

3 Port Direct Operated Poppet Solenoid Valve Rubber Seal

Series VT307

Compact yet provides a large flow capacity

Dimensions (W x H x D) ... 30 x 54.5 x 33 (Grommet)

C: 0.71 dm³/(s·bar)
{Rc 1/4 (Passage 2 → 3)}

Low power consumption

VT/VO307 4.8 W DC/Standard type
VT/VO307Y 2 W DC/Energy-saving type
VT/VO307W

Suitable for use in vacuum applications

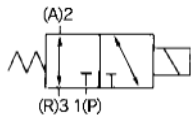
–101.2 kPa
(For vacuum specifications type:
VT/VO307V, VT/VO307W)

A single valve with 6 valve functions

(Universal porting type)
Selective porting can provide 6 valve functions, such as N.C. valve, N.O. valve, Divider valve, Selector valve, etc.



JIS Symbol



How to Order

V	T	307		5	D		01		F
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Body type

T	Body ported
0	Manifold

Valve option

Nil	Standard type
E*	Continuous duty type
Y*	Energy-saving type (2 W DC)
V*	For vacuum
W*	Energy-saving type, For vacuum

* Option

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

Option

F	With foot bracket
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Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Port size

Nil	Without port (For manifold)
01	1/8 (6A)
02	1/4 (8A)

Light/Surge voltage suppressor

Nil	None
S	With surge voltage suppressor (Grommet type is only available.) Refer to the figure below.
Z	With light/surge voltage suppressor (Except grommet type)

* As for the case of rated voltage [Others (9)], please contact SMC.

Surge voltage suppressor mounting part

Electrical entry

G	Grommet, 300 mm lead wire
H	Grommet, 600 mm lead wire
D	DIN terminal
E	Grommet terminal
T	Conduit terminal

Manifold

Model	Applicable manifold type	Accessory
VO307□	Common or individual exhaust	Function plate (DXT152-14-1A) ^{Note} Mounting screw (NXT013-3)

Note) It is not applied to "Continuous duty type". Refer to the accessories on page 4-7-5.

Option

Description	Part no.
Bracket	DXT152-25-1A (With thread)

V100

SY

SYJ

VK

VZ

VT

VP

VG

VP

S070

VQ

VKF

VQZ

VZ

VS

VFN

Series VT307

⚠ Precautions

Be sure to read before handling.
For Safety Instructions and Solenoid Valve Precautions,
refer to page 4-18-2.

⚠ Caution

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

How to Calculate the Flow Rate

For obtaining the flow rate, refer to page 4-1-6.

Standard Specifications

Type of actuation	Direct operated type 2 position single solenoid	
Fluid	Air	
Operating pressure range	0 to 0.9 MPa	
Ambient and fluid temperature	-10 to 50°C (No freezing. Refer to page 4-18-4.)	
Response time ⁽¹⁾	20 ms or less (at the pressure of 0.5 MPa)	
Max. operating frequency	10 Hz	
Lubrication	Not required (Use turbine oil Class 1 ISO VG32, if lubricated.)	
Manual override	Non-locking push type	
Mounting orientation	Unrestricted	
Shock/Vibration resistance ⁽²⁾	150/50 m/s ²	
Enclosure	Dustproof	
Electrical entry	Grommet, Grommet terminal, Conduit terminal, DIN terminal	
Coil rated voltage (V)	AC (50/60 Hz)	100, 200, 24°, 48°, 110°, 220°, 240°
	DC	24, 6°, 12°, 48°, 100°
Allowable voltage fluctuation	-15 to +10% of rated voltage	
Apparent power ^{(3) (4)}	AC	Inrush 12.7 VA (50 Hz) 10.7 VA (60 Hz)
		Holding 7.6 VA (50 Hz) 5.4 VA (60 Hz)
Power consumption ^{(3) (4)}	DC	Without indicator light: 4.8 W, With indicator light: 5 W
Light/Surge voltage suppressor (Not applicable for grommet type)	AC	ZNR (Varistor), Neon bulb
	DC	Diode, LED (Neon bulb for 100 V or more)



* Option

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

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)

Note 3) At rated voltage

Note 4) The value is different for continuous duty type (VT307E), and energy-saving type (VT307Y/W). Refer to "Option" shown below.

