

Pilot Operated 2 Port Solenoid Valve for Dry Air

VQ20/30 Series



Compact and lightweight with large flow capacity

| | Weight (g) | C [dm ³ /(s·bar)] |
|------|------------|------------------------------|
| VQ20 | 46 | 1.5 (C8) |
| VQ30 | 80 | 3.0 (C12) |



VQ30 Series



VQ20 Series

| | |
|-----------|-------------------------------------|
| VCH | <input type="checkbox"/> |
| VDW | <input type="checkbox"/> |
| SX10 | <input type="checkbox"/> |
| VQ | <input checked="" type="checkbox"/> |
| LVM | <input type="checkbox"/> |

High frequency operation possible

High speed response 7 ms or less (VQ20), 20 ms or less (VQ30)

(High speed response type without light/surge voltage suppressor at the supply pressure of 0.5 MPa)

Long operating life

Easy piping with One-touch Fittings

**Dusttight low jetproof enclosure (IP65)
compliant in DIN terminal type.**

Application: Air-blow, Blow-off of workpiece, etc.

Pilot Operated
For Dry Air

2 Port Solenoid Valve

VQ20/30 Series

Single Unit



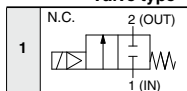
How to Order Valves

VQ 2 1 A 1 - 1 G - - - C6 - - - -

Series/ Orifice diameter

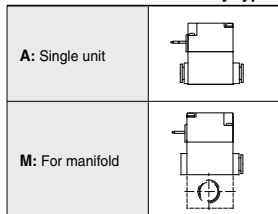
| Symbol | Series |
|--------|--------|
| 2 | VQ20 |
| 3 | VQ30 |

Valve type



When the valve is closed, flow is blocked from port 1 to port 2. However, if the pressure in port 2 is higher than port 1, the valve will not be able to block the fluid and it will flow from port 2 to port 1.

Body type



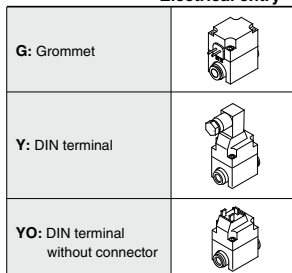
Coil voltage

| | |
|----------------------|-----------------------|
| 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 |
| 9 ^{Note 1)} | Other special voltage |

Note 1) Please consult with SMC for special voltages.

Note 2) There is polarity for DC voltage (with power-saving circuit type).

Electrical entry



CE-compliant

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

Made to Order specifications (Refer to the table below)

Option

| | |
|------------------------------|--|
| Nil: None | |
| F: With bracket | |
| L: Type L (VQ20 only) | |

Note) If ordering both options, indicate "LF".

Manual override

| | |
|--------------------|--------------------------------------|
| Nil | None |
| B ^{Note)} | Slotted locking type (tool required) |

Note) Only normally closed DIN terminal in-line type is applicable.

Port size

| Symbol | Port size | VQ20 | VQ30 |
|------------|---------------------------|------|------|
| C6 | One-touch fitting for ø6 | ○ | — |
| C8 | One-touch fitting for ø8 | ○ | — |
| C10 | One-touch fitting for ø10 | — | ○ |
| C12 | One-touch fitting for ø12 | — | ○ |

Electricity circuit

| Symbol | DC voltage | AC voltage |
|---------------------------|--|---|
| Nil | With power-saving circuit (With surge voltage suppressor protection circuit) | With full wave rectifier circuit (With surge voltage suppressor protection circuit) |
| Z | With power-saving circuit (With light/surge voltage suppressor protection circuit) | With full wave rectifier circuit (With light/surge voltage suppressor protection circuit) |
| H ^{Note)} | High speed response type (Without energy-saving, light/surge voltage suppressor circuit) | |

Note) H is available only for DC voltage and cannot be energized continuously.

Made to Order Specifications

Please contact SMC for further specifications, delivery and price.



Oil-free specifications

VQ₃²1^A_M1- - - -X2(-Q)

Note) Please consult with SMC when using. Not available for manual operation.

Seal material fluororubber specifications

VQ₃²1^A_M1- - - -X5(-Q)

Seal material fluororubber/oil-free specifications

VQ₃²1^A_M1- - - -X23(-Q)

Note) Not available for manual operation.

Pilot Operated 2 Port Solenoid Valve for Dry Air **VQ20/30 Series**

Standard Specifications



| Series | | VQ20 | VQ30 | |
|-------------------------|--|---|-------------------------------|--|
| Valve specifications | Valve construction | 2 port poppet pilot operated | | |
| | Fluid | Air ^{Note 1)} | | |
| | Ambient and fluid temperature | -10 to 50°C ^{Note 2)} | | |
| | Lubrication | Not required | | |
| | Manual override | Slotted locking type (tool required) ^{Note 3)} | | |
| | Impact resistance/Vibration resistance | 150/30 m/s ² ^{Note 4)} | | |
| | Enclosure | Dustproof ^{Note 5)} | | |
| | Internal leakage cm ³ /min | 15 or less | | |
| | Exterior leakage cm ³ /min | 15 or less | | |
| | Mounting orientation | Unrestricted | | |
| Weight | 46 g | 80 g | | |
| Electric specifications | Coil rated voltage | 12 VDC, 24 VDC, 100 VAC, 110 VAC, 200 VAC, 220 VAC | | |
| | Allowable voltage fluctuation | ±10% of rated voltage | | |
| | Coil insulation type | Class B or equivalent | | |
| | Power consumption (Current value) | DC voltage (with power-saving circuit) | Inrush: 2.9 W, Holding: 0.6 W | |
| | | DC voltage (without power-saving circuit) | 2.9 W | |
| | AC | 2 VA | | |
| Electrical entry | Grommet, DIN terminal | | | |

Note 1) This product is for dry air. Use in clean air, and be sure that drain and oil content does not flow into the product.

