





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.







# **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

## 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.



## Full line – up & Compact

Full line-up new VCB models to the high interrupting capacity and large current ( $\sim$  50kA,  $\sim$  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 & accessaries, 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

### 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 & accessaries, 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)	
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

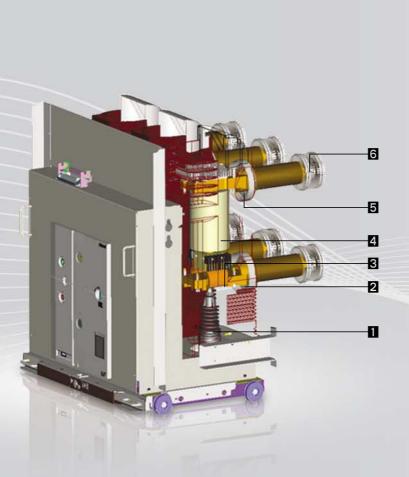


7.2   50   1250   2500   2500   3150   2500   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150   3150	(KV)	(KA)	
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3150			
			3150





VCB Cradle type



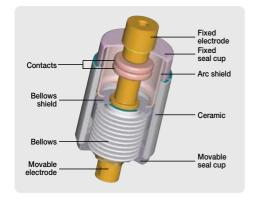
## Main circuit structure with high reliability

# Susol

#### **Breaker**

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





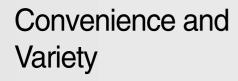
#### Vacuum Interrupter, VI

The vacuum rate within the VI is very high (approximately 5x10<sup>-5</sup> Torr) and the spacing between fixed contact and movable contact is about 6~20mm, depending on the

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

the contacts are made of special alloy (copperchromium) 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.



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





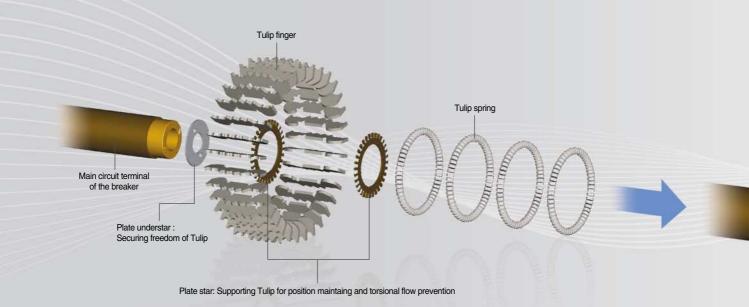




# **Stego Tulip**

#### 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

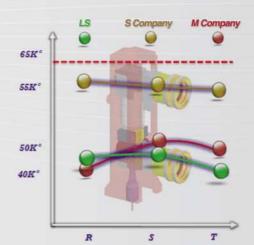
## 6/12/17.5/24/36/40kV...

(VH-06/12/17/24/36/40)

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









VH type Tulip contactor

VL type 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.

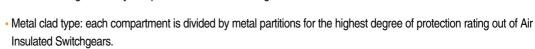
- Up to 57% reduction in installation space compared to conventional switchgear
- 20% reduction in the width of switchgear with rating upto 1250A
- Integration: Incoming VCB and main PT are installed in a panel (from 2 panels before)

#### **Solution Power** Conventional Switchgear 3320 2,350 Incoming Feeder Incoming Main Feeder VCB+PT **VCB VCB** VCB 1.000 (800) 800 1.000 1.000 1,000

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.



- 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







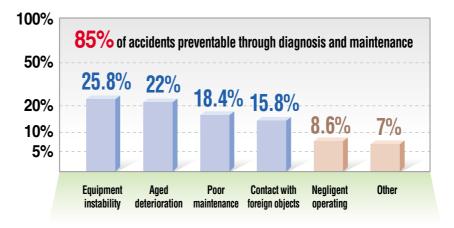




Preventive maintenance is essential for all switchgears.

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 .



