

GEIS

SecoGear 12kV-27kV

Medium Voltage Metal-Clad Switchgear

GEIS Electrical Protection

Safer Smarter Greener



About GEIS

GEIS was established in 2019 following the spin-off of several businesses and assets that ABB had acquired from GE on July 1, 2018, including 3 manufacturing centers, Warehousing & Trading business at FTZ, and China Technology Center.

- Components: Full range of circuit breakers up to 40.5kV: Medium voltage vacuum circuit breakers, and contactors, LV circuit breakers: ACB, MCCB, MCB, RCD and Control components.
- Equipment: MV switchgear (Air insulation and Gas Insulation Technology), LV switchgear, industrial enclosures and LV switchboard.
- Medium voltage distribution transformers.
- Medium voltage ATS system (Paralleling Switchgear).

After the separation, all the above product lines were rebranded as AEG for selected markets and GEIS for global markets. Moreover, GEIS has expanded its technological portfolio to include medium-voltage controls such as VFDs and soft starters, as well as ATS systems and EV chargers.



Quality is Built-in

Where Technology Meets Manufacturing Excellence for Customers

- Since 2000, we have been specializing in localizing world-class products and manufacturing technologies, developing strong expertise and a highly capable team.
- Vertical integrated Shanghai Manufacturing Center brought key manufacturing processes into a 75,000 m² facility, enabling high-quality, high-efficiency production and fostering innovation. A dedicated R&D team committed to developing products that meet global standards and serve diverse applications.
- Global expansion: GEIS's first Thailand facility makes it easier to serve customers worldwide.



GEIS deliver complete range of products for the evolving electrification needs:



SecoVac VCB



M-PACT Plus ACB



Elfa Series MCB/RCBO



SolidDrive MV VFD



SecoGear MV Switchgear



USx Gas Insulated Switchgear



WaveCast Transformer



MLS LV Switchgear

SecoGear 12kV-27kV Air Insulated Switchgear

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Product Description

SecoGear Series Up to 27kV Switchgear

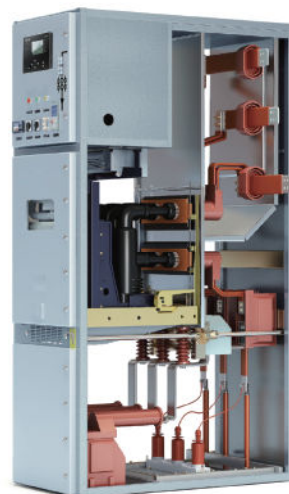


- Indoor metal-clad (According to IEC 62271-200, loss of service continuity category (LSC) 2B and partition class is PM-metallic partition) switchgear designed for the MV section of HV/MV and MV/MV substation
- Air insulated switchgear with a compact design
- Safe and Reliable switchgear for universal indoor applications
- Designed with full metallic segregation of its internal compartments
- Equipped with the latest design embedded pole SecoVac vacuum circuit breaker
- Cable compartments with ample space for ease of power cable connection
- Fully arc-proof unit up to 50kA for 1 second AFLR
- Tested in accordance with the IEC international standards
- Tested to UBC zone 4 IBC 2012 intensity 9 for Seismic
- Front panel features easy operation and low maintenance
- Complete interlocking system to prevent incorrect operation and to improve safety

Innovative in its design, SecoGear is compact air insulated switchgear and leads the industry in safety, reliability, performance and sustainability. Fully IEC certified at the KEMA, IPH and TUV test labs to IEC 62271-100 and IEC 62271-200, meeting the requirements of LSC2B. SecoGear Switchgear is suited to provide control and protection for cables, transformers, capacitors and motors used across many industries. SecoGear excels anywhere that medium voltage power has to be switched, controlled and protected.



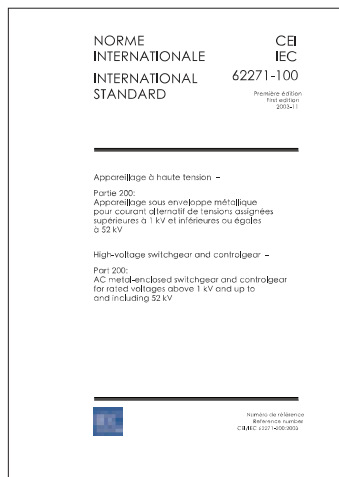
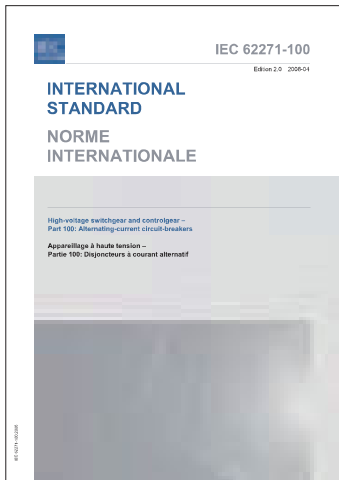
SecoGear Front Access
Unit compartment



SecoGear
Unit compartment

Apparatus compartment
Busbar compartment
Cable compartment
Low voltage compartment

Product Description



Built to highest quality standards

SecoGear is designed and fully third-party type tested to the latest IEC 62271-200 standards. It is fully isolated by earthed metal partitions for all the major compartments. It is equipped with very latest series of IEC vacuum circuit breakers type SecoVac, which are fully third party type tested in accordance with IEC 62271-100. Using state of the art technology, and manufactured in accordance with the highest quality standards; our engineers have integrated core technologies. These technologies such as circuit breaker and mechanism design, vacuum arc control technology, insulation technology and electrical field control and analysis combine to build a highly reliable and compact system. SecoGear benefits from best practices incorporated in our current medium voltage.

The typical rated voltage of SecoGear is 12/17.5/24/27kV and rated current ranges for SecoGear up to 17.5 is from 630A to 5000A (4000A/5000A force cooling), cooling), for SecoGear 24/27kV the rated current is up to 3150A. All SecoGear with a switching device is equipped with SecoVac vacuum circuit breaker or fuse contactor with corresponding specifications.

Fully type tested to latest IEC standards

The switchgear is type tested to the latest IEC 62271-200 and has the third party certification to prove internal arc containment classification of AFLR from 31.5kA for 1 second and up to 50kA for 1 second. This means protection against harm to personnel in the unlikely event of an internal arc in the cable compartment, vacuum circuit breaker compartment and the bus bar compartment in any direction: front, rear and sides of the switchgear.

Product Description

Minimal costs during service due to:

- Robust maintenance-free design with minimum number of parts
- SecoVac VB2 Plus vacuum circuit breaker has a long life up to 30,000 operations without the need for active maintenance
- An advanced vacuum interrupter contact design prevents hot spots, creates less heat and minimizes electrode erosion to yield longer life
- Low end of life disposal costs due to:
 - Vacuum switching technology
 - Air insulation
 - Recycling or re-use of all materials possible
 - No special decommissioning procedures necessary

User interface friendly

- Cable connection and user interfaces for operation on the same side of the unit
- Up to 8 cables per phase with standard compression lug for ease of cable connection
- Secondary cable entry points on both sides of the low voltage compartment top plate
- Secondary cable wiring runs over the length of the switchgear to help with inter-unit wiring
- Secondary cable terminals positioned at a good reachable height within the low voltage compartment
- Clear and simple, straightforward operation, panels combined with an active LED mimic diagram
- Base frame for up to 5 panels decreases the commissioning time and site works

Low lifetime cost

Low initial costs due to:

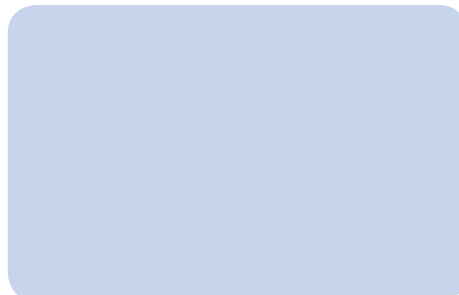
- Compact footprint
- Cable access from front or rear
- Cable entry from either top or bottom
- Bus Duct entry from top or bottom
- Easy-access cable compartment for ease of cable connection
- Integrated arc release system, there are arc skirt, arc duct and arc roof as optional solutions
- Back to wall configuration with front cable access

Product Description

Applications

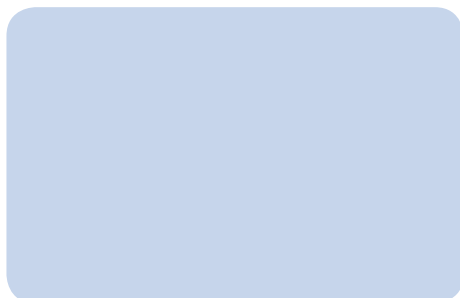
Utilities and power plants

Power generation stations
Transformer stations
Switching stations
Main and auxiliary switchgear
E-House
Generator Circuit Breaker



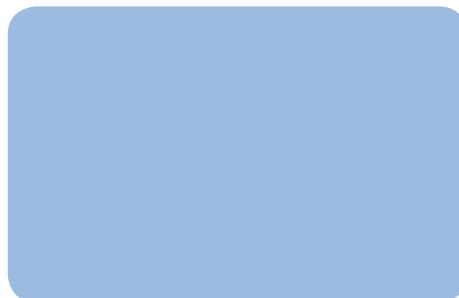
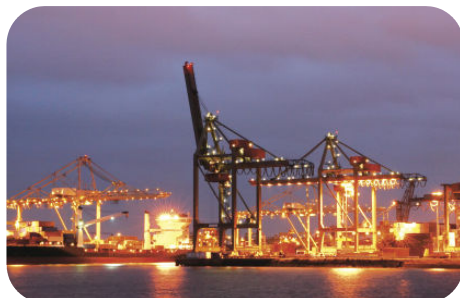
Industry

Oil and Gas
Mining
Pulp and Paper
Cement
Textiles
Chemicals
Automotive
Petrochemical
Data Center
Metallurgy



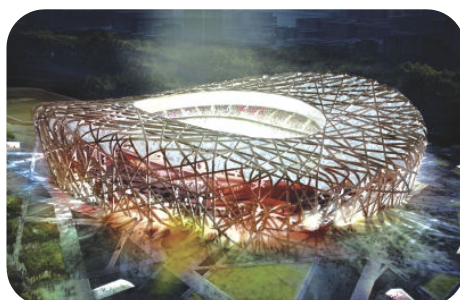
Transport

Airports
Ports Railways
Underground transport



Services

Supermarkets
Shopping malls
Hospitals
Large infrastructure and civil works



Marine

Drilling and Exploration
Merchant
Cruise
FPSO
Naval

Product Description

Safety

Internal Arc Containment

When developing modern medium voltage switchgear, personnel safety must take priority. This is why the SecoGear switchgear has been designed and tested to withstand an internal arc due to a short-circuit current of the same current level as the maximum shorttime withstand level.

