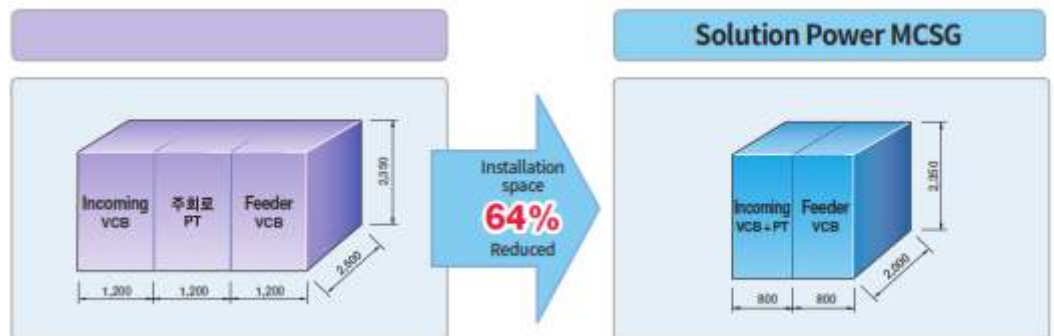


## Features

### Reduced installation space

Securing a free space for installation even in the places where safety is top priority such as Power Plant (Nuclear, Thermal, Hydro and Cogeneration), Industrial Plant (Semiconductor, petrochemical, steel) and Infrastructure facilities (subways, railways, airports), etc.

- Up to 64% reduction in installation space compared to conventional switchgear
- 33% reduction in the width of switchgear with rating upto 2000A
- Integration: Incoming VCB and main PT are installed in a panel (from 2 panels before)



### Safety considerations

Solution Power switchgear provides the best protection rating out of air insulated switchgear. It is designed to remove explosion or damage to peripheral devices as possible in the event of internal arc happening.

### Seismic Design

#### Extended

LS manufactures and provides MCSG having proper seismic performance through a seismic qualification analysis and robust design method.

#### Seismic analysis

- Applicable to the product that can be assessed for seismic performance only with demonstrating structural integrity
  - Implement seismic test for the product required demonstration of functional integrity
- Analysis method
  - Use mathematical model mode analysis to determine the method analysis
  - Dynamic analysis (~33Hz), Static analysis (over 33Hz)
- Combining seismic analysis and test for the large and combined products

#### Seismic test

- Test criteria
  - Different criteria is applied by country and product, structural/non structural factors
- Applied test load
  - Create the acceleration spectrum for product according to the damping of seismic wave and ground condition

# 1-high MCSG (Standard type)

## Specification

7.2kV



Section		Contents							
Model		Solution Power V7 / S7							
Rated voltage	(kV)	7.2							
Rated frequency	(Hz)	50/60							
Rated power frequency withstand voltage	(kV/1min)	20							
Rated lightning impulse withstand voltage	(kV[1.2×50μs])	60							
Rated short-time withstand current	(kA/s)	25/3	40/3	50/3					
Degree of protection		IP4X	IP4X	IP4X					
Internal arc withstand current	(kA/s)	25/1	40/1	50/0.5					
Rated current	(A)	630/1250/2000	1250/2000	3150	1250/2000	2500/3150	4000	5000	
Size	Width	(mm)	(650)750/800	(650)800	850	850	1050	1200	
	Height	(mm)	2250	2250		2250			
	Depth	(mm)	(1800)2000	(1900)2000	(1900)2200	(2000)2200	2400	(2200)2400	
Standard		IEC 62271-200							

Note) 1. Solution Power V Series : Pro-MEC VCB installed.  
 2. Solution Power S Series : Susol VCB installed.  
 3. The number of the size in ( ) is for minimum size.

12kV



Section		Contents							
Model		Solution Power V12 / S12							
Rated voltage	(kV)	12							
Rated frequency	(Hz)	50/60							
Rated power frequency withstand voltage	(kV/1min)	28							
Rated lightning impulse withstand voltage	(kV[1.2×50μs])	75							
Rated short-time withstand current	(kA/s)	25/3	40/3	50/3					
Degree of protection		IP4X	IP4X	IP4X					
Internal arc withstand current	(kA/s)	25/1	40/1	50/0.5					
Seismic Qualification Test		-	-	-	UBC 97 Code Zone 4/IEC 60068		-		
Rated current	(A)	630/1250/2000	1250/2000	3150	1250/2000	2500/3150	4000	5000	
Size	Width	(mm)	(650)750/800	(650)800	850	850	1050	1200	
	Height	(mm)	2250	2250		2250			
	Depth	(mm)	(1800)2000	(1900)2000	(1900)2200	(2000)2200	2400	(2200)2400	
Standard		IEC 62271-200							

Note) 1. Solution Power V Series : Pro-MEC VCB installed.  
 2. Solution Power S Series : Susol VCB installed.  
 3. The number of the size in ( ) is for minimum size.

