NEMA STANDARDS PUBLICATION NO. SG 5

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Power Switchgear Assemblies

NEMA

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION ■ 1300 N. 17th Street, Rosslyn, VA 22209

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POWER SWITCHGEAR ASSEMBLIES

Published by

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Foreword

This is one of two NEMA Standards Publications covering the range of low- to high-voltage switchgear products. Such products are generally applied to utility and industrial use with a portion going to commercial applications. User and general interest input played a significant part in the development of the product requirements carried by this publication. It, as well as other NEMA Standards Publications, is not intended to stand alone for without exception:

a. It adopts by reference the appropriate American National Standards (approved by Accredited Standards Committee C37, Power Switchgear) as the main body of this NEMA publication.
b. It offers a vehicle for getting into print the proposed NEMA revisions of the pertinent C37 Standards, until such time as those revisions can be evaluated, approved and published as a revision of the particular American National Standard.
c. It covers additional information about a product of specific interest to the manufacturing community, which the ANSI Standards Committee does not include in its scope.

Within this NEMA publication, therefore, the main focus is on American National Standards and the consensus method of standards approval used by ANSI.

Switchgear standards are, for the most part, developed through the combined and separate efforts of the Institute of Electrical and Electronics Engineers, Electric Light and Power and the National Electrical Manufacturers Association. Accredited Standards Committee C37 serves as the administrator through which are channeled all switchgear proposals intended for eventual publication as American National Standards. It is within these organizations that the principal manufacturer-user exchange is accomplished. This exposes product requirements to those people having the direct responsibility for the use, design, application, maintenance, and acceptance of the products and thus assures an objective and critical review within the voluntary standards program.

This Standards Publication has been developed in the public interest and is designed to promote a better understanding between the manufacturer and the user and to assist the user in selecting and obtaining the proper low-voltage power circuit breaker for his particular need.

These standards are periodically reviewed by the Switchgear Section of NEMA for any revisions necessary to keep them up to date with advancing technology. Proposed or recommended revisions should be submitted to:

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Section 1
GENERAL

1.1 SCOPE

This standards publication covers:

a. Power switchgear assemblies including, but not specifically limited to, equipment for the control and protection of apparatus used for power generation, conversion, transmission, and distribution:

1. Low-voltage metal-enclosed power AC circuit breaker switchgear assemblies, in indoor and outdoor, rated 1000 volts AC or less including, either drawout or stationary low-voltage power circuit breakers
2. Low-voltage metal enclosed power DC circuit breaker switchgear assemblies, indoor or outdoor rated 3200 volts DC or less, including either drawout or stationary DC circuit breakers
3. Metal-clad switchgear assemblies, indoor or outdoor, rated above 1000 volts AC, including drawout medium voltage power circuit breakers and/or load interrupter switches
4. Metal enclosed interrupter switchgear assemblies, indoor or outdoor, rated above 1000 volts AC, including drawout or stationary medium voltage load interrupter switches
5. Station type cubicle switchgear, indoor or outdoor, rated above 1000 volts AC, including stationary medium voltage power circuit breakers

b. Metal-enclosed bus assemblies over 100 volts with associated interconnections, enclosures and support structures.

c. Control switchboards, indoor or outdoor, rated 600 volts AC or 250 volts DC or less consisting of the following types:

1. Vertical switchboards, open or enclosed
2. Dual switchboards
3. Duplex switchboards
4. Control desks (console)
5. Benchboards
6. Dual and duplex benchboards
7. Fixed rack cabinets
8. Swing rack cabinets

d. Renewal and spare parts designed exclusively for any switch-gear assemblies enumerated in this section and not included in the scope of some other subdivision.

1.2 REFERENCED STANDARDS

In this Publication, reference is made to the standards listed below. Copies are available from the indicated sources.

