

# Ceiling-Mounted Temperature Sensor (Round Type)

## ■ Overview

Ceiling-mounted temperature sensor (round type), Model TY7302Z0\_0\_, is a room temperature sensor designed for mounting on ceilings.

Since the number of offices with less pillars and walls is increasing, the use of the ceiling surface for mounting the temperature sensor is increasing.

This product is a sensor that can be applied to various indoor applications including air conditioning in general office buildings because it is designed to be inconspicuous for mounting on ceilings and it can be easily mounted using springs.



## ■ Features

- Even in large spaces with few pillars and walls, it is possible to measure the temperature near the center of segmented zones.
- It is small and thin, so it is inconspicuous.
- It is an omni-directional round type sensor, so it can be mounted in any orientation at the time of construction.
- It is possible to mount on various types of ceilings such as steel ceiling panel and acoustic ceiling board.
- It can be easily snapped in for installation with mounting springs.

Maintenance can be done from inside the room.

## Safety Precautions

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

### Restrictions on Use

This product was developed, designed, and manufactured for general air conditioning use.

Do not use the product in a situation where human life may be at risk or for nuclear applications in radiation controlled areas. If you wish to use the product in a radiation controlled area, please contact Azbil Corporation.

Particularly when the product is used in the following applications where safety is required, implementation of fail-safe design, redundant design, regular maintenance, etc., should be considered in order to use the product safely and reliably.

- Safety devices for protecting the human body
- Start/stop control devices for transportation machines
- Aeronautical/aerospace machines

For system design, application design, instructions for use, or product applications, please contact Azbil Corporation.

Azbil Corporation bears no responsibility for any result, or lack of result, deriving from the customer's use of the product.

### Recommended Design Life

It is recommended that this product be used within the recommended design life.

The recommended design life is the period during which you can use the product safely and reliably based on the design specifications.

If the product is used beyond this period, its failure ratio may increase due to time-related deterioration of parts, etc.

The recommended design life during which the product can operate reliably with the lowest failure ratio and least deterioration over time is estimated scientifically based on acceleration tests, endurance tests, etc., taking into consideration the operating environment, conditions, and frequency of use as basic parameters.

The recommended design life of this product is 15 years.

The recommended design life assumes that maintenance, such as replacement of the limited life parts, is carried out properly.

Refer to the section on maintenance in this manual.

### 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.

### Signs



Electric shock

Alerts users to possible hazardous conditions caused by erroneous operation or erroneous use. The symbol inside  $\triangle$  indicates the specific type of danger. (For example, the sign on the left warns of the risk of electric shock.)



Disassemble

Notifies users that specific actions are prohibited to prevent possible danger. The symbol inside  $\odot$  graphically indicates the prohibited action. (For example, the sign on the left means that disassembly is prohibited.)



General

Instructs users to carry out a specific obligatory action to prevent possible danger. The symbol inside  $\bullet$  graphically indicates the actual action to be carried out. (For example, the sign on the left indicates general instructions.)

### 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 may cause fire or device failure.



For the sake of safety, 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 use an AC power supply for wiring this product. Doing so may cause electric shock or device failure.



Do not block the ventilation holes of this product. If the ventilation holes are clogged, clean them. Failure to do so may result in measurement error or device failure.



Do not disassemble this product. Doing so may cause device failure.

## ■ Model Numbers

Basic model number	Power supply	Fixed	RTD	Fixed	Output wiring	Specification
TY7302						Ceiling-mounted (round type)
	Z					Power supply is not required.
		0				Fixed
			P			Pt100Ω (3-wire)
			K			Pt1000Ω (2-wire)
				0		Fixed
					0	Lead wire output (300 mm)
					1	Modular connector output

