

Metal-enclosed single busbar, Solid and Air-Insulated switchgear
IEC Medium Voltage Switchgear up to 24 kV

Xiria E

Extendable switchgear for distribution substations
and commercial / industrial applications



EATON

Powering Business Worldwide



Automotive



Aerospace



Truck



Hydraulics



Electrical

Powering business worldwide

Eaton delivers the power inside hundreds of products that are answering the demands of today's fast changing world.

We help our customers worldwide manage the power they need for buildings, aircraft, trucks, cars, machinery and entire businesses. And we do it in a way that consumes fewer resources.

Next generation transportation

Eaton is driving the development of new technologies – from hybrid drivetrains and emission control systems to advanced engine components – that reduce fuel consumption and emissions in trucks and cars.

Higher expectations

We continue to expand our aerospace solutions and services to meet the needs of new aviation platforms, including the high-flying light jet and very light jet markets.

Building on our strengths

Our hydraulics business combines localised service and support with an innovative portfolio of fluid power solutions to answer the needs of global infrastructure projects, including locks, canals and dams.

Powering Greener Buildings and Businesses

Eaton's Electrical Group is a leading provider of power quality, distribution and control solutions that increase energy efficiency and improve power quality, safety and reliability. Our solutions offer a growing portfolio of "green" products and services, such as energy audits and real-time energy consumption monitoring. Eaton's Uninterruptible Power Supplies (UPS), variable-speed drives and lighting controls help conserve energy and increase efficiency.



MV Switchgear Technology is in our DNA

Eaton's knowledge and understanding of industries, applications, technology and products enables us to offer customers safe, reliable and high performance solutions. We have been part of the Medium Voltage switchgear technology creation and therefore carry what's needed with us – always!

Complete MV switchgear solutions

The series of Eaton Medium Voltage systems offers switchgear and components for applications in distribution networks (main stations, substations and transformer stations) and industrial power supplies. These technically high quality systems are air- or epoxy-resin insulated and are always equipped with circuit-breakers based on proprietary vacuum interrupters.

The medium voltage switchgear systems carrying Eaton's brand are based on the use of vacuum circuit-breakers combined with solid insulation material. This is an environmentally-friendly technology in comparison with the methods used by many other suppliers, which use SF₆ as an insulation medium.

Eaton thus has a wide range of switching systems and components that offer an environmentally friendly solution for every application. Additionally, Eaton's global service network provides maximum customer support in all regions of the world.

Industry leading vacuum and solid insulation technology

Through more than eighty years of innovation and experience, Eaton has developed environmentally friendly vacuum interrupters capable of reliably switching both normal load currents and high stress fault currents.

Eaton is one of the few companies in the world producing vacuum interrupters and has succeeded in developing world class products with international patents. This has been achieved through company acquisitions over the years of Westinghouse®, Cutler-Hammer®, MEM® and Holec®.

To increase the dielectric strength of the vacuum interrupter, Eaton has also designed vacuum interrupters that are encapsulated in epoxy resin material. The medium voltage IEC circuit breaker family utilizes this solid insulation technology that has been catering to a wide range of applications for more than 40 years.

Eaton's range of
SF₆ free switchgear
for Medium Voltage

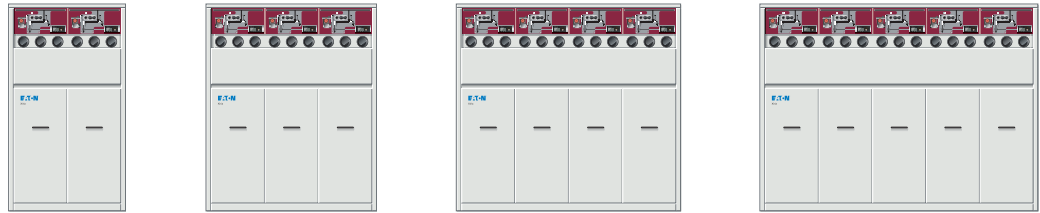


Xiria is the name of Eaton's product family for a new generation of medium voltage switchgear. The Xiria family started more than a decade ago with the introduction of the Xiria ring main unit.

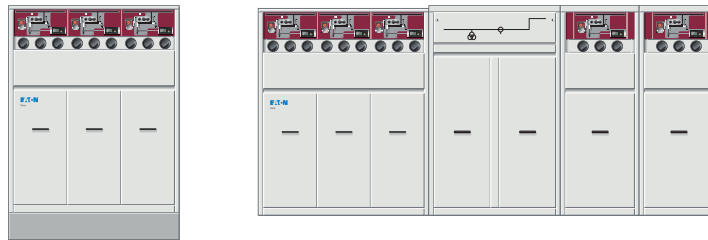
This ring main unit consists of a block containing three panels. Due to the quick acceptance and worldwide interest in more configurations, Eaton consequently developed a four, five and two panel block. Due to the fact that the individual units cannot be coupled and are limited in the number of panels and protection and control equipment, the single panel version was developed. This single panel version is called Xiria E. E in this case stands for Extendable.

The Xiria family includes multiple possibilities and configurations for Power consumption metering. These configurations are indicated as Xiria M-versions. M stands for metering. The transformers for power consumption metering can be either integrated into the block-type Xiria switchgear or housed in a separate metering panel. This dedicated metering panel can be integrated with both the current block type switchgear and the new single extendable panels.

Xiria
(Block type)



Xiria M
(Metering)



Xiria E
(Extendable)



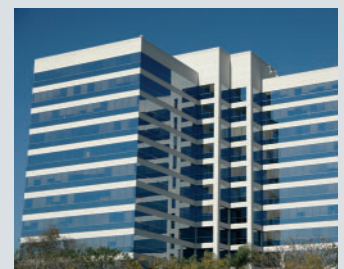
The complete solution

By adding the Xiria E panel to the current range of Xiria a complete family, based on the same and proven key technologies, is created. The Xiria block type system is already frequently used for transformers stations, small industries,

heavy duty applications and commercial buildings. With the new Xiria E panel it is also possible to use the system in applications with higher specifications and a bigger number of panels.

Some applications are:

- Distribution substations for utilities
- Wind power plants
- Bigger industrial applications
- Hotels
- Shopping centres
- Office buildings
- Infrastructure projects (tunnels, subways, airports)
- Universities
- Hospitals
- Data centers



Xiria E

Modular Switchgear for Smart Grid Applications

Xiria E is the name of Eaton's new medium voltage switchgear for smart grid applications. The system is characterised by its high level of operational safety and suitable for applications up to 24 kV.

The Xiria E switchgear is designed around Eaton's proven vacuum interrupters, which require no maintenance and are certified for 30,000 operation cycles.

All live parts in the available panels are single pole insulated. The used materials are shaped specifically to provide optimum insulation combined with excellent thermal characteristics. In addition, the insulation is configured to provide effective control over electric fields around the used components, thereby minimizing any risk of internal arcing.

