



Installation and Maintenance Manual

Series VDW 10/20/30: 2 port, VDW200/300: 3 port Compact Direct Operated Solenoid Valve for Water and Air



Read this manual before using this product.

- The information within this document is to be used by pneumatically trained personnel only.
- For future reference, please keep manual in a safe place.
- This manual should be read in conjunction with the current catalogue.

1 SAFETY

1.1 General recommendation

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 (Note1), JIS B 8370 (Note2) and other safety practices.

Note 1:ISO 4414:Pneumatic fluid power - General rules relating to 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

- 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.
- 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.
- 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.
 - 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 backpressure, i.e. incorporate a soft-start valve).
- Contact SMC if the product is to be used in any of the following conditions:**
 - Conditions and environments beyond the given specifications, or if product is used outdoors.
 - Installations on equipment 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.

CAUTION:

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

1.2 Conformity to standard

This product is certified to and complies with the following standards:

EMC Directive 89/336/EEC	EN61000-6-2 EN55011
Low Voltage Directive 93/68/EEC	DIN VDE 0580

2 INTENDED CONDITIONS OF USE

2.1 Standard specifications VDW 10/20/30

Valve specifications	Valve construction	Direct operated poppet
	Fluid Note 2)	Water (except waste water or agricultural water), Air, Low vacuum
	Withstand pressure Mpa	2.0
	Ambient temperature °C	-10 to 50
	Fluid temperature °C	1 to 50 (with no freezing)
	Environment	Location without corrosive or explosive gases
	Valve leakage cm ³ /min	0 (with water pressure) 1 (with air pressure)
Coil specifications	Mounting orientation	Unrestricted
	Vibration/Impact m/s ² Note 4)	30/150
	Rated voltage	24VDC, 12VDC, 100VAC, 110VAC, 200VAC, 220VAC (50/60Hz)
	Allowable voltage fluctuation %	±10% of rated voltage
	Coil insulation type	Class B
	Enclosure Note 5)	Dust proof (equivalent to IP40)
Power consumption W Note 3)	2.5 (VDW10), 3 (VDW20/30/200/300)	

Valve specifications

Note 1) Consult SMC when used under conditions which may cause condensation on the exterior of the product.

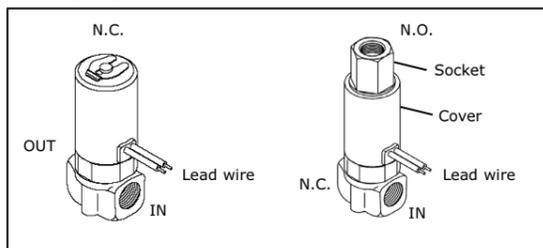
Note 2) When used with pure water, select "L" (stainless steel, FKM) for the material type.

Note 3) Since AC coil specifications include a rectifying device, there is no difference in power consumption for starting and holding. **In case of 110/220VAC, VDW10 is 3W and VDW20/30 is 3.5W.**

Note 4) Vibration resistance ... No malfunction when tested with one sweep of 5 to 200Hz in the axial direction and at a right angle to the armature, in both energized and deenergized.states. Impact resistance ... No malfunction when tested with a drop tester in the axial direction and at a right angle to the armature, one time each in energized and deenergized states.

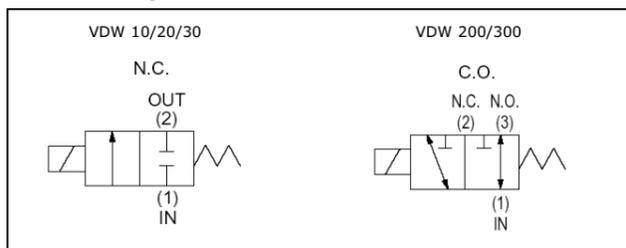
Note 5) Consult SMC regarding drip-proof specifications (equivalent to IP54).

2.2 Piping



When piping to an N.O. port, be sure to perform piping work while holding the socket with a wrench or other tool.