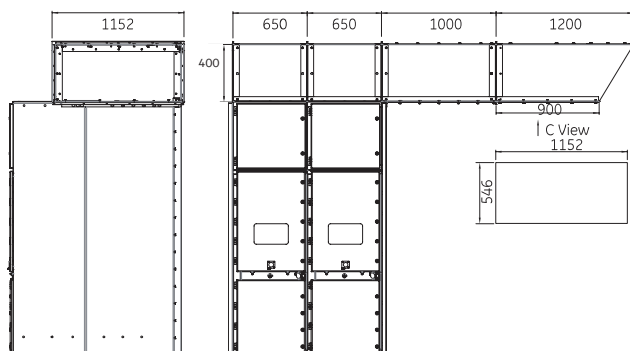
The tests show that the metal housing of SecoGear switchgear provides an enhanced degree of protection for personnel near the switchgear in the case of an internal arcing fault.

Arc Release System

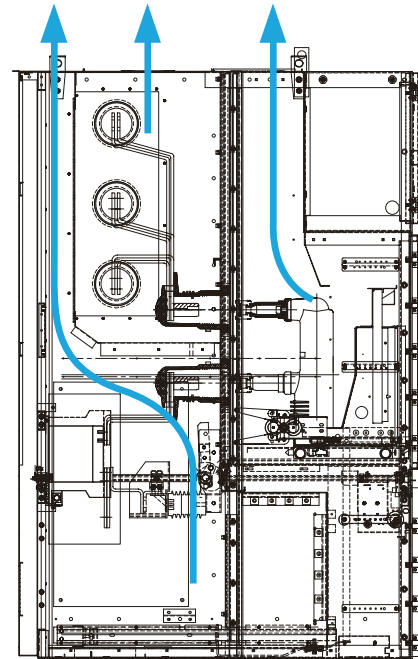
The Arc Release System is the perfect solution for an E-house, marine and other restricted area, where do not allow hot particles and gases can not be vented within the switchroom. It guarantees safety for all personnel.

The top of each panel is fitted with two metal mesh panels. The pressure generated by arc fault causes these panels to open, allowing the gas and particles into the arc tunnel and are then evacuated to the outside of the room.

- All high voltage primary compartment are provided with pressure relief flaps located on the topside of the switchgear.
- Any overpressure inside the compartment caused by internal arcing will be released through the pressure relief flaps.



Arc Release System

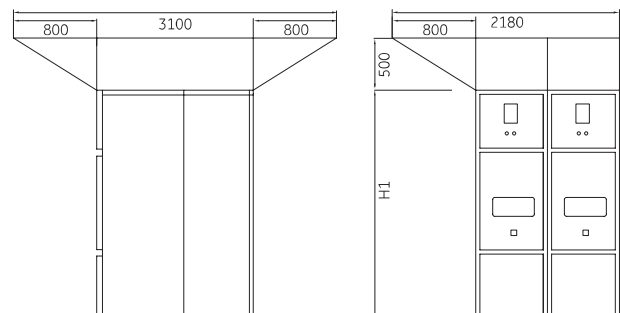


Arc release Channel

Switchgear with standard arc release system can be used where the room height is greater than 3000mm. At the location of the exhaust exits from the switchroom, personal access should be restricted.

For SecoGear FA 17.5kV, a reduced arc release system height is available with the tunnel having a height of 400mm, the ceiling height being a minimum of 2700mm.

The switchgear units have been tested according to IEC 62271-200:2003 for the following Internal Arc Classification. The SecoGear have pass type test IAC AFLR 50kA/1s for 17.5kV and for 27kV 31.5kA/1s with skirt as below.

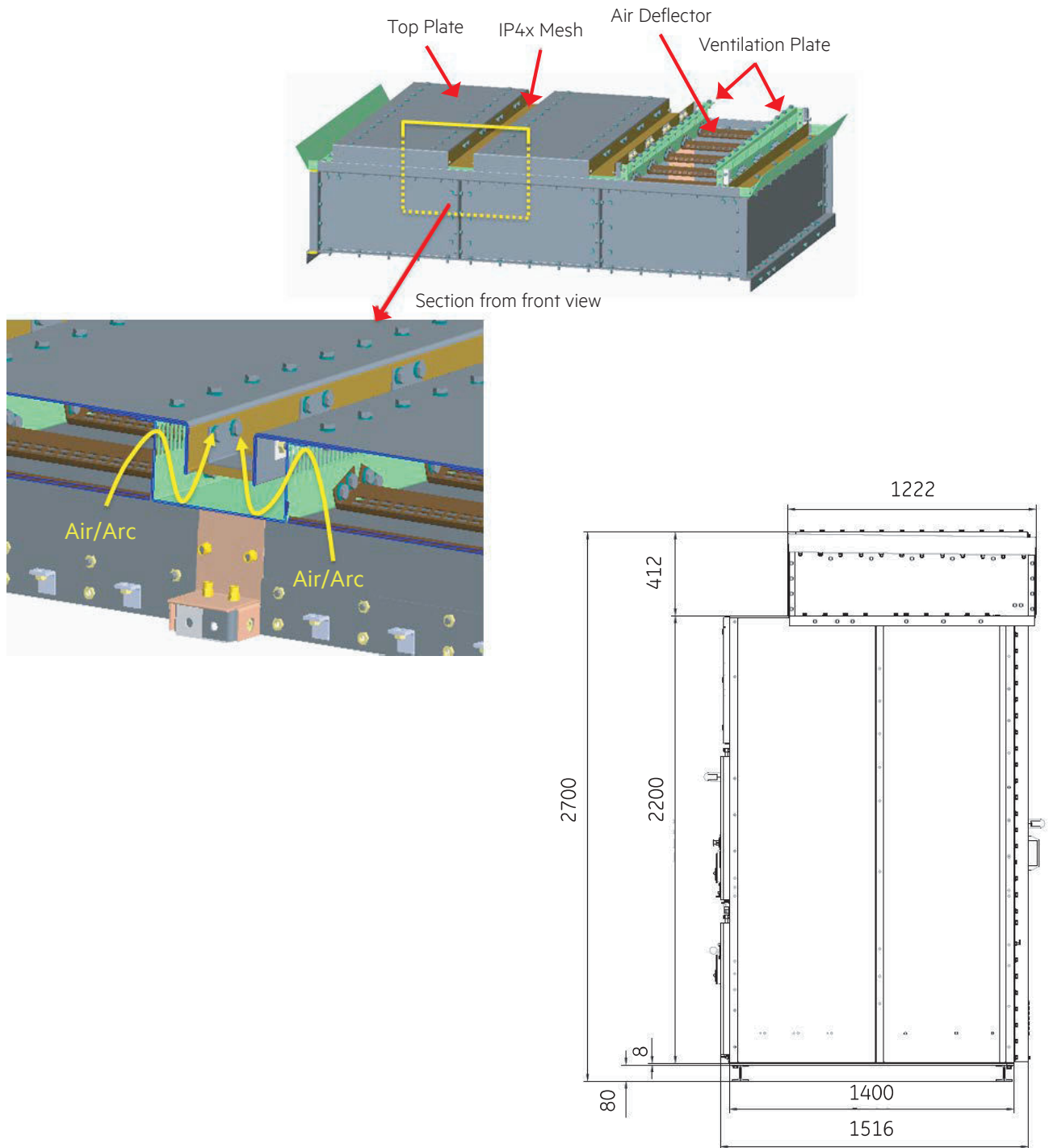


Arc skirt (optional)

Product Description

Arc roof (optional)

For installations where installation of the arc duct or arc skirt could be physically or economically difficult GEIS can provide an alternative arc release system. The Arc Roof uses arc energy absorption technology to contain the arc and its by products in the roof mounted assembly.



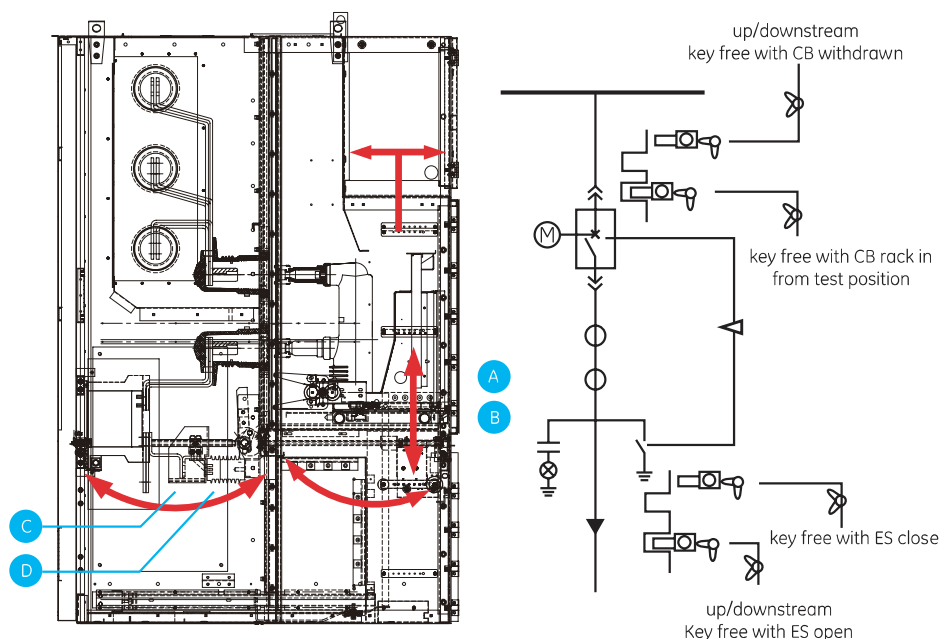
Product Description

Interlock

Safety interlock systems guarantee the highest level of personnel safety preventing operator errors from occurring. SecoGear is designed with a number of interlocking systems to prevent mis-operation:

- The apparatus can only be moved from test to connected position and vice versa when apparatus is opened.
- The earthing switch cannot be closed when the apparatus is in the connected position and in the traveling position between test and connected.
- The cable compartment door can be opened only when the earthing switch is closed.
- The earthing switch can be opened only when the cable compartment door is closed.
- The secondary plug can be inserted or removed only when the apparatus is in the test position.
- The apparatus can only be closed when the circuit breaker is positively located in the connected position.
- When the apparatus is removed from connected position, the metal shutters will close automatically preventing access to live connections.

