



Installation and Maintenance Manual

Series VQD1000 Solenoid Valve (Direct Operated)

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

This manual should be read in conjunction with the current Catalogue (contact SMC for details)

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.

Standard Specifications

Item	Type	Standard type (2W)	High flow type (4W, Power saving type)
Valve specification	Valve structure	4 port direct operated poppet valve	
	Fluid	Air, Inert gas	
	Max. operating pressure	0.7MPa (7.1 kgf/cm ²)	
	Min. operating pressure/Vacuum	0MPa/10 Torr	
	Effective area (Cv factor)	0.9mm ² (Cv 0.05)	1.5mm ² (Cv 0.08)
	Response time	ON: 4ms, OFF: 2ms	
	Ambient and fluid temperature	-10 to 50°C	
	Lubrication	Not required	
	Manual override	Non-locking push type	
	Shock resistance/Vibration resistance	150/30m/s ²	
Electrical specification	Mounting orientation	Free	
	Enclosure	IP40	
	Weight	34g (Without sub-plate)	
	Coil rated voltage	DC	24V, 12V
	Allowable voltage fluctuation	±10% of rated voltage	
	Type of coil insulation	Class B	
	Power consumption	DC	2W 4W (Power saving) (Inrush: 4W, Holding: 2W)
	Electrical entry	L type plug connector, M type plug connector (With light and surge suppressor)	

Note 1: Subject to JISB8375-1981. Value is with light and surge suppressor (subject to clean air). Dispersion accuracy of ±1ms.
Note 2: Operating the valve at low temperatures can cause condensate to form, therefore dry air must be used.

Note 3: Shock resistance: No malfunction from test using drop impact tester, to axis and right angle direction of main valve and armature, each one time when energized and de-energized.

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 energized and de-energized.

Fig 2

Component parts

No.	Part name	Material	Note
1	Solenoid coil assembly	—	—
2	Sub-plate	Aluminum	VQD1000-S-M5
3	Body	ZDC	—
4	Spool valve	Aluminum	—
5	Poppet	NBR	—
6	Guide ring	Resin	—
7	Return spring	Stainless steel	—
8	Manual override	Aluminum	—
9	Gasket	NBR	VQD1000-9-1
10	Round head screw	Steel	AXT632-7-13 (M1.7 x 18)

Note: Body cannot be disassembled.

Fig 3

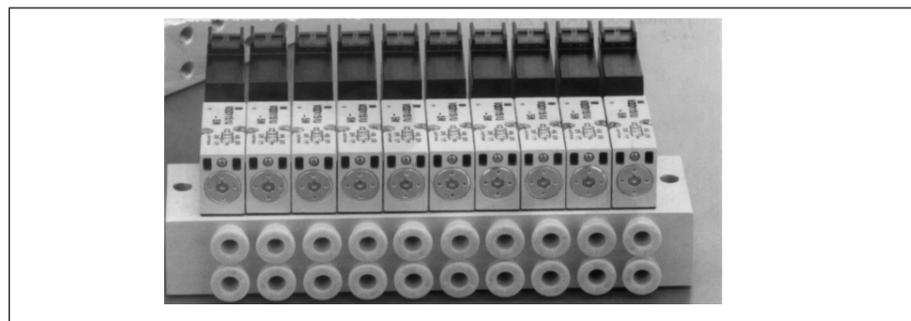


Fig 1

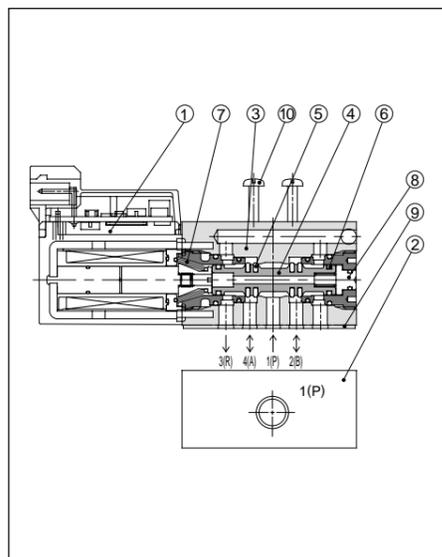


Fig 3

Symbol

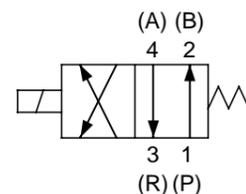


Fig 4

Installation of valve onto manifold/sub base (Fig 3)

CAUTION Note: Ensure all air and electrical supplies are isolated before attempting to work on the equipment.

1. Ensure gasket ⑨ is correctly fitted.
2. Offer valve up to manifold-subplate ②.
3. Tighten the two mounting screws ⑩ to the torque show below (Fig 4).

Clamping torque (mounting screws)
0.18 to 0.25N-m (1.8-2.5 kgf-cm)

Fig 11

4. Electrically re-connect the valve (see below).
5. Re-connect air and electrical supplies and test valve.

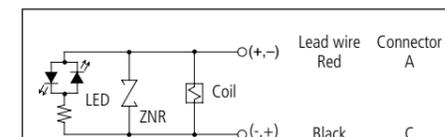
Removal of valve from manifold/sub base (Fig 3)

1. Ensure air and electrical supplies are isolated.
2. Exhaust residual pressure.
3. Disconnect plug connector (Fig 6).
4. Loosen and remove two retaining screws ⑩.
5. Remove valve from base ②.
6. Retain gasket ⑨.

