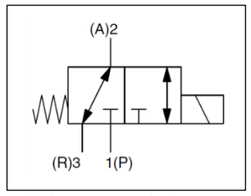
VT325-TF2Z403EN

ORIGINAL INSTRUCTIONS

Instruction Manual

3 Port Solenoid Valve Direct Operated Poppet Type

Series (E)VT325



The intended use of this product is to control compressed air or vacuum in pneumatic industrial automation systems and 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) *1), and other safety regulations.

*1) 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.

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

Valve configuration	Rubber seal
Actuation	Direct operated type 2 position single solenoid
Fluid	Air
Min. operating pressure [MPa]	0
Max. operating pressure [MPa]	1.0
Proof pressure [MPa]	1.5
Ambient and fluid temperature [°C]	5 to 50
Response time [ms] Note 1)	30 or less (at 0.5 MPa)
Min. operating frequency	1 cycle / 30 days
Max. operating frequency [Hz]	5
Duty cycle	Contact SMC
Flow characteristics	Refer to catalogue
Lubrication	Not required (Refer to 3.4)
Manual override	Non-locking push type Locking type (tool required)

2 Specifications - continued

Mounting orientation		Unrestricted
Impact / Vibration resistance [m/s²] Note 2)		150 / 50
Enclosure (based on IEC60529)	Grommet (G), Conduit (C)	IP40 equivalent
	Conduit terminal (T, TL), DIN terminal (D, DL)	IP50 equivalent
Weight [kg]		0.55 (AC), 0.60 (DC)

Table 1.

Note 1) Based on dynamic performance test JIS B8374-1981. (Coil temperature 20 °C, at rated voltage, without surge voltage suppressor.)

Note 2) 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 1000 Hz one 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).

2.2 Solenoid specifications

Electrical entry				Grommet, Conduit, DIN terminal, conduit terminal
Coil rated voltage [V]	AC (50 / 60 Hz)			100, 110, 200, 220, 240
	DC			12, 24
Allowable voltage fluctuation				-15 to +10% of rated voltage Note 1)
Apparent power [VA] Note 2)	AC	Inrush	50 Hz	75
			60 Hz	60
		Holding	50 Hz	27
			60 Hz	17
Power consumption [W] Note 2)	DC			12

Table 2.

Note 1) Valve state is not defined if electrical input is outside the specified operating range.

Note 2) At rated voltage.

2.3 Vacuum type: (E)VT325V

- This vacuum model has less air leakage than the standard model under low pressure. It is recommended for vacuum applications.

⚠ Caution

- Since this valve has slight air leakage, it cannot be used for vacuum holding (including positive pressure holding) in the pressure container.

2.3.1 Specification different from standard

Operating pressure range [MPa]	-101.2 kPa to 0.1

Table 3.

2.4 Indicator light

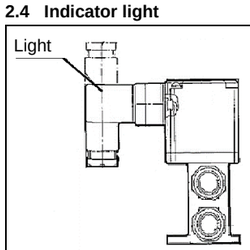


Figure 1. DIN connector

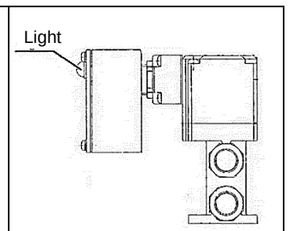


Figure 2. Conduit terminal connector

2.5 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.
- It is possible to install the valve in the open or closed position. Therefore, pay careful attention to the following information:
  Normally closed means that there is no output from port "2(A)" when pressure is connected to port "1(P)" and the solenoid is de-energised.
  Normally open means that there is an output from port "2(A)" when pressure is connected to port "3(R)" and the solenoid is de-energised.
- If it is intended to energise the valve for extended periods, please consult SMC.

3 Installation - continued

⚠ Caution

- Ensure all air and power supplies are isolated before commencing installation.

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.
- Do not use in high humidity environment where condensation can occur.
- Do not use near water or product malfunction or performance change may occur.
- Contact SMC for altitude limitations.

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.

Port	Connection thread size (R, NPT)	Tightening Torque [N·m]
1 (P), 2 (A), 3 (R)	1/4	8 to 12
	3/8	15 to 20

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 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 Bleed port

⚠ Caution

- The bottom of the solenoid valve has a breather hole for the main valve. Take proper measures to prevent this hole from being blocked as this will lead to a malfunction.
  Note: Ordinarily, when the solenoid valve is mounted on a metal surface, it can breathe through the breather hole, via the breather groove. However, in particular, if the surface to be mounted is made of rubber, the rubber could deform and block the hole.
- Take proper measures to prevent dust or foreign matter from entering through unused ports. The grommet portion contains a breather hole for the core. Take proper measures to prevent dust or foreign matter from accumulating in this area.

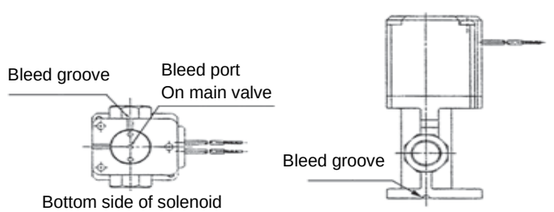


Figure 3.

3 Installation - continued

3.7 Light / surge voltage suppression

3.7.1 With indicator light

	AC	DC
DIN terminal with indicator light (DL)	Neon bulb, Coil	Varistor, Coil
Conduit terminal with indicator light (TL)	Neon bulb, Coil	

Figure 4.

Note) Non polar type valves.

