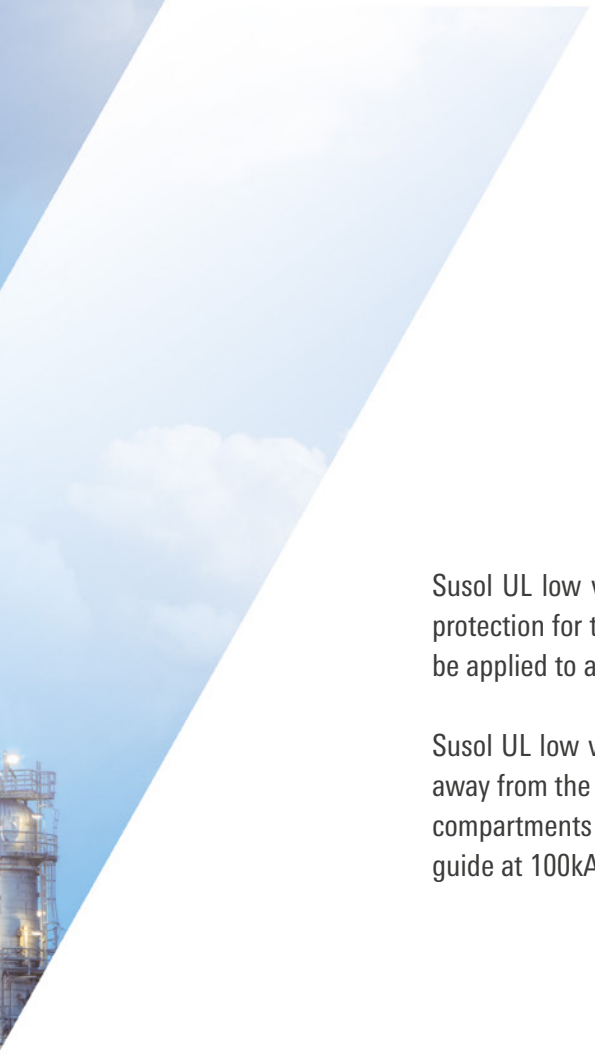
Beyond X™

Susol
UL LV Switchgear

LS ELECTRIC



Susol UL low voltage switchgear is designed to provide superior electrical distribution and protection for the facility. It is designed, built and tested to meet UL/ANSI standards and can be applied to a wide range of markets requiring high reliability and safety.

Susol UL low voltage switchgear is designed to safely contain and redirect arc flash energy away from the operator. LS's arc-resistant low voltage switchgear has been tested in all three compartments for a full 0.5 seconds (30 cycles), passing the ANSI/IEEE C37.20.7, Type 2B test guide at 100kA at 635V.

Contents

Overview

High reliability & safety

- High reliability for all applications
  - All essential protection and safety functions guaranteed
  - Compliance with UL/ANSI standards
    (UL 1558, ANSI C37.20.1, ANSI C37.51, ANSI C37.20.7)
- Arc-resistant structure designed to protect personnel and property in the working environment
  - Arc fault containment: up to 100kAIR at 635Vac
- Seismic qualification
  - IEEE 693 High level 2.5g
    (Special seismic certification valid up to 3.0g)
  - ICC ES AC 156 1.3g
    (Special seismic certification valid up to 2.0g)
- ANSI Type 2B accessibility
- NEMA 1 enclosure

Convenience & high performance

- Modular design
  - Simplified and easily stackable structure for quick assembly
  - Reduction of lead time and rationalization of installation cost
  - Flexible arrangements and easy modifications
- Continuity of service and durability guaranteed
- Short circuit withstand rating up to 100kA/1s at 635Vac
- Up to 6,000A continuous current for both main and vertical bus
- Adopted and tested with LS ELECTRIC low voltage devices for accurate and optimum operation
- Exclusive insulator designed for LS ELECTRIC switchgear
- Optimized dimensions for footprint reduction
  - Width: 19.68”(D-type), 21.65”(E-type), 43.3”(G-type)

Expertise

- LS guarantees the quality and technical excellence based on expertise and lengthy experience in the design and manufacture of electrical devices and switchgears
- LS responds rapidly to the requirements of our customers and provides competitive design and solutions for each project through close cooperation

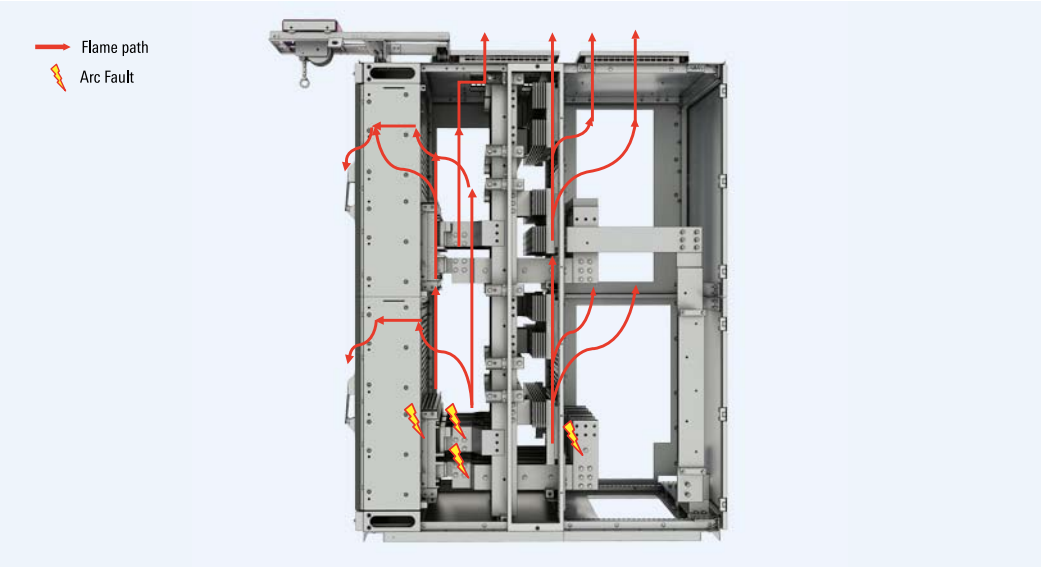
Applications

Building	・Data center ・Hospital ・University	・Large office building ・Large warehouse
Industry	・Oil and gas ・Petroleum ・Chemical ・Iron and steel ・Automobile	・Semiconductor ・Mining and metal ・Manufacturing ・Food and beverage ・Pharmaceutical
Utility / Public	・Power plants ・Wastewater and water treatment ・Airport	

