

# **Type TE Series**

#### **Key Features**

Up to 2500W Power rating in free air

Flameproof construction – UL94V coating

**RoHS compliant** 

Custom terminations / leads available

#### Applications

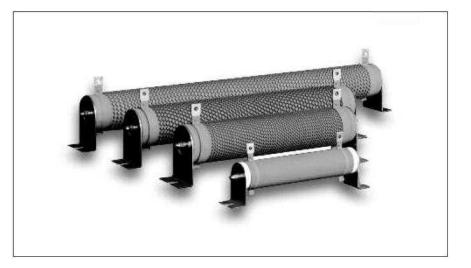
Large electrical and production machinery

Load test simulation

Motor start / stop cycles

#### Dynamic braking

Equipment discharge



TE Connectivity is a leading supplier of standard and custom-designed power resistors for industrial, control and general- purpose applications.

The TE range of flameproof coated tubular ceramic core resistors use both standard and edge wound (corrugated) winding methods to improve power handling capability. Designed for heavy duty machinery, electrical equipment, motor control etc. requiring stability and reliability.

Characteristics – Electrical

| Power rating @70°C in free air | 50W – 2500W (see table)     |
|--------------------------------|-----------------------------|
| Resistance range               | See table                   |
| Selection series               | E12                         |
| Tolerance                      | ±5% ±10%                    |
| Temperature Coefficient of     | <20Ω ±400PPM/°C             |
| resistance                     | ≥20Ω ±300PPM/°C             |
| Operating temperature range    | -55 ~ +155°C                |
| Short term overload            | 3 x rated power / 5 seconds |
| Dielectric strength            | 2500VAC Min.                |
| Insulation resistance          | DC500V 20MΩ min.            |
|                                |                             |

#### 9-1773453-2 CIS WR 12/2016

Dimensions in millimetres unless otherwise specified Dimensions Shown for reference purposes only. Specifications subject to change



# Specifications – Electrical

| Power   | Resistance | Resistance Tolerance D |          | Appearance |
|---------|------------|------------------------|----------|------------|
| Rating  | Value      |                        | Strength |            |
| 50W     | R10 ~ 2K7  | ±5% ±10%               | 500VAC   | Smooth     |
| 60W     | R10 ~ 2K7  | ±5% ±10%               | 500VAC   | Smooth     |
| 80W     | R10 ~ 2K7  | ±5% ±10%               | 500VAC   | Smooth     |
| 100W    | 1R0 ~ 2K7  | ±5% ±10%               | 500VAC   | Smooth     |
| 120W    | 1R0 ~ 2K7  | ±5% ±10%               | 500VAC   | Smooth     |
| 150W    | 1R0 ~ 2K7  | ±5% ±10%               | 500VAC   | Smooth     |
| 200W    | 1R0~9R1    | ±5% ±10%               | 300VAC   | Ribbed     |
| 20070   | 10R ~ 2K7  | ±5% ±10%               | 500VAC   | Smooth     |
| 300W    | 1R0~9R1    | ±5% ±10%               | 300VAC   | Ribbed     |
| 50070   | 10R ~ 2K7  | ±5% ±10%               | 500VAC   | Smooth     |
| 400W    | 1R0 ~ 15R  | ±5% ±10%               | 300VAC   | Ribbed     |
| 400 W   | 16R ~ 2K7  | ±5% ±10%               | 500VAC   | Smooth     |
| 500W    | 1R0 ~ 20R  | ±5% ±10%               | 300VAC   | Ribbed     |
| 50070   | 21R ~ 2K7  | ±5% ±10%               | 500VAC   | Smooth     |
| 60014   | 1R0 ~ 20R  | ±5% ±10%               | 300VAC   | Ribbed     |
| 600W    | 21R ~ 2K7  | ±5% ±10%               | 500VAC   | Smooth     |
| 75014   | 1R0 ~ 75R  | ±5% ±10%               | 300VAC   | Ribbed     |
| 750W    | 76R ~ 2K7  | ±5% ±10%               | 500VAC   | Smooth     |
| 1000W   | 1R0 ~ 100R | ±5% ±10%               | 300VAC   | Ribbed     |
| 100010  | 101R ~ 2K7 | ±5% ±10%               | 500VAC   | Smooth     |
| 1200W   | 1R0 ~ 100R | ±5% ±10%               | 300VAC   | Ribbed     |
| 120000  | 101R ~ 2K7 | ±5% ±10%               | 500VAC   | Smooth     |
| 150014/ | 1R0 ~ 120R | ±5% ±10%               | 300VAC   | Ribbed     |
| 1500W   | 121R ~ 2K7 | ±5% ±10%               | 500VAC   | Smooth     |
| 2000W   | 1R0 ~ 120R | ±5% ±10%               | 300VAC   | Ribbed     |
|         | 121R ~ 2K7 | ±5% ±10%               | 500VAC   | Smooth     |
| 2500W   | 1R0 ~ 120R | ±5% ±10%               | 300VAC   | Ribbed     |
| 230070  | 121R ~ 2K7 | ±5% ±10%               | 500VAC   | Smooth     |