# 1-high MCSG (Standard type)

## Specification

17.5kV



Section		Contents					
Model		Solution Power V17 / S17					
Rated voltage	(kV)	17.5					
Rated frequency	(Hz)	50/60					
Rated power frequency withstand voltage	(kV/1min)	38					
Rated lighting impulse withstand voltage	(kV[1.2×50μs])	95					
Rated short-time withstand current	(kA/s)	25/3	40/3	50/3			
Degree of protection		IP4X	IP4X	IP4X			
Internal arc withstand current	(kA/s)	25/1	40/0.1	50/0.5			
Rated current	(A)	630/1250/2000	1250	3150	1250/2000	2500/3150	4000
Size	Width	(mm)	800	800	950	850	1050
	Height	(mm)	2250	2250		2250	
	Depth	(mm)	(1800)2000	(1900)2200		2200	2400
Standard		IEC 62271-200					

Note) 1. Solution Power V Series : Pro-MEC VCB installed. 2. Solution Power S Series : Susol VCB installed. 3. The number of the size in ( ) is for minimum size.

24kV



Section		Contents					
Model		Solution Power V24 / S24					
Rated voltage	(kV)	24					
Rated frequency	(Hz)	50/60					
Rated power frequency withstand voltage	(kV/1min)	50					
Rated lighting impulse withstand voltage	(kV[1.2×50μs])	125					
Rated short-time withstand current	(kA/s)	25/3			40/3		
Degree of protection		IP4X			IP4X		
Internal arc withstand current	(kA/s)	25/1			40/0.5		
Seismic Qualification Test		-			IEC 60068		-
Rated current	(A)	630/1250	2000	2500	1250/2000	3150	
Size	Width	(mm)	800	(800)1000	1000	(800)1000	1000
	Height	(mm)	2250/2350			2250/2350	
	Depth	(mm)	2000		2200	2200	
Standard		IEC 62271-200					

Note) 1. Solution Power V Series : Pro-MEC VCB installed. 2. Solution Power S Series : Susol VCB installed.  
 3. The number of the size in ( ) is for minimum size.  
 4. Height 2350mm is the height of 24kV receiving equipment 5. Max internal arc capability is 1Sec for 40kA model.

