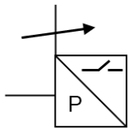
ORIGINAL INSTRUCTIONS

Instruction Manual

CE*

Air checker: Electronic Pressure Switch
PS1000 / PS1100 / PS1200





The intended use of the electronic pressure switch is to detect pressure.

*For the part numbers of CE marked products refer to section 4 How to Order.
Validated according to ISO 13849, see section 2.

1 Safety Instructions

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.
- These instructions indicate the level of potential hazard by label of “Caution”, “Warning” or “Danger”, followed by important safety information which must be carefully followed.
- To ensure safety of personnel and equipment the safety instructions in this manual must be observed, along with other relevant safety practices.

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

This product is class A equipment that is intended for use in an industrial environment.
There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbances.

⚠ 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 can be used in various operating conditions, their compatibility with the specific pneumatic system must be decided by the person who designs the equipment or decides its specification based on necessary analysis and test results. The expected performance and safety performance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review the specification of the product expressed in this document. The specification of this product is subject to change and this will be expressed in revisions of this document. The designer must monitor these revisions to ensure ongoing compatibility with the application.
- **Only trained personnel should operate pneumatically operated 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
  .

1 Safety Instructions (continued)

- **Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**
  1) The inspection and maintenance of machinery should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
  2) When equipment is to be removed, confirm the safety measures as mentioned above are implemented and the power from any appropriate source is cut.
  3) Read and understand the specific product precautions of all relevant products carefully.
  4) Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.
- **Do not use this product outside its specifications.**
- **If the product is used outside of the specifications, it may cause malfunction, failure or damage to the product, leading to an electric shock, explosion or fire.**
- **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 or beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the specification described in this document.
  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.**
  Pay particular attention to the requirements of ISO 4414 and IEC 60204-1.

⚠ Caution

- The product is 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.
- Ensure that the air supply system meets the requirements in section 2.1.

2 Specifications

2.1 Specifications

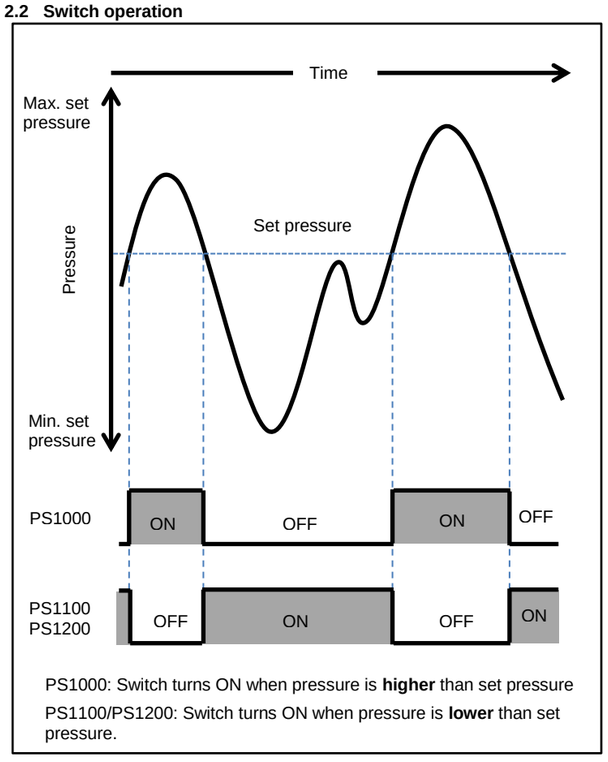
MODEL	PS1000	PS1100	PS1200
Switch output	Pressure ≥ Set Pressure: ON	Pressure ≤ Set Pressure: ON	
Max. operating pressure	1.0 MPa		500 kPa
Pressure setting range	-0.1 to 0.45 MPa	-0.1 to 0.4 MPa	-100 to 0 kPa
Applicable fluids	Air/Non-corrosive non-flammable gas		
Minimum air quality	5μm filtration. See also section 3.		
Indicator LED	Switch ON: red LED turns on		
Switch output response time	5 ms (typical)		
Vibration resistance	IEC60068-2-6 10G (10 to 500Hz, 2 hours each in the X,Y and Z axis)		
Impact resistance	IEC60068-2-27 100G (11ms, 3 times for each of X,Y and Z axis)		
Operating humidity range	35 to 85% RH (no condensation)		
Temperature characteristics	±3%F.S.		
Repeatability	±1%F.S.		
Hysteresis	4%F.S. or less	10%F.S. or less	
Load voltage	12 to 24 VDC±10%, Ripple(p-p) 10% or less		