## ● Optional parts

Model number	Description	Remarks
FT7302001	Attachment rings for ceiling-mounted temperature sensor (round type), x10 (hereinafter attachment ring)	Silicon rubber attachment rings for attaching on a thin ceiling panel such as steel ceiling panel.
DY7210A_ _ _ _	LAN cable	<ul style="list-style-type: none"> <li>The last 4 digits of the model number denotes the cable length from "0005" (5 m) to "0050" (50 m) by the 5 m steps.</li> <li>To be used for the modular connector connection.</li> <li>Select the LAN cable described in ■ "Specifications" below.</li> <li>For the cable length, refer to the Specifications/Instructions of the controller to which this sensor is connected.</li> </ul>

## ■ Specifications

Item		Specification	
Measuring range		0–60 °C	
Measuring accuracy	Model TY7302Z0P_ _	± 0.3 °C (0–40 °C), ± 0.35 °C (40–60 °C) Note: Applied current: 1 mA, air velocity 0.5 m/s	
	Model TY7302Z0K_ _	± 0.5 °C (0–60 °C) Note: Applied current: 0.1–0.3 mA, air velocity 0.5 m/s	
Output signal	Model TY7302Z0P_ _	100 Ω / 0 °C, RTD (Pt100), conforming to JIS C 1604:2013 Class A	
	Model TY7302Z0K_ _	1000 Ω / 0 °C, RTD (Pt1000), conforming to JIS C 1604:2013 Class A	
Time constant		3 min or less (ambient air velocity at 0.5 m/s)	
Environmental conditions	Operating conditions		Transport/storage conditions
	Ambient temperature	0–60 °C	-10–65 °C
	Ambient humidity	10–90 % RH (without condensation)	5–95 % RH (without condensation)
Insulation resistance		100 MΩ or more (500 V DC applied) (Between the output terminal leads and the case, or output connector pins and the case)	
Withstand voltage		Leakage current: 5 mA or less (500 V AC is applied for 1 min) (Between the output terminal leads and the case, or output connector pins and the case)	
Color		White (equivalent to Munsell N9)	
Major materials	Body of sensor	Fire-resistant PC resin (equivalent to UL V-0)	
Weight		Approx. 15 g	
Wiring (lead wire)	Model TY7302Z0P00	3-wire (red x1, white x2)	
	Model TY7302Z0K00	2-wire (red x1, white x1)	
(Modular connector)	Model Y7302Z0_01	LAN cable that conforms to EIA/TIA-568 category 3 or more (φ0.5 mm ×4P) is required.	

