

design Understanding and Using E-Stops

FAQs

FREQUENTLY ASKED QUESTIONS

Q: What is an e-stop and how is it used?

A: E-stops, or emergency stop switches, are used to ensure machine as well as personnel safety. They are used to provide a consistent and predictable failsafe response on a wide range of electrical machinery and must stop the machine without creating additional hazards. The devices can be highly specialized for emergency shutdown of equipment and meet workplace and machine safety standards established by international and U.S. regulatory commissions.

Q: Is there a difference between e-stops and regular stop switches?

A: E-stops provide what can be considered foolproof equipment shutdown, and always require a human action for resetting. Often, the switch requires an additional step—a twist, pull, or key—in order to release the electrical contacts prior to the machine being in a position to be restarted. As a general standard, e-stops must be a red operator with a yellow background. Companies often offer additional product options for particular applications. For example, some companies offer the same operators in various specialty colors. These non-red operators do not qualify as “Emergency Stops,” but can be applied in a similar way to stop applications. Black operators are used as a Machine Stop, similar in function to e-stops, but are simply a different color. Typical application for these devices is when the machine’s “OFF” button is required to be manually reset before restarting the machine. Blue operators are an accepted designated color for stopping water or sprinkler systems, and yellow operators are an



accepted designated color for shutting off gas lines. Different color operators were designed for customers with specific needs.

Q: What standards must e-stops adhere to in order to be considered properly certified?

A: Always check with your supplier to assure their devices are tested and approved by appropriate institutions relevant to your application. Some important standards include: IEC60947-5-1 and EN60947-5-5; VDE0660; UL508; CSA: C22.2 No. 14-95; and NEMA Type 4X, 12. These are some of the most used in the U.S. while other compliance and rating bodies also exist for other countries as well.

Q: What types of applications are required to have e-stops installed?

A: All industry segments mandate e-stops for safe operation, including,

but not limited to industries involving vehicles and transportation, medical treatment and diagnostics, industrial machinery, oil and gas, food and beverage, water and waste water, and instrumentation. Therefore, designers will want to have a knowledge of e-stop fundamentals, and switch characteristics and capabilities, as well as the international and U.S. standards and compliance requirements that need to be met for their application.

Q: How can I begin to select the right e-stop for my application?

A: The first step is to determine where the e-stop fits within your machine control system and what category of emergency shutdown is needed according to the standard you are adhering to. The intended application often determines the electrical and mechanical specifications, as well as the size and place-

ment. So, a thorough understanding of the machinery and associated control systems is key to making the right e-stop choice. Requirements vary by industry segment, therefore standards for e-stops used in the transportation industry may differ significantly from those used on process machinery or medical equipment, and will be governed by different regulatory bodies, provides online access to information that allows designers to select the panel opening size, type of actuator, type and number of contact blocks, and all the electrical ratings you'll need to adhere to.

Q: Are there specific changes in any of the standards that I should be aware of?

A: There are continual adjustments being made to the standards as issues arise. One of particular interest recently is concern about generators — a key component in many industries. The NEC 2017 standard, for instance, has recently changed for article 445 on disconnecting means and shutdown of prime mover, and should be read thoroughly before finishing your design. This new change in the NEC standard requires the generator installer to include a lockable disconnecting means, see picture, that would disable all prime mover start control circuits—which would then require a mechanical reset. This additional shutdown e-stop switch is to be located outside the equipment room or enclosure and should not be installed with an e-stop lockout or a lockable shroud.

Q: What is the difference between e-stop lockout shrouds and e-stop guards?

A: E-stop shrouds are usually lockable and used where safety is a requirement for the particular application's specific design and installation parameters. E-stop guards, on the other hand, are not lockable and can be used in any application where protection of the operator is required but the operator has a full access to the e-stop operator. This guard is meant to prevent the machine operator from accidentally bumping into the e-stop while working, but does not provide a lockout function. ■

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