Note 2) Use dry air to prevent condensation when operating at low temperatures.

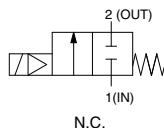
Note 3) Manual override is available only for DIN terminal type.

Note 4) Vibration resistance: No malfunction occurred in a one-sweep test between 8.3 and 2000 Hz. Test was performed at both energized and de-energized states to the axis and right angle directions of the main valve and armature (value at the initial state).

Impact resistance: No malfunction resulted from the impact test using a drop impact tester. The test was performed on the axis and right angle directions of the main valve and armature for both energized and de-energized states (value at the initial state).

Note 5) DIN terminal type: Applicable to dusttight and jetproof (IP65).

Symbol



When the valve is closed, flow is blocked from port 1 to port 2. However, if the pressure in port 2 is higher than port 1, the valve will not be able to block the fluid and it will flow from port 2 to port 1.

Characteristic Specifications

| Series | VQ20 | | VQ30 | | |
|--|------------------------------|---------------------------|---|---------------------------|---|
| | Port size | ø6 | ø8 | ø10 | ø12 |
| Flow rate characteristics ^{Note 1)} | C [dm ³ /(s·bar)] | 1.4 | 1.5 | 2.8 | 3.0 |
| | b | 0.23 | 0.42 | 0.42 | 0.37 |
| | Cv | 0.33 | 0.39 | 0.80 | 0.81 |
| Min. operating pressure differential | 0.01 MPa ^{Note 4)} | | | | |
| Max. operating pressure | 0.6 MPa | | 0.5 MPa | | |
| Response time ^{Note 2)} | Electricity circuit | With power-saving circuit | High speed response type ^{Note 3)} | With power-saving circuit | High speed response type ^{Note 3)} |
| | ON | 10 ms or less | 7 ms or less | 25 ms or less | 20 ms or less |
| OFF | 15 ms or less | 5 ms or less | 15 ms or less | 5 ms or less | |

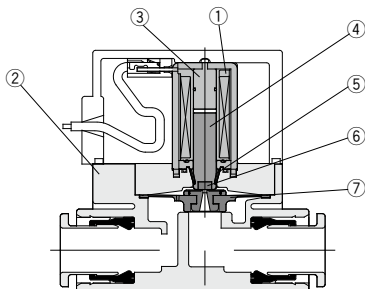
Note 1) The flow rate characteristics of this product have variations.

Note 2) JIS B 8373-2015 (Value of high response time is subject to change upon pressure, quality of air.)

Note 3) It cannot be used when energized continuously.

Note 4) If a restrictor (nozzle, etc.) is mounted on the outlet side piping, the pressure differential when ON is smaller. Be sure that the pressure differential does not drop below 0.01 MPa. Additionally, take great care when used for the ejector supply, etc.

Construction



Component Parts

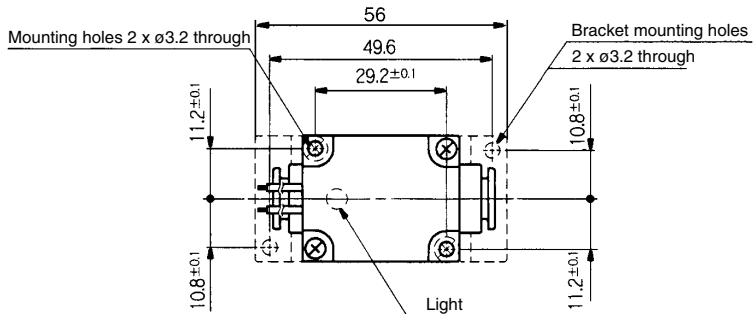
| No. | Description | Material |
|-----|--------------------|-----------------|
| 1 | Solenoid coil | |
| 2 | Body | Resin |
| 3 | Fixed armature | Stainless steel |
| 4 | Armature | Stainless steel |
| 5 | Return spring | Stainless steel |
| 6 | Poppet | NBR |
| 7 | Diaphragm assembly | H NBR, Resin |

VQ20/30 Series

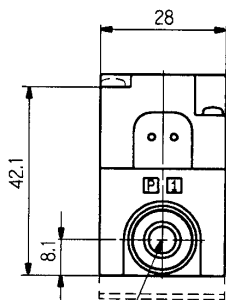
Dimensions: VQ20 Series

In-line Type: Grommet (G)

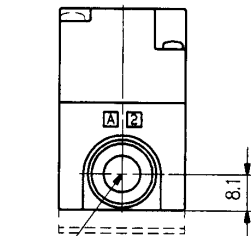
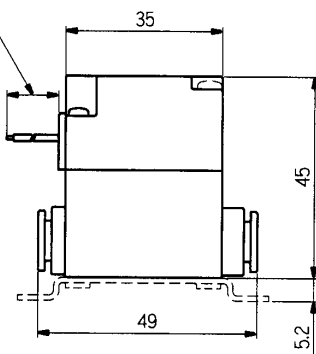
VQ21A1-□G□-□-□



