

Basic Electrical and Electronic Symbols

 Resistor IEC System	 Resistor NEMA System	 Inductor	 Capacitor	 Switch	 Changeover	 Push-Button	 Male Plug IEC System	 Male Plug NEMA System
 Female Plug IEC System	 Female Plug NEMA System	 Fuse	 Electric Line	 Ground	 Diode	 Diac	 Thyristor	 Triac
 IC Chip	 Amplifier	 Electric Generator	 Battery	 Transistor	 Vacuum tube	 AND Gate ANSI System	 OR Gate ANSI System	 NAND Gate ANSI System
 NOR Gate ANSI System	 NOT Gate ANSI System	 AND Gate IEC System	 OR Gate IEC System	 AND Gate NEMA System	 OR Gate NEMA System	 7 Segment Display	 Ammeter	 Voltmeter
 Ohmmeter	 Frequency Meter	 Wattmeter	 Electric Clock	 Electrical Counter	 Recording Instrument	 Antenna	 Speaker	 Microphone
 Light Bulb	 Direct Current	 Alternating Current	 Positive Polarity	 Negative Polarity	 Piezoelectric Crystal	 Relay	 Transformer	 Electric Motor

Resistor



Resistor (NEMA & IEC System)

Resistor is a passive electrical component that introduces resistance (opposes the flow of current in it) in a circuit to reduce current, divide voltage or for biasing other active components.

Inductor



Inductor Symbol

Inductor is a passive electrical component that stores energy in the form of magnet field. It is basically an insulated wire wound in a coil around a core. It has inductive reactance that increases with the frequency thus they act as a short wire for direct current. They are used in frequency filter, chokes, transformer & motors etc.

Capacitor



Capacitor is a passive electrical component that stores energy in the form of electric field. It is made from metal plates with dielectric between them. Its capacitive reactance decreases with frequency thus they block DC while acts as shorted wire for high frequency signal. Almost every electronic component incorporate a capacitor in some form. Some applications of capacitors are filters, wave smoothing, noise filtering etc.

Switch



Switch is an electrical component that is used for breaking or making a circuit. They are used for stopping the current flow in a circuit or start its conduction.

Changeover Switch



A changeover switch is a type of switch used for changing or directing the current flow from one terminal to another terminal.

Push-Button



Push buttons are switches that consist of a button which enable us to make or break the circuit by pressing it with finger. There are different types of push-button switches e.g. some of them recover back to normal position after release or after pressing the button again. They are used in many applications depending on the requirement.

Male Plug



It is an electrical connector that connects an electrical cord to a female plug to complete an electrical circuit. It has two or three unshielded pins that insert into a socket or female plug of the same design.

Female Plug



The female plug is a connector that has two or three holes instead of pins. The female plug at the end of an electrical cord is used for connecting it to a matching male plug by inserting the pins of male plug into it.

Fuse



Fuse is an electrical safety device that provides protection against overcurrent. It has thin metal wire that melts due to heat produced by large current & breaks the electrical connection to stop the current flow.

Electric Line



This symbol represents an electrical conductor such as cables, wires etc. in a circuit schematic.

Ground



The ground in an electrical circuit represents a common reference point from where the voltages are measure & it is the return path for all the currents.

Diode



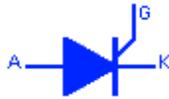
Diode is an active electronic component made up of semiconductor. It is made of N type & P type semiconductor material forming a PN junction. The junction allows the current flow in only one direction. They are mainly used for rectification.

DIAC



The name DIAC is made up of Diode AC switch. it is bi-directional semiconductor device with the analogy of a two diodes connected in antiparallel combinations. It can conduct current in both directions when the voltage increases from its certain breakdown voltage limit. They are mostly used for triggering the TRIAC by connecting it in series with its gate terminal.

Thyristor



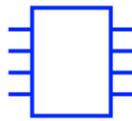
Thyristor or SCR (Silicon controlled rectifier) is a 4 layered PNP semiconductor device. It has three terminals Anode, Cathode & Gate. Just like a diode, It is a unidirectional device but with a gate control input for triggering the SCR. It starts conduction when the line voltage increases above the forward breakdown voltage or by applying current to the gate.

TRIAC



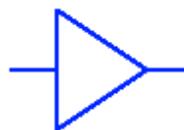
The name TRIAC is made up of Triode for Alternating Current. it is a modified version of SCR that can conduct and also control the current flow in both directions. The gate input is used for triggering the conduction in each direction. It can switch high AC current & voltages. They are used in dimmer applications & motor speed control etc.

IC (Integrated Circuit)



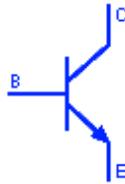
It is a symbol of generic IC (integrated circuit). It is a small chip made up of semiconductor material upon which multiple micro electrical components are fabricated to perform specific task and reduce size.

Amplifier



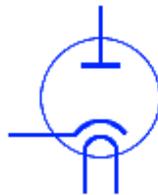
Amplifier is an electronic circuit or device used to amplify or increase the amplitude of a signal. This is a generic symbol for amplifier. There are different types of amplifier that depends on electrical quantity it can amplify such as voltage amplifier, current amplifier, power amplifier, radio frequency amplifier etc.

