

Power Xpert UX 36
High-voltage switchgear system

Reliable and safe for
high performance applications



EATON

Powering Business Worldwide

A high-performance solution for high-voltage power distribution

Eaton's Power Xpert UX™ 36 IEC high-voltage switchgear is designed for your most critical applications. At Eaton, our focus is on developing the latest in power distribution, control and protection technologies that optimize the performance of your installation, while keeping your personnel and equipment safe from harm. With over 90 years of experience in high-voltage switching and vacuum technology, our customers can depend on our expertise to provide the right equipment for the most demanding of applications.



Safety first

The Power Xpert UX 36 showcases the power of Eaton's heritage of expertise and industry-leading control and protection component technology. This feature-rich system ensures minimum process interruptions for increased reliability and safety.

Designed to be fully scalable, the Power Xpert UX 36 enables you to create a fit-for-purpose high-voltage switchgear system. With ratings up to 2500A and 31.5kA, this system provides reliable power distribution for applications.

The Power Xpert UX 36 is free of SF₆, which eliminates recording and re-filling, SF₆ inspections at end-of-life and disposal costs, reducing your total cost of ownership.

Best-in-class testing program

No matter where the system is produced around the world, the same rigorous testing is provided as standard. You can count on Eaton's commitment to quality, from the design phase with full third-party type testing to all relevant

IEC standards to factory and on-site acceptance testing. In addition to compliance with ISO 9001, all manufacturing locations must adhere to Eaton's quality system to ensure the highest quality standards are delivered.



Ensuring maximum uptime

Versatile for different applications

Applications for power distribution can vary widely. The Power Xpert UX 36 is a versatile system for high-voltage applications from utility substations, industrial infrastructure, and power generation to the oil and gas and mining and metals industries. In areas of the world prone to earthquake activity, a seismic tested and qualified system ensures, as far as possible, continuity of electrical power during the seismic event.



Flexibility in a small footprint

Basic design

The Power Xpert UX 36 features modular construction and is custom built to application parameters. Its broad feature-set can be tailored to meet your performance, reliability and safety requirements.

Three major sections separated by earthed metal barriers provide LSC2B-PM level of protection:



1. The busbar compartment

Busbars are totally enclosed in their own earthed metal compartment, which vents into the arc chamber. Fully insulated along their entire length, the busbars are type tested for ratings up to 2500, 31.5kA for 3 seconds. Earthed metal partitions segregate switchgear sections.



2. The switching device compartment

Fully segregated by earthed metal partitions, with its own pressure relief channel into the arc chamber, the compartment provides all the safety interlocking mechanisms required for safe and reliable operation of the vacuum circuit breaker.



3. The cable compartment

Ample cable termination provision is provided for up to 6 single core cables per phase to enter the bottom of the switchgear and are terminated with compression lugs onto copper tails provided in the bottom of each panel.

4. The integral arc-chamber

Evacuates the gases associated with an internal arc. Optional standard parts are available to extend the arc chamber; flanges and grilles are available to exhaust the gases outside the switch-gear room. Internal Arc Classification of AFLR – 31.5kA – 1 sec.



5. The low voltage compartment

Segregated with earthed metal partitions with ample space for control and protection devices. A fully segregated horizontal wireway connects all the low-voltage compartments.



Keeping you and your equipment safe

With proven technologies that offer best-in-class safety of operation and maintenance, the Power Xpert UX 36 is designed with safety in mind.

We integrated our decades-long expertise in cast-resin technology, vacuum technology, arc interruption and electrical field control into the design and development of the Power Xpert UX 36. Ensuring that the switchgear is safe and has the highest level of operational reliability throughout its lifetime is our highest priority.

Internal arc classification (IAC) of AFLR

One of the biggest potential threats to operators is an internal arc in the switchgear. The design and robust construction of the Power Xpert UX 36 enables it to successfully pass internal arcing testing in accordance with IEC 62271-200 in all three primary compartments and provide an IAC rating of up to 31.5 kA for 1 second. IEC62271-200 defines the level of protection to be provided in the event of an internal arc fault being generated within the switchgear. This system has been proven by independent third-party testing to provide an IAC Classification of IAC = AFLR.

