Rubber Seal
3-Port/Poppet Type
VT315 Series

Compact with a large flow capacity

Dimensions (W x H x D)···45 x 95 x 45
(Grommet)
C: 1.7 dm^3/(s·bar)
(Passage 2 → 3)

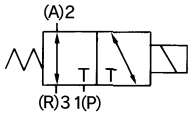
A single valve with 6 valve functions

(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.)

Suitable for use in vacuum applications

–101.2 kPa
(Vacuum specification type: VT/VO315V)

Symbol



How to Order

VT315 [ ] - **02** **1** **G** [ ] - [ ] - [ ]

For the manifold (VO315), refer to page 12.

Valve option

Nil	Standard
E	Continuous-duty type
V	For vacuum

Port size

02	1/4

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

For other rated voltages, please contact SMC.

Electrical entry

G	Grommet, Lead wire length 300 mm
H	Grommet, Lead wire length 600 mm
C	Conduit
D	DIN terminal
DO	DIN terminal, Without connector
T	Conduit terminal
TL	Terminal with indicator light
DL	DIN terminal with indicator light
DOL	DIN terminal with indicator light, Without connector

Manual override

Nil	Non-locking type
M	Locking type (Tool required)

Surge voltage suppressor

Nil	None
S	Surge voltage suppressor (AC: Can be attached to the grommet, conduit, and conduit terminal entry types; DC: Can be attached to the grommet, conduit, and conduit terminal entry types)

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

∗ A gasket must be ordered separately for DO and DOL.
Gasket part no.: DXT087-27-2

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	–5 to 60°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^2
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, Conduit terminal	
Coil rated voltage			100, 200 VAC, 50/60 Hz, 24 VDC	
Allowable voltage fluctuation			–15 to +10% of the rated voltage	
Apparent power∗3	**AC**	**Inrush**	50 Hz	36 VA
			60 Hz	28 VA
		Holding	50 Hz	20 VA
			60 Hz	16 VA
Power consumption∗3	**DC**		6 to 7 W	

∗3 At the rated voltage

Flow Rate Characteristics/Weight

Valve model	Flow rate 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
VT315	1.6	0.30	0.39	1.7	0.39	0.45	1.9	0.38	0.49	1.7	0.36	0.45	0.38 kg
VT315V (Vacuum spec. type)													0.39 kg (For AC)
VT315E (Continuous-duty type)													0.38 kg (For DC)

∗ These are the values for a single valve unit. They are not applicable to manifolds. Refer to the manifold specifications on page 12 for details.

Valve Options

1. Continuous-duty type

Recommended for continuous operation for long periods of time

⚠Caution

1) This model is for continuous duty, not for high frequency cycles. But even for low frequency cycles, if energizing the valve more than once a day, please contact SMC.
2) The solenoid should be energized at least once every 30 days.

Apparent power		Holding: 18 VA (50 Hz)
Coil rated voltage	AC	100, 110, 200, 220 VAC (50/60 Hz)
	DC	12, 24 VDC

2. For vacuum

Pressure range	−101.2 kPa to 0.1 MPa

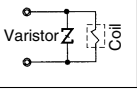
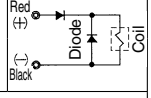
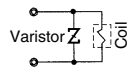
This vacuum model has less air leakage than the standard model under low pressure. It is recommended for vacuum applications.

⚠Caution

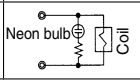
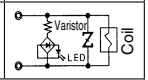
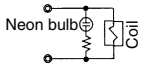
1) Since this valve has slight air leakage, it cannot be used for vacuum retention (including positive pressure retention) in the pressure container.

