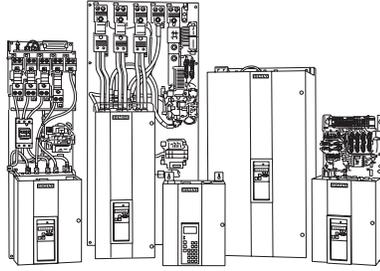


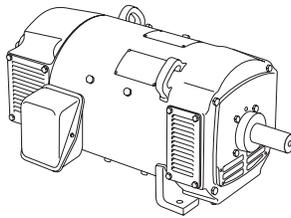
DC Drive

An electronic device used to control the speed and torque of a DC motor. Also called a variable speed drive or an adjustable speed drive.



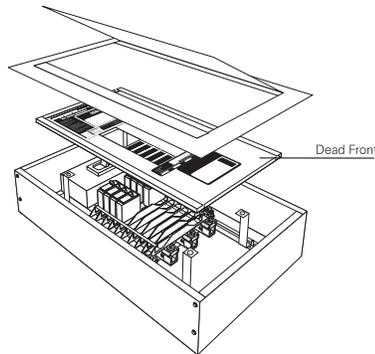
DC Motor

A motor that converts direct current electrical energy into mechanical energy.



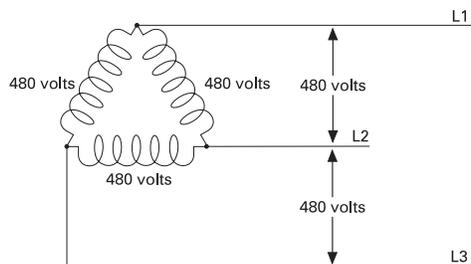
Dead Front

A front portion of a panelboard or switchboard that limits exposure to electrical connections.



Delta

A connection arrangement used for the primary and/or secondary of a three-phase transformer.



Digital

Used to describe circuits that use on or off (binary) signals. Also used to describe equipment that includes these circuits.

Digital-to-Analog (D/A) Converter

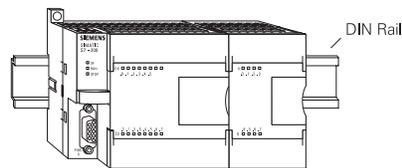
A circuit that converts *digital* signals to signals that can be used by *analog* devices.

DIN

DIN is the German Institute for standardization. DIN has been recognized since 1975 as the standards organization that represents German interests nationally and internationally.

DIN Rail

A mounting bracket manufactured to *DIN* specifications. Typically used to mount devices such as small *PLCs*, *motor starters*, relays, and other components that are *DIN* rail compatible.



Diode

A component with two terminals (anode and cathode) that passes *current* primarily in one direction. Often used as part of a *rectifier* circuit.

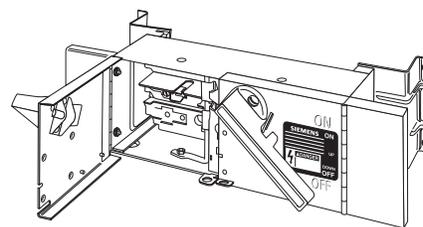


Direct Current (DC)

Current with a constant direction.

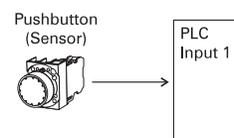
Disconnect Switch

A switch designed to disconnect electrical *power* from a circuit.



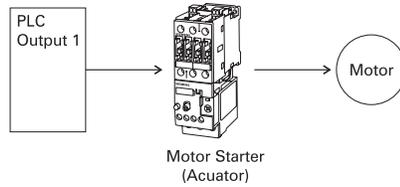
Discrete Input

An input that is either on or off.



