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# IEEE Guide for Paralleling Regulating Transformers

IEEE Power and Energy Society

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Transformers Committee

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IEEE Std C57.153™-2015

# IEEE Guide for Paralleling Regulating Transformers

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**Transformers Committee**
of the
**IEEE Power and Energy Society**

Approved 26 March 2015

**IEEE-SA Standards Board**

**Abstract:** Control methods of paralleling regulating transformers are described and compared in this guide. The control methods include: master/follower, circulating current, power factor, circulating reactive current and negative reactance methods. Operating philosophy descriptions, sample wiring diagrams, typical operational variations, the provision of adequate backup protection, and typical misapplication consequences are presented. This guide does not apply to phase-shifting regulating transformers.

**Keywords:** backup protection, circulating current method, circulating reactive current method, IEEE C57.153™, line current compensation, line drop compensation, master/follower method, negative reactance method, power factor method, tap changer control, transformer loading, transformer paralleling, voltage control

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3 Park Avenue, New York, NY 10016-5997, USA



PDF: ISBN 978-0-7381-9640-4 STD20176
Print: ISBN 978-0-7381-9641-1 STDPD20176

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## Introduction

This introduction is not part of IEEE Std C57.153-2015, IEEE Guide for Paralleling Regulating Transformers.

This guide was prepared by the C57.153 Working Group of the Power Transformers Subcommittee of the Transformers Committee of the IEEE Power and Energy Society.

The intent of this new guide is to present information for the selection and application of transformer paralleling methods used to maintain power system operations. This guide describes paralleling methods in common practice at the time this guide was written and provides information concerning the operational requirements and limitations of each method. Additional information is provided for cases of paralleling transformers with unequal ratings and other operational conditions requiring special considerations.

## Contents

# IEEE Guide for Paralleling Regulating Transformers



## 1. Overview

### 1.1 Scope

This paralleling guide describes and compares control methods of paralleling regulating transformers. The control methods include: master/follower, circulating current, power factor, circulating reactive current, and negative reactance methods. This guide presents operating philosophy descriptions, sample wiring diagrams, typical operational variations, the provision of adequate backup protection, and typical misapplication consequences. This guide does not apply to phase-shifting regulating transformers.

### 1.2 Purpose

The purpose of this guide is to provide power transformer paralleling users with an easily accessible source for comparing control methods of transformer paralleling. This comparison allows the proper choice of control method and proper operation to best maintain proper system operations. The guide also provides an operational understanding to assist in the analysis of changing system configurations on paralleling operations.

## 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