



Installation and Maintenance Manual

5 Port Solenoid Valve

Series 56-VQC1000/2000/4000

ATEX Marking Description

II 3G Ex nA IIB T4..T5 Gc -10°C ≤ Ta ≤ +50°C
II 3D Ex tc IIIC T80..T86°C Dc IP67

Manifold with Serial Transmission System (56-EX500 or 56-EX250)

Refer to separate applicable documentation

Certificate reference: SMC 19.0030 X
For specific conditions of use see section 1.1.

1 Safety Instructions

This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.

- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of "Caution", "Warning" or "Danger", followed by important safety information which must be carefully followed.
- To ensure safety of personnel and equipment the safety instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.

1 Safety Instructions (continued)

3) Before machinery/equipment is re-started, ensure all safety measures to prevent sudden movement of cylinders etc. (Supply air into the system gradually to create back pressure, i.e. incorporate a soft-start valve).

- Do not use this product outside of the specifications. Contact SMC if it is to be used in any of the following conditions:**

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

1.1 Specific recommendations:

⚠ Danger

- Protect from impacts using an ATEX enclosure suitable for impacts.

⚠ Warning

- Not suitable for Zones 0/20 and Zones 1/21. Only suitable for Zones 2/22.

⚠ Caution

- This product has components made of aluminium alloy. When mounting this product, it must be installed such that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.
- Do not brush or wipe this product to avoid static charge build up. Static charge can cause a spark or ignition source.

⚠ Caution

- Ensure that the air supply system is filtered to 5 microns.

2 Specifications

2.1 General Specifications

Series	56-VQC1000, 2000, 4000		
Valve configuration	Metal seal	Rubber seal	
Fluid	Air/Inert gas		
56-VQC1000 56-VQC2000	Maximum operating pressure	0.7 MPa	
	Minimum operating pressure	Single	0.1 MPa
		Double	0.1 MPa
		3-position	0.1 MPa
4-position	-	0.15 MPa	
56-VQC4000	Maximum operating pressure	1.0 MPa	
	Minimum operating pressure	Single	0.15 MPa
		Double	0.15 MPa
3-position	0.15 MPa	0.2 MPa	
Proof pressure	1.5 MPa		
Fluid temperature	-10°C to 50°C		
Lubrication	Not required		
Manual override	Locking type (tool required) Locking type (finger/thumb operation) Slide locking type (56-VQC1000/2000)		
Impact/Vibration resistance	150/30 m/s ² (Note 1)		
Enclosure	IP67		
Rated coil voltage	24VDC		
Allowable voltage fluctuation	±10% of rated voltage		
Coil insulation	Equivalent to B type		
Power consumption (current) at 24VDC	1W (42mA), inrush (Note 2) 0.35W (15mA), holding		
Max operating frequency (Hz)	1		

2 Specifications (continued)

Note 1) Impact resistance: There should be no malfunction of the valve after testing, using a drop impact tester, along the valve axis and at right-angles to the valve and armature. Carry out each test with the valve energised and de-energised (Value at the initial stage).
Vibration resistance; There should be no malfunction of the valve after testing, using a 8.3 to 2000 Hz sweep along the valve axis and at right-angles to the valve and armature. Carry out each test with the valve energised and de-energised (Value at the initial stage).

Note 2) The power saving circuit is included in the manifold.

2.2 Batch codes and Construction month:

Year	2012	2013	2014	.....	2021	2022	2023	.....
Month	Q	R	S	.....	Z	A	B	.....
Jan	o	Qo	Ro	So	.....	Zo	Ao	Bo
Feb	P	QP	RP	SP	.....	ZP	AP	BP
Mar	Q	QQ	RQ	SQ	.....	ZQ	AQ	BQ
Apr	R	QR	RR	SR	.....	ZR	AR	BR
May	S	QS	RS	SS	.....	ZS	AS	BS
Jun	T	QT	RT	ST	.....	ZT	AT	BT
Jul	U	QU	RU	SU	.....	ZU	AU	BU
Aug	V	QV	RV	SV	.....	ZV	AV	BV
Sep	W	QW	RW	SW	.....	ZW	AW	BW
Oct	X	QX	X	SX	.....	ZX	AX	BX
Nov	y	Qy	RQy	Sy	.....	Zy	Ay	By
Dec	Z	QZ	RZ	SZ	.....	ZZ	AZ	BZ

