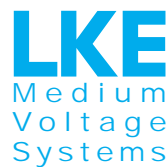


Vacuum Circuit Breaker



12/24kV
VECTOR series
Vacuum Circuit Breaker
VMS series Metal-clad Switchgear



FM 73638



12/24kV VECTOR VCB

■ Features of the VECTOR Vacuum Circuit Breaker:

The VECTOR is a cassette-type (withdrawable) 12/24kV Vacuum Circuit Breaker designed for the VMS metal-clad switchgear, featuring compact dimensions of the circuit breaker and switchboard panels.

The VECTOR VCB has nominal current ratings of up to 2000A, with a maximum breaking capacity of 31.5 kA, and short-time current ratings of up to 31.5 kA / 4 sec.

Whereas the VECTOR-S is a spring-mechanism driven VCB, the VECTOR-M is driven by a low-energy single-coil permanent-magnet actuator system capable of more than 50,000 mechanical operations.

The Vector-M is a low maintenance circuit breaker. The vacuum interrupters are maintenance-free with a minimum lifetime of 20 years. Maintenance of the operating mechanism is only required after 10 years or 25,000 operations. After 40,000 switching operations a general inspection by the manufacturer is recommended.

■ VECTOR VCB compliance with the following standards:

IEC 298, IEC 185 , IEC 282,

IEC 529, IEC 186 ,IEC 56,

IEC 129, DL 404

■ Ambient conditions

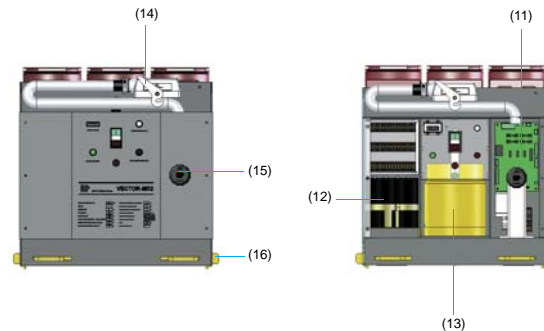
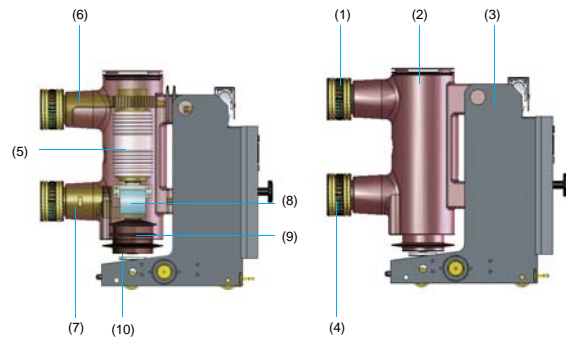
- Ambient temperature: -25 °C to +40 °C.
- Relative humidity: daily average of less than 95% and monthly average of less than 90%.
- Height above sea level of less than 1000 m.
- Earthquake intensity less than 8 degree.
- Environment: no frequent violent vibration.



