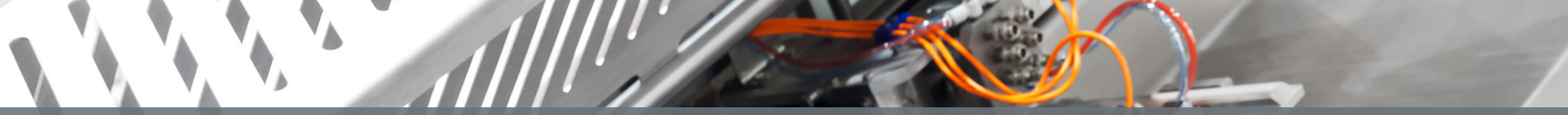
Electrical safety and reliability: SCCR

BUSSMANN SERIES

Equipment SCCR made easy

EATON
Powering Business Worldwide

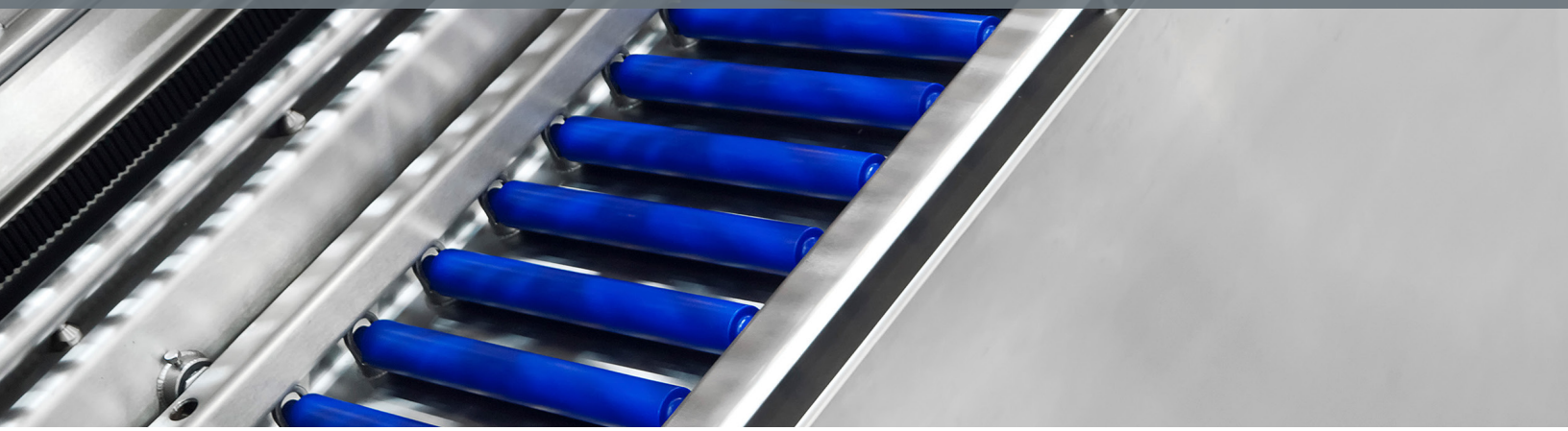


Is your system safe?

A Short-Circuit Current Rating (SCCR) represents the maximum level of fault current that the control panel or machinery can safely withstand. The NEC® requires that industrial control panels, industrial machinery and HVAC equipment be marked with an assembly SCCR that is greater than the fault current at the location where the equipment is installed. Inspectors and installers need this information in order to ensure compliance with NEC 110.10.

Adequate SCCR is imperative for a safe electrical system. If the available fault current of the system exceeds the equipment SCCR and a short-circuit occurs, catastrophic damage to the panel may occur. Electrical workers and others are put at risk of injury from burns, flying debris and electric shock. Nearby equipment is also at risk of damage and the improperly installed piece of equipment can cause fines or commissioning delays.

To help ensure a safe system, personnel and equipment, SCCRs must be properly understood and implemented.



Protecting what matters most

With safety and compliance top priority, both users and manufacturers of equipment play a key role in understanding and implementing adequate SCCRs.

For users of machinery equipment, understanding the available fault current at the location where equipment is installed is a key first step to providing adequate SCCR protection requirements. Users should communicate these requirements to their equipment suppliers and verify equipment installed meets those requirements. This enhances the safety of the system, but also builds flexibility into the equipment for the customer.

For the Original Equipment Manufacturer (OEM), determining and marking the assembly SCCR on the equipment provides important SCCR information to the authority having jurisdiction. This is a critical element to allow for proper installation, but also can provide a competitive advantage.

In a recent survey, more than half of OEMs surveyed expressed some degree of difficulty locating SCCRs for components needed to design an SCCR solution. Nearly half also stated that they have difficulty applying or interpreting the standard that determines panel SCCR.

