# 4 Port Solenoid Valve

## *VQD1000 Series*

**Rubber Seal** **Direct Operated Poppet Type**

### Unprecedented high speed, with stable response times

ON: 4 ms, OFF: 2 ms, Dispersion accuracy
±1 ms (With light/surge voltage suppressor
at a supply pressure of 0.5 MPa)
(Use clean and dry air.)

### Compact and lightweight (34 g) with large flow capacity

CE [Option]

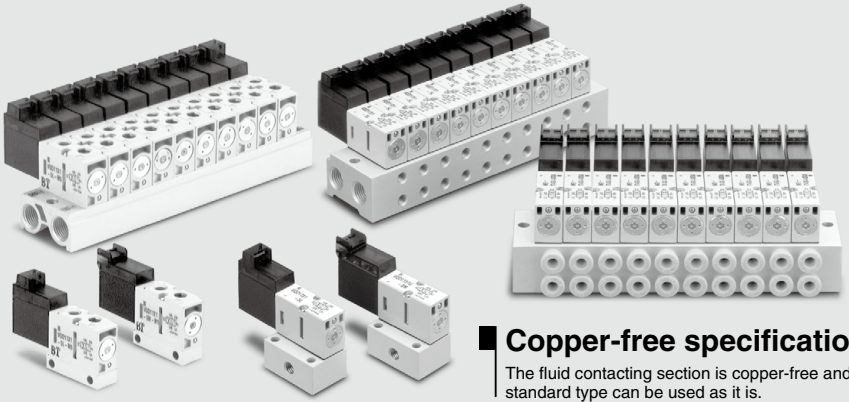
Body width of 10 mm, C: 0.22 dm³/(s·bar) 2 W
C: 0.27 dm³/(s·bar)
3.2 W (U type: Large flow)

### Available in vacuum applications (Up to –101.2 kPa)

Can be used in vacuum/release circuits
When used as a 3 port valve, conversion from N.O. to N.C. and vice versa is possible by plugging either port 4(A) or 2(B).

### Clean room specifications available as special.

Since the main valve has no sliding seals, non-oil treatment specification at the fluid contacting section is available (Made-to-Order part no. X16). The external non-leak specification is also available (10- series).



Body ported Base mounted

### Copper-free specifications

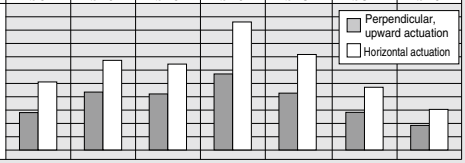
The fluid contacting section is copper-free and the standard type can be used as it is.

## Cylinder Speed Chart

**Base Mounted**

Use as a guide for selection.
Please confirm the actual conditions with SMC Sizing Program.

| Series | Average speed (mm/s) | Bore size | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | CJ2 series Pressure 0.5 MPa Load factor 50% Stroke 60 mm | | | CM2 series Pressure: 0.5 MPa Load ratio: 50% Stroke: 300 mm | | | |
| | | ø6 | ø10 | ø16 | ø20 | ø25 | ø32 | ø40 |
| VQD1151U | 500 450 400 350 300 250 200 150 100 50 0 | | | | | | | |




∗ It is when the cylinder is extending that is meter-out controlled by speed controller which is directly connected with cylinder, and its needle valve with being fully open.
∗ The average velocity of the cylinder is what the stroke is divided by the total stroke time.
∗ Load factor: ((Load weight x 9.8)/Theoretical force) x 100%

**Conditions**

| Base mounted | | CJ2 series | CM2 series |
|---|---|---|---|
| VQD1151U | Tube bore x Length | TU0425 x 1m | |
| | Speed controller | AS1201F-M5-04 | AS2201F-02-04 |
| | Silencer | AN120-M5 | |

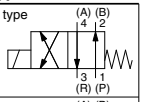
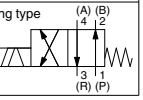
# 4 Port Solenoid Valve
# Direct Operated Poppet Type
# VQD1000 Series

CE [Option]

## How to Order Valves

**VQD1 1 5 1 □ – 5 L – □ – □ – □**

### Type of actuation

| | | |
|---|---|---|
| 1 | Single type |  |
| 2 | Latching type |  |

### Body type

| | |
|---|---|
| 2 | Body ported (Single unit) |
| 3 | Body ported (Manifold) |
| 5 | Base mounted |

Note) Latching type: Base mounted type only.

