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IEEE Std 3001.11™ - 2017

Recommended Practice for
Application of Controllers and
Automation to Industrial and
Commercial Power Systems



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IEEE Recommended Practice for Application of Controllers and Automation to Industrial and Commercial Power Systems

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Abstract: The selection and application of controllers and automation to industrial and commercial power systems is covered by this recommended practice. It is likely to be of greatest value to the power-oriented engineer with limited experience with this equipment. It can also be an aid to all engineers responsible for the electrical design of industrial and commercial power systems.

Keywords: automation, building automation system (BAS), contactor, controller, facility automation system (FAS), heater controller, IEEE 3001.11™, industrial controller, motor control, motor control center (MCC), motor controller, motor starter, power controller, starter

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Introduction

This introduction is not part of IEEE Std 3001.11–2017, IEEE Recommended Practice for Application of Controllers and Automation to Industrial and Commercial Power Systems.

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This recommended practice was developed by the Technical Books Coordinating Committee of the Industrial and Commercial Power Systems Department of the Industry Applications Society as part of a project to repackage the popular IEEE Color Books®. The goal of this project is to speed up the revision process, eliminate duplicate material, and facilitate use of modern publishing and distribution technologies.

When this project is completed, the technical material in the 13 IEEE Color Books will be included in a series of new standards—the most significant of which will be a new standard, IEEE Std 3000™, IEEE Recommended Practice for the Engineering of Industrial and Commercial Power Systems. The new standard will cover the fundamentals of planning, design, analysis, construction, installation, startup, operation, and maintenance of electrical systems in industrial and commercial facilities. Approximately 60 additional dot standards, organized into the following categories, will provide in-depth treatment of many of the topics introduced by IEEE Std 3000™:

- Power Systems Design (3001 series)
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- Protection and Coordination (3004 series)
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In many cases, the material in a dot standard comes from a particular chapter of a particular IEEE Color Book. In other cases, material from several IEEE Color Books has been combined into a new dot standard.

IEEE Std 3001.11

The material in this recommended practice largely comes from subclauses 10.6 and 10.7 of the *IEEE Red Book*™, IEEE Std 100™-1993, IEEE Recommended Practice for Electric Power Distribution in Industrial Plants, and Chapters 6 and 14 of the *IEEE Grey Book*™, IEEE Std 241™-1990, IEEE Recommended Practice for Electric Power Systems in Commercial Buildings.

This publication provides a recommended practice for the electrical design of commercial and industrial facilities. It is likely to be of greatest value to the power-oriented engineer with limited commercial or industrial design experience. It can also be an aid to all engineers responsible for the electrical design of commercial and industrial facilities. However, it is not intended as a replacement for the many excellent engineering texts and handbooks commonly in use, nor is it detailed enough to be a design manual. It should be considered a guide and general reference on electrical design for commercial and industrial facilities.

Tables, charts, and other information that have been extracted from codes, standards, and other technical literature are included in this publication. Their inclusion is for illustrative purposes; where technical accuracy is important, the latest version of the referenced document should be consulted to assure use of complete, up-to-date, and accurate information.

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IEEE Recommended Practice for Application of Controllers and Automation to Industrial and Commercial Power Systems

1. Overview

1.1 Scope

This recommended practice covers the selection and application of controllers and automation to industrial and commercial power systems. It is likely to be of greatest value to the power-oriented engineer with limited experience with this equipment. It can also be an aid to all engineers responsible for the electrical design of industrial and commercial power systems.

The present edition of this recommended practice focuses on the application of ANSI/NEMA design controllers. There are differences in the design of IEC controllers, which require additional application considerations which are beyond the scope of the present edition.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

CSA C22.1, Canadian Electrical Code, Part I (CE Code).¹

IEEE Std 141™, IEEE Recommended Practice for Electric Power Distribution for Industrial Plants (*IEEE Red Book™*).²

IEEE Std 242™, IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems (*IEEE Buff Book™*).

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