3 Port Solenoid Valve Series VQ100

Unprecedented high speed, stable response, and extra-long service life.

ON: 3.5ms, OFF: 2ms, Dispension accuracy ±1ms (With indicator light and surge voltage suppressor; supply pressure 0.5MPa) 200million cycles or more (clean and dry air) (Factors determined in a life test

by SMC)

Compact with large flow capacity.

Body width: 9.8mm, Cv: 0.02 (Standard, high pressure style) Cv: 0.04 (Option, large flow style)

Options

External non-leak
Latching style
Negative COM specifications
AC voltage
Normally open
Vacuum ⁽¹⁾
Note 1) Consult SMC for vacuum specifications

SYJ
VK
VZ
VT
VT
VP
VG
VP
VO

VQZ

VZ

VS

SY

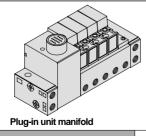


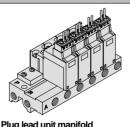
Copper-free specifications

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

A wide variations of wiring

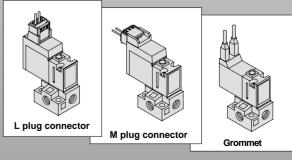
Manifold





Plug lead unit manifold

Single unit



SY

SYJ

VK

VZ

VT

VT

VP

VG

VP

VQ

VQZ

VZ

VS

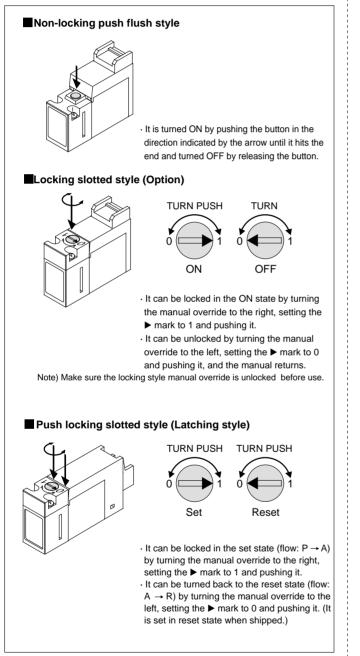
APrecautions

Be sure to read before handling. Refer to p.0-33 to 0-36 for Safety Instructions and common precautions.

Marning

Manual Override

The connected equipment will be operated when manual override is used. Check carefully before handling to make sure that there is no danger.



When operating the lock style with a screwdriver, turn it softly using only small screwdrivers.

(Torque: Less than 0.1Nm)

A Caution

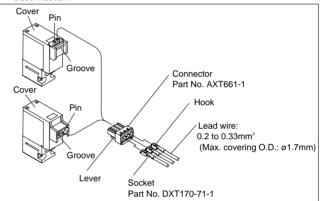
How to Use a Plug Connector

Connection/Disconnection of connector

• Push the connector straight onto the pins of the solenoid, making sure the lip of the lever is securely positioned in the groove on the solenoid cover.

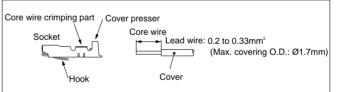
• Press the lever against the connector and pull the connector away from the solenoid.

Note) GENTLY pull the lead wire, otherwise it may cause contact failure or disconnection.



Crimping connection of lead wire and socket

Remove the insulation on the lead wire at the end from 3.2 to 3.7mm and insert the wires into the socket crimping area. Crimp the socket onto the wire using a crimping tool. Be careful not to let the insulation of the lead wire get into the wire crimping part. (Crimping tool: Part No. DXT170-75-1)

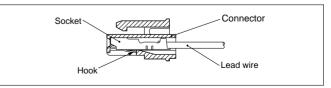


Connection/Disconnection of socket with lead wire Installation

Insert socket into the square hole (indicated as A, C and B) on the connector, hold the lead wire and push until it locks in place. Ensure that it is locked by pulling the lead wire a little.

Removal

Pull and detach the lead wire, pressing in on the end of the hook of the socket through the side hole using a stick with thin end (about 1mm). To reuse the socket, extend the hook outward.



