

Underwriters Laboratory 508A

GE Consumer and Industrial
Electrical Distribution

White Paper

***Underwriters Laboratory implemented UL508A
supplement SB to require compliance by UL authorized
panel builders***

April 2, 2007



imagination at work

Introduction

Article 409 on Industrial Control Panels was added to the NEC 2005 edition. This Article requires all Industrial Control Panels to be marked with a Short Circuit Current Rating (SCCR). The SCCR requirements for UL 508A are effective after April 25, 2006. Underwriters Laboratory implemented UL 508A supplement SB to require compliance by UL authorized panel builders.

The following document prepared by GE Consumer & Industrial will outline the following:

- Overview of code changes in NEC Article 409
- Overview of UL 508A Supplement SB
- How SCCR is determined
- Process Flow Charts
 - Determination of Individual Component SCCR UL 508A SB4.2
 - Feeder Components that limit SCCR available UL 508A SB4.3
 - Determination of overall SCCR of Industrial Control Panel UL508A SB4.4

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Overview of code changes in NEC Article 409

Section 409.2 defines a control panel as:

An assembly of a systematic and standard arrangement of two or more components such as motor controllers, overload relays, fused disconnect switches, and circuit breakers and related control devices such as pushbutton stations, selector switches, timers, switches, control relays, and the like with associated wiring, terminal blocks, pilot lights, and similar components. The industrial control panel does not include controlled equipment.

Section 409.110 requires a control panel to be marked:

Not only are there high levels of short-circuit current available at the line terminals of many industrial control panels, there is also an interaction of the protective and control components under fault conditions that is assessed as part of the evaluation of control panels by **conformity testing organizations**. Assembling interrelated and interactive control and protective components in an enclosure presents a dynamic that in many cases can be evaluated for safety only under strict conformity assessment guidelines. [Emphasis added.]

Overview of UL508A Supplement SB

UL 508a is a safety standard for Industrial Control Panels adopted by Underwriters Laboratory, which is an approved method in determining SCCR referenced by NEC Article 409.

UL508A Supplement SB4 is the approved method for determining Short Circuit Current Ratings for Industrial Control Panels.

The SCCR of the industrial control panel is based on the SCCR of each power circuit component within the industrial panel.

Paragraph SB4.2.1 and Table SB4.1 list the following components as part of the power circuit:

Disconnect Switches	Current Meters
Branch Circuit Protective Devices	Current Shunt
Branch Circuit Fuse Holders	Overload Relays
Load Controllers	Switches
Bus Bars	Meter Socket Bases
Terminal Blocks	Receptacles

Components not considered within UL508A SB4

In most cases components located within the control circuit are protected by the fuse SCCR and need not be applied to SCCR calculation. *The overall circuit SCCR must still be evaluated.*

SB3.2 Overcurrent protection of control circuit

SB3.2.1 For control circuits tapped from the feeder circuit, the overcurrent protection for the common control circuit or for the primary of a control transformer or power supply shall be provided with branch circuit protective devices having a short circuit current rating not less than the overall panel short circuit current rating, see SB4.4.4. For control circuits tapped from the load-side of a motor branch circuit protective device, the overcurrent protection for the common control circuit or for the primary of a control transformer or power supply, the short circuit current rating of the overcurrent protection shall be included in the determination of the branch circuit short circuit current rating in SB4.4.1 and SB4.4.4 (a).