Lead wire length Approx. 300



C6: One-touch fitting for ø6
C8: One-touch fitting for ø8



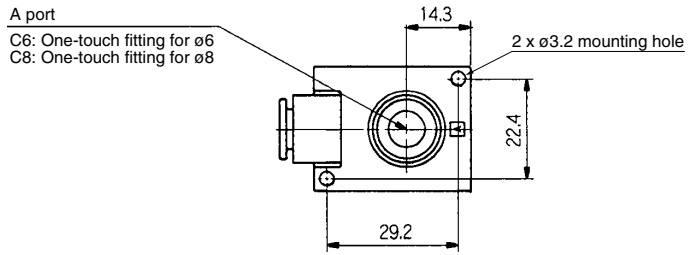
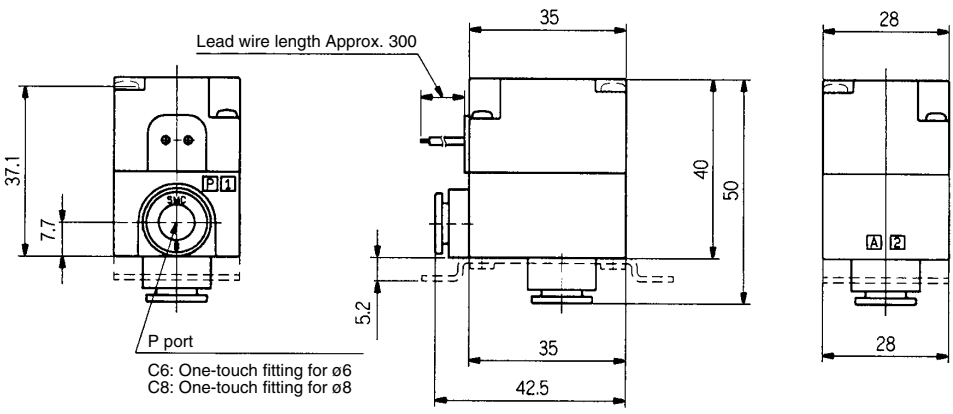
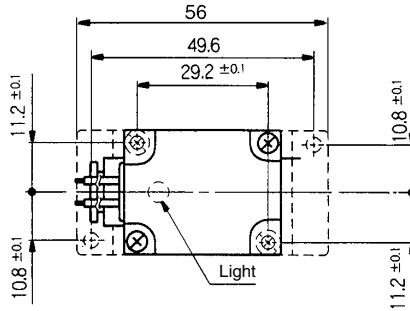
C6: One-touch fitting for ø6
C8: One-touch fitting for ø8

* Dotted line: Bracket mounting type (-F)

Dimensions: VQ20 Series

Type L: Grommet (G)

VQ21A1-□G□-□□-□□



- VCH □
- VDW
- SX10
- VQ**
- LVM

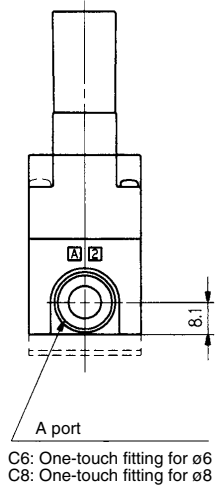
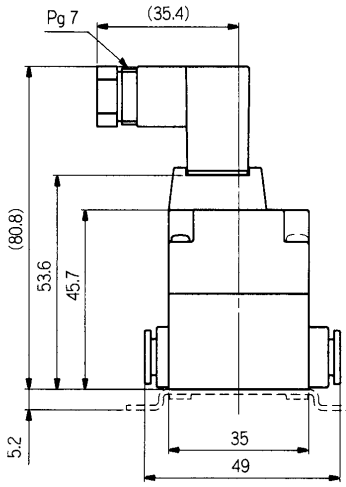
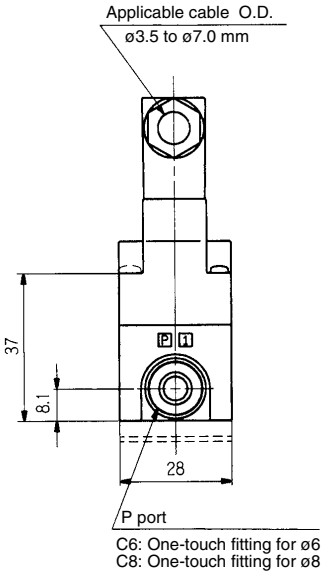
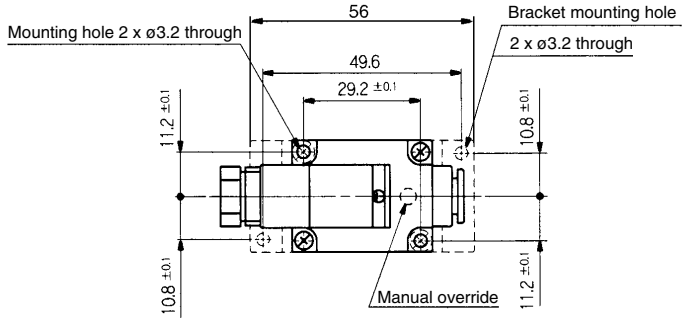
* Dotted line: Bracket mounting type (-LF)

VQ20/30 Series

Dimensions: VQ20 Series

In-line Type: DIN terminal (Y)