36kV

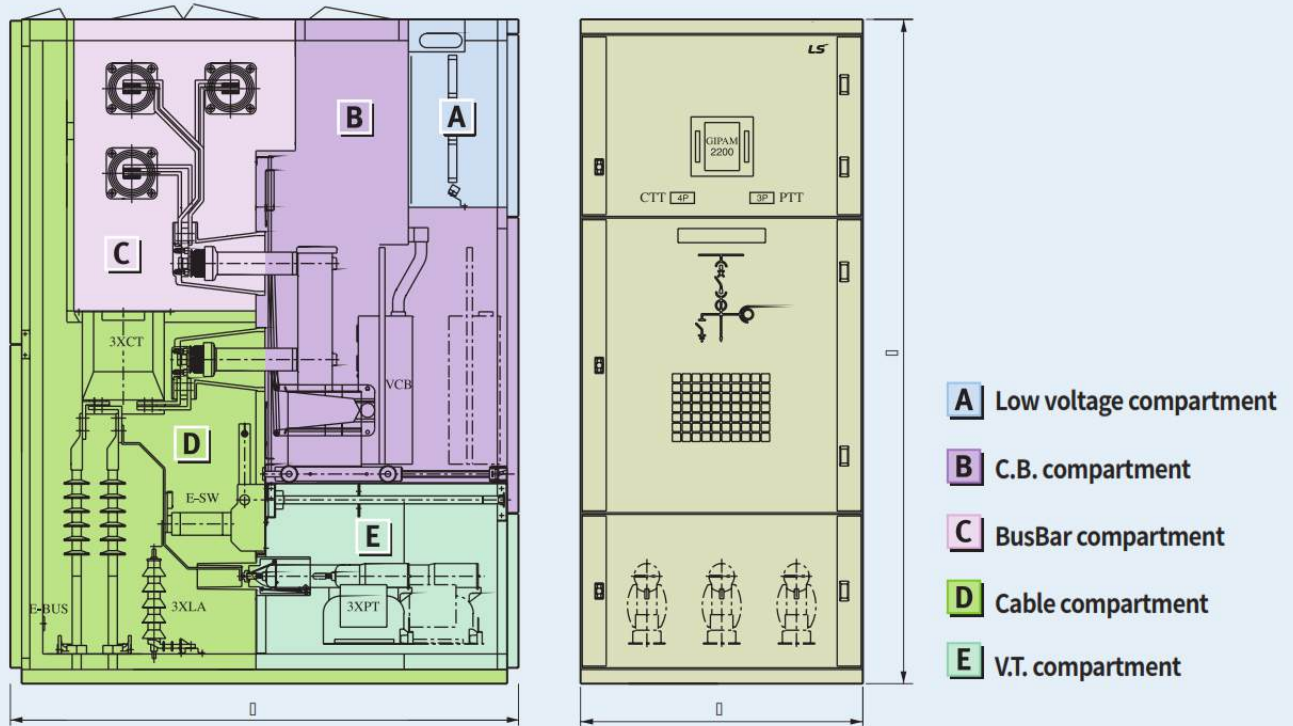


Section		Contents	
Model		Solution Power S36	
Rated voltage	(kV)	36	
Rated frequency	(Hz)	50/60	
Rated power frequency withstand voltage	(kV/1min)	70	
Rated lighting impulse withstand voltage	(kV[1.2×50μs])	170	
Rated short-time withstand current	(kA/s)	25, 31.5, 40/3	
Degree of protection		IP4X	
Internal arc withstand current	(kA/s)	40/1	
Rated current	(A)	1250/2000/3150	
Size	Width	(mm)	1200
	Height	(mm)	2250~3000
	Depth	(mm)	2600~3300
Standard		IEC 62271-200	

Note) Please contact us for exact size.



## Structures and dimensions



Type	Unit	Solution Power S36	Solution Power S24		Solution Power S17			Solution Power S12			Solution Power S7					
Rated voltage	kV	36	24		17.5			12			7.2					
Rated power frequency withstand voltage	kV/ 1min	70	50		38			28			20					
Rated lightning impulse withstand voltage	kV [1.2x50µs]	170	125		95			75			60					
Rated short-time withstand current	kA/s	25-40 /3	25-40/3		25-50/3			25-50/3			25-50/3					
Internal arc withstand current	kA/s	40/1	25/1, 40/0.5 <sup>1)</sup>		25/1, 50/0.5			25/1, 40/1, 50/0.5			25/1, 40/1, 50/0.5					
Rated current	A	3150 2000 1250	3150 (40kA) 2000 1250 2500 (25kA)	2000 1250 630	4000 3150 2500 (50kA)	2000 1250 (50kA)	3150 (40kA)	2000 1250 630	5000 4000 3150 2500 (50kA)	2000 1250 (50kA)	3150 (40kA)	2000 1250 630	5000 4000 3150 2500 (50kA)	2000 1250 (50kA)	3150 (40kA)	2000 1250 630
Width	mm	1200	1000	800	1050	850	950	800	1050 (1200)	850	850	650	1050 (1200)	850	850	650
Depth	mm	2600- 3300	2200	2000 (2200)	2400/ 2200	2200	1900	1800 (1900)	2400/ 2200	2000	1900	1800 (1900)	2400/ 2200	2000	1900	1800 (1900)
Height	mm	2250- 3000	2250	2250	2250	2250	2250	2250	2250	2250	2250	2250	2250	2250	2250	2250

Note) 1. Max internal arc capability is 1Sec for 40kA model.  
 3. The number of the size in ( ) is for 31.5~40kA model.

2. The size in this table is for minimum applicable size.  
 4. In the case of upper withdrawal/insertion of cable, depth expansion is required(300~500mm).

## 1-high MCSG (Front access type)

### Features

LS Front access type MCSG enables front cable installation and front maintenance in response to the customer's need to reduce the footprint of the switchgear.

#### Extended

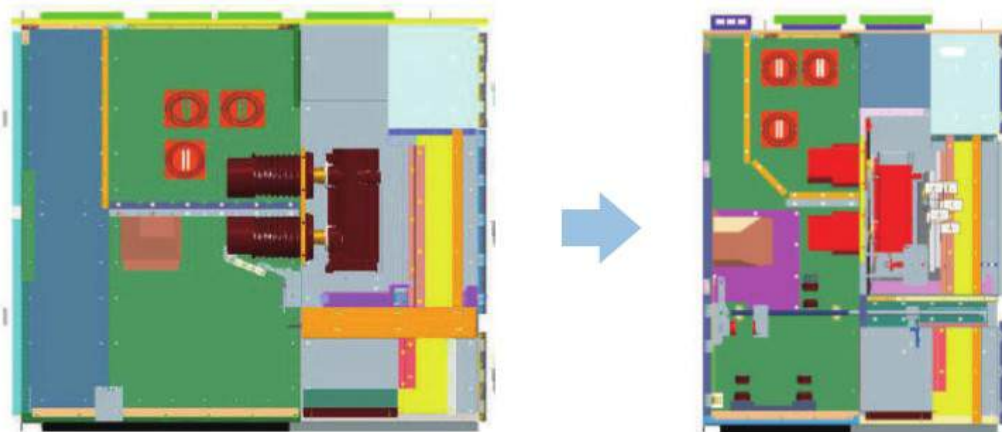
##### Securing ease of maintenance through front access