Flow Characteristics/Weight

Valve model	Port size	Flow characteristics												Weight
		1 → 2 (P → A)			2 → 3 (A → R)			3 → 2 (R → A)			2 → 1 (A → P)			
		C [dm³/(sbar)]	b	Cv	C [dm³/(sbar)]	b	Cv	C [dm³/(sbar)]	b	Cv	C [dm³/(sbar)]	b	Cv	Grommet
VT307	1/8	0.71	0.35	0.18	0.68	0.27	0.17	0.65	0.36	0.17	0.63	0.35	0.17	0.14 kg
VT307V (Vacuum spec. type)														
VT307E (Continuous duty type)														
VT307Y (Energy-saving type)														
VT307W (Energy-saving, Vacuum spec. type)	1/4	0.41	0.26	0.10	0.44	0.35	0.11	0.48	0.27	0.12	0.35	0.33	0.10	
VT307		0.71	0.31	0.19	0.71	0.25	0.17	0.68	0.33	0.17	0.71	0.26	0.18	
VT307V (Vacuum spec. type)														
VT307E (Continuous duty type)														
VT307Y (Energy-saving type)		0.49	0.20	0.12	0.44	0.34	0.11	0.48	0.17	0.12	0.46	0.28	0.11	
VT307W (Energy-saving, Vacuum spec. type)														

Note) Values for a single valve unit. It differs in the manifold case. Refer to manifold specifications on page 4-7-5.

Option

Continuous duty type: VT307E

Exclusive use of VT317E is recommended for continuous duty with long time loading.

⚠ Caution

1. This model is for continuous duty, not for high cycle rates. But even in low cycle rates, if energizing the valve more than once a day, please consult with SMC.
2. Energizing solenoid should be done at least once in 30 days.

Specifications different from standard are as follows.

Apparent power/AC	Inrush	7.9VA (50 Hz), 6.2VA (60 Hz)
	Holding	5.8VA (50 Hz), 3.5VA (60 Hz)
Power consumption/DC	2 W, 2.2 W (With indicator light)	
Response time ⁽¹⁾	30 ms or less (at the pressure of 0.5 MPa)	



Note 1) Refer to "Response time" of standard specifications.

Note 2) For the flow characteristics, refer to "Flow Characteristics".

4-7-2

Energy-saving type: VT307Y (VT307W)

If low power consumption is required for electronic control, "VY307Y(W)" (2 W DC) is recommended.

Specifications different from standard are as follows.

Power consumption/DC	2 W, 2.2 W (With indicator light) *
Response time ⁽¹⁾	25 ms or less (at 0.5 MPa)



* 100 VDC: 2.4 W

Note 1) Refer to "Response time" of standard specifications.

Note 2) For the flow characteristics, refer to "Flow Characteristics".

Vacuum spec. type: VT307V (VT307W)

This vacuum model has less air leakage than the standard model under low pressure. It is recommended for vacuum application.

⚠ Caution

1. Since this valve has slight air leakage, it can not be used for vacuum holding (including positive pressure holding) in the pressure container.

Specifications different from standard are as follows.