VQ21A1-□Y□□-□-□

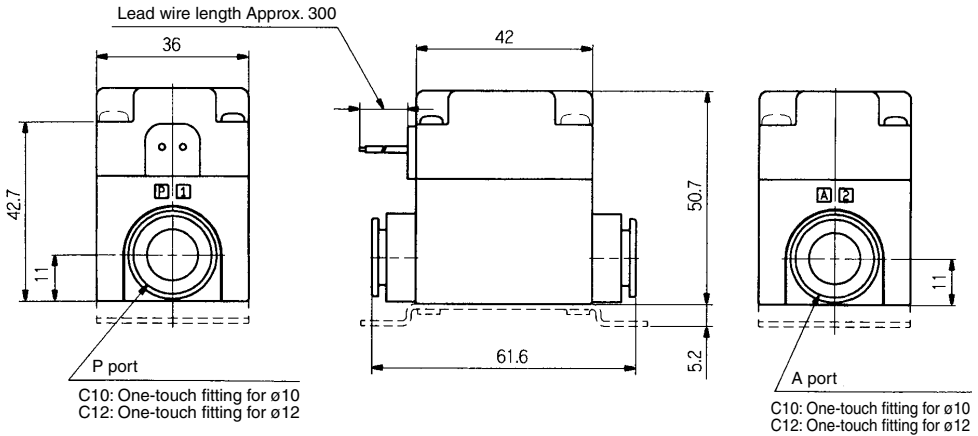
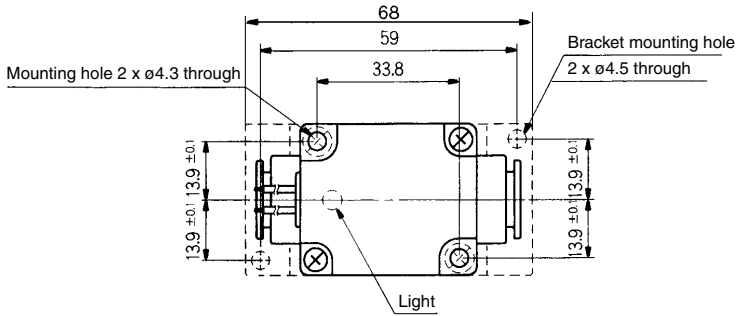


* Dotted line: Bracket mounting type (-F)

Dimensions: VQ30 Series

In-line Type: Grommet (G)

VQ31A1-□G□-□-□



| | |
|-----------|---|
| VCH | □ |
| VDW | |
| SX10 | |
| VQ | |
| LVM | |

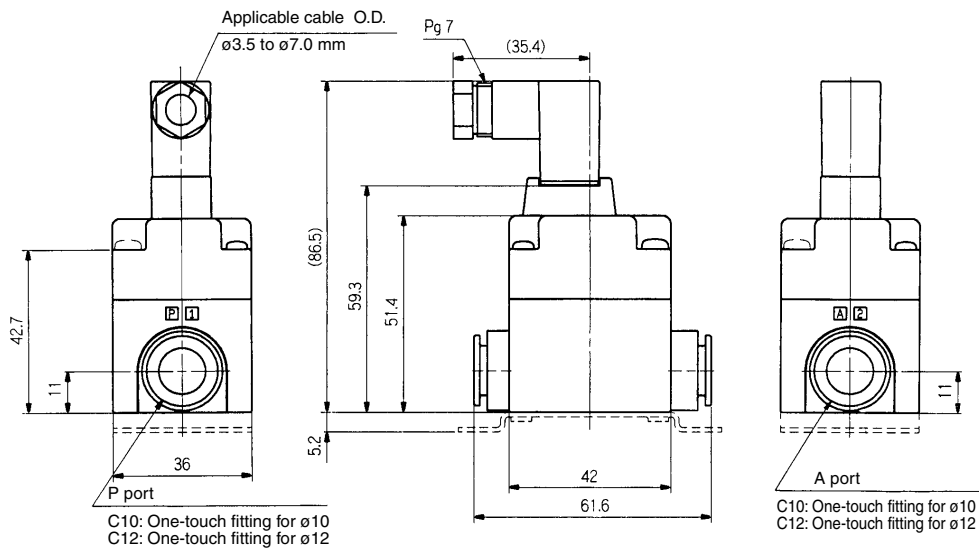
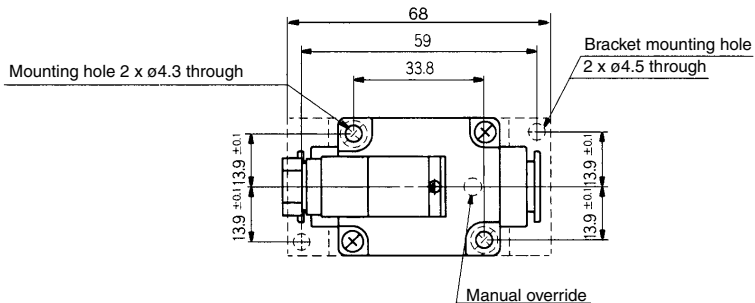
* Dotted line: Bracket mounting type (-F)

VQ20/30 Series

Dimensions: VQ30 Series

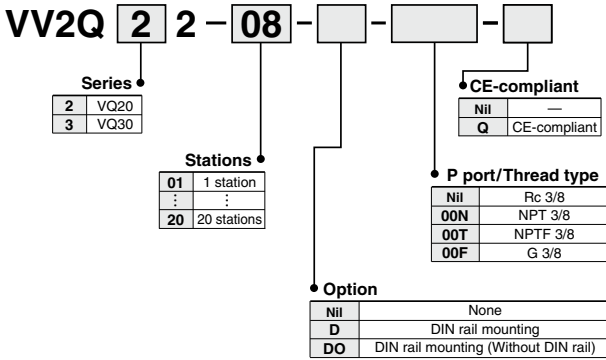
DIN terminal (Y)

VQ31A1-□Y□□-□□



* Dotted line: Bracket mounting type (-F)

How to Order Manifold



How to Order Manifold Assembly

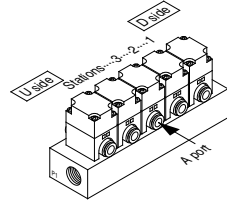
Enter the mounting base and option part numbers under the manifold base part number.

