CBGS-2
Gas Insulated metal enclosed Switchgear
52 kV
Catalogue
A new path for achieving your electrical installations

A comprehensive offer

The CBGS-2 range is part of a comprehensive offer of products that are perfectly coordinated to meet all medium and low voltage electrical distribution requirements. All of these products have been designed to work together: electrical, mechanical and communication compatibility. The electrical installation is thus both optimised and has improved performance:
- better service continuity,
- increased personnel and equipment safety,
- guaranteed upgradeability,
- efficient monitoring and control.
You therefore have all the advantages at hand in terms of know-how and creativity for achieving optimised, safe, upgradeable and compliant installations.

Tools for facilitating the design and installation

With Schneider Electric, you have a complete range of tools to help you get to know and install the products whilst complying with current standards and good working practices. These tools, technical sheets and guides, design software, training courses, etc are regularly updated.

Schneider Electric is associating itself with your know-how and your creativity to produce optimised, safe, upgradeable and compliant installations

For a real partnership with you

A universal solution doesn’t exist because each electrical installation is specific. The variety of combinations on offer allows you to truly customise the technical solutions. You are able to express your creativity and put your know-how to best advantage when designing, manufacturing and exploiting an electrical installation.
# Contents

**General overview**
- Field of application 4
- Main characteristics 5

**Functional units**
- Basic description 8
- Configurations for single busbar 10
- Configurations for double busbar 12

**Apparatus**
- 52 kV circuit breaker 14
- Circuit breaker operating mechanism 15
- 3 position disconnector 17
- Current transformers 18
- Voltage transformers 19
- General busbar system 20

**Installation**
- Power cables 21
- Implementation examples 22
- Civil engineering 23
General overview

Field of application

Power supply utilities

Windfarms

Airports

Industrial sector

Cogenerations

Traction substations**  mono-phase, two-phase and three-phase versions
- High speed trains (TGV)
- Railways
- Underground
- Tramways.

The technical requirements for traction substations are different from those of other types of installations.

For this reason, CBGS-2 range is extended for this market with other versions, keeping the basic architecture of the switchgear invariable.

In any case, CBGS-2 range complies with the specifications of general international standards and specific standards for railways, maintaining the usual characteristics of our switchgears, that is, reliability, safety, robustness and repairability.
CBGS-2 range of switchgears has been officially approved by the main power supply utilities as well as by the main industrial and infrastructure users. Nowadays, more than 7,000 switchgears of the CBGS range have already been installed.

This range of switchgears offers certain distinctive characteristics, such as the following ones:
- Low working pressure (0.4 relative bars)
- Homogeneous architecture
- High degree of partitioning
- Optional gas exhaustion channel for single busbar version.

Besides, the design of he CBGS-2 switchgears fully meets the basic requirements of end users:
- Investment optimization
- Service continuity
- Operation safety.

**Investment optimization**
The switchgears of the CBGS-2 range are the best choice of investment due to the following features:
- **Optimization of the required space compared to other outdoor solutions**
  - The compact design, as well as the SF6 insulation of the switchgears, provide extremely reduced dimensions compared to traditional outdoor solutions.
  - An appropriate solution is thus provided for urban environments or reduced spaces.
- **Simplified engineering**
  As a result of the experience gathered in collaboration with Power Supply Utilities, Consultants and Contractors, there is a complete range of already developed solutions which considerably simplify the engineering work.

**Integral management of networks**
For those clients who wish to install a complete supervision system for their switchgears in order to improve their electrical supply, there is a full range of protection, control and monitoring elements suitable for CBGS-2 switchgears.

**Service continuity**
Choosing CBGS-2 switchgears provides users with the highest degree of availability of their MV units, thus ensuring the greatest reliability and quality when supplying energy to the clients of the Power Supply Utilities.

**Highly confirmed quality**
- Proven experience in the design and manufacturing of SF6 insulated primary distribution switchgears.
- Use of 3D design techniques and other advanced tools.
- Fully factory-tested equipments.

