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IEEE Standard Requirements for Electrical Control for AC High-Voltage (>1000 V) Circuit Breakers

IEEE Power and Energy Society

Sponsored by the

Switchgear Committee

IEEE
3 Park Avenue
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USA

IEEE Std C37.11™-2014
(Revision of
IEEE Std C37.11-1997)

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IEEE Standard Requirements for Electrical Control for AC High-Voltage (>1000 V) Circuit Breakers

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IEEE Power and Energy Society

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Abstract: Standard requirements for all types of electrical control circuits for ac high-voltage circuit breakers rated above 1000 V are given. This standard is applicable for any type of power-operated mechanism and for both ac and dc control power. Only basic control elements of the circuit breaker, including reclosing where required, are included in this standard. Devices or circuits for protective relaying, special interlocking, etc., are not included.

Keywords: ac high-voltage circuit breakers, alarm circuits, auxiliary contacts, auxiliary switch, closing, control schemes, electrical control, grounding, heater circuits, IEEE C37.11™, metal-clad switchgear, metal-enclosed switchgear, motor circuits, opening, re-closing, tripping

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Introduction

This introduction is not part of IEEE Std C37.11™-2014, IEEE Standard Requirements for Electrical Control for AC High-Voltage (>1000 V) Circuit Breakers.

This standard is a revision of IEEE Std C37.11-1997. There have been editorial changes in all figures and Figure 5 has had the requirement for safety disconnecting devices on all power sources clarified; Figure 9 has been added to reflect optional contacts which are commonly in use on many circuit breakers. Among the normative changes is one which allows the use of molded case circuit breakers or switches as disconnecting devices for control power on circuit breakers where previously only a knife switch or fuse block was permitted. The purpose is to bring this standard up-to-date and in line with present-day requirements for ac high-voltage power circuit breakers and to bring it into agreement with IEEE Std C37.100™-1992, IEEE Standard Definitions for Power Switchgear.

As reflected in the title, this standard applies to ac high-voltage circuit breakers rated on a symmetrical current basis. A wide variety of control schemes are now in use by companies. Many of these users consider it essential that their particular scheme be continued so as to maintain unified operating practices within their company. It has been necessary, therefore, to set up certain preferred arrangements for wiring at the circuit breaker. These arrangements, in effect, constitute standards for production of the circuit breakers. They are, however, sufficiently versatile to permit the majority of users to connect the circuit breaker to their external circuits to achieve the required control scheme without changing the internal wiring of the circuit breaker. Diagrams of typical operating connections are included in this standard to demonstrate this versatility.

A number of circuit breakers now incorporate electronics in their control devices. This standard has been updated to address certain aspects of circuit breaker operations with electronic control devices. Additionally, new circuit breakers which utilize a magnetic operator as the prime mover for the circuit breaker are now being produced; these are also considered in this standard.

This standard includes only the basic control elements of the circuit breaker, including reclosing where required. It does not include devices or circuits for protective relaying, special interlocking, etc., since these are dependent upon the specific application of a particular circuit breaker. This standard is not intended to preclude the possibility of obtaining, as additional equipment, such devices or circuits, including auxiliary switches in excess of the specified minimum requirements, where necessary in a specific application.

It is not intended that the standard be considered inflexible as to future change. Future developments in application and manufacturing, as well as further study of existing requirements, should result in revision and expansion of the standard.

The explanatory notes that appear in small type are included to give the user of this standard the reason or background for certain requirements.

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IEEE Standard Requirements for Electrical Control for AC High-Voltage (>1000 V) Circuit Breakers

1. Overview

1.1 Scope

This standard establishes basic requirements for the control schemes of electrically controlled ac high-voltage circuit breakers rated above 1000 V. This standard is applicable to any type of power-operated mechanism and for both ac and dc control power. Only the basic control elements of the circuit breaker, including reclosing where required, are included in this standard. This standard does not include devices or circuits for protective relaying, special interlocking, etc., since these are dependent upon the specific application of a particular circuit breaker.

1.2 Purpose

The purpose of this standard is to establish basic requirements for ac high-voltage power circuit breaker control schemes so that users and manufacturers can affect engineering and production economies by reducing the multiplicity of special control schemes that are specified in the absence of standards.