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# COMPACT AND DURABLE DC DISCONNECT SWITCHES

*With a number of challenges concerning the design, manufacturing, and delivery of all types of electrical components, it is important for companies to design new products with a full understanding of customer needs and market realities. Disconnect switches are such a key component to most applications that the proper design along with assured deliveries is essential.*


Robots, battery powered transports, and portable lab equipment are being used on the factory floor and in the laboratory, which means they are in close proximity to humans. An AC disconnect switch separates the inverter from the electrical grid, while a DC disconnect switch separates the equipment from the DC source. In the past disconnect switches were mounted to walls and or electrical cabinets where they are available for emergency use. With smaller and smaller real estate like that of a small robot, the disconnect switch is often panel mounted close to the device.

Disconnect switches are used to keep equipment and people safe. They must be properly installed so that incoming power can be quickly shut off whenever necessary. Most equipment being manufactured today must be equipped with a disconnect switch for safety purposes. Their purpose is to shut off incoming power from your equipment or device.

The primary reasons you might use a disconnect switch include local or federal requirements and codes, the threat of product waste or system damage during an equipment breakdown if power is left on, or in the even that a human gets into a position where they can be harmed.

## Engineered Products

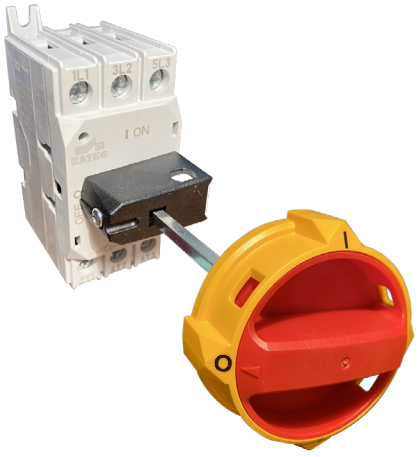
The markets have changed, the availability of materials has changed, and the needs of manufacturers have changed—and continue to change. Design teams need to focus on present needs as well as future challenges. Every component has to be reviewed, evaluated, and designed to meet the present and future needs of the customer.

When it came to designing the new disconnect switch line offered by Altech, a range of features were considered. With the increases in supply struggles, the aim was to use materials that were easy to acquire and use, as well as those that will be available for many years into the future. Plus, design features were focused on manufacturability using the latest automation tools.

The switch bodies are produced from high-grade plastics able to handle most harsh environments. The tough bodies can operate within a wide temperature range, are shock resistant, and chemical resistant. Internally, the design team focused on the quality of the contacts. Silver plated contacts and rivets are used throughout to assure long life cycles while providing better conductivity.

Designated as the LSF series, these disconnect switches are the only DC switches available in the compact frame size that are dual rated for AC/DC. The switches are available to mount in multiple ways, including with an integrated base and DIN-rail mounting, and a separate RT version with integrated door mounting and side panel mounting. The RT devices are provided with rear facing terminals for ease of installation. For electrical box installations, the mounting versions depend on the needs of the user. One option is an extended handle application where the shaft sticks out beyond the electrical box for easy access and interlocks with an external handle so that the box cannot be opened until power is turned off (see Figure 1). This dual rated switch represents the “only” DC switch in this small of a frame—36mm (W) x 71mm (H) x 46mm (D)—without integrated switching knob and panel mount tabs).

Another option is the panel mount. Usually installed in a side panel, this option requires users to drill a small 22.5mm hole into their panel which will accommodate the rear-mounted disconnect switch (see Figure 2). A knob is then attached to the front of the panel for easy access. The panel mount version is typically used for applications where the user requires a local disconnect for total power, or a local disconnect used to remove power from a portion of a particular piece of equipment without shutting the entire system down. Both of these mounting options for the disconnect switches have only three parts, unlike most other products on the market that have multiple parts and can be complex to install.




**The extended handle application uses a long shaft that sticks out beyond the electrical box for easy access.**

The LSF series disconnect switches are designed to be compact for use in a wide variety of applications. They are available in 16A, 30A, and 40A versions. They all offer UL 60947-4-1 certification. An important design feature is that the switch make/break operation is independent from the operator's actual turning speed. Hence, the actuator arm has nothing to do with changing the state of the switch. The internal design of the switch is spring loaded so that DC current cannot arc and burn up the contacts after multiple uses. Once the switch gets to a certain point, it snaps into place and cannot be backed off. Unlike AC switches where you can "tease" it open or closed without harming the internal functionality of the switch, DC switches must take arcing into consideration.

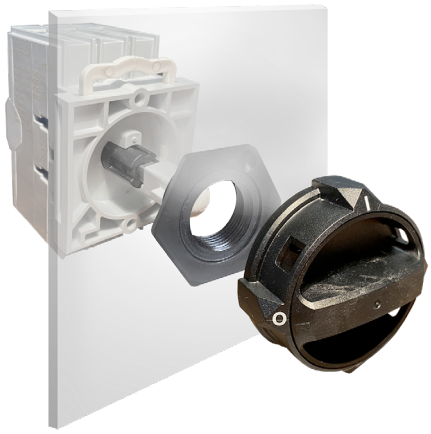


**Figure 2: The panel mount option for the LSF series disconnect switch is easy to install.**

## Assuring Quality and Delivery

Automation, when done properly has been shown to increase efficiencies in production, as well as assure that quality is maintained throughout an entire line of products being manufactured. When using readily available materials, and a reduced number of component parts, further efficiencies can be obtained. Manufacturing lines do not have to slow due to supply issues. These factors are even more important when it comes to products such as disconnect switches that have such a wide user base.

The reality of supply chain challenges facing today's manufacturers on multiple levels have been taken under consideration during the entire concept and design of Altech's LSF disconnect switches. The design specifically incorporated only materials that were safe from becoming obsolete and leaving customers unable to fulfill their application needs. By combining multiple levels of evaluation and analysis, the company was able to guaranty delivery times, eliminating the supply chain issues other companies struggle with daily. Everything from concept through design through manufacturing has been reviewed and purposefully streamlined for easy of manufacturing as well as delivery.