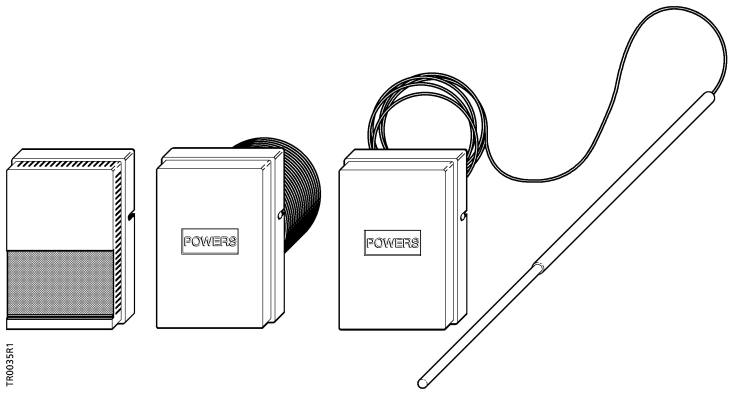
SIEMENS

Installation Instructions
Document No. 129-143
April 6, 2022

RETROLINE®

Replacement Transmitters for Johnson Controls



Product Description

These Temperature Transmitters are direct acting, one-pipe instruments that sense temperature and transmit a proportional pneumatic signal to a remotely located receiver gauge and/or receiver-controller.

The kit includes the:

- Transmitter
- Cover
- Wall plate or flange for mounting

Features

- Rapid response to temperature changes over the full range.
- Internal feedback for excellent linearity and accuracy.

Application

The temperature transmitters are ideal for applications requiring indication with a receiver gauge and/or control with a receiver-controller.

Product Numbers

Table 1. Product Numbers and Specifications.

Description	Range	Bulb	Replaces Johnson Controls	POWERS™ Controls Product Number
Room Temperature Transmitter	50°F to 100°F (10°C to 37.8°C)	—	T5002-2001	184-0127
Remote Bulb Transmitter	0°F to 100°F (-18 to 37.8°C)	1/4-inch × 7-5/8 inches(6.4 mm × 194 mm) bulb with 8-inch (203 mm) capillary	T5210-1002	184-0123
Averaging Transmitter	0°F to 100°F (-18°C to 37.8°C)	3/32-inch × 18-3/4 feet (2.4 mm × 5.7 m) bulb with 12-inch (0.305 m) capillary	T5210-1009	184-0125
	50°F to 150°F (10°C to 66°C)		T5210-1007	—

Troubleshooting

Table 2. Troubleshooting Chart.

Complaint	Check	Probable Cause	Corrective Action
Low temperature indication	Restrictor	Plugged restrictors	Clean and replace if clogged
		Wrong size restrictor	Replace restrictor
	Receiver gauge temperature indication vs. temperature at sensing element	Receiver gauge out of calibration	Adjust receiver gauge
	Fittings and tubing	Leak in transmitter line	As necessary
	Supply pressure	Low supply pressure	As necessary
High temperature indication	Receiver gauge temperature indication vs. temperature at sensing element	Receiver gauge out of calibration	Adjust receiver gauge
	Restrictor used	More than one restrictor used. Both internal (in receiver-controller) restrictor and external restrictor installed	Remove all but one restricted air supply
		Wrong size restrictor	Replace restrictor

Specifications

Operating

Action: Direct acting

Output air pressure: 3 to 15 psi (21 to 103 kPa)

Temperature range: See Table 1.

Ambient temperature range: 40 to 120°F (4.4 to 49°C)

Input (supply) air pressure:
- Recommended pressure: 22 ±1.0 psig (152 ±6.9 kPa)
- Maximum: 30 psig (207 kPa)
- Restrictor size (not supplied): 40 scim (11 ml/s)

Thermal system:
- Room: Bimetal
- Remote bulb: Liquid filled
- Averaging bulb: Liquid filled

Air consumption: 35 scim (10 ml/s)

Physical

Mounting:
- Room: Wall terminal
- Remote bulb: Mounting flange
- Averaging bulb: Mounting flange

Air connection
- Room: Plastic tubing and tubing retainer
- Remote and averaging bulb: 1/8" NPT

Cover finish:
- Room transmitter: (plastic) Desert Beige
- Averaging and remote bulb: (metal) Gray

Dimensions: Figures 9 and 10

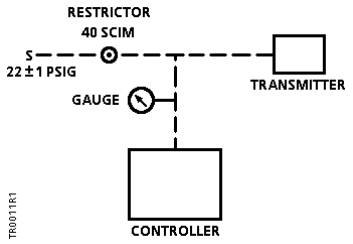


Figure 1. Typical Connection.