2.3 Piping

56-VQC1000/2000 (M-Kit)

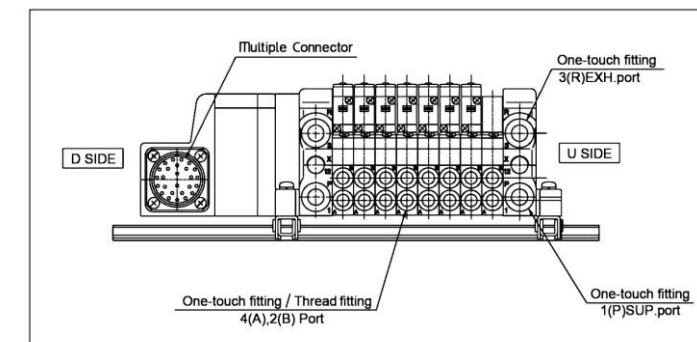


Figure 1

56-VQC1000/2000 (T-Kit)

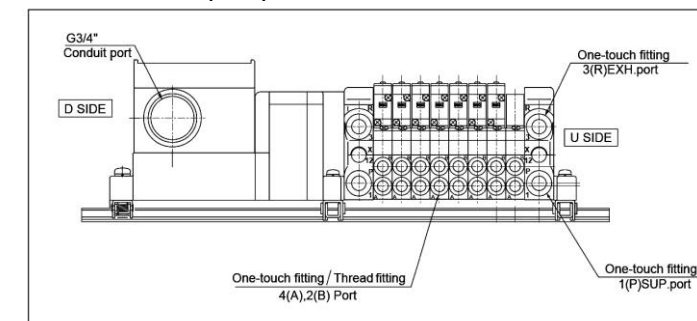


Figure 2

2 Specifications (continued)

56-VQC1000/2000 (56-EX500)

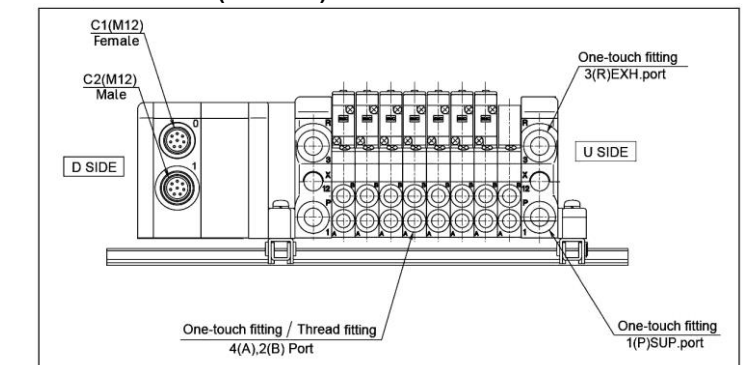


Figure 3

56-VQC1000/2000 (56-EX250)

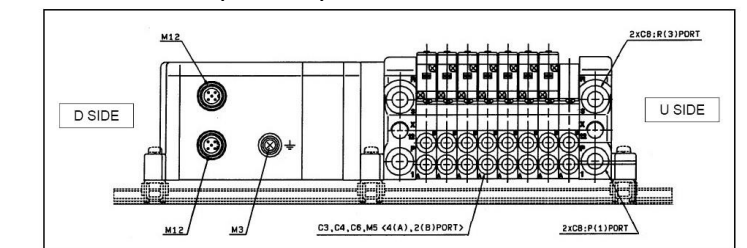


Figure 4

⚠ Caution	Indicates a hazard with a low level of risk, which if not avoided, could result in minor or moderate injury.
⚠ Warning	Indicates a hazard with a medium level of risk, which if not avoided, could result in death or serious injury.
⚠ Danger	Indicates a hazard with a high level of risk, which if not avoided, will result in death or serious injury.

