

The North American Electrical Safety System

Changes affecting Industrial Control Panels

A White Paper on UL 508A, NEC 409 and related codes and standards changes that affect panel builders, machine builders and those who design and develop industrial control panels.

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 safe installations as shown below.



The installation code 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 the above components combined form an effective electrical safety system.

What's New – Installation Code?

When the 2005 edition of the National Electrical Code (NEC), NFPA 70 is published later this year, it will include a new Article 409 on Industrial Control Panels. This Article will provide the installer and enforcement authorities 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.

Why Article 409?

Up until now, industrial control panels have been developed based on general requirements from several different Articles in the NEC. With the increase in the use of these panels, there has been a significant increase in the misapplication of control products and related equipment associated with their installation. Article 409 will provide a dedicated list of requirements for the installer and/or electrical inspector to ensure electrical safety is not compromised, resulting in safer installations.

Article 409 – What do I need to know?

The new Article 409 covers industrial control panels that are intended for general use and that operate at a voltage of 600 Vac 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, such as Article 440 for air-conditioning and refrigerating equipment, Article 610 for cranes and hoists and Article 670 for industrial machinery. The major feature of the new Article 409 is the requirement that an industrial control panel has to be marked with a short circuit current rating (SCCR) established by using an approved method.

UL 508A, The Standard for Safety for Industrial Control Panels is referenced overall in the Article for evaluating control panels and its Supplemental Bulletin (SB) is noted as being an approved method for establishing the short circuit current rating of the panel.

How can a manufacturer obtain the needed SCCR for a given panel?

The manufacturer has three options:

- 1) Test each panel construction and record the construction in their Follow-up Procedure. With the multitude of possible combinations, this option would require considerable testing and maintenance on the control panel manufacturer's file;
- 2) Purchase previously tested constructions from a major supplier of equipment that can be tabulated in the control panel manufacturer's procedure;
- 3) Apply the method described in UL 508A, SB.

Product Standards – What is UL 508A, Supplemental Bulletin?

The SB outlines one of the methods that can be used to determine the SCCR of an industrial control panel. There are three distinct steps to establishing the rating:

- 1) Determine the rating of individual power circuit components (SB4.2) by either;
 - The component marking or instruction marking in the case of specific overcurrent protection
 - The unmarked component rating determined by Table SB4.1 in the supplement; or
 - By testing a component or combination of components per UL 508.
- 2) When current limiting components are included in a feeder circuit, determine the modified rating (SB4.3) based on the let-through values of the current limiting devices.
- 3) Establish the overall rating (SB4.4) which cannot exceed the rating of the lowest rated device or circuit, including the modified rating determined in item 2 above.

Each one of these steps is further detailed in its respective section of the SB.

Summary

As mentioned before, the effective date for SCCR marking will be January 1, 2005 for those jurisdictions that immediately adopt the 2005 NEC. Inspectors and facilities engineers in these jurisdictions will begin rejecting control panels that are not compliant with these new requirements.

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

Local Implementation

State jurisdictions have adopted Code change at various times as illustrated by the chart below. This information is provided simply as a possible indicator of each state's willingness to adopt new Code changes.

