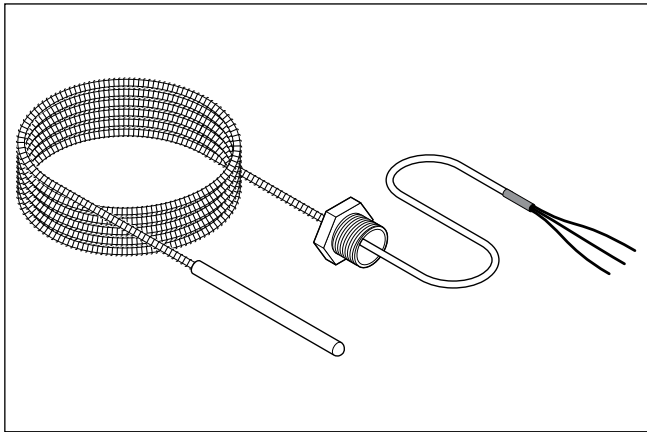# RTD3CS and RTD10CS

RTD Temperature Sensors for Temperature Measurement
Up to 400°F (204°C) Installation Instructions

DESCRIPTION

The nVent RAYCHEM RTD3CS and RTD10CS are three-wire platinum RTD (resistance temperature detectors) typically used with monitoring and control systems, such as our RAYCHEM 910 controller, when accurate temperature control is required.

The RTD3CS and RTD10CS can be installed directly to the controller using the supplied ½ inch conduit fitting or to an RTD junction box where RTD extension wire is used.

TOOLS REQUIRED

• 3.5-mm flat-blade screwdriver

ADDITIONAL MATERIALS REQUIRED

• nVent RAYCHEM AT-180 aluminum tape

APPROVALS

Approvals associated with control device, however not to be used in Div. 1 locations.

KIT CONTENTS

Qty	Description
1	RTD temperature sensor

SPECIFICATIONS

Sensor

Housing	316 stainless steel
Dimensions	3 in (76 mm) length 3/16 in (8 mm) diameter
Sensing area	1½ in (38 mm)
Accuracy	±1°F (0.5°C) at 32°F (0°C)
Range	−76°F to 400°F (−60°C to 204°C)
Resistance	100 ohms at 0°C α =0.00385 ohms/ohm/°C

Extension Wires

Wire size (each of 3)	20 AWG, stranded tinned copper	
Wire insulation rating	300 volts	
Length	**RTD3CS:**	3 ft (.3 m) flexible armor, 18 in (457 mm) lead wire
	RTD10CS:	10 feet (3 m) flexible armor, 18 in (457 mm) lead wire
Outer shield	Stainless steel flexible armor	
Maximum exposure temperature	400°F (204°C)	
Conduit bushing	½ in NPT	

⚠ **WARNING:**

This component is an electrical device. It must be installed correctly to ensure proper operation and to prevent shock or fire. Read these important warnings and carefully follow all the installation instructions. Component approvals and performance are based on the use of specified parts only. Do not use substitute parts or vinyl electrical tape to make connections.

POSITIONING THE SENSOR

Single traced
- Heating cable
- Control sensor
- AT-180 tape

Double traced
- Heating cable
- Control thermostat bulb
- AT-180 tape
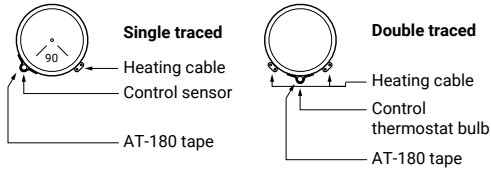
Position the RTD sensor in the lower quadrant of the pipe as shown in the diagram. **Place the RTD sensor at least 3 feet (1 m) from pipe supports, valves, or other heat sinks.** Tape the RTD firmly to the pipe with AT-180 aluminum tape, making sure there is no air space between the RTD and the pipe. **Do not use the same piece of AT-180 tape to overlap the RTD and heat-trace cable.**
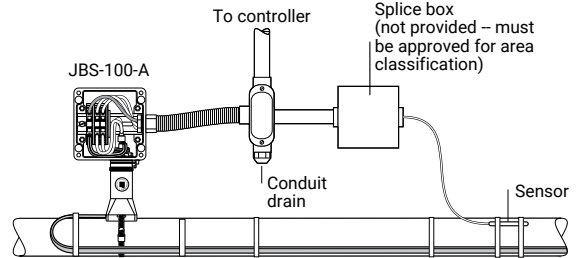
INSTALLATION WITH HEATING CABLE

