



Up to 24kV

# Modular type Air insulated switchgear



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## Contents

• Features .....	03	• A variety of accessories for SM VCB .....	11
• General characteristics .....	04	• Types and ordering information .....	12
• Units for function .....	05	• Dimensions - SM VCB .....	13
• Units for dimensions .....	06	• SM(Side Mount) LBS .....	19
• Configuration .....	09	• A variety of option for Modular type Air insulated switchgear .....	21
• Ratings - SM VCB .....	10		



**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.**



### Reliability

- Type testing is complete for all models according to latest standard, IEC62271-200
- Internal arc proofed 16 kA – 1 Sec
- Earthing of both the whole switchboard structure and the metal division between the compartments
- Mechanical interlocks which assure the exact operation sequence
- Protection Classes: PI (insulating partition)
- Loss of service continuity classes: LSC2A (LSC1 for metering functions)
- IP3X protection degree on the external housing
- High voltage indication system in each cubicle



### Optimize

- Reduced dimensions and weights
- Less space requirement for switchboard installation
- Easy integration in factory-built outdoor substations
- A solution adapted to cable connection
- Modular units containing fixed and withdrawable metal-enclosed switchgear, using vacuum



### Simplicity

- Simplified switchboard busbar design
- Mimic diagram front of the switchboard by means of simple and functional devices



### Applications

- Secondary electricity distribution networks
- MV/LV Distribution Transformer Substations
- Manufacturing industry
- Shopping malls
- Airports, hospitals, holiday village
- Small size power plants
- Wind Power plants

# General characteristics

## Electrical characteristics

Rated voltage	Ur	12	17.5	24
Rated frequency	fr Hz	50/60		
<b>Insulation level</b>				
Insulation	Ud 1 min (kV r ms)	28	38	50
Isolation	Ud 1 min (kV r ms)	32	45	60
Insulation	Ud 1.2/50 $\mu$ s (kV peak)	75	95	125
Isolation	Ud 1.2/50 $\mu$ s (kV peak)	85	110	145
<b>Breaking capacity</b>				
Transformer off load	A	16		
Cables off load	A	31.5		
Rated current	Ir A	630		
Short-time withstand current	Ik/tk 25kA/1 s	630		
	21kA/3 s	630		
	16kA/3 s	630		
Making capacity (50 Hz)	Ima 54.6 kA	630	N/A	
	50 kA	630		
	40 kA	630		
Internal arc classification	IAC kA/1 s	16 (AFL)		

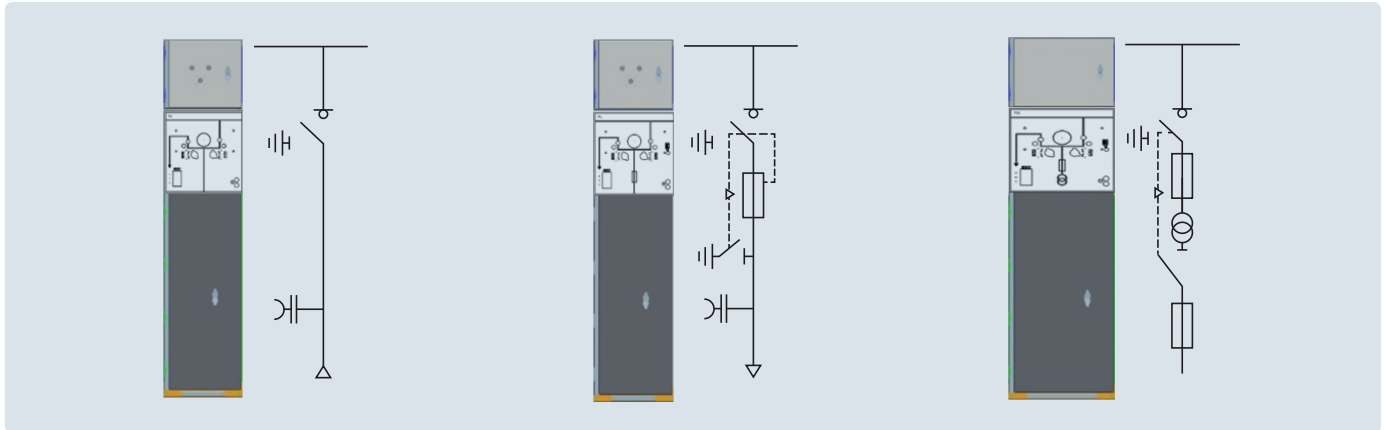
## IEC standards

IEC 62271-1	High-voltage switchgear and controlgear Part 1: Common specifications
IEC 62271-100	High-voltage switchgear and controlgear Part 100: Alternating-current circuit-breakers
IEC 62271-102	High-voltage switchgear and controlgear Part 102: Alternating current disconnectors and earthing switches
IEC 62271-103	High-voltage switchgear and controlgear Part 103: Switches for rated voltages above 1 kV up to and including 52 kV
IEC 62271-105	High-voltage switchgear and controlgear Part 105: Alternating current switch-fuse combinations
IEC 62271-200	High-voltage switchgear and controlgear Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV

## Normal operating conditions

Ambient air pollution	no significant pollution by dust, smoke, corrosive and/or flammable gases, vapours or salt.
Ambient air temperature	less than or equal to 40°C less than or equal to 35°C on average over 24 hours greater or equal to -5°C
Altitude	less than or equal to 1000 m
Humidity	average relative humidity over a 24 hour period, less than or equal to 95% (average relative humidity over a 1 month period, less than or equal to 90%)

