Competence in connection technology

UL 508 A
Short Circuit Current Rating

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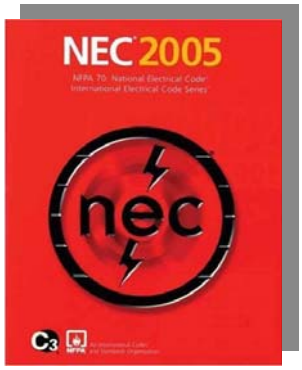
INSPIRING INNOVATIONS

Short Circuit Current Ratings – Application Guide



The subject of Short Circuit Current Ratings, otherwise known as the SCCR rating, has been gaining increasing International awareness since the publication of the 2005 Edition of ANSI/NFPA 70 by the National Fire Protection Association (NFPA) in the United States. In this revision, Article 409 – Industrial Control Panels was released to provide Inspectors a single source for requirements and to assist with verification of compliance to Article 110.10 – Circuit Impedance and Other Characteristics. Widely recognized as the National Electrical Code®, or NEC®, the NFPA 70 standard identifies safe practices for the installation and wiring of electrical equipment in the United States. Although the NEC® itself is not United States Law, conformance to the requirements of the NEC® is generally mandated by State or Local Law and is enforced by Electrical Inspectors and Authorities Having Jurisdiction (AHJs) throughout the country.

What is a Short Circuit Current Rating (SCCR)?

The Short Circuit Current Rating of an assembly or component represents the maximum symmetrical fault current, at rated voltage, that the assembly or component can withstand without sustaining damage that exceeds acceptance criteria or creating a hazardous operating condition. It is important that the SCCR rating not be confused with Interrupting Rating of a component. Interrupting Ratings apply only to equipment that is intended to interrupt current and not to the assembly in which the equipment is installed or the components it may be intended to protect. A common mistake, for example, is to assume that the Interrupting Rating of a primary overcurrent protective device such as a fuse or circuit breaker may be used as the SCCR rating of the panel in which it is installed.

Where Does the Requirement for SCCR Originate?

SCCR ratings have long existed in the United States for certain components such as fuseholders, but were generally referred to as the Short Circuit Withstand Rating of the device and defined within the relevant product standard (e.g. UL 512 Standard for Fuseholders). The SCCR requirement was expanded with the release of the 2005 NEC® where Marking of the SCCR rating became required for:

Equipment Type	NEC® Article
HVAC Equipment	440.4 (B)
Industrial Control Panels	409.110
Industrial Machinery	670.3 (A)
Meter Disconnect Switches	230.82 (3)
Motor Controllers	430.8

For the purpose of this Application Guide, the focus will be directed to Industrial Control Panels and Industrial Machinery, for which the requirements for SCCR marking are very similar as demonstrated by Figure 1, summarized from the 2005 NEC®. Primary reference will be made to Article 409 – Industrial Control Panels, newly published in the 2005 edition of the NEC®,

Subsequently, in April 2006, the requirement for Marking the assembly SCCR rating of an Industrial Control Panel became mandated by Underwriters Laboratories for all equipment Listed to the revised UL 508A Standard for Industrial Control Panels. The modification of UL 508A by Underwriters Laboratories was made to bring the Standard into compliance with the new requirements of the 2005 NEC®.

PHOENIX CONTACT P.O. Box 4100 Harrisburg, PA 17111-0001
717-944-1300 Fax: 717-944-1625 e-mail: info@phoenixcon.com www.phoenixcon.com

Figure 1 – NEC® Articles 409.110 and 670.3

NEC® 2005 Article 409 – Industrial Control Panels

409.110 Marking. An industrial control panel shall be marked with the following information that is plainly visible after installation:

(3) **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.

FPN: UL 508A-2001, Supplement SB, is an example of an approved method.

Exception to (3): Short-circuit current rating markings are not required for industrial control panels containing only control circuit components. (Exception added for clarification in the 2008 NEC®).

NEC® 2005 Article 670.3 – Industrial Machinery

670.3 Machine Nameplate Data.

(A) **Permanent Nameplate**. A permanent nameplate shall be attached to the control equipment enclosure of machine and shall be plainly visible after installation. The name plate shall include the following information:

(4) **Short circuit current rating** of the machine industrial control panel based on one of the following:
   a. Short circuit current rating of a listed and labeled machine control enclosure or assembly
   b. Short circuit current rating established utilizing an approved method.

