# 3-Port Solenoid Valve

## *VQ100 Series*

CE

[Option]

## Unprecedented high speed, with stable response times

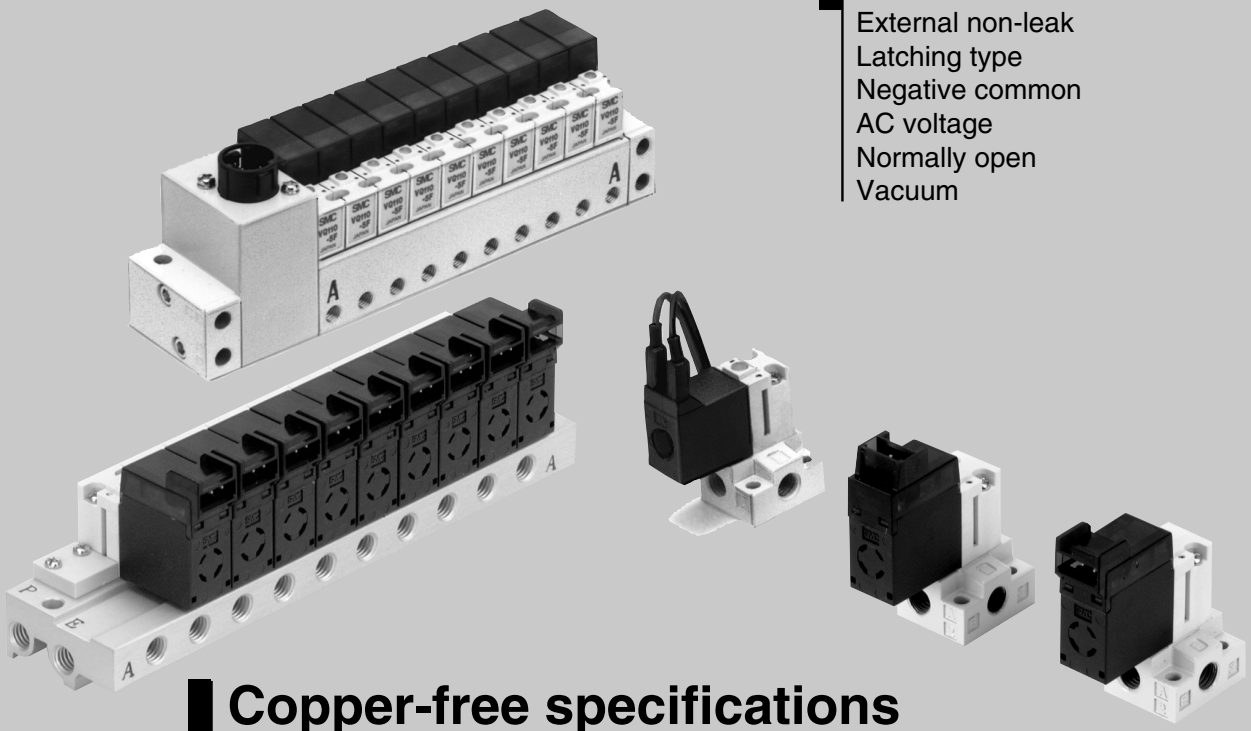
ON: 3.5 ms, OFF: 2 ms, Dispersion accuracy ±1 ms
(With light/surge voltage suppressor; supply pressure 0.5 MPa)

## Compact with large flow capacity.

Body width 9.8 mm C: 0.055 $dm^3/(s \cdot bar)$ (Standard, high-pressure type)
C: 0.14 $dm^3/(s \cdot bar)$ (Large flow capacity type)
: Semi-standard

## Semi-standard

External non-leak
Latching type
Negative common
AC voltage
Normally open
Vacuum

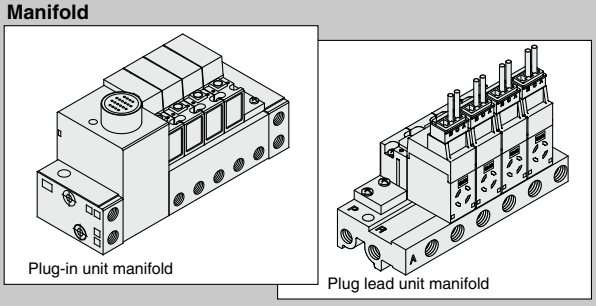


## Copper-free specifications

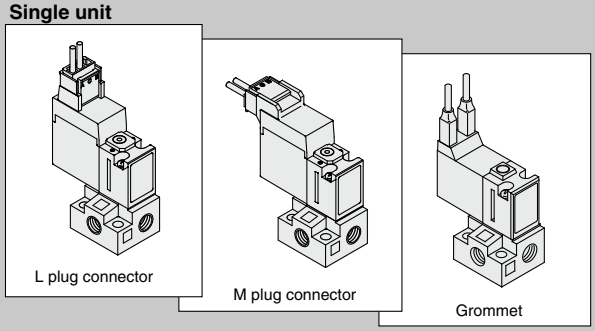
The fluid contacting section is copper-free and the standard type can be used as it is.

## A wide variation of wiring

**Manifold**




**Single unit**



# 3-Port Solenoid Valve
# VQ100 Series

[Option]
∗ The 100 VAC, 110 VAC, 24 VDC, and 12 VDC are the only CE-compliant products.

NRTL /C
(Refer to page 17 for details.)

## How to Order Valves

**VQ1 1 0 □ – 5 F □ – □ – □ – □**

**VQ series**
**Compact 3-port valve**

**Actuation**

| | |
|---|---|
| **1** | Normally closed |
| **2**∗1 | Normally open |

∗1 Normally open is only selectable for the standard type (1 W).

**Functions**∗3

| | |
|---|---|
| **Nil** | Standard type (1 W) |
| **H** | High-pressure type (1.5 W) |
| **Y** | Low wattage type (0.5 W) |
| **L**∗2 | Latching type∗4 Positive common |
| **N**∗2 | Latching type∗4 Negative common |
| **U**∗2 | Large flow capacity type |

∗2 Semi-standard (It has both + and – polarity.)
∗3 Only one function can be selected. If the valve is to be energized continuously for extended periods of time, select "Y" (low-wattage type). For details, refer to "Extended periods of continuous energization" in the "Selection" section of the Best Pneumatics No. 1 catalog.
∗4 For details on the latching type, refer to the latching type in the "Specific Product Precautions" on page 15.

**Coil rated voltage**

| | | CE-compliant |
|---|---|---|
| **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 | ● |

For other rated voltages, please consult with SMC.

**Manual override**

| | |
|---|---|
| **Nil** | Non-locking push type (Tool required) |
| | Latching type: Push-locking type (Tool required) |
| **B**∗5 | Locking type (Tool required) |

∗5 Semi-standard
∗ Latching manual override: Push-locking type only.

**Port size**

| | |
|---|---|
| **Nil** | Without sub-plate |
| **M3** | With sub-plate |
| **M5** | With sub-plate |

**Made to Order**

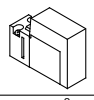
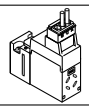
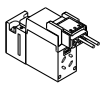
| Symbol | Specifications |
|---|---|
| **Nil** | Standard |
| **X21** | Power saving type (1.5 W) |
| **X42** | Fluid-contact part: Oil-free |
| **X113** | Fluororubber |

**CE-compliant**

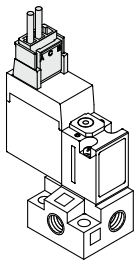
| | |
|---|---|
| **Nil** | — |
| **Q** | CE-compliant |

∗ The 100 VAC, 110 VAC, 24 VDC, and 12 VDC are the only CE-compliant products.

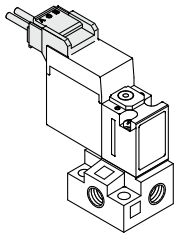
**Electrical entry**

| | | |
|---|---|---|
| **F** | Plug-in<br>With light/surge voltage suppressor<br>(only for plug-in manifold) |  |
| **L** | L plug connector, With lead wire<br>With light/surge voltage suppressor |  |
| **LO** | L plug connector, Without connector<br>With light/surge voltage suppressor |  |
| **M** | M plug connector, With lead wire<br>With light/surge voltage suppressor |  |
| **MO** | M plug connector, Without connector<br>With light/surge voltage suppressor |  |
| **G** | Grommet |  |

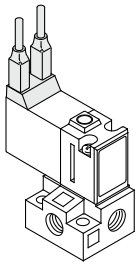
∗ Grommet: No latching, AC and large flow capacity.