- Cable installation and maintenance work available from the front of the MCSG
- VCB base detachable structure
- Rear installation of earthing switch panel
- Maximize assembly through separate kit structure for operation and interlock



#### Compact

Enhancement of space utilization by reducing the size compared to the standard type MCSG



#### Reliability/ Safety

- Metal partitions between each compartment
- Equipment with a mechanical interlock to prevent misoperation
- User safety through internal arc test
- Stable structure through temperature and structural analysis

## Specification

### 12kV

Section		Contents	
Model		Solution Power S12F	
Rated voltage	(kV)	12	
Rated frequency	(Hz)	50/60	
Rated power frequency withstand voltage	(kV/1min)	28	
Rated lightning impulse withstand voltage	(kV[1.2×50μs])	75	
Rated short-time withstand current	(kA/s)	31.5/3	
Degree of protection		IP41	
Internal arc withstand current		31.5/1	
Rated current	(A)	1250	2000
Size	Width	600	800
	Height	2250	
	Depth	1700	
Standard		IEC 62271-200	

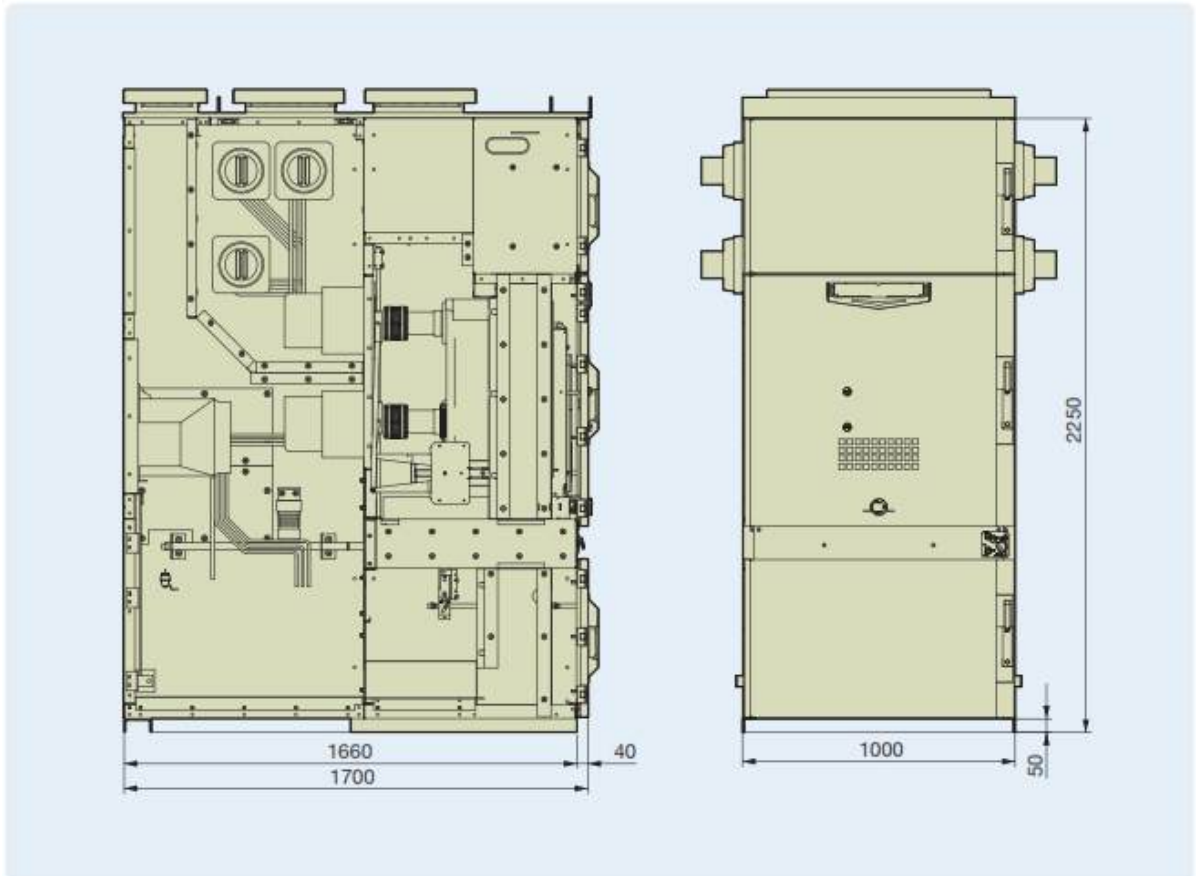
### 17.5kV

Section		Contents	
Model		Solution Power S17F	
Rated voltage	(kV)	17.5	
Rated frequency	(Hz)	50/60	
Rated power frequency withstand voltage	(kV/1min)	38	
Rated lightning impulse withstand voltage	(kV[1.2×50μs])	95	
Rated short-time withstand current	(kA/s)	40/3	
Degree of protection		IP41	
Internal arc withstand current		40/0.5	
Rated current	(A)	3150	
Size	Width	1000	
	Height	2250	
	Depth	1700	
Standard		IEC 62271-200	