Description of the interlock system		Key Condition
A	Functional truck racking-out lock	Key will be free when the truck in the connected position
		Key will be trapped when the truck in the test position
B	Functional truck racking-in lock	Key will be free when the truck in the test position
		Key will be trapped when the truck in the connected position
C	Earthing switch closing lock	Key will be free when the earthing switch is open
		Key will be trapped when the earthing switch in closed position
D	Earthing switch opening lock	Key will be free when the earthing switch closed
		Key will be trapped when the earthing switch in open position

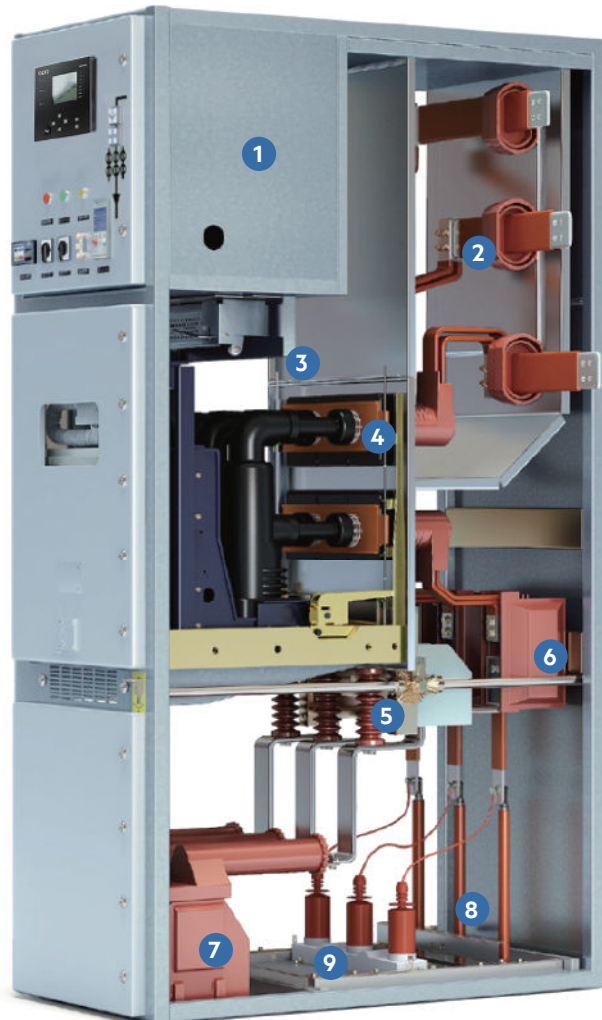


Interlock

Safety

Product Introduction

Product Introduction



1. Low voltage compartment

The compartment is isolated with earthed metal partitions and has ample space for control and protection devices.

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

2. Busbar compartment

Busbars are totally enclosed in their own earthed metal compartment which vents into the arc chamber. Fully insulated along their entire length, the busbars for up to 17.5kV SecoGear are type tested for ratings up to 4000A, 50kA for 3 seconds, up to 27kV SecoGear are type tested for rating up to 2500A, 31.5kA for 3 seconds. For 24/27kV SecoGear, the busbars are type tested for rating up to 2500A, 31.5kA for 3 seconds. Epoxy moldings separate switchgear sections.

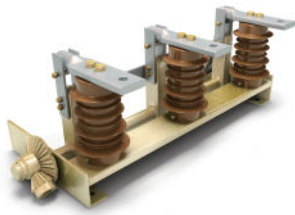
3. Apparatus compartment

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

4. Automatic shutters

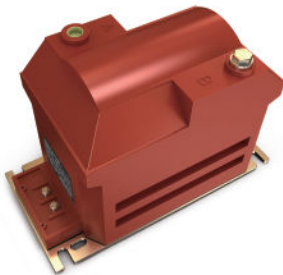
When the apparatus is in test position, the shutters automatically close to isolate the fixed contact from any live parts. Shutters can be individually and automatically operated for bus side and feeder side connection in close position.

Product Introduction



5. Earth switch

The earthing switch can be operated from the front of the switchgear. It is mechanically interlocked with the apparatus truck so that the earthing switch can only be operated when the apparatus is open in test position as well. The switch is also mechanically interlocked with the cable compartment for additional safety.



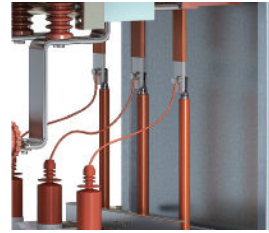
6. Current transformers

Current transformers are cast in resin, and totally enclosed. This provides superior protection against pollutants and moisture. It can be equipped with one or more independent magnetic cores with equal or different characteristics for measuring, metering and protection purposes.



7. Voltage transformers

Voltage transformers are cast in resin, and totally enclosed. This provides superior protection against pollutants and moisture. It can be equipped with one or more independent magnetic cores with equal or different characteristics for measuring, metering and protection purposes.



8. Cable compartment

Cable supports are provided to secure cables. Cable clamps are applied to fix the cables. And the metal floor cover is removable. Infrared sight glass window can be offered.



9. Earth bar

Earth bar is made of copper and installed in the bottom of cable compartment. The earth bar system has been fault tested and runs vertically and horizontally with each panel section and is connected to the earth switch.



10. Surge arrester

Surge arrester is used to protect electric equipment against transient operating or lightning over-voltage. It is connected between primary conductor and ground for protecting protective load from damage effect. When the operating or lightning over-voltage occurs, surge arrester immediately limits over-voltage amplitude and protects the insulation of device.

Product Introduction

Control and Operation

1. Low voltage control and protection compartment

Panel with all controls and indicators clearly visible and easy to operate.

2. Protection relay

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

3. Mimic diagram

Easy to understand mimic diagram of each circuit.

4. Apparatus position indicator

Apparatus position indication shows the apparatus in the connected or test position.

5. Voltage detection system

Each panel can be equipped with an optional standard three phase voltage detection system for voltage detection to IEC 61243-5.

6. Viewing windows

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

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

7. Apparatus racking operate hole

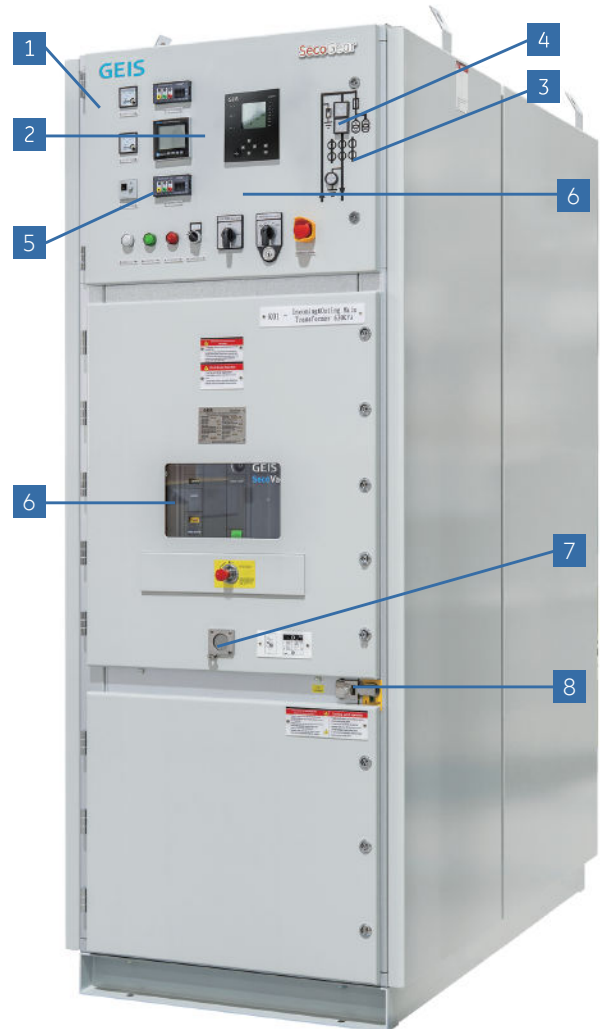
Apparatus racking in/out operate hole

Electrical operation for racking in/out available

8. Earthing switch operate hole

Earthing switch open/close

Electrical operation for Earthing switch available



Product Introduction

Technical Characteristics

	For VCB					For FC	
Product Type		SecoGear 12/17.5		SecoGear 24/27		SecoGear FC	
Rated voltage	kV	12	17.5	24	27	7.2	12
Rated power frequency (min)	kVp	28	38	50	65	20	28
Rated lightning impulse (1.2/50µs)	kV	75	95	125	125	60	75
Rated frequency	Hz	50/60		50/60		50/60	
Rated current	A	630/1250/1600/2000/2500/3150/4000/5000*		630/1250/1600/2000/2500/3150		400**	
Rated short time withstand	kA	25/31.5/40/50		25/31.5		4**	
Rated peak value withstand current	kAp	65/82/104/130		65/82		10.4	
IP level for weather protection	Enclosure	IP4X/41/42					

* Forced cooling

** Only for contactor

Protection

- IP4X for the enclosure
- IP2X between each compartment
- IP41 / IP42 optional

Connections

- Front and/or rear access
- Cable entry from bottom or top
- Bus Duct entry bottom or top

Construction

- Internal arc withstand (classification IAC): AFLR up to 50kA/1sec
- 3 compartments (classification LSC2B according to IEC 62271-200)
- All the metal surfaces in the panels are corrosion proof
- Panels are produced using hot dipped galvanized steel sheet
- Busbar fully insulated for 12kV, 17.5kV, 24kV, 27kV



Product Introduction

Operating Conditions

Normal operating conditions

The switchgear is fundamentally designed for the normal service conditions for indoor switchgear to IEC Publication 62271-1. The following limit values, among others, apply.

- Ambient temperature
 - Maximum +40°C
 - 24h-Medium +35°C
 - Minimum -15°C
- Humidity
 - Highest average value measured over 24 hours
 - Relative humidity 95%
 - Highest average value measured over 1 month
 - Relative humidity 90%
- The maximum site altitude is 1000m above sea level
- Seismic Rating up to Uniform Building Code (UBC) 1997 Zone 4
- Seismic Rating up to IBC 2012 for 27kV SecoGear

Special operating conditions

SecoGear is suitable for indoor type installations according to IEC standard. Special operating conditions must be discussed with GEIS in advance.

For example: At site altitudes above 1000m, the effects of the reduction in density of the air on the dielectric properties must be taken into account.

Increased ambient temperatures must be compensated for in the design of the busbar and the branch conductors as well as the withdrawable parts; otherwise the current carrying capacity will be reduced. Fitting additional ventilation facilities can assist heat dissipation in the switchgear panel.

High altitude application

The insulating capacity of the switchgear with rated values of short-time power-frequency withstand voltage and impulse withstand voltage according to IEC 62271-1.

Note on any special climatic operating conditions

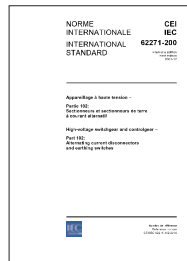
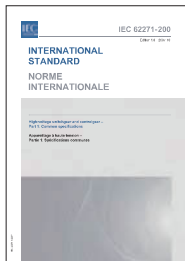
When the switchgear is operated in areas with high humidity and/or major rapid temperature fluctuations, there is a risk of condensation. Preventative action (e.g. fitting an electric heater) must be taken in consultation with the manufacturer to avoid the condensation and any resulting corrosion or other adverse effects.