VECTOR24-S32



VECTOR12-M32



Section view of VECTOR

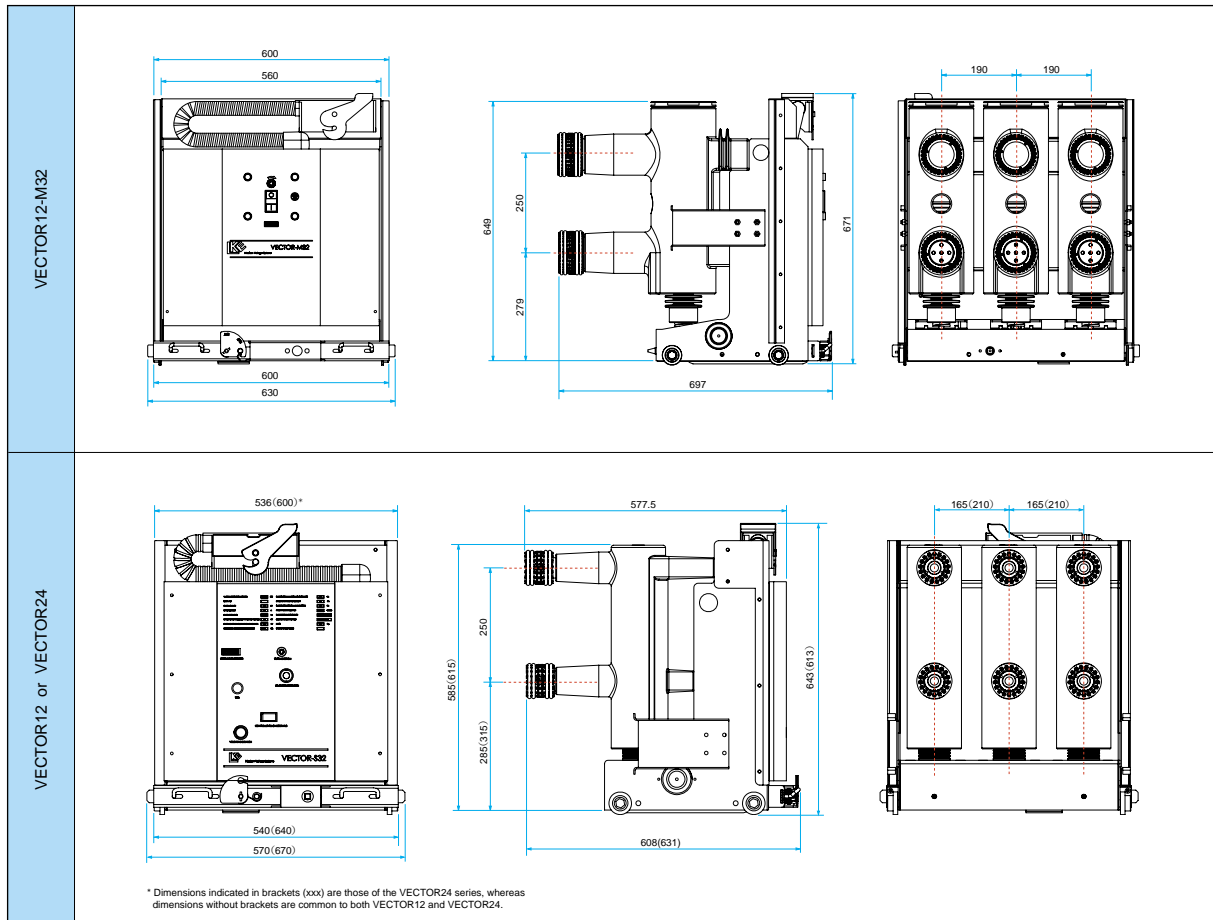
- | | |
|--|---|
| (1)--Top terminals with lotus contacts | (9)-- Insulated push rod |
| (2)--Interrupter housing of epoxy resin | (10)--Contact load spring |
| (3)--Truck | (11)--Actuator controller |
| (4)--Lower terminals with lotus contacts | (12)--Capacitor banks |
| (5)--Vacuum interrupter | (13)--Permanent magnet actuator |
| (6)--Top copper conductor | (14)--Auxiliary terminal connection block |
| (7)--Bottom copper conductor | (15)--Manual trip button |
| (8)--Flexible copper connection. | (16)--Position interlock |

For ratings of current 1600A & above sliding contacts are used instead.

Technical parameters

| Electrical Characteristics | Unit | VECTOR12-M32 | VECTOR12-S20-S32 | VECTOR24-S20-S32 |
|--|--------|-------------------|--------------------|--------------------|
| Rated Voltage | kV | 12 | 12 | 24 |
| Rated current | A | 2000 | 1250 | 1250 |
| Rated frequency | Hz | 50/60 | 50/60 | 50/60 |
| Rated power-frequency withstand voltage | kV | 28/32 | 28/32 | 50/60 |
| Rated Lighting impulse withstand voltage | kV | 75/85 | 75/85 | 125/145 |
| Rated short-circuit breaking current | kA | 31.5 | 20, 25, 31.5 | 20, 25, 31.5 |
| Rated short-time withstand current | kA/s | 31.5/4 | 20/4, 25/4, 31.5/4 | 20/4, 25/4, 31.5/4 |
| Rated peak withstand current | kA | 80 | 80 | 80 |
| Rated short-circuit making current | kV | 80 | 80 | 80 |
| Mechanical endurance | cycles | 20000 | 20000 | 30000 |
| Rated Operating sequence | | O-0.3s-CO-180s-CO | | |
| Mass | kg | 170 | 120 | 130 |