2 Specifications (continued)

Load current	5 to 40 mA
Leakage current	1 mA or less
Int. voltage drop	5 V or less
Operating temp. range	0 to 60 °C (With no condensation)
Insulation resistance	2 MΩ or more (measured at 500 VDC) between live parts and case
Withstand voltage	1000 VAC 50/60 Hz for 1 minute between live parts and case
Mass	5 g (Excluding lead wire)
Port size	R06: ø6 reducer, R07: 1/4” reducer
Enclosure	IP40
Lead wire	Oil-resistant vinyl 2 core cable ø2.55, 3 m Cross section: 0.18 mm^2, insulator O.D.: 0.96 mm
Wetted part materials	Sensor: Silicon, Body: PBT, O-ring: HNBR
Standards	CE (option), RoHS, Complies with the basic safety principles of ISO 13849-2:2012
MTTF[1)]	126 years
MTTF$_d$[2)]	256 years

Note 1) Calculated. Contact SMC for details.
Note 2) Based on ISO 13849-1:2008 Annex C.

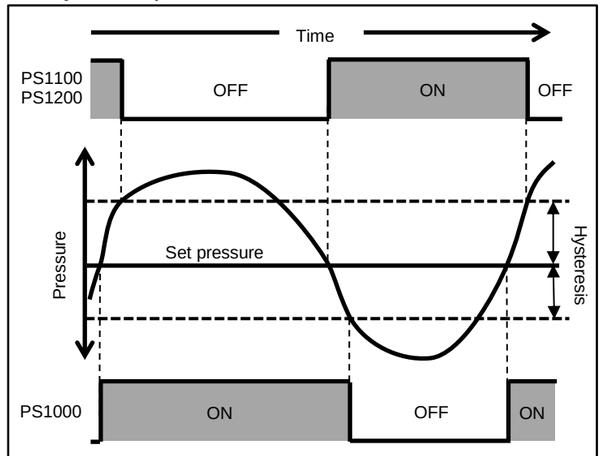
2.2 Switch operation



PS1000: Switch turns ON when pressure is **higher** than set pressure
PS1100/PS1200: Switch turns ON when pressure is **lower** than set pressure.

2 Specifications (continued)

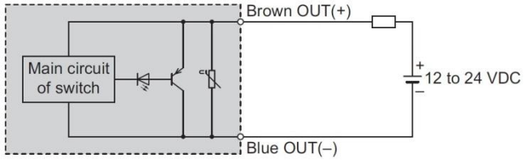
2.3 Hysteresis operation



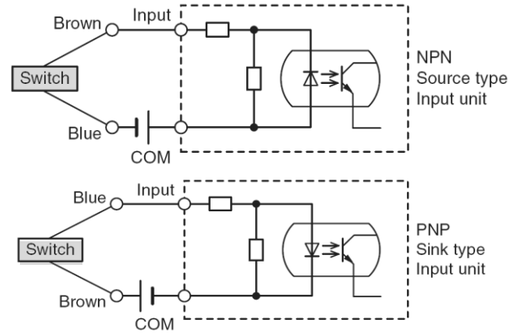
Hysteresis is the difference in pressure between the point at which the switch turns ON and at which it turns OFF again.

2.4 Circuit diagrams

2.4.1 Internal circuit diagram



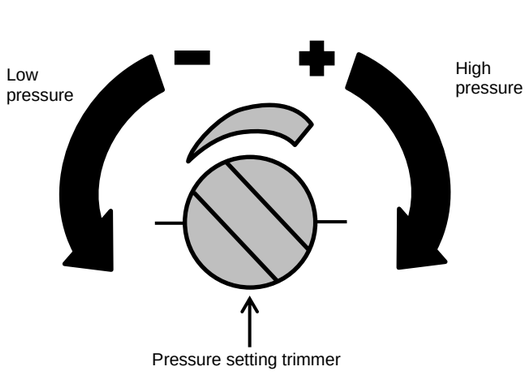
2.4.2 PLC connection examples



The selection of the connection type depends upon the application.