Precautions

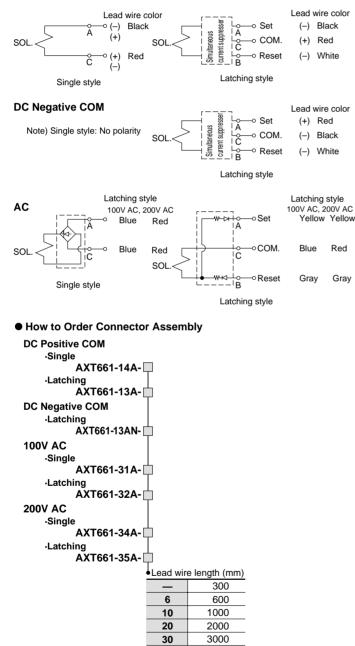
Be sure to read before handling. Refer to p.0-33 to 0-36 for Safety Instructions and common precautions.

How to Use Plug Connector

Wiring

• Lead wires are connected as follows. Connect them to the power supply side.

DC Positive COM



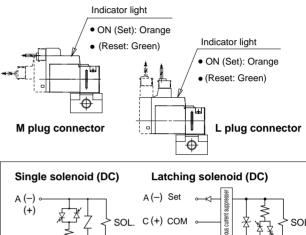
Plug connector lead wire length

The lead wire length of the valve with lead wire is 300mm. When ordering a valve with lead wire of 600mm or more, order the valve without lead wire and order the lead wire separately.

▲ Caution Light and Surge Voltage Suppressor

For latching style, set energizing side and reset the energizing side are indicated with orange and green respectively.





SOL B (-) Reset C (-) (+)Latching solenoid (AC) Single solenoid (AC) <u>~~~</u>N4 A set ⊶k⊢√√ Δ C COM SOL SOL С B reset ⊶ Note 1) Single: No polarity ON: Orange light lights. Note 3) A (set) side energizing: P→A B (set) side energizing: $A \rightarrow R$ Note 2) Setting side energizing: Orange light lights. Note 4) Negative COM specification Resetting side energizing: Green light lights. is applicable. With wrong wiring preventing ability (stop dieode) With surge voltage suppresser (ZNR/Surge absorbing dieode)

Caution

The latching solenoid is equipped with a self-holding mechanism, which permits a movable iron core in the solenoid to hold the "set" position. Therefore there is no need to energize continuously.

<Special Cautions for Latching Solenoid>

- 1. Make sure ON and OFF signals are not energized simultaneously.
- 2. 10ms enegizing time is necessary for self-holding.

3. Consult SMC if using in a place with high vibrations (10G or more) or high magnetic fields.

4. This valve is shipped in the "reset" position (passage: $A \rightarrow R$). However, it may move to the "set" position during transportation or due to impacts during mounting. Therefore, check the initial position before use by means of a power supply or manual override.

_							
	Latching	Passage	Indicator light		Single	Passage	Indicator light
	-C N (Set)	P→A	Orange Green		A-C ON	P→A	Orange
	. ,				OFF	A→R	
C	-C N (Reset)	A→R					

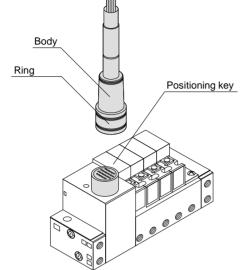
ACaution

How to Use of Multi-connector (For plug-in manifold: For VV3Q11)

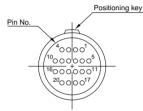
()Connecton/Disconnection of Plug

• When mounting a connector: Align the positioning key grooves of the body to the key, and it is locked.

• When remouing the connector: Poll the ring section straight back, and it is unlocked and then take it off.



Wiring Specifications



Multi-connector pin arrangement

1 station

2 stations

3 stations

4 stations

5 stations

6 stations

7 stations

8 stations

9 stations

10 stations

11 stations

12 stations

13 stations

14 stations

15 stations

16 stations

17 stations

18 stations

SOL -0 1

SOL. O 2

SOL. O 3

SOL. 0 4

SOL. O 5

SOL. O 6

SOL. 07

SOL. O 8

SOL. 0 9

SOL. 010

SOL. 011

SOL. 012

SOL. 013

SOL. 014

-015 SOL -016

-018 <u>COM</u>019 COM 020

SOL

SOL -017

SOL

Pin No.