Operating pressure range	-101.2 kPa to 0.1 MPa
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3 Port Direct Operated Poppet Solenoid Valve Rubber Seal Series VT307

Construction

De-energized

Energized

Operation principle <De-energized>
Spool valve ② is pushed upward by the return spring ③, port P ① is closed, and then port A ② and port R ③ are opened.
Air flow direction:
Port P ↔ Block, A ↔ R

<Energized>
When an electric current is applied to the molded coil ④, the armature ⑤ is attracted to the core ⑥, and through the push rod ⑦, it pushes down the spool valve ②. Then, port P ① and port A ② are connected. At this time, there will be gaps between the armature ⑤ and the core ⑥, but the armature will be magnetically attracted to the core ⑥.
Air flow direction:
Port P ↔ Port A, Port R ↔ Block

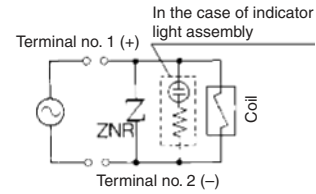
Component Parts

No.	Description	Material	Note
①	Body	Aluminum die-casted	Color: Platinum silver
②	Spool valve	Aluminum, NBR	
③	Return spring	Stainless steel	
④	Molded coil	Resin	

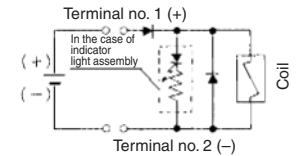
⚠ Caution

Light/Surge Voltage Suppressor

AC, 100 VDC or more



48 VDC



Electrical Connection

DIN terminal and terminal (with light/surge voltage suppressor) are connected inside as in the figure below. Connect to the corresponding power supply.

DIN terminal block

Terminal block

Terminal no.	1	2
DIN terminal	+	-
Terminal	+	-

- Applicable cable O.D.
Type T: $\phi 4.5$ to $\phi 7$ mm
Type E: $\phi 2.3$ to $\phi 2.8$ mm
Type D: $\phi 6$ to $\phi 8$ mm
- Applicable crimp terminal
Type E/T: 1.25-3, 1.25-3S
1.25Y-3N, 1.25Y-3S
(Round or "Y" shaped crimped terminals)
can be not used for type "D".

Lead Wire Color

Voltage	Color
100 VAC	Blue
200 VAC	Red
DC	Red (+), Black (-)
Other	Gray

How to Use DIN Terminal

1. Disassembly

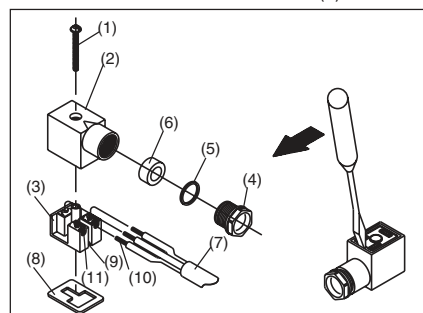
- 1) After loosening the thread (1), then if the housing (2) is pulled in the direction of the thread, the connector will be removed from the body of equipment (solenoid, etc.).
- 2) Pull the screw (1) out of the housing (2).
- 3) On the bottom part of the terminal block (3), there's a cut-off part (9).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

3. Wiring

- 1) Passing through the cable (7), cable gland (4), plain washer (5), rubber seal (6) in this order, and then insert into the housing (2).
- 2) From the terminal block (3), loosen the screw (11), then pass the lead wire (10) through, then again tighten the screw (11).
Note 1) Tighten within the tightening torque of $0.5 \text{ N} \cdot \text{m} \pm 15\%$.
Note 2) Cable (7) external: $\phi 6$ to $\phi 8$ mm
Note 3) Crimped terminal like round-shape or Y shape cannot be used.

3. Assembly

- 1) Passing cable gland (4), washer (5), rubber seal (6), housing (2) in this order through cable (7) and connect to terminal block (3) and then set the terminal block (3) to the housing (2).
(Push it down until you hear the click sound.)
- 2) Putting rubber seal (6), plain washer (5), in this order into the cable introducing slit on the housing (2), then further tighten the cable gland (4) securely.
- 3) Insert the gasket (8) between the bottom part of terminal block (3) and a plug attached to equipment, and then screw (1) in from the top of the housing (2) to tighten it.
Note 1) Tighten within the tightening torque of $0.5 \text{ N} \cdot \text{m} \pm 15\%$.
Note 2) Connector orientation can be changed by 180 degrees depending on how to assemble the housing (2) and the terminal block (3).



