IEC medium voltage vacuum circuit breakers 12 kV, 17.5 kV and 24 kV
Product Guide

W-VACi

for safety, reliability and performance

EATON
Powering Business Worldwide

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 localized 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 Corporation is a worldwide leader in the design, manufacture, and sale of safe, reliable and high-performance medium voltage power distribution equipment in accordance with IEC, GB and ANSI standards.

Complete Global Medium Voltage Switchgear Solutions

Eaton, a premier leader in designing and manufacturing power distribution and protection equipment in the electrical industry, offers a comprehensive range of medium voltage (MV) solutions to meet the needs of virtually every application. From products that feature cutting-edge design that allow for easy access, maintenance and space savings, to arc-resistant products that enhance safety, Eaton's medium voltage solutions provide a variety of products for every need. Additionally, Eaton's global service network provides maximum customer support in all regions of the world.

As one of the few completely vertically integrated and diversified industrial manufacturers in the world, Eaton designs not only MV assemblies, but also the key components that comprise the MV solutions – from steel housing and circuit breaker compartments to vacuum interrupters, circuit breakers, bus systems and fuses.

Eaton's MV heritage, strengthened by acquisitions such as Westinghouse DCBU, Cutler Hammer, MEM and Holec, has resulted in breakthrough MV technologies and numerous international patents over the years.

Integral to Eaton's complete electrical PowerChain Solutions – which help businesses increase reliability, efficiency and safety – Eaton's medium voltage equipment meets all applicable standards and certifications such as IEC, NEMA / ANSI, GB, UL, IEEE, KEMA and CSA.

When it comes to medium voltage solutions, you can trust the one name with a long history of proven performance: Eaton.

W-VAC*i* IEC 12 kV, 17.5 kV and 24 kV

Reliability, safety and performance in a compact package

The new and extensive line of W-VAC*i* 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-VAC*i* 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.

W-VAC*i* vacuum circuit breakers provide you with:

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. In an effort to increase the dielectric strength of the vacuum interrupter, Eaton has also designed vacuum interrupters that are encapsulated in epoxy resin material. The W-VAC*i* IEC circuit breaker family utilizes this solid insulation technology that has been catering to a wide range of applications for years.

Environmentally friendly design

Eaton's vacuum and solid insulation technology is free of SF_6-gas that contributes significantly to the greenhouse effect and associated climate change.

Conformance to the latest IEC standards

W-VAC*i* IEC circuit breakers are designed and third party tested to the latest IEC 62271-100 and IEC 62271-1 standards. All W-VAC*i* circuit breakers meet or exceed the electrical and mechanical endurance requirements of E2 and M2 in accordance with IEC 62271-100.

Reliability, safety, and performance

The W-VAC*i* IEC circuit breakers offer numerous safety features for maximum protection. Eaton's extensive innovation and experience in the electrical industry deliver world-class product reliability and quality. Each W-VAC*i* circuit breaker is tested mechanically and electrically before it leaves the ISO 9001 certified factory. W-VAC*i* circuit breakers are compact, user-friendly and cost effective.

Versatility and flexibility

W-VAC*i* circuit breakers can be used in an extensive scope of applications such as the protection of transformers, capacitor banks, motors, busbar sections and cables. The circuit breakers can be used in special environment conditions such as high altitude, light shock, vibration and high ambient temperature.

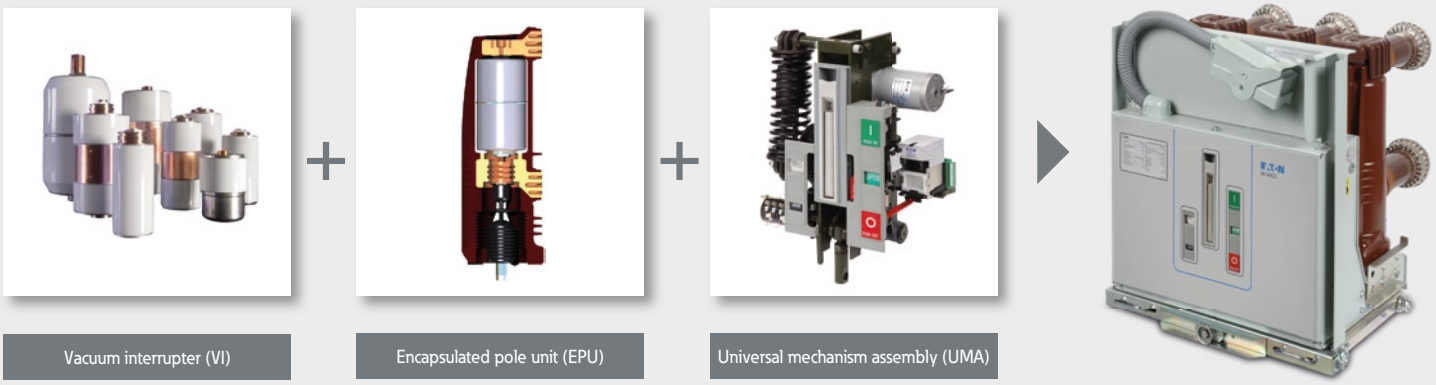
*Power Xpert® UX with W-VAC*i*

An Eaton Green Solution

W-VAC*i* IEC 12 kV, 17.5 kV and 24 kV

Building Blocks

The W-VAC*i* IEC circuit breakers are comprised of three key building blocks: vacuum interrupter (VI), epoxy resin encapsulated pole unit (EPU), and universal mechanism assembly (UMA). Each building block offers a set of specific benefits to construct a circuit breaker assembly of extreme safety, reliability and performance.

