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IEEE Guide for the Measurement of DC Transmission Line and Earth Electrode Line Parameters

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Abstract: Field testing methodology and techniques are presented for measuring parameters for dc transmission lines and earth electrode lines are discussed in this guide. The topics addressed include the basic requirements of measurement, safety cautions, requirements for test instruments, testing induced voltage and current, verifying the polarity and testing insulation resistance, measuring dc resistance, measuring the impedance frequency characteristic, and various factors that can distort measurements.

Keywords: distributed parameters; IEEE 1893™; impedance frequency characteristic; open-circuit impedance; short-circuit impedance; transmission line parameters

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Introduction

This introduction is not part of IEEE Std 1893™-2015, IEEE Guide for the Measurement of DC Transmission Line and Earth Electrode Line Parameters.

As an effective means for long-distance and large-capacity power transmission, high-voltage direct current (HVDC) has been employed worldwide. In addition to regular tests, such as polarity verification and insulation resistance testing, the line parameters need to be measured after the dc transmission line and the earth electrode line have been installed or reconstructed. The main purpose of measuring is to provide actual data for system short-circuit calculations, relay protection-setting calculations, communication interference calculations, operating scheme selection, etc. Therefore, a working group was formed to develop a standard that would provide guidance for measurement of dc transmission line and earth electrode line parameters.

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IEEE Guide for the Measurement of DC Transmission Line and Earth Electrode Line Parameters

1. Overview

1.1 Scope

The testing methods and techniques that are used for measuring electrical characteristics and parameters of dc transmission lines and earth electrode lines include the following topics:

a) Test safety precautions

b) Measuring instrument requirements

c) Induced-voltage and induced-current testing

d) Polarity verification and insulation resistance testing

e) Measurement of dc resistance

f) Measurement of impedance frequency characteristics