



IEEE Standard for 4.76 kV to 48.3 kV Rated Ground and Test Devices Used in Enclosures

IEEE Power and Energy Society

Developed by the
Switchgear Committee

IEEE Std C37.20.6™-2024
(Revision of IEEE Std C37.20.6-2015)



STANDARDS

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Switchgear Committee
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Approved 6 June 2024

IEEE SA Standards Board

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Abstract: Drawout-type ground and test devices for use in medium-voltage metal-clad switchgear rated 4.76 kV through 48.3 kV are covered by this standard. The description, design, and testing of these accessory devices that are inserted in place of drawout circuit breakers for the purpose of grounding and testing are also covered.

Keywords: electrical operation, G&T, ground and test devices, IEEE C37.20.6™, locking/interlocking, manual operation, one or two terminal sets, terminal selector switch, test port

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Introduction

This introduction is not part of IEEE Std C37.20.6-2024, IEEE Standard for 4.76 kV to 48.3 kV Rated Ground and Test Devices Used in Enclosures.

Although ground and test (G&T) devices have been used as accessory devices in metal-clad switchgear for decades, they were not covered by standards until the original (1997) edition of this standard. This is because they are specialized accessory devices, designed and tested in accordance with applicable sections of circuit breaker standards and based on user-unique operational requirements.

This standard complements IEEE Std C37.20.2™, IEEE Standard for Metal-Clad Switchgear and IEEE Std C37.20.3™, IEEE Standard for Metal-Enclosed Interrupter Switchgear and addresses the more common G&T device types.⁶ IEEE Std C37.20.6™-2007 clarified that G&T devices are not required to have the interrupting and continuous current ratings of the circuit breakers they may temporarily replace for the purpose of grounding and testing medium-voltage circuits. IEEE Std C37.20.6-2007 also recognized that some devices may be offered that have interrupting capability and specified applicable tests to verify such ratings. The current revision makes no significant changes with respect to these issues. There are minor and editorial changes throughout this revision but little substantive change.

G&T devices are supplied in various forms, and the following list generally summarizes the more common forms:

- a) *Simple manual devices.* These devices are equipped with either one or two terminal sets for grounding through cables or bus, manually connected to the device ground connection system. Hot stick voltage testing is possible.
- b) *Complex manual devices.* These devices are equipped with one or two terminal sets and a manually operated switch. In the case of a device with one terminal set, the switch allows connection of the terminal set to the device ground connection system or disconnection of the terminal set from the device ground connection system. In the case of a device with two terminal sets, the switch allows selection of which terminal set to connect to the device ground connection system. In either case, the switch is manually operated and is not required to have any continuous or fault-making current ratings.
- c) *Simple electrical devices.* These devices are equipped with one terminal set connected, through a power-operated ground-making switch, to the device ground connection system. Voltage test ports may be provided. A second terminal set may be included for connection to test ports.
- d) *Complex electrical devices.* These devices are equipped with two terminal sets and a manually operated switch for selecting which terminal set is to be connected, through the power-operated ground-making switch, to the device ground connection system. Voltage test ports may be provided.

All G&T devices are equipped with necessary isolation barriers and locking or interlocking mechanisms to provide some degree of protection during handling and operation.

This standard does not cover G&T devices that are specially equipped with current and voltage transformers, glow-tubes, and like components.

This revision, as in IEEE Std C37.20.6™-2007, uses the rating system introduced in IEEE Std C37.04™-1999, with voltage range factor (K) set equal to 1.0, effectively eliminating the voltage range factor from the ratings basis. It is recognized that some G&T devices may be required for use with equipment manufactured and rated to the older rating system. For such applications, the user should refer to IEEE Std C37.20.6™-1997.

⁶Information on references can be found in [Clause 2](#).

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IEEE Standard for 4.76 kV to ~~48.3~~ 38 kV Rated Ground and Test Devices Used in Enclosures

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1. Overview

1.1 Scope

This standard covers drawout-type, indoor, medium-voltage ground and test (G&T) devices for use in drawout metal-clad switchgear rated 4.76 kV through ~~48.3~~ 38 kV as described in IEEE Std C37.20.2™ ~~and IEEE Std C37.20.3™.~~⁷ † Four G&T device types are generally ~~applied~~ **supplied** for temporary circuit maintenance procedures for insertion in place of the circuit breaker as follows:

- a) Simple manual devices
- b) Complex manual devices
- c) Simple electrical devices
- d) Complex electrical devices

⁷ † Information on references can be found in Clause 2.

There may be more complicated G&T devices that may include current and/or voltage transformers, glow tubes, or other accessory components. These more complex devices are not covered by this standard. Due to their complexity, additional testing and interlocking are required, and manufacturers should be consulted for the availability and ratings of these types of devices.

