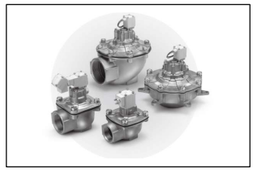
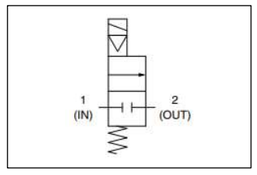
ORIGINAL INSTRUCTIONS

Instruction Manual
2 Port Solenoid Valve for Dust Collectors
Series VXF





The intended use of this valve is to control a large pulse of air for use in dust collectors.

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) *1), and other safety regulations.

*1) ISO 4414: Pneumatic fluid power - General rules and safety requirements for systems and their components.
ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components.
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.

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

⚠ Caution

- The product is provided for use in manufacturing industries only. This product must not be used in residential areas.

2 Specifications

2.1 Valve specifications

2.1.1 Size 1-4

Model	VXF21	VXF22	VXF23	VXF24
Fluid	Air			
Minimum Operating pressure [MPa]	0.03			0.1
Maximum operating pressure [MPa]	0.7			
Orifice Ø [mm]	22	28	44	53
Fluid temperature [°C]	-10 to 60 -10 to 100 (High temperature) (No freezing)			
Ambient temperature [°C]	-10 to 60 (No freezing)			
Flow characteristics	Contact SMC			
Response time [ms]	Refer to catalogue			
Duty cycle [%]	33 (Max ON time: 1 sec)			
Min. operating frequency	1 cycle / 30 days			
Max. operating frequency [Hz] Note 1)	1			
Lubrication	Not required			
Impact/Vibration resistance [m/s²] Note 2)	150/30			
Enclosure (based on IEC60529)	IP65 Note 3)			
Mounting orientation	Coil Upwards			
Operating environment	Indoor			
Weight – VXF / (VXFA) Piping type [g] Note 4)	2710 / [2550]	3630 / [3450]	-	-
Weight – VXF / (VXFA) Flange type [g] Note 4)	1300 / [1090]	1720 / [1540]	1810 / [1610]	1820 / [1630]
Weight – VXF / (VXFA) Flange body type I [g] Note 4)	-	3300 / [3060]	-	-
Weight – VXF / (VXFA) Flange body type II [g] Note 4)	-	3390 / [3170]	-	-

Table 2.

Note 1) Maximum operating frequency depends on air supply capacity.
Note 2) Impact resistance: No malfunction occurred when it was tested with a drop tester in the axial direction and at right angles to the main valve and armature; in both energized and de-energised states and for every time in each condition. (Values quoted are for a new valve)
Vibration resistance: No malfunction occurred in a one-sweep test between 5 and 400 Hz. Tests are performed at both energized and de-energized states in the axial direction and at right angles to the main valve and armature. (Values quoted are for a new valve).
Note 3) When using the product in a place which requires water resistance, please contact SMC.
Note 4) Weights are for Grommet, for Conduit: +10g, for DIN: +30g, for conduit Terminal: +60g.

2 Specifications - continued

2.1.2 Size 5-8

Model	VXF25	VXF26	VXF27	VXF28
Fluid	Air			
Minimum Operating pressure [MPa]	0.1			
Maximum operating pressure [MPa]	0.7			
Orifice Ø [mm]	70	80	90	100
Fluid temperature [°C]	-10 to 60 -10 to 100 (High temperature) (No freezing)			
Ambient temperature [°C]	-10 to 60 (No freezing)			
Flow characteristics	Contact SMC			
Response time [ms]	Refer to catalogue			
Duty cycle [%]	33 (Max ON time: 1 sec)			
Min. operating frequency	1 cycle / 30 days			
Max. operating frequency [Hz] Note 1)	1			
Lubrication	Not required			
Impact/Vibration resistance [m/s²] Note 2)	150/30			
Enclosure (based on IEC60529)	IP65 Note 3)			
Mounting orientation	Coil Upwards			
Operating environment	Indoor			
Weight – VXF / (VXFA) Piping type [g] Note 4)	2710 / [2550]	3630 / [3450]	-	-
Weight – VXF / (VXFA) Flange type [g] Note 4)	1300 / [1090]	1720 / [1540]	1810 / [1610]	1820 / [1630]
Weight – VXF / (VXFA) Flange body type I [g] Note 4)	-	3300 / [3060]	-	-
Weight – VXF / (VXFA) Flange body type II [g] Note 4)	-	3390 / [3170]	-	-

Table 2.

