



CBGS-0 Gas-Insulated Switchgear



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Life Is On

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CBGS-0 Gas-Insulated Circuit Breaker Switchgear Unit up to 38 kV

Energy supply reliability is our challenge

At Schneider Electric, we are constantly developing and improving our products and services. Our aim is to satisfy our customers' high demands for a reliable electrical power supply while producing highly efficient yet economical transmission and distribution equipment.

The UL listed, gas-insulated circuit breaker switchgear CBGS-0 is compact and easy to install and operate. The SF6 blanket, solidly insulated busbar and cable connections help protect the internal configuration of the medium voltage components from environmental influences which improves resistance to arc flash events.

Easy, innovative, and economical

CBGS-0 is the optimal solution for a variety of applications from transformer substations to primary power supplies. CBGS-0 is suited for mining, petrochemical oil and gas industries, renewable installations, and container substations.

CBGS-0 is a unique and innovative concept with ratings up to 38 kV, 2,000 A, and 31.5 kA. It is available with configurations using mains and feeders, ties, and cable sections. Primary fused voltage transformers and current transformers are available as well.

This compact and modular switchgear offers both flexibility and a long, low-maintenance service life. It is an excellent choice for any location, including those with limited space or harsh environmental conditions.

CBGS-0 is economical as assembly, expansions, and disassembly occur on site in a straightforward fashion. CBGS-0 uses a grounded and shielded solid insulated bus system installed in the top rear part of the switchgear, outside the SF6 gas compartment, allowing for system changes without gas handling on site.

Advantages

- Save up to 70% of footprint compared to traditional air insulated switchgear
- No SF6 gas handling required during installation
- Shielded solid insulated busbar system minimizes the likelihood of phase to phase faults and arc flash.
- Intuitive operation with integral safety interlocks
- 10 year maintenance cycle
- UL listed to IEEE C37.20.3





Reliability

- Installation, extension, replacement, and maintenance, all without SF6 handling on-site.
- Monitoring equipment included for each gas compartment, and individual pressure relief devices for each circuit breaker.
- Minimal static and dynamic seals for the SF6 tank.
- Shielded solid insulated main bussing using silicone-rubber dielectric.
- Increased protection of the medium voltage components from environmental contaminants such as
 - » moisture
 - » dust/dirt
 - » chemicals/solvents
 - » rodents/vermin

System Integrity

- No exposed live medium voltage components
- Reduced likelihood of arc flash or phase to phase faults
- Minimized human interaction due to long maintenance cycle
- Built in interlocking to block inadvertent operation

Reduced Footprint

- Compact base form factor with 24" width up to 38kV.
- Up to 70% footprint savings versus traditional air insulated switchgear designs
- Designed for front access only
- Reduced space requirements due to SF6 and solid dielectrics

Reduced Total Cost of Ownership

- Maintenance-free gas tank made of stainless steel
- 10 year switchgear maintenance cycle

Ecological

- No SF6 gas handling during assembly or maintenance
- Use of recyclable materials for efficient disposal at service life end including the SF6.
- RoHS compliant



CBGS-0

Busbar Compartment

Greater simplicity of installation using the solid insulated silicone-rubber busbar

Isolated from the circuit breaker tank and low voltage cabinet, the busbar system is composed of busbar lengths, end connectors, tee connectors, and end caps. Busbars extend continuously through the length of the switchgear and easily transition from one section to another. The busbar is a round, copper conductor, plug-in type that is grounded and shielded within a silicone-rubber insulation and is connected to the circuit breaker compartment by means of singlepole screwed bushing. Like the sealed-for-life circuit breaker compartment, the busbar does not require any maintenance. It enables assembly without gas work at the installation site and allows the switchgear line-up to be extended in a very quick and simple way, with minimal outage required.

Further benefits of this busbar system include:

- Single pole configuration helps prevent phase-to-phase faults
- Hermetically sealed SF6 circuit breaker compartment and the grounded and shielded solid insulated bus system helps protect components from aggressive environmental conditions and the ingress of foreign objects
- Optional current transformers mounted on the busbar

Reduced space requirement

CBGS-0 helps to minimize the cost of investment due to its space saving design. Replacement of older, conventional switchgear units by CBGS-0 in existing rooms is possible through step-by-step commissioning of the CBGS-0 panels while disassembling the existing switchgear. This process minimizes downtime for the electrical power supply.

CBGS-0 switchgear has been designed for front access-only installations. It does not require a rear access aisle. Operating and maintenance procedures for the low voltage components and structure can be performed from the front and side.