Product Introduction

IEC Standards

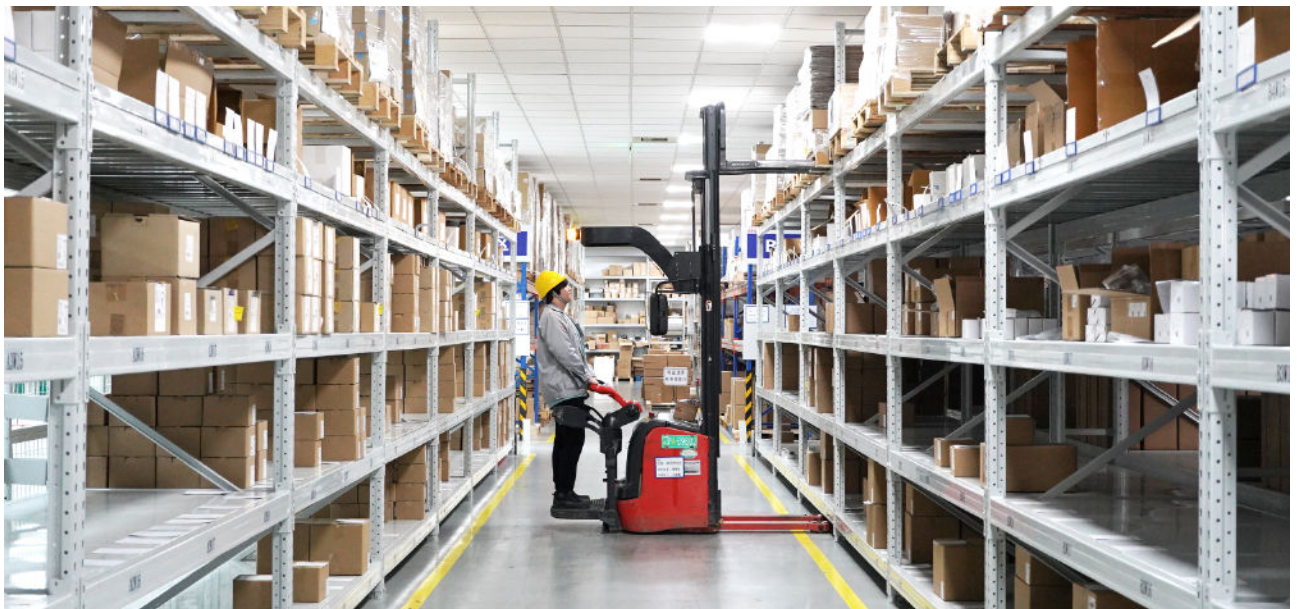
SecoGear complies with the standards and specifications for factory assembled metal-clad switchgear and has been type tested in accordance with the IEC publications as given below.



IEC 62271-100	High-voltage alternating current circuit breakers.
IEC 62271-200	AC Metal-Clad switchgear and control gear for rated voltages above 1kV and up to 52kV.
IEC 62271-102	High-voltage alternating current disconnectors and Earth Switches.
IEC 62271-1	The common specification for high voltage switchgear and control gear Standards.
IEC 60529	Degrees of protection as provided by enclosures (IP Code).
IEC 62271-106	High-voltage Alternating Current Contactors and Contactor-based Motor-Starters.

Storage Conditions

In order to retain all of the functional unit's qualities when stored for prolonged periods, we recommend that the equipment is stored in its original packaging, in dry conditions sheltered from the sun and rain at a temperature of between -15°C and +40°C. For storage: -30°C.



Configurations

Incoming/Feeder

Rated Voltage (kV)

12 17.5 24 27

Rated Insulation Level

Power frequency withstand voltage (kV)

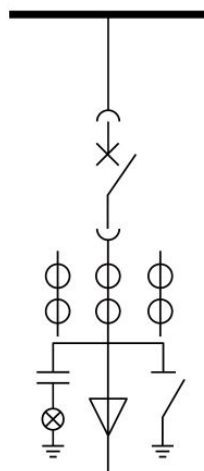
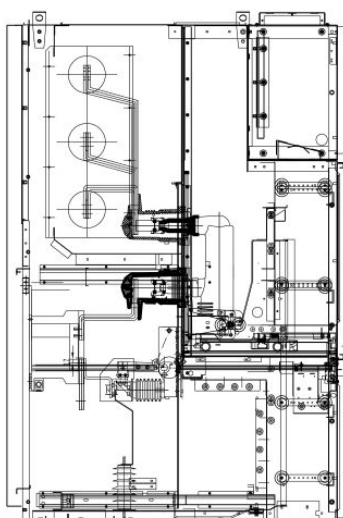
28 38 50 65

Lighting impulse withstand voltage (kV)

75 95 125 125

Rated Current (A)	630	■	■		■	■		■		■	
	1250	■	■		■	■		■		■	
	1600		■	■		■	■		■		■
	2000		■	■		■	■		■		■
	2500			■			■		■		■
	3150			■			■		■		■
	4000*			■			■				
	5000*			■			■				
Breaking capacity (kA)	25	■			■			■		■	
	31.5	■			■			■	■	■	■
	40		■	■		■	■				
	50		■	■		■	■				
Short time withstand current (kA/3s)	25	■			■			■		■	
	31.5	■			■			■	■	■	■
	40		■	■		■	■				
	50		■	■		■	■				

*4000A/5000A switchgear with force cooling



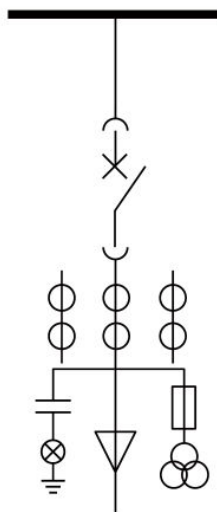
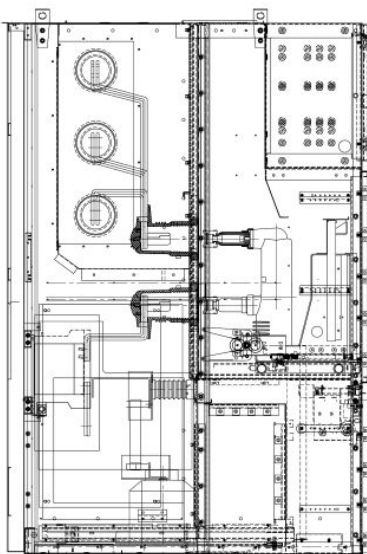
For the 5000A switchgear, please contact GEIS.

Configurations

Incoming with Measuring (VT)

Rated Voltage (kV)											
		12			17.5			24		27	
Rated Insulation Level											
Power frequency withstand voltage (kV)		28			38			50		65	
Lighting impulse withstand voltage (kV)		75			95			125		125	
Rated Current (A)	630	■	■		■	■		■		■	
	1250	■	■		■	■		■		■	
	1600		■	■		■	■		■		■
	2000		■	■		■	■		■		■
	2500			■			■		■		■
	3150			■			■		■		■
	4000*			■			■				
	5000*			■			■				
Breaking capacity (kA)	25	■			■			■		■	
	31.5	■			■			■	■	■	■
	40		■	■		■	■				
	50		■	■		■	■				
Short time withstand current (kA/3s)	25	■			■			■		■	
	31.5	■			■			■	■	■	■
	40		■	■		■	■				
	50		■	■		■	■				

*4000A/5000A switchgear with force cooling

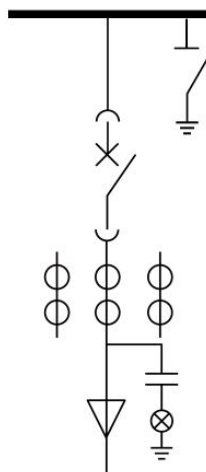
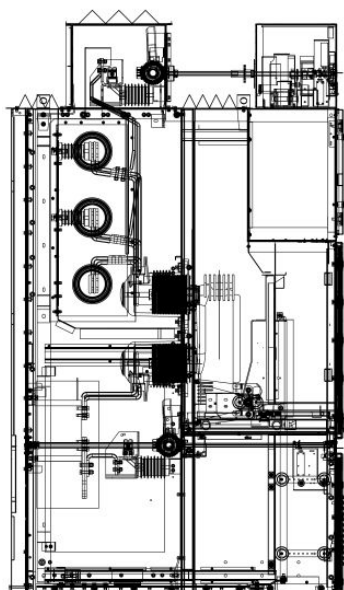


Configurations

Busbar Earthing Switch

Rated Voltage (kV)							
		12			17.5		
Rated Insulation Level							
Power frequency withstand voltage (kV)		28			38		
Lighting impulse withstand voltage (kV)		75			95		
Rated Current (A)	630	■	■		■	■	
	1250	■	■		■	■	
	1600		■	■		■	■
	2000		■	■		■	■
	2500			■			■
	3150			■			■
	4000*			■			■
Breaking capacity (kA)	25	■			■		
	31.5	■			■		
	40		■	■		■	■
Short time withstand current (kA/3s)	25	■			■		
	31.5	■			■		
	40		■	■		■	■

*4000A switchgear with force cooling



Configurations

Incoming/Feeder (VT, SA, ESW)

Rated Voltage (kV)

		12	17.5	24	27
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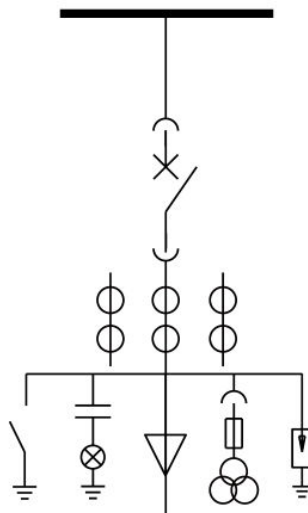
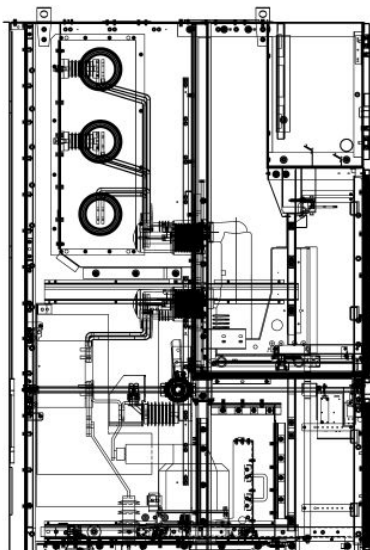
Rated Insulation Level

Power frequency withstand voltage (kV)		28	38	50	65
--	--	----	----	----	----

Lighting impulse withstand voltage (kV)		75	95	125	125
---	--	----	----	-----	-----

Rated Current (A)	630	■	■		■	■		■		■	
	1250	■	■		■	■		■		■	
	1600		■	■		■	■		■		■
	2000		■	■		■	■		■		■
	2500			■			■		■		■
	3150			■			■		■		■
	4000*			■			■				
	5000*			■			■				
Breaking capacity (kA)	25	■			■			■		■	
	31.5	■			■			■	■	■	■
	40		■	■		■	■				
	50		■	■		■	■				
Short time withstand current (kA/3s)	25	■			■			■		■	
	31.5	■			■			■	■	■	■
	40		■	■		■	■				
	50		■	■		■	■				

*4000A/5000A switchgear with force cooling



Configurations

Busbar Tie

Rated Voltage (kV)

		12	17.5	24	27
--	--	----	------	----	----

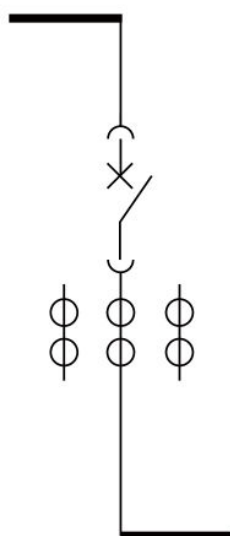
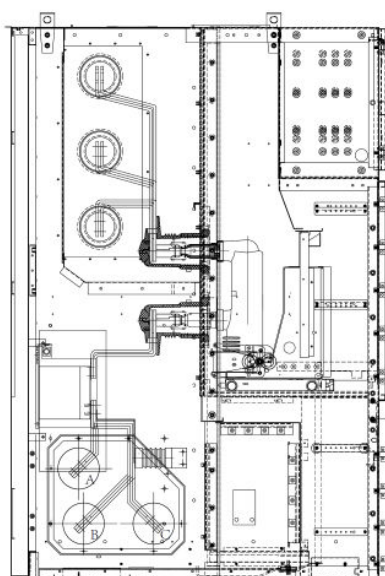
Rated Insulation Level

