Check Valve

Vacuum Generators

Flow Switches

Check Valve

AP64 Series

- **Simple design with free of springs and poppets**
- **Reseals with minimal back pressure**
- **Low cracking pressure**

RoHS

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

AP64 S [ ] **MV4** (Inlet) **MV4** (Outlet) [ ]

Material

Code	Body material
S	316L SS secondary remelt

Seal material

Code	Material
No code	FKM (Standard)
NP	Polychloroprene

Surface finish

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

Connections (Inlet, Outlet)

Code	Connections
MV4	1/4 inch face seal (Male)
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

Specifications

Operating Parameters		**AP64**
Gas		Select compatible materials of construction for the gas
Inlet pressure		Vacuum to 3500 psig (24.1 MPa)
Cracking pressure ∗1)		3 psi (0.023 MPa) differential ∗2)
Maximum back pressure		3500 psig (24.1 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) ∗3)
Cv		0.4 max
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s
	Outboard leakage	2×10^{-11} Pa·m³/s ∗4)
Surface finish		Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm)
Connections		Face seal, Tube weld
Internal volume		0.122 in.³ (2 cm³)
Weight		0.02 kg ∗5)

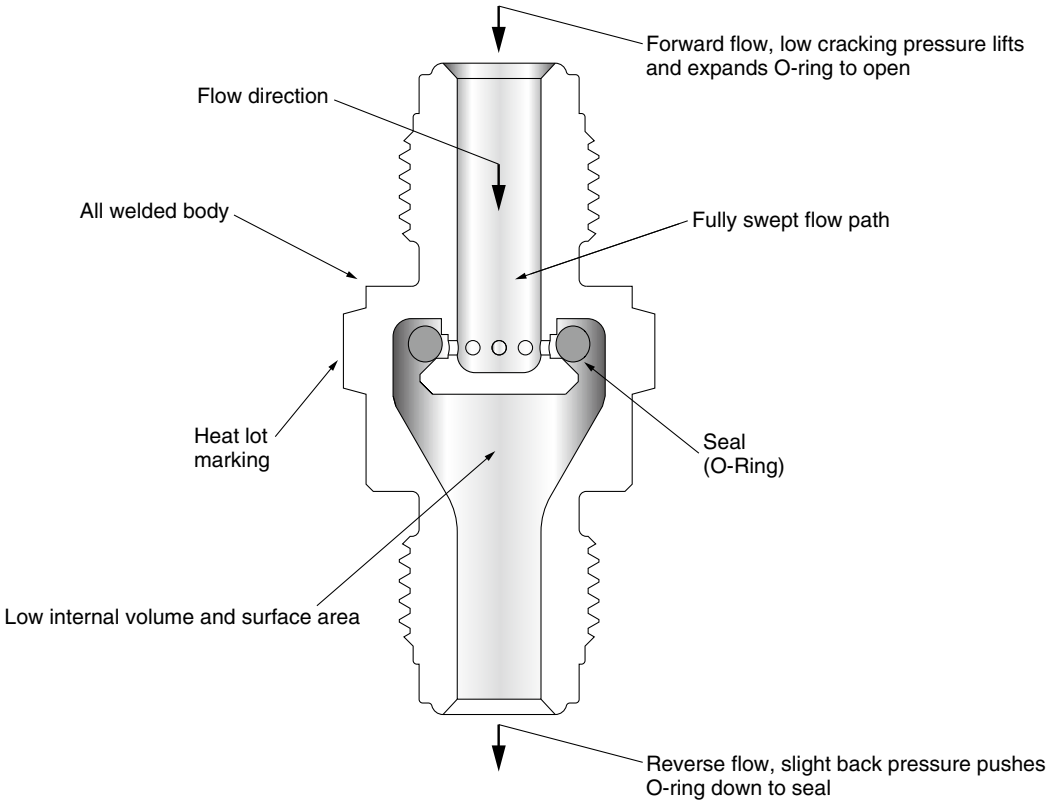
∗1) Cracking pressure is a nominal value which may vary depending on the application and operating conditions.
∗2) 6 psi (0.04 MPa) differential for CR seat.
∗3) Polychloroprene seal is limited to a maximum temperature of 50°C.
∗4) Tested with inlet pressure 500 psig (3.5 MPa).
∗5) Weight, including 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
Seal	FKM (Option: Polychloroprene)

Construction

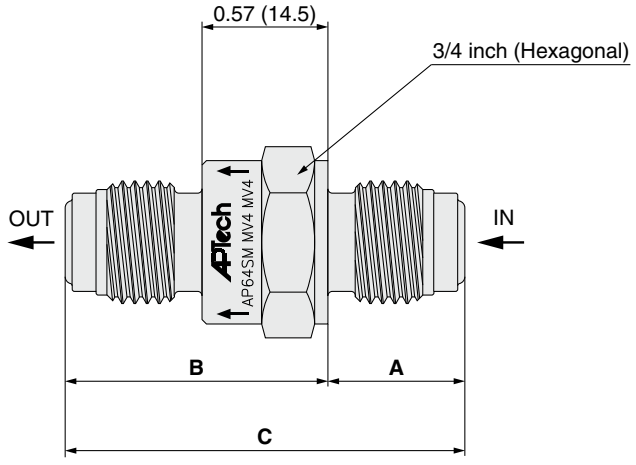
AP64



Dimensions

inch (mm)

AP64

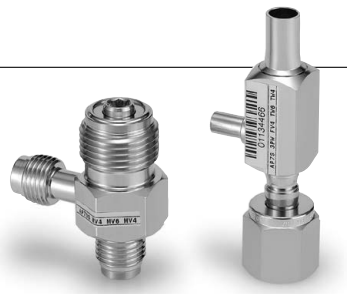


Connections		A		B		C	
Inlet	Outlet	inch	(mm)	inch	(mm)	inch	(mm)
MV4	**MV4**	0.62	(15.7)	1.19	(30.2)	1.81	(46.0)
MV4	**FV4**			1.50	(38.1)	2.12	(53.8)
FV4	**FV4**	0.93	(23.6)			2.43	(61.7)
FV4	**MV4**			1.19	(30.2)	2.12	(53.8)
TW4	**TW4**	0.34	(8.6)	0.91	(23.1)	1.25	(31.8)
MV6	**MV6**	1.83	(46.5)	2.40	(61.0)	4.23	(107.4)
MV6	**FV6**						
FV6	**MV6**						
FV6	**MV6**						
TW6	**TW6**	0.34	(8.6)	0.91	(23.1)	1.25	(31.8)

Vacuum Generator

AP7 & 70 Series

- **Max. vacuum pressure: -26 in.Hg (-88 kPa)**
- **AP70 series**
  - **Compact**
  - **Fine vacuum efficiency**
- **AP7 series**
  - **All connections available with all ports**



RoHS

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

AP 70 S MV4 MV6 FV4

(Inlet) (Vent) (Vacuum)