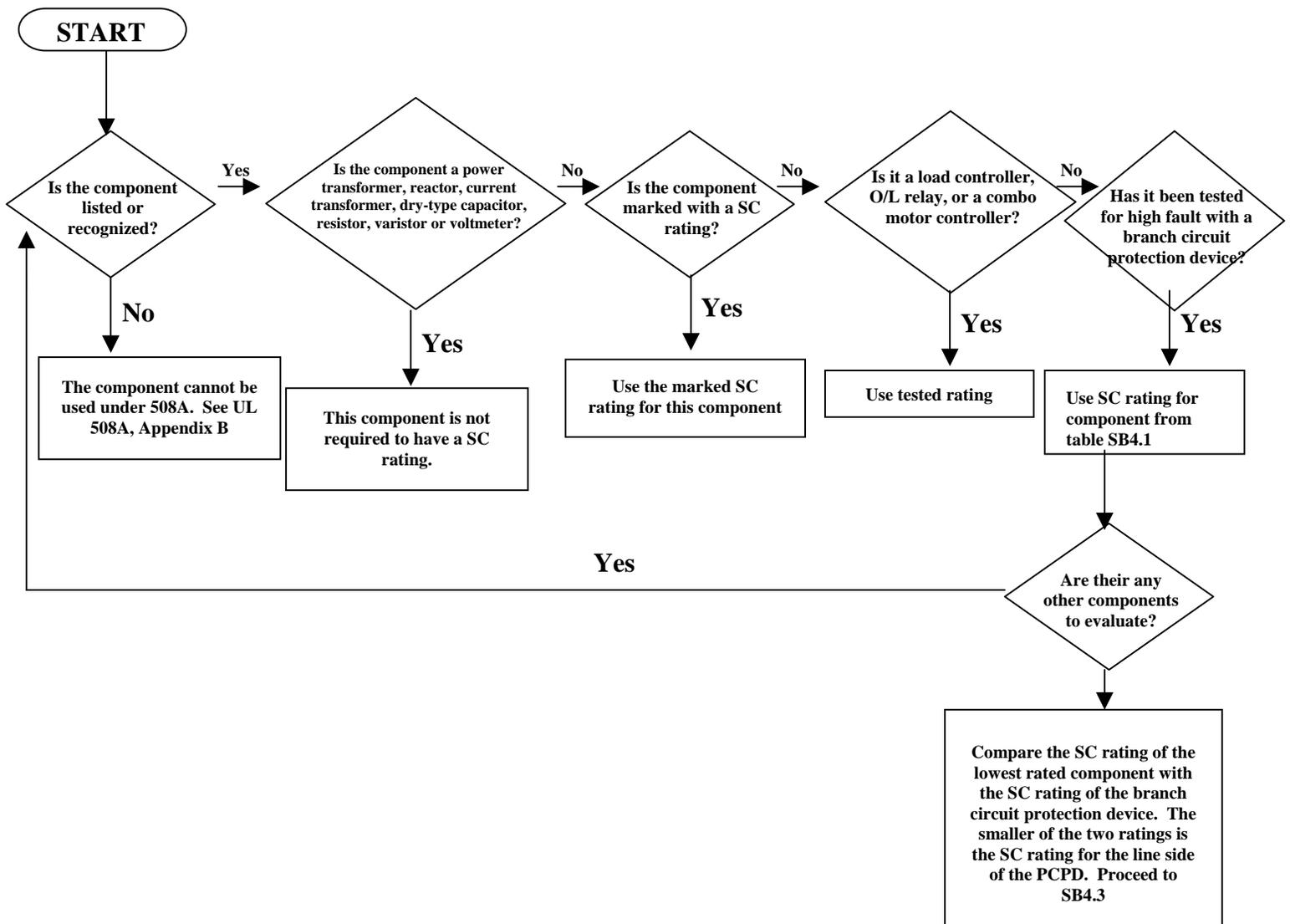
How SCCR is Determined

UL508A supplement SB: Short Circuit Current Ratings for Industrial Control Panels