The VECTOR as the following general dimensions



VMS Metal-clad switchgear

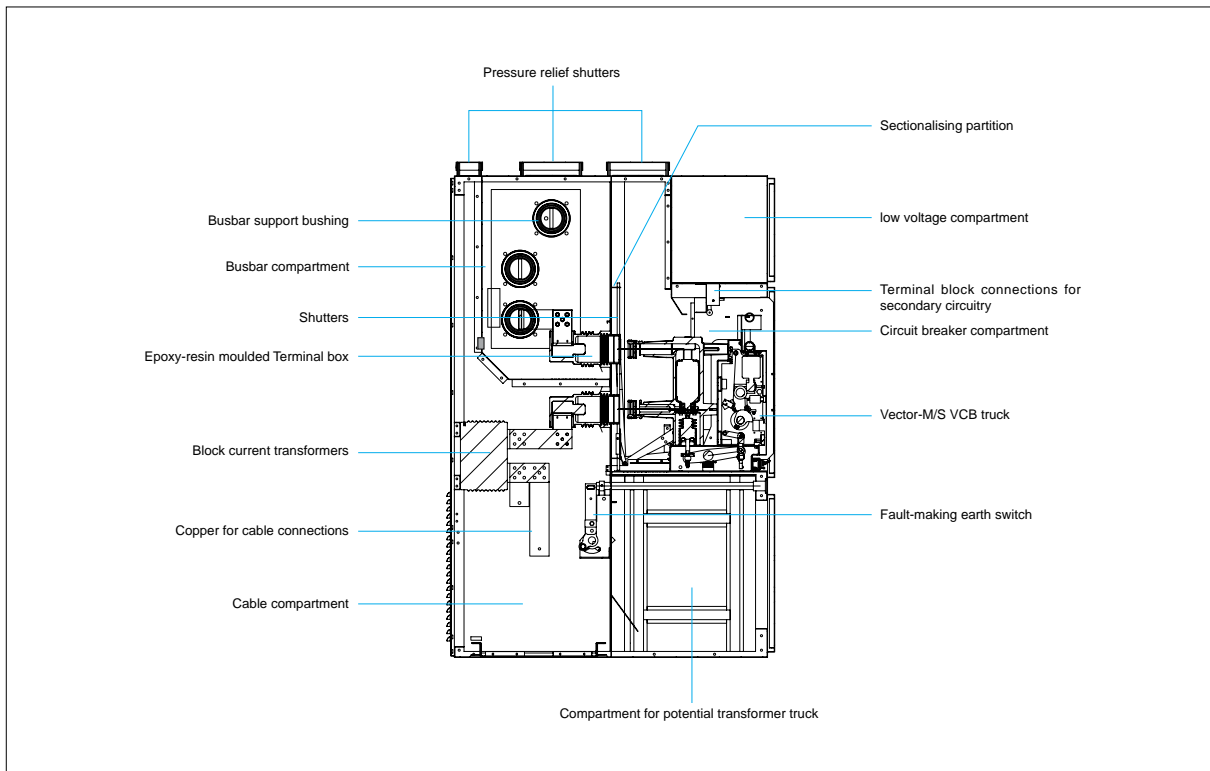
The type **VMS** metal-clad switchgear is designed for installation in distribution substations, transformer substations, electric power stations and industrial companies.