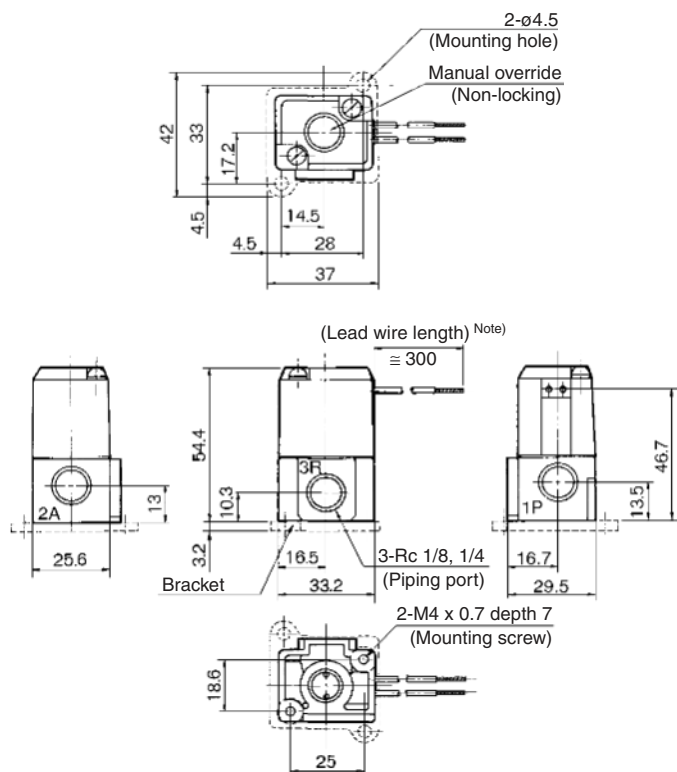
Connector for DIN Terminal

Description	Part no.
DIN connector	B1B09-2A

Series VT307

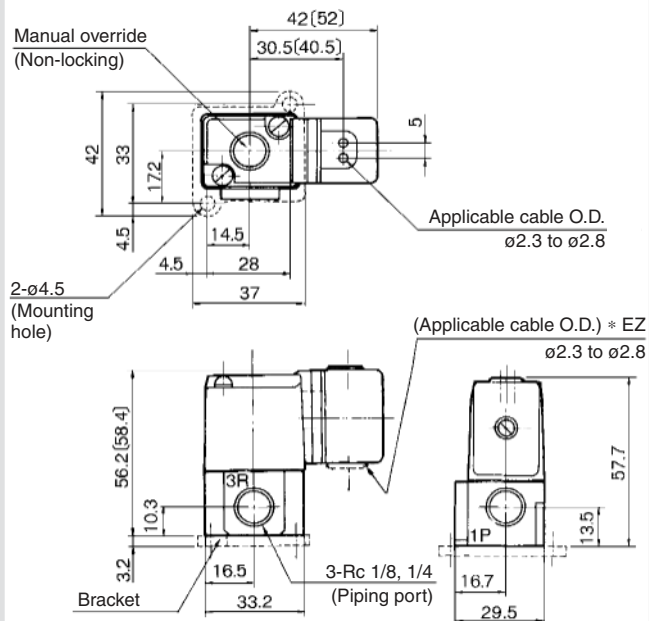
Dimensions (Interchangeable with “VT301” for mounting)

