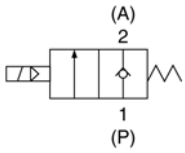
2/2 пневмораспределитель с электропневматическим управлением

VQ20/30

ø6 ~ ø12

- Компактная конструкция
- Высокая скорость срабатывания – менее 5 мс
- Ресурс – не менее 20 миллионов циклов
- Встроенные быстроразъемные соединения
- Высокая пропускная способность



Технические характеристики

Типоразмер	VQ20	VQ30
Среда *	Очищенный сжатый воздух, инертный газ	
Конструкция	2-х линейный клапан тарельчатого типа, Н.З.	
Диапазон рабочего давления (МПа)	0.01 ~ 0.6	0.01 ~ 0.5
Диапазон рабочих температур (°C)	От -10 до +50	
Время срабатывания (мс)	< 5	< 20
Макс. частота срабатывания (Гц)	100	30
Вспомогательное ручное управление	Блокируется	
Монтажное положение	Произвольное	
Электрический подвод	DIN разъем	
Напряжение ** (В, DC)	24	
Допуск по напряжению	±10%	
Потребляемая мощность (Вт, DC)	2.5	
Степень защиты	IP65	
Класс изоляции	B	
Вес (г)	46	80

* При низких температурах использовать сухой воздух
** Другие напряжения – по запросу

Номер для заказа

Номер для заказа	Расход воздуха (норм. л/мин)	ø быстроразъемного соединения (мм)
VQ21A1-5YOB-C6-Q	390	6
VQ21A1-5YOB-C8-Q	490	8
VQ31A1-5YOB-C10-Q	780	10
VQ31A1-5YOB-C12-Q	980	12

* Ответные части разъемов заказываются отдельно
** Возможен монтаж на общей плите от 2 до 20 пневмораспределителей – по запросу

Принадлежности (заказываются отдельно)

Ответные части разъема

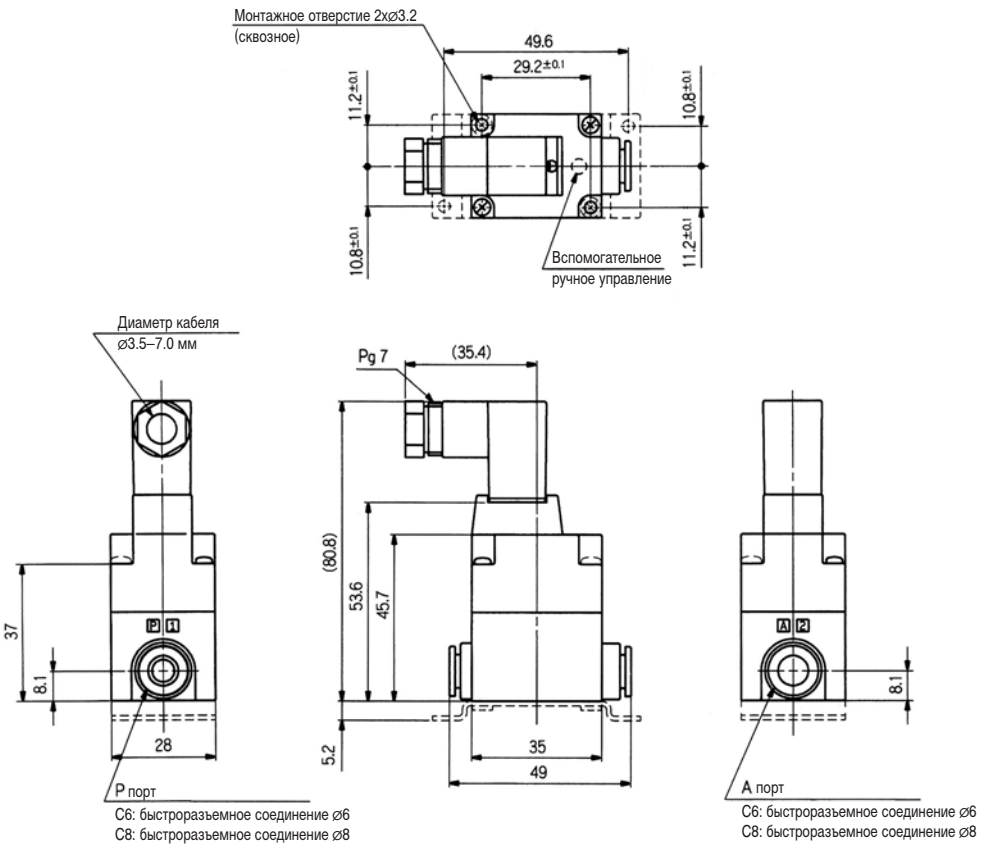
Номер для заказа	Описание
K41	Без индикатора рабочего состояния и искрогашения
K43	С индикатором рабочего состояния и искрогашением

Крепежный угольник (с крепежными винтами)

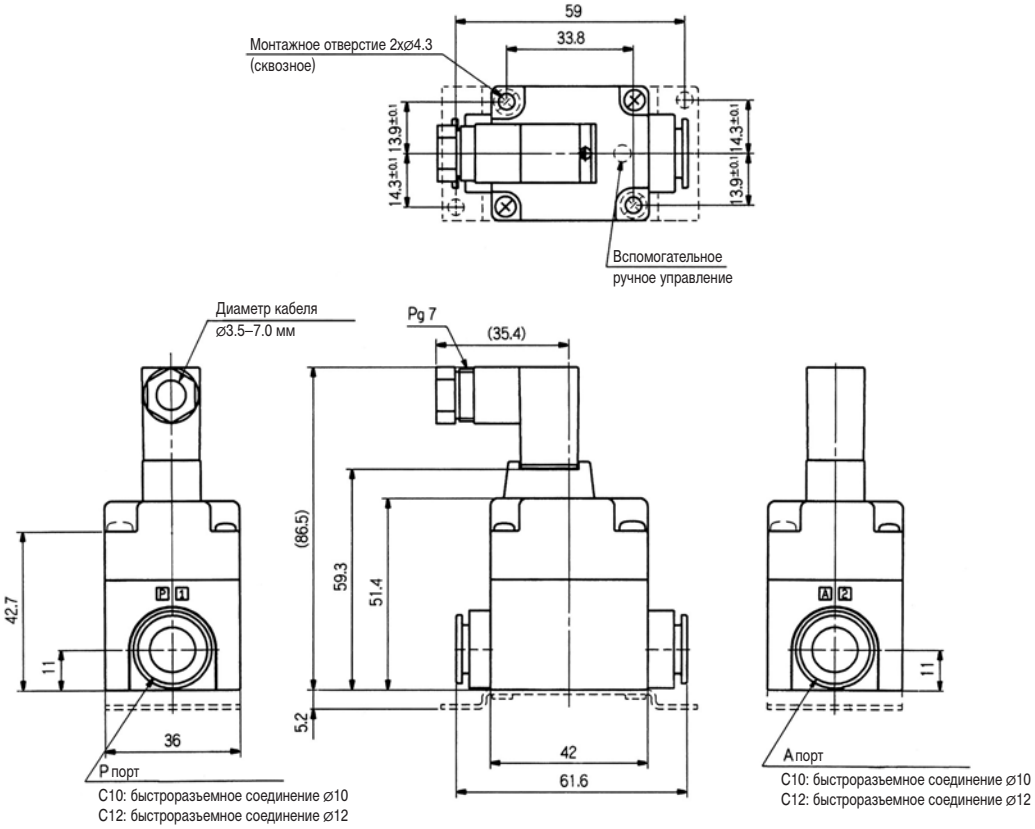
Номер для заказа	Серия
AXT835-13A	Для VQ20
AXT837-13A	Для VQ30

Размеры

VQ20



VQ30

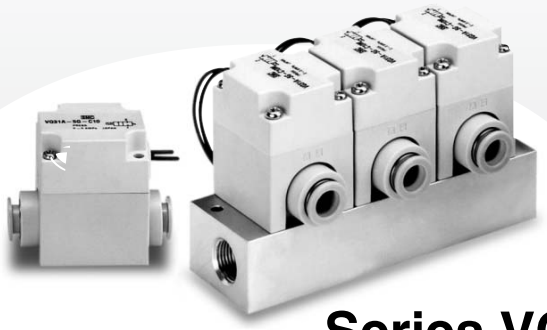


Pilot Operated 2 Port Solenoid Valve For Dry Air

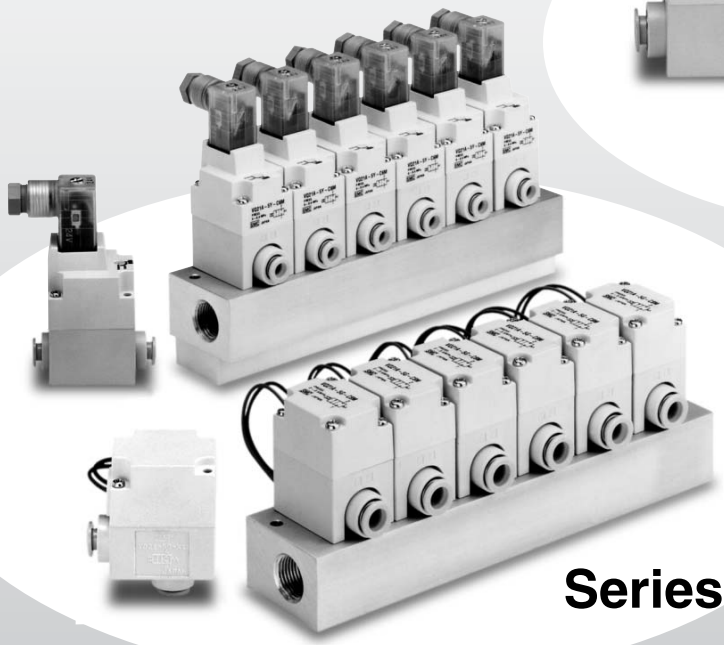
Series VQ20/30

Compact and lightweight with large flow capacity

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



Series VQ30



Series VQ20

High frequency operation possible and long operating life

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)

20 million cycles (subject to clean and dry air)

Easy piping with One-touch Fittings

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

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

⚠ Precautions

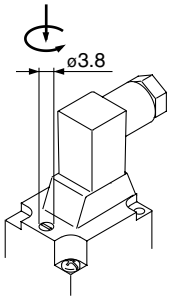
Be sure to read before handling. Refer to page 17-6-3 for Safety Instructions and Solenoid Valve Precautions.

⚠ Warning

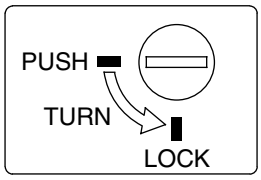
Manual Override

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)

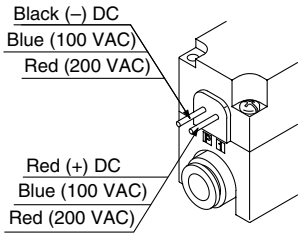


Push the manual override button with a small flat head screwdriver until it stops. Turn it in the counterclockwise direction at 90° to lock the manual.
Turn it right to release.

