



Solution Power

Medium Voltage Metal Clad Switchgear



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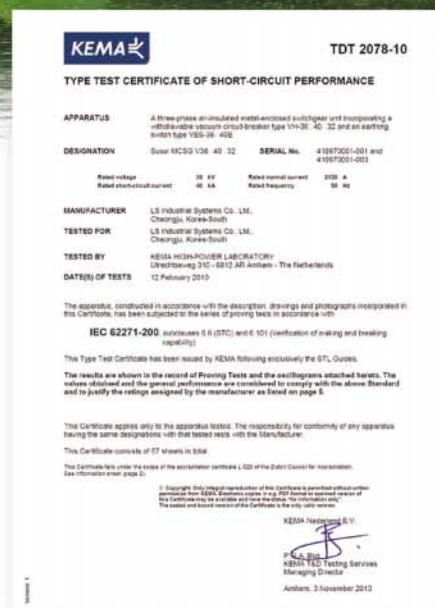
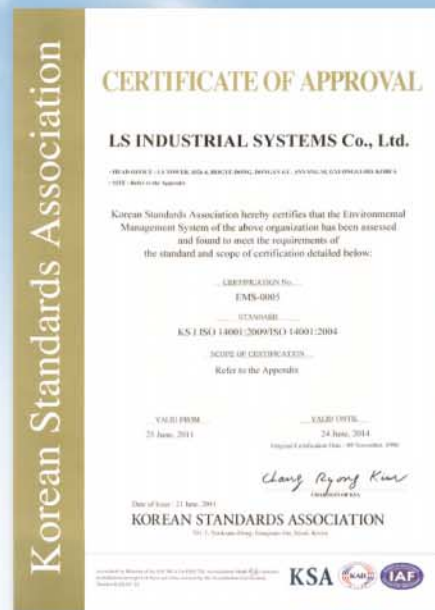
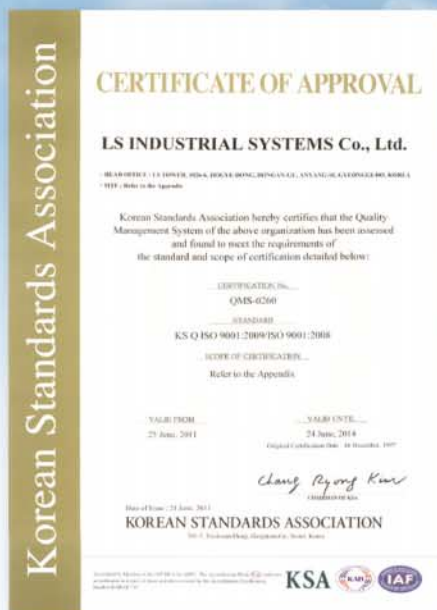
Medium Voltage Metal Clad Switchgear



Contents

• Features	12
• Ratings	14
• Structures and dimensions	16
• Accessories and apparatuses	18
• Arrangement (for general application)	22

LSIS showing the new, innovative products every customer desires to present standards for the future electric power solution as leading industrial electrical / electronic sectors with developing high-tech.



Susol VCB

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.

LSIS' Super Solution, Susol VCB responds.

- customer needs for the breakers with high interrupting capacity and large current due to the integration 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 device industry, power plants, high-rise buildings, large ships.



- ▶ 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	400/630/1250/2000/3150/4000A
12/17.5kV	20/25/31.5/40/50kA	630/1250/2000/3150/4000A
24kV	12.5/25/31.5/40kA	630/1250/2000/2500/3150A
36kV	25/31.5/40kA	1250/2000/3150A
40.5kV	25/31.5kA	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. And the convenience of switchgear building is extended by its module style.
 - A 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.

※ Type testing is complete for all models according to latest standard, IEC62271-100 (2008) [M2, E2 (List1 or 3), C2].





Susol VCB installed

Solution Power Medium Voltage Metal Clad Switchgear by adopting high performance and reliable Susol VCB supports compact size to be widely used in a variety of electric power facilities for the stable power supply and maintenance.

Susol VCB Family

Susol VCB series are premium-type products featuring main structure with high reliability application and a variety of accessories and ability to maximize to be suitable for use as the main circuit breaker to protect key installations in the places such as device industry, power plants, high-rise buildings, large ships



Full line – up & Compact

Full line-up new VCB models to the high interrupting capacity and large current (~ 50kA, ~ 4000A) featuring maximization of compatibility with existing products through the dualistic deployment of phases and compact models

7.2/12/17.5kV (VL-06/12/17)

- Rated short-time (to withstand current): 3sec. 4sec*
- Rated operating sequence: O-0.3s-CO-15s-CO
- Type test level: M2, E2 (List3), C2
- Electrical and mechanical life: 30,000 operations
- Compatibility with existing Pro-MEC breakers
- Various cradle: E, F, G and H type
- CB Compartment for MCSG available
- A variety of control power
 - DC 24~30V, DC 48~60V, DC 110V, DC 125V, DC 220V
 - AC 48V, AC 100~130V, AC 220~250V
- A variety of accessories
 - VCB part: Charge switch, UVT, Secondary trip coil, Latch checking switch, Position switch, Locking magnet, Plug interlock, Key lock, Button cover, Button padlock, Padlock (H type Door interlock), MOC
 - Cradle part: MOC (Mechanical Operated Cell switch), TOC (Truck Operated Cell switch), Temperature sensor, Earthing switch & accessories, Door, Door interlock, Door emergency button
 - Others: Racking in/out handle, UVT Time delay controller, CTD (Condensor Trip Device), Temperature module
- TEST/SERVICE Automatic Position Indicator
- Standards and certification
 - IEC62271-100 (2008) [M2, C2, E2 (List3)]
 - KEMA, KERI type tested, V-check (KESCO) certification

