



Installation and Maintenance Manual

VQZ100/200/300, 3 Port Solenoid Valves

VQZ1000/2000/3000, 5 Port Solenoid Valves

For future reference, please keep this manual in a safe place

This manual should be read in conjunction with the current catalogue

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 label of "Caution", "Warning" or "Danger". To ensure safety, be sure to observe ISO4414 (Note 1), JIS B 8370 (Note 2) and other safety practices.

Note 1: ISO 4414: Pneumatic fluid power – Recommendations for the application of equipment to transmission and control systems.
Note 2: JIS B 8370: Pneumatic system axiom.

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.

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.

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 component until safety is confirmed.

- 1) Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
- 2) 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.
- 3) Before machinery/equipment is re-started, ensure all safety measures to prevent sudden movement of cylinders etc. (Bleed air into the system gradually to create back-pressure, i.e. incorporate a soft-start valve).

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) 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.
- 3) An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

CAUTION

Ensure that the air supply system is filtered to 5 micron.

VQZ1000/2000/3000 Standard Specification

Type of seal	Metal seal		Rubber seal	
	Air, inert gas		Air, inert gas	
Fluid	Air, inert gas		Air, inert gas	
Max. operating pressure	0.7MPa (high pressure type: 0.8MPa)			
Min. operating pressure	2 position	Single	0.1MPa (1.0 kgf/cm ²)	0.15MPa (1.5 kgf/cm ²)
	3 position	Double	only for VQZ3000, 3 position 0.15MPa (1.5 kgf/cm ²)	0.1MPa (1.0 kgf/cm ²) 0.2MPa (2.0 kgf/cm ²)
Ambient and fluid temperature	-10 to 50°C ^{Note 1}		-10 to 50°C ^{Note 1}	
Max. operating frequency	2 position	Single	20Hz	5Hz
	3 position	Double	10Hz	3Hz
Proof pressure	1.5MPa (15 kgf/cm ²)			
Lubrication	Not required			
Manual override	Non-locking push type/slotted locking type			
Shock/vibration resistance ^{Note 2}	150/30 m/s ²			
Enclosure	IP65 DIN connector		IP40 plug connector	
Coil rated voltage	12V, 24VDC and 100V, 110V, 200V, 220VAC			
Allowable voltage	±10% of rated voltage			
Coil insurance	Class B			
Power consumption (current value)	24VDC	1WDC(42mA), 1.5WDC(63mA), 0.5WDC(21mA)		
	12VDC	1WDC(83mA), 5WDC(125mA), 0.5WDC(42mA)		
	100VAC	Inrush 1.2VA (12mA), Holding 1.2 VA (12mA)*		
	110VAC	Inrush 1.3VA (11.7mA), Holding 1.3 VA (11.7mA)*		
	200VAC	Inrush 2.4VA (12mA), Holding 2.4 VA (12mA)*		
	220VAC	Inrush 2.6VA (11.7mA), Holding 2.6 VA (11.7mA)*		

* AC Voltages - Din Connector only

Note 1: Use dry air to prevent dew condensation when operating at low temperature.

Note 2: Shock resistance -----No malfunction from test using drop impact tester, to exist and right angle direction of main valve and armature, each one time when energised and de-energised.

Vibration resistance -----No malfunction from test with 8.3 to 2000Hz 1 sweep, to axis and right angle direction of main valve and armature, each one time when energised and de-energised.

Installation

WARNING

Ensure all air and power supplies are ISOLATED before commencing installation.

Do not install these valves in explosive atmospheres.

If these valves are exposed to water or oil droplets, ensure that they are protected.

If it is intended to energise a valve for an extended period, please consult SMC.

If air leakage causes associated equipment to malfunction cease using valve and inspect for cause.

Check fixings while pressure and power are applied. Initial function and leakage tests should be performed after installation.

Install only once safety instructions have been read and understood.

Coating. Warnings or specifications indicated on the product should not be erased, removed, or covered. If paint is applied to resin parts it may have an adverse effect due to solvent attack.

Should coating of valve be required, contact SMC for advice.

Symbol	2 position single	3 position pressure centre
1		
2		
3		
4		* Except VQZ1000 and metal seal type.