2.3 Circuit Symbols



3 INSTALLATION

WARNING

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

3.1 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.
- 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 strong vibrations and/or shock. Check the product specifications for above ratings.
- Do not mount the product in a location where it is exposed to radiant heat.

3.2 Piping

CAUTION

- Before piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fitting into a port, ensure that sealant material does not enter the port inside. When using seal tape, leave 1.5 to 2 threads exposed on the end of pipe/fitting.

CAUTION

The maximum operating pressure differential differs depending on the flow direction of the fluid. If the pressure differential at each port exceeds the values in the table below, valve leakage may occur.

Model	Orifice size mm	Maximum operating pressure differential Mpa		Operating pressure range Mpa ⁽¹⁾
		Pressure port 1	Pressure port 2 ⁽²⁾	
VDW10	ø1	0.9	0.4	0 to 1.0
	ø1.6	0.4	0.2	
VDW20	ø1.6	0.7	0.2	
	ø2.3	0.4	0.1	
	ø3.2	0.2	0.05	
VDW30	ø2	0.8	0.2	
	ø3	0.4	0.1	
	ø4	0.2	0.05	

3.3 Electrical connection

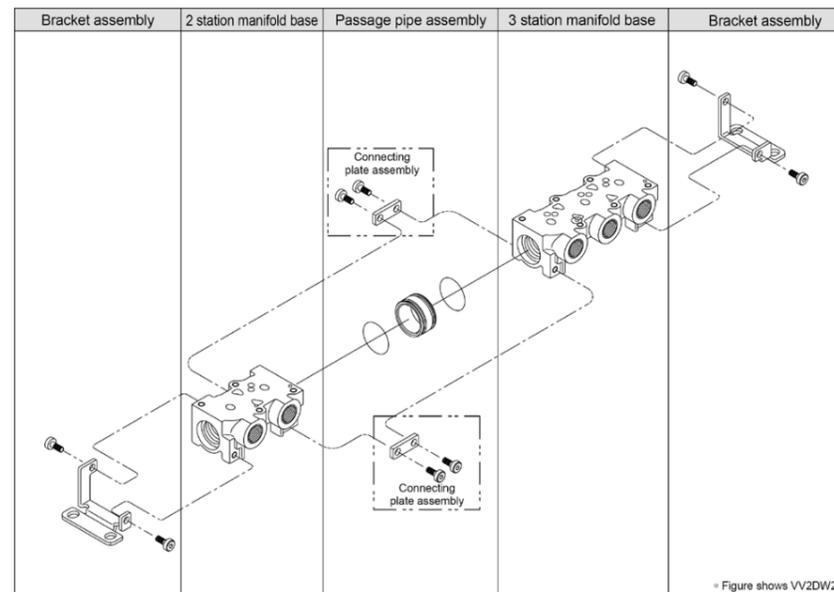
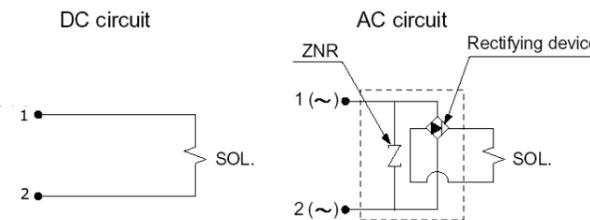
CAUTION:

- When DC power is connected to a solenoid valve equipped with light and/or surge voltage suppressor, check for polarity indications.
- For polarity indications:
 - No diode to protect polarity: if polarity connection is wrong, the diode in the valve or switching device at control equipment or power supply may be damaged.
 - With diode to protect polarity: if polarity connection is wrong, the valve does not switch.

3.4 Wiring

CAUTION:

- As a rule, use electrical wire of 0.5 to 1.25mm² or more. Furthermore, do not allow excessive force to be applied to the lines.
- Use electrical circuits which do not generate chattering in their contacts.
- Use voltage which is within ±10% of the rated voltage, In cases of a DC power supply where emphasis is placed on responsiveness, stay within ±5% of the rated value. The voltage drop is the value in the lead wire section connecting the coil.