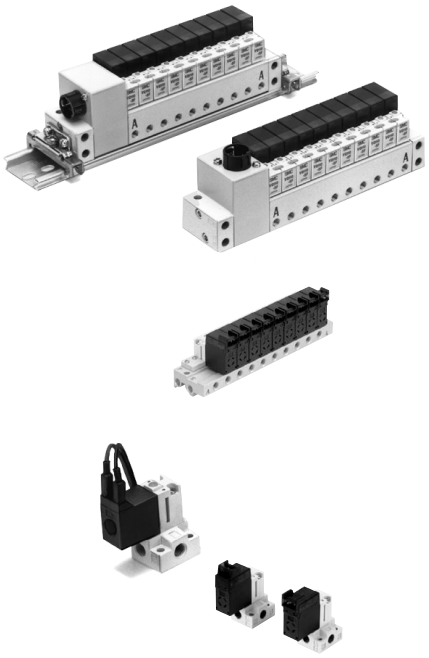
**L plug connector**



**M plug connector**



**Grommet**

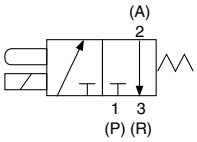


## Standard Specifications

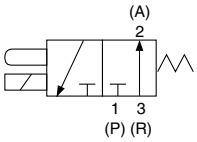
| Item | | | | Type: Standard (1 W) | High-pressure (1.5 W) | Low wattage (0.5 W) |
|---|---|---|---|---|---|---|
| Valve specifications | Valve structure | | | 3-port direct operated poppet | | |
| | Fluid | | | Air | | |
| | Max. operating pressure | | | 0.7 MPa | 0.8 MPa | 0.7 MPa |
| | Min. operating pressure (Vacuum) | | | 0 MPa (–0.1 MPa[*5]) | | |
| | Flow rate characteristics | 1 → 2 | C [dm³/(s·bar)] | 0.055 | | 0.042 |
| | | | b | 0.22 | | 0.27 |
| | | | Cv | 0.014 | | 0.011 |
| | | 2 → 3 | C [dm³/(s·bar)] | 0.083 | | 0.045 |
| | | | b | 0.28 | | 0.28 |
| | | | Cv | 0.021 | | 0.012 |
| | Response time[*1] | | | ON: 3.5 ms, OFF: 2 ms | | ON: 3.5 ms, OFF: 2.5 ms |
| | Ambient and fluid temperatures | | | –10 to 50°C[*2] | | |
| | Lubrication | | | Not required | | |
| | Manual override | | | Non-locking push type/Locking type (Tool required)[*3] | | |
| | Mounting operation | | | Free | | |
| | Impact/Vibration resistance[*4] | | | 150/30 m/s² | | |
| | Enclosure | | | Dust-tight | | |
| | Weight | | | 12.6 g (L/M plug connector, Without sub-plate) | | |
| Electrical specifications | Coil rated voltage | | DC | 24 V, 12 V | | |
| | Allowable voltage fluctuation | | | ±10% of rated voltage | | |
| | Coil insulation type | | | Equivalent to class B | | |
| | Power consumption (Current) | | DC | 1 W (42 mA) | 1.5 W (63 mA) | 0.5 W (21 mA) |
| | Electrical entry | | | Grommet<br>Plug-in, L plug connector, M plug connector<br>(With light/surge voltage suppressor) | | |

*1 Based on JIS B 8374-1993. With light/surge voltage suppressor (clean air), Dispersion accuracy ±1 ms
*2 Use dry air to prevent condensation when operating at low temperatures.
*3 Locking type: Semi-standard
*4 Impact resistance: No malfunction when tested with a drop tester in the axial direction and at a right angle to the armature, one time each in energized and deenergized states. Vibration resistance: No malfunction when tested with one sweep of 45 to 2000 Hz in the axial direction and at a right angle to the armature, in both energized and deenergized states. (Value in the initial stage)
*5 For vacuum, please use the 10- clean series. The 3(R) port can be used for vacuum, and the 1(P) port can be used for vacuum release pressure. (For the differential pressure between the 3(R) port and the 1(P) port, use within the max. operating pressure of each type.)
* For the power-saving type electrical entry, plug-in, L, or M plug connectors are applicable.

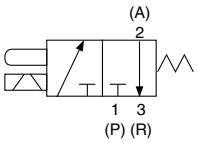
**Symbol**




Normally closed




Normally open




Latching type

## Clean Series

Clean series is available for both standard and option specifications.

**How to Order Valves**

**10 - VQ110 □-□**

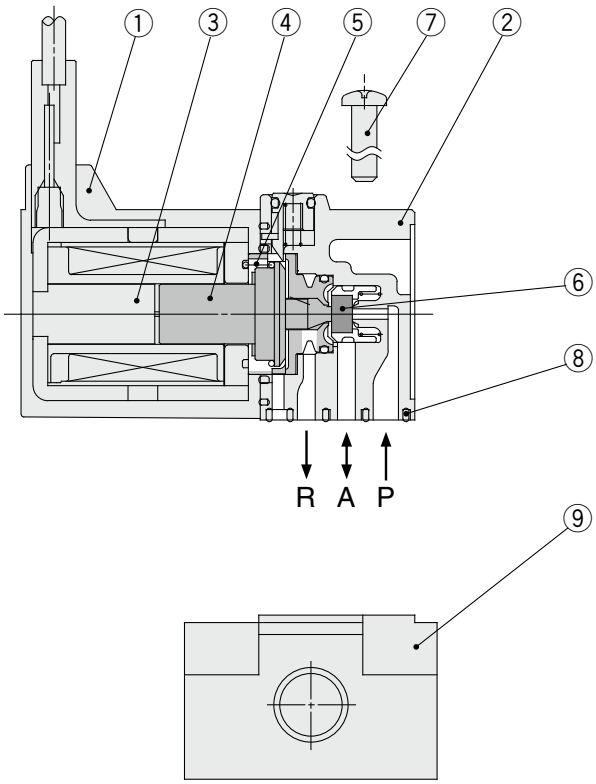
**Clean series**

## Semi-standard Specifications

| Item | | | Type | Latching type | AC type | Large flow capacity type | Normally open type | Power saving type |
|---|---|---|---|---|---|---|---|---|
| Valve specifications | **Model** | | | **VQ110L-□** | **VQ110-$\frac{1}{2}$□** | **VQ110U-□** | **VQ120-□** | **VQ110-□-X21** |
| | **Max. operating pressure** | | | 0.7 MPa | | 0.6 MPa | 0.5 MPa | 0.7 MPa |
| | **Min. operating pressure** | | | 0 MPa (–100 kPa[*4, *5]) | | | | |
| | Flow rate characteristics | **1 → 2[*6] (3 → 2)** | **C [dm³/(s·bar)]** | 0.042 | | 0.14 | 0.04 | 0.055 |
| | | | **b** | 0.27 | | 0.26 | 0.11 | 0.22 |
| | | | **Cv** | 0.011 | | 0.036 | 0.009 | 0.014 |
| | | **2 → 3[*6] (2 → 1)** | **C [dm³/(s·bar)]** | 0.045 | | 0.14 | 0.044 | 0.083 |
| | | | **b** | 0.28 | | 0.25 | 0.3 | 0.28 |
| | | | **Cv** | 0.012 | | 0.036 | 0.011 | 0.021 |
| | **Response time**[*2] | | | 5 ms or less | 15 ms or less | 5 ms or less | 5 ms or less | 5 ms or less |
| Electrical specifications | **Power consumption (Current)** | | **24 VDC** | 1 W (42 mA)[*7] | — | 0.35 W (15 mA)[*3] | 1 W (42 mA) | 0.25 W (11 mA)[*8] |
| | | | **12 VDC** | 1 W (83 mA)[*7] | — | 0.35 W (30 mA)[*3] | 1 W (83 mA) | 0.25 W (21 mA)[*8] |
| | | | **100 VAC** | 0.6 VA (6 mA) | 0.5 VA (5 mA) | — | | |
| | | | **110 VAC** | 0.65 VA (5.9 mA) | 0.55 VA (5 mA) | — | | |
| | | | **200 VAC** | 1.2 VA (6 mA) | 1.0 VA (5 mA) | — | | |
| | | | **220 VAC** | 1.3 VA (5.9 mA) | 1.1 VA (5 mA) | — | | |
| | **Electrical entry**[*1] | | | Plug-in, L plug connector, M plug connector (With light/surge voltage suppressor) | | | | |

∗1 Grommets can only be produced for the normally open type (without light/surge voltage suppressor).
Only the 1 W DC specification is available for the normally open type.
∗2 Based on JIS B 8374-1993. With light/surge voltage suppressor (clean air).
∗3 Inrush: 3.1 W (10 ms after energized); Holding: 0.35 W (It has both + and – polarity.)
∗4 For vacuum, please use the 10- clean series. The 3(R) port can be used for vacuum, and the 1(P) port can be used for vacuum release pressure. (For the differential pressure between the 3(R) port and the 1(P) port, use within the max. operating pressure of each type.)
∗5 If the 1(P) port is to be used for vacuum, and the 3(R) port is to be used for vacuum release, please select the VQ120 (normally open type). In this case, the 10- is not required.
∗6 The values in brackets are for the normally open type's air passage.
∗7 It has both + and – polarity.
∗8 For the power-saving type electrical entry, plug-in, L, or M plug connectors are applicable.

## Construction




**(The normally closed valve is shown.)**

### Component Parts

| No. | Description | Material |
|---|---|---|
| 1 | **Solenoid coil** | — |
| 2 | **Body** | Resin |
| 3 | **Core** | Stainless steel |
| 4 | **Armature assembly** | Stainless steel/Resin |
| 5 | **Return spring** | Stainless steel |
| 6 | **Poppet** | NBR |
| 7 | **Round head combination screw** | Carbon steel |
| 8 | **Interface gasket** | FKM |

### Replacement Parts

| No. | Description | Material | Part no. |
|---|---|---|---|
| 9 | **Sub-plate** | ZDC | AXT662-1-$\frac{1}{2}$ (1: M5, 2: M3) |

**Optional Parts**

· Gasket and screw: VQ100-GS-5

∗ 1 set includes 1 gasket and 2 screws.
An order contains 10 of these sets.

## How to Order Valves

∗ The 100 VAC, 110 VAC, 24 VDC, and 12 VDC are the only CE-compliant products.

