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IEEE Standard for Control Switchboards

IEEE Power and Energy Society

Sponsored by the
Switchgear Committee

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

IEEE Std C37.21™-2017
(Revision of IEEE Std C37.21-2005)

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Approved 23 March 2017

IEEE-SA Standards Board

Abstract: Ratings, construction, and testing of dead-front control switchboards containing, but not limited to, devices such as switches, control devices, instrumentation, metering, monitoring, alarms, annunciators, protective and auxiliary relays, and regulating devices and accessories are covered in this standard. It includes, but is not specifically limited to, switchboards for the control and protection of apparatus used for or associated with power generation, conversion, transmission, and distribution. Types of switchboards may include control, vertical, dead-front, enclosed, dual, or duplex switchboards. Other construction types include control desks, consoles, benchboards, dual or duplex benchboards, fixed rack, cabinet, and swing rack cabinets. It does not apply to industrial controls, communication equipment, switchboards for use on board ships, or Class 1E switchboards for use in nuclear generating stations.

Keywords: benchboard, console, control desk, control switchboard, dead-front switchboard, dual benchboard, duplex benchboard, enclosed switchboard, fixed rack cabinet, IEEE C37.21™, swing rack cabinet, vertical switchboard

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Introduction

This introduction is not part of IEEE Std C37.21–2017, IEEE Standard for Control Switchboards.

This standard has been revised to reflect changes that have been suggested since the 2005 revision of IEEE Std C37.21. The revisions in this standard include the following:

- Revised Switchgear Assemblies Diagram, Figure a
- Moved "General Application Guide" and "Handling, Storage, and Installation Guide" from normative part of standard to an informative annex
- Aligned Usual Service Conditions with IEEE Std C37.20.1™ [B6][1]
- Revision of the rain test to use the test method in IEEE Std C37.100.1™[2]
- Revision of the salt spray requirement for test of coatings from 200 h to 600 h, in line with revisions to other standards in the IEEE C37.20.X switchgear assemblies series of standards

The following revisions reflect changes made in the 1985 edition:

- Modification of the use of units to conform to the latest IEEE-SA policy on modification
- Removal of current ratings for control switchboards
- Clarification of requirements for production tests
- Clarification of voltage and current limits for instruments and control circuits
- Clarification of voltage circuit protection
- Clarification of altitude correction factors
- Expansion of nameplate requirements to include control switchboard ratings

This standard includes only the requirements for control switchboards (also called *control boards*). These requirements were originally a part of IEEE Std C37.20-1969. Other types of equipment originally included in IEEE Std C37.20-1969 are now incorporated in separate standards.

IEEE Std C37.20-1969 for many years covered all switchgear assemblies including metal-enclosed bus and control switchboards. Standards committees of IEEE Switchgear Assemblies Subcommittee and NEMA Power Switchgear Assemblies Technical Committee recommended that the document be further developed and, where appropriate, the various subclauses be identified with their own standards.

The Switchgear Assemblies Subcommittee of the Switchgear Committee of the IEEE Power Engineering Society was responsible for this revision.

This publication is one of a series covering switchgear assemblies as follows:

- IEEE Std C37.20.1™ [B6], Standard for Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear
- IEEE Std C37.20.2™ [B7], IEEE Standard for Metal-Clad Switchgear
- IEEE Std C37.20.3™ [B8], IEEE Standard for Metal-Enclosed Interrupter Switchgear

[1]The numbers in brackets correspond to those of the bibliography in Annex A.
[2]Information on references can be found in Clause 2.

— IEEE Std C37.20.7™, IEEE Guide for Testing Medium-Voltage Metal-Enclosed Switchgear for Internal Arcing Faults

— IEEE Std C37.21™, IEEE Standard for Control Switchboards

— IEEE Std C37.23™, IEEE Standard for Metal-Enclosed Bus

— IEEE StdC37.20.4™, IEEE Standard for Indoor AC Switches (1 kV–38 kV) for Use in Metal-Enclosed Switchgear

— IEEE Std C37.20.6™, IEEE Standard for 4.76 kV to 38 kV Rated Grounding and Testing Devices Used in Enclosures

— IEEE Std C37.24™, IEEE Guide for Evaluating the Effect of Solar Radiation on Outdoor Metal-Enclosed Switchgear

The following diagram depicts types of switchgear assemblies:

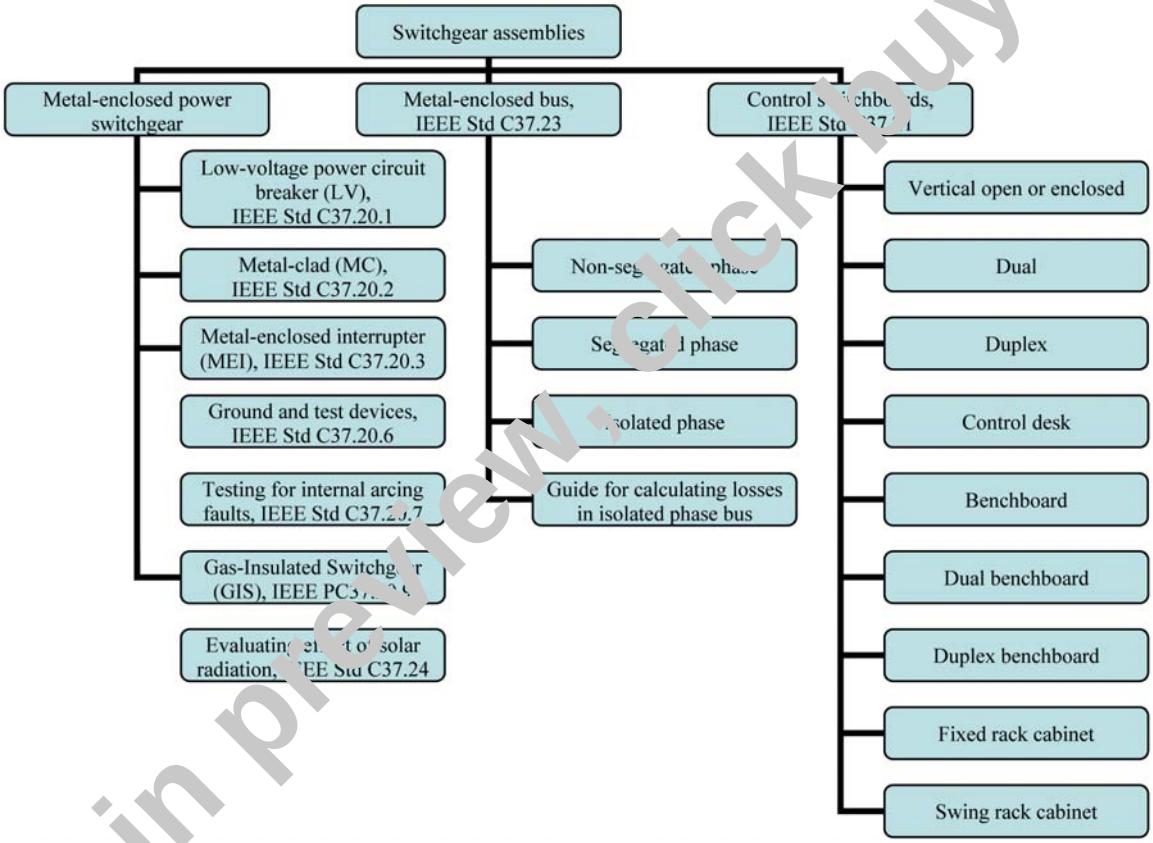

Figure a—Types of switchgear assemblies

Contents

IEEE Standard for Control Switchboards

1. Overview

1.1 Scope

This standard covers ratings, construction, and testing of dead-front control switchboards containing, but not limited to, devices such as switches, control devices, instrumentation, metering, monitoring, protective and auxiliary relays, and regulating devices and accessories.

It includes, but is not specifically limited to, switchboards for the control and protection of apparatus used for or associated with power generation, conversion, transmission, and distribution.

It does not apply to industrial controls, communication equipment, switchboards for use onboard ships, or Class 1E switchboards for use in nuclear generating stations, nor does it address human factor considerations.

In this standard, dead-front control switchboards shall be called control switchboards.

1.2 Types of switchboards

Switchboards may be freestanding or mounted on equipment or wall. Typical switchboard types are shown in Figure 1.

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.

ASTM B117, Standard Practice for Operating Salt Spray (Fog) Apparatus.[3]

ASTM D229, Standard Test Method for Rigid Sheet and Plate Materials Used for Electrical Insulation.

ASTM D714, Standard Test Method for Evaluating Degree of Blistering of Paints.

ASTM D1535, Standard Practice for Specifying Color by the Munsell System.

[3]ASTM publications are available from American Society of Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, USA (http://www.astm.org/).