# Voltage rating:

Resistors shall have a rated direct-current (DC) continuous working voltage or an approximate sine-wave root-mean-square (RMS) alternating-current (AC) continuous working voltage at commercial line frequency and waveform corresponding to the power rating, as determined from the following formula:

 $RCWV = VP \times R$ 

Where : RCWV = Rated DC or RMS AC continuous working voltage at commercial-line frequency and waveform (volt)

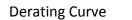
P = Power Rating (watt)

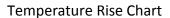
R = Nominal Resistance (ohm)

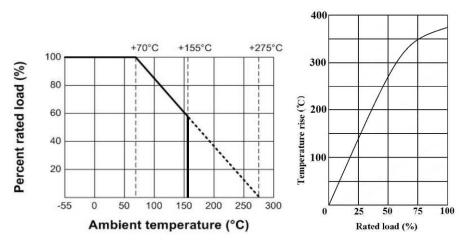
#### 9-1773453-2 CIS WR 12/2016

Dimensions in millimetres unless otherwise specified Dimensions Shown for reference purposes only. Specifications subject to change



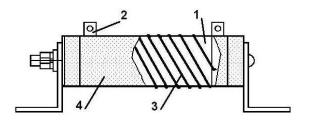




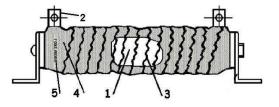


# Construction:

Smooth:



Ribbed:



| No. | Name       | Material                | Material Generic Name                             |
|-----|------------|-------------------------|---|
| 1   | Basic Body | Rod Type Ceramics       | Al <sub>2</sub> O <sub>3</sub> , SiO <sub>2</sub> |
| 2   | Terminal   | Tin plated terminal cap | Fe : 73%, Mn : 21%, C : 5%                        |
| 3   | Resistance | Ni-Cr or Cu-Ni Alloy    | Ni-Cr or Cu-Ni Alloy                              |
|     | Wire       |                         |   |
| 4   | Coating    | Insulated and non-flame | Non-Flame paint UL94V                             |
|     |            | paint                   |   |
|     |            | (Color: Green)          |   |
| 5   | Marking    | Marking Ink             |   |

9-1773453-2 CIS WR 12/2016

Dimensions in millimetres unless otherwise specified Dimensions Shown for reference purposes only. Specifications subject to change



