Basic Type of AC Power Systems

Types

Single Phase

120/240 volt, 1 phase, 3 wire

Application

Any load up to 400 A, then should consider 3 phase.

Motors 7.5 HP maximum. Most equipment available 120-240-Volt. This is the most standard system.

Individual unit heaters are limited to about 10 KW max.

Three Phase

120/208 V, WYE, 3 phase, 4 wire

Application

Any application from 200A up, allows motors larger than 7.5 HP and has 120 volts available from all legs to neutral. Must have 208 Volt rated motors and heaters.

Easy to balance 120 Volt loads From each phase to neutral.

240 Volt heaters used on 208V will supply only 75% of heat.

All three phase systems provide 1.73 times as much power as a single phase system of same ampacity for only about 1.25% the cost.

More economical.

120 V, 1 phase, 208V 1 phase and 3 phase loads can be used.

All panel spaces can be used.

No wild leg.
120/240 Volt, 3 phase, 4 wire Delta

Application

Used mainly in shops where 240V 1 phase equipment exists and where 120V single phase is a minor part of the load.

Usually used with a 120/240V single phase panel because L2 is a wild leg.

If one line, either L1 to neutral is loaded up to ampacity on 120 volt loads, no other 3 phase loads may be placed on the system.

Line 2 to neutral is 208 volts to neutral. “Wild leg” can't use 1/3 of panel space for 120 volt loads because every 3rd pole is 208 volts to ground.

(120V, 1 phase, 240V loads 1 phase and 2 phase can be used).

Hard to Balance

120 and 240V, 3 phase and 1 phase equipment easy to obtain. Should not use if 120V load is more than 25% of load.
Application
Used primarily in large industrial and commercial buildings with high power requirements and large motors. Lighting is usually 277 Volts with another transformer To transform to 120/208V, 3 phase, 4 wire for 120 volt loads such as outlets.

Motors usually available down to ½-1 HP range. Heating equipment available at 480V on a limited basis.