



HMGS Medium Voltage Gas-Insulated Switchgear

Cubicle Type, Internal Arc-Resistant



HMGS Switchgear
up to 36/38 (40.5) kV,
Medium Voltage
Gas-Insulated Switchgear
Cubicle Type,
Internal Arc-Resistant

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HMGS series

HYUNDAI Medium Voltage Gas-Insulated Switchgear, provide various benefits with compact, safe, and climate independent design







HMGS series

HYUNDAI Medium Voltage Gas-Insulated Switchgear,
manufactured and tested based on accumulating
experience acquired throughout the world



Description

Characteristics

The integrated assembly of vacuum circuit breaker, 3-position disconnector, bus connector and control devices are coordinated electrically and mechanically for medium voltage power system.

This metal-enclosed design provides high reliability, user-friendly operation and safety with various electrical advantages to meet various electrical requirements of the medium voltage distribution system up to 36/38 (40.5) kV.

Production Scope

HMGS-G11	≤ 24 (25.8) kV 2,000 A 25 kA IEC, Single Bus
HMGS-G81	≤ 36 (40.5) kV 4,000 A 40 kA IEC, Single/Double Bus
HMGS-G30	≤ 36 kV 2,000 A 31.5 kA IEC, Single Bus
HMGS-G38	≤ 38 kV 2,500 A 40 kA IEC, Single Bus
HMGS-G82	≤ 38 kV 2,500 A 40 kA IEEE (ANSI), Single/Double/Transfer Bus
HMGS-G83	≤ 40.5 kV 2,500 A 40 kA GOST, Single/Double

The gas tank is made of stainless-steel or made with the combination of stainless-steel and carbon-steel, containing 3-position disconnector, busbars and vacuum interrupters provide climate independent operation and safe to touch for its life.

This HMGS switchgear is divided into five completely separate compartments:

- Busbar compartment
- Circuit breaker compartment
- Cable connection compartment (Exclude HMGS-G82)
- Low voltage compartment
- Plenum duct

Compactness

The Switchgear of SF₆ gas insulation gives space-saving compactness. The standard frame saves and simplifies layout to reduce switchgear room and construction cost effectively. It also permits complete allocation of space for future extension.

Benefits

- Compact and systematic design
- Optimum engineering
- Modular design saves and simplifies the layout.
- Intelligent digital control and protection system
- Panels coupled by plug-in connecting system
- Extension capability to existing systems on both sides
- Factory-assembled panels with insulating gas at operating pressure requires no SF₆ work on site.
- Operating mechanism is accessed from out side of gas compartment
- Low maintenance allows system to run continuously without down-time.



Safety and Reliability

- Climate independent & Safe to touch
- All live parts are hermetically sealed in the gas-tight enclosure
- Inner SF₆ gas is non-flammable, non-toxic and non-ozone depleting insulating medium and prevents contact to oxidation against environmental condition
- Safe and reliable operation of energy storage vacuum circuit breaker with spring charge mechanism
- Partition class PM
- Loss of service category: LSC2
- Internal arc classification of IAC B FLR or IAC A FLR
- Equipped with logical internal interlock system to prevent operating errors and to minimize interruption of operation
- Type tests have been carried out for each switchgear model
- The design, manufacturing, and testing was carried out according to ISO 9001 quality standard.

Certified Quality System: ISO 9001 & ISO 14001

The quality system for the design and manufacture of HMGS switchgear is certified to be in conformity with the requirements of ISO 9001 quality assurance standard from DNV Certification B.V.

The environmental management system is assessed and recognized as conforming to the requirements of the ISO 14001 standard.

Applications



Utility and Power Plants

- Transforming stations
- Switching stations
- Power generation stations
- Main and auxiliary switchgear



Industry

- Chemical industry
- Petroleum industry
- Iron and steel works
- Automobile industry
- Oil and gas pipelines
- Textile and rolling mills



Services and Transport

- Shopping malls
- Hospitals
- Large infrastructure
- Civil works
- Airports, ports



Marine

- Drilling rigs
- Off-shore platforms
- FPSOs
- Container ships
- Passenger ships
- Tanker, bulk ships

Type Test

The HMGS switchgear have performed all the tests required by the IEC, IEEE (ANSI) or GOST standards.

As described in the IEC, the tests were made on representative functional units considered most sensitive to the effect of the tests.



Routine Test

The HMGS was designed for unsurpassed structural strength, to be arc proof, and to offer trouble-free installation and operation providing complete customer satisfaction.

To ensure the quality and conformity of the each functional unit, systematic routine testing is performed during manufacturing according to IEC 62271-200 or related standards.

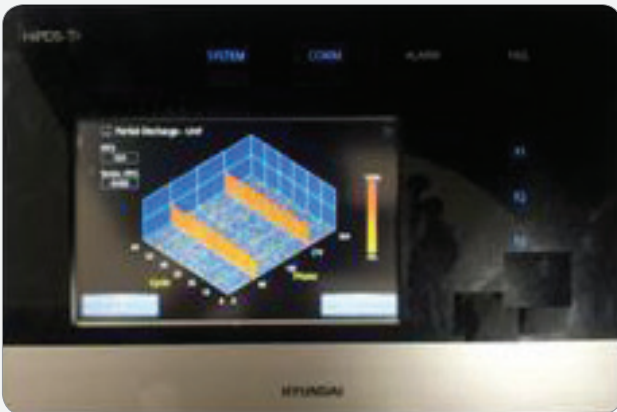
Description

Automation & Relays

Monitoring and Diagnostic System: HiPDS-D

HiPDS-D, HYUNDAI Intelligent Preventive Diagnostic System, is the advanced monitoring and diagnostic system for air and gas insulated switchgear having the following functions can be applicable.

- Real-time PRPD monitoring for TEV & UHF sensors
- Real-time moisture & temperature monitoring
- AV signal inputs for the internal camera monitoring
- Supporting remote monitoring through ethernet communication



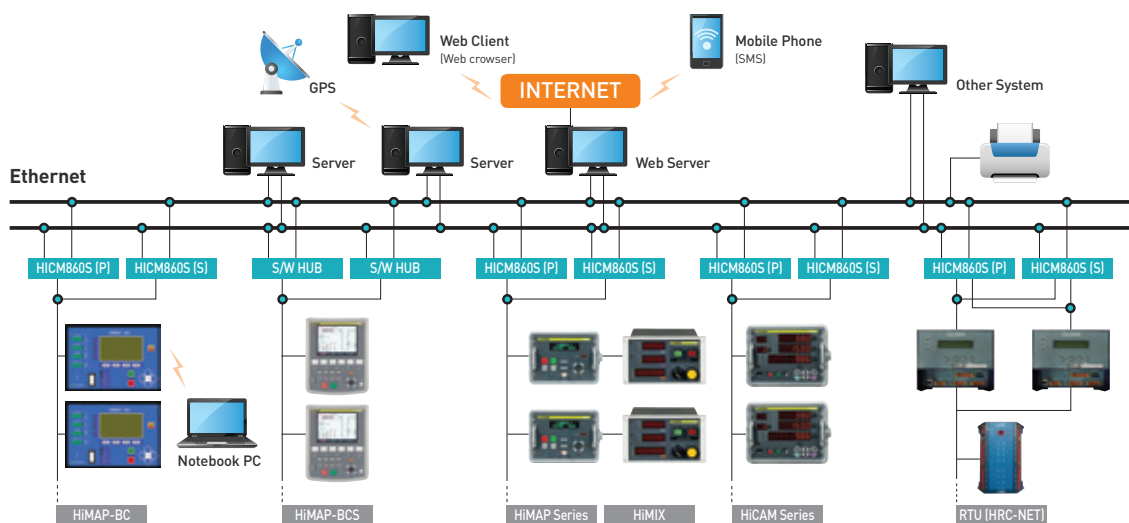
3D PRPD. analyzing



Camera monitoring

Power Management System (SCADA): HiPAS

HiPAS, HYUNDAI Intelligent Power Automation System, is a power management system which consists of an independent function modules in a network. It can be divided into 3 system security levels; "Master", "PCM", and "Device".



LSC2 (Metal clad), Partition Class PM

The gas enclosures are grounded and contain 3-position disconnect or disconnector, busbars and vacuum interrupters. They are designed for their entire life, and inner SF₆ insulating gas prevents fire in the system and contact from oxidation. The connection compartment is accessible with the busbar live, and the switchgear meets the requirements for the loss of service continuity, LSC2 and partition class, PM of IEC 62271-200.

Arc Classification, IAC A/B FLR

The Switchgear is designed to withstand and protect personnels in the case of failure due to internal arcing, and classified as IAC AFLR or IAC BFLR, up to 40 kA.

