

Understanding Electrical Terms



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Power for Australians since '66

Understanding Electrical Terms

In today's computer-intensive work environments, a critical issue is clean, reliable power. Powerlite is the industry leader in diesel generator power solutions. The ability to handle any power requirement is an important component in Powerlite's mission to completely satisfy customers' needs.

This booklet is designed to help you become familiar with electrical terms commonly used in the contract furniture industry. You'll find descriptions of specific Powerlite electrical products as well. Having a working knowledge of these terms and descriptions will help you understand Powerlite's furniture-based power capabilities.

Remember, Powerlite field sales engineers are also always ready and available to answer specific customer inquiries.

Use this booklet to become conversant in the language of power, and as a companion to the other Powerlite booklets on electrical topics.



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NOTE: Within each description, italicized type is used to denote terms that are described elsewhere in this booklet.



Industry-Common Electrical Terms

Access Flooring

A flooring system in which modular panels are raised above the floor slab, typically on 75 to 300mm high supports. Electrical *conduit* and data cabling are routed beneath the flooring panels and connected to *floor monuments* (raised or flush). This type of flooring system can provide efficient access to wires and cables and can in some instances simplify reconfiguration.

Ampacity

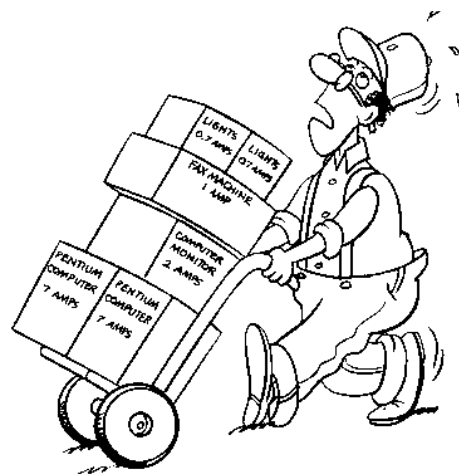
Ampacity refers to the maximum current, in *amperes*, that a *conductor* can carry three hours or more without exceeding the temperature rating of the electrical insulation.

Amperage, Ampere, Amp

Amperage is the volume (or quantity) of electrical current flowing through a *circuit*. This volume is measured in amperes, otherwise referred to as amps. The amount of amps required by an electrical device to operate is usually listed on the equipment's electrical nameplate.

Balancing, Load Balancing

A planning practice in which the total *amperage* requirements of the electrical equipment in a *shared-neutral* installation is distributed equally among the number of available electrical *circuits* servicing the installation. For shared-neutral *three-phase* circuits, this refers to matching the current of circuits 1, 2, and 3 with respect to each other.



Load Balancing in a Shared-Neutral Office Installation

Ballast

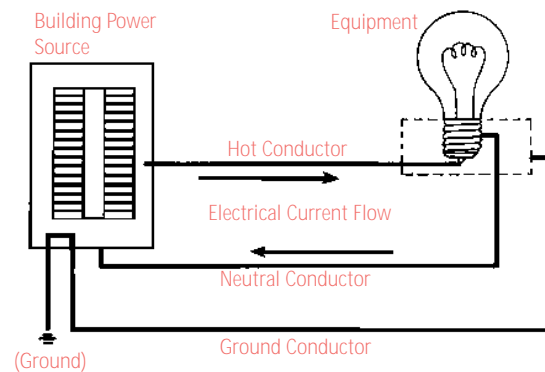
A device in fluorescent lamps that regulates the level (*amps*) of electrical current and voltage flowing through the fluorescent lamp tube. Ballasts may be magnetic or electronic, with electronic being slightly more energy efficient.

Branch Circuit

A single *circuit* carrying electrical current (usually limited to 10 *amps*) to office furniture and equipment. It consists of *conductors* (wires) connected between the building's electrical service panel (*circuit breakers*) and the electrical *outlets* (*power receptacles*).