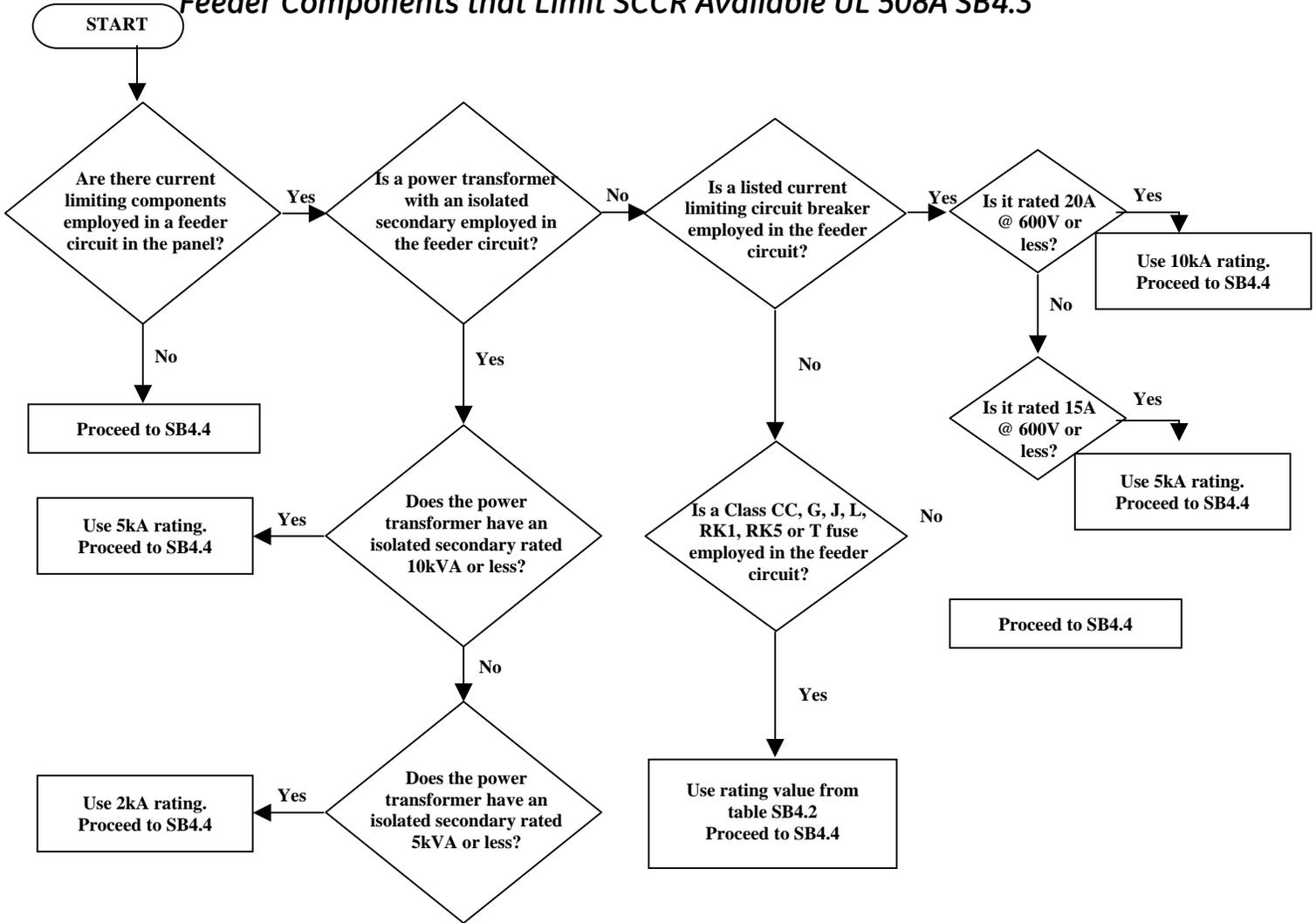
SB4 Ratings

SB1.1 These requirements that cover industrial control panels provided with a short circuit current rating. These requirements supplement and in some cases modify the requirements contained elsewhere in this standard.

