MOELLER
SERIES

The future starts now

The new digital NZM circuit breaker is here.
Compact • Reliable • Innovative

Thinking ahead.
Shaping the future.

Switch,
protect
control,
measure,
communicate:

The energy supply and distribution systems of tomorrow have to contend with multiple competing demands. And Eaton has the right products to meet these challenges. Because Eaton, as a global leader in many technology areas, understands what panel building is all about.

For Eaton, future-oriented energy management means: to tackle complex tasks head-on with smart, simple solutions; to develop products that cover a broad range of applications and to provide all markets and sectors with the necessary systems for ensuring a safe, reliable and efficient energy future.

Eaton's product range leaves nothing to be desired, from the big picture down to the smallest detail:
- **MODAN** offers globally proven modular switchgears for a wide range of building and industrial applications up to 6,300 A
- With **xEnergy** Eaton is able to offer safety-tested switchgear systems for power distribution systems up to 5,000 A
- Eaton's new **digital NZM circuit breakers** are universally suitable for rated currents from 20 A to 1,600 A; they are now also equipped with the innovative **PXR electronic release** technology
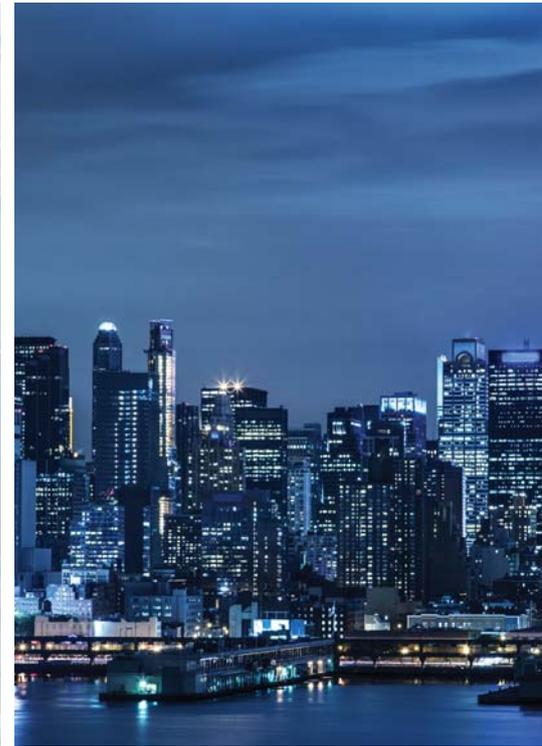
The NZM series – circuit breakers up to 1,600 A
Best in class

Eaton's NZM series circuit breakers cover rated currents of 20 to 1,600 A – with only four frame sizes. And they are also optimally matched to each other. The wide range of possible applications covers every need. Eaton took a close look at what customers really want and designed the product accordingly.

What stands out, for example, is the comprehensive system of accessories, which can be individually assembled and easily installed in line with specific application requirements. The same goes for the flexible terminals, which offer increased safety for operators thanks to the variety of available covers.

The circuit breakers are thus suitable for universal use – from small distribution boards to machine controls and motor-starter combinations, and all the way to large power distribution systems with a short-circuit breaking capacity of up to 150 kA.

Full performance, compact design

The new digital NZM circuit breakers combine full performance with a compact design. The circuit breakers and accessories have been designed in such a way that their function, assembly and handling are the same throughout, in order to make your work as simple as possible.

Various types of releases are available, including cost-effective versions with bimetallic strips and models with communications-enabled digital electronics, which can take on a variety of protective functions. This makes them suitable for use in both AC and DC networks – from cable protection to the protection of motors, generators and transformers. With switch-disconnectors up to 1,600 A, implementing applications such as main switches, emergency power-off switches and coupler switches is quick and simple.

Despite their slim design, the NZM circuit breakers can handle loads with rated currents up to 1,600 A, and they can safely switch off short-circuit currents up to 150 kA.
The innovative switching technology with double-break contacts helps to speed up the switching process.
In the event of a short circuit, the special design and the selected materials will generate repulsive magnetic forces that fling open the contacts in a fraction of a sine wave.

