



Keywords: non-instantaneous trip  
zone selective interlocking  
differential relaying  
energy-reducing maintenance switch

# New 2011 NEC Requirement Regarding Non-Instantaneous Trip Circuit Breakers

## Introduction

There are several requirements in the National Electrical Code® (NEC®) that call for the total selective coordination of various systems. However, this can result in increasing the downstream arc flash hazard should energized (hot) work be required. Code Making Panel 10 (CMP 10) accepted a proposal for the 2011 NEC in an attempt to address this concern.

## 2011 NEC

The new section added to Article 240 requires the use of Zone Selective Interlocking (ZSI), differential relaying, energy-reducing maintenance switching or approved equivalent means where a circuit breaker without an instantaneous trip function is used.

**240.87 Non-instantaneous Trip.** Where a circuit breaker is utilized without an instantaneous trip, documentation shall be available to those authorized to design, install, operate or inspect the installation as to the location of the circuit breaker(s).

Where a circuit breaker is utilized without an instantaneous trip one of the following or approved equivalent means shall be provided:

- (A) Zone-selective interlocking
- (B) Differential relaying
- (C) Energy-reducing maintenance switching with local status indicator

FPN: An energy-reducing maintenance switch allows a worker to set a circuit breaker trip unit to no intentional delay to reduce the clearing time while the worker is working within an arc-flash boundary as defined in NFPA 70E, and then to set the trip unit back to a normal setting after the potentially hazardous work is complete.

## What does it Mean?

In its statement on comment 10-41, CMP 10 clarified that the new requirement pertains to the absence of an instantaneous trip function, not the absence of an instantaneous trip setting. This means that a circuit breaker with the adjustable instantaneous trip function set to OFF would not require one of the means specific in 240.87.

Electronic trip units without an instantaneous trip function are typically designated LS or LSG where the "L" stands for long time, the "S" stands for short time and the "G" stands for ground-fault. Circuit breakers with LS or LSG trip functions would require the documentation and one of the means specified in 240.87. Most manufacturers now offer an instantaneous OFF position on their trip units.

Electronic trip units with an instantaneous trip function are typically designated LI, LSI or LSIG where the "I" stands for instantaneous. Circuit breakers with LI, LSI or LSIG trip functions would not require the documentation and one of the means specified in 240.87, even if the "I" setting switch has an OFF position.

This section does not apply to thermal-magnetic circuit breakers as they all have an instantaneous trip function.

### Does 240.87 apply to Square D® circuit breakers?

All Square D molded case, insulated case and low voltage power circuit breakers are equipped with an instantaneous trip function and thus do not require documentation, ZSI, differential relaying or energy-reducing maintenance switching. In other words, all of these circuit breakers, if equipped with an electronic trip unit, have either an LI, LSI or LSIG trip function. (The instantaneous function of Micrologic LSI and LSIG trip units may be set to OFF.)

### Are there other ways to reduce the arc flash hazard?

There are other ways that can be employed to reduce the arc flash hazard such as; reducing the fault current, using faster acting circuit breakers such as the Masterpact L1F Low Arc Flash circuit breaker or by using a virtual main with ZSI. For more information about these alternatives, refer to data bulletin 3000DB0810.

#### For More Information

Arc Flash Reduction Systems-Are They Always a Good Idea? [0600DB0901](#)  
Alternate Maintenance Setting (AMS) Switch [8998HO1001](#)  
Arc Flash Reduction Methods [3000DB0810](#)  
Arc Flash Protection with Masterpact NW and NT Circuit Breakers [0613DB0202](#)

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