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.
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.
The new and extensive line of 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.

W-VACi 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-VACi 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 SF6-gas that contributes significantly to the greenhouse effect and associated climate change.

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

**Versatility and flexibility**
W-VACi 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.

**Reliability, safety, and performance**
The W-VACi 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-VACi circuit breaker is tested mechanically and electrically before it leaves the ISO 9001 certified factory. W-VACi circuit breakers are compact, user-friendly and cost effective.

An Eaton Green Solution
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 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.

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.

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-VACi 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.

**Universal mechanism assembly (UMA)**

Designed with reliability and long product life, the W-VACi 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-VACi circuit breaker frames, making the W-VACi circuit breaker family easy to work with. Customers see no variation between different W-VACi 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.
W-VACi IEC 12 kV, 17.5 kV and 24 kV

Vacuum circuit breaker

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

W-VACi IEC withdrawable

W-VACi IEC fixed

L-Frame

The L-frame is the interface between the circuit breaker and the switchgear in withdrawable configurations. All W-VACi 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-VACi circuit breaker into a switchgear design is simple and cost-effective. The W-VACi 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-VACi 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.

W-VACi IEC product portfolio overview

<table>
<thead>
<tr>
<th>Circuit breaker designation</th>
<th>12 kV</th>
<th>17.5 kV</th>
<th>24 kV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>U_r  kV</td>
<td>12</td>
<td>17.5</td>
</tr>
<tr>
<td>Rated frequency</td>
<td>f_r Hz</td>
<td>50 / 60</td>
<td></td>
</tr>
<tr>
<td>Rated duration of short circuit</td>
<td>t_k s</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Pole-center distance</td>
<td>mm</td>
<td>150</td>
<td>210</td>
</tr>
<tr>
<td>Upper-to-lower terminal spacing</td>
<td>mm</td>
<td>205 / 275</td>
<td>310</td>
</tr>
</tbody>
</table>

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

W-VACi vacuum circuit breakers provide you with:

- **Environmentally friendly offering**
  The W-VACi IEC circuit breaker interrupting chamber and pole unit insulation are free of SF6 gas. The mechanism plating is RoHS compliant. The encapsulated pole unit materials are recyclable.

- **User friendly operation**
  The W-VACi 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-VACi circuit breakers are very easy to handle due to low weight and small size.

- **Automatic alignment with easy circuit breaker insertion**
  The W-VACi 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-VACi 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 mechanical 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.

- **Flexible**
  The W-VACi 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-VACi 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-VACi 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-VACi IEC vacuum circuit breaker serves all end-user segments such as industrial, commercial, utility, mining, marine and offshore. W-VACi 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 circuit breaker accessories

The W-VACi 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-VACi 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.
Optional accessories

Shunt opening release (SO1)
This device allows for local or remote opening of the circuit breaker and can operate with both direct and alternating current.

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

Second shunt opening release (SO2)
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 both direct and alternating current.

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

Breaker auxiliary contacts
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: 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.)

Racking handle
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.

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

Fixed circuit breaker interlock
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.

Attributes
- Us (DC): 24-48-60-110-125-220-250 V
- Us (AC): 110-120-220-230 V
- Operating limits: 35-50% Us: UVR operates, circuit breaker opens
- 70-110% Us: UVR does not operate
- Continuous Power (Pc): DC = 5 W
- Insulation voltage: 2000 V, 50 / 60 Hz (for 1 min.)

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

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

Closing spring signaling contacts
This device is used to signal whether the operation 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: 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.)

Spring charging motor
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
- Us (DC): 24-48-60-110-125-220-250 V
- Us (AC): 110-120-220-230 V
- Operating limits: 85…110% Us (AC)
- Opening time: 25 – 60 ms
- Insulation voltage: 2000 V, 50 / 60 Hz (for 1 min.)

Position contacts
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.)

Optional accessories

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

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

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

Second shunt opening release (SO2)
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 both direct and alternating current.

