

Three-Phase Voltage Unbalance Calculator

Compare three measured line-to-line voltages with an entered reference for a preliminary power-quality review.

Generated October 10, 2026

<https://www.elecatrix.com/testing-protection-grounding/voltage-unbalance-calculator/>

Inputs		
Input	Value	Unit
Measurement label	Panel P1 / Load on	
Vab	480	V
Vbc	476	V
Vca	482	V
Nominal system voltage	480	V
Entered reference unbalance	3	%
Results		
Result	Value	Unit
Average line voltage	479.3333	V
Minimum line voltage	476	V
Maximum line voltage	482	V
Maximum deviation	3.3333	V
Voltage unbalance	0.6954	%
Margin vs entered reference	2.3046	%
Calculation details		
Detail	Value	Unit
Calculation basis	Voltage unbalance uses the maximum absolute deviation from the average of the three entered line-to-line readings.	

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Test boundary	Measured voltage comparison only; do not infer motor derating, utility compliance, service quality, equipment approval, or current unbalance.
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Formulas

$$V_{avg} = \frac{V_{AB} + V_{BC} + V_{CA}}{3}$$

$$\text{Maximum deviation} = \max(|V_{AB} - V_{avg}|, |V_{BC} - V_{avg}|, |V_{CA} - V_{avg}|)$$

$$\text{Voltage unbalance} = \frac{\text{maximum deviation}}{V_{avg}} \times 100\%$$

$$\text{Reference margin} = \text{entered reference} - \text{calculated unbalance}$$

Warnings and limitations

This measured-voltage comparison does not determine motor derating, utility compliance, service quality, equipment approval, or current unbalance.