

# Diaphragm Valves

## ■ For Ultra High Purity (UHP): AP Series

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Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

Vacuum Generators

Flow Switches

Technical Data/  
Glossary of Terms

Precautions

# Diaphragm Valve for Ultra High Purity

Air operated type  
(For low pressure)

## AP3500 Series

- Suitable for UHP gas supply line
- Body material : 316L SS secondary remelt
- Pneumatically actuated normally closed or normally open
- LOTO option available as an option (AP3540)
- Indicator switch available as an option (AP3550, AP3580)



RoHS

How to Order (See p. 250 for ordering syntax)

(Inlet) (Outlet)

**AP 3 540 S 2PW FV4 FV4**

**Size**

Code	Cv
3	0.29

**Model**

Code	Status	Maximum operating pressure
542		125 psig (0.9 MPa)
540	Normally closed (N.C.)	145 psig (1.0 MPa)
550		300 psig (2.1 MPa)
580	Normally open (N.O.)	250 psig (1.7 MPa)

**Material**

Code	Body material
S	316L SS secondary remelt
H	Ni-Cr-Mo alloy

**Surface finish**

Code	Surface finish Ra max
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)
V	7 μin. (0.18 μm)
X	5 μin. (0.13 μm)

**Ports**

Code	Ports
2PW	2 ports

\*) Optional porting and porting configurations available. Refer to the AP series optional porting configuration on page 179.

**Connections (Inlet, Outlet)**

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

**Option (AP3550 and AP3580 only)**

Code	Specification
No code	—
IPC	N.C. Indicator switch
IPO	N.O. Indicator switch

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide *3)

\*3) Not available with H material.

**Face to face dimension**

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm) *1)*2)

\*1) Only applies to S material with TW4 or TW6 connections.  
\*2) AP3542 has limited clearance for orbital weld head.

## Specifications

Operating Parameters	AP3542	AP3540	AP3550	AP3580
Status	Normally closed (N.C.)			Normally open (N.O.)
Gas	Select compatible materials of construction for the gas			
Operating pressure	Vacuum to 125 psig (0.9 MPa)	Vacuum to 145 psig (1.0 MPa) *1)	Vacuum to 300 psig (2.1 MPa)	Vacuum to 250 psig (1.7 MPa)
Proof pressure	1.5 times the maximum operating pressure			
Burst pressure	3 times the maximum operating pressure			
Ambient and operating temperature	-10 to 71°C (No freezing) *2)			
Cv	0.29			
Leak rate	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s			
Inboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *3)			
Outboard leakage	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s			
Across the seat leak	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s			
Surface finish	Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)			
Connections	Face seal, Tube weld			
Actuation pressure	60 to 110 psig (0.4 to 0.76 MPa) 70 to 110 psig (0.48 to 0.76 MPa)			
Actuation port connection	M5 x 0.8	NPT 1/8 inch	M5 x 0.8	NPT 1/8 inch
Actuation port location	Top		Side (360° rotatable)	Top
Installation	Bottom mount			
Internal volume	0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )			
Weight	0.28 kg *4)	0.68 kg *4)	0.82 kg *4)	0.68 kg *4)
LOTO (Lockout)	N/A	Option (Part number: AP PL 210) *5)	N/A	

- \*1) Vacuum to 125 psig (0.9 MPa) for Polyimide seat.  
\*2) Max. 90°C for Polyimide seat.  
\*3) Tested with Helium gas inlet pressure 125 psig (0.9 MPa).  
\*4) Weight, including individual boxed weight, may vary depending on connections or options.  
\*5) Refer to the specification for options. (P.227)

## Indicator Switch (Option) Specification

Code	IPO	IPC
Contacts	NO (When the valve is open, the circuit is closed.)	NC (When the valve is closed, the circuit is closed.)
Minimum operating current	5 mA	
Power supply voltage	10 to 36 VDC	
Rated isolation voltage	75 VDC	
Rated operating current	100 mA	
Rated operating voltage	24 VDC	
Maximum load current	100 A	
Ambient temperature range	-25 to 70°C	
Function indicator lamp	Available	
Cable	Polyurethane cable 2 cores, 2 m	PVC cable 2 cores, 3 m
Wiring diagram		

## Wetted Parts Material

Wetted Parts	S	H
Body	316L SS secondary remelt	Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation	Electropolish
Diaphragm	Ni-Co alloy	
Seat	PCTFE (Option: Polyimide)	PCTFE

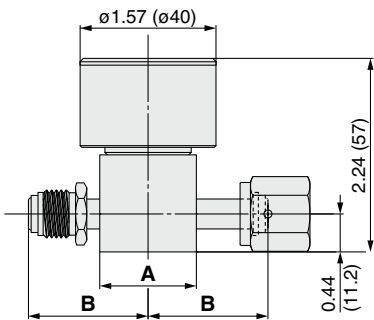
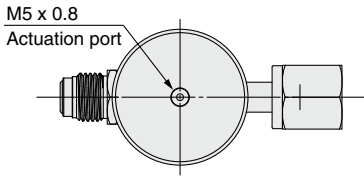
# Diaphragm Valve for Ultra High Purity **AP3500 Series**

Air operated type (For low pressure)

## Dimensions

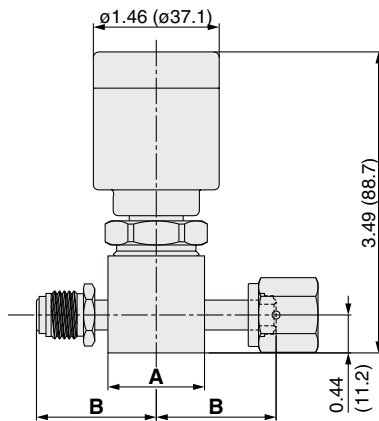
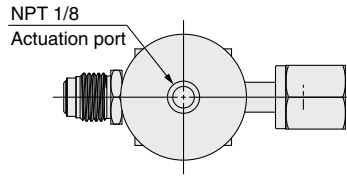
inch (mm)

### AP3542



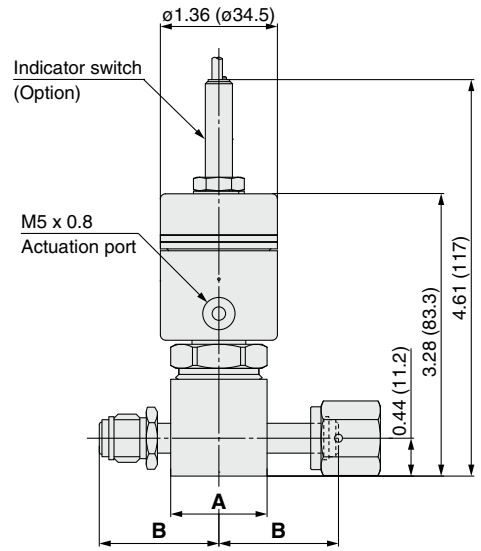
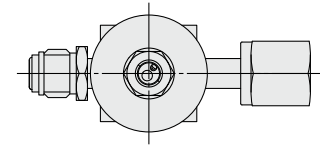
Connections: MV□, FV□

### AP3540



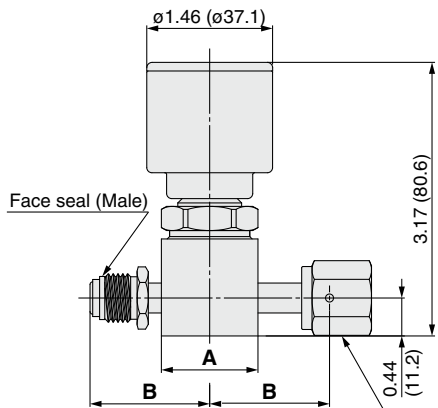
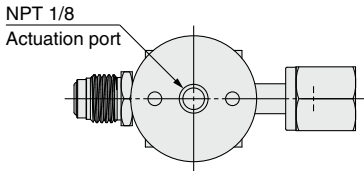
Connections: MV□, FV□

### AP3550

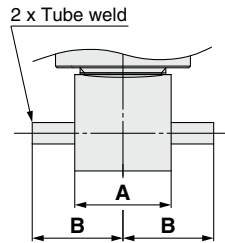


Connections: MV□, FV□

### AP3580

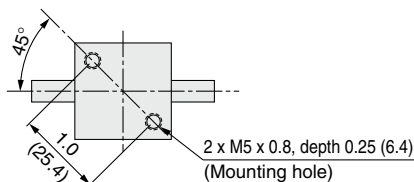


Connections: MV□, FV□

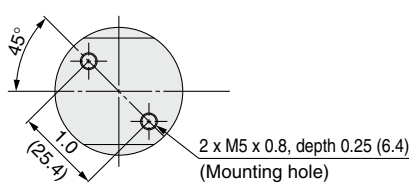


Connections: TW□

### Bottom view



Material code: S



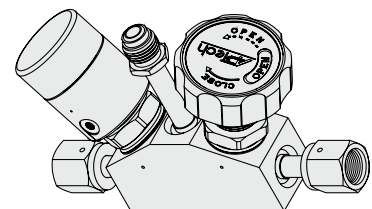
Material code: H

Material	Connections	A		B	
		inch	(mm)	inch	(mm)
S	FV4	1.12 sq.	□28.4	1.39	(35.3)
	MV4			1.06	(26.9)
	TW4			1.93	(49.0)
	MV6			1.325	(33.7)
	TW6			1.45	(36.8)
H	FV4	1.24 dia.	○31.5	1.08	(27.4)
	MV4			1.93	(49.0)
	TW4			1.325	(33.7)
	FV6			1.45	(36.8)
	MV6			1.325	(33.7)



### Made to Order

Products such as three port dual valves can be made with monoblock configurations. Please contact SMC for details.



Recommendations

Regulators

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SL

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Diaphragm Valves

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Check Valves

Vacuum Generators

Flow Switches

Technical Data/  
Glossary of Terms

Precautions

# Diaphragm Valve for Ultra High Purity

Air operated type  
(For low pressure)

## AP4500 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- Pneumatically actuated normally closed or normally open
- LOTO option available as an option (AP4540)
- Indicator switch available as an option (AP4550, AP4580)



RoHS

How to Order (See p. 250 for ordering syntax)

(Inlet) (Outlet)

**AP 4 540 S 2PW FV6 FV6**

**Size**

Code	Cv
4	0.5

**Model**

Code	Status	Maximum operating pressure
542		125 psig (0.9 MPa)
540	Normally closed (N.C.)	125 psig (0.9 MPa)
550		300 psig (2.1 MPa)
580	Normally open (N.O.)	250 psig (1.7 MPa)

**Material**

Code	Body material
S	316L SS secondary remelt
H	Ni-Cr-Mo alloy

**Surface finish**

Code	Surface finish Ra max
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)
V	7 μin. (0.18 μm)
X	5 μin. (0.13 μm)

**Ports**

Code	Ports
2PW	2 ports

\*) Optional porting and porting configurations available. Refer to the AP series optional porting configuration on page 179.

**Connections (Inlet, Outlet)**

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

**Option (AP4550 and AP4580 only)**

Code	Specification
No code	—
IPC	N.C. indicator switch
IPO	N.O. indicator switch

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide *3)

\*3) Not available with H material.

**Face to face dimension**

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm) *1)*2)

\*1) Only applies to S material with TW4 or TW6 connections.  
\*2) Not available with AP4542.

## Specifications

Operating Parameters	AP4542	AP4540	AP4550	AP4580
Status	Normally closed (N.C.)			Normally open (N.O.)
Gas	Select compatible materials of construction for the gas			
Operating pressure	Vacuum to 125 psig (0.9 MPa)	Vacuum to 300 psig (2.1 MPa)	Vacuum to 300 psig (2.1 MPa)	Vacuum to 250 psig (1.7 MPa)
Proof pressure	1.5 times the maximum operating pressure			
Burst pressure	3 times the maximum operating pressure			
Ambient and operating temperature	-10 to 71°C (No freezing) *1)			
Cv	0.5			
Leak rate	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s			
Inboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)			
Outboard leakage	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s			
Across the seat leak	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s			
Surface finish	Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)			
Connections	Face seal, Tube weld			
Actuation pressure	60 to 110 psig (0.4 to 0.76 MPa) 70 to 110 psig (0.48 to 0.76 MPa)			
Actuation port connection	M5 x 0.8	NPT 1/8 inch	M5 x 0.8	NPT 1/8 inch
Actuation port location	Top		Side (360° rotatable)	Top
Installation	Bottom mount			
Internal volume	0.12 in <sup>3</sup> (1.94 cm <sup>3</sup> )			
Weight	0.28 kg *3)	0.68 kg *3)	0.82 kg *3)	0.68 kg *3)
LOTO (Lockout)	N/A	Option (Part number: AP PL 210) *4)	N/A	N/A

- \*1) Max. 90°C for Polyimide seat.  
\*2) Tested with Helium gas inlet pressure 125 psig (0.9 MPa).  
\*3) Weight, including individual boxed weight, may vary depending on connections or options.  
\*4) Refer to the specification for options. (P.227)

## Indicator Switch (Option) Specification

Code	IPO	IPC
Contacts	NO (When the valve is open, the circuit is closed.)	NC (When the valve is closed, the circuit is closed.)
Minimum operating current	5 mA	
Power supply voltage	10 to 36 VDC	
Rated isolation voltage	75 VDC	
Rated operating current	100 mA	
Rated operating voltage	24 VDC	
Maximum load current	100 A	
Ambient temperature range	-25 to 70°C	
Function indicator lamp	Available	
Cable	Polyurethane cable 2 cores, 2 m	PVC cable 2 cores, 3 m
Wiring diagram		

## Wetted Parts Material

Wetted Parts	S	H
Body	316L SS secondary remelt	Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation	Electropolish
Diaphragm	Ni-Co alloy	
Seat	PCTFE (Option: Polyimide)	PCTFE

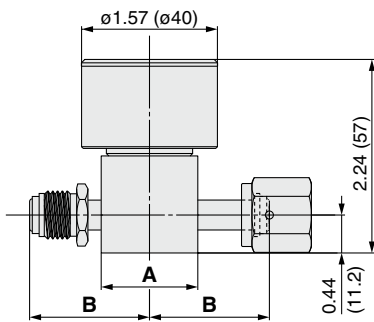
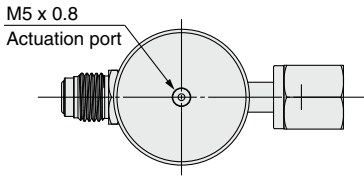
# Diaphragm Valve for Ultra High Purity **AP4500 Series**

Air operated type (For low pressure)

## Dimensions

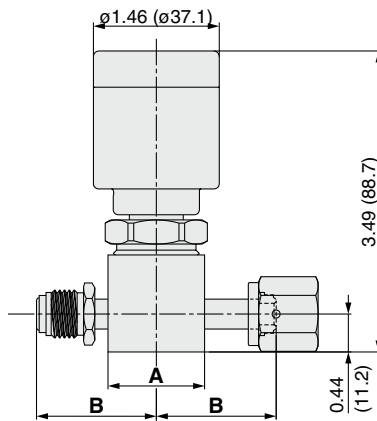
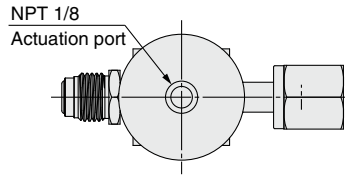
inch (mm)

### AP4542



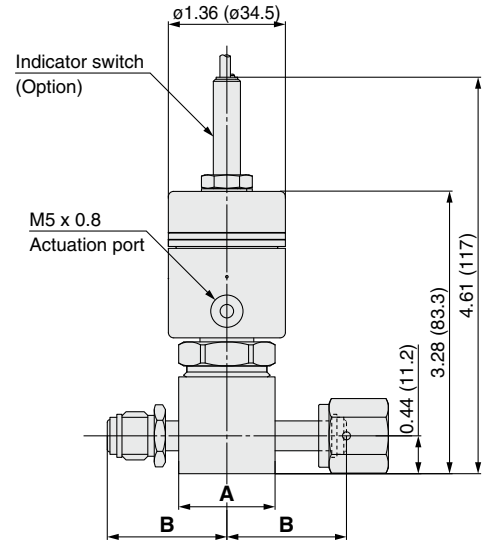
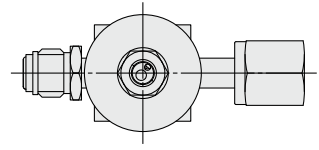
Connections: MV□, FV□

### AP4540



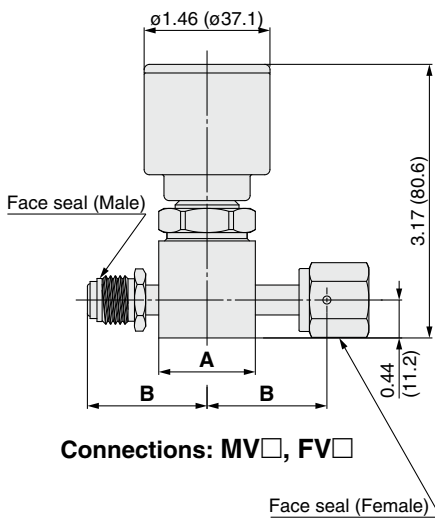
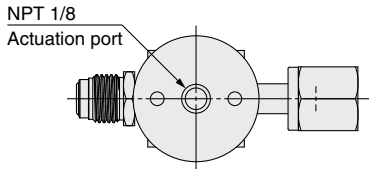
Connections: MV□, FV□

### AP4550

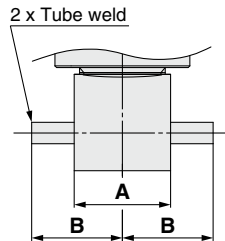


Connections: MV□, FV□

### AP4580

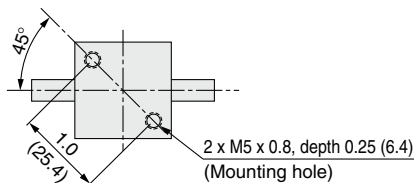


Connections: MV□, FV□

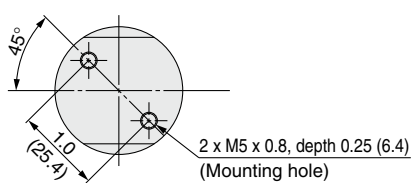


Connections: TW□

### Bottom view



Material code: S



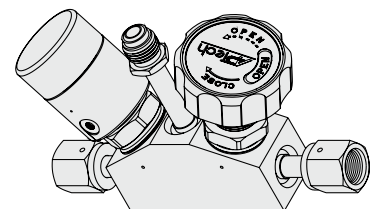
Material code: H

Material	Connections	A		B	
		inch	(mm)	inch	(mm)
S	FV4	1.12 sq.	(□28.4)	1.39	(35.3)
	MV4			1.06	(26.9)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6				
H	FV4	1.24 dia.	(ø31.5)	1.45	(36.8)
	MV4			1.08	(27.4)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6				



### Made to Order

Products such as three port dual valves can be made with monoblock configuration. Please contact SMC for details.



Recommendations

Regulators

AP

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AZ

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Diaphragm Valves

AP

AZ

AK

Check Valves

Vacuum Generators

Flow Switches

Technical Data/  
Glossary of Terms

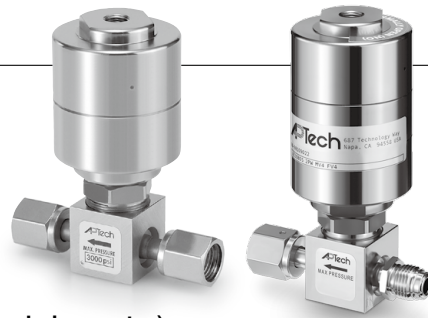
Precautions

# Diaphragm Valve for Ultra High Purity

Air operated type  
(For high pressure)

## AP3000 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- Pneumatically actuated normally closed or normally open
- High pressure type: Max. 4500 psig (31 MPa)
- LOTO option available as an option
- Indicator switch available as an option



RoHS

How to Order (See p. 250 for ordering syntax)

(Inlet) (Outlet)

**AP30 00 S 2PW FV4 FV4**

**Model**

Code	Status	Max. operating pressure	Cv
00	Normally closed (N.C.)	3000 psig (20.7 MPa)	0.23
02		3700 psig (25.5 MPa)	0.28
04		4500 psig (31.0 MPa)	0.23
07	Normally open (N.O.)	3000 psig (20.7 MPa)	0.23
80		3000 psig (20.7 MPa)	0.23

**Material**

Code	Body material
S	316L SS secondary remelt
H	Ni-Cr-Mo alloy *1)

\*1) Not available with AP3004 and AP3007.

**Surface finish**

Code	Surface finish Ra max
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)
V	7 μin. (0.18 μm)
X	5 μin. (0.13 μm)

**Connections (Inlet, Outlet)**

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female) *2)
MV6	3/8 inch face seal (Male) *2)
TW6	3/8 inch tube weld *2)

\*2) Not available with AP3004 and AP3007.

**Ports**

Code	Ports
2PW	2 ports

\*3) Optional porting and porting configurations available. Refer to the AP series optional porting configuration on page 179.

**Face to face dimension \*3)**

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm)

\*3) Only applies to S material with TW4 or TW6 connections.

**Option**

Code	Specification
No code	—
IS	Indicator switch

**Seat material**

Code	Material	Model				
		3000	3002	3004	3007	3080
No code	PCTFE (Standard)	●	●	●	—	●
VS	Polyimide *4)	●	●	●	●	●
PK	PEEK *4)	—	—	●	●	—

\*4) Not available with H material.

## Specifications

Operating Parameters		AP3000	AP3002	AP3004	AP3007	AP3080
<b>Status</b>		Normally closed (N.C.)				Normally open (N.O.)
<b>Gas</b>		Select compatible materials of construction for the gas				
<b>Operating pressure</b>		Vacuum to 3000 psig (20.7 MPa)		Vacuum to 3700 psig (25.5 MPa)	Vacuum to 4500 psig (31 MPa)	Vacuum to 3000 psig (20.7 MPa)
<b>Proof pressure</b>		1.5 times the maximum operating pressure				
<b>Burst pressure</b>		3 times the maximum operating pressure				
<b>Ambient and operating temperature</b>		-10 to 71°C (No freezing) *1)		-10 to 49°C (No freezing)	-10 to 60°C (No freezing)	-10 to 71°C (No freezing) *1)
<b>Cv</b>		0.23	0.28	0.23		
<b>Leak rate</b>	<b>Inboard leakage</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s				
	<b>Outboard leakage</b>	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)				
<b>Across the seat leak</b>		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s				
<b>Surface finish</b>		Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)				
<b>Connections</b>		Face seal, Tube weld				
<b>Actuation pressure</b>		70 to 110 psig (0.48 to 0.76 MPa)				
<b>Actuation port connection</b>		NPT 1/8 inch				
<b>Actuation port location</b>		Top				
<b>Installation</b>		Bottom mount				
<b>Internal volume</b>		0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )				
<b>Weight</b>		1.27 kg *3)				
<b>LOTO (Lockout)</b>		Option (Part number: AP PL 210) *4)				N/A

\*1) Max. 90°C for Polyimide seat.

\*2) Tested with Helium gas inlet pressure 1000 psig (6.9 MPa).

\*3) Weight, including individual boxed weight, may vary depending on connections or options.

\*4) Refer to the specification for options. (P.227)

## Indicator Switch (Option) Specification

Code	IS	
<b>Switch type</b>	SPDT	
<b>Rated voltage</b>	Max. 30 VDC	
<b>Contact capacity</b>	Max. 3 VA	
<b>Switching current</b>	Max. 0.2 A	
<b>Carrying current</b>	Max. 0.5 A	
<b>Cable</b>	<b>Lead wire</b>	AWG 24
	<b>Cable length</b>	3 m
	<b>Color (Lead wire)</b>	Blue: Common line Brown: NC (When the valve is closed, the circuit is closed.) Black: NO (When the valve is open, the circuit is closed.)

## Wetted Parts Material

Wetted Parts	S	H	
Body	316L SS secondary remelt	Ni-Cr-Mo alloy	
Surface finish	Electropolish + Passivation	Electropolish	
Diaphragm	Ni-Co alloy		
Seat	AP3000, 3002, 3080	PCTFE (Option: Polyimide)	PCTFE
	AP3004	PCTFE (Option: Polyimide, PEEK)	—
	AP3007	Polyimide or PEEK	—

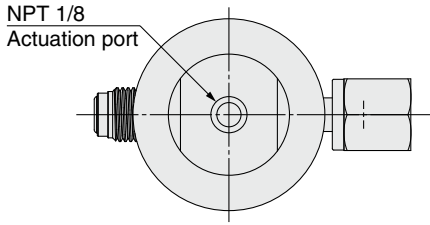
# Diaphragm Valve for Ultra High Purity **AP3000 Series**

Air operated type (For high pressure)

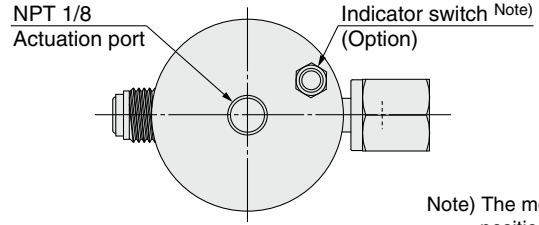
## Dimensions

inch (mm)

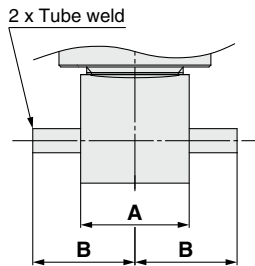
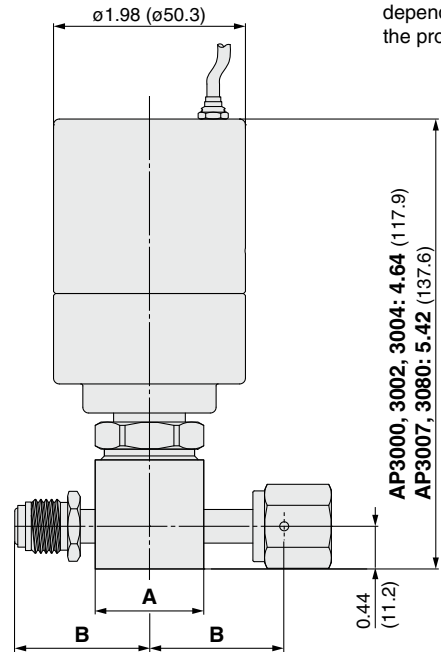
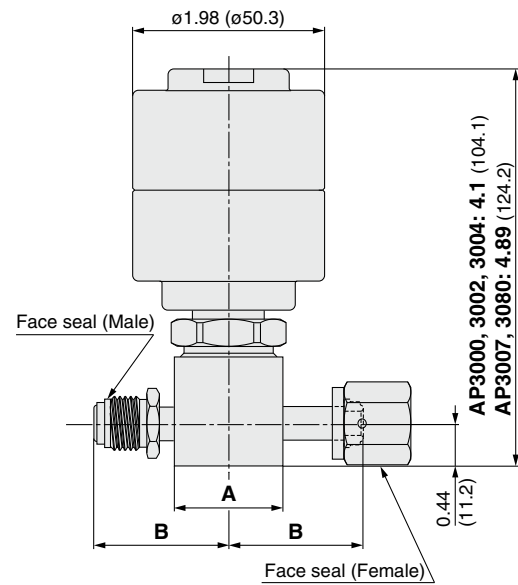
### AP3000 AP3002, AP3080, AP3004, AP3007



### Indicator switch



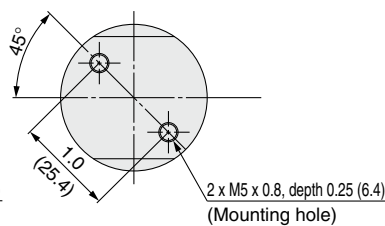
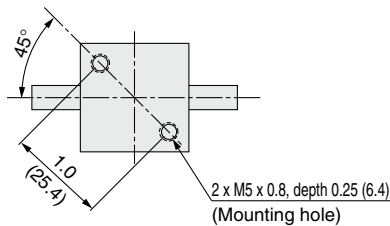
Note) The mounting position varies depending on the product.



Connections: TW□

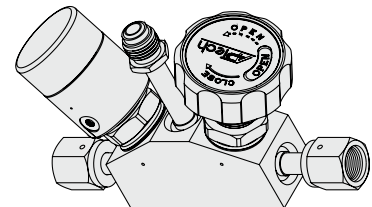
Material	Connections	A		B	
		inch	(mm)	inch	(mm)
S	FV4	1.12 sq.	(□28.4)	1.39	(35.3)
	MV4			1.06	(26.9)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6			1.325	(33.7)
H	FV4	1.24 dia.	(ø31.5)	1.45	(36.8)
	MV4			1.08	(27.4)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6			1.325	(33.7)

### Bottom view



**Made to Order**

Products such as three port dual valves can be made with monoblock configurations. Please contact SMC for details.



Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

AP

AK

Check Valves

AP

AK

Check Valves

AP

AK

Check Valves

AP

AK

Check Valves

AP

AK

Check Valves

AP

AK

Check Valves

# Diaphragm Valve for Ultra High Purity

Air operated type  
(For high pressure)

## AP4000 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- Pneumatically actuated normally closed
- High pressure type: Max. 3000 psig (20.7 MPa)
- Indicator switch available as an option



RoHS

### How to Order (See p. 250 for ordering syntax)

**AP40 00 S 2PW FV4 FV4**

(Inlet) (Outlet)

**Model**

Code	Status	Max. operating pressure
00	Normally closed (N.C.)	3000 psig (20.7 MPa)

**Material**

Code	Body material
S	316L SS secondary remelt
H	Ni-Cr-Mo alloy

**Surface finish**

Code	Surface finish Ra max
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)
V	7 μin. (0.18 μm)
X	5 μin. (0.13 μm)

**Ports**

Code	Ports
2PW	2 ports

\*) Optional porting and porting configurations available. Please refer to page 179.

**Connections (Inlet, Outlet)**

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

**Option**

Code	Specification
No code	—
IS	Indicator switch

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide *2)

\*2) Not available with H material.

**Face to face dimension**

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm) *1)

\*1) Only applies to S material with TW4 or TW6 connections.

## Specifications

Operating Parameters		AP4000	
<b>Status</b>		Normally closed (N.C.)	
<b>Gas</b>		Select compatible materials of construction for the gas	
<b>Operating pressure</b>		Vacuum to 3000 psig (20.7 MPa)	
<b>Proof pressure</b>		1.5 times the maximum operating pressure	
<b>Burst pressure</b>		3 times the maximum operating pressure	
<b>Ambient and operating temperature</b>		-10 to 71°C (No freezing) *1)	
<b>Cv</b>		0.35	
<b>Leak rate</b>	<b>Inboard leakage</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s	
	<b>Outboard leakage</b>	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)	
<b>Across the seat leak</b>		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s	
<b>Surface finish</b>		Ra max 15 μin. (0.4 μm)	Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)
<b>Connections</b>		Face seal, Tube weld	
<b>Actuation pressure</b>		70 to 110 psig (0.48 to 0.76 MPa)	
<b>Actuation port connection</b>		NPT 1/8 inch	
<b>Actuation port location</b>		Top	
<b>Installation</b>		Bottom mount	
<b>Internal volume</b>		0.12 in <sup>3</sup> (1.94 cm <sup>3</sup> )	
<b>Weight</b>		1.27 kg *3)	

\*1) Max. 90°C for Polyimide seat.

\*2) Tested with Helium gas inlet pressure 1000 psig (6.9 MPa).

\*3) Weight, including individual boxed weight, may vary depending on connections or options.

## Indicator Switch (Option) Specification

Code	IS	
<b>Switch type</b>	SPDT	
<b>Rated voltage</b>	Max. 30 VDC	
<b>Contact capacity</b>	Max. 3 VA	
<b>Switching current</b>	Max. 0.2 A	
<b>Carrying current</b>	Max. 0.5 A	
<b>Cable</b>	<b>Lead wire</b>	AWG 24
	<b>Cable length</b>	3 m
	<b>Color (Lead wire)</b>	Blue: Common line Brown: NC (When the valve is closed, the circuit is closed.) Black: NO (When the valve is open, the circuit is closed.)

## Wetted Parts Material

Wetted Parts	S	H
Body	316L SS secondary remelt	Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation	Electropolish
Diaphragm	Ni-Co alloy	
Seat	PCTFE (Option: Polyimide)	PCTFE



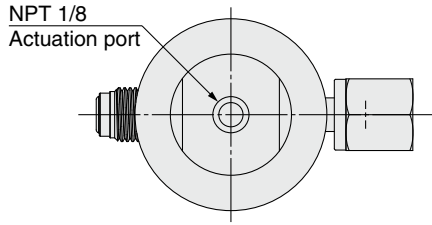
# Diaphragm Valve for Ultra High Purity **AP4000 Series**

Air operated type (For high pressure)

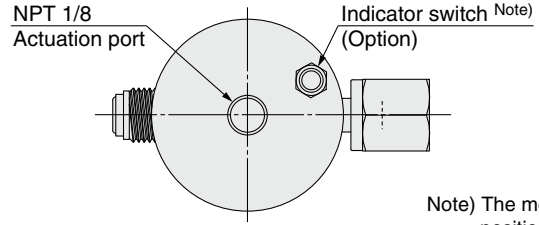
## Dimensions

inch (mm)

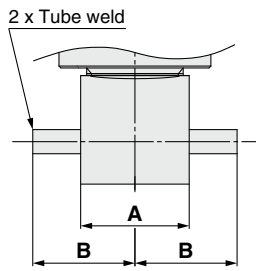
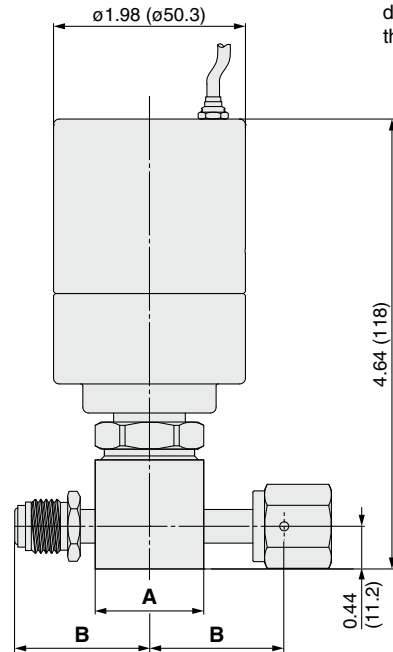
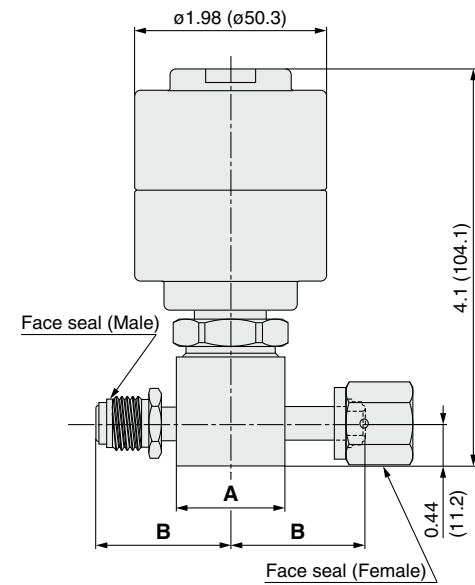
### AP4000



### Indicator switch

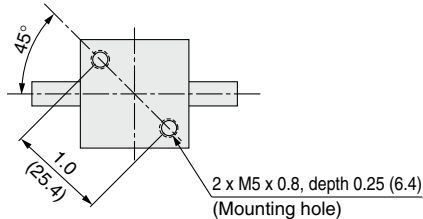


Note) The mounting position varies depending on the product.

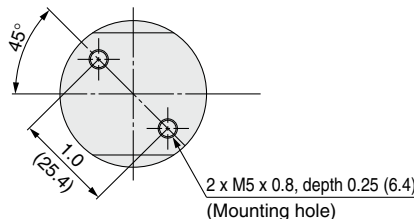


Connections: TW□

### Bottom view



Material code: S



Material code: H

Material	Connections	A		B	
		inch	(mm)	inch	(mm)
S	FV4	1.12 sq.	□28.4	1.39	(35.3)
	MV4			1.06	(26.9)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6			1.325	(33.7)
H	FV4	1.24 dia.	ø31.5	1.45	(36.8)
	MV4			1.08	(27.4)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6			1.325	(33.7)

Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

Vacuum Generators

Flow Switches

Technical Data/  
Glossary of Terms

Precautions

# Diaphragm Valve for Ultra High Purity

Air operated type

## AP4141 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt



RoHS

How to Order (See p. 250 for ordering syntax)

AP41 41 S [ ] 2PW MV8 MV8 [ ] [ ] [ ]

Port Number  
① ② ③ ④

**Model**

Code	Max. operating pressure	Cv
41	250 psig (1.7 MPa)	0.8

**Material**

Code	Body material
S	316L SS secondary remelt

**Surface finish**

Code	Surface finish Ra max
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)
V	7 μin. (0.18 μm)
X	5 μin. (0.13 μm)

**Ports (Refer to the porting configuration.)**

Code	Ports
2PW	2 ports
3PWD	3 ports
3PWE	3 ports
3PWF	3 ports
4PWW	4 ports

**Connections (Refer to the porting configuration.)**

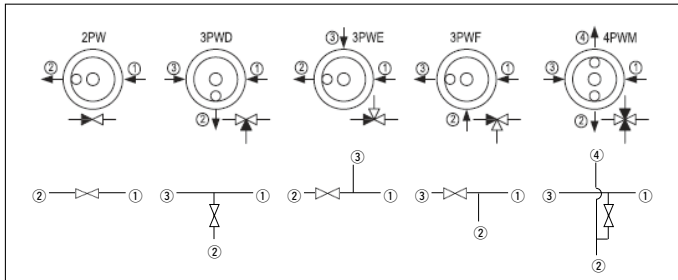
Code	Connections
No code	No port
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW6	3/8 inch tube weld
FV8	1/2 inch face seal (Female)
MV8	1/2 inch face seal (Male)
TW8	1/2 inch tube weld

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

### Porting Configuration

(The porting configurations viewed from the actuator side are shown.)



### Sample Order Number

Port	①	②	③	④
AP4141S	2PW	MV8	MV8	
	3PWD	MV8	MV8	

### Specifications

Operating Parameters		AP4141
<b>Status</b>		Normally closed (N.C.)
<b>Gas</b>		Select compatible materials of construction for the gas
<b>Operating pressure</b>		Vacuum to 250 psig (1.7 MPa)
<b>Proof pressure</b>		1.5 times the maximum operating pressure
<b>Burst pressure</b>		3 times the maximum operating pressure
<b>Ambient and operating temperature</b>		-10 to 71°C (No freezing) *1)
<b>Cv</b>		0.8
<b>Leak rate</b>	<b>Inboard leakage</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s
	<b>Outboard leakage</b>	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s
<b>Across the seat leak</b>		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s
<b>Surface finish</b>		Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)
<b>Connections</b>		Face seal, Tube weld
<b>Actuation pressure</b>		70 to 110 psig (0.48 to 0.76 MPa)
<b>Actuation port connection</b>		M5 x 0.8
<b>Actuation port location</b>		Side
<b>Installation</b>		Bottom mount
<b>Internal volume</b>		0.37 in <sup>3</sup> (6.1 cm <sup>3</sup> )

\*1) Max. 90°C for Polyimide seat.

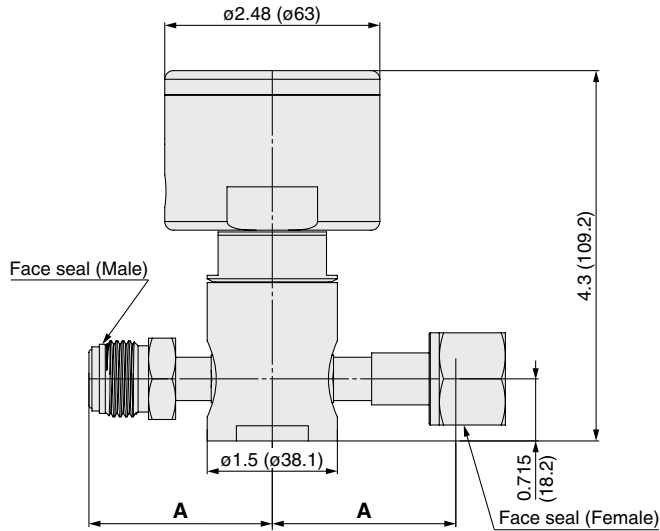
### Wetted Parts Material

Wetted Parts	S
Body	316L SS secondary remelt
Surface finish	Electropolish + Passivation
Diaphragm	Ni-Co alloy
Seat	PCTFE (Option: Polyimide)

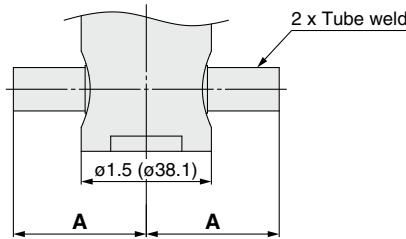
### Dimensions

inch (mm)

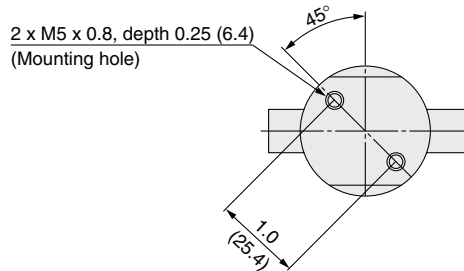
#### AP4141



Connections: MV□, FV□



Connections: TW□



Connections	A	
	inch	(mm)
FV4	1.59	(40.4)
MV4		
TW6	1.49	(37.8)
FV8	2.12	(53.8)
MV8		
TW8	1.53	(38.9)

# Diaphragm Valve for Ultra High Purity

**Air operated type**  
(For high pressure and high flow)

## AP3130 & 3113 Series



RoHS

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- Pneumatically actuated normally closed
- High pressure type: 20.7 MPa and 9 MPa
- Designed for bulk specialty gas (BSGS) delivery
- LOTO option available as an option

**How to Order** (See p. 250 for ordering syntax)

(Inlet) (Outlet)

**AP31 30 S 2PW MV8 MV8**

**Model**

Code	Maximum operating pressure	Cv
13	1300 psig (9.0 MPa)	1.0
30	3000 psig (20.7 MPa) *1)	0.7

\*1) 2400 psig (16.5 MPa) for connection size 3/4 inch.

**Material**

Code	Body material
S	316L SS secondary remelt
H	Ni-Cr-Mo alloy *2)

\*2) Special export controls apply to Ni-Cr-Mo alloy body with 1/2 inch or greater size connection.

**Surface finish**

Code	Surface finish Ra max
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)

**Ports**

Code	Ports
2PW	2 ports

**Option**

Code	Specification
No code	—
IS	Indicator switch

**Connections (Inlet, Outlet)**

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW6	3/8 inch tube weld
FV8	1/2 inch face seal (Female)
MV8	1/2 inch face seal (Male)
TW8	1/2 inch tube weld
FV12	3/4 inch face seal (Female) *3)
MV12	3/4 inch face seal (Male) *3)
TW12	3/4 inch tube weld

\*3) Prepare a suitable mating fitting with a rated pressure.

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide *4)

\*4) Not available with H material.

### Specifications

Operating Parameters		AP3113	AP3130
<b>Status</b>		Normally closed (N.C.)	
<b>Gas</b>		Select compatible materials of construction for the gas	
<b>Operating pressure</b>		Vacuum to 1300 psig (9.0 MPa)	Vacuum to 3000 psig (20.7 MPa)
<b>Proof pressure</b>		1.5 times the maximum operating pressure	
<b>Burst pressure</b>		3 times the maximum operating pressure	
<b>Ambient and operating temperature</b>		-10 to 65°C (No freezing) *1)	
<b>Cv *2)</b>		1.0	0.7
<b>Leak rate</b>	<b>Inboard leakage</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s	
	<b>Outboard leakage</b>	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *3)	
<b>Across the seat leak</b>		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s	
<b>Surface finish</b>		Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm)	
<b>Connections</b>		Face seal, Tube weld	
<b>Actuation pressure</b>		70 to 110 psig (0.48 to 0.76 MPa)	
<b>Actuation port connection</b>		NPT 1/8 inch	
<b>Actuation port location</b>		Top	
<b>Installation</b>		Bottom mount	
<b>Internal volume</b>		0.36 in <sup>3</sup> (6.0 cm <sup>3</sup> ) for body	
<b>Weight</b>		1.27 kg *4)	
<b>LOTO (Lockout)</b>		Option (Part number: AP PL 210) *5)	

\*1) Max. 90°C for Polyimide seat.

