



Features/Products	Xiria	Xiria E	FMX	UX	
Rated Voltage	3.6, 7.2, 12, 17.5 & 24kV	3.6, 7.2, 12, 17.5 & 24kV	12, 17.5 & 24KV	12, 17.5 & 24KV	36kV
Max. Short time withstand	20kA-3s	20kA-1s & 3s	25kA-3s	50kA-3s 25kA-3s for 24kV	31.5kA-3s
Rated Current Busbars	630A Single busbar	630A Single busbar	2000A Single busbar	4000A 2500A for 24kV Single busbar	1250A / 2500A Single busbar
Internal Arc	20kA-1s AFL (Against the Wall)	20kA-1s AFL (Arc Absorber Against the Wall)	25kA-1s AFL	AFLR 50kA-3s AFLR 25kA-3s for 24kV	AFLR 31.5kA-3s
Circuit Breaker	200A / 500A 630A optional	200A / 630A	1250, 1600 & 2000A 630A, 800A	630A – 4000A 800A to 2500A for 24kV	1250A / 2500A
Load Break Switch	630A	630A	N/A	NA Disconnecter Panel	NA Disconnecter Panel
Fuse load-break switch	N/A	N/A	N/A	N/A	N/A
Transformer panel	N/A	200A	N/A	CB	CB
Busbar sectionaliser, direct busbar panel	N/A	630A	1250, 1600 & 2000A with CB	CB + Riser	CB + Riser
Metering panel	Add Xiria M 850 x 750 x 1305mm for metering VT's and CT's.	Dedicated Metering Panel Included	N/A	Yes	Yes
Current transformers	Epoxy Resin Insulated around primary conductors behind the cable cones for protection	Block type for metering or protection available with equipment	Epoxy Resin Insulated around primary conductors behind the cable cones	Cast-resin insulated block-type in the panel metering or protection	Cast-resin insulated block-type in the panel metering or protection
Voltage transformers	Available only if Xiria M is used	For metering or protection available with equipment	Cast-resin insulated voltage transformers for the voltage measurement on the cable side, or on the busbar side.	Cast-resin insulated voltage transformers voltage protection or metering in the panel	Cast-resin insulated voltage transformers voltage protection or metering in the panel
Switching	Vacuum	Vacuum	Vacuum	Vacuum	Vacuum
Insulation	Air	Air	Air	Air	Air
Degree of Protection	IP 31D	IP 31D	LV - IP3XD; HV - IP4X	IP4X – IP42	IP2X - IP4X
Loss of Service Continuity category	LSC2B - PM	LSC2B - PM	LSC2B - PM	LSC2B - PM	LSC2B - PM
Cable connections	Front/Bottom	Front/Bottom	Front/Bottom	Bottom, Top optional	Bottom
Relays	Protection relays in panel Self-power	Self-power relays in Panel	No self-power option	No self-power option	No self-power option
	Control Box w/aux power supply relays	Control Box w/ aux power supply relays	Aux power supply relays	Aux power supply relays	Aux power supply relays
Motorized option	Open/Close remotely breaker only, not for the selector switch, no earth switching	Open/Close remotely breaker only, not for the selector switch, no earth switching	Remote Operation CB, VT's + earth switch selector switch	Remote for all options	Remote for all options
Automation	Remote, signaling, tripping & control	Remote, signaling, tripping & control	Remote, signaling, tripping & control	Remote, signaling, tripping & control	Remote, signaling, tripping & control
Local options	Ammeter, Short-circuit indicator, trip indicator	Ammeter, Short-circuit indicator, trip indicator	Ammeter, Short-circuit indicator, trip indicator	Ammeter, Short-circuit indicator, trip indicator	Ammeter, Short-circuit indicator, trip indicator
Dimensions (W x D x H)(mm)	760mm 2panels to 1810mm 5 panels x 600 x 1305mm	500 x 600 x 1305mm self-power relay 500 x 770 x 1705mm relay top control box	500mm to 1325mm x 1450mm x 2100mm	600, 800, 1000mm x 1310 to 1570mm x 2200/2320 to 2860mm	1200mm x 2600mm x 2930mm (height includes arc chamber)
Applications	CB: Protection of transformers & cables LBS: for ring cable connection	CB: Protection of transformers & cables LBS: for ring cable connection ARC Absorber available	Primary distribution, fixed space, fully motorized	Primary and secondary	Primary

Air Insulated Switchgear

Xiria

Xiria ring main units are characterised by their high level of operational safety and are suitable for applications up to 24 kV. Xiria units can be supplied in two-, three-, four- or five-panel versions. Both the primary part of the unit and the mechanisms are housed in a fully enclosed housing which protects the system against environmental influences.

There is a choice of two basic panel versions in our product range:

- A vacuum load break switch for ring cable connections.
- A vacuum circuit-breaker for protecting transformers and cable connections.

Both versions can be supplied in a unit in any desired combination and order.

Xiria is an extremely well designed and modern system. For example, when developing the system we intentionally opted for protection in the form of a circuit-breaker combined with an electronic relay. This is a modern, safe and flexible alternative to fuse protection.

In addition it also makes Xiria very easy to use in an automated distribution network. These specific features make Xiria an easy-to-use system that responds perfectly to changing electricity distribution requirements, both now and in the future.



Maintenance-free



All the live primary parts and mechanisms in a Xiria unit are installed in a fully enclosed housing. This prevents dust, moisture and other environmental influences from affecting the operation of the unit. The switching mechanism has been designed with a minimum number of parts, and is specifically intended for switching after a long period of inactivity – precisely the way it happens in practice. What is more, the mechanism does not use any lubricants, which also benefits its operational safety. As it is maintenance-free, Xiria significantly cuts inspection and maintenance costs without adversely affecting the operational safety of your distribution network. Which is something to look forward to in today's liberalised energy market.

Intrinsically safe



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

Xiria is designed with a fully enclosed metal housing combined with single-phase insulation of all primary live parts. This reduces the risk of an internal fault to an absolute minimum, thus providing a high degree of safety and availability. The KEMA-tested arc-proof housing also offers additional protection for operating personnel.

Compact



Xiria is one of the smallest ring main units of its kind. This high degree of compactness is a direct result of the combination of technologies used by Eaton – electrical field control, solid insulation and the use of extremely compact vacuum interrupters. This compactness offers direct financial benefits in new buildings and when refurbishing existing transformer stations because of the minimal floor area required.

Ready for automated networks



Xiria is completely ready for use in fully-automated networks. There are various options available for the system, depending on the level of remote signalling and remote control required. These options are modular, so they can be quickly and easily added in the future. In this way Xiria anticipates future developments in automation and operational control, so you can be sure that you will not be left with control, display and communication standards that are too specific or possibly even obsolete.

Clean and green



Xiria is made exclusively of environmentally-friendly materials. The insulation medium is clean, dry air and the switching medium is vacuum. Thus Xiria responds to the demand for sustainability in energy distribution. The unit is easy to dismantle at the end of its service life as the materials used are clearly labeled and can be reused. This facilitates recycling and avoids excessive costs and environmental taxes when the unit is decommissioned.

