

How to calculate Voltage and Current in a Resistor?

Resistors provide an obstruction to the flow of electricity around a circuit. A voltage is dropped across a resistor, dependant on the current flowing through the resistor. Here are some useful formulae:

Voltage Dropped across a Resistor:

$V = IR$, where I is in Amps, and R in Ohms

This can be re-arranged to give Current or Resistance if Voltage is already known (see ohms law).

Power Dissipated in a Resistor:

$P = I^2R$ or V^2/R where P is in Watts

Always make sure the resistor's power rating is not exceeded!

Resistors in Series:

Putting resistors in series increases the total resistance:

$$R = R_1 + R_2 + R_3 \dots$$

Note that the total resistance should be greater than that of any of the individual resistors.

Resistors in Parallel:

Putting resistors in parallel reduces the total resistance:

$$(1/R) = (1/R_1) + (1/R_2) + (1/R_3) \dots$$

If you have only 2 resistors in parallel you can use:

$$R = (R_1 R_2) / (R_1 + R_2)$$

Here are some general formulae for working out values in an A.C. circuit:

Resistors:

Resistors are exactly the same as in D.C. circuits

$$I = V / R \quad P = I^2R$$

