



***Susol* RMU** **Ring Main Unit**

SF₆ Gas Insulated Ring Main Units



LSIS

Susol RMU Ring Main Unit

SF₆ Gas Insulated Ring Main Units



24kV LFL type

**Based on maximizing efficiency and reliability
of the power technology helps offering
optimized solutions for your environment**

Susol RMU is enable to install on medium voltage distribution network and mainly used for protection of transformers in compact substations. It is used for medium voltage distribution in compact substations, small buldings, residential housing complex, large shopping malls, airports, wind power, and solar power comprising medium voltage networks.

The concept of Susol RMU is offering a choice of other switch-fuse combination or Circuit Breaker with relay for protection of the transformer.





24kV LCL type



24kV Extensible type



36kV LCL type

Certified quality

STL (The Short-Circuit Testing Liaison, KERI), ISO 9001, ISO 14001
LSIS has integrated a functional organization into each of its units,
the main purpose of which is to check quality and ensure the adherence to standards.



Routine quality check

While producing Susol RMU,
various routine tests are taken for product capacity.
Tested items are as shown follows.

- Filling pressure check
Manual and motor operation check
Contact resistance check
Tightness check
Dielectric check
OCR operation check

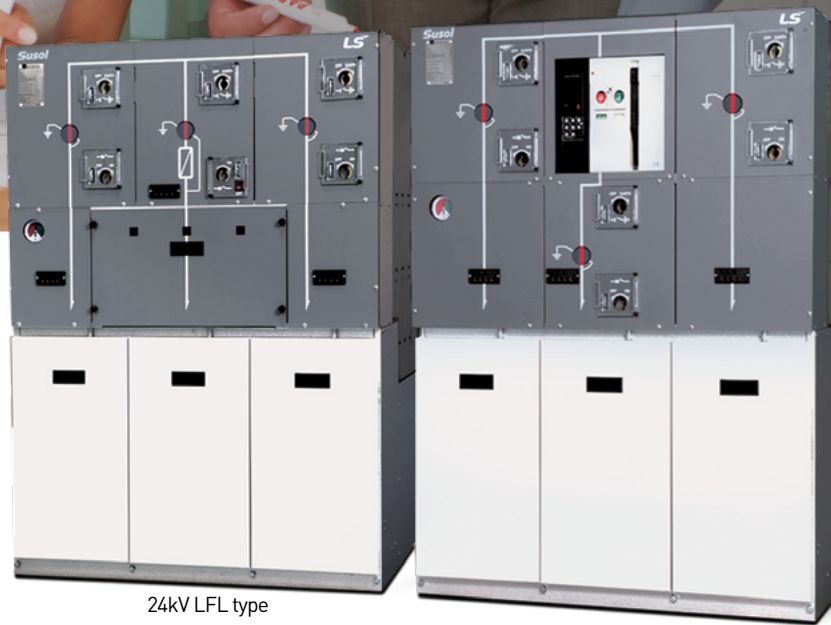
Contents

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Susol RMU

Non-Extensible: CB Feeder (LCL) & Fuse Feeder (LFL) RMU
Extensible: LBS Feeder (L), CB Feeder (C) & Fuse Feeder (F)



24kV LFL type

24kV LCL type

Features

Susol RMU is a compact ring main unit combining all MV functional units to enable to supply and protect transformers on the secondary distribution network.

Susol RMU can be supplied in various and different configurations suitable for most switching applications in 12 / 17.5 / 24kV / 36kV distribution networks

Technology

- Metal enclosed unit for indoor installation and type tested.
- Insulated by SF₆ Gas.
- Maintenance free and easy installation.
- Independent of climate.
- ON-OFF-Earth, 3-position load break switch

Safety

- Approachable and operable safety in the presence of power in the cables.
- Clear indication of operation status via mimic diagram on front panel.
- Fully automatic interlocking system.
 - Operation is only possible in case door is totally closed.
 - Fuse compartment is only accessible when Load break switch is earthed.
 - Voltage detector to check whether cables are lined or not.
- Internal arc withstand is tested for the operator safety in case of accident current occur.

Durability and usefulness

- Metal enclosed tank is hermetically sealed, it means this is independent of environmental effects such as dirt, small insects, moisture and so on.
- Load break switch operating is possible in the front of Ring Main Unit.
- All switching operations can be made safely to personnel because of interlocking system that operates automatically according to the switch position by the operator.
- No requirement of recharging SF₆ gas until its service life.
- Remote operation available in case of using motor operating mechanism and RTU.
- HRC power fuse will trip the mechanism automatically by a fuse striker pin connected to mechanism in the event of fault happening.

Saving cost

- No maintenance is required other than replacement of HRC Power Fuse after installation.
- Compact design that requires minimum space to install and operate locally is main advantage especially where the space is limited.



Features

Intelligent application

Network remote control for DAS / SCADA

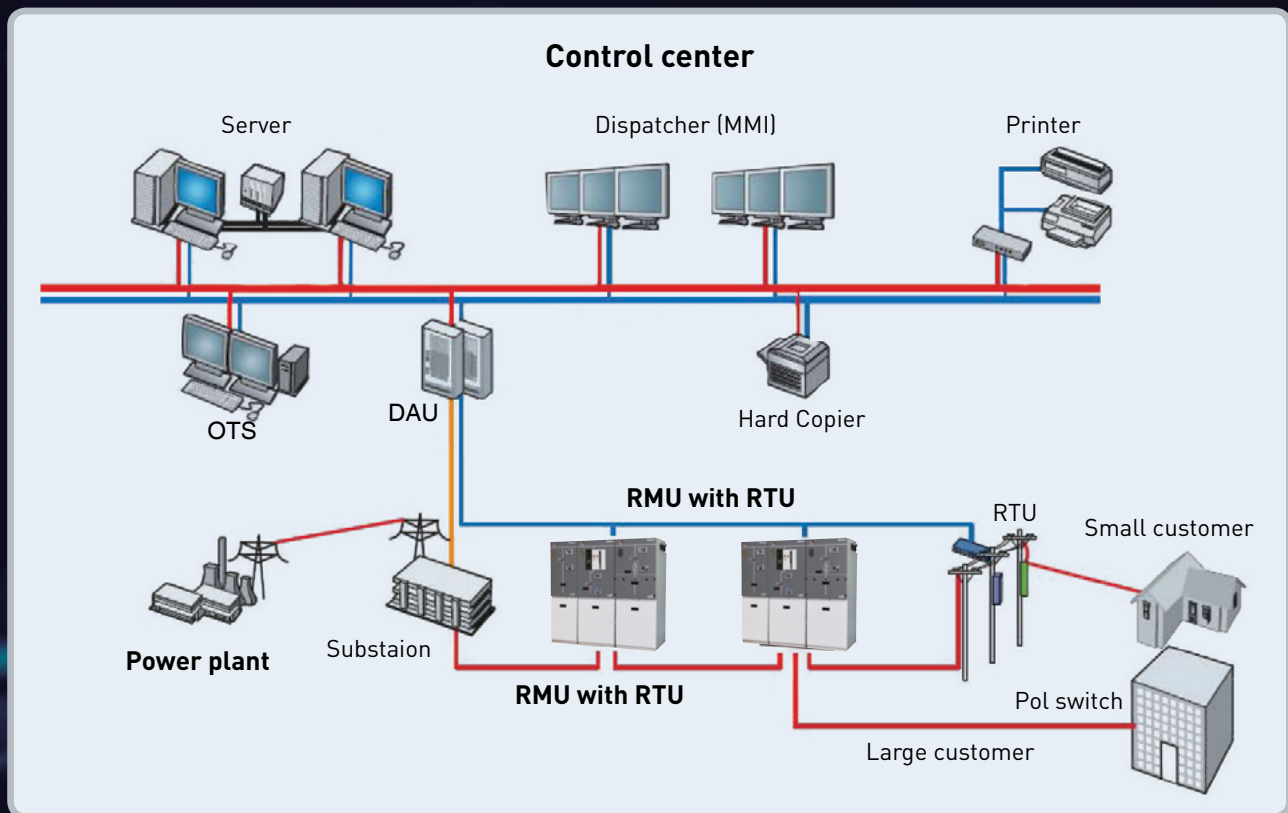
Equipped with RTU (remote termination unit), the Susol RMU switchgear can implement intelligent application.

Connecting all the IRMUs by a communication network, it enable to monitor and control the switchgear remotely, locate and isolate fault automatically as well as the system recovery.

This will dramatically reduce the affected area and duration of blackout, and realize the high reliability and excellent power quality.

System configuration

Susol RMU equipped with RTU provides all the functions needed to operate the MV network in real time



RTU(Remote Terminal Unit)

Equipped with RTU (Remote Terminal Unit), the Susol RMU switchgear can implement intelligent application. Connecting all Susol RMU with communication network, it enables to monitor and control the switchgear remotely.

The Remote Terminal Unit (RTU) collects data from field instruments & sensors and transmits the information to the Supervisory Control and Data Acquisition System (SCADA) installed in a central control room through communication systems and lines, and receives control commands from the telemeter telecontrol system to conduct online controls in real time.