- A = Protection for personnel
- F = Protection at the front
- L = Protection at the sides
- R = Protection at the rear



Safety and reliability through accessibility of compartments

Ensuring safety of personnel whether in operation or maintenance is essential and is further enhanced in the Power Xpert UX 36 by providing a level of accessibility that limits unauthorized access. IEC62271-200 defines the accessibility classification for each of the power sections in the switchgear. The system has the following accessibility definitions:

- Busbar: tool-based/ non-accessible
- Circuit breaker: interlocked controlled
- Cable: tool-based or option for interlocked controlled

Loss of service continuity classification and partition classification

Safety of personnel is critical, including during installation and maintenance. The ability to work on an installation without switching off the power to maximize uptime is defined as "Loss of Service Continuity" (LSC). It describes the extent to which the switchgear and control gear are allowed to remain operational in case access to a main circuit compartment is necessary.

The Power Xpert UX 36 has the highest attainable level of loss of service continuity of LSC2B as standard. Switchgear is classified as LSC2B when it is possible and safe to open the switching device compartment when the cable and busbars are energized. With all partitions between sections, including the shutters, having earthed metal construction, the system has the highest level of partition classification (PM).

Other safety features

Racking behind closed doors

To maximize operator safety, the system enables operation of the withdrawable switching device from Test to service and back to the Test position, all behind closed doors. This ensures full internal arc containment at all times during operation.



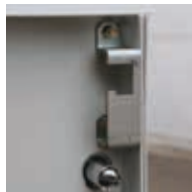
Door interlocked with the vacuum circuit breaker (VCB)

The main switching compartment door can be opened only when the VCB is fully racked out to the Test position. The racking mechanism is disabled until the door is closed.



Cable compartment door interlock

The cable compartment door is interlocked with the circuit earth switch to prevent the door from opening unless the earth switch is in the On position. A second interlock ensures that the earth switch cannot be switched off when the cable compartment door is open.



Remote operation of earth switch

Remote electrical operation of the earth switch provides added safety and security of the switchgear.

Racking mechanism interlock with earth switch

The racking mechanism of the VCB provides an integral interlock, which prevents the device from being racked until the earth switch is in the Off position. This ensures that the device cannot be connected to the main busbars or cable if the earth switch is on.

Safety interlocks

For personnel safety, the Power Xpert UX 36 is designed with a number of comprehensive mechanical interlocks to prevent unsafe operation.

- It is not possible to rack-in or rack-out a circuit breaker unless it is in the Off or Open position
- It is not possible to close a circuit breaker unless the circuit breaker is in the Connected or Test position
- The secondary socket can be disconnected only when the circuit breaker is in the Test position
- It is not possible to close the earth switch when the circuit breaker is in the Connected position
- The door of the switching device compartment can be opened only when the circuit breaker is in the Disconnected / Test position
- It is possible to rack-in or rack-out the circuit breaker only when the switching device door is closed
- The cable compartment door can be opened only when the earth switch is in the Closed position
- The earth switch cannot be opened when the cable compartment door is open

Protecting personnel and equipment from internal arc faults

When considering the effects of an internal arc in high-voltage switchgear and on personnel in its vicinity, it is important to take into account both the design of the equipment and the installation conditions.

With advances in materials, design and manufacture, the probability of an arc fault occurring in high-voltage switchgear is extremely low. Statistics show that the majority of arcing faults that do occur are in the cable compartment, where there is more human interaction with the high-voltage parts. Due care and attention at the time of installation, cabling and commissioning is necessary to reduce the risk of initiating an arc.

Should an arc event occur, this will generate overpressures inside the compartment affected by the arc. This overpressure causes the exhaust of hot gases, flames and material particles. The temperature of the arc can be in the region of 20,000 degrees Celsius. Careful consideration of the safe handling of this exhaust should include guaranteeing safety of personnel in the switchroom and avoiding damage to the objects in the vicinity of the switchgear.

External exhausting of the effects of internal arc

Tested in accordance with IEC 62271-200 with a classification of AFLR at the following ratings:

- 36kV Ratings - I_{sc} ratings of: 31.5kA-1s
- The integral arc chambers are designed to collect the exhaust from the cable, VCB and busbar compartments and safely direct them outside the building via a series of interconnecting extension pieces
- The height of the arc chamber is 630mm to ensure compatibility with the switchgear. Eaton provides extension pieces and wall flanges to extend the arc duct to the outside of the building



Maximizing uptime and ease of maintenance

Safety is critical to uptime, but so is the reliability of your control and power distribution equipment. As a part of the design of the Power Xpert UX 36, we identified traditional switchgear failure points. Then, our engineers set their sights on designing a platform with features that focus on improving uptime and eliminating costly maintenance.