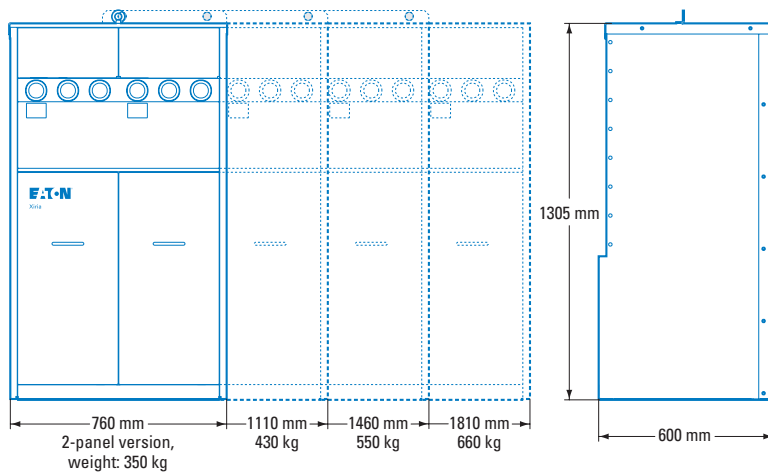
Air Insulated Switchgear

Xiria

		3.6kV	7.2kV	12kV	17.5kV	24kV
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	10	20	28	38	50
Rated frequency	Hz	50/60	50/60	50/60	50/60	50/60
Internal arc resistance	kA-s	20-1	20-1	20-1	16-1	16-1
Busbar system						
Rated normal current	A	630	630	630	630	630
Rated short-time withstand current	kA-s	20-3	20-3	20-3	16-3	16-3
Rated peak withstand current	kA	50	50	50	40	40
Circuit-breaker						
Rated normal current	A	200/630	200/630	200/630	200/630	200/630
Rated breaking current	kA	20	20	20	16	16
Rated short-circuit making current	kA	50	50	50	40	40
Rated short-time withstand current	kA-s	20-3	20-3	20-3	16-3	16-3
Load break switch						
Rated normal current	A	630	630	630	630	630
Rated mainly active load breaking current at cos. phi 0.7	A	630	630	630	630	630
Rated short-circuit making current	kA	50	50	50	40	40
Rated short-time withstand current	kA-s	20-3	20-3	20-3	16-3	16-3



Main dimensions



Xiria complies with the following international standards

IEC 62271-1	Common specifications
IEC 62271-200	Metal-enclosed switchgear
IEC 62271-304	Severe climatic conditions
IEC 62271-100	Circuit-breakers (M1/E2)
IEC 60265-1	Switches (M1/E3)
IEC 62271-102	Disconnectors/Earthing switch (M0)
IEC 62271-102	Earthing via vacuum bottle (E2)
IEC 60529	Degree of protection
IEC 60044-1	Current transformers
EN 50181	Cable cones
Classification according to IEC 62271-200	

Air Insulated Switchgear

Xiria E

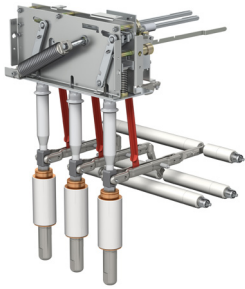


The Xiria E switchgear is designed around Eaton's proven vacuum interrupters, which require no maintenance and are certified for 30,000 operation cycles. All live parts in the available panels are single pole insulated. The used materials are shaped specifically to provide optimum insulation combined 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.

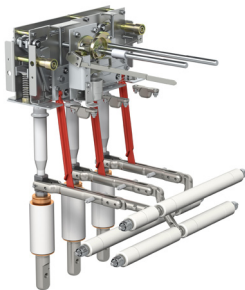
When it comes to the safety of the operating personnel the Xiria E design leaves nothing to chance. All parts are fully enclosed by an internal arc tested safe metal housing. Besides that the panels in the system are provided with direct visible indication of the integrated earthing and ON/OFF-position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



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.

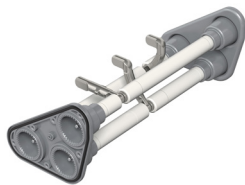
- With environmental friendly vacuum interrupters
- Simple spring charging mechanism
- No use of lubricants
- Housed in a sealed for life enclosure
- Manual or motor-operated
- Position indication by means of inspection windows and mechanical indicators
- Auxiliary contacts for Open/Closed position



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.

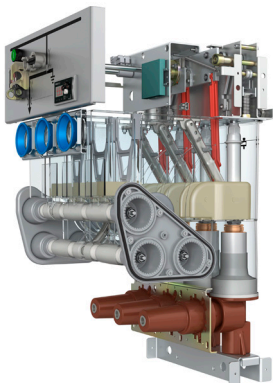
- Manual-operated switch with 2 positions (service / earthed)
- Maintenance free
- Housed in sealed for life enclosure
- Auxiliary contacts for service / earthed positions
- Position indication by means of inspection windows and mechanical indicators
- Mechanically interlocked with the vacuum circuit-breaker



Busbar

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.

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



Preventing an internal arc

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. 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

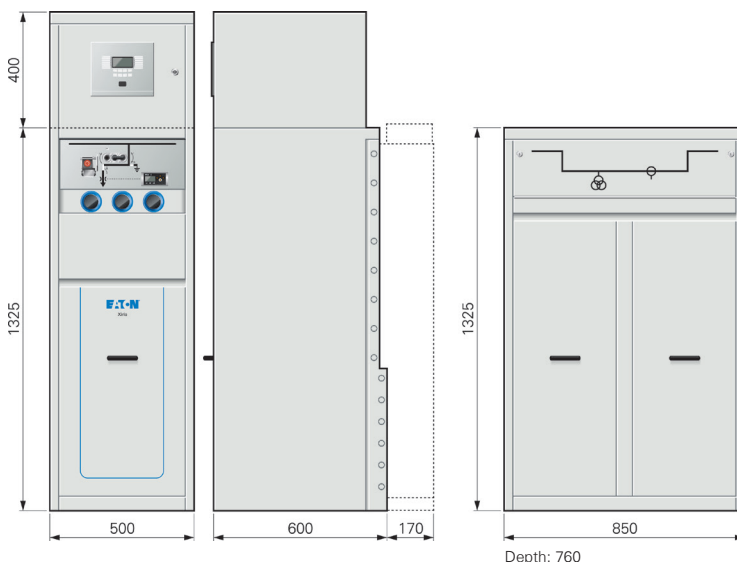
Engineers designed the whole construction of primary parts, housed in the sealed for life tank, based on Eaton's key technology for electrical field control. By means of special shapes and dimensions the possibility of an open arc is minimized.

Air Insulated Switchgear

Xiria E

		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
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 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 - 630A						
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 - 630A						
Rated active load break current	A	630	630	630	630	630
Rated short-circuit making current	kA	50	50	50	50	50
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 - 630A						
Rated breaking current	kA	20	20	20	20	20
Rated short-circuit making current	kA	50	50	50	50	50
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
Transformer panel - 200A						
Rated breaking current	kA	20	20	20	20	20
Rated short-circuit making current	kA	50	50	50	50	50
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

Main dimensions



XiriaE 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

Air Insulated Switchgear

Magnefix

Eaton has more than fifty years experience in manufacturing insulation enclosed switchgear and is recognised throughout the world as being a specialist in the field of epoxy resin based insulation technology. More than 200,000 Magnefix switchboards have been supplied to satisfied customers all over the world.

Magnefix was first introduced onto the market more than 50 years ago. Especially the smart design, safe and robust construction and easy operation have made Magnefix "timeless". New developments are still being carried out and research into new applications and technologies is continuing unabated. Eaton's engineers are continuously working on improvements in the design and efficiency, and Magnefix users can count on maximum support and the associated service.

Magnefix is applied in, decentralised transformer stations, high rise buildings, consumer connections, wind turbine connections and for the electrical supply to signalling and protection equipment along railway tracks.

Extremely compact

Epoxy resin is not only a high quality insulating material but due to its high mechanical strength, also an excellent construction material. This combination produces a very compact design. The compact construction and full insulation enclosed design of Magnefix equipment enables it to be installed in very small spaces. This results in considerable savings in building costs.