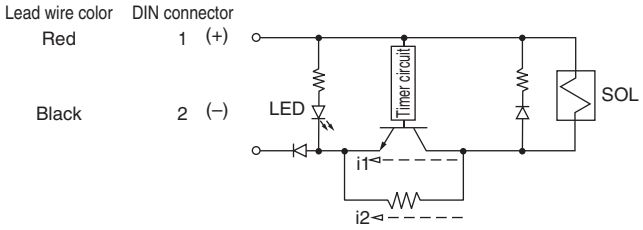


⚠ Caution

Connection and Electrical Circuit



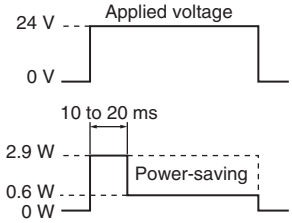
With DC voltage power-saving circuit (with polarity)



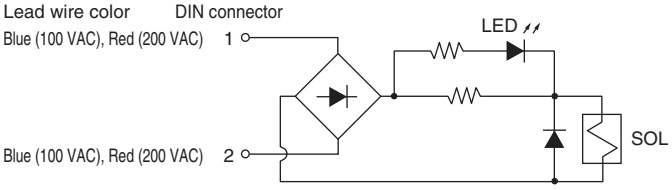
i1: Inrush current, i2: Holding current

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.

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



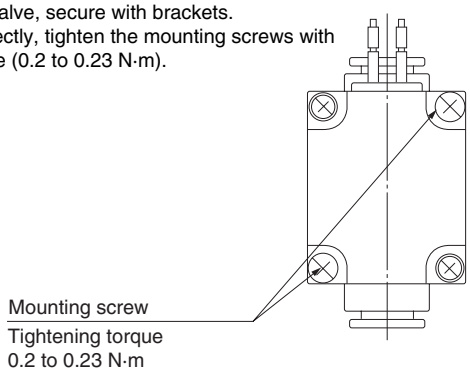
AC circuit



⚠ Caution

Valve Mounting

When mounting the valve, secure with brackets.
When mounting it directly, tighten the mounting screws with the appropriate torque (0.2 to 0.23 N·m).



⚠ Caution

When Energizing Continuously for Long Period of Time

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.

⚠

How to Wire DIN Terminal

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

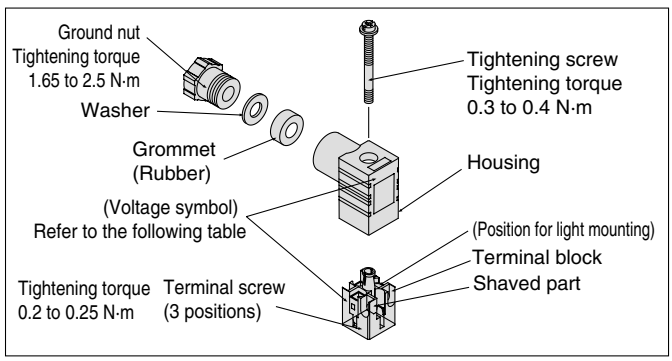
Wire entry can be changed by mounting the housing in either direction (four directions at every 90°) after dividing the terminal block and the housing.
∗ For the indicator lighted style, be careful not to damage the light with the lead wire of the cable.

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.



⚠ Precautions

Be sure to read before handling. Refer to page 17-6-3 for Safety Instructions and Solenoid Valve Precautions.

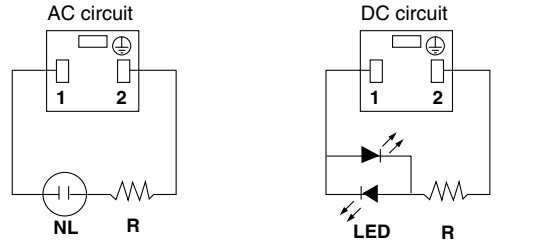
DIN Terminal Part No. (Based on DIN)

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

DIN Terminal Circuit with Indicator Light



Manifold

⚠ Caution

How to Mount/Remove from DIN Rail

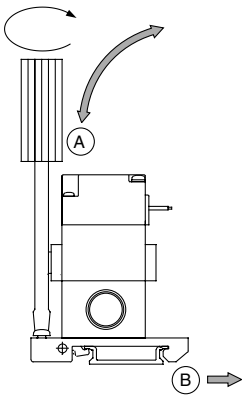
Removing procedure

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 "Ⓑ" side.

Mounting procedure

1) Hook the mounting hook on the "Ⓑ" side of the manifold base to the DIN rail.
2) Lift the "Ⓐ" side of the manifold off the DIN rail and slide it in the direction of the "Ⓑ" side.

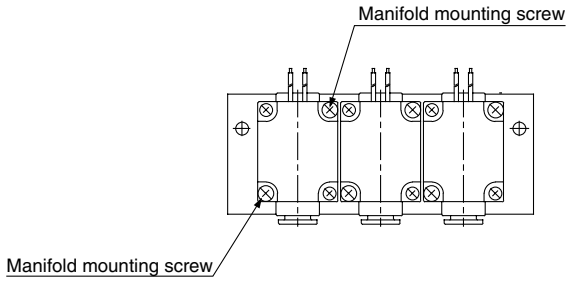
(Tightening torque: 0.3 to 0.4 N·m).



⚠ Caution

Valve Mounting

After confirming the gasket is correctly placed under the valve, tighten the mounting screws with the appropriate torque (0.2 to 0.23 N·m).



For details about certified products conforming to international standards, visit us at www.smcworld.com.

Pilot Operated 2 Port Solenoid Valve For Dry Air

Series VQ20/30

How to Order Valves (Single unit)

VQ | **2** | **1** | **A** | **1** – | **1** | **G** | | | – **C6** | |

Series/ Orifice size

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
3	110 VAC
5	24 VDC
6	12 VDC
9 (1)	Other

Note 1) Please consult with SMC for other 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	

Option

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

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

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	—	○

Manual override

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

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

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.

Please contact SMC for further specifications, delivery and price. Made to Order

Made to Order Specifications

Oil-free specifications

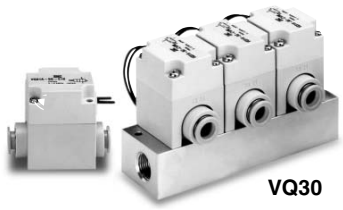
VQ $\frac{2}{3}$ **1** $\frac{A}{M}$ **1–** □□□ **–** □□ **–** □ **–X2**

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

Seal material fluorine rubber specifications

VQ $\frac{2}{3}$ **1** $\frac{A}{M}$ **1–** □□□ **–** □□ **–** □ **–X5**

VQ20



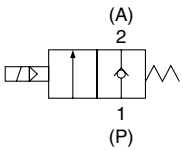
VQ30

Standard Specifications

			VQ20	VQ30
Valve specifications	Series			
	Valve construction		2 port poppet pilot operated	
	Fluid		Air/Inert gas	
	Ambient and fluid temperature		–10 to 50°C (1)	
	Lubrication		Not required	
	Manual override		Slotted locking type (tool required) (2)	
	Shock resistance/Vibration resistance		150/30 m/s² (3)	
	Enclosure		Dustproof (4)	
	Mounting orientation		Unrestricted	
	Weight		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) Use dry air to prevent condensation when operating at low temperatures.
Note 2) Manual override is available only for DIN terminal type.
Note 3) 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 4) DIN terminal type: Applicable to dusttight and low jetproof (IP65).

JIS Symbol



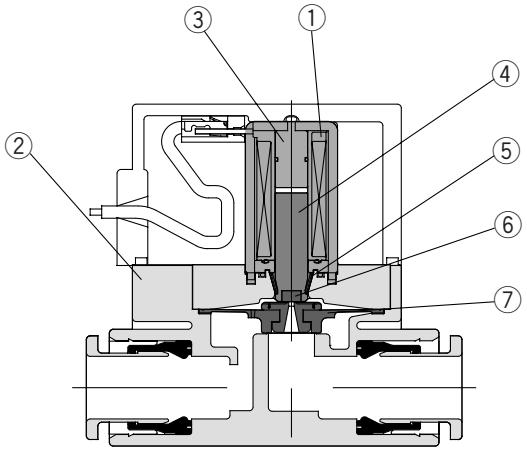
N.C.

Characteristic Specifications

Series		VQ20		VQ30	
Flow characteristics		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		0.01 MPa			
Max. operating pressure		0.6 MPa		0.5 MPa	
Response time (1)	Electricity circuit	With power-saving circuit	High speed response type (2)	With power-saving circuit	High speed response type (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.