Grommet: VT307-□G



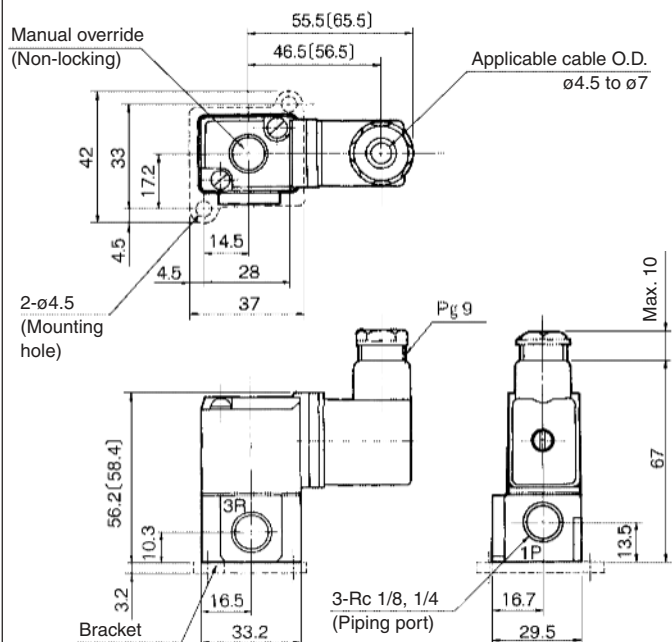
Note) There is also “VT307-□H” (lead wire length: 600 mm).

Grommet terminal: VT307-□E



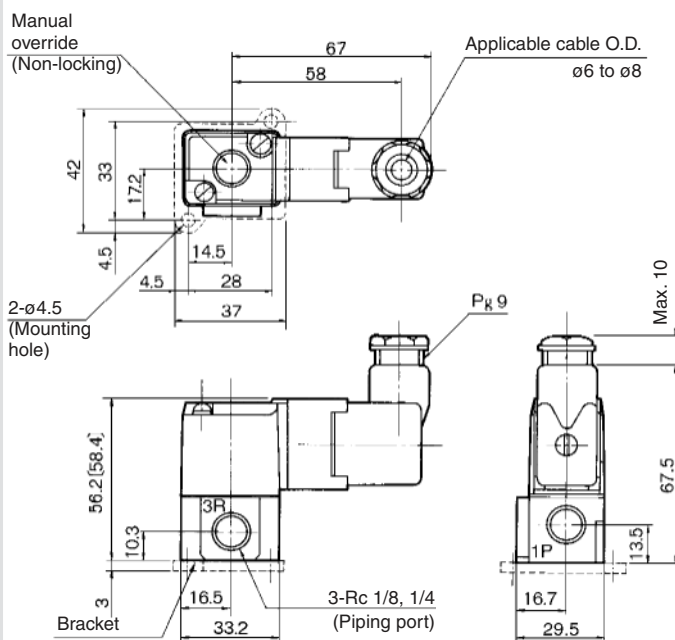
[]: With light/surge voltage suppressor

Conduit terminal: VT307-□T



[]: With light/surge voltage suppressor

DIN terminal: VT307-□D



[]: With light/surge voltage suppressor

Series VT307

Manifold Specifications

VT307 manifold is B mount style and available both as a common exhaust and individual exhaust model.

Manifold valve can be easily converted from N.C. (Normally Closed) to N.O. (Normally Open) merely by turning over the switch cover.



VV307-01-052-F

VV307-01-063-□-F

How to Order Manifold

VV307	- 01	- 05	2	- 01	- □	- F	
							Mounting bracket
							Thread type
							Nil Rc
							F G
							N NPT
							T NPTF
							A port size (Base mounted)
							01 1/8 common exhaust/individual exhaust
							02 1/4 individual exhaust
							Exhaust port type
							2 Common exhaust
							3 Individual exhaust

Valve stations

02	2 stations
...	...
20	20 stations

Max. 20

* Please indicate manifold base type, applicable manifold valve and blanking plate when ordering.

Ordering Example: VV307-01-052-01-F... 1 pc.
(5 station manifolds base)
V0307-1G... 4 pcs.
DXT060-51-13A... 1 pc.

