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IEEE Guide on Shielding Practice for Low Voltage Cables

IEEE Power and Energy Society

Sponsored by the
Insulated Conductors Committee

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Abstract: A concise overview of shielding options for various types of interference is discussed in this guide. Recommendations on shielding practices for low voltage cables are given. Suggestions on terminating and grounding methods are provided.
Keywords: cable shielding, cable terminations, electromagnetic interference, grounding, IEEE 1143™, low voltage cables

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Introduction

This introduction is not part of IEEE Std 1143-2012, IEEE Guide on Shielding Practice for Low Voltage Cables.

This project will provide a revision to the Guide on Shielding Practice for Low Voltage Cables. Insulated Conductors Committee (ICC) Working Group D11W, under ICC Subcommittee D, prepared this revision. The guide will be helpful for users of low voltage cable to understand how shielding works, to choose an appropriate shielding system to address the type of interference being encountered and to be able to be familiar with the test protocols to measure shielding effectiveness. The revision will focus on shielding techniques and defer the discussion of theory and sources of interference to other appropriate IEEE documents by reference. The document will be of greatest use to cable users for control systems in industrial plants, generating stations, and substations. The experts contributing to the document will be cable manufacturers, material suppliers, and knowledgeable engineers. The document will be useful to consultants and engineers in engineering firms who design and build control systems for various plants and facilities.

Background on 1994 version: A guide on the use of shielding on low voltage cables was proposed in Subcommittee No. 9 of the Insulated Conductors Committee due to the lack of a single source of information on this topic. For example, information on shielding of medium voltage and high voltage cables was available in several documents, but the same could not be said for low voltage cable. Subsequently, a task group was formed to develop the guide. The task group began its work by preparing a bibliography of the information by key topic. These topics eventually made their way into an outline of the guide. A first draft was prepared, and after review and comment, the draft was broken into two sections: Section I, covering shielding; and Section II, providing background information on the need for shielding. This approach was taken because an understanding of the need for shielding helps achieve the purpose of the guide—which is to provide the user with an understanding of cable shielding practices for low voltage cables.

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IEEE Guide on Shielding Practice for Low Voltage Cables

1. Overview

1.1 Scope

This function of this guide on shielding practice for low voltage cables is to inform and familiarize the reader with shielding practice. Overviews of shielding practice, systems and test methods are provided. These tests may not be standardized; however, they are included to inform the reader and provide an overview as to what has been done to characterize shielding. This guide provides the following: a review of shielding techniques to control electrostatic and electromagnetic interference for varying types of low voltage cable used for power, control and instrumentation services, including signal and communications cable; an overview of the functional characteristics of various types of shielding; suggested tests or techniques for measuring shielding effectiveness; recommendations on shielding practices, including suggestions on terminating and grounding methods.

1.2 Purpose

The main purpose of this guide is to show how shielding can minimize the effects of electrostatic and electromagnetic interference. A secondary purpose is to provide recommendations on shielding practice for various applications including suggestions on terminating and grounding methods.