### Valve option

| | |
|---|---|
| Nil | Standard |
| V | Vacuum |
| U | For large flow(1) |
| W | For large flow, vacuum(1) |

Note 1) Latching type: U and W only
Note 2) Latching type (-COM): NU and NW

### Rated voltage

| | |
|---|---|
| 5 | 24 VDC |
| 6 | 12 VDC |

Note) Latching type: 24 VDC only

### Electrical entry

| | |
|---|---|
| **L**: Plug lead type<br>L plug connector, With lead wire<br>With light/surge voltage suppressor |  |
| **LO**: Plug lead type<br>L plug connector, Without connector<br>With light/surge voltage suppressor |  |
| **M**: Plug lead type<br>M plug connector, With lead wire<br>With light/ surge voltage suppressor |  |
| **MO**: Plug lead type<br>M plug connector, Without connector<br>With light/surge voltage suppressor |  |

Note) When you expect to energize the unit for extended periods of time, refer to page 3 for details.

### Port size

| | | |
|---|---|---|
| Body ported | M5 | M5 thread (Single unit, Manifold) |
| Base mounted | Nil | Without sub-plate (Manifold) |
| | M5 | M5 thread (Single unit) |

∗ Fittings with a 10 mm or more width across flats may cause interference.

### Made to Order

| | |
|---|---|
| X16 | Fluid-contact part: Oil-free |

### CE-compliant

| | |
|---|---|
| Nil | — |
| Q | CE-compliant |

L plug connector
Base mounted

L plug connector
Body ported

M plug connector
Base mounted

M plug connector
Body ported

## Standard Specifications

| Item | | | Standard single type | Large-flow single type | Large-flow latching type |
|---|---|---|---|---|---|
| Valve specifications | Valve construction | | 4 port direct operated poppet valve | | |
| | Fluid | | Air | | |
| | Maximum operating pressure | | 0.7 MPa | | |
| | Minimum operating pressure/Vacuum | | 0 MPa / –101.2 kPa | | |
| | Response time(1) | | ON: 4ms±1, OFF: 2ms±1 | | 10ms or less |
| | Ambient and fluid temperature | | –10 to 50°C (2) | | |
| | Lubrication | | Not required | | |
| | Manual override | | Non-locking push type | | Locking type |
| | Impact/Vibration resistance(3) | | 150/30 m/s² | | |
| | Mounting position | | Unrestricted | | |
| | Enclosure | | Dust tight | | |
| | Weight | | 34 g | | 37 g |
| Electricity specifications | Coil rated voltage | DC | 24 V, 12 V | | 24 DC |
| | Allowable voltage fluctuation | | ±10% of rated voltage | | |
| | Coil insulation type | | Class B or equivalent | | |
| | Power consumption | DC | 2 W | 3.2 W (Energy saving type) (Inrush: 3.2 W, Holding: 1.0 W)(4) | 2 W |
| | Electrical entry | | L plug connector, M plug connector (With indicator light and surge voltage suppressor) | | |

Note 1) Based on response time measurement, JIS B8419: 2010. (Coil temperature: 20°C, pressure: 0.5 MPa, at rated voltage, with light and surge suppressor, value at operation excluding restart period) The period immediately after a restart may be delayed for about 1 msec depending on operating conditions.
Note 2) Operating the valve at low temperatures may cause condensate to form, therefore dry air must be used.
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 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)
Note 4) For the start-up time, refer to the energy saving type's electrical power waveform on page 1399 "Wiring Specifications".