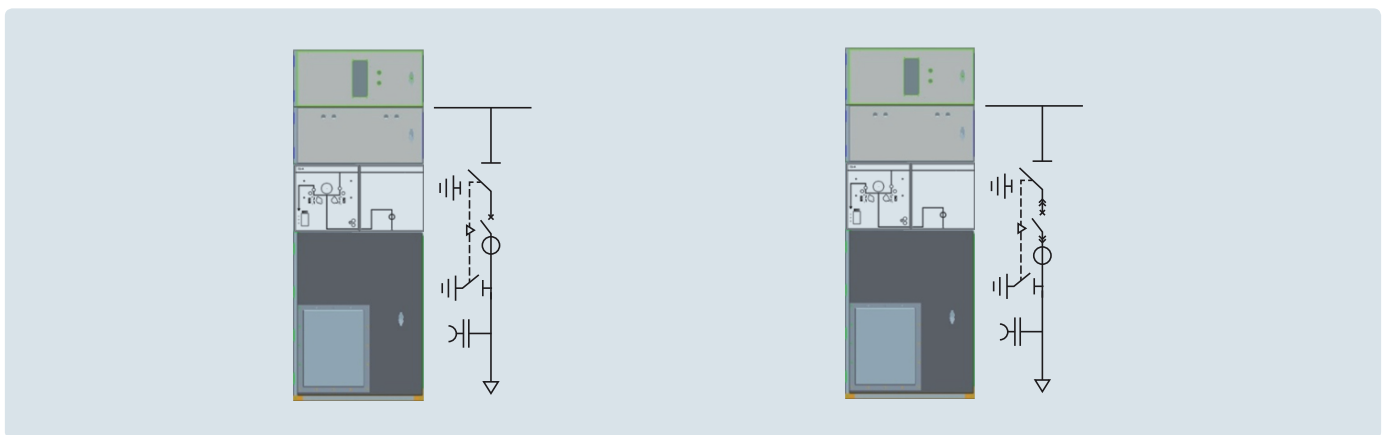
# Units for function



**LU**  
Switch unit

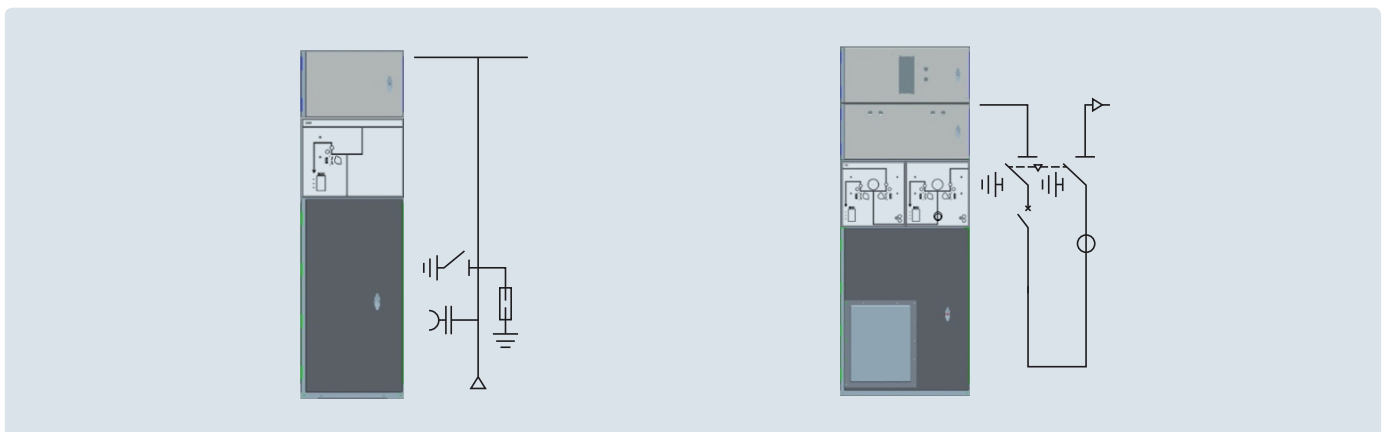
**FU**  
Fuse-switch combination unit

**PU**  
Voltage transformers for mains with earthed neutral system



**CU-A**  
Single-isolation, disconnectable  
circuit breaker unit

**CU-W**  
Withdrawable single-isolation  
circuit breaker unit

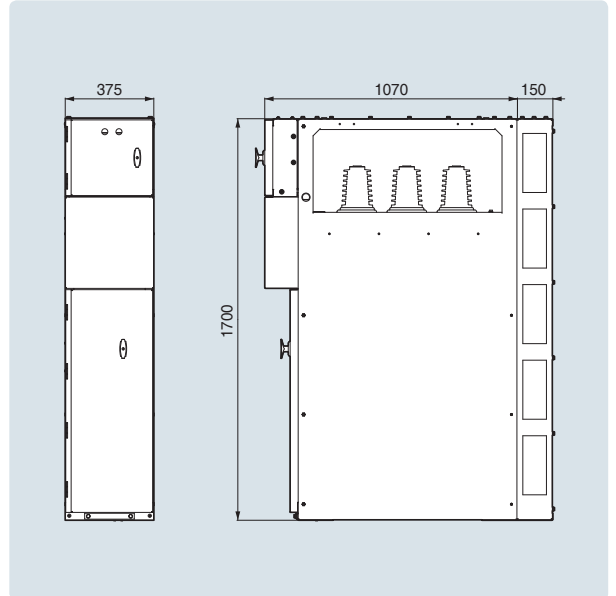


**GAU**  
Incoming cable-connection unit  
with earthing

**SU**  
Double-isolation, disconnectable  
circuit breaker unit right or left outgoing line

# Units for dimensions

## LU – Load Break Switch



- W×H×D(mm) :  
375×1700×1070
- Load Break Switch

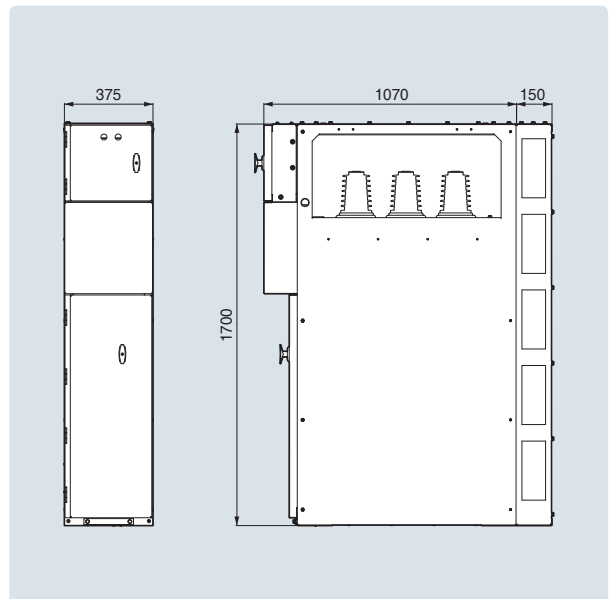
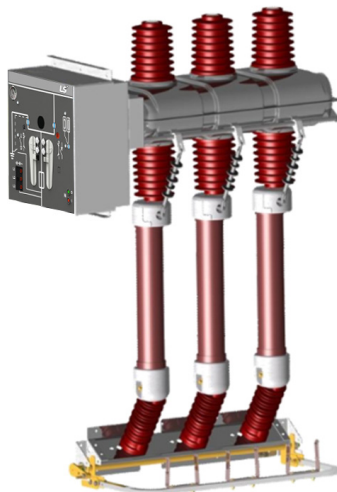
### BASE UNIT

- 3-position Load Break Switch rated 630A and less for load breaking and earthing
- Key Interlock

### OPTIONAL COMPONENTS

- Motor operation for load break switch
- Voltage Detector
- Gas gauge

## FU – Switch fuse combination



- W×H×D(mm) :  
375×1700×1070
- Switch Fuse Combination
- Power Fuse
- External E/S

### BASE UNIT

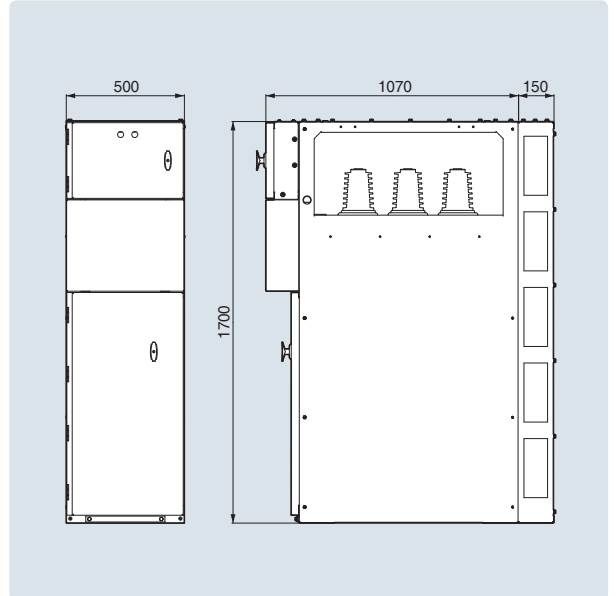
- 3-position switch-fuse combination with earthing switch
- Key Interlock key lock
- Power Fuse : 63A (SIBA社)

### OPTIONAL COMPONENTS

- Motor operation for switch-fuse combination
- Voltage Detector
- Gas gauge



## PU – Power Transformer



- W×H×D(mm) :  
500×1700×1070
- Switch Fuse Combination
- Power Fuse
- Power Transformer

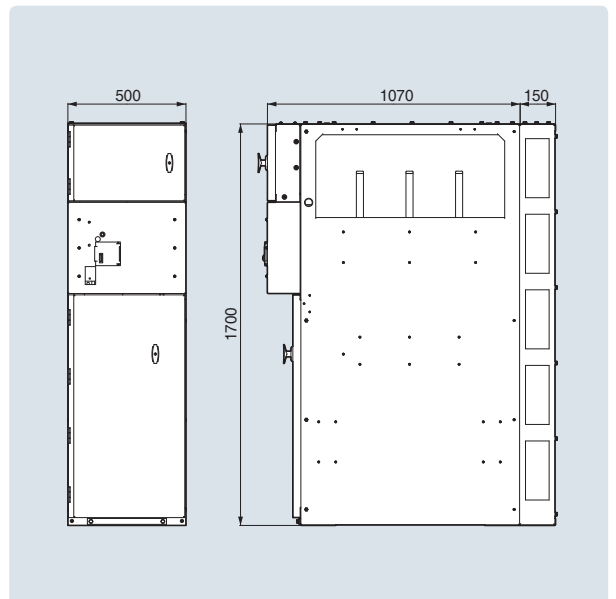
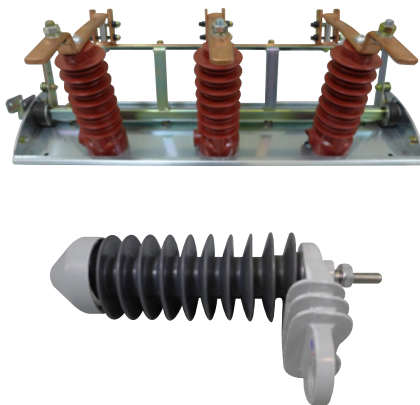
### BASE UNIT

- 3-position Load Break Switch rated 630A and less for load breaking and earthing
- Key Interlock
- Power Fuse : 1A (SIBA社)

### OPTIONAL COMPONENTS

- Motor operation for load break switch
- Voltage Detector
- Gas gauge
- Power Transformer