Fig 1

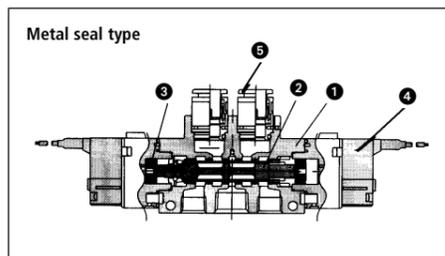


Fig 2

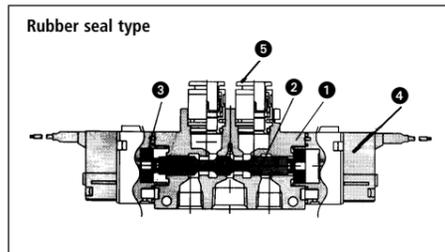


Fig 3

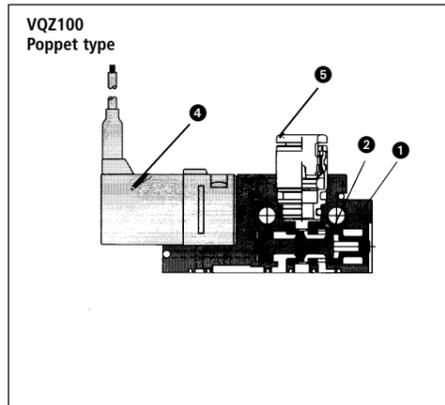


Fig 4

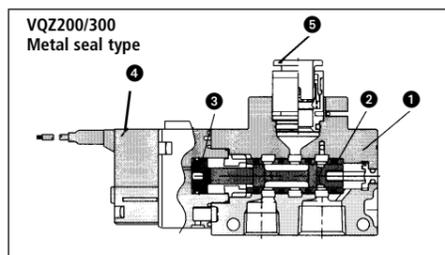


Fig 5

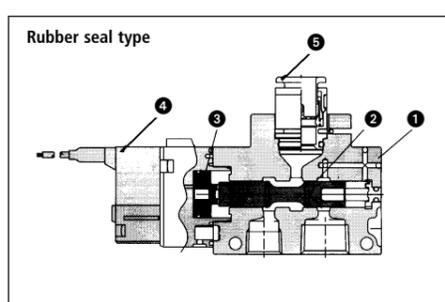


Fig 6

Parts list

No.	Description	Material	Note
1	Body	Aluminum die cast	
2	Spool/sleeve	Stainless steel	Metal seal
3	Spool valve	Aluminum/NBR	Rubber seal
4	Piston	Resin	
5	Pilot valve	-	

Tube connections (push-in fittings). (Fig. 7)

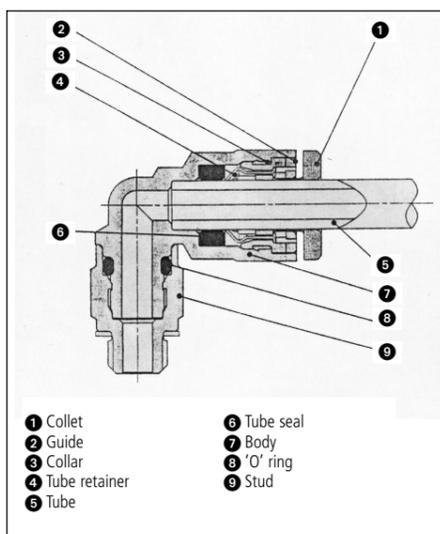


Fig 7

1. Ensure that the end of the tube is cut square.
2. Push the tube firmly into the fitting until it stops.
3. Pull back the tube to ensure that it is securely gripped.
4. To disconnect the tube, push down on the collet (1) and hold down. Withdraw the tube (5) from the fitting and release the collet when the tube is removed.

Electrical connection L/M type plug connector (Fig 8)

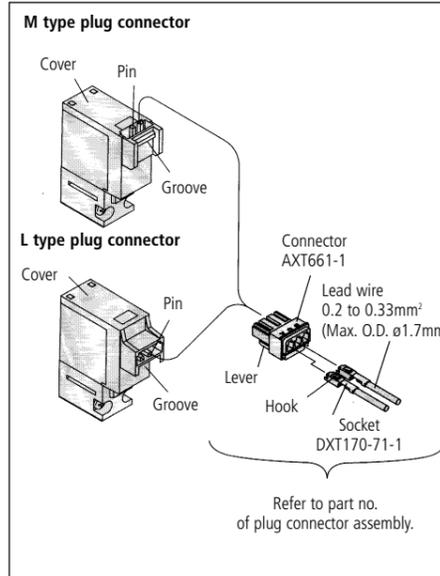


Fig 8

1. **Insertion** : Push the connector straight onto the pins of the solenoid, making sure the lip of the lever securely 'locks' into the groove of the solenoid cover.
2. **Removal**: Press the lever against the connector housing and pull it away from solenoid.

With light and surge voltage suppressor

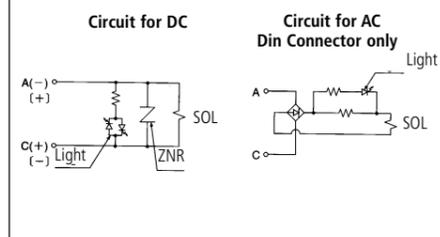


Fig 9

Electrical connection DIN plug connector (Fig 10)

CAUTION

Isolate both power and air supplies before removing/replacing connector.