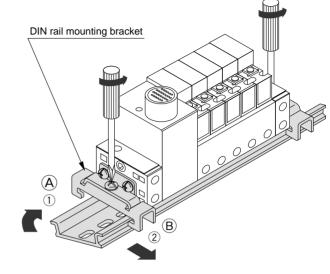
Terminal No./Lead wire color Lead wire color Termina No Wire color Dot marking Black 1 2 Brown 3 Red 4 Orange 5 Yellow 6 Pink Blue 7 8 Violet White 9 Gray Black 10 White Black 11 White Red 12 Yellow Red 13 Orange Red 14 Yellow Black 15 Pink Black 16 Blue White 17 Violet 18 Gray 19 Orange Black 20 Red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

A Caution

How to Connect/Disconnect DIN Rail

Removing

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



Mounting

1) Hook side (B) of the manifold base on the DIN rail.

2) Press down side (A) and mount the end plate on the DIN rail. Tighten the clamp screw on the side.

Proper tightening torque of thread: 0.8 to 1.2Nm

VQ
VQZ
VZ
VS

SY

SYJ

VK

VZ

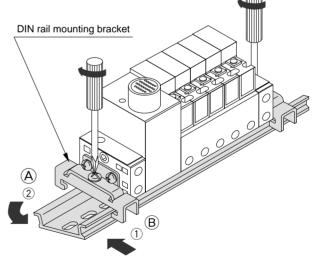
VT

VT

VP

VG

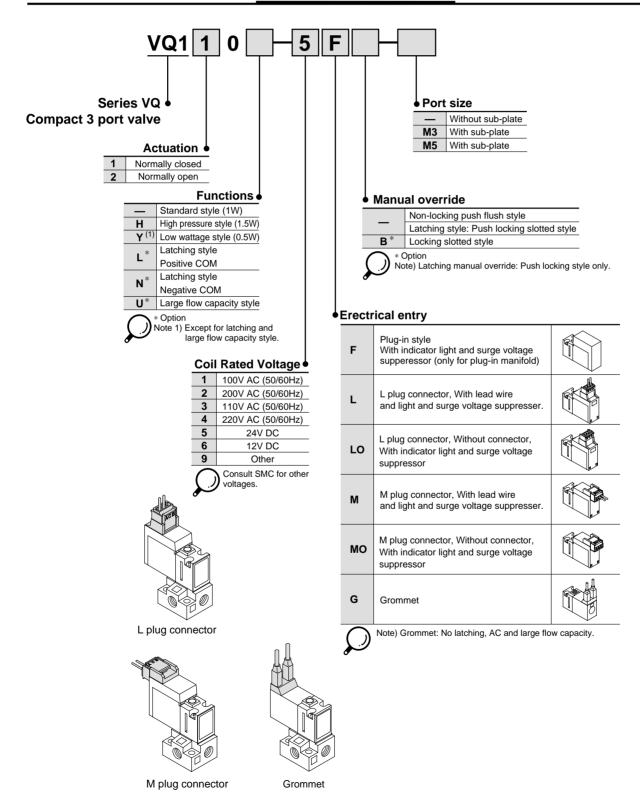
VP

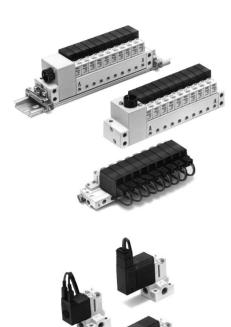


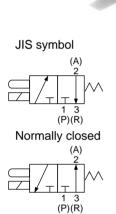
Electrical wiring specifications

3 Port Solenoid Valve Series VQ100

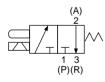
How to Order Valve







Normally open



Latching style

Clean Series

Clean series is available for both standard and option specifications.