3. With surge voltage suppressor, with indicator light

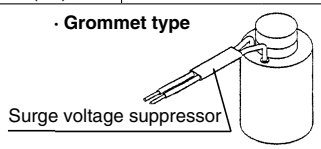
Surge Voltage Suppressor

	AC	DC
Grommet (GS) / Conduit (CS)		
Conduit terminal (TS)		

Circuit for Indicator Light

	AC	DC
DIN terminal with indicator light (DL)		
Conduit terminal with indicator light (TL)		

· **Grommet type**

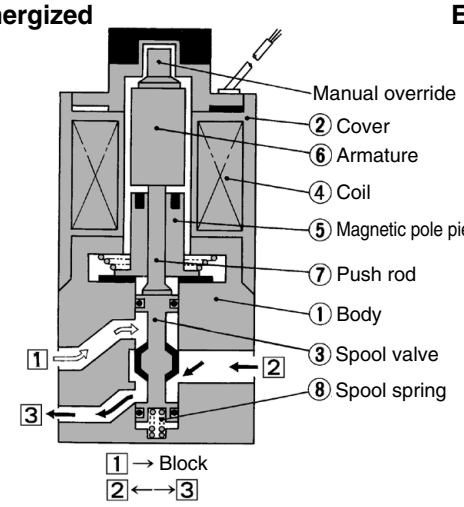


4. Manual override with lock

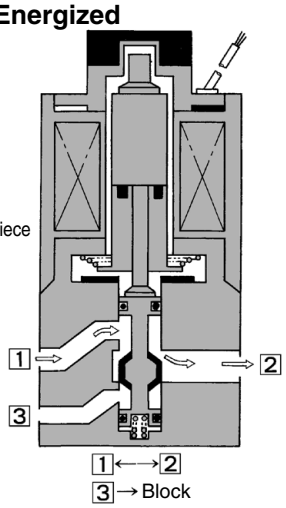
1) Using a screwdriver, push the manual override button that is located in the head portion of the solenoid valve in order to directly push the spool valve downward, thus causing the valve to switch.
2) With the button remaining pushed down, turn it approximately 90° clockwise or counterclockwise to maintain the manual override locked state.
3) To revert to the original state, keep the button pushed down and turn it approximately 90° clockwise or counterclockwise.

Construction

De-energized



Energized



Operation principle

<De-energized>

The spool valve ③ is pushed up by the spring reaction force, sealing port 1 and opening ports 2 and 3.

Air flow direction: 1 ⟷ Block, 2 ⟷ 3

<Energized>

The armature ⑥ is suctioned toward the magnetic pole piece ⑤, and the spool valve ③ is pushed down via the push rod ⑦. This seals port 3 and opens ports 1 and 2. At this time, the armature ⑥ and the magnetic pole piece ⑤ are brought into close contact with each other by the magnetic pole piece ⑤ being suctioned toward the armature ⑥.

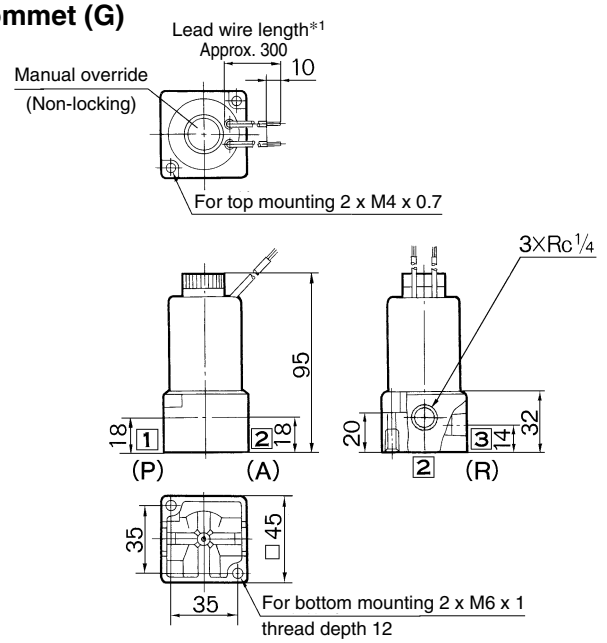
Air flow direction: 1 ⟷ 2, 3 ⟷ Block

Component Parts

No.	Description	Material	Note
1	**Body**	Aluminum die-casted	Platinum silver
2	**Cover**	Steel	Platinum silver
3	**Spool valve**	Aluminum, NBR	