Model

Code	Feature
70	Compact and high performance

Material

Code	Body material
S	316L SS

Connections (Inlet N_2)

Code	Connections
MV4	1/4 inch face seal (Male)

Connections (Vent)

Code	Connections
MV6	3/8 inch face seal (Male)

Connections (Vacuum)

Code	Connections
MV4	1/4 inch face seal (Male)
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

AP 7 S 3PW MV4 MV6 FV4

(Inlet) (Vent) (Vacuum)

Model

Code	Feature
7	Optional connections available

Material

Code	Body material
S	316L SS

Ports

Code	Ports
3PW	3 ports

Connections (Inlet N_2, Vent, Vacuum)

Code	Connections
MV4	1/4 inch face seal (Male)
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

Specifications

Operating Parameters		AP7	AP70
Gas (Inlet N_2 port)		N_2	
Gas (Vacuum port)		Select compatible materials of construction for the gas	
N_2 Inlet pressure		70 to 110 psig (0.48 to 0.76 MPa)	
Vacuum port maximum pressure		3500 psig (24.1 MPa)	
Proof pressure (Vacuum)		1.5 times the maximum operating pressure	
Burst pressure (Vacuum)		3 times the maximum operating pressure	
Maximum vacuum pressure		-26 in.Hg (-88 kPa) *1)	
Ambient and operating temperature		-40 to 71°C	
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s	
	Outboard leakage		
Connections	**Inlet**	Face seal, Tube weld	1/4 inch face seal (Male)
	Vent	Face seal, Tube weld	3/8 inch face seal (Male)
	Vacuum	Face seal, Tube weld	
Weight		0.11 kg *2)	0.13 kg *2)

*1) At inlet pressure 80 psig (0.55 MPa) and flow rate 60 slpm.

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

Wetted Parts Material

AP7

Wetted Parts	S
Body	316L SS

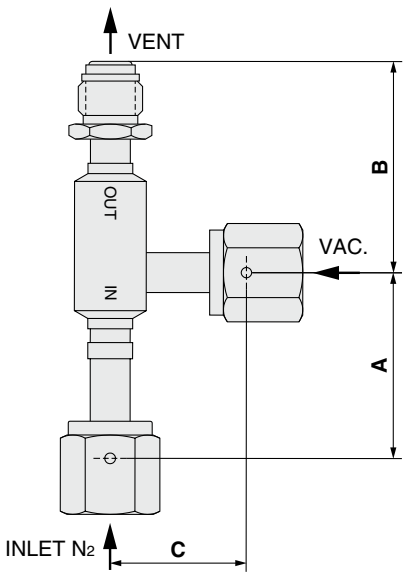
AP70

Wetted Parts	S
Body	316L SS

Dimensions

inch (mm)

AP7

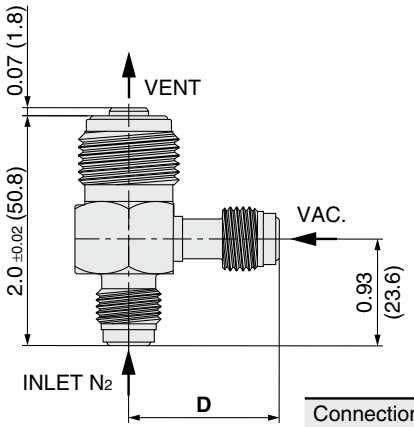


Connections (Inlet)	A	
	inch	(mm)
MV4	1.62	(41.1)
FV4		
TW4	1.25	(31.8)
MV6	2.13	(54.1)
FV6		
TW6	1.25	(31.8)

Connections (Vent)	B	
	inch	(mm)
MV4	1.83	(46.5)
FV4		
TW4	1.46	(37.1)
MV6	2.34	(59.4)
FV6		
TW6	1.46	(37.1)

Connections (Vacuum)	C	
	inch	(mm)
MV4	1.18	(30.0)
FV4		
TW4	0.81	(20.6)
MV6	1.69	(42.9)
FV6		
TW6	0.81	(20.6)

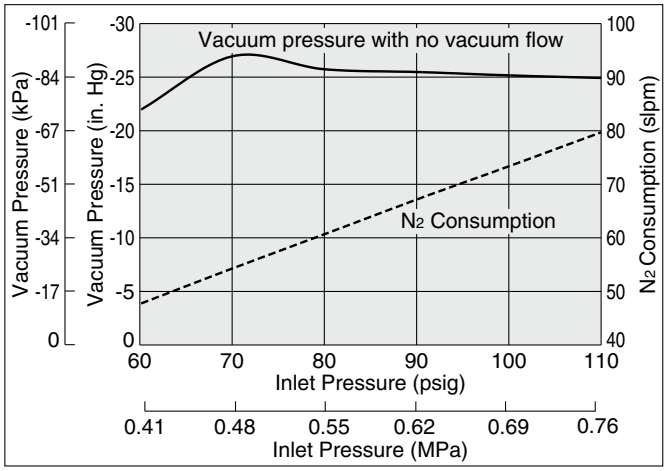
AP70



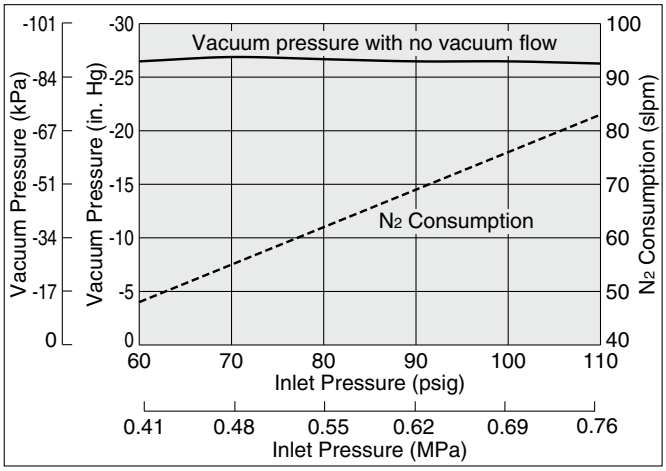
Connections (Vacuum)	D	
	inch	(mm)
MV4	1.31	(33.3)
FV4		
TW4	0.97	(24.6)
MV6	1.85	(47.0)
FV6		
TW6	0.97	(24.6)

