

# Rubber Seal 3-Port/Poppet Type VT301 Series

## Compact with a large flow capacity

Dimensions (W x H x D)···30 x 57 x 33  
(Grommet)

C: 0.60 dm<sup>3</sup>/(s·bar)  
{Rc1/4 (Passage 2 → 3)}

## A single valve with 6 valve functions (Universal porting type)

6 valve functions can be selected according to the selected piping ports. (Enabling of the N.C. valve, N.O. valve, divider valve, selector valve, etc.)

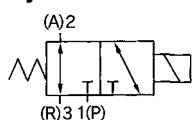
Valve function	3-port N.C.	3-port N.O.	2-port N.C.
De-energized			
Energized			
Valve function	2-port N.O.	Selector	Divider
De-energized			
Energized			

## Suitable for use in vacuum applications

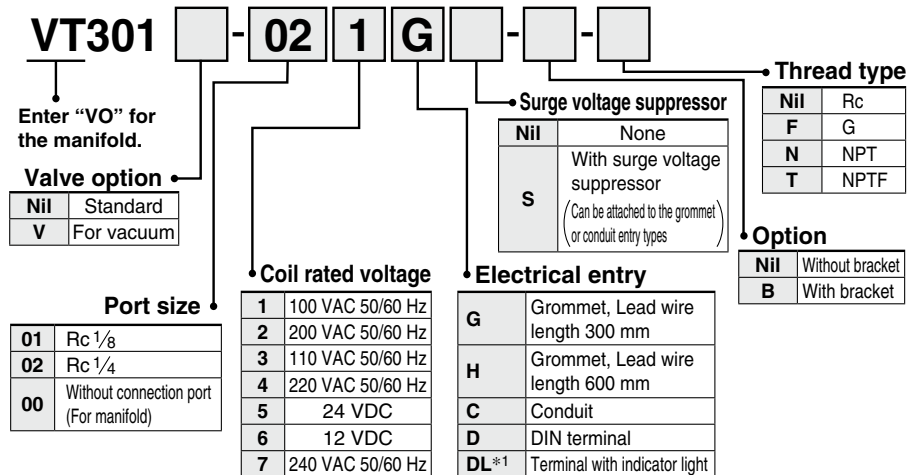
-101.2 kPa  
(Vacuum specification type: VT/VO301V)



## Symbol



## How to Order



For other rated voltages, please contact SMC.

\*1 "DL" is only applicable to the VT301. It is not applicable to the VO301. The width dimension of the terminal is different from that of the DIN terminal. Refer to page 3 for details. Also, please contact SMC for other rated coil voltages.

## Manifold

Model	Applicable manifold	Accessory (Part no.)
VO301-00□□	Common/Individual exhaust	Function plate (DXT060-32-4A)

## Specifications

Type of actuation	Direct operated type 2-position single solenoid
Fluid	Air
Operating pressure range	0 to 1.0 MPa
Ambient and fluid temperatures	-10 to 50°C (No freezing. Refer to "Best Pneumatics No.1.")
Max. operating frequency	10 Hz
Response time*1	30 ms or less (at 0.5 MPa)
Lubrication	Not required (Use turbine oil Class 1 ISO VG32 if lubricating.)
Manual override	Non-locking push type
Impact/Vibration resistance*2	150/50 m/s <sup>2</sup>
Enclosure	Dustproof

\*1 Based on JIS B 8374: 1981 dynamic performance test (Coil temperature 20°C, at rated voltage, without surge voltage suppressor)  
\*2 Impact resistance: No malfunction occurred when tested with a drop tester in the axial direction and at right angles to the main valve and the armature in both an energized and de-energized state, once in each condition. (Value in the initial state)  
Vibration resistance: No malfunction occurred in a one-sweep test between 45 and 2000 Hz in the axial direction and at right angles to the main valve and the armature in both an energized and de-energized state, once in each condition. (Value in the initial state)

## Solenoid Specifications

Electrical entry		Grommet, Conduit, DIN terminal		
Coil rated voltage		100 VAC, 200 VAC 50/60 Hz, 24 VDC		
Allowable voltage fluctuation		-15 to +10% of the rated voltage		
Apparent power*3	AC	Inrush	50 Hz 12 VA 60 Hz 10.5 VA	
		Holding	50 Hz 7.5 VA 60 Hz 6 VA	
	Power consumption*3		DC	Without indicator light···4.8 W, With indicator light···5 W