Improved switchgear management — no on-site gas handling during assembly

CBGS-0 does not require on-site gas handling for assembly or expansion work. The circuit breaker compartment is delivered to the site of installation with the rated filling pressure. The gas-filled compartment is factory tested for leakage. If necessary, a switchgear section addition or replacement is possible without gas handling and without interference of the gas-filled compartments.

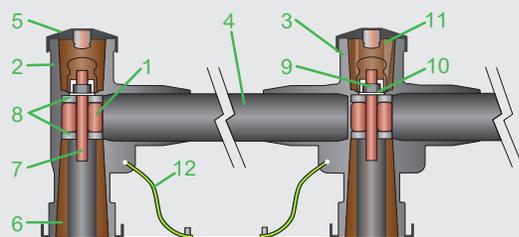
Options allow for diversity of sections

The versatile modules enable implementation of a variety of switchgear configurations:

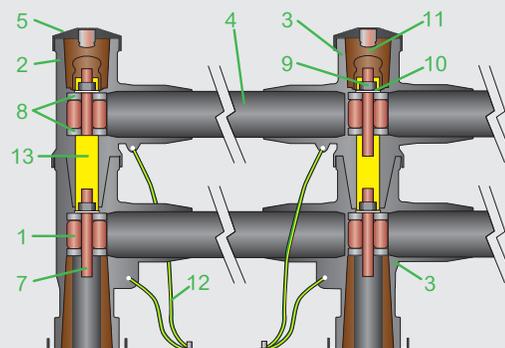
- Circuit breaker sections for incoming and outgoing feeders with insulated dead-break bolted elbow cable connections
- Voltage transformer with isolating device on MV side and transformer grounding feature
- Bus tie with circuit breaker including busbar risers and integrated busbar grounding

Details of the Busbar System

1,200 A



2,000 A



1. Busbar connection
2. Insulation plug
3. Cross adapter
4. Busbar
5. Covering cap
6. Bushing
7. Threaded bolt
8. Contact shell
9. Nut
10. Washer
11. Insulating plug
12. Ground strand
13. Intermediate connection

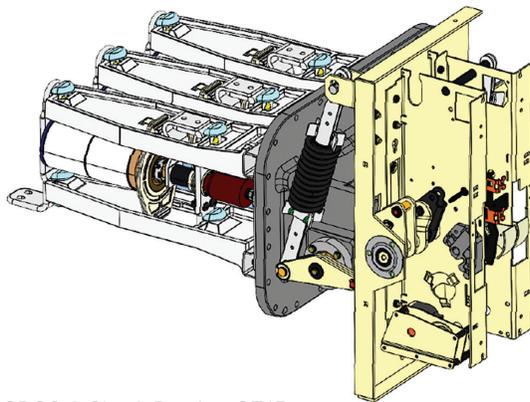
Circuit breakers

CBGS-0's fixed mounted circuit breaker is available in two forms; either with vacuum interrupting bottles or SF6 interrupting bottles for load and fault interruption.

The vacuum bottle circuit breaker is a common, modern application of contact interrupting technology balancing interrupting time, fault interruption ratings, and cost. Vacuum bottles are a proven method for long term load and fault interrupting in the medium voltage applications.

The SF6 interrupting bottle breaker works on the basis of the "puffer" type principle in SF6 which is used as a breaking and insulating medium. Each of the three poles is independently enclosed in a low relative pressure system and does not require filling during equipment's life.

Both breaker types are standardized for 10,000 mechanical operations and 5 cycle interruption using charged spring actuation and have been designed and tested to the IEEE C37.04, C37.06, and C37.09 standards.



CBGS-0 Circuit Breaker, SF1P

Verifying voltage presence

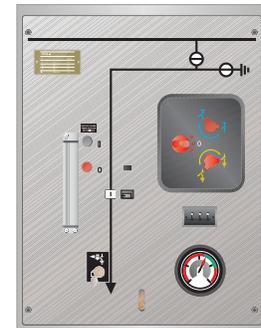
CBGS-0 switchgear is provided with a live line indicator (LLI) installed in the front panels and capacitive divider installed in the output bushings. Each of the LLI's three lamps will illuminate to indicate voltage presence in the cable corresponding to the indicated phase. The LLI will indicate voltage when the equipment is energized.

