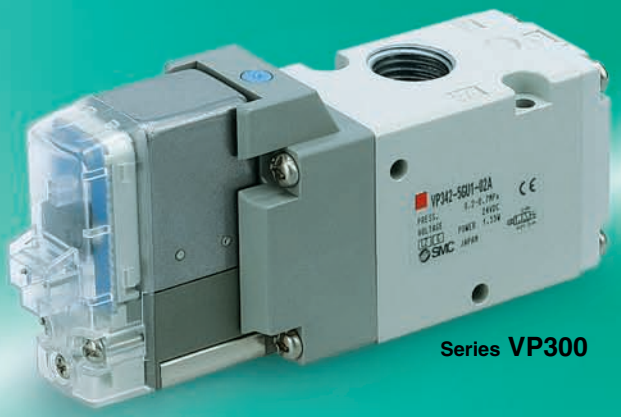
3 Port Solenoid Valve

Reduced power consumption:

0.55 W [With power saving circuit]

1.55 W [Standard]

(Conventional: 2.0 W) * With DC light

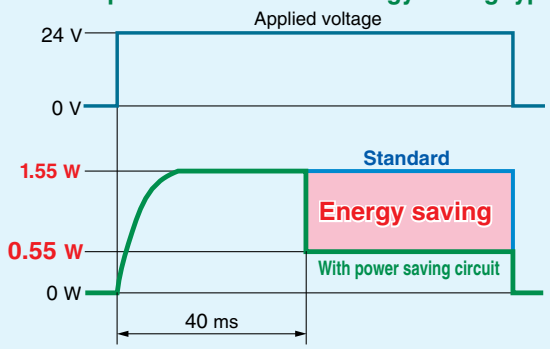


Series **VP300**

Power consumption is reduced by power saving circuit.

Power consumption is decreased by approx. 1/3 by reducing the wattage required to hold the valve in an energized state. (Effective energizing time is over 40 ms at 24 VDC.) Refer to electrical power waveform as shown below.

Electrical power waveform of energy saving type



Built-in full-wave rectifier (AC)

- **Noise reduction**
  Noise is considerably reduced by changing it to DC mode with a full-wave rectifier.
- **Reduced apparent power**
  Conventional: 5.6 VA → 1.55 VA

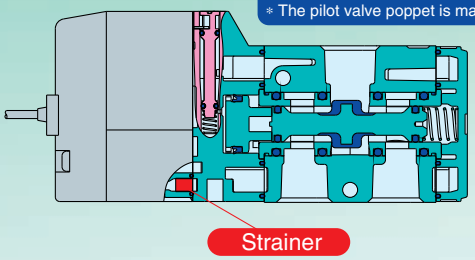
Longer life expectancy: 50 million cycles or more

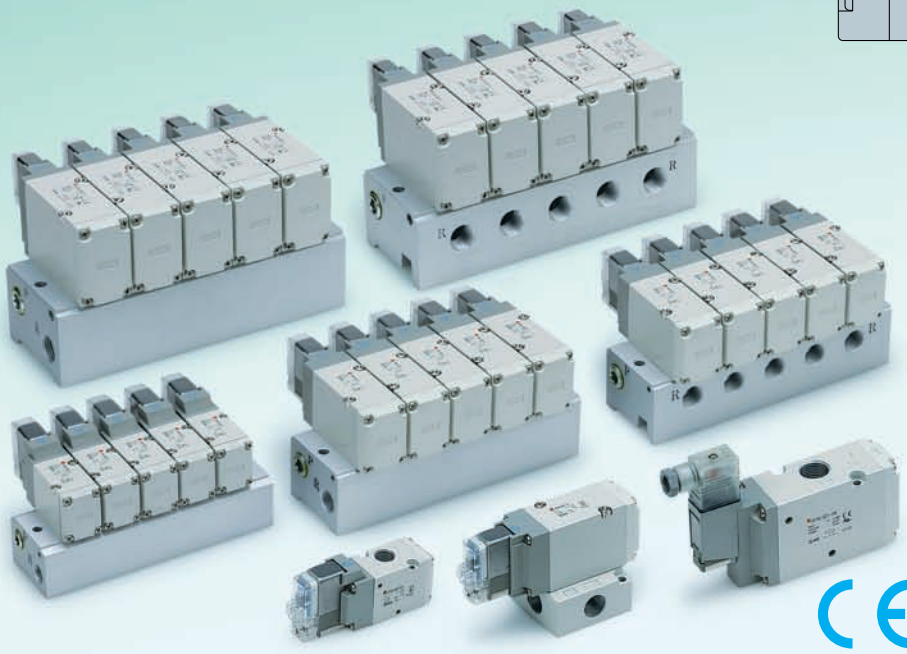
(Conventional: 20 million cycles) * Based on SMC test conditions

Built-in strainer in the pilot valve

Unexpected troubles due to foreign matter can be prevented.
Note) Be sure to mount an air filter on the inlet side.

Rubber material: HNBR
Ozone-resistant specification
* The pilot valve poppet is made of FKM.





Air Operated Valve

Series VPA300/500/700

Series VP300/500/700

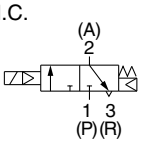
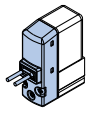
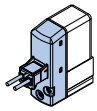
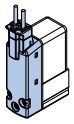
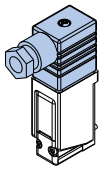
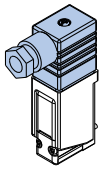
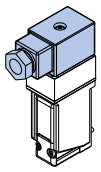
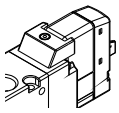
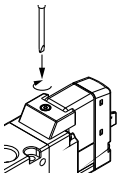
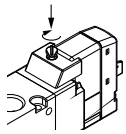
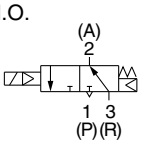
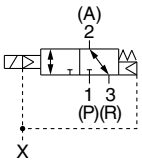
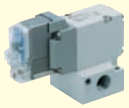
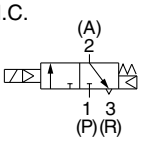
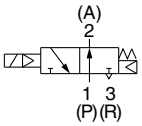
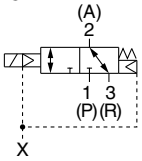
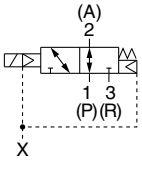
CE RoHS compliant SMC

CAT.ES11-97B

Model Selection by Operating Conditions ①

Solenoid Valve: Single Unit

Solenoid valve

	Series	Sonic conductance C [dm³/(s·bar)]	Type of actuation	Port size	Voltage	Electrical entry	Light/surge voltage suppressor	Manual override
Body ported	**VP300** 	4.2	Internal pilot N.C. 	1/8 1/4	12 VDC 24 VDC 24 VAC 100 VAC 200 VAC 110 VAC 220 VAC 240 VAC	Grommet  L-type plug connector  M-type plug connector  DIN terminal  DIN (EN1753 01-803) terminal  Conduit terminal 	DC ■ With surge voltage suppressor ■ With light/surge voltage suppressor ■ With surge voltage suppressor (Non-polar) ■ With light/surge voltage suppressor (Non-polar) AC ■ With light/surge voltage suppressor	Non-locking push type  Push-turn locking slotted type  Push-turn locking lever type 
	VP500 	8.9	N.O. 	1/4 3/8				
	VP700 	15.3	External pilot N.C./N.O. 	3/8 1/2				
Base mounted	**VP300** 	3.8	Internal pilot N.C.  N.O. 	1/8 1/4				
	VP500 	8.8	External pilot N.C. 	1/4 3/8				
	VP700 	15.0	N.O. 	3/8 1/2				

P. 1

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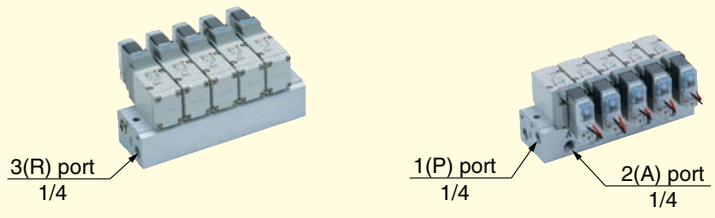
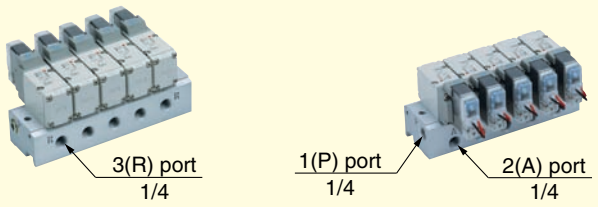
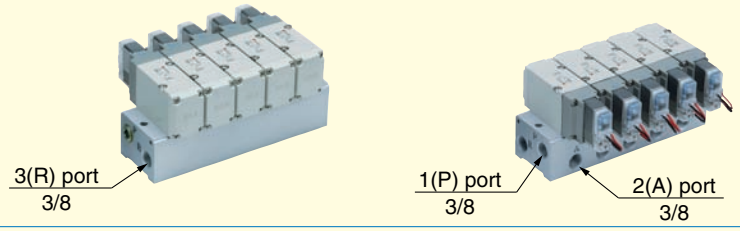
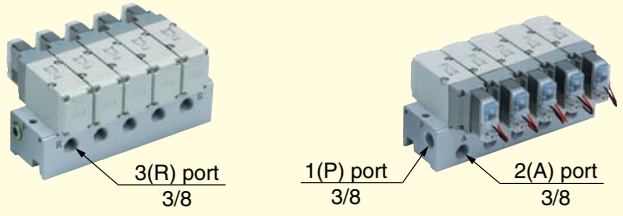
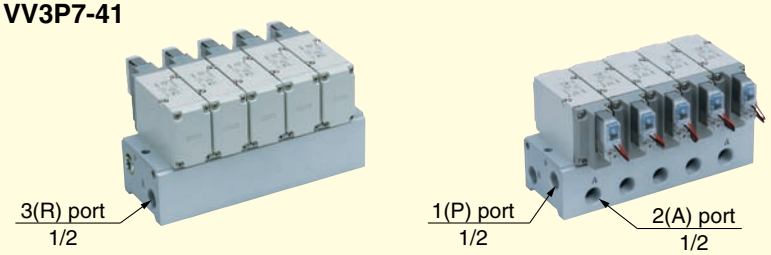
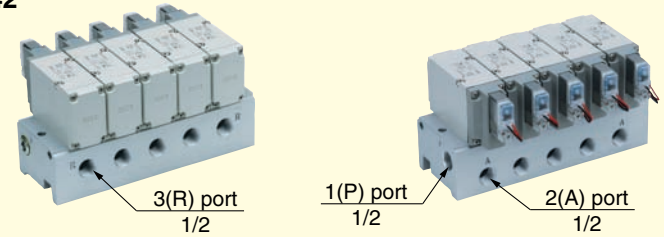
Model Selection by Operating Conditions ②

Solenoid Valve: Manifold

Solenoid valve
Base mounted

Series	EXH port type	Manifold base model	Applicable stations Note)
VP300	Common EXH	**VV3P3-41** 	2 to 20 stations
	Individual EXH	**VV3P3-42** 	
VP500	Common EXH	**VV3P5-41** 	2 to 20 stations
	Individual EXH	**VV3P5-42** 	
VP700	Common EXH	**VV3P7-41** 	2 to 20 stations
	Individual EXH	**VV3P7-42** 	

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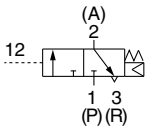
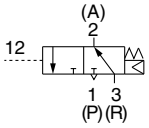
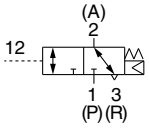
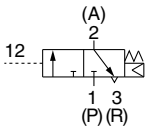
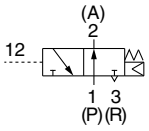
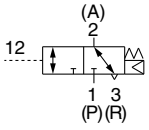
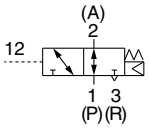
Note) Supply pressure to 1(P) ports and exhaust air from 3(R) ports on both sides for 10 stations or more.

Model Selection by Operating Conditions ③

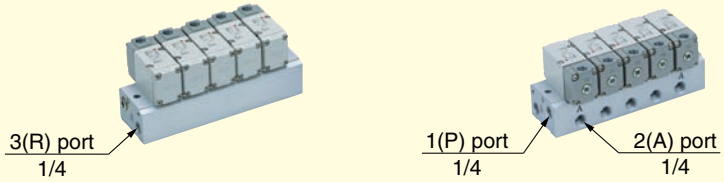
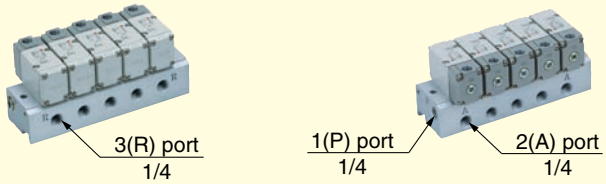
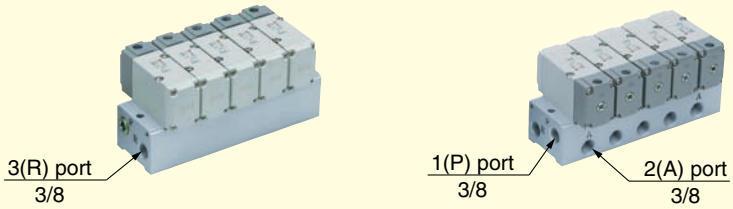
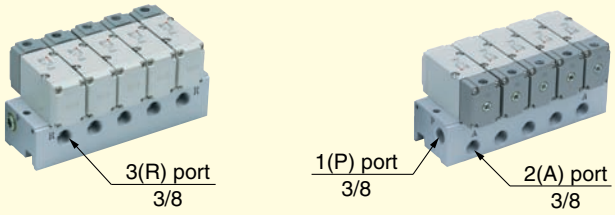
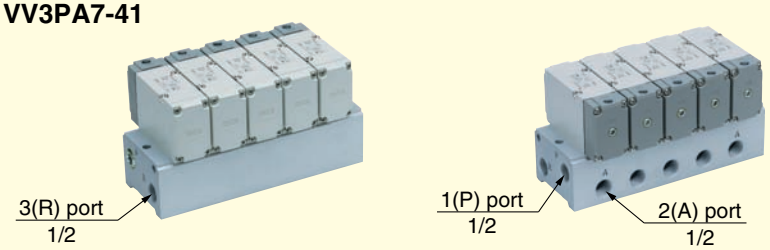
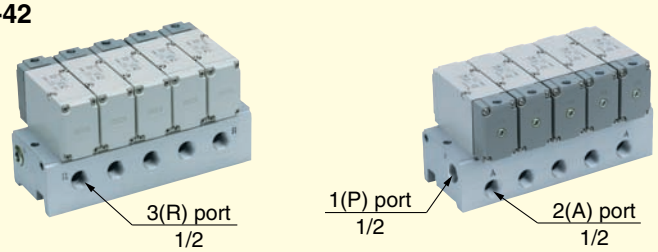
Air Operated Valve: Single Unit

	Series	Sonic conductance C [dm³/(s·bar)]	Type of actuation	Port size	Voltage	Electrical entry	Light/surge voltage suppressor	Manual override	
Air operated valve / Body ported	**VPA300** 	4.2	N.C. 	1/8 1/4	—	—	—	—	
	VPA500 	8.9	N.O. 	1/4 3/8					P. 25
	VPA700 	15.3	For vacuum N.C./N.O. 	3/8 1/2					
Air operated valve / Base mounted	**VPA300** 	3.8	N.C. 	1/8 1/4					
	VPA500 	8.8	N.O.  For vacuum N.C. 	1/4 3/8					P. 30
	VPA700 	15.0	N.O. 	3/8 1/2					

Model Selection by Operating Conditions ④

Air Operated Valve: Manifold

Air operated valve
Base mounted

Series	EXH port type	Manifold base model	Applicable stations Note)
VPA300	Common EXH	**VV3PA3-41** 	2 to 20 stations
	Individual EXH	**VV3PA3-42** 	
VPA500	Common EXH	**VV3PA5-41** 	2 to 20 stations
	Individual EXH	**VV3PA5-42** 	
VPA700	Common EXH	**VV3PA7-41** 	2 to 20 stations
	Individual EXH	**VV3PA7-42** 	

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Note) Supply pressure to 1(P) ports and exhaust air from 3(R) ports on both sides for 10 stations or more.

Rubber Seal
3 Port/Pilot Poppet Type
Body Ported/Single Unit
Series VP300/500/700

How to Order

Note) Only DIN and conduit terminal types are available for AC mode. Refer to the electrical entry for details.

Body ported **VP 3 4 2 □ □ □ – 5 G □ □ 1 – 01 □ A – □ – □**

Series

3	VP300
5	VP500
7	VP700

Pilot type

Nil	Internal pilot
R	External pilot

Pressure specification

Nil	Standard (0.7 MPa)
K	High-pressure type (1.0 MPa)

Coil specification

Nil	Standard
T	With power saving circuit (DC only)

Note) Be sure to select the power saving circuit type when it is continuously energized for a long time. (Refer to back page 5 for details.)

∗ T type is only available for DC mode. When T is selected, only Z type of light/surge voltage suppressor is available. (Note that when the electrical entry of DIN terminal type without connector is selected, only DOS and YOS are available.)

Rated voltage

DC

5	24 VDC
6	12 VDC

AC (50/60 Hz)

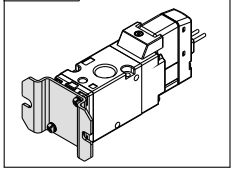
1	100 VAC
2	200 VAC
3	110 VAC [115 VAC]
4	220 VAC [230 VAC]
7	240 VAC
B	24 VAC

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Bracket

Nil	Without bracket
F	With bracket



Type of actuation

A	N.C. (Normally closed)
B	N.O. (Normally open)

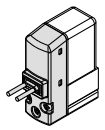
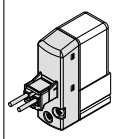
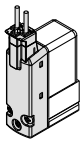
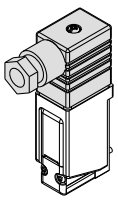
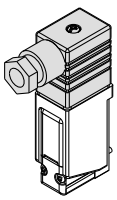
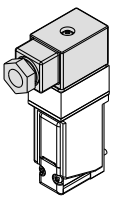
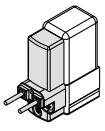
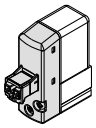
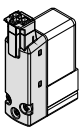
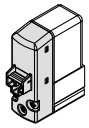
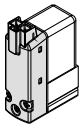
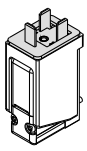
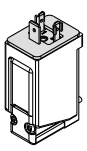
Port size

Symbol	Port size	VP300	VP500	VP700
01	1/8	○	—	—
02	1/4	○	○	—
03	3/8	—	○	○
04	1/2	—	—	○

Made to Order

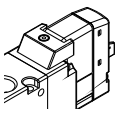
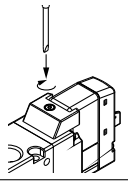
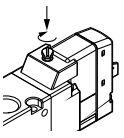
Nil	—
X500	Pilot exhaust port with piping thread (M3) specification (Refer to page 24).
X505	Interchangeable specification with the previous valve mounting hole pitch type (Refer to page 24).

Electrical entry

Grommet	L-type plug connector	M-type plug connector	DIN terminal [IP65 compatible]	DIN (EN175301-803) terminal [IP65 compatible]	Conduit terminal [IP65 compatible]
 **G**: Lead wire length 300 mm **H**: Lead wire length 600 mm	 **L**: With lead wire (length 300 mm)	 **M**: With lead wire (length 300 mm)	 **D**: With connector	 **Y**: With connector	 **T**: Conduit terminal
 **G**: Lead wire length 300 mm **H**: Lead wire length 600 mm DC Without light/surge voltage suppressor	 **LN**: Without lead wire	 **MN**: Without lead wire			
	 **LO**: Without connector	 **MO**: Without connector	 **DO**: Without connector	 **YO**: Without connector	
CE compliant DC: CE	CE	CE	CE	CE	CE
CE compliant AC[Note]: —	—	—	CE	CE	CE

∗ LN and MN types are with 2 sockets.
∗ Refer to back page 2 when different length of lead wire for L/M-type plug connector is required.
∗ Refer to back page 3 for details on the DIN (EN175301-803) terminal.
Note) With the same specifications as the DC type, all lead wire entries for the 24 VAC type are CE marking compliant.

Manual override

Nil: Non-locking push type	D: Push-turn locking slotted type	E: Push-turn locking lever type
		

Light/surge voltage suppressor

		DC	AC
Nil	Without light/surge voltage suppressor	○	○
S	With surge voltage suppressor	○	—Note)
Z	With light/surge voltage suppressor	○	○
R	With surge voltage suppressor (Non-polar)	○	—
U	With light/surge voltage suppressor (Non-polar)	○	—

Note) There is no S option for AC mode, since a rectifier prevents surge voltage generation.
∗ In the DIN terminal type, since a light is installed in the connector, DOZ, DOU, YOZ, YOU are not available.

⚠ Caution

When using the surge voltage suppressor type, residual voltage will remain. Refer to back page 5 for details.

Low power consumption 1.5 W (DC)

Possible to use as either a selector or divider valve

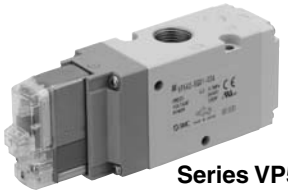
Possible to change from N.C. to N.O.

• Refer to back page 6 for changing the type of actuation.

Possible to use in vacuum applications

Up to –100 kPa

Series VP300



Series VP500

Series VP700

External Pilot

Use external pilot type in the following cases:

- For vacuum or for low pressure 0.2 MPa or less
- Please consult with SMC for use in a vacuum hold application.
- When having P port downsized in diameter
- When using A port as the atmospheric releasing port, e.g. air blower

Made to Order
(Refer to page 24 for details.)

X500	Pilot exhaust port with piping thread (M3) specification
X505	Interchangeable specification with the previous valve mounting hole pitch type

Specifications

Fluid		Air
Type of actuation		N.C. or N.O. (Convertible)
Internal pilot Operating pressure range (MPa)	**Standard**	0.2 to 0.7
	High-pressure type	0.2 to 1.0
External pilot Operating pressure range (MPa)	**Standard**	–100 kPa to 0.7
	High-pressure type	–100 kPa to 1.0
	Pilot pressure range	Same as operating pressure (Min. 0.2 MPa)
Ambient and fluid temperature (°C)		–10 to 50 (No freezing)
Max. operating frequency (Hz)		5
Manual override		Non-locking push type Push-turn locking slotted type Push-turn locking lever type
Pilot exhaust type		Individual exhaust
Lubrication		Not required
Mounting orientation		Unrestricted
Impact/Vibration resistance (m/s²) Note)		300/50
Enclosure		Dust-tight (IP65 for D, Y, T)

Note) Impact resistance: No malfunction occurred when it is tested in the axial direction and at the right angles to the main valve and armature in both energized and de-energized states every once for each condition. (Values at the initial period)
Vibration resistance: No malfunction occurred in a one-sweep test between 45 and 2000 Hz. Test was performed at both energized and de-energized states in the axial direction and at the right angles to the main valve and armature. (Values at the initial period)

Solenoid Specifications

Electrical entry			Grommet (G), (H) L-type plug connector (L) M-type plug connector (M)	DIN terminal (D) DIN (EN175301-803) terminal (Y) Conduit terminal (T)
			G, H, L, M	D, Y, T
Coil rated voltage (V)	**DC**		24, 12	
	AC (50/60 Hz)		24, 100, 110, 200, 220, 240	
Allowable voltage fluctuation			±10% of rated voltage*	
Power consumption (W)	**DC**	**Standard**	1.5 (With light: 1.55)	1.5 (With light: 1.75)
		With power saving circuit	0.55 (With light only)	0.75 (With light only)
Apparent power (VA)*	**AC**	**24 V**	1.5 (With light: 1.55)	1.5 (With light: 1.75)
		100 V	1.55 (With light: 1.65)	1.55 (With light: 1.7)
		110 V [115 V]		
		200 V		
		220 V [230 V]		
		240 V		
Surge voltage suppressor			Diode (Non-polar type: Varistor)	
Indicator light			LED (Neon bulb is used for AC mode of D, Y, T.)	

* It is in common between 110 VAC and 115 VAC, and between 220 VAC and 230 VAC.
* Allowable voltage fluctuation is –15% to +5% of the rated voltage for 115 VAC or 230 VAC.
* Since voltage drops due to the internal circuit in S, Z, T types (with power saving circuit), the allowable voltage fluctuation should be within the following range.
  24 VDC: –7% to +10%
  12 VDC: –4% to +10%

Response Time

Model	Pressure specifications	Response time ms (at 0.5 MPa)			
		Without light/surge voltage suppressor	With light/surge voltage suppressor		AC
			S, Z type	R, U type	
VP342	Standard (0.2 to 0.7)	13 or less	38 or less	16 or less	38 or less
	High-pressure type (0.2 to 1.0)	17 or less	42 or less	20 or less	42 or less
VP542	Standard (0.2 to 0.7)	14 or less	39 or less	17 or less	39 or less
	High-pressure type (0.2 to 1.0)	18 or less	43 or less	21 or less	43 or less
VP742	Standard (0.2 to 0.7)	19 or less	44 or less	22 or less	44 or less
	High-pressure type (0.2 to 1.0)	22 or less	47 or less	25 or less	47 or less

Note) Based on dynamic performance test, JIS B 8374-1981. (Coil temperature: 20°C, at rated voltage)

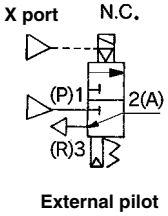
Flow Characteristics/Weight

Model	Port size	1 ↔ 2 (P ↔ A)			2 ↔ 3 (A ↔ R)			Weight (g) Note)	
		C [dm³/(s·bar)]	b	Cv	C [dm³/(s·bar)]	b	Cv	Grommet	DIN terminal
VP342	1/8	3.5	0.26	0.8	3.6	0.26	0.9	149	185
	1/4	4.2	0.22	1.0	4.2	0.23	1.0	145	181
VP542	1/4	7.9	0.21	1.8	7.2	0.27	1.8	249	285
	3/8	8.9	0.16	2.2	8.9	0.20	2.1	241	277
VP742	3/8	11.9	0.21	2.7	11.8	0.20	2.7	484	520
	1/2	15.1	0.21	3.6	15.3	0.22	3.7	467	503

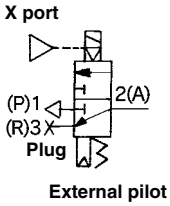
Note) Values without bracket

Application Example

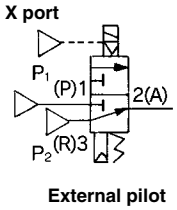
(1) Blow-off valve



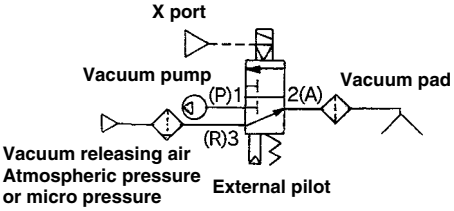
(2) Pressure release valve



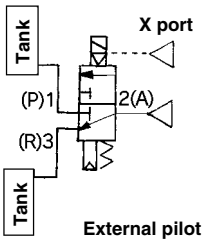
(3) Selector valve



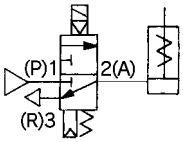
(4) Valve for vacuum



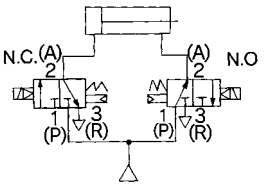
(5) Divider valve



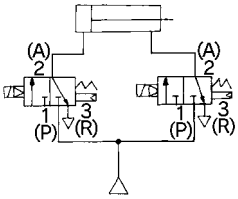
(6) Single-acting cylinder drive



(7) Double-acting cylinder drive



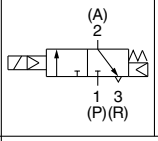
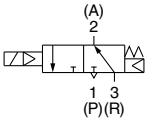
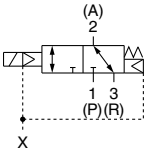
(8) Double-acting cylinder drive (Exhaust center)

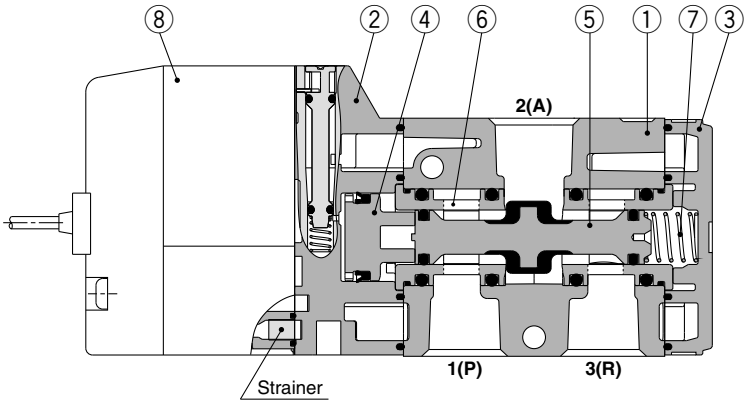


Construction

Body ported

JIS symbol

Pilot type	N.C.	N.O.
Internal pilot		
External pilot		



Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum die-casted	White
2	**Adapter plate**	Resin	Gray
3	**End plate**	Resin	White
4	**Piston**	Resin	
5	**Spool valve**	Aluminum/HNBR	
6	**Retainer**	Resin	
7	**Spring**	Stainless steel	

Bracket Assembly Part No.

Description	Model	Part no.
Bracket (With 2 screws)	VP342	VP300-227-1A
	VP542	VP500-227-1A
	VP742	VP700-227-1A

Replacement Parts

No.	Description	Part no.	Note
8	**Pilot valve assembly**	Refer to “How to Order Pilot Valve Assembly” on page 4.	Built-in strainer

How to Order Pilot Valve Assembly

⚠ Caution

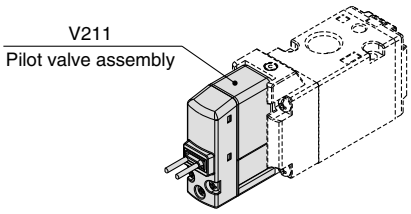
When only the pilot valve assembly is replaced, it is not possible to change from V211 (Grommet or L/M-type) to V212 (DIN or Conduit type), or vice versa.

Valve model: VP□□□ □□ – 5 G Z □1 – □□□

∗ Select from the below in accordance with the valve used.

■ Grommet or L/M-type

V 2 1 1 □□ – 5 G Z



Light/surge voltage suppressor

		DC	AC
Nil	Without light/surge voltage suppressor	○	○
S	With surge voltage suppressor	○	—Note)
Z	With light/surge voltage suppressor	○	○
R	With surge voltage suppressor (Non-polar)	○	—
U	With light/surge voltage suppressor (Non-polar)	○	—

Note) There is no S option for AC mode, since a rectifier prevents surge voltage generation. When T is selected, only Z type of light/surge voltage suppressor is available.

⚠ Caution

When using the surge voltage suppressor type, residual voltage will remain. Refer to back page 5 for details.

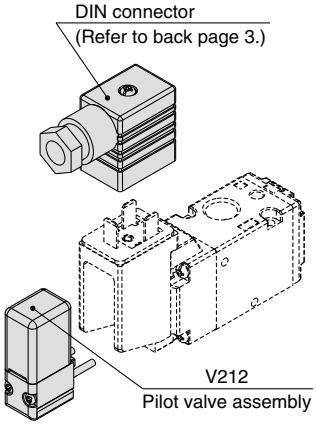
Electrical entry

G	Grommet (Lead wire length 300 mm)	
H	Grommet (Lead wire length 600 mm)	
L	L-type plug connector	With lead wire
LN		Without lead wire
LO		Without connector
M	M-type plug connector	With lead wire
MN		Without lead wire
MO		Without connector

∗ LN and MN types are with 2 sockets.
∗ Refer to back page 2 when different length of lead wire for L/M-type plug connector is required.

■ DIN or Conduit type

V 2 1 2 □□ – 5



Pressure specification

Nil	Standard (0.7 MPa)
K	High-pressure type (1.0 MPa)

Coil specification

Nil	Standard
T	With power saving circuit (DC only)

∗ T type is only available for DC mode.

