

# Differential Pressure Transmitter

## General

Model PY9000D is a differential pressure transmitter that uses a ceramic cantilever sensor.

Deflection of the ceramic cantilever caused by differential pressure is sensed as a change in electrical resistance, which is converted to a current signal proportional to even a slight differential pressure.

The detected differential pressure is then transmitted as a 4–20 mA DC signal.

Model PY9000D is used for measuring and controlling room pressure, duct static pressure, etc., for clean rooms and general air conditioning applications.



## Features

- Compact and lightweight ceramic cantilever sensor
- Stable pressure measurement  
Built-in circuit corrects error due to environmental temperature.
- Splash-proof (IP54) structure
- Zero-point adjustment function for easy correction of error due to mounting position
- CE marking  
This product conforms to the standards for CE marking.



**Safety Instructions**

Please read instructions carefully and use the product as specified in this manual. Be sure to keep this manual near by for ready reference.







**Usage Restrictions**



This product is targeted for general air conditioning.  
 Do not use this product in a situation where human life may be affected. If this product is used in a clean room or a place where reliability or control accuracy is particularly required, please contact our sales representative.  
 Azbil Corporation will not bear any responsibility for the results produced by the operators.

**Warnings and Cautions**

	<b>WARNING</b>	Alerts users that improper handling may cause death or serious injury.
	<b>CAUTION</b>	Alerts users that improper handling may cause minor injury or material loss.

**Signs**

	Alerts users possible hazardous conditions caused by erroneous operation or erroneous use. The symbol inside  indicates the specific type of danger. (For example, the sign on the left warns of the risk of electric shock.)
	Notifies users that specific actions are prohibited to prevent possible danger. The symbol inside  graphically indicates the prohibited action. (For example, the sign on the left notifies that disassembly is prohibited.)
	Instructs users to carry out a specific obligatory action to prevent possible danger. The symbol inside  graphically indicates the actual action to be carried out. (For example, the sign on the left indicates general instructions.)

 <b>WARNING</b>	
	Before wiring or maintenance, be sure to turn off the power to this product. Failure to do so might cause electric shock or device failure

 <b>CAUTION</b>	
	Use the product under the operating conditions (temperature, humidity, power, vibration, shock, mounting direction, atmospheric condition, etc.) as listed in the specifications. Failure to do so might cause fire or device failure.
	Installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards.
	All wiring must comply with applicable codes and ordinances.
	Do not subject the product to shock or impact. Doing so might cause device failure.
	Do not put load or weight on the product. Doing so might damage the product.
	Dispose of the product as industrial waste in accordance with local regulations. Do not reuse all or part of this product.

**Model Numbers**

Model number		Description
PY9000D		Differential pressure transmitter
	1005	0 to 50 Pa
	1010	0 to 100 Pa
	1050	0 to 500 Pa
	1100	0 to 1000 Pa
	1250	0 to 2500 Pa
	2005	-50 to 50 Pa
	2010	-100 to 100 Pa
		Without inspection report
	C1	With inspection report

**Accessories**

Model number	Description
RYY792D3001	24 V DC power supply unit
104312	Duct tube (90° type) One vinyl tube (5 mm inside diameter, 2 m long) attached
100064	Duct tube (straight type) One vinyl tube (5 mm inside diameter, 2 m long) attached
112854	DIN rail mount adapter

## Specifications

Item	Specification
Measuring range	Refer to Model Numbers.
Measuring accuracy	±2.0 % F.S.
Measuring method	Semiconductor ceramic cantilever
Allowable differential pressure	Model PY9000D 1005, 1010, 2005, 2010: Max. 5000 Pa, Min. -400 Pa Model PY9000D 1050, 1100, 1250: Max. 10000 Pa, Min. -400 Pa
Applicable gases	Air, neutral gases (Note) Measured gas When the ambient temperature rapidly decrease, measurement gas that contains high humidity condenses into water. Condensed water on the electrodes will degrade their characteristics. Do not use the product in an environment where condensation occurs.
Temperature characteristics	Refer to <i>Table 1 Ambient temperature characteristics</i> .
Output signal	4–20 mA DC (linear)
Time constant	0.02 s
Damping time	0.2 s
Supply power	24 V DC ±20 % (output short-circuit protection should be provided)
Power consumption	Max. 0.6 VA
Load resistance	Max. 800 Ω
Size of pressure inlet	Outside diameter 6.2 mm
Installation location	Wall mounting
Mounting orientation	Recommended installation: vertical (pressure inlet facing downward)
Environment conditions	Rated operation conditions                      Transportation/storage conditions
Ambient temperature	0 to 70 °C    -10 to 70 °C
Ambient humidity	Without condensation                                      Without condensation
Enclosure protection	Splash-proof for indoor use (IP54)
Color	Housing, cover                      Semi-transparent
Major materials	Housing, cover                      Polycarbonate
Weight	Approx. 90 g