Ordering Information

SF₆ Gas Insulated Ring Main Units

Non-Extensible RMU

1. CB Feeder RMU

RC		B		36		6		6		6		0	
Type		Operation	Code	Rated voltage	Code	Rated current (Main)	Code	Rated current (T-OFF)	Code	Rated frequency	Code	Oder type	Code
RC		Manual	B	36kV	36	630A	6	630A	6	60Hz	6	SKD	S
LC		AC 110V	A1	24kV	24					50Hz	5	CKD	C
LCL		AC 220V	A2	17.5kV	17					60 / 50Hz	0	Complete product	0
LLCL		DC 110V	D1	12kV	12								
LCCL		DC 220V	D2										

2. Switch-Fuse Feeder RMU

RF		B		36		6		6		6		0	
Type		Operation	Code	Rated voltage	Code	Rated current (Main)	Code	Rated current (T-OFF)	Code	Rated frequency	Code	Oder type	Code
RF		Manual	B	24kV	24	630A	6	200A	2	60 / 50Hz	0	SKD	S
LF		AC 110V	A1	17.5kV	17							CKD	C
LFL		AC 220V	A2	12kV	12							Complete Product	0
LLFL		DC 110V	D1										
LFFL		DC 220V	D2										

3. LBS Feeder RMU

LR		B		24		6		0		0		0	
Type		Operation	Code	Rated voltage	Code	Rated current (Main)	Code	Rated current (T-OFF)	Code	Rated frequency	Code	Oder type	Code
LR		Manual	B	24kV	24	630A	6	N/A	0	60 / 50Hz	0	SKD	S
LLL		AC 110V	A1	17.5kV	17							CKD	C
LLLL		AC 220V	A2	12kV	12							Complete product	0
		DC 110V	D1										
		DC 220V	D2										

Extensible RMU

R		B		24		6		6		6		0	
Type		Operation	Code	Rated voltage	Code	Rated current (Main)	Code	Rated current (T-OFF)	Code	Rated frequency	Code	Oder type	Code
R		Manual	B	24kV	24	630A	6	630A	6	60Hz	6	SKD	S
L		AC 110V	A1	17.5kV	17			200A	2	50Hz	5	CKD	C
C		AC 220V	A2	12kV	12					60 / 50Hz	0	Complete product	0
F		DC 110V	D1										
		DC 220V	D2										

Configurations (Non-Extensible RMU)

12/17.5/24kV Non-Extensible CB Feeder RMU

2 LBS & 1 CB-DS in single chamber.

L: LBS (Load Break Switch)

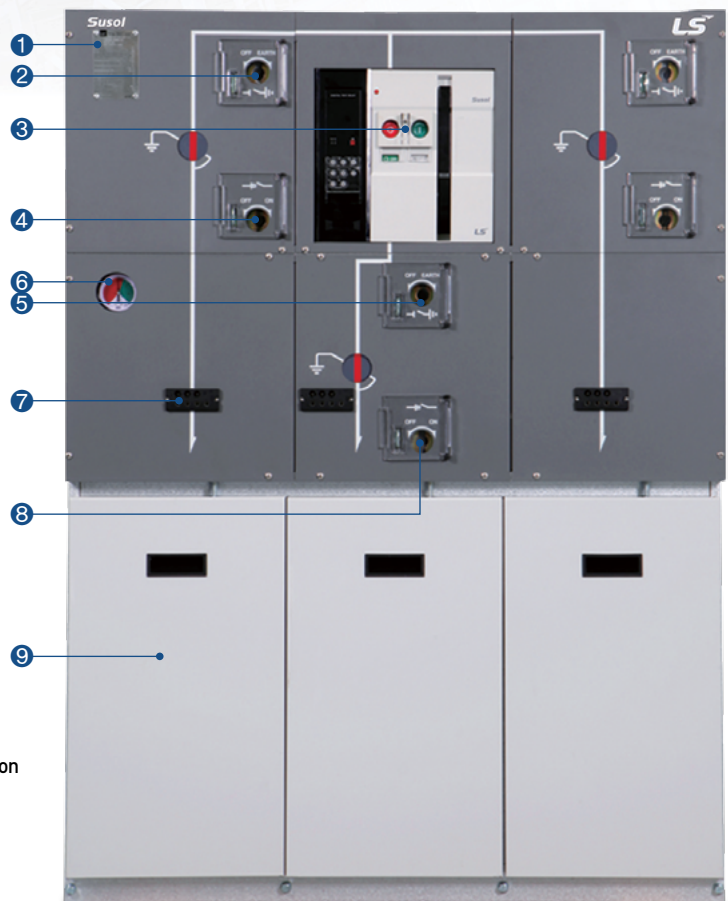
3-position Load Break Switch rated 630A and less for load breaking and earthing

C: VCB (Vacuum Circuit Breaker)

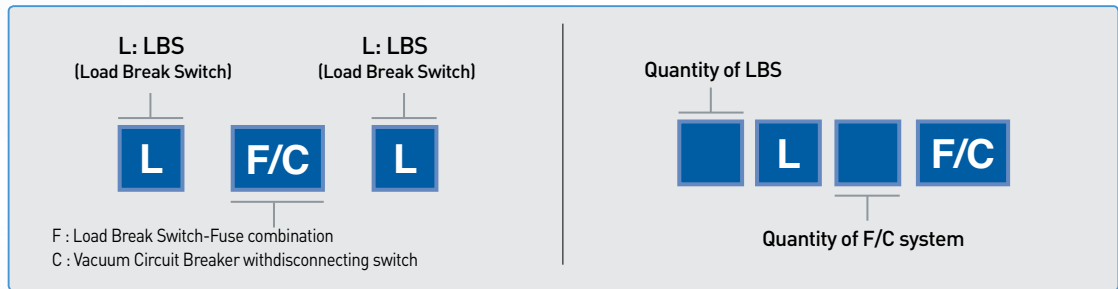
Circuit Breaker with 21kA interrupting capacity for the transformer and line protection

Horizontal Cable Bushing in Front

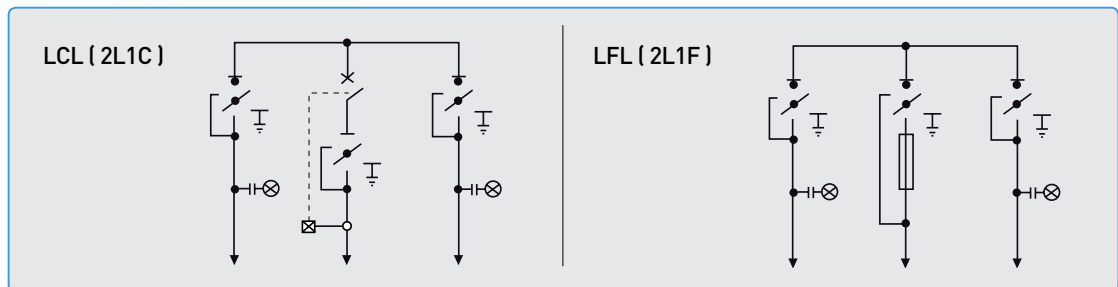
- ① Name plate
- ② Circuit Breaker operation
- ③ Ring S / W operation
- ④ Ring S / W operation
- ⑤ Disconnecter S/W Earth operation
- ⑥ Pressure gauge
- ⑦ Voltage Indicator
- ⑧ Disconnecter S / W operation
- ⑨ Cable compartment



Information of model name



Diagram, standard types



36kV Non-Extensible CB Feeder RMU

2 LBS & 1 Switch-Fuse in single chamber.

L: LBS (Load Break Switch)

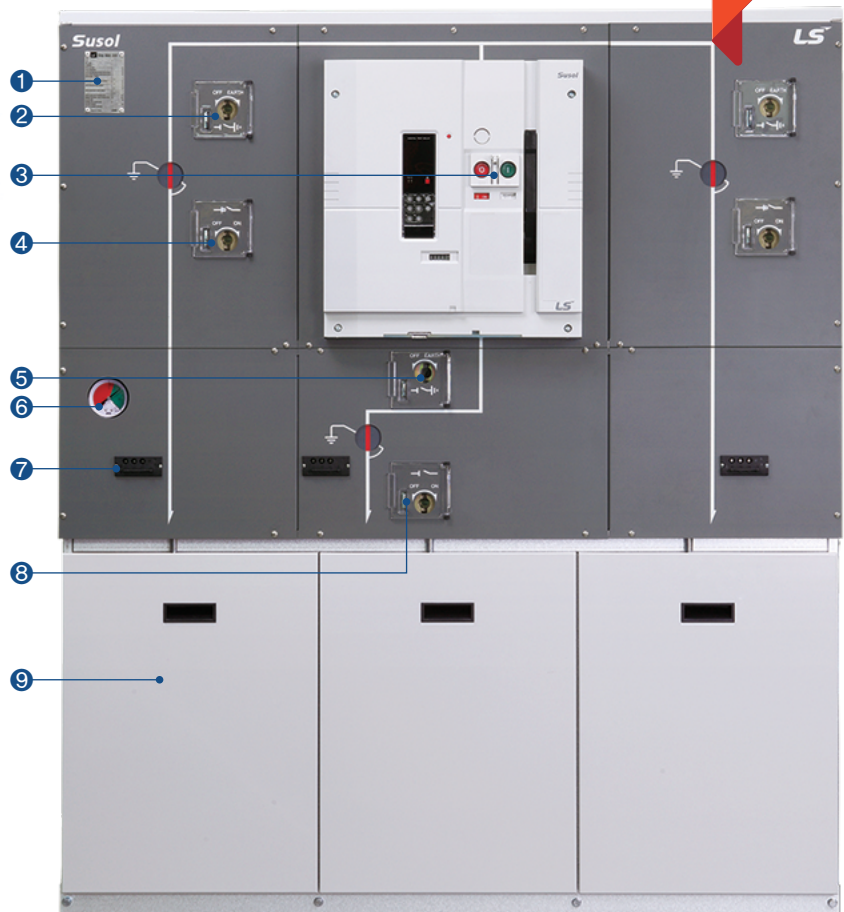
3-Position load break switch with a rating of 630A or less for load break and earthing

C: VCB (Vacuum Circuit Breaker)

20kA circuit breaker with interrupting capacity for the transformer and line protection

Horizontal Cable Bushing in Front

- ① Name plate
- ② Circuit breaker operation
- ③ Main circuit operation
- ④ Ring S / W operation
- ⑤ DS earth operation
- ⑥ Pressure gauge
- ⑦ Voltage indicator
- ⑧ DS main circuit operation
- ⑨ Cable compartment



Configurations (Non-Extensible RMU)