## GAU – Riser



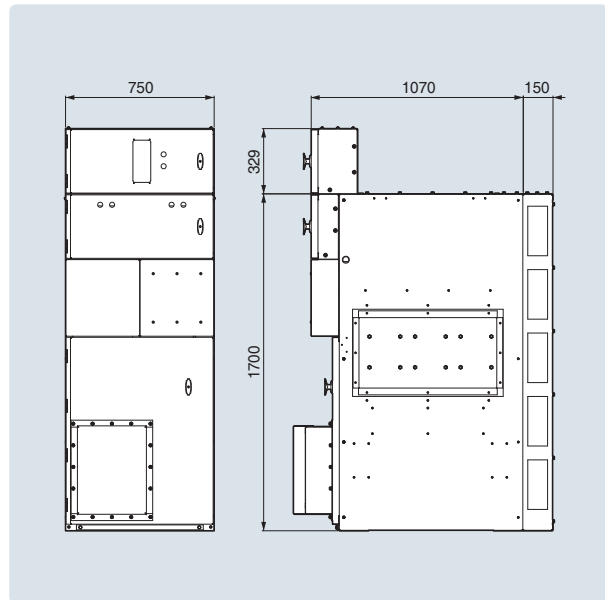
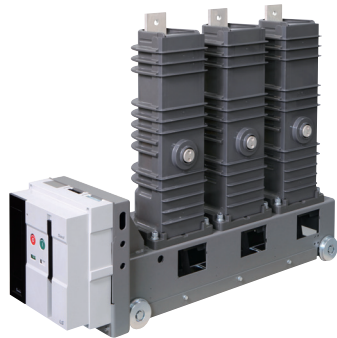
- W×H×D(mm) :  
500×1700×1070
- External E/S
- Lightning Arrester

### OPTIONAL COMPONENTS

- Voltage Detector

# Units for dimensions

## CU-A/CU-W – Vacuum Circuit Breaker



- W×H×D(mm) :  
750×1700×1070
- Load Break Switch
- Vacuum Circuit Breaker
- Current Transformer
- External E/S

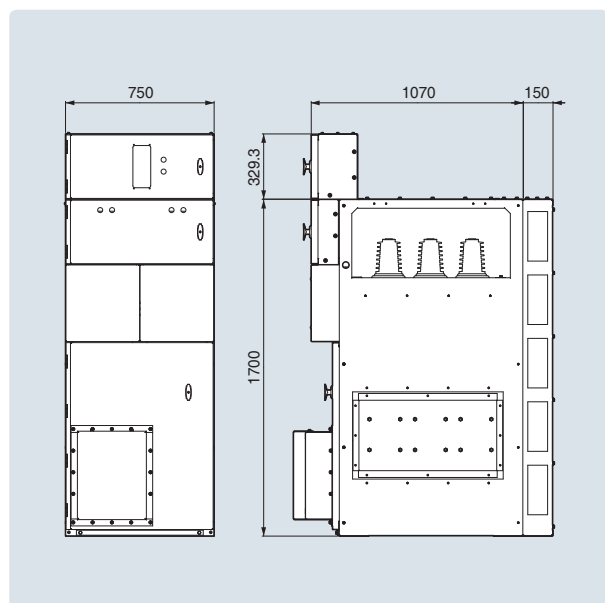
### BASE UNIT

- 3cycle Circuit Breaker
- SM-VCB Auxiliary contacts : 4a4b
- 3-position Load Break Switch rated 630A and less for load breaking and earthing
- Key Interlock

### OPTIONAL COMPONENTS

- Motor operation for load break switch
- Voltage Detector
- Gas gauge
- Current Transformer

## SU – Section



- W×H×D(mm) :  
750×1700×1070
- Load Break Switch
- Vacuum Circuit Breaker
- Current Transformer
- External E/S

### BASE UNIT

- 3cycle Circuit Breaker
- SM-VCB Auxiliary contacts : 4a4b
- 3-position Load Break Switch rated 630A and less for load breaking and earthing
- Key Interlock

### OPTIONAL COMPONENTS

- Motor operation for load break switch
- Voltage Detector
- Gas gauge
- Relay
- Current Transformer



# Configuration

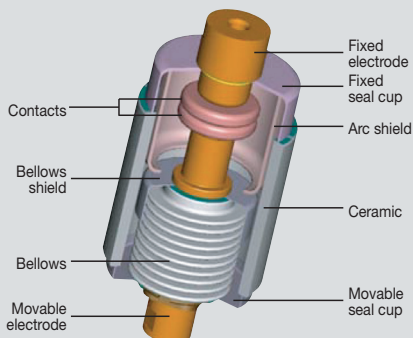
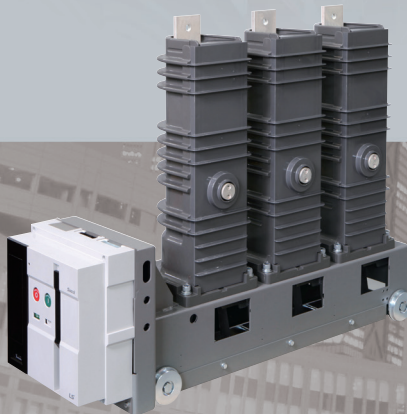
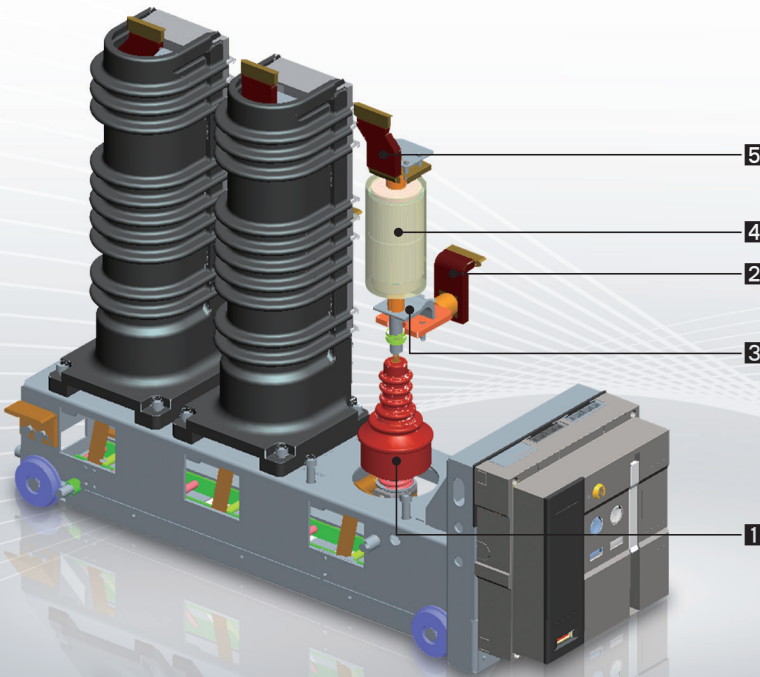
## Main circuit structure with high reliability

SM(Side Mount)

# VCB

### Breaker

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



### Vacuum Interrupter, VI

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

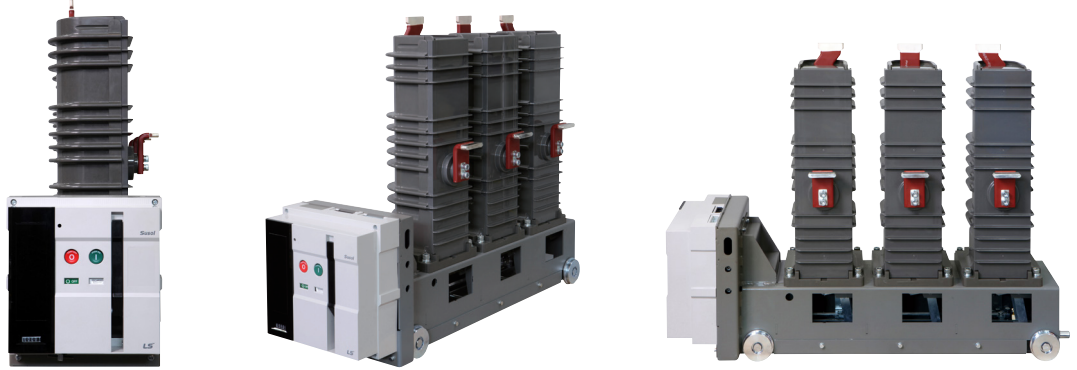
The contacts are in a structure that arc can easily be extinguished and the surfaces of

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.