Features

Vacuum switching

With over 90 years of experience in the field, Eaton is a world leader in vacuum switching technology.

SF₆-free design

The combination of vacuum interrupters for switching, cast-resin technology, and clean air as the insulation medium, makes the system environmentally friendly and helps maintain quality throughout the product lifecycle. Because there is no SF₆ gas, plant maintenance and operation is simplified and costly administration, gas management and end-of-life disposal costs are minimized.

Vacuum circuit breaker

By designing a simple, modular, efficient and low energy spring-charged mechanism with the fewest possible number of parts for the vacuum circuit breaker, normal maintenance requirements are dramatically reduced. The 360W-VACi breaker is virtually maintenance-free.

LSC2B-PM construction

The construction of the system ensures maximum uptime as personnel can safely perform maintenance on the cable compartment with live busbars or the switching device compartment with live busbars and cables.



Eaton's newest range of IEC vacuum circuit breakers are virtually maintenance-free.



The Power Xpert UX 36 busbar system is fully insulated along its entire length, with a molded busbar support segregating the busbar chambers of adjacent panels, as well as mechanical support for a short circuit rating of 31.5kA-3s. This design provides a maintenance-free busbar system with maximum integrity.



Jointly operated and lockable shutters allow for safe cable or busbar testing while adjacent compartments are live.

Designed with flexibility in mind



The flexibility to design and configure the Power Xpert UX 36 to your specific needs helps to ensure it is built for your applications.

Standard configurations for power distribution and control are readily available within the Power Xpert UX 36 product range.

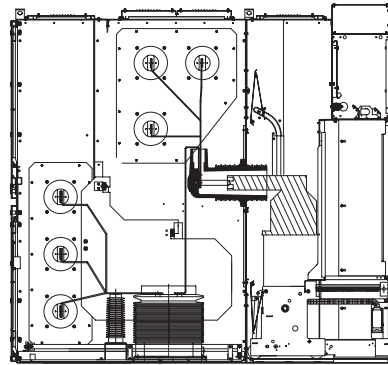
Standard VCB ratings of 1250A, 2500A at 36kV meet the requirements of virtually all applications.

Special configurations

In addition to VCB panels, the Power Xpert UX 36 offers a range of panels with specialized configurations, increasing the flexibility of the switchgear.

One of these configurations is the equipped riser panel, which allows for a busbar-connected

voltage transformer (VT) and control transformers (CT) to be mounted in the riser. This can reduce the overall length of the lineup reducing the cost of the building.



Equipped riser panel with mid-mount VT compartment and CT connection.

Additional flexibility

Optional configurations for the switchgear optimize the system's overall footprint, resulting in an economical design for both the equipment and the entire electrical room.



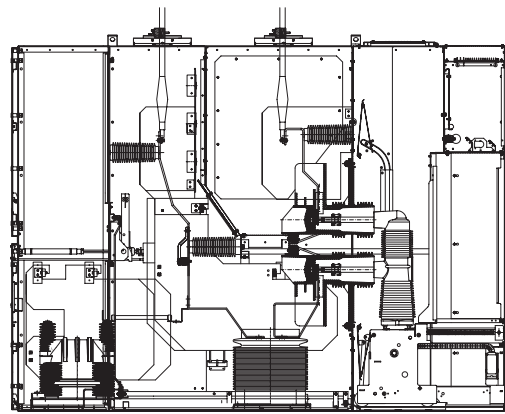
Busbar earthing switch options

- Busbar earthing trucks are also available to mount in the switching device compartment, replacing a VCB when earthing of the busbars is required



Voltage Transformer

- Cable side voltage transformer is available with fixed de-mountable type with HV fuses in primary side
- Withdrawable busbar side connected voltage transformers with shutters for safe operation under live conditions