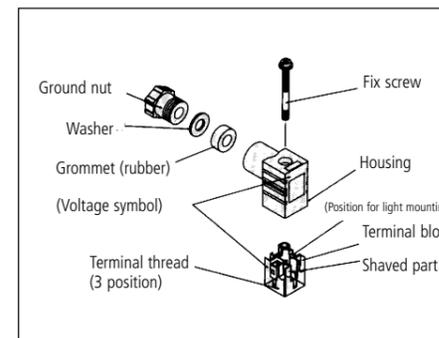


Fig 10

1. Loosen the top screw and remove the connector housing from the terminal spades on the solenoid.
2. Remove the housing screw and insert a screwdriver into the slot on the underside of the DIN cap and carefully remove the block.
3. Loosen the terminal screws on the block and insert the stripped leads in accordance with the wiring diagram (Fig.12). Secure each lead by re-tightening the appropriate terminal screw.
4. Tighten the housing grommet nut to secure the cable.

Circuit with light

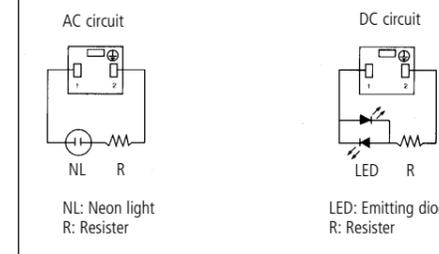


Fig 11

CAUTION

Pull connector out vertically, never at an angle.

Leakage voltage (Fig 12)

Note that when using a C-R device (surge voltage suppressor) for contact protection, the voltage leakage may increase due to the current leakage flowing through the C-R device.

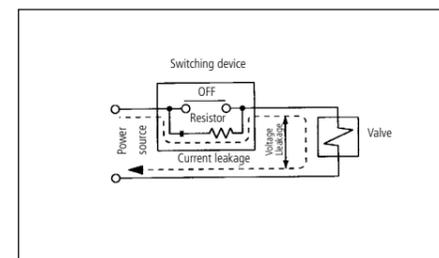


Fig 12

Suppress residual voltage leakage as follows:

- DC Coil 2% or less of rated voltage
- AC Coil 2% or less of rated voltage

Lubrication

These valves have been lubricated for life during manufacture and as such require no further lubrication.

CAUTION

However, if a lubricant is to be used with a rubber seal type, a turbine oil type #1, (ISO VG32) should be used. Continuous lubrication must be carried out as the original lubricant will be washed away.

Manual override operation (Fig 13a, b)

WARNING

Exercise EXTREME CAUTION when operating a solenoid manual override as connected equipment will commence operation. Ensure all safety measures are in place.

Non-locking push type (Fig 13a)

1. Push down the manual override button (Orange) until it stops using a small-bladed screwdriver.
2. Hold this position for the duration of the check (ON position).
3. Release the button and the override will re-set to the OFF position.

Non-locking push type (tool type) A

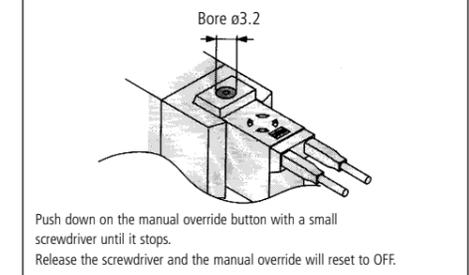


Fig 13a

Slotted locking type (tool type) B

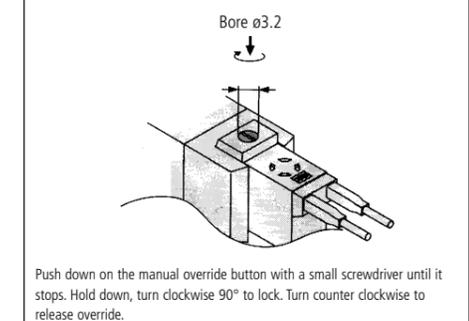


Fig 13b

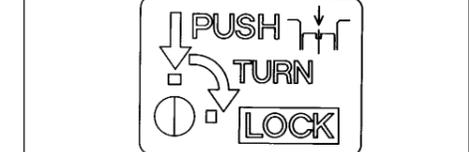


Fig 13b

Slotted locking type (Fig 13b)

1. Insert a small-bladed screwdriver into the slot and push the manual override down until it stops.
2. Turn the override through 90° in the direction of the arrow (ON position).
3. Remove screwdriver.

WARNING

In this position the manual override is in the locked 'ON' position.

To Unlock

1. Insert small-bladed screwdriver into the slot of the manual override.
2. Turn the screwdriver 90° in the reverse direction.
3. Remove the screwdriver, the manual override will re-set to the 'OFF' position.