⚠ Warning

- 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 can be used in various operating conditions, their compatibility with the specific pneumatic system must be based on specifications or after analysis and/or tests to meet specific requirements.
- 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 personnel.
- Do not service machinery/equipment or attempt to remove components until safety is confirmed.**
 - Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
 - When equipment is to be removed, confirm the safety process as mentioned above. Switch off air and electrical supplies and exhaust all residual compressed air in the system.

56-VQC4000 (M-Kit)

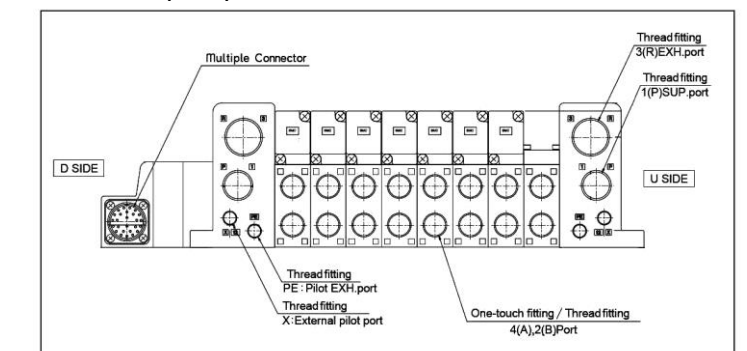


Figure 5

56-VQC4000 (T-Kit)

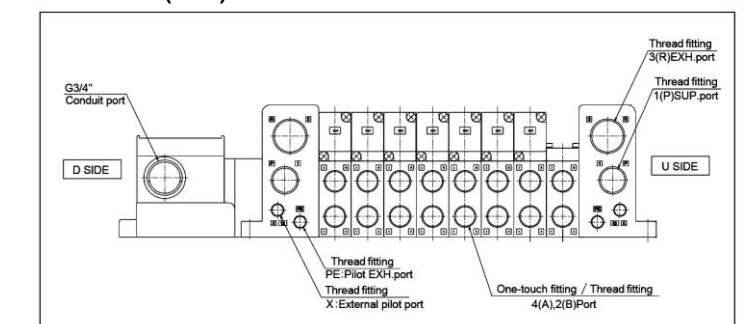


Figure 6

2 Specifications (continued)

56-VQC4000 (56-EX500)

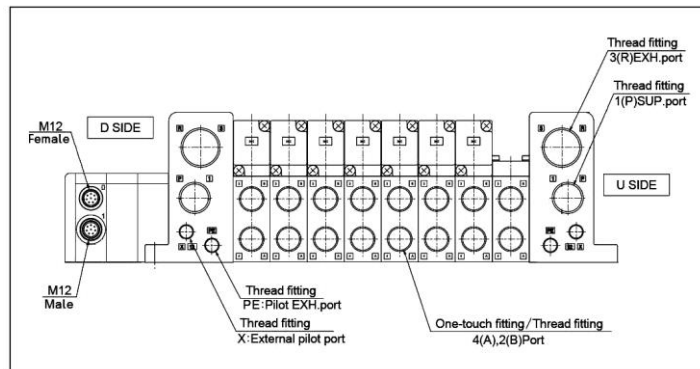


Figure 7

56-VQC4000 (56-EX250)

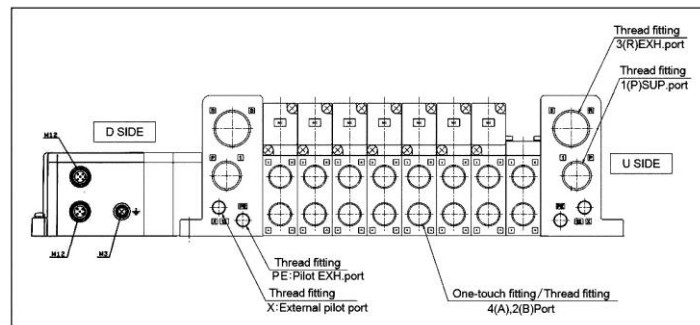


Figure 8

3 Installation

3.1 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood.

Danger

- Protect from impacts using an ATEX enclosure suitable for impacts.

