What's New with UL508A Codes & Standards
Presented by Jeff Woolfolk
Manufacturing in America | March 14-15, 2018
Before we start… A Penny for Your Thoughts

At the end of the session, share your feedback via MiA App - and get a chance to win tickets to the Detroit Tigers baseball game!
What’s New With UL 508A Codes and Standards?

Note / Disclaimer

The circuit examples and interpretations of the standard are non-binding and do not claim completeness concerning configuration, equipping and contingencies. They do not represent customized solutions but merely provide support for typical tasks.

Every user of this presentation assumes full responsibility for the proper operation of the described products. This presentation does not relieve you of your obligation to ensure safe application, installation, operation and maintenance.

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Many tables and texts in this description were directly taken from NEC and the UL standards. Every user has to regularly check whether the quoted references are still up-to-date.

The final decision as to whether an application complies with the corresponding American standards and regulations lies with the end customer or any organization respectively authorized by him (e.g. authority having jurisdiction, AHJ).
What’s New With UL 508A Codes and Standards?

Why do we have standards?

What standards apply?

What has changed?

SCCR overview
What’s New With UL 508A Codes and Standards?

Why do we have standards?

General function of standards:

- **Standards do not represent laws** – their application is voluntary, strictly speaking; however, they have a quasi-legislative character due to their high acceptance.

- **Standards** reflect the **rules of technology / state-of-the-art technology**

- Standards have a **supporting function for the attainment of technical minimum levels**

- Compliance with standards is not sufficient but is a **minimum requirement**

- Main protection targets of standards: **safety of persons, livestock and objects**
What’s New With UL 508A Standards?

Why do we have standards?

1893 World Exhibition in Chicago
Outbreak of a fire

1894 Start of UL
William H. Merrill opens the “Underwriters Electrical Bureau”
What’s New With UL 508A Standards?

Why do we have standards?

National Fire Protection Association
The authority on fire, electrical, and building safety

- Foundation: 1896, due to increasing sprinkler system installations
- Headquarters: Quincy, Massachusetts
- Publication of over 300 standards to date

National Electrical Code
or
NFPA70

NFPA79
Electrical Standard for Industrial Machinery

Standardization organization in the field of fire protection, electrical safety and building safety
What’s New With UL 508A Codes and Standards?

What standards apply?

- National Electrical Code or NFPA70
- UL508A Industrial Control Panels
- NFPA79 Industrial Machinery

NEC is the only statutory standard in the USA
UL508A and NFPA79 have a quasi-legislative character
What's New With UL 508A Codes and Standards?

What standards apply?
Example of the scope of application standards

NEC (NFPA70)
*) UL508A

NFPA79
What’s New With UL 508A Codes and Standards?

What has changed?

**UL 508A**
Standard for Industrial Control Panels

First Edition  April 1, 2001
Second Edition  December 20, 2013
Second Edition (Revised)  December 20, 2013

This UL Standard for Safety consists of the Second Edition including revisions through July 31, 2017.
What’s New With UL 508A Standards?

What has changed?

UL Standard for Safety for Industrial Control Panels, UL 508A

Summary of Topics

These revision pages of the UL 508A include the following changes in requirements:

- Interlocking means to prevent restoring power
- Marking of Overload Setting
- SB 4.3.1 correction
- Redefining the definition of Low Voltage
- Cable Assemblies and Fittings for Power and Control Circuits
- SB 4.2.3 Exception No. 4 - Substituting for a Non-Current Limiting Overcurrent Device
- Add 6P as an additional device that may be used to close an opening in a Type 4X enclosure in UL 508A, Table 19.2

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated February 15, 2017, June 2, 2017, June 13, 2017, and July 11, 2017.
What’s New With UL 508A Standards?

What has changed?

UL 508A

1.1 These requirements cover industrial control panels intended for general industrial use, operating from a voltage of 1000 volts or less. This equipment is intended for installation in ordinary locations, in accordance with the National Electrical Code, ANSI/NFPA 70, where the ambient temperature does not exceed 40°C (104°F) maximum.

NFPA 79

1.1* Scope.

1.1.1 The provisions of this standard shall apply to the electrical/electronic equipment, apparatus, or systems of industrial machines supplied from a nominal voltage of 1000 volts or less, and commencing at the point of connection of the supply circuit conductors to the electrical equipment of the machine.

UL 508A and NFPA 79 now match NFPA 70 (NEC) and IEC standards for maximum supply voltage.
What’s New With UL 508A Standards?

What has changed?

**UL 508A was extended to cover the following applications:**

- Control panels for aquatic playgrounds
- Control panels for swimming pools and in-ground spas
- Control panels for water park rides and similar installations
- Fountain control panels
- Industrial control panels for irrigation equipment
- Enclosures
- Industrial machinery
- Crane control
- Service Equipment Use
- Flame Control
- Marine Use
- Air Conditioning and Refrigeration Equipment
What’s New With UL 508A Standards?

What has changed?

Transition to UL 60947-4-1A Frequently Asked Questions

1.) What is the transition from UL 508 to the UL 60947 series and why is it being done?

The standard for Industrial Control Equipment UL 508 has been harmonized with the relevant product standards of the IEC standard for Low-Voltage Switchgear and Controlgear IEC 60947.