Power frequency withstand voltage (kV)		28	38	50	65
--	--	----	----	----	----

Lighting impulse withstand voltage (kV)		75	95	125	125
---	--	----	----	-----	-----

Rated Current (A)	630	■	■	■	■	■	■	■	■
	1250	■	■	■	■	■	■	■	■
	1600		■	■	■	■	■	■	■
	2000		■	■	■	■	■	■	■
	2500			■	■	■	■	■	■
	3150			■	■	■	■	■	■
	4000*			■	■	■	■	■	■
	5000*			■	■	■	■	■	■
Breaking capacity (kA)	25	■		■		■		■	
	31.5	■		■		■	■	■	■
	40		■	■	■	■			
	50		■	■	■	■			
Short time withstand current (kA/3s)	25	■		■		■		■	
	31.5	■		■		■	■	■	■
	40		■	■	■	■			
	50		■	■	■	■			

*4000A/5000A switchgear with force cooling

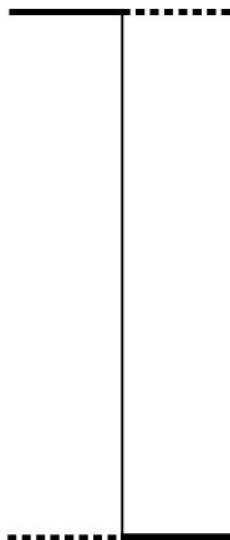
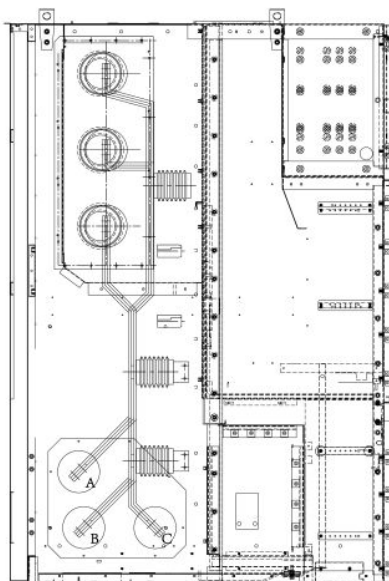


Configurations

Riser

Rated Voltage (kV)					
		12	17.5	24	27
Rated Insulation Level					
Power frequency withstand voltage (kV)		28	38	50	65
Lighting impulse withstand voltage (kV)		75	95	125	125
Rated Current (A)	630	■	■	■	■
	1250	■	■	■	■
	1600	■	■	■	■
	2000	■	■	■	■
	2500	■	■	■	■
	3150	■	■	■	■
	4000*	■	■		
	5000*	■	■		
Short time withstand current (kA/3s)	25	■	■	■	■
	31.5	■	■	■	■
	40	■	■		
	50	■	■		

*4000A/5000A switchgear with force cooling

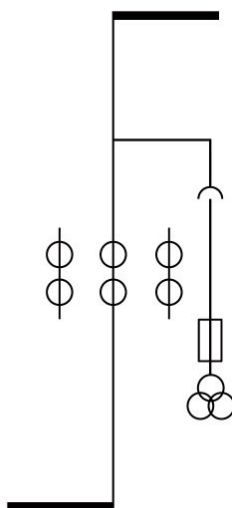
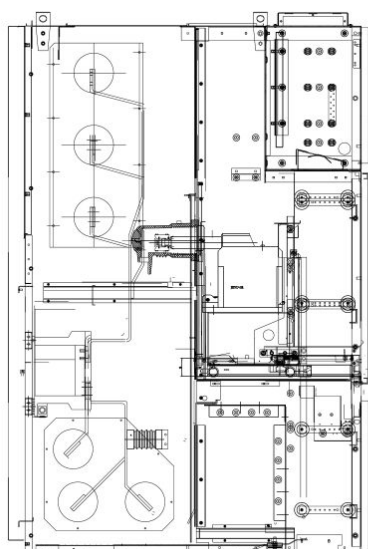


Configurations

Riser with VT & CT

Rated Voltage (kV)					
		12	17.5	24	27
Rated Insulation Level					
Power frequency withstand voltage (kV)		28	38	50	65
Lighting impulse withstand voltage (kV)		75	95	125	125
Rated Current (A)	630	■	■	■	■
	1250	■	■	■	■
	1600	■	■	■	■
	2000	■	■	■	■
	2500	■	■	■	■
	3150	■	■	■	■
	4000*	■	■		
	5000*	■	■		
Short time withstand current (kA/3s)	25	■	■	■	■
	31.5	■	■	■	■
	40	■	■		
	50	■	■		

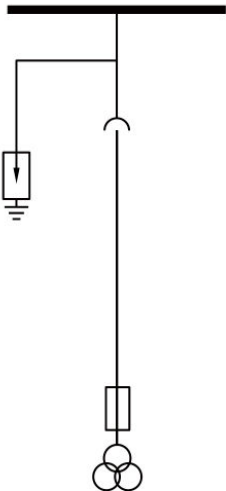
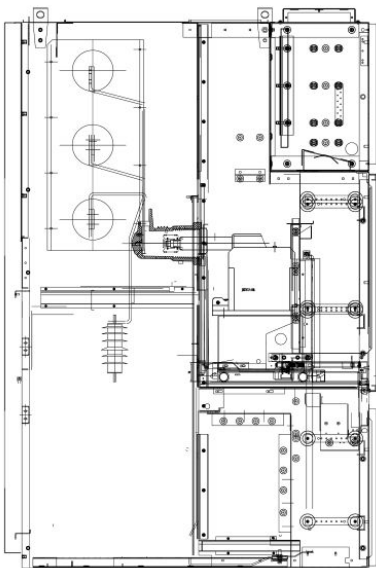
*4000A/5000A switchgear with force cooling



Configurations

VT Panel

Rated Voltage (kV)					
		12	17.5	24	27
Rated Insulation Level					
Power frequency withstand voltage (kV)		28	38	50	65
Lighting impulse withstand voltage (kV)		75	95	125	125
Short time withstand current (kA/3s)	25	■	■	■	■
	31.5	■	■	■	■
	40	■	■		
	50	■	■		



Switchgear Compartments

Switchgear Apparatus

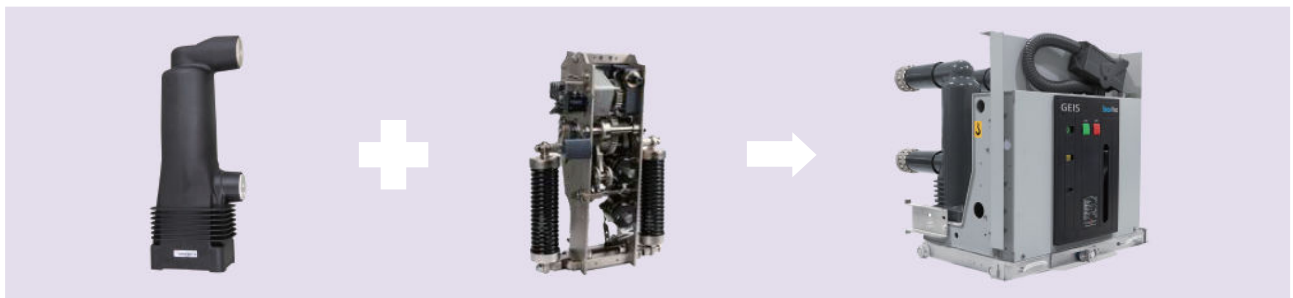
SecoVac VB2 Plus embedded pole vacuum circuit breaker 12kV, 17.5kV, 24kV and 27kV

Safety, more reliability and High performance in a compact package

The range of Apparatus available for SecoGear Medium Voltage switchgears includes:

- Withdrawable vacuum circuit breakers: SecoVac VB2 Plus
- Withdrawable vacuum generator circuit breakers: SecoVac VB2 Plus G
- Withdrawable vacuum contactors with fuses
- Disconnecter trucks
- Voltage transformer trucks
- Earthing trucks

SecoVac VB2 Plus of Modular design



Features and benefit

Industry leading vacuum and solid insulation technology

- Fixed and withdrawable versions available
- Environmentally friendly design - no SF6 gas
- Conformance to the latest IEC standards - IEC 62271-100 IEC/IEEE 62271-37-031 and IEC 62271-1
- Numerous safety features for maximum personnel protection
- User friendly operation with easy access and minimal inspection
- Compact and cost effective
- Flexible with a full line of accessories and OEM Solution
- Standard distribution breakers and generator circuit breakers with compatible accessories

Applications

- Serving global 50 Hz and 60 Hz
- Segments of the electrical industry: industrial, commercial, utility, mining, marine and off-shore
- Protecting transformers, capacitor banks, motors, busbar sections and cables
- Suitable for special environment conditions: shock, vibration and high ambient temperature
- Suitable for generation protection

Switchgear Compartments

Switchgear Apparatus

Circuit Breaker Characteristics

Rated Voltage	kV	12	17.5	24	27
Rated power frequency withstand (Imin)	kV	28	38	50	65
Rated lightning frequency impulse withstand voltage (1.2/50µs)	kVp	75	95	125	125
Rated Frequency	Hz	50/60			50/60
Rated Current	A	630/1250/1600/2000/2500/3150/4000*/5000*			1250, 2500
Rated short-circuit breaking current	kA	25/31.5/40/50			31.5
Percentage of DC component		Up to 50%			52%
Rated short-circuit closing current	kAp	65/82/104/130			82
Rated short time withstand current	kA	25/31.5/40/50			31.5
Rated peak value withstand current	kAp	65/82/104/130			82
Rated duration time for short-circuit	s	3			3
Opening Time	ms	20-50			20-50
Closing Time	ms	30-70			30-70
Rated auxiliary control voltage	V	36/48/60/110/220 V DC 110/220 V AC			
Mechanical life operations	Quantity	30,000 (M2)	10,000		10,000 (M2)
Electrical Endurance class		E2			E2
Single capacitor bank Switching current	A	400**			400

* Force cooling

** 3 phase back to back capacitor bank switching current 630A only for 17.5kV 3150A 40kA breaker

Switchgear Compartments

Switchgear Apparatus

Vacuum Contactor

SecoVac fuse contactors are provided in withdrawable type and includes high voltage fuses

Features

- Withdrawable type
- Conformance to the latest IEC standards. IEC 62271-1 and IEC 62271-106
- Conformance to IEC 60282-1 for high voltage fuse
- With/without mechanical latch
- HV fuse protection
- Interlocking features for safety
- Compact and robust

Applications

- Serving for global 50 Hz and 60 Hz
- Segments of industry: Power generation, marine, water treatment, mining
- Medium voltage motor control applications
- Suitable for special environment conditions: Shock, vibration, high ambient temperature
- Suitable for marine application



Fuse Contactor Characteristics

Item	Unit	Value
Rated Voltage	kV	7.2/12
Rated Frequency	Hz	50/60 Hz±5%
Rated power freq withstand voltage (Imin)	kV	28
Rated lightning impulse withstand voltage	kV	75
Rated Currents for contactor	A	400
Rated short-time withstand current (3s)	kA	4
Rated making current	kA	4
Rated peak withstand current	kA	10.4
Maximum rated breaking current	A	3200
Minimum rated breaking current	A	80
Use type		AC3/AC4
Latch type both latched & non latched required		Mechanical
Mechanical life	Times	300k
Number of auxiliary contacts		5a/5b
Minimum Auxillary contacts rating		AC 110V/10A, AC 220V/5A or DC
Control voltage		48/110/125/220/230 VDC, 110/125/220/230 VAC
Under voltage and tripping coil for Mechanical Latched type contactor		Required
Anti-pumping relay		Required
The drop-out voltage of contactor		AC 85%/DC 70%
SC breaking capacity for fuse	kA	50
Rated take-over current	A	3200

Switchgear Compartments

Component

Ground Fault Sensing CT

It is of the type insulated in resin and is used to supply measurement and protection devices. These CTs can be furnished in either a solid or split core design. They can be used either for measuring phase currents or for detecting the earth fault current. They conform to the IEC 61869-2 Standards.



