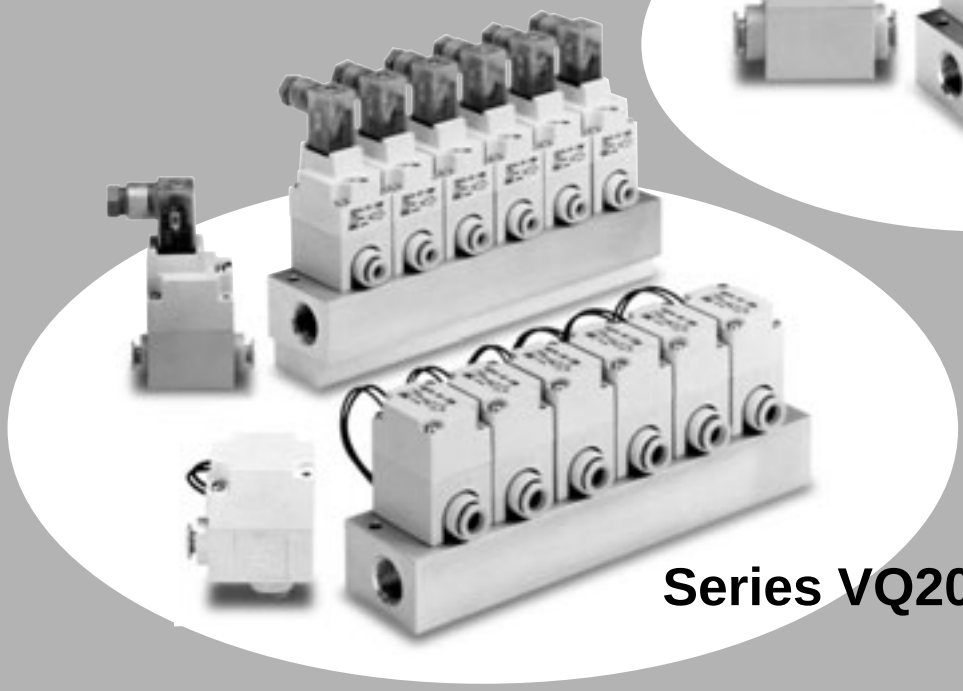
Pilot Operated 2 Port Solenoid Valve for Dry Air

Series VQ20/30

Compact and lightweight with large flow capacity

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

Series VQ30



Series VQ20

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
Series VQ20/30
Single Unit

How to Order Valves

VQ 2 1 A 1 – 1 G □ □ – C6 – □ – □

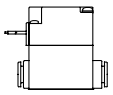
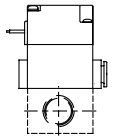
Series/ Orifice diameter

Symbol	Series
2	VQ20
3	VQ30

Valve type

1	N.C. (A) 2 / 1 (P)

Body type

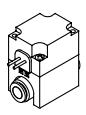
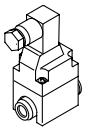
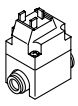
A: Single unit	
M: For manifold	

Coil voltage

1	100 VAC (50/60 Hz)
2	200 VAC (50/60 Hz)
3	110 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

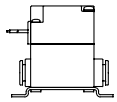
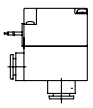
G: Grommet	
Y: DIN terminal	
YO: DIN terminal without connector	

Manual override

Nil	None
B Note)	Slotted locking type (tool required)

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

Option

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

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

Made to order specifications
(Refer to the table below)

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

VQ$^{2}_{3}$1$^{A}_{M}$1– □□□ – □□ – □ –X2

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

Seal material fluororubber specifications

VQ$^{2}_{3}$1$^{A}_{M}$1– □□□□ – □□ – □ –X5

Seal material fluororubber/oil-free specifications

VQ$^{2}_{3}$1$^{A}_{M}$1– □□□ – □□ – □ –X23

Note) Not available for manual operation.

VQ20

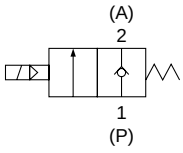
VQ30

Standard Specifications

			VQ20	VQ30
Valve specifications	Series			
	Valve construction		2 port poppet pilot operated	
	Fluid		Air/Inert gas Note 1)	
	Ambient and fluid temperature		–10 to 50°C Note 2)	
	Lubrication		Not required	
	Manual override		Slotted locking type (tool required) Note 3)	
	Shock resistance/Vibration resistance		150/30 m/s² Note 4)	
	Enclosure		Dustproof Note 5)	
	Internal leakage cm³/min		15 or less	
	Exterior leakage cm³/min		15 or less	
	Mounting orientation		Unrestricted	
	Mass		46 g	80 g
Electric specifications	Coil rated voltage		12 VDC, 24 VDC, 100 VAC, 110 VAC, 200 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).
Shock 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 low jetproof (IP65).

JIS Symbol



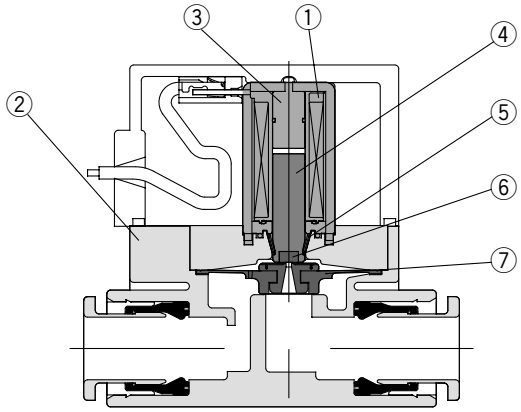
N.C.

Characteristic Specifications

Series		VQ20		VQ30	
Flow characteristics	Port size	C6	C8	C10	C12
	C [dm³/(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 3)			
Max. operating pressure differential		0.6 MPa		0.5 MPa	
Response time Note 1)	Electricity circuit	With power-saving circuit	High speed response type Note 2)	With power-saving circuit	High speed response type Note 2)
	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) JIS B 8375 (value of DC voltage specifications at 0.5 MPa supply pressure)
(Value of high response time is subject to change upon pressure, quality of air.)
Note 2) It cannot be used when energized continuously.
Note 3) 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.