Key features

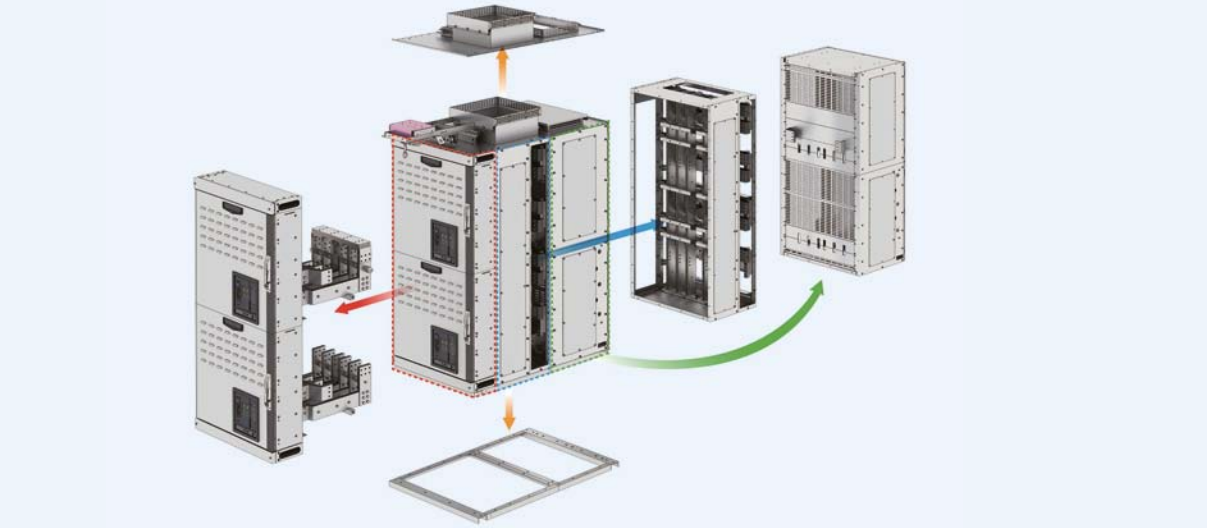
Arc resistant structure ready for type 2B class

The arc pressure relief vent at the top of the panel automatically opens when abnormal pressure is generated inside the section, helping to naturally reduce internal pressure. Although each compartment has a barrier, ventilation holes allow the relief vent to operate regardless of the arc fault location. The switchgear is engineered to meet ANSI Type 2B arc-resistant structure requirements. Even if the instrument compartment door adjacent to the arc fault is open, the exterior remains unaffected (note: this does not imply the instrument compartment door can be opened under actual operating conditions). The front vent is louvered to minimize potential harm to personnel in the event of an arc fault.



Modular design

Modular frame design makes it possible to have flexibility in the arrangements.
Susol UL LV switchgear is divided into three modules - front, middle and rear module. Front module includes power circuit breaker, and it is designed as an enclosure type. Enclosure system leads in empowering on time delivery, lead time reduction and simplification. Maximum 4 stacks of CB compartment are available in a section. Front module can be assembled using only a door accessory kit and a power circuit breaker cradle composing CB compartment. Customers can select and compose devices for each panel to maximize efficiency. Only 1 module can be ordered and it is also possible to order the components in assembled form.



LS low voltage devices inside

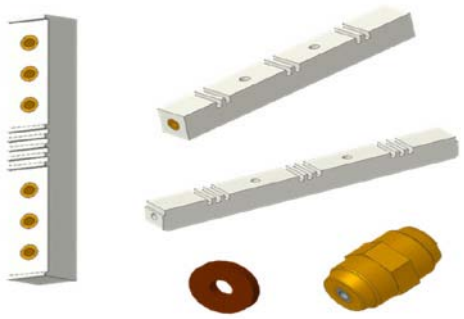
LS circuit breakers are designed for precise coordination, isolating only the source of abnormal power.
They offer long and reliable service life and are tested for short-circuit withstand capability. A variety of accessories are available for these breakers.

- Rated voltage: up to 635Vac
- Rated current: up to 6000A

Exclusive insulator for switchgear

All insulators used in busbar bracing structures are molded LS-only products, with LS guaranteeing insulation material performance. Designed to maintain all insulation distances in accordance with ANSI C37.20.1, they provide excellent product safety.

The use of standardized products minimizes human error and enables easy assembly.
A part list is provided for facilitate section assembly and reduce material waste. All assembly materials are UL -listed .



Standards

Susol UL low voltage switchgear conforms to the following standards:

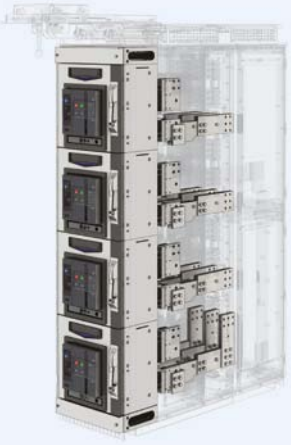
- UL 1558
- ANSI C37.20.1
- ANSI C37.51
- ANSI C37.20.7

Susol low-voltage power circuit breaker conforms to the following standards:

- ANSI C37.13, ANSI C37.16, ANSI C37.17, ANSI C37.50
- UL 1066 (cULus Listed)
- CSA C22.2 No.31-10