CE [Option]

**VQ1 1 0 □ – 5 L □ – M5 – □ – □**

**VQ series**
**Compact 3-port valve**

**Actuation**

| | |
|---|---|
| **1** | Normally closed |
| **2**∗1 | Normally open |

∗1 Normally open is only selectable for the standard type (1 W).

**Functions**∗3

| | |
|---|---|
| **Nil** | Standard type (1 W) |
| **H** | High-pressure type (1.5 W) |
| **Y** | Low wattage type (0.5 W) |
| **L**∗2 | Latching type∗4 Positive common |
| **N**∗2 | Latching type∗4 Negative common |
| **U**∗2 | Large flow capacity type |

∗2 Semi-standard (It has both + and – polarity.)
∗3 Only one function can be selected. If the valve is to be energized continuously for extended periods of time, select "Y" (low-wattage type). For details, refer to "Extended periods of continuous energization" in the "Selection" section of the Best Pneumatics No. 1 catalog.
∗4 For details on the latching type, refer to the latching type in the "Specific Product Precautions" on page 15.

**Coil rated voltage**

| | | CE-compliant |
|---|---|---|
| **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 | ● |

For other rated voltages, please consult with SMC.

**Manual override**

| | |
|---|---|
| **Nil** | Non-locking push type (Tool required) |
| | Latching type: Push-locking type (Tool required) |
| **B**∗5 | Locking type (Tool required) |

∗5 Semi-standard
∗ Latching manual override: Push-locking type only.

**Port size**

| | |
|---|---|
| **Nil** | Without sub-plate |
| **M3** | With sub-plate |
| **M5** | With sub-plate |

**Made to Order**

| Symbol | Specifications |
|---|---|
| **Nil** | Standard |
| **X21** | Power saving type (1.5 W) |
| **X42** | Fluid-contact part: Oil-free |
| **X113** | Fluororubber |

**CE-compliant**

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

∗ The 100 VAC, 110 VAC, 24 VDC, and 12 VDC are the only CE-compliant products.

**Electrical entry**

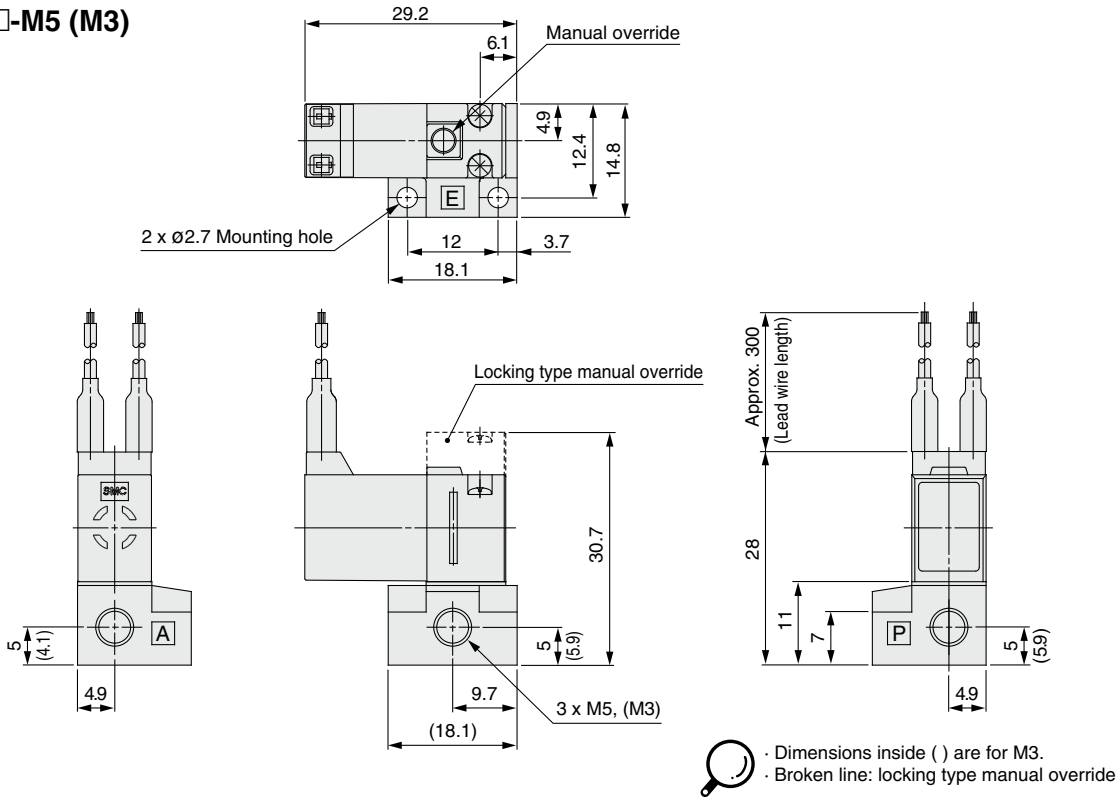
| | |
|---|---|
| **L** | L plug connector, With lead wire With light/surge voltage suppressor |
| **LO** | L plug connector, Without connector With light/surge voltage suppressor |
| **M** | M plug connector, With lead wire With light/ surge voltage suppressor |
| **MO** | M plug connector, Without connector With light/surge voltage suppressor |
| **G** | Grommet |

∗ Grommet: No latching, AC and large flow capacity.

