Thought Leadership
White Paper

Understanding National Electrical Code (NEC) and UL series ratings for panelboards and switchboards

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Proper ratings can protect equipment and personnel

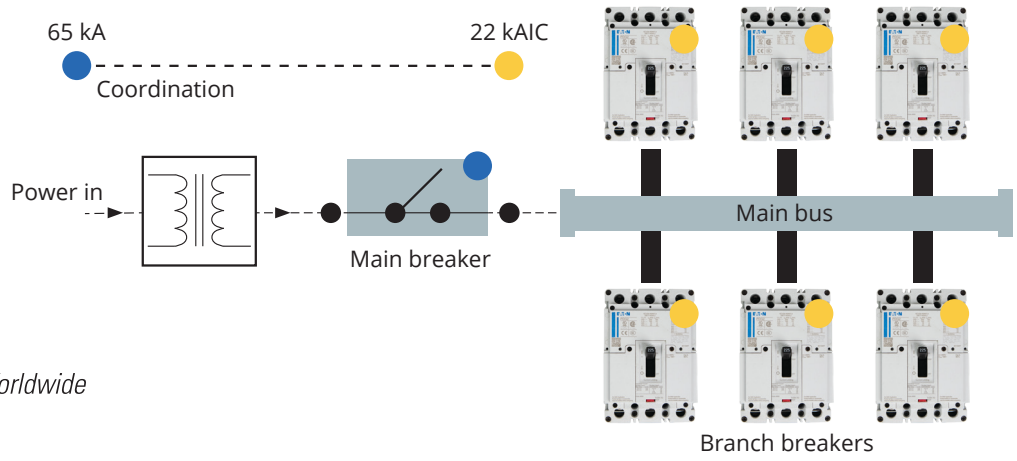
Everyone in the panelboard and switchboard industry—designers, contractors and owners—are looking to have budget-friendly and safe installation. However, both budget and safety happen to be inversely proportional as the ratings increase. This is because the circuit breakers found in electrical panels and switchboards become more expensive as the rated current interrupting capacity (AIC) increases. Therefore, to avoid the big risks of equipment damage and the live threat to personnel performing operations and maintenance at the time of the electrical fault, proper rating of the equipment's AIC must be a selected. The proper way of doing this is to get the equipment tested and listed with UL®.

Eaton offers competitive products both in terms of budget and safety, and all the products offered are UL listed to prevent extensive damage to the equipment, as required by NEC® Sections 110.9 and 110.10.

Importance of NEC and UL series ratings

UL standard provides the guidelines to the panel builder on proper component selection, wiring methods and calculation of short-circuit rating. NEC article gives the minimum requirements to the installer for safe application, installation and inspection of the switchboard and panelboard.

As per basic convention, the primary requirement happens to be when two or more overcurrent protective devices (OCPDs) are connected in series, the interrupting current rating of the downstream device(s) should be less than the interrupting current rating of the system.



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Short-circuit current rating (SCCR) system

According to NEC Article 409.110, the short-circuit current rating must be based on the following methods:

1. SCCR of a listed and labeled assembly
2. SCCR established utilizing an approved method

UL 508A-2001, Supplement SB, is an example of an approved method. The Supplement SB4 is used for determining SCCR for industrial control panels.

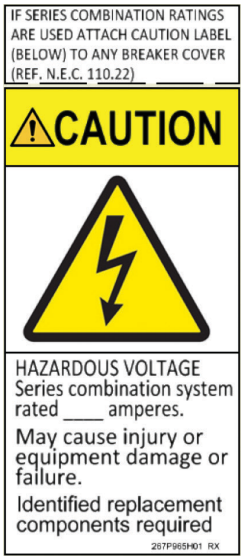
Eaton follows this approved method and on the same context has published the series rating chart that can be downloaded using the link provided below:

Panelboard and switchboard series rating information manual

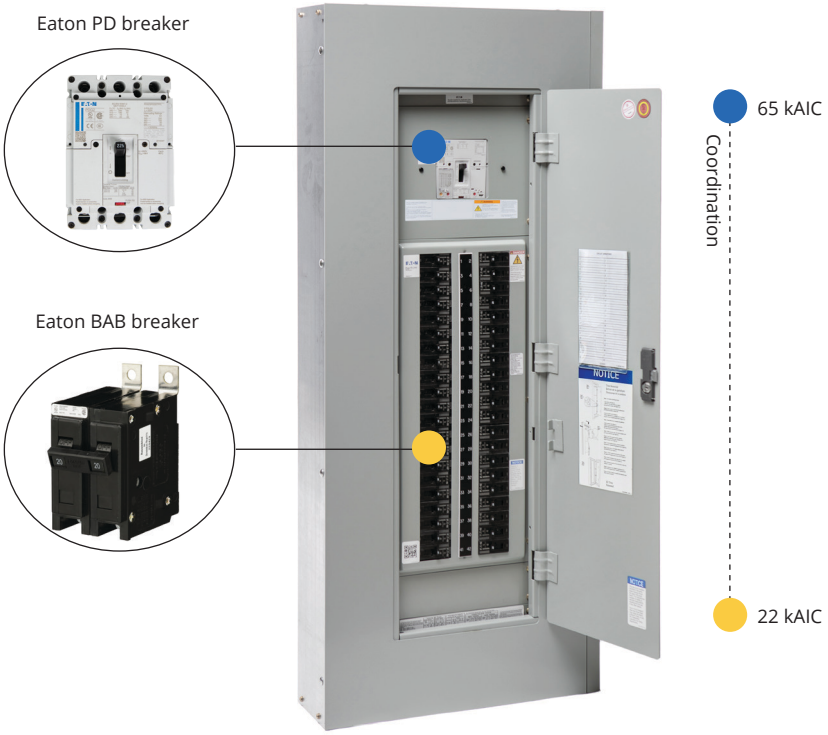
NEC 2005 Article 409 and UL 508 ensure that all industrial control panels are marked with an appropriate short-circuit current rating. These rules avoid the misapplication of the industrial control panel and the components used to build the panel.

Application summary

Installation of OCPDs in the UL Listed panelboards and switchboards are in such a way that they can clear a fault without extensive damage to the equipment. According to NEC, a short-circuit interrupting rating is assigned to a combination of two or more OCPDs that are connected in series in which the rating of the downstream device(s) in the combination is less than the series combination rating. Panelboard and switchboard must be supplied with the proper short-circuit current ratings. The objective is to ensure panels are designed to maximize equipment life and personnel safety, at the same time reducing the risk of equipment catching fire.



Example of caution label with ampere rating as per NEC 110.22



Example for explanation only—225 A / 240 Vac

To learn more, contact your local representative or visit **Eaton.com/panelboards**.

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