> How to Order Valve 10-VQ110□-□ Clean series

Standard	Specifications
otariaara	opoonnoutionio

Item		Style)	Standard (1W)	High pressure (1.5W)	Low wattage (0.5W)			
	Valve structure		_	3 port di	irect operated pop	pet (NC)			
	Fluid		_		Air, Inert gas				
	Max. operating pressu	re		0.7MPa	0.8MPa	0.7MPa			
	Min. operating pressur	e			0MPa				
	Effective area	1→2		0.28mm ² (Cv 0.016)	0.14mm ² (Cv 0.008)			
	Effective area	2→3		0.36mm ² ((Cv 0.02)	0.20mm ² (Cv 0.011)	SY		
Valve	Response time ⁽¹⁾			ON: 3.5m	s, OFF: 2ms	ON: 3.5ms, OFF: 2.5ms	SYJ		
Va	Ambient and fluid temp	oerature			-10 to 50°C $^{(2)}$				
	Lubrication		_		Not required		VK		
	Manual override			Non-lock	king push/Locking	slotted (3)	VZ		
	Mounting operation				Free				
	Shock/Vibration resista	ance ⁽⁴⁾			150/30m/s ²		VT		
	Protection structure				Dust proof		VT		
	Weight			12.6g (L/M	12.6g (L/M connector, Without subplate)				
	Coil rated voltage	DC	5		24V DC, 12V DC	;	VP		
	Allowable voltage			±1	VG				
oid	Coil insulation		_	С	Class B or equivalent				
Solenoid	Power consumption (Curre	ent) DO	2	1W (42mA)	1.5W (63mA)	0.5W (21mA)	VP		
Ó	Electrical entry			Plug-in, L plu (With indicator li					
\bigcirc	Note 1) As per JISB8374-	1993. W	ith	light/surge voltage	suppressor (clean a	air), Dispersion	VQ		
Y	accuracy ±1ms Note 2) Use dry air to prev Note 3) Locking style: Opt	ion			•		VQZ		
	Note 3) Locking style: Option Note 4) 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 value and armature for both energized and de-energized states								

armature, for both energized and de-energized states.

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

Option Specifications

Item		Туре	Latching	AC	Large flow capacity	Normally open		
	Model		VQ110L-□	VQ110-2□	VQ110U-□	VQ120-□		
a	Max. operatin	g pressure	0.7	ИРа	0.6MPa	0.5MPa		
Valve	Effective	1→2	0.14mn	n² (^{Cv}	0.68mm ² (^{Cv} _{0.038})	3→2 0.20mm ² (^{Cv} _{0.011})		
	area	2→3	0.20mr	n ² (^{Cv} _{0.011})	0.68mm ² (^{Cv} _{0.038})	2→1 0.14mm ² (^{Cv} _{0.008})		
	Response tim	e ⁽²⁾	5ms or less	6.5 or less	5ms or less	5ms or less		
		24V DC	1W (42mA)	_	0.7W (29mA) ⁽³⁾	1W (42mA)		
	Power consumption (Current)	12V DC	1W (83mA)	_	0.7W (29mA) ⁽³⁾	1W (83mA)		
σ		100V AC	0.6VA (6mA)	0.5VA (5mA)	-	_		
Solenoid		110V AC	0.65VA (5.9mA)	0.55VA (5mA)	_	_		
Sole		200V AC	1.2VA (6mA)	1.0VA (5mA)	_	_		
		220V AC	1.3VA (5.9mA)	1.1VA (5mA)	_	_		
	Electrical entr	y ⁽¹⁾	Plug-in, L plug connector, M plug connector (With indicator light and surge voltage suppressor)					

Note 1) Grommet is available only for normally open style

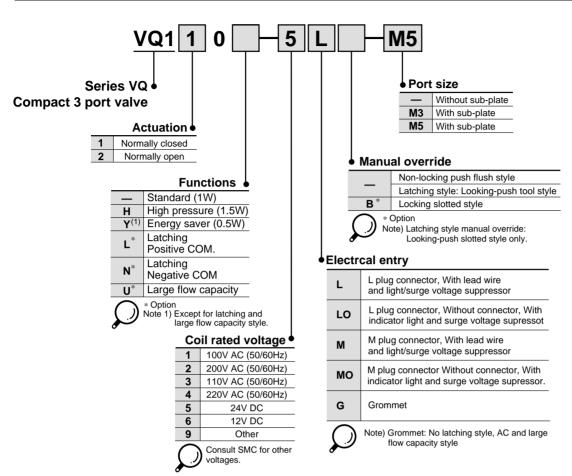
(without light/surge voltage suppressor).