Rated voltage

DC

5	24 VDC
6	12 VDC

AC (50/60 Hz)

1	100 VAC
2	200 VAC
3	110 VAC [115 VAC]
4	220 VAC [230 VAC]
7	240 VAC
B	24 VAC

⚠ Caution

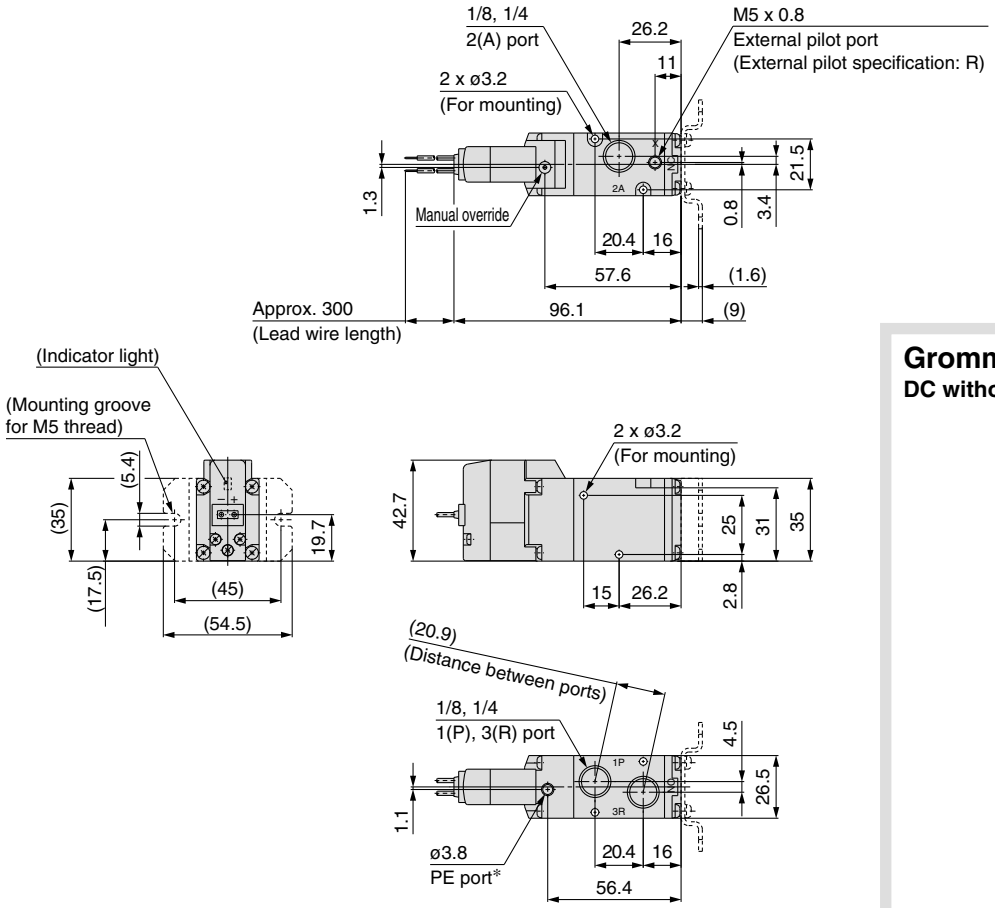
For V212 (DIN or Conduit type), the coil specification and voltage (including light/surge voltage suppressor) cannot be changed by changing the pilot valve assembly.

⚠ Caution

Tightening torque of the pilot valve assembly mounting screw
M2.5: 0.32 N·m

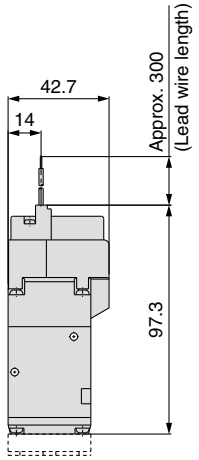
Series VP300/Body Ported/Dimensions

Grommet (G)

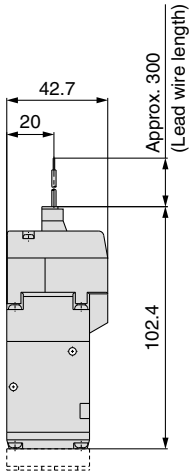


* Refer to page 24 separately when piping to PE port is required.

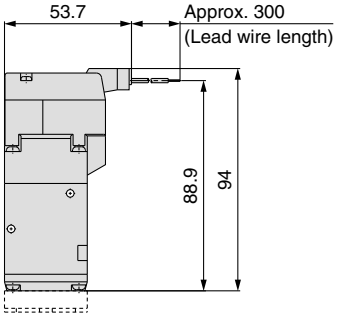
Grommet (G)
DC without light/surge voltage suppressor



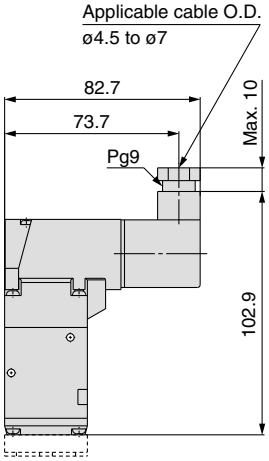
L-type plug connector (L)



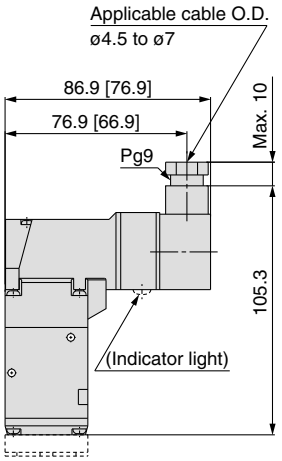
M-type plug connector (M)



DIN terminal (D, Y)



Conduit terminal (T)

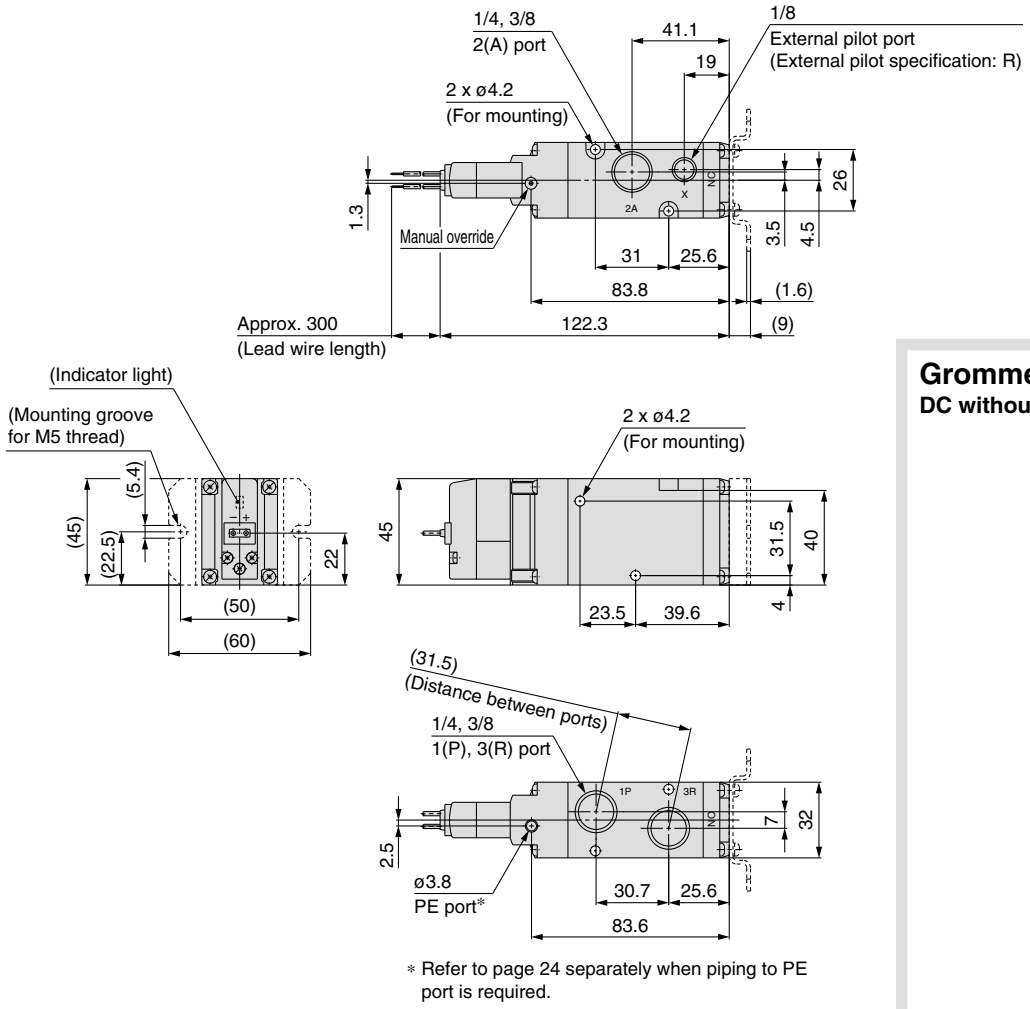


[ ]: Without indicator light

Unless otherwise indicated, dimensions are the same as Grommet (G).

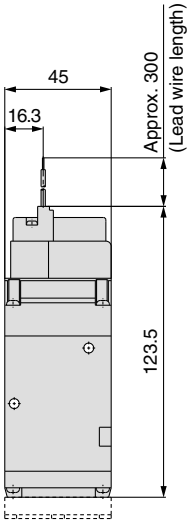
Series VP500/Body Ported/Dimensions

Grommet (G)

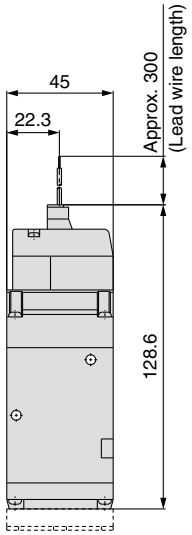


* Refer to page 24 separately when piping to PE port is required.

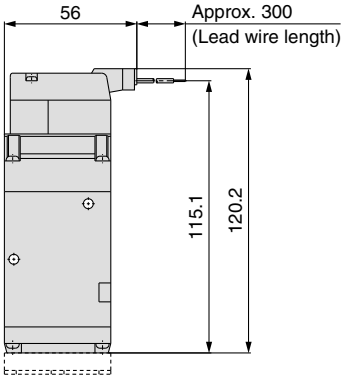
Grommet (G)
DC without light/surge voltage suppressor



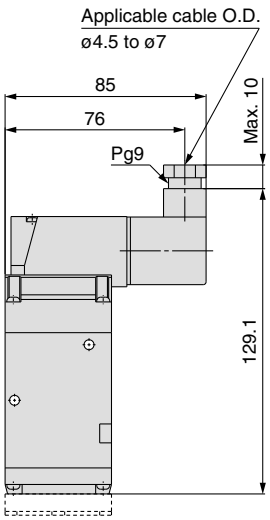
L-type plug connector (L)



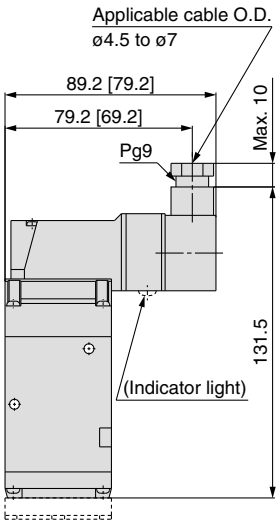
M-type plug connector (M)



DIN terminal (D, Y)



Conduit terminal (T)

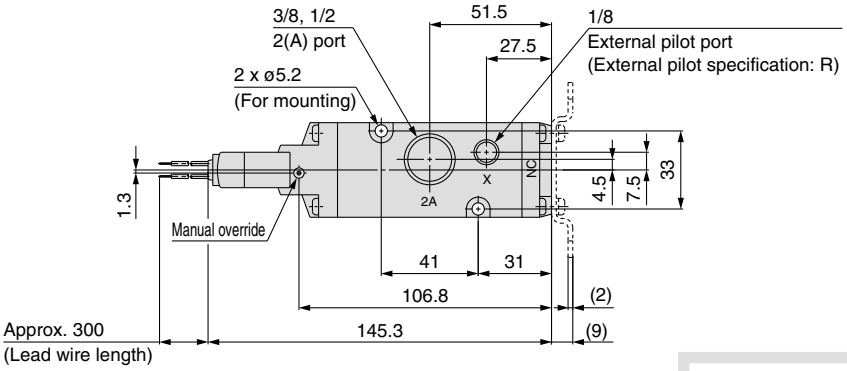


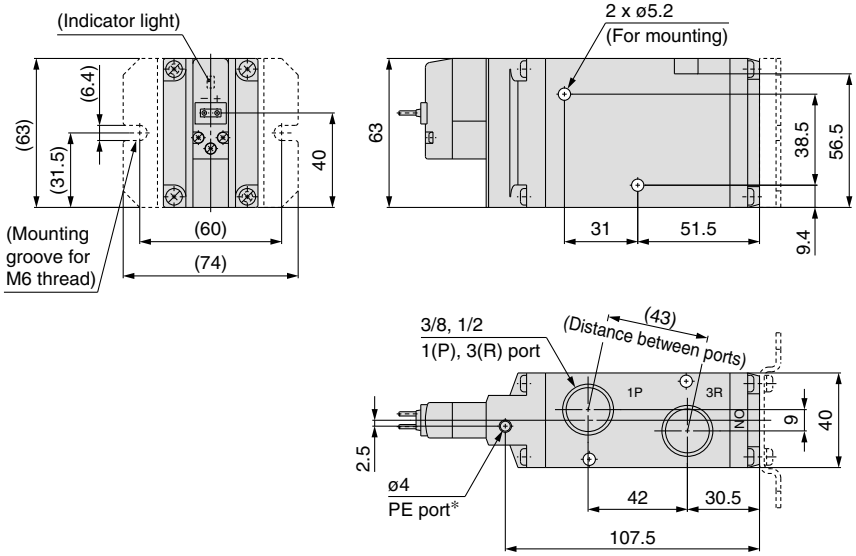
[ ]: Without indicator light

Unless otherwise indicated, dimensions are the same as Grommet (G).

Series VP700/Body Ported/Dimensions

Grommet (G)

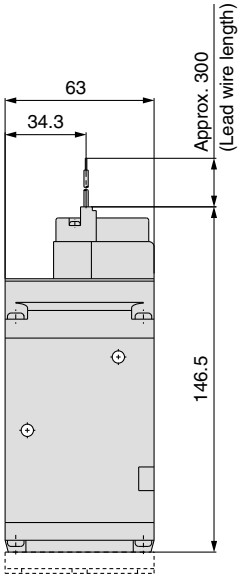




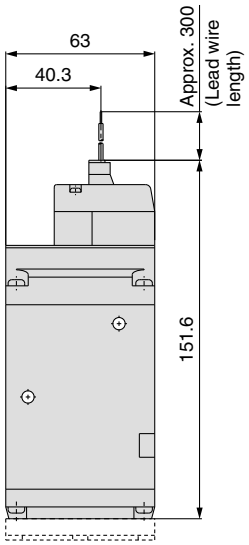
* Refer to page 24 separately when piping to PE port is required.

Grommet (G)

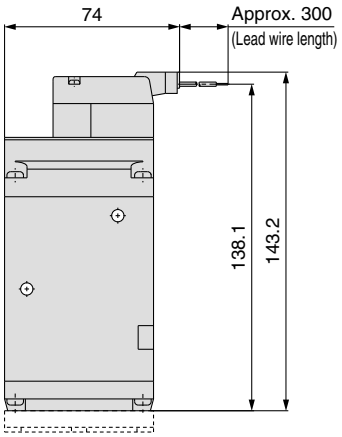
DC without light/surge voltage suppressor



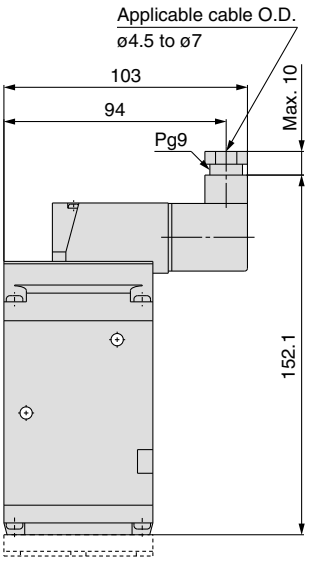
L-type plug connector (L)



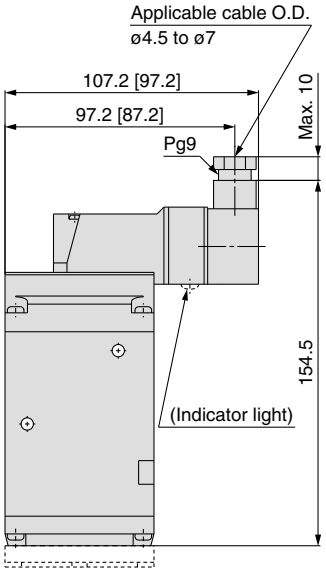
M-type plug connector (M)



DIN terminal (D, Y)



Conduit terminal (T)



[ ]: Without indicator light

Unless otherwise indicated, dimensions are the same as Grommet (G).

Rubber Seal
3 Port/Pilot Poppet Type
Base Mounted/Single Unit
Series VP300/500/700

Note) Only DIN and conduit terminal types are available for AC mode. Refer to the electrical entry for details.

How to Order

Base mounted VP 3 4 4 □ □ □ – 5 G □ □ 1 – □ □ A – □

Series

3	VP300
5	VP500
7	VP700

Pilot type

Nil	Internal pilot
R	External pilot

Pressure specification

Nil	Standard (0.7 MPa)
K	High-pressure type (1.0 MPa)

Coil specification

Nil	Standard
T	With power saving circuit (DC only)

Note) Be sure to select the power saving circuit type when it is continuously energized for a long time. (Refer to back page 5 for details.)

∗ T type is only available for DC mode. When T is selected, only Z type of light/surge voltage suppressor is available. (Note that when the electrical entry of DIN terminal type without connector is selected, only DOS and YOS are available.)

Rated voltage

DC

5	24 VDC
6	12 VDC

AC (50/60 Hz)

1	100 VAC
2	200 VAC
3	110 VAC [115 VAC]
4	220 VAC [230 VAC]
7	240 VAC
B	24 VAC

Type of actuation

A	N.C. (Normally closed)
B	N.O. (Normally open)

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Made to Order

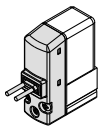
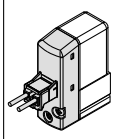
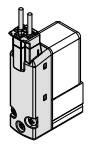
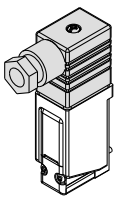
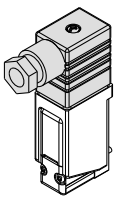
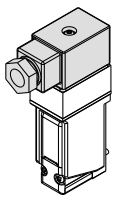
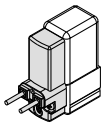
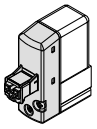
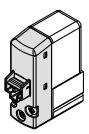
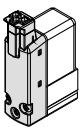
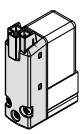
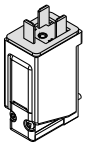
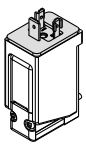
Nil	—
X500	Pilot exhaust port with piping thread (M3) specification (Refer to page 24).

Port size (Sub-plate)

Symbol	Port size	VP300	VP500	VP700
Nil	Without sub-plate∗			
01	1/8	○	—	—
02	1/4	○	○	—
03	3/8	—	○	○
04	1/2	—	—	○

∗ With a gasket and two mounting bolts.

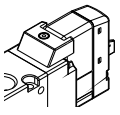
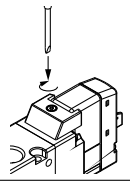
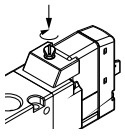
Electrical entry

Grommet	L-type plug connector	M-type plug connector	DIN terminal [IP65 compatible]	DIN (EN175301-803) terminal [IP65 compatible]	Conduit terminal [IP65 compatible]
 **G**: Lead wire length 300 mm **H**: Lead wire length 600 mm	 **L**: With lead wire (length 300 mm)	 **M**: With lead wire (length 300 mm)	 **D**: With connector	 **Y**: With connector	 **T**: Conduit terminal
 **G**: Lead wire length 300 mm **H**: Lead wire length 600 mm DC Without light/surge voltage suppressor	 **LN**: Without lead wire  **LO**: Without connector	 **MN**: Without lead wire  **MO**: Without connector	 **DO**: Without connector	 **YO**: Without connector	

CE compliant						
	DC	CE	CE	CE	CE	CE	CE
	AC Note)	—	—	—	CE	CE	CE

∗ LN and MN types are with 2 sockets.
∗ Refer to back page 2 when different length of lead wire for L/M-type plug connector is required.
∗ Refer to back page 3 for details on the DIN (EN175301-803) terminal.
Note) With the same specifications as the DC type, all lead wire entries for the 24 VAC type are CE marking compliant.

Manual override

Nil: Non-locking push type	D: Push-turn locking slotted type	E: Push-turn locking lever type
		

Light/surge voltage suppressor

		DC	AC
Nil	Without light/surge voltage suppressor	○	○
S	With surge voltage suppressor	○	—Note)
Z	With light/surge voltage suppressor	○	○
R	With surge voltage suppressor (Non-polar)	○	—
U	With light/surge voltage suppressor (Non-polar)	○	—

Note) There is no S option for AC mode, since a rectifier prevents surge voltage generation.
∗ In the DIN terminal type, since a light is installed in the connector, DOZ, DOU, YOZ, YOU are not available.

⚠ Caution

When using the surge voltage suppressor type, residual voltage will remain. Refer to back page 5 for details.

Low power consumption 1.5 W (DC)

Possible to use as either a selector or divider valve

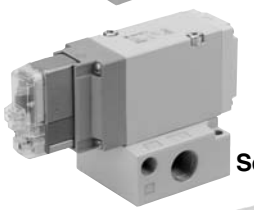
Possible to change from N.C. to N.O.

• Refer to back page 6 for changing the type of actuation.

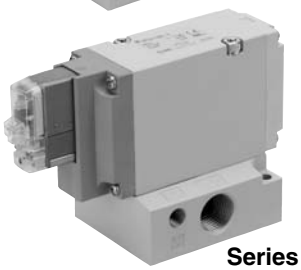
Possible to use in vacuum applications

Up to –100 kPa

Series VP300



Series VP500



Series VP700

External Pilot

Use external pilot type in the following cases:

- For vacuum or for low pressure 0.2 MPa or less
- Please consult with SMC for use in a vacuum hold application.
- When having P port downsized in diameter
- When using A port as the atmospheric releasing port, e.g. air blower
- If manifold, external pilot piping can be centralized in manifold base.

Made to Order
(Refer to page 24 for details.)

X500	Pilot exhaust port with piping thread (M3) specification

Specifications

Fluid		Air
Type of actuation		N.C. or N.O. (Convertible)
Internal pilot Operating pressure range (MPa)	**Standard**	0.2 to 0.7
	High-pressure type	0.2 to 1.0
External pilot Operating pressure range (MPa)	**Standard**	–100 kPa to 0.7
	High-pressure type	–100 kPa to 1.0
	Pilot pressure range	Same as operating pressure (Min. 0.2 MPa)
Ambient and fluid temperature (°C)		–10 to 50 (No freezing)
Max. operating frequency (Hz)		5
Manual override		Non-locking push type Push-turn locking slotted type Push-turn locking lever type
Pilot exhaust type		Individual exhaust
Lubrication		Not required
Mounting orientation		Unrestricted
Impact/Vibration resistance (m/s²) Note)		300/50
Enclosure		Dust-tight (IP65 for D, Y, T)

Note) Impact resistance: No malfunction occurred when it is tested in the axial direction and at the right angles to the main valve and armature in both energized and de-energized states every once for each condition. (Values at the initial period)

Vibration resistance: No malfunction occurred in a one-sweep test between 45 and 2000 Hz. Test was performed at both energized and de-energized states in the axial direction and at the right angles to the main valve and armature. (Values at the initial period)

Solenoid Specifications

Electrical entry			Grommet (G), (H) L-type plug connector (L) M-type plug connector (M)	DIN terminal (D) DIN (EN175301-803) terminal (Y) Conduit terminal (T)
			G, H, L, M	D, Y, T
Coil rated voltage (V)	**DC**		24, 12	
	AC (50/60 Hz)		24, 100, 110, 200, 220, 240	
Allowable voltage fluctuation			±10% of rated voltage*	
Power consumption (W)	**DC**	**Standard**	1.5 (With light: 1.55)	1.5 (With light: 1.75)
		With power saving circuit	0.55 (With light only)	0.75 (With light only)
Apparent power (VA)*	**AC**	**24 V**	1.5 (With light: 1.55)	1.5 (With light: 1.75)
		100 V	1.55 (With light: 1.65)	1.55 (With light: 1.7)
		110 V [115 V]		
		200 V		
		220 V [230 V]		
		240 V		
Surge voltage suppressor			Diode (Non-polar type: Varistor)	
Indicator light			LED (Neon bulb is used for AC mode of D, Y, T.)	

* It is in common between 110 VAC and 115 VAC, and between 220 VAC and 230 VAC.
* Allowable voltage fluctuation is –15% to +5% of the rated voltage for 115 VAC or 230 VAC.
* Since voltage drops due to the internal circuit in S, Z, T types (with power saving circuit), the allowable voltage fluctuation should be within the following range.
  24 VDC: –7% to +10%
  12 VDC: –4% to +10%

Response Time

Model	Pressure specifications	Response time ms (at 0.5 MPa)			
		Without light/surge voltage suppressor	With light/surge voltage suppressor		AC
			S, Z type	R, U type	
VP344	Standard (0.2 to 0.7)	13 or less	38 or less	16 or less	38 or less
	High-pressure type (0.2 to 1.0)	17 or less	42 or less	20 or less	42 or less
VP544	Standard (0.2 to 0.7)	14 or less	39 or less	17 or less	39 or less
	High-pressure type (0.2 to 1.0)	18 or less	43 or less	21 or less	43 or less
VP744	Standard (0.2 to 0.7)	19 or less	44 or less	22 or less	44 or less
	High-pressure type (0.2 to 1.0)	22 or less	47 or less	25 or less	47 or less

Note) Based on dynamic performance test, JIS B 8374-1981. (Coil temperature: 20°C, at rated voltage)

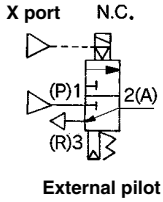
Flow Characteristics/Weight

Model	Port size	1 ↔ 2 (P ↔ A)			2 ↔ 3 (A ↔ R)			Weight (g) Note)	
		C [dm³/(s·bar)]	b	Cv	C [dm³/(s·bar)]	b	Cv	Grommet	DIN terminal
VP344	1/8	3.6	0.22	0.8	3.5	0.24	0.8	216 (149)	252 (185)
	1/4	3.9	0.22	0.9	3.8	0.14	0.9	211 (149)	247 (185)
VP544	1/4	7.5	0.16	1.7	7.3	0.20	1.7	370 (245)	406 (281)
	3/8	8.8	0.07	2.0	8.8	0.13	2.0	362 (245)	398 (281)
VP744	3/8	12.9	0.10	2.9	13.3	0.24	3.1	676 (459)	712 (495)
	1/2	14.7	0.05	3.3	15.0	0.17	3.4	658 (459)	694 (495)

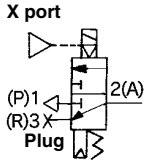
Note) ( ): Values without sub-plate

Application Example

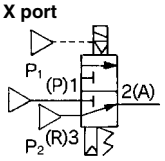
(1) Blow-off valve



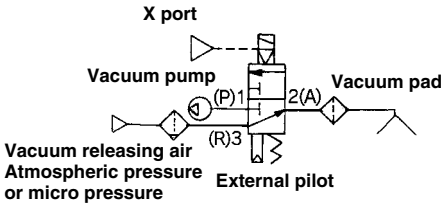
(2) Pressure release valve



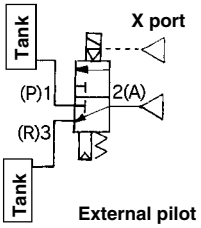
(3) Selector valve



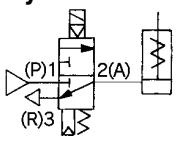
(4) Valve for vacuum



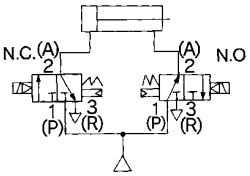
(5) Divider valve



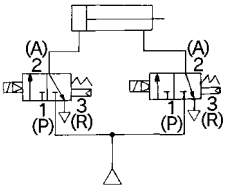
(6) Single-acting cylinder drive



(7) Double-acting cylinder drive



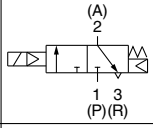
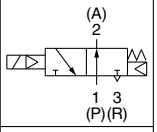
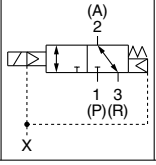
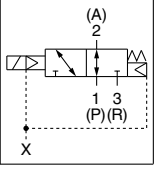
(8) Double-acting cylinder drive (Exhaust center)

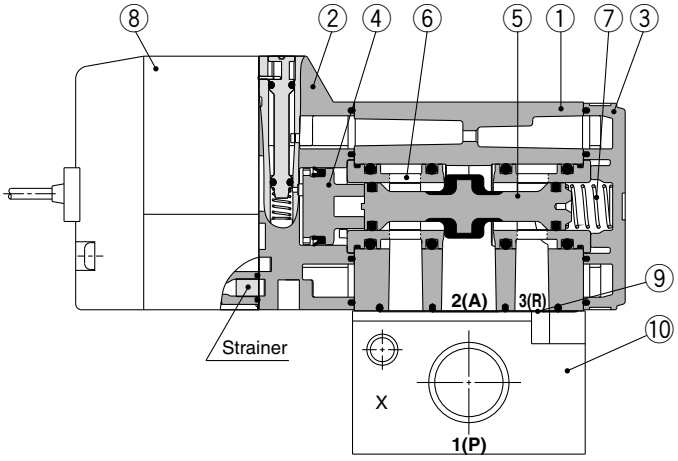


Construction

Base mounted

JIS symbol

Pilot type	N.C.	N.O.
Internal pilot		
External pilot		



Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum die-casted	White
2	**Adapter plate**	Resin	Gray
3	**End plate**	Resin	White
4	**Piston**	Resin	
5	**Spool valve**	Aluminum/HNBR	
6	**Retainer**	Resin	
7	**Spring**	Stainless steel	

Replacement Parts

No.	Description	Part no.			Note
		VP344	VP544	VP744	
8	**Pilot valve assembly**	Refer to "How to Order Pilot Valve Assembly" on page 11.			Built-in strainer
9	**Gasket**	VP300-217-1	VP500-217-1	VP700-217-1	HNBR
10	**Sub-plate**	VP300-202-□	VP500-202-□	VP700-202-□	Aluminum die-casted
—	**Hexagon socket head bolt (1 pc.)**	VP300-224-1 (M3 x 36)	VP500-224-1 (M4 x 46)	VP700-224-1 (M5 x 66)	For valve mounting

How to Order Sub-plate

VP 3 00 − 202 − 1 □

Series

3	VP344
5	VP544
7	VP744

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Port size

Symbol	VP344	VP544	VP744
1	1/8	1/4	3/8
2	1/4	3/8	1/2

⚠ Caution

Tightening Torque of Mounting Screw

M3: 0.8 N·m
M4: 1.4 N·m
M5: 2.9 N·m

How to Order Pilot Valve Assembly

⚠ Caution

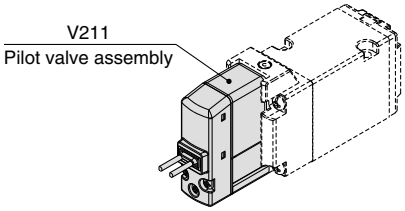
When only the pilot valve assembly is replaced, it is not possible to change from V211 (Grommet or L/M-type) to V212 (DIN or Conduit type), or vice versa.

Valve model: VP□□□ □□ – 5 G Z □1 – □□□

∗ Select from the below in accordance with the valve used.

■ Grommet or L/M-type

V 2 1 1 □□ – 5 G Z



Light/surge voltage suppressor

		DC	AC
Nil	Without light/surge voltage suppressor	○	○
S	With surge voltage suppressor	○	—Note)
Z	With light/surge voltage suppressor	○	○
R	With surge voltage suppressor (Non-polar)	○	—
U	With light/surge voltage suppressor (Non-polar)	○	—

Note) There is no S option for AC mode, since a rectifier prevents surge voltage generation. When T is selected, only Z type of light/surge voltage suppressor is available.

⚠ Caution

When using the surge voltage suppressor type, residual voltage will remain. Refer to back page 5 for details.

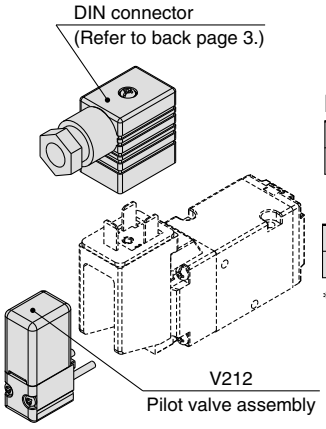
Electrical entry

G	Grommet (Lead wire length 300 mm)	
H	Grommet (Lead wire length 600 mm)	
L	L-type plug connector	With lead wire
LN		Without lead wire
LO		Without connector
M	M-type plug connector	With lead wire
MN		Without lead wire
MO		Without connector

∗ LN and MN types are with 2 sockets.
∗ Refer to back page 2 when different length of lead wire for L/M-type plug connector is required.

■ DIN or Conduit type

V 2 1 2 □□ – 5



Pressure specification

Nil	Standard (0.7 MPa)
K	High-pressure type (1.0 MPa)

Coil specification

Nil	Standard
T	With power saving circuit (DC only)

∗ T type is only available for DC mode.