12/17.5/24kV Non-Extensible Switch-Fuse Feeder RMU

2 LBS & 1 Switch-Fuse in single chamber.

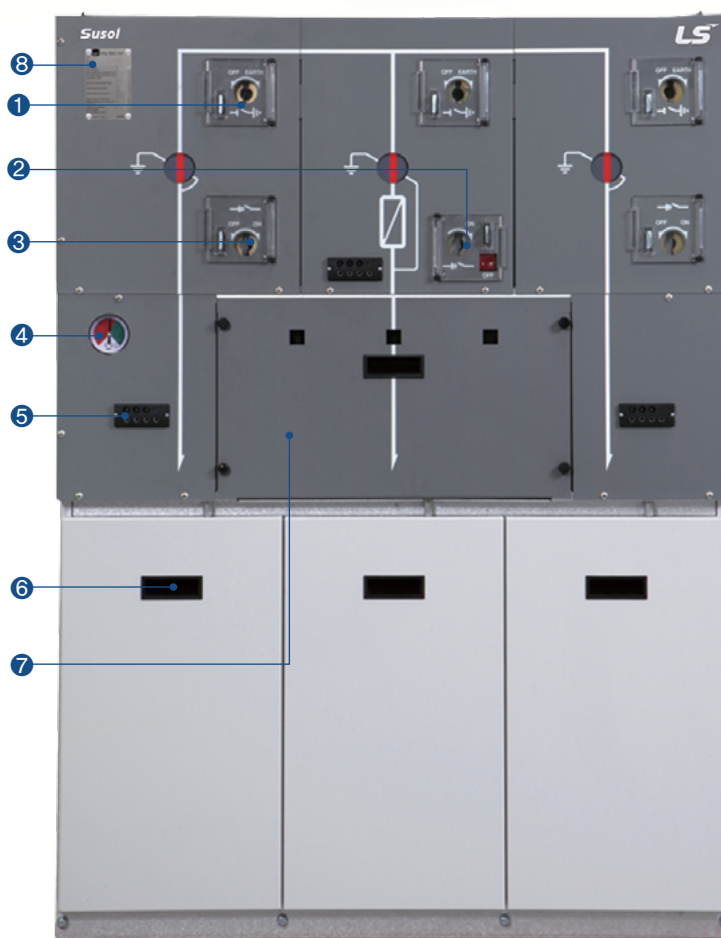
L: LBS (Load Break Switch)

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

F: Switch Fuse

(Load Break Switch-Fuse combination)
200A switch-fuse combination for transformer protection

Horizontal Cable bushing in Front

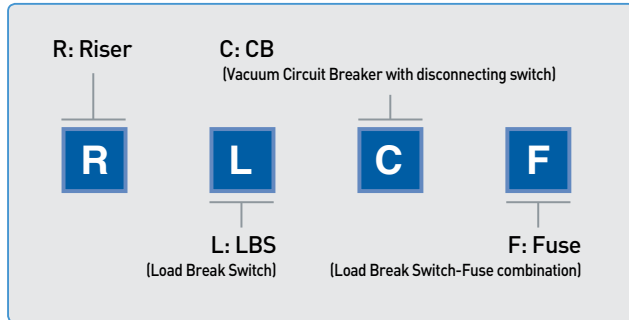


- ① Ring S / W Earth operation
- ② T-off operation
- ③ Ring S / W operation
- ④ Pressure gauge
- ⑤ Voltage Indicator
- ⑥ Cable compartment
- ⑦ Fuse compartment
- ⑧ Name plate

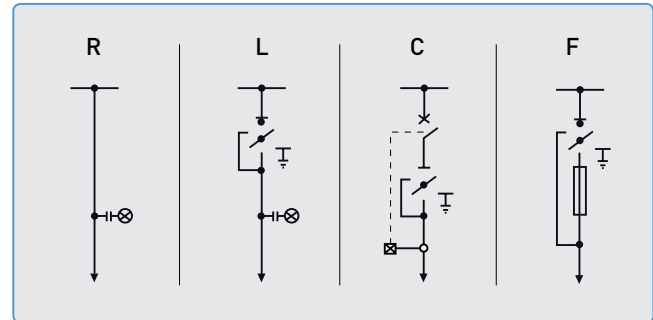
Configurations (Extensible RMU)

SF₆ Gas Insulated Ring Main Units

Information of model name

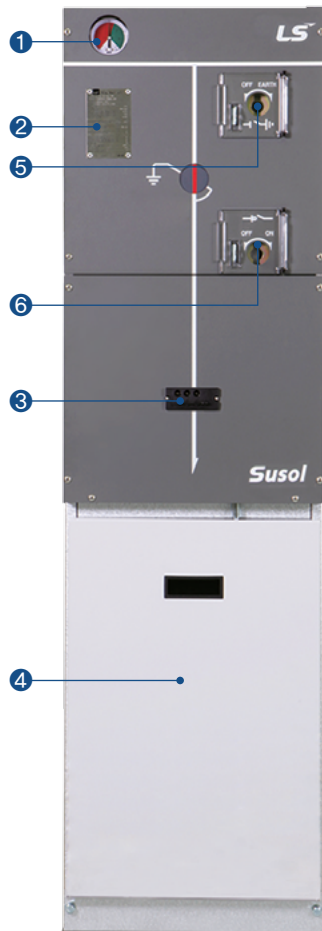


Diagram, standard types



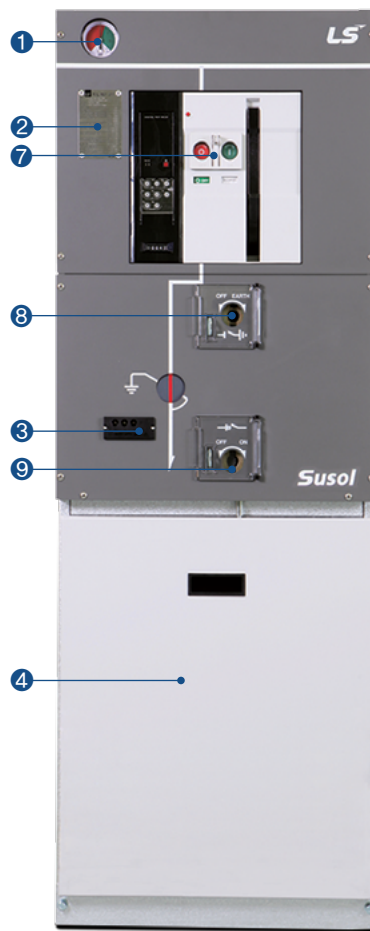
LBS Feeder(L)

L: LBS
(Load Break Switch)
3-position Load Break Switch rated 630A
and less for load breaking and earthing



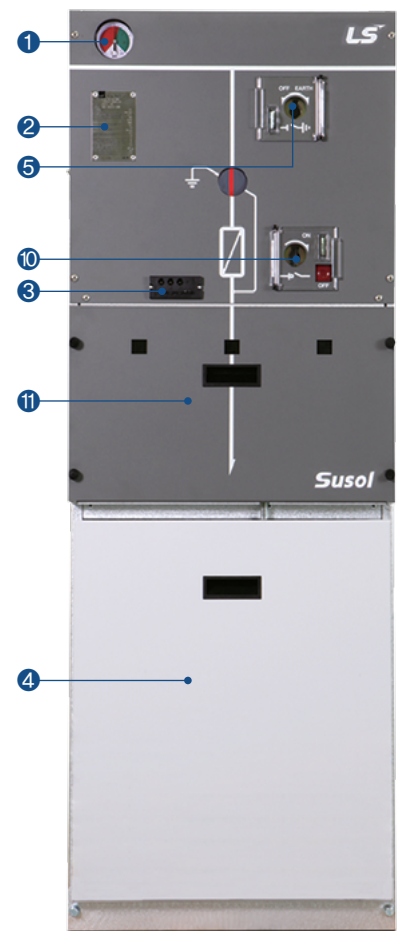
CB Feeder(C)

C: VCB
(Vacuum Circuit Breaker)
Circuit Breaker with 21kA
interrupting capacity for the
transformer and line protection



Switch-Fuse Feeder(F)

F: Switch Fuse
(Load Break Switch-Fuse
Combination)
200A switch-fuse combination for
transformer protection



- ① Pressure gauge
- ② Name plate
- ③ Voltage detector
- ④ Cable compartment

- ⑤ Ring S / W Earth operation
- ⑥ Ring S / W operation
- ⑦ Circuit Breaker operation
- ⑧ Disconnector S / W Earth operation

- ⑨ Disconnector S / W operation
- ⑩ Fwitch - Fuse operation
- ⑪ Fuse compartment

Main characteristics

Rating

Rated voltage	kV	12	17.5	24	36
Rated frequency	Hz	50/60	50/60	50/60	50/60
Rated power frequency withstand voltage	kV	28	38	50	70
Rated lightning impulse withstand voltage	kV	75	95	125	170
Rated current main busbars	A	630	630	630	630
Rated short-time withstand current (3s)	kA	21	21	21	20
Rated short-circuit making current	kA	54.6	54.6	54.6	52
Rated withstand arc current (1s, AFAL)	kA	21	21	21	20
Rated SF ₆ gas pressure	psi.G	5	5	5	5

Standards

Susol RMU meets international standards such as following

Standard	Description
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 High-Voltage Switchgear and Controlgear
IEC 62271-200	Part 200: AC Metal-Enclosed Switchgear and Controlgear for Rated Voltages Above 1 kV and up to and Including 52 kV

Environment conditions

Conditions	Description
Temperatures	• Products should be stored and installed under the following conditions. • For stocking : from -40 °C to +60 °C • For working : from -25 °C to +40 °C • Other temperature, consult us.
Altitude	• Altitude for installation above sea level : under 1, 000 m
Humidity	• Relative humidity : max. 95 %

Additional information

Conditions	Description
Options	• Manometer • VIS (Voltage Indication Systems) • All cable covers with interlock system • Fuse cover with interlock system
User options	• Internal arc exhausting box for 21kA / 1s • Remote operating system for Load break switch • Remote operating system for fuse combination switch • Remote operating system for Circuit Breaker • OCR (Over Current Relay) operating Circuit Breaker • Padlock system (key locking devices)Internal arc exhausting box for 21kA / 1s • Remote operating system for Load break switch • Remote operating system for fuse combination switch • Remote operating system for Circuit Breaker • OCR(Over Current Relay) for Circuit Breaker • Padlock system (key locking devices)
Protection index	• IP 3X: on front face, IP67 for SF ₆ tank