This harmonization work was undertaken with the intent of creating standards that, while being based upon and adopting IEC requirements, would incorporate sufficient national differences to ease the transition from UL 508 to UL 60947-4-1A. This goal has largely been accomplished in all cases. While the UL 508 and UL 60947 series standards do not look the same, when taking into account the national differences included in the harmonized standards, they are essentially technically identical.
What’s New With UL 508A Standards?

What has changed?

Transition to UL 60947-4-1A Frequently Asked Questions

4.) What industrial control categories are affected?

The following Categories are affected by this harmonization effort.

<table>
<thead>
<tr>
<th>Standard</th>
<th>Category Control Number (CCN)</th>
<th>Issued as a standard?</th>
<th>Implementation Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL 60947-1</td>
<td>No CCN associated</td>
<td>Yes</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>
| UL 60947-4-1A | NLDX- Magnetic Motor Controllers  
|              | NLRV- Manual Motor Controllers  
|              | NKJH- Combination Motor Controllers  
|              | NKCR- Auxiliary Devices  
|              | (Overload Relays only, thermal and electronic)  
|              | NRNT- Industrial Control Switches                                                             | Yes                   | Three transition phases*     |
| UL 60947-5-1 | NKCR- Auxiliary Devices  
|              | (Pilot duty rated devices, push buttons, indicator lights and selector switches only)        | No                    | TBD in 2012                  |
| UL 60947-5-2 | NRKH- Proximity Switches                                                                     | Yes                   | TBD in 2012                  |
| UL 61131-2  | NRAQ- Programmable Controllers                                                               | Yes                   | TBD in 2012                  |
| IEC 61810-1 | Control Relays (e.g. print relays, ice cube relays, etc...)                                  | No                    | #                            |
### Transition to UL 60947-4-1A Frequently Asked Questions

**6) How will the harmonized standards be implemented?**

The implementation plan for UL 60947-4-1A is as follows. The following verbiage can be found on page 6 of the standard.

The three transition phases are:

<table>
<thead>
<tr>
<th>Date</th>
<th>Transaction phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before January 26, 2012</td>
<td>Product submittals will be evaluated to UL 60947-4-1A unless customers specifically request in writing that they be evaluated using UL 508.</td>
</tr>
<tr>
<td>January 26, 2012 – January 26, 2017</td>
<td>New product submittals will be evaluated to UL 60947-4-1A only; however revisions to existing products may still be evaluated using UL 508 if customers specifically request this in writing.</td>
</tr>
<tr>
<td>Effective January 27, 2017</td>
<td>All UL certified products must meet UL 60947-4-1A only. Existing UL certification to UL 508 will be withdrawn</td>
</tr>
</tbody>
</table>

The requirements in UL 508 and UL 60947-4-1A are at this time technically identical. Products complying with UL 508 also comply with UL 60947-4-1A. Because the documents are technically identical at the present time it is not anticipated there will be a need for a technical review or Industry File Review of products evaluated to the affected UL 508 CCNs for compliance with UL 60947-4-1A.
What’s New With UL 508A Standards?

Transition to UL 60947-4-1A Frequently Asked Questions

UL 60947-4-1 allows “Type “2”” of contactors and motor starters not covered by the UL 508 standard

Definition as per UL 60947-4-1: Type “1” coordination requires that under short-circuit conditions the contactor or starter shall cause no danger to persons or installation and may not be suitable for further service without repair and replacement of parts.

Consequence: After a short-circuit, it is permissible for the starter to be inoperative. In particular, damage to the contactor, solid-state switching devices and overload relay is permissible.

Definition as per UL 60947-4-1: Type “2” co-ordination requires that under short-circuit conditions the contactor or starter shall cause no danger to persons or installation and shall be suitable for further use. The risk of contact welding is recognized, in which case the manufacturer shall indicate the measures to be taken in regards to the maintenance of the equipment. The starter is still operative. There must be no signs of damage to the devices with the exception of slightly welded contactor contacts that can be easily separated again without any noticeable deformation.

Consequence: After a short-circuit, the starter must remain suitable for further operation. The risk of contact welding (such as on a contactor) is acceptable. In that case, the
**What's New With UL 508A Codes and Standards?**

**NFPA79 Ed. 2007**

8.2.3.1 The continuity of the equipment groundling (protective bonding) circuit shall be ensured by effective connections through conductors *or structural members*.

**NFPA79 Ed. 2012**

8.2.3.1 The continuity of the equipment grounding (protective bonding) circuit shall be ensured by effective connections through conductors.
What’s New With UL 508A Codes and Standards?

NFPA79 Ed. 2018

8.2.2 Equipment Grounding Conductors and Bonding Jumpers.

8.2.3 Continuity.

△ 8.2.3.1 Continuity of equipment grounding conductors and bonding jumpers shall be ensured by effective connections.

8.2.3.2 Equipment grounding conductors and bonding jumpers shall be installed in a manner such that removal of a wiring device, such as a receptacle or switch, does not interrupt the continuity of the equipment grounding conductor or bonding conductor.
What’s New With UL 508A Standards?

SCCR overview

**SCCR Requirements**

- **Requirement of NEC 2005 Art. 409** (mandatory since April 26, 2006)

  Re-enforcement of the standards for “industrial control panels” **Failures in determining the short-circuit current rating** (= SCCR) of an industrial control panel.

  For the short-circuit current rating not only the short-circuit breaking capacity of, e.g. the circuit breaker is needed, also the **short-circuit current rating of every individual device** is as relevant.