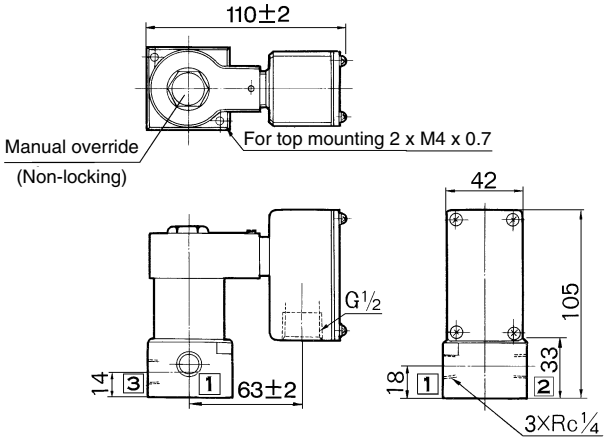
Dimensions

Grommet (G)

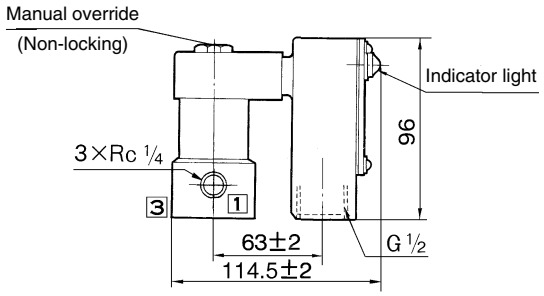


*1 There is also an option with a 600 mm lead wire length (VT315-□H).

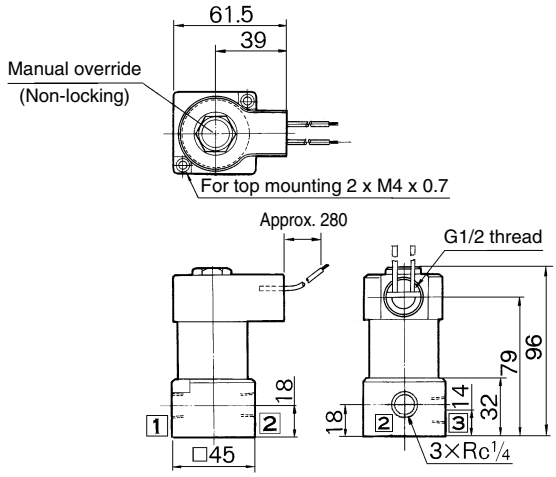
Conduit terminal (T)



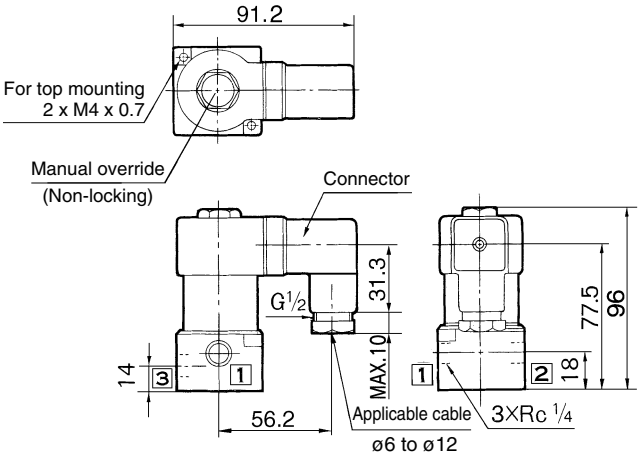
Conduit terminal with indicator light (TL)



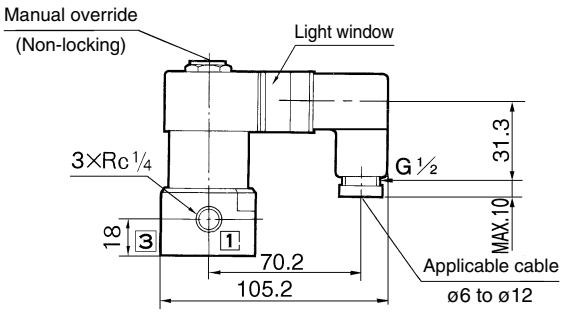
Conduit (C)