■ Dimensions

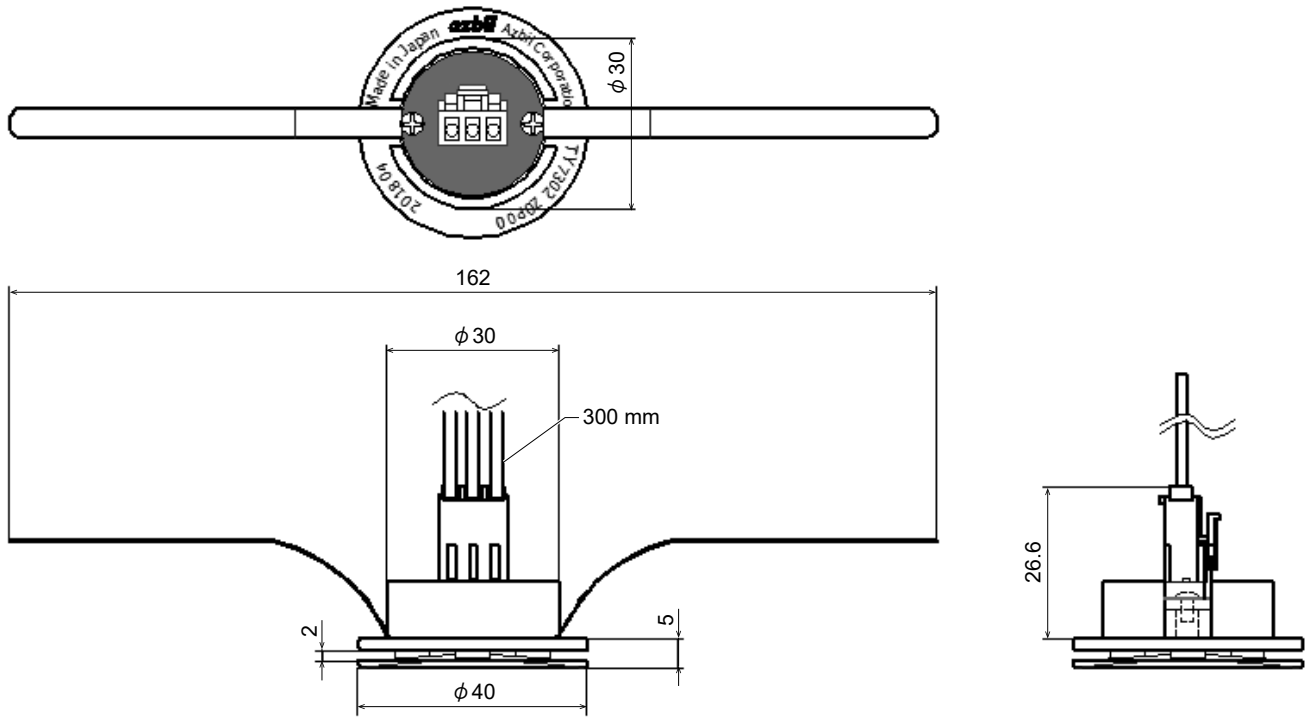


Figure 1. TY7302Z0\_00: Lead wire connection

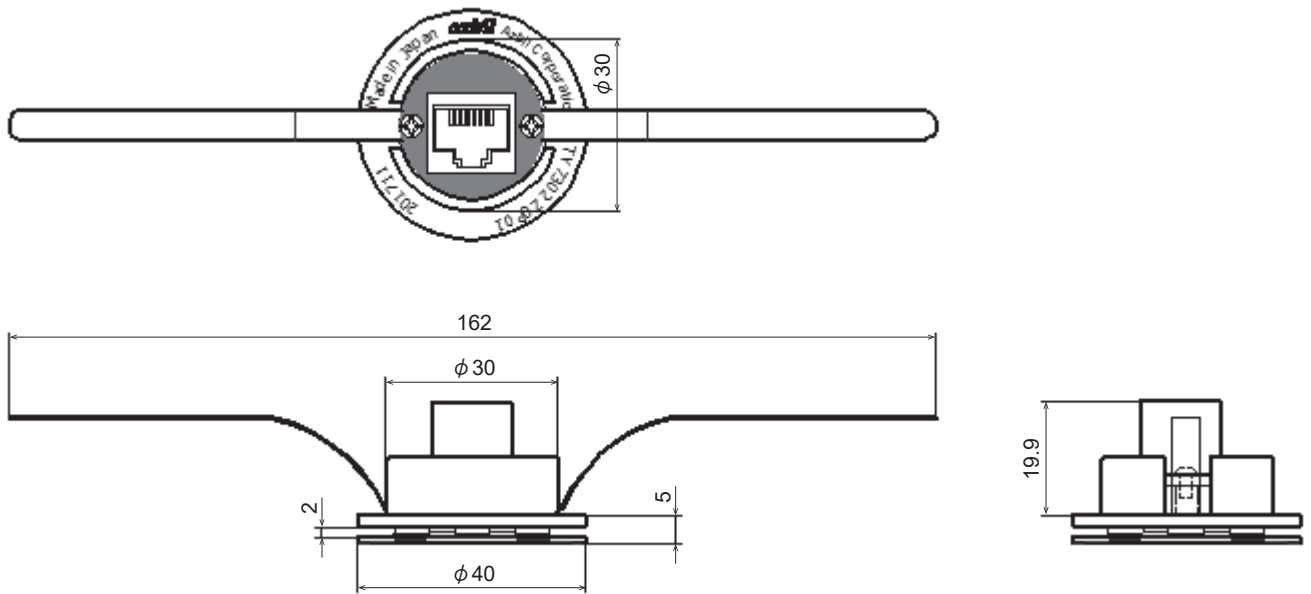


Figure 2. TY7302Z0\_01: Moduler connector connection

## ■ 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 may cause fire or device failure.
!	For the sake of safety, installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards.

