

Pressure sensor for fluids

Series *PSE560*



Series *PSE560*

Main Features

- **Adoption of SUS316L** makes this product superior in corrosion resistance for wetted part
- **Full variation in piping** configuration (7 available)
- **Positive pressure, vacuum or compound pressure** versions available
- **Enclosure rated to IP65**
- **Current output type** (4 to 20mA) besides of voltage type
- **Could be used as stand alone or with PSE 20* and 30* controllers** (only voltage output)
- **Certified by CE marking and UL/CSA**



Applications

Suction of glasses sheet (pressure control even if moisture is present)

Control of semiconductors manufacturing equipment both for purge pressure and vacuum (compound pressure version)

Pressure control for gases not corrosive to SUS316L

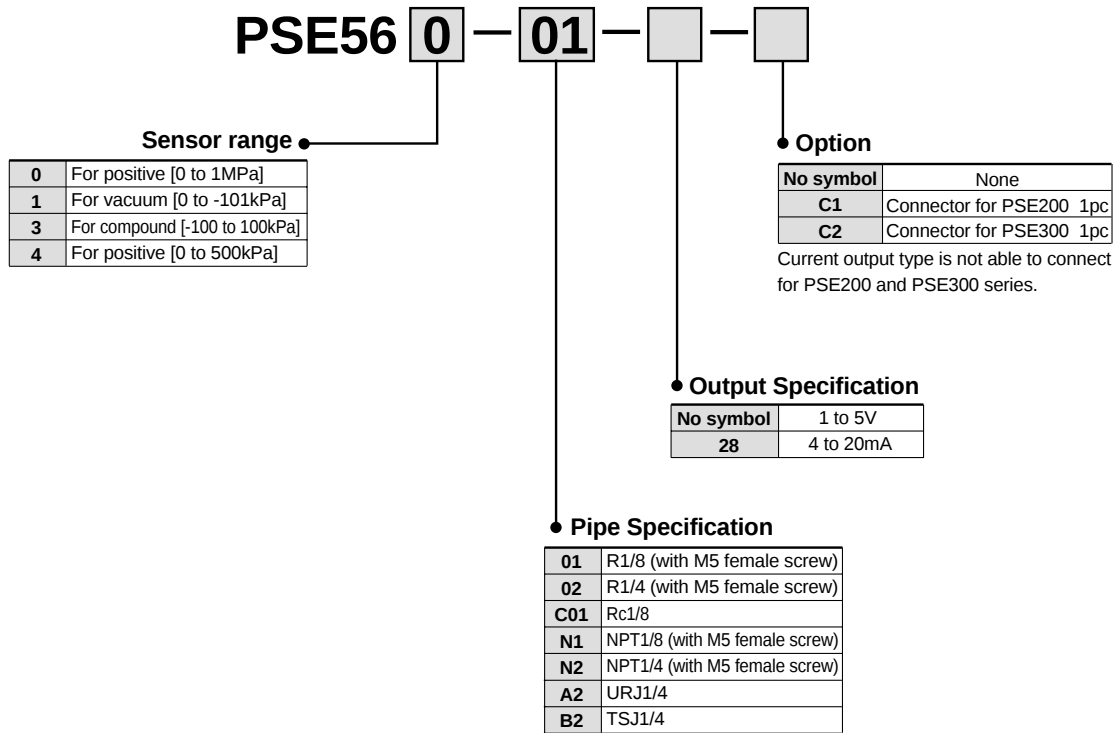
Specifications

Model	Rated pressure range	Analog Output	Transmission type	Enclosure	Port size
PSE560	0 to 1MPa	1 to 5V	3 wire type	IP65	R1/8, R1/4, Rc1/8, NPT1/8, NPT1/4, URJ1/4, TSJ1/4
PSE561	0 to -101kPa				
PSE563	-100 to 100kPa	4 to 20mA	2 wire type		
PSE564	0 to 500kPa				

Pressure sensor for fluids

Series *PSE560*

How to order



Options

Option products	Model	Note
Connector for PSE200	ZS-26-E-4	1pc
Connector for PSE300	ZS-28-C	1pc