Rated voltage

DC

5	24 VDC
6	12 VDC

AC (50/60 Hz)

1	100 VAC
2	200 VAC
3	110 VAC [115 VAC]
4	220 VAC [230 VAC]
7	240 VAC
B	24 VAC

⚠ Caution

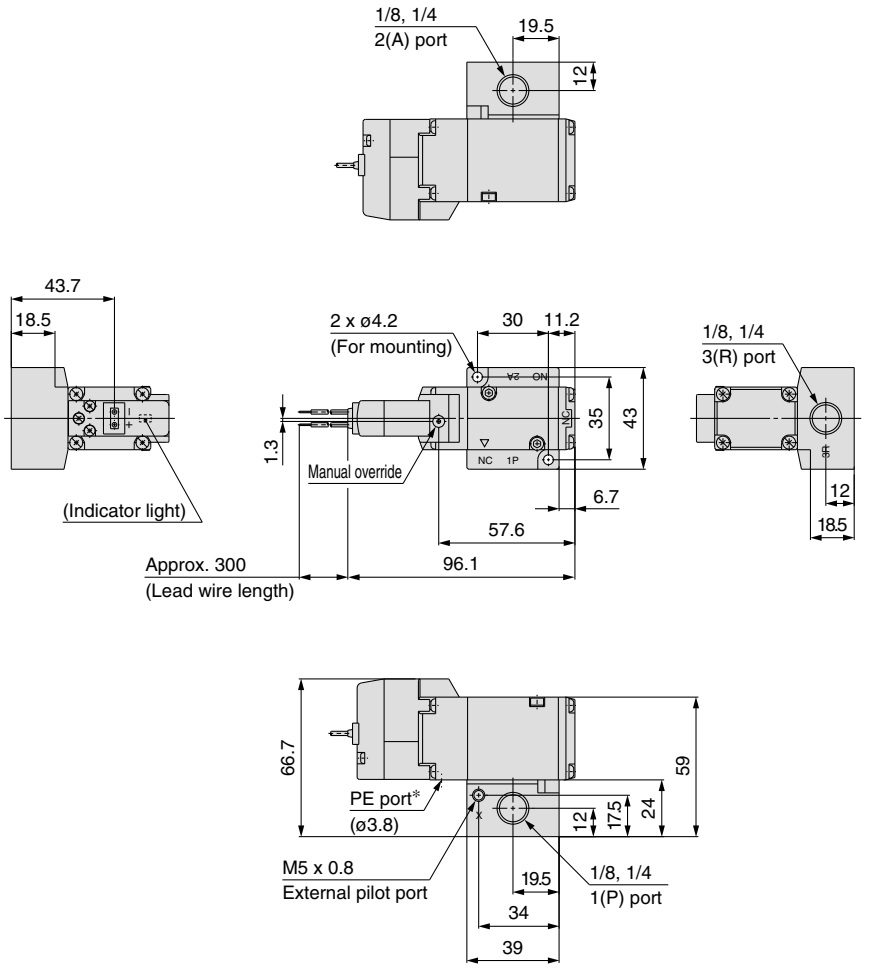
For V212 (DIN or Conduit type), the coil specification and voltage (including light/surge voltage suppressor) cannot be changed by changing the pilot valve assembly.

⚠ Caution

Tightening torque of the pilot valve assembly mounting screw
M2.5: 0.32 N·m

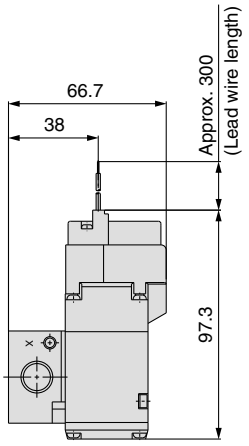
Series VP300/Base Mounted/Dimensions

Grommet (G)

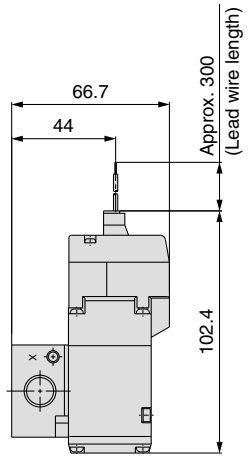


∗ Refer to page 24 separately when piping to PE port is required.

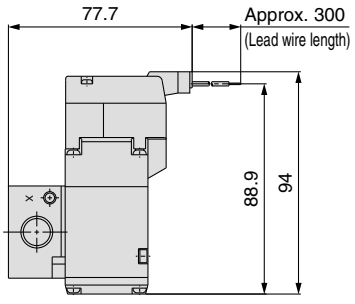
Grommet (G)
DC without light/surge voltage suppressor



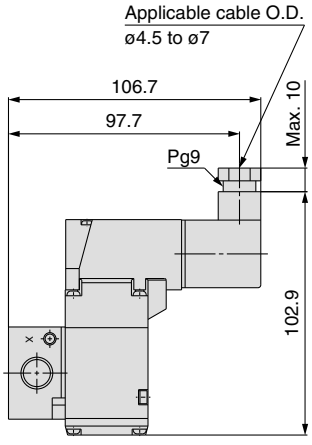
L-type plug connector (L)



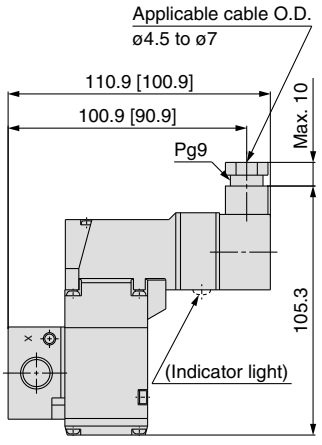
M-type plug connector (M)



DIN terminal (D, Y)



Conduit terminal (T)

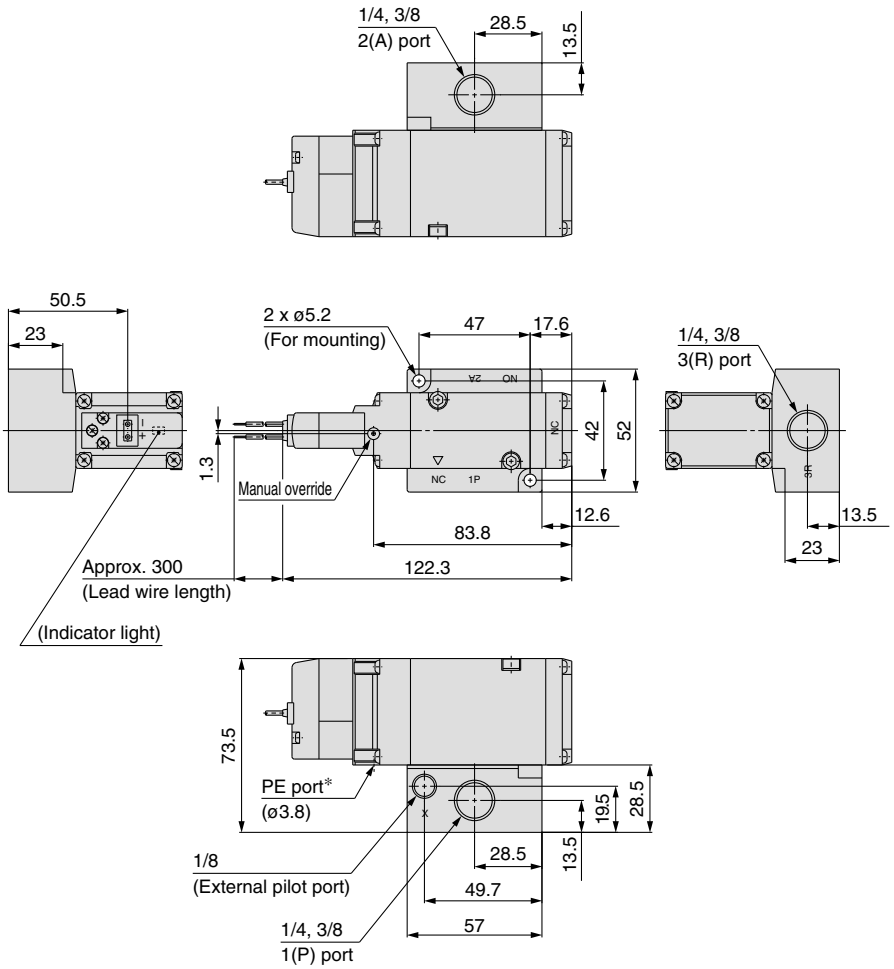


[ ]: Without indicator light

Unless otherwise indicated, dimensions are the same as Grommet (G).

Series VP500/Base Mounted/Dimensions

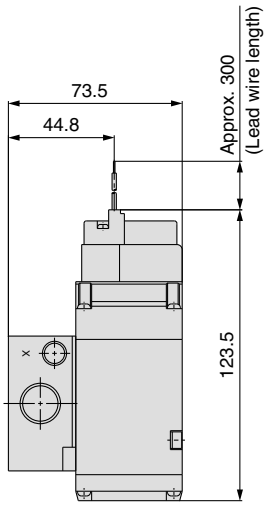
Grommet (G)



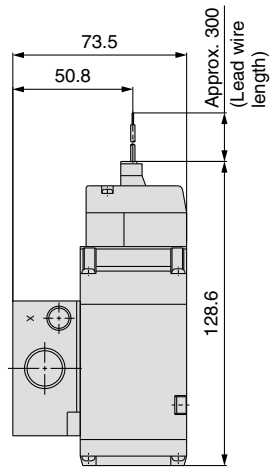
∗ Refer to page 24 separately when piping to PE port is required.

Grommet (G)

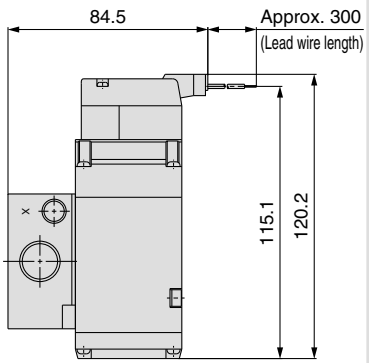
DC without light/surge voltage suppressor



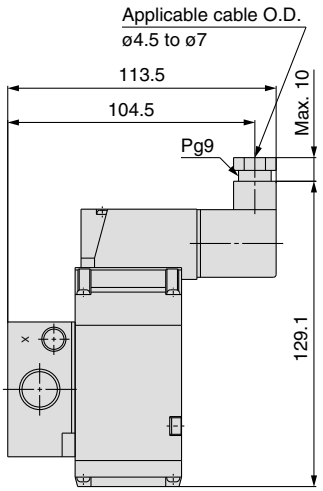
L-type plug connector (L)



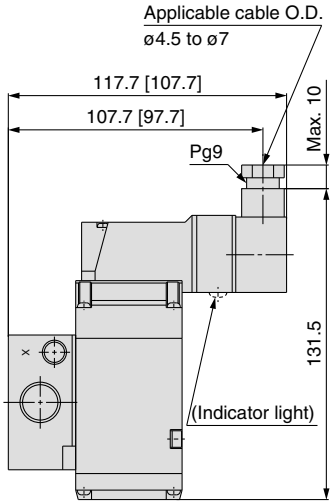
M-type plug connector (M)



DIN terminal (D, Y)



Conduit terminal (T)

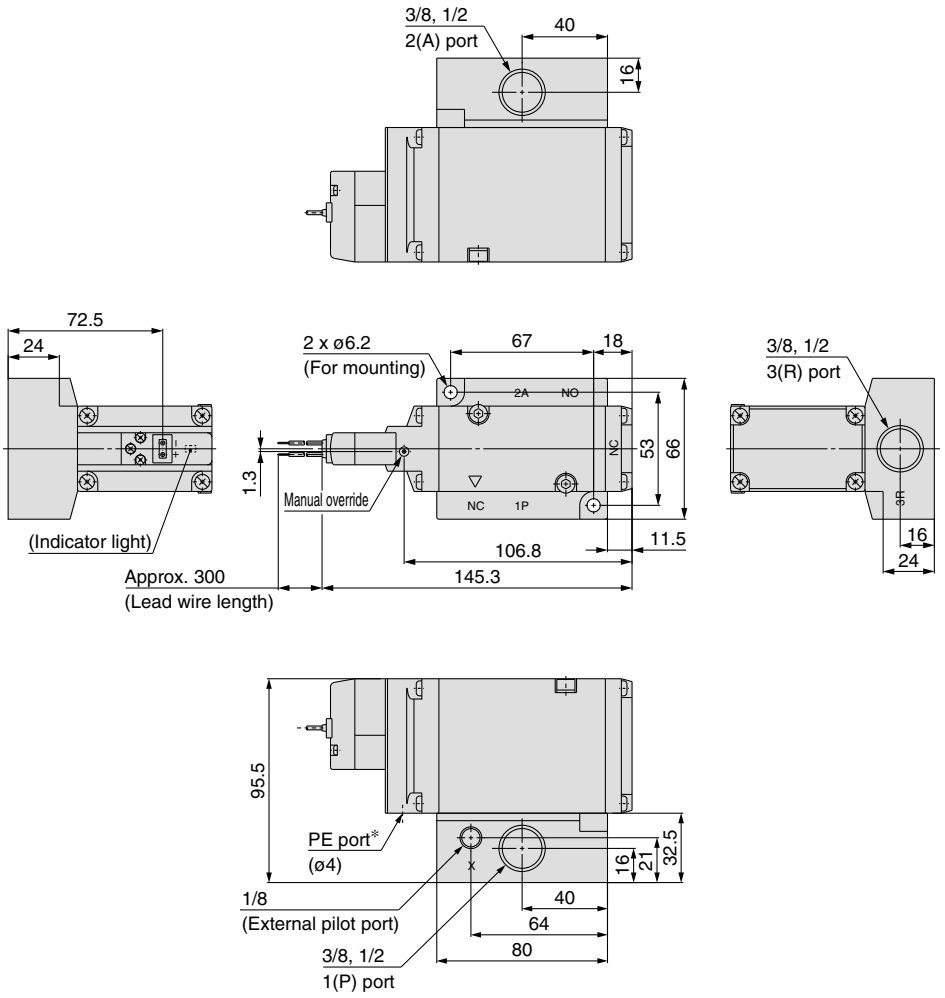


[ ]: Without indicator light

Unless otherwise indicated, dimensions are the same as Grommet (G).

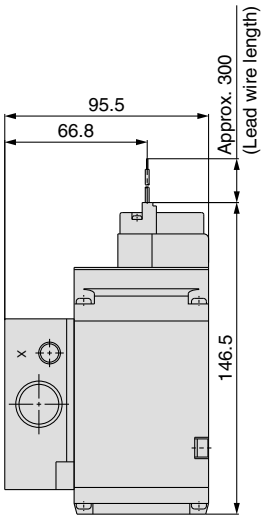
Series VP700/Base Mounted/Dimensions

Grommet (G)

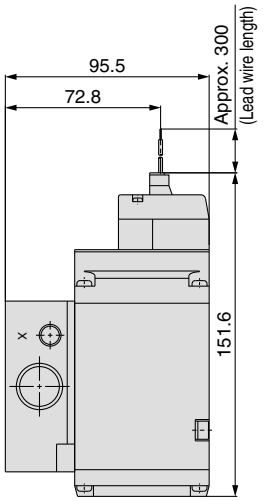


* Refer to page 24 separately when piping to PE port is required.

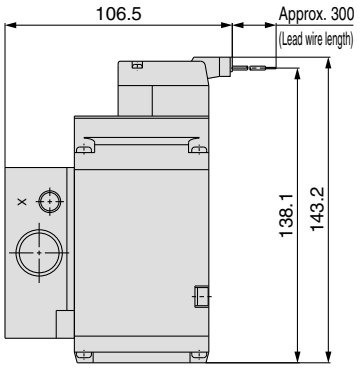
Grommet (G)
DC without light/surge voltage suppressor



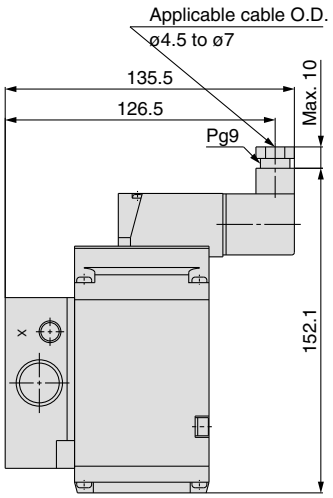
L-type plug connector (L)



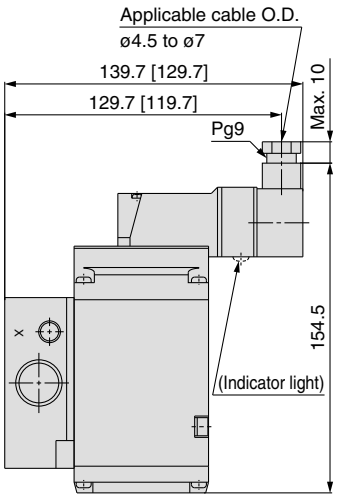
M-type plug connector (M)



DIN terminal (D, Y)



Conduit terminal (T)



[ ]: Without indicator light

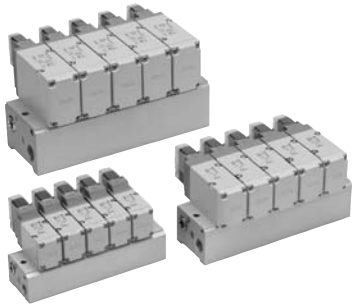
Unless otherwise indicated, dimensions are the same as Grommet (G).

Rubber Seal/3 Port/Pilot Poppet Type Manifold
Common Exhaust Type 41 /
Individual Exhaust Type 42
Series VP300/500/700

How to Order Manifold

Type 41/Common exhaust

VV3P 3 – 41 ☐ – 04 1 – 02 ☐



Series

3	VP300
5	VP500
7	VP700

Pilot type

Nil	Internal pilot
R	External pilot

Note) When the external pilot type manifold is selected, external pilot type valves are mounted.

Stations

02	2 stations
⋮	⋮
20	20 stations

Port size

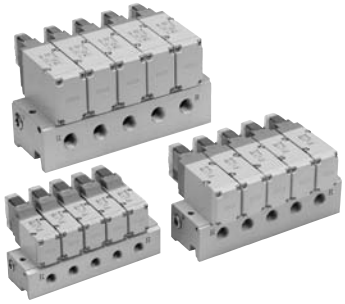
Symbol	Port size	Applicable series
02	1/4	VP300
03	3/8	VP500
04	1/2	VP700

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Type 42/Individual exhaust

VV3P 3 – 42 ☐ – 04 3 – 02 ☐



Series

3	VP300
5	VP500
7	VP700

Pilot type

Nil	Internal pilot
R	External pilot

Note) When the external pilot type manifold is selected, external pilot type valves are mounted.

Stations

02	2 stations
⋮	⋮
20	20 stations

Port size

Symbol	Port size	Applicable series
02	1/4	VP300
03	3/8	VP500
04	1/2	VP700

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Note) Only DIN and conduit terminal types are available for AC mode. Refer to the electrical entry for details.

How to Order Valve (With a gasket and two mounting bolts)

VP 3 4 4 □ □ □ – 5 G □ □ 1 – A – □

Series

3	VP300
5	VP500
7	VP700

Pilot type

Nil	Internal pilot
R	External pilot

Pressure specification

Nil	Standard (0.7 MPa)
K	High-pressure type (1.0 MPa)

Coil specification

Nil	Standard
T	With power saving circuit (DC only)

Note) Be sure to select the power saving circuit type when it is continuously energized for a long time. (Refer to back page 5 for details.)
∗ T type is only available for DC mode. When T is selected, only Z type of light/surge voltage suppressor is available.
(Note that when the electrical entry of DIN terminal type without connector is selected, only DOS and YOS are available.)

Rated voltage

DC

5	24 VDC
6	12 VDC

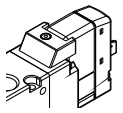
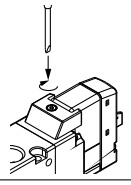
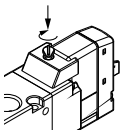
AC (50/60 Hz)

1	100 VAC
2	200 VAC
3	110 VAC [115 VAC]
4	220 VAC [230 VAC]
7	240 VAC
B	24 VAC

Type of actuation

A	N.C. (Normally closed)
B	N.O. (Normally open)

Manual override

Nil: Non-locking push type	D: Push-turn locking slotted type	E: Push-turn locking lever type
		

Light/surge voltage suppressor

		DC	AC
Nil	Without light/surge voltage suppressor	○	○
S	With surge voltage suppressor	○	—Note)
Z	With light/surge voltage suppressor	○	○
R	With surge voltage suppressor (Non-polar)	○	—
U	With light/surge voltage suppressor (Non-polar)	○	—

Note) There is no S option for AC mode, since a rectifier prevents surge voltage generation.
∗ In the DIN terminal type, since a light is installed in the connector, DOZ, DOU, YOZ, YOU are not available.

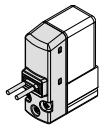
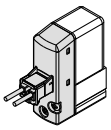
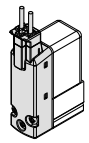
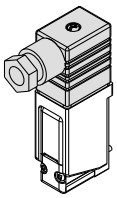
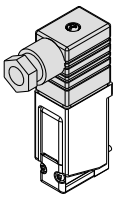
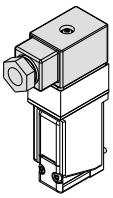
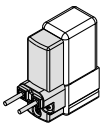
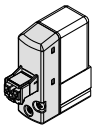
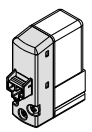
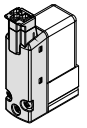
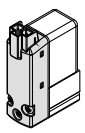
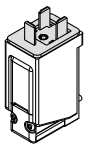
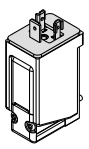
⚠ Caution

When using the surge voltage suppressor type, residual voltage will remain. Refer to back page 5 for details.

Made to Order

Nil	—
X500	Pilot exhaust port with piping thread (M3) specification (Refer to page 24).

Electrical entry

Grommet	L-type plug connector	M-type plug connector	DIN terminal	DIN (EN175301-803) terminal	Conduit terminal
			[IP65 compatible]	[IP65 compatible]	[IP65 compatible]
 **G**: Lead wire length 300 mm **H**: Lead wire length 600 mm	 **L**: With lead wire (length 300 mm)	 **M**: With lead wire (length 300 mm)	 **D**: With connector	 **Y**: With connector	 **T**: Conduit terminal
 **G**: Lead wire length 300 mm **H**: Lead wire length 600 mm DC Without light/surge voltage suppressor	 **LN**: Without lead wire  **LO**: Without connector	 **MN**: Without lead wire  **MO**: Without connector	 **DO**: Without connector	 **YO**: Without connector	
CE compliant DC	CE	CE	CE	CE	CE	CE
CE compliant AC Note)	—	—	—	CE	CE	CE

∗ LN and MN types are with 2 sockets.
∗ Refer to back page 2 when different length of lead wire for L/M-type plug connector is required.
∗ Refer to back page 3 for details on the DIN (EN175301-803) terminal.
Note) With the same specifications as the DC type, all lead wire entries for the 24 VAC type are CE marking compliant.

Piping is concentrated on the base side.

All external pilots are gathered in the base.

Common external pilot port allows one piping.

2 types of exhaust ports

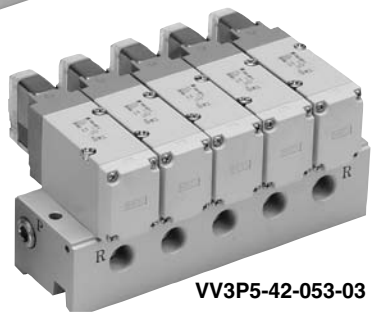
Common or individual exhaust type are available. For individual exhaust type, exhaust can be restricted.

Easy to change between N.C. and N.O.

Type of actuation can be easily changed from normally closed to normally open by changing the direction of a valve and end-plate only 180°.

• Refer to back page 6 for changing the type of actuation.

VV3P3-41-051-02



VV3P5-42-053-03

Manifold Specifications

Series	Base model	Piping specifications			Applicable valve	Applicable stations Note)	Manifold base Weight: W [g] Stations: n
		1P (SUP) port type	3R (EXH) port type	Port size			
VP300	VV3P3-41	Common	Common	1/4	VP344	2 to 20 stations	W = 110n + 90
	VV3P3-42		Individual				
VP500	VV3P5-41		Common	3/8	VP544	2 to 20 stations	W = 190n + 150
	VV3P5-42		Individual				
VP700	VV3P7-41		Common	1/2	VP744	2 to 20 stations	W = 410n + 380
	VV3P7-42		Individual				

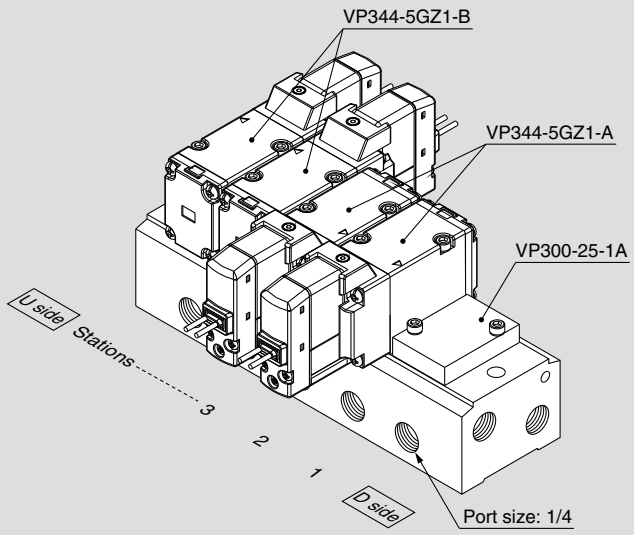
Note) Supply pressure to 1(P) ports and exhaust pressure from 3(R) ports on both sides for 10 stations or more.

Manifold Option

Description	Part no.	Applicable manifold base model
Blanking plate assembly (With a gasket and two mounting bolts)	VP300-25-1A	VV3P3
	VP500-25-1A	VV3P5
	VP700-25-1A	VV3P7

How to Order Manifold Assembly (Example)

Ordering example (VV3P3-41)

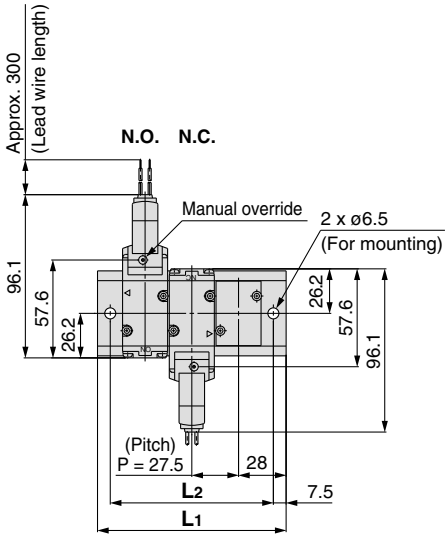


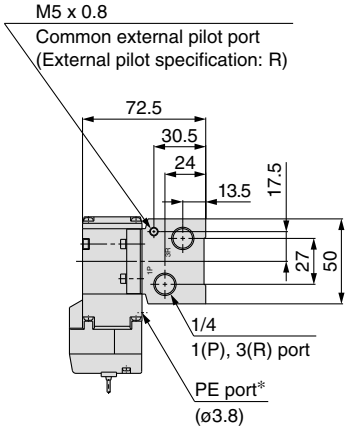
VV3P3-41-051-02 ····· 1 set (Type 41, 5-station manifold base part no.)
*** VP300-25-1A ····· 1 set (Blanking plate assembly part no.)**
*** VP344-5GZ1-A ····· 2 sets (N.C. type part no.)**
*** VP344-5GZ1-B ····· 2 sets (N.O. type part no.)**
→The asterisk denotes the symbol for assembly. Prefix it to the part nos. of the solenoid valve, etc.

• Indicate the valves to be attached below the manifold part number, in order starting from station 1 as shown in the drawing.

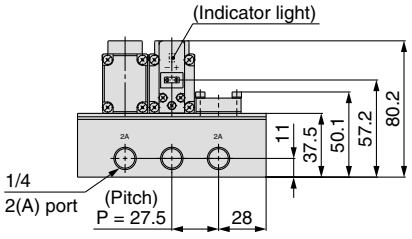
Series VP300/Dimensions

Type 41/Common exhaust: VV3P3-41□-Stations1-02
Grommet (G)



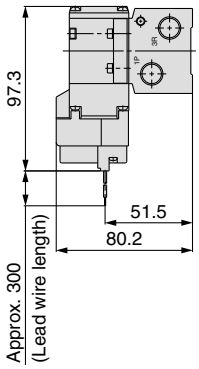


* Refer to page 24 separately when piping to PE port is required.

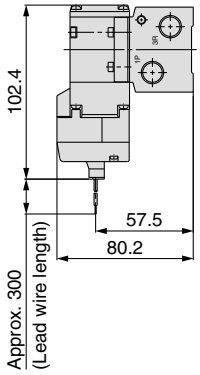


Station n	2 stations	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 stations
L1	83.5	111	138.5	166	193.5	221	248.5	276	303.5	331	358.5	386	413.5	441	468.5	496	523.5	551	578.5
L2	68.5	96	123.5	151	178.5	206	233.5	261	288.5	316	343.5	371	398.5	426	453.5	481	508.5	536	563.5

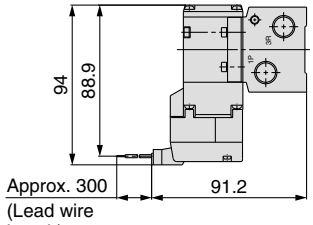
Grommet (G)
DC without light/surge voltage suppressor



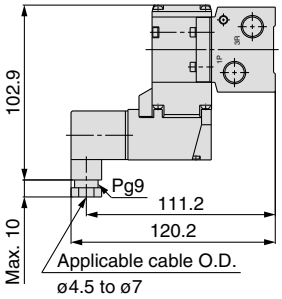
L-type plug connector (L)



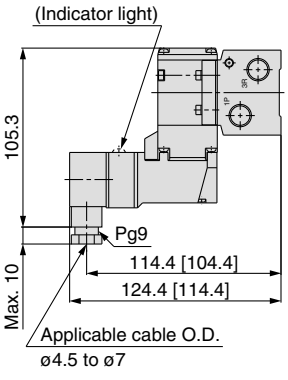
M-type plug connector (M)



DIN terminal (D, Y)



Conduit terminal (T)

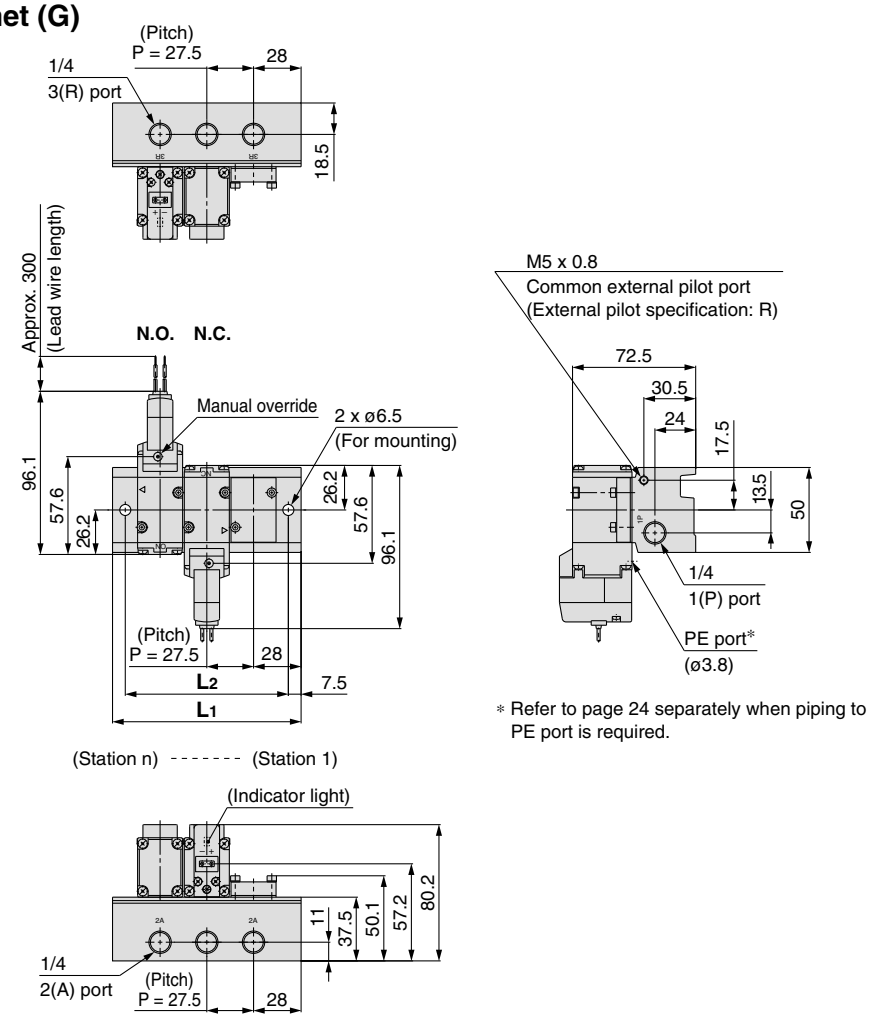


[ ]: Without indicator light

Unless otherwise indicated, dimensions are the same as Grommet (G).

Series VP300/Dimensions

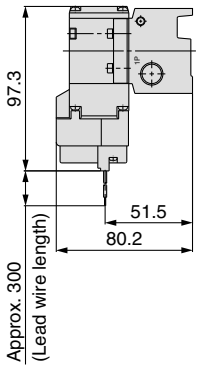
Type 42/Individual exhaust: VV3P3-42□-Stations 3-02
Grommet (G)



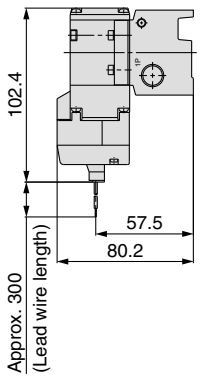
* Refer to page 24 separately when piping to PE port is required.