Types and diagrams

SF₆ Gas Insulated Ring Main Units

Non-Extensible RMU

12/17.5/24kV CB Feeder RMU

Dimension (W×H×D), mm

RC (1R1C)	LC (1L1C)	LCL (2L1C)	LLCL (3L1C)	LCCL (2L2C)
718×1,437×779	718×1,437×779	1,030×1,437×779	1,362×1,437×779	1,362×1,437×779

36kV CB Feeder RMU

RC (1R1C)	LC (1L1C)	LCL (2L1C)	LLCL (3L1C)	LCCL (2L2C)
1,015×1,607×1,108	1,015×1,607×1,108	1,375×1,607×1,108	Detailed dimensions for this type need prior consultation	

12/17.5/24kV Switch-Fuse Feeder RMU

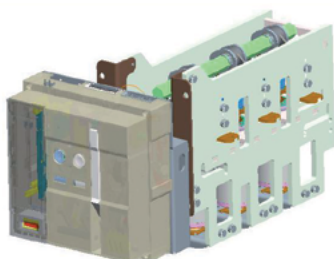
RF (1R1F)	LF (1L1F)	LFL (2L1F)	LLFL (3L1F)	LFFL (2L2F)
718×1,437×779	718×1,437×779	1,030×1,437×779	1,362×1,437×779	1,362×1,437×779

12/17.5/24kV LBS Feeder RMU

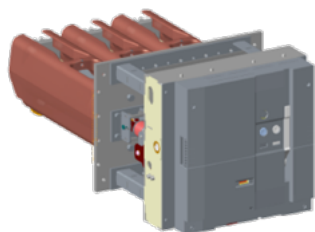
LR (1L1R)	LLL (3L)	LLLL (4L)
718×1,222×779	1,030×1,222×779	1,362×1,222×779

12/17.5/24kV Extensible RMU

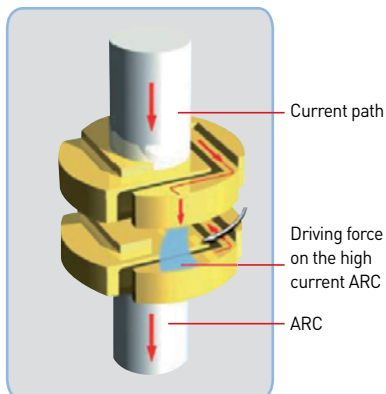
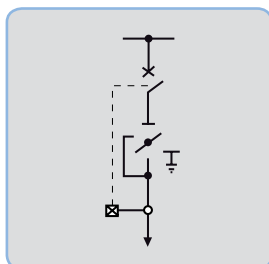
R	L	C	F
411×1,456×779	411×1,456×779	521×1,456×779	521×1,456×779



12/17.5/24kV CB module



36kV CB module



Circuit Breaker

Rating

Rated voltage	kV	12	17.5	24	36
Rated frequency	Hz	50/60	50/60	50/60	50/60
Rated power frequency withstand voltage	kV	28	38	50	70
Rated lightning impulse withstand voltage	kV	75	95	125	170
Rated current	A	630	630	630	630
Rated short-time withstand current (3s)	kA	21	21	21	20
Rated short-circuit making current	kA	54.6	54.6	54.6	52
Electrical endurance class		E2/C2	E2/C2	E2/C2	E2/C2
Mechanical endurance class		M1	M1	M1	M1
Disconnecter and Earthing switch					
Rated current	A	630	630	630	630
Rated short-time withstand current (3s)	kA	21	21	21	20
Rated short-circuit making current	kA	54.6	54.6	54.6	52
Electrical endurance class (Earthing switch)		E1	E1	E1	E1
Mechanical endurance class (Disconnecter)		M1	M1	M1	M1
Mechanical endurance class (Earthing switch)		M0	M0	M0	M0

Standard features

- Circuit Breaker with 21kA interrupting capacity for the transformer and line protection
- 3-position DS disconnecting and earthing switch
- Switch position indication for CB and DS / ES
- Cable bushing horizontal in front
- Interlocking between CB and DS / ES

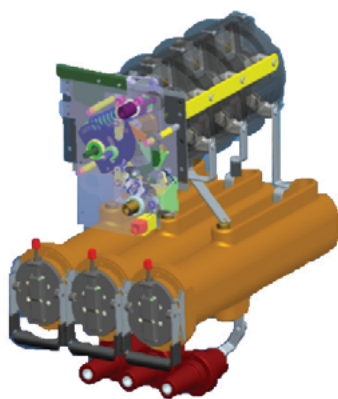
Optional features

- Motor operation for Circuit Breaker
- Auxiliary switches
 - CB position
 - Disconnector position
 - Earthing switch position
- Voltage indicating system
- Trip coil and close coil

Vacuum Interrupter

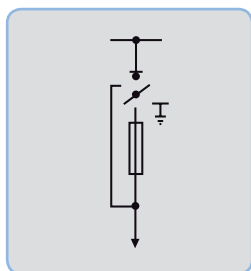
In the closed position, normal current flows through the interrupter. When a fault occurs and interruption is required, the contacts are quickly separated. The arc drawn between the surfaces of contact is rapidly moved around the slotted contact surface by self induced magnetic effects, preventing gross contact erosion and the formation of hot spot on the surface. The arc burns in an ionized metal vapor, which condenses on the surrounding metal shield. At current zero the arc extinguishes and vapor production ceases. The metal vapor plasma is very rapidly dispersed, cooled, recombined, and deionized, and the metal vapor products are quickly condensed so that the contacts withstand the transient recovery voltage.

Switch fuse combination



Rating

Rated voltage	kV	12	17.5	24
Rated frequency	Hz	50/60	50/60	50/60
Rated power frequency withstand voltage	kV	28	38	50
Rated lightning impulse withstand voltage	kV	75	95	125
Rated current	A	200	200	200
Electrical endurance class		E1	E1	E1
Mechanical endurance class		M1	M1	M1
Earthing switch				
Rated short-time withstand current (1s)	kA	5	5	5
Rated short-circuit making current	kA	13	13	13
Electrical endurance class		E1	E1	E1
Mechanical endurance class		M0	M0	M0



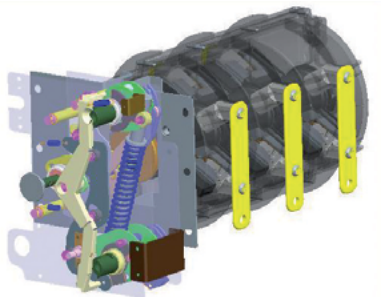
Standard features

- 3-position switch-fuse combination with earthing switch
- Switch position indication for switchfuse combination and earth switch
- Cable bushing horizontal in front
- Fuse holder for DIN type fuse-links
- Fuse-link rating
 - 12 / 17.5kV : max. 100 A, LSIS DIN type fuse-link
 - 24kV : max. 75 A, LSIS DIN type fuse-link

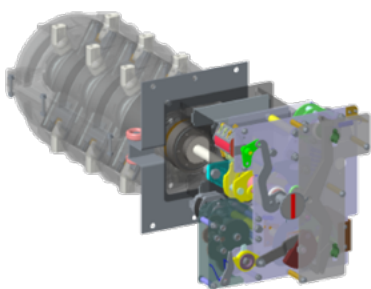
Optional features

- Motor operation for switch-fuse combination
- Auxiliary switches
 - LBS position
 - Earthing switch position
 - Fuse blown status
- Voltage indicating system
- Trip coil

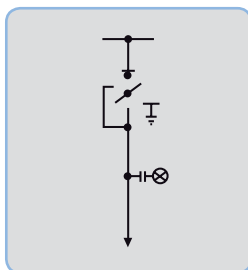
Major components



12/17.5/24kV LSB module



36kV LBS module

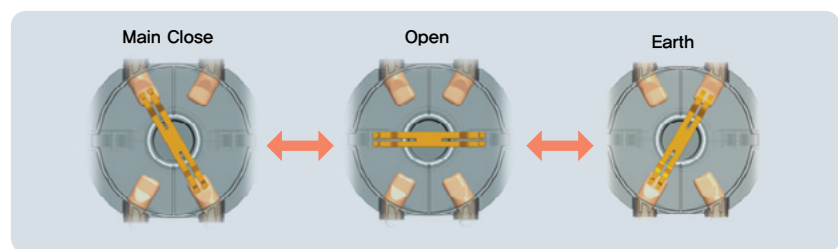


Load Break Switch

Rating

Rated voltage	kV	12	17.5	24	36
Rated frequency	Hz	50/60	50/60	50/60	50/60
Rated power frequency withstand voltage	kV	28	38	50	70
Rated lightning impulse withstand voltage	kV	75	95	125	170
Rated current	A	630	630	630	630
Rated short-time withstand current (3s)	kA	21	21	21	20
Rated short-circuit making current	kA	54.6	54.6	54.6	52
Electrical endurance class		E3/C2	E3/C2	E3/C2	E3/C2
Mechanical endurance class		M1	M1	M1	M1
Earthing switch					
Rated short-time withstand current (3s)	kA	21	21	21	20
Rated short-circuit making current	kA	54.6	54.6	54.6	52
Electrical endurance class		E1	E1	E1	E1
Mechanical endurance class		M0	M0	M0	M0

Operation of 3-Position Load Break Switch



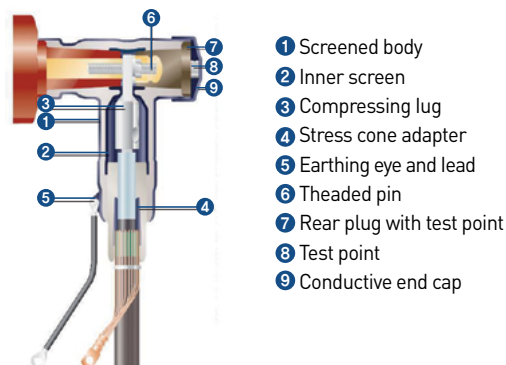
Standard features

- 3-position Load Break Switch rated 630A and less for load breaking and earthing
- Operating mechanism with two separate shaft for load and earthing function
- Switch position indication for LBS and ES
- Cable bushing horizontal in front with integrated capacitor for voltage indication