**Solid and safe design**
- CBGS-2 cubicles can neither be affected by moisture or dirt, nor by corrosive or polluted operating environments, since all high voltage parts are contained inside the SF6 tanks, which are made of stainless steel.
- The hermetic nature of the stainless steel tanks ensures the protection of the cubicles against external agents such as dust, insects, rodents, etc.

**High degree of maintenance and repairability**
- The operating mechanism of the circuit breaker is accessible from the outside of the stainless steel sealed tank.
- The screened voltage transformers, can be plug-in type and independent from the stainless steel tank.
- Possibility of elements replacement, such as three-phase bushings, gaskets, disconnectors, etc. without moving the affected cubicles or the adjacent ones.
- Possibility of intermediate cubicles replacement without moving the adjoining ones.

**Extensions under voltage**
The design of CBGS-2 switchgears, double busbar version, allows the extension of a switchboard without cutting off service.

**Low maintenance**
There is practically no maintenance required for the operation of a CBGS-2 switchboard and this is mainly focused on the operating mechanisms.
Main characteristics

Maximum operating safety

CBGS-2 switchgears provide users with the highest degree of safety in operating conditions.

High degree of partitioning

CBGS-2 switchgears have been designed so that the apparatus is distributed in clearly distinguished and independent, gas-tight and insulated compartments, in order to avoid the spreading of an eventual failure.

Gas exhaustion channel

The single busbar version offers the possibility of an optional gas exhaustion channel, thus increasing personnel safety.

Others

- An easy to understand system, completed with mechanical and electrical interlocks to prevent maloperation.
- Internal arc withstand, tested and certified according to IEC 62271-200 standard, appendixAA, 1 to 6 criterions, accessibility class A.
- All live parts are placed inside SF6 gas-tight compartments.
- Safe access to the operating mechanisms and other auxiliary elements, as these are placed outside the SF6 tanks.
- Each phase incoming/outgoing is provided with voltage presence indicators.
- Minimum fire contribution.
General electrical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>kV</td>
<td>52</td>
</tr>
<tr>
<td>Rated insulation level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power frequency withstand voltage, 50 Hz</td>
<td>kV rms</td>
<td>95</td>
</tr>
<tr>
<td>Lightning impulse withstand voltage</td>
<td>kV peak</td>
<td>250</td>
</tr>
<tr>
<td>Rated normal current</td>
<td>A</td>
<td>Max. 2000</td>
</tr>
<tr>
<td>Busbar system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incoming/outgoing</td>
<td>A</td>
<td>Max. 1600(1)</td>
</tr>
<tr>
<td>Short circuit breaking current (C.B.)</td>
<td>kA</td>
<td>25</td>
</tr>
<tr>
<td>Short circuit making current (C.B.)</td>
<td>kA peak</td>
<td>63</td>
</tr>
<tr>
<td>Short time withstand current</td>
<td>kA/s</td>
<td>25</td>
</tr>
<tr>
<td>Internal arc withstand 1 s</td>
<td>kA</td>
<td>25</td>
</tr>
<tr>
<td>SF6 gas pressure at 20°C</td>
<td>Bar</td>
<td>0.40</td>
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<tr>
<td>Standard degrees of protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HV compartment</td>
<td>IP</td>
<td>65</td>
</tr>
<tr>
<td>LV compartment</td>
<td>IP</td>
<td>3X</td>
</tr>
</tbody>
</table>

Specific electrical data, monophase and two-phase versions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Monophase</th>
<th>Two-phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>1 x 27.5</td>
<td>2 x 27.5</td>
</tr>
<tr>
<td>BIL</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>Busbar rated normal current</td>
<td>Max. 2500</td>
<td>Max. 2000</td>
</tr>
<tr>
<td>Incoming/outgoing rated normal current</td>
<td>Max. 2000</td>
<td>Max. 2000(1)</td>
</tr>
</tbody>
</table>

The above mentioned values are given for normal operating conditions (2) according to IEC 62271-200 and IEC 62271-001 standards:

- **Ambient air temperature**
  - Less than or equal to +40°C
  - Less than or equal to +35°C on average over a 24 hour period
  - Greater than or equal to –5°C.