CB compartment 1-module

CB compartment ass'y



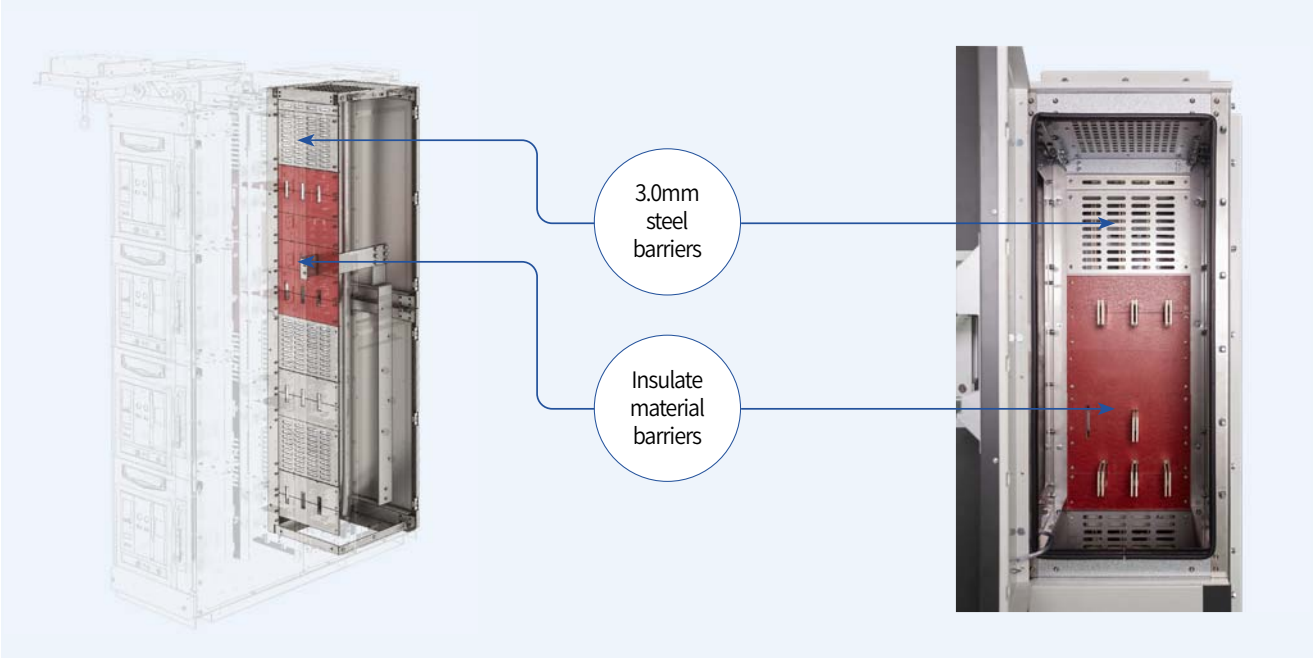
CB compartment in a section
(Maximum 4 stack available)

Product description

Structure features

Separated compartments

Each compartment is divided by metal partitions. CB compartment is designed as full metal enclosure in accordance with UL/ANSI standards. Thickness of sheet-metal that separates each compartment is more than 3.0mm. Bus compartment and cable compartment are separated by sheet-metal barrier and insulated plate partition for preventing arc fault from spreading and for maintaining availability of a power supply. Barriers between sections also can be provided if required. Safer, easier, and faster maintenance is possible.



Through-the-door design

The following functions can be performed without opening the compartment door - push on/off button of ACB, control the manual charging lever, withdraw and insert the ACB. The door can be completely opened when the ACB is under disconnected position.

Drawable design

A cradle is provided in the circuit breaker cell, with extendable rails to facilitate breaker insertion and withdrawal, allowing easy movement to the service position with minimal effort.

4-position draw-out design

Breakers can be positioned in service, test, disconnected, or withdrawn modes. Movement between service, test, and disconnected positions is controlled via a handle in the cradle, with a padlock provided at each position for user safety.

Interlocks

Interlocks are provided between breakers and between the device and the door.

Paint

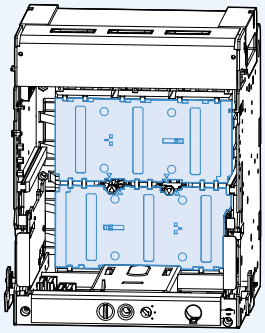
The standard color is gray (ANSI 61), with other color options available upon request.

Optional safety shutters [ST]

The automatic safety device protects the main circuit connectors by preventing hazardous external contact when the breaker is withdrawn. The shutter automatically opens when the ACB is inserted.