- **SCCR-relevant components in the main circuit, such as:**
  - Circuit-breakers, contactors, soft starters, overload relays, but also
  - Terminals, busbars,
  - Supply to an control transformers,
  - Frequency converters, …

- **Further current limiting “effects” are not allowed to be considered** e.g.: that of wires, cables, busbars, …
409.110 Marking
An industrial control panel shall be marked with the following information that is plainly visible after installation:

(4) **Short-circuit current rating** of the industrial control panel based on one of the following:

a. Short-circuit current rating of a listed and labeled assembly
b. Short-circuit current rating established utilizing an approved method

**Informational Note:** ANSI/UL 508, Standard for Industrial Control Panels, Supplement SB, is an example of an approved method.

Exception to (4): Short-circuit current rating markings are not required for industrial control panels containing only control circuit components
What’s New With UL 508A Standards?

SCCR overview

UL 508A Important changes

Enclosure Air conditioners are not part of short circuit current (SCCR) calculation when cord-and-attachment plug connected or supplied from a branch circuit protected maximum 60A

SB4.2 Short circuit current ratings of individual power circuit components

SB4.2.1 All power circuit components, including disconnect switches, branch circuit protective devices, branch circuit fuseholders, load controllers, motor overload relays, terminal blocks, and bus bars, shall have a short circuit current rating expressed in amperes or kiloamperes and voltage.

Exception No. 1: Power transformers, reactors, current transformers, dry-type capacitors, resistors, varistors, and voltmeters are not required to have a short circuit current rating.

Exception No. 2: The “S” contactor of a wye-delta motor controller is not required to have a short circuit current rating.

Exception No. 3: Enclosure air conditioners or multimotor and combination load equipment that is cord-and-attachment-plug connected or supplied from a branch circuit protected at 60 A or less is not required to have a short circuit current rating.
What’s New With UL 508A Standards?

SCCR overview

UL 508A Important changes

SB4.2 Short circuit current ratings of individual power circuit components

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Exception No. 4: Wiring ferrules are not required to have a short circuit current rating, provided that the requirements of 29.3.5A are met.

Ferrules

- E35-25-RED
- 9609708
- MULTICOMP - Wire Ferrule, E Series, Single Wire, 2 AWG, 25 mm, 39 mm, Red
- Product Range
- Wire Ferrule Type
- Wire Size AWG Max
- + See all product info

- F205G
- 7409976
- THOMAS & BETTS - Wire Ferrule, Sta-Kon Series, Single Wire, 2 AWG, 16 mm, 30 mm, Red
- Product Range
- Wire Ferrule Type
- Wire Size AWG Max
- + See all product info

- FD0-32-C
- 35CM1610
- PANDUIT - Wire Ferrule, F Series, Single Wire, 2 AWG, 32 mm
- Product Range
- Wire Ferrule Type
- Wire Size AWG Max
- + See all product info
What’s New With UL 508A Standards?

SCCR overview

Short Circuit Current Rating (SCCR)

• What should this value be?
  ➔ To be agreed between the customer and the contractor

Note: The higher the value, the more expensive the devices (compare devices with 35kA and devices with 100kA)

The 2017 edition of NFPA 70, the National Electrical code, addresses this issue by requiring end users to provide documentation regarding the available short circuit at the location of the installed panel. Per the National Electrical Code article 409.22 (B) “If an industrial control panel is required to be marked with a short-circuit rating in accordance with (article) 409.110(4), the available short-circuit at the industrial control panel and the date the short-circuit current calculation was performed shall be documented and made available to those authorized to inspect the installation.” This places the burden of specifying actual available short-circuit current squarely on the shoulders of the end user.
What’s New With UL 508A Standards?

SCCR overview

**Determining SCCR**

Determination of the short-circuit current rating (SCCR) acc. to NEC 409.110 (4):

- **Step 1:**  →  **indispensable!**  
  SCCR of the installed and UL-listed components in the power circuit

- **Step 2:**  →  **indispensable!**  
  Establishment of the SCCR on the basis of standard values if components are unmarked (UL508A suppl. SB).

- **Step 3:**  →  **Optional!**  
  SCCR of tested industrial control equipment assemblies  
  (series rating = 2 circuit breakers in series or combination tests = motor branch circuits)

- **Step 4:**  →  **Optional!**  
  Use of current limiting devices (transformers, fuses, circuit breakers)
What’s New With UL 508A Standards?

SCCR overview

Determining SCCR  Step 1

List the short circuit current ratings of components, marked on components or on instructions provided with the components.

Excerpt of a method description from the “White Paper” by Siemens Energy & Automation (SE&A)

Establishing the SCCR value based on the installed UL-listed components
What’s New With UL 508A Standards?