FPN: UL 508A-2001, Supplement SB, is an example of an approved method.

How to Determine a Panel Assembly SCCR Rating

First, it is important to note that SCCR ratings are determined based upon **Power Circuit** components in the assembly. For panel assemblies containing only **Control Circuits**, SCCR rating markings are not required for the assembly. An exception to Article 409.110(3) was added for clarification in the 2008 NEC®. Of course, the final decision as to whether a panel assembly exclusively contains Control Circuits is up to the AHJ in the locality of installation. For reference, the following definitions are provided from the National Electrical Code®:

> **Control Circuit**. The circuit of a control apparatus or system that carries the electric signals directing the performance of the controller but does not carry the main power current. (*A control circuit is, in most cases, limited to 15 amps*).
>
> **Power Circuit**. Components and conductors of branch and feeder circuits (e.g. the main power circuit)
>
> **Industrial Control Panel**. An assembly of two or more components consisting of one of the following:
>
> 1. Power circuit components only, such as motor controllers, overload relays, fused disconnect switches, and circuit breakers.
> 2. Control circuit components only, such as pushbuttons, pilot lights, selector switches, timers, switches, control relays.
> 3. A combination of power and control circuit components.
>
> These components, with associated wiring and terminals, are mounted on or contained within an enclosure or mounted on a subpanel. The industrial control panel does not include the controlled equipment.

As indicated by referenced Articles 409.110 and 670.3, there are two methods according to the NEC® that may be used to identify the SCCR rating in order to achieve compliance to the requirement for SCCR Marking.

1. **SCCR rating of a Listed and Labeled Assembly.** Article 100, Definitions, of the NEC® defines Listed and Labeled as follows:
   - **Listed**. Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with the evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that the equipment, material, or services either meets appropriate designated standards or has been tested and found suitable for a specified purpose.
   - **Labeled**. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

2. **SCCR rating established utilizing an approved method.** Supplement SB of the UL 508A-2001 Standard for Industrial Control Panels is specifically referenced by FPN (Fine Print Note) in each of the above NEC® Articles as an example of an approved method for the determination of the SCCR rating.

"Listed and Labeled Method" – A Further Look

An example based upon the Listed and Labeled method would be submittal of the completed Assembly for third-party compliance testing to the short circuit current requirements of the UL 508A Standard for Industrial Control Panels. If, for example, Underwriters Laboratories was utilized as the third-party test laboratory, UL Listing to UL 508A and authorization to apply the UL Listed mark would be granted to the applicant if the Assembly was found to be in compliance with the requirements of the Standard at the Manufacturer's requested SCCR rating at rated voltage. In this case, the SCCR rating would be verified through a sequence of tests by connecting the input of the completed Assembly to a calibrated source capable of delivering the desired short circuit current at rated voltage while a bolted-fault short circuit condition was created through various paths of the Power Circuit to verify safe operation of Power Circuit components in the assembly during fault conditions.

The Listed and Labeled method may be the preferred process to verify the SCCR rating for Manufacturers who produce large quantities of only a few variants of completed Assemblies. However, it is likely to be impractical for those Manufacturers who produce only a few pieces of a large variety of products due to the submittal costs and associated time for compliance testing. In addition, the list of component parts, Bill of Materials, for an Assembly qualified using this method may be difficult to change in the future without re-evaluation of the Assembly under short circuit test conditions. This is because the Power Circuit components that were evaluated and found to be compliant during initial testing may be limited to the specific Manufacturer and Type or Series of component that was used in the Assembly at the time of test; limiting the future ability to substitute a similar component from another Manufacturer without resubmitting the Assembly for SCCR testing.

"Approved Method" – A Further Look

Although not the only approved method, Supplement SB of the UL 508A-2001 Standard for Industrial Control Panels is specifically referenced in the NEC® by FPN (Fine Print Note) as an example of an approved method for the determination of the SCCR rating and is a widely accepted means for verification of compliance by Electrical Inspectors and AHJs throughout the United States. Other methods may also be accepted as determined by the AHJ in the locality of the final product installation. Any utilized method should be based upon the weakest identified Power Circuit elements; those with the lowest component SCCR rating.

