

2017 Catalog

CBGS-0

Gas insulated switchgear
up to 36/38 kV

Medium Voltage Distribution



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Your requirements



Service continuity



Peace of mind



Economical

Our solution

- Live parts encapsulated in sealed for life enclosures or with solid insulation:
 - not affected by environmental condition, vermin or dust
 - Fault mitigation due to gas and solid insulation of all components
 - Maintenance free on MV parts:
 - no shutdowns
 - eliminated human failure sources
 - Factory gas-filled and tested:
 - reduced risk of leakage and contamination of gas
 - easy monitoring of insulation (1 tank, 1 manometer)
 - Low panel replacement time, even in the middle of the switchboard
-
- Arrives on site ready to connect
 - No gas-handling along lifetime of the switchgear under normal operations (installation, commissioning, operations, extension, replacement)
 - Schneider electric supervision of installation
 - Front access only
 - Easy operations with ergonomic and guided operator interface
-
- Expected lifetime of 30 years
 - Increased availability and reduced downtimes
 - Maintenance-free Medium Voltage parts
 - Less civil work
 - Reduced space requirements for real savings on the building cost in dense urban areas

CBGS-0, more than 10,000 units are
in operation in more than 60 countries.



The right fit, simply affordable.

The CBGS-0 range gives you the choice of already standardized switchgears for different applications.

The flexibility of the design of CBSG will likely accomodate specific requirements.



Maximum safety
with
minimum space

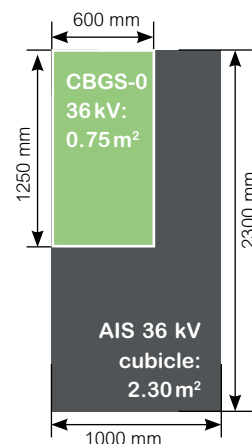
Investment optimization - Space savings

Space and civil works savings

- The compact design, thanks to the SF6 insulation of the main circuit, provides extremely reduced dimensions, in order to achieve important space savings
- CBGS-0 requires only front access and can consequently be installed against the wall

Installation savings

The modularity of design, the simplicity of the connection system and the fact that there is no need to manipulate SF6 on site permits an extremely quick installation.



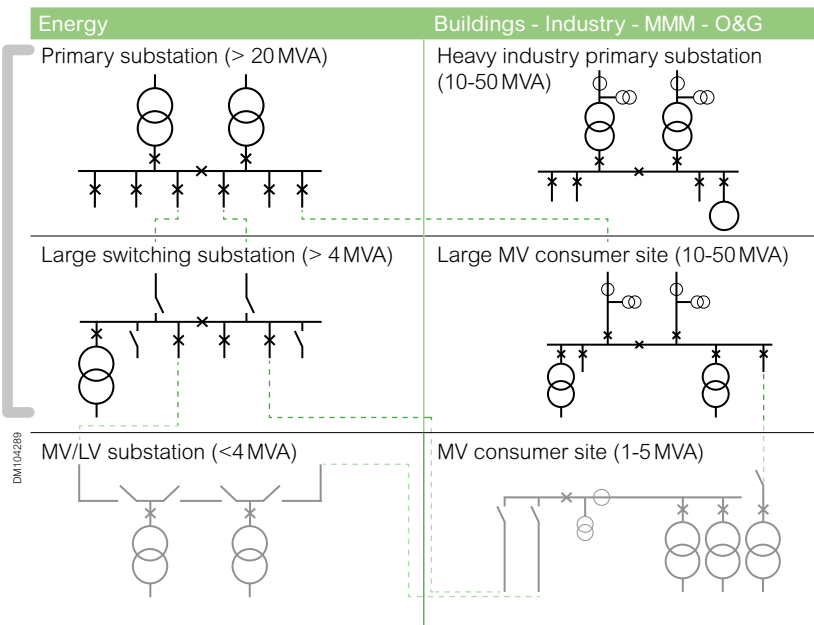
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CBGS-0 is a gas insulated switchgear. This technology offers reliability and safety for your installations in a minimum space.

Thanks to the different functions available, the CBGS-0 is an excellent response for HV/MV or MV/MV substations.

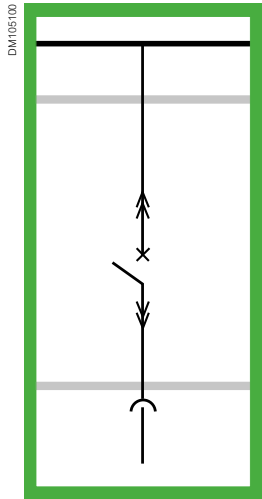
Description



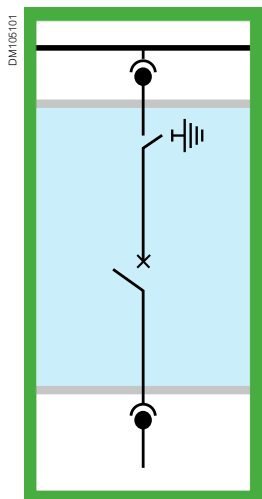
Typical applications

- Transmission & distribution
- Wind power
- Critical infrastructures
 - Airports
 - Hospitals
 - Data Centers
- Railway
- Mining
- Oil & Gas





AIS



GIS

AIS concept

- Insulation of Medium Voltage by air and partly epoxy insulated
- External conditions have influence on insulation (humidity, dust, altitude, etc.)

GIS concept

- Medium Voltage parts are installed into sealed for life stainless-steel tank filled with insulating gas
- External conditions do not have influence on the insulation. Insulation (gas pressure) can be monitored using gas density sensors (standard)
- Dimensions and ageing behavior are determined through the design and remain constant during the switchgear lifetime

Unrivalled level of availability

Prevent failures

- More than 70% of the most common sources of failures are not applicable to GIS (Source: IEEE 493 Gold Book, Annex E, table XVIII, page 479) or are mitigated using GIS.
- Failure prevention are mostly due to totally encapsulated and insulated live parts, fixed components, no maintenance on MV parts

Low panel replacement time

- A panel can be replaced in the middle of switchboard without gas work within the same day. No extended mechanical work is necessary

Maintenance free MV parts

- Reduced downtimes due to maintenance on MV parts
- Operating mechanism is accessible in the front of the switchgear

Schneider Electric product portfolios include a wide choice of multi-function relays to be used together with CBGS-0 to build a consistent solution for protection, control, and monitoring.



Vamp 57



Sepam range



MiCOM range



PowerLogic range



Vamp 120

Protection and control relays

VAMP

The VAMP range of relays is suitable for all common applications as well as some specific applications. VAMP relays are to protect applications, from overhead line feeders and substations to power plants and industrial power systems.

Sepam

Sepam series 20, series 40, series 60 and series 80 digital protection relays take full advantage of Schneider Electric's experience in electrical network protection.

They provide all the necessary functions:

- Effective fault diagnosis and protection planning
- Accurate measurements and detailed diagnosis
- Integral equipment control
- Local or remote indication and operation.
- Easy upgrading: addition of communication, digital I/O's, analog output, or temperature acquisition systems can be added due to its modular design

MiCOM

MiCOM protection provides the user with a choice of cost-optimised solutions for specific protection requirements within the distribution network.

The MiCOM relay series offers comprehensive protective function solutions for all power supply systems as well as for various functional and hardware project stages.

PowerMeter and circuit monitors

The PowerLogic PowerMeter replaces a whole set of basic analogue meters.

This cost-effective, high-performance meter provides a full range of accurate true-rms metering values.

The PowerLogic series 3000/4000 Circuit Monitor is designed for critical power users and large energy consumers, to provide the information needed to confidently enter the evolving world of deregulation.

It can be adapted to meter almost any time-of-use or real-time rate.

VAMP arc fault protection relay

The VAMP arc protection unit detects an arc flash in an installation and trips the feeding breaker. The unique arc fault protection functionality enhances the safety of both people and property and has made VAMP a leading brand in arc protection relays worldwide.

Schneider Electric's recycling service for SF6 products is part of a rigorous management process.

Environmental performance

Schneider Electric is committed to a long-term environmental approach.

All necessary measures have been taken in conjunction with our services, suppliers and subcontractors to ensure that the materials used in the composition of the equipment do not contain any substances prohibited by regulations and directives.

Schneider Electric's ambition is to reduce the environmental impact of its products throughout their whole life cycle, by offering end-of-life SF6 recycling solutions. Up to 98% of its equipment can be recycled for re-use.

Our Gas Insulated Switchgear is designed with environmental protection in mind:

- The materials used, insulators and conductors are identified, easily separable and recyclable
- The SF6 can be recovered at the end of the equipment's life and reused after Treatment
- The environmental management system adopted by Schneider Electric's production sites for the manufacture of our Gas Insulated Switchgear has been assessed and recognised as conforming to the requirements of the ISO 14001 standard.



CBGS-0 switchgears have been designed with the aim of preserving the environment.

The materials used are clearly identified for easy separation and recycling. In addition, the gas 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 and is RoHS compliant.

Quality assurance

Quality certified to ISO 9001



A major advantage

Schneider Electric has integrated a functional organisation into each of its units. The main mission of this organisation is to check the quality and the compliance with standards.

This procedure is:

- Uniform throughout all departments
- Recognised by many customers and approved organisations.

The quality system for the design and manufacture of CBGS-0 units has been certified in conformity with the requirements of the ISO 9001: 2000 quality assurance model.



Factory assembled and tested

Guarantees the highest level of quality. Material used (stainless steel) all assembled, leakage tested, gas fill and tightness test done in factory in an environment constantly under control (moisture, dust, etc.)



Supervision of installation

Installation and commissioning, exclusively intended for specialist electricians who have been certified for the CBGS-0 series (training certificate).

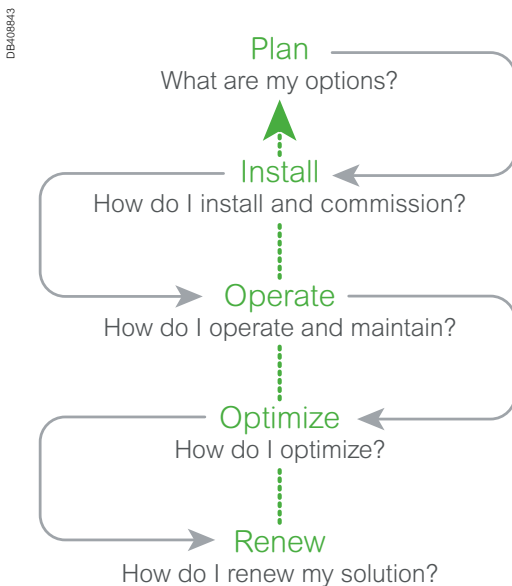
Schneider Electric Services

Peace of mind throughout your installation life cycle

How can you cut costs and improve performance at the same time?

When it comes to your electrical distribution infrastructure, the answer is straightforward: get professional expertise.

Life Cycle Services



When it comes to your electrical distribution installation, we can help you:

- Increase productivity, reliability, and safety
- Mitigate risk and limit downtime
- Keep equipment up to date and extend lifespan
- Cut cost and increase savings
- Improve your return on investment

CONTACT US!

www.schneider-electric.com/b2b/en/services/

Plan

Schneider Electric helps you plan the full design and execution of your solution, looking at how to secure your process and optimize your time:

- **Technical feasibility studies:** Design solution in your environment
- **Preliminary design:** Accelerate turnaround time to reach a final solution design

Install

Schneider Electric will help you to install efficient, reliable and safe solutions based on your plans.

- **Project management:** Complete your projects on time and within budget
- **Commissioning:** Ensure your actual performance versus design, through on-site testing and commissioning, and tools and procedures

Operate

Schneider Electric helps you maximize your installation uptime and control your capital expenditures through its services offering.

- **Asset operation solutions:** Provide the information you need to increase safety, enhance installation performance, and optimize asset maintenance and investment
- **Advantage service plans:** Customize service plans that cover preventive, predictive and corrective maintenance
- **On-site maintenance services:** Deliver extensive knowledge and experience in electrical distribution maintenance
- **Spare parts management:** Ensure spare parts availability and optimized maintenance budget of your spare parts
- **Technical training:** Build necessary skills and competencies to properly and safely operate your installations

Optimize

Schneider Electric proposes recommendations for improved safety, availability, reliability and quality.

- **MP4 electrical assessment:** Define an improvement and risk management program

Renew

Schneider Electric extends the life of your system while providing upgrades.

We offer to take full responsibility for the end-of-life processing of old electrical equipments.

- **ECOFIT™:** Keep up to date and improve performances of your electrical installations (LV, MV, protection relays, etc.)
- **MV product end of life:** Recycle and recover outdated equipment with end-of-life services

CBGS-0 range

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CBGS-0 range

Each CBGS-0 set is made up of several functional units (switchgears) that are assembled together.

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

The different switchgears (functional units) are interconnected by means of a Shielded Solid Insulated busbar system, which is outside of the gas tank. The trays for the Low Voltage inner connection cables are placed at the top of the panel, above the Low Voltage cabinet.

General electrical characteristics

Rated voltage		(kV)	24	36
Rated insulation level	Power frequency withstand voltage, 50 Hz	(kV rms)	50	70
	Lightning impulse withstand voltage	(kV peak)	125	170
Rated normal current	Busbar system	(A)	1250 / 1600 / 2000	
	Incoming/outgoing	(A)	630 / 1250 / 1600 / 2000	
Short circuit breaking current		(kA)	25 / 31.5	
Short circuit making current		(kA peak)	65 / 82	
Short time withstand current		(kA-3 s)	Max 25 / 31.5	
Internal arc withstand (AFL or AFLR)		(kA-1 s)	31.5	
Gas pressure at 20 °C		(bar)	0.30	
Standard degrees of protection	HV compartment		IP65	
	LV compartment		IP3X - IP41	

3 switchgear variants (IEC, RAIL, ANSI)

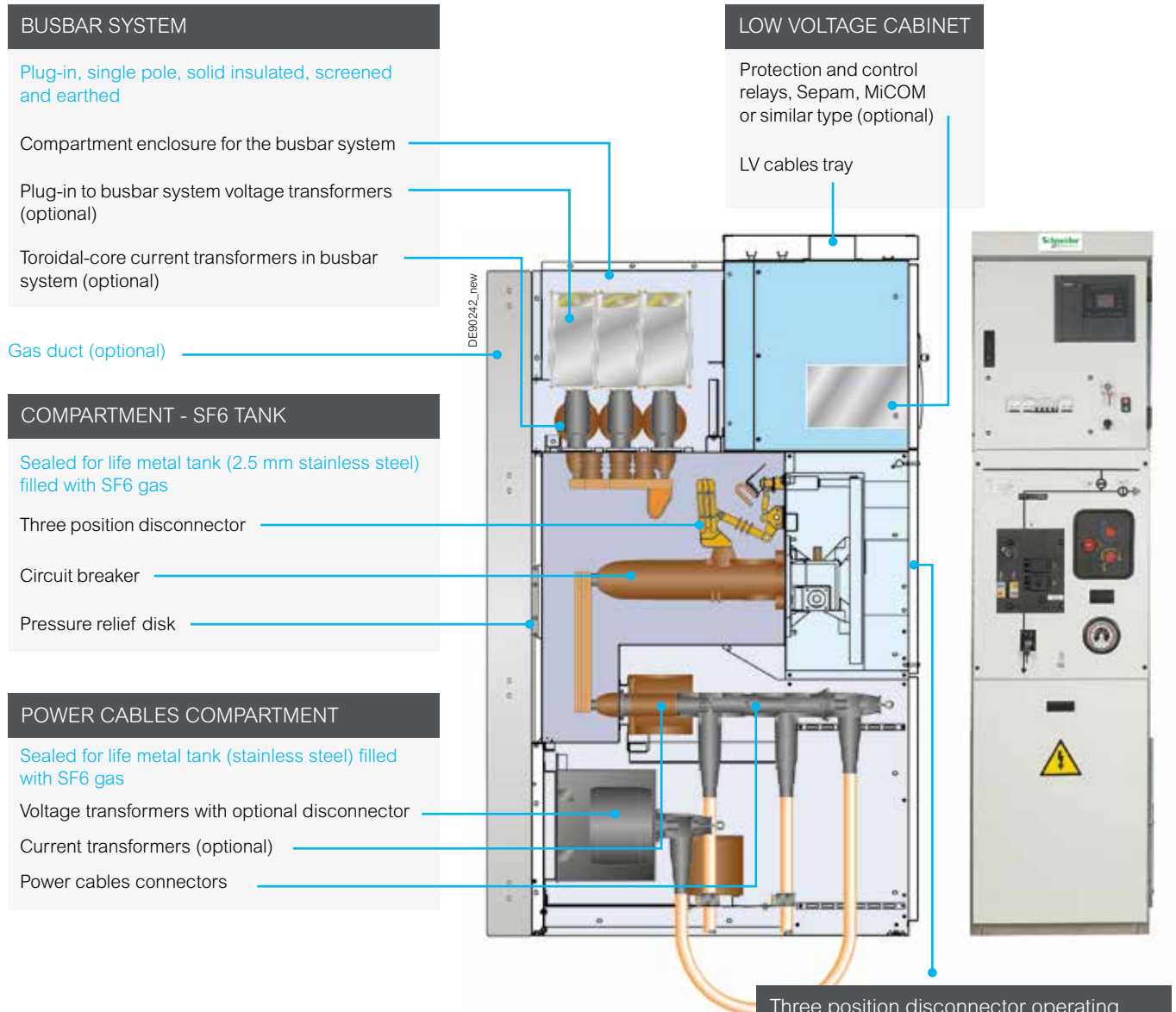


CBGS-0 cubicle structure

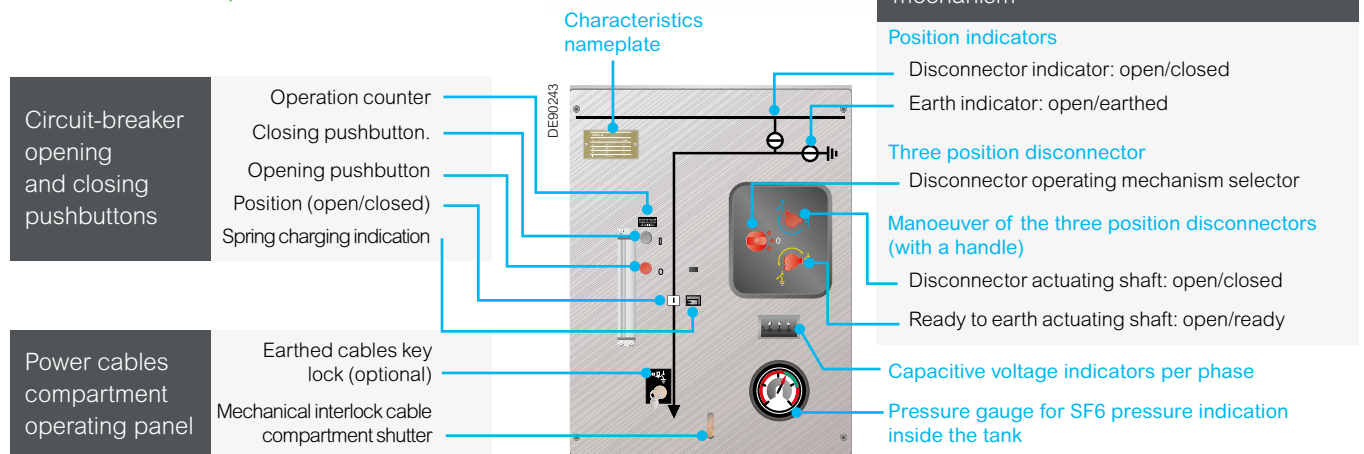
The enclosure of each switchgear is a set of panels (RAL 9002), metal sheets and metal frames. All of them are earthed according to the "metal-enclosed" definition and comply with the requirements of IEC 62271-200.