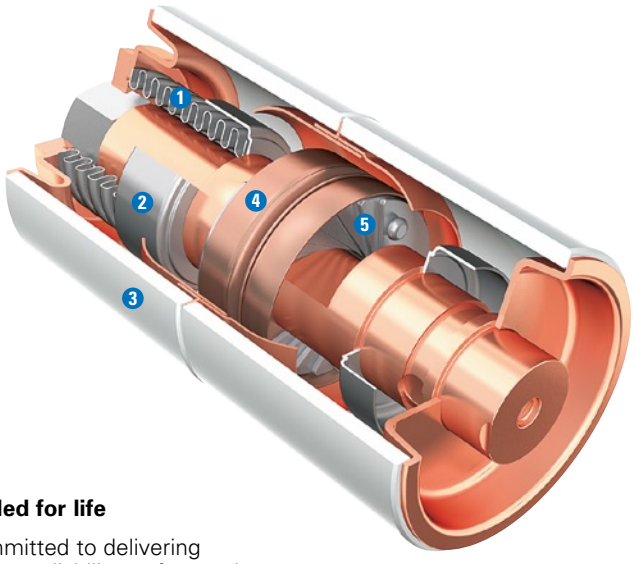


Vacuum interrupter (VI) | Encapsulated pole unit (EPU) | Universal mechanism assembly (UMA)

Vacuum interrupter (VI)

At the heart of the W-VAC*i* IEC circuit breaker portfolio is Eaton's proven vacuum interruption technology and eighty-year expertise in this field.

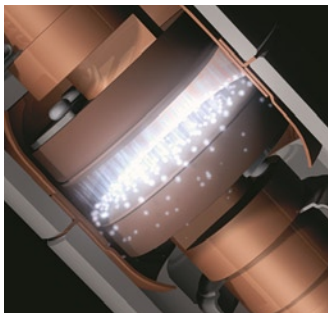
The vacuum interrupter is where current making and breaking occurs. It houses Eaton-designed high-performance copper-chrome contacts, which provide superior performance characteristics. The vacuum in the arc chamber protects the copper contacts from adverse effects such as contamination and corrosion.



1. Bellows
2. Bellows shield
3. Ceramic insulators
4. Movable contact
5. Magnetic laminations

Negligible contact erosion

A principal feature of Eaton vacuum interrupters is the large number of parallel arcs that are created between the contacts during breaking. This "diffuse discharge" is characterized by very low arc voltage and short arc times, resulting in very low arc energy. Therefore, contact wear in an Eaton vacuum interrupter is negligible.



Sealed for life

Committed to delivering proven reliability, safety and performance, Eaton's vacuum interrupting technology is the result of years of research and development. Eaton vacuum interrupters are hermetically sealed and offer extensive vacuum integrity. They are maintenance free.

Encapsulated pole unit (EPU)

The W-VAC*i* IEC vacuum circuit breakers use Eaton vacuum interrupters that are embedded in epoxy resin. This assembly is referred to as an encapsulated pole unit (EPU).

Durable

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. The material is vibration and shock proof and its durability is long lasting.

High performance

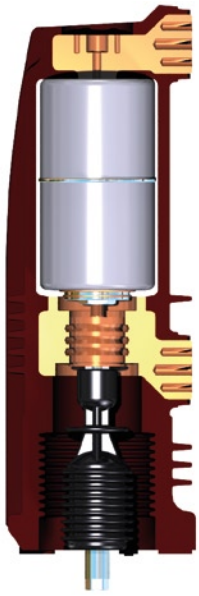
Originally developed for outdoor use, the robust epoxy resin insulating material offers;

- Optimum thermal conductivity
- High electrical resistivity
- Low moisture absorption
- High creepage current resistance
- High mechanical strength
- Complete homogeneity

Eaton encapsulated pole units are designed in such a way that no partial discharging occurs on the surface.

Compact

Due to its mechanical strength, epoxy resin lends itself to a very compact design, when combined with Eaton's world leading vacuum interrupter technology. High current and interruption ratings are achieved in a small package, generating cost savings for users.



Encapsulated pole unit (EPU)

Universal mechanism assembly (UMA)

Designed with reliability and long product life, the W-VAC*i* circuit breaker utilizes a simple spring charged, stored energy mechanism. It is compact and has a limited number of moving parts.

Integrated modular design

Eaton's universal mechanism assembly (UMA) is a modular design that is common across all W-VAC*i* circuit breaker frames, making the W-VAC*i* circuit breaker family easy to work with. Customers see no variation between different W-VAC*i* frames, simplifying training, operation and inspection of the circuit breakers. UMA is a self contained functional unit and allows for fast and easy installation. It is manufactured in large quantities and is not sensitive to process variations.

Eaton's UMA design requires low energy to operate motor close and trip through the use of special electronic components. All universal mechanism assembly plating is Restriction of Hazardous Substances (RoHS) compliant, offering an environmentally friendly solution.

Minimal inspection

Due to its modular design, material selection and limited number of moving parts, Eaton's mechanism assembly requires minimal inspection. The simplicity of the design reduces the energy required to operate it, minimizing system wear and the need for inspection.

Long life and reliability

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.

Easy to use

To achieve smooth operation, Eaton's mechanism assembly comes with an anti-pump relay as standard. It utilizes simple and clear circuit breaker status indication and requires low manual operation force. UMA has an integrated manual charging handle. It is light and quiet for maximum ease of use.