Note 1) Maximum operating frequency depends on air supply capacity.
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Vibration resistance: No malfunction occurred in a one-sweep test between 5 and 400 Hz. Tests are performed at both energized and de-energized states in the axial direction and at right angles to the main valve and armature. (Values quoted are for a new valve).
Note 3) When using the product in a place which requires water resistance, please contact SMC.
Note 4) Weights are for Grommet, for Conduit: +10g, for DIN: +30g, for conduit Terminal: +60g.

2 Specifications - continued

2.2 Solenoid specifications

Coil rated voltage	DC [VDC]	12, 24
	AC [VAC]	24, 48, 100, 110, 200, 220, 230, 240
Electrical entry		Grommet, DIN terminal, Conduit, Flat terminal
Coil insulation class		Class B / Class H Note 1)
Allowable voltage fluctuation Note 2)		±10% of rated voltage
Apparent power [VA] Note 3) Note 4)		7/9 10/12 (VXF23)
Power consumption [W]		7 8 (VXF23)
Surge voltage suppressor		Varistor
Indicator light		LED / Diode

Table 3.

Note 1) Class B is standard temperature specification. Class H is high temperature specification.
Note 2) Valve state is not defined if electrical input is outside of specified operating ranges.
Note 3) Power consumption, Apparent power: The value at ambient temperature of 20°C and when the rated voltage is applied.
Note 4) There is no difference in the frequency and the inrush and energised apparent power because a rectifying circuit is used in the AC (Built-in full-wave rectifier type).

2.3 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.
- The installation should allow sufficient space for maintenance activities.

- If a regulator or restrictor is installed immediately before or after IN port, valve may oscillate (chatter). Install away from valve.
- The header tank capacity should be sufficient. This is a valve for large flow rates, so if capacity is small, the main valve may oscillate due to pressure drop or insufficient air supply.

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.
- Products compliant with IP65 enclosures are protected against dust and water, however, these products cannot be used in water.
- Products compliant with IP65 enclosures satisfy the specifications by mounting each product properly. Be sure to read the Specific Product Precautions for each product.
- Do not use in high humidity environment where condensation can occur.

3 Installation - continued

3.3 Piping

⚠ Caution

- Before connecting piping make sure to clean up chips, cutting oil, dust etc.
- Thoroughly blow through piping before connecting to valve.
- Install piping so that it does not apply pulling, pressing, bending or other forces on the valve body.
- During use, deterioration of the tube or damage to the fittings could cause tubes to come loose from their fittings and thrash about. Securely fasten tubes in place to prevent uncontrolled movement.
- 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.
- Tighten fittings to the specified tightening torque.

Thread	Tightening torque [N·m]
1/4	12 to 14
3/8	22 to 24
1/2	28 to 30
3/4	28 to 30
1	36 to 38
1 1/2	40 to 42
2	48 to 50
2 1/2	48 to 50
3	48 to 50

Table 4.

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 Fluid supply

⚠ Warning

- The use of a fluid that contains foreign matter can cause problems, such as malfunction and seal failure by promoting the wear of the valve seat and armature, by sticking to the sliding parts of the armature, etc.
- Install a suitable filter (strainer) immediately upstream of the valve.
- Select a filter with a filtration size of 5 µm or smaller for air.

3.5.1 Air

⚠ 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

- Compressed air that includes excessive drainage may cause malfunction of valves and other pneumatic equipment. To prevent this, install an air dryer or after cooler, etc.
- If excessive carbon powder is generated by the compressor, it may adhere to the inside of the valves and cause a malfunction. Install mist separators upstream of the valves to eliminate it.
- When operating fluid air with a dew point of −70°C or lower, the inside of the valve may wear and the product life will be shortened.

3.6 Mounting

⚠ Warning

- Do not install with the coil downwards. If a valve is mounted with the coil positioned downwards, foreign objects in the fluid will adhere to the core/armature leading to a malfunction.
- 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.
- Mount a valve with its coil position upward, not downward. When mounting a valve with its coil position downward, foreign objects in the fluid will adhere to the iron core leading to a malfunction. Especially for strict leakage control, such as with vacuum applications and non-leak specifications, the coil must be positioned upward.

3 Installation - continued

- Do not warm the coil assembly with a heat insulator etc. Use tape, heaters, etc., for freeze prevention on the piping and body only. They can cause the coil to burn out.
- Avoid sources of vibration, or adjust the arm from the body to the minimum length so that resonance will not occur.
- Painting and coating Warnings or specifications printed or labelled on the product should not be erased, removed or covered up.