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American National Standards Institute
11 West 42nd Street
New York, New York 10036

C37.20.1-1993	*Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear*
C37.20.2-1993	*Metal-Clad and Station-Type Cubicle Switchgear*
C37.20.3-1987 (R1992)	*Metal-Enclosed Interrupter Switchgear*
C37.21-1985 (R1991)	*Control Switchboards*
C37.23-1987 (R1991)	*Metal-Enclosed Bus and Calculating Losses in Isolated-Phase Bus*
C37.24-1986 (R1991)	*Guide for Evaluating the Effects of Solar Radiation on Outdoor Metal-Enclosed Switchgear*
C37.51-1989 (R1995)	*Conformance Testing of Metal-Enclosed Low-Voltage AC Power Circuit Breaker Switchgear Assemblies*
C37.54-1987	*Conformance Testing of Indoor AC High-Voltage Circuit Breakers Applied as Removable Elements in Metal-Enclosed Switchgear Assemblies*
C37.55-1989	*Conformance Testing of Metal-Clad Switchgear Assemblies*
C37.57-1990	*Conformance Testing of Metal-Enclosed Interrupter Switchgear Assemblies*
C37.58-1990	*Conformance Testing of Indoor AC Medium-Voltage Switches For Use in Metal-Enclosed Switchgear Assemblies*
C37.100-1992	*Definitions for Power Switchgear*

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Section 2
METAL-ENCLOSED LOW-VOLTAGE POWER CIRCUIT BREAKER SWITCHGEAR

2.1 EXCEPTIONS TO AMERICAN NATIONAL STANDARD C37.13-1990

The following American National Standard has been approved as a NEMA Standard and shall be inserted in this section: C37.20.1-1993.

Section 3
METAL-CLAD AND STATION-TYPE CUBICLE SWITCHGEAR

3.1 EXCEPTIONS TO AMERICAN NATIONAL STANDARD C37.20.2-1993

The following American National Standard has been approved as a NEMA Standard and shall be inserted in this section: C37.20.2-1993.

Section 4
METAL-ENCLOSED INTERRUPTER SWITCHGEAR

4.1 EXCEPTIONS TO AMERICAN NATIONAL STANDARD C37.20.3-1987 (R1992)

The following American National Standard has been approved as a NEMA Standard and shall be inserted in this section: C37.20.3-1987 (R1992).

Section 5
CONTROL SWITCHBOARDS

5.1 EXCEPTIONS TO AMERICAN NATIONAL STANDARD C37.21-1985 (R1991)

The following American National Standard has been approved as a NEMA Standard and shall be inserted in this section: C37.21-1985 (R1991).

Section 6
METAL-ENCLOSED BUS AND CALCULATING LOSSES IN ISOLATED-PHASE BUS

6.1 EXCEPTIONS TO AMERICAN NATIONAL STANDARD C37.23-1987 (R1991)

The following American National Standard has been approved as a NEMA Standard and shall be inserted in this section: C37.23-1987 (R1991).

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Section 7
GUIDE FOR EVALUATING THE EFFECTS OF SOLAR RADIATION ON OUTDOOR METAL-ENCLOSED SWITCHGEAR

7.1 EXCEPTIONS TO AMERICAN NATIONAL STANDARD C37.24-1986 (R1991)

The following American National Standard has been approved as a NEMA Standard and shall be inserted in this section: C37.24-1986 (R1991).

Section 8
CONFORMANCE TESTING OF METAL-ENCLOSED LOW-VOLTAGE AC POWER CIRCUIT BREAKER SWITCHGEAR ASSEMBLIES

8.1 EXCEPTIONS TO AMERICAN NATIONAL STANDARD C37.51-1989 (R1995)

The following American National Standard has been approved as a NEMA Standard and shall be inserted in this section: C37.51-1989.

Section 9
CONFORMANCE TESTING OF INDOOR AC HIGH-VOLTAGE CIRCUIT BREAKERS APPLIED AS REMOVABLE ELEMENTS IN METAL-ENCLOSED SWITCHGEAR ASSEMBLIES

9.1 EXCEPTIONS TO AMERICAN NATIONAL STANDARD C37.54-1987

The following American National Standard has been approved as a NEMA Standard and shall be inserted in this section: C37.54-1987.

