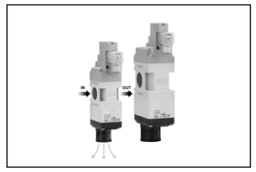
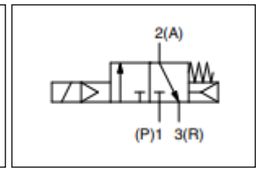
Instruction Manual
Residual Pressure Relief Solenoid Valve
Series VP517/717 Modular Connection Type





The intended use of this valve is to vent a system to atmosphere when it is de-energised.

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 Valve specifications

Fluid		Air
Type of actuation		N. C.
Internal pilot operating pressure range [MPa]	Standard	0.2 to 0.7
	High pressure type	0.2 to 1
Ambien and fluid temperature [˚C]		-10 to 50 (No freezing)
Maximum operating frequency [Hz]		5
Minimum operating frequency		Once every 30 days
Duty cycle		Contact SMC
Manual override (manual operation)		Non-locking push type Push-turn locking type (Manual) Non-locking push type (Manual)
Pilot exhaust method		Individual exhaust
Lubrication		Not required (See also 3.4)
Mounting orientation		Unrestricted

2 Specifications - continued

Impact/Vibration resistance [m/s²] Note 1		150/30
Response time		Refer to catalogue
Flow		Refer to catalogue
Enclosure (based on IEC60529)		IP65
Weight	VP517Y	222 (with bracket: 257)
	VP717Y	413 (with bracket: 468)

Table 1

Note 1) Impact resistance: No malfunction occurred when it was tested in the axial direction and at right angles to the main valve and armature in both energized and de-energized states. Each condition was tested once. (Values quoted are for a new valve).
Vibration resistance: No malfunction occurred in a one-sweep test between 45 and 2000 Hz. Test was performed in 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).

2.2 Solenoid specifications

Electrical entry			DIN terminal (D) DIN terminal (Y) <EN175301-803(C)>
Coil rated voltage [V]	DC		24, 12
	AC (50/60 Hz)		100, 110, 200, 220
Allowable voltage fluctuation			±10% of rated voltage Note 1, 2
Coil insulation class			Contact SMC
Power consumption [W]	DC	Standard	0.35 (With light: 0.45)
Apparent power [VA] Note 3	AC	100 V	0.78 (With light: 0.87)
		110 V [115 V]	0.86 (With light: 0.97) [0.94 (With light: 1.07)]
		200 V	1.15 (With light: 1.30)
		220 V [230 V]	1.27 (With light: 1.46) [1.39 (With light: 1.60)]
Surge voltage suppressor			Varistor (DC)
Indicator light			LED (DC), Neon bulb (AC)

Table 2

Note 1) The allowable voltage fluctuation is -15% to +5% for the rated voltage 115 VAC or 230 VAC.
Note 2) Valve state is not defined if electrical input is outside the specified operating range.
Note 3) The 110 VAC and 115 VAC are interchangeable. The 220 VAC and 230 VAC are interchangeable as well.

2.3 Indicators

In the DIN terminal type, the light is installed in the connector.

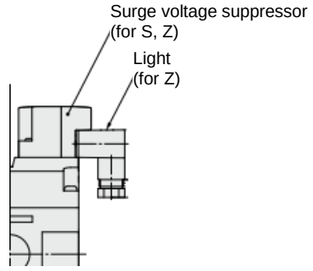


Figure 1

2.4 Special products

⚠ Caution

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. Note that the valve is not for outdoor use.
- 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 Installation - continued

- 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.
- Contact SMC for altitude limitations.

⚠ Caution

- **Temperature of ambient environment**

Use the valve within the range of the ambient temperature specification of each valve. In addition, pay attention when using the valve in environments where the temperature changes drastically.

- **Humidity of ambient environment**

When using the valve in environments with low humidity, take measures to prevent static.
If the humidity rises, take measures to prevent adhesion of water droplets on the valve.

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 (R, NPT)	Tightening torque (N·m)
1/8	3 to 5
1/2	20 to 25

Table 3

⚠ Warning

- If the tightening torque is insufficient, looseness or seal failure may occur. On the other hand, excess tightening torque can cause damage to the threads. Furthermore, tightening without holding the female thread side can cause damage too due to the excess force that is applied directly to the piping bracket.
- Avoid excessive torsional moment or bending moment other than those caused by the equipment’s own weight, as this can cause damage. Support external piping separately.
- Piping materials without flexibility, such as steel tube piping, are prone to be affected by excess moment loads and vibrations from the piping side. Use flexible tubing in between to avoid such effects.