3.2 Environment

Warning

- Do not use in an environment where the product is directly exposed to corrosive gases, chemicals, salt water, water or steam.
- Do not use in an explosive atmosphere, except Zone 2/22.
- The product should not be exposed to prolonged sunlight. Use a protective cover.
- Do not mount the product in a location where it is subject to excessive vibrations and/or impacts.
- Do not mount the product in a location exposed to radiant heat.
- Remove emissive heat.
- Employ suitable protective measures in locations where there is contact with water droplets, oil or welding splatter, etc.
- When the solenoid valve is mounted in a control panel or is energised for a long time, make sure the ambient temperature is within the valve specification range.

3.3 Piping

Caution

- Before piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1.5 to 2 threads exposed on the end of the pipe/fitting.
- Install piping so that it does not apply pulling, pressing, bending or other forces on the valve body.

3 Installation (continued)

- Tighten fittings to the specified tightening torque shown in Table 1.

Thread	Tightening Torque N·m
M5	By hand + 1/6 turn with a wrench (1/4 turn for miniature fittings)
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

Table 1

3.4 Electrical Connection

Caution

- The manifold has negative common (-COM).
- Avoid mis-wiring, as this can cause malfunction, damage and combustion to the product.
- Use voltage that is within $\pm 10\%$ of the rated voltage. Application of incorrect voltage may cause malfunction or damage.
- To prevent noise and surge in signal lines, keep all wiring separate from power lines and high voltage lines. Otherwise this can cause malfunction.
- Use electrical circuits that do not generate chattering in their contacts.
- Do not bend or pull cables repeatedly.

Danger

- Disconnect power supply before removing or making electrical connections

Multiple connector wiring (M-Kit)

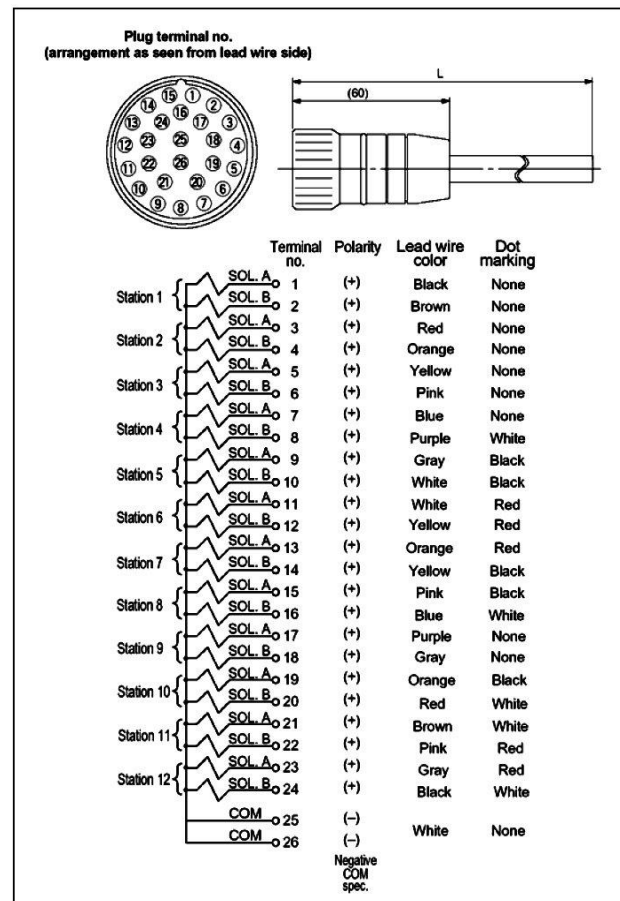


Figure 9

3 Installation (continued)

Terminal block wiring (T-Kit)