Whether you're determining how much SCCR protection is needed, or determining the SCCR of your equipment control panel, the process does not have to be a struggle.

When you partner with Eaton, you gain access to a range of products and solutions that make SCCR compliance easy and efficient. We offer software solutions that:

- Quickly determine available fault current
- Quickly determine the SCCR of a control panel

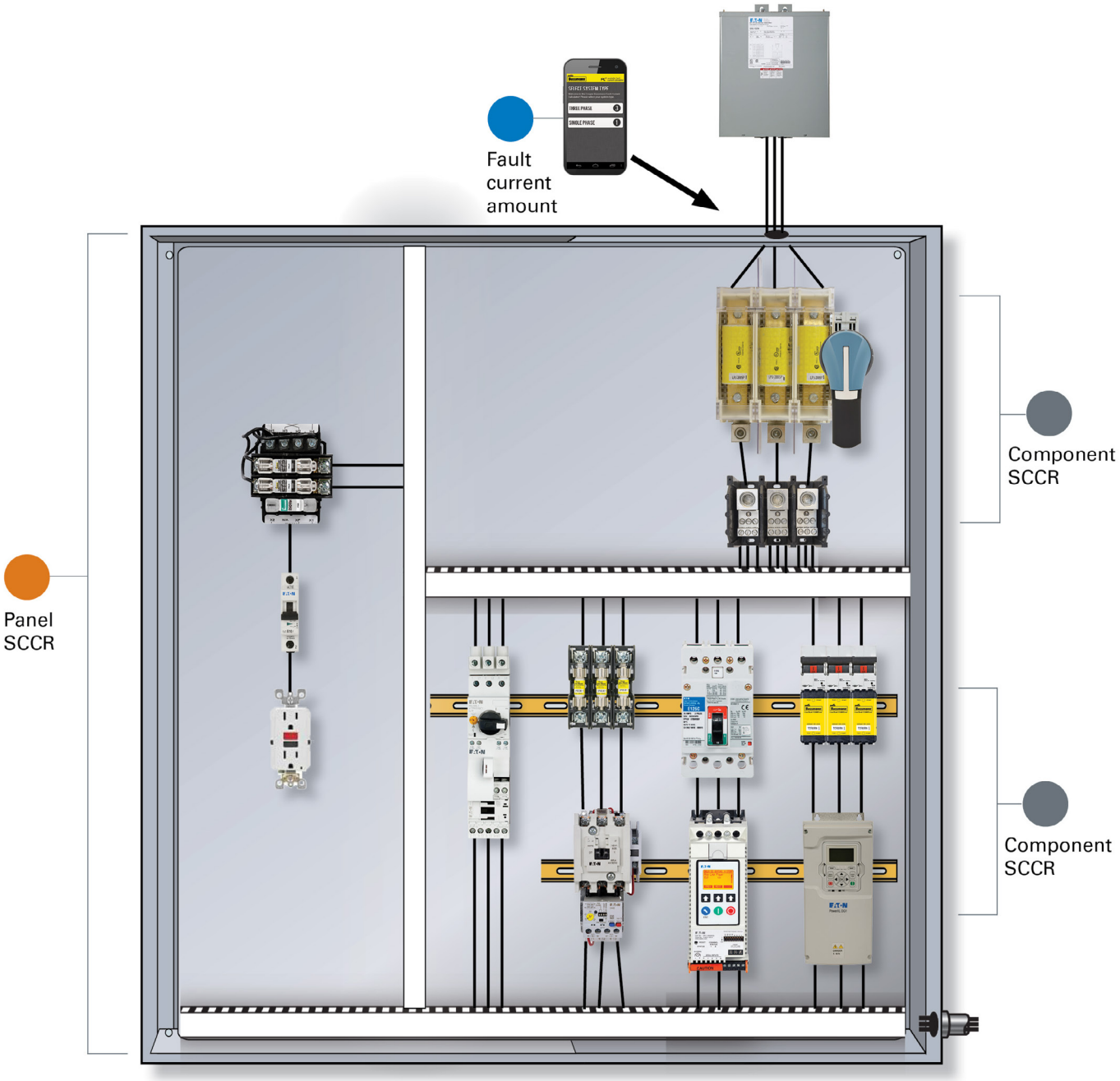
Each of these solutions takes the difficulty and guesswork out of the equation. In addition to these tools, we have the right product portfolio that:

- Offers the largest product offering, from fuses and power distribution blocks to terminal blocks and switches
- Meets a wide range of SCCR needs up to 300kA
- Limits and lowers fault current

Visit Eaton.com/bussmannseries for more information on how our team can help ensure that you're protecting what matters most.

