

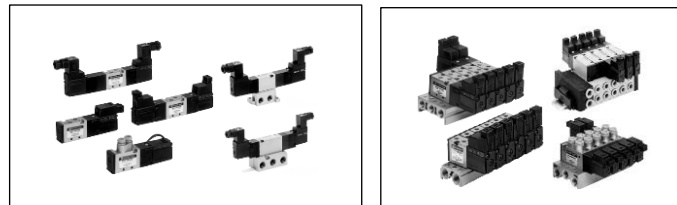


ORIGINAL INSTRUCTIONS

# Instruction Manual

## 3 Port and 4/5 Port Solenoid Valve

### Series VZ100/200/300/400/500 and VZ1000/2000/3000/4000/5000



The intended use of this valve is to control the movement of an actuator.

### 1 Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of "Caution," "Warning" or "Danger."

They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)<sup>(1)</sup>, and other safety regulations.

- <sup>(1)</sup> ISO 4414: Pneumatic fluid power - General rules relating to systems.
- ISO 4413: Hydraulic fluid power - General rules relating to systems.
- IEC 60204-1: Safety of machinery - Electrical equipment of machines. (Part 1: General requirements)
- ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots.

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

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

#### Warning

- Always ensure compliance with relevant safety laws and standards.
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.
- If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

#### Caution

- The product is provided for use in manufacturing industries only. Do not use in residential premises.

### 2 Specifications

#### 2.1 Common valve specifications

Fluid	Air, inert gas	
Ambient and fluid temperature [°C]	-10 to 50 (no freezing)	
Flow characteristics (including manifold)	Contact SMC	
Duty cycle		
Minimum operating frequency	1 cycle / 30 days	
Lubrication	Not required	
Impact/Vibration resistance [m/s <sup>2</sup> ] <sup>Note 1)</sup>	VZ100/300/500/1000/3000/5000	300 / 50
	VZ200/400/2000/4000	150 / 50
Manual override	VZ100/1000	Non-locking push
	VZ300/500/3000/5000 / 200/400/2000/4000	Non-locking push type, locking type (tool required), locking type (manual)
Enclosure (based on IEC60529)	Grommet, plug connector	IP40
	DIN terminal	IP65

### 2 Specification - continued

Mounting orientation	Rubber seal (VZ100/300/500/1000/3000/5000)	Unrestricted
	Metal seal (VZ200/400/2000/4000)	
Pilot exhaust <sup>Note 2)</sup>	VZ1000	Spool to be horizontal Common exhaust (pilot and main valve)
	VZ300/500/3000/5000	Individual pilot exhaust, common exhaust (pilot and main valve)
	VZ200/400/2000/4000	Individual pilot exhaust (pilot and main valve)

Table 1.

Note 1) Impact resistance: No malfunction from test using drop impact tester, to axis and right angle directions of main valve and armature, each one time when energized and de-energized. (Values quoted are for a new valve).  
Vibration resistance: No malfunction from test with 45 to 2000Hz 1 sweep, to axis and right angle directions of main valve and armature, each one time when energized and de-energized. (Values quoted are for a new valve).

Note 2) VZ100 is direct operated, so there is no pilot exhaust.

#### 2.2 Specific valve specifications

##### 2.2.1 VZ1000/3000/5000 (Rubber seal)

Model		VZ1000	VZ3000	VZ5000
Operating pressure range [MPa]	2 position single	0.15 to 0.7		
	2 position double	0.1 to 0.7		
	3 position	0.15 to 0.7		
Response time (0.5 MPa) [ms] <sup>Note 1, 2)</sup>	2 position single / double	≤ 15	≤ 20	
	3 position	-	≤ 35	≤ 50
Maximum operating frequency [Hz] <sup>Note 2)</sup>	2 position single / double	15	10	
	3 position	-	3	
Weight		Contact SMC		

Table 2.

Note 1) According to dynamic performance test of JIS B8375-1981. (Coil temperature 20°C, rated voltage, without surge voltage suppressor)

Note 2) 2 position double not available for VZ1000.

