

# Circuit Breaker vs. Switch:

## Can you use a Circuit Breaker as a Switch?

### Introduction

Is it possible to use a circuit breaker as a switch interchangeably, or are they separate entities?

Circuit breakers and switches are not new commodities; in fact, [Thomas Edison](#) first developed the idea for a circuit breaker in 1879.

These items are often taken for granted as they work behind the scenes, and yet they are crucial for safety in homes and in industry.

For industrial purposes, both the switch and the circuit breaker need to be able to handle a higher capacity of electricity than a residential one would.

But what are the differences between a switch and a circuit breaker?

### Making and Breaking

There are two important parameters concerning the connection and disconnection of power for electrical utilities:

1. Making Capacity – The maximum load current at start up.
2. Breaking Capacity – The maximum fault current that can be interrupted.

A circuit breaker is designed and is rated for both making and breaking fault and load currents whereas a switch is designed and rated for only making and breaking load currents.

#### A Switch

An electrical switch serves the purpose of controlling the flow of electrical current within a circuit. It can be used to both inhibit the flow of the current or to initiate it.

A switch performs the task of manually cutting or reconnecting power from an electrical supply by creating or closing an air insulation gap between two conduction points.

They're known as [binary devices](#), which essentially means it has two states, open (1) and closed (0). You will sometimes see the numbers "1" and "0" used on switches.

## A Circuit Breaker

A circuit breaker is a safety device to prevent damage to motors and wiring when the current flowing through the electrical circuit supersedes its design limits. It does this by removing the current from a circuit when an unsafe condition arises. Unlike a switch, a circuit breaker automatically does this and shuts off the power immediately, or darn close to immediately. In this way it works as an automatic service protection device.

A switch is typically used as an isolator, turning power on and off to a particular device. A circuit breaker, on the other hand, can be used to protect a circuit that contains many switches or devices. An exception to this is a disconnect switch, which is used to connect or disconnect power to an entire control panel, or machine.

Simply put, a switch is designed to switch power on and off, a circuit breaker “breaks” the circuit in an overload or fault condition. Switches switch and breakers break. These differences are crucial to understanding their safety and practicality.

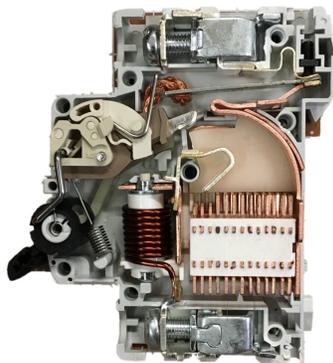
## The BIG Difference

When it's all said and done, a big reason NOT to use a circuit breaker as a switch is a question of endurance. Switches are designed for a high number of operations, how many times the switch is turned on and off. Circuit breakers are not rated for nearly the same amount of operations.

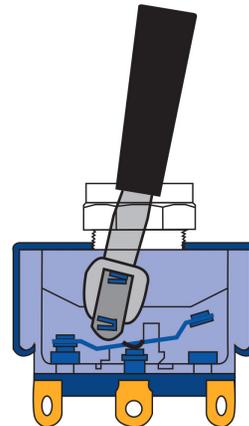
Device	Mechanical Endurance Operations
Miniature Circuit Breaker	20,000
Rotary Cam Switch	100,000

A miniature circuit breaker is a deceiving simple device. It is a much more complicated device, with more parts, than a switch. Cycling a breaker on and off numerous times will result in its eventual failure.

Cutaway of Miniature Circuit Breaker



Cutaway of Toggle Switch



## However...

Circuit breakers can be rated for switching duty for lighting circuits. Circuit breakers applied in 120V or 277V fluorescent lighting circuits must be marked SWD or HID. SWD stands for Switching Duty. HID signifies rated for High Intensity Discharge lighting. The UL489 Standard for MCBs states that SWD circuit breaker can be rated up to 20A, no more. HID breakers are rated up to 50A.

## Which will it be then?

The question still begs, even though it's obvious by now, can you use a circuit breaker like a switch in an industrial control panel? It's quite evident that though they share a similar function on a basic level, they are two separate entities.

Circuit breakers may work more effectively as safe switches, but they are not switches. They are not interchangeable. Therefore, using a circuit breaker as a switch is not recommended.

## Can I use a Switch in place of a Circuit Breaker?

No. Don't ever do this. A switch cannot detect and interrupt an overload or fault condition. It would more likely melt or burst into flames. Either of which is considered "bad" by experts.

If you need more advice on how circuit breakers and switches function, and how to use them safely, don't hesitate to [contact us](#).

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