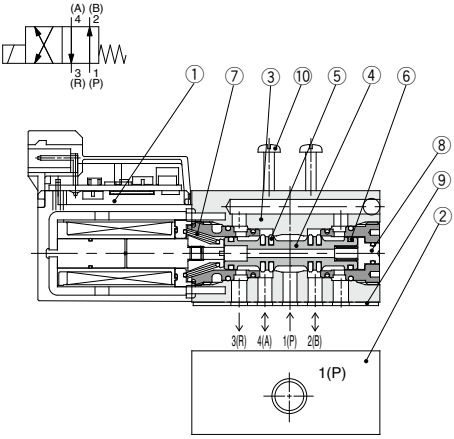
SMC

## Flow Rate Characteristics

| Valve model | | Port size | Flow rate characteristics | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1 → 4/2 (P → A/B) | | | 4/2 → 5/3 (A/B → EA/EB) | | |
| | | | C [dm³/(s·bar)] | b | Cv | C [dm³/(s·bar)] | b | Cv |
| Body ported | VQD1121-□$^{L}_{M}$-M5 | M5 x 0.8 | 0.22 | 0.16 | 0.05 | 0.19 | 0.31 | 0.05 |
| | VQD1121$^{U}_{W}$-□$^{L}_{M}$-M5 | | 0.27 | 0.24 | 0.07 | 0.28 | 0.28 | 0.07 |
| Base mounted (With sub-plate) | VQD1151-□$^{L}_{M}$-M5 | | 0.22 | 0.10 | 0.05 | 0.22 | 0.31 | 0.06 |
| | VQD1$^{1}_{2}$51$^{U}_{W}$-□$^{L}_{M}$M5 | | 0.27 | 0.25 | 0.07 | 0.27 | 0.28 | 0.07 |

## Construction

**Symbol**



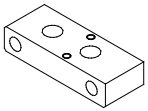

### Component Parts (Single Type)

| No | Description | Material | Note |
|---|---|---|---|
| 1 | **Solenoid coil assembly** | — | |
| 2 | **Sub-plate** | Aluminum | VQD1000-S-M5 (Base mounted only) |
| 3 | **Body** | ZDC | |
| 4 | **Spool valve** | Aluminum | |
| 5 | **Poppet** | HNBR | |
| 6 | **Guide ring** | Resin | |
| 7 | **Return spring** | Stainless steel | |
| 8 | **Manual override** | Aluminum | |
| 9 | **Gasket** | HNBR | |
| 10 | **Round head combination screw** | Steel | |

Note) Body cannot be disassembled.

## Valve Single Unit Option

**Piping plate assembly**
**VQD1000-20A**

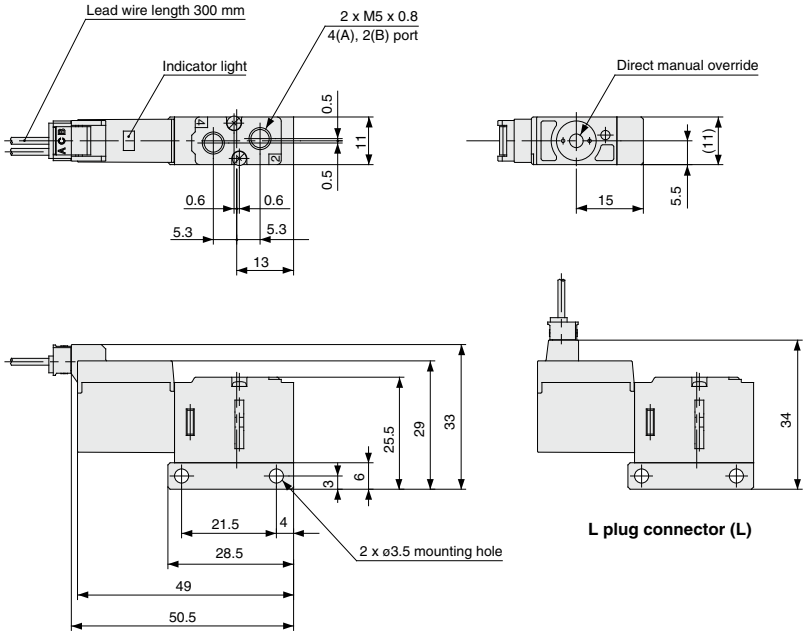


Manifold type (VQD1131) can be changed to single unit type (VQD1121) by mounting plate assembly.

