

Switching Devices —Low Voltage

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Switching Devices—Low Voltage

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Specifications

See Eaton's *Product Specification Guide*, available on the Web.

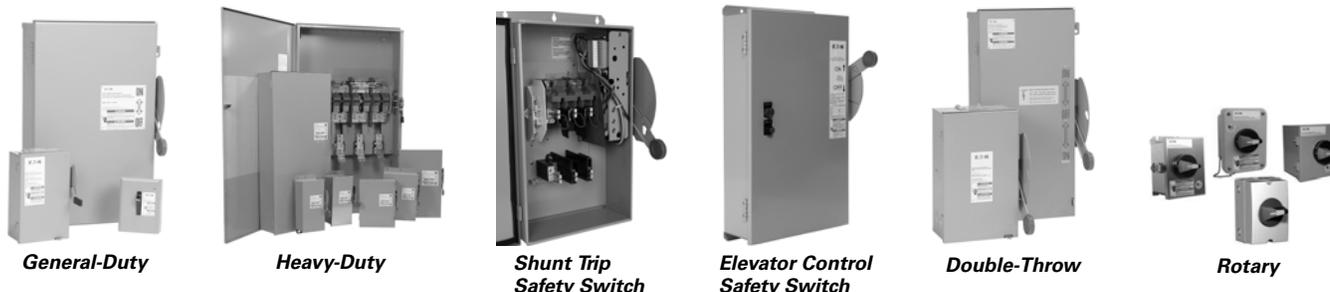
CSI Format:	1995	2010
Safety Switches	Section 16441A	Section 26 28 16.16
Auxiliary Power Heavy-Duty Safety Switch	Section 16441B	Section 26 28 16.23
Elevator Control Switch	Section 16445	Section 26 28 16.17
Quick-Connect Double-Throw	Section 16441A Paragraph 2.05	Section 26 28 16.16 Paragraph 2.05
1000 Vdc Solar Safety Switches	Section 16441D	Section 26 28 16.16
600 Vdc Solar Safety Switches	Section 16441E	Section 26 28 16.16
Shunt Trip Safety Switch	Section 16441A Paragraph 2.03.B.16	Section 26 28 16.16



Quick-Connect Double-Throw Safety Switches

General Description

Safety Switches



Safety switches have a number of applications from service entrance to branch circuit protection. They are also horsepower rated for use as motor circuit switches. **Table 28.0-1** summarizes major differences and similarities between the heavy-duty and general-duty type of Eaton’s safety switches. In addition to heavy-duty and general-duty applications, we have seen many industry trends that have created needs for specialized versions of safety switches:

- Eaton’s EnviroLine line of switches come with options for stainless steel enclosures, mechanisms and springs, various types of interlocked receptacles, viewing windows and also non-metallic enclosures for use in abnormal environments. Solar switches made to meet specific requirements and demands of the solar industry

- Quick connect switches for quick connection of portable generators and loads
- Shunt trippable switches for a quick and safe means to remotely open a switch in an emergency situation
- Elevator control switches to provide a one-stop method to meet demands of the NEC and building codes for elevator circuits
- Auxiliary power switches for providing control power for HVAC and other applications that may require disconnect and receptacle to meet NEC requirements
- Rotary switches for OEM and compact applications where space is limited
- NEMA Type 7/9 switches—Class I, Div I and II rated—for harsh industrial applications and environments

If you don’t see your specific application listed above, make sure to call your local Eaton salesperson to discuss the capabilities of our Flex Center that will provide custom switches to meet many industry needs.

The following pages give more details on the many types of switching devices Eaton can provide to meet your every need.

Seismic Qualification



Refer to **Tab 1** for information on seismic qualification for this and other Eaton products.

Table 28.0-1. Safety Switch Application Guide—See Catalog Selection Tables for Specific Ratings

Application/ Features	General-Duty Safety Switches	Heavy-Duty Safety Switches
Type of facility	Residential, commercial, light industrial	Commercial, institutional, industrial
Maximum voltages	240 Vac—250 Vdc in larger sizes	600 Vac—250 Vdc and 600 Vdc
Short-circuit rating for non-fused switches	10,000 rms symmetrical amperes	10,000 rms symmetrical amperes. Higher combination ratings available with upstream Eaton molded-case circuit breakers and fuses.
Short-circuit rating with standard fuse clips	With Class H fuse clips—10,000 rms symmetrical amperes	Switches with Class H Fuse Clips—10,000 rms amperes 800–1200 A switches with Class L fusing—200,000 rms
Short-circuit rating with fuse options	Class R fuse adaptation and 400–600 A switches with T or J fuse adaptation—100,000 rms amperes	Switches with Class R or Class J fusing and 200–800 A switches with Class T fuse adaptation—200,000 A at 480 V and 100,000 rms symmetrical amperes at 600 V
Ampere sizes	30, 60, 100, 200, 400, 600	30, 60, 100, 200, 400, 600, 800, 1200
Maximum horsepower ratings	200 hp at 240 Vac	250 hp at 240 V, 500 hp at 480 and 600 Vac
UL (NEMA) enclosure types	Type 1—general purpose indoor use Type 3R—rainproof and sleet-resistant	Type 1 indoor, 3R outdoor Type 4 watertight and dust-tight Type 4X watertight, dust-tight and corrosion-resistant Type 12 indoor falling dust, dirt and liquids Type 12/3R convertible to outdoor use Type 7/9 hazardous (classified) locations
Terminals	Box lug (screw pressure) for Al/Cu wire	Box lug (screw pressure) for Al/Cu wire
Electrical interlock—snap-switch type	Field-installed kit, 200–600 A sizes	Field- or factory-installed for all sizes
Control pole interlock	Field-installed kit, 400–600 A sizes	Field- or factory-installed for K-Series switches
Fuse pullers	Not available	Standard in Type 4X and 12 enclosed switches through 200 A field- or factory-installed for all other 30–200 A switches

General-Duty



General-Duty (Plug Fuse)



General-Duty (Cartridge Fuse)

For residential and commercial applications. Suitable for light-duty motor circuits and service entrance.

- 240 Vac
- 30–600 A
- For short-circuit ratings, see Technical Data
- Suitable for service entrance applications unless otherwise noted
- Fusible and non-fusible switches are 100% load break and load make rated
- The continuous load current of fusible switches is not to exceed 80% of the rating of fuses employed in other than motor circuits. Non-fusible switches are 100% fully rated
- 200–600 A features K-Series design
- Horsepower rated
- Ample wire bending space provides for easier installation
- With Class R fuses, switches may be used on systems capable of delivering 100,000 A rms symmetrical

Note: Plug fuse switches are not service entrance rated.

Heavy-Duty

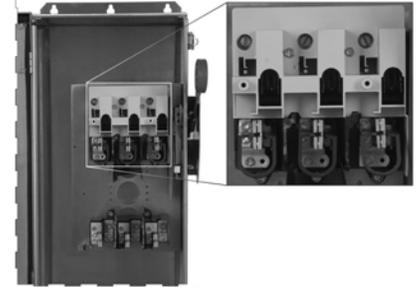


Heavy-Duty

For heavy commercial and industrial applications where reliable performance and service continuity are critical.

- 600 Vac, 600 Vdc maximum
- 30–1200 A
- For short-circuit ratings, see Technical Data
- Horsepower rated
- Fusible and non-fusible switches are 100% load break and load make rated
- The continuous load current of fusible switches is not to exceed 80% of the rating of fuses employed in other than motor circuits. Non-fusible switches are 100% fully rated
- Suitable for service entrance applications unless otherwise noted
- Visible double break rotary blade mechanism. Two points of contact provide a positive open and close, easier operation, and also help to prevent contact burning for longer contact life
- Triple padlocking capability. Personnel safety feature because the large hasp can accommodate up to three 3/8-inch (9.5 mm) shank locks. Cabinet door can be further padlocked at the top and bottom
- Interlocking mechanism. Door cannot be opened when the handle is in the ON position. Built-in defeater mechanism provides for user access when necessary
- De-ionizing arc chutes. Arc chutes confine and suppress the arcs produced by contacts under load

Enhanced Visible Blade



Advanced Visibility Blade

- Heavy-duty safety switches with enhanced visible blade provide a highly visible means of disconnect to help improve personnel safety and equipment protection
- Enhanced visible means of disconnect allows personnel to clearly see that blades are disengaged from stationary contacts when the switch handle is in the OFF position
- New visible blade design provides increased visibility over each pole, allowing users to clearly see the trailing edge of the blade
- Material color update from red to yellow creates greater contrast between blades and arc shield
- Available in 30–1200 A ratings
- Fusible and non-fusible configurations in two-, three-, four- and six-pole
- NEMA 1, 3R, 12, 4 and 4X enclosures for robust environmental protection
- Modifications available such as auxiliary contacts, pilot lights and more. Call the Flex Center at 888-329-9272 or email FlexSwitches@eaton.com
- To order safety switches with enhanced visible blade features and no viewing window, the standard heavy-duty catalog number should be used with the addition of a 'V' suffix

EnviroLine



Stainless Steel Switch

Eaton offers a line of safety switches designed for your special application and/or extreme environmental conditions.

EnviroLine Stainless Steel Switch

Primarily for use in the meatpacking and food processing industries, or any application where water is frequently used to hose down equipment.

- Stainless steel NEMA 4X enclosure
- Stainless steel interior mechanism, back pan and springs
- Available in 30–400 A ratings, 240–600 Vac
- Fusible and non-fusible configurations
- 316 grade stainless steel option replaces standard 304 grade stainless steel and hardware with 316 stainless. 316 stainless holds up better in high salt environments found in coastal areas, and in water/wastewater applications



Advanced Visibility Features

Window Switches

These switches incorporate a new external viewing window to replace the internal design. The new design instills confidence by allowing users to easily view the trailing edge of the blade to confirm disconnect is open while the switch handle is in the OFF position.

- All Eaton safety switches featuring a viewing window incorporates enhanced visible blade components as standard
- Viewing window provides clear path to view switch interior
- Window material is high-quality laminated safety glass
- External viewing window design is field replaceable—kits available for switches 30–1200 A
- 30 A and 60 A heavy-duty safety switches feature a vertical viewing window
- 100–1200 A heavy-duty safety switches feature a horizontal viewing window(s)
- Ratings are 30–1200 A, 240–600 Vac, fusible and non-fusible. Available in NEMA 12/3R, 4X stainless steel enclosures



Receptacle Switches

Receptacle Switches

These heavy-duty switches are pre-wired and interlocked to polarized receptacles for three-phase, three-wire, grounded type power plugs.

- Used for portable power applications such as welders, infrared ovens, batch feeders, conveyors, and truck and marine docks
- Receptacles are interlocked to handle mechanisms so that power plugs may not be inserted or removed when the switch is in the ON position unless noted otherwise.
- Ratings are 30–100 A, 600 Vac
- Available in NEMA 12 and 4X stainless steel enclosures



Non-Metallic Switches

Non-Metallic Switch

This switch has a KRYDON™ enclosure. This is a compression molded fiberglass reinforced polyester enclosure, which is capable of withstanding almost any corrosive environment. Ratings are 30–200 A, 240–600 Vac, fusible and non-fusible. Enclosure is NEMA 4X rated.

Shunt Trip Safety Switch



Shunt Trip Safety Switch

Integrates shunt trip technology, enhancing safety by providing a means to remotely open a safety switch electrically.

- Heavy-duty safety switch design with integrated shunt trip module
- Visible means of disconnect—visible blade
- 30–800 A (240–600 Vac)
- NEMA® Type 12/3R, 4 (painted steel) and 4X (stainless steel) enclosures
- Horsepower ratings same as standard safety switches
- Passes Class 1 ground fault testing (1200% opening)
- Maximum response time of 50 ms
- Switch arcing time less than 10 ms (AC)
- Class H fuse clips supplied as standard on fusible devices 30–600 A, Class L for 800 A; Class R, J, T fuse clips available

Modifications available, such as viewing windows, pilot lights, and more. Call the Flex Center at 888-329-9272 for more information.

Six-Pole Motor Circuit

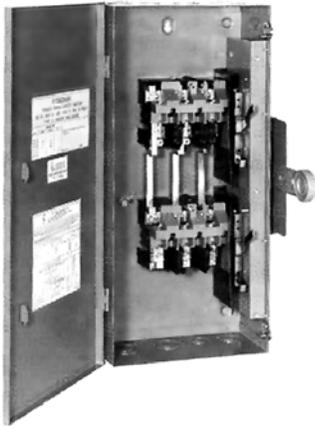


Six-Pole Motor Circuit

A compact safety switch that's ideal for use in heavy industry...when an "in sight" disconnecting means is required for two-speed motors that are remote from their motor control devices.

- 600 Vac, 250 Vdc maximum
- 30–800 A
- Fusible or non-fusible
- Trunk-type latches keep the cover tightly closed and a neoprene gasket seals out moisture and dust from the switch assembly
- Visible double break rotary blade mechanism. Two points of contact provide a positive open and close, easier operation, and also help to prevent contact burning for longer contact life
- Clear line shield protection
- Built-in fuse pullers
- Clearly visible handle
- Triple padlocking capability. Cabinet door can be further padlocked at the top and bottom
- De-ionizing arc chutes. Arc chutes confine and suppress the arcs produced by contacts under load

Heavy-Duty Double-Throw



Heavy-Duty Double-Throw

Used to transfer service from a normal power source to an alternate source, or to switch from one load circuit to another.

- For short-circuit ratings, see Technical Data
- 30–1200 A switches are horsepower rated
- 600 Vac, 250 Vdc maximum
- Fusible or non-fusible
- Fusible and non-fusible switches are 100% load break and load make rated
- The continuous load current of fusible switches is not to exceed 80% of the rating of fuses employed in other than motor circuits. Non-fusible switches are 100% fully rated
- Suitable for service entrance applications unless otherwise noted

- Wiring configuration from factory allows a single load to be supplied by a normal or alternate source. Can be field modified to allow two loads to be alternately supplied by a single source
- Ample wire bending space provides for easier installation
- Visible double-break rotary blade mechanism. Two points of contact provide a positive open and close, easier operation, and also help to prevent contact burning for longer contact life
- Triple padlocking capability. Personnel safety feature because the large hasp can accommodate up to three 3/8-inch (9.5 mm) shank locks
- Clearly visible handle. The position (ON or OFF) can be clearly seen from a distance
- Additional locking capability. Cabinet door can be further padlocked at the top and bottom
- Clear line shield protects against accidental contact with energized parts. Probe holes enable the user to test if the line side is energized without removing the shield
- De-ionizing arc chutes. Arc chutes confine and suppress the arcs produced by contacts under load
- UL listed switching neutral capability is available on three-pole and four-pole non-fusible double-throw switches with the installation of the proper bonding kit shown on **Page 28.0-19**
- 600–1200 A fusible utilizes a common set of fuses; two source, one load applications

Quick-Connect Switches



Quick-Connect Double-Throw

Provides a safe and quick means of connecting portable generators to facilities, transferring the building to backup power, or providing for temporary connection of portable loads.

- Single-throw and double-throw designs
- Single-throw receptacles can wire to the line side or the load side
- Safety interlocks prevent access to the receptacle compartment unless the lower switch is in the “open” position. This prevents against accidentally unplugging a circuit under load
- For short-circuit ratings, see Technical Data
- 30–800 A switches
- 600 Vac, 600 Vdc maximum
- Fusible or non-fusible
- Fusible and non-fusible switches are 100% load break and load make rated
- Cam-Lok® or Posi-Lok® receptacle options
- NEMA 1 or NEMA 3R enclosure ratings
- Switching neutral option

Elevator Control Switch



Elevator Control Switch

The elevator control switch provides an all-in-one product solution and selective coordination for elevator circuits. The elevator control switch uses a shunt trip disconnect as standard with Class J time-delay current-limiting fuses for meeting several code and user requirements for such circuits. Ratings are 30–200 A, 600 Vac, NEMA 1, 3R, 12 and 4 enclosures. The elevator control switch carries a 200 kAIC rms symmetrical short-circuit rating.

Why do Buildings Require Eaton Elevator Disconnects?

Eaton's Elevator Disconnect is a simple, all-in-one solution that takes the mystery out of meeting the many codes associated with fire protection and safety in elevator shafts. The model national building codes that prescribe the requirements for sprinklers, elevators and electrical equipment, and how the various systems shall interact are:

- NFPA® 70 (National Electrical Code®)
- NFPA 72 (National Fire Alarm Code®)
- ANSI/ASME A17.1 (Safety Code for Elevators and Escalators)
- NFPA 13 (Installation of Sprinkler Systems)

In addition to these national codes, state and local jurisdictions or other agencies of the government (such as the Veteran's Administration) may edit or amend the codes, as they deem necessary for public safety.

Eaton's Elevator Disconnect enables consultants, contractors and building owners to install a single device that meets the requirements of the various codes.

Why is There a Need for the Eaton Elevator Disconnect?

1. According to 2010 NFPA 13, fire sprinkler protection is required (with some exceptions) at the top and bottom of elevator shafts. Additionally, NFPA 13 requires the installation of sprinklers in the elevator machine room. When sprinkler heads are installed in elevator shafts, or in elevator machine rooms, then they must also be installed according to the State-Adopted Elevator Code (in many cases, ANSI/ASME A17.1).

2. The ASME A17.1 Safety Code for Elevators and Escalators, Rule 102.2 (c) (3), requires the shutdown of power to the elevator **prior to the application of water** in the elevator machine room or hoistway.

Shutdown of power is usually accomplished with the use of a shunt trip device in the elevator circuit, and is done for two valid safety concerns.

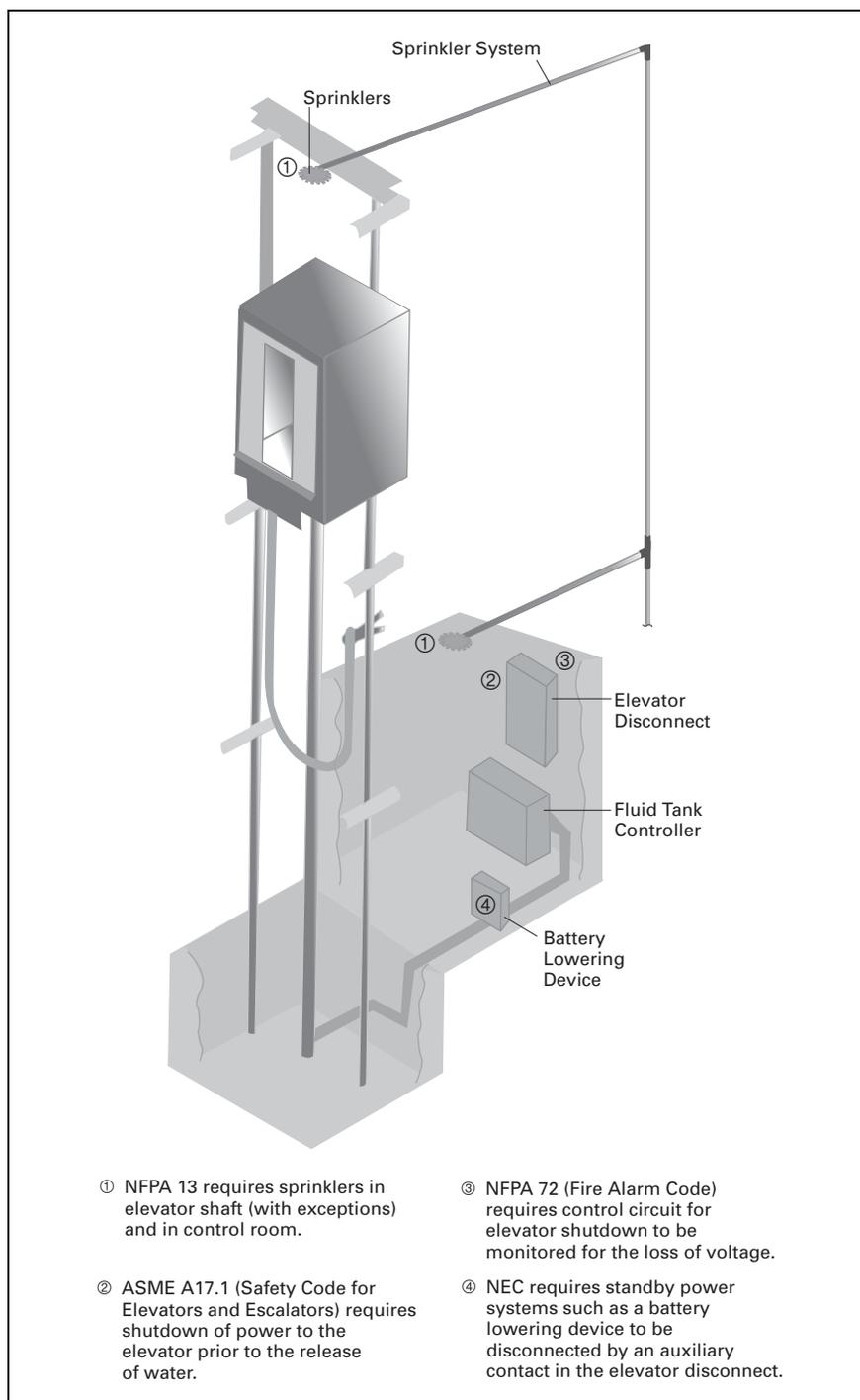
The first of these is to minimize the potential for electric shock due to the release of water on energized electrical equipment. The second, and less obvious, is to reduce the possibility of elevator car slippage after the car has gone to the recall floor and the doors have opened. Slippage is possible when the hoisting equipment (cables, sheave, braking system, etc.) become wet from discharged water.

Eaton's Elevator Disconnect is a fusible switch that is equipped with a shunt trip mechanism. The shunt trip is operated by a control relay (called a Fire Safety Interface Relay) in the unit that is wired to a normally open contact in the remote Fire Alarm Control Panel (FACP).

When the FACP receives a signal from the fire alarm system that there is going to be a sprinkler release in an elevator shaft, a normally open contact in the FACP closes, energizing the Fire Safety Interface Relay and completing a circuit to initiate a trip.

The Fire Safety Interface Relay is available with a 120 Vac or 24 Vdc coil. The 120 Vac coil should be selected when powered by the Elevator Disconnect control circuit, and the 24 Vdc relay should be selected when the power is supplied from the fire alarm system.

