



ORIGINAL INSTRUCTIONS

Instruction Manual
Compact Pressure Switch
PSE54#(A)-#-L/N/P



The intended use of the pressure sensor is to measure the pressure of fluids and provide an output signal while connected to IO-Link.

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)^{*)}, and other safety regulations.
- *) 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: Robotics - Safety requirements - Part 1: Industrial robots.
- Refer to the 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

- 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.

2 Specifications

2.1 General specifications

| Product No. | | PSE540(A) - #-L/N/P | PSE541(A) - #-L/N/P | PSE543(A) - #-L/N/P |
|---------------|-----------------------|---|------------------------|------------------------|
| Environmental | Enclosure | IP40 | | |
| | Ambient temperature | Operation: 0 to 50°C Storage: -20 to 70°C (no condensation or freezing) | | |
| | Ambient humidity | Operation, Storage: 35 to 85% RH (no condensation) | | |
| | Withstand voltage | 1000 VAC or more (50/60 Hz), 1 minute (between terminals and housing) | | |
| | Insulation resistance | 50 MΩ or more at 500 VDC (between terminals and housing) | | |
| Standards | | CE/UKCA marked, UL/CSA (E216656) | | |

2 Specifications (continued)

2.2 IO-Link specifications

| Product No. | | PSE540(A) - #-L | PSE541(A) - #-L | PSE543(A) - #-L |
|--|--|--|--------------------|--------------------|
| Rated pressure range | | -0.1 to 1 MPa | 0 to -101 kPa | -100 to 100 kPa |
| Set pressure range | | -0.105 to 1.05 MPa | 10 to -105 kPa | -105 to 105 kPa |
| Minimum setting unit | | 0.001 MPa | 0.1 kPa | 0.1 kPa |
| Proof pressure | | 1.5 MPa | 500 kPa | |
| Applicable fluid | | Air, non-corrosive and non-flammable gas | | |
| Power supply | Used as switch output device | 12 to 24 VDC (±10%), and power supply ripple (p-p) 10% max. | | |
| | Used as IO-Link device | 18 to 26.4 VDC, ripple max.10% (p-p) | | |
| | Protection | Polarity protection | | |
| | Current consumption | 35 mA or less | | |
| Output specification | Output type | Select from NPN open collector 1 output, PNP open collector 1 output | | |
| | Output mode | Hysteresis mode, window comparator mode, error output | | |
| | Switch operation | Normal output, Reversed output | | |
| | Max. load current | 80 mA | | |
| | Max. applied voltage (NPN output) | 30 V | | |
| | Internal voltage drop (Residual voltage) | 1.5 V or less (Load current 80 mA) | | |
| | Delay time | 3.4 ms or less, variable from 0 to 60 s / 0.01 s increments | | |
| Accuracy (at ambient temperature 25 °C and rated pressure range) | | PSE54#A: ±1% F.S. PSE54#: ±2% F.S. | | |
| Linearity | | ±0.7% F.S. | ±0.4% F.S. | |
| Repeatability | | ±0.2% F.S. | | |
| Effect of power supply voltage | | ±0.8% F.S. | | |

2.3 Switch Output specifications

| Product No. | | PSE540(A) - #-N/P | PSE541(A) - #-N/P | PSE543(A) - #-N/P |
|--|--|--|----------------------|----------------------|
| Rated pressure range | | -0.1 to 1 MPa | 0 to -101 kPa | -100 to 100 kPa |
| Set pressure range | | -0.10 to 1.05 MPa | 10 to -105 kPa | -105 to 105 kPa |
| Minimum setting unit | | Refer to Product No. | | |
| Proof pressure | | 1.5 MPa | 500 kPa | |
| Applicable fluid | | Air, non-corrosive gas non-flammable gas | | |
| Power supply | Used as switch output device | 12 to 24 VDC (±10%), and power supply ripple (p-p) 10% at max. | | |
| | Protection | Polarity protection | | |
| | Current consumption | 35 mA or less | | |
| Output specification | Output type | NPN open collector 1 output, PNP open collector 1 output | | |
| | Output mode | Hysteresis mode | | |
| | Switch operation | Normal output, Reversed output | | |
| | Max. load current | 80 mA | | |
| | Max. applied voltage (NPN output) | 30 V | | |
| | Internal voltage drop (Residual voltage) | 1.5 V or less (Load current 80 mA) | | |
| Delay time | | 3.4 ms or less, variable from 0 to 60 s / 0.01 s increments | | |
| Accuracy (at ambient temperature 25 °C and rated pressure range) | | PSE54#A: ±1% F.S. PSE54#: ±2% F.S | | |
| Linearity | | ±0.7% F.S. | ±0.4% F.S. | |
| Repeatability | | ±0.2% F.S. | | |
| Effect of power supply voltage | | ±0.8% F.S. | | |