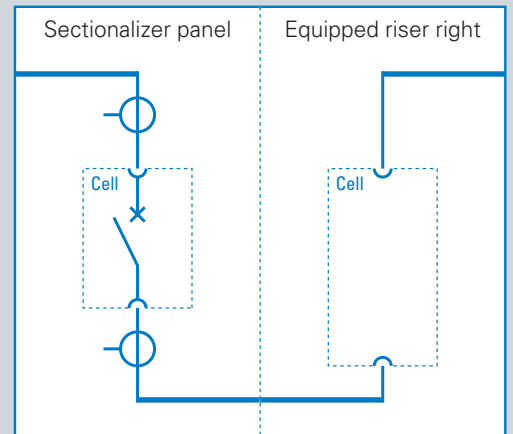
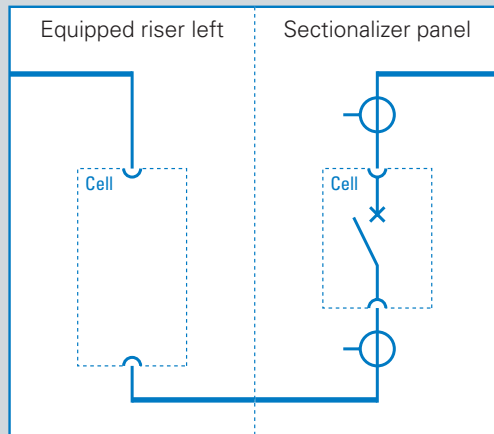
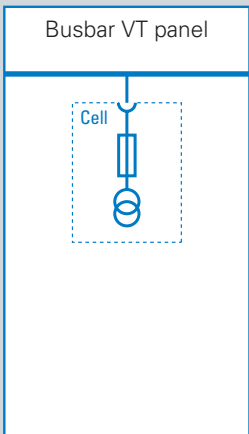
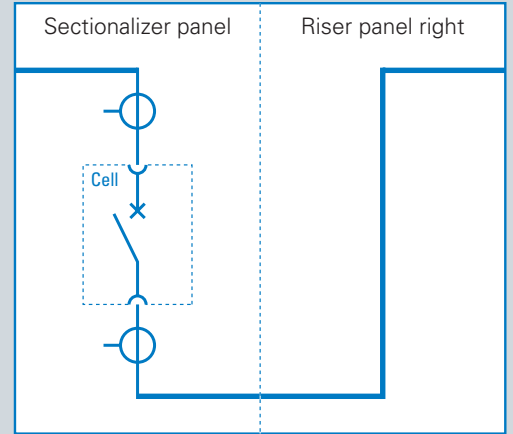
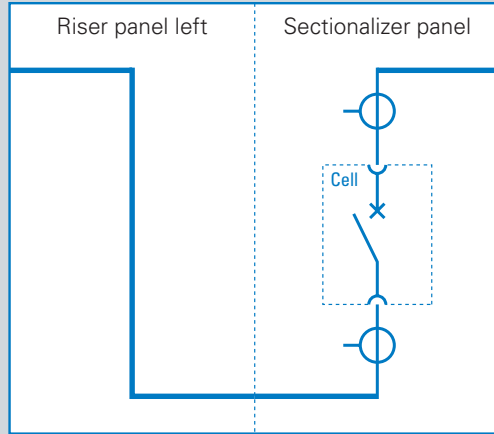
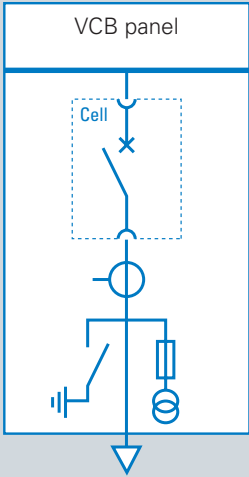
Cable-in / Cable-out using a single panel

- Cable in/cable out single-width panel solutions are available with cable entry suitable for bottom/top or top/top

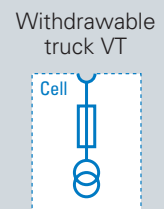
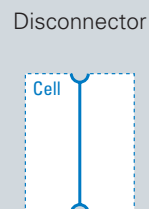
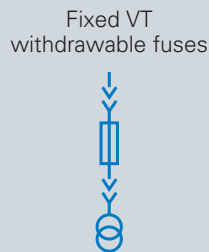
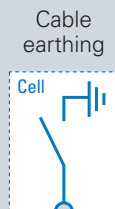
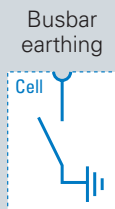
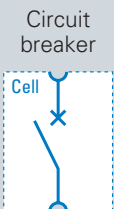
Flexible panel configurations

The Power Xpert UX 36 product range is very flexible and has a variety of circuit options that enable almost all types of application to be configured.