## Dimensions

**Grommet**

**VQ1□0□-□G□-M5 (M3)**

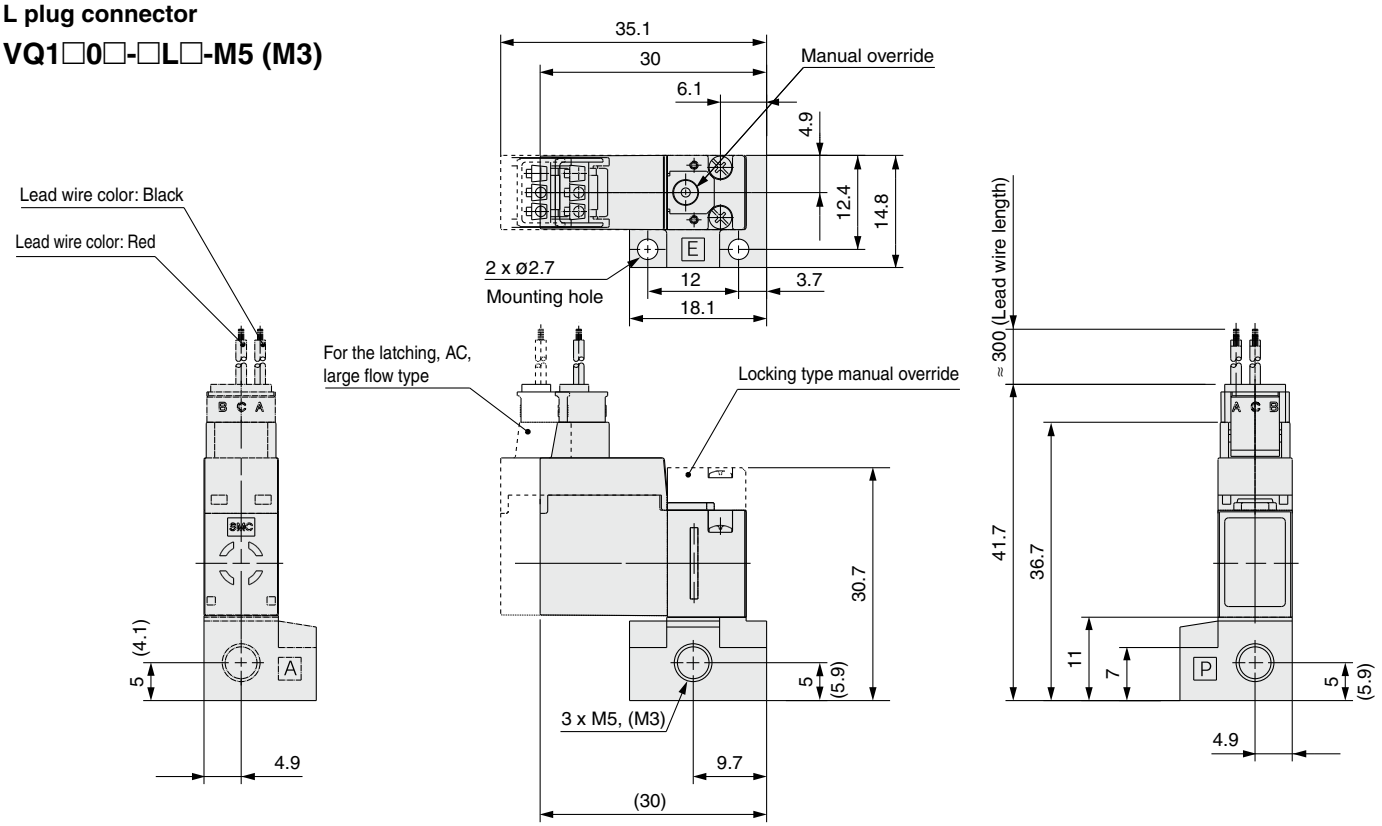



· Dimensions inside ( ) are for M3.
· Broken line: locking type manual override

## Dimensions

### L plug connector

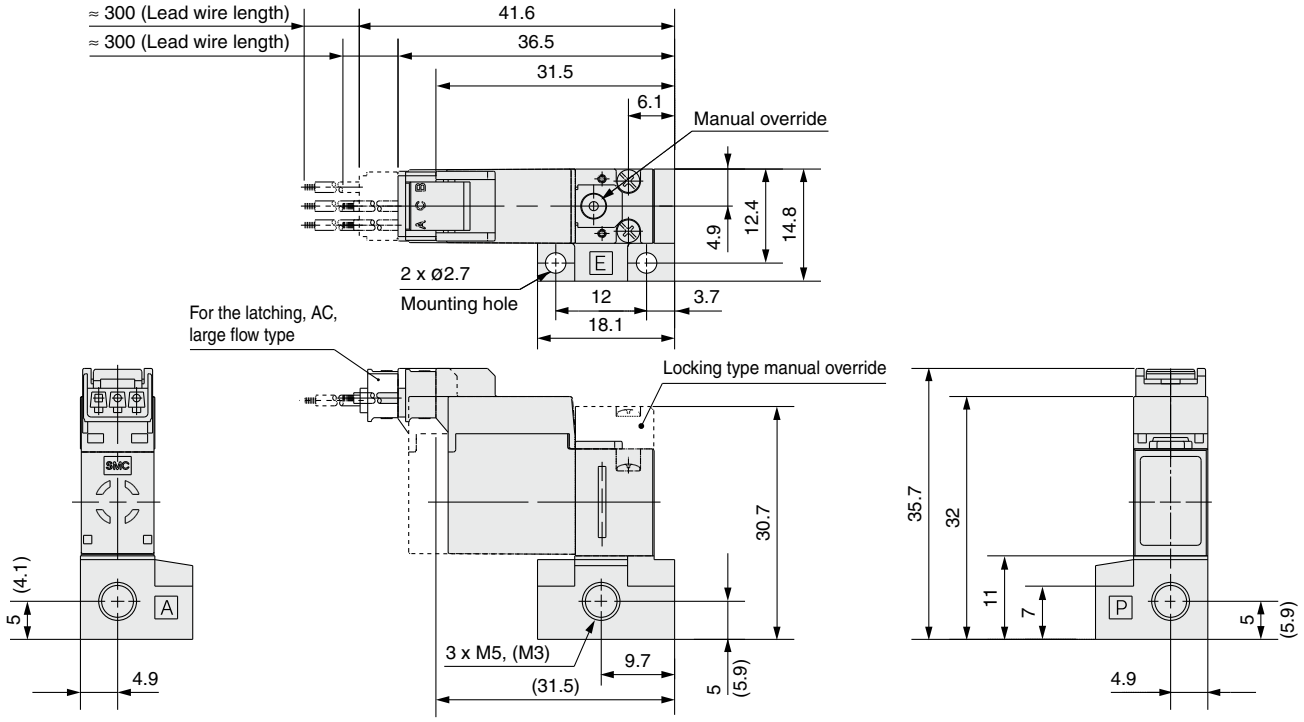
**VQ1□0□-□L□-M5 (M3)**




· Dimensions inside ( ) are for M3.
· The dashed lines show the latching, AC, large flow type.
· Dashed line: Locking type manual override and push locking type manual override (latching)

### M plug connector

**VQ1□0-□M□-M5 (M3)**




· Dimensions inside ( ) are for M3.
· **The dashed lines show the latching, AC, large flow type.**
· Dashed line: Locking type manual override and push locking type manual override (latching)

## How to Order Manifold

[Option]

**Plug-in unit manifold** **VV3Q 1 1 – 08 C U 1 – D –**

**Applicable solenoid valve (Plug-in type)**
**VQ1□0□-□F**

- Consult SMC for mounting latching type.
- Possible to mount U type (large flow capacity). In this case, it will be + common. For – common, add X343 to the end of the part number.

∗ Normally closed and normally open type cannot be mounted on the same manifold.

**Series**

| | |
|---|---|
| 1 | VQ100 |

**Stations**

| | |
|---|---|
| 02 | 2 stations |
| ⋮ | ⋮ |
| 18 | 18 stations |

**Electrical entry**

| | |
|---|---|
| C | Circular connector type |

**Manifold base**

| | |
|---|---|
| 1 | Plug-in unit |

**Electrical entry direction**

| | |
|---|---|
| U | Top entry |
| S | Side entry |

**Cable length**

| | |
|---|---|
| 0 | Without cable |
| 1 | With cable (1.5 m) |
| 2 | With cable (3 m) |
| 3 | With cable (5 m) |

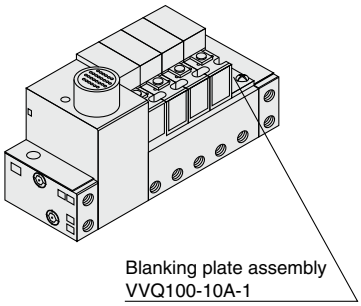
**Option**

| | |
|---|---|
| Nil | None |
| D | DIN rail mounting (With standard DIN rail length) |
| DO∗1 | DIN rail mounting (Without DIN rail) |

∗1 Order DIN rail separately.
For DIN rail part no., refer to page 12.

**CE-compliant**

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



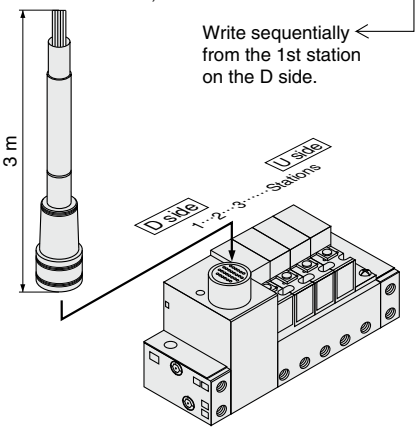

## How to Order Manifold Assembly

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

**<Example>**
Plug-in unit manifold with cable (3 m)
**VV3Q11-05CU2(-Q)·····1 set** — **Manifold base part no.**
∗ **VQ110-5F(-Q)** ····· **4 sets** — **Valve part no. (Stations 1 to 4)**
∗ **VVQ100-10A-1(-Q)**··**1 set** — **Blanking plate part no. (Station 5)**

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

Write sequentially from the 1st station on the D side.




## How to Order Valves

[Option]

∗ For CE-compliant models, DC type only.

**VQ1 1 0 □ – 5 F □ – □ – □**

**VQ series**
**Compact 3-port valve**

**Actuation**

| | |
|---|---|
| 1 | Normally closed |
| 2∗1 | Normally open |

∗1 Normally open is only selectable for the standard type (1 W).

**Functions∗3**

| | |
|---|---|
| Nil | Standard type (1 W) |
| H | High-pressure type (1.5 W) |
| Y | Low wattage type (0.5 W) |
| U∗2 | Large flow capacity type |

∗2 Semi-standard (It has both + and – polarity.)
∗3 Only one function can be selected. If the valve is to be energized continuously for extended periods of time, select "Y" (low-wattage type). For details, refer to "Extended periods of continuous energization" in the "Selection" section of the Best Pneumatics No. 1 catalog.

**Coil rated voltage**

| | | CE-compliant |
|---|---|---|
| 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 | ● |

For other rated voltages, please consult with SMC.

**Electrical entry**

| | |
|---|---|
| F | Plug-in<br>With light/surge voltage suppressor<br>(only for plug-in manifold) |

**Manual override**

| | |
|---|---|
| Nil | Non-locking push type (Tool required) |
| B∗4 | Locking type (Tool required) |

∗4 Semi-standard

**Made to Order**

| Symbol | Specifications |
|---|---|
| Nil | Standard |
| X21 | Power saving type (1.5 W) |
| X42 | Fluid-contact part: Oil-free |
| X113 | Fluororubber |

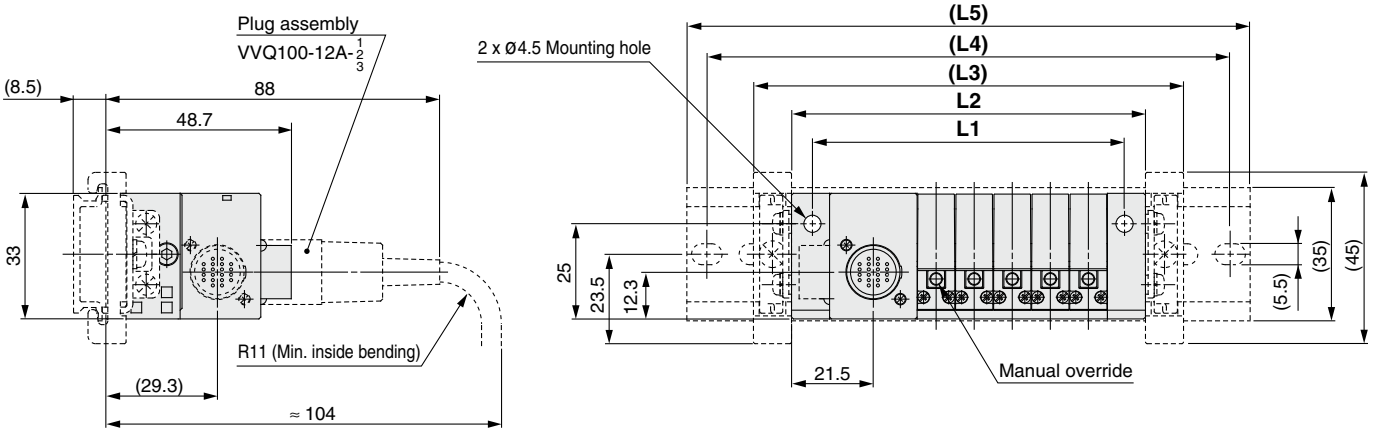
**CE-compliant**

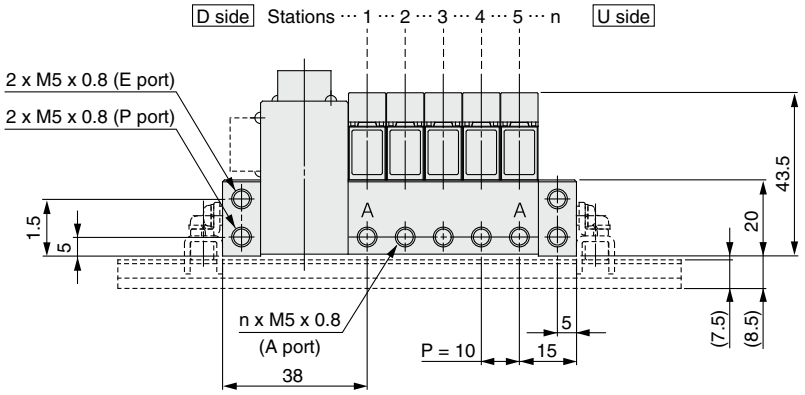
| | |
|---|---|
| Nil | — |
| Q | CE-compliant |

∗ For CE-compliant models, DC type only.