Manifold Specifications

Manifold type		B mount		
Max. number of stations		20 stations ^{Note)}		
Applicable solenoid valve		VO307□-□□□		
Exhaust port		Port location (Direction)/Port size		
Symbol	Type	P	A	R
2	Common	<u>Base (Side)</u> 1/8	<u>Base (Side)</u> 1/8	<u>Base (Side)</u> 1/8
3	Individual	<u>Base (Side)</u> 1/4	<u>Base (Side)</u> 1/8, 1/4	<u>Base (Top)</u> 1/8



Note) For more than 6 stations, supply air both sides of P port. The common exhaust type should exhaust from both of the R port.

Option

Description	Part no.
Blanking plate (With gasket, screw) ^{Note)}	DXT060-51-13 ^{A B}

Accessory for Applicable Solenoid

Description	Part no.	Qty.
Function plate (With gasket) ^{Note)}	DXT152-14-1 ^{A B}	1 pc.
Mounting screw	NXT013-3	2 pcs.



Note) DXT060-51-13B, DXT152-14-1B are for energizing continuously.

Flow Characteristics/Weight

Valve model	Flow characteristics												Weight
	1 → 2 (P → A)			2 → 3 (A → R)			3 → 2 (R → A)			2 → 1 (A → P)			
	C [dm³/(s·bar)]	b	Cv	C [dm³/(s·bar)]	b	Cv	C [dm³/(s·bar)]	b	Cv	C [dm³/(s·bar)]	b	Cv	Grommet
VO307	0.34	0.28	0.089	0.34	0.22	0.082	0.36	0.28	0.091	0.34	0.18	0.080	0.14 kg
VO307V (Vacuum spec. type)													
VO307E (Continuous duty type)													
VO307Y (Energy-saving type)													
VO307W (Energy-saving, Vacuum spec. type)	0.30	0.18	0.070	0.30	0.15	0.072	0.32	0.20	0.075	0.30	0.15	0.069	

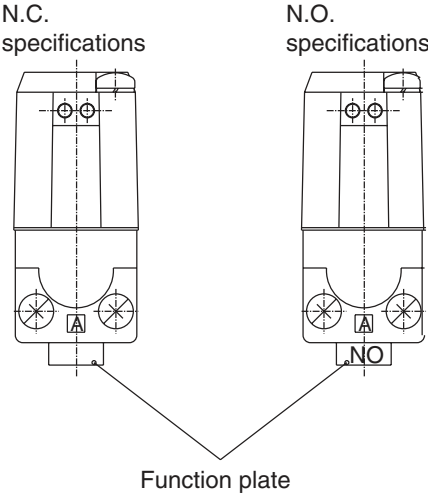
⚠ Precautions

Be sure to read before handling. For Safety Instructions and Solenoid Valve Precautions, refer to page 4-18-2.

Mounting

⚠ Warning

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



⚠ Caution

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

Port Direction

⚠ Caution

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

Changing from N.C. to N.O.

⚠ Caution

This product is delivered as N.C. valve. If N.O. valve is needed, 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.