Construction



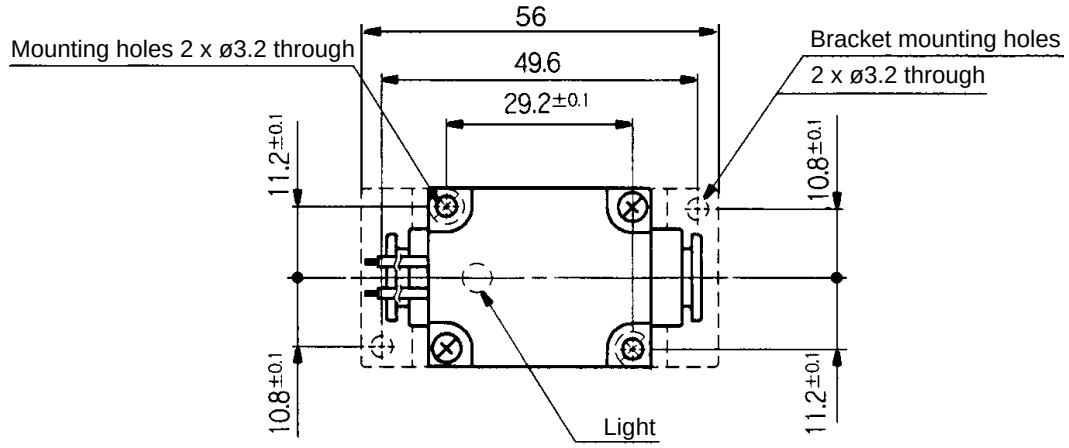
Component Parts

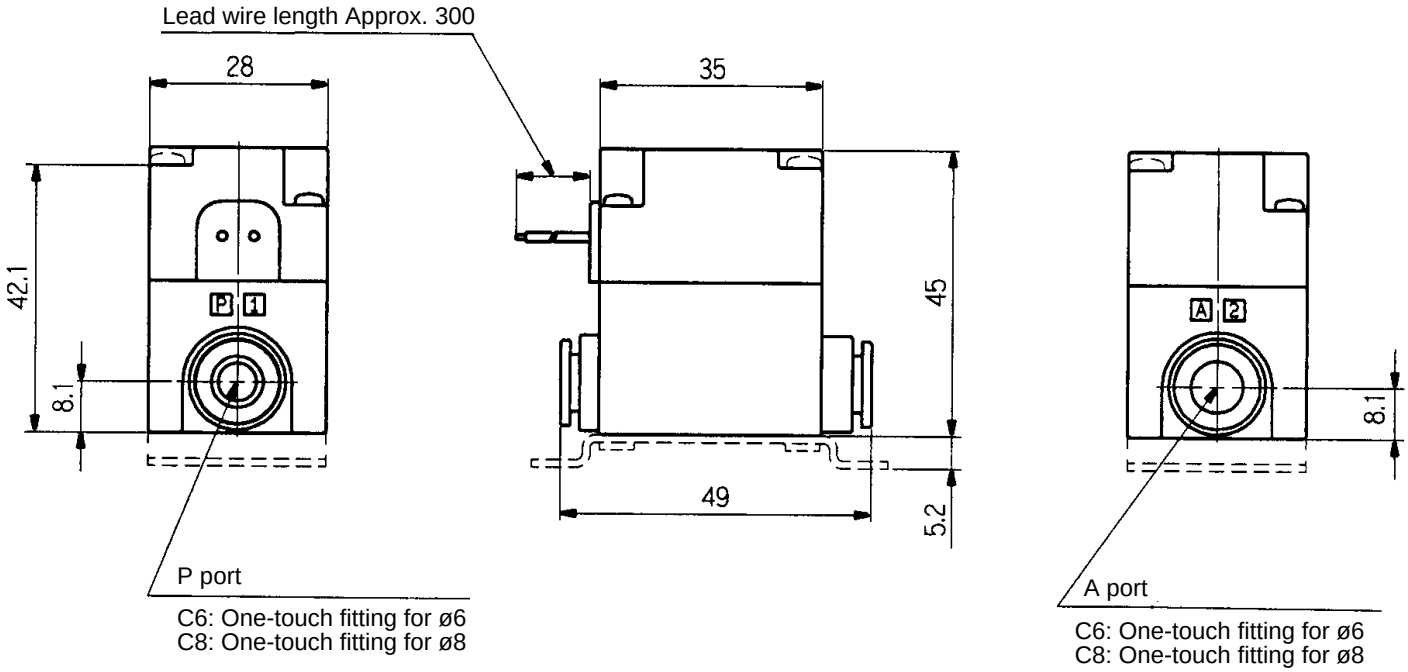
No.	Description	Material
1	**Solenoid coil**	—
2	**Body**	Resin
3	**Fixed armature**	Stainless steel
4	**Armature**	Stainless steel
5	**Return spring**	Stainless steel
6	**Poppet**	NBR
7	**Diaphragm assembly**	H NBR, Resin

Dimensions: Series VQ20

In-line Type: Grommet (G)