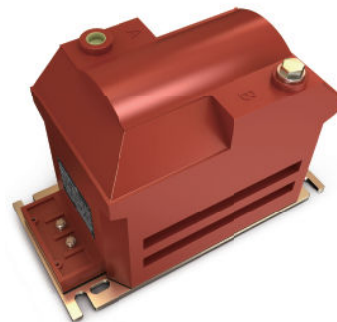
Voltage Transformer

Voltage transformers are cast in resin, and totally enclosed. This provides superior protection against pollutants and moisture. It can be equipped with one or more independent magnetic cores with equal or different characteristics for measuring, metering and protection purposes.



Current Transformer

Current transformers are cast in resin, and totally enclosed. This provides superior protection against pollutants and moisture. It can be equipped with one or more independent magnetic cores with equal or different characteristics for measuring, metering and protection purposes.



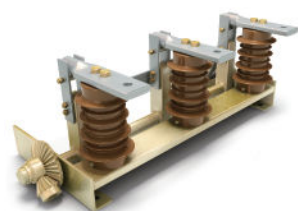
Switchgear Compartments

Component



Surge arrester

Surge arrester is used to protect electric equipment against transient operating or lightning over-voltage. It is connected between primary conductor and ground for protecting protective load from damage effect. When the operating or lightning over-voltage occurs, surge arrester immediately limits over-voltage amplitude and protects the insulation of device.



Earthing Switch

The earthing switch can be operated from the front of the switchgear. It is mechanically interlocked with the apparatus truck so that the earthing switch can only be operated when the apparatus is open in the Test position as well. The switch is so mechanically interlocked with the cable compartment for additional safety.



Voltage Transformer Truck

The withdrawable trucks also allow replacement of the fuses with the switchboard in service. Truck racking- out with the door closed automatically operates closure of a metallic segregation shutter between the live parts of the switchgear and the instrument compartment.



Disconnecter Truck

Disconnecter truck is used to disconnect primary circuit and normally coupling with busbar tie breaker to achieve two section power supply. Disconnecter truck can be provided with bus tie/riser panels.

Earthing switch characteristics

Specification	Unit	EFEN		SIBA	
Rated voltage	kV	12	17.5	24	27
Rated Work frequency withstand voltage (Imin) in open condition of switch	kV	28	38	50	65
Rated Lighting impulse withstand voltage (peak value) in open condition of switch	kVp	75	95	125	125
Rated short-time withstand current (3s)	kA	31.5/40/50		31.5	
Rated peak value withstand current	kAp	82/104/130		82	
Rated short circuit making current	kAp	82/104/130		82	
Centre distance between phases	mm	170/210/275		220/275	
Electric endurance class		E1		E1	
Mechanical endurance	Times	2000		2000	

Switchgear Compartments

Disconnecter truck characteristics

Specification	Unit	Data		
Rated voltage	kV	12/17.5		24/27
Rated power frequency withstand voltage (Imin)	kV	28/38		50/65
Rated Lightning impulse withstand voltage	kV	75/95		125/125
Rated Frequency	Hz	50/60		
Rated Current	A	630/1250	1250/1600/2000/3150/4000/5000	630/1250/1600/2000/2500/3150
Rated short time withstand current	kA	25/31.5	40/50	25/31.5
Rated peak value withstand current	kAp	65/82	104/130	65/82
Rated duration time for short-circuit	s	3		
Dimension		As same current rating VCB		

Cable Connection

The cable compartment contains current transformers, voltage transformers (fixed), withdrawable, and earthing switch, depending on the individual operating requirements.

The cable compartment is constructed for installation of three current transformers. When all the three current transformers are not required, dummies can be installed in their place to maintain the same installation and connection procedures.

The fixed voltage transformers (optional) are connected on the primary side with busbar and fitted with HRC fuses. The earthing switch can be operated by manual, with position indicated by mechanical indicator on the driveshaft and the auxiliary switch. Three surge arrester (optional) can be mounted in the space available.

Operation Tools



Gear door lock's key



Rack handle for truck



Earthing switch handle

Installation Detail

Layout Detail

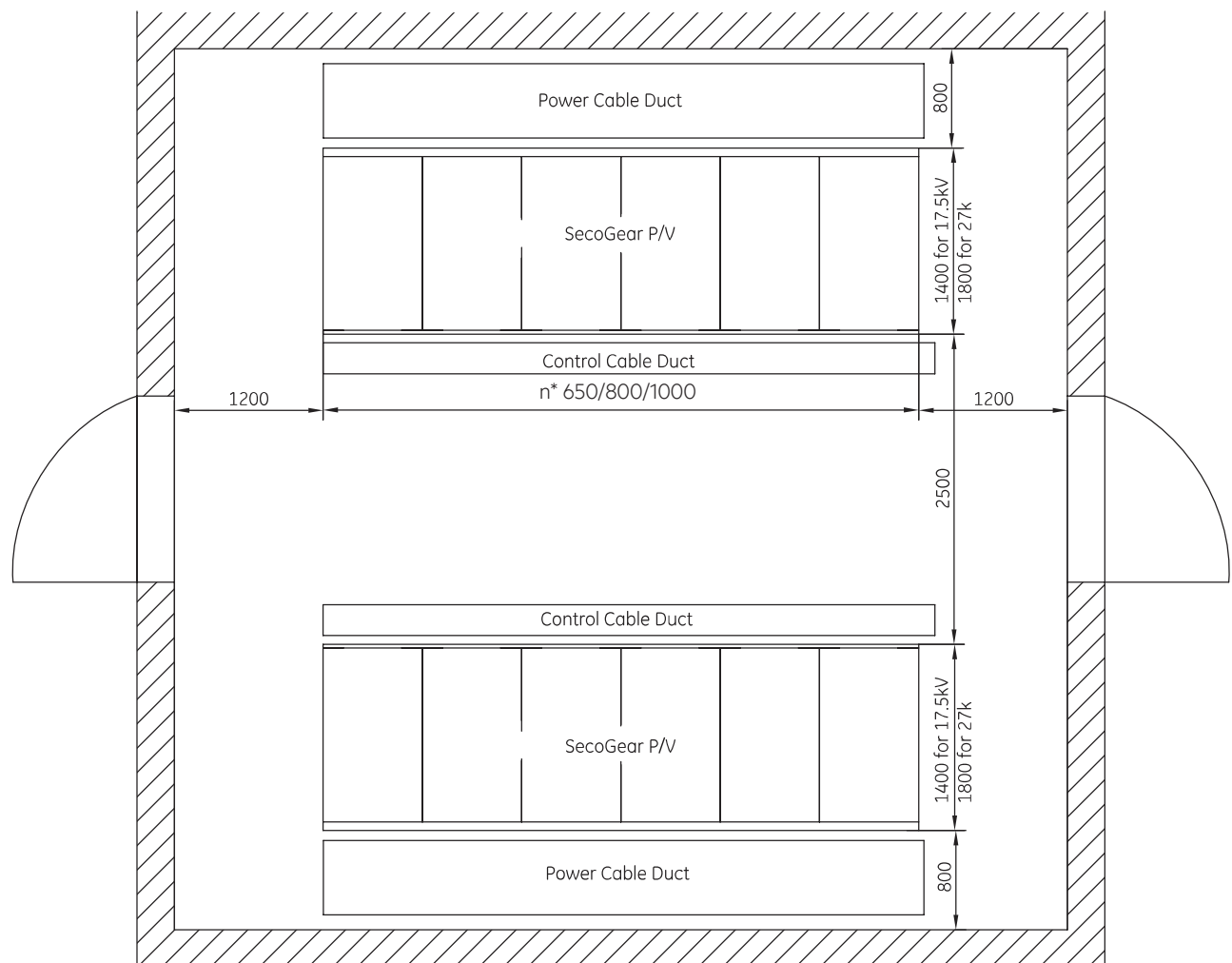
Layout Detail

In order to obtain an optimum installation sequence and ensure high quality standards, site installation of the switchgear should only be carried out by specially trained personnel, or supervised and monitored by qualified personnel, or by personnel supervised and monitored by responsible persons.

On commencement of installation on site, the switch-room must be fundamentally finished, provided with lighting and the electricity supply, lockable, dry and with facilities for ventilation. It is also required that the basic frame and indoor ground of substation should be checked and accepted before the construction. It must be ensure that the ceiling height is sufficient for the opening travel of the pressure relief plates and clearance for exhaust.

Tolerances for laying the floor frame are: Evenness tolerance: $\pm 1\text{mm}$ within a measuring length of 1m, Straightness tolerance: 1mm per 1m, but not more than 3mm over entire length of frame.