Through-the-door design

Cradle in the breaker cell

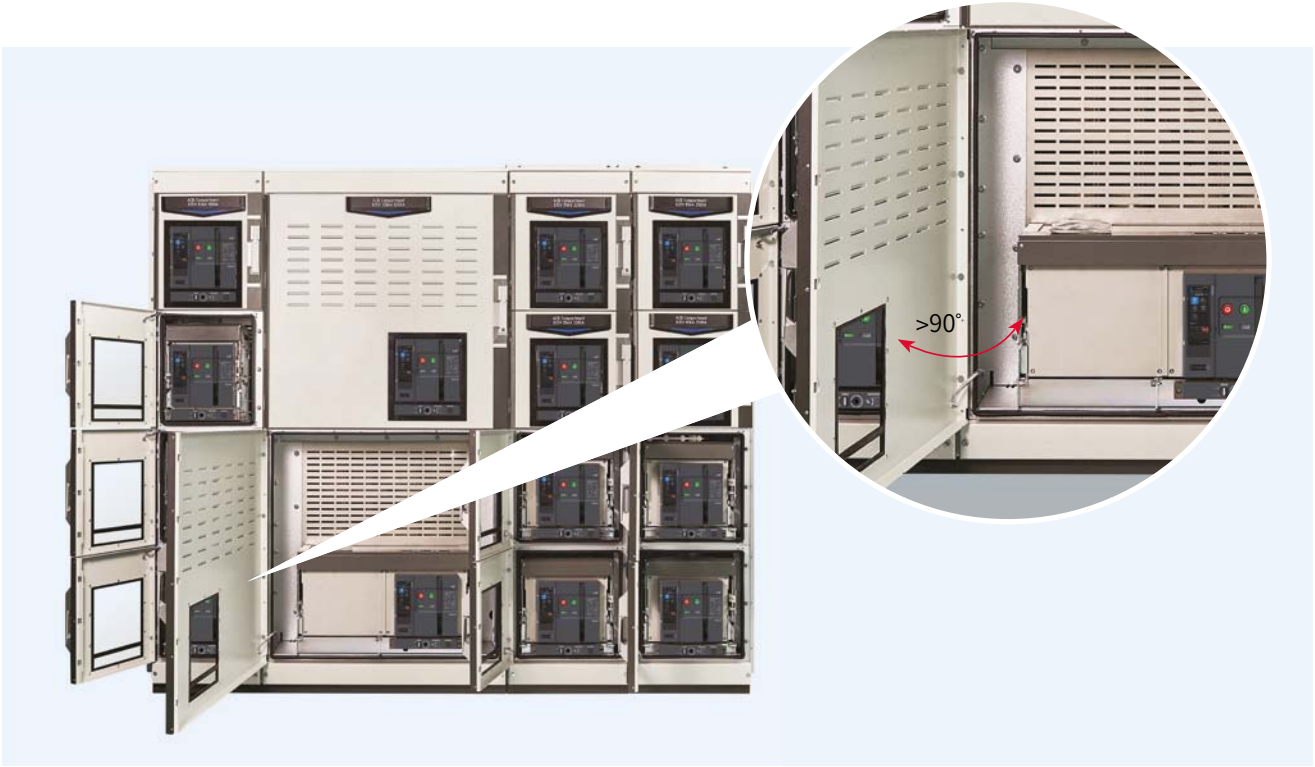


Safety shutter

User-friendly design

Hinged doors that open more than 90ì provide ample space for operation and maintenance. Switchgear can be installed regardless of side wall orientation, thanks to reversible LHS and RHS hinged doors. Doors of each compartment can be opened and closed individually, with robust handles and door locks ensuring high reliability.

Wireways exceeding 100 mm at the top and bottom of each panel facilitate convenient wiring between devices, instruments, and lamps, while enabling efficient control wire organization.



Bus features

Busbar design

The temperature rise performance of busbars meets the requirements of ANSI C37.20.1, C37.51 and all the busbars are silver plated. M12(8.8) high strength bolt is applied for both vertical and main bus, and spring washer and plain washer are applied. The minimum distance for air clearance is 1". For creepage distance, the minimum distance between phases is 2", and between phase and earth is 1". The thickness of busbar is ¼", and the width can be 3", 4", 5" or 6" depending on capacity. All the connection point is bolted joint.

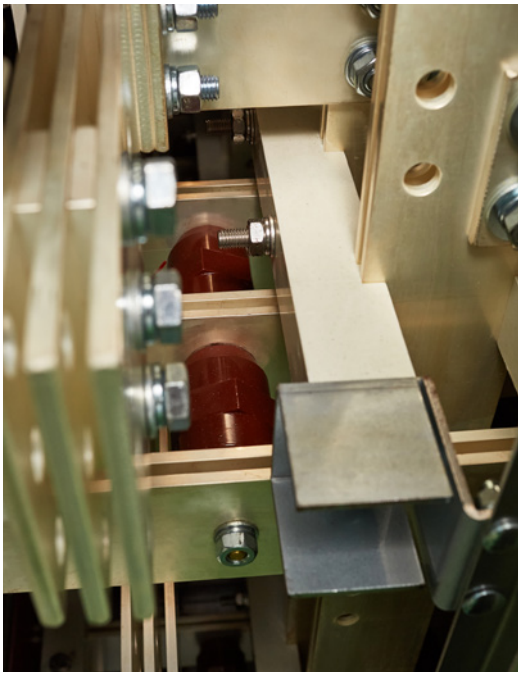
Main and ground bus bracing

All bus designs comply with UL and ANSI standards for a 65K temperature rise at 40°C ambient temperature.

Main bus ratings are 2000, 2500, 3200, 4000, 5000 and 6000A with bus bracing of 100kA/1s bus bracing for all types. (Contact us for higher specifications.)

Vertical bus ratings include 800, 1000, 1200, 2000, 2500, 3200, 4000, 4500, 4755, 5000, and 6000A, with bus bracing as follows: 65kA/1s for D-type, 85kA/1s for E-type, and 100kA/1s for G-type. (Contact us for higher specifications.)

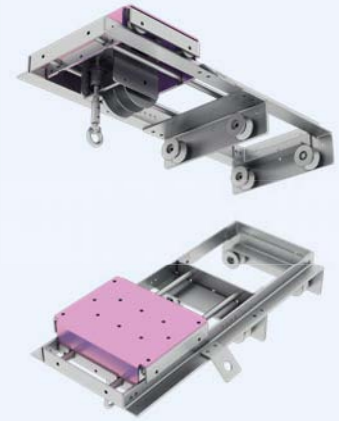
Neutral bus is rated at 100% of the main bus, with bracing identical to the main bus. Ground busbars have a cross-sectional area of ¼" × 4", a peak withstand current of 230kA, and an RMS current rating of 100kA/0.5 s.



Options

Optional overhead hoist

It is possible to provide an overhead hoist that can move along the rail installed on the upper part of the panel. Since it can be moved by rail without installing 1EA per section, 1 set per room can be installed for efficient operation. In addition, the maximum load is 300kgf, which is enough to carry even the heaviest models of ACB.