- **The Low voltage cabinet**, separated from the medium voltage area, is located at the top part of the switchgear and contains relays and the rest of low voltage auxiliary elements of protection and control
- **The busbar system**, silicon-insulated, shielded and grounded, is located in the top rear part of the switchgear, outside the SF6 compartment
- **The circuit-breaker compartment (SF6 tank)** is located in the central part of the switchgear. The power cables and the busbar system are connected to it by means of bushings
- **The medium voltage cable connection compartment** is placed in the lower part of the switchgear, accessible from the front

Description



Front view of the operator interface



Operating conditions and standards

Environmental and operating conditions

CBGS-0 switchgear units can be operated as indoor switchgear under normal operating conditions in accordance with the standard IEC 62271-1.

Operation under conditions other than these is only admissible upon consultation with and with the consent of the manufacturer.

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

For other temperatures, please contact us.

Vibrations

- Seismic certified switchgear in option

Altitude

- ≤ 1000 m above sea level. For higher altitude, please contact us

Humidity

- Average relative humidity over a period of 24 hours: 95%
- Average relative humidity over a period of 1 month: 90%
- Steam pressure averaged over a period of 24 hours: 2.2 kPa
- Steam pressure averaged over a period of 1 month: 1.8 kPa

IEC standards

CBGS-0 cubicles have been designed and certified as compliant with the following standards:

Standard	Specification
IEC 62271-1	High-voltage switchgear and controlgear
IEC 62271-100	High-voltage switchgear and controlgear Part 100: High-voltage alternating-current circuit breakers
IEC 62271-102	High-voltage switchgear and controlgear Part 102: High-voltage alternating current disconnectors and earthing switches
IEC 62271-200	High-voltage switchgear and controlgear Part 200: A.C. metal-enclosed switchgear and controlgear for rated voltage above 1 kV and up to and including 52 kV
IEC 62271-103	High-voltage switches Part 1: Switches for rated voltages above 1 kV and less than 52 kV
IEC 60529	Degrees of protection provided by enclosures (IP Code)

Operating conditions and standards

American standards

CBGS-0 cubicles are certified by UL (Underwriters Laboratories):

Standard	Specification
IEEE C37.06-2000	Guide for High-Voltage Circuit Breakers Rated on Symmetrical Current Basis Designated "Definite Purpose for Fast Transient Recovery Voltage Rise Times.
IEEE C37.09-1999	Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis
IEEE C37.010-1999	(R 2005), IEEE Application Guide for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis
ANSI C37.54-2002	Indoor Alternating Current High-Voltage Circuit Breakers Applied as Removable Elements in Metal-enclosed Switchgear – Conformance Test Procedures
IEEE C37.20.3-2001	Metal-Enclosed Interrupter Switchgear
IEEE C37.20.4-2001	Indoor AC Switches (1 kV–38 kV) for Use in Metal - Enclosed Switchgear.
C37.57-2003 NEMA	Switchgear — Metal-Enclosed Interrupter Switchgear Assemblies — Conformance Testing.
C37.58-2003 NEMA	Switchgear — Indoor AC. Medium Voltage Switches for Use in Metal-Enclosed Switchgear — Conformance Test Procedures
IEEE 1247-1998	Interrupter Switches for Alternating Current, Rated Above 1000 V
NFPA 70-2005	National Electrical Code (NEC)

Canadian standards

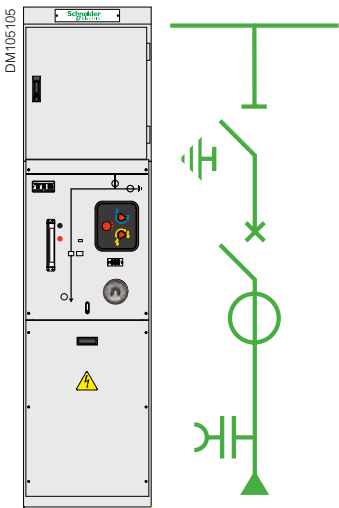
Standard	Specification
C22.2 No. 31-04	Switchgear Assemblies
C22.2 NO. 58-M1989	High Voltage Isolating Switches
C22.2 No. 193-M1983 Reaffirmed 2004	High Voltage Full-Load Interrupter Switches

CBGS-0 IEC: Functions and characteristics

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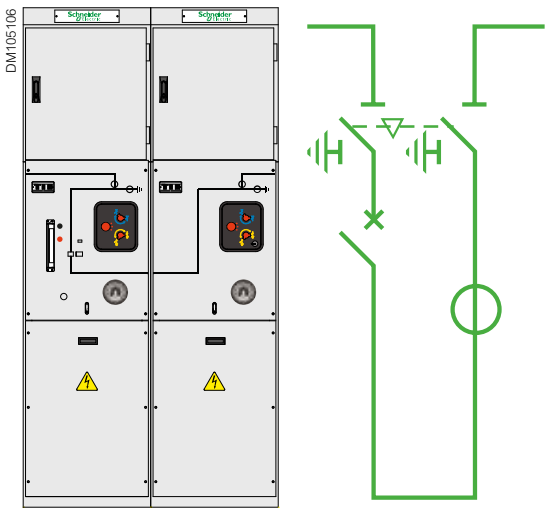
Overview: Choice of functional units

Circuit breaker



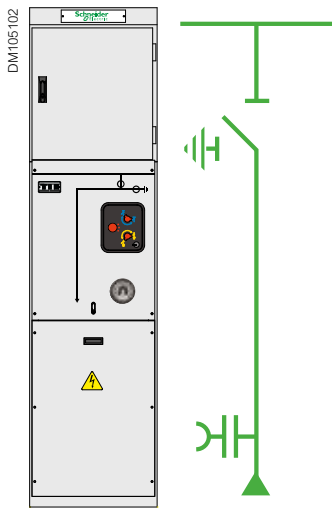
Rated voltage (kV)	24 / 36
Busbar system rated current (A)	1250 / 1600 / 2000
Outgoing rated current (A)	630 / 1250 / 1600 / 2000
Short time withstand current 3s (kA)	25 - 31.5

Bus coupler



Rated voltage (kV)	24 / 36
Busbar system rated current (A)	1250 / 1600 / 2000
Outgoing rated current (A)	1250 / 1600 / 2000
Short time withstand current 3s (kA)	25 - 31.5

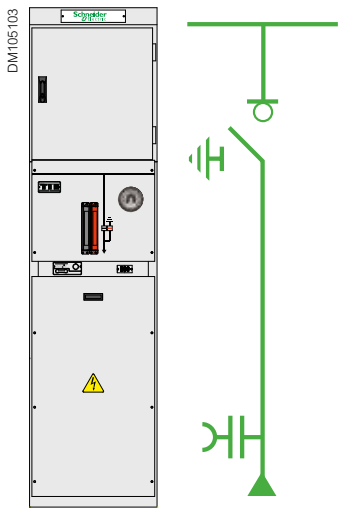
Disconnecter



Rated voltage (kV)	24 / 36
Busbar system rated current (A)	1250 / 1600 / 2000
Outgoing rated current (A)	630 / 1250 / 1600 / 2000
Short time withstand current 3s (kA)	25 - 31.5

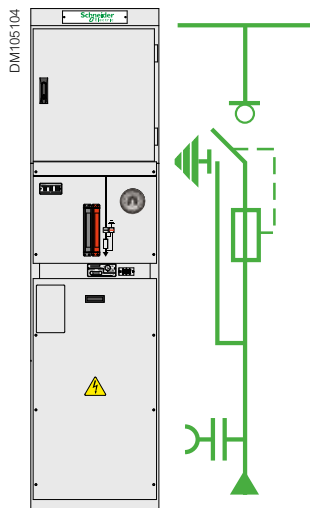
Overview: Choice of functional units

Load-break switch



Rated voltage (kV)	24 / 36
Busbar system rated current (A)	1250 / 1600 / 2000
Outgoing rated current (A)	630
Short time withstand current 1s (kA)	25

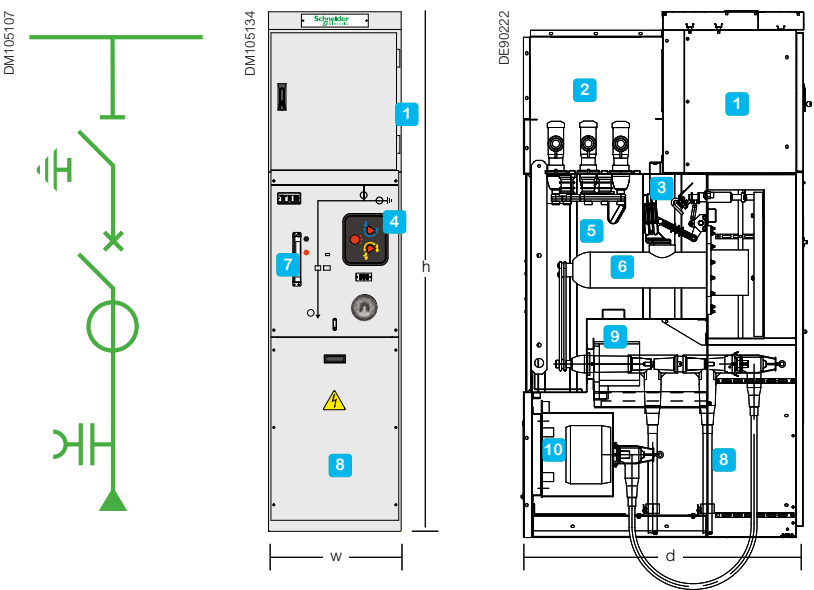
Load-break switch + Fuse



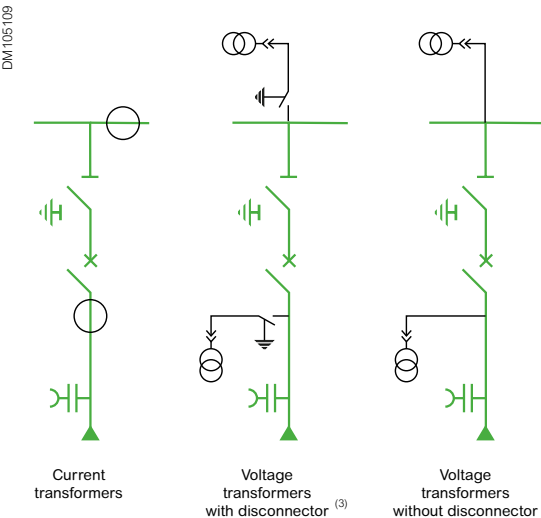
Rated voltage (kV)	24 / 36
Busbar system rated current (A)	1250 / 1600 / 2000
Outgoing rated current (A)	200 (limited by the fuse)
Short time withstand current 3s (kA)	Limited by the fuse

Circuit breaker

- 1 Low Voltage cabinet
- 2 General busbar system
- 3 Three position disconnector (Closed-Open-Ready to earth)
- 4 Disconnecter operating mechanism.
- 5 Main tank (2.5 mm stainless steel) filled with SF6 gas, sealed for life
- 6 Circuit breaker
- 7 Circuit breaker operating mechanism
- 8 Power cables compartment
- 9 Current transformers (optional)
- 10 Voltage transformers (optional)



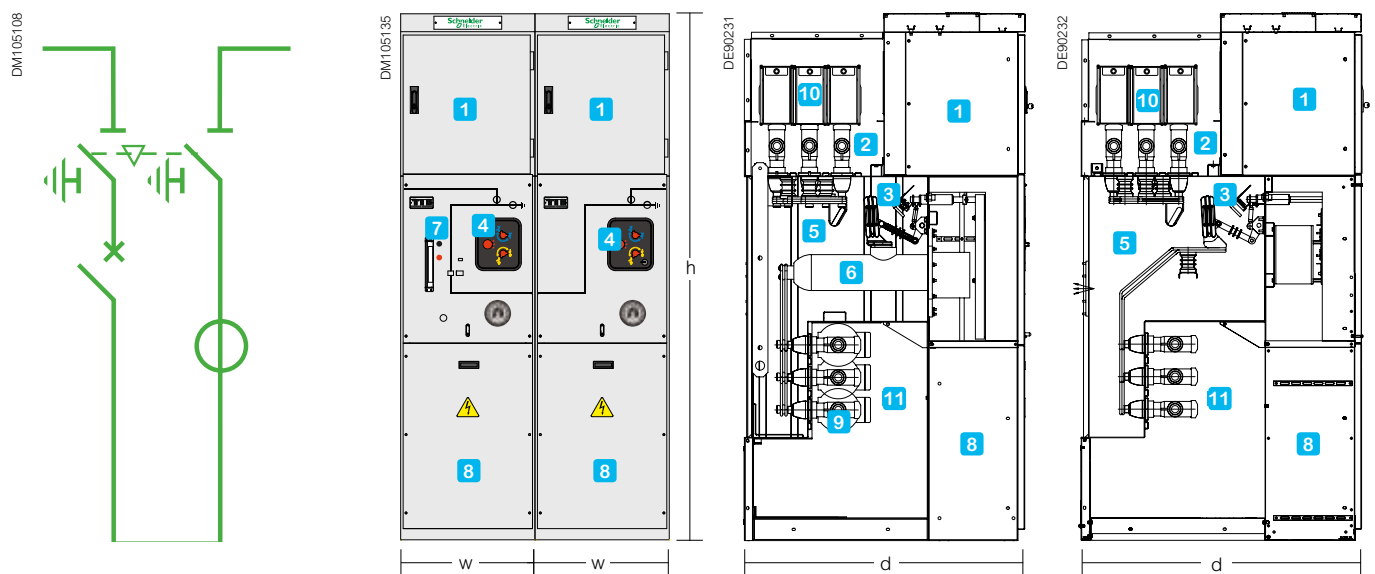
Instrument transformers



		IX-S	
Rated voltage	kV	24	36
Rated insulation level	kV rms - 1 min	50	70
	kV impulse 1.2/50 ms	125	170
Rated normal current (Busbar system)	A	1250	•
		1600	•
		2000	•
Rated normal current (incoming/outgoing)	A	630	•
		1250	•
		1600	•
		2000	•
Breaking capacity	kA	25/31.5	
Short time withstand current	kA 3s	25/31.5	
(w) Width	mm	600 ⁽²⁾	
(h) Height	mm	2350 ⁽¹⁾	
(d) Depth	mm	1400 (AFLR)	
Approximative weight 1250 A	kg	650	
Approximative weight 2000 A	kg	1250	

(1) 2500 mm with voltage transformers for 2000 A busbar
(2) 1200 mm width for panels 2000 A at 24 kV and 1600/2000 A at 36 kV
(3) Please contact us

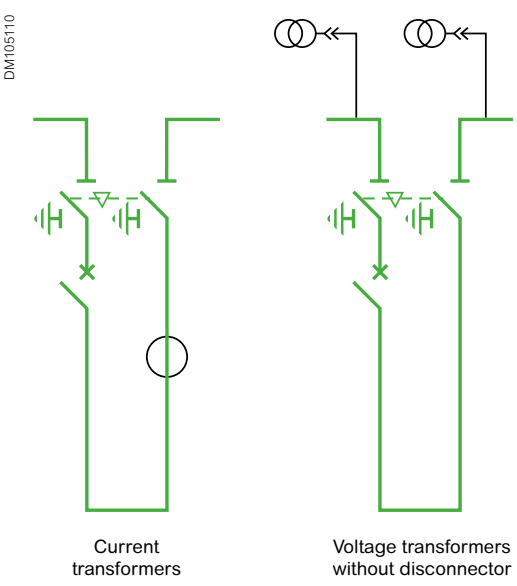
Bus coupler



- 1 Low Voltage cabinet
- 2 General busbar system
- 3 Three position disconnector (Closed-Open-Ready to earth)
- 4 Disconnector operating mechanism
- 5 Main tank (2.5 mm stainless steel) filled with SF6 gas, sealed for life
- 6 Circuit breaker
- 7 Circuit breaker operating mechanism
- 8 Power cables compartment
- 9 Current transformers (optional)
- 10 Voltage transformers (optional)
- 11 Lower busbar system

