The construction of the switchgear is modular by design. It is custom built to meet your project specific application parameters and has a broad set of features that can be tailored to meet your performance, reliability and safety requirements. The design draws on Eaton's extensive experience in insulation technologies, combining cast resin insulation and fully insulated busbar systems.
The Switchgear platform has three high-voltage compartments separated by earthed metal barriers, providing the highest loss of service continuity classification LSC2B and partition class PM:

01 Arc chamber

The integral arc-chamber evacuates the gasses associated with an internal arc. Optional standard parts are available to extend the arc chamber, flanges and grilles are available to exhaust the gasses outside the switchgear room.

02 Low voltage wire-way for Interpanel wiring

A fully segregated metal wire- way is mounted at the top of each switchgear panel that connects together to form a continuous low voltage wire way that runs along the entire length of the switchgear.

03 Low voltage compartment

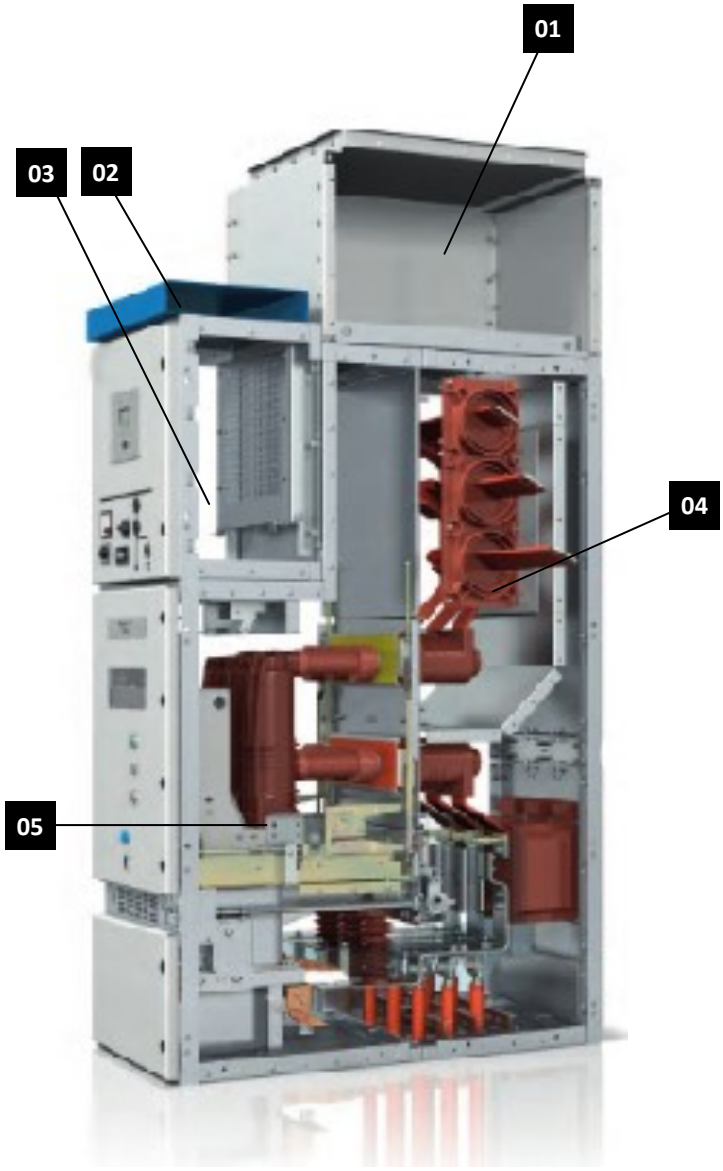
The compartment is segregated with earthed metal partitions and has ample space for any protection and control devices specified by the user.

04 Busbar compartment

Busbars are totally enclosed in their own earthed metal compartment which vents into the arc chamber. Fully insulated along their entire length, the busbars are type tested for ratings up to 3150A, 31.5kA for 3 seconds. Epoxy mouldings segregate switchgear sections.

05 Vacuum circuit breaker compartment

Fully segregated by earthed metal partitions, with its own pressure relief channel into the arc chamber, the compartment provides all the safety interlocking mechanisms required for safe and reliable operation of the vacuum circuit breaker. Manual operation buttons allow for full operation of the vacuum circuit breaker from the front of the switchgear with the door fully closed. The circuit breaker is mechanically interlocked with the compartment door so that the door cannot be opened until the circuit breaker is switched Off and racked out into the Test position.