<Ordering Example>

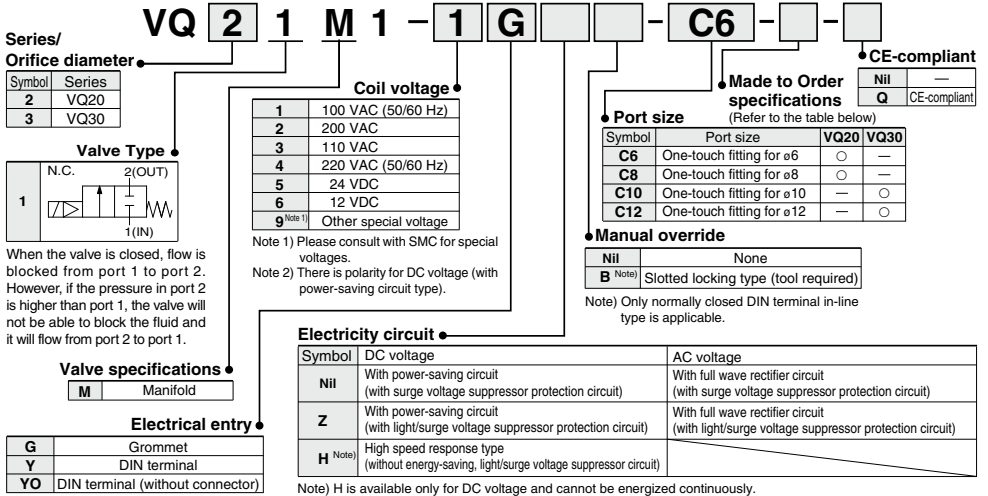
- VV2Q22-05 (-Q) 1 set Manifold part No.
- * VQ21M1-5G-C6 (-Q) ... 4 sets Valve part No. (Stations 1 to 4)
- * VQ21M1-5G-C8 (-Q) ... 1 set Valve part No. (Station 5)

"s" is the symbol for assembly. Add a "s" in front of the part numbers for solenoid valves, etc., to be mounted.

Enter together in order, counting from station 1 on the D side.



How to Order Valves (For Manifold)



- VCH
- VDW
- SX10
- VQ
- LVM

Made to Order Specifications

Please contact SMC for further specifications, delivery and price.



Oil-free specifications

VQ $\frac{2}{3}$ **1M1** - [] [] [] - [] - [] - **X2 (-Q)**

Note) Please consult with SMC when using. Not available for manual operation.

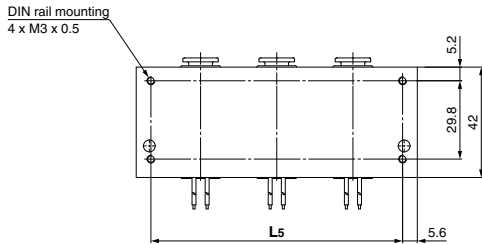
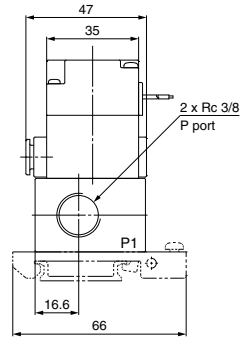
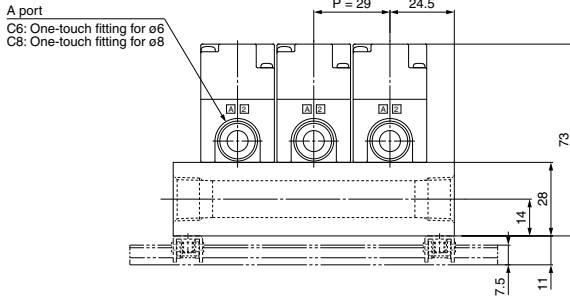
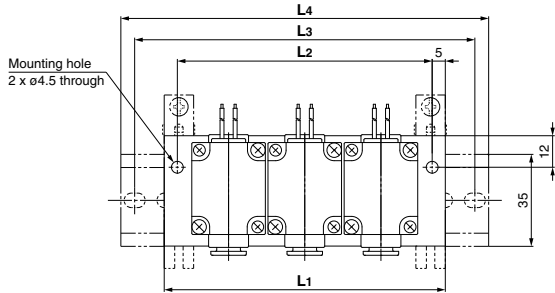
Seal material fluororubber specifications

VQ $\frac{2}{3}$ **1M1** - [] [] [] [] - [] - [] - **X5 (-Q)**

VQ20/30 Series

Dimensions

Plug lead unit manifold (VV2Q22-□)



* Dotted line: DIN rail mounting (-D)