\*2) Figure of 1/2 inch connection.

\*3) Tested with Helium gas inlet pressure 500 psig (3.5 MPa).

\*4) Weight, including individual boxed weight, may vary depending on connections or options.

\*5) Refer to the specification for options. (P.227)

### Indicator Switch (Option) Specification

Code	IS	
<b>Switch type</b>	SPDT	
<b>Rated voltage</b>	Max. 30 VDC	
<b>Contact capacity</b>	Max. 3 VA	
<b>Switching current</b>	Max. 0.2 A	
<b>Carrying current</b>	Max. 0.5 A	
<b>Cable</b>	<b>Lead wire</b>	AWG 24
	<b>Cable length</b>	3 m
	<b>Color (Lead wire)</b>	Blue: Common line Brown: NC (When the valve is closed, the circuit is closed.) Black: NO (When the valve is open, the circuit is closed.)

### Wetted Parts Material

Wetted Parts	S	H
Body	316L SS secondary remelt	Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation	Electropolish
Spring	316 SS	Ni-Cr-Fe alloy
Diaphragm	Ni-Co alloy	
Poppet	316L SS	Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide)	PCTFE

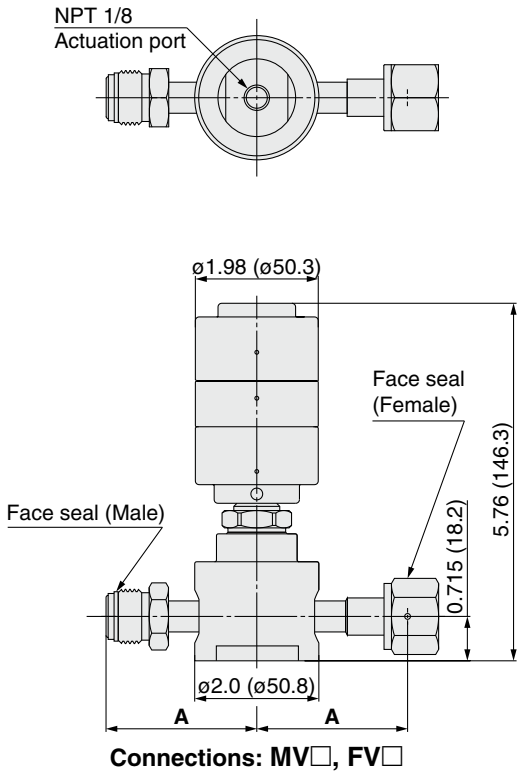
# Diaphragm Valve for Ultra High Purity **AP3130 & 3113 Series**

Air operated type (For high pressure and high flow)

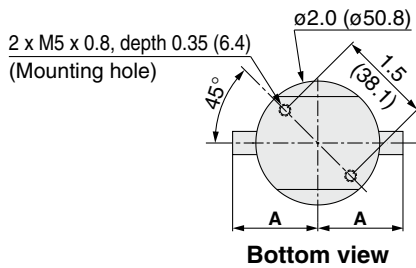
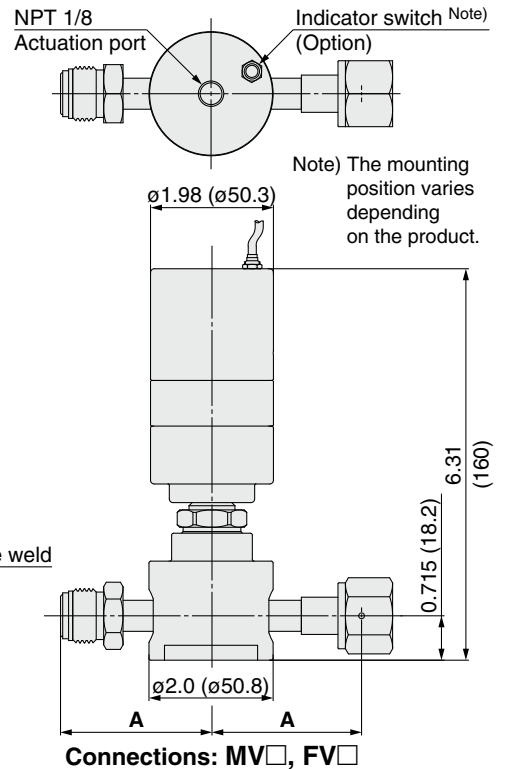
## Dimensions

inch (mm)

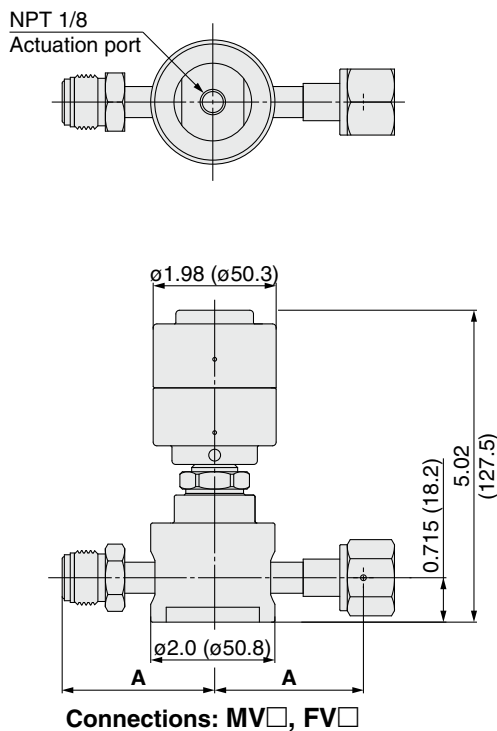
### AP3113



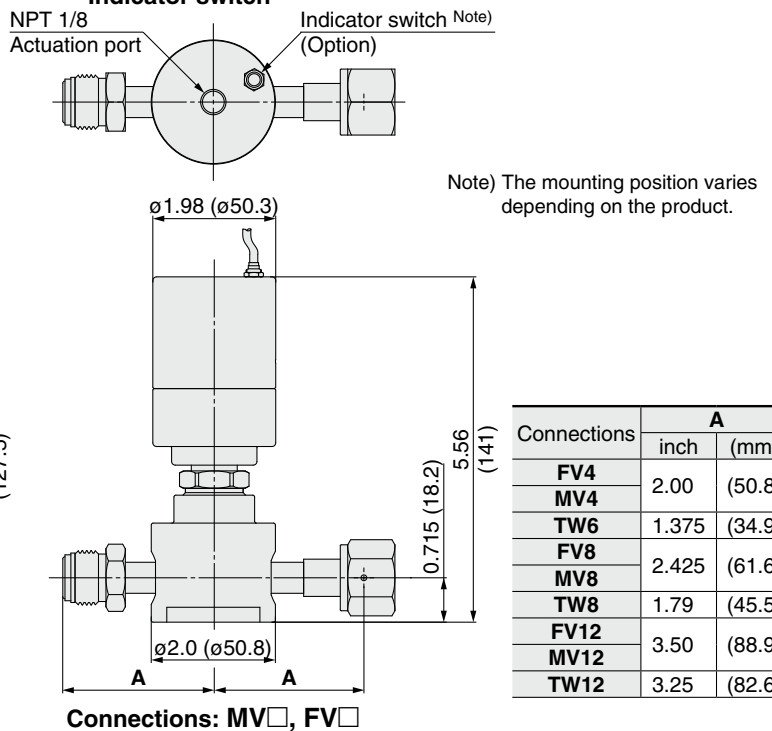
### Indicator switch



### AP3130



### Indicator switch



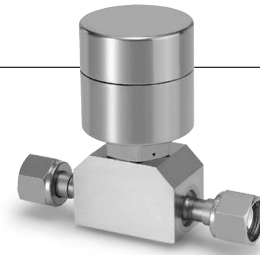
Connections	A	
	inch	(mm)
FV4	2.00	(50.8)
MV4	2.00	(50.8)
TW6	1.375	(34.9)
FV8	2.425	(61.6)
MV8	2.425	(61.6)
TW8	1.79	(45.5)
FV12	3.50	(88.9)
MV12	3.50	(88.9)
TW12	3.25	(82.6)

# Diaphragm Valve for Ultra High Purity

Air operated type  
(For high flow)

## AP3700 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- Pneumatically actuated normally closed or normally open
- Purge ports and monoblock configurations available
- Indicator switch available as an option



RoHS

How to Order (See p. 250 for ordering syntax)

(Inlet) (Outlet)

**AP37 00 S [ ] MV8 MV8 00 [ ] [ ] [ ] [ ]**

**Model**

Code	Status
00	Normally closed (N.C.)
08	Normally open (N.O.)

**Material**

Code	Body material
S	316L SS secondary remelt

**Surface finish**

Code	Surface finish Ra max
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)
V	7 μin. (0.18 μm)
X	5 μin. (0.13 μm)

**Porting Configuration**

**Connections (Inlet ①, Outlet ②)**

Code	Connections
TW6	3/8 inch tube weld
FV8	1/2 inch face seal (Female)
MV8	1/2 inch face seal (Male)
TW8	1/2 inch tube weld
FV12	3/4 inch face seal (Female)
MV12	3/4 inch face seal (Male)
TW12	3/4 inch tube weld

**Option**

Code	Specification
No code	—
IPC	N.C. indicator switch
IPO	N.O. indicator switch

**Purge port option**

Code	Specification
No code	—
C	Capped purge port

**Diaphragm material**

Code	Material
No code	316L SS (Standard)
HD	Ni-Cr-Mo alloy

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

**Purge port \*1)**

Code	Inlet ③	Outlet ④
00	None	None
M0	Available	None
0B	None	Available
MB	Available	Available

\*1) 1/4 inch face seal (Male) as standard.

## Specifications

Operating Parameters		AP3700	AP3708
Status		Normally closed (N.C.)	Normally open (N.O.)
Gas			
Select compatible materials of construction for the gas			
Operating pressure		Vacuum to 250 psig (1.7 MPa)	
Proof pressure		1.5 times the maximum operating pressure	
Burst pressure		3 times the maximum operating pressure	
Ambient and operating temperature		-10 to 71°C (No freezing) *1)	
Cv		2.8	
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s	
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)	
Across the seat leak		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s	
Surface finish		Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)	
Connections		Face seal, Tube weld	
Actuation pressure		80 to 100 psig (0.55 to 0.7 MPa)	
Actuation port connection		M5 x 0.8	
Actuation port location		Side (360° rotatable)	
Installation		Bottom mount	
Internal volume		0.76 in <sup>3</sup> (12.52 cm <sup>3</sup> )	
Weight		1.54 kg *3)	

\*1) Max. 90°C for Polyimide seat.

\*2) Tested with Helium gas inlet pressure 125 psig (0.9 MPa).

\*3) Weight, including individual boxed weight, may vary depending on connections or options.

## Indicator Switch (Option) Specification

Code	IPO	IPC
Contacts	NO (When the valve is open, the circuit is closed.)	NC (When the valve is closed, the circuit is closed.)
Minimum operating current	5 mA	
Power supply voltage	10 to 36 VDC	
Rated isolation voltage	75 VDC	
Rated operating current	100 mA	
Rated operating voltage	24 VDC	

Code	IPO	IPC
Maximum load current	100 A	
Ambient temperature range	-25 to 70°C	
Function indicator lamp	Available	
Cable	Polyurethane cable 2 cores, 2 m	PVC cable 2 cores, 3 m
Wiring diagram		

# Diaphragm Valve for Ultra High Purity **AP3700 Series**

Air operated type (For high flow)

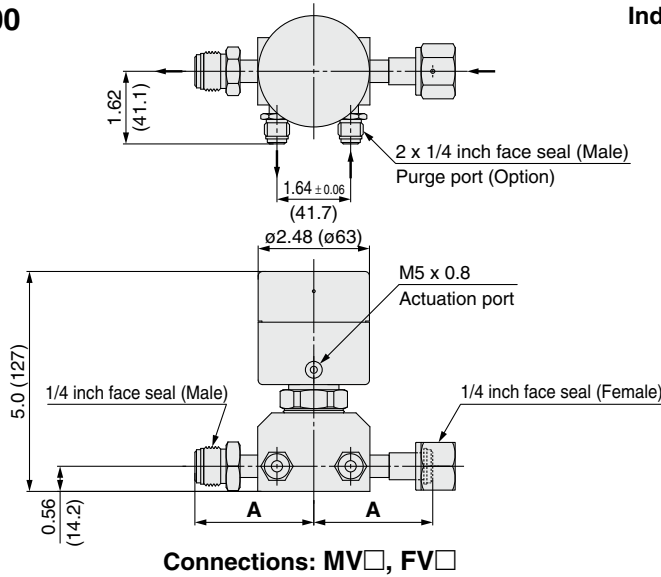
## Wetted Parts Material

Wetted Parts	S
Body	316L SS secondary remelt
Surface finish	Electropolish + Passivation
Diaphragm	316L SS (Option: Ni-Cr-Mo alloy)
Seat	PCTFE (Option: Polyimide)

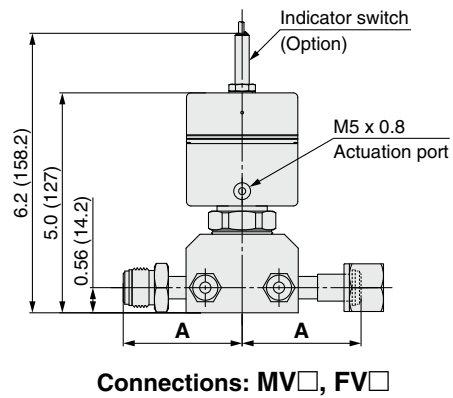
## Dimensions

inch (mm)

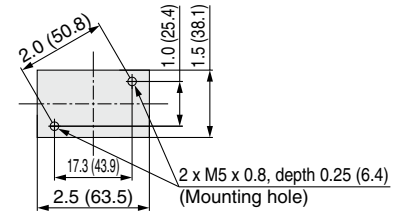
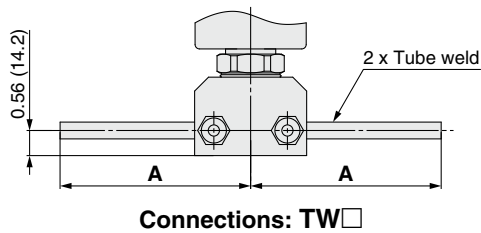
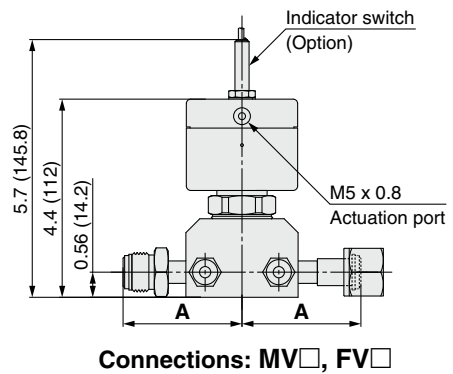
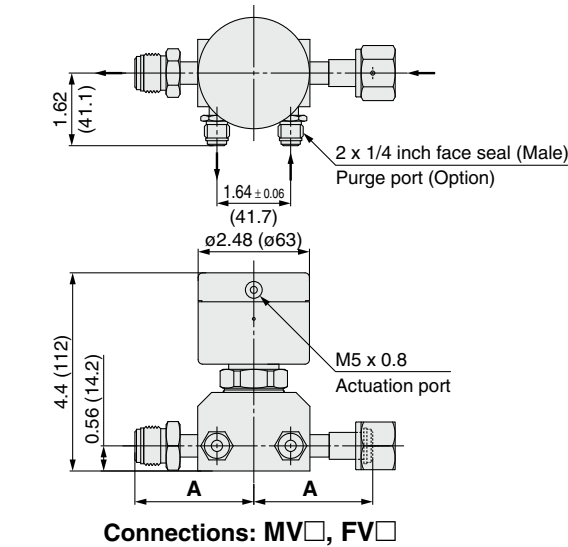
### AP3700



### Indicator switch



### AP3708



Bottom view

Connections	A	
	inch	(mm)
TW6	4.25	(108.0)
FV8	2.65	(67.3)
MV8		
TW8	4.25	(108.0)
FV12	3.20	(81.3)
MV12		
TW12	4.25	(108.0)



**Made to Order**

Change of porting configuration and products such as three port dual valves can be made. Please contact SMC for details.

# Diaphragm Valve for Ultra High Purity

Air operated type  
Two Step

## AP3571 & 4571 Series



RoHS

- Two step mode - metered flow and full open
- Two separate actuation ports
- Soft start valve to minimize vacuum chamber pressurization turbulence
- Metered flow adjustable AP3571: 10 to 200 slpm\*  
AP4571: 10 to 350 slpm\*

- Pneumatically actuated normally closed
- Body material: 316L SS secondary remelt

\* At 80 psig (0.55 MPa) of N<sub>2</sub>

How to Order (See p. 250 for ordering syntax)

(Inlet) (Outlet)

**AP 3 571 S 2PW FV4 FV4 M 050**

**Size**

Code	Cv
3	0.29
4	0.5

**Model**

Code	Mode	Status
571	Two step mode	Normally closed (N.C.)

**Material**

Code	Body material
S	316L SS secondary remelt
H	Ni-Cr-Mo alloy

**Surface finish**

Code	Surface finish Ra max
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)
V	7 μin. (0.18 μm)
X	5 μin. (0.13 μm)

**Ports**

Code	Ports
2PW	2 ports

\*) Optional porting and porting configurations available. Refer to the AP series optional porting configuration on page 179.

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide *2)

\*2) Not available with H material.

**Face to face dimension**

Code	Face to face
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm) *1)

\*1) Only applies to S material with TW4 or TW6 connections.

**Connections (Inlet, Outlet)**

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

**Metered flow**

Code	Metered adjusted flow in slpm
XXX (3 digits)	Metered adjusted flow in slpm at 80 psig (0.55 MPa) N <sub>2</sub> . Replace XXX with flow rate using 3 digits, example 50 slpm = "050" Adjustable range: AP3571= 10 to 200 slpm AP4571= 10 to 350 slpm

## Specifications

Operating Parameters		AP3571	AP4571
Status		Normally closed (N.C.)	
Gas		Select compatible materials of construction for the gas	
Operating pressure		Vacuum to 125 psig (0.9 MPa)	
Proof pressure		1.5 times the maximum operating pressure	
Burst pressure		3 times the maximum operating pressure	
Ambient and operating temperature		-10 to 71°C (No freezing) *1)	
Cv		0.29	0.5
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s	
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)	
Across the seat leak		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s	
Surface finish		Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)	
Connections		Face seal, Tube weld	
Actuation pressure		70 to 110 psig (0.48 to 0.76 MPa)	
Actuation port connection		M5 thread	
Actuation port location		Sides (2 each)	
Installation		Bottom mount	
Internal volume		0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )	0.12 in <sup>3</sup> (1.94 cm <sup>3</sup> )
Adjustable range of metered flow *3)		10 to 200 slpm	10 to 350 slpm
Tolerance of metered flow *3)	10 to 20 slpm	±6 slpm	
	21 to 50 slpm	±10 slpm	
	51 to 100 slpm	±15 slpm	
	101 to 200 slpm	±20 slpm	
	201 to 350 slpm	N/A	±25 slpm

\*1) Max. 90°C for Polyimide seat.

\*2) Tested with Helium gas inlet pressure 125 psig (0.9 MPa)

\*3) At 80 psig (0.55 MPa) N<sub>2</sub>



# Diaphragm Valve for Ultra High Purity **AP3571 & 4571 Series**

Air operated type (Two Step)

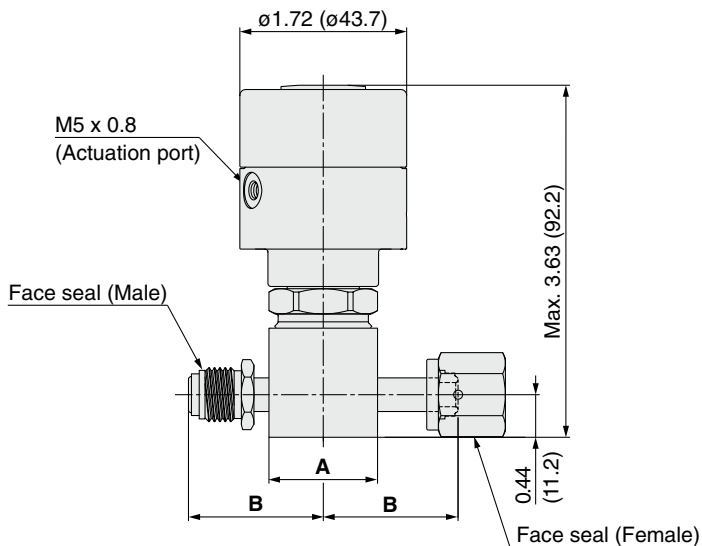
## Wetted Parts Material

Wetted parts	S	H
Body	316L SS secondary remelt	Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation	Electropolish
Diaphragm	Ni-Co alloy	
Seat	PCTFE (Option: Polyimide)	PCTFE

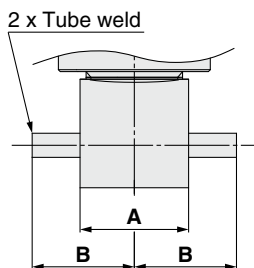
## Dimensions

inch (mm)

### AP3571 & 4571

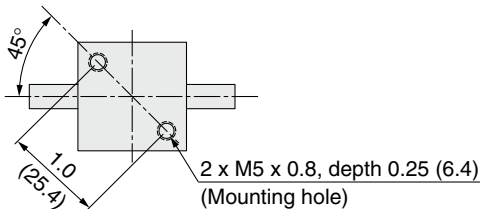


Connections: MV□, FV□

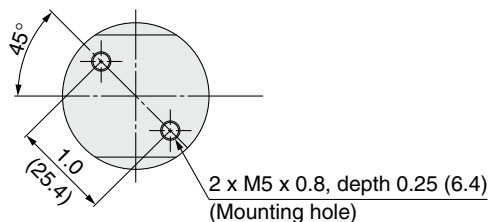


Connections: TW□

### Bottom view



Material code: S



Material code: H

Material	Connections	A		B	
		inch	(mm)	inch	(mm)
S	FV4	1.12 sq.	(□28.4)	1.39	(35.3)
	MV4			1.06	(26.9)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6			1.325	(33.7)
H	FV4	$\phi 1.24$	( $\phi 31.5$ )	1.45	(36.8)
	MV4			1.08	(27.4)
	TW4			1.93	(49.0)
	FV6			1.93	(49.0)
	MV6			1.325	(33.7)

# Diaphragm Valve for Ultra High Purity

Air operated type  
(Metal seated)

## AP3200 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- All metal wetted parts
- Pneumatically actuated normally closed
- Indicator switch available as an option



RoHS

How to Order (See p. 250 for ordering syntax)

(Inlet) (Outlet)

**AP32 00 S 2PW FV4 FV4**

**Model**

Code	Max. operating pressure
00	125 psig (0.9 MPa)
02	508 psig (3.5 MPa)

**Material**

Code	Body material
S	316L SS secondary remelt

**Surface finish**

Code	Surface finish Ra max
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)
V	7 μin. (0.18 μm)
X	5 μin. (0.13 μm)

**Ports**

Code	Ports
2PW	2 ports

\*) Optional porting and porting configurations available. Refer to the AP series optional porting configuration on page 179.

**Connections (Inlet, Outlet)**

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

**Option**

Code	Specification
No code	—
IS	Indicator switch

**Face to face dimension**

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm) *1)

\*1) Only applies to TW4 connections.

## Specifications

Operating Parameters		AP3200	AP3202
Status		Normally closed (N.C.)	
Gas		Select compatible materials of construction for the gas	
Operating pressure		Vacuum to 125 psig (0.9 MPa)	Vacuum to 508 psig (3.5 MPa)
Proof pressure		1.5 times the maximum operating pressure	
Burst pressure		3 times the maximum operating pressure	
Ambient and operating temperature		-10 to 100°C (No freezing)	
Cv		0.27	
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s	
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *1)	
Across the seat leak		1 x 10 <sup>-7</sup> Pa·m <sup>3</sup> /s	
Surface finish		Ra max 15 μin. (0.4 μm)	Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)
Connections		Face seal, Tube weld	
Actuation pressure		70 to 110 psig (0.48 to 0.76 MPa)	
Actuation port connection		NPT 1/8 inch	
Actuation port location		Top	
Installation		Bottom mount	
Internal volume		0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )	
Weight		1.27 kg *2)	

\*1) Tested with Helium gas inlet pressure 125 psig (0.9 MPa).

\*2) Weight, including individual boxed weight, may vary depending on connections or options.

## Indicator Switch (Option) Specification

Code	IS	
Switch type	SPDT	
Rated voltage	Max. 30 VDC	
Contact capacity	Max. 3 VA	
Switching current	Max. 0.2 A	
Carrying current	Max. 0.5 A	
Cable	Lead wire	AWG 24
	Cable length	3 m
	Color (Lead wire)	Blue: Common line Brown: NC (When the valve is closed, the circuit is closed.) Black: NO (When the valve is open, the circuit is closed.)

## Wetted Parts Material

Wetted Parts	S
Body	316L SS secondary remelt
Surface finish	Electropolish + Passivation
Diaphragm	Ni-Co alloy

# Diaphragm Valve for Ultra High Purity **AP3200 Series**

Air operated type (Metal seated)

## Dimensions

inch (mm)

### AP3200

### Indicator switch

Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

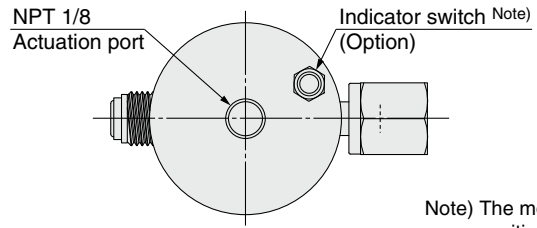
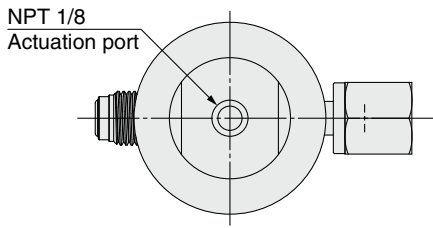
Check Valves

Vacuum Generators

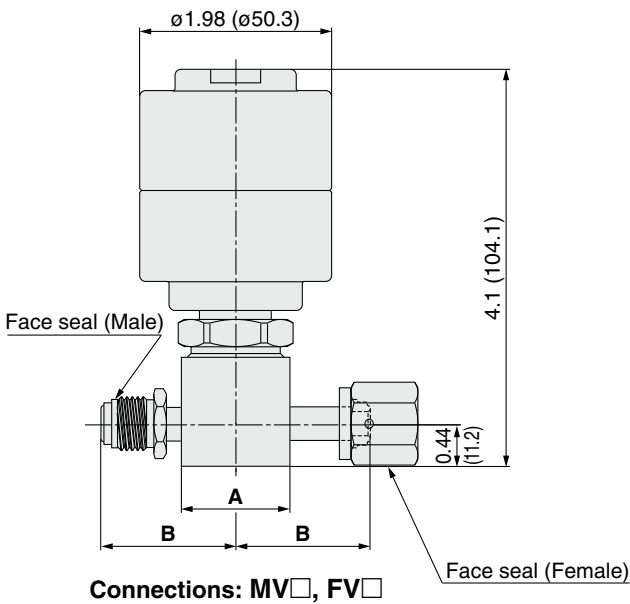
Flow Switches

Technical Data/  
Glossary of Terms

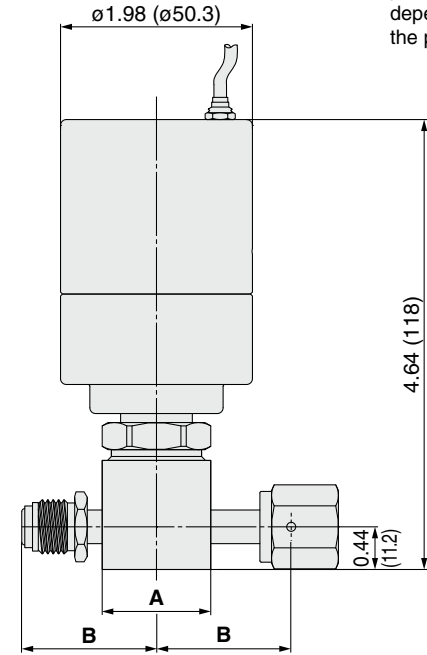
Precautions



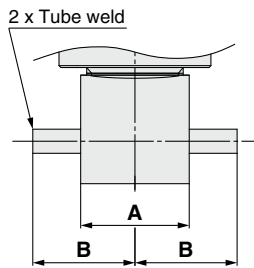
Note) The mounting position varies depending on the product.



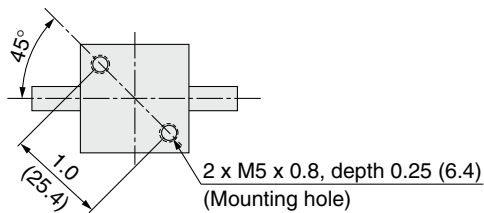
Connections: MV□, FV□



Connections: MV□, FV□



Connections: TW□



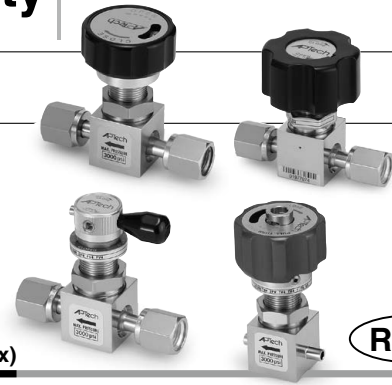
Material	Connections	A		B	
		inch	(mm)	inch	(mm)
S	FV4	1.12 sq.	(□28.4)	1.39	(35.3)
	MV4			1.06	(26.9)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6				
	TW6				

# Diaphragm Valve for Ultra High Purity

Manually operated type

## AP3600 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- LOTO standard with AP3657/3659, optional AP3625
- Indicator switch available as an option (AP3650)



How to Order (See p. 250 for ordering syntax)

(Inlet) (Outlet)

### AP 3 650 S 2PW FV4 FV4

**Size**

Code	Cv
3	0.29

**Model**

Code	Knob	Max. operating pressure
652	Round knob with a raised rectangular section	250 psig (1.7 MPa)
659	Pull twist knob with LOTO	
600	Multi turn round knob	
625	Lever knob	3000 psig (20.7 MPa)
650	Round knob with open/close indication window	
657	Pull twist knob with LOTO	

**Material**

Code	Body material
S	316L SS secondary remelt
H	Ni-Cr-Mo alloy

**Surface finish**

Code	Surface finish Ra max
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)
V	7 μin. (0.18 μm)
X	5 μin. (0.13 μm)

**Ports**

Code	Ports
2PW	2 ports

\*) Optional porting and porting configurations available. Refer to the AP series optional porting configuration on page 179.

**Connections (Inlet, Outlet)**

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

**Face to face dimension**

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm) *1)

**Option (AP3650 only)**

Code	Specification
No code	—
ISH	Indicator switch

**Installation option**

Code	Installation
No code	Bottom mount (Standard)
P	Panel Installation *3)*4)

\*3) Panel mounting hole: dia.0.78 inch (19.8 mm).  
\*4) Not available with AP3652 and AP3659.

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide *2)

\*2) Not available with H material.

\*1) Only applies to S material with TW4 or TW6 connections.

## Specifications

Operating Parameters	AP3652	AP3659	AP3600	AP3625	AP3650	AP3657
<b>Gas</b>	Select compatible materials of construction for the gas					
<b>Operating pressure</b>	Vacuum to 250 psig (1.7 MPa)			Vacuum to 3000 psig (20.7 MPa)		
<b>Proof pressure</b>	1.5 times the maximum operating pressure					
<b>Burst pressure</b>	3 times the maximum operating pressure					
<b>Ambient and operating temperature</b>	-40 to 71°C (No freezing) *1)					
<b>Cv</b>	0.29					
<b>Leak rate</b>	<b>Inboard leakage</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s				
	<b>Outboard leakage</b>	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)				
<b>Across the seat leak</b>	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s					
<b>Surface finish</b>	Ra max 15 μin. (0.4 μm)		Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)			
<b>Connections</b>	Face seal, Tube weld			Face seal, Tube weld		
<b>Installation</b>	Bottom mount			Bottom mount (Option: panel mount)		
<b>Internal volume</b>	0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )					
<b>Weight</b>	0.26 kg *3)	0.45 kg *3)	0.36 kg *3)	0.45 kg *3)	0.73 kg *3)	0.4 kg *3)
<b>Knob</b>	1/4 turn round knob with a raised rectangular section and open/close indication window	Pull twist knob with LOTO *5)	Multi turn round knob	1/4 turn lever knob *4)	1/4 turn round knob with open/close indication window	Pull twist knob with LOTO *5)
<b>Operational Safety Device (OSD)</b>	N/A	Standard	N/A	Option (Part number: AP PL227) *6)	N/A	Standard
<b>LOTO (Lockout)</b>	N/A	Standard	N/A	Option (Part number: AP PL225) *6)	N/A	Standard

\*1) -10 to 90°C for Polyimide seat.

\*2) Tested with Helium gas inlet pressure 250 psig (1.7 MPa).

\*3) Weight, including individual boxed weight, may vary depending on connections or options.

\*4) Optional lever color available. Please contact SMC.

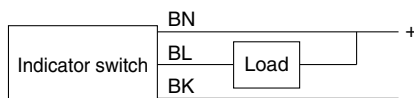
\*5) Handle must be pulled to turn open from closed.

\*6) Refer to the specification for options. (P.227)

## Indicator Switch (Option) Specification

Code	ISH	
<b>Output type</b>	NPN	
<b>Power supply voltage</b>	3.8 to 30 VDC	
<b>Output voltage</b>	Max. 0.4 VDC	
<b>Supply current</b>	Max. 11 mA	
<b>Output current</b>	Max. 20 mA	
<b>Cable</b>	<b>Lead wire</b>	AWG 24
	<b>Cable length</b>	3 m
	<b>Color (Lead wire)</b>	Blue (BL), Brown (BN), Black (BK)

Wiring Diagram



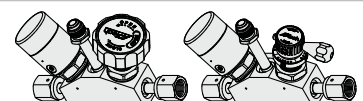
## Wetted Parts Material

Wetted Parts	S	H
Body	316L SS secondary remelt	Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation	Electropolish
Diaphragm	Ni-Co alloy	
Seat	PCTFE (Option: Polyimide)	PCTFE



Made to Order

Products such as three port dual valves can be made with monoblock configurations. Please contact SMC for details.



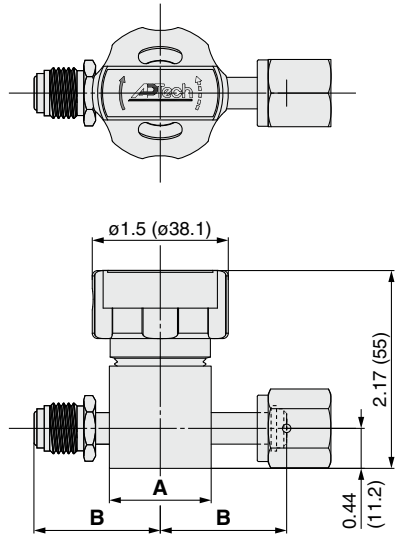
# Diaphragm Valve for Ultra High Purity **AP3600 Series**

Manually operated type

## Dimensions

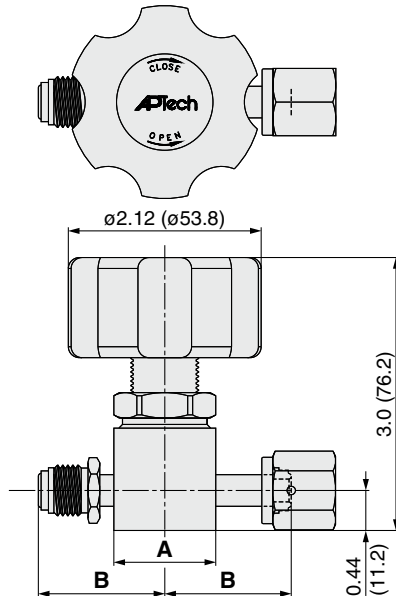
inch (mm)

### AP3652



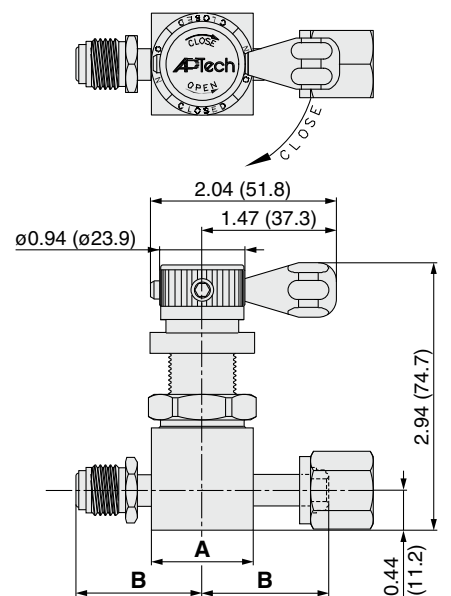
Connections: MV□, FV□

### AP3600



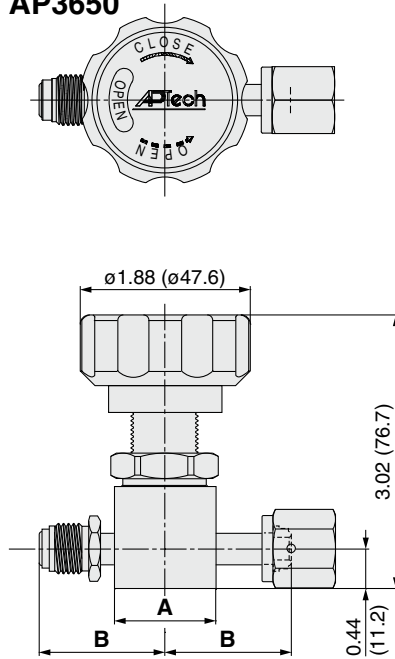
Connections: MV□, FV□

### AP3625



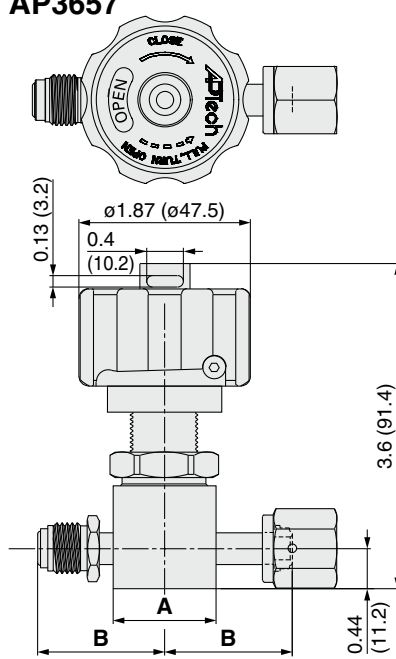
Connections: MV□, FV□

### AP3650



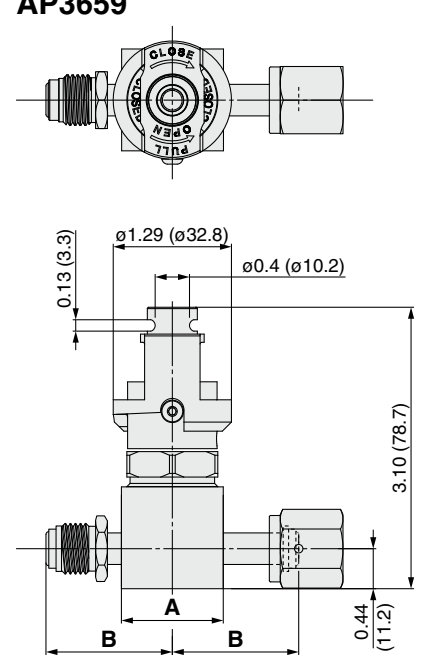
Connections: MV□, FV□

### AP3657

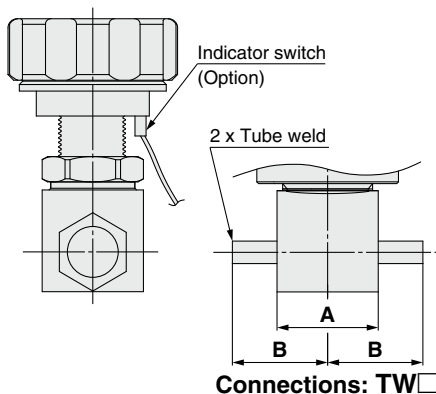


Connections: MV□, FV□

### AP3659

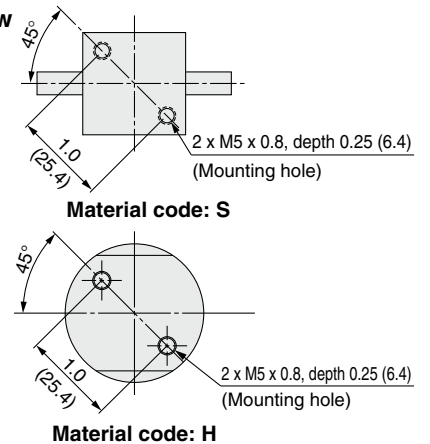


Connections: MV□, FV□



Connections: TW□

### Bottom view



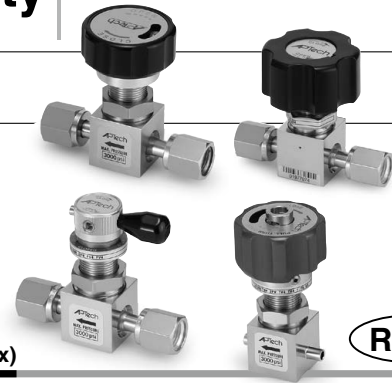
Material	Connections	A		B	
		inch	(mm)	inch	(mm)
S	FV4	1.12 sq.	(28.4)	1.39	(35.3)
	MV4			1.06	(26.9)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6			1.45	(36.8)
H	FV4	1.24 dia.	(31.5)	1.08	(27.4)
	MV4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6			1.325	(33.7)

# Diaphragm Valve for Ultra High Purity

Manually operated type

## AP4600 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- LOTO standard with AP4657/4659, optional AP4625
- Indicator switch available as an option (AP4650)



RoHS

How to Order (See p. 250 for ordering syntax)

(Inlet) (Outlet)

**AP 4 650 S 2PW FV6 FV6**

**Size**

Code	Cv
4	0.5

**Model**

Code	Knob	Max. operating pressure
652	Round knob with a raised rectangular section	250 psig (1.7 MPa)
659	Pull twist knob with LOTO	
600	Multi turn round knob	
625	Lever knob	300 psig (2.1 MPa)
650	Round knob with open/close indication window	
657	Pull twist knob with LOTO	

**Connections (Inlet, Outlet)**

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

**Option (AP4650 only)**

Code	Specification
No code	Standard
HR	High pressure *3) (Max. operating pressure 3000 psig (20.7 MPa))

\*3) Not available with AP4652 and AP4659.

**Material**

Code	Body material
S	316L SS secondary remelt
H	Ni-Cr-Mo alloy

**Surface finish**

Code	Surface finish Ra max
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)
V	7 μin. (0.18 μm)
X	5 μin. (0.13 μm)

**Ports**

Code	Ports
2PW	2 ports

\*) Optional porting and porting configurations available. Refer to the AP series optional porting configuration on page 179.

**Face to face dimension**

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm) *1)

\*1) Only applies to S material with TW4 or TW6 connections.

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide *2)

\*2) Not available with H material.

**Installation option**

Code	Installation
No code	Bottom mount (Standard)
P	Panel Installation *4)*5)

\*4) Panel mounting hole: dia.0.78 inch (19.8 mm).  
\*5) Not available with AP4652 and AP4659.