- A FLR: For authorized personnel, front, lateral and rear side
- B FLR: For all front, lateral and rear side
- Specified criteria according to IEC 62271-200
 - Correctly secured doors and covers do not open.
 - No ejection of fragments or of other parts, mass of 60 g or more.
 - No holes up to a height of 2,000 mm.
 - Indicators arranged on front, lateral, and rear side do not ignite.
 - The enclosure remains connected to its earthing point.
- Bursting disc is positioned in each gas compartment and metal pressure relief is positioned in the cable connection compartment which in the case of internal fault, limits overpressure in the compartments.
- Non-flammable materials used for the cubicle.
- The hot and toxic gas can only be released through the arc way or arc duct.
- When installing the switchgear, some fundamental points must be taken into consideration.
- Escape routes for the hot and toxic gases exhausting from switchgear.
- Dimensions of the room with special attention to the height of ceiling.



Internal arc testing

Description

Switchgear Design

Protection Degree

Protection against entry of hazardous parts and water according to the IEC 62271-200 and IEC 60529 following degree of protection.

High voltage live parts	IP65	Dust-tight and protected against water jet
Low voltage compartment	IP4X	Protect for a diameter or strips of a thickness greater than 1.0 mm.

Applied Standard

HMGS is manufactured and tested according to the following IEC or IEEE (ANSI) standards.

Switchgear	HMGS	IEC 62271-1 IEC 62271-200 IEEE C37.100.1
Device	Circuit breaker	IEC 62271-100 IEEE C37.06 IEEE C37.09
	3 Position disconnecter	IEC 62271-102
	Load breaker switch	IEC 62271-103
	Fuse combination switch	IEC 62271-105
Degree of protection		IEC 60529
SF ₆ gas	Specification Diagnosis guide	IEC 60376 IEC 60480
Insulation transformer	Current transformer	IEC 61869-2, IEEE C57.13
	Voltage transformer	IEC 61869-3, IEEE C57.13
Guide	For application of gas insulated substation	IEEE C37.122.2

Environmental Condition

All live parts in the circuit breaker and busbar compartment are hermetically sealed by gas-tight enclosure of IP65, and are safe to touch and suitable for application under aggressive ambient condition such as salt, humidity, dust, condensation, altitude and small animals.

Inner SF₆ gas is a non-flammable, non-toxic and non-ozone depleting insulating medium and prevents contact to oxidation against environmental condition.

Normal Operating Condition

The rated current of the switchgear is based on the normal operating conditions for indoor switchgear according to the related IEC or IEEE standards as listed below:

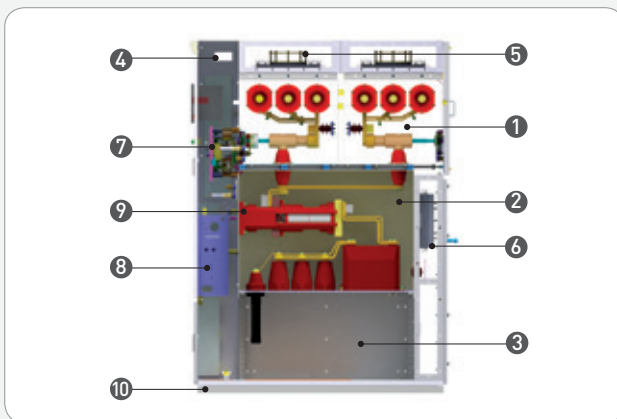
- Maximum ambient temperature: + 40°C
- Maximum of 24 hour mean: + 35°C
- Minimum ambient temperature
 - According to the IEC 62271-1, 200: -5°C
 - According to IEEE C37.100.1: -30°C

If the ambient temperature is higher than + 40°C, the permissible current is different from the rated current (please contact us for details). However, the maximum ambient temperature should not be higher than + 55°C.

Modularization

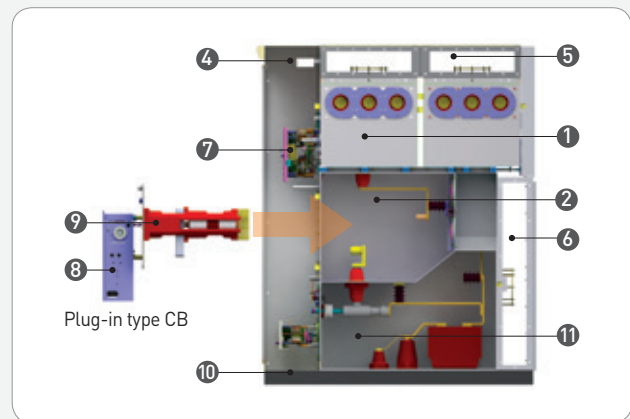
The switchgear unit can be easily assembled and maintained with minimized gas work due to its modular construction. And, in the case of outgoing feeder of HMGS-G82, the circuit breaker of plug-in design can be easily replaced without interrupting power of the main busbar.

Fig.1 Switchgear assembling (HMGS-G81)



- ① Busbar compartment ② Circuit breaker compartment
- ⑤ Bus plenum duct ⑥ Rear plenum duct
- ⑨ Vacuum circuit breaker ⑩ Base frame

Fig.2 Installing circuit breaker (Out going feeder of HMGS-G82)



- ③ Cable connection compartment ④ Low voltage compartment
- ⑦ 3PS mechanism ⑧ CB Mechanism
- ⑪ Transfer bus compartment

The switchgear can be connected effectively to neighboring panels without SF₆ gas injection when installing or expanding the panels.

- HMGS-G11, G81 and G82 : Busbar connectors are used for connecting neighboring panels as shown Fig.3
- HMGS-G30 : Main busbars can be assembled as shown Fig.4

Fig.3 Busbar connectors for HMGS-G11, G81, G82

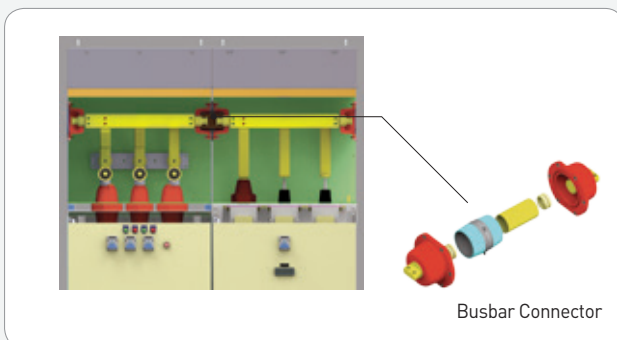
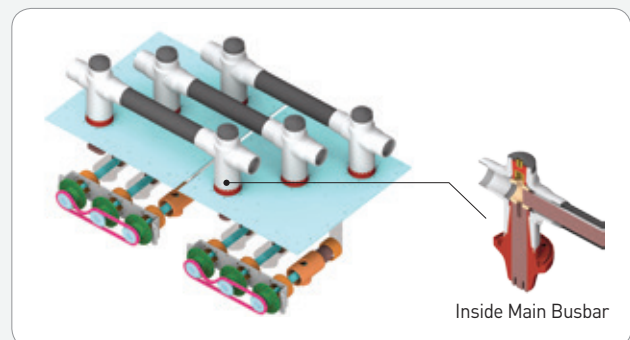


Fig.4 Main busbar assembly (HMGS-G30)



Interlocks

- 3-position disconnector can only be operated (electrically and manually) when circuit breaker is in the open position.
- The circuit breaker can be operated when the 3-position disconnector is in the connected, disconnected, or earthed position.

- Manual handle of the 3-position disconnector can not be removed until switching operation has been completed (Optional)
- Locking device for 3-position disconnector (Optional)
- Locking device for circuit breaker operation (Optional)
- Electromagnetic interlocks for the 3-position disconnector (Optional)

Installation of Current Transformer

Current transformer can be installed inside of CB compartment or cable connection compartment depending on the type of switchgear.

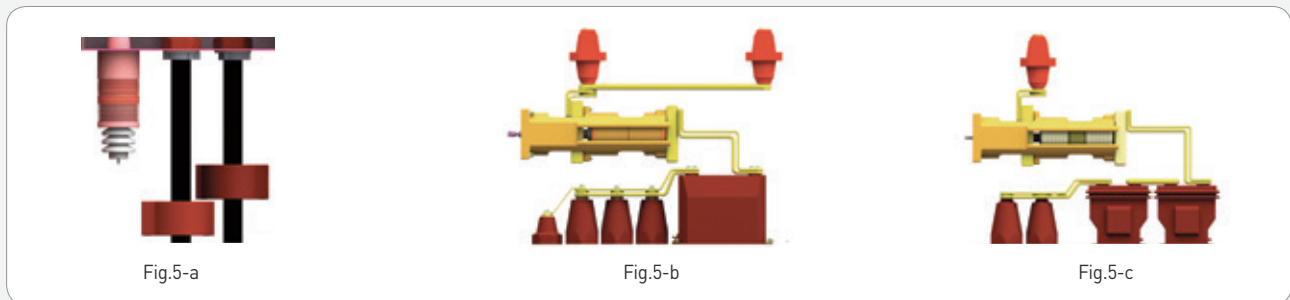
For HMGS-G11, G81, G83, G30, G38

- 1 Ring type CT per phase in the cable compartment (Fig.5-a).
- 1 ZCT in the cable tray under cable compartment, or in the cable compartment if there is space.