2 Specifications (continued)

2.5 Setting



- **The pressure setting trimmer is used to set the ON pressure.**
- **Rotate clockwise to increase the set pressure, rotate anticlockwise to decrease the set pressure.**
- **Use a flat bladed screwdriver of a suitable size to adjust the trimmer.**
  Rotate lightly to adjust.
- **There is a stop provided to prevent the trimmer from rotating beyond its limits.**
  Rotation beyond the limits can damage the trimmer.
  Adjust the trimmer gently within the rotation angle.
- **Monitor the system pressure with a pressure gauge and use the LED indicator on the switch to ensure the pressure setting is correct for the application.**

3 Installation

3.1 Installation

⚠ Warning

- **Do not install the product unless the safety instructions have been read and understood.**
- **Do not modify the product.**
  Do not disassemble, modify (including changing the printed circuit board) or repair the product. An injury or failure can result.
- **The product should be mounted correctly.**
  If the product is not mounted correctly, malfunction, failure or damage may occur.
- **Do not apply vibration, impact or loads.**
  If vibration, impact or loads are applied, malfunction, failure or damage may occur.
- **Do not use fluids other than applicable fluids.**
  If fluids other than applicable fluids are used, malfunction, failure or breakage may occur.
  If the compressed air includes chemicals, synthetic materials (including organic solvents), salinity, corrosive gas, etc., it may lead to damage or malfunction.
- **Do not use for flammable or poisonous fluids.**
  If flammable or poisonous fluids are used, an explosion or fire may occur.
- **Do not let foreign matter or condensate get inside the piping of the product.**
  If foreign matter or condensate enters the product, malfunction, failure or damage may occur.
  Mount an appropriate filter on the fluid inlet side (IN side).
- **Use the product within the specified operating pressure range.**
  If the product is used outside of the rated pressure range, malfunction may occur.
- **Do not apply pressure which exceeds the proof pressure.**
  If pressure exceeding the proof pressure is applied, malfunction, failure or damage may occur.

3 Installation (continued)

- **Avoid repeatedly bending, stretching or applying load to the cable.**
  Applying repeated bending, tensile stress or load to the cable can damage the wire.
  The recommended bend radius of the cable is 6 times the outside diameter of the sheath, or 33 times the outside diameter of the insulation material, whichever is larger.
- **Route the wires of the product separately from power or high voltage cables.**
  If the wires of the product are routed with power or high voltage cables, malfunction or failure may occur due to noise.
- **Confirm proper insulation of the wiring.**
  If there is insulation failure (short circuits, faulty ground connection, improper insulation between terminals, etc.), malfunction or failure may occur.

⚠ Caution

- **Slight scratches or dirt on the display of the product body will not cause a problem. Please continue to use the product.**
- **Ensure sufficient space for installation and maintenance.**

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.**
  This product does not have an explosion proof construction
- **Do not install in a location subject to vibration or impact. Check the product specifications.**
- **Do not mount in a location exposed to radiant heat.**
- **Do not expose the product to direct sunlight.**
  If the product is exposed to direct sunlight, malfunction, failure or damage may occur.
  if the product is exposed to direct sunlight, provide a suitable protective cover.
- **Do not use the product in an environment where the product may be corroded.**
  If the product is used in a corrosive environment, malfunction, failure or damage may occur.
  Check the product materials before use.
- **Ensure that the product is used within the enclosure specifications.**
  If the product is used outside of the specifications, malfunction or failure may occur.
  Use the product in accordance with the protection level with reference to IEC 60529.
- **Use the product within the operating temperature, humidity and fluid temperature.**
  Do not use the product outside of these specifications.
  Even when the product is used within the specifications, do not use in a location where there are rapid temperature changes, or in a location where there are heating/cooling cycles, or in a location where there is freezing or condensation.
  It may result in malfunction or failure.
  If the product is to be used at low temperature, protection against freezing is necessary.
- **Do not use in an area where surges are generated.**
  If the product is used in an environment where surges are generated (solenoid lifter, high frequency induction furnace, motor, etc.), malfunction or failure may occur.
  Take appropriate measures before using the product.
- **Do not use the product in a place where static electricity is a problem.**
  It may result in system failure or malfunction.

3 Installation (continued)

3.3 Piping and Wiring

⚠ Warning

- **Ensure that the product is used within the power supply specifications.**
  If the product is used outside of the specifications, malfunction or failure may occur, leading to an electric shock or fire.
- **Ensure that the FG terminal is connected to ground when using a commercially available switch-mode power supply.**
  When a switch-mode power supply is connected to the product, switching noise will be superimposed and the product specification can no longer be met.
  This can be prevented by inserting a noise filter, such as a line noise filter and ferrite core, between the switch-mode power supply and the product, or by using a series power supply instead of a switch-mode power supply.
- **Do not use a load exceeding the maximum load voltage or current.**
  If the product is used outside of the specifications, it may cause malfunction or damage, leading to a reduction in the life of the product.
- **Wire the product correctly.**
  Incorrect wiring could cause malfunction or failure, leading to an electric shock or fire.
- **Do not perform wiring while the power is ON.**
  Touching the terminal or connector while the power is ON may cause an electric shock.
  Performing wiring while the power is ON may result in malfunction or failure.
- **Use appropriate countermeasures against surge when using a load which generates a surge voltage.**
  If surge voltages are repeatedly applied, this may cause malfunction or failure.