General Description—Selection Guide



3. In addition to turning off power, the model codes require other functions that are satisfied by the Eaton Elevator Disconnect. One of these requirements is that the shunt trip control circuit requires monitoring. The NFPA 72 (Fire Alarm Code) requires:

Control circuits to shut down elevator power shall be monitored for the presence of operating voltage. Loss of voltage to the control circuit for the disconnecting means shall cause a supervisory signal to be indicated at the control unit and required remote annunciation.

Thus, there is a requirement to monitor and to annunciate the presence of shunt trip control power. This is accomplished in the Eaton Elevator Disconnect by the Fire Alarm Voltage Monitoring Relay option. This relay is either a SPDT or a 3PDT relay. When control power is present, the closed relay contacts complete a circuit to the FACP that indicate the presence of control voltage. If control voltage is lost, the contact opens, signaling an alarm at the FACP and/or monitoring and annunciating a single elevator; all that is required is the single-pole relay. When wiring multiple switches (for multiple elevators), the three-pole relay option should be chosen. However, if there is a doubt, selecting the three-pole relay will provide all the functionality that is needed.

Figure 28.0-1. Typical Hydraulic Elevator Components and Requirements

General Description

Additional Requirements and Concerns

Many elevators are equipped with backup power supplies to allow the elevator to be lowered if power is lost. For example, many hydraulic elevators are equipped with a battery system that opens a solenoid to lower the elevator, and then provides power to open the elevator doors.

This battery-lowering device is viewed by the NEC as an “emergency or standby power system,” and is governed by Article 620.91.

- Paragraph (C) requires that the main disconnect be provided with an auxiliary contact that disconnects the additional power source from the load when the disconnecting means is in the open position. The purpose of this auxiliary contact is to disconnect the backup power system when the elevator switch is opened to prevent the elevator from automatically lowering while being maintained—which would endanger maintenance personnel.

Eaton’s Elevator Disconnect is supplied with a standard set of 1NO and 1NC auxiliary contacts that are wired to the terminal blocks for this feature. Other manufacturers offer this as an option.

An additional concern that is not code related is accidental signaling of a loss of voltage if a switch is turned off for maintenance or testing. For example, if an Eaton Elevator Disconnect is turned off to perform routine maintenance, the control voltage will be disconnected and it will send a signal to the FACP—which may alert the local fire department and initiate a fire call.

To solve this problem, an optional micro switch mounted on the main switch can be supplied and field-wired in parallel with the alarm contact on the Voltage Monitoring relay. Wiring in this fashion would prevent an alarm signal from being sent when the Eaton Elevator Disconnect is turned off for routine maintenance.

An additional standard feature on the Eaton Elevator Disconnect is a Key-To-Test switch to perform a functional test of the operation of the shunt trip. A pilot light signaling that the switch is ON and a neutral lug are the only other available options.

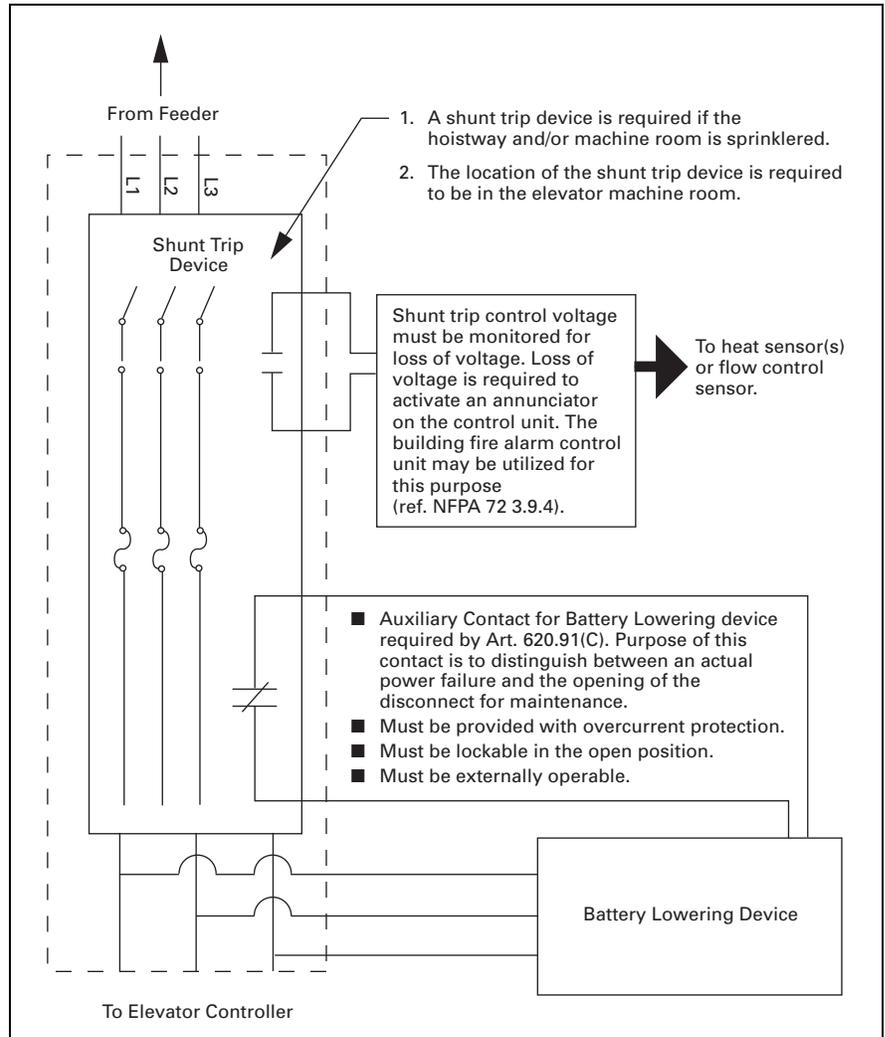


Figure 28.0-2. Shunt Trip Device Wiring Diagram

OEM Line Isolation (OLI) Switch



OLI Switch Integrated onto Disconnect Enclosure

28

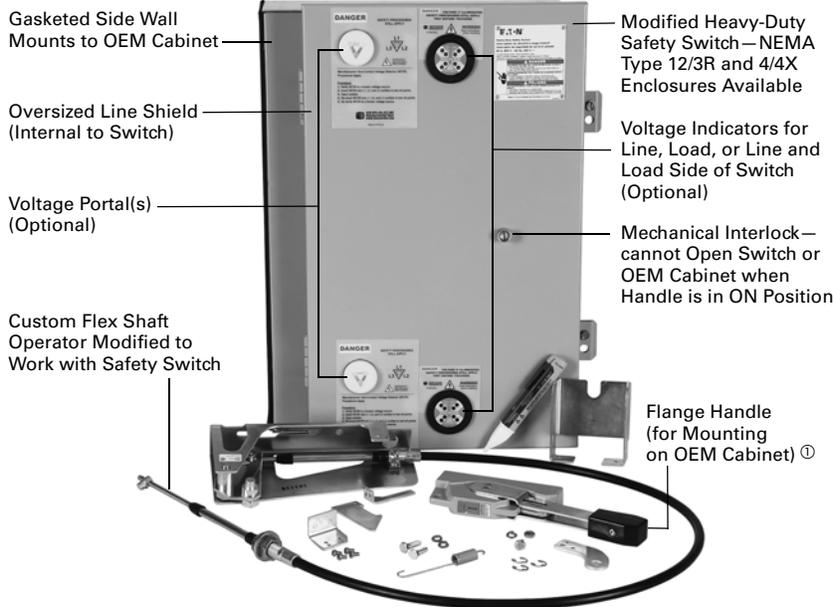
General Description

Traditional control panels may expose operators to line side system voltage (i.e., 480 Vac) even when the internal main disconnect is in the OFF position. Many panel-building OEMs and OEM customers are concerned with arc flash hazards and arc flash categories and may be looking for ways to reduce them.

The solution is the OEM Line Isolation (OLI) switch—the newest product in Eaton’s expanding offering of safer switching devices. The OLI switch provides an external disconnecting means for industrial control panels. It allows an operator to access the control panel without exposure to the line side voltage, thus enhancing safety and allowing for reduced PPE, which improves worker dexterity and mobility.

The OLI switch is designed to universally integrate to major manufacturers’ “disconnect enclosures” that will work with the Eaton C371-style handle and operating mechanism. The Eaton solution is a complete package, including enclosure, disconnect, handle, flex-cable operator and all other necessary components.

Features and Benefits



① Flex shaft operator and handle assembly is included and shipped with switch loose, for field installation.

Modifications

Additions are available such as custom paint, 316-stainless enclosures, custom OEM labeling and more. Call the Flex Center at 1-888-329-9272 for more information.

Standards and Certifications

- UL/cUL
- UL 98 standard, file no. e222859
- UL 50 standard, file no. e478865

**NEMA 7/9—Hazardous Location
Disconnect Switch**



NEMA Type 7/9

- The cast aluminum enclosure is ideally suited for harsh industrial applications including petrochemical facilities, mining operations, pharmaceutical plants and wastewater treatment facilities. Eaton’s Type DS switch is used as the switching device. Ratings are 30–100 A, 600 Vac, fusible and non-fusible

Certifications and Compliances

- Class I, Divisions 1 and 2, Groups B, C, D
- Class I, Zones 1 and 2
- Class II, Division 1, Groups E, F, G
- Class III
- NEMA 3, 3R, 4, 4X, 7BCD, 9EFG
- UL® standard: 1203
- cUL® to CSA® C22.2 No. 30

Standard Materials

- Body and cover—copper-free aluminum
- Gasket—neoprene
- Cover bolts—steel, stainless steel
- Hinges—stainless steel
- Mounting plate sheet—aluminum
- Rotary actuating handle—aluminum

Standard Finishes

- Copper-free aluminum—natural
- Steel—electrogalvanized

Auxiliary Power Heavy-Duty Safety Switch



Auxiliary Power Heavy-Duty Safety Switch

NEC Section 210.63 for Heating, Air-Conditioning and Refrigeration Equipment requires a 125 V, single-phase, 15 A- or 20 A-rated receptacle outlet be installed at an accessible location for the servicing of heating, air-conditioning and refrigeration equipment. The receptacle must be located on the same level and within 25 ft (7.5 m) of the heating, air-conditioning and refrigeration equipment. The receptacle outlet is not to be connected to the load side of the equipment disconnecting means.

The Auxiliary Power Heavy-Duty Safety Switch combines a safety switch, 2 kVA control transformer, and 15 A GFI receptacle in a single product. Ratings are 30–200 A, 240 or 600 Vac, NEMA 3R outdoor enclosures. The auxiliary circuit is tapped off of the line side of the safety switch and can be operated independently of the main switch circuit. Auxiliary circuit voltages are available at either 208, 240, 480 or 600 V. In 480 V and 600 V applications, the auxiliary circuit disconnect and overcurrent protection are provided by a fusible deadfront disconnect switch with Class J fuses. The short-circuit rating is 200 kAIC. 208 V and 240 V applications have a molded-case breaker with a 100 kAIC rating as the auxiliary circuit disconnect. The use of the Auxiliary Power Heavy-Duty Safety Switch eliminates the need for running a separate 120 V circuit common to rooftop air-conditioning applications.

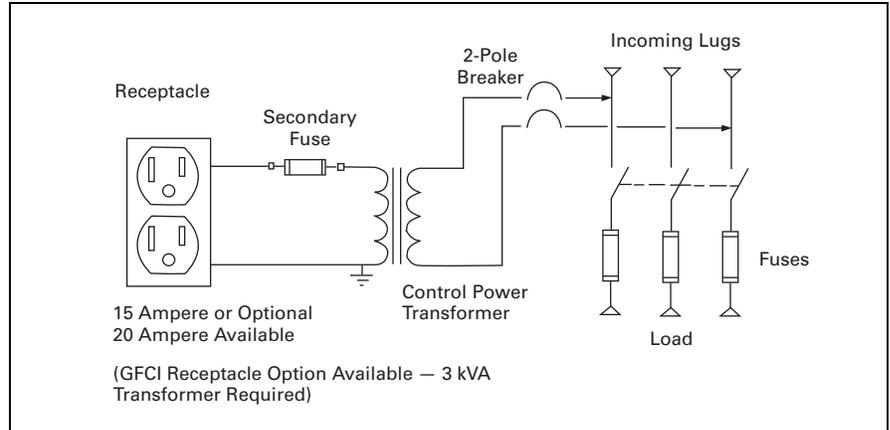


Figure 28.0-3. Auxiliary Power Heavy-Duty Safety Switch Circuit Diagram

Heavy-Duty—Solar Photovoltaic Switch Single-Circuit



Heavy-Duty—Solar Photovoltaic Switch

Marked as suitable for NEC 690 PV applications up to 600 Vdc.

- UL 98 listed
- All switches are single-pole and suitable for switching one circuit
- Clear polycarbonate deadfront to guard against accidental contact with live parts
- Suitable for positive and negative grounded systems—100% load break rated with current flowing in either direction
- NEC 690.17—compliant labeling warning that the switch terminals may be energized in the open position
- NEC 690.14.(C) two required “PV System Disconnect” labels included
- Isolated ground terminals (neutral) for grounded conductors
- Ground lug for equipment grounding conductor
- NEMA 3R, 12 and 4X stainless enclosures
- Fusible and non-fusible configurations—Class R fuse clips standard
- Fuse clips are located on the center pole to ensure that both fuse clips are de-energized—meets NEC Article 690.16, which requires isolation of the fuse from all potential supply sources

Heavy-Duty Solar Photovoltaic Switch Multi-Circuit



Heavy-Duty Solar Photovoltaic Switch Multi-Circuit

Marked as suitable for NEC 690 PV applications per UL 1741 requirements. 600 Vdc per pole and 1000 Vdc.

- UL Listed to the UL 98B standard
 - Products designed and available for grounded and ungrounded (floating) systems
- Note:** Catalog numbers beginning with DCG are for use on grounded systems. Catalog numbers beginning with DCU are for use on ungrounded systems.
- Grounded designs can be used on positive and negative grounded systems
 - Not polarity sensitive
 - Bi-directional functionality
 - Will break high-energy DC arc regardless of direction of current flow
 - Ampacity range—30, 60, 100, 200 and 400 A
 - Clear polycarbonate deadfront shield
 - Equipment ground
 - NEMA 3R, 4 and 4X stainless steel enclosures
 - Flex Center modification available, such as viewing windows, pilot lights and more

Enclosed Rotary



Enclosed Rotary

Provides users with the ability to lock directly wired motor loads in the OFF position to comply with new OSHA lock-out/tagout regulations. Also for machine applications that require compact, economical disconnect switches.

- UL listed
- Meets NEC Article 430 requirements for a separate disconnect means within sight of all motor loads
- Padlockable in the OFF position (up to three padlocks) to meet OSHA lockout requirements
- Available 16–80 A ratings
- 600 Vac, three- and four-pole non-fusible device
- Rated at highest available hp rating (at 480 Vac, 16 A–10 hp, 25 A–15 hp, 30 A–15 hp, 40 A–20 hp, 60 A–30 hp, 80 A–40 hp)
- Rated for making and breaking loads
- Accepts auxiliary contacts
- Capability to signal PLC controllers
- Ground lug connection provided
- Can be rated up to 65 kAIC, when protected by applicable upstream fusing

Flex Center

Introduction

The Switching Device Flex Center is a special facility at the site of Eaton's Cleveland, Tennessee plant that is dedicated to providing customized safety switches and enclosed breakers that meet customer's challenging applications.

Table 28.0-2. Common Flex Center Design Offerings

Modification	Catalog Suffix	Description
Custom paint	(varies)	Special paint colors are available such as red, orange, yellow, green, black, white. Other colors may be available upon request. Custom color is applied over the standard ANSI-61 gray finish.
Nameplates	-00NP	Plastic or phenolic nameplates are available. Up to three lines of text, 25 characters per line. Standard offering is white with black letters. Custom colors and sizes available upon request. Specify text at order entry.
Lock on provisions	-00LO	Available on heavy-duty and double-throw safety switches. Provision will accept a single lock.
Trapped key interlock	-00TK	Available on heavy-duty and double-throw safety switches. Trapped key systems are used on safety switches to prevent unauthorized operations or to predetermine a series of power transfers by an authorized operator.
Upper viewing window	W	An upper viewing window is centered over the switching contacts to provide visual verification of ON/OFF status. Available on NEMA 12/3R and NEMA 4X stainless steel heavy-duty and double-throw safety switches. Note: 30–100 A switches are now provided with a full view cover window for both blade and blown fuse viewing.
Lower viewing window	LW	A lower viewing window is centered over the fuses and provides visual verification of blown fuse indicators. Available on 200–1200 A NEMA 12/3R and NEMA 4X stainless steel heavy-duty and double-throw safety switches. Available for fusible switches only. Note: 30–100 A switches are now provided with a full view cover window for both blade and blown fuse viewing.
Neutral assemblies	N	Factory install of field neutral accessory kits. Add Suffix N on non-fusible switches, or replace the 6th character "F" with "N" on fusible switches.
Class "R" fuse clips	5 or 6	Factory installed Class R fuse clips/provisions. Add Suffix 5 for 240 V switches, and Suffix 6 for 600 V switches. Available on 30–600 A safety switches.
Class "T" fuse clips	T	Factory installed Class T fuse clips/provisions. Available on 200–1200 A safety switches.
Class "J" fuse clips	J	Factory installed Class J fuse clips/provisions. Available on 30–600 A safety switches. Note: Field modification kits are not available for 30 A heavy-duty safety switches. 30 A switches requiring Class J fusing must be ordered factory installed with J suffix.
Fungus proofing	-00FP	All non-metallic components of the switch are coated with a moisture and fungus-resistant varnish. The inhibitor used meets military specification: MIL-V-173C for MOISTURE AND FUNGUS-RESISTANT TREATMENT. The treated switch meets military specification MIL-T-152E for MOISTURE AND FUNGUS-RESISTANT TREATMENT OF COMMUNICATIONS, ELECTRONICS, AND ASSOCIATED EQUIPMENT. Not UL Listed.
Fuse pullers	FE	Factory installed fuse pullers. Note: Standard NEMA 12/3R and 4X switches 30–200 A are supplied with fuse pullers from the factory.
Crimp lug pads	-00CK	Factory installed crimp lug pad kits. Available on 400–800 A safety switches. Crimp lugs are not included. Note: Standard heavy-duty Type DH switches 30–200 A are adaptable to crimp lugs; simply remove the box lugs.
Copper lugs	-00CL	Factory installed copper lug kits. Available on 30–800 A safety switches.
Ground lug kits factory installed	G	Factory installed ground lug kits. Provides additional ground lug capacity when compared to ground lugs that come with standard safety switches. Available on 30–1200 A safety switches.
Custom lugs	-000L	Customer-specified lug arrangements are available on heavy-duty and double-throw safety switches.
Auxiliary contacts	2 or 3	Factory installed auxiliary contact kits (DS200EK1 or DS200EK2). Auxiliary contacts are Early-Make/Early-Break operation. To specify 1NO/1NC contact, add Suffix 2. To specify 2NO/2NC contacts, add Suffix 3.
Control pole	-00CP	The K-Series control pole provides one NO contact. It mounts in the exact location as the neutral block using the same pre-drilled holes. This is directly connected to the power pole operating shaft. Direct connection and visible blades provide more secure electrical interlocking than handle linkage operation of a snap/switch type interlock. This reliability meets the requirements of many specifications for four-pole switches when the fourth pole is required for secure electrical interlocking. This control pole provides Same-Make/Same-Break operation.
Control pole with offset	-0CP2	Same as above except this control pole provides Late-Make/Early-Break operation. Both Control Pole options are provided when you purchase the DS16CP field kit.
Switching neutral double throws	SN	UL Listed for three-pole and four-pole non-fusible double-throw safety switches. Switching neutrals are required for separately derived systems when bonding the neutral of the generator to a grounding system at the generator.
Surge protection	(varies)	Factory installed Eaton Type 1 (SP1 series) or Type 2 (CVX series) surge protective device products. SPD installed and wired to load side of disconnect.

Additional Flex Center Design Offerings

- Left-hand design (30–200 A)
- Cover controls
- 200% neutrals
- Seam-welded stainless steel
- Quick Connect products with Cam-Lok and Posi-Lok receptacles
- Custom enclosures
- 316 grade stainless steel
- Mill duty switches
- Irrigation switches
- Fuses installed
- Hook stick handles (heavy-duty switches only)
- Custom labels
- Custom mounting
- Pad-mount designs
- Non-standard receptacles
- Enhanced visible blade
- Voltage indicators

Contact

For more information on these or any other modifications, please contact the Switching Device Flex Center at 1-888-329-9272, email FlexSwitches@eaton.com or visit Eaton.com/FlexCenter.

General Description—Selection Guide

Safety Switch Selection Guide

Table 28.0-3. Safety Switch Selection Guide

Type	Fuse Type	Fuse Class	Ampere Rating	Number of Poles	Enclosure Types									
					NEMA 1	NEMA 3R	NEMA 12	NEMA 4 Painted Steel	NEMA 4X Stainless Steel	NEMA 4X Non-Metallic	NEMA 4X 316 Grade Stainless Steel	NEMA 7/9		
General-duty	Single-throw max. 240 Vac horsepower rated	Fusible	Plug	—	30	1 and 2	Yes	Yes	—	—	—	—	—	—
		Cartridge	H ^①	30–600	2 and 3	Yes	Yes	—	—	—	—	—	—	
	Non-fusible	—	—	—	30–600	2 and 3	Yes	Yes	—	—	—	—	—	
		—	—	—	30–600	2 and 3	Yes	Yes	—	—	—	—	—	
Shunt trip	Single-throw max. 600 Vac horsepower rated	Fusible	Cartridge	H ^① L	30–600 800	2, 3 and 4	—	—	Yes ^②	Yes	Yes	—	Yes	—
		Non-fusible	—	—	30–800	2, 3 and 4	—	—	Yes ^②	Yes	Yes	—	Yes	—
Heavy-duty	Single-throw max. 600 Vac horsepower rated	Fusible	Cartridge	H ^① L	30–600 800–1200	2, 3 and 4	Yes up to 1200 A	Yes up to 1200 A	Yes ^② up to 1200 A	Yes 400–1200 A	Yes up to 1200 A	Yes up to 200 A	Yes up to 1200 A	Yes ^③ up to 100 A
		Non-fusible	—	—	30–1200	2, 3 and 4	Yes	Yes	Yes ^② up to 1200 A	Yes 400–1200 A	Yes up to 1200 A	Yes up to 200 A	Yes up to 1200 A	Yes up to 100 A
Six-pole motor circuit	Single-throw max. 600 Vac	Fusible	Cartridge	H ^①	30–800	6	—	Yes	Yes ^②	—	Yes	—	Yes	—
		Non-fusible	—	—	30–800	6	—	Yes	Yes ^②	—	Yes	—	—	—
Double-throw	Max. 600 Vac horsepower rated	Fusible	Cartridge	H ^① T (600 V) J L	30–400 400 600 800–1200	2 and 3	Yes	Yes	Yes up to 600 A ^②	—	Yes up to 400 A	—	Yes up to 400 A	—
		Non-fusible	—	—	30–1200	2, 3, 4 and 6	Yes	Yes	Yes up to 800 A ^②	—	Yes up to 600 A	—	Yes up to 600 A	—
Rotary switches	Max. 600 Vac	Non-fusible	—	—	16–80	3, 4	Yes	Yes	Yes ^②	—	Yes	Yes	Yes	—
Auxiliary power heavy-duty	Max. 600 Vac horsepower rated	Fusible	Cartridge	H ^①	30–200	3	—	Yes	—	—	—	—	—	—
		Non-fusible	—	—	30–200	3	—	Yes	—	—	—	—	—	—
Elevator control switch	Max. 600 Vac horsepower rated	Fusible	Cartridge	J	30–400	3	Yes	Yes	Yes	Yes	Yes	—	—	—

① Class J, R and T available in many instances with the use of adapter kits listed on Page 28.0-19.