Universal mechanism assembly (UMA)

W-VAC*i* IEC 12 kV, 17.5 kV and 24 kV

Vacuum circuit breaker

The W-VAC*i* IEC vacuum circuit breakers are available globally in both withdrawable and fixed configurations for maximum flexibility.

The W-VAC*i* portfolio of products is complemented by a full line of breaker accessories for maximum safety and ease of use. Additionally, Eaton's global service network provides extensive customer support in all regions of the world.

W-VAC*i* IEC withdrawable

W-VAC*i* IEC fixed

L-Frame

The L-frame is the interface between the circuit breaker and the switchgear in withdrawable configurations. All W-VAC*i* circuit breakers can be packaged with the Eaton L-Frame by panel builders and OEMs. The L-Frame can be used in all end user segments for installation into new or existing switchgear. Its optimized design and robust construction provide a solution that is safe, reliable and easy to use.

Integrating the W-VAC*i* circuit breaker into a switchgear design is simple and cost effective. The W-VAC*i* L-Frame is designed for fast installation by panel builders and OEMs. It ensures full alignment of the circuit breaker contacts with the L-Frame primary contacts that allow for busbar or cable connections. The independently operated shutters are automatically aligned within the L-Frame, facilitating the smooth operation of the shutter mechanism. The shutters can be locked in the closed position for additional safety when the circuit breaker is withdrawn from the switchgear.

Integral position contacts and interlocking mechanisms within the circuit breaker racking in assembly ensure smooth and easy insertion. The L-Frame and W-VAC*i* designs allow for the L-Frame to be free of low voltage secondary cables and wires. Circuit breaker position contacts within the racking in assembly provide remote indication of "Service" or "Test / Withdrawn" positions. Interlocks prevent the circuit breaker from being inserted or withdrawn unless it is in the "Open" position. An optional interlock on the breaker racking in assembly is available to provide a door interlock such that the panel door can only be opened with the circuit breaker in the "Test / Withdrawn" position.

L-Frame for withdrawable configurations

W-VAC*i* IEC product portfolio overview

Circuit breaker designation			**12 kV**			**17.5 kV**			**24 kV**	
Rated voltage	U_r	kV	12			17.5			24	
Rated frequency	f_r	Hz	50 / 60							
Rated normal current	I_r	A	630 / 800 / 1250 / 1600 / 2000 / 2500 / 3150 / 4000 [1] [2] [3]						800 / 1250 / 1600 / 2000 / 2500 [2] [3]	
Rated short-time withstand current	I_k	kA rms	25 / 26.3 [4] / 31.5 / 40 / 50 [2] [3]			25 / 31.5 / 40 / 50 [2] [3]			20 / 25 [2] [3]	
Rated duration of short circuit	t_k	s	3							
Rated supply voltage		V	24 - 48 - 60 - 110 - 125 - 220 - 250 VDC / 120 - 220 - 230 VAC [3]							
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

[2] See page 10, 11 and 12 for exact technical information and configurations

[3] Please contact Eaton for availability

[4] Tested at 50 Hz

Years of innovation and experience deliver industry leading vacuum circuit breaker technology

Eaton has combined global innovation and substantial design investments to deliver a complete IEC vacuum circuit breaker portfolio for all applications.

W-VAC*i* vacuum circuit breakers provide you with;

Environmentally friendly offering

The W-VAC*i* IEC circuit breaker interrupting chamber and pole unit insulation are free of SF_6 gas. The mechanism plating is RoHS compliant. The encapsulated pole unit materials are recyclable.

User friendly operation

The W-VAC*i* circuit breaker controls and position indicators are clearly and functionally grouped on the front of the control panel. They include manual close and trip pushbuttons, closing spring charged/discharged indicator, circuit breaker open/closed indicator and operations counter. All controls are ergonomic for maximum ease of use. The W-VAC*i* circuit breakers are very easy to handle due to low weight and small size.

Automatic alignment with easy circuit breaker insertion

The W-VAC*i* circuit breaker can conveniently be rolled into the switchgear compartment via guide rails which allow automatic alignment of the primary disconnects.

Easy access and minimal inspection

The stored energy mechanism and control components are easily accessible and can be inspected by removing the front panel. The location of the mechanism and control components on the circuit breaker also ensures easy inspection. Only minimal inspection is required.

Safety, reliability and performance

The W-VAC*i* IEC circuit breakers offer several different safety features. The steel shield behind the UMA and the circuit breaker front cover are earthed and offer double layer isolation from the high voltage components when the circuit breaker is energized in switchgear. The circuit breaker can be connected or disconnected with the compartment door closed by utilizing an integral racking device. The manual racking device requires minimal operator force. The optional integral motor operated racking device allows for the breaker to be racked in remotely, offering an added layer of operator safety.

The mechanically and electrically trip-free stored energy mechanism design ensures that while holding a mechanical trip command, the circuit breaker contacts will not close even when an electrical or mechanical close command is received.

Safety interlocks provide the highest level of protection to operators. If the circuit breaker is closed, it cannot be racked in or out. An optional door interlock mechanism on the circuit breaker can be supplied to ensure that the racking of the breaker can only happen when the compartment door is closed.

Eaton's world class quality and routine circuit breaker life testing process provide lasting product reliability. The reliability of the vacuum interrupter, encapsulated pole unit and mechanism assemblies ensures that the circuit breaker assembly is of the highest performance standards.