SCCR overview

**Determining SCCR** Step 2

List the short circuit current ratings of components, from UL 508A, Table SB 4.1, if no values on the nameplate or on instructions provided with the components (see step 1)

### Table SB4.1
**Assumed maximum short circuit current rating for unmarked components**

Table SB4.1 effective April 25, 2006

<table>
<thead>
<tr>
<th>Component</th>
<th>Short circuit current rating, kA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus bars</td>
<td>10</td>
</tr>
<tr>
<td>Circuit breaker (including GFCl type)</td>
<td>5</td>
</tr>
<tr>
<td>Current meters</td>
<td>a</td>
</tr>
<tr>
<td>Current shunt</td>
<td>10</td>
</tr>
<tr>
<td>Fuseholder</td>
<td>10</td>
</tr>
<tr>
<td>Industrial control equipment:</td>
<td></td>
</tr>
<tr>
<td>a. Auxiliary devices (overload relay)</td>
<td>5</td>
</tr>
<tr>
<td>b. Switches (other than mercury tube type)</td>
<td>5</td>
</tr>
<tr>
<td>c. Mercury tube switches</td>
<td></td>
</tr>
<tr>
<td>Rated over 60 amperes or over 250 volts</td>
<td>5</td>
</tr>
<tr>
<td>Rated 250 volts or less, 60 amperes or less, and over 2 kVA</td>
<td>3.5</td>
</tr>
<tr>
<td>Rated 250 volts or less and 2 kVA or less</td>
<td>1</td>
</tr>
</tbody>
</table>
What’s New With UL 508A Standards?

SCCR overview

Determining the SCCR  Step 3

SCCR of tested industrial control equipment assemblies

- **Series rating tests**
  Series connection of 2 or more devices, which are able to automatically respond in short circuit cases without delay.
  - SB4.3.2 in UL508A
  - ! Current limiting cannot be used here!

- **Combination tests**
  Series connection of any type of devices, e.g.:
  - § Motor protection circuit breaker and contactor (=fuseless load feeders as type F acc. to UL508)
  - § MCCB and terminal block

SB4.2.2 The short circuit current rating of a component shall be established by one of the following methods:

  c) The short circuit current rating for a load controller, motor overload relay, or combination motor controller that has been investigated in accordance with the performance requirements, including short circuit test requirements for standard fault currents or high fault currents specified in the Standard for Industrial Control Equipment, UL 508, and described in the manufacturer’s Procedure.
What’s New With UL 508A Standards?
SCCR overview

Determining the SCCR  Step 3

**Series rating**

- MCCB 3VL
- MCB 5SJ4..HG4
- Fuse

**Tested combinations**

- MCCB 3VL
- 3RT contactor
- 3RB motor protection relay
What’s New With UL 508A Standards?

Increasing the SCCR  Step 4

- **Use of current limiting fuses, when used as feeder elements → SB 4.3.3**
  - Only fuses listed in UL508A – table SB 4.2 are applicable.
  - Use let-through values from the UL508A – table SB 4.2 **ONLY** (manufacturer’s values are **NOT** permissible)
  - Fuses are also standardized in the geometrical dimensions → manufacturer-independent replacement
  - The fuse is replaced by the service staff, which is shall not compare the corresponding let-through values (old fuse versus new fuse)

- **Note:**
  For practical application only partially useable, as, e.g.:
  - Standard contactor up to 37kW: max. 5kA
  - Standard busbar: max. 10kA
  - Standard terminal block: max. 10kA
What’s New With UL 508A Standards?

SCCR overview

Increasing the SCCR  Step 4

• **Use of current limiting fuses**, when used as feeder elements → SB 4.3.3
  
  • Only fuses listed in UL508A – table SB 4.2 are applicable.
  
  • Use let-through values from the UL508A – table SB 4.2 **ONLY** (manufacturer's values are **NOT** permissible)
  
  • Fuses are also standardized in the geometrical dimensions → manufacturer-independent replacement
  
  • The fuse is replaced by the service staff, which is shall not compare the corresponding let-through values (old fuse versus new fuse)
What's New With UL 508A Standards?

SCCR overview

Increasing the SCCR  Step 4

- **Use of current limiting circuit breakers, listed as “current limiting”,** when applied as feeder element → SB 4.3.2
- The circuit breaker *must be listed as “current limiting”*
- The circuit breaker *must be marked as “current limiting”* (UL508A – SB 4.3.2)
- The *manufacturer has to publish the current limiting characteristics* or data and provide them to the user
- When replacing the circuit breaker by a different type or manufacturer, the SCCR value must be checked again → engineering is required

**Note:**
- For practical applications hardly usable, as, e.g.:
  - Standard contactor up to 37kW: max. 5kA
  - Standard busbar: max. 10kA
  - Standard terminal block: max. 10kA

Siemens “current limiting” breakers
What’s New With UL 508A Standards?

SCCR overview

Determining the SCCR Step 4

Transformer peak-let-through currents can be used to protect Branch circuits!

Every Transformer is current limiting
What’s New With UL 508A Standards?

SCCR overview

Determining the SCCR Step 4

Previous rule:

A.) Transformer < 5kVA and max. 120V sec. => max. 2kA at the secondary side
   → all devices at the secondary side for at least 2kA

B.) Transformer < 10kVA => max. 5kA at the secondary side
   → all devices at the secondary side for at least 5kA

C.) All other transformers are not considered as current limiting
   → same short-circuit current at the secondary and primary side
Determining the SCCR Step 4

New rule:
- Loads provided by a Transformer with isolated secondary acc. to UL 508A SB4.3.1

Possibility 1: For transformer with marked or known impedance (Z acc. To UL 508A), the maximum secondary short circuit current will be calculated as follows:

\[
\text{Transformer full load current } (I_{FL}) = \frac{\text{Transformer VA}}{\text{secondary voltage}} \cdot \sqrt{3}
\]

\[
\text{Short circuit current } (I_{SC}) = \frac{I_{FL}[A]}{\text{Impedance } Z \text{ [%]}}
\]

Notice:
For single phase secondary factor \(\sqrt{3}\) is not applicable

All devices located at transformer secondary shall be ≥ the calculated short circuit current rating \((I_{sc})\)
→ SCCR of the loads = Interrupting rating of primary overcurrent protection device
What’s New With UL 508A Standards?