⚠ Caution

- **Before 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.**
- **Stop using the equipment immediately when an audible air leak is detectable, or when the equipment does not operate properly. If possible perform an appropriate function test and leakage test.**
- **Periodically check that piping is not loosened and that there is no air leakage.**
- **Regularly check that there is no external damage.**
- **Install the product while taking into consideration the internal voltage drop**
  Verify the equation below is satisfied after checking the operating voltage of the load.
  Power supply voltage - Product internal voltage drop > Minimum operating voltage
  Even though the product operates normally, if the operating voltage is not satisfied, the load may not operate.
- **Install the cable in such a way that a shortcut cannot be caused by any mechanical damage.**

3.4 Test Procedure

⚠ Warning

- **Setting Pressure**
  A change in the pressure set point can only be detected by a manual check of the set point.
- **Short circuit**
  A short circuit which causes an incorrect signal to the connected system can only be detected by a test routine in the connected system.

3 Installation (continued)

3.5 Suitable Power Unit

⚠ Warning

Use only power units which guarantee reliable electrical isolation of the operating voltage as per IEC 60204-1. Observe also the general requirements for PELV power circuits as per IEC 60204-1.

4 How to Order

PS □ 00 - □ L - □

Output specification

10	For vacuum and positive pressure (see 2.2)
11	For vacuum and positive pressure (see 2.2)
12	For vacuum only

Lead wire length

L	3 m

CE compliance*

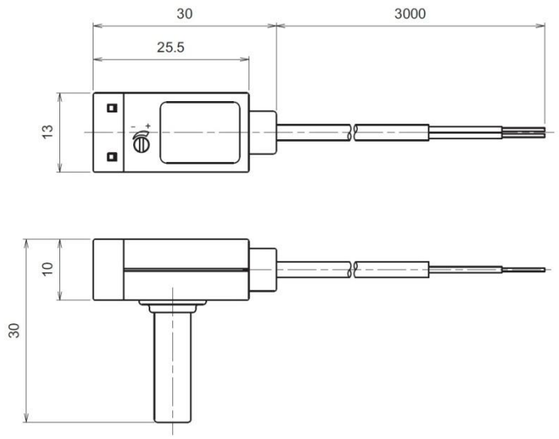
	Not CE compliant
-Q	CE compliant

Piping specification

R06	Ø 6 reducer
R07	¼" reducer

*For PS1200 series, only CE compliant product (-Q) is available

5 Outline Dimensions (mm)



6 Maintenance

6.1 General Maintenance

⚠ Warning

- **Perform regular maintenance and confirm normal operation.**
  If maintenance is not performed, malfunction or failure may occur.
  Turn off the power supply and stop the fluid supply before performing maintenance.
  Otherwise, it may cause an injury.
  After maintenance is complete, perform appropriate functional inspections and leak tests.
  Safety cannot be assured in the case of unexpected malfunction.
  Cut off the power supply and stop supplying fluid if the equipment does not function properly or there is leakage of fluid.

⚠ 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.**
- **Wear safety glasses when conducting periodic inspections**
- **Do not make any modification to the product.**
- **Do not disassemble the product.**
- **Do not use solvents such as benzene, thinner etc. to clean the product.**
  They could damage the surface of the body and erase the markings on the body.
  Use a soft cloth to remove stains. For heavy stains, use a cloth lightly dampened with diluted neutral detergent, then wipe up any residue with a dry cloth.

7 Limitations of Use

⚠ Danger

- **Do not exceed any of the specifications laid out in section 2 of this document or the specific product catalogue.**
- **Any use in an ISO 13849 system must be within the specified limits and application condition. The user is responsible for the specification, design, implementation, validation and maintenance of the safety system (SRP/CS).**

8 Contacts

AUSTRIA	(43) 2262 62280-0	**LATVIA**	(371) 781 77 00
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BULGARIA	(359) 2 974 4492	**NETHERLANDS**	(31) 20 531 8888
CZECH REP.	(420) 541 424 611	**NORWAY**	(47) 67 12 90 20
DENMARK	(45) 7025 2900	**POLAND**	(48) 22 211 9600
ESTONIA	(372) 651 0370	**PORTUGAL**	(351) 21 471 1880
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