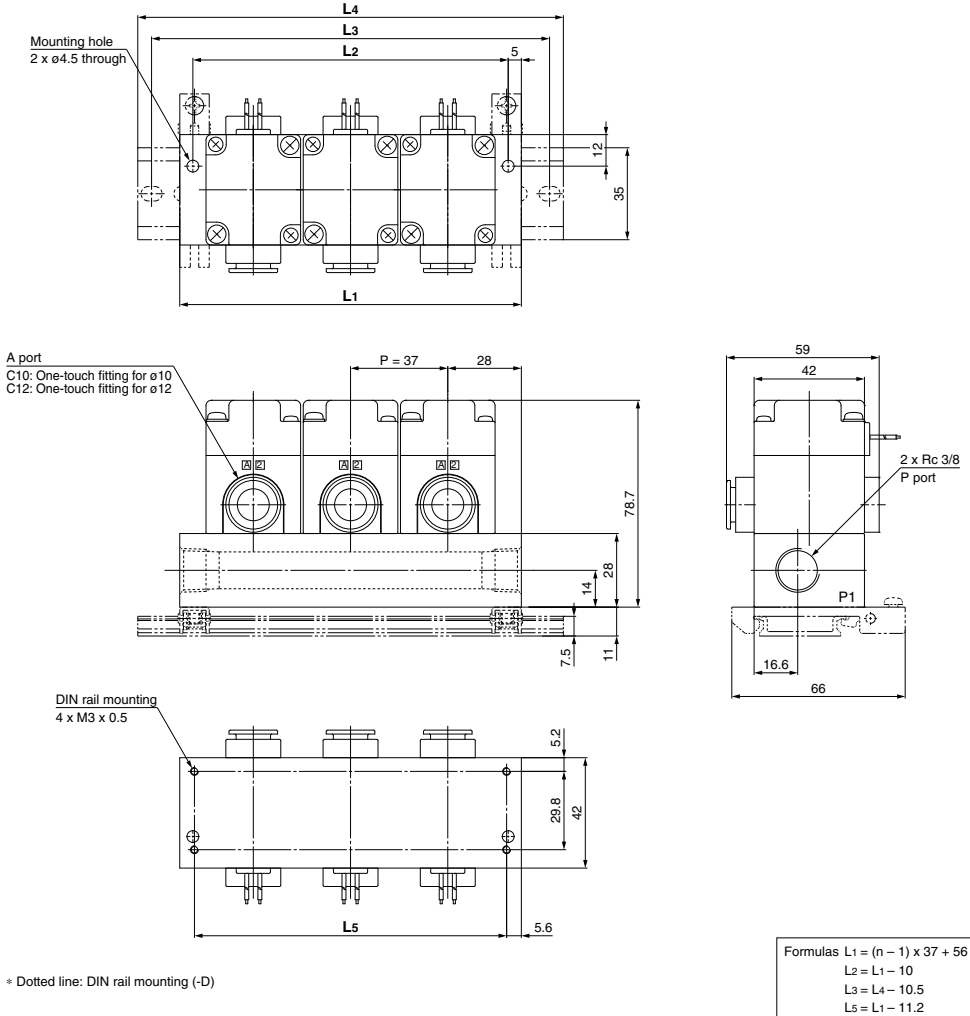
Formulas $L1 = (n - 1) \times 29 + 49$
 $L2 = L1 - 10$
 $L3 = L4 - 10.5$
 $L5 = L1 - 11.2$

Dimensions

| L | n | n: Station (Max. 20) | | | | | | | | | | | | | | | | | | |
|----|------|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| L1 | 49 | 78 | 107 | 136 | 165 | 194 | 223 | 252 | 281 | 310 | 339 | 368 | 397 | 426 | 455 | 484 | 513 | 542 | 571 | 600 |
| L2 | 39 | 68 | 97 | 126 | 155 | 184 | 213 | 242 | 271 | 300 | 329 | 358 | 387 | 416 | 445 | 474 | 503 | 532 | 561 | 590 |
| L3 | 75 | 100 | 137.5 | 162.5 | 187.5 | 212.5 | 250 | 275 | 300 | 337.5 | 362.5 | 387.5 | 425 | 450 | 475 | 500 | 537.5 | 562.5 | 587.5 | 625 |
| L4 | 85.5 | 110.5 | 148 | 173 | 198 | 223 | 260.5 | 285.5 | 310.5 | 348 | 373 | 398 | 435.5 | 460.5 | 485.5 | 510.5 | 548 | 573 | 598 | 635.5 |
| L5 | 37.8 | 66.8 | 95.8 | 124.8 | 153.8 | 182.8 | 211.8 | 240.8 | 269.8 | 298.8 | 327.8 | 356.8 | 385.8 | 414.8 | 443.8 | 472.8 | 501.8 | 530.8 | 559.8 | 588.8 |

Dimensions

Plug lead unit manifold (VV2Q32-□)



* Dotted line: DIN rail mounting (-D)

Dimensions

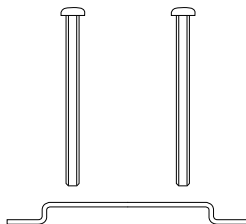
| L | n | n: Station (Max. 20) | | | | | | | | | | | | | | | | | | | |
|----|------|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| L1 | 56 | 93 | 130 | 167 | 204 | 241 | 278 | 315 | 352 | 389 | 426 | 463 | 500 | 537 | 574 | 611 | 648 | 685 | 722 | 759 | |
| L2 | 46 | 83 | 120 | 157 | 194 | 231 | 268 | 305 | 342 | 379 | 416 | 453 | 490 | 527 | 564 | 601 | 638 | 675 | 712 | 749 | |
| L3 | 75 | 112.5 | 150 | 187.5 | 225 | 261.5 | 300 | 337.5 | 375 | 412.5 | 450 | 487.5 | 525 | 562.5 | 598.5 | 625 | 662.5 | 700 | 737.5 | 775 | |
| L4 | 85.5 | 123 | 160.5 | 198 | 235.5 | 273 | 310.5 | 348 | 385.5 | 423 | 460.5 | 498 | 535.5 | 573 | 598 | 635.5 | 673 | 710.5 | 748 | 785.5 | |
| L5 | 44.8 | 81.8 | 118.8 | 155.8 | 192.8 | 229.8 | 266.8 | 303.8 | 340.8 | 377.8 | 414.8 | 451.8 | 488.8 | 525.8 | 562.8 | 599.8 | 636.8 | 673.8 | 710.8 | 747.8 | |

VQ20/30 Series

Single Unit Option

Bracket assembly (with 2 mounting screws)

For fixing this solenoid valve.