Table 1 Ambient temperature characteristics

Item	Unit	PY9000D							
		1005	1010	1050	1100	1250	2005	2010	
Zero point	Typ.	% F.S./°C	±0.02	±0.01	±0.01	±0.01	±0.02	±0.02	±0.02
	Max.	% F.S./°C	±0.10	±0.04	±0.04	±0.04	±0.10	±0.10	±0.10
Sensitivity	Typ.	% F.S./°C	±0.03	±0.01	±0.01	±0.01	±0.03	±0.03	±0.03
	Max.	% F.S./°C	±0.06	±0.05	±0.02	±0.02	±0.06	±0.06	±0.06

## CE Marking

Install this product in a place out of reach of unauthorized persons who are not well-trained for electric facilities.

This product conforms to the following specifications for CE marking.

EN 61326-2-3:2013

EN 50581:2012

**Dimensions**

**Main unit**

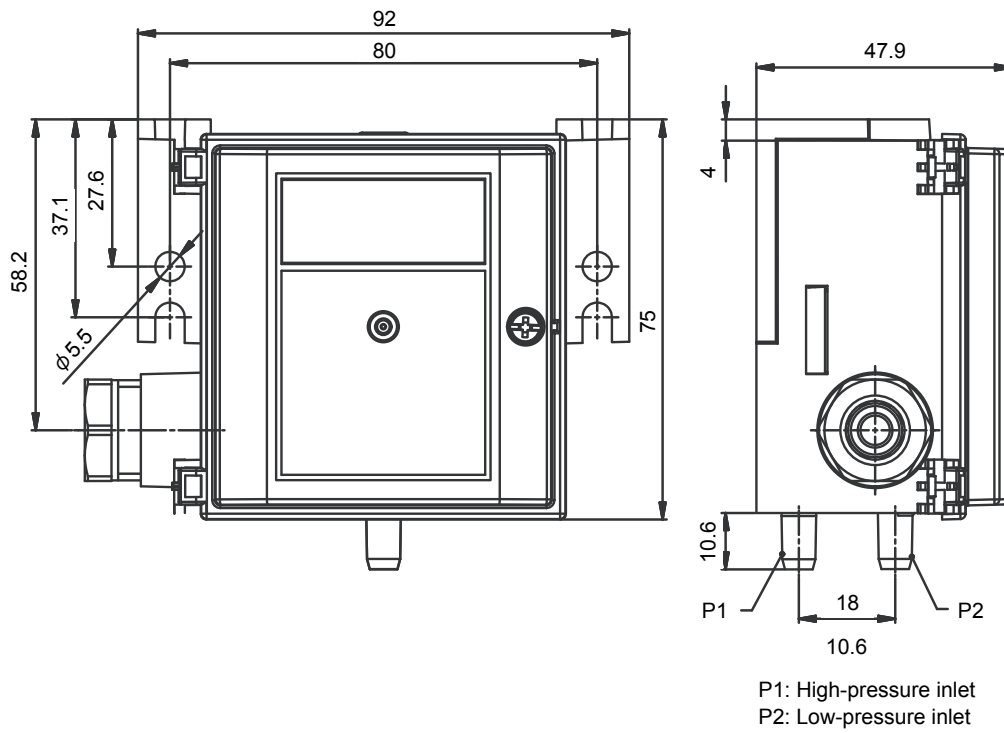


Figure 1 Dimensions (mm)