Operation

The transmitter must be provided with a restricted (40 scim) supply of air. Assume a rise in temperature at the transmitter sensing element. The free end of the bimetal or the liquid-filled element moves downward. This increases the load on the throttling pin (or throttling ball) and moves it closer to the nozzle. See Figures 2 and 3. Pressure builds up in the chamber below the nozzle until the force of the increased air pressure against the bottom of the throttling pin exactly balances the downward force of the free end of the sensing element.

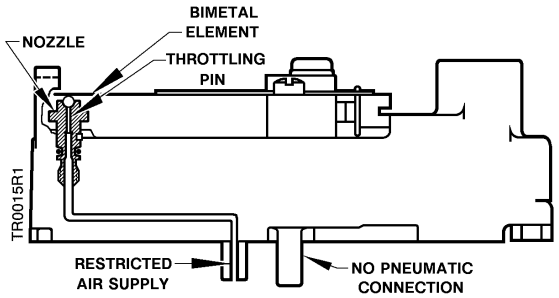


Figure 2. Operation of the Room Transmitter.

Operation, Continued

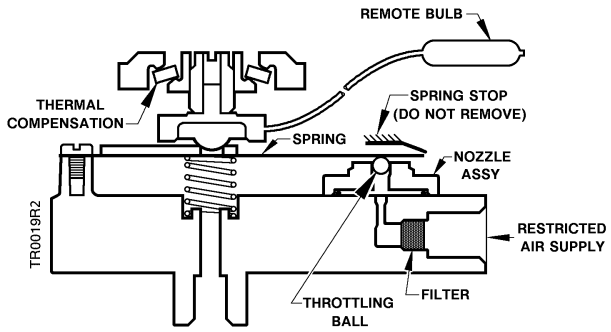


Figure 3. Operation of the Remote or Averaging Bulb Transmitter.

Installation

Room temperature transmitter

Tools

- Small flat-blade screwdriver
- Needle nose pliers
- 1/16-inch (1.5 mm) hex Allen wrench

Temperature transmitters may be mounted in any position on a vertical surface; however, the preferred position is shown in Figure 4.

Use the wall plate kit provided with the room transmitter for any surface.

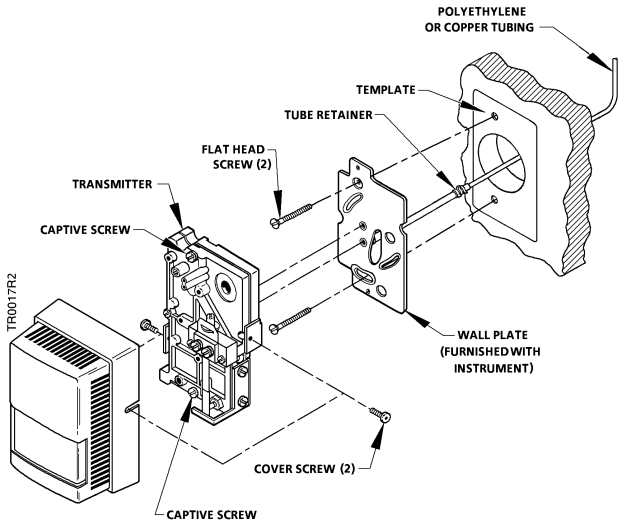


Figure 4. Typical Mounting of the Room Temperature Transmitter in Existing Construction.

1. Use the 5/32-inch diameter tubing to connect the air line to the bottom port on the back of the wall plate. Note the position of the wall plate in Figure 4. Use the needle nose pliers to position the tube retainer that secures the connection.
2. Install the wall plate on the wall using the flat-head mounting screws furnished with the transmitter. The wall plate has a slotted hole to allow leveling of the wall plate.
3. Carefully plug the transmitter into the wall plate. Moistening the O-rings in the wall plate will allow the unit to slip through the O-rings easily.
4. Secure the transmitter to the wall plate using the two captive screws attached to the transmitter body.
5. Place the cover over the transmitter. Use the hex Allen wrench to fasten the cover with the cover screws.

Remote bulb transmitter

Mounting Remote Bulb Transmitter. (See Figure 5.)