# Ratings - SM VCB

## SM VCB

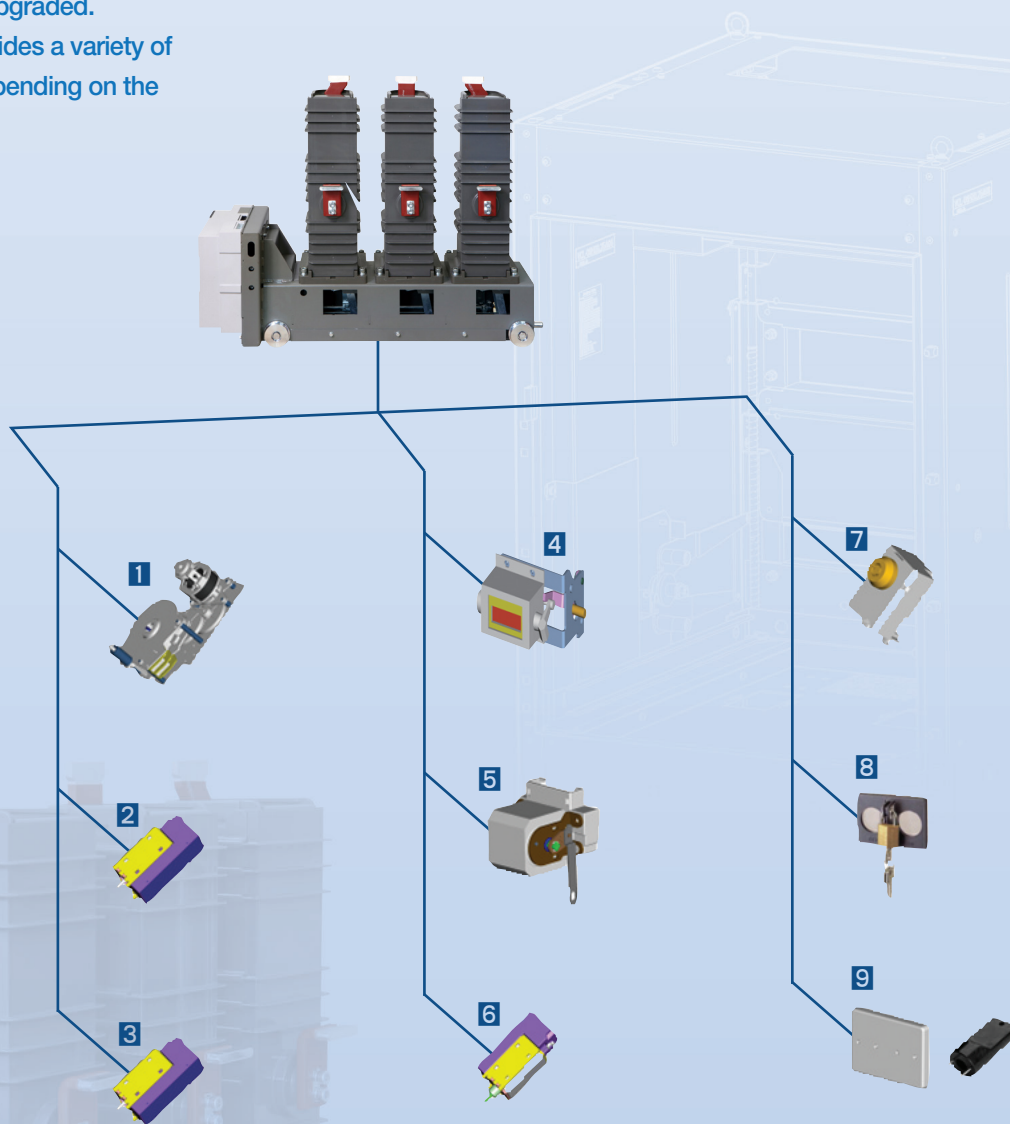


Insulation level		SVL-06□20,25□06,13	SVL-12□16,20,25□06,13	SVL-17□16,20,25□06,13	SVL-20□16,20,25□06,13	SVL-25□16,20,25□06,13					
Rated voltage	Ur (kV)	7.2		12		17.5		24		25.8	
Rated normal current	Ir (A)	630	1250	630	1250	630	1250	630	1250	630	1250
Phase distance	(mm)	210(Fixed Type Only), 230									
Weight (Fixed type)	(kg)	80									
Weight (Withdrawable type)	(kg)	85									
Rated frequency	fr (Hz)	50/60									
Rated short-circuit current	Isc (kA)	20, 25		16, 20, 25							
Rated short-circuit breaking capacity	(MVA)	249, 312		333, 415, 520		485, 606, 758		665, 831, 1039		715, 894, 1117	
Rated short-time withstand current	Ik/tk(kA)	16/3(4*), 20/3(4*), 25/3(4*)									
Rated short-circuit making current	Ip (kA)	2.5 Isc(50Hz)/2.6 Isc(60Hz)									
Rated breaking time	(cycle)	3									
Rated withstand voltage	Power frequency	Ud (kV)	20	28	38	50	60				
	Impulse	-	60	75	95	125	125				
Rated operating sequence		O-0.3s-CO-15s-CO									
Control voltage	Closing coil	(V)	DC 24~30V, DC 48~60V, DC110V, DC125V, DC220V, AC 48V, AC100~130V, AC220~250V								
	Trip coil	(V)	DC 24~30V, DC 48~60V, DC110V, DC125V, DC220V, AC 48V, AC100~130V, AC220~250V								
Auxiliary contacts		4a4b									
Rated opening time	(s)	≤ 0.04									
No-load closing time	(s)	≤ 0.07									
Type test class	Mechanical		M2								
	Electrical		E2 (List3)								
	Capacitive current switching		C2								
Type	Fixed type		R/L type								
	Withdrawable type		S/T type								
Standards		IEC 62271-100									

Note ) \* Please contact us

## A variety of accessories for SM VCB

If accessories are attached to the breaker, the function of the breaker is upgraded. Susol VCB provides a variety of accessories depending on the purpose.



### Breaker

- |                      |                  |
|----------------------|------------------|
| 1 Motor              | 6 UVT coil       |
| 2 Closing coil       | 7 Keylock        |
| 3 Trip coil          | 8 Button padlock |
| 4 Counter            | 9 Button cover   |
| 5 Auxiliary contacts |                  |



# Types and ordering information

## SM VCB

### Breaker

<b>SVL</b>	<b>06</b>	<b>R</b>	<b>20</b>	<b>H</b>	<b>06</b>
<b>Basic model name</b>	<b>Rated voltage (kV)</b>	<b>Version</b>	<b>Interrupting current (kA)</b>	<b>Phase distance/Compatibility</b>	<b>Rated current (A)</b>
SVL SM VCB	06 7.2 12 12 17 17.5 20 24 25 25.8	R Fixed type Right L Fixed type Left S Withdrawable type Right T Withdrawable type Left	16 16 20 20 25 25	B 210mm H 230mm * 210mm Fixed Type Only	06 630A 13 1250A
			* 7.2kV Model 20, 25kA Only		

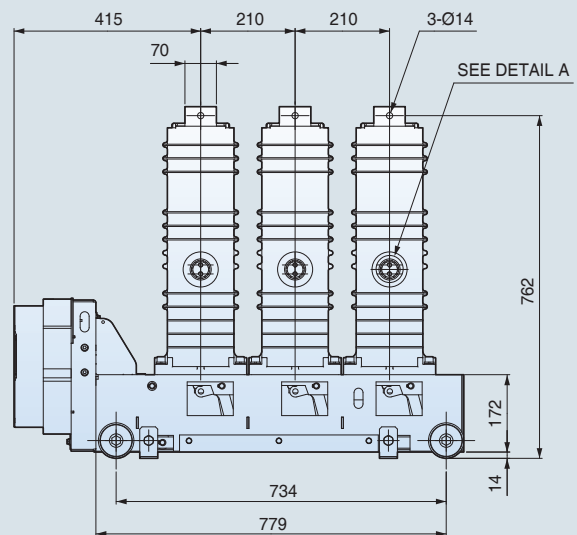
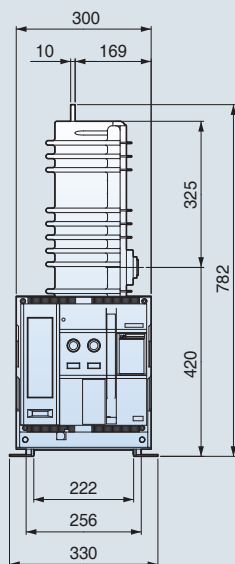
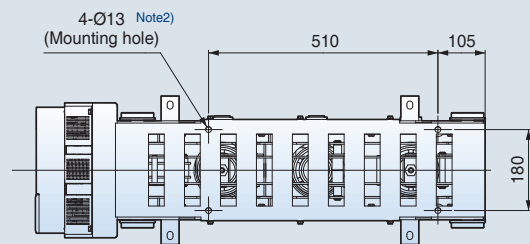
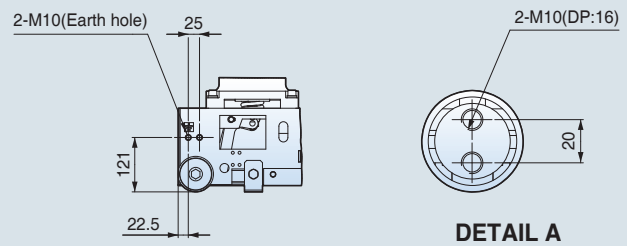
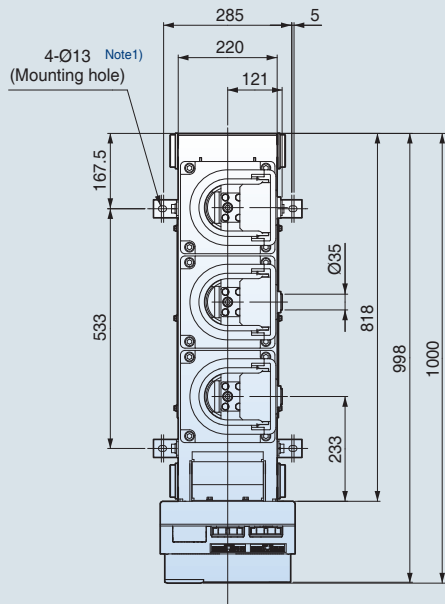
<b>SVL-06R20H06</b>	<b>M1</b>	<b>C1</b>	<b>T1</b>	<b>SB2</b>	<b>U1</b>	<b>A</b>	<b>1 2 3...</b>
	<b>Motor control voltage</b>		<b>Trip coil voltage</b>		<b>UVT</b>		
	M0 - M1 DC 110V M2 DC 220V M3 DC 125V M4 DC 24V~30V M5 DC 48V~60V M6 AC 48V M7 AC 100V~130V M8 AC 200V~250V		T0 - T1 DC 110V T2 DC 220V T3 DC 125V T4 DC 24V~30V T5 DC 48V~60V T6 AC 48V T7 AC 100V~130V T8 AC 200V~250V		U0 - U1 DC 110V U2 DC 220V U3 DC 125V U4 DC 24V~30V U5 DC 48V~60V U6 AC 48V U7 AC 100V~130V U8 AC 200V~250V		
		<b>Closing coil voltage</b>		<b>Connector and wire</b>		<b>Other accessories</b>	
		C0 - C1 DC 110V C2 DC 220V C3 DC 125V C4 DC 24V~30V C5 DC 48V~60V C6 AC 48V C7 AC 100V~130V C8 AC 200V~250V		SA2 Standard A type connector, 4a4b SB6 Flame retardant A type connector, 4a4b		A1 Secondary Trip coil A2 Secondary Trip Coil with TCS Contact A3 A4 A5 A6 A7 Keylock A8 Button Padlock A9 Button Cover AA Lead Wire AB User Plug(Part)	