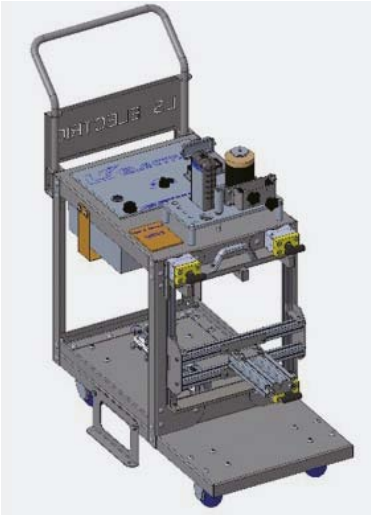
Over head hoist unit

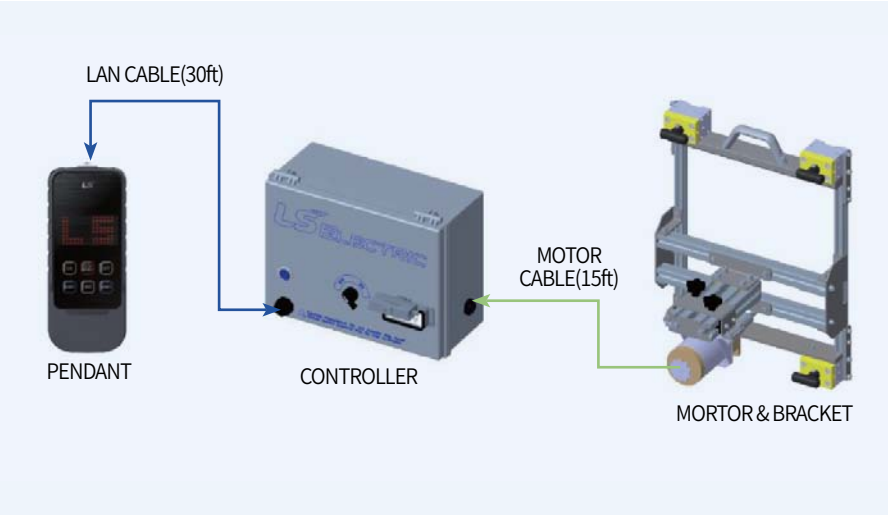
Hoist mounted on switchgear

Connection for moving to assemble

Optional Motorized Control Racking System [MCRS]

Motorized control racking enhances operator safety by increasing the distance from potential arc flash energy at the switchgear.

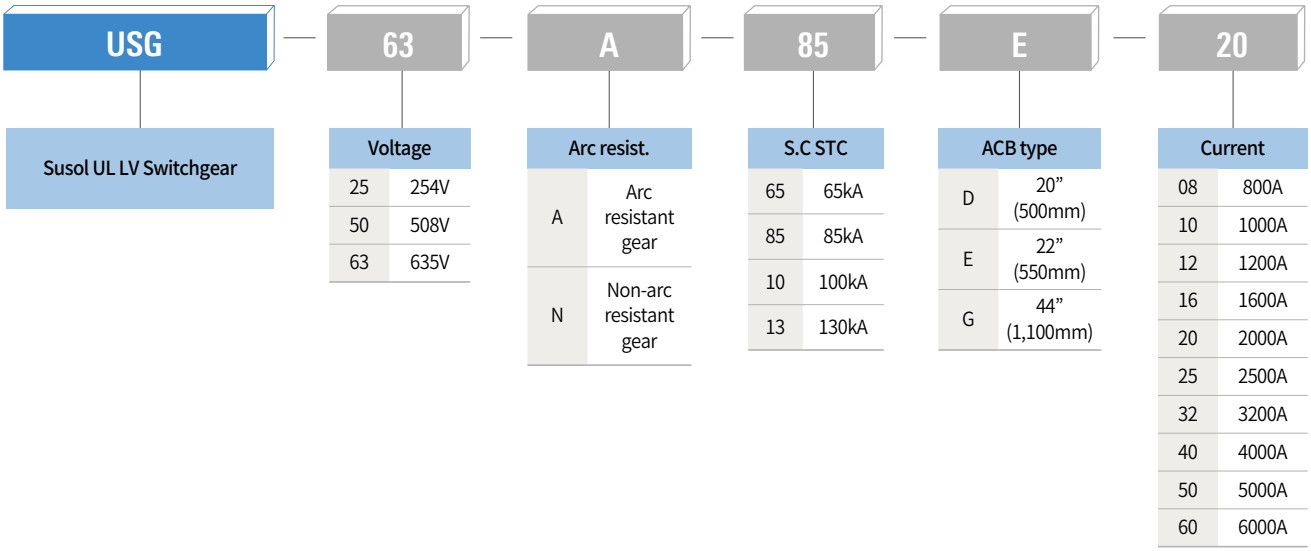




MCRS [External Motor Type]

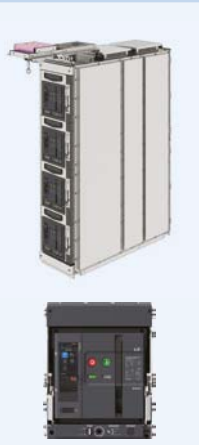
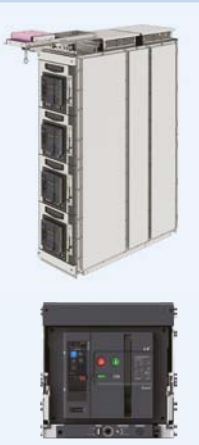
Technical data

Designation



- Susol Low Voltage Switchgear for the Americas can be ordered using the model names above.
- Rated voltage ranges from 254 V to 635 V, with enclosures classified as internal arc or non-arc type according to protection level.
- Busbar bracing allows selection from 65 kA to 130 kA, with enclosure sizes of 20", 22", and 44" available for each ACB type. (Contact us for 130 kA.)
- The last two digits of the model can be selected to indicate the representative rating of the switchgear, depending on main bus capacity.