Tools

- 7/16-inch (11 mm) open-end wrench
- Drill and drill bits
- Flat-blade screwdriver

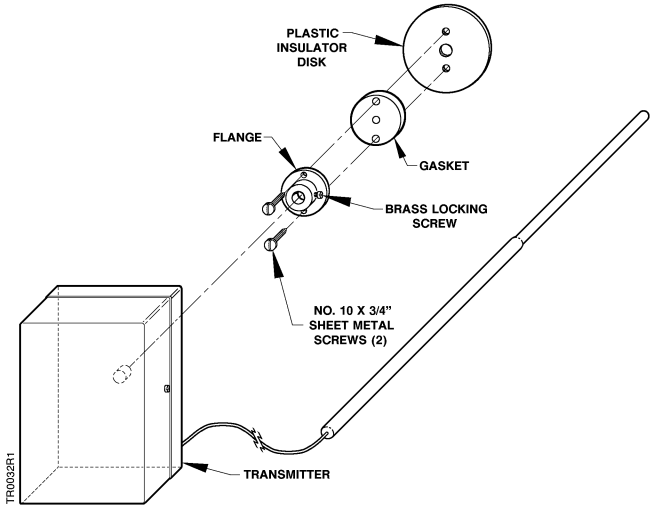


Figure 5. Mounting the Remote Bulb Transmitter to a Duct.

The transmitter may be mounted in any position on a vertical surface.

1. Disconnect the air line from transmitter to be replaced.
2. Remove the bulb from the holder in the duct.
3. Remove the mounting bracket and transmitter together.
4. With the 7/16-inch open-end wrench, remove the 1/8-inch NPT brass air line fitting. Attach the brass fitting to the new transmitter.

Installation, Continued

5. Using the flange as a template, drill or punch two holes in the duct.
6. Place the plastic insulator disk, the gasket and the flange on the duct and attach with sheet metal screws.
7. Insert the bulb into the duct and secure it in the holder. Any extra capillary may be coiled inside the duct.
8. Place the transmitter into the flange and tighten the brass locking screw.
9. Connect the air line. Make sure there is no leakage. If you reuse the polyethylene tubing, clip the last half inch of tubing to ensure a tight connection with fitting.

Remote bulb transmitter

Mounting the Remote Bulb in an Existing Duct Flange. (See Figure 6.)

Tools

- Flat-blade screwdriver
- 7/16-inch (11 mm), 1/2-inch (13 mm), and 11/16-inch (17 mm) open-end wrenches

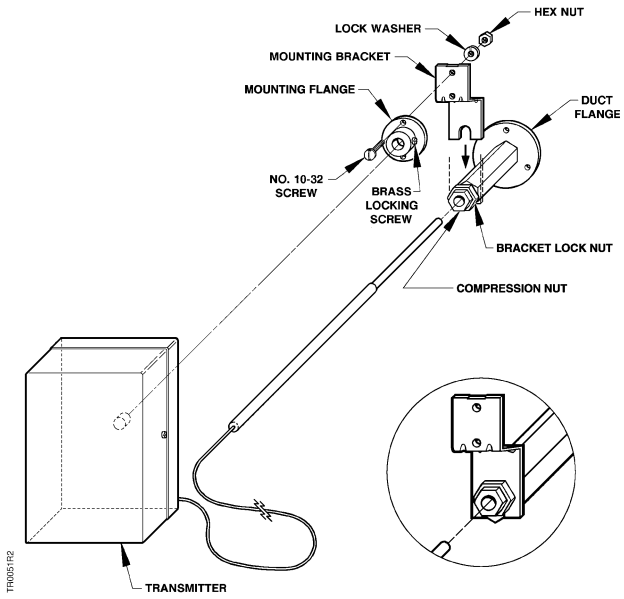


Figure 6. Mounting the Remote Transmitter Bulb in an Existing Duct Flange.

The transmitter may be mounted in any position on a vertical surface.

1. Disconnect the air line.
2. Observe how much of the bulb sticks out of the duct flange.
3. Loosen the compression nut with the 1/2-inch open-end wrench and the bracket locknut with the 11/16-inch open-end wrench just enough to remove the transmitter and mounting bracket from the duct flange.
4. Remove the bulb from the duct.
5. Separate the transmitter from the mounting bracket. Save the mounting bracket.
6. With the 7/16-inch open-end wrench, remove the 1/8-inch NPT brass air line fitting. Attach the brass fitting to the new transmitter.
7. Attach the mounting flange to the mounting bracket with the steel screw, lock washer, and hex nut.
8. Insert the bulb through the duct flange to the same depth as observed in Step 2. Tighten the bracket locknut.
9. Place the mounting bracket with the mounting flange back onto the duct flange and tighten the compression nut.
10. Place the transmitter into the flange on the mounting bracket and tighten the brass locking screw.
11. Connect the air line. Make sure there is no leakage. If you reuse the polyethylene tubing, clip the last half inch of tubing to ensure a tight connection with fitting.