### ● Installation location

To install this product, check that the following conditions are satisfied.

- Install on a ceiling.

Note: This product is designed to install on a ceiling.  
Do not install on a wall.

- The air conditioning system should have return air chamber in the ceiling.
- To install the sensor in an interior zone of a room:
  - Check that the room atmosphere passes through the sensing element.
  - Prevent short-circuit on the product.
  - Keep away from heat generated by lights and other devices.
- To install the sensor in a perimeter zone of a room:
  - Check that the room atmosphere passes through the sensing element.
  - Prevent short-circuit on the product.
  - Select an adequate supply air blowing method.
  - If cold/hot air blows from the ceiling slit on the window side, install it to the interior side rather than the blowing slit side.
  - Keep away from the radiation heat of the sun.

### ● Preparation for installation

- This product can be installed on the following ceiling panels.
  - Ceiling panel with thickness between 3 mm and 25 mm:  
E.g., Acoustic ceiling board
  - Ceiling panel with thickness between 1 mm and 3 mm:  
E.g., Steel ceiling panel

Since there are differences in handling depending on the thickness and material of the ceiling panel, in the following example, we will call each notation “acoustic ceiling board” and “steel ceiling panel” according to the example above.

Make sure that the upper space of the ceiling for installation is at least 100 mm in height and there are no other devices, wiring, etc. in the range of diameter 200 mm. If there are a lot of wiring, etc. above the ceiling, the sealing sensor may not be correctly installed.

- Before installing this product, make a hole in the ceiling panel as shown below.

Material of ceiling panel	Hole diameter
Nonmetallic (e.g., acoustic ceiling board)	30–31 mm
Metal (e.g., steel ceiling panel)	31–34 mm (recommended dia. $32 \pm 1$ mm)

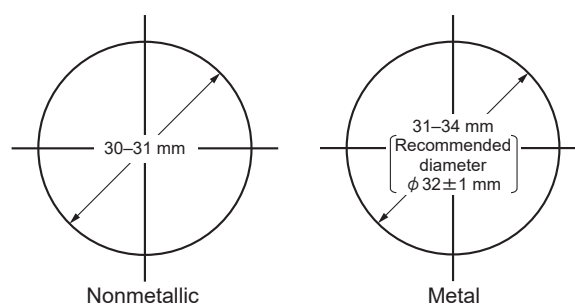


Figure 3. Hole size in ceiling panel (mm)

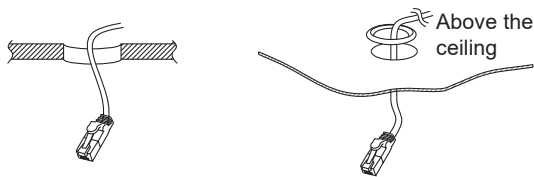
- When installing on the steel ceiling panel, use the attachment ring (optional parts) to mount the sensor firmly. After drilling the mounting hole, remove dust and dirt on the back side of the ceiling panel (side for mounting the attachment ring).

● **Installation method**

(1) Pull out the wiring.

- For lead wire connection:  
Pull out the wiring through the mounting hole.
- For modular connector connection:  
Pull out the LAN cable through the mounting hole.

If the sensor is installed on the steel ceiling panel, pull the wiring or cable through the attachment ring.



(a) Installed on the acoustic ceiling board (b) Installed on the steel ceiling panel

Figure 4. Pulling out the wiring

(2) Connect the wiring for the sensor above the ceiling to the sensor.

- For lead wire connection:  
Connect the wiring for the sensor above the ceiling to the lead wires of the sensor. Connect them using your relay crimp terminals and connectors.