Safe and reliable

Magnefix is a fully insulation enclosed type of switchgear. All live parts are surrounded by insulating material in such a way that touching is impossible.

Insulation

The primary insulation of the Magnefix system consists of epoxy resin with powdered quartz as filling material. This ensures a very low dielectric loss factor (also with high temperatures), high insulation breakdown factor, very low moisture absorption, high creepage current resistance, high mechanical strength and complete homogeneity. The cable boxes for PILC and XLPE type cables are made of synthetic materials. Magnefix switchgear is provided with double insulation at points accessible to operating personnel. This additional insulation is manufactured and tested independently of the primary insulation.

Protected against atmospheric and climatic influences

The epoxy resin insulation ensures protection against atmospheric and climatic influences. In addition, the material is vibration proof and shock proof and does not age. Magnefix is highly reliable and has a very long life-cycle.

Fully tested

Each Magnefix switchboard is extensively mechanically and electrically tested before it leaves the factory. The test procedures carried out are not only in accordance with the routine tests as specified in the relevant IEC publications, each switchboard is also subjected to additional discharge tests. Consequently, Eaton can guarantee the quality and reliability of each Magnefix switchboard supplied.

Earthing

Before a cable connected to a Magnefix switchboard can be earthed, the switch caps of the unit must be removed. Only then is it possible to fit the earthing caps. The Magnefix unit can only be energized again after the earthing caps have been removed. The earthing caps are designed to make inadvertent earthing of the busbars impossible.



MD4

Magnefix type MD4

A Magnefix switchboard type MD4 usually comprises a number of cable units to which the main cables are connected (switch-disconnectors), plus one or more protected tee-off units to which the transformer cables are connected (switch-disconnectors combined with fuse-links). A cable unit consists of a fixed portion and three removable switch-caps. The fixed portion is made of epoxy resin, in which the conductors are embedded.

The epoxy resin switch caps, in which the moving main and arcing contacts are located, are held in the closed position by high-strength permanent magnets. The latter are not subject to variation, so that the contacts are always MAGNETically FIXED. The various units can be mounted on either a floor frame or a wall frame.

Air Insulated Switchgear

Power Xpert FMX

Power Xpert® FMX is Eaton's IEC single busbar, solid- and air-insulated medium voltage switchgear system, for use up to 24 kV. The system provides reliable switching, protection, metering and distribution of electrical energy. The modern design system uses Eaton's state of the art technology and is manufactured in accordance with the highest quality standards. Within the system our engineers have integrated Eaton core technologies, such as vacuum technology, solid insulation and electrical field control. More than a century of experience in design and production of medium voltage systems has gone into the product. Type FMX switchgear features a reliable and compact system design, which benefits from the best practices incorporated in Eaton's current range of MV systems. The system is tested according to the latest standard IEC 62271.

The system uses only environmentally friendly technology and materials. Since the type FMX system is based on vacuum technology and solid insulation, the system is the latest environmentally friendly "green" switchgear on the market.

The new system incorporates highly innovative technology, by implementing an electro - magnetic mechanism for the circuit-breaker control, and it introduces an integrated cable test facility outside of the high voltage compartment.



Vacuum circuit-breaker

The vacuum circuit-breaker uses a simple and reliable electromagnetic mechanism for operation of the vacuum interrupters. The construction of the mechanical linkage between the actuator and the drive rod of each of the three vacuum interrupters is reduced in complexity, compared to a conventional spring-charged mechanism.

- Environmentally friendly vacuum interrupters
- Electromagnetic mechanism with controller
- Mechanical lever for hand-operated operation (switch off)
- Mechanical position indicator for Open / Closed position
- Auxiliary contacts for Open / Closed position

2-position change-over switch

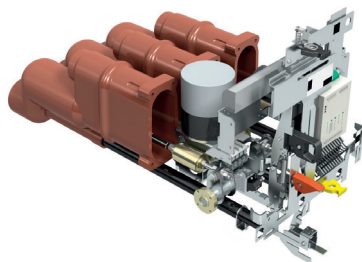
All panels are equipped with a change-over switch consisting of interconnected contact pins moving in the horizontal plane. Since it is mechanically interlocked, the change-over switch can only be operated when the circuit-breaker is in the open position.

- Motor or manually-operated switch with two positions (Service / Earthed)
- Interconnected contact pins moving in the horizontal plane
- Mechanical position indicators
- Contact pins epoxy resin insulated and located in the busbar compartment
- Auxiliary contacts for Service / Earthed positions
- Interlocked with the vacuum circuit-breaker

Busbar

The busbars in the panel are constructed from high-quality aluminium bars of standardised cross-sections. The shape of the busbar has been designed to attain optimal electrical field control.

- Busbars constructed from high-quality aluminium; Branch of busbars made of copper or aluminium; Aluminium parts are coated with galvanic silver layer
- Contact surfaces are treated with Penetrox
- Housed in busbar duct covering the full width of the panel
- Air insulated
- Situated in fully closed compartment complying with IP4X degree of protection



Safe in use

- Capacitive voltage detection system for verification of safe isolation from supply
- Operation only possible with closed cable compartment
- Cable testing via integrated cable test facility outside high voltage compartments
- Voltage transformers can be (dis) connected from the primary circuit, with closed high voltage compartments

Reliable and safe in operation

- Complete design certified in accordance with IEC
- Arc fault tested in accordance with IEC 62271-200
- Single pole insulated primary parts within one compartment
- Ferro-resonance protected voltage transformers
- Integrated (internal) arc absorbers

Environmentally friendly

- Minimised number of components
- Environmentally-friendly materials used in the design
- No use of SF₆-gas for switching and insulation (green switching)
- Minimal number of transition points in the primary design enables low energy loss during operation
- Only re-usable and/or recyclable materials used

Low total cost of ownership

Low initial costs due to:

- Panels minimum 500 mm width
- Integrated arc channel with absorbers
- 12 kV and 24 kV panels in the same housing

No costs during service due to:

- Long-life, using epoxy resin as insulation medium
- Maintenance-free circuit breaker (electromagnetic mechanism and vacuum interrupters)

User friendly

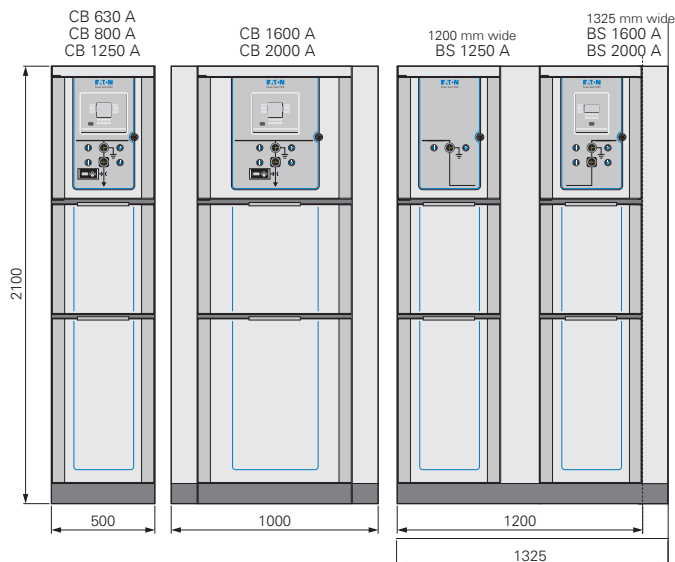
- Cable connection and user interfaces for operation on the front side of the unit
- Ergonomic cable connection height of 750 mm from floor level
- Cable (secondary) entry points on both sides of the low voltage compartment top plate
- Facility for (dis) connecting the voltage transformers, easily accessible from the front without entering the HV compartment