⚠ Caution

- Machine the mounting surface shape so that there are no gaps between the mounting surface and the product.

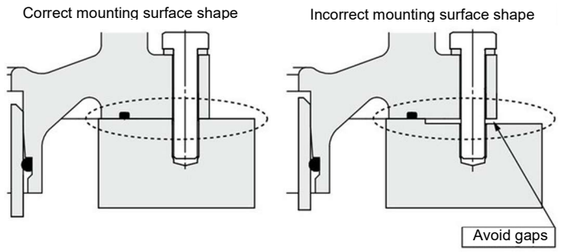


Figure 1.

Product number		Tightening torque [N·m]
VXF25B	(A,B)	12.5 to 15.0
	(C,D)	15.0 to 17.5
VXF26B	(A,B)	24.5 to 29.4
	(C,D)	29.4 to 34.3
VXF27B	(A,B)	24.5 to 29.4
	(C,D)	29.4 to 34.3
VXF28B	(A,B)	24.5 to 29.4
	(C,D)	29.4 to 34.3

Table 5.

3.7 Wiring

⚠ Warning

- The solenoid valve is an electrical product. For safety, install an appropriate fuse and circuit breaker before use.
- When using multiple solenoid valves, it is not sufficient to merely install one fuse on the inlet side. In order to ensure the safety of the devices, select and install a fuse for each circuit.

⚠ Caution

- As a rule, use electrical wire with a cross sectional area of 0.5 to 1.25 mm2 for wiring. 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 with a DC power supply where importance 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.
- When a surge from the solenoid affects the electrical circuitry, install a surge voltage suppressor etc. in parallel with the solenoid. Or, adopt an option that comes with the surge voltage protection circuit. (However, a surge voltage occurs even if the surge voltage protection circuit is used.)

3.8 Electrical circuits

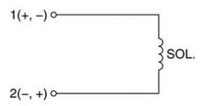
⚠ Caution

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

3 Installation – continued

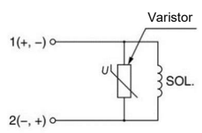
3.8.1 DC circuits

Grommet, Flat terminal



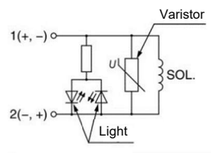
Without electrical option

Grommet, DIN terminal, Conduit terminal, Conduit



With surge voltage suppressor

DIN terminal, Conduit terminal

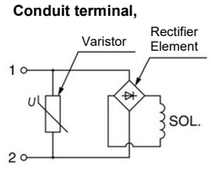


With light and surge voltage suppressor

Figure 2.

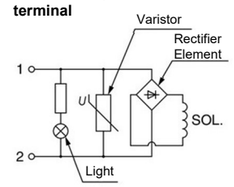
3.8.2 AC Circuits

Grommet, DIN terminal, Conduit terminal,



Without electrical option

DIN terminal, Conduit terminal



With light and surge voltage suppressor

Figure 3.

3.9 Electrical connectors

3.9.1 Grommet

Class B coil: AWG20 Outside insulator diameter of 2.5 mm

Rated voltage	Lead wire colour (See Figure 2)	
	1	2
DC	Black	Red
100 VAC	Blue	Blue
200 VAC	Red	Red
Other AC	Grey	Grey

Table 6.

Note) There is no polarity.

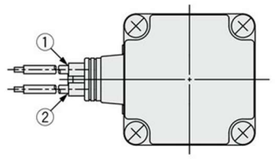


Figure 4.

3.9.2 DIN Terminal

⚠ Caution

- Internal connections are as shown below. Make connections to the power supply accordingly.

3 Installation - continued

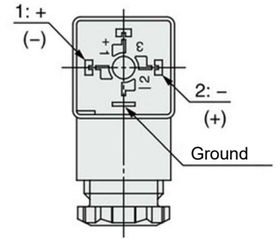


Figure 5.

Contact	1	2
DIN Terminal	+ (-)	- (+)

Table 7.

Note) There is no polarity.

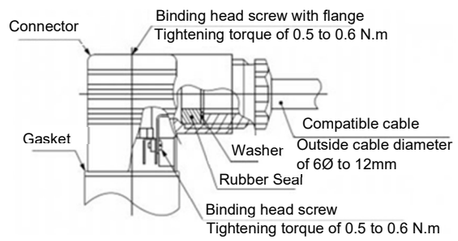


Figure 6.

- Conforms to DIN EN 17301-803, 18 mm, Form A
- This DIN terminal corresponds to the Form A DIN terminal with an 18 mm terminal pitch, which complies with EN175301-803B.