For HMGS-G82 and optional for HMGS-G81, G83

- 1 Block type CT per phase in the CB compartment when less than 1 inner socket of size 2 and 3 inner socket of size 3 per phase are used (Fig.5-b).
- 2 Block type CT per phase in the CB compartment when 2 inner socket of size 3 per phase are used on request (Fig.5-c).
- 1 ZCT in the cable trace under the cable compartment, or in the cable compartment if there is space.

Fig.5 Installation of current transformer

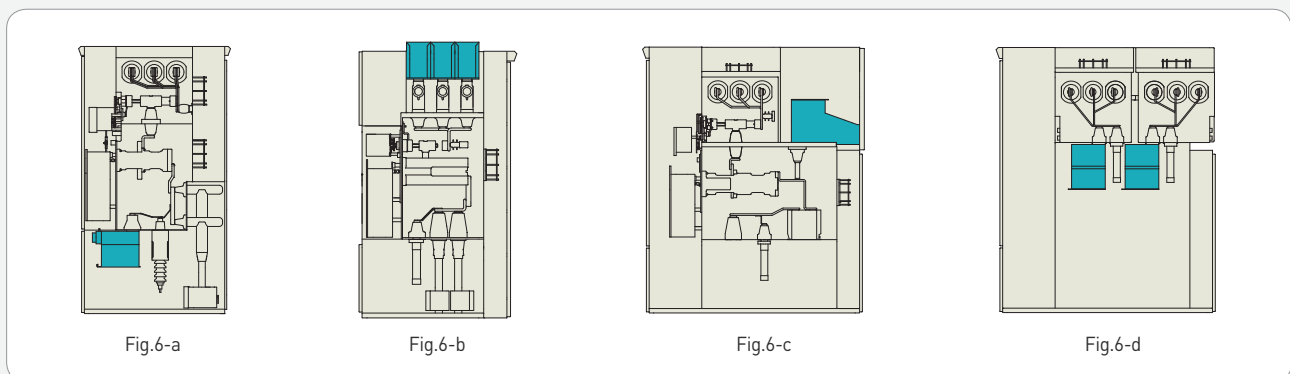


Installation of Voltage Transformer, Voltage Detector, Lightning Arrestor and Surge Absorber

Voltage transformer, voltage detector, lightning arrestor, and surge absorber can be installed in the switchgear. According to the switchgear type, plug-in type voltage transformer with fuse can be installed as follows:

- HMGS-G11: In cable compartment (Fig.6-a)
- HMGS-G30 and G38: In cable compartment and main busbar (Fig.6-a, b)
- HMGS-G81, G82 and G83: In cable, rear bus, and metering compartments, and lower side of busbar compartment (Fig.6-a, c, d)

Fig.6 Installation of voltage transformer



Gas Monitoring System

In the gas tight compartment, SF₆ gas is filled as the insulation medium, and is equipped with a gas pressure transmitter, a gas filling inlet for each gas compartment, and a gas meter for a panel. The gas monitor, HDM3 can indicate the absolute pressure in bar for up to three gas compartments. It can provide visual alarm by lighting a lamp and send signal via a contact if the pressure is less than minimum level.

- Operating zone: ≥ 1.2 bar.abs, green lamp
- Low zone: 1.1~1.2 bar.abs, yellow lamp, and signal
- Low low zone: < 1.1 bar.abs, red lamp, and signal

Fig.7 Gas pressure transmitter and gas filling inlet

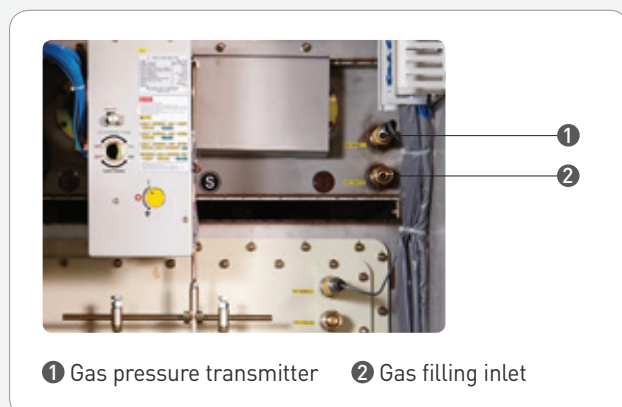
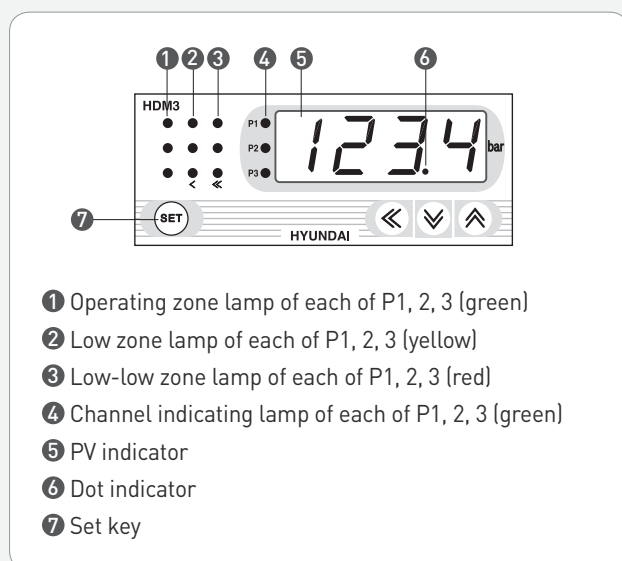


Fig.8 Gas monitor



Cable Socket

Inner cone plug-in system of socket size 2, 3, and 4 according to DIN EN 50181 can be used for the cable connection.

Quantity of socket per phase according to the switchgear current rating and request of customer is as follows:

Rating	Q'ty	Socket size
Up to 800 A	1	Size 2 or 3
Up to 1,250 A	1 or 2	Size 2 or 3
Up to 2,000 A	1 or 2	Size 4
	2 or 3	Size 3
Up to 2,500 A	3 or 4	Size 3
Up to 3,150 A	4	Size 3
Up to 4,000 A	Bus duct	

Fig.9 Inner cone plug-in system

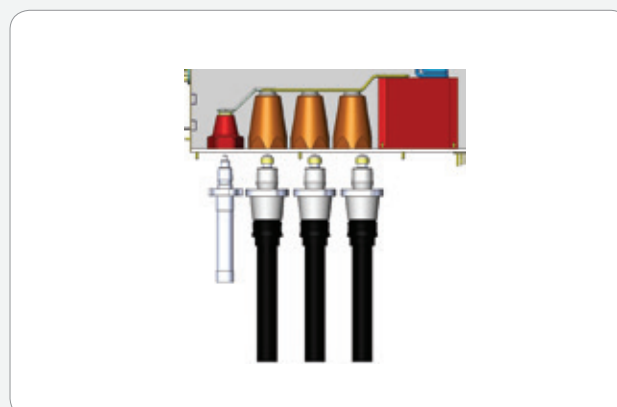
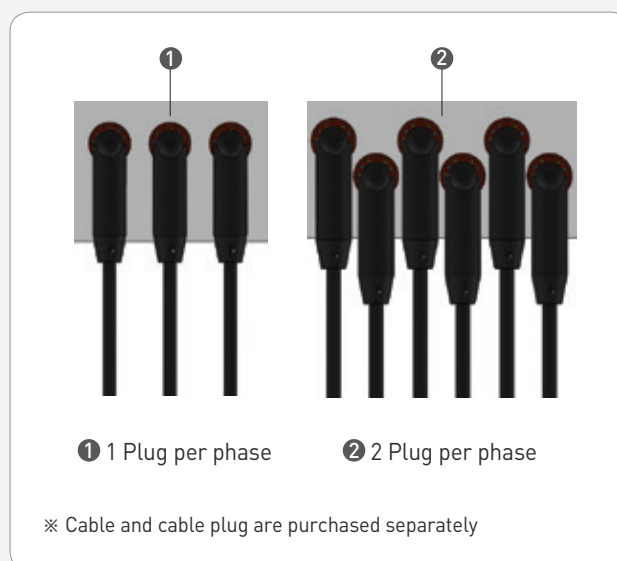


Fig.10 Outer cone plug-in system



24 (25.8) kV Switchgear

The switchgear, HMGS-G11 is designed for use up to 24 (25.8) kV three phase system of single bus in compliance with IEC 62271-200.