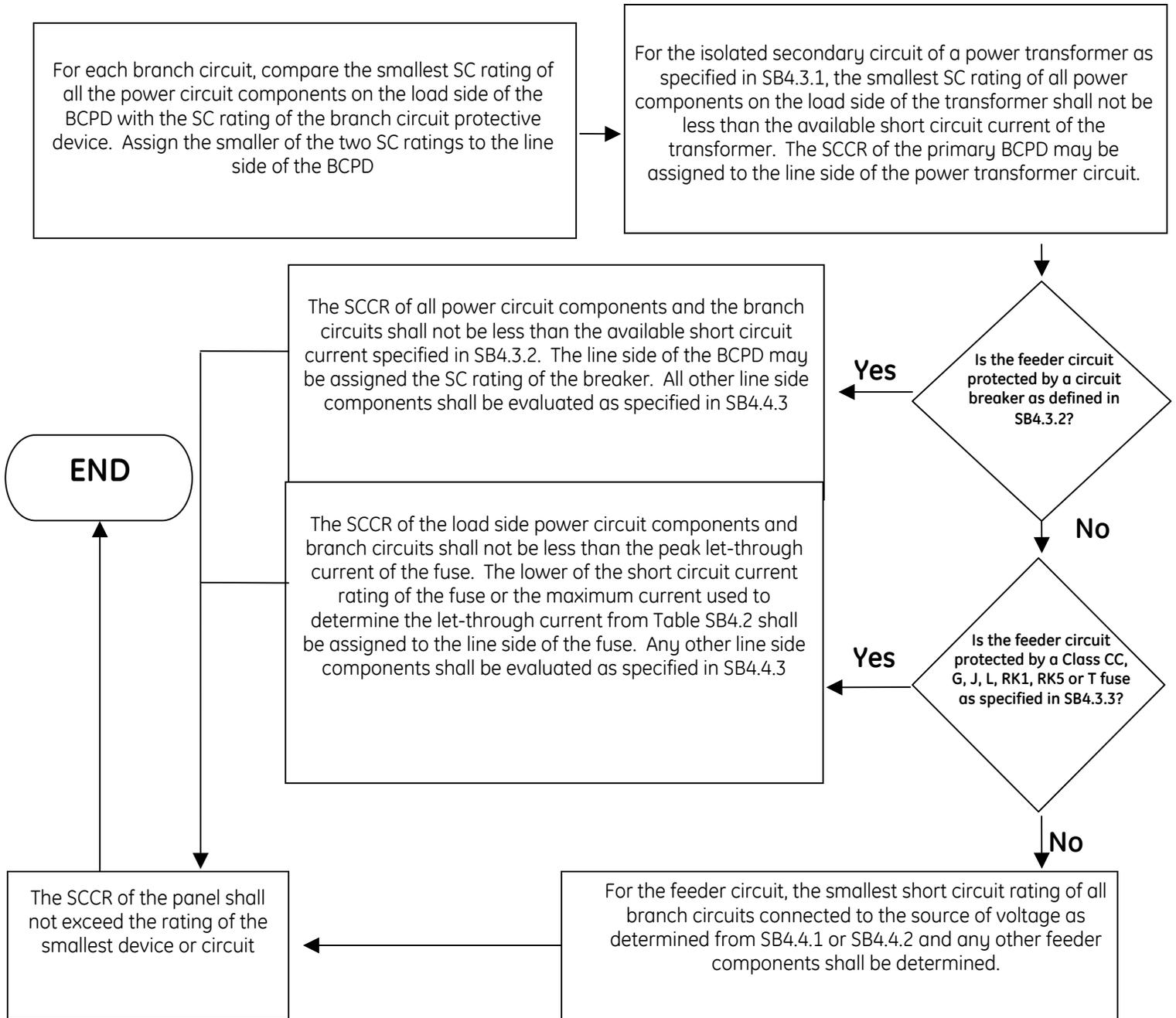
Determination of Individual Component SCCR UL 508A SB4.2



Feeder Components that Limit SCCR Available UL 508A SB4.3



Determination of Overall SCCR of Industrial Control Panel UL 508A SB4.4



Instruction Sheet for C2000 contactors and Overloads protected by Fuses:

GE Consumer & Industrial

Supplement to Instruction Sheets GEH-6223, GEH-6224, GEH-6225, GEH-6226, GEH-6227, GEH-6237, GEH-6238, GEH-6239, GEH-6240, GEH-6241, DEH-040, DEH-041, and DEH-042

High Available Short Circuit Ratings for C-2000 Contactors, Overload Relays, and Starters. The following catalog numbers are suitable for use on a circuit capable of Delivering Not More Than 100,000 RMS Symmetrical Amperes, 600V maximum, when protected by Class J or Class L fuses with maximum ampere rating as shown below. These ratings apply to devices used individually; when used together as Starters, the maximum fuse size must be the lower of the two components, and the minimum enclosure size must be the larger volume of the two components.

CONTACTOR		FUSE	Minimum
Catalog Number	Max. FLA	Maximum Fuse Size, Class J or L (A)	Enclosure Volume (cu in)
CL00	11.0	40	420
CL01	11.0	40	420
CL02	17.5	40	420
CL25	22.0	45	420
CL03	25.3	70	420
CL04	32.2	70	420
CL45	34.0	70	420
CL05	42.0	125	420
CL06	48.3	125	420
CL07	62.1	125	420
CL08	68.0	125	420
CL09	77.0	200	420
CL10	96.0	200	420
CK75C	124	300	3,528
CK08C	156	300	3,528
CK08B	156	450	11,960
CK85B	192	450	11,960
CK09B	180	450	11,960
CK95B	302	450	11,960
CK10C	382	600	11,960
CK11C	480	600	11,960

OVERLOAD RELAY		FUSE	Minimum
Catalog Number	FLA Range	Maximum Fuse Size, Class J or L (A)	Enclosure Volume (cu in)
RT1B, RT12B	0.16-0.26	1	420
RT1C, RT12C	0.25-0.41	1	420
RT1D, RT12D	0.40-0.65	1	420
RT1F, RT12F	0.65-1.10	3	420
RT1G, RT12G	1.0-1.5	6	420
RT1H, RT12H	1.3-1.9	6	420
RT1J, RT12J	1.8-2.7	10	420
RT1K, RT12K	2.5-4.1	15	420
RT1L, RT12L	4.0-6.3	25	420
RT1M, RT12M	5.5-8.5	30	420
RT1N, RT12N	8.0-12.0	45	420
RT1P, RT12P	10.0-16	60	420
RT1S, RT12S	14.5-18	70	420
RT1T, RT12T	17.5-22.0	70	420
RT1U, RT12U	21.0-26.0	70	420
RT1V, RT12V	25.0-32.0	70	420
RT1W, RT12W	30.0-40.0	70	420
RT2A, RT22A	11.5-15.0	60	420
RT2B, RT22B	14.5-19.0	70	420
RT2C, RT22C	18.5-25.0	100	420
RT2D, RT22D	24.0-32.0	125	420
RT2E, RT22E	30.0-43.0	150	420
RT2G, RT22G	42.0-55.0	200	420
RT2H, RT22H	54.0-65.0	200	420
RT2J, RT22J	64.0-82.0	200	420
RT2L, RT22L	78.0-97.0	200	420
RT2M, RT22M	90-110	200	420
RT3B, RT32B	55.0-80.0	300	11,960
RT3C, RT32C	63.0-90.0	350	11,960
RT3D, RT32D	90.0-120.0	450	11,960
RT3E, RT32E	110.0-140.0	450	11,960
RT3F, RT32F	140.0-190.0	450	11,960
RT4N, RT4LN	120.0-190.0	700	11,960
RT4P, RT4LP	175.0-280.0	1000	11,960
RT4R, RT4LR	200.0-310.0	1200	11,960
RT5A, RT5LA	120.0-190.0	700	11,960
RT5B, RT5LB	175.0-280.0	1000	11,960
RT5C, RT5LC	250.0-400.0	1600	11,960
RT5D, RT5LD	315.0-500.0	2000	11,960
RT5E, RT5LE	430.0-650.0	2500	11,960