Station n	2 stations	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 stations
L1	83.5	111	138.5	166	193.5	221	248.5	276	303.5	331	358.5	386	413.5	441	468.5	496	523.5	551	578.5
L2	68.5	96	123.5	151	178.5	206	233.5	261	288.5	316	343.5	371	398.5	426	453.5	481	508.5	536	563.5

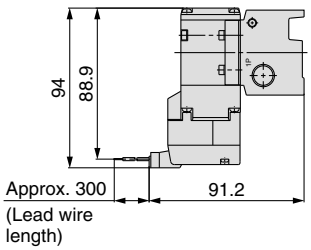
Grommet (G)
DC without light/surge voltage suppressor



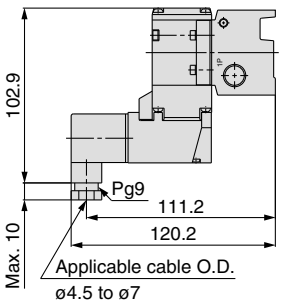
L-type plug connector (L)



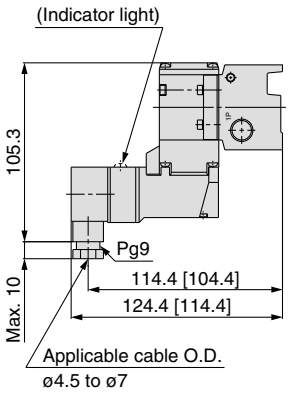
M-type plug connector (M)



DIN terminal (D, Y)



Conduit terminal (T)

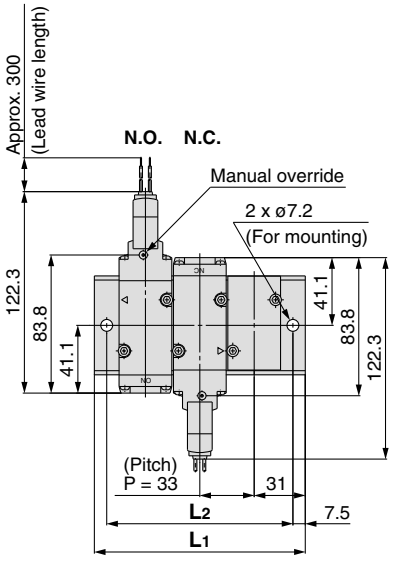


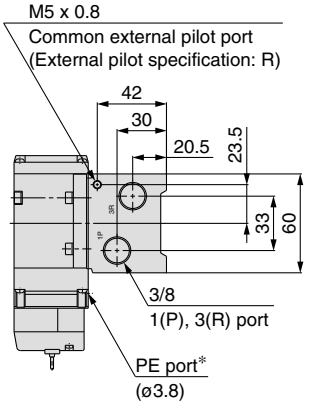
[ ]: Without indicator light

Unless otherwise indicated, dimensions are the same as Grommet (G).

Series VP500/Dimensions

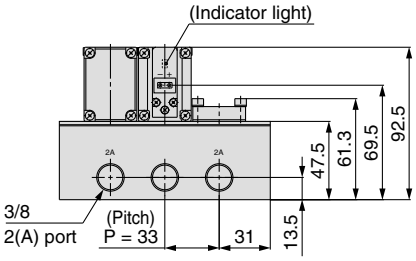
Type 41/Common exhaust: VV3P5-41□-Stations1-03
Grommet (G)





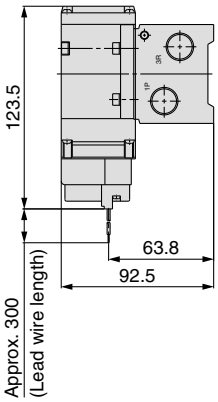
* Refer to page 24 separately when piping to PE port is required.

(Station n) - - - - - - - - - (Station 1)

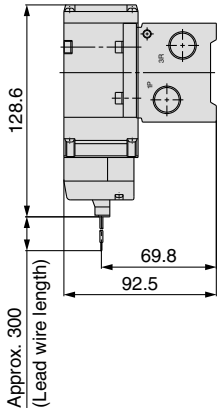


Station n	2 stations	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 stations
L1	95	128	161	194	227	260	293	326	359	392	425	458	491	524	557	590	623	656	689
L2	80	113	146	179	212	245	278	311	344	377	410	443	476	509	542	575	608	641	674

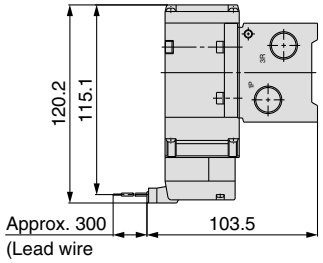
Grommet (G)
DC without light/surge voltage suppressor



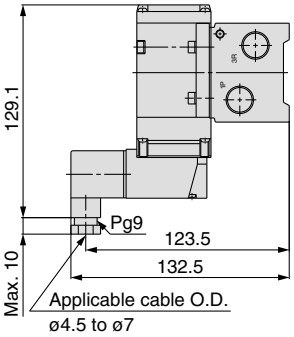
L-type plug connector (L)



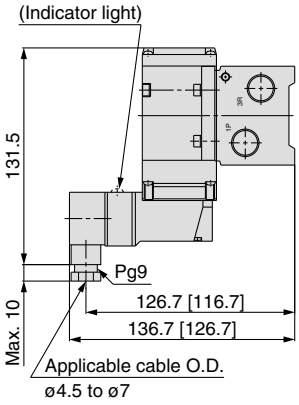
M-type plug connector (M)



DIN terminal (D, Y)



Conduit terminal (T)

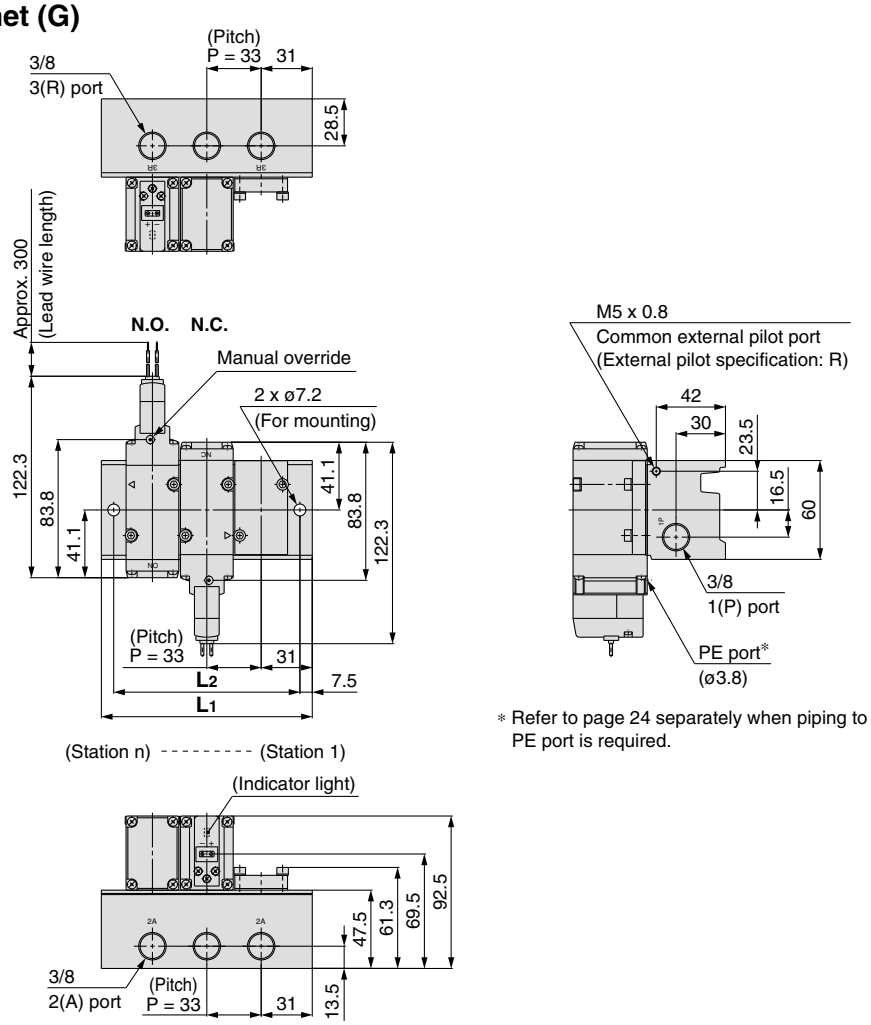


[ ]: Without indicator light

Unless otherwise indicated, dimensions are the same as Grommet (G).

Series VP500/Dimensions

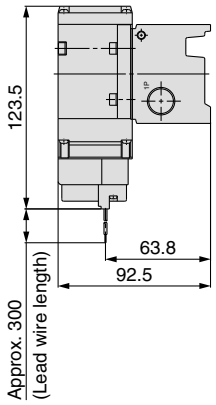
Type 42/Individual exhaust: VV3P5-42□-Stations 3-03
Grommet (G)



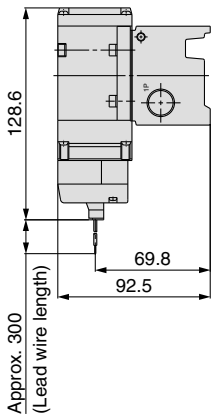
* Refer to page 24 separately when piping to PE port is required.

Station n	2 stations	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 stations
L1	95	128	161	194	227	260	293	326	359	392	425	458	491	524	557	590	623	656	689
L2	80	113	146	179	212	245	278	311	344	377	410	443	476	509	542	575	608	641	674

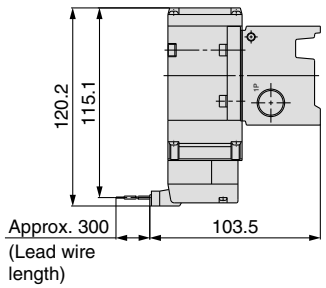
Grommet (G)
DC without light/surge voltage suppressor



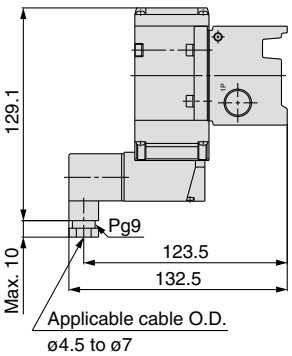
L-type plug connector (L)



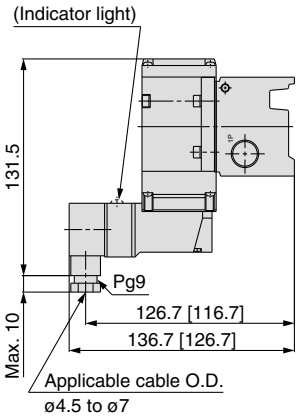
M-type plug connector (M)



DIN terminal (D, Y)



Conduit terminal (T)

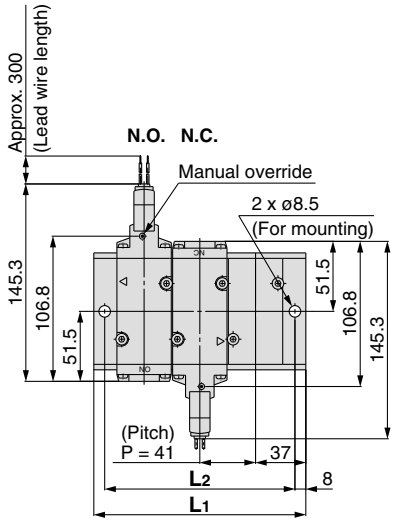


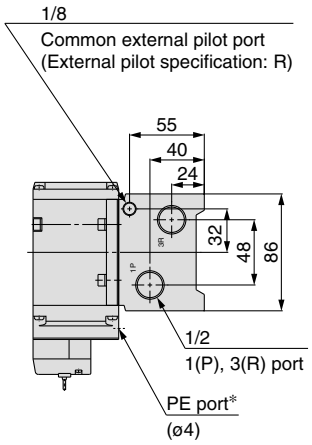
[ ]: Without indicator light

Unless otherwise indicated, dimensions are the same as Grommet (G).

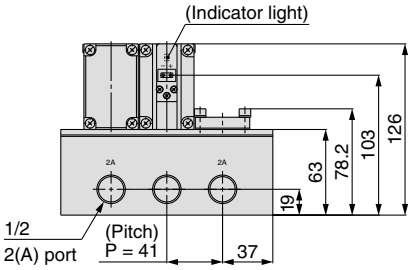
Series VP700/Dimensions

Type 41/Common exhaust: VV3P7-41□-Stations1-04
Grommet (G)



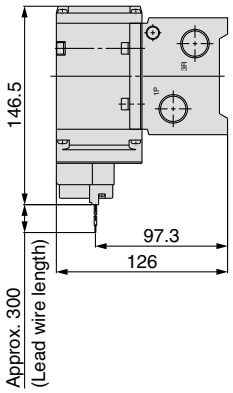


* Refer to page 24 separately when piping to PE port is required.

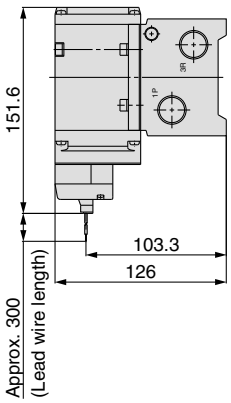


Station n	2 stations	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 stations
L1	115	156	197	238	279	320	361	402	443	484	525	566	607	648	689	730	771	812	853
L2	99	140	181	222	263	304	345	386	427	468	509	550	591	632	673	714	755	796	837

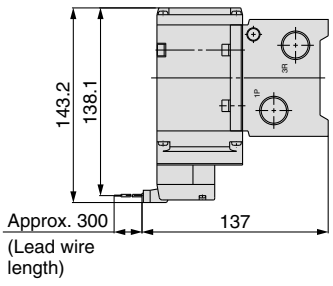
Grommet (G)
DC without light/surge voltage suppressor



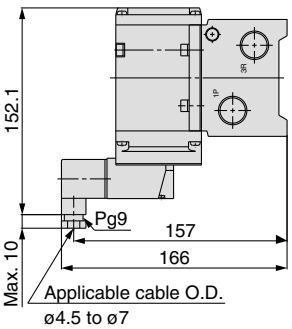
L-type plug connector (L)



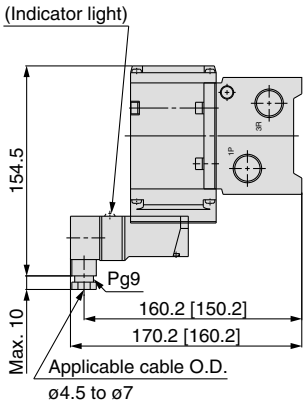
M-type plug connector (M)



DIN terminal (D, Y)



Conduit terminal (T)

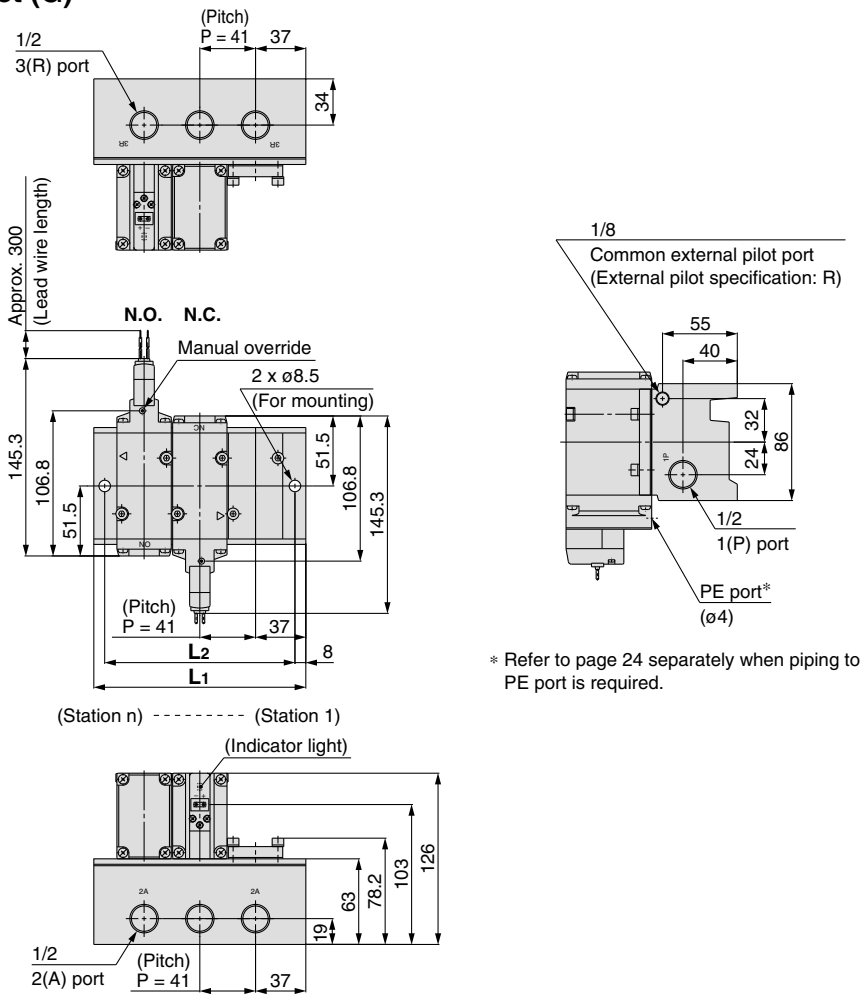


[ ]: Without indicator light

Unless otherwise indicated, dimensions are the same as Grommet (G).

Series VP700/Dimensions

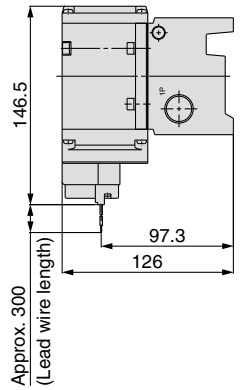
Type 42/Individual exhaust: VV3P7-42□-Stations 3-04
Grommet (G)



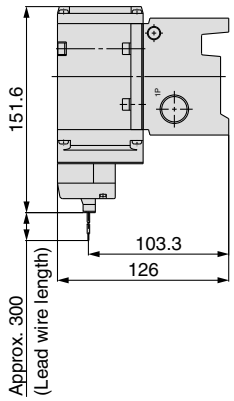
* Refer to page 24 separately when piping to PE port is required.

Station n	2 stations	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 stations
L1	115	156	197	238	279	320	361	402	443	484	525	566	607	648	689	730	771	812	853
L2	99	140	181	222	263	304	345	386	427	468	509	550	591	632	673	714	755	796	837

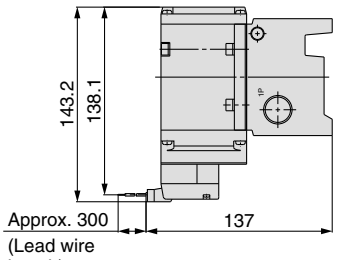
Grommet (G)
DC without light/surge voltage suppressor



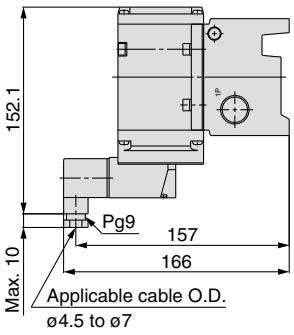
L-type plug connector (L)



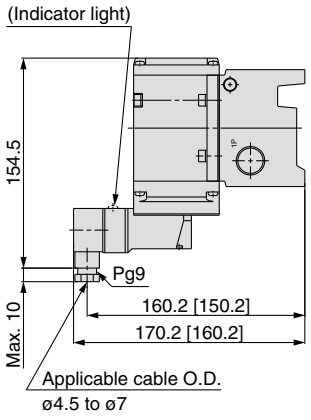
M-type plug connector (M)



DIN terminal (D, Y)



Conduit terminal (T)



[ ]: Without indicator light

Unless otherwise indicated, dimensions are the same as Grommet (G).

Made to Order

Made to Order

Please contact SMC for detailed dimensions, specifications, and lead times.

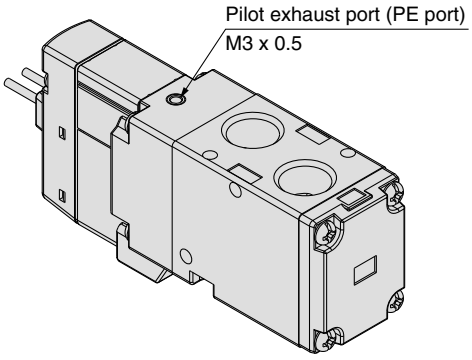
1 Pilot Exhaust Port with Piping Thread (M3) Specification

In this specification, piping to the pilot exhaust port (PE port) is available when the valve is used in an environment where the exhaust from the pilot valve is not allowable, or intrusion of ambient dust should be prevented.

How to Order Valve

$$VP\begin{matrix}3\\5\\7\end{matrix}4\begin{matrix}2\\4\end{matrix}\square\square\square-\square\square\square\square1-\square\square\square-X500$$

- **Entry is the same as standard products.**
  The specifications, performance and external dimensions are the same as those of standard models.



2 Body Ported Interchangeable Specification with the Previous Valve Mounting Hole Pitch Type

The mounting hole has been changed to the long type in order to provide interchangeability with the previous VP300/500 series.

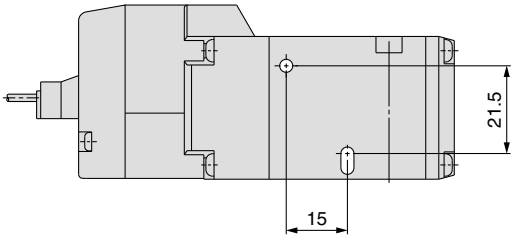
How to Order Valve

$$VP\begin{matrix}3\\5\end{matrix}42\square\square\square-\square\square\square\square1-\square\square\square-X505$$

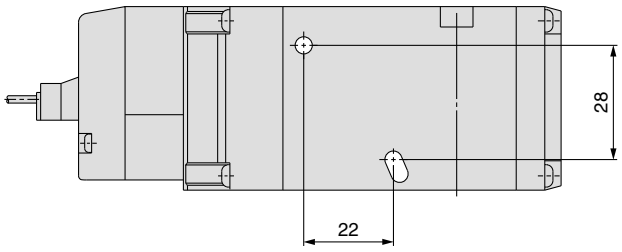
- **Entry is the same as standard products.**
  The specifications, performance and external dimensions are the same as those of standard models.

Note) VP742 is not available because the mounting hole pitch is the same as the previous type.

VP342



VP542



3 Port/Air Operated Valve
Body Ported/Single Unit
Series VPA300/500/700

Series VPA300

Series VPA500

Series VPA700

How to Order

VPA 3 4 2 □ – 1 – 01 □ A – □ – □

Series

3	VPA300
5	VPA500
7	VPA700

Valve option

Nil	Standard
V	For vacuum

Port size

Symbol	Port size	VPA300	VPA500	VPA700
01	1/8	○	—	—
02	1/4	○	○	—
03	3/8	—	○	○
04	1/2	—	—	○

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Type of actuation

A	N.C. (Normally closed)
B	N.O. (Normally open)

Bracket

Nil	Without bracket
F	With bracket

Made to Order

Nil	—
X505	Interchangeable specification with the previous valve mounting hole pitch type (Refer to page 40).

Specifications

Fluid	Air	
Type of actuation	N.C. or N.O. (Convertible)	
Operating pressure range (MPa)	Standard	0.2 to 1.0
	For vacuum	–100 kPa to 0.2
Pilot pressure (MPa)	0.2 to 1.0 (Equivalent to the operating pressure or more)	
Ambient and fluid temperature (°C)	–10 to 50 (No freezing)	
Lubrication	Not required	
Mounting orientation	Unrestricted	
Impact/Vibration resistance (m/s²) Note)	300/50	

Note) Impact resistance: No malfunction to axis and right angle directions of main valve, each one time when pilot signal ON and OFF. (Values at the initial period)
Vibration resistance: No malfunction from test with 45 to 2000 Hz one sweep, to axis and right angle direction of main valve, each one time when pilot signal ON and OFF. (Values at the initial period)

Flow Characteristics/Weight

Model	Port size	1 ↔ 2 (P ↔ A)			2 ↔ 3 (A ↔ R)			Weight (g) Note)
		C [dm³/(s·bar)]	b	Cv	C [dm³/(s·bar)]	b	Cv	
VPA342	1/8	3.5	0.26	0.8	3.6	0.26	0.9	118
	1/4	4.2	0.22	1.0	4.2	0.23	1.0	114
VPA542	1/4	7.9	0.21	1.8	7.2	0.27	1.8	237
	3/8	8.9	0.16	2.2	8.9	0.20	2.1	229
VPA742	3/8	11.9	0.21	2.7	11.8	0.20	2.7	501
	1/2	15.1	0.21	3.6	15.3	0.22	3.7	484

Note) Values without brackets

⚠ Caution

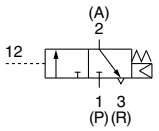
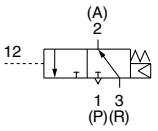
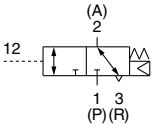
Refer to back cover for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for Common Precautions.

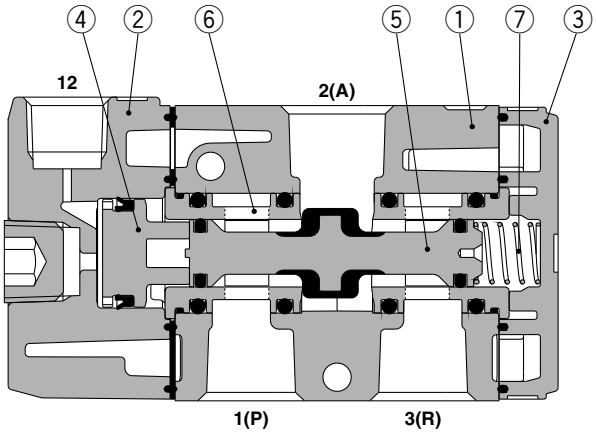
• Refer to back page 6 for changing the type of actuation.

Construction

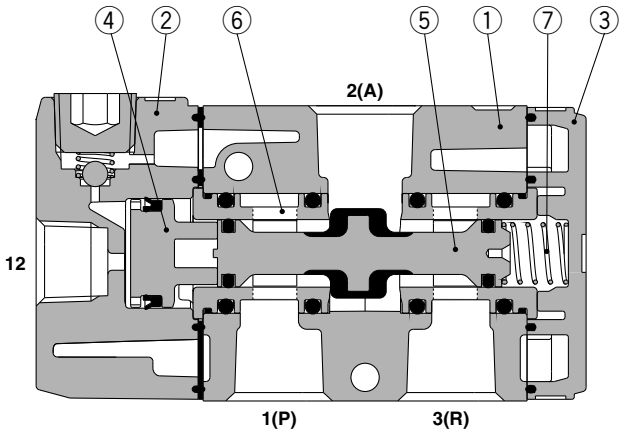
Standard

JIS symbol

	N.C.	N.O.
Standard		
For vacuum		



For vacuum



Component Parts

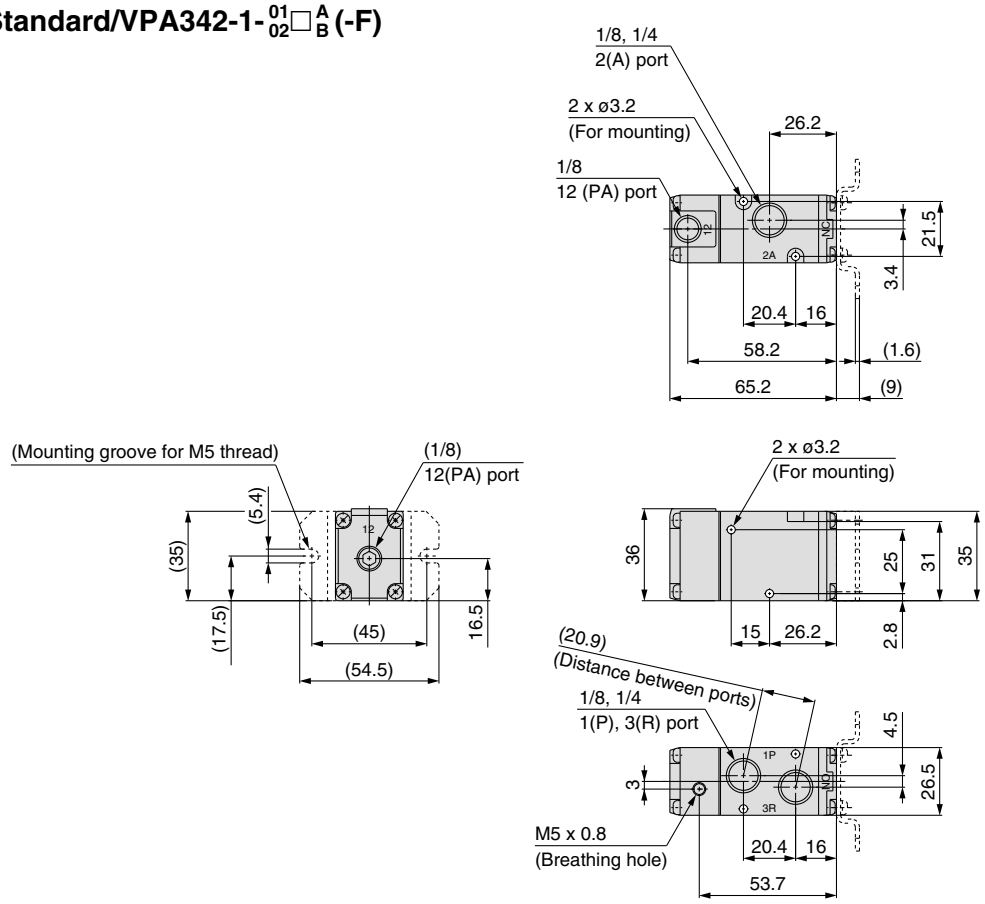
No.	Description	Material	Note
1	**Body**	Aluminum die-casted	White
2	**Adapter plate**	Aluminum die-casted	Gray
3	**End plate**	Resin	White
4	**Piston**	Resin	
5	**Spool valve**	Aluminum/HNBR	
6	**Retainer**	Resin	
7	**Spring**	Stainless steel	

Bracket Assembly Part No.