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

Undervoltage release
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
- Us (DC): 24-48-60-110-125-220-250 V
- Us (AC): 110-120-220-230 V
- Operating limits: 35-50% Us: UVR operates, circuit breaker opens
- 70-110% Us: UVR does not operate
- Insulation voltage: 2000 V, 50 / 60 Hz (for 1 min.)
### Technical Data 12 kV

**Circuit breaker designation**: W-VACi IEC 12 kV, 17.5 kV and 24 kV

<table>
<thead>
<tr>
<th>Parameter</th>
<th>12 kV W-VACi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage (U&lt;sub&gt;r&lt;/sub&gt;) kV</td>
<td>12</td>
</tr>
<tr>
<td>Circuit breaker designation</td>
<td>W-VACi</td>
</tr>
<tr>
<td>Power frequency withstand (U&lt;sub&gt;d&lt;/sub&gt;) kV 1min</td>
<td>28</td>
</tr>
<tr>
<td>Lightning impulse withstand (U&lt;sub&gt;p&lt;/sub&gt;) kV pk</td>
<td>75</td>
</tr>
<tr>
<td>Rated frequency (f&lt;sub&gt;r&lt;/sub&gt;) Hz</td>
<td>50 / 60</td>
</tr>
<tr>
<td>Rated short-circuit breaking current (I&lt;sub&gt;sc&lt;/sub&gt;) kA</td>
<td>25 kA 25 - 25 - 25 - - - - -</td>
</tr>
<tr>
<td>- 31.5 kA - 31.5 31.5 31.5 - 31.5 31.5 31.5 31.5</td>
<td></td>
</tr>
<tr>
<td>- 40 kA - - - - 40 40 40 40 40</td>
<td></td>
</tr>
<tr>
<td>Rated short-circuit making current (I&lt;sub&gt;ma&lt;/sub&gt;) kA pk</td>
<td>25 kA 63 - 63 - 63 - - - - -</td>
</tr>
<tr>
<td>- 31.5 kA - 79 79 79 79 - 79 79 79 79</td>
<td></td>
</tr>
<tr>
<td>- 40 kA - - - - 100 100 100 100 100</td>
<td></td>
</tr>
<tr>
<td>Rated short-time withstand current (I&lt;sub&gt;k&lt;/sub&gt;) kA rms</td>
<td>Same as rated short-circuit breaking current</td>
</tr>
<tr>
<td>Rated peak withstand current (I&lt;sub&gt;pk&lt;/sub&gt;) kA pk</td>
<td>50 Hz / 60 Hz Same as rated short-circuit making current</td>
</tr>
<tr>
<td>Rated duration of short circuit (t&lt;sub&gt;k&lt;/sub&gt;) s</td>
<td>3</td>
</tr>
<tr>
<td>Rated supply voltage (U&lt;sub&gt;s&lt;/sub&gt;) V</td>
<td>24 - 48 - 80 - 110 - 125 - 220 - 250 DC / 120 - 220 - 230 AC</td>
</tr>
<tr>
<td>DC component (I&lt;sub&gt;dc&lt;/sub&gt;) %</td>
<td>29 …35</td>
</tr>
<tr>
<td>Transient recovery voltage related to short-circuit breaker current (U&lt;sub&gt;c&lt;/sub&gt; t&lt;sub&gt;3&lt;/sub&gt;) kV</td>
<td>20.6</td>
</tr>
<tr>
<td>Rated operating sequence</td>
<td>O-0.3s-CO-15s-CO [4] Same as rated short-circuit making current</td>
</tr>
<tr>
<td>Spring charging time seconds</td>
<td>50 ± 20</td>
</tr>
<tr>
<td>Spring charging time seconds</td>
<td>≤ 12</td>
</tr>
<tr>
<td>Rated cable charging</td>
<td>A: class 25 A, C2</td>
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<tr>
<td>Rated out of phase breaking current (I&lt;sub&gt;d&lt;/sub&gt;) Assigned for circuit breakers rated &gt; 2000 A</td>
<td>kA ms</td>
</tr>
<tr>
<td>Rated mechanical endurance</td>
<td>10,000 / 20,000 [1]</td>
</tr>
<tr>
<td>Rated electrical endurance</td>
<td>E2</td>
</tr>
<tr>
<td>For use in cable-connected systems class</td>
<td>S1</td>
</tr>
<tr>
<td>Operating temperature range °C</td>
<td>- 5 … + 40</td>
</tr>
<tr>
<td>Pole-center distance mm</td>
<td>150 150 150 150 210 210 210 275 275</td>
</tr>
<tr>
<td>Upper-to-lower terminal spacing mm</td>
<td>205 275 275 275 310 310 310 310 310</td>
</tr>
<tr>
<td>Weight [3] kg</td>
<td>Fixed</td>
</tr>
<tr>
<td>25 kA 83 - 90 91 - - - - -</td>
<td></td>
</tr>
<tr>
<td>- 26.3 kA 83 - 90 91 - - - - -</td>
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</tr>
<tr>
<td>- 31.5 kA - 92 93 94 - - - - -</td>
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<tr>
<td>- 40 kA - - - - 131 131 131 217 217</td>
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<tr>
<td>- 50 kA - - - - 183 184 185 218 219</td>
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<tr>
<td>Withdrawable</td>
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<tr>
<td>25 kA 110 - 122 122 - - - - -</td>
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<tr>
<td>- 26.3 kA 110 - 122 122 - - - - -</td>
<td></td>
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<tr>
<td>- 31.5 kA - 123 123 124 - - - - -</td>
<td></td>
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<tr>
<td>- 40 kA - - - - 173 173 173 284 284</td>
<td></td>
</tr>
<tr>
<td>- 50 kA - - - - 229 230 231 285 286</td>
<td></td>
</tr>
</tbody>
</table>