Complete protection and control

01 Low voltage control and Protection compartment

Clear to view panel with all controls and indications clearly visible and easy to operate.

02 Control and Protection

Eaton has a range of preferred relay options that can be fitted as standard. However, customer specific protection relays from any manufacturer can be fitted to the compartment door.

03 Mimic diagram

Easy to understand mimic diagram of each circuit.

04 Metering with phase selector switch

Option for an ammeter and phase selector switch. Option for voltmeter and phase selector switch.

05 Voltage detection System

Each circuit breaker panel can be equipped with an optional standard three phase voltage detection system for voltage detection to IEC 61243-5. The VDS is driven from a capacitive divider fitted within the insulators connected to the cable connection and shows the operator if the connected cable is live.

06 Circuit breaker position Indicator

Breaker position indication shows the breaker in the Connected/Service or Disconnected/Test position.

07 Electrical operation with circuit breaker status indicator

- Breaker Open/Closed status indicator.
- Breaker Open/Closed command switch.
- Optional LED indication of spring charge mechanism "Charged" status

08 Earth switch indicator

Optional LED indication of earth switch Open/Closed status.

09 Viewing windows

The circuit breaker compartment door viewing window provides visual indication of the position of the circuit breaker indicating:

- The status of the breaker
- The status of the spring charged mechanism

The cable compartment door viewing window allows visual indication of:

- The status of the earth switch
- Inspection of the cable connections

10 Circuit breaker racking mechanism

Circuit breaker racking In/Out mechanism

Main Component

Vacuum circuit breaker

Type W-Vaci and VS1

The vacuum circuit breaker uses a simple and reliable, true two step spring charged mechanism for operation of the vacuum interrupters. The construction of the mechanical linkage between the actuator and the drive rod of each of the three vacuum interrupters is simple and effective.

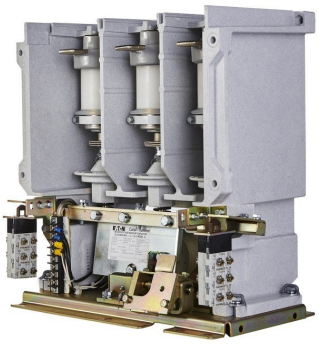
Features

- Environmentally friendly vacuum interrupters totally encapsulated within pole units constructed of solid epoxy resin
- Mechanically and electrically trip-free stored energy mechanism design
- Integrated mechanical lever for manual charging operation with pushbutton control
- Spring charged indicator with contacts for remote indication of spring status
- Mechanical status indicator for Open/Closed
- Auxiliary contacts for Open/Closed position
- Position indicator for Connected/Test position within the compartment.
- Auxiliary contacts for remote position indication
- Mechanically interlocked with the compartment door
- Mechanical interlock to ensure the breaker is in the open position before it can be racked-in or racked-out

Contactor

Type SL400

For motor starters, transformers and capacitor switching, the CP-PrimAirGear system is available with vacuum contactor and fuse combination trucks. Surge arresters can be mounted at the cable terminals. For motor control applications up to 7.2 kV, CP-PrimAirGear incorporates the Eaton range of SL contactors. For motor starters at 12 kV please contact Eaton.



Features

- Environmentally friendly vacuum interrupters
- Ratings up to 400 amps at 6.6 kV
- Capacitor switching up to 295 amps at 6.6 kV
- Maximum interruption current of 8.5 kA
- Fuse protected up to 50 kA
- Electronic coil control for optimum control of the coil voltage and reduced watts loss means more efficient use of power and lower heat generation
- Electronic coil control allows for field selectable control voltages and drop out times
- Up to 6 auxiliary contacts in any combination of Normally Open and Normally Closed configurations
- Mechanical latch option is available with electrical unlatch signal.

Safe and reliable in use

Proven experience and knowledge gained by Eaton over any years in the areas of cast-resin technology, vacuum technology, arc interruption and electrical field control have been integrated in the design and development of CP-PrimAirGear - ensuring that the switchgear is safe and has high operational reliability throughout its lifetime.