Remote bulb transmitter

Well Mounting (See Figure 7.)

Tools

- Flat-blade screwdriver
- 7/16-inch (11 mm), 1/2-inch (13 mm), and 11/16-inch (17 mm) open-end wrenches

The transmitter may be mounted in any position on a vertical surface.

1. Disconnect the air line.
2. Loosen the compression nut with the 1/2-inch open-end wrench and the bracket locknut with the 11/16-inch open-end wrench just enough to remove the transmitter and mounting bracket from the pipe fitting.
3. Remove the bulb from the pipe fitting.
4. Separate the transmitter from the mounting bracket. Save the mounting bracket.

Installation, Continued

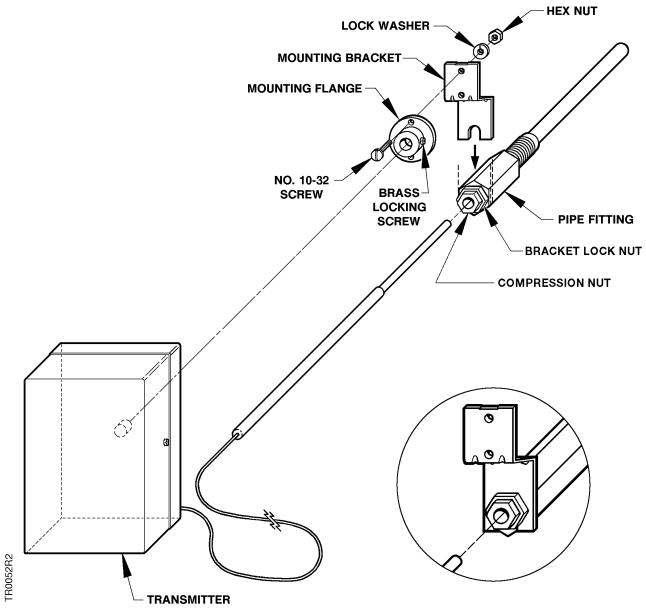


Figure 7. Mounting the Remote Bulb in an Existing Well.

5. With the 7/16-inch open-end wrench, remove the 1/8-inch NPT brass air line fitting. Attach the brass fitting to the new transmitter.
6. Attach the mounting flange to the mounting bracket with the steel screw, lock washer, and hex nut.
7. Insert the bulb through the pipe fitting and tighten the bracket locknut.
8. Place the mounting bracket with the mounting flange back onto the pipe fitting and tighten the compression nut.
9. Place the transmitter into the flange on the mounting bracket and tighten the brass locking screw.
10. Connect the air line. Make sure there is no leakage. If you reuse the polyethylene tubing, clip the last half inch to ensure a tight connection.

Averaging bulb

Duct Mounting. (See Figure 8)

Tools

- Flat-blade screwdriver
- 7/16-inch (11 mm) open-end wrench
- Drill and drill bit for No. 10 screws

The transmitter may be mounted in any position on a vertical surface.

1. Disconnect the air line.
2. Remove the old transmitter and the mounting bracket.
3. With the 7/16-inch open-end wrench, remove the 1/8-inch NPT brass air line fitting. Attach the brass fitting to the new transmitter.
4. Remove the old bulb from the holders on the coil fins.

   NOTE: Ensure there is some protection, such as a rubber grommet, around the opening through which you will insert the new averaging bulb. Protect the bulb from damage or breakage from metal-to-metal contact.
5. With the new averaging bulb still coiled, thread it through the opening in the duct using a rotary movement.