		BR	
Rated voltage	kV	24	36
Rated insulation level	kV rms - 1 min	50	70
	kV impulse 1.2/50 ms	125	170
Rated normal current (Busbar system)	A	1250	● ●
		1600	● ●
		2000	● ●
Rated normal current (incoming/outgoing)	A	1250	● ●
		1600	● ●
		2000	● ●
Breaking capacity	kA	25/31.5	
Short time withstand current	kA 3s	25/31.5	
(w) Width	mm	600 ⁽²⁾	
(h) Height	mm	2350 ⁽¹⁾	
(d) Depth	mm	1400 (AFLR)	
Approximative weight 1250 A	kg	1100	
Approximative weight 2000 A	kg	2050	

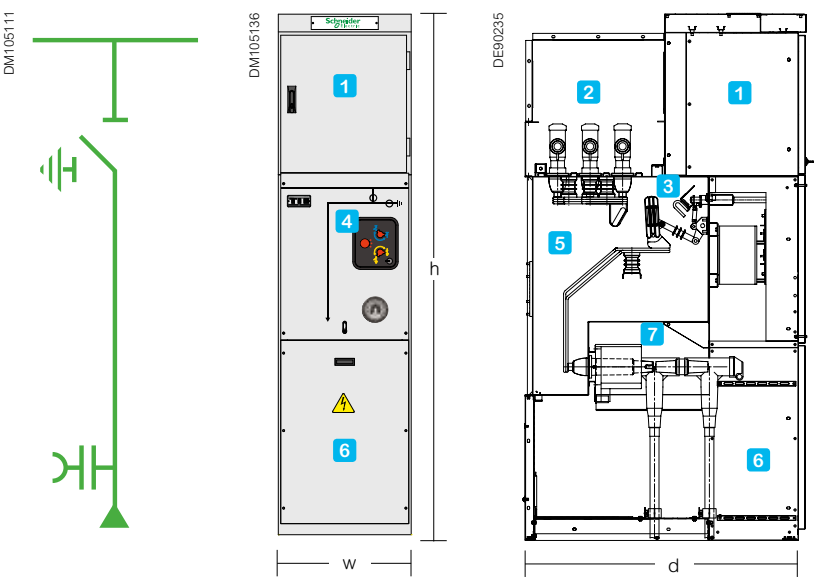
Instrument transformers



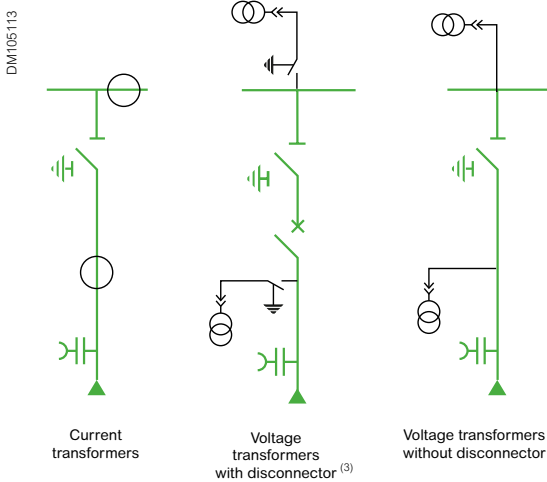
(1) 2500 mm with voltage transformers for 2000 A busbar
(2) 1200 mm width for panels 2000 A at 24 kV and 1600/2000 A at 36 kV

Disconnecter

- 1 Low Voltage cabinet
- 2 General busbar system
- 3 Three position disconnector (Closed-Open-Ready to earth)
- 4 Disconnector operating mechanism
- 5 Main tank (2.5 mm stainless steel) filled with SF6 gas, sealed for life
- 6 Power cables compartment
- 7 Current transformers (optional)



Instrument transformers

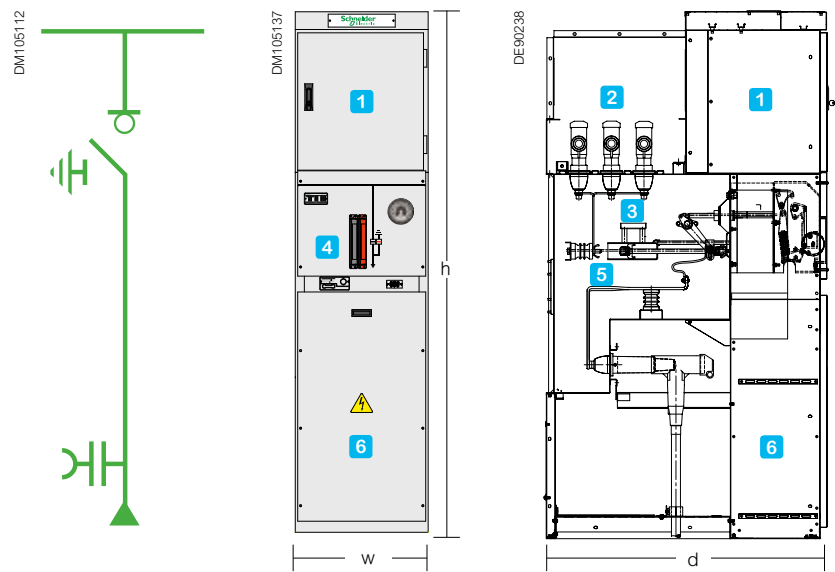


		BR	
Rated voltage	kV	24	36
Rated insulation level	kV rms - 1 min	50	70
	kV impulse 1.2/50 ms	125	170
Rated normal current (Busbar system)	A	1250	●
		1600	●
		2000	●
Rated normal current (incoming/outgoing)	A	630	●
		1250	●
		1600	●
		2000	●
Short time withstand current	kA 3s	25/31.5	
(w) Width	mm	600 ⁽²⁾	
(h) Height	mm	2350 ⁽¹⁾	
(d) Depth	mm	1400 (AFLR)	
Approximative weight 1250 A	kg	450	
Approximative weight 2000 A	kg	800	

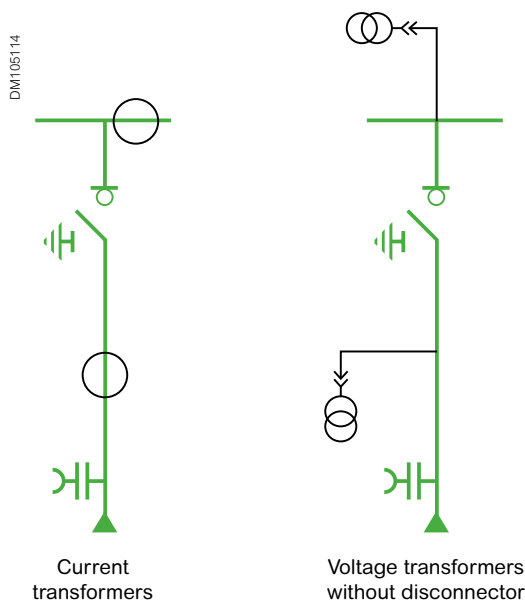
(1) 2500 mm with voltage transformers for 2000 A busbar
(2) 1200 mm width for panels 2000 A at 24 kV and 1600/2000 A at 36 kV
(3) Please contact us

Load-break switch

- 1 Low Voltage cabinet
- 2 General busbar system
- 3 Three position disconnecter (Closed-Open-Ready to earth)
- 4 Switch-Disconnecter operating mechanism
- 5 Main tank (2.5 mm stainless steel) filled with SF6 gas, sealed for life
- 6 Power cables compartment



Instrument transformers

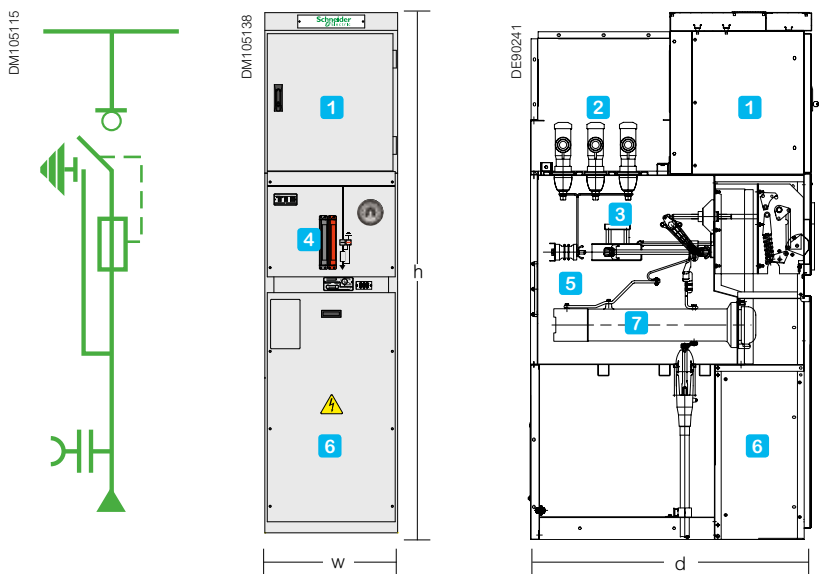


			BM-S	
Rated voltage	kV		24	36
Rated insulation level	kV rms - 1 min		50	70
	kV impulse 1.2/50 ms		125	170
Rated normal current (Busbar system)	A	1250	●	●
		1600	●	●
		2000	●	●
Rated normal current (incoming/outgoing)	A	630	●	●
Breaking capacity	A		630	
Short time withstand current	kA 1s		25 ⁽¹⁾	
(w) Width	mm		600	
(h) Height	mm		2350 ⁽²⁾	
(d) Depth	mm		1400 (AFLR)	
Approximative weight	kg		450	

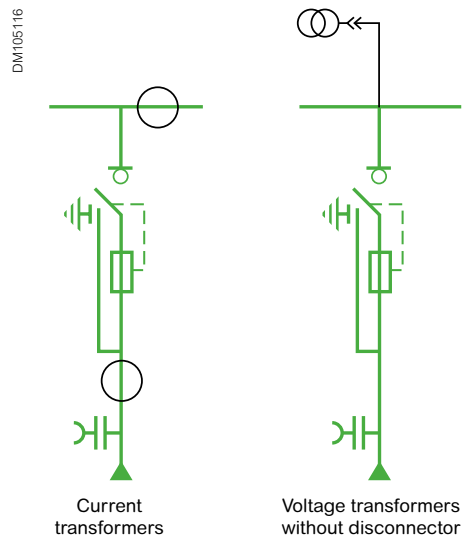
(1) Making current 50 kA
(2) 2500 mm with voltage transformers for 2000 A busbar

Load-break switch + Fuse

- 1 Low Voltage cabinet
- 2 General busbar system
- 3 Three position switch (Closed-Open earth)
- 4 Switch operating mechanism
- 5 Main tank (2.5 mm stainless steel) filled with SF6 gas, sealed for life
- 6 Power cables compartment
- 7 Fuse holder



Instrument transformers



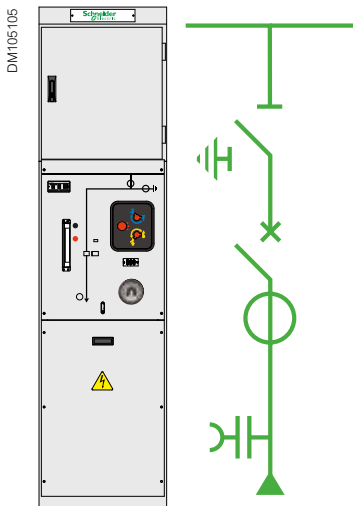
		AS-S	
Rated voltage	kV	24	36
Rated insulation level	kV rms - 1 min	50	70
	kV impulse 1.2/50 ms	125	170
Rated normal current (Busbar system)	A	1250	●
		1600	●
		2000	●
Rated normal current (incoming/outgoing)	A	Acc. to fuse	
Breaking capacity	kA	Acc. to fuse	
Short time withstand current	kA 3s	Acc. to fuse	
(w) Width	mm	600	
(h) Height	mm	2350 ⁽¹⁾	
(d) Depth	mm	1250	
Approximative weight	kg	550	

(1) 2500 mm with voltage transformers for 2000 A busbar

CBGS-0 Rail: Functions and characteristics

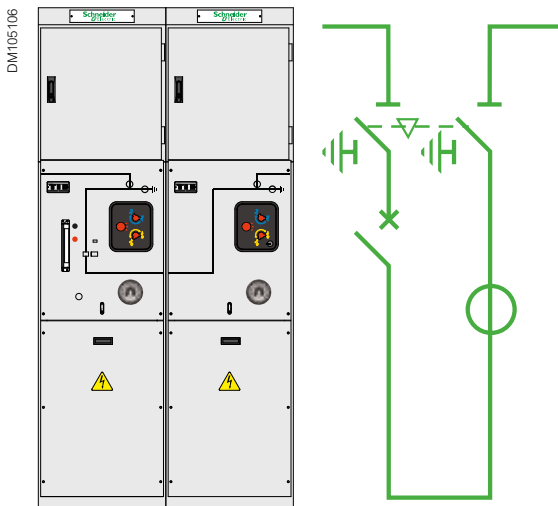
Overview: Choice of functional units

Circuit breaker



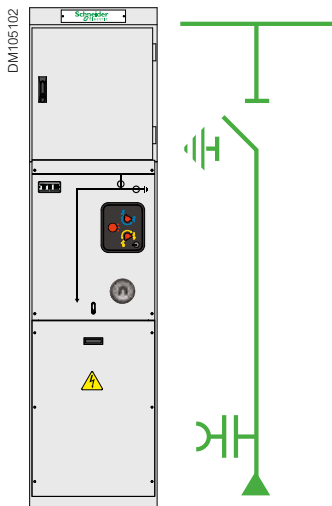
	One pole
Rated voltage (kV)	1 x 27.5
Busbar system rated current (A)	1250 / 1600 / 2000 / 2500
Outgoing rated current (A)	630 / 1250 / 1600 / 2000 / 2500
Short time withstand current 3s (kA)	25 - 31.5

Bus coupler



	One pole
Rated voltage (kV)	1 x 27.5
Busbar system rated current (A)	1250 / 1600 / 2000 / 2500
Outgoing rated current (A)	1250 / 1600 / 2000 / 2500
Short time withstand current 3s (kA)	25 - 31.5

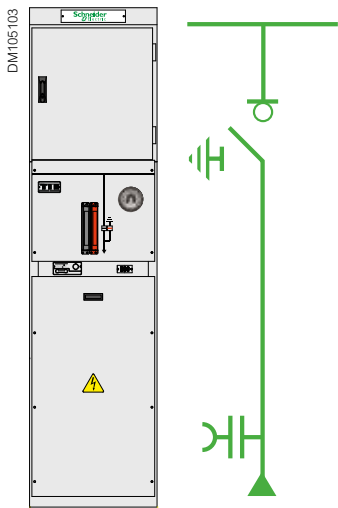
Disconnecter



	One pole
Rated voltage (kV)	1 x 27.5
Busbar system rated current (A)	1250 / 1600 / 2000 / 2500
Outgoing rated current (A)	630 / 1250 / 1600 / 2000 / 2500
Short time withstand current 3s (kA)	25 - 31.5

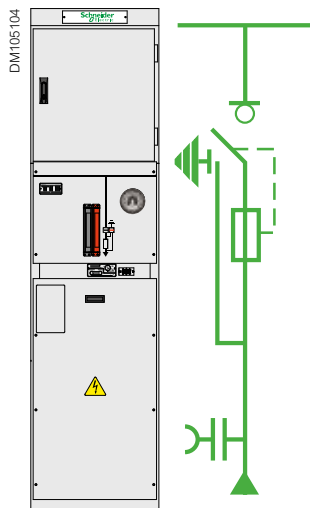
Overview: Choice of functional units

Load-break switch



	One pole
Rated voltage (kV)	1 x 27.5
Busbar system rated current (A)	1250 / 1600 / 2000 / 2500
Outgoing rated current (A)	630
Short time withstand current 1s (kA)	25

Load-break switch + Fuse



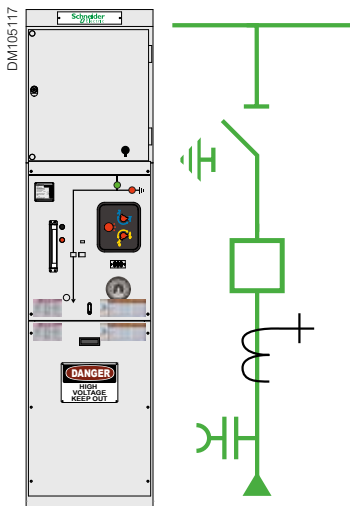
	One pole
Rated voltage (kV)	1 x 27.5
Busbar system rated current (A)	1250 / 1600 / 2000 / 2500
Outgoing rated current (A)	200 (limited by the fuse)
Short time withstand current 3s (kA)	Limited by the fuse

CBGS-0 ANSI: Functions and characteristics

Overview: choice of functional units	38
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Bus coupler	40
Disconnecter	41

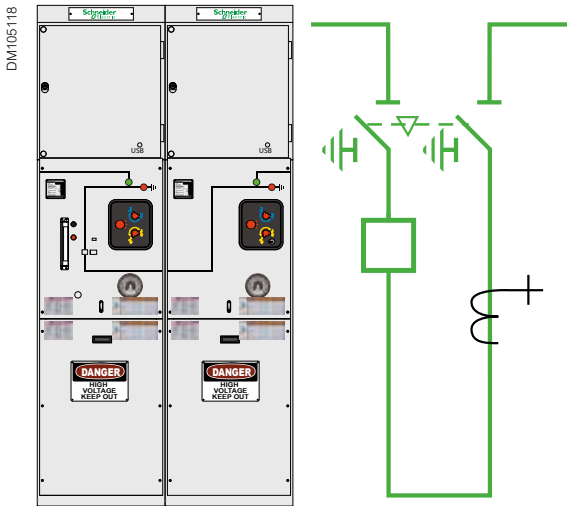
Overview: Choice of functional units

Circuit breaker



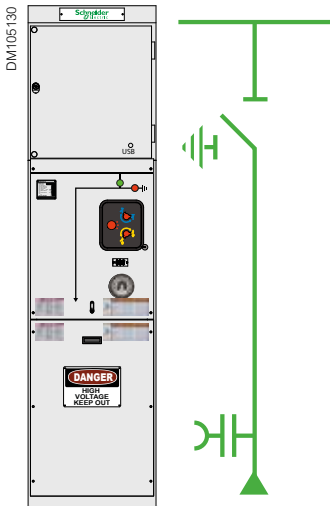
Rated voltage (kV)	27/38
Busbar system rated current (A)	1200 / 2000
Outgoing rated current (A)	1200 / 2000
Short time withstand current 2s (kA)	25 - 31.5