Note) Plate should be mounted with manifold mounting screws (M1.7 x 20).
Proper tightening torque of thread: 0.18 to 0.25 N·m

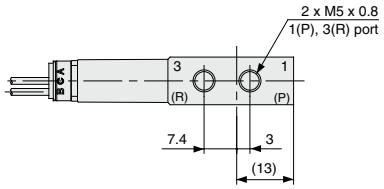
## Dimensions/Body Ported

**L plug connector: VQD1121□-□L-M5**
**M plug connector: VQD1121□-□M-M5**



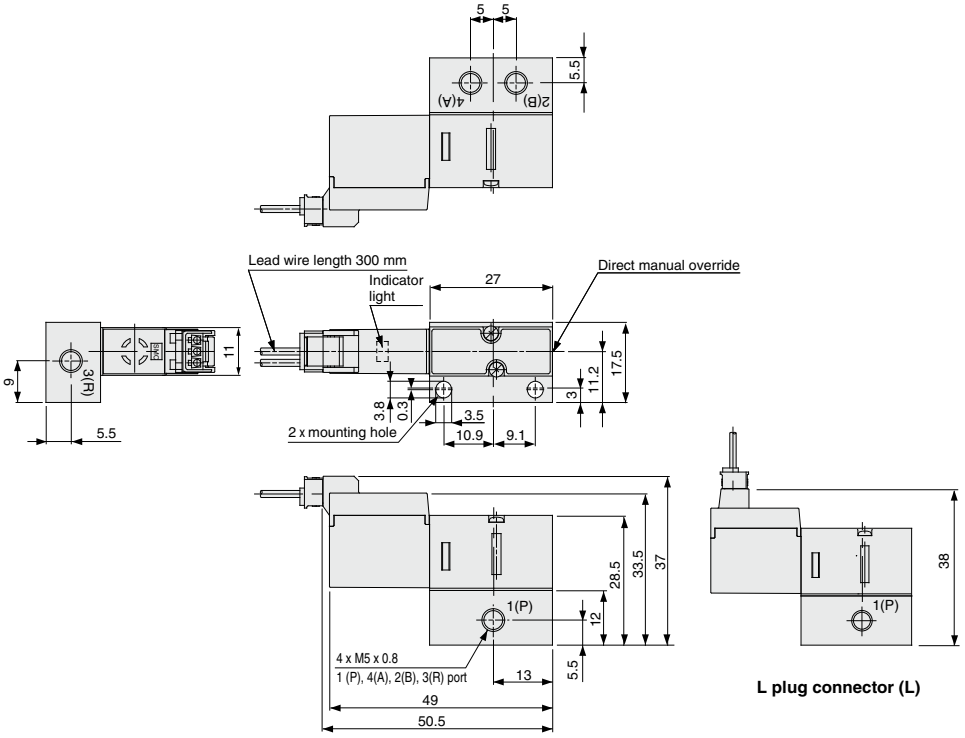

**M plug connector (M)**

**L plug connector (L)**



## Dimensions/Base Mounted

**L plug connector: VQD1151□-□L-M5**
**M plug connector: VQD1151□-□M-M5**



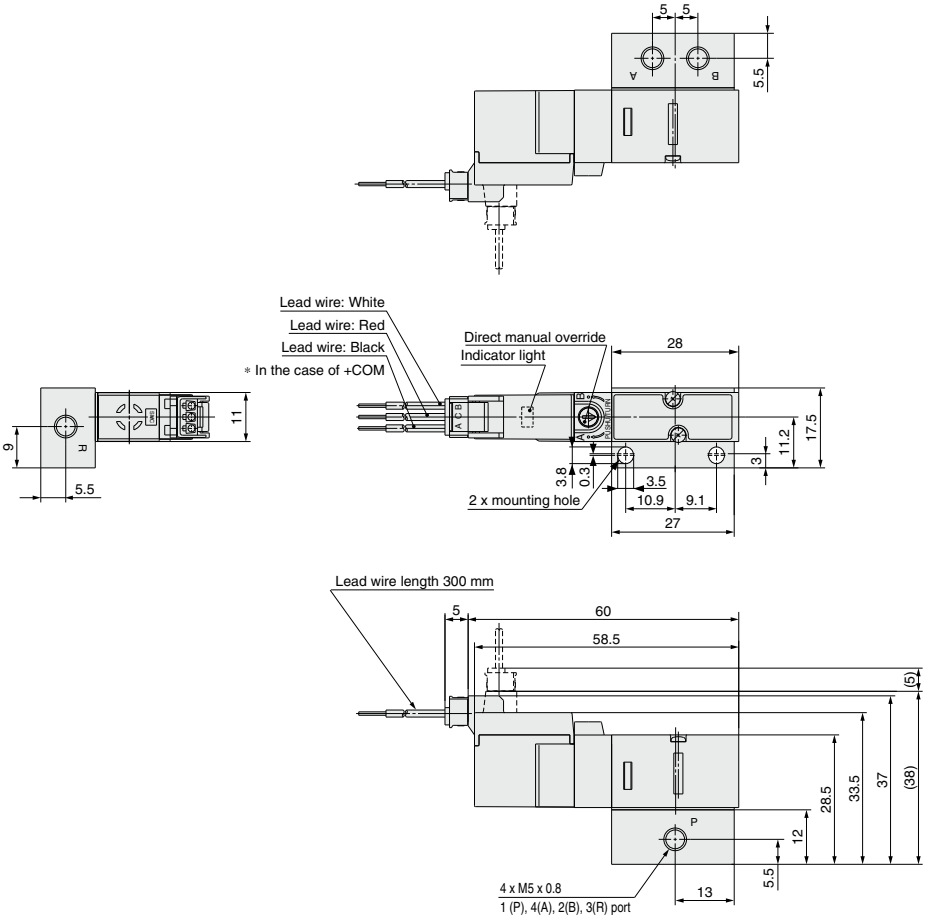

**M plug connector (M)**

**L plug connector (L)**

## Dimensions/Base Mounted

**L plug connector: VQD1251□-□L-M5**

**M plug connector: VQD1251□-□M-M5**




• The dashed line indicates L plug connector.

## How to Order Manifold

[Option]

**Plug lead unit manifold**

**VV4QD1 5 – □ □ – □**

**Manifold**

| | |
|---|---|
| 2 | Body ported |
| 5 | Base mounted |

**Valve station**

| | |
|---|---|
| 02 | 2 stations |
| ⋮ | ⋮ |
| 20 | 20 stations (Max.) |

**Port size(Cylinder port)**

| | | |
