

Getting it straight: interruption rating vs. short-circuit current rating

BY KENNETH CYBART, *Senior Technical Sales Engineer, Littelfuse, Des Plaines, Ill.*



SCCR—NEC Compliance

- Short-circuit current rating (SCCR) must be equal to or greater than available short-circuit current where equipment is installed.
- To verify NEC 110.10 compliance, one must calculate available fault current.
- NEC 409 requires that the SCCR be displayed on industrial control panels.
- If the SCCR depends on a particular current-limiting device, equipment must be labeled as such.

Specifiers often use the terms short-circuit current rating (SCCR) and interrupting rating (IR) interchangeably. But a system's or component's SCCR may depend on the fuse or circuit breaker used in the circuit. Not understanding this difference between SCCR and IR may lead to under-protection, fire, and possibly death.

For proper protection and compliance with National Electrical Code (NEC) 110.10, the SCCR of equipment must be equal to or greater than the available short-circuit (or high-level ground fault) current where the equipment is installed. Fuses and circuit breakers must have sufficient IRs for the fault current they interrupt.

Usually, the SCCR of a system is much less than the maximum IR of the main overcurrent device. This is due to the fact that SCCRs of an assembly take into account all components contained within the equipment rather than just the main overcurrent protective device.

To verify compliance with NEC 110.10, the circuit designer must calculate available fault current. For example, if the calculated available fault current is 35 kA, then the IR and SCCR of all installed overcurrent protective devices and system components must be greater than 35 kA.

This seems simple enough, but not all IRs are comparable. Fuses have IRs that do not depend on the action of any other protective device in the circuit. This is often referred to as "fully tested" or "fully rated."

On the other hand, some manufacturers achieve higher IRs by having Underwriters Laboratories test their circuit breakers in series with current-limiting fuses or breakers. The latter clear a circuit in less than one-half an AC cycle, limiting peak let-through current to a safe level. When this is done, the manufactur-

er's datasheet will note that the IR is conditional on the combination of devices.

The NEC allows such combinations, but requires that their series rating be labeled on the equipment next to the IR. When replacements are needed, such breakers and fuses must be replaced by the same make, model, and rating to maintain the original IR.

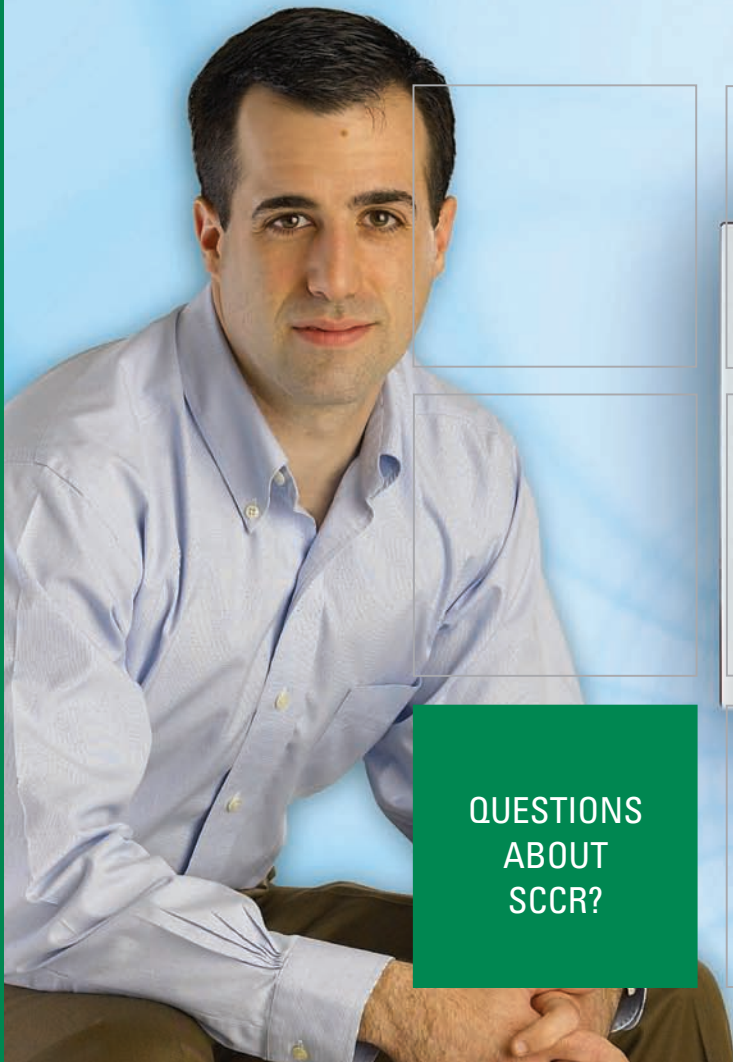
NEC Article 240.86 has similar requirements. On new equipment, or where a series rating can be assigned by a registered professional engineer, it must be field marked on the end use equipment. This applies to some so-called fully rated systems if they depend on a tested combination of fuses and circuit breakers.

NEC Article 409 requires that the SCCR be displayed on industrial control panels. If that SCCR depends on the use of a specific current-

The SCCR of a component may depend on the circuit breaker or fuse used in the circuit.

limiting device, then the equipment must be labeled as such, and indicate which device is needed. Specifiers achieve the proper SCCR by selecting a current-limiting device that limits the peak let-through current to a level that protects all components within the panel. Thus, the SCCR of the panel is the maximum RMS current at which the peak let-through current is safe for the most sensitive component.

If current-limiting devices are not used, the only alternative is to design with "fully rated" components and overcurrent protective devices. Whichever type of overcurrent protection is specified—fully rated or a combination—the specifier must start with an understanding of the difference between SCCR and IR. **lcse!**



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Need help understanding Short Circuit Current Ratings or determining the SCQR on your industrial electrical control panels? How about raising your panel's SCQR to meet an existing Available Fault Current in your facility? Littelfuse has the answers to these questions in one convenient place.

The fact is, the NEC® requires that the SCQR of all industrial control panels is accurately determined and clearly labeled. This requirement is necessary to ensure the integrity of the panel and the safety of personnel during a short circuit situation. For more information on SCQR and NEC® requirements go to www.littelfuse.com/sccr

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