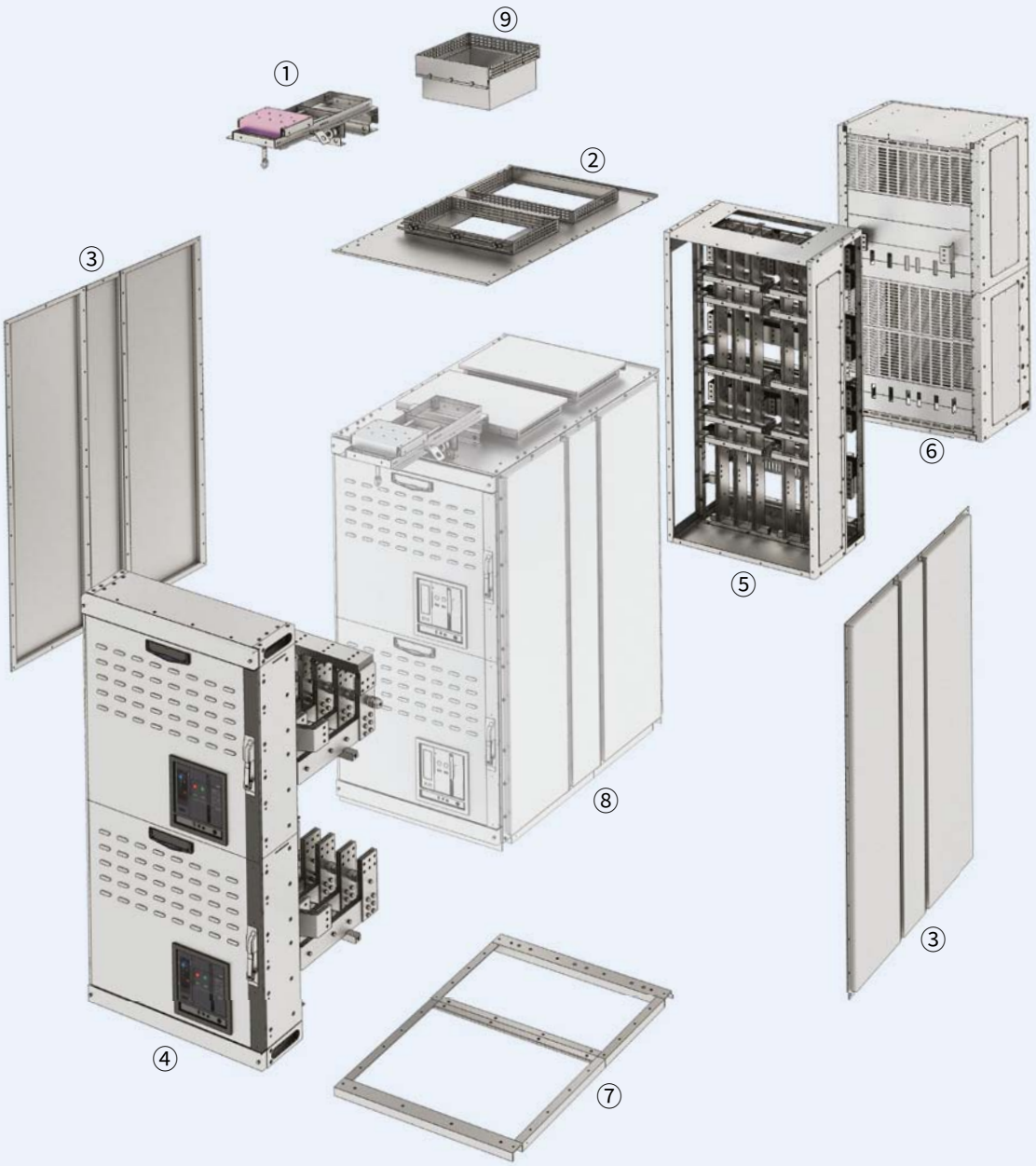
Ratings

Description			USG-□□D (D-type)	USG-□□E (E-type)	USG-□□G (G-type)
Type					
Rated voltage		V, rms	Up to 635 V		
Rated short circuit withstand current	H-BUS	kA, rms	100(@635V)	100(@635V)	100(@635V)
	V-BUS		65(@635V)	85(@635V)	100(@635V)
Duration time		sec	1	1	1
Stack			4 high		2 high
Rated current		A, rms	800, 1000, 1200, 1600	800, 1000, 1200, 1600, 2000, 2500/3200	3200, 4000, 5000, 6000
Frequency		Hz	60		
Insulation level	Power frequency	kV, rms	2.2		
Enclosure protection			NEMA 1		
Standard size	W	Inch (mm)	19.68 Note 1 (500)	21.65 Note 1 (550)	43.3 (1100)
	H	Inch (mm)	91.73 (2330)		
	D	Inch (mm)	62 Note 2 (1575)		71.85 Note 2 (1825)
Internal arc rating (ANSI TYPE 2B)			-		100kA, 0.5s, 635V
Standards			UL 1558, ANSI C37.20.1, ANSI C37.51, ANSI C37.20.7		

Note) 1. The width in the ratings table is the minimum size. Depending on the specifications of devices such as lamps, relays, and TTM(Test terminals) installed on the front door, the width can be extended up to a maximum of 31.5 inches (800 mm).
2. The depth in the ratings table is the minimum size. Depending on specifications such as the number of cables per circuit breaker and the need for additional space for rear cable connections, the depth can be extended up to a maximum of 102.36 inches (2600 mm).

Structure

Structure



① Over head ACB lifter
② Top cover ass'y (Ventilation module/ Arc relief cover)
③ Side cover plate (3 pieces)
④ Front module ass'y (CB comp. module & Cable race way)
⑤ Middle module ass'y (Bus comp. module, 6000A)
⑥ Rear module ass'y (Cable comp., Ground busbar)
⑦ Channel base ass'y (W 1,100)
⑧ G-type 6000A total ass'y
⑨ Optional fan

Susol UL listed/ANSI certified low-voltage power circuit breaker

Premium Susol ACB meets your demands for high breaking capacity with full line-up up to 6000A, all in optimized frame sizes for panel design. Various accessories and connection methods realize user-friendly handling. Susol ACB provides the total solution with an advanced trip relay for measurement, diagnosis, analysis, and communication as well as protective functions for absolute protective coordination and electric power monitoring system.