|---|---|---|
| Nil | Body ported | M5 thread |
| M5 | Base mounted | M5 thread |
| C4 | | One-touch fitting for ø4 |

1(P), 3(R) port: Rc 1/8

**CE-compliant**

| | |
|---|---|
| Nil | — |
| Q | CE-compliant |

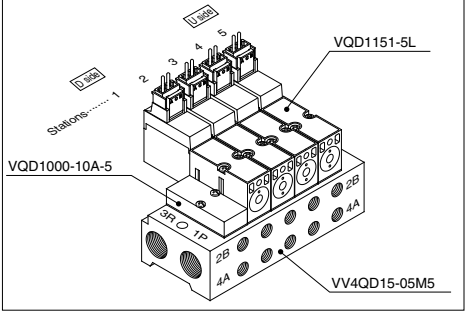
## How to Order Manifold Assembly

Specify the part numbers for valves and options together beneath the manifold base part number.

<Example>
Plug lead unit manifold
VV4QD15-05M5·····1 set —— Manifold base part no.
∗VVQD1000-10A-5····1 set —— Blanking plate part no. (1st station)
∗VQD1151-5L·····4 sets — Valve part no. (2 to 5th station)

Prefix the asterisk to the part nos. of the solenoid valve, etc.

Enter in order starting from the first station on the D side.




## How to Order Valves

[Option]

**VQD1 1 5 1 □ – 5 L – □ – □**

**Type of actuation**

| | |
|---|---|
| 1 | Single type |
| 2 | Latching type |

**Body type**

| | |
|---|---|
| 3 | Body ported |
| 5 | Base mounted |

Note) Latching type: Base-mounted type only.