Fittings tightening torque (Fig 14)

Tightening torque

Thread	Appropriate tightening torque N-m (kgf-cm)
M5	1.5 to 2 (15 to 20)
Rc(PT)1/8	7 to 9 (70 to 90)
Rc(PT)1/4	12 to 14 (120 to 140)
Rc(PT)3/8	22 to 24 (220 to 240)

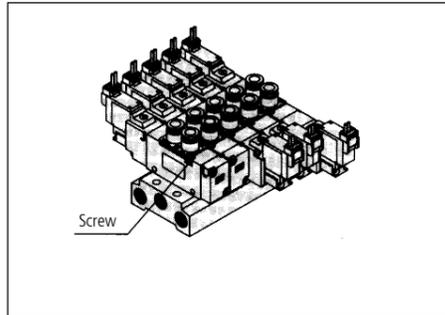
Maintenance**WARNING**

Ensure air and electrical supplies are isolated before commencing any maintenance work.
Valve should be switched at least every 30 days to avoid malfunction.

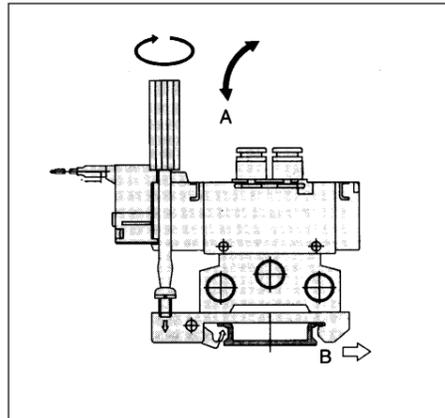
Valve Mounting

After confirming the gasket is correctly placed under the valve, tighten the mounting screws to the torque as shown in the table below.

Model	Suitable tightening torque
VQZ100/VQZ1000	0.18 to 0.25Nm(1.8 to 2.5kgfcm)
VQZ200/VQZ2000	0.25 to 0.35Nm(2.5 to 3.5kgfcm)
VQZ300/VQZ3000	0.5 to 0.7Nm(5 to 7kgfcm)

**Fig 14****DIN rail removing/mounting (Fig 15)****To remove manifold from DIN rail:**

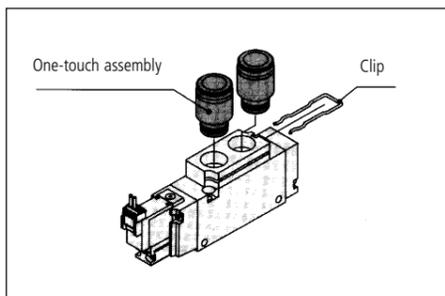
1. Loosen the clamp screw on the 'A' side of both ends of the manifold.
2. Lift the 'A' side of the manifold off the DIN rail and slide it in the direction of the 'B' side.

**Fig 15****Mounting manifold to DIN rail:**

1. Engage the hook of the DIN rail bracket on the 'B' side of the DIN rail.
2. Push side 'A' onto the DIN rail and tighten the clamp screw. (Tightening torque of 0.3 to 0.4 N-m (3 to 4 kgf/cm))

Changing the one-touch fittings (Fig 16).

The built in fittings can be changed easily. Simply remove the valve and take out the fitting clip underneath. Remove the desired fitting and replace. Finally, replace the fitting clip and replace the valve.

**Fig 16****Environment****WARNING**

1. Do not use in environments where the valve is in direct contact with corrosive gasses, chemicals, salt water, water or steam.
2. Do not use in an explosive atmosphere.
3. Do not use in an environment where the valve may be subjected to heavy vibration an/or shock.
4. The valve should not be exposed to sunlight for prolonged periods of time. If so, the use of a protective cover is strongly recommended.
5. When valve is mounted in a control panel or is energised for long periods of time, make sure the ambient temperature is within the specified range.

When you enquire about the product, please contact the following

SMC Corporation:

ENGLAND	Phone 01908-563888	TURKEY	Phone 212-2211512
ITALY	Phone 02-92711	GERMANY	Phone 6103-402-0
HOLLAND	Phone 020-5318888	FRANCE	Phone 01-64-76-10-00
SWITZERLAND	Phone 052-34-0022	SWEDEN	Phone 08-603 07 00
SPAIN	Phone 945-184100	AUSTRIA	Phone 02262-62-280
	Phone 902-255255	IRELAND	Phone 01-4501822
GREECE	Phone 01-3426076	DENMARK	Phone 70 25 29 00
FINLAND	Phone 09-68 10 21	NORWAY	Phone 67-12 90 20
BELGIUM	Phone 03-3551464	POLAND	Phone 48-22-6131847