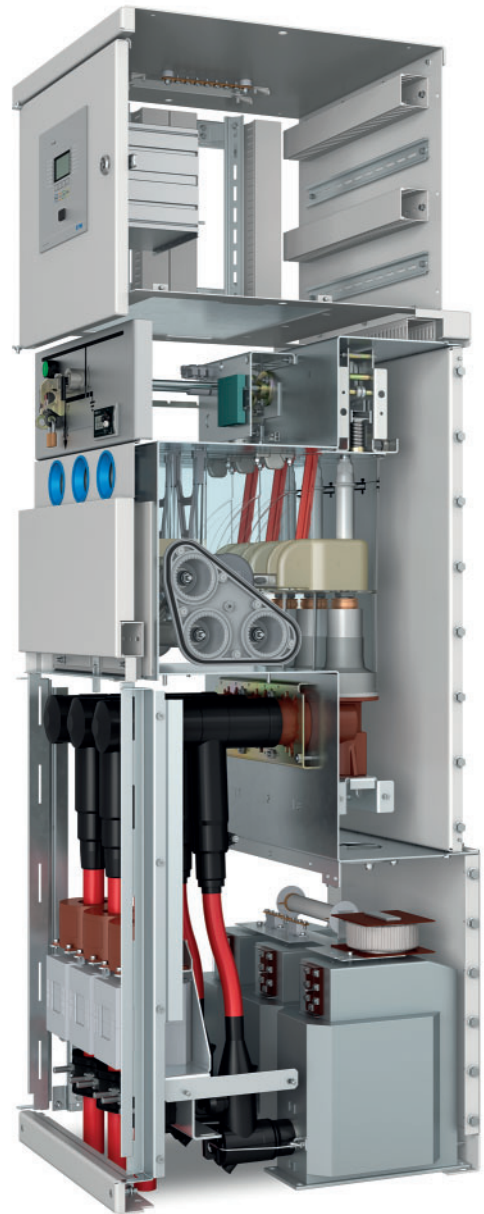
Within the Xiria E panels both the primary parts and the mechanisms are housed in a fully enclosed housing which protects the whole system against environmental influences.

The use of vacuum interrupters and solid insulation means that the Xiria E is environmentally friendly. These technologies ensure that this system is a conservational alternative to switchgear systems using Sulfur Hexafluoride (SF₆) gas for insulation. The cost of ownership is also significantly

reduced, as no regular testing of gas pressure or other routine maintenance is needed and there is no high end-of-life cost associated with ultimately disposing of the equipment.

With panel dimensions of only 500 mm width and a provision for cable connection from the front, the Xiria E system is economical in its use of valuable floor space, and easy to accommodate in even the most restricted environments. For locations where there is no possibility to exhaust an internal arc into cellar, the system has the possibility to exhaust into the room. This is realized by means of a special chimney at the back side with integrated arc absorbers.

When it comes to the safety of the operating personnel the Xiria E design leaves nothing to chance. All parts are fully enclosed by an internal arc tested safe metal housing. Besides that the panels in the system are provided with direct visible indication of the integrated earthing and ON/OFF-position by means of inspection windows in the front.



Features and Benefits

(quick overview)

Safe in Use

- Visible isolation by means of inspection windows in the front
- Compartments protected against penetration of objects
- Capacitive voltage detection system for verification of safe isolation from supply
- Logical mechanical and electrical interlocks prevent formal operation
- Smooth contemporary design

Environmental Friendly

- Minimized number of components
- Environmental-friendly design with respect to the materials used
- No use of SF₆-gas for switching and insulation
- Energy efficient production and assembly with environmental energy sources
- Minimal number of transition points in primary design enable low energy loss during operation
- Only Re-usable and / or recyclable materials used

User Friendly

- Cable connection and user interfaces for operation on the same front side of the panel
- Ergonomic cable connection height
- Cable (secondary) entry points on both sides of the low voltage compartment top plate
- Secondary cable terminals positioned on a good reachable place in the low voltage compartment
- Clear and simple straight-forward operation panels

Low Total Cost of Ownership

Low initial costs due to:

- Panels with only 500 mm width
- Cable connection from the front / wall standing arrangement
- No need for external arc channel
- 12 kV and 24 kV panels in same housing

No costs during service due to:

- Robust design with minimum number of parts (routine tested in factory)
- Long-life solid insulated components as insulation medium
- Maintenance free vacuum circuit-breaker and load-break switch
- Primary parts and mechanism installed in a fully sealed for life enclosed housing
- No SF₆ pressure checks

Low end of life disposal cost due to:

- Vacuum switching technology
- Solid insulation with air as isolating medium
- Recycling or re-use of materials

Reliable and Safe in Operation

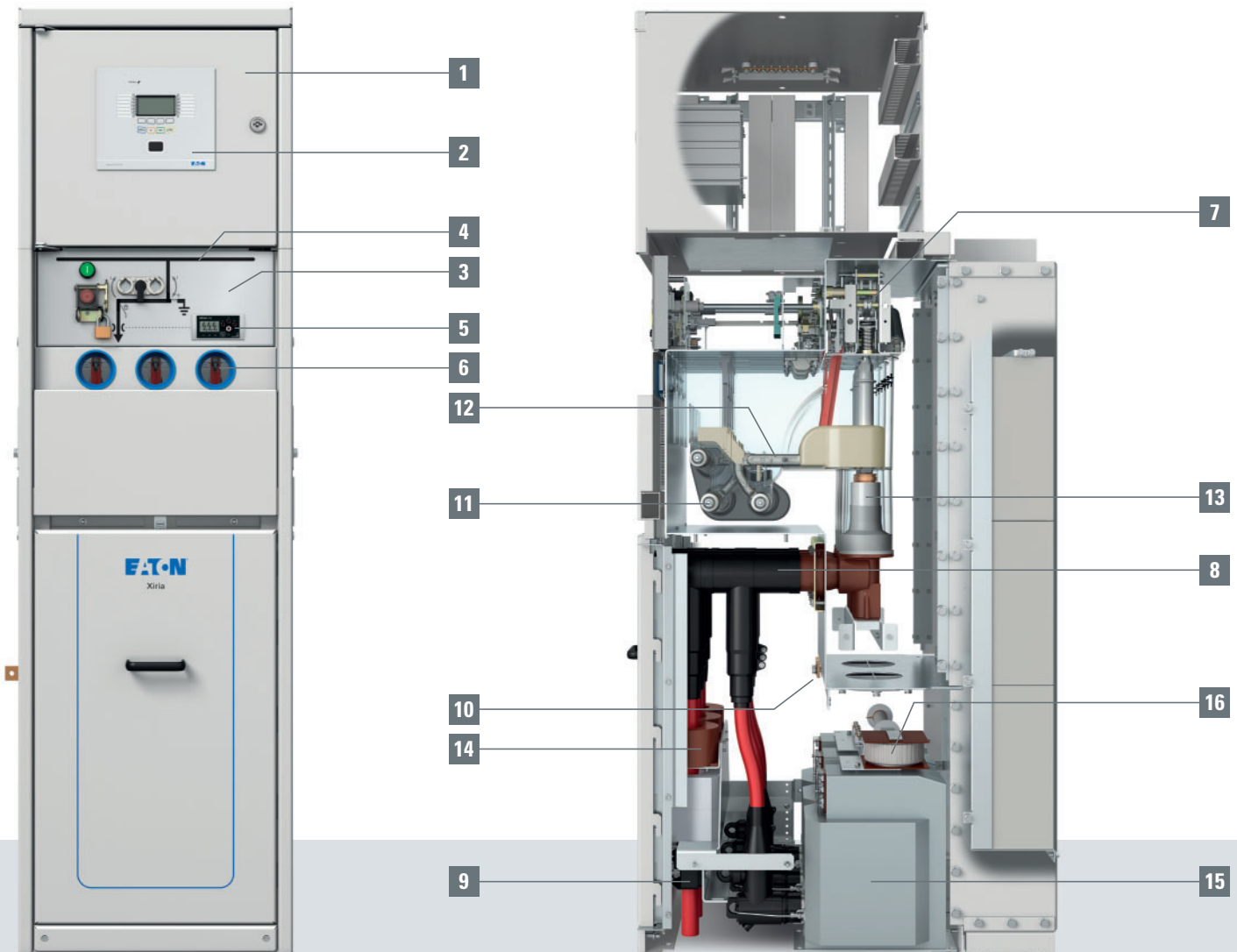
- Complete design certified in accordance with IEC standards
- Arc fault tested according IEC 62271-200
- Quality assurance in accordance with DIN EN 9001
- Routine tested
- Single pole insulated primary parts within one compartment
- Primary parts and mechanism in sealed for life fully enclosed housing
- Protected voltage transformers



Basic Design

The Xiria E system is modular in construction. This ensures that any panel combination and sequence is possible.

