A
alternating current
A periodic current (sine wave) whose average value over a cycle is zero. The current reverses at regular intervals of time and has alternately positive and negative values.
ambient temperature
The temperature of the medium in which the heat of a device is dissipated. The ambient temperature is often specified in standards for device performance (such as the UL Standards) as the basis for determining the heat rise of the component.
ampacity
The current carrying capacity of a conductor or device.
ampere see coulomb
1) The classic definition of an ampere is a unit of electric current equivalent to the motion of 1 coulomb of charge, or 6.28 X 10^18 electrons, past any cross section in 1 second. This is an intuitive way to think about an ampere, it is the flow of a huge number of electrons through a conductor.
2) In 1948 this alternative definition was adopted: A unit of electric current in the meter-kilogram-second system. It is the steady current that when flowing in straight parallel wires of 1 meter length and negligible cross section, separated by a distance of one meter in free space, produces a force between the wires of 2 x 10^-7 newtons per meter of length.
battery see cell
Two or more cells connected together. Thus a group of batteries connected together can also be referred to as a battery.
battery bank
When groups of 6V or 12V batteries are wired in series or parallel or a combination to increase voltage or capacity the entire group is referred to as a battery bank. When batteries are connected in series the amp-hour rating is the same and the voltage is additive. When batteries are connected in parallel the voltage is the same and the amp-hour rating is additive.
battery state-of-charge
The term is used to describe and estimate of how much energy the battery is able to deliver. There have been many attempts to develop improved state-of-charge estimators. The most common methods include specific gravity, at-rest open-circuit voltage, and amp-hour measurement.
branch circuit see main
The portion of the wiring system after the main circuit protection device.
break (rating)
The amount of current that can be passing through a set of contacts, such as those in a solenoid, when they open, without damaging the contacts. This can be a rating for a single event or over some number of cycles, generally 1000, 10,000 or 100,000.
bus, busbar
A bus is a group of common connections, often consisting of a strip of copper or brass with a number of screws or bolt studs for the connection of wires. It may be a negative or a positive bus.
cascade circuit
A series arrangement of more than one protector connected between the power source and the load.
CE (Conformité Européen)
The CE marking is a conformity marking consisting of the letters “CE”. The CE marking is applied to products regulated by certain European health, safety and environmental protection legislation. The CE marking is obligatory for products it applies to. The manufacturer affixes the marking certifying that the product conforms to applicable regulations, in order to be allowed to sell his product in the European market.
cell
An electrochemical system that converts chemical energy into electrical energy. Typically consisting of two conductive plates with different galvanic potential immersed in an electrolyte.
charge
Classically refers to an accumulation of electrons producing an electrostatic charge. In common usage, charge is the quantity of electricity, whether positive or negative.
charge transformer
See ammeter.
charging rate
A characteristic of a battery that defines its rate of charge or discharge.
circular mil
A method of specifying wire size mathematically. One Circular Mil is a unit of area equal to that of a circle 0.001” in diameter.
coupling see coulomb
The measurement unit of electric charge, which is determined by the number of electrons in excess (or less than) the number of protons. Classically a charge of 1 coulomb = 6.25 X 10 18 electrons. The meter-kilogram-second unit of electrical charge equal to the quantity of charge transferred in one second by a steady current of one ampere.
cracking (starting)
Normally associated with “cranking current” which is the current required by the starter circuit prior to the engine starting. The cracking current varies significantly during the starting cycle. Initially, there is a large surge of current required to overcome the inertia and compression of the engine. This surge can be two to four times the average cranking current. Once the engine is turning the piston peaks and valleys as the pistons go through the compression and exhaust cycles. The cranking current rating is used for sizing batteries, cables, and battery switches.
cracking current rating
Current is a flow of electrical charge carriers, usually electrons or electron-deficient atoms. The common symbol for current is the uppercase letter I. The standard unit is the ampere, symbolized by A. Physicists consider current to flow from positively charged points to negatively charged points; this is called conventional current or Franklin current. Electrons, the most common charge carriers, are negatively charged. They flow from relatively negatively charged points to relatively positively charged points. Electric current can be either direct or alternating. Direct current (DC) flows in the same direction at all points in time, although the instantaneous magnitude of the current might vary. In an alternating current (AC), the flow of charge carriers reverses direction periodically. The number of complete AC cycles per second is the frequency, which is measured in hertz. An example of DC is the DC output of a power supply, AC to DC converter, prior to filtering, is an example of pulsating DC. The output of common utility outlets is AC.
crane
A protective device that reduces the available short circuit peak current to a lesser value.
cracking current rating
The maximum current in amperes that a device will carry continuously under defined conditions without exceeding specified performance limits.