- **Vibrations**: lack of vibrations external to the switchgear
- **Altitude**: less than 1000 m over the sea level (3).

**Standards**

- IEC 62271-1
- IEC 62271-200
- IEC 62271-100
- IEC 62271-102.

(1) For other technical requirements, please contact Schneider Electric.
(2) For other operating conditions or specially aggressive environments, please contact Schneider Electric.
(3) For higher altitude, please contact Schneider Electric.
Each CBGS-2 switchboard is made up of several functional units (switchgears) assembled to each other.

Each functional unit contains all the necessary elements to carry out its task.

The different switchgears (functional units) are interconnected by means of a busbar system, placed inside one of the SF6 tanks.

The quality of the earthing of all the metal compartments of the switchgear is ensured by the connection of the earthing bar from each compartment to the earthing collector bar of the switchgear.

**The switchgear**

The outer structure of each switchgear is a set of panels (RAL 1007 for the front panel covering the circuit breaker operating mechanism and RAL 7032 for the rest), metal sheets and frames. In accordance with IEC 62271-200 requirements, all of them are metallic and earthing.

It consists of four or five (single busbar, double busbar) independent compartments metallic and earthing. A great partitioning is thus achieved in order to avoid damage spreading in case of an eventual failure.

**The Low Voltage compartment (box)**, separated from the Medium Voltage area, is located at the lower part of the switchgear and contains Sepam type relays as an option (for other versions, please consult us) and the rest of Low Voltage auxiliary elements for protection and control.

**The general busbar system** (up to 2000) is located at the upper part of the switchgear. This compartment uses SF6 gas as insulating medium and contains the following elements inside it:
- Inner busbar and connections
- Disconnector and earthing switch.

**The main compartment, which uses SF6 gas as insulating medium and contains the circuit breaker** is located at the central part of the switchgear. The power cables and the busbar system are connected to it by means of bushings.

**The Medium Voltage incoming/outgoing cable connection compartment** is placed in the lower part of the switchgear and is accessible from the rear part. It contains the following elements:
- Adequate socket bushings for the connection of MV cable terminals
- Pfisterer type straight connectors (optional)
- Clamps for individual fastening of each power cable
- Socket bushing for simple and safe insulation test of MV cables or for plug-in type voltage transformers (optional)
- Toroidal-core current transformers (optional).

**Environment**

CBGS-2 switchgears have been designed with the aim of preserving the environment: the materials used are clearly identified for an easy separation and recycling. Besides, the SF6 can be collected and reused after an appropriate processing.

The environmental management system followed by Schneider Electric is certified according to the established requirements of the ISO 14001 standard.
1. Low Voltage compartment
2. Protection and control relays. Sepam or similar type (optional)
3. General busbar system, inside a 3 mm thick stainless steel tank, with the appropriate three phase bushings
4. SF6 gas pressure relief devices
5. Two or three position disconnector (disconnector and earthing switch)
6. Operating mechanism of the disconnector
7. Actuating shaft for the operating handle of the operating mechanism of the disconnector
8. Pushbuttons for the electrical operating mechanism of the disconnector (optional)
9. Disconnector indicator: open/closed
10. Earthing indicator: open / closed
11. Metal tank (3 mm, stainless steel), sealed for life
12. SF6 gas pressure relief device
13. Circuit breaker
14. Operating mechanism of the circuit breaker
15. Actuating shaft for the operating handle of the manual spring charging
16. Opening and closing pushbutton
17. Mechanical pushbutton for emergency opening
18. Position indicator (open/closed)
19. Operation counter
20. Power cables compartment
22. Earthed power cables key lock (optional)
23. Current transformers (optional)
24. Socket bushing for voltage transformers, surge arrestor, etc. (optional)
25. MV connection cable for voltage transformers (optional)
26. Capacitive voltage indicators per phase
27. Pressure gauge for SF6 pressure indication inside the circuit breaker compartment
28. Pressure gauge for SF6 pressure indication inside the busbar cubicles (1 per each busbar system)
29. Characteristics nameplate
30. Pressure switch
## Configurations for single busbar

### Standardized solutions
The choice between different cubicle installations (including for the low-voltage compartment) presents considerable advantages.