Air Insulated Switchgear

Power Xpert FMX

		12 kV	17.5 kV	24 kV
Rated Voltage	kV	12	17.5	24
Lightning Impulse withstand voltage	kV	75	95	125
Power frequency withstand voltage	kV	28	38	50
Rated frequency	Hz	50	50	50
Internal arc class		AFL 25 kA - 1 s	AFL 25 kA - 1 s	AFL 25 kA - 1 s
Loss of service continuity category		LSC2B	LSC2B	LSC2B
Partition class		PM	PM	PM
Earthing circuit	kA - s	25-3	25-3	25-3
Compartment circuit-breaker/cable		Interlock-controlled	Interlock-controlled	Interlock-controlled
Compartment busbar		Tool-based / non-accessible	Tool-based / non-accessible	Tool-based / non-accessible
Degree of protection HV compartments (optional)		IP4X	IP4X	IP4X
Degree of protection LV compartment		IP3XD	IP3XD	IP3XD
Temperature classification		Minus 5 °C indoor	Minus 5 °C indoor	Minus 5 °C indoor
Busbar system				
Rated normal current	A	2000	2000	2000
Rated short-time withstand current	kA - s	25-3	25-3	25-3
Rated peak withstand current	kA	63	63	63
Circuit-breaker - incoming feeder and sectionalizer				
Rated normal current	A	1250 - 1600 - 2000	1250 - 1600 - 2000	1250 - 1600 - 2000
Rated short-circuit breaking current	kA	25	25	25
Rated short-circuit making current	kA	63	63	63
Rated short-time withstand current	kA - s	25-3	25-3	25-3
Circuit-breaker - outgoing feeder				
Rated normal current	A	630 - 800	630 - 800	630 - 800
Rated short-circuit breaking current	kA	25	25	25
Rated short-circuit making current	kA	63	63	63
Rated short-time withstand current	kA - s	25-3	25-3	25-3
Class		E2, C2	E2, C2	E2, C2
Operating cycles at short-circuit current		100	100	100
Single capacitor bank switching	A	400	400	400
Mechanism				
Rated operating sequence	A	C+P		
Class		M2	M2	M2
Opening time	ms	50	50	50
DC component	%	35	35	35
Closing time	ms	70	70	70
Number of operations actuator		30,000	30,000	30,000
Number of operations interrupter		30,000	30,000	30,000
Auxiliary voltage	V	24, 48, 60, 110, 220 VDC 110/230 VAC	24, 48, 60, 110, 220 VDC 110/230 VAC	24, 48, 60, 110, 220 VDC 110/230 VAC
Mechanism change-over switch				
Opening time	s	< 20	< 20	< 20
Closing time	s	< 20	< 20	< 20
Number of operations change-over switch		1,000	1,000	1,000
Class		M0	M0	M0

Main dimensions

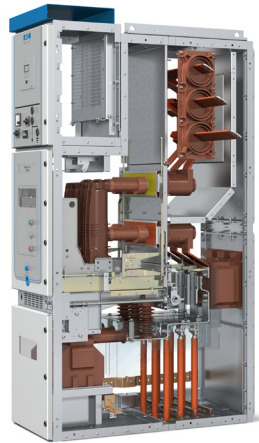


FMX complies with the following international standards

IEC 62271-1	Common specifications
IEC 62271-100	Circuit-breakers (E2, M2, C2)
IEC 62271-102	Disconnectors and earthing switches (E2, M0)
IEC 62271-200	Metal enclosed switchgear and controlgear
IEC 60044-1	Current transformers
IEC 60044-2	Voltage transformers
IEC 60529	Degrees of protection (IP Code)
IEC 61850	Communication networks and systems in substations
IEC 61243-5	Live working - Voltage detectors - Part 5: Voltage detecting systems

Depth: 1450 mm

Extra panel height: 500 mm for busbar side voltage transformers, 150 mm for busbar venting box, 500 mm for busbar side cooling box on 2000 A panels.



Air Insulated Switchgear

Power Xpert UX 3.6kV - 24 kV

Eaton understands that real estate is a valuable resource. The available space must be optimized to ensure building and land costs are minimized, without compromise to the solution design or functionality.

The footprint of Eaton's Power Xpert UX switchgear is one of the most compact of all systems available on the market. 12/17.5kV vacuum circuit breaker (VCB) panels with rated current of 630/1250A up to 31.5kA are only 600mm wide and 1320mm deep – up to 37% less floor area than similar switchgear solutions on the market. Along with a compact footprint, the Power Xpert UX system offers flexible design options for the most demanding of applications.

The Power Xpert UX platform has three high-voltage compartments separated by earthed metal barriers, providing the highest loss of service continuity classification LSC2B and partition class PM; The busbar compartment, the switch device compartment and the cable compartment.

For personnel safety, the Power Xpert UX system is designed with a number of comprehensive mechanical interlocks according to IEC62271-200 for safe and reliable operation of the switchgear. Additional electrical or mechanical key interlocks are available to secure safe and reliable operation for busbar earthing and up or downstream interlocking.

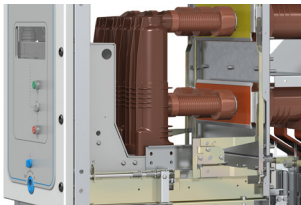
Eaton's expertise in switchgear innovation, including cast-resin, vacuum circuit breaker and contactor technologies, arc interruption and electrical field control have been integrated into the design and development of Power Xpert UX. This ensures that the switchgear has the highest levels of safety and operational reliability at all times.

Maximising performance and safety

- Safety first
- Ensuring maximum uptime
- Flexibility in small foot print

Best-in-class testing

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, beginning in the design phase with full 3rd party type testing to all relevant IEC standards, right through to factory and on site acceptance testing. In addition to compliance to ISO 9001, all manufacturing locations must adhere to Eaton's quality system to ensure the highest quality standards are delivered.

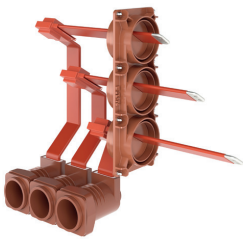


SF6-free design

The combination of vacuum interrupters for switching, cast-resin technology and clean air as the isolation medium ensures that the Power Xpert UX is an environmental friendly system. Without SF6 gas, plant maintenance and operation is simplified and costly administration, SF6 gas management and end of life disposal costs are minimized.

Vacuum circuit breaker technology

By designing a simple and efficient low energy springcharged mechanism with the minimum possible number of parts, the maintenance requirements normally associated with this type of mechanism are minimized. The W-VACi breaker is virtually maintenance-free.



Internal arc classification (IAC) AFLR up to 50kA for 1 second

In the unlikely event of an internal arc fault, the metal enclosed design and robust construction enables the Power Xpert UX system to successfully pass internal arcing tests in accordance with IEC 62271-200. This standard defines the required level of protection in the event of an internal arc fault, in all three primary compartments up to 50kA for 1 second. Fully insulated and isolated current paths reduce the potential for internal faults through the creation of arc free zones.

Racking behind closed doors

To maximize operator safety Power Xpert UX 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.

Remote operation

For additional safety, full remote operation of the switchboard is possible without the need to enter the switch room. Operational safety and automation can be further enhanced by including the remote racking option for withdrawable switching devices and the option for remote operation of the integral earthing switches.