Ergonomic operation

Mechanical operation is performed the same way as conventional air insulated switchgear with stationary switching devices. Separate mechanical controls and indicators are available for the following functions:

- Circuit breaker OPEN/CLOSE
- Isolation switch OPEN/CLOSE
- Cable/Busbar grounding switch OPEN/CLOSE

The mechanical control panel is located at an operator-friendly height and arranged in a recessed position on the switchgear front. The operating area is clearly visible without control elements protruding from the switchgear front.



Control Panel

Low voltage cabinet

Low voltage devices for protection, control, and monitoring as well as terminal strips are installed in the spacious low voltage cabinet. The rugged door of the low voltage cabinet accommodates the devices required for operation of a switchgear section. The basic model of the metal-enclosed, low voltage switch cabinet mounted on the section is 31.5 in. high (total section height of 92.5 in.). The interface to the section on the low voltage end is a pluggable design.

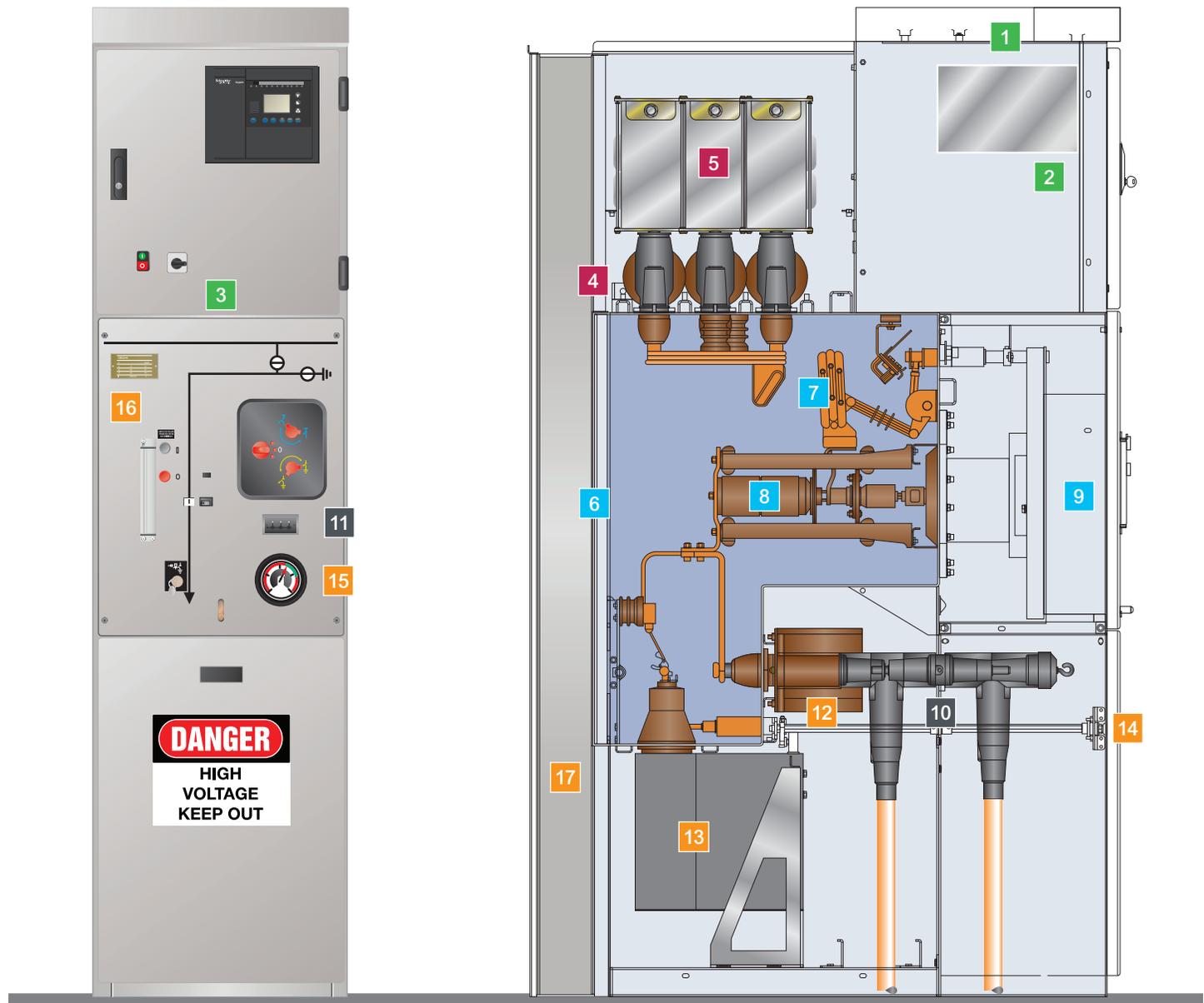
Cable compartment

The metal-enclosed cable connection compartment is easily accessible on the front of the switchgear, and allows for easy access for pulling and terminating cables. The CBGS-0 cable connection system uses dead-break bolted elbow style connections in order to limit potential exposure to live components.