Exhaust Characteristics

AP7

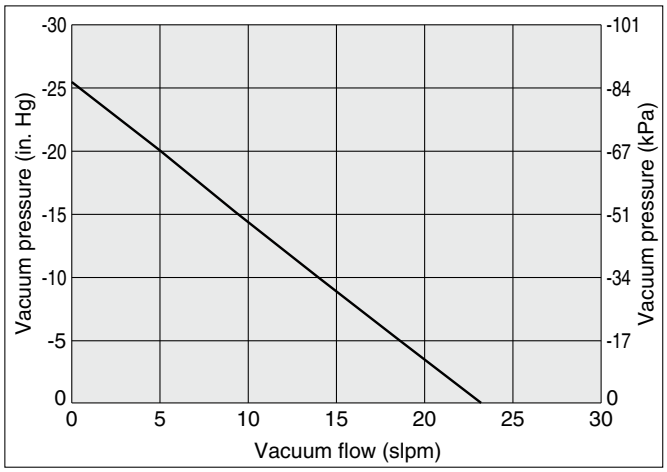


AP70

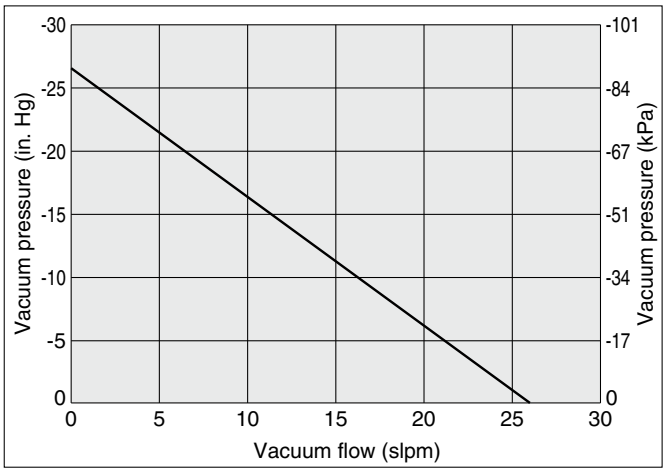


Flow Rate Characteristics

AP7



AP70



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

AP71 Series

- **Unique compact design by integrating vacuum generator, air operated valve and check valve**
- **Max. vacuum pressure: -26 in.Hg (-88 kPa)**
- **Integrate N.C. air operated valve**
- **Constant bleed option to maintain inert vent line**

RoHS

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

AP71 [S] [MV4] [FV6] [TW4] [ ] [ ]

(Inlet) (Vent) (Vacuum)

Material

Code	Body	Poppet	Piston
S	316L SS	303 SS	
S6		316L SS	

Seat material

Code	Material
No code	FMK (Standard)
NP	Polychloroprene

Connections (Inlet N_2 port, Vent, Vacuum)

Code	Connections	Inlet	Vent	Vacuum
MV4	1/4 inch face seal (Male)	●	●	●
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	—	●	—

●: Available —: Not available

Bleed options

Code	Bleed options
No code	No bleed option (Standard)
CB005	2.5 slpm
CB009	5 slpm
CB013	8 slpm
CB023	15 slpm

Specifications

Operating Parameters		**AP71**
Gas (Inlet N_2 port)		N_2
Gas (Vacuum)		Select compatible materials of construction for the gas
N_2 Inlet pressure		70 to 110 psig (0.48 to 0.76 MPa)
Vacuum port maximum pressure		3500 psig (24.1 MPa)
Proof pressure (Vacuum)		1.5 times the maximum operating pressure
Burst pressure (Vacuum)		3 times the maximum operating pressure
Maximum vacuum pressure		-26 in.Hg (-88 kPa) *1)
Ambient and operating temperature		-10 to 71°C
Cracking pressure (Check valve)		3 psid (0.023 MPa)*2)
Air operated	**Status**	Normally closed (N.C.)
	Actuation pressure	60 to 110 psig (0.4 to 0.76 MPa)
	Actuation port	M5 thread
Connections	**Inlet**	1/4 inch face seal (Male)
	Vent	1/4, 3/8 inch face seal, 3/8 inch tube weld
	Vacuum	1/4 inch face seal, Tube weld
Weight		0.14 kg *3)

*1) At inlet pressure 80 psig (0.55 MPa) and flow rate 60 slpm.
*2) Cracking pressure is a nominal value which may vary depending on the application and operating conditions.
*3) Weight, including individual boxed weight, may vary depending on connections or options.

Option

Bleed

Bleed option provides constant low flow of N_2 to maintain inert atmosphere in vent line.
Following 4 options are available:

Option	Bleed *
CB005	1 to 2.5 slpm
CB009	2 to 5 slpm
CB013	5 to 8 slpm
CB023	10 to 15 slpm

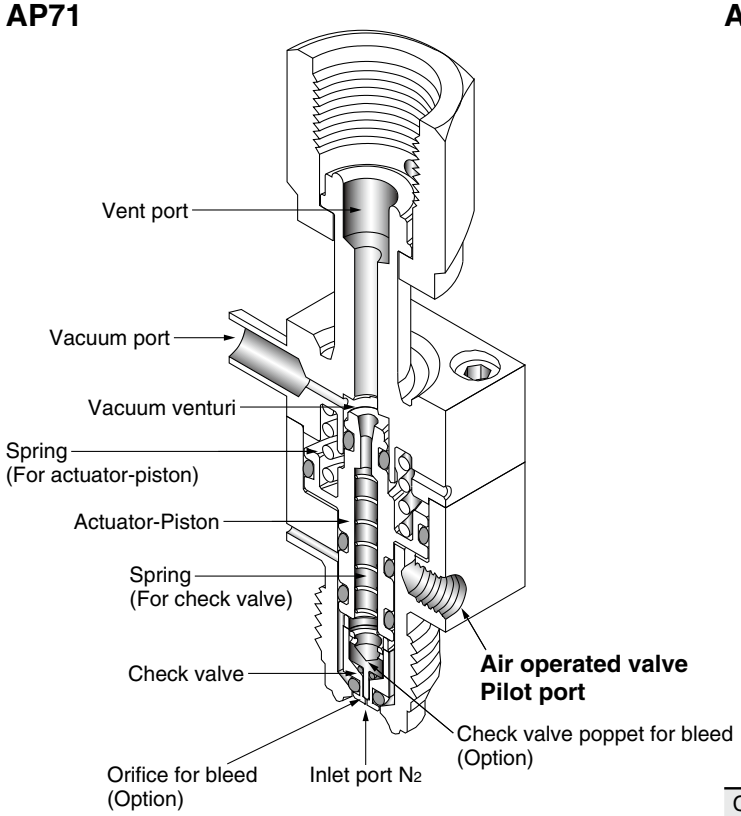
* At 80 psig (0.55 MPa) N_2 gas.