##### 2.2.2 VZ100/300/500 (Rubber seal)

Model		VZ100	VZ300/500
Operating pressure range [MPa] <sup>Note 1)</sup>	VZ110 (N.C.): 0 to 0.7	0.15 to 0.7	
	VZ120 (N.O.): 0 to 0.5	-	
External pilot operating pressure range [MPa]	Main pressure	-100kPa to 0.7	
	Pilot pressure	0.15 to 0.7	
Response time [ms] <sup>Note 2)</sup>		≤ 15	≤ 20
Maximum operating frequency [Hz]		15	10
Weight [g] <sup>Note 3)</sup>	VZ110 / VZ120	70	
	VZ312 / VZ322	75	
	VZ314 / VZ324	105 (without sub-plate: 75)	
	VZ512 / VZ522	110	
	VZ514 / VZ524	160 (without sub-plate: 110)	

Table 3.

Note 1) See section 2.4 for vacuum specifications.

Note 2) According to dynamic performance test of JIS B8375-1981. (Coil temperature 20°C, rated voltage, without surge voltage suppressor)

Note 3) Values for grommet.

##### 2.2.3 VZ200/400 (Metal seal)

Model		VZ200	VZ400
Operating pressure range [MPa]		0.1 to 1	0.15 to 1
Response time [ms] <sup>Note 1)</sup>		17	21
Maximum operating frequency [Hz]		20	15
Weight [g] <sup>Note 2)</sup>	Body ported	85	125
	Base mounted	155	250
	Port size	M5	Rc1/8
Port size	Body ported	M5	Rc1/8
	Base mounted	Rc1/8	Rc1/8, Rc1/4

Table 4.

Note 1) According to dynamic performance test of JIS B8375-1981. (Coil temperature 20°C, rated voltage, without surge voltage suppressor)

Note 2) Values for grommet (Sub-plate weight: 0.03 kg (VZ200), 0.055 kg (VZ400)).

### 2 Specification - continued

#### 2.2.4 VZ2000/4000 (Metal seal)

Model		VZ2000		VZ4000	
Type	Body ported	Base mounted (without sub-plate)	Body ported	Base mounted (without sub-plate)	0.1
		0.1		0.15	
Minimum operating pressure range [MPa]	2 position single	0.1		0.15	
	2 position double, 3 position	0.1		0.1	
	3 position	0.1		0.1	
Maximum operating pressure range [MPa]		1			
Response time [ms] <sup>Note 1)</sup>	2 position single	17	21		
	2 position double	13	16		
	3 position	22	26		
Maximum operating frequency [Hz]	2 position single	20		15	
	2 position double	20		15	
	3 position	10		8	
Port size	M5	Rc1/8	Rc1/8	Rc1/8	Rc1/4
	Rc1/8	Rc1/8	Rc1/8	Rc1/8	Rc1/4
Weight [g] <sup>Note 2)</sup>	2 position single	95	140	145	220
	2 position double	150	200	225	290
	3 position	180	230	270	345

Table 5.

Note 1) According to dynamic performance test of JIS B8375-1981. (Coil temperature 20°C, rated voltage, without surge voltage suppressor)

Note 2) Values for grommet (Sub-plate weight: 0.045 kg (VZ2000), 0.07 kg (VZ4000)).

#### 2.3 Vacuum specifications (only for VZ100/300/500)

Specifications different from standard:

Model	Operating pressure range [MPa]	
	1 (P) port	3 (R) port
VZ110 (N.C.)	-27 kPa to 0.6	-100 kPa to 0
VZ120 (N.O.)	-100 kPa to 0	-100 kPa to 0.4
VZ3##R (N.C. / N.O.)	-100kPa to 0.7	
VZ5##R (N.C. / N.O.)	-100kPa to 0.7	

Table 6.

#### 2.4 Solenoid specifications

Electrical entry	Grommet (G, H), plug connector (L, M), DIN terminal (D)		
Coil rated voltage	[VAC] (50 / 60 Hz)	24, 48, 100, 110, 200, 220	
	[VDC]	6, 12, 24, 48	
Allowable voltage fluctuation	-15 to 10% of rated voltage		
Power consumption [W] (current [mA])	1.8 (with light: 2.1)		
	(24 VDC: 75 (with light: 87.5))		
Apparent power [VA] (current [mA])	Inrush	50 Hz	4.5 (100 VAC:45, 200 VAC: 22.5)
		60 Hz	4.2 (100 VAC:42, 200 VAC: 21)
	Holding	50 Hz	3.5 (100 VAC:35, 200 VAC: 17.5)
		60 Hz	3 (100 VAC:30, 200 VAC: 15)
Surge voltage suppressor	DC	Diode	
	AC	Varistor (ZNR)	
Indicator light <sup>Note)</sup>	DC	LED (Red)	
	AC	Neon light	

Table 7.