In addition, the number of panels capable of being used in an installation is unlimited as several sections can easily be connected. As the panels can be quickly assembled and connected, flexible commissioning of the switchgear is possible. The panels in the Xiria E system are compact (500 mm wide), resulting in considerable savings in costs and installation space.

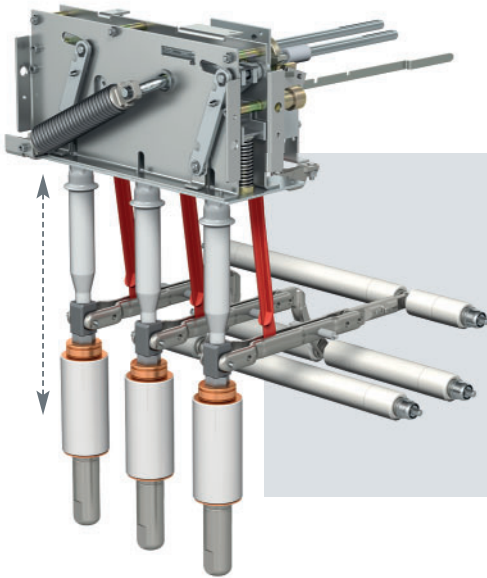


Circuit-breaker panel (example)

- | | | |
|-------------------------------------------------------------------------------|----------------------|-------------------------------------------------------------|
| 1. Low Voltage compartment | 6. Inspection window | 12. Change-over switch |
| 2. Protection relay | 7. Mechanism | 13. Vacuum interrupter |
| 3. Control panel with operation of the circuit-breaker and change-over switch | 8. Cable cones | 14. Current transformers |
| 4. Mimic diagram | 9. Cable clamps | 15. Voltage transformers |
| 5. Voltage detection system | 10. Earth bar | 16. Coil and resistor for protection against ferroresonance |
| | 11. Busbar | |

Main Components

Vacuum circuit-breaker

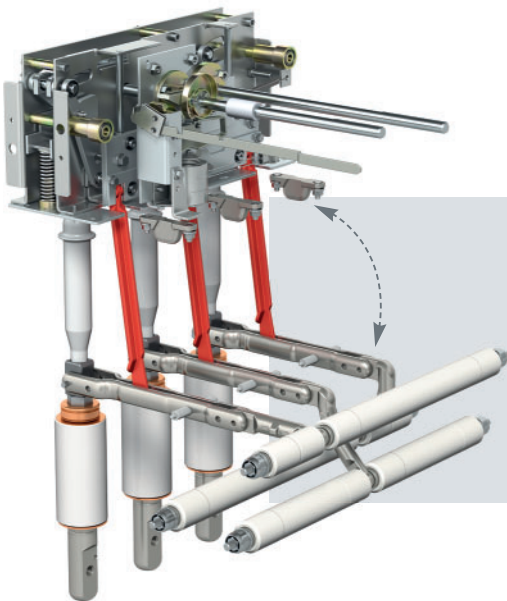


The vacuum circuit-breaker uses a simple and reliable spring charging mechanism for operation of the vacuum interrupters. The mechanism contains a low number of moving parts and makes no use of lubricants. It is completely housed in a sealed for life enclosure and therefore needs no maintenance.

Features

- With environmental friendly vacuum interrupters
- Simple spring charging mechanism
- No use of lubricants
- Housed in a sealed for life enclosure
- Manual or motor-operated
- Position indication by means of inspection windows and mechanical indicators
- Auxiliary contacts for Open/Closed position

2-position change-over switch

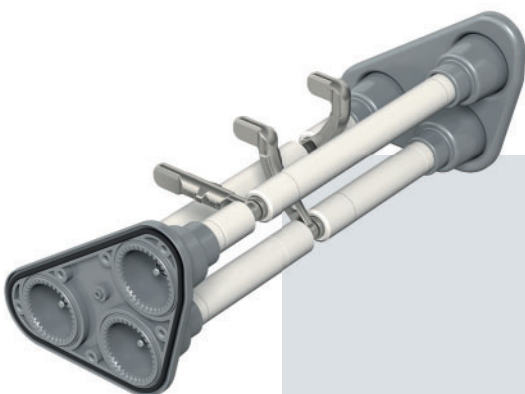


All panels are equipped with a change-over switch positioned in the same sealed for life enclosure as the circuit-breaker. The change-over switch consists of three shafts connected to the busbars or earthing points. Since it is mechanically interlocked the change-over switch can only be operated when the circuit breaker is in the open position.

Features

- Manual-operated switch with 2 positions (service / earthed)
- Maintenance free
- Housed in sealed for life enclosure
- Auxiliary contacts for service / earthed positions
- Position indication by means of inspection windows and mechanical indicators
- Mechanically interlocked with the vacuum circuit-breaker

Busbars



The busbars in the panel are housed in the same sealed for life enclosure as the circuit-breaker and change-over switch. To prevent a possible internal arc all busbars are single phase insulated.

Features

- Single phase insulated
- Air insulated
- Housed in a sealed for life enclosure
- Simple and robust construction
- Easy to couple

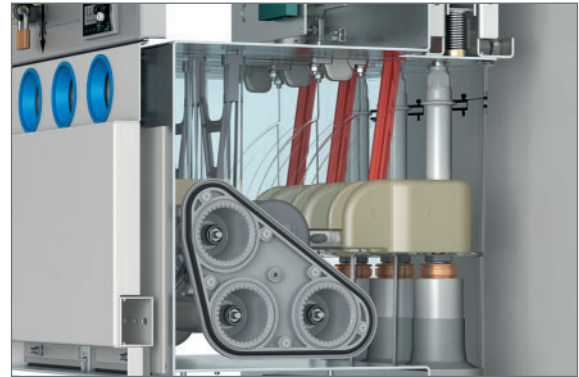
Eaton Core Technologies

Solid insulation

Polycarbonate and Thermo-plastic elastomer (TPE) is used as high-quality primary insulation materials around live parts.

By applying Polycarbonate and TPE for solid insulation our design engineers can shape the parts specifically for optimal insulation, robust construction

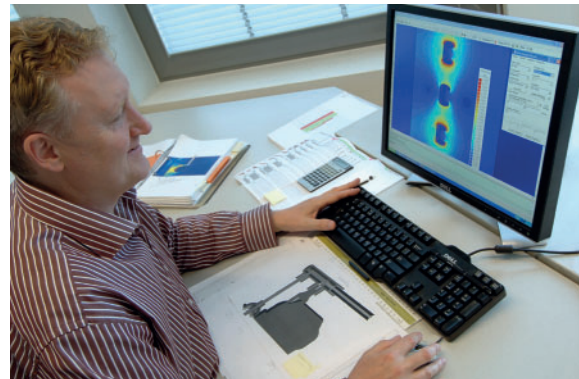
and cooling purposes. In the many years of experience with design and manufacturing of insulation materials, we learned to construct smart single phase insulated constructions. Xiria utilizes optimal field control through the special design of all primary components.



Electrical field control

With conventional shapes for primary components like busbars and conductors, the electrical field between the phases and between phase and earth is non-uniformly distributed. In areas with high field, partial break-through can

initiate avalanches resulting in flash-overs. In-depth knowledge about breakthrough phenomena and field steering techniques enable us to prevent flash over completely. The result is a particular compact design.