(Note) * Please contact us



Ur (kV)	Isc (kA)	Ir (A)
7.2	20	630
		1250
		2000
	25	630
		1250
		2000
12	20	630
		1250
		2000
	25	630
		1250
		2000
17.5	20	630
		1250
		2000
	25	630
		1250
		2000

7.2/12/17.5/24/36/40.5kV (VH-06/12/17/24/36/40)

- Rated short-time (to withstand current): 3sec. 4sec*
- Rated operating sequence: O-0.3s-CO-3min-CO
- Type test level: M2, E2 (List3), C2
- Electrical and mechanical life: 20,000 operations
- Various cradle: K and H type
- CB Compartment for MCSG available
- A variety of control power
 - DC 48V, DC 110V, DC 125V, DC 220V
 - AC 48V, AC 110V, AC 220V
- A variety of accessories
 - VCB part: UVT, Secondary trip coil, Latch checking switch, Position switch, Locking magnet, Plug interlock, Key lock, Button cover, Button padlock, Padlock (H type Door interlock), MOC
 - Cradle part: MOC (Mechanical Operated Cell switch), TOC (Truck Operated Cell switch), Temperature sensor, Earthing switch & accessories, Door, Door interlock, Door emergency button
 - Others: Racking in/out handle, Lifting hook, UVT Time delay controller, CTD (Condensor Trip Device), Temperature module
- Standards and certification
 - IEC62271-100 (2008) [M2, C2, E2 (List3)]
 - KEMA, KERI type tested, V-check (KESCO) certification

(Note) * Please contact us



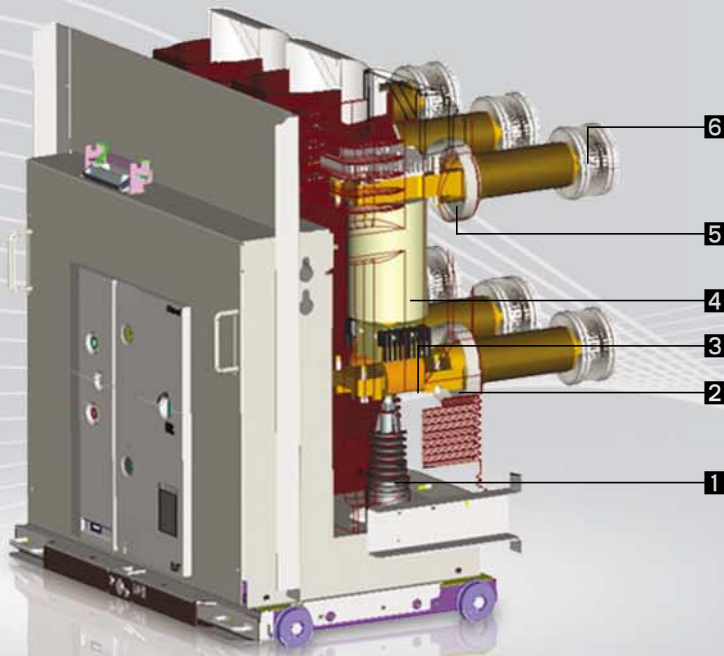
Ur (kV)	Isc (kA)	Ir (A)
7.2	50	1250
		2000
		2500
		3150
		4000
		5000
12	50	1250
		2000
		2500
		3150
		4000
		5000
17.5	50	1250
		2000
		2500
		3150
		4000
		5000
24	25	1250
		2000
		3150
	31.5	1250
		2000
		3150
36	25	1250
		2000
		3150
	31.5	1250
		2000
		3150
40.5	25	1250
		2000
		3150
	31.5	1250
		2000
		3150



VCB Cradle type

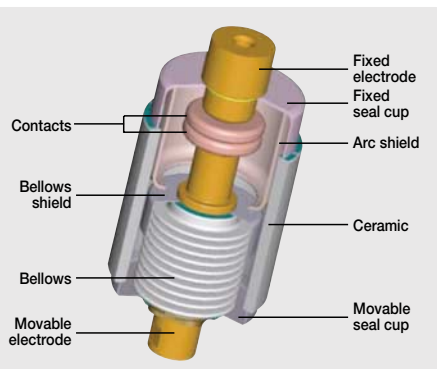
Main circuit structure with high reliability

Susol VCB



Breaker

- 1** Insulation rod
- 2** Lower terminal
- 3** Shunt
- 4** Vacuum interrupter
- 5** Upper terminal
- 6** Tulip contactor



Vacuum Interrupter, VI

The vacuum rate within the VI is very high (approximately 5×10^{-5} Torr) and the spacing between fixed contact and movable contact is about 6~20mm, depending on the voltage.