Note) Not available for Grommet type.

#### 2.5 Manifold specifications

##### 2.5.1 VZ1000

Model	Type 20	
Manifold type	Single base / base mounted	
P (SUP) / R (EXH)	Common SUP. / EXH.	
Valve stations	2 to 20	
Port size	1(P)/3(R)	1/8
	2(A)/4(B)	M5

Table 8.

##### 2.5.2 VZ3000

Model	Type 20	Type 40	Type 41	Type 42	Type 43	Type 45
Manifold type	Single base / base mounted					Stacking non plugin
P(SUP)/R(EXH)	Common SUP. / EXH.					
Valve stations	2 to 20					
Port size	1(P)/3(R)	1/8	1/4	1/8	C8	
	2(A)/4(B)	M5, C4, C6	M5	1/8, C6	C4	C4, C6

Table 9.

### 2 Specification - continued

#### 2.5.3 VZ5000

Model	Type 20	Type 21	Type 40	Type 41	Type 42	Type 45
P(SUP)/R(EXH)	Common SUP. / EXH.					Stacking non plugin
Valve stations	2 to 15	2 to 20				
Port size	1(P)/3(R)	1/8	1/4		C10	
	2(A)/4(B)	1/8, C6, C8	1/8	C6, C8		

Table 10.

#### 2.5.4 VZ100

Model	VV3Z1-01-#1	VV4Z1-20-#1
Manifold type	Single base / base mounted	
P(SUP)/R(EXH)	Common SUP. / EXH.	
Valve stations	2 to 20 stations	
Port size	1(P)/3(R)	M5 x 0.8
	2(A)	Rc1/8
X port	M5 x 0.8	

Table 11.

#### 2.5.5 VZ300

Model	Internal pilot	20-#1	40-#2	40-#1
External pilot	21R-#1	40R-#2	40R-#1	
Manifold type	Single base / base mounted			
P(SUP)/R(EXH)	Common SUP. / EXH.			
Valve stations	2 to 20 stations			
Port size	1(P)/3(R)	Rc1/8		
	2(A)	M5 x 0.8	M5 x 0.8, 1/8	M5 x 0.8, Rc1/8, C4, C6
	X port	M5 x 0.8		

Table 12.

#### 2.5.6 VZ500

Model	Internal pilot	20-#1	21-#1	40-#2	41-#2	41-#1
External pilot	-	21R-#1	-	41R-#2	41R-#1	
Manifold type	Single base / base mounted					
P(SUP) / R(EXH)	Common SUP. / EXH.					
Valve stations	2 to 20 stations					
Port size	1(P)/3(R)	Rc1/8	Rc1/4	Rc1/8	Rc1/4	
	2(A)	Rc1/8			C6, C8	
	X port	-	M5	-	M5	

Table 13.

#### 2.5.7 VZ200

Model	VV3Z2-20	VV3Z2-30	VV3Z2-50
Manifold type	Common base / base mounted		
P(SUP) / R(EXH)	Common SUP. / EXH.		
Valve stations	2 to 20 stations		
Pilot Exhaust	Individual exhaust	Common exhaust	
Port size	1(P)/3(R)	Rc1/4	
	2(A)/4(B)	M5 x 0.8, Ø4	M5 x 0.8, Rc1/8, Ø4
	PE port	M5 x 0.8	

Table 14.

#### 2.5.8 VZ400

Model	VV3Z4-20	VV3Z4-30	VV3Z4-50
Manifold type	Common base / base mounted		
P(SUP) / R(EXH)	Common SUP. / EXH.		
Valve stations	2 to 20 stations		
Pilot Exhaust	Individual exhaust	Common exhaust	
Model	VV3Z4-20	VV3Z4-30	VV3Z4-50
Port size	1(P)/3(R)	Rc1/4	
	2(A)/4(B)	Rc1/8	Rc1/8, Rc1/4
	PE port	M5 x 0.8	

Table 15.