## Plug-in Unit (VV3Q11) Manifold with Circular Connector

The broken line indicates DIN rail mounted type (-D) and side entry connector (S).




**Dimensions**

Formula: L1 = 10 n + 32 L2 = 10 n + 43 n: Station (Maximum 18 stations)

| L \ n | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **L1** | 52 | 62 | 72 | 82 | 92 | 102 | 112 | 122 | 132 | 142 | 152 | 162 | 172 | 182 | 192 | 202 | 212 |
| **L2** | 63 | 73 | 83 | 93 | 103 | 113 | 123 | 133 | 143 | 153 | 163 | 173 | 183 | 193 | 203 | 213 | 223 |
| **(L3)** | 83 | 93 | 103 | 113 | 123 | 133 | 143 | 153 | 163 | 173 | 183 | 193 | 203 | 213 | 223 | 233 | 243 |
| **(L4)** | 112.5 | 112.5 | 125 | 137.5 | 150 | 162.5 | 162.5 | 175 | 187.5 | 200 | 212.5 | 212.5 | 225 | 237.5 | 250 | 262.5 | 262.5 |
| **(L5)** | 123 | 123 | 135.5 | 148 | 160.5 | 173 | 173 | 185.5 | 198 | 210.5 | 223 | 223 | 235.5 | 248 | 260.5 | 273 | 273 |

## How to Order Manifold

[Option]

**Plug lead unit manifold** **VV3Q1 2 – 08 01N –**

**Applicable solenoid valve (Plug lead type)**
**VQ1□0□-□L**
**VQ1□0□-□M**
**VQ1□0□-□G**

∗ Normally closed and normally open type cannot be mounted on the same manifold.

**Series**

| | |
|---|---|
| 1 | VQ100 |

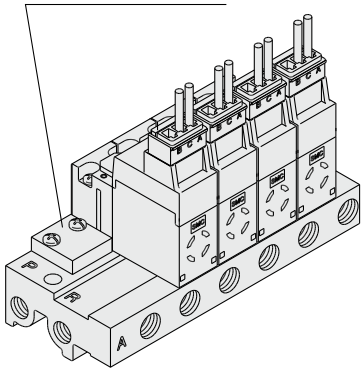
**Manifold base**

| | |
|---|---|
| 2 | Plug lead unit |
| 2U | Plug lead unit<br>U type (large flow capacity) mounting base |

**Stations**

| | |
|---|---|
| 02 | 2 stations |
| ⋮ | ⋮ |
| 20 | 20 stations |

Blanking plate assembly
VVQ1000-10A-2



**Port size∗1 and thread**

| | |
|---|---|
| Nil | M5, Rc1/8 |
| 01N | NPT1/8 |
| 01T | NPTF1/8 |
| 01F | PF1/8 |

∗1 Only thread port size 1/8 type (2U type, P/E port) has choice of thread.

**CE-compliant**

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

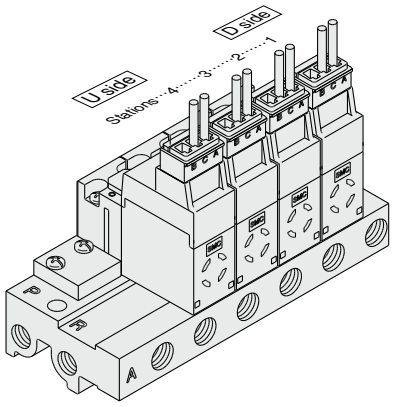
## How to Order Manifold Assembly

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

**<Example>**
Plug lead unit manifold
**VV3Q12-05 (-Q)** ····· **1 set**———**Manifold base part no.**
∗ **VQ110-5L (-Q)** ····· **4 sets**———**Valve part no. (Stations 1 to 4)**
∗ **VVQ100-10A-2** ····· **1 set**—**Blanking plate part no. (Station 5)**

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

Write sequentially from the 1st station on the D side.




## How to Order Valves

∗ For CE-compliant models, DC type only.

[Option]

**VQ1 1 0 – 5 L – –**

**VQ series**
**Compact 3-port valve**

**Actuation**

| | |
|---|---|
| 1 | Normally closed |
| 2∗1 | Normally open |

∗1 Normally open is only selectable for the standard type (1 W).

**Functions∗3**

| | |
|---|---|
| Nil | Standard type (1 W) |
| H | High-pressure type (1.5 W) |
| Y | Low wattage type (0.5 W) |
| L∗2 | Latching type∗4<br>Positive common |
| N∗2 | Latching type∗4<br>Negative common |
| U∗2 | Large flow capacity type |

∗2 Semi-standard (It has both + and – polarity.)
∗3 Only one function can be selected. If the valve is to be energized continuously for extended periods of time, select "Y" (low-wattage type). For details, refer to "Extended periods of continuous energization" in the "Selection" section of the Best Pneumatics No. 1 catalog.
∗4 For details on the latching type, refer to the latching type in the "Specific Product Precautions" on page 15.

**Coil rated voltage**

| | | CE-compliant |
|---|---|---|
| 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 | ● |

For other rated voltages, please consult with SMC.

**Manual override**

| | |
|---|---|
| Nil | Non-locking push type (Tool required) |
| | Latching type: Push-locking type (Tool required) |
| B∗5 | Locking type (Tool required) |

∗5 Semi-standard
∗ Latching manual override: Push-locking type only.

**Made to Order**

| Symbol | Specifications |
|---|---|
| Nil | Standard |
| X21 | Power saving type (1.5 W) |
| X42 | Fluid-contact part: Oil-free |
| X113 | Fluororubber |

**CE-compliant**

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

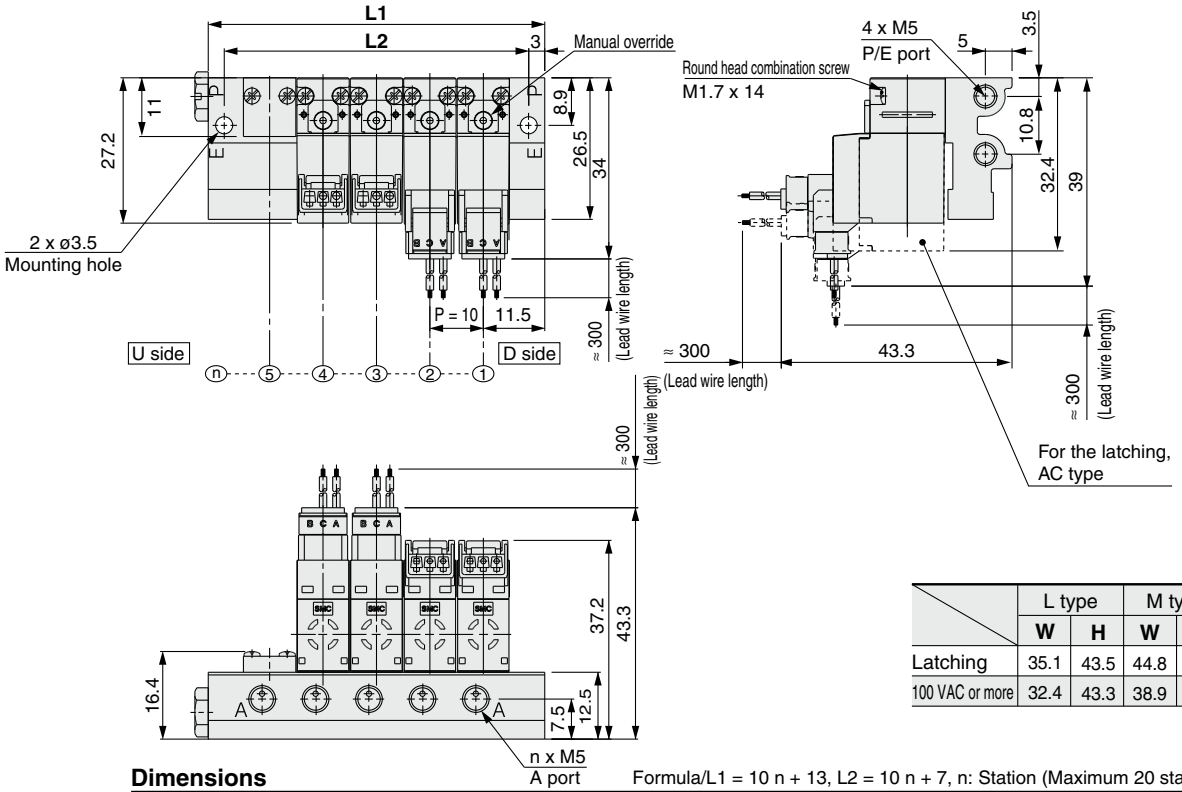
∗ For CE-compliant models, DC type only.