Wetted Parts Material

Wetted Parts	**S**	**S6**
Body	316L SS	
Poppet	303 SS	316L SS
Piston	303 SS	316L SS
Spring	302 SS	
Check valve seat	FKM (Option: Polychloroprene)	

Construction

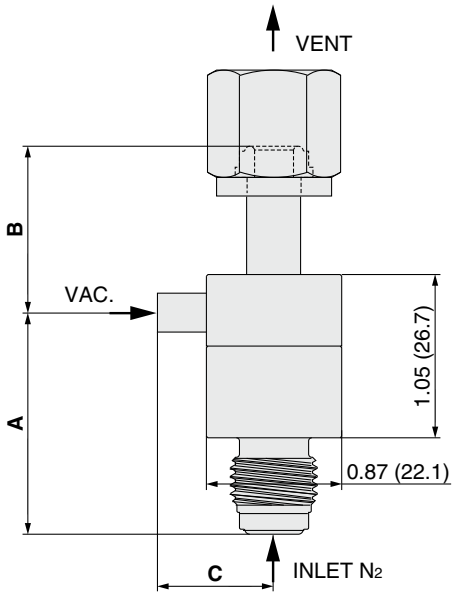
AP71



Dimensions

inch (mm)

AP71



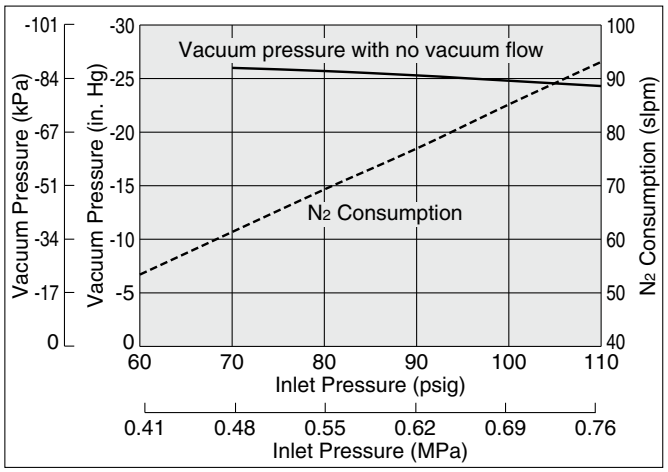
Connections (Inlet)	A	
	inch	(mm)
MV4	1.43	(36.3)

Connections (Vent)	B	
	inch	(mm)
MV4	1.07	(27.2)
FV4		
MV6	1.64	(41.7)
FV6		
TW6	0.96	(24.4)

Connections (Vacuum)	C	
	inch	(mm)
MV4	1.39	(35.3)
FV4		
TW4	0.75	(19.1)

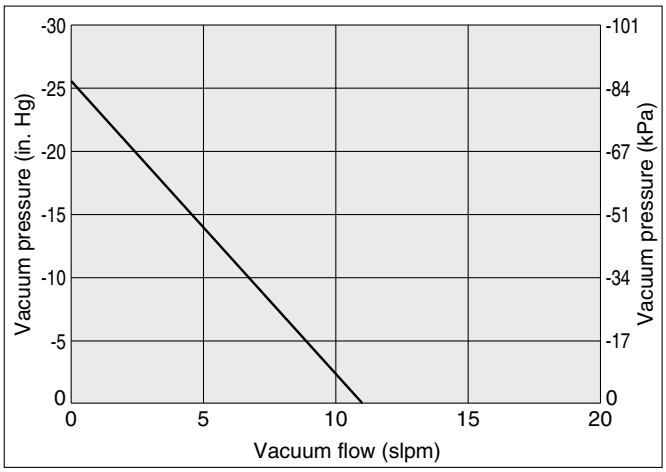
Exhaust Characteristics

AP71



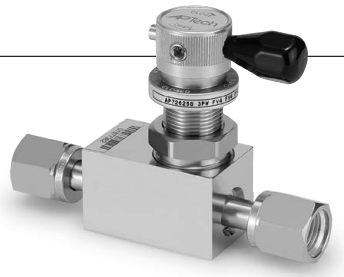
Flow Rate Characteristics

AP71



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

AP72 Series



- **Unique compact design by integrating vacuum generator, diaphragm valve and check valve**
- **Flow consumption: 60 slpm, Low flow consumption type: 20 slpm**
- **Max. vacuum pressure: -26 in.Hg (-88 kPa)**
- **Air operated or manually operated type is available as diaphragm valve**
- **Constant bleed option to maintain inert vent line**

RoHS

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

AP72		625	S	3PW	MV4	FV6	TW4				
				(Inlet)	(Vent)	(Vacuum③)	(Vacuum④)				

Option

Code	Option
No code	Standard
L	Low N_2 consumption

Material

Code	Body material
S	316L SS secondary remelt

Ports (Refer to the porting configuration)

Code	Ports
3PW	3 ports
3PWA	3 ports (Angle type)
4PW	4 ports

Bleed options

Code	Bleed options
No code	No bleed option (Standard)
CB009	5 slpm
CB013	8 slpm
CB023	15 slpm

Check valve seat material

Code	Material
No code	FKM (Standard)
NP	Polychloroprene

Diaphragm valve seat material

Code	Material
No code	PCTFE (Standard)
VS	Polyimide

Model

Code	Actuation	Knob
540	Air operated	—
550		
600	Manual operated	Multi turn round knob
625		1/4 turn lever knob
650		1/4 turn round knob with open/close indication window

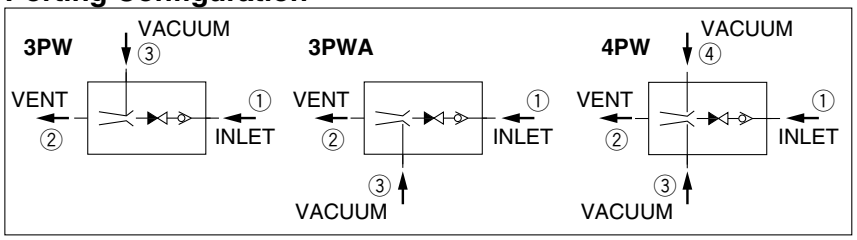
Connections (Inlet N_2 port, Vent, Vacuum③, Vacuum④)

Code	Connections	Inlet	Vent	Vacuum③	Vacuum④
MV4	1/4 inch face seal (Male)	●	●	●	●
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	—	●	—	—

●: Available —: Not available

∗) Specify the piping connection method for vacuum side ④ only when port "4PW" is selected.

Porting Configuration



Specifications

Operating Parameters		AP72540/AP72L540	AP72550/AP72L550	AP72600/AP72L600	AP72625/AP72L625	AP72650/AP72L650
Gas (Inlet N_2 port)		N_2				
Gas (Vacuum)		Select compatible materials of construction for the gas				
N_2 Inlet pressure		70 to 110 psig (0.48 to 0.76 MPa)				
Vacuum port maximum pressure		3000 psig (20.7 MPa)				
Proof pressure (Vacuum)		1.5 times the maximum operating pressure				
Burst pressure (Vacuum)		3 times the maximum operating pressure				
Maximum vacuum pressure		-26 in.Hg (-88 kPa) ∗1)				
Ambient and operating temperature		-10 to 71°C				
Cracking pressure (Check valve)		3 psid (0.023 MPa) ∗2)				
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s				
	Outboard leakage	2×10^{-10} Pa·m³/s ∗3)				
Across the seat leak		4×10^{-9} Pa·m³/s ∗3)				
Connections	**Inlet**	1/4 inch face seal				
	Vent	1/4, 3/8 inch face seal, 3/8 inch tube weld				
	Vacuum	1/4 inch face seal, 1/4 inch tube weld				
Weight		0.82 kg ∗4)				

∗1) At inlet pressure 80 psig (0.55 MPa) and flow rate 60 slpm.