- Note)
1. If A1(Secondary trip coil), A7(Keylock), A8(Button Padlock) are selected, A148 is the type name in the ordering.
  2. A1(Secondary trip coil), U1~U8(UVT) can not be selected simultaneously.
  3. A8 (Button Padlock) and A9 (Button Cover) can not be selected simultaneously.
  4. If A1(Sencondary Trip Coil with TCS Contact) are selected, Auxiliary contacts is max 4a3b

# Dimensions - SM VCB

24kV, 25kA, 1250A

Fixed (Right type, phase distance 210mm)



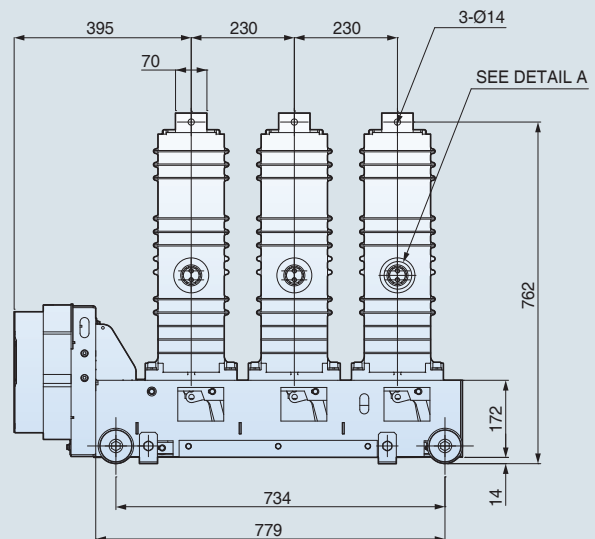
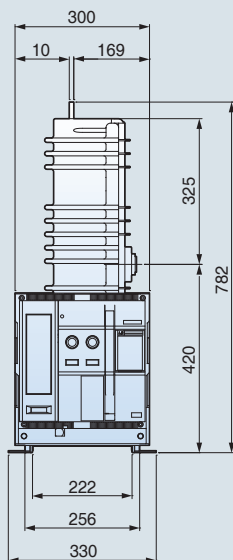
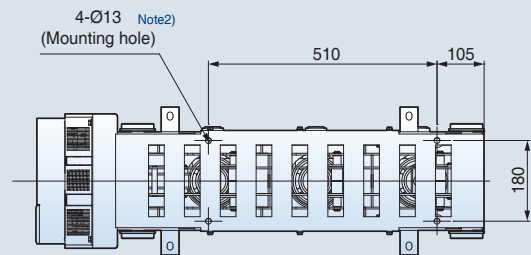
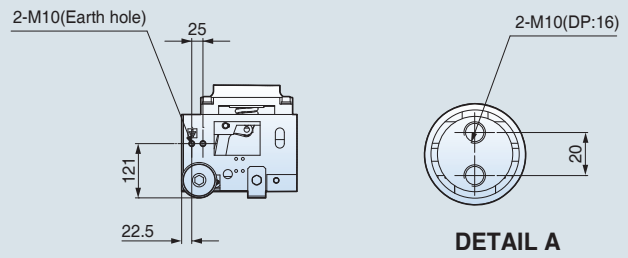
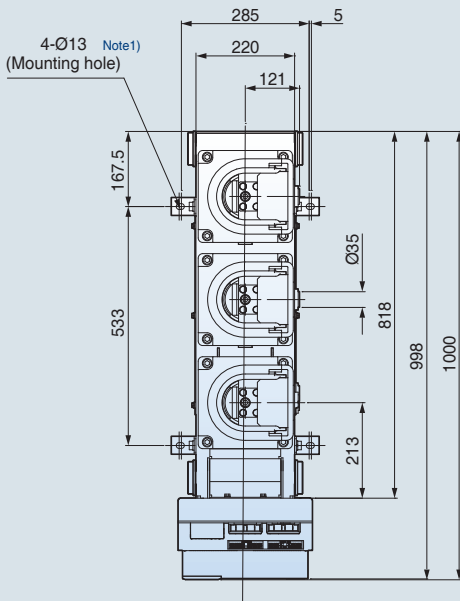
Note)

1. Mounting Hole 01 for Compact AIS Panel
2. Mounting Hole 02 for using SM VCB only
3. If using Mounting Hole 02, four brackets attached to the frame for Mounting Hole 01 can be removed.

# Dimensions - SM VCB

24kV, 25kA, 1250A

Fixed (Right type, phase distance 230mm)