- Susol ACB low voltage power circuit breakers are designed and built to the following standards.
  - ANSI C37.13, ANSI C37.16, ANSI C37.17, ANSI C37.50, UL 1066 (cULus Listed), CSA C22.2 No.31-10
- Modular design
- 3 compact frame sizes that enables users to design panels of optimal volume
- High (130kA) breaking capacity full line-up to 6000A at 508Vac
- Satisfy the needs for compact sized panels
- N-Phase conducting capacity 100%
- Monitor temperatures for safety (Optional)
- Easy installation of accessories
- Interchangeable trip unit and rating plug
- Intelligent trip relay with various advanced functions for protection, measurement, diagnosis, analysis and communication

Ratings

Type					Susol UAS-□□D	
AF					08	16
Rated current (CT Ration)	(A)			at 40°C	800	1600
Rated current (Available rating plug)	(V)			at 40°C	400 600 630 800	800 1000 1200 1250 1600
Rated maximum voltage	(V)				254V / 508V / 635V	
Frequency	(Hz)				UAS: 50/60	
Number of poles	(P)				3P / 4P	
Type of trip relay (Electronic trip device)					N, A, P, S (4 type)	
Rated short circuit current (Sym.) (Duty: O-15s-CO)	(kA)	With instantaneous	AC	847V(60Hz)	-	
				635V	65	
				508V	85	
				254V	85	
		Without instantaneous	AC	847V(60Hz)	-	
				635V	65	
				508V	65	
				254V	65	
Rated making current (X/R=more than 6.6)	(kA peak)	With instantaneous	AC	847V(60Hz)	-	
				635V	149.5	
				508V	195.5	
				254V	195.5	
		Without instantaneous	AC	847V(60Hz)	-	
				635V	149.5	
				508V	150.5	
				254V	151.5	
Rated short time current	(kA)		AC		60	
Operating time (t)	(ms)	Breaking time			Less than 30ms	
		Opening time			Less than 50ms	
		Closing time			Less than 80ms	
		Charging time			Less than 5 sec.	
Endurance rating C/O Cycles) (Without maintenance)	(Cycles)	Mechanical (60 times per hour)			12,500	
		Electrical (30 times per hour)			2,800	
Weight (Include charging motor)	lb (kg)	Drawout type	Main Body with Cradle	3P	154 (70)	
				4P	187 (85)	
			Only Cradle	3P	71 (32)	
				4P	84 (38)	
		Fixed type		3P	77 (35)	
				4P	99 (45)	
External dimension 	Draw-out type	in (mm)	H×W×D	3P	16.93×13.15×16.02 (430×334×407)	
				4P	16.93×16.50×16.02 (430×419×407)	
	Fixed type	in (mm)	H×W×D	3P	11.81×11.81×11.61 (300×300×295)	
				4P	11.81×15.16×11.61 (300×385×295)	
Enclosure dimension		in (mm)	H×W×D	3P	19.69×15.75×13.39 (500×400×340)	
				4P	19.69×19.69×13.39 (500×500×340)	
Operation temperature					-13°F ~ 140°F (-25°C ~ 60°C)	
Certified standards					UL 1066 / ANSI C37.13	

Susol UAH-□□E / UAW-□□E				
08	16	20	25	32
800	1600	2000	2500	3200
400	800	1000	1200	1600
600	1000	1200	1250	2000
630	1200	1250	1600	2500
800	1250	1600	2000	3000
	1600	2000	2500	3200
254V / 508V / 635V / 847V(UAW)				
UAH/UAW: 50/60				
3P / 4P				
N, A, P, S (4 type)				
85				
85				
100				
100				
85				
85				
85				
85				
195.5				
195.5				
230				
230				
195.5				
195.5				
195.5				
195.5				
85				
Less than 30ms				
Less than 50ms				
Less than 80ms				
Less than 5 sec.				
12,500				5,000
2,800				1,000
214 (97) 269 (122)			245 (111) 309 (140)	326 (148) 414 (188)
99 (45) 121 (55)			123 (56) 152 (69)	205 (93) 256 (116)
101 (46) 126 (57)			110 (50) 137 (62)	196 (89) 249 (113)
16.93×16.22×16.02 (430×412×407)				
16.93×20.75×16.02 (430×527×407)				
11.81×14.88×11.61 (300×378×295)				
11.81×19.41×11.61 (300×493×295)				
19.69×19.69×13.39 (500×500×340)				
19.69×24.21×13.39 (500×615×340)				
-13°F ~ 140°F (-25°C ~ 60°C)				
UL 1066 / ANSI C37.13				

Susol UAH-□□G			
32	40	50	60
3200	4000	5000	6000
1600	2000	2500	3000
2000	2500	3000	3200
2500	3000	3200	3600
3000	3200	3600	4000
3200	3600	4000	5000
	4000	5000	6000
254V / 508V / 635V			
UAH: 50/60			
3P / 4P			
N, A, P, S (4 type)			
-			
100			
130			
130			
-			
100			
100			
100			
-			
230			
299			
299			
-			
230			
230			
230			
100			
Less than 30ms			
Less than 50ms			
Less than 90ms			
Less than 5 sec.			
5,000			
1,000			
489 (222) 626 (284)			
276 (125) 355 (161)			
227 (127) 287 (130)			
18.11×30.91×16.02 (460×785×407)			
18.11×39.96×16.02 (460×1015×407)			
11.81×29.57×11.61 (300×751×295)			
11.81×38.62×11.61 (300×981×295)			
31.50×32.48×13.39 (800×825×340)			
31.50×41.54×13.39 (800×1055×340)			
-13°F ~ 140°F (-25°C ~ 60°C)			
UL 1066 / ANSI C37.13			

Trip relay (OCR)

The trip relay of Susol ACB provides the additional protection functions for voltage, frequency, unbalance, and others in addition to main protection functions for over current, short-circuit, ground fault. It supports the advanced measurement functions for voltage, current, power, electric energy, harmonics, communication function, and others. Analog trip function interlocked with mechanism enhances the durability as well as the breaking capacity of the ACB. Zone selective interlocking function makes the protective coordination more simple and thermal memory can be applied to various loads.

Trip relays are classified according to function.

Trip relays are classified according to their uses and functions to maximize customers' satisfaction. They are also easy to installation for customers' convenience.