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**

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

- **Take measures to ensure air quality, such as by installing an aftercooler, air dryer or water separator.**

Compressed air that contains large amount of drainage can cause malfunction of pneumatic equipment such as valves. Therefore, take appropriate measures to ensure air quality, such as by providing an aftercooler, air dryer, or water separator.

- **If excessive carbon powder is seen, install a mist separator on the upstream side of the valve.**

If excessive carbon dust is generated by the compressor, it may adhere to the inside of a valve and cause it to malfunction.

For compressed air quality, refer to SMC’s Best Pneumatics catalogue.

3 Installation - continued

3.6 Applicable combinations/attachment part numbers

Residual pressure relief 3 port solenoid valve	Air combination	Spacer	Spacer with bracket	Piping adapter*	Silencer
VP517	AC25#-A AC30#-A	Y300-A	Y300T-A	E300-#03-A	AN30-03 AN302-03
VP717	AC40#-A	Y400-A	Y400T-A	E400-#04-A	AN40-04 AN402-04

Table 4

Refer to section 6 and 7 for details of the spacer.
* Connection threads are not available for valve. Order piping adapter separately.

3.7 Tightening torque for spacer/spacer with bracket

Spacer	Hexagon wrench size	Tightening torque (N·m)
AC25-#-A	3	0.6±0.05
AC30#-A	4	1.5±0.05
AC40#-A	5	3.0±0.05

Table 5

3.8 Light/surge voltage suppressor

⚠ Caution

If a valve type without suppression is used, suppression should be provided as close as possible to the valve by the host controller.

3.8.1 DC (non-polar type)

- DIN With surge voltage suppressor (DS, DOS, YS, YOS)

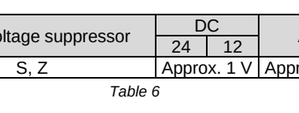


Figure 2

- DIN With light/surge voltage suppressor (DZ, YZ)

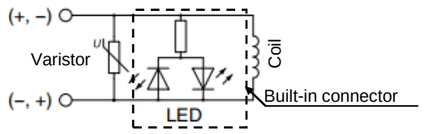


Figure 3

3.8.2 AC

There is no S option. It is already built into the rectifier circuit. The rectifier prevents surge voltage generation.

- DIN With light/surge voltage suppressor (DZ, YZ)

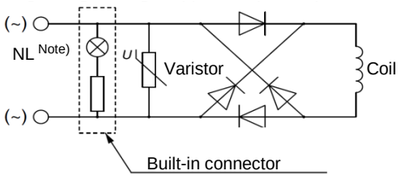


Figure 4

NL: Neon bulb

3.9 Residual voltage of the surge voltage suppressor

⚠ Caution

Note) If a varistor surge voltage suppressor is used, there is some residual voltage to the protection element and rated voltage. Therefore, refer to the table below and pay attention to the surge voltage protection on the controller side. Also, since the response time does change; refer to the specifications in catalogue.

Residual voltage

Surge voltage suppressor	DC		AC
	24	12	
S, Z	Approx. 1 V		Approx. 1 V

Table 6

3 Installation - continued

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.
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 Extended periods of continuous energization

Caution

- Refer to '3, 4, 5 port solenoid valves precautions' for more details.
- When solenoid valves are mounted in a control panel, employ measures to radiate excess heat, so that temperatures remain within the valve specification range.

3.12 Wiring

Warning

- **The solenoid valve is an electrical product. For safety, install an appropriate fuse and circuit breaker before use.**

Caution

- **External force applied to lead wire**

If an excessive force is applied to the lead wire, this may cause faulty wiring. Take appropriate measures so that a force of 30 N or more is not applied to the lead wire. When instructions are given to the Specific Product Precautions, follow these specifications.

3.13 How to use DIN terminal

Caution

The DIN terminal type with an IP65 enclosure is protected against dust and water, however, it must not be used in water.

Connection

1. Loosen the holding screw and pull the connector out of the solenoid valve terminal block.
2. After removing the holding screw, insert a flat head screwdriver, etc. into the notch on the bottom of the terminal block and pry it open, separating the terminal block and the housing.
3. Loosen the terminal screws (slotted screws) in the terminal block. Insert the lead core wires into the terminals according to the connection method, and secure the wires by re-tightening the terminal screws.
4. Secure the cord by fastening the ground nut.

Caution

When making connections, please note that using a heavy-duty cord of a size outside of the range of supported sizes (ø3.5 mm to ø7 mm) will not satisfy IP65 (enclosure) standards. Also, be sure to tighten the gland nut and holding screw within their specified torque ranges.

Changing the entry direction

After separating terminal block and housing, the cord entry direction can be changed by attaching the housing in the desired different direction (four directions at 90˚ intervals).
* When equipped with a light, be careful not to damage the light with the cord's lead wires.