## 1-high MCSG (Front access type)

### Structures and dimensions

Solution  
Power S17F





## 2-high MCSG

### Specification

#### Compact type



Section		Contents					
Model		Compact type					
Rated voltage	(kV)	7.2		12			
Rated frequency	(Hz)	50/60		50/60			
Rated power frequency withstand voltage	(kV/1min)	20		28			
Rated lightning impulse withstand voltage	(kV[1.2×50μs])	60		75			
Rated short-time withstand voltage	(kA/s)	20/3, 25/3	31.5/3, 40/3		31.5/3, 40/3		
Degree of protection		IP4X	IP4X		IP4X		
Rated current	(A)	630/1250/2000	1250/2000	3150	1250/2000	3150	
Size	Width	(mm)	750(800)	750(800)	850	750(800)	850
	Height	(mm)	2350/2450		2350/2450		
	Depth	(mm)	2200/2400	2200/2400		2400	
Standard		IEC 62271-200					

Note) The number of the size in ( ) is for installed PT model.

#### Middle busbar type



Section		Contents					
Model		Middle busbar + LV comp.	Middle busbar + Side arc duct				
Rated voltage	(kV)	7.2	7.2				
Rated frequency	(Hz)	50/60	50/60				
Rated power frequency withstand voltage	(kV/1min)	20	20				
Rated lightning impulse withstand voltage	(kV[1.2×50μs])	60	60				
Rated short-time withstand current	(kA/s)	25/3	40/3	50/3			
Degree of protection		IP4X	IP4X		IP4X		
Internal arc withstand current	(kA/s)	25/1	40/0.5	50/0.5			
Seismic qualification test		IEEE 693	-		-		
Rated current	(A)	630/1250/2000	1250/2000	3150	1250/2000	2500/3150/4000	
Size	Width	(mm)	750	900	1000	1000	1050
	Height	(mm)	2450	2250/2450		2450	
	Depth	(mm)	2200	2400		2400	
Standard		IEC 62271-200					

Note) 1. Max internal arc capability is 1Sec for 40kA model. 2. Height 2450mm size for 50kA 2,500/3,150/4,000A is applied by customer needs.

#### Double busbar type



Section		Contents					
Model		Double busbar type+Earthing switch+Arc duct					
Rated voltage	(kV)	7.2		12			
Rated frequency	(Hz)	50/60		50/60			
Rated power frequency withstand voltage	(kV/1min)	20		28			
Rated lightning impulse withstand voltage	(kV[1.2×50μs])	60		75			
Rated short-time withstand current	(kA/s)	25/3	40/3	50/3			
Degree of protection		IP4X	IP4X		IP4X		
Internal arc withstand current	(kA/s)	25/0.5	40/0.5	50/0.5			
Seismic Qualification Test		UBC 97 Code Zone 4/IEC 60068			-		
Rated current	(A)	630/1250/2000	1250/2000	3150	1250/2000	2500/3150/4000	
Size	Width	(mm)	800	800	850	950	1050
	Height	(mm)	2700	2700		2750	2750
	Depth	(mm)	2400	2400		2300	2300
Standard		IEC 62271-200					