The contacts are in a structure that arc can easily be extinguished and the surfaces of

the contacts are made of special alloy (copper-chromium) and the interior is completely sealed to prevent loss of vacuum.

Therefore the wearing of the contacts can be minimized in the event of short-circuit and the arc energy by overvoltage or switching can be reduced effectively.

Convenience and Variety

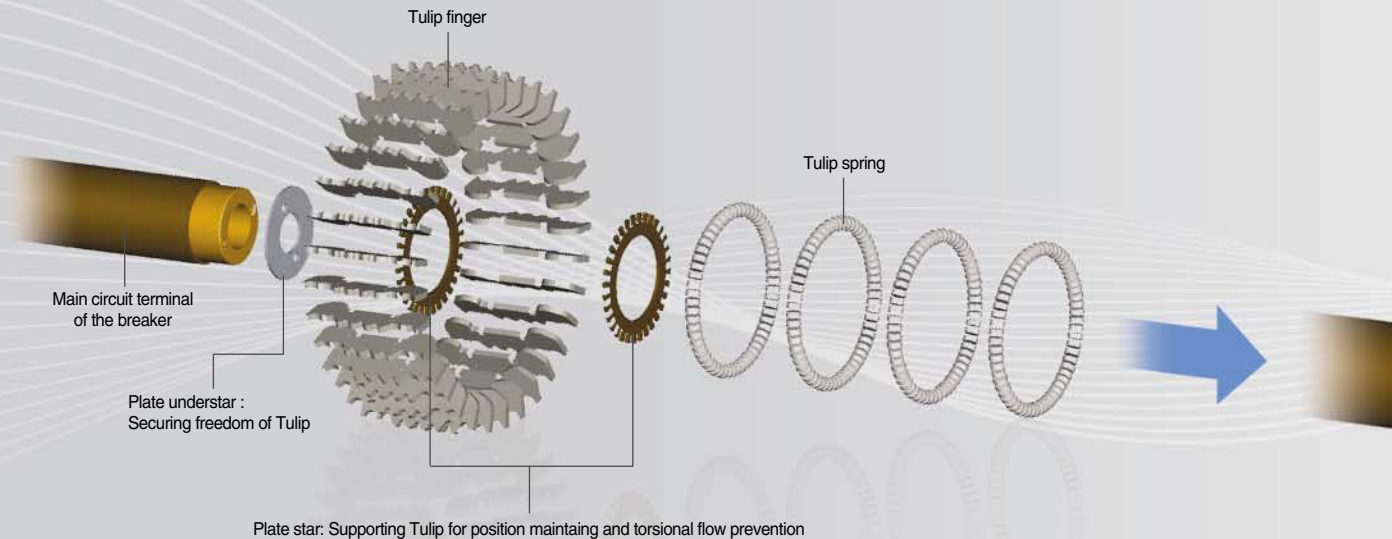
- Maximizing the durability and reliability of the main circuit contactors (Stego Tulip contactor)
- Strong structure for the temperature rise (Natural cooling system)



Stego Tulip

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)



Structure of Stego Tulip Terminal

- Maintaining the connection between breaker and cradle for the optimum current path through securing freedom of Tulip.
- Increasing the heat dissipation area of the contactors and minimizing aging.

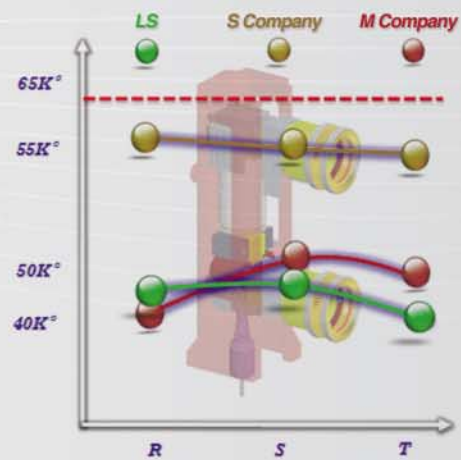
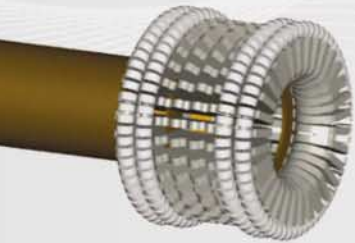


Major supply records

- S Electro-Mechanics, Busan plant: 12kV 40kA 4000A VCB
- P Combined cogeneration power plant: 7.2kV 50kA 4000A VCB
- K Petrochemical, Ulsan plant: 7.2kV 40kA 4000A VCB
- P Steel plant, Gwangyang: 7.2kV 50kA 4000A VCB
- P Steel plant, Pohang: 7.2kV 50kA 4000A VCB
- L Chem, Cheongju plant: 7.2kV 40kA 4000A VCB
- S Electronics, Tangjeong plant: 7.2kV 40kA 4000A VCB

6/12/17.5/24/36/40kV... (VH-06/12/17/24/36/40)

- Drawout / natural cooling system
- Improved temperature characteristics and ensured high reliability