#### 2.5.9 VZ2000

Model	VV5Z2-20	VV5Z2-30	VV5Z2-50
Manifold type	Common base / base mounted		
P(SUP) / R(EXH)	Common SUP. / EXH.		
Valve stations	2 to 20 stations		
Pilot Exhaust	Individual exhaust	Common exhaust	
Port size	1(P)/3(R)	Rc1/8	
	2(A)/4(B)	M5 x 0.8	
	PE port	M5 x 0.8	

Table 16.

#### 2.5.10 VZ4000

Model	VV5Z4-20	VV5Z4-30	VV5Z4-50
Manifold type	Common base / base mounted		
P(SUP)/R(EXH)	Common SUP. / EXH.		
Valve stations	2 to 20 stations		
Pilot Exhaust	Individual exhaust	Common exhaust	

## 2 Specification - continued

Model	VV5Z4-20	VV5Z4-30	VV5Z4-50
Port size	1(P)/3(R) 2(A)/4(B) PE port	Rc1/8  Rc1/4	Rc1/8, Rc1/4  Rc1/4

Table 17.

### 2.6 Pneumatic symbol

Model	2 position single	2 position double(Rubber seal)	2 position double(Metal seal)
VZ1000			
VZ2000/ 3000/4000 /5000			
VZ2000/ 3000/4000/ 5000	3 position closed center	3 position exhaust center	3 position pressure center

Table 18.

Model		N.C	N.O.
VZ100			
VZ300 / VZ500	Internal pilot		

VZ300 / VZ500	External pilot		
VZ200 / 400			

Table 19.

### 2.7 Indicator light

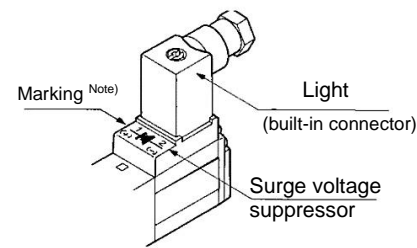


Figure 1.

Note) Marking:



Figure 2.

### 2.8 Special products

#### Warning

Special products (-X) might have specifications different from those shown in this section. Contact SMC for specific drawings.

## 3 Installation

### 3.1 Installation

#### Warning

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

### 3.2 Environment

#### Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications.

### 3.3 Piping

#### Caution

- Before connecting 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 thread exposed on the end of the pipe/fitting.
- Tighten fittings to the specified tightening torque.

Connection thread size (Rc, G, NPTF)	Tightening torque [N·m]
M5	1 to 1.5
1/8	3 to 5
1/4	8 to 12
3/4	28 to 30

Table 20.

### 3.4 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, refer to catalogue for details.

### 3.5 Air supply

#### Warning

- 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.

#### Caution

- Install an air filter upstream of the valve. Select an air filter with a filtration size of 5 μm or smaller.

### 3.6 Manual override

#### Warning

- Regardless of an electric signal for the valve, the manual override is used for switching the main valve. Since connected equipment will operate when the manual override is activated, confirm that conditions are safe prior to activation.
- Locked manual overrides might prevent the valve responding to being electrically de-energised or cause unexpected movement in the equipment.

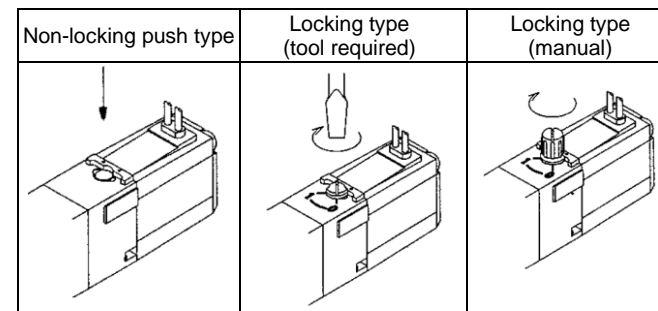


Figure 3.

Note) For locking type, apply torque of 0.2 N·m or less.

### 3.7 Mounting

#### Caution

- Ensure gaskets are in good condition, not deformed and are dust and debris free.

## 3 Installation - continued

- When mounting valves ensure gaskets are present, aligned and securely in place and tighten screws to torque levels as per table below.

Series	Mounting thread	Tightening torque [N·m]
VZ100/200/300/1000/2000/3000	M2.5	0.45
VZ400/500/4000/5000	M3	0.8

Table 21.

### 3.7.1 Mixed mounting of 3 port and 5 port valves (Rubber seal only)

#### 3.7.1.1 VZ1000

A VZ110 can be mounted on the VZ1000 series manifold base. The mounting direction is the same as the VZ1120.

