

Insertion Thermostat (Proportional)

■ General

Model TY9800Z is an insertion thermostat applicable to control temperature for air in duct and liquid in tank or pipe.

■ Features

(1) Proportional control

The temperature sensing element, filled with liquid, detects changing of temperature.

It activates the potentiometer through diaphragm, setting mechanism, and lever mechanism.

(2) Easy temperature setting and proportional band adjustment

Target temperature is easily set by the knob in the front of the thermostat.

Proportional band is set by the proportional band adjustment dial inside the main unit.



■ Model Numbers

Model Numbers	Temperature setting range (°C)	Allowable max. temperature of temperature sensor (°C)	Allowable min. temperature of temperature sensor (°C)	Capillary length (m)
TY9800Z6000	-15–70	100	-40	1.5
TY9800Z6010	-15–70	100	-40	5
TY9800Z7000	5–90	100	-40	1.5
TY9800Z7010	5–90	100	-40	5
TY9800Z8000	40–125	150	-40	1.5

Note:

1. This product can be used with an Azbil Corporation's actuator: modutrol motor, multi-purpose control motor, or ACTIVAL™.
2. Actual length of capillary is 1.35–1.6 m for the 1.5 m type, 4.75–5 m for the 5 m type.
Order the capillary considering the minimum required length.

● Parts ordered separately

Description	Model Number	Note	Reference
Immersion well	112624AA-J	R1/2 SUS304	Figure 2. in this manual AB-4074, Immersion Wells Specifications/ Instructions
Pressure fitting	83165370-001	1/2NPT	Figure 3. in this manual
Temperature sensor holder	DY3002A1011	Construction material	Figure 4. in this manual AB-4009, Bulb Holder Specifications/ Instructions

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.

● Cautions for connecting to system

- If this product breaks down, it does not have function to avoid or notify the abnormal conditions to other equipment. Please take countermeasures independently from this product.

● Prohibitions for installing this product

- Do not install the product in the following environments. Doing so might cause malfunction of the device or device failure in a short period of usage.
- Where special chemicals or corrosive gas (such as ammonia, sulfur, chlorine, ethylenic compound, acids, etc.) exist.
 - Where water droplets or excessive damp air exists.
 - Where condensation is made on the product.
 - Where exposed to direct sunlight or high temperature.
 - Where vibrations or shocks are applied.
 - Where dust or particles will not easily enter into the product.

● Cautions for installing this product

- Mount the the temperature sensor where representative temperature of the measuring object can be measured.
- Do not mount the temperature sensor in locations such as the following. Temperature may not be correctly measured.
 - Where exposed to warm or cold wind directly.
 - Where air stagnates or there is a draft.
 - Where water level changes largely.
 - Where the temperature sensor cannot be securely mounted.
 - Where unauthorized persons can have easy access.
 - Secure space around the product for maintenance.

■ 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



Alerts users 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.)



Notifies users that specific actions are prohibited to prevent possible danger. The symbol inside \ominus 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 \bullet graphically indicates the actual action to be carried out. (For example, the sign on the left indicates general instructions.)

⚠ WARNING



If this product is connected to a system, be sure to implement safety measures. Failure to do might cause fire.

⚠ 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.
	All wiring must comply with applicable codes and ordinances.
	To connect the wires to the screw terminals, use crimp terminal lugs that have insulation. Failure to do so might cause short circuit and result in device failure or fire.
	Firmly tighten the terminal screws. Insufficient tightening of the terminal screws might cause overheating or fire.
	Do not disassemble the product. Doing so might cause electric shock or device failure.
	Dispose of the product as industrial waste in accordance with your local regulations. Do not reuse all or part of this product.

IMPORTANT • To use this product properly, follow the instructions described in this manual and the manuals for other devices connected to this product.