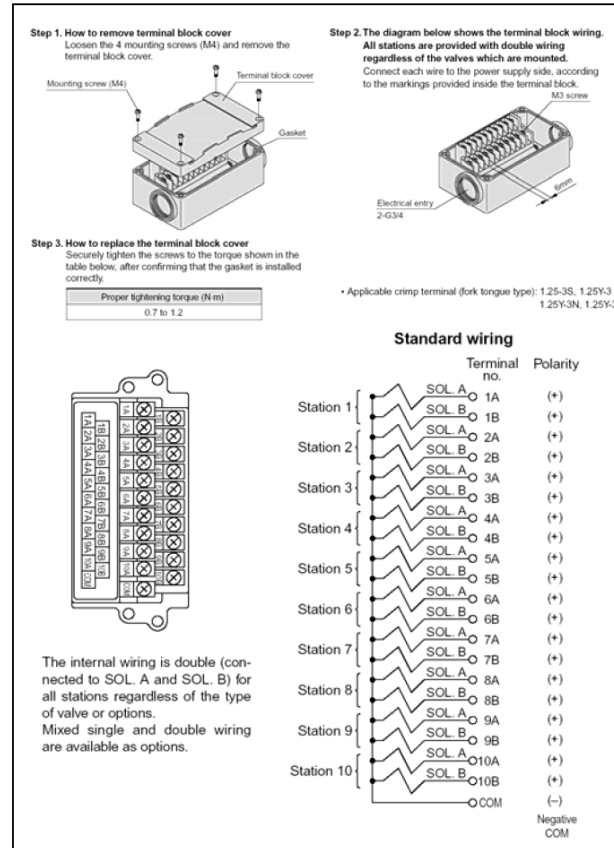


Figure 10

3.5 Mounting

Danger

- Never remove a valve from the manifold when energised.
- Never remove terminal box cover when power is connected to the manifold.
- Never disconnect or reconnect cables or connectors when power is connected to the manifold.
- Install 56-VQC valves only.
- Install 56-VV5QC manifolds only, as it has an integrated power saving circuit.

56-VQC1000/2000 Valve mounting:

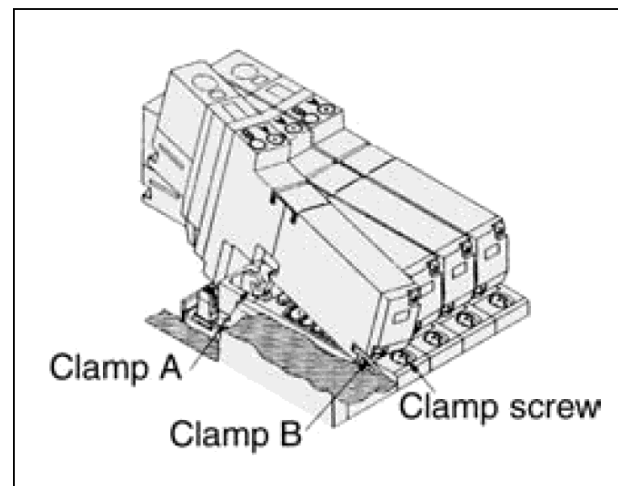


Figure 11

Removal procedure:

- Loosen clamp screws until they turn freely (they do not come out).
- Remove the solenoid valve from Clamp B by lifting the coil side of the valve, while pushing on the screw top.

3 Installation (continued)

Mounting procedure:

- Push the clamp screw. Clamp A now opens.
- Insert the end plate hook of the valve into Clamp B from an angle.
- Push the valve down into place (when the clamp screw is released, Clamp A will lock).

56-VQC4000 Valve mounting:

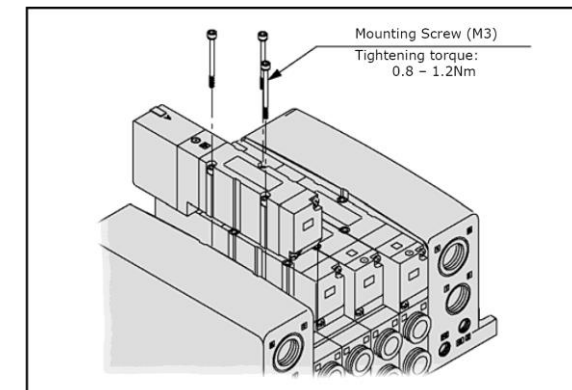


Figure 12

Removal procedure:

- Loosen mounting screws until they turn freely.
- Remove the solenoid valve from Clamp B by lifting the coil side of the valve first.