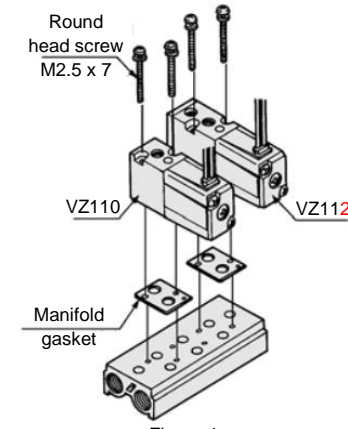


Figure 4.

#### 3.7.1.2 VZ3000 / VZ5000

- VZ300, VZ500 can be mounted on the VZ3000, VZ5000 series manifold base by using an adapter plate.
- The mounting direction is shown in the diagram below. Mount the solenoid so that it will be on the same side as the single solenoid of the VZ3000 / VZ5000 series.
- For type 45 manifolds, A port of 3 port valve should be B port of manifold base.

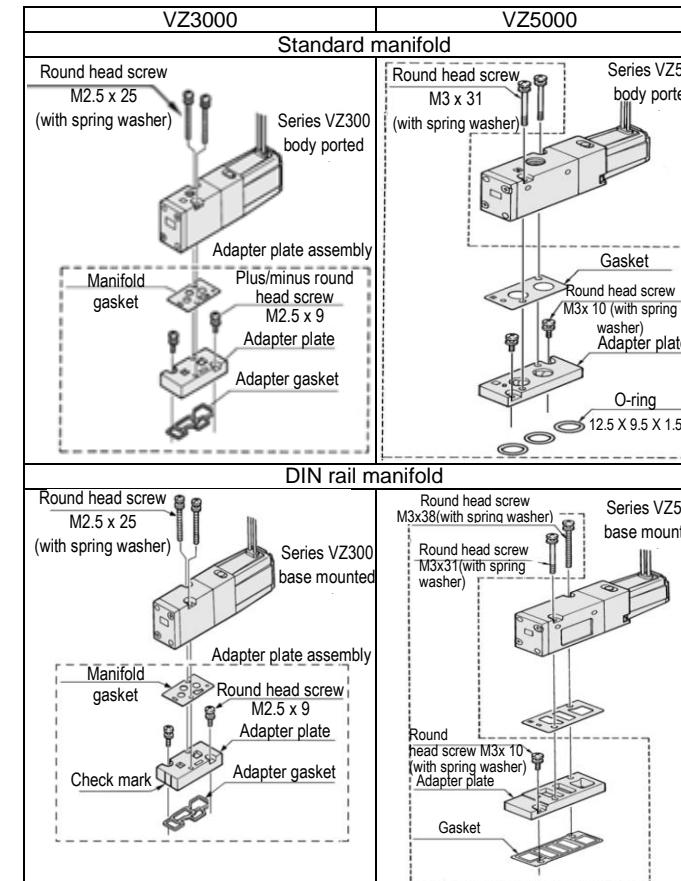


Table 22.

## 3 Installation - continued

### 3.8 Electrical circuits

#### Caution

Surge suppression should be specified by using the appropriate part number. If a valve type without suppression is used, suppression must be provided by the host controller as close as possible to the valve.