② NEMA Type 12 enclosures (30–1200 A) can be field modified to meet NEMA 3R rainproof requirements when a factory provided drain screw is removed.

③ Class J clips provided.

Table 28.0-4. EnviroLine Safety Switch Selection Guide

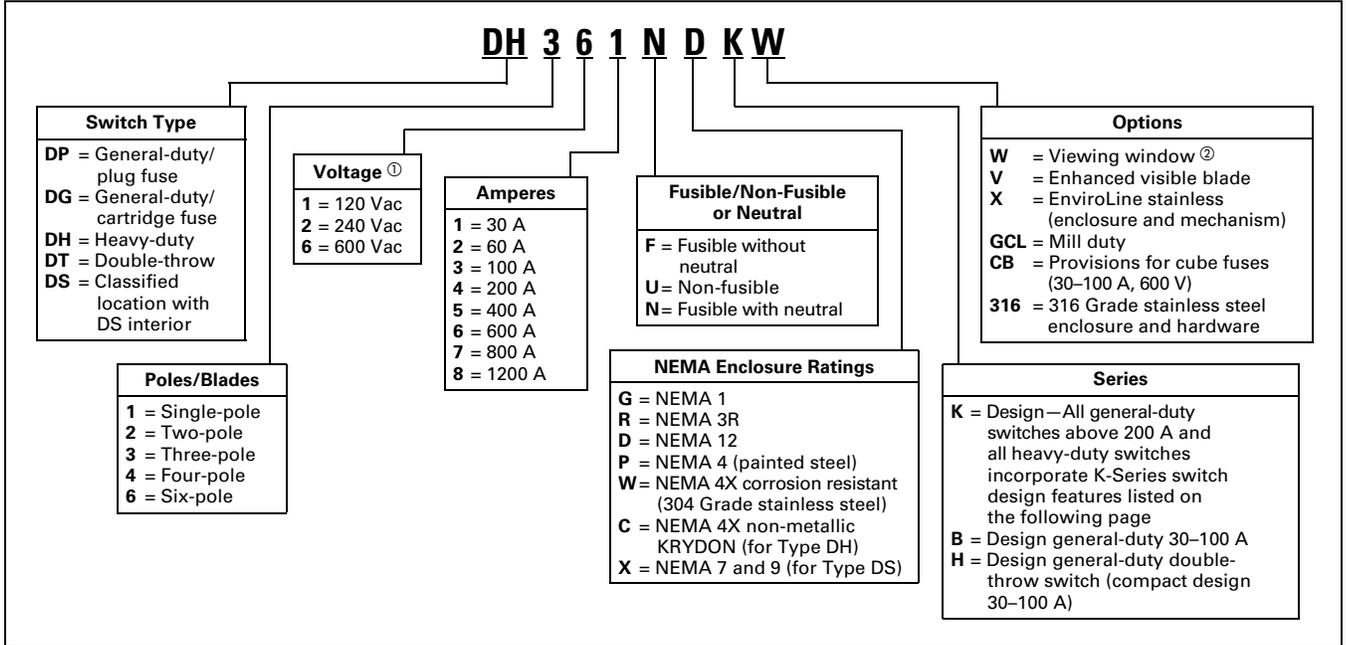
EnviroLine	Fuse Type	Fuse Class	Ampere Rating	Number of Poles	Enclosure Types						
					NEMA 1	NEMA 3R	NEMA 12	NEMA 4 Painted Steel	NEMA 4X Stainless Steel	NEMA 4X Non-Metallic	
Stainless enclosure with stainless mechanism	Fusible	Cartridge	H ^④	30–400	2 and 3	—	—	—	—	Yes	—
	Non-fusible	—	—	30–400	3	—	—	—	—	Yes	—
Viewing window	Fusible	Cartridge	H ^④ L	30–600 800–1200	2, 3, 4 and 6	—	—	Yes ^⑤	Yes	Yes	—
	Non-fusible	—	—	30–1200	2, 3, 4 and 6	—	—	Yes ^⑤	Yes	Yes	—
Welding receptacle	Fusible	Cartridge	H ^④	30–100	3	—	—	Yes ^⑤	—	Yes	—
	Non-fusible	—	—	30–100	3	—	—	Yes ^⑤	—	Yes	—
Non-metallic	Fusible	Cartridge	H ^④	30–200	3	—	—	—	—	—	Yes
	Non-fusible	—	—	30–200	3	—	—	—	—	—	Yes

④ Class J, R and T available in many instances with the use of adapter kits listed on Page 28.0-19.

⑤ NEMA Type 12 enclosures (30–1200 A) can be field modified to meet NEMA 3R rainproof requirements when a factory provided drain screw is removed.

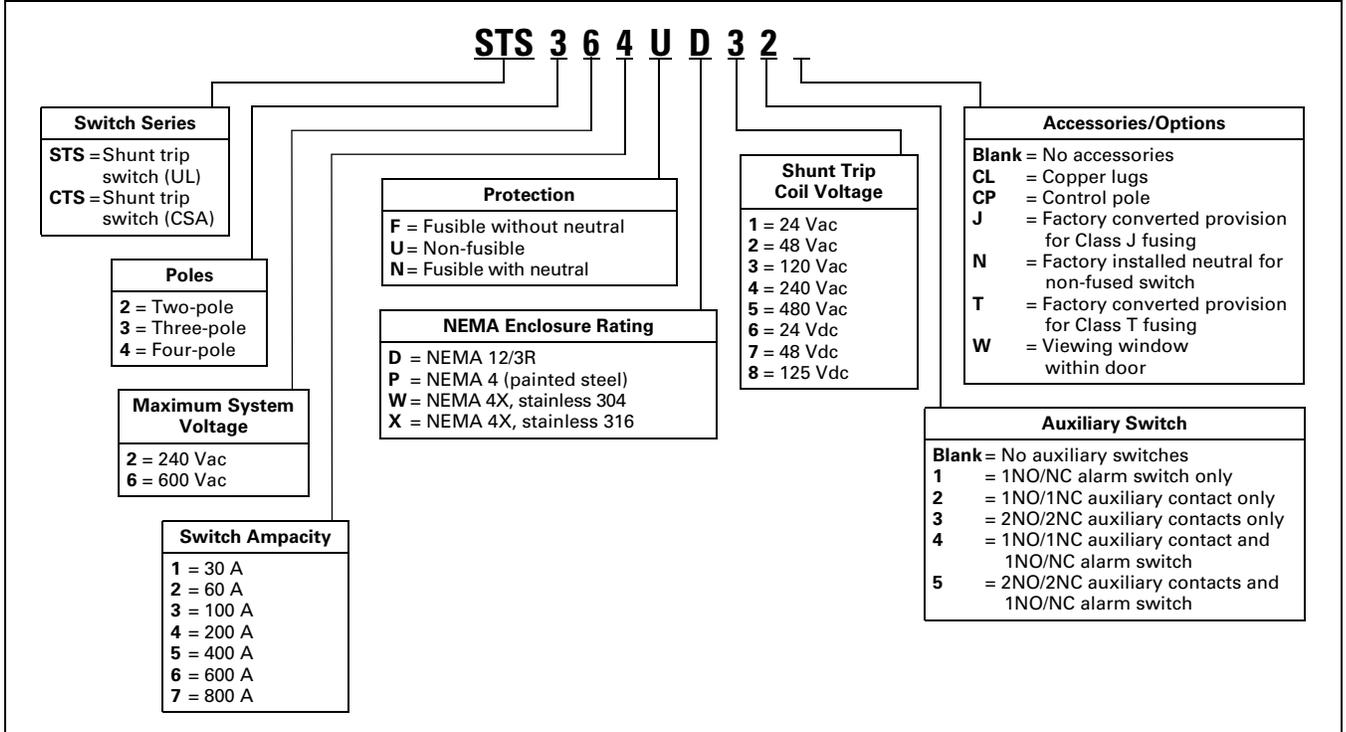
Catalog Numbering System

Table 28.0-5. Safety Switch Catalog Numbering System



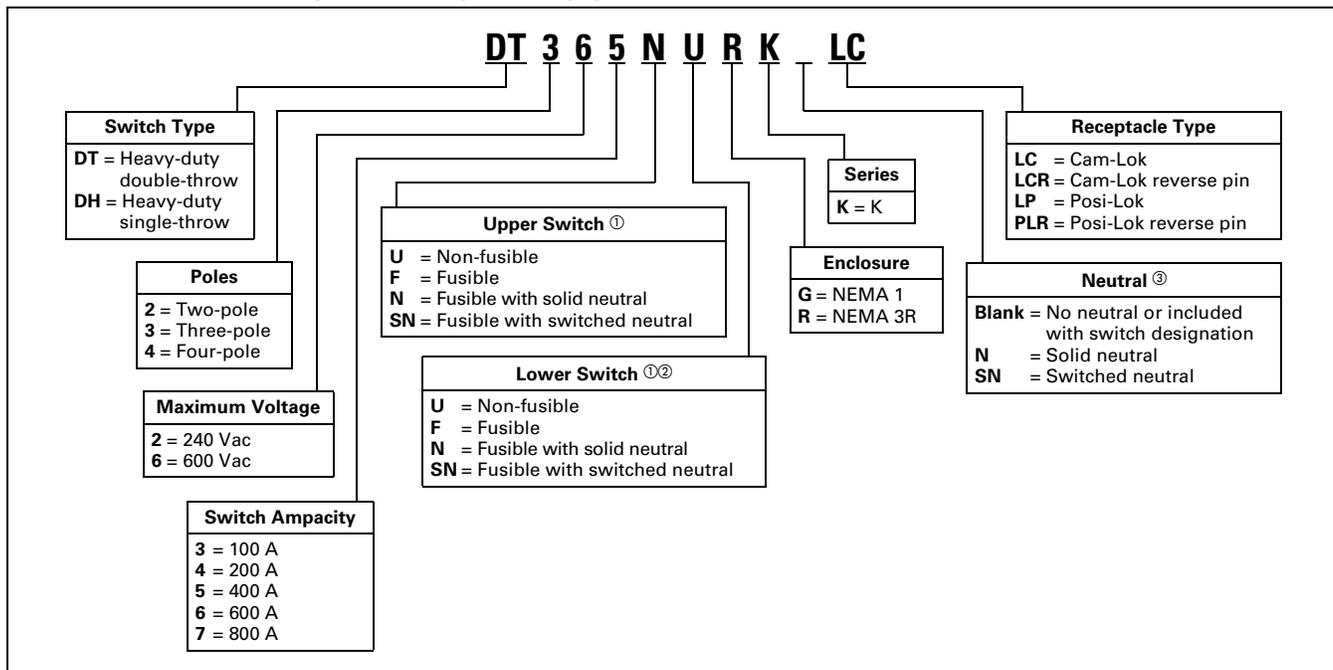
① For DC ratings, check individual switch ratings.
② All window switches feature enhanced visible blade design as standard.

Table 28.0-6. Shunt Trip Safety Switch Catalog Numbering System



General Description—Catalog Numbering System

Table 28.0-7. Quick-Connect Safety Switch Catalog Numbering System

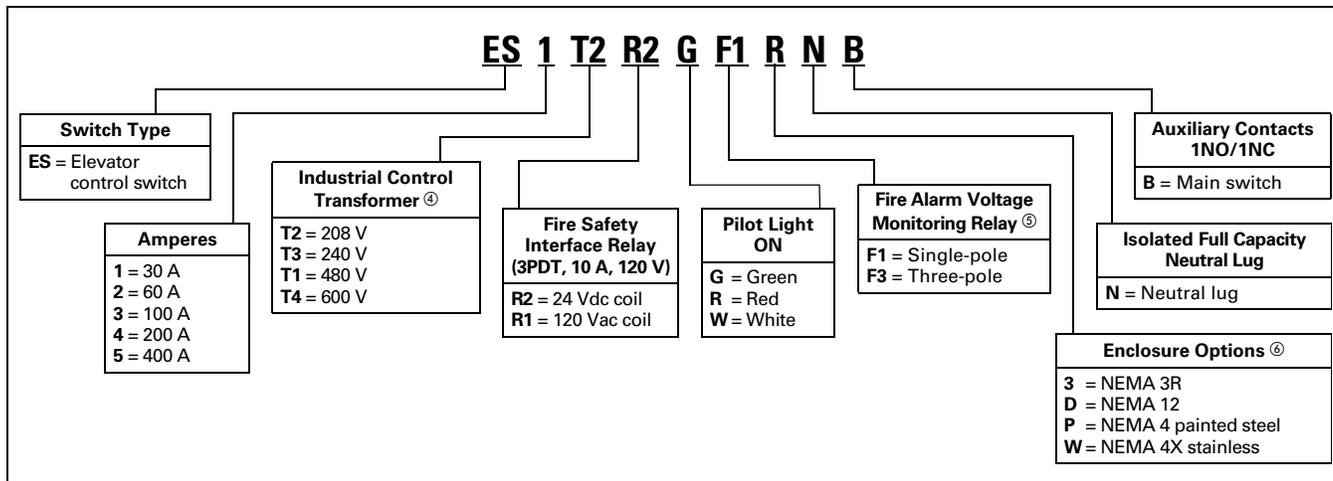


① When upper and lower switches are the same, the switch configuration is consolidated in one letter (e.g., "U" not "UU"). Also, a switch with a neutral will have either a solid neutral or a switched neutral, not both. Lastly, a switched neutral pole is never fused.

② Heavy-duty single-throw switches will not have a lower switch option.

③ This field is only used when a switch is completely non-fused.

Table 28.0-8. Elevator Control Switch Catalog Numbering System



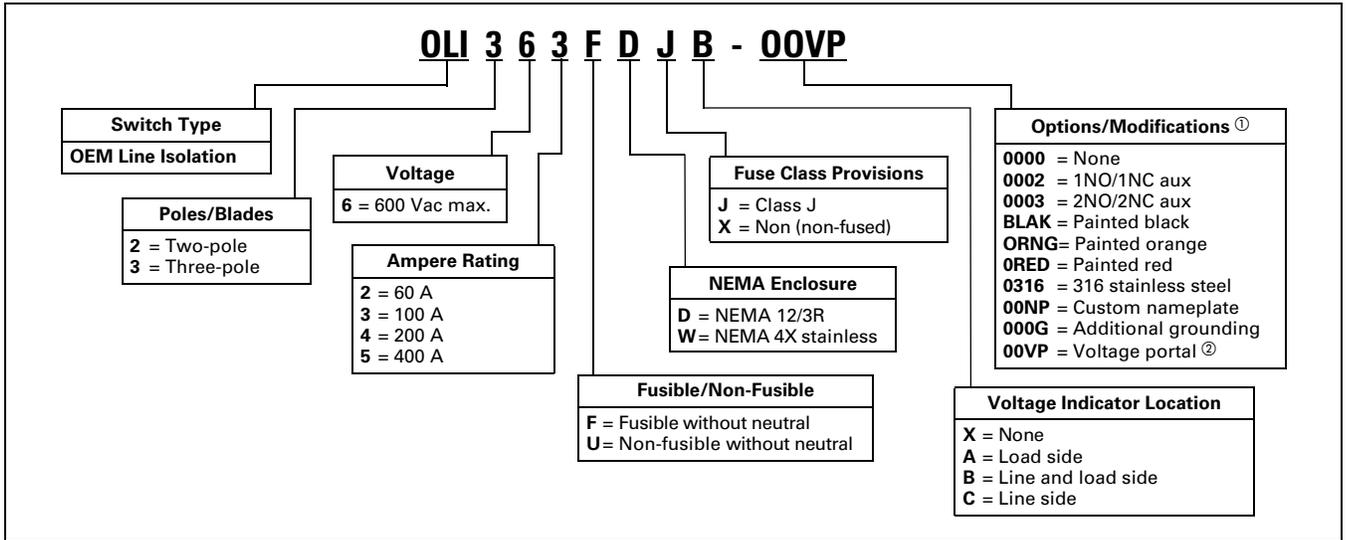
④ 100 VA with primary and secondary fusing (120 V secondary).

⑤ To monitor shunt trip voltage.

⑥ NEMA 1 standard with no suffix designation required.

Note: All modules are three-pole, 600 V and contain a key to test switch and mechanically interlocked auxiliary contact as standard.

Table 28.0-9. OEM Line Isolation Switch Catalog Numbering System



① More combinations and options are available.
② One voltage portal for each voltage indicator specified.

Table 28.0-10. Auxiliary Power Heavy-Duty Safety Switch Catalog Numbering System

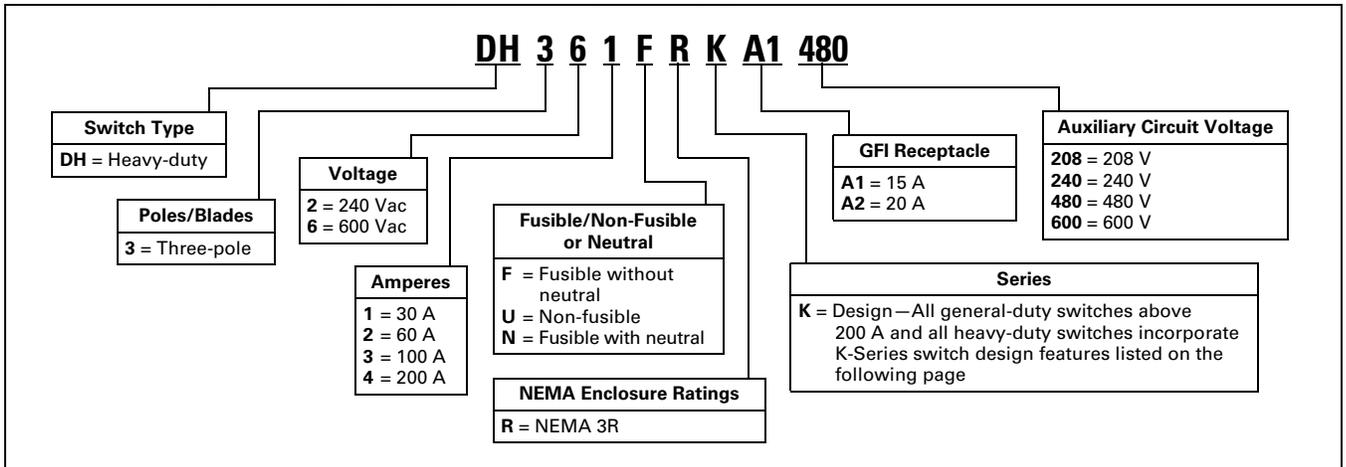
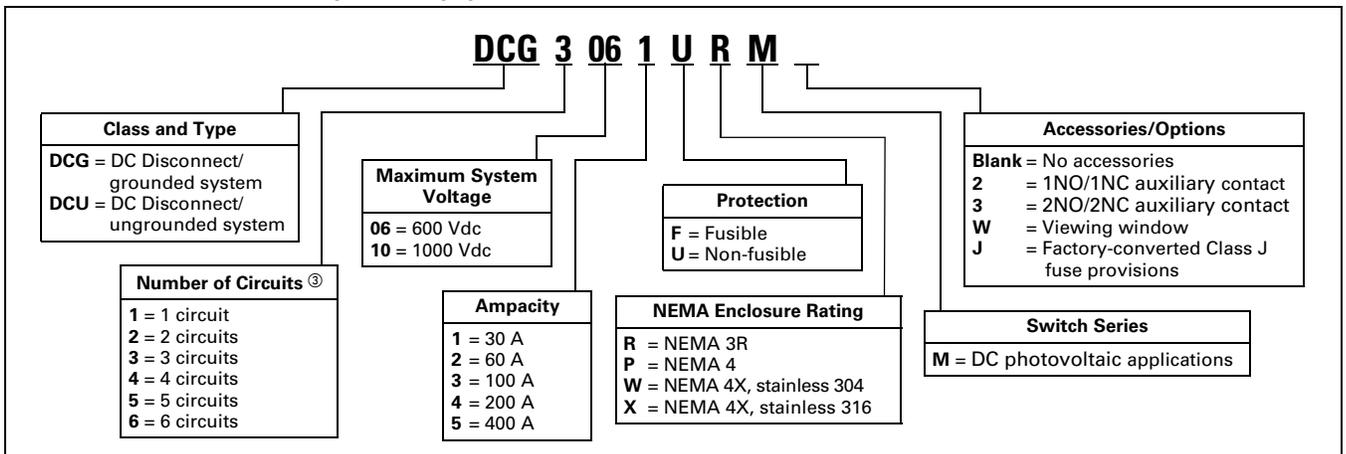


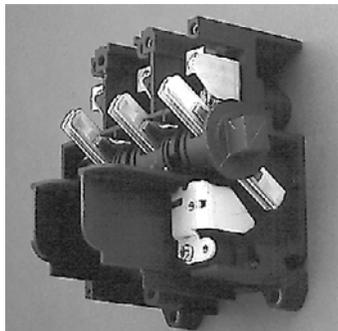
Table 28.0-11. DC Disconnect Catalog Numbering System



③ Not all configurations for ampere rating and number of circuits are available. All circuit configurations can be found in the product dimension tables.