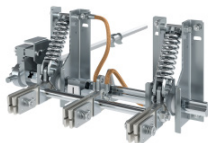
Air Insulated Switchgear

Power Xpert UX 3.6kV - 24 kV

24/7 thermal monitoring system

By determining potential reliability issues before they occur, uptime can be increased through planned and preventative maintenance. Eaton has partnered with Exertherm, a world leader in continuous thermal monitoring, to provide the Power Xpert UX system with an optional continuous 24/7 temperature monitoring system. Hotspots in joints and cable connections are detected at an early stage of development via permanently installed infrared sensors.

The system provides valuable data for preventative maintenance. Based on real-time data, preventative maintenance can be scheduled to reduce unplanned downtime. The thermal monitoring system is modular and can be scaled to any size of installation. Local or remote monitoring of the system is possible via local display or web connection.



Primary components

Eaton is one of the few global, fully integrated manufacturers of high-voltage switchgear. Utilizing core technologies of vacuum interruption and cast resin insulation, switching devices used within the Power Xpert UX switchgear have outstanding performance including:

- Optimal arc control
- High electrical endurance
- SF6 free
- Virtually maintenance-free
- Insensitivity to environment
- Long service life

Vacuum circuit breakers - Type W-Vaci

- Type tested in accordance with IEC62271-100
- 12/17.5kV up to 4000A 50kA/3sec.
- 24kV up to 2500A 31.5kA/3sec.
- Wide range of AC or DC auxiliary control voltages
- Full range of accessories
- Optional remote racking capability
- Electrical or mechanical key interlocking options

Vacuum contactors - Type W-SLC

- Tested in accordance with IEC 62271-106
- Mid-mount type
- 3.6/7.2/12kV ratings
- Contactor switching up to 400A
- Maximum fuse/contactors combination: 200A
- Breaking capacity with fuse up to 50kA
- Wide range of AC or DC auxiliary control voltages
- On-board contactor control power transformer option
- Optional remote racking capability
- Electrical or mechanical key interlocking options

Vacuum contactors - Type W-SLN

- Tested in accordance with IEC 62271-106
- Roll-on floor type
- 3.6/7.2kV ratings
- Contactor switching up to 400A
- Maximum fuse/contactors combination: 400A
- Breaking capacity with fuse up to 50kA
- Wide range of AC or DC auxiliary control voltages
- On-board contactor control power transformer option
- Suitable for integration in 400mm wide Slimline contactor panel
- Electrical or mechanical key interlocking options

Earthing switch

- Type tested in accordance with IEC62271-102
- 12/17.5kV up to 50kA/3sec. 130kA peak
- 24kV up to 31.5kA/3sec. 80kA peak
- Optional remote operating capability

Flexibility in arc channel solutions

- Arc channels provided with integrated arc absorber technology for venting gases inside the switch room, without the need to exhaust to the outside
- Different heights of arc channels are available
- Flexible solutions to connect the arc channel to the wall flange (via sides, front or rear of the installation), in case of venting gases outside the switch room



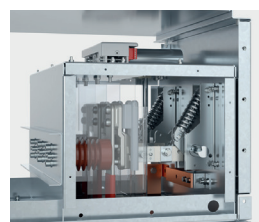
Arc channel with integral arc absorber



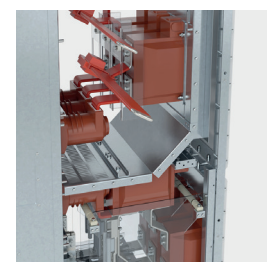
Low height arc channels.

Space saving solutions

- Current and voltage transformers located in the bus riser
- Voltage transformer and integral fault-making busbar earthing combined in the bus coupler
- Top mounted integral fault making busbar earthing
- Top mounted voltage transformers
- Multiple sets of current transformers per phase
- Fixed/removable and withdrawable voltage transformers
- On board control power transformer (contactor)



Top mounted integral fault-making busbar earthing.



Current and voltage transformers located in the bus riser.

Medium Voltage Assemblies

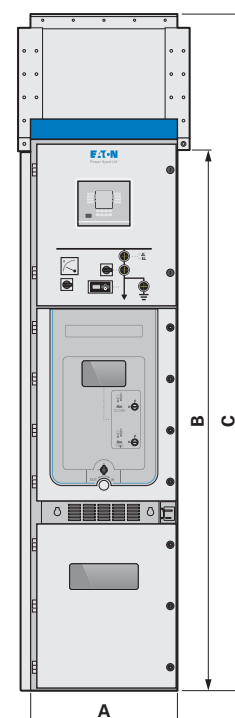
Air Insulated Switchgear

Power Xpert UX 3.6kV - 24 kV

	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	125
Power frequency withstand voltage kV	10	20	28	38	50
Rated frequency Hz	50/60	50/60	50/60	50/60	50/60
Busbar system					
Rated normal current A	630 ... 4000	630 ... 4000	630 ... 4000	630 ... 4000	630 ... 2500
Rated short time withstand current kA/s	25 ... 50/3	25 ... 50/3	25 ... 50/3	25 ... 50/3	20 ... 31.5/3
Rated peak withstand current kA	63 ... 125	63 ... 125	63 ... 125	63 ... 125	50 ... 80
Circuit-breaker type W-VACi					
Rated nominal current A	630 ... 4000 (FC)				630 ... 2500
Rated breaking current kA	25 ... 50/3	25 ... 50/3	25 ... 50/3	25 ... 50/3	20 ... 31.5/3
Rated short-circuit making current kA	63 ... 125	63 ... 125	63 ... 125	63 ... 125	50 ... 80
Rated short time withstand current kA/s	25 ... 50/3	25 ... 50/3	25 ... 50/3	25 ... 50/3	20 ... 31.5/3
Contactor type W-SLC					
Rated nominal current A	400	400	400	-	-
Rated current contactor / fuse combination A	Max. 200	Max. 200	Max. 200	-	-
Rated breaking current kA	50 (limited by the fuse)			-	-
Rated short time withstand current kA/s	6/1	6/1	6/1	-	-
Rated peak withstand current kA	15.6	15.6	15.6	-	-
Earthing switch					
Rated short-circuit making current kA	63 ... 130	63 ... 130	63 ... 130	63 ... 130	50 ... 80
Rated short time withstand current kA/s	25 ... 50/3	25 ... 50/3	25 ... 50/3	25 ... 50/3	20 ... 31.5/3
Contactor type W-SLN (Slimline)					
Rated nominal current A	400	400	400	-	-
Rated current contactor / fuse combination A	Max. 400 (double fuse)			-	-
Rated breaking current kA	50 (limited by the fuse)			-	-
Rated short time withstand current kA/s	6/1	6/1	6/1	-	-
Rated peak withstand current kA	15.6	15.6	15.6	-	-
Earthing switch Rated short-circuit making current kA	15.6	15.6	15.6	-	-
Rated short time withstand current kA/s	6/1	6/1	6/1	-	-
Internal arc					
Internal arc classification AFLR kA/s	Up to 50/1	Up to 50/1	Up to 50/1	Up to 50/1	Up to 31.5/1
Enclosure data					
Degree of protection	IP4X (IP41, IP42 or IP44 as an option)				
Loss of service continuity category	LSC2B				
Partition class	PM				
Standard color	RAL7035				

Main dimensions

System	Width A (mm)	Height B (mm)	Height C1 (mm)	Depth D (mm)
3.6/7.2kV				
Slimline contactor	400	2200	2760	1770
3.6/7.2/12kV				
Mid-mount contactor panel	600	2200	2760	1320
3.6/7.2/12/17.5kV				
630A - 25kA	600	2200	2760	1320
1250A - 25/31.5kA	600	2200	2760	1320
2000A - 25/31.5kA	800	2200	2760	1320
2500A - 25/31.5kA	800	2200	2760	1320
1250A - 40/50kA	800	2200	2760	1500
2000A - 40/50kA	800	2200	2760	1500
3150A - 25/31.5/40/50kA	1000	2200	2760	1500
24kV				
1250A - 20/25/31.5kA	800	2320	2880	1570
2000A - 20/25/31.5kA	1000	2320	2880	1570
2500A - 20/25/31.5kA	1000	2320	2880	1570



Air Insulated Switchgear

Power Xpert UX 36kV

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.