UL 508A Supplement SB - Explained

Supplement SB of the UL 508A Standard for Industrial Control Panels became effective April 25, 2006 and provides a uniform method for the establishment of Short Circuit Current Ratings for Industrial Control Panels. The process to determine the SCCR rating for the overall Industrial Control Panel is completed in three steps according to UL 508A SB 4.1:

1. Identify the SCCR ratings of individual Power Circuit Components (*see SB4.2 of UL 508A*).
2. Determine if the presence of qualified current-limiting components, installed internal to the Industrial Control Panel in a Feeder Circuit, may reduce the available short circuit current within a portion of a Power Circuit (*see SB4.3 of UL 508A*).
3. Determine the overall SCCR rating for the Industrial Control Panel (*see SB4.4 of UL 508A*).

Step 1: Identify the SCCR ratings for Power Circuit Components

To begin, you must first identify the SCCR rating for each component installed in the Power Circuit. This will be the basis for conducting the weakest element analysis for determining the overall Panel SCCR rating. Power transformers, reactors, current transformers, dry-type capacitors, resistors, varistors, and voltmeters are not required to have SCCR ratings and may be excluded when determining the overall SCCR rating of an Industrial Control Panel. According to UL 508A SB4.2.2, Component SCCR ratings may be determined as follows:

a. The SCCR rating marked on the component or as detailed by Manufacturer instructions;
b. The default SCCR rating for the component determined by the voltage rating and Table SB4.1 *Assumed Maximum Short Circuit Current Rating for Unmarked Components* of UL 508A;
c. The SCCR rating for a load controller, motor overload relay, or combination motor controller that is described in the Manufacturer's Procedure and has been qualified in accordance with the performance requirements specified by the UL 508 Standard for Industrial Control Equipment.

Phoenix Contact has many products including terminal blocks, supplementary protectors, and fuseholders with SCCR ratings well above the default values assigned in Table SB4.1.

Step 2: Determine Effect of Current-Limiting Components in the Feeder Circuit

As described by UL 508A SB4.3, components such as Power Transformers, current limiting Circuit Breakers, and UL Listed Class CC, G, J, L, RK1 or T, when installed in a Feeder location, may be used to provide a current limiting effect to downstream Power Circuit components. It is important to note that the current limiting effect may not be utilized when calculating the overall Panel SCCR rating if the Power Transformer, Circuit Breaker, or Fuse is installed in a Branch Circuit location. For reference, the following definitions are provided from the National Electrical Code®:

> **Branch Circuit**. The circuit conductors between the final overcurrent device protecting the circuit and the outlet(s) [*or utilization equipment*]
>
> **Feeder**. All circuit conductors between the service equipment, the source of a separately derived system, or other power supply source and the final branch-circuit overcurrent device.

The use of current limiting components in the Feeder Circuit may be an effective method to increase the SCCR rating of an Industrial Control Panel that would have otherwise been limited by a Power Circuit component with a low SCCR rating. Let's look at an example:

According to Table SB4.1 in Supplement SB of UL 508A, a Receptacle (other than GFCI type) has a default SCCR rating of 10kA when unmarked and not documented in instructions from the Manufacturer. Assuming this to be the weakest Power Circuit element for this example, the Industrial Control Panel SCCR rating would be limited to a maximum of 10kA. However, by installing a Power Transformer, current limiting Circuit Breaker, or UL Listed Fuse in the Feeder of the Panel, it may be possible to achieve an increased assembly SCCR rating. According to the UL 508A Supplement SB Table SB4.2 *Peak Let-through Currents, I_p, and Clearing, I^2t, for Fuses*, the peak let-through current of a UL Listed Class J 60-amp fuse is 10kA when supplied by a 600Vac source with an available short circuit of 100kA. By installing the Class J 60-amp fuse in the Panel Feeder, you are able to claim benefit of the current limiting nature of the device to reduce the available short circuit current to downstream Power Circuit components. In the case of this example, since the Receptacle SCCR rating is 10kA and the peak let-through current of the Class J 60-amp fuse is 10kA, you may be able to achieve an assembly SCCR rating of up to 100kA for the Industrial Control Panel based upon the benefit of current limitation. The actual value, of course, would depend upon the ratings of other Power Circuit components that may be used in the assembly.