Note 2) With light/surge voltage suppressor based on JISB8374-1993 (clean air).

Note 3) Inrush: 3.1W (10ms after energized.), Holding: 0.7W

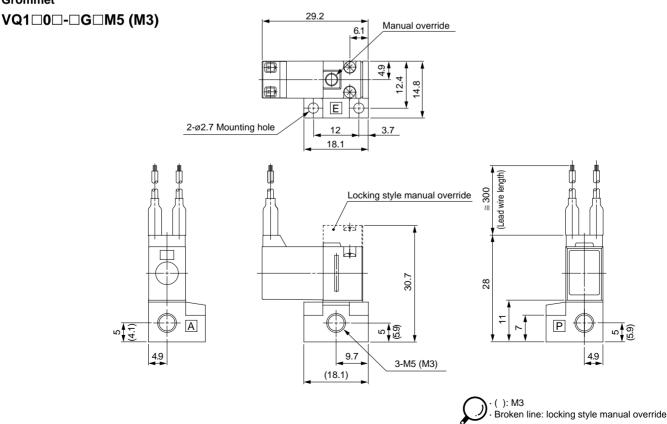
Ζ

How to Order Valve

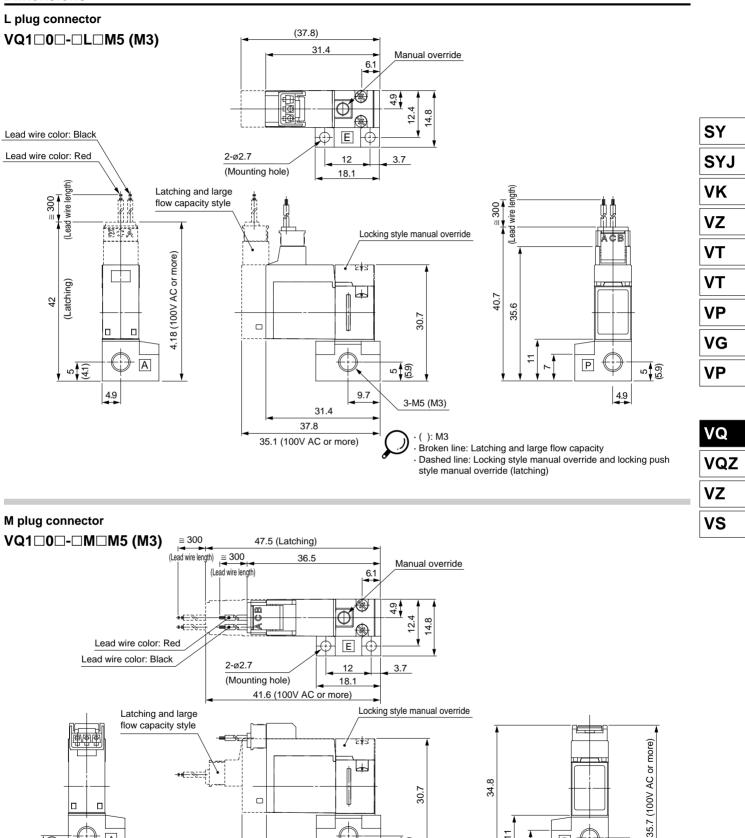


Dimensions

Grommet



Dimensions



30.7

3-M5 (M3)

(): M3

£ (2) (2)

9.7

31.4 37.8

5

Broken line: Latching and large flow capacity

style manual override (latching)

