

Transformer Voltage Drop Calculator

Estimates transformer voltage regulation, voltage drop, and loaded secondary voltage from nameplate resistance, reactance, load level, and power factor.

Generated October 10, 2026

<https://www.elecatrix.com/power-quality-transformers/transformer-voltage-drop-calculator/>

Inputs

Input	Value	Unit
No-load secondary voltage	480	V
Load level	50	%
Resistance component	2	%
Reactance component	5	%
Power factor	0.8	PF
Power-factor type	Lagging	

Results

Result	Value	Unit
Load fraction	0.5	x
Load angle	36.8699	deg
Estimated regulation	2.3	%
Estimated voltage drop	11.04	V
Loaded secondary voltage	468.96	V
Power factor used	0.8	PF

Calculation details

Detail	Value	Unit
Calculation basis	Transformer voltage regulation is estimated from resistance percent, reactance percent, load fraction, power factor, and leading or lagging power-factor direction.	

Transformer Voltage Drop Calculator

Estimates transformer voltage regulation, voltage drop, and loaded secondary voltage from nameplate resistance, reactance, load level, and power factor.

Generated October 10, 2026

<https://www.elecatrix.com/power-quality-transformers/transformer-voltage-drop-calculator/>

Selection boundary

Transformer voltage-drop estimate only; verify actual transformer impedance, nameplate data, tap settings, temperature, source voltage, utility requirements, and manufacturer guidance.

Formulas

$$f_L = (L/100)$$

$$\theta = \cos^{-1}(PF)$$

$$Reg_{lag} = f_L(R\% \times PF + X\% \times \sin\theta)$$

$$Reg_{lead} = f_L(R\% \times PF - X\% \times \sin\theta)$$

$$V_{drop} = V_{no-load} \times (Reg/100)$$

$$V_{loaded} = V_{no-load} - V_{drop}$$

Warnings and limitations

This transformer voltage-drop estimate is planning arithmetic. It does not replace transformer nameplate impedance, tap setting review, source-voltage study, temperature effects, utility requirements, manufacturer data, or code compliance.