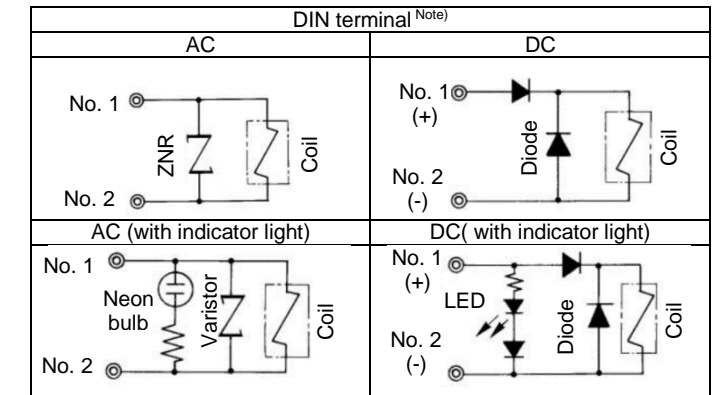
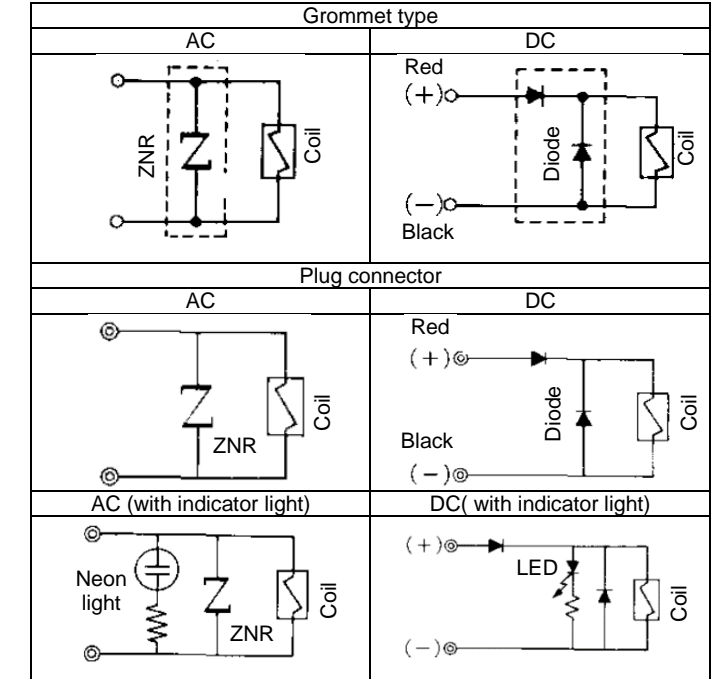


Table 23.

Note) In the case of DC wiring, connect terminal No. 1 of the connector to the positive [+ ] side, and terminal No. 2 to the negative [- ] side. (Refer to the marks on the terminal board).

### 3.9 Residual voltage

#### Caution

- If a Zener diode or varistor voltage suppressor is used, the suppressor arrests the back EMF voltage from the coil to a level in proportion to the rated voltage.
- Ensure the transient voltage is within the specification of the host controller.
- Contact SMC for the varistor residual voltage.
- In the case of a diode, the residual voltage is approximately 1 V.
- Valve response time is dependent on surge suppression method selected.

### 3.10 Countermeasure for surge voltage

#### Caution

- At times of sudden interruption of the power supply, the energy stored in a large inductive device may cause non-polar type valves in a de-energised state to switch.

### 3 Installation - continued

- When installing a breaker circuit to isolate the power, consider a valve with polarity (with polarity protection diode), or install a surge absorption diode across the output of the breaker.

#### 3.11 How to use DIN connector

##### Caution

- Insert or take out the plug connector vertically, never at an angle.
- In the case of indicator light, avoid damaging the light with lead wire.

##### 3.11.1 Connection

- Loosen set screw and pull-out connector from the terminal block of solenoid.
- Pull out screw and insert screwdriver to the slit area near the bottom of terminal block to separate block and housing.
- Loosen terminal screw of terminal block, place bare end of lead wire into terminal in accordance with wiring method and affix it securely with the terminal screw.
- Tighten ground nut to secure the wire.

##### 3.11.2 Change of electrical entry

After separating terminal block and housing, mount housing at any position (total 4 directions, per 90 degrees), therefore changing electrical entry.

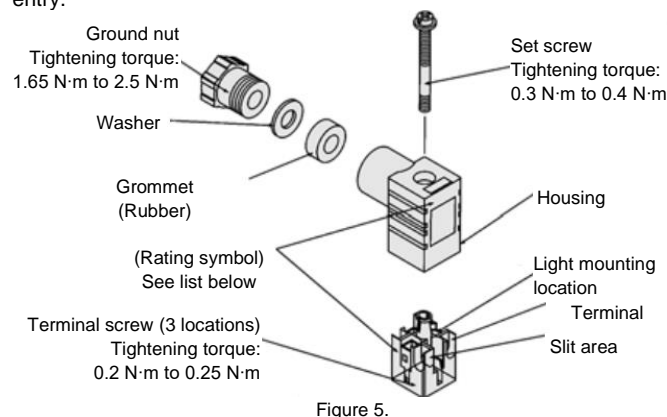


Figure 5.