The tables below each of the configurations indicate only the most common standardized options.

### Flexibility of design
The design of CBGS-2 switchgears allows the use of many other options, so in case of any particular need, please consult us.

### Table: Functional units

<table>
<thead>
<tr>
<th>Function</th>
<th>Rated voltage (kV)</th>
<th>Busbar rated normal current (A)</th>
<th>Incoming/outgoing rated normal current (A)</th>
<th>Rated short time withstand current 3 s/1 s (kA peak)</th>
<th>SF6 control pressure gauge of central cubicle</th>
<th>SF6 control pressure gauge of busbars</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>52</td>
<td>1250 / 1600 / 2000</td>
<td>630 / 250 / 1600</td>
<td>25/ 63</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table: Disconnector

<table>
<thead>
<tr>
<th>Available function</th>
<th>Optional function</th>
<th>Not available function</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 or 3 positions</td>
<td>3 positions</td>
<td></td>
</tr>
<tr>
<td>Manual operating mechanism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor-operated mechanism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated normal current</td>
<td>630 / 1250 / 1600</td>
<td></td>
</tr>
<tr>
<td>Disconnector key lock in open position</td>
<td></td>
<td></td>
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<tr>
<td>Disconnector key lock in closed position</td>
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<tr>
<td>Earthing switch key lock in open position</td>
<td></td>
<td></td>
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<tr>
<td>Earthing switch key lock in closed position</td>
<td></td>
<td></td>
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<tr>
<td>Earthed cable termination key lock</td>
<td></td>
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<tr>
<td>Electromagnetic lock for the disconnector</td>
<td></td>
<td></td>
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<tr>
<td>Electromagnetic lock for the earthing switch</td>
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<td></td>
</tr>
</tbody>
</table>

### Table: Circuit breaker (electrically operated)

<table>
<thead>
<tr>
<th>Available function</th>
<th>Optional function</th>
<th>Not available function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated normal current</td>
<td>2000</td>
<td></td>
</tr>
<tr>
<td>Supply voltage (Vdc)</td>
<td>110 / 125 (3)</td>
<td></td>
</tr>
<tr>
<td>Tripping coil</td>
<td>Double</td>
<td></td>
</tr>
<tr>
<td>Circuit breaker locking in open position</td>
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<td></td>
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<tr>
<td>Mechanical locking for opening pushbutton</td>
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<td></td>
</tr>
</tbody>
</table>

## Diagram

- **A**

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(1) In case of additional VT or surge arrester, we have 3 power cables and an auxiliary socket.

(2) This section will be limited by the connector, which is size 3, 52 kV.

(3) For other characteristics, please contact Schneider Electric.
### Functional units

**Configurations for single busbar**

<table>
<thead>
<tr>
<th>Line switchgear with cable disconnector</th>
<th>Measuring switchgear</th>
<th>Bus coupling</th>
<th>Riser</th>
<th>Lateral incoming with disconnector</th>
</tr>
</thead>
<tbody>
<tr>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
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<tr>
<td>630 / 1250 / 1600</td>
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<tr>
<td>25 / 63</td>
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<td>3 positions</td>
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<td>2 positions (3)</td>
<td>2 positions (3)</td>
<td>3 positions</td>
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<td>—</td>
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<tr>
<td>630 / 1250 / 1600</td>
<td>630 / 1250 / 1600</td>
<td>630 / 1250 / 1600</td>
<td>630 / 1250 / 1600</td>
<td>630 / 1250 / 1600</td>
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<tr>
<td>Double</td>
<td>Double</td>
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<td>2000</td>
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<tr>
<td>110 / 125 (3)</td>
<td>—</td>
<td>110 / 125 (3)</td>
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<td>Double</td>
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<tr>
<td>3 (1) / 500 mm² (2)</td>
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<td>—</td>
<td>—</td>
<td>3 (1) / 500 mm² (2)</td>
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</tbody>
</table>
### Functional units:

#### Configurations for double busbar

<table>
<thead>
<tr>
<th>Function</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage (kV)</td>
<td>52</td>
</tr>
<tr>
<td>Busbar rated normal current (A)</td>
<td>1250 / 1600 / 2000</td>
</tr>
<tr>
<td>Incoming/outgoing rated normal current (A)</td>
<td>630 / 1250 / 1600 / 2000</td>
</tr>
<tr>
<td>Rated short time withstand current 3 s/1 s (kA peak)</td>
<td>25 / 63</td>
</tr>
</tbody>
</table>

#### Available function

- SF6 control pressure gauge of central cubicle
- SF6 control pressure gauge of busbars (in lateral panel)

#### Measuring in general busbars
- Voltage transformers —
- Current transformers —

#### Disconnector

- 2 or 3 positions
- Manual operating mechanism
- Motor-operated mechanism
- Rated normal current 630 / 1250 / 1600
- Disconnector key lock in open position
- Disconnector key lock in closed position
- Earthing switch key lock in open position
- Earthing switch key lock in closed position
- Earthing cable termination key lock
- Electromagnetic lock for the disconnector
- Electromagnetic lock for the earthing switch

#### Circuit breaker (electrically operated)

- Rated normal current (A) 2000
- Supply voltage (Vdc) 110 / 125 (3)
- Tripping coil Double
- Circuit breaker locking in open position
- Mechanical locking for opening pushbutton

#### Voltage indicators

- Power cables and transformers bottom compartment
  - Maximum number of incoming/outgoing cables per phase 3 (1) / 500 mm² (2)
- Toroidal-core current transformers
- Bus section busbar system —
- Current transformers in bus section —
- Voltage transformers in bus section —

#### Cable disconnector

- Available function

#### Low voltage compartment

- Available function
- Light (lamp + micro)
- Protection relay Sepam or similar type
- Control type (Conventional or digital) Conventional / Digital
- Auxiliary relays and devices:
  - Switch
  - Converter
  - Circuit breakers
  - LV terminals

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(1) In case of additional VT or surge arrester, we have 3 power cables and an auxiliary socket.
(2) This section will be limited by the connector, which is size 3, 52 kV.
(3) For other characteristics, please contact Schneider Electric.
Functional units

Configurations for double busbar

<table>
<thead>
<tr>
<th>Measuring switchgear</th>
<th>Bus coupling</th>
<th>Riser</th>
<th>Cross coupling</th>
<th>Lateral incoming with disconnector</th>
</tr>
</thead>
<tbody>
<tr>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
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<tr>
<td>25 / 63</td>
<td>25 / 63</td>
<td>25 / 63</td>
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<td>25 / 63</td>
</tr>
</tbody>
</table>

- ■ (in lateral panel) ■ (in lateral panel) ■ (in lateral panel) ■ (in lateral panel)
- □ — ■ (in lateral panel) ■ (in lateral panel)
- ■ — □ — □
- □ — □ — □
- ■ — ■ — □

3 positions 2 positions (3) 2 positions (3) 2 positions (3) 3 positions

<table>
<thead>
<tr>
<th>Measuring switchgear</th>
<th>Bus coupling</th>
<th>Riser</th>
<th>Cross coupling</th>
<th>Lateral incoming with disconnector</th>
</tr>
</thead>
<tbody>
<tr>
<td>630 / 1250 / 1600</td>
<td>630 / 1250 / 1600</td>
<td>630 / 1250 / 1600</td>
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</tr>
</tbody>
</table>

- ■ — 2000 — 2000 —
- — 110 / 125 (3) — 110 / 125 (3) —
- — Double — Double —
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The circuit breaker
The circuit breaker of CBGS-2 switchgears has separate poles, is “puffer” type and uses SF6 gas as breaking and insulating medium.
The cast resin enclosure of the circuit breaker fulfills the requirements of IEC 62271-100 standard regarding sealed pressure systems.
The relative pressure of SF6 filling is 0.48 Mpa (4.8 bar).
In the very improbable event of a pressure falling underneath the established working threshold, 2 alarms, (at different levels) will be automatically released.