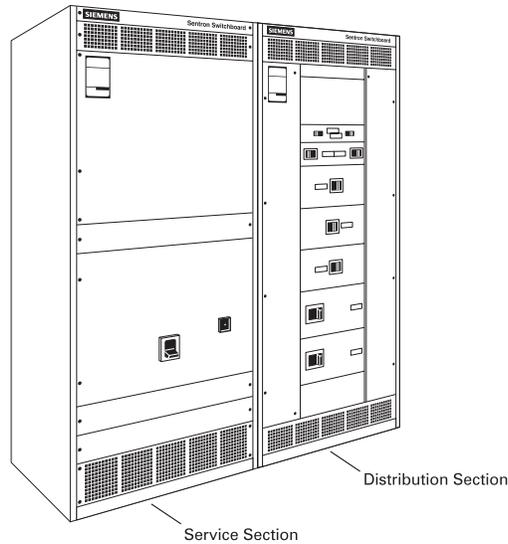
Discrete Output

An output that is either on or off.



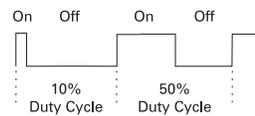
Distribution Section

A section of switchboard that receives power from the service section.



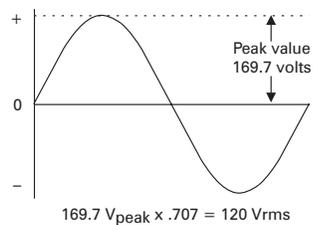
Duty Cycle

The ratio of a device's on time to its total cycle time. Duty cycle is normally expressed as a percentage; therefore, a device with a 50% duty cycle is on half the time.



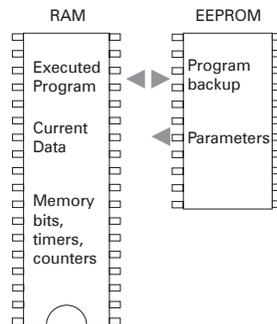
Effective Value

A measure of the amplitude of alternating current or voltage. Also called the root-mean-square or RMS value. Test meters used to measure alternating current or voltage usually display effective values.



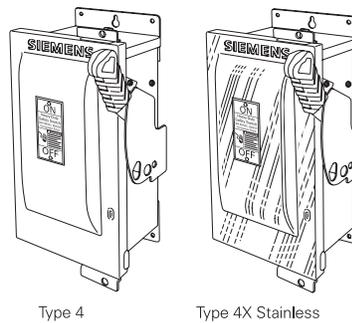
Electrically Erasable Programmable Read Only Memory (EEPROM)

A type of *semiconductor* memory often used for storage of data or programs that change infrequently. The contents of EEPROM chips are erased with electrical pulses rather than with ultraviolet light as with *erasable programmable read only memory*. EEPROMs retain their contents when power is lost.



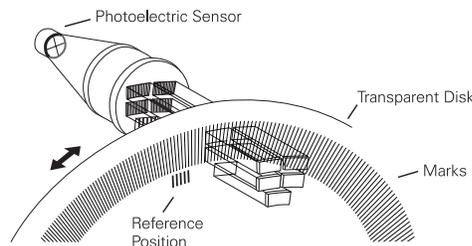
Enclosure

A case or housing. Guidelines for various types of electrical enclosures are provided by the *National Electrical Manufacturers Association (NEMA)*.



Encoder

Often refers to a *digital* device that provides angular position information. Some encoders provide this information as incremental pulses as position changes. Other types of encoders provide a digital signal representative of absolute position.

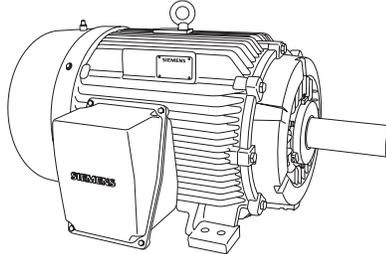


Erasable Programmable Read Only Memory

A type of semiconductor memory often used for storage of data or programs that change infrequently. EPROM chips must be removed from the circuit to be erased and reprogrammed. EEPROMS retain their contents when power is lost.