VL type Tulip contactor



VH type Tulip contactor



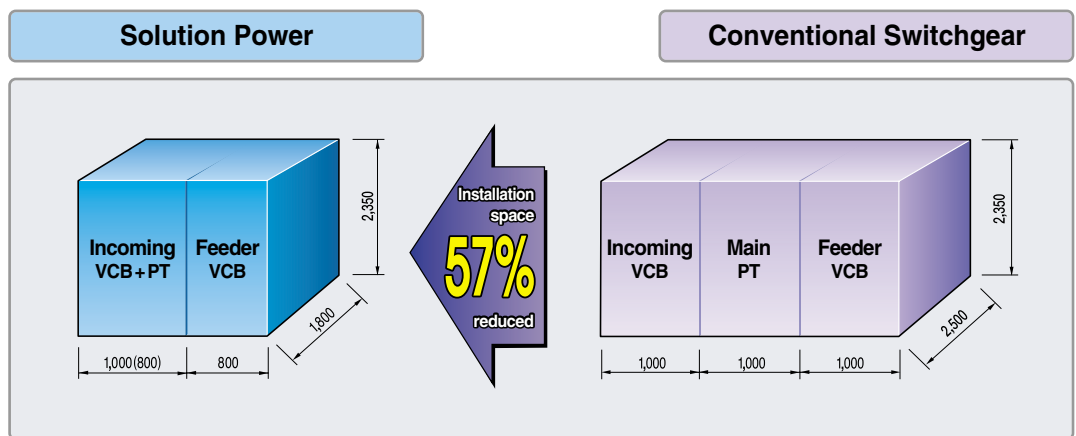
36kV Tulip contactor

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 57% reduction in installation space compared to conventional switchgear
- 20% reduction in the width of switchgear with rating upto 1250A
- Integration : Incoming VCB and main PT are installed in a panel (from 2 panels before)



Note) 1. For models up to 24kV 25kA 1,250A.
2. In order to apply above size CT, PT and VCB models stated in this catalog should be applied.

Safety considerations



This Solution Power switchgear provides the best protection rating out of Air Insulated Switchgear !!

Designed to remove explosion or damage to peripheral devices as possible in the event of internal arc happening .To prove its reliability and safety LSIS use the internationally recognized testing agency, KERI / KEMA / CESI for certification as well as LSIS' test lab PT&T that is a KOLAS-qualified (Korea Laboratory Accreditation Scheme) accredited testing laboratory and provides worldwide testing service.

- Metal clad type: each compartment is divided by metal partitions for the highest degree of protection rating out of Air Insulated Switchgears.
- Short-circuit, short-time current and internal arc tests passed at KERI / KEMA / CESI by IEC 62271-200.
- Various options including
 - Mechanical interlock to prevent from inadvertent operating
 - Mechanism enable the breaker to be drawn in or out without opening the door
 - Position padlock to lock the breaker at the present position.
- Solid structure with hinge and locker
- IP Cover on the face of the breaker and inspection window on the door
- Metal shutter and shutter padlock installed in CB compartment for safe maintenance
- Used reliable tube & boots for busbar insulation
- Insulation cap and padlock used for earthing switch to secure insulation and safety
- CT equipped with protective insulation wall
- Inhouse test equipment with 1,500 MVA capacity for performing reliability test

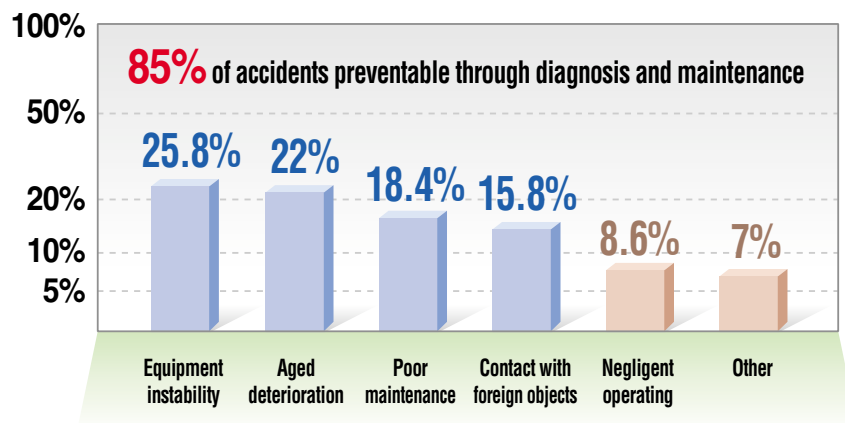
Convenient maintenance and inspection



Preventive maintenance is essential for all switchgears.

LSIS' One-Stop Total preventive maintenance activities cover continuous maintenance, inspection, remaining life expectancy and streamline. Solution Power Switchgear is structured for these convenient maintenance and inspection.

- Using recently developed Susol VCB for almost unnecessary maintenance and inspection .
- Low voltage compartment provides enough space to test and change the internal wiring easily, and the wiring duct at the top of it is made of steel material .
- Independent bus compartment structured not to affect any accident to adjacent panels .



Digital type switchgear capable of digital data link

Digital Protection & Monitoring Device, GIPAM developed by LSIS is adopt for establishing convenient and reliable power protection and monitoring system, and for Digital data link with remote monitoring and control system.



