

# Series to Parallel Converter Calculator

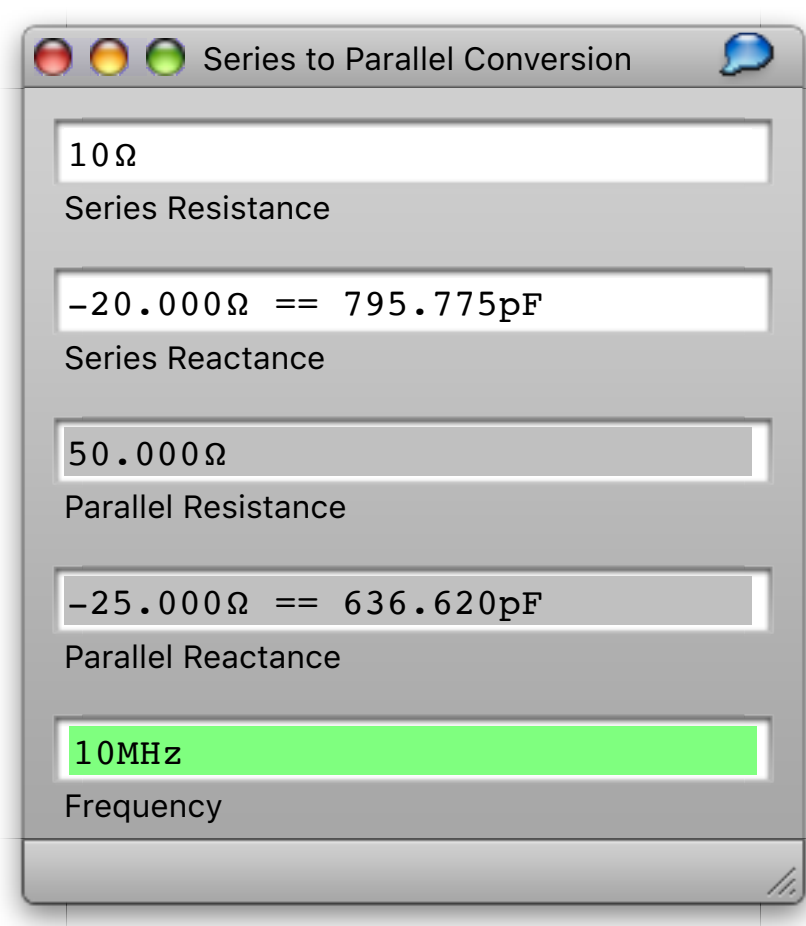
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## Summary

This is a special purpose calculator which converts between series and parallel impedances.

## Instructions

When the Widget is started, it displays a window with five fields.



Enter data into the first and second (serial) or third and fourth (parallel) fields. The alternative form of the impedance is displayed in the other two fields when the RETURN or ENTER key is pressed.

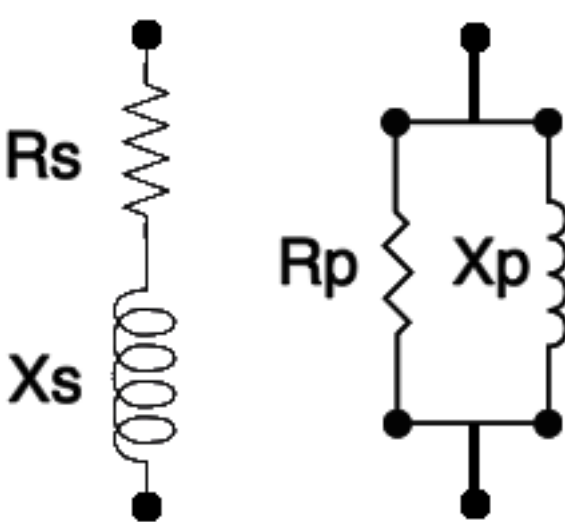
Resistances must be non-negative. Reactances may be negative (for capacitance), positive (for inductance) or zero.

SI suffixes T, G, M, k, m,  $\mu$ /u, n or p *may* be used, optionally followed by an  $\Omega$  character. Type Alt-M for  $\mu$  character. Type Alt-Z for  $\Omega$  character.

If a frequency is entered into the fourth (frequency) field, then reactances may also be entered in Henries or Farads indicated by an H or F character. SI suffixes may be used.

Frequencies must be positive. SI suffixes may be used, optionally followed by the characters Hz.

## Conversion Formulae



### Series to Parallel

$$\begin{aligned} R_p &= (R_s \cdot R_s + X_s \cdot X_s) / R_s \\ X_p &= (R_s \cdot R_s + X_s \cdot X_s) / X_s \end{aligned}$$

### Parallel to Series

$$\begin{aligned} R_s &= R_p \cdot X_p \cdot X_p / (R_p \cdot R_p + X_p \cdot X_p) \\ X_s &= X_p \cdot R_p \cdot R_p / (R_p \cdot R_p + X_p \cdot X_p) \end{aligned}$$

### Reactance to Capacitance or Inductance

Reactance  $X \ \Omega$  at frequency  $f \text{ Hz}$ :

$$\begin{aligned} X < 0 &: \text{Capacitance } C = -1 / (2 \cdot \pi \cdot f \cdot X) \text{ Farads} \\ X \geq 0 &: \text{Inductance } L = 2 \cdot \pi \cdot f \cdot X \text{ Henries} \end{aligned}$$

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## Widget Concept, Coding and Documentation

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