Vacuum technology: safe, compact and reliable

Eaton vacuum interrupters consist of a ceramic cylinder, housing a fixed and movable contact. Movement of the contact under vacuum conditions is facilitated by a bellows. A shield surrounding the contacts prevents the insulators from becoming contaminated by metal vapour produced during current interruption. This shield also ensures good potential distribution over the insulator.

A typical feature of Eaton vacuum interrupters is that they are characterised by very low arc voltage and short arc times, resulting in very low arc energy. Contacts wear in a vacuum interrupter is therefore virtually negligible. Vacuum interrupters are maintenance free and are certified up to 30,000 operation cycles.



Reliable and Safe in Operation



Eaton's proven technologies have been integrated in the design and development of the Xiria in order to ensure that the switchgear is safe and has high operational reliability throughout its complete lifetime.

Experience and knowledge gained over many years in the areas of cast resin technology, vacuum technology and electrical field control have been implemented.

The system has been thoroughly arc fault tested according to the latest standard IEC 62271-200.

Preventing an internal arc

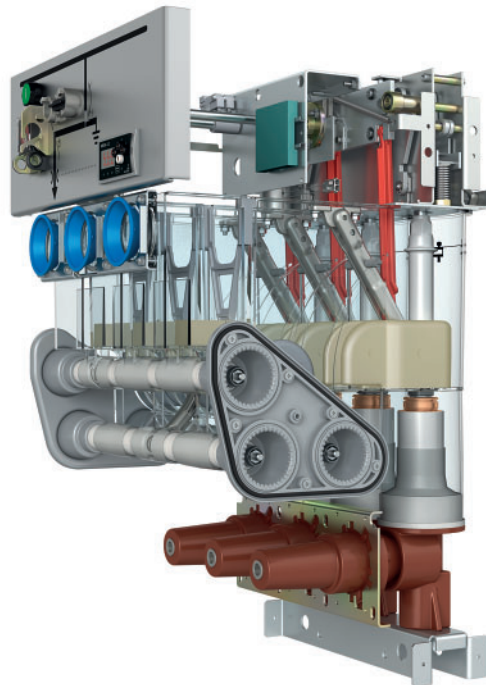
Within the Xiria design there are different technologies used to prevent an open arc.

Single pole insulated primary parts

All high voltage parts are single pole insulated. The insulation materials used for this are Polycarbonate and Thermo-plastic elastomer (TPE), both high-quality materials with optimal insulation characteristic resulting in minimised dimensions.

Use of Electrical Field control

Engineers designed the whole construction of primary parts, housed in the sealed for life tank, based on Eaton's key technology for electrical field control. By means of special shapes and dimensions the possibility of an open arc is minimized.



Sealed for life fully enclosed housing

Both the primary parts of the unit and the mechanisms are housed in a fully enclosed (sealed for life) housing which protects the whole system against environmental influences and therefore makes it maintenance free. This compartment can be classified as non-accessible and has an IP degree of IP55.



Protected Voltage transformers

Ferro resonance can cause that voltage transformers are damaged and consequently initiate an internal arc in the switchgear. Our design prevents that the voltage transformers are affected by ferroresonance. A resistor and a saturable coil are installed in the tertiary circuit of the voltage transformer.



Routine tests

Various prescribed routine tests are carried out during the production of the switchgear. To assure quality, all processes are in accordance with DIN EN 9001. This means that at every stage of production the components, circuit-breakers and current transformers are inspected for correct functioning. When the entire installation has been

assembled, a thorough visual inspection is carried out, together with mechanical, functional and electrical checks.

Philosophy on Internal arcs

Eaton always puts extra focus on creating safe switchgear for operators at all times. One of the biggest potential threats to operators is an internal arc in switchgear.

Engineers therefore did everything necessary in design and construction to prevent internal arcs, despite the fact that it is very rare for an operator to be in front (without operating) of the switchgear at exactly the same time that an internal fault occurs.

Eaton supports the philosophy that it is best to avoid internal arcs than to cure, in line with the relevant standard

IEC 62271-200. Within the Xiria design a double prevention philosophy is used. Firstly, the design is constructed in such a way that an internal arc is prevented. In the unlikely case that an internal arc could occur, the Xiria is equipped to provide maximum safety to the operator, and to control and minimise damage to the rest of the switchgear and room.

Controlling an internal arc

An internal arc in switchgear causes an overpressure supported by the release of fire and smoke.

By design, vacuum and air/solid insulated switchgear has the least environmental impact after an internal arc event. The impact of an arc is twofold: an internal impact (in the switchgear) and external impact (in the switch room).

The overpressure created by an internal arc will, in standard switchgear, be guided out of the switchgear by means of a pressure relief duct. Next to the duct a complicated and

expensive arc channel may be installed, that guides the arc output outside the switch room. The Xiria design is constructed in such a way that both impacts are significantly reduced and consequently a less complicated arc channel is needed.

No phase-to-phase short circuits minimises pressure

Within the Xiria all high voltage parts are single pole insulated. The advantage of this single pole construction is that the only conceivable internal fault is a single-phase short circuit, e.g. due to a cable connection failure (when single core cables are connected, as is the normal practice nowadays).

Arc absorber reduces output impact

In case it is not possible to vent into the cable cellar or into an adjacent room, the Xiria design offers the possibility to safely vent into the switch room. In this case a special arc chimney is installed at the backside of the panel. This arc chimney contains integrated arc absorbers that break and filter gasses and fire significantly.



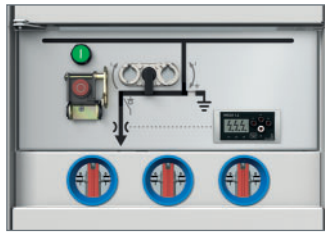
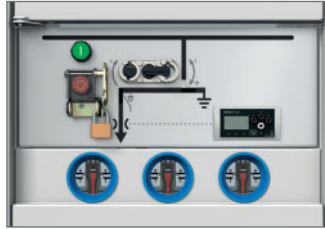
Safe in Use

The Xiria design contains some special features that guarantee the operator to work safely with the different panel types.

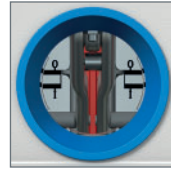
What you see is what you get!

Visible isolation by means of inspection windows in the front

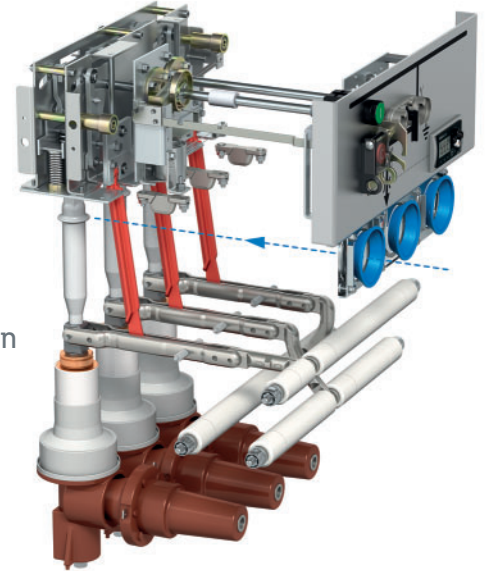
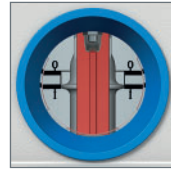
When carrying out operational actions and work on the cables, it is vital to have unambiguous status indications. When it comes to safety of the operating personnel Eaton leaves nothing to change. That is why the Xiria design is fitted with directly visible isolation by means of inspection windows in the front which makes the isolating distance between the cable and busbar system directly visible. A visible, short-circuit proof earthing can take place via the load-break switch or circuit-breaker.



Earth position



Operating position



Capacitive voltage detection system for verification of safe isolation from supply

Each panel type within the Xiria family is equipped with a standard three-phase Voltage Detection System for voltage testing to IEC 61243-5. The VDS shows the operator if the panel is isolated from supply or not.