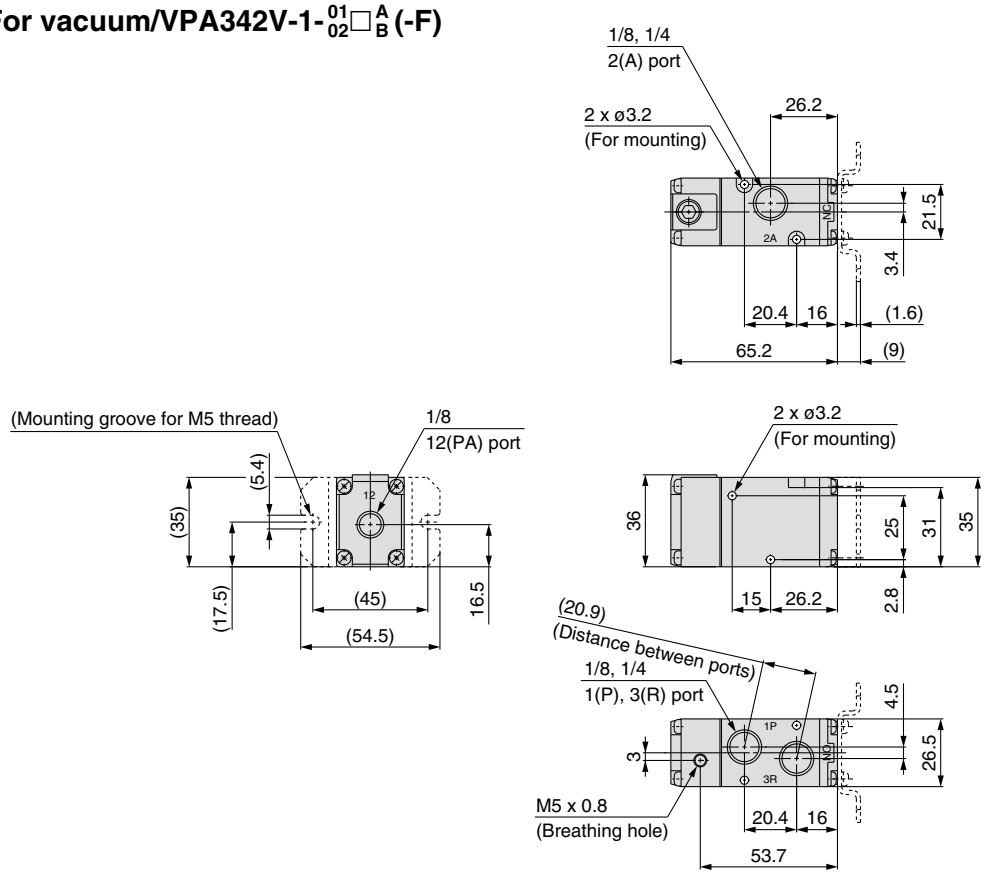
Description	Model	Part no.
Bracket (With 2 screws)	VPA342	VP300-227-1A
	VPA542	VP500-227-1A
	VPA742	VP700-227-1A

Series VPA300/Body Ported/Dimensions

Standard/VPA342-1-$\frac{01}{02}\square\frac{A}{B}$(-F)

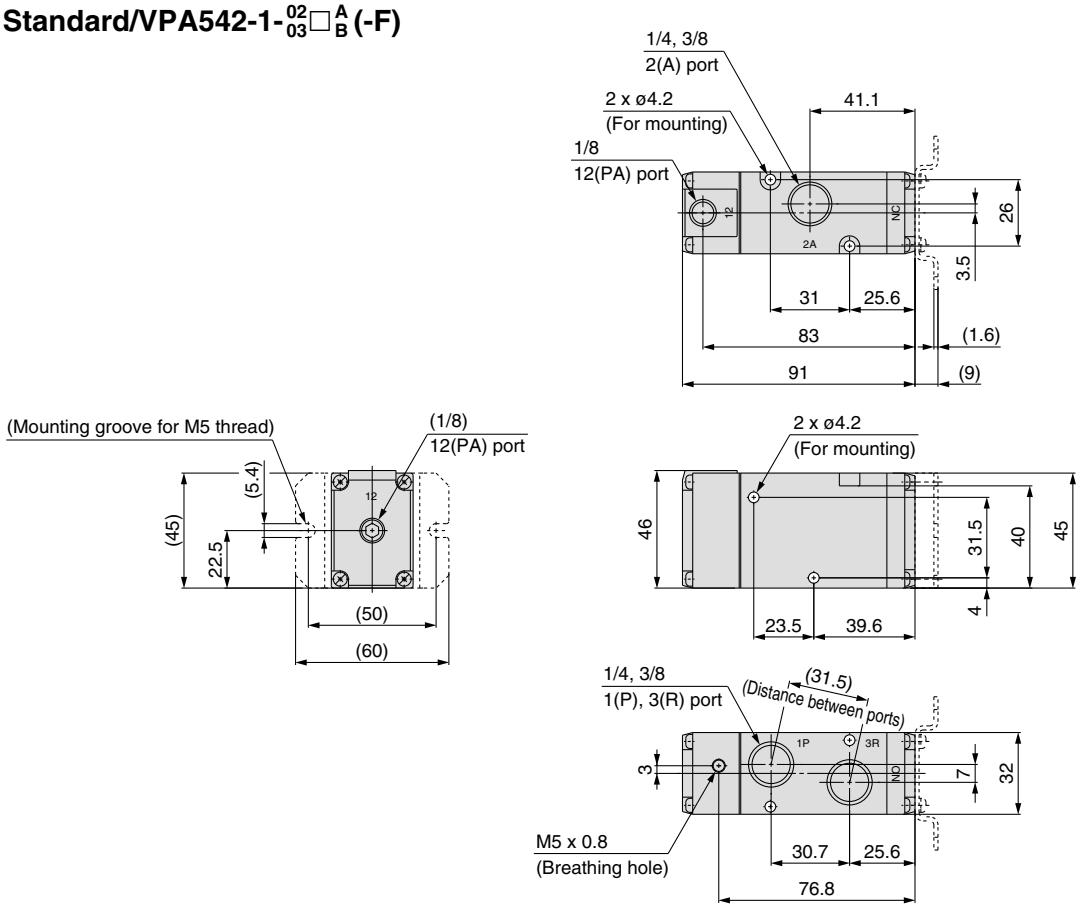


For vacuum/VPA342V-1-$\frac{01}{02}\square\frac{A}{B}$(-F)

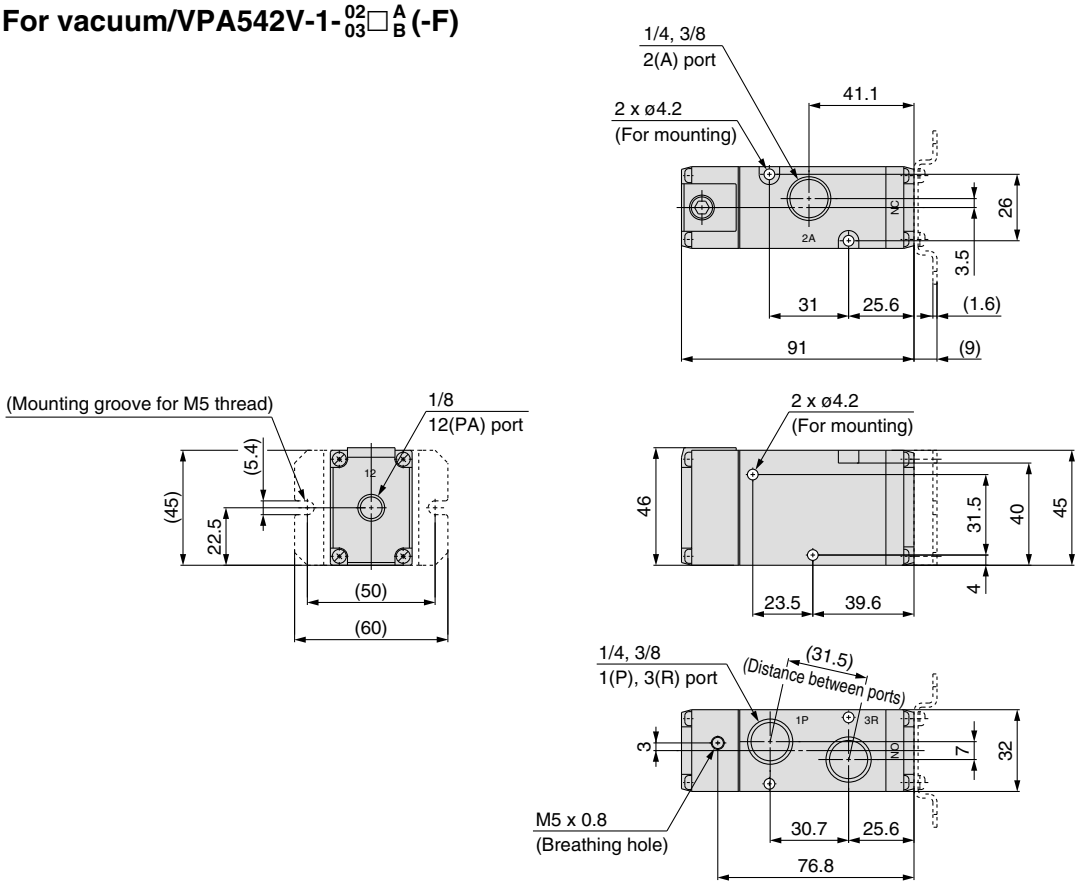


Series VPA500/Body Ported/Dimensions

Standard/VPA542-1-$^{02}_{03}$□$^{A}_{B}$(-F)

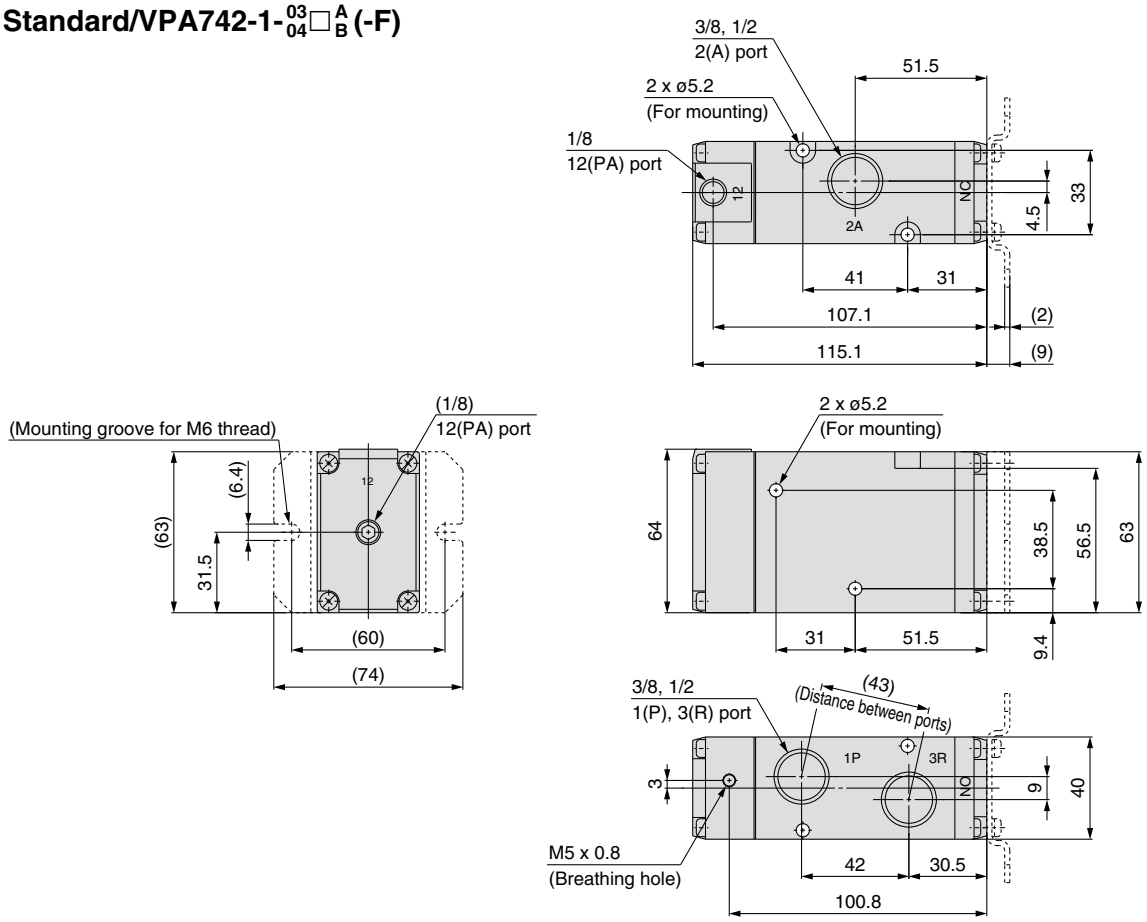


For vacuum/VPA542V-1-$^{02}_{03}$□$^{A}_{B}$(-F)

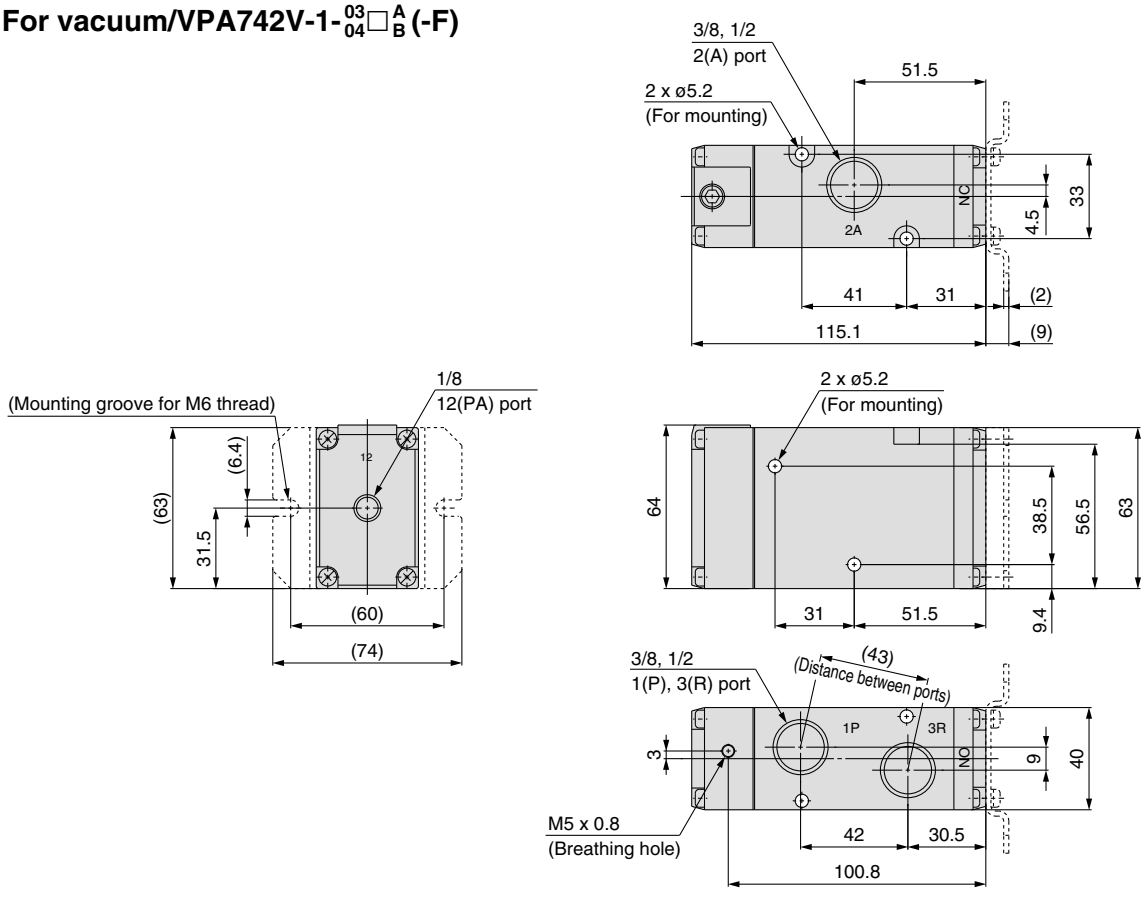


Series VPA700/Body Ported/Dimensions

Standard/VPA742-1-$^{03}_{04}$□$^{A}_{B}$(-F)



For vacuum/VPA742V-1-$^{03}_{04}$□$^{A}_{B}$(-F)



3 Port/Air Operated Valve
Base Mounted/Single Unit
Series VPA300/500/700

Series VPA300

Series VPA500

Series VPA700

How to Order

VPA 3 4 4 ☐ – 1 – 01 ☐ A

Series

3	VPA300
5	VPA500
7	VPA700

Body option

Nil	Standard
V	For vacuum

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Type of actuation

A	N.C. (Normally closed)
B	N.O. (Normally open)

Port size (Sub-plate)

Symbol	Port size	VPA300	VPA500	VPA700
Nil	Without sub-plate*			
01	1/8	○	—	—
02	1/4	○	○	—
03	3/8	—	○	○
04	1/2	—	—	○

* With a gasket and two mounting bolts

Specifications

Fluid	Air	
Type of actuation	N.C. or N.O. (Convertible)	
Operating pressure range (MPa)	Standard	0.2 to 1.0
	For vacuum	–100 kPa to 0.2
Pilot pressure (MPa)	0.2 to 1.0 (Equivalent to the operating pressure or more)	
Ambient and fluid temperature (°C)	–10 to 50 (No freezing)	
Lubrication	Not required	
Mounting orientation	Unrestricted	
Impact/Vibration resistance (m/s²) Note)	300/50	

Note) Impact resistance: No malfunction to axis and right angle directions of main valve, each one time when pilot signal ON and OFF. (Values at the initial period)
Vibration resistance: No malfunction from test with 45 to 2000 Hz one sweep, to axis and right angle direction of main valve, each one time when pilot signal ON and OFF. (Values at the initial period)

Flow Characteristics/Weight

Model	Port size	1 ↔ 2 (P ↔ A)			2 ↔ 3 (A ↔ R)			Weight (g) Note)
		C [dm³/(s·bar)]	b	Cv	C [dm³/(s·bar)]	b	Cv	
VPA344	1/8	3.6	0.22	0.8	3.5	0.24	0.8	185 (118)
	1/4	3.9	0.22	0.9	3.8	0.14	0.9	180 (118)
VPA544	1/4	7.5	0.16	1.7	7.3	0.20	1.7	358 (233)
	3/8	8.8	0.07	2.0	8.8	0.13	2.0	350 (233)
VPA744	3/8	12.9	0.10	2.9	13.3	0.24	3.1	693 (476)
	1/2	14.7	0.05	3.3	15.0	0.17	3.4	675 (476)

Note) ( ): Values without sub-plate

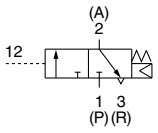
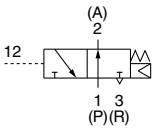
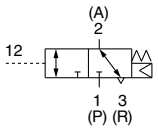
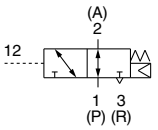
⚠ Caution

Refer to back cover for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for Common Precautions.

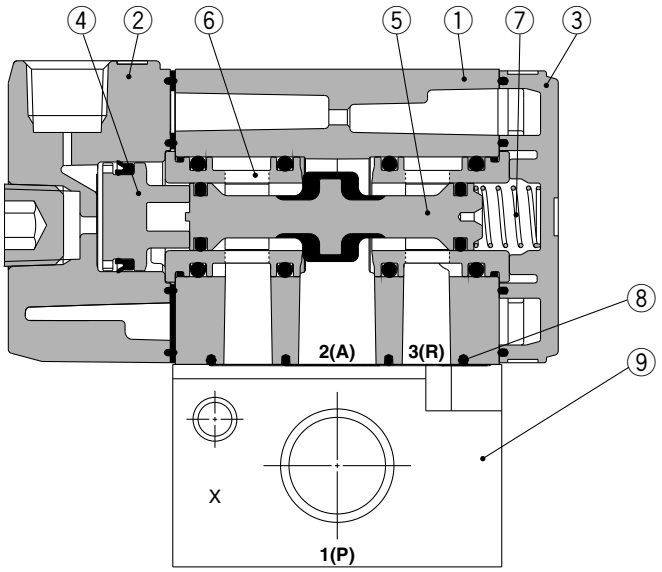
• Refer to back page 6 for changing the type of actuation.

Construction

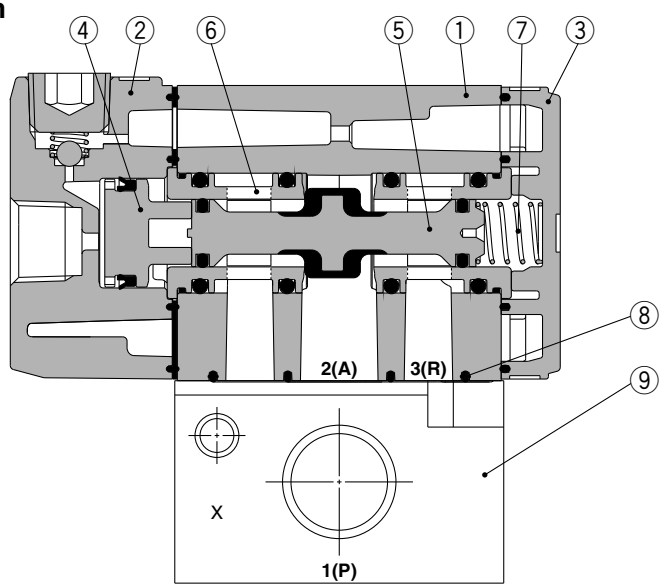
JIS symbol

	N.C.	N.O.
Standard		
For vacuum		

Standard



For vacuum



Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum die-casted	White
2	**Adapter plate**	Aluminum die-casted	Gray
3	**End plate**	Resin	White
4	**Piston**	Resin	
5	**Spool valve**	Aluminum/HNBR	
6	**Retainer**	Resin	
7	**Spring**	Stainless steel	

Replacement Parts

No.	Description	Part no.			Note
		VP344	VP544	VP744	
8	**Gasket**	VP300-217-1	VP500-217-1	VP700-217-1	HNBR
9	**Sub-plate**	VP300-202-□	VP500-202-□	VP700-202-□	Aluminum die-casted
—	**Hexagon socket head bolt (1 pc.)**	VP300-224-1 (M3 x 36)	VP500-224-1 (M4 x 46)	VP700-224-1 (M5 x 66)	For valve mounting