Software application solutions

Eaton offers three application solutions that make SCCR compliance easy and efficient. From the available fault current of the incoming power to both component and panel SCCR, these applications guide you through the process of determining an efficient and safe SCCR solution.



Easily calculate

FC² Available Fault Current Calculator

Easily calculates available fault current anytime, anywhere

Our FC² mobile and web-based app quickly delivers fault current calculations in the palm of your hand. The program:

- Calculates both single- and three-phase system fault current levels
- Generates NEC® compliant labels, one-line diagrams and documents
- Features fuse sizing guide for main, feeder and branch circuits

FC² considers transformer size, conductors and conduit in calculating the fault current.

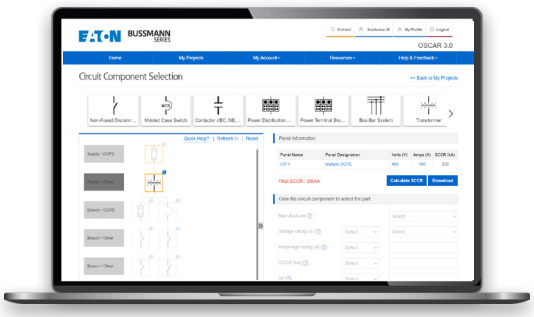
Quickly find

SCCR Protection Suite

Quickly finds components with the SCCRs you need

With just a few simple selections from drop-down lists, you can easily find all the available Eaton components and their respective SCCRs based on your system needs. You can reduce the number of results by setting various component preferences. SCCR Protection Suite also allows the application of an upstream current limiting device to determine if the branch circuit SCCR can be raised.

Validate and sustain



OSCAR 3.0

Calculates and documents assembly SCCR for a control panel

Our OSCAR software allows you to enter a one-line diagram of a control panel circuit, identify the components in that circuit and calculate the SCCR for the entire assembly. OSCAR contains over 60,000 part numbers and thousands of component SCCRs. The program also applies current limiting rules per UL508A that permit the SCCR of branch circuits to be raised. What's more, you can view, print and save SCCR analysis reports.

Product solutions

When developing a panel with a desired SCCR level, one of the most difficult challenges is resolving the SCCR weak links in the panel circuit. These weak links are components in the panel that do not have sufficient component SCCR, and thus lower the panel assembly short-circuit current rating.

Eaton offers a comprehensive product portfolio that ranges from fuses and circuit breakers to power distribution blocks, terminal blocks and control equipment that meets a broad range of SCCRs, from 18kA to 200kA. These solutions eliminate weak links by raising the component SCCR, limiting the fault current or lowering the fault current. The tables below represent common SCCR weak links that can limit the overall assembly SCCR, and a selection of Eaton solutions and the level of protection they can provide. Visit www.eaton.com/SCCR to find specific part numbers for the solutions mentioned below.

Challenge		Solution						
Component type	**Default SCCR protection**	**Eaton solution**		**SCCR protection level**				
				Basic up to 18kA	**Mid up to 35kA**	**High up to 65kA**	**Premium up to 100kA**	**Ultimate up to 200kA**
Miniature fuses	10kA		Fuses - Class CC, CF, J, R, T	✔	✔	✔	✔	✔
			Circuit breakers - Class G, C	✔	✔	✔	✔	✔
Miniature circuit breaker	5kA		Fuses - Class CC, CF, J, R, T	✔	✔	✔	✔	✔
			Circuit breakers - Class G, C	✔	✔	✔	✔	✔
Supplementary protector	0.2kA		Fuses - Class CC, CF, J, R, T	✔	✔	✔	✔	✔
			Circuit breakers - Class G, C	✔	✔	✔	✔	✔
Fuseholders	10kA		Fuse holder with Class CC, CF, J, R, T fuse	✔	✔	✔	✔	✔
Switches	10kA		RDF fusible switches with fuse	✔	✔	✔	✔	✔
			RD UL 508 and 98 non-fused switches with fuse	✔	✔	✔	✔	✔
			Compact Circuit Protector (CCP) with fuse	✔	✔	✔	✔	✔
Power distribution	10kA		PDB and PDBFS power distribution blocks with fuse	✔	✔	✔	✔	✔
			PDB and PDBFS power distribution blocks with breaker	✔	✔	✔		
			Power distribution fuse blocks with fuse	✔	✔	✔	✔	✔
			Multi-wire lugs on circuit breakers	✔	✔	✔	✔	✔
Motor starters	5kA depending on size		XT IEC with fuse	✔	✔	✔	✔	✔ *
			XT IEC with breaker	✔	✔	✔	✔ *	✔ *
			XT IEC with motor circuit protector	✔	✔	✔	✔	
			XT IEC Type E/F	✔	✔	✔		
			Freedom NEMA with fuse	✔	✔	✔	✔	✔ *
			Freedom NEMA with breaker	✔	✔	✔	✔	✔ *
			Freedom NEMA with motor circuit protector	✔	✔	✔	✔	
			A25 definite purpose (to 75A) with fuse	✔	✔	✔	✔	✔ *
			XT manual starters Type E/F	✔	✔	✔		