Internal Arc Classification (IAC) of AFLR

While the integrity of the equipment to provide continuity of supply was a major design consideration throughout its development, the safety of the operator has also been one of the most important criteria, with a number of reassuring features Built in. Eaton has always Emphasized the need to design and create safe switchgear for operators at all times. One of the biggest potential threats to operators is an internal arc in the switchgear. The metal-clad design and the robust construction has enabled CP-PrimAirGear to success fully pass internal arcing test in accordance with IEC 62271-200 in all three primary compartments and provides an IAC rating of up to 31.5 kA for 1 second. IEC62271-200 defines the level of protection to be provided in the event of an internal arc fault being generated within the switchgear. CP-PrimAirGear has been proven by independent third- party test to provide an IAC Classification of IAC = AFLR.

A = Protection for personnel

F = Protection at the Front of the switchgear

L = Protection at the Lateral (sides) of the switchgear

R = Protection at the Rear of the switchgear

Loss of service continuity Classification

IEC62271-200 describes the extent to which the switchgear and control gear are allowed to remain operational in case access to a main compartment is necessary. CP-PrimAirGear has the highest attainable level of Loss of Service Continuity of LSC2B.

Partition Classification

In addition to the IAC and the LSC classifications, IEC62271- 200 defines the type of partitions required between each panel and between each functional unit within the panel. CP-PrimAirGear employs only earthed metal partitions and therefore has the highest level of partition classification of PM.

For personnel safety CP -PrimAirGear is designed with a number of comprehensive mechanical interlocks to prevent unsafe operation.

- It is not possible to rack-in or rack-out a circuit breaker unless it is in the Off or Open position.
- It is not possible to close acircuit breaker unless the circuit breaker is in the Connected or Test position.
- The secondary socket can only be disconnected with the circuit breaker in the test position.
- Closing the circuit breaker is only possible with the secondary contacts connected.
- It is not possible to close theearth switch when the circuit breaker is in the Connected position.
- The door of the vacuum circuit breaker compartment can only be opened when the circuit beaker is in the Disconnected / Test position.
- It is only possible to rack-in or rack-out the circuit breaker when the circuit breaker door is closed.
- The cable compartment door can only be opened when the earth switch is in the Closed position.
- The earth switch cannot be Opened when the cable compartment door is open.

Fully type-tested to latest IEC standards

The switchgear is type tested to the latest IEC 62271-200standard and has third party certification to prove internal arc containment classification of AFLR.

CP-PrimAirGear complies with the following international standards

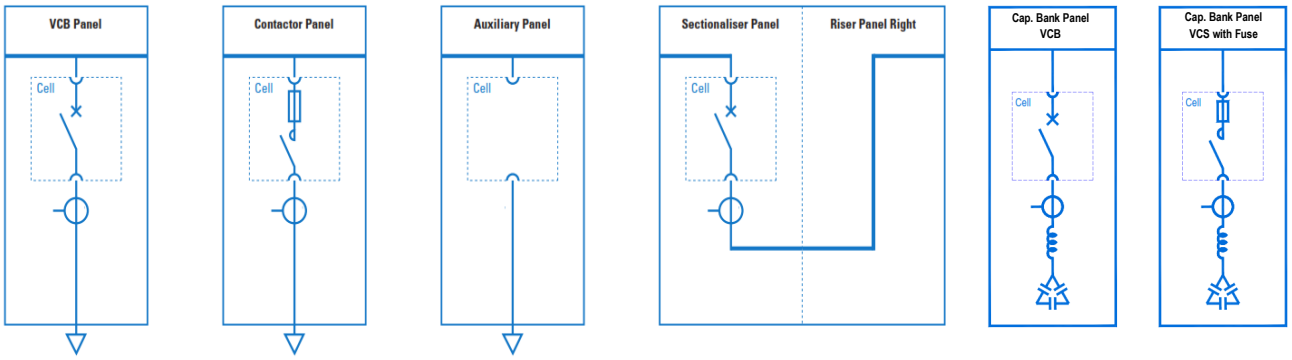
IEC 62271-1	Common specifications
IEC 62271-100	Circuit breakers (E2, M2, C2)
IEC 62271-102	Disconnectors and earthing switches (E2, M0)
IEC 62271-200	Metal enclosed switchgear and controlgear
IEC 60044-1	Current transformers
IEC 60044-2	Voltage transformers
IEC 60529	Degrees of protection (IP Code)
IEC 61850	Communication networks and systems in substations
IEC 61243-5	Live working - voltage detectors - Part 5: voltage detecting systems