Circuit

A complete path for electrical current flowing from the building power source to the equipment being powered and back to the power source. The "*hot*" *conductor* of a circuit carries 240-volt power to the equipment; the "*neutral*" *conductor* carries it back to the source. The "*ground*" *conductor* provides a safe escape route for power in the event of *short circuits* or other problems. Circuits are rated according to the number of *amps* they can accommodate. The total number of amps required by all of the equipment in a furniture installation will dictate the number of circuits required.



Circuit Breaker(s)

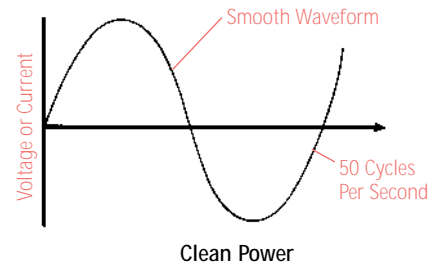
A safety device designed to automatically stop the flow of electricity whenever a *circuit* becomes overloaded, i.e. exceeds the number of *amps* that the wiring can accommodate. *Branch circuits* usually have 10-amp breakers.

The *maximum continuous load* on a circuit breaker is permitted to be 80% (8 amps) of the rating, which prevents unnecessary power interruptions caused by operation too close to 100% capacity.

Industry-Common Electrical Terms

Clean Power

Power which has a smooth waveform with no spikes, notches or other irregularities; clean power also has a *voltage* within a range 10% above or below the standard 240 volts. Computers and peripheral equipment operate most reliably with clean power, which is free from electrical noise (spikes, drop-outs, surges, sags, etc.) and voltage variations generated by operating equipment. *Dedicated circuits* and/or an *isolated ground* are often specified in order to obtain clean power for sensitive electronic equipment. (See Dirty Power.)



Codes, Local Electrical Codes

Various government bodies have adopted minimum safety standards, or "codes," for the electrical wiring of furniture installations. The *Australian/ NZ standards* are the most widely recognized code, and it applies to most installations. Some municipalities, e.g. Sydney, Melbourne, etc., have their own codes. Since local codes are often more restrictive than the AS/NZ, it's always important to check their requirements as well.



Common Ground

An electrical *circuit* that uses a variety of *conductors* for a ground path. Ground conductors include wire, *conduit*, the metal of a building, or water pipes. Because so much of a building's structure is grounded this way, a common ground is often electrically "noisy." Therefore, an *isolated ground* is more suitable for computers.

Conductor

In *branch circuits* and in furniture-based power systems, the conductor is more than just wire. It includes the electrical conductors (power infeed, *flexible power connectors*, etc.), *circuit breaker*, and wire nuts. All elements in a conductor should be *UL* tested, listed, and labeled for safety.

Conduit

Metal or non-metallic tubing — available in either rigid or flexible varieties — used to route and protect electrical wires and communication cables.

Connector, Terminal

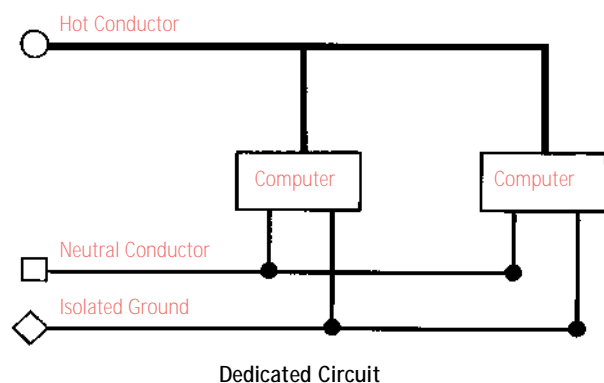
Devices used to terminate or join two *conductors*. Connectors must be tested and labeled for safety. The *amp* rating of a power system is dictated by its connector or terminal *ampacity*, not the gauge of conductors within the system.

Continuous Load

See Maximum Continuous Load.