Optional features

- Motor operation for load break switch
- Auxiliary switches
 - Load break switch position
 - Earthing switch position
- Voltage indicating system
- Short circuit and earth fault indicator

Cable compartment



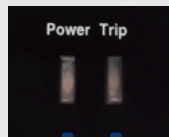
Trip Relay

Standard OCR

- Performing optimum relay operation
- Overload protection
 - 51T Protection characteristic (Curve selection)
 - 51D Protection characteristic (Definite time characteristic)
- Ground fault protection
 - 51ND Protection characteristic (Definite time characteristic)
- Remote Trip function
- Self Powered
- Viewing fault records via PC manager



① LED: Indication of trip information and power status

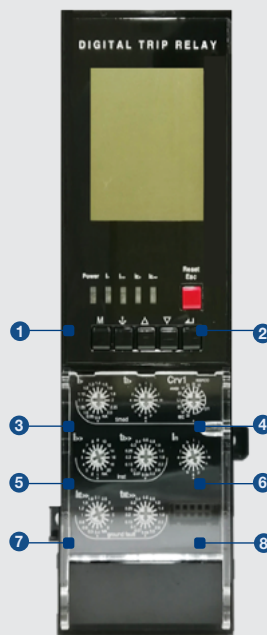


Trip: Indication of trip
Power: Indication of power status

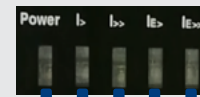
- ② Reset key: Trip initialization
- ③ I>: 51T current setting
tI>: 51T time delay and lever setting
- ④ Cv: 51T operation curve setting
- ⑤ I>>: 51D current setting,
tI>>: 51D time delay setting
- ⑥ In: rated current setting
- ⑦ IE>: ground fault current setting,
tIE>: ground fault time delay setting
- ⑧ Automatically tripped: to protect from fault current when a fuse is blown

Premium OCR

- Dual-powered protective relay
 - Self-Power (CT)
 - Auxiliary Power: AC/DC 100~220V 50/60Hz
- Overload protection
 - Low current region (definite/inverse time characteristics)
 - High current region (instantaneous time characteristic)
- Ground fault protection
 - Low current region (definite/inverse time characteristics)
 - High current region (instantaneous time characteristic)
- LCD user interface
- Event/Fault history search function
 - 128 system events can be saved
 - 10 fault events can be saved
 - 1 fault waveform can be saved
- Remote monitoring function (RS-485 network)



① LED: Indication of trip information and power status

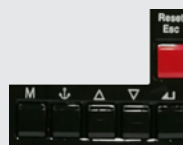


Overcurrent
Ground Trip
Status Display

Overcurrent
Trip Status
Display

Power Status
Display

② User interface button



Button	Basic function
M	Changes the screen mode.
I>	Fixed to current screen. (Screen on measurement gauge)
I>>	Moves to previous item.
IE>	Moves to next item.
IE>>	Saves the current value.
Reset Esc	1. (3 seconds) clears the trip alarm. 2. (Short) cancels the current insertion (Setup screen) or returns to the screen on measurement.

Major components

Trip Relay

Protection

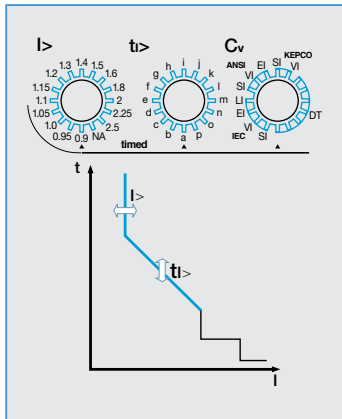
51T																	
Current Setting Range(A)	$I_{>=I_n^*}$	0.9	0.95	1	1.05	1.1	1.15	1.2	1.3	1.4	1.5	1.6	1.8	2	2.25	2.5	NA
Time delay(s)	$t_{I>}$	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
	$t_{I>@DT \text{ Curve}}$	0.04	0.3	0.6	1	2	3	4	6	8	10	15	30	60	120	210	300
Lever	$t_{I>@INV \text{ Curve}}$	0.05	0.1	0.2	0.3	0.4	0.5	0.6	0.8	1	2	3	4	5	6	8	10
51D																	
Current Setting Range(A)	$I_{>=I_n^*}$	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20	NA
Time delay(s)	$t_{I>@I_n^*}$	0.04	0.07	0.1	0.15	0.2	0.25	0.3	0.4	0.6	0.8	1	1.4	1.8	2.2	2.6	3
Accuracy $\pm 15\%$ or $\pm 40\text{ms}$	Min.Trip Time(s)	0	0.03	0.06	0.11	0.16	0.21	0.26	0.34	0.51	0.68	0.85	1.19	1.53	1.87	2.21	2.55
	Max.Trip Time(s)	0.08	0.11	0.14	0.19	0.24	0.29	0.35	0.46	0.69	0.92	1.15	1.61	2.07	2.53	2.99	3.45
51ND																	
Current Setting Range(A)	$I_{E>=I_n^*}$	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	1.2	1.4	1.6	1.8	2	2.5	NA
Time delay(s)	$t_{I>@I_n^*}$	0.1	0.2	0.4	0.6	0.8	1	1.5	2	2.5	3	3.5	4	6	8	10	20
Accuracy $\pm 15\%$ or $\pm 40\text{ms}$	Min.Trip Time(s)	0.06	0.16	0.34	0.51	0.68	0.85	1.28	1.7	2.13	2.55	2.98	3.4	5.1	6.8	8.5	17
	Max.Trip Time(s)	0.14	0.24	0.46	0.69	0.92	1.15	1.73	2.3	2.88	3.45	4.03	4.6	6.9	9.2	11.5	23

※ Note :

- 51ND(Ground fault protection) normally operates when the sum of the RMS current of each phase measured by OCR is more than 90% of the minimum set value to the direction of P1 → P2 of the connected CT.

- If the sum of the RMS current of each phase at cold state is less than 2 times of the minimum set value, the absolute error of $\pm 200\text{ms}$ should be added to the basic error.

51T characteristic



Operating characteristic

The function for overload protection which has definite time characteristic and time delayed in inverse ratio to fault current.

- Pickup current setting knob: $I_{>}$
 - Setting range: $(0.9-0.95-1.0-1.05-1.1-1.15-1.2-1.3-1.4-1.5-1.6-1.8-2.0-2.25-2.5-NA) \times I_n$
- Time delay setting knob: $t_{I>}$
 - Operation time based on $1 \times I_{>}$
 - DT Setting range: 0.04-0.3-0.6-1-2-3-4-6-8-10-15-30-60-120-210-300 sec
 - INV Setting range (Lever value) : 0.05-0.1-0.2-0.3-0.4-0.5-0.6-0.8-1-2-3-4-5-6-8-10
- Operation current based on the largest one of the three phases

* Trip time for INV Curve setting

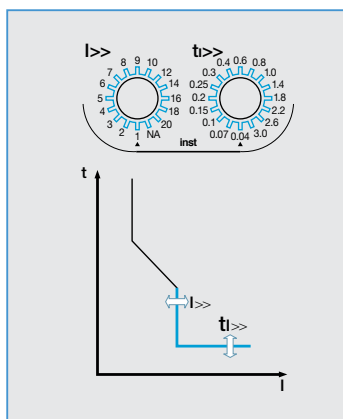
$$\text{trip time} = \left[\frac{A}{\left(\frac{I_f}{I_s} \right)^B - 1} + C \right] \times T/L + DT$$

* I_f : fault current, I_s : set current, $DT=0$ for INV, $T/L=0$ for for DT

* Constants by Curve

	A	B	C
IEC SI	0.14	0.02	0
IEC VI	13.5	1	0
IEC EI	80	2	0
IEC LI	120	1	0
ANSI SI	0.0515	0.02	0.114
ANSI VI	19.61	2	0.491
ANSI EI	28.2	2	0.1217
KEPCO SI	0.11	0.02	0.42
KEPCO VI	39.85	1.95	1.084

51D characteristic

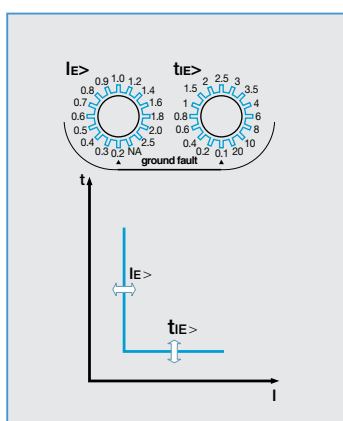


Operating characteristic

The function for over current protection which has a definite time characteristic.

1. Standard current setting knob: $I >>$
- Setting range: (1-2-3-4-5-6-7-8-9-10-12-14-16-18-20-NA)* I_n
2. Time delay setting knob: $tI >>$
- Setting range: 0.04-0.07-0.1-0.15-0.2-0.25-0.3-0.4-0.6-0.8-1-1.4-1.8-2.2-2.6-3.0 sec
3. Operation current based on the largest one of the three phases

51ND characteristic



Ground fault protection function provides trip signal at the set values for pickup current and time delay.

1. Standard current setting knob: $I_{E>}$
- Setting range: (0.2-0.3-0.4-0.5-0.6-0.7-0.8-0.9-1-1.2-1.4-1.6-1.8-2-2.5-NA)* I_n
2. Time delay setting knob: $tI_{E>}$
- Setting range: 0.1-0.2-0.4-0.6-0.8-1-1.5-2-2.5-3-3.5-4-6-8-10-20 sec
3. Ground fault current= Vector sum of the three phases (R+S+T)



CT (Current Transformer)

Max. system voltage	kV	0.6
Primary current	A	7.2 / 14/4 / 28.8 / 57.6 / 115.2 / 230.4
Secondary current	A	0.075
Rated burden	VA	0.1
Accuracy class		10P80
Short time-current	KA/3s	21
Rated frequency	Hz	50/60



Voltage indicator lamps (Voltage detector)

It is a device to check the presence or absence of voltage in the cables. It is conforming to IEC standard 61958. Push button type LED voltage indicator is provided and lamp power is supplied by bushing type capacitive dividers.