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.

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 switchgear room. Internal Arc Classification of AFLR – 31.5kA – 1 sec.



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.

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.

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. Earthen metal partitions segregate switchgear sections.

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.

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

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.

Medium Voltage Assemblies

Air Insulated Switchgear

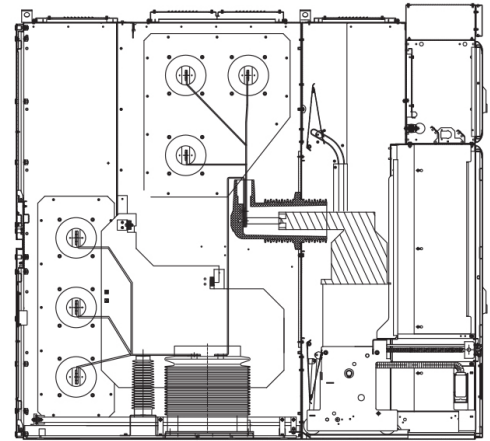
Power Xpert UX 36kV

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.



Primary components

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)

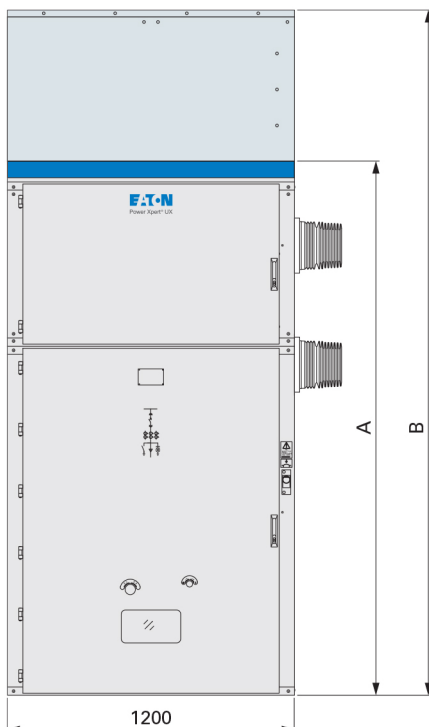
- In accordance with IEC 61243-5, voltage detection systems shown here provide additional operator and maintenance personnel safety
- Capacitive sensors in the cable compartment provide the power to the monitor mounted on the door of the low voltage compartment door
- Voltage detection systems provide 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.

Air Insulated Switchgear

Power Xpert UX 36kV

		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	O - 0.3s - CO - 15s - CO
Class		M2
Number of operations		>10,000
Number of operations interrupter		>10,000



Main dimensions

Panel width (A)	1200mm
36 kV	
Max. rating	1250A, 2500A
Depth	2600
Height (A)	2400
Height including arc chamber (B)	2950

Gas Insulated Switchgear

RVAC Ring Main Unit

RVAC RMUs are fully sealed and insulated switchgears developed by ECPS exclusively for the cable system, and have been extensively applied in the urban grid system across the country since introduction in 1995 with their excellent operating performance.

RVAC RMU's are characterized by the following:

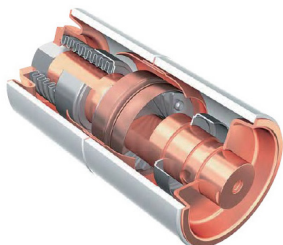
- Insulation using SF6 gas
- Three position SF6 Switch as the breaking device in the load switch unit to break rated current
- Vacuum arc-extinguishing chamber as the breaking device in the circuit breaker unit to break short-circuit current.
- Based on the design principles of all insulation and omniseal, all primary parts of a RVAC RMU are fully enclosed in the SS main case, free from condensation and foreign materials. The main case has the protection grade of IP67 and is equipped with Cooper touchable waterproof cable joints to protect against occasional floods in flood-prone areas

Currently, the development of a grid system is focused on application of ecological resources, requiring a medium-voltage switchgear which is characterised by energy conservation, low operating cost, reliable performance and flexible configuration.

Featuring long service life, compact structure and re-usability, the RVAC RMUs have become a role model economically and ecologically.

With rapid development of urbanization, the improvement and perfection of buried cable system has loomed large in terms of equipment and many other aspects. Ring main units (RMU), as the main equipment for protection and sectional isolation of the buried cable system, have been widely used in the urban grid system with their safe and reliable performance, compact and pleasant appearance, and outstanding cost performance.

As the leader in the distribution switch gear field, Eaton Cooper Power Systems (ECPS) started design and production of high-quality distribution switchgears as early as 1942, with over 2,000,000 switchgears in proper operation throughout the world up to now.



Vacuum technology features

- As the leader in the vacuum technology field, Eaton carries forward the innovation of vacuum Westinghouse and HOLEC arc-extinguishing chambers
- Eaton is the first enterprise to develop proprietary technologies for copper-chromium alloy contactor and inner shield
- The arc-extinguishing chamber developed by Eaton for contactor has a long service life of 2,500,000 operations
- Almost all of global high-end electrical equipment manufacturers are our purchasers of our arc-extinguishing chambers.



SF6 gas insulated system

- All primary HV components are enclosed in SF6 gas tank, free from ambient conditions and maintenance and ensuring full insulation
- The main case has the protection grade of IP67 and is equipped with Cooper prefab shielded touchable cable accessories, allowing for long-term operation underwater or at other extreme conditions.
- Advanced gas shielded welding and the pressure seal system with the leak rate of $\leq 1\%/a$ is available, ensuring a service life of 30 years



Load break switch

The load switch is a three-position switch for opening, closing and grounding. The movable blade at the opening position provides enough insulation distance. Opening and closing of master switch and grounding switch can be available respectively with one operating handle, and master switch and grounding switch are mechanically interlocked.

- Arch-extinguishing with deionised metal grating for load switch ensures excellent breaking performance;
- The operating mechanism controls moving speed of contactor of the load switch so that the switch on and off speed of the load switch will not vary with operators.