Explosion Proof (XP)

A motor enclosure type used in hazardous locations. Explosion proof enclosures are also available for other types of equipment.

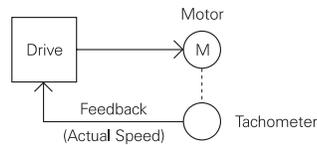


Farad

The basic unit of capacitance. The symbol for the farad is "F"

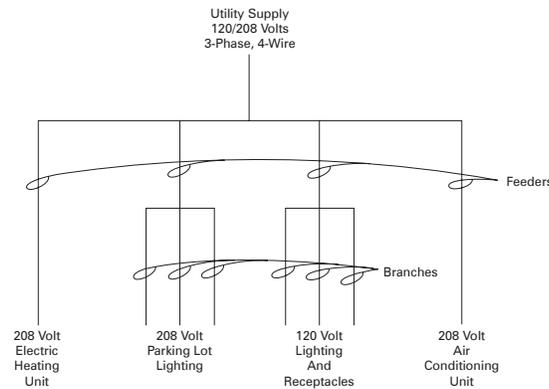
Feedback

A signal provided to a control circuit that is representative of an actual condition in a machine or process.



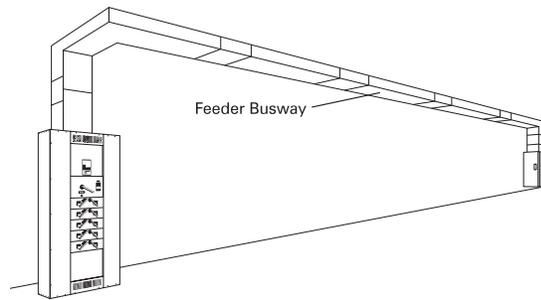
Feeder

A set of conductors that originates at a main distribution center and supplies power to one or more secondary or branch distribution centers.



Feeder Busway

Busway used to distribute power, often over a long run, to loads concentrated in one area.

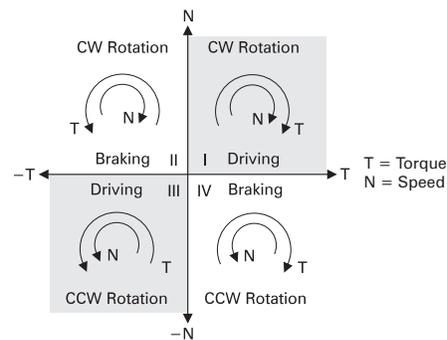


Filler Plates

Plates used to cover unused spaces in a panel.

Four-Quadrant Operation

Describes the operation of a variable speed drive that is capable of providing forward or reverse torque with the motor rotating in either the forward or reverse direction.

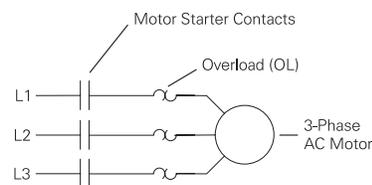


Frequency

The rate of variation of a periodic waveform. The symbol for frequency is "f." The unit for frequency is Hz.

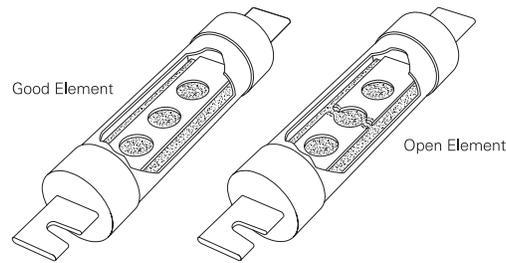
Full-Voltage Starter

A type of motor starter often used for three-phase induction motors that applies the full-line voltage to the motor immediately. Sometimes called an across-the-line starter.



Fuse

A device designed to open a circuit when its rated current is exceeded. This is usually accomplished when a metal link in the fuse melts. Fuses are available in various sizes and types. Some have a time delay or more than one element.