Phoenix Contact offers UL Listed Class CC and Class J fuseholders with SCCR ratings of 200kA that may be used in Feeder applications to benefit from the effect of current limitation when determining the SCCR rating of an Industrial Control Panel.

Step 3: Determine the Overall SCCR Rating of the Industrial Control Panel

Now that the component SCCR ratings have been identified for all Power Circuit components and Feeder Circuit components have been reviewed for potential current limitation benefits to downstream Power Circuit Components, you are ready to determine the overall SCCR rating for the Industrial Control Panel.

This last step begins by separating the Power Circuit of the Industrial Control Panel into its individual Branch Circuits. For each Branch Circuit, an SCCR rating is established based upon the lesser of (e.g. weakest element SCCR rating):

a. The short circuit current rating (Interrupting Rating) of the Branch Circuit protective device; or
b. The smallest SCCR rating of all Power Circuit components on the load side of the branch circuit protective device in (a) above.

A Branch Circuit that supplies a Power Transformer with an isolated secondary, and complies with the requirements of UL 508A Supplement SB4.3.1, is assigned an SCCR rating at the line side (input) of the power transformer circuit equal to the short circuit current rating (Interrupting Rating) of the primary branch circuit protective device.

Finally, the Feeder Circuit is now examined using a similar weakest element method as used for Branch Circuits above. For the Feeder Circuit, the SCCR rating is established based upon the lesser of (e.g. weakest element SCCR rating):

a. The smallest SCCR rating of all Branch Circuits connected to the source voltage; or
b. The SCCR rating of any Feeder Circuit components, such as disconnecting switches, bus bars, terminal blocks, and Feeder overcurrent protective devices.

The SCCR rating of the Industrial Control Panel may now be assigned, but shall not exceed the minimum SCCR value of any Feeder Circuit component or Branch Circuit connected to the source voltage.

How Can You Increase the SCCR rating of an Industrial Control Panel?
After completing the steps for calculating the SCCR rating of an Industrial Control Panel, you may find that the resulting maximum SCCR value is below the expectation of the customer or end-use application requirement. What can you do?

Option 1: Submit for SCCR Testing
Submittal of a representative sample of the Industrial Control Panel for compliance testing at the desired Voltage and Short Circuit Current Rating may be an option. As previously discussed, the Listed and Labeled Assembly method of establishing an SCCR rating is accepted practice according to the National Electrical Code®. However, remember that this method may not be the preferred option if:

a. The Panel Assembly is one-of-a-kind and will only be produced in small quantity; or
b. The Bill of Materials for the Assembly may change in the future, or the desire to have the flexibility to change the Bill of Materials in the future exists.

Option 2: Replace the Weakest Element
Another potentially viable option is to replace the identified Weakest Element in the Power Circuit with a higher SCCR rated component. This may be the easiest and quickest alternative to pursue an increased SCCR assembly rating, as many component manufacturers have achieved SCCR ratings for their components that far exceed the default values assigned by the UL 508A Supplement SB.

Phoenix Contact offers terminal blocks in multiple connection technologies with SCCR ratings of 100,000 Amps

Option 3: Install a Current Limiting Feeder Component
If it is not feasible to submit the assembly for SCCR compliance testing or a suitable replacement cannot be found for the identified Weakest Element in the Power Circuit, there remains the option to install a current limiting device in the Feeder of the Industrial Control Panel to limit the available short circuit current to a level below or equal to the SCCR rating of the Weakest Element. Suitable current-limiting components include:

a. Power transformer with an isolated secondary winding (*see SB4.3.1 of UL 508A*).
b. Listed current limiting Circuit Breaker rated 15 or 20-amps, 600V or less (*see SB4.3.2 of UL 508A*).
c. UL Listed Class CC, G, J, L, RK1, RK5, or T fuses (*see SB4.3.3 of UL 508A*)

Class CC and J Fuseholders from Phoenix Contact make it easy to take advantage of the benefits of current limitation in the Feeder Circuit

Summary
The determination of Short Circuit Current Ratings can at first appear to be a formidable task to complete if you are not familiar with the National Electrical Code® or the UL 508A Standard for Industrial Control Panels in the United States. However, by breaking the task down into systematic steps, the process can be much simpler to follow. Through up-front planning, an understanding of the Weakest Element SCCR rating determination method, and the careful selection of Power Circuit components, a suitable Assembly Short Circuit Current Rating can be achieved.