**Puffer type breaking system: operating principle**

(1) The fixed and mobile main contacts are initially closed.

(2) **Precompression**
When the fixed and mobile contacts begin to open, the piston slightly compresses the SF6 gas inside the pressure chamber.

(3) **Arcing period**
The arc strikes between the arcing contacts while the piston continues its movement.
A small quantity of SF6 gas is injected onto the arc through the insulating nozzle.
For the breaking of low currents, the arc is cooled by forced convection.
For high currents, however, thermal expansion causes the hot gases to move towards the colder parts of the pole unit.
The distance between the two arcing contacts becomes sufficient for the current to be broken when it reaches the zero point, due to the dielectric properties of SF6 gas.

(4) **Final sweeping**
The moving parts finish their movement and the injection of cold gas continues until the contacts are completely open.

**Characteristics of the circuit breaker**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage 50/60 Hz kV</td>
<td>52</td>
</tr>
<tr>
<td>Power frequency withstand voltage insulation level (50 Hz–1 min) kV (rms)</td>
<td>95</td>
</tr>
<tr>
<td>Lightning impulse withstand voltage insulation level (1.2/50 μs) kV (peak)</td>
<td>250</td>
</tr>
<tr>
<td>Rated normal current A</td>
<td>2000</td>
</tr>
<tr>
<td>Short circuit breaking current kA (rms)</td>
<td>25</td>
</tr>
<tr>
<td>Short circuit making current kA (peak)</td>
<td>63</td>
</tr>
<tr>
<td>Short time withstand current (3 s) kA (rms)</td>
<td>25</td>
</tr>
<tr>
<td>Capacitor breaking current for rated current A</td>
<td>220</td>
</tr>
<tr>
<td>Rated operating sequence O-0.3 s-CO-3 min-CO</td>
<td></td>
</tr>
<tr>
<td>Approximate operating time ms</td>
<td></td>
</tr>
<tr>
<td>Opening</td>
<td>35-43</td>
</tr>
<tr>
<td>Breaking</td>
<td>35-58</td>
</tr>
<tr>
<td>Closing</td>
<td>55-65</td>
</tr>
</tbody>
</table>
Circuit breaker operating mechanism

Operating mechanism
The opening and closing speed of the circuit breaker contacts used for CBGS-2 switchgears is independent of the operator’s action.
This electrically operated mechanism, which is always motorized, can perform remote control functions and implement fast re-closing cycles.
In CBGS-2 type switchgears, all the operating mechanisms are arranged outside the SF6 tank.
Furthermore, maintenance in this type of operating mechanisms is quite reduced, as they use self-lubricating components.

The operating mechanism consists of:
- A spring system that stores the necessary energy for the opening and closing operations.
- A manual spring charging system.
- An electrical motorized spring charging device that automatically recharges the springs in less than 5 seconds after the main contacts of the circuit breaker have closed.
- Mechanical opening pushbutton with optional padlock on the front panel.
- Electrical system including:
  - Closing coil
  - Anti-pumping relay
  - Double tripping coil
  - Undervoltage coil (optional).
- Operation counter.
- A spring charging indication contact.
- An end of spring charging indication contact.
- Mechanical indicator for open/closed position.
- Mechanical indicator for spring charging position.
- An optional key lock to interlock the circuit breaker in open position.

Auxiliary contacts
The operating mechanism is equipped with a block of a maximum of 15 auxiliary contacts. The number of available contacts depends on the composition of the operating mechanism and the options chosen. In any case, at least 3 O/C contacts are available on the switchgear outgoing LV terminal block for the external signals.

