

# The Switching Device Flex Center

Modified  
safety  
switches

Enclosed  
circuit  
breakers

Rotary  
disconnects



## Service that exceeds your expectations

# EATON

Powering Business Worldwide



# When “off-the-shelf” doesn't quite fit your needs...

Eaton's Cleveland, Tennessee, Switching Device Flex Center is a solutions center that designs and modifies safety switches, enclosed circuit breakers and rotary disconnects for unique customer needs that are not met by standard products. The Flex Center is a one-of-a-kind operation that is capable of solving our customers' issues, while our competition is content to offer their customers only catalog items.

The Flex Center staff has over 120 years of design, manufacturing and industry experience, and has been providing solutions to our customers since 1998. While you may think that your power switching needs are unlike any other, chances are, the Flex Center staff has already “been there and done that.”

This brochure outlines some of the solutions that have been provided to our customer base

over the years—solutions that are applicable to many other contractors and industrial users. It is by no means a complete capabilities brochure, as we are continuously expanding the switching solutions we provide. If you do not see a solution to your need in this brochure, our staff will be happy to answer your telephone call or e-mail inquiries.

The solutions that you will find on the following pages are grouped into four main categories:

- Harsh environments
- Safety
- Customer convenience
- Customer-specific solutions

**Contact the Flex Center at  
1-888-329-9272.**

# Harsh environments

- Increased reliability

From dust to high humidity to corrosive chemicals, the industrial environment can tear up equipment—unless you install the right device for the job. By installing the right switching enclosure, you can extend the life of the switch and minimize your downtime.

For more information on how Eaton can help you with switching devices for harsh environments, call the Flex Center at 1-888-329-9272.



316 Stainless Steel Option

## 316 Stainless steel option

### Feature

Switch is similar to our standard stainless steel NEMA® 4X (watertight and corrosion-resistant) enclosure, except external sheet metal and hardware are manufactured with Type 316 stainless steel. The Flex Center can substitute 316-grade stainless steel in virtually any enclosure.

### Benefits

Type 316 stainless steel holds up better than 304 against most chemicals, salts and acids, and is more resistant to marine atmospheres.

### Application/industry

316 stainless is perfect for water/wastewater, power generation, petrochemical, pulp & paper, pharmaceutical and textile mills. 316 is also suitable for marine environments such as drilling platforms, marine terminals, desalination plants, and any industrial or commercial operation in a coastal environment.



EnviroLine | Stainless Steel

## EnviroLine | stainless steel

### Feature

Switch enclosure is manufactured with Type 304 stainless steel NEMA 4X (watertight and corrosion-resistant) with a Type 304 stainless steel operating mechanism and 304 stainless backpan.

### Benefits

The stainless steel mechanism holds up better in high humidity environments. In some environments, condensation can build up in a switch, and corrode the standard mechanism.

### Application/industry

EnviroLine | Stainless Steel is suitable for food processing, pharmaceutical and any application where the switch is in a high temperature/high humidity location such as high temperature washdown.



EnviroLine | Non-Metallic

## EnviroLine | non-metallic

### Feature

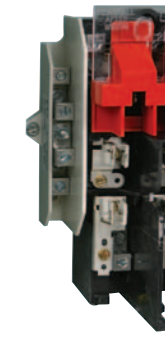
In this switch, the enclosure is NEMA 4X (watertight and corrosion-resistant) molded from a compression-molded, fiberglass-reinforced polyester.

### Benefits

Non-metallic enclosures provide the most complete protection for the toughest corrosive atmospheres.

### Application/industry

In most petrochemical and pulp & paper applications, non-metallic enclosures outperform 316 stainless steel against corrosion in atmospheres containing chlorides and sulfuric acid. If these are not present, 316 stainless will be a more cost-efficient solution.



200% Neutral

## 200% neutral

### Feature

Neutral is supplied with a lug capacity of 200% of phase lugs.

### Benefits

Allows for the connection of oversized neutrals to withstand the effects of high neutral currents due to harmonics caused by non-sinusoidal loads such as drives, PCs and other electronic equipment, or to account for increased neutral currents caused by unbalanced loads.

### Application/industry

200% neutrals are suitable for any location with either known harmonic issues or unbalanced loads that can cause increased neutral current.



Fungus-Resistant Non-Metallic Components

## Fungus-proofing

### Feature

Non-metallic components of the switch are coated with a moisture and fungus-resistant varnish.