SCCR overview

Example:

Result:
Overall SCCR = **100kA** = A.I.C of the Class J Fuse on the primary side of the Transformer since the available secondary fault current of the transformer (4.6kA) is less than the SCCR and A.I.C’s of the components on the load side of the transformer.

Transformer: S = 150 kVA, Z = 4%, 3 Phase, 480/277V
Available secondary Fault Current = **4.6kA @480V**

Class J Fuse, 100 Amps
A.I.C: 100 kA

Power Distribution Block
SCCR: 10 kA @480V

MSP
A.I.C: 65 kA @480V

Compact MSP
A.I.C: 30 kA @480V

Solid state relay
SCCR: 5 kA @480V

Contactors
SCCR: 5 kA @480V

MCB
A.I.C: 10 kA @480V

Terminal Block
SCCR: 10 kA @480V

Terminal Block
SCCR: 10 kA @480V

Terminal Block
SCCR: 10 kA @480V

Terminal Blocks
SCCR: 10 kA @480V

Transformer: S = 150 kVA, Z = 4%, 3 Phase, 480/277V
Available secondary Fault Current = **4.6kA @480V**

Result:
Overall SCCR = **100kA** = A.I.C of the Class J Fuse on the primary side of the Transformer since the available secondary fault current of the transformer (4.6kA) is less than the SCCR and A.I.C’s of the components on the load side of the transformer.
New rule:
- Loads provided by a Transformer with isolated secondary acc. to UL 508A SB4.3.1

Possibility 2: For transformer with unknown impedance (Z acc. To UL 508A) or ≥ 2.1%, the maximum secondary short circuit current will be calculated as in possibility 1 described (assumption Z = 2.1 %) or determined with Table SB4.3 (single phase) respectively SB4.4 (three phase) as follows:
1. Transformer kVA ≤ maximum value column 1 and
2. Secondary voltage not smaller as values in column 2. If the secondary voltage is between the values, the next smaller voltage shall be used.

### Table SB4.3
<table>
<thead>
<tr>
<th>Transformer Max KVA</th>
<th>Minimum Transformer Secondary Voltage (V)</th>
<th>Column 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>400 A</td>
<td>390 A</td>
</tr>
<tr>
<td>5</td>
<td>1200 A</td>
<td>1100 A</td>
</tr>
<tr>
<td>5</td>
<td>1900 A</td>
<td>1800 A</td>
</tr>
<tr>
<td>10</td>
<td>2900 A</td>
<td>2800 A</td>
</tr>
<tr>
<td>10</td>
<td>5600 A</td>
<td>5400 A</td>
</tr>
<tr>
<td>25</td>
<td>9300 A</td>
<td>9000 A</td>
</tr>
<tr>
<td>37</td>
<td>14500 A</td>
<td>14000 A</td>
</tr>
<tr>
<td>50</td>
<td>27700 A</td>
<td>27000 A</td>
</tr>
</tbody>
</table>

### Table SB4.4
<table>
<thead>
<tr>
<th>Transformer Max KVA</th>
<th>Minimum Transformer Secondary Voltage (V)</th>
<th>Column 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>1,10 A</td>
<td>1,00 A</td>
</tr>
<tr>
<td>10</td>
<td>2,20 A</td>
<td>1,80 A</td>
</tr>
<tr>
<td>5</td>
<td>3,47 A</td>
<td>2,78 A</td>
</tr>
<tr>
<td>10</td>
<td>4,63 A</td>
<td>3,71 A</td>
</tr>
<tr>
<td>15</td>
<td>5,79 A</td>
<td>4,82 A</td>
</tr>
<tr>
<td>25</td>
<td>9,90 A</td>
<td>7,45 A</td>
</tr>
<tr>
<td>30</td>
<td>11,17 A</td>
<td>8,58 A</td>
</tr>
<tr>
<td>45</td>
<td>18,90 A</td>
<td>13,89 A</td>
</tr>
<tr>
<td>50</td>
<td>27,77 A</td>
<td>22,33 A</td>
</tr>
</tbody>
</table>