Thread	Appropriate tightening torque (Nm)
M5	By hand + 1/6 turn with the wrench (1/4 turn for miniature fittings)
Rc 1/8	7 to 9
Rc 1/4	12 to 14

Model	Orifice size mm	Maximum operating pressure differential Mpa		Operating pressure range Mpa ⁽¹⁾
		Pressure port 1	Pressure port 2,3 ⁽²⁾	
VDW200	ø1	0.9	0.3	0 to 1.0
	ø1.6	0.7	0.1	
VDW300	ø2	0.8	0.2	
	ø3	0.4	0.1	
	ø4	0.2	0.05	

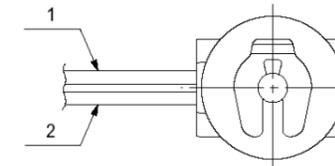
Note1) Indicate the maximum operating pressure differential between ports 2 and 3.

Note2) When applying pressure from port 2, be careful to avoid vibration and impacts etc.

Note3) For low vacuum specifications, the operating pressure range is 1 Torr (1.33 102Pa) to 1.0Mpa.

The grommet is the only available option.

CAUTION



Rated voltage	Lead wire color	
	①	②
DC	Black	Red
100VAC	Blue	Blue
200VAC	Red	Red
Other AC	Gray	Gray

* DC does not have polarity.

3.5 Mounting

WARNING

- If air leakage increases or equipment does not operate properly, stop operation.**
 - After mounting is completed, confirm that it has been done correctly by performing a suitable function test.
- Do not apply external force to the coil section.**
 - When tightening is performed, apply a wrench or other tool to the outside of the piping connection parts.
- Do not warm the coil assembly with a heat insulator, etc.**
 - Use tape and heaters, etc., for freeze prevention on the piping and body only. They can cause the coil to burn out.
- Secure the product except in the case of steel piping and copper fittings.**
- Avoid sources of vibration, or set the arm from the body to the minimum length so that resonance will not occur.**
- Instruction manual**
 - Mount the product after reading the manual carefully and understanding its contents. Also keep the manual where it can be referred to as necessary.
- Painting and coating**
 - Warning and specifications printed or pasted on the product should not be erased, removed or covered up.

3.6 Manifold Mounting

Manifold additions

- Install a passage pipe assembly in between the manifold bases to be added.
- Connect the respective manifold bases with a connecting plate assembly. (Tightening torque: 0.9±0.1N.m)
- Attach brackets to the manifold bases. {When equipped with brackets} (Tightening torque: 0.9±0.1N.m)

4 MAINTENANCE

⚠ WARNING:

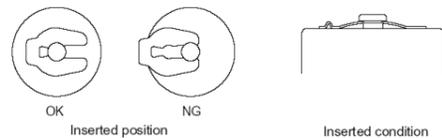
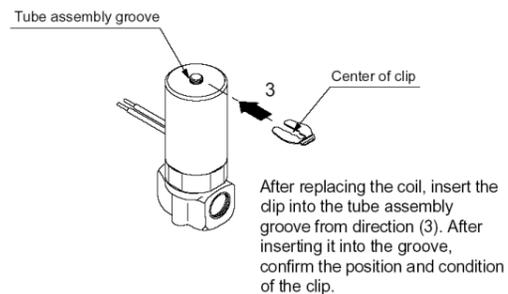
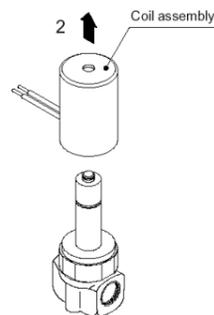
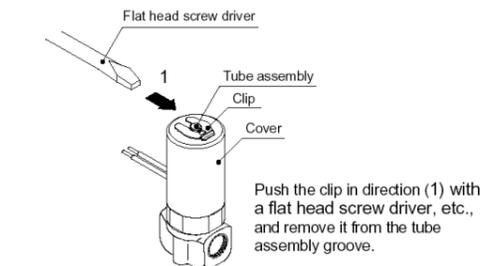
- Not following proper procedures could cause the product to malfunction and could lead to damage to the equipment or machine.
- If handled improperly, compressed air can be dangerous. Assembly, handling and repair of pneumatic system should be performed by qualified personnel only.
- Drain: remove condensate from the filter bowl on a regular basis.
- Shut-down before maintenance: before attempting any kind of maintenance make sure the supply pressure is shut off and all residual air pressure is released from the system to be worked on.
- Start-up after maintenance: apply operating pressure and power to the equipment and check for proper operation and possible air leaks. If operation is abnormal, please verify product set-up parameters.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.