**IMPORTANT** • Firmly connect them using closed end connectors, etc.

- For modular connector connection:  
Remove the protective seal of the modular jack. Connect the wiring for the sensor and the modular jack on the sensor.

**IMPORTANT**

- Insert the modular jack until it clicks and lightly pull the cable to make sure perfect connection.
- Do not accidentally insert the LAN cable or PoE (power on Ethernet) cable in use into the modular jack terminal of this product.
- After removing the modular jack protective seal, do not leave the sensor attached on the ceiling without connecting the LAN cable.
- If the sensor is repeatedly attached or detached from the ceiling panel, depending on the type of ceiling, the ceiling wall may be scraped and its holding force may become weak.

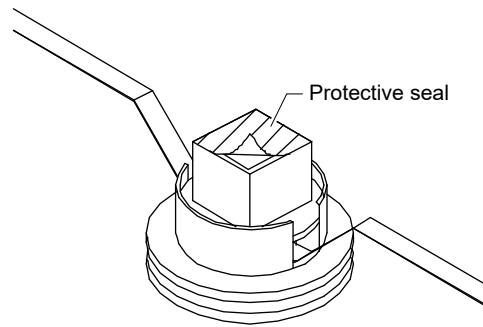
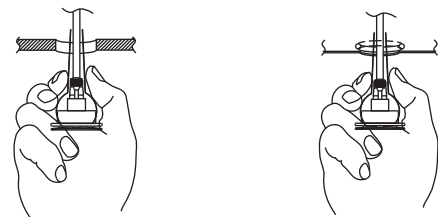


Figure 5. Protective seal of the modular jack terminal

(3) Push the mounting springs with one hand and insert the mounting springs through the hole (and attachment ring if installed on the steel ceiling panel) prepared in “Preparation for installation,” and release the mounting springs.

**IMPORTANT**

- Do not apply excessive force, such as bending the mounting springs to the opposite side. Doing so may damage the product.
- Do not cut or process the mounting springs.

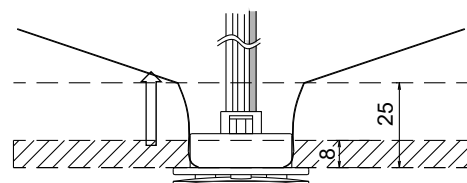


(a) Installed on the acoustic ceiling board (b) Installed on the steel ceiling panel

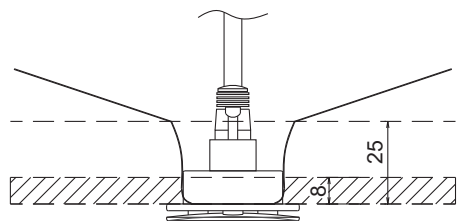
Figure 6. Installation on the ceiling panel

(4) Push in the sensor unit firmly so that there is no gap between the ceiling and the unit.

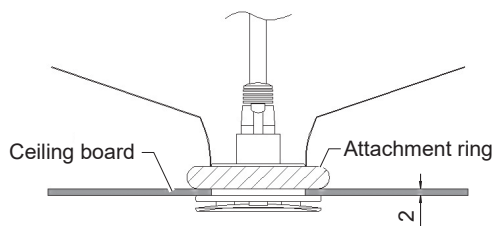
If the sensor is installed on the steel ceiling panel, mount the sensor so that the attachment ring and the ceiling panel, the sensor and the ceiling panel are in close contact each other. Install it so that there is no gap or wobble.



(a) Installation on the acoustic ceiling board with the lead wires  
(Model TY7302Z0\_00)



(b) Installation on the acoustic ceiling board with the modular jack connector (Model TY7302Z0\_01)



(b) Installation on the steel ceiling panel with the modular jack connector (Model TY7302Z0\_01)

Figure 7. Installation on the ceiling panel

● **Removal method**

- (1) Hold the ceiling panel with one hand and pull down the sensor unit straight downward with the other hand. When the mounting spring appears, swap the sensor unit for the mounting spring and pull it out while holding down it.
- (2) Disconnect the wiring for the sensor above the ceiling from the sensor unit.

