

## Typical power and temperature at fixed resistors, fixed resistor elements and resistor devices

1. Since electrical energy is converted into heat, heating up of the exhaust air and of the enclosure at the air outlet is inevitable. The highest allowable temperature at the resistor element may be maximum 400°C beyond the ambient temperature. Since the cooling of the devices is accomplished by convection, the above mentioned aspects have absolutely to be considered.

In cases of insufficient cooling or false mounting

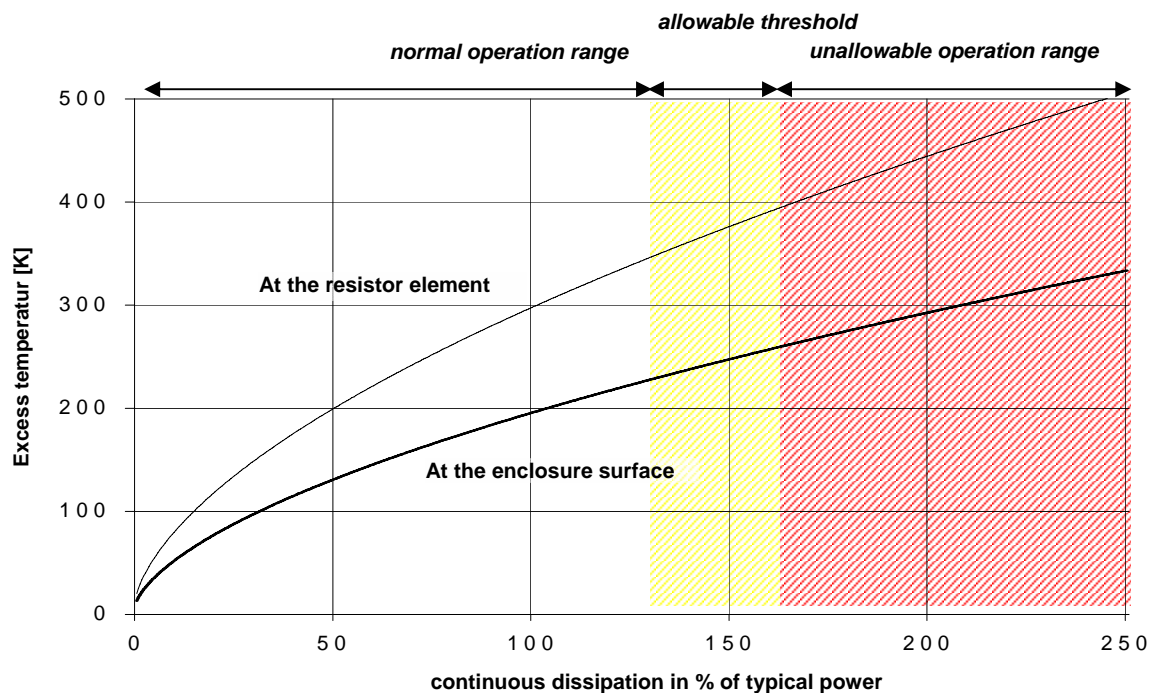
- the resistor or the surrounding devices could be overheated or ruined.

2. The given typical power values and temperatures in our technical documentation are valid for 100% duty cycle factor (DCF) (continuous dissipation) according to DIN VDE 0660 part 100 and part 102. The mentioned excess temperatures for enclosure and exhaust air are 200 K and based on our 100% typical power value. They are valid under the following conditions:

- temperature rise of 200 K at the surface of fixed resistor enclosures (degree of protection > IP00)
- temperature rise of 300 K at the surface of fixed resistor elements (degree of protection IP00). The temperature rise of slide resistors is only 250K.
- maximum ambient temperature 40°C  
Warning: If the ambient temperature is higher than 40°C, you have to lower the continuous dissipation for 4% per 10 K temperature rise!
- unhindered access of cooling air
- unhindered diverting of warmed up air (mind a minimum separation distance of approx. 200 mm to neighbouring components/walls and of approx. 300 mm to components above/ceiling)

3. Depending upon use it can be possible to increase the continuous dissipation of the resistors, if higher temperatures are accepted. With increase e.g. of 130% of the typical power you will have a rise in temperature of 350K at the surface of the resistor. In other cases of application the continuous dissipation must be reduced, for example with temperature sensitive devices in the surrounding area. The dependence between temperature rise and actual continuous dissipation is shown in the diagram below

Excess temperature in dependence of continuous dissipation



Normal operation range (up to 130%):

Recommended operation range for maximum product life and failure free operation

Allowable threshold (up to 160%):

Allowable operation range, danger of shorter product life and higher failure probability

Unallowable operation range (more than 160%):

Danger of excessive heat and destruction of resistor and neighbouring components