■ **Dimensions**

● **Insertion thermostat**

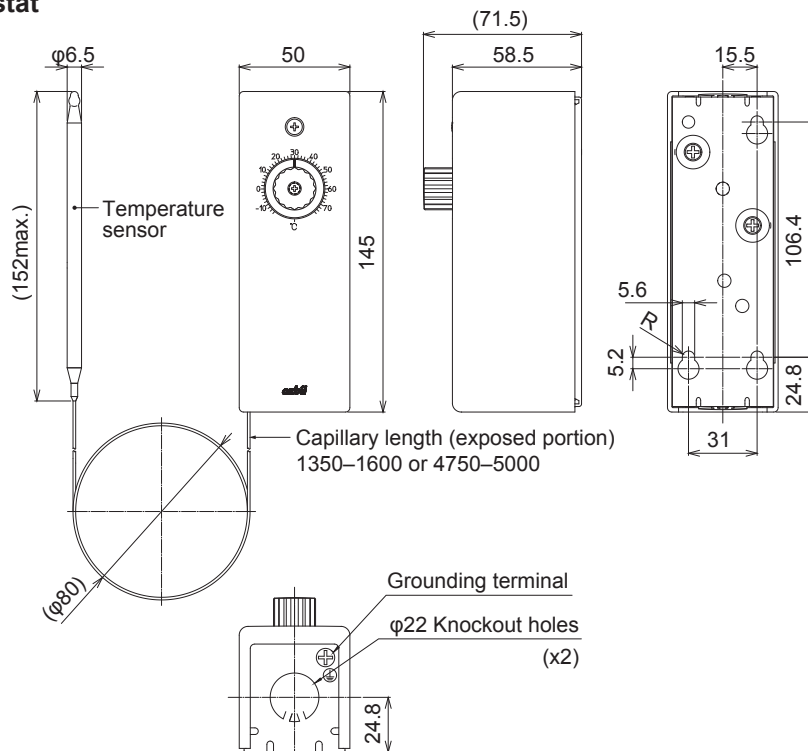


Figure 1. Dimensions (mm)

● Auxiliary parts

< Immersion well >

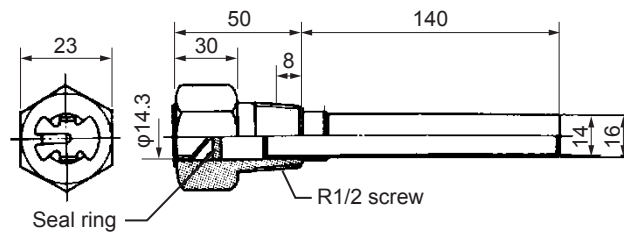


Figure 2. Dimensions of Model 112624AA-J (mm)

< Pressure fitting >

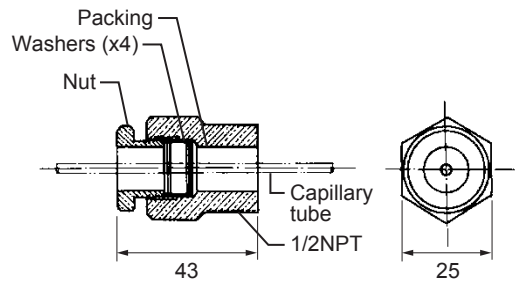


Figure 3. Dimensions of Model 83165370-001 (mm)