After removing the socket with a wrench, etc., lift off the plate, wave washer and cover, and replace the coil assembly. After replacing the coil, first tighten the socket by hand while holding down the plate and wave washer, and then tighten it further with a torque of 0.8 to 1N·m.

* Precautions when attaching and removing the socket.

- Be careful that the O-ring installed on the bottom (plate side) of the socket does not fall out or become chewed up, etc.
- Be sure to hold the body with a wrench, etc., and tighten the socket within the tightening torque range given above. If excessive torque is applied, there is a danger of damaging the threads.

2 port valve

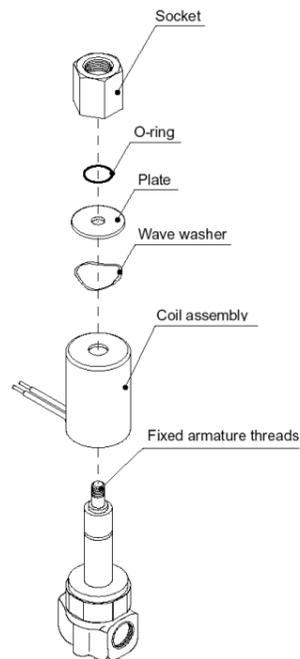


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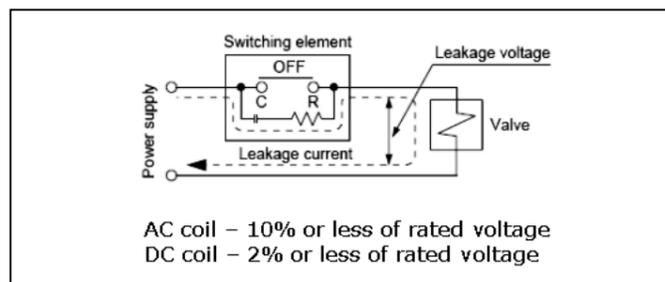
3 port valve



5 LIMITATIONS OF USE

Leakage

Particularly when using a resistor in parallel with a switching element and using a C-R element (surge voltage suppressor) to protect the switching element, take note that leakage current will flow through the resistor and C-R element, etc., creating a danger that the valve may not shut OFF.



Low temperature operation

The valve can be used at ambient temperatures as low as -10°C, but take measures to prevent freezing or solidification of impurities, etc.

When used in cold areas with water, etc., adopt freeze prevention measures such as draining the water from pipelines after pump operation has been stopped. If warmed with a heater, etc., avoid the coil unit. Also, implement warming or other freeze prevention measures for the body.

6 EUROPEAN CONTACT LIST

6.1 SMC Corporation

Country	Telephone	Country	Telephone
Austria	(43) 2262-62 280	Italy	(39) 02-92711
Belgium	(32) 3-355 1464	Netherlands	(31) 20-531 8888
Czech Republic	(420) 5-414 24611	Norway	(47) 67 12 90 20
Denmark	(45) 70 25 29 00	Poland	(48) 22-548 50 85
Finland	(358) 9-859 580	Portugal	(351) 22 610 89 22
France	(33) 1-64 76 1000	Spain	(34) 945-18 4100
Germany	(49) 6103 4020	Sweden	(46) 8 603 12 00
Greece	(30) 1- 342 6076	Switzerland	(41) 52-396 3131
Hungary	(36) 23 511 390	Turkey	(90) 212 221 1512
Ireland	(353) 1-403 9000	United Kingdom	(44) 1908-56 3888

6.2 Websites

SMC Corporation	www.smcworld.com
SMC Europe	www.smceu.com