X GIPAM separate type touch screen applied

## 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.







GIPAM-2200

## **Ratings**





Section		Contents		
Model		Solution Power S7 / V7		
Rated voltage (k	V)		7.2	
Rated frequency	(Hz)		50/60	
Rated power free (kV/1min)	quency withstand voltage	20		
Rated lighting impulse withstand voltage (kV[1.2×50μs])			60	
Rated short-time impulse withstand voltage (kA/s)		25/3	40/3	50/3
Degree of Protection		IP4X	IP4X	IP4X
Internal arc withs	stand 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 (H	z)	50/60				
Rated power freque (kV/1min)	ncy withstand voltage	28				
Rated lighting impul (kV[1.2×5Q/s])	se withstand voltage		75			
Rated short-time im	Rated short-time impulse withstand voltage (kA/s)		40/3	40/3	50/3	50/3
Degree of Protection	Degree of Protection		IP4X	IP4X	IP4X	IP4X
Internal arc withstand current (kA/s)		25/1	40/1	-	50/0.5	-
Rated current (A)	Rated current (A)		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.





Section		Contents		
Model		Solution Power S17 / V17		
Rated voltage (k	(V)	17	.5	
Rated frequency	/ (Hz)	50/	60	
Rated power fre	quency withstand voltage (kV/1min)	38	3	
Rated lighting in	npulse withstand voltage (kV[1.2×5Q <sub>LS</sub> ])	99	5	
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	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	7)	2	24	
Rated frequency (	Hz)	50	/60	
Rated power frequ	uency withstand voltage (kV/1min)	5	50	
Rated lighting imp	oulse withstand voltage (kV[1.2×50µs])	1:	25	
Rated short-time i	mpulse withstand voltage (kA/s)	25/3		
Degree of Protect	ion	IP4X		
Internal arc withst	and 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

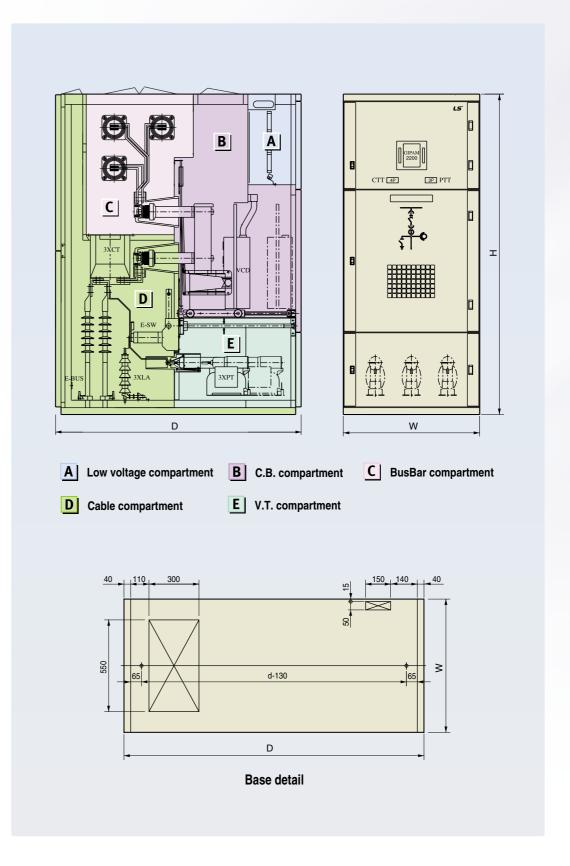


	Section	Contents	
Model		Solution Power S36	
Rated voltage (kV)		36	
Rated frequency (I	Hz)	50/60	
Rated power frequ	ency withstand voltage (kV/1min)	70	
Rated lighting impo	ulse withstand voltage (kV[1.2×50us])	170	
Rated short-time impulse withstand voltage (kA/s)		25, 31.5, 40/3	
Degree of Protection		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







## **Accessories and apparatuses**

#### Optional accessories for C.B. Compartment



### 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.



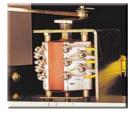


#### **CB** Compartment Option



**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**



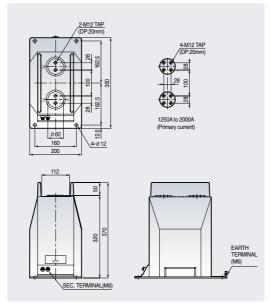
## **Current Transformer**

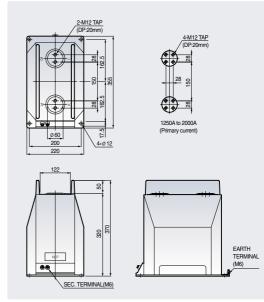
#### In Door Insulator Type Current Transformer DCI-204A(W)