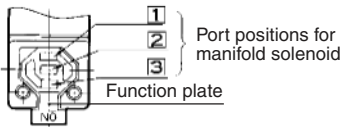


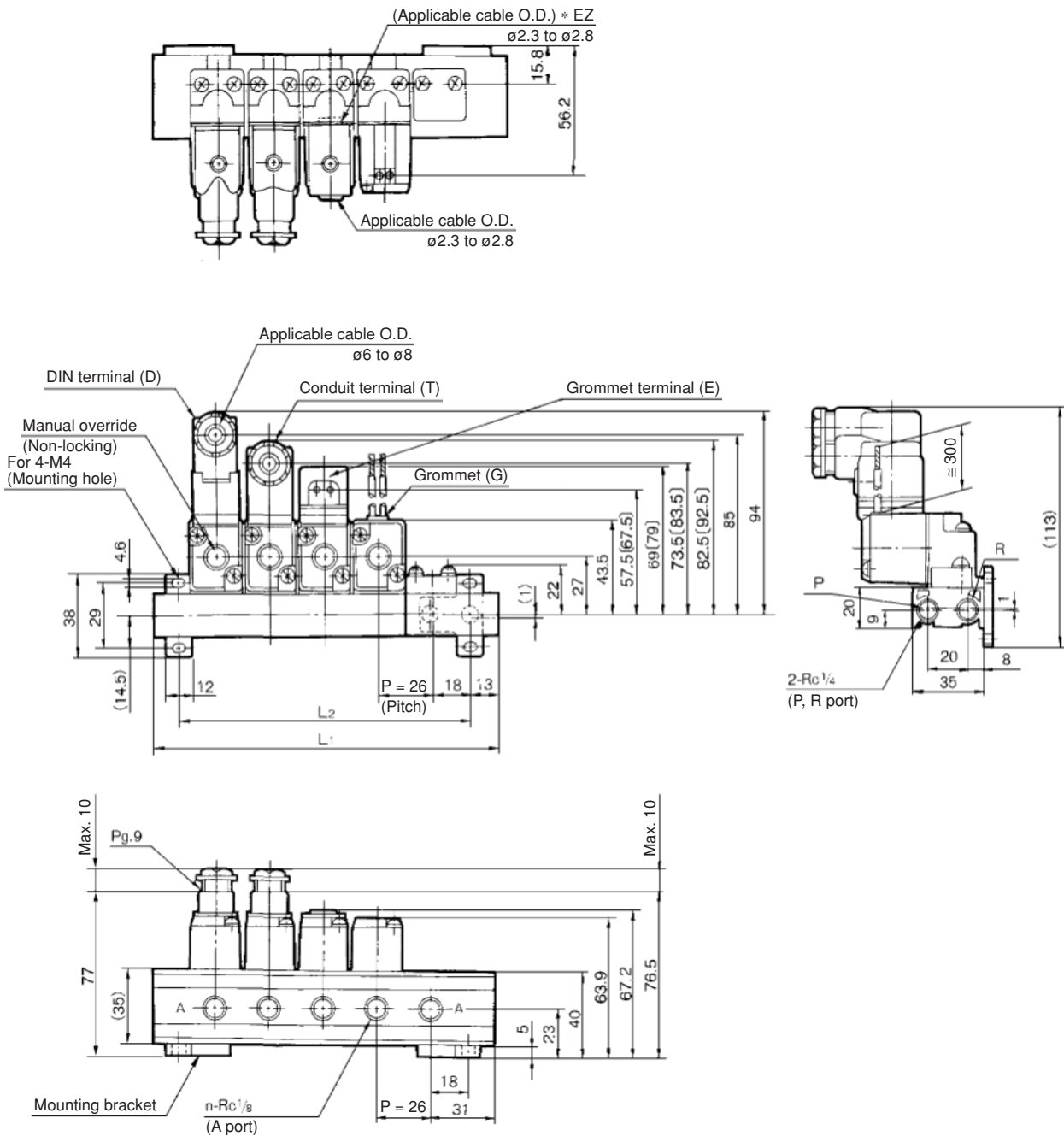
Figure: For N.C.

Specifications	Function plate
N. C.	No mark
N. O.	NO

3 Port Direct Operated Poppet Solenoid Valve Rubber Seal

Dimensions: Common Exhaust (Interchangeable with VT301 for mounting)

VV307-01-□2-01-F



L Dimension										n: Stations
L \ n	2	3	4	5	6	7	8	9	10	Formula
L ₁	88	114	140	166	192	218	244	270	296	L ₁ = 26 x n + 36
L ₂	62	88	114	140	166	192	218	244	270	L ₂ = 26 x n + 10

