



## NECA 700-2016

Standard for Installing

# Overcurrent Protection to Achieve Selective Coordination

AN AMERICAN NATIONAL STANDARD

Currently in preview, click buy full version



Published by  
National Electrical Contractors Association

**NECA 700-2016**

Standard for

Installing Overcurrent  
Protection to Achieve  
Selective Coordination

An American  
National Standard



Published by  
National Electrical  
Contractors Association



<b>Revision History</b>	
NECA 700-2010 originally published	03/2010
NECA 700-2016 revised	09/2016

## **NOTICE OF COPYRIGHT**

*This document is copyrighted by NECA*

ISBN: 978-1-944148-1-1

©2016. Reproduction of these documents either in hard copy or soft (including posting on the web) is prohibited without copyright permission. For copyright permission to reproduce portions of this document, please contact NECA Standards & Safety at (301) 215-4549, or send a fax to (301) 215-4500.

CP

National Electrical Contractors Association  
3 Bethesda Metro Center, Suite 1100  
Bethesda, Maryland 20814  
(301) 657-3110

# Table of Contents

- Foreword..... v**
- 1. Scope ..... 1**
  - 1.1 Products and Applications Included..... 1
  - 1.2 Products and Applications Excluded ..... 1
  - 1.3 Regulatory and Other Requirements ..... 1
  - 1.4 Mandatory Requirements, Permissive Requirements, Quality and Performance Recommendations, Explanatory Material, and Informative Annexes..... 1
- 2. Definitions ..... 3**
- 4. NEC Requirements ..... 8**
  - 4.1 Emergency Systems (NEC Article 700)..... 8
  - 4.2 Legally-Required Standby Systems (NEC Article 701) ..... 8
  - 4.3 Critical Operations Power Systems (NEC Article 706)..... 8
  - 4.4 Healthcare Facilities (NEC Article 517)..... 8
  - 4.5 Elevators, Dumbwaiters, Escalators, Moving Walks, Wheelchair Lifts, and Stairway Chair Lifts (NEC Article 620) ..... 9
  - 4.6 Critical Operations Data Systems (NEC Article 645) ..... 9
  - 4.7 Fire Pumps (NEC Article 695) ..... 9
  - 4.8 Ground-Fault Protection of Equipment (GFPE)..... 9
- 5. Overcurrent Protective Device Operation ..... 12**
  - 5.1 General..... 12
  - 5.2 Fuses..... 13
  - 5.3 Circuit Breakers..... 15
- 6. Achieving Selective Coordination ..... 20**
  - 6.1 Short Circuit and Coordination Studies..... 20
  - 6.2 Competing Objectives..... 22
  - 6.3 Ground-Fault Protection of Equipment..... 23
  - 6.4 Fuses..... 24
  - 6.5 Circuit Breakers..... 25
  - 6.6 Methods of Achieving Selective Coordination ..... 25
- Annex A: Fire Pumps..... 28**
- Annex B: Reference Standards ..... 29**

(This foreword is not a part of the standard)

# Foreword

*National Electrical Installation Standards* (NEIS) are designed to improve communication among specifiers, purchasers, and suppliers of electrical construction services. They define a minimum baseline of quality and workmanship for installing electrical products and systems. NEIS are intended to be referenced in contract documents for electrical construction projects. The following language is recommended:

Overcurrent protective devices should be installed in accordance with NECA 700-2016, *Standard for Installing Overcurrent Protection to Achieve Selective Coordination* (ANSI).

Use of NEIS is voluntary, and the National Electrical Contractors Association assumes no obligation or liability to users of this publication. Existence of a standard shall not preclude any member or nonmember of NECA from specifying or using alternate construction methods permitted by applicable regulations.

This publication is not intended to substitute for qualified design professionals. Selective coordination of overcurrent protective devices requires the analysis and comparison of overcurrent protective device time-current characteristics and the available short circuit current within an electrical distribution system, and should be performed under the supervision of qualified individuals, such as by qualified professional engineers.