General Description

All General-Duty Switches Above 100 A and All Heavy-Duty Switches Incorporate These K-Series Switch Design Features



Visible Double Break Rotary Blade Mechanism

Two points of contact provide a positive open and close, easier operation, and also help prevent contact burning for longer contact life.



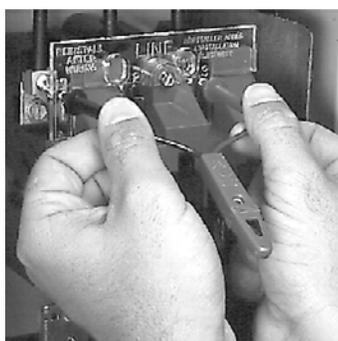
Clearly Visible Handle

The position (ON or OFF) can be clearly seen from a distance and the length provides for easy operation.



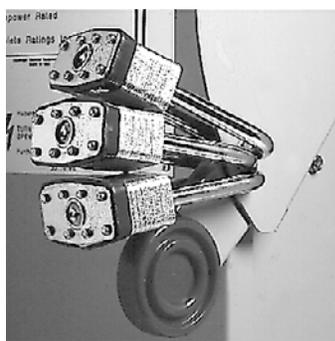
Interlocking Mechanism

Door cannot be opened when the handle is in the ON position. Front side operable defaeter mechanism provides for user access when necessary.



Clear Line Shield

Protects against accidental contact with energized parts. Probe holes enable the user to test if the line side is energized without removing the shield. **Not provided on general-duty switches.**



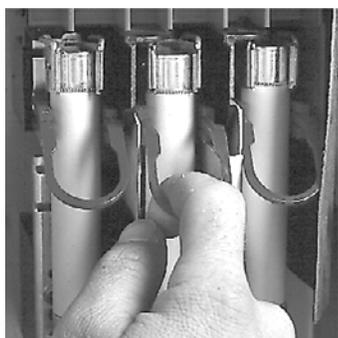
Triple Padlocking Capability

Personnel safety feature because the large hasp can accommodate up to three 3/8-inch (9.5 mm) shank locks to lock switch in the OFF position.



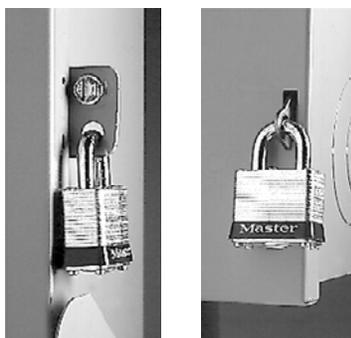
Tangential Knockouts

An ample number are provided on the top, bottom and sides of both NEMA Types 1 and 3R enclosures through 200 A.



Built-in Fuse Pullers (NEMA 12 and 4X 30–200 A Only)

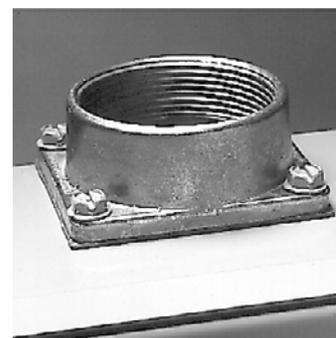
Provide easy removal of fuses.



Additional Locking Capability

Cabinet door can be further padlocked at the top and bottom as applicable.

Note: Size of hasp in inches (mm):
30–100 A—0.344 (8.7) 0.250 shank
200–1200 A—0.50 (12.7) 0.375 shank



Bolt-On Hub Kits

For switches in a NEMA Type 3R, 12, 4 or 4X enclosure.

Accessories, Hubs, Lug Data



DH030NK



DS16CP



DS200EK1



DS200GK



DS22JK



DS36CL



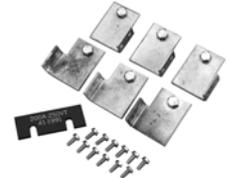
DS56CK



DS30FP



DS12FK



DS426TK

Table 28.0-12. Safety Switches—Accessories

Description	Catalog Number
Neutral Kits/Ground Kits 30 A DG 60–100 A DG 200 A DG, DH (NEMA 1, 3R enclosures) 30–60 A DH 100 A DH 200 A DH (NEMA 4X, 12 enclosures) 400 A DG, DH 600 A DG, DH 400–600 A Fusible DT, 800–1200 A DH 30–100 A DT 200 A DT 400 A Non-fusible DT 600 A Non-fusible DT 800 A DT 1200 A DT	DG030NB DG100NB DG200NK DH030NK DH100NK DH200NK DS400NK DS600NK DS800NK DT100NK DT200NK DT400NK DT600NK DT800NK DT1200NK
Ground Lug Kits ① 30–100 A DG 30–100 A DH, DT ② 200 A DG, DH, DT 400–600 A DG, 400–1200 A DH, 400–1200 A DT	DG030GB DS100GK DS200GK DS468GK
Switching Neutral Bonding Kits ③ 30–100 A DT, three-pole, four-pole, non-fusible 200 A DT, three-pole, four-pole, non-fusible 400 A DT, three-pole, four-pole, non-fusible 600 A DT, three-pole, four-pole, non-fusible 800 A DT, three-pole, four-pole, non-fusible	DT100BK DT200BK DT400BK DT600BK DT800BK
Control Pole Kit 400–600 A DG, 30–1200 A DH, 30–800 A DT	DS16CP
Auxiliary Contact Kits All switches (except 30–100 A DG) 1NO/1NC All switches (except 30–100 A DG) 2NO/2NC NEMA 7/9 switches (30–100 A) 1NO/1NC NEMA 7/9 switches (30–100 A) 2NO/2NC	DS200EK1 ④ DS200EK2 ④ 178C265G05 178C265G06
Copper Lug Kits 30 A DH, DT ⑤ 60 A DH, DT ⑤ 100 A DH, DT ⑤ 200 A DH ⑤ 400 A DH (NEMA 4, 4X, 12 enclosures) ⑥ 600–800 A DH (NEMA 4, 4X, 12 enclosures) ⑥	DS16CL DS26CL DS36CL DS46CL DS56CL DS66CL
Crimp Lug Pad Kit (NEMA 4, 4X, 12 Enclosures) 400–600 A DH ⑤ 800 A DH ⑤ 400–800 A neutral DH ⑤	DS56CK DS76CK DS800CNK

① Provides additional ground lug capacity when compared to ground lugs that are provided as standard on all safety switches.
② Ground bar kit is not listed on device publications.
③ Order one kit per switch.

Description	Catalog Number
Fuse Puller Kits 30 A DH ⑤ 60 A DH 100 A DH ⑤ 200 A DH ⑤	DS30FP DS60FP DS100FP DS200FP
"J" Fuse Adapter Kits ⑦⑧ 60 A 240 V DH ⑤ 60 A DT and receptacle switches ⑤ 400 A 600 V DT ⑤ 600 A 240–600 V DH only ⑤	DS22JK DS26JK DT400JK DS600JK
"R" Fuse Adapter Kits ⑤ 30 A DG 100 A DG 30 A 240 V DH, DT 30 A 600 V DH, DT, 60 A 240 V DH, DT, 60 A DG 60 A 600 V DH, DT 100 A 240–600 V DH, DT 200 A 240–600 V DH, DT, 200 A DG 400 A 240–600 V DH, 240 V DT, 400 A DG 600 A 240–600 V DH, 600 A DG	DG030RB DG100RB DS12FK DS16FK DS26FK DS36FK DS46FK DS56FK DS66FK
"T" Fuse Adapter Kits 200 A 240 V DH ⑤ 200 A 600 V DH ⑤ 400 A 240 V DG, DH ⑤ 400 A 600 V DH ⑤ 600 A 240 V DG, DH ⑤ 600 A 600 V DH ⑤ 600 A 240 V ⑤ 600 A 600 V ⑤ 800 A 240 V DH, DT ④ 800 A 600 V DH, DT ④ 1200 A 240 V DH DT ⑩ 1200 A 600 V DH DT ⑩	DS426TK DS466TK DS526TK DS566TK DS626TK DS666TK DT626TK DT666TK DS726TK DS766TK — —
Hookstick handle	DH800HSH
Lubricating grease for safety switch blades and contacts (Each kit contains three 30 cc tubes of lubricating grease.)	DSLUBEKIT

④ For duty ratings, see table on Page 28.0-20.
⑤ Order one kit for three poles.
⑥ Order one kit for each pole.
⑦ 30 A Class J available as factory option only.
⑧ If no kit is listed, the switch will accept Class J fusing by repositioning either the fuse base or fuse clips. No drilling required.
⑨ Order one kit for six poles.
⑩ No kit needed, simply move fuse bases forward.
Note: Accessories are not applicable to NEMA 7/9 switches unless indicated otherwise.

General Description—Accessories, Hubs, Lug Data

Auxiliary Contact Rating

Table 28.0-13. AC Pilot Duty Ratings

Description	Volts	Break (Amperes)	Make (Amperes)	Catalog Number
1NO-1NC	110	15.0	40.0	DS200EK1
1NO-1NC	220	10.0	20.0	DS200EK1
1NO-1NC	440	6.0	10.0	DS200EK1
1NO-1NC	600	5.0	8.0	DS200EK1
2NO/2NC	110	3.0	30.0	DS200EK2
2NO/2NC	220	1.5	15.0	DS200EK2
2NO/2NC	440	1.0	8.0	DS200EK2
2NO/2NC	600	0.8	6.0	DS200EK2

Table 28.0-14. DC Pilot Duty Ratings

Description	Volts	Single Throw (Amperes)	Double Throw (Amperes)	Catalog Number
1NO-1NC	115	2.0	0.5	DS200EK1
1NO-1NC	230	0.5	0.2	DS200EK1
1NO-1NC	600	0.1	0.02	DS200EK1
2NO/2NC	115	1.0	0.2	DS200EK2
2NO/2NC	230	0.3	0.1	DS200EK2
2NO/2NC	600	0.1	—	DS200EK2

Hubs


DS075H1
Table 28.0-15. Plate Type Hubs for NEMA Type 3R Enclosures (Up to 200 A)

Group 1 General-Duty, Heavy-Duty, Double-Throw Through 100 A			Group 2 General-Duty, Heavy-Duty, Double-Throw —200 A		
Conduit Size		Catalog Number	Conduit Size		Catalog Number
Inches	mm		Inches	mm	
3/4	19.1	DS075H1	2	50.8	DS200H2
1	25.4	DS100H1	2-1/2	63.5	DS250H2
1-1/4	31.8	DS125H1	3	76.2	DS300H2
1-1/2	38.1	DS150H1	—	—	—
2	50.8	DS200H1	—	—	—

Note: Catalog Number **DS900AK** Adapter Kit—Permits Installation of Group 1 Hubs on 200 A Type General-Duty, Heavy-Duty and Double-Throw Switches.

Table 28.0-16. Myers Type Hubs NEMA Type 3R (400 A and Above) NEMA Types 4, 4X (Stainless Steel), 12

Conduit Size		Catalog Number
Inches	mm	
1/2	12.7	DS050MH DS075MH DS100MH
3/4	19.1	
1	25.4	
1-1/4	31.8	DS125MH DS150MH DS200MH
1-1/2	38.1	
2	50.8	
2-1/2	63.5	DS250MH DS300MH DS350MH
3	76.2	
3-1/2	88.9	
4	101.6	
5	127.0	DS400MH DS500MH

Note: Contact the Flex Center at 1-888-329-9272 for information on hubs for non-metallic NEMA 4X switches.

Table 28.0-17. Standard Lug Capacities

Ampere Rating	Minimum Wire Size	Maximum Wire Size	Wire Type
30 A DP	#14 #12	#10 #10	Cu OR Al
30 A DG 30 A DH, DT	#14 #14	#6 #2	Cu/Al Cu/Al
60 A DG 60 A DH, DT	#14 #14	#1/0 #2	Cu/Al Cu/Al
100 A DG ① 100 A DH, DT	#14 #14	#1/0 #1/0	Cu/Al Cu/Al
200 A DG, DT 200 A DH Type 1 and 3R 200 A DH Type 4 and 12	#6 #6 #6	250 kcmil 250 kcmil 300 kcmil	Cu/Al Cu/Al Cu/Al
400 A DG, DH, DT	(2) #1/0 (1) #1/0	(2) 300 kcmil (1) 750 kcmil	Cu/Al OR ② Cu/Al
600 A DG 600 A DH	(1) #2 (1) #1/0	(1) 600 kcmil (1) 750 kcmil	Cu/Al AND ③ Cu/Al
600 A DT (Non-fusible)	(2) #250	(2) 500 kcmil	Cu/Al
800 A DH 800 A DT, 600 A Fusible DT	(4) #1/0 (3) #250	(4) 750 kcmil (3) 500 kcmil	Cu/Al Cu/Al
1200 A DH, DT	(4) #1/0	(4) 750 kcmil	Cu/Al

Copper-Bodied Lugs

30 A Cu 60 A Cu 100 A Cu	#14 #14 #6	#6 #4 #1/0	Cu Cu Cu
200 A Cu 400 A Cu 600–800 A Cu	#6 #1/0 (2) #1/0	250 kcmil 500 kcmil (2) 500 kcmil	Cu Cu Cu

① The maximum size aluminum or copper-clad aluminum wire allowable for applications where the conductor enters or leaves the enclosure through the wall opposite its terminal is #1 gauge.

② Single-barrel lug accepts one OR two cables per phase as detailed above.

③ Double-barrel lug accepts two cables per phase as detailed above.

Note: Although certain lug capacities are larger than required, only minimum wire bending space is provided per the requirements noted in NEC Tables 373.6 (a) and (b) for respective ampere ratings.

Table 28.0-18. Available Lug Capacities of the Double-Throw Switch Assembly with Cam-Lok or Posi-Lok Receptacles

Double Throw Switch Size—Cam-Lok or Posi-Lok Receptacles	Service Terminal Openings	Load Terminal Openings	Switched Neutral Pole Load Terminal Openings	Solid Neutral Terminal Openings	Ground Terminal Openings	Receptacle Bypass Terminal
100	(1) 1/0–14 AWG Cu/Al	(1) 1/0–14 AWG Cu/Al	(1) 1/0–14 AWG Cu/Al	(2) 1/0–14 AWG, (1) 2–14 AWG Cu/Al	(3) 2–14 AWG Cu/Al	(1) 10–32 Screw mounting
200	(1) 300 kcmil–6 AWG Cu/Al	(1) 250 kcmil–6 AWG Cu/Al	(1) 250 kcmil–6 AWG Cu/Al	(2) 250 kcmil–6 AWG, (1) 1/0–14 AWG, (1) 2–14 AWG Cu/Al	(3) 2–14 AWG Cu/Al	(2) 1/4 Studs, 1.75-inch spacing
400	(1) 750 kcmil–1/0 or (2) 300 kcmil–1/0 Cu/Al	(1) 750 kcmil–1/0 or (2) 300 kcmil–1/0 Cu/Al	(1) 750 kcmil–1/0 or (2) 300 kcmil–1/0 Cu/Al	(6) 500 kcmil, (6) 250 kcmil–6 AWG Cu/Al	(4) 250 kcmil–6 AWG Cu/Al	(2) 1/2-13 UNC studs, 1.75-inch spacing
600	(4) 750 kcmil–3/0 Cu/Al	(4) 750 kcmil–3/0 Cu/Al	(4) 750 kcmil–3/0 Cu/Al	(6) 500–250 kcmil, (4) 250 kcmil–6 AWG Cu/Al	(4) 250 kcmil–6 AWG Cu/Al	(2) 1/2-13 UNC studs, 1.75-inch spacing
800	(4) 750 kcmil–3/0 Cu/Al	(4) 750 kcmil–3/0 Cu/Al	(4) 750 kcmil–3/0 Cu/Al	(6) 500–250 kcmil, (4) 250 kcmil–6 AWG Cu/Al	(4) 250 kcmil–6 AWG Cu/Al	(2) 1/2-13 UNC studs, 1.75-inch spacing

Table 28.0-19. Quick-Connect Double-Throw Standard Receptacles and Corresponding Connection Plugs (Part Numbers are Crouse-Hinds)

Switch Ampacity	Connector Color	Cam-Lok Connectors		Posi-Lok Connectors	
		Receptacle ①	Plug ②	Receptacle Panel	Plug ③
240 Vac					
100, 200	Ground (green) Neutral (white) A Phase (black) B Phase (red) C Phase (blue)	E1016-1635S E1016-1636S E1016-1600S E1016-1602S E1016-1612S	E-Z1016-8366 E-Z1016-8367 E-Z1016-8387 E-Z1016-8389 E-Z1016-8393	Two-pole, three-wire with solid neutral or three-pole, three-wire with switched neutral pole (two-phase and one neutral pole): E0200-1672/ three-pole, three-wire (no neutral): E0200-1661-NN/ three-pole, four-wire with solid neutral or four-pole, four-wire with solid neutral or four-pole, four-wire with switched neutral pole (three-phase and one neutral pole): E0200-1662	E0200-281 E0200-282 E0200-283 E0200-284 E0200-285
400	Ground (green) Neutral (white) A Phase (black) B Phase (red) C Phase (blue)	E1016-1635S E1016-1636S E1016-1600S E1016-1602S E1016-1612S	E-Z1016-8366 E-Z1016-8367 E-Z1016-8387 E-Z1016-8389 E-Z1016-8393	Two-pole, three-wire with solid neutral or three-pole, three-wire with switched neutral pole (two-phase and one neutral pole): E0400-1672/ three-pole, three-wire (no neutral): E0400-1661-NN/ three-pole, four-wire with solid neutral or four-pole, four-wire with solid neutral or four-pole, four-wire with switched neutral pole (three-phase and one neutral pole): E0400-1662	E0400-281 E0400-282 E0400-283 E0400-284 E0400-285
600, 800	Ground (green) Neutral (white) A Phase (black) B Phase (red) C Phase (blue)	(2) E1016-1635S (2) E1016-1636S (2) E1016-1600S (2) E1016-1602S (2) E1016-1612S	(2) E-Z1016-8366 (2) E-Z1016-8367 (2) E-Z1016-8387 (2) E-Z1016-8389 (2) E-Z1016-8393	Two-pole, three-wire with solid neutral or three-pole, three-wire with switched neutral pole (two-phase and one neutral pole): (2) E0400-1672/ three-pole, three-wire (no neutral): (2) E0400-1661-NN/ three-pole, four-wire with solid neutral or four-pole, four-wire with solid neutral or four-pole, four-wire with switched neutral pole (three-phase and one neutral pole): (2) E0400-1662	(2) E0400-281 (2) E0400-282 (2) E0400-283 (2) E0400-284 (2) E0400-285
600 Vac ④					
100, 200	Ground (green) Neutral (white) A Phase (brown) B Phase (orange) C Phase (yellow)	E1016-1635S E1016-1636S E1016-1619S E1016-1603S E1016-1601S	E-Z1016-8366 E-Z1016-8367 E-Z1016-8394 E-Z1016-8390 E-Z1016-8388	Three-pole, three-wire (no neutral): E0200-1891-NN/ three-pole, four-wire with solid neutral or four-pole, four-wire with solid neutral or four-pole, four-wire with switched neutral pole (three-phase and one neutral pole): E0200-1891	E0200-281 E0200-282 E0200-288 E0200-289 E0200-286
400	Ground (green) Neutral (white) A Phase (brown) B Phase (orange) C Phase (yellow)	E1016-1635S E1016-1636S E1016-1619S E1016-1603S E1016-1601S	E-Z1016-8366 E-Z1016-8367 E-Z1016-8394 E-Z1016-8390 E-Z1016-8388	Three-pole, three-wire (no neutral): E0400-1862-NN/ three-pole, four-wire with solid neutral or four-pole, four-wire with solid neutral or four-pole, four-wire with switched neutral pole (three-phase and one neutral pole): E0400-1703	E0400-281 E0400-282 E0400-299 E0400-295 E0400-292
600, 800	Ground (green) Neutral (white) A Phase (brown) B Phase (orange) C Phase (yellow)	(2) E1016-1635S (2) E1016-1636S (2) E1016-1619S (2) E1016-1603S (2) E1016-1601S	(2) E-Z1016-8366 (2) E-Z1016-8367 (2) E-Z1016-8394 (2) E-Z1016-8390 (2) E-Z1016-8388	Three-pole, three-wire (no neutral): (2) E0400-1862-NN/ three-pole, four-wire with solid neutral or four-pole, four-wire with solid neutral or four-pole, four-wire with switched neutral pole (three-phase and one neutral pole): (2) E0400-1703	(2) E0400-281 (2) E0400-282 (2) E0400-299 (2) E0400-295 (2) E0400-292

① For non-standard receptacle options, please contact the Flex Center at 888-329-9272.

② E/E-Z 1016 type plugs listed in above table accept 2/0–4/0 size cable.

③ E0200 type plugs listed in above table accept #2–2/0 size cable. E0400 type plugs listed accept 3/0–4/0 size cable.

④ For Canadian switches, 600 Vac products have the same color configurations as the 240 Vac versions (green, white, black, red, blue).