### Specifications

Operating Parameters	AP4652	AP4659	AP4600	AP4625	AP4650	AP4657
<b>Gas</b>	Select compatible materials of construction for the gas					
<b>Operating pressure</b>	Vacuum to 250 psig (1.7 MPa)			Vacuum to 300 psig (2.1 MPa)		
<b>Proof pressure</b>	1.5 times the maximum operating pressure					
<b>Burst pressure</b>	3 times the maximum operating pressure					
<b>Ambient and operating temperature</b>	-40 to 71°C (No freezing) *1)					
<b>Cv</b>	0.5					
<b>Leak rate</b>	<b>Inboard leakage</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s				
	<b>Outboard leakage</b>	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)				
<b>Across the seat leak</b>	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s					
<b>Surface finish</b>	Ra max 15 μin. (0.4 μm)		Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)			
<b>Connections</b>	Face seal, Tube weld					
<b>Installation</b>	Bottom mount			Bottom mount (Option: panel mount)		
<b>Internal volume</b>	0.12 in <sup>3</sup> (1.94 cm <sup>3</sup> )					
<b>Weight</b>	0.26 kg *3)	0.45 kg *3)	0.36 kg *3)	0.45 kg *3)	0.73 kg *3)	0.4 kg *3)
<b>Knob</b>	1/4 turn round knob with a raised rectangular section and open/close indication window	Pull twist knob with LOTO *5)	Multi turn round knob	1/4 turn lever knob *4)	1/4 turn round knob with open/close indication window	Pull twist knob with LOTO *5)
<b>Operational Safety Device (OSD)</b>	N/A		Standard	Option (Part number: AP PL227) *6)		Standard
<b>LOTO (Lockout)</b>	N/A		Standard	Option (Part number: AP PL225) *6)		Standard

\*1) -10 to 90°C for Polyimide seat.

\*2) Tested with Helium gas inlet pressure 250 psig (1.7 MPa).

\*3) Weight, including individual boxed weight, may vary depending on connections or options.

\*4) Optional lever color available. Please contact SMC.

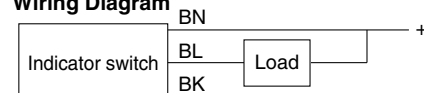
\*5) Knob must be pulled to turn open from closed.

\*6) Refer to the specification for options. (P.227)

### Indicator Switch (Option) Specification

Code	ISH	
<b>Output type</b>	NPN	
<b>Power supply voltage</b>	3.8 to 30 VDC	
<b>Output voltage</b>	Max. 0.4 VDC	
<b>Supply current</b>	Max. 11 mA	
<b>Output current</b>	Max. 20 mA	
<b>Cable</b>	Lead wire	AWG 24
	Cable length	3 m
	Color (Lead wire)	Blue (BL), Brown (BN), Black (BK)

#### Wiring Diagram



### Wetted Parts Material

Wetted Parts	S	H
Body	316L SS secondary remelt	Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation	Electropolish
Diaphragm	Ni-Co alloy	
Seat	PCTFE (Option: Polyimide)	PCTFE

### Option

#### High pressure

Option	Other Parameters	AP4600	AP4625	AP4650	AP4657
HR	Operating pressure	Vacuum to 3000 psig (20.7 MPa)			

**Made to Order**

**Made to Order**

Products such as three port dual valves can be made with monoblock configurations. Please contact SMC for details.

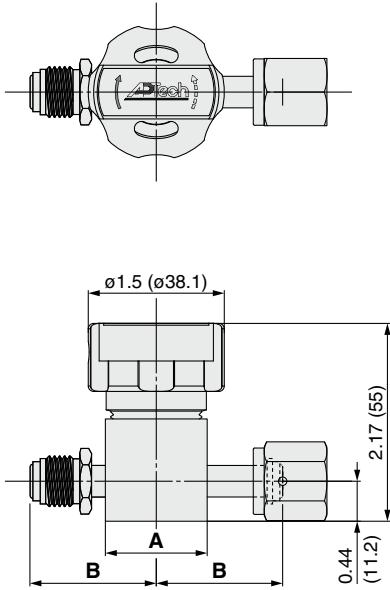
# Diaphragm Valve for Ultra High Purity **AP4600 Series**

Manually operated type

## Dimensions

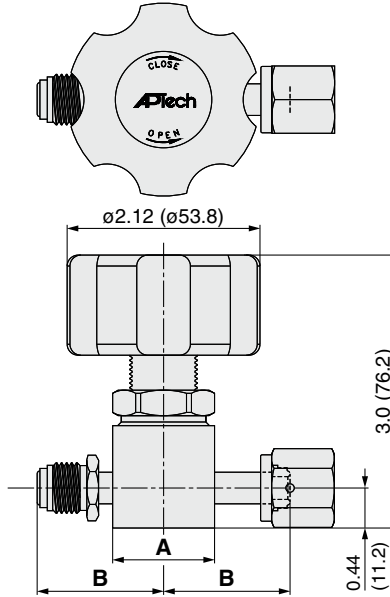
inch (mm)

### AP4652



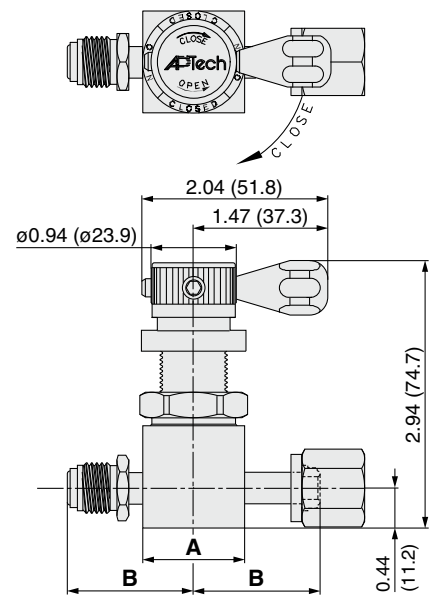
Connections: MV□, FV□

### AP4600



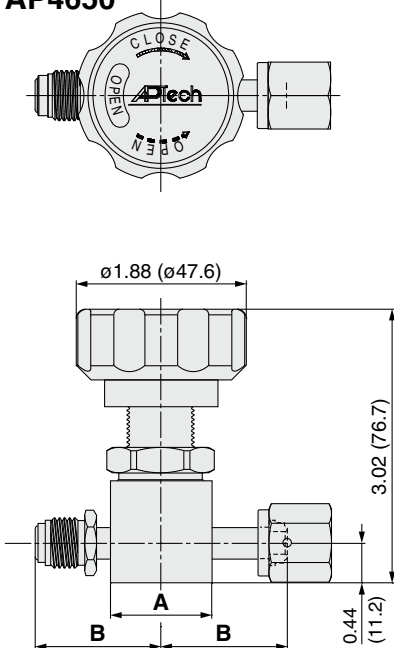
Connections: MV□, FV□

### AP4625



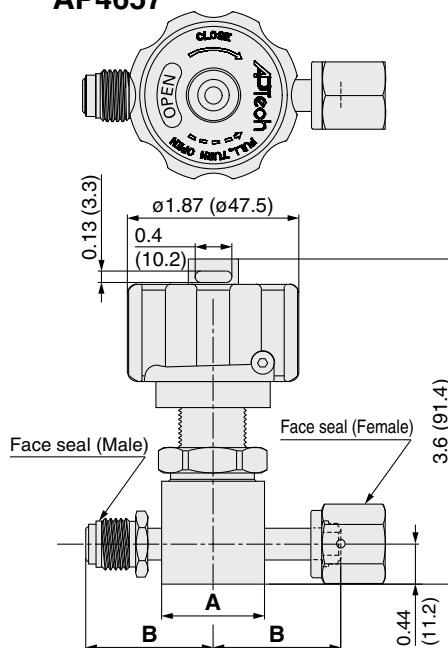
Connections: MV□, FV□

### AP4650



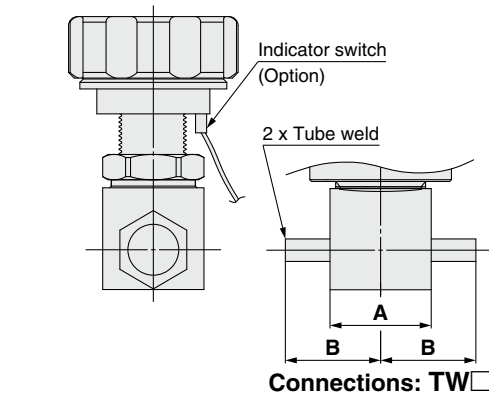
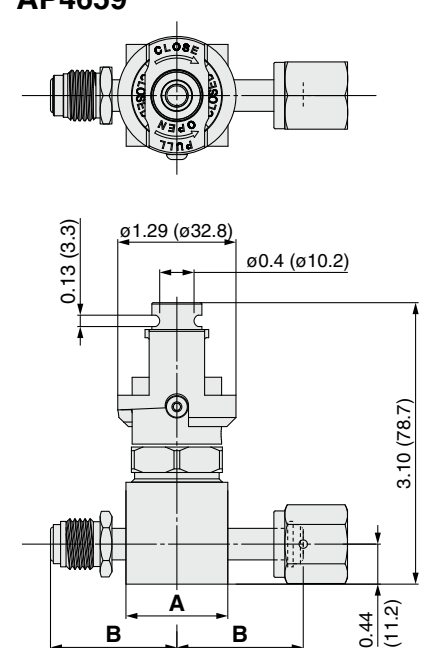
Connections: MV□, FV□

### AP4657



Connections: MV□, FV□

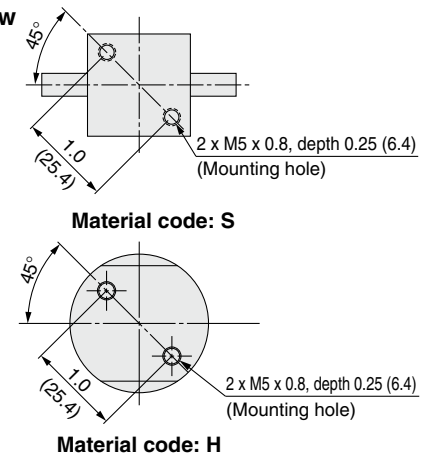
### AP4659



Connections: TW□

### Bottom view

Material	Connections	A		B	
		inch	(mm)	inch	(mm)
S	FV4	1.12 sq. (□28.4)		1.39	(35.3)
	MV4			1.06	(26.9)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6			1.45	(36.8)
H	TW4	1.24 dia. (ø31.5)		1.08	(27.4)
	FV6			1.93	(49.0)
	MV6			1.325	(33.7)
	TW6			1.325	(33.7)



## AP3604, 3624 & 3627 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- LOTO option available as an option (AP3624)



RoHS

### How to Order (See p. 250 for ordering syntax)

(Inlet)      Outlet

**AP 3 604 S**      **2PW FV4 FV4**

**Size**

Code	Cv
3	0.29

**Model**

Code	Knob	Max. operating pressure
604	Multi turn round knob	3700 psig (25.5 MPa)
624	Lever knob	(25.5 MPa)
627	T handle	4500 psig (31 MPa)

**Material**

Code	Body material
S	316L SS secondary remelt

**Surface finish**

Code	Surface finish Ra max
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)
V	7 μin. (0.18 μm)
X	5 μin. (0.13 μm)

**Connections (Inlet, Outlet)**

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld

**Ports**

Code	Ports
2PW	2 ports

\*) Optional porting and porting configurations available. Refer to page 179.

**Installation option**

Code	Installation
No code	Bottom mount (Standard)
P	Panel installation *2)

\*2) Panel mounting hole: dia. 0.78 inch (19.8 mm).

**Seat material**

Code	Material	Model		
		3604	3624	3627
No code	PCTFE (Standard)	●	●	—
VS	Polyimide	●	●	●
PK	PEEK	●	●	●

●: Available  
—: Not available

**Face to face dimension**

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm) *1)

\*1) Only applies to TW4 connections.

### Specifications

Operating Parameters		AP3604	AP3624	AP3627
Select compatible materials of construction for the gas				
<b>Operating pressure</b>		Vacuum to 3700 psig (25.5 MPa)		Vacuum to 4500 psig (31 MPa)
<b>Proof pressure</b>		1.5 times the maximum operating pressure		
<b>Burst pressure</b>		3 times the maximum operating pressure		
<b>Ambient and operating temperature</b>		-40 to 49°C (No freezing)		-40 to 60°C (No freezing)
<b>Cv</b>		0.29		
<b>Leak rate</b>	<b>Inboard leakage</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s		
	<b>Outboard leakage</b>	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *1)		
<b>Across the seat leak</b>		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s		
<b>Surface finish</b>		Ra max 15 μin. (0.4 μm)	Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)	
<b>Connections</b>		Face seal, Tube weld		
<b>Installation</b>		Bottom mount (Option: panel mount)		
<b>Internal volume</b>		0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )		
<b>Weight</b>		0.36 kg *2)	0.45 kg *2)	0.45 kg *2)
<b>Knob</b>		Multi turn round knob	1/4 turn lever knob *3)	1/4 turn T handle
<b>Operational Safety Device (OSD)</b>		N/A	Option *4) (Part number: AP PL227)	N/A
<b>LOTO (Lockout)</b>			Option *4) (Part number: AP PL225)	

\*1) Tested with Helium gas inlet pressure 250 psig (1.7 MPa).

\*2) Weight, including individual boxed weight, may vary depending on connections or options.

\*3) Optional lever color available. Please contact SMC.

\*4) Refer to the specification for options. (P.227)

### Wetted Parts Material

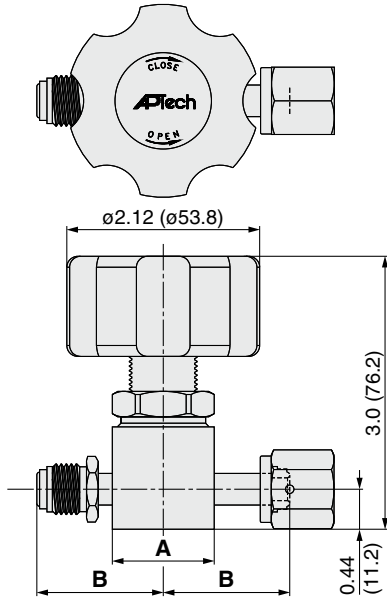
Wetted Parts		S
Body		316L SS secondary remelt
Surface finish		Electropolish + Passivation
Diaphragm		Ni-Co alloy
Seat	AP3604, AP3624	PCTFE (Option: Polyimide, PEEK)
	AP3627	Polyimide or PEEK



**Dimensions**

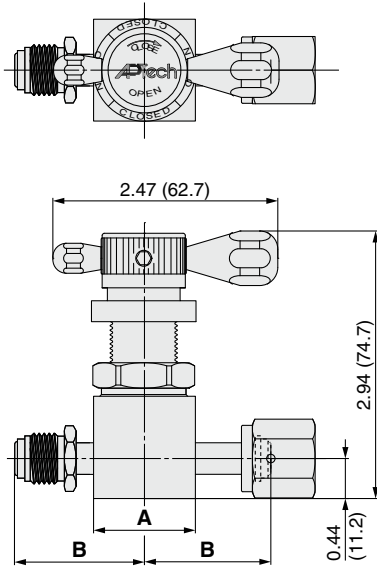
inch (mm)

**AP3604**



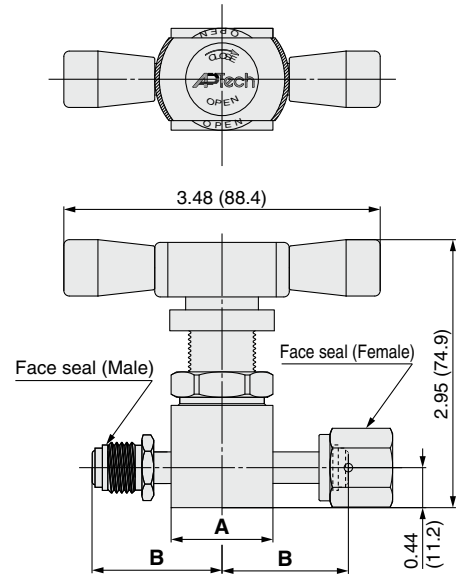
Connections: MV□, FV□

**AP3624**



Connections: MV□, FV□

**AP3627**



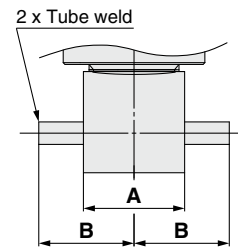
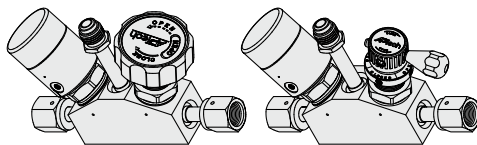
Connections: MV□, FV□

Connections	A		B	
	inch	(mm)	inch	(mm)
FV4			1.39	(35.3)
MV4	1.12 sq.	(□28.4)	1.06	(26.9)
TW4				

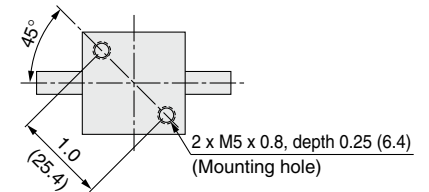


**Made to Order**

Products such as three port dual valves can be made with monoblock configurations. Please contact SMC for details.



Connections: TW□



Bottom view

Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

Vacuum Generators

Flow Switches

Technical Data/  
Glossary of Terms

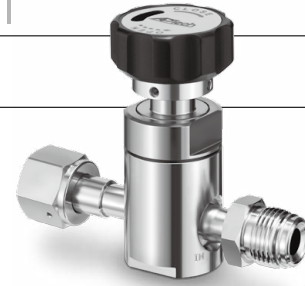
Precautions

# Diaphragm Valve for Ultra High Purity

Manually operated type

## AP4150 & 4157 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- Springless design (No poppet spring in the wetted area)
- LOTO available (AP4157)
- Indicator switch available as an option (AP4150)



RoHS

How to Order (See p. 250 for ordering syntax)

AP
41
50
S
2PW
MV8
MV8
 
 
 
 

①
②
③
④

Port Number

**Model**  

Code	Knob	Cv
50	Round knob with open/close indication window	0.8
57	Pull twist knob with LOTO	

**Material**  

Code	Body material
S	316L SS secondary remelt

**Surface finish**  

Code	Surface finish Ra max
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)
V	7 μin. (0.18 μm)
X	5 μin. (0.13 μm)

**Ports (Refer to the porting configuration.)**  

Code	Ports
2PW	2 ports
3PWD	3 ports
3PWE	3 ports
3PWF	3 ports
4PWM	4 ports

**Option (AP4150 only)**  

Code	Specification
No code	—
ISH	Indicator switch

**Seat material**  

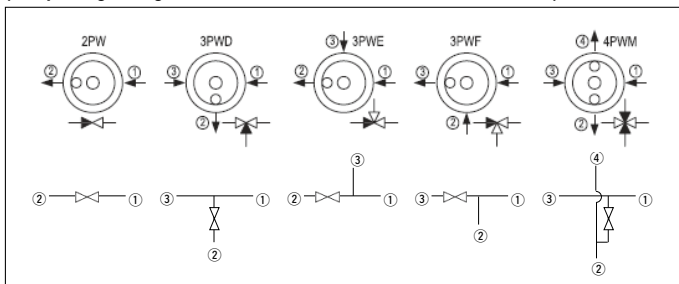
Code	Material
No code	PCTFE (Standard)
VS	Polyimide

**Connections**  

Code	Connections
No code	No port
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW6	3/8 inch tube weld
FV8	1/2 inch face seal (Female)
MV8	1/2 inch face seal (Male)
TW8	1/2 inch tube weld

### Porting Configuration

(The porting configurations viewed from the knob side are shown.)



### Sample Order Number

	Port	①	②	③	④
AP4150S	2PW	MV8	MV8		
	3PWD	MV8	MV8	MV8	

### Specifications

Operating Parameters		AP4150	AP4157
<b>Gas</b>		Select compatible materials of construction for the gas	
<b>Operating pressure</b>		Vacuum to 250 psig (1.7 MPa)	
<b>Proof pressure</b>		1.5 times the maximum operating pressure	
<b>Burst pressure</b>		3 times the maximum operating pressure	
<b>Ambient and operating temperature</b>		-40 to 71°C (No freezing) *1)	
<b>Cv</b>		0.8	
<b>Leak rate</b>	<b>Inboard leakage</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s	
	<b>Outboard leakage</b>	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s	
<b>Across the seat leak</b>		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s	
<b>Surface finish</b>		Ra max 15 μin. (0.4 μm)	Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)
<b>Connections</b>		Face seal, Tube weld	
<b>Installation</b>		Bottom mount	
<b>Internal volume</b>		0.37 in <sup>3</sup> (6.1 cm <sup>3</sup> )	
<b>Knob</b>		1/4 turn round knob with open/close indication window	Pull twist knob with LOTO *2)
<b>LOTO (Lockout)</b>		N/A	Standard

\*1) -10 to 90°C for Polyimide seat.

\*2) Handle must be pulled to turn open from closed.

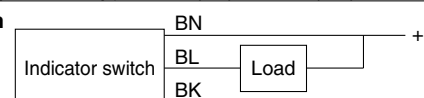
### Wetted Parts Material

Wetted Parts	S
Body	316L SS secondary remelt
Surface finish	Electropolish + Passivation
Diaphragm	Ni-Co alloy
Seat	PCTFE (Option: Polyimide)

### Indicator Switch (Option) Specification

Code	ISH	
<b>Output type</b>	NPN	
<b>Power supply voltage</b>	3.8 to 30 VDC	
<b>Output voltage</b>	Max. 0.4 VDC	
<b>Supply current</b>	Max. 11 mA	
<b>Output current</b>	Max. 20 mA	
<b>Cable</b>	<b>Lead wire</b>	AWG 24
	<b>Cable length</b>	3 m
	<b>Color (Lead wire)</b>	Blue (BL), Brown (BN), Black (BK)

### Wiring Diagram

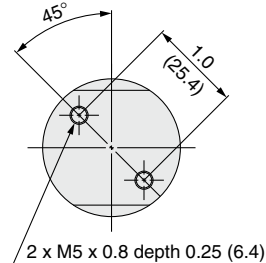
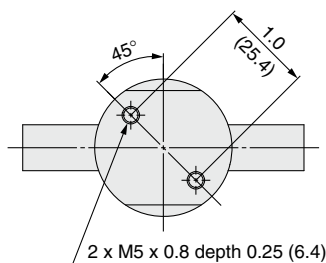
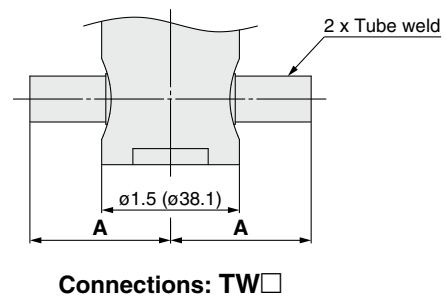
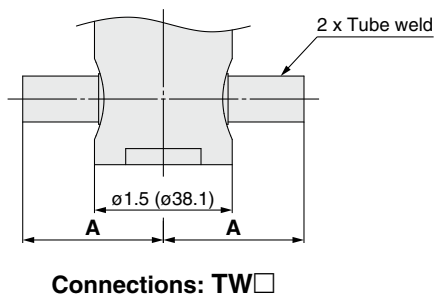
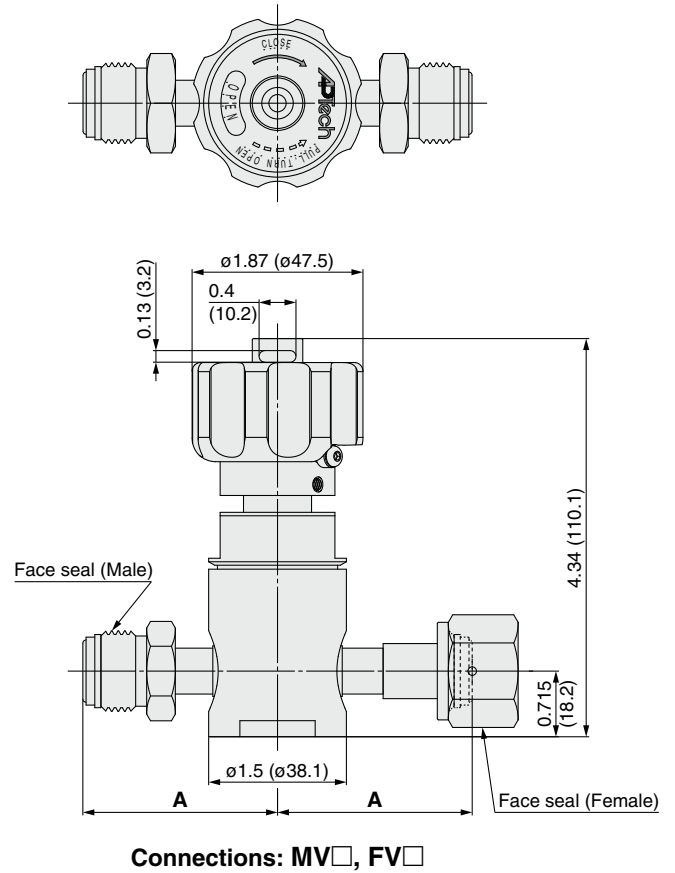
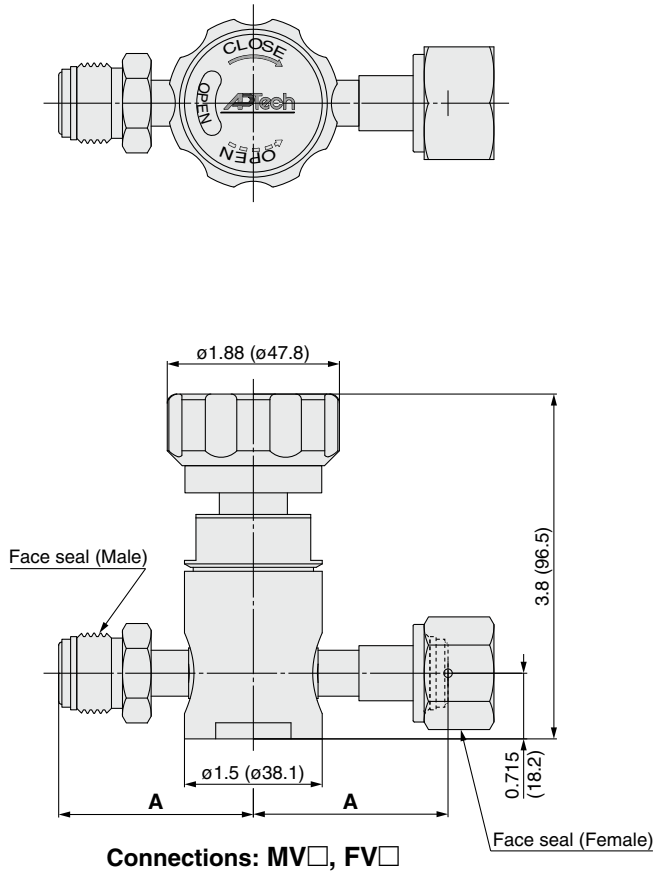


**Dimensions**

inch (mm)

**AP4150**

**AP4157**



Connections	A	
	inch	(mm)
FV4	1.59	(40.4)
MV4	1.59	(40.4)
TW6	1.49	(37.8)
FV8	2.12	(53.8)
MV8	2.12	(53.8)
TW8	1.53	(38.9)

Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

Vacuum Generators

Flow Switches

Technical Data/  
Glossary of Terms

Precautions

# Diaphragm Valve for Ultra High Purity

Manually operated type  
(For high pressure and high flow)

## AP3100 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- High pressure type: 20.7 MPa and 9 MPa
- Designed for bulk specialty gas (BSGS) delivery
- LOTO standard with AP3157, optional AP3125



RoHS

How to Order (See p. 250 for ordering syntax)

AP31 00 S 2PW MV8 MV8

Model			
Code	Maximum operating pressure	Cv	Knob
00	3000 psig (20.7 MPa) *1)	0.7	Multi turn round knob
02	1300 psig (9.0 MPa)	1.3	1/4 turn lever knob
25	3000 psig (20.7 MPa) *1)	1.0	1/4 turn round knob
50	1300 psig (9.0 MPa)	1.0	1/4 turn round knob
57	1300 psig (9.0 MPa)	1.0	Pull twist knob with LOTO

\*1) 2400 psig (16.5 MPa) for connection size 3/4 inch.

Material	
Code	Body material
S	316L SS secondary remelt
H	Ni-Cr-Mo alloy *2)

\*2) Special export controls apply to Ni-Cr-Mo alloy body with 1/2 inch or greater size connection.

Surface finish	
Code	Surface finish Ra max
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)

Ports	
Code	Ports
2PW	2 ports

Connections (Inlet, Outlet)	
Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW6	3/8 inch tube weld
FV8	1/2 inch face seal (Female)
MV8	1/2 inch face seal (Male)
TW8	1/2 inch tube weld
FV12	3/4 inch face seal (Female) *3)
MV12	3/4 inch face seal (Male) *3)
TW12	3/4 inch tube weld

\*3) Prepare a suitable mating fitting with a rated pressure.

Option (AP3150 only)	
Code	Specification
No code	—
ISH	Indicator switch

Seat material	
Code	Material
No code	PCTFE (Standard)
VS	Polyimide *4)

\*4) Not available with H material.

## Specifications

Operating Parameters	AP3100	AP3102	AP3125	AP3150	AP3157
Gas	Select compatible materials of construction for the gas				
Operating pressure	Vacuum to 3000 psig (20.7 MPa)	Vacuum to 1300 psig (9.0 MPa)	Vacuum to 3000 psig (20.7 MPa)	Vacuum to 1300 psig (9.0 MPa)	
Proof pressure	1.5 times the maximum operating pressure				
Burst pressure	3 times the maximum operating pressure				
Ambient and operating temperature	-40 to 65°C (No freezing) *1)				
Cv *2)	0.7	1.3		1.0	
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s			
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *3)			
Across the seat leak	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s				
Surface finish	Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm)				
Connections	Face seal, Tube weld				
Installation	Bottom mount				
Internal volume	0.36 in <sup>3</sup> (6.0 cm <sup>3</sup> )				
Weight	1.27 kg *4)				
Knob	Multi turn round knob (1 1/2 turn)	1/4 turn lever knob *5)	1/4 turn round knob with open/close indication window *6)	Pull twist knob with LOTO *7)	
Operational Safety Device (OSD)	N/A		Option (Part number: AP PL227) *8)	N/A	
LOTO (Lockout)	N/A		Option (Part number: AP PL225) *8)	Standard	

\*1) -10 to 90°C for Polyimide seat.

\*2) Figure of 1/2 inch connection.

\*3) Tested with Helium gas inlet pressure 500 psig (3.5 MPa).

\*4) Weight, including individual boxed weight, may vary depending on connections or options.

\*5) Optional lever color available. Please contact SMC.

\*6) Optional indicator switch available. Please contact SMC.

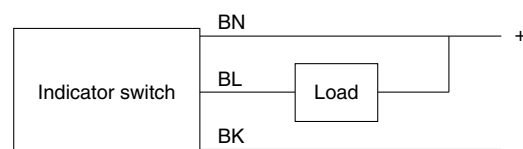
\*7) Knob must be pulled to turn open from closed.

\*8) Refer to the specification for options. (P.227)

## Indicator Switch (Option) Specification

Code	ISH
Output type	NPN
Power supply voltage	3.8 to 30 VDC
Output voltage	Max. 0.4 VDC
Supply current	Max. 11 mA
Output current	Max. 20 mA
Cable	Lead wire
	Cable length
	Color (Lead wire)
	AWG 24
	3 m
	Blue (BL), Brown (BN), Black (BK)

## Wiring Diagram



# Diaphragm Valve for Ultra High Purity **AP3100 Series**

Manually operated type (For high pressure and high flow)

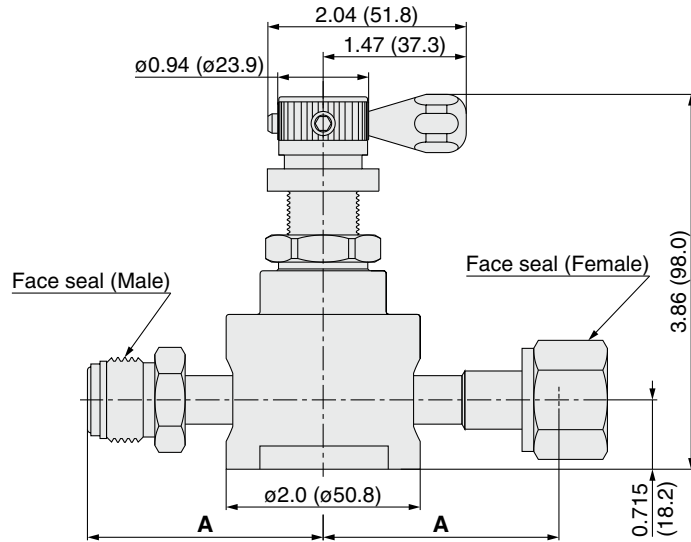
## Wetted Parts Material

Wetted Parts	S	H
Body	316L SS secondary remelt	Ni-Cr-Mo alloy
Surface finish	Electropolish + Passivation	Electropolish
Spring	316 SS	Ni-Cr-Fe alloy
Diaphragm	Ni-Co alloy	
Poppet	316L SS	Ni-Cr-Mo alloy
Seat	PCTFE (Option: Polyimide)	PCTFE

## Dimensions

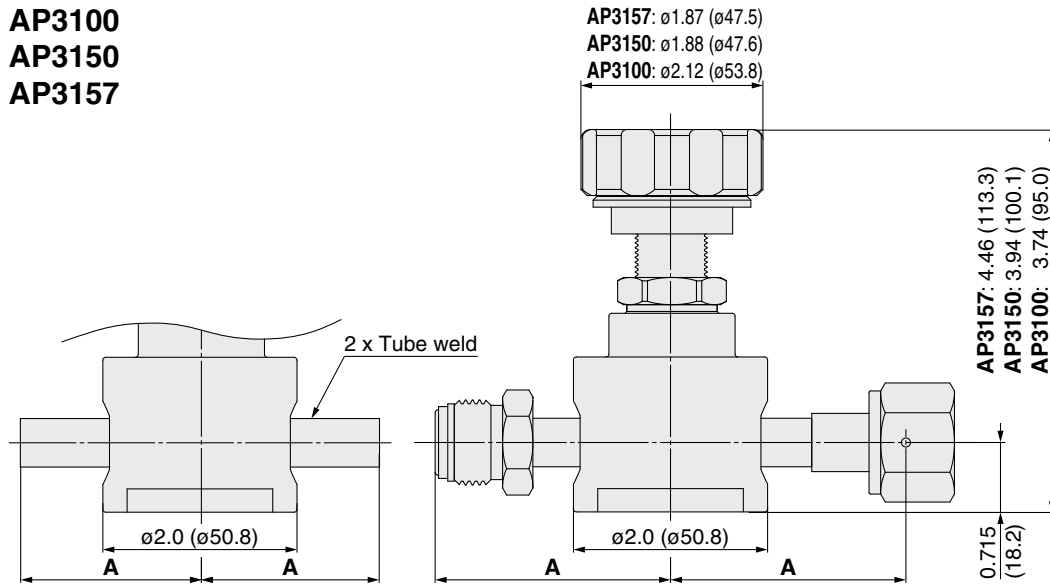
inch (mm)

### AP3125



Connections: MV□, FV□

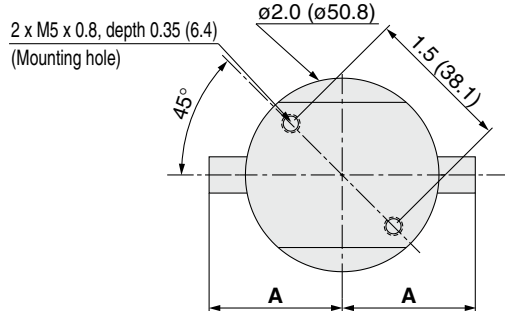
### AP3100 AP3150 AP3157



Connections: TW□

Connections: MV□, FV□

Connections	A	
	inch	(mm)
FV4	2.00	(50.8)
MV4	2.00	(50.8)
TW6	1.375	(34.9)
FV8	2.425	(61.6)
MV8	2.425	(61.6)
TW8	1.79	(45.4)
FV12	3.50	(88.9)
MV12	3.50	(88.9)
TW12	3.25	(82.6)



Bottom view



Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

Vacuum Generators

Flow Switches

Technical Data/  
Glossary of Terms

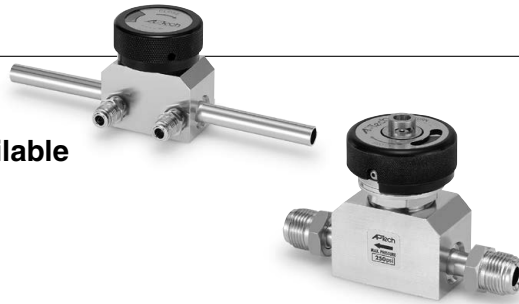
Precautions

# Diaphragm Valve for Ultra High Purity

Manually operated type  
(For high flow)

## AP3800 & 3900 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- Purge ports and monoblock configurations available
- LOTO available (AP3900)



RoHS

How to Order (See p. 250 for ordering syntax)

(Inlet) (Outlet)

**AP 3800 S M MV8 MV8 00**

**Model**

Code	Knob
3800	Round knob with open/close indication window
3900	Pull twist knob with LOTO

**Material**

Code	Body material
S	316L SS secondary remelt

**Surface finish**

Code	Surface finish Ra max
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)
V	7 μin. (0.18 μm)
X	5 μin. (0.13 μm)

**Purge port option**

Code	Specification
No code	—
C	Capped purge port

**Diaphragm material**

Code	Material
No code	316L SS (Standard)
HD	Ni-Cr-Mo alloy

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

**Porting Configuration**

**Connections (Inlet<sup>①</sup>, Outlet<sup>②</sup>)**

Code	Connections
TW6	3/8 inch tube weld
FV8	1/2 inch face seal (Female)
MV8	1/2 inch face seal (Male)
TW8	1/2 inch tube weld
FV12	3/4 inch face seal (Female)
MV12	3/4 inch face seal (Male)
TW12	3/4 inch tube weld

**Purge port \*1)**

Code	Inlet <sup>③</sup>	Outlet <sup>④</sup>
00	None	None
M0	Available	None
0B	None	Available
MB	Available	Available

\*1) 1/4 inch face seal (Male) as standard.

## Specifications

Operating Parameters		AP3800	AP3900
Gas		Select compatible materials of construction for the gas	
Operating pressure		Vacuum to 250 psig (1.7 MPa)	
Proof pressure		1.5 times the maximum operating pressure	
Burst pressure		3 times the maximum operating pressure	
Ambient and operating temperature		-40 to 71°C (No freezing)*1)	
Cv		2.8	
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s	
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)	
Across the seat leak		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s	
Surface finish		Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)	
Connections		Face seal, Tube weld	
Installation		Bottom mount	
Internal volume		0.76 in <sup>3</sup> (12.52 cm <sup>3</sup> )	
Weight		1.36 kg *3)	1.45 kg *3)
Knob		Round knob with open/close indication window	Pull twist knob *4)
LOTO (Lockout)		N/A	Standard

\*1) -10 to 90°C for Polyimide seat.

\*2) Tested with Helium gas inlet pressure 125 psig (0.9 MPa).

\*3) Weight, including individual boxed weight, may vary depending on connections or options.

\*4) Knob must be pulled to turn open from closed.

## Wetted Parts Material

Wetted Parts	S
Body	316L SS secondary remelt
Surface finish	Electropolish + Passivation
Diaphragm	316L SS (Option: Ni-Cr-Mo alloy)
Seat	PCTFE (Option: Polyimide)

# Diaphragm Valve for Ultra High Purity **AP3800 & 3900 Series**

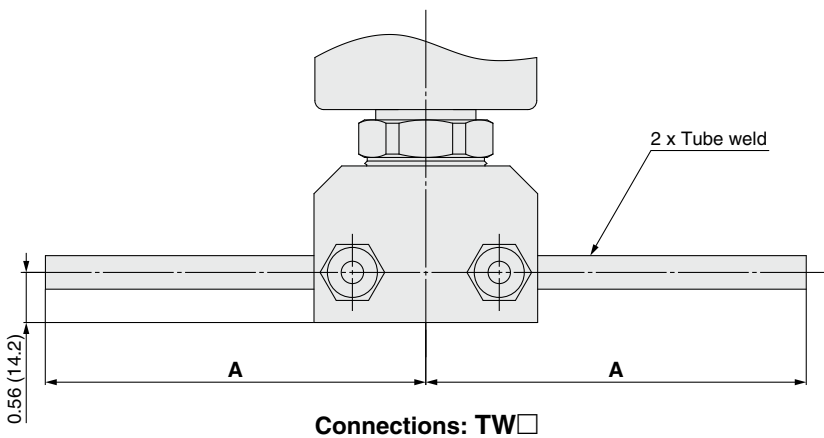
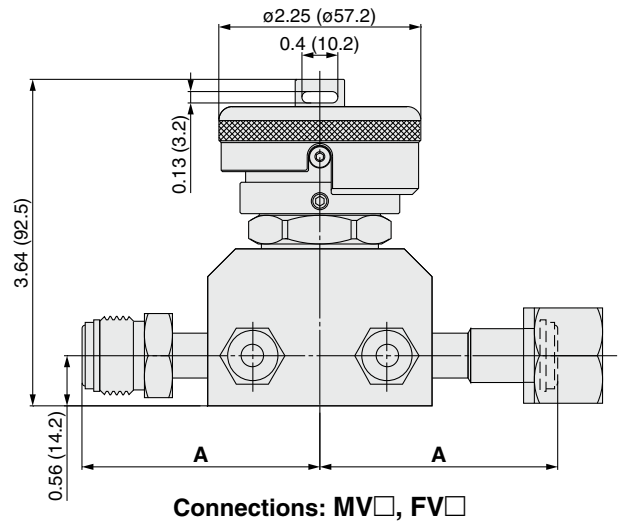
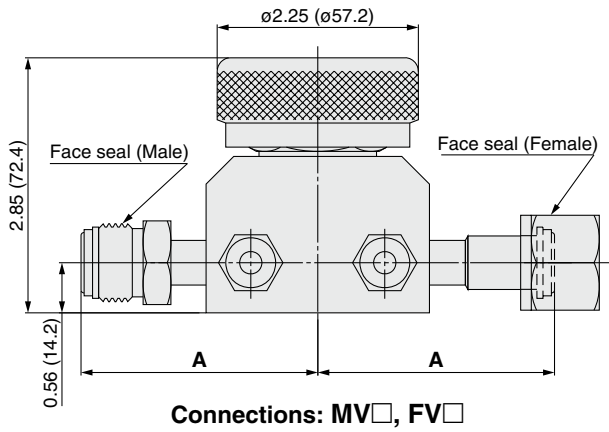
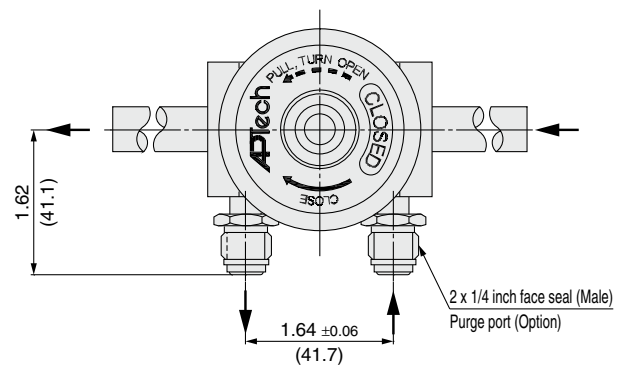
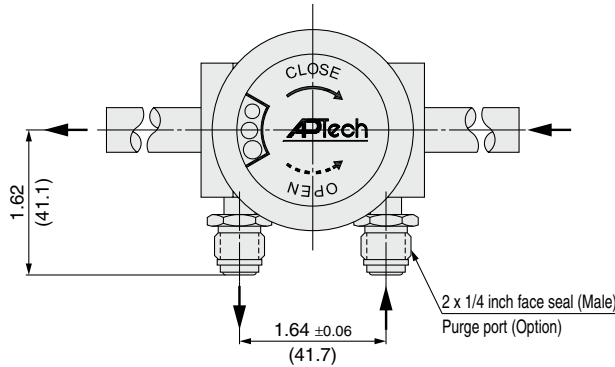
Manually operated type (For high flow)

## Dimensions

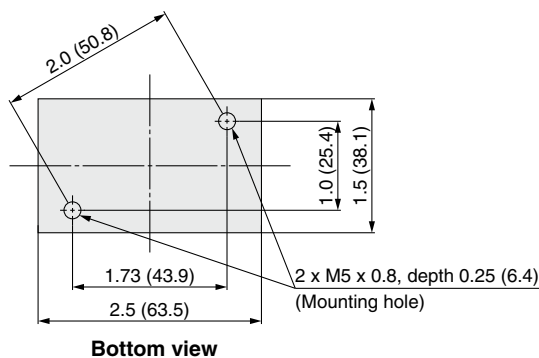
inch (mm)

### AP3800

### AP3900



Connections	A	
	inch	(mm)
TW6	4.25	(108.0)
FV8	2.65	(67.3)
MV8	2.65	(67.3)
TW8	4.25	(108.0)
FV12	3.20	(81.3)
MV12	3.20	(81.3)
TW12	4.25	(108.0)



**Made to Order**

**Made to Order**

Change of porting configuration and products such as three port dual valves can be made. Please contact SMC for details.