This publication is intended to comply with the National Electrical Code (NEC). Because they are quality standards, NEIS may in some instances go beyond the minimum safety requirements of the NEC. It is the responsibility of users of this publication to comply with state and local electrical

codes when installing electrical products and systems.

Suggestions for revisions and improvements to this standard are welcome. They should be addressed to:

NECA Standards & Safety  
3 Bethesda Metro Center, Suite 1100  
Bethesda, MD 20814  
(301) 215-4521  
(301) 215-4500 Fax  
[www.neca-neis.org](http://www.neca-neis.org)  
[neis@necanet.org](mailto:neis@necanet.org)

To purchase *National Electrical Installation Standards*, contact the NECA Order Desk at (301) 215-4504 tel, (301) 215-4500 fax or [orderdesk@necanet.org](mailto:orderdesk@necanet.org). NEIS can also be purchased in pdf format from [www.neca-neis.org/standards](http://www.neca-neis.org/standards).

Copyright ©2016, National Electrical Contractors Association. All rights reserved. Unauthorized reproduction prohibited.

*National Electrical Installation Standards*, NEIS, and the NEIS logo are registered trademarks of the National Electrical Contractors Association. National Electrical Code and NEC are registered trademarks of the National Fire Protection Association, Quincy, Massachusetts.

*Illustrations and tables provided by:*

<sup>1</sup>This material and associated copyrights are proprietary to and used with permission of Schneider Electric.

<sup>2</sup>This material and associated copyrights are proprietary to and used with permission of Cooper Bussman.

# 1. Scope

This standard describes the application procedures for selecting and adjusting low-voltage overcurrent protective devices to achieve selective coordination.

## 1.1 Products and Applications Included

This standard covers the installation of low-voltage overcurrent protective devices rated 1000 volts and less, for selective coordination in electrical distribution systems for residential, commercial, and industrial applications. This applies to:

- Low voltage power circuit breakers
- Fuses
- Molded case circuit breakers

## 1.2 Products and Applications Excluded

This standard does not apply to:

- Overcurrent protective devices rated more than 1000 V
- Protective relays
- Protection of conductors, transformers, motors or other equipment

## 1.3 Regulatory and Other Requirements

All information in this publication is intended to conform to the *National Electrical Code* (ANSI/NFPA 70). Installers shall follow the NEC, applicable state and local codes, manufacturer instructions, and contract documents when installing overcurrent protective devices.

Only qualified persons as defined in the *National Electrical Code* familiar with the construction, installation, and operation of overcurrent protective

devices shall perform the technical work described in this publication. Administrative functions such as receiving, handling, and storing overcurrent protective devices and other tasks may be performed under the supervision of a qualified person. All work shall be performed in accordance with NFPA 70E, *Standard for Electrical Safety in the Workplace*.

General requirements for installing electrical products and systems are described in NECA 1, *Standard for Good Workmanship in Electrical Construction* (ANSI). Other *NEIS* provide additional guidance for installing particular types of electrical products and systems. A complete list of *NEIS* is provided in Annex B.

## 1.4 Mandatory Requirements, Permissive Requirements, Quality and Performance Recommendations, Explanatory Material, and Informative Annexes

Mandatory requirements in manufacturer instructions, Codes or other mandatory Standards that may or may not be adopted into law, are those that identify actions that are specifically required or prohibited and are characterized by the use of the terms “must” or “must not,” “shall” or “shall not,” or “may not,” or “are not permitted,” or “are required,” or by the use of positive phrasing of mandatory requirements. Examples of mandatory requirements may equally take the form of, “equipment must be protected . . .,” “equipment shall be protected . . .,” or “protect equipment . . .,” with the latter interpreted (understood) as “(it is necessary to) protect equipment . . .”

Permissive requirements of manufacturer instructions, Codes or other mandatory Standards that may or may not be adopted into law, are