



New Safety and Code Standards:

Industrial Control Panels

*Understanding the impact of
NEC® Article 409 and UL 508A*

Merlin Gerin

Square D

Telemecanique

Schneider
 **Electric**

What's changing in the code and how will it affect my business?

The 2005 Edition of the National Electrical Code® (NEC®), NFPA 70 contains a new Article 409 on Industrial Control Panels. This article will provide the installer and enforcement authorities with the minimum requirements to facilitate the safe installation and inspection of industrial control panels. It will become effective January 1, 2005 for those jurisdictions that immediately adopt the new edition of the code.

Up until now, industrial control panels have been installed based upon general electrical requirements from several different articles in the NEC. With the increased use of these panels, there has been a significant increase in their misapplication of control products and related equipment.

Article 409 will impact the way your equipment is designed and constructed so that the entire panel and all components inside meet a defined Short Circuit Current Rating (SCCR) for the application and that the panel is marked with the appropriate SCCR.

What do I need to know about Article 409?



New Article 409 covers industrial control panels that are intended for general use and operate at a voltage of 600V or less.

In addition, this article recognizes in Table 409.3 that industrial control panels may be constructed and

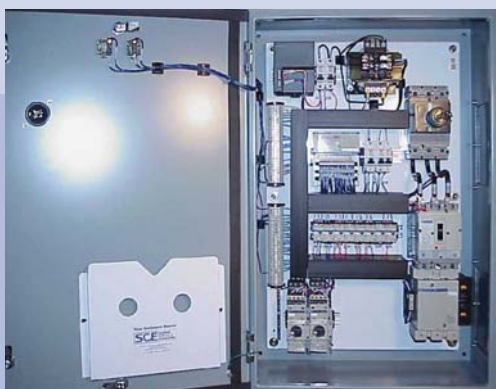
installed for use in applications covered by other articles in the NEC. Examples can be found in Article 440 for air-conditioning and refrigeration equipment, Article 610 for cranes and hoists and Article 670 for industrial machinery.

How do I obtain the needed SCCR for a panel I am building?

The final builder/assembler of the equipment inside of the panel will be responsible for providing the SCCR levels for the overall panel.

There are three options:

1. Test each panel construction and record the construction in their follow-up procedure. With the multitude of possible product combinations within a panel, this option can require a lot of testing and maintenance. Third-party testing and certification may also be required.
2. Purchase previously tested constructions (combinations) from a major supplier of equipment that can be tabulated in the control or machine panel builder's procedure. Once you have all the component ratings, either utilize an outside service or UL 508A, Supplement SB.
3. Utilize a method described by Underwriters Laboratories Inc. in their UL 508A, Supplement SB. If your jurisdiction does not adopt the 2005 code, control panels certified to the UL 508A standard will require a SCCR rating in April 2006.



What do the new code articles and product standard requirements from UL really mean?

The previous standards allowed the practice of listing a panel according to the AIR rating of its main overcurrent protective device. The new standards include the entire combined power circuit in requirements for the SCCR.

The NEC® is asking industrial control panelbuilders to determine an overall SCCR for the panel. One new procedure takes the approach of using the “least common denominator” for SCCRs within a panel.

For example, if you have several items within the panel, such as circuit breakers, a motor control and a starter, the lowest rated SCCR of the device within the control panel **MUST** be the one that is marked on the panel. If you obtained the SCCR from the manufacturer of the components, a simple example is:

Circuit Breaker: SCCR of 25 kA

Motor Control: SCCR of 15 kA

Starter: SCCR of 5 kA

The panel’s overall short circuit current rating is 5kA based on the lowest rated component. Another procedure is to use a group of power circuit components that have been tested in combination to the specified SCCR.

Why is determining the SCCR so important?

Previous editions of the NEC provided no guidance to the electrical inspector to ensure electrical safety for industrial control panels. Some states introduced their own specific rules to address the safe installation of panels. NEC Article 409 now provides the minimum requirements to facilitate the safe installation and inspection of these panels.

This code change addresses the fact that if an overcurrent situation arises, the energy level may be higher than the lowest level SCCR on a component within the panel. When ratings on components are less than the available fault current, the safe performance of the panel comes into question. Further evaluation of the panel and component combinations may be necessary to ensure a safe electrical installation.



What is UL 508A, Supplement SB?