< Temperature sensor holder >

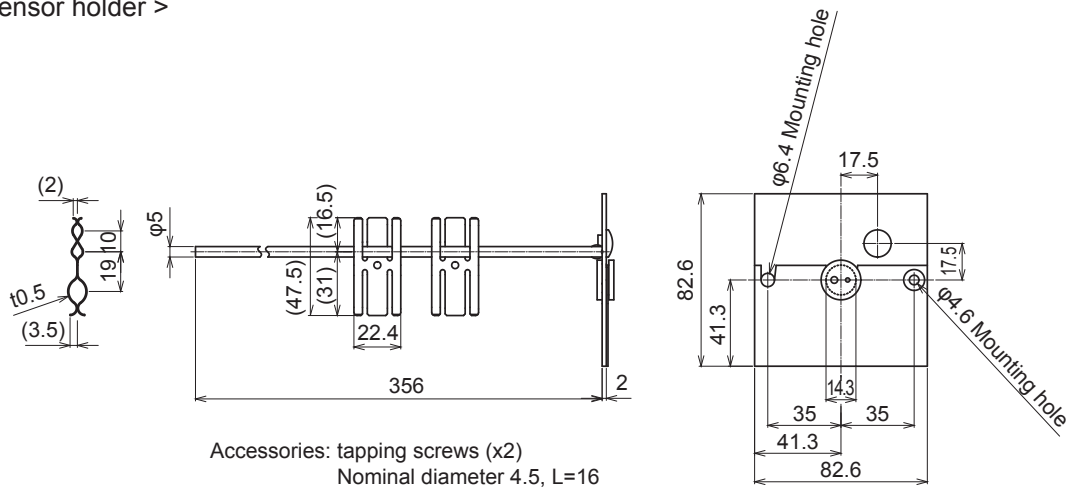




Figure 4. Dimensions of Model DY3002A1011 (mm)

■ Specifications

Item		Specification	
Proportional band		Approx. 4–30 °C (variable)	
Potentiometer resistance		Nominal 135 Ω	
Electric rating		24 V AC	
Environment conditions			Operating conditions
			Transportation/storage conditions
		Ambient temperature	0–50 °C
	Ambient humidity:	Max. 90 % RH (without condensation)	Max. 95 % RH (without condensation)
Temperature sensor	Size	Max. φ6.5x152 mm	
	Material	Copper	
	Max. pressure	0.35 MPa	
Capillary tube	Length	Approx. 1.5 m (actual 1.35–1.6 m) Approx. 5 m (actual 4.75–5 m) Note: Length of Model TY9800Z8000 (temperature range: 40–125°C) is 1.5 m only.	
	Material	Copper	
Installation		Mount the thermostat using the mounting holes on the back side of its case. (See <i>Figure 6.</i> and <i>7.</i>)	
Wiring		Connection to the screw terminals (M4)	
Weight		0.5 kg	
Major materials	Front cover	Polycarbonate resin, natural gray (Munsell value: N6.8)	
	Case	Cold rolled steel plate (1.2 mm thick) with galvanization	
Accessories	Mounting main unit	3 round machine screws (M4x12)	
		3 hexagonal nuts (M4)	
Auxiliary parts (to be ordered separately)		Immersion well	Model 112624AA-J, R1/2 screw, SUS304 (See <i>Figure 2.</i> , AB-4074)
		Pressure fitting	Part No. 83165370-001, 1/2NPT screw, brass (See <i>Figure 3.</i>)
		Temperature sensor holder	Model DY3002A1011, construction material (See <i>Figure 4.</i> , AB-4009)

■ 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.

Install the product referring to *Figure 5.*, *6.*, and *7.*

- If the temperature sensor is attached at higher position than the main unit, part of the capillary tube should be lower than the main unit. Water made by condensation etc. may enter the main unit to cause a short circuit, fire, or failure.
- If the product is installed outdoors, place it in a plastic box.

Note: The waterproof cover (Model Q615) is not applicable for the product.

● Prohibitions for installing this product

<p>Do not install the product in the following environments. Doing so might cause malfunction of the device or device failure in a short period of usage.</p> <ul style="list-style-type: none"> • Where special chemicals or corrosive gas (such as ammonia, sulfur, chlorine, ethylenic compound, acids, etc.) exist. • Where water droplets or excessive damp air exists. • Where condensation is made on the product. • Where exposed to direct sunlight or high temperature. • Where vibrations or shocks are applied. • Where dust or particles will not easily enter into the product.

● Cautions for installing this product

<ul style="list-style-type: none"> • Mount the the temperature sensor where representative temperature of the measuring object can be measured. • Do not mount the temperature sensor in locations such as the following. Temperature may not be correctly measured. <ul style="list-style-type: none"> • Where exposed to warm or cold wind directly. • Where air stagnates or there is a draft. • Where water level changes largely. • Where the temperature sensor cannot be securely mounted. <ul style="list-style-type: none"> • Where unauthorized persons can have easy access. • Secure space around the product for maintenance.

● Installation procedure

<p>IMPORTANT</p> <ul style="list-style-type: none"> • Do not twist or sharply bend the capillary tube. • Do not leave the cover detached. If the product is used in a dusty environment, dust may enter the unit or potentiometer, place the product in a dust-proof case etc. in order to avoid entering of dust.