### Benefits

In high humidity areas, the coating will prevent the saturation of fibrous insulators and the formation of mold.

### Application/industry

Water/wastewater, petrochemical, food processing, pulp & paper, textile mills, and other areas within a high humidity environment.



Seam-Welded Stainless Steel Enclosures

## Seam-welded stainless steel enclosures

### Feature

Standard stainless steel enclosures are spot-welded with the seam sealed from the inside with metal sealant. Enclosures ordered with this option are seam-welded on the outside of the enclosure—providing a watertight seal with no external gaps.

### Benefits

While the standard switch meets all of the requirements of NEMA 4X—including direct water jet—there is still a small seam where food, dust or chemical particulates can become trapped. The presence of these can allow bacteria to grow, or chemicals to interact with one another. By supplying seam-welded stainless switches, the potential of particulates being trapped in the seam is eliminated.

### Application/industry

Seam welding is applicable for food processing or food preparation areas, petrochemical industries, pharmaceutical industries, pulp & paper mills, or any other environment with high concentration of airborne particulates.



# Safety

- Increased protection

You may think of Eaton as your electrical equipment supplier, but we have a lot in common. We build our products in a manufacturing environment that has numerous dangers for our associates. We understand how important it is to maintain a safe working environment. There is no more important task for plant management than ensuring the safety of the workforce. The safety solutions shown here take the guesswork out of many operations associated with power switching to help your employees go home safely every day.

Call the Flex Center at 1-888-329-9272 to discuss your specific safety solution.



**Kirk Key Interlocks**

## Kirk® and Superior® key interlocks

### Feature

The Flex Center will factory install coordinated Kirk and Superior key interlocks on the safety switch or enclosed breaker shroud.

### Benefits

Providing a trapped key interlock system allows the switch or enclosed circuit breaker to be mechanically interlocked with another piece of equipment to prevent both pieces of equipment from being energized at the same time or to require specified sequence of operation. Key interlock systems can prevent expensive machinery and electrical equipment from being damaged due to operator error.

### Application/industry

Process industries such as chemical, paint lines, food processing, molding, and the like.



**Pilot Lights**

## Pilot lights/ pilot control

### Feature

The Flex Center will punch the cover of the safety switch or enclosed breaker, and install pilot lights, pushbuttons or selector switches to meet customer requirements.

### Benefits

Pilot lights can be installed in the cover of a safety switch and wired to a normally open auxiliary contact to provide additional visual indication of the switch position.

### Application/industry

Any application where visible indication of the switch position is desired.

## Left-handed switch

### Feature

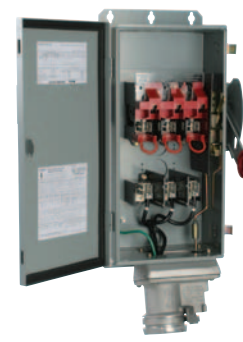
Switch is built with the operating handle on the left-hand side of the switch rather than on the right.

### Benefits

87% of the American population is right handed. The tendency of a right-handed operator that operates a switch with the handle on the right side is to stand in front of the switch while



**Left-Handed Switch**



**Weld Receptacle Switch**

operating. This places the operator squarely in front of the door where the potential for injury is higher. By putting the handle on the left side, the natural operating position is moved to the side with less potential for injury.

### Application/industry

Any customer concerned about operator safety.

## Weld receptacle switch

### Feature

Switch is built with a pin-and-sleeve receptacle by Appleton, Crouse-Hinds or Russellstoll. The receptacle and the switch are mechanically interlocked, which prevents the switch from being turned ON without a plug in the receptacle, and also prevents the plug from being withdrawn with the switch in the ON position.

### Benefits

The receptacle allows the operators to quickly connect portable electrical equipment such as welders, pressure washers, conveyors and pumps.

### Application/industry

Food processing, pharmaceutical, petrochemical, metal-forming (welding), bulk raw material conveyance and pulp & paper industries.



**Lock-On Provision**

## Lock-on provision

### Feature

Switch shroud is modified to accept a padlock to protect against switch being inadvertently turned off.

### Benefits

Protects critical processes from being interrupted by accidental or intentional movement of the handle mechanism.

### Application/industry

Electronics manufacturing processes such as wave-soldering, clean-room processes, pharmaceutical mixing operations, beverage production, injection molding, compression molding, plating operations, paint lines, ventilating equipment, and any application where uncontrolled personnel may operate the switch.