- Recommendations
- Regulators
- AP
- SL
- AZ
- AK
- BP
- Diaphragm Valves
- AP
- AZ
- AK
- Check Valves
- Vacuum Generators
- Flow Switches
- Technical Data/ Glossary of Terms
- Precautions

# Diaphragm Valve for Ultra High Purity

Manually operated type  
(Metal seated)

## AP3260, 3262 & 3225 Series

- Suitable for UHP gas supply line
- Body material: 316L SS secondary remelt
- All metal wetted parts



RoHS

How to Order (See p. 250 for ordering syntax)

AP32 60 S 2PW MV4 MV4

(Inlet) (Outlet)

**Model**

Code	Knob	Max. operating pressure
60	Multi turn round knob	125 psig (0.9 MPa)
62		508 psig (3.5 MPa)
25	1/4 turn lever knob	125 psig (0.9 MPa)

**Material**

Code	Body Material
S	316L SS secondary remelt

**Surface finish**

Code	Surface finish Ra max
No code	15 μin. (0.4 μm) Standard
M	10 μin. (0.25 μm)
V	7 μin. (0.18 μm)
X	5 μin. (0.13 μm)

**Ports**

Code	Ports
2PW	2 ports

\*) Optional porting and porting configurations available. Refer to the AP series optional porting configuration on page 179.

**Installation option**

Code	Installation
No code	Bottom mount (Standard)
P	Panel Installation *2)

\*2) Panel mounting hole: dia. 0.78 inch (19.8 mm).

**Face to face dimension \*1)**

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm)

\*1) Only applies to TW4 connections.

**Connections (Inlet, Outlet)**

Code	Connections
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

## Specifications

Operating Parameters		AP3260	AP3262	AP3225
<b>Gas</b> Select compatible materials of construction for the gas				
<b>Operating pressure</b>		Vacuum to 125 psig (0.9 MPa)	Vacuum to 508 psig (3.5 MPa)	Vacuum to 125 psig (0.9 MPa)
<b>Proof pressure</b>		1.5 times the maximum operating pressure		
<b>Burst pressure</b>		3 times the maximum operating pressure		
<b>Ambient and operating temperature</b>		-40 to 90°C (No freezing)		
<b>Cv</b>		0.27		
<b>Leak rate</b>	<b>Inboard leakage</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s		
	<b>Outboard leakage</b>	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *1)		
<b>Across the seat leak</b>		1 x 10 <sup>-7</sup> Pa·m <sup>3</sup> /s *1)		
<b>Surface finish</b>		Ra max 15 μin. (0.4 μm)	Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)	
<b>Connections</b>		Face seal, Tube weld		
<b>Installation</b>		Bottom mount (Option: panel mount)		
<b>Internal volume</b>		0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )		
<b>Weight</b>		0.45 kg *2)		
<b>Knob</b>		Multi turn round knob		1/4 turn lever knob

\*1) Tested with Helium gas inlet pressure 125 psig (0.9 MPa).

\*2) Weight, including individual boxed weight, may vary depending on connections or options.

## Wetted Parts Material

Wetted Parts	S
Body	316L SS secondary remelt
Surface finish	Electropolish + Passivation
Diaphragm	Ni-Co alloy

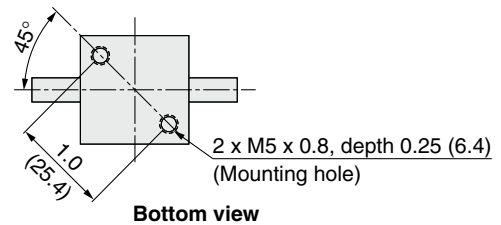
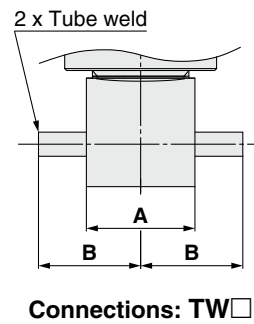
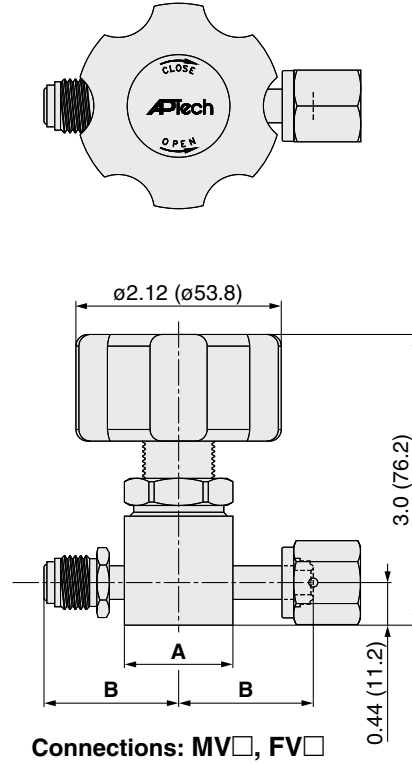
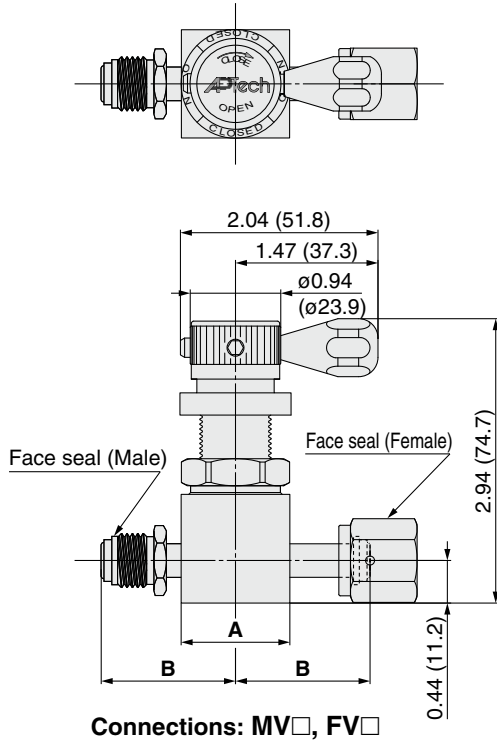


## Dimensions

inch (mm)

### AP3225

### AP3260, 3262



Material	Connections	A		B	
		inch	(mm)	inch	(mm)
S	FV4	1.12 sq.	(□28.4)	1.39	(35.3)
	MV4			1.06	(26.9)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6				

Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

Vacuum Generators

Flow Switches

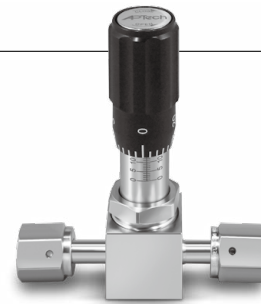
Technical Data/  
Glossary of Terms

Precautions

# Metering Valve for Ultra High Purity

## AP3672, 3675 & 4675 Series

- Suitable for UHP gas supply line
  - Body material: 316L SS secondary remelt
  - Fine adjustment control 12 to 15 turns of the knob to wide open
  - One wetted moving part - a diaphragm
  - Flow rate AP3672: 10 slpm <sup>\*1)</sup>  
AP3675: 40 slpm <sup>\*1)</sup>  
AP4675: 70 slpm <sup>\*1)</sup>
- <sup>\*1)</sup> At 30 psig (0.2 MPa) of N<sub>2</sub>



### How to Order (See p. 250 for ordering syntax)

(Inlet) (Outlet)

**AP 3672 S 2PW FV4 FV4**

**Model**

Code	Cv
<b>3672</b>	0 to 0.02
<b>3675</b>	0 to 0.08
<b>4675</b>	0 to 0.15

**Material**

Code	Body material
<b>S</b>	316L SS secondary remelt

**Surface finish**

Code	Surface finish Ra max
<b>No code</b>	15 μin. (0.4 μm) Standard
<b>M</b>	10 μin. (0.25 μm)
<b>V</b>	7 μin. (0.18 μm)
<b>X</b>	5 μin. (0.13 μm)

**Ports**

Code	Ports
<b>2PW</b>	2 ports

**Face to face dimension**

Code	Dimension
<b>No code</b>	2.12 inch (53.8 mm) Standard
<b>1.75</b>	1.75 inch (44.5 mm) <sup>*1)</sup>

<sup>\*1)</sup> Only applies to TW4 or TW6 connections.

**Connections (Inlet, Outlet)**

Code	Connections
<b>FV4</b>	1/4 inch face seal (Female)
<b>MV4</b>	1/4 inch face seal (Male)
<b>TW4</b>	1/4 inch tube weld
<b>FV6</b>	3/8 inch face seal (Female)
<b>MV6</b>	3/8 inch face seal (Male)
<b>TW6</b>	3/8 inch tube weld

<sup>\*)</sup> Optional porting and porting configurations available. Refer to page 179.

## Specifications

Operating Parameters		AP3672	AP3675	AP4675
<b>Gas</b>		Select compatible materials of construction for the gas		
<b>Operating pressure</b>		Vacuum to 145 psig (1 MPa)		
<b>Proof pressure</b>		1.5 times the maximum operating pressure		
<b>Burst pressure</b>		3 times the maximum operating pressure		
<b>Ambient and operating temperature</b>		-40 to 71°C (No freezing)		
<b>Cv</b>		0 to 0.02	0 to 0.08	0 to 0.15
<b>Leak rate</b>	<b>Inboard leakage</b>	2×10 <sup>-11</sup> Pa·m <sup>3</sup> /s		
	<b>Outboard leakage</b>	2×10 <sup>-10</sup> Pa·m <sup>3</sup> /s		
<b>Surface finish</b>		Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm), 7 μin. (0.18 μm), 5 μin. (0.13 μm)		
<b>Connections</b>		Face seal, Tube weld		
<b>Installation</b>		Bottom mount		
<b>Internal volume</b>		0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )		

## Wetted Parts Material

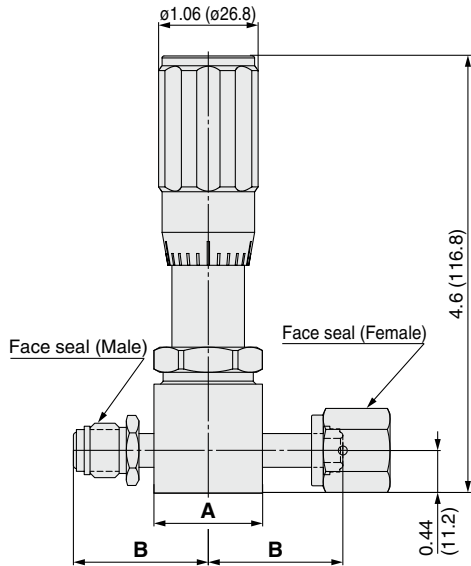
Series	AP3672/AP3675	AP4675
Body	316L SS secondary remelt	
Surface finish	Electropolish + Passivation	
Diaphragm	Ni-Co alloy	
Seat	PCTFE	316L SS

# Metering Valve for Ultra High Purity **AP3672, 3675 & 4675 Series**

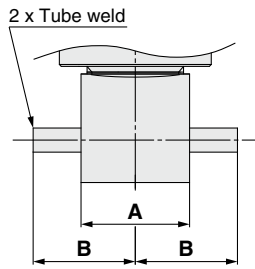
## Dimensions

inch (mm)

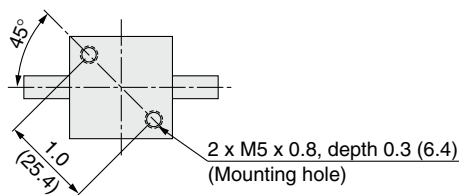
### AP3672/3675/4675



Connections: MV□, FV□



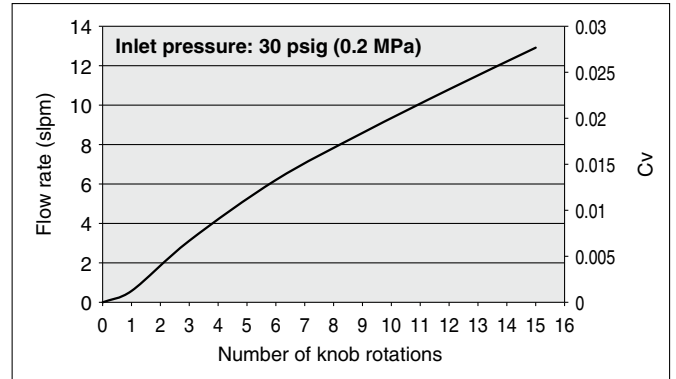
Connections: TW□



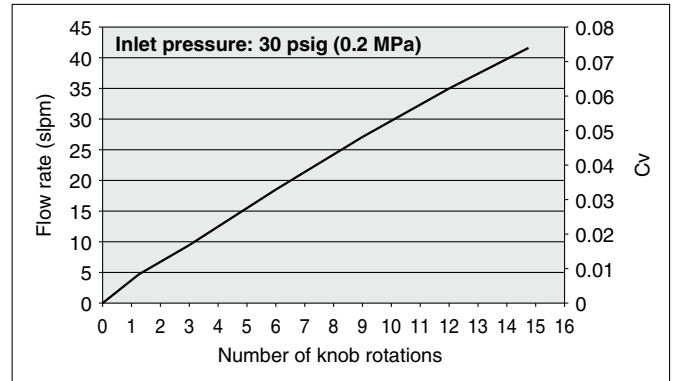
Material	Connections	A		B	
		inch	(mm)	inch	(mm)
S	FV4	1.12 sq.	(□28.4)	1.39	(35.3)
	MV4			1.06	(26.9)
	TW4			1.93	(49.0)
	FV6			1.325	(33.7)
	MV6				
	TW6				

## Flow Rate Characteristics

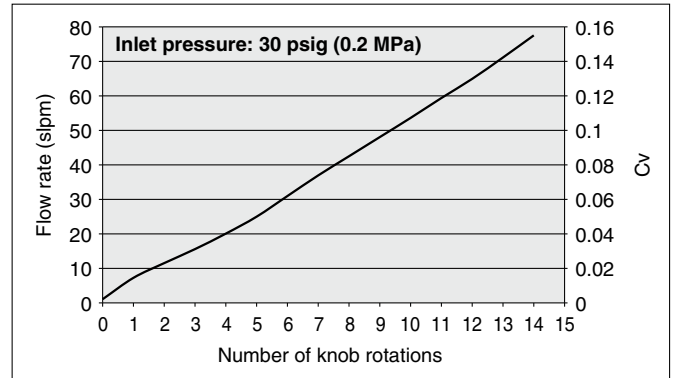
### AP3672



### AP3675



### AP4675



Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

Vacuum Generators

Flow Switches

Technical Data/ Glossary of Terms

Precautions

# AP Series / Diaphragm Valve Optional Porting Configuration

\* Made to order specifications

How to Order (See p. 250 for ordering syntax)

Port Number  
① ② ③ ④

**AP 3650 S 4PWM MV4 TW4 FV4 FV4**

**Available series**

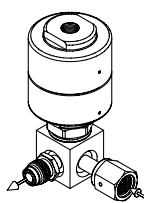
Code	Series
30□□	AP3000
32□□	AP3200
35□□	AP3500
45□□	AP4500
36□□	AP3600
40□□	AP4000
46□□	AP4600

**Ports**

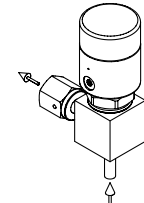
Code	Ports	Configuration
2PW	2 ports	Refer to the following. (Port specifications)
2PWA		
2PWB		
2PWC	3 ports	Refer to the following. (Port specifications)
3PWD		
3PWE		
3PWF		
3PWG	4 ports	Refer to the following. (Port specifications)
3PWH		
3PWJ		
4PWK	4 ports	Refer to the following. (Port specifications)
4PWL		
4PWM		
4PWN		

**Option Depends on the product series**

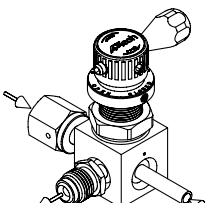
**Examples of The Many Available options**



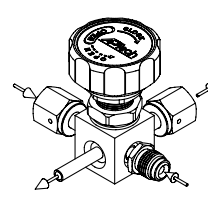
AP3000S  
2PWC FV4 MV4



AP3550S  
2PWB TW4 FV4



AP3625S  
3PWD TW4 MV4 FV4



AP3650S  
4PWM MV4 TW4 FV4 FV4

**Materials**  
Stainless steel

**Surface finish**  
Depends on the product series

**Connections**  
(Number indicates the port location)

Code	Connections
No code	No port
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW4	1/4 inch tube weld
FV6	3/8 inch face seal (Female)
MV6	3/8 inch face seal (Male)
TW6	3/8 inch tube weld

## Port Specifications

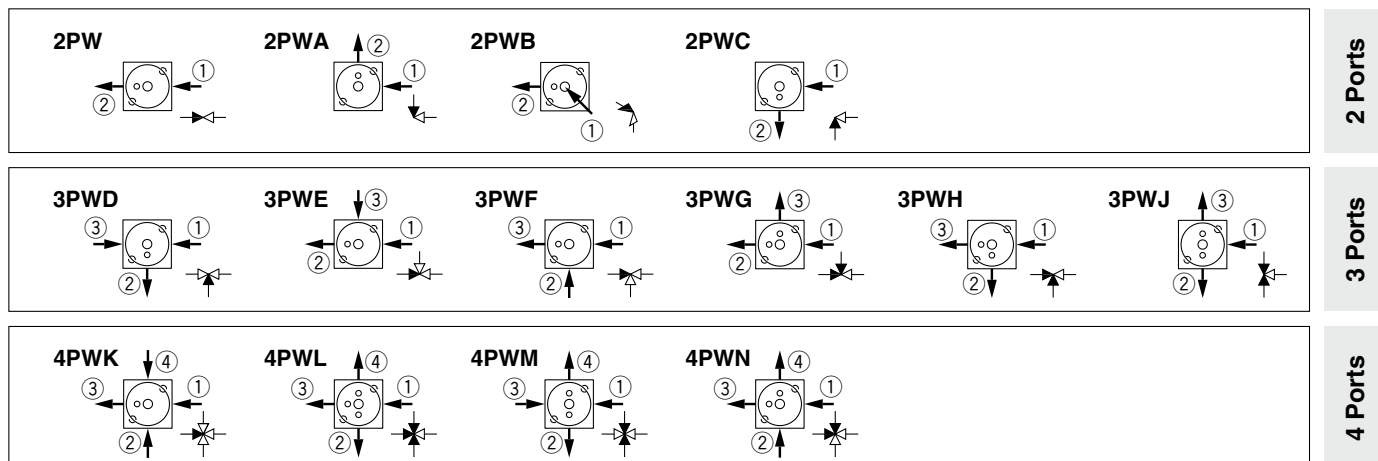
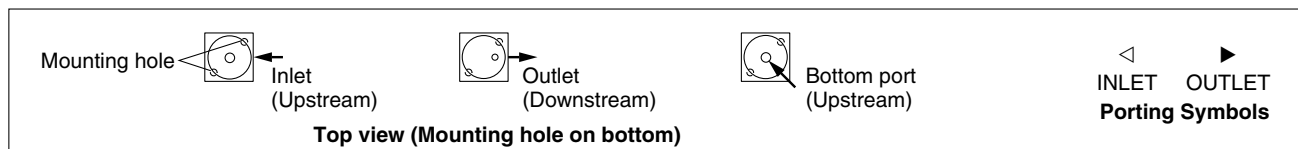
Valves are illustrated top view looking down through the valve.

The traditional flow direction is INLET to OUTLET, but AP Tech valves may be employed in either flow direction.

Port locations are indicated by numbers.

INLET (Upstream) is defined as a port connected to the region below the valve seat. It is illustrated with an arrow pointing towards the valve body or an "empty" triangle on the schematic.

OUTLET (Downstream) is defined as a port connected to the region above the seat and below the diaphragm. It is illustrated with an arrow pointing away from the valve body or a "filled" triangle on the schematic.



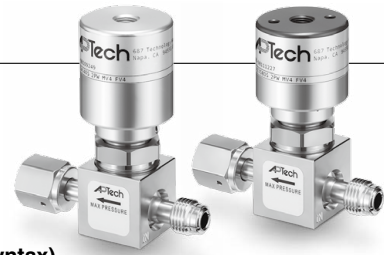
Precautions	Technical Data/ Glossary of Terms	Flow Switches	Vacuum Generators	Check Valves	AK	AZ	AP	<b>Diaphragm Valves</b>	BP	AK	AZ	SL	AP	Regulators	Recommendations
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# Diaphragm Valve for Ultra High Purity

Air operated type

## AZ3500 Series

- Suitable for UHP gas supply line
- Body material: 316L SS
- Pneumatically actuated normally closed or normally open
- Indicator switch available as an option (AZ3550/3580)



How to Order (See p. 250 for ordering syntax)

**AZ 3 542 S 2P MV4 MV4**

(Inlet) (Outlet)

**Size**

Code	Cv
3	0.29

**Model**

Code	Status	Max. operating pressure
542		125 psig (0.9 MPa)
540	Normally closed (N.C.)	145 psig (1.0 MPa)
550		300 psig (2.1 MPa)
580	Normally open (N.O.)	250 psig (1.7 MPa)

**Material**

Code	Body material
S	316L SS

**Ports**

Code	Ports	Connection
2P	2 ports	Machined
2PW		Welded

**Connections**

Code	Connections	Port	
		2P	2PW
MV4	1/4 inch face seal (Male) *1)	●	○
FV4	1/4 inch face seal (Female)	—	○
TW4	1/4 inch tube weld	●	○
MV6	3/8 inch face seal (Male)	—	○
FV6	3/8 inch face seal (Female)	—	○
TW6	3/8 inch tube weld	—	○

●: Only available with the same type fittings inlet and outlet.  
○: Male and female threads of the same size can be used in combination.  
—: Not available  
\*1) Fixed fitting (no rotating nut)

**Option (AZ3550 and AZ3580 only)**

Code	Specification
No code	—
IPC	N.C. indicator switch
IPO	N.O. indicator switch

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

**Face to face dimension**

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm) *2)

\*2) Can only be used when port code "2PW" and connection "TW4" are selected

\*) Optional porting and porting configurations available. Refer to the AZ series optional porting configuration on page 207. The optional porting configuration can be selected when the welded type (PW) is selected.

## Specifications

Operating Parameters	AZ3542	AZ3540	AZ3550	AZ3580
Status		Normally closed (N.C.)		Normally open (N.O.)
Gas	Select compatible materials of construction for the gas			
Operating pressure	Vacuum to 125 psig (0.9 MPa)	Vacuum to 145 psig (1.0 MPa) *1)	Vacuum to 300 psig (2.1 MPa)	Vacuum to 250 psig (1.7 MPa)
Proof pressure	1.5 times the maximum operating pressure			
Burst pressure	3 times the maximum operating pressure			
Ambient and operating temperature	-10 to 71°C (No freezing) *2)			
Cv	0.29			
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s		
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *3)		
Across the seat leak	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s			
Surface finish	Ra10 μin. (0.25 μm)			
Connections	Face seal, Tube weld			
Actuation pressure	60 to 110 psig (0.4 to 0.76 MPa)	70 to 110 psig (0.48 to 0.76 MPa)		
Actuation port connection	M5 x 0.8	NPT 1/8 inch	M5 x 0.8	NPT 1/8 inch
Actuation port location	Top		Side (360° rotatable)	Top
Installation	Bottom mount			
Internal volume	0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )			
Weight	0.28 kg *4)	0.68 kg *4)	0.82 kg *4)	0.68 kg *4)
LOTO (Lockout)	N/A	Option (Part number: AP PL 210) *5)	N/A	

- \*1) Vacuum to 125 psig (0.9 MPa) for Polyimide seat.
- \*2) Max. 90°C for Polyimide seat.
- \*3) Tested with Helium gas inlet pressure 125 psig (0.9 MPa).
- \*4) Weight, including individual boxed weight, may vary depending on connections or options.
- \*5) Refer to the specification for options. (P.227)

## Indicator Switch (Option) Specification

Code	IPO	IPC
Contacts	NO (When the valve is open, the circuit is closed.)	NC (When the valve is closed, the circuit is closed.)
Minimum operating current	5 mA	
Power supply voltage	10 to 36 VDC	
Rated isolation voltage	75 VDC	
Rated operating current	100 mA	
Rated operating voltage	24 VDC	
Maximum load current	100 A	
Ambient temperature range	-25 to 70°C	
Function indicator lamp	Available	
Cable	Polyurethane cable 2 cores, 2 m	PVC cable 2 cores, 3 m
Wiring diagram		

## Wetted Parts Material

Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Diaphragm	Ni-Co alloy
Seat	PCTFE (Option: Polyimide)

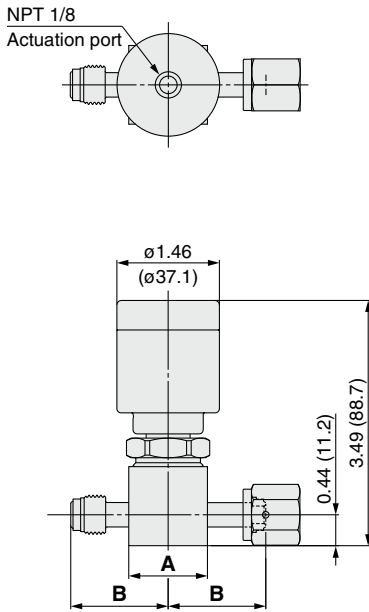
# Diaphragm Valve for Ultra High Purity **AZ3500 Series**

Air operated type

## Dimensions

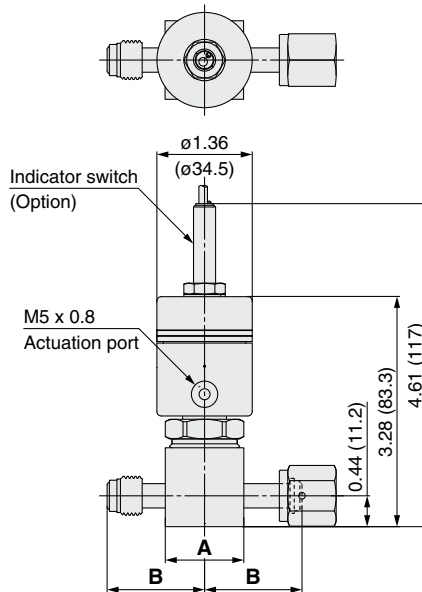
inch (mm)

### AZ3540



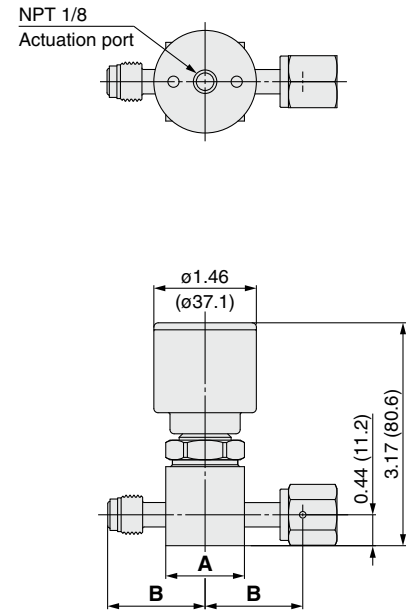
**2PW (Connections: MV□, FV□)**

### AZ3550



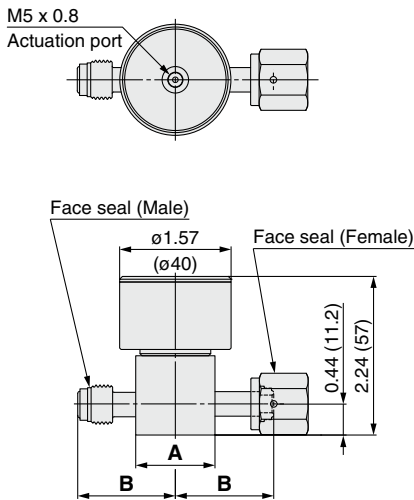
**2PW (Connections: MV□, FV□)**

### AZ3580

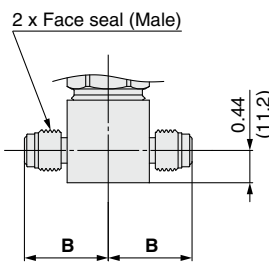


**2PW (Connections: MV□, FV□)**

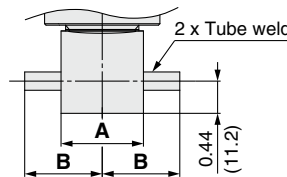
### AZ3542



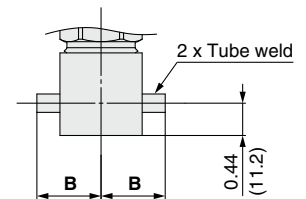
**2PW (Connections: MV□, FV□)**



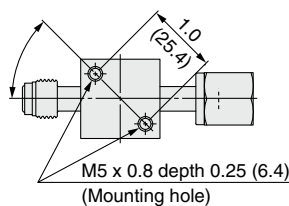
**2P (Connections: MV□)**



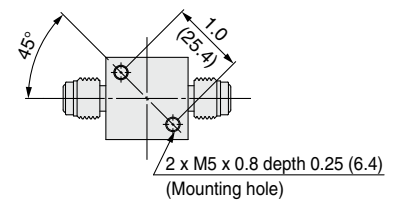
**2PW (Connections: TW□)**



**2P (Connections: TW□)**



**2PW (Bottom view)**



**2P (Bottom view)**

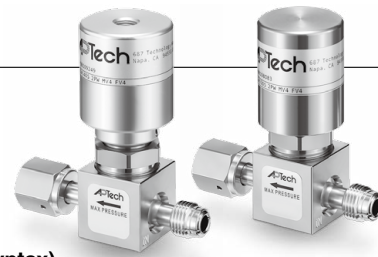
Connections	Port code					
	2P		2PW			
	B		A	B	B	
	inch	(mm)	inch	(mm)	inch	(mm)
MV4	1.14	(29.0)	1.12 sq. (□28.4)		1.39	(35.3)
FV4	—	—			1.06	(26.9)
TW4	0.875	(22.2)			1.93	(49.0)
MV6	—	—			1.325	(33.7)
FV6	—	—				
TW6	—	—				

# Diaphragm Valve for Ultra High Purity

Air operated type

## AZ4500 Series

- Suitable for UHP gas supply line
- Body material: 316L SS
- Pneumatically actuated normally closed or normally open
- Indicator switch available as an option (AZ4550/4580)



How to Order (See p. 250 for ordering syntax)

**AZ 4 542 S 2P MV4 MV4** (Inlet) (Outlet)

**Size**

Code	Cv
4	0.5

**Model**

Code	Status	Max. operating pressure
542	Normally closed	125 psig (0.9 MPa)
540	(N.C.)	
550		300 psig (2.1 MPa)
580	Normally open (N.O.)	250 psig (1.7 MPa)

**Material**

Code	Body material
S	316L SS

**Ports**

Code	Ports	Connection
2P	2 ports	Machined
2PW		Welded

**Connections**

Code	Connections	Port	
		2P	2PW
MV4	1/4 inch face seal (Male) *1	●	○
FV4	1/4 inch face seal (Female)	—	○
MV6	3/8 inch face seal (Male) *1	●	○
FV6	3/8 inch face seal (Female)	—	○
TW6	3/8 inch tube weld	●	○
TW8	1/2 inch tube weld	●	—

**Option (AZ4550 and AZ4580 only)**

Code	Specification
No code	—
IPC	N.C. indicator switch
IPO	N.O. indicator switch

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

●: Only available with the same type fittings inlet and outlet.  
○: Male and female threads of the same size can be used in combination.  
—: Not available  
\*1) Fixed fitting (no rotating nut)  
When port code "2PW" and connection "MV6" are selected, it will be a rotating nut.

\*) Optional porting and porting configurations available.  
Refer to the AZ series optional porting configuration on page 207.  
The optional porting configuration can be selected when the welded type (PW) is selected.

## Specifications

Operating Parameters	AZ4542	AZ4540	AZ4550	AZ4580
Status	Normally closed (N.C.)			Normally open (N.O.)
Gas	Select compatible materials of construction for the gas			
Operating pressure	Vacuum to 125 psig (0.9 MPa)		Vacuum to 300 psig (2.1 MPa)	Vacuum to 250 psig (1.7 MPa)
Proof pressure	1.5 times the maximum operating pressure			
Burst pressure	3 times the maximum operating pressure			
Ambient and operating temperature	-10 to 71°C (No freezing) *1)			
Cv	0.5			
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s		
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)		
Across the seat leak	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s			
Surface finish	Ra 10 μm. (0.25 μm)			
Connections	Face seal, Tube weld			
Actuation pressure	60 to 110 psig (0.4 to 0.76 MPa)	70 to 110 psig (0.48 to 0.76 MPa)		
Actuation port connection	M5 x 0.8	NPT 1/8 inch	M5 x 0.8	NPT 1/8 inch
Actuation port location	Top		Side (360° rotatable)	Top
Installation	Bottom mount			
Internal volume	0.12 in <sup>3</sup> (2.14 cm <sup>3</sup> )			
Weight	0.28 kg *3)	0.68 kg *3)	0.82 kg *3)	0.68 kg *3)
LOTO (Lockout)	N/A	Option (Part number: AP PL 210) *4)	N/A	

- \*1) Max. 90°C for Polyimide seat.
- \*2) Tested with Helium gas inlet pressure 125 psig (0.9 MPa).
- \*3) Weight, including individual boxed weight, may vary depending on connections or options.
- \*4) Refer to the specification for options. (P.227)

## Indicator Switch (Option) Specification

Code	IPO	IPC
Contacts	NO (When the valve is open, the circuit is closed.)	NC (When the valve is closed, the circuit is closed.)
Minimum operating current	5 mA	
Power supply voltage	10 to 36 VDC	
Rated isolation voltage	75 VDC	
Rated operating current	100 mA	
Rated operating voltage	24 VDC	
Maximum load current	100 A	
Ambient temperature range	-25 to 70°C	
Function indicator lamp	Available	
Cable	Polyurethane cable 2 cores, 2 m	PVC cable 2 cores, 3 m
Wiring diagram		

## Wetted Parts Material

Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Diaphragm	Ni-Co alloy
Seat	PCTFE (Option: Polyimide)



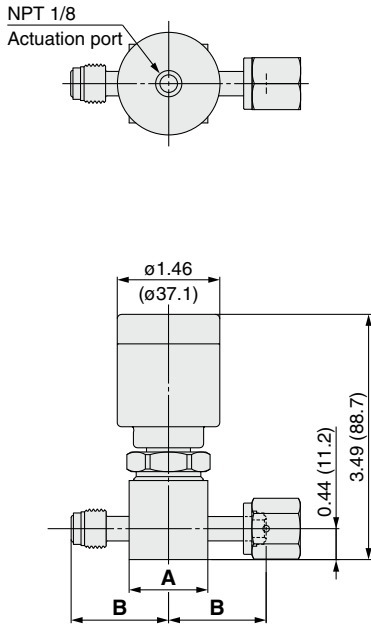
# Diaphragm Valve for Ultra High Purity

## Air operated type **AZ4500 Series**

### Dimensions

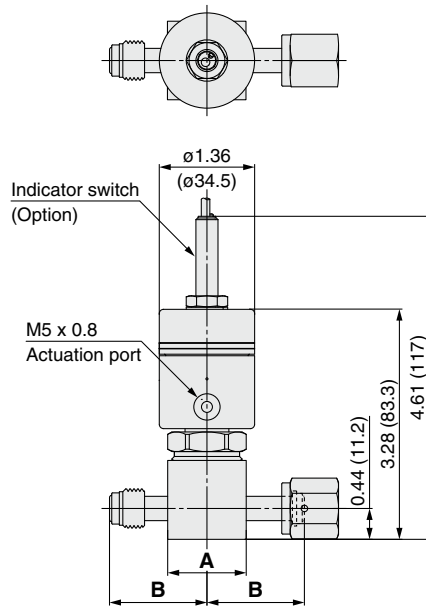
inch (mm)

#### AZ4540



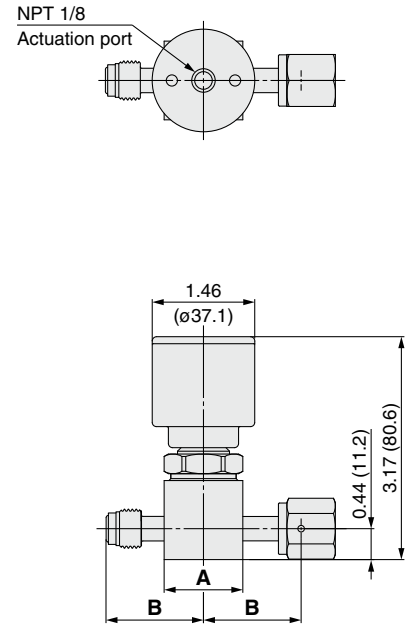
2PW (Connections: MV□, FV□)

#### AZ4550



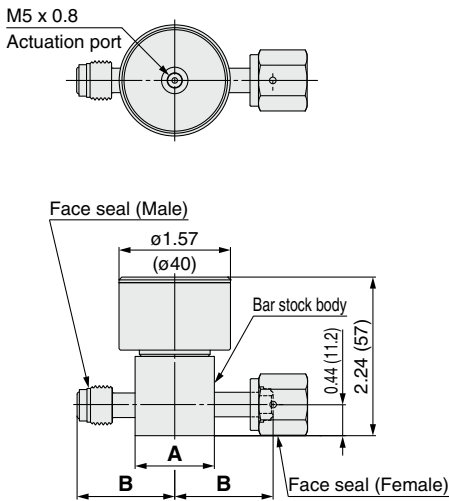
2PW (Connections: MV□, FV□)

#### AZ4580

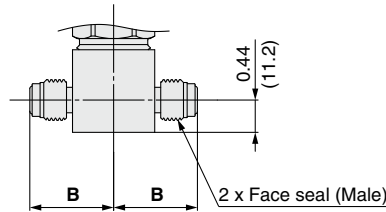


2PW (Connections: MV□, FV□)

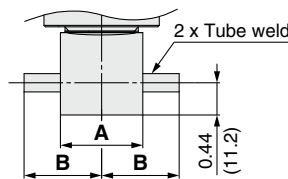
#### AZ4542



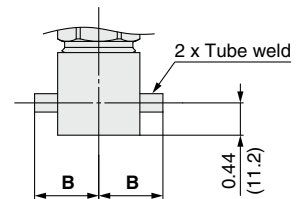
2PW (Connections: MV□, FV□)



2P (Connections: MV□)

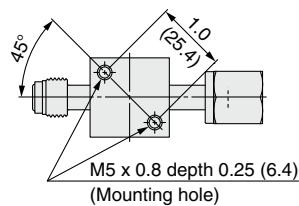


2PW (Connections: TW□)

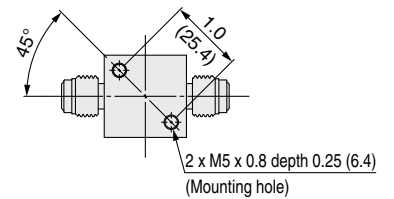


2P (Connections: TW□)

Connections	Port code					
	2P		2PW			
	B		A	B	B	
	inch	(mm)	inch	(mm)	inch	(mm)
MV4	1.14	(29.0)	1.12 sq. (28.4)	□28.4	1.39	(35.3)
FV4	—	—			1.93	(49.0)
MV6	1.50	(38.1)			1.325	(33.7)
FV6	—	—			—	—
TW6	0.875	(22.2)			—	—
TW8	1.125	(28.6)	—	—	—	—



2PW (Bottom view)



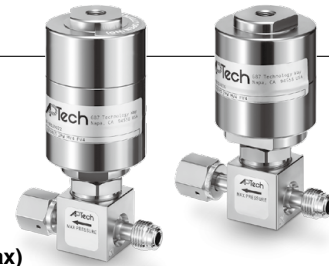
2P (Bottom view)

# Diaphragm Valve for Ultra High Purity

Air operated type  
(For high pressure)

## AZ3000 Series

- Suitable for UHP gas supply line
- Body material: 316L SS
- Pneumatically actuated normally closed or normally open
- High pressure type: Max. 4500 psig (31 MPa)
- Indicator switch available as an option



RoHS

How to Order (See p. 250 for ordering syntax)

AZ 30 00 S 2PW FV4 FV4

Code	Status	Max. operating pressure	Cv
00	Normally closed (N.C.)	3000 psig (20.7 MPa)	0.23
02		3700 psig (25.5 MPa)	0.28
04		4500 psig (31.0 MPa)	0.23
07	Normally open (N.O.)	3000 psig (20.7 MPa)	0.23
80		3000 psig (20.7 MPa)	0.23

Model

Code	Body material
S	316L SS

Material

Code	Ports	Connection
2P	2 ports	Machined *1)
2PW		Welded *2)

- \*1) Not available with AZ3004 and AZ3007.
- \*2) Optional porting and porting configurations available. Refer to the AZ series optional porting configuration on page 207. The optional porting configuration can be selected when the welded type (PW) is selected.

Code	Connections	Port	
		2P	2PW
MV4	1/4 inch face seal (Male) *3)	●	○
FV4	1/4 inch face seal (Female)	—	○
TW4	1/4 inch tube weld	●	○
MV6	3/8 inch face seal (Male) *4)	—	○
FV6	3/8 inch face seal (Female) *4)	—	○
TW6	3/8 inch tube weld *4)	—	○

- : Only available with the same type fittings inlet and outlet.
- : Male and female threads of the same size can be used in combination.
- : Not available
- \*3) Fixed fitting (no rotating nut)
- \*4) Size 3/8 cannot be selected for AZ3004 and AZ3007.

Code	Specification
No code	—
IS	Indicator switch

Option

Seat material

Code	Material	Model				
		3000	3002	3004	3007	3080
No code	PCTFE (Standard)	●	●	●	—	●
VS	Polyimide	●	●	●	●	●
PK	PEEK	—	—	●	●	—

- : Available
- : Not available

Face to face dimension

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm) *5)

- \*5) Only applies to port code 2PW with TW4 connections.

## Specifications

Operating Parameters		AZ3000	AZ3002	AZ3004	AZ3007	AZ3080
Status		Normally closed (N.C.)				Normally open (N.O.)
Gas		Select compatible materials of construction for the gas				
Operating pressure		Vacuum to 3000 psig (20.7 MPa)		Vacuum to 3700 psig (25.5 MPa)	Vacuum to 4500 psig (31 MPa)	Vacuum to 3000 psig (20.7 MPa)
Proof pressure		1.5 times the maximum operating pressure				
Burst pressure		3 times the maximum operating pressure				
Ambient and operating temperature		-10 to 71°C (No freezing) *1)		-10 to 49°C (No freezing)	-10 to 60°C (No freezing)	-10 to 71°C (No freezing) *1)
Cv		0.23	0.28			0.23
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s				
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)				
Across the seat leak		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s				
Surface finish		Ra 10 μm. (0.25 μm)				
Connections		Face seal, Tube weld				
Actuation pressure		70 to 110 psig (0.48 to 0.76 MPa)				
Actuation port connection		NPT 1/8 inch				
Actuation port location		Top				
Installation		Bottom mount				
Internal volume		0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )				
Weight		1.27 kg *3)				
LOTO (Lockout)		Option (Part number: AP PL 210) *4)				N/A

- \*1) Max. 90°C for Polyimide seat.
- \*2) Tested with Helium gas inlet pressure 1000 psig (6.9 MPa).
- \*3) Weight, including individual boxed weight, may vary depending on connections or options.
- \*4) Refer to the specification for options. (P.227)

## Indicator Switch (Option) Specification

Code	IS	
Switch type	SPDT	
Rated voltage	Max. 30 VDC	
Contact capacity	Max. 3 VA	
Switching current	Max. 0.2 A	
Carrying current	Max. 0.5 A	
Cable	Lead wire	AWG 24
	Cable length	3 m
	Color (Lead wire)	Blue: Common line Brown: NC (When the valve is closed, the circuit is closed.) Black: NO (When the valve is open, the circuit is closed.)