Phoenix Contact creates progress through inspiring and innovative solutions. For more information regarding innovative products from Phoenix Contact, please visit us on the Web at www.phoenixcontact.com. For an updated list of SCCR rated Terminal Blocks from Phoenix Contact, visit www.ul.com/database under File number E60425.

PHOENIX CONTACT P.O. Box 4100 Harrisburg, PA 17111-0001
717-944-1300 Fax: 717-944-1625 e-mail: info@phoenixcon.com www.phoenixcon.com

Artikel -bezeichnung	Einsetzbare Leiter kcmil / AWG		Überstrom Schutz Sicherung Class / Max Ampere Rating						SCCR RMS Sym A	Max. Span.
	Line	Load	J	T	RK1	RK5	G	CC		
ST 1.5	14 Cu	14 Cu	60	60	--	--	30	30	100000	300
ST 1.5 PE	14 Cu	14 Cu	60	60	--	--	30	30	100000	N/A
ST 1.5 QUATTRO	14 Cu	14 Cu	60	60	--	--	30	30	100000	300
ST 1.5-QUATTRO-PE	14 Cu	14 Cu	60	60	--	--	30	30	100000	N/A
ST 1.5-TWIN	14 Cu	14 Cu	60	60	--	--	30	30	100000	300
ST 1.5-TWIN PE	14 Cu	14 Cu	60	60	--	--	30	30	100000	N/A
STTB 1.5	14 Cu	14 Cu	60	60	--	--	30	30	100000	300
STTB 1.5PE	14 Cu	14 Cu	60	60	--	--	30	30	100000	N/A
QTC 2.5-HEDI	14 Cu	14 Cu	60	60	--	--	30	30	100000	300
QTC 2.5-MT	14 Cu	14 Cu	60	60	--	--	30	30	100000	300
QTC 2.5-TG	14 Cu	14 Cu	60	60	--	--	30	30	100000	300
QTC 2.5	14 Cu	14 Cu	60	60	--	--	30	30	100000	600
QTC 2.5-PE	14 Cu	14 Cu	60	60	--	--	30	30	100000	N/A
QTC 2.5-TWIN	14 Cu	14 Cu	60	60	--	--	30	30	100000	600
QTC 2.5-TWIN PE	14 Cu	14 Cu	60	60	--	--	30	30	100000	N/A
QTCS 2.5	14 Cu	14 Cu	60	60	--	--	30	30	100000	600
QTCS 2.5 PE	14 Cu	14 Cu	60	60	--	--	30	30	100000	N/A
QTCS 2.5-TWIN	14 Cu	14 Cu	60	60	--	--	30	30	100000	600
QTCS 2.5-TWIN PE	14 Cu	14 Cu	60	60	--	--	30	30	100000	N/A
QTCU 2.5	14 Cu	14 Cu	60	60	--	--	30	30	100000	600
QTCU 2.5-PE	14 Cu	14 Cu	60	60	--	--	30	30	100000	N/A
QTCU 2.5-TWIN	14 Cu	14 Cu	60	60	--	--	30	30	100000	600
QTCU 2.5-TWIN PE	14 Cu	14 Cu	60	60	--	--	30	30	100000	N/A
UT 2.5	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	600
UT 2.5 PE	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	N/A
UT 2.5-QUATTRO	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	150
UT 2.5-QUATTRO-PE	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	N/A
UT 2.5-TWIN	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	150
UT 2.5-TWIN-PE	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	N/A
UTTB 2.5	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	300
UTTB 2.5 PE	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	N/A
UTTB 2.5-PV	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	300
ST 2.5 MT	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	600
ST 2.5 QUATTRO-MT	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	600
ST 2.5 QUATTRO-TG	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	300
ST 2.5 TG	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	300
ST 2.5 TWIN MT	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	600
ST 2.5 TWIN TG	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	300
ST 2.5-3PV	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	300
ST 2.5-3L	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	300
ST 2.5-3PE	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	N/A
ST 2.5	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	600
ST 2.5 PE	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	N/A
ST 2.5-QUATTRO	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	600