**Enclosed Circuit Breaker With Receptacle**

## Enclosed circuit breaker with receptacle

### Feature

Switch is built with a pin-and-sleeve receptacle by Appleton, Crouse-Hinds or Russellstoll. The receptacle and the switch are mechanically interlocked, which prevents the switch from being turned ON without a plug in the receptacle, and also prevents the plug from being withdrawn with the switch in the ON position.

### Benefits

The receptacle allows the operators to quickly connect portable electrical equipment such as welders, pressure washers, conveyors and pumps.

### Application/industry

Food processing, pharmaceutical, petrochemical, metal-forming (welding) and bulk raw material conveyance.



**Window Option**

## Window option

### Feature

Safety switches can be provided with a factory-installed laminated safety glass to provide operators with a view inside the switch.

### Benefits

Operators can visibly check to see blown-fuse indicating fuses or that the switch blades are in the open position prior to opening the switch enclosure or working on the connected equipment. This extra measure of safety allows the operator to verify that all blades of the switch are opened properly and that none of the blades are still engaged.

### Application/industry

Any industry with safety concerns—particularly process industries where operators must open the switch and perform lock-out/tag-out operations prior to working on connected equipment. Common applications are milling, manufacturing, lumber, and pulp & paper operations where operators must periodically work on the connected equipment.

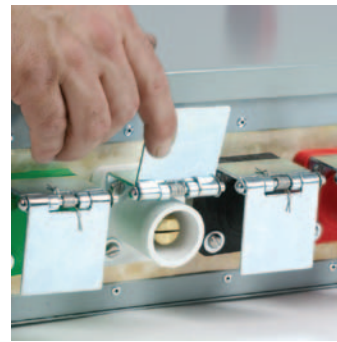


# Customer convenience

- Increased safety
- Reduced installation cost

Sometimes, it is the little things that can save hours—like receiving your switches with the field accessory kits already installed, or providing a convenient way to quickly and safely connect portable electric loads to a switch. Our convenience solutions cut installation and operation time, and allow your personnel to work on more important tasks than turning on and off power loads.

For more information, call the Flex Center at 1-888-329-9272.



Cam-Lok Switches

## Cam-Lok® switches

### Feature

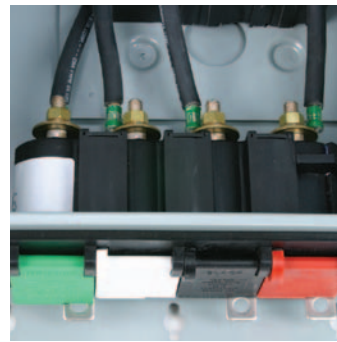
The load side of the switch is factory wired to individual Cam-Lok receptacles that allow for quick connection and disconnection of load conductors. The receptacles are not interlocked with the switch. The switch contains a 200% neutral to be able to withstand increased neutral currents caused by unbalanced loads.

### Benefits

This type of connector allows the operator to quickly connect portable devices to the switch, replacing the need to open the door, and connect the cables to the switch at the load side terminals.

### Application/industry

Switches with secondary Cam-Lok connections are used in the theater industry to connect portable lighting equipment. They are used in convention centers, fairgrounds and school theaters to provide quick-connect capabilities.



Posi-Lok Switches

## Posi-Lok® switches

### Feature

Like the Cam-Lok, the load side of the switch is factory wired to a Posi-Lok panel with receptacles similar to the Cam-Lok. However, the Posi-Lok panel requires that the load cables be connected in sequential order—Ground - Neutral - Phase - Phase that allows for quick connection and disconnection of load conductors.

### Benefits

The benefits are the same as the Cam-Lok with the added benefit of requiring the cables to be connected in the proper order that is considered to be the safest way possible.

### Application/industry

Switches with secondary Posi-Lok connections are used in the theater industry to connect portable lighting equipment. They are used in convention centers, fairgrounds and school theaters to provide quick-connect capabilities.



HOA/Pilot Lights

## HOA/pilot lights

### Feature

With a remote-mounted starter, such as at a motor control center, the NECT requires a motor disconnect within sight of the motor. Usually this function is performed by a safety switch. Additionally, there will often be a pushbutton station located close to the motor to allow the operator to locally start and stop the motor. Rather than locating a separate pushbutton station next to the safety switch, the pilot devices can be located in the door of the switch.