Section 10
CONFORMANCE TESTING OF METAL-CLAD SWITCHGEAR ASSEMBLIES

10.1 EXCEPTIONS TO AMERICAN NATIONAL STANDARD C37.55-1989

The following American National Standard has been approved as a NEMA Standard and shall be inserted in this section: C37.55-1989.

Section 11
CONFORMANCE TESTING OF METAL-ENCLOSED INTERRUPTER SWITCHGEAR ASSEMBLIES

11.1 EXCEPTIONS TO AMERICAN NATIONAL STANDARD C37.57-1990

The following American National Standard has been approved as a NEMA Standard and shall be inserted in this section: C37.57-1990.

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Section 12
CONFORMANCE TESTING OF INDOOR AC MEDIUM-VOLTAGE SWITCHES FOR USE IN METAL-ENCLOSED SWITCHGEAR ASSEMBLIES

12.1 EXCEPTIONS TO AMERICAN NATIONAL STANDARD C37.58-1990

The following American National Standard has been approved as a NEMA Standard and shall be inserted in this section: C37.58-1990.

Section 13
DEFINITIONS FOR POWER SWITCHGEAR

13.1 EXCEPTIONS TO AMERICAN NATIONAL STANDARD C37.100-1992

The following American National Standard has been approved as a NEMA Standard and shall be inserted in this section: C37.100-1992.

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NEMA STANDARDIZATION BACKGROUND

The purpose of NEMA standards, their classification, and status are set forth in certain clauses of the NEMA *Standardization Policies and Procedures* manual and are referenced below:

Purpose of Standards

National Electrical Manufacturers Association Standards are adopted in the public interest and are designed to eliminate misunderstandings between the manufacturer and the purchaser and to assist the purchaser in selecting and obtaining the proper product for their particular needs. Existence of a National Electrical Manufacturers Association Standard does not in any respect preclude any member or nonmember from manufacturing or selling products not conforming to the standard.

Definition of a Standard

A standard of the National Electrical Manufacturers Association defines a product, process, or procedure with reference to one or more of the following; nomenclature, composition, construction, dimensions, tolerances, safety, operating characteristics, performance, rating, testing, and the service for which they are designed.

(Standardization Policies and Procedures, p. 1)

Dimensions

Where dimensions are given for interchangeability purposes, alternate dimensions satisfying the other provisions of the Standards Publication may be capable of otherwise equivalent performance.

(Standardization Policies and Procedures, p. 6)

Categories of Standards

National Electrical Manufacturers Association Standards are of three classes, which have received the affirmative vote of at least two-thirds of the Subdivision votes cast in the affirmative or negative:

NEMA Standard, which relates to a product, process, or procedure commercially standardized and subject to repetitive manufacture.

Suggested Standard for Future Design, which may not have been regularly applied to a commercial product, but which suggests a sound engineering approach to future development.

Adoptive Standard, which is adopted in whole or in part from the standards of another organization, either domestic, regional, or international.

(Standardization Policies and Procedures, p. 5)

Authorized Engineering Information

Authorized Engineering Information consists of explanatory data or other engineering information of an informative character not falling within the classification of NEMA Standard or Suggested Standard for Future Design, which standard has received the affirmative vote of at least two-thirds of the Subdivision votes cast in the affirmative or negative.

(Standardization Policies and Procedures, p. 5)

Identification of Status

Standards in NEMA Standards Publications are identified as "NEMA Standard," "Suggested Standard for Future Design," or "Adoptive Standard." These indicate the status of the standard. A statement incorporating the auxiliary verb "shall" indicates that compliance with a requirement is mandatory for compliance with the standard. These classes of standards are identified in the foreword or throughout the text.

The material identified as "Authorized Engineering Information" is designated similarly. Statements incorporating other auxiliary verbs such as "should," "may," etc. refer to the authorized engineering information and not to procedures required for compliance with the standard.

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SWITCHGEAR SECTION

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