How to Order Sub-plate

VP 3 00 − 202 − 1 □

Series

3	VPA344
5	VPA544
7	VPA744

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Port size

Symbol	VPA344	VPA544	VPA744
1	1/8	1/4	3/8
2	1/4	3/8	1/2

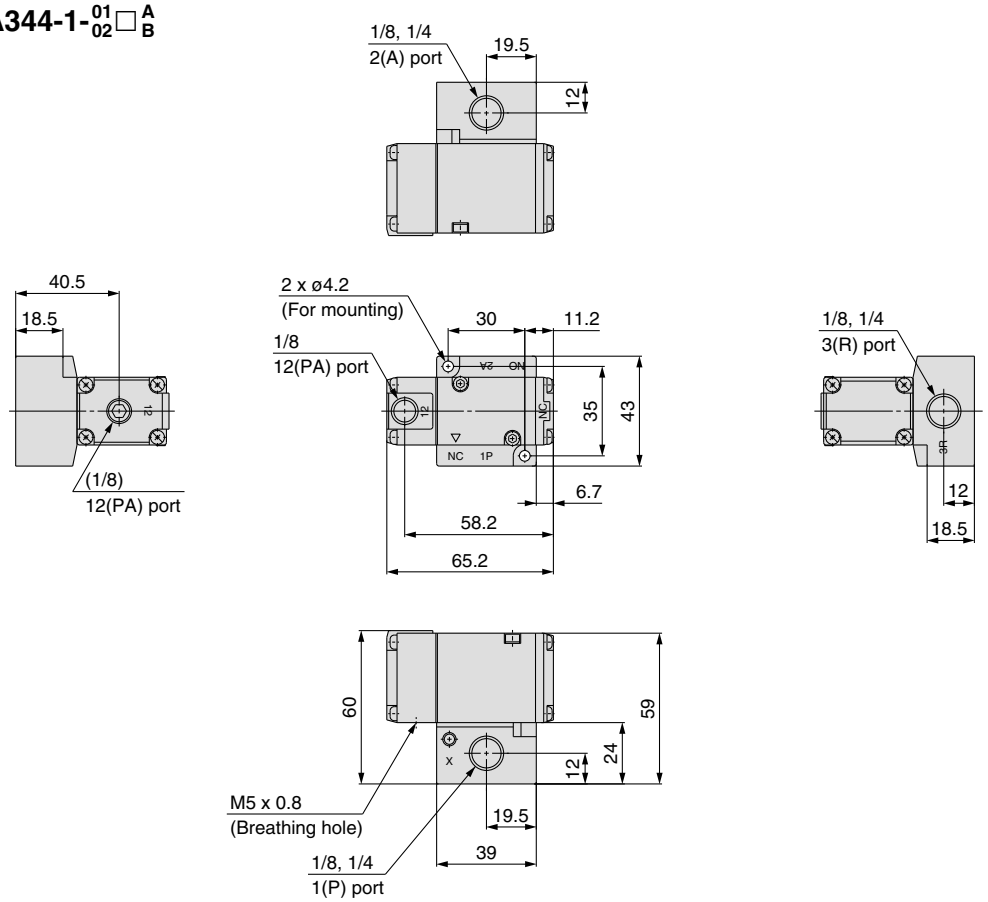
⚠ Caution

Tightening Torque of Mounting Screw

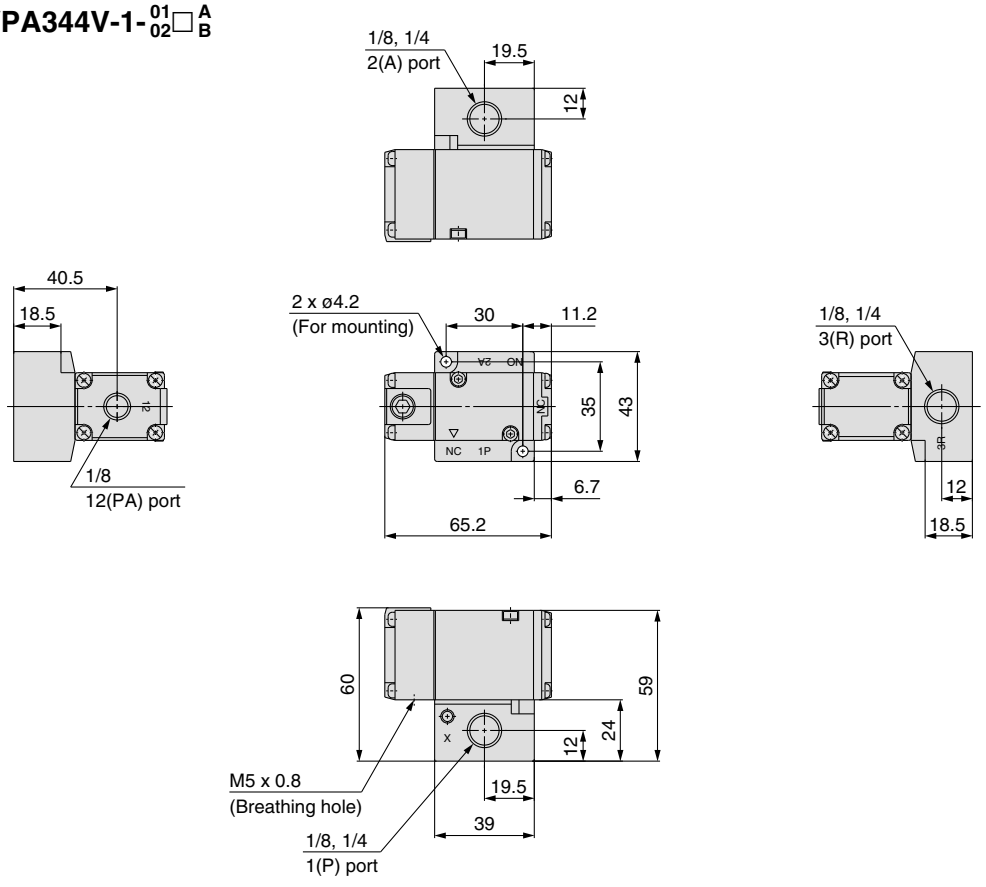
M3: 0.8 N·m
M4: 1.4 N·m
M5: 2.9 N·m

Series VPA300/Base Mounted/Dimensions

Standard/VPA344-1-$^{01}_{02}\square^{A}_{B}$

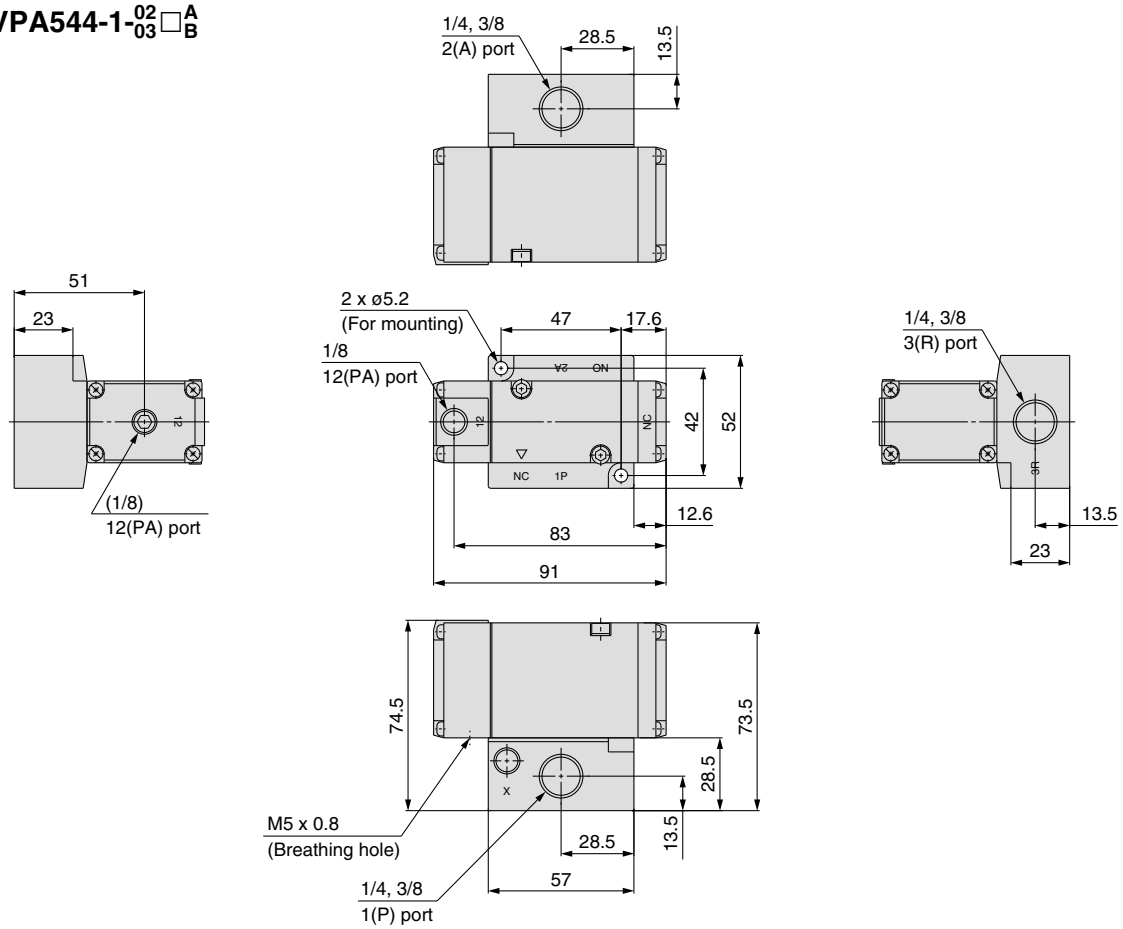


For vacuum/VPA344V-1-$^{01}_{02}\square^{A}_{B}$

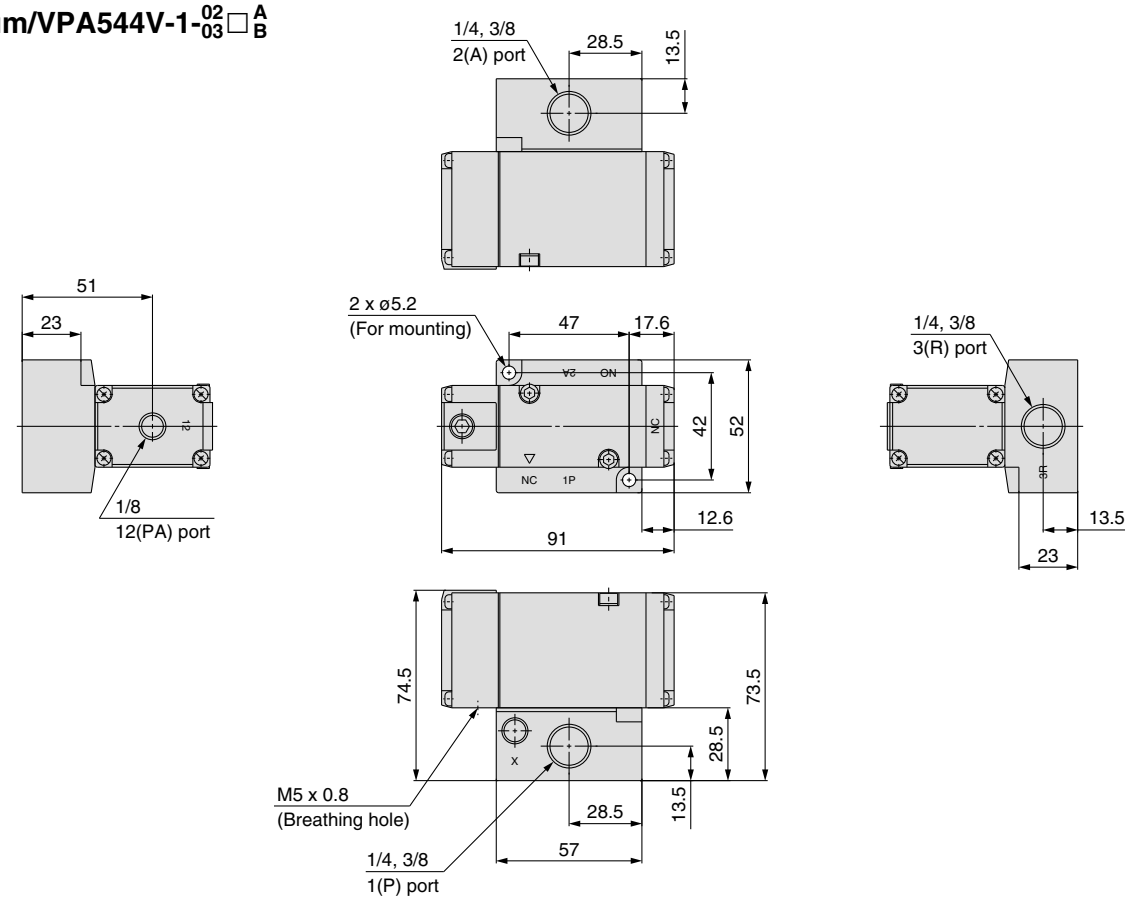


Series VPA500/Base Mounted/Dimensions

Standard/VPA544-1-$^{02}_{03}$□$^{A}_{B}$

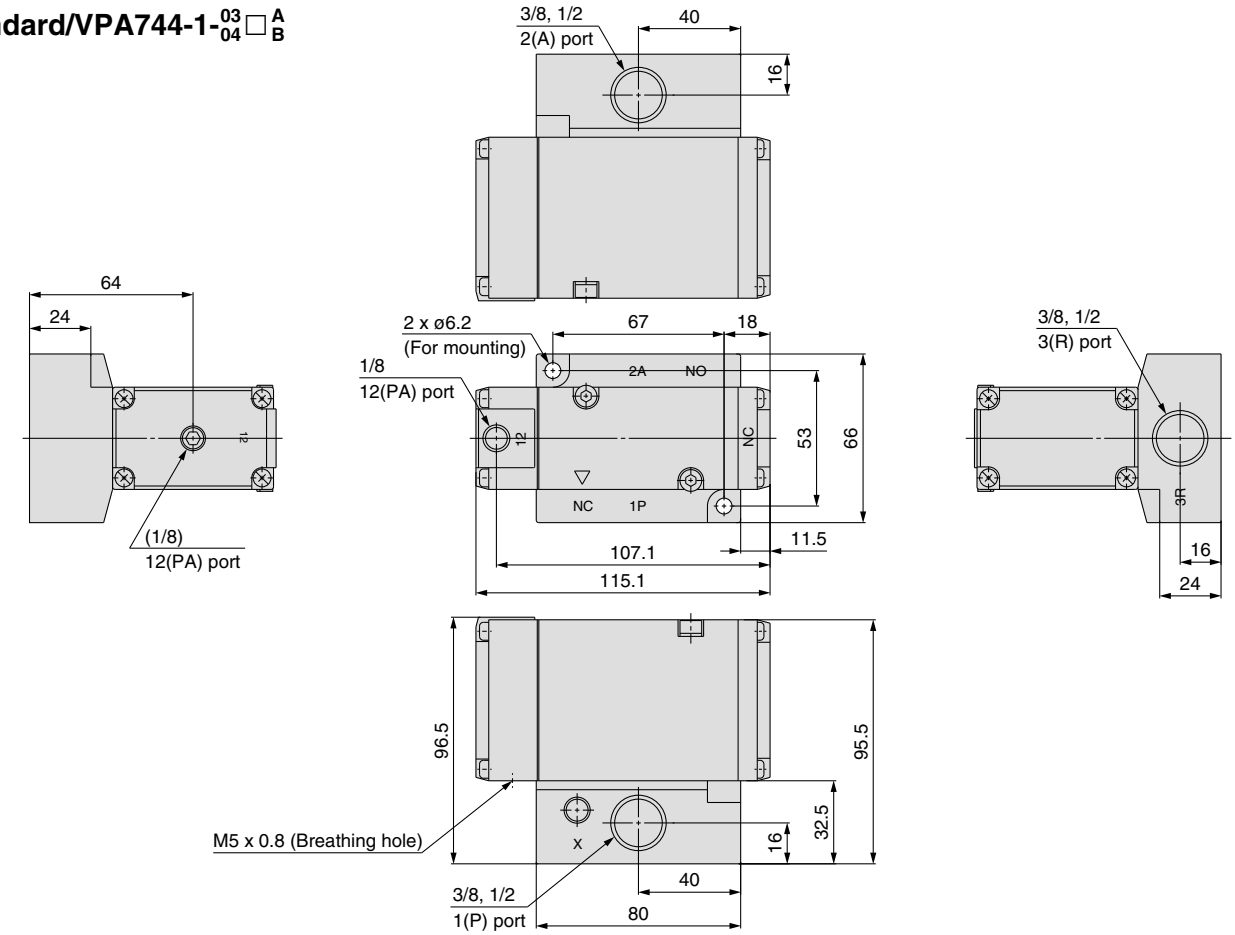


For vacuum/VPA544V-1-$^{02}_{03}$□$^{A}_{B}$

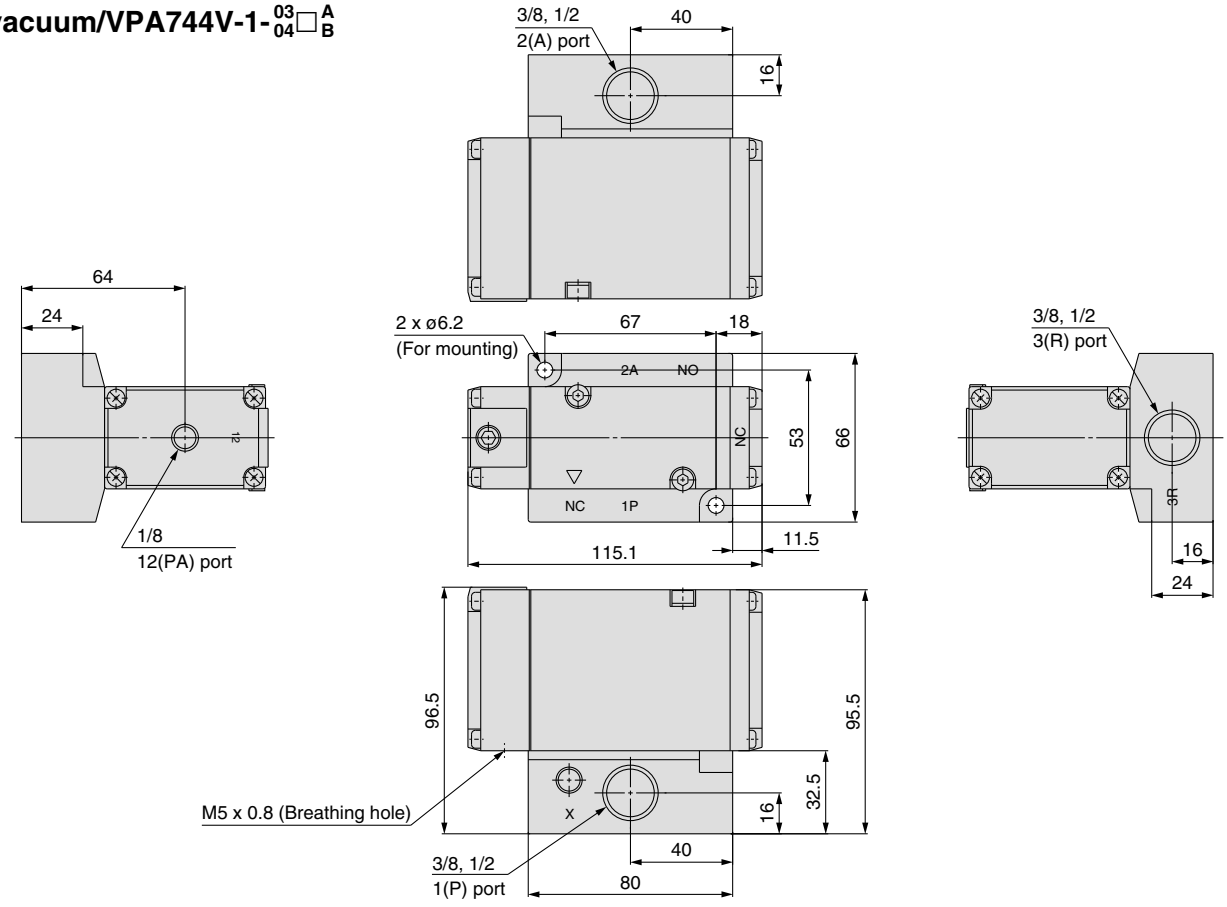


Series VPA700/Base Mounted/Dimensions

Standard/VPA744-1-$^{03}_{04}$□$^{A}_{B}$



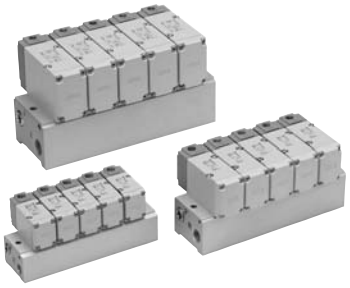
For vacuum/VPA744V-1-$^{03}_{04}$□$^{A}_{B}$



3 Port/Air Operated Valve Manifold
Common Exhaust Type 41 /
Individual Exhaust Type 42
Series VPA300/500/700

How to Order Manifold

Type 41/Common exhaust **VV3PA 3 – 41 – 04 1 – 02 □**



Series

3	VPA300
5	VPA500
7	VPA700

Stations

02	2 stations
⋮	⋮
20	20 stations

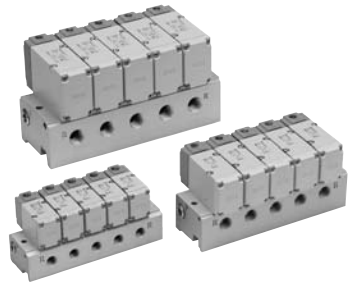
Port size

Symbol	Port size	Applicable series
02	1/4	VPA300
03	3/8	VPA500
04	1/2	VPA700

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Type 42/Individual exhaust **VV3PA 3 – 42 – 04 3 – 02 □**



Series

3	VPA300
5	VPA500
7	VPA700

Stations

02	2 stations
⋮	⋮
20	20 stations

Port size

Symbol	Port size	Applicable series
02	1/4	VPA300
03	3/8	VPA500
04	1/2	VPA700

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Manifold Option

Description	Part no.	Applicable manifold base model
Blanking plate assembly (With a gasket and two mounting bolts)	VP300-25-1A	VV3PA3
	VP500-25-1A	VV3PA5
	VP700-25-1A	VV3PA7

How to Order Valve (With a gasket and two mounting bolts)

VPA 3 4 4 □ – 1 – □ A

Series

3	VPA300
5	VPA500
7	VPA700

Body option

Nil	Standard
V	For vacuum

Thread type

Nil	RC
F	G
N	NPT
T	NPTF

Type of actuation

A	N.C. (Normally closed)
B	N.O. (Normally open)

Manifold Specifications

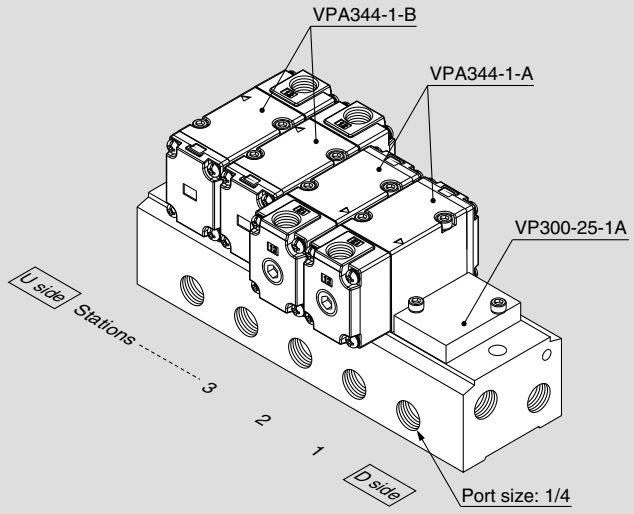
Series	Base model	Piping specifications			Applicable valve	Applicable stations Note)	Manifold base Weight: W [g] Stations: n
		1P (SUP) port type	3R (EXH) port type	Port size			
VPA300	VV3PA3-41	Common	Common	1/4	VPA344	2 to 20 stations	W = 110n + 90
	VV3PA3-42		Individual				
VPA500	VV3PA5-41		Common	3/8	VPA544	2 to 20 stations	W = 190n + 150
	VV3PA5-42		Individual				
VPA700	VV3PA7-41		Common	1/2	VPA744	2 to 20 stations	W = 410n + 380
	VV3PA7-42		Individual				

Note) Supply pressure to 1(P) ports and exhaust air from 3(R) ports on both sides for 10 stations or more.

• Refer to back page 6 for changing the type of actuation.

How to Order Manifold Assembly (Example)

Ordering example (VV3PA3-41)



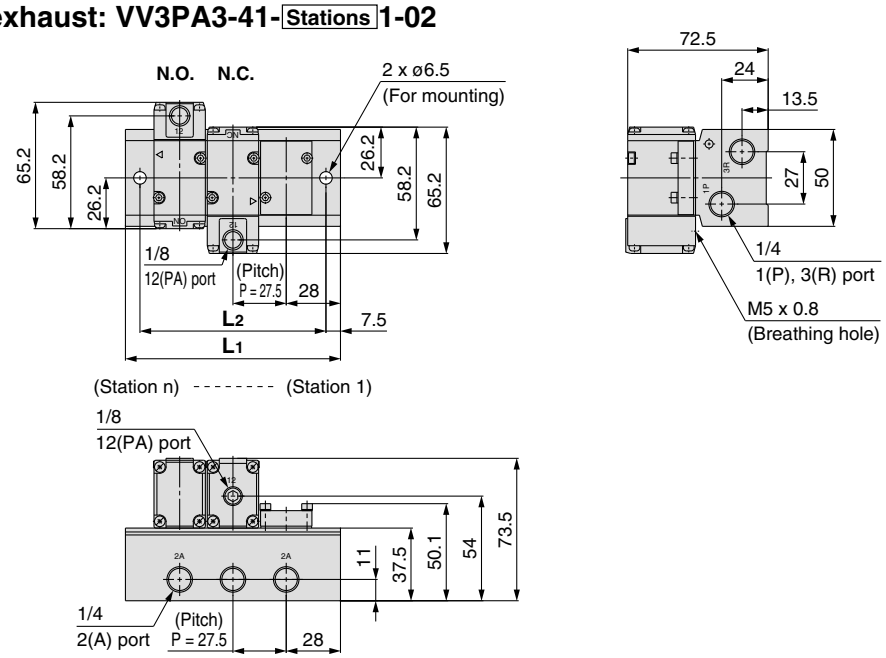
VV3PA3-41-051-02 ····· 1 set (Type 41, 5-station manifold base part no.)
*** VP300-25-1A ····· 1 set (Blanking plate assembly part no.)**
*** VPA344-1-A ····· 2 sets (N.C. type part no.)**
*** VPA344-1-B ····· 2 sets (N.O. type part no.)**

The asterisk denotes the symbol for assembly.
Prefix it to the part nos. of the valve, etc.

• Indicate the valves to be attached below the manifold part number, in order starting from station 1 as shown in the drawing.

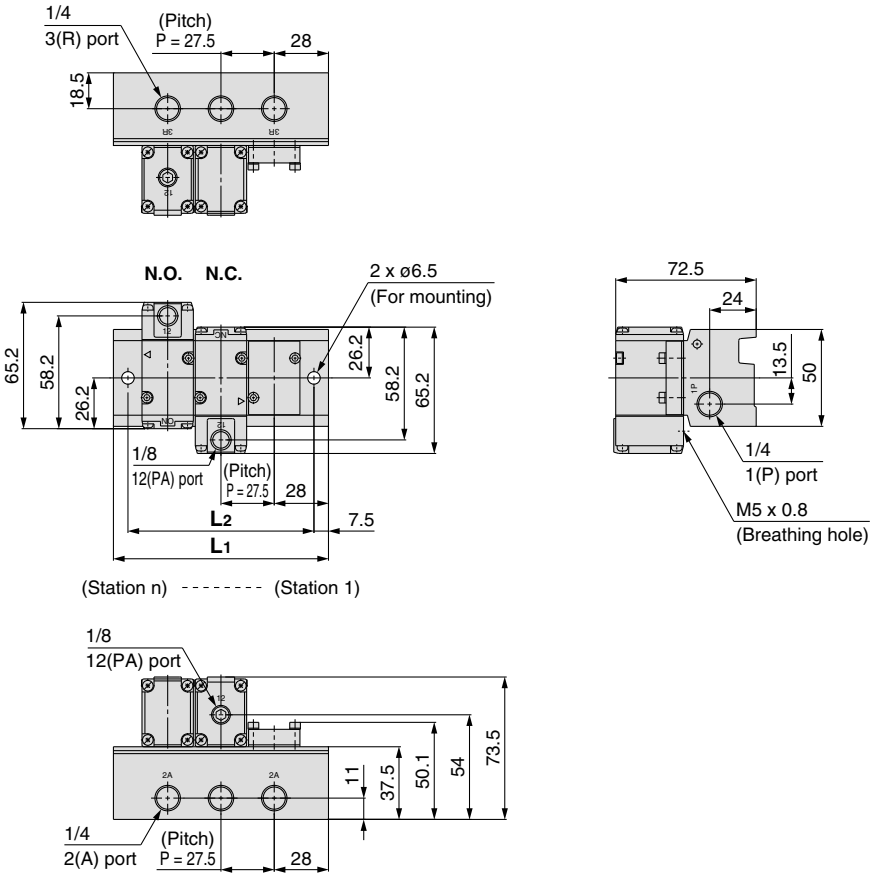
Series VPA300/Dimensions

Type 41/Common exhaust: VV3PA3-41-Stations 1-02



Station n	2 stations	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 stations
L1	83.5	111	138.5	166	193.5	221	248.5	276	303.5	331	358.5	386	413.5	441	468.5	496	523.5	551	578.5
L2	68.5	96	123.5	151	178.5	206	233.5	261	288.5	316	343.5	371	398.5	426	453.5	481	508.5	536	563.5

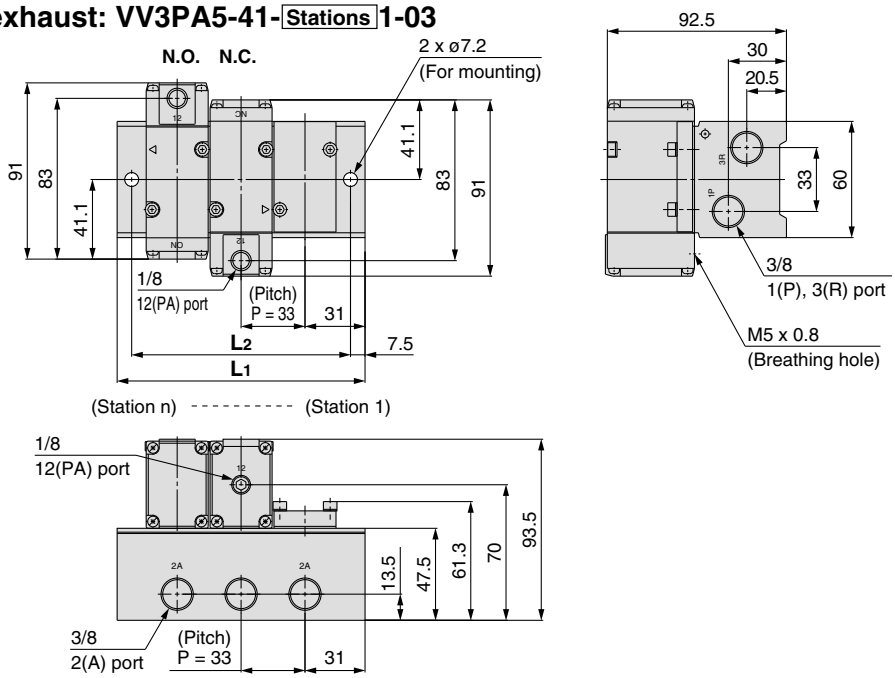
Type 42/Individual exhaust: VV3PA3-42-Stations 3-02



Station n	2 stations	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 stations
L1	83.5	111	138.5	166	193.5	221	248.5	276	303.5	331	358.5	386	413.5	441	468.5	496	523.5	551	578.5
L2	68.5	96	123.5	151	178.5	206	233.5	261	288.5	316	343.5	371	398.5	426	453.5	481	508.5	536	563.5

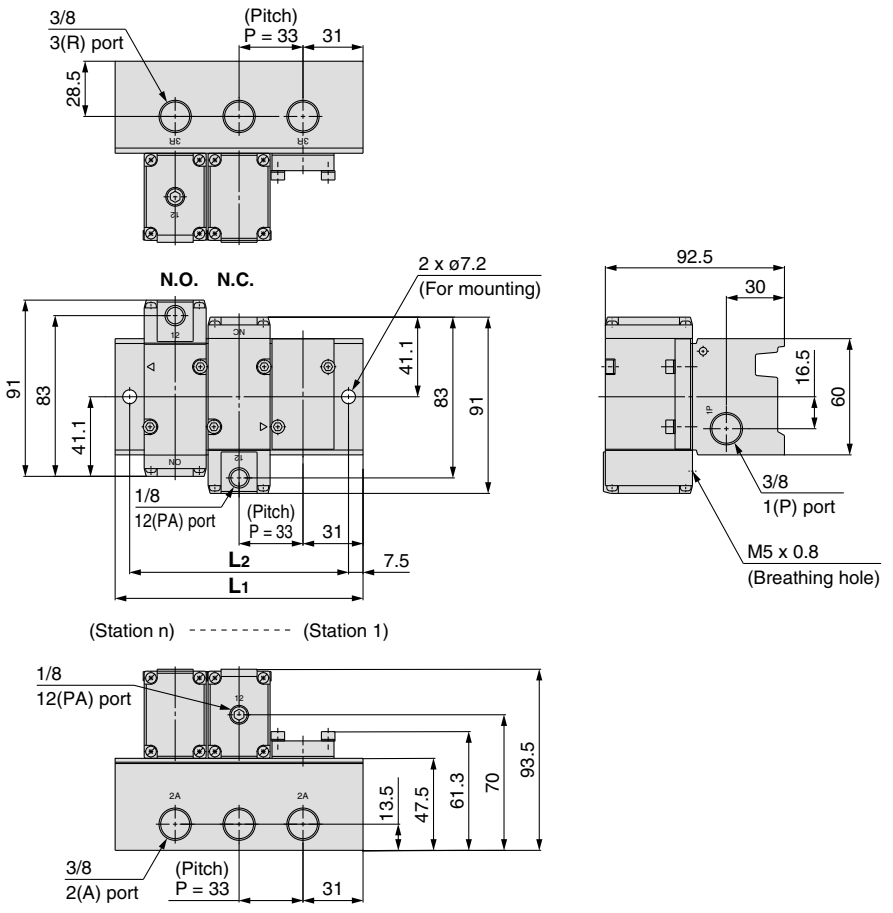
Series VPA500/Dimensions

Type 41/Common exhaust: VV3PA5-41-Stations 1-03



Station n	2 stations	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 stations
L1	95	128	161	194	227	260	293	326	359	392	425	458	491	524	557	590	623	656	689
L2	80	113	146	179	212	245	278	311	344	377	410	443	476	509	542	575	608	641	674

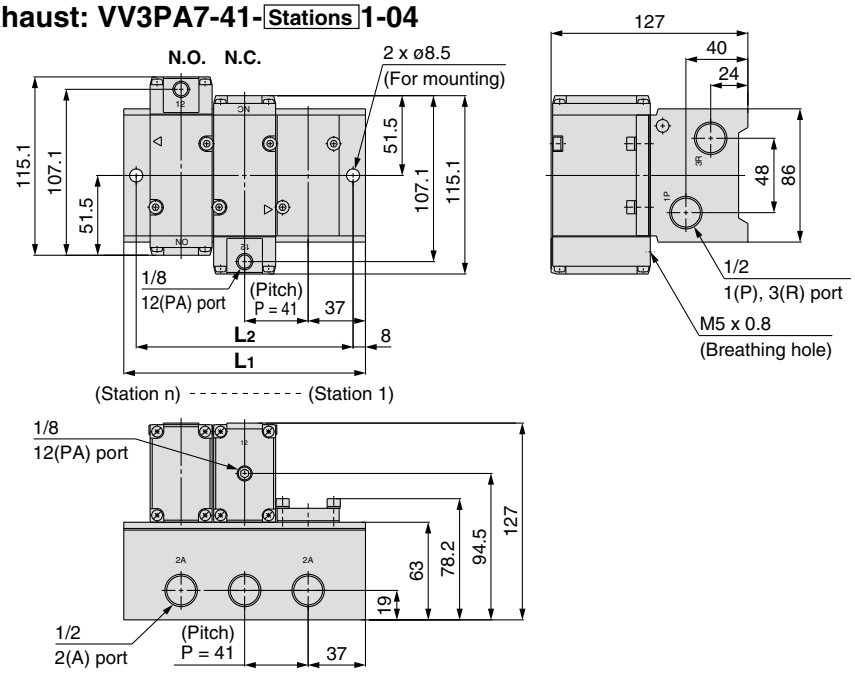
Type 42/Individual exhaust: VV3PA5-42-Stations 3-03



Station n	2 stations	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 stations
L1	95	128	161	194	227	260	293	326	359	392	425	458	491	524	557	590	623	656	689
L2	80	113	146	179	212	245	278	311	344	377	410	443	476	509	542	575	608	641	674

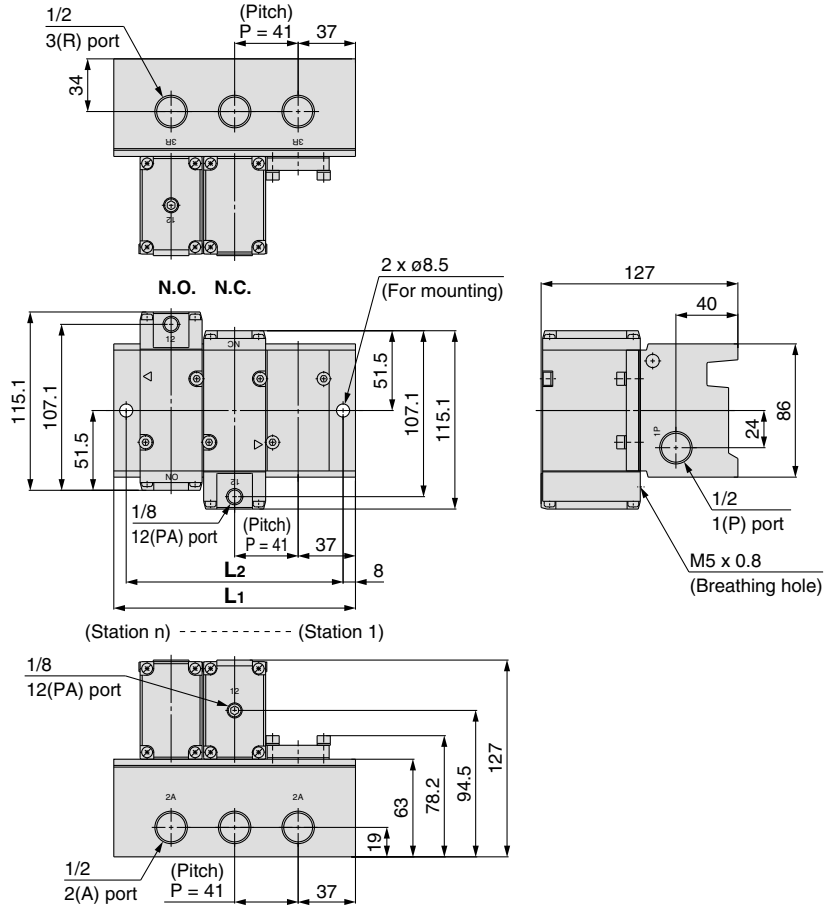
Series VPA700/Dimensions

Type 41/Common exhaust: VV3PA7-41-Stations 1-04



Station n	2 stations	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 stations
L1	115	156	197	238	279	320	361	402	443	484	525	566	607	648	689	730	771	812	853
L2	99	140	181	222	263	304	345	386	427	468	509	550	591	632	673	714	755	796	837

Type 42/Individual exhaust: VV3PA7-42-Stations 3-04



Station n	2 stations	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 stations
L1	115	156	197	238	279	320	361	402	443	484	525	566	607	648	689	730	771	812	853
L2	99	140	181	222	263	304	345	386	427	468	509	550	591	632	673	714	755	796	837

Made to Order

Please contact SMC for detailed dimensions, specifications, and lead times.

1 Body Ported Interchangeable Specification with the Previous Valve Mounting Hole Pitch Type

The mounting hole has been changed to the long type in order to provide interchangeability with the previous VPA300/500 series.

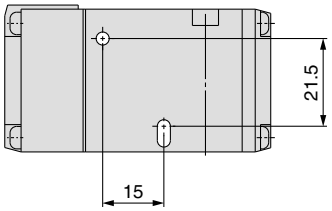
How to Order Valve

VPA$\frac{3}{5}$42□–1–□□□–X505

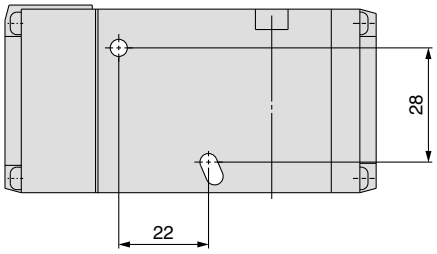
- **Entry is the same as standard products.**
  The specifications, performance and external dimensions are the same as those of standard models.

Note) VPA742 is not available because the mounting hole pitch is the same as the previous type.

VPA342



VPA542



Series VP
Specific Product Precautions 1

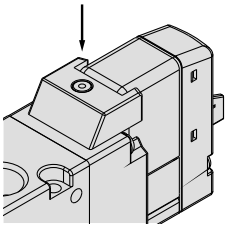
Be sure to read before handling.
Refer to back cover for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for 3/4/5 Port Solenoid Valves Precautions.

Manual Override

⚠Warning

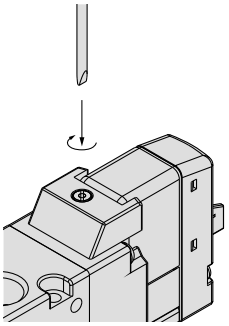
Without an electric signal for the solenoid valve the manual override is used for switching the main valve. Connected actuator is started by manual operation. Use the manual override after confirming that there is no danger.

■ Non-locking push type

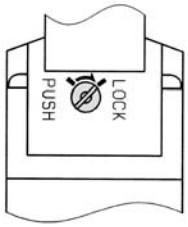


Push down on the manual override button with a small screwdriver until it stops. Release the screwdriver and the manual override will return.

■ Push-turn locking slotted type



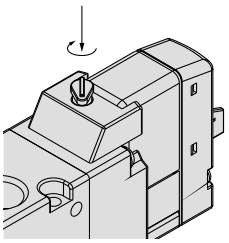
Locked condition

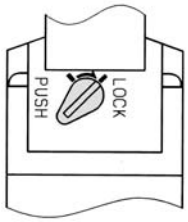


Push the manual override button with a small flat head screwdriver until it stops. Turn it in the clockwise direction at 90° to lock the manual. Turn it counterclockwise to release it.

■ Push-turn locking lever type

Locked condition





After pushing down, turn in the direction of the arrow. If it is not turned, it can be operated the same way as the non-locking type.

⚠Caution

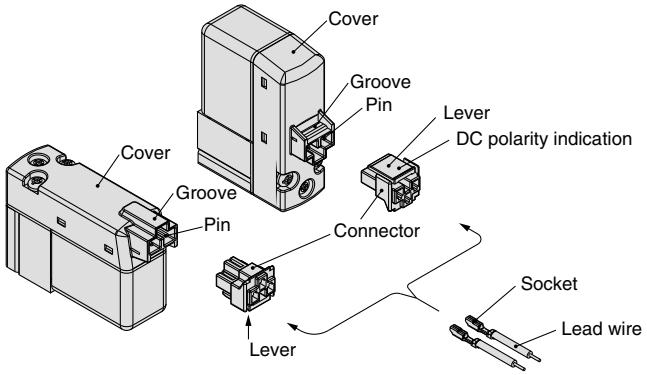
When locking the manual override with the push-turn locking type (D or E type), be sure to push it down before turning.
Turning without first pushing it down can cause damage to the manual override and other trouble such as air leakage, etc.
Do not apply excessive torque when turning the locking type manual override. (0.1 N·m)

How to Use L/M-Type Plug Connector

⚠Caution

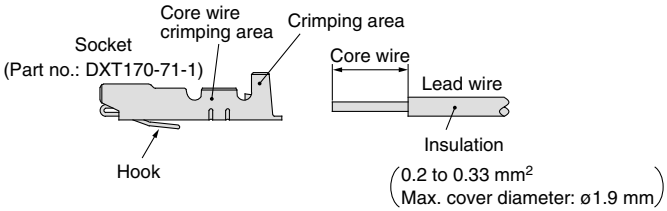
1. Attaching and detaching connectors

- To attach a connector, hold the lever and connector unit between your fingers and insert straight onto the pins of the solenoid valve so that the lever's pawl is pushed into the groove and locks.
- To detach a connector, remove the pawl from the groove by pushing the lever downward with your thumb, and pull the connector straight out.



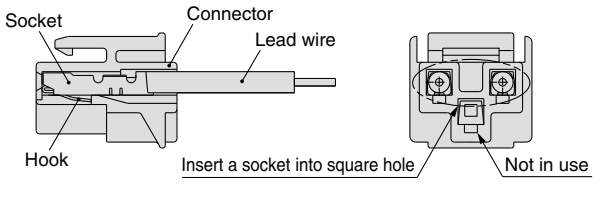
2. Crimping lead wires and sockets

Not necessary if ordering the lead wire pre-connected model. Strip 3.2 to 3.7 mm at the end of the lead wires, insert the ends of the core wires evenly into the sockets, and then crimp with a crimping tool. When this is done, take care that the coverings of the lead wires do not enter the core wire crimping area. (Please contact SMC for details on the crimping tool.)



3. Attaching and detaching sockets with lead wire

- **Attaching**
  Insert the sockets into the square holes of the connector (⊕, ⊖ indication), and continue to push the sockets all the way in until they lock by hooking into the seats in the connector. (When they are pushed in, their hooks open and they are locked automatically.) Then, confirm that they are locked by pulling lightly on the lead wires.
- **Detaching**
  To detach a socket from a connector, pull out the lead wire while pressing the socket's hook with a stick having a thin tip (approx. 1 mm). If the socket will be used again, first spread the hook outward.



Back page 1

Series VP
Specific Product Precautions 2

Be sure to read before handling.
Refer to back cover for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for 3/4/5 Port Solenoid Valves Precautions.

Plug Connector Lead Wire Length

⚠Caution

Plug connector lead wires have a standard length of 300 mm, however, the following lengths are also available.

How to Order Connector Assembly

DC : V200-30-4A- □

100 VAC : V200-30-1A- □

200 VAC : V200-30-2A- □

AC other voltages: V200-30-3A- □

Without lead wire : V200-30-A
(With connector and 2 pcs. of socket)

● Lead wire length

Nil	300 mm
6	600 mm
10	1000 mm
15	1500 mm
20	2000 mm
25	2500 mm
30	3000 mm
50	5000 mm

How to Order

Include the connector assembly part number together with the part number for the plug connector's solenoid valve without connector.

(Example) 2000 mm lead wire length

DC	AC
VP342-5LO1-01A	VP342-1LO1-01A
V200-30-4A-20	V200-30-1A-20

How to Use DIN Terminal

The DIN terminal type with an IP65 enclosure is protected against dust and water, however, it must not be used in water.

⚠Caution

Connection

1) Loosen the set screw and pull the connector out of the solenoid valve terminal block.
2) After removing the set screw, insert a flat head screwdriver, etc. into the notch on the bottom of the terminal block and pry it open, separating the terminal block and the housing.
3) Loosen the terminal screws on the terminal block, insert the core of the lead wire into the terminal, and attach securely with the terminal screws.
   In addition, when using the DC mode type with a surge voltage suppressor (polar: S and Z types), connect wires corresponding to the polarity (+ or –) that is printed on the terminal block.
4) Tighten the ground nut to secure the wire.
   In the case of connecting wires, select cabtire cords carefully because if those out of the specified range (ø4.5 to ø7) are used, it will not be able to satisfy IP65 (enclosure).
   Tighten the ground nut and set screw within the specified range of torque.

Changing the entry direction

After separating terminal block and housing, the cord entry direction can be changed by attaching the housing in the opposite direction.

∗ Make sure not to damage elements, etc., with the lead wires of the cord.

Precautions

Plug in and pull out the connector vertically without tilting to one side.