Bushing Connections

The cable bushings are Type C according to CENELEC EN 50180 and 50181 which uses completely insulated and shielded elbow or tee style connections for incoming and outgoing cables as well as surge arrestors. Each bushing allows for the depth of up to four elbows in the cable compartment.

General Architecture



Low Voltage Cabinet:

1. LV cable intersection tray
2. Protection, metering, automation, and control devices
3. Isolation switch monitoring camera port

Main busbar system with shielded solid insulation system:

4. Busbar current transformers (optional)
5. Busbar voltage transformers (optional)

Stainless steel SF6 tank (2.5 mm):

6. Pressure relief valve
7. Three position disconnect and grounding switch
8. Circuit breaker
9. Circuit breaker and disconnect switch operating mechanism

Power cable compartment:

10. Power cable connectors
11. Live line indicator (LLI)

Instrument Transformers

12. Current transformers
13. Voltage transformers
14. Voltage transformer disconnect switch
15. SF6 Pressure Gauge
16. Switchgear nameplate
17. Rear exhaust duct

Functional Units

| | Main/feeder | Bus section* | Bus riser* | Disconnecting switch | Fused bus VT section** |
|---------------------------------|-------------|--------------|-------------|----------------------|------------------------|
| | | | | | |
| Nominal voltage (kV) | 15, 27, 38 | 15, 27, 38 | 15, 27, 38 | 15, 27, 38 | 15, 27, 38 |
| Busbar system rated current (A) | 1,200/2,000 | 1,200/2,000 | 1,200/2,000 | 1,200/2,000 | 1,200/2,000 |
| Outgoing rated current (A) | 1,200/2,000 | 1,200/2,000 | 1,200/2,000 | 1,200/2,000 | |
| 2 sec. withstand current (kA) | 25 – 31.5 | 25 – 31.5 | 25 – 31.5 | 25 – 31.5 | Limited by the fuse |

* Two options: busbar or cable connection.

** Used for primary fused potential transformer.

Dimensions and weight

| Modular functional units | | Main/feeder, bus section | | Bus riser, disconnecting switch | | VT auxiliary section |
|---------------------------|--------|--------------------------|---------------|---------------------------------|--------------|----------------------|
| Continuous Current Rating | | 1,200 A | 2,000 A | 1,200 A | 2,000 A | Not Applicable |
| Dimensions in. (mm) | Width | 23.5 (598) | 47.2 (1,198) | 23.5 (598) | 47.2 (1,198) | 23.5 (598) |
| | Depth | 55.1 (1,400) | 55.1 (1,400) | 55.1 (1,400) | 55.1 (1,400) | 55.1 (1,400) |
| | Height | 92.5 (2,350) | 92.5 (2,350) | 92.5 (2,350) | 92.5 (2,350) | 92.5 (2,350) |
| Weight lb. (kg) | | 1,598 (725) | 2,249 (1,020) | 1,058 (480) | 2,052 (930) | 926 (420) |

General electrical characteristics*

| Rated voltage | | kV | 27 | 38 |
|---|-------------------------------------|-----------|-------------------|---------|
| Rated insulation level | Power frequency, 60 Hz | (kV) | 60 | 70/80 |
| | Lightning impulse withstand voltage | (kV peak) | 125 | 150/170 |
| Rated normal current | Busbar system | (A) | 1,200/2,000 | |
| | Incoming/outgoing | (A) | 1,200/2,000 | |
| Rated interrupting short circuit current | | (kA) | 25/31.5 | |
| Rated momentary withstand short circuit current | | (kA peak) | 65/82 | |
| Short time withstand current | | (kA/s) | Max 25/2 – 31.5/2 | |
| Gas pressure at 20 °C | | (psi) | 18.85 | |
| Standard degrees of protection | HV Compartment | | IP65 | |
| | LV Compartment | | IP3X – IP41 | |

* Designed, manufactured, and tested in accordance with and meets the applicable ANSI/IEEE and NFPA 70 requirements.



For more information, visit www.schneider-electric.us/cbgs
or contact your local Schneider Electric representative.

Schneider Electric

800 Federal Street
Andover, MA 01810
888-778-2733

schneider-electric.us

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