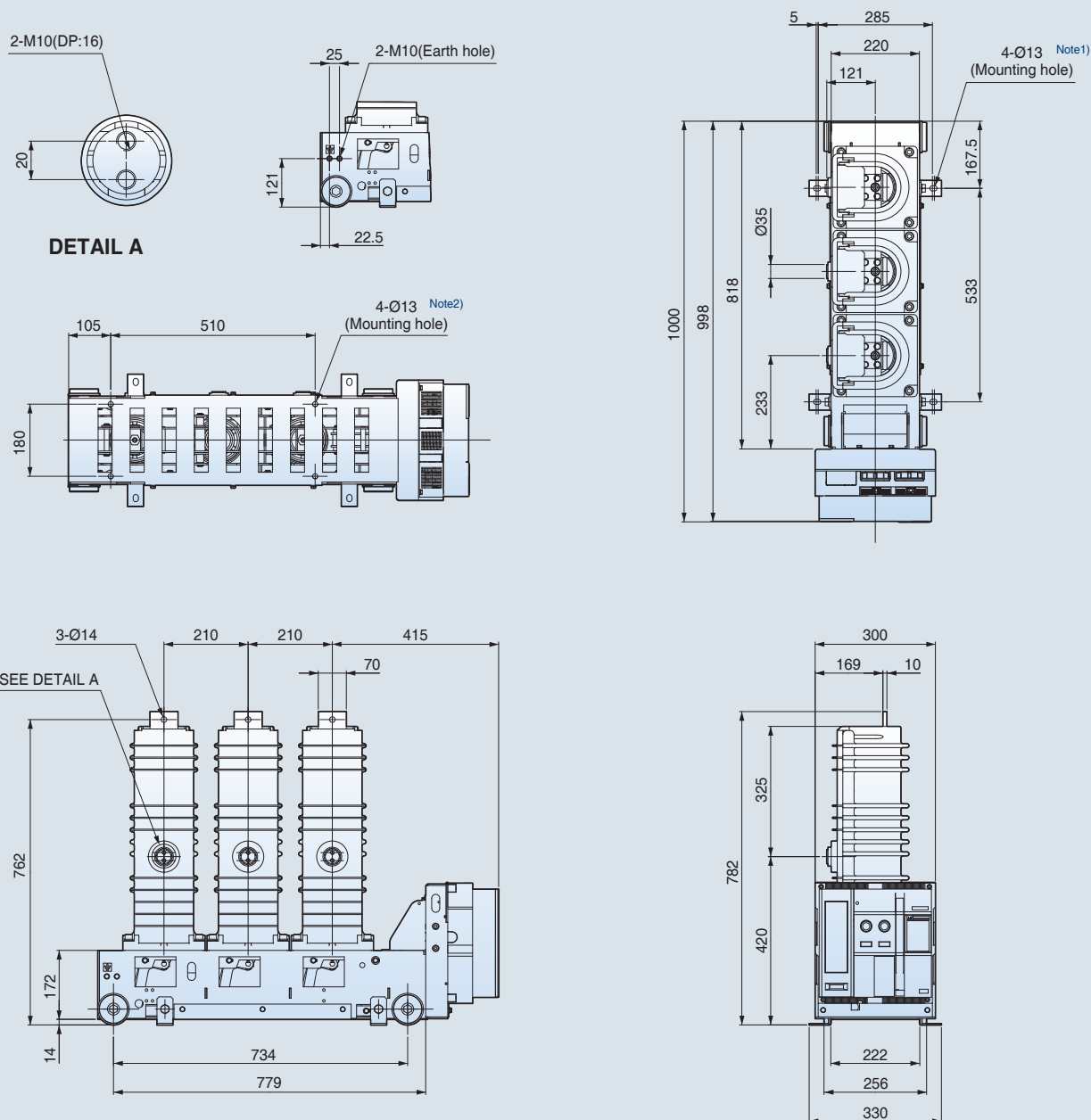


Note)

1. Mounting Hole 01 for Compact AIS Panel
2. Mounting Hole 02 for using SM VCB only
3. If using Mounting Hole 02, four brackets attached to the frame for Mounting Hole 01 can be removed.



## 24kV, 25kA, 1250A Fixed (Left type, phase distance 210mm)



Note)

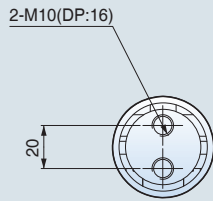
1. Mounting Hole 01 for Compact AIS Panel

2. Mounting Hole 02 for using SM VCB only

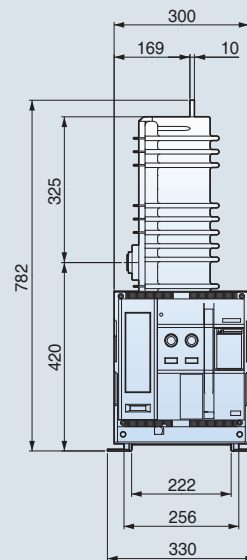
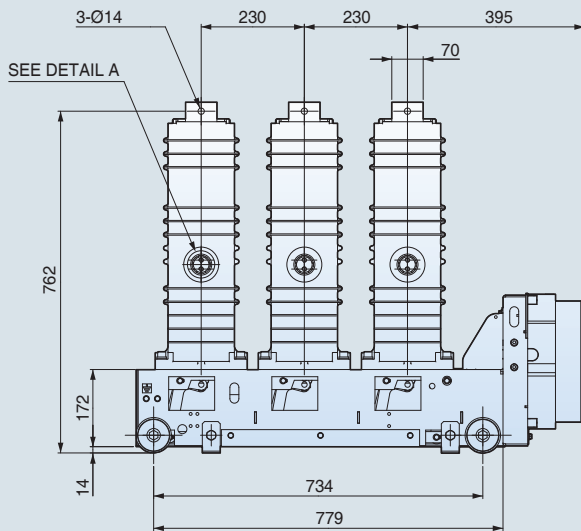
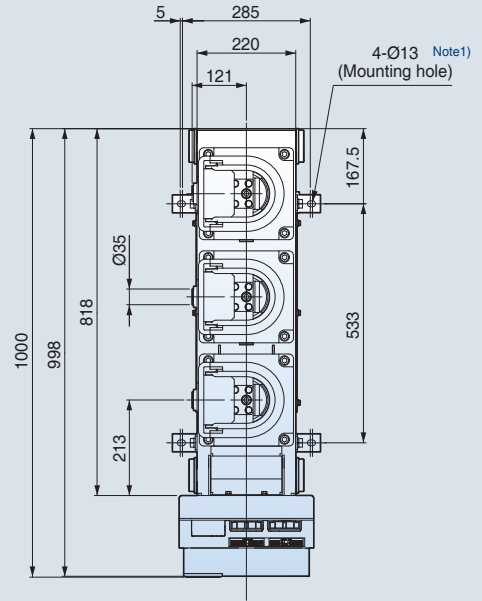
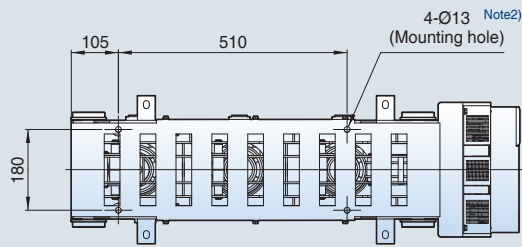
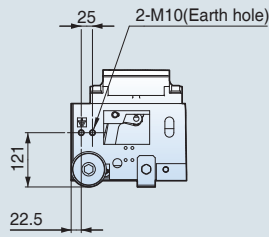
3. If using Mounting Hole 02, four brackets attached to the frame for Mounting Hole 01 can be removed.

# Dimensions - SM VCB

24kV, 25kA, 1250A  
Fixed (Left type, phase distance 230mm)

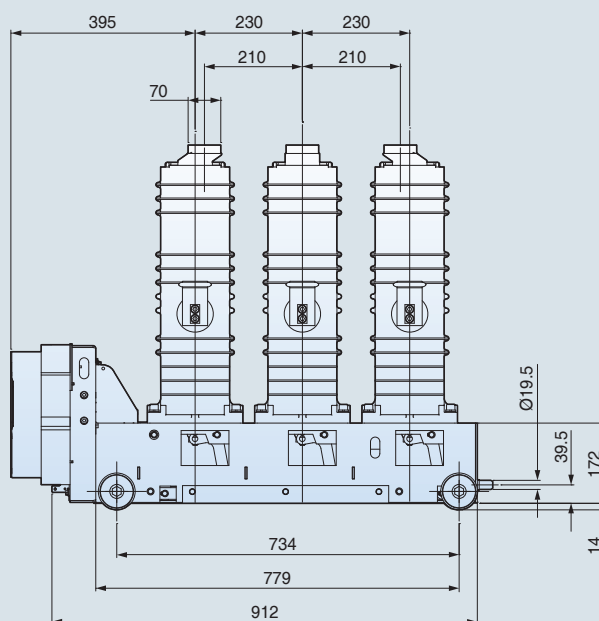
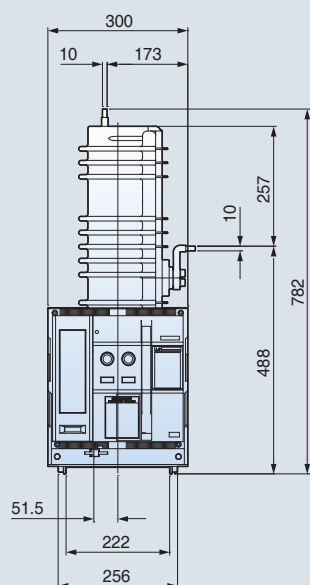
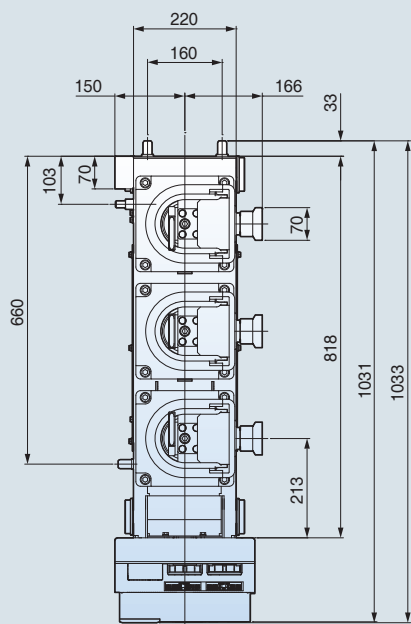


DETAIL A



- Note)
1. Mounting Hole 01 for Compact AIS Panel
  2. Mounting Hole 02 for using SM VCB only
  3. If using Mounting Hole 02, four brackets attached to the frame for Mounting Hole 01 can be removed.