Supplement SB from Underwriters Laboratories Inc. is one of the three methods that can be used to determine the SCCR of an industrial control panel. There are three distinct steps to establishing the rating:

Step 1. Determine the rating of the individual components within the control panel by using either:

- The component marking or instruction marking which may require specific overcurrent protection
- The unmarked component rating determined by Table SB4.1 in the supplement
- A test of a component or combination of components per UL 508A

Step 2. When the current limiting protective devices are included in a feeder circuit, determine the modified rating (SB4.3) based upon the let-through values of the current limiting protective devices.

Step 3. Establish the overall rating (SB4.4) which cannot exceed the rating of the circuit, including the modified rating determined in Step 2 above. Each one of these steps is further detailed in the UL Supplement.

Our commitment to NEC® Article 409 and UL 508A

Schneider Electric has information that can help you determine the SCCR for your industrial panel by



providing to you the ratings and select combination ratings for our products.



We are in direct support of NEC Article 409 and UL 508A. Our products are tested to perform reliably as a system to meet the new code requirements.

Schneider Electric actively participates as an industry member in the development of NEC requirements and UL product standards. Our commitment to this activity permits us to ensure our products and solutions not only align with published codes and standards, but exceed those requirements and meet our customer demands and expectations.

The philosophy behind the Square D® and Telemecanique® product families has been to always put safety first. Schneider Electric is committed to electrical safety and providing our customers with UL listed products and innovative solutions to support the safe construction and installation of control panels.



**Square D® FA/KA/LA/MA
Family of Circuit Breakers**

Purchasing coordinated products simplifies SCCR compliance

Don't get caught using old fuse technology. Square D® circuit protection provides you with convenience, design flexibility and safety in single and three-phase environments that fuses cannot match. You don't have to stock fuses or reach into a panel's energized interior to reset our breakers. Our smaller footprint eliminates the fusible switch as well.

By purchasing coordinated products from Schneider Electric, your installation will perform as rated because our components have undergone UL testing.



**Square D Powerpact®
H- & J-Frame Circuit Breakers**

Schneider Electric will also support panel and machine builders during the electrical inspection process using our expertise to assist you during your review.

products in your industrial control panels will also make your panels easier to install.

Telemecanique® drives and starters can provide you with reliability and ease of operation coordinated with our full family of products.



Telemecanique Drives

Using the Schneider Electric family of

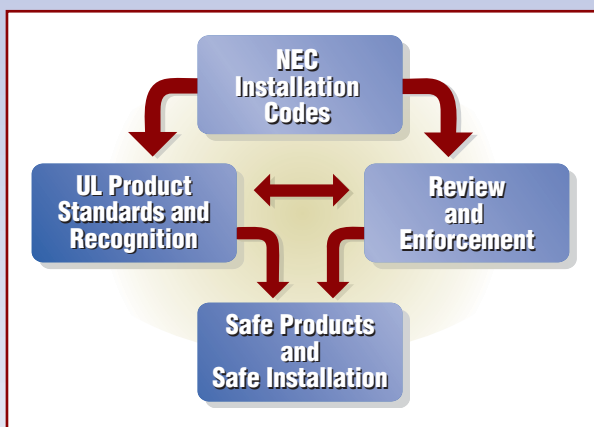
Square D circuit breakers in our FA/KA/LA/MA product classes are rated for use in equipment meeting requirements of NEC Article 409 and UL 508A.

using our complete line of Schneider Electric products. You can rely on us to help you through the code details to keep your business operating and your customers' installations functioning safely.

NEC® compliance can be made simpler by

What is the North American Electrical Safety System?

Participants in the electrical industry have always had one common goal – the safe use and installation of electrical products and systems. The North American Electrical Safety System is comprised of three major components that are closely aligned to ensure safe products and installations as shown below.



The NEC® sets the minimum installation rules for electrical products and systems. The product standards set the design, construction and safety-related performance requirements for electrical products to ensure compliance with the installation code. Most installed electrical distribution and control equipment is listed under a third-party certification program.

Inspection authorities rely on third-party certification to ensure that products meet the standards and the installation code. All of these components combined form an effective electrical safety system.

To learn more about Schneider Electric solutions, visit our website at www.us.squared.com/ul508a or contact your nearest Square D® and Telemecanique® sales engineer or distributor for details.

Schneider Electric – North American Operating Division

1415 S. Roselle Road
Palatine, IL 60067
Tel: 847-397-2600
Fax: 847-925-7500