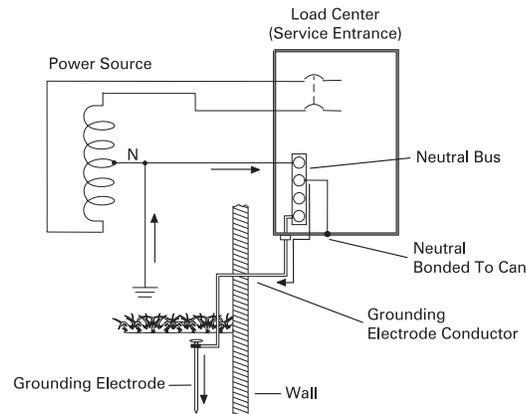
Fuse Class

A letter designation given to a fuse to identify its operating and construction characteristics.

Class	AIC Rating
H	10,000 A
K	50,000 A
R	200,000 A
J	200,000 A
L	200,000 A

Ground

A connection to the earth or to a conductive object such as an equipment chassis.

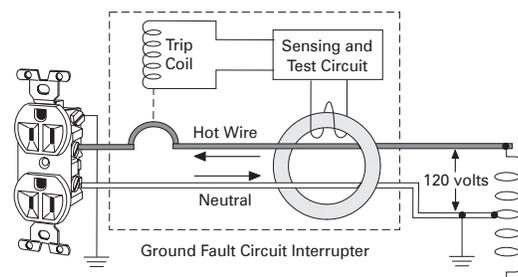


Ground Fault

A condition in which current unintentionally flows to ground.

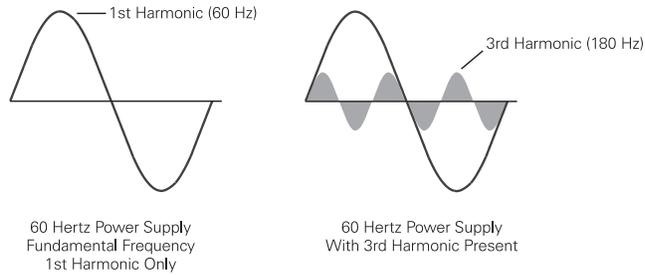
Ground Fault Circuit Interrupter (GFCI)

A device designed to interrupt current in a circuit if the current in the hot wire is not equal to current in the neutral wire.



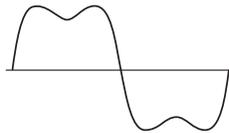
Harmonics

The base frequency of a power supply is said to be the fundamental frequency or first harmonic. Additional harmonics can appear on the power supply which are usually whole number multiples of the first harmonic. The 3rd harmonic of a 60 Hz power supply, for example, is 180 Hz (3 x 60).



Harmonic Distortion

The effect of harmonics on the fundamental frequency. Harmonic distortion is destructive and interferes with the operation of electronic devices.



Henry

The basic unit of inductance. The symbol for the henry is "H."

Hertz

A unit of frequency equal to one cycle per second. Hertz is abbreviated Hz.

Hexadecimal

A number system that uses powers of 16.

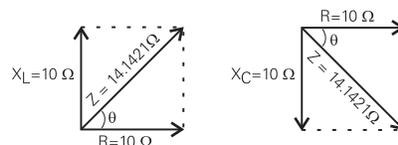
Decimal	Binary	BCD	Hexadecimal
0	0	0000	0
1	1	0001	1
2	10	0010	2
3	11	0011	3
4	100	0100	4
5	101	0101	5
6	110	0110	6
7	111	0111	7
8	1000	1000	8
9	1001	1001	9
10	1010	0001 0000	A
11	1011	0001 0001	B
12	1100	0001 0010	C
13	1101	0001 0011	D
14	1110	0001 0100	E
15	1111	0001 0101	F
16	1 0000	0001 0110	10
17	1 0001	0001 0111	11
18	1 0010	0001 1000	12
19	1 0011	0001 1001	13
20	1 0100	0010 0000	14

Horsepower

A unit of power. Horsepower is symbolized by "HP". 1 horsepower is equal to 746 watts.