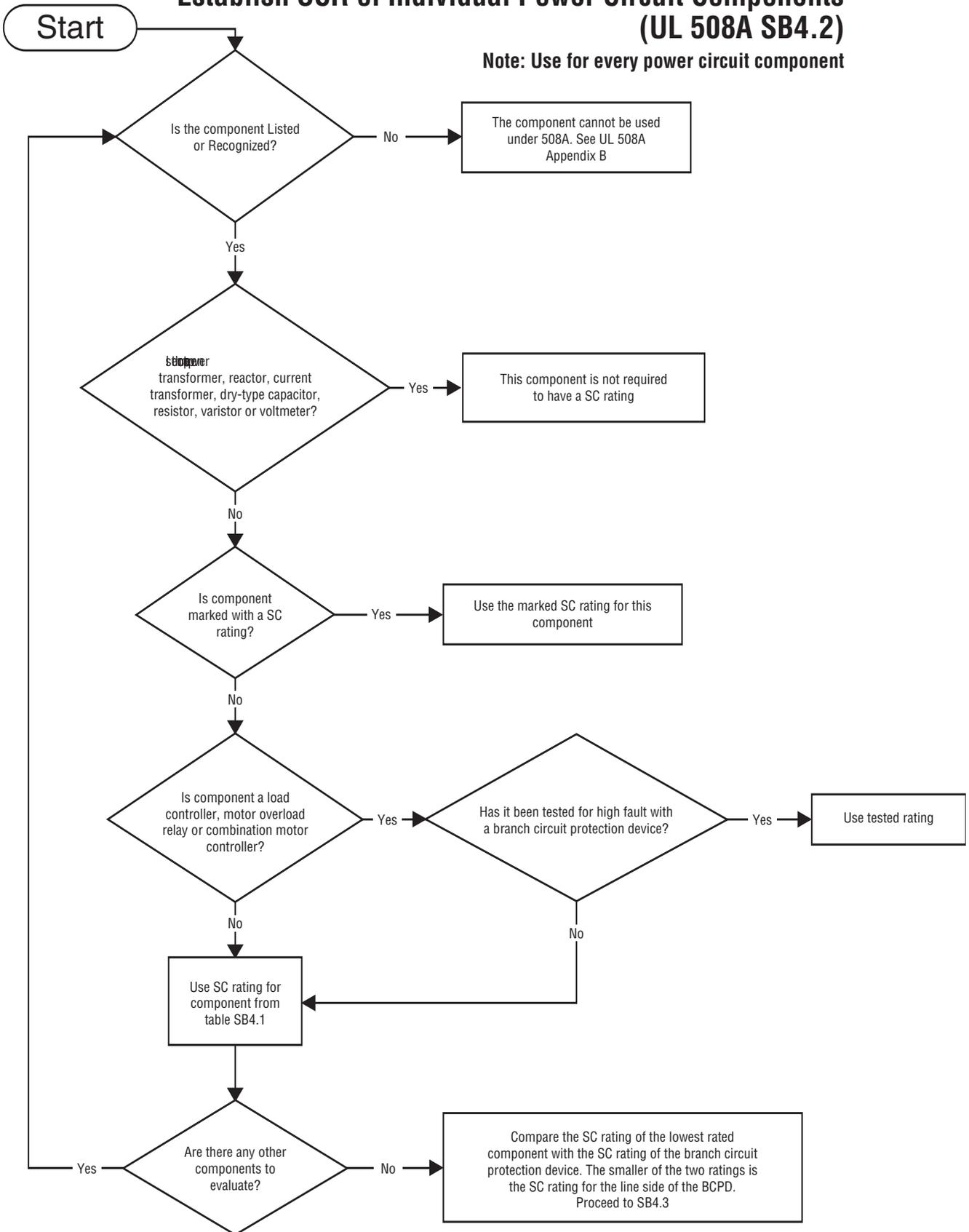
List of Current Code Version by State/Jurisdictions

Source National Fire Protection Association, One Stop Data Shop, Fire Analysis and Research Division, Quincy, MA 02169-7471

