

Radiant Temperature Sensor TY7321

General

TY7321 Radiant Temperature Sensors are designed to measure infrared radiation from perimeter windows and walls and provide a proportional output for use in resetting the space temperature control setpoint in heating, ventilating and air conditioning control systems.

The sensors use thermopile elements to measure infrared radiation.



Features

- Radiant temperature reset provides enhanced comfort in perimeter zones where solar gain affects occupant comfort.
- The radiant temperature sensor provides remote measurement of radiant temperature from windows or walls.
- Adjustable radiant sensing window allows for easy setup in a variety of different applications.
- Can easily be installed in a variety of ceilings.

Measurement principle

All objects radiate infrared rays in relation to their surface temperatures. This radiation is especially noticeable from perimeter walls and windows. Detecting the energy volume of these infrared rays allows the measurement of the radiant temperature affect. The TY7321's thermopile sensing element converts infrared radiation to an electrical signal that is proportional to the radiant temperature.

Specifications

(1/2)

Item	Specification
Sensing range	Radiant temperature: 41 to 122 °F (5 °C to 50 °C)
Sensing accuracy	Radiant temperature: +/- 3.6 °F (+/-2 °C) at an ambient temperature of 77 °F (25 °C)
Power supply	24 V AC +/-15 %
Frequency	50/60 Hz +/-4 %
Power consumption	Max. 0.3 VA
Output signal	Radiant temperature: 1 to 5 V DC (corresponds to radiant temperature 32 to 122 °F (0 to 50 °C))
Time constant	Radiant temperature: Max. 10 seconds
Rated conditions	Ambient temperature: 59 to 95 °F (15 to 35 °C)
	Ambient humidity: 10 to 90 % RH (non-condensing)
	Vibration: 2 m/s ² (10 to 55 Hz)

Item	Specification
Transport/storage conditions	Ambient temperature: -4 to 140 °F (-20 to + 60 °C) Ambient humidity: 5 to 95 % RH (non-condensing) Vibration: 9.8 m/s ² (packed)
Effective range	52 °
Sensor coverage	344 ° (horizontal) 65 ° (vertical, in 5 ° steps)
Weight	Approx. 0.44 lb (200 g)
Color	Base, housing, terminal cover: DIC 546 1/2 Cover: White Case, housing, cover of sensor : White
Materials	Base, housing, terminal cover : Molded polycarbonate resin, equivalent to UL V-O Cover : Molded fire-resistant ABS resin, equivalent to UL V-O Case, housing, sensor cover : Molded polycarbonate resin, equivalent to UL V-O

Models Available

TY7321A1009	Radiant Temperature Sensor
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Safety Instructions

Please read instructions carefully and use the product properly. Please keep this instruction on hand for reference at any time.

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 clean rooms or places where reliability or control accuracy is particularly required, please contact Yamatake's sales representatives. Yamatake Building Systems Co., Ltd. bears no responsibility for any benefit, or lack of benefit, derived from the operation by the customer.

CAUTION

-  Installer must be a trained, experienced service technician.
-  Check the ratings given in this instructions to prevent equipment damage.
-  Check the environment given in this instructions to prevent equipment damage.
-  Disconnect power supply before wiring to prevent electrical shock or equipment damage.
-  All wiring must comply with local codes and ordinances.
-  Use crimp contacts with insulation jackets for wire terminals.
-  Do not remove or disassemble casing except for wiring. May result in equipment damage.
-  Use an insulating transformer to supply 24V AC. Do not share power supply with other equipment. A loop is formed at the common and may cause equipment damage.

Dimensions & Parts Identification

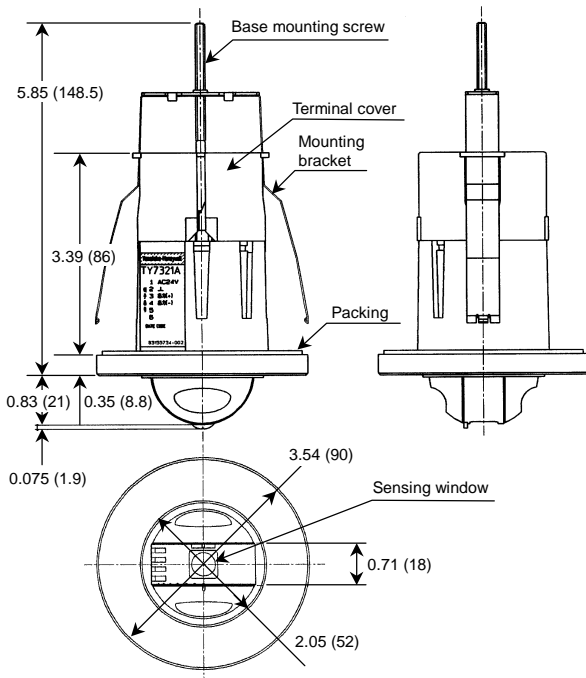


Fig.1 Boxless type dimensions – in. (mm)