### What’s New With UL 508A Standards?

**SCCR overview**
### What’s New With UL 508A Standards?

SCCR overview

#### Table SB4.3

<table>
<thead>
<tr>
<th>Transformer Max kVA</th>
<th>Column 1</th>
<th>Column 2</th>
<th>Minimum Transformer Secondary Voltage (V)</th>
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<tbody>
<tr>
<td></td>
<td>120</td>
<td>120/240b</td>
<td>208</td>
</tr>
<tr>
<td>1</td>
<td>400 A</td>
<td>300 A</td>
<td>230 A</td>
</tr>
<tr>
<td>3</td>
<td>1,200 A</td>
<td>900 A</td>
<td>690 A</td>
</tr>
<tr>
<td>5</td>
<td>1,990 A</td>
<td>1,490 A</td>
<td>1,150 A</td>
</tr>
<tr>
<td>10</td>
<td>3,970 A</td>
<td>2,980 A</td>
<td>2,290 A</td>
</tr>
<tr>
<td>15</td>
<td>5,960 A</td>
<td>4,470 A</td>
<td>3,440 A</td>
</tr>
<tr>
<td>25</td>
<td>9,930 A</td>
<td>7,450 A</td>
<td>5,730 A</td>
</tr>
<tr>
<td>37.5</td>
<td>14,890 A</td>
<td>11,170 A</td>
<td>8,590 A</td>
</tr>
<tr>
<td>50</td>
<td>19,850 A</td>
<td>14,890 A</td>
<td>11,450 A</td>
</tr>
<tr>
<td>75</td>
<td>29,770 A</td>
<td>22,330 A</td>
<td>17,180 A</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>240</th>
<th>277</th>
<th>347</th>
<th>480</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>200 A</td>
<td>180 A</td>
<td>140 A</td>
<td>100 A</td>
</tr>
<tr>
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<td>5</td>
<td>1,000 A</td>
<td>860 A</td>
<td>690 A</td>
<td>500 A</td>
</tr>
<tr>
<td>10</td>
<td>1,990 A</td>
<td>1,720 A</td>
<td>1,380 A</td>
<td>1,000 A</td>
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<tr>
<td>15</td>
<td>3,970 A</td>
<td>2,580 A</td>
<td>2,060 A</td>
<td>1,490 A</td>
</tr>
<tr>
<td>25</td>
<td>9,930 A</td>
<td>4,300 A</td>
<td>3,440 A</td>
<td>2,490 A</td>
</tr>
<tr>
<td>37.5</td>
<td>14,890 A</td>
<td>6,450 A</td>
<td>5,150 A</td>
<td>3,730 A</td>
</tr>
<tr>
<td>50</td>
<td>19,850 A</td>
<td>8,600 A</td>
<td>6,870 A</td>
<td>4,970 A</td>
</tr>
<tr>
<td>75</td>
<td>29,770 A</td>
<td>12,900 A</td>
<td>10,300 A</td>
<td>7,450 A</td>
</tr>
</tbody>
</table>

**Notes:**
- **Z assumed to be 2.1%**.
- Short-circuit current shown is line-to-neutral.
What’s New With UL 508A Standards?

SCCR overview

The 3 phase short circuit current values in the 2013 initial release are incorrect (substantially too high)

Table SB4.4
Three phase transformer secondary available short circuit currents (Amps)\textsuperscript{a}

<table>
<thead>
<tr>
<th>Transformer Max KVA</th>
<th>208Y/120\textsuperscript{b}</th>
<th>208</th>
<th>240</th>
<th>480Y/277\textsuperscript{b}</th>
<th>480</th>
<th>600Y/347\textsuperscript{b}</th>
<th>600</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>1,160 A</td>
<td>930 A</td>
<td>810 A</td>
<td>510 A</td>
<td>410 A</td>
<td>410 A</td>
<td>330 A</td>
</tr>
<tr>
<td>10</td>
<td>2,320 A</td>
<td>1,860 A</td>
<td>1,610 A</td>
<td>1,010 A</td>
<td>810 A</td>
<td>810 A</td>
<td>650 A</td>
</tr>
<tr>
<td>15</td>
<td>3,470 A</td>
<td>2,780 A</td>
<td>2,410 A</td>
<td>1,510 A</td>
<td>1,210 A</td>
<td>1,210 A</td>
<td>970 A</td>
</tr>
<tr>
<td>20</td>
<td>4,630 A</td>
<td>3,710 A</td>
<td>3,210 A</td>
<td>2,910 A</td>
<td>1,610 A</td>
<td>1,610 A</td>
<td>1,290 A</td>
</tr>
<tr>
<td>25</td>
<td>5,790 A</td>
<td>4,630 A</td>
<td>4,010 A</td>
<td>2,510 A</td>
<td>2,010 A</td>
<td>2,010 A</td>
<td>1,610 A</td>
</tr>
<tr>
<td>30</td>
<td>6,940 A</td>
<td>5,560 A</td>
<td></td>
<td>2,410 A</td>
<td>1,930 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>10,410 A</td>
<td>8,330 A</td>
<td></td>
<td>3,010 A</td>
<td>2,890 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>75</td>
<td>17,350 A</td>
<td>13,860 A</td>
<td></td>
<td>6,020 A</td>
<td>4,820 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>23,140 A</td>
<td>18,510 A</td>
<td>16,040 A</td>
<td>10,030 A</td>
<td>8,020 A</td>
<td>8,020 A</td>
<td>6,420 A</td>
</tr>
</tbody>
</table>

\textsuperscript{a} Z assumed to be 2.1%.