Bus coupler



Rated voltage (kV)	27/38
Busbar system rated current (A)	1200 / 2000
Outgoing rated current (A)	1200 / 2000
Short time withstand current 2s (kA)	25 - 31.5

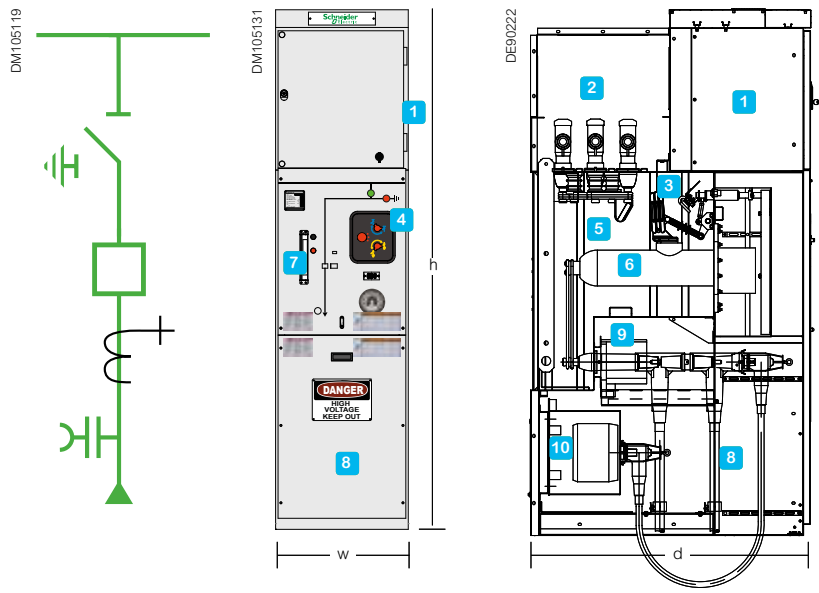
Disconnecter



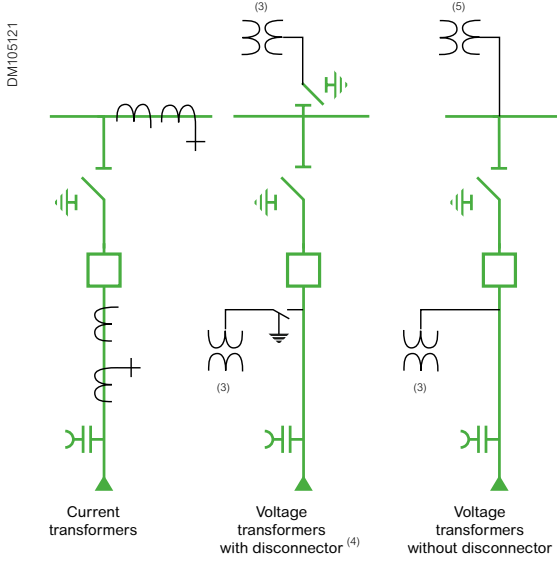
Rated voltage (kV)	27/38
Busbar system rated current (A)	1200 / 2000
Outgoing rated current (A)	1200 / 2000
Short time withstand current 2s (kA)	25 - 31.5

Circuit breaker

- 1 Low Voltage cabinet
- 2 General busbar system
- 3 Three position disconnector (Closed-Open-Ready to earth)
- 4 Disconnecter operating mechanism.
- 5 Main tank (2.5 mm stainless steel) filled with SF6 gas, sealed for life
- 6 Circuit breaker
- 7 Circuit breaker operating mechanism
- 8 Power cables compartment
- 9 Current transformers (optional)
- 10 Voltage transformers (optional)



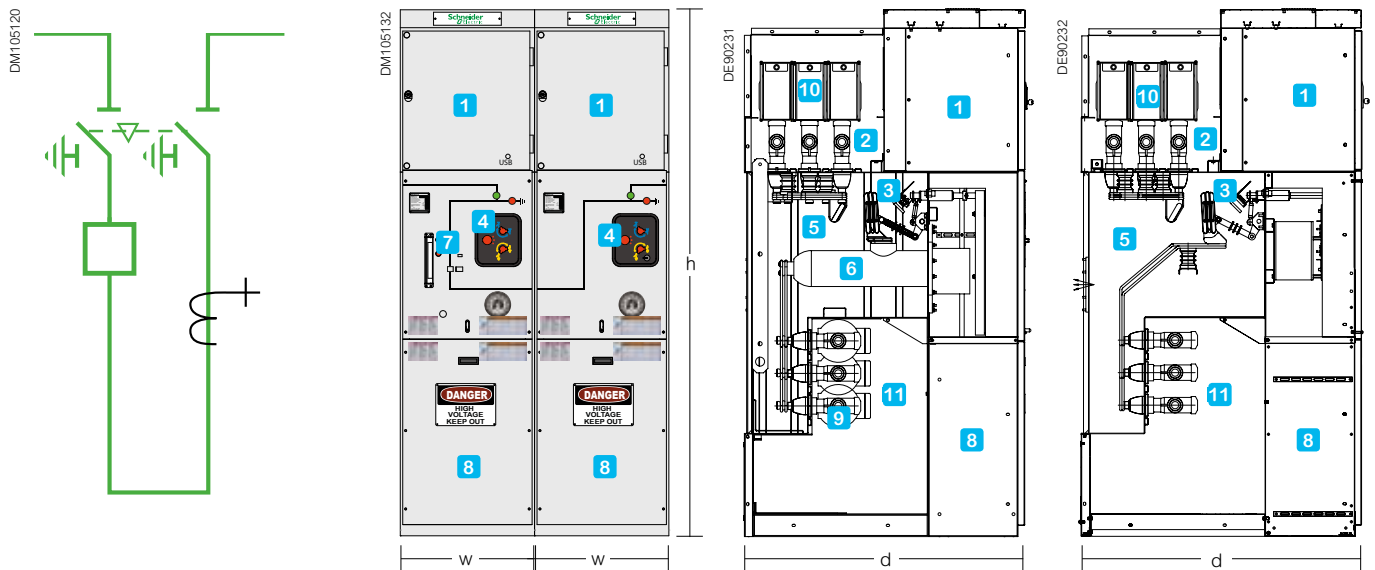
Instrument transformers



		IX-S	
Rated voltage	kV	27	38
Rated insulation level	kV rms - 1 min	60	70
	kV impulse 1.2/50 ms	125	150
Rated normal current (Busbar system)	A 1200	●	●
	A 2000	●	●
Rated normal current (incoming/outgoing)	A 1200	●	●
	A 2000	●	●
Breaking capacity	kA	25/31.5	
Short time withstand current	kA 3s	25/31.5	
(w) Width	mm	600 ⁽²⁾	
(h) Height	mm	2350 ⁽¹⁾	
(d) Depth	mm	1400 (AFLR)	
Approximative weight 1200 A	kg	650	
Approximative weight 2000 A	kg	1250	

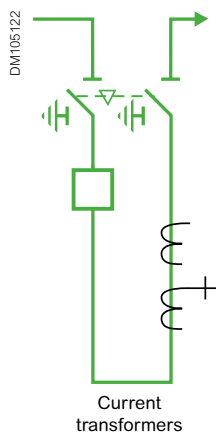
- (1) 2500 mm with voltage transformers for 2000 A busbar
- (2) 1200 mm width for panels >1200 A
- (3) Primary-fused VT
- (4) On special request only
- (5) Please consult us

Bus coupler



- 1 Low Voltage cabinet
- 2 General busbar system
- 3 Three position disconnector
(Closed-Open-Ready to earth)
- 4 Disconnector operating mechanism
- 5 Main tank (2.5 mm stainless steel)
filled with SF6 gas, sealed for life
- 6 Circuit breaker
- 7 Circuit breaker operating mechanism
- 8 Power cables compartment
- 9 Current transformers (optional)
- 10 Voltage transformers (optional)
- 11 Lower busbar system

Instrument transformers

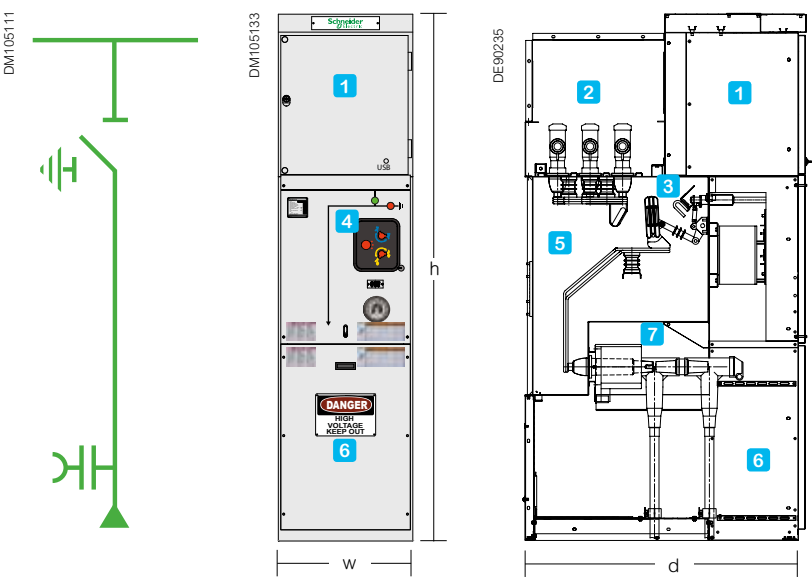


		BR	
Rated voltage	kV	27	38
Rated insulation level	kV rms - 1 min	60	70
	kV impulse 1.2/50 ms	125	150
Rated normal current (Busbar system)	A	1200	2000
		●	●
Rated normal current (incoming/outgoing)	A	1200	2000
		●	●
Breaking capacity	kA	25/31.5	
Short time withstand current	kA 3s	25/31.5	
(w) Width	mm	1200 ⁽¹⁾	
(h) Height	mm	2350 ⁽²⁾	
(d) Depth	mm	1400 (AFLR)	
Approximative weight 1200 A	kg	1100	
Approximative weight 2000 A	kg	2050	

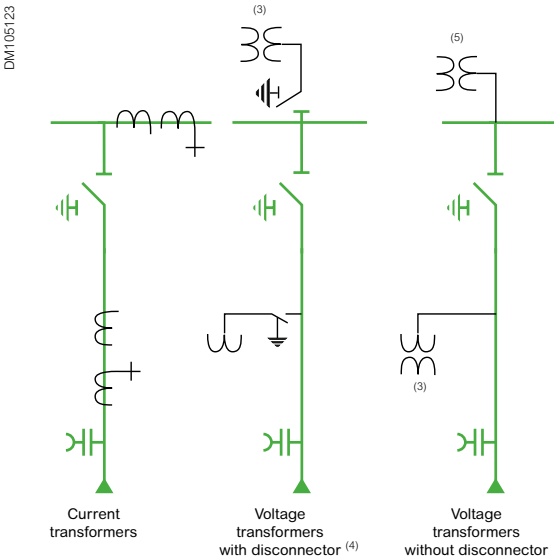
(1) 2400 mm width for panel > 1200 A
(2) 2500 mm with voltage transformers for 2000 A busbar

Disconnect

- 1 Low Voltage cabinet
- 2 General busbar system
- 3 Three position disconnect (Closed-Open-Ready to earth)
- 4 Disconnect operating mechanism
- 5 Main tank (2.5 mm stainless steel) filled with SF6 gas, sealed for life
- 6 Power cables compartment
- 7 Current transformers (optional)



Instrument transformers



			BR	
Rated voltage	kV		27	38
Rated insulation level	kV rms - 1 min		60	70
	kV impulse 1.2/50 ms		125	150
Rated normal current (Busbar system)	A	1200	●	●
		2000	●	●
Rated normal current (incoming/outgoing)	A	1200	●	●
		2000	●	●
Breaking capacity	kA		25/31.5	
(w) Width	mm		600 ⁽¹⁾	
(h) Height	mm		2350 ⁽²⁾	
(d) Depth	mm		1400 (AFLR)	
Approximative weight 1200 A	kg		450	
Approximative weight 2000 A	kg		800	

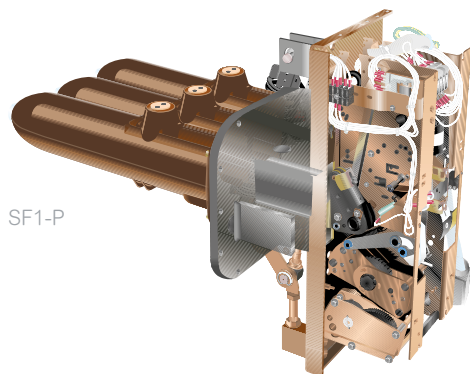
- (1) 1200 mm width, for panels >1200A
- (2) 2500 mm with voltage transformers for 2000 A busbar
- (3) Primary-fused VT
- (4) On special request only
- (5) Please consult us

Components

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CBGS-0 offers two options of circuit breakers: SF6 and Vacuum.

PM105664



SF1-P

SF1-P&G: SF6 circuit breakers

The circuit breaker is placed inside the intermediate SF6 compartment in a fixed configuration.

They work on the basis of the “puffer” type principle in SF6, which is used as a breaking and insulating medium.

- Each of the 3 poles has an independent insulating enclosure which forms a filled pressure system in compliance with IEC standard 62271-100
- No filling is required during the life of the equipment
- Each SF6 circuit breaker is equipped with a pressure switch in order to continuously control the SF6 pressure. In the very improbable event of a pressure falling underneath the established working threshold, 2 alarms are automatically released

DP: Vacuum circuit breaker

All operating and fault currents are switched via the innovative vacuum circuit breaker technology. Here, currents are switched independently of the gas medium.

In circuit breaker switchgear cubicles with vacuum circuit breaker, SF6 gas is used as an insulating medium and not for interrupting electric arcs.

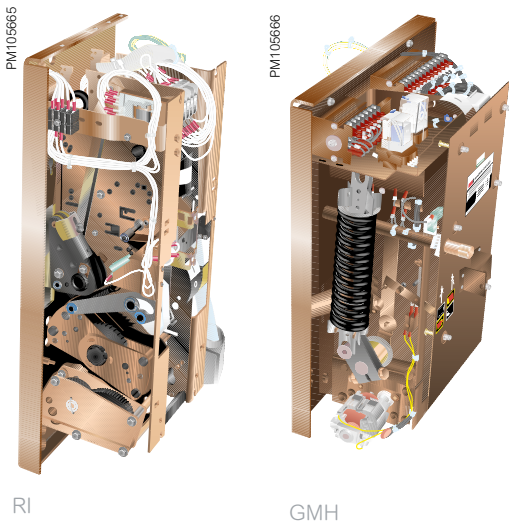
The vacuum circuit breaker can meet all requirements for any type of application:

- Switching of cables, overhead lines, transformers, capacitors, generators and motors
- High number of mechanical and electrical switching operations without maintenance

Circuit breaker type		SF6 CB		Vacuum CB
		SF1-P	SF1-G	DP
Rated voltage	kV	24	36	24 / 36
Rated insulation level	kV rms 50Hz - 1 min	50	70	50 / 70
	kV impulse 1.2/50 ms	125	170	125 / 170
Rated normal current (Ir)	A 1250	●	-	●
	2500	-	●	●
Breaking capacity (Isc)	kA rms	25	31.5	25 / 31.5
Making capacity	kA peak	65 / 82	65 / 82	65 / 82
Short time withstand current	kA rms 3s	25	31.5	25 / 31.5
Rated operating sequence	O-3min-CO-3min-CO	●	●	●
	O-0.3s-CO-3min-CO	●	●	●
	O-0.3s-CO-15s-CO	●	-	●
Electrical endurance classification		E2	E2	E2
Mechanical endurance classification		M2	M2	M2

Switchgear

Circuit breaker operating mechanism



Depending on the circuit breaker used in the switchgear and the requirements of the customer, two operating mechanisms are available.

Circuit-breaker	Circuit breaker type	Rated voltage	Rated nominal current	Short time withstand current	Operating mechanism
SF1-P	SF6	24	1250	25	RI
SF1-G	SF6	36	2500	31.5	GMH
DP	Vacuum	24 / 36	1250 / 2000	25 / 31.5	RI

Operating mechanism

The opening and closing speed of the circuit breaker contacts used for CBGS-0 switchgears are independent of the operator's action. This electrically operated mechanism, which is always motorized to perform remote control functions, allows fast re-closing cycles.

In CBGS-0 type switchgears, all of the operating mechanisms are arranged outside the SF6 tank.

Furthermore, maintenance in this type of operating mechanisms is quite reduced, as self-lubricating components are used.

Auxiliary contacts

The operating mechanism is equipped with a block of at least 14 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 spare contacts are available on the LV terminal block for external signalisation.

