

Harmonics

Electrical Engineering

Where harmonic currents come from, and the heating and neutral problems they cause.

Harmonics are currents at multiples of the supply frequency, drawn by non-linear loads.

SIX-PULSE DRIVE

5th and 7th dominate

TRIPLIN ORDERS

3rd, 9th, 15th

COMMON DESIGN LIMIT

THD under 5%

- Rectifier front ends draw current in short pulses
- Odd orders dominate: 5th, 7th, 11th, 13th
- Triplen harmonics add rather than cancel
- Neutral current can exceed the phase current
- Harmonics heat transformers, cables and motors
- THD reports total distortion as a percentage

LOOK FOR IT

Three identical single-phase rectifiers can push more current into the neutral than into any one phase.

Educational reference. Harmonic surveys and mitigation on live installations need qualified supervision and local compliance.