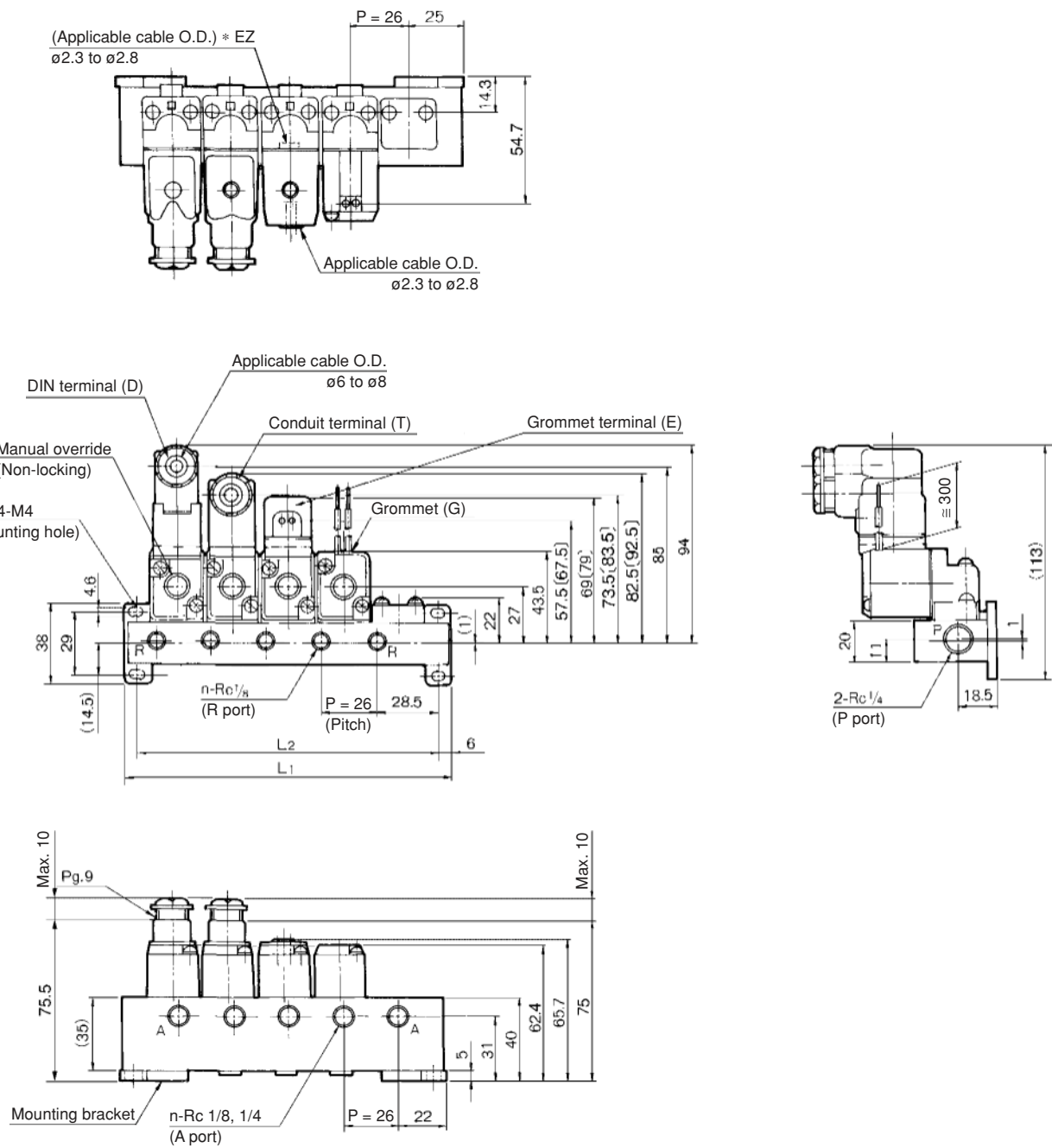


[]: With light/surge voltage suppressor

Series VT307

Dimensions: Individual Exhaust (Interchangeable with VT301 for mounting)

VV307-01-□3-□-F



[]: With light/surge voltage suppressor

L Dimension										n: Stations
Stations	2	3	4	5	6	7	8	9	10	Formula
L1	76	102	128	154	180	206	232	258	284	L1 = 26 x n + 24
L2	64	90	116	142	168	194	220	246	272	L2 = 26 x n + 12