Mounting procedure:

- Push the coil side of the valve into the connector on the manifold.
- Tighten the mounting screws to torque 0.8 to 1.2 N·m.

Caution

- Ensure all gaskets are present before mounting valves.
- Do not let foreign matter stick to gaskets or sealing faces of the valve to avoid air leaks

3.6 Lubrication

Caution

- SMC products have been lubricated for life at manufacture, and do not require lubrication in service.
- If a lubricant is used in the system, use turbine oil Class 1 (no additive), ISO VG32. Once lubricant is used in the system, lubrication must be continued because the original lubricant applied during manufacturing will be washed away.

4 Settings

4.1 Manual Override

Caution

- Since connected equipment will operate when the manual override is activated, confirm that conditions are safe prior to activation.

Non-locking push type (tool required)

- Push down the manual override button with a small screwdriver, etc. until it stops.
- The manual override will return when released.

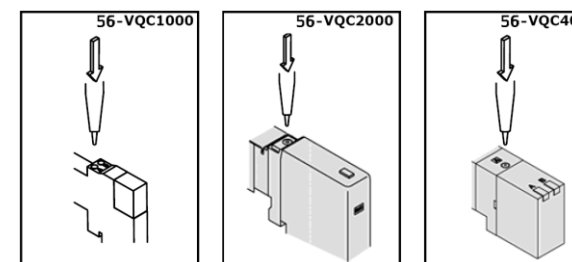


Figure 13

Slotted locking push type (tool required)

- Push down the manual override button with a small flat head screwdriver until it stops and turn 90° clockwise to lock.

4 Settings (continued)

- Turn anti-clockwise to release.

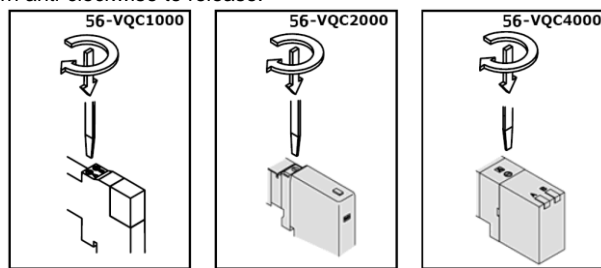


Figure 14

Locking type (manual). 56-VQC1000/2000

- Push down the manual override button with a small flat head screwdriver or finger until it stops and turn 90° clockwise to lock.
- Turn anti-clockwise to release

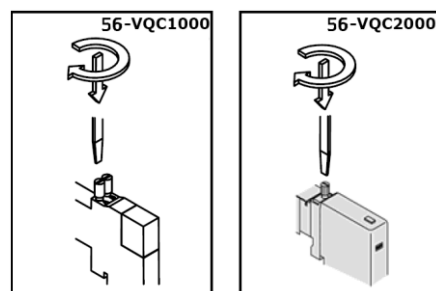


Figure 15

Slide locking type (manual). 56-VQC1000/2000

- Push down the manual override button with a small flat head screwdriver or finger until it stops and slide towards the coil to lock.

- To unlock, slide the override away from the coil.

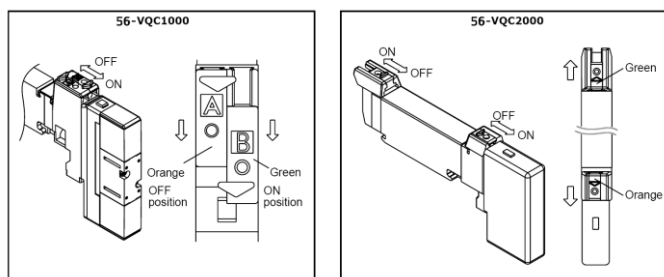


Figure 16

5 Circuit Symbols

2-position single EAPEB	3-position closed center EAPEB	4-position dual 3-port valve (A) N.C. 1 N.C.
2-position double (metal) EAPEB	3-position exhaust center EAPEB	4-position dual 3-port valve (B) N.O. 1 N.O.
2-position double (rubber) EAPEB	3-position pressure center EAPEB	4-position dual 3-port valve (C) N.C. 1 N.O.
3-position perfect (56-VQC4000 only) EAPEB	Note) For rubber seal type only. 56-VQC1000/2000	

Figure 17

6 Options

6.1 Mounting

⚠ Danger

- Disconnect power supply before removing or making electrical connections.