General Description—Lug Data, Connection Plugs

Table 28.0-20. Company Switch Available Lug Capacities of the Single-Throw Switch Assembly with Cam-Lok™ or Posi-Lok™ Receptacles

Switch Ampacity	Service Terminal Openings Cu/Al	Load Terminal Openings Cu/Al	Switched Neutral Pole Load Terminal Openings Cu/Al	Solid Neutral Terminal Openings	Ground Terminal Openings Cu/Al	Receptacle Bypass Terminal
100	(1) 1/0–14 AWG	(1) 1/0–14 AWG	(1) 1/0–14 AWG	(2) 14 AWG–1/0 and (2) 6–14 AWG	(1) 2–14 AWG	(1) 1/0–14 AWG
200	(1) 300 kcmil–6 AWG	(1) 300 kcmil–6 AWG	(1) 300 kcmil–6 AWG	(2) 6 AWG–300 kcmil and (2) 6–14 AWG	(2) 2–14 AWG	(1) 300 kcmil–6 AWG
400	(1) 750 kcmil–1/0 or (2) 300 kcmil–1/0	(1) 750 kcmil–1/0 or (2) 300 kcmil–1/0	(1) 750 kcmil–1/0 or (2) 300 kcmil–1/0	(2x) (2) 1/0–300 kcmil or (1) 1/0–750 kcmil and (3) 6 AWG–250 kcmil	(2) 250 kcmil–6 AWG	Crimp lug provisions
600	(1) 750 kcmil–1/0 or (1) 600 kcmil–2	(1) 750 kcmil–1/0 or (1) 600 kcmil–2	(1) 750 kcmil–1/0 or (1) 600 kcmil–2	(2) 2 AWG–600 kcmil and 1/0–750 kcmil and (3) 6 AWG–250 kcmil	(2) 250 kcmil–6 AWG	Crimp lug provisions
800	(4) 750 kcmil–1/0	(4) 750 kcmil–1/0	(4) 750 kcmil–1/0	(2x) (4) 1/0–750 kcmil and (3) 6 AWG–250 kcmil	(2) 250 kcmil–6 AWG	Crimp lug provisions

Table 28.0-21. Company Switch Standard Receptacles and Corresponding Connection Plugs

Switch Ampacity	Connector Color	Cam-Lok Connectors		Posi-Lok Connectors	
		Receptacle ①	Plug ②	Receptacle Panel	Plug ③
240 Vac					
100, 200	Ground (green) Neutral (white) A Phase (black) B Phase (red) C Phase (blue)	E1016-1604S E1016-1605S E1016-1631S E1016-1633S E1016-1643S	E-Z1016-8391 E-Z1016-8392 E-Z1016-8362 E-Z1016-8364 E-Z1016-8368	Two-pole, three-wire with solid neutral or three-pole, three-wire with switched neutral pole (two-phase and one neutral pole): E0200-1696/ three-pole, three-wire (no neutral): E0200-1686-NN/ three-pole, four-wire with Solid neutral or four-pole, four-wire with solid neutral or four-pole, four-wire with switched neutral pole (three-phase and one neutral pole): E0200-1687	E0200-181 E0200-182 E0200-183 E0200-184 E0200-185
400	Ground (green) Neutral (white) A Phase (black) B Phase (red) C Phase (blue)	E1016-1604S E1016-1605S E1016-1631S E1016-1633S E1016-1643S	E-Z1016-8391 E-Z1016-8392 E-Z1016-8362 E-Z1016-8364 E-Z1016-8368	Two-pole, three-wire with solid neutral or three-pole, three-wire with switched neutral pole (two-phase and one neutral pole): E0400-1696/ three-pole, three-wire (no neutral): E0400-1686-NN/ three-pole, four-wire with solid neutral or four-pole, four-wire with solid neutral or four-pole, four-wire with switched neutral pole (three-phase and one neutral pole): E0400-1687	E0400-181 E0400-182 E0400-183 E0400-184 E0400-185
600, 800	Ground (green) Neutral (white) A Phase (black) B Phase (red) C Phase (blue)	(2) E1016-1604S (2) E1016-1605S (2) E1016-1631S (2) E1016-1633S (2) E1016-1643S	(2) E-Z1016-8391 (2) E-Z1016-8392 (2) E-Z1016-8362 (2) E-Z1016-8364 (2) E-Z1016-8368	Two-pole, three-wire with solid neutral or three-pole, three-wire with switched neutral pole (two-phase and one neutral pole): (2) E0400-1696/ three-pole, three-wire (no neutral): (2) E0400-1686-NN/ three-pole, four-wire with solid neutral or four-pole, four-wire with solid neutral or four-pole, four-wire with switched neutral pole (three-phase and one neutral pole): (2) E0400-1687	(2) E0400-181 (2) E0400-182 (2) E0400-183 (2) E0400-184 (2) E0400-185
600 Vac ④					
100, 200	Ground (green) Neutral (white) A Phase (brown) B Phase (orange) C Phase (yellow)	E1016-1604S E1016-1605S E1016-1687S E1016-1634S E1016-1632S	E-Z1016-8391 E-Z1016-8392 E-Z1016-8369 E-Z1016-8365 E-Z1016-8363	Three-pole, three-wire (no neutral): E0200-1892-NN/ three-pole, four-wire with solid neutral or four-pole, four-wire with solid neutral or four-pole, four-wire with switched neutral pole (three-phase and one neutral pole): E0200-1890	E0200-181 E0200-182 E0200-199 E0200-195 E0200-192
400	Ground (green) Neutral (white) A Phase (brown) B Phase (orange) C Phase (yellow)	E1016-1604S E1016-1605S E1016-1687S E1016-1634S E1016-1632S	E-Z1016-8391 E-Z1016-8392 E-Z1016-8369 E-Z1016-8365 E-Z1016-8363	Three-pole, three-wire (no neutral): E0400-1833-NN/ three-pole, four-wire with solid neutral or four-pole, four-wire with solid neutral or four-pole, four-wire with switched neutral pole (three-phase and one neutral pole): E0400-1702	E0400-181 E0400-182 E0400-199 E0400-195 E0400-192
600, 800	Ground (green) Neutral (white) A Phase (brown) B Phase (orange) C Phase (yellow)	(2) E1016-1604S (2) E1016-1605S (2) E1016-1687S (2) E1016-1634S (2) E1016-1632S	(2) E-Z1016-8391 (2) E-Z1016-8392 (2) E-Z1016-8369 (2) E-Z1016-8365 (2) E-Z1016-8363	Three-pole, three-wire (no neutral): (2) E0400-1833-NN/ three-pole, four-wire with solid neutral or four-pole, four-wire with solid neutral or four-pole, four-wire with switched neutral pole (three-phase and one neutral pole): (2) E0400-1702	(2) E0400-181 (2) E0400-182 (2) E0400-199 (2) E0400-195 (2) E0400-192

① For non-standard receptacle options, please contact the Flex Center at 888-329-9272.

② E/E-Z 1016 type plugs listed in above table accept 2/0–4/0 size cable.

③ E0200 type plugs listed in above table accept #2–2/0 size cable. E0400 type plugs listed accept 3/0–4/0 size cable.

④ For Canadian switches, 600 Vac products have the same color configurations as the 240 Vac versions (green, white, black, red, blue).

General Description—Lug Data, Connection Plugs

Table 28.0-22. Generator Switch Available Lug Capacities of the Single-Throw Switch Assembly with Cam-Lok or Posi-Lok Receptacles

Switch Ampacity	Service Terminal Openings Cu/Al	Load Terminal Openings Cu/Al	Switched Neutral Pole Load Terminal Openings Cu/Al	Solid Neutral Terminal Openings	Ground Terminal Openings Cu/Al	Receptacle Bypass Terminal
100	(1) 1/0–14 AWG	(1) 1/0–14 AWG	(1) 1/0–14 AWG	(2) 14 AWG–1/0 and (2) 6–14 AWG	(1) 2–14 AWG	(1) 1/0–14 AWG
200	(1) 300 kcmil–6 AWG	(1) 300 kcmil–6 AWG	(1) 300 kcmil–6 AWG	(2) 6 AWG–300 kcmil and (2) 6–14 AWG	(2) 2–14 AWG	(1) 300 kcmil–6 AWG
400	(1) 750 kcmil–1/0 or (2) 300 kcmil–1/0	(1) 750 kcmil–1/0 or (2) 300 kcmil–1/0	(1) 750 kcmil–1/0 or (2) 300 kcmil–1/0	(2x) (2) 1/0–300 kcmil or (1) 1/0–750 kcmil and (3) 6 AWG–250 kcmil	(2) 250 kcmil–6 AWG	(1) 750 kcmil–1/0 or (2) 300 kcmil–1/0
600	(4) 750 kcmil–1/0	(4) 750 kcmil–1/0	(4) 750 kcmil–1/0	2x (4) 1/0–750 kcmil and (3) 6 AWG–250 kcmil	(2) 250 kcmil–6 AWG	(4) 750 kcmil–1/0
800	(4) 750 kcmil–1/0	(4) 750 kcmil–1/0	(4) 750 kcmil–1/0	(2x) (4) 1/0–750 kcmil and (3) 6 AWG–250 kcmil	(2) 250 kcmil–6 AWG	(4) 750 kcmil–1/0

Table 28.0-23. Generator Switch Standard Receptacles and Corresponding Connection Plugs

Switch Ampacity	Connector Color	Cam-Lok Connectors		Posi-Lok Connectors	Plug ③
		Receptacle ①	Plug ②	Receptacle Panel	
240 Vac					
100, 200	Ground (green) Neutral (white) A Phase (black) B Phase (red) C Phase (blue)	E1016-1635S E1016-1636S E1016-1600S E1016-1602S E1016-1612S	E-Z1016-8366 E-Z1016-8367 E-Z1016-8387 E-Z1016-8389 E-Z1016-8393	Two-pole, three-wire with solid neutral or three-pole, three-wire with switched neutral pole (two-phase and one neutral pole): E0200-1672/ three-pole, three-wire (no neutral): E0200-1661-NN/ three-pole, four-wire with solid neutral or four-pole, four-wire with solid neutral or four-pole, four-wire with switched neutral pole (three-phase and one neutral pole): E0200-1662	E0200-281 E0200-282 E0200-283 E0200-284 E0200-285
400	Ground (green) Neutral (white) A Phase (black) B Phase (red) C Phase (blue)	E1016-1635S E1016-1636S E1016-1600S E1016-1602S E1016-1612S	E-Z1016-8366 E-Z1016-8367 E-Z1016-8387 E-Z1016-8389 E-Z1016-8393	Two-pole, three-wire with solid neutral or three-pole, three-wire with switched neutral pole (two-phase and one neutral pole): E0400-1672/ three-pole, three-wire (no neutral): E0400-1661-NN/ three-pole, four-wire with solid neutral or four-pole, four-wire with solid neutral or four-pole, four-wire with switched neutral pole (three-phase and one neutral pole): E0400-1662	E0400-281 E0400-282 E0400-283 E0400-284 E0400-285
600, 800	Ground (green) Neutral (white) A Phase (black) B Phase (red) C Phase (blue)	(2) E1016-1635S (2) E1016-1636S (2) E1016-1600S (2) E1016-1602S (2) E1016-1612S	(2) E-Z1016-8366 (2) E-Z1016-8367 (2) E-Z1016-8387 (2) E-Z1016-8389 (2) E-Z1016-8393	Two-pole, three-wire with solid neutral or three-pole, three-wire with switched neutral pole (two-phase and one neutral pole): (2) E0400-1672/ three-pole, three-wire (no neutral): (2) E0400-1661-NN/ three-pole, four-wire with solid neutral or four-pole, four-wire with solid neutral or four-pole, four-wire with switched neutral pole (three-phase and one neutral pole): (2) E0400-1662	(2) E0400-281 (2) E0400-282 (2) E0400-283 (2) E0400-284 (2) E0400-285
600 Vac ④					
100, 200	Ground (green) Neutral (white) A Phase (brown) B Phase (orange) C Phase (yellow)	E1016-1635S E1016-1636S E1016-1619S E1016-1603S E1016-1601S	E-Z1016-8366 E-Z1016-8367 E-Z1016-8394 E-Z1016-8390 E-Z1016-8388	Three-pole, three-wire (no neutral): E0200-1891-NN/ three-pole, four-wire with solid neutral or four-pole, four-wire with solid neutral or four-pole, four-wire with switched neutral pole (three-phase and one neutral Pole): E0200-1891	E0200-281 E0200-282 E0200-288 E0200-289 E0200-286
400	Ground (green) Neutral (white) A Phase (brown) B Phase (orange) C Phase (yellow)	E1016-1635S E1016-1636S E1016-1619S E1016-1603S E1016-1601S	E-Z1016-8366 E-Z1016-8367 E-Z1016-8394 E-Z1016-8390 E-Z1016-8388	Three-pole, three-wire (no neutral): E0400-1862-NN/ three-pole, four-wire with solid neutral or four-pole, four-wire with solid neutral or four-pole, four-wire with switched neutral pole (three-phase and one neutral pole): E0400-1703	E0400-281 E0400-282 E0400-299 E0400-295 E0400-292
600, 800	Ground (green) Neutral (white) A Phase (brown) B Phase (orange) C Phase (yellow)	(2) E1016-1635S (2) E1016-1636S (2) E1016-1619S (2) E1016-1603S (2) E1016-1601S	(2) E-Z1016-8366 (2) E-Z1016-8367 (2) E-Z1016-8394 (2) E-Z1016-8390 (2) E-Z1016-8388	Three-pole, three-wire (no neutral): (2) E0400-1862-NN/ three-pole, four-wire with solid neutral or four-pole, four-wire with solid neutral or four-pole, four-wire with switched neutral pole (three-phase and one neutral pole): (2) E0400-1703	(2) E0400-281 (2) E0400-282 (2) E0400-299 (2) E0400-295 (2) E0400-292

① For non-standard receptacle options, please contact the Flex Center at 888-329-9272.

② E/E-Z 1016 type plugs listed in above table accept 2/0–4/0 size cable.

③ E0200 type plugs listed in above table accept #2–2/0 size cable. E0400 type plugs listed accept 3/0–4/0 size cable.

④ For Canadian switches, 600 Vac products have the same color configurations as the 240 Vac versions (green, white, black, red, blue).

Layout—Dimensions

Dimensions

Table 28.0-24. General-Duty, Non-Fusible, 240 V, Three-Pole, Single-Throw

Ampere Rating	NEMA 1					NEMA 3R				
	Dimensions in Inches (mm)				Weight Lb (kg)	Dimensions in Inches (mm)				Weight Lb (kg)
	Width (W)	Height (H)	Depth (D)	Depth (D2)		Width (W)	Height (H)	Depth (D)	Depth (D2)	
30	6.38 (162.1)	10.69 (271.5)	6.88 (174.8)	3.75 (95.2)	6 (2.724)	6.38 (162.1)	10.81 (274.6)	6.88 (174.8)	3.75 (95.2)	6 (2.724)
60	8.69 (220.7)	14.19 (360.4)	7.38 (187.5)	4.21 (106.9)	9 (4.086)	8.69 (220.7)	14.38 (365.3)	7.38 (187.5)	4.21 (106.9)	9 (4.086)
100	9.13 (231.9)	18.81 (477.8)	7.38 (187.5)	4.23 (107.4)	12 (5.448)	9.13 (231.9)	19.25 (489.0)	7.38 (187.5)	4.23 (107.4)	12 (5.448)
200	16.00 (406.4)	25.25 (641.4)	11.25 (285.8)	6.14 (156.0)	48 (21.792)	16.00 (406.4)	25.50 (647.7)	11.25 (285.8)	6.14 (156.0)	55 (24.97)
400	23.00 (584.2)	44.75 (1136.7)	12.63 (320.8)	7.27 (184.7)	100 (45.4)	23.00 (584.2)	45.19 (1147.8)	12.63 (320.8)	7.27 (184.7)	105 (47.67)
600	24.00 (609.6)	52.25 (1327.2)	14.25 (362.0)	8.95 (227.3)	130 (59.02)	24.00 (609.6)	52.70 (1338.6)	14.25 (362.0)	8.95 (227.3)	135 (61.29)

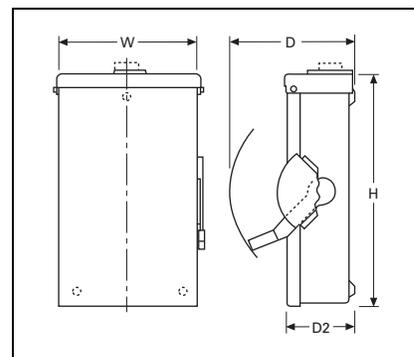


Figure 28.0-4. NEMA 1-3R 30–100 A

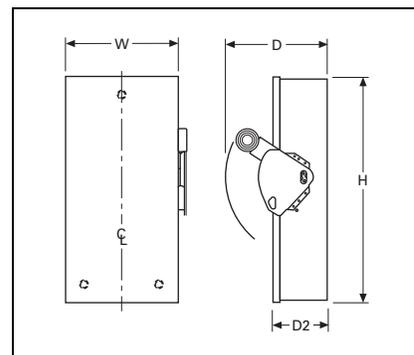


Figure 28.0-5. NEMA 1-3R 200–600 A

Table 28.0-25. General-Duty, Fusible, 240 V, Three-Pole, Solid Neutral, Single-Throw

Ampere Rating	NEMA 1					NEMA 3R				
	Dimensions in Inches (mm)				Weight Lb (kg)	Dimensions in Inches (mm)				Weight Lb (kg)
	Width (W)	Height (H)	Depth (D)	Depth (D2)		Width (W)	Height (H)	Depth (D)	Depth (D2)	
30	6.38 (162.1)	10.69 (271.5)	6.88 (174.8)	3.75 (95.2)	6 (2.724)	6.38 (162.1)	10.81 (274.6)	6.88 (174.8)	3.75 (95.2)	6 (2.724)
60	8.68 (220.7)	14.19 (360.4)	7.38 (187.5)	4.21 (106.9)	10 (4.54)	8.69 (220.7)	14.38 (365.3)	7.38 (187.5)	4.21 (106.9)	10 (4.54)
100	9.13 (231.9)	18.81 (477.8)	7.38 (187.5)	4.23 (107.4)	14 (6.356)	9.13 (231.9)	19.25 (489.0)	7.38 (187.5)	4.23 (107.4)	14 (6.356)
200	16.00 (406.4)	24.75 (628.7)	11.25 (285.8)	6.14 (156.0)	48 (21.792)	16.00 (406.4)	25.50 (647.7)	11.25 (285.8)	6.14 (158.0)	55 (24.97)
400	23.00 (584.2)	44.75 (1136.7)	12.63 (320.8)	7.27 (184.7)	110 (49.94)	23.00 (584.2)	45.19 (1147.8)	12.63 (320.8)	7.27 (184.7)	115 (52.21)
600	24.00 (609.6)	52.25 (1327.2)	14.25 (362.0)	8.95 (227.3)	145 (65.83)	24.00 (609.6)	52.70 (1338.6)	14.25 (362.0)	8.95 (227.3)	150 (68.1)

Note: Not applicable to plug fuse.

Dimensions are for estimating purposes only.

Dimensions (Continued)

Table 28.0-26. Heavy-Duty, Non-Fusible, 600 V, Three-Pole, Single-Throw

Ampere Rating	NEMA 1, 3R					NEMA 12, 4X Stainless Steel, 4				
	Dimensions in Inches (mm)				Weight Lb (kg)	Dimensions in Inches (mm)				Weight Lb (kg)
	Width (W)	Height (H)	Depth (D)	Depth (D2)		Width (W)	Height (H)	Depth (D)	Depth (D2)	
30	8.13 (206.5)	15.88 (403.4)	10.00 (254.0)	5.25 (133.3)	16 (7.264)	8.13 (206.5)	12.13 (308.1)	10.00 (254.0)	5.50 (139.7)	17 (7.718)
60	8.13 (206.5)	15.88 (403.4)	10.00 (254.0)	5.25 (133.3)	16 (7.264)	8.13 (206.5)	12.13 (308.1)	10.00 (254.0)	5.50 (139.7)	17 (7.718)
100	11.13 (282.7)	21.69 (550.9)	10.00 (254.0)	5.25 (133.3)	22 (9.988)	11.13 (282.7)	24.00 (609.6)	10.25 (260.4)	5.50 (139.7)	28 (12.712)
200	16.00 (406.4)	27.63 (701.8)	11.25 (285.8)	6.14 (156.0)	46 (20.884)	16.00 (406.4)	34.38 (873.3)	11.50 (292.1)	6.44 (163.6)	55 (24.97)
400	23.00 (584.2)	45.19 (1147.8)	12.63 (320.8)	7.27 (184.7)	110 (49.94)	23.00 (584.2)	57.63 (1463.8)	12.63 (320.8)	7.19 (182.6)	125 (56.75)
600	24.00 (609.6)	52.70 (1338.6)	14.25 (362.0)	8.95 (227.3)	135 (61.29)	24.00 (609.6)	63.00 (1600.2)	14.25 (362.0)	8.88 (225.6)	167 (75.818)
800	25.38 (644.7)	56.69 (1439.9)	14.25 (362.0)	8.95 (227.3)	158 (71.732)	25.38 (644.7)	71.75 (1822.5)	14.25 (362.0)	8.88 (225.6)	175 (79.45)
1200	41.47 (1053.3)	70.31 (1785.9)	19.94 (506.5)	12.44 (316.0)	430 (195.22)	41.47 (1053.3)	70.31 (1785.9)	19.94 (506.5)	13.51 (343.2)	475 (215.65)

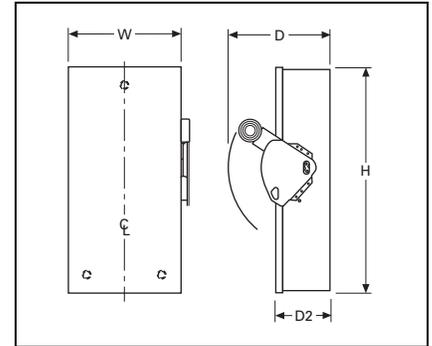


Figure 28.0-6. NEMA 1, 3R 30–1200 A

Table 28.0-27. Heavy-Duty, Fusible, 240 and 600 V, Three-Pole Solid Neutral, Single-Throw

Ampere Rating	NEMA 1, 3R					NEMA 12, 4X Stainless Steel, 4				
	Dimensions in Inches (mm)				Weight Lb (kg)	Dimensions in Inches (mm)				Weight Lb (kg)
	Width (W)	Height (H)	Depth (D)	Depth (D2)		Width (W)	Height (H)	Depth (D)	Depth (D2)	
30	8.13 (206.5)	15.88 (403.4)	10.00 (254.0)	5.25 (133.3)	20 (9.08)	8.13 (206.5)	17.88 (454.2)	10.00 (254.0)	5.50 (139.7)	22 (9.988)
60	8.13 (206.5)	15.88 (403.4)	10.00 (254.0)	5.25 (133.3)	20 (9.08)	8.13 (206.5)	17.88 (454.2)	10.00 (254.0)	5.50 (139.7)	22 (9.988)
100	11.13 (282.7)	21.69 (550.9)	10.00 (254.0)	5.25 (133.3)	27 (12.258)	11.13 (282.7)	24.00 (609.6)	10.25 (260.4)	5.50 (139.7)	30 (13.62)
200	16.00 (406.4)	27.63 (701.8)	11.25 (285.8)	6.14 (156.0)	52 (23.608)	16.00 (406.4)	34.38 (873.3)	11.50 (292.1)	6.44 (163.6)	61 (27.694)
400	23.00 (584.2)	45.19 (1147.8)	12.63 (320.8)	7.27 (184.7)	120 (54.48)	23.00 (584.2)	57.63 (1463.8)	12.63 (320.8)	7.19 (182.6)	135 (61.29)
600	24.00 (609.6)	52.70 (1338.6)	14.25 (362.0)	8.95 (227.3)	153 (69.462)	24.00 (609.6)	63.00 (1600.2)	14.25 (362.0)	8.88 (225.6)	203 (92.162)
800	25.38 (644.7)	56.69 (1439.9)	14.25 (362.0)	8.95 (227.3)	168 (76.272)	25.38 (644.7)	71.75 (1822.5)	14.25 (362.0)	8.88 (225.6)	213 (96.702)
1200	41.47 (1053.3)	70.31 (1785.9)	19.94 (506.5)	12.44 (316.0)	465 (211.11)	41.47 (1053.3)	70.31 (1785.9)	19.94 (506.5)	13.51 (343.2)	510 (231.54)