**Electrical entry**

| | |
|---|---|
| L | L plug connector, With lead wire<br>With light/surge voltage suppressor |
| LO | L plug connector, Without connector<br>With light/surge voltage suppressor |
| M | M plug connector, With lead wire<br>With light/ surge voltage suppressor |
| MO | M plug connector, Without connector<br>With light/surge voltage suppressor |
| G | Grommet |

∗ Grommet: No latching, AC and large flow capacity.

## Plug Lead Unit Manifold (VV3Q12)

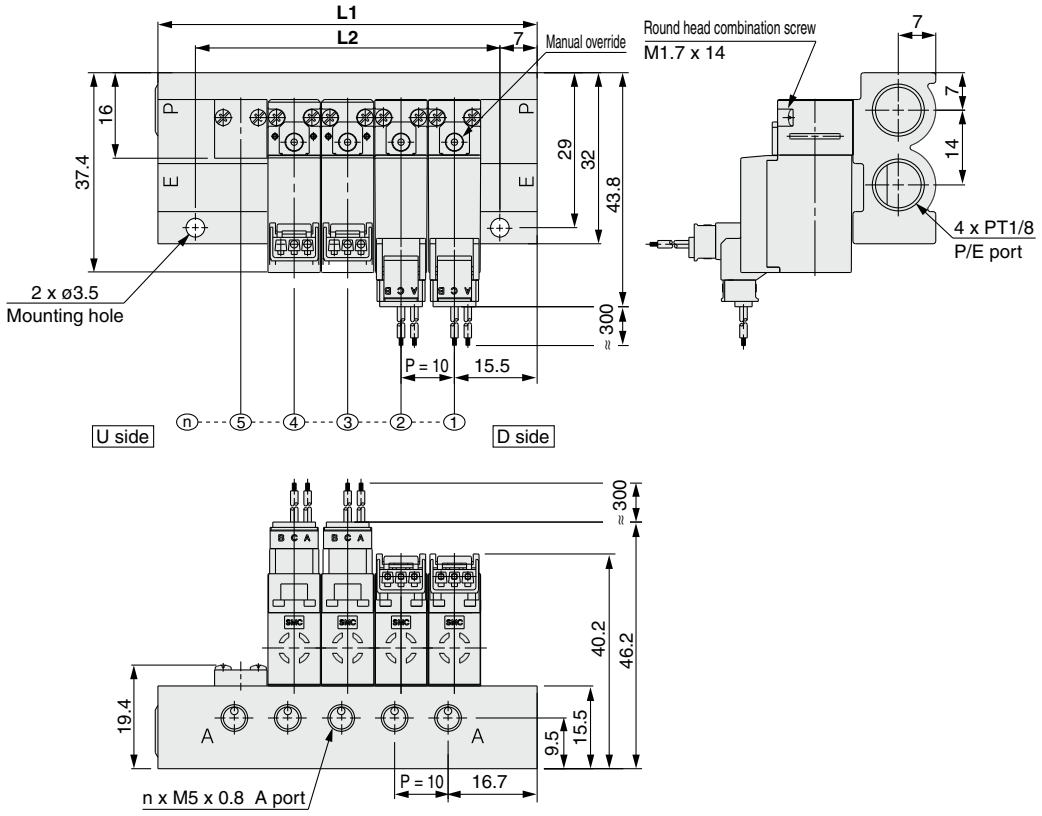



| | L type | | M type | |
|---|---|---|---|---|
| | **W** | **H** | **W** | **H** |
| Latching | 35.1 | 43.5 | 44.8 | 32.2 |
| 100 VAC or more | 32.4 | 43.3 | 38.9 | 37.2 |

**Dimensions** Formula/L1 = 10 n + 13, L2 = 10 n + 7, n: Station (Maximum 20 stations)

| L \ n | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **L1** | 23 | 33 | 43 | 53 | 63 | 73 | 83 | 93 | 103 | 113 | 123 | 133 | 143 | 153 | 163 | 173 | 183 | 193 | 203 | 213 |
| **L2** | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 | 107 | 117 | 127 | 137 | 147 | 157 | 167 | 177 | 187 | 197 | 207 |

## Plug Lead Unit U Type (Large Flow Capacity) Mounted Manifold (VV3Q12U)



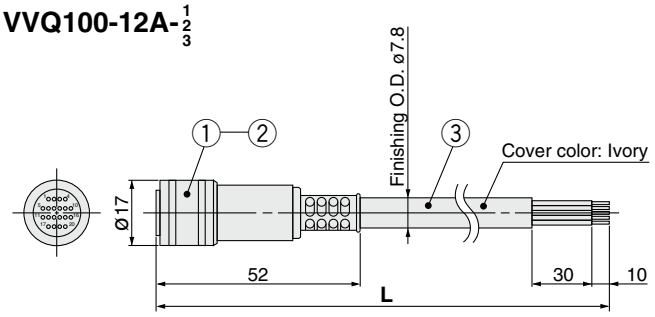

**Dimensions** Formula/L1 = 10 n + 21, L2 = 10 n + 7, n: Station (Maximum 20 stations)

| L \ n | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **L1** | 31 | 41 | 51 | 61 | 71 | 81 | 91 | 101 | 111 | 121 | 131 | 141 | 151 | 161 | 171 | 181 | 191 | 201 | 211 | 221 |
| **L2** | 17 | 27 | 37 | 47 | 57 | 67 | 77 | 87 | 97 | 107 | 117 | 127 | 137 | 147 | 157 | 167 | 177 | 187 | 197 | 207 |

## Manifold Option

### Plug Assembly

**VVQ100-12A-** 1 2 3




| | | |
|---|---|---|
| 1 | **Plug** | RP13A-12PS-20SC <Made by HIROSE ELECTRIC CO., LTD.> |
| 2 | **Female contact** | RP19-SC-222 <Made by HIROSE ELECTRIC CO., LTD.> |
| 3 | **Vinyl multi-core cable** | VVRF 0.2 mm$^2$ 20 cores |

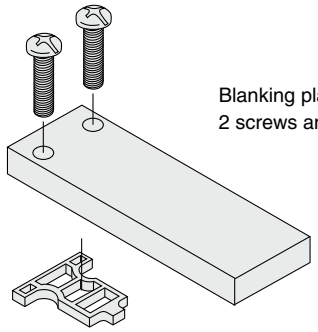
**Cable length**

| Part no. | **L** Dimension |
|---|---|
| **VVQ100-12A-1** | 1.5 m |
| **VVQ100-12A-2** | 3 m |
| **VVQ100-12A-3** | 5 m |

### Blanking Plate Assembly

#### VVQ100-10A-1

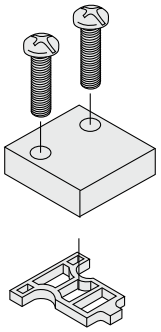
Plug-in Unit (**VV3Q11**) for Manifold with Circular Connector



Blanking plate assembly includes
2 screws and gasket

#### VVQ100-10A-2

Plug Lead Unit (**VV3Q12**) for Manifold



Blanking plate assembly includes
2 screws and gasket

### VV3Q11 For Manifold with Circular Connector

**<D-Side End Plate Assembly>**

D-side end plate assembly no.

**VVQ100-3A-**□

**Option**

| | |
|---|---|
| **1** | Standard type |
| **2** | DIN rail mounting |

**<U-Side End Plate Assembly>**

U-side end plate assembly no.

**VVQ100-2A-**□

**Option**

| | |
|---|---|
| **1** | Standard type |
| **2** | DIN rail mounting |

**<DIN Rail Mounting Brackets Assembly>**

DIN rail mounting brackets assembly no.

**AXT802-1A-**□

**Mounting direction**

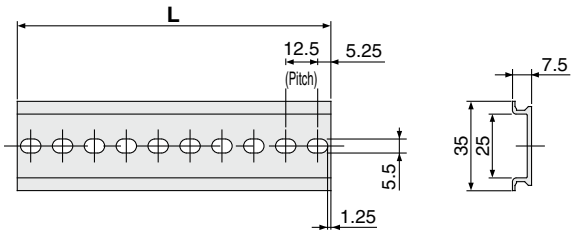
| | |
|---|---|
| **D** | D side mounting |
| **U** | U side mounting |

∗ The number of manifold stations cannot be changed.

### When Ordering DIN Rail Only

**DIN rail no: AXT100-DR-**□

∗ As for □, enter the number from the DIN rail dimensions table.
For L dimension, refer to the dimensions on page 9.