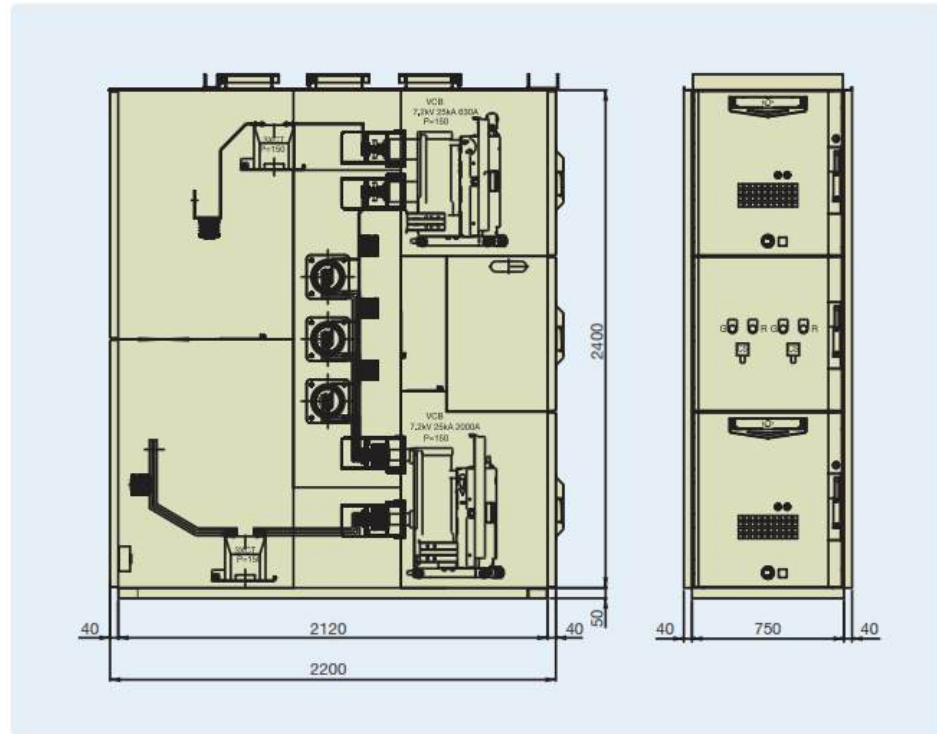
Note) Internal arc performance can be verified with 1Sec when customer requests



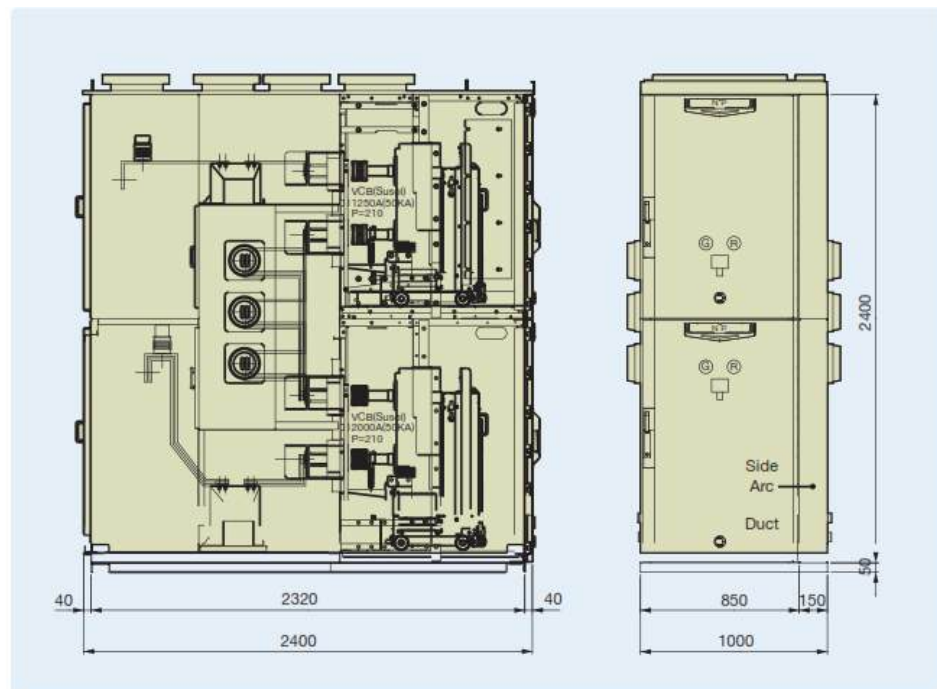
## 2-high MCSG

### Structures and dimensions

Middle busbar type  
 (Middle busbar+LV  
 compartment)



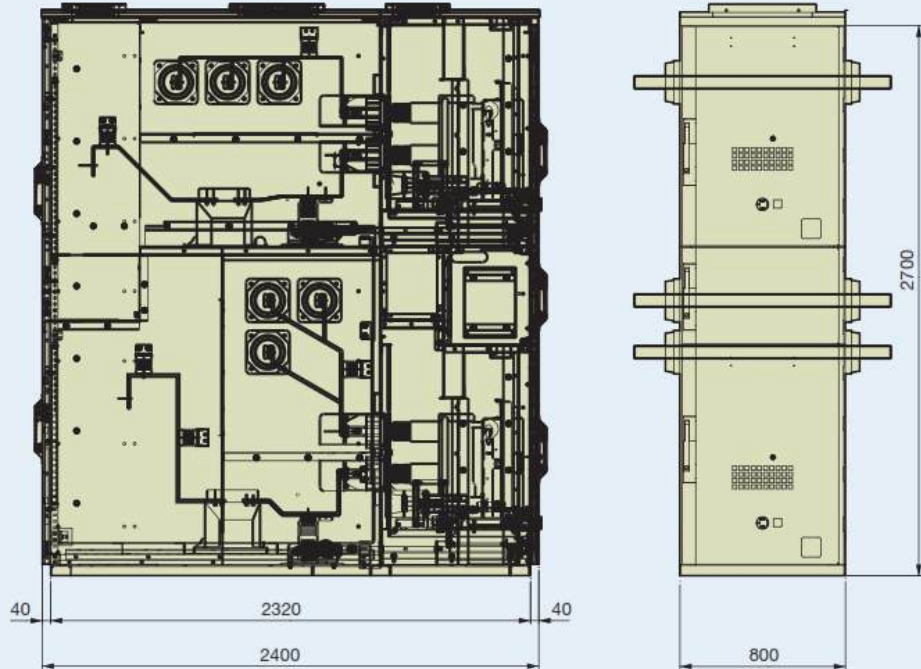
Middle busbar type  
 (Middle busbar+ Side  
 arc duct)