**Duct tube**

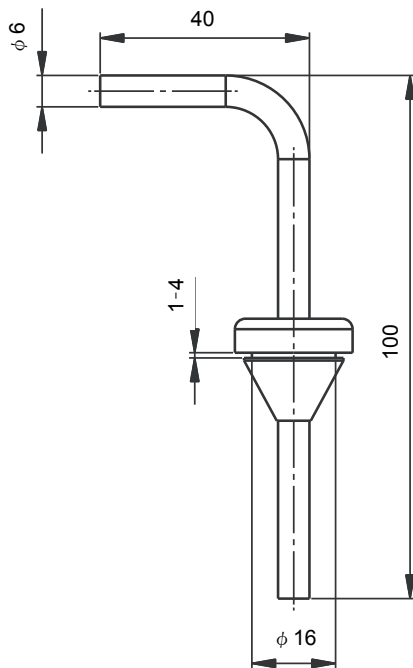


Figure 2 Duct tube (90° angle)

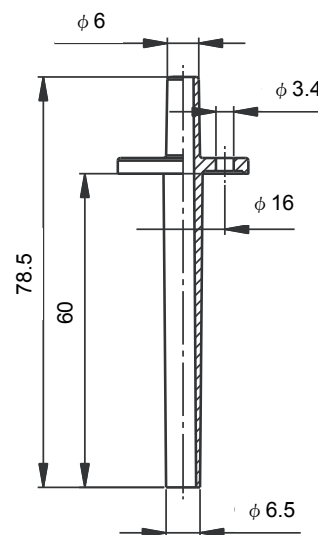


Figure 3 Duct tube (straight)

DIN rail mount adapter

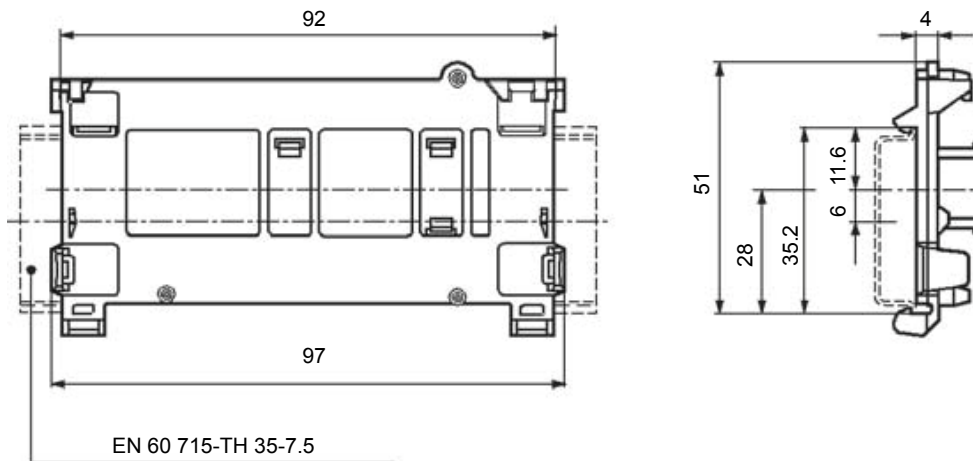







Figure 4 DIN rail mount adapter

Installation

 CAUTION	
	Use this product under the operating conditions (for temperature, humidity, power, vibration, shock, mounting direction, atmosphere, etc.) listed in the specifications. Failure to do so might cause fire or device failure.
	Installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards.
	Do not subject the product to shock or impact. Doing so might cause device failure.
	Do not put load or weight on the product. Doing so might damage the product.

Installation Location

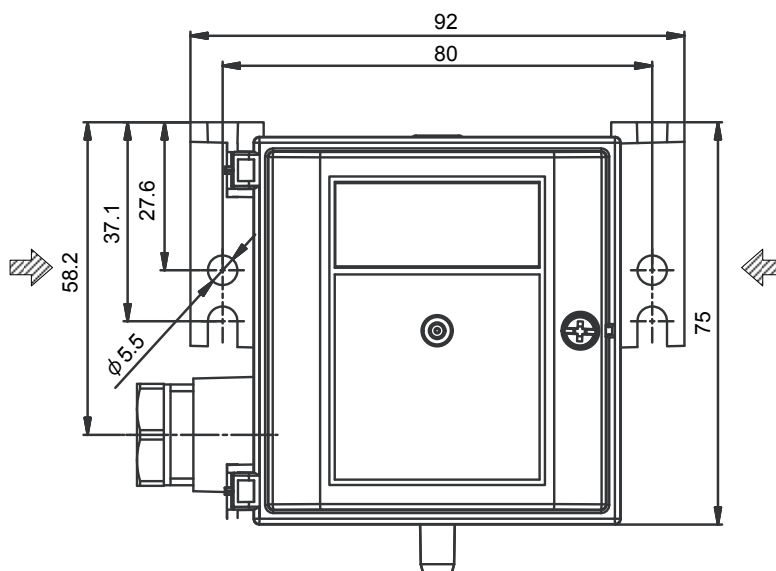
Install the transmitter indoors, and follow the below instructions for installation.