Panels available for this switchgear are as follows:

- CB panel (Incoming/Outgoing feeder, Bus-tie, Bus-riser)
- ALTS panel (Incoming feeder)
- LBS panel (Bus-tie/Outgoing feeder)
- MOF panel



Type			HMGS-G11		
Rated voltage (kV)			24 (25.8) ¹⁾		
Panel			CB	LBS	ALTS
Power frequency withstand voltage (kV)			50 (70) ¹⁾		
Lightning impulse withstand voltage (kV)			125 (150) ¹⁾		
Rated frequency (Hz)			50/60		
Normal current (A)	Main-bus		≤ 2,000	≤ 2,000	≤ 2,000
	Feeder		630 / 1,250 / 2,000	630	630
Rated short time withstand current, 3s (kA)			25	20	20
Rated peak withstand current (kA, peak)			65	52	52
Rated short circuit breaking current (kA)			25	20	20
Rated short circuit making current (kA)			65	52	52
Rated operating sequence			O-0.3s-CO-3min-CO	C-O-C	C-O-C
Closing time			≤ 70 ms	≤ 2 sec	≤ 160 ms
Opening time			≤ 50 ms	≤ 2 sec	≤ 50 ms
Breaking time (cycle)			5	-	-
Auxiliary voltage (V)			DC110 / 125 ²⁾	DC110 / 125 ²⁾	DC24 / AC230 ²⁾
Insulation gas			SF ₆	SF ₆	SF ₆
Rated pressure at 20°C bar (g)			0.3	0.3	0.3
Minimum operating pressure at 20°C bar (g)			0.2	0.2	0.2
Arc classification			A FLR, 25 kA / 1s		
Busbar system			Single		
Size (mm) ³⁾	Width (W)	≤ 1,250 A	550 (700) ⁴⁾	500 (700) ⁵⁾	650
		2,000 A	650 (700) ⁴⁾	-	-
	Depth (D)		1,200 (1,300) ⁶⁾	1,200 (1,300) ⁶⁾	1,200 (1,300) ⁶⁾
	Height (H)		2,400	2,400	2,400

※ ¹⁾ The value in "[]" is for the system according to the series II of IEC 62271-1 or relevant standard on request.

²⁾ The auxiliary voltage can be changed on request.

³⁾ The size of actual panel can be different according to the rating, quantity, and arrangement of components.

⁴⁾ Width of the panel is 700 mm when voltage transformer is installed.

⁵⁾ Width of the panel is 700 mm when power fuse is installed.

⁶⁾ Depth of the panel can increase by 1,300 mm according to the numbers and size of components of LV compartment.

36 kV Switchgear (Busbar Silicon Insulated)

The switchgear, HMGS-G30 is designed for use up to 36 kV three phase system of single bus in compliance with IEC 62271-200.

And HMGS-G38 is designed for use up to 36(38) kV three phase system of single bus in compliance with IEC 62271-200.

Panels available for this switchgear are as follows:

- Incoming/Out going feeder
- Bus-tie with VT
- Bus-riser with VT



Type			HMGS-G30	HMGS-G38	
Rated voltage (kV)			36	36	38 ¹⁾
Power frequency withstand voltage (kV)			70	70	95 ¹⁾
Lightning impulse withstand voltage (kV)			170	170	200 ¹⁾
Rated frequency (Hz)			50 / 60	50 / 60	
Normal current (A)	Main-bus		≤ 2,000	≤ 2,500	
	Feeder		1,250 / 2,000	1,250 / 2,500	
Rated short time withstand current, 3s (kA)			31.5	40	
Rated peak withstand current (kA, peak)			82	104	
Rated short circuit breaking current (kA)			31.5	40	
Rated short circuit making current (kA)			82	104	
Rated operating sequence			0-0.3s-CO-15s-CO	0-0.3s-CO-3min-CO	
Closing time (ms)			≤ 70	≤ 70	
Opening time (ms)			≤ 50	≤ 50	
Breaking time (cycle)			≤ 3	≤ 3	
Auxiliary voltage (V)			DC110 / 125 ²⁾	DC110 / 125 ²⁾	
Insulation gas	Main-bus		Silicon	Silicon	
	Circuit breaker		SF ₆	SF ₆	
Rated pressure at 20°C bar (g)			0.3	0.3	
Minimum operating pressure at 20°C bar (g)			0.2	0.2	
Arc classification			A FLR, 31.5 kA / 1s	A FLR, 40 kA / 1s	
Busbar system			Single	Single	
Size (mm) ³⁾	Width (W)	≤ 1,250 A	600 (650) ⁴⁾	700	
		≥ 2,000 A	650	700	
	Depth (D)		1,200 (1,300) ⁵⁾	1,350	
	Height (H)		2,200	2,200	

※ ¹⁾ The value in "[]" is for the system according to the GOST 1516.3, GB 3906 or relevant standard on request.

²⁾ The auxiliary voltage can be changed on request.

³⁾ The size of actual panel can be different according to the rating, quantity, and arrangement of components.

⁴⁾ Width of the panel in "[]" is incase voltage transformer is installed.

⁵⁾ Depth of the panel can increase according to the numbers and size of components of LV compartment.

36 / 38 / 40.5 kV Switchgear

The switchgear, HMGS-G81 is designed for use up to 36kV three phase system for single bus and double bus according to the IEC 62271-200.

HMGS-G82 is designed for use up to 38 kV three phase system with plu-in type circuit breaker for double and transfer bus according to the IEEE C37.100.1 and related international standards. And HMGS-G83 is designed for use up to 40.5kV three phase system for single bus and double bus according to the COST 1516.3-96.

Type of available panel is as followings:

- Incoming/Out going feeder
- Bus-coupler (Bus-tie/Bus-riser)
- Bus-section and bus-riser



Type			HMGS-G81	HMGS-G82	HMGS-G83
Rated voltage (kV)			36	38	40.5
Power frequency withstand voltage (kV)			70	80	95
Lightning impulse withstand voltage (kV)			170	150	190
Rated frequency (Hz)			50 / 60	50 / 60	50 / 60
Normal current (A)	Main-bus		≤ 4,000	≤ 2,500	≤ 2,500
	Feeder		1,250 / 2,000 / 2,500 / 3,150	1,250 / 2,000 / 2,500	1,250 / 2,000 / 2,500
Rated short time withstand current, 3s (kA)			40	40	40
Rated peak withstand current (kA, peak)			104	104	104
Rated short circuit breaking current (kA)			40	40	40
Rated short circuit making current (kA)			104	104	104
Rated operating sequence			0-0.3s-CO-15s-CO	0-0.3s-CO-15s-CO	0-0.3s-CO-15s-CO
Closing time (ms)			≤ 70	≤ 70	≤ 70
Opening time (ms)			≤ 50	≤ 40	≤ 40
Breaking time (cycle)			5	3	3
Auxiliary voltage (V)			DC110 / 125 ¹⁾	DC110 / 125 ¹⁾	DC110 / 125 ¹⁾
Insulation gas			SF ₆	SF ₆	SF ₆
Rated pressure at 20°C bar (g)			0.3	0.4	0.3
Minimum operating pressure at 20°C bar (g)			0.2	0.3	0.2
Arc classification			B FLR 40 kA / 1s	B FLR 40 kA / 1s	B FLR 40 kA / 1s
Busbar system			Single / Double	Single / Double / Transfer	Single / Double
Size (mm) ²⁾	Width (W)	≤ 1,250 A	600 (800) ³⁾	800	800
		2,000 / 2,500 / 3,150 A	800	800 (1,100) ⁵⁾	800
	Depth (D)		1,760 (1,960) ⁴⁾	1,960	1,960
	Height (H)		2,400	2,400	2,400

※ ¹⁾ The auxiliary voltage can be changed on request.

²⁾ The size of actual panel can be different according to the rating, quantity, and arrangement of components.

³⁾ Width of the panel in "[]" is incase voltage transformer is installed.

⁴⁾ Depth of the panel can increase according to the number and size of components of LV compartment.

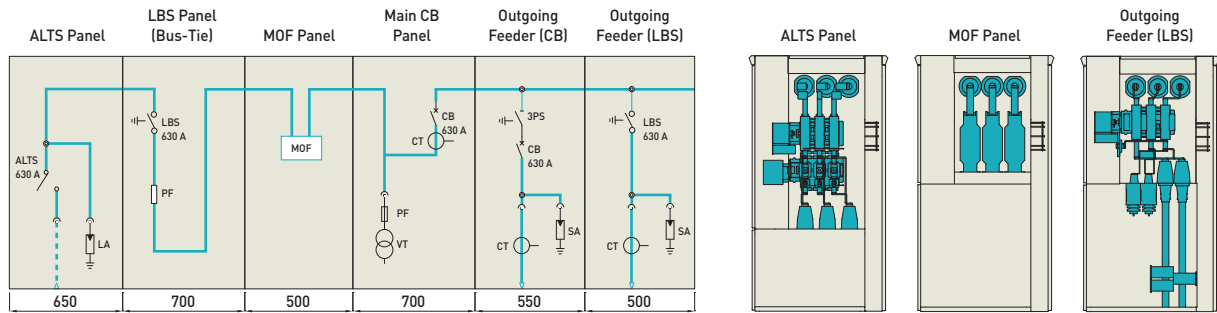
⁵⁾ Upon customer request.