### Benefits

The benefit to the installer is that the installation will be faster because there is one less enclosure to mount and wire. For the owner of the facility and the operators, the installation will be more streamlined.

### Application/industry

Water/wastewater, petrochemical, pulp & paper, pharmaceutical, textile, food processing, and heavy and light manufacturing.



Nameplates

## Nameplates

### Feature

The switch or ECB is manufactured with a factory-installed engraved nameplate that labels the switch to the customer's specification. The nameplate can either be laser-engraved plastic, or rotary-engraved phenolic.

### Benefits

When receiving multiple shipments, the nameplate can reduce installation errors because the switch is labeled from the factory with the specific load that it is to feed.

### Application/industry

All customers.



Factory-Installed Auxiliary Contacts

## Factory-installed auxiliary contacts

### Feature

Switch is shipped with auxiliary contacts factory installed.

### Benefits

Auxiliary contacts can be used in control schemes to turn on or off pilot lights, initiate actions, and so on. The benefit to the installer is the time they save by having the contacts installed in the factory.

### Application/industry

Any operation where the customer wants to monitor the switch position, or where the switch position is needed to be integrated into a control or annunciation scheme.



Mill Duty Switches

## Mill duty switches

### Feature

Heavy-duty NEMA 12 or 4X, horsepower-rated switch with factory-installed copper-body lugs, ground lugs and fuse pullers (through 200A).

### Benefits

Common mill options are grouped together to provide a preferred Mill Package switch. This option streamlines the ordering process.

### Application/industry

Mill duty switches are applicable for the toughest environments found in steel mills, saw mills, foundries, paper mills, smelting operations, and similar rough-duty applications.

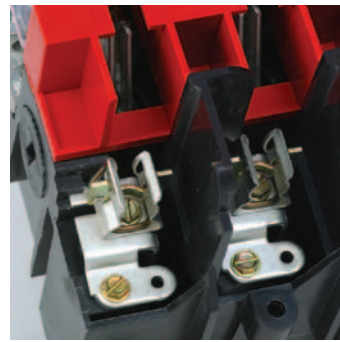


# Customer convenience

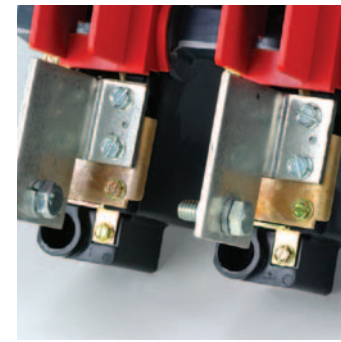
- Reduced installation cost



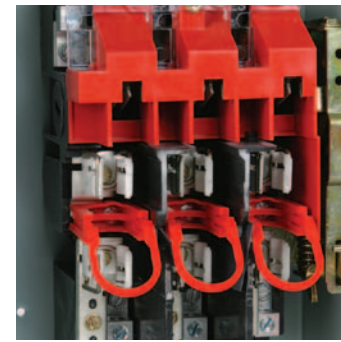
Factory-Installed Control Pole



Factory-Installed Class R Fuse Clips



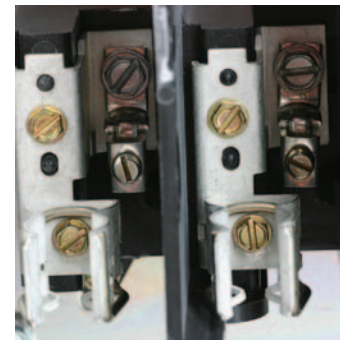
Factory-Installed Class T Fuse Clips



Factory-Installed Class J Fuse Clips



Factory-Installed Fuse Pullers



Copper-Body Lugs

## Factory-installed control pole

### Feature

Switch is shipped with a factory-installed control pole. Pole is rated at 60A at 120V, 30A at 240V, 15A at 480V and 12A at 600V.

### Benefits

A control pole is a late-make, early-break auxiliary switch that is directly connected to the switch shaft. It is used to interrupt the control circuit before opening the switch. This is desirable to protect adjustable frequency drives from being damaged by opening the power circuit.

### Application/industry

Any industrial application where the customer wants a rugged interlock to open the control circuit.

## Factory-installed Class R fuse clips

### Feature

Switch is shipped with Class R fuse kits factory installed.

### Benefits

Standard fusible switches through 600A are shipped with provisions for Class H fuses. If a customer is using Class R fuses, a kit is required to install these fuses. These fuse clips can be installed in the factory, to reject all fuses other than Class R, saving the customer time and expense.