Technical characteristics		
Rated current		10A
Rated insulation level	AC - 220 V (cos φ ≥ 0,3)	10A
	DC - 110 or 220 V (L/R ≤ 0.01s)	1.5A

The operating mechanism includes:

- A spring system that stores the necessary energy to open and close the circuit breaker
- A manual spring charging system
- An electrical motor spring charging device that automatically recharges the springs in less than 10 seconds after the main contacts close
- A mechanical pushbutton padlockable on the front panel to open
- A mechanical pushbutton padlockable on the front panel to close
- An electrical closing system including:
 - A closing release for remote control and an anti-pumping relay
- An electrical opening system including:
 - Single or double (optional) tripping coil
- Operation counter
- A spring charging indication contact
- An end of charging indication contact
- An open/closed mechanical position indicator
- A charged/uncharged mechanical position indicator
- An optional key lock to interlock the circuit breaker in open position

Switchgear

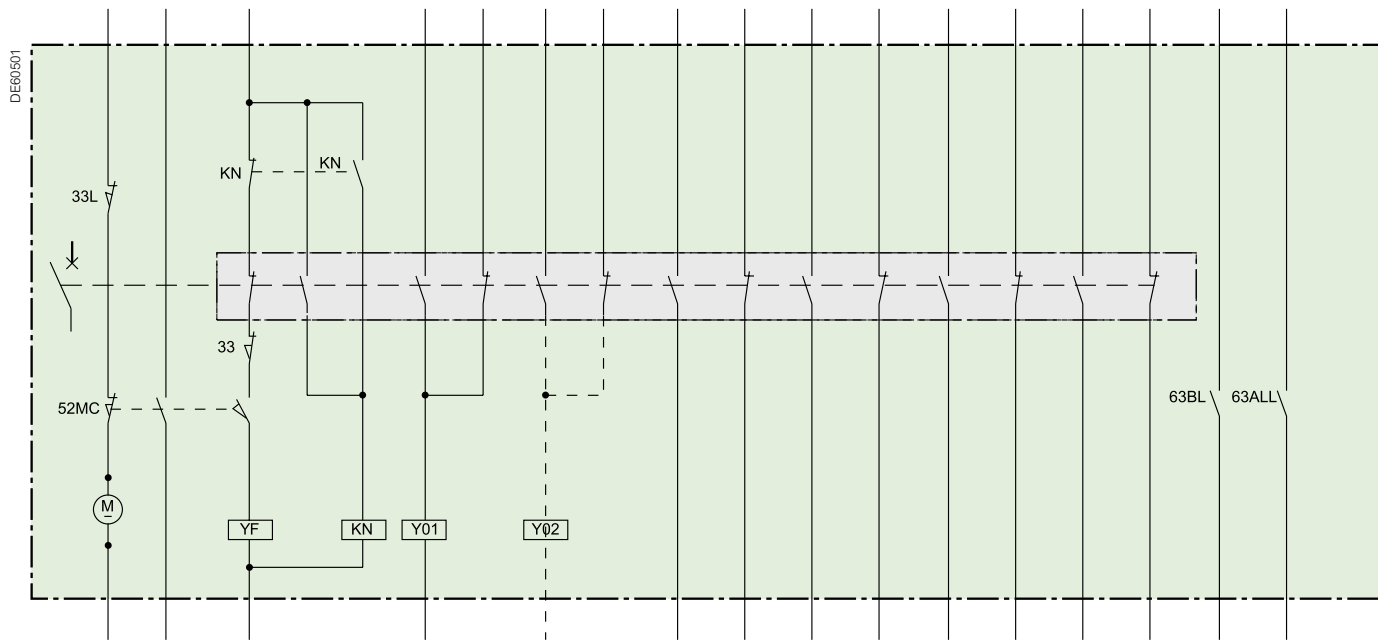
Circuit breaker operating mechanism

RI operating mechanism

Circuit breakers are actuated by an RI operating mechanism that ensures a switching device closing and opening rate that is independent of the operator. This operating mechanism enables remote and fast closing cycles.

Type of auxiliary			Spring charging motor	Closing release	Opening release Shunt		Available contact	
					Single	Double	NC	NO
Supply voltage	AC (V)	50 Hz	48-110-127-220					
		60 Hz	120-240					
	DC (V)	24-48-60-110-125-220						
Consumption	AC (VA)		360	160	160	320		
	DC (W)		360	50	50	100		
Possible combinations of auxiliaries and quantities			●	●	●		5	4
		o	●	●		●	5	3
		o	●	●			5	5

RI auxiliary diagram



- M**

Spring charging motor
- YF**

Closing release
- KN**

Anti-pumping relay
- Y01**

Tripping coil
- Y02**

Second tripping coil (optional)
- 33**

Switch contact for mechanical closing availability
- 33L**

Switch contact for blocking of spring charging motor during manual charging
- 52MC**

End of charging contacts
- 63BL**

Pressure switch contact for opening or locking
- 63ALL**

Low pressure alarm

Switchgear

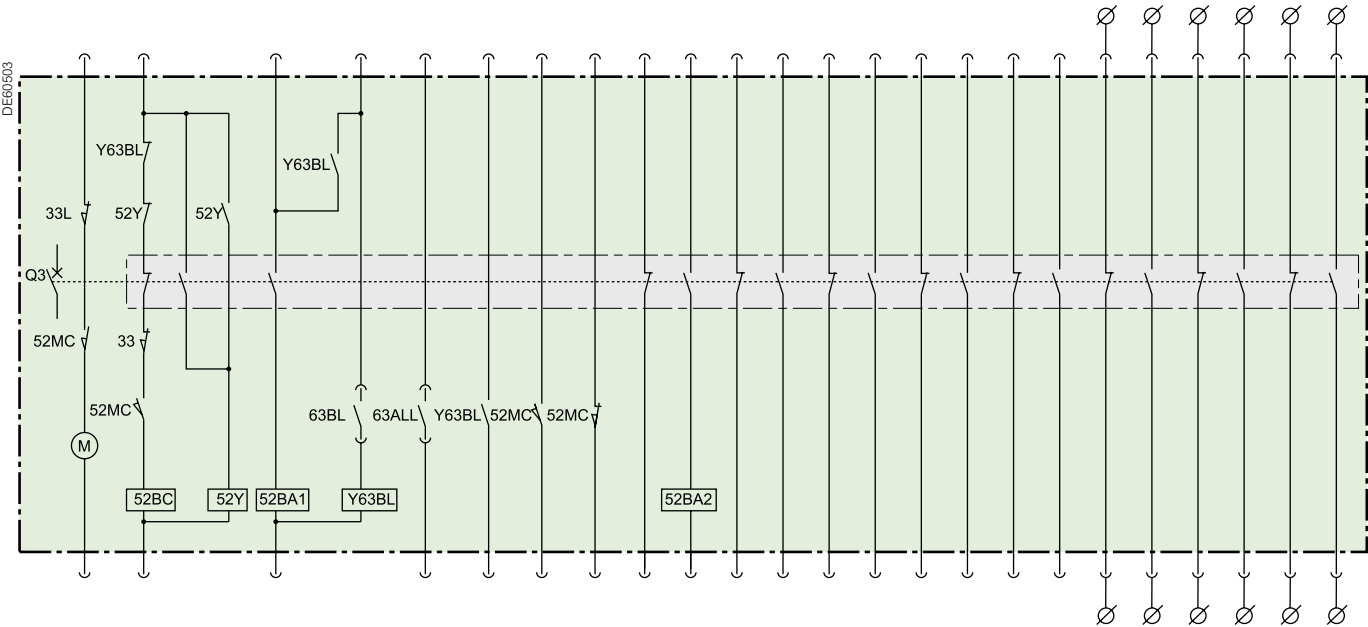
Circuit breaker operating mechanism

GMH operating mechanism

SF1-G circuit breakers are actuated by an GMH operating mechanism that ensures a switching device closing and opening rate that is independent of the operator. This operating mechanism enables remote and fast closing cycles.

Type of auxiliary			Spring charging motor	Closing release	Opening release Shunt		Available contact	
					Single	Double	NC	NO
Supply voltage	AC (V)	50 Hz	48-110-127-220					
		60 Hz	120-240					
	DC (V)		24-48-60-110-125-220					
Consumption	AC (VA)		700	120	120	240		
	DC (W)		570	70	70	140		
Possible combinations of auxiliaries and quantities			●	●	●	5		4
	o		●	●		●	5	3
	o		●	●			5	5

GMH auxiliary diagram

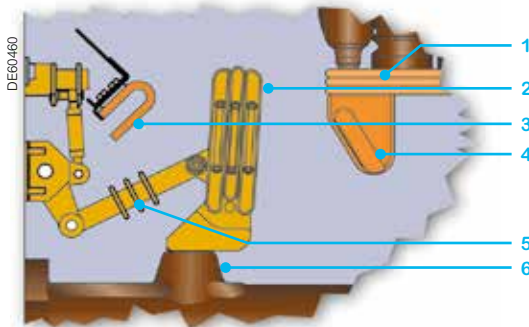


- M** Spring charging motor
- 52BC** Closing release
- 52Y** Anti-pumping relay
- 52BA1** Tripping coil
- 52BA2** Second tripping coil
- 63BL** Pressure switch contact for opening
- 63ALL** Low pressure alarm

- 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

Switchgear

3 position disconnecter



- 1 Upper internal bars
- 2 Mobile contact fingers
- 3 Fixed contact "disconnecter earthed"
- 4 Fixed contact "disconnecter closed"
- 5 Insulating rod
- 6 Support

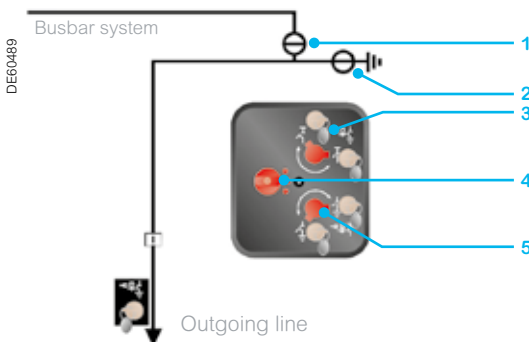
Characteristics of the 3 position disconnecter

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

- Short circuit current making capacity (disconnecter and earthing switch) through the circuit breaker.
- Compact design and reduced dimensions.
- Highly reliable position indicator (without any transmission rods).
- Separate actuation shafts for the disconnecter and the ready-to-earth function.
- Single rotation shaft for the disconnecter and the earthing switch.

Operation and interlocks

- Operated by means of an operating handle.
- Function selection (admissible operations) by means of a selector.
- The flag type design of the selector allows the operating handle to be inserted only in the actuating shaft corresponding to the preselected function.
- The operating handle cannot be removed from the actuating shaft until the switching operation is completed.
- The circuit breaker cannot be closed until the function selector has returned to the neutral position.
- The three position disconnecter can only be operated when the circuit breaker is in the open position.
- Other special interlocks, such as key locks, can be included as an option.

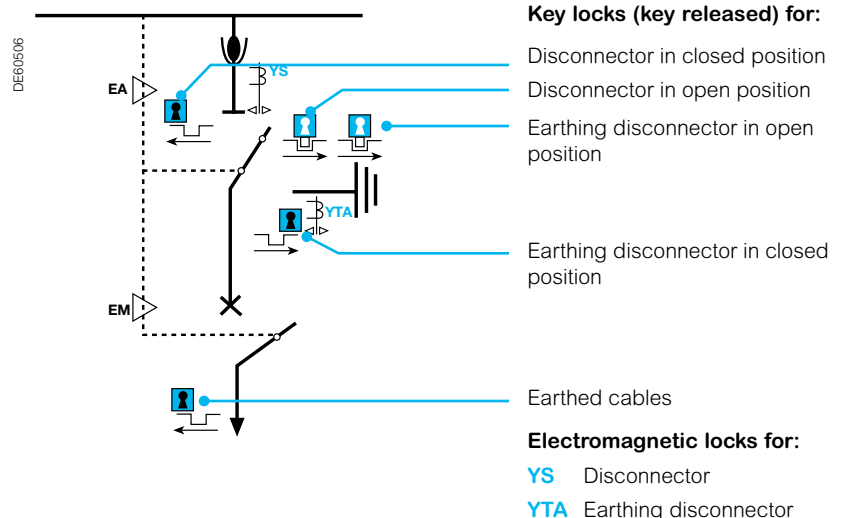


Position indicators

- 1 Disconnecter
- 2 Earthing disconnecter

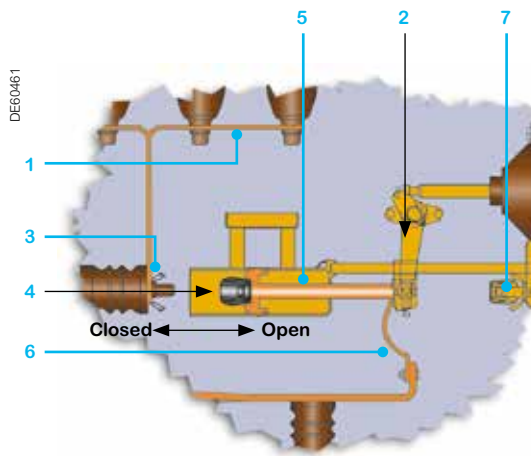
Actuating shafts operated by handle

- 3 Disconnecter (open and close)
- 4 Function selector.
Disconnecter neutral earthing switch
- 5 Earthing disconnecter



Switchgear

Load-break switch



- 1 Upper internal bars
- 2 Insulating rods
- 3 Fixed contact "switch in closed position"
- 4 Mobile contact fingers
- 5 Switch chamber
- 6 Flexible connection
- 7 Fixed contact "earthing switch in closed position"

Characteristics of the switch disconnector

The architecture of the switch disconnectors used for CBGS-0 switchgears is the 3 position type: closed / open / earthed, which has been designed to prevent malfunction.

The breaking system uses the autopneumatic "puffer" technique. This flow of gas onto the contacts separation area takes place only as a consequence of the horizontal and high speed movement of the switch chamber inside the gas tank, without having any additional gas contribution.

It complies with the requirements of IEC 62271-103 and IEC 62271-102 standards for switch disconnectors and disconnectors.

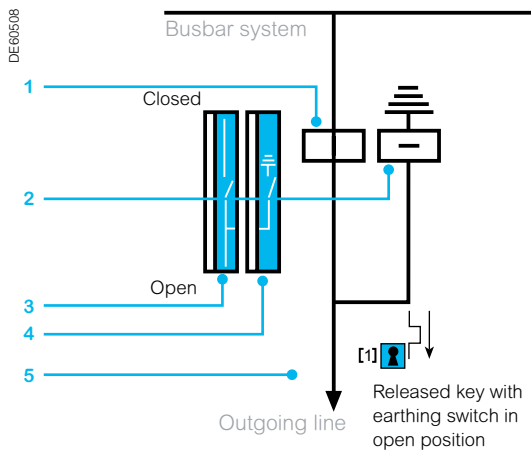
Switch function

- Class: E3 / M0
- Breaking capacity: 630 A
- Short time withstand current: 25kA/1s

Earthing switch function

- Short time withstand current: 25kA/1s

This sort of switch disconnectors are optionally motorized.



Position indicators

- 1 Switch disconnector
- 2 Earthing switch

Actuating shafts

- 3 Switch disconnector
- 4 Earthing switch
- 5 Key lock interlocking

Operation and interlocks

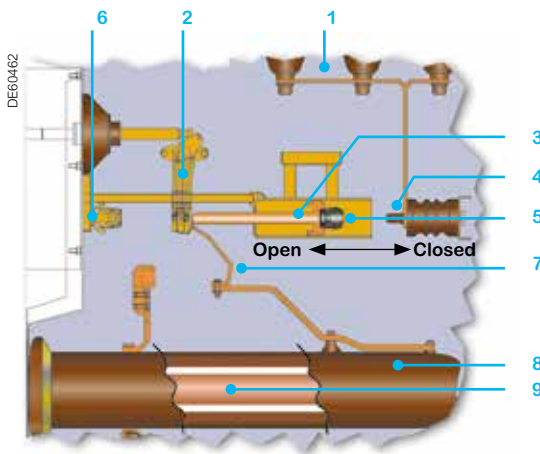
All the opening/closing operations (always tripolar) can be performed by means of a handle, the speed being always independent of the operator's action (except for the earthing switch opening).

For the switch disconnector and earthing switch operations, the operating handle cannot be removed until the operation is completed.

The earthed position of the earthing switch is always interlocked with access to the cable compartment, so that the cover of this compartment cannot be opened until the earthed position is closed. In this situation, also, the key of the interlocking lock is released.

Switchgear

Load-break switch with fuses



- 1 Upper internal bars
- 2 Insulating rods
- 3 Switch chamber
- 4 Fixed contact "switch in closed position"
- 5 Mobile contact fingers
- 6 Fixed contact "earthing switch in closed position"
- 7 Flexible connection
- 8 Fuseholder
- 9 Fuse

Fuse characteristics and arrangement

In CBGS-0 switchgears, the 3 individual fuseholders are arranged inside the gas tank in a horizontal position, all at the same height.

The fuses to be installed must comply with IEC 60282-2 standard. Fuses with a striker of the CF type striker (according to DIN standards) are advisable due to low heat dissipation.

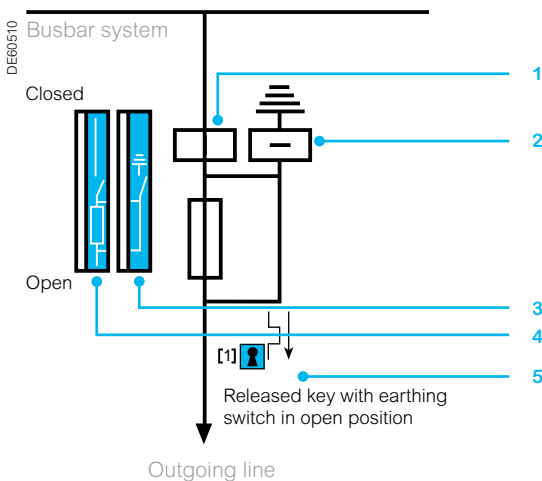
As the fuseholder has been designed for 36 kV fuses, it is provided with an adaptor to be used with 24 kV.

For further details about the appropriate fuse in each case based on the network voltage and the power of the transformer to be protected, please refer to our specific catalogue for MV fuses.

Fuse replacement

If a failure in the network implies the blowing of one (or two) fuses, the characteristics of the apparently undamaged fuses are often affected by the action of the short circuit. A return to service in such conditions would entail the danger of a sudden blow for low overcurrents. Consequently, it is advisable to replace the three fuses according to the IEC 60282-2 requirements.

Operations and interlocks



Position indicators

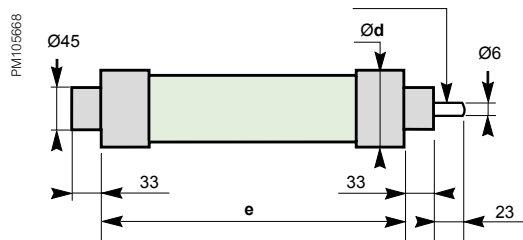
- 1 Switch disconnector
- 2 Earthing switch

Actuating shafts

- 3 Switch disconnector
- 4 Earthing switch
- 5 Key lock interlocking

The access to the fuse compartment (usually for replacement) is always interlocked. This interlocking permits the opening of the cover only when the earthing switch is in a closed position.