■ Features

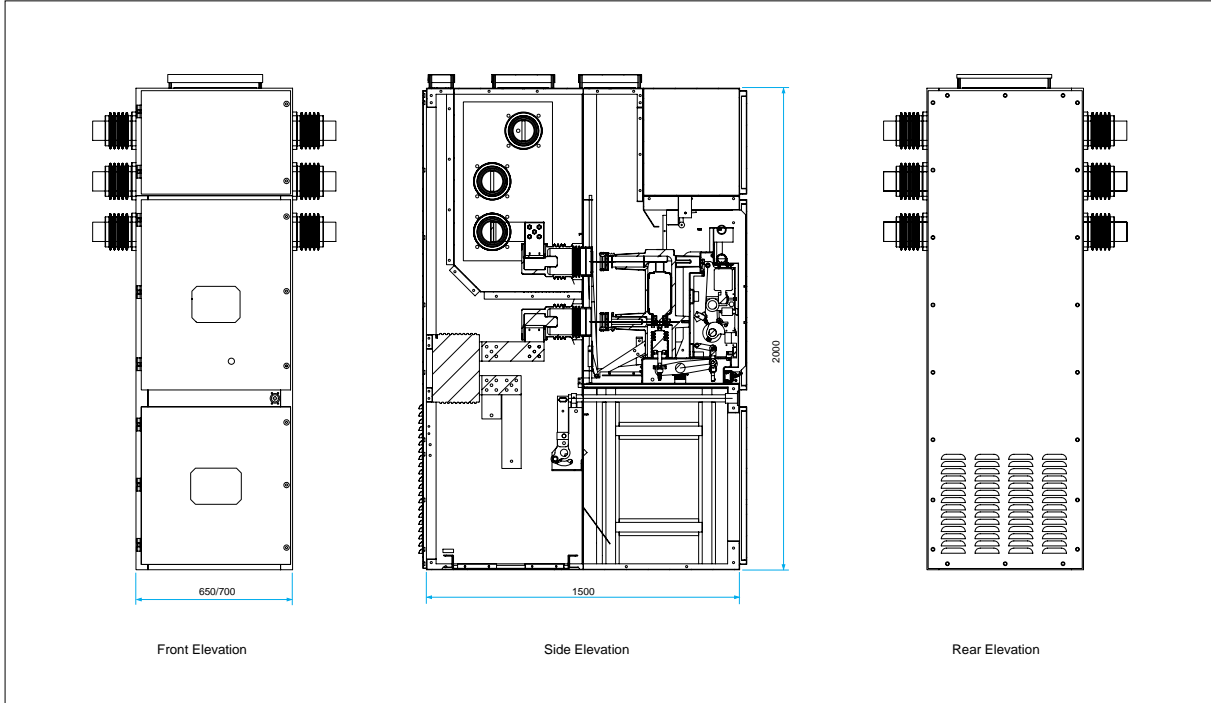
- Air-insulated switchgear panels, metal-enclosed, metal-clad, with a single busbar system.
- Compact dimensioning arising from the compactness of the Vector-M/S and the combination of the terminal box, the current transformers and the voltage indicators into a single component bloc.
- The cable connection compartment is readily accessible through a separate door.
- Ease of operation on closed front section.
- High staff safety through closing of the busbar compartment cladding even in service position.
- Reliability through effective mechanical interlocking system.
- Modular construction allows high flexibility and adaptability.
- Easy access to the various switching devices for routine tests even with maximum complements.

■ The design of the VMS

- The basic frame and supports for mounting the incorporated devices are designed as a compound construction made of welded and bolted parts.
- Reinforced H-frame provides the necessary robustness to withstand internal arcing.
- The reinforced sheet-steel door is provided with a four-point centrally controlled locking system.
- The withdrawable chassis is moved by means of a manual crank into the service and disconnected positions.
- The circuit breaker truck is placed upon the chassis in the service and disconnected positions. For removing the circuit breaker truck, it is slid from the chassis onto a transport trolley and locked onto the trolley for transportation.
- The transport trolley and thus the circuit breaker, may be moved without any other mechanical aid.



