

American National Standard

for switchgear –
high-voltage air switches –
rated control voltages and their ranges
(addition to table 1)

Approved July 19, 1990

Secretariat: National Electrical Manufacturers Association

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Foreword

(This Foreword is not part of American National Standard C37.33a-1990.)

This standard is a supplement to American National Standard for Switchgear – High-Voltage Air Switches – Rated Control Voltages and Their Ranges, ANSI C37.33-1987, which is one of a series of complementary American National Standards on High-Voltage Air Switches, Insulators, and Bus Supports.

ANSI C37.32-1990, Schedules of Preferred Ratings, Manufacturing Specification, and Application Guide for High-Voltage Air Switches, Bus Supports, and Switch Accessories¹

ANSI/IEEE. C37.30-1971 (R1988), C37.30g-1979 (R1988), C37.30c-1984 (R1988), and C37.30e-1984 (R1988), Definitions and Requirements for High-Voltage Air Switches, Insulators, and Bus Supports (in Excess of 1000 Volts)

¹ At the time this standard was being prepared, ANSI C37.32-1990 was under development. Contact the Secretariat for more information.

ANSI/IEEE C37.34-1971 (R1988), C37.34a-1978 (R1988), and C37.34b-1985, Test Code for High-Voltage Air Switches

ANSI/IEEE C37.35, Guide for the Application, Installation, Operation, and Maintenance of High-Voltage Air Disconnecting and Load Interrupter Switches²

1. Scope

This standard specifies additional nominal voltage ratings and permissible ranges for power-operated mechanisms and auxiliary devices, when measured at their terminals with maximum operating current flowing.

2. Rated Control Voltages and Their Ranges

Same as in ANSI C37.33-1987.

² At the time this standard was being prepared, ANSI/IEEE C37.35 was under development. Contact the Secretariat for more information.

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**Addition to Table 1
Rated Control Voltages and Their Ratings (1,2,3)
Class A Devices (4)**

Nominal Voltage Rating, Volts	Voltage Range, Volts	
	Operating and Auxiliary Functions (5)	Tripping Functions (6)
	Direct Current (7,8)	
12 (9)	10-14	7-14

NOTES:

- 1) Electrically operated motors, contactors, solenoids, valves, and the like need not carry a nameplate voltage rating that corresponds numerically to the nominal voltage rating shown in Table 1 as long as these components perform the intended duty cycle (usually intermittent) in the voltage range specified.
- 2) Relays, motors, or other auxiliary equipment that functions as part of the control for a device shall be subject to the voltage limits imposed by this standard, whether mounted at the device or at a remote location.
- 3) Switchgear devices in some applications may be exposed to control voltages exceeding those specified here due to abnormal conditions such as abrupt changes in line loading. Such applications require specific study, and the manufacturer should be consulted. Also, application of switchgear devices containing solid-state control exposed continuously to control voltages approaching the upper limits of ranges specified herein requires specific attention, and the manufacturer should be consulted before application is made.
- 4) Power-operated mechanisms and devices for this standard are Class A devices, that is, they are utilized in applications of a critical nature where the ability of the power-operated mechanism or device to function is essential to the integrity of large or important systems. (In contrast, some other switchgear standards may have Class B devices, that is, they are for applications that are less critical and where a failure to function will not result in extensive loss of service.)
- 5) Operating functions include (a) the opening and closing power mechanisms, and (b) the means (coils, contactors, seal-in relays, and the like) to actuate the power mechanisms. Auxiliary functions include all functions except operating and tripping.
- 6) Tripping is the release of the holding means that permits stored energy to open or close a device, such as an interrupter switch, fault initiating switch, and the like.
The lower limits of tripping voltage ranges for Class A direct-current devices are somewhat lower than those of Class B devices to ensure operation under adverse conditions.
Alternating-current tripping is not generally recommended for Class A devices; however, some Class A switches may be tripped by specially designed alternating-current trip devices suitable for the particular application.
- 7) It is recommended that the coils of operating, auxiliary, and tripping devices that are connected continually to one direct-current potential should be connected to the negative control bus so as to minimize electrolytic deterioration.
- 8) Power-operated mechanisms having self-contained direct-current control sources shall operate over the range of 85 percent to 115 percent of nominal voltage, and Table 1 shall not apply.
- 9) 12-, 24-, or 48-volt tripping, operating, and auxiliary functions are recommended only when the device is located near the battery or where special effort is made to ensure the adequacy of conductors between battery and control terminals. The 12- or 24-volt operating function for Class A devices is not recommended.

ANSI C37.33a-1990

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Approved February 18, 1987

Secretariat: National Electrical Manufacturers Association

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Foreword

(This Foreword is not part of American National Standard C37.33-1987.)

This publication is one of a series of complementary American National Standards on High Voltage Air Switches, Insulators, and Bus Supports.