Flexible

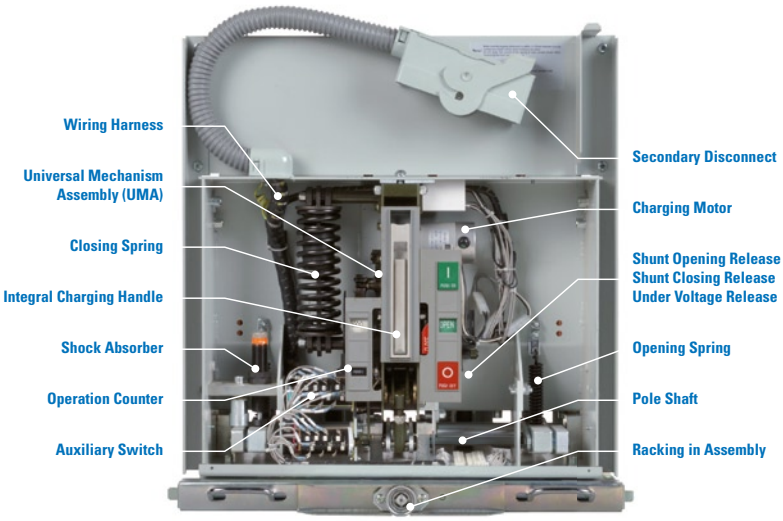
The W-VAC*i* circuit breaker offers field customization with a full range of accessories that allow easy and fast installation. It comes with an integral spring charging handle. In addition, it offers a wide selection of optional accessories for additional features and flexibility.

Cost effective

The compact size of W-VAC*i* circuit breakers helps reduce switchgear footprint to achieve reduced building costs. The reliable and simple design minimizes inspection and life cycle costs. In addition, the W-VAC*i* portfolio offers optimized circuit breaker rating combinations and dimensions. This helps reduce users' inventory levels and makes circuit breaker selection and ordering easy.

Versatile in applications

The W-VAC*i* IEC vacuum circuit breaker serves all end-user segments such as industrial, commercial, utility, mining, marine and offshore. W-VAC*i* circuit breakers can be used in a wide range of applications such as the protection of transformers, capacitor banks, motors, busbar sections and cables. The circuit breakers can be applied in special environment conditions such as high altitude, light shock, vibration and high ambient temperature.



W-VACi breaker with front cover removed

W-VAC*i* circuit breaker accessories

The W-VAC*i* circuit breaker portfolio is complemented by a full line of accessories that fit all breaker sizes. This reduces inventory parts for customers and simplifies the purchasing process.

The W-VAC*i* accessories are easy to mount and wire, minimizing installation time and cost. This feature facilitates accessory changes by the installer or user personnel, eliminating the need for manufacturer modification or outside service companies.

Standard accessories

Shunt opening release (SO1) — Standard

This device allows for local or remote opening of the circuit breaker and can operate with both direct and alternating current.

Attributes

Ua (DC)	24-48-60-110-125-220-250 V
Ua (AC)	110-120-220-230 V
Operating limits	70…110% Ua (DC) 85…110% Ua (AC)
Opening time	40 ~ 60 ms
Insulation voltage	2000 V, 50 / 60 Hz (for 1 min.)

Breaker auxiliary contacts — Standard

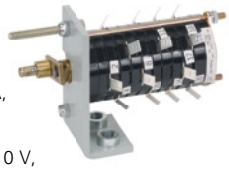
Standard circuit breakers contain a 10NO / 10NC auxiliary switch. 6NO / 6NC contacts are used by the circuit breaker, therefore 4NO / 4NC contacts are available for the end user.

Selection

Standard	Two switches - 10NO / 10NC

Attributes

IEC Contact Class 1, Rated Continuous Current 10 A,
Breaking Capacity 440 W.
Power Consumption:
DC: 10 A @ 24 V, 6 A @ 48 V, 5 A @ 60 V, 3 A @ 110 V,
2.8 A @ 125 V, 1.8 A @ 220 V, 1.6 A @ 250 V
AC: 15 A @ 110 V, 14 A @ 120 V, 10 A @ 220 V, 9 A @ 230 V
Insulation voltage 2000 V, 50 / 60 Hz (for 1 min.)



Shunt closing release — Standard

This device allows for local or remote closing of the circuit breaker and can operate with both direct and alternating current.

Attributes

Ua (DC)	24-48-60-110-125-220-250 V
Ua (AC)	110-120-220-230 V
Operating limits	85…110% Ua (AC)
Closing time	25 ~ 60 ms
Insulation voltage	2000 V, 50 / 60 Hz (for 1 min.)

Closing spring signaling contacts — Standard

This device is used to signal whether the operating mechanism's closing spring is charged or discharged. It uses a micro-switch that allows remote signaling of the state of the closing spring.

State of the contacts

Open	Closing spring charged
Closed	Closing spring discharged

Attributes

Power Consumption:
DC: 4 A @ 24 V, 2.5 A @ 48 V, 2 A @ 60 V, 1 A @ 110 V,
0.8 A @ 125 V, 0.5 A @ 220 V, 0.4 A @ 250 V
AC: 10 A @ 110 V, 9 A @ 120 V, 5 A @ 220 V, 5 A @ 230 V
Insulation voltage 2000 V, 50 / 60 Hz (for 1 min.)