\*3 At the rated voltage

## Option

Description	Part no.
Bracket (With screw)	DXT060-27A

# VT301 Series

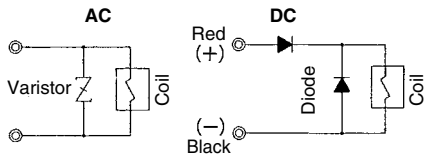
## Flow Rate Characteristics/Weight

Valve model	Port size	Flow rate characteristics												Weight	
		1 → 2 (P → A)			2 → 3 (A → R)			3 → 2 (R → A)			2 → 1 (A → P)			Grommet	
		C [dm <sup>3</sup> /(s·bar)]	b	Cv	C [dm <sup>3</sup> /(s·bar)]	b	Cv	C [dm <sup>3</sup> /(s·bar)]	b	Cv	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VT301□-01□□□□□□□□	1/8	0.63	0.30	0.16	0.59	0.30	0.15	0.59	0.32	0.15	0.65	0.30	0.16	0.12 kg (With bracket: 0.14 kg)	
VT301□-02□□□□□□□□	1/4	0.66	0.28	0.16	0.60	0.29	0.15	0.61	0.32	0.15	0.66	0.30	0.16	0.12 kg (With bracket: 0.14 kg)	

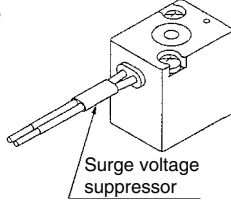
\* These are the values for a single valve unit. They are not applicable to manifolds. Refer to the manifold specifications on page 4 for details.

## Valve Options

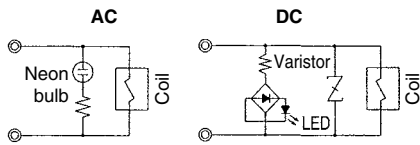
### 1) Light/Surge voltage suppressor With surge voltage suppressor (For "G" and "C")



\* Only applicable to the grommet and conduit types  
- Grommet type



### With indicator light (DL)



\* Only applicable to the DIN terminal type

### 2) For vacuum

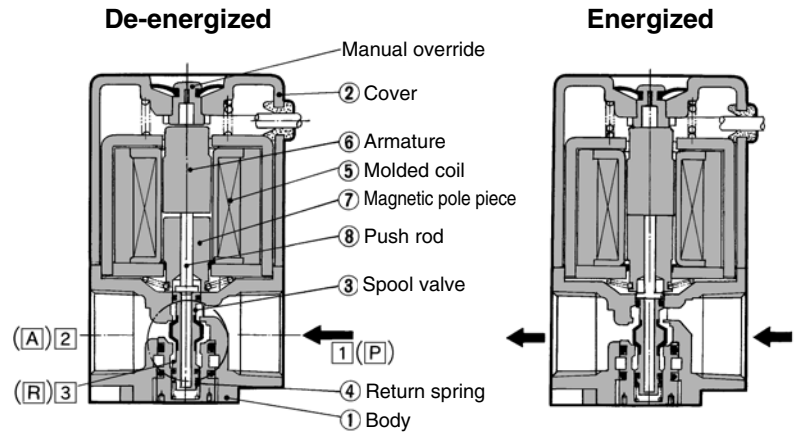
Pressure range	-101.2 kPa to 0.1 MPa
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This vacuum model has less air leakage than the standard model under low pressure. It is recommended for vacuum applications.

## Caution

- Since this valve has slight air leakage, it cannot be used for vacuum retention (including positive pressure retention) in the pressure container.

## Construction



### Operation principle

#### <De-energized>

The spool valve ③ is pushed upward by the return spring ④, sealing port P and opening ports A and R.  
Air flow direction: P ↔ Block, A ↔ R