Specifications

Model	PS560	PS561	PS563	PS564
Rated Pressure range	0 to 1MPa	0 to -101kPa	-100 to 100kPa	0 to 500kPa
Withstand Pressure	1.5MPa	500kPa	500kPa	750kPa

Model	PS56□□-□	PS56□□-□-28
Fluid	Air, Non-corrosive fluid, Incombustible fluid	
Power Supply Voltage	12 to 24VDC, ripple (p-p) ±10% or less (Protected against inverse connection)	
Current Consumption	10mA or less	-
Analog Output	1 to 5V (Rated Pressure Range) Output impedance : Approx. 1kΩ	4 to 20mA (Rated Pressure Range) Allowable load impedance : 500Ω or less (24VDC) 100Ω or less (12VDC)
Accuracy	± 1%F.S. or less	
Linearity	± 0.5%F.S. or less	
Repeatability	± 0.2%F.S. or less	
Influence from power supply voltage	± 0.3%F.S. or less	
Environment	Enclosure	IP65
	Ambient Temp.Range	Operation: 0 to 50°C, Storage: -10 to 60°C (No condensation or freezing)
	Ambient Humidity Range	Operation, Storage: 35 to 85% RH (No condensation)
	Withstand Voltage	250VAC, 1minute (Between lead block and case)
	Insulation Resistance	50MΩ or more (500VDC by megameter) (Between lead block and case)
	Vibration proof	10 to 500Hz smaller one 1.5mm or 20m/s ² double amplitude each in directions of X, Y and Z for 2 hours
	Impact proof	500m/s ² , 3 times each in directions of X, Y and Z respectively.
Temp. Characteristic	± 2%F.S. or less (0 to 50°C: 25°C), ±3%F.S. or less (-10 to 60°C: 25°C)	

Pipe Specification

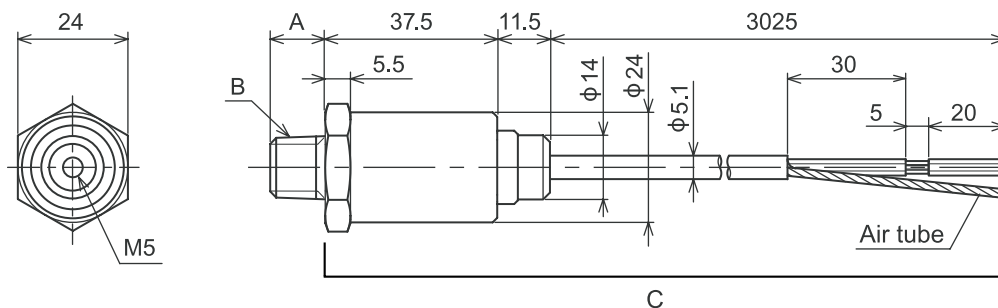
Model		01	02	N01	N02	C01	A2	B2
Port size		R1/8, M5	R1/4, M5	NPT1/8, M5	NPT1/4, M5	Rc1/8	URJ1/4	TSJ1/4
Material		Case : C3604 + Ni, Piping port, Sensor receiving area : SUS316L						
Lead wire		PS56□□-□: 3-cores oil-resistance Vinyl cabtyre cable (0.2mm²) PS56□□-□-28: 2-cores oil-resistance Vinyl cabtyre cable (0.2mm²)						
Mass * (Weight)	PS56□□-□	193g	200g	194g	201g	187g	203g	193g
	PS56□□-□-28	188g	195g	189g	196g	182g	198g	188g

* Applied with lead wire.