Switchgear panel dimensions



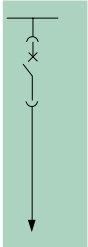
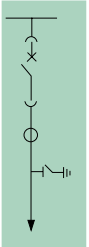
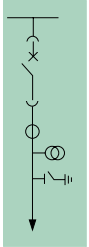
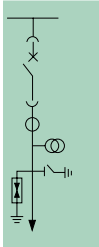
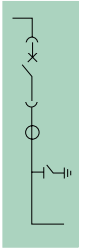

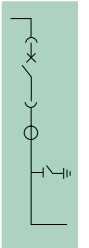
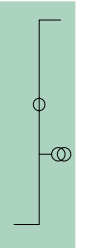
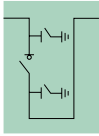
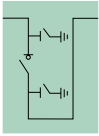
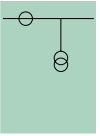
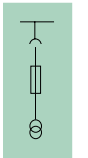
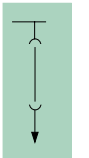
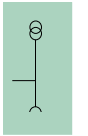
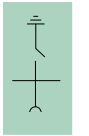
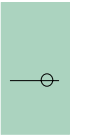
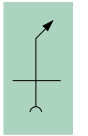
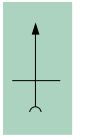
VMS conforms to the following standards and specifications

| | |
|--|--|
| Construction and design type test, routine test | Metal-enclosed(M) DIN VDE 0670, part 6 IEC 298 |
| Arcing resistance in compliance with | DIN VDE 0670, part 601, IEC 298, Appendix AA Criteria 1-3,6 1s 1-6 1s |
| Earthing | DIN VDE 0670, part 6 IEC 298, VDE 0141 |
| Operation, control and work near live parts | DIN VDE 0105, part 1 |
| Installation, building dimensions, room height in compliance with | DIN VDE 0101 Closed electrical substations |
| Protection categories in compliance with* Basic version To order | DIV VDE 0670, part 6 IP 2X IP 3X / IP 4X |
| Normal operating conditions | DIN VDE 0670, part 1000 DIN VDE 0670, part 6 IEC 694, IEC 298 |
| Temperature of ambient air Maximum Mean over 24 hrs Minimum | 40 °C 35 °C minus 5 °C indoor (minus 25 °C with additional measures) |
| Relative humidity Installation altitude | up to 95% up to 1,000m (3,300 ft) above sea level |

Enquiries must be made regarding other operating conditions, e.g. higher ambient temperature, different altitude

*Up to IP52 to order-where no louvres possible

Layout of standard panels

| | | | | | | |
|---------------------------|---|--|---|---|---|--|
| Circuit-breaker panel |  <p>VECTOR-M/S Vacuum circuit breaker</p> |  <p>With: Up to 3 current transformers Earthing switch,make-resistant</p> | or |  <p>With: Up to 3 current transformers Up to 3 voltage transformers Earthing switch,make-resistant</p> | or |  <p>With: Up to 3 current transformers Up to 3 voltage transformers Surge diverter Earthing switch,make-resistant</p> |
| Section isolation panel |  <p>Panel 1 Vacuum Circuit-breaker Up to 3 current transformers Earthing switch,make-resistant</p>  <p>Panel 2 Isolator chassis</p> |  <p>Panel 1 Circuit-breaker or Switch-disconnector Up to 3 current transformers Earthing switch,make-resistant</p>  <p>Panel 2 Up to 3 current transformers Up to 3 voltage transformers or Upward feeder panel or Disconnection truck</p> |  <p>Section isolation with switch-disconnector -up to 1250A - Earthing switch,make-resistant</p>  <p>Panel 1 Section isolation with switch-disconnector Earthing switch,make-resistant</p>  <p>Panel 2(also supplied 600mm wide) Busbar measurement</p> | | | |
| truck panel/chassis panel |  <p>Instrument truck panel/ Instrument chassis panel Without/with fuse-carrier Up to 3 voltage transformers</p> |  <p>Disconnection truck panel/Dis- connection chassis panel</p> | | | | |
| Busbar |  <p>Up to 3 single-pole insulated voltage transformers or Up to 2 two-pole insulated voltage transformers</p> |  <p>Earthing switch, make-resistant</p> |  <p>Up to 3 current transformers</p> |  <p>Busbar connection(fully insulated busbar and flat copper connection)</p> |  <p>Cable connection Up to 2 cable end boxes per phase</p> | |



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