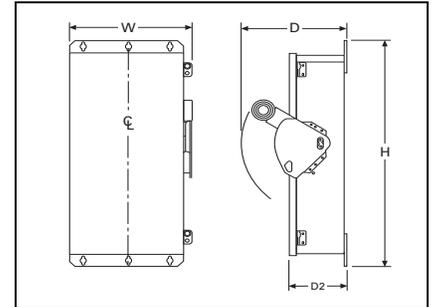


Figure 28.0-7. NEMA 4/4X and 12 30–1200 A

Layout—Dimensions

Dimensions (Continued)

Table 28.0-28. Heavy-Duty, Non-Fusible, 240 and 600 V, Three-Pole, Double-Throw

Ampere Rating	NEMA 1, 3R					NEMA 12, 4X Stainless Steel				
	Dimensions in Inches (mm)				Weight Lb (kg)	Dimensions in Inches (mm)				Weight Lb (kg)
	Width (W)	Height (H)	Depth (D)	Depth (D2)		Width (W)	Height (H)	Depth (D)	Depth (D2)	
30	11.94 (303.3)	24.63 (625.6)	9.88 (251.0)	5.38 (136.7)	34 (15.436)	12.00 (304.8)	25.88 (657.4)	10.25 (260.4)	5.50 (139.7)	60 (27.24)
60	11.94 (303.3)	24.63 (625.6)	9.88 (251.0)	5.38 (136.7)	34 (15.436)	12.00 (304.8)	25.88 (657.4)	10.25 (260.4)	5.50 (139.7)	60 (27.24)
100	11.94 (303.3)	24.63 (625.6)	9.88 (251.0)	5.38 (136.7)	34 (15.436)	12.00 (304.8)	25.88 (657.4)	10.25 (260.4)	5.50 (139.7)	60 (27.24)
200	19.56 (496.8)	37.38 (949.5)	11.25 (285.8)	6.10 (154.9)	80 (36.32)	19.50 (495.3)	41.00 (1041.4)	11.63 (295.4)	6.48 (164.6)	105 (47.67)
400	23.13 (587.5)	53.81 (1366.8)	12.50 (317.5)	7.25 (184.2)	140 (63.56)	23.00 (584.2)	57.50 (1460.5)	12.50 (317.5)	7.25 (184.2)	185 (83.99)
600	24.13 (612.9)	63.31 (1608.1)	14.13 (358.9)	8.88 (225.6)	175 (79.45)	—	—	—	—	—
800	24.13 (612.9)	63.31 (1608.1)	14.13 (358.9)	8.88 (225.6)	175 (79.45)	—	—	—	—	—
1200	42.62 (1082.5)	78.11 (1984.0)	25.62 (650.7)	20.47 (519.9)	509 (231.09)	—	—	—	—	—

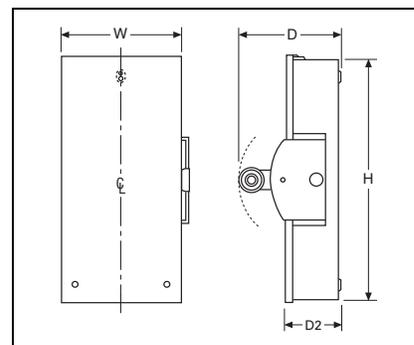


Figure 28.0-8. NEMA 1, 3R 30–800 A

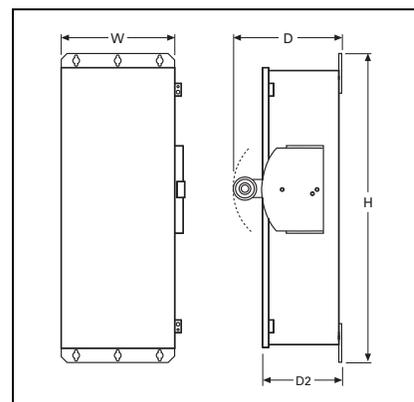


Figure 28.0-9. NEMA 12, 4X 30–400 A

Table 28.0-29. Heavy-Duty, Fusible, 240 and 600 V, Three-Pole, Double-Throw

Ampere Rating	NEMA 1, 3R					NEMA 12, 4X Stainless Steel				
	Dimensions in Inches (mm)				Weight Lb (kg)	Dimensions in Inches (mm)				Weight Lb (kg)
	Width (W)	Height (H)	Depth (D)	Depth (D2)		Width (W)	Height (H)	Depth (D)	Depth (D2)	
30	11.94 (303.3)	36.63 (930.4)	9.88 (251.0)	5.38 (136.7)	44 (19.976)	12.00 (304.8)	39.81 (1011.2)	10.25 (260.4)	5.50 (139.7)	45 (20.43)
60	11.94 (303.3)	36.63 (930.4)	9.88 (251.0)	5.38 (136.7)	44 (19.976)	12.00 (304.8)	39.81 (1011.2)	10.25 (260.4)	5.50 (139.7)	45 (20.43)
100	11.94 (303.3)	36.63 (930.4)	9.88 (251.0)	5.38 (136.7)	44 (19.976)	12.00 (304.8)	39.81 (1011.2)	10.25 (260.4)	5.50 (139.7)	45 (20.43)
200	19.56 (496.8)	50.88 (1292.4)	11.25 (285.8)	6.10 (154.9)	95 (43.13)	19.56 (496.8)	55.63 (1413.0)	11.63 (295.4)	6.46 (164.1)	100 (45.4)
400	25.38 (644.7)	74.75 (1898.7)	14.13 (358.9)	8.88 (225.6)	230 (104.42)	25.38 (644.7)	74.75 (1898.7)	14.13 (358.9)	8.92 (226.6)	260 (118.04)
600	28.12 (714.3)	58.86 (1495.0)	25.62 (650.7)	20.47 (520.0)	282 (128.03)	—	—	—	—	—
800	28.12 (714.2)	58.86 (1495.0)	25.62 (650.7)	20.47 (519.9)	282 (128.03)	—	—	—	—	—
1200	42.62 (1082.5)	78.11 (1984.0)	29.62 (752.3)	20.47 (519.9)	509 (231.09)	—	—	—	—	—

Dimensions (Continued)

Table 28.0-30. Shunt Trip Safety Switch, 240 Vac and 600 Vac

Ampere Rating	Fuse Class ②	Number of Poles	Enclosure Dimensions ①, Exterior in Inches (mm)			
			Height (H)	Width (W)	Depth (D1)	Depth (D2)
Fusible						
30	H	2, 3 or 4 ③	21.58 (584.1)	11.58 (294.1)	11.43 (290.3)	5.58 (141.7)
60	H	2, 3 or 4 ③	21.58 (584.1)	11.58 (294.1)	11.43 (290.3)	5.58 (141.7)
100	H	2, 3 or 4 ③	24.95 (633.7)	14.89 (378.2)	11.51 (282.4)	5.58 (141.7)
200	H	2, 3 or 4	35.38 (898.7)	20.11 (510.8)	11.61 (294.9)	6.45 (163.8)
400	H	2, 3 or 4	57.47 (1459.7)	27.29 (693.2)	12.43 (315.7)	7.42 (188.5)
600	H	2, 3	62.97 (1599.4)	28.29 (718.6)	12.43 (315.7)	7.42 (188.5)
800	L	2, 3	71.72 (1821.7)	29.54 (750.3)	12.43 (315.7)	7.42 (188.5)
Non-Fusible						
30	—	2, 3 or 4 ③	21.58 (584.1)	11.58 (294.1)	11.43 (290.3)	5.58 (141.7)
60	—	2, 3 or 4 ③	21.58 (584.1)	11.58 (294.1)	11.43 (290.3)	5.58 (141.7)
100	—	2, 3 or 4 ③	24.95 (633.7)	14.89 (378.2)	11.51 (282.4)	5.58 (141.7)
200	—	2, 3 or 4	35.38 (898.7)	20.11 (510.8)	11.61 (294.9)	6.45 (163.8)
400	—	2, 3 or 4	57.47 (1459.7)	27.29 (693.2)	12.43 (315.7)	7.42 (188.5)
600	—	2, 3	62.97 (1599.4)	28.29 (718.6)	12.43 (315.7)	7.42 (188.5)
800	—	2, 3	71.72 (1821.7)	29.54 (750.3)	12.43 (315.7)	7.42 (188.5)

- ① Accurate for all enclosure NEMA type ratings—12/3R, 4, 4X stainless steel.
- ② Class H fuse clips supplied as standard on fusible devices 30–600 A, Class L for 800 A; Class R, J, T fuse clips available.
- ③ Four-pole devices are wider than dimension for 30, 60 and 100 A devices. Consult factory for details.

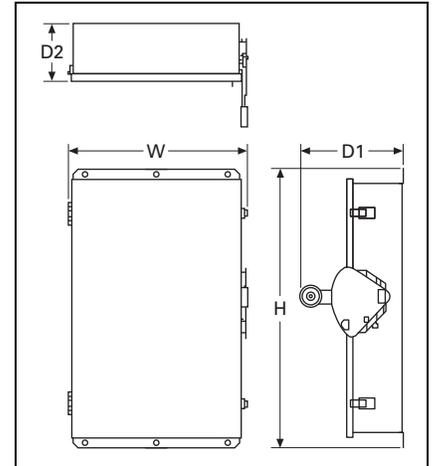


Figure 28.0-10. Shunt Trip Safety Switch, 240 Vac and 600 Vac

Layout—Dimensions

Dimensions (Continued)

Table 28.0-31. Heavy-Duty, Solar Photovoltaic Switch Multi-Circuit, 600 Vdc, Non-Fusible and Fusible

Ampere Rating	Number of Circuits	NEMA Type 3R ①				NEMA Types 4, 4X Stainless ①			
		Dimensions in Inches (mm)				Dimensions in Inches (mm)			
		A	B	C	D	A	B	C	D
Grounded									
30, 60	3	16.27 (413.3)	8.87 (225.3)	9.89 (251.2)	5.25 (133.4)	19.08 (484.6)	8.76 (222.5)	10.22 (259.6)	5.50 (139.7)
30, 60	6	19.08 (484.6)	12.88 (327.2)	10.22 (259.6)	5.50 (139.7)	19.08 (484.6)	12.88 (327.2)	10.22 (259.6)	5.50 (139.7)
100	3	21.99 (558.5)	11.84 (300.7)	9.89 (251.2)	5.25 (133.4)	24.95 (633.7)	11.79 (299.5)	10.22 (259.6)	5.50 (139.7)
100	6	24.95 (633.7)	16.13 (409.7)	10.22 (259.6)	5.50 (139.7)	24.95 (633.7)	16.13 (409.7)	10.22 (259.6)	5.50 (139.7)
200	2	35.38 (898.7)	16.54 (420.1)	11.63 (295.4)	6.44 (163.6)	35.38 (898.7)	16.54 (420.1)	11.63 (295.4)	6.44 (163.6)
200	3	35.38 (898.7)	16.54 (420.1)	11.63 (295.4)	6.44 (163.6)	35.38 (898.7)	16.54 (420.1)	11.63 (295.4)	6.44 (163.6)
200	4	35.38 (898.7)	24.46 (621.3)	11.63 (295.4)	6.44 (163.6)	35.38 (898.7)	24.46 (621.3)	11.63 (295.4)	6.44 (163.6)
200	6	39.18 (995.2)	30.18 (766.6)	11.63 (295.4)	6.44 (163.6)	39.18 (995.2)	30.18 (766.6)	11.63 (295.4)	6.44 (163.6)
400 ②	2	57.47 (1459.7)	24.12 (612.7)	12.43 (315.7)	7.19 (182.6)	57.47 (1459.7)	24.12 (612.7)	12.43 (315.7)	7.19 (182.6)
400 ②	3	57.47 (1459.7)	24.12 (612.7)	12.43 (315.7)	7.19 (182.6)	57.47 (1459.7)	24.12 (612.7)	12.43 (315.7)	7.19 (182.6)
400 ②	4	57.47 (1459.7)	24.12 (612.7)	12.43 (315.7)	7.19 (182.6)	57.47 (1459.7)	24.12 (612.7)	12.43 (315.7)	7.19 (182.6)
Ungrounded									
30, 60	1	16.27 (413.3)	8.87 (225.3)	9.89 (251.2)	5.25 (133.4)	19.08 (484.6)	8.76 (222.5)	10.22 (259.6)	5.50 (139.7)
30, 60	3	19.08 (484.6)	12.88 (327.2)	10.22 (259.6)	5.50 (139.7)	19.08 (484.6)	12.88 (327.2)	10.22 (259.6)	5.50 (139.7)
100	1	21.99 (558.5)	11.84 (300.7)	9.89 (251.2)	5.25 (133.4)	24.95 (633.7)	11.79 (299.5)	10.22 (259.6)	5.50 (139.7)
100	3	24.95 (633.7)	16.13 (409.7)	10.22 (259.6)	5.50 (139.7)	24.95 (633.7)	16.13 (409.7)	10.22 (259.6)	5.50 (139.7)
200	1	35.38 (898.7)	16.54 (420.1)	11.63 (295.4)	6.44 (163.6)	35.38 (898.7)	16.54 (420.1)	11.63 (295.4)	6.44 (163.6)
200	2	35.38 (898.7)	16.54 (420.1)	11.63 (295.4)	6.44 (163.6)	35.38 (898.7)	16.54 (420.1)	11.63 (295.4)	6.44 (163.6)
200	3	35.38 (898.7)	24.46 (621.3)	11.63 (295.4)	6.44 (163.6)	35.38 (898.7)	24.46 (621.3)	11.63 (295.4)	6.44 (163.6)
400 ②	1	57.47 (1459.7)	24.12 (612.7)	12.43 (315.7)	7.19 (182.6)	57.47 (1459.7)	24.12 (612.7)	12.43 (315.7)	7.19 (182.6)
400 ②	2	57.47 (1459.7)	24.12 (612.7)	12.43 (315.7)	7.19 (182.6)	57.47 (1459.7)	24.12 (612.7)	12.43 (315.7)	7.19 (182.6)

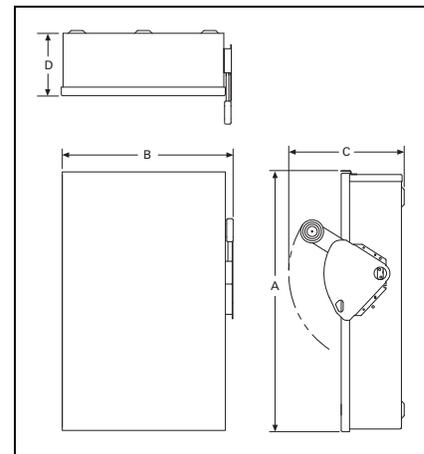


Figure 28.0-11. NEMA Type 3R Dimensions

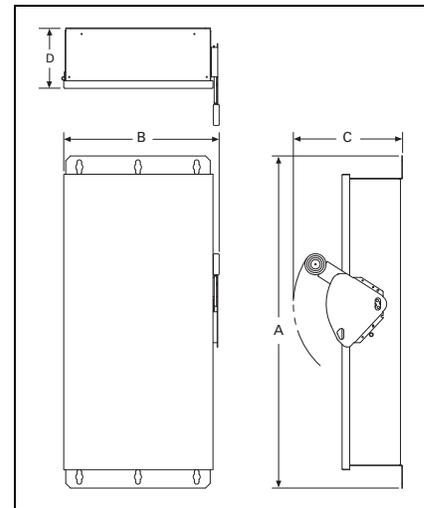


Figure 28.0-12. NEMA 4/4X Stainless Dimensions

① NEMA Type 4 and 4X stainless steel enclosures are suitable for mounting in either vertical or horizontal positions. NEMA Type 3R enclosures must be mounted vertically.

② For smaller NEMA 3R enclosure, consult factory.

Layout—Dimensions

Dimensions (Continued)

Table 28.0-32. Heavy-Duty, Solar Photovoltaic Switch Multi-Circuit, 1000 Vdc, Non-Fusible (Fusible Available at 200 A and 400 A)

Ampere Rating	Number of Circuits	NEMA Type 3R ①				NEMA Types 4, 4X Stainless ①			
		Dimensions in Inches (mm)				Dimensions in Inches (mm)			
		A	B	C	D	A	B	C	D
Grounded									
30, 60	1	16.27 (413.3)	8.87 (225.3)	9.89 (251.2)	5.25 (133.4)	14.14 (359.2)	8.76 (222.5)	10.22 (259.6)	5.50 (139.7)
30, 60	2	19.08 (484.6)	12.88 (327.2)	10.22 (259.6)	5.50 (139.7)	19.08 (484.6)	12.88 (327.2)	10.22 (259.6)	5.50 (139.7)
100	1	21.99 (558.6)	11.84 (300.7)	9.89 (251.2)	5.25 (133.4)	24.95 (633.7)	11.79 (299.5)	10.22 (259.6)	5.50 (139.7)
100	2	24.95 (633.7)	16.13 (409.7)	10.22 (259.6)	5.50 (139.7)	24.95 (633.7)	16.13 (409.7)	10.22 (259.6)	5.50 (139.7)
200	1	35.38 (898.7)	16.95 (430.5)	11.63 (295.4)	6.44 (163.6)	35.38 (898.7)	16.95 (430.5)	11.63 (295.4)	6.44 (163.6)
200	2	35.38 (898.7)	24.57 (624.1)	11.63 (295.4)	6.44 (163.6)	35.38 (898.7)	24.57 (624.1)	11.63 (295.4)	6.44 (163.6)
200	3	35.38 (898.7)	24.57 (624.1)	11.63 (295.4)	6.44 (163.6)	35.38 (898.7)	24.57 (624.1)	11.63 (295.4)	6.44 (163.6)
400 ②	1	57.47 (1459.7)	24.12 (612.7)	12.43 (315.7)	7.19 (182.6)	57.47 (1459.7)	24.12 (612.7)	12.43 (315.7)	7.19 (182.6)
400 ②	2	57.47 (1459.7)	24.12 (612.7)	12.43 (315.7)	7.19 (182.6)	57.47 (1459.7)	24.12 (612.7)	12.43 (315.7)	7.19 (182.6)
Ungrounded									
30, 60	1	16.27 (413.3)	8.87 (225.3)	9.89 (251.2)	5.25 (133.4)	14.14 (359.2)	8.76 (222.5)	10.22 (259.6)	5.50 (139.7)
30, 60	2	19.08 (484.6)	12.88 (327.2)	10.22 (259.6)	5.50 (139.7)	19.08 (484.6)	12.88 (327.2)	10.22 (259.6)	5.50 (139.7)
100	1	21.99 (558.6)	11.84 (300.7)	9.89 (251.2)	5.25 (133.4)	24.95 (633.7)	11.79 (299.5)	10.22 (259.6)	5.50 (139.7)
100	2	24.95 (633.7)	16.13 (409.7)	10.22 (259.6)	5.50 (139.7)	24.95 (633.7)	16.13 (409.7)	11.63 (295.4)	5.50 (139.7)
200	1	35.38 (898.7)	16.54 (420.1)	11.63 (295.4)	6.44 (163.6)	35.38 (898.7)	16.54 (420.1)	11.63 (295.4)	6.44 (163.6)
200	2	35.38 (898.7)	16.54 (420.1)	11.63 (295.4)	6.44 (163.6)	35.38 (898.7)	16.54 (420.1)	11.63 (295.4)	6.44 (163.6)
200	3	35.38 (898.7)	24.26 (616.2)	11.63 (295.4)	6.44 (163.6)	35.38 (898.7)	24.26 (616.2)	11.63 (295.4)	6.44 (163.6)
400 ②	1	57.47 (1459.7)	24.12 (612.7)	12.43 (315.7)	7.19 (182.6)	57.47 (1459.7)	24.12 (612.7)	12.43 (315.7)	7.19 (182.6)
400 ②	2	57.47 (1459.7)	24.12 (612.7)	12.43 (315.7)	7.19 (182.6)	57.47 (1459.7)	24.12 (612.7)	12.43 (315.7)	7.19 (182.6)

① NEMA Type 4 and 4X stainless steel enclosures are suitable for mounting in either vertical or horizontal positions. NEMA Type 3R enclosures must be mounted vertically.

② For smaller NEMA 3R enclosure, consult factory.