∗2) Cracking pressure is a nominal value which may vary depending on the application and operating conditions.

∗3) Tested with Helium gas inlet pressure 250 psig (1.7 MPa). 125 psig (0.9 MPa) for AP72540

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

Air operated type

Model	AP72540/AP72L540	AP72550/AP72L550
Status	Normally closed (N.C.)	
Actuation pressure	70 to 110 psig (0.48 to 0.76 MPa)	
Actuation port connection	NPT 1/8 inch	10-32 UNF thread
Actuation port location	Top	Side

Manually operated type

Model	AP72600/ AP72L600	AP72625/ AP72L625	AP72650/ AP72L650
Knob	Multi turn round knob	1/4 turn lever knob	1/4 turn round knob with open/close indication window

Option

Bleed

Provides constant low flow of N_2 to maintain inert atmosphere in vent line.

Following 3 options are available:

Option	Bleed *
CB009	2 to 5 slpm
CB013	5 to 8 slpm
CB023	10 to 15 slpm

* At 80 psig (0.55 MPa) N_2 gas.

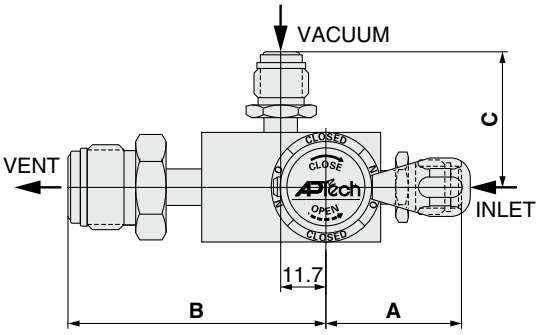
Material

Material	S
Body	316L SS secondary remelt
Surface finish	Electropolish + Passivation
Diaphragm	Ni-Co alloy
Diaphragm valve seat	PCTFE (Option: Polyimide)
Check valve seal	FKM (Option: Polychloroprene)

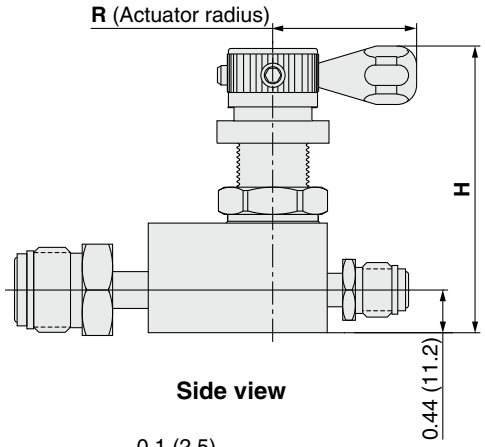
Dimensions

inch (mm)

AP72



Top view



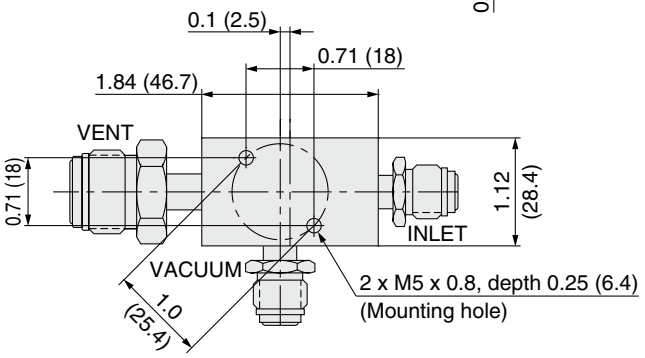
Side view

Model	R		H	
	inch	(mm)	inch	(mm)
AP72540/AP72L540	0.73	(18.5)	3.49	(88.6)
AP72550/AP72L550	0.69	(17.4)	3.28	(83.3)
AP72600/AP72L600	1.06	(26.9)	3.00	(67.1)
AP72625/AP72L625	1.48	(37.6)	2.94	(74.7)
AP72650/AP72L650	0.94	(23.9)	3.02	(76.7)

Connections (Inlet)	A	
	inch	(mm)
MV4	1.39	(35.3)
FV4		

Connections (Vent)	B	
	inch	(mm)
MV4	2.11	(53.6)
FV4		
MV6	2.65	(67.3)
FV6		
TW6	2.05	(52.0)

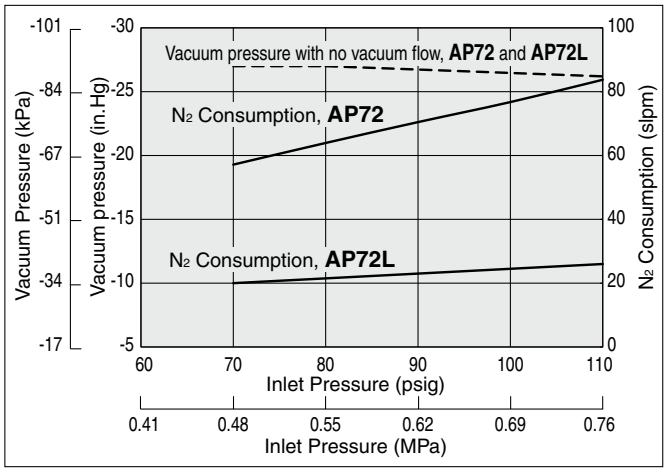
Connections (Vacuum)	C	
	inch	(mm)
MV4	1.39	(35.3)
FV4		
TW4	1.06	(26.9)



Bottom view

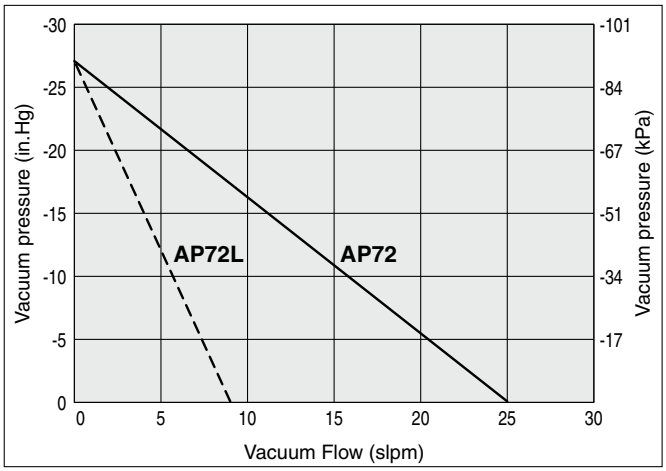
Exhaust Characteristics

AP72



Flow Rate Characteristics

AP72



Note) slpm, N_2: The volumetric flow rate under normal conditions (0°C, 1 atm) when N_2 gas is flowing.