current transformer see ammeter
The “CT”, as current transformers are commonly referred to, is used by AC ammeters to “sense” current in a wire in an AC circuit. It is a toroidal coil of wire through which a wire whose current we wish to measure is passed. It is normally encapsulated and looks like a “doughnut”, which is how electrician’s commonly refer to it. The doughnut has two wires coming out of it, which are connected to the AC ammeter. As current flows in the AC wire we wish to measure, it induces a current flow in the current transformer. The magnitude of the current varies directly with the current flowing in the AC wire. Current transformers are rated by the number of maximum amperes that can flow in the unassured wire and the current generation by a CT, at that current flow. For example: A 50:5 CT is rated for 50 amps flowing in the measured wire, and it generates 5 amps of current as a consequence.
device
All components and systems that constitute an electrical system. The term includes electrical circuit, electrical devices, and all electrical components.
delay
A difference in time between the initiation of an event and its occurrence, or between an event’s observation and enumeration of it. This is usually used to refer to the time between the application of overcurrent to a fuse or circuit breaker and the time when the device opens.
digital
A digital signal is one which has only two valid values denoted as 1 or 0. Commonly these are equated to distinctly different voltage. For example: A voltage of +5V would equal a 1 and a voltage of 0V would equal a 0. A digital meter is one that displays values as numerical values rather than as the position of a meter on a relative scale.
direct current (DC)
An electric current that always flows in the same direction. The magnitude may vary but the current direction is always the same. Commonly referred to as DC. Examples of direct current sources are batteries, fuel cells, and photovoltaic cells. DC sources such as battery chargers and alternators actually use rectified AC current as the source.
discharge
Refers to the consumption of energy from a battery, or to the electrostatic discharge associated with a lightning bolt, capacitor, etc.
double pole
Indicates a switch, relay, or circuit breaker with two separate conductive paths, which are opened or closed when the device is operated.
duty, continuous
The requirement that demands operation at a constant load for an indefinite period of time.
duty, intermittent
The requirement that demands operation for alternate intervals of (1) load/no load; (2) load/rest; or (3) load/no load/rest.
edenominate
A negatively charged subatomic particle, that is either free (not attached to any atom), or bound to the nucleus of an atom. In electromagnetic conductions, current flow results from the movement of free electrons from atom to atom individually, and from negative to positive electric poles in general. The charge on a single electron is considered as the unit electrical charge. It is assigned negative polarity. Electrical charge quantity is not usually measured in terms of charge on a single electron, as this is an extremely small charge. Instead, the standard unit of electrical charge quantity is the coulomb, symbolized by C, representing about 6.25 X 10 18 electrons.
electromotive force (EMF)
Commonly referred to as voltage, electromotive force is the energy per unit of charge that is supplied by a source of electrical energy such as a battery, charger or alternator.
electromagnetic interference (EMI)
Noise generated by a load (typically by electrical switching action). Usually specified as meeting agency limits for conducted EMI (noise reflected back onto the power bus) or radiated EMI (noise emitted into the area surrounding a device).
energy see power
The classically simple definition is, the capacity to do work. Energy may be manifested as mechanical motion, thermal heat, or electrical power, which is consumed, radiated, dissipated, or stored over a period of time. The energy in a direct-current circuit is equal to the product of the voltage in volts, the current in amperes, and the time in seconds. The units for energy are Watt-hours. In alternating current (AC) circuits, the expression for energy is more complex.
effective or RMS value
The value of alternating current that will produce the same amount of energy in a resistance as the corresponding value of direct current.
F
fault
A defect in the normal circuit configuration, usually due to unintentional grounding. Commonly referred to as a short circuit.
fault current
The current that may flow in any part of a system under fault conditions.
feeder
All circuit conductors between the service entrance equipment and the final branch circuit protector.
field
Typically refers to a magnetic field. Specifically used when discussing the rotating electro-magnetic field associated with an alternator. By varying the field current, thus its strength, the output of the alternator may be controlled.
frequency see hertz
For an oscillating or varying current, frequency is the number of complete cycles per second in alternating current direction. The standard unit of frequency is the hertz, abbreviated Hz. If a current completes one cycle per second, then the frequency is 1 Hz; 60 cycles per second equals 60 Hz (the standard alternating-current utility frequency).
fuse
Safety device, consisting of a strip of low-melting-point alloy, which is inserted in an electric circuit to prevent excess current from flowing. If the current becomes too high the alloy strip melts, opening the circuit.
G
generator
A rotating machine capable of generating electrical power. In the narrow definition generator refers to a DC machine and alternator refers to an AC machine. However, in common use the term generator is used to refer to AC machines as well.
green wire
The green wire is the non-current carrying safety grounding wire in an AC system in the United States. It is connected to an exposed metal part in the electrical system to provide a path for fault current in the case of a short circuit.