Spring charging motor — Standard

This device charges the mechanism's closing spring electrically. In the event of a loss of power, the mechanism's closing spring can be charged manually.

Attributes

Ua (DC)	24-48-60-110-125-220-250 V
Ua (AC)	110-120-220-230 V
Operating limits	Circuit breaker opening: 85…110% Ua
Insulation voltage	2000 V, 50 / 60 Hz (for 1 min.)

Position contacts — Standard for withdrawable

Fitted in the racking assembly, these contacts are used to identify if the circuit breaker is in the service, test, or disconnected position. This device also acts as an electrical interlock to prevent unsafe operations.

Attributes

IEC Contact Class 1, Rated Continuous Current 10 A,
Breaking Capacity 440 W.
Power Consumption:
DC: 10 A @ 24 V, 7 A @ 48 V, 6 A @ 60 V, 4 A @ 110 V,
3.5 A @ 125 V, 1 A @ 220 V, 0.8 A @ 250 V
AC: 5 A @ 110 V, 5 A @ 120 V, 2.5 A @ 220 V,
2.5 A @ 230 V
Insulation voltage 2000 V, 50 / 60 Hz (for 1 min.)

Racking handle — Standard for withdrawable

This device is used to manually rack the circuit breaker into the switchgear. One unit of this device can be used for all of the circuit breakers on a particular site.

Optional accessories

Second shunt opening release (SO2) — Optional

Like the shunt opening release (SO1), this device allows for local or remote opening of the circuit breaker. It can be supplied by a circuit completely independent from the shunt opening release # 1 (SO1). This device can operate with direct and alternating current.

Attributes

Ua (DC)	24-48-60-110-125-220-250 V
Ua (AC)	110-120-220-230 V
Operating limits	70…110% Ua (DC) 85…110% Ua (AC)
Opening time	40 ~ 60 ms
Insulation voltage	2000 V, 50 / 60 Hz (for 1 min.)

Undervoltage release — Optional

This device opens the circuit breaker when there is notable lowering or loss of its power supply. It can operate with both direct and alternating current.

Attributes

Ua (DC)	24-48-60-110-125-220-250 V
Ua (AC)	110-120-220-230 V
Operating limits	35-0% Ua: UVR operates, circuit breaker opens 70-110% Ua: UVR does not operate
Insulation voltage	2000 V, 50 / 60 Hz (for 1 min.)

Mechanism electromagnetic interlock — Optional

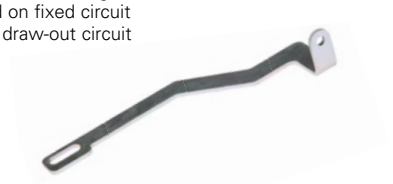
This device protects the operating mechanism from being unsafely activated in the event that the control circuit is not energized.

Attributes

Ua (DC)	24-48-60-110-125-220-250 V
Ua (AC)	110-120-220-230 V
Operating limits	85…110% Ua
Continuous Power (Pc)	DC = 5 W AC = 5 VA
Insulation voltage	2000 V, 50 / 60 Hz (for 1 min.)

Fixed circuit breaker interlock — Optional

This mechanical device is used to prevent mis-closing of the circuit breaker by discharging the closing spring when racking the breaker in or out. It is used on fixed circuit breakers that are converted to draw-out circuit breakers by the customer.



W-VAC*i* IEC 12 kV, 17.5 kV and 24 kV

Technical Data 12 kV

Circuit breaker designation				**12 kV W-VAC*i***								
Rated voltage (U_r)		kV		12								
Rated insulation level	Power frequency withstand (U_d)	kV 1min		28								
	Lightning impulse withstand (U_p)	kV pk		75								
Rated frequency (f_r)		Hz		50 / 60								
Rated normal current (I_r)		A		630	630	800	1250	1250	1600	2000	2500 [1]	3150 [1] [2]
Rated short-circuit breaking current (I_{sc})		kA	25 kA	25	-	25	25	-	25	25	-	-
			26.3 kA	26.3 [3]	-	26.3 [3]	26.3 [3]	-	26.3 [3]	26.3 [3]	-	-
			31.5 kA	-	31.5	31.5	31.5	-	31.5	31.5	31.5	31.5
			40 kA	-	-	-	-	40	40	40	40	40
			50 kA	-	-	-	-	50 [1]	50 [1]	50 [1]	50	50
Rated short-circuit making current (I_{ma})		kA pk - 50 Hz	25 kA	63	-	63	63	-	63	63	-	-
			26.3 kA	66 [3]	-	66 [3]	66 [3]	-	66 [3]	66 [3]	-	-
			31.5 kA	-	79	79	79	-	79	79	79	79
			40 kA	-	-	-	-	100	100	100	100	100
			50 kA	-	-	-	-	125 [1]	125 [1]	125 [1]	125	125
		kA pk - 60 Hz	25 kA	65	-	65	65	-	65	65	-	-
			26.3 kA	-	-	-	-	-	-	-	-	-
			31.5 kA	-	82	82	82	-	82	82	82	82
			40 kA	-	-	-	-	104	104	104	104	104
			50 kA	-	-	-	-	130 [1]	130 [1]	130 [1]	130	130
Rated short-time withstand current (I_k)		kA rms		Same as rated short circuit breaking current								
Rated peak withstand current (I_{pk})		kA pk - 50 Hz / 60 Hz		Same as rated short-circuit making current								
Rated duration of short circuit (t_k)		s		3								
Rated supply voltage (U_s)		V		24 - 48 - 60 - 110 - 125 - 220 - 250 DC / 120 - 220 - 230 AC								
DC component (I_{dc})		%		29 …35								
Transient recovery voltage related to short-circuit breaker current (U_c t_3)		kV		20.6								
		ms		61								
Rated operating sequence				O-0.3s-CO-15s-CO [4]								
				O-0.3s-CO-180s-CO [5]								
Opening time range		ms		50 ± 10								
Breaking time range		ms		≤ 80								
Closing time range		ms		50 ± 20								
Spring charging time		seconds		≤ 12								
Rated cable charging		A, class		25 A, C2								
Rated out of phase breaking current (I_d) Assigned for circuit breakers rated > 2000 A		kA rms	25 kA	-	-	-	-	-	-	6.25	-	-
			26.3 kA	-	-	-	-	-	-	6.6	-	-
			31.5 kA	-	-	-	-	-	-	7.9	7.9	7.9
			40 kA	-	-	-	-	-	-	10	10	10
			50 kA	-	-	-	-	-	-	12.5	12.5	12.5
Mechanical endurance		class		M2								
		operations		10,000 / 20,000 [1]								
Electrical endurance		class		E2								
For use in cable-connected systems		class		S1								
Operating temperature range		°C		- 5 … + 40								
Pole-center distance		mm		150	150	150	150	210	210	210	275	275
Upper-to-lower terminal spacing		mm		205	275	275	275	310	310	310	310	310
Weight [6]	Fixed	kg	25 kA	83	-	90	91	-	129	129	-	-
			26.3 kA	83	-	90	91	-	129	129	-	-
			31.5 kA	-	92	93	94	-	130	130	216	217
			40 kA	-	-	-	-	131	131	131	217	218
			50 kA	-	-	-	-	183	184	185	218	219
	Withdrawable		25 kA	110	-	122	122	-	172	172	-	-
			26.3 kA	110	-	122	122	-	172	172	-	-
			31.5 kA	-	123	123	124	-	173	173	283	284
			40 kA	-	-	-	-	173	173	173	284	285
			50 kA	-	-	-	-	229	230	231	285	286

