

# RTD SPECIFICATIONS



OMEGAs sanitary RTD sensors are supplied standard with 100 Ω, Class A sensing elements that conform to the International IEC 60751 Standard. This standard specifies the resistance vs. temperature relationship, the Accuracy Classes, and the color code used. This information is included below to help in the application and use of these sanitary sensors.

## Resistance vs. Temperature Characteristics

The Resistance vs. Temperature Characteristics of OMEGAs sanitary RTD sensors conform to the following equation:

### Equations

Platinum RTD resistance can be calculated using the Callendar-Van Dusen Equation as follows:

|  |  |
|--|--|
| For temperatures below 0°C:<br>$R_t = R_0 [1 + At + Bt^2 + C(t-100)t^3]$<br>where: $A = 3.9083 \times 10^{-3} (C^{-1})$<br>$B = -5.775 \times 10^{-7} (C^{-2})$<br>$C = -4.183 \times 10^{-12} (C^{-4})$<br>$R_0 = \text{Resistance at } 0^\circ\text{C}$<br>$t = \text{Temperature in degrees celsius}$ | For temperatures above 0°C, this simplifies to:<br>$R_t = R_0 (1 + At + Bt^2)$ |
|--|--|

## Resistance vs. Temperature Values per IEC 60751

| Temp (°C) | Resistance (Ω) | Temp (°C) | Resistance (Ω) | Temp (°C) | Resistance (Ω) |
|-----------|----------------|-----------|----------------|-----------|----------------|
| -200      | 18.52          | 150       | 157.33         | 450       | 264.18         |
| -150      | 39.72          | 200       | 175.86         | 500       | 280.98         |
| -50       | 80.31          | 250       | 194.10         | 550       | 297.49         |
| 0         | 100.00         | 300       | 212.05         | 600       | 313.71         |
| 50        | 119.40         | 350       | 229.72         | 650       | 329.64         |
| 100       | 138.50         | 400       | 247.09         | 700       | 345.28         |

To see the full table (every 1°C), visit [omega.com/temperature/Z/pdf/z252-254.pdf](http://omega.com/temperature/Z/pdf/z252-254.pdf)

**Note:** Resistance values for temperatures from -200 to 700°C are provided for reference. The RTD sensors included in these pages have specific temperature ranges assigned. See the applicable product pages for specific temperature ranges.

## Accuracy Classes

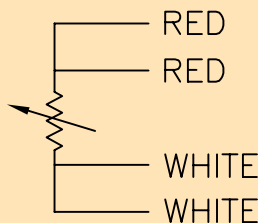
There are four “Accuracy Classes” specified in IEC 60751, listed from least accurate to most accurate they are: (Note: Accuracy Values are in Degrees C)

- |                                     |                |
|-------------------------------------|----------------|
| Class C = $\pm(0.60 + 0.01 * t)$    | (-50 to 500°C) |
| Class B = $\pm(0.30 + 0.005 * t)$   | (-50 to 500°C) |
| Class A = $\pm(0.15 + 0.002 * t)$   | (-30 to 300°C) |
| Class AA = $\pm(0.10 + 0.0017 * t)$ | (0 to 150°C)   |

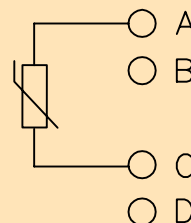
where t = temperature of interest in °C without regard to sign



## Wiring Diagrams



Cable and Connection Head Style Sensors



M12 Connector Style Sensors