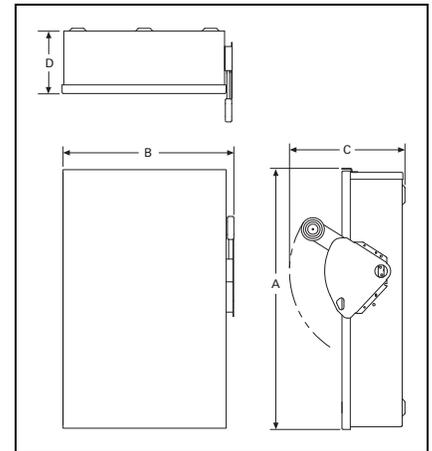


Figure 28.0-13. NEMA Type 3R Dimensions

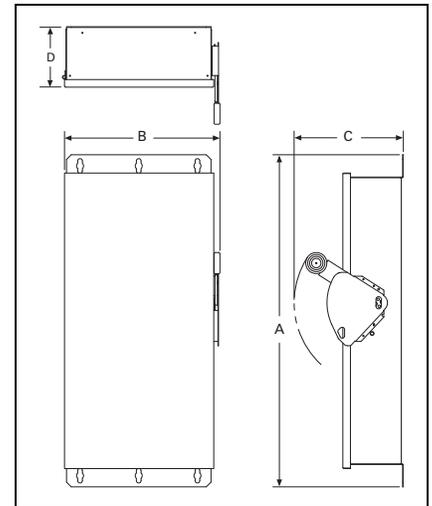


Figure 28.0-14. NEMA 4/4X Stainless Dimensions

Dimensions (Continued)

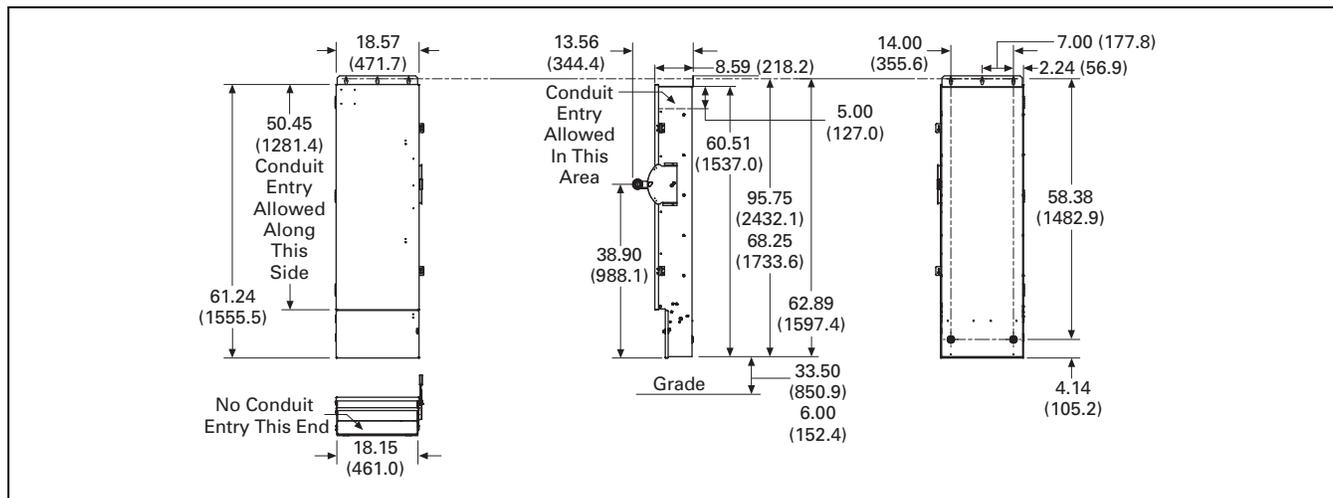


Figure 28.0-15. Quick-Connect Double-Throw 30/200 A—Dimensions in Inches (mm)

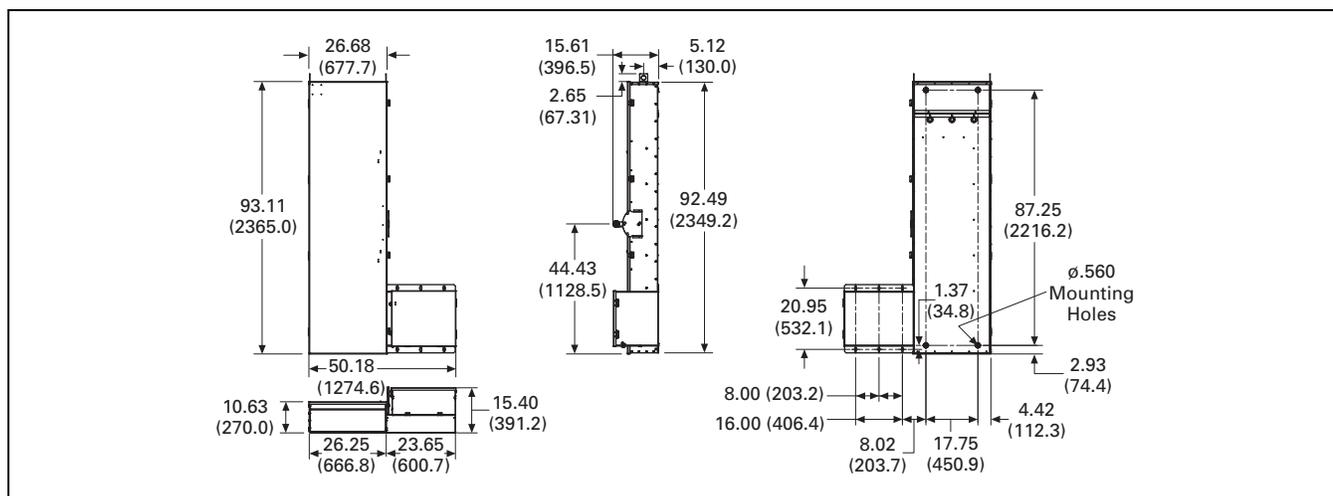


Figure 28.0-16. Quick-Connect Double-Throw 400 A—Dimensions in Inches (mm)

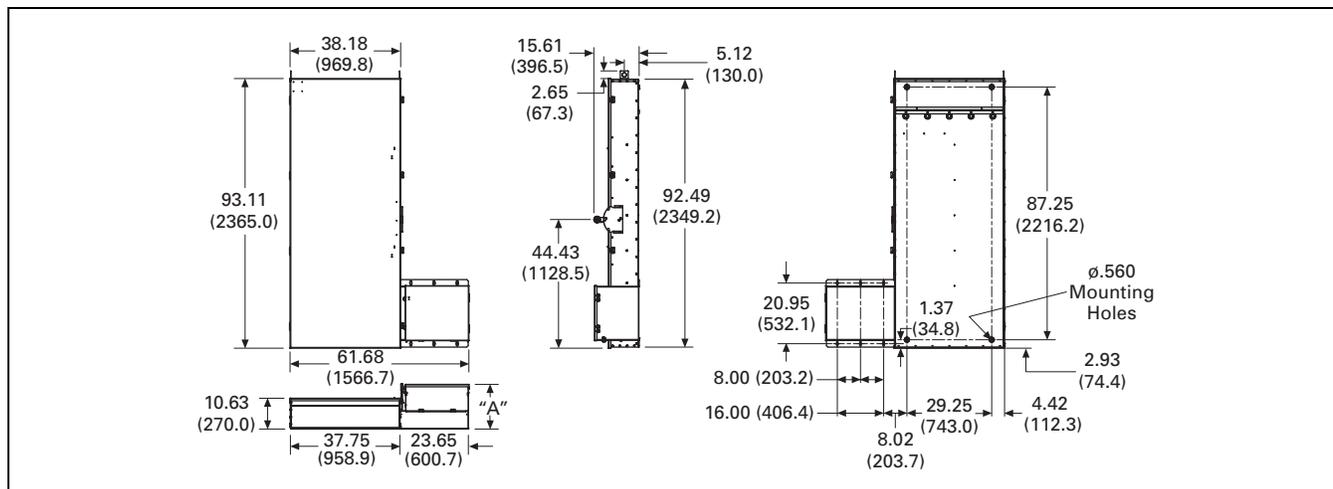


Figure 28.0-17. Quick-Connect Double-Throw 600–800 A—Dimensions in Inches (mm)

Dimensions (Continued)

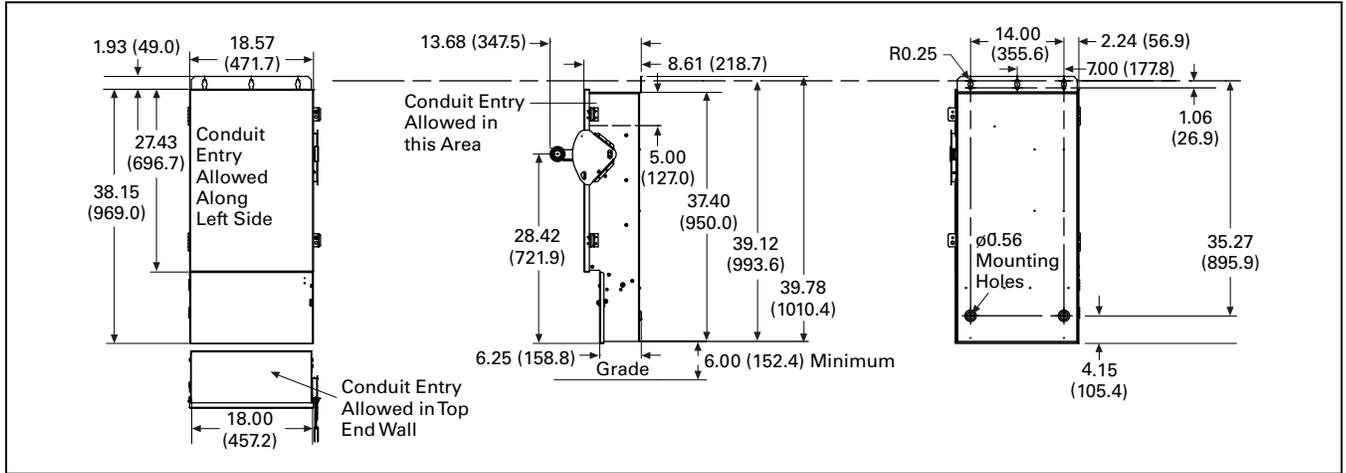


Figure 28.0-18. 100 A Quick-Connect Single-Throw Switch—Dimensions in Inches (mm)

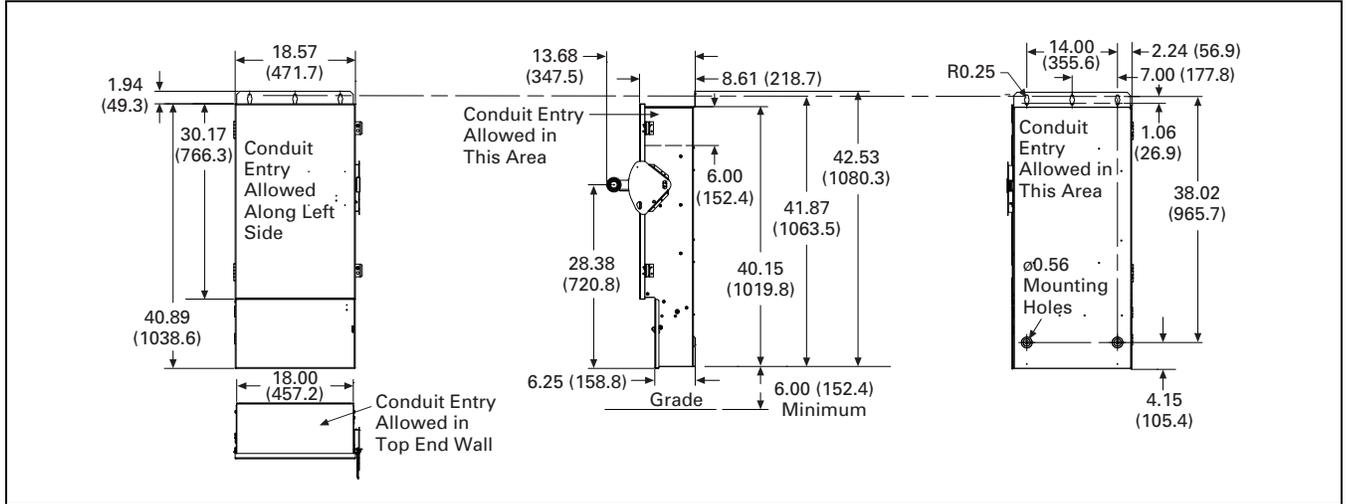


Figure 28.0-19. 200 A Quick-Connect Single-Throw Switch—Dimensions in Inches (mm)

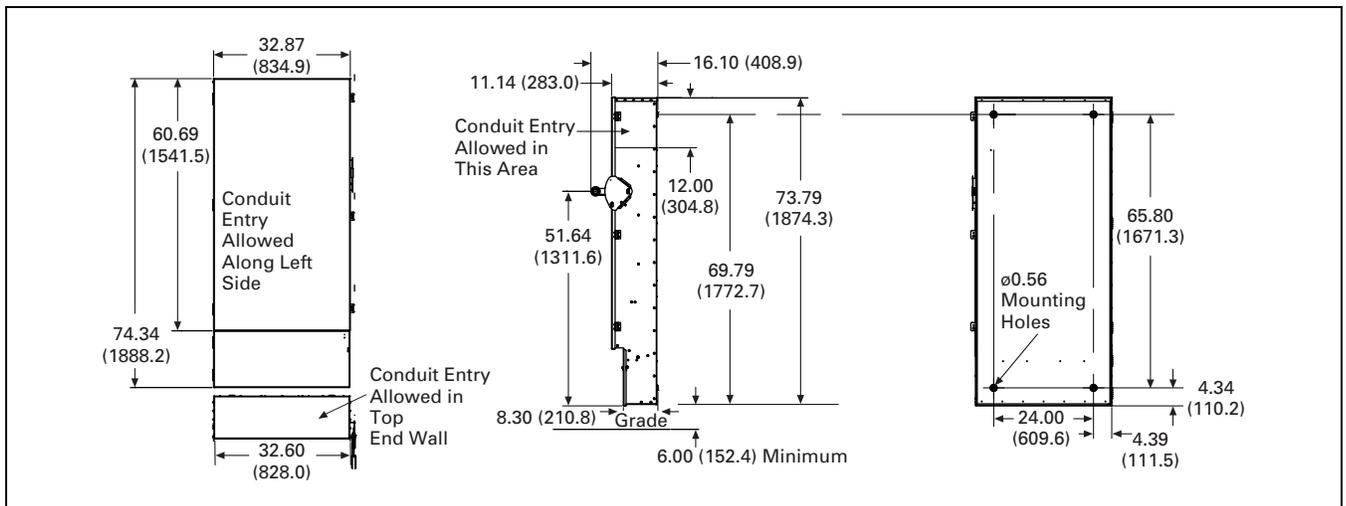


Figure 28.0-20. 400–600 A Quick-Connect Single-Throw Switch—Dimensions in Inches (mm)

Layout—Dimensions

Dimensions (Continued)

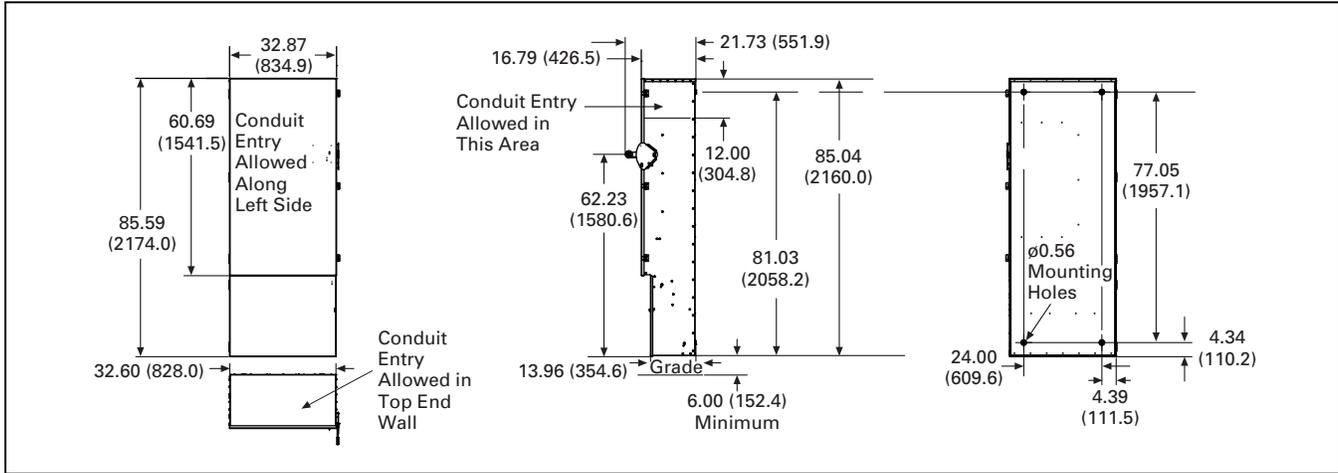


Figure 28.0-21. 800 A Quick-Connect Single-Throw Switch—Dimensions in Inches (mm)

Dimensions (Continued)

Table 28.0-33. Auxiliary Power Heavy-Duty Safety Switch

Ampere Rating	NEMA 3R				Weight Lb (kg)
	Dimensions in Inches (mm)				
	Width (W)	Height (H)	Depth (D)	Depth (D2)	
30	26.58 (675.1)	24.93 (633.2)	16.00 (406.4)	11.29 (286.8)	①
60	26.58 (675.1)	24.93 (633.2)	16.00 (406.4)	11.29 (286.8)	①
100	26.58 (675.1)	24.93 (633.2)	16.00 (406.4)	11.29 (286.8)	①

① 108 lbs (49 kg) with a 15 A GFI receptacle; 130 lbs (59 kg) with a 20 A GFI receptacle.

Table 28.0-34. Elevator Control Switch

Ampere Rating	Dimensions in Inches (mm)		
	Width (W)	Height (H)	Depth (D)
NEMA 1			
30	16.35 (415.4)	29.62 (752.3)	11.18 (283.9)
60	16.35 (415.4)	29.62 (752.3)	11.18 (283.9)
100	16.35 (415.4)	29.62 (752.3)	11.18 (283.9)
200	20.38 (517.8)	32.63 (828.9)	11.28 (286.4)
400	25.21 (640.3)	54.63 (1387.7)	12.69 (322.3)
NEMA 3R or 12			
30	16.35 (415.4)	29.62 (752.3)	11.18 (283.9)
60	16.35 (415.4)	29.62 (752.3)	11.18 (283.9)
100	16.35 (415.4)	29.62 (752.3)	11.18 (283.9)
200	20.38 (517.8)	32.63 (828.9)	11.28 (286.4)
400	25.21 (640.3)	54.63 (1387.7)	12.69 (322.3)

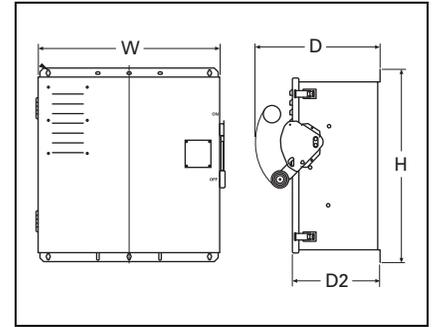


Figure 28.0-22. Auxiliary Power Heavy-Duty Switch Diagram

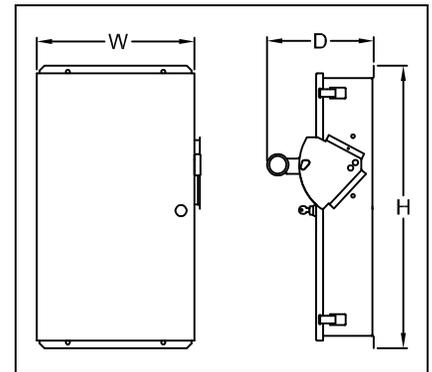


Figure 28.0-23. Elevator Control Switch Diagram

Layout—Dimensions

Dimensions (Continued)

Table 28.0-35. OEM Line Isolation (OLI) Switch Ratings and Capacities

Ampere Rating	Short-Circuit Ratings (Amperes)		Standard Lug Capacities					
	Fusible (Class J)	Non-Fusible	Per Phase			Ground		
			Min. Wire Size	Max. Wire Size	Wire Type	Min. Wire Size	Max. Wire Size	Wire Type
60	200 k at 600 V	10 k at 600 V	#14	#2	Cu/Al	(2) #14	(2) 1/0	Cu/Al
100	200 k at 600 V	10 k at 600 V	#14	1/0	Cu/Al	(2) #14	(2) 1/0	Cu/Al
200	200 k at 600 V	10 k at 600 V	#6	300 kcmil	Cu/Al	(2) #14	(2) 1/0	Cu/Al
400	100 k at 600 V 200 k at 480 V	10 k at 600 V	(2) 1/0 (1) 1/0	(2) 300 kcmil or (1) 750 kcmil	Cu/Al	(2) #6	(2) 250 kcmil	Cu/Al

Table 28.0-36. OLI Switch Dimensions in Inches (mm)

Switch Amperage	Height (H)	Width (W)	Depth (D)
60	21.49 (545.8)	16.08 (408.4)	9.24 (234.7)
100	21.49 (545.8)	16.08 (408.4)	9.24 (234.7)
200	28.21 (716.5)	18.30 (464.8)	9.24 (234.7)
400	50.15 (1273.8)	21.30 (541.0)	9.24 (234.7)

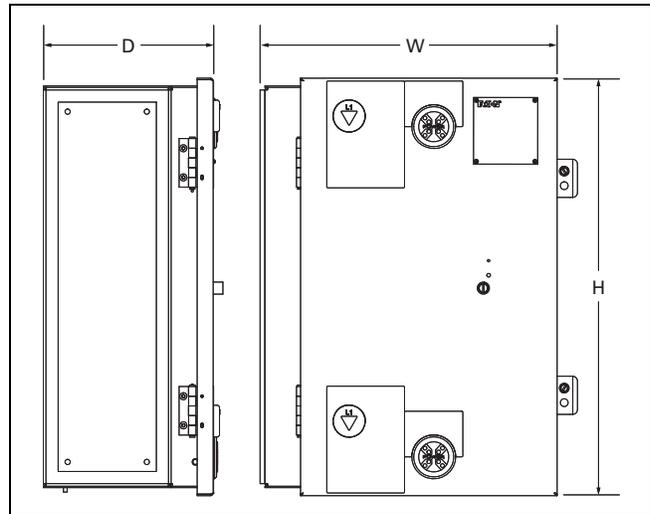


Figure 28.0-24. OLI Switch Dimensions

Note: Learn more at Eaton.com/OLI.