Precautions

Plug in and pull out the connector vertically without tilting to one side.

Applicable cable

Cable O.D.: Ø3.5 mm to Ø7 mm
(Reference) 0.5 mm^2, 2-core or 3-core, equivalent to JIS C 3306

3 Installation - continued

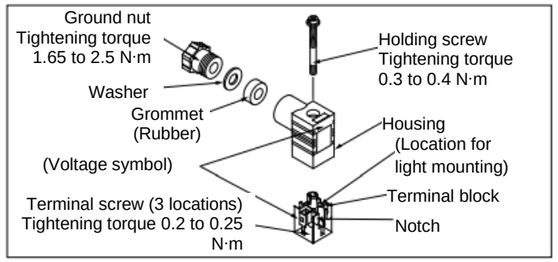


Figure 5

3.14 DIN Terminal conforming to EN175301-803C (former DIN 43650C)

Y type DIN terminal corresponds to the DIN connector with terminal pitch 8 mm, which complies with EN175301-803C. Since the terminal pitch is different from the D type DIN connector (which has a pitch of 9.4 mm), these two types are not interchangeable.

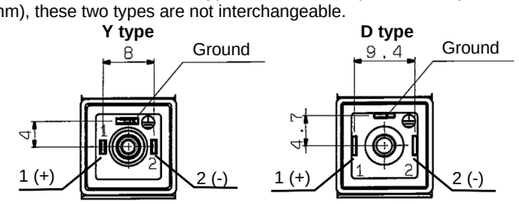


Figure 6

Applicable cable

Cable O.D.: Ø3.5 mm to Ø7 mm
(Reference) 0.5 mm^2, 2-core or 3-core, equivalent to JIS C 3306

Refer to 3.13 for connection and change of entry direction details.

3.15 Circuit with indicator light (built-in connector)

DC (□Z) circuit **AC (□Z) circuit**

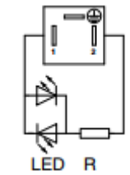


Figure 7

LED: Light emitting diode
R: Resistor

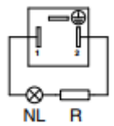


Figure 8

NL: Neon light
R: Resistor

Figure 7

3.16 Solenoid valve for AC specification

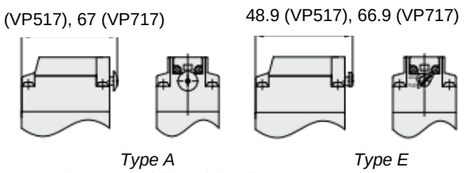
Warning

AC specification pilot valves have a built-in rectifier that generates heat when energized. The surface may become hot depending on the energized condition; therefore, do not touch the solenoid valves.

3.17 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.



Type A *Type E*

Refer to catalogue for additional details.

4 How to Order

Refer to catalogue for 'How to Order'.

5 Outline Dimensions

Refer to catalogue for outline dimensions.

Refer to catalogue also for spacer, bracket, piping adaptor and silencer dimensions.

6 Maintenance

6.1 General maintenance

Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- Ensure sufficient space for maintenance and inspection. Refer to section 5 for the minimum clearance of each component.
- 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.
- Ensure seals are in good condition, not deformed and are dust and debris free.
- When mounting valves ensure seals are present, aligned and securely in place and tighten screws to a torque as per section 3.7.

6.2 Accessories

Refer to Specific Product Catalogue for more details.

6.2.1 Spacer

Y300-A or Y400-A.

Figure 8: Y400-A

6.2.2 Spacer with bracket

Y300T-A or Y400T-A.

Figure 9: Y400T-A

6.2.3 Piping adapter 3/8", 1/2"

A piping adapter allows installation/removal of the component without removing the piping and thus makes maintenance easier.

Figure 10: E300-#03-A or E400-#04-A

6 Maintenance - continued

6.2.4 Silencer 3/8", 1/2"

Figure 11: AN30-03/AN40-04

Figure 12:AN302-03/AN402-04

7 Limitations of Use

Warning

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.

Warning

7.2 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.

7.3 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 Safety relays or PLC

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.

7.5 Air/spring returned spool valves

7.5.1 Internal pilot type

For internal pilot type, the main valve returns to the original (de-energized) position by means of the spring when the air supply is cut. When only the electrical power is cut, the return is by means of the pilot pressure and spring force.

Caution

7.6 Low temperature operation

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

7.7 Air connection

To avoid reversed connections of the air inlet/outlet, make connections after confirming the "IN/OUT" marks or arrows that indicate the direction of air flow. Reversed connections can cause malfunction.

7.8 Leakage voltage

Caution

Ensure that any leakage current when the switching element is OFF causes ≤3% of the rated voltage across the valve for DC coil and ≤8% for AC coils.

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

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