Logical mechanical and electrical interlocks prevent mal operation

Within the Xiria design mis-operation by an operator is prevented by using different interlocks. The interlocks are mechanical and electrical. For example electrical and mechanical interlocks prevent to operate the change-over

switch when the circuit-breaker is switched on. All mechanical interlocks are constructed in such a way that they directly block the mechanism.

Switching to service position is only possible with closed cable compartment

The door of the cable compartment can only be standard opened when the circuit-breaker is in the earthed position. After the door is removed it is possible to switch off the circuit-breaker for cable testing. Next switching on to service position is only possible with the door positioned back again.

Smooth temporary design

All compartments of the Xiria panels are designed in such a way that the system is safe to touch from the outside. By using a smooth and smart design it is not possible for the operator to injure himself by moving parts or parts that stick out of the switchgear when moving in front of the switchgear.

Compartments protected against penetration of objects

Within the Xiria design it is also not possible to accidentally penetrate the switchgear by part of a body or a tool.

For the latter all high voltage compartments have an IP55 degree.



Low Total Cost of Ownership

The Xiria design guarantees very low costs related to owning the switchgear during its entire lifetime.

The life-time costs can be split in the initial costs, installation cost, service cost and finally, costs for disposal of the switchgear.

All costs of owning the switchgear are influenced by different features of the switchgear. Within Xiria all these features are constructed in such a way that the costs for the owner are as low as possible of course with no concessions to the quality of the switchgear.



Low initial costs

Initial costs consist of purchase, transport, building and installation costs.

Panel width only 500 mm

By using a combination of solid insulation technology, electrical field control and vacuum technologies, Eaton's engineers managed to construct Xiria E panels with a width of maximum 500 mm. Because a typical switchgear installation normally consists of a large number of panels, this compact design significantly reduces the switch room size. The compact design also makes Xiria E highly flexible and economically attractive when existing installations are being replaced.

Cable connection from the front (back-to-wall arrangement)

Cable connection from the front is a feature that saves building costs. Due to this front connection the rear of the Xiria E can be installed close to the wall of a building, again reducing building cost.

12 kV and 24 kV panels in same housing

The 12 kV and 24 kV versions are both accommodated in the same compact housing. This means substantial savings on building costs because the same switchroom can be used when the operating voltage is increased (upgrading).

Arc chimney with integrated arc absorbers

A standard option (in case there is no possibility to vent down or backwards) that reduces the switchroom dimension is the Xiria arc chimney with integrated arc absorbers. In normal switchgear, gasses caused by an internal arc are guided out of the switchroom by means of an extra duct and arc channel connected to the switchgear. These additions require extra switch room space and consequently increasing initial building cost.

Low service cost during operation

Service cost consists of maintenance, failure and consequential cost. Besides that the technical lifetime of parts or modules will determine the replacement cost of the equipment.

Robust "lean" design with minimum number of parts

Costs during service of a switchgear can be caused by damaged parts requiring replacement, or by maintenance parts that will not reach their expected lifetime if they are not serviced.

Within the Xiria design a minimal number of components are used. This robust design with only the necessary parts is designed based on experience of building switchgear for more than a century.

No SF₆-gas pressure checks

Switchgear that uses SF₆-gas as an insulation medium has a leakage rate. To maintain the isolation level within this type of switchgear, the pressure of the SF₆ tanks must be checked and refilled on a regular basis during the unit's lifetime. Within the Xiria, an owner does not have to incur the extra costs involved in checking and maintaining the required insulation level. The combination of vacuum interrupters for switching, solid insulation and clean air as the insulation medium, is environmentally friendly and maintains the same quality level during the complete lifetime of Xiria.

Primary parts and mechanism installed in a fully sealed for live enclosed housing

The biggest influence on the quality of the primary and moving parts in switchgear, has the environment in and outside the switchroom. These environmental influences could in the end cause damage to the switchgear that should be repaired. To prevent any environmental influence on the most critical parts in the Xiria, all of these parts are housed in a fully sealed for live enclosure (IP55).

Product quality guaranteed by prescribed routine testing in the factory

During production of the panels, various prescribed routine tests are carried out by specialists, making sure that the panels achieve the quality that they are designed for.

Low end of life disposal cost

Full recycling or re-use of materials

The primary parts of the Xiria have a lifetime of at least 30 years. Depending on the location where the system is installed the lifetime can be extended. If for what reason the decision is made not to use the switchgear anymore the Xiria can be handed over to Eaton again. Next the switchgear will be dismantled and the different materials can, and will, be categorised. Because no toxic materials are used in the Xiria, dismantling is a less complicated, more cost effective and environmentally friendly operation. The dismantled and categorised materials will be, depending on the material, recycled or re-used.

User friendly

First of all requirements is a safe and reliable installation. Number two is an installation that is convenient and efficient to operate.

The second aspect does not always get the attention it deserves, but for Xiria most certainly did. The Xiria panels are designed to be user friendly and are easy to operate.

Primarily, all operations can be carried out on the front side of the panel. This means that both cable connection and user interface for operation are positioned at the same front side of the panel. The logically arranged control panel enable operators to do their job as efficiently and safe as possible.

Easy and ergonomic connection of cables

Primary cables

The cable cones of Xiria are positioned on a height of 700 mm from floor level. This height makes it relatively easy for operators to connect the primary cables. There is also enough space in the cable compartment to connect the required number of cables with connectors available on the market.

Secondary cables

Connecting the secondary cables is carried out by entering the low voltage compartment of the Xiria E from the top. The low voltage cable terminals are positioned in such a way that the operator can connect the cables easily within the compartment whilst standing in front of the Xiria E.



Clear and simple control panel

The control panel on the Xiria is positioned on a convenient height for the operator. It is directly connected to the mechanism.

The mechanism is a hand operated or hand/motor operated spring charged mechanism, connected to the vacuum interrupters and the change-over switch. It is operated via two rotating shafts on the front provided with the necessary mechanical interlocks to avoid wrong operation. For example an interlock is built-in that prevents operation of the change-over switch when the circuit-breaker or load-break switch is in the ON-position. Another standard feature on the control panel is the padlocking of the earthed position. For padlocking the position, the most common padlocks available in the market can be used.

Manual operation of the switchgear is achieved with one operating handle. This handle can be used for switching the circuit-breaker, load-break switch and change-over switch. Operation is done by inserting the handle in the access holes in the front. In case a motor-operated circuit-

breaker is requested a push button will be installed in the control panel for achieving this function.

The mechanism is provided with viewing windows on the front for direct visual indication of the earthed position of the change-over switch and the ON/OFF-position of the main vacuum interrupter. The front operating panel is also provided with a black and white single line intuitive mimic, showing the positions of the vacuum interrupter and the Earth/Busbar position of the change-over switch.

Each panel is provided with a voltage detector mounted on the front. It is connected via internal wiring to capacitive sensors inside the cable connection cones. It shows the presence of the primary voltage on all three phases of the primary cables connected to the panel.

In case advanced protection and control equipment is requested, the low voltage compartment positioned on top of the panel, will house these.

Environmentally friendly



Like all Eaton's other medium voltage switchgear, Xiria is designed to be an environmentally friendly product throughout the whole chain.

One of the key strategic initiatives of Eaton is to provide environmentally friendly products. Eaton realises that for this they should look at their total product chain, from design to dismantling. The optimal situation is that for each phase there is no damage to the environment and at the end, all materials can be re-used again in the same product (the Cradle-to-Cradle principle). The product chain can be divided into four main blocks. These blocks are the design (materials used) of the product, the assembly of the product, the usage phase of the product and finally the dismantling of the product.