As an additional safety measure, the earthing is done on both fuse ends.



Fuse dimensions

The fuse ratings intended to protect the transformer depend, among other things, on the following factors:

- Operating voltage
- Transformer power
- Fuse heat dissipation
- Fuse technology (manufacturer).

It is recommended to use the Fusarc CF type, according to dimensional standards DIN 43.625, equipped with a thermal striker.

Range	Rated normal current (A)	Length (mm)	Diameter Ød (mm)	Weight (kg)
CF-24/...	6.3-10-16-20-25	442	50.5	1.6
CF-24/...	31.5-40	442	55	2.2
CF-24/...	50-63-80	442	76	4.1
CF-24/...	100	442	86	5.3
CF-36/...	6.3-10-16-20	537	50.5	1.9
CF-36/...	25	537	55	3.1
CF-36/...	31.5-40	537	76	5.4
CF-36/...	50-63	537	86	6.5

Fusarc CF fuse selection table for transformer protection

According to IEC 60076-5:2000:

- U_{cc} (S and 630 kVA) = 4%
- U_{cc} (S > 630 kVA and 1250) = 5%

Admissible overload $\leq 20\%$ and ambient temperature $< 40^\circ\text{C}$.

S (kVA)	U _n (kV)											
	6	6,6	10	11	13,2	13,8	15	20	22	25	30	33
25	CF-12/6.3	CF-12/6.3	CF-12/6.3	CF-12/4	CF-24/4	CF-24/4	CF-24/4					
50	CF-12/16	CF-12/16	CF-12/10	CF-12/10	CF-24/6.3	CF-24/6.3	CF-24/6.3	CF-24/6.3	CF-24/4	CF-36/4	CF-36/4	CF-36/4
75	CF-12/25	CF-12/20	CF-12/16	CF-12/16	CF-24/10	CF-24/10	CF-24/10	CF-24/6.3	CF-24/6.3	CF-36/6.3	CF-36/6.3	CF-36/4
100	CF-12/25	CF-12/25	CF-12/20	CF-12/20	CF-24/16	CF-24/16	CF-24/16	CF-24/10	CF-24/10	CF-36/6.3	CF-36/6.3	CF-36/6.3
125	CF-12/31.5	CF-12/31.5	CF-12/25	CF-12/20	CF-24/20	CF-24/20	CF-24/16	CF-24/10	CF-24/10	CF-36/10	CF-36/6.3	CF-36/6.3
160	CF-12/40	CF-12/31.5	CF-12/25	CF-12/25	CF-24/25	CF-24/20	CF-24/20	CF-24/16	CF-24/16	CF-36/10	CF-36/10	CF-36/10
200	CF-12/40	CF-12/40	CF-12/31.5	CF-12/31.5	CF-24/25	CF-24/25	CF-24/25	CF-24/20	CF-24/20	CF-36/16	CF-36/16	CF-36/10
250	CF-12/50	CF-12/50	CF-12/40	CF-24/31.5	CF-24/31.5	CF-24/31.5	CF-24/25	CF-24/25	CF-24/20	CF-36/20	CF-36/16	CF-36/16
315	CF-12/63	CF-12/50	CF-12/40	CF-12/40	CF-24/31.5	CF-24/31.5	CF-24/31.5	CF-24/25	CF-24/25	CF-36/25	CF-36/20	CF-36/20
400	CF-12/80 ⁽²⁾	CF-12/80	CF-12/50	CF-12/50	CF-24/40	CF-24/40	CF-24/40	CF-24/31.5	CF-24/31.5	CF-36/25	CF-36/25	CF-36/25
500	CF-12/100 ⁽¹⁾	CF-12/100 ⁽²⁾	CF-12/63	CF-12/63	CF-24/50	CF-24/50	CF-24/40	CF-24/31.5	CF-24/31.5	CF-36/31.5	CF-36/25	CF-36/25
630			CF-12/80	CF-12/80	CF-24/63	CF-24/63	CF-24/50	CF-24/40	CF-24/40	CF-36/40	CF-36/31.5	CF-36/31.5
800			CF-12/100 ⁽¹⁾	CF-12/80 ⁽¹⁾	CF-24/63 ⁽¹⁾	CF-24/63 ⁽¹⁾	CF-24/63 ⁽²⁾	CF-24/50	CF-24/40	CF-36/40	CF-36/31.5	CF-36/31.5
1000			CF-12/100 ⁽¹⁾	CF-12/100 ⁽²⁾	CF-24/80 ⁽¹⁾	CF-24/80 ⁽²⁾	CF-24/80	CF-24/63	CF-24/50 ⁽²⁾	CF-36/50 ⁽¹⁾	CF-36/40	CF-36/40
1250						CF-24/100 ⁽¹⁾	CF-24/100 ⁽²⁾	CF-24/63 ⁽¹⁾	CF-24/63 ⁽¹⁾	CF-36/63 ⁽¹⁾	CF-36/50 ⁽¹⁾	CF-36/50 ⁽¹⁾
1650								CF-24/80 ⁽¹⁾				

(1) No valid overload

(2) Valid overloads $< 10\%$

Values according to IEC standards. For other standards, such as ANSI and NBR, please contact us

Switchgear

Busbar system

Characteristics of the busbar system

The general busbar system of the CBGS-0 switchgears has been designed to provide this type of switchgears with the highest degree of safety and reliability, together with a great simplicity of installation.

The possibility of a failure in the busbar system is practically excluded. Nevertheless, as it is a single pole configuration, a failure in one of the busbars would not affect the rest of them.

The set consists of three or six independent copper conductive, silicone insulated, round bars. The connection between the switchgear bushings is made by means of a bar and «T»(cross piece) and «L» (end piece) connectors.

The electrical field is controlled with the aid of semi-conductive inserts in the silicone-rubber insulation, both inside and outside. The external screen is earthed through the switchgear enclosure.

Although the whole set is insensitive to dirt and condensation, it is shock-hazard protected by an external metal covering.

Switchgear extension

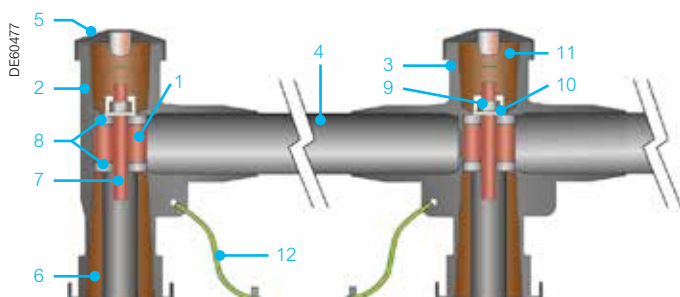
A CBGS-0 switchboard can be extended in a very quick and simple way, cutting off the service for a very short period of time.

Switchgear replacement

In case it was necessary to leave a switchgear out of service due to a failure, there is an optional specific kit to make a by-pass between the adjacent switchgears in order to provide service continuity to the busbar system. In this way, the extent to which the service is cut off is minimized.

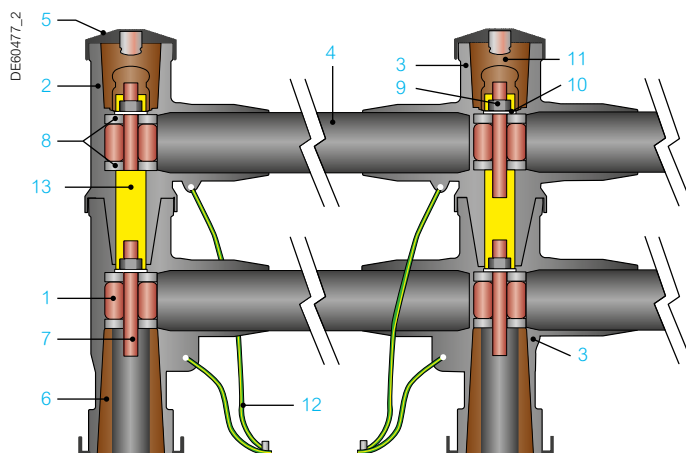
Detail of the shielded busbar system

1250-1600A



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

2000A



Protection and control solutions

MiCOM and Sepam protection systems



Sepam range

Sepam is a self contained unit and brings many advanced features

- **Sepam Series 20** is suitable for common applications and offers Sepam series 20 offers simple solutions based on current or voltage metering
- **Sepam Series 40** with its current and voltage metering capabilities offers high performing solutions for more demanding applications.
- **Sepam Series 60** is even further suited to demanding applications with more inputs/ outputs (up to 28 binary inputs and 16 outputs) and optional mimic-based display units to view a portion of single-line and phasor diagrams.
- **Sepam Series 80** is specially designed for demanding customers on large industrial site.

CGBS-O switchgear integrates Schneider Electric's proven Sepam & MiCOM systems for advanced protection, control and monitoring.

Sepam & MiCOM offer comprehensive protection schemes and advanced control functions for even the most demanding applications.

For more basic applications such as cable and transformer feeders, the range also includes a lower specification device that offers communications and fault recording capabilities coupled with overcurrent and earth fault protection.

Full integration achieves the highest level of system protection at a substantially reduced overall cost.

Main characteristics

- Protection, metering, control, monitoring and annunciation functions
- Trip circuit supervision, logic selectivity, circuit breaker fail protection, intertripping and circuit breaker lockout.
- Local indication of phase currents, maximum demand, line voltages, power factor, active and reactive power
- Integral analogue and digital disturbance recorder
- High level of electromagnetic compatibility
- High reliability from advanced self supervision systems
- Indication of phase and earth fault values at the time of tripping to aid fault analysis
- Simple to set and no routine maintenance help cut costs.
- Some relays can be supplied with Ethernet, to allow a full IEC 61850 solution for the substation



MiCOM range

MiCOM offers varying levels of functionality and hardware

- **MiCOM Series 10** is designed for universal overcurrent protection for the primary or back-up protection on LV or MV systems.
- **MiCOM Series 20** fulfills the basic requirements of industrial, utility and building applications, providing simplicity and ease of use in a wide range of installations.
- **MiCOM Series 30** is designed to meet the rigorous requirements of MV & HV applications with particular focus on feeder and transformer protection and control.
- **MiCOM Series 40** fulfills the protection requirements for a wide market of utility and industrial systems and offers a complete range of protection functions.

Protection and control solutions

Vamp 57 protection system

PE91025



PE91025



Ease of use

User-friendliness has always been a feature of VAMP products, and the VAMP 57 is no exception.

A great deal of effort has gone into the design of the operational aspects of the new products. The rapid setting and download/upload is achieved with the unique VAMPSET setting software which dramatically improves usability. Unicode support allows the menu text and settings to be translated into various international languages including for example Russian and Chinese. The informative human machine interface shows all of the required information for the user with support of customised legend texts.

Enhanced usability

The VAMP 57 protection relay concept has been extended with a number of features that make installation and testing of the relays even more efficient and user-friendly.

Multipurpose feeder and motor protection relay

The VAMP 57 protection relay family is based on proven technology concepts developed in close cooperation with customers. VAMP products have been designed around user-friendliness, a feature which is proven in our customer reports day after day.

The VAMP 57 feeder manager has been developed to cover basic protection needs for OEMs, utilities and industrial applications. Thanks to its cost-effective and flexible design, the VAMP 57 provides an excellent alternative for various protection applications.

VAMP 57 combines further protection functions such as directional earth fault for feeder and motor protection.

Robust hardware

- User selectable Ethernet or RS485 based communication interface
- Designed for demanding industrial conditions
- Common technology for cost efficiency
- Powerful CPU supporting IEC 61850
- Thanks to four setting groups adaptation to various protection schemes is convenient

User-friendly and high functionality

- Common firmware platform with other VAMP range protection devices
- Standard USB connection (type B) for setting software (VAMPSET)

Modern Human Machine Interface (HMI)

- Clear LCD display for alarms and events
- Single line diagram mimic with control, indication and live measurements
- Programmable function keys and LEDs
- Circuit breaker ON / OFF control

Depending on the cubicle type, application and the customer's needs, the CBGS-0 has several options for current transformers.

Ring type current transformers

- Outside SF6 atmosphere
- Not dielectrically stressed
- According to IEC 61869-2 (for other specific standards, such as ANSI, AS, BS, NBR, please contact us)

DE60517



Ring type (toroidal core)
Current Transformer

PM105667

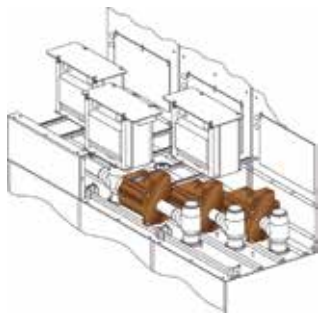


Low Power Ring type
Current Transformer

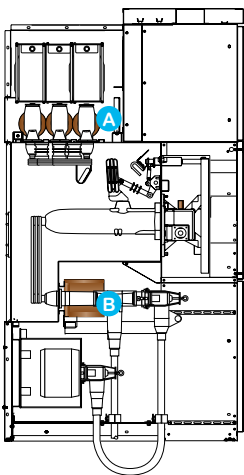
Characteristics				
Thermal current	Permanent (max. value)		1.2 x I _n	
Rated normal current	Primary	A	25 to 2000	
	Secondary	A	1 to 5	
Switch possibilities on the secondary	From	25 - 50		
	Up to	1000 - 2000		
Core data depending on normal primary current (max. 3 cores)			Measuring core	Protection core
Power		VA	2.5 to 25	0.5 to 30
Class			0.2 to 1	5 to 10
Overcurrent factor			FS5	P10 to P30
Dimensions (type A*)				
Inside diameter		mm	Min.: 60 - Max.: 205	
Max. effective length		mm	Min.: 130 - Max.: 225	
Dimensions (type B**)				
Height x Width x Length		mm	435 x 420 x 190	
Operating ambient air temperature		° C	- 5 °C / + 40 °C	
Insulation class			E	

* Located on busbar system. The space required on the busbar system for the arrangement of a complete set of 3 current transformers corresponds to the width of 2 CBGS-0 switchgears.
** On incoming/outgoing bushings.

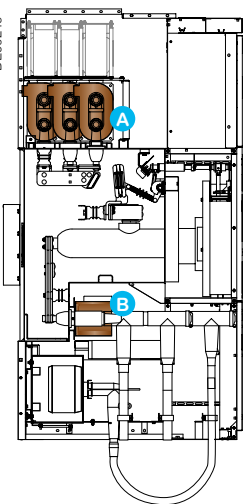
DE60515



DE90244



DE90245



Low power ring type current transformers

Reasons to develop these applications:

- To avoid the use of high burdens (not needed for actual state electronic relays)
- To have combined class burdens and accuracies (Measuring + protection)
- Electronic relays normally have 1 CT input both for measuring and protection
 - Not connected to the primary - Not thermically stressed
 - LV→ Not dielectrically stressed
 - According to IEC 61869-2(for other specific standards, such as ANSI, AS, BS, NBR, please contact us).

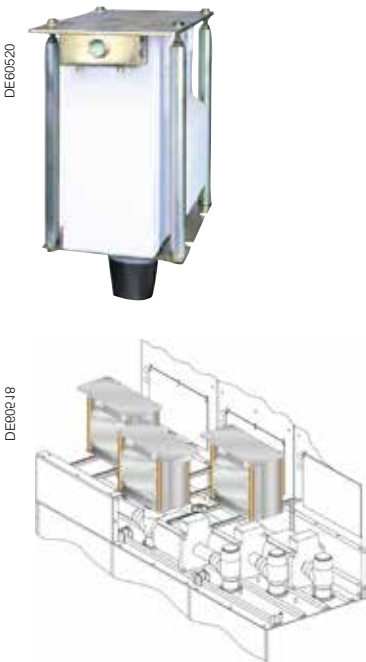
Rated Voltage		N.A. (Low Voltage)
Possible ratios		2 x primary current*
		1 x secondary current
Burdens	VA	0.5
Accuracies		Cl 1/5P20 (combined)
		Cl 0.5 /5P20 (combined for several cases)
Ratios	A	100
		150
		600
		200 - 400
		250 - 500
		300 - 600
		400 - 800
		500 - 1000
* Number of cores depending on client needs.		

