

IEEE Guide for Paralleling Regulating Transformers

IEEE Power and Energy Society

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Transformers Committee

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IEEE Power and Energy Society

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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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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

1. Overview	1
1.1 Scope	1
1.2 Purpose	1
2. Normative references.....	1
3. Definitions, acronyms, and abbreviations	2
3.1 Definitions	2
3.2 Acronyms and abbreviations	3
4. Basic paralleling information	3
4.1 General application.....	3
4.2 Reasons for paralleled transformer operation.....	6
4.3 Basic voltage-control operation.....	6
4.4 Effects of off-tap operation.....	10
4.5 Consequences of less-than-optimal paralleling operation.....	14
4.6 Regulating transformer/system requirements for parallel operation.....	15
5. Requirements of the paralleling control system	16
5.1 Need for paralleling operation control.....	16
5.2 Basic paralleling control requirements	18
6. Equipment involved in paralleling.....	21
6.1 Regulating transformers.....	21
6.2 Step-voltage regulators	22
7. Parallel control method choice considerations	24
7.1 Paralleled transformer impedance	24
7.2 Unequal voltage-regulating tap-sizes and ranges.....	26
7.3 Transformers with multiple windings.....	26
7.4 Multiple (greater than two) paralleled transformers	28
7.5 Source bus configurations.....	28
8. Master/follower (MF) paralleling method.....	29
8.1 Operating principle	29
8.2 Control arrangements.....	29
8.3 Settings and sensitivity	31
8.4 Backup methods	32
8.5 Effects of non-similar transformers/configuration.....	33
8.6 Frequent application errors	37
9. Power factor (PF) paralleling method.....	37
9.1 Operating principle	37
9.2 Control arrangements.....	41
9.3 Settings and sensitivity	41
9.4 Backup methods	43
9.5 Effects of non-similar transformer/configuration	43
10. Negative (reverse) reactance paralleling method.....	48
10.1 Operating principle—control voltage biasing.....	48
10.2 Control arrangements.....	53

10.3 Settings and sensitivity	53
10.4 Backup methods	55
10.5 Effects of non-similar transformer/configuration	56
10.6 Frequent application errors	60
11. Circulating current (CC) paralleling method	60
11.1 Operating principle—control voltage (set point) biasing	60
11.2 Control arrangements.....	62
11.3 Settings/sensitivity	64
11.4 Backup methods	66
11.5 Effects of non-similar transformers/configurations	67
11.6 Frequent application errors and solutions	72
12. Circulating reactive current (CRC) paralleling method.....	72
12.1 Operating principle—control voltage (set point) biasing	72
12.2 Control arrangements.....	75
12.3 Settings/sensitivity.....	77
12.4 Backup methods	79
12.5 Effects of non-similar transformers/configurations	80
Annex A (informative) Bibliography	85
Annex B (informative) Paralleling transformers—impedance issues.....	86
B.1 Transformers of equal ratings	86
B.2 Transformers of different ratings	87
Annex C (informative) Concept of apparent circulating current	90
C.1 Paralleling issues.....	90
C.2 Apparent circulating current examples	91

IEEE Guide for Paralleling Regulating Transformers

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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