Installation

Installation Location

Make sure the installation is :

- Within the area to be sensed
- Not directly affected by lighting
- Not directly affected by discharge airflows or drafts
- 3 to 10 ft away from window surfaces

Connection/Wiring

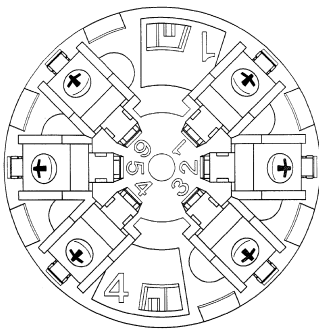


Fig.3

Table 1

Terminal #	Connection destination
	24V AC (~)
	24V AC (⊥)
	Radiant temperature output (+)
	Radiant temperature output (⊥)
	N.C.
	N.C.

⚠ CAUTION

⚡ Disconnect power supply when wiring to prevent electrical shock and equipment damage.

Wiring Instructions

Shielded multi-wire cables (CVV-S) with 16 AWG (1.25 mm²) wire size is recommended.
 A 16 AWG (1.25 mm²) IV cable may be used.
 Be sure to ground the shielded cable at the controller. Use separate conduit for the 24VAC power and the sensor output signal wiring.
 The maximum cable length is 327 ft (100 m).

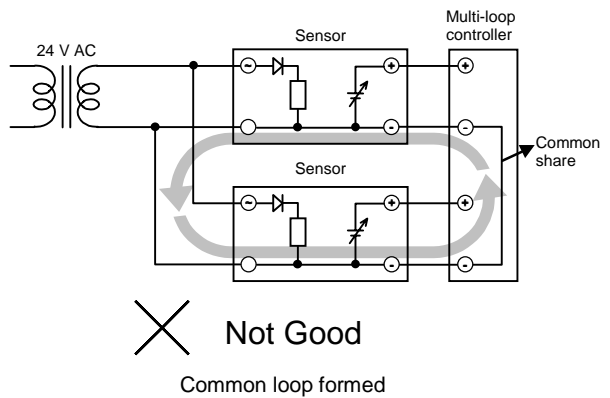
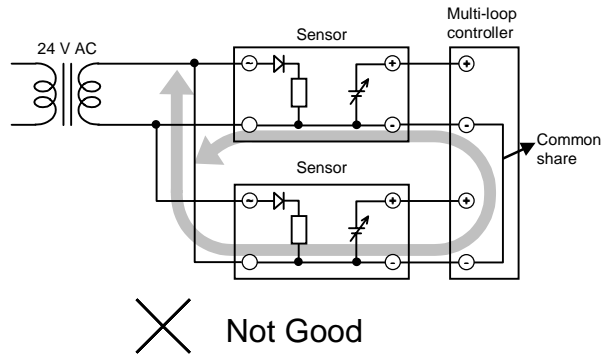
Always check wiring before supplying power.
 Always use a dedicated 24 VAC transformer. Never share the 24 V AC transformer with other products.

Use of individual AC transformer

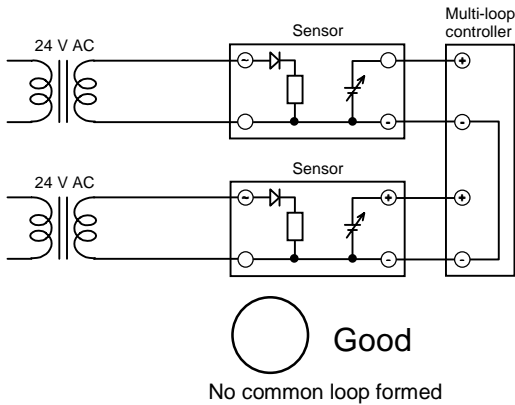
⚠ CAUTION

! Use a dedicated insulated transformer to supply 24 V AC power supply voltage. Never share 24 V AC power supply with other equipment.
 If a transformer is shared with other equipment, a loop may be formed at common and the sensor may be damaged.