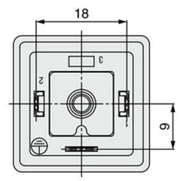


Figure 7.

⚠ Warning

The ground terminal is connected to the coil assembly only and does not provide a protective earth for the body of the valve.

3.9.3 Conduit terminal

- Make connections according to the marks shown below.
- Use the tightening torques below for each section.
- Properly seal the terminal connection (G1/2) with the special wiring conduit etc.

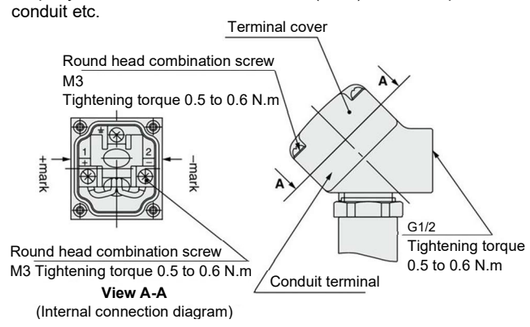
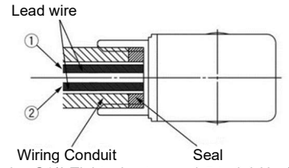


Figure 8.

3 Installation - continued

3.9.4 Conduit

- When used as an IP65 equivalent, use seal to install the wiring conduit. Also, use the tightening torque below for the conduit.
- Class B coil: AWG20 Outside insulator diameter of 2.5 mm.



(Port size G1/2 Tightening torque 0.5 to 0.6 N.m)

Figure 9.

Rated voltage	Lead wire colour (See Figure 2)	
	1	2
DC	Black	Red
100 VAC	Blue	Blue
200 VAC	Red	Red
Other AC	Grey	Grey

Table 8.

Note) There is no polarity.

⚠ Warning

- The ground terminal is linked to the coil assembly only and does not provide protective earth for the valve body.

3.10 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.

3.11 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.
- 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.

3.12 Extended period of continuous energization

⚠ Warning

- The solenoid coil will generate heat when continuously energized so avoid installing in an enclosed space. Install the valve in a well-ventilated area.
- Do not touch the coil while it is being energized or immediately after energization.

4 How to Order

Refer to catalogue for 'How to Order'.

5 Outline Dimensions

Refer to catalogue 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.

6 Maintenance - continued

- 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 Replacement parts

See the catalogue for replacement parts.

6.3 Storage

⚠ Caution

In the case of long term storage, thoroughly remove all moisture to prevent rust and deterioration of rubber materials, etc.

6.4 Silencer

⚠ Caution

- Use of a silencer will not affect response time at the time of installation. However, the silencer will become clogged over time, and this can affect the response time of the valve. To avoid this, replace silencer after using about 500,000 times. This number is subject to change based on fluid quality and energizing time.
- When using a silencer, make space for silencer replacement.

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

Air supply present, electrical supply cut	Valve returns to the initial de-energised position by spring force
Electrical supply present, air supply cut	Valve remains in the energised position.

Table 9.

7.3 Low temperature operation

The valve can be used in an ambient temperature of -10˚C. However, take measures to prevent freezing or solidification of impurities, etc.

7.4 Holding of pressure

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

7.5 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.

⚠ Caution

7.6 Leakage voltage

Ensure that any leakage voltage caused by the leakage current when the switching element is OFF causes ≤ 2% (for DC coils) or ≤ 5% (for AC coils) of the rated voltage across the valve.

7.7 EMC restrictions

7.7.1 Class and group description

- This product is group 1, class A equipment according to EN55011.
- Group 1 equipment does not intentionally generate radio-frequency energy in the range 9kHz to 400 GHz.
- Class A equipment is equipment suitable for use in all locations other than those allocated in residential environments and those directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.
- This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

7.7.2 Cable length to connect

The cable to connect the product shall be less than or equal to 30m.

7.7.3 Connecting the power supply

This product is not intended to be directly connected to any DC Distribution network.

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 Return of Product

If the product to be returned is contaminated or is possibly contaminated with substances that are harmful to humans, for safety reasons, please contact SMC beforehand and then employ a specialist cleaning company to decontaminate the product. After the decontamination prescribed above has been carried out, submit a Product Return Request Sheet or the Detoxification/Decontamination Certificate to SMC and await SMC's approval and further instructions before attempting to return the item. Please refer to the International Chemical Safety Cards (ICSC) for a list of harmful substances.

10 Contacts

Refer to www.smcworld.com or 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

Template DKP50047-F-085N