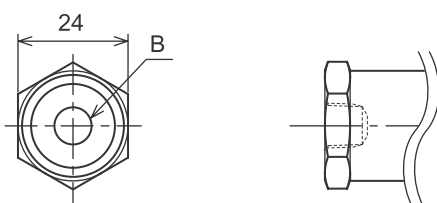
Series PSE560

Dimensions

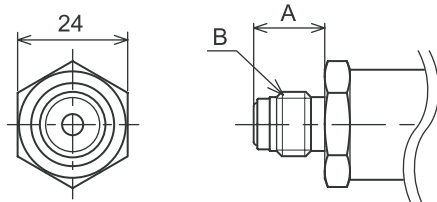
PSE56□-⁰¹/₀₂ / PSE56□-^{N01}/_{N02}



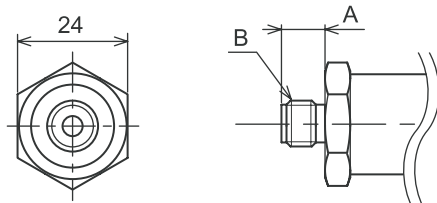
PSE56□-C01



PSE56□-A2



PSE56□-B2



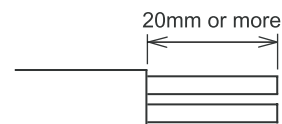
Model No.	A	B
PSE56□-01	8.2	R1/8
PSE56□-02	12	R1/4
PSE56□-N01	9.2	NPT1/8
PSE56□-N02	12.2	NPT1/4
PSE56□-C01	—	Rc1/8
PSE56□-A2	15.5	URJ1/4
PSE56□-B2	9.5	TSJ1/4

* The dimensions and length of C part is same.

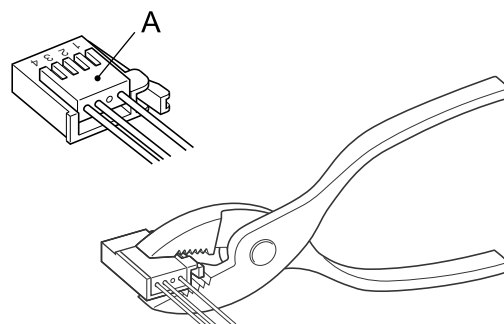
Installation

Attaching the connector to the lead wire

- Sensor wire is stripped as shown in the right figure.
(The connector, which suits the lead wire used, is shown in the following tables.)
- The core of the corresponding color shown in the following table is pit into the pin of the number stamped on the connector for sensor connection to the back.



Pin No.	Color of cable core	
	For PSE200 (ZS-26-E)	For PSE300 (ZS-28-C)
1	Brown (DC+)	Brown (DC+)
2	Black (IN: 1 to 5VDC)	NC
3	Blue (DC-)	Blue (DC-)
4	NC	Black (IN: 1 to 5VDC)



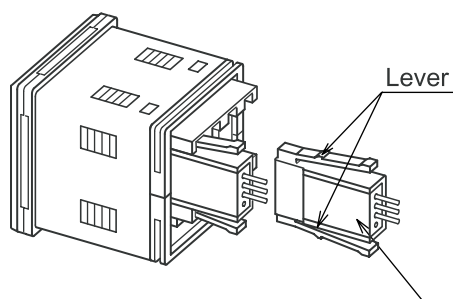
Maker	Model No.
(c) Sumitomo 3M	37104-3101-000FL
Tyco Electronics AMP K.K.	1-1473562-4

Connector

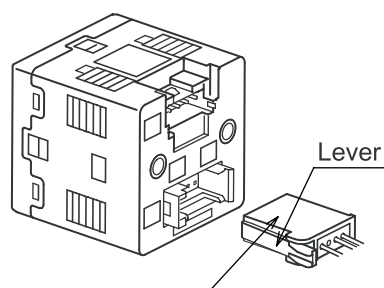
Connector Connecting/Disconnecting

- When connecting the connector, insert it straight onto the pin holding the lever and connector body between fingers and lock the connector by pushing the lever claw into the square groove in the housing until connector clicks.
- When disconnecting the connector, push down the lever by thumb to disengage the lever claw from the square groove. Then pull the connector straight out.