Circuit Diagram and Sections

HMGS-G11, 630 A / 1,250 A Panel

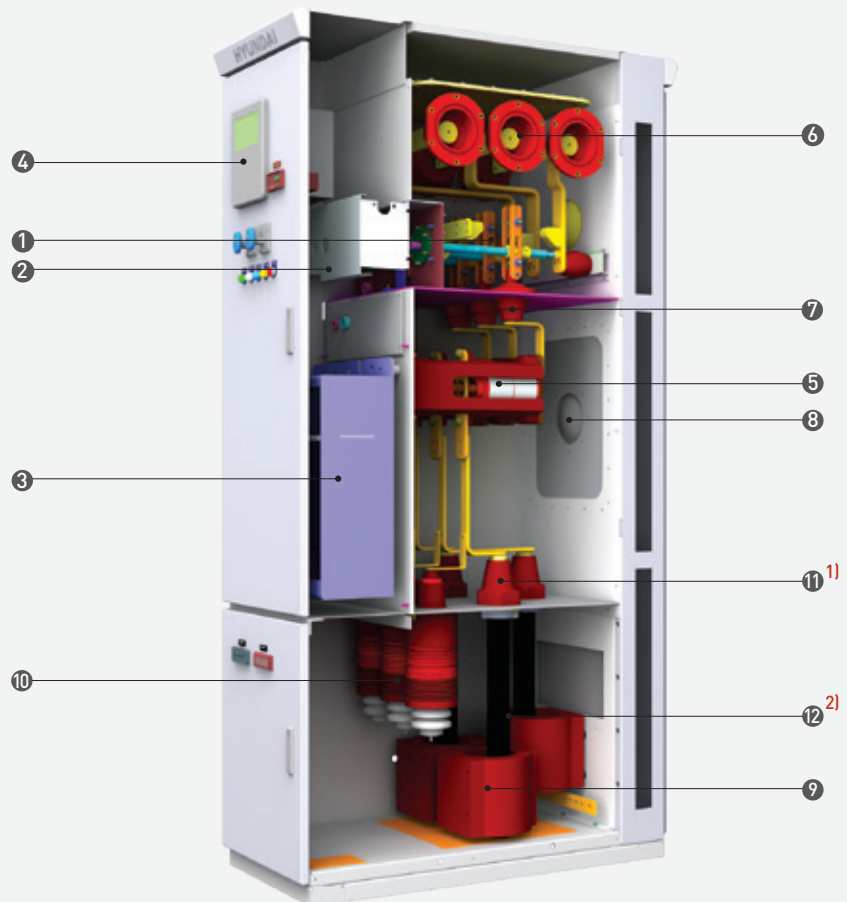
(Unit : mm)

Circuit Diagram for Typical Unit



Outgoing Feeder (CB, 1,250 A)

- ❶ 3 Position disconnecter
- ❷ 3 Position disconnecter mechanism
- ❸ Circuit breaker mechanism
- ❹ Relay
- ❺ Vacuum interrupter
- ❻ Busbar connector
- ❼ Bushing
- ❽ Bursting disc
- ❾ Current transformer
- ❿ Lightning arrester/Surge absorber
- ⓫ Inner cone socket
- ⓬ Cable & Cable plug



※ ❶ Outer cone socket is available instead of inner cone socket on request.

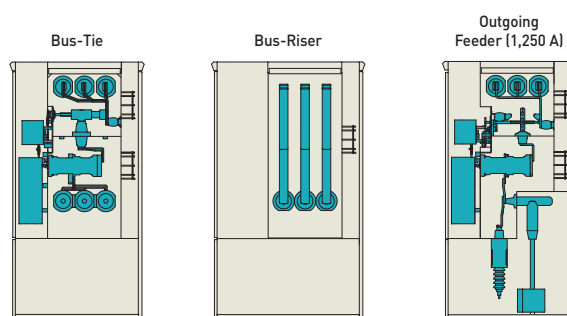
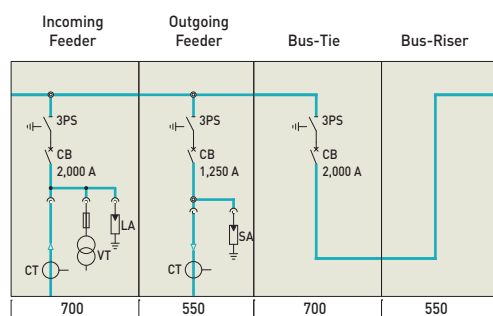
❷ Cable and cable plug is out of scope of supply.

Circuit Diagram and Sections

HMGS-G11, 2,000 A Panel

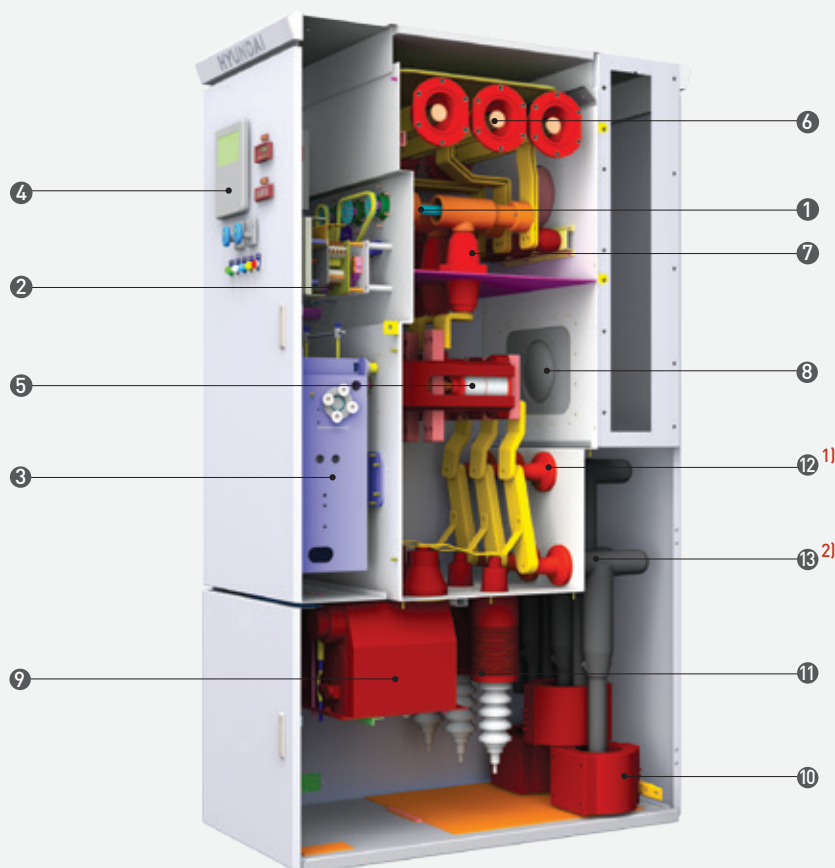
(Unit : mm)

Circuit Diagram for Typical Unit



Incoming Feeder (CB, 2,000 A)

- ① 3 Position disconnecter
- ② 3 Position disconnecter mechanism
- ③ Circuit breaker mechanism
- ④ Relay
- ⑤ Vacuum interrupter
- ⑥ Busbar connector
- ⑦ Bushing
- ⑧ Bursting disc
- ⑨ Voltage transformer
- ⑩ Current transformer
- ⑪ Lightning arrester/Surge absorber
- ⑫ Out cone socket
- ⑬ Cable plug & Cable

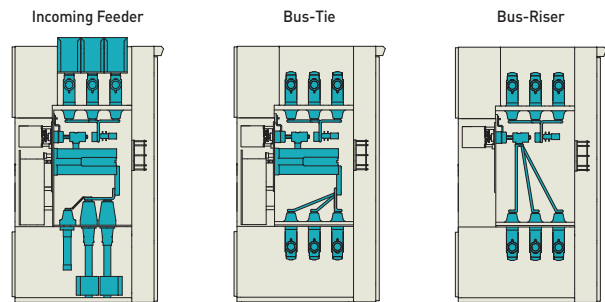
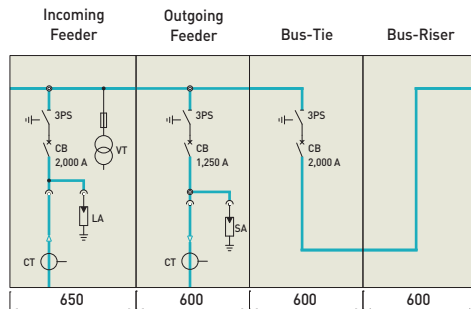


※ 1) Inner cone socket is available instead of outer cone socket on request.