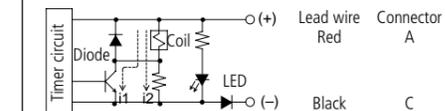
Wiring specification (Fig 7)

CAUTION

Standard: 2W specification



High flow: 4W specification (Power saving type)



i1: Inrush current i2: Holding current

For the 4W specification (power saving) type power consumption at holding is reduced with the above circuit. Refer to the power wave form below

<Power wave form> (at 24VDC of rated voltage)

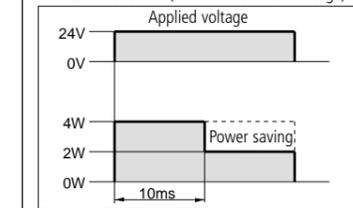


Fig 7

CAUTION

Voltage leakage (Fig 8)

When connecting a C-R (surge voltage) element in parallel with a switching element leakage current will flow through the C-R element, increasing the leakage voltage. Ensure that the leakage voltage, across the coil, is as follows:
DC coil: 2% or less of rated voltage.

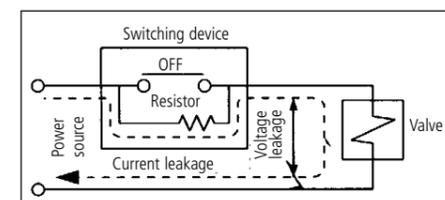


Fig 8

Blanking plate assembly (Fig 9 and 10)

Fitting blanking plug

1. Place gasket ① into position, on station to be blanked.
2. Fit blanking plate ②.
3. Fit the two screws ③.
4. Tighten to torque figures shown in Fig 11.

Removal of blanking plug

1. Isolate air and electrical supplies.
2. Exhaust residual pressure.
3. Loosen and remove the two retaining screws ③.
4. Remove blanking plate ②.
5. Retain gasket ①.

Fitting installation

When installing fittings follow the torque figures given below.

Thread	Appropriate torque N-m (kgf-cm)
M5	1.5 to 2 (15 to 20)
Rc(Pt)1/8	7 to 9 (70 to 90)

* Installing M5 fittings
After tightening fittings by hand, tighten an additional 1/6 rotation with the proper tool. (If the fitting has gaskets, tighten an additional 1/2 rotation.)

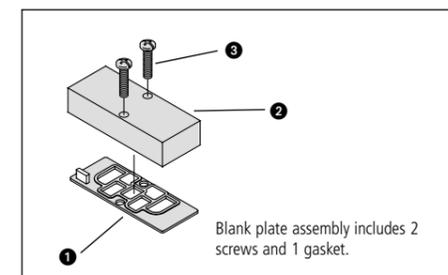


Fig 9

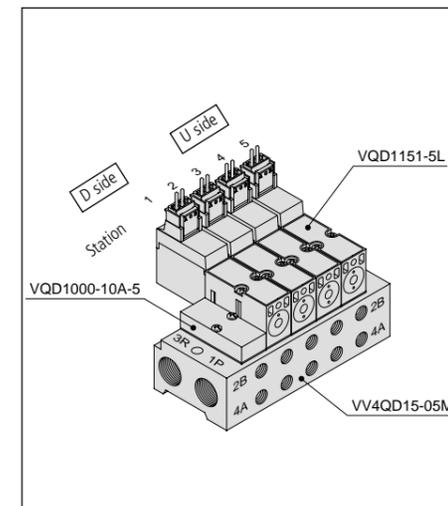


Fig 10

How to Use the Valve for Vacuum Applications (When used as a 3 port valve)

CAUTION

VQD1151/W Example of application (Fig 11)

To use a VQD1151/W type valve for vacuum applications. Connect the vacuum source to the 3(R) port.
*Air pressure cannot be applied to the 3(R) port.
When used as a 3 port valve, conversion from N.O. to N.C. and vice versa is possible by plugging either port 4(A) or 2(B).

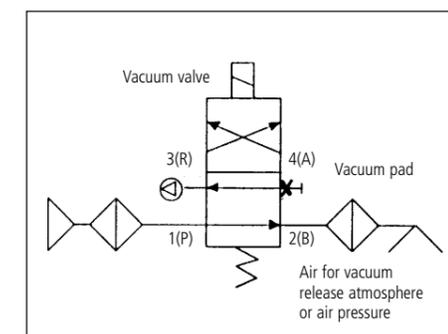


Fig 11

When you enquire about the product, please contact the following

SMC Corporation:

ENGLAND	Phone 01908-563888	TURKEY	Phone 212-2211512
ITALY	Phone 02-927111	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 87 38 87 00
FINLAND	Phone 09-68 10 21	NORWAY	Phone 67-12 90 20
BELGIUM	Phone 03-3551464	POLAND	Phone 48-22-6131847