Construction



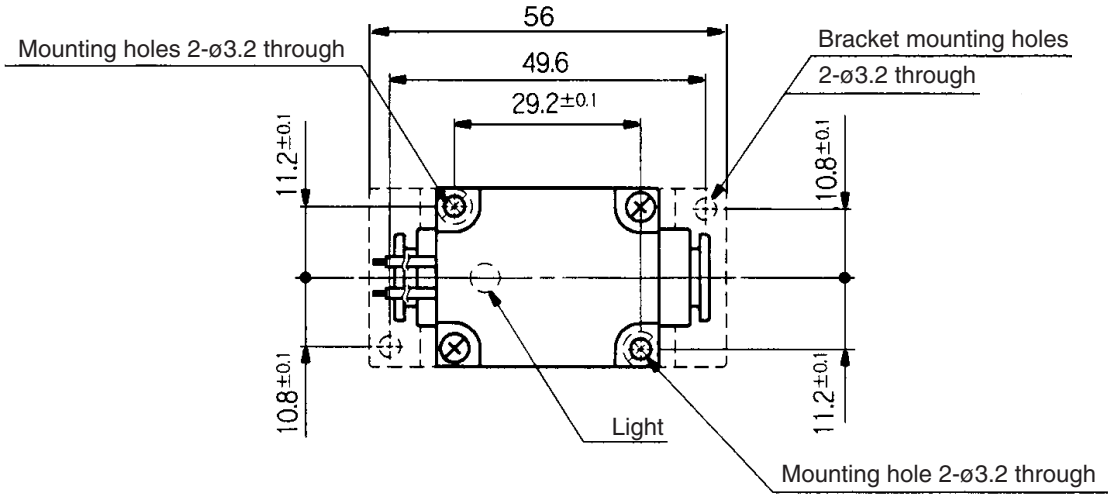
Component Parts

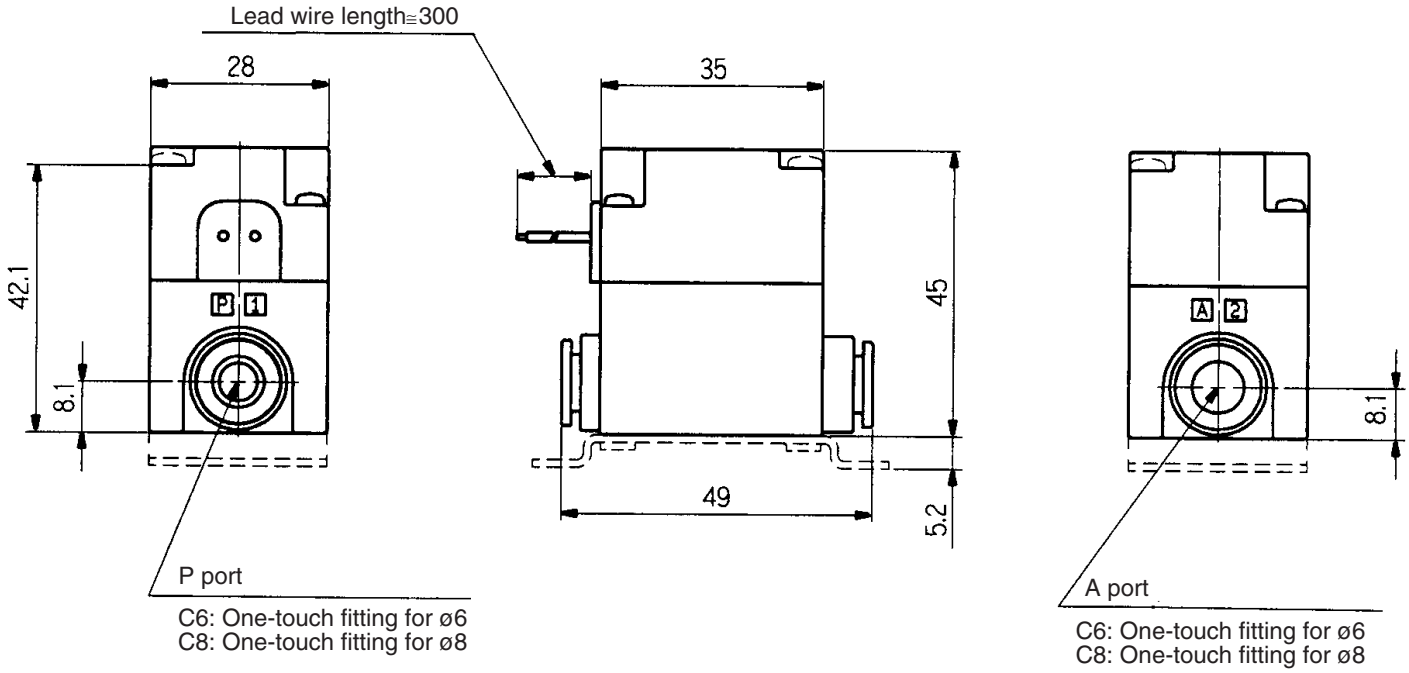
No.	Description	Material
①	Solenoid coil	—
②	Body	Resin
③	Fixed armature	Stainless steel
④	Armature	Stainless steel
⑤	Return spring	Stainless steel
⑥	Poppet	NBR
⑦	Diaphragm assembly	HNBR, Resin

Dimensions: Series VQ20

In-line Type: Grommet (G)

VQ21A1-□G□-□-□



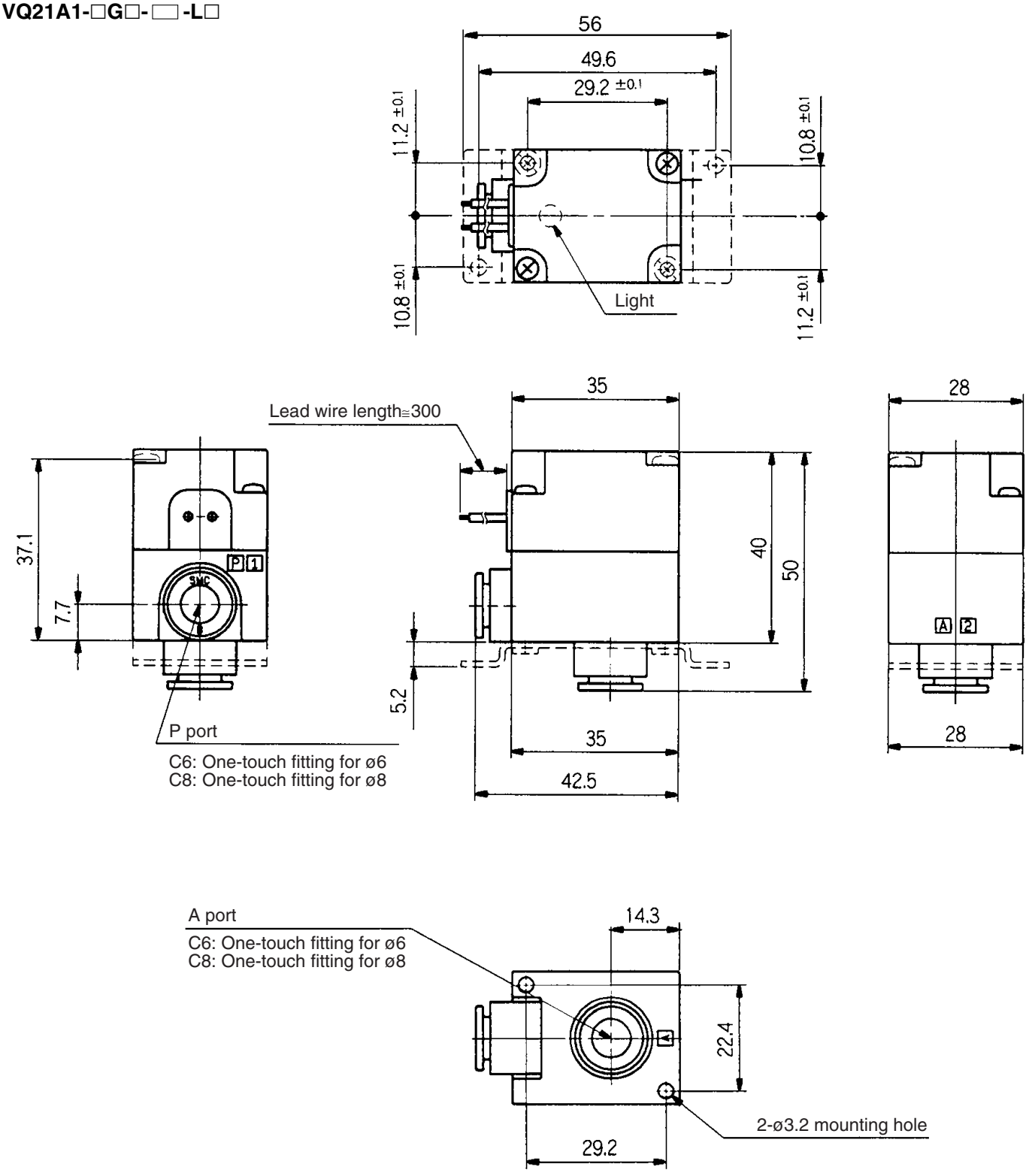


Dotted line: Bracket mounting style (-F)

Dimensions: Series VQ20

Type L: Grommet (G)

VQ21A1-□G□-□-L□

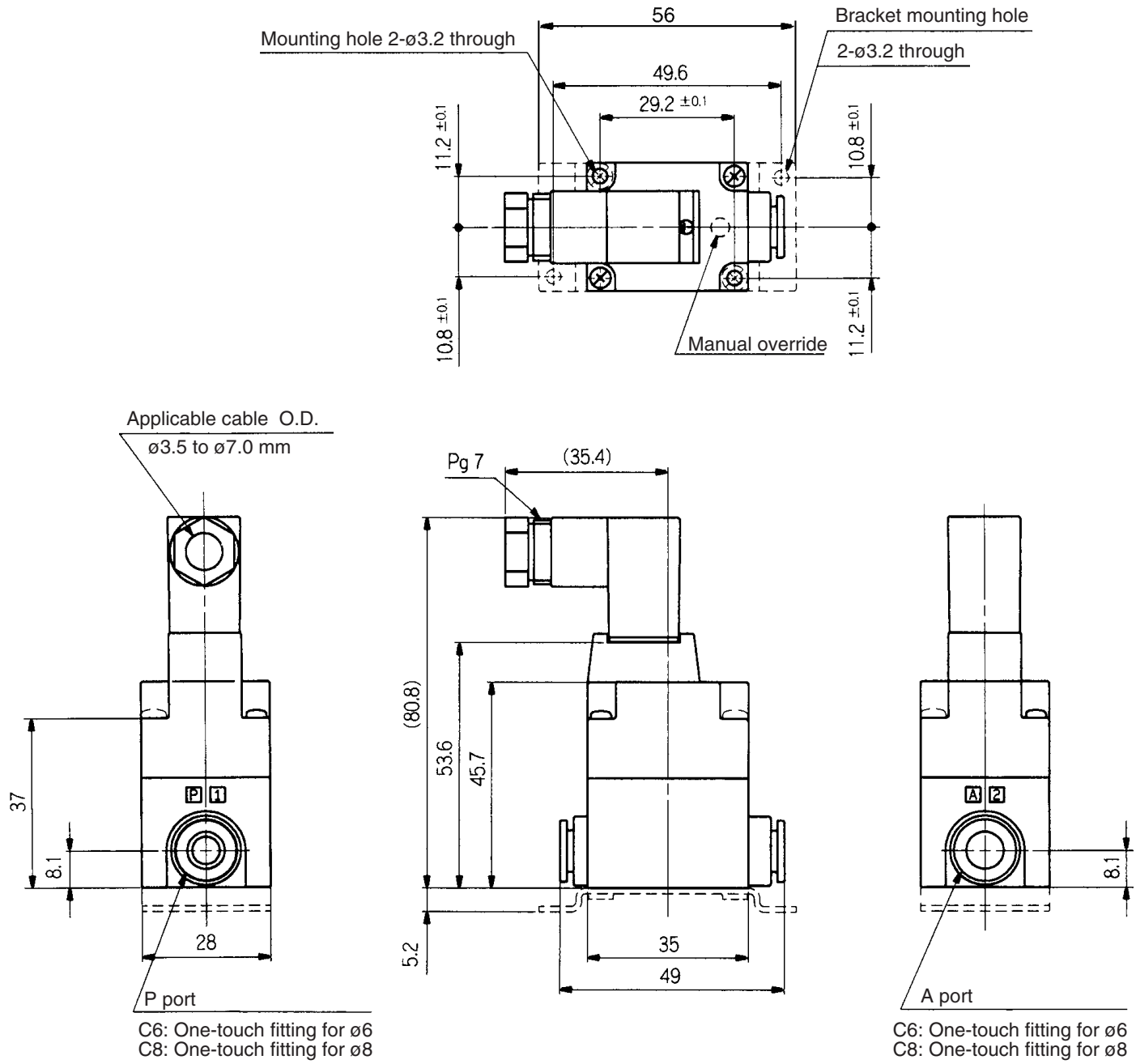


Dotted line: Bracket mounting style (-LF)

Dimensions: Series VQ20

In-line Type: DIN terminal (Y)