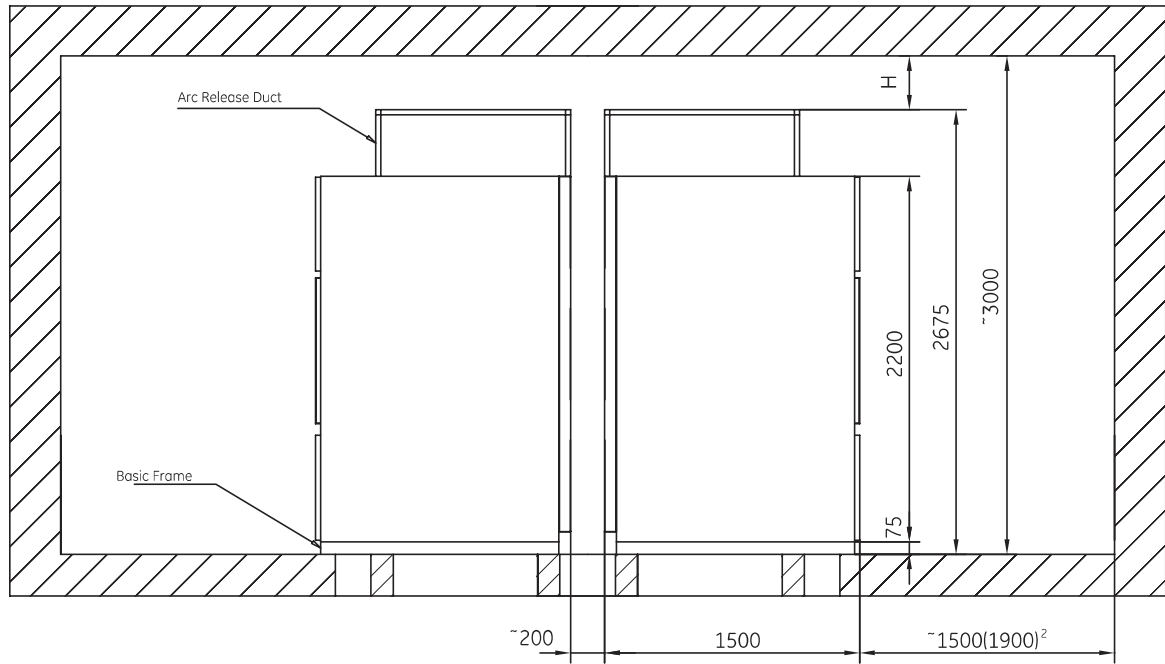
Layout Detail



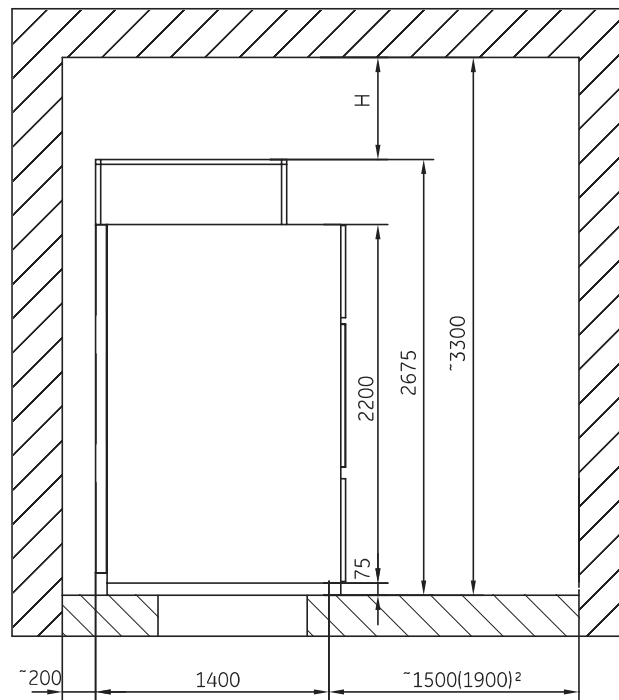
Installation Detail

Layout Detail

SecoGear FA 17.5kV layout



a) Back to back scheme



b) Back to wall

H: Maintain space, should make sure at least 300mm.