## Wetted Parts Material

Wetted Parts	S	
Body	316L SS	
Surface finish	Electropolish + Passivation	
Diaphragm	Ni-Co alloy	
Seat	AZ3000, AZ3002, AZ3080	PCTFE (Option: Polyimide)
	AZ3004	PCTFE (Option: Polyimide, PEEK)
	AZ3007	Polyimide or PEEK

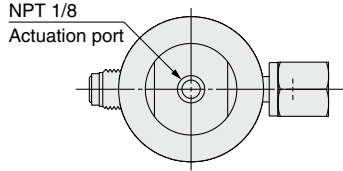
# Diaphragm Valve for Ultra High Purity **AZ3000 Series**

Air operated type (For high pressure)

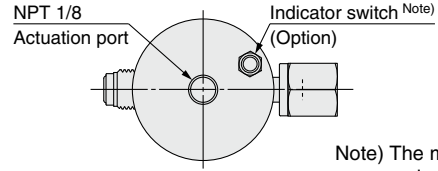
## Dimensions

inch (mm)

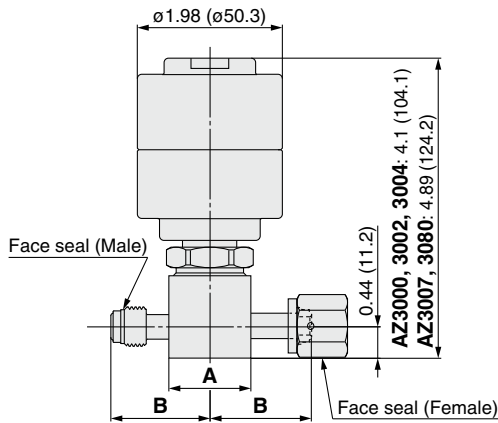
**AZ3000**  
**AZ3002**  
**AZ3004**  
**AZ3007**  
**AZ3080**



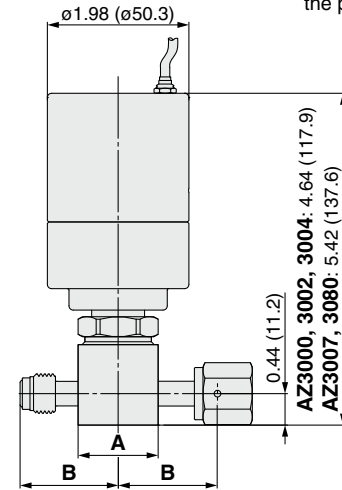
### Indicator switch



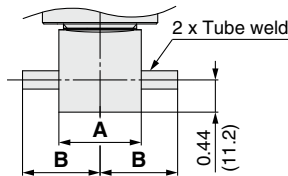
Note) The mounting position varies depending on the product.



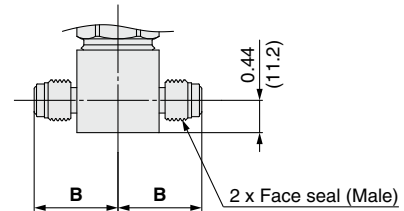
**2PW (Connections: MV□, FV□)**



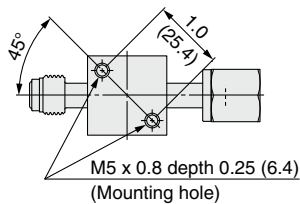
**2PW (Connections: MV□, FV□)**



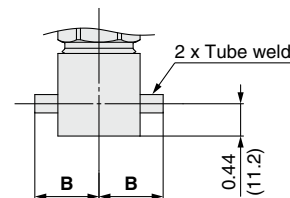
**2PW (Connections: TW□)**



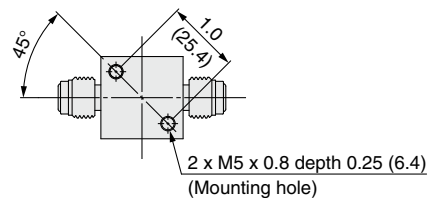
**2P (Connections: MV4)**



**2PW (Bottom view)**



**2P (Connections: TW4)**



**2P (Bottom view)**

Connections	Port code					
	2P		2PW			
	B		A	B	B	
	inch	(mm)	inch	(mm)	inch	(mm)
<b>MV4</b>	1.14	(29.0)	1.12 sq. (□28.4)		1.39	(35.3)
<b>FV4</b>	—	—			1.06	(26.9)
<b>TW4</b>	0.875	(22.2)			1.93	(49.0)
<b>MV6</b>	—	—			1.325	(33.7)
<b>FV6</b>	—	—				
<b>TW6</b>	—	—				

# Diaphragm Valve for Ultra High Purity

Air operated type  
(For high pressure)

## AZ4000 Series



- Suitable for UHP gas supply line
- Body material: 316L SS
- Pneumatically actuated normally closed
- High pressure type: Max. 3000 psig (20.7 MPa)
- Indicator switch available as an option

How to Order (See p. 250 for ordering syntax)

**AZ 40 00 S 2PW FV4 FV4** (Inlet) (Outlet)

**Model**

Code	Status	Max. operating pressure
00	Normally closed (N.C.)	3000 psig (20.7 MPa)

**Material**

Code	Body material
S	316L SS

**Ports**

Code	Ports	Connection
2P	2 ports	Machined
2PW		Welded

**Connections**

Code	Connections	Port	
		2P	2PW
MV4	1/4 inch face seal (Male) *1)	●	○
FV4	1/4 inch face seal (Female)	—	○
MV6	3/8 inch face seal (Male) *1)	●	○
FV6	3/8 inch face seal (Female)	—	○
TW6	3/8 inch tube weld	●	○
TW8	1/2 inch tube weld	●	—

**Option**

Code	Specification
No code	—
IS	Indicator switch

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

- : Only available with the same type fittings inlet and outlet.
- : Male and female threads of the same size can be used in combination.
- : Not available
- \*1) Fixed fitting (no rotating nut)  
When port code "2PW" and connection "MV6" are selected, it will be a rotating nut.

\*) Optional porting and porting configurations available.  
Refer to the AZ series optional porting configuration on page 207.  
The optional porting configuration can be selected when the welded type (PW) is selected.

## Specifications

Operating Parameters		AZ4000
<b>Status</b>		Normally closed (N.C.)
<b>Gas</b>		Select compatible materials of construction for the gas
<b>Operating pressure</b>		Vacuum to 3000 psig (20.7 MPa)
<b>Proof pressure</b>		1.5 times the maximum operating pressure
<b>Burst pressure</b>		3 times the maximum operating pressure
<b>Ambient and operating temperature</b>		-10 to 71°C (No freezing) *1)
<b>Cv</b>		0.35
<b>Leak rate</b>	<b>Inboard leakage</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s
	<b>Outboard leakage</b>	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)
<b>Across the seat leak</b>		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s
<b>Surface finish</b>		Ra 10 μin. (0.25 μm)
<b>Connections</b>		Face seal, Tube weld
<b>Actuation pressure</b>		70 to 110 psig (0.48 to 0.76 MPa)
<b>Actuation port connection</b>		NPT 1/8 inch
<b>Actuation port location</b>		Top
<b>Installation</b>		Bottom mount
<b>Internal volume</b>		0.12 in <sup>3</sup> (2.14 cm <sup>3</sup> )
<b>Weight</b>		1.27 kg *3)

\*1) Max. 90°C for Polyimide seat.

\*2) Tested with Helium gas inlet pressure 1000 psig (6.9 MPa).

\*3) Weight, including individual boxed weight, may vary depending on connections or options.

## Indicator Switch (Option) Specification

Code	IS	
<b>Switch type</b>	SPDT	
<b>Rated voltage</b>	Max. 30 VDC	
<b>Contact capacity</b>	Max. 3 VA	
<b>Switching current</b>	Max. 0.2 A	
<b>Carrying current</b>	Max. 0.5 A	
<b>Cable</b>	<b>Lead wire</b>	AWG 24
	<b>Cable length</b>	3 m
	<b>Color (Lead wire)</b>	Blue: Common line Brown: NC (When the valve is closed, the circuit is closed.) Black: NO (When the valve is open, the circuit is closed.)

## Wetted Parts Material

Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Diaphragm	Ni-Co alloy
Seat	PCTFE (Option: Polyimide)

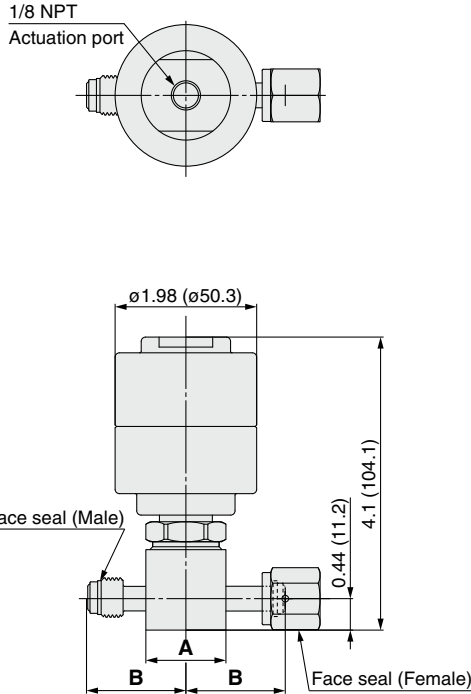
# Diaphragm Valve for Ultra High Purity **AZ4000 Series**

Air operated type (For high pressure)

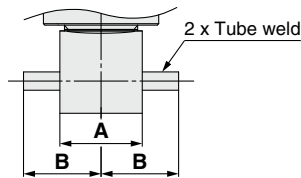
## Dimensions

inch (mm)

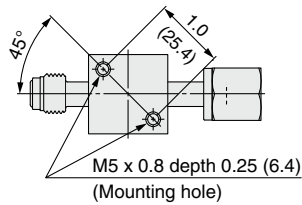
### AZ4000



2PW (Connections: MV□, FV□)

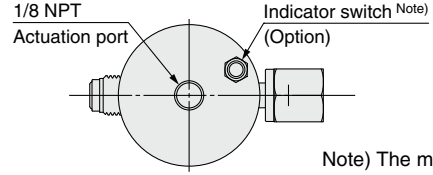


2PW (Connections: TW□)

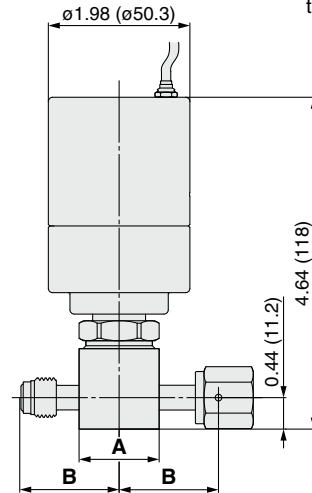


2PW (Bottom view)

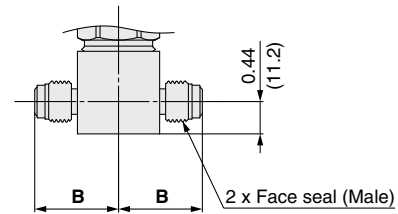
### Indicator switch



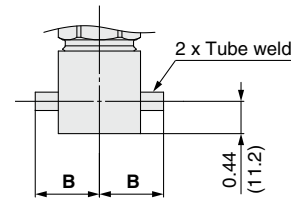
Note) The mounting position varies depending on the product.



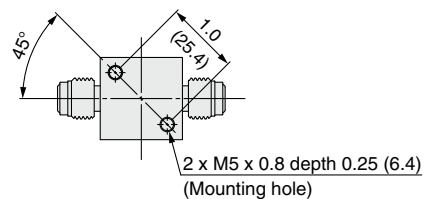
2PW (Connections: MV□, FV□)



2P (Connections: MV□)



2P (Connections: TW□)



2P (Bottom view)

Connections	Port code					
	2P		2PW			
	B		A		B	
	inch	(mm)	inch	(mm)	inch	(mm)
MV4	1.14	(29.0)	1.12 sq. (□28.4)		1.39	(35.3)
FV4	—	—			1.93	(49.0)
MV6	1.50	(38.1)			1.325	(33.7)
FV6	—	—			—	—
TW6	0.875	(22.2)			—	—
TW8	1.125	(28.6)	—	—	—	—

# Diaphragm Valve for Ultra High Purity

Air operated type

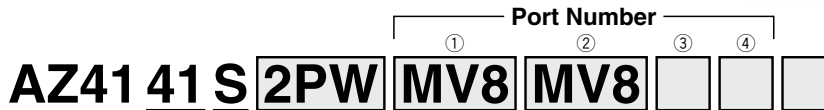
## AZ4141 Series

- Suitable for UHP gas supply line
- Body material: 316L SS
- Pneumatically actuated normally closed



RoHS

How to Order (See p. 250 for ordering syntax)



**Model**

Code	Max. operating pressure	Cv
41	250 psig (1.7 MPa)	0.8

**Material**

Code	Body material
S	316L SS

**Ports (Refer to the porting configuration.)**

Code	Ports
2PW	2 ports
3PWD	3 ports
3PWE	3 ports
3PWF	3 ports
4PWM	4 ports

**Seat material**

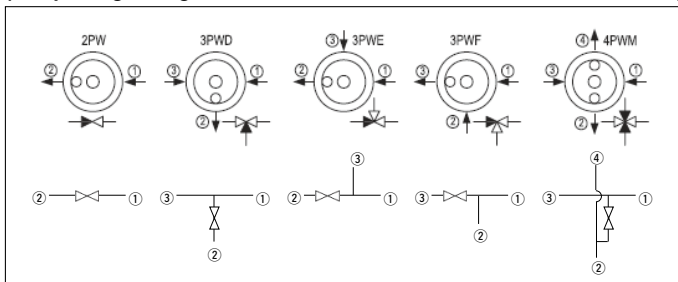
Code	Material
No code	PCTFE (Standard)
VS	Polyimide

**Connections (Refer to the porting configuration.)**

Code	Connections
No code	No port
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW6	3/8 inch tube weld
FV8	1/2 inch face seal (Female)
MV8	1/2 inch face seal (Male)
TW8	1/2 inch tube weld

### Porting Configuration

(The porting configurations viewed from the actuator side are shown.)



### Sample Order Number

AZ4141S	Port			
	①	②	③	④
	2PW	MV8	MV8	
	3PWD	MV8	MV8	MV8

### Specifications

Operating Parameters		AZ4141
Status		Normally closed (N.C.)
Gas		Select compatible materials of construction for the gas
Operating pressure		Vacuum to 250 psig (1.7 MPa)
Proof pressure		1.5 times the maximum operating pressure
Burst pressure		3 times the maximum operating pressure
Ambient and operating temperature		-10 to 71°C (No freezing) *1)
Cv		0.8
Leak rate	Inboard leakage	$2 \times 10^{-11}$ Pa·m <sup>3</sup> /s
	Outboard leakage	$2 \times 10^{-10}$ Pa·m <sup>3</sup> /s
Across the seat leak		$1 \times 10^{-10}$ Pa·m <sup>3</sup> /s
Surface finish		Ra 10 μin. (0.25 μm)
Connections		Face seal, Tube weld
Actuation pressure		70 to 110 psig (0.48 to 0.76 MPa)
Actuation port connection		M5 x 0.8
Actuation port location		Side
Installation		Bottom mount
Internal volume		0.37 in <sup>3</sup> (6.1 cm <sup>3</sup> )

\*1) Max. 90°C for Polyimide seat.

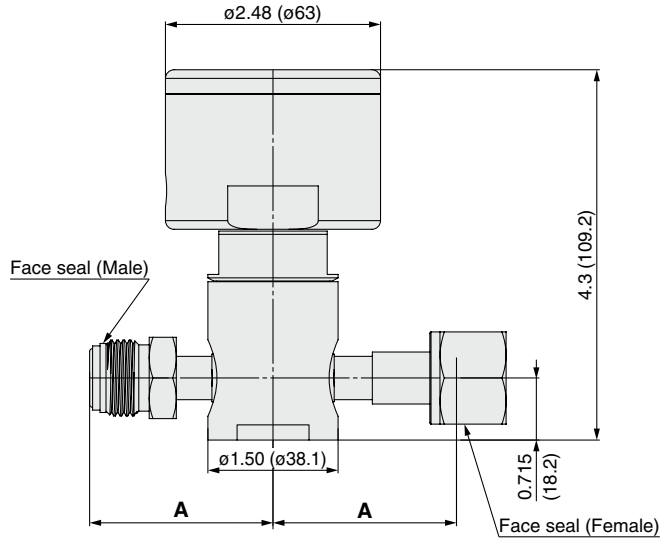
### Wetted Parts Material

Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Diaphragm	Ni-Co alloy
Seat	PCTFE (Option: Polyimide)

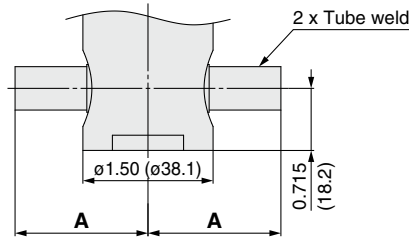
**Dimensions**

inch (mm)

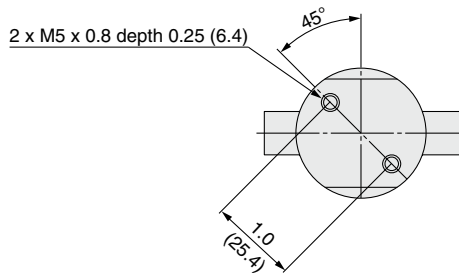
**AZ4141**



Connections: MV□, FV□



Connections: TW□



Bottom view

Connections	A	
	inch	(mm)
<b>FV4</b>	1.59	(40.4)
<b>MV4</b>		
<b>TW6</b>	1.49	(37.8)
<b>FV8</b>	2.12	(53.8)
<b>MV8</b>		
<b>TW8</b>	1.53	(38.9)

Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

Vacuum Generators

Flow Switches

Technical Data/  
Glossary of Terms

Precautions

# Diaphragm Valve for Ultra High Purity

Air operated type  
(For high flow)

## AZ3700 Series

- Suitable for UHP gas supply line
- Body material: 316L SS
- Pneumatically actuated normally closed or normally open
- Indicator switch available as an option
- Purge ports and monoblock configurations available



RoHS

How to Order (See p. 250 for ordering syntax)

**AZ 37 00 S MV8 MV8**

(Inlet) (Outlet)

**Model**

Code	Status
00	Normally closed (N.C.)
08	Normally open (N.O.)

**Material**

Code	Body material
S	316L SS

**Connections (Inlet, Outlet)**

Code	Connections
TW6	3/8 inch tube weld
FV8	1/2 inch face seal (Female)
MV8	1/2 inch face seal (Male)
TW8	1/2 inch tube weld
FV12	3/4 inch face seal (Female)
MV12	3/4 inch face seal (Male)
TW12	3/4 inch tube weld

**Option**

Code	Specification
No code	—
IPC	N.C. indicator switch
IPO	N.O. indicator switch

**Purge port option**

Code	Specification
No code	—
C	Capped purge port

**Diaphragm material**

Code	Material
No code	316L SS (Standard)
HD	Ni-Cr-Mo alloy

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

**Purge port \*1)**

Code	Inlet (3)	Outlet (4)
00	None	None
MO	Available	None
OB	None	Available
MB	Available	Available

**Porting Configuration**

## Specifications

Operating Parameters		AZ3700	AZ3708
<b>Status</b>		Normally closed (N.C.)	Normally open (N.O.)
<b>Gas</b>		Select compatible materials of construction for the gas	
<b>Operating pressure</b>		Vacuum to 250 psig (1.7 MPa)	
<b>Proof pressure</b>		1.5 times the maximum operating pressure	
<b>Burst pressure</b>		3 times the maximum operating pressure	
<b>Ambient and operating temperature</b>		-10 to 71°C (No freezing) *1)	
<b>Cv</b>		2.8	
<b>Leak rate</b>	<b>Inboard leakage</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s	
	<b>Outboard leakage</b>	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s	
<b>Across the seat leak</b>		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s	
<b>Surface finish</b>		Ra 10 μin. (0.25 μm)	
<b>Connections</b>		Face seal, Tube weld	
<b>Actuation pressure</b>		80 to 100 psig (0.55 to 0.7 MPa)	
<b>Actuation port connection</b>		M5 x 0.8	
<b>Actuation port location</b>		Side (360° rotatable)	
<b>Installation</b>		Bottom mount	
<b>Internal volume</b>		0.76 in <sup>3</sup> (12.52 cm <sup>3</sup> )	

\*1) Max. 90°C for Polyimide seat.

## Indicator Switch (Option) Specification

Code	IPO	IPC
<b>Contacts</b>	NO (When the valve is open, the circuit is closed.)	NC (When the valve is closed, the circuit is closed.)
<b>Minimum operating current</b>	5 mA	
<b>Power supply voltage</b>	10 to 36 VDC	
<b>Rated isolation voltage</b>	75 VDC	
<b>Rated operating current</b>	100 mA	
<b>Rated operating voltage</b>	24 VDC	
<b>Maximum load current</b>	100 A	
<b>Ambient temperature range</b>	-25 to 70°C	
<b>Function indicator lamp</b>	Available	
<b>Cable</b>	Polyurethane cable 2 cores, 2 m	PVC cable 2 cores, 3 m
<b>Wiring diagram</b>		

## Wetted Parts Material

Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Diaphragm	316L SS (Option: Ni-Cr-Mo alloy)
Seat	PCTFE (Option: Polyimide)



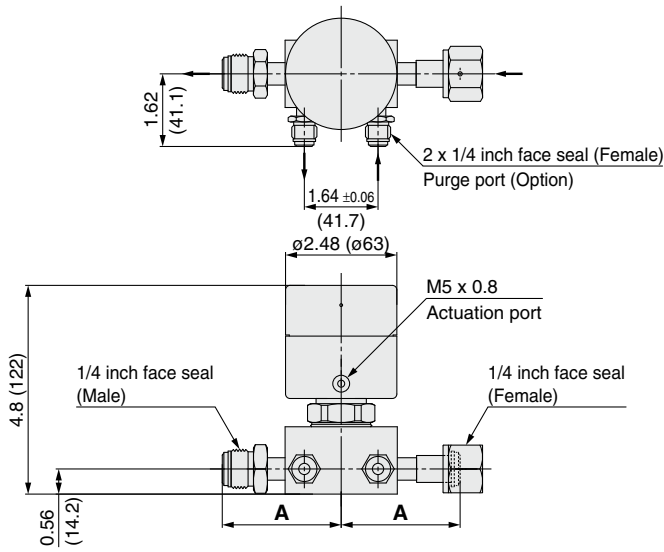
# Diaphragm Valve for Ultra High Purity **AZ3700 Series**

Air operated type (For high flow)

## Dimensions

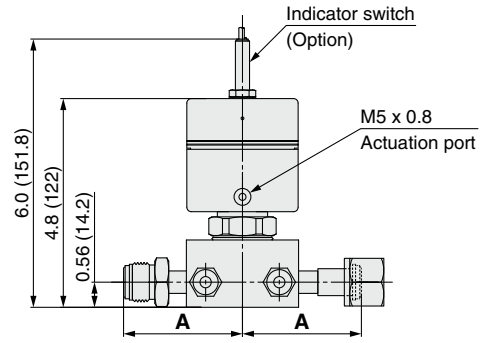
inch (mm)

### AZ3700



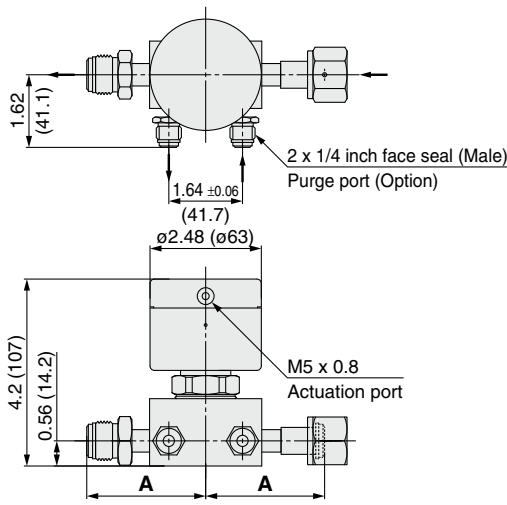
Connections: MV□, FV□

### Indicator switch

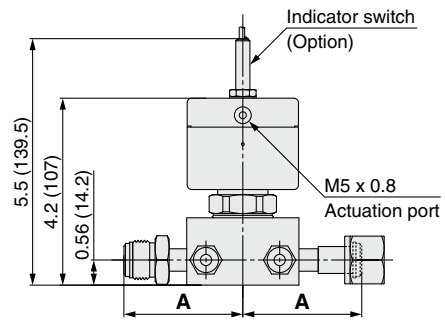


Connections: MV□, FV□

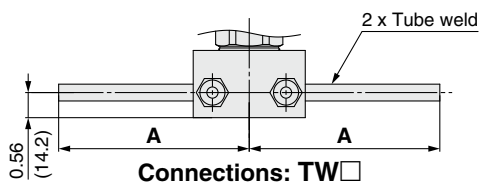
### AZ3708



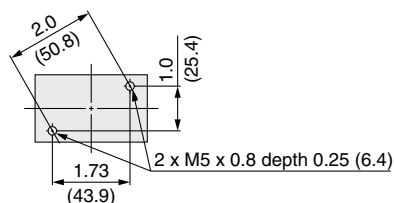
Connections: MV□, FV□



Connections: MV□, FV□



Connections: TW□



Bottom view

Connections	A	
	inch	(mm)
TW6	4.25	(108.0)
FV8	2.65	(67.3)
MV8		
TW8	4.25	(108.0)
FV12	3.20	(81.3)
MV12		
TW12	4.25	(108.0)

Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

Vacuum Generators

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Precautions

## AZ3571 & 4571 Series



- Two step mode - metered flow and full open
- Two separate actuation ports
- Soft start valve to minimize vacuum chamber pressurization turbulence
- Metered flow adjustable AZ3571: 10 to 200 slpm\*  
AZ4571: 10 to 350 slpm\*

- Pneumatically actuated normally closed

- Body material: 316L SS

\* At 80 psig (0.55 MPa) of N<sub>2</sub>

**How to Order** (See p. 250 for ordering syntax)

(Inlet) (Outlet)

**AZ 3 571 S 2PW FV4 FV4 M 050**

**Size**

Code	Cv
3	0.29
4	0.5

**Model**

Code	Mode	Status
571	Two step mode	Normally closed (N.C.)

**Material**

Code	Body material
S	316L SS

**Ports**

Code	Ports	Connection
2P	2 ports	Machined
2PW		Welded

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

**Face to face dimension \*2)**

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm) *2)

\*2) Can be used when size code 3, port code "2PW," and connection "TW4" are selected

**Metered flow**

Code	Metered adjusted flow in slpm
XXX (3 digits)	Metered adjusted flow in slpm at 80 psig (0.55 MPa) N <sub>2</sub> . Replace XXX with flow rate using 3 digits, example 50 slpm = "050" Adjustable range: AZ3571 = 10 to 200 slpm, AZ4571 = 10 to 350 slpm

\*) Optional porting and porting configurations available. Refer to the AZ series optional porting configuration on page 207. The optional porting configuration can be selected when the welded type (PW) is selected.

### Connections

Code	Connections	Size Port	AZ3		AZ4	
			2P	2PW	2P	2PW
MV4	1/4 inch face seal (Male) *1)		●	○	●	○
FV4	1/4 inch face seal (Female)		—	○	—	○
TW4	1/4 inch tube weld		●	○	—	—
MV6	3/8 inch face seal (Male) *1)		—	○	●	○
FV6	3/8 inch face seal (Female)		—	○	—	○
TW6	3/8 inch tube weld		—	○	●	○
TW8	1/2 inch tube weld		—	—	●	—

- Only available with the same type fittings inlet and outlet.
- Male and female threads of the same size can be used in combination.
- : Not available
- \*1) Fixed fitting (no rotating nut) When port code "2PW" and connection "MV6" are selected, it will be a rotating nut.

## Specifications

Operating Parameters		AZ3571	AZ4571
Status		Normally closed (N.C.)	
Gas		Select compatible materials of construction for the gas	
Operating pressure		Vacuum to 125 psig (0.9 MPa)	
Proof pressure		1.5 times the maximum operating pressure	
Burst pressure		3 times the maximum operating pressure	
Ambient and operating temperature		-10 to 71°C (No freezing) *1)	
Cv		0.29	0.5
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s	
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)	
Across the seat leak		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s	
Surface finish		Ra 10 μm. (0.25 μm)	
Connections		Face seal, Tube weld	
Actuation pressure		70 to 110 psig (0.48 to 0.76 MPa)	
Actuation port connection		M5 thread	
Actuation port location		Sides (2 each)	
Installation		Bottom mount	
Internal volume		0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )	0.12 in <sup>3</sup> (2.14 cm <sup>3</sup> )
Adjustable range of metered flow *3)		10 to 200 slpm	10 to 350 slpm
Tolerance of *3) metered flow	10 to 20 slpm	±6 slpm	
	21 to 50 slpm	±10 slpm	
	51 to 100 slpm	±15 slpm	
	101 to 200 slpm	±20 slpm	
	201 to 350 slpm	N/A	±25 slpm

\*1) -10 to 90°C for Polyimide seat.

\*2) Tested with Helium gas inlet pressure 125 psig (0.9 MPa)

\*3) At 80 psig (0.55 MPa) N<sub>2</sub>

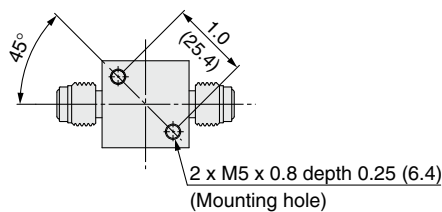
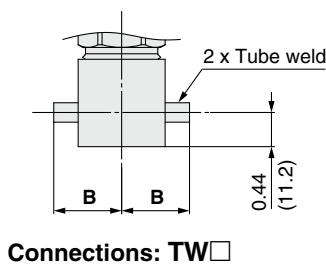
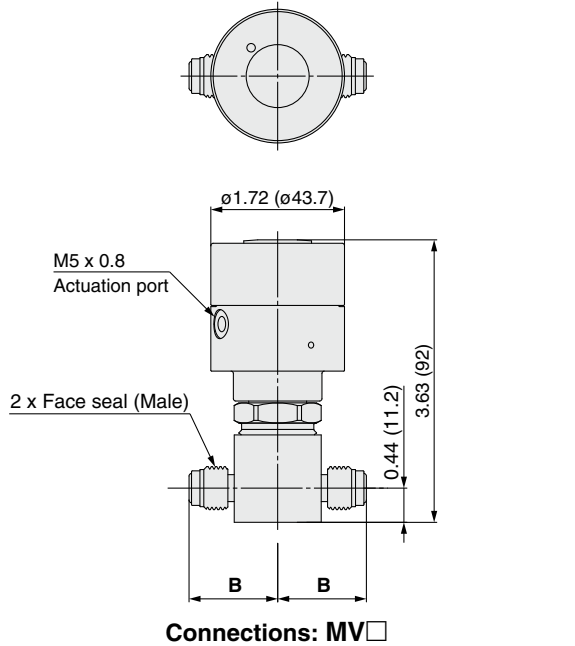
## Wetted Parts Material

Wetted Parts	<b>S</b>
Body	316L SS
Surface finish	Electropolish + Passivation
Diaphragm	Ni-Co alloy
Seat	PCTFE (Option: Polyimide)

## Dimensions

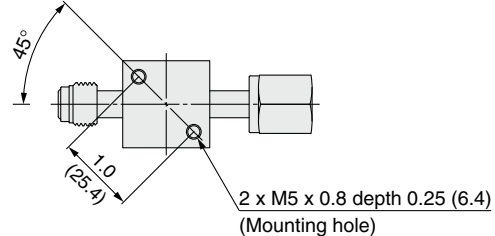
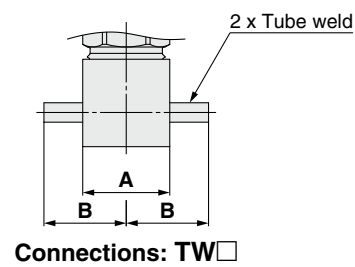
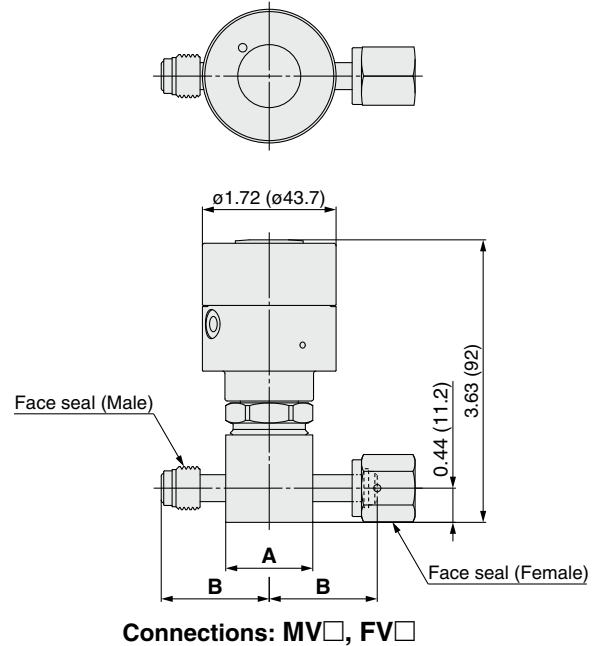
inch (mm)

**Machined: 2P**



**Bottom view (2P)**

**Welded: 2PW**



**Bottom view (2PW)**

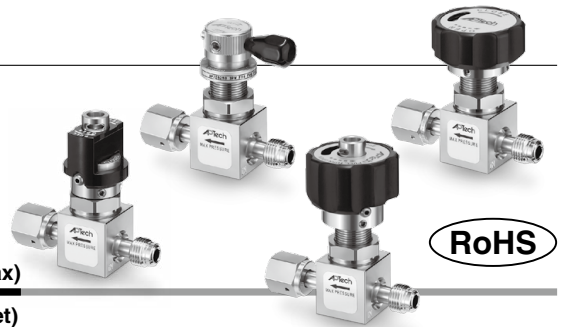
Connections	Port code					
	2P		2PW			
	B		A		B	
	inch	(mm)	inch	(mm)	inch	(mm)
MV4	1.14	(29.0)	1.12 sq. (□28.4)		1.39	(35.3)
FV4	—	—			1.06	(26.9)
TW4	0.875	(22.2)			1.93	(49.0)
MV6	1.50	(38.1)			1.325	(33.7)
FV6	—	—			—	—
TW6	0.875	(22.2)			—	—
TW8	1.125	(28.6)			—	—

# Diaphragm Valve for Ultra High Purity

Manually operated type

## AZ3600 Series

- Suitable for UHP gas supply line
- Body material: 316L SS
- LOTO standard with AZ3657/3659, optional AZ3625
- Indicator switch available as an option (AZ3650)



How to Order (See p. 250 for ordering syntax)

**AZ 3 652 S 2P MV4 MV4**

**Size**

Code	Cv
3	0.29

**Material**

Code	Body material
S	316L SS

**Model**

Code	Knob	Max. operating pressure
652	Round knob with a raised rectangular section	250 psig
659	Pull twist knob with LOTO	(1.7 MPa)
600	Multi turn round knob	
625	Lever knob	
650	Round knob with open/close indication window	3000 psig
657	Pull twist knob with LOTO	(20.7 MPa)

**Connections**

Code	Connections	Port	
		2P	2PW
MV4	1/4 inch face seal (Male) *1	●	○
FV4	1/4 inch face seal (Female)	—	○
TW4	1/4 inch tube weld	●	○
MV6	3/8 inch face seal (Male)	—	○
FV6	3/8 inch face seal (Female)	—	○
TW6	3/8 inch tube weld	—	○

**Ports**

Code	Ports	Connection
2P	2 ports	Machined
2PW		Welded

**Option (AZ3650 only)**

Code	Specification
No code	—
ISH	Indicator switch

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

**Installation option**

Code	Installation
No code	Bottom mount (Standard)
P	Panel installation *3

**Face to face dimension**

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm) *2

**Notes:**

- : Only available with the same type fittings inlet and outlet.
- : Male and female threads of the same size can be used in combination.
- : Not available
- \*1) Fixed fitting (no rotating nut)

\*2) Can be used when port code "2PW" and connection "TW4" are selected

\*3) Panel mounting hole: dia. 0.78 inch (19.8 mm). Not available with AZ3652 and AZ3659.

\*4) Optional porting and porting configurations available. Refer to the AZ series optional porting configuration on page 207. The optional porting configuration can be selected when the welded type (PW) is selected.

## Specifications

Operating Parameters	AZ3652	AZ3659	AZ3600	AZ3625	AZ3650	AZ3657
<b>Gas</b>	Select compatible materials of construction for the gas					
<b>Operating pressure</b>	Vacuum to 250 psig (1.7 MPa)			Vacuum to 3000 psig (20.7 MPa)		
<b>Proof pressure</b>	1.5 times the maximum operating pressure					
<b>Burst pressure</b>	3 times the maximum operating pressure					
<b>Ambient and operating temperature</b>	-40 to 71°C (No freezing) *1					
<b>Cv</b>	0.29					
<b>Leak rate</b>	<b>Inboard leakage</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s				
	<b>Outboard leakage</b>	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2				
<b>Across the seat leak</b>	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s					
<b>Surface finish</b>	Ra 10 μm. (0.25 μm)					
<b>Connections</b>	Face seal, Tube weld					
<b>Installation</b>	Bottom mount			Bottom mount (Option: panel mount)		
<b>Internal volume</b>	0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )					
<b>Weight</b>	0.26 kg *3	0.45 kg *3	0.36 kg *3	0.45 kg *3	0.73 kg *3	0.4 kg *3
<b>Knob</b>	1/4 turn round knob with a raised rectangular section and open/close indication window	Pull twist knob with LOTO *5	Multi turn round knob	1/4 turn lever knob *4	1/4 turn round knob with open/close indication window	Pull twist knob with LOTO *5
<b>Operational Safety Device (OSD)</b>	N/A	Standard	N/A	Option *6 (Part number: AP PL227)	N/A	Standard
<b>LOTO (Lockout)</b>				Option *6 (Part number: AP PL225)		

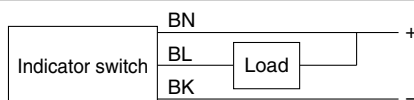
- \*1) -10 to 90°C for Polyimide seat.
- \*2) Tested with Helium gas inlet pressure 250 psig (1.7 MPa).
- \*3) Weight, including individual boxed weight, may vary depending on connections or options.

- \*4) Optional lever color available. Please contact SMC.
- \*5) Handle must be pulled to turn open from closed.
- \*6) Refer to the specification for options. (P.227)

## Indicator Switch (Option) Specification

Code	ISH	
<b>Output type</b>	NPN	
<b>Power supply voltage</b>	3.8 to 30 VDC	
<b>Output voltage</b>	Max. 0.4 VDC	
<b>Supply current</b>	Max. 11 mA	
<b>Output current</b>	Max. 20 mA	
<b>Cable</b>	<b>Lead wire</b>	AWG 24
	<b>Cable length</b>	3 m
	<b>Color (Lead wire)</b>	Blue (BL), Brown (BN), Black (BK)

Wiring Diagram



## Wetted Parts Material

Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Diaphragm	Ni-Co alloy
Seat	PCTFE (Option: Polyimide)

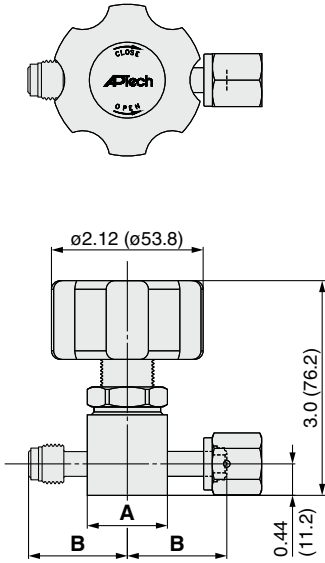
# Diaphragm Valve for Ultra High Purity **AZ3600 Series**

Manually operated type

## Dimensions

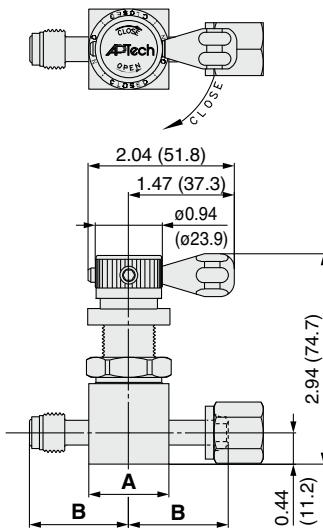
inch (mm)

### AZ3600



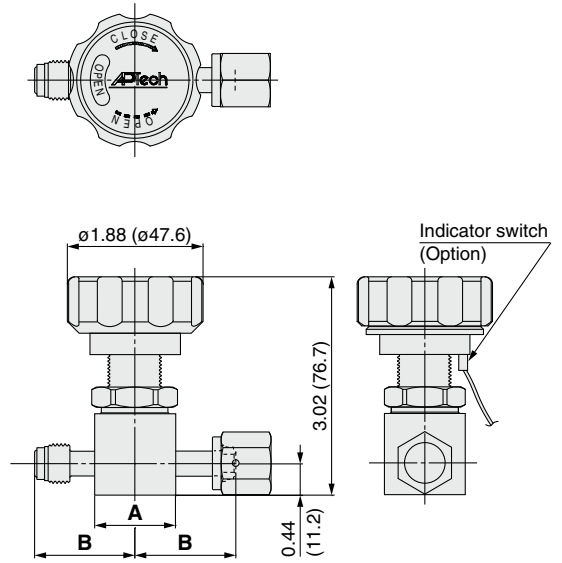
2PW (Connections: MV□, FV□)

### AZ3625



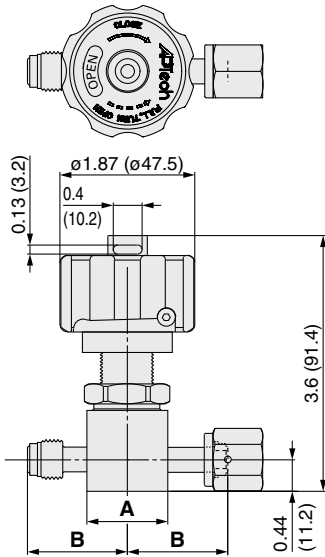
2PW (Connections: MV□, FV□)

### AZ3650



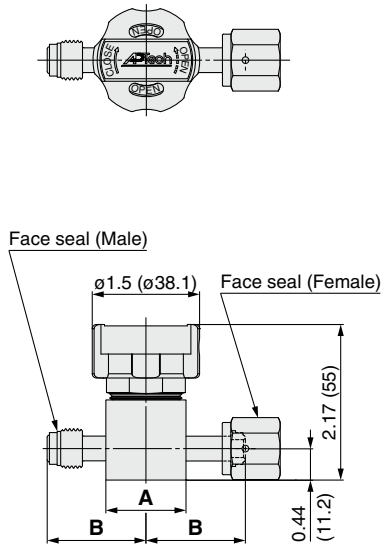
2PW (Connections: MV□, FV□)

### AZ3657



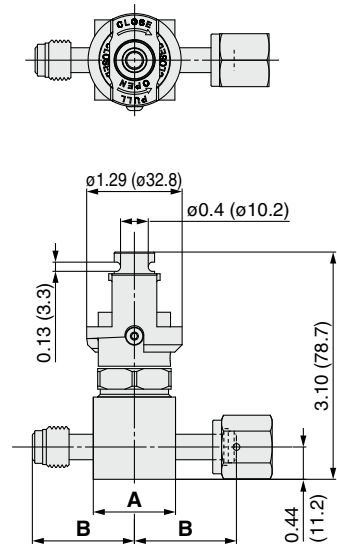
2PW (Connections: MV□, FV□)

### AZ3652

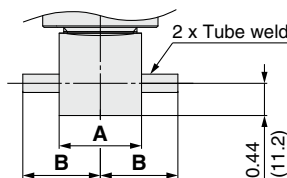


2PW (Connections: MV□, FV□)

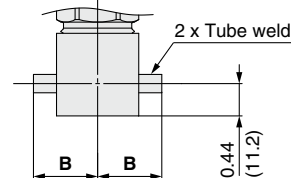
### AZ3659



2PW (Connections: MV□, FV□)

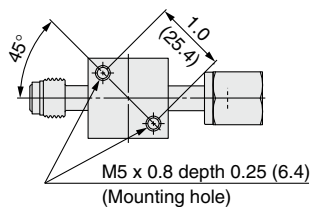


2PW (Connections: TW□)

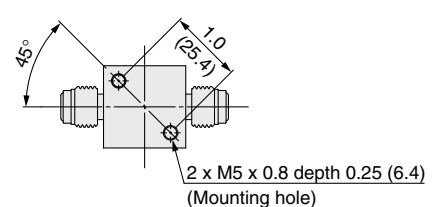


2P (Connections: TW4)

Connections	Port code					
	2P		2PW			
	B		A	B	B	
	inch	(mm)	inch	(mm)	inch	(mm)
MV4	1.14	(29.0)	1.12 sq. (□28.4)		1.39	(35.3)
FV4	—	—			1.06	(26.9)
TW4	0.875	(22.2)			1.93	(49.0)
MV6	—	—			1.325	(33.7)
FV6	—	—				
TW6	—	—				



2PW (Bottom view)



2P (Bottom view)

Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

Vacuum Generators

Flow Switches

Technical Data/  
Glossary of Terms

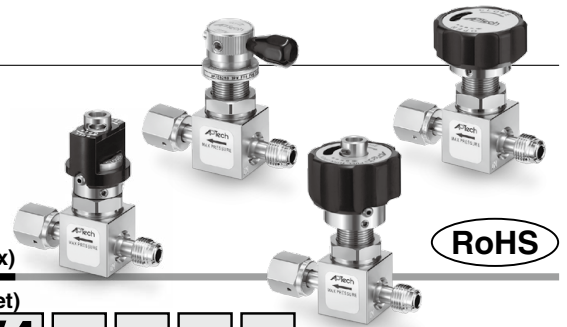
Precautions

# Diaphragm Valve for Ultra High Purity

Manually operated type

## AZ4600 Series

- Suitable for UHP gas supply line
- Body material: 316L SS
- LOTO standard with AZ4657/4659, optional AZ4625
- Indicator switch available as an option (AZ4650)



How to Order (See p. 250 for ordering syntax)

**AZ 4 652 S 2P MV4 MV4** (Inlet) (Outlet)

**Size**

Code	Cv
4	0.5

**Material**

Code	Body material
S	316L SS

**Model**

Code	Knob	Max. operating pressure
652	Round knob with a raised rectangular section	250 psig (1.7 MPa)
659	Pull twist knob with LOTO	
600	Multi turn round knob	
625	Lever knob	
650	Round knob with open/close indication window	300 psig (2.1 MPa)
657	Pull twist knob with LOTO	

**Ports**

Code	Ports	Connection
2P	2 ports	Machined
2PW		Welded

**Connections**

Code	Connections	Port	
		2P	2PW
MV4	1/4 inch face seal (Male) *1)	●	○
FV4	1/4 inch face seal (Female)	—	○
MV6	3/8 inch face seal (Male) *1)	●	○
FV6	3/8 inch face seal (Female)	—	○
TW6	3/8 inch tube weld	●	○
TW8	1/2 inch tube weld	●	—

**Option (AZ4650 only)**

Code	Specification
No code	—
ISH	Indicator switch

**Installation option**

Code	Installation
No code	Bottom mount (Standard)
P	Panel installation *2)

\*2) Panel mounting hole: dia. 0.78 inch (19.8 mm). Not available with AZ4652 and AZ4659.