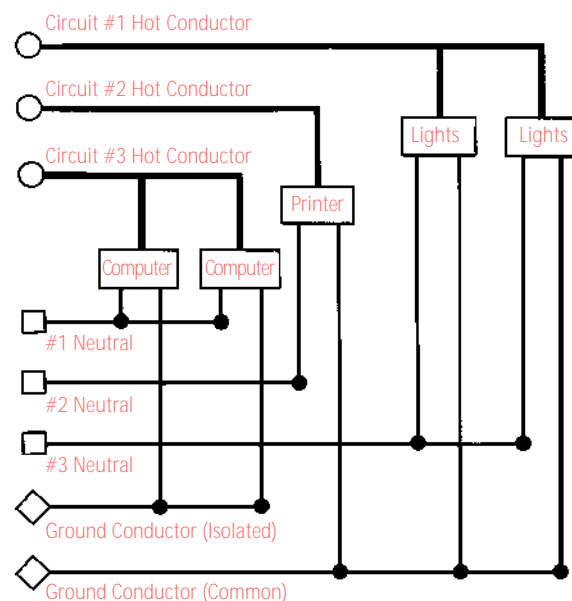
Dedicated Circuit

A *circuit* with three *conductors* — consisting of hot, neutral, and ground — between the *circuit breaker* protecting the *branch circuit* and the *outlet* that is dedicated only for use with specific equipment. (Dedicated circuits are sometimes incorrectly referred to as isolated circuits.)



Designated Branch Circuit

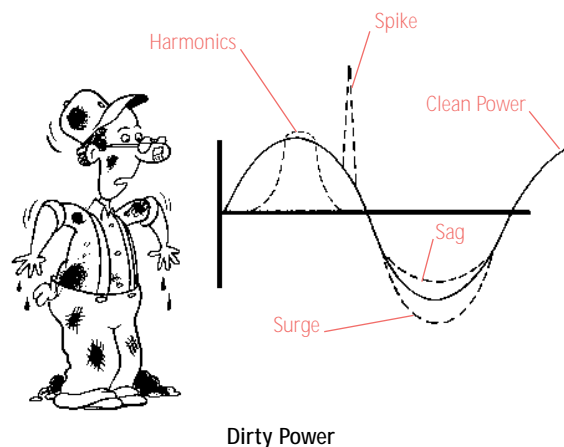
A *branch circuit* with three *conductors* — consisting of hot, neutral, and ground — that is designated by the user for use with specific equipment. Either the neutral and ground, or both, may be shared with another branch circuit.



Industry-Common Electrical Terms

Dirty Power

Unlike *clean power*, dirty power flows outside a range 10% above or below the standard 240 *volts*. Dirty power often results from electrical noise generated by the normal operation of electrical equipment. Dirty power is OK for lighting, fans, and other non-computer equipment. But it can adversely affect computers and other types of sensitive electronic equipment. Dirty power can be cleaned with protective devices such as *surge protectors* or *Uninterruptible Power Supplies*, either of which can be installed in a work station or at the building power source.



Electrical Test Laboratories

Recognized testing authority (RTA) - for example Austel.

Electromagnetic Interference (EMI)

An electrical, magnetic, or electromatic, e.g. radio interference that causes an undesirable response, degradation, or failure in electronic equipment.

Flat Wiring

A special flat power cable that carries the *branch circuit* power between the building's floor slab and the carpet. The thin *conductors* are separated and enclosed within an insulating assembly.

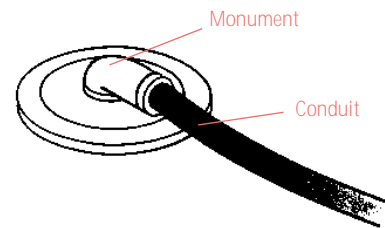
The wiring system is accessed through specially designed *floor monuments* and *connectors*.