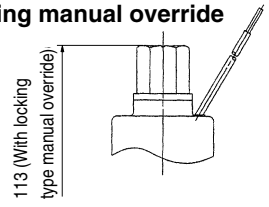
DIN terminal (D)



DIN terminal with indicator light (DL)

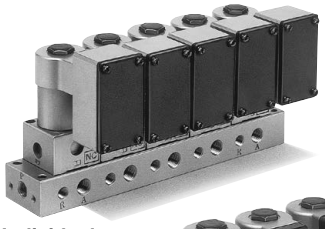


With locking manual override

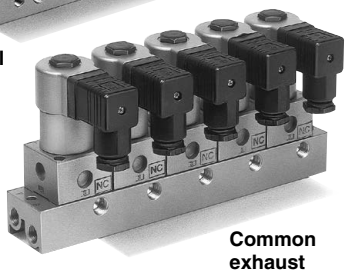


VT315 Series
Manifold Specifications

The VT315 type manifold is a B-mounted system with 2 types: a common exhaust type and an individual exhaust type.



Individual exhaust



Common exhaust

How to Order

VVT32 0 - 05 0 1 -

Porting specifications

Symbol	P	A	R
0	Side	Side	Side
1	Side	Bottom	Side

Thread type

Nil	Rc
F	G
N	NPT
T	NPTF

Valve stations

02	2 stations
⋮	⋮
20	20 stations

Exhaust type

1	Common exhaust
2	Individual exhaust

Mounting bracket

0	Without mounting bracket
A	With mounting bracket

∗ 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> VVT320-0501 ····· 1 pc.
∗ VO315-001G ····· 4 pcs.
∗ DXT010-36-2A··· 1 pc.
The asterisk denotes the symbol for assembly.
Prefix it to the part nos. of the solenoid valve, etc.

How to Order Valves (For Manifold)

VO315 □ -00 □□□ - □ - □

Exhaust port type of manifold

Nil	Common exhaust
1	Individual exhaust

The entry is the same as that of the standard model.

Accessory for Applicable Solenoid Valves

Description	Part no.	Qty
O-ring	KA00087(P8)	4
Round head combination screw	DXT010-66-2	2

Option

Description	Part no.	Note
Mounting bracket assembly	DXT010-37-4□A	Common exhaust
	DXT010-37-3□A	Individual exhaust
Blanking plate (O-ring, With screw)	DXT010-36-2A	Common exhaust
		Individual exhaust

□: Thread type (Refer to "How to Order.")

Manifold Specifications

Manifold type	B mount
Max. number of stations	20 stations∗1
Applicable solenoid valve	VO315□-00□□□

Exhaust port type	Port location/Port size			Port direction		
	P	A	R	P	A	R
Common	Base 1/4(3/8)	Base 1/4	Base 1/4(3/8)	Side	Side/Bottom	Side
Individual	Base 1/4(3/8)	Base 1/4	Base 1/8	Side	Side/Bottom	Side

∗1 For more than 6 stations, supply air to both sides of the P port. The common exhaust type should exhaust from both of the R ports.
∗ The mounting bracket can change the P and R ports (only the P port for the individual exhaust type) to 3/8".The common exhaust type needs a specific base.

Flow Rate Characteristics/Weight

Valve model	Flow rate 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
VO315	1.4	0.12	0.33	1.2	0.18	0.29	1.5	0.16	0.35	1.2	0.13	0.28	0.39 kg
VO315V (Vacuum spec. type)													
VO315E (Continuous-duty type)													0.40 kg (For AC) 0.39 kg (For DC)

VT315 Series
Specific Product Precautions

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 valves on the manifold base, the mounting orientation is decided. If it is mounted in the wrong direction, connected equipment may malfunction. Mount it by referring to how to switch over from N.C. to N.O. specifications.