**Option**

Code	Specification
No code	Standard
HR	High pressure (Max. operating pressure 3000 psig (20.7 MPa))

\*1) Not available with the same type fittings inlet and outlet.  
 ○: Male and female threads of the same size can be used in combination.  
 —: Not available  
 \*1) Fixed fitting (no rotating nut)  
 When port code "2PW" and connection "MV6" are selected, it will be a rotating nut.

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

\*1) Optional porting and porting configurations available. Refer to the AZ series optional porting configuration on page 207. The optional porting configuration can be selected when the welded type (PW) is selected.

## Specifications

Operating Parameters	Z4652	AZ4659	AZ4600	AZ4625	AZ4650	AZ4657
Gas	Select compatible materials of construction for the gas					
Operating pressure	Vacuum to 250 psig (1.7 MPa)			Vacuum to 300 psig (2.1 MPa)		
Proof pressure	1.5 times the maximum operating pressure					
Burst pressure	3 times the maximum operating pressure					
Ambient and operating temperature	-40 to 71°C (No freezing) *1)					
Cv	0.5					
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s				
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *2)				
Across the seat leak	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s					
Surface finish	Ra 10 μin. (0.25 μm)					
Connections	Face seal, Tube weld					
Installation	Bottom mount			Bottom mount (Option: panel mount)		
Internal volume	0.12 in <sup>3</sup> (2.14 cm <sup>3</sup> )					
Weight	0.26 kg *3)	0.45 kg *3)	0.41 kg *3)	0.45 kg *3)	0.4 kg *3)	0.4 kg *3)
Knob	1/4 turn round knob with a raised rectangular section and open/close indication window	Pull twist knob with LOTO *5)	Multi turn round knob	1/4 turn lever knob *4)	1/4 turn round knob with open/close indication window	Pull twist knob with LOTO *5)
Operational Safety Device (OSD)	N/A	Standard	N/A	Option *6) (Part number: AP PL227) Option *6) (Part number: AP PL225)	N/A	Standard
LOTO (Lockout)	N/A	Standard	N/A		N/A	Standard

\*1) -10 to 90°C for Polyimide seat.

\*2) Tested with Helium gas inlet pressure 250 psig (1.7 MPa).

\*3) Weight, including individual boxed weight, may vary depending on connections or options.

\*4) Optional lever color available. Please contact SMC.

\*5) Knob must be pulled to turn open from closed.

\*6) Refer to the specification for options. (P.227)

## Option

### High pressure

Changes from the standard type are:

Option	Other Parameters	AZ4600	AZ4625	AZ4650	AZ4657
HR	Operating pressure	Vacuum to 3000 psig (20.7 MPa)			

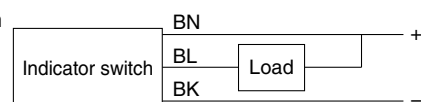
## Wetted Parts Material

Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Diaphragm	Ni-Co alloy
Seat	PCTFE (Option: Polyimide)

## Indicator Switch (Option) Specification

Code	ISH	
Output type	NPN	
Power supply voltage	3.8 to 30 VDC	
Output voltage	Max. 0.4 VDC	
Supply current	Max. 11 mA	
Output current	Max. 20 mA	
Cable	Lead wire	AWG 24
	Cable length	3 m
	Color (Lead wire)	Blue (BL), Brown (BN), Black (BK)

### Wiring Diagram



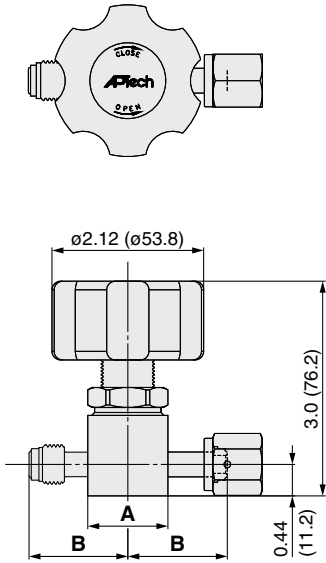
# Diaphragm Valve for Ultra High Purity **AZ4600 Series**

Manually operated type

## Dimensions

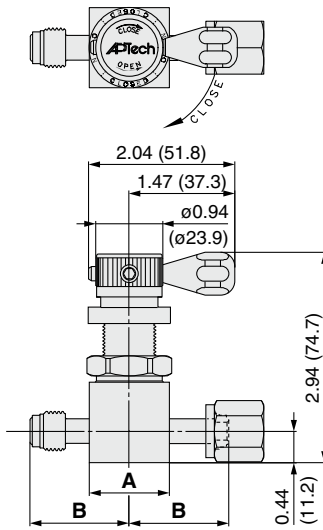
inch (mm)

### AZ4600



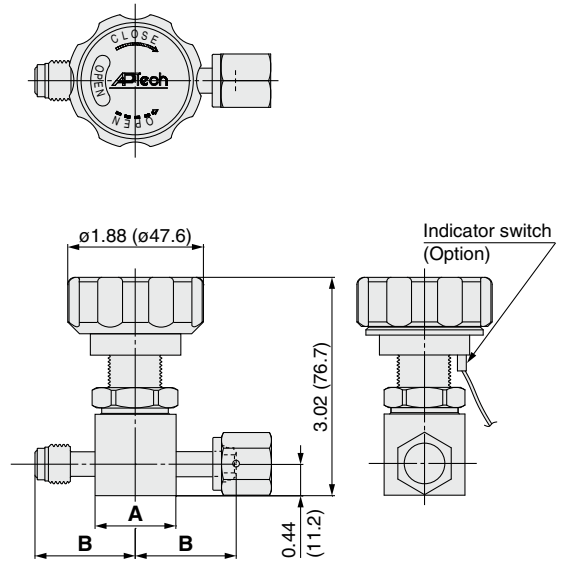
2PW (Connections: MV□, FV□)

### AZ4625



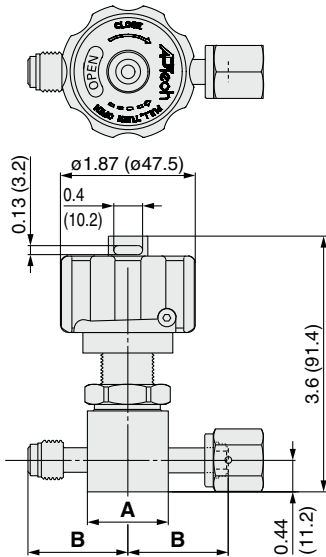
2PW (Connections: MV□, FV□)

### AZ4650



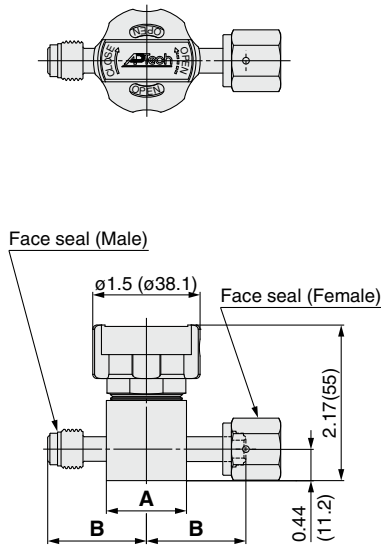
2PW (Connections: MV□, FV□)

### AZ4657



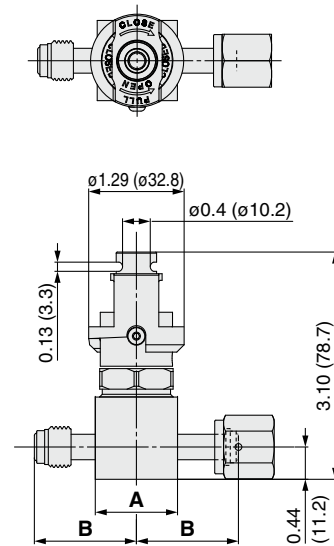
2PW (Connections: MV□, FV□)

### AZ4652

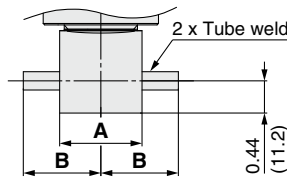


2PW (Connections: MV□, FV□)

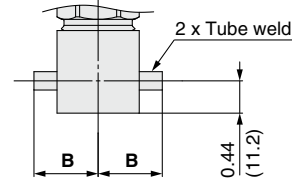
### AZ4659



2PW (Connections: MV□, FV□)

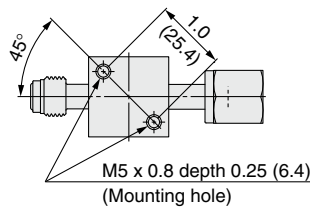


2PW (Connections: TW□)

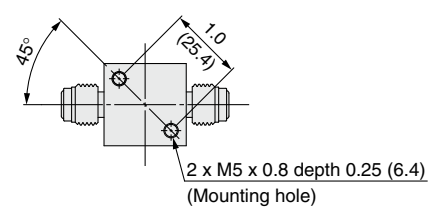


2P (Connections: TW□)

Connections	Port code					
	2P		2PW			
	B		A	B		
	inch	(mm)	inch	(mm)	inch	(mm)
MV4	1.14	(29.0)	1.12 sq. (□28.4)		1.39	(35.3)
FV4	—	—			1.93	(49.0)
MV6	1.50	(38.1)			1.325	(33.7)
FV6	—	—			—	—
TW6	0.875	(22.2)	—	—	—	—
TW8	1.125	(28.6)	—	—	—	—



2PW (Bottom view)



2P (Bottom view)

Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

Vacuum Generators

Flow Switches

Technical Data/ Glossary of Terms

Precautions

## AZ3604, 3624 & 3627 Series

- Suitable for UHP gas supply line
- Body material: 316L SS



How to Order (See p. 250 for ordering syntax)

**AZ 3 604 S 2PW MV4 MV4**

(Inlet) (Outlet)

**Size**

Code	Cv
3	0.29

**Model**

Code	Knob	Max. operating pressure
604	Multi turn round knob	3700 psig (25.5 MPa)
624	1/4 turn lever knob	4500 psig (31 MPa)
627	1/4 turn T handle	

**Material**

Code	Body material
S	316L SS

**Ports**

Code	Ports
2PW	2 ports

\*) Optional porting and porting configurations available. Refer to the AZ series optional porting configuration on page 207.

**Connections**

Code	Connections
MV4	1/4 inch face seal (Male) *1)
FV4	1/4 inch face seal (Female)
TW4	1/4 inch tube weld

\*1) Fixed fitting (no rotating nut)

**Installation option**

Code	Installation
No code	Bottom mount (Standard)
P	Panel installation *3)

\*3) Panel mounting hole: dia. 0.78 inch (19.8 mm).

**Seat material**

Code	Material	Model		
		3604	3624	3627
No code	PCTFE (Standard)	●	●	—
VS	Polyimide	●	●	●
PK	PEEK	●	●	●

●: Available  
—: Not available

**Face to face dimension \*2)**

Code	Dimension
No code	2.12 inch (53.8 mm) Standard
1.75	1.75 inch (44.5 mm)

\*2) Can be used when connection "TW4" is selected

## Specifications

Operating Parameters	AZ3604	AZ3624	AZ3627
Gas	Select compatible materials of construction for the gas		
Operating pressure	Vacuum to 3700 psig (25.5 MPa)		Vacuum to 4500 psig (31 MPa)
Proof pressure	1.5 times the maximum operating pressure		
Burst pressure	3 times the maximum operating pressure		
Ambient and operating temperature	-40 to 49°C (No freezing)		-40 to 60°C (No freezing)
Cv	0.29		
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s	
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s *1)	
Across the seat leak	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s		
Surface finish	Ra 10 μin. (0.25 μm)		
Connections	Face seal, Tube weld		
Installation	Bottom mount		
Internal volume	0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )		
Weight	0.36 kg *2)	0.45 kg *2)	0.45 kg *2)
Knob	Multi turn round knob	1/4 turn lever knob *3)	1/4 turn T handle
Operational Safety Device (OSD)	N/A	Option (Part number: AP PL227) *4)	N/A
		Option (Part number: AP PL225) *4)	
LOTO (Lockout)			

\*1) Tested with Helium gas inlet pressure 250 psig (1.7 MPa).

\*2) Weight, including individual boxed weight, may vary depending on connections or options.

\*3) Optional lever color available. Please contact SMC.

\*4) Refer to the specification for options. (P.227)

## Wetted Parts Material

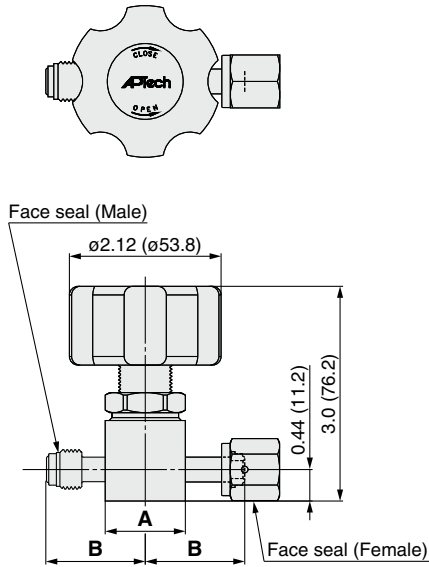
Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Diaphragm	Ni-Co alloy
Seat	AZ3604, AZ3624
	AZ3627



## Dimensions

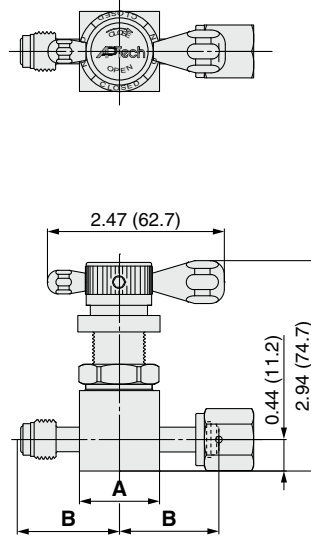
inch (mm)

### AZ3604



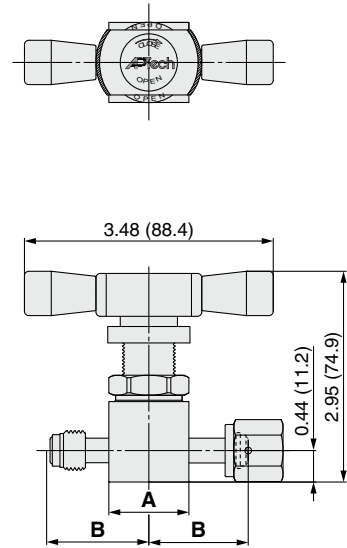
Connections: MV4, FV4

### AZ3624

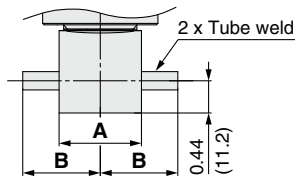


Connections: MV4, FV4

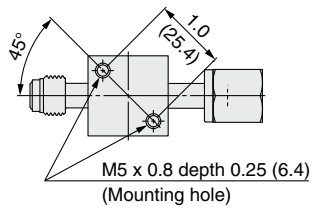
### AZ3627



Connections: MV4, FV4



Connections: TW□



Bottom view

Connections	A		B	
	inch	(mm)	inch	(mm)
MV4				
FV4	1.12 sq.	(□28.4)	1.39	(35.3)
TW4			1.06	(26.9)

Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

Vacuum Generators

Flow Switches

Technical Data/  
Glossary of Terms

Precautions

# Diaphragm Valve for Ultra High Purity

Manually operated type

## AZ4150 Series

- Suitable for UHP gas supply line
- Body material: 316L SS
- Springless design (No poppet spring in the wetted area)
- LOTO available (AZ4157)
- Indicator switch available as an option (AZ4150)



RoHS

How to Order (See p. 250 for ordering syntax)

Port Number

① ② ③ ④

**AZ 41 50 S 2PW MV8 MV8** □ □ □ □

**Model**

Code	Knob	Cv
50	Round knob with open/close indication window	0.8
57	Pull twist knob with LOTO	

**Material**

Code	Body material
S	316L SS

**Ports**  
(Refer to the porting configuration.)

Code	Ports
2PW	2 ports
3PWD	3 ports
3PWE	3 ports
3PWF	3 ports
4PWW	4 ports

**Option (AZ4150 only)**

Code	Specification
No code	—
ISH	Indicator switch

**Seat material**

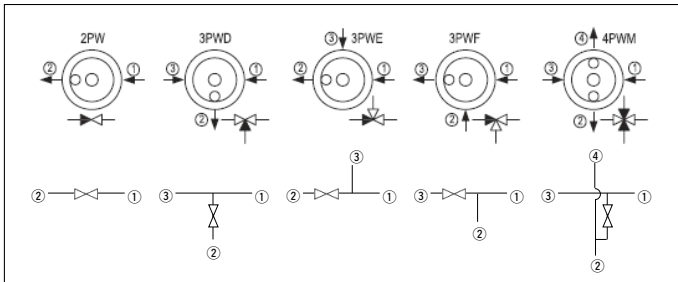
Code	Material
No code	PCTFE (Standard)
VS	Polyimide

**Connections**  
(Refer to the porting configuration.)

Code	Connections
No code	No port
FV4	1/4 inch face seal (Female)
MV4	1/4 inch face seal (Male)
TW6	3/8 inch tube weld
FV8	1/2 inch face seal (Female)
MV8	1/2 inch face seal (Male)
TW8	1/2 inch tube weld

### Porting Configuration

(The porting configurations viewed from the knob side are shown.)



### Sample Order Number

	Port ①	②	③	④
AZ4150S	2PW	MV8	MV8	
	3PWD	MV8	MV8	MV8

### Specifications

Operating Parameters		AZ4150	AZ4157
<b>Gas</b>		Select compatible materials of construction for the gas	
<b>Operating pressure</b>		Vacuum to 250 psig (1.7 MPa)	
<b>Proof pressure</b>		1.5 times the maximum operating pressure	
<b>Burst pressure</b>		3 times the maximum operating pressure	
<b>Ambient and operating temperature</b>		-40 to 71°C (No freezing) *1)	
<b>Cv</b>		0.8	
<b>Leak rate</b>	<b>Inboard leakage</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s	
	<b>Outboard leakage</b>	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s	
<b>Across the seat leak</b>		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s	
<b>Surface finish</b>		Ra 10 μin. (0.25 μm)	
<b>Connections</b>		Face seal, Tube weld	
<b>Installation</b>		Bottom mount	
<b>Internal volume</b>		0.37 in <sup>3</sup> (6.1 cm <sup>3</sup> )	
<b>Knob</b>		1/4 turn round knob with open/close indication window	Pull twist knob with LOTO *2)
<b>LOTO (Lockout)</b>		N/A	Standard

\*1) -10 to 90°C for Polyimide seat.

\*2) Handle must be pulled to turn open from closed.

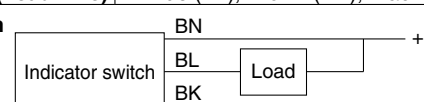
### Wetted Parts Material

Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Diaphragm	Ni-Co alloy
Seat	PCTFE (Option: Polyimide)

### Indicator Switch (Option) Specification

Code		ISH
<b>Output type</b>		NPN
<b>Power supply voltage</b>		3.8 to 30 VDC
<b>Output voltage</b>		Max. 0.4 VDC
<b>Supply current</b>		Max. 11 mA
<b>Output current</b>		Max. 20 mA
<b>Cable</b>	<b>Lead wire</b>	AWG 24
	<b>Cable length</b>	3 m
	<b>Color (Lead wire)</b>	Blue (BL), Brown (BN), Black (BK)

### Wiring Diagram



# Diaphragm Valve for Ultra High Purity

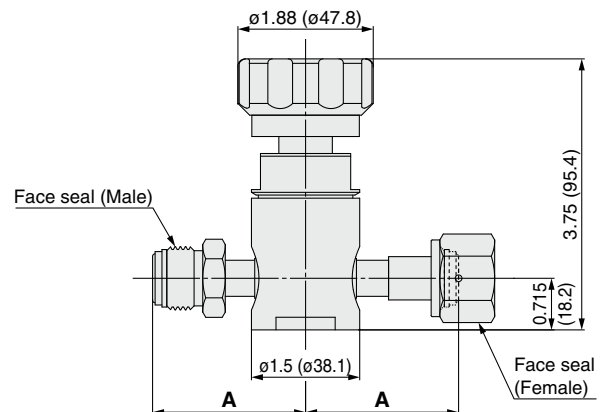
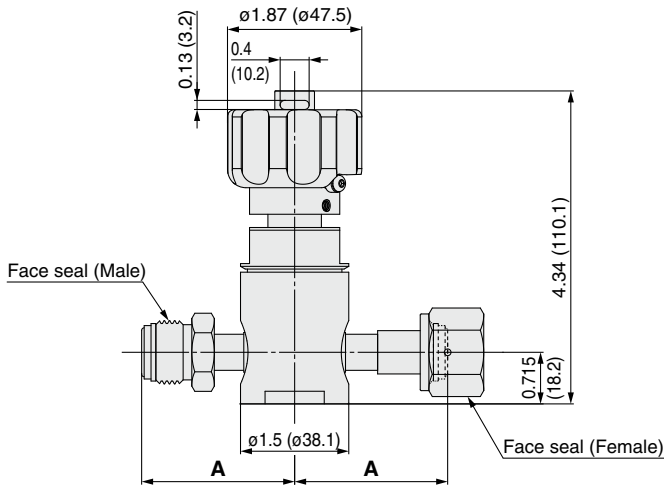
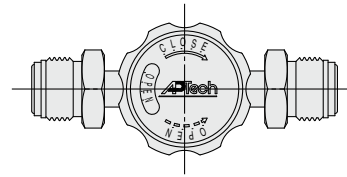
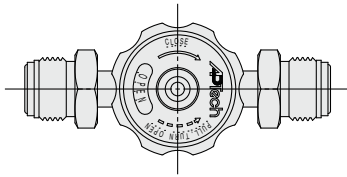
## Manually operated type **AZ4150 Series**

### Dimensions

inch (mm)

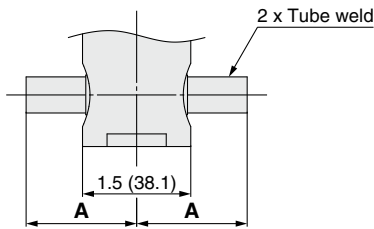
#### AZ4157

#### AZ4150

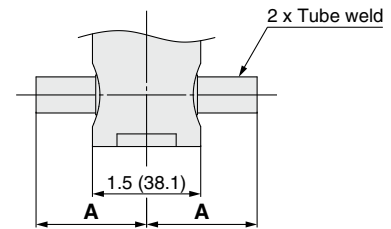


Connections: MV□, FV□

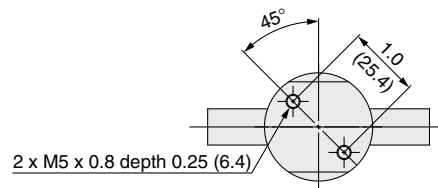
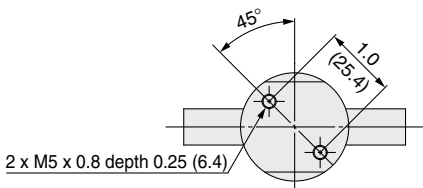
Connections: MV□, FV□



Connections: TW□



Connections: TW□



Connections	A	
	inch	(mm)
FV4	1.59	(40.4)
MV4	1.59	(40.4)
TW6	1.49	(37.8)
FV8	2.12	(53.8)
MV8	2.12	(53.8)
TW8	1.53	(38.9)

Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

Vacuum Generators

Flow Switches

Technical Data/  
Glossary of Terms

Precautions

# Diaphragm Valve for Ultra High Purity

Manually operated type

## AZ3800 & 3900 Series

- Suitable for UHP gas supply line
- LOTO available (AZ3900)
- Purge ports and monoblock configurations available



RoHS

How to Order (See p. 250 for ordering syntax)

AZ **3800** **S** **FV8** **FV8** [ ] [ ] [ ] [ ]

(Inlet) (Outlet)

Model

Code	Knob
3800	Round knob with open/close indication window
3900	Pull twist knob with LOTO

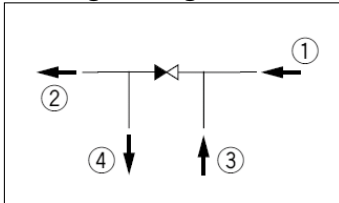
Material

Code	Body material
S	316L SS

Connections (Inlet, Outlet)

Code	Connections
TW6	3/8 inch tube weld
FV8	1/2 inch face seal (Female)
MV8	1/2 inch face seal (Male)
TW8	1/2 inch tube weld
FV12	3/4 inch face seal (Female)
MV12	3/4 inch face seal (Male)
TW12	3/4 inch tube weld

Porting Configuration



Purge port option

Code	Material
No code	—
C	Capped purge port

Diaphragm material

Code	Material
No code	316L SS (Standard)
HD	Ni-Cr-Mo alloy

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

Purge port \*1)

Code	Inlet (3)	Outlet (4)
00	None	None
MO	Available	None
OB	None	Available
MB	Available	Available

\*1) 1/4 inch face seal (Male) as standard.

## Specifications

Operating Parameters		AZ3800	AZ3900
Gas		Select compatible materials of construction for the gas	
Operating pressure		Vacuum to 250 psig (1.7 MPa)	
Proof pressure		1.5 times the maximum operating pressure	
Burst pressure		3 times the maximum operating pressure	
Ambient and operating temperature		-40 to 71°C (No freezing) *1)	
Cv		2.8	
Leak rate	Inboard leakage	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s	
	Outboard leakage	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s	
Across the seat leak		1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s	
Surface finish		Ra 10 µin. (0.25 µm)	
Connections		Face seal, Tube weld	
Installation		Bottom mount	
Internal volume		0.76 in <sup>3</sup> (12.52 cm <sup>3</sup> )	
Knob		Round knob with open/close indication window	Pull twist knob with LOTO *2)
Operational Safety Device (OSD)		N/A	Standard
LOTO (Lockout)		N/A	Standard

\*1) -10 to 90°C for Polyimide seat.

\*2) Knob must be pulled to turn open from closed.

## Wetted Parts Material

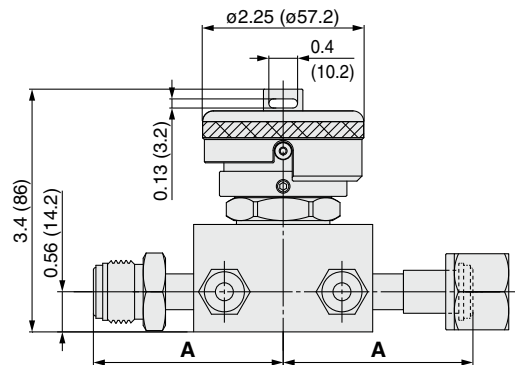
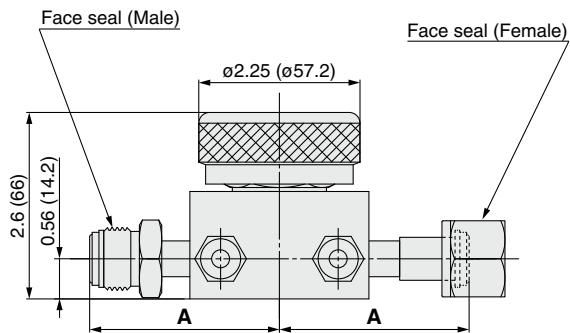
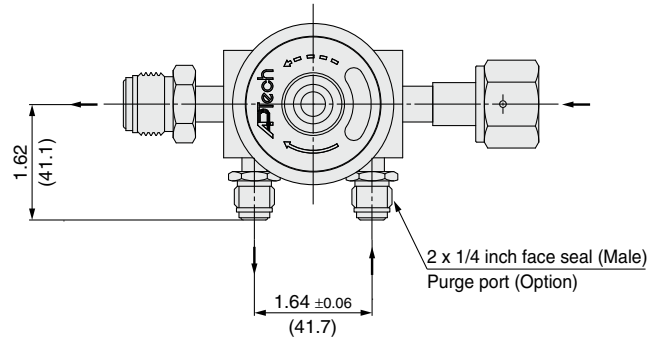
Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Diaphragm	316L SS (Option: Ni-Cr-Mo alloy)
Seat	PCTFE (Option: Polyimide)

## Dimensions

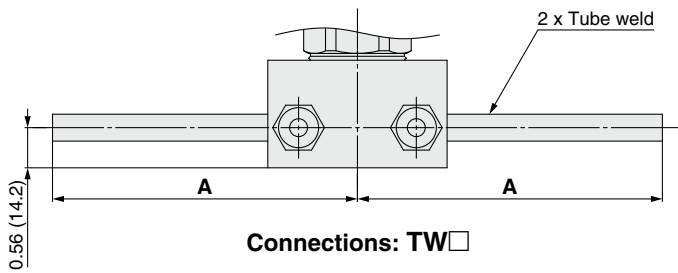
inch (mm)

### AZ3800

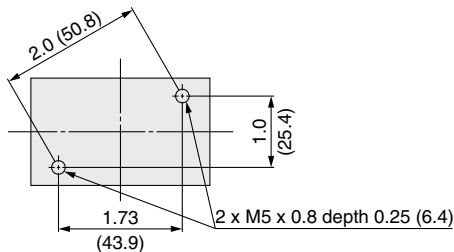
### AZ3900



Connections: MV□, FV□



Connections: TW□



Bottom view

Connections	A	
	inch	(mm)
TW6	4.25	(108.0)
FV8	2.65	(67.3)
MV8		
TW8	4.25	(108.0)
FV12	3.20	(81.3)
MV12		
TW12	4.25	(108.0)

Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

AP

AZ

AK

Check Valves

AP

AZ

AK

Vacuum

Generators

Flow

Switches

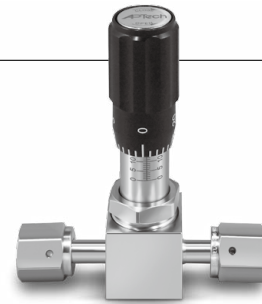
Technical Data/

Glossary of Terms

Precautions

### AZ3672, 3675 & 4675 Series

- Suitable for UHP gas supply line
- Body material: 316L SS
- Fine adjustment control 12 to 15 turns of the knob to wide open
- One wetted moving part - a diaphragm
- Flow rate AZ3672: 10 slpm \*1)  
AZ3675: 40 slpm \*1)  
AZ4675: 70 slpm \*1)  
\*1) At 30 psig (0.2 MPa) of N<sub>2</sub>



#### How to Order (See p. 250 for ordering syntax)

AZ **3672** **S** **2P** **MV4** **MV4**

#### Model

Code	Cv
<b>3672</b>	0 to 0.02
<b>3675</b>	0 to 0.08
<b>4675</b>	0 to 0.15

#### Material

Code	Body material
<b>S</b>	316L SS

#### Ports

Code	Ports	Connection
<b>2P</b>	2 ports	Machined
<b>2PW</b>		Welded

\*) Optional porting and porting configurations available.  
Refer to the AZ series optional porting configuration on page 207.  
The optional porting configuration can only be selected when the welded type (PW) is selected.

#### Face to face dimension

Code	Dimension
<b>No code</b>	2.12 inch (53.8 mm) Standard
<b>1.75</b>	1.75 inch (44.5 mm) *2)

\*2) Can be used when port code "2PW" and connection "TW4" are selected. However, it cannot be used for type 4675.

#### Connections

Code	Connections	Model	AZ3672/3675		AZ4675	
		Port	2P	2PW	2P	2PW
<b>MV4</b>	1/4 inch face seal (Male) *1)	●	○	●	○	
<b>FV4</b>	1/4 inch face seal (Female)	—	○	—	○	
<b>TW4</b>	1/4 inch tube weld	●	○	—	—	
<b>MV6</b>	3/8 inch face seal (Male) *1)	—	○	●	○	
<b>FV6</b>	3/8 inch face seal (Female)	—	○	—	○	
<b>TW6</b>	3/8 inch tube weld	—	○	●	○	
<b>TW8</b>	1/2 inch tube weld	—	—	●	—	

●: Only available with the same type fittings inlet and outlet.

○: Inlet and outlet available with any combination of fitting type and size.

—: Not available

\*1) Fixed fitting (no rotating nut)

When port code "2PW" and connection "MV6" are selected, it will be a rotating nut.

## Specifications

Operating Parameters		AZ3672	AZ3675	AZ4675
<b>Gas</b>		Select compatible materials of construction for the gas		
<b>Operating pressure</b>		Vacuum to 145 psig (1 MPa)		
<b>Proof pressure</b>		1.5 times the maximum operating pressure		
<b>Burst pressure</b>		3 times the maximum operating pressure		
<b>Ambient and operating temperature</b>		-40 to 71°C (No freezing)		
<b>Cv</b>		0 to 0.02	0 to 0.08	0 to 0.15
<b>Leak rate</b>	<b>Inboard leakage</b>	2 x 10 <sup>-11</sup> Pa·m <sup>3</sup> /s		
	<b>Outboard leakage</b>	2 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s		
<b>Surface finish</b>		Ra 10 μin. (0.25 μm)		
<b>Connections</b>		Face seal, Tube weld		
<b>Installation</b>		Bottom mount		
<b>Internal volume</b>		0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )		

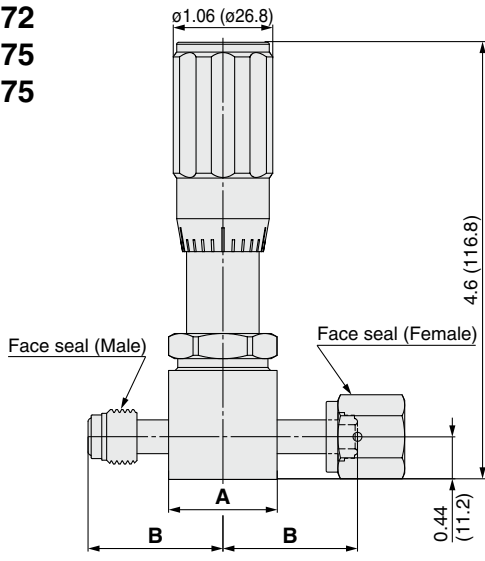
## Wetted Parts Material

Series	AZ3672/AZ3675	AZ4675
Body	316L SS	
Surface finish	Electropolish + Passivation	
Diaphragm	Ni-Co alloy	
Seat	PCTFE	316L SS

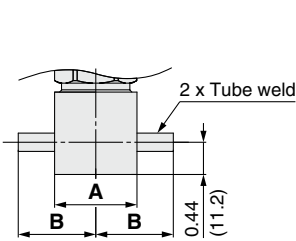
## Dimensions

inch (mm)

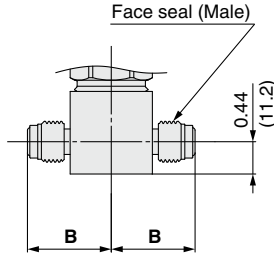
**AZ3672**  
**AZ3675**  
**AZ4675**



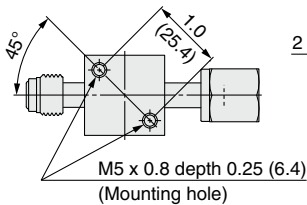
**2PW (Connections: MV□, FV□)**



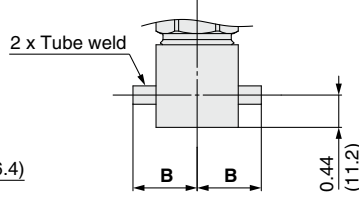
**2PW (Connections: TW□)**



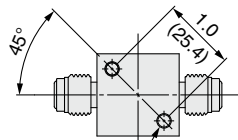
**2P (Connections: MV□)**



**2PW (Bottom view)**



**2P (Connections: TW□)**



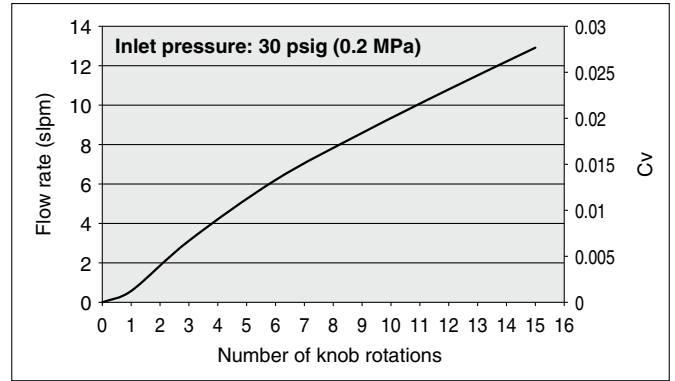
2 x M5 x 0.8 depth 0.25 (6.4)  
(Mounting hole)

**2P (Bottom view)**

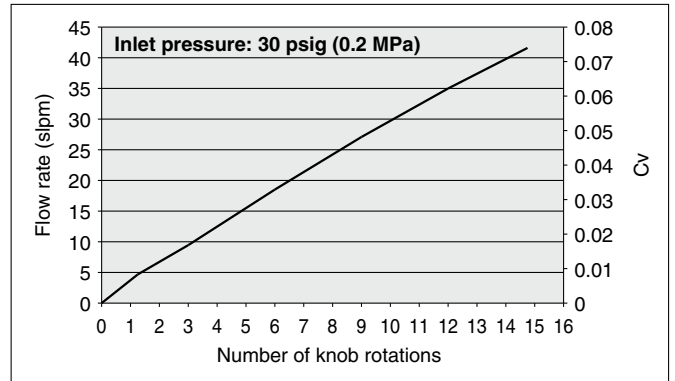
Connections	Port code					
	2P		2PW			
	B	A	A		B	
	inch	(mm)	inch	(mm)	inch	(mm)
<b>MV4</b>	1.14	(29.0)			1.39	(35.3)
<b>FV4</b>	—	—			1.06	(26.9)
<b>TW4</b>	0.875	(22.2)			1.93	(49.0)
<b>MV6</b>	1.50	(38.1)	1.12 sq.	(□28.4)	1.325	(33.7)
<b>FV6</b>	—	—			—	—
<b>TW6</b>	0.875	(22.2)			—	—
<b>TW8</b>	1.125	(28.6)			—	—

## Flow Rate Characteristics

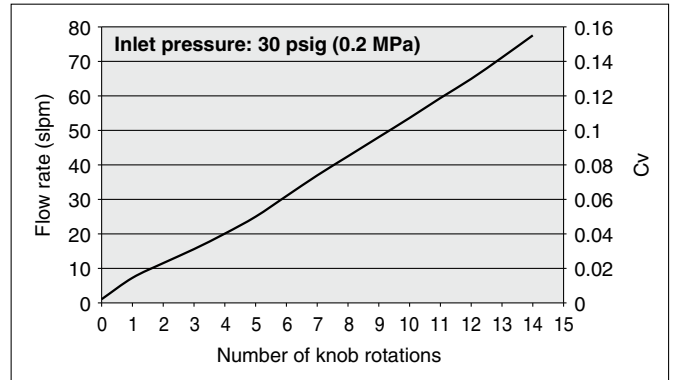
**AZ3672**



**AZ3675**



**AZ4675**



Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

Vacuum Generators

Flow Switches

Technical Data/  
Glossary of Terms

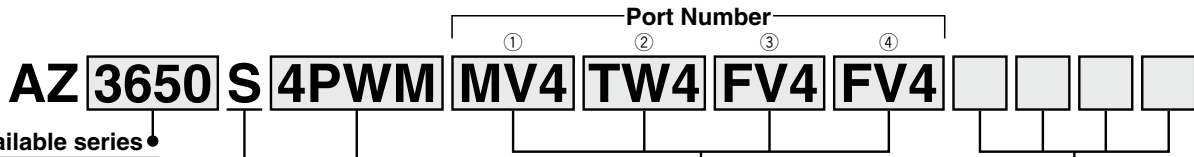
Precautions

# AZ Series / Diaphragm Valve

## Optional Porting Configuration

\* Made to order specifications

How to Order (See p. 250 for ordering syntax)



### Available series

Code	Series
35□□	AZ3500
45□□	AZ4500
30□□	AZ3000
36□□	AZ3600
46□□	AZ4600
40□□	AZ4000

### Material

Code	Body material
S	316L SS

### Ports

Code	Ports	Configuration	Connection
2PW	2 ports	Refer to the following. (Port specifications)	Welded
2PWA			
2PWC			
3PWD	3 ports		
3PWE			
3PWF			
3PWG			
3PWH			
4PWM	4 ports		

Option Depends on the product series

### Connections

Code	Connections	AZ3	AZ4
MV4	1/4 inch face seal (Male) *1)	●	●
FV4	1/4 inch face seal (Female)	●	●
TW4	1/4 inch tube weld	●	—
MV6	3/8 inch face seal (Male)	●	●
FV6	3/8 inch face seal (Female)	●	●
TW6	3/8 inch tube weld	●	●

●: Male and female threads of the same size can be used in combination.  
—: Not available

\*1) Fixed fitting (no rotating nut)

All multiple port options are welded type.  
Please refer to the welded type for dimensions.