Gas Insulated Switchgear

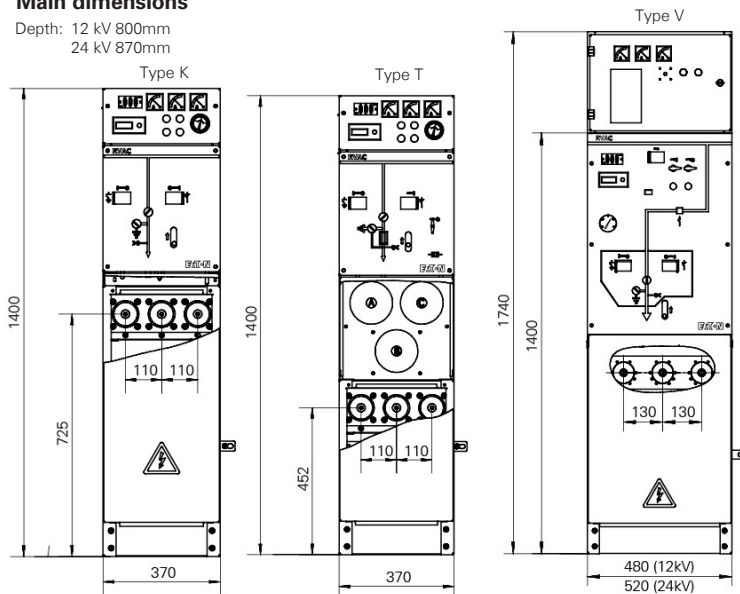
RVAC Ring Main Unit

Rated voltage	kV	12	24
Power frequency withstand voltage (1min)			
Phase to phase/Phase to earth	kV	42	50
Between isolating distance		48	60
Lightning impulse withstand voltage (BIL)			
Phase to phase/Phase to earth	kV	75	125
Between isolating distance		85	145
Rated frequency	Hz	50	50
Internal arc classification (IAC)	kA-s	AFLR 20-1	AFLR 20-1
Degree of protection in service		IP3X	IP3X
Degree of protection with doors/covers open		IP2X	IP2X
Busbar system			
Rated normal current	A	630	630
Rated short-time withstand current	kA-s	20-4	20-4
Rated peak withstand current	kA	50	50
Load break switches panel			
Rated normal current	A	630	630
Rated short-circuit making current	kA	50	50
Rated short-time withstand current	kA-s	20-Apr	20-Mar
Mechanical endurance class (Load break switch)		M1 5000	M1 5000
Mechanical endurance class (Earthing switch)		M1 2000	M1 3000
Electrical endurance class (active load breaking capacity 630A)		E3	E3
Circuit-breakers panel			
Rated normal current	A	630	630
Rated breaking current	kA	20	20
Rated short-circuit making current	kA	50	50
Rated capacitive switching current class		C2	C2
Mechanical endurance class (Circuit-breakers)		M2 10000 x	M1 3000
Mechanical endurance class (Earthing switch)		M1 2000	M1 3000
Electrical endurance class		E2	E2
Rated short-time withstand current	kA-s	20-4	20-4
Mechanism type		O - 0.3s - CO - 180s - CO	O - 0.3s - CO - 180s - CO
Switch-fuse combination panel			
Normal current of load-break switch	A	630	630
Normal current with fuses	A	125	125
Rated breaking current	kA	31.5	31.5
Rated short-circuit making current	kA	80	80
Rated transfer current	A	1750	900

For others, please contact local Eaton sales representative.

Main dimensions

Depth: 12 kV 800mm
24 kV 870mm



RVAC complies with the following international standards

IEC62271-1	Common specifications for high-voltage switchgear and controlgear
IEC62271-103	High-voltage switches for rated voltages above 1kV up to and including 52 kV
IEC62271-102	High-voltage alternating current disconnectors and earthing switches
IEC62271-200	A.C. metal-enclosed switchgear and controlgear for rated voltages above 1kV and up to including 52kV
IEC62271-100	High-voltage alternating-current circuit breakers
IEC62271-105	High-voltage alternating current switch-fuse combinations for rated voltage above 1kV up to and including 52kV

Components

W-VACi medium voltage vacuum circuit breakers

Eaton's W-VACi compact MV vacuum circuit breakers with IEC ratings of 12 kV, 17.5 kV and 24 kV are part of Eaton's comprehensive global product portfolio. It serves both 50 Hz and 60 Hz end-user segments of the electrical industry such as industrial, commercial, utility, mining, marine and off-shore. The W-VACi circuit breakers are complemented by a full line of accessories and compartment kits for panel builders. In addition, they fit in Eaton's new IEC panel design, Power Xpert® UX. UX is available in 600 mm, 800 mm and 1000 mm configurations.

- Fixed and withdrawable versions available
- Eno SF6 - gas
- Conformance to the latest IEC standards - IEC 62271-100 and IEC 62271-1
- Numerous safety features for maximum protection
- User friendly operation with easy access and minimal inspection
- Compact and cost effective
- Flexible with a full line of accessories and OEM components

Universal mechanism assembly (UMA)

Designed with reliability and long product life, the W-VACi circuit breaker utilizes a simple spring charged, stored energy mechanism. With its simple and proven design, the universal mechanism assembly has a life of up to 20,000 mechanical operations and does not require inspection up to 10,000 operating cycles. It includes special plating on metal components to increase mechanical life and prevent corrosion.

Encapsulated pole unit (EPU)

The W-VACi IEC vacuum circuit breakers use Eaton vacuum interrupters that are embedded in epoxy resin. Encapsulating the vacuum interrupter in epoxy resin results in circuit breaker pole units that are extremely durable. Further, it protects the vacuum interrupter from mechanical impact and climatic conditions such as moisture, humidity and dust.

Vacuum interrupter (VI)

At the heart of the W-VACi IEC circuit breaker portfolio is Eaton's proven vacuum interruption technology and eighty-year expertise in this field. The vacuum interrupter is where current making and breaking occurs. It houses Eaton-designed high-performance copperchrome contacts, which provide superior performance characteristics. The vacuum in the arc chamber protects the copper contacts from adverse effects such as contamination and corrosion.

Description

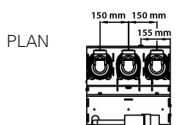
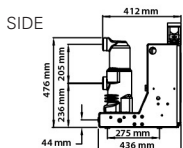
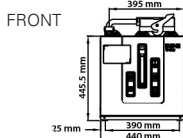
Circuit breaker designation			12 kV			17.5 kV			24 kV		
Rated voltage	Ur	kV	12			17.5			24		
Rated frequency	fr	Hz	50 / 60			50 / 60			50 / 60		
Rated normal current	Ir	A	630 / 800 / 1250 / 1600 / 2000 / 2500 / 3150 / 4000 ①						800 / 1250 / 1600 / 2000 / 2500		
Rated short-time withstand current	Ik	kA rms	25 / 26.3 / 31.5 / 40 / 50			25 / 31.5 / 40 / 50			20 / 25		
Rated duration of short circuit	tk	s	3			3			3		
Rated supply voltage		V	24 - 48 - 60 - 110 - 125 - 220 - 250 VDC / 120 - 220 - 230 VAC								
Pole-center distance		mm	150	210	275	150	210	275	210		275
Upper-to-lower terminal spacing		mm	205 / 275	310	310	205 / 275	275	310	310		310

① 4000 A rating with forced cooling

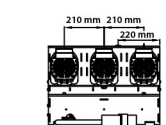
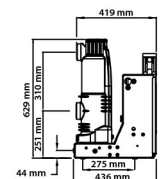
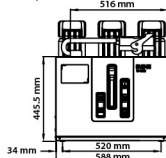
Main dimensions

W-VACi 12kV and 17.5kV family

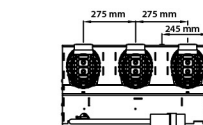
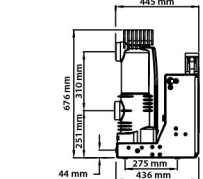
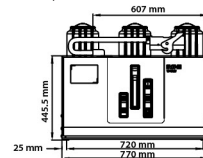
Pole space 150 mm



Pole space 210 mm

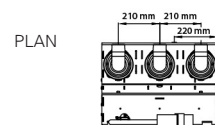
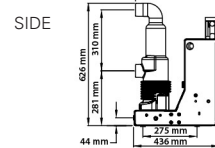
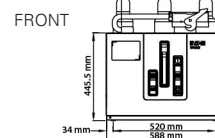


Pole space 275 mm

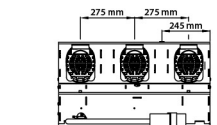
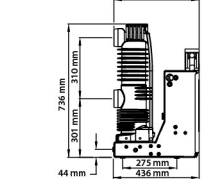
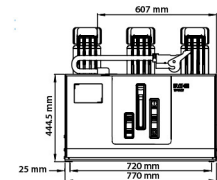


W-VACi 24kV family

Pole space 210 mm



Pole space 275 mm



Components

SL medium voltage vacuum contactors

The “SL” family of medium voltage vacuum contactors is designed and engineered specifically for the OEM, combining the highest ratings available in a cost-saving, reduced-size package that’s lighter and easier to install. “SL” Contactors are ideal for full and reduced voltage starting of squirrel-cage induction, wound-rotor, and synchronous motors. Other applications include power and capacitor switching. They’re especially recommended for heavy duty applications and harsh environments found in many industries including mining, pulp and paper, HVAC, petrochemical, and automotive.