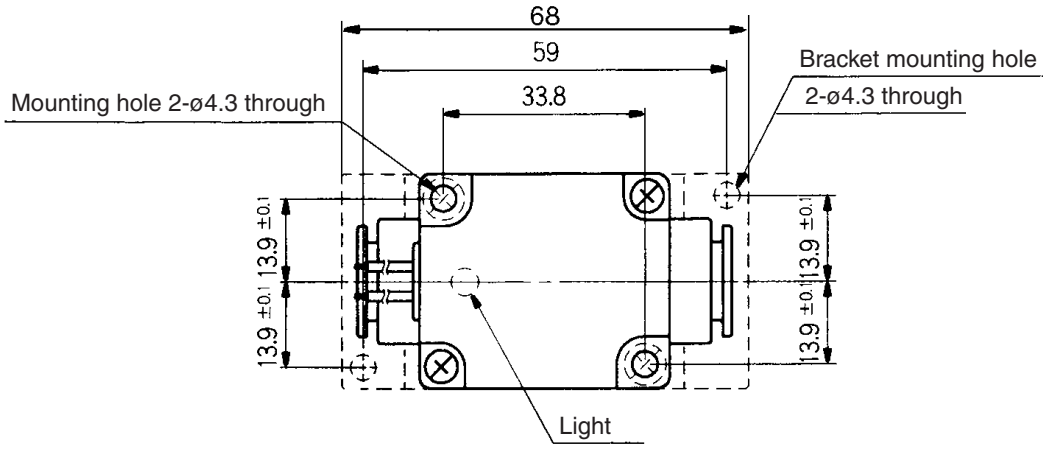
VQ21A1-□Y□□-□-□

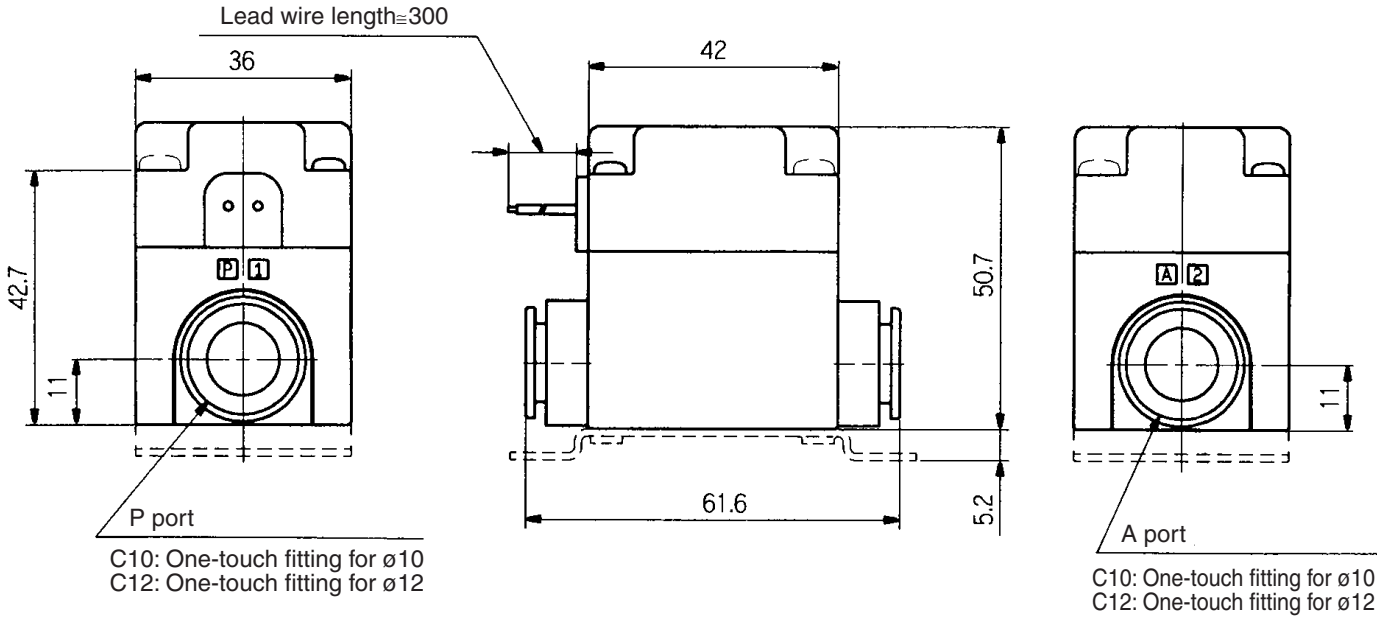


Dimensions: Series VQ30

In-line Type: Grommet (G)

VQ31A1-□G□- □-□



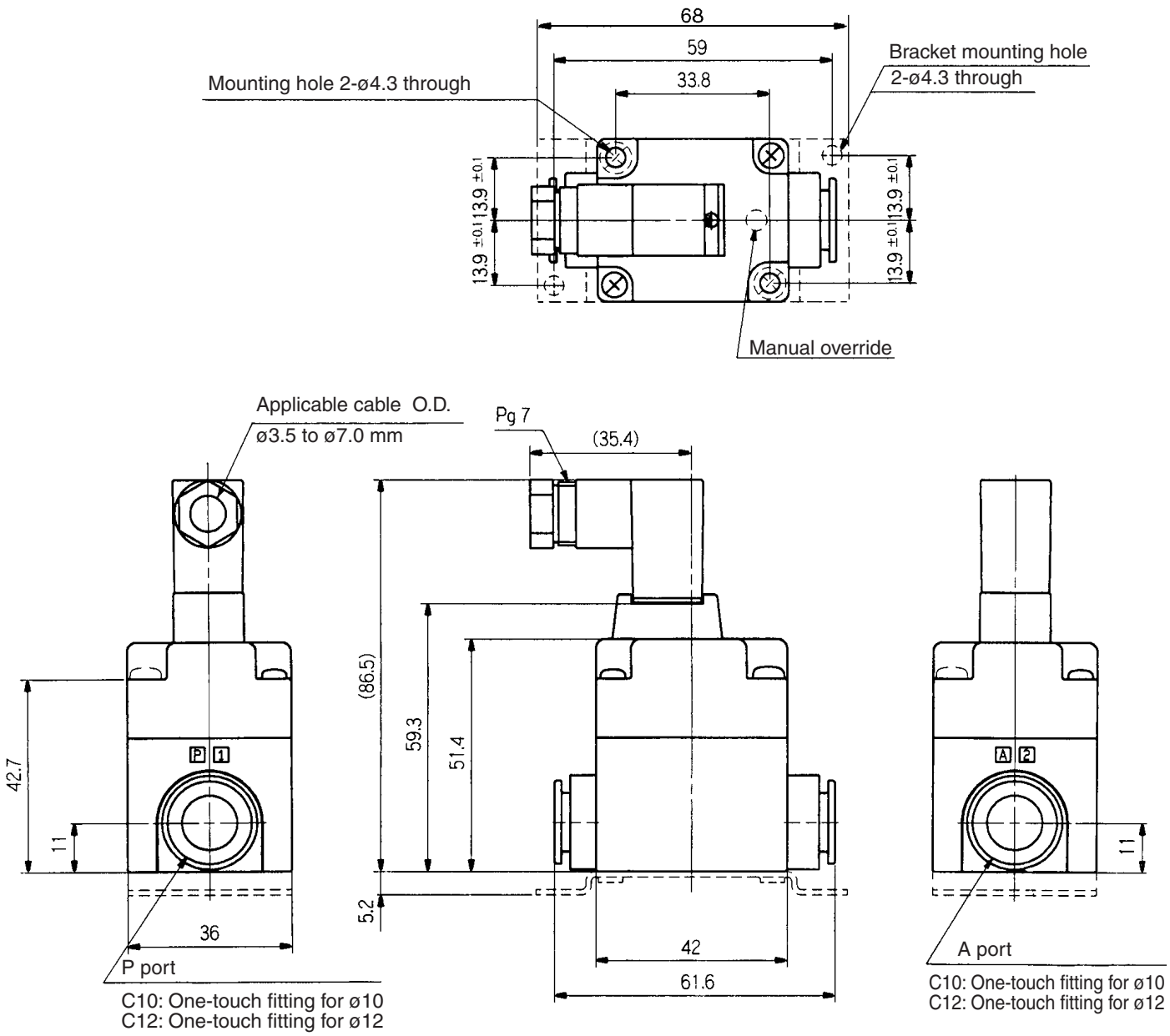


Dotted line: Bracket mounting style (-F)

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

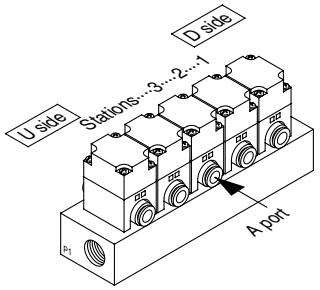
Enter the mounting valve and option part numbers under the manifold base part number.

<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 size

Symbol	Series
2	VQ20
3	VQ30

Valve Type

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

Valve specifications

M	Manifold

Coil voltage

1	100 VAC (50/60 Hz)
2	200 VAC
3	110 VAC
5	24 VDC
6	12 VDC
9 (1)	Other

Note 1) Please consult with SMC for other 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)

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.

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

Please contact SMC for further specifications, delivery and price. Made to Order

Oil-free specifications

VQ $\frac{2}{3}$1M1– [ ][ ][ ] – [ ] – [ ] –X2

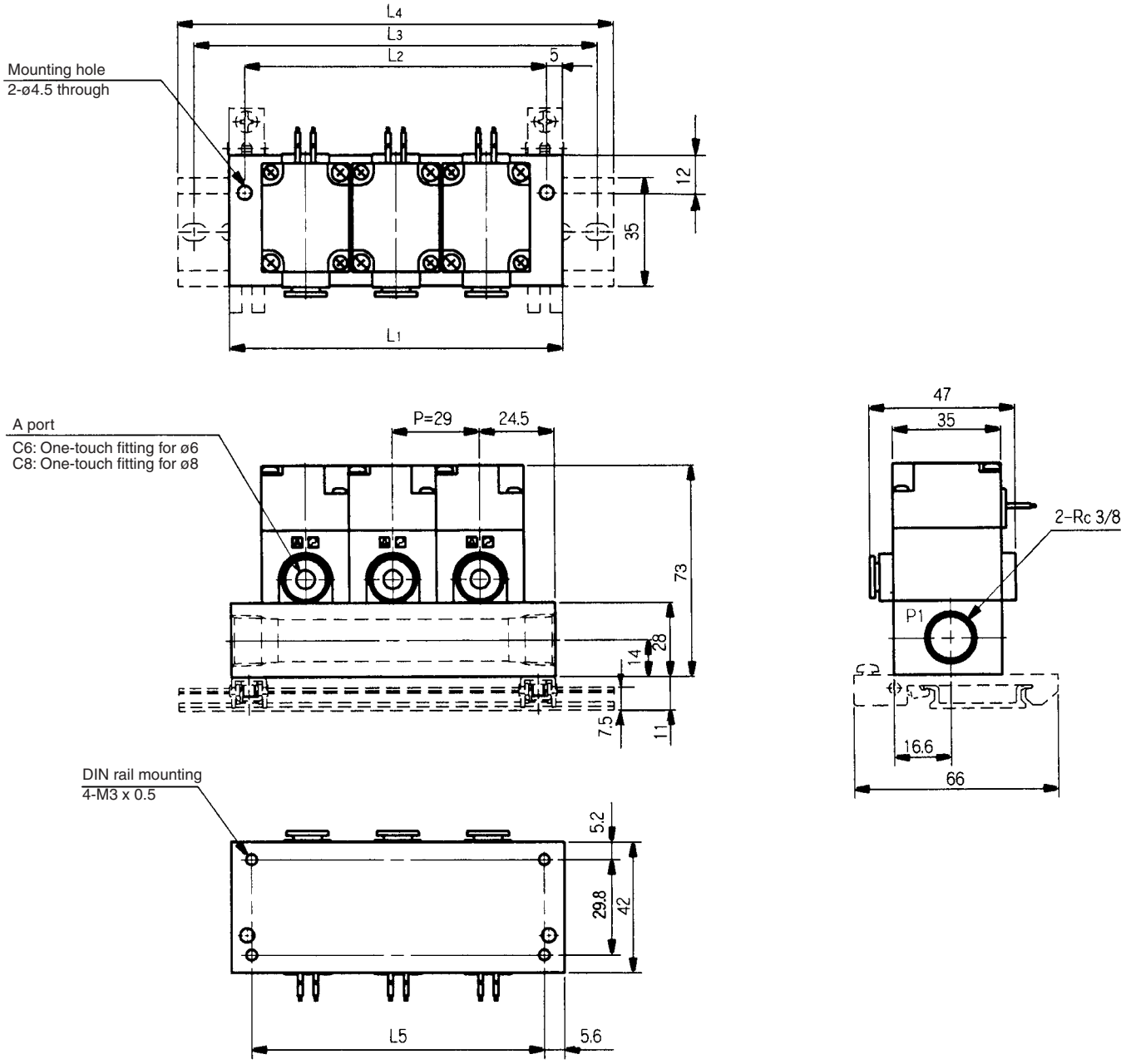
Seal material fluorine rubber specifications