- Mount the thermostat with the screws through 3 mounting holes provided on its rear side to a wall or panel.
- Detach the cover before mounting it.
- The temperature sensor is inserted into the duct, pipe, or tank with or without the immersion well. If the immersion well is used, refer to *AB-4074* for the details .

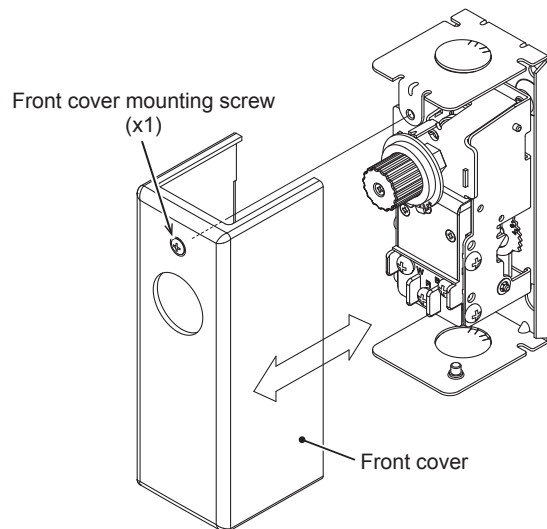


Figure 5. Attaching/detaching the cover

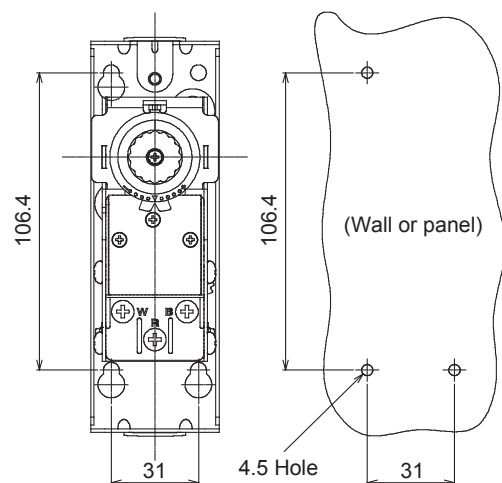


Figure 6. Mounting wall/panel dimensions (mm)