Power Fuse

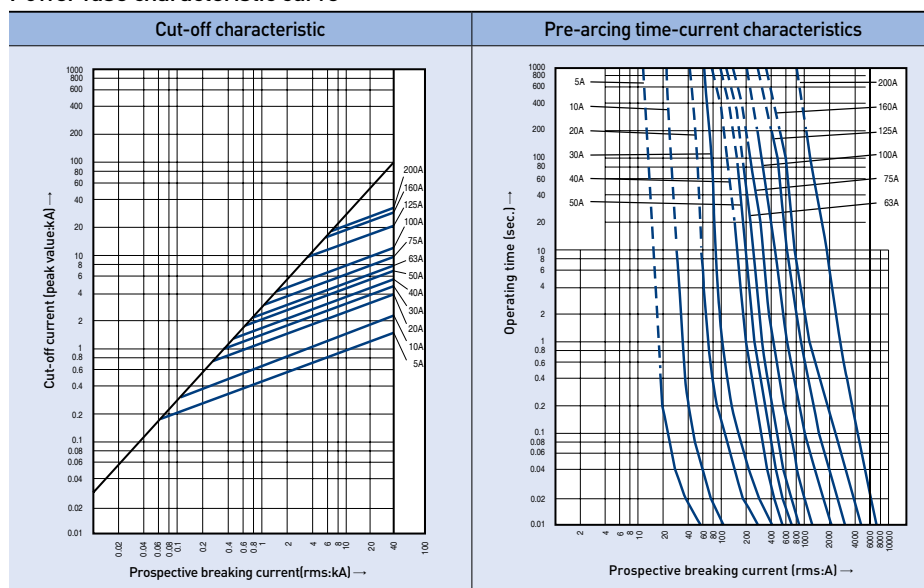
1. The LS HRC Power Fuses belong to the PRIME MEC series. It interrupts high currents before the peak value and therefore cuts down the required withstand capacity of the associated equipment on the electric system.
2. Though small in size, it has a high breaking capacity and its enclosed type is suitable for use inside of the panel board.
3. PRIME-MEC fuses are equipped with striker pins for trip indicators as well as for inflicting impulse to trip link of related load break switches.

Selection of fuses: According to IEC 60787(24kV)

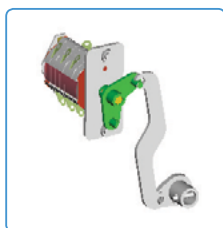
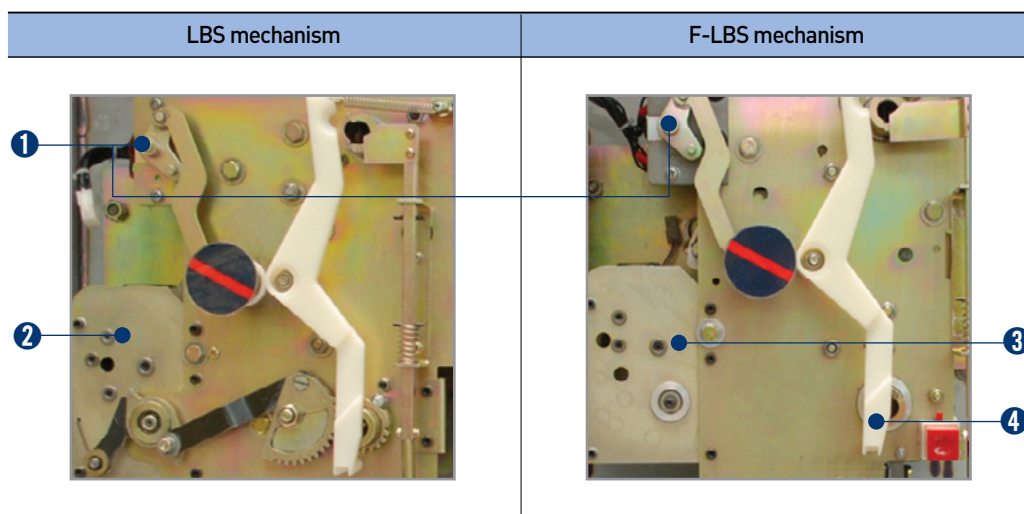
Transformer rating capacity (kVA)	Power Fuse rated current (A)
36 ~ 75	5
75 ~ 157	10
172 ~ 358	20
258 ~ 538	30
464 ~ 840	40
598 ~ 1048	50
745 ~ 1320	63
1000 ~ 1572	75

Note) Please ask fuse maker for optimum selection of fuses.

Power fuse characteristic curve



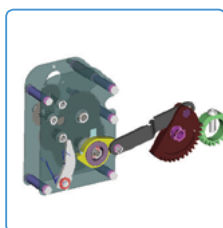
Optional components for LBS / F-LBS mechanism



1 LBS/F-LBS auxiliary contact

A contact used for remote control of LBS/ F - LBS ON/OFF/EARTH status.
The auxiliary contact consists of 2a2b.
(However, when operating an electric motor, it consists of 1a1b.)

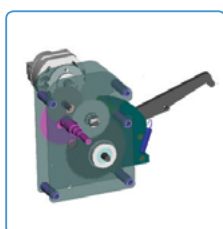
12/17.5/24/36kV RMU LBS auxiliary contact				
Type			Resistive load	Inductive load
Minimum current			DC5V, 1mA	
Contact capacity	AC	490V	5A	2.5A
		250V	10A	10A
		125V	10A	10A
	DC	250V	3A	1.5A
		125V	10A	6A
		30V	10A	10A



2 LBS motor

With the external power source, it charges the closing/opening spring of LBS.

12/17.5/24/36kV RMU LBS motor					
Rated voltage(Vn)	DC 24~30V	DC 110V	DC 220V	AC 100~130V	AC 200~250V
Load current(A)	≤ 9	≤ 2	≤ 1	≤ 2	≤ 1
Starting current(A)	3 times the load current		5 times the load current		



3 F-LBS motor

With the external power source, it charges the closing/opening spring of F - LBS.

12/17.5/24kV RMU F-LBS motor					
Rated voltage(Vn)	DC 24~30V	DC 110V	DC 220V	AC 100~130V	AC 200~250V
Load current(A)	≤ 9	≤ 2	≤ 1	≤ 2	≤ 1
Starting current(A)	3 times the load current		5 times the load current		

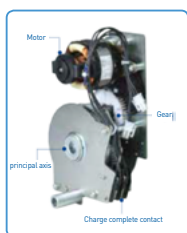
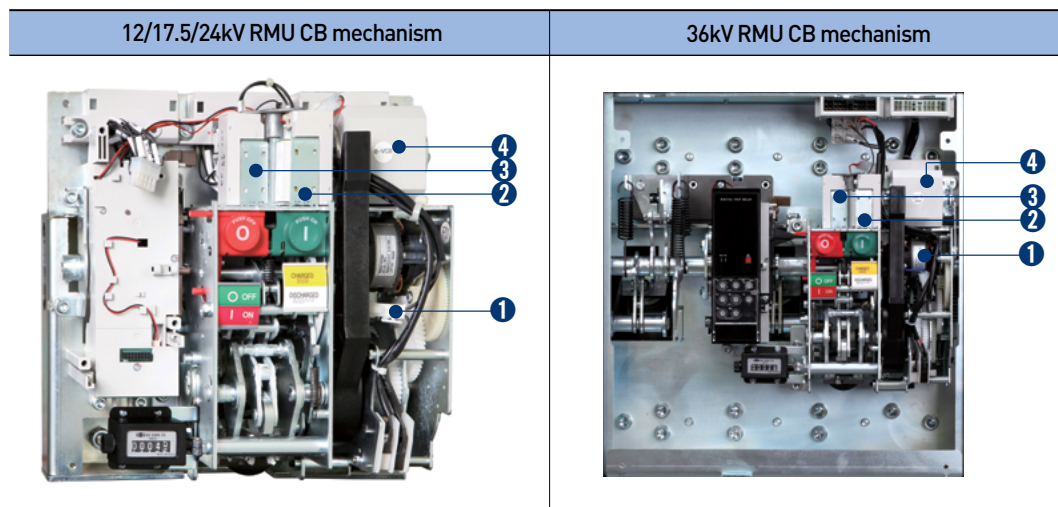


4 F-LBS trip coil

A device used to trip F - LBS in a remote place; it trips F - LBS by operating the coil when voltage is continuously applied or instantaneously supplied.

12/17.5/24kV RMU F-LBS trip coil				
Rated voltage(Vn)	DC 110V	DC 220V	AC 100~130V	AC 200~250V
Steady current(A)	≤ 3	≤ 2.5	≤ 3	≤ 2.5
Control voltage fluctuation range	70~110%		85~110%	

Optional components for CB mechanism



1 CB motor

- With the external power source, it charges the closing spring of CB. When charging is completed, the motor's control power is switched "OFF" by a built-in Limit S/W.

12/17.5/24/36kV RMU CB motor							
Rated voltage(Vn)	DC 24~30V	DC 48~60V	DC 110V	DC 220V	AC 48V	AC 100~130V	AC 200~250V
Load current(A)	≤ 5	≤ 3	≤ 1	≤ 0.5	≤ 3	≤ 1	≤ 0.5
Starting current(A)	5 times the load current						
Charging time	[5 seconds or less] Charge						
Charge completion contact	10A at 250VAC						



2 CB closing coil

- A control device to trip CB in a remote place; it trips a circuit breaker by operating the coil when voltage is continuously applied or instantaneously supplied (200ms or more).

12/17.5/24/36kV RMU CB closing coil							
Rated voltage(Vn)	DC 24~30V	DC 48~60V	DC 110V	DC 220V	AC 48V	AC 100~130V	AC 200~250V
Power consumption(W) Upon operation; inrush(Inrush)	200						
Power consumption(W) upon operation; inrush(Inrush)	≤ 5						

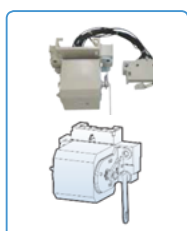


3 CB trip coil

- A control device to trip CB in a remote place; it trips a circuit breaker by operating the coil when voltage is continuously applied or instantaneously supplied (35ms or more).