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

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

Dimensions

Plug lead unit manifold (VV2Q22-☐)



Dotted line: DIN rail mounting (-D)

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

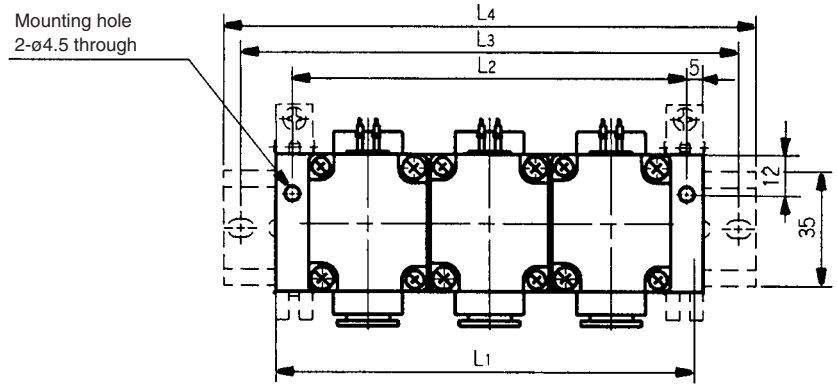
Dimensions

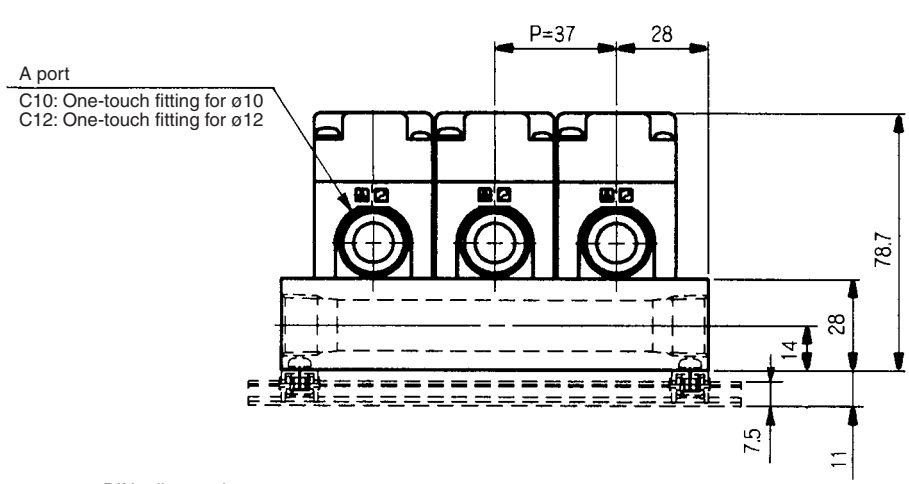
n: Station (Max. 20)

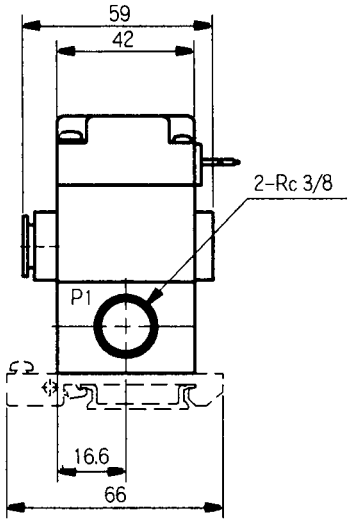
L \ n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
L_1	49	78	107	136	165	194	223	252	281	310	339	368	397	426	455	484	513	542	571	600
L_2	39	68	97	126	155	184	213	242	271	300	329	358	387	416	445	474	503	532	561	590
L_3	75	100	137.5	162.5	187.5	212.5	250	275	300	337.5	362.5	387.5	425	450	475	500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

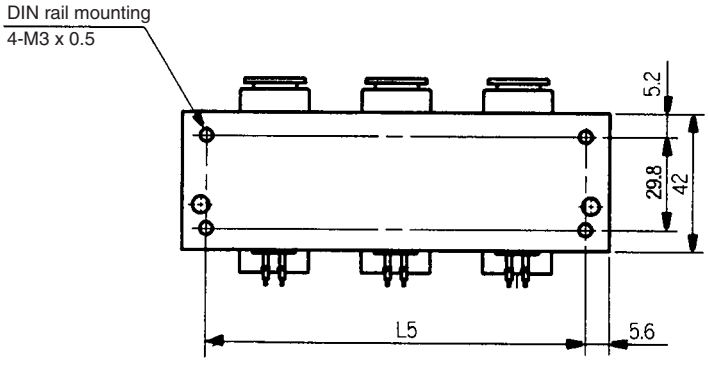
Dimensions

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

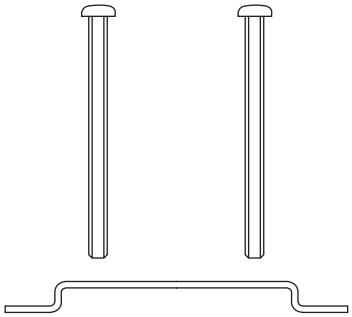
n: Station (Max. 20)

L \ n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
L_1	56	93	130	167	204	241	278	315	352	389	426	463	500	537	574	611	648	685	722	759
L_2	46	83	120	157	194	231	268	305	342	379	416	453	490	527	564	601	638	675	712	749
L_3	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
L_4	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
L_5	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.



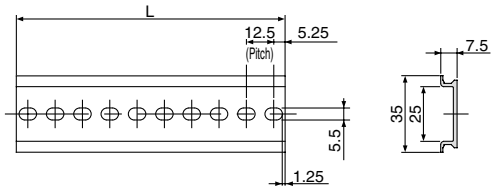
Type	Bracket assembly	(Mounting screws, 2 pcs.)
VQ20 Grommet in-line type	AXT835-13A	M3 x 45
VQ20 Grommet L type, DIN terminal type	AXT835-13A-2	M3 x 40
DIN terminal L type	AXT835-13A-3	M3 x 35
VQ30	AXT837-13A	M4 x 45

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

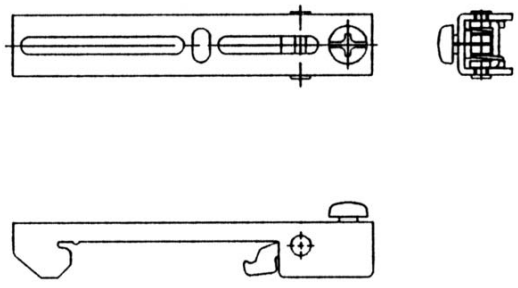
Stations	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
No.	6	8	11	13	15	17	20	22	24	27	29	31	34	36	38	40	43	45	47	50
L	85.5	110.5	148	173	198	223	260.5	285.5	310.5	348	373	398	435.5	460.5	485.5	510.5	548	573	598	635.5

• 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

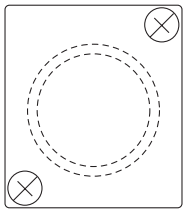
DIN rail mounting bracket
VVQZ100-DB-5

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

Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels of **"Caution", "Warning"** or **"Danger"**. To ensure safety, be sure to observe ISO 4414 Note 1), JIS B 8370 Note 2) and other safety practices.

⚠ **Caution :** Operator error could result in injury or equipment damage.

⚠ **Warning :** Operator error could result in serious injury or loss of life.

⚠ **Danger :** In extreme conditions, there is a possible result of serious injury or loss of life.

Note 1) ISO 4414: Pneumatic fluid power--General rules relating to systems.
Note 2) JIS B 8370: General Rules for Pneumatic Equipment

⚠ Warning

1. The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements. The expected performance and safety assurance will be the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalog information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

2. Only trained personnel should operate pneumatically operated machinery and equipment.

Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

3. Do not service machinery/equipment or attempt to remove components until safety is confirmed.

1. Inspection and maintenance of machinery/equipment should only be performed once measures to prevent falling or runaway of the driver objects have been confirmed.
2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.
3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc.

4. Contact SMC if the product is to be used in any of the following conditions:

1. Conditions and environments beyond the given specifications, or if product is used outdoors.
2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuits in press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

2/3 Port Process Valve Precautions 1

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Caution on Design

⚠ Warning

1. Cannot be used as an emergency shutoff valve, etc.
The valves presented in this catalog are not designed for safety applications such as an emergency shutoff valve. If the valves are used in this type of system, other reliable safety assurance measures should also be adopted.

2. Extended periods of continuous energization
Please consult with SMC if valves will be continuously energized for extended periods of time.

3. Solenoid valves are not allowed to use as an explosion proof one.

4. Maintenance space
The installation should allow sufficient space for maintenance activities (removal of valve, etc.).

5. Liquid rings
In cases with a flowing liquid, provide a by-pass valve in the system to prevent the liquid from entering the liquid seal circuit.

6. Operation of actuator
When an actuator, such as a cylinder, is to be driven using a valve, take appropriate measures to prevent potential danger caused by actuator operation.

7. Holding pressure (including vacuum)
Since the valve may have slight internal air leakage, it may not be suitable for holding pressure (including vacuum) in a tank or other vessel for an extended period of time.

8. When the conduit type is used as equivalent to an IP65 enclosure, install a wiring conduit, etc. (Series VC)
For details, refer to page 17-6-7.

Selection

⚠ Warning

1. Check the specifications.
Give careful consideration to operating conditions such as the application, fluid and environment, and use within the operating ranges specified in this catalog.

2. Operating fluids
1) Type of operating fluids
Select model according to the operating fluid for its material. Viscosity of the operating fluids must be less than 50 cst in general.
Please contact SMC for further information.
2) Flammable oil or gases
Confirm the specifications for the internal/external leakage.
3) Corrosive gases
Since corrosive gases may cause stress corrosion, cracking or other accidents, it is not applicable for valves in this catalog.
4) Use a Non-lube valve when impurities such as oil should not be in the fluid passage.
5) Option and fluids may not be usable on the operating conditions. General use of option and fluids are shown in the catalog to be referred for model selection.