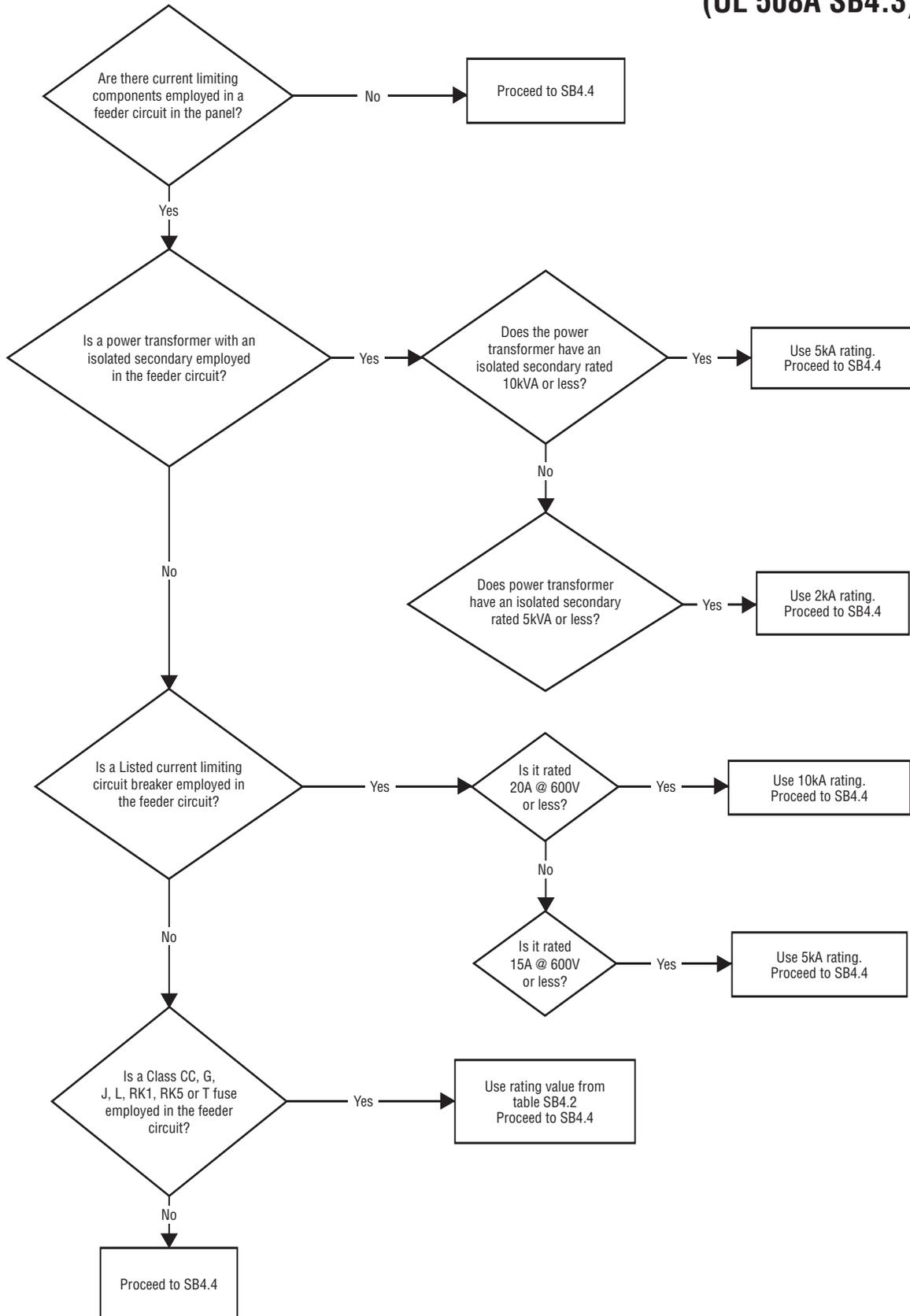
AL – 2002	MD – 1999	OR – 1999
AR – 2002	ME – 1999	RI – 1996
AZ – 1987	MI – 1999	SC – 2002
CA – 1999	MN – 2002	SD – 1996
CO – 2002	MO – 1999	TN – 1999
CT – 1999	MS – 1996	TX – 1999
DE – 2002	MT – 2002	UT – 2002
FL – 1999	NC – 2002	VA – 1996
GA – 2002	ND – 2002	VT – 1996
IA – 1996	NE – 2002	WA – 1999
ID – 2002	NH – 2002	WI – 2002
IL – 1999	NJ – 1996	WV – 1999
IN – 2002	NM – 1999	WY – 2002
KS – 1996	NV – 1996	KY – 2002
NY – 2002	LA – 2002	OH – 2002
MA – 2002	OK – 2002	

Establish SCR of Individual Power Circuit Components (UL 508A SB4.2)