PSE200 Series



PSE300 Series



Connector for Sensor Lead Wire

Series PSE560

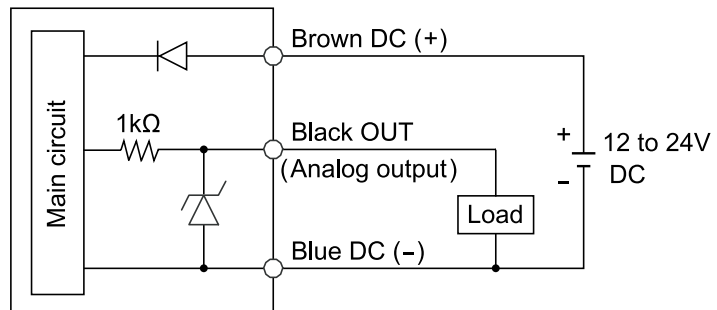
Examples of Internal Circuit and Wiring

PSE56□-□

Voltage output : 1 to 5V

Output impedance :

Approx. 1kΩ



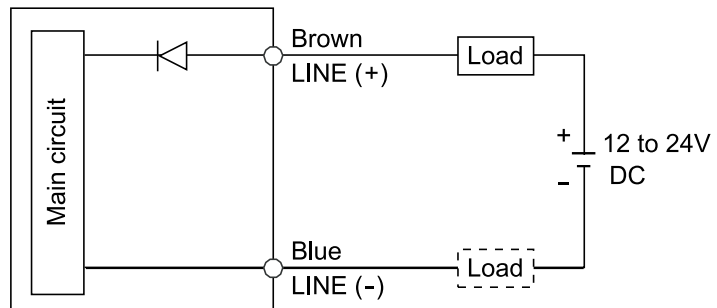
PSE56□-□-28

Current output : 4 to 20mA

Allowable load impedance :

500Ω or less (Power supply 24VDC)

100Ω or less (Power supply 12VDC)



* Connect load to either Power supply voltage LINE(+) or LINE(-).



Series **PSE560**

Safety Instructions

The Pressure Sensor and this technical specification contain essential information for the protection of users and others from possible injury and damage to property and to ensure correct handling. Please check that you fully understand the definition of the following messages (signs) before going on to read the text, and always follow the instructions. Also read carefully the technical specification of relevant equipment or apparatus before use.

Read this manual and follow its instructions. Signal words such as WARNING, CAUTION and NOTE, will be followed by important safety information that must be carefully reviewed.

 **Warning :** Indicates a potentially hazardous situation which could result in death or serious injury if you do not follow instructions.

 **Caution :** Indicates a potentially hazardous situation which if not avoided, may result in minor injury or moderate injury.

Note : Gives you helpful information.

Usage Restrictions

- 1. This product is designed for use in general equipment for factory automation. Never use this product with equipment or apparatus that directly concerns human lives*1, or which malfunction or failure can cause a huge loss.**

*1: Equipment or apparatus that directly matters human lives means the following:

- Medical equipment such as life support systems or equipment used in operating rooms
- Compulsory equipment required by law such as the Fire Prevention Law, Construction Law and etc.
- Equipment or apparatus that conforms with those mentioned above.

- 2. Contact our sales department when plans are made for the product to be used for the system*2 including equipment that concerns itself with the safety of persons or that seriously affects the public. This usage needs special consideration*3.**

*2: The system including equipment that concerns itself with the safety of persons or that seriously affects the public means the following:

- Nuclear reactor control systems in nuclear power plants, safety protection systems or other systems important for safety in nuclear power facilities
- Driving control systems of mass transportation systems, and flight control systems
- Equipment or apparatus that comes into contact with foods or beverages

*3: Special consideration means discussing usage with our engineers to establish a safe system designed as fool-proof, fail-safe, redundant and etc.

- 3. Special consideration of safety or maintainability should be taken to prevent hazard or loss caused by a failure or malfunction that is likely to occur in certain probability due to environmental stress (deterioration).**

•The special consideration means to fully review the equipment or apparatus in design stage and to establish a backup system in advance such as a redundant system or fail-safe system.

- 4. Use for an interlocking circuit When using the pressure sensor as a sensor for interlock, adopt a double interlocking method such as equipping the mechanical protection function in order to deal with a pressure sensor failure. Check the pressure sensor regularly to ensure proper operation.**



Series PSE560

Pressure sensor for fluids Precautions 1

Be sure to read before handling.