⚠Caution

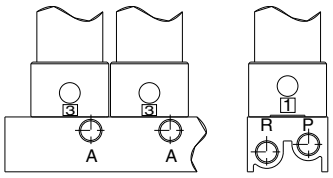
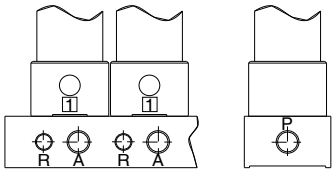
The valves are assembled as N.C. valves at the time of shipment.

By removing the two retaining screws from the desired valves, and rotating each valve body 180° and reassembling it on the manifold base, it is possible to reassemble an N.C. valve as an N.O. valve. (Make sure that there are O-rings fixed on 4 positions of the valve surface.) Properly tighten the screws.

Tightening torque of the mounting screw: 1.4 N·m

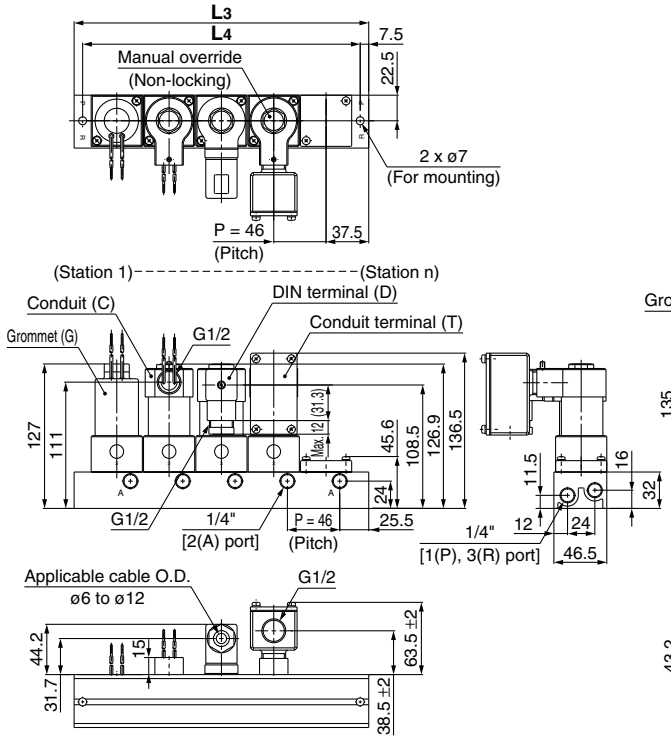
Changing from N.C. to N.O.

Universal porting permits convertibility N.C./N.O. by a simple 180 degree rotation.
Mounting conditions for N.C. and N.O. is indicated as below figure.

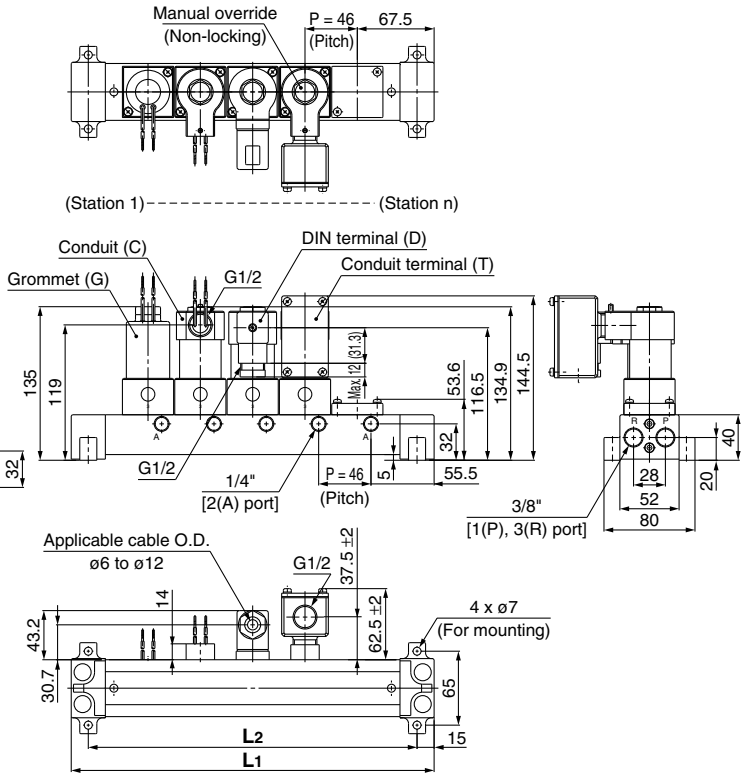
Valve / Exhaust port type	N.C.	N.O.
Common exhaust		
Individual exhaust		