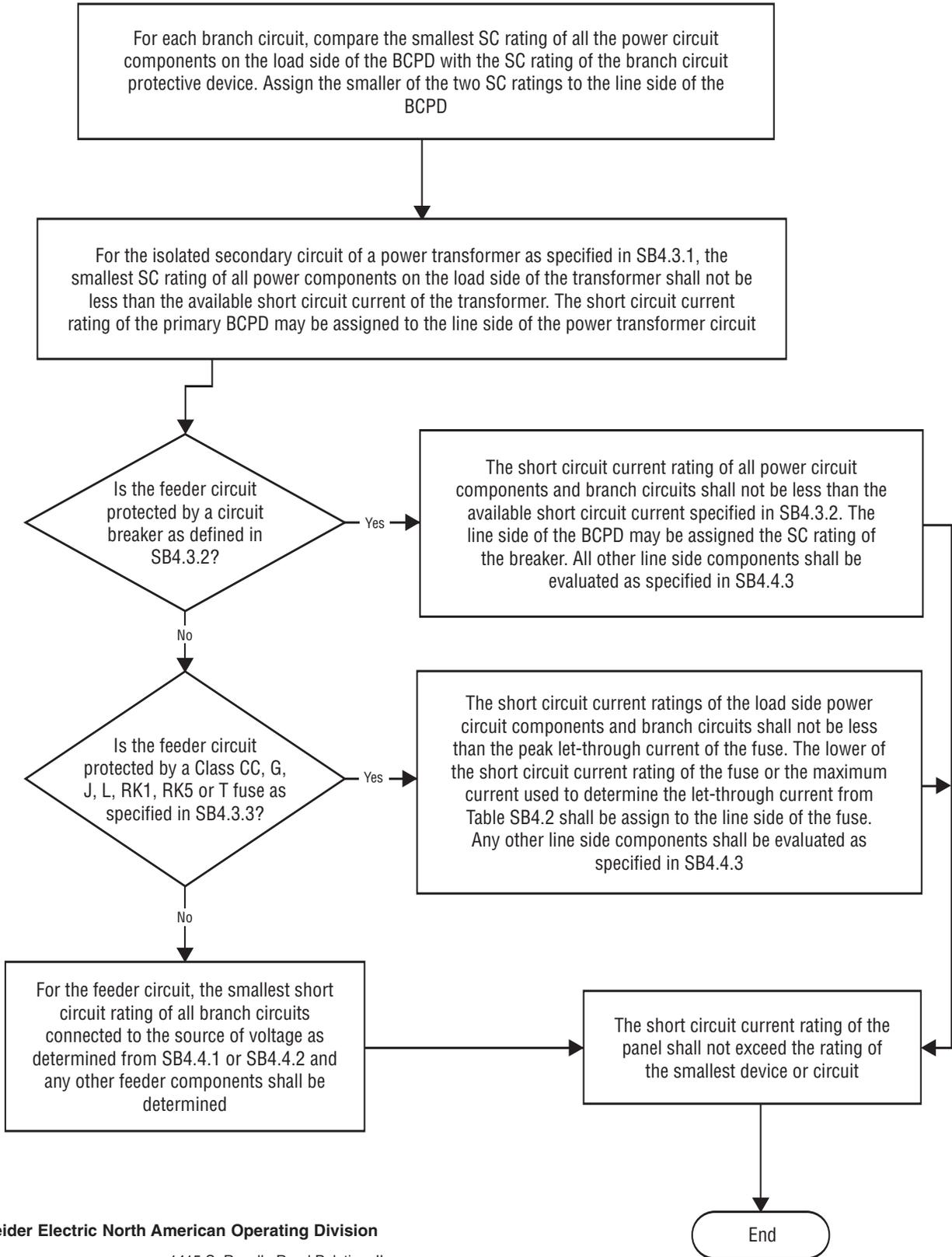
Note: Use for every power circuit component



Feeder Components that Limit the Short Circuit Current Available (UL 508A SB4.3)



Determination of the overall short circuit current rating of the panel (UL 508A SB4.4)



Schneider Electric North American Operating Division

1415 S. Roselle Road Palatine, IL
60067
Tel: 847-397-2600
Fax: 847-925-7500
www.us.squared.com/ul508a