Eaton's production plant in Hengelo (the Netherlands) acts entirely in accordance with the rules and procedures of ISO 14001 environmental certificate during development and production processes.

Environmentally friendly design

With respect to the design of switchgear, the vision "the less number of components the better" applies. This because every part must be manufactured and therefore impacts on the environment. Next, applies the affect of different materials on the environment.

Use of minimised number of components

Xiria is designed to use the minimum of materials and resources, without affecting the strength of the system. For example, Eaton reduced the number of components dramatically, compared to conventional switchgear, by using a simple spring charging mechanism and integrated compartments. This also ensures straight forward assembly with low labour cost.

Materials with no/less impact on the environment

Eaton selects materials with care. It is essential that they are safe for personnel and the environment - not just during use, but at the end of service life too.

Within Xiria a combination of solid (cast resin) insulation and air as insulation medium is used. The solid insulation technology, in combination with electrical field calculations, provides a very compact, environmentally friendly design for the switchgear. As the

switching medium, vacuum technology is used within the interrupters of the Xiria circuit-breakers. Xiria can be completely recycled at the end of its life without any problem.

No use of SF₆ gas for insulation or switching

Within medium voltage switchgear SF₆-gas is being used, because of its good insulating properties. Emissions of SF₆-gas from switchgear contribute significantly to the threat of the greenhouse effect and associated climate change. SF₆ is on the list of greenhouse gasses in the Kyoto protocol.

SF₆ is the most potent of the six main greenhouse gasses, with a Global Warming Potential (GWP) of 23,000.

In the 1980s, the Holec group, as it was then, made a fundamental choice not to use SF₆ as a switching and insulation medium for medium voltage equipment. In the 1980s, Holec had SF₆ technology available in-house. The main reason for not using any SF₆ in medium voltage equipment was the complexity of the treatment required for the toxicity of the gasses that have been in contact with an arc, and the need for additional safety measures when used in public locations such as residential areas and shopping centres.

Efficient use of materials

Besides the energy sources, special focus was placed on the efficient use of material during assembly. For example, sheet steel plates are cut with as little waste material as possible. Residual material is used within other product components.

Minimal energy loss during operation

To prevent energy loss by the system itself, Xiria uses a minimum number of primary change-over points. All the available change-over points use optimal surface contacts and by this, prevent extra energy losses over these points.

No service checks on site

Because Xiria is designed for a lifetime of at least 30 years, the system needs no energy usage for maintenance activities during this long period. Due to the green insulation and switching technology, there is also no leakage of the SF₆-gas during its lifetime and no need for extra maintenance activities on SF₆ pressure checks.

Re-use or recycling of materials

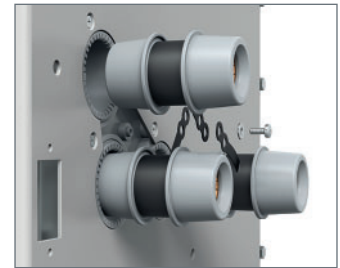
During dismantling Xiria switchgear is demounted into parts and thereafter categorized per material. Next the parts will be recycled or re-used. Because Xiria uses no SF₆, there is no loss of this gas during dismantling of the switchgear.



Exactly how you want it

Simple configuration, coupling and extension

Every application of this type of system is unique, so Eaton offers a large number of different panel types and field versions. If, in due course, the end-user needs additional capacity in the form of more panels, Xiria E can easily be extended to the right or left.



Flexible application of secondary apparatus, protection relays and substation automation

Eaton realises that end-users have their own direction with respect to the use of secondary apparatus, protection relays and substation automation within the switchgear. The need for customer specific apparatus and relays was taken into account during the development of the Xiria E. This resulted in a system that enables end-users to integrate apparatus according to their specification. Thanks to the large number of protection and control options, end-users will always be able to construct an Xiria E system that conforms exactly to your requirements.

Range of Voltage transformers

All Xiria E panels can be fitted with cast-resin insulated voltage transformers (of the requested transformer ratio and class) for the voltage measurement on the cable side, or on the busbar side. Both transformers can be (dis-)connected safely and easily.

Range of Current transformers

The epoxy resin insulated current transformers are of the ring core type. They are positioned around the primary conductors behind the cable cones or around the primary cables. All common transformer ratios, outputs, rated currents and classes are possible.

Protection and Control equipment

The protection and control equipment is located in the low voltage compartment. This compartment is completely separate and has its own access door. There is space on the door for equipment such as protection relays, test plugs, meters, etc.

The Xiria E is standardised for the Woodward HighProtec line relays series. However the Xiria E is adaptable for the installation of other brands. In case more than one relay is required, the low voltage compartment can be extended.



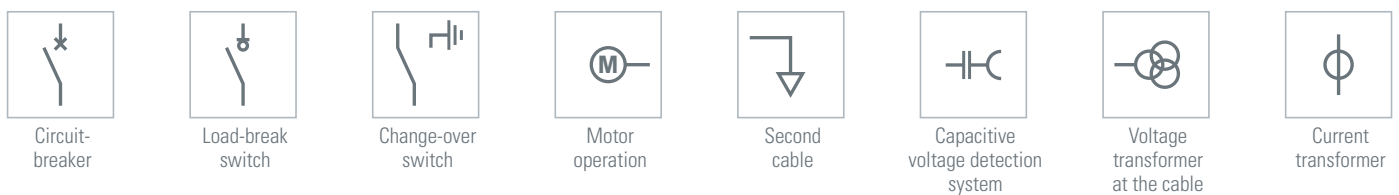
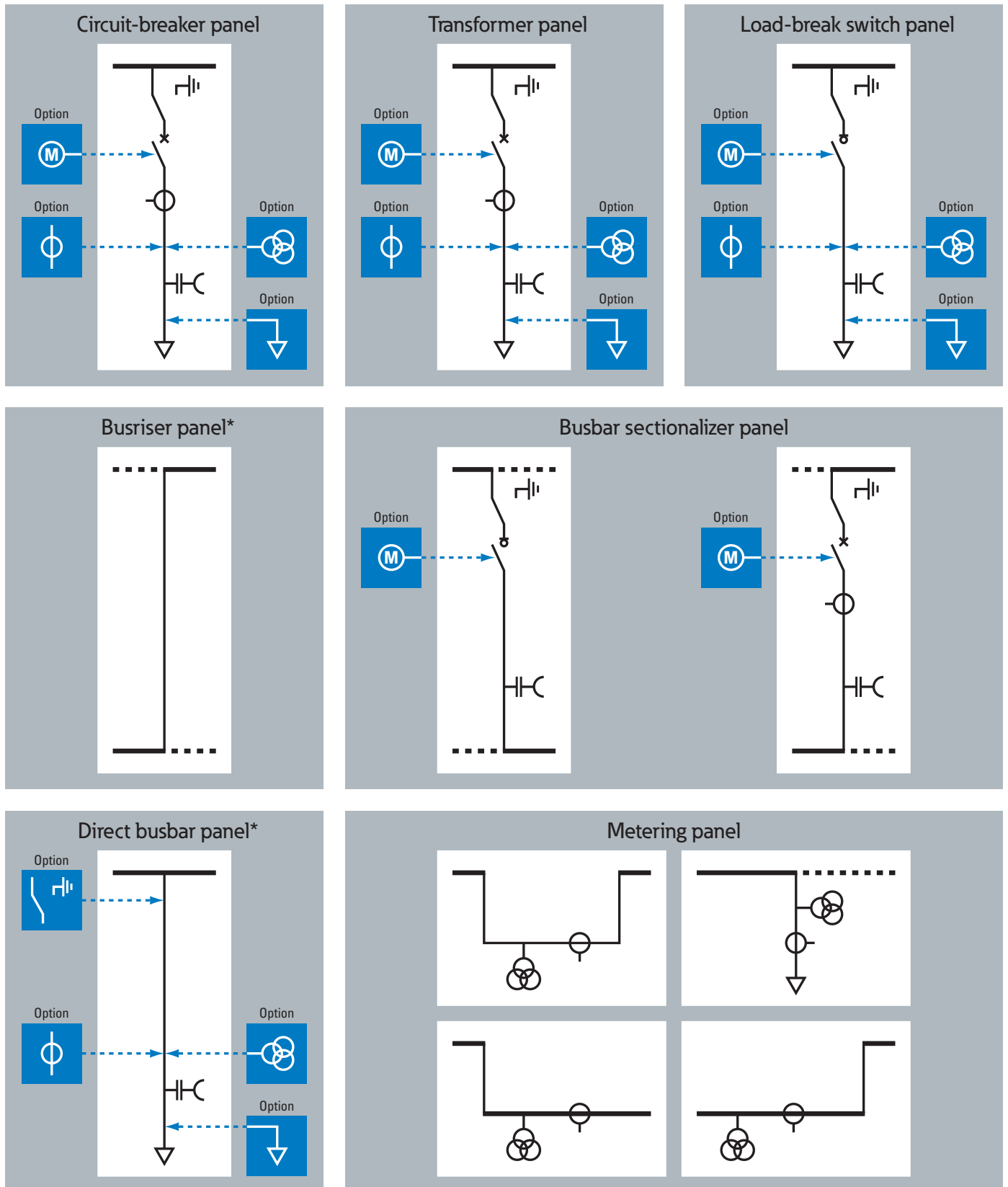
Smart Grids