These voltage transformers supply power to:

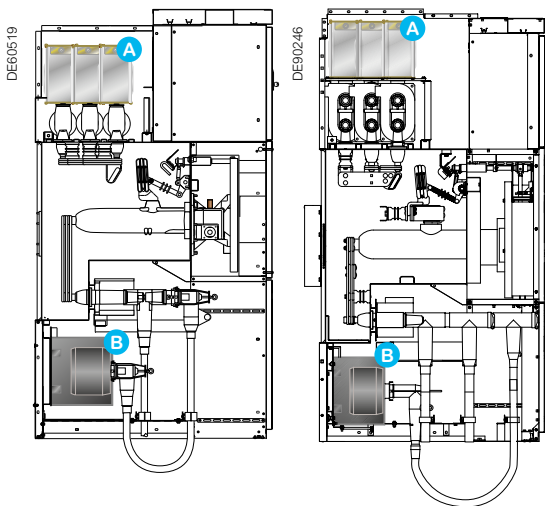
- Measuring, metering and monitoring devices
- Relays or protective devices

General characteristics

- Inductive principle
- Architecture
 - Busbar connected (type A)
 - Cable connected (type B)
- Safe to touch by means of a shielded metal enclosure
- Cast resin insulated
- According to IEC 61869-3 standards
(for other specific standards: ANSI, AS, BS, NBR...please contact us)



Characteristics		A	B	
Normal voltage (U _N)	kV	> 3.6 up to 36/38		
Normal alternal voltage on the primary		1.2 x U _N		
Voltage normal factor (U _N / 8h)		1.9		
Normal voltage on the secondary	V	100 / √3 V		
		110 / √3 V		
		100 / 3 V		
		110 / 3 V		
		120 / 3 V		
Thermal current limit (measuring winding)	A	8		
Normal long duration current (8 h)	A	5		
Power output depending on the accuracy class	Class 0.2	VA	20, 25, 30	25
	Class 0.5	VA	30, 50, 60	50
	Class 1	VA	50, 60, 100	100



Mounting possibilities and types

- MV Cable connected, optionally with disconnecter
- Busbar connected, optionally with disconnecter

Installation and connection

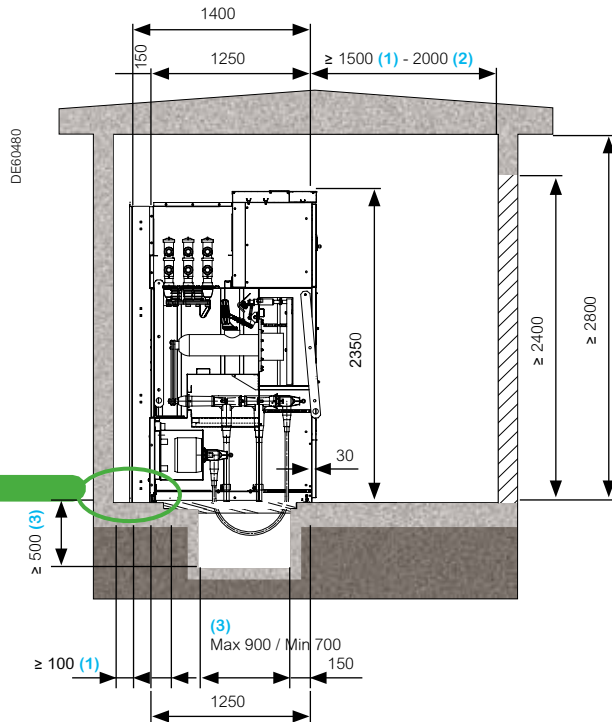
Civil engineering	60
2000 A substation layout	62
Cable connection	63

The use of CBGS-0 switchgears implies a maximum optimization of the necessary space. Space saving is about 50% (24 kV) and 70% (36 kV), compared to the traditional air insulation solutions.

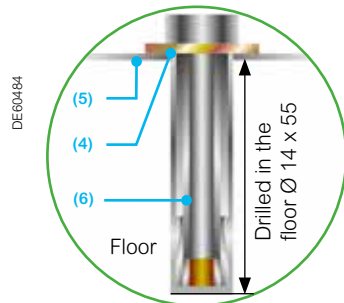
- Weight per cubicle:
from 450 up to 650 kg.
- All the given numbers are minimum values.
- Dimensions in mm.

For further details, please refer to the Instructions Manual.

Switchgear positioning in the substation

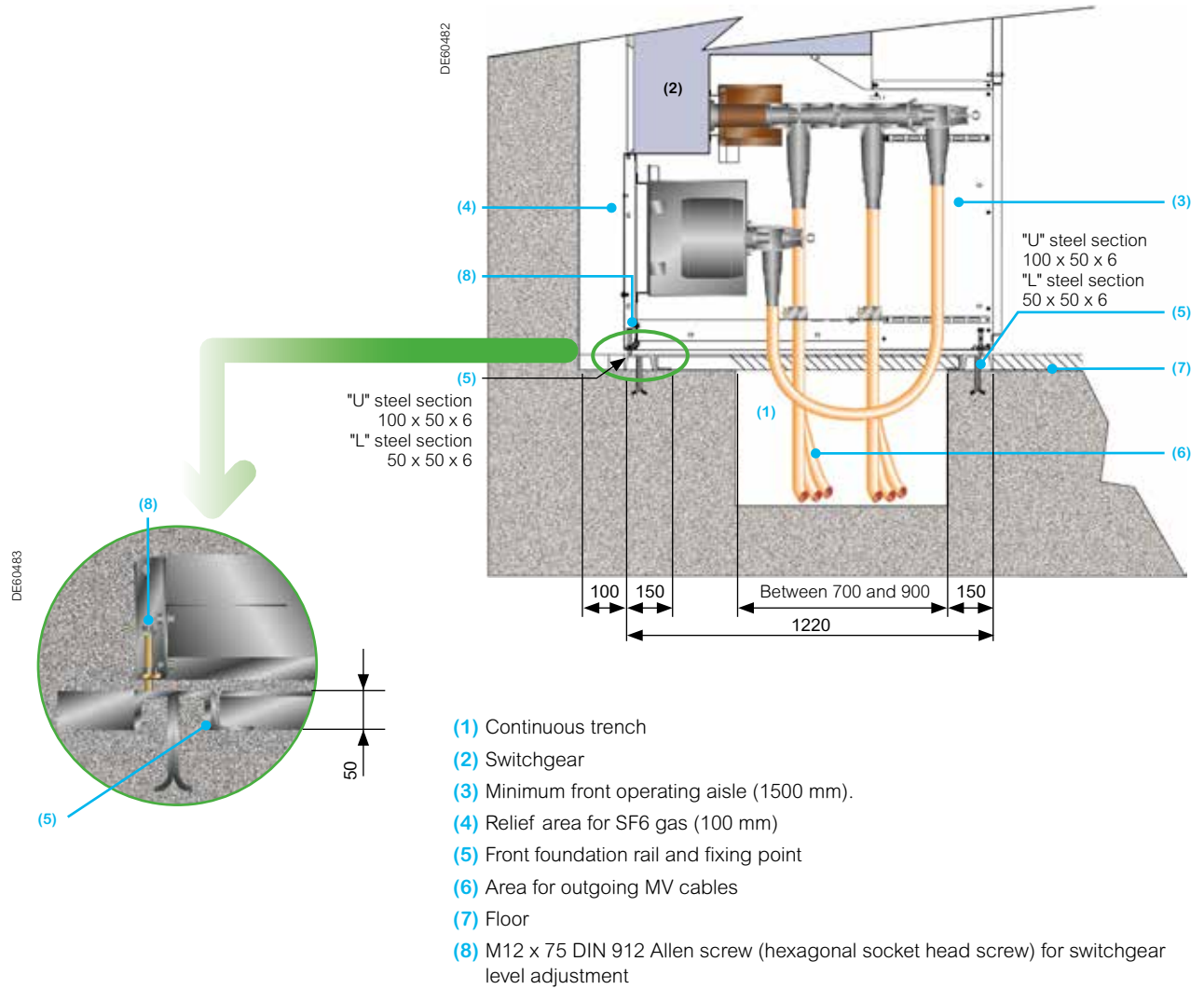


Switchboard fixing detail

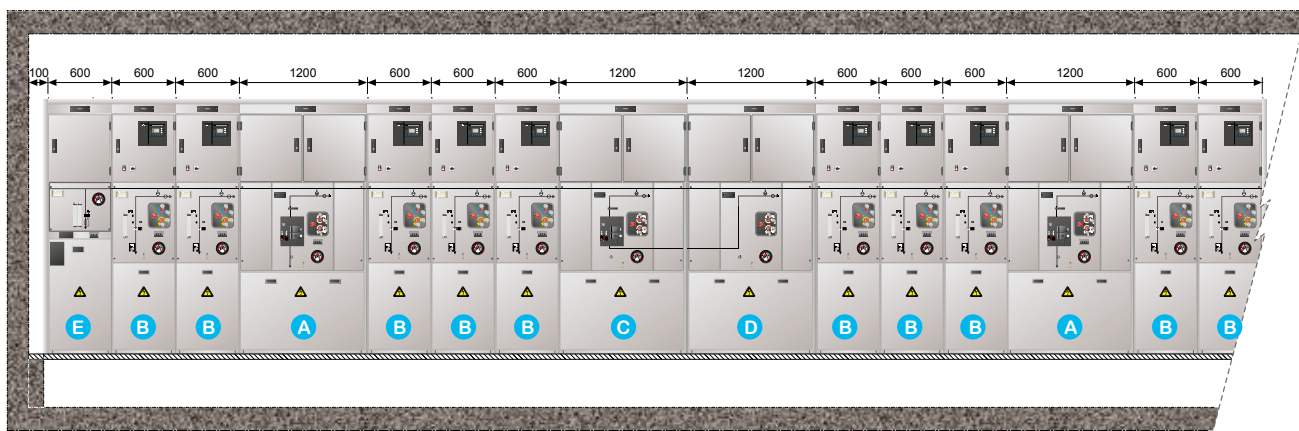


- (1) Minimum distance required for operation
- (2) Necessary distance for the extraction of a functional unit from the switchboard without moving the rest of the units
- (3) Trench dimensions in accordance with the characteristics of the cables used (minimum cable bending radius)
- (4) Washer
- (5) Switchgear baseplate
- (6) Expand screw

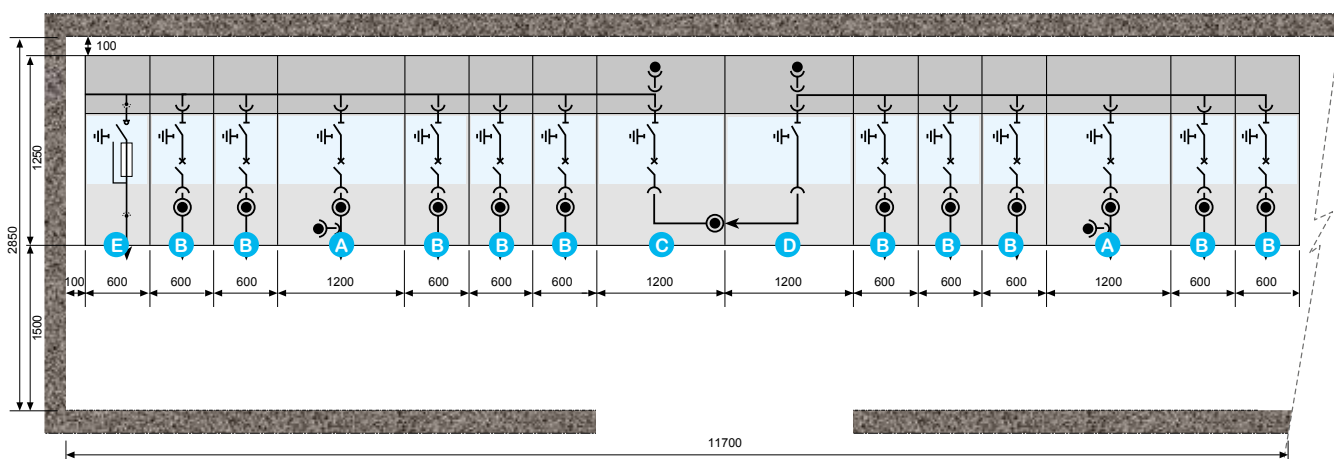
Detail of the switchgear level adjustment



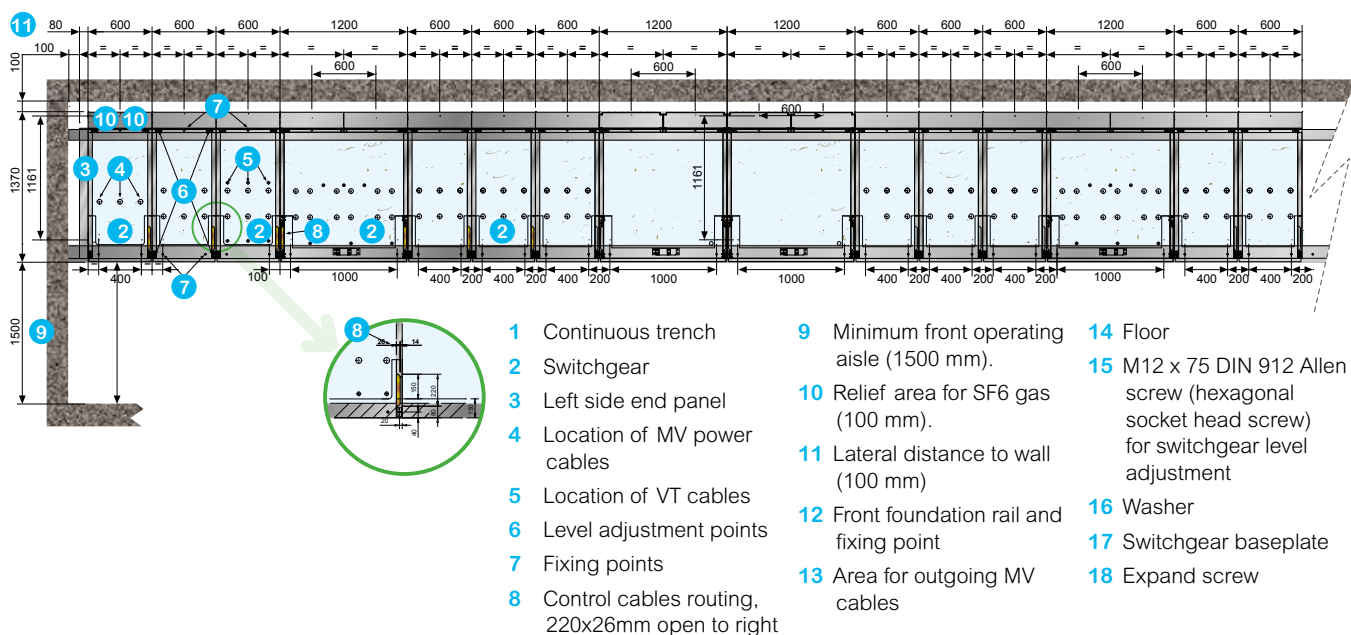
2000 A substation layout



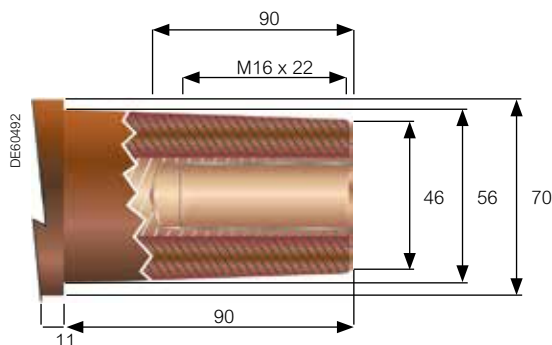
A Incomer **B** Feeder **C** Bus section **D** Bus riser **E** Auxiliary Services



Layout

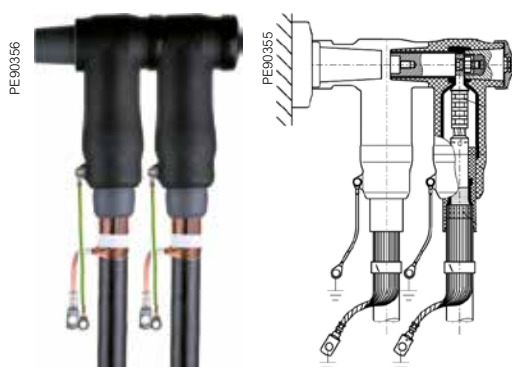


Detail of a type C standardized bushing according to the requirements of EN 50181 for power connectors



Dimensions in mm.

Coupling connectors



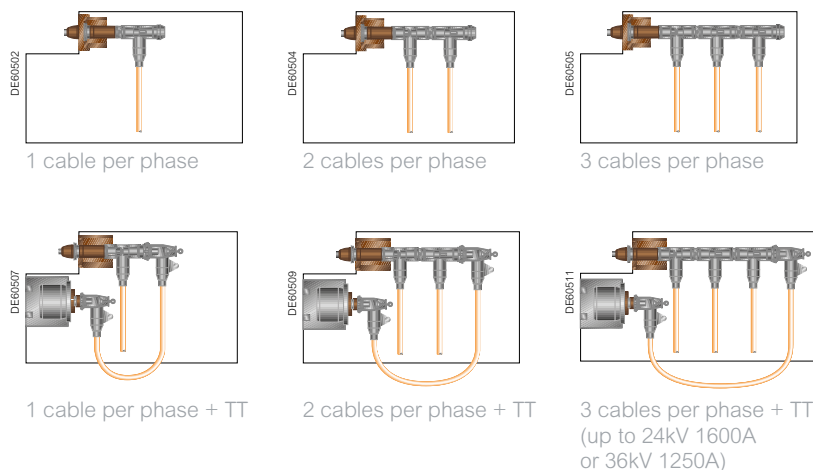
* Same installation possibilities as standard connectors

Plug in connectors for incoming / outgoing cables

The connectors used for the incoming cables in all the CBGS-0 24 / 36 kV switchgears (1) are plug in, «T» type, threaded (M16) and shielded, according to EN 50181.

The maximum cross-section ($\leq 630 \text{ mm}^2$) and the characteristics of the cables that can be connected to CBGS-0 switchgears by means of connectors such as those already described, are given by the manufacturer of each connector. For further details about the characteristics of the different connectors, please contact the main manufacturers.

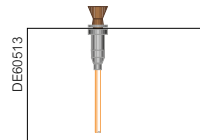
The power cables compartment allows a maximum of three cables per phase.



(1) The connectors used for the MV connection bridges for voltage transformers are plug in elbow types, not threaded and shielded, for 250 A in 24 kV and 400 A in 36 kV.

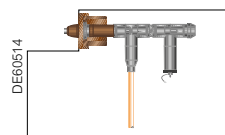
Outgoing connectors for auxiliary service switchgear

CBGS-0 switchgears 24/36 kV with switch disconnecter combined with fuses need the following type of connectors: plug-in straight type, not threaded and shielded and always of 36 kV and 400 A.



1 cable per phase (Aux. S.)

Installation of surge arrestors

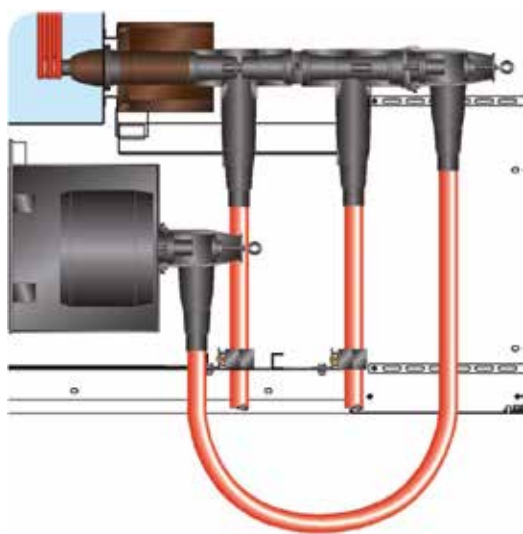


Surge arrestors

In the cable compartment, it is possible to install surge arrestors. The surge arrestors must be suitable for type C bushing, according to the EN 50181 standard (same space of a connector).

