TIP SHEET
UL 98 AND UL 508 SWITCHES – STANDARDS AND APPLICATIONS

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With any design, physical space and part cost are two things that are always considerations. In order to save space and cost, a UL 508 disconnect switch can seem more desirable than a UL 98 disconnect switch. However, without an understanding of the differences between the two types of switches, they can very easily be misapplied.

The scope of this paper will be to define the differences between UL 98 and UL 508 disconnect switches, including their defined uses in the NEC, the standards that they are designed to, and ultimately when one should be used over the other.

Disconnects and the NEC

To begin to understand the differences between the two types of switches, the first exercise to be taken here will be a brief examination of the National Electrical Code® (NEC).

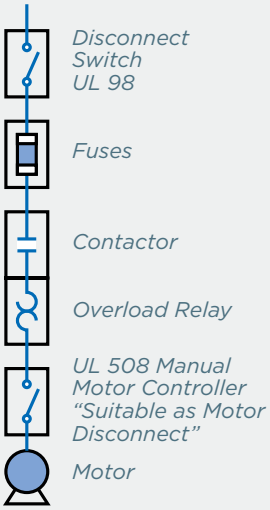

Figure 1: Motor Circuit Diagram

The primary article that needs to be addressed regarding the two types of switches is Article 430 – Motors, Motor Circuits, and Controllers. Section 430.109(1) specifies that the motor circuit switch is required to be listed and rated in horsepower. This passage specifically refers to the disconnecting means at the top of the motor circuit, as shown in Figure 1.

Section 430.109(6) refers to manual motor disconnecting methods and contains a critical passage for the differences between UL 98 and UL 508 switches. This passage reads:

> *"Manual Motor Controller. Listed manual motor controllers additionally marked "Suitable as Motor Disconnect" shall be permitted as a disconnecting means where installed between the final motor branch-circuit short-circuit protective device and the motor."*

In other words, a switch used as a manual motor controller that is labeled "Suitable as Motor Disconnect" is considered to be a supplemental disconnecting means before the motor itself. Figure 1 illustrates this concept.

For determining the sizing of a disconnect switch, the NEC incorporates many sections, depending on where a disconnecting means is needed. For example, Part VI of Article 230 details the requirements for Service Disconnecting Means. Section 230.79 provides the sizing requirements for the service disconnect, including minimum values and general sizing guidelines.

The Defining Standards

In addition to the NEC, the standards that the switches are designed to must also be examined in order to understand the differences between them.

UL 98 is the UL Standard entitled **Enclosed and Dead-Front Switches**. This large standard details the design and testing requirements for switches to be used as branch circuit, feeder, service, and motor circuit disconnecting means.

TS-UL-98-508-SWITCH-002 | 09.17 | PDF | ©Mersen 2017

UL 508 is another standard and is entitled **Industrial Control Equipment**. In the opening sentences of this standard, devices designed to UL 508 are intended to be used as "industrial control devices, and devices accessory thereto, for starting, stopping, regulating, controlling, or protecting electric motors." The primary note with this standard is that it does not deal with the requirements for branch, feeder, and service disconnecting devices.

As a result of the applications they serve, the two types of switches are different in terms of their construction. In each standard, tables exist that define the minimum spacing requirements for each type of switch. For the purposes of comparison, the requirements for 600 V devices will be examined. For a UL 98 device, the minimum spacing between un-insulated live parts of different polarities over surface is two inches. For a UL 508 device, that same requirement is only 0.5 inches. This means that UL 98 switches will be larger than UL 508 switches. The table below details some of the minimum spacing differences for 600 V rated UL 98 and 508 parts.

Minimum Spacing Between Uninsulated Live Parts of Opposite Polarity for 600 V UL 98 and UL 508 Switches		
Spacing Type	UL 98	UL 508
Over Surface	50 mm (2 inches)	12.7 mm (1/2 inches)
Through Air	25 mm (1 inch)	9.5 mm (3/8 inches)

A UL 508 switch may seem to have a significant physical advantage over a UL 98 switch, being smaller, but it actually limits the scope of use. The smaller spacing requirements of UL 508 switches effectively limit the maximum energy they can be exposed to and restrict their use in upstream applications. UL 98 switches, on the other hand, are designed to withstand larger events that could be seen in a service entrance application and can also be designed to incorporate internal fusing.

Choosing the Right Switch Type

Now that the NEC and the respective design standards have been examined, how do we ultimately decide what kind of switch is best to use?

A UL 98 switch can always be used if there is any doubt. They are designed specifically to be used in a wide range of applications, including use in service equipment, motor control centers, and branch and feeder circuits. They will often have horsepower ratings as well, meaning they can be used as motor controllers if marked accordingly.

In contrast, a UL 508 switch has a very limited range of applications. UL 508 switches may only be used as supplemental circuit disconnects for equipment or as manual motor disconnects when they are marked as such.

Often times, UL 508 switches may seem attractive as disconnecting means because they are smaller and are less expensive. However, the use of UL 508 switches as anything other than manual motor controllers is a direct violation of the NEC guidelines and should be avoided for safety and code compliance.

Mersen M60J30
60 A Class J Fused UL 98 Disconnect

Mersen M100U3
100 A Non-Fused UL 98 Disconnect

Mersen M633
63 A UL 508 Disconnect