Switching capacities up to 150 kA and operating voltages up to 690 V pose no problem at all. At the same time, thanks to their optimal rate of power loss, the devices have a positive impact on the size of the control panel. The digital NZM circuit breakers are suitable for use in even the toughest environments, such as mining (up to 1,000 V AC), renewable energy (up to 1,500 V DC) and other power-intensive applications with high switching capacities at 690 V AC (e.g. data center, marine and renewable energy applications etc.).
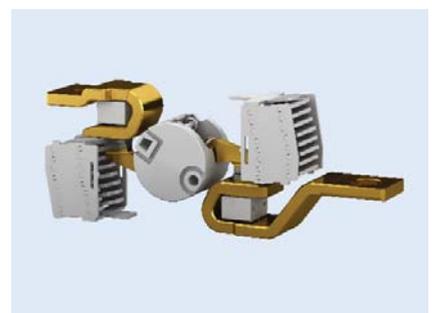
Power Xpert Release

The next generation of electronic releases – now also available for the NZM
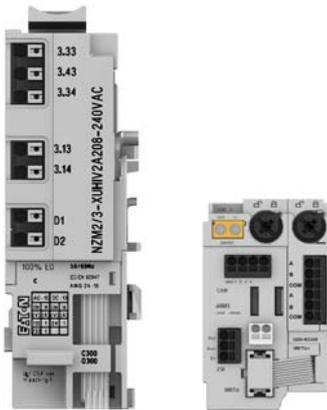
With the Power Xpert Release (PXR) Eaton has developed a new platform for trip units. This technology has already been integrated in the IZMX series of air circuit breakers, and is now also available for the compact circuit breakers of the NZM series.

The PXR is a powerful trip unit for professional users. Our customers' greatest possible benefit is always our main priority. Therefore, the PXR combines easy handling across all frame sizes with state of the art technology, a wide range of practical functions and, as always, a proven safety record.

The PXR technology makes it possible to configure and test the circuit breakers from a PC via a USB port. This makes it very easy to access the information generated by the switchgear, to save the test data and to print it. This is the fastest and most convenient way to continuously improve control and maintenance systems. All sensitive data and settings are password-protected to prevent unauthorized access.

Improved lifecycle management through digital circuit protection

What does lifecycle management mean and what are the benefits for users?
Different approaches from Eaton and their advantages and benefits are discussed in this white paper.

Convincing in every way
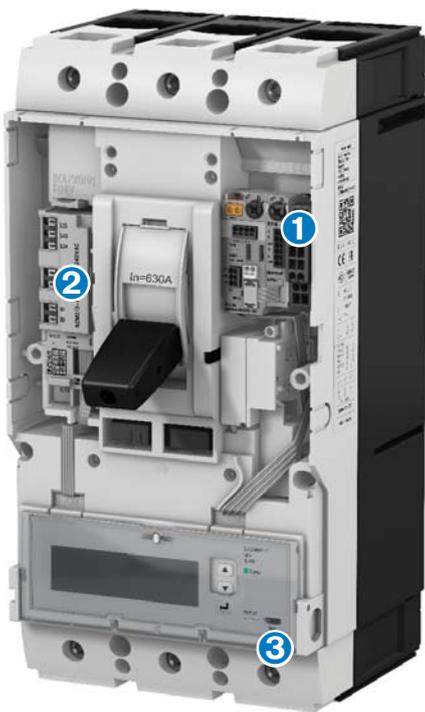
Saving our users time and offering them the broadest possible range of applications – these were the goals Eaton had in mind while developing the Power Xpert Release platform.

❶ As such, we have equipped the PXR with a consistent design and clear menu navigation that will simplify your day-to-day work. With the PXR, communications are similarly easy: The many available communication modules for various bus systems allow for high-performance connections in line with the respective system requirements. Additionally, the integrated Modbus RTU connection also saves space during installation.

The new, fully integrated control and measurement technology creates additional benefits for customers

❷ The integrated relays inside the voltage release enable the control of any associated components, alongside the display of operating states (such as alert notifications), the control of remote operators and motor-starter combinations, and much more.

❸ The USB interface allows for easy connection to a PC to change the settings, conduct analyses or launch one of the test function.

The Rogowski coil transformer supports ISO 50001 energy management with Class 1 energy metering in accordance with IEC 60557-12.

The PXR25 premium version with display
With the PXR25 premium version (=NZM...PX), you can keep everything in sight. For intuitive handling and to make configuration even easier, the PXR25 is equipped with a high-resolution display. You can enter the desired settings via this display. You can choose between protection settings and soft settings (additional settings). The settings of PXR switches can also be easily adjusted by using the Power Xpert Protection Manager (PXPM) software for PC.
With the PXR20 version, you can adjust the protection settings using the rotary heads on the circuit breaker itself, while the soft settings can be adjusted using the PXPM software.

