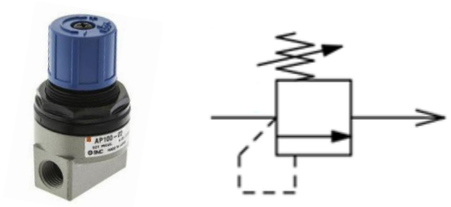
ORIGINAL INSTRUCTIONS

Instruction Manual

Pressure Control Valve (Relief Valve)

AP100



The intended use of a pressure control valve is to maintain a set pressure in part of a circuit by releasing pressure greater than the set pressure into the atmosphere.
Validated according to ISO 13849, see section 2.

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: Manipulating industrial robots - - Safety. etc.

This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.

- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- To ensure safety of personnel and equipment the safety instructions in this manual must be observed, along with other relevant safety practices.

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

- **The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**
  Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalogue information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

1 Safety Instructions - continued

- **Only personnel with appropriate training should operate machinery and equipment.**
  The product specified here may become unsafe if handled incorrectly.
  The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.
- **Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**
  1) The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
  2) When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
  3) Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.
- **Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**
  1) Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
  2) Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustions and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specification described in the product catalogue.
  3) An application which could have negative effects on people, property, or animals requiring special safety analysis outside the scope of ISO 13849 described in this document.
  4) Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.
- **Always ensure compliance with relevant safety laws and standards.**
  All electrical 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.**
  The product herein described is basically provided for peaceful use in manufacturing industries.
  If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
  If anything is unclear, contact your nearest sales branch.

2 Specifications

2.1 General Specifications

Model	**AP100**
Port size	1/8, 1/4
Fluid	Air
Proof pressure	1.5 MPa
Max. operating pressure	1.0 MPa
Set pressure range	0.05 to 0.69 MPa
Ambient and fluid temperature	–5 to 60°C (No freezing)
Bracket	Part no.: B21-1P
Weight (kg)	0.12
Maximum operating frequency	1 cycle / sec
Minimum operating frequency	1 cycle / 3 months
Impact and vibration resistance	See section 3.2
Air quality required	5μm filtration or smaller

2 Specifications - continued

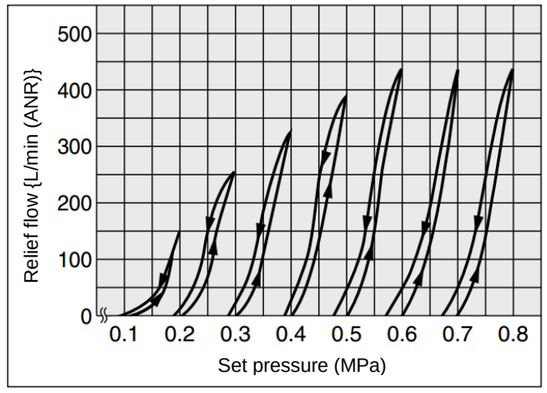
B_{10} Note 1)	370,000 cycles
B_{10D} Note 1)	740,000 cycles
Standards	Complies with the basic and well-tried safety principles of EN ISO 13849-2:2012

Table 1

Note 1) Under SMC test conditions. The B_{10} figure is estimated from SMC life tests. The B_{10D} figure is derived from B_{10} using the assumption in EN ISO 13849-1:2015 Annex C. Contact SMC for details.

2.2 Relief Flow Characteristics

AP100-02



Note) The graph above shows the relief flow when the set pressure rises and falls from 0.1MPa.

Caution

Special products might have specifications different from those shown in this section. Contact SMC for specific drawings. These drawings will give the appropriate specification details and compliance with the safety principles of ISO 13849, if applicable.

3 Installation

3.1 Mounting

Warning

- Do not install the product unless the safety instructions have been read and understood.
- Ensure sufficient space for good access during maintenance activities.
- Do not install the product unless the safety instructions have been read and understood.

3.2 Design / Selection

- **Confirm the specifications.**
  Do not operate at pressures or temperature, etc., beyond the range of specifications, as this can cause damage or malfunction. We do not guarantee against any damage if the product is used outside of the specification range.
- **Do not use this product for caisson shielding, breathing, medical use, medicine that is injected by humans, or for blowing air on food products.**
  The air preparation equipment has been designed exclusively for industrial compressed air, and it should not be used for any other purpose. Due to unavoidable circumstances, if it must be used for other purposes, make sure to follow safety measures and contact SMC beforehand.
- **Do not use this product on board a vehicle or a vessel.**
  This product must not be installed and used on board a conveyance such as a vehicle or vessel, since it may become damaged due to vibrations. If it must be used in such a manner due to unavoidable circumstances, please contact SMC beforehand.

3 Installation - continued

- **Do not disassemble the product or make any modifications, including additional machining.**
  It may cause human injury and/or an accident.

Caution

- **Do not use with low air pressure (blower).**
  The air preparation equipment, which operates at a specific minimum operating pressure in accordance with the equipment to be used, is designed to be used exclusively with compressed air. Using it below the minimum operating pressure could lower its performance or cause malfunction. If it must be used under such conditions due to unavoidable circumstances, please contact SMC beforehand.

3.3 Environment

Warning

- Do not use in an environment where corrosive gases, dust, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight or in a location exposed to radiant heat. Use a suitable protective cover and ensure good ventilation is used.
- Do not install in a location subject to vibration or impact. Check the product specifications.

