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.

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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

⚠ WARNING	Alerts users that improper handling may cause death or serious injury.
⚠ CAUTION	Alerts users that improper handling may cause minor injury or material loss.

Symbols

	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.)

⚠ WARNING	
	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

⚠ CAUTION	
	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.

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

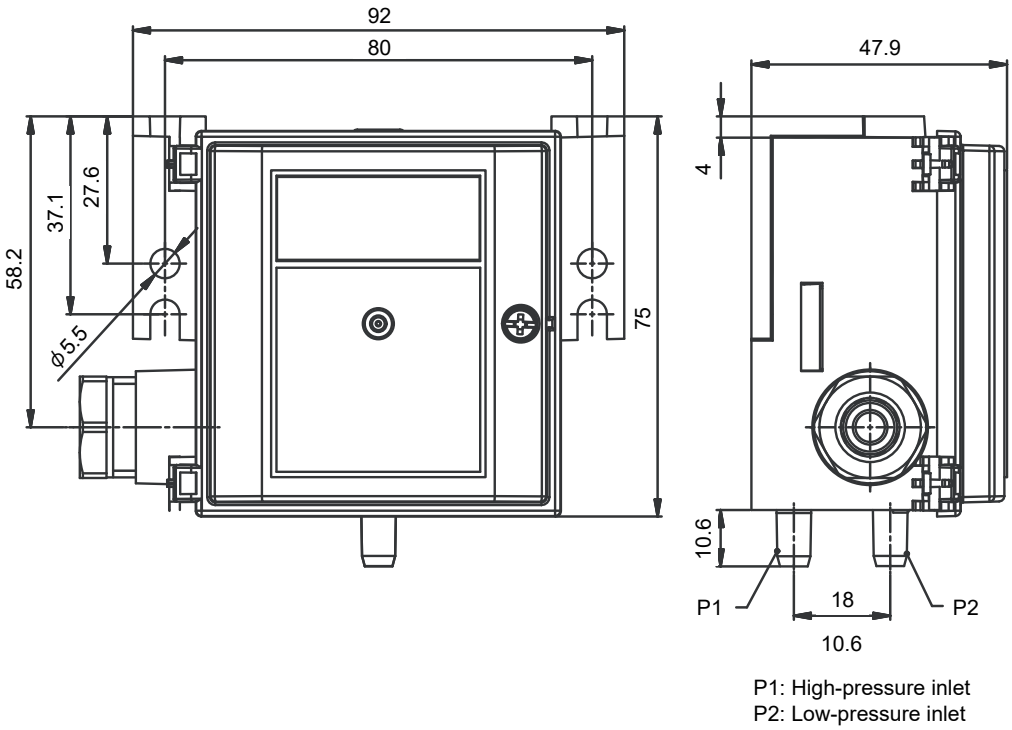
Item		Specification		
Measuring range		Refer to Model Numbers.		
Measuring accuracy		±2.0 % F.S.		
Measuring method		Semiconductor ceramic cantilever		
Allowable differential pressure		Model PY9000D 1005, 1010, 2005, 2010:	Max. 5000 Pa,	Min. -400 Pa
		Model PY9000D 1050, 1100, 1250:	Max. 10000 Pa,	Min. -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 *Table 1 Ambient temperature characteristics.*		
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

Dimensions

Main unit



P1: High-pressure inlet
P2: Low-pressure inlet

Figure 1 Dimensions (mm)

Duct tube

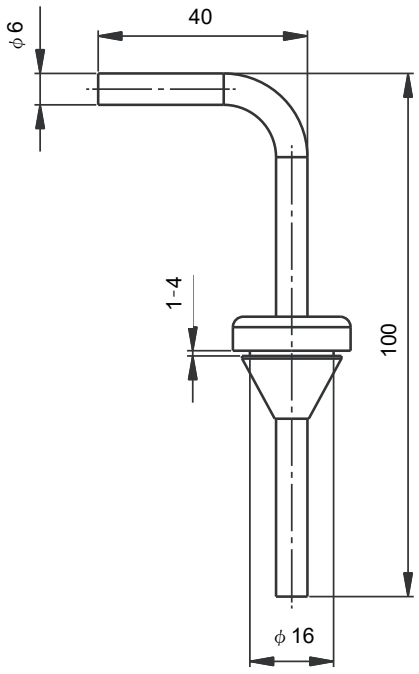


Figure 2 Duct tube (90° angle)

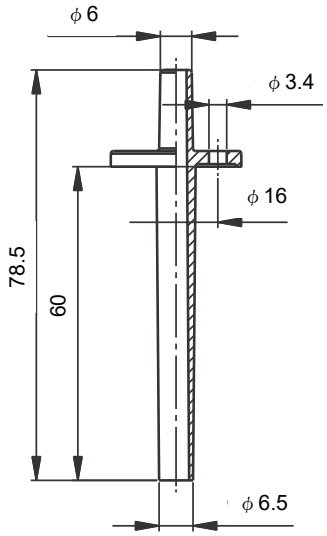


Figure 3 Duct tube (straight)