[1] Please contact Eaton for availability
[2] 4000 A rating with forced cooling
[3] Tested at 50 Hz
[4] Operating sequence 0-0.3s-C0-15s-C0 is available on ALL circuit breakers rated 12 kV and 50 kA, and all 12 kV circuit breakers rated ≥ 2500 A
[5] Operating sequence O-0.3s-C0-180s-C0 is available on circuit breakers rated 12 kV up to 40 kA and up to 2000 A
[6] Weights are ± 3 kg depending on breaker configuration
## Technical Data 17.5 kV

### Circuit breaker designation

<table>
<thead>
<tr>
<th>Rated voltage (U)</th>
<th>17.5 kV W-VAC</th>
</tr>
</thead>
</table>

#### Rated insulation level
- Power frequency withstand (U_r) kV 1min: 38
- Lightning impulse withstand (U_f):
- DC component (I_d) %: 29 … 35

#### Rated supply voltage (U):

#### Rated normal current (I_n):
- A, 630, 800, 1250, 1600, 2000, 2500, 3150

#### Rated short-circuit breaking current (I_{sc}):
- kA: 25, 31.5, 40, 50, 63, 82, 104, 125, 172
- kA pk - 50 Hz: 31.5, 40, 50, 63
- kA pk - 60 Hz: 31.5, 40, 50, 63

#### Rated short-circuit making current (I_{tm}):
- kA pk - 50 Hz: 25, 31.5, 40, 50
- kA pk - 60 Hz: 25, 31.5, 40, 50

#### Rated short-time withstand current (I_{st}):
- kA ms: 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):
- ms: 3

#### Rated supply voltage (U):

#### DC component (%):
- %: 29 … 35

#### Transient recovery voltage related to short-circuit breaker current (U_d):
- ms: 71

#### Rated operating sequence:
- 0-0.3s-CO-15s-CO
- 0-0.3s-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_{op}):
- kA ms:
  - 25 kA: -
  - 31.5 kA: -
  - 40 kA: -
  - 50 kA: -

#### Assigned for circuit breakers rated ≥ 2000 A:
- kA ms:
  - 25 kA: -
  - 31.5 kA: -
  - 40 kA: -
  - 50 kA: -

#### Mechanical endurance:
- class: M2

#### 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
  - 150: 150
  - 210: 210
  - 275: 275

#### Upper-to-lower terminal spacing:
- mm:
  - 205: 275
  - 275: 275
  - 310: 310
  - 310: 310

#### Weight:
- kg:
  - Fixed: 25 kA: 84
  - 31.5 kA: 93
  - 40 kA: 93
  - 50 kA: -
  - Withdrawable: 25 kA: 111
  - 31.5 kA: 124
  - 40 kA: 124
  - 50 kA: -

---

[1] Please contact Eaton for availability
[2] 4000 A rating with forced cooling
[3] Operating sequence 0-0.3s-CO-15s-CO is available on circuit breakers rated 17.5 kV up to 40 kA and up to 2000 A
[4] Operating sequence 0-0.3s-CO-180s-CO is available 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/