Product range

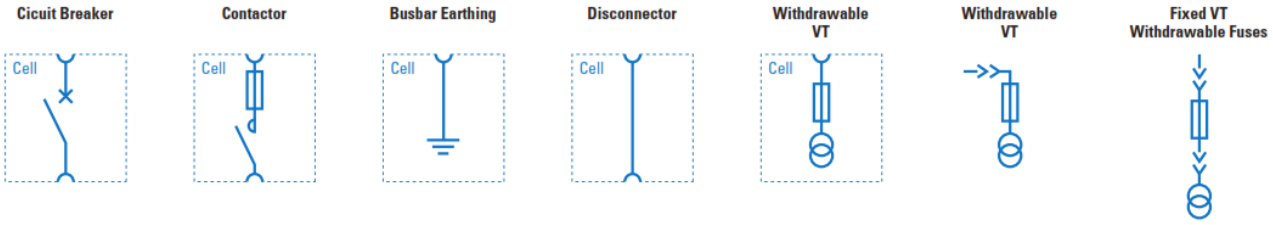
The CP-PrimAirGear product range is very flexible and has a variety of circuit options that enable almost all types of application to be configured.

The truck design is common for all the types enabling the reconfiguration of the panel while in service. For added configuration flexibility the Riser Panels can be fitted on either the left or the right side of the Sectionaliser Panels. Also the width of the combination of Sectionaliser and Riser Panels is kept to a minimum. Further flexibility is provided by the Equipped Riser Panel option. In this configuration any standard equipment truck can be fitted into the Equipped Riser, offering options for busbar metering, earthing, and a disconnect truck. A wide range of additional options are also available for mounting within the main primary compartments. The low voltage control and protection compartment also offers many options for control and indication.

Panel configurations



Trucks configurations



Electrical Data

System	Unit	Up to 12kV	Up to 24kV
Rated voltage	kV	12	24
Lightning impulse withstand voltage	kV	75	125
Power frequency withstand voltage	kV	28	50
Rated frequency	Hz	50/60	
Internal arc class		AFLR	
Loss of service continuity category		LSC2B	
Partition class		PM	
Earthing circuit	kA - s	25 - 3; 26.3 - 3; 31.5 - 3	20 - 3; 25 - 3

Busbar System	Unit	Up to 12kV	Up to 24kV
Rated normal current	A	1250, 1600, 2000, 2500, 3150	1250, 2000, 2500
Rated short-time withstand current	kA - 3 s	25 / 26.3 / 31.5	20 / 25
Rated peak withstand current	kA/50 Hz	63 / 66 / 80	50 / 63
	kA/60 Hz	65 / / 82	52 / 65

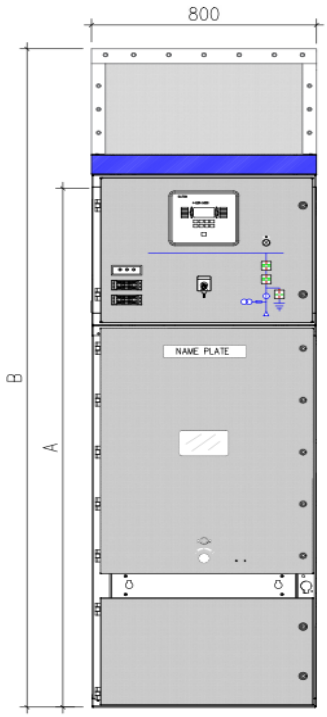
Circuit breaker ratings	Unit	Up to 12kV	Up to 24kV
Rated normal current	A	630, 1250, 2000, 2500, 3150	800, 1250, 2000, 2500
Rated short-circuit breaking current	kA	26.3 / 31.5	20 / 25
Rated short-circuit making current	kA	65/ 82	50 / 63
Rated short-time withstand current	kA-3s	26.3 / 31.5	52 / 65
Single capacitor bank switching	C2 A	400	
Multiple capacitor bank switching back to back	C1 A	400	
Class		S1, E2	
Auxiliary voltage	Vac 50/60Hz	110/120/127, 208/220/240	
	Vdc	24/48/60, 110/125, 220/250	