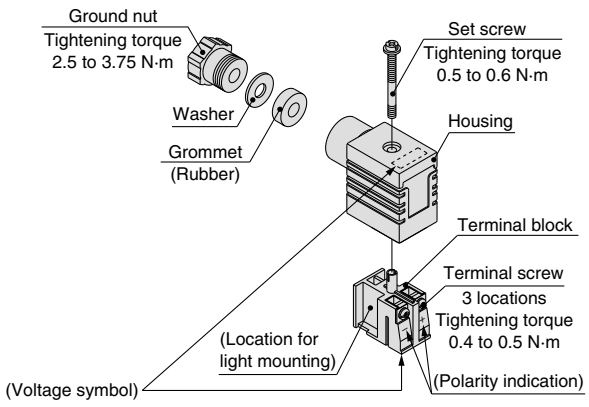
Applicable cable

Cable O.D.: ø4.5 to ø7

(Reference) 0.5 mm² to 1.5 mm², 2-core or 3-core, equivalent to JIS C 3306

Applicable crimped terminal

O terminal: R1.25-4M that is specified in JIS C 2805
Y terminal: 1.25-3L, which is released by JST Mfg. Co., Ltd.
Stick terminal: Size 1.5 or shorter

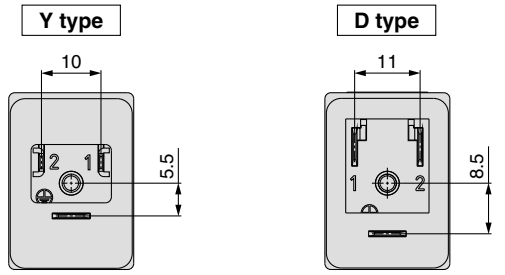


Series VP
Specific Product Precautions 3

Be sure to read before handling.
Refer to back cover for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for 3/4/5 Port Solenoid Valves Precautions.

DIN (EN175301-803) Terminal

Y type DIN terminal corresponds to the DIN connector with terminal pitch 10 mm, which complies with EN175301-803B. Since the terminal pitch is different from the D type DIN connector, these two types are not interchangeable.



How to Order DIN Connector

⚠Caution

● **Without indicator light**
DC, AC, Other voltages: V200- □ **-1**

● **With indicator light**
DC
Polar type (□Z) : V200- □ **-3-** □
Non-polar type (□U) : V200- □ **-5-** □

Rated voltage

05	24 VDC
06	12 VDC

AC (□Z) : V200- □ **-7-** □

Connector specification

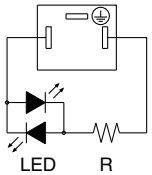
61	D type
63	Y type

Rated voltage

01	100/110 VAC [115 VAC]
02	200/220 VAC [230 VAC]
07	240 VAC
B	24 VAC

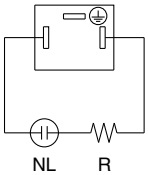
Circuit with indicator light (Built-in connector)

DC (□U) circuit



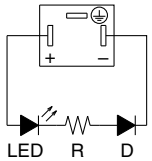
LED: Light emitting diode, R: Resistor

AC (□Z) circuit



NL: Neon bulb R: Resistor

DC (□Z) circuit



LED: Light emitting diode
D: Protective diode
R: Resistor

Note) The 24 VAC specifications are the same as those in the DC (□U) circuit diagram.

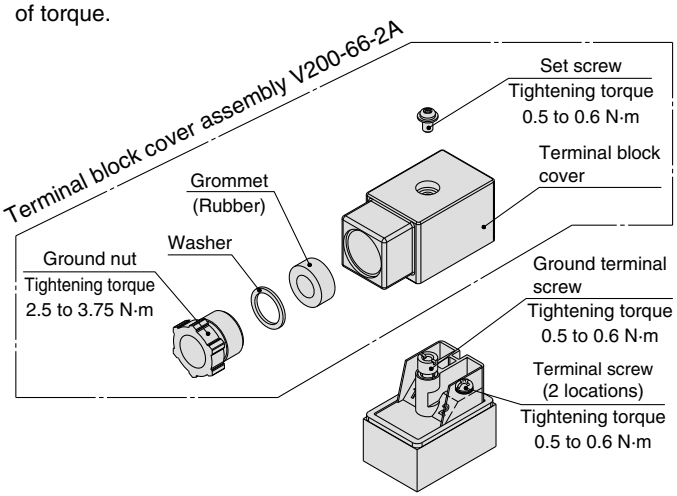
How to Use Conduit Terminal

⚠Caution

Connection

1) Loosen the set screw and remove the terminal block cover from the terminal block.
2) Loosen the terminal screws on the terminal block, insert the core of the lead wire or crimped terminal into the terminal, and attach securely with the terminal screws.
   In addition, when using the DC mode type with a surge voltage suppressor (polar: S and Z types), connect wires to terminal 1 and 2 corresponding to the polarity (+ or –) as shown on the right figure.
3) Secure the cord by fastening the ground nut.

In the case of connecting wires, select cabtire cords carefully because if those out of the specified range (ø4.5 to ø7) are used, it will not be able to satisfy IP65 (enclosure).
Tighten the ground nut and set screw within the specified range of torque.



Applicable cable

Cable O.D.: ø4.5 to ø7
(Reference) 0.5 mm² to 1.5 mm², 2-core or 3-core, equivalent to JIS C 3306

Applicable crimped terminal

O terminal: Equivalent to R1.25-3 that is specified in JIS C 2805
Y terminal: Equivalent to 1.25-3, which is released by JST Mfg. Co., Ltd.
∗ Use O terminal when a ground terminal is used.

Back page 3

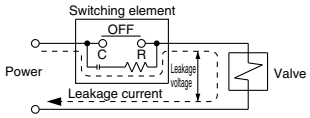
Series VP
Specific Product Precautions 4

Be sure to read before handling.
Refer to back cover for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for 3/4/5 Port Solenoid Valves Precautions.

Leakage Voltage

⚠Caution

Especially when a resistor and a switching element are used in parallel or C-R device (surge voltage suppressor) is used for the protection of the switching device, note that leakage voltage will be increased by passing leakage voltage through the resistor and C-R device. Therefore, suppressor residual leakage voltage should be as follows.



DC coil

3% or less of the rated voltage

AC coil

8% or less of the rated voltage

Continuous Duty

⚠Caution

- If a valve is energized continuously for long periods of time, the rise in temperature due to heat-up of the coil assembly may cause a decline in solenoid valve performance, reduce service life, or have adverse effects on peripheral equipment. If the valve is energized continuously for a long time, or the total energizing time per day becomes longer than the non-energizing time, use a valve with power saving circuit.
  Also, it is possible to reduce the energizing time by using a N.O. (normally open) valve.
- When the valve is mounted onto a control panel, take measures against radiation in order to keep the valve temperature within the specified range.

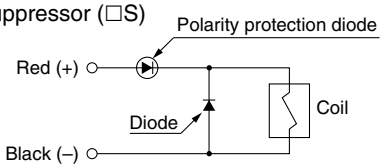
Light/Surge Voltage Suppressor

⚠Caution

<DC>

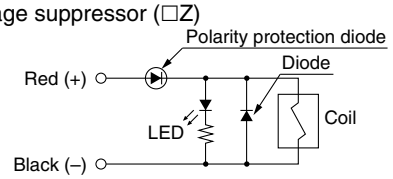
■ **Polar type**

With surge voltage suppressor (□S)



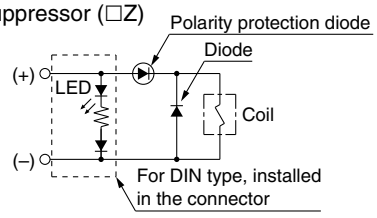
● Grommet or L/M-type plug connector

With light/surge voltage suppressor (□Z)



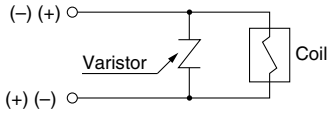
● DIN or Conduit terminal

With light/surge voltage suppressor (□Z)



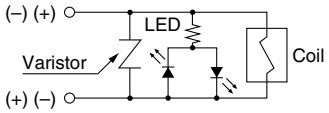
■ **Non-polar type**

With surge voltage suppressor (□R)



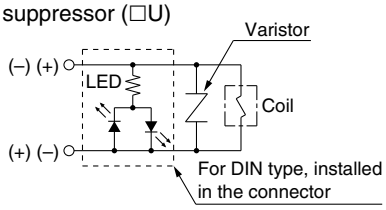
● Grommet or L/M-type plug connector

With light/surge voltage suppressor (□U)



● DIN or Conduit terminal

With light/surge voltage suppressor (□U)



- Please connect correctly the lead wires to + (positive) and – (negative) indications on the connector. (For non-polar type, the lead wires can be connected to either one.)
- When the valve with mis-wiring protection diode is used, the voltage will drop by approx. 1 V. Therefore, pay attention to the allowable voltage fluctuation (For details, refer to the solenoid specification of each type of valve).
- Solenoids, whose lead wires have been pre-wired: + (positive) side red and – (negative) side black.

Series VP
Specific Product Precautions 5

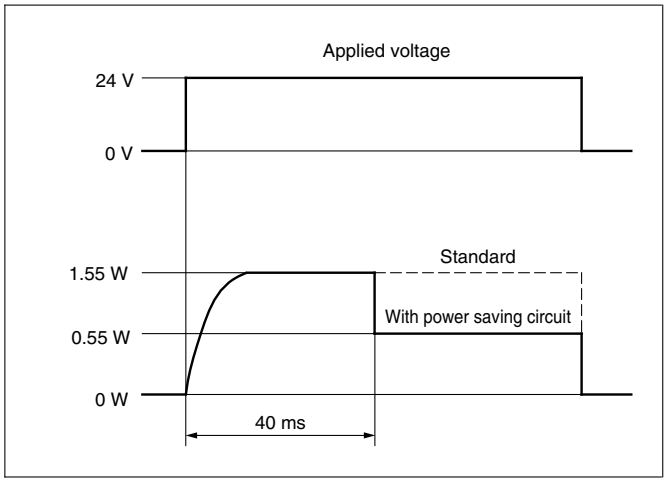
Be sure to read before handling.
Refer to back cover for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for 3/4/5 Port Solenoid Valves Precautions.

Light/Surge Voltage Suppressor

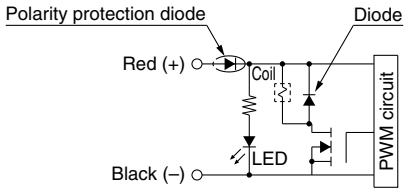
■ **With power saving circuit**

Power consumption is decreased by approx. 1/3 by reducing the wattage required to hold the valve in an energized state. (Effective energizing time is over 40 ms at 24 VDC.)
Refer to the electrical power waveform as shown below.

<Electrical power waveform of energy saving type>



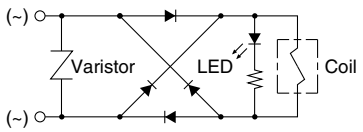
• Since the voltage will drop by approx. 0.5 V due to the transistor, pay attention to the allowable voltage fluctuation. (For details, refer to the solenoid specifications of each type of valve.)



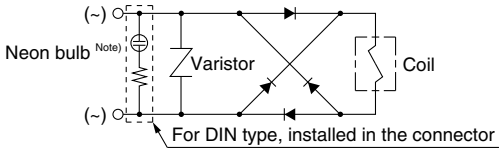
<AC>

There is no S option, since a rectifier prevents surge voltage generation.

● Grommet or L/M-type plug connector
With light/surge voltage suppressor (□Z)



● DIN or Conduit terminal
With light/surge voltage suppressor (□Z)



Note) LED for 24 VAC.

⚠Caution

Residual voltage of the surge voltage suppressor

Note) if a varistor or diode surge voltage suppressor is used, there is some residual voltage to the protection element and rated voltage. Therefore, refer to the table below and pay attention to the surge voltage protection on the controller side. Also, since the response time does change, refer to the specifications on page 2 and 9.

Residual Voltage

Surge voltage suppressor	DC		AC
	24	12	
S, Z	Approx. 1 V		Approx. 1 V
R, U	Approx. 47 V	Approx. 32 V	—

Countermeasure for Surge Voltage Intrusion

⚠Caution

With non-polar type solenoid valves, at times of sudden interruption of the loading power supply, such as emergency shutdown, surge voltage intrusion may be generated from loading equipment with a large capacity (power consumption), and the solenoid valve in a de-energized state may switch over (see Figure 1).
When installing a breaker circuit for the loading power supply, consider using a solenoid valve with polarity (with polarity protection diode), or install a surge absorption diode between the loading equipment COM line and the output equipment COM line (see Figure 2).

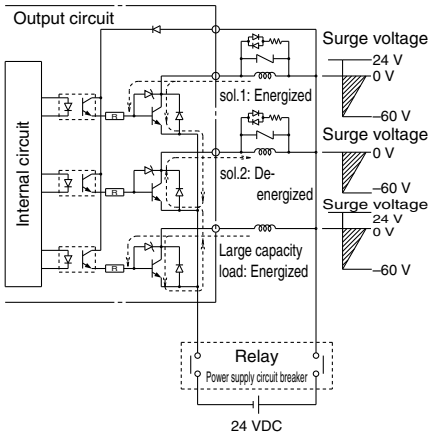


Figure 1. Surge intrusion circuit example (NPN outlet example) (24 VDC)

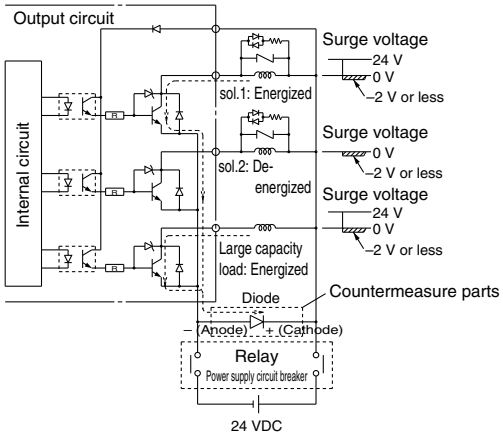


Figure 2. Surge intrusion circuit example (NPN outlet example) (24 VDC)

Back page 5

Specific Product Precautions 6

Be sure to read before handling.
Refer to back cover for Safety Instructions, "Handling Precautions for SMC Products" (M-E03-3) for 3/4/5 Port Solenoid Valves Precautions.

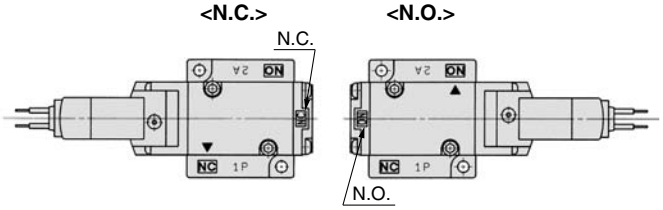
Type of Actuation Changing

⚠Warning

When changing the actuation or restarting the valve after the change, make sure that safety is fully assured and pay great attention.

Example: Changing from N.C. to N.O.

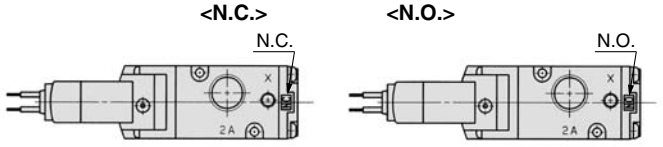
1) Base mounted



1. Remove the body from the sub-plate and reset the "▼" mark on the body corresponding to the "N.O." mark on the sub-plate as shown in the figure above.
2. Remove the end plate from the body and rotate the end plate by 180° so that the "N.O." mark on the end plate is at the top of the valve.

∗ It is not necessary to change the piping when this is done.

2) Body ported



● Remove the end plate from the body and rotate the end plate by 180° to correspond the "N.O." mark on the end plate to the top of the valve.

∗ Piping should be arranged as follows.

Type of actuation \ Port	1P	2A	3R
N.C.	Inlet side	Outlet side	Exhaust side
N.O.	Exhaust side	Outlet side	Inlet side

One-touch Fittings

⚠Caution

When fittings are used, they may interfere with one another depending on their types and sizes. Therefore, the dimensions of the fittings to be used should first be confirmed in their respective catalogs.

Fittings whose compliance with the VP series is already confirmed are stated below. If the fitting within the applicable range is selected, there will not be any interference.

Applicable Fittings: Series KQ2H, KQ2S

Series	Piping port	Port size	Applicable tubing O.D.						
			ø3.2	ø4	ø6	ø8	ø10	ø12	ø16
VP(A)300	1P, 2A, 3R	1/8, 1/4	●	●	●	●			
	X	M5	●	●	●				
VP(A)500	1P, 2A, 3R	1/4, 3/8	●	●	●	●	●	●	
	X	1/8	●	●	●	●	●		
VP(A)700	1P, 2A, 3R	3/8, 1/2			●	●	●	●	●
	X	1/8	●	●	●	●	●		
VV3P(A)3 Manifold base	1P, 2A, 3R	1/4	●	●	●	●	●	●	
	X	M5	●	●	●				
VV3P(A)5 Manifold base	1P, 2A, 3R	3/8			●	●	●	●	
	X	M5	●	●	●				
VV3P(A)7 Manifold base	1P, 2A, 3R	1/2					●	●	●
	X	1/8	●	●	●	●	●		

⚠ Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of **"Caution," "Warning"** or **"Danger."** They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1), and other safety regulations.

⚠ Caution: **Caution** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

⚠ Warning: **Warning** indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

⚠ Danger : **Danger** indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.
ISO 4413: Hydraulic fluid power – General rules relating to systems.
IEC 60204-1: Safety of machinery – Electrical equipment of machines.
(Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots - Safety.
etc.

⚠ Warning

1. **The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**
Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.
2. **Only personnel with appropriate training should operate machinery and equipment.**
The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.
3. **Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**
   1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
   2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
   3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.
4. **Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**
   1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
   2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
   3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
   4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

⚠ Caution

1. **The product is provided for use in manufacturing industries.**
The product herein described is basically provided for peaceful use in manufacturing industries.
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
If anything is unclear, contact your nearest sales branch.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements".
Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered.*2)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.

*2) **Vacuum pads are excluded from this 1 year warranty.**
A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.
2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Revision history

Edition B
* Addition of 24 VAC to Rated voltage for Series VP300/500/700.
* Addition of -X505 to Made to Order for Series VP300/500.
* Addition of -X505 to Made to Order for Series VPA300/500. OZ

⚠ Safety Instructions	Be sure to read "Handling Precautions for SMC Products" (M-E03-3) before using.

SMC Corporation
Akihabara UDX 15F,
4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, JAPAN
Phone: 03-5207-8249 Fax: 03-5298-5362
URL http://www.smcworld.com

Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.
D-DN
1st printing MZ printing OZ 12450SZ Printed in Japan.

Large Size 3 Port Solenoid Valve

Series VP3145/3165/3185

Rubber Seal

CE

[Option]

Large flow capacity, small exhaust resistance

(Refer to "Flow Characteristic" table.)

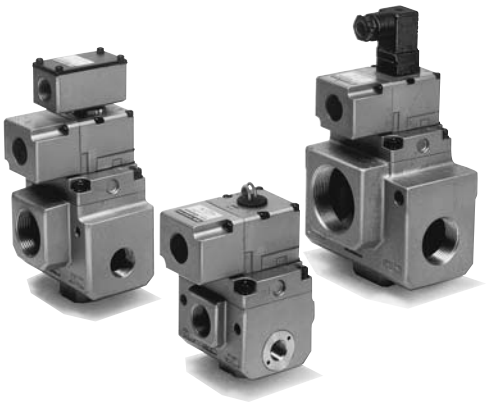
Easy conversion to N.C. or N.O.

Function plate makes it possible to use as a N.C. or N.O. valve with the port unchanged.

Possible to use in vacuum or under low pressures

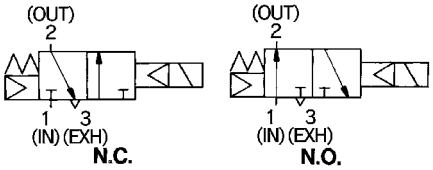
Vacuum: Up to 101.2 kPa
Low pressure: 0 to 0.2 MPa

Free mounting orientation

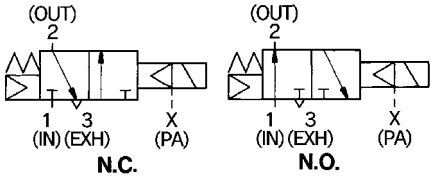


JIS Symbol

Internal pilot
<Standard>



External pilot



Note) N.O. valve operates properly only when appropriate pressure is applied to the pilot.

How to Order

VP3 1 4 5 ☐ - 04 1 G A ☐ - ☐ - ☐

Series VP 3 port solenoid valve

Number of solenoids

1	Single

Body size

4	1/2
6	1
8	1 1/2

Body type

5	Body ported

Valve option

Nil	For general
V	For vacuum/low pressure

Port size (IN, OUT port)

Symbol	Port size Rc (Nominal size)	VP3145	VP3165	VP3185
03	3/8 (10A)	●		
04	1/2 (15A)	●		
06	3/4 (20A)	●	●	
10	1 (25A)		●	
12	1 1/4 (32A)		●	●
14	1 1/2 (40A)			●
20	2 (50A)			●

Coil rated voltage

1	100 VAC, 50/60 Hz
2	200 VAC, 50/60 Hz
3*	110 VAC, 50/60 Hz
4*	220 VAC, 50/60 Hz
5	24 VDC
6*	12 VDC
7*	240 VAC, 50/60 Hz
9*	Other

* Option

Electrical entry

G	Grommet
T	Conduit terminal
D	DIN terminal
TL*	Conduit terminal with indicator light
TS*	Conduit terminal with surge voltage suppressor
TZ*	Conduit terminal with light/surge voltage suppressor
DL*	DIN terminal with indicator light
DS*	DIN terminal with surge voltage suppressor
DZ*	DIN terminal with light/surge voltage suppressor

* Option

Type of actuation

A	N.C. (Normally closed)
B	N.O. (Normally open)

Pilot option

Nil	Standard (Internal pilot)
1	External pilot

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

CE-compliant

Nil	—
Q	CE-compliant*

* Electrical entry: D/DL/DS/DZ only

How to Order Pilot Valve Assembly

VT3113 – 00 1 G - ☐

Coil rated voltage

1	100 VAC, 50/60 Hz
2	200 VAC, 50/60 Hz
3*	110 VAC, 50/60 Hz
4*	220 VAC, 50/60 Hz
5	24 VDC
6*	12 VDC
7*	240 VAC, 50/60 Hz
9*	Other

* Option

Electrical entry

G	Grommet
T	Conduit terminal
D	DIN terminal
TL*	Conduit terminal with indicator light
TS*	Conduit terminal with surge voltage suppressor
TZ*	Conduit terminal with light/surge voltage suppressor
DL*	DIN terminal with indicator light
DS*	DIN terminal with surge voltage suppressor
DZ*	DIN terminal with light/surge voltage suppressor

* Option

CE-compliant

Nil	—
Q	CE-compliant*

* Electrical entry: D/DL/DS/DZ only

Made to Order

Made to Order
(Refer to pages 1501 to 1503 for details.)

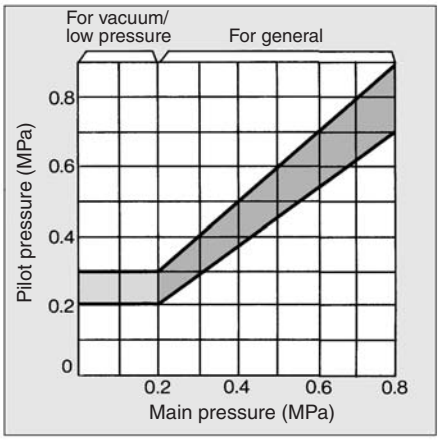
External Pilot

Use external pilot model in the following cases.

- Vacuum or low pressure (0.2 MPa or less): Vacuum/Low pressure type
- Using the valve with supply port external throttle: General type
- Air pressure of supply port is slow: General type
- Resistance in outlet side is small in case of air blowing or filling an air tank: General type

Note 1) Keep external pilot pressure within the pressure range below.

Note 2) Conversion of internal pilot and external pilot can not be done.



Specifications

Fluid		Air					
Type of actuation		N.C. or N.O. (Convertible)					
Pilot type		Internal pilot	External pilot				
		For general	For vacuum/low pressure	For general			
Operating pressure range (MPa)	**Main pressure**	0.2 to 0.8	−101.2 kPa to 0.2	0.2 to 0.8			
	Pilot pressure		0.2 to 0.3	Refer to the graph left.			
Ambient and fluid temperature (°C)		0 (No freezing) to 60					
Response time (ms) (1) **(at the pressure of 0.5 MPa)**		ON	AC	30 or less	OFF	AC	30 or less
			DC	40 or less		DC	30 or less
Max. operating frequency (Hz)		3					
Lubrication (2)		Required (Equivalent to turbine oil Class1 ISO VG32)					
Manual override		Yes (Non-locking)					
Mounting orientation		Unrestricted					
Shock/Vibration resistance (m/s²) (3)		150/50					

Note 1) Based on dynamic performance test, JIS B 8374-1981. (Coil temperature: 20°C, at rated voltage, without surge voltage suppressor)

Note 2) This solenoid valve requires lubrication. Use turbine oil Class 1 (ISO VG32).

Note 3) Impact resistance: No malfunction occurred when it is tested with a drop tester in the axial direction and at the right angles to the main valve and armature in both energized and de-energized states every once for each condition. (Values at the initial period)

Vibration resistance: No malfunction occurred in a one-sweep test between 45 and 1000 Hz. Test was performed at both energized and de-energized states in the axial direction and at the right angles to the main valve and armature. (Values at the initial period)

Solenoid Specifications

Electrical entry	**Standard**		Grommet (G), Conduit terminal (T) DIN terminal (D)
	Option		Conduit terminal with indicator light (TL), Conduit terminal with surge voltage suppressor (TS), Conduit terminal with light/surge voltage suppressor (TZ), DIN terminal with indicator light (DL), DIN terminal with surge voltage suppressor (DS), DIN terminal with light/surge voltage suppressor (DZ)
Coil rated voltage (V)	**AC (50/60 Hz)**		100, 200, 110 *, 220 *, 240 *
	DC		12 *, 24
Allowable voltage fluctuation			−15 to +10% of rated voltage
Apparent power Note)	**AC**	**Inrush**	73 VA (50 Hz), 58 VA (60 Hz)
		Holding	28 VA (50 Hz), 17 VA (60 Hz)
Power consumption Note)	**DC**		12 W

* Option

Note) At rated voltage

Flow Characteristics/Mass

Valve model	Port size		Flow characteristics						Mass * (kg)
			1 → 2 (IN → OUT)			2 → 3 (OUT → EXH)			
	1(IN), 2(OUT)	3(EXH)	C [dm³/(s·bar)]	b	Cv	C [dm³/(s·bar)]	b	Cv	Grommet
VP3145	3/8	3/4	19	0.43	5.5	18	0.47	5.4	1.5
	1/2		23	0.32	6.2	21	0.39	5.8	
	3/4		28	0.36	7.6	26	0.35	7.0	

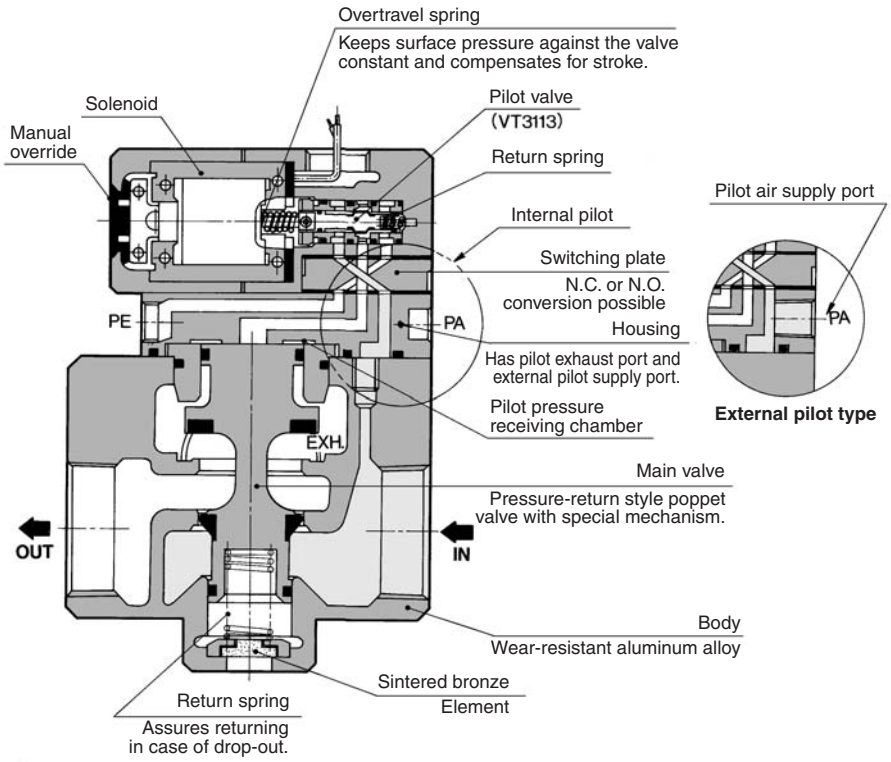
Valve model	Port size		Effective area (mm²)		Mass * (kg)
	1 (IN), 2 (OUT)	3(EXH)	1 → 2 (IN → OUT)	2 → 3 (OUT → EXH)	Grommet
VP3165	3/4	1 1/4	230	280	2.0
	1		280	310	
	1 1/4		310	330	
VP3185	1 1/4	2	570	650	2.8
	1 1/2		650	670	
	2		650	670	

* For grommet

Conduit terminal··· +0.2 kg

Construction/Internal Pilot

As in the figure below, this pilot-operated solenoid valve consists of a compact 3 port solenoid valve as the pilot valve and a large 3 port valve as the main valve.
The pilot valve controls opening and closing the main valve. N.C. or N.O. function conversion can be done by switching the pilot passage.



Note) Pilot valve and body are shown in a different direction from the actual product in order to show the construction and air passage.

Piping (Vacuum Use)

1. Piping in general:

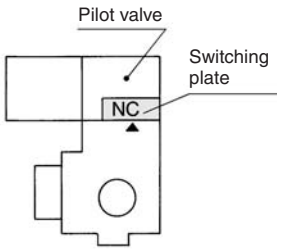
EXH port = Vacuum pump/ Blower } (Suction side)
OUT port = Tank/ Vacuum pad } (Load side)
IN port = Plug (2 port valve) Air releasing Air pressure-in

2. Following the above piping, vacuum passage is switched between OUT and EXH, therefore, N.C./N.O. indication on the function plate and switching of the vacuum passage are reversed; N.C. (Normally closed) in vacuum passage are reversed:

"N.C." indicated on the plate
→ N.O. in vacuum passage (Normally open)
"N.O." indicated on the plate
→ N.C. in vacuum passage (Normally closed)

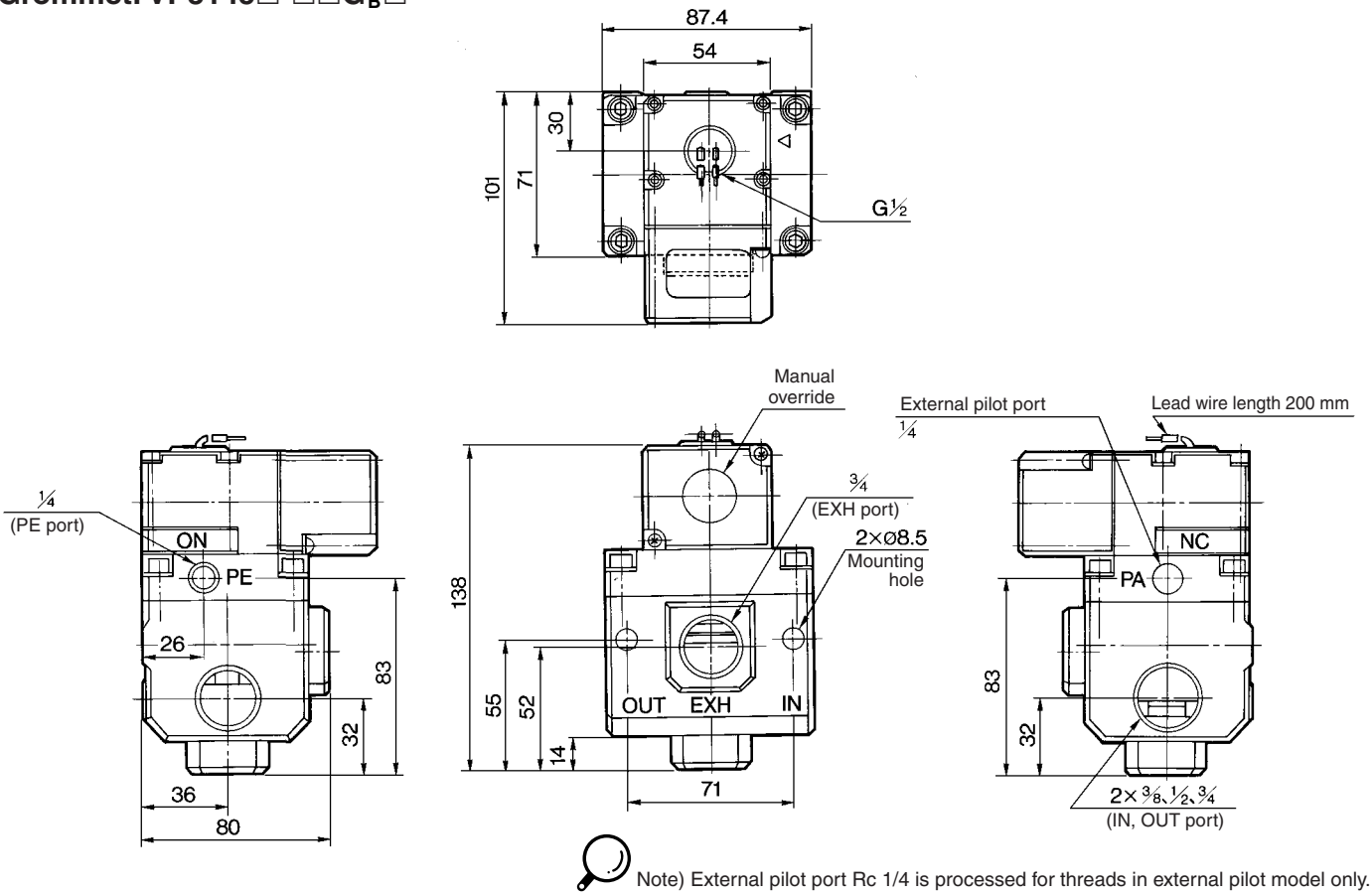
N.C./N.O. Conversion

To convert valve operation from N.C. to N.O. or N.O. to N.C., remove the pilot valve, move the function plate along the gasket, both top and bottom until the mark ▶ meets N.C. (N.O.)
Please note however, that the N.O. valve functions properly only when the appropriate pressure is applied to the valve.