⚠ Caution

- Do not use options other than specified in the 56-VQC catalogues.
- The options are standard parts without "56-" prefix.

Removal and mounting procedure:

- Blanking plate assembly, individual SUP spacer and individual EXH spacer are mounted in the same way as valves. Please refer to section 3.5 Mounting.

6.2 Adding manifold stations (see Figure 18)

⚠ Danger

- When adding manifold stations, ensure the correct number of power saving units are installed, as operating the valves could exceed the marked surface temperatures.
- 1 to 12 solenoids – 1 power saving unit required.
- 13 to 24 solenoids – 2 power saving units required.
- Install 56-VQC valves only.

⚠ Caution

- Undo the bolts (Item 3) to the tie-rods and remove the U-side end plate assembly (Item 6). If DIN rail is fitted, first release the DIN rail.
- Screw in tie-rod extensions (Item 2) supplied with the manifold block assembly (standard VQC type) and assemble the manifold block (Item 1).
- Re-assemble the U-side end plate assembly (Item 6) and tighten the tie-rod screws (Item 3) to torque shown in Table 2.
- Ensure all seals and gaskets are installed.
- Install valve to added manifold block as described in section 3.5 Mounting.

- Check the correct number of power saving units (Item 5) are present.

Valve Series	Tightening Torque N·m
56-VQC1000	0.85 to 0.95
56-VQC2000	1.2 to 1.6
56-VQC4000	1.7 to 2.3

Table 2

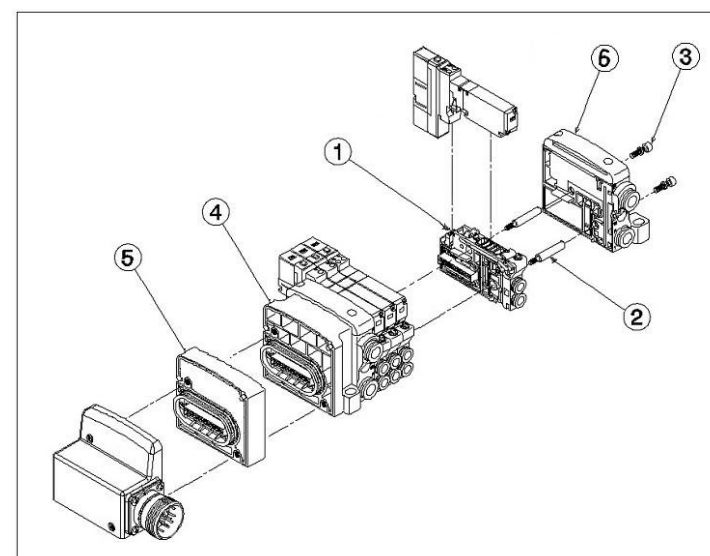


Figure 18

6.3 Adding power saving unit (Item 5)

- If a second power saving unit is required due to exceeding 12 solenoids on the manifold, contact SMC for the correct part.
- The second power saving unit must be positioned next to the D-side end plate assembly (Item 4).

7 How to Order

Refer to the catalogue for this product.

8 Outline Dimensions

Refer to the catalogue for this product.

9 Maintenance

9.1 General Maintenance

⚠ Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly, compressed air can be dangerous. Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.
- Drain: remove condensate from the filter bowl on regular basis.
- Low frequency operation: Switch valves at least once every 30 days to prevent malfunction. Also, in order to use it under optimum state, conduct a regular inspection once every 6 months.
- Filters and strainers:
 - Be careful regarding clogging of filters and strainers
 - Replace filter elements after one year of use, or earlier if the pressure drop reaches 0.1 MPa.
 - Clean strainers when the pressure drop reaches 0.1 MPa.

9.2 Replacing One-touch fittings

- Cylinder port fittings are available in cassette type and can be replaced easily.