Mechanism	Unit	Up to 12kV	Up to 24kV
Rated operating sequence	A	O - 0.3s - CO - 15s –CO *1 O - 0.3s - CO - 180s –CO *2	
Class		M2	
Number of Operations		up to 20,000	
Number of Operations Interrupter		up to 20,000	

Accessibility of compartments	
Circuit breaker compartment	Interlock-controlled
Busbar compartment	Tool-based/non-accessible
Cable compartment	Tool-based or Interlock-controlled
External degree of protection	IP 41
Internal degree of protection	IP 21
Installation	Indoor
Temperature classification	-5 to +40°C
Relative humidity (max)	95 %

Dimension & Weight

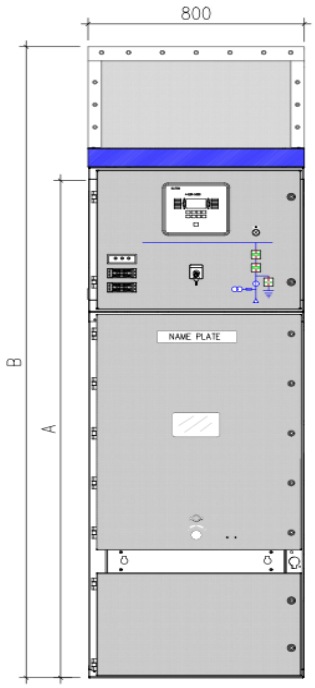
12kV



Dimensions 12kV		
Width	800mm	1000mm
Rating	Up to 2000A	Up to 3150A
Depth	1720mm	1920mm
Height (A)	2100mm	2100mm
Height including Arc Chamber (B)	2660mm	2660mm

Dimensions 24kV		
Width	800mm	1000mm
Rating	Up to 2000A	Up to 3150A
Depth	1720mm	1920mm
Height (A)	2200mm	2200mm
Height including Arc Chamber (B)	2760mm	2760mm

24kV



Weights 12kV	
Circuit Breaker Cubicle 12kV	Max weight including Circuit Breaker
25kA, 630A	730 kg
31.5kA 1250A	770 kg
31.5kA 2000A	1100 kg
31.5kA 3150A	1550 kg

Weights 24kV	
Circuit Breaker Cubicle 24kV	Max weight including Circuit Breaker
20kA, 800A	1330 kg
25kA 1250A	1370 kg
25kA 2000A	1700 kg
25kA 2550A	1700 kg

Certificates

Type Test Certificate by Qualis

Rated 12KV

Type Test Certificate by Qualis

Rated 24KV

Success Stories

PT. Hyundai Motor Manufacturing Indonesia

PT. Hyundai Motor Manufacturing Indonesia has established a car manufacturing facility on an area of 77.6 hectares located in the central of Cikarang, Deltamas West of Java, Indonesia. With a target of production 150,000 units of cars per year, half of that amount to be exported to Southeast Asian countries. We, as an Electrical Switchgear supplier, both LV Switchgear and MV Switchgear are very proud to be able supply to PT. Hyundai Motor Manufacturing Indonesia. We have supplied Electrical Switchgear products as follows:

- MV Switchgear 20kV : 64 Unit
- MV Switchgear 3.3 kV : 22 Unit
- MV Capacitor Bank 3.3 kV : 20 Unit

NO	Project Name	Customer	Market Application
1	Pembangunan Mini LNG Tuban	PT. Sumber Aneka Gas	Oil & Gas
2	PLTMG BALOI 50MW BATAM	PT. Tasnim Gerak Persada	Power Plant
3	Pertamina Geothermal Energi Lumut Balai	PT. Prasasti Nusalestari	Power Plant
4	Hyundai New BSA Manufacturing Plant	PT. Hyundai Motor Manufacturing Indonesia	Industrial
5	PLTU SEBALANG	PT. Enviromate Technology Indonesia	Power Plant
6	N2 GENERATOR PATRA ARUN GAS ACEH PROJECT	PT. IMECO INTER SARANA	Oil & Gas