Thought leadership
Tech brief

Understanding National Electrical Code (NEC) selective coordination for switchboards and panelboards

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Executive summary

Irrespective of how robust an electrical system is, electrical faults sometimes occur due to environmental conditions or uncertain events. These incidents interrupt the power supply and may affect the whole system regardless of the fault area. Isolation of the faulted circuit from the remaining installation is critical in today's modern electrical systems where power blackouts cannot be tolerated. To isolate the faulted circuit while maintaining the power to the other circuits, selective coordination is needed.

The National Electrical Code® definition of selective coordination

NEC® Article 100 defines selective coordination as: "Localization of an overcurrent condition to restrict outages to the circuit or equipment affected, accomplished by the selection and installation of overcurrent protective devices and their ratings or settings for the full range of available overcurrent, from overload to the available fault current, and for the full range of overcurrent protective device opening times associated with those overcurrents".

Selective coordination key points

- Select the protective devices based on their ability to carry the system load current and interrupt the maximum fault current at their respective points of application
- Determine if the type of overcurrent protective devices and ratings (or settings) are selectively coordinated

Figure 1 shows an electrical system that is not selectively coordinated as the fault in Branch A interrupts the entire system, causing shutdown to the load connected in Branch B.

Figure 2 shows an electrical system that is selectively coordinated. The fault in Branch A does not result in a shutdown to the load connected in Branch B, therefore the entire system is not interrupted.

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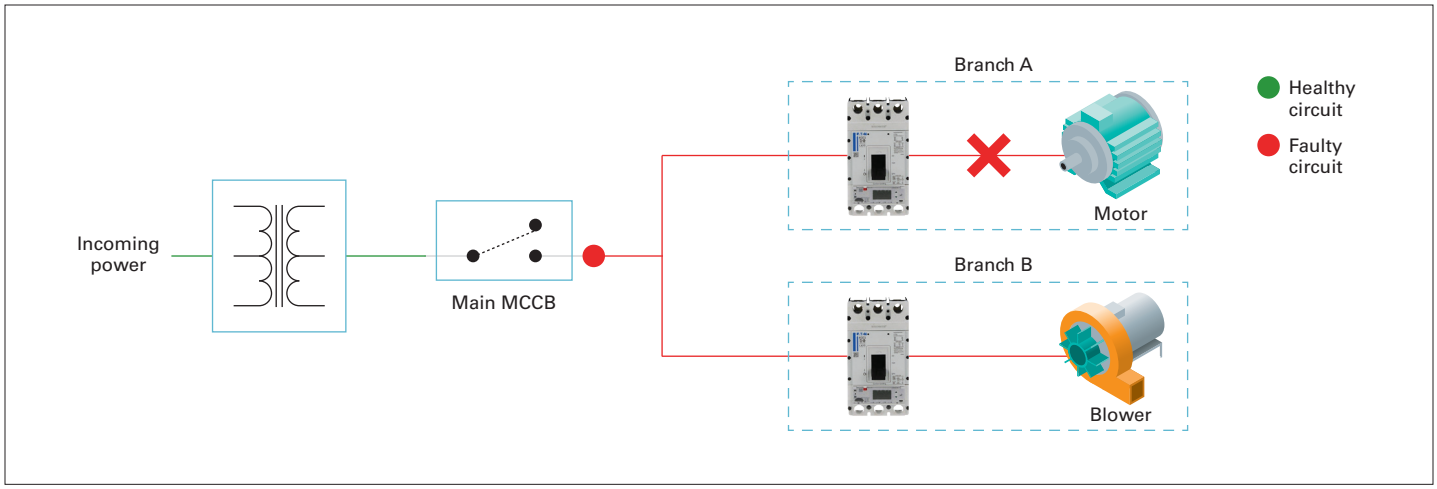

Figure 1. Electrical system without selective coordination

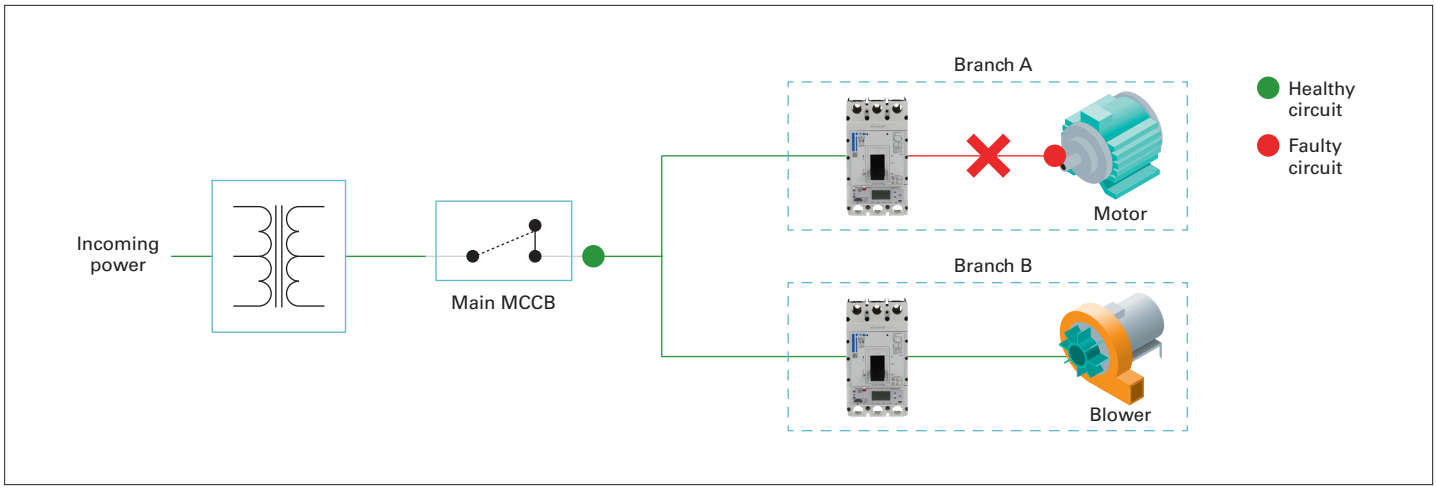

Figure 2. Electrical system with selective coordination

Selective coordination important norms

- Selective coordination shall be selected by a licensed professional engineer or other qualified person engaged primarily in the design, installation, or maintenance of electrical systems
- The selection and device settings shall be documented and made available to those who are authorized to design, install, inspect, maintain, and operate the electrical system
- Selectively coordinated enclosures shall be legibly marked for selective coordination

When Eaton panelboards and switchboards are specified as selectively coordinated, look for the caution label on the enclosure as shown below.

⚠CAUTION

CAUTION: OVERCURRENT DEVICES IN THIS ENCLOSURE ARE SELECTIVELY COORDINATED. EQUIVALENT REPLACEMENTS AND TRIP SETTINGS ARE REQUIRED. (620.66)

Application summary

It is important to consider selective coordination for overcurrent protective devices in the design phase. Once switchboards, distribution panels, motor control centers, and lighting panelboards are installed, it is difficult to achieve selective coordination. Eaton offers a broad range of circuit protection products and electrical safety solutions, enabling customers to achieve code compliance and meet selective coordination requirements more effectively and economically. What's more, we offer technical expertise and a customer support structure to help achieve your project goals and to make sure the right product is provided for your application.

For more information, please visit
Eaton.com/selectivecoordination
and **Eaton.com/panelboards.**

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