\textsuperscript{b} Short-circuit current shown is line-to-neutral.
The July 2017 revision corrects the short circuit current values

Table SB4.4
Three phase transformer secondary available short circuit currents (Amps)\(^a\)

<table>
<thead>
<tr>
<th>Transformer Max kVA</th>
<th>208Y/120 (^b)</th>
<th>208</th>
<th>240</th>
<th>480Y/277 (^b)</th>
<th>480</th>
<th>600Y/347 (^b)</th>
<th>600</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>830 A</td>
<td>670 A</td>
<td>580 A</td>
<td>360 A</td>
<td>290 A</td>
<td>290 A</td>
<td>230 A</td>
</tr>
<tr>
<td>10</td>
<td>1,660 A</td>
<td>1,330 A</td>
<td>1,150 A</td>
<td>720 A</td>
<td>580 A</td>
<td>580 A</td>
<td>460 A</td>
</tr>
<tr>
<td>15</td>
<td>2,480 A</td>
<td>1,990 A</td>
<td>1,720 A</td>
<td>1,080 A</td>
<td>860 A</td>
<td>860 A</td>
<td>690 A</td>
</tr>
<tr>
<td>20</td>
<td>3,310 A</td>
<td>2,650 A</td>
<td>2,300 A</td>
<td>1,440 A</td>
<td>1,150 A</td>
<td>1,150 A</td>
<td>920 A</td>
</tr>
<tr>
<td>25</td>
<td>4,140 A</td>
<td>3,310 A</td>
<td>2,870 A</td>
<td>1,800 A</td>
<td>1,440 A</td>
<td>1,440 A</td>
<td>1,150 A</td>
</tr>
<tr>
<td>30</td>
<td>4,960 A</td>
<td>3,970 A</td>
<td>3,440 A</td>
<td>2,150 A</td>
<td>1,720 A</td>
<td>1,720 A</td>
<td>1,380 A</td>
</tr>
<tr>
<td>45</td>
<td>7,440 A</td>
<td>5,950 A</td>
<td>5,160 A</td>
<td>3,230 A</td>
<td>2,580 A</td>
<td>2,580 A</td>
<td>2,070 A</td>
</tr>
<tr>
<td>75</td>
<td>12,400 A</td>
<td>9,920 A</td>
<td>8,600 A</td>
<td>5,370 A</td>
<td>4,300 A</td>
<td>4,300 A</td>
<td>3,440 A</td>
</tr>
<tr>
<td>100</td>
<td>16,530 A</td>
<td>13,220 A</td>
<td>11,460 A</td>
<td>7,160 A</td>
<td>5,730 A</td>
<td>5,730 A</td>
<td>4,590 A</td>
</tr>
</tbody>
</table>

\(^a\) Z assumed to be 2.1%. All values are rounded up.
\(^b\) Short-circuit current shown is line-to-neutral. (1.25 times line-to-line)
### What’s New With UL 508A Standards?

#### SCCR overview

**SCCR Example 1**

**? What is the SCCR value for this combination?**

**With circuit breaker:**

**SCCR rating for combinations**

SCCR **5kA**

Downstream the feeder circuit breaker (feeder), several motor branch circuits may be installed.

Establishment of the short circuit current (SCCR) in acc. with NEC409.110 (4): SCCR has to be determined acc. to a specified procedure (UL508A suppl. SB or UL guide; chapter 5.8).

---

**Example:**

**Feeder** circuit breaker (MCCB; UL489):
- rated current 40A / 480V,
- switching capacity 35kA at 480V

**BCPD** circuit breaker acc. to UL489:
- rated current 15A / 480V,
- switching capacity 35kA at 480V

**Contactor / overload relay**
- rated current 10A / 460V
- max. short circuit current load: 5kA / 480V

**Motor**
- operating current 10A
What’s New With UL 508A Standards?

SCCR overview

**SCCR Example 2**

? What is the SCCR value for this combination?

With circuit breaker:

SCCR rating for combinations

**SCCR** 35kA

Downstream the feeder fuse (feeder), several motor branch circuits may be installed.

Establishment of the short circuit current (SCCR) in acc. with NEC409.110 (4): SCCR has to be determined acc. to a specified procedure (UL508A suppl. SB or UL guide; chapter 5.8).

Example:

- Fuse is current limiting: rated current 20A, switching capacity = 100kA, prospective Short Circuit Current = 50kA
- let-through value 3kA (class CC) (in acc. with UL508A; table SB4.2)

- BCPD, circuit breaker acc. to UL489: rated current 15A / 480V, switching capacity 35kA at 480V

**Contactor / overload relay**

- rated current 10A / 460V
- max. short circuit current load: 5kA / 460V

**Motor**

- operating current 10A
What’s New With UL 508A Standards?

SCCR overview

**SCCR Example 3**

**? What is the SCCR value for this combination?**

With circuit breaker:
SCCR rating for combinations

**SCCR 5kA**

Downstream the feeder circuit breaker (feeder), several motor branch circuits may be installed.

Establishment of the short circuit current (SCCR) in acc. with NEC409.110 (4): SCCR has to be determined acc. to a specified procedure (UL508A suppl. SB or UL guide; chapter 5.8).

Example:
Circuit breaker in acc. with UL489: rated current 30A / 480V, switching capacity 35kA / 480V

Fuse is current limiting: rated current 20A, switching capacity = 100kA prospective Short Circuit Current = 50kA → let-through value 3kA (class CC) (in acc. with UL508A; table SB4.2)

**Contactor / overload relay**
rated current 10A / 460V
max. short circuit current load: 5kA / 480V

Motor
operating current 10A
What’s New With UL 508A Standards?

SCCR overview

**SCCR Example 4**

**? What is the SCCR value for this combination?**

**With circuit breaker:**

**SCCR rating for combinations**

SCCR _65kA_

Downstream the feeder circuit breaker (feeder), several motor branch circuits may be installed.