Operator

1. This technical specification has been written for those who have knowledge of machinery and apparatus that use pneumatic equipment and have full knowledge of assembly, operation and maintenance of such equipment.
2. Please read this technical specification carefully and understand it before assembling, operating or providing maintenance to the pressure sensor.

Safety

Warning

1. Do not disassemble, modify (including change of printed circuit board) or repair. An injury or failure can result.
2. Do not operate beyond specification range. Do not use the pressure sensor for inflammable or harmful gas or fluid. Operation at a range that exceeds the specifications can cause a fire, malfunction, or damage to the pressure sensor. Verify the specifications before use.
3. Do not use it in an atmosphere of an inflammable, an explosive and corrosive gas. A fire, explosion and corrosion can result. This pressure sensor is not an explosion-proof type.
4. These instructions must be followed when using this pressure sensor in an interlocking circuit:
 - Provide double interlocking by another system such as mechanical protection.
 - Check the c pressure sensor regularly to ensure proper operation. Otherwise malfunction can cause an accident.
5. These instructions must be followed while in maintenance:
 - Turn off the power supply.
 - Stop the supplied air, exhaust the residual pressure and verify the release of air before performing maintenance. Otherwise it can cause injury.

Safety

Caution

Perform proper functional checks and leak tests after maintenance. Stop operation when an abnormality is observed such that the sensor does not work properly or there is a leakage of fluid. Safety is not be assured due to unexpected malfunction.

Note

Follow the instruction given below when designing, selection and handling your pressure sensor.

The instructions on design and selection

Installation, wiring, environment of use, adjustment, operation and maintenance described below must also be followed.

•Product specifications

1. Operate the pressure sensor with the specified voltage.

- Operation with a voltage beyond specifications can cause malfunction or damage of the pressure sensor.
- Insufficient supply voltage may not drive a load due to a voltage drop inside the pressure sensor. Verify the operating voltage of the load before use.

2. Use the pressure sensor within the specified ranges of the measurement flow rate and under the specified operating pressure.

Otherwise it can cause damage to the pressure sensor and an abnormal measurement.

3. Do not exceed the specified maximum allowable load.

Otherwise it can cause damage or shorten the lifetime of the pressure sensor.

4. Reserve a space for maintenance.

Remember to leave space for maintenance when designing the piping plan.

Product handling

•Installation

1. Do no drop, hit or apply excessive shock (500 m/s²) to the pressure sensor.

Otherwise it can result in damage to the pressure sensor causing failure or malfunction.

2. Do not pull lead wires or lift the body with lead wires.

Hold the body when handling. Otherwise it can result in damage of the pressure sensor causing failure or malfunction.

3. Follow the specified tightening torque

Excessive tightening torque can break the pressure sensor. Insufficient tightening torque can displace the pressure sensor from the original position or loosen the mountingscrews. Refer to the following table for the appropriate torque values.



Series PSE560

Pressure sensor for fluids Precautions 2

Be sure to read before handling.

Normal size of screws	Appropriate tightening torque N·m
R•NPT•Rc 1/8	7 to 9
R•NPT 1/4	12 to 14

4. When piping, apply the wrench only to the metal option (attachment to be piped) integrated into the piping.

Applying the wrench in other position can break the pressure sensor.

5. Blow off all the dust inside the pipes before piping the pressure sensor.

Otherwise it can cause damage or malfunction.

6. Clean the inside of the pipe of dust or tape sealant when screwing pipes or joints.

When using tape sealant, leave a couple of screw threads unwrapped with tape sealant. Otherwise it can cause damage or malfunction.

7. Do not insert wires or other foreign matter into the pressure measurement port.

It can damage the pressure sensor causing failure or malfunction.

8. Connect frame-ground terminal (FG terminal) to the ground when using a switching power supply.

9. Insert a noise filter (power line noise filter, ferrite core, etc.) between the switching power supply and this pressure sensor.

•Wiring

1. Do not bend or apply tensile stress to lead wires repeatedly.

Wiring with repetitive bending stress or tensile stress can cause breakage of the lead wires. Replace the product when damage to a lead wire is observed.

2. Connect wires and cables correctly.

Miswiring can break the pressure sensor depending on a miswired circuit.