- Protection : overload, short current, ground fault, earth leakage, under voltage, over voltage, under frequency, over frequency, reverse power, unbalance, etc.
- Measurement: voltage, ampere, power, energy, frequency, power factor, harmonics, etc.
- Event & fault recording: Max. 256 events & faults.
- Communication: Modbus/RS-485, Profibus-DP.

Trip relay types

		N-Type	A-Type	P-Type	S-Type
Externals					
Current relay		• L, S, I, G	• L(N), S, I, G, PTA, Gext	• L(N), S1, I, G, PTA, Gext • D, S(V)1, IU	• P type Current relay • S(V)2
Voltage relay		-	-	• UV1, OV1, RV, VU	• P type Voltage relay • UV2, OV2
Frequency relay		-	-	• UF1, OF1, ROCOF	• P type Frequency relay • UF2, OF2
Power relay		-	-	• RP, RQ1, OP, OQ, UP	• P type Power relay • RP, RQ1, RQ2
Group control		-	-	-	• A,B (Control by DI and communication)
Relay fine tuning		-	-	• Possible (Adjust knob and freely set operating value current)	• Possible (Freely set operating value current)
ERMS		-	• Control by DI and Communication	• Control by DI and Communication	• Control by DI and Communication
IDMTL Support		-	• L relay element (Thermal, DT, SIT, VIT, EIT, EIT50)	• L relay element (Thermal, DT, SIT, VIT, EIT, EIT50)	• L relay element (Thermal,DT,SIT,VIT, EIT,EIT50)
Trip information Maintenance LED		• L, S, I, G • SP : Self protection	• L, S, I, G/Gext/PTA, SP	• L, S, I, G/Gext/PTA, SP	• L, S, I, G/Gext/PTA, SP
Incident record	Screen	-	• Display of 32 incident events (Incident phase/current/time)	• Display of 127 incident events (Incident phase/current/time)	• Display of 127 incident events (Incident phase/current/time)
	Memory	-	• Saves 127 incident events • Saves 6 incident waveforms (In case of operation by Self Power, incident waveform is not saved)	• Saves 127 incident events • Saves 6 incident waveforms (In case of operation by Self Power, incident waveform is not saved)	• Saves 127 incident events • Saves 6 incident waveforms (In case of operation by Self Power, incident waveform is not saved)

Trip relay (OCR)

		N-Type	A-Type	P-Type	S-Type
Measuring function		• Current [R/S/T/N]	• Current [R/S/T/N] • External CT current • Current phase (Based on the phase A) • Vector Sum zero sequence current • Imbalance negative sequence current • Previous current demand for each phase	• 3 phase voltage, line - to - line voltage • Current (R/S/T/N) • Vector Sum zero sequence Current • 3 phase voltage, line - to - line voltage • Frequency • External CT current • Voltage/Current phase (Based on the phase A) • Total/Each phase power (P, Q, S) • Total/Each phase power factor • Positive/Negative, Effective/ Reactive/Apparent energy • Vector sum zero sequence voltage • Vector sum zero sequence current • Positive, Negative sequence voltage • Positive, Negative sequence current • Voltage imbalance rate • Current imbalance rate • Previous current demand for each phase • Previous apparent, reactive and active power demand	3 phase voltage, line - to - line voltage • Current (R/S/T/N) • Vector Sum zero sequence Current • 3 phase voltage, line - to - line voltage • Frequency • External CT current • Voltage/Current phase (Based on the phase A) • Total/Each phase power (P, Q, S) • Total/Each phase power factor • Positive/Negative, Effective/ Reactive/Apparent energy • Vector sum zero sequence voltage • Vector sum zero sequence current • Positive, Negative sequence voltage • Positive, Negative sequence current • Voltage imbalance rate • Current imbalance rate • Previous current demand for each phase • Previous apparent, reactive and active power demand
Accuracy degree of measur-ement	Current	• 0.5%	• 0.5%	• 0.5%	• 0.5%
	Voltage	-	-	• 0.5%	• 0.5%
	Power	-	-	• Class 1 (IEC 62053 - 21, 22)	• Class 1 (IEC 62053 - 21, 22)
	Frequency	• 50Hz or 60Hz	• 50Hz or 60Hz	• 0.1% (10 ~ 200Hz)	• 0.1% (10 ~ 200Hz)
PQ function		-	• Voltage/Current harmonics harmonics 63rd • Current THD, TDD, K – Factor	• Voltage/Current harmonics harmonics 63rd • Voltage THD • Current THD, TDD, K – Factor	• Voltage/Current harmonics harmonics 63rd • Voltage THD • Current THD, TDD, K – Factor
Measurement record		-	• Max Ext Io • Max Current demand • Max Io • Max In • Max Max internal temperature	• Max Current demand • Demand for max apparent, reactive and active power • Max active power • Max Vo • Max Io • Max Ext Io • Max In • Max internal temperature	• Max Current demand • Demand for max apparent, reactive and active power • Max active power • Max Vo • Max Io • Max Ext Io • Max In • Max internal temperature
Real time waveform		• Using USB communication	• Using USB/RS485 communication	• Using USB/RS485 communication • Using LCD screen	• Using USB/RS485 communication • Using LCD screen

* N type can check measurement function, measurement record, and PQ function through USB communication.

		N-Type	A-Type	P-Type	S-Type
Communication		• USB (For site operator) • NFC (Near Field communication)	• USB (For site operator) • RS485/Modbus (Communication type Only))	• USB (For site operator) • RS485/Modbus • BLE (Bluetooth, Option)	• USB (For site operator) • RS485/Modbus • BLE(Bluetooth) • NFC (Near Field communication)
Power		• Self Power (Operates when it is higher than 30% of rated current by single phase load)	• Self Power (Operates when it is higher than 30% of rated current by single phase load) • AC/DC 88~264V • DC 24V/48V	• Self Power (Operates when it is higher than 50% of rated current by single phase load) • AC/DC 88~264V	• Self Power (Operates when it is higher than 50% of rated current by single phase load) • AC/DC 88~264V
Event record		-	• 255 kinds including change of device status (Information, status, date and time)	• 255 kinds including change of device status (Information, status, date and time)