



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: Robots and robotic devices - Safety requirements for industrial robots - Part 1: 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

Model		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		1 kPa	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		-0.105 to 1.05 MPa	10 to -105 kPa	-105 to 105 kPa
Minimum setting unit		1 kPa		
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		

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.

2.5 Piping / Weight Specification

Model		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		-		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.

- 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

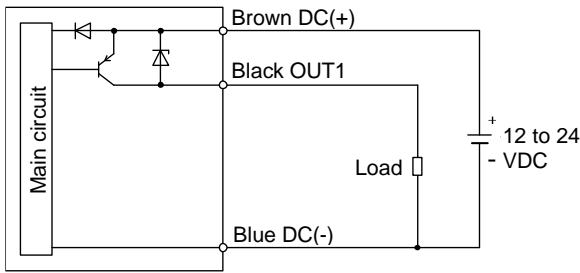
Warning

- 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)

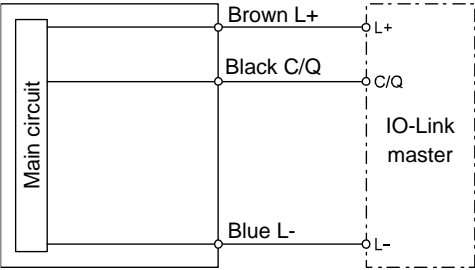
4.2.2 PSE54##-#-P

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

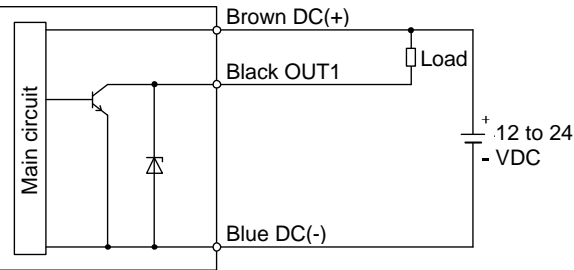
- Connections should be made with the power supply turned OFF.
- Use a separate route for the sensor wiring and any power or high voltage wiring. Otherwise, malfunction may result due to noise.

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 Number	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.

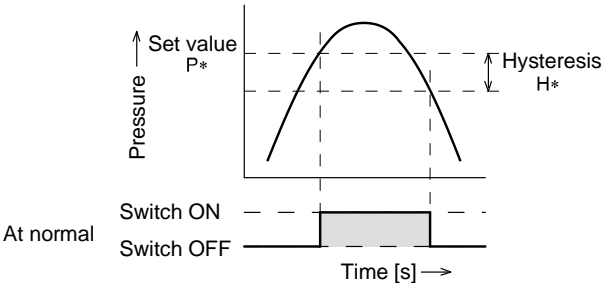
5 Settings (continued)

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)

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