What the PXR is capable of
The most important benefits and features at a glance

One design for all products
The consistent design for all product groups and the clear, ergonomic arrangement of the various elements ensures that the operation is the same operation and configuration of the PXR across the whole range of compact and open circuit breakers.

Now also with LED light for status and overload indication
A green-red dual LED indicates the current status: In start-up mode, the LED is permanently green. Green flashing indicates normal operation. Red flashing indicates an error in the electronic trip unit (tripping unit). The overload LED indicates the load status of the circuit breaker.
This warning can also be transmitted via the integrated communications. The PXR20 is fixed at 80 % and 105 % of I_r. The PXR25 has same default-values as the PXR20, but in this case they can be adjusted as required.

Everything under control – thanks to the high-resolution display
The high-quality, full graphic display features a premium pixel matrix for enhanced contrast and brightness. The uniform menu navigation has been designed for maximum user-friendliness.

Always the right setting
The new NZM is fully adjustable over an extended range. The customary PZ2 screwdriver can still be used. The VX trip unit of the NZM2 can now also be set for the instantaneous release range. In addition the NZM2 now comes with optional ground fault protection.

The PXR – a real knack for connectivity
The PXR electronic release uses the modern communications platform provided by the CAM interface and the internal Modbus RTU module, with possible connections to numerous systems such as PROFIBUS, ProfiNet, Modbus TCP etc.

New modules that make things easier

Interface module
This module is used to detect the status of the circuit breaker by means of photoelectric light barriers, and for connection to enhanced functional interfaces. Each version has been specifically adapted to the respective circuit breaker type. A 24 V DC screw terminal supplies the tripping unit with power. Photoelectric sensors detect the respective device status (on/off/tripped) and relay it via the communication connection. In the event of a short circuit, zone selectivity ensures a faster and more precise shutdown. In addition, the module can be used to connect an internal Modbus RTU module, to remotely operate the ARMS maintenance mode, and to connect the CAM interface to any external communication modules.

The internal Modbus RTU module
A Modbus RTU connection can be integrated internally, so that no external communication components are required. The connection to a superordinate system saves space and allows for the quick and cost-effective transmission of data. As a result, your system will be optimally prepared for all Industry 4.0-related tasks.

Relay module
The relay module contains two programmable relays, in addition to established components such as the undervoltage release. These relays can be used, for example, for the remote control of drives or to control motor starters. They are equally suitable for alert notifications or status messages.

Zone selectivity and ARMS maintenance mode

Precise disconnection of faults upstream from their location and protection against arc faults

Zone selectivity
Zone selectivity is the next stage in the concept of time selectivity. In contrast to time selectivity, any faults will be switched off instantaneously and at any point in the network. This keeps the energy that is being generated ($I^2 \times t$) – and thus the thermal and dynamic system load – as low as possible.

For this purpose, the circuit breakers are connected to a signal cable. In the event of a fault, the signal cable ensures that only the circuit breaker located directly upstream of the fault (i.e. the circuit breaker that feeds into the short circuit) switches off immediately. This keeps that part of the system that has not been affected by the fault operational and thereby minimizes downtime.

ARMS – Arcflash Reduction Maintenance System
Our circuit breakers can be optionally equipped with our new, patented Arcflash Reduction Maintenance System. In the event of an arc fault, this system ensures an immediate and accelerated shutdown.

The disconnection is even faster than that effected by a non-delayed short-circuit release. This feature can either be activated directly at the circuit breaker or via an external switch, for example when maintenance personnel enter a hazardous area. No special wiring is required.

More safety when working on live electrical circuits

Safety is Eaton's top priority. Therefore, we offer additional safety functions that go beyond the standard requirements. In this white paper you can find out what advantages this has for users.