VQ21A1-□G□-□-□



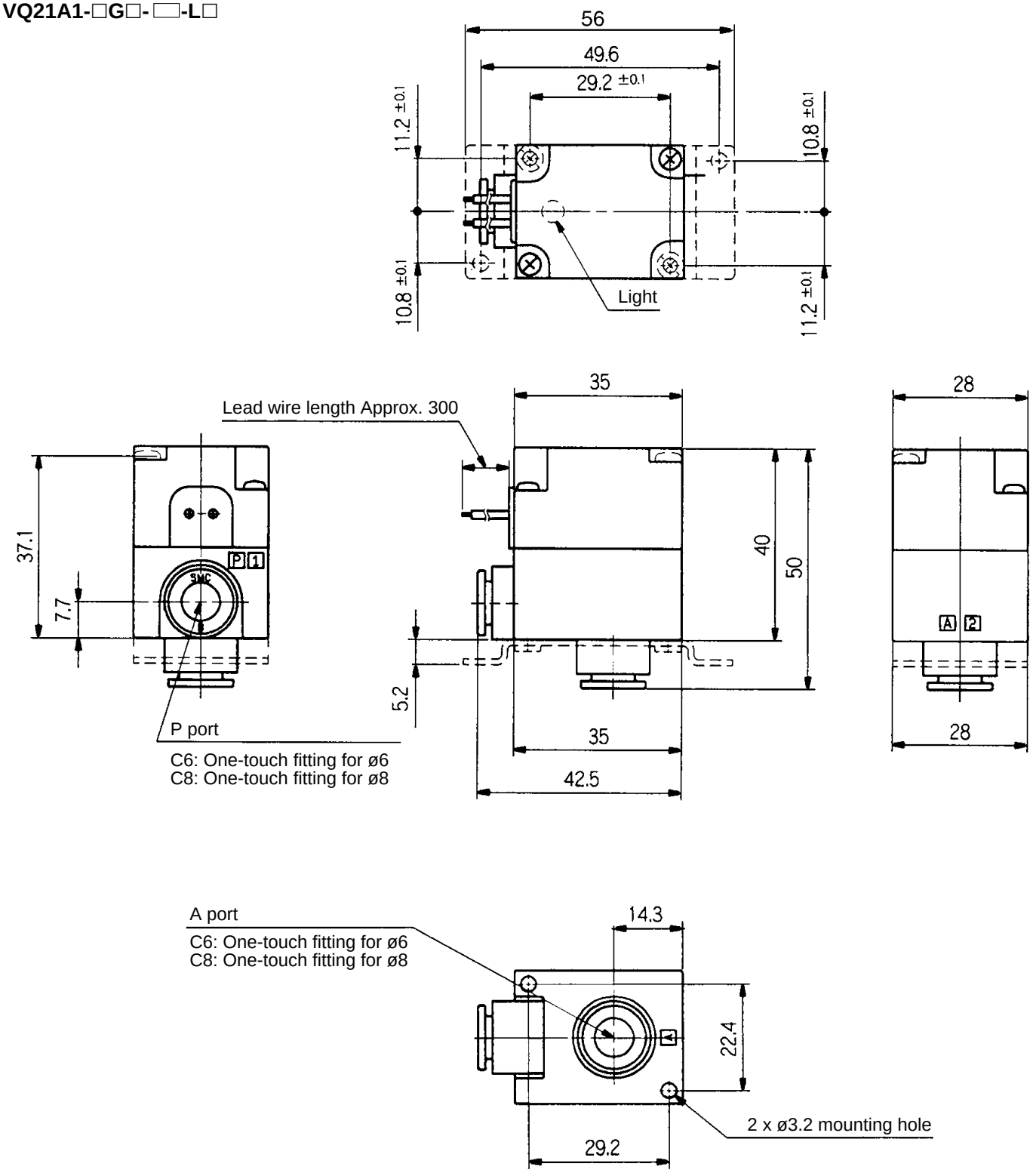


Dotted line: Bracket mounting style (-F)

Dimensions: Series VQ20

Type L: Grommet (G)