2) Cable and cable plug is out of scope of supply.

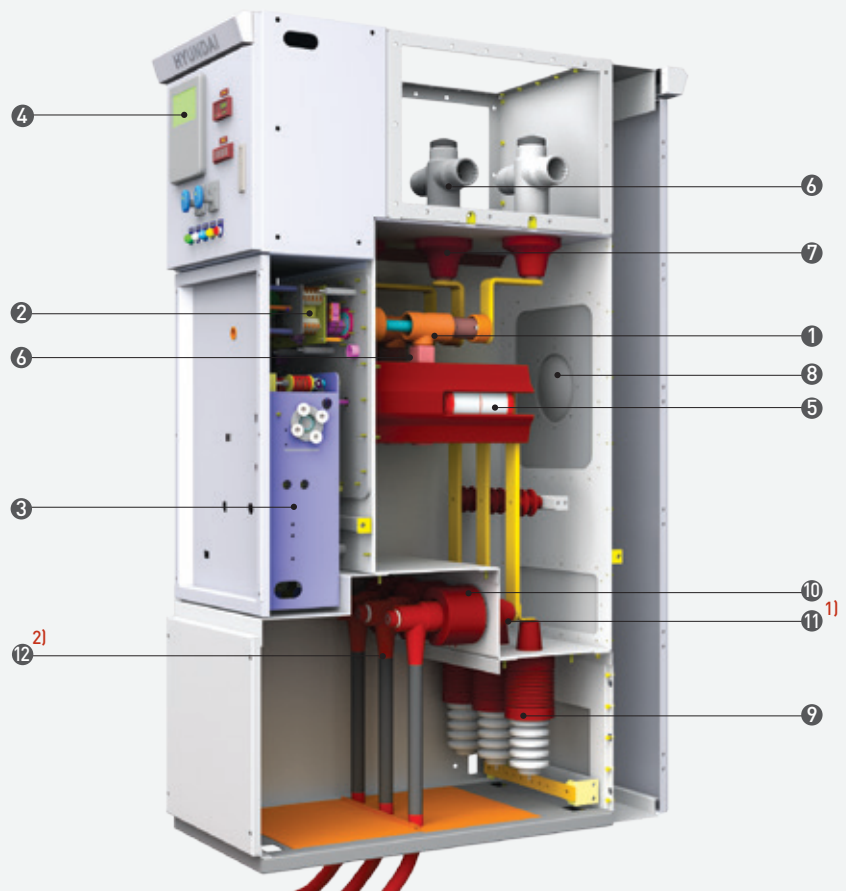
(Unit : mm)

Circuit Diagram for Typical Unit



Outgoing Feeder

- ❶ 3 Position disconnecter
- ❷ 3 Position disconnecter mechanism
- ❸ Circuit breaker mechanism
- ❹ Relay
- ❺ Vacuum interrupter
- ❻ Busbar connector
- ❼ Bushing
- ❽ Bursting disc
- ❾ Lightning arrester/Surge absorber
- ❿ Current transformer
- ⓫ Outer cone socket
- ⓬ Cable plug & Cable



※ ❶ Inner cone socket is available instead of outer cone socket on request.

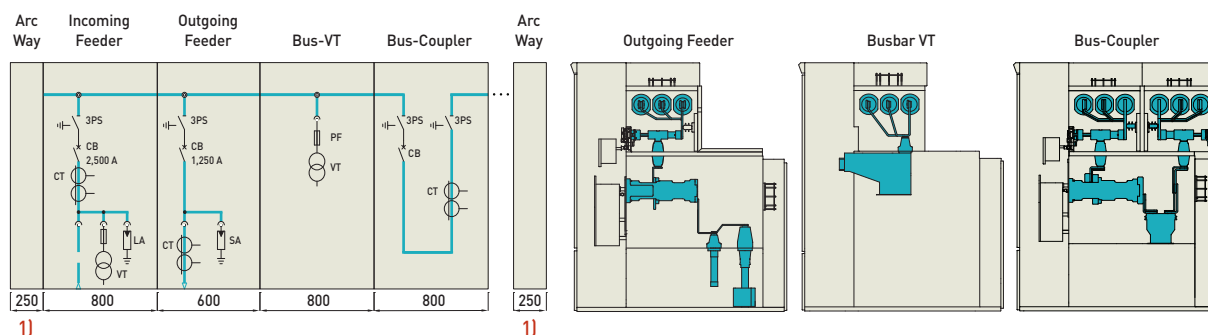
❷ Cable and cable plug is out of scope of supply.

Circuit Diagram and Sections

HMGS-G81, Single Bus System

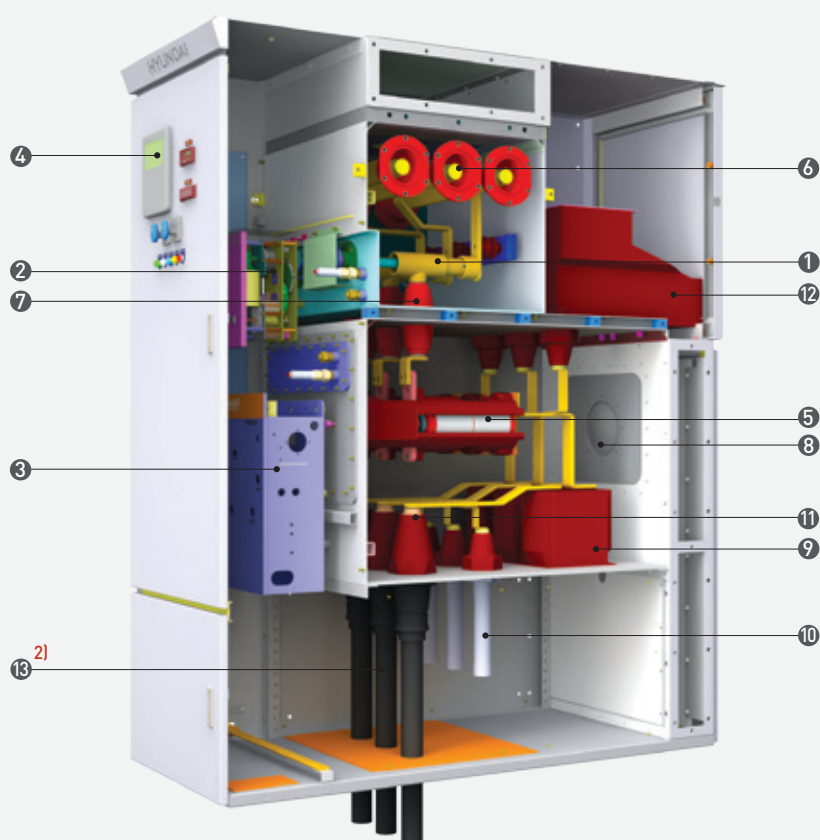
(Unit : mm)

Circuit Diagram for Typical Unit



Incoming Feeder

- ① 3 Position disconnecter
- ② 3 Position disconnecter mechanism
- ③ Circuit breaker mechanism
- ④ Relay
- ⑤ Vacuum interrupter
- ⑥ Busbar connector
- ⑦ Bushing
- ⑧ Bursting disc
- ⑨ Current transformer
- ⑩ Lightning arrester/Surge absorber
- ⑪ Inner cone socket
- ⑫ Voltage transformer
- ⑬ Cable plug & Cable