*UVT Coil not applicable when a double trip coil is chosen

12/17.5/24/36kV RMU CB trip coil							
Rated voltage(Vn)	DC 24~30V	DC 48~60V	DC 110V	DC 220V	AC 48V	AC 100~130V	AC 200~250V
Power consumption(W) Upon operation; inrush(Inrush)	200						
Power consumption(W) Upon operation; inrush(Inrush)	≤ 5						



4 CB auxiliary contact

- A contact used to remotely monitor ON/OFF status of a circuit breaker.
- The auxiliary contact consists of 4a4b

12/17.5/24/36kV RMU CB auxiliary contact				
Type		Resistive load		Inductive load
Minimum current		DC5V, 1mA		
Contact capacity	AC	490V	5A	2.5A
		250V	10A	10A
		125V	10A	10A
	DC	250V	3A	1.5A
		125V	10A	6A
		30V	10A	10A



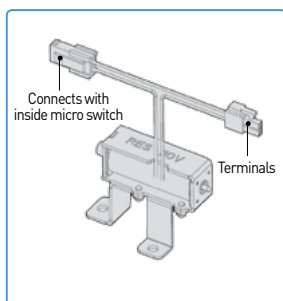
Under Voltage Trip device: Instantaneous type (Under Voltage Trip device: UVT)

- A device that automatically trips CB when the main line or control power voltage drops below the defined range. It is attached inside a circuit breaker.
- When no control power is supplied to UVT, CB's electrical and mechanical closing is not possible. For CB tripping, 65~85% of the rated voltage should be applied to both ends of the UVT coil.
- When the UVT Coil is selected, a double trip coil cannot be chosen. Thus, the trip coil location should be changed
- Dual trip coil can not be selected when UVT coil is selected and the trip coil position must be changed

UVT coil rated voltage and characteristics

12/17.5/24/36kV RMU CB UVT coil						
Rated voltage (Vn)		Operating voltage range(V)		Power consumption (VA or W)		Trip time (ms)
DC(V)	AC(V)	Pick up	Drop out	(Inrush)	(Steady-State)	
24~30	-	0.65~0.85 Vn	0.4~0.6 Vn	200	≤ 5	50
48~60	48					
100~130	100~130					
200~250	200~250					

Note) Operating voltage range is the minimum rating standard of each rated voltage (Vn)

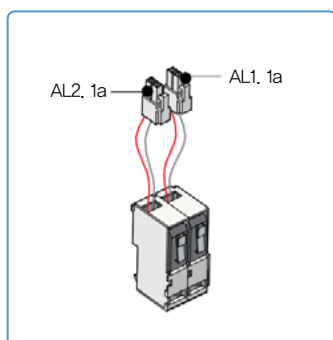


CB Remote Reset Switch: RES (Remote Reset switch: RES)

- It is an optional attachment that resets a circuit breaker in remote places when CB trip has occurred by OCR(Over Current Relay) owing to fault current.
- When a Trip Alarm(AL) switch is used, CB trip occurs. For CB re-closing, the circuit breaker should be mechanically reset. Such mechanical reset operation is possible with a switch in remote places.
- When the circuit breaker is reset with a micro-switch inside the circuit breaker, it automatically breaks the current supplied to the coil inside a remote reset switch(RES). For safety, it is recommended to use a Push Button Switch the operation switch. (Recommended Specifications of the Push Button Switch) (resistive load)
- AL2 and RES cannot be used simultaneously. Thus, there is only one option, either AL2 or RES.

Rated voltage and operating current of RES

12/17.5/24/36kV RMU CB RES coil			
Rated voltage (Vn)	Operating current (Max)		Operating time
AC 110~130V	AC	6A	40ms or less
AC/DC 110~125V	DC	5A	
AC/DC 200~250V	AC / DC	3A	

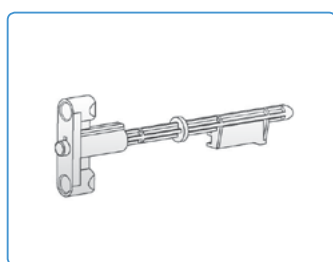


CB-Trip alarm contact (Trip Alarm Contact: AL)

- When a Circuit Breaker is tripped by OCR which operates against the fault current(Over Current Relay), Trip Alarm switch provides the information regarding the trip of Circuit Breaker by sending the electrical signal from the mechanical indicator on main cover of main Circuit Breaker or internal auxiliary switch. (Installed at the inside of Circuit Breaker)
- When a Circuit Breaker is tripped by fault current, a mechanical trip indicator(MRB, Manual Reset Button) pops out from the main cover and the switch(AL) which sends control signal electrically is conducted to output the information occurred from fault Circuit Breaker
- MRB and AL can be operated only when tripped by OCR, but doesn't be operated by Off button and OFF operation of trip coil.
- To re-close a Circuit Breaker after a trip, press MRB to reset it for closing.
- 2pcs of electrical trip switch(AL1, AL2, 1a) are provided(Optional)
- Trip alarm contact and MRB(Manual reset button) need to be purchased together
- AL2 and RES cannot be used simultaneously. Thus, there is only one option, either AL2 or RES..

Electrical characteristics of a trip alarm contact

12/17.5/24/36kV RMU CB trip alarm contact					
Rated voltage (A)	Non-inductive load(A)		Inductive load(A)		Inrush current
	Resistive load	Lamp load	Inductive load	Motor load	
8V DC	11	3	6	3	Max. 24A
30V DC	10	3	6	3	
125V DC	0.6	0.1	0.6	0.1	
250V DC	0.3	0.05	0.3	0.05	
250V AC	11	1.5	6	2	

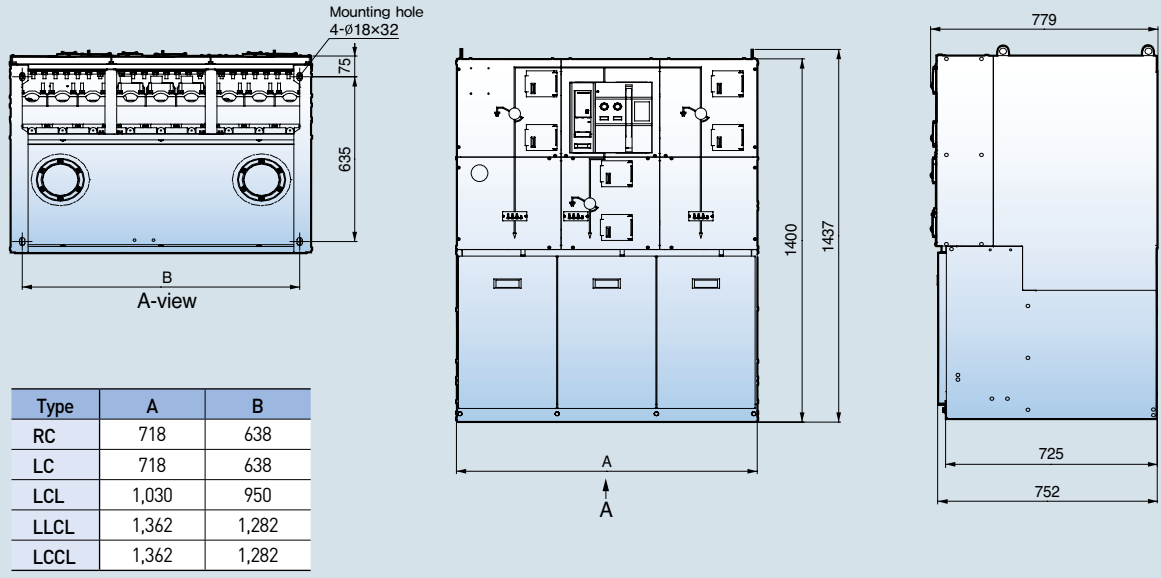


MRB (Manual Reset Button)

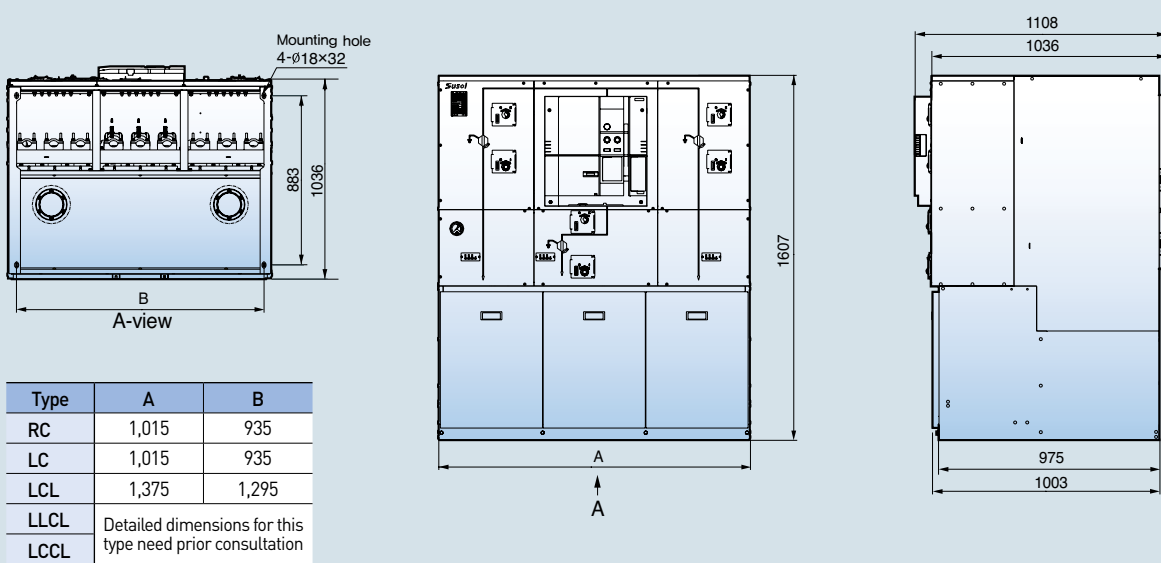
- It is a function which resets a Circuit Breaker manually when a Circuit Breaker is tripped by OCR.
- When a Circuit Breaker tripped by fault current, a mechanical trip indicator (MRB, Manual Reset Button)pops out from the main cover and the switch(SDE) which sends control signal electrically is conducted to output the information occurred from fault Circuit Breaker.
- MRB can be operated only by OCR but not by OFF operation of Circuit Breaker, To re-close a Circuit Breaker after a trip, press MRB to reset it for closing.