[1] Please contact Eaton for availablility
[2] 4000 A rating with forced cooling
[3] Tested at 50 Hz
[4] Operating sequence O-0.3s-CO-15s-CO is available on circuit breakers rated 12 kV up to 40 kA and up to 2000 A
[5] Operating sequence O-0.3s-CO-180s-CO is availabe on ALL circuit breakers rated 12 kV and 50 kA, and all 12 kV circuit breakers rated ≥ 2500 A
[6] Weights are ± 3 kg depending on breaker configuration

Technical Data 17.5 kV

Circuit breaker designation				**17.5 kV W-VAC*i***								
Rated voltage (U_r)		kV		17.5								
Rated insulation level	Power frequency withstand (U_d)	kV 1min		38								
	Lightning impulse withstand (U_p)	kV pk		95								
Rated frequency (f_r)		Hz		50 / 60								
Rated normal current (I_r)		A		630	630	800	1250	1250	1600	2000	2500 [1]	3150 [1] [2]
Rated short-circuit breaking current (I_{sc})		kA	25 kA	25	-	25	25	-	25	25	-	-
			31.5 kA	-	31.5	31.5	31.5	-	31.5	31.5	31.5	31.5
			40 kA	-	-	-	-	40	40	40	40	40
			50 kA	-	-	-	-	50 [1]	50 [1]	50 [1]	50	50
Rated short-circuit making current (I_{ma})		kA pk - 50 Hz	25 kA	63	-	63	63	-	63	63	-	-
			31.5 kA	-	79 [1]	79 [1]	79 [1]	-	79	79	79	79
			40 kA	-	-	-	-	100	100	100	100	100
			50 kA	-	-	-	-	125 [1]	125 [1]	125 [1]	125	125
		kA pk - 60 Hz	25 kA	65	-	65	65	-	65	65	-	-
			31.5 kA	-	82	82	82	-	82	82	82	82
			40 kA	-	-	-	-	104	104	104	104	104
			50 kA	-	-	-	-	130 [1]	130 [1]	130 [1]	130	130
Rated short-time withstand current (I_k)		kA rms		Same as rated short circuit breaking current								
Rated peak withstand current (I_{pk})		kA pk - 50 Hz / 60 Hz		Same as rated short-circuit making current								
Rated duration of short circuit		s		3								
Rated supply voltage (U_s)		V		24 - 48 - 60 - 110 - 125 - 220 - 250 DC / 120 - 220 - 230 AC								
DC component (I_{dc})		%		29 …35								
Transient recovery voltage related to short-circuit breaker current (U_c t_3)		kV		30								
		ms		71								
Rated operating sequence				O-0.3s-CO-15s-CO [3]								
				O-0.3s-CO-180s-CO [4]								
Opening time range		ms		50 ± 10								
Breaking time range		ms		≤ 80								
Closing time range		ms		50 ± 20								
Spring charging time		seconds		≤ 12								
Rated cable charging		A, class		31.5 A, C2								
Rated out of phase breaking current (Id) Assigned for circuit breakers rated > 2000 A		kA rms	25 kA	-	-	-	-	-	-	6.25	-	-
			31.5 kA	-	-	-	-	-	-	7.9	7.9	7.9
			40 kA	-	-	-	-	-	-	10	10	10
			50 kA	-	-	-	-	-	-	12.5	12.5	12.5
Mechanical endurance		class		M2								
		operations		10,000 / 20,000 [1]								
Electrical endurance		class		E2								
For use in cable-connected systems		class		S1								
Operating temperature range		°C		- 5 … + 40								
Pole-center distance		mm		150	150	150	150	210	210	210	275	275
Upper-to-lower terminal spacing		mm		205	275	275	275	310	310	310	310	310
Weight [5]	Fixed	kg	25 kA	84	-	91	92	-	130	130	-	-
			31.5 kA	-	93	93	93	-	131	131	218	219
			40 kA	-	-	-	-	132	132	132	219	220
			50 kA	-	-	-	-	185	186	187	220	221
	Withdrawable		25 kA	111	-	123	124	-	173	173	-	-
			31.5 kA	-	124	124	125	-	174	174	285	286
			40 kA	-	-	-	-	174	174	174	286	287
			50 kA	-	-	-	-	231	232	233	287	288