**Attention**

Up to max. 480Y/277V

Establishment of the short circuit current (SCCR) in acc. with NEC409.110 (4): SCCR has to be determined acc. to a specified procedure (UL508A suppl. SB or UL guide; chapter 5.8).

**Example:**

**Feeder** circuit breaker (MCCB; UL489) as main disconnecting means:

- rated current 40A / 480V,
- switching capacity 100kA / 480V

**Motor starter** acc. to UL508, type E / F rated current 20A,

- switching capacity 65kA / 480Y/277V

See UL report E156943; Vol.1; Sec.18

With circuit breaker:

**SCCR** _65kA_

MV

3RT2 contactor

3RV20

3VL circuit breaker

M

Motor

Motor operating current 20A
What’s New With UL 508A Standards?

**SCCR Example 5**

*? What is the SCCR value for this combination?*

**With circuit breaker:**

**SCCR rating for combinations**

**SCCR** 65kA

Downstream the feeder circuit breaker (feeder), several motor branch circuits may be installed.

**Attention**

Up to max. 480Y/277V

Establishment of the short circuit current (SCCR) in acc. with NEC409.110 (4): SCCR has to be determined acc. to a specified procedure (UL508A suppl. SB or UL guide; chapter 5.8).

Example:

**Feeder circuit breaker** (MCCB; UL489) as main disconnecting means:
- rated current 40A / 480V
- switching capacity 100kA / 480V

**Motor starter** acc. to UL508, type E / F
- rated current 20A
- switching capacity 65kA / 480Y/277V

See UL report E156943; Vol.1; Sec.18
What’s New With UL 508A Standards?

SCCR overview

Device Data / Reports

Siemens SIRIUS Contactor 3RT1035

Short Circuit Current 5kA, 600V
## What's New With UL 508A Standards?

SCCR overview

### Device Data / Reports

### Short Circuit Ratings:

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Fuse</th>
<th>Circuit Breaker</th>
<th>Short Circuit</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>3RT1023</td>
<td>max 70 A</td>
<td>max 60 A</td>
<td>max 10 A</td>
<td>5 kA</td>
</tr>
<tr>
<td>3RT1024</td>
<td>max 70 A</td>
<td>max 60 A</td>
<td>max 10 A</td>
<td>5 kA</td>
</tr>
<tr>
<td>3RT1025/3RT1025</td>
<td>max 70 A</td>
<td>max 60 A</td>
<td>max 30 A</td>
<td>5 kA</td>
</tr>
<tr>
<td>3RT1026</td>
<td>max 100 A</td>
<td>max 100 A</td>
<td>max 40 A</td>
<td>5 kA</td>
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<tr>
<td>3RT1026/3RT1026</td>
<td>max 100 A</td>
<td>max 100 A</td>
<td>max 40 A</td>
<td>5 kA</td>
</tr>
<tr>
<td>3RT1124</td>
<td>max 40 A</td>
<td>-</td>
<td>-</td>
<td>5 kA</td>
</tr>
<tr>
<td>3RT1626</td>
<td>max 80 A</td>
<td>-</td>
<td>-</td>
<td>5 kA</td>
</tr>
<tr>
<td>3RT1627</td>
<td>Max 125 A</td>
<td>-</td>
<td>-</td>
<td>5 kA</td>
</tr>
</tbody>
</table>

\*Note: UL Listed inverse time circuit breakers

\*Note: UL Recognized instantaneous trip circuit breakers manufactured by Siemens, Type ED63A...

### High Capacity Short Circuit Ratings:

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Fuse Rating</th>
<th>CB Rating (Bkr TM)</th>
<th>3RV102 / Size S0'</th>
</tr>
</thead>
<tbody>
<tr>
<td>3RT1023</td>
<td>-</td>
<td>480</td>
<td>-</td>
</tr>
<tr>
<td>3RT1024</td>
<td>-</td>
<td>600</td>
<td>-</td>
</tr>
<tr>
<td>3RT1025</td>
<td>-</td>
<td>480</td>
<td>-</td>
</tr>
<tr>
<td>3RT1026</td>
<td>-</td>
<td>600</td>
<td>-</td>
</tr>
<tr>
<td>3RT1026</td>
<td>-</td>
<td>480</td>
<td>-</td>
</tr>
</tbody>
</table>

### Magnetic Motor Control

Type F

See report in the annex.
What’s New With UL 508A Standards?

SCCR overview
Support from Siemens

www.usa.siemens.com/sccr

Short Circuit Current Ratings (SCCR) for UL508A and NEC

Overview
- High Short Circuit Current Ratings for Siemens Control Components and Assemblies
- UL Website for Short Circuit Current Ratings
- Peak Let-thru Current (Ipk) Curves for Current Limiting Circuit Breakers

In April 2008, the Short Circuit Current Rating (SCCR) requirements of NEC Article 409 went into effect. These changes have impacted you, our customer. You now need to consider how you select power circuit components for your control panels, how you determine your preferred manufacturers for power components and how you design and install your industrial control panels. Siemens is committed to supplying our customers with best in class products and services. With the implementation of NEC Article 409 and the changes to UL 508A, Siemens has put together a comprehensive list of our device ratings and combination ratings.
How did we do? Share your thoughts to win!

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http://www.usa.siemens.com/mia-seminars
Questions?

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Siemens Industry
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E-mail: jeffrey.woolfolk@siemens.com