#### <Energized>

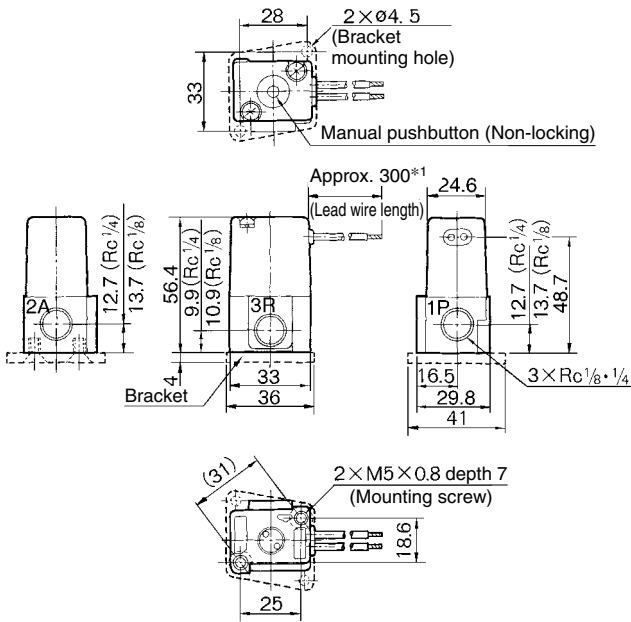
When the molded coil ⑤ is energized, the armature ⑥ is suctioned toward the magnetic pole piece ⑦, and the spool valve ③ is pushed down by the push rod ⑧, sealing port R and opening ports P and A. At this time, the armature ⑥ and the magnetic pole piece ⑦ are brought into close contact with each other by the magnetic pole piece ⑦ being suctioned toward the armature ⑥.  
Air flow direction: P ↔ A, R ↔ Block

### Component Parts

No.	Description	Material	Note
1	Body	Aluminum die-casted	Platinum silver
2	Cover	Aluminum die-casted	Platinum silver
3	Spool valve	Aluminum, NBR	
4	Return spring	Steel	
5	Molded coil	Resin	

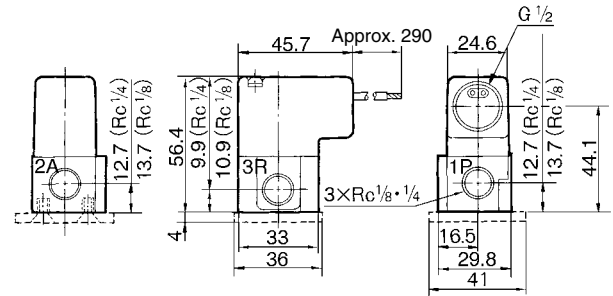
## Dimensions

### Grommet (G)

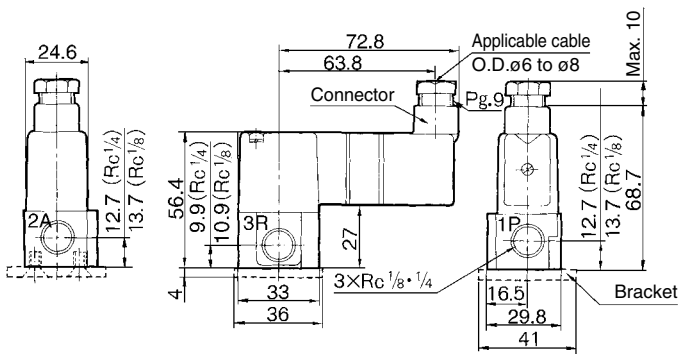


\*1 There is also an option with a 600 mm lead wire length (VT301-□H).

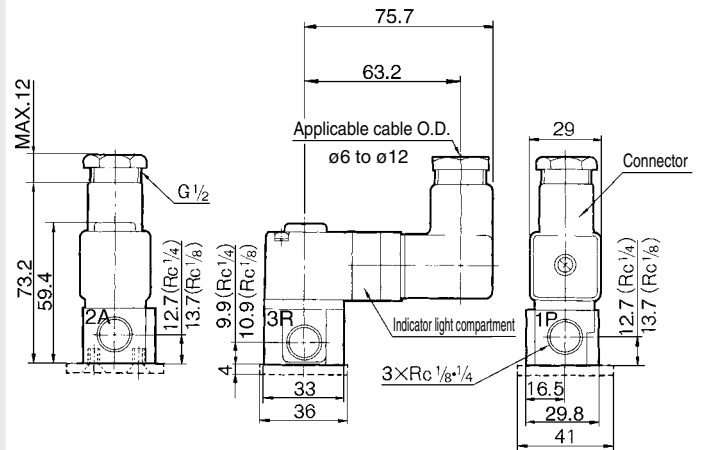
### Conduit (C)