- Transformer (24 V AC power supply) shared



Transformer (24 V AC) separated



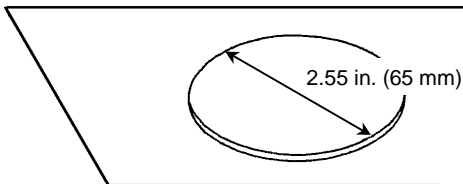
If using the sensor with another manufacturer's controller follow these instructions to prevent an induction current flowing from the sensor to the controller input circuit, or to prevent excessive noise due to a different controller time constant.

Use a controller with a low pass filter having a removal ratio of 40dB or higher (normal mode).

- Connect an isolator to the controller input circuit if a removal ratio is unknown.
- The above precautions are not required if the sensor is used in with a Yamatake controller.

Mounting Without A Conduit Box

1) Cut a circular opening of 2.55 in. (65 mm) diameter in the ceiling where the sensor is to be installed, and remove the sensor from the body.



- 2) Pass the wires through the opening and attach crimp-style terminals to the wires.
- 3) Connect the wires to the terminals of the base (refer to Connection/Wiring diagram Fig. 3 Table 1).

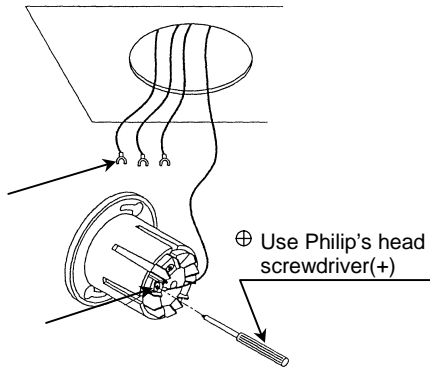


Fig.4

4) When wiring is complete, put the terminal cover over the base. Then pass the wires along the slits and through the round holes.

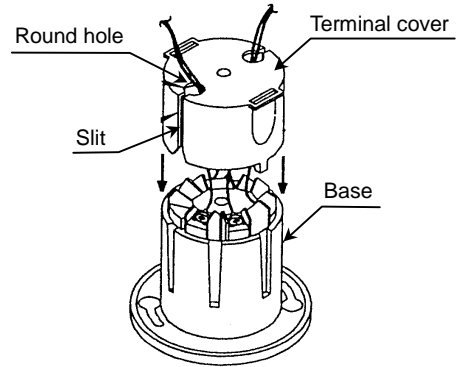


Fig.5

5) Insert the mounting bracket into the square holes on both sides of terminal cover. Turn the base mounting screw two or three times to attach loosely.

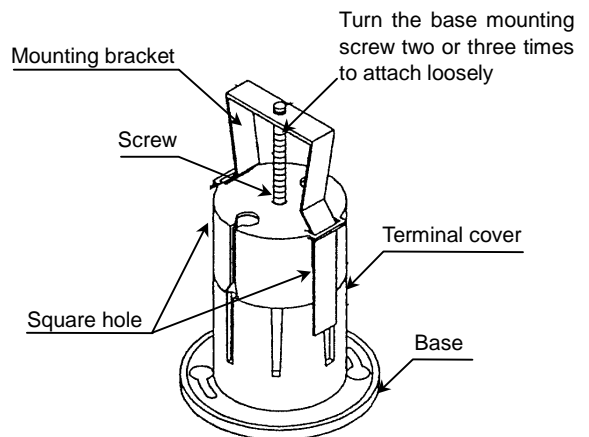


Fig.6

6) Insert the base into the ceiling and tighten the base mounting screw.

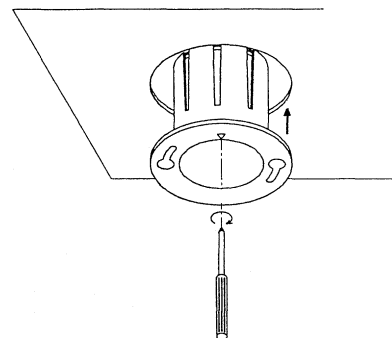
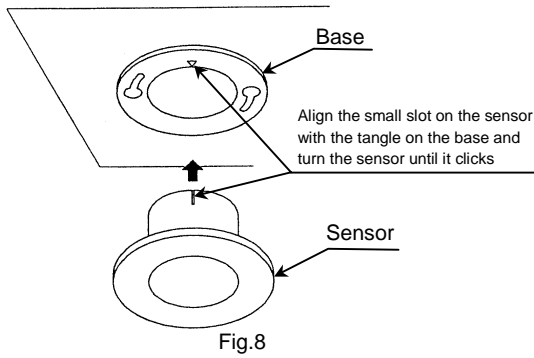