56-VQC 1000/2000

- Remove the valve.
- Extract clip with flat head screwdriver.
- Pull fitting to remove.
- Refitting is the reversal of removal.

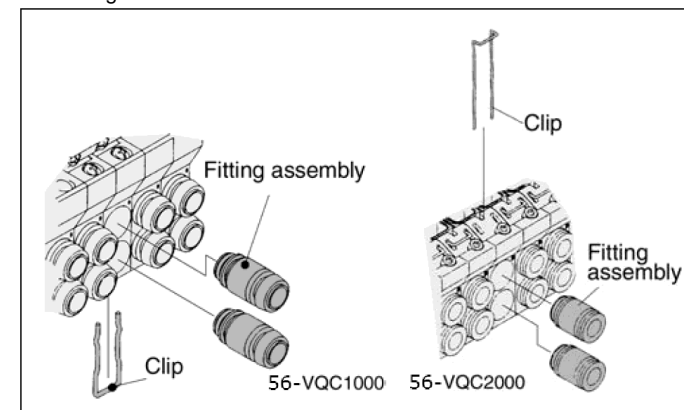


Figure 19

Applicable tube O.D.	Fitting assembly part no.	
	56-VQC1000	56-VQC2000
Ø3.2	VVQ1000-50A-C3	-
Ø4	VVQ1000-50A-C4	VVQ1000-51A-C4
Ø6	VVQ1000-50A-C6	VVQ1000-51A-C6
Ø8	-	VVQ1000-51A-C8
M5	VVQ1000-50A-M5	-
Ø1/8"	VVQ1000-50A-N1	-
Ø5/32"	VVQ1000-50A-N3	VVQ1000-51A-N3
Ø1/4"	VVQ1000-50A-N7	VVQ1000-51A-N7
Ø5/16"	-	VVQ1000-51A-N9

Table 3

9 Maintenance (continued)

56-VQC 4000

- Remove the valve.
- Extract clip with flat head screwdriver.
- Pull fitting to remove.
- Refitting is the reversal of removal.

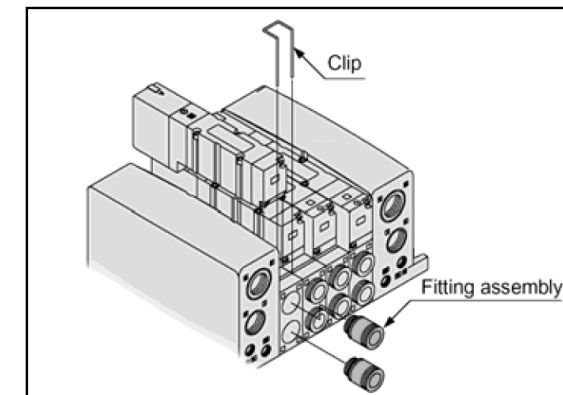


Figure 20

Applicable tube O.D.	Fitting assembly part no.	
	56-VQC4000	
Ø8	VVQ4000-50B-C8	
Ø10	VVQ4000-50B-C10	
Ø12	VVQ4000-50B-C12	
Ø1/4"	VVQ4000-50B-N7	
Ø5/16"	VVQ4000-50B-N9	
Ø3/8"	VVQ4000-50B-N11	

Table 4

10 Limitations of Use

⚠ Danger

- Do not exceed any of the specifications in section 2 of this document or the specific product catalogue.

10.1 Maintenance space

- The installation should allow sufficient space for maintenance activities.

10.2 Ambient environment

- Use within the allowable ambient temperature range.

10.3 Mounting orientation

- In the case of a single solenoid, the mounting orientation is unrestricted. In the case of double solenoid or 3 position valves, mount so the spool is horizontal.
- When mounting for an application that will involve vibration or impact, mount so the spool is at right angles to the direction of vibration.
- Do not use in applications where vibration or impact exceed the products specification.

11 Contacts

Refer to Declaration of Conformity and www.smcworld.com for contacts.

SMC Corporation

URL : <http://www.smcworld.com> (Global) <http://www.smc.eu.com> (Europe)
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