Selection

⚠ Warning

3. Quality of operating fluids
Since the use of fluid which contains foreign matter can cause problems such as malfunction and seal failure by promoting wear of the valve seat and core, and by sticking to the sliding parts of the armature, etc., install a suitable filter (strainer) immediately upstream from the valve. As a general rule, use 80 to 100 mesh.
When used to supply water to boilers, substances such as calcium and magnesium which generate hard scale and sludge are included. Since this scale and sludge can cause valve malfunction, install water softening equipment, and a filter (strainer) directly upstream from the valve to remove these substances.

4. Quality of operating air
1) **Use clean air.**
If the compressed air supply includes chemicals, synthetic materials (including organic solvents), salinity, corrosive gas, etc., it can lead to damage or malfunction.
2) **Install an air filter.**
Install an air filter at the up stream side to the valve. Filtration degree should be 5 μm or less.
3) **Install an air dryer, after cooler, etc.**
Compressed air that includes excessive drainage may cause malfunction of valves and other pneumatic equipment. To prevent this, install an air dryer or after cooler, etc.
4) **If excessive carbon powder is seen, install a mist separatoron the upstream side of the valve.**
If excessive carbon powder is generated by the compressor, it may adhere to the inside of valves and cause malfunction.
For compressed air quality, refer to “Air Cleaning Equipment” catalog.

5. Ambient environment
Operate within the ambient operating temperature range. After confirming the compatibility of the product’s component materials with the ambient environment, operate so that fluid does not adhere to the product’s exterior surfaces.

6. Countermeasures for static electricity
Since static electricity may be generated depending on the fluid being used, implement suitable countermeasures.

2/3 Port Process Valve Precautions 2

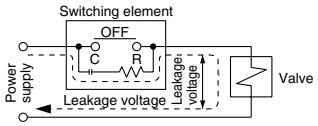
Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Selection

⚠ Caution

1. Leakage voltage

Particularly when using a resistor in parallel with a switching element and using a C-R element (surge voltage suppressor) to protect the switching element, take note that leakage current will flow through the resistor and C-R element, etc., creating a danger that the valve may not shut OFF.



Series VC, VD, VQ

AC coil: 10% or less of rated voltage
DC coil: 2% or less of rated voltage

Series VX

AC coil: 20% or less of rated voltage
DC coil: 2% or less of rated voltage

Series VN

AC coil: 15% or less of rated voltage
DC coil: 3% or less of rated voltage

2. Low temperature operation

1) Valve use is possible to temperature extremes of –10°C. Take appropriate measures to avoid freezing of drainage, moisture etc. by using an air dryer.
2) When using valves for water application in cold climates, take appropriate countermeasures to prevent the freezing in tubing after cutting the water supply from the pump, e.g. drain the water, etc. When heating by steam, be careful not to expose the coil portion to steam. Installation of dryer, heat retaining of the body are recommended to prevent the freezing in condition that dew-point temperature is high and ambient temperature is low.

Mounting

⚠ Warning

1. If air leakage increases or equipment does not operate properly, stop operation.

Check mounting conditions after air and power supplies are connected. Initial function and leakage tests should be performed after installation.

2. Do not apply external force to the coil section.

Apply spanner to the external connection part when tightening.

3. Avoid installing the coil downward.

Foreign materials in the fluid may stick to the armature and it could cause malfunction. (In the case of VX series)

4. Do not warm the coil assembly part by the heat insulating material, etc.

Tape heater for anti-freezing is applicable to use only for piping or body.

5. Other than fittings made of stainless steel or copper should be tightened with a bracket.

6. Do not use in locations subjected to vibrations. If impossible, arm from the body should be as short as possible to prevent resonance.

7. Instruction manual

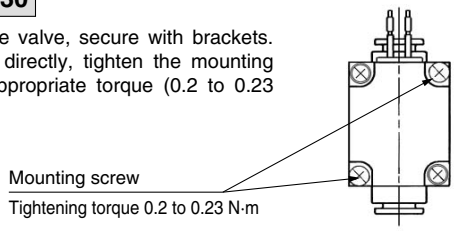
Install only after reading and understanding the safety instructions. Keep the catalog on life so that it can be referred to when necessary.

8. Coating

Warnings or specifications indicated on the product should not be erased, removed, or covered up.

Series VQ20/30

When mounting the valve, secure with brackets. When mounting it directly, tighten the mounting screws with the appropriate torque (0.2 to 0.23 N·m).



Port Direction

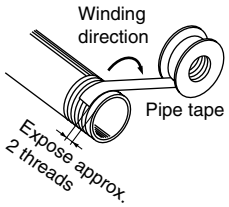
⚠ Caution

1. Preparation before piping

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe.
Install piping so that it does not apply pulling, pressing, bending or other forces on the valve body.

2. Sealant tape

When installing piping or fitting into a port, ensure that sealant material does not enter the port internally. Furthermore, when sealant tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.



3. Avoid connection of ground lines to piping, as this may cause electric corrosion of the system.

4. Always tighten threads with the proper tightening torque.

When screwing fittings into valves, tighten with the proper tightening torque shown below.

Tightening Torque for Piping

Connection thread	Applicable tightening torque (N·m)
M5	1.5 to 2
Rc 1/8	7 to 9
Rc 1/4	12 to 14
Rc 3/8	22 to 24
Rc 1/2	28 to 30
Rc 3/4	28 to 30
Rc 1	36 to 38
Rc 11/4	40 to 42
Rc 11/2	48 to 50
Rc 2	48 to 50

∗ Reference
How to tighten M5 threads on the fittings
After tightening by hand, use a tightening tool to add about 1/6 turn more. But when using miniature fittings, after tightening by hand, use a tightening tool to add 1/4 turn more. (When there are gaskets for universal elbow, universal tee, etc. in 2 locations, tighten them with twice as 1/2 turn.)

5. Connection of piping to products

When connecting piping to a product, avoid mistakes regarding the supply port, etc.

6. Steam generated in a boiler contains a large amount of drainage.
Be sure to operate with a drain trap installed.

7. In applications such as vacuum and non-leak specifications, use caution specifically against the contamination of foreign matters or airtightness of the fittings.

2/3 Port Process Valve Precautions 3

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Port Direction

⚠ Caution

Series LV

1. Use the tightening torques shown below when making connections to the pilot port.

Operating Port Tightening Torque

Operating port	Torque (N·m)
M5	1/6 turn with a tightening tool after first tightening by hand 0.8 to 1.0
Rc, NPT 1/8	0.8 to 1.0

2. Use of metal fittings
Do not use metal fittings for piping on taper threads made of resin, as this may cause damage to the threads.

3. Use pilot ports and sensor (breathing) ports as indicated below.

	PA Port	PB port	Sensor (breathing) port
N.C.	Pressure	Exhaust	Exhaust
N.O.	Exhaust	Pressure	Exhaust
Double acting	Pressure	Pressure	Exhaust

In the case of N.C. and N.O. types, the port which does not receive operating pressure is released to atmosphere. When intake and exhaust directly from the valve is not desired due to problems with the ambient environment or scattering of dust, etc., install piping and perform intake and exhaust at a location which does not present a problem.

4. For tubing connections, refer to pages 17-5-38 to 39.

Wiring

⚠ Caution

1. Use electrical wires for piping with more than 0.5 to 1.25 mm².
Further, do not allow excessive force to be applied to the lines.

2. Use electrical circuits which do not generate chattering in their contacts.

3. Use voltage which is within 10% of the rated voltage. In cases with a DC power supply where importance is placed on responsiveness, stay within 5% of the rated value. The voltage drop is the value in the lead wire section connecting the coil.

4. When electrical circuit is not acceptable for surge voltage generated by solenoid, install a surge absorber in parallel to the solenoid or use a optional type with surge killer.
(VCB, VCL: Class H coil, Series VCS, VDW, VX, VQ)

5. Series VX, VQ
Use the option with surge voltage suppressor, with surge voltage protection circuit.

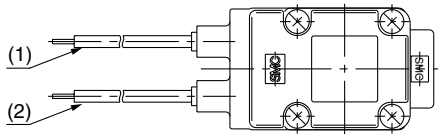
Electrical Connections

⚠ Caution

Series VC

Grommet

Class H coil: AWG18
Class B coil: AWG20



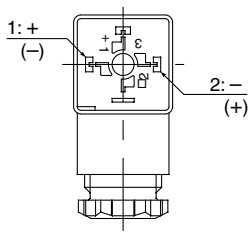
Rated voltage	Lead wire color	
	(1)	(2)
DC (Type B only)	Black	Red
100 VAC	Blue	Blue
200 VAC	Red	Red
Other AC	Gray	Gray

∗ There is no polarity.

Series VC, VX

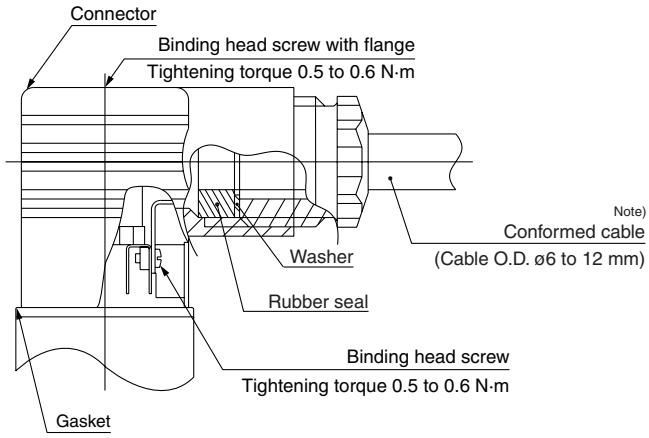
DIN terminal (Class B only)

The figure below shows the internal connection of DIN terminal, so connect DIN terminals with power supply.



Terminal no.	1	2
DIN terminal	+ (–)	– (+)

∗ There is no polarity.
• Heavy-duty cord can be used up to the cable O.D. ø6 to 12.
• Use the tightening torques below for each section.



Note) For the one with outside diameter of the cable ø9 to 12 mm, remove the internal parts of the rubber seal before using.

2/3 Port Process Valve Precautions 4

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Electrical Connections

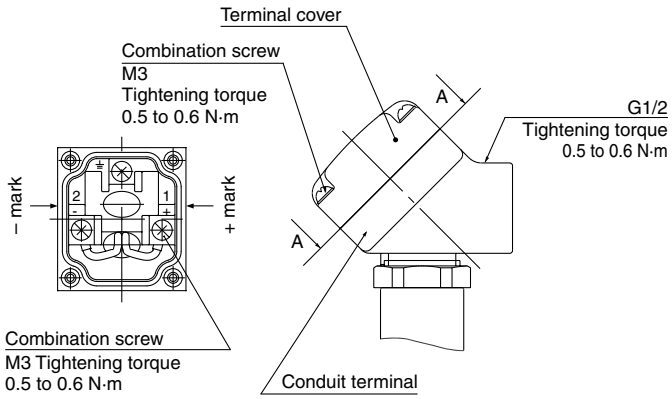
⚠ Warning

Series VC, VX

Conduit terminal

In the case of the conduit terminal, make connections according to the marks shown below.

- Use the tightening torques below for each section.
- Properly seal the terminal connection (G 1/2) with the special wiring conduit, etc.