Panel configurations



Truck configurations



Primary components

A system is only as strong as the individual components used, which determines the performance and quality of the overall system.

Eaton power control and protection components are among the best in the world. The Power Xpert UX 36 is designed specifically around these components and provides a best-in-class power distribution system. Fully third-party type tested to meet even the most arduous of applications.

Vacuum circuit breaker type 360W-VACi



- Type tested in accordance with IEC 62271-100
- 36kV Ratings
- 1250A
- 2500A
- With I_{sc} ratings of 31.5kA-3s
- Full range of field mountable accessories, shunt trip, UVR, motorized mechanism, auxiliary contacts

Truck-mounted fused voltage transformer



- Fused transformer truck arranged to mount into either an equipped riser or an auxiliary (metering) panel
- Arranged for mounting 3 single-phase cast resin transformers with integral primary fuse protection
- Wide range of ratings and classes of VT are available

Earthing switch



- Tested in accordance with IEC 62271-102
- Fully type tested within Power Xpert UX 36 switchgear with ratings of 31.5kA-3s
- 2,000 mechanical operations M1 class
- Optional remote operation

Secondary components

Safe and reliable operation of any switchgear relies heavily on a clear, uncomplicated control and protection system. Clarity of operation is key to the design of the control and protection systems in the Power Xpert UX 36.

Clear, uncluttered low voltage compartment



- Clear monitoring and simple operation provide added safety and security to the installation
- Ample space for protection relays
- Space for circuit metering
- VCB local Open/Close switch
- Contactor On/Off pushbutton control
- LED indicators provide clear VCB or contactor position and Open/Close status
- Earth switch Open/Close status LED indicator

Voltage detection system (VDS)



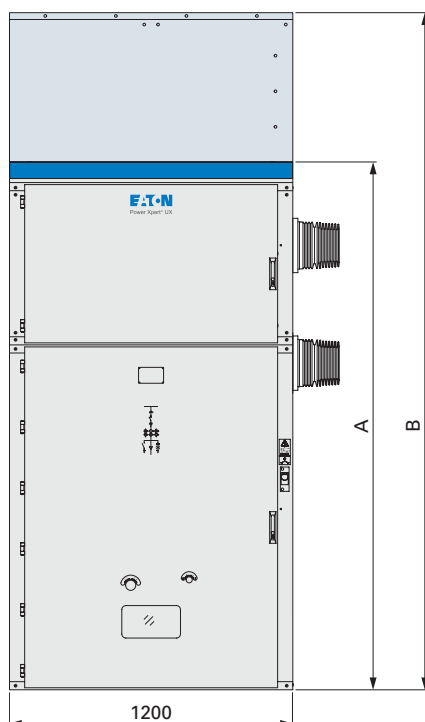
- In accordance with IEC 61243-5, voltage detection systems shown here provide additional operator and maintenance personnel safety
- Capacitive sensors in the cable compartment provide the power to the monitor mounted on the door of the low voltage compartment door
- Voltage detection systems provide visual indication that voltage is present at the monitored location, whether that is the cable or a busbar location

Other manufacturer's systems can be integrated within the Power Xpert UX 36.

Electrical data

System		36 kV
Rated voltage	kV	36
Lightning impulse withstand voltage	kV	170
Power frequency withstand voltage	kV	70
Rated frequency	Hz	50/60
Internal arc class		AFLR
Loss of service continuity category		LSC2B
Partition class		PM
Earthing circuit	kA - 3 s	31.5
Accessibility of compartments		
Circuit breaker compartment		Interlock-controlled
Busbar compartment		Tool-based/non-accessible
Cable compartment		Tool-based or interlock-controlled
External degree of protection		IP4X (IP41 as an option)
Internal degree of protection		IP2X
Installation		Indoor
Temperature classification	°C	-5 to +40
Relative humidity (max)	%	95
Busbar system		
Rated normal current	A	1250, 2500
Rated short-time withstand current	kA - 3 s	31.5
Rated peak withstand current	kA	82
Circuit breaker ratings		
Rated normal current	A	1250, 2500
Rated short-circuit breaking current	kA	31.5
Rated short-circuit making current	kA	82
Rated short-time withstand current	kA - 3 s	31.5
Class		E2, M2, C2
Breaking number of short-circuit current		30
Auxiliary voltage	V	AC110/220 - DC110/220
Mechanism		
Rated operating sequence	A	0 - 0.3s - CO - 15s - CO
Class		M2
Number of operations		≥10,000
Number of operations interrupter		≥10,000