Fig.7

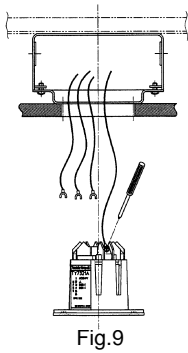
7) Now insert the sensor into the base.



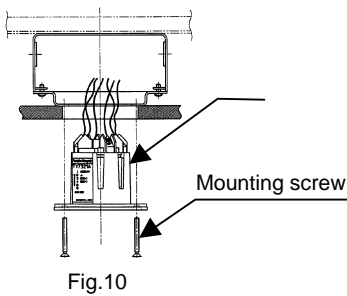
8) Adjust the measurement coverage area (refer to Radiant Sensor Adjustment Section).

Using an outlet box for installation box

- 1) Cut a circular opening of 2.75 in. (70 mm) in the ceiling board where the sensor is to be installed. Then pass wires through the board and attach crimp-style terminals.
- 2) Connect wires to the screw terminal of the base as shown in the Connection/Wiring diagram (Fig. 3 Table 1).



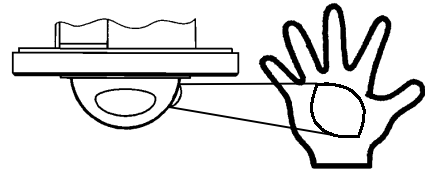
3) Insert the base through the opening and attach the base to the outlet box using the mounting screws.



- 4) Attach the sensor to the base.
- 5) Adjust the measurement coverage area (refer to Radiant Sensor Adjustment Section)

Checkout

1) To make sure that sensor has been wired correctly, hold the palm of your hand in front of the radiant sensing window.

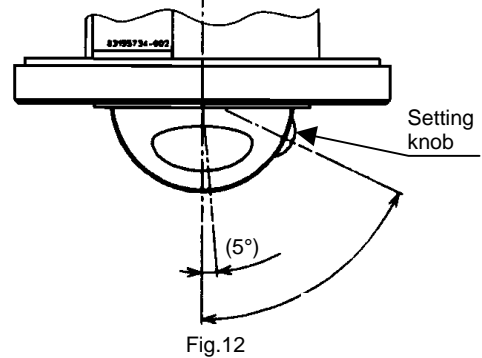
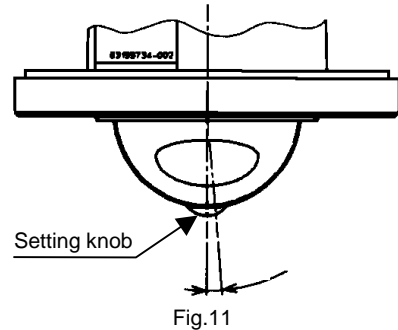


2) The radiant sensor output voltage should be between 3 and 4 VDC within 10 seconds.

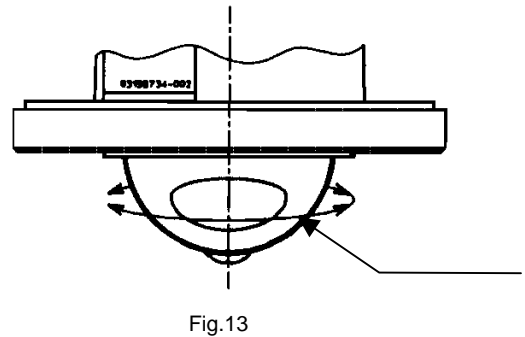
Radiant Sensor Adjustment

Turn the setting knob so that the sensing window faces the center of the area of measurement (i.e. perimeter wall or window). Use the notched groove next to the sensing window for horizontal movement.

1) The sensor moves 0 ° to 65 ° vertically.



2) The sensor pivots 344 ° horizontally.



Radiant Sensor Maintenance

To clean the radiant sensing window, periodically wipe it lightly using a cotton swab or soft cloth and alcohol. (Do not use benzene or thinner).



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