



Commonly Used Electrical Symbols

Technical Data

Effective April 2005
New Information

A one-line diagram is an important means of communicating the components, electrical relationships and connections within a circuit or system. Components are normally represented by universally accepted symbols.

The one-line diagram symbols presented here are commonly accepted symbols. Individual symbols with an identification and brief explanation and/or application are presented first. Commonly accepted combination symbols made up of individual symbols are also presented in a similar fashion. For additional information, refer to the notes on the reverse side.

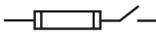
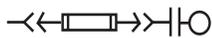
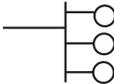
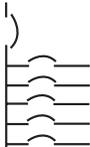
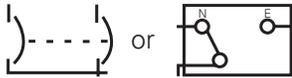
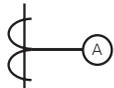
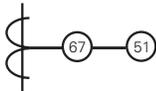
TABLE 1. INDIVIDUAL SYMBOLS

SYMBOL	IDENTIFICATION	EXPLANATION
	Transformer	Represents a variety of transformers from liquid-filled to dry-types. Additional information is normally printed next to symbol indicating winding connections, primary/secondary voltages, impedance and kVA or MVA ratings.
	Removable/Drawout Circuit Breaker	Normally represents a drawout circuit breaker 5 kV and above.
	Future Removable/Drawout Circuit Breaker Position	Represents a structure equipped to accept a circuit breaker in the future, commonly known as provisions.
	Non-Drawout Circuit Breaker	Represents a fixed mounted low voltage circuit breaker.
	Removable/Drawout Circuit Breaker	Represents a drawout low voltage circuit breaker.
	Disconnect Switch	Represents a switch in low or high voltage applications (open position shown).
	Fuse	Represents low voltage and power fuses.
	Bus Duct	Represents low and medium voltage bus duct.
	Current Transformer	Represents current transformers mounted in assembled equipment. A ratio of 4000 to 5 amperes shown.
	Potential Transformer	Represents potential transformers usually mounted in assembled equipment. A ratio of 480 to 120 volts shown.
	Ground (Earth)	Represents a grounding (earthing) point.
	Battery	Represents a battery in an equipment package.
	Motor	Represents a motor and also can be shown with an "M" inside the circle. Additional motor information is commonly printed next to symbol, such as horsepower, rpm and voltage.
	Normally Open Contact	Can represent a single contact or single-pole switch in the open position for motor control.
	Normally Closed Contact	Can represent a single contact or single-pole switch in the closed position for motor control.
	Indicating Light	The letter indicates the color. The color red is indicated.

TABLE 1. INDIVIDUAL SYMBOLS (CONTINUED)

SYMBOL	IDENTIFICATION	EXPLANATION
	Overload Relay	Protects a motor should an overload condition develop.
	Capacitor	Represents a variety of capacitors.
	Ammeter	A letter is usually shown to designate the meter type (A = ammeter, V = voltmeter, etc.).
	Instantaneous Overcurrent Protective Relay	The device number designates the relay type (50 = instantaneous overcurrent, 59 = overvoltage, 86 = lockout, etc.).
	Emergency Generator	The symbol is frequently shown in conjunction with a transfer switch.

TABLE 2. COMBINATION SYMBOLS

SYMBOL	IDENTIFICATION	EXPLANATION
	Fused Disconnect Switch	The symbol is a combination of a fuse and disconnect switch with the switch in the open position.
	Low Voltage Motor Control	The symbol is a combination of a normally open contact (switch), overload relay, motor and disconnect device.
	Medium Voltage Motor Starter	The symbol is a combination of a drawout fuse, normally open contact (switch) and motor.
	Meter Center Enclosure	A series of circle symbols representing meters usually mounted in a common enclosure.
	Loadcenter or Panelboard	One circuit breaker representing a main device and other circuit breakers representing feeder circuits usually in a common enclosure.
	Transfer Switch	<ul style="list-style-type: none"> • Circuit breaker type transfer switch or • Non-circuit breaker type transfer switch
	Current Transformer with Connected Ammeter	The instrument connected could be a different instrument or several different instruments identified by the letter.
	Protective Relays Connected to Current Transformer	Device numbers indicate types of relays connected, such as <ul style="list-style-type: none"> • 67 = Directional overcurrent • 51 = Time overcurrent

Notes:

1. Some devices, especially new devices, may not have universally accepted symbols. These devices could be represented in a number of ways, usually a matter of personal choice. In such instances, the symbol is usually accompanied by a verbal description. Examples of this situation are:



2. In a number of instances, the same symbol can represent a number of components. They are usually distinguished from one another by letters or numbers, such as M, W, A, and 50 representing a motor, watthour meter, ammeter and overcurrent protective relay, respectively.

3. Universally accepted symbols frequently have additional information provided near the symbol. The distinguishes like symbols from one another. The following examples are typical:

- 1200 A  Identifies the drawout circuit breaker represented by the symbol as a 1200 ampere circuit breaker.
- 225 A/3P  Indicates the fixed circuit breaker represented by the symbol as a 225 ampere, 3-pole breaker.
-  Indicates that the transformer represented by the symbol is connected "Delta-Wye."