[1] Please contact Eaton for availablility
[2] 4000 A rating with forced cooling
[3] Operating sequence O-0.3s-CO-15s-CO is available on circuit breakers rated 17.5 kV up to 40 kA and up to 2000 A
[4] Operating sequence O-0.3s-CO-180s-CO is availabe on ALL circuit breakers rated 17.5 kV and 50 kA, and all 17.5 kV circuit breakers rated ≥ 2500 A
[5] Weights are ± 3 kg depending on breaker configuration

Technical Data 24 kV

Circuit breaker designation				**24 kV W-VAC*i***					
Rated voltage (U_r)		kV		24					
Rated insulation level	Power frequency withstand (U_d)	kV 1min		50					
	Lightning impulse withstand (U_p)	kV pk		125					
Rated frequency (f_r)		Hz		50 / 60					
Rated normal current (I_r)		A		800	800 [1]	1250 [1]	1600	2000	2500 [1]
Rated short-circuit breaking current (I_{sc})		kA	20 kA	20	-	-	-	-	-
			25 kA	-	25	25	25	25	25
Rated short-circuit making current (I_{ma})		kA pk - 50 Hz	20 kA	50	-	-	-	-	-
			25 kA	-	63	63	63	63	63
		kA pk - 60 Hz	20 kA	52	-	-	-	-	-
			25 kA	-	65	65	65	65	65
Rated short-time withstand current (I_k)		kA rms		Same as rated short circuit breaking current					
Rated peak withstand current (I_{pk})		kA pk - 50 Hz / 60 Hz		Same as rated short-circuit making current					
Rated duration of short circuit		s		3					
Rated supply voltage		V		24 - 48 - 60 - 110 - 125 - 220 - 250 DC / 120 - 220 - 230 AC					
DC component (I_{dc})		%		29 …31					
Transient Recovery voltage related to short-circuit breaker current (U_C t_3)		kV		41.2					
		ms		87					
Rated operating sequence				O-0.3s-CO-15s-CO					O-0.3s-CO-180s-CO
Opening time range		ms		50 ± 10					
Breaking time range		ms		≤ 80					
Closing time range		ms		50 ± 20					
Spring charging time		seconds		≤ 12					
Rated Cable charging		A, class		31.5 A, C2					
Rated out of phase breaking current (I_d) Assigned for circuit breakers rated > 2000 A		kA rms	20 kA	-	-	-	-	-	-
			25 kA	-	-	-	-	6.3	6.3
Mechanical endurance		class		M2					
		operations		10,000 / 20,000 [1]					
Electrical endurance		class		E2					
For use in cable-connected systems		class		S1					
Operating temperature range		°C		- 5 … + 40					
Pole-center distance		mm		210	210	210	275	275	275
Upper-to-lower terminal spacing		mm		310	310	310	310	310	310
Weight [2]	Fixed	kg	20 kA	104	-	-	-	-	-
			25 kA	-	156	157	157	158	159
	Withdrawable		20 kA	142	-	-	-	-	-
			25 kA	-	232	233	234	234	235

[1] Please contact Eaton for availablility
[2] Weights are ± 3 kg depending on breaker configuration

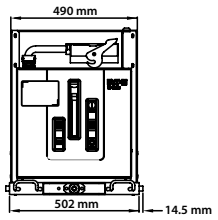
W-VAC*i* Dimensions

Withdrawable

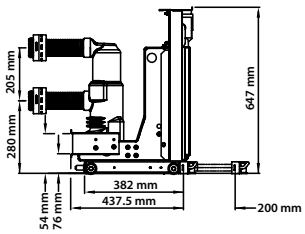
12 kV and 17.5 kV

Pole space 150 mm

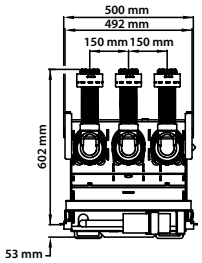
Front



Side

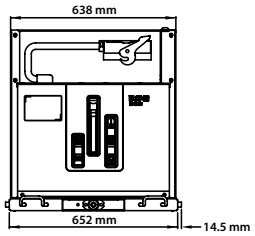


Plan



Pole space 210 mm

Front



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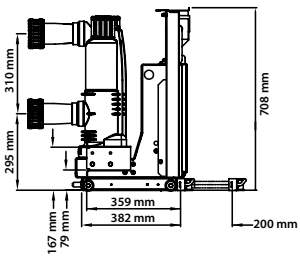