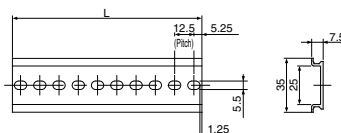
| Type | Bracket assembly | (Mounting screws, 2 pcs.) |
|--|------------------|---------------------------|
| VQ20 Grommet in-line type | AXT835-13A | M3 x 45 |
| VQ20 Grommet L type, DIN terminal type | AXT835-13A-2 | M3 x 40 |
| DIN terminal L type | AXT835-13A-3 | M3 x 35 |
| VQ30 | AXT837-13A | M4 x 45 |

Manifold Option

DIN rail AXT100-DR-□

* Suffix the number from DIN rail dimensions table below.
Refer to the dimension drawing for each manifold for L dimension.

Each manifold can be mounted on a DIN rail.
Order with the option symbol "D" to specify DIN rail mounting type.
The DIN rail is approximately 30 mm longer than the length of manifold.



L dimension • VQ20 series

| Stations | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|----------|------|-------|-----|-----|-----|-----|-------|-------|-------|-----|-----|-----|-------|-------|-------|-------|-----|-----|-----|-------|
| No. | 6 | 8 | 11 | 13 | 15 | 17 | 20 | 22 | 24 | 27 | 29 | 31 | 34 | 36 | 38 | 40 | 43 | 45 | 47 | 50 |
| L | 85.5 | 110.5 | 148 | 173 | 198 | 223 | 260.5 | 285.5 | 310.5 | 348 | 373 | 398 | 435.5 | 460.5 | 485.5 | 510.5 | 548 | 573 | 598 | 635.5 |

• VQ30 series

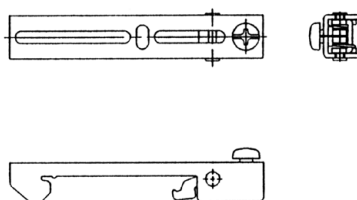
| Stations | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|----------|------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-----|-------|-----|-------|-----|-------|
| No. | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 47 | 50 | 53 | 56 | 59 | 62 |
| L | 85.5 | 123 | 160.5 | 198 | 235.5 | 273 | 310.5 | 348 | 385.5 | 423 | 460.5 | 498 | 535.5 | 573 | 598 | 635.5 | 673 | 710.5 | 748 | 785.5 |

DIN rail mounting bracket

VVQZ100-DB-5

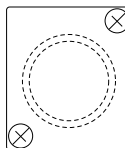
This bracket is used for mounting the manifold on the DIN rail. DIN rail mounting bracket is attached on the manifold.

1 set of DIN rail mounting brackets for 1 manifold includes 2 brackets.



Blanking plate assembly (with O-ring and 2 mounting screws)

Mount a blank plate on valve manifold when a valve is disassembled for maintenance purposes, or when spare valve unit is supposed to be mounted in the future.



| Series | Blanking plate assembly | (O-ring) | (Mounting screws, 2 pcs.) |
|--------|-------------------------|---------------|---------------------------|
| VQ20 | AXT835-35A | OR-1679-100-H | M3 x 6 |
| VQ30 | AXT837-35A | OR-2400-150-H | M4 x 6 |



VQ20/30 Series

Specific Product Precautions 1

Be sure to read this before handling the products.

Refer to back page 50 for Safety Instructions and pages 17 to 19 for 2 Port Solenoid Valve for Fluid Control Precautions.

Selection

Warning

1. Air quality

This product is for dry air. Drain, oil, etc. in the air may result in faulty operation. Use clean (dry) air.

2. Pressure differential

If a restrictor (nozzle, etc.) is mounted on the outlet side, the outlet side pressure differential at the inlet side is smaller.

Be sure the pressure differential when ON does not drop below 0.01 MPa.

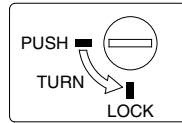
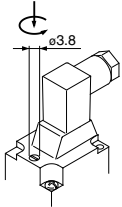
Manual Override

Warning

Regardless of electric signals to the solenoid valve, the manual override is used for switching the main valve. (DIN terminal only.)

Slotted locking type (tool required)

Push the manual override button with a small flat head screwdriver until it stops. Turn it in the counterclockwise direction at 90° to lock the manual. Turn it right to release.



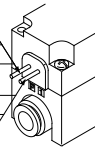
Connection and Electrical Circuit

Caution

Black (-) DC
Blue (100 VAC)
Red (200 VAC)
Gray (Other AC)

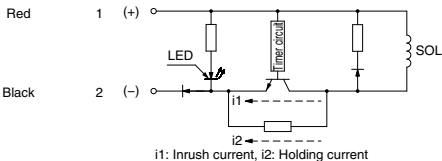
Red (+) DC
Blue (100 VAC)
Red (200 VAC)
Gray (Other AC)

■ Grommet lead wire
AWG22,
Insulator O.D. 1.6 mm



With DC voltage power-saving circuit (with polarity)

Lead wire color DIN connector



i1: Inrush current, i2: Holding current

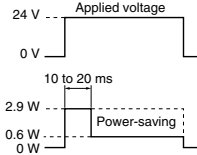
DC (with power-saving circuit) specifications is designed to reduce the power consumption at holding to achieve power-saving by circuit shown above.