Floor Duct

An under-floor system of wireways (covered troughs) which brings electrical wires and data cabling to *floor monuments*. This system provides many of the benefits of *access flooring* but often costs less.

Floor Monument/Floor Access

An electrical *outlet*, located on or under the floor's surface, that is connected to *conduit* carrying power beneath the floor. Flush "under floor" access consists of a flush access door that may be lifted to access the electrical and/or data cable *junction boxes*.



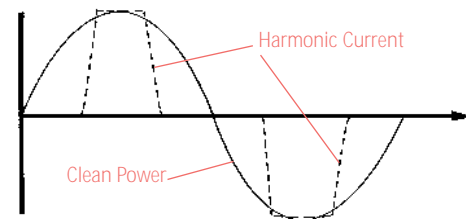
Floor Monument

Ground Conductor

The *conductor* of a *circuit* that provides safety from fire and electrical shock in cases of *short circuits* and other electrical problems. The conductor is physically attached to the earth and represents a zero *volt* potential, thus reducing the shock hazard to persons if an electrical device ever fails or short-circuits.

Harmonic Currents, Harmonics

A distortion in electrical current caused by equipment that uses power in sharp pulses instead of in a smooth pattern. When electrical *circuits* share a common *neutral conductor*, harmonic currents can lead to an electrical overload, causing the neutral conductor to overheat.



Harmonic Currents

Hot Conductor

The *conductor* that carries current from the power source to the equipment. For a complete *circuit*, the hot conductor requires a *neutral conductor* to carry the current back to the power source.

Inspector

All *branch circuits* — carrying electrical current to office furniture and office equipment from the building power source — must be approved by an inspector affiliated with the governmental body having jurisdiction over the installation site.

Industry-Common Electrical Terms

Isolated Ground

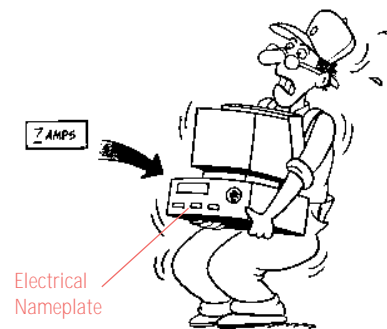
Serves the same safety and protection function as a *common ground* conductor, but it is run in a separate “isolated” *conductor*. This separation usually – but not always – enables the isolated ground to reduce the amount of electrical noise that’s introduced into an electrical *circuit*. Therefore, computers, *Uninterruptible Power Supplies*, and other electronic equipment are often connected to an isolated ground. More than one *hot/neutral conductor* combination may share an isolated ground and still maintain a lower level of electrical noise versus common ground usage.

Junction Box

An electrical construction box that provides a space for the connection or “splicing” of the electrical *conductors*. Connections inside the junction box are usually accomplished with twist-on electrical conductors, called wire nuts.

Load

Describes the amount of power (*amps*) consumed by an electrical *circuit* or device. Loads are usually expressed in amps, but sometimes in *watts*.



Load

Load Balancing

See Balancing.

Maximum Continuous Load

The maximum electrical current in a *circuit* expected to be in constant use for three hours or more. For safety considerations, a continuous load must not exceed 80% of the maximum electrical rating

AS/NZ Electrical Code

A set of minimum standards and regulations that governs planning, construction, and installation of electrical *conductors* and equipment. This is the basis for all electrical *codes* used in Australia. A governmental body having legal jurisdiction over an installation site could apply regulations alone, or it could apply even more restrictive mandatory codes, e.g. local codes.

Neutral Conductor

The *conductor* that carries current back to the power source. It is always used with a *hot conductor* to complete a *circuit*. (See Separate Neutral, Shared Neutral.)

Ohm

Ohm is the measure of electrical resistance, or impedance, in a *circuit*. One *volt* will cause one *amp* to flow through one ohm of resistance.

Open Circuit

A condition where the current flow through a *conductor* is interrupted by a missing or damaged component.