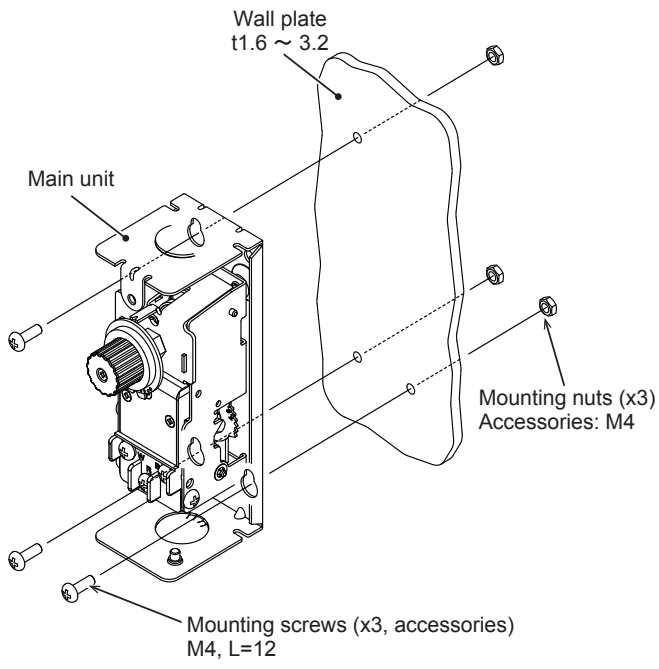
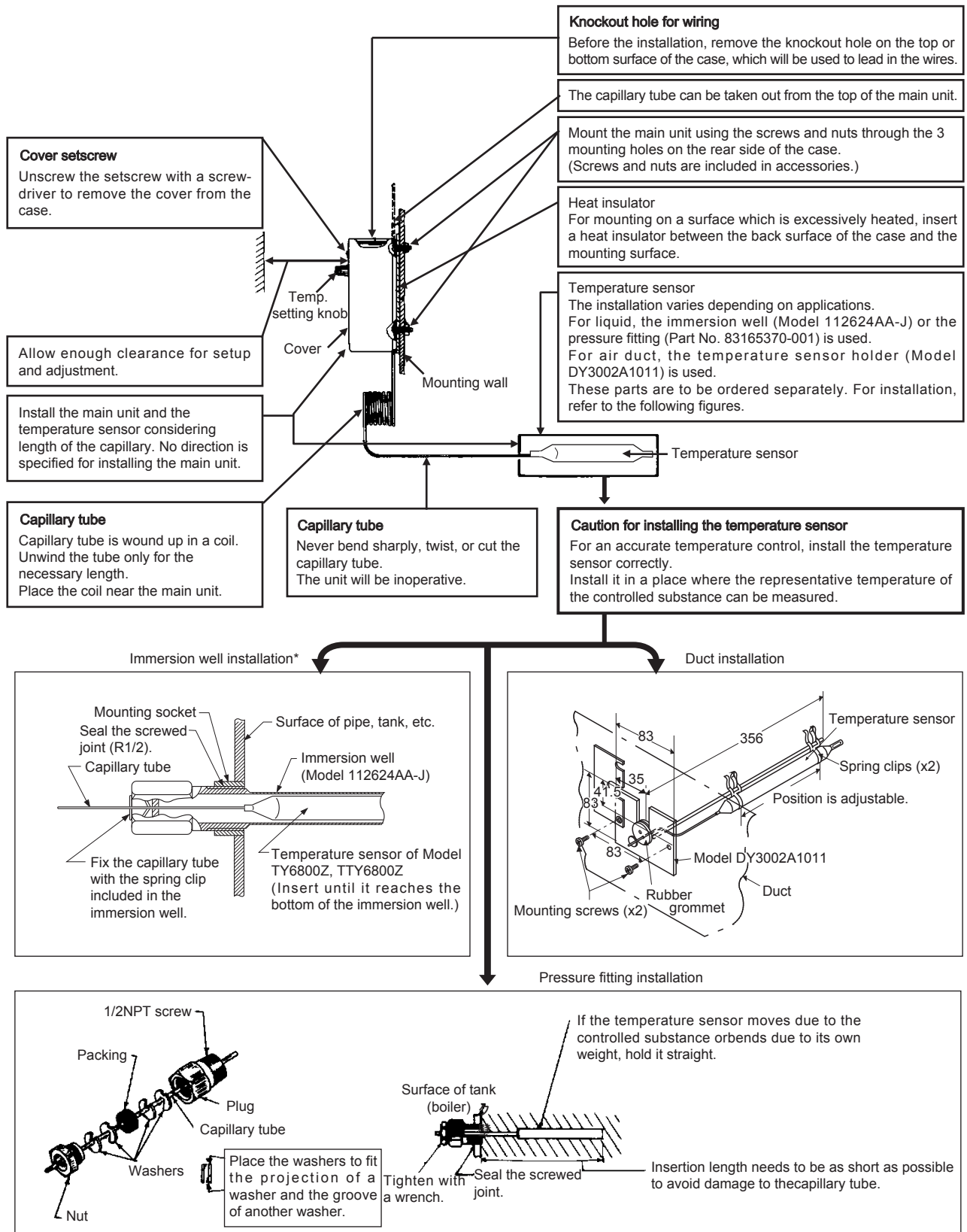


Figure 7. Installation procedure



Note: If the immersion well is used, fill the well with special grease to improve response performance of the temperature sensor. (Ex. For the stainless steel immersion well, response performance will be improved by approx. 15 %.) For the special grease, the silicon grease, G-30M (Shin-Etsu Chemical) or equivalent, is recommended.

Figure 8. Installation

■ Wiring

⚠ WARNING

⚠ If this product is connected to a system, be sure to implement safety measures. Failure to do might cause fire.

⚠ CAUTION

❗ 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.

⚠ To connect the wires to the screw terminals, use crimp terminal lugs that have insulation. Failure to do so might cause short circuit and result in device failure or fire.