VQ21A1-□G□-□-L□

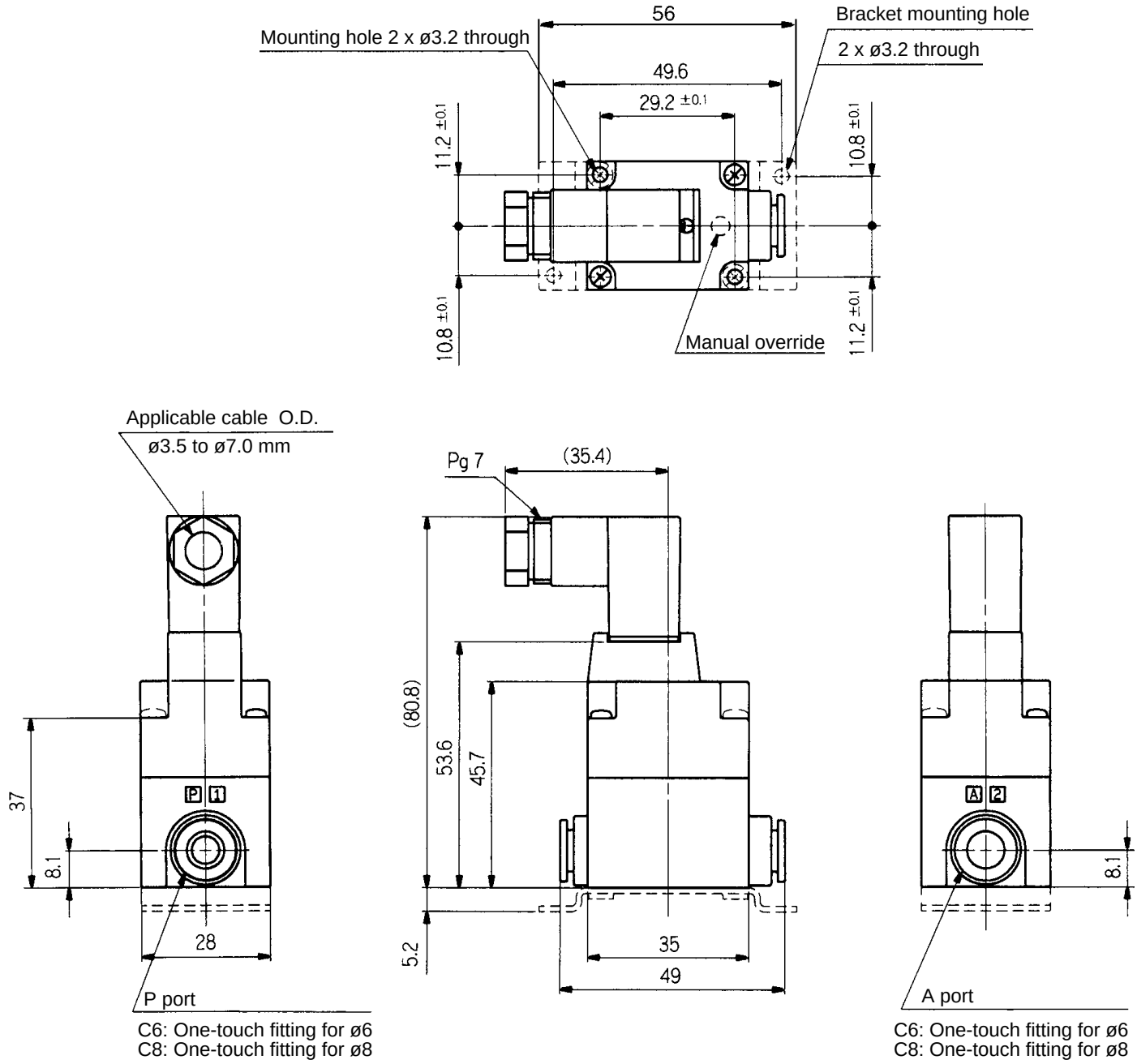


Dotted line: Bracket mounting style (-LF)

Dimensions: Series VQ20

In-line Type: DIN terminal (Y)

VQ21A1-□Y□□-□-□

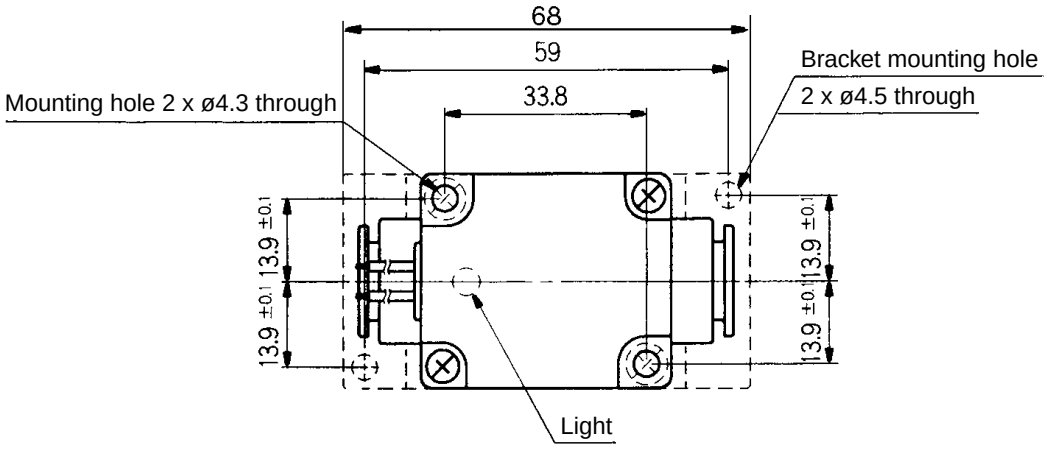


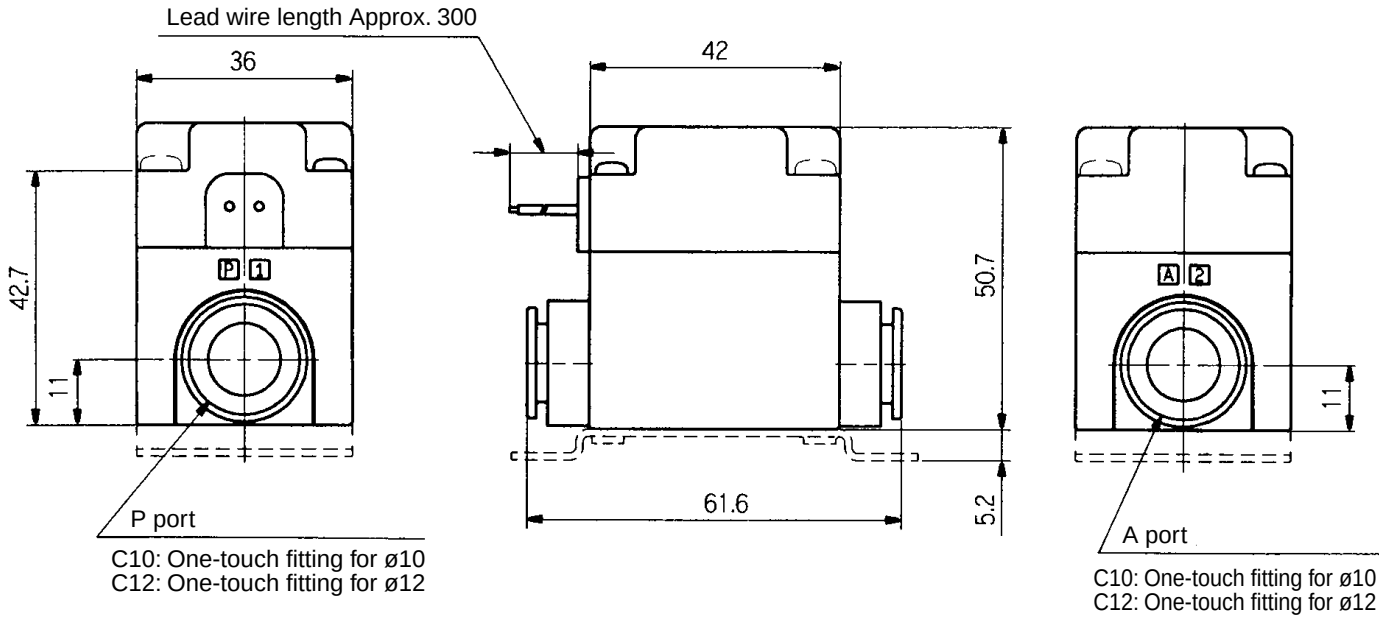
Dotted line: Bracket mounting style (-F)