Outlet

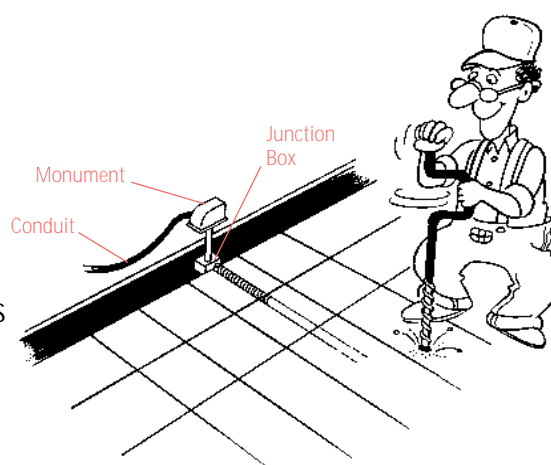
See Receptacle Outlet.

Plenum, Plenum-Rated

Plenum refers to an air chamber in a heating, ventilation, and air conditioning (HVAC) system or to the space between a dropped ceiling and the floor above. In many buildings, the plenum space is often used to route *conductors* and cables. Plenum-rated describes a special type of conductor or cable which is approved/rated for use in a building plenum space. These types of conductors are specially insulated, giving them low flame- and smoke-producing properties. Non-plenum rated cables may also be routed in a plenum space, if they are enclosed in *conduit* that provides fire-resistant properties.

Poke Through

A wiring access device that enables *conductors* located in the ceiling space of a building floor to be routed upward through holes in the floor above. The poke through device includes an electrical *junction box* and a floor trim/access plate; it also has a fire stop.

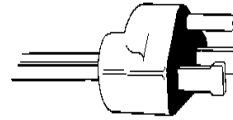


Poke Through

Industry-Common Electrical Terms

Polarized Plug, Grounded Plug, 3-Prong Plug

A plug designed to be inserted into a *receptacle* in one position only. All standard receptacles are designed for polarized, grounded plugs.



Power Outage

A sudden termination of power caused by problems at an electrical utility company or by a tripped *circuit breaker* in a building. A power outage will erase information in a computer's short-term-stored RAM (random access memory), if the equipment is not protected with a back-up power system - an *Uninterruptible Power Supply* device or portable petrol/ diesel generators from [Powerlite \(www.powerlite.com.au\)](http://www.powerlite.com.au).

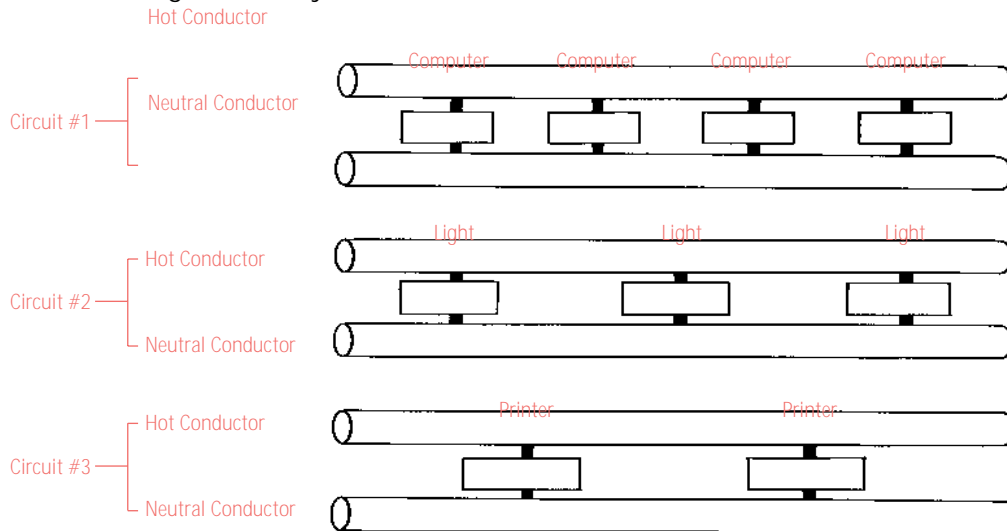
Power Zone

A function of *circuit* planning which defines each office area that is supplied by specific *circuit breakers*.