<table>
<thead>
<tr>
<th><strong>Rated voltage (Ur)</strong></th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rated insulation level</strong></td>
<td>Power frequency withstand (Ud) kV</td>
</tr>
<tr>
<td></td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Lightning impulse withstand (Up) kV</td>
</tr>
<tr>
<td><strong>Rated frequency (f)</strong></td>
<td>Hz</td>
</tr>
<tr>
<td><strong>Rated short-circuit breaking current (Is)</strong></td>
<td>kA</td>
</tr>
<tr>
<td></td>
<td>25 kA</td>
</tr>
<tr>
<td><strong>Rated short-circuit making current (Im)</strong></td>
<td>kA pk - 50 Hz</td>
</tr>
<tr>
<td></td>
<td>25 kA</td>
</tr>
<tr>
<td><strong>Rated short-time withstand current (Ik)</strong></td>
<td>kA rms</td>
</tr>
<tr>
<td><strong>Rated peak withstand current (Ip)</strong></td>
<td>kA pk - 50 Hz / 60 Hz</td>
</tr>
<tr>
<td><strong>Rated duration of short circuit</strong></td>
<td>s</td>
</tr>
<tr>
<td><strong>DC component (Id)</strong></td>
<td>%</td>
</tr>
<tr>
<td><strong>Transient Recovery voltage related to short-circuit breaker current (Uc)</strong></td>
<td>kV</td>
</tr>
<tr>
<td><strong>Rated operating sequence</strong></td>
<td>O-0.3s-CO-15s-CO O-0.3s-CO-180s-CO</td>
</tr>
<tr>
<td><strong>Opening time range</strong></td>
<td>ms</td>
</tr>
<tr>
<td><strong>Breaking time range</strong></td>
<td>ms</td>
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<tr>
<td><strong>Closing time range</strong></td>
<td>ms</td>
</tr>
<tr>
<td><strong>Spring charging time</strong></td>
<td>seconds</td>
</tr>
<tr>
<td><strong>Rated Cable charging</strong></td>
<td>A, class</td>
</tr>
<tr>
<td><strong>Rated out of phase breaking current (Id)</strong></td>
<td>kA rms</td>
</tr>
<tr>
<td></td>
<td>25 kA</td>
</tr>
<tr>
<td><strong>Mechanical endurance</strong></td>
<td>operations</td>
</tr>
<tr>
<td><strong>Electrical endurance</strong></td>
<td>class</td>
</tr>
<tr>
<td><strong>For use in cable-connected systems</strong></td>
<td>class</td>
</tr>
<tr>
<td><strong>Operating temperature range</strong></td>
<td>°C</td>
</tr>
<tr>
<td><strong>Pole-center distance</strong></td>
<td>mm</td>
</tr>
<tr>
<td><strong>Upper-to-lower terminal spacing</strong></td>
<td>mm</td>
</tr>
<tr>
<td><strong>Weight [2]</strong></td>
<td>kg</td>
</tr>
<tr>
<td></td>
<td>25 kA</td>
</tr>
<tr>
<td></td>
<td>20 kA</td>
</tr>
<tr>
<td></td>
<td>25 kA</td>
</tr>
</tbody>
</table>

[1] Please contact Eaton for availability
[2] Weights are ± 3 kg depending on breaker configuration
W-VACi Dimensions

Withdrawable

12 kV and 17.5 kV
Pole space 150 mm

24 kV
Pole space 210 mm
Pole space 275 mm
## Fixed

### 12 kV and 17.5 kV

<table>
<thead>
<tr>
<th>Pole space 150 mm</th>
<th>Pole space 210 mm</th>
<th>Pole space 275 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Front</strong></td>
<td><strong>Front</strong></td>
<td><strong>Front</strong></td>
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<tr>
<td><img src="image1.png" alt="Front View" /></td>
<td><img src="image2.png" alt="Front View" /></td>
<td><img src="image3.png" alt="Front View" /></td>
</tr>
<tr>
<td><strong>Side</strong></td>
<td><strong>Side</strong></td>
<td><strong>Side</strong></td>
</tr>
<tr>
<td><img src="image4.png" alt="Side View" /></td>
<td><img src="image5.png" alt="Side View" /></td>
<td><img src="image6.png" alt="Side View" /></td>
</tr>
<tr>
<td><strong>Plan</strong></td>
<td><strong>Plan</strong></td>
<td><strong>Plan</strong></td>
</tr>
<tr>
<td><img src="image7.png" alt="Plan View" /></td>
<td><img src="image8.png" alt="Plan View" /></td>
<td><img src="image9.png" alt="Plan View" /></td>
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</tbody>
</table>

### 24 kV

<table>
<thead>
<tr>
<th>Pole space 210 mm</th>
<th>Pole space 275 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Front</strong></td>
<td><strong>Front</strong></td>
</tr>
<tr>
<td><img src="image10.png" alt="Front View" /></td>
<td><img src="image11.png" alt="Front View" /></td>
</tr>
<tr>
<td><strong>Side</strong></td>
<td><strong>Side</strong></td>
</tr>
<tr>
<td><img src="image12.png" alt="Side View" /></td>
<td><img src="image13.png" alt="Side View" /></td>
</tr>
<tr>
<td><strong>Plan</strong></td>
<td><strong>Plan</strong></td>
</tr>
<tr>
<td><img src="image14.png" alt="Plan View" /></td>
<td><img src="image15.png" alt="Plan View" /></td>
</tr>
</tbody>
</table>
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