Artikel -bezeichnung	Einsetzbare Leiter kcmil / AWG		Überstrom Schutz Sicherung Class / Max Ampere Rating						SCCR RMS Sym A	Max. Span
	Line	Load	J	T	RK1	RK5	G	CC		
ST 2.5-QUATTRO PE	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	N/A
ST 2.5-TWIN	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	600
ST 2.5-TWIN-PE	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	N/A
STU 2.5-TWIN	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	600
STU 2.5-TWIN-PE	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	N/A
STTB 2.5	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	600
STTB 2.5-PE	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	N/A
STTB 2.5-TWIN	14-12 Cu	14-12 Cu	60	60	--	--	30	30	100000	300
UT 4-HEDI	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
UT 4-HEDI BU	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
UT 4-HEDI-P/P	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
UT 4-MT	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
UT 4-MT-P/P	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
UT 4-TG	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
UT 4-TG-P/P	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
UTTB4-TG	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
UT 4	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
UT 4 CB	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
UT 4-MTD	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
UT 4-MTD-PE	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	N/A
UT 4-MTD-PE/S	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	N/A
UT 4-PE	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	N/A
UT 4-QUATTRO	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	150
UT 4-QUATTRO-PE	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	N/A
UT 4-TWIN	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	150
UT 4-TWIN-PE	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	N/A
UTTB 4	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	300
UTTB 4-PE	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	N/A
UTTB 4-PV	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	300
ST 4	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
ST 4-PE	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	N/A
ST 4-TWIN	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
ST 4-TWIN-PE	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	N/A
ST 4-QUATTRO	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
ST 4-QUATTRO-PE	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	N/A
STTB 4	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	300
STTB 4-PV	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	300
STTB 4-PE	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	N/A
STU 4-TWIN	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
STU 4-TWIN-PE	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	N/A
ST 4-MT	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	300
ST 4-TG	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	300
UDK 4	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
UDK 4-PE	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	N/A
UDK 4-TG	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	300

Description	Conductorkcmil / AWG		Overcussent Protection Fuse Class / Max Ampere Rating						SCCR RMS Sym A	Max. Volts
	Line	Load	J	T	RK1	RK5	G	CC		
UDK 4-MTK	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
UDK 4-MTK-P/P	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
UK 5N	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
UKK 5	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	600
UKK 5-PE	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	N/A
UKK 5-MTKD	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	300
UKK 5-MTKD-P/P	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	300
UKK 5-MTK	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	300
UKK 5-MTK-P/P	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	300
UKK 5-T	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	300
UKK 5-TG	14-10 Cu	14-10 Cu	60	60	--	--	30	30	100000	300
UK 6N	14-8 Cu	14-8 Cu	100	100	30	30	60	30	100000	600
UT 6	14-8 Cu	14-8 Cu	100	100	30	30	60	30	100000	600
UT 6-PE	14-8 Cu	14-8 Cu	100	100	30	30	60	30	100000	N/A
ST 6	14-8 Cu	14-8 Cu	100	100	30	30	60	30	100000	600
ST 6-PE	14-8 Cu	14-8 Cu	100	100	30	30	60	30	100000	N/A
UT10	14-6 Cu	14-6 Cu	100	100	30	30	60	30	100000	600
UT 10-PE	14-6 Cu	14-6 Cu	100	100	30	30	60	30	100000	N/A
ST 10	14-6 Cu	14-6 Cu	100	100	30	30	60	30	100000	600
ST 10-PE	14-6 Cu	14-6 Cu	100	100	30	30	60	30	100000	N/A
UT 16	14-4 Cu	14-4 Cu	100	100	30	30	60	30	100000	600
UT 16-PE	14-4 Cu	14-4 Cu	100	100	30	30	60	30	100000	N/A
ST 16	14-4 Cu	14-4 Cu	100	100	30	30	60	30	100000	600
ST 16-PE	14-4 Cu	14-4 Cu	100	100	30	30	60	30	100000	N/A
UT 35	14-1/0 Cu	14-1/0 Cu	200	200	100	30	60	30	100000	600
UT 35-PE	14-1/0 Cu	14-1/0 Cu	200	200	100	30	60	30	100000	N/A
ST 35	14-2 Cu	14-2 Cu	200	200	100	30	60	30	100000	600
ST 35-PE	14-2 Cu	14-2 Cu	200	200	100	30	60	30	100000	N/A