Dashed line: Locking style manual override and push locking

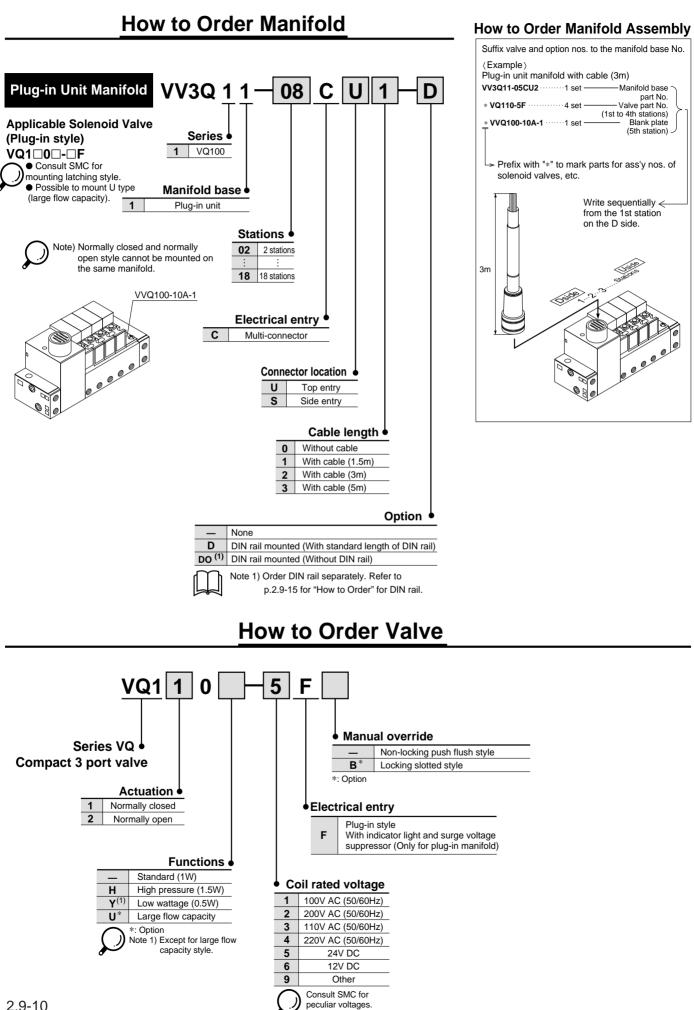
Ρ

(5.9)

4.9

4.9

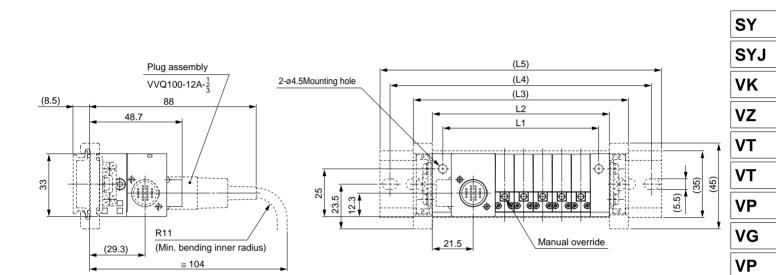
А

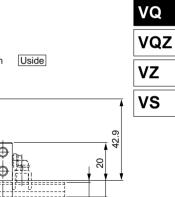


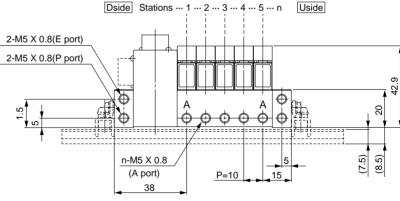
Plug-in Unit (VV3Q11) Manifold with Multi-connector



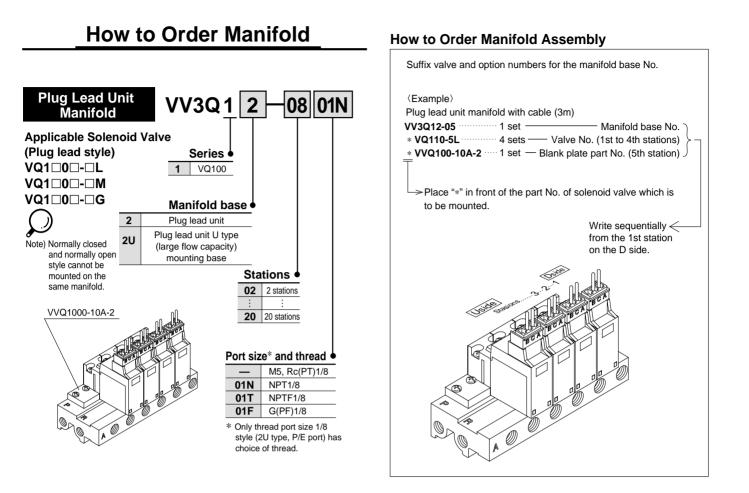
The broken line indicates DIN rail mounted style (-D) and side entry connector (S).



