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## TAKING THE GUESSWORK OUT OF DE-ENERGIZING INDUSTRIAL EQUIPMENT

New solutions expedite the lockout/tagout process and provide clear line-of-sight disconnect for operators.

BY TOM BERANEK | MOLEX INCORPORATED



Lesson one when it comes to working with any type of electrical equipment is that a switch in the “off” position doesn’t necessarily mean it is truly “off.” As several recent product recalls have demonstrated, some hard-wired switches have the potential to supply power even when the handle is in the “off” position, posing a serious risk of shock or electrocution to both the switch user and any downstream equipment operator.

National Fire Protection Association standard 70E requires that electrical equipment should always be de-energized before being worked on unless there is a compelling reason not to. In most all maintenance situations, workers must prove the absence of power prior to working on or near electrical components. The practices and procedures used to disable machinery or equipment and prevent the release of hazardous energy, called lockout/tagout (LO/TO), prevent more than 100 fatalities and tens of thousands of injuries annually, according to data from the Occupational Safety and Health Administration (OSHA).

Properly complying with LO/TO procedures may require donning cumbersome personal protective equipment and opening the switch to manually probe wires using a volt meter to confirm zero power. While time-consuming, taking shortcuts in this process can lead to serious injuries.

In accordance with National Electric Code, any motor application requires that the motor have its own shutoff. The estimated replacement time for an electric motor is one to three hours and involves multiple tradespeople, due to code and safety requirements.

### A SWITCH IS IN SIGHT

One way to address these time and labor challenges is to utilize switch-rated plugs and connectors listed under UL 2682. Unlike standard connectors, devices listed under UL 2682 can operate as switches and be used to disconnect loads, even when energized. Spring-loaded silver-alloy contacts provide switching capabilities similar to a circuit breaker or contactor, with the connector remaining engaged during operation to protect users from arc flash and contact with live electrical components. A two-step connector operation places the plug in a rest position after disconnection, requiring a rotating motion to remove the plug while simultaneously closing the receptacle shutter.

Sections 430.102 - 430.109 of the National Electric Code (NEC) require approved disconnecting means to be located in a readily accessible location within sight of the motor location and driven machinery. This can often be a challenge because disconnect switches can be difficult to locate near machinery due to space or mounting constraints and/or require electricians to perform this task.

With a switch-rated connector system, the plug being separated from the receptacle provides visual proof that power has been removed and displays fast and positive compliance with NEC requirements for de-energizing industrial equipment.

This technology provides workers a simple and efficient way to safely de-energize equipment and perform LO/TO. Workers injured on the job from exposure to hazardous energy lose an average of 24 workdays for recuperation, and one safety incident can cost millions of dollars in lawsuits, lost man-hours, OSHA fines, and negative publicity. This technology also enables faster maintenance and equipment changeovers, leading to improved production uptime and efficiencies.

### PLANNED MAINTENANCE: REDUCING DOWNTIME

Planned maintenance is on the rise across all U.S. industrial markets, such as food and beverage and most notably in the oil and gas industry, where U.S. refiners spent more than \$1.26 billion on scheduled plant outages, turnarounds, and shutdowns in 2018, an increase of 38.5 percent compared to the year prior. With oil refineries and chemical facilities in North America relying on an average of thousands of electric motors to operate fans and pumps, the process to change out these electric motors can be very time and labor intensive, depending on their size and location.



Scheduled events when all or part of an industrial plant is taken offline for an extended period so that preventive maintenance or upgrades may be performed are costly in terms of both lost production and costs for the labor, tools, and materials used to execute the project. Depending on the product that is under production, attention also must be paid to ensure that product quality is not compromised during scheduled downtime.

With the large number of planned maintenance activities scheduled over the next several years, companies are looking for innovative ways to efficiently and cost effectively manage the business impact. By utilizing switch-rated plugs and connectors listed under UL 2682, the amount of time necessary to replace an electric motor can be reduced from hours to minutes and both worker lives and manufacturer costs can be saved.

### **REDUCING UNPLANNED DOWNTIME IN HARSH ENVIRONMENTS**

All electrical components exposed to moisture, weather, or harsh environments, whether indoors or outdoors, require a watertight connection to eliminate or reduce the risk of electrical shocks, short circuits, and electrical fires. For workers operating in wet conditions, it is also important to choose products with Type 4X and IP69K protection ratings. Sealed systems can withstand washdown and a number of harsh industrial environments, effectively eliminating the ingress of dust and water.

Seals must be able to withstand both the extreme temperature and high pressure of sprays and the corrosive effects of the harsh chemicals. These conditions mean that workers require a high-performance solution to stay safe and keep production lines running.

In harsh environments, such as in the food and beverage industry, processing facilities are traditionally wet and harsh environments, with machinery routinely needing to undergo washdown to sanitize equipment. Washdown processes typically involve high-pressure and high-temperature water and harsh sanitizing chemicals that can corrode wiring and other electrical products, leading to downtime and additional labor and repair costs.

By investing in electrical componentry designed with industry ratings and OSHA compliance in mind, end users now have an easy solution to the dangerous problem of de-energizing industrial machines and equipment. Companies will then ensure code compliance and increase plant maintenance efficiencies by reducing unplanned downtime.