3.4 Piping

Caution

- Before piping make sure to clean up chips, cutting oil, dust, dirt, scale inside the piping etc. by air-flashing prior to connection.
- 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.

Warning

- **Hold the female thread side and tighten to the recommended torque when screwing in the piping material.**
  Insufficient tightening torque may cause loosening or defective sealing. Over-tightening torque may damage the thread etc. If it is tightened without holding the female thread side, excessive force will be directly applied to the piping bracket resulting in a product failure.

Connection thread	1/8	1/4
Torque (N.m)	7 to 9	12 to 14

Table 2

- **Verify the IN and OUT sides.**
  When connecting the piping, avoid interchanging the IN and the OUT sides.

3.5 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, use turbine oil Class 1 (no additive), ISO VG32. Once lubricant is used in the system, lubrication must be continued because the original lubricant applied during manufacturing will be washed away.

3.6 Air Supply

Caution

- **Do not use compressed air that contains chemicals, organic solvents, or corrosive gases.**

4 Settings

4.1 Adjusting the set pressure

- Rotate adjusting handle clockwise to increase pressure on the outlet port, and anti-clockwise to decrease it.
- Adjustment and manipulation of the handle should be done manually.
- Once the pressure is set to the required value, fasten the lock-nut. This helps prevent fluctuation of the adjusted pressure due to vibration.

5 How to Order

AP100 – □ 01 □ – □

Pressure control valve

Thread type

Symbol	Type
Nil	Rc
N	NPT
F	G

Special specifications

Symbol	Specifications
Nil	–
X201	Set pressure range 0.02 to 0.2 MPa

Connection thread

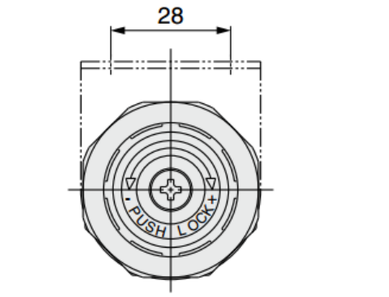
Symbol	Size
01	1/8
02	1/4

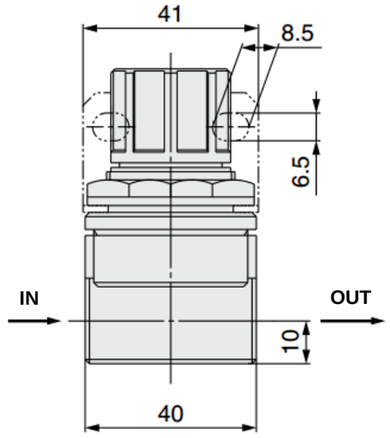
Accessory

Symbol	Description
Nil	–
B	With bracket

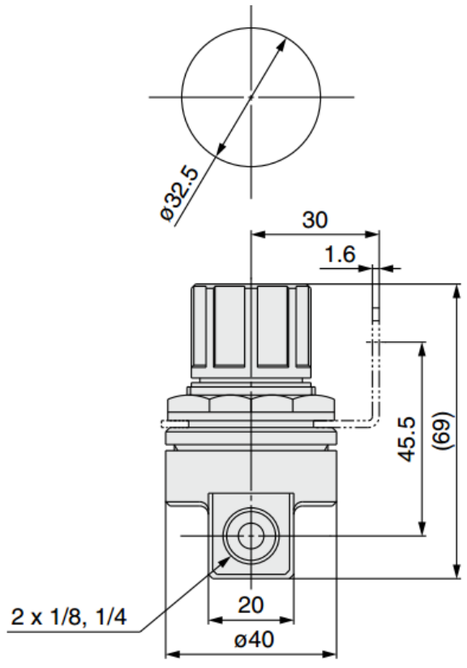
¤: Validated according to ISO13849-2

6 Outline Dimensions (mm)





Panel cut dimensions



7 Maintenance

7.1 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.

Warning

- **If an abnormal condition occurs, turn off the power supply and stop the flow of compressed air.**
  If an abnormal condition occurs, such as smoke, foul smell, or noise, immediately turn off the power supply, stop the glow of compressed air and set the pressure of the compressed air to zero because there is a possible risk of electrical shock or fire. .
- **Do not use this product on board a vehicle or a vessel.**
  This product must not be installed and used on board a conveyance such as a vehicle or vessel, since it may become damaged due to vibrations. If it must be used in such a manner due to unavoidable circumstances, please contact SMC beforehand.

8 Limitations of Use

8.1 Limited warranty and Disclaimer/Compliance Requirements

- **The product used is subject to the following "Limited warranty and Disclaimer" and "Compliance Requirements". Read and accept them before using the product**.

- **Limited warranty and Disclaimer**

  1) The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first [(1)]. Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

  2) For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.

  This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

  3) Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products.

  [(1)] Vacuum pads are excluded from this 1 year warranty.

  A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

- **Compliance Requirements**

  1) The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.

  2) The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

8 Limitations of Use - continued

Caution

- **SMC products are not intended for use as instruments for legal metrology.**
  Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country.
  Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

Danger

- **Do not use this product as a safety valve.**
  Definition of safety valves (JIS). Valves used for ensuring pressure capacity and piping safety.

9 Contacts

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