X GIPAM separate type
touch screen applied



X GIPAM



GIPAM-2000



GIPAM-2200

Ratings

7.2kV Metal Clad Switchgear Specification



Section		Contents		
Model		Solution Power S7 / V7		
Rated voltage (kV)		7.2		
Rated frequency (Hz)		50/60		
Rated power frequency withstand voltage (kV/1min)		20		
Rated lightning impulse withstand voltage (kV[1.2×5Q _{LS}])		60		
Rated short-time impulse withstand voltage (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	-
Rated current (A)		2000/1250/630	3150/2000/1250	4000
Size (mm)	Wide	600	650(850)	1050
	Height	2250	2150	2150
	Depth	1800	1900	2100
Certification		KERI	KERI	KERI
VCB Model		Susol	Pro-MEC	Susol
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 3150A rating.

12kV Metal Clad Switchgear Specification



Section		Contents				
Model		Solution Power S12 / V12				
Rated voltage (kV)		12				
Rated frequency (Hz)		50/60				
Rated power frequency withstand voltage (kV/1min)		28				
Rated lightning impulse withstand voltage (kV[1.2×5Q _{LS}])		75				
Rated short-time impulse withstand voltage (kA/s)		25/3	40/3	40/3	50/3	50/3
Degree of Protection		IP4X	IP4X	IP4X	IP4X	IP4X
Internal arc withstand current (kA/s)		25/1	40/1	-	50/0.5	-
Rated current (A)		2000/1250/ 630	3150/2500/ 1250	4000	2500/1250	4000
Size (mm)	Wide	600	650(850)	1050	850	1050
	Height	2250	2150	2150	2150	2150
	Depth	1800	1900	2100	1900	2100
Certification		KERI/KEMA	KERI/KEMA	KERI/CESI	KERI/CESI	KERI/KEMA
VCB Model		Susol	Pro-MEC	Susol	Pro-MEC	Susol
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 3150A rating.

17.5kV Metal Clad Switchgear Specification



Section		Contents	
Model		Solution Power S17 / V17	
Rated voltage (kV)		17.5	
Rated frequency (Hz)		50/60	
Rated power frequency withstand voltage (kV/1min)		38	
Rated lighting impulse withstand voltage (kV[1.2×50 μ s])		95	
Rated short-time impulse withstand voltage (kA/s)		25/3	40/3
Degree of Protection		IP4X	IP3X
Internal arc withstand current (kA/s)		25/1	40/0.1
Rated current (A)		2000/1250/630	3150/1250
Size (mm)	Wide	600	800(950)
	Height	2250	2150
	Depth	1800	1900
Certification		KERI/KEMA	KERI/KEMA
VCB Model		Susol	Pro-MEC
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 3150A rating.

24kV Metal Clad Switchgear Specification



Section		Contents	
Model		Solution Power V24	
Rated voltage (kV)		24	
Rated frequency (Hz)		50/60	
Rated power frequency withstand voltage (kV/1min)		50	
Rated lighting impulse withstand voltage (kV[1.2×50 μ s])		125	
Rated short-time impulse withstand voltage (kA/s)		25/3	
Degree of Protection		IP4X	
Internal arc withstand current (kA/s)		25/1	
Rated current (A)		2000	1250/630
Size (mm)	Wide	1000	800
	Height	2250 (2650 *)	
	Depth	1800	
Certification		KERI	
VCB Model		Pro-MEC	
Standard		IEC 62271-200	

Note) *: Arc Duct

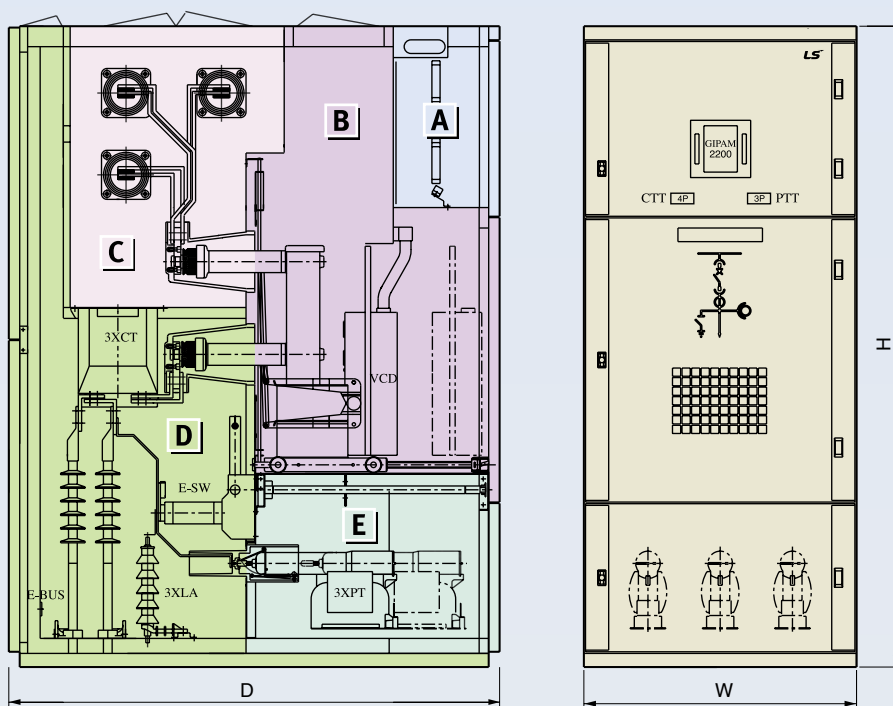
36kV Metal Clad Switchgear Specification