ground fault
GFI (Ground Fault Interruptor) GFI is genetic term referring to both GFCI and GFP
GFCI (Ground Fault Circuit Interruptor) see GFI
A device intended for the protection of personnel that functions to de-energize a circuit, or portion thereof, within an established period of time when a current to ground exceeds some predetermined value that is less than that required to operate the overcurrent protective device of the supply circuit.
GFP (Ground Fault Protector) see GFP
A device intended to protect equipment by interrupting the electric current to the load when a fault to ground current exceeds some predetermined value that is less than that required to operate the overcurrent protection device of the supply circuit.
ground, ground conductor
A point in a circuit which is at zero potential with respect to the Earth, or which is at the lowest potential in the system, (as with a floating ground).
grounding, grounding conductor
The AC conductor, not normally carrying current, used to connect the metallic non-current carrying parts of electrical equipment to the AC system and engine negative terminal, or its bus, and to the shore AC grounding conductor through the shore power cable. This term can also refer to the normally non-current carrying conductor used to connect metallic non-current carrying parts of direct current devices to the engine negative terminal, or its bus, to minimize stray current corrosion.
grounded
The AC current carrying conductor that is intentionally maintained at ground potential, also called neutral.
H
hertz see frequency
Hertz is a unit of frequency of one cycle per second. It replaces the earlier term of “cycle per second (cps).” The abbreviation for Hertz is Hz.
high inrush (HI-INRUSH)
A load that exhibits, upon application of power, a steep wave front transient of very high current amplitude for a short duration.
hot
Hot usually refers to the ungrounded current carrying conductors in an AC system. These would typically have a voltage of 120V or 240V in the United States. The term Hot is also used to describe a circuit that is energized, and has a potential greater than ground.
I
inductance
An effect in electrical systems in which electrical currents store energy temporarily in magnetic fields before that energy is returned to the circuit.
instantaneous trip
Indicates that no intentional delay is purposely introduced in the opening time of a protector.
interrupt rating (AIC)
The fault current that a device, normally a fuse or circuit breaker is capable of interrupting without damage.
interrupting capacity
The maximum fault current that can be interrupted by a protective device without failure of the device.
Inverter
An inverter converts DC power stored in a battery to AC power which is used by most household appliances.
IP ignition protection
Devices, which operate in a potentially explosive environment, must be ignition protected. This would include engine rooms with gasoline engines. There is a very specific set of tests which a device must pass to claim ignition protection. They include operating safely in an explosive mixture of propane and air.
isolation transformer
A transformer that is inserted in series with the incoming AC power to provide a magnetic coupling for power between the ship’s systems and the AC grid. By magnetically coupling the power there is no direct connection by wires, which isolates the ships AC system from the AC grid.
I L
line-through current
The actual fault current passing through a protective device as compared to the current available to the device.
line load
The conductors that are at the supply of energy to a circuit. Line normally refers to the current carrying non-grounded conductor.
normal ground
A ground that is not spotted to the shore.
neutral ground
The current that may flow in any part of a system under fault conditions.
neutral (ground)
The grounded current carrying conductor in a single phase, four wire, 120/240V AC system.
neutral-to-ground bonding
Connecting the ground and the neutral together via an electrical conductor.
nuisance trip
A circuit breaker or fuse, which trips or blows without the circuit actually being overloaded. This may be due to a surge current which requires a slow tripping breaker or a slow blow fuse.
O
ohm see hertz
The unit for resistance equals V = I/R, where V is the voltage in volts, I is the current in amperes, and R is the resistance in ohms.
overload current
The current in a circuit in excess of the rating of the device or conductors in it. Fuses and circuit breakers protect from overload by opening the circuit if such a condition exists and persists.
overcurrent
When the current in a circuit exceeds the rating of the devices or conductors in it. Fuses and circuit breakers protect from overcurrent by opening the circuit if such a condition exists and persists.
overload rating (OL)
Designates whether the protector or family of protectors has been tested for general use or motor-starting applications:
OL - tested at 1.5 times amp rating for general use
OL2 - tested at 6 times sarc rating or 10 times DC rating for motor starting application.
panelboard
A collection of circuit breakers, switches, and instrumentation installed into a panel, which provides the central point for power distribution and monitoring for the electrical system. May also refer to a smaller panel, which is located remotely from the main panel, which is used to supply loads in the adjacent area. “Panelboard” is a term generally used only by NEC. In the marine industry they are usually called “panels”, or “circuit breaker panels”, or “distribution panels”.
parallel circuit
An electrical circuit in which the positive connections are all in common and the negative connections are all in common. The voltage of the system appears across each branch of the circuit. The current varies as required by each load or source.
A device whose ability to limit output power regardless of input power is intrinsic to its design.