# **Environmental Characteristics:**

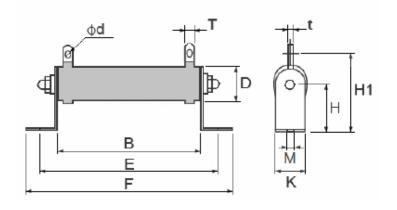
| Characteristics | Limits                           | Test Methods   |  |  |  |  |
|-----------------|----------------------------------|--|--|--|--|--|
|                 |                                  | (JIS C 5201-1)   |  |  |  |  |
| Temperature     | <20Ω : ± 400 PPM/°C Max.         | Natural Resistance change per temperature degree   |  |  |  |  |
| Coefficient     | ≥20Ω : ± 300 PPM/°C Max.         | centigrade.  |  |  |  |  |
|                 |                                  | R <sub>2</sub> -R <sub>1</sub>   |  |  |  |  |
|                 |                                  | x10 <sup>6</sup> (PPM/°C)  |  |  |  |  |
|                 |                                  | $R_1(t_2-t_1)$   |  |  |  |  |
|                 |                                  | $R_1$ : Resistance value at room temperature ( $t_1$ )   |  |  |  |  |
|                 |                                  | $R_2$ : Resistance value at room temperature +100°C ( $t_2$ )                                  |  |  |  |  |
|                 |                                  | (Sub-clause 4.8)   |  |  |  |  |
| Short term      | ±(2% + 0.05Ω) Max. with no       | Permanent resistance change after the application of a   |  |  |  |  |
| overload        | evidence of mechanical           | potential of 3 x RCWV for 5 seconds  |  |  |  |  |
|                 | damage                           | (Sub-clause 4.13   |  |  |  |  |
| Terminal        | No evidence of mechanical        | Direct load :  |  |  |  |  |
| Strength        | damage                           | Resistance to a 2.5 kgs direct load for 10 secs. in the  |  |  |  |  |
|                 |                                  | direction of the longitudinal axis of the terminal leads                                       |  |  |  |  |
|                 |                                  | Twist Test :   |  |  |  |  |
|                 |                                  | Terminal leads shall be bent through 90 ° at a point of  |  |  |  |  |
|                 |                                  | about 6mm from the body of the resistor and shall be   |  |  |  |  |
|                 |                                  | rotated through 360° about the original axis of the bent                                       |  |  |  |  |
|                 |                                  | terminal in alternating direction for a total of 3 rotations                                   |  |  |  |  |
|                 |                                  | (Sub-clause 4.16)  |  |  |  |  |
| Solderability   | 95 % coverage Min.               | The area covered with a new smooth, clean, shiny and   |  |  |  |  |
|                 |                                  | continuous surface free from concentrated pinholes.  |  |  |  |  |
|                 |                                  | Test temp. of solder : 245°C ± 3°C   |  |  |  |  |
|                 |                                  | Dwell time in solder : 2 ~ 3 seconds   |  |  |  |  |
|                 |                                  | (Sub-clause 4.17)  |  |  |  |  |
| Soldering Temp. | Electrical Characteristics shall | Terminals immersed into solder bath to 3.2 ~ 4.8mm   |  |  |  |  |
| Reference       | be satisfied without distinct    | from the body. Permanent resistance change shall be  |  |  |  |  |
|                 | deformation in appearance.       | checked.   |  |  |  |  |
|                 | (95% coverage Min.)              | Wave soldering condition (2 cycles max.)   |  |  |  |  |
|                 |                                  | Pre-heat : $100 \sim 120 \circ C$ , $30 \pm 5 sec$ .   |  |  |  |  |
|                 |                                  | Suggested solder temp.: 235 ~ 255 °C, 10 sec. (max.)   |  |  |  |  |
|                 |                                  | Peak temp.: 260 °C   |  |  |  |  |
|                 |                                  |  |  |  |  |  |
|                 |                                  | Hand soldering condition:  |  |  |  |  |
|                 |                                  | Hand Soldering bit temp. : $380 \pm 10 \text{ °C}$<br>Dwell time in solder : $3 \pm 1/-0$ sec. |  |  |  |  |
| Resistance to   | Resistance change rate           | Permanent resistance change when terminals immersed  |  |  |  |  |
| soldering heat  | $\pm(1\%+0.05\Omega)$ with no    | to $3.2 \approx 4.8$ mm from body in $350^{\circ}$ C $\pm 10^{\circ}$ C solder for             |  |  |  |  |
| 0.000           | evidence of mechanical           | 3±0.5 seconds  |  |  |  |  |
|                 | damage                           | Sub-clause 4.18  |  |  |  |  |
| Load life in    | Resistance change rate           | Resistance change after 1,000 hours (1.5 hours "on", 0.5                                       |  |  |  |  |
| humidity        | ±(5%+ 0.05Ω) Max. with no        | hour "off") at RCWV in a humidity test chamber   |  |  |  |  |
|                 | evidence of mechanical           | controlled at 40 °C± 2 °C and 90 to 95 % relative  |  |  |  |  |
|                 | damage                           | humidity   |  |  |  |  |
|                 |                                  | (Sub-clause 4.24.2.1)  |  |  |  |  |
| Load Life       | Resistance change rate           | Permanent resistance change after 1,000 hours  |  |  |  |  |
|                 | ±(5%+ 0.05Ω) Max. with no        | operating at RCWV with duty cycle of (1.5 hours "on",  |  |  |  |  |
|                 | evidence of mechanical           | 0.5 hour "off") at 70°C ± 2°C ambient  |  |  |  |  |
|                 | damage                           | (Sub-clause 4.25.1)  |  |  |  |  |