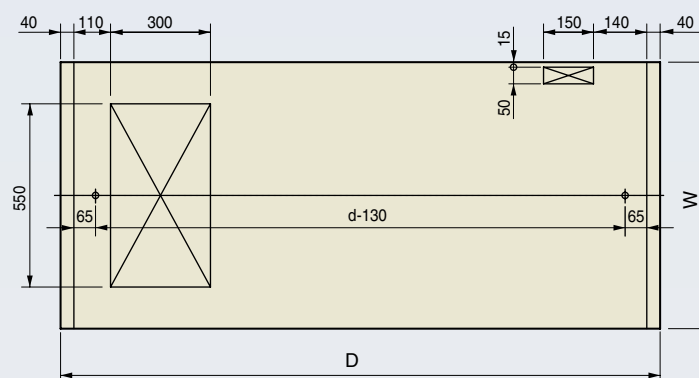
Section		Contents	
Model		Solution Power S36	
Rated voltage (kV)		36	
Rated frequency (Hz)		50/60	
Rated power frequency withstand voltage (kV/1min)		70	
Rated lighting impulse withstand voltage (kV[1.2×50 μ s])		170	
Rated short-time impulse withstand voltage (kA/s)		25, 31.5, 40/3	
Degree of Protection		IP4X	
Internal arc withstand current (kA/s)		40/1	
Rated current (A)		3150, 2000, 1250	
Size (mm)	Wide	1200	
	Height	2250 (2650 *)	
	Depth	2600	
Certification		KERI/KEMA	
VCB Model		Susol	
Standard		IEC 62271-200	

Note) *: Arc Duct

Structures and dimensions



- A** Low voltage compartment **B** C.B. compartment **C** BusBar compartment
D Cable compartment **E** V.T. compartment



Base detail



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)

Accessories and apparatuses

Optional accessories for C.B. Compartment

Connector for Auxiliary circuits

When the C.B. is service position, jack terminal can not be removed.

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.



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.



Emergency trip device

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

Inspection window

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

VCB Position Padlock

The hole prevent the draw-in and out of a VCB from the present position('RUN' or 'Test').

Vacuum circuit breaker

LS Susol VCB is user-friendly to give more convenience and safety by providing high speed interrupting time (3cycles), adopting the rapid auto reclosing method, and having wide range of accessories.

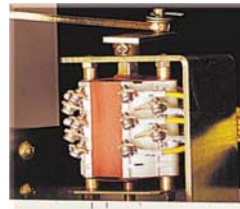


CB Compartment Option



Mechanically Operated Cell switch (MOC)

Auxiliary switch, which is mechanically operated in 'Run' position, indicates 'ON' or 'OFF' condition of the breaker.



Earthing Switch Position Switch

The auxiliary switch (5a5b) to indicate 'ON' or 'OFF' of the earthing switch.



Truck Operated Cell Switch (TOC)

The auxiliary switch (3a4b), which is operated when the breaker comes to 'Run' position.



Earthing Locking Coil

To prevent the accident through carelessness earthing switch operation, the earthing switch can be changed to 'ON' position after releasing the lock by energizing the coils.

Code Plate (Miss insertion prevention)

To prevent the insertion of a breaker to a cradle If their ratings do not match.

Accessories and apparatuses

Current Transformer

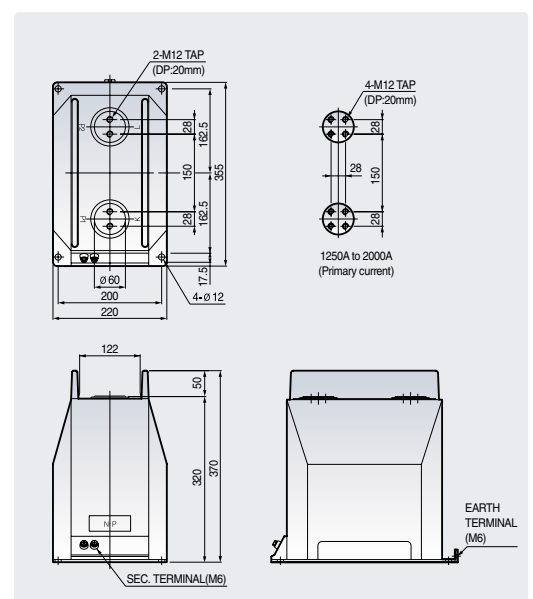
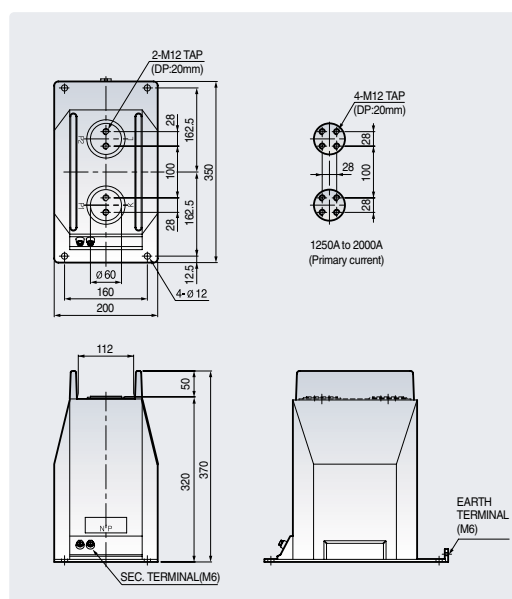
In Door Insulator Type Current Transformer DCI-204A(W)