❗ Firmly tighten the terminal screws. Insufficient tightening of the terminal screws might cause overheating or fire.

IMPORTANT

- To use this product properly, follow the instructions described in this manual and the manuals for other devices connected to this product.
- After wiring, check that wires are correctly wired. Incorrect wiring may cause device damage or malfunction.
- Remove the knockout holes being careful not to leave protrusions or burrs. Failure to do so might damage the wires or cause injury.

It is recommended using cable glands for wiring. If cable glands are not used, provide a fixture to hold the wires near the product in order to reduce tension from the wires.

- According to the position of cable inlet/outlet, open a knockout hole.
- Remove the protrusions or burrs at the opening.
Note: There are two knockout holes prepared for wiring at the top and bottom of the product.

- Pull in the wires through the knockout hole, connect the wires to the screw terminals (marked R, B, and W) on the potentiometer using the round terminals (M4 size).
- Connector other devices and power supply.
- Check that the wires are correctly connected.

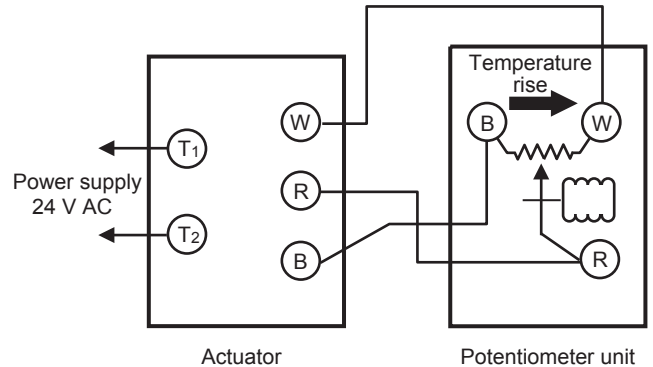


Figure 9.

■ Settings

IMPORTANT

- According to the thermal load, be careful to specify the proportional band not to cause huntings. Failure to do so might start and stop the devices frequently and cause device failure.
- Specify the proportional band appropriately, not too wide. Failure to do might cause potentiometer failure.

Set the temperature setpoint and adjust the proportional band.

Figure 10. shows setpoint and its proportional band. Setpoint is positioned at the middle of the proportional band.

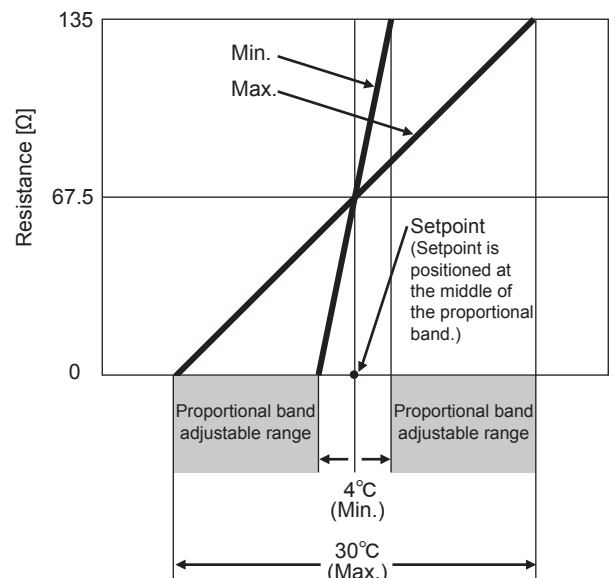


Figure 10. Setpoint and proportional band

● **Adjusting proportional band**

Turn the proportional band adjusting dial until the pointer points to your desired value on the scale of the proportional band.

Note: Factory preset for the proportional band is 6 °C.