**L Dimension** L = 12.5 n + 10.5

| No. | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
|---|---|---|---|---|---|---|---|---|---|---|
| **L** Dimension | 23 | 35.5 | 48 | 60.5 | 73 | 85.5 | 98 | 110.5 | 123 | 135.5 |
| No. | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** | **19** | **20** |
| **L** Dimension | 148 | 160.5 | 173 | 185.5 | 198 | 210.5 | 223 | 235.5 | 248 | 260.5 |
| No. | **21** | **22** | **23** | **24** | **25** | **26** | **27** | **28** | **29** | **30** |
| **L** Dimension | 273 | 285.5 | 298 | 310.5 | 323 | 335.5 | 348 | 360.5 | 373 | 385.5 |
| No. | **31** | **32** | **33** | **34** | **35** | **36** | **37** | **38** | **39** | **40** |
| **L** Dimension | 398 | 410.5 | 423 | 435.5 | 448 | 460.5 | 473 | 485.5 | 498 | 510.5 |

# *VQ100 Series*
# Specific Product Precautions 1

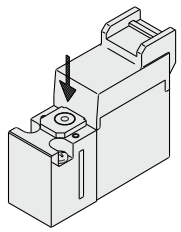
**Be sure to read this before handling the products.**
**Refer to the "Handling Precautions for SMC Products" (M-E03-3) for safety instructions and solenoid valve precautions.**

## ⚠ Warning

### Manual Override

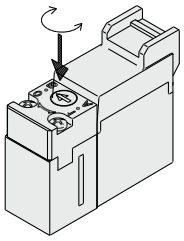
Connected actuator is started by manual operation. Use the manual override after confirming that there is no danger.

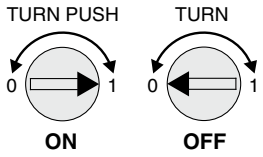
**■ Non-locking push type (Tool required)**



· It is turned ON by pushing the button in the direction indicated by the arrow until it hits the end and turned OFF by releasing the button.

**■ Locking type (Tool required) <Semi-standard>**

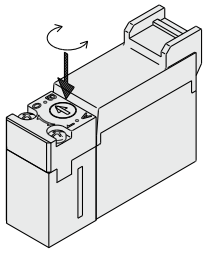


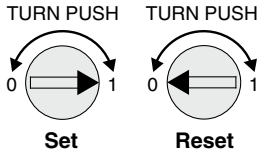



· It can be locked in the ON state by turning the manual override to the right, setting the ▶ mark to 1 and pushing it.
· It can be unlocked by turning the manual override to the left, setting the ◀ mark to 0 and pushing it, and the manual returns.

∗ Make sure the locking type manual override is unlocked before use.

**■ Push-locking type (Tool required) <Latching type>**






· It can be locked in the set state (flow: P → A) by turning the manual override to the right, setting the ▶ mark to 1 and pushing it.
· It can be turned back to the reset state (flow: A → R) by turning the manual override to the left, setting the ◀ mark to 0 and pushing it. (It is set in reset state when shipped.)

**⚠ Caution** When operating with a screwdriver, turn it gently using a watchmakers screw driver.
[Torque: Less than 0.1 N·m]

### Mounting

To mount the valve, check the condition of the body interface gasket and then tighten it uniformly to the appropriate tightening torque (0.15 to 0.18 N·m).

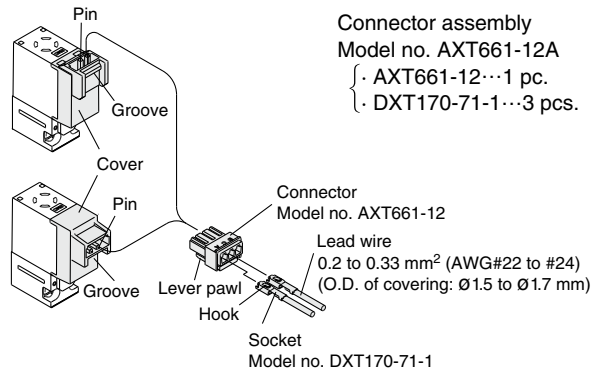
## ⚠ Caution

### How to Use Plug Connector

#### Attaching and detaching connectors

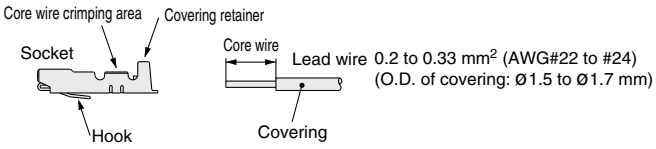
- To attach a connector, hold the lever and connector unit between your fingers and insert straight onto the pins of the solenoid valve so that the lever's pawl is pushed into the groove and locks.
- To detach a connector, remove the pawl from the groove by pushing the lever downward with your thumb,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

∗ Gently pull the lead wire, otherwise it may cause contact failure or disconnection.




#### Crimping connection of lead wire and socket

Strip 3.2 to 3.7 mm at the end of lead wires, insert the end of the core wires evenly into the sockets, and then crimp it by a crimping tool. When this is done, take care that the coverings of the lead wires do not enter the core wire crimping area.
(Crimping tool: Model no. DXT170-75-1)



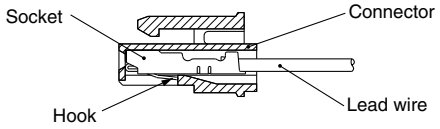

#### Attaching and detaching lead wires with sockets

- Attaching

  Insert the sockets into the square holes of the connector (A, C, B 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.



# *VQ100 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.**

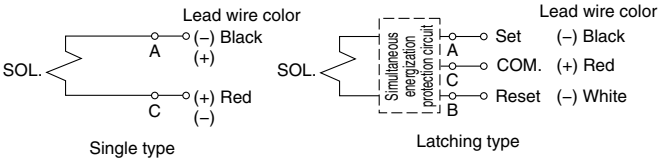
## ⚠ Caution

### How to Use Plug Connector

#### Wiring Specifications

●Wiring should be connected as shown below. Connect with the power supply respectively.

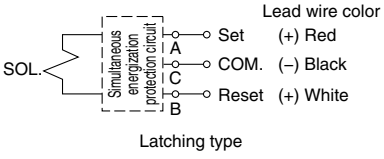
**DC positive common**



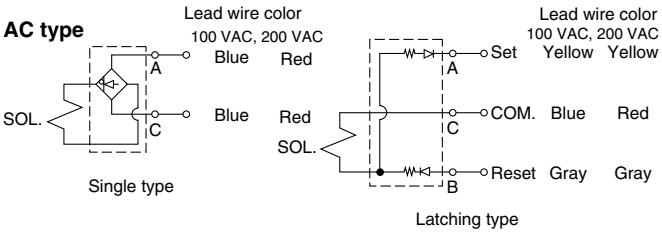

**DC negative common**

There is no polarity for the single type.

∗ However, there is polarity for the large flow type.




**AC type**




**●How to Order valve plug connector assembly**

**DC positive common**
- **Single type** **AXT661-14A-□**
- **Latching type** **AXT661-13A-□**

**DC negative common**
- **Latching type** **AXT661-13AN-□**

**For 100 VAC**
- **Single type** **AXT661-31A-□**
- **Latching type** **AXT661-32A-□**

**For 200 VAC**
- **Single type** **AXT661-34A-□**
- **Latching type** **AXT661-35A-□**

**Connector/Socket only (3 pcs.)** **AXT661-12A**

**Lead wire length**

| | |
|---|---|
| **Nil** | 300 mm |
| **6** | 600 mm |
| **10** | 1000 mm |
| **20** | 2000 mm |
| **30** | 3000 mm |

**●Plug connector lead wire length**

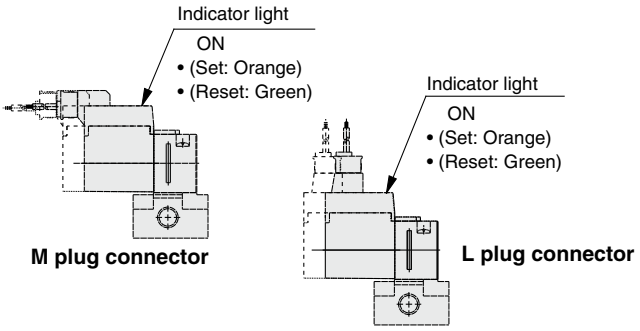
The lead wire length of the valves with lead wire is 300 mm. When ordering a lead wire length of 600 mm or longer, list the part numbers for the valve without connector and the connector assembly.

## ⚠ Caution

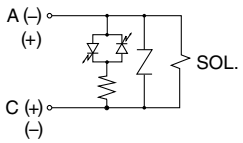
### Light/Surge Voltage Suppressor

In the latching type, the set side and the reset side energization are indicated by two colors – orange and green.

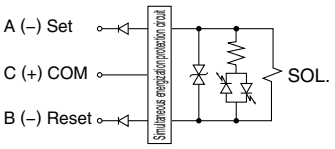
∗ ( ) and the dotted lines indicate the latching and large flow type.



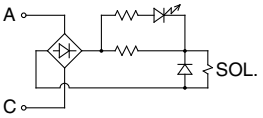

**Single solenoid (DC)**



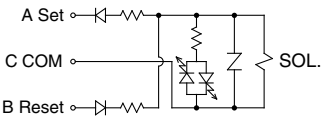

**Latching solenoid (DC)**




**Single solenoid (AC)**




**Latching solenoid (AC)**




∗ Single: No polarity
ON: Orange light lights.

∗ Setting side energizing: Orange light lights.
Resetting side energizing: Green light lights.
With wrong wiring prevention (stop diode) mechanism
With surge voltage suppresser (ZNR/Surge absorbing diode)

∗ A (set) side energizing: P → A
B (set) side energizing: A → R

∗ Negative common specification is applicable.