- Max system voltage 7.2KV to 25.8KV
- The primary and secondary coil are wound on high permeability directional core with short magnetic path. The assembly of primary, secondary and ground is entirely encapsulated with silica-filled epoxy resin.
- This ensures superior electrical characteristics and mechanical strength



Type	DCI-204A(W)DIC-205A(W)	TPU 60.23
Maker	Dongwoo	ABB
Rated Voltage (kV)	24	
Rated Primary Current (A)	20 to 2,000	
Rated Secondary Current (A)	1,5	
Rated Output (VA)	40	
Rated Insulation	Power Frequency (kV/1min)	50
Level	Impulse (kV/1.2×50 μ s)	125
Rated Short Time Current (kA)	25	

Contact us for other specification.



Voltage Transformer

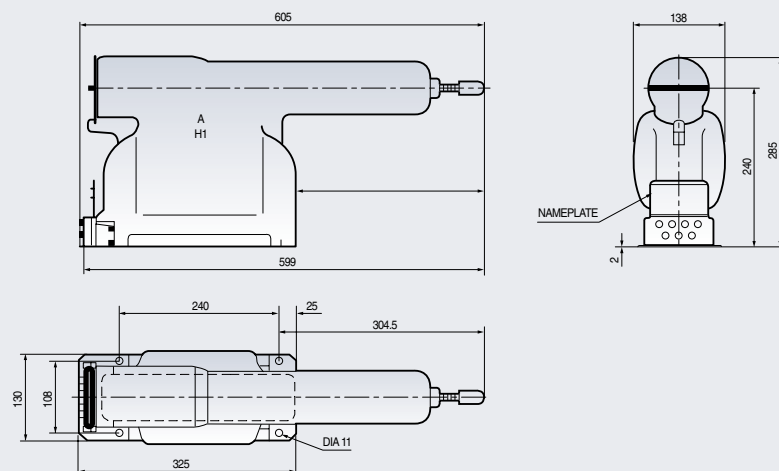
In Door Type Voltage Transformer

- Compact and concentrated fuse holder of Y24F can be easily applied to the VTS compartment
- Mounting type
- Compact and epoxy molded for superior insulation and maintenance free

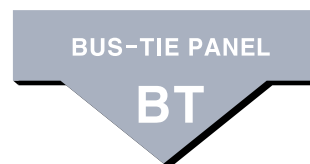
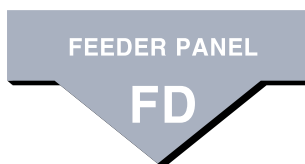


Type	Y24F/a14 (Equipped with a fuse)	
Maker	SADTEM (France)	
Rated Voltage (kV)	24	
Rated Voltage Ratio (V)	$22,900/\sqrt{3} / 190/\sqrt{3}$ or $110/\sqrt{3}$	
Rated Output (VA)	100	
Rated Insulation	Power Frequency (kV/1min)	50
Level	Impulse (kV/1.2×50 μ s)	125
Rated Voltage Factor	1.9×8h	

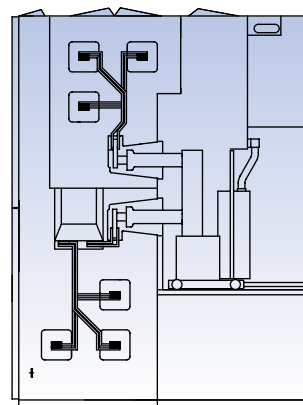
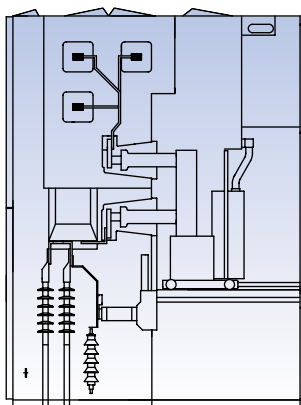
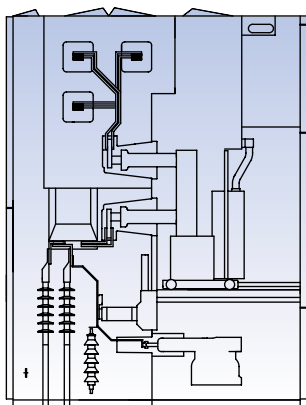
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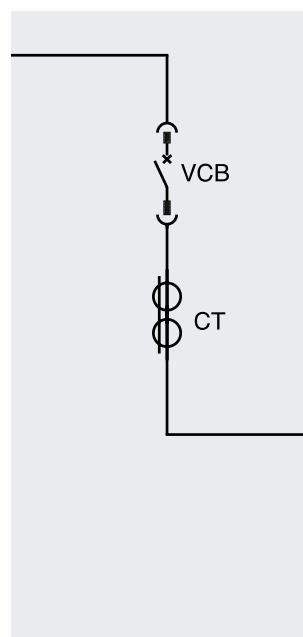
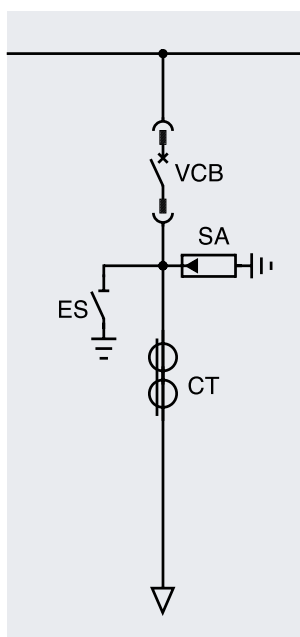
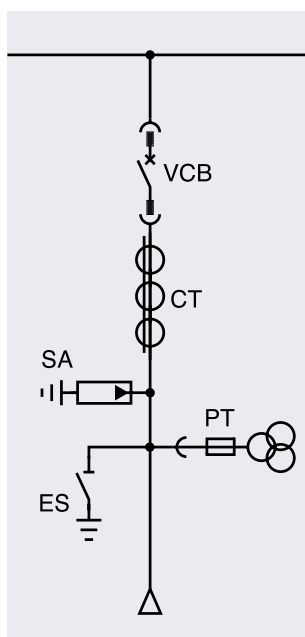
Arrangement (for general application)