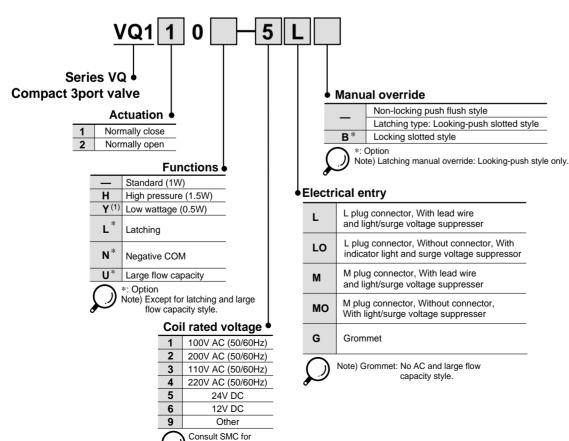




Dimensions Equation: L1=10n+32 L2=10n+43)n+43	n: Station	(Max. 18)					
L n	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
L1	52	62	72	82	92	102	112	122	132	142	152	162	172	182	192	202	212
L2	63	73	83	93	103	113	123	133	143	153	163	173	183	193	203	213	223
(L3)	83	93	103	113	123	133	143	153	163	173	183	193	203	213	223	233	243
(L4)	112.5	112.5	125	137.5	150	162.5	162.5	175	187.5	200	212.5	212.5	225	237.5	250	262.5	262.5
(L5)	123	123	135.5	148	160.5	173	173	185.5	198	210.5	223	223	235.5	248	260.5	273	273



How to Order Valve



other voltages.

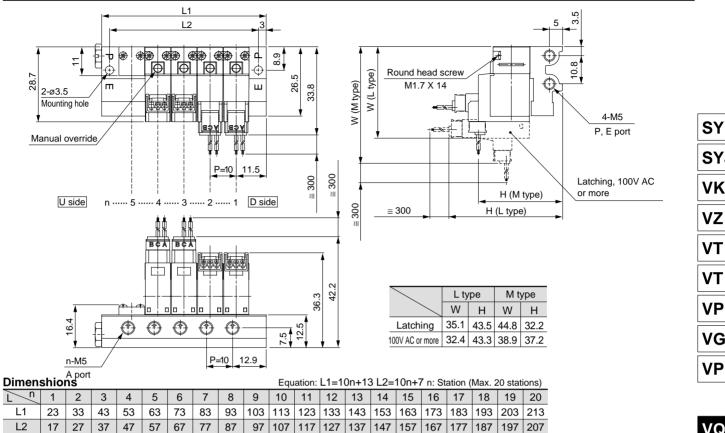
2.9-12

Plug Lead Unit Manifold (VV3Q12)

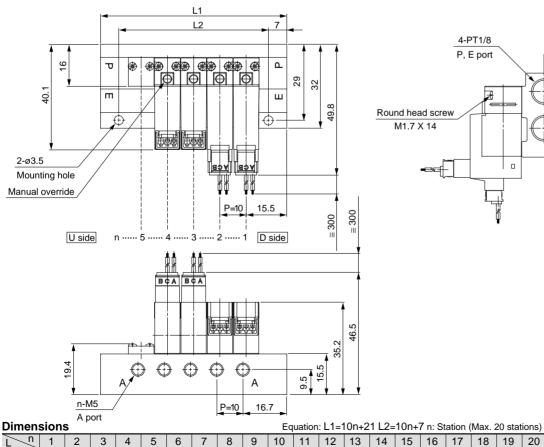
ì

L1

L2



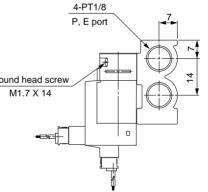
Plug Lead Unit U Type (Large Flow Capacity) Mounted Manifold (VV3Q12U)