Dimensions

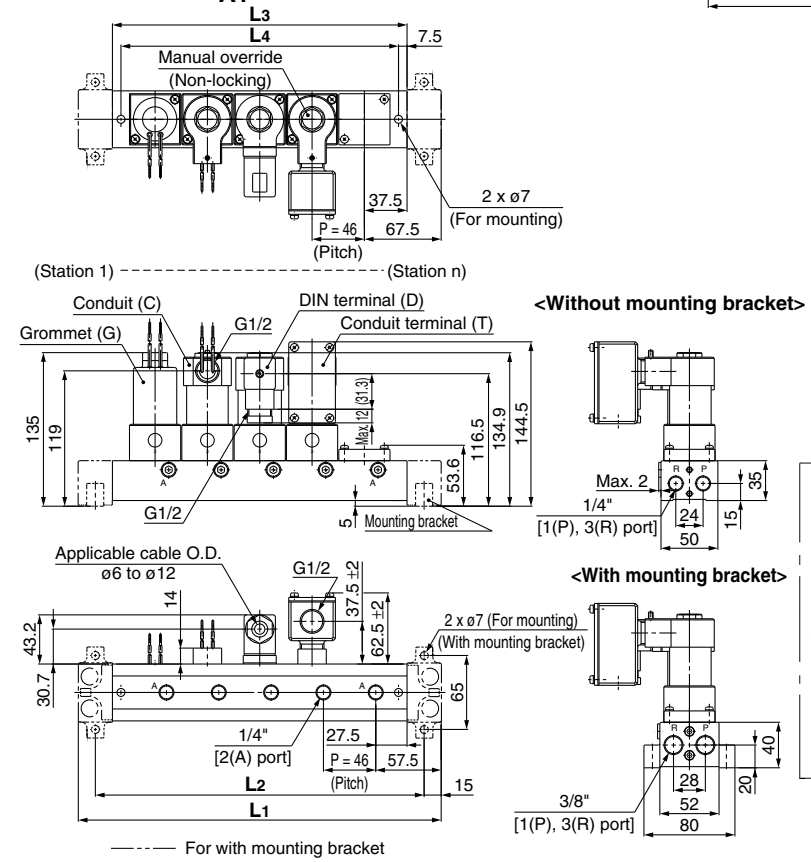
Common exhaust
VVT320- Station 01



VVT320- Station A1



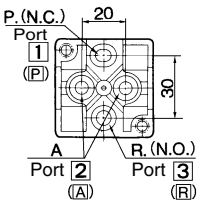
VVT321- Station 01 A1 (Bottom Ported)



<Without mounting bracket>

<With mounting bracket>

Bottom ported single valve unit
Port location



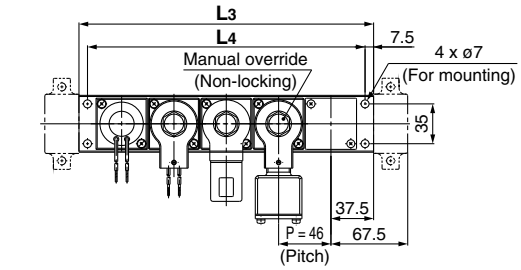
* The 1, 2, and 3 (P, A, and R) indications on the body side have no relation to the bottom piping port position.