### DIN terminal (D)



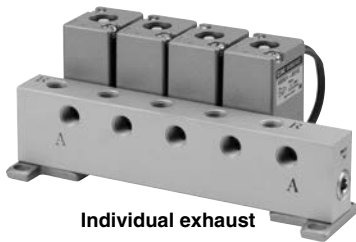
### Terminal with indicator light (DL)



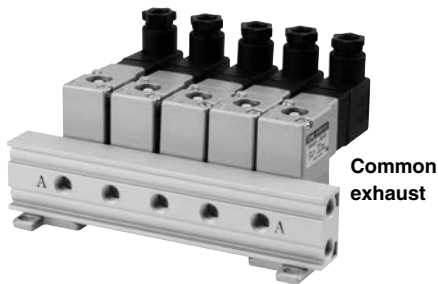
# VT301 Series Manifold Specifications

The VT301 type manifold is a **B-mount system with 2 types: a common exhaust type and an individual exhaust type.**

A manifold valve can be easily converted from N.C. (normally closed) to N.O. (normally open) merely by turning over the function plate.



Individual exhaust



Common exhaust

## How to Order

VVT300 - 05 1 - 01

Valve stations	
02	2 stations
⋮	⋮
20	20 stations

**Exhaust port type**  
1 — Individual exhaust  
3 — Common exhaust

A port size		
Symbol	Port size	Exhaust type
01	1/8	Individual exhaust, Common exhaust
02	1/4	Individual exhaust

Thread type	
Nil	Rc
F	G
N	NPT
T	NPTF

\* To order valves and blanking plate assemblies mounted onto the manifold, list the valve and blanking plate assembly part numbers with the manifold base part number.

<Example> VVT300-051-01 ..... 1 pc.  
VO301-001G ..... 4 pcs.  
DXT060-51-13A ... 1 pc.

## Manifold Specifications

<b>Manifold type</b>	B mount					
<b>Max. number of stations</b>	20 stations*1					
<b>Applicable solenoid valve</b>	VO301□-00□□□					
Exhaust port type	Port location/Port size			Port direction		
	P	A	R	P	A	R
Individual	Base 1/4	Base 1/8, 1/4	Base 1/8	Side	Side	Top
	Base 1/8	Base 1/8	Base 1/8	Side	Side	Side



\*1 For 6 stations or more, supply air to both sides of the P port. The common exhaust type should exhaust from both of the R ports.

## Option

Description	Part no.
Blanking plate (D-seal, With screw)	DXT060-51-13A

## Accessory for Applicable Manifolds

Description	Part no.
Mounting bracket (With screw)	DXT060-31-2A

## Accessory for Applicable Solenoid Valves

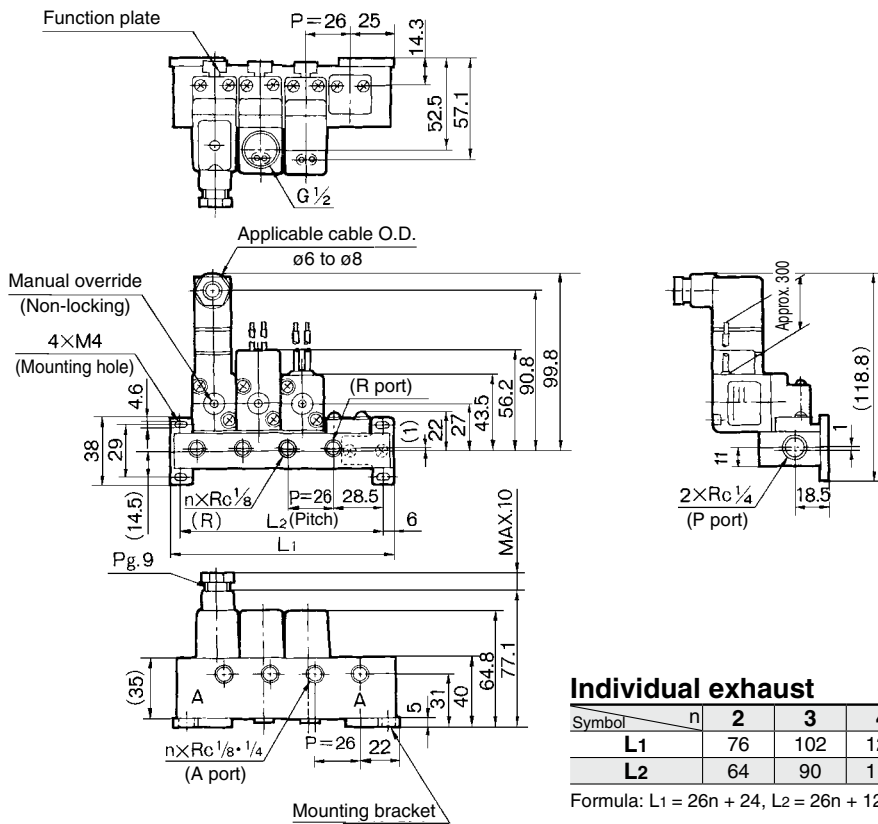
Description	Part no.
Function plate (D-seal, With screw)	DXT060-32-4A