DIN rail mount adapter

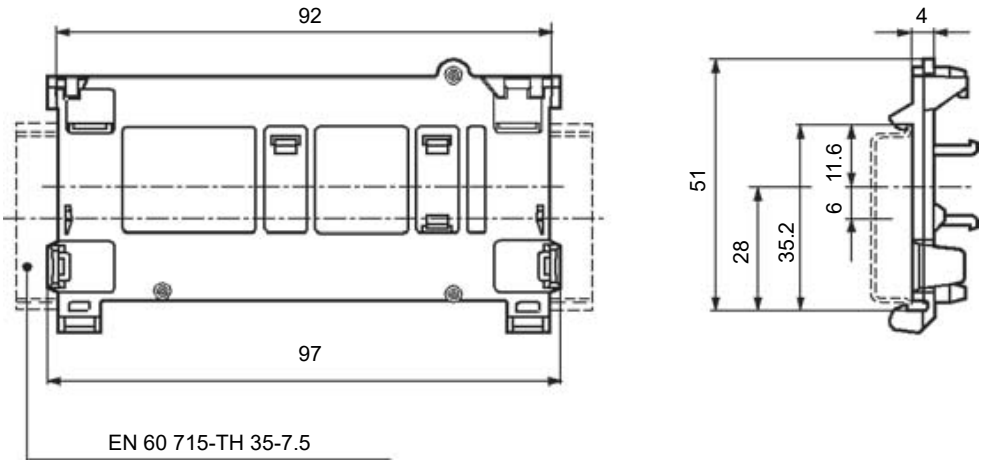


Figure 4 DIN rail mount adapter

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.

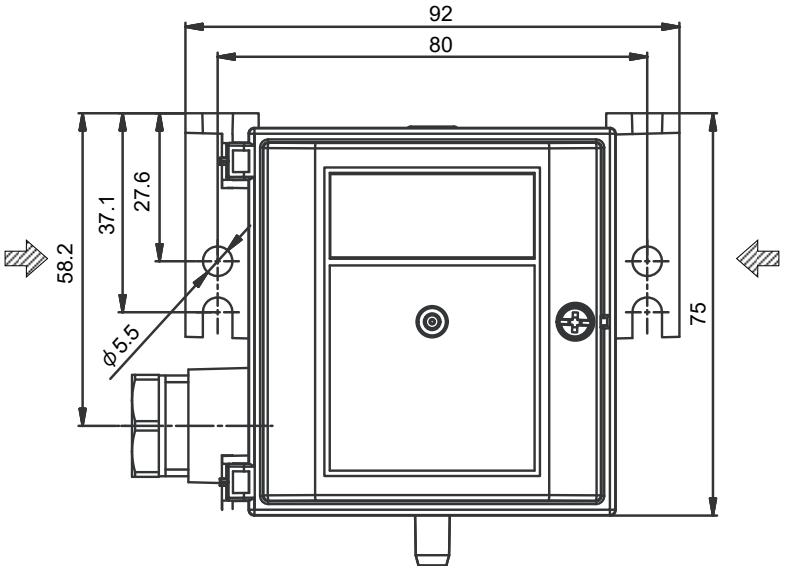


Figure 5 Mounting holes (φ 5.5 × 2)

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

Wiring

⚠WARNING	
❗	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

⚠CAUTION	
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❗	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.

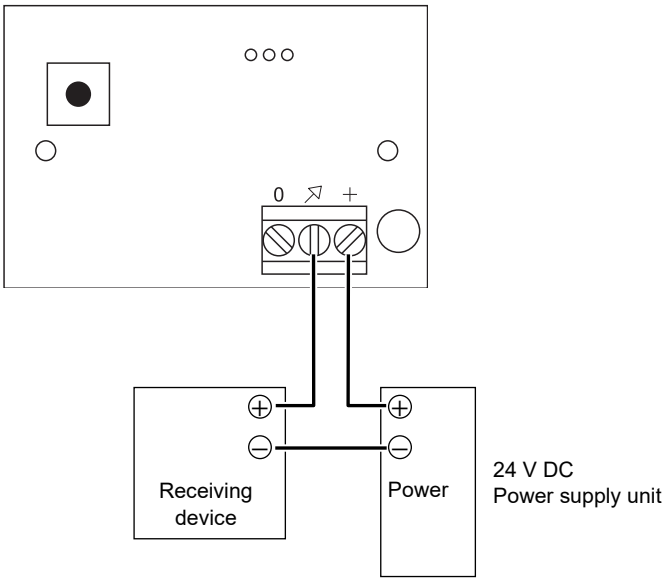

Figure 6 Wiring between receiving device and power supply unit

(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.

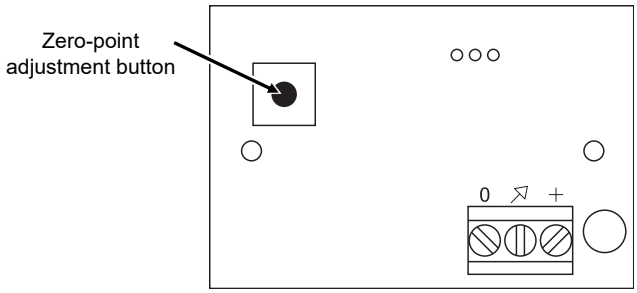

Figure 7 Zero-point adjustment button

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

Disposal

When this product is no longer needed, please dispose of it as industrial waste in accordance with local regulations.

Do not reuse all or part of this product.

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.
EMCD: EN 61326-1 Class B, Table 1 (for use in a basic electromagnetic environment)

Specifications are subject to change without notice.

Azbil Corporation
Building Systems Company

http://www.azbil.com/

Rev.1.0 Dec. 2021 AB-7271
(J: AI-7271 Rev. 2.0)