** : 1900mm are required for panel replacement.

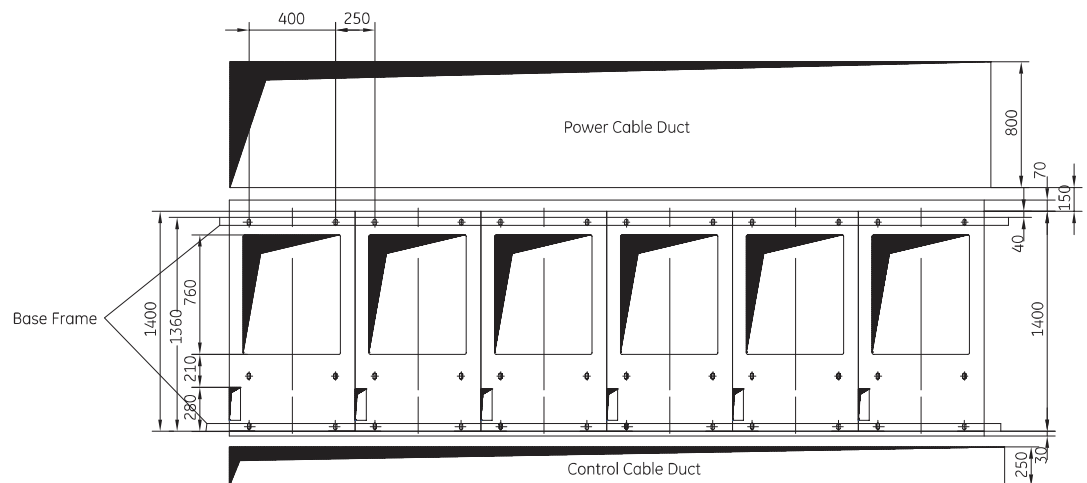
Installation Detail

Layout Detail

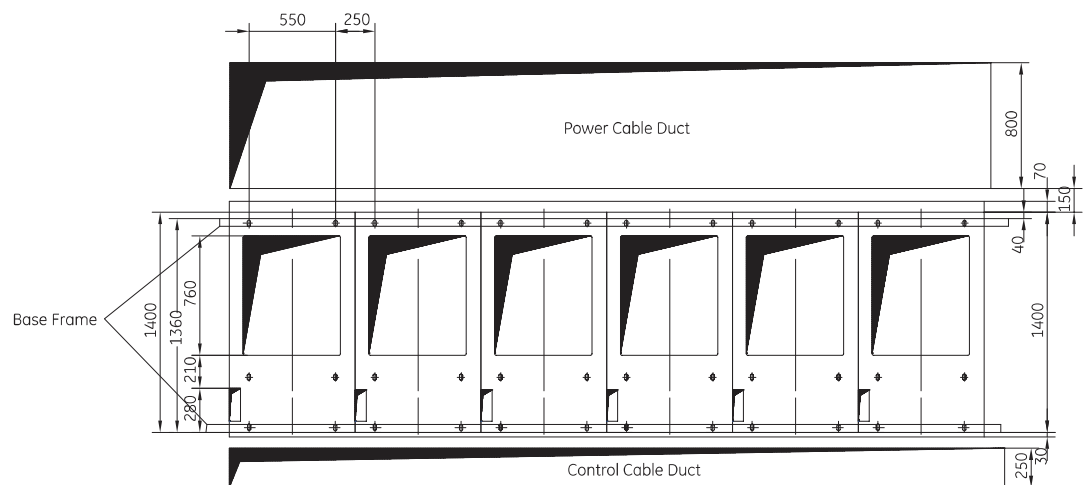
Switch room cable duct arrangement

12/17.5kV

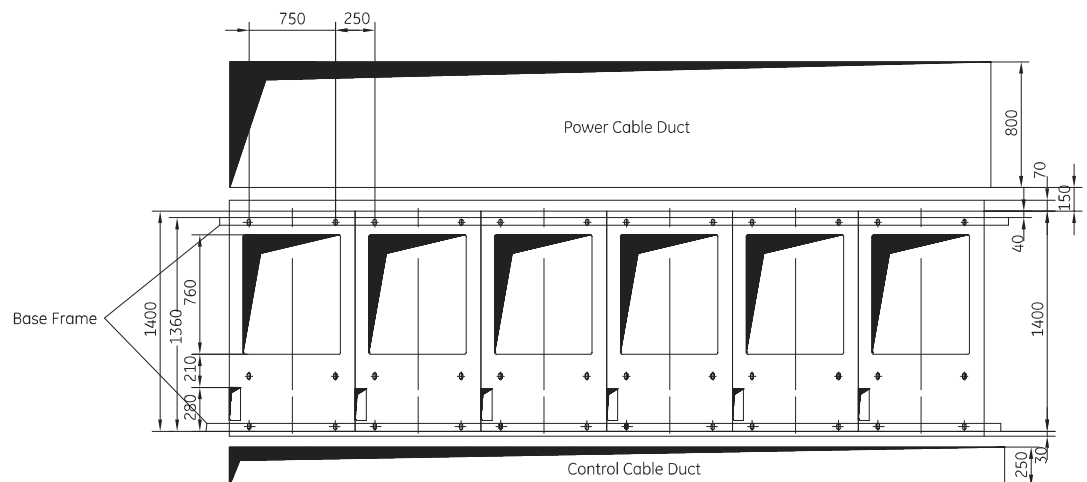
For 650mm panel



For 800mm panel



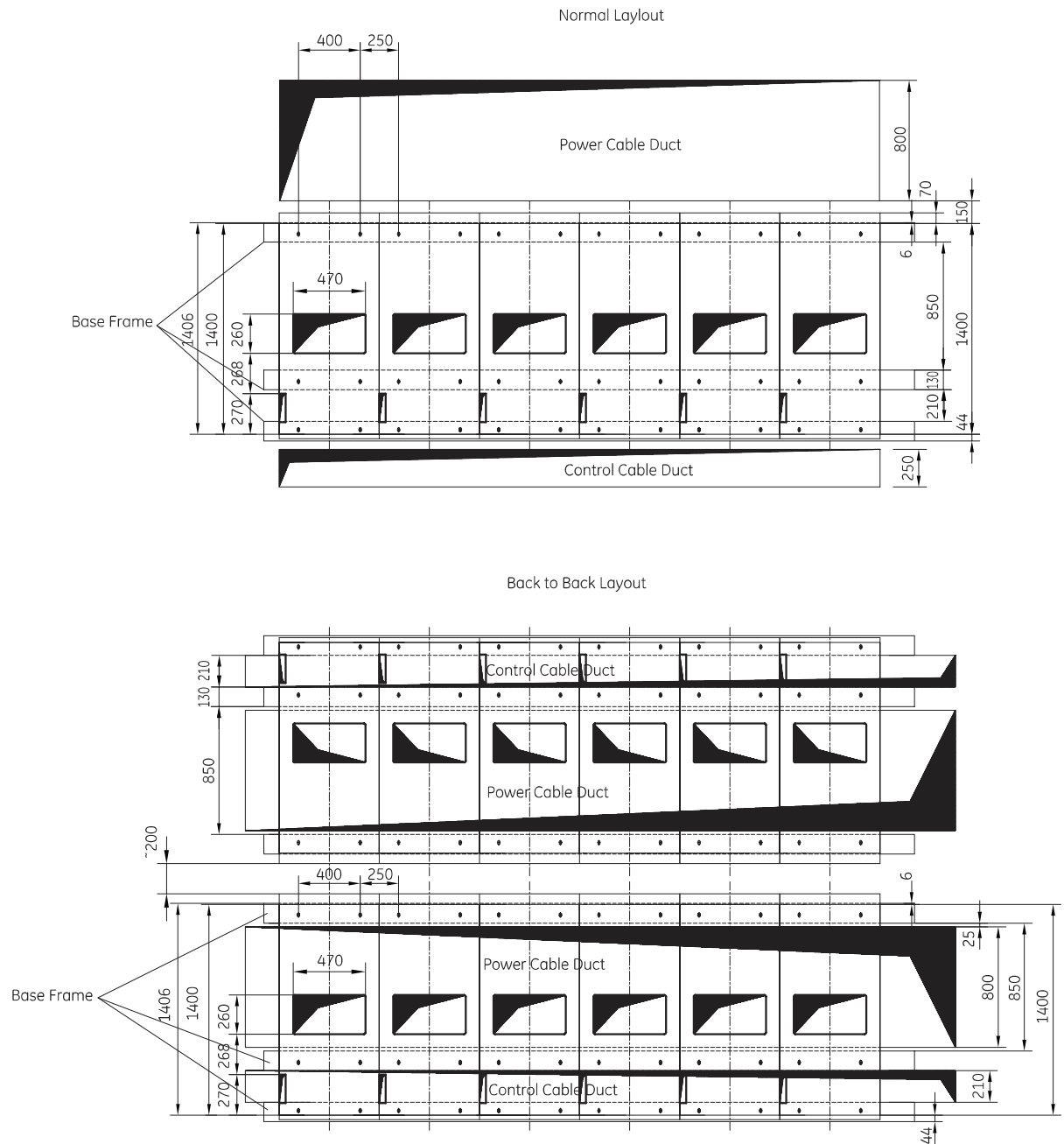
For 1000mm panel



Installation Detail

Layout Detail

SecoGear FA17.5kV

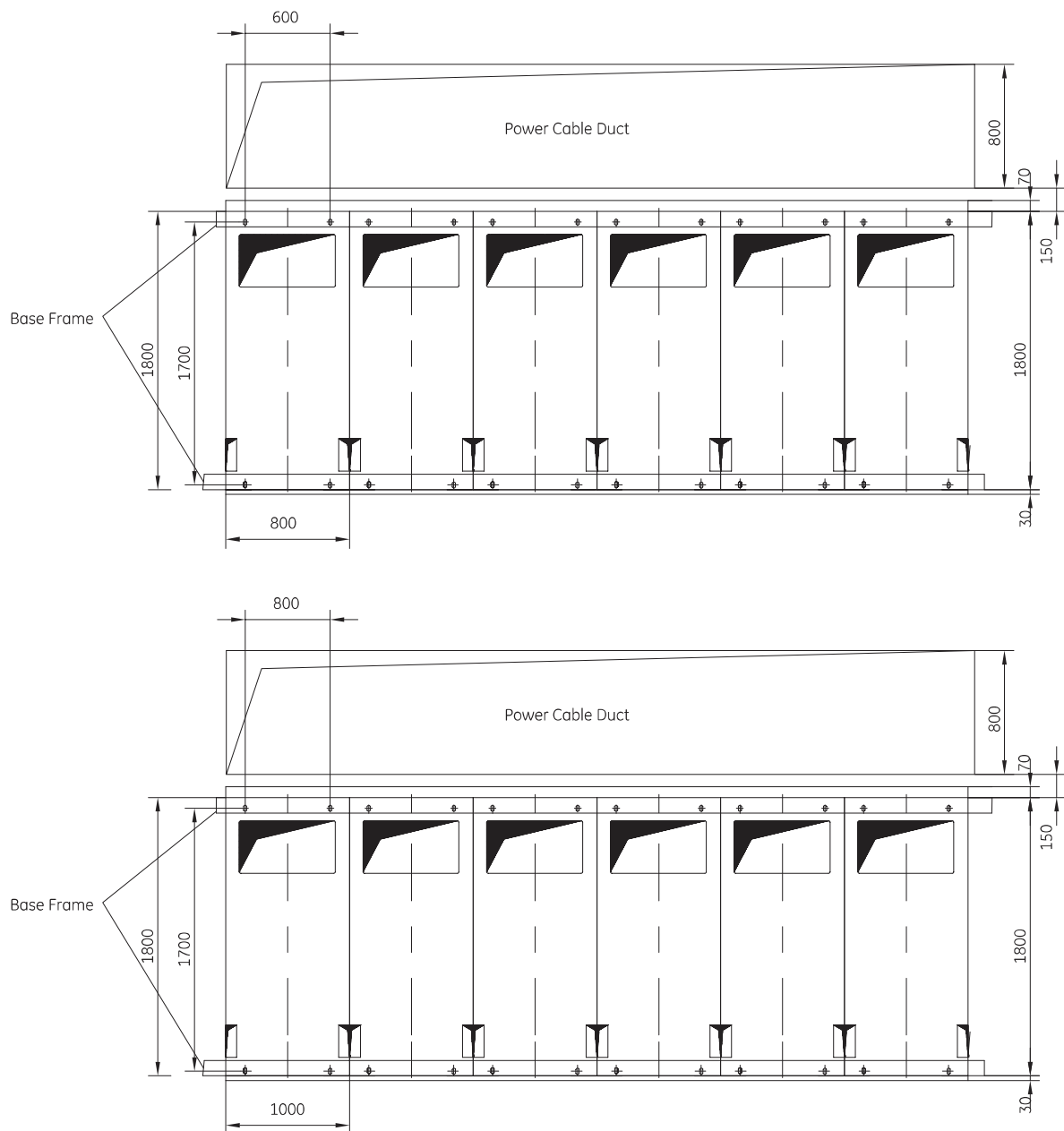


Installation Detail

Layout Detail

Switch room cable duct arrangement

24/27kV

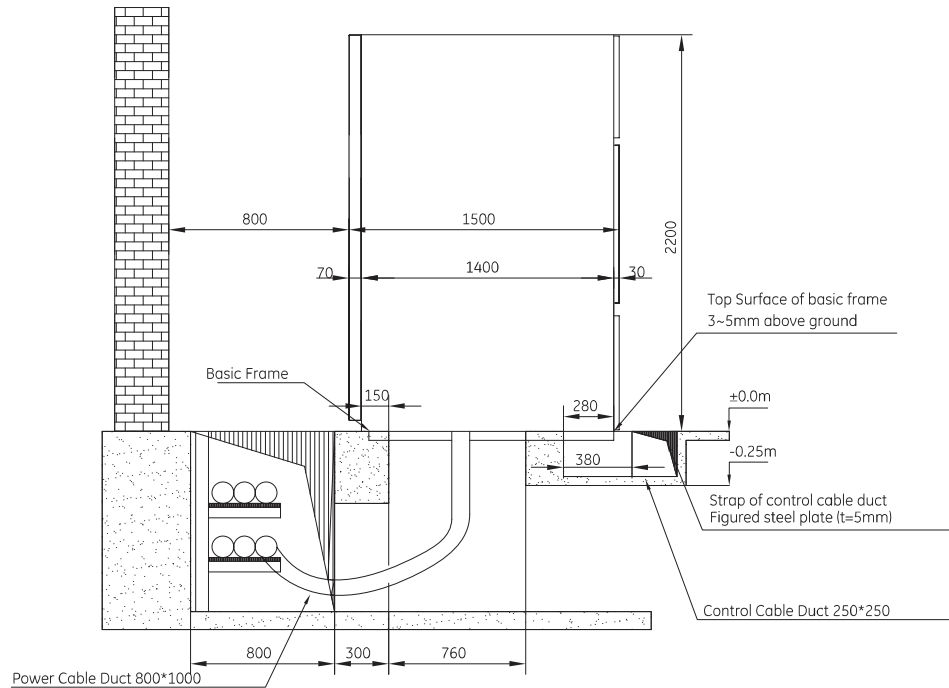


Installation Detail

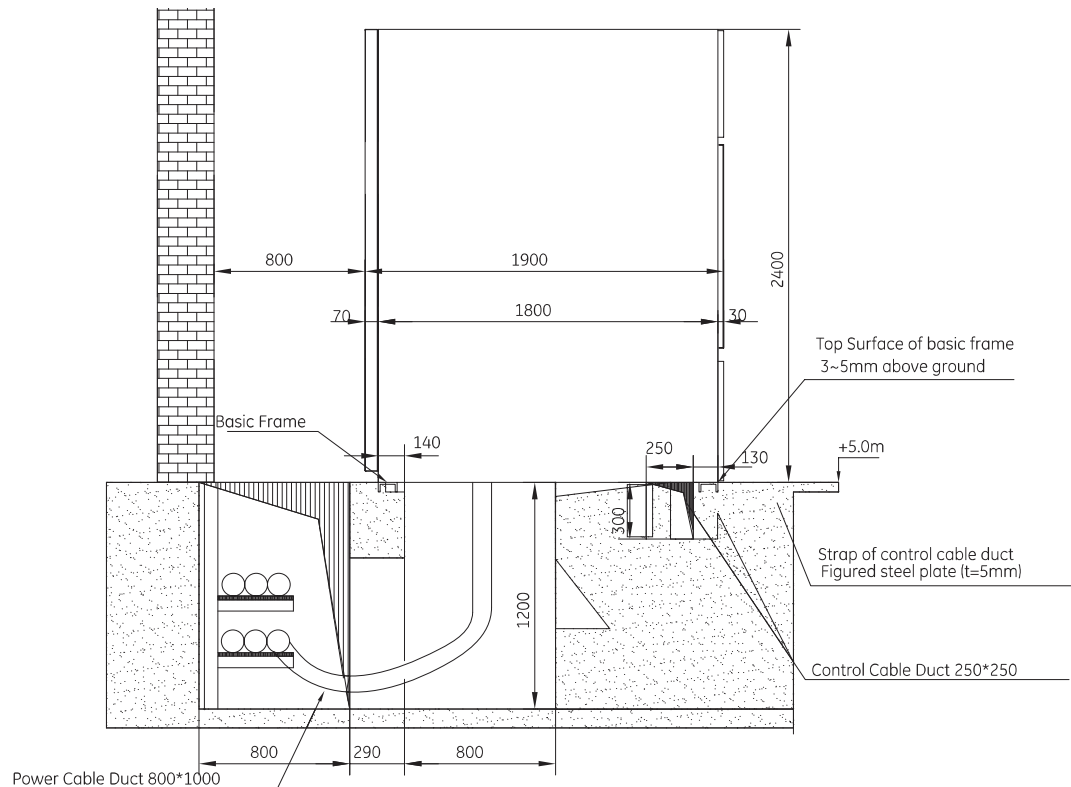
Layout Detail

Cross section view of switchgear room layout

12/17.5kV



24/27kV



Detail of switchgear cable access cutout

Technical drawing of a control cabinet showing front and side views with dimensions and cable specifications.

Dimensions:

- Overall width: 1400
- Overall height: A
- Internal width: 1330
- Internal height: B
- Distance from left wall to internal structure: 650
- Distance from right wall to internal structure: 545
- Distance from top to cable entry point: 350
- Distance from right wall to cable entry point: 30
- Distance from bottom to cable entry point: 70
- Distance from right wall to cable entry point (bottom): 70
- Distance from right wall to cable entry point (bottom): 200

Cable Specifications:

- Power Cable: 6—14x28
- Control Cable: 800, 100, 500, 750

Width A	550	650	750	800	100
B	300	400	550	550	750
C	370	470	600	620	820

Technical drawing of a rectangular panel with dimensions and cable connections. The overall width is 1800 and the overall height is 1700. The panel features a large black triangular area on the left side, with a width of 144 and a height of 358. Two circular holes are located on the left side, with a vertical distance of 1700 between them. A cable connection labeled "Power Cable" is shown on the left side. On the right side, there are two cable connections: "4-15x20" and "Control Cable". The "Control Cable" connection is located at the bottom right corner, with a width of 190 and a height of 130. The panel has a thickness of 54.

Width A	800	1000
B	600	800
C	595	695

GEIS

GEIS Electric

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This catalog may be subjected to revision without prior notice.
Version No.: GENCSWAA26V4