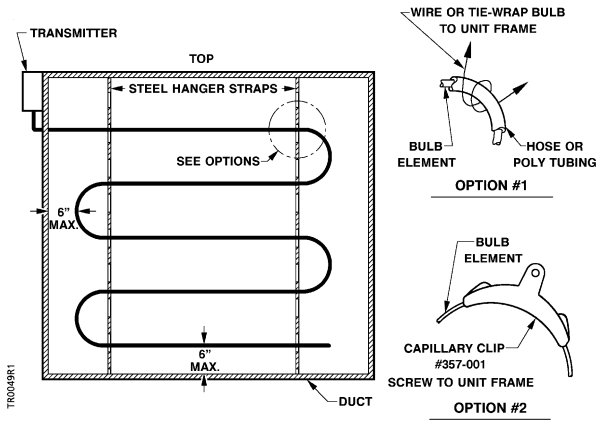


Figure 8. Mounting the Averaging Bulb in Large Ducts.
*Capillary Clips, Part Number 357-001
(100 clips per package).

6. Mount two perforated steel strap hangers inside the duct with the wide part of the hanger strap parallel to the airflow.
7. Carefully uncoil the averaging bulb avoiding sharp bends or kinks in the sensing element.
8. Distribute the averaging bulb evenly in front of the fan coils using a serpentine pattern. Attach the averaging bulb to the strap hangers with wire ties or with plastic tie wraps.
9. Using the flange as a template, drill or punch two holes in the duct. See Figure 5.
10. Place the duct insulator, the gasket and the flange on the duct and attach with sheet metal screws provided.
11. Insert the transmitter into the flange and tighten the brass locking screw.

Installation, Continued

12. Connect the air line. Ensure there is no leakage. If you reuse the polyethylene tubing, clip the last half- inch to ensure a tight connection.

The installation is now complete.

Alternate method using capillary clips

Follow the steps for duct mounting except substitute the following instructions for Steps 6, 7, and 8.

6. Carefully uncoil the averaging bulb avoiding sharp bends or kinks in the sensing element.
7. Distribute the averaging bulb evenly in front of the fan coils using a serpentine pattern. This bulb is twice as long as the one removed. You may need additional holders to support the additional length.

Calibration

This transmitter is factory calibrated. The transmitter should not be calibrated in the field.

For minor improvements in accuracy, adjust the pointer on the receiver gauge to agree with the temperature at the sensing element.

Preventive Maintenance

The temperature transmitter does not require lubrication.

Periodically clean dust from the transmitter body using a soft hairbrush.

Check yearly to ensure that the temperature at the sensing element agrees with the temperature shown at the gauge.

Dimensions

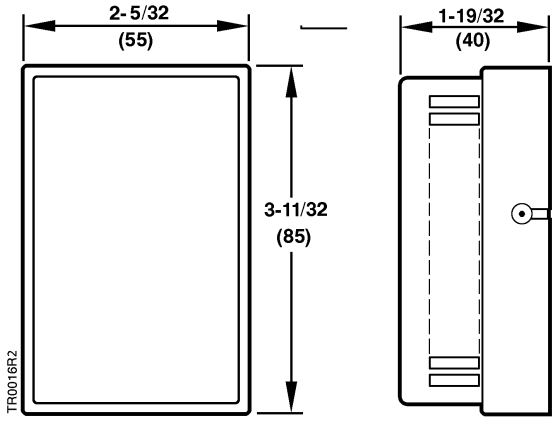


Figure 9. Dimensions of the Room Transmitter. Dimensions in Inches (Millimeters).

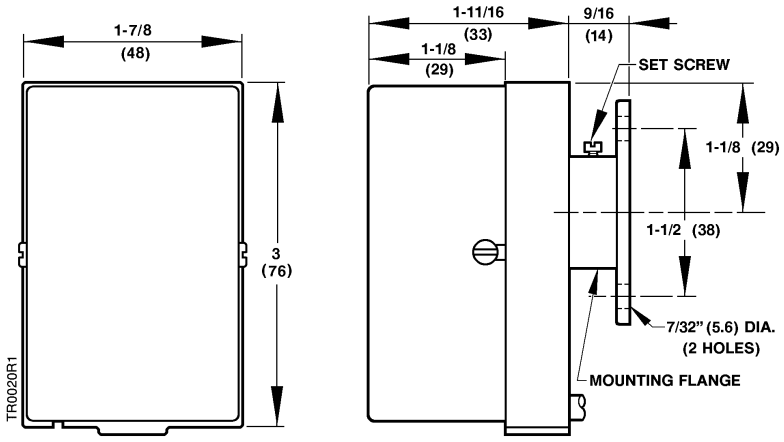


Figure 10. Dimensions of the Remote or Averaging Bulb Transmitter. Dimensions in Inches (Millimeters).