Auxiliary contacts characteristics

<table>
<thead>
<tr>
<th>Options</th>
<th>Rated current</th>
<th>Breaking capacity</th>
<th>Alternating current voltage</th>
<th>Direct current voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>10 A</td>
<td>10 A with 220 Vac</td>
<td>(power factor ≥ 0.3)</td>
<td>1.5 A with 110 or 220 Vdc</td>
</tr>
<tr>
<td>Consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private contacts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Possible combinations of auxiliaries and quantities</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Electrical characteristics of the operating mechanism

<table>
<thead>
<tr>
<th>Options</th>
<th>Spring charging motor</th>
<th>Closing release</th>
<th>Double voltage tripping coil</th>
<th>Undervoltage coil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>Direct current V</td>
<td>48-110-125 Vdc</td>
<td>52 kV</td>
<td>52 kV</td>
</tr>
<tr>
<td>Consumption</td>
<td>Direct current W</td>
<td>500</td>
<td>70</td>
<td>140 (2 x 70)</td>
</tr>
<tr>
<td>Possible combinations of auxiliaries and quantities</td>
<td>*</td>
<td>or</td>
<td>or</td>
<td>or</td>
</tr>
<tr>
<td></td>
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</tbody>
</table>
Circuit breaker operating mechanism

Auxiliary diagram

Circuit breaker operating mechanism.

The second tripping coil and the opening and blocking of the breaker by very low SF6 pressure are included as a standard option.

Open circuit breaker with discharged springs and gas at normal pressure

- **M**: Spring charging motor
- **52BC**: Closing release
- **52Y**: Anti-pumping relay
- **52BA1**: Tripping coil
- **52BA2**: Second tripping coil
- **63BL**: Pressure switch contact for opening
- **63ALL**: Low pressure alarm
- **Y63BL**: Pressure switch auxiliary relay for tripping and blocking
- **33**: Switch contact for mechanical closing availability
- **33L**: Switch contact for blocking of spring charging motor during manual charging operation
- **52MC**: End of charging contacts
Characteristics of the 3 position disconnector

It complies with the requirements of IEC 62271-102 standard for disconnectors and earthing switches.

Short circuit current making capacity (disconnector and earthing switch) through the circuit breaker is 25 kA.

Rated currents: 630 A / 1250 A / 1600 A.

An optional cable disconnector can be installed in the rear part of the switchgear.

Compact design and reduced dimensions. Highly reliable position indicator (without transmission rods).

Single rotation-driving axis for the disconnector and the earthing switch.

To operate the earthing switch after operating the disconnector, the operating handle must be removed and inserted again. These are completely independent operations. Motorization of disconnectors can be included as an option (not advisable for single busbar version).

Operation and interlocks

Manually operated by means of an operating handle or motor operated.

The operating handle can not be removed from the actuating shaft until the switching operation has been completed.

The circuit breaker can not be closed until the operating handle has been withdrawn (extreme positions of the disconnector).

Other special key lock interlocks may be included as an option.
Apparatus

Current transformers

General characteristics
- Architecture:
  - Type A: toroidal
  - Type B: flanged to SF6 tank.
- Type A: free from dielectrically stressed cast resin components
- According to IEC 60044-1 standards.

Mounting possibilities and types
<table>
<thead>
<tr>
<th>Location</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>In cable compartment</td>
<td>A</td>
</tr>
<tr>
<td>In SF6 tank</td>
<td>B</td>
</tr>
</tbody>
</table>

Characteristics table

<table>
<thead>
<tr>
<th>Maximum operating voltage</th>
<th>0.72 kV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum admissible AC voltage</td>
<td>3 kV / 1 min</td>
</tr>
<tr>
<td>Normal operating frequency</td>
<td>50/60 Hz</td>
</tr>
</tbody>
</table>

Thermal currents
- Permanent (max. value) 1.2 x In
- Normal short time (3 s) 25 kA

Normal currents
- Dynamic 25 x I. Th
- Primary 40 A to 1600 A
- Secondary 1 A and 5 A

Switch possibilities in the secondary winding
- From 100 - 200 A to 800 - 1600 A

Core data depending on normal primary current
- 3 cores maximum

Measuring core
- Power 2.5 VA to 15 VA
- Class 0.5 to 1
- Overcurrent factor F5S

Protection core
- Power 2.5 VA to 30 VA
- Class 5 or 10
- Overcurrent factor From P10 to P30

Dimensions Type A
- Internal diameter 60 mm to 205 mm
- Maximum height 130 mm to 225 mm

Dimensions Type B
- Height 548 mm
- Width 420 mm
- Depth 243 mm

Operating ambient air temperature
- –5°C / +40°C

Insulation class
- E
General characteristics
- Inductive principle
- Architecture:
  - Type A: plug-in type by means of MV cable
  - Type B: flanged to SF6 tank.
- Safe to touch by means of a shielded metal enclosure
- Cast resin insulated
- According to IEC 60044-2 standards.