### Application/industry

Customers using Class R fuses.

## Factory-installed Class T fuse clips

### Feature

Switch is shipped with Class T fuse kits factory installed.

### Benefits

Standard fusible switches 200–600A are shipped with provisions for Class H fuses, 800A switches are shipped with provisions for Class L. If a customer is using Class T fuses, a kit is required to install these fuses. These fuse clips can be installed in the factory, saving the customer time and expense.

### Application/industry

Customers using Class T fuses.

## Factory-installed Class J fuse clips

### Feature

Switch is shipped with Class J fuse kits factory installed.

### Benefits

Standard fusible switches through 600A are shipped with provisions for Class H fuses. If a customer is using Class J fuses, a kit is required to install these fuses. These fuse clips can be installed in the factory, saving the customer time and expense.

### Application/industry

Customers using Class J fuses.

## Factory-installed fuse pullers

### Feature

Switch is shipped with fuse pullers factory installed.

### Benefits

Fuse pullers can be installed through 200A.

### Application/industry

Any customer desiring fuse pullers.

## Copper-body lugs

### Feature

Switch is shipped with copper-body lugs factory installed.

### Benefits

Standard switch lugs are manufactured of aluminum and are rated for either copper or aluminum wire. This option changes the lugs to an all-copper design.

### Application/industry

Customers that prefer 100% copper conductors throughout their facility.



For more information, call the Flex Center at 1-888-329-9272.

# Customer-specific solutions

- Improved uptime
- Increased safety
- Increased reliability
- Improved maintainability
- Reduced installation cost

On these pages, you will find a sampling of some of the custom work that has been done in the Flex Center.

We've worked with many customers over the years to provide unique solutions to customer issues. These solutions range from simple to complex, and help our customers in many different ways. Do you...

- Need a switch in a smaller enclosure because of limited space?
- Need an enclosure that is painted to match the color of your equipment?
- Have a need for a custom-mounting configuration?
- Need to operate several switches simultaneously?
- Have concerns about radio frequency interference?

To learn more or speak to us about your specific solution, call the Flex Center at 1-888-329-9272.



Custom Mounting

## Custom mounting

In many applications, the mounting configuration of switches or breaker enclosures is a real concern. For some customers, it is critical. The Flex Center created a "pole-mount" configuration for a customer that was installing switches on existing racks at compressor stations. This configuration allowed them to reduce the time needed to change out their existing switches, which saved over \$200 in installation costs.

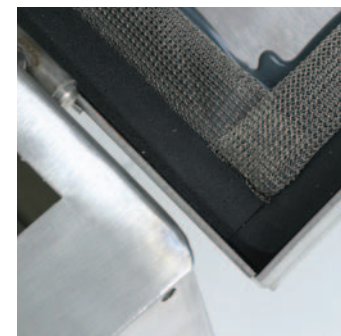


Custom Painting

## Custom painting

For OEMs, the Flex Center has painted enclosures to match the OEM's equipment. Ingersoll-Rand saw the value for the switches that they purchased, painted to match their compressors. In other applications, the Flex Center has painted stainless steel as an extra layer of protection for waste/water treatment plants, painted fire pump switches red, painted switches for golf courses green, and painted switches for the mining industry yellow for visibility.

Available colors include Safety Yellow, Safety Purple, Safety Green, Safety Red, Safety Orange, Safety Blue, Safety White and Safety Black.



RFI Shielded Enclosures

## RFI shielded enclosures

The Flex Center has built circuit breaker enclosures to keep radio frequency interference (RFI) out—to protect the electronic trip unit from nuisance tripping. The process is labor intensive and involves seam welding stainless steel enclosures, as well as installing special RF gasketing that seals the enclosure.



Custom-Sized Enclosures

## Custom-sized enclosures

Often, the Flex Center is able to solve installation issues by designing a custom-sized enclosure. If meeting wire-bending space of the NEC is not a concern, the Flex Center can custom-fit a switch into a smaller enclosure to meet the requirements.

The Flex Center can also build switches in oversized enclosures to provide room for customer-mounted components.



Adding a Motor Starter to a Receptacle Switch

## Adding a motor starter to a receptacle switch

A customer asked the Flex Center to make a custom enclosure containing a fusible switch and motor starter—and wired to an interlocked welding receptacle. It took some work, but the custom receptacle starters were shipped to meet the customer's needs.