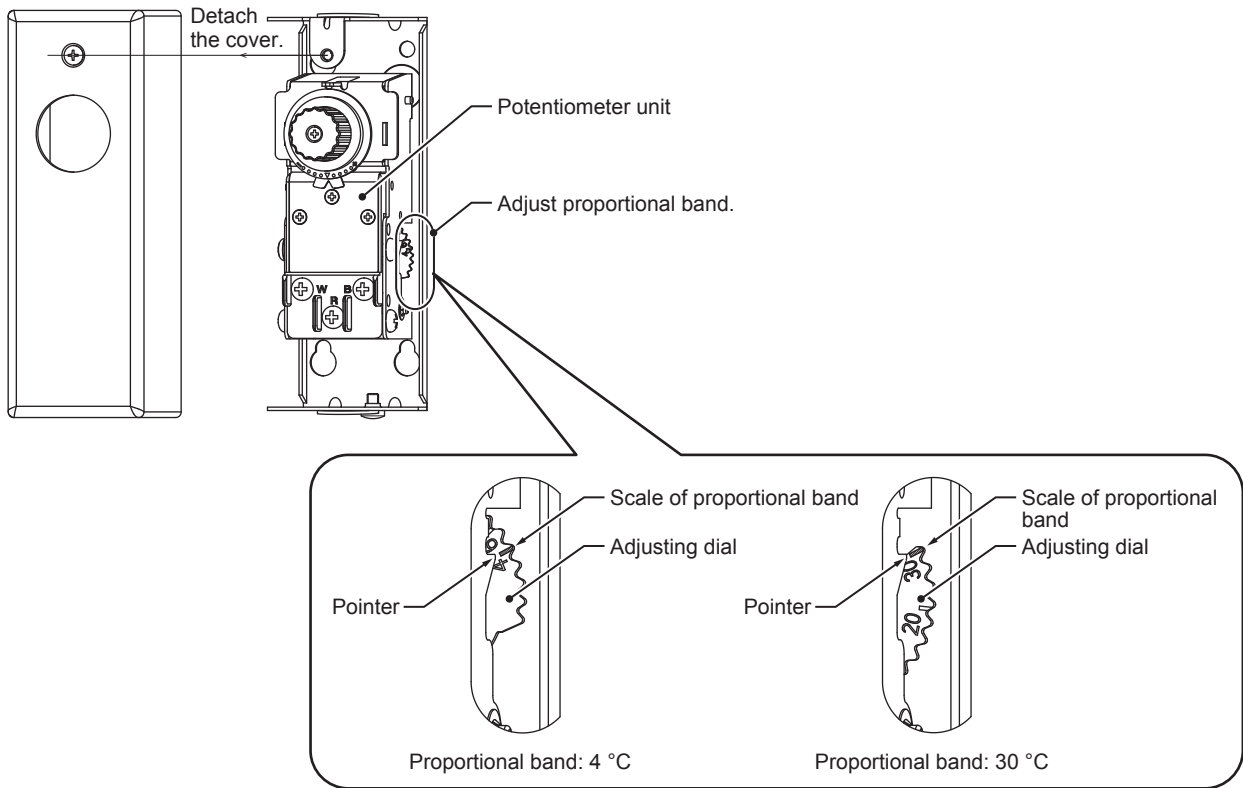



Figure 11. Adjusting proportional band

● **Operation check**

IMPORTANT • Because of delayed response of the sensing element, the controlling system may cause huntings.
As necessary, adjust the mounting location and proportional band setting to eliminate delayed response.

- (1) Turn on the power to the product.
- (2) Turn the setting knob to set the setpoint.
- (3) Check that the control target equipment normally runs or stops as intended.
- (4) Turn off the power to the product.

■ Maintenance

⚠ WARNING	
	If this product is connected to a system, be sure to implement safety measures. Failure to do might cause fire.

⚠ CAUTION	
	Do not disassemble the product. Doing so might cause device failure.

Determine the appropriate cycle of maintenance and inspection, taking into consideration the environmental conditions, frequency of use, etc.

If use is only occasional, inspection before every use is recommended.

Maintain and inspect the product following the procedures below.

- (1) Wipe dirt and dust on the temperature sensor and capillary tube using a soft clean cloth or toothbrush so that the element can be effectively exposed to the air.
- (2) Check that the temperature sensor is not deformed, flattened, or damaged.
- (3) In the same way as (1), wipe the potentiometer's terminals and the nearby parts, and the setting knob.
- (4) Check that the terminal screws are firmly tightened.
- (5) Check that the wires are well insulated.

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Specifications are subject to change without notice.

Azbil Corporation
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