Dimensions

12/17.5/24kV Non-Extensible CB Feeder RMU



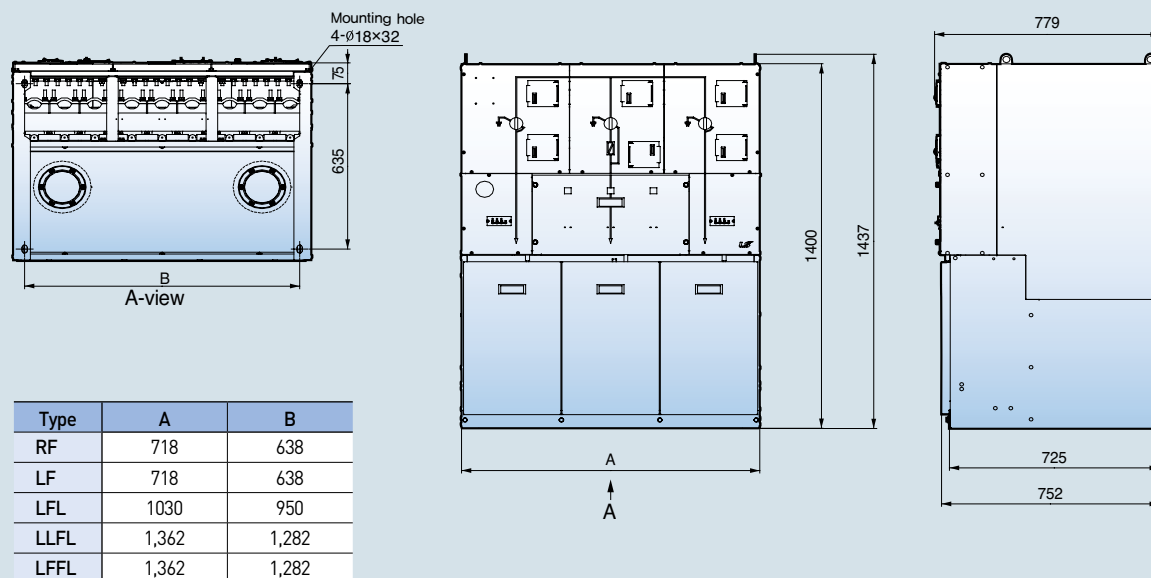
36kV Non-Extensible CB Feeder RMU



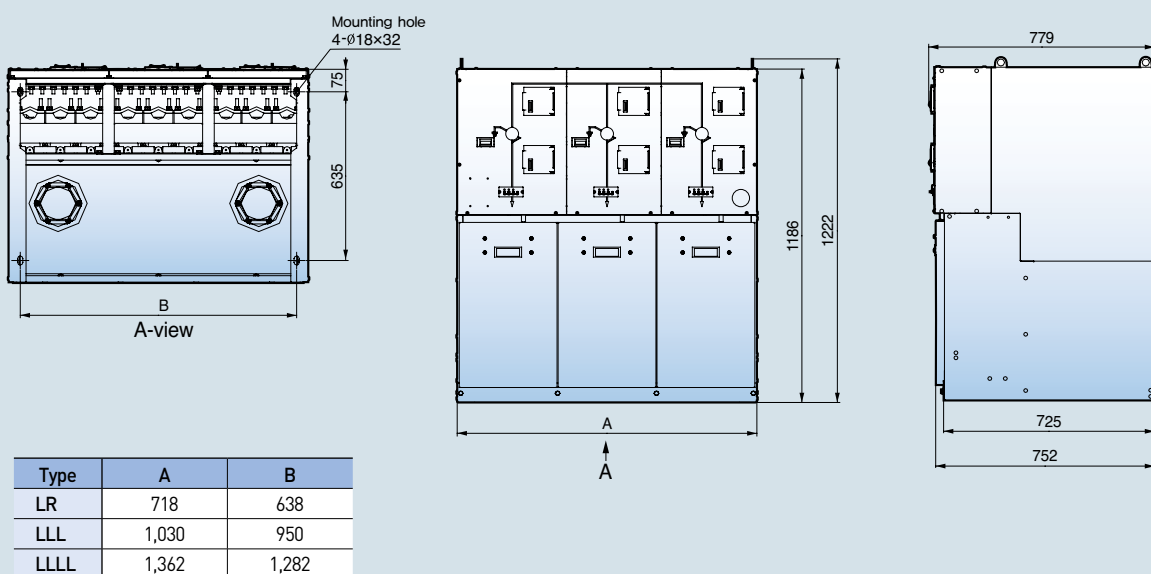
Ring Main Unit

Dimensions

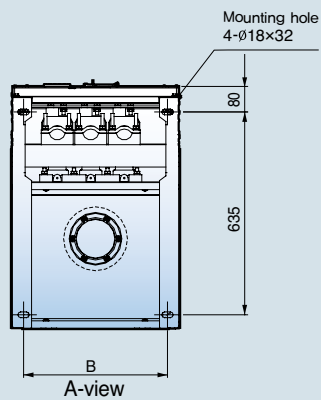
12/17.5/24kV Non-Extensible Switch-Fuse Feeder RMU



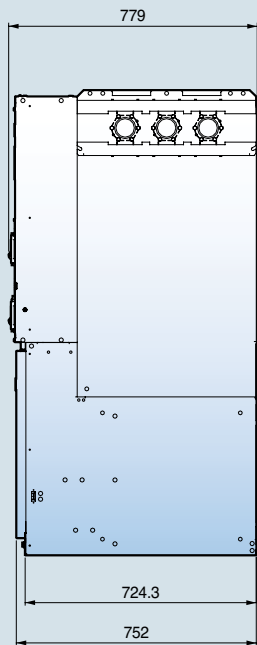
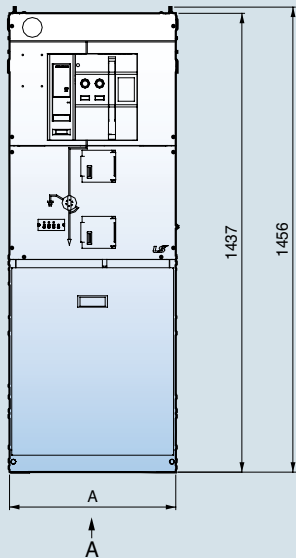
36kV Non-Extensible CB Feeder RMU



12/17.5/24kV Extensible RMU



Type	A	B
R	411	341
L	411	341
C	521	451
F	521	451





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 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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■ Head Quarter

LS-ro 127(Hogye-dong) Dongan-gu, Anyang-si, Gyeonggi-Do, 14119, Korea
Tel: 82-2-2034-4902, 4484, 4429 Fax: 82-2-2034-4555

■ Overseas Subsidiaries

- **LSIS(Dalian) Co., Ltd. (Dalian, Chin)**
Tel: 86-411-8730-7510 Fax: 86-411-8730-7560 E-Mail: jiheo@lsis.com
- **LSIS(Wuxi) Co., Ltd. (Wuxi, China)**
Tel: 86-510-8534-6666-8005 Fax: 86-510-8534-4078 E-Mail: sunhwank@lsis.com
- **LS VINA Industrial Systems Co., Ltd. (Hanoi, Vietnam)**
Tel: 84-4-6275-8055 Fax: 84-4-3882-0220 E-Mail: hjchoid@lsis.com
- **LSIS Middle East FZE (Dubai, U.A.E.)**
Tel: 971-4-886-5360 Fax: 971-4-886-5361 E-Mail: jungyongl@lsis.com
- **LSIS Europe B.V. (Amsterdam, Netherlands)**
Tel: 31-20-654-1420 Fax: 31-20-654-1429 E-Mail: europartner@lsis.com
- **LSIS Japan Co., Ltd. (Tokyo, Japan)**
Tel: 81-3-6268-8241 Fax: 81-3-6268-8240 E-Mail: jschuna@lsis.com
- **LSIS USA Inc. (Chicago, U.S.A.)**
Tel: 1-800-891-2941 Fax: 1-847-383-6543 E-Mail: sales.us@lsis.com

■ Overseas Branches

- **LSIS Shanghai Office (China)**
Tel: 86-21-5237-9977 Fax: 86-21-5237-7189 E-Mail: ygeo@lsis.com
- **LSIS Beijing Office (China)**
Tel: 86-10-5761-3127 Fax: 86-10-5761-3128 E-Mail: sson@lsis.com
- **LSIS Guangzhou Office (China)**
Tel: 86-20-8326-6784 Fax: 86-20-8326-6287 E-Mail: sojhtroh@lsis.com
- **LSIS Qingdao Office (China)**
Tel: 86-532-8501-6058 Fax: 86-532-8501-6057 E-Mail: sson@lsis.com
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Tel: 86-28-8670-3200 Fax: 86-28-8670-3203 E-Mail: yangcf@lsis.com
- **LSIS ShenYang Office (China)**
Tel: 86-24-2321-9050 Fax: 86-24-8386-7210 E-Mail: yangcf@lsis.com
- **LSIS Jinan Office (China)**
Tel: 86-531-8699-7826 Fax: 86-531-8697-7628 E-Mail: yangcf@lsis.com
- **LSIS Co., Ltd. Tokyo Office (Japan)**
Tel: 81-3-6268-8241 Fax: 81-3-6268-8240 E-Mail: jschuna@lsis.com
- **LSIS Co., Ltd. Rep. Office (Vietnam)**
Tel: 84-8-3823-7890 E-Mail: sjbaik@lsis.com
- **LSIS Moscow Office (Russia)**
Tel: 7-495-258-1466 Fax: 7-495-258-1467 E-Mail: jdpark1@lsis.com
- **LSIS Jakarta Office (Indonesia)**
Tel: 62-21-293-7614 E-Mail: dioh@lsis.com