**24kV, 25kA, 1250A**  
**Withdrawable (Right type, phase distance 230mm)**

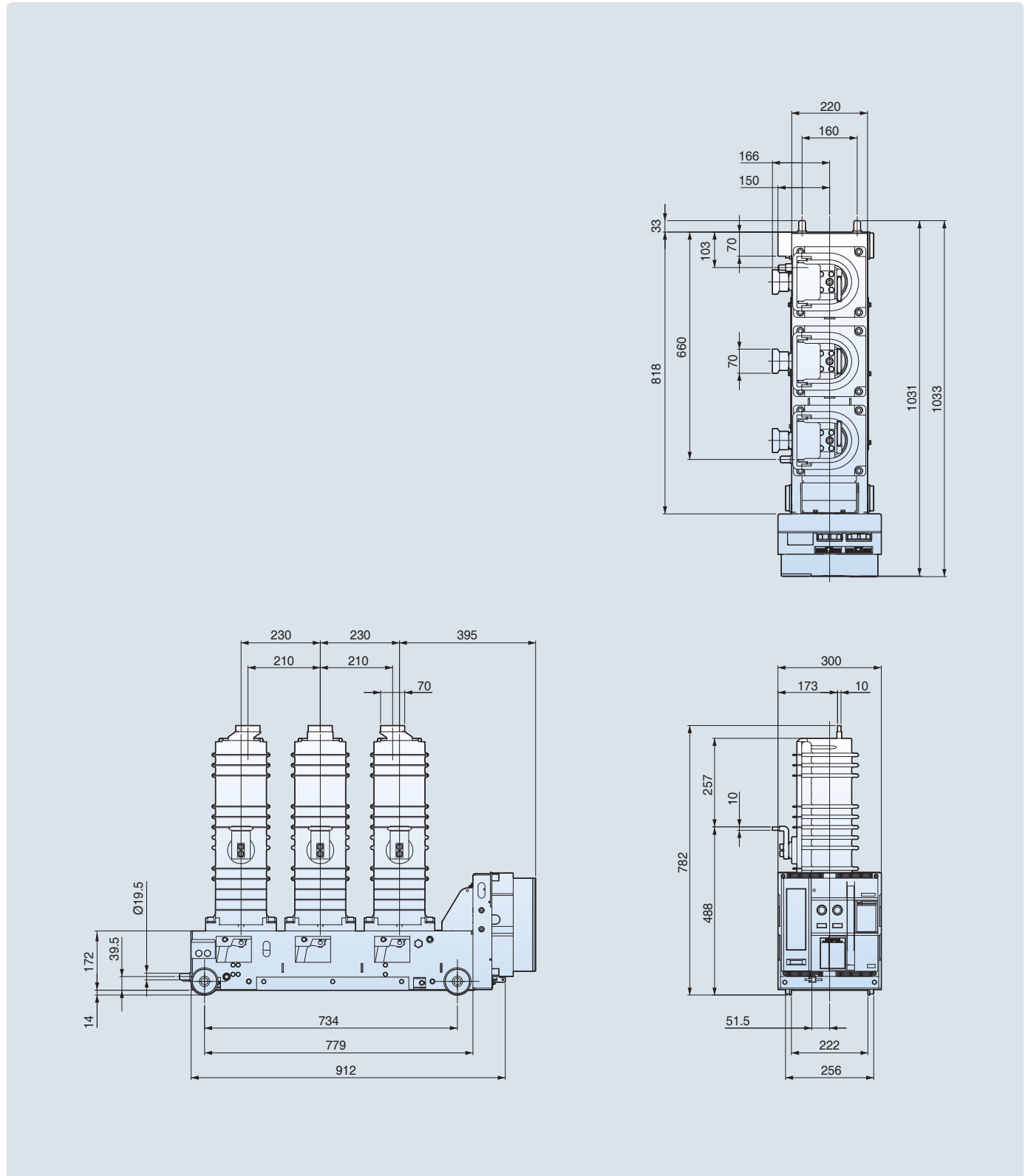




# Dimensions - SM VCB

24kV, 25kA, 1250A

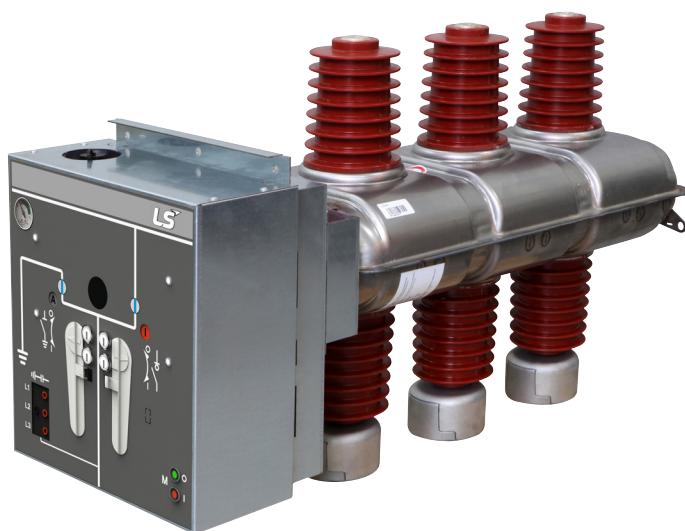
Withdrawable (Left type, phase distance 230mm)



# SM(Side Mount) LBS

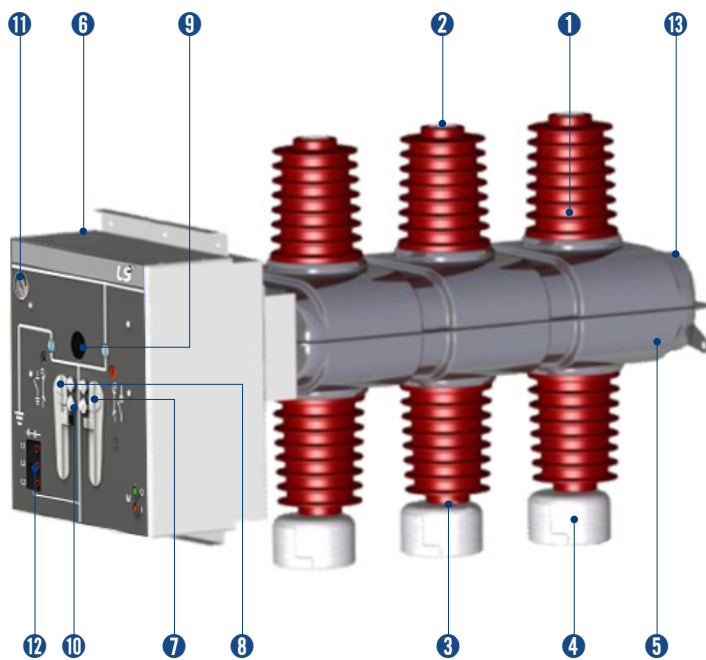
## SD6/L

INTERRUTTORE DI MANOVRA-SEZIONATORE  
SWITCH-DISCONNECTOR



### CHARACTERISTICS OF COMPONENTS

SF6 disconnecting unit is equipped with switch disconnector and earthing switch fitted with separated and interlocked operating mechanism.

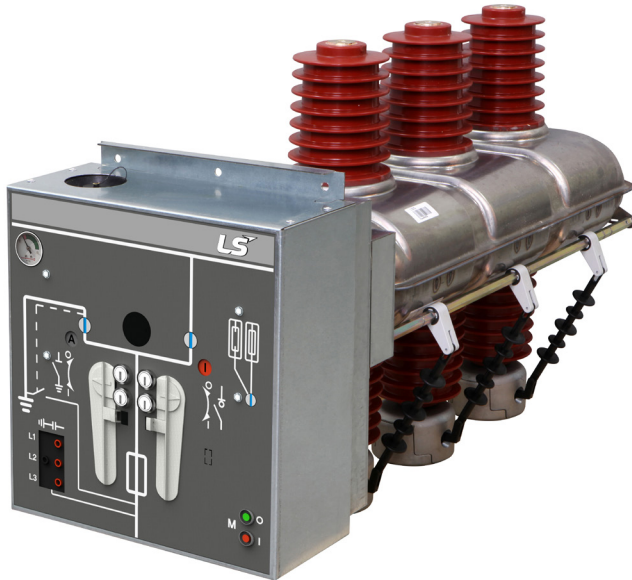


- 1 Insulator
- 2 Upper terminal
- 3 Lower Terminal
- 4 Electrical field adapter only for 24kV
- 5 Stainless steel body
- 6 Operating Mechanisms box
- 7 Switch-disconnector operating seat
- 8 Earthing-switch operating seat
- 9 Inspection window
- 10 Key interlock
- 11 Manometer
- 12 Voltage signalling lamp
- 13 Safety valve