**Valve option**

| | |
|---|---|
| Nil | Standard |
| V | Vacuum |
| U Note) | For large flow |
| W Note) | For large flow, vacuum |

Note 1) Latching type: U and W only
Note 2) Latching type (-COM): NU and NW

**Rated voltage**

| | |
|---|---|
| 5 | 24 VDC |
| 6 | 12 VDC |

Note) Latching type: 24 VDC only

**Electrical entry**

| | |
|---|---|
| **L**: Plug lead type<br>L plug connector, With lead wire<br>With light/surge voltage suppressor |  |
| **LO**: Plug lead type<br>L plug connector, Without connector<br>With light/surge voltage suppressor |  |
| **M**: Plug lead type<br>M plug connector, With lead wire<br>With light/surge voltage suppressor |  |
| **MO**: Plug lead type<br>M plug connector, Without connector<br>With light/surge voltage suppressor |  |

**Port size (Body ported only)**

| | | |
|---|---|---|
| Nil | Base mounted | — |
| M5 | Body ported | M5 thread |

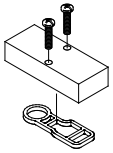
**CE-compliant**

| | |
|---|---|
| Nil | — |
| Q | CE-compliant |

## Manifold Options

### Blanking plate assembly/Body ported

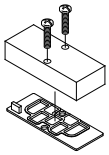
## VVQD1000-10A-2



Blanking plate assembly includes 2 screws and gasket

### Blanking plate assembly/Base mounted

## VVQD1000-10A-5

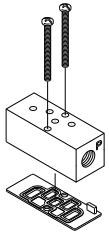


Blanking plate assembly includes 2 screws and gasket

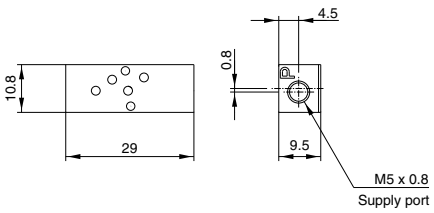
### Individual SUP spacer/Base mounted

## VVQD1000-P-M5-5

Mount the individual SUP spacer on the manifold base, and thus making it possible to have supply port individually for each valve.



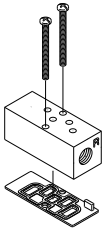
Individual SUP spacer with screw (2 pcs.) and gasket



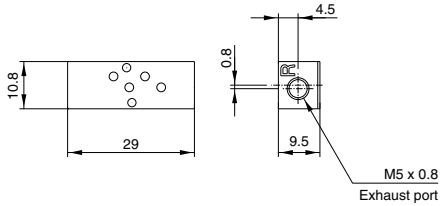

### Individual EXH spacer/Base mounted

## VVQD1000-R-M5-5

Mount the individual EXH spacer on the manifold base, and thus making it possible to have exhaust port individually for each valve. (Common EXH type)