# 9-1773453-2 CIS WR 12/2016

Dimensions in millimetres unless otherwise specified Dimensions Shown for reference purposes only. Specifications subject to change

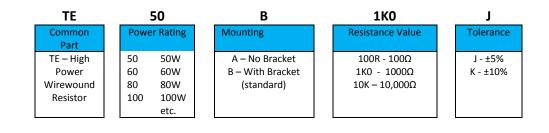


### Dimensions:



| Power  | Dimension |     |     |     |     |      |       |     |       |       |            |
|--------|-----------|-----|-----|-----|-----|------|-------|-----|-------|-------|------------|
| rating | B±2       | E±5 | F±3 | D±2 | H±1 | H1±3 | M±0.5 | K±1 | T±0.5 | t±0.5 | Ød<br>±0.5 |
| 50W    | 102       | 124 | 146 | 28  | 28  | 61   | 6.5   | 28  | 8     | 1.8   | 4.3        |
| 60W    | 102       | 124 | 146 | 28  | 28  | 61   | 6.5   | 28  | 8     | 1.8   | 4.3        |
| 80W    | 152       | 174 | 196 | 28  | 28  | 61   | 6.5   | 28  | 8     | 1.8   | 4.3        |
| 100W   | 182       | 204 | 226 | 28  | 28  | 61   | 6.5   | 28  | 8     | 1.8   | 4.3        |
| 120W   | 182       | 204 | 226 | 28  | 28  | 61   | 6.5   | 28  | 8     | 1.8   | 4.3        |
| 150W   | 195       | 217 | 239 | 40  | 41  | 81   | 8     | 40  | 10    | 1.8   | 5.5        |
| 200W   | 195       | 217 | 239 | 40  | 41  | 81   | 8     | 40  | 10    | 1.8   | 5.5        |
| 300W   | 282       | 304 | 326 | 40  | 41  | 81   | 8     | 40  | 10    | 1.8   | 5.5        |
| 400W   | 282       | 304 | 326 | 40  | 41  | 81   | 8     | 40  | 10    | 1.8   | 5.5        |
| 500W   | 316       | 338 | 360 | 50  | 45  | 101  | 8     | 50  | 16    | 1.8   | 6.5        |
| 600W   | 345       | 367 | 389 | 40  | 41  | 81   | 8     | 40  | 10    | 1.8   | 5.5        |
| 750W   | 316       | 338 | 360 | 50  | 45  | 101  | 8     | 50  | 16    | 1.8   | 6.5        |
| 1000W  | 300       | 325 | 350 | 60  | 60  | 119  | 8.5   | 60  | 15    | 2     | 6.5        |
| 1200W  | 415       | 440 | 465 | 60  | 60  | 119  | 8.5   | 60  | 15    | 2     | 6.5        |
| 1500W  | 415       | 440 | 465 | 60  | 60  | 119  | 8.5   | 60  | 15    | 2     | 6.5        |
| 2000W  | 510       | 535 | 560 | 60  | 60  | 119  | 8.5   | 60  | 15    | 2     | 6.5        |
| 2500W  | 600       | 625 | 650 | 60  | 60  | 119  | 8.5   | 60  | 15    | 2     | 6.5        |

# How To Order



9-1773453-2 CIS WR 12/2016

Dimensions in millimetres unless otherwise specified Dimensions Shown for reference purposes only. Specifications subject to change

# **Mouser Electronics**

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

TE Connectivity: TE200B100RJ