131 141 151

97 107 117 127 137

 147 157 167 177

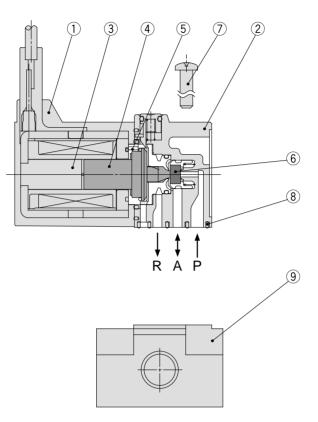


197 207

SY
SYJ
VK
VZ
VT
VT
VP
VG
-

	VQ
-	VQZ
	٧Z
	VS

Construction



(N.C. valve)

Component Parts

No.	Description	Material
1	Solenoid coil	—
2	Body	Resin
3	Fixed iron core	Stainless steel
(4)	Movable iron core assembly	Stainless steel, Resin
5	Return spring	Stainless steel
6	Poppet	NBR
7	Phillips/ordinary round head screw	Corbon steel
8	Interface gasket	NBR

Replacement Parts

No.	Part	Material	Part No.
9	Sub-plate	ZDC	AXT662-1- ¹ / ₂ (1: M5, 2: M3)

Optional Parts

· Gasket, screw: VQ100-GS-5

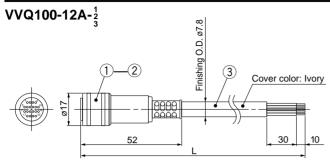
Note) 1 set includes: 1 gasket and 2 screws. Please order 10 sets at a time.



2.9-14

Manifold Option

Plug Assembly



1	Plug	RP13A-12PS-20SC 〈Made by Hirose Erectric〉
2	Female contact	RP19-SC-222 $\langle Made by Hirose Erectric \rangle$
3	Vinyl multi-core cable	VVRF 0.2mm ² 20-core

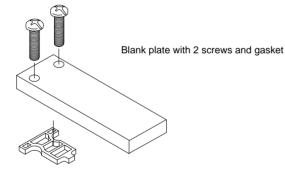
Cable Length

Model	L dimensions
VVQ100-12A-1	1.5m
VVQ100-12A-2	3m
VVQ100-12A-3	5m

Blank Plate Assembly

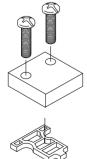
VVQ100-10A-1

Plug-in unit (VV3Q11) for manifold with multiple connectors



VVQ100-10A-2

Plug lead unit (VV3Q12) for manifold



Blank plate with 2 screws and gasket

VV3Q11 For Manifold With Multi-connector

\langle D Side End Plate Assembly \rangle

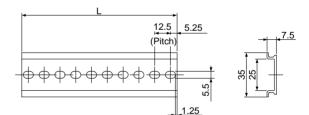
D side end plate assembly p	art number	
VVQ100-3A-□		
• OI	otion	SY
1	Standard	SYJ
2	DIN rail mounting	313
\langle U Side End Plate As	sembly $ angle$	VK
U side end plate assembly p	art number	VZ
VVQ100-2A-□	٧Z	
• OI	otion	VT
1	Standard type	VT
2	DIN rail mounting	VI
〈DIN Rail Mounting B	racket Assembly $ angle$	VP
DIN rail mounting bracket pa	VG	
AXT802-1A-□	VG	
• Mo	ounting direction	VP
D	D side mounting	
U	U side mounting	
Note) The number of r	nanifold stations cannot be changed.	VQ

How to Order Only DIN Rail

DIN rail part number: AXT100-DR-□

*Refer to DIN rail dimension table below and put number into

to order DIN rail. Refer to the manifold dimensions on p.2.9-11 to know L size.



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

VQ
VQZ
 VZ
VS