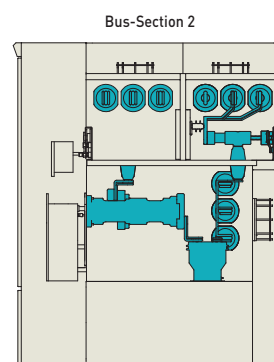
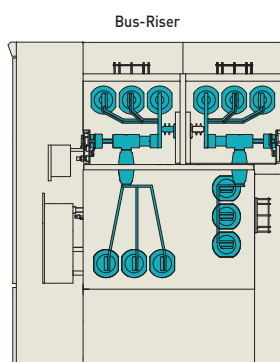
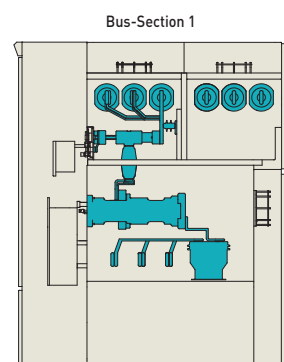
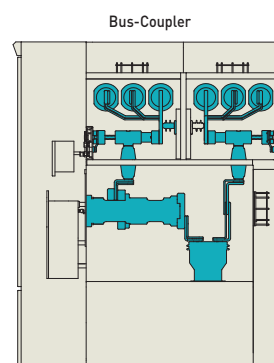
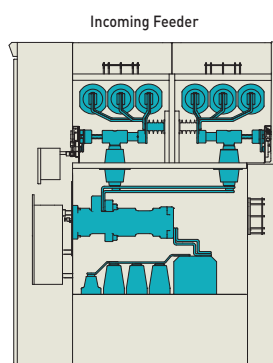
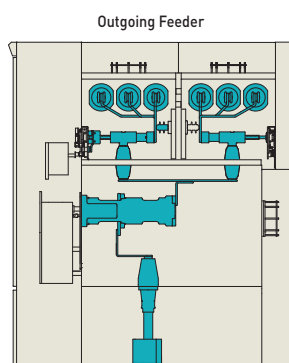
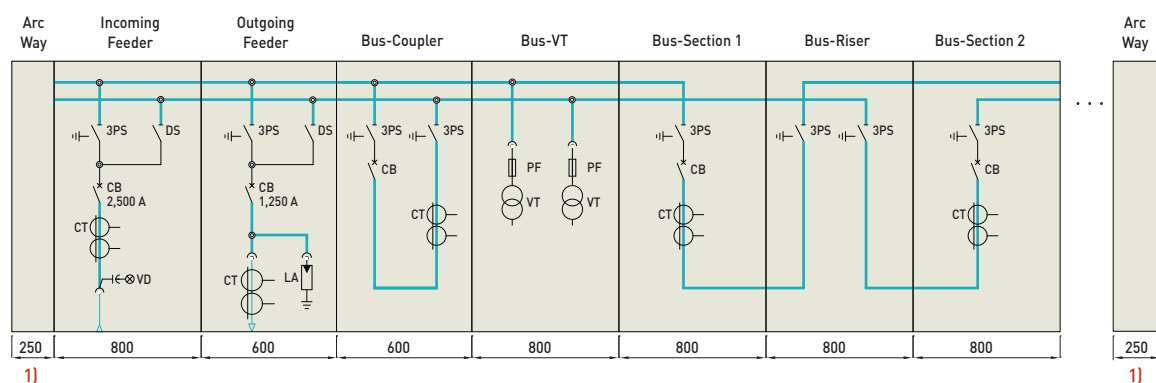


- ※ 1) An arc way is needed at the each side of end panel.
- 2) Cable and cable plug is out of scope of supply.

HMGS-G81, Double Bus System

(Unit : mm)

Circuit Diagram for Typical Unit



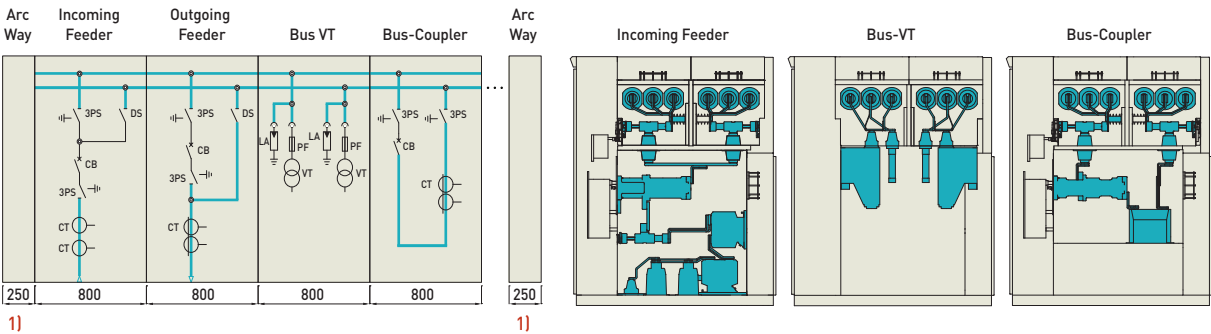
※ 1) An arc way is needed at the each side of end panel.

Circuit Diagram and Sections

HMGS-G82

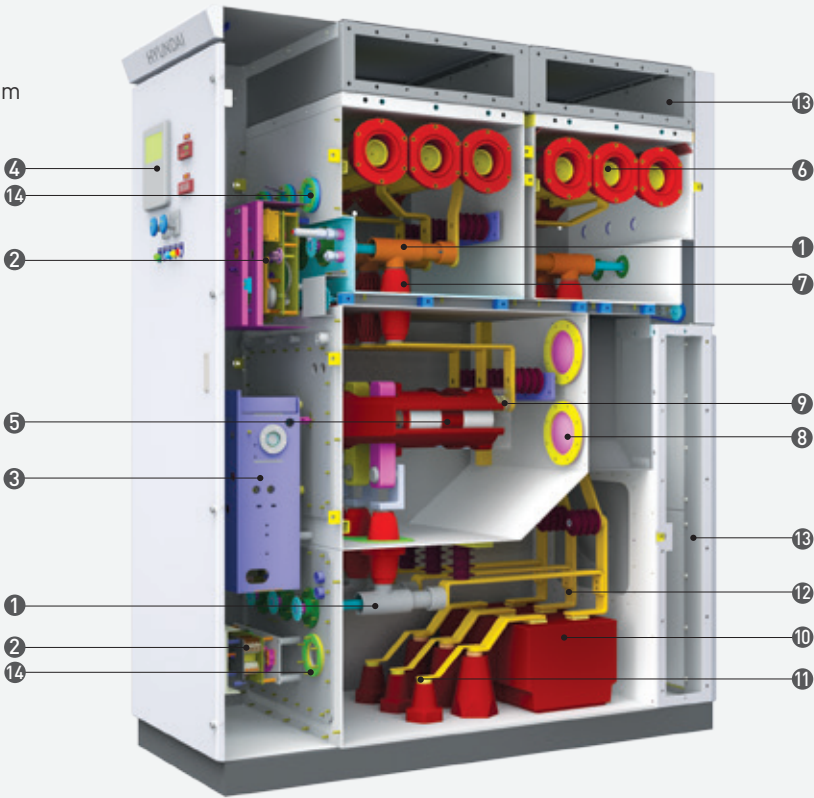
(Unit : mm)

Circuit Diagram for Typical Unit



Outgoing Feeder

- ① Main bus 3 Position disconnector
- ② Main bus 3 Position disconnector mechanism
- ③ Circuit breaker mechanism
- ④ Relay
- ⑤ Vacuum interrupter
- ⑥ Busbar connector
- ⑦ Bushing
- ⑧ Bursting disc
- ⑨ Bal seal connector
- ⑩ Current transformer
- ⑪ Inner cone socket
- ⑫ Transfer busbar
- ⑬ Plenum duct
- ⑭ Camera view port



※ 1) An arc way is needed at the both side of end panel.

Vacuum Circuit Breaker

Fixed vacuum circuit breaker is installed in the switchgear which is designed and verified according to IEC 62271-100.

The pole parts of the circuit breaker are horizontally installed in the CB compartment, and the operating mechanism is easily accessible from front side of the switchgear.

The vacuum interrupters retain high dielectric strength and short-circuit breaking capability with the high vacuum degree of 10^{-7} mbar, and they are mounted rigidly in the pole part so that they can withstand forces arising from switching operation and contact pressure.

The operating mechanism is motor-spring stored-energy type. It consists of charging mechanism, closing spring, trip spring, motor, solenoids, auxiliary switches, spring charged and on/off indicators.

The released closing spring is automatically recharged by the charging motor, and capable of the operating sequences "open-close-open" which is required when unsuccessful auto-reclosing operation is attempted.