Flow Switch

AP74 Series

- **6 flow trip points available, from 2 to 100 slpm**
- **Body material: 316L SS secondary remelt**
- **High pressure Max. 3500 psig (24.1 MPa)**
- **Detect excess flow by N.C. or N.O. contact output with non-wetted reed switch tripped by float with encapsulated magnet (SPDT, 3 wire / 2 position)**

RoHS

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

AP74 [100] [S] [ ] [MV4] [MV4]

(Inlet) (Outlet)

Size

Code	Flow trip reference points ∗1)
002	2 slpm
005	5 slpm
010	10 slpm
025	25 slpm
050	50 slpm
100	100 slpm

∗1) To obtain the nominal trip point in process gases other than nitrogen or pressures other than 100 psig (0.69 MPa), please refer to the Precaution of Selection (P.242).

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)

Connections (Inlet, Outlet)

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

Specifications

Operating Parameters		AP74002	AP74005	AP74010	AP74025	AP74050	AP74100
Gas		Select compatible materials of construction for the gas					
Source pressure		Vacuum to 3500 psig (24.1 MPa)					
Flow trip reference points ∗1) ∗2)		2 slpm	5 slpm	10 slpm	25 slpm	50 slpm	100 slpm
Accuracy		±10% of trip point or 0.5 slpm, whichever is greater					
Installation orientation		Inlet port at the bottom (Vertical within 8°)					
Pressure drop at trip point		0.5 psi (0.0034 MPa) differential ∗3)					
Proof pressure		1.5 times the maximum operating pressure					
Burst pressure		3 times the maximum operating pressure					
Ambient and operating temperature		-23 to 80°C (No freezing)					
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s					
	Outboard leakage	2×10^{-11} Pa·m³/s ∗4)					
Surface finish		Ra max 15 μin. (0.4 μm) Option: 10 μin. (0.25 μm)					
Connections		Face seal, Tube weld					
Reed switch	**Type**	SPDT (3 wire / 2 position)					
	Power	30 VDC (3 W max)					
	Switching current	0.2 A max					
	Carrying current	0.5 A max					
	Initial contact resistance	0.1 Ω max					
Cable	**Wire gauge**	AWG24 (PVC jacket)					
	Cable length	10 ft. (3 m)					
	Lead color	Blue: common					
		Brown: normally closed					
		Black: normally open					
Internal volume		0.12 in³ (1.9 cm³)					
Weight		0.11 kg ∗5)					

∗1) Trip point varies slightly with temperature change, ±2% over the specified operating range.
∗2) At N_2 gas 100 psig (0.69 MPa). To obtain the nominal trip point in process gases other than nitrogen or pressures other than 100 psig (0.69 MPa), please refer to the Precaution on Selection (P.242).
∗3) Pressure drop at trip point.
∗4) Tested with Helium gas inlet pressure 500 psig (3.5 MPa).
∗5) Weight, including individual boxed weight, may vary depending on connections or options.

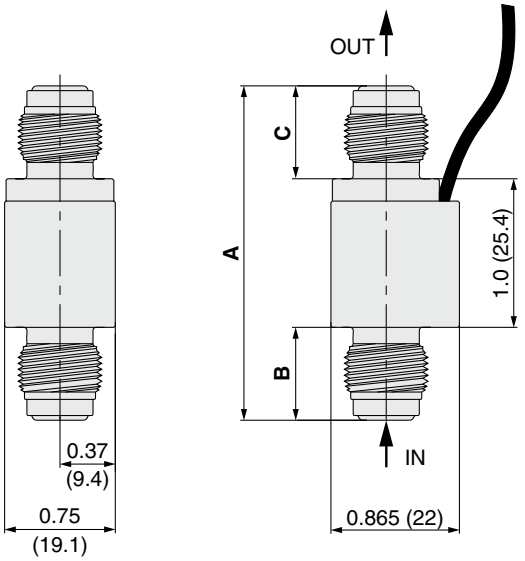
Wetted Parts Material

Wetted Parts	S
Body	316L SS secondary remelt
Surface finish	Electropolish + Passivation
Float	316L SS

Dimensions

inch (mm)

AP74

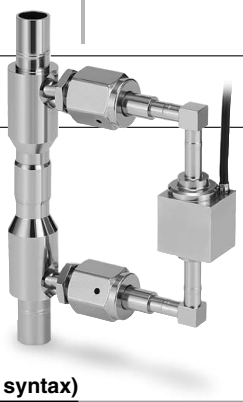


Connections		A		B		C	
Inlet	Outlet	inch	(mm)	inch	(mm)	inch	(mm)
MV4	**MV4**	2.25	(57.2)	0.625	(15.9)	0.625	(15.9)
FV4	**FV4**	3.99	(101.4)	1.495	(38.0)	1.495	(38.0)
TW4	**TW4**	2.25	(57.2)	0.625	(15.9)	0.625	(15.9)
MV4	**FV4**	3.12	(79.3)			1.495	(38.0)
MV4	**TW4**	2.25	(57.2)			0.625	(15.9)
FV4	**MV4**	3.12	(79.3)	1.495	(38.0)		
FV4	**TW4**						
TW4	**MV4**	2.25	(57.2)	0.625	(15.9)		
TW4	**FV4**	3.12	(79.3)			1.495	(38.0)

Flow Switch

For high flow

AP74B Series



- **Bypass design suitable for high flow (BSGS) application**
- **11 flow trip points available, from 225 to 6000 slpm**
- **Horizontal or vertical installation orientation is available**
- **Main line 1/2 inch, 3/4 inch, 1 inch, or 1 1/2 inch size available**

RoHS

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

AP74B [V] [500] [S] [M] [FV8 (Inlet)] [MV8 (Outlet)]

Installation orientation

Code	Orientation
H	Horizontal
V	Vertical

Size

Code	Flow trip reference points *1)	Code	Flow trip reference points *1)
225	225 slpm	**2600**	2600 slpm
350	350 slpm	**3000**	3000 slpm
500	500 slpm	**4000**	4000 slpm
950	950 slpm	**5000**	5000 slpm
1100	1100 slpm	**6000**	6000 slpm
1650	1650 slpm		

Surface finish

Code	Surface finish Ra max
M	10 μin. (0.25 μm)

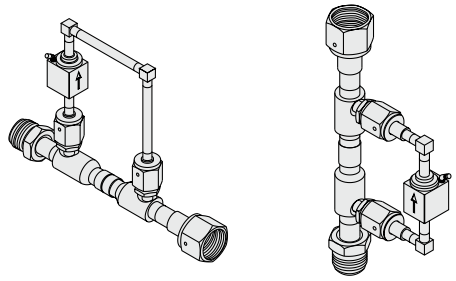
Material

Code	Body material
S	316L SS

∗1) As N_2 gas 100 psig (0.69 MPa). To obtain the nominal trip point in process gases other than nitrogen or pressures other than 100 psig (0.69 MPa), please refer to the Precaution on Selection (P.242).