Dimensions (Continued)

**Table 28.0-37. NEMA 7/9 Hazardous Location Disconnect Switch
Dimensions in Inches (mm) and Weights**

Non-Fusible Disconnect Switch				Fusible Disconnect Switch		
Dimension	DS361UX	DS362UX	DS363UX	DS361FX	DS362FX	DS363FX
A	9.74 (247.0)	9.90 (251.0)	10.28 (261.0)	10.02 (255.0)	9.90 (251.0)	10.40 (264.0)
B	5.00 (127.0)	7.00 (178.0)	9.00 (229.0)	7.00 (178.0)	7.00 (178.0)	15.00 (380.0)
C	10.47 (266.0)	12.53 (318.0)	14.67 (373.0)	12.67 (322.0)	12.53 (318.0)	17.31 (440.0)
D	11.13 (283.0)	15.13 (384.0)	17.13 (435.0)	13.13 (333.0)	15.13 (384.0)	11.50 (292.0)
E	12.47 (317.0)	16.53 (420.0)	18.67 (474.0)	14.67 (373.0)	16.53 (420.0)	23.31 (592.0)
F	3.50 (89.0)	3.50 (89.0)	3.50 (89.0)	3.50 (89.0)	3.50 (89.0)	3.50 (89.0)
Weight in lb (kg)	33 (15)	51 (23)	72 (33)	47 (21)	51 (23)	108 (49)

**Table 28.0-38. NEMA 7/9 Hazardous Location Disconnect Switch
Electrical Ratings**

Non-Fusible Horsepower Rating				Fusible Horsepower Rating			
Switch Rating (Amperes)	480 Vac	600 Vac	250 Vdc	Switch Rating (Amperes)	480 Vac	600 Vac	250 Vdc
30	15	20	5	30	15	20	5
60	30	50	10	60	30	50	10
100	60	75	20	100	60	75	20

**Table 28.0-39. NEMA 7/9 Hazardous Location Disconnect Switch
Ordering Information**

Ampere Rating	Fusible/Non-Fusible	Catalog Number
30	Non-fusible	DS361UX
	Fusible	DS361FX
60	Non-fusible	DS362UX
	Fusible	DS362FX
100	Non-fusible	DS363UX
	Fusible	DS363FX

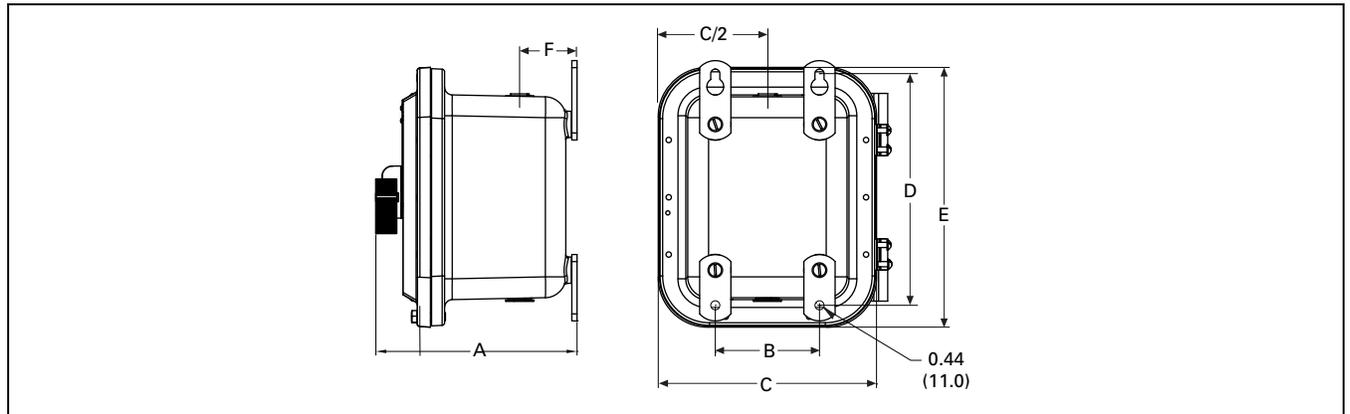


Figure 28.0-25. Non-Fusible and Fusible Disconnect Switch Dimensions

Dimensions are for estimating purposes only.

Technical Data

Maximum Horsepower Ratings

Table 28.0-40. General-Duty, Fusible and Non-Fusible, 120 V with Time Delay Fuses

Ampere Rating	Single-Phase AC	Three-Phase AC
30	2	3
60	3	7-1/2

Table 28.0-41. General-Duty, Fusible and Non-Fusible, 240 V with Time Delay Fuses

Ampere Rating	Single-Phase AC	Three-Phase AC
30	3	7-1/2
60	10	15
100	15	30
200	15	60
400	—	125
600	—	200

Table 28.0-42. Heavy-Duty, Non-Fusible, 120 V

Ampere Rating	Single-Phase AC	Three-Phase AC
30	2	5
60	3	10

Table 28.0-43. Heavy-Duty, Fusible, 240 V with Time Delay Fuses

Ampere Rating	Single-Phase AC	Three-Phase AC
30	3	7-1/2
60	10	15
100	15	30
200	15	60
400	—	125
600	—	200
800	—	250

Table 28.0-44. Heavy-Duty, Fusible, 480 V with Time Delay Fuses

Ampere Rating	Single-Phase AC	Three-Phase AC
30	7-1/2	15
60	20	30
100	30	60
200	50	125
400	—	250
600	—	400
800	—	500

Table 28.0-45. Heavy-Duty, Fusible, 600 V with Time Delay Fuses

Ampere Rating	Single-Phase AC	Three-Phase AC
30	10	20
60	25	50
100	40	75
200	50	150
400	—	350
600	—	500
800	—	500

Table 28.0-46. Heavy-Duty, Non-Fusible, 240 V

Ampere Rating	Single-Phase AC	Three-Phase AC
30	3	10
60	10	20
100	20	40
200	15	60
400	—	125
600	—	200
800	—	—

Table 28.0-47. Heavy-Duty, Non-Fusible, 480 V

Ampere Rating	Single-Phase AC	Three-Phase AC
30	7-1/2	20
60	20	50
100	40	75
200	50	125
400	—	250
600	—	400
800	—	500

Table 28.0-48. Heavy-Duty, Non-Fusible, 600 V

Ampere Rating	Single-Phase AC	Three-Phase AC
30	10	30
60	25	60
100	50	100
200	50	150
400	—	350
600	—	500
800	—	500

Table 28.0-49. Double Throw, Fusible, 240 V with Time Delay Fuses

Ampere Rating	Single-Phase AC	Three-Phase AC
30	3	7-1/2
60	10	15
100	15	30
200	15	60
400	—	125
600 ①	—	50

① Only available for use with fast acting fuses. Standard hp rating is shown.

Table 28.0-50. Double Throw, Fusible, 480 V with Time Delay Fuses

Ampere Rating	Single-Phase AC	Three-Phase AC
30	7-1/2	15
60	20	30
100	30	60
200	50	125
400	—	250

Note: Ratings are based on three-pole designs.

Technical Data

Maximum Horsepower Ratings

Table 28.0-51. Double-Throw, Fusible, 600 V with Time Delay Fuses

Ampere Rating	Single-Phase AC	Three-Phase AC
30	10	20
60	25	50
100	40	75
200	50	150
400	—	350

Table 28.0-52. Double-Throw, Non-Fusible, 120 V

Ampere Rating	Single-Phase AC	Three-Phase AC
30	2	5
60	3	10

Table 28.0-53. Double-Throw, Non-Fusible, 240 V

Ampere Rating	Single-Phase AC	Three-Phase AC
30	3	10
60	10	20
100	20	40
200	15	60
400	—	125
600	—	125
800	—	125

Table 28.0-54. Double-Throw, Non-Fusible, 480 V

Ampere Rating	Single-Phase AC	Three-Phase AC
30	7-1/2	20
60	20	50
100	40	75
200	50	125
400	—	250
600	—	250
800	—	250

Table 28.0-55. Double-Throw, Non-Fusible, 600 V

Ampere Rating	Single-Phase AC	Three-Phase AC
30	10	30
60	25	60
100	50	100
200	50	150
400	—	350
600	—	350
800	—	350

Table 28.0-56. Heavy-Duty, Non-Fusible, 480 V, 600 V Types 7 and 9

Ampere Rating	Three-Phase, 480 V AC	Three-Phase, 600 V AC
30	20	20
60	40	50
100	75	75
200	125	150

Table 28.0-57. Heavy-Duty, Fusible, 480 V, 600 V Types 7 and 9 with Time Delay Fuses

Ampere Rating	Three-Phase, 480 V AC	Three-Phase, 600 V AC
30	15	20
60	30	50
100	60	75
200	125	150

Note: Ratings are based on three-pole designs.

Technical Data—Short-Circuit Ratings

General-Duty

Table 28.0-58. Short-Circuit Ratings Using Class “R,” “J” or “T” Fusing where Applicable

Ampere Rating	Short-Circuit Ratings (Amperes)	
	Type 1	Type 3R
30	100 k at 240 V	100 k at 240 V
60	100 k at 240 V	100 k at 240 V
100	100 k at 240 V	100 k at 240 V
200	100 k at 240 V	100 k at 240 V
400	100 k at 250 V	100 k at 250 V
600	100 k at 250 V	100 k at 250 V

Note: Class “H” fuse clips supplied as standard for 30–600 A. Rated at 10,000 rms symmetrical when using Class “H” fuses.

Shunt Trip Safety Switch

Table 28.0-59. Short-Circuit Ratings Using Class “R,” “J/L” or “T” Fusing ①

Ampere Rating	480 V	600 V
30	200 kAIC	200 kAIC
60	200 kAIC	200 kAIC
100	200 kAIC	200 kAIC
200	200 kAIC	100 kAIC
400	200 kAIC	100 kAIC
600	200 kAIC	100 kAIC
800	200 kAIC	200 kAIC

① Non-fusible values are based on combination rating with upstream device (see TD00801005E).

Heavy-Duty

Table 28.0-60. Short-Circuit Ratings Using Class “R,” “J” or “T” Fusing where Applicable

Ampere Rating	Short-Circuit Ratings (Amperes)			
	Type 1	Type 3R	Type 12	Type 4 and 4X
30	200 k at 600 V			
60	200 k at 600 V			
100	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V	200 k at 600 V	200 k at 600 V
200	200 k at 600 V			
400	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V
600	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V
800 ②	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V	200 k at 480 V 100 k at 600 V
1200 ②	200 k at 600 V			

② Class “L” fuse connectors supplied as standard for 800 A and 1200 A.

Note: Class “H” fuse clips supplied as standard for 30–600 A. Rated at 10,000 A rms symmetrical when using Class “H” fuses.

Double Throw

Table 28.0-61. Short-Circuit Ratings Using Class “R,” “J” or “T” Fusing where Applicable

Ampere Rating	Short-Circuit Ratings (Amperes) (600 V)			
	Type 1	Type 3R	Type 12	Type 4 and 4X
30	100 k	100 k	100 k	100 k
60	100 k	100 k	100 k	100 k
100	100 k	100 k	100 k	100 k
200	100 k	100 k	100 k	100 k
400	100 k	100 k	100 k	100 k
600	100 k	100 k	100 k	100 k
800	100 k	100 k	—	—
1200	100 k	100 k	—	—

Note: Class “H” fuse clips supplied as standard for 30–600 A, except Class “T” for 400 A at 600 V and 600 A at 240 V. Rated at 10,000 A rms symmetrical when using Class “H” fuses.

Note: Class “L” fuse connectors supplied as standard for 800 A and 1200 A.

Note: Safety switch short-circuit ratings are applicable to AC only. **Note:** Safety switch I^2t and I_p values are identical to UL maximum acceptable I^2t and I_p values for the corresponding class fuse.

Note: Table 28.0-61 is not applicable to the compact design shown in Eaton’s Volume 2—Commercial Distribution, CA08100003E, Tab 8, Section 8.1. The compact design is suitable for use on a circuit capable of delivering not more than 10,000 rms symmetrical amperes.

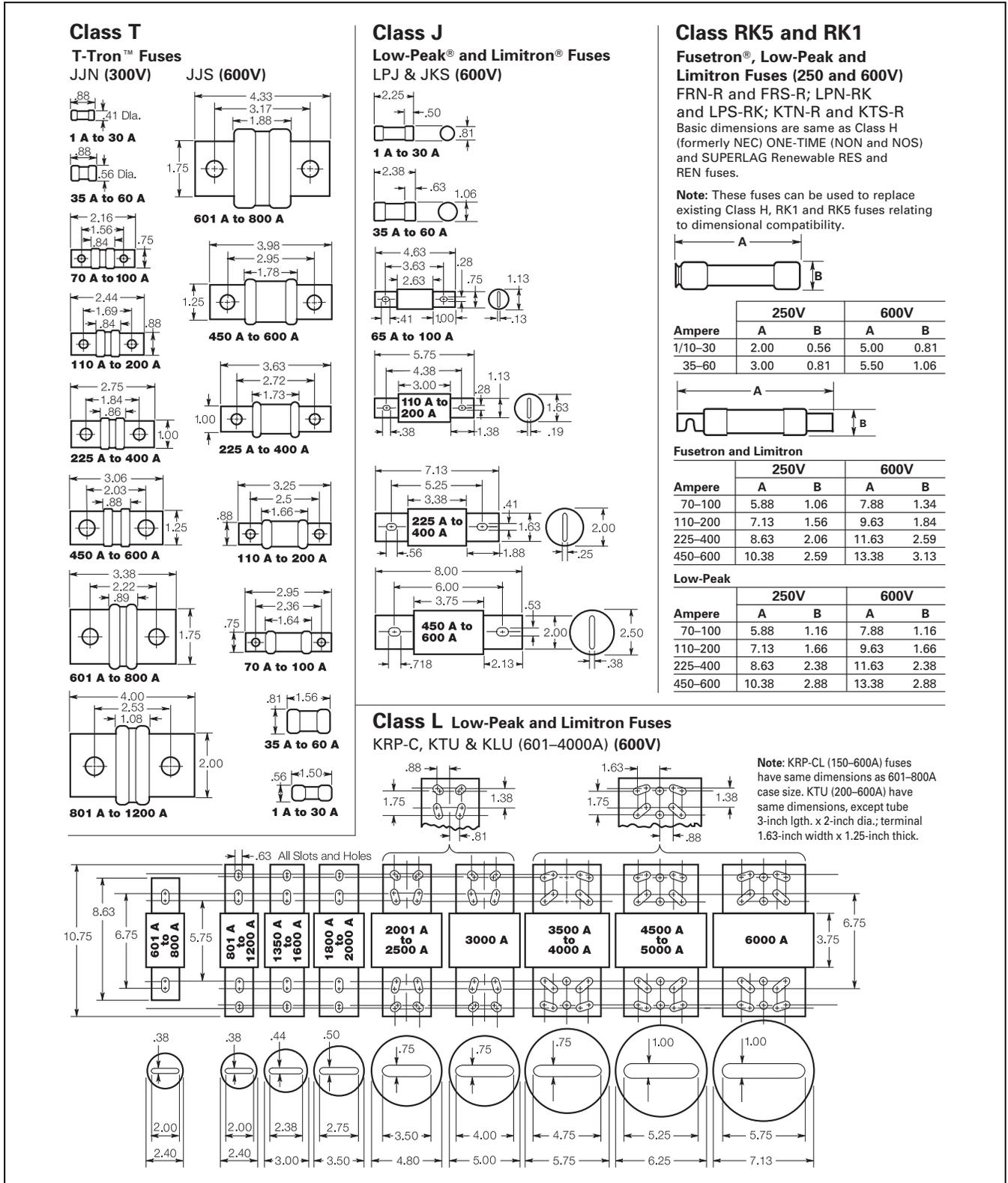
Short-Circuit Ratings of Non-Fusible Switches

The UL listed short-circuit ratings for Eaton’s non-fusible switches are based on the switches being properly protected by overcurrent protective devices. For applications that require a UL listed short-circuit rating of 10,000 rms symmetrical amperes or less, an Eaton non-fusible switch must be properly protected by any overcurrent protective device rated no greater than the ampere rating of the switch. For applications that require a UL listed short-circuit rating of greater than 10,000 rms symmetrical amperes, an Eaton non-fusible switch must be properly protected by the appropriate class and size fusing noted. Otherwise, this non-fusible switch must be replaced with an Eaton fusible switch that uses the appropriate fusing required. Molded-case circuit breaker protection of non-fusible Eaton switches for applications that require a short-circuit rating of greater than 10,000 rms symmetrical amperes has been evaluated and is summarized below. Refer to the reference tables for typical Eaton fusible switch UL listed short-circuit ratings.

Table 28.0-62. UL Recognized Safety Switch/Circuit Breaker Series-Connected Ratings

Safety Switch Ampere Rating	Maximum System Voltage AC	Circuit Breaker Maximum Short Circuit Rating (rms Symmetrical)	Circuit Breaker Frame(s)
30 and 60	600	25,000	FDC, HFD, HFDE, EGH
		18,000	FD, EGE
100	600	14,000	FDB
		25,000	FDC, HFD, HFDE, EGH
	18,000	FD, EGE	
200	600	14,000	FDB
		35,000	EGH, EGS
	600	25,000	FDC, HFD, HFDE, HJD, JGH
480	65,000	18,000	FD, JD, JGE
		14,000	FDB
480	65,000	65,000	HFD, HFDE, HJD, JGH

Typical Fuse Dimensions

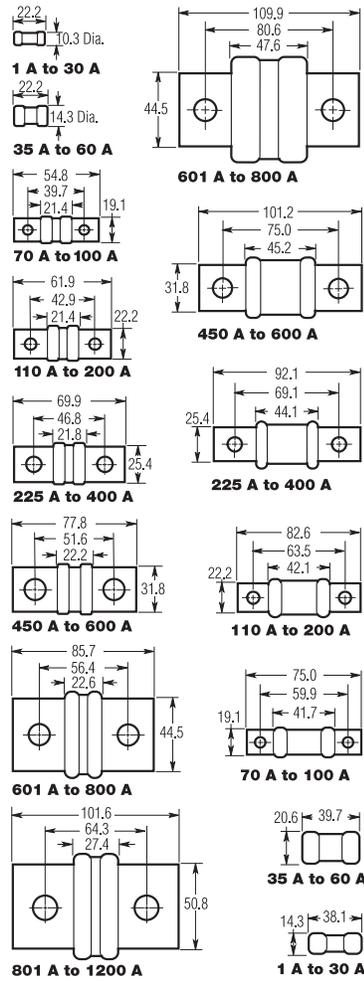


Typical Fuse Dimensions (Continued)

Class T

T-Tron Fuses

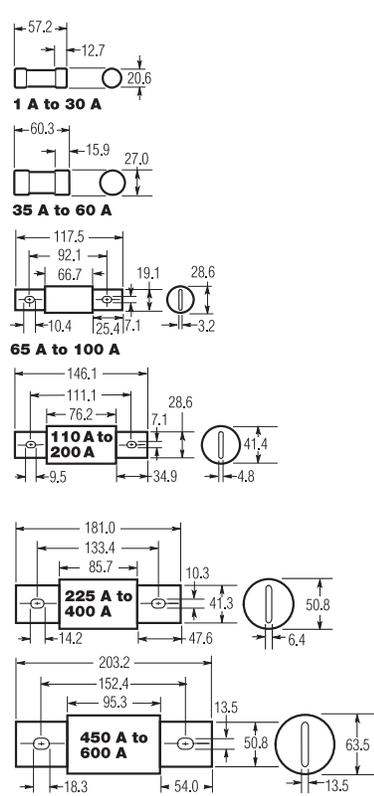
JJN (300V) JJS (600V)



Class J

Low-Peak and Limitron Fuses

LPJ and JKS (600V)



Class RK5 and RK1

Fusetron, Low-Peak and Limitron Fuses (250 and 600V)

FRN-R and FRS-R; LPN-RK and LPS-RK; KTN-R and KTS-R
Basic dimensions are same as Class H (formerly NEC) ONE-TIME (NON and NOS) and SUPERLAG Renewable RES and REN fuses.

Note: These fuses can be used to replace existing Class H, RK1 and RK5 fuses relating to dimensional compatibility.

Ampere	250V		600V	
	A	B	A	B
1/10-30	50.8	14.3	127.0	20.6
35-60	76.2	20.6	139.7	27.0

Fusetron and Limitron

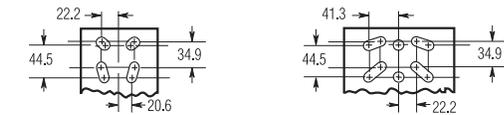
Ampere	250V		600V	
	A	B	A	B
70-100	149.2	26.9	200.0	34.0
110-200	181.0	39.6	244.5	46.7
225-400	219.1	52.3	295.3	65.8
450-600	263.5	65.8	339.7	79.5

Low-Peak

Ampere	250V		600V	
	A	B	A	B
70-100	149.2	29.5	200.0	29.5
110-200	181.0	42.2	244.5	42.2
225-400	219.1	60.5	295.3	60.5
450-600	263.5	73.2	339.7	73.2

Class L Low-Peak and Limitron Fuses

KRP-C, KTU and KLU (601-4000A) (600V)



Note: KRP-CL (150-600A) fuses have same dimensions as 601-800A case size. KTU (200-600A) have same dimensions, except tube 76.2 mm lgth. x 50.8 mm dia.; terminal 41.3 mm width x 31.8 mm thick.

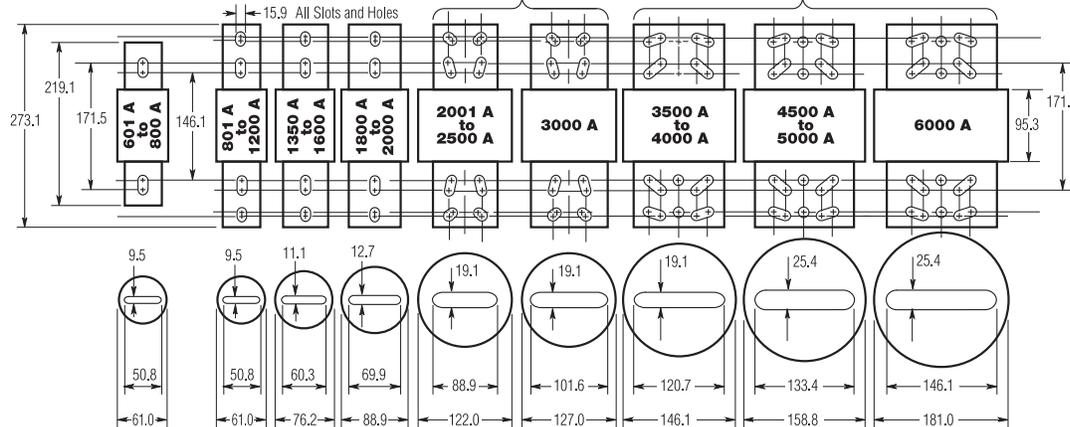


Figure 28.0-27. Typical Fuse Dimensions in Millimeters

Note: For typical fuse dimensions in inches, see Figure 28.0-26 on Page 28.0-39.