3.7.2 With surge voltage suppressor

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

	AC	DC
Grommet (GS)	Varistor, Coil	Red (+), Diode, Coil, Black (–)
Conduit (CS)		
Conduit terminal (TS)	Varistor, Coil	

Figure 5.

Note) Non polar type valves except DC grommet and conduit.

3.8 Residual voltage

⚠ Caution

- If a surge protection circuit contains non-ordinary diodes such as zener diodes or varistor, a residual voltage will remain that is in proportion to the protective elements and the rated voltage. Therefore, give consideration to surge voltage protection of the controller.
- In the case of diodes, the residual voltage is approximately 1 V.
- Contact SMC for the varistor's residual voltage.

3.9 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 Installation - continued

3.10 Connector for DIN terminal

Refer to catalogue for additional information.

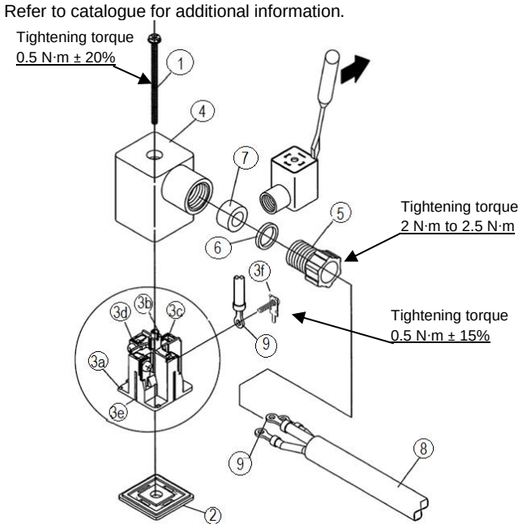


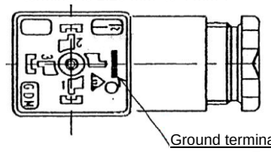
Figure 6.

Note 1) It is possible to wire even in the state of bare wire. In that case, loosen the screw with washer and place a lead wire into the bracket of the terminal block, and then tighten it once again.

Note 2) The orientation of a connector can be changed arbitrarily, depending on the combination of a housing and terminal box.

3.11 Inside wiring DIN connector

- Applicable cable O.D.: ø6 mm to ø12 mm.
  Note) For those with an external measurement of ø9 mm to ø12 mm, remove the inner portion of the ground gasket before using.
- Applicable crimping terminal:
  The maximum size for the round terminal is 1.25 mm^2 to 3.5 mm^2 and for the Y terminal is 1.25 mm^2 to 4 mm^2.



Connect wires to terminals 1 and 2.
Terminal 3 is not used.

Figure 7.

3.11.1 Change of electrical entry

Once the terminal cover is separated from the terminal block, it can be rotated in any direction (4 directions, each 90°) to change the orientation of the electrical entry.

⚠ Caution

To insert the connector into the pin plug or to pull it out, do so as vertically as possible, without tilting.

3.12 Lead wire colour (grommet & conduit)

Voltage		Colour
AC	100	Blue
	200	Red
DC	Without surge voltage suppressor	Grey
	With surge voltage suppressor	Red (+), Black (-)
Others		Grey

Table 5.

3.13 Extended periods of continuous energization

Caution for high temperature
Be aware that the valve surface may get hot.

⚠ Caution

- If a valve is energized continuously for a long period of time, the rise in temperature due to heat rise of the coil assembly may cause a decline in solenoid valve performance, reduce service life, or have adverse effects on peripheral equipment.

3 Installation - continued

- If the valves are energized continuously for a long time, switch the valve at least once every 30 days and the operating time should not exceed 1400 hours (equivalent to 2 months) per year.
- If the operating time exceeds 1400 hours, contact SMC.
- Note that the valve should be switched at least once every 30 days in this case.
- If the valve is used for special applications, please contact your SMC sales representative.
- When solenoid valves are mounted in a control panel, employ measures to radiate excess heat, so that temperatures remain within the valve specification range. Use special caution when three or more stations sequentially aligned on the manifold are continuously energized since this will cause a drastic temperature rise.

3.14 Effect of back pressure when using a manifold

⚠ Caution

Use caution when valves are used on a manifold, because an actuator may malfunction due to back-pressure.

3.15 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.

⚠ Warning

Locked manual overrides might prevent the valve responding to being electrically de-energized or cause unexpected movement in the equipment.
Refer to the catalogue for details of manual override operation.

4 How to Order

Refer to catalogue for 'How to order' or product drawing for special products.

5 Outline Dimensions

Refer to the 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.
- 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.

7 Limitations of Use

⚠ Warning

The system designer should determine the effect of the possible failure modes of the product on the system.

7.1 Limited warranty and disclaimer/compliance requirements

Refer to Handling Precautions for SMC Products.

7.2 Leakage voltage

⚠ Caution

Ensure that any leakage voltage caused by the leakage current when the switching element is OFF causes ≤2% (for DC coils) or ≤15% (for AC coils) of rated voltage across the valve.

7.3 Safety relay or PLC

⚠ Warning

If a safe output from a safety relay or PLC is used to operate this valve, ensure that any output test pulse duration is shorter than 1 ms to avoid the valve solenoid responding.

7.4 Return of the spool to the de-energised position

⚠ Warning

When electricity is cut, the spool valve returns to the de-energised position by spring force.

7.5 Holding of pressure

⚠ Warning

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

7.6 Cannot be used as an emergency shut-off valve

⚠ Warning

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.

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 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
Specifications are subject to change without prior notice from the manufacturer.

Template DKP50047-F-085M