## Port Specifications

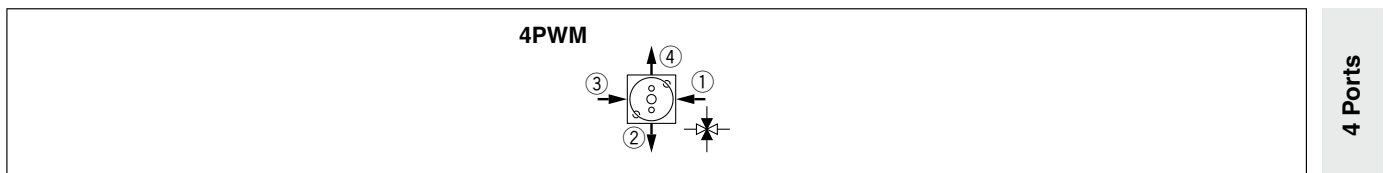
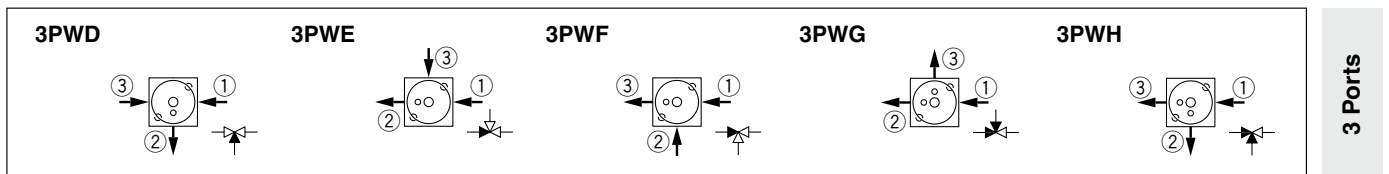
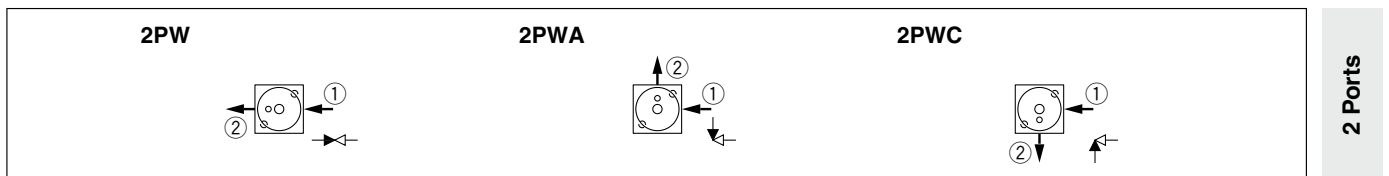
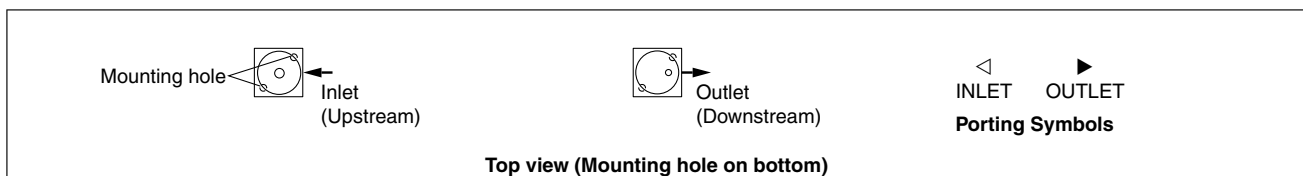
Valves are illustrated top view looking down through the valve.

The traditional flow direction is INLET to OUTLET, but AP Tech valves may be employed in either flow direction.

Port locations are indicated by numbers.

INLET (Upstream) is defined as a port connected to the region below the valve seat. It is illustrated with an arrow pointing towards the valve body or an "empty" triangle on the schematic.

OUTLET (Downstream) is defined as a port connected to the region above the seat and below the diaphragm. It is illustrated with an arrow pointing away from the valve body or a "filled" triangle on the schematic.





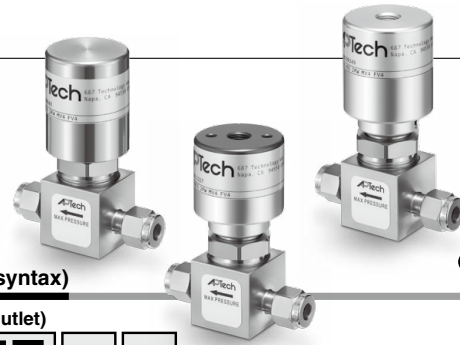
Precautions	Technical Data/ Glossary of Terms	Flow Switches	Vacuum Generators	Check Valves	AK	AZ	AP	Diaphragm Valves	BP	AK	AZ	SL	AP	Regulators	Recommendations
-------------	--------------------------------------	------------------	----------------------	--------------	----	----	----	------------------	----	----	----	----	----	------------	-----------------

# Diaphragm Valve for General Applications

Air operated type

## AK3500 Series

- Body material: 316L SS
- Pneumatically actuated normally closed or normally open
- Indicator switch available as an option (AK3550/3580)



RoHS

How to Order (See p. 250 for ordering syntax)

AK 3 542 S 2P 4T 4T

Size

Code	Cv
3	0.29

Model

Code	Status	Max. operating pressure
542	Normally closed (N.C.)	125 psig (0.9 MPa)
540		145 psig (1.0 MPa)
550	Normally open (N.O.)	300 psig (2.1 MPa)
580		250 psig (1.7 MPa)

Material

Code	Body material
S	316L SS

Ports

Code	Ports
2P	2 ports

Option (AK3550 and AK3580 only)

Code	Specification
No code	—
IPC	N.C. indicator switch
IPO	N.O. indicator switch

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

Connections \*1)

Code	Connections
4T	1/4 inch compression
4BR	Rc 1/4
4BRN	R 1/4
4	NPT 1/4 female
4N	NPT 1/4 male
6MT	6 mm compression

\*1) Only available with same type fittings inlet and outlet.

## Specifications

Operating Parameters	AK3542	AK3540	AK3550	AK3580
Status	Normally closed (N.C.)			Normally open (N.O.)
Gas	Select compatible materials of construction for the gas			
Operating pressure	Vacuum to 125 psig (0.9 MPa)	Vacuum to 145 psig (1.0 MPa) *1)	Vacuum to 300 psig (2.1 MPa)	Vacuum to 250 psig (1.7 MPa)
Proof pressure	1.5 times the maximum operating pressure			
Burst pressure	3 times the maximum operating pressure			
Ambient and operating temperature	-10 to 71°C (No freezing) *2)			
Cv	0.29			
Leak rate	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s			
Connections	Compression, Rc, R, NPT			
Actuation pressure	60 to 110 psig (0.4 to 0.76 MPa)	70 to 110 psig (0.48 to 0.76 MPa)		
Actuation port connection	M5 x 0.8	NPT 1/8 inch	M5 x 0.8	NPT 1/8 inch
Actuation port location	Top		Side (360° rotatable)	Top
Installation	Bottom mount			
Internal volume	0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )			
Weight	0.28 kg *3)	0.68 kg *3)	0.82 kg *3)	0.68 kg *3)
LOTO (Lockout)	N/A	Option (Part number: AP PL210) *4)	N/A	

\*1) Vacuum to 125 psig (0.9 MPa) for Polyimide seat.

\*2) Max. 90°C for Polyimide seat.

\*3) Weight, including individual boxed weight, may vary depending on connections or options.

\*4) Refer to the specification for options. (P.227)

## Indicator Switch (Option) Specification

Code	IPO	IPC
Contacts	NO (When the valve is open, the circuit is closed.)	NC (When the valve is closed, the circuit is closed.)
Minimum operating current	5 mA	
Power supply voltage	10 to 36 VDC	
Rated isolation voltage	75 VDC	
Rated operating current	100 mA	
Rated operating voltage	24 VDC	
Maximum load current	100 A	
Ambient temperature range	-25 to 70°C	
Function indicator lamp	Available	
Cable	Polyurethane cable 2 cores, 2 m	PVC cable 2 cores, 3 m
Wiring diagram		

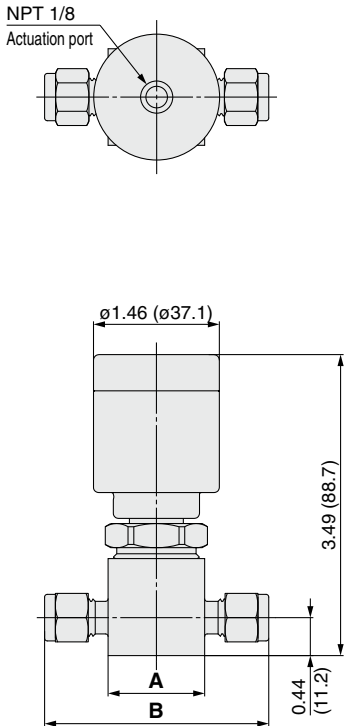
## Wetted Parts Material

Wetted Parts	S
Body	316L SS
Diaphragm	Ni-Co alloy
Seat	PCTFE (Option: Polyimide)

**Dimensions**

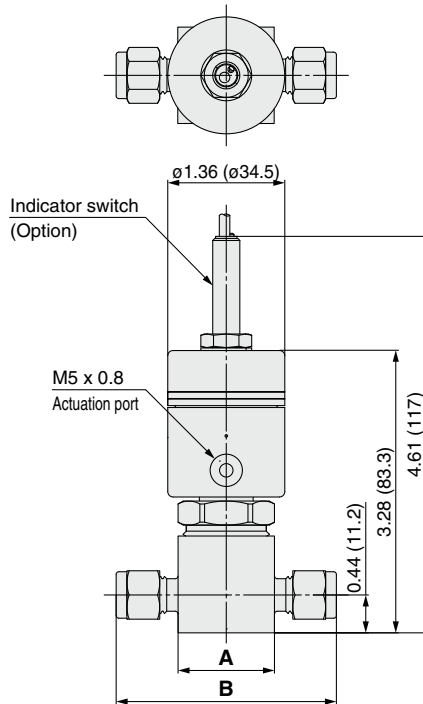
inch (mm)

**AK3540**



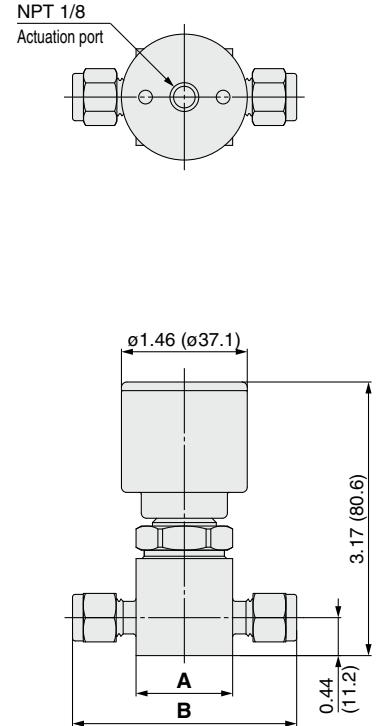
Connections: 4T, 6MT

**AK3550**



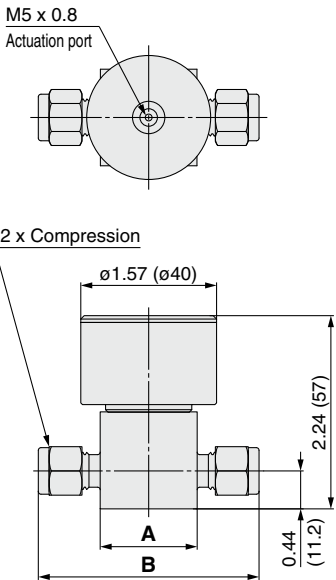
Connections: 4T, 6MT

**AK3580**

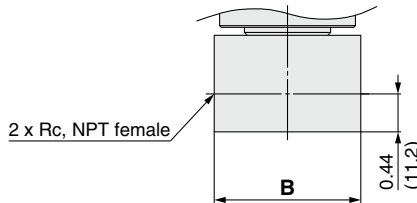


Connections: 4T, 6MT

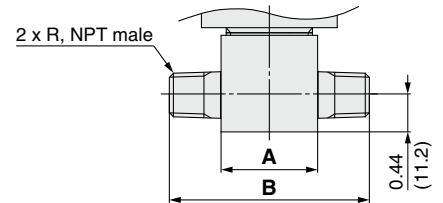
**AK3542**



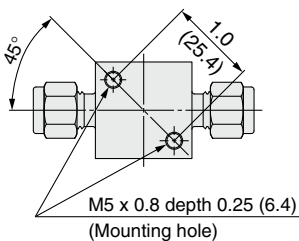
Connections: 4T, 6MT



Connections: 4, 4BR



Connections: 4N, 4BRN



Bottom view

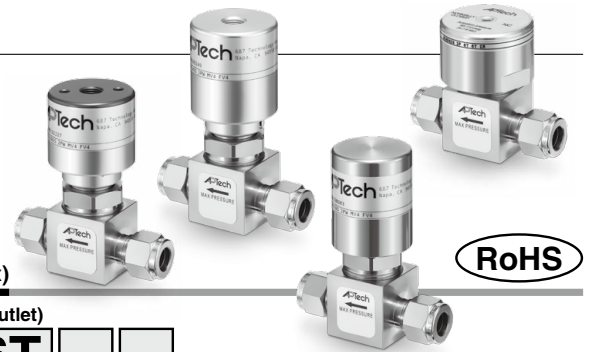
Connections	A		B		Ports
	inch	(mm)	inch	(mm)	
<b>4T</b>	1.12 sq.	(□28.4)	2.56	(65)	1/4 inch compression
<b>4BR</b>	—	—	1.70	(43.2)	Rc 1/4
<b>4BRN</b>	1.12 sq.	(□28.4)	2.32	(58.9)	R 1/4
<b>4</b>	—	—	1.70	(43.2)	NPT 1/4 female
<b>4N</b>	1.12 sq.	(□28.4)	2.32	(58.9)	NPT 1/4 male
<b>6MT</b>	1.12 sq.	(□28.4)	2.62	(66.5)	6 mm compression

# Diaphragm Valve for General Applications

Air operated type

## AK4500 Series

- Body material: 316L SS
- Pneumatically actuated normally closed or normally open
- Indicator switch available as an option (AK4550/4580)



How to Order (See p. 250 for ordering syntax)

AK 4 542 S 2P 6T 6T

Size

Code	Cv
4	0.5

Model

Code	Status	Max. operating pressure
542	Normally closed (N.C.)	125 psig (0.9 MPa)
540		300 psig (2.1 MPa)
550	Normally open (N.O.)	250 psig (1.7 MPa)
580		250 psig (1.7 MPa)

Material

Code	Body material
S	316L SS

Ports

Code	Ports
2P	2 ports

Option (AK4550 and AK4580 only)

Code	Specification
No code	—
IPC	N.C. indicator switch
IPO	N.O. indicator switch

Seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

Connections \*1)

Code	Connections
6T	3/8 inch compression
6BR	Rc 3/8
6BRN	R 3/8
6	NPT 3/8 female
6N	NPT 3/8 male

\*1) Only available with same type fittings inlet and outlet.

## Specifications

Operating Parameters	AK4542	AK4540	AK4550	AK4580
Status	Normally closed (N.C.)			Normally open (N.O.)
Gas	Select compatible materials of construction for the gas			
Operating pressure	Vacuum to 125 psig (0.9 MPa)		Vacuum to 300 psig (2.1 MPa)	Vacuum to 250 psig (1.7 MPa)
Proof pressure	1.5 times the maximum operating pressure			
Burst pressure	3 times the maximum operating pressure			
Ambient and operating temperature	-10 to 71°C (No freezing) *1)			
Cv	0.5			
Leak rate	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s			
Connections	Compression, Rc, R, NPT			
Actuation pressure	60 to 110 psig (0.4 to 0.76 MPa)	70 to 110 psig (0.48 to 0.76 MPa)		
Actuation port connection	M5 x 0.8	NPT 1/8 inch	M5 x 0.8	NPT 1/8 inch
Actuation port location	Top		Side (360° rotatable)	Top
Installation	Bottom mount			
Internal volume	0.12 in <sup>3</sup> (2.14 cm <sup>3</sup> )			
Weight	0.28 kg *2)	0.68 kg *2)	0.82 kg *2)	0.68 kg *2)
LOTO (Lockout)	N/A	Option (Part number: AP PL210) *3)	N/A	

\*1) Max. 90°C for Polyimide seat.

\*2) Weight, including individual boxed weight, may vary depending on connections or options.

\*3) Refer to the specification for options. (P.227)

## Indicator Switch (Option) Specification

Code	IPO	IPC
Contacts	NO (When the valve is open, the circuit is closed.)	NC (When the valve is closed, the circuit is closed.)
Minimum operating current	5 mA	
Power supply voltage	10 to 36 VDC	
Rated isolation voltage	75 VDC	
Rated operating current	100 mA	
Rated operating voltage	24 VDC	
Maximum load current	100 A	
Ambient temperature range	-25 to 70°C	
Function indicator lamp	Available	
Cable	Polyurethane cable 2 cores, 2 m	PVC cable 2 cores, 3 m
Wiring diagram		

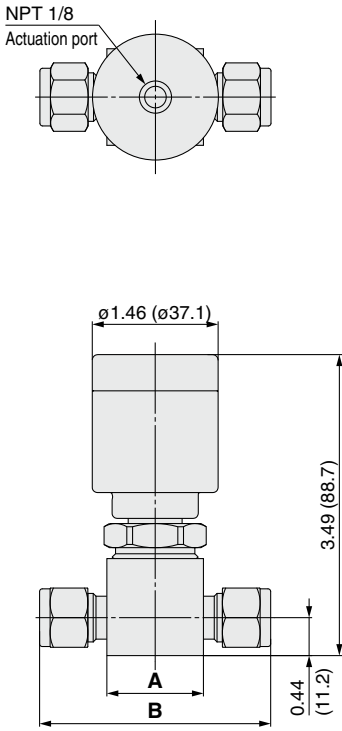
## Wetted Parts Material

Wetted Parts	S
Body	316L SS
Diaphragm	Ni-Co alloy
Seat	PCTFE (Option: Polyimide)

**Dimensions**

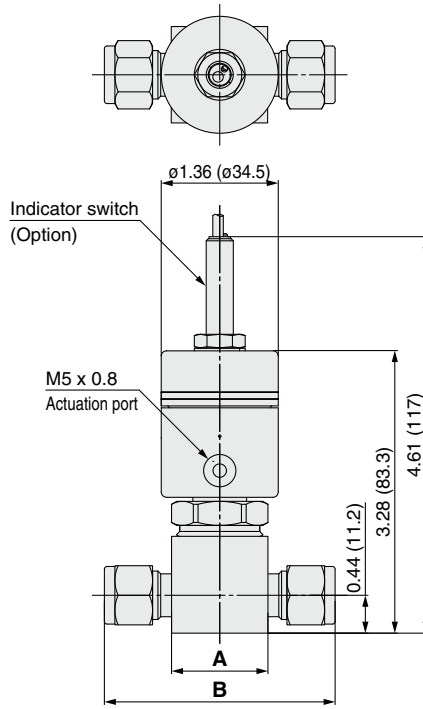
inch (mm)

**AK4540**



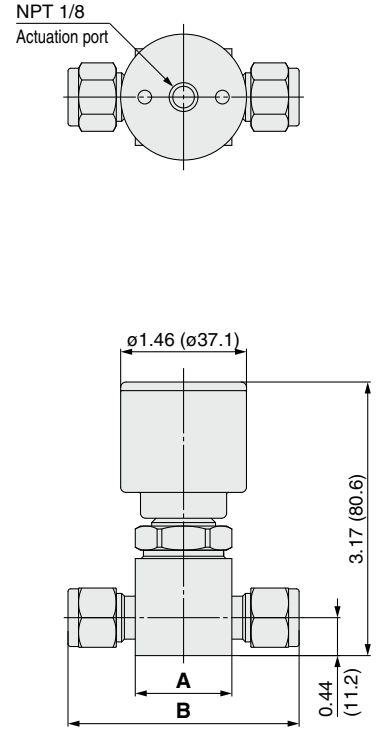
Connections: 6T

**AK4550**



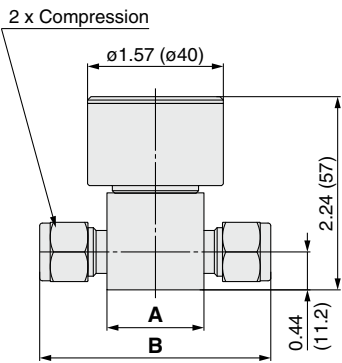
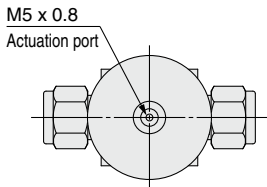
Connections: 6T

**AK4580**

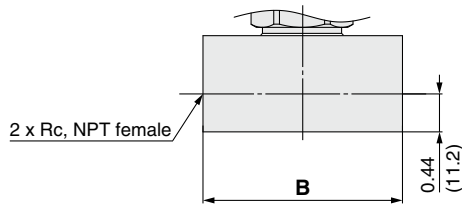


Connections: 6T

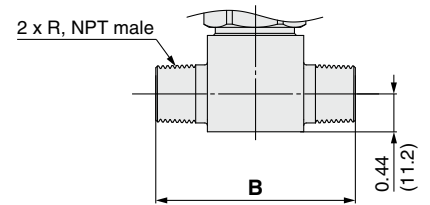
**AK4542**



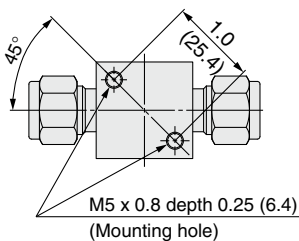
Connections: 6T



Connections: 6, 6BR



Connections: 6N, 6BRN



Bottom view

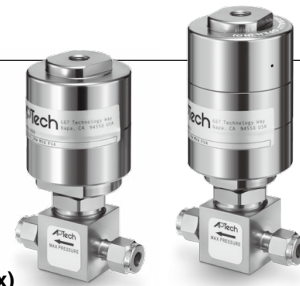
Connections	A		B		Ports
	inch	(mm)	inch	(mm)	
<b>6T</b>	1.12 sq.	(□28.4)	2.68	(68.1)	3/8 inch compression
<b>6BR</b>	—	—	2.32	(58.9)	Rc 3/8
<b>6BRN</b>	1.12 sq.	(□28.4)	2.32	(58.9)	R 3/8
<b>6</b>	—	—	2.32	(58.9)	NPT 3/8 female
<b>6N</b>	1.12 sq.	(□28.4)	2.32	(58.9)	NPT 3/8 male

# Diaphragm Valve for General Applications

Air operated type  
(For high pressure)

## AK3000 Series

- Suitable for UHP gas supply line
- Body material: 316L SS
- Pneumatically actuated normally closed or normally open
- High pressure type: Max. 4500 psig (31 MPa)
- Indicator switch available as an option



How to Order (See p. 250 for ordering syntax)

AK 30 00 S 2P 4T 4T

Code	Status	Max. operating pressure	Cv
00	Normally closed (N.C.)	3000 psig (20.7 MPa)	0.23
02		3700 psig (25.5 MPa)	0.28
07		4500 psig (31.0 MPa)	0.23
80	Normally open (N.O.)	3000 psig (20.7 MPa)	

Code	Body material
S	316L SS

Code	Ports
2P	2 ports

Code	Connections
4T	1/4 inch compression
4BR	Rc 1/4
4BRN	R 1/4
4	NPT 1/4 female
4N	NPT 1/4 male
6MT	6 mm compression *2)

Code	Specification
No code	—
IS	Indicator switch

Code	Material	Model				
		3000	3002	3004	3007	3080
No code	PCTFE (Standard)	●	●	●	—	●
VS	Polyimide	●	●	●	●	●
PK	PEEK	—	—	●	●	—

●: Available  
—: Not available

\*1) Only available with same type fittings inlet and outlet.  
\*2) Not available with AK3004 and AK3007.

## Specifications

Operating Parameters	AK3000	AK3002	AK3004	AK3007	AK3080
Status	Normally closed (N.C.)				Normally open (N.O.)
Gas	Select compatible materials of construction for the gas				
Operating pressure	Vacuum to 3000 psig (20.7 MPa)		Vacuum to 3700 psig (25.5 MPa)	Vacuum to 4500 psig (31 MPa)	Vacuum to 3000 psig (20.7 MPa)
Proof pressure	1.5 times the maximum operating pressure				
Burst pressure	3 times the maximum operating pressure				
Ambient and operating temperature	-10 to 71°C (No freezing) *1)		-10 to 49°C (No freezing)	-10 to 60°C (No freezing)	-10 to 71°C (No freezing) *1)
Cv	0.23	0.28	0.23		
Leak rate	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s				
Connections	Face seal, Tube weld				
Actuation pressure	70 to 110 psig (0.48 to 0.76 MPa)				
Actuation port connection	NPT 1/8 inch				
Actuation port location	Top				
Installation	Bottom mount				
Internal volume	0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )				
Weight	1.27 kg *3)				
LOTO (Lockout)	Option (Part number: AP PL210) *3)				N/A

\*1) Max. 90°C for Polyimide seat.

\*2) Weight, including individual boxed weight, may vary depending on connections or options.

\*3) Refer to the specification for options. (P.227)

## Indicator Switch (Option) Specification

Code	IS	
Rated voltage	Max. 30 VDC	
Contact capacity	Max. 3 VA	
Switching current	Max. 0.2 A	
Carrying current	Max. 0.5 A	
Cable	Lead wire	AWG 24
	Cable length	3 m
	Color (Lead wire)	Blue: Common line Brown: NC (When the valve is closed, the circuit is closed.) Black: NO (When the valve is open, the circuit is closed.)

## Wetted Parts Material

Wetted Parts	S	
Body	316L SS	
Diaphragm	Ni-Co alloy	
Seat	AK3000, AK3002, AK3080	PCTFE (Option: Polyimide)
	AK3004	PCTFE (Option: Polyimide, PEEK)
	AK3007	Polyimide or PEEK

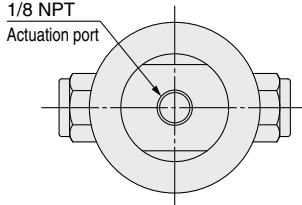
# Diaphragm Valve for General Applications **AK3000 Series**

Air operated type (For high pressure)

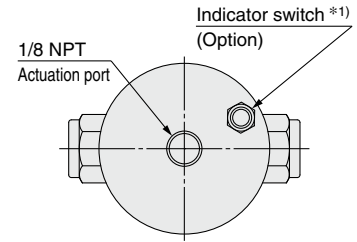
## Dimensions

inch (mm)

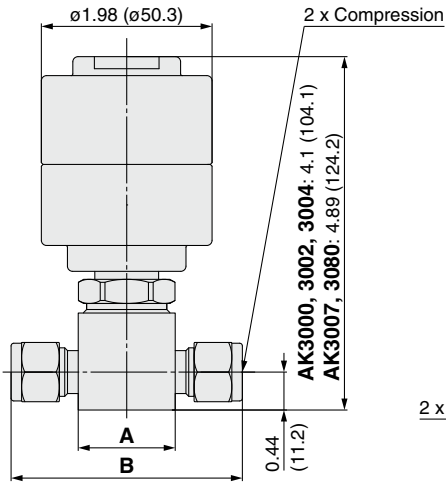
**AK3000**      **AK3007**  
**AK3002**      **AK3080**  
**AK3004**



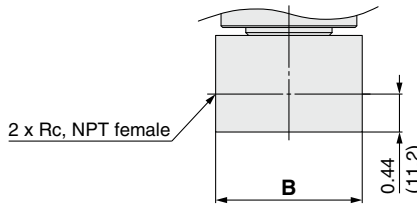
### Indicator switch



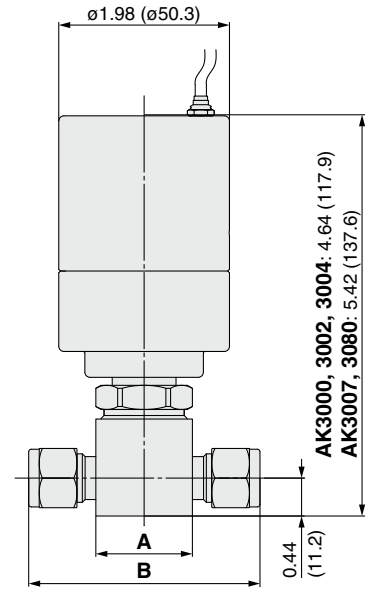
\*1) The mounting position varies depending on the product.



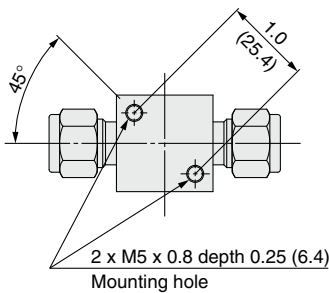
Connections: 4T, 6MT



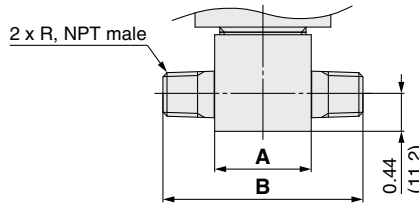
Connections: 4, 4BR



Connections: 4T



4T (Bottom view)



Connections: 4N, 4BRN

Connections	A		B		Ports
	inch	(mm)	inch	(mm)	
4T	1.12 sq.	(□28.4)	2.56	(65)	1/4 inch compression
4BR	—	—	1.70	(43.2)	Rc 1/4
4BRN	1.12 sq.	(□28.4)	2.32	(58.9)	R 1/4
4	—	—	1.70	(43.2)	NPT 1/4 female
4N	1.12 sq.	(□28.4)	2.32	(58.9)	NPT 1/4 male
6MT	1.12 sq.	(□28.4)	2.62	(66.5)	6 mm compression

# Diaphragm Valve for General Applications

Air operated type  
(For high pressure)

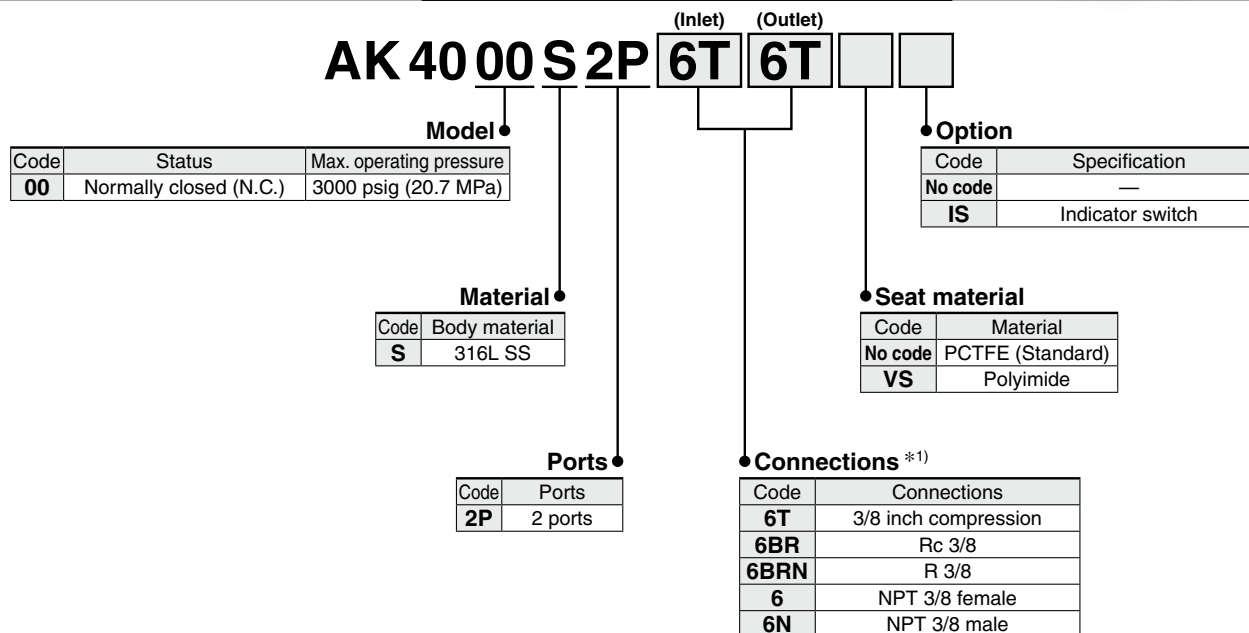
## AK4000 Series

- Suitable for process gas supply line
- Body material : 316L SS
- Pneumatically actuated normally closed
- High pressure type: Max. 3000 psig (20.7 MPa)
- Indicator switch available as an option



RoHS

How to Order (See p. 250 for ordering syntax)



\*1) Only available with same type fittings inlet and outlet.

## Specifications

Operating Parameters	AK4000
Status	Normally closed (N.C.)
Gas	Select compatible materials of construction for the gas
Operating pressure	Vacuum to 3000 psig (20.7 MPa)
Proof pressure	1.5 times the maximum operating pressure
Burst pressure	3 times the maximum operating pressure
Ambient and operating temperature	-10 to 71°C (No freezing) *1)
Cv	0.35
Leak rate	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s
Connections	Compression, Rc, R, NPT
Actuation pressure	70 to 110 psig (0.48 to 0.76 MPa)
Actuation port connection	NPT 1/8 inch
Actuation port location	Top
Installation	Bottom mount
Internal volume	0.12 in <sup>3</sup> (2.14 cm <sup>3</sup> )
Weight	1.27 kg *2)

\*1) Max. 90°C for Polyimide seat.

\*2) Weight, including individual boxed weight, may vary depending on connections or options.

## Indicator Switch (Option) Specification

Code	IS	
Switch type	SPDT	
Rated voltage	Max. 30 VDC	
Contact capacity	Max. 3 VA	
Switching current	Max. 0.2 A	
Carrying current	Max. 0.5 A	
Cable	Lead wire	AWG 24
	Cable length	3 m
	Color (Lead wire)	Blue: Common line Brown: NC (When the valve is closed, the circuit is closed.) Black: NO (When the valve is open, the circuit is closed.)

## Wetted Parts Material

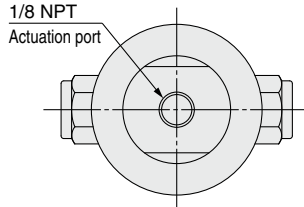
Wetted Parts	S
Body	316L SS
Diaphragm	Ni-Co alloy
Seat	PCTFE (Option: Polyimide)



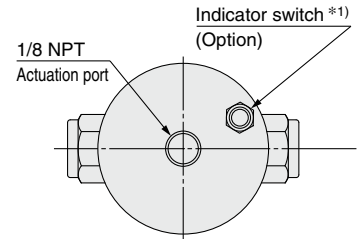
## Dimensions

inch (mm)

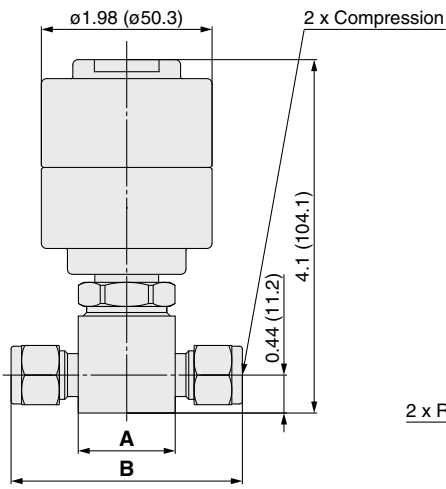
### AK4000



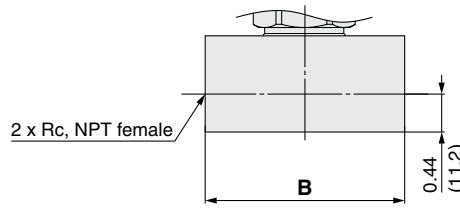
### Indicator switch



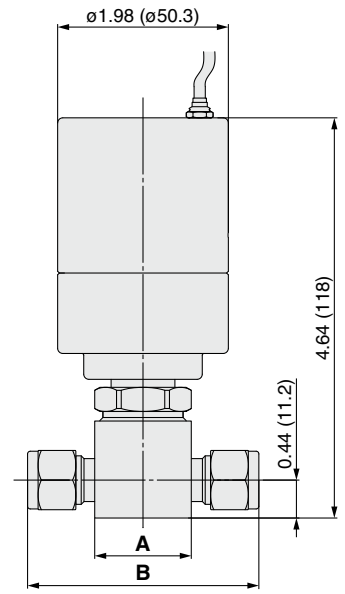
\*1) The mounting position varies depending on the product.



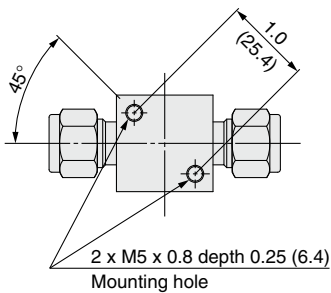
Connections: 6T



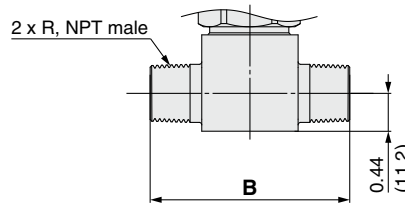
Connections: 6, 6BR



Connections: 6T



6T (Bottom view)



Connections: 6N, 6BRN

Connections	A		B		Ports
	inch	(mm)	inch	(mm)	
6T	1.12 sq.	(□28.4)	2.68	(68.1)	3/8 inch compression
6BR	—	—	2.32	(58.9)	Rc 3/8
6BRN	1.12 sq.	(□28.4)	2.32	(58.9)	R 3/8
6	—	—	2.32	(58.9)	NPT 3/8 female
6N	1.12 sq.	(□28.4)	2.32	(58.9)	NPT 3/8 male

Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

Vacuum Generators

Flow Switches

Technical Data/  
Glossary of Terms

Precautions

## AK3571 & 4571 Series



- Two step mode - metered flow and full open
- Two separate actuation ports
- Soft start valve to minimize vacuum chamber pressurization turbulence
- Metered flow adjustable AK3571: 10 to 200 slpm\*  
AK4571: 10 to 350 slpm\*
- Pneumatically actuated normally closed
- Body material: 316L SS

\* At 80 psig (0.55 MPa) of N<sub>2</sub>

### How to Order (See p. 250 for ordering syntax)

(Inlet) (Outlet)

**AK 3 571 S 2P 4T 4T M 050**

**Size**

Code	Cv
3	0.29
4	0.5

**Model**

Code	Mode	Status
571	Two step mode	Normally closed (N.C.)

**Material**

Code	Body material
S	316L SS

**Ports**

Code	Ports
2P	2 ports

**Metered flow**

Code	Metered adjusted flow in slpm
XXX (3 digits)	Metered adjusted flow in slpm at 80 psig (0.55 MPa) N <sub>2</sub> . Replace XXX with flow rate using 3 digits, example 50 slpm = "050" Adjustable range: AK3571= 10 to 200 slpm, AK4571= 10 to 350 slpm

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

**Connections \*1)**

Code	Connections	AK3	AK4
4T	1/4 inch compression	●	—
4BR	Rc 1/4		
4BRN	R 1/4		
4	NPT 1/4 female		
4N	NPT 1/4 male	—	●
6MT	6 mm compression		
6T	3/8 inch compression		
6BR	Rc 3/8		
6BRN	R 3/8		
6	NPT 3/8 female		
6N	NPT 3/8 male		

\*1) Only available with same type fittings inlet and outlet.

## Specifications

Operating Parameters	AK3571	AK4571
Status	Normally closed (N.C.)	
Gas	Select compatible materials of construction for the gas	
Operating pressure	Vacuum to 125 psig (0.9 MPa)	
Proof pressure	1.5 times the maximum operating pressure	
Burst pressure	3 times the maximum operating pressure	
Ambient and operating temperature	-10 to 71°C (No freezing) *1)	
Cv	0.29	0.5
Leak rate	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s	
Connections	Compression, Rc, R, NPT	
Actuation pressure	70 to 110 psig (0.48 to 0.76 MPa)	
Actuation port connection	M5 x 0.8	
Actuation port location	Sides (2 each)	
Installation	Bottom mount	
Internal volume	0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )	0.12 in <sup>3</sup> (2.14 cm <sup>3</sup> )
Adjustable range of metered flow *2)	10 to 200 slpm	10 to 350 slpm
Tolerance of *2) metered flow	10 to 20 slpm	±6 slpm
	21 to 50 slpm	±10 slpm
	51 to 100 slpm	±15 slpm
	101 to 200 slpm	±20 slpm
	201 to 350 slpm	N/A

\*1) -10 to 90°C for Polyimide seat.