- For lead wire connection:  
Cut the lead wires and do treatment for the cut leads.
- For modular connector connection:  
Unplug the modular connector.

If the sensor is installed on the steel ceiling panel, collect the attachment ring and keep it.

**IMPORTANT** ● If the ceiling panel is acoustic ceiling board, there is a possibility that the ceiling board is scraped off due to bouncing of the mounting springs, etc. if force for holding them is weak, and the debris will be generated and it may get in eyes.

■ **Wiring**

**⚠ CAUTION**

For the sake of safety, installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards.

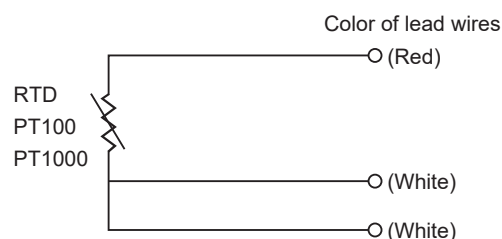
All wiring must comply with applicable codes and ordinances.

Because the resistance temperature detector (Pt1000) has 2 wires, resistance of the wiring becomes a measurement error.

- If cross section of the wire is 1.25 mm<sup>2</sup>, approx. 0.1 °C per 10 m will be given as a measurement error.  
Adjust the error by the controller as necessary.

● **Lead wire connection**

Recommended wire: 1.25 mm<sup>2</sup>, heat-resistant vinyl insulated wire (stranded wire)



● **Modular connector connection**

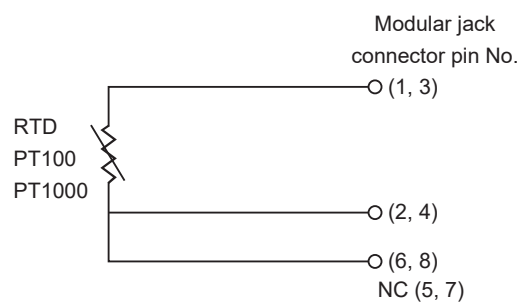


Figure 8. Internal circuits

**IMPORTANT** ● For wiring Pt1000 with 2 wires, use the red wire and either of the white wires. For the white wire that is not used, cut it off or treat properly.

## ■ Maintenance

This product is inspected at the factory when it is shipped and the temperature accuracy is adjusted within the specifications.

No field adjustment is required for installation.

The product should be maintained as described below.

### (1) Regular inspection

- According to the amount of dust in the air and the condition of dirt, determine the cycle for inspection. Check the sensing accuracy, clogging of ventilation holes and clean them.
- There is a temperature difference between the space where person is present and the space near the ceiling. Adjust the controller as necessary.

### (2) Troubleshooting

If any problem occurs during operation, refer to table 1, "Troubleshooting" for taking countermeasures.

Table 1. Troubleshooting

Problem	Inspection	Countermeasures
No output Unstable output	Loose wiring	Redo wiring.
	Disconnected wires	
	Damaged sensing element	Replace the product.
Slow response to output	Sensing element soaked with water or condensation	Replace the product.
	Ventilation holes clogged with dust	Clean the dust.
Measurement errors	Check the installation location.	Refer to ■ "Installation" to check the installation location.
	Check dust on the cover and the condition of dirt.	Clean the cover.
	Check the measurement error with the actual value.	<ul style="list-style-type: none"> <li>• Adjust the parameters of the controller.</li> <li>• Replace the product.</li> </ul> Note: Contact Azbil Corporation.
The product is coming off.	Wobble and looseness of the product.	Refer to • "Installation method" to remount the product.

## ■ Disposal

Dispose of this product as industrial waste in accordance with your local regulations.

Do not reuse all or any part of the product.

Azbil Corporation  
Building Systems Company

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*Specifications are subject to change without notice.*