## Flow Rate Characteristics/Weight

Valve model	Port size	Flow rate characteristics												Weight Grommet
		1 → 2 (P → A)			2 → 3 (A → R)			3 → 2 (R → A)			2 → 1 (A → P)			
		C [dm <sup>3</sup> /(s·bar)]	b	Cv	C [dm <sup>3</sup> /(s·bar)]	b	Cv	C [dm <sup>3</sup> /(s·bar)]	b	Cv	C [dm <sup>3</sup> /(s·bar)]	b	Cv	
VO301□-00□□□	Without connection port	0.34	0.26	0.084	0.32	0.17	0.076	0.35	0.22	0.084	0.35	0.13	0.079	0.13 kg

## Manifold/Dimensions

### Individual exhaust

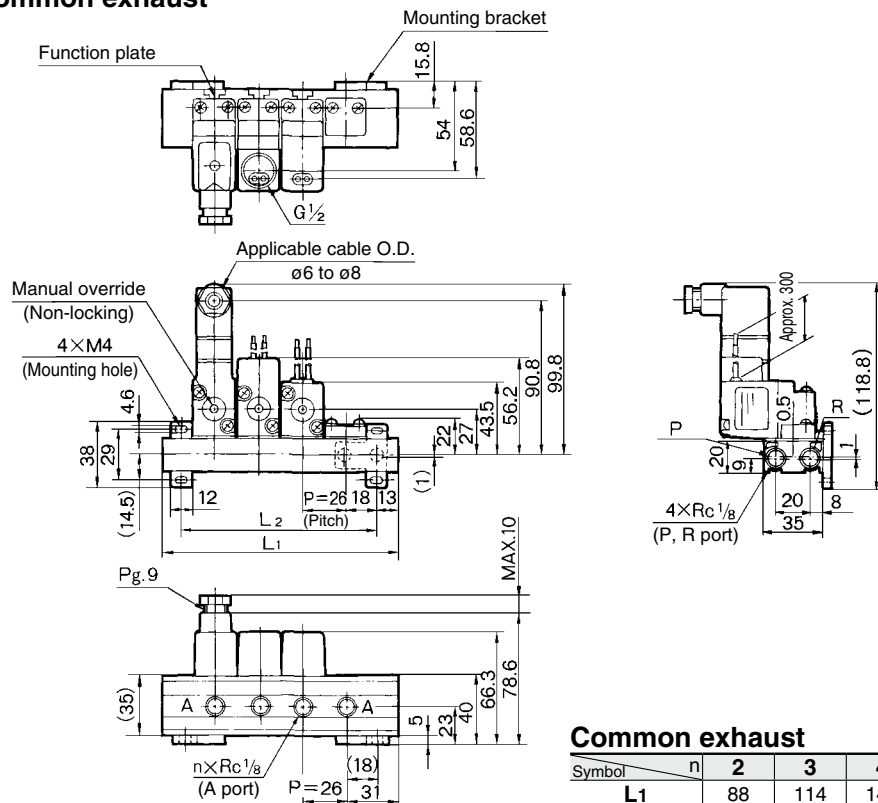


### Individual exhaust

		n: Stations									
Symbol	n	2	3	4	5	6	7	8	9	10	
<b>L1</b>		76	102	128	154	180	206	232	258	284	
<b>L2</b>		64	90	116	142	168	194	220	246	272	

Formula:  $L_1 = 26n + 24$ ,  $L_2 = 26n + 12$

### Common exhaust



### Common exhaust

		n: Stations									
Symbol	n	2	3	4	5	6	7	8	9	10	
<b>L1</b>		88	114	140	166	192	218	244	270	296	
<b>L2</b>		62	88	114	140	166	192	218	244	270	

Formula:  $L_1 = 26n + 36$ ,  $L_2 = 26n + 10$



# VT301 Series

## Specific Product Precautions 1

Be sure to read this before handling the products.