Impedance

The total opposition to alternating current. Impedance is the vector sum of resistance and reactance. The symbol for impedance is "Z." The unit for impedance is the ohm.

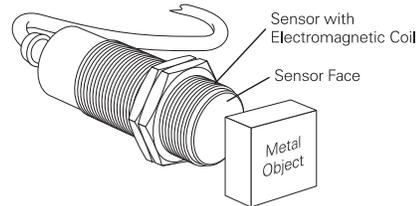


Inductance

The property of an electrical circuit that causes it to oppose changes in current. Inductance is designated by the symbol “L” and is measured in *henries*.

Inductive Proximity Sensor

A type of *sensing switch* that uses an electromagnetic coil to detect the presence of a metal object without coming into physical contact with it. Inductive proximity sensors ignore non-metallic objects.



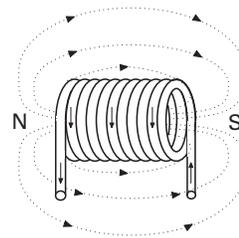
Inductive Reactance

The opposition to *alternating current* resulting from circuit *inductance*. Inductive reactance is directly proportional to *frequency* and inductance. The symbol for inductive reactance is “X_L.” The unit for inductive reactance is the *ohm*.

$$X_L = 2\pi f l$$

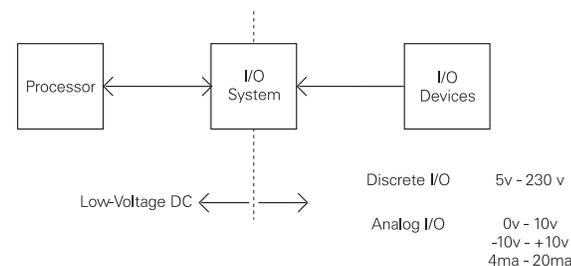
Inductor

A device manufactured to have a specific *inductance*. An inductor is made from a coil of wire and is sometimes called a coil or choke.



Input/Output (I/O) System

The part of a control system that interfaces to the real world. The I/O system accepts signals from switches and sensors, and provides signals to actuating devices, indicators, etc.

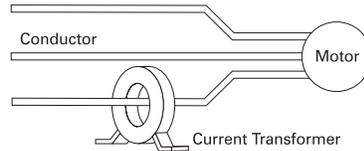


Institute of Electrical and Electronic Engineers (IEEE)

An organization open to individual membership that provides a variety of services for its members, but also develops numerous standards for electrical and electronic equipment and practices.

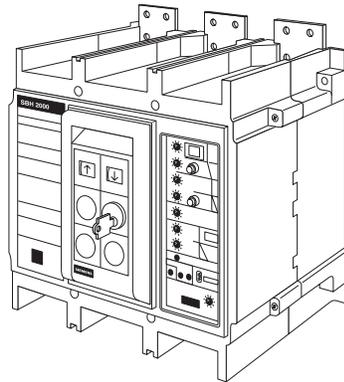
Instrument Transformer

A type of *transformer* used to allow circuits to sense the *voltage* or *current* of associated *conductors*. A potential transformer (PT) is used to step-down voltage. A current transformer (CT) is used to sense the level of current.



Insulated Case Circuit Breaker (ICCB)

A type of *circuit breaker* that combines the high *interrupting rating* of a *molded case circuit breaker* with the high short-time ratings of a *power circuit breaker*. Also called an encased systems breaker.



Insulated Gate Bipolar Transistor (IGBT)

A type of *transistor* often used as a switching device in the *inverter* section of a *variable frequency drive*. *Voltage* on the gate element is used to control the *current* flowing between the collector and emitter.