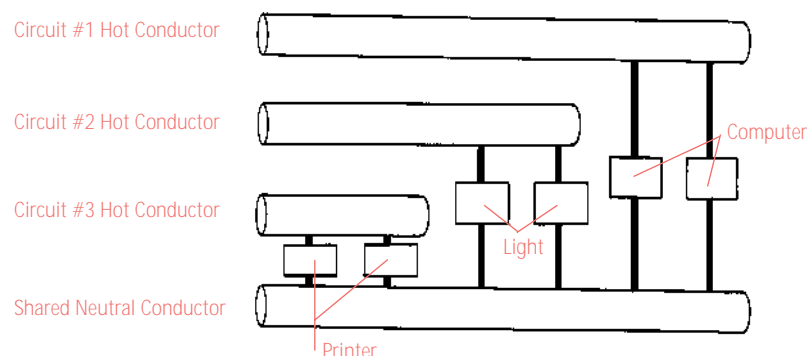
Separate Neutral

A pioneered *circuit* design in furniture-based power systems which features the use of a separate *neutral conductor* for each *hot conductor*. This innovation provides separation of circuits and prevents neutral conductor overloading and overheating caused by *harmonic currents*.



Shared Neutral

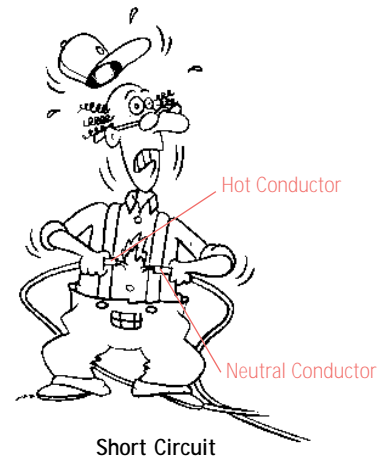
A *circuit* design in which one of two conditions exist: all of the *hot conductors* share a *neutral conductor*, or separate neutral conductors exist for some — but not all — of the hot conductors. In equipment-intensive work environments, a shared neutral system can cause overloading/overheating of the neutral conductor and power quality issues.



Industry-Common Electrical Terms

Short Circuit

A condition in which the *hot conductor* comes in contact with the *ground* or *neutral conductor*. A short circuit creates a spark or arc that often damages one or both of the *circuit* components and causes the *circuit breaker* to trip.



6-Circuit Configuration

See description on page 14.

Surge Protector, Spike Protector

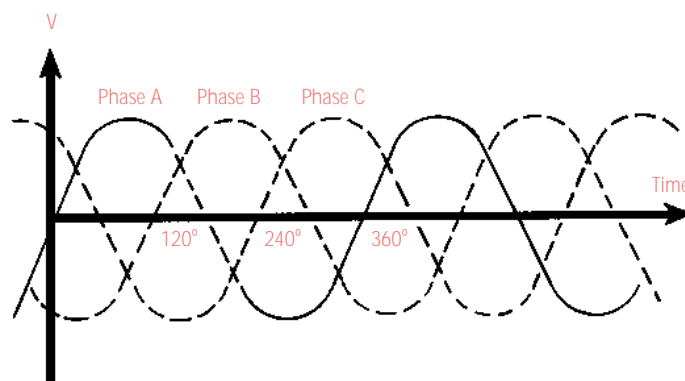
An electrical device that protects equipment from a sudden, high fluctuation in the level of *voltage* normally flowing during a period of time.

Terminal

See Connector.

