

IEEE Guide for the Application of Neutral Grounding in Electrical Utility Systems—Part I: Introduction

IEEE Power and Energy Society

Sponsored by the
Surge Protective Devices Committee

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IEEE Guide for the Application of Neutral Grounding in Electrical Utility Systems—Part I: Introduction

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Surge Protective Devices Committee
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IEEE Power and Energy Society

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Abstract: The application of neutral grounding to three-phase electrical utility systems is described in this guide. It is Part 1 of the IEEE C62.92 series of guides for neutral grounding. This guide presents basic considerations of the selection of neutral grounding parameters that will provide for the control of overvoltage and ground-fault current on all parts of three-phase electrical utility systems rated greater than 1000 V.

Keywords: classes of grounding, effectively grounding, IEEE C62.92.1™, means of grounding, neutral grounding, undergrounded systems

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Introduction

This introduction is not part of IEEE Std C62.92.1–2016, IEEE Guide for the Application of Neutral Grounding in Electrical Utility Systems—Part I: Introduction.

This document is the first part of a five-part series of guides on the subject of electric utility system neutral grounding practices and serves as an introduction. When the series was first approved and published, it replaced IEEE Std 143™-1954, IEEE Guide for Ground-Fault Neutralizers, Grounding of Synchronous Generator Systems, and Neutral Grounding of Transmission Systems.

Each of the remaining four parts addresses a specific part of the utility system to serve as a guide for neutral grounding. The five parts are as follows:

- a) IEEE Std C62.92.1™, IEEE Guide for the Application of Neutral Grounding in Electrical Utility Systems—Part I: Introduction¹
- b) IEEE Std C62.92.2™, IEEE Guide for the Application of Neutral Grounding in Electrical Utility Systems—Part II: Grounding of Synchronous Generator Systems
- c) IEEE Std C62.92.3™, IEEE Guide for the Application of Neutral Grounding in Electrical Utility Systems—Part III: Generator Auxiliary Systems
- d) IEEE Std C62.92.4™, IEEE Guide for the Application of Neutral Grounding in Electrical Utility Systems—Part IV: Distribution
- e) IEEE Std C62.92.5™, IEEE Guide for the Application of Neutral Grounding in Electrical Utility Systems—Part V: Transmission and Subtransmission Systems

This series of guides is intended for application to three-phase electrical utility systems. They provide definitions and considerations that are general to all types of neutral grounding for electrical utility systems, as well as basic considerations of the selection of neutral grounding parameters that will provide for the control of overvoltage and ground-fault current on all parts of three-phase electrical utility systems. They are not intended to be used with the grounding, for example, of industrial systems, which are covered in other guides and standards. These guides and standards should be referenced, when appropriate, to gain a full picture of other grounding practices.

This document has been revised to address comments received as part of the most recent re-affirmation ballot. The most significant changes were to correct an error in one of the equations in the caption beneath [Figure 1](#) in [6.3](#) and to correct an omission in the drawing itself. [Equation A.2](#) and [Equation A.3](#) were changed to correct arithmetic errors. Most of the other comments received during that re-affirmation ballot were editorial in nature and have been addressed. Other changes include the update of reference material publish dates that may have changed or been reported.

It is impossible to give recognition to all those who have contributed to the technology and practices of grounding of power systems, because work involving the preparation of this guide has been in progress for more than 50 years. However, the assistance of members, past and present, of the Neutral Grounding Devices Subcommittee of the Surge Protective Devices Committee, and other similar groups with comparable purposes, should be acknowledged.

¹Information on references can be found in Clause 2.

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IEEE Guide for the Application of Neutral Grounding in Electrical Utility Systems—Part I: Introduction

1. Overview

1.1 Scope

This guide is intended for application to three-phase electrical utility systems and is Part I of the IEEE Std C62.92 series. This part provides definitions and considerations that are general to all types of neutral grounding for electrical utility systems. Goals of system grounding, means of grounding, and classes of grounding are addressed in this part.

1.2 Purpose

This guide presents basic considerations of the selection of neutral grounding parameters that will provide for the control of overvoltage and ground-fault current on all parts of three-phase electrical utility systems.

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.

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IEEE Std 80™, IEEE Guide for Safety in AC Substation Grounding.^{3,4}

IEEE Std 142™, IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems (IEEE Green Book™).⁵

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