Electrical Wiring Guidelines:
Most electrical codes (such as NEC 725.15) permit Class 1 circuits to occupy the same cable, enclosure, or raceway without regard to whether the individual circuits are alternating current or direct current, providing all conductors are insulated for the maximum voltage of any conductors in the cable, enclosure or raceway.

Additional Materials Required
- nVent RAYCHEM JBS-100-A or other power connection kit
- Pipe straps

JBS-100-A
To controller
Splice box (not provided -- must be approved for area classification)
Conduit drain
Sensor

WIRING INFORMATION

The length of RTD extension wires is determined by the wire gauge used.

To reduce the likelihood that electrical noise will affect temperature measurement, keep RTD extension wires as short as possible.
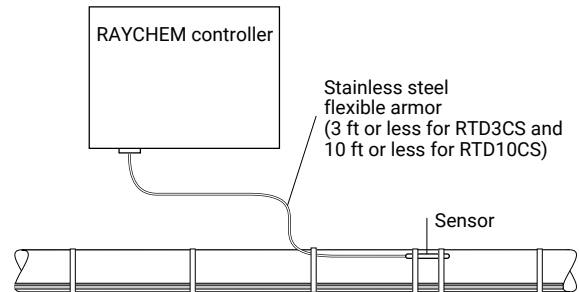
Use shielded instrument cable such as nVent RAYCHEM MONI-RTD-WIRE (22AWG, PVC insulation, −30°F to 140°F, −20°C to 60°C) or Belden 83553 (22 AWG, FEP insulation, −95°F to 395°F, −70°C to 200°C).

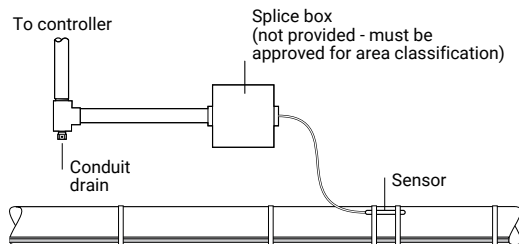| AWG	Maximum RTD extension wire length	
	Feet	(meters)
16	4500	(1400)
18	2800	(880)
20	1800	(550)
22	1100	(340)

RTD DIRECT CONNECTION TO CONTROLLER

(Distance from sensor bulb to controller must be less than 10 feet)

The RTD3CS and RTD10CS can be terminated directly at the controller using the supplied ½ inch NPT fitting. In this configuration, no additional extension wire is required.

RAYCHEM controller
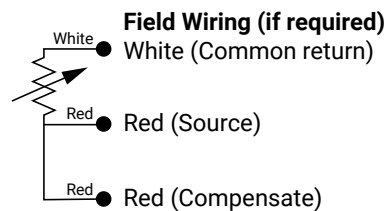Stainless steel flexible armor (3 ft or less for RTD3CS and 10 ft or less for RTD10CS)
Sensor

RTD DIRECT CONNECTION TO CONTROLLER

(Distance from sensor bulb to controller greater than 3 feet for the RTD3CS and 10 feet for the RTD10CS)

To controller
Splice box (not provided - must be approved for area classification)
Conduit drain
Sensor

RTD3CS AND RTD10CS WIRING

Connect the wires as shown.

Note: Ground RTD extension wire shield at one end only, preferably at RAYCHEM electronics end.

Field Wiring (if required)
White — White (Common return)
Red — Red (Source)
Red — Red (Compensate)

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