1.2 Purpose

Although G&T devices have been used as accessory devices in metal-clad switchgear for decades, they were not addressed in the standards until IEEE Std C37.20.6™-1997 was approved. This is because they are specialized accessory devices, designed and tested in accordance with applicable sections of circuit breaker standards, and based on user-unique operational requirements. This revised standard complements IEEE Std C37.20.2 and [IEEE Std C37.20.3 and](#) addresses the more common G&T device types. This standard also clarifies that G&T devices are not required to have [either](#) the interrupting [or](#) ~~and~~ continuous current ratings of the circuit breakers they may temporarily replace for the purpose of grounding and testing medium-voltage circuits. It also recognizes that some devices may be offered with interrupting capabilities, and required tests for such devices are specified.

1.3 Word usage

The word *shall* indicates mandatory requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted (*shall equals is required to*).^{8,9}

The word *should* indicates that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required (*should equals is recommended that*).

⁸ The use of the word *must* is deprecated and cannot be used when stating mandatory requirements; *must* is used only to describe unavoidable situations.

⁹ The use of *will* is deprecated and cannot be used when stating mandatory requirements; *will* is only used in statements of fact.

The word *may* is used to indicate a course of action permissible within the limits of the standard (*may equals is permitted to*).

The word *can* is used for statements of possibility and capability, whether material, physical, or causal (*can equals is able to*).

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.

ANSI Z535.4, American National Standard [for](#) – Product Safety Signs and Labels. ^{10 2}

IEEE Std 4TM, IEEE Standard for High-Voltage Testing Techniques. ^{11,12 3,4}

IEEE Std C37.04TM, IEEE Standard [Ratings and Requirements](#) ~~Rating Structure~~ for AC High-Voltage Circuit Breakers [with Rated Maximum Voltage Above 1000 V](#).

~~IEEE Std C37.06TM, IEEE Standard for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis—Preferred Ratings and Related Required Capabilities for Voltages Above 1000 V.~~

^{10 2} ANSI [publications are](#) ~~Z535.4 is~~ available from [the American National Standards Institute \(https://www.ansi.org/\)](https://www.ansi.org/) ~~NEMA, 1300 North 17th Street, Suite 900, Arlington, VA 22209 USA (http://nema.org).~~

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IEEE Std C37.09™, IEEE Standard Test ~~Procedures~~ ~~Procedure~~ for AC High-Voltage Circuit Breakers with Rated ~~Maximum Voltage Above 1000 V on a Symmetrical Current Basis~~.

IEEE Std C37.20.2™, IEEE Standard for Metal-Clad Switchgear.

~~IEEE Std C37.20.3™, IEEE Standard for Metal-Enclosed Interrupter Switchgear Rated above 1 kV AC up to and Including 48.3 kV AC.~~

~~IEEE Std C37.20.10 IEEE Std C37.100™, IEEE Standard Definitions for AC (52 kV and below) and DC (3.2 kV and below) Power Switchgear Assemblies.~~

NFPA 70E®, Standard for Electrical Safety in the Workplace. ¹³ ⁵

3. Definitions

For the purposes of this document, the following terms and definitions apply. ~~The IEEE Standards Dictionary Online should be consulted for terms not defined in this clause.~~⁶

When multiple definitions exist, the definitions shall be evaluated in the following priority:

- a) Definitions embedded in this standard shall be used.
- b) For terms not defined within this standard, the definitions within IEEE Std C37.20.10 shall be used.
- c) For terms not defined in either this standard or IEEE Std C37.20.10, the IEEE Standards Dictionary Online should be consulted.¹⁴

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¹⁴ IEEE Standards Dictionary Online is available at: <http://dictionary.ieee.org>. An IEEE account is required for access to the dictionary, and one can be created at no charge on the dictionary sign-in page.

⁶ ~~IEEE Standards Dictionary Online subscription is available at: http://www.ieee.org/portal/innovate/products/standard/standards_dictionary.html.~~

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

complex electrical ground and test device: A device with two terminal sets and a manually operated terminal selector switch for connecting either terminal set to the device ground connection system through a power-operated ground-making switch, complete with necessary isolation barriers and suitable interlocking. These devices may, but are not required to, have interrupting capability. Test ports may be provided.

complex manual ground and test device: A device with one or two terminal sets⁷ and a manually operated switch⁷ complete with necessary isolation barriers and suitable interlocking. In the case of a device with one terminal set, the switch allows connection of the terminal set to the device ground connection system or disconnection of the terminal set from the device ground connection system. In the case of a device with two terminal sets, the switch allows selection of which terminal set to connect to the device ground connection system. In either case, the switch is not required to have any continuous or fault-making current ratings. Test ports may be provided.

design tests: Tests made by the manufacturer to determine the adequacy of the design of a particular type, style, or model of equipment or its component parts to meet its assigned ratings and to operate satisfactorily under normal service conditions or under special conditions if specified; **and** may be used to demonstrate compliance with applicable standards of the industry. *Syn:* **type tests.**

ground and test (G&T) device: A ~~term applied to a~~ switchgear assembly accessory device that can be inserted in place of a drawout circuit breaker for the purpose of grounding the main bus and/or external circuits connected to the switchgear assembly and/or primary circuit testing.

ground connection system: The conductors of a ground and test device and a circuit breaker compartment that provide the connection between the ground and test device to the ground bus of the circuit breaker compartment.