Equipment for (remote or local) communication between panels or automation systems can also be installed in the low voltage compartment. For instance an Eaton remote terminal unit (RTU) can be applied. Having this possibility makes the system the perfect solution for current and future Smart Grid applications.



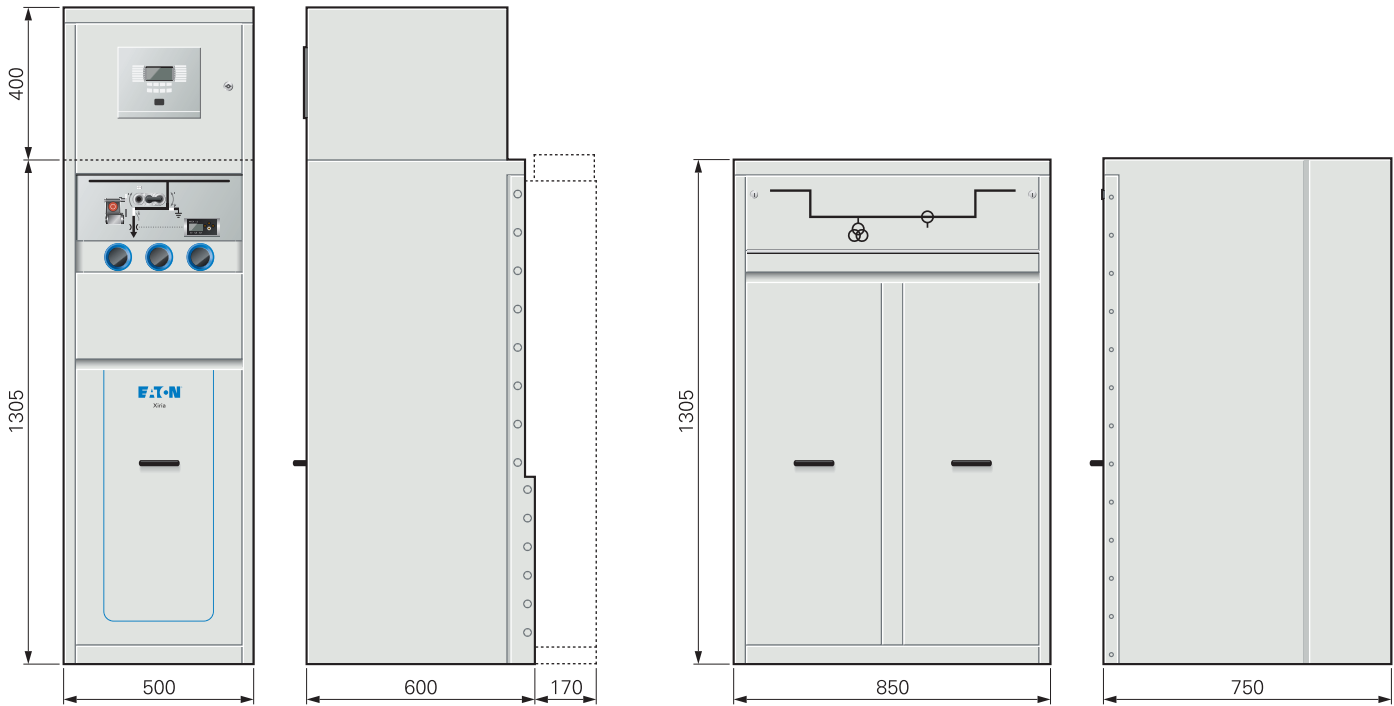
Eaton remote terminal unit (RTU).

Product Range



*) Direct busbar and busriser panel available at a later stage.

Dimensions (mm)



Circuit-breaker panel

Transformer panel

Load-break switch panel

Busriser panel

Busbar sectionaliser panel

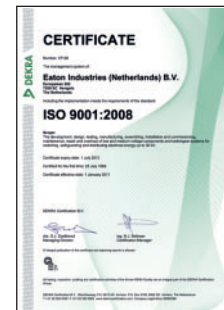
Direct busbar panel

Metering panel

Standards

Xiria E complies with the following international standards

IEC 62271-1	Common specifications for high-voltage switchgear and control gear standards
IEC 62271-100	High-voltage alternating-current circuit-breakers
IEC 62271-102	Alternating current disconnectors and earthing switches
IEC 62271-103	High-voltage switches
IEC 62271-200	A.C. metal-enclosed switchgear and control gear for rated voltages above 1 kV and up to and including 52 kV
IEC 62271-304	Additional requirements for enclosed switchgear and control gear from 1 kV to 72.5 kV to be used in severe climatic conditions
IEC 60529	Degrees of protection provided by enclosures
IEC 60044-1	Instrument transformers - Part 1: Current transformers
IEC 60044-2	Instrument transformers - Part 2: Inductive voltage transformers
EN 50181	Plug-in type bushings above 1 kV up to 36 kV
ISO 9001-2000	Quality
ISO 14001	Environmental management