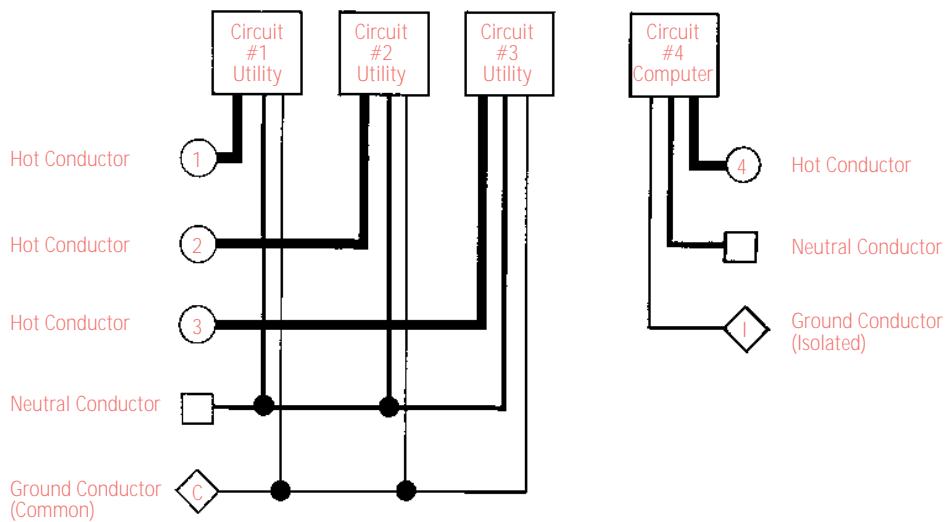
Three-Phase Power

A type of electrical system or *circuit* that utilizes three separate sources of alternating current. The three sources are electrically related to each other by a 120° phase separation. A 3-phase circuit — the most common type in the United States — may consist of four or more *conductors*.



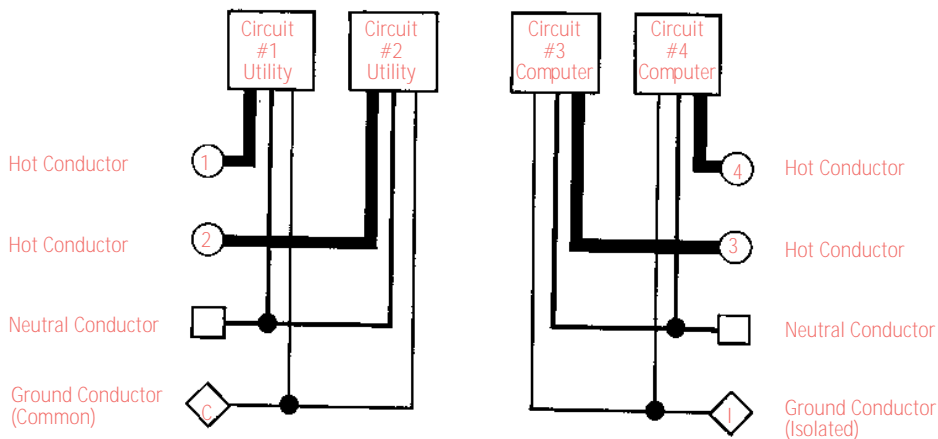
3+D Circuit Configuration

A configuration of four electrical *circuits* within a furniture power system. It's most commonly used for non-intensive computer work environments. Typically, one circuit is *dedicated* for use with computer equipment; the remaining three circuits are dedicated for non-computer equipment.