3. Do not connect wires while the power is on.

Otherwise it can break the circuit inside the pressure sensor causing malfunction.

4. Do not lay wires or cables with power cable or high-voltage cable in the same wiring route.

Otherwise the wires to the pressure sensor can be contaminated with noise or induced surge voltage from power lines or high voltage lines causing malfunction. Lay the wires to the controller to a wire duct or in a protective tube other than those for power lines or high voltage lines.

5. Verify the insulation of wiring.

Poor insulation (interference with other circuit, poor insulation between terminals and etc.) can introduce excess voltage or current to the controller causing damage.

6. Keep wiring as short as possible to prevent contamination from noise and induced surge voltage.

Do not use a cable longer than 10m. Consult with SMC for the use with a cable longer than 10 m. Connect the 0V DC wire (blue line) directly or as close as possible to the 0V DC terminal of the DC power supply.

7. The direct-current power supply to combine should use UL authorization power supply which is the class 2 power supply based on UL 1310 or the power supply is using the transformer of a class 2 based on UL 1585.

•Environment

1. Do not use the product in an atmosphere containing corrosive gas, oil, chemicals, sea water, water vapor, or in a place where there is a possibility of adhesion of those substances to the product.

It can cause failure or malfunction.

2. Avoid exposure of this product to direct sunlight.

Use sunshades if the product is exposed to direct sunlight. Otherwise it can cause failure or malfunction.

3. Do not use with inflammable gas or liquid.

Only Non-corrosive SUS316L fluids shall be used. Otherwise it can cause failure or malfunction.

4. Do not use a pressure sensor nearby a place where electric surges are generated.

Internal circuit elements of the pressure sensor can deteriorate or break when equipment generating a large surge (electromagnetic lifter, high frequency induction furnace, motor, etc.) is located near the pressure sensor. Provide surge preventives, and avoid interference.

5. Do not apply the pressure sensor to the load that generates electric surge voltage.

Relays or solenoid valves generate electric surge voltage. When applying the controller to drive these loads directly use the product equipped with surge absorber.

6. The product is not resistive to a lightning surge defined in CE marking. Take measures to protect against a lightning surge at the load side.

7. Prevent foreign matter such as remnant of wires from entering this product.

Take proper measures for the remnant not to enter the pressure sensor in order to prevent failure or malfunction.

8. Do not expose the pressure sensor to vibration (less than 20 m/s²), and impact (less than 500 m/s²).

Otherwise it can cause damage or malfunction.

9. Follow the specified ranges of the operating fluid and maintain ambient temperatures.

The operating fluid and ambient temperatures should be in the range of 10 to 60 °C. When operating at low temperature of 5°C or below, breakage or malfunction can occur to the pressure sensor due to freezing of condensed water in the pressurized air. Take preventive measures against freezing. Do not use the pressure sensor in a place where temperature suddenly changes even if it stays within the specified range.



Series PSE560

Pressure sensor for fluids Precautions 3

Be sure to read before handling.

- 10. Do not expose the pressure sensor to heat radiation from a heat source located nearby.**
It can cause malfunction.

• Adjustment and Operation

1. Do not short-circuit the load.

Excess current can damage the pressure sensor when a load is short-circuited.

2. A warm-up time of 20 to 30 minutes is needed for detection of low pressure.

The indication drifts about $\pm 1\%$ soon after the power is on.

• Maintenance

1. Before performing maintenance, make sure to turn off the power supply.

Otherwise an unexpected operation of the system component can occur.

2. Perform maintenance and check regularly.

Otherwise an unexpected malfunction of the system can occur due to a malfunction of the pressure sensor.

3. Perform a proper functional check after maintenance.

Stop operation when an abnormality is observed such that the device does not work properly. Otherwise an unexpected malfunction of the system component can occur.

4. Do not use solvents such as benzene or thinner to clean the pressure sensor body.

It can damage the surface of the body and erase the indication on the body. Use a soft cloth to remove stains. For heavy stains, use a cloth soaked with diluted neutral detergent and fully squeezed, then wipe up the stains again with a dry cloth.



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