Refer to below power wave form.

Connection and Electrical Circuit

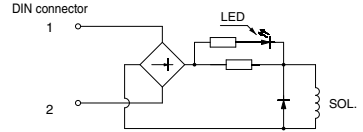
Caution

Power wave form of power-saving type (Rated voltage at 24 VDC)



AC circuit

Lead wire color
Blue (100 VAC)
Red (200 VAC)
Gray (Other AC)

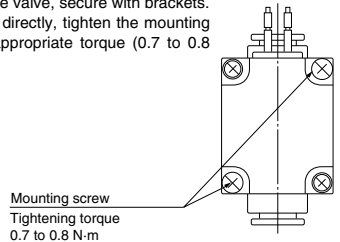


Blue (100 VAC)
Red (200 VAC)
Gray (Other AC)

Valve Mounting

Caution

When mounting the valve, secure with brackets. When mounting it directly, tighten the mounting screws with the appropriate torque (0.7 to 0.8 N·m).



When Energizing Continuously for Long Period of Time

Caution

When energizing continuously, choose the option of an energy-saving circuit specifications. High speed response type (with no energy-saving circuit) cannot be energized continuously.



VQ20/30 Series

Specific Product Precautions 2

Be sure to read this before handling the products.

Refer to back page 50 for Safety Instructions and pages 17 to 19 for 2 Port Solenoid Valve for Fluid Control Precautions.

How to Wire DIN Terminal

⚠ Caution

ISO#: Based on DIN 43650C (Pin gap 8 mm)

Connection

1. Loosen the tightening screw and pull the connector off of the solenoid valve.
2. After removing the tightening screw, divide the terminal block and housing by prying open the slot area of the lower part of the terminal block open with a screwdriver.
3. Loosen the terminal screws of the block and insert stripped lead wires in accordance with the wiring diagram. Secure each wire by re-tightening the terminal screw (In the case of terminal 1: (+), 2: (-) DC)
4. Tighten the ground nut to secure the cable wire.

Change of electrical entry

Wire entry can be changed by mounting the housing in either direction (four directions at every 90°) after dividing the terminal block and the housing.

* For the indicator lighted type, be careful not to damage the light with the lead wire of the cable.

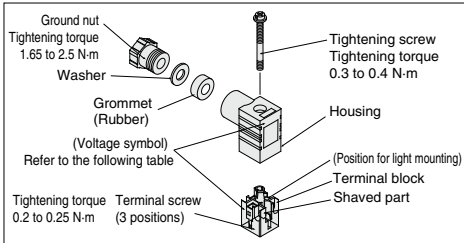
Precautions

Insert a connector straight or pull it out straight, using caution it does not be tilted.

Applicable cable

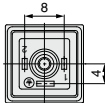
Cord O.D.: $\phi 3.5$ to $\phi 7$

(Reference) 0.5 mm² 2-core and 3-core wire equivalent to JIS C 3306.



DIN (EN175301-803) Terminal

This DIN terminal corresponds to the Form C DIN connector with an 8 mm terminal pitch, which complies with EN175301-803B.



DIN Terminal Part No. (Based on DIN)

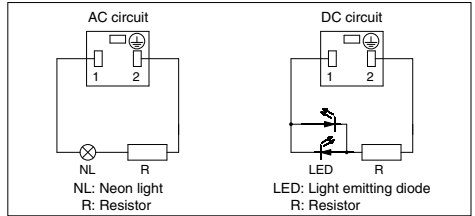
| | |
|-------------------------|------------|
| Without indicator light | SY100-82-4 |
|-------------------------|------------|

With Indicator Light

| Rated voltage | Voltage symbol | Part no. |
|---------------|----------------|---------------|
| 24 VDC | 24 V | SY100-82-3-05 |
| 12 VDC | 12 V | SY100-82-3-06 |
| 100 VAC | 100 V | SY100-82-2-01 |
| 200 VAC | 200 V | SY100-82-2-02 |
| 110 VAC | 110 V | SY100-82-2-03 |
| 220 VAC | 220 V | SY100-82-2-04 |

How to Wire DIN Terminal

DIN Terminal Circuit with Indicator Light



Manifold

How to Mount/Remove from DIN Rail

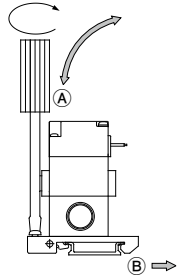
⚠ Caution

Removing procedure

1. Loosen the clamp screw on the "A" side of both ends of the manifold.
2. Lift the "A" side of the manifold off the DIN rail and slide it in the direction of the arrow.

Mounting procedure

1. Hook the mounting hook on the "B" side of the manifold base to the DIN rail.
 2. Press down side "A" and mount the end plate on the DIN rail. Tighten the clamp screw on side "B" of the end plate.
- (Tightening torque: 0.3 to 0.4 N-m).



Valve Mounting

⚠ Caution

After confirming the gasket is correctly placed under the valve, tighten the mounting screws with the appropriate torque (0.7 to 0.8 N-m).