Energy metering with the digital NZM
Measurement data for ISO 50001
With Class 1 energy-metering accuracy in accordance with IEC 61557-12

Greater efficiency with ISO 50001
The EN ISO 50001 standard was defined at the international level to facilitate the implementation of in-house energy management systems. The most important aim of the standard is the sustainable reduction of energy costs, energy consumption and CO_2 emissions by means of organizational and technical changes. Both for globally connected companies and for small and medium-sized businesses, sound energy management can lead to enhanced cost transparency and cost savings, while also contributing to the protection of natural resources and to a better corporate image. Especially for power-intensive companies whose consumption exceeds 10 GWh, or whose electricity costs account for more than 14 % of the value added, the German Renewable Energy Sources Act harbors enormous cost reduction potentials in the form of lower energy taxes.

The importance of accurate metrics and analytics
Prerequisites for introducing an energy management system in accordance with ISO 50001 are accurate energy metrics, the identification of the main energy consumers and a full analysis of the company's energy costs. This creates a sound foundation for realizing concrete energy-efficiency improvements. Eaton offers a broad range of innovative products for monitoring, measuring and analyzing energy data.

ISO 50003 – new as of October 2017

Since October 2017, new energy-efficiency requirements have been in place following the publication of the ISO 50003 standard. From now on, companies with certified energy management systems will have to provide hard data to prove the energy-efficiency gains they have realized. With our innovative energy metering technology, we are able to support you in meeting the stricter certification criteria.

Product cost efficiency through precise measurement
To compete in today's markets, cost-optimized products must be manufactured. By measuring the energy requirements of production machines, the energy costs incurred for the production of the individual product can be precisely calculated. The more precise the measurement, the more precise the calculation of the proportional energy costs of the individual product. Especially when large production volumes and short cycle times come together, a very precise measurement is profitable, as incorrect values will otherwise falsify the cost calculation.

Communications
Effective energy management systems

Saving space – quick and safe connection
With the integrated Modbus RTU module, you will save space inside the control panel. In addition, the process of planning your system is now more flexible and cost-effective thanks to the modular interface module. This reduces the time and effort required for installation as well as the overall size of the control cabinet. The handling of the devices has also been simplified thanks to the new push-in terminals. This not only reduces the likelihood of errors, but also simplifies preparation and wiring and ensures that your installation concept meets the highest safety requirements.

**Centralized data collection – integration into existing systems**
Eaton's centralized data collection system consolidates the operating data of the entire system to ensure their rapid transmission.
The operating data are collected in a uniform format by all IZMX air circuit breakers, all NZM compact circuit breakers and all other PXR modules. For you, this means that the amount of programming work required across the system will be much lower.
In addition, the CAM module simplifies the integration of existing communications systems, such as Profibus DP, ProfiNet or Modbus TCP. Eaton has thus made it much easier to connect your existing architecture.

**Full access at all times – conveniently with remote control**
Via the integrated communications of the PXR and additional modules, such as a remote operator, motor-starter combinations etc., you will have full access to the circuit breaker at all times. The remote operator can be conveniently controlled via the communication connection in combination with the relay module. The relays can also be used to control other devices, e.g. automatic contactor releases at low overloads. You will thus benefit from a significant increase in security while saving time.
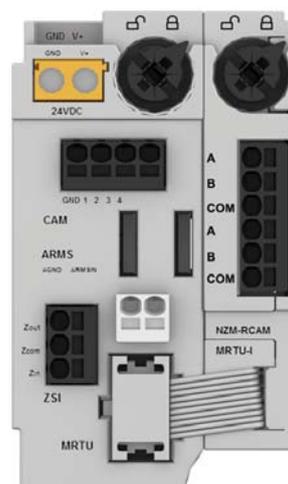
Everything at a glance