Refer to the "Handling Precautions for SMC Products" (M-E03-3) for safety instructions and solenoid valve precautions.

### ⚠ Caution

1. Make sure that dust and/or other foreign matter do not enter the valve from the unused ports (e.g. exhaust port). Also, since there is a bleed port for the armature in the manual override, do not allow an accumulation of dust and/or other foreign matter to block the bleed port.

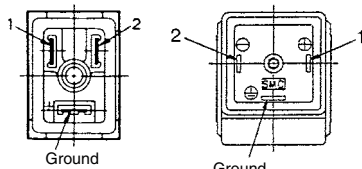
### How to Calculate the Flow Rate

For obtaining the flow rate, refer to "Best Pneumatics No.1."

### Electrical Connection

DIN terminal is connected inside as in the figure below. Connect to the corresponding power supply.

#### DIN terminal block



For D

For DL

Terminal no.	1	2
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### DIN Terminal Part No.

For D	B1B09-2A
For DL	GDM2C

### ⚠ Caution

### Terminal with Indicator Light (DL)

#### 1. Disassembly

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

#### 2. Wiring

- 1) Pass the cable ⑧ through the cable gland ⑤, washer ⑥, and rubber seal ⑦, in this order, and then insert them into the housing ④.
- 2) Skin the cable ⑧ and crimp the crimped terminal ⑨ to the edges.
- 3) Remove the screw with a washer ⑩ from the bracket ⑩. (Loosen in the case of the Y-shape type terminal.) As shown in the figure on the right, mount the crimped terminal ⑨, and then tighten the screw ⑩ again.  
\* Tighten within the tightening torque range of 0.5 N·m ±15%.

### ⚠ Caution

### How to Use the DIN Terminal

#### DIN Terminal (D)

##### 1. Disassembly

- 1) After loosening the screw ①, if the housing ② is pulled in the direction of the screw ①, the connector can be removed from the body of the equipment (solenoid, etc.).
- 2) Pull the screw ① out of the housing ②.
- 3) On the bottom part of the terminal block ③, there's a cut-off part ⑨. If a small flat head screwdriver is inserted between the opening in the bottom, the terminal block ③ can be removed from the housing ②. (Refer to the figure on the right.)
- 4) Remove the cable gland ④, plain washer ⑤, and rubber seal ⑥.

##### 2. Wiring

- 1) Pass the cable ⑦ through the cable gland ④, plain washer ⑤, and rubber seal ⑥, in this order, and then insert them into the housing ②.
- 2) Loosen the screw ⑩ attached to the terminal block ③. Then, pass the lead wire ⑩ through the terminal block ③ and tighten the screw ⑩ again.  
\* Tighten within the tightening torque range of 0.5 N·m ±15%.  
\* Cable ⑦ outside diameter:  $\phi 6$  to  $\phi 8$  mm  
\* Crimped terminal like round-shape or Y-shape cannot be used.

##### 3. Assembly

- 1) Pass the cable ⑦ through the cable gland ④, plain washer ⑤, and rubber seal ⑥, in this order, and connect to the terminal

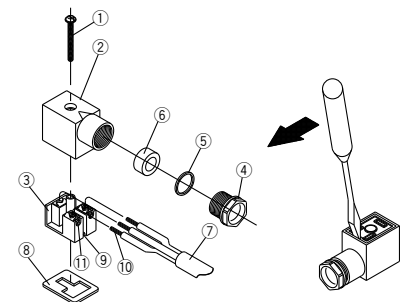
block ③. Then, mount the terminal block ③ on the housing ②.

(Push it down until you hear it click.)

- 2) Put the rubber seal ⑥ and the plain washer ⑤, in this order, into the cable entry of the housing ②, and then firmly tighten the cable gland ④.
- 3) After inserting the gasket ⑧ between the bottom part of the terminal block ③ and the plug on the equipment, screw in the screw ① on top of the housing ② and tighten it.  
\* Tighten within the tightening torque range of 0.5 N·m ±20%.

#### Changing the entry direction

The orientation of a connector can be changed 180°, depending on the combination of the housing ② and terminal block ③.



### How to Use the DIN Terminal

Note: a It is possible to wire using bare wires.

