Indoor Vacuum Circuit Breaker
The worldwide demand for power continues to increase at a rapid rate. This is placing ever greater performance demands on utilities and industrial enterprises. Offering everything that is needed for a long service life and switching under short circuit conditions our EHHV-12, vacuum circuit breaks help you gain a competitive edge and adeptly achieve your switching tasks.

Compact design for perfect switching everywhere
One of the most effective ways of interrupting an arc circuit is to do so by means of contacts in vacuum (the vacuum interrupter). During breaking a.c. circuits, the metal vapors condense very rapidly as the current falls to zero, giving a very predictable performance and fast rise of dielectric strength between opening contacts. Several individual designs of vacuum interrupters have emerged having a logical basic concept i.e., a sealed cylindrical enclosure of insulation and metal containing contacts, shields and bellows. The figure along adequately illustrates this concept. As no single metal has all characteristics required for contact material, mixtures have evolved ranging from alloys and bulk interspersions e.g. copper-bismuth, to a sintered matrix consisting of semi refractory porous base infiltrated with a softer material e.g. Chromium and Copper. Copper-chromium contacts have lower current chopping-levels with better voltage withstand when compared to copper-bismuth contacts. Energypac predominantly, uses vacuum interrupters having chromium contacts.

Vacuum interrupters being a sealed-for life device with nil maintenance, great importance is laid on ensuring that the switchgear requires minimum maintenance. Because of the short stroke and inherent vacuum force characteristics of the vacuum interrupters, particular attention has been paid to obtain the optimum level of kinetic energy for achieving the right acceleration at contact separation and also to overcome the tendency for welding which may occur between the contact. When massive butt contacts are closed, there is a pronounced tendency to bounce with undesirable extension of pre-arcing and increased erosion. The mechanism and structure of Energypac vacuum circuit breakers have been coordinated to eliminate bounce by rigidity of drive and flexibility of mounting.

ENERGY PAC remains the first and only company in Bangladesh to introduce horizontal isolated, horizontal draw out type vacuum circuit breaker. Motivation of the top management together with the innovative skills of its R&D team made this circuit breaker meet highly demanding needs for performance from all quarters including consultants, contractors, industries and utilities. Large numbers of this circuit breaker are in operation today in Bangladesh and other parts of the world. This 12 kV horizontal isolated, horizontal draw out vacuum circuit breaker type HHV-12 is highly effective and easy to operate and maintain equipment for distribution at 12 kV. This specially designed equipment offers the following advantages:-

- Customer friendly
- High degree of safety
- High operational reliability
- Rugged design
- Simple in construction
- Modular and compact
- Easy maneuverability of truck
- Extensible with high degree of customisation
The basic enclosure houses the circuit breaker compartment, bus bar chamber, cable chamber, current transformer / potential transformer chambers, relay and instrument panels and earthing facilities. The construction is of metal clad type and uses high grade CRCA steel of adequate thickness ensuring safety and security.

The circuit breaker trolley comprising of vacuum interrupter, mechanism, etc. engages to the enclosure facilitating horizontal isolation and horizontal draw out. The trolleys have distinct service positions, and test positions with latching and locking facility as needed. Interlocking facility is also available through limit switches.

HHV 12 employs rated vacuum interrupters for arc extinction. These interrupters are procured from the world renowned manufacturer, CUTLER-HAMMER (EATON), USA. The interrupters are suitable for a large number of full short circuit operations and mechanical operations.

The mechanism (M-37) is of conventional design and is very simple in operation and construction. The mechanism is designed for operation of very short strokes required in vacuum interrupters and is normally charged by motor. Standby manual charging facility is also provided for the operation in case of necessity. Quick O-CO operation is possible. When charged, the closing spring is held by a latch which can be released either by manual means or by a solenoid to close the circuit breaker. When motor charging is provided, the spring gets automatically recharged immediately after a closing operation. The mechanism is retained in the "ON" position (circuit breaker closed) by an over toggle linkage and trip solenoid to open circuit breaker. That’s why we import springs from one of the best manufacturers of the world, HARRIS SPRING(UK). A hinged door id provided for easy access to the above components. The closing mechanism includes the following indication:

Breaker On/Off
Springs charged or discharged.

The following features are also provided on the switchgear:-

- Operation counter.
- Local On/Off switch.
- Local/remote switch
- All necessary fuses and wiring.

Cable chamber is located at the rest of the panel and can accommodate 6nos.single core 1000 sq. mm cable or equivalent. This can be accessed through removable rear cover.

The cable box is designed for cable entry from top or bottom and sufficient head room is provided for cable termination. Multicourse cables are accommodated in separate compartment to the control/relay panels mounted at the grunt of the housing within metal earthed conduct. All glands and earthing facilities are provided to terminate the main and multi core cables and need to be specified by the customer.
Type EHHV-12 Range

CT/PT CHAMBERS

While the current transformers are housed in the chamber within the cubicle, the potential transformers (voltage transformers) are mounted on top of the cubicle. Range of current transformers can be provided to meet individual customer or replacement in protection repairmen’s.

provision for feeder connection for 3 phase voltage transformers are provided by means of isolatable high voltage fuse Chamber mounted on top position on the circuit breaker metal clad housing.

INSTRUMENT CHAMBER

Relays, indicating instruments and measuring instruments are mounted on a separate chamber. This is a LT chamber and is fully segregated from the other chambers. The relays and meters are mounted on a hinged door and are located at comfortable height for ease of viewing and maintenance. there is a provision to increase the height depending on the number of instruments/ relays to be fitted as needed by the customer.

EARTH SWITCH

Where repaired, earth switches can be provided as an integral part of the equipment. The earth switches are independent in operation to the main closing mechanism, and are interlocked to prevent use when the VCB is connected into its service position.

This prevents the vacuum circuit breaker being faced in a circuit that has been earthed.

operator indicators are provided to warn if the earth switch is in the ON or OFF position, with the additional security that the design has been tested against a full fault make of 3 seconds. Bus bar earthing trucks are provided when repaired.

SPECIAL APPLICATION

In addition to regular distribution function HHV-12 is ideally suitable for capacitor switching application and auto reclosing duty.

ASSURED QUALITY AND SAFETY

HHV-12 is systematically strictly under technology standards set by the company with the components and subsystems selected through strict quality control procedures as per ISO 9001 certifications guidelines.

Separate front door has been provided for circuit breaker to ensure double safety. HHV-12 is the only equipment successfully tested for internal arc for 20kA for 0.1 Sec.

HHV-12. The Proven Solution In Power Distribution

With its systematically developed technology, the Vacuum Circuit-breaker of type HHV-12 occupies a leading position in networks for electrical power distribution. The rated data are dimensioned to suit the user’s requirements. Designed for the operators, the HHV-12 circuit breaker fulfils the high demands of users in all respects.

Applications  | Our circuit-breaker is designed for Switching
--- | ---
Power station  | Short circuit current
Transformers  | Cables overhead lines under load and
Chemical Industry  | no load conditions
Steel industry  | Ripple control system
Automotive Industry  | Capacitor banks
Airport Power Supply  | Transformers and generators under load and
Cold storage power supply  | no-load condition
Building power supply  |  

KEY FEATURES

- Long maintenance free operation
- Fully metal clad design
- Horizontal isolation
- Bus bar system fully insulated
- Manual or motor charged main
- Closing mechanism
- Fully rated earth switches
- Complete set of interlocks and
- Padlocking facilities
- Isolatable voltage transformer
- Ample current transformer
- Commodation
- Extensive use tropical environments
- Safety interlock
EHHV-12 Range vacuum circuit-breaker with green benefits

The EHHV-12 Range vacuum circuit-breaker is our most modern product, which is manufactured using state-of-the-art machines. For voltage levels of 7.2 kV to 24 kV we offer a wide range of pole-center distances and widths across flats as well as different accessory packages. Withdrawable modules, contact arms, contacts, and bushings permit simple integration in all common medium-voltage switchgear. Whether you want to switch overhead lines, cables, transformers, capacitors, or motors, the EHHV-12 Range is easy to integrate into your panels.

Compact design for a long service life

The more compact and lighter construction offers practical benefits for implementing a clear panel design. Moreover, the compact design combined with a long service life and freedom from maintenance of the circuit-breakers for 10,000 operating cycles is kind to the environment.

Careful use of resources

Next to technical advances, we also address environmentally responsible use of resources in the development of our products. All processes are reviewed critically in respect of climate and environmental protection based on our comprehensive know-how and many years of experience.

By including intelligent technology in the manufacturing processes of the EHHV-12 Range, we have been able to reduce the carbon footprint. A EHHV-12 Range vacuum circuit-breaker means quality down to the very last detail.

Your benefits at a glance

- Compact, smaller, and lighter design
- Durable materials
- Long maintenance-free periods
- Environmental recyclable packaging

When time is running short, the vacuum circuit-breaker can also be ordered by emergency express delivery.

The compact and light EHHV-12 Range fits into all medium-voltage switchgear
WSA/WSB WITH VACUUM CIRCUIT-BREAKER 
ADN DISCONNECTOR, 36KV

<table>
<thead>
<tr>
<th>Type</th>
<th>Breaker width</th>
<th>Rated voltage</th>
<th>Rated insulation level</th>
<th>Rated lightning impulse withstand voltage (50/60 Hz)</th>
<th>Rated power frequency withstand voltage</th>
<th>Rated frequency</th>
<th>Rated breaking current</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHHV-12</td>
<td>500 km</td>
<td>12kV</td>
<td>630A, 1250A</td>
<td>62.5 kA</td>
<td>25% %</td>
<td>25</td>
<td>1000 kA</td>
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<tr>
<td></td>
<td>500 km</td>
<td>75</td>
<td>28</td>
<td>25</td>
<td>33% %</td>
<td>33%</td>
<td>2000 kA</td>
</tr>
<tr>
<td></td>
<td>500 km</td>
<td>28</td>
<td>75</td>
<td>20</td>
<td>33% %</td>
<td>33%</td>
<td>2500 kA</td>
</tr>
<tr>
<td></td>
<td>500 km</td>
<td>50</td>
<td>50</td>
<td>20</td>
<td>33% %</td>
<td>33%</td>
<td>3000 kA</td>
</tr>
</tbody>
</table>

Number of operating cycles without overhaul:
- 500 km: 10,000
- 500 km: 10,000
- 500 km: 10,000
- 500 km: 10,000

Operating times with release:
- Opening time (min.): 40 ms
- Closing time (max.): 45 ms
- Arc duration (max.): 15 ms
- Charging time for circuit-breaker: 12 s
Outline drawing and installation dimension

Distance between phases: 15mm
Outline drawing and installation dimension of Fixed type

<table>
<thead>
<tr>
<th>Rated current (A)</th>
<th>630A</th>
<th>1250A</th>
<th>1600A</th>
<th>2000A</th>
<th>2500A</th>
<th>3150A</th>
</tr>
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<tbody>
<tr>
<td>Rated short circuit breaking current (kA)</td>
<td>20,25,31.5</td>
<td>20,25,31.5</td>
<td>20,25,31.5</td>
<td>20,25,31.5</td>
<td>20,25,31.5</td>
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</table>
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