Dimensions: Series VQ30

In-line Type: Grommet (G)

VQ31A1-□G□- □-□



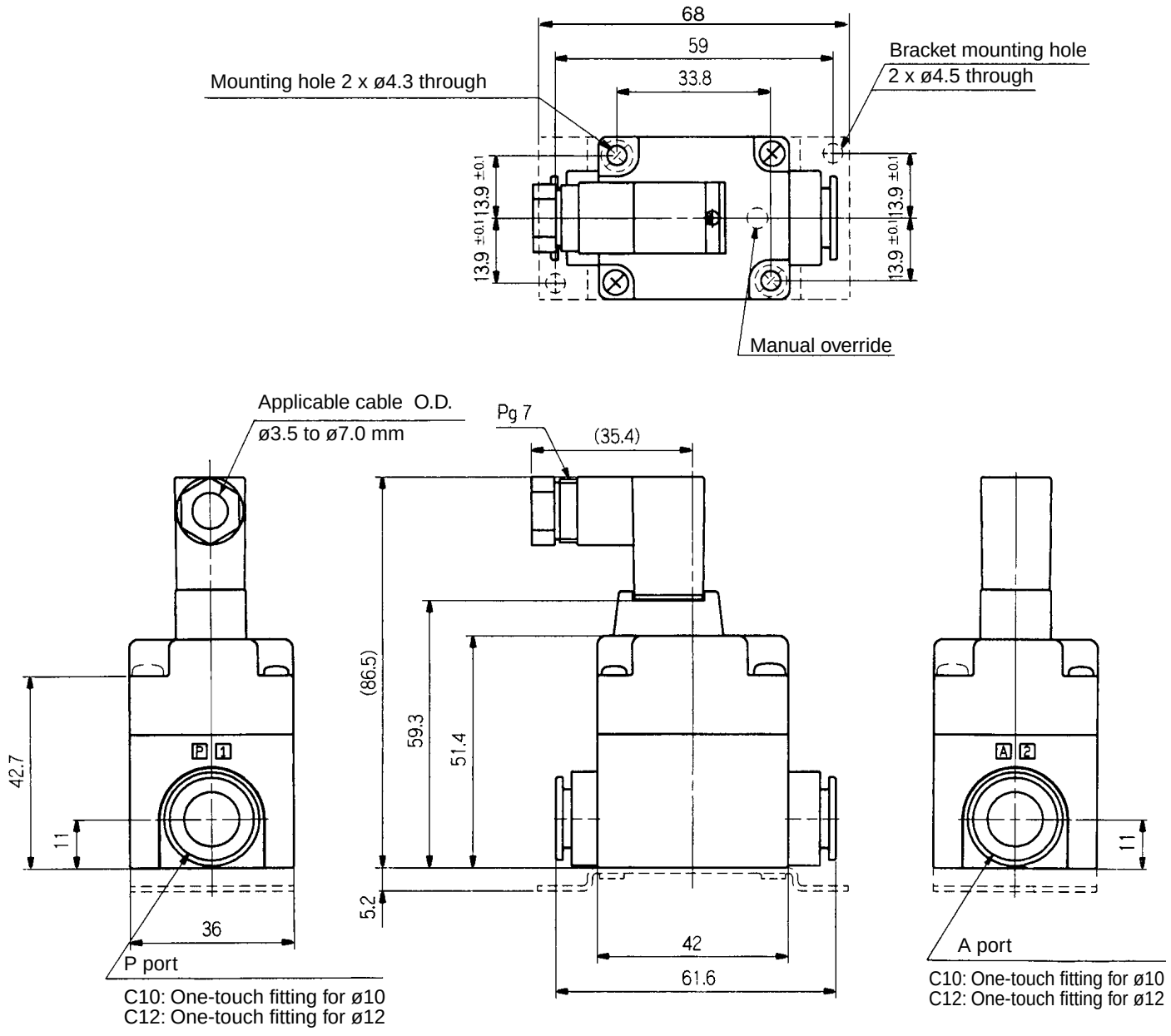


Dotted line: Bracket mounting style (-F)

Dimensions: Series VQ30

DIN terminal (Y)

VQ31A1-□Y□□-□-□



Dotted line: Bracket mounting style (-F)

How to Order Manifold

VV2Q 2 2 – 08 – ☐ – ☐

Series

2	VQ20
3	VQ30

Stations

01	1 station
⋮	⋮
20	20 stations

Option

Nil	None
D	DIN rail mounting
DO	DIN rail mounting (Without DIN rail)

P port/Thread type

Nil	Rc 3/8
00N	NPT 3/8
00T	NPTF 3/8
00F	G 3/8

How to Order Manifold Assembly

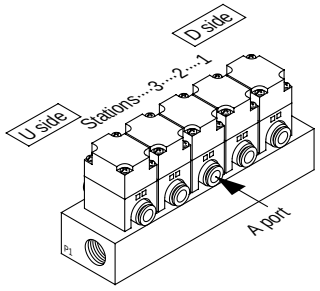
Enter the mounting valve and option part numbers under the manifold base part number.

<Ordering Example>

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

"∗" is the symbol for assembly. Add a "∗" 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)

VQ 2 1 M 1 – 1 G ☐ ☐ – C6 – ☐

Series/ Orifice diameter

Symbol	Series
2	VQ20
3	VQ30

Valve Type

1	N.C. (A) 2 / 1 (P)

Valve specifications

M	Manifold

Electrical entry

G	Grommet
Y	DIN terminal
YO	DIN terminal (without connector)

Coil voltage

1	100 VAC (50/60 Hz)
2	200 VAC
3	110 VAC
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).