2 Specifications (continued)

2.4 Communication specifications

| Product No. | | PSE540(A) - #-L | PSE541(A) - #-L | PSE543(A) - #-L |
|-------------------------------|---------------|---|--------------------|--------------------|
| IO-Link type | | Device | | |
| IO-Link version | | V1.1 | | |
| Communication speed | | COM2 (38.4 kbps) | | |
| Configuration file | | IODD file | | |
| Min. cycle time | | 3.4 ms | | |
| Process data length | | Input Data: 4 byte, Output Data: 0 byte | | |
| On request data communication | | Available | | |
| Data storage function | | Available | | |
| Event function | | Available | | |
| Vendor ID | | 131 (0x0083) | | |
| Device ID | PSE540(A)-*-L | 0x0002A5 | | |
| | PSE541(A)-*-L | 0x0002A6 | | |
| | PSE543(A)-*-L | 0x0002A7 | | |
| Operation light | | SIO mode: Light ON when switch output is ON. OUT1: Red IO-Link communication: Light ON when switch output is ON. In IO-Link mode, Operation light is ON or flashes. OUT1: Red | | |

2.5 Piping / Weight Specification

| Product No. | | M3 | M5 | 01 | N01 | R04 | R06 | IM5 | IM5H |
|--|---------------|---------------------------------------|------|----------|-------------|------|------|-----------|---------|
| Port size | | M3 | M5 | R1/8, M5 | NPT 1/8, M5 | φ4 | φ6 | M5 fem. | M5 fem. |
| Material of Case | | PC | | | | | | | |
| Material of Fitting | | SUS303 | | C3604BD | | PBT | | A6063S-T5 | |
| Materials of parts in contact with fluid | | Pressure sensor: Silicon, O ring: NBR | | | | | | | |
| Weight (g) | With cable | 43.6 | 43.9 | 50.5 | 50.5 | 42.6 | 42.8 | 44.5 | 45.3 |
| | Without cable | 4.1 | 4.4 | 11 | 11 | 3.1 | 3.3 | 5.0 | 5.8 |

2.6 Cable Specification

| | |
|-----------------------|------------------------------|
| Wire Cross section | 0.15 mm ² |
| Wire outside diameter | 0.9 mm |
| Wire Colours | Brown, Blue, Black |
| Sheath material | Oil resistant vinyl chloride |
| Outside diameter | 2.7 x 3.2 mm |
| Cable Length | 3 m |

Warning

- Special products (-X) might have specifications which are different from those shown in this section. Contact SMC for specific drawings.

3 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood.
- Tighten to the specified tightening torque.
If the tightening torque is exceeded the mounting screws and brackets may be damaged.
 - If the tightening torque is insufficient, the product can be displaced.
 - Do not pull the lead wire forcefully, not lift the product by pulling the lead wire (Tensile force 50 N or less).

3.1 Piping

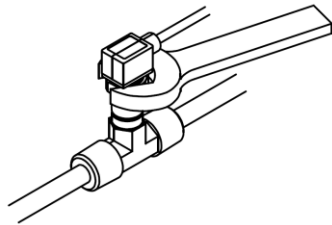
Caution

- 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. 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 size | Tightening Torque |
|--------------|---------------------------------------|
| R1/8, NPT1/8 | 7 to 9 N•m |
| M3 | 1/4 rotation after tightening by hand |
| M5 | 1/6 rotation after tightening by hand |

- Only fluids which are non-corrosive to SUS303, C3604BD, and NBR should be used.
- Install the piping correctly in a safe place away from water and dust.
- When piping, apply a spanner to the metal piping section of the sensor.



- For one touch fittings, insert the tube into the sensor fitting carefully and securely all the way to the bottom.

3 Installation (continued)

3.2 Environment

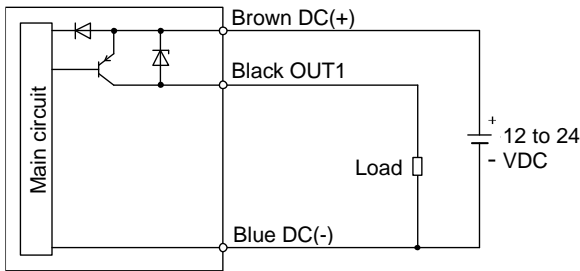
Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in a location where the product could be splashed with oil or chemicals.
- 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 specifications.

4 Wiring (continued)

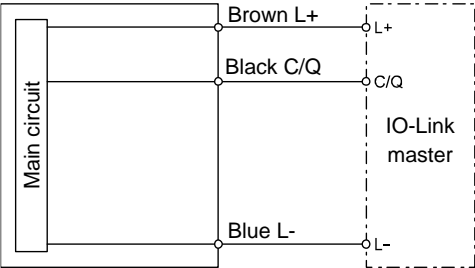
4.2.2 PSE54##-#-P

PNP open collector 1 output,
Maximum 80 mA
Residual voltage: 1.5 V or less



- Used as an IO-Link device

4.2.3 PSE54##-#-L



4 Wiring

4.1 Wiring connections

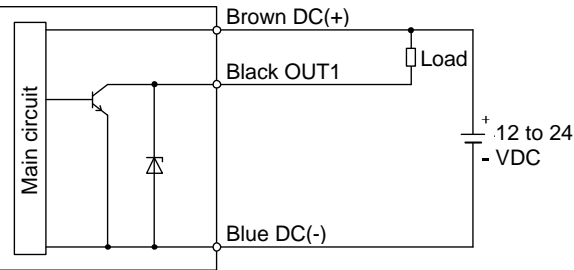
- Connections should be made with the power supply turned OFF.
- Use a separate route for the sensor wiring and any power or high voltage wiring. Otherwise, malfunction may result due to noise.