Dimensions (mm)



Panel width (A)	1200mm
36 kV	
Max. rating	1250A, 2500A
Depth	2600
Height (A)	2400
Height including arc chamber (B)	3030

Relevant standards

Power Xpert UX 36 switchgear complies with the following IEC standards:

IEC 62271-200	High-voltage switchgear and controlgear – Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV
IEC 60529	Degrees of protection provided by enclosures (IP code)
IEC 62271-1	High-voltage switchgear and controlgear – Part 1: Common specifications

The components used comply with the following IEC standards:

IEC 62271-100	High-voltage switchgear and controlgear – Part 100: Alternating-current circuit-breakers
IEC 62271-102	High-voltage switchgear and controlgear – Part 102: High-voltage alternating current disconnectors and earthing switches
IEC 60044-1	Instrument transformers – Part 1: Current transformers
IEC 60044-2	Instrument transformers – Part 2: Inductive Voltage transformers.
IEC 60265-1	High-voltage switches – Part 1: Switches for rated voltages above 1 kV and less than 52 kV
IEC 60282-1	High-voltage fuses – Part 1: Current-limiting fuses

Operating conditions

Normal operating conditions, according to IEC 62271-1 for indoor switchgear.

Ambient air temperature

Less than or equal to 40°C

Less than or equal to 35°C on average over 24 hours

Greater than or equal to – 5°C

Altitude

Less than or equal to 1000 m.

Above 1000 m, a derating coefficient is applied (please consult us)

Atmosphere

No dust, smoke or corrosive or inflammable gas and vapor, or salt (clean industrial air)

Humidity

Average relative humidity over a 24-hour period $\leq 95\%$

Average relative humidity over a 1-month period $\leq 90\%$

Average vapor pressure over a 24-hour period ≤ 2.2 kPa

Average vapor pressure over a 1-month period ≤ 1.8 kPa

Storage conditions

In order to retain all of the functional unit's qualities when stored for prolonged periods, we recommend that the equipment is stored in its original packaging, in dry conditions sheltered from the sun and rain at a temperature of between – 25°C and + 55°C.

Seismically tested for the most arduous of locations

Power Xpert UX 36 switchgear design has been tested to withstand the effects of seismic activity to provide a strong, resilient, robust product to meet even the most demanding of applications. Power Xpert UX 36 exceeds the requirements of IEEE 693 part C1.2 and IEC 60068-2-57.



Local service

When and where you need it

The globalization and standardization of the Power Xpert UX 36 platform go hand in hand with local application engineers, service technicians and operations team.

Eaton offers highly efficient product supply and service at a local level, worldwide. Whether you purchase or use the Power Xpert UX 36 in an industrial area, in a difficult-to-access oilfield, or down a deep mine, you can depend on the same exceptional product quality, performance, safety, reliability, efficiency and service support.

Additional services can be offered, such as:

- Power system studies
- Configuration and commissioning of protection relays
- Arc flash studies
- Health check of electrical systems
- Preventative maintenance
- Training
- Turn-key delivery of projects including complete E-house solutions



We make what matters work.*

* At Eaton, we believe that power is a fundamental part of just about everything people do. That's why we're dedicated to helping our customers find new ways to manage electrical, hydraulic and mechanical power more efficiently, safely and sustainably. To improve people's lives, the communities where we live and work, and the planet our future generations depend upon. Because this is what really matters. And we're here to make sure it works.

To learn more go to: Eaton.com/whatmatters

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Powering Business Worldwide

We make what matters work.

At Eaton, we're energized by the challenge of powering a world that demands more. With over 100 years experience in electrical power management, we have the expertise to see beyond today. From groundbreaking products to turnkey design and engineering services, critical industries around the globe count on Eaton.

We power businesses with reliable, efficient and safe electrical power management solutions. Combined with our personal service, support and bold thinking, we are answering tomorrow's needs today. Follow the charge with Eaton.

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