Manual override

Nil	None
B Note)	Slotted locking type (tool required)

Note) Only normally closed DIN terminal in-line style 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	—	○

Made to order specifications (Refer to the table below)

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

VQ $\frac{2}{3}$1M1 – ☐☐☐ – ☐ – ☐ –X2

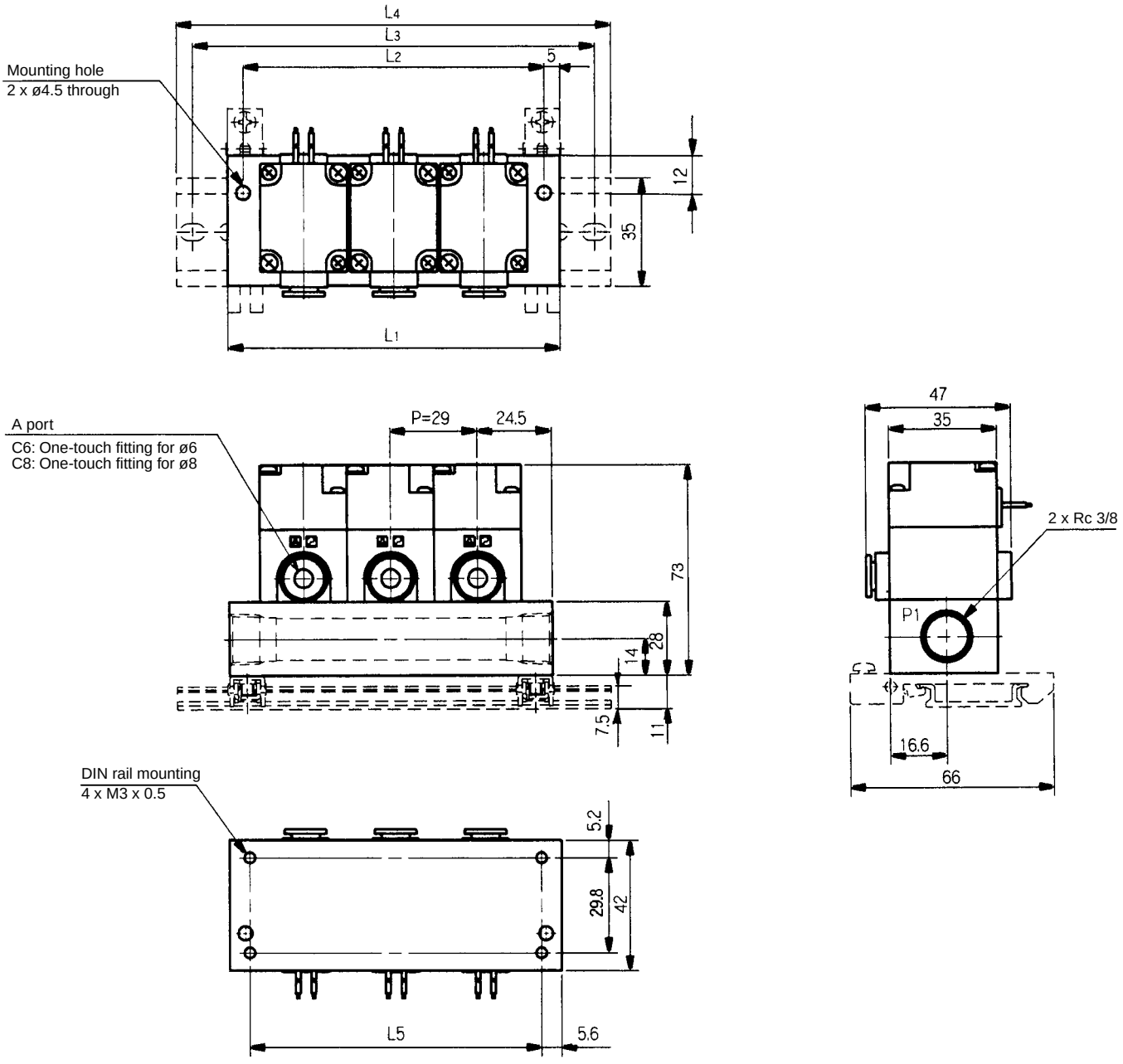
Note) Please consult with SMC when using. Not available for manual operation.

Seal material fluororubber specifications

VQ $\frac{2}{3}$1M1 – ☐☐☐☐ – ☐ – ☐ –X5

Dimensions

Plug lead unit manifold (VV2Q22-□)



Dotted line: DIN rail mounting (-D)

Formulas $L_1 = (n - 1) \times 29 + 49$
$L_2 = L_1 - 10$
$L_3 = L_4 - 10.5$
$L_5 = L_1 - 11.2$

