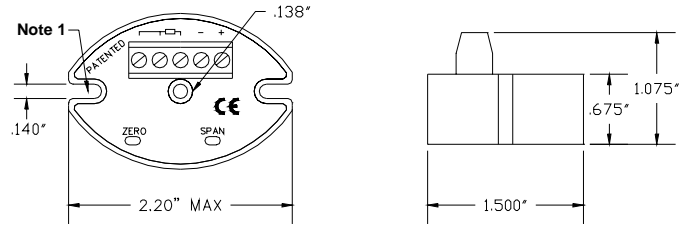


**General Information**

The Pyromation Series 401 RTD temperature transmitter is a “two wire” loop powered resistance to current transducer. This transmitter will produce a linearized (4 to 20) mA dc output current proportional to the temperature of the RTD temperature sensor.

The transmitter’s small size allows universal mounting inside Series 300, 400, and 900 screw cover heads, Series 800 explosion-proof, thermostat housings, and panel surface mounting using two 6-32 screws<sup>1</sup>. The transmitter is designed for an operating ambient temperature of (-30 to 65) °C [(-22 to 149) °F].



**Power Supply**

The transmitter is designed for a nominal 24 V dc power supply. The transmitter will operate over a range of (9 to 36) V dc depending on the resistive load. Use the following formulas to determine the maximum resistive loading (RL) allowed for the power used, or to determine minimum supply voltage (V) required for fixed resistive loads. The formulas assume a maximum current of 20 mA.

$$V_{MIN} = 20 \text{ mA} \times R_{LOAD} + 9 \text{ V dc}$$

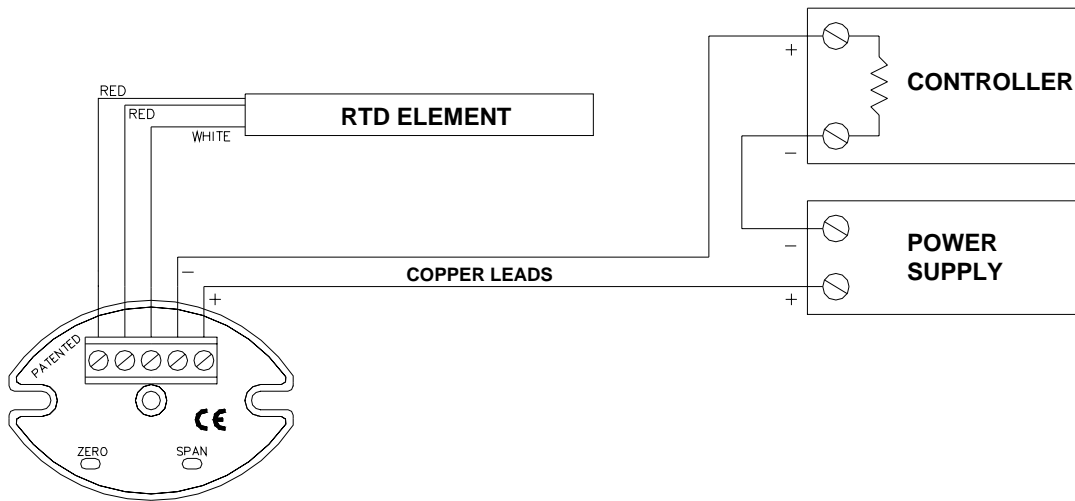
$$R_{MAXLOAD} = (V_{SUPPLY} - 9 \text{ V dc}) / 20 \text{ mA}$$

One power supply can be used for several transmitter loops. Each loop must have only one transmitter in it and all loops must be wired in parallel. Do not forget to observe the maximum current rating for your power supply.

**Note:** If used in a manner not specified by the manufacture, the protection provided by the equipment may be impaired.

**Wiring**

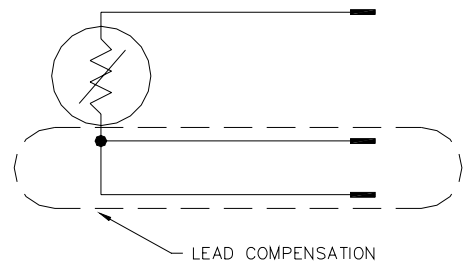
The terminal block on the transmitter can accept wire from 14 to 24 gauge. Shielded or conduit encased (twisted pair) cable is required from the transmitter to the controller, including the sensing element and lead wire. Note that low voltage lines should be run in separate conduit isolated from high voltage or high current carrying lines.