Section view



Diagram



Note) Panels except Incoming panel and Feeder panel to be applied those of a general switchgear.

BUS-RISER PANEL

BR

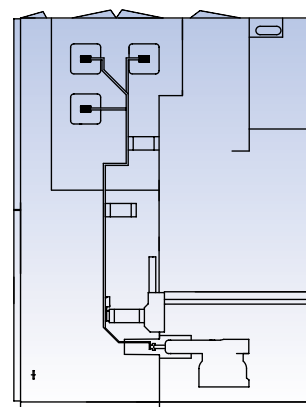
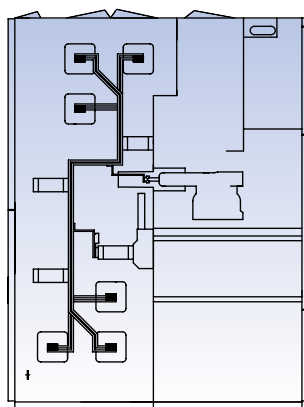
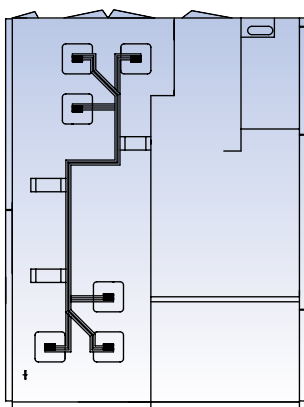
BUS-RISER PANEL
(Withdrawable VT)

RP

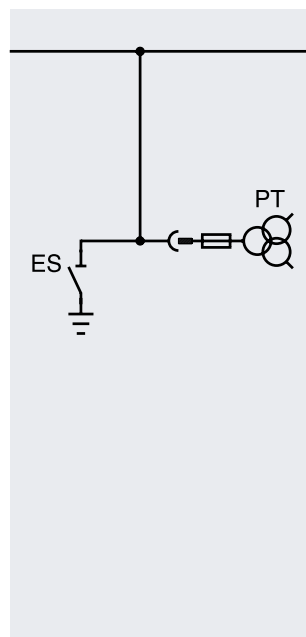
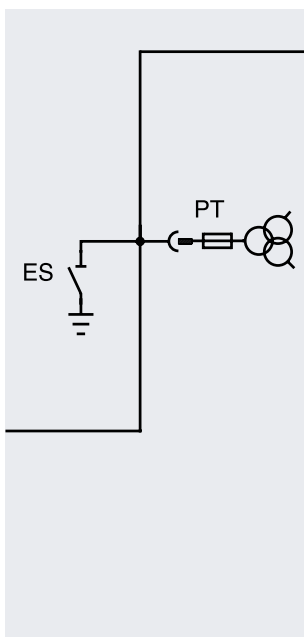
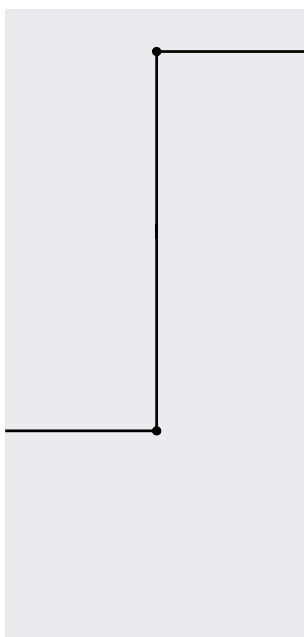
BUS-PT PANEL

BP

Section view



Diagram



Green Innovators of Innovation



Safety Instructions

- For your safety, please read user's manual thoroughly before operating.
- Contact the nearest authorized service facility for examination, repair, or adjustment.
- Please contact a qualified service technician when you need maintenance.
Do not disassemble or repair by yourself!
- Any maintenance and inspection shall be performed by the personnel having expertise concerned.

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Specifications in this catalog are subject to change without notice due to continuous product development and improvement.