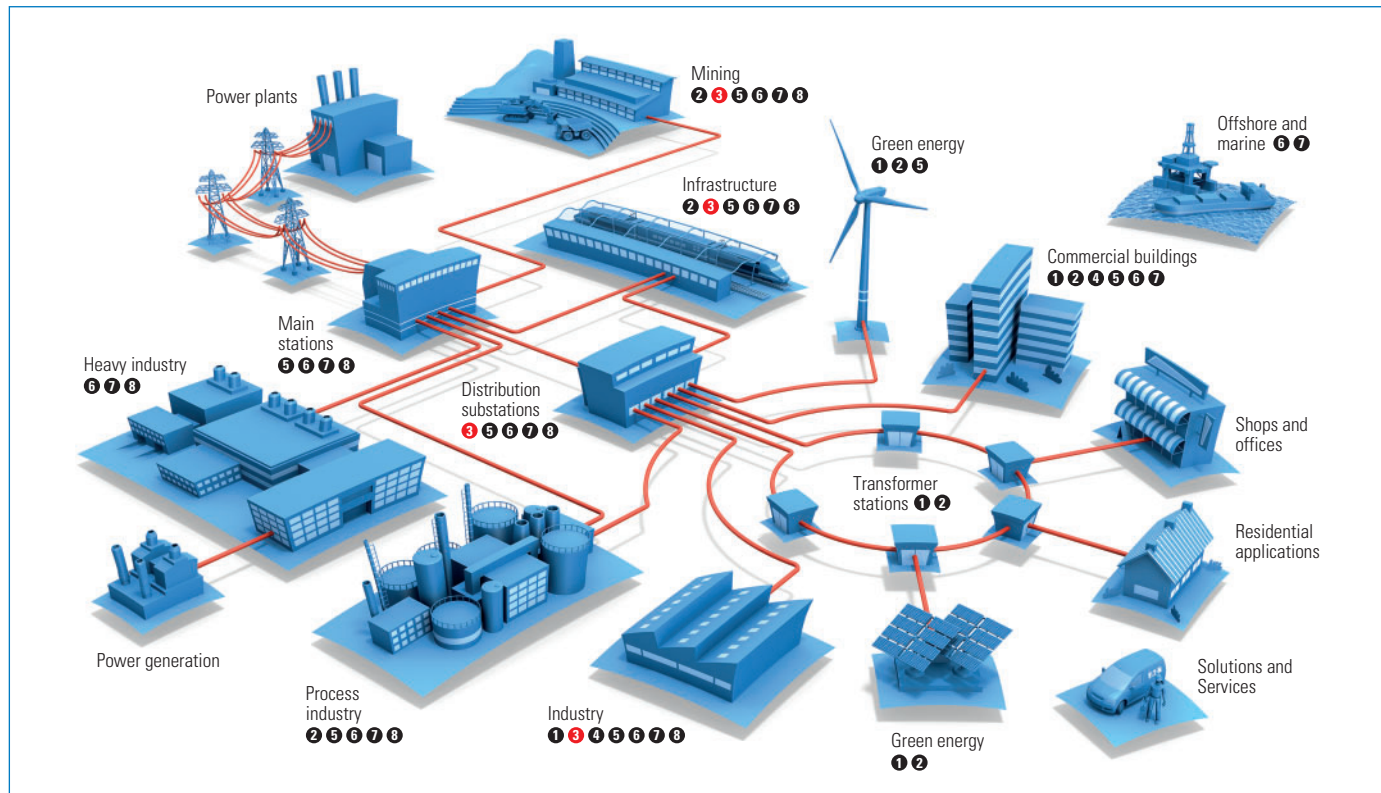
Electrical Data

General		3.6 kV	7.2 kV	12 kV	17.5 kV	24 kV
Rated voltage	kV	3.6	7.2	12	17.5	24
Impulse withstand voltage	kV	40	60	75 / 95	95	125
Power frequency withstand voltage	kV-1m	10	20	28 / 38 / 42	38	50
Rated frequency	Hz	50/60	50/60	50/60	50/60	50/60
Loss of service continuity		LSC2B	LSC2B	LSC2B	LSC2B	LSC2B
Partition class		PM	PM	PM	PM	PM
Internal Arc Classification (IAC)		AFL	AFL	AFL	AFL	AFL
Internal arc resistance	kA - s	20 - 1	20 - 1	20 - 1	20 - 1	20 - 1
Internal arc resistance with absorber	kA - s	16 - 1	16 - 1	16 - 1	16 - 1	16 - 1
Internal arc resistance cable compartment	kA - s	16 - 1	16 - 1	16 - 1	16 - 1	16 - 1
Internal arc resistance cable comp. alternative	kA - s	20 - 1	20 - 1	20 - 1	20 - 1	20 - 1
Degree of protection in service		IP31D	IP31D	IP31D	IP31D	IP31D
Degree of protection with doors/covers open		IP2X	IP2X	IP2X	IP2X	IP2X
Ambient air temperature range	°C	-25 +40	-25 +40	-25 +40	-25 +40	-25 +40
Busbar system						
Rated normal current	A	630	630	630	630	630
Rated short-time withstand current	kA - s	20 - 1	20 - 1	20 - 1	20 - 1	20 - 1
Rated short time withstand current alternative	kA - s	20 - 3	20 - 3	20 - 3	20 - 3	20 - 3
Rated peak withstand current	kA	50	50	50	50	50
Load break switches						
Rated normal current	A	630	630	630	630	630
Rated active load break current	A	630	630	630	630	630
Rated short-circuit making current	kA	50	50	50	40	40
Rated short-time withstand current	kA - s	20 - 1	20 - 1	20 - 1	20 - 1	20 - 1
Rated short-time withstand current alternative	kA - s	20 - 3	20 - 3	20 - 3	20 - 3	20 - 3
Rated Cable Charging Breaking Current	A	31.5	31.5	31.5	31.5	31.5
Mechanical Endurance Class		M2 5000 x	M2 5000 x	M2 5000 x	M2 5000 x	M2 5000 x
Mechanical Endurance Class as Earth Switch		M0	M0	M0	M0	M0
Mechanical Endurance Class Disconnecter		M0	M0	M0	M0	M0
Electrical Endurance Class		E3	E3	E3	E3	E3
Electrical Endurance Class as Earth Switch		E2	E2	E2	E2	E2
Circuit-breakers						
Rated normal current	A	630	630	630	630	630
Rated breaking current	kA	20	20	20	16	16
Rated short-circuit making current	kA	50	50	50	40	40
Rated Capacitive Switching Current Class		C2	C2	C2	C2	C2
Rated Cable Charging Breaking Current	A	31.5	31.5	31.5	31.5	31.5
DC Time Constant	msec	45	45	45	45	45
DC Component	%	<20	<20	<20	<20	<20
Mechanical Endurance Class		M1	M1	M1	M1	M1
Mechanical Endurance Class as Earth Switch		M1	M1	M1	M1	M1
Mechanical Endurance Class Disconnecter		M0	M0	M0	M0	M0
Electrical Endurance Class		E2	E2	E2	E2	E2
Rated short-time withstand current	kA - s	20 - 1	20 - 1	20 - 1	20 - 1	20 - 1
Rated short-time withstand current alternative	kA - s	20 - 3	20 - 3	20 - 3	20 - 3	20 - 3
Minimum tripping time	msec	80	80	80	80	80
Mechanism type		O - 3 min - CO - 3 min - CO				
Transformer panel						
Rated normal current	A	200	200	200	200	200
Rated breaking current	kA	20	20	20	16	16
Rated short-circuit making current	kA	50	50	50	40	40
Rated Capacitive Switching Current Class		C2	C2	C2	C2	C2
Rated Cable Charging Breaking Current	A	31.5	31.5	31.5	31.5	31.5
DC Time Constant	msec	45	45	45	45	45
DC Component	%	<20	<20	<20	<20	<20
Mechanical Endurance Class		M1	M1	M1	M1	M1
Mechanical Endurance Class as Earth Switch		M1	M1	M1	M1	M1
Mechanical Endurance Class Disconnecter		M0	M0	M0	M0	M0
Electrical Endurance Class		E2	E2	E2	E2	E2
Rated short-time withstand current	kA - s	20 - 1	20 - 1	20 - 1	20 - 1	20 - 1
Rated short-time withstand current alternative	kA - s	20 - 3	20 - 3	20 - 3	20 - 3	20 - 3
Minimum tripping time	msec	80	80	80	80	80
Mechanism type		O - 3 min - CO - 3 min - CO				

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Eaton medium voltage products in the energy chain



1 Magnefix



2 Xiria (blocktype)



3 Xiria E (extendable)



4 Xiria M (metering solutions)



5 SVS



6 Power Xpert® FMX



7 Power Xpert® UX



8 MMS

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Form No. BR02200010U / 607.3141_03
May 2012

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