Note) Applicable cable diameter  $\varnothing 3.5$  mm to  $\varnothing 7$  mm (Reference  $0.5$  mm<sup>2</sup>, 2 core

and 3 core wires equivalent to JISC3306).

Rated voltage	Rating symbol	Part no.
With light	-	DXT170-176-1
Without light		
100 VAC	100V	DXT170-176-2-01
200 VAC	200V	DXT170-176-2-02
110 VAC	110V	DXT170-176-2-03
220 VAC	220V	DXT170-176-2-04
240 VAC	240V	DXT170-176-2-07
6 VDC	6VD	DXT170-176-3-51
12 VDC	12VD	DXT170-176-3-06
24 VDC	24VD	DXT170-176-3-05
48 VDC	48VD	DXT170-176-3-53

Table 24. Connector part no.

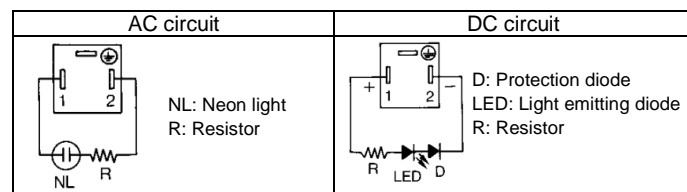


Table 25. Connector with light circuit

#### 3.12 How to use plug connector (not available for VZ1000/3000/5000)

In applications where the supply voltage is DC, correctly connect the lead wires to + (positive) and - (negative) indications on the connector or to the markings. For those on which the lead wires have been pre-wired, the positive side is red and negative side is black.

##### 3.12.1 Attaching and detaching connectors

- To attach a connector, hold the lever and connector unit between your fingers and insert straight onto the pins of the solenoid valve so that the lever's pawl is pushed into the groove and locks.
- To detach a connector, remove the pawl from the groove by pushing the lever downward with your thumb, and pull the connector straight out.

### 3 Installation - continued

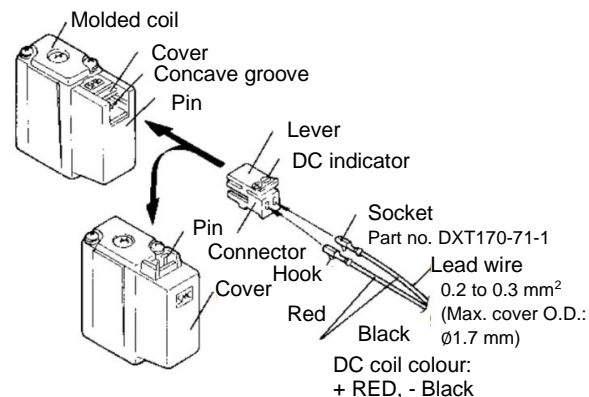


Figure 6

##### 3.12.2 Crimping of lead wires and sockets

Peel 3.2 to 3.7 mm of the tip of lead wire, enter the core wires neatly into a socket and crimp it with a special crimp tool. Be careful so that the cover of lead wire does not enter into the crimping part. (Crimping tool part no.: DXT 170-75-1)

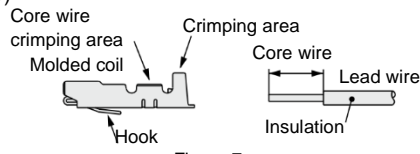


Figure 7.

##### 3.12.3 Attaching and detaching lead wires with sockets

###### 3.12.3.1 Attaching

Insert the sockets into the square holes of the connector (with + and - indication) and continue to push the sockets all the way in until the lock by hooking into the seats in the connector. (When they are pushed in, their hooks open and they are locked automatically.) Then confirm that they are locked by pulling lightly on the lead wires.

###### 3.12.3.2 Detaching

To detach a socket from a connector, pull out the lead wire while pressing

the socket's hook with a stick having a thin tip (approx. 1 mm). If the socket will be used again, first spread the hook outward.

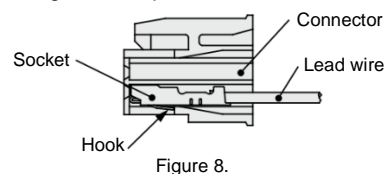


Figure 8.

##### 3.12.4 Connector assembly with protective cover

- Connector assembly with protective cover enhances dust protection. Effective to prevent short circuit accidents due to penetration of foreign matter into the connector section.
- The material of cover is chloroprene rubber for electricity which is excellent in weathering and electrical insulating properties. But don't splash with cutting oil.
- Simple and unencumbered appearance by adopting round-shaped cord.