n: Stations

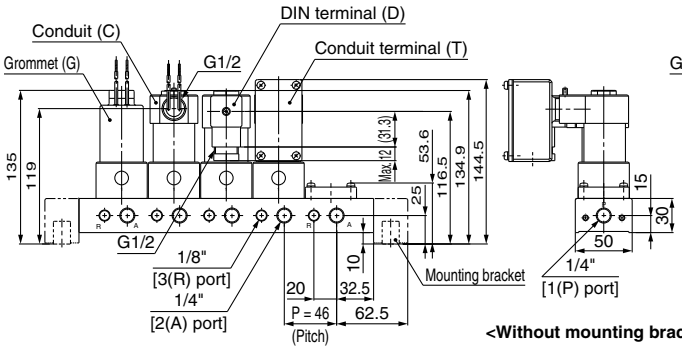
Symbol \ n	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
L1	181	227	273	319	365	411	457	503	549	595	641	687	733	779	825	871	917	963	1009
L2	151	197	243	289	335	381	427	473	519	565	611	657	703	749	795	841	887	933	979
L3	121	167	213	259	305	351	397	443	489	535	581	627	673	719	765	811	857	903	949
L4	106	152	198	244	290	336	382	428	474	520	566	612	658	704	750	796	842	888	934

Dimensions

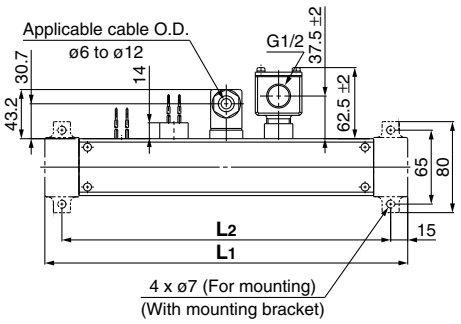
Individual exhaust
VVT320- Station 02 A2

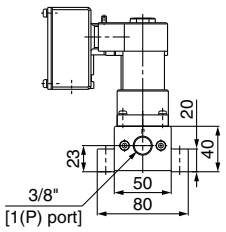


(Station 1) ---------- (Station n)



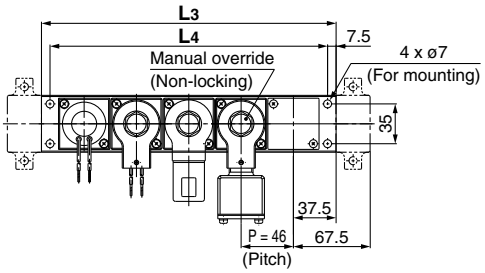
<Without mounting bracket>



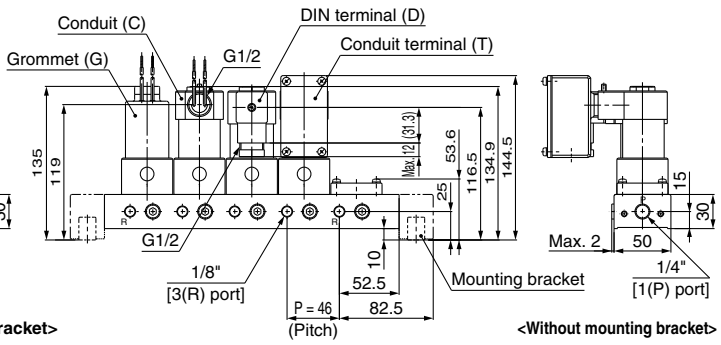


<With mounting bracket>

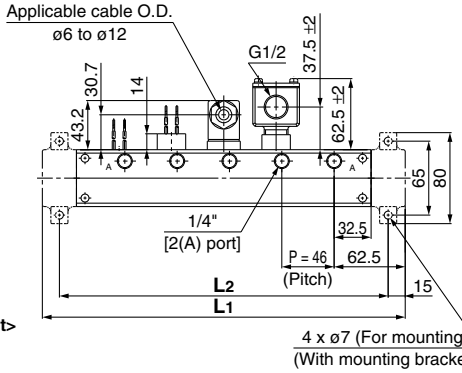
VVT321- Station 02 A2 (Bottom Ported)

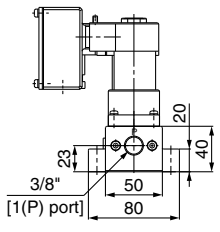


(Station 1) ---------- (Station n)