**Open Sensor Indication**

When an RTD has failed due to an open sensor, the transmitter will indicate an error. The way the error is produced is by either driving the current low, under 4 mA (**downscale burnout**) or by driving the current high, above 20 mA (**upscale burnout**). Upscale burnout is standard for all Pyromation transmitters.

However, the burnout indication does not apply to a break in the lead compensation loop. In this case, the burnout signal will drive the transmitter either high or low depending upon which lead has broken.



## Troubleshooting

### Problem

**No Current Flow in Signal Loop**

### Possible Causes

- Current loop may be open at some point
- No Voltage out at power supply
- Reverse polarity on loop connection

**Current Over 20 mA**

- RTD is open
- Current loop connections shorted

**Erratic Readings**

- Loose connection in RTD or signal loop
- Damaged RTD
- AC noise on loop connections
- Exceeds loop resistance RL

**Destructive Errors**

- Do not connect power to the RTD input; this could destroy the unit
- Do not connect power to the RTD sensor
- Do not use AC line power

**Non-Destructive Errors**

- Reverse polarity on loop connection
- Do not connect multiple transmitter in series

## Calibration

Pyromation RTD transmitters are factory calibrated. If recalibration is necessary, a **zero** and **span** adjustment can be made from the top of the unit. **Note: adjustment to calibration will void warranty**

1. Remove the RTD sensor wires and attach a RTD simulator.
2. Apply a simulated 'zero' resistance input and adjust the **zero** potentiometer for 4.00 mA output.
3. Apply a simulated 'span' resistance input and adjust the **span** potentiometer for 20.00 mA output.
4. The **zero** and **span** adjustments are interactive. Repeat steps 2 and 3 as necessary.

## Application Hints

The calibrated output of the Pyromation transmitter is (4 to 20) mA. However, the lower and upper limits of output current are approximately (2.2 and 30) mA respectively. This means that for a system using a 250 ohm resistor ( 1 to 5) V, the maximum voltage could be as high as 7.5 volts ( 30 mA x 250  $\Omega$  ) in the case of an open RTD.

Some computer based systems will not tolerate input voltages greater than approximately 5.5 volts. Instead of selecting a different scaling resistor (167  $\Omega$  for example gives 5 V for an open RTD), a 5.1 V zener diode in parallel with the scaling resistor will clamp the voltage across the scaling resistor to 5.1 V while still allowing the calibrated range to remain (1 to 5) V.

## Limited Warranty

**THE SERIES 401 RTD TEMPERATURE TRANSMITTER SOLD BY OR PURCHASED FROM PYROMATION, INC. OR FROM AN AUTHORIZED PYROMATION, INC. DISTRIBUTOR, OR AGENT IS SUBJECT TO THE FOLLOWING LIMITED WARRANTY.**

This product is warranted to be free from functional defects in materials and workmanship at the time the product leaves the Pyromation, Inc. factory, and to conform at that same time to the specifications set forth in the relevant Pyromation, Inc. installation, wiring, operation manual for this product for a period of one year after shipment from the Pyromation, Inc. factory.

Pyromation's exclusive and sole obligation, and Buyer's exclusive and sole remedy under the above Limited Warranty is limited to either repair or replacement of such product, at Pyromation's option, free of charge to Buyer. Pyromation shall have no obligation to repair or replace unless the claimed defect in material or workmanship is reported in writing to Pyromation at 5211 Industrial Road, Fort Wayne, Indiana 46825 within ten (10) days after delivery to the Buyer from Pyromation or an authorized Pyromation distributor, representative or reseller. If so requested by Pyromation, the product shall be returned to a designated facility during normal business hours, transportation prepaid.

Any action for breach of this warranty or other action arising out of this contract must be commenced within one year after delivery.

Pyromation shall not be liable for any warranty, express or implied, other than the warranty stated above, and in the event of a breach of the above stated warranty, Pyromation shall not be liable for any incidental, consequential, special, or other damages, costs, or expenses other than repair or replacement as described above. Pyromation excludes any and all warranties of merchantability or fitness for a particular purpose. The above stated warranty extends only to the original Buyer from Pyromation, Inc. or from an authorized Pyromation distributor or agent, and may not be transferred or assigned.