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IEEE Standard for Control Switchboards

Sponsor
**Switchgear Committee
of the
IEEE Power Engineering Society**

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Foreword

(This Foreword is not a part of Draft ANSI/IEEE C37.21-1985, IEEE Standard for Control Switchboards.)

This publication includes only the requirements for control switchboards (also called control boards). These requirements were previously a part of ANSI/IEEE C37.20-1969. Other types of equipment previously included in ANSI/IEEE C37.20-1969 are now incorporated in separate publications.

ANSI/IEEE C37.20-1969 for many years covered all switchgear assemblies including metal-enclosed bus. 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 sections be identified with their own standards.

The following documents were developed and have been published for each product type based on ANSI/IEEE C37.20-1969:

- C37.20.1 — Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear (1000 V and below)
- C37.20.2 — Metal-Clad and Station-Type Cubicle Switchgear (above 1000 V)
- C37.20.3 — Metal-Enclosed Interrupter Switchgear (above 1000 V)
- C37.21 — Control Switchboards
- C37.23 — Guide for Metal-Enclosed Bus and Calculating Losses in Isolated-Phase Bus

Through this joint effort over the many years, the Switchgear Assemblies Standards have been of extreme value to the industry and further suggestions for improvement gained in the use of this standard will be welcomed. They should be sent to IEEE.

The Switchgear Assemblies Subcommittee of the IEEE Switchgear Committee, which prepared and approved this document, had the following membership:

S. C. Atkinson, *Chair*

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The IEEE Working Group that prepared and approved this document had the following membership:

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The NEMA Power Switchgear Assemblies Technical Committee of the NEMA Switchgear Section, which prepared and approved this document, had the following personnel:

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The C37 Subcommittee on Power Switchgear Assemblies, which reviewed and approved this standard, had the following membership:

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IEEE Standard for Control Switchboards

1. Scope and References

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 1) industrial controls, 2) communication equipment, 3) switchboards for use on board ship, 4) Class 1E switchboards for use in nuclear generating stations, nor 5) does it address human factor considerations.

1.2 References

The following publications shall be used in conjunction with this standard:

- [1] ANSI C2-1987, American National Standard National Electrical Safety Code.¹
- [2] ANSI Z55.1-1967 (R 1973), American National Standard Gray Finishes for Industrial Apparatus and Equipment.
- [3] ANSI/IEEE C37.90.1-1974 (R 1979), IEEE Guide for Surge Withstand Capability (SWC) Tests.²
- [4] ANSI/IEEE C37.100-1981, IEEE Standard Definitions for Power Switchgear.
- [5] ANSI/IEEE Std 100-1984, IEEE Standard Dictionary of Electrical and Electronics Terms.
- [6] ANSI/NEMA ICS1-1983, General Standards for Industrial Control and Systems.³
- [7] ANSI/NFPA 70-1987, National Electrical Code.⁴
- [8] ANSI/UL 44-1985, Safety Standard for Rubber-Insulated Control and Systems.⁵

¹ANSI publications are available from the Sales Department, American National Standards Institute, 1430 Broadway, New York, NY 10018.

²IEEE publications are available from the Institute of Electrical and Electronics Engineers, Service Center, 445 Hoes Lane, PO Box 1331, Piscataway, NJ 08855-1331.

³NEMA publications are available from the National Electrical Manufacturers Association, 2101 L Street, NW, Washington, DC 20037.

⁴NFPA publications are available from Publications Sales, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

⁵UL publications are available from Underwriters Laboratories Inc, Publication Stock, 33 Pfingsten Road, Northbrook, IL 60062.

- [9] ANSI/UL 486A-1982, Wire Connectors and Soldering Lugs for Use With Copper Conductors.
- [10] ASTM B117-85, Standard Method of Salt Spray (Fog) Testing.⁶
- [11] ASTM D229-82, Standard Method of Testing Rigid Sheet and Plate Materials Used for Electrical Insulation.
- [12] ASTM D714-56 (R 1981), Standard Method of Evaluating Degree of Blistering of Paints.
- [13] ASTM D1535-80, Standard Method of Specifying Color by the Munsell System.
- [14] ASTM D1654-79 (R 1984), Standard Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.
- [15] ASTM G21-70 (R 1980), Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- [16] IEEE C37.2-1987, IEEE Standard Electrical Power System Device Function Numbers.
- [17] NEMA WC5-1973, Thermoplastic Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy (ICEA S-61-402).
- [18] NEMA WC7-1971 (R 1976), Cross-Linked-Thermosetting Polyethylene-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy (ICEA S-66-524).

2. Definitions

The definitions of terms contained in this document, or in other standards referred to in this document, are not intended to embrace all legitimate meanings of the terms. They are applicable only to the subject treated in this standard.

If a term is not defined in this standard, the definition in ANSI/IEEE C37.100-1981 [4]⁷ applies. An asterisk (*) following a definition indicates that the definition in this standard is not contained in ANSI/IEEE C37.100-1981 while a dagger (†) indicates the definition differs from that in ANSI/IEEE C37.100-1981.

2.1 Type of Switchboards (see Fig 1)

2.1.1 control switchboard: A type of switchboard including control, instrumentation, metering, protective (relays) or regulating equipment for remotely controlling other equipment. Control switchboards do not include the primary power-switching devices or their connections.

2.1.2 vertical switchboard: A control switchboard composed only of vertical panels.

NOTE — This type of switchboard may be enclosed or have an open rear. An enclosed vertical switchboard has an overall sheet metal enclosure (not grille) covering back and ends of the entire assembly, access to which is usually provided by doors or removable covers.

2.1.3 enclosed switchboard: A dead-front switchboard that has an overall sheet metal enclosure (not grille) covering back, top, and ends of the entire assembly.[†]

NOTE — Access to the interior of the enclosure is usually provided by doors or removable covers.

2.1.4 dual switchboard: A control switchboard with front and rear panels separated by a comparatively short distance (no aisle) and enclosed at both ends and top. The panels on at least one side are hinged for access to the panel wiring.[†]

⁶ASTM publications are available from American Society for Testing and Materials, 1916 Race St, Philadelphia, PA 19103.

⁷The numbers in square brackets refer to those of the references listed in 1.2.