- Max system voltage 7.2KV to 25.8KV
- The primary and secondary coil are wounded 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

Туре		DCI-204A(W)DIC-205A(W)	TPU 60.23
Maker		Dongwoo	ABB
Rated Voltage (kV)		2	4
Rated Primary Current (A)		20 to 2,000	
Rated Secondary Current (A)		1,5	
Rated Output (VA)		40	
Rated Insulation	Rated Insulation Power Frequency (kV/1min) 50		0
Level	Impulse (kV/1.2×50µs)	125	
Rated Short Time C	Current (kA)	25	

Contact us for other specification.







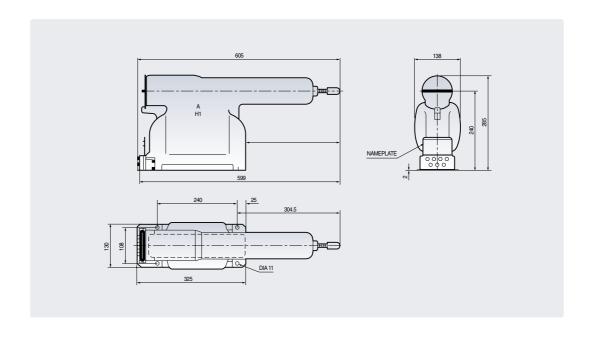
## **Voltage Transformer**

#### **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 Maker		Y24F/a14 (Equipped with a fuse) 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/1.2×5Q <sub>JS</sub> )		125	
Rated Voltage Factor		1.9×8h	

Contact us for other specification.



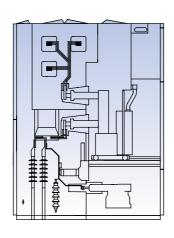
## **Arrangement** (for general application)

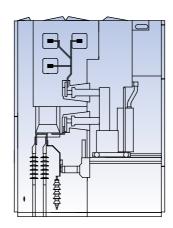


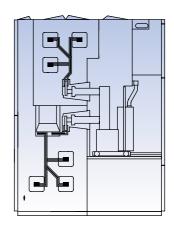




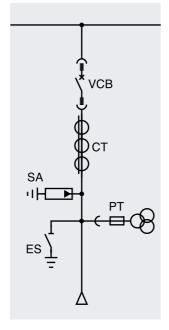
## **Section view**

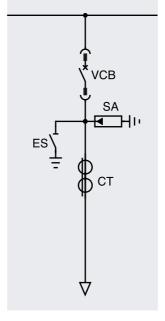


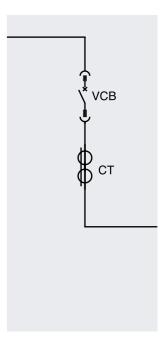




## Diagram







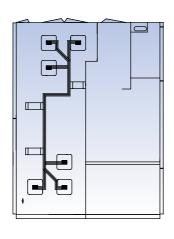
Note) Panels except Incoming panel and Feeder panel to be applied those of a general switchgear.

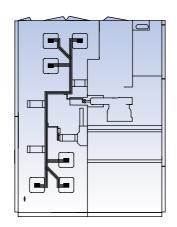


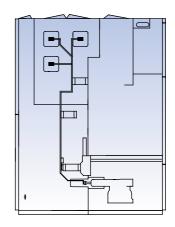




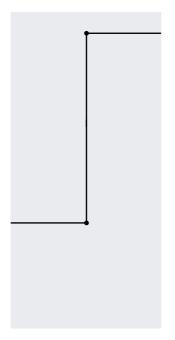
## **Section view**

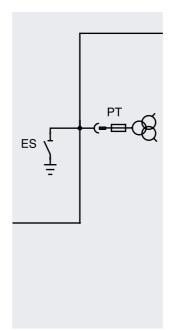


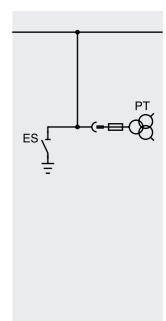




## Diagram







#### Green Innovators of Innovation



- 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

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