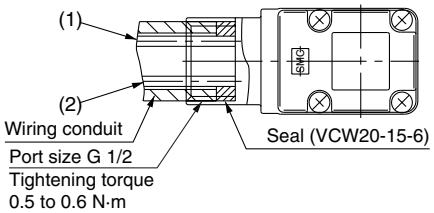
View A-A
(Internal connection diagram)

Series VC

Conduit

When used as an IP65 equivalent, use seal (Part no. VCW20-15-6) to install the wiring conduit. Also, use the tightening torque below for the conduit.

Class H coil: AWG18
Class B coil: AWG20



Rated voltage	Lead wire color	
	(1)	(2)
DC	Black	Red
100 VAC	Blue	Blue
200 VAC	Red	Red
Other AC	Gray	Gray

∗ There is no polarity.

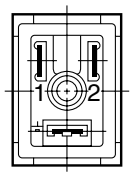
Description	Part no.
Seal	VCW20-15-6

Note) Please order separately.

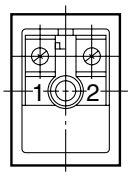
Series VN

The figures below show the internal connection of DIN terminal or terminal box, so connect them with power supply.

With DIN terminal box

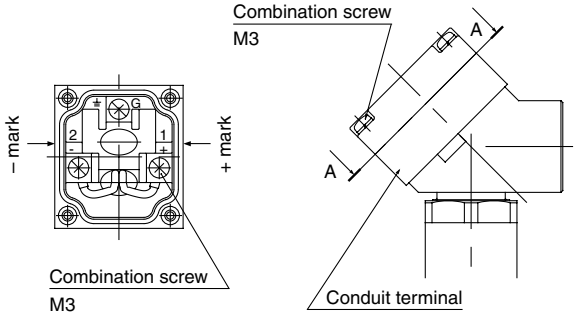


With terminal box



Terminal no.	1	2
DIN terminal	+	–
Terminal	+	–

Connect the conduit terminal according to the marks shown below.



View A-A
(Internal connection diagram)

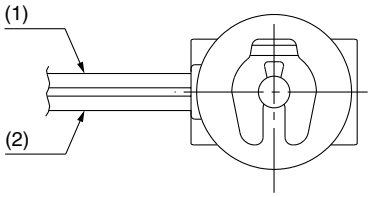
2/3 Port Process Valve Precautions 5

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Electrical Connections

⚠ Caution

Series VDW

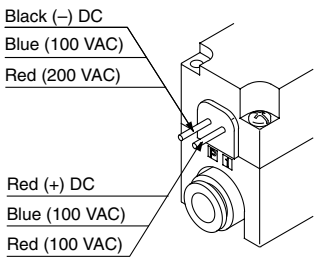


Rated voltage	Lead wire color	
	(1)	(2)
DC	Black	Red
100 VAC	Blue	Blue
200 VAC	Red	Red
Other AC	Gray	Gray

∗ There is no polarity.

Series VQ20/30

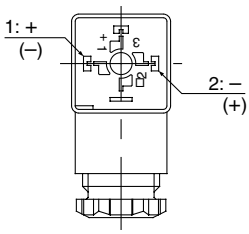
Grommet



∗ For energy-saving circuit, there is the polarity.

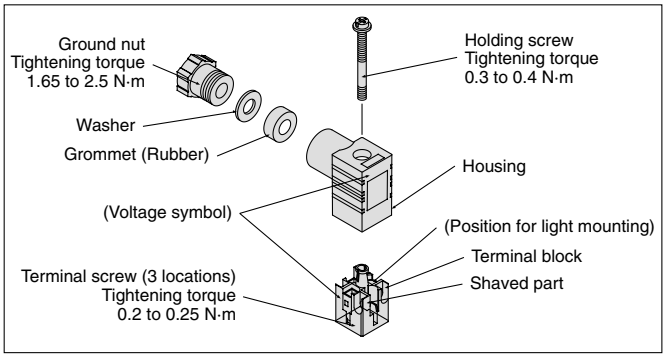
DIN terminal

Since internal connections are as shown below for the DIN terminal, make connections to the power supply accordingly.



Terminal no.	1	2
DIN terminal	+	–

∗ For energy-saving circuit, there is the polarity.
Heavy-duty cord can be used up to the cable O.D. ø3.5 to 7.



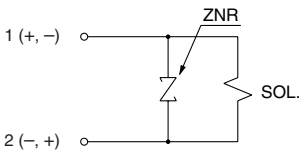
Electrical Circuit

⚠ Caution

Series VC (Class B coil)

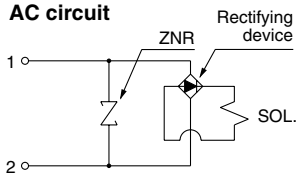
Grommet, Conduit, Conduit terminal, DIN connector

DC circuit



Without indicator light

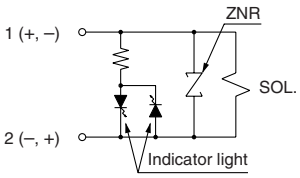
AC circuit



Without indicator light

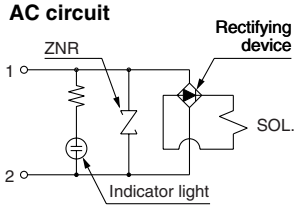
Conduit terminal, DIN terminal

DC circuit



With indicator light

AC circuit

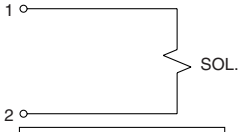


With indicator light

Series VC (Class H coil)

Grommet, Conduit, Conduit terminal

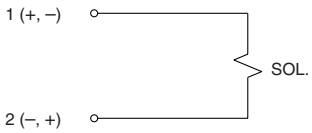
AC circuit



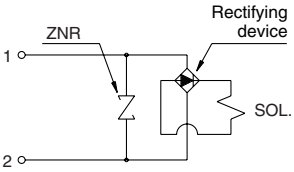
Without indicator light

Series VDW

DC circuit



AC circuit



2/3 Port Process Valve Precautions 6

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

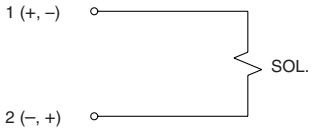
Electrical Circuit

⚠ Caution

Series VX

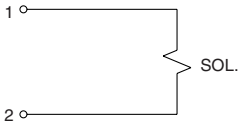
Grommet, Conduit, Conduit terminal, DIN connector

DC circuit



Without indicator light

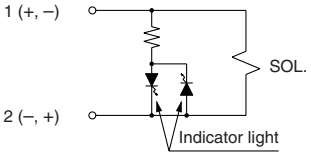
AC circuit



Without indicator light

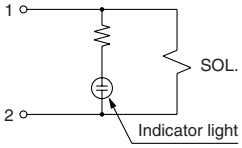
Conduit terminal, DIN terminal

DC circuit



With indicator light

AC circuit

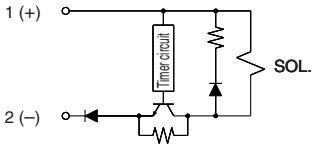


With indicator light

Series VQ20/30

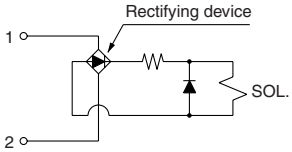
Grommet, DIN terminal

DC voltage
(With energy-saving circuit)



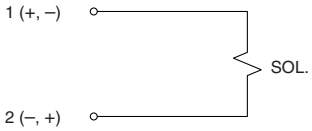
Without indicator light

AC circuit



Without indicator light

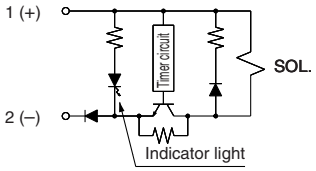
DC circuit



With indicator light

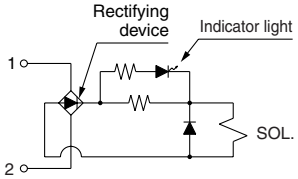
Grommet

DC voltage
(With energy-saving circuit)



With indicator light

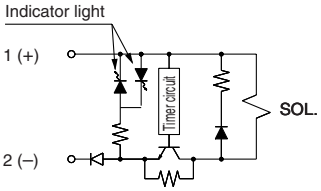
AC circuit



With indicator light

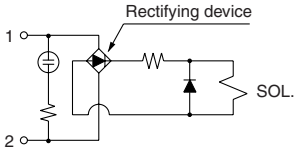
DIN terminal

DC voltage
(With energy-saving circuit)



With indicator light

AC circuit



With indicator light

2/3 Port Process Valve Precautions 7

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Operating Environment

⚠ Warning

1. **Do not use valves in atmospheres of corrosive gases, chemicals, salt water, water or steam, or where there is direct contact with same.**
2. **Do not use in explosive atmospheres.**
3. **Do not use in locations where vibration or impact occurs.**
4. **Do not use in locations subject to emissive heat.**
5. **Employ suitable protective measures in locations where there is contact with water droplets, oil or welding spatter, etc.**

Lubrication

⚠ Caution

1. **The valve has been lubricated for life at manufacture, and does not require lubrication in service.**
   If a lubricant is used in the system, use turbine oil Class 1, ISO VG32 (no additive). But do not lubricate the valve with EPR seal.
   Refer to the below brand name table of lubricants compliant to Class 1 turbine oil (without additive), ISO VG32.

Class 1 Turbine Oil (with no additive), ISO VG32

Classification of viscosity (cst) (40°C)	Viscosity according to ISO Grade	32
Idemitsu Kosan Co.,Ltd.		Turbine oil P-32
Nippon Mitsubishi Oil Corp.		Turbine oil 32
Cosmo Oil Co.,Ltd.		Cosmo turbine 32
Japan Energy Corp.		Kyodo turbine 32
Kygnus Oil Co.		Turbine oil 32
Kyushu Oil Co.		Stork turbine 32
NIPPON OIL CORPORATION		Mitsubishi turbine 32
Showa Shell Sekiyu K.K.		Turbine 32
Tonen General Sekiyu K.K.		General R turbine 32
Fuji Kosan Co.,Ltd.		Fucoal turbine 32

Please contact SMC regarding Class 2 turbine oil (with additives), ISO VG32.

Maintenance and Inspection

⚠ Warning

1. **Removing the product**
   The valve will reach high temperatures from high temperature fluids such as steam. Confirm that the valve has cooled sufficiently before performing work. If touched inadvertently, there is a danger of being burned.
   1) Shut off the fluid supply and release the fluid pressure in the system.
   2) In the case of air pilot or air-operated type, shut off the supply air source and discharge the compressed air inside a pilot piping.
   3) Shut off the power supply.
   4) Remove the product.
2. **Remove any remaining chemicals and carefully replace them with pure water or air, etc., before beginning work activities. (Series LV)**
3. **Low frequency operation**
   In order to prevent malfunction, conduct a switching operation of a valve every 30 days. Also, in order to use it under the optimum state, conduct a regular inspection once a half year.
4. **Manual override**
   When the manual override is operated, connected equipment will be actuated.
   Operate after safety is confirmed.
5. **Do not disassemble the product. Products which have been disassembled cannot be guaranteed.**
   If disassembly is necessary, please contact SMC.