2+2 Circuit Configuration

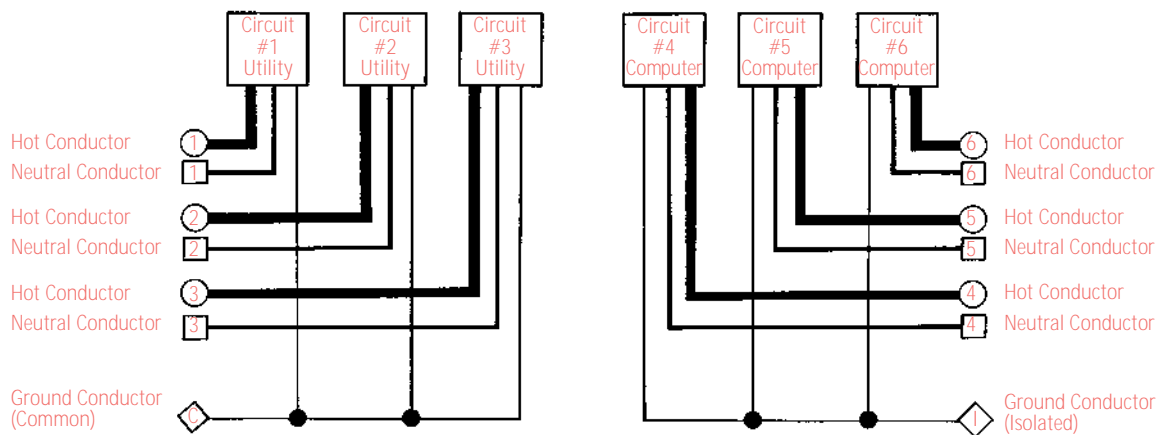
A configuration of four electrical *circuits* within a furniture power system. It's most commonly used for moderately-intensive computer work environments. Typically, two circuits are *designated* for use with computer equipment; the remaining two circuits are designated for non-computer equipment.



Industry-Common Electrical Terms

6-Circuit Configuration

A configuration of six electrical *circuits* within a furniture power system which is most commonly used for intensive computer and peripheral equipment applications. Typically, three circuits are *designated* for use with computer equipment; the remaining three circuits are designated for non-computer equipment. *This Power Base* has six electrical circuits, each with its own separate neutral.



Uninterruptible Power Supply (UPS)

An electrical device that supplies separate or supplemental power to equipment in the event of a *power outage*. The UPS uses a battery and electronic *voltage-generating circuits* to supply power during brief power interruptions, usually up to 10 minutes (then use [Powerlite](#) generators).



Voltage, Volts

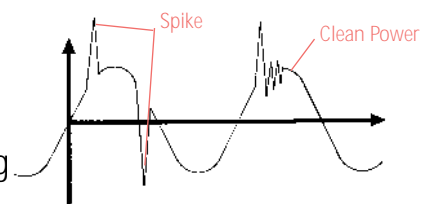
The measure of electrical pressure in a *circuit*. One volt of pressure is required to push one *amp* of current through a *conductor* with one *ohm* of resistance.

Voltage Fluctuation

A deviation — either up or down — in the otherwise stable *voltage* level of 240 volts. A voltage “sag,” usually 216 volts or less, can occur during a brown-out, when the demand for power exceeds supply. A voltage “surge,” usually 264 volts or more, can occur when power usage is suddenly reduced, such as at night. Devices like voltage regulators or stabilizers can be installed in an office to keep voltage levels close to a stable 240 volts. Alternatively use back-up diesel (petrol) generators from [Powerlite](#).

Voltage Spike

A sudden, extreme surge in *voltage*. A voltage spike can be caused by lightning striking near a power line, or the activation and deactivation of large equipment *loads*, such as air conditioners and elevators, in an office setting. *Surge protectors* are specified to control voltage spikes and protect equipment from damage.



Voltage Spike

Wattage, Watts

The amount of power used by an electrical device. Wattage can be calculated by multiplying *voltage* and *amperage*. Watts can be converted to amps with this calculation: watts divided by volts equals amps.

Wire Gauge

The diameter of a wire, measured in numbers. In furniture power systems, wire gauge does not determine the system's *amp* rating due to the existence of *connectors*, *terminals*, and the product's modular construction. The proper amp rating can only be determined through *UL* testing, listing, and product labeling.

