Wye & Delta

Electrical Engineering

The two three-phase connections, and what each does to voltage and current.

Star (wye)

- Three windings meet at a neutral point
- $V_L = \sqrt{3}\, V_{ph}$ and $I_L = I_{ph}$
- Offers two voltages, phase and line
- The neutral carries any imbalance
- Usual for distribution into buildings

Delta

- Windings form a closed triangle
- $V_L = V_{ph}$ and $I_L = \sqrt{3}\, I_{ph}$
- One voltage only, and no neutral
- Circulating path traps triplen harmonics
- Usual on motor and transformer windings

THE DIFFERENCE THAT MATTERS

The same motor in delta draws three times its star current, which is what makes star-delta starting work.

Educational reference. Changing a connection on real plant is regulated work needing qualified supervision and local compliance.