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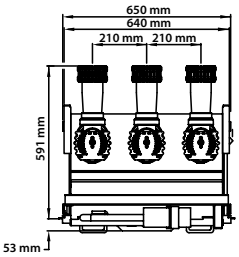
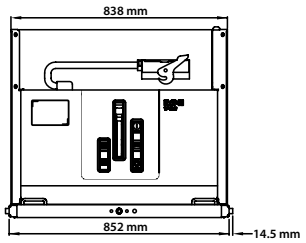


Pole space 275 mm

Front



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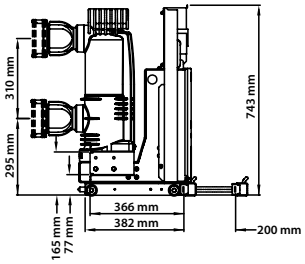

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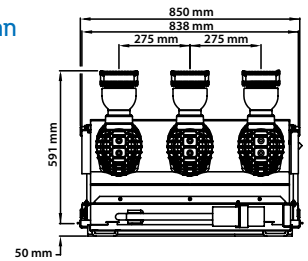
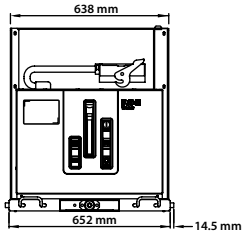


24 kV

Pole space 210 mm

Front



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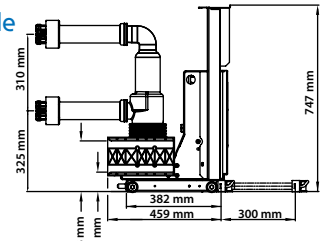

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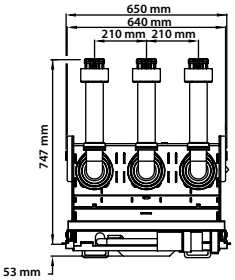
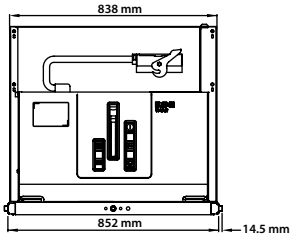
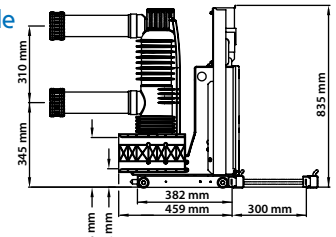


Pole space 275 mm

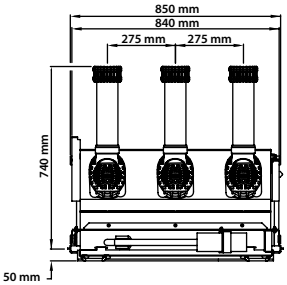
Front



Side



Plan



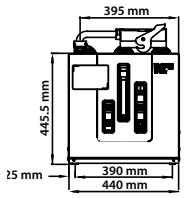
Note:
Not all breaker configurations shown.
For detailed drawings of all available breaker sizes, please contact your Eaton representative.

Fixed

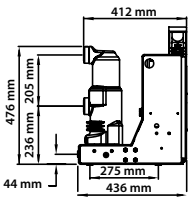
12 kV and 17.5 kV

Pole space 150 mm

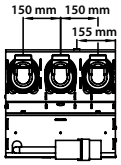
Front



Side

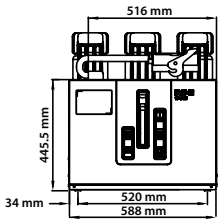


Plan



Pole space 210 mm

Front



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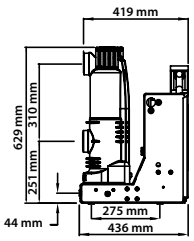
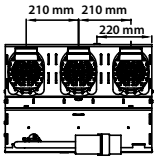
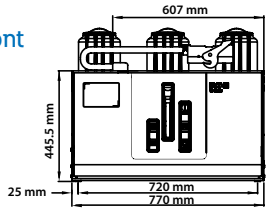


Plan



Pole space 275 mm

Front



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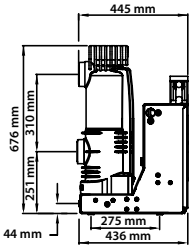
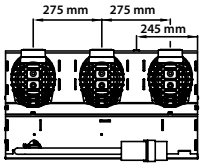


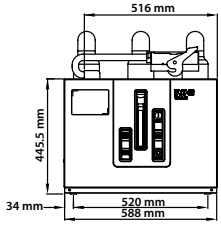
Plan



24 kV

Pole space 210 mm

Front



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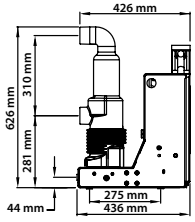
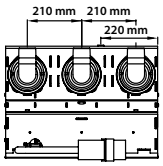
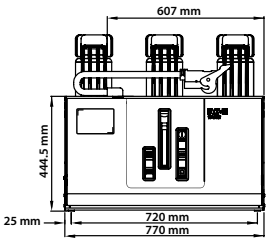


Plan

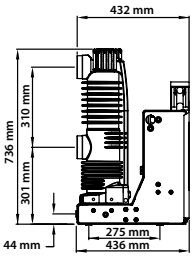


Pole space 275 mm

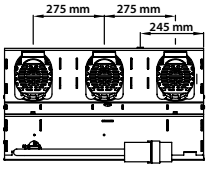
Front



Side



Plan



Note:
Not all breaker configurations shown. For detailed drawings of all available breaker sizes, please contact your Eaton representative.

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