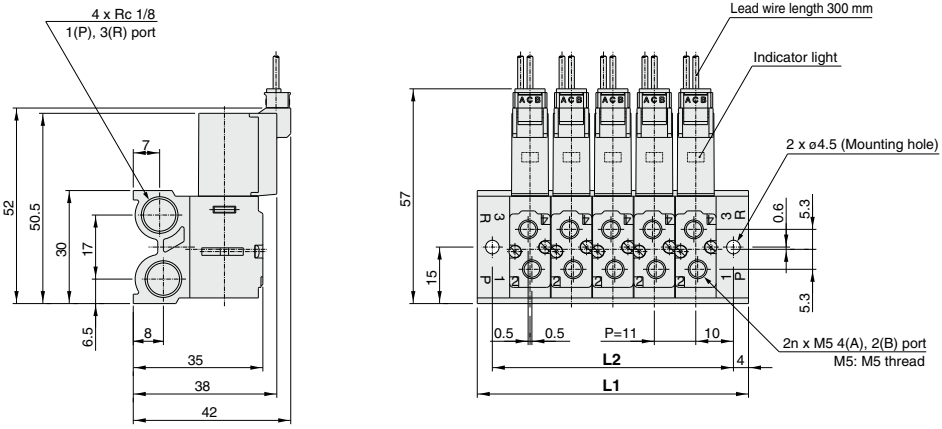


Individual EXH spacer with screw (2 pcs.) and gasket

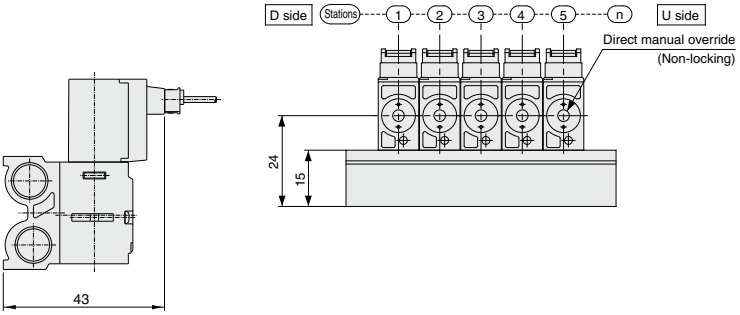


## Dimensions/Body Ported

### Plug lead unit manifold(VV4QD12-□)




**M plug connector (M)**




**L plug connector (L)**

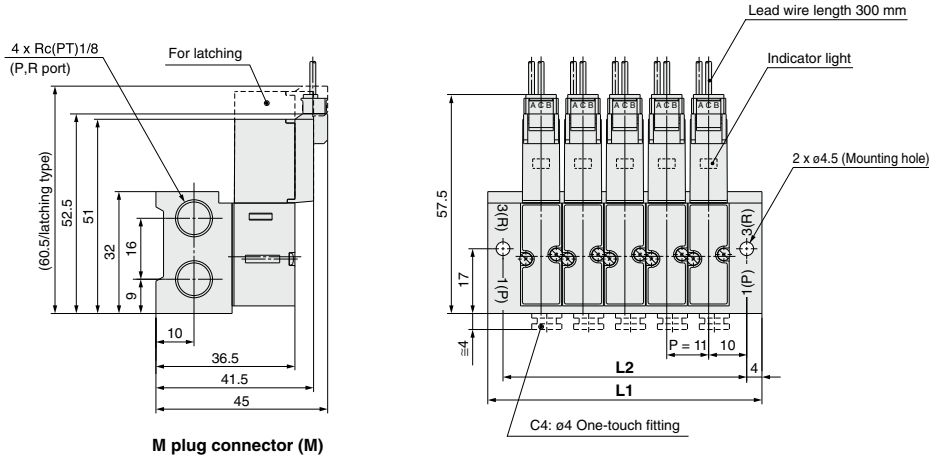
### Dimensions

n: Stations

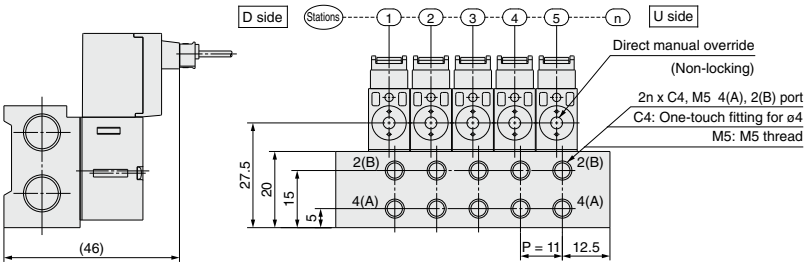
| L \ n | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **L1** | 39 | 50 | 61 | 72 | 83 | 94 | 105 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 215 | 226 | 237 |
| **L2** | 31 | 42 | 53 | 64 | 75 | 86 | 97 | 108 | 119 | 130 | 141 | 152 | 163 | 174 | 185 | 196 | 207 | 218 | 229 |

## Dimensions/Base Mounted

### Plug lead manifold unit (VV4QD15-□)




**M plug connector (M)**




**L plug connector (L)**

### Dimensions

n: Stations

| L \ n | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **L1** | 39 | 50 | 61 | 72 | 83 | 94 | 105 | 116 | 127 | 138 | 149 | 160 | 171 | 182 | 193 | 204 | 215 | 226 | 237 |
| **L2** | 31 | 42 | 53 | 64 | 75 | 86 | 97 | 108 | 119 | 130 | 141 | 152 | 163 | 174 | 185 | 196 | 207 | 218 | 229 |