- If the transmitter is used with one pressure inlet open to the air, mount the transmitter (for the pressure inlet open to the air) in a location with small fluctuation of the pressure.
- Avoid locations exposed to wind.
- Avoid locations with significant thermal changes.
- Avoid locations with vibration.
- Avoid locations subject to high pressure pulses.
- Avoid locations with corrosive gas contained in atmospheric air.
- Leave enough space for installation and maintenance.
- Avoid locations near magnetic materials and/or magnetic fields.
- Mount the transmitter in non-condensing environment.

**IMPORTANT:** Do not use the transmitter in a location where human life may be affected (e.g., medical intensive care unit, etc.). For applications that require safety. To ensure the required degree of reliability and safety, the customer's system should provide failsafe design in the event that the transmitter fails.


**Vertical installation (recommended)**




- (1) Check that the target control system is stopped.
- (2) Mount the pressure inlet facing downward.  
(Note) If the pressure inlet is facing upward, condensed water may enter into the transmitter and cause device failure.
- (3) Mount the product with two M5 screws or tapping screws on a wall through the mounting holes shown in figure 5.  
(Note) The two M5 screws or tapping screws are not included with the product.

Figure 5 Mounting holes ( $\phi 5.5 \times 2$ )

(Note) This product can be mounted horizontally. Be sure to adjust the zero point.

**Wiring**

<b>⚠ WARNING</b>	
	Before wiring or maintenance, be sure to turn off the power to this product. Failure to do so might cause electric shock or device failure

<b>⚠ CAUTION</b>	
	Use this product under the operating conditions (for temperature, humidity, power, vibration, shock, mounting direction, atmosphere, etc.) listed in the specifications. Failure to do so might cause fire or device failure.
	Installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards.
	Do not subject the product to shock or impact. Doing so might cause device failure.

- (1) Loosen the screw on the surface to open the front cover.
- (2) Connect the wires as shown in figure 6.

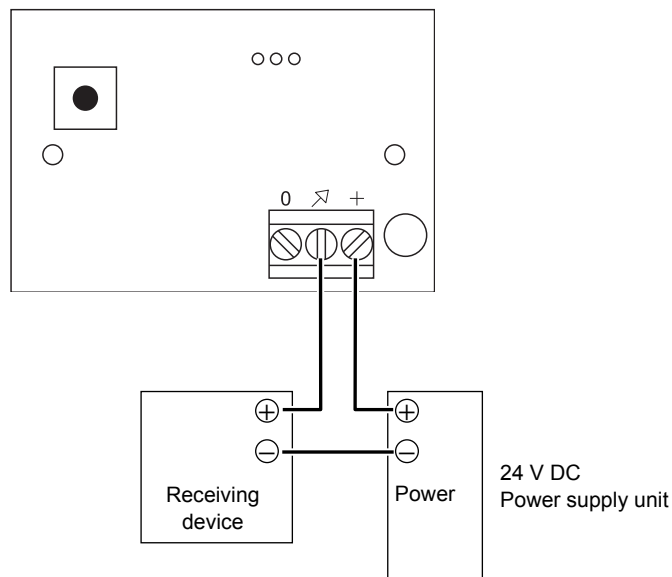


Figure 6 Wiring between receiving device and power supply unit

(Note) For details, refer to AB-6484, *Converter Specifications/Instructions* (Model RYY792).

- (3) Check that the transmitter is wired correctly.
- (4) Close the front cover and fasten it with the screw.

(Note) This product is splash-proof for indoor use (IP54). Be sure not to damage the cover or housing. Before closing the cover, check that there is no foreign matter inside. Make sure that the cover is correctly attached to the case and fasten it with the screw.



## Operation

### Start

The measuring range of model PY9000D is preset at the factory at 4 mA DC for the lower limit and 20 mA DC for the upper limit.

