

Transformer Inrush Duration Calculator

Calculate the cycles and seconds for a simplified transformer inrush current to decay from an initial multiplier to an entered target multiplier.

Generated October 10, 2026

<https://www.elecatrix.com/power-quality-transformers/transformer-inrush-duration-calculator/>

Inputs

Input	Value	Unit
Initial inrush current	1000	A
Steady-state current	100	A
Decay time constant	5	cycles
Target multiplier	2	x steady current
Frequency	60	Hz

Results

Result	Value	Unit
Initial multiplier	10	x
Target current	200	A
Inrush decay duration	8.0472	cycles
Inrush decay duration	0.1341	s

Calculation details

Detail	Value	Unit
Calculation basis	Simplified exponential decay from entered initial multiplier to entered target multiplier.	
Inrush boundary	Decay estimate only; real transformer inrush, source behavior, voltage sag, and protection response remain external.	

Formulas

Initial multiplier = (Initial inrush current/Steady-state current)

Target current = Steady-state current x Target multiplier

Duration (cycles) = Decay time constant x ln!((Initial multiplier/Target multiplier))

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Duration (seconds) = (Duration (cycles)/Frequency)

Warnings and limitations

This exponential decay estimate does not model residual flux, switching angle, source impedance, remanence, protection operation, voltage sag, or manufacturer inrush test data.