#### 3.13 Extended period of continuous energization

##### Warning

If a valve will be continuously energized for an extended period of time, the temperature of the valve will increase due to the heat generated by the coil assembly. This will likely adversely affect the performance of the valve and any nearby peripheral equipment. Therefore, if the valve is to be energized for periods of longer than 30 minutes at a time or if during the hours of operation the energized period per day is longer than the de-energized period, we advise using a 0.4 W or lower valves, such as the SY series, or a valve with power-saving circuit.

##### 3.14 Effect of back pressure when using a manifold

##### Warning

- Use caution when valves are used on a manifold because an actuator may malfunction due to back-pressure.
- Special caution must be taken when using 3 position exhaust centre valve or when driving a single acting cylinder. To prevent a malfunction, implement counter measures such as using a single EXH spacer assembly or an individual exhaust manifold.

### 3 Installation - continued

#### 3.15 Use as a 3 port valve (Rubber seal only)

##### Caution

VZ1000/3000/5000 are possible for use with normally closed (N.C.) or normally open (N.O.) 3 port valve by closing one of the cylinder ports (A, B) with a plug. However, exhaust port (R) is always open. It is convenient when a double solenoid 3 port valve is needed.

Plug position	Actuation	B port	A port
		N.C.	N.O.
Solenoid	Single		
	Double		

Table 26.

#### 4 How to Order

Refer to drawings for 'How to Order'.

#### 5 Outline Dimensions

Refer to drawings for outline dimensions.

#### 6 Maintenance

##### 6.1 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.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.

##### 6.2 Mounting

##### Caution

Refer to section 3.7 for valve mounting.

##### 6.3 Maintainable parts

##### Caution

Contact SMC for maintainable parts.

#### 7 Limitations of Use

##### 7.1 Limited warranty and disclaimer/compliance requirements

Refer to Handling Precautions for SMC Products.

##### Warning

##### 7.2 Effect of energy loss on valve switching

- The use of 2-position single valves with air returned or air/spring returned spools has to be carefully considered.
- The return of the valve spool into the de-energized position depends on the pilot pressure (for both internal and external pilot types). If the pilot pressure or main operating pressure drops below the specified pressure range, the position of the spool cannot be defined.
- The design of the system must take into account such behaviour.
- Additional measures might be necessary. For example, the installation of an additional air tank to maintain the pilot pressure.

### 7 Limitations of Use - continued

##### 7.3 Cannot be used as an emergency shut-off valve

This product is not designed for safety applications such as an emergency shut-off valve. If the valves are used in this type of system, other reliable safety assurance measures should be adopted.

##### 7.4 Holding of pressure (including vacuum)

Since valves are subject to air leakage, they cannot be used for applications such as holding pressure (including vacuum) in a system.

##### 7.5 Intermediate stopping

Refer to Handling Precautions for 3/4/5 port Solenoid Valves.

##### Caution

##### 7.6 Leakage voltage

Ensure that any leakage voltage caused by the leakage current when the switching element is OFF is  $\leq 2\%$  for DC coils of the rated voltage across the valve or  $\leq 15\%$  for AC coils.

##### 7.7 Low temperature operation

Unless otherwise indicated in the specifications for each valve, operation is possible to  $-10^{\circ}\text{C}$ , but appropriate measures should be taken to avoid solidification or freezing of drainage and moisture, etc.

##### 7.8 Momentary energization

If a double solenoid valve is operated with momentary energization, it should be energized for at least 0.1 second. However, depending on the secondary load conditions, it should be energized until the cylinder reaches the stroke end position, as there is a possibility of malfunction otherwise.

#### 8 Product Disposal

This product shall not be disposed of as municipal waste. Check your local regulations and guidelines to dispose this product correctly, in order to reduce the impact on human health and the environment.

#### 9 Contacts

Refer to [www.smcworld.com](https://www.smcworld.com) or [www.smc.eu](https://www.smc.eu) for your local distributor/importer.

## SMC Corporation

URL : <https://www.smcworld.com> (Global) <https://www.smc.eu> (Europe)  
SMC Corporation, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, Japan  
Specifications are subject to change without prior notice from the manufacturer.  
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Template DKP50047-F-085M