Installation Orientation

AP74BH Horizontal **AP74BV Vertical**



Connections (Inlet, Outlet)

Code	Connections	Size										
		225	350	500	950	1100	1650	2600	3000	4000	5000	6000
MV8	1/2 inch face seal (Male)	●	●	●	●	—	—	—	—	—	—	—
FV8	1/2 inch face seal (Female)	●	●	●	●	—	—	—	—	—	—	—
TW8	1/2 inch tube weld	●	●	●	●	—	—	—	—	—	—	—
MV12	3/4 inch face seal (Male) ∗2)	—	—	—	—	●	●	●	—	—	—	—
FV12	3/4 inch face seal (Female) ∗2)	—	—	—	—	●	●	●	—	—	—	—
TW12	3/4 inch tube weld	—	—	—	—	●	●	●	—	—	—	—
TW16	1 inch tube weld	—	—	—	—	—	—	—	●	●	—	—
TW24	1 1/2 inch tube weld	—	—	—	—	—	—	—	—	—	●	●

●: Available —: Not available

∗2) Prepare a suitable mating fitting with a rated pressure.

Specifications

Operating parameters		AP74B□225	AP74B□350	AP74B□500	AP74B□950	AP74B□1100	AP74B□1650	AP74B□2600	AP74B□3000	AP74B□4000	AP74B□5000	AP74B□6000
Gas		Select compatible materials of construction for the gas										
Source pressure		Vacuum to 3500 psig (24.1 MPa)				Vacuum to 3000 psig (20.7 MPa)			Vacuum to 2200 psig (15.2 MPa)		Vacuum to 1300 psig (9 MPa)	
Flow trip reference points ∗1) ∗2)		225 slpm	350 slpm	500 slpm	950 slpm	1100 slpm	1650 slpm	2600 slpm	3000 slpm	4000 slpm	5000 slpm	6000 slpm
Accuracy		±20% of trip point										
Proof pressure		1.5 times the maximum operating pressure										
Burst pressure		3 times the maximum operating pressure										
Ambient and operating temperature		-23 to 80°C (No freezing)										
Leak rate	**Inboard leakage**	2×10^{-11} Pa·m³/s										
	Outboard leakage	2×10^{-11} Pa·m³/s										
Surface finish		Ra max 10 μin. (0.25 μm)										
Connections		1/2 inch face seal, Tube weld				3/4 inch face seal, Tube weld			1 inch tube weld		1 1/2 inch tube weld	
Pressure drop at trip point		0.5 psi (0.0034 MPa) differential ∗3)										
Reed switch	**Type**	SPDT, 3 wire / 2 position										
	Power	30 VDC (3 W max)										
	Switching current	0.2 A max										
	Carrying current	0.5 A max										
	Initial contact resistance	0.1 Ω max										
Cable	**Wire gauge**	AWG24 (PVC jacket)										
	Cable length	10 ft. (3 m)										
	Lead color	Blue: common										
		Brown: normally closed										
		Black: normally open										
Weight		0.56 kg ∗4)										

∗1) When the flow rate exceeds the flow trip reference point, the switch turns ON. When turning the switch OFF, set the flow rate to zero.

∗2) At N_2 gas 100 psig (0.69 MPa). To obtain the nominal trip point in process gases other than nitrogen or pressures other than 100 psig (0.69 MPa), please refer to the Precautions on Selection (P.242).

∗3) Pressure drop at trip point

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

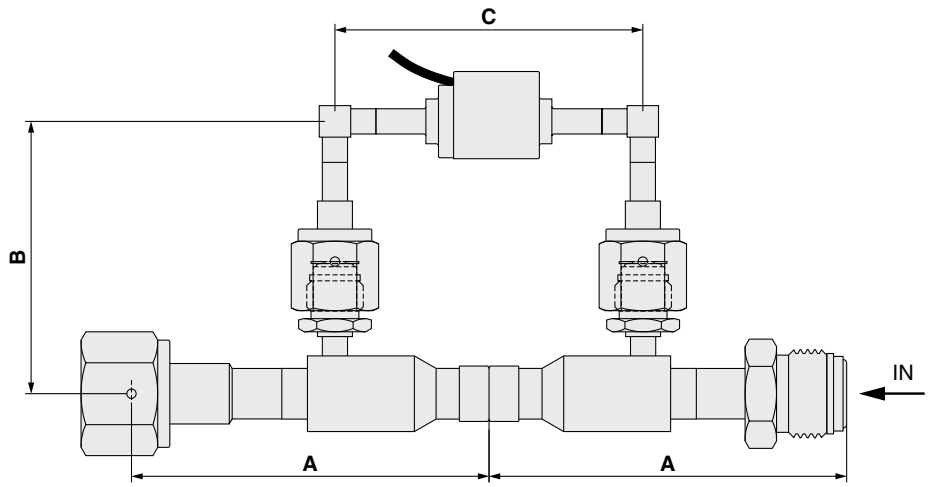
Wetted Parts Material

Wetted Parts	S
Body	316L SS
Surface finish	Electropolish + Passivation
Float	316L SS
Metal gasket	Nickel 200

Dimensions

inch (mm)

AP74B



Connections	A		B				C	
			Horizontal		Vertical			
	inch	(mm)	inch	(mm)	inch	(mm)	inch	(mm)
MV8	3.55	(90.2)	4.55	(115.6)	2.70	(68.6)	3.05	(77.5)
FV8								
TW8	2.59	(65.8)						
MV12	5.51	(140.0)	5.44	(138.2)	3.59	(91.2)		
FV12								
TW12	3.53	(89.7)						
TW16	3.90	(99.1)	5.57	(141.5)	3.72	(94.5)		
TW24	4.15	(105.4)	5.82	(147.8)	3.97	(100.8)		

⚠ Precaution on Selection

Nominal flow trip reference points are at 100 psig (0.69 MPa) of N_2 gas.
In order to obtain the nominal trip point for operating pressure, other than 100 psig (0.69 MPa), and for gas, other than N_2, calculate the correction factors (Fp, Fg) with the following formula and then, multiply both factors.

1. Change in operating pressure

$$Fp = \sqrt{\frac{OP}{114.7}}$$

$$\left(Fp = \sqrt{\frac{OP_{MPa}}{0.79}} \right)$$

2. Change in gas type

$$Fg = \sqrt{\frac{28}{MW}}$$

***MW*: Molecular weight of the gas**

***OP*: Operating pressure (abs) psia**
(*OP_{MPa}*: Operating pressure (abs) MPa abs)

E.g) Nominal trip point when gas type is hydrogen gas (molecular weight: 2) and operating pressure is 0.5 MPa:

1. Calculation of Fp

$$Fp = \sqrt{\frac{(0.5 + 0.1)}{0.79}} = 0.871$$

2. Calculation of Fg

$$Fg = \sqrt{\frac{28}{2}} = 3.742$$

When using the flow switch, whose nominal trip point is 10 slpm (AP74010S□), under these conditions, its nominal trip point will be 32.6 slpm (10 (slpm) x 0.871 x 3.742 = 32.6 (slpm)).