- (1) Turn on the 24 V DC power supply.
- (2) Adjust the zero point.
  1. Loosen the screw on the surface to open the front cover.
  2. Remove the tubes connected to the high and low pressure inlets.

3. Leave both inlets open to the air,  
or apply the same pressure to both of them.

(Note) Do not allow the inlets to be exposed to wind.

4. Press the zero-point adjustment button for 1 second or more.

Model PY9000D1\_\_\_ is adjusted to 4 mA DC.

Model PY9000D20\_\_ is adjusted to 12 mA DC.

(Note) When power is not supplied, the zero point cannot be adjusted by pressing the button.

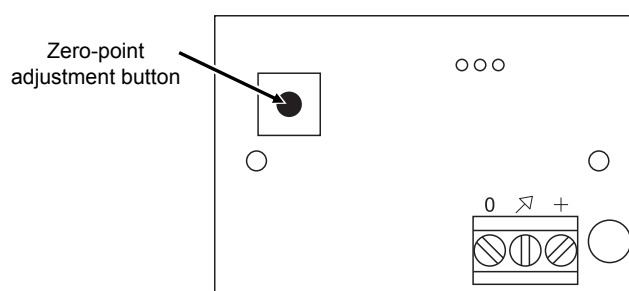


Figure 7 Zero-point adjustment button

### Stop

- (1) Turn off the power supply.  
Turn off the power supply when the product is not used.

### Notes for operation

- During operation, do not open the cover.
  - If the zero-point adjustment button is pressed during operation, measuring accuracy will be affected.
  - Magnetic force from a magnetic screwdriver placed nearby may interfere with measurement.
  - If a component on the printed circuit board is damaged, safe system operation may not be ensured.
- Do not allow an inlet that is open to the air to be exposed to wind.

If both the high and low pressure inlets are open to the air,  
 model PY9000D1\_\_\_ generates a 4 mA DC signal,  
 model PY9000D20\_\_ generates a 12 mA DC signal.

Table 2 Input and output current

Output current [mA]	Input [%]
4	0
12	50
20	100

Table 3 Input and differential pressure

Input [%]	Differential pressure [Pa]						
	PY9000D2005	PY9000D2010	PY9000D1005	PY9000D1010	PY9000D1050	PY9000D1100	PY9000D1250
0	-50	-100	0	0	0	0	0
50	0	0	25	50	250	500	1250
100	50	100	50	100	500	1000	2500

## Troubleshooting

### No output

Check the following items.

If the both of the following items are correct, there may be a problem with the sensor or the electric circuit.

- Is power supplied correctly?
- Are the positive and negative wires connected correctly?

### Low output

Measured pressure for the high pressure inlet may be too low, or measured pressure for the low pressure inlet may be too high.

Check the following items.

- For differential pressure measuring, check if the tubes for the high or low pressure inlet are connected correctly. If they are reversed, connect them to the correct inlets.
- For static pressure measuring, check if the pressure tube is connected correctly. If it is connected to the wrong side, connect it to the correct inlet.
- Check if gas leaks from the tube for the high pressure inlet. If so, replace the tube or disconnect and connect the tube again.
- Check if the tube for the high or low pressure inlet is deformed. If so, replace the tube or disconnect and connect the tube again.

### High output

Measured pressure for the high pressure inlet may be too high, or measured pressure for the low pressure inlet may be too low.

Check the following items.

- Check if gas leaks from the tube for the low pressure inlet. If so, replace the tube or disconnect and connect the tube again.
- Check if the measured pressure is higher than the allowed range, or if the specified measuring range of the installed transmitter model is suitable for the actual pressure range.
- Check if the tube for the high or low pressure inlet is deformed. If so, replace the tube or disconnect and connect the tube again.

### Ripple

- Check if the product is mounted in a place where there is vibration.  
Prevent the product from vibrating by changing the mounting location, etc.
- Check if the measured pressure ripples.  
Reduce ripple by using the filtering function of the controller.
- For pressure measuring with one of the inlets open to the air, check if the pressure greatly changes due to wind, etc.  
If so, prevent exposure to the wind by changing the mounting location, etc.

### Maintenance

Check the following items at least once a year.

- Ripple or other abnormal conditions in output signal
- Zero-point shift

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*Specifications are subject to change without notice.*

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