Note) Width of 40kA model is 900mm.

## Structures and dimensions

### Double busbar type



## Reference of 2-high MCSG

### Middle busbar+LV comp. type

PJT name	Ratings	Market	Delivery
DGB Innovation Center (Daegu Bank)	7.2kV 20kA 630A	IDC	2018.01
Shinsegae Group Data Center	7.2kV 20kA 630A	IDC	2018.12
Samsung SDS Sangam Data Center	7.2kV 25kA 1250A	IDC	2019.01
Microsoft Busan IDC (Phase 1)	7.2kV 25kA 630/1250A	IDC	2019.11

### Double busbar+E/S+Arc duct type

PJT name	Ratings	Market	Delivery
POSCO Brazil CSP Steel Plant	7.2kV 25/40kA 630/1250/2000/3150A	Steel	2016.12
E-CL/RED DRAGON, Chile PIEM (SK E&C)	7.2kV 50kA 1250/3150A	Power plant	2017.06
Samsung SDS Sangam Data Center	7.2kV 25kA 1250A	IDC	2019.01

### Middle busbar+Side arc duct type

PJT name	Ratings	Market	Delivery
Jangmoon CCPP	7.2kV 40kA 1250/2000/4000A	Power plant	2015.10
POSCO Pohang 3 Continuous Casting	7.2kV 31.5kA 1250A	Steel	2016.03
BNK Financial Group Integrated IT Center	7.2kV 25kA 630/1250A	IDC	2016.12
POSCO No.2 EGL MV System Replacement	7.2kV 40kA 1250/4000A	Steel	2017.04
KT Mokdong IDC (2 Center)	7.2kV 40kA 1250/2000A	IDC	2017.07
POSCO Pohang 1 Hot Rolling	7.2kV 40kA 1250A	Steel	2017.08
POSCO Pohang Headquarter	7.2kV 40kA 2000A	Steel	2017.09
LS-NIKKO Copper 2 Factory (Janghang)	7.2kV 25kA 1250A	Smelting	2018.02
POSCO Gwangyang 4 Cold Rolling	7.2kV 40kA 3150A	Steel	2018.06

PJT name	Ratings	Market	Delivery
Wirye ES Gamil Pump Station	7.2kV 20kA 630A	Water supply	2018.08
LG MMA M3 Revamping	7.2kV 25kA 630/2000A	Petrochemistry	2018.11
Lotte Chemical Ulsan 1 Factory MEX3	7.2kV 40kA 2000/3150A	Petrochemistry	2018.12
LS-NIKKO Copper (Onsan)	7.2kV 25kA 630/1250A	Smelting	2019.03
LG Chemical IPA 50KTA EXPANSION	7.2kV 25kA 630/1250A	Petrochemistry	2019.04
SK Energy Improvement	7.2kV 40kA 1250A	Power plant	2019.05
SK Energy NAC 33 Substation	7.2kV 25kA 630/1250A	Power plant	2019.09
Korea Univ. Anam Hospital Medical Center	7.2kV 40kA 1250A, 25kA 630A	Hospital	2019.11
POSCO Gwangyang 3 Furnace	7.2kV 40kA 2000A	Steel	2019.11
Microsoft Busan IDC (Phase 1)	7.2kV 40kA 1250/2000A	IDC	2019.11



## Compartment and accessories



**Ventilation Cover**



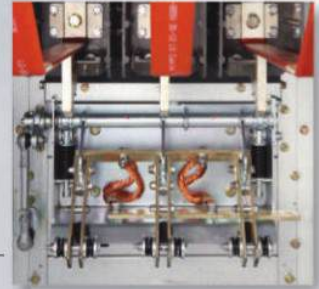
**Bus Compartment**

- Independent bus compartment structured not to affect any accident to adjacent panels.



**Low Voltage Compartment**

- Enough space to test and change the internal wiring easily.
- Wiring duct for panel connection at the top is made of steel.



