

American Standard Requirements for Power Circuit Breaker Control

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Foreword

(This Foreword is not a part of American Standard Requirements for Power Circuit Breaker Control, C37.11-1957.)

This standard has been developed by the Subject Committee on Power Circuit Breaker Control, Committee on Electric Switching and Switchgear, Association of Edison Illuminating Companies. The Subject Committee included ten representatives from operating companies and four advisory representatives from manufacturing companies, as follows:

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

A wide variety of control schemes is now in use by operating companies and many of these users consider it essential that their particular scheme be continued so as to maintain unified operating practices within their companies. It has been necessary, therefore, to set up certain preferred arrangements for wiring at the circuit breaker which, in effect, constitute standards for production of the circuit breakers, but which are sufficiently versatile to permit the majority of users to connect the circuit breaker to their external circuits to get the control scheme they require without changing the internal wiring of the circuit breaker as manufactured. Diagrams of typical operating connections are included in this standard to demonstrate this versatility.

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. The standard, however, 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 both application and manufacturing as well as further study of existing requirements should result in revision and expansion of the standard.

The explanatory notes which appear in fine print are not a part of this standard. They are included to give the user of the standard the reasons or background for certain requirements.

This standard was submitted to the ASA Sectional Committee on Power Switchgear, C37, for approval. Suggestions for improvement gained in the use of the standard will be welcomed. They should be sent to the American Standards Association, Incorporated, 70 East Forty-fifth Street, New York 17, N. Y.

The ASA Sectional Committee on Power Switchgear, C37, which reviewed and approved this standard, had the following personnel at the time of approval:

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American Standard Requirements for Power Circuit Breaker Control

1. Scope

1.1 This standard applies to all types of electrically controlled indoor and outdoor power circuit breakers, including circuit breakers in switchgear cubicles and in metal-clad switchgear, having an interrupting rating of 50 megavolt-amperes (mva) or higher and a voltage rating above 1500 volts.

This standard applies for any source of circuit breaker operating energy, such as solenoid, motor, spring, compressed gas, etc, for any type of operating mechanism and for both a-c and d-c control power.

2. Functional Requirements

2.1 The basic functional requirements of the control scheme for a circuit breaker are as follows:

2.1.1 The circuit breaker mechanism shall make one complete closing operation, including automatic cut-off of closing power, after an initiating control device has operated and the first device in the control scheme has responded, even though the contacts of the initiating control device are opened before the circuit breaker closing operation is completed.

NOTE: This requirement insures that, after the closing operation has been initiated, a seal-in circuit will be provided so that the closing operation will be completed automatically, even though the operator releases the control switch before the circuit breaker is completely closed.

Control schemes in which the seal-in circuit is disconnected or made inoperative are objectionable because of the hazard to circuit breaker performance.

2.1.2 Only one closing operation of the circuit breaker mechanism shall result from each closing operation of a manually operated initiating control device, even though the circuit breaker trips while the initiating control device is being held in the closed position.

NOTE: This requirement insures that the circuit breaker will not "pump" when it trips during a closing operation when closed against a fault or fails to latch.

The control scheme need not provide against reclosure in the event that control power is removed by casual and entirely random occurrences, such as the opening of a control circuit to check for grounds, while the initiating control device remains closed.

The control scheme should, however, provide against reclosure in the event that control power is

lost or reduced in voltage, for reasons directly and regularly related to the closing operation, while the initiating control device remains closed. A typical example is the case in which control power is obtained from the primary power system and has its voltage reduced when the circuit breaker closes against a fault.

NOTE: It is recognized that, with automatically operated initiating devices of the maintained-contact type such as pressure switches, fluid-level switches, etc, lockout relays or other devices are necessary to prevent reclosure, if control power is lost during or subsequent to a circuit breaker tripping while the initiating device remains closed. Such cases are considered to be specific applications which these requirements are not intended to cover.

2.1.3 When power is removed from the closing control circuit after or during an incompleted closing operation, all electrically operated devices in the control circuit shall reset to the normal circuit breaker open position, except for those devices which require a supply of control power in order for them to assume their normal circuit breaker open position.

NOTE: This requirement insures that, if the control power supply is removed during an incompleted closing operation, all the control devices will restore to the normal circuit breaker open position so that an additional operation of the master control device will be required to close the circuit breaker. The reference to devices which require a supply of control power to assume their normal circuit breaker open position covers control schemes which employ a reverse "Y" relay control.

2.1.4 When the circuit breaker is in the closed position, a closing operation of an initiating control device shall not result in an operation of the circuit breaker closing mechanism.

NOTE: This requirement insures against unnecessary mechanical operation of the circuit breaker mechanism, with accompanying shock and possibility of trip-out.

2.1.5 When a closing operation of a circuit breaker having a stored-energy type operating mechanism, such as air, oil, or a charged spring, cannot be completed successfully because of the absence of an adequate supply of stored energy, all actuating devices in the control circuit shall remain in the normal circuit breaker open position when the initiating control device is operated.

2.1.6 When a tripping operation of an air-blast circuit breaker cannot be completed successfully because of the absence of an adequate supply of air, all actuating devices in the control circuit shall