Disconnecting Multiple Loads Simultaneously

## Disconnecting multiple loads simultaneously

A process control OEM needed a custom switch that would simultaneously disconnect eight three-pole rotary switches and allow all eight to be locked out for maintenance. Another customer wanted to mechanically interlock three safety switches such that all three would be operated at the same time. In some instances, it is advantageous to operate switches simultaneously, and to lock out all of the switches with one lock. The Flex Center can design a custom solution for your custom switching needs.

# Customer-specific solutions

- Improved uptime
- Increased safety
- Increased reliability
- Improved maintainability
- Reduced installation cost

Just about any concern you may have, we have likely solved it for someone in the past. Give us a call, we'll be happy to discuss your needs and provide you with a solution.

To learn more or to speak to us about your specific solution, call the Flex Center at 1-888-329-9272.



Standardized Options

## Standardized options

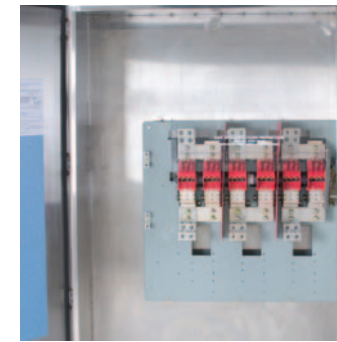
A large pulp & paper manufacturer required a custom switch that was a NEMA 12 dust-tight, fusible switch in a window enclosure. To that, the Flex Center added a Hand-Off-Auto (HOA) selector switch, a green "Run" light, and 1NO and 1NC auxiliary contact. The HOA allows the machine operator to jog the machine when it jams—while the pilot light and window provide safety by giving visual indication of the switch position. These switches were set up with unique catalog numbers that easily allow the customer to order their switches and set up specific customer pricing.



Double Throw with Switching Neutral

## Switching neutral double throw

In a generator application, if the neutral of the generator is bonded to a grounding system at the generator, a separately derived system has been created and a switched neutral must be used. Most industry double-throw safety switches are not UL listed for switching neutral application. The Flex Center can install the appropriate bonding means in a non-fusible double-throw safety switch required for the application and provide a UL listing.



1200A Stainless Steel

## 1200A stainless steel

Stainless steel NEMA 4X enclosures are required for many industrial applications. In the past, the availability of stainless steel on a safety switch stopped at 600 or 800A. The Flex Center has expanded Eaton's stainless steel capability by obtaining UL listing on 1200A safety switches. This allows the customer to use the benefits of a fusible or non-fusible switching device where an enclosed circuit breaker was the only prior option.



Custom Lugs

## Custom lug configurations

Voltage drop considerations often require that feeder cables be increased in size or quantity. However, solving the voltage drop problem can create a termination nightmare. How exactly does a customer connect 2–300 kcmil per phase to a 200A switch? The Flex Center can offer factory-installed lug pads to meet the individual requirements of a project. Getting the switch on the job site with the right lugs saves the customer from installing a junction box and cable reducers, which saves installation time and material cost.



Special Meters and Relays

## Factory-installed meters

The Flex Center has installed numerous analog and digital meters in the front panel doors of switching devices. These devices range from simple ammeters, voltmeters and elapsed time meters, to phase-rotation meters and IQ devices. Because the disconnect is often in sight of the motor, or load, the disconnect is a convenient mounting location for point-of-use metering.



Clipper VL

## Surge suppressions and Powerline filters

Eaton was one of the pioneers in incorporating surge protection within the electrical apparatus, and is a leading manufacturer of industrial surge protection products in the industry today. IEEE® recommends a two-stage approach to surge protection, and the disconnect provides a convenient mounting location for point-of-use surge protection. The Flex Center can supply the appropriate Clipper surge protection or AEGIS Powerline filter for the application.



Eaton's Electrical Sector is a global leader in power distribution, power quality, control and automation, and monitoring products. When combined with Eaton's full-scale engineering services, these products provide customer-driven PowerChain™ solutions to serve the power system needs of the data center, industrial, institutional, public sector, utility, commercial, residential, IT, mission critical, alternative energy and OEM markets worldwide.

PowerChain solutions help enterprises achieve sustainable and competitive advantages through proactive management of the power system as a strategic, integrated asset throughout its life cycle, resulting in enhanced safety, greater reliability and energy efficiency. For more information, visit [www.eaton.com/electrical](http://www.eaton.com/electrical).

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