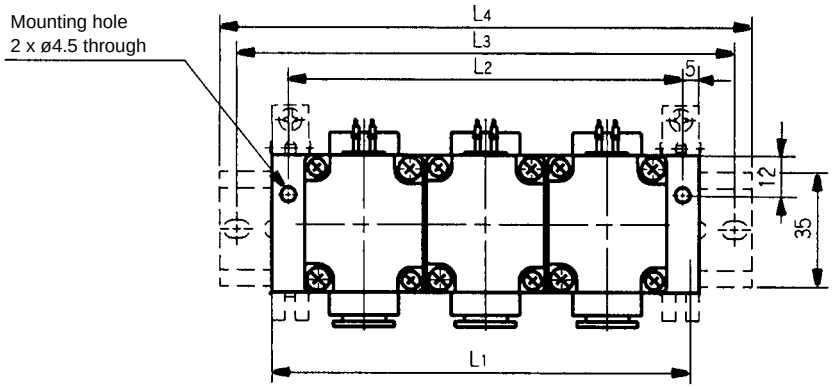
Dimensions

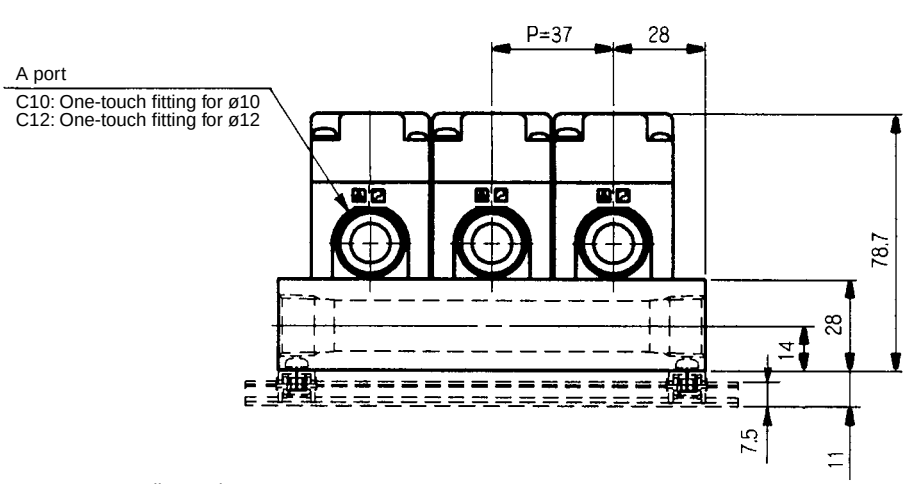
n: Station (Max. 20)

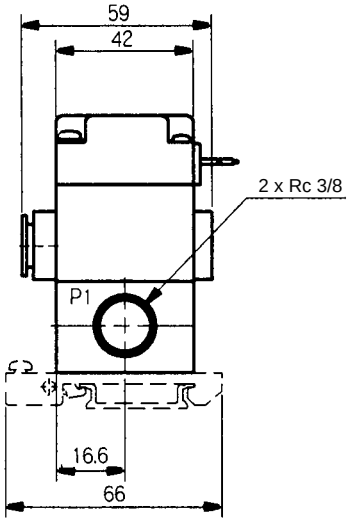
L \ n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
L_1	49	78	107	136	165	194	223	252	281	310	339	368	397	426	455	484	513	542	571	600
L_2	39	68	97	126	155	184	213	242	271	300	329	358	387	416	445	474	503	532	561	590
L_3	75	100	137.5	162.5	187.5	212.5	250	275	300	337.5	362.5	387.5	425	450	475	500	537.5	562.5	587.5	625
L_4	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
L_5	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

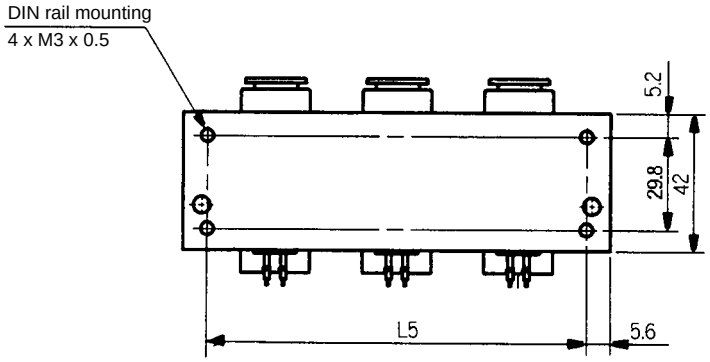
Dimensions

Plug lead unit manifold (VV2Q32-☐)









Dotted line: DIN rail mounting (-D)

Formulas
$L_1 = (n - 1) \times 37 + 56$
$L_2 = L_1 - 10$
$L_3 = L_4 - 10.5$
$L_5 = L_1 - 11.2$

Dimensions

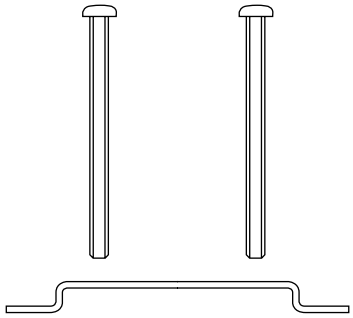
n: Station (Max. 20)

L \ n	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	587.5	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

Single Unit Option

Bracket assembly (with 2 mounting screws)

For fixing this solenoid valve.



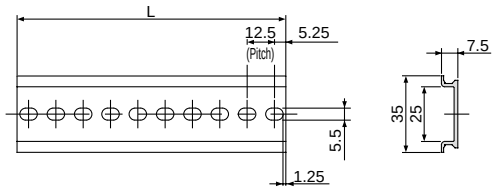
Type	Bracket assembly	(Mounting screws, 2 pcs.)
VQ20 Grommet in-line type	AXT835-13A	M3 x 45
VQ20 Grommet L type, DIN terminal type	AXT835-13A-2	M3 x 40
DIN terminal L type	AXT835-13A-3	M3 x 35
VQ30	AXT837-13A	M4 x 45

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 style.
The DIN rail is approximately 30 mm longer than the length of manifold.



L dimension

• Series VQ20

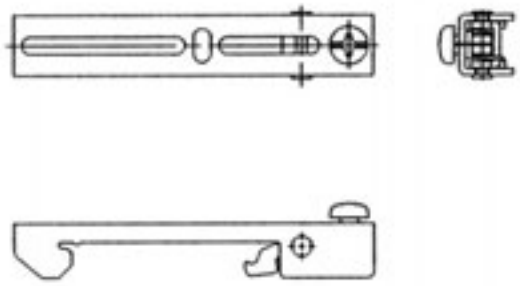
Stations	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
No.	6	8	11	13	15	17	20	22	24	27	29	31	34	36	38	40	43	45	47	50
L	85.5	110.5	148	173	198	223	260.5	285.5	310.5	348	373	398	435.5	460.5	485.5	510.5	548	573	598	635.5

• Series VQ30

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

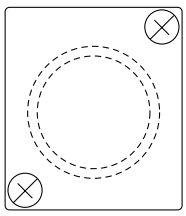
DIN rail mounting bracket
VVQZ100-DB-5

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

Specific Product Precautions 1

Be sure to read before handling.
Refer to front matters 42 and 43 for Safety Instructions, and pages 17 to 19 for 2 Port Solenoid Valves 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

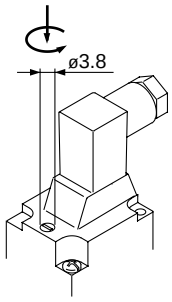
If a restrictor (nozzle, etc.) is mounted on the outlet side, the outlet side pressure differential at the inlet side is smaller.
Be sure the pressure differential when ON does not drop below 0.01 MPa.