With the new, integrated communications platform

- Modbus RTU
- Profibus DP
- Ethernet IP
- Modbus TCP
- Profinet

NZM **IZMX**
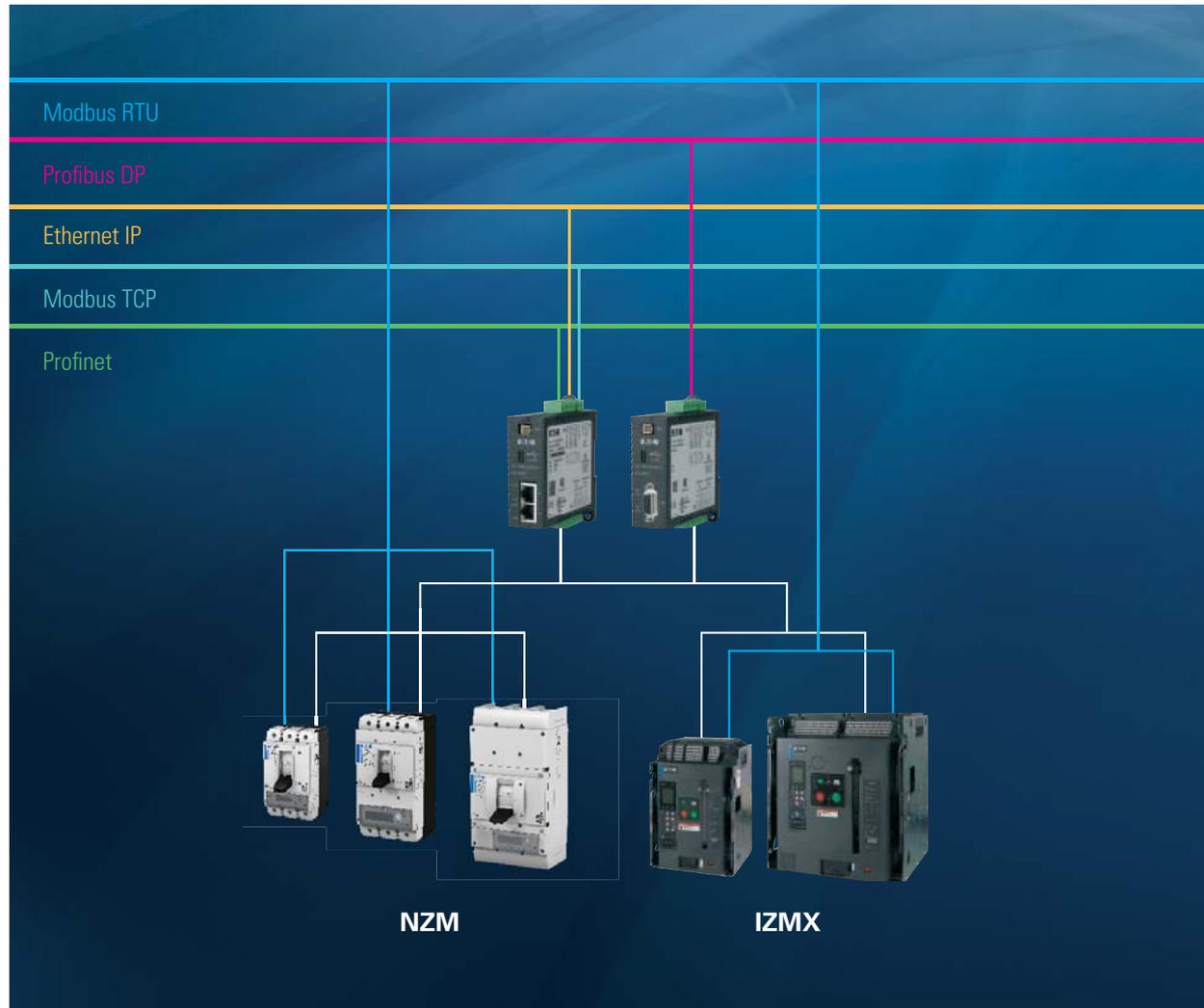
Reliable and efficient data collection, with Eaton's PXR circuit breakers and measurement and communication modules. Providing users with data in the required form and data format is a challenge, not least given the many different types of communications architectures used in industry today.

Eaton has answered this challenge by creating a variable topology of measuring points in order to meet the demands of users. Eaton offers a comprehensive range of communication interfaces to meet the demands of the market. Based on this structure, the data can be transferred to other communication platforms via various interfaces and gateways as required.