In such a case, loosen the screw with a washer ⑩, place the lead wire into the bracket ⑩, and then tighten it once again.

b The max. size for the round terminal ⑨ is 1.25 mm<sup>2</sup>—3.5, and for the Y terminal, it is 1.25 mm<sup>2</sup>—4.

c Cable ⑧ outside diameter:  $\phi 6$  to  $\phi 12$  mm

\* For those with an outside diameter ranging from  $\phi 9$  to  $\phi 12$ , remove the inside parts of the rubber seal ⑦ before using.

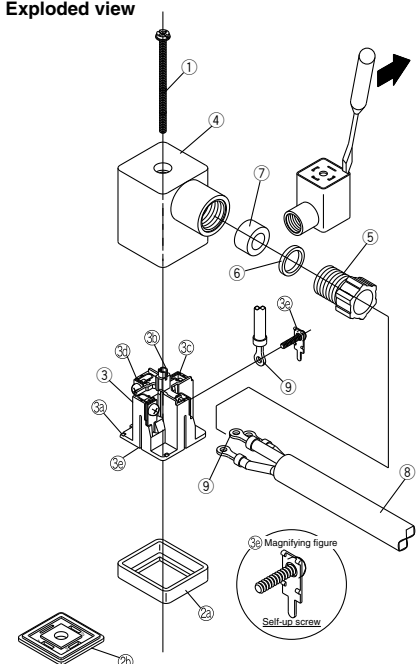
#### 3. Assembly

- 1) The terminal box ③ connected to the housing ④ should be put back in place. (Push it down until you hear it click.)
- 2) Put the rubber seal ⑦ and the plain washer ⑥, in this order, into the cable-introducing slit on the housing ④, and then firmly tighten the cable gland ⑤.
- 3) After inserting the gasket ② or ② between the bottom part of the terminal box ③ and the plug on the equipment, screw in the screw ① on top of the housing ④ and tighten it.  
\* Tighten within the tightening torque range of 0.5 N·m ±20%.

#### Changing the entry direction

The cable entry direction of a connector can be changed as desired (4 directions at 90° intervals), depending on the combination of the housing ④ and terminal block ③.

#### Exploded view





# VT301 Series

## Specific Product Precautions 2

Be sure to read this before handling the products.

Refer to the "Handling Precautions for SMC Products" (M-E03-3) for safety instructions and solenoid valve precautions.

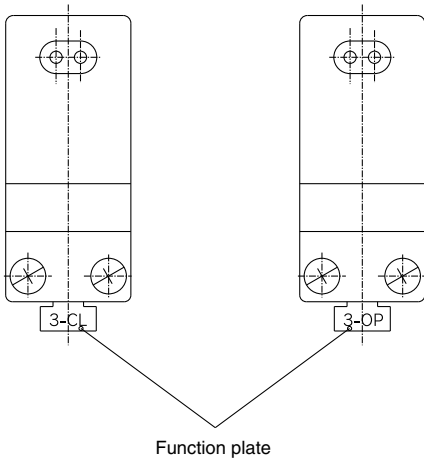
### Mounting

#### ⚠ Warning

When mounting a valve on the manifold base, N.C. and N.O. can be reversed by the function plate orientation. Also, since the cylinder operates in reverse, confirm if the function plate is correctly mounted or not.

N.C. specification

N.O. specification



### Changing from N.C. to N.O.

#### ⚠ Caution

Port positions for manifold solenoid valve body

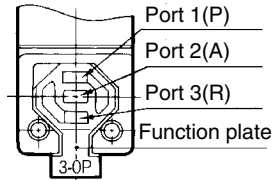


Figure: For N.C.

Specifications	Function plate
N.C.	3-CL
N.O.	3-OP



\* This product is delivered as N.C. valve. If N.O. valve is required, remove mounting screws of the required valve and turn over the function plate. (Make sure that there are gaskets on both sides of the plate.) Then, tighten the mounting screws to fix the valve to the manifold base.

#### ⚠ Caution

1. Each valve is fixed to the manifold base with two M4 mounting screws. Tighten the screws firmly when re-mounting.  
Tightening torque of the mounting screw: 1.4 N·m
2. For mounting, tighten M4 or equivalent screws evenly into the mounting holes of the manifold base.

### Piping

#### ⚠ Caution

1. For the common exhaust type, pressurization or evacuation of the R port can cause a malfunction.