Direct cable connection to upper bushings

Upper bushings for busbar connection are also type C according to EN 50181, which is why they eventually allow the direct connection of MV cables by means of adequate connectors.



The maximum cross-section and the characteristics of the cables that can be connected by means of connectors, is given by each manufacturer.

See samples for 24kV and 36kV

Installation possibilities for connectors

Number of cables per phase	Brand	Core cross section ⁽¹⁾ mm ²	Insulation	Cable T-plugs bolted	Coupling inserts bolted
Outer cone ≤ 24 kV					
1	Euromold	≤ 300	EPDM	1x(K)400 TB/G	-
		185 to 630	EPDM	1x(K)440 TB/D	-
		≤ 300	EPDM	-	-
		≤ 300	EPDM	1x430 TB-630A	-
		≤ 240	Silicone	1xAGT 20, metallic shielded	-
		≤ 240	Silicone	1xAGTL 20	-
1	Südkabel	25 to 240	Silicone	1xSET 24/12	-
		300 to 500	Silicone	1xSEHDT 23/13	-
1	NKT cables	≤ 300	Silicone	1xCB 12/24 630	-
		400 to 630	Silicone	1xCB 36/630 (1250) 24kV	-
1	Tyco Electronics Raychem	≤ 300	Silicone	1xRSTI-L56xx	-
		400 to 360	Silicone	1xRSTI-xxLxx	-
2	Euromold	≤ 300	EPDM	2x(K)400 TB/G	1x(K)400 CP
		185 to 630	EPDM	2x(K)440 TB/G	1x(K)440 CP
		≤ 300	EPDM	1x(K)400 TB/G	1x(K)400 CP-LB
2	Prysmian	0 to 400	EPDM	PMA3-400/24	FMPCs-400
2	Südkabel	25 to 240	Silicone	2xSET 24/12	1xKU 23.2
		300 to 500	Silicone	2xSEHDT 23/13	1xKU 33
2	NKT cables	≤ 300	Silicone	2xCB 12/24630	1xCP 630C
		≤ 300	Silicone	1xCB 12/24630+ 1xCC 12/24 630	-
		400 to 630	Silicone	2xCB 36/630 (1250) 24kV	1xCP 630 C
		400 to 630	Silicone	1xCB 36/630 (1250) 24kV+ 1xCC 36/630 (1250) 24kV	-
		400 to 630	Silicone	1xCB 36/630 (1250) 24kV+ 1xCC 36/630 (1250) 24kV	-
2	Tyco Electronics Raychem	≤ 300	EPDM	1xRSTI-L56xx+	1xRSTI-CC-L56xx
		400 to 630	EPDM	1xRSTI-xxLxx+	1xRSTI-CCxL56xx

(1) Only for reference. Complete cable characteristics to be transmitted to connectors manufacturer for real reference.

The maximum cross-section and the characteristics of the cables that can be connected by means of connectors, is given by each manufacturer.

See samples for 24kV and 36kV

Installation possibilities for connectors

Number of cables per phase	Brand	Core cross section ⁽¹⁾ mm ²	Insulation	Cable T-plugs bolted	Coupling inserts bolted
Outer cone ≤ 36 kV					
1	Euromold	≤ 185	EPDM	1xM400 TB/G	-
		240 to 630	EPDM	1xM400 TB/G	-
1	Südkabel	≤ 500	Silicone	1xSEHDT 33	-
1	NKT cables	≤ 300	Silicone	1xCB 36/630	-
		400 to 630	Silicone	1xCB 36/630 (1250)	-
1	Tyco Electronics Raychem	≤ 300	Silicone	1xRSTI-L66xx	-
		400 to 360	Silicone	1xRSTI-xxLxx	-
2	Euromold	≤ 185	EPDM	2xM400 TB/G	1xM400 CP
		240 to 630	EPDM	2xM440 TB/G	1xM440 CP
2	Prysmian	0 to 400	EPDM	PMA5-400/36	FMPCs-400
2	Südkabel	≤ 500	Silicone	2xSEHDT 33	1xKU 33
2	NKT cables	≤ 300	Silicone	2xCB 36/630	1xCP 630C
		≤ 300	Silicone	1xCB 36/630+ 1xCC 36/630	-
		400 to 630	Silicone	2xCB 36/630 (1250)	1xCP 630 C
		400 to 630	Silicone	1xCB36/630 (1250)+ 1xCC 36/630 (1250)	-
2	Tyco Electronics Raychem	≤ 300	Silicone	1xRSTI-66xx+	1xRSTI-CC-L66xx
		400 to 630	Silicone	1xRSTI-xxLxx+	1xRSTI-CC-xLxx

(1) Only for reference. Complete cable characteristics to be transmitted to connectors manufacturer for real reference.



TOOLS

www.schneider-electric.com

This global website allows you to access all the Schneider Electric Solutions and Product information by means of:

- Comprehensive descriptions
- Range data sheets
- A download area
- Product selectors

You can also access information dedicated to your business and contact your Schneider Electric country customer support teams.





TOOLS

Web selector

This site allows you to access all the Schneider Electric products in just two clicks via a comprehensive range of data sheets, with direct links to:

- Complete libraries: technical documents, catalogs, FAQs, brochures
- Selection guides from the e-catalog
- Product discovery sites and animations

You will also find illustrated overviews, news to which you can subscribe, and the list of country contacts.

Training

Training allows you to acquire the necessary expertise (installation design, work with power on, etc.) to increase efficiency and improve customer service.

Our training catalog includes beginner's courses in a wide variety of topics, including electrical distribution, knowledge of MV and LV switchgear, operation and maintenance of installations to name but a few examples.

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CBGS-0 Gas-Insulated Switchgear



schneider-electric.us/cbgs

Life Is On

Schneider
Electric



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.

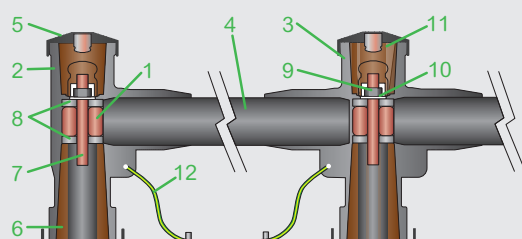
Options allow for diversity of sections

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

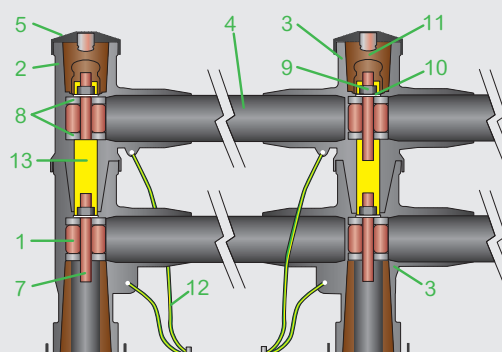
- Circuit breaker sections for incoming and outgoing feeders with insulated dead-break bolted elbow cable connections
- Voltage transformer with isolating device on MV side and transformer grounding feature
- Bus tie with circuit breaker including busbar risers and integrated busbar grounding

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

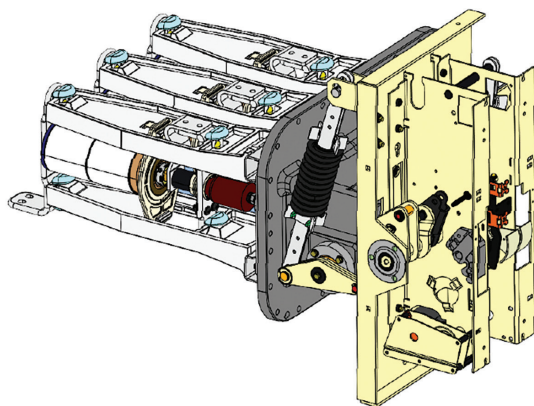
Circuit breakers

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

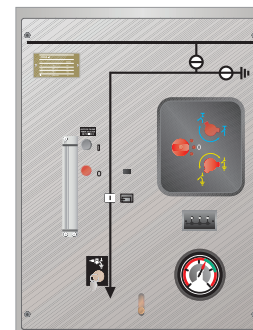
CBGS-0 switchgear is provided with a live line indicator (LLI) installed in the front panels and capacitive divider installed in the output bushings. Each of the LLI's three lamps will illuminate to indicate voltage presence in the cable corresponding to the indicated phase. The LLI will indicate voltage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

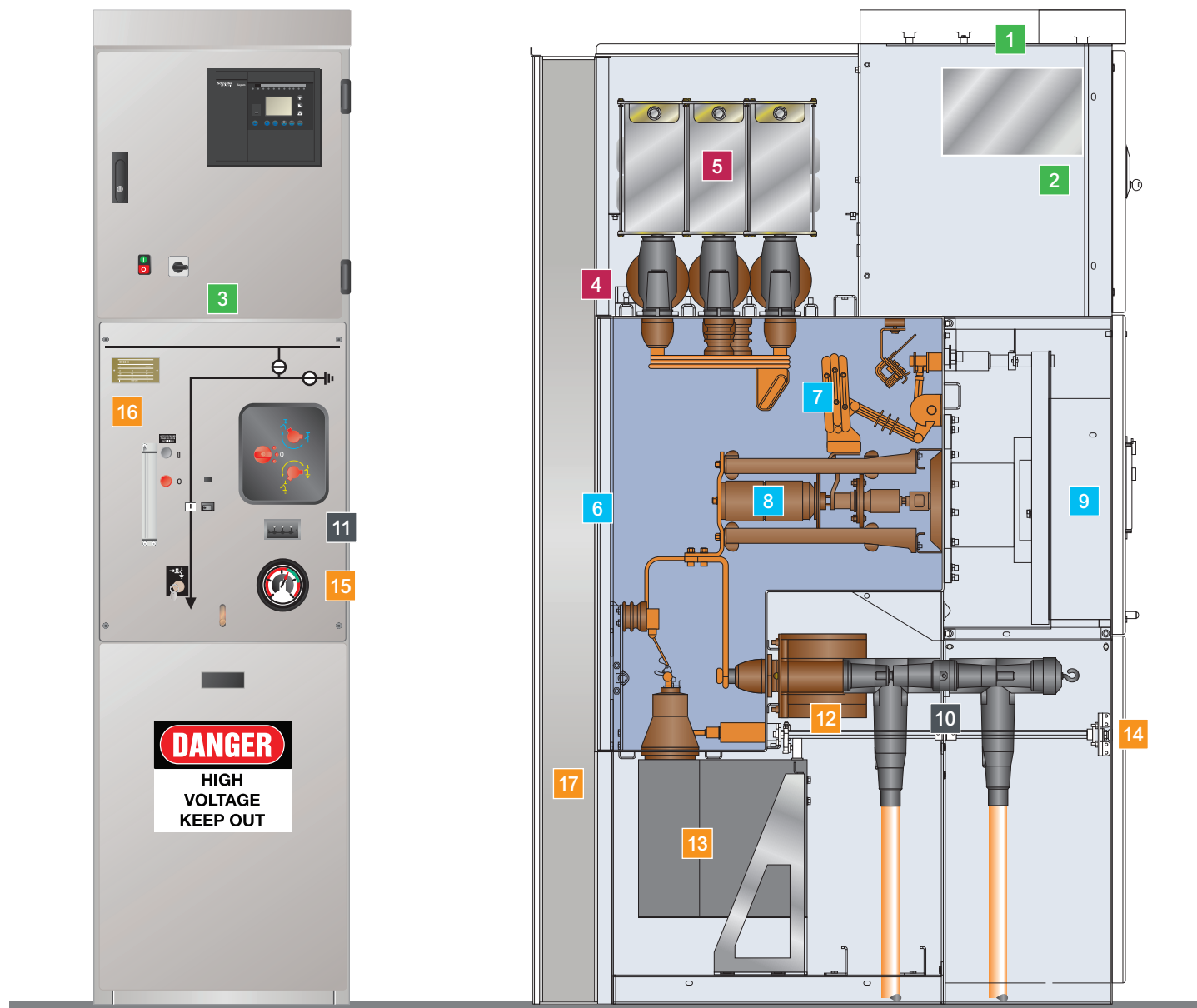
Cable compartment

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

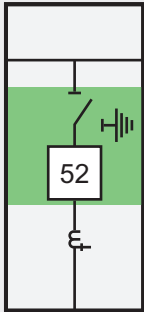
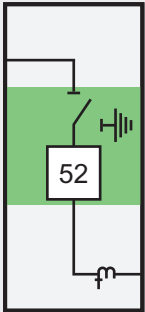
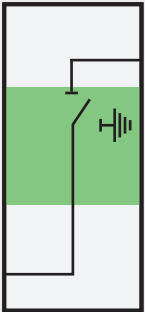
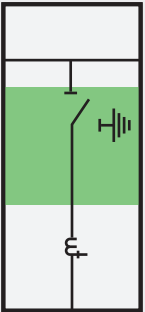
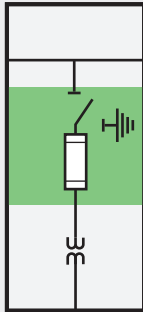
Power cable compartment:

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.

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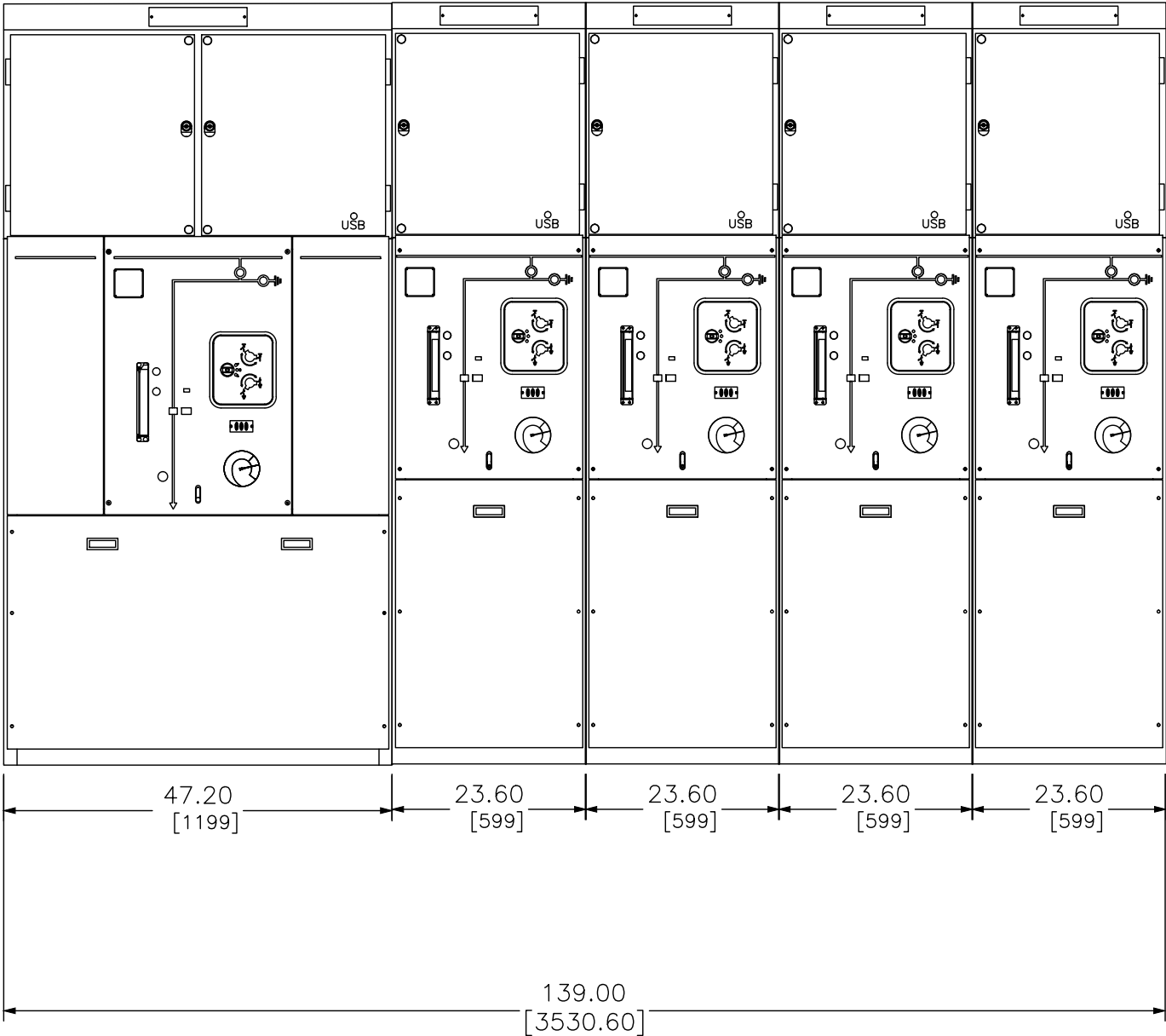
Life Is On



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DUAL DIMENSIONS: INCHES
MILLIMETERS

JOB NAME:	East End Substation Restoration & Expansion Projec	EQUIPMENT DESIGNATION:	CBGS-0 13.8KV 2000A 31.5K
JOB LOCATION:		EQUIPMENT TYPE:	CBGS-0 TYPE GAS INSULATED SWITCHGEAR
DRAWN BY:	(Q2C)	DRAWING TYPE:	ELEVATION
ENGR:		<div>SQUARE D[™]</div> <div>by Schneider Electric</div>	
DATE:	April 13 2020		
DRAWING STATUS:	QUOTE	DWG# FQ-1595855-42542930-01	PG 1 OF 1 REV -

REV	DESCRIPTION	BY	DATE											
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