Maintenance and Inspection

⚠ Caution

1. **Filters and strainers**
   1) Be careful regarding clogging of filters and strainers.
   2) Replace filters after one year of use, or earlier if the amount of pressure drop reaches 0.1 MPa.
   3) Clean the strainer when pressure drop exceeds 0.1 MPa.
2. **Lubrication**
   If operated with lubrication, be sure to continue the lubrication.
3. **How to store for a long period of time**
   Remove water completely from valves before storing for a long period of time to avoid the dust generation and damage to the rubber material.
4. **Flush drainage from filters regularly.**

Precautions on Handling

⚠ Warning

1. **Valves will reach high temperatures from high temperature fluids. Use caution, as there is a danger of being burned if a valve is touched directly.**

⚠ Caution

Series LV

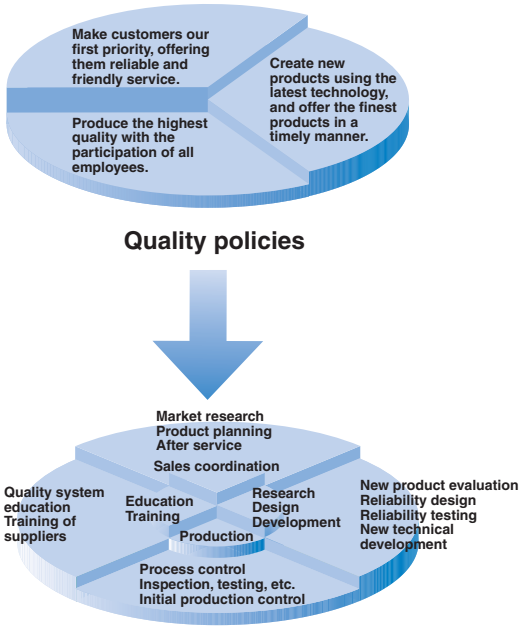
1. **When the diaphragm is made of PTFE**
   Please note that when the product is shipped from the factory, gases such as N2 and air may leak from the valve at a rate of 1 cm^3/min (when pressurized).
2. **When operated at a very low flow rate, the series LV□ with flow rate adjustment may vibrate, etc. depending on the operating conditions. Therefore, operate it after careful examination of the flow rate, pressure and piping conditions.**
3. **In the series LV□, water hammering may occur depending on the fluid pressure conditions. In most cases, improvement is possible by adjusting the pilot pressure with a speed controller, etc., but the flow rate, pressure and piping conditions should be reviewed.**
4. **To adjust the flow rate for the series LV□ with flow rate adjustment, open gradually starting from the fully closed condition.**
   Opening is accomplished by turning the adjustment knob counterclockwise. It is in the fully closed condition when the product is shipped from the factory.
5. **After a long period of nonuse, perform a test run before beginning regular operation.**
6. **Since the LVC is packaged in a clean room use sufficient care in handling when opened.**

Quality Assurance Information (ISO 9001, ISO 14001)

Reliable quality of products in the global market

To enable our customers throughout the world to use our products with even greater confidence, SMC has obtained certification for international standards “ISO 9001” and “ISO 14001”, and created a complete structure for quality assurance and environmental controls. SMC products pursue to meet its customers’ expectations while also considering company’s contribution in society.

SMC’s quality control system



Quality management system

ISO 9001

This is an international standard for quality control and quality assurance. SMC has obtained a large number of certifications in Japan and overseas, providing assurance to our customers throughout the world.



Environmental management system

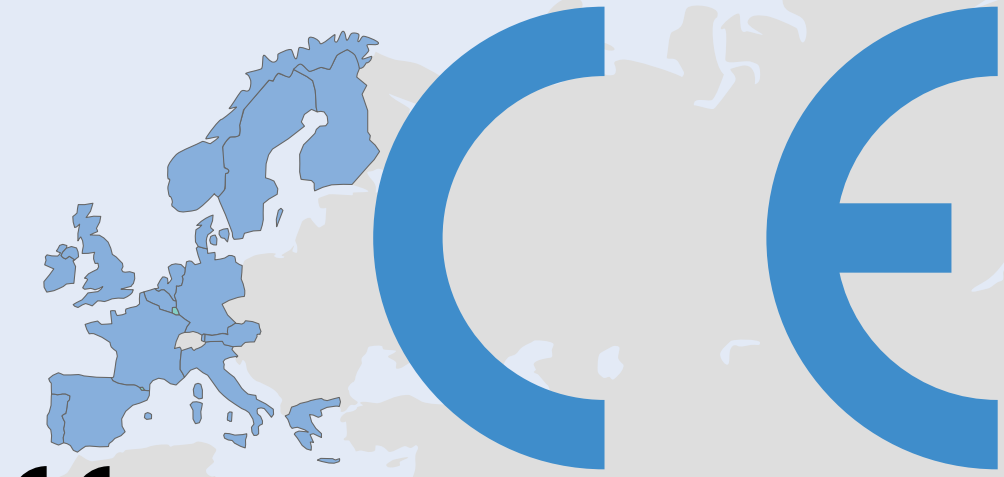
ISO 14001

This is an international standard related to environmental management systems and environmental inspections. While promoting environmentally friendly automation technology, SMC is also making diligent efforts to preserve the environment.



SMC Product Conforming to Inter

SMC products complying with EN/ISO, CSA/UL standards are supporting



CE Mark

The CE mark indicates that machines and components meet essential requirements of all the EC Directives applied.
It has been obligatory to apply CE marks indicating conformity with EC Directives when machines and components are exported to the member Nations of the EU.
Once “A manufacturer himself” declares a product to be safe by means of CE marking (declaration of conformity by manufacturer), free distribution inside the member Nations of the EU is permissible.

■ CE Mark

SMC provides CE marking to products to which EMC and Low Voltage Directives have been applied, in accordance with CETOP (European hydraulics and pneumatics committee) guide lines.

■ As of February 1998, the following 18 countries will be obliged to conform to CE mark legislation

Iceland, Ireland, United Kingdom, Italy, Austria, Netherlands, Greece, Liechtenstein, Sweden, Spain, Denmark, Germany, Norway, Finland, France, Belgium, Portugal, Luxembourg

■ EC Directives and Pneumatic Components

• Machinery Directive

The Machinery Directive contains essential health and safety requirements for machinery, as applied to industrial machines e.g. machine tools, injection molding machines and automatic machines. Pneumatic equipment is not specified in Machinery Directive. However, the use of SMC products that are certified as conforming to EN Standards, allows customers to simplify preparation work of the Technical Construction File required for a Declaration of Conformity.

• Electromagnetic Compatibility (EMC) Directive

The EMC Directive specifies electromagnetic compatibility. Equipment which may generate electromagnetic interference or whose function may be compromised by electromagnetic interference is required to be immune to electromagnetic affects (EMS/immunity) without emitting excessive electromagnetic affects (EMI/emission).

• Low Voltage Directive

This directive is applied to products, which operate above 50 VAC to 1000 VAC and 75 VDC to 1500 VDC operating voltage, and require electrical safety measures to be introduced.

• Simple Pressure Vessels Directive

This directive is applied to welded vessels whose maximum operating pressure (PS) and volume of vessel (V) exceed 50 bar/L. Such vessels require EC type examination and then CE marking.

national Standards

you to comply with EC directives and CSA/UL standards.

Mark of compliance for CSA/UL

Mark of compliance for CSA

NRTL /C

■ CSA Standards & UL Standards

UL and CSA standards have been applied in North America (U.S.A. and Canada) symbolizing safety of electric products, and are defined to mainly prevent danger from electric shock or fire, resulting from trouble with electric products. Both UL and CSA standards are acknowledged in North America as the first class certifying body. They have a long experience and ability for issuing product safety certificate. Products approved by CSA or UL standards are accepted in most states and governments beyond question.
Since CSA is a test certifying body as the National Recognized Testing Laboratory (NRTL) within the jurisdiction of Occupational Safety and Health Administration (OSHA), SMC was tested for compliance with CSA Standards and UL Standards at the same time and was approved for compliance with the two Standards. The above CSA NRTL/C logo is described on a product label in order to indicate that the product is approved by CSA and UL Standards.

■ TSSA (MCCR) Registration Products

TSSA is the regulation in Ontario State, Canada. The products that the operating pressure is more than 5 psi (0.03 MPa) and the piping size is bigger than 1 inch. fall into the scope of TSSA regulation.

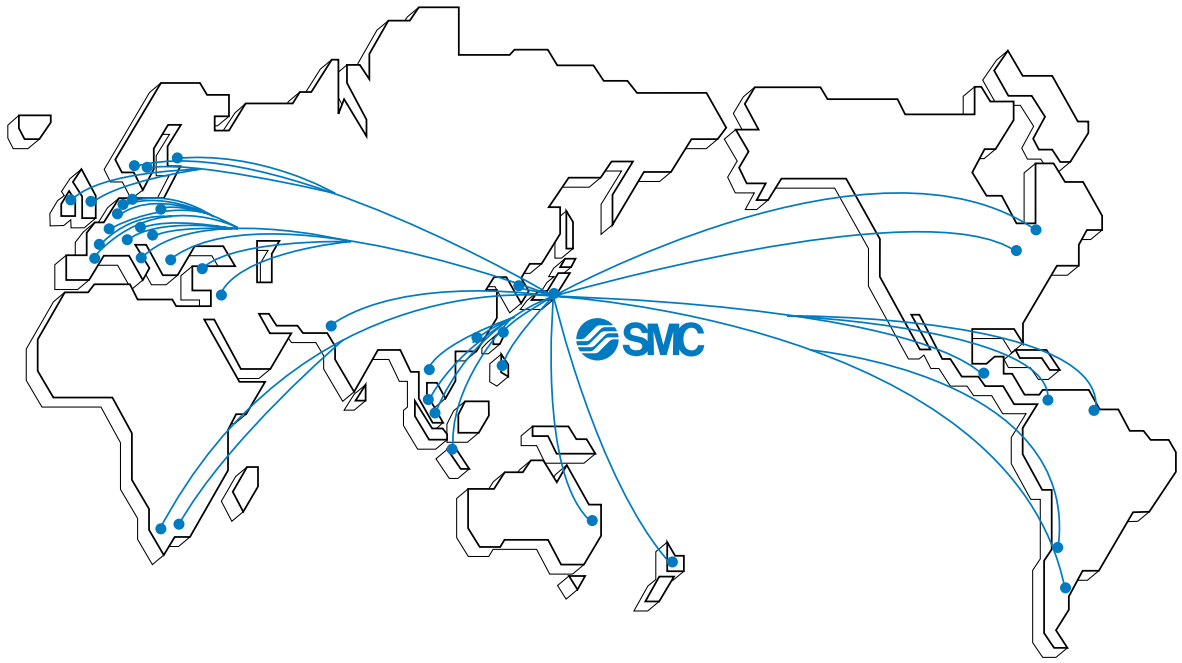
Products conforming to CE Standard

CE **With CE symbol for simple visual recognition**

In this catalog each accredited product series is indicated with a CE mark symbol. However, in some cases, every available models may not meet CE compliance. Please visit our web site for the latest selection of available models with CE mark.

http://www.smcworld.com

SMC's Global Service Network



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Apartado 40152, Avenida Nueva Granada, Edificio Wanlac,
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Galicia 1650 esq. Gaboto C.P. 11200, Montevideo, Uruguay
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