Mounting possibilities and types

<table>
<thead>
<tr>
<th>Location</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>In cable trench (outside of the switchgear)</td>
<td>A</td>
</tr>
<tr>
<td>In SF6 tank</td>
<td>B</td>
</tr>
</tbody>
</table>

Characteristics table

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Voltage (Un)</td>
<td>&gt; 3.6 to 52 kV</td>
<td></td>
</tr>
<tr>
<td>Normal alternal voltage in the primary winding</td>
<td>1.2 x Un</td>
<td></td>
</tr>
<tr>
<td>Voltage normal factor (Un/8 h)</td>
<td>1.9 / 2.5 (*)</td>
<td></td>
</tr>
<tr>
<td>Voltage in the secondary (**)</td>
<td>100√3 V</td>
<td>110√3 V</td>
</tr>
<tr>
<td></td>
<td>100/3 V</td>
<td>110/3 V</td>
</tr>
<tr>
<td>Thermal current limit (measuring winding)</td>
<td>8 A</td>
<td></td>
</tr>
<tr>
<td>Normal long duration current (8 h)</td>
<td>5 A</td>
<td></td>
</tr>
<tr>
<td>Data according to the accuracy class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class 0.2</td>
<td>20, 25 and 30 VA</td>
<td>25 VA</td>
</tr>
<tr>
<td>Class 0.5</td>
<td>30, 50 and 60 VA</td>
<td>50 VA</td>
</tr>
<tr>
<td>Class 1</td>
<td>50, 60 and 100 VA</td>
<td>100 VA</td>
</tr>
</tbody>
</table>

(*) 2.5 x Un Optional.
(**) For other voltages, please consult Schneider Electric.
Characteristics of the busbar system
The busbar system is completely segregated and its continuity is achieved by means of three phase busbar bushings.
The busbar compartment is gas-tight and uses SF6 gas as insulating medium.
The three position disconnector (open / closed / earthed) is located inside the busbar compartment.
In case of busbar coupling and busbar rising switchgears, the standard option is the two position disconnector.
The set consists of three independent copper conductive bars. Desiccation bags are included in the busbar tanks.

Switchgears extension
A CBGS-2 switchboard can be extended in a quick and simple way on both ends of the busbar system. Extension under voltage is possible in case of double busbar version. Such extensions under voltage will be carried out only in those cases when it is absolutely necessary and there is no other choice.
It is possible to remove intermediate switchgears from a switchboard without having to move the adjacent ones.
Power cables situation in case of cable-disconnector

Straight connectors, Pfisterer or similar type, size 3, 52 kV for incoming / outgoing cables
The connectors used for incoming cables of the whole range of switchgears are metal-enclosed type.
They are Pfisterer type, size 3, 52 kV up to 500 mm² section, for a maximum insulation diameter of 47.1 mm. For bigger sections or bigger cable insulation diameters, please consult available documentations about connectors.
The maximum number of power cables per phase is 3, plus a fourth socket for voltage transformers or other elements (arresters).
The power cable compartment can house a maximum of four cables per phase.
Weight per cubicle approx.: 1,000 kg.
All distances are minimum values.
For further details, please refer to the Instructions Manual.
1 Level
2 Power cables trench
3 Hole for control cables
4 Fixing
5 Levelling screw M20-DIN 912
6 Security nut
7 Metal plate
8 Nut welded to the frame
9 Fixing screws (2 fixing points per switchgear)
10 U section (40 x 20 x 5)

Weight per cubicle approx.: 1,000 kg.
For further details, please refer to the Instructions Manual.