The non-current carrying conductor in a three wire 120V or four wire 240V AC circuit, it provides called "117-volt" AC circuit has a voltage of about 165 volts peak (pk), or 330 volts peak-to-peak connected to the resistor. For a sine wave, the rms value is 0.707 times the peak value, or 0.354 sipated by the resistor, then 50 watts of heat will also be dissipated if a 100-volt DC source is often called the effective value or DC-equivalent value. For example, if an AC source of 100 volts in a circuit whose impedance consists of a pure resistance, the RMS value of an AC wave is Root-mean-square (RMS) refers to the most common mathematical method of defining the effec-

Describes a situation where the neutral and hot wires of an AC system are reversed. Most AC users installing devices in the field.

A device that is UL Recognized differs from a device that is UL Listed. A Recognized device is recognized (UL recognized)

A device that is UL Recognized differs from a device that is UL Listed. A Recognized device is recognized (UL recognized)

The minimum value of current that will cause tripping of a protective device.

Any conductor that is not connected to the Earth ground system.

The unit of electrical potential and electromotive force, equal to the difference of electrical potential between two points on a conducting wire carrying a constant current of one ampere when the power dissipated between the points is one watt.

Conductor’s voltage reduction due to resistance.

The maximum voltage at which a device is designed to operate.

A protective device that is factory calibrated to trip at a predetermined voltage value.

Watt is the measurement of electrical power. One watt is equal to one ampere of current flowing at one volt. Watts are typically rated as amps x volts; however, amps x volts, or volts-amps (v-a) ratings and watts are only equivalent when powering devices that absorb all the energy such as electric heating coils or incandescent light bulbs.

The process of selecting the appropriate sized conductor for the amount of current to be carried while considering the length of the circuit. The withstand voltage The maximum voltage level that can be applied between circuits or components without causing a breakdown.