Features and measurement values of the PXR variants

	NZM...-AX...	NZM...-VX/MX...	NZM...-PX/PMX...
Power Xpert Release version	PXR10	PXR20	PXR25
Connectivity			
Test option / PXPM connection via USB	✓	✓	✓
Interface module with CAM connection	-	optional	✓
Internal Modbus RTU module	-	optional	optional
Relay module	-	optional	optional
Provision of the measured data			
Current			
In real time, value per phase and neutral conductor	✓	✓	✓
Average	✓	✓	✓
Asymmetry in %	✓	✓	✓
Min/max	✓	✓	✓
Voltage			
In real time, phase-phase / phase-neutral	-	-	✓
Asymmetry in %	-	-	✓
Min/max	-	-	✓
Frequency			
In real time	-	-	✓
Min/max	-	-	✓
Real/apparent/reactive energy Class 1			
Total	-	-	✓
Forward	-	-	✓
Backward	-	-	✓
Net	-	-	✓
Real/apparent/reactive energy Class 1			
In real time	-	-	✓
Min/max	-	-	✓
Power factor	-	-	✓
Maintenance information and notifications			
Service life indicator	-	-	✓
LED display	status, alert	status, alert, trip reason	status
LCD display	-	-	settings, alert, trip reason
Safety-related functions			
ARMS maintenance mode	-	-	optional
ZSI zone-selective interlocking	-	-	optional
Thermal memory	✓	✓	✓
Ambient temperature compensation	✓	✓	✓

The universal PXPM software
One program for all Eaton devices with PXR electronics

Power Xpert Protection Manager

With the new PXPM software, Eaton has developed a universal program that will allow you to conveniently manage all Eaton PXR devices.
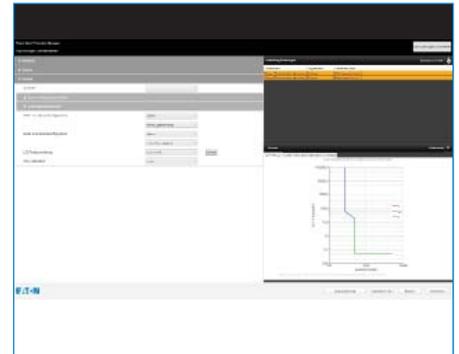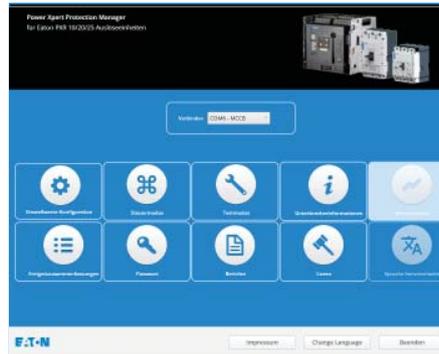
Main features:
- Configuration and settings
- Retrieval and evaluation of data
- Test function

With the PXR technology, configuring, controlling, protecting and testing the system architecture of your Eaton devices is easier than ever before, thanks to the integrated Power Xpert Protection Manager. It is no longer necessary to manually identify the various devices, as the program automatically adapts to each. Guided and drop-down menus ensure that the configuration process is as user-friendly as possible. And the recorded data are always clearly displayed via a single screen.

The PXPM software speaks your language: Eaton provides you with a wide range of language packs; the system can either recognize the language of your computer automatically, or you can set it manually.

A wide selection of additional options allows you to select application-specific settings exactly as required:

- The protective function can be adapted and controlled via the display and by configuring the trip type.
- The waveforms of both current and voltage can be automatically captured and displayed before and after tripping, or manually via the "waveform capture" function.

Eaton software for a broad range of tasks
Configuration, project planning, visualization and much more

xEnergy configurator
The circuit breaker configurator is part of the xEnergy Configurator, and supports users in correctly configuring and ordering their Eaton products:
• Easy to operate
• Support of error-free selection and ordering of compact and open circuit breakers (NZM / IZMX)

xSpider
xSpider is the next generation of software for the sizing and planning of low-voltage networks. It supports the design, selection and optimal configuration of the requisite switchgear. The graphic-oriented drafting software is easy to use and the corresponding database contains all relevant Eaton devices. The ability to select a circuit breaker based on the network diagram, and to examine the tripping characteristic directly, allows for a quick assessment of the selectivity and the required backup fuse. The integrated ArcRisk module, which is currently unique on the market, offers a quick and clear assessment of the arc fault risk in the planned low-voltage switchgear assembly.

Eaton is a power management company with 2018 sales of $21.6 billion. We provide energy-efficient solutions that help our customers effectively manage electrical, hydraulic and mechanical power more efficiently, safely and sustainably. Eaton is dedicated to improving the quality of life and the environment through the use of power management technologies and services. Eaton has approximately 99,000 employees and sells products to customers in more than 175 countries.

For more information, visit **Eaton.com.**

To contact us please visit **http://www.eaton.eu/Europe/ Electrical/CustomerSupport/ContactDetails/index.htm**
For Technical Support please get in contact with **techsupportemea@eaton.com**

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