4.2 Internal circuit and wiring examples

- Output specification (used as a switch output device)

4.2.1 PSE54##-#-N

NPN open collector 1 output,
Maximum 30 V, 80 mA
Residual voltage: 1.5 V or less



5 Settings

5.1 IO-Link Configuration

IODD file

- IODD (I/O Device Description) is a definition file which provides all properties and parameters required for establishing functions and communication of the device.
- IODD includes the main IODD file and a set of image files such as vendor logo, device picture and device icon.
- The IODD files are listed below.

| No. | Product No. | IODD file |
|-----|---------------|-------------------------------|
| 1 | PSE540(A)-#-L | SMC-PSE540-L-yyyymmdd-IODD1.1 |
| 2 | PSE541(A)-#-L | SMC-PSE541-L-yyyymmdd-IODD1.1 |
| 3 | PSE543(A)-#-L | SMC-PSE543-L-yyyymmdd-IODD1.1 |

- For more information about the IODD files, refer to the SMC website (URL: <https://www.smcworld.com>) or contact SMC.

5 Settings (continued)

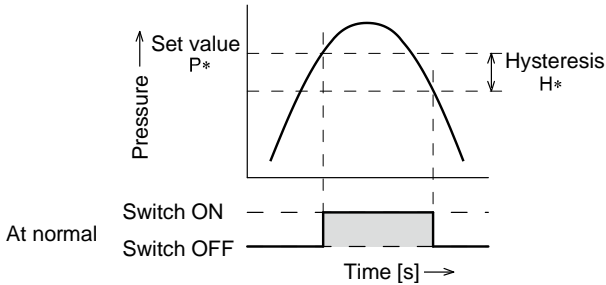
5.2 Pressure setting

- Default setting

When the pressure exceeds the set value, the switch will be turned ON. When the pressure falls below the set value by the amount of hysteresis or more, the switch will be turned OFF.

The default setting is to turn on the pressure switch when the pressure reaches the centre of between atmospheric pressure and the upper limit of the rated pressure range (for output specification -L).

If this condition shown below, is acceptable, then keep these settings.



5.2.1 PSE540#-L

| Item | Default setting |
|-------------------------|-----------------|
| [P1] Set value of OUT1 | 0.5 MPa |
| [H1] Hysteresis of OUT1 | 0.05 MPa |

| Item | Default setting |
|-------------------------|-----------------|
| [P2] Set value of OUT2 | 0.5 MPa * |
| [H2] Hysteresis of OUT2 | 0.05 MPa * |

5.2.2 PSE541#-L

| Item | Default setting |
|-------------------------|-----------------|
| [P1] Set value of OUT1 | -50.0 kPa |
| [H1] Hysteresis of OUT1 | -5.0 kPa |

| Item | Default setting |
|-------------------------|-----------------|
| [P2] Set value of OUT2 | -50.0 kPa * |
| [H2] Hysteresis of OUT2 | -5.0 kPa * |

5.2.3 PSE543#-L

| Item | Default setting |
|-------------------------|-----------------|
| [P1] Set value of OUT1 | 50.0 kPa |
| [H1] Hysteresis of OUT1 | 5.0 kPa |

| Item | Default setting |
|-------------------------|-----------------|
| [P2] Set value of OUT2 | 50.0 kPa * |
| [H2] Hysteresis of OUT2 | 5.0 kPa * |

*: Available only with IO-Link communication.

6 How to Order

Refer to the catalogue or operation manual on the SMC website (URL: <https://www.smcworld.com>) for How to order information.

7 Outline Dimensions (mm)

Refer to the catalogue or operation manual on the SMC website (URL: <https://www.smcworld.com>) for outline dimensions.

8 Maintenance

8.1 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.

How to reset the product after a power cut or forcible de-energizing

The setting of the product will be retained as it was before a power cut or de-energizing. The output condition is also basically recovered to that before a power cut or de-energizing, but may change depending on the operating environment.

Therefore, check the safety of the whole installation before operating the product. If the installation is using accurate control, wait until the product has warmed up (approximately 20 to 30 minutes).

9 Limitations of Use

9.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

10 Product disposal

This product should not be disposed of as municipal waste. Check your local regulations and guidelines to dispose of this product correctly, in order to reduce the impact on human health and the environment.

11 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, 1-5-5, Kyobashi, Chuo-ku, Tokyo 104-0031, JAPAN
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