Challenge		Solution						
Component type	Default SCCR protection	Eaton solution		SCCR protection level				
				Basic up to 18kA	Mid up to 35kA	High up to 65kA	Premium up to 100kA	Ultimate up to 200kA
Motor overload protection	5kA		XT Electronic with fuse	✔	✔	✔	✔	✔ *
			XT Electronic with breaker	✔	✔	✔	✔	✔ *
			C441 motor insight with fuse	✔	✔	✔	✔	✔ *
			C441 motor insight with breaker	✔	✔	✔	✔	✔ *
Reduced voltage motor starters	5kA depending on size		S801/S811+, S611 with fuse	✔	✔	✔	✔	✔ *
			S801/S811+, S611 with breaker	✔	✔	✔	✔	✔ *
			S801/S811+, S611 with motor circuit protector	✔	✔	✔	✔	
Adjustable frequency drive	5kA depending on size		DA1, DC1, DE1, DG1, MMX, SVX, SPX with fuse	✔	✔	✔	✔	✔ *
			DA1, DC1, DE1, DG1, MMX, SVX, SPX with breaker	✔	✔	✔	✔	✔ *
Resistor/non-inductive loads	5kA depending on size		XT IEC with fuse	✔	✔	✔	✔	✔ *
			XT IEC with breaker	✔	✔	✔	✔ *	✔ *
			Freedom NEMA XT NEMA with fuse	✔	✔	✔	✔	✔ *
			Freedom NEMA XT NEMA with breaker	✔	✔	✔	✔	✔ *
			C25 definite purpose (to 75A) with fuse	✔	✔	✔	✔	✔ *
Lighting controllers	5kA depending on size		A202 lighting with fuse	✔	✔	✔	✔	✔ *
			A202 lighting with breaker	✔	✔	✔	✔	✔ *
Ground fault and current monitoring relays	5kA		CT Type CurrentWatch sensors	✔	✔	✔	✔	✔
			CT Type D65 relays	✔	✔	✔	✔	✔
Terminal blocks	10kA		DP and DG terminal blocks with fuse	✔	✔	✔	✔	✔
High fault currents larger than panel SCCR			Control power transformers**	✔	✔	✔	✔	✔
			Encapsulated transformers**	✔	✔	✔	✔	✔
			Dry type transformers**	✔	✔	✔	✔	✔
			External disconnect with current limiting fuses**	✔	✔	✔	✔	✔
			Current limiting circuit breakers**	✔	✔	✔	✔	✔

* SCCR applies to devices in the branch circuit with a properly applied upstream current-limiting overcurrent protective device in the feeder. See SCCR Protection Suite for specific part number solutions.

** Lowered fault current or raised SCCR with properly applied current limiting devices and transformers. See UL 508A regarding proper application.

Leadership in circuit protection

When it comes to circuit protection, only Eaton can provide a complete portfolio of solutions for virtually every application. Eaton delivers:

- Diverse solutions to mitigate arc flash energy and help protect personnel and equipment.
- Products and tools to easily achieve short-circuit current ratings requirements.
- The widest range of circuit breaker/circuit breaker, circuit breaker/fuse and fuse/fuse selective coordination combinations.
- An unmatched circuit protection portfolio and custom design capabilities to meet local and national code, and engineering challenges.

Our focus is on delivering the right solution for the application. But, decision makers demand more than just innovative products. They turn to Eaton for an unwavering commitment to personal support that makes customer success a top priority.

Case study

A Wisconsin-based manufacturer of chiller equipment needed to improve the SCCR of their standard design from 5,000 amps to 85,000 amps in order to meet a customer requirement.

Struggling with the task, they reached out to a local Bussmann series product application engineer for support. The goal was to develop a solution with minimal changes to material costs and minimal engineering effort.

After working closely with our team, the customer quickly achieved a solution that involved minimal component changes and was in line with the original material costs.

The customer now has the tools and support needed to efficiently meet the code requirements regarding equipment SCCR as well as provide equipment that assists their customers toward providing a safe working environment.

Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

Bussmann Division
114 Old State Road
Ellisville, MO 63021
United States
Eaton.com/bussmannseries

Publication No. 10374
November 2021

For Eaton's Bussmann series product information, call **1-855-287-7626** or visit: **Eaton.com/bussmannseries**

Follow us on social media to get the latest product and support information.

Powering Business Worldwide