# *VQ100 Series*
# Specific Product Precautions 3

**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.**

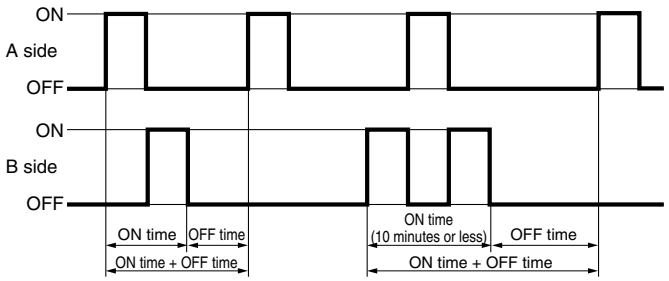
## ⚠ Caution

### Latching Type

The latching solenoid is equipped with a self-holding mechanism which permits the movable iron core in the solenoid to hold the set position or reset position during momentary energization (20 ms or longer), so there is no need for continuous energization. Depending on conditions, continuous energization may cause a rise in the coil temperatures, resulting in a malfunction.

<Special precautions to be taken with the latching type>

1. Do not continuously energize the latching type.
   When it is necessary to energize it continuously, keep the energized period to 10 minutes or less, and then leave a de-energized period (on both the A side and B side) lasting longer than the energized period, before operating it again. The duty ratio should be 50% or less.




· Maximum ON time is 10 minutes.
· Duty ratio ≤ 50% (Duty ratio = $\frac{\text{ON time}}{\text{ON time + OFF time}}$)

Example: When energization lasts for five minutes, it should be followed by five or more minutes of de-energization. Because the latching type has only one solenoid, both the A side and B side should be off for five minutes or more.

However, a minimum energization time of 20 ms is recommended.
[Ambient temperature]
The product should be installed in an environment with an ambient temperature of –10°C to 50°C. Especially in environments with poor heat dissipation, such as in a panel, the heat of the coil can cause the ambient temperature to rise, so please exercise caution.

2. Use a circuit in which the set and reset signals will not be energized at the same time.
3. The minimum energization time for self-holding is 20 ms.
4. Even when there is no problem with normal operations and locations, please consult with SMC before using in locations with a vibration of 30 m/s$^2$ or more or a strong magnetic field.
5. Even though this valve is set to the reset position at the time of shipment (passage: A → R), it may switch to the set position during transportation or due to impact when mounting valves, etc. Therefore, check the initial position with the power supply or by performing a manual override prior to use.

| Latching | Passage | Indicator light |
|---|---|---|
| A-C ON (set) | P → A | Orange |
| B-C ON (reset) | A → R | Green |

| Single | Passage | Indicator light |
|---|---|---|
| A-C ON | P → A | Orange |
| OFF | A → R | — |

# *VQ100 Series*
# Specific Product Precautions 4

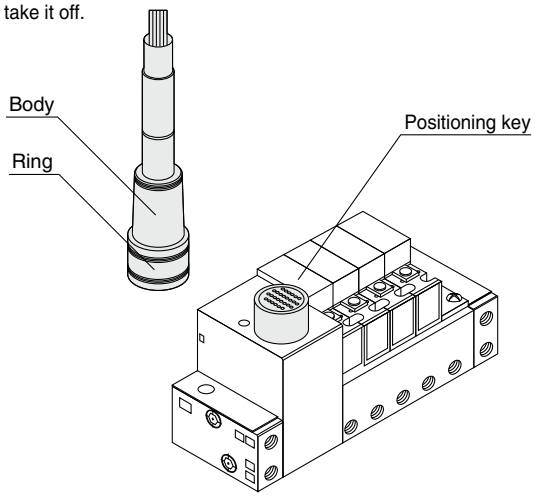
**Be sure to read this before handling the products.**
**Refer to the "Handling Precautions for SMC Products" (M-E03-3) for safety instructions and solenoid valve precautions.**

## ⚠ Caution

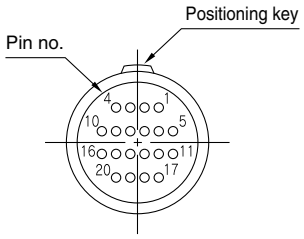
### How to Use of Circular Connector (For plug-in manifold: For VV3Q11)

#### 1. Attaching and detaching connectors

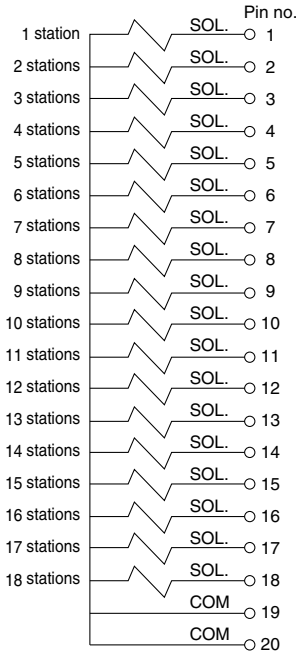
- To attach a connector, align the positioning key grooves of the body to the key, and it is locked.
- To detach the connector, pull the ring section straight back, and it is unlocked and then take it off.




#### 2. Wiring Specifications




**Circular connector pin arrangement**




**Electrical wiring specifications**

**Terminal no./Lead wire color**

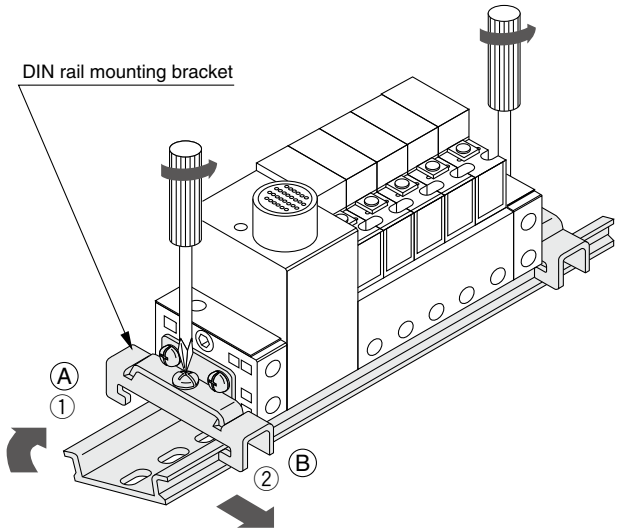
| Terminal no. | Lead wire color | |
|---|---|---|
| | Wire color | Dot marking |
| 1 | Black | — |
| 2 | Brown | — |
| 3 | Red | — |
| 4 | Orange | — |
| 5 | Yellow | — |
| 6 | Pink | — |
| 7 | Blue | — |
| 8 | Violet | White |
| 9 | Gray | Black |
| 10 | White | Black |
| 11 | White | Red |
| 12 | Yellow | Red |
| 13 | Orange | Red |
| 14 | Yellow | Black |
| 15 | Pink | Black |
| 16 | Blue | White |
| 17 | Violet | — |
| 18 | Gray | — |
| 19 | Orange | Black |
| 20 | Red | White |

## ⚠ Caution

### How to Connect/Disconnect DIN Rail

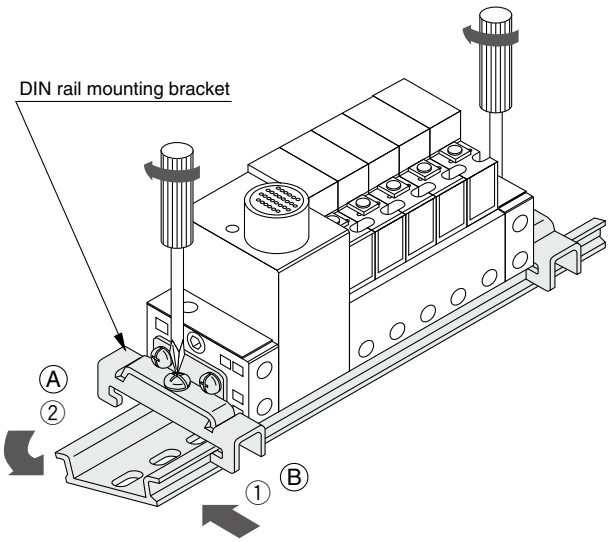
#### Removing

1) Loosen the clamp screw of the end plate on both sides.
2) Lift side Ⓐ of the manifold base and slide the end plate in the direction of ② shown in the figure to remove.




#### Mounting

1) Hook side Ⓑ of the manifold base on the DIN rail.
2) Press down side Ⓐ and mount the end plate on the DIN rail.
   Tighten the clamp screw on the side.
   Proper tightening torque of thread: 0.8 to 1.2 N·m




### How to Calculate the Flow Rate

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

# 3-Port Solenoid Valve
# *VQ100 Series*

NRTL /C

## How to Order Valves

**30 – VQ1 [1] 0 – [5] [F] – [ ]**

**Conforming to CSA standard**

**VQ series**
**Compact 3-port valve**

**Actuation**

| | |
|---|---|
| **1** | Normally closed |
| **2** | Normally open |

**Coil rated voltage**

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

**Port size**

| | |
|---|---|
| **Nil** | Without sub-plate |
| **M3** | With sub-plate |
| **M5** | With sub-plate |

**Electrical entry**

| | | |
|---|---|---|
| **F** | Plug-in<br>With light/surge voltage suppressor<br>(only for plug-in manifold) |  |

**Function**: Standard (1 W)
**Manual override**: Non-locking push type (Tool required)
Latching type: Push-locking type (Tool required)

Refer to standard products for specifications and dimensions.