<Without mounting bracket>

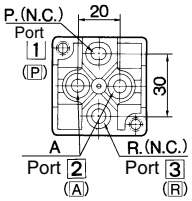




<With mounting bracket>

—·—·— For with mounting bracket

Bottom ported single valve unit
Port location



* The 1, 2, and 3 (P, A, and R) indications on the body side have no relation to the bottom piping port position.

n: Stations

Symbol \ n	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
L1	181	227	273	319	365	411	457	503	549	595	641	687	733	779	825	871	917	963	1009
L2	151	197	243	289	335	381	427	473	519	565	611	657	703	749	795	841	887	933	979
L3	121	167	213	259	305	351	397	443	489	535	581	627	673	719	765	811	857	903	949
L4	106	152	198	244	290	336	382	428	474	520	566	612	658	704	750	796	842	888	934

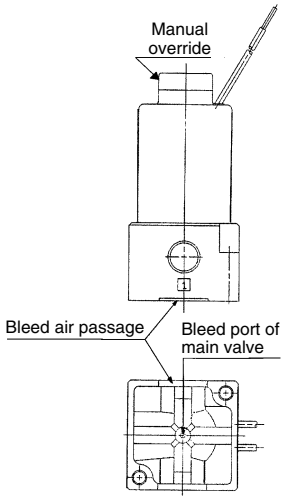
VT315 Series
Specific Product Precautions

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. A bleed port for the main valve is located at the bottom of the solenoid valve. Please refrain from blocking it as doing so may result in malfunction.

∗ Generally, when the solenoid valve is mounted on a metal surface, it can breathe through the breather hole, via the breather groove. However, if it is mounted on a rubber surface, the rubber could become deformed and block the hole.



Bottom of the solenoid valve

2. 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.
3. Do not touch the solenoid valve because the coil generates heat when energized, which may cause the external surface to become hot, resulting in burns, etc., depending on the energized state.

⚠ Caution

How to Use the DIN Terminal

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 ②a or ②b.
3) On the bottom part of the terminal block ③, there's a cut-off part (indicated by an arrow) ③a. 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 ③e from the bracket ③e. (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 ③e again.
∗ Tighten within the tightening torque range of 0.5 N·m ±15%.

Note: a It is possible to wire using bare wires. In such a case, loosen the screw with a washer ③e, place the lead wire into the bracket ③d, and then tighten it once again.
b The max. size for the round terminal ⑨ is 1.25 mm^2—3.5, and for the Y terminal, it is 1.25 mm^2—4.
c Cable ⑧ outside diameter: ø6 to ø12 mm
∗ For those with an outside diameter ranging from ø9 to ø12, remove the inside parts of the rubber seal ⑦ before using.

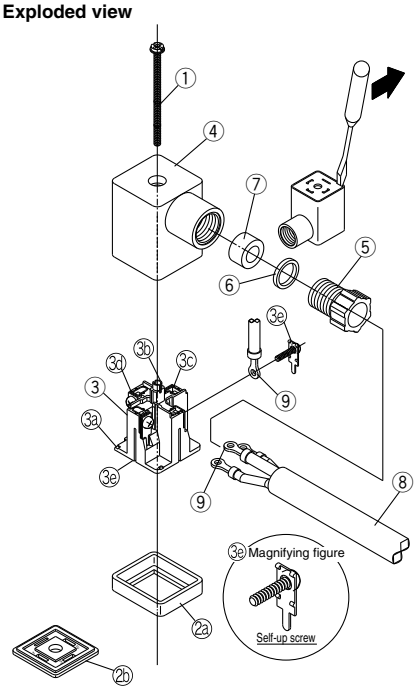
3. Assembly

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 ②a or ②b 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



Electrical Connection

If the rated voltage for the solenoid valve is DC and there is polarity, connect terminal no.1 to the positive (+) side and no.2 to the negative (-) side.

Connector for DIN Terminal

Description	Part no.
DIN connector	GDM2B

How to Calculate the Flow Rate

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