**Earthing Switch**

- Device to discharge the load side current in the position of Test and Drawout to ensure the safe maintenance



**CB Compartment**

- Can be drawn in and out C.B. without opening the door.
- Viewing window for C.B. inspection
- Solid structure with hinge and locker
- Metal shutter and shutter padlock
- IP cover on the face of C.B



**Cable compartment**

- Sufficient spaces for wiring
- Insulation cap for the dielectric of Earthing switch
- Bottom incoming and outgoing (Top incoming and outgoing not available)

## Optional accessories for C.B. Compartment

### Shutter Padlock

The hole to lock the shutters (load and line side) in close position, to increase the safety during the maintenance of a VCB draw-out position.



### VCB Interlock

The device that prevents the circuit breaker to separate the Jack Terminal when the Run position.

### Inspection window

Viewing window permits view of the status of the breaker through the closed door.

### Emergency trip device

C.B. can be tripped by trip device without opening the door.

### Draw-in and out device

C.B. can be drawn-in and out with the door closed.

### Mechanical position indicator

Indicate the service and test position of C.B.

### Interlocking device between door and C.B.

When the C.B. is service position, customer can not open the door without releasing the interlock key.

### Earthing Switch Padlock

Prevent the accident in case of carelessness earthing switch operation. The locking of the earthing switch is available when the switch is in 'OFF' position.





## Main devices

### Vacuum circuit breaker

Vacuum Circuit Breaker, VCB is installed in the medium voltage distribution lines to protect life and load equipment. In case of accidents such as over current, short circuit and ground fault current, VCB works by interrupting the circuit through the inner Vacuum Interrupter which is acted by signal from the outside separate relay.

#### LS` Super Solution, Susol VCB responds

- Customer needs for the breakers with high interrupting capacity and large current due to the intergration and increase of the load capacity.
- Worldwide trend of diversification in the medium voltage distribution lines.
- Increase of the reliability for the temperature characteristics of circuit breakers.

#### Premium-type products to improve convenience and reliability of medium voltage switchgear configuration.

- Full line-up modeling to the high interrupting capacity and large current.
- Main structure with high reliability application.
- A variety of accessories and ability to maximize.

Suitable for use as the main circuit breaker to protect key installations in the places such as devices industry, power plants, high-rise buildings, large ships.

### Features

#### Strengthening of the high interrupting capacity and large current models and full line-up new VCB models to high/middle/low.

Voltage	Interrupting current	Rated current
7.2kV	8/12.5/20/25/31.5/40/50kA	400/630/1250/2000/3150/4000/5000A
12kV	20/25/31.5/40/50kA	630/1000/1250/2000/2500/3150/4000/5000A
17.5kV	20/25/31.5/40/50kA	630/1000/1250/2000/2500/3150/4000A
24kV	12.5/25/31.5/40kA	630/1250/2000/2500/3150A
25.8kV	12.5/16/25/31.5/40kA	630/1250/2000/3150A
36kV	25/31.5/40kA	1250/2000/3150A

#### Main circuit structure with high reliability.

- Maximizing the durability and reliability of the main circuit contactors (Stego Tulip contactor)
- Strong structure for the temperature rise (Natural cooling system).

#### Convenience of switchgear configuration and a variety of accessories.

- CB compartment structure
  - Metal isolation structures to prevent the accident spread and ensure safety
  - Convenience of switchgear building by its module style
- Variety of accessories
  - UVT, Locking Magnet, Plug Interlock, Key Lock, Temperature sensor, MOC, TOC, Earthing S/W
- Maximizing compatibility with existing products through the dualistic deployment of phases and compact models.

#### Full line-up & Compact

- Full line-up new VCB models to the high interrupting with existing products through the dualistic deployment of phases and compact models.

## Certificate

**MEDIUM VOLTAGE  
 METAL CLAD SWITCHGEAR**

PT. Berkah Cipta Persada  
 Under license of **LSI**

**CERTIFICATE OF APPROVAL**  
**LS ELECTRIC Co., Ltd.**

**CERTIFICATE OF APPROVAL**  
**LS ELECTRIC Co., Ltd.**

**CERTIFICATE OF APPROVAL**  
**LS ELECTRIC Co., Ltd.**

**Test Report CESI**

**KEMAR TDT 2078-10**  
 TYPE TEST CERTIFICATE OF SHORT-CIRCUIT PERFORMANCE

**TEST REPORT KERI**

## Address :

Assembly Factory:  
 Kawasan Industri Greenland I  
 Jl. Greenland IV Blok AC No. 07 kota Deltamas  
 Cikarang Pusat, Bekasi-Indonesia 17530

Sheet Metal Factory:  
 Kawasan Delta Silicon 3  
 Jl. Rotan I Blok F27 N0. 20D Lippo Cikarang  
 Cikarang Pusat - Bekasi 17530

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