



Indoor Vacuum Circuit Breaker

Made in Bangladesh
crafted with pride

 **Energypac**[®]

Engineering Ltd.



Compact design for perfect switching everywhere

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 EHV-12, vacuum circuit breaks help you gain a competitive edge and adeptly achieve your switching tasks.

Type EHV-12 Range



VACUUM-THE TECHNOLOGY OF CHOICE

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.

ENERGYPAC 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 manoueverability of truck
- Extensible with high degree of customisation

EHV-12 Indoor AC High Voltage Vacuum Circuit Breaker



Type EHV-12 Range

THE CIRCUIT BREAKER

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.

VACUUM INTERRUPTERS

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.

Our vacuum interrupters offer the following advantages:-

- Very low arcing time
- Quick recovery of dielectric strength
- Small contact gap
- Trouble free service
- Low energy mechanism



OPERATING MECHANISM

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.

The energy required for opening is provided by the springs, incorporated in the drive assembly which are compressed during the closing stroke. Springs play the major role for the trip and close time of the breaker. That's why we import springs from one of the best manufacturers of the world, HARRIS SPRING(UK). A hinged door is 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.

CUBICLE

Cubicle is compartmentalised design in various segregations and bus bar are fully insulated for specified power frequency withstand voltage through use of shrinkable sleeves. Joints are fully encapsulated. Bus bar support is rigid enough for all thermal and electrodynamic stresses arising out of 3 second short time current. Duplicate bus bar arrangement is also available with tie breaker trolleys being racked in to the upper or lower bus.

CABLE CHAMBER

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 front 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 EHV-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 no load conditions
Chemical Industry	Ripple control system
Steel industry	Capacitor banks
Automotive Industry	Transformers and generators under load and no-load condition
Airport Power Supply	
Cold storage power supply	
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
- Ccommodation
- 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.