Process Gas Equipment/Check 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 prevent reverse gas flow. This product can only supply gas from inlet to outlet side. When selecting the product, confirm the operating conditions, such as type of gas, operating pressure, flow rate, 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. Confirm the compatibility of the product materials with the process gas in the catalog selection guide. Design the equipment and select the product by understanding the characteristics of gas.

Mounting

⚠ Caution

1. Confirm the mounting direction of the product.

An arrow is indicated on the product. The arrow points in the direction flow are allowed from the inlet side towards the outlet side.

Maintenance

⚠ Warning

1. AP64 check valves cannot be repaired.

AP Tech AP64 check valves are welded shut and internal problems usually cannot be repaired.

Operation

⚠ Caution

1. Do not use the check valve as shutoff valve.

Do not rely on a check valve exclusively to absolutely prevent any reverse flow, especially when the pressure differential is small. For situations where it is known the downstream pressure will exceed the upstream pressure, use a diaphragm valve to positively shut off reverse flow.

Process Gas Equipment/Vacuum Generator 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 assist in purging of piping systems. When selecting the product, confirm the operating conditions, such as type of process gas being vented, nitrogen supply pressure and flow rate, vent line back pressure generated by the nitrogen supply flow rate, actuation 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. Confirm the compatibility of the product with the process gas in the catalog selection guide.
Design the equipment and select the product by understanding the characteristics of gas.

Mounting

⚠Caution

1. Confirm the mounting direction of the product.

Inlet port is labeled with "IN" mark and outlet port is labeled with "OUT" mark. Alternatively, the nitrogen flow direction may be indicated with an arrow instead of "IN" and "OUT" marks. Inlet and outlet ports run in line with each other. The vacuum port runs perpendicular to the inlet and outlet ports. The vacuum port may be labeled with "VAC" mark. Confirm the mounting direction and install at correct direction.

2. Connect actuation pressure to the valve actuator connection.

If an air operated valve is built in the product, connect actuation pressure to the valve actuator connection. Use nitrogen or clean dry air for actuation pressure.

Operation

⚠Warning

1. Supply nitrogen to the inlet port.

2. If an air operated valve is built in the product, use nitrogen or clean dry air for actuation pressure.

3. Apply nitrogen within the specified pressure range to the inlet port in order to generate a vacuum.

When applying nitrogen to the inlet port, vacuum will be generated. If a valve is built in the product, vacuum will be generated after applying nitrogen to the inlet port and opening the built-in valve. In the case of an air operated valve, it will open when applying actuation pressure to the actuation port. In the case of a manually operated valve, it will open when the handle is rotated counterclockwise until it completely stops.

4. Shut off nitrogen supply in order to shut off vacuum.

When shutting off nitrogen supply to the inlet port, vacuum will be shut off. If a valve is built in the product, vacuum will be shut off when closing the valve. In the case of an air operated valve, it will close when venting off actuation pressure. In the case of a manually operated valve, it will close when rotating the handle clockwise until it completely stops.

5. In the case the check valve is built in the product, back flow through the inlet port will be prevented when pressure on the vacuum or vent ports exceeds the inlet port pressure.

Check valve is used for preventing back flow through the inlet port when pressure on the vacuum or vent ports exceeds the inlet port pressure, regardless of whether the built-in valve is opened or closed, and regardless of whether or not the product has a constant bleed option. However, the check valve does not prevent back flow from the outlet port through the vacuum port.

6. If the product with built-in valve is selected with constant bleed option, when supplying nitrogen pressure to the inlet port, nitrogen will bleed through a small hole to the vacuum and vent ports even when the built-in valve is closed.

Process Gas Equipment/Flow Switch 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 signal an increase in flow above a trip point. When selecting the product, confirm the operating conditions, such as type of gas, operating pressure, flow rate, 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. Confirm the compatibility of the product with the process gas in the catalog selection guide.
Design the equipment and select the product by understanding the characteristics of gas.

2. Confirm the flow trip reference point of the product.

Flow trip reference point is fixed. Select the product which meets the desired flow rate. Flow trip reference point, specified in the How To Order, is the trip point value with nitrogen at 0.69 MPa inlet pressure. When the products are used with other inlet pressures or gases, use the conversion formula to calculate the flow trip reference point for such application.

Mounting

⚠Caution

1. Do not drop or bump the products.

When dropping, bumping, or applying excessive impacts to the products, it may damage inside of the product and cause malfunction.

2. Confirm the mounting direction of the products.

An arrow is indicated on the product. In the case of the AP74B series, an arrow is indicated on the bypass line. The arrow points in the forward flow direction from inlet port to outlet port.

3. Install the products vertically with the inlet port on the bottom in order to supply gases from bottom to top.

In the case of the AP74 series, install the product within 8 degrees of vertical in order to supply gas from bottom to top. In the case of the AP74B series, install the product with its arrow indicated on the bypass line within 8 degrees of vertical in order to make its arrow direction upward.

Wiring

⚠Warning

1. Avoid bending repeatedly or stretching the lead wires.

Lead wire may break when applying bending stress repeatedly or stretching force to the lead wires.

2. Do not wire in conjunction with power lines or high voltage lines.

Wire separately from power lines and high voltage lines and avoid wiring in the same conduit with these lines. Close proximity between power lines or high voltage lines and the product may result in malfunction due to electrical noise.

Wiring

⚠Warning

3. Confirm proper insulation of wiring.

Make sure that there is no insulation failure (contact with other circuits, insulation failure between terminal, etc.). Damage may occur due to excessive current applied to the product.

4. Connect wires properly.

Use brown and blue wires for normally closed contact installation.
Use black and blue wires for normally open contact installation.

5. Do not connect wiring while product is energized.

6. Make sure to connect a load before energizing the product.

Energizing the product without connecting a load (load short-circuit) can create excessive current and damage the switch.

7. Confirm operation of the product by supplying nitrogen after installation and wiring.

Confirm the product trips when supplying nitrogen above the flow trip reference point and that it resets when the flow is shut off.

Operating Environment

⚠Warning

1. Do not use in an area, where a magnetic field is generated. It may cause malfunction.

Maintenance

⚠Warning

1. AP Tech flow switches cannot be repaired.

AP Tech flow switches are welded shut and internal problems usually cannot be repaired.

Operation

⚠Warning

1. Initial pressurization of system lines can cause a temporary flow surge that trips the flow switch.

Confirm flow switch resets once system lines are filled with gas. If it does not reset after system lines are filled, stop supplying gas and check for leakage of the system.