Manual Override

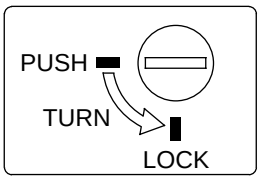
⚠Warning

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)

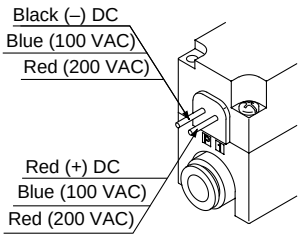


Push the manual override button with a small flat head screwdriver until it stops. Turn it in the counterclockwise direction at 90° to lock the manual. Turn it right to release.

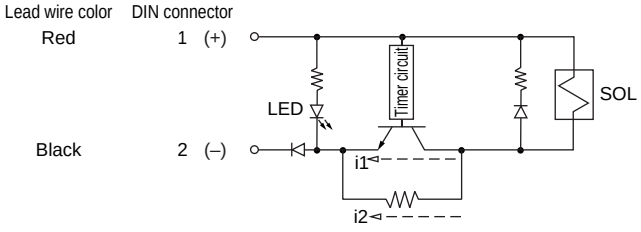


Connection and Electrical Circuit

⚠Caution



With DC voltage power-saving circuit (with polarity)



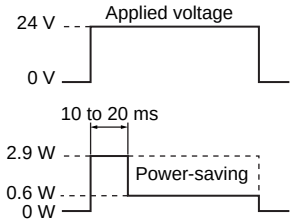
i1: Inrush current, i2: Holding current

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.

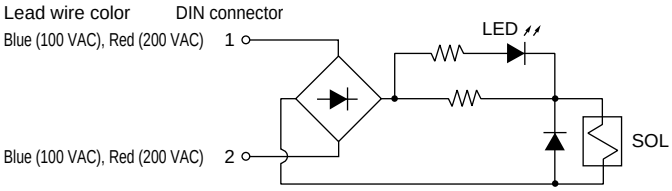
Connection and Electrical Circuit

⚠Caution

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



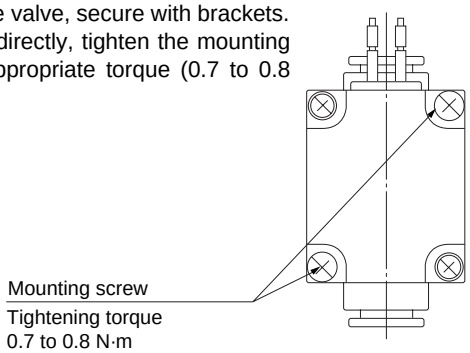
AC circuit



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.

Series VQ20/30
Specific Product Precautions 2

Be sure to read before handling.
Refer to front matters 42 and 43 for Safety Instructions, and pages 17 to 19 for 2 Port Solenoid Valves 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.

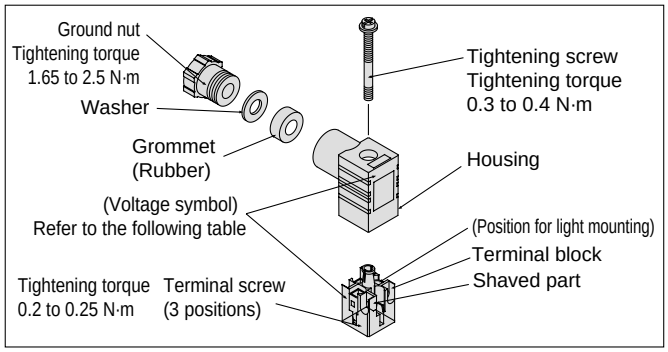
∗ For the indicator lighted style, be careful not to damage the light with the lead wire of the cable.

Precautions

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

Applicable cable

Cord O.D.: ø3.5 to ø7
(Reference) 0.5 mm² 2-core and 3-core wire equivalent to JIS C 3306.



DIN Terminal Part No. (Based on DIN)

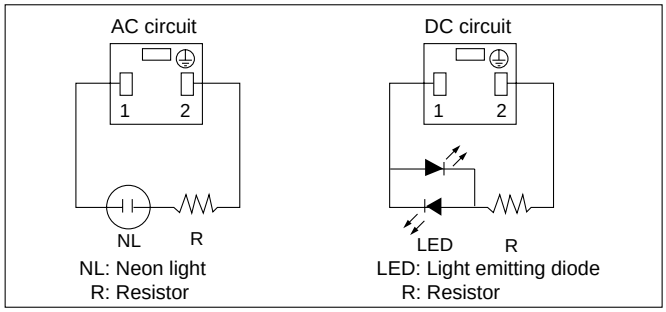
Without indicator light	SY100-82-4

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

How to Wire DIN Terminal

DIN Terminal Circuit with Indicator Light



Manifold

How to Mount/Remove from DIN Rail

⚠ Caution

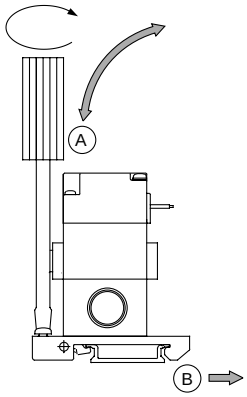
Removing procedure

1. Loosen the clamp screw on the "Ⓐ" side of both ends of the manifold.
2. Lift the "Ⓐ" 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 "Ⓑ" side of the manifold base to the DIN rail.
2. Press down side "Ⓐ" and mount the end plate on the DIN rail. Tighten the clamp screw on side "Ⓑ" 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).