ANSI/IEEE C37.30-1971, C37.30g-1979, C37.30c-1984, and C37.30e-1984, Definitions and Requirements for High-Voltage Air Switches, Insulators, and Bus Supports

ANSI C37.32-1972, Schedules of Preferred Ratings, Manufacturing Specifications, and Application Guide for High-Voltage Air Switches, Bus Supports, and Switch Accessories

ANSI/IEEE C37.34-1971, C37.34a-1978, and C37.34b-1985, Test Code for High-Voltage Air Switches

ANSI C37.35-1976, Guide for the Application, Installation, Operation, and Maintenance of High-Voltage Air Disconnecting and Load Interrupter Switches

Suggestions for improvement of this standard will be welcome. They should be sent to the National Electrical Manufacturers Association, 2101 L Street, NW, Washington, DC 20037.

1. Scope

This standard specifies the nominal voltage ratings and permissible ranges for power-operated mechanisms and auxiliary devices, when measured at their terminals with the maximum operating current flowing.

An American National Standard implies a consensus of those substantially concerned with its scope and provisions. An American National Standard is intended as a guide to aid the manufacturer, the consumer, and the general public. The existence of an American National Standard does not in any respect preclude anyone, whether he has approved the standard or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standard. American National Standards are subject to periodic review and users are cautioned to obtain the latest editions.

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2. Rated Control Voltages and Their Ranges

2.1 Definition. Class A is the designation applicable to the equipment covered by the related Standards, ANSI C37.30 to C37.35. Class A devices are utilized in applications of a critical nature where the ability of the power-operated mechanism or device to function is essential to the integrity of large or important systems.

2.2 Control Voltages. The rated control voltages and their ranges for power-operated mechanisms used on Class A high-voltage air switches shall be as shown in

Table 1. Operating, auxiliary and tripping functions will be performed satisfactorily when control voltages are within the ranges given in the table.

2.3 Torque Requirements. Power-operated mechanisms shall develop the manufacturer's rated torque when operating at the nominal voltage rating, but not necessarily when operating at a voltage below the nominal voltage rating.

NOTE: The rated torque requirement at minimum control voltage shall be considered nonstandard.

Table 1
Rated Control Voltages and Their Ratings (1, 2, 3)
Class A Devices (4)

Nominal Voltage Rating, Volts	Voltage Range, Volts	
	Operating and Auxiliary Functions (5)	Tripping Functions (6)
	Direct Current (7, 8)	
24 (9)	—	14–28
48 (9)	36–56	28–56
125	90–140	70–140
250	180–280	140–280
	Single-Phase Alternating Current (60 Hz)	
120	104–127 (10)	—
240	208–254 (10)	—
480	416–508 (10)	—
	Poly-Phase Alternating Current (60 Hz)	
208Y/120	180Y/104–220Y/127	—
240	208–254	—
480	416–508	—
480Y/277	416Y/240–508Y/292	—

NOTES:

(1) Electrically operated motors, contactors, solenoids, valves, and the like, need not carry a nameplate voltage rating that corresponds numerically to the nominal voltage rating shown in Table 1 as long as these components perform the intended duty cycle (usually intermittent) in the voltage range specified.

(2) Relays, motors, or other auxiliary equipment that function as part of the control for a device shall be subject to the voltage limits imposed by this standard, whether mounted at the device or at a remote location.

(3) Switchgear devices in some applications may be exposed to control voltages exceeding those specified here due to abnormal conditions such as abrupt changes in line loading. Such applications require specific study, and the manufacturer should be consulted. Also, application of switchgear devices

containing solid-state control exposed continuously to control voltages approaching the upper limits of ranges specified herein require specific attention, and the manufacturer should be consulted before application is made.

(4) Power-operated mechanisms and devices for this standard are Class A devices, that is, they are utilized in applications of a critical nature where the ability of the power-operated mechanism or device to function is essential to the integrity of large or important systems. (In contrast, some other switchgear standards may have Class B Devices, that is, they are for applications that are less critical and where a failure to function will not result in extensive loss of service.)

(5) Operating functions include (a) the opening and closing power mechanisms, and (b) the means (coils, contactors, seal-in relays, and the like) to actuate the power mechanisms. Auxiliary functions include all functions except operating and tripping.

(6) Tripping is the release of the holding means that permits stored energy to open or close a device, such as an interrupter switch, fault initiating switch, and the like.

The lower limits of tripping voltage ranges for Class A direct-current devices are somewhat lower than those of Class B devices to ensure operation under adverse conditions.

Alternating-current tripping is not generally recommended for Class A devices; however, some Class A switches may be tripped by specially designed alternating-current trip devices suitable for the particular application.

(7) It is recommended that the coils of operating, auxiliary, and tripping devices that are connected continually to one direct-current potential should be connected to the negative control bus so as to minimize electrolytic deterioration.

(8) Power-operated mechanisms having self-contained direct-current control sources shall operate over the range of 85 percent to 115 percent of nominal voltage, and Table 1 shall not apply.

(9) 24-volt tripping and auxiliary functions or 48-volt tripping, operating, and auxiliary functions are recommended only when the device is located near the battery or where special effort is made to ensure the adequacy of conductors between battery and control terminals. The 24-volt operating function is not recommended for Class A devices.

(10) Includes heater circuits and supply for pump or compressor motors.

ANSI C37.33-1987