No adjustment or replacement of vacuum interrupters is required to achieve 300,000 electrical operations. With fewer moving parts the contactor enhances longevity and reliability while decreasing maintenance, resulting in a mechanical life of 2.5 million operations.

Field-Adjustable Settings

Field adjustable coil voltages & drop-out times enable the installer to adjust to specific requirements and make last minute changes to standard units.

Auxiliary Contact Kits provide for up to six extra auxiliary contacts.

Mechanical Latch Kits available in many coil voltages with a wide range of AC and DC selections.

Mechanical Interlock Kit prevents unintentional energizing.

Easy Installation

The SL medium voltage vacuum contactor can be mounted in horizontal or vertical positions when space is an issue. The built-in mounting tabs provide for pedestal mounts or panel mounting also.

3 different altitude versions

Low altitude rating of -3500 to -1001 meters.

Standard altitude rating of -1000 to +2000 meters.

High altitude rating of +2001 to +4000 meters.

Design and Test Standards

IEC #60470

CSA T.I.L D-21, File

#LR28548ANSI/NEMA ICS3, Part 2



Control terminal strip

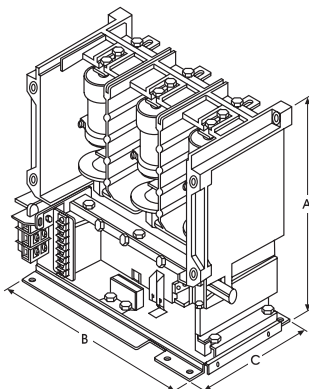


Mounting cutout

Technical specifications

Contactor size	Voltage, V	Interrupting rating, kA	Induction motor, kW	Synchronous motor (1.0 PF), kW	Transformer kVA	Capacitor switching * kVAR/A
160A	2200 – 2500V	4.5	450	600	600	480/120
	3000 – 3600V		675	750	800	640/120
	3800 – 4800V		900	1050	1000	960/120
	6000 – 6900V		1350	1650	1600	1320/120
200A	2200 – 2500V	4.5	600	750	750	600/150
	3000 – 3600V		825	950	1000	800/150
	3800 – 4800V		1100	1300	1250	1200/150
	6000 – 6900V		1675	2050	2000	1650/150
360A	2200 – 2500V	4.5	1100	1300	1200	1000/270
	3000 – 3600V		1500	1850	1600	1475/270
	3800 – 4800V		1850	2250	2500	2150/270
	6000 – 6900V		3000	3750	3200	2950/270
400A	2200 – 2500V	8.5	1300	1500	1500	1200/295
	3000 – 3600V		1675	1850	2000	1650/295
	3800 – 4800V		2250	2600	2500	2400/295
	6000 – 6900V		3350	4100	4000	3300/295
800A	2200 – 2500V	13.2	2250	2600	2500	2400/550
	3000 – 3600V		3000	3750	3500	3200/550
	3800 – 4800V		3750	4500	4500	4000/550
	6000 – 6900V		6000	7500	6000	4800/550

* Ratings not applicable for back-to-back switching. Consult factory.



Main dimensions

Current size	Mounting	Length (A)	Width (B)	Height (C)	Weight kg
160	Control panel or pedestal	406	387	221	21.4
200	Control panel or pedestal	406	387	221	21.4
360	Control panel or pedestal	406	387	221	21.4
400	Control panel or pedestal	406	387	221	22.2
800	Control panel or pedestal	378	430	466	43.2

Components

Medium voltage generator circuit breakers

Eaton's Cutler-Hammer VCP-WG line of Vacuum Generator breakers were designed and tested to the specific ANSI / IEEE C.37.013 standard. These breakers are designed to handle the rigorous and unique characteristics needed when applied in close proximity to a Generator and Transformer configuration.

Ratings of our VCP-WG line include 5 and 15kV, 50, 63 and 75kA, and up to 4000A continuous current with natural convection cooling. Higher current ratings can be achieved with the use of fan cooling packages.

Eaton has dedicated years of research, design, enhancement and testing to create Cutler-Hammer VCP-WG Circuit Breakers that meet, and even exceed, these rigorous service duty requirements of generator circuit application defined by IEEE. VCP-W vacuum circuit breakers incorporate many design features which have been field proven with over 50 years of vacuum interrupter design and manufacturing experience...coupled with over 75 years of power circuit breaker design and manufacturing experience.

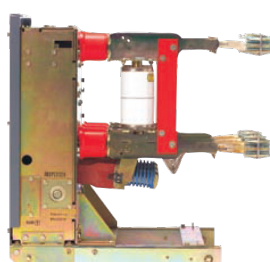


Eaton's VCP-WG generator circuit breakers meet and even exceed service duty requirements set forth by IEEE for generator circuit applications, including:

- Generator circuit configuration
- High continuous current levels
- Unique fault current conditions
- Transformer-source short-circuit faults
- Generator-source short-circuit faults
- Unique voltage conditions
- Very fast RRRV
- Out-of-phase switching

Fault Current Breaking capacity

Eaton's VCP-WG Generator Circuit Breakers have a distinct feature to perform under out-of-phase conditions when the generator and power system voltages are not in sync. The voltages across the open contacts can be as high as twice the rated line-to-ground voltage of the system. The VCP-WG complies with IEEE standard requirement and passes the test that the generator circuit breaker can switch under specified out-of-phase conditions.



Versatility in Application

Eaton's Generator Vacuum Circuit Breakers are available in drawout (VCP-WG) or fixed (VCP-WRG) configurations to provide superior performance and versatility. Many industrial and commercial power systems now include small generators as a local source of power. New applications are arising as a result of the de-regulation of the utility industry, and the construction of smaller packaged power plants. Typical applications include:

- Small and mid-sized hydro power generator
- Electrical generators
- Power plant
- Combined cycle/combustion turbines
- Paper, Chemical and manufacture companies with backup power plant

Technical specifications

Description		50VCP-WG50	50VCP-WG63	50VCP-WG75	150VCP-WG50	150VCP-WG63	150VCP-WG75
Rated voltage	kV	4.76	4.76	4.76	15	15	15
Power frequency withstand voltage	kV-1min	19	19	19	36	36	36
Impulse withstand voltage	kVp	60	60	60	95	95	95
Rated current	A	1200, 2000, 3000	1200, 2000, 3000	1200, 2000, 3000, 4000	1200, 2000, 3000	1200, 2000, 3000	1200, 2000, 3000, 4000
Rated short circuit breaking current	kA	50	63	75	50	63	75

Ratings referenced to 60Hz.

Description		5	15	27	38
Rated voltage	kV	5	15	27	38
Impulse withstand voltage	kVp	60	95	125	170
Main bus rating	A	1200, 2000, 3000, 4000	1200, 2000, 3000, 4000	1200, 2000	1200, 2000, 3000 Depending on kA Rating
Circuit breaker rating	A	1200, 2000, 3000	1200, 2000, 3000	1200, 2000	1200, 1600, 2500 A Depending on kA Rating
Short circuit interrupting capacity	kA	29, 41, 63	18, 28, 37, 63	16, 22, 25, 40	16, 21, 25, 32, 40

Ratings referenced to 60Hz.