Transistor



A transistor is a three terminal device made from semiconductor material. It is used for switching or amplification of weak signals. This symbol represents a BJT (bi-polar junction transistor) which is current controlled current device.

Vacuum Tube



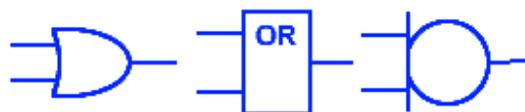
A vacuum tube or electron tube is a sealed tight tube with vacuum and two electrodes. There is a heating element between the electrodes that controls the current flow between the electrodes just like a diode.

AND Gate



These symbols represent AND Gate in different system such as ANSI, IEC & NEMA. The AND Gate performs the logical inclusive conjunction (True output only if all True inputs). It provides output of logic “HIGH” only when it’s all inputs are logic “HIGH” and provides logic “LOW” for any logic “LOW” at input.

OR Gate



ANSI, IEC & NEMA representation for OR Gate respectively. The OR Gate performs the logical inclusive disjunction (True output for any True input). The output of OR gate is logic “HIGH” when any input is logic “HIGH”. The output becomes logic “LOW” when all of its inputs are logic “LOW”.

NAND Gate



The NAND Gate is the Inverse of AND gate or “NOT of AND” gate. Its output is logic “High” for logic “LOW” at any input & it is logic “LOW” when all inputs are logic “HIGH”.

NOR Gate



NOR Gate is Negative or inverse of OR gate or “NOT of OR” gate. Its output is logic “HIGH” when all inputs are logic “LOW” & it is logic “LOW” for logic “High” at any input.

NOT Gate



A NOT Gate also known as logic Inverter, is a single input single output logic gate. It inverts the input logic. The output is logic “LOW” for input logic “HIGH” & it is logic “HIGH” for input logic “LOW”.

7 Segment Display



Seven segment displays is made of 7 LEDs in specific pattern. It is used for displaying decimal numerals and English alphabets. However it can be designed to display numerous characters

Ammeter



Ammeter or ampere meter is a measurement instrument used to measure the current flow in a power line. It is connected in series with the line through which the current need to be measured.

Voltmeter



Voltmeter or voltage meter is also a measurement instrument used for measuring the voltage between two points on a circuit. it is always connected in parallel to the points of measurement.

Ohmmeter



Ohm meter or resistance meter is a measurement instrument used for measuring the resistance of any component. Ohmmeter can be used for checking connectivity in a wire.

Frequency Meter



A frequency meter is used for measuring the frequency of a periodic signal such as the frequency of an alternating current in a power line. There are different types of frequency meters depending on its range.

Wattmeter



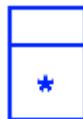
A wattmeter is used for measuring the electrical power supplied through a power line. The unit of electrical power is watt thus the name.

Electric Clock



This symbol represents a clock that is powered by electricity in an electrical circuit schematic.

Electrical Counter



This is the symbol used for a generic counter for counting a specific quantity such as energy unit counter. The asterisk is replaced with the symbol of that quantity to represent it.

Recording Instrument



This is a recording or measurement instrument to record a specific quantity and the asterisk is replaced by the symbol of that quantity.

Antenna



An antenna or aerial is an electrical transducer that converts the electrical signal into radio frequency & vice versa. An antenna can transmit and receive a signal.

Speaker



A speaker is an electrical transducer that converts the electrical signal into the an audio signal that can be heard by listeners (waves).

Microphone



A microphone is a transducer that converts the audio signal into an electrical signal that can be processed by any electrical circuit.

Light Bulb



A light bulb is an electrical device used to convert the electrical energy into light energy.

Direct Current



Direct current (DC) is flows of electric charge that does not change its direction. It is unidirectional that flows in a single direction. A battery or a solar cell is a prime source of direct current.

Alternating Current



Alternating current (AC) is the flow of electric charge that changes its directions periodically. AC current is used in power transmission over long distance.

Positive Polarity



The plus sign in an electrical circuit schematic shows the positive terminal of potential. The positive terminal is at higher potential than the negative (reference) terminal.

Negative Polarity



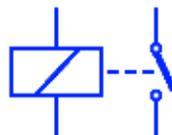
The minus sign represents the negative terminal of a potential where the potential is relatively low as compared to the positive terminal. A battery has both positive & negative terminal.

Piezoelectric Crystal



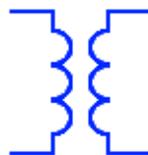
Piezoelectric crystal is a quartz crystal that produces electrical pulses known as clock signal when connected with an oscillator circuit.

Relay



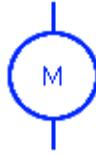
A relay is an electrical switch that has a set of control terminal & contact terminals. The control terminals is operated by a single or multiple control signals to switch the contact terminals. They are used for switching relatively high power circuits using low power signals.

Transformer



A transformer is a stationary electrical machine that transfers the electrical energy between two circuit with increasing or decreasing the levels of voltage and current keeping the frequency constant.

Electric Motor



This is a generic symbol used for electrical motors in any electrical schematic designs. A motor is an electrical machine that converts electrical energy into mechanical energy.

Generator



A generator is an electrical machine that converts the mechanical energy into electrical energy. This symbol represents a generic generator. There are different types of generator with different symbols.

Battery

A Battery is direct current source that has electrochemical cells inside that produce electrical power. They are used for storing electrical energy in the form of chemical energy & supply power when needed.