A Quick Guide to Voltage

AC vs DC Power

Think of **AC Power (Alternating Current)** as a wave, alternating between positive and negative flow. The distance between those peaks and valleys of that flow is called "**frequency**" (measured in Hertz or Hz) and in the U.S. this is measured at 60Hz (or 50Hz in other places such as the U.K.), meaning that one complete cycle or "wave" happens 50 or 60 times per second. AC Power usually operates at higher voltages and offers slightly more flexibility as it can be transmitted over longer-distances while also being able to be increased or decreased through a transformer. AC Power is best used for things such as gate operators, traffic spikes, or for anything with a large power requirement.

Unlike AC Power, **DC Power (Direct Current)** looks like a straight or "direct" line, moving in one single direction. Part of what makes DC power unique is that it can be stored (batteries, power supplies, etc.) as well as chemically produced. DC Power often runs in lower voltages, primarily being used for accessories and controls like transmitters and control boards.

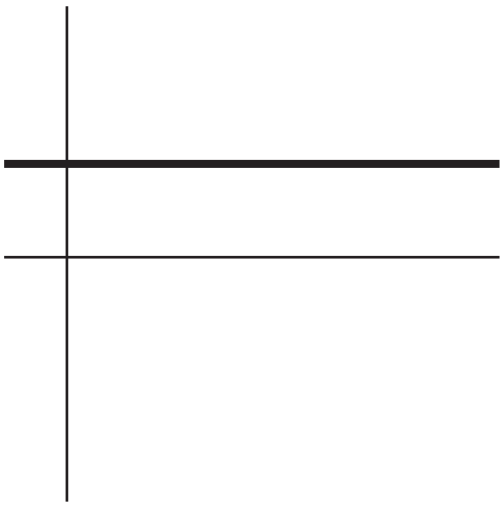
Voltage & Phases

Voltage (V), like Wattage (W), is the measurement of electricity that is either required to power something or that a power unit supplies. You'll commonly see 120V in the U.S. as it's what is used for lighting and most small appliances. Voltage ranges can vary widely but you will mostly see between 5V and 600V for heavy-duty applications like industrial gate openers.

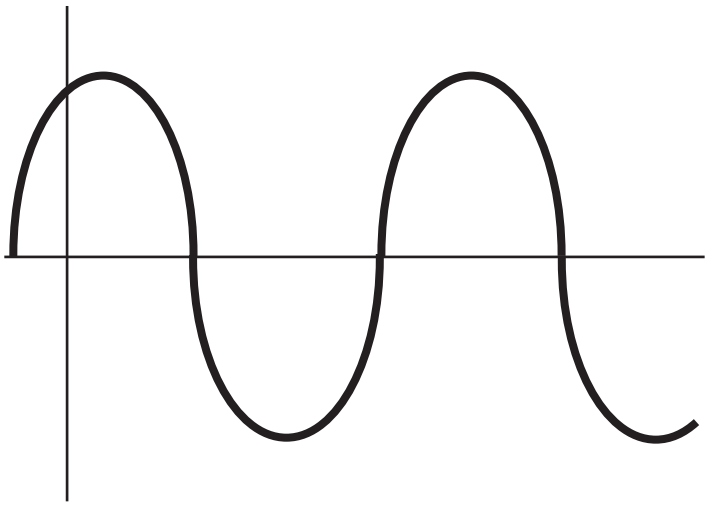
Additionally, sometimes the listed voltage can be slightly higher or lower than what it says. For instance 110V is equal to 115V and 120V just as 220V is equal to 230V and 240V. This is due to **Input Tolerance** sometimes also referred to as Nominal Range. This is the safety range that certain voltages can operate at to prevent equipment damage, decreased efficiency, and avoid any serious threats like fires.

Phases refers to the delivery of electricity in any AC powered system, measured by the number of wires that carry different loads throughout it. Instead of using a single wire and wave the way that DC power would, AC power phases use multiple cables to provide multiple waves. This provides consistent and efficient power.

There are two kinds of phases: **Single-Phase** which is 2 wires & **3-Phase** which is three or four wires. **Single-Phase** is typically found in residential appliances and uses a single voltage wave using two conductors (hot and neutral wire) and a ground wire. **3-Phase** on the other hand is used in commercial or industrial appliances only and operates using 3 voltage waves, 3 conductors, a neutral wire, and some kind of ground wire depending on the installation.



DC Power (Direct Current)



AC Power (Alternating Current)

Input Tolerance / Nominal Range	Input Voltage Options	Common Wire Color(s)	Wires	Common In
12 AC	12 AC	Red / Black / Striped / Unmarked	~ / ~	NA - Residential
12 DC	12 DC		+ / -	NA - Residential
24 AC	24 AC	Red / Black / Striped / Unmarked	~ / ~	NA - Residential & Commercial
24 DC	24 DC		+ / -	NA - Residential & Commercial
36 AC	36 AC	Red / Black / Striped / Unmarked	~ / ~	NA - Residential & Commercial
36 DC	36 DC		+ / -	NA - Residential & Commercial
48 AC	48 AC	Red / Black / Striped / Unmarked	~ / ~	NA - Industrial
48 DC	48 DC		+ / -	NA - Industrial
110/115/120 AC (60Hz, 1 Phase)	110 AC (60Hz, 1 Phase)	Black / White	Hot + Neutral	NA - Residential & Industrial
	115 AC (60Hz, 1 Phase)			
	120 AC (60Hz, 1 Phase)			
220/230/240 AC (60Hz, 1 Phase)	220 AC (60Hz, 1 Phase)	Black / White / Red	Hot 1 + Hot 2	NA - Residential
	230AC (60Hz, 1 Phase)			
	240 AC (60Hz, 1 Phase)			
208 AC (60 Hz, 1 Phase)	208 AC (60 Hz, 1 Phase)	Black / Blue / Red	Hot 1 + Hot 2	NA - Industrial
277 AC (60Hz, 1 Phase)	277 AC (60Hz, 1 Phase)	Brown / Gray / Orange / Yellow	Hot + Neutral	
347 AC (60Hz, 1 Phase)	347 AC (60Hz, 1 Phase)			
208 AC (60Hz, 3 Phase)	208 AC (60Hz, 3 Phase)	Black / Red / Blue	Hot 1 + Hot 2 + Hot 3	
240 AC (60Hz, 3 Phase)	240 AC (60Hz, 3 Phase)		Hot 1 + Hot 2	
460/480 AC (60Hz, 3 Phase)	460 AC (60Hz, 3 Phase)	Brown / Orange / Yellow	Hot 1 + Hot 2 + Hot 3	NA - Industrial
	480 AC (60Hz, 3 Phase)			
575/600 AC (60Hz, 3 Phase)	575 AC (60Hz, 3 Phase)	Brown / Orange / Yellow	Hot 1 + Hot 2 + Hot 3	CA - Industrial
	600 AC (60Hz, 3 Phase)			
230 AC (50Hz, 1 Phase)	230 AC (50Hz, 1 Phase)	Brown / Blue	Hot + Neutral	EU - Residential & Industrial
400 AC (50Hz, 1 Phase)	400 AC (50Hz, 1 Phase)	Brown / Black / Gray	Hot 1 + Hot 2 + Hot 3	EU - Residential & Industrial

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