\*2) At 80 psig (0.55 MPa) N<sub>2</sub>

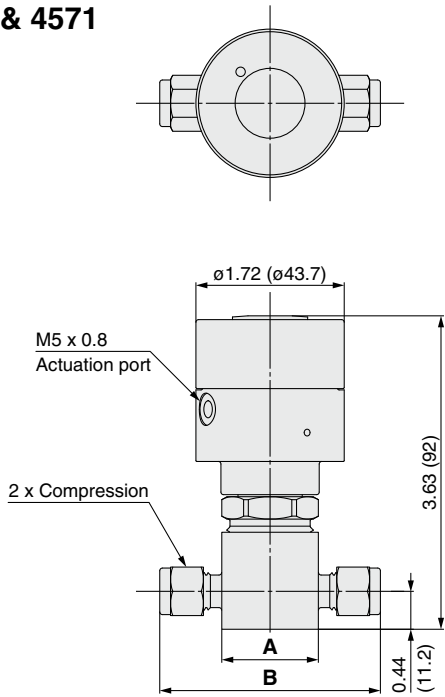
**Wetted Parts Material**

Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Diaphragm	Ni-Co alloy
Seat	PCTFE (Option: Polyimide)

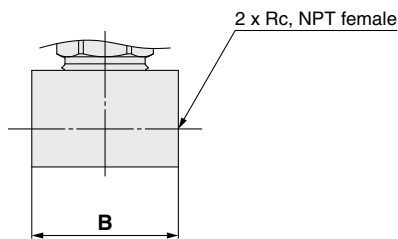
**Dimensions**

inch (mm)

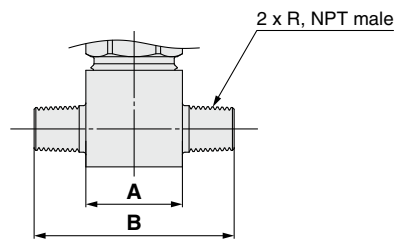
**AK3571 & 4571**



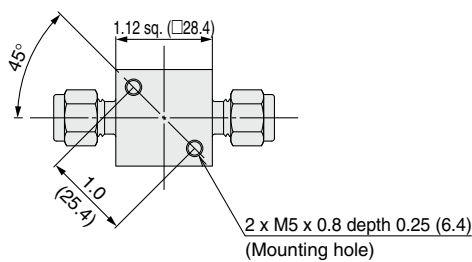
Connections: 4T, 6MT, 6T



Connections: 4, 6, 4BR, 6BR



Connections: 4N, 6N, 4BRN, 6BRN

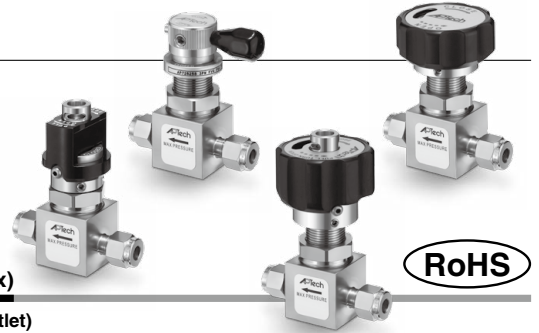


Bottom view

Connections	A		B		Ports
	inch	(mm)	inch	(mm)	
4T	1.12 sq.	(□28.4)	2.56	(65.0)	1/4 inch compression
4BR	—	—	1.70	(43.2)	Rc 1/4
4BRN	1.12 sq.	(□28.4)	2.32	(58.9)	R 1/4
4	—	—	1.70	(43.2)	NPT 1/4 female
4N	1.12 sq.	(□28.4)	2.32	(58.9)	NPT 1/4 male
6MT	1.12 sq.	(□28.4)	2.62	(66.5)	6 mm compression
6T	1.12 sq.	(□28.4)	2.68	(68.1)	3/8 inch compression
6BR	—	—	2.32	(58.9)	Rc 3/8
6BRN	1.12 sq.	(□28.4)	2.32	(58.9)	R 3/8
6	—	—	2.32	(58.9)	NPT 3/8 female
6N	1.12 sq.	(□28.4)	2.32	(58.9)	NPT 3/8 male

## AK3600 Series

- Body material: 316L SS
- LOTO standard with AK3657/3659, optional AK3625
- Indicator switch available as an option (AK3650)



### How to Order (See p. 250 for ordering syntax)

**AK 3 652 S 2P 4T 4T** (Inlet) (Outlet)

**Size**

Code	Cv
3	0.29

**Model**

Code	Knob	Max. operating pressure
652	Round knob with a raised rectangular section	250 psig (1.7 MPa)
659	Pull twist knob with LOTO	3000 psig (20.7 MPa)
600	Multi turn round knob	
625	Lever knob	
650	Round knob with open/close indication window	
657	Pull twist knob with LOTO	

**Material**

Code	Body material
S	316L SS

**Ports**

Code	Ports
2P	2 ports

**Connections \*1)**

Code	Connections
4T	1/4 inch compression
4BR	Rc 1/4
4BRN	R 1/4
4	NPT 1/4 female
4N	NPT 1/4 male
6MT	6 mm compression

**Option (AK3650 only)**

Code	Specification
No code	—
ISH	Indicator switch

**Installation option**

Code	Installation
No code	Bottom mount (Standard)
P	Panel installation *2)

\*2) Panel mounting hole: dia. 0.78 inch (19.8 mm). Not available with AK3652 and AK3659.

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

\*1) Only available with same type fittings inlet and outlet.

## Specifications

Operating Parameters	AK3652	AK3659	AK3600	AK3625	AK3650	AK3657
Gas	Select compatible materials of construction for the gas					
Operating pressure	Vacuum to 250 psig (1.7 MPa)			Vacuum to 3000 psig (20.7 MPa)		
Proof pressure	1.5 times the maximum operating pressure					
Burst pressure	3 times the maximum operating pressure					
Ambient and operating temperature	-40 to 71°C (No freezing) *1)					
Cv	0.29					
Leak rate	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s					
Connections	Compression, Rc, R, NPT					
Installation	Bottom mount			Bottom mount (Option: panel mount)		
Internal volume	0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )					
Weight	0.26 kg *2)	0.45 kg *2)	0.36 kg *2)	0.45 kg *2)	0.73 kg *2)	0.4 kg *2)
Knob	1/4 turn round knob with a raised rectangular section and open/close indication window	Pull twist knob with LOTO *4)	Multi turn round knob	1/4 turn lever knob *3)	1/4 turn round knob with open/close indication window	Pull twist knob with LOTO *4)
Operational Safety Device (OSD)	N/A	Standard	N/A	Option *5) (Part number: AP PL227)	N/A	Standard
LOTO (Lockout)				Option *5) (Part number: AP PL225)		

\*1) -10 to 90°C for Polyimide seat.

\*2) Weight, including individual boxed weight, may vary depending on connections or options.

\*3) Optional lever color available. Please contact SMC.

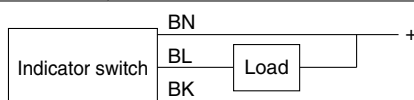
\*4) Handle must be pulled to turn open from closed.

\*5) Refer to the specification for options. (P.227)

## Indicator Switch (Option) Specification

Code	ISH
Output type	NPN
Power supply voltage	3.8 to 30 VDC
Output voltage	Max. 0.4 VDC
Supply current	Max. 11 mA
Output current	Max. 20 mA
Cable	Lead wire
	Cable length
	Color (Lead wire)

### Wiring Diagram



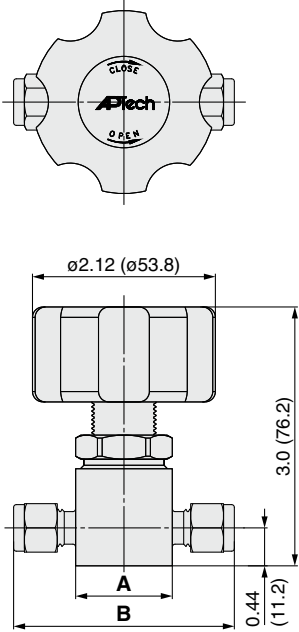
## Wetted Parts Material

Wetted Parts	S
Body	316L SS
Diaphragm	Ni-Co alloy
Seat	PCTFE (Option: Polyimide)

**Dimensions**

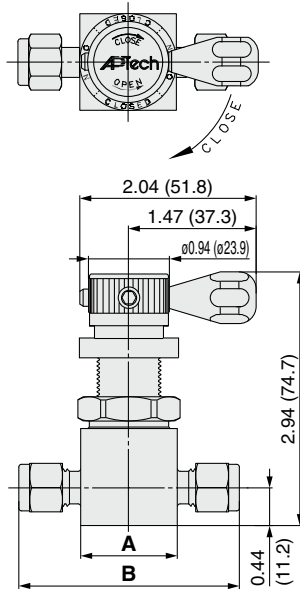
inch (mm)

**AK3600**



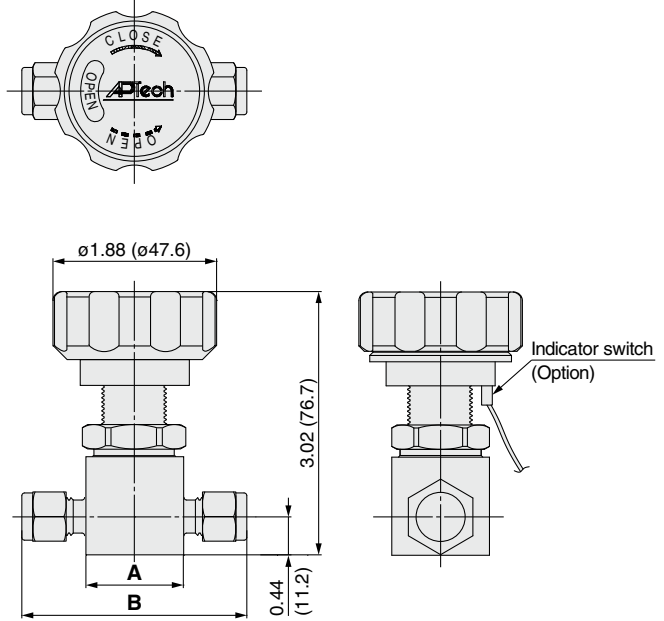
Connections: 4T, 6MT

**AK3625**



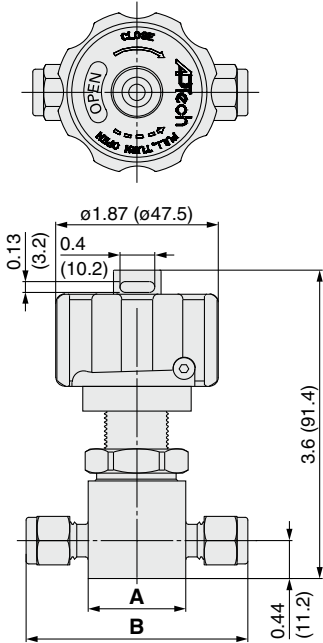
Connections: 4T, 6MT

**AK3650**



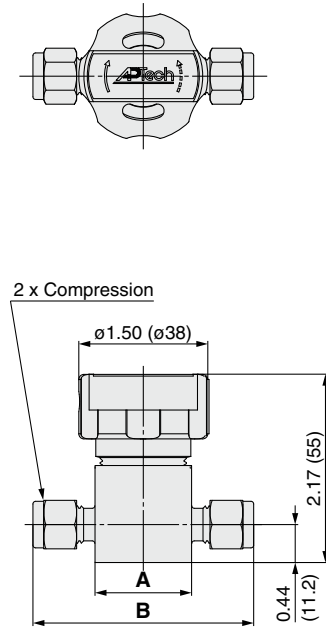
Connections: 4T, 6MT

**AK3657**



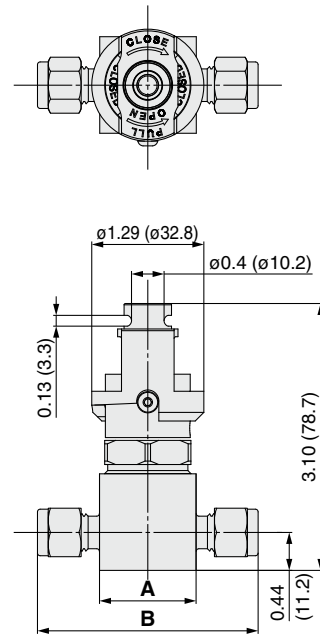
Connections: 4T, 6MT

**AK3652**

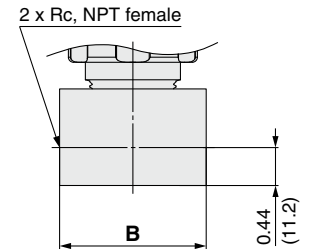


Connections: 4T, 6MT

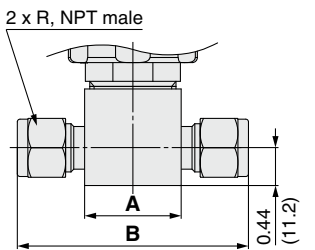
**AK3659**



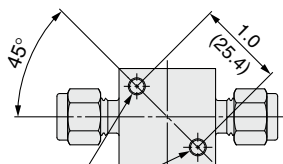
Connections: 4T, 6MT



Connections: 4, 4BR



Connections: 4N, 4BRN



M5 x 0.8 depth 0.25 (6.4)  
(Mounting hole)

**Bottom view**

Connections	A		B		Ports
	inch	(mm)	inch	(mm)	
4T	1.12 sq.	(28.4)	2.56	(65)	1/4 inch compression
4BR	—	—	1.70	(43.2)	Rc 1/4
4BRN	1.12 sq.	(28.4)	2.32	(58.9)	R 1/4
4	—	—	1.70	(43.2)	NPT 1/4 female
4N	1.12 sq.	(28.4)	2.32	(58.9)	NPT 1/4 male
6MT	1.12 sq.	(28.4)	2.62	(66.5)	6 mm compression

## AK4600 Series

- Body material: 316L SS
- LOTO standard with AK4657/4659, optional AK4625
- Indicator switch available as an option (AK4650)



RoHS

### How to Order (See p. 250 for ordering syntax)

**AK 4 652 S 2P 6T 6T** (Inlet) (Outlet)

**Size**

Code	Cv
4	0.5

**Model**

Code	Knob	Max. operating pressure
652	Round knob with a raised rectangular section	250 psig (1.7 MPa)
659	Pull twist knob with LOTO	
600	Multi turn round knob	
625	Lever knob	
650	Round knob with open/close indication window	300 psig (2.1 MPa)
657	Pull twist knob with LOTO	

**Material**

Code	Body material
S	316L SS

**Ports**

Code	Ports
2P	2 ports

**Connections \*1)**

Code	Connections
6T	3/8 inch compression
6BR	Rc 3/8
6BRN	R 3/8
6	NPT 3/8 female
6N	NPT 3/8 male

\*1) Only available with same type fittings inlet and outlet.

**Option (AK4650 only)**

Code	Specification
No code	—
ISH	Indicator switch

**Installation option**

Code	Installation
No code	Bottom mount (Standard)
P	Panel installation *3)

\*3) Panel mounting hole: dia. 0.78 inch (19.8 mm). Not available with AK4652 and AK4659.

**Option**

Code	Specification
No code	Standard
HR	High pressure *2) (Max. operating pressure 3000 psig (20.7 MPa))

\*2) Not available with AK4652 and AK4659.

**Seat material**

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

## Specifications

Operating Parameters	AK4652	AK4659	AK4600	AK4625	AK4650	AK4657
<b>Gas</b>	Select compatible materials of construction for the gas					
<b>Operating pressure</b>	Vacuum to 250 psig (1.7 MPa)			Vacuum to 300 psig (2.1 MPa)		
<b>Proof pressure</b>	1.5 times the maximum operating pressure					
<b>Burst pressure</b>	3 times the maximum operating pressure					
<b>Ambient and operating temperature</b>	-40 to 71 °C (No freezing) *1)					
<b>Cv</b>	0.5					
<b>Leak rate</b>	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s					
<b>Connections</b>	Compression, Rc, R, NPT					
<b>Installation</b>	Bottom mount			Bottom mount (Option: panel mount)		
<b>Internal volume</b>	0.12 in <sup>3</sup> (2.14 cm <sup>3</sup> )					
<b>Weight</b>	0.26 kg *2)	0.45 kg *2)	0.36 kg *2)	0.45 kg *2)	0.73 kg *2)	0.4 kg *2)
<b>Knob</b>	1/4 turn round knob with a raised rectangular section and open/close indication window	Pull twist knob with LOTO *4)	Multi turn round knob	1/4 turn lever knob *3)	1/4 turn round knob with open/close indication window	Pull twist knob with LOTO *4)
<b>Operational Safety Device (OSD)</b>	N/A	Standard	N/A	Option *5) (Part number: AP PL227)	N/A	Standard
<b>LOTO (Lockout)</b>				Option *5) (Part number: AP PL225)		

\*1) -10 to 90°C for Polyimide seat.

\*2) Weight, including individual boxed weight, may vary depending on connections or options.

\*3) Optional lever color available. Please contact SMC.

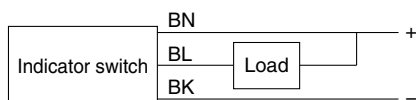
\*4) Handle must be pulled to turn open from closed.

\*5) Refer to the specification for options. (P.227)

## Indicator Switch (Option) Specification

Code	ISH	
<b>Output type</b>	NPN	
<b>Power supply voltage</b>	3.8 to 30 VDC	
<b>Output voltage</b>	Max. 0.4 VDC	
<b>Supply current</b>	Max. 11 mA	
<b>Output current</b>	Max. 20 mA	
<b>Cable</b>	<b>Lead wire</b>	AWG 24
	<b>Cable length</b>	3 m
	<b>Color (Lead wire)</b>	Blue (BL), Brown (BN), Black (BK)

### Wiring Diagram



## Wetted Parts Material

Wetted Parts	S
Body	316L SS
Diaphragm	Ni-Co alloy
Seat	PCTFE (Option: Polyimide)

## Option

### High pressure

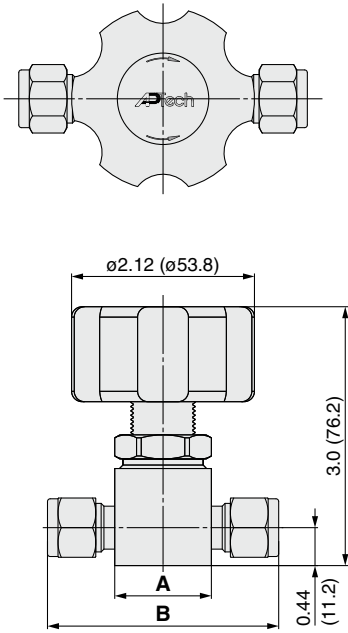
Changes from the standard type are:

Option	Other Parameters	AK4600	AK4625	AK4650	AK4657
HR	Operating pressure	Vacuum to 3000 psig (20.7 MPa)			

**Dimensions**

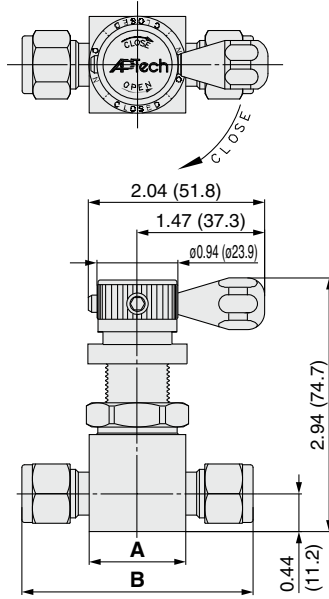
inch (mm)

**AK4600**



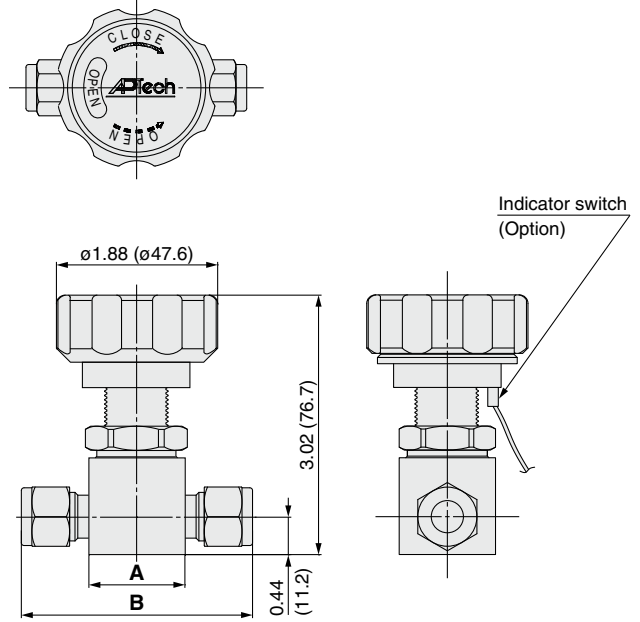
Connections: 6T

**AK4625**



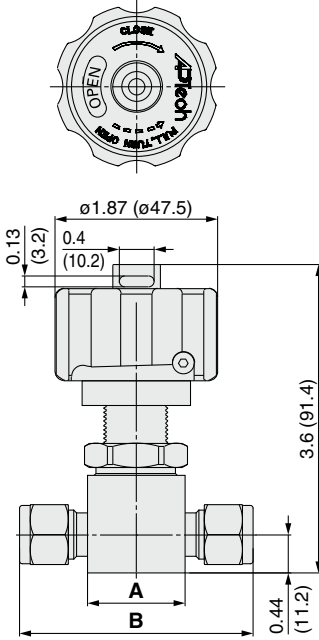
Connections: 6T

**AK4650**



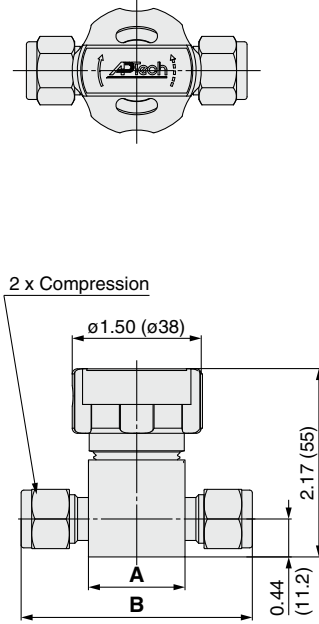
Connections: 6T

**AK4657**



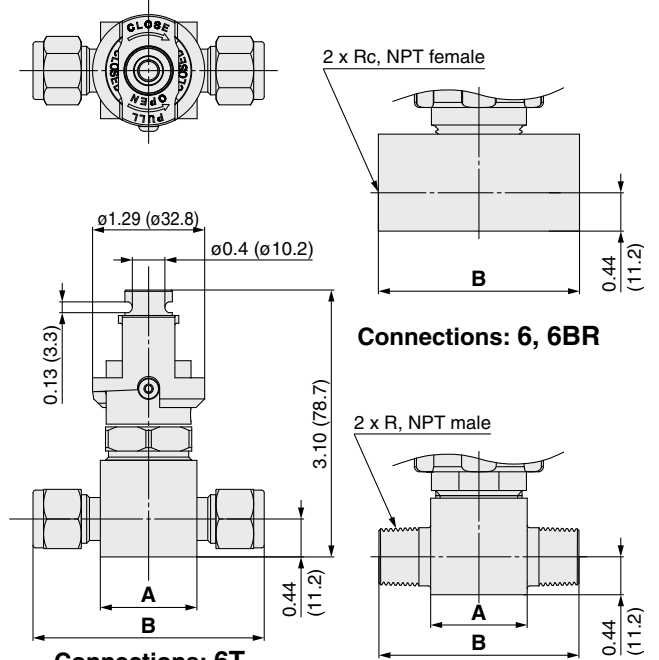
Connections: 6T

**AK4652**



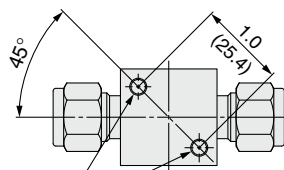
Connections: 6T

**AK4659**



Connections: 6T

Connections: 6N, 6BRN



M5 x 0.8 depth 0.25 (6.4)  
(Mounting hole)

Bottom view

Connections	A		B		Ports
	inch	(mm)	inch	(mm)	
6T	1.12 sq.	(□28.4)	2.68	(68.1)	3/8 inch compression
6BR	—	—	2.32	(58.9)	Rc 3/8
6BRN	1.12 sq.	(□28.4)	2.32	(58.9)	R 3/8
6	—	—	2.32	(58.9)	NPT 3/8 female
6N	1.12 sq.	(□28.4)	2.32	(58.9)	NPT 3/8 male

Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

Vacuum Generators

Flow Switches

Technical Data/  
Glossary of Terms

Precautions

## AK3604, 3624 & 3627 Series

- Body material: 316L SS



RoHS

How to Order (See p. 250 for ordering syntax)

AK 3 **604** **S** **2P** **4T** **4T** [ ] [ ]

(Inlet) (Outlet)

• **Size**

Code	Cv
3	0.29

• **Model**

Code	Knob	Max. operating pressure
604	Multi turn round knob	3700 psig (25.5 MPa)
624	1/4 turn lever knob	4500 psig (31 MPa)
627	T handle	

• **Material**

Code	Body material
S	316L SS

• **Ports**

Code	Body material
2P	2 ports

• **Installation option**

Code	Installation
No code	Bottom mount (Standard)
P	Panel installation *2)

\*2) Panel mounting hole: dia. 0.78 inch (19.8 mm).

• **Seat material**

Code	Material	Model		
		3604	3624	3627
No code	PCTFE (Standard)	●	●	—
VS	Polyimide	●	●	●
PK	PEEK	●	●	●

●: Available  
—: Not available

• **Connections** \*1)

Code	Connections
4T	1/4 inch compression
4BR	Rc 1/4
4BRN	R 1/4
4	NPT 1/4 female
4N	NPT 1/4 male

\*1) Only available with same type fittings inlet and outlet.

## Specifications

Operating Parameters	AK3604	AK3624	AK3627
Gas	Select compatible materials of construction for the gas		
Operating pressure	Vacuum to 3700 psig (25.5 MPa)		Vacuum to 4500 psig (31 MPa)
Proof pressure	1.5 times the maximum operating pressure		
Burst pressure	3 times the maximum operating pressure		
Ambient and operating temperature	-40 to 49°C (No freezing)		-40 to 60°C (No freezing)
Cv	0.29		
Leak rate	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s		
Connections	Compression, Rc, R, NPT		
Installation	Bottom mount (Option: panel mount)		
Internal volume	0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )		
Weight	0.36 kg *1)	0.45 kg *1)	0.45 kg *1)
Knob	Multi turn round knob	1/4 turn lever knob	1/4 turn T handle
LOTO (Lockout)	N/A	Option *2) (Part number: AP PL225)	N/A

\*1) Weight, including individual boxed weight, may vary depending on connections or options.

\*2) Refer to the specification for options. (P.227)

## Wetted Parts Material

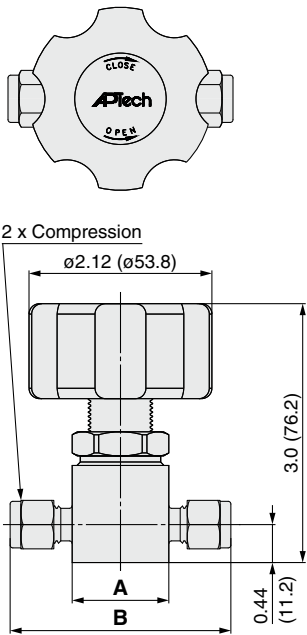
Wetted Parts		S
Body		316L SS
Diaphragm		Ni-Co alloy
Seat	AK3604, AK3624	PCTFE (Option: Polyimide, PEEK)
	AK3627	Polyimide or PEEK



**Dimensions**

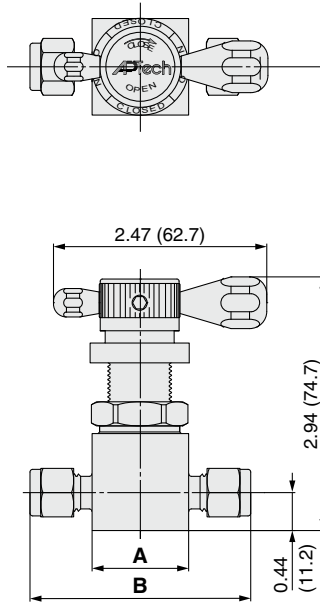
inch (mm)

**AK3604**



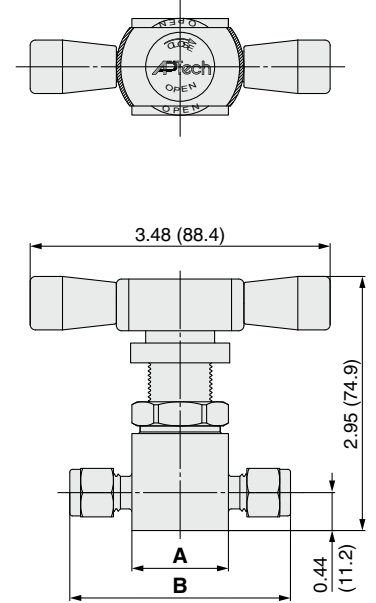
Connections: 4T

**AK3624**

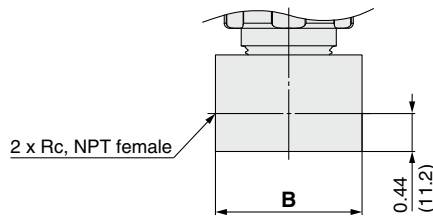


Connections: 4T

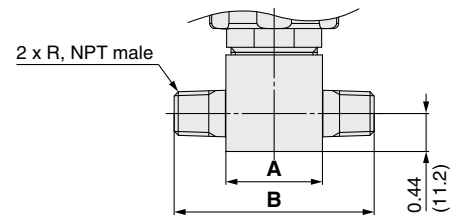
**AK3627**



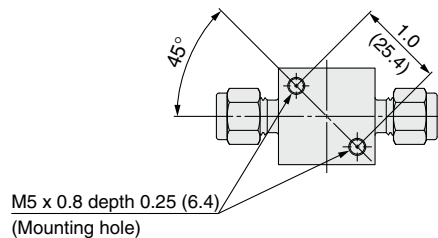
Connections: 4T



Connections: 4, 4BR



Connections: 4N, 4BRN



M5 x 0.8 depth 0.25 (6.4)  
(Mounting hole)

**Bottom view**

Connections	A		B		Ports
	inch	(mm)	inch	(mm)	
4T	1.12 sq.	(□28.4)	2.56	(65)	1/4 inch compression
4BR	—	—	1.70	(43.2)	Rc 1/4
4BRN	1.12 sq.	(□28.4)	2.32	(58.9)	R 1/4
4	—	—	1.70	(43.2)	NPT 1/4 female
4N	1.12 sq.	(□28.4)	2.32	(58.9)	NPT 1/4 male

# Metering Valve for General Applications

## AK3672, 3675 & 4675 Series

- Suitable for process gas supply line
- Body material: 316L SS
- Fine adjustment control 12 to 15 turns of the knob to wide open
- One wetted moving part - a diaphragm
- Flow rate AK3672: 10 slpm \*1)  
AK3675: 40 slpm \*1)  
AK4675: 70 slpm \*1)

\*1) At 30 psig (0.2 MPa) of N<sub>2</sub>



**How to Order** (See p. 250 for ordering syntax)

AK **3672** S **2P** **4** **4**  
(Inlet) (Outlet)

• **Model**

Code	Cv
3672	0 to 0.02
3675	0 to 0.08
4675	0 to 0.15

• **Material**

Code	Body material
S	316L SS

• **Ports**

Code	Ports
2P	2 ports

• **Connections** \*1)

Code	Connections	AK3672	AK4675
4T	1/4 inch compression	●	—
4BR	Rc 1/4		
4BRN	R 1/4		
4	NPT 1/4 female		
4N	NPT 1/4 male	—	●
6T	3/8 inch compression		
6BR	Rc 3/8		
6BRN	R 3/8		
6	NPT 3/8 female		
6N	NPT 3/8 male		

\*1) Only available with same type fittings inlet and outlet.

## Specifications

Operating Parameters	AK3672	AK3675	AK4675
Gas	Select compatible materials of construction for the gas		
Operating pressure	Vacuum to 145 psig (1 MPa)		
Proof pressure	1.5 times the maximum operating pressure		
Burst pressure	3 times the maximum operating pressure		
Ambient and operating temperature	-40 to 71°C (No freezing)		
Cv	0 to 0.02	0 to 0.08	0 to 0.15
Leak rate	1 x 10 <sup>-10</sup> Pa·m <sup>3</sup> /s		
Connections	Compression, Rc, R, NPT		
Installation	Bottom mount		
Internal volume	0.06 in <sup>3</sup> (1.07 cm <sup>3</sup> )		

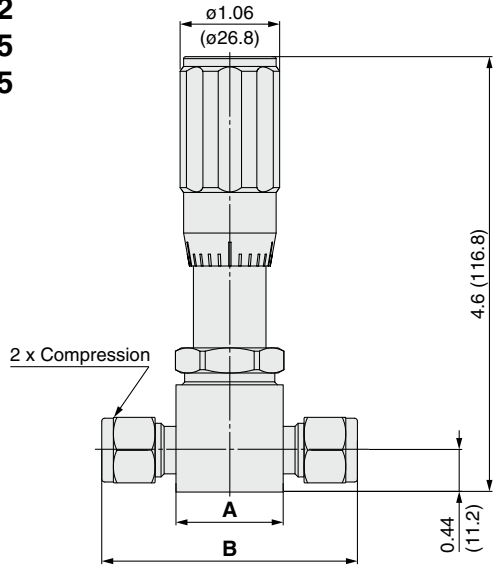
## Wetted Parts Material

Wetted Parts	AK3672/AK3675	AK4675
Body	316L SS	
Diaphragm	Ni-Co alloy	
Seat	PCTFE	316L SS

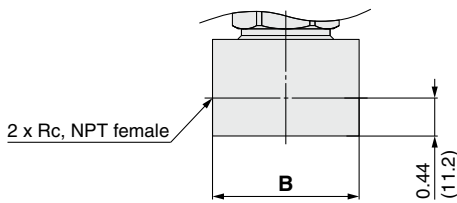
## Dimensions

inch (mm)

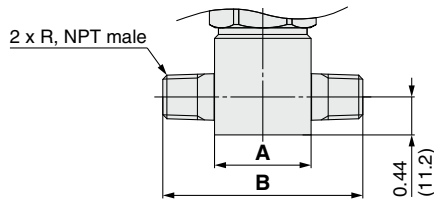
**AK3672**  
**AK3675**  
**AK4675**



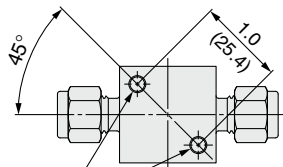
**Connections: 4T, 6T**



**Connections: 4, 6, 4<sub>6</sub>BR**



**Connections: 4<sub>N</sub>, 4<sub>6</sub>BRN**



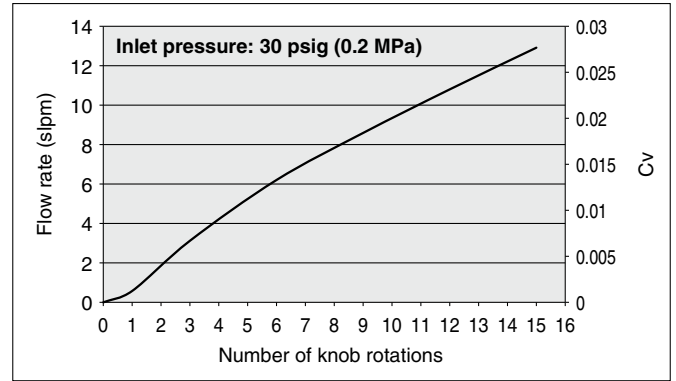
M5 x 0.8 depth 0.25 (6.4)  
(Mounting hole)

**Bottom view**

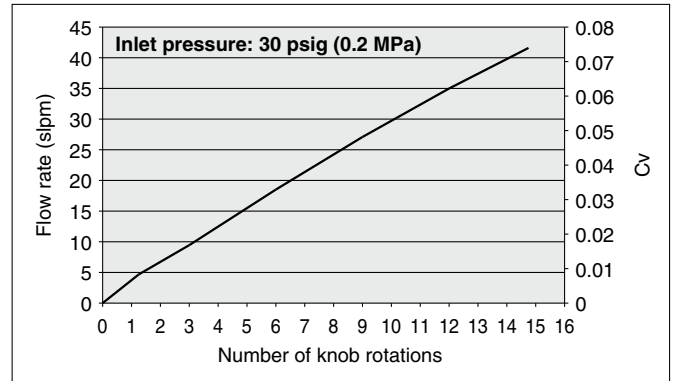
Connections	A		B		Ports
	inch	(mm)	inch	(mm)	
<b>4T</b>	1.12 sq.	(□28.4)	2.56	(65)	1/4 inch compression
<b>4BR</b>	—	—	1.70	(43.2)	Rc 1/4
<b>4BRN</b>	1.12 sq.	(□28.4)	2.32	(58.9)	R 1/4
<b>4</b>	—	—	1.70	(43.2)	NPT 1/4 female
<b>4N</b>	1.12 sq.	(□28.4)	2.32	(58.9)	NPT 1/4 male
<b>6T</b>	1.12 sq.	(□28.4)	2.68	(68.1)	3/8 inch compression
<b>6BR</b>	—	—	2.32	(58.9)	Rc 3/8
<b>6BRN</b>	1.12 sq.	(□28.4)	2.32	(58.9)	R 3/8
<b>6</b>	—	—	2.32	(58.9)	NPT 3/8 female
<b>6N</b>	1.12 sq.	(□28.4)	2.32	(58.9)	NPT 3/8 male

## Flow Rate Characteristics

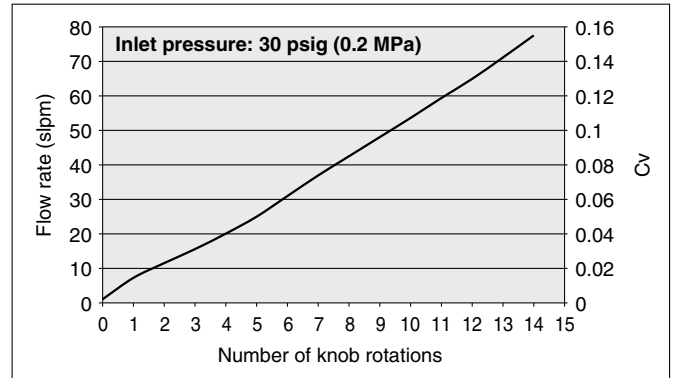
**AK3672**



**AK3675**



**AK4675**



Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

AP

AZ

AK

Check Valves

Vacuum Generators

AP

AZ

AK

Flow Switches

AP

AZ

AK

Technical Data/ Glossary of Terms

AP

AZ

AK

Precautions

# LOTO Options for Diaphragm Valves

\* Made to order specifications

## Lockout Device/For Air Operated Valve (Order Separately)

### Product number: AP PL210

#### Feature

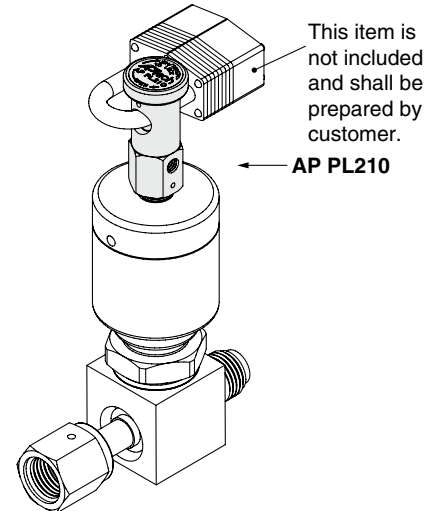
- Lockable by installing the AP PL210 to the actuation port of air operated valve (only available for N.C. with actuation port connection NPT 1/8 inch)
- Prevent accidental valve opening by manually shutting off actuation pressure
- Lockable only in the closed position
- Accept standard pad lock with 1/4 inch shackle
- Actuation port connection: 10-32 UNF thread
- Actuation port pressure rating: Maximum 150 psig (1.0 MPa)

#### Operation

Push top button down and twist to close the valve. This feature allows the valve to stay in closed position even if actuation pressure is supplied into an actuation port. Valve opens by repositioning the button, then pressurizing the actuation port.

#### Series

AP3000, AP3113, AP3130, AP3200, AP3540, AP4540  
AZ3000, AZ3540, AZ4540  
AK3000, AK3540, AK4540



## Lockout Device/For Manually Operated Valve (Order Separately)

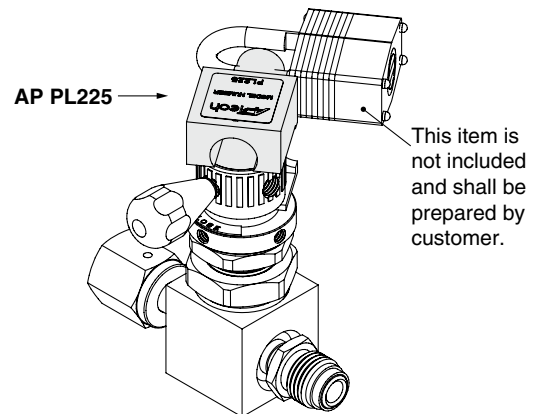
### Product number: AP PL225

#### Feature

- Lockable by installing the AP PL225 to the manually operated valve (only available for lever knob)
- Lockable in the closed position
- Accept standard pad lock with 1/4 inch shackle.

#### Series

AP3125, AP3625, AP4625  
AZ3125, AZ3625, AZ4625  
AK3625, AK4625



## Hook for Operational Safety Device (OSD) (Order Separately)

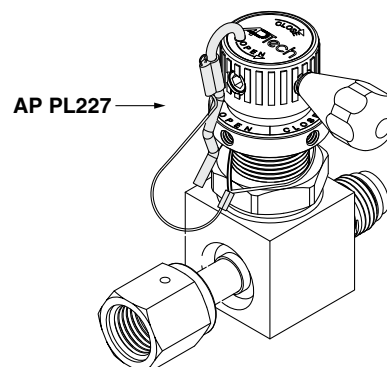
### Product number: AP PL227

#### Feature

- Secure valve in the closed position by installing the AP PL227 to the top of the handle.
- Prevents accidental opening of the valve.

#### Series

AP3125, AP3625, AP4625  
AZ3125, AZ3625, AZ4625  
AK3625, AK4625





# Process Gas Equipment/Diaphragm Valve Specific Product Precautions

Be sure to read this before handling the products. Refer to page 248 for safety instructions. For process gas equipment precautions, refer to pages 249, 250, and the "Operation Manual" on the SMC website: <https://www.smcworld.com>

## Selection

### Warning

#### 1. Confirm the specifications.

This product is used in gas delivery systems to shutoff gas flow. When selecting the product, confirm the operating conditions, such as type of gas, operating pressure (inlet and outlet), flow rate, actuating pressure, operating temperature etc., and use within the operating range specified in the catalog. The product may not be suitable for use with specific gases and applications/environments. Check the compatibility of the product materials with the process gas. Design the equipment and select the product by understanding the characteristics of gas.

## Mounting

### Warning

#### 1. Confirm the mounting direction of the product.

Inlet ports are labeled with an "IN" mark. The outlet ports are usually not labeled but may be labeled with an "OUT" mark. Orient the valve as specified by the system designer.

#### 2. Connect actuation pressure to the valve actuator connection. (Air operated type)

Use nitrogen or clean dry air for actuation pressure. The connection may be a 1/8 inch NPT female thread or M5 female thread depending on the valve model.

#### 3. After installation, check internal leakage (leakage across seat) with inert gases.

Perform a helium leak test depending on applications.

## Maintenance

### Warning

#### 1. If a valve requires repair, contact SMC.

## Operation (Air operate type)

### Warning

#### 1. Use nitrogen or clean dry air as actuation pressure.

#### 2. Confirm the valve type (N.C. or N.O.).

In the case of N.C. (Normally Closed), valve will open when applying actuation pressure to the valve actuator connection and valve will close when actuation pressure is vented to atmospheric pressure. In the case of N.O. (Normally Open), its actuation mechanism is opposite to the N.C. type. Valve will close when applying actuation pressure to the valve actuator connection.

#### 3. Apply actuation pressure within the range of specifications.

## Operation (Manually operated type)

### Warning

#### 4. When closing the valve, rotate the handle clockwise until it completely stops.

There is the internal stop in the handle or in the valve body. Rotate the handle clockwise until the internal stop is reached and it completely stops.

#### 5. When closing the valve with LOTO feature, rotate the handle fully clockwise until the stop. (AP/AZ/AK3657, AP/AZ/AK4657, AP3157, AP/AZ3900)

When the handle is fully clockwise, the indicator plate roller is aligned with a vertical slot in the handle allowing the handle to drop downward. This feature prevents the valve from being accidentally opened.

#### 6. When opening the valve, rotate the handle counterclockwise until it completely stops.

There is the internal stop in the handle. Rotate the handle counterclockwise until the internal stop is reached and it completely stops.

#### 7. When opening the valve with LOTO feature, the handle must first be lifted up, away from the valve body, and rotated counterclockwise until it completely stops. (AP/AZ/AK3657, AP/AZ/AK4657, AP3157, AP/AZ3900)

When valve is closed, handle will not rotate as the fixed indicator plate roller is positioned within the vertical slot in the handle. The handle must first be lifted up away from the valve body and rotated counterclockwise until it completely stops.

#### 8. Do not use a tool when rotating the handle.

When the handle is rotated with a tool, it may apply excessive torque to the handle or inside the valve body and it may cause damage. Rotate the handle by hand.

#### 9. When locking the valve with LOTO feature in the closed position, use safety lockout hasp. (AP/AZ/AK3657, AP/AZ/AK4657, AP3157, AP/AZ3900)

The valve with LOTO feature has a built in LOTO capability. When using LOTO feature, rotate the handle clockwise and insert safety lockout hasp into lock stem slot.

## Export

### Warning

Some of the products or technologies in this catalog are subject to list control under the laws and regulations stipulated by the Ministry of Economy, Trade and Industry (Foreign Exchange and Foreign Trade Control Act).

When these products or technologies subject to list control are exported or provided, strictly follow the laws and regulations stipulated by the Ministry of Economy, Trade and Industry (Foreign Exchange and Foreign Trade Control Act).

In addition, when the products or technologies in this catalog are exported or provided, be sure to ensure that they are not intended for use as weapons or in any applications related to weapons.

Recommendations

Regulators

AP

SL

AZ

AK

BP

Diaphragm Valves

AP

AZ

AK

Check Valves

Vacuum Generators

Flow Switches

Technical Data/  
Glossary of Terms

Precautions