# SM(Side Mount) LBS

## SD6/F

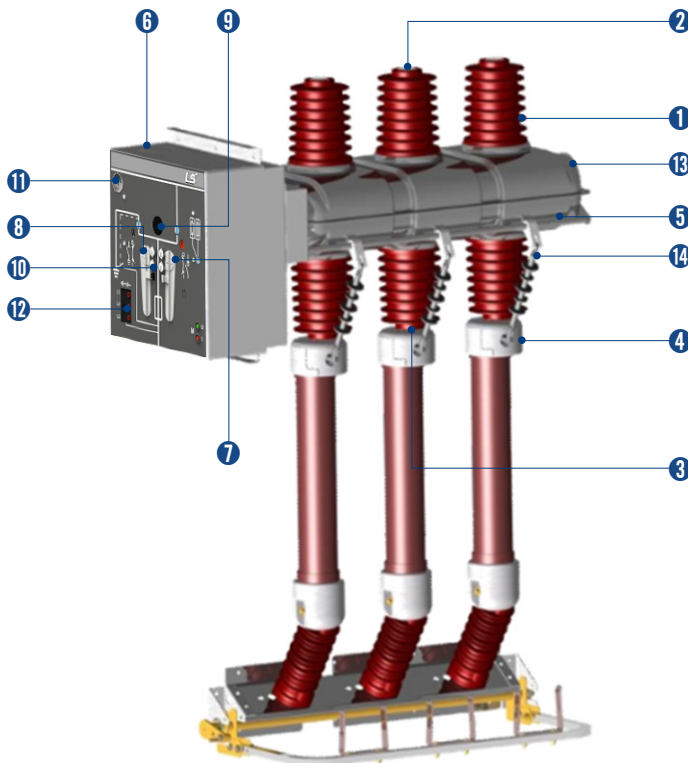
INTERRUTTORE DI MANOVRA-SEZIONATORE CON FUSIBILI  
SWITCH-DISCONNECTOR EQUIPPED WITH FUSES



## CHARACTERISTICS OF COMPONENTS

Structurally, SD6/F is similar to SD6/L switch disconnector but it is equipped with fuse-holder and downstream fuses air insulated earthing switch and release system activated by fuse striker and shunt-trip coil (optional).

SD6/F is equipped with switch-disconnector and earthing switch fitted with separated and inter locked operating mechanism.



- ① Insulator
- ② Upper terminal
- ③ Lower Terminal
- ④ Electrical field adapter only for 24kV
- ⑤ Stainless steel body
- ⑥ Operating Mechanisms box
- ⑦ Switch-disconnector operating seat
- ⑧ Earthing-switch operating seat
- ⑨ Inspection window
- ⑩ Key interlock
- ⑪ Manometer
- ⑫ Voltage signalling lamp
- ⑬ Safety valve
- ⑭ Fuse striker link
- ⑮ External earthing switch
- ⑯ Fuse link

# A variety of option for Modular type Air insulated switchgear



## Digital Protection Relay (GIPAM10 : LSIS)

- GIPAM-10 Series provide accurate measurement and monitoring information necessary for efficient maintenance and post-fault analysis
- Protection 50/51, 50/51N, 46, 79, 59, 27, 47P, 64, 67G, 67N
- Communication : Modbus
- Wave/Fault/Event Recording



## Current Transformer (DCI-209C)

Section	Contents				
Highest voltage for equipment	kV	7.2	12	17.5	24
Rated power frequency withstand voltage (1min)	kV	20	28	38	50
Rated lightning impulse withstand voltage	kV	60	75	95	125
Rated frequency	Hz	50 / 60			
Rated primary current	A	20 to 600			
Rated continuous thermal current	X I <sub>n</sub>	1.2			
Rated secondary current	A	5 or 1			
Rated short-time thermal current I <sub>th</sub> (1sec)	max.kA	50			
Rated dynamic current I <sub>dyn</sub> (2.5×I <sub>th</sub> )	max.kA	125			
Number of cores	max.	2			
Weight (approx.)	kg	20			
Applying Standards		IEC 61869-2, IEEE C57.13, KS C 1706, JEC 1201			
Model designation		DCI-209C			



## Power Transformer (DPI-209N)

Section	Contents	
Highest voltage for equipment	kV	24
Rated power frequency withstand voltage	kV	50
Rated lightning impulse withstand voltage	kV	125
Rated frequency	Hz	50 / 60
Rated primary voltage	kV	22000√3
Rated secondary voltage	V	100√3
Rated voltage factor/cont		1.9/8h
Rated burden	VA	15
Weight (approx.)	kg	25
Applying Standards		IEC 61869-2, IEEE C57.13, KS C 1706, JEC 1201
Model designation		DPI-209N

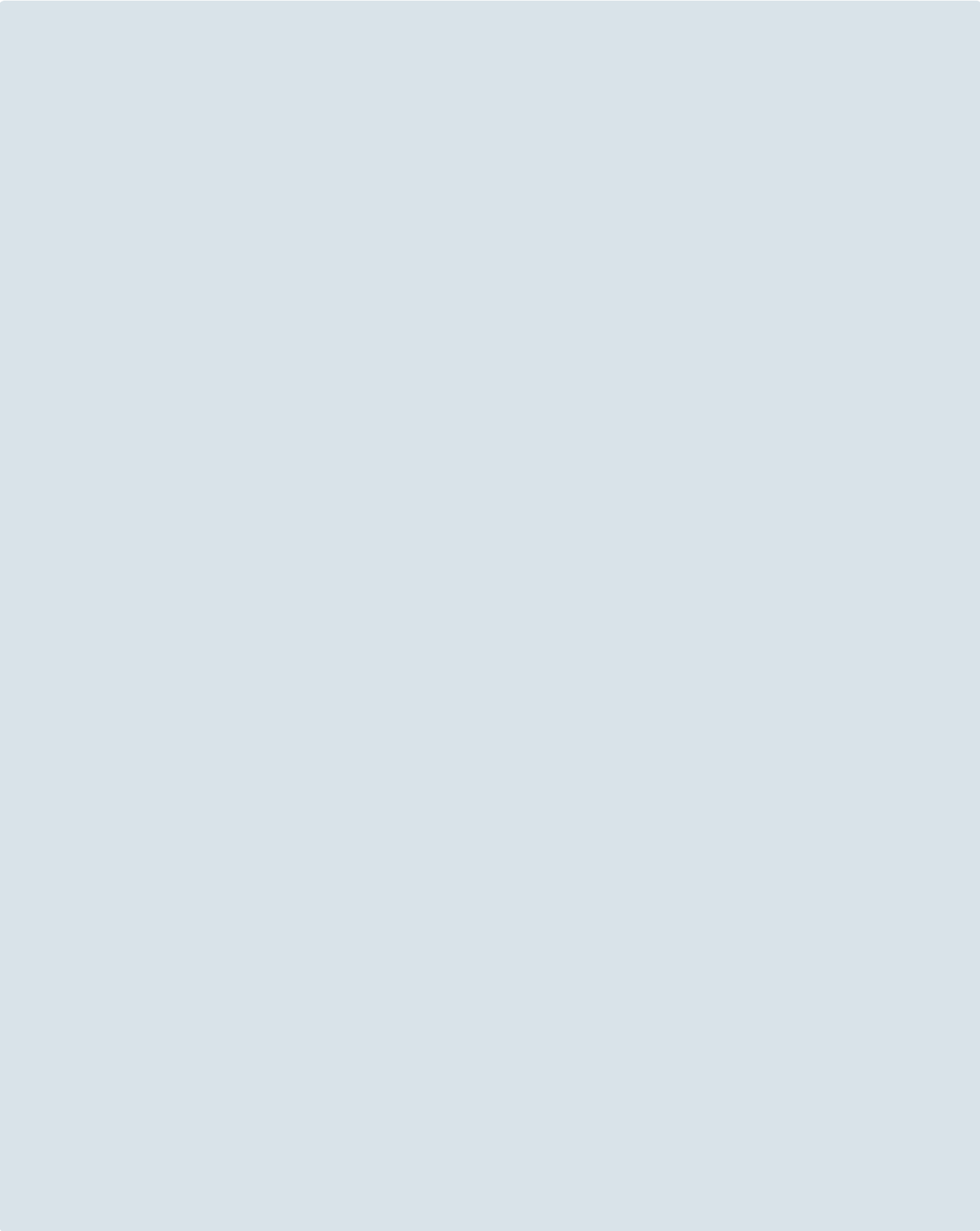


## Indicator (VDIS : RB社)



## Power Fuse (SIBA)

Bemessungs- spannung Rated voltage	Artikel Article	Bemessungsstrom Rated current	Länge "e" Length "e"	Durchmesser D Diameter D
kV		A	mm	mm
10/24	30 006 13	6,3 - 40	442	53
	30 014 13	50 - 80		67
	30 022 13	100 - 160RC100		85
	30 022 14	200RC112		87







# FUTURING SMART ENERGY



## Safety Instructions

- Para su seguridad, por favor lea detenidamente el manual del usuario antes de operar los equipos.
- Contacte con el centro de servicio autorizado más cercano para revisiones, reparaciones o ajustes.
- Contacte con personal técnico cualificado cuando requiera mantenimiento. No desensamble o repare los equipos por su cuenta.
- Cualquier mantenimiento o inspección debe realizarla personal cualificado.



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