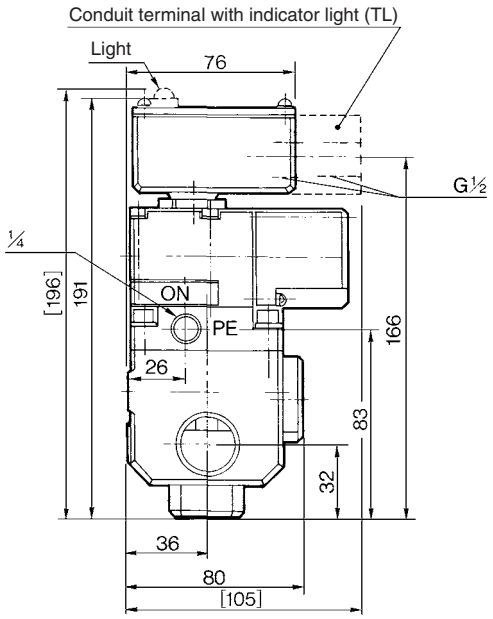
Dimensions: VP3145

Grommet: VP3145□-□□G$^{A}_{B}$□



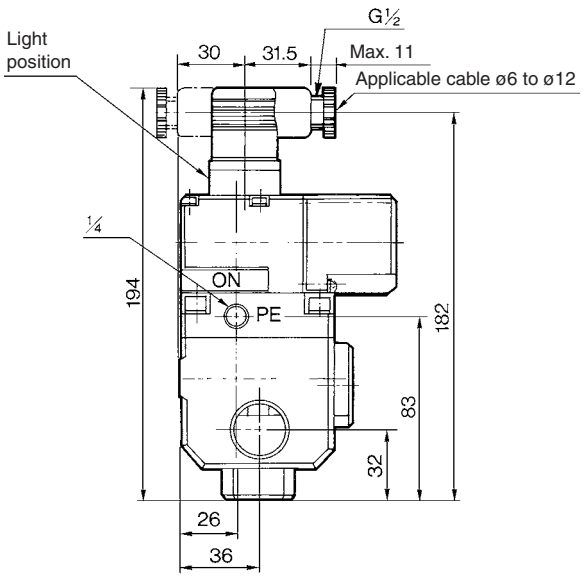
Note) External pilot port Rc 1/4 is processed for threads in external pilot model only.

Conduit terminal: VP3145□-□□T$^{A}_{B}$□



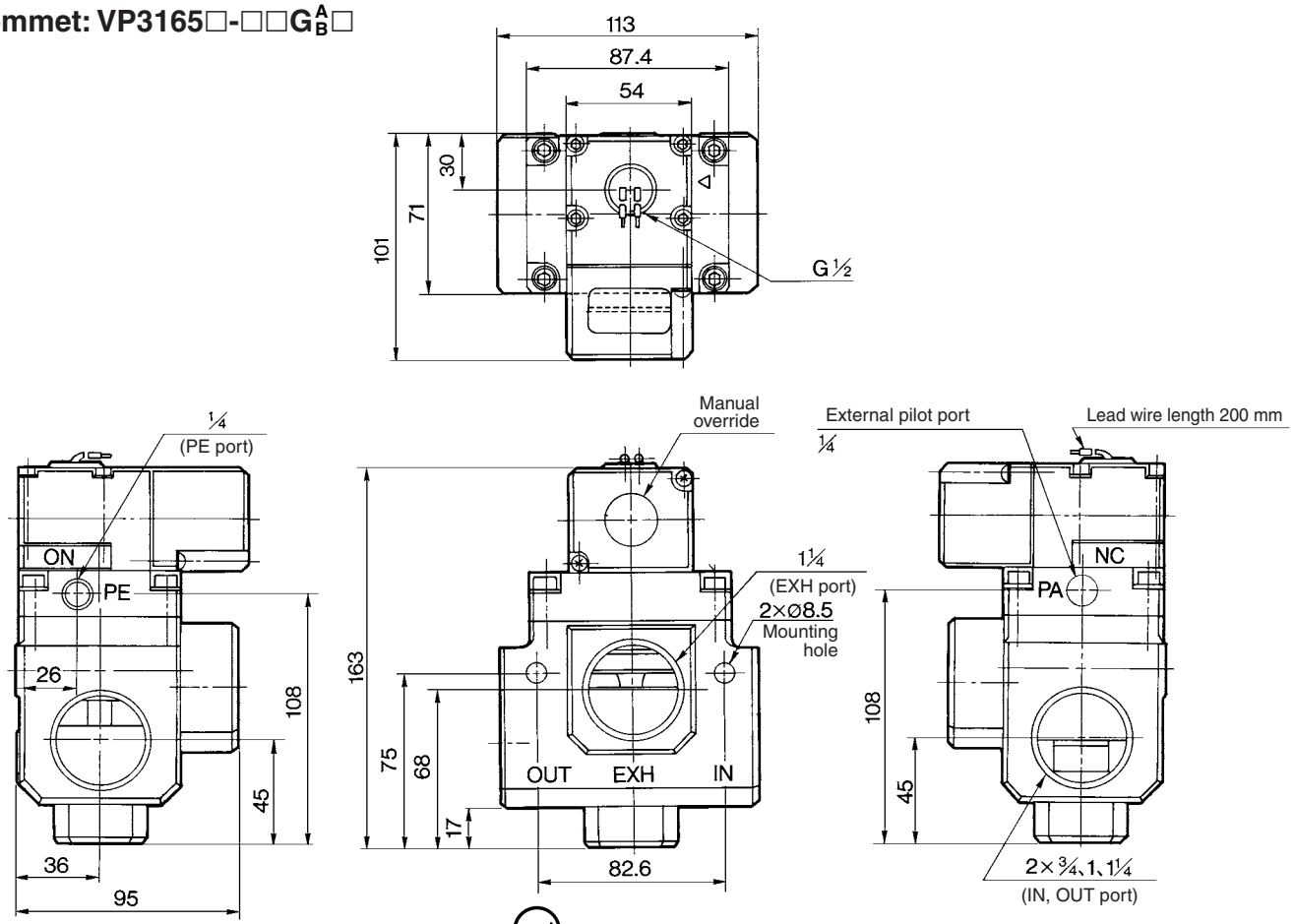
[ ]: With indicator light (TL)

DIN terminal: VP3145□-□□D$^{A}_{B}$□



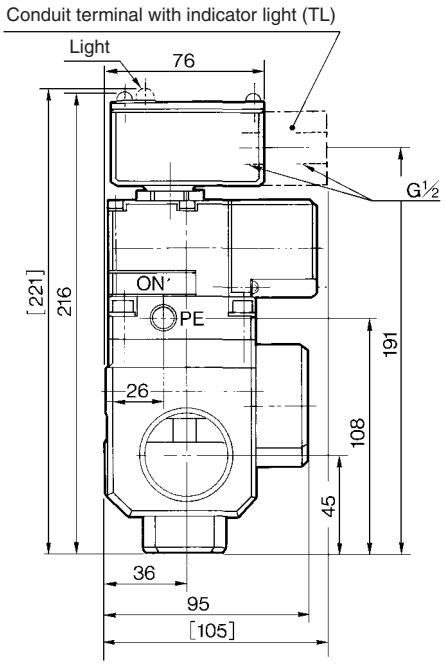
Dimensions: VP3165

Grommet: VP3165□-□□G$^{A}_{B}$□



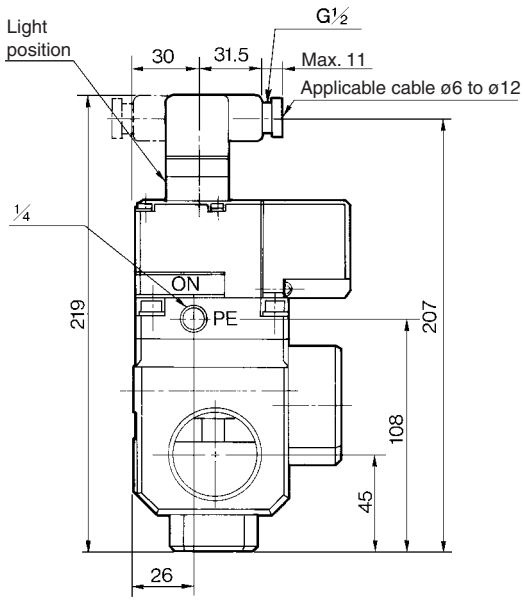
Note) External pilot port Rc 1/4 is processed for threads in external pilot model only.

Conduit terminal: VP3165□-□□T$^{A}_{B}$□



[ ]: With indicator light (TL)

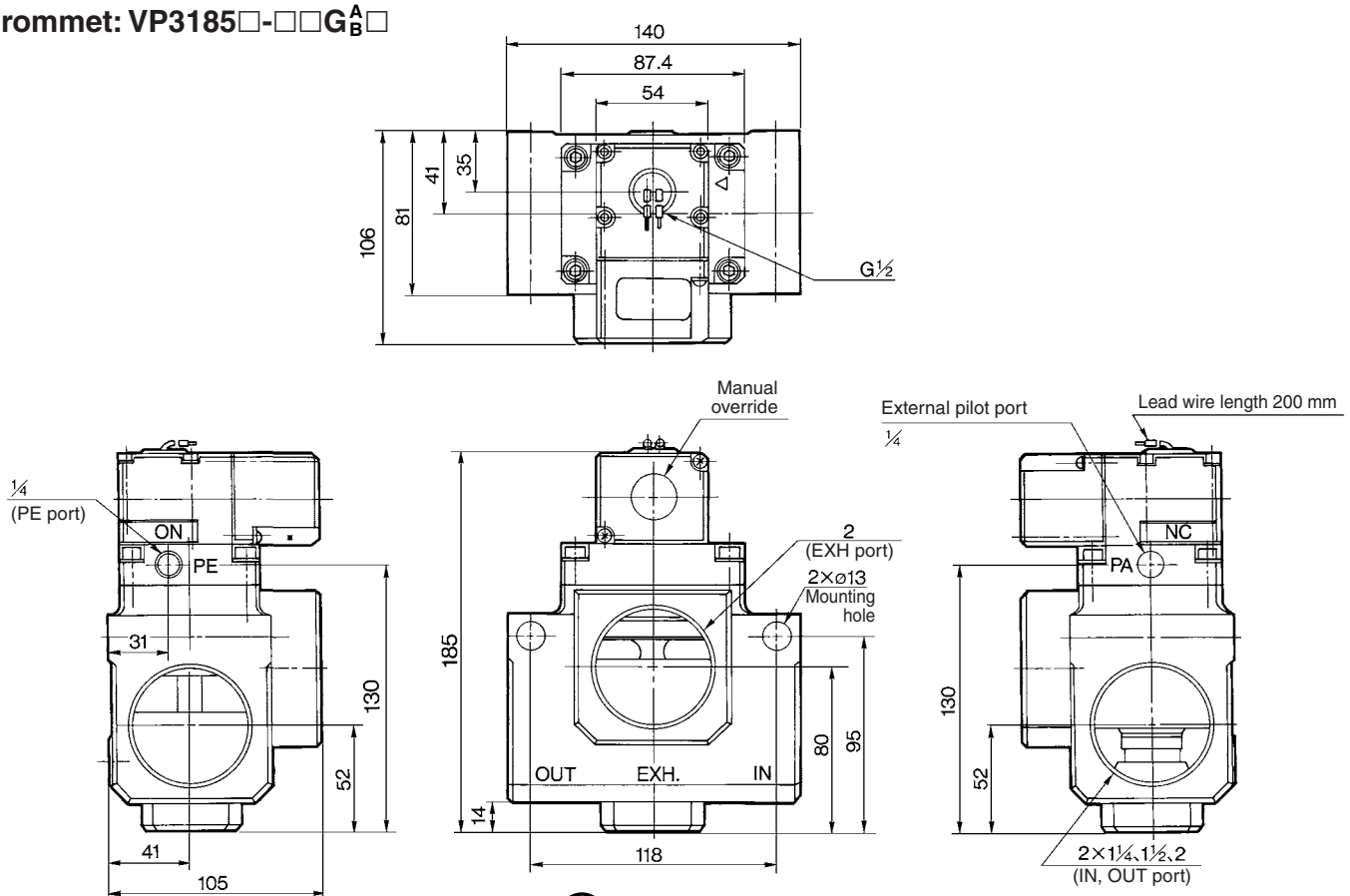
DIN terminal: VP3165□-□□D$^{A}_{B}$□



SYJ
VQZ
VP
VG
VP3□

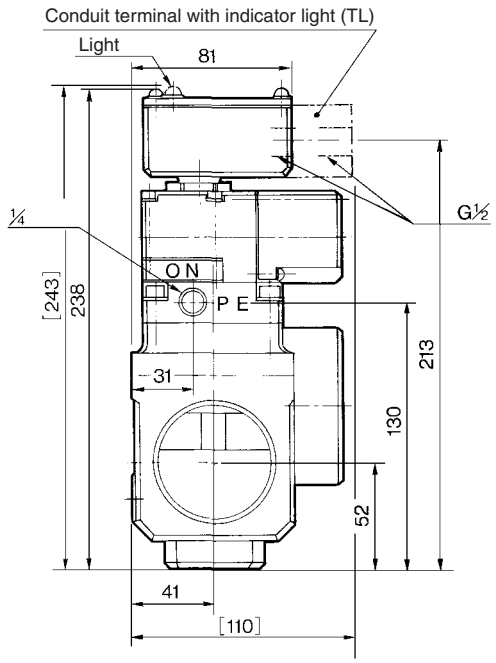
Dimensions: VP3185

Grommet: VP3185□-□□G^{A}_{B}□



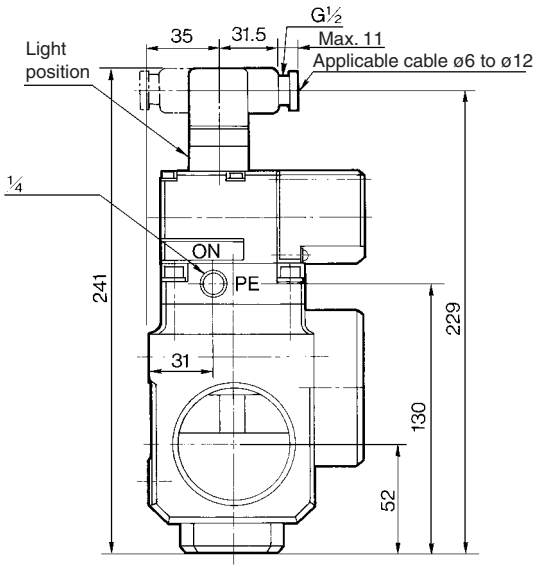
Note) External pilot port Rc 1/4 is processed for threads in external pilot model only.

Conduit terminal: VP3185□-□□T^{A}_{B}□



[ ]: With indicator light (TL)

DIN terminal: VP3185□-□□D^{A}_{B}□



Made to Order:
Series VP3145/3165/3185
Main Valve Double Acting Type: -X80/X81

Made to Order

How to Order

VP31 [4] 5- [06] [1] [D] [Z] [A] 1- [N] -X [81] - [ ]

Body size

4	1/2
6	1
8	1 1/2

Port size (IN, OUT port)

Symbol	Port size	VP3145	VP3165	VP3185
03	3/8	●		
04	1/2	●		
06	3/4	●	●	
10	1		●	
12	1 1/4		●	●
14	1 1/2			●
20	2			●

Coil rated voltage

1	100 VAC, 50/60 Hz
2	200 VAC, 50/60 Hz
3*	110 to 120 VAC, 50/60 Hz
4*	220 VAC, 50/60 Hz
5	24 VDC
6*	12 VDC
7*	240 VAC, 50/60 Hz
9*	Other

* Option
L, M plug connector is 220 VAC at the maximum.

Electrical entry

G	Grommet (Lead wire: 300 mm)	
H	Grommet (Lead wire: 600 mm)	
E	Grommet terminal	
T	Conduit terminal	
D	DIN terminal	With connector
DO		Without connector
L	L plug connector	With lead wire
LN		Without lead wire
LO		Without connector
M	M plug connector	With lead wire
MN		Without lead wire
MO		Without connector

Passage, Type of actuation

A	NC
B	NO

In the case of -X80, only N.C. is available.

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Type of actuation

80	Double solenoid
81	Single solenoid

Light/Surge voltage suppressor

Nil	None
Z	With light/surge voltage suppressor
S	With surge voltage suppressor

* Indicator light is not available for grommet type. W/ surge voltage suppressor is available for grommet type only.

CE-compliant

Nil	—
Q	CE-compliant*

*Electrical entry: D/DO only

How to Order Pilot Valve Assembl

VF3 [ ] 40- [ ] [ ] [ ] - [ ]

Type of actuation

1	Single solenoid
2	Double solenoid

Coil rated voltage

1	100 VAC, 50/60 Hz
2	200 VAC, 50/60 Hz
3*	110 to 120 VAC, 50/60 Hz
4*	220 VAC, 50/60 Hz
5	24 VDC
6*	12 VDC
7*	240 VAC, 50/60 Hz
9*	Other

* Option
L, M plug connector is 220 VAC at the maximum.

Electrical entry

G	Grommet (Lead wire: 300 mm)	
H	Grommet (Lead wire: 600 mm)	
E	Grommet terminal	
T	Conduit terminal	
D	DIN terminal	With connector
DO		Without connector
L	L plug connector	With lead wire
LN		Without lead wire
LO		Without connector
M	M plug connector	With lead wire
MN		Without lead wire
MO		Without connector

Light/Surge voltage suppressor

Nil	None
Z	With light/surge voltage suppressor
S	With surge voltage suppressor

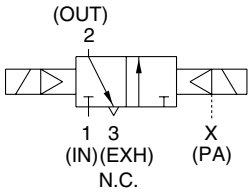
* Indicator light is not available for grommet type. W/ surge voltage suppressor is available for grommet type only.

CE-compliant

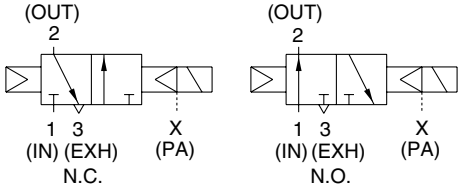
Nil	—
Q	CE-compliant*

*Electrical entry: D/DO only

JIS Symbol
-X80



-X81



Specifications

Valve configuration	External pilot 3 port solenoid valve
Type of actuation	Double solenoid (-X80), Single solenoid (-X81)
Fluid	Air
Operating pressure range	–101.2 kPa to 0.8 MPa
Pilot pressure	85 to 115% of main pressure, Min. 0.2 MPa
Ambient and fluid temperature	0 to 50°C (No freezing)
Lubrication (1)	Required (Equivalent to turbine oil Class 1 ISO VG32)
Mounting orientation	Unrestricted
Impact/Vibration resistance (2)	150/50 m/s^2

Note 1) This solenoid valve requires lubrication. Use turbine oil Class 1 (ISO VG32).
Note 2) Impact resistance: No malfunction occurred when it is tested with a drop tester in the axial direction and at the right angles to the main valve and armature in both energized and de-energized states every once for each condition. (Values at the initial period)
Vibration resistance: No malfunction occurred in a one-sweep test between 45 and 1000 Hz. Test was performed at both energized and de-energized states in the axial direction and at the right angles to the main valve and armature. (Values at the initial period)

Solenoid Specifications

Electrical entry	Grommet, Grommet terminal, Conduit terminal DIN terminal, L plug connector, M plug connector	
Coil rated voltage (V)	AC (50/60 Hz)	100, 200, 110*, 220*, 240*
	DC	24, 12*
Allowable voltage fluctuation	–15 to 10%	
Apparent power (AC) Note)	Inrush	5.6 VA/50 Hz, 5.0 VA/60 Hz
	Holding	3.4 VA/50 Hz, 2.3 VA/60 Hz
Power consumption (DC) Note)	W/o indicator light	1.8W
	W/ indicator light	2W

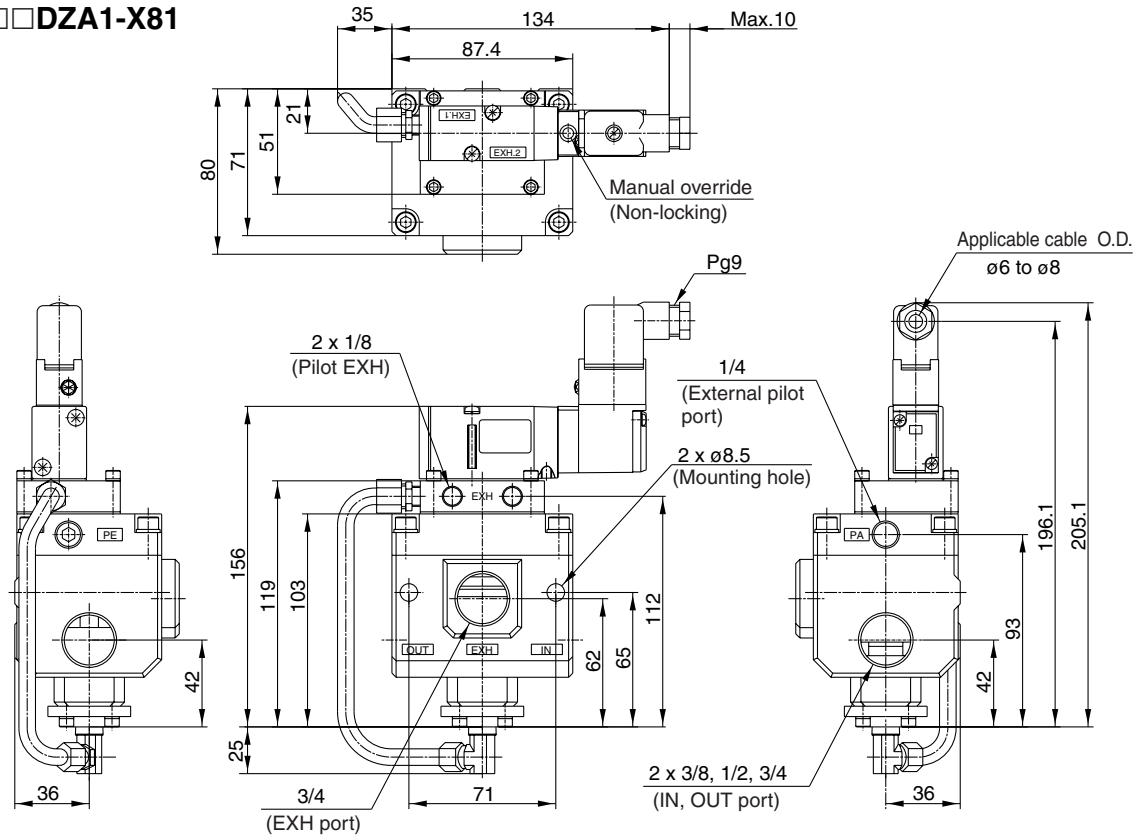
* Option
Note) At rated voltage

⚠ Caution

Piping and other usage are the same as standard products.

Dimensions

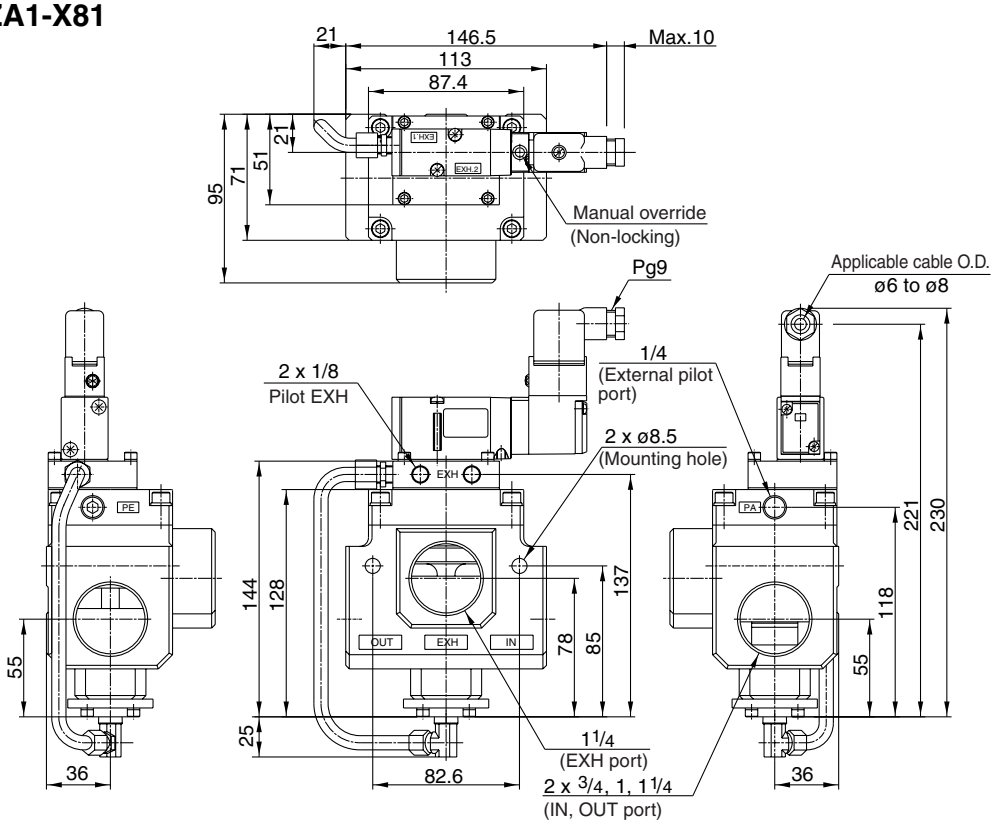
VP3145-□□DZA1-X81



• When B spec. of -X81 (N.O. spec.), VF3140 solenoid has to be positioned at left, when looking at the EXH port in the front face.
• In the case of -X80, VF3240-□□□ (Pilot valve) will be mounted.

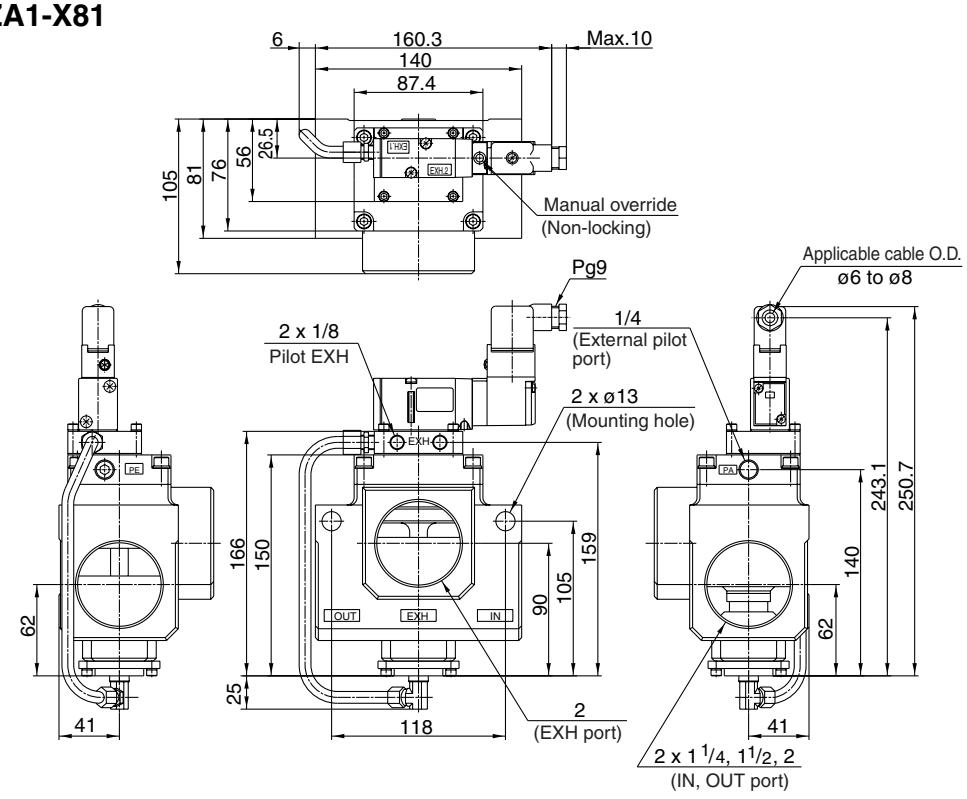
Dimensions

VP3165-□□DZA1-X81



• When B spec. of -X81 (N.O. spec.), VF3140 solenoid has to be positioned at left, when looking at the EXH port in the front face.
• In the case of -X80, VF3240-□□□ (Pilot valve) will be mounted.

VP3185-□□DZA1-X81



• When B spec. of -X81 (N.O. spec.), VF3140 solenoid has to be positioned at left, when looking at the EXH port in the front face.
• In the case of -X80, VF3240-□□□ (Pilot valve) will be mounted.

Series VP3145/3165/3185
Specific Product Precautions

Be sure to read before handling.
Refer to front matters 58 and 59 for Safety Instructions and pages 3 to 7 for 3/4/5 Port Solenoid Valve Precautions.

⚠ Caution

Piping
If supply port air pressure drops to less than 0.2 MPa, the valve may malfunction. In such a case, use external pilot type.
(When throttling IN port, or operating with OUT port open to the atmosphere or in a similar operation.)

Pressure balance among each port
This solenoid valve is pressure-unbalanced type. Operate it within this pressure range: IN ≥ OUT ≥ EXH. If not operated in the range, the valve will malfunction.

Use as 2 port valve
1. Plug EXH port in case of pressure-in and plug IN port in case of vacuum use.
2. This valve has slight air leakage and can not be used for such purposes as holding air pressure (including vacuum) in the pressure container.

Supply air
Install an air filter and a lubricator on the upstream side.

Lubrication
This solenoid valve requires lubrication. Use turbine oil Class 1 (ISO VG32).
Besides that, for brands of each manufacturer, refer to page 6.

Environment
If using the valve in a dusty environment, install a silencer at EXH port and PE port to prevent dust from entering.

N.C./N.O. conversion
When changing the direction of a switching plate to convert from N.C. to N.O. and vice versa, note that the equipment to be connected will act reversely.

How to Calculate the Flow Rate
For obtaining the flow rate, refer to front matters 44 to 47.

Light/Surge Voltage Suppressor

	Grommet (G)	Conduit terminal (T)	DIN terminal (D)
With indicator light (L)	None	Neon bulb, Coil	48 VDC or less: LED, Coil; 100 VAC or more: Neon bulb, Coil
Surge voltage suppressor (S)	Varistor, Coil		
With light/surge voltage suppressor (Z)	None	Neon bulb, Varistor, Coil	48 VDC or less: LED, Varistor, Coil; 100 VAC or more: Neon bulb, Varistor, Coil

"Items that are marked "With indicator light," "With surge voltage suppressors," and "With light/surge voltage suppressor" are all non-polar types.

How to Use DIN Terminal

1. Disassembly
1) After loosening the screw (1), then if the housing (4) is pulled in the direction of the screw, the connector will be removed from the body of equipment (solenoid, etc.).
2) Pull out the screw (1), then remove the gasket (2a) or (2b).
3) On the bottom part of the terminal block (3), there's a cut-off part (indication of an arrow) (3a). If a small flat head screwdriver is inserted between the opening in the bottom, terminal block (3) will be removed from the cover (4). (Refer to the figure below.)
4) Remove the cable gland (5) and plain washer (6) and rubber seal (7) .

2. Wiring
1) Pass them through the cable (8) in the order of cable ground (5), washer (6), rubber seal (7), and then insert into the housing (4).
2) Dimensions of the cable (8) are the figure as below. Skin the cable and crimp the crimped terminal (9) to the edges.
3) Remove the screw with washer (3e) from the bracket (3e). (Loosen in the case of Y-shape type terminal.) As shown in the below figure, mount a crimped terminal (9), and then again tighten the screw (3e).

Note) Tighten within the tightening torque of 0.5 N·m±15%.
Note: a It is possible to wire even in the state of bare wire. In that case, loosen the screw with washer (3e) and place a lead wire (3d) into the bracket, and then tighten it once again.
b Maximum size of crimped terminal (9) is up to 1.25 mm² —3.5 when O terminal. For Y terminal, it is up to 1.25 mm² —4.
c Cable (8) external: 6 to 12 mm ø
Note) For the one with the external dimension ranged between 9 to 12 mmø, remove the inside parts of the rubber seal (7) before using.

3. Assembly
1) Terminal block (3) connected with housing (4) should be reinstated. (Push it down until you hear the click sound.)
2) Putting rubber seal (7), plain washer (6), in this order into the cable introducing slit on the housing (4), then further tighten the cable gland (5) securely.
3) By inserting gasket (2a) or (2b) between the bottom part of the terminal block (3) and a plug on an equipment, screw in (1) on top of the housing (4) and tighten it.

Note) Tighten within the tightening torque of 0.5 N·m ±20%.
Note: The orientation of a connector can be changed arbitrarily, depending on the combination of a housing (4) and a terminal block (3).

Exploded view