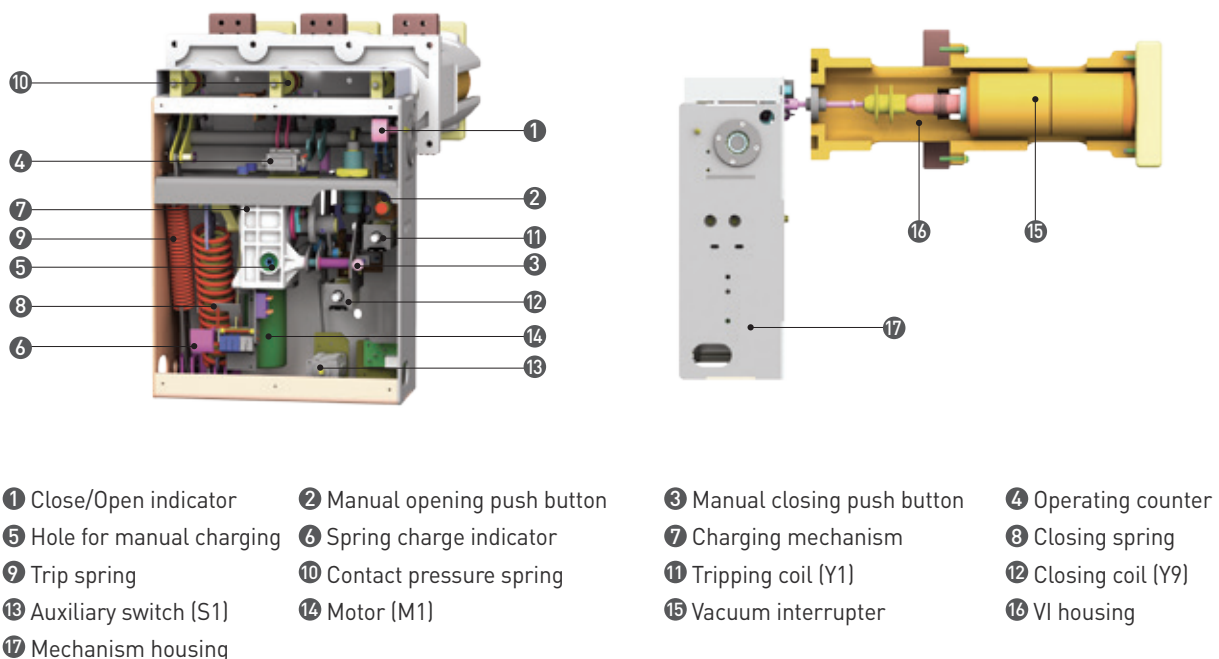
Classification

Mechanical endurance	M2	10,000 times with minimal maintenance
Electrical endurance	E2	No maintenance of the interrupting parts
Capacitive current switching	C2	Very low probability of restrike
Circuit breaker class	G81	S2 Used in cable and line system
	Others	S1 Used in cable system

Control and Auxiliary Circuit

Charging motor	500 VA at DC110 V / 220 V
Closing coil	150 VA at DC110 V / 220 V
Opening coil	300 VA at DC110 V / 220 V
Auxiliary contact	6NO, 6NC or 10NO, 10NC

Fig.10 Vacuum circuit breaker



❖ 3 Position Disconnecter

3-position disconnecter is designed and verified in compliance with IEC 62271-102 and interlocked with circuit breaker according to IEC 62271-200.

- Disconnecter class of operating endurance: M1
- Operating motor: 90 W at DC110 V / 125 V
- Auxiliary contact: 5NO + 5NC

The switching operating of the disconnecter can be performed electrically with the operating motor or manually with the operating handle.

The moving contact for the switchgear, HMGS-G30, 81, 82 and G11, 2000 A is longitudinally, and the contact for HMGS-G11, 1250 A is rotated through an threaded screw.

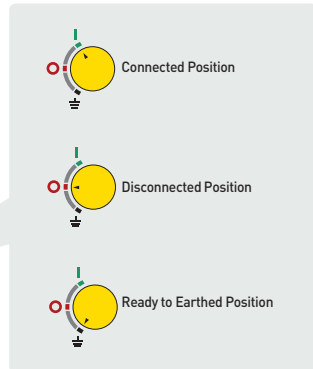
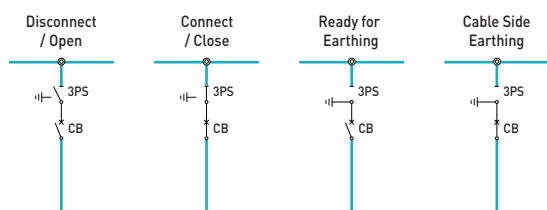
The 3-position disconnecter have connected, disconnected and ready to grounded position. And, for grounding the cable connection compartment, 3-position disconnecter should be in the grounded position and the circuit breaker is in closed position.

Interlocks

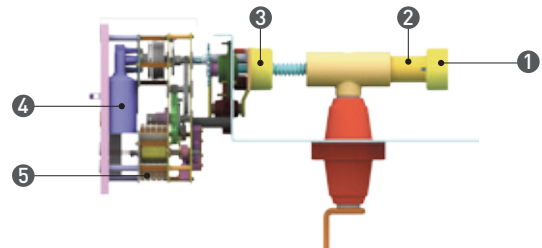
- 3-position disconnecter can only be operated when circuit breaker is in open position.
- If the circuit breaker is closed, 3-position disconnecter can not be operated by the mechanical interlock with circuit breaker and/or by prohibiting the manual handle inserting hole of the 3-position disconnecter to be opened electromagnetically.
- The circuit breaker can be operated when the 3-position disconnecter is in the connected, disconnected or earthed position.
- Manual handle can not be removed until switching operation has been completed
- Locking device for 3-position disconnecter
- Electromagnetic interlocks (Optional)

Fig.11 3 Position disconnecter

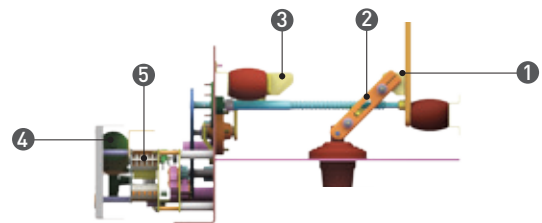
Available position for 3-position disconnecter/Circuit breaker



3-position disconnecter for HMGS-G30, 81, 82 and G11, 2000 A



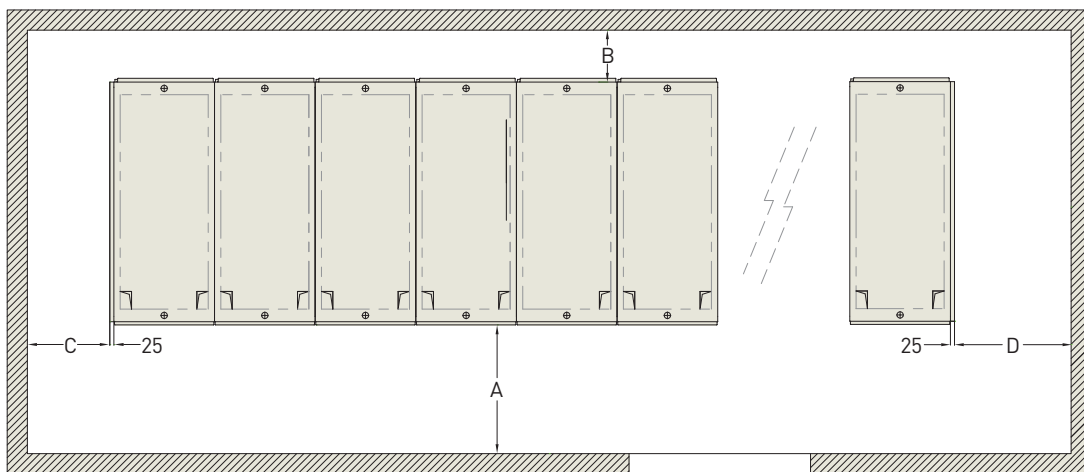
3-position disconnecter for HMGS-G11, 1250 A



- ① Fixed contact ② Moving contact ③ Earthing contact
- ④ Operating motor ⑤ Auxiliary switch

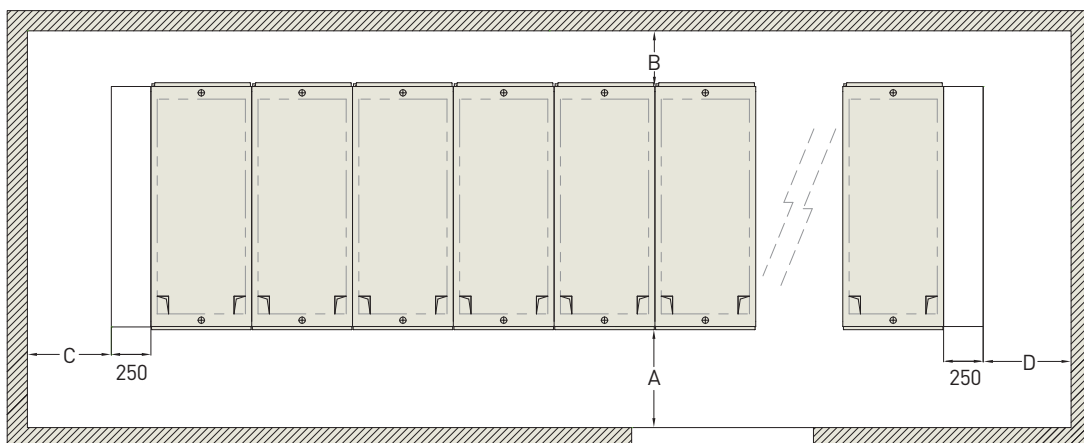
Minimum Dimensions for the Switchgear Room

HMGS-G11, G30, G38



- ※ - A: $\geq 1,500$ mm, B: ≥ 700 mm, C: ≥ 500 mm, D: ≥ 500 mm
- For detailed dimension regarding actual project, contact Hyundai switchgear team.

HMGS-G81, G82, G83



- ※ - A: $\geq 2,200$ mm, B: ≥ 700 mm, C: ≥ 500 mm, D: ≥ 500 mm
- For detailed dimension regarding actual project, contact Hyundai switchgear team.



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