The compact and light EHHV-12 Range fits into all medium-voltage switchgear

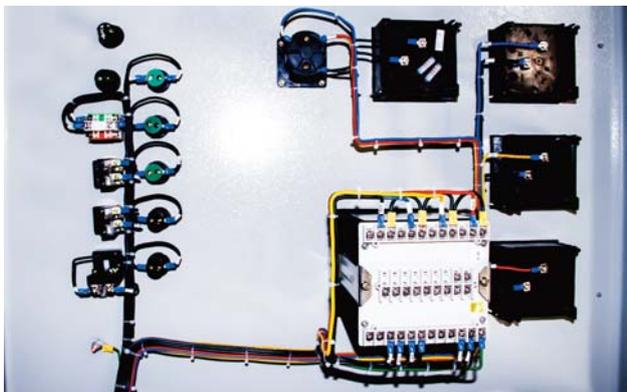
Careful use of resources

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



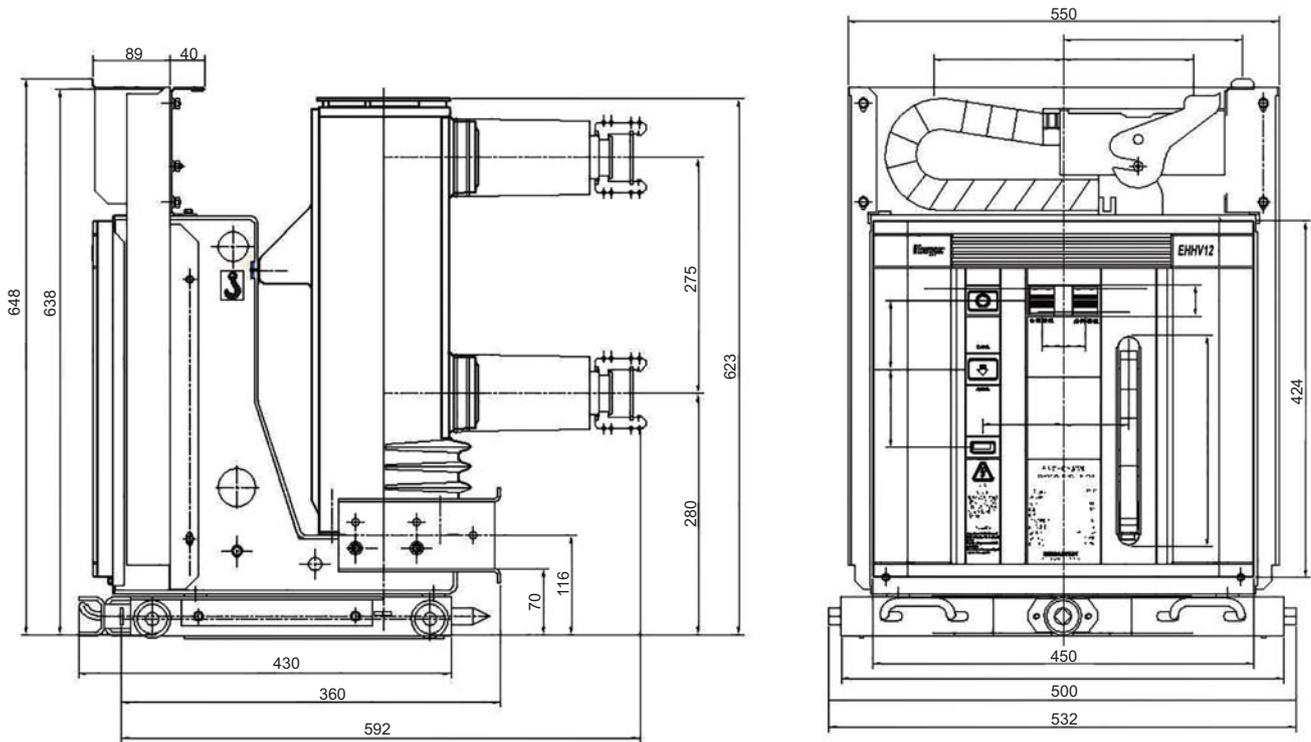
When time is running short, the vacuum circuit-breaker can also be ordered by emergency express delivery



WSA/WSB WITH VACUUM CIRCUIT-BREAKER ADN DISCONNECTOR, 36KV

Type	Breaker width mm	Rated voltage U_r kv	Rated insulation level		Rated frequency f_r Hz	Rated (normal) current I_k Outgoing feeder A	Rated peak withstand current, equal to rated short-circuit making current I_p (50/60 Hz) kA	Rated short-time current I_k $t_k = 1$ 3 s kA	Rated short-circuit breaking current I_{sc} kA	Percentage value of the DC component %	Rated breaking current under asynchronous conditions I_d kA	Number of operating cycles without overhaul		Operating times with release		Arc duration (max.) ms	Charging time for circuit-breaker s
			Rated lightning impulse withstand voltage U_p kv	Rated power frequency withstand voltage U_d kv								with rated (normal) current	with rated short-circuit breaking current	Opening time (man) ms	Closing time (max.) ms		
EHHV-12	500	12kV	75	28	50	630A, 1250A	50	20	20	33%	20 kA	≤10,000	≤100	<40	<45	15ms	<12
	500	12kV	75	28	50	630A, 1250A, 1600A, 2000A, 2500A	62.5	25	25	33%	25	≤10,000	≤100	<40	<45	15ms	<12
	500	12kV	75	28	50	3150	80	31.5	31.5	33%	31.5 kA	≤10,000	≤100	<40	<45	15ms	<12
	500	12kV	75	28	50	3150	100	40	40	33%	40 kA	≤10,000	≤100	<40	<45	15ms	<12

Outline drawing and installation dimension



Rated current (A)	630A	1250A	1600A	2000A	2500A	3150A
Rated short circuit breaking current (kA)	20,25,31.5	20,25,31.5	20,25,31.5	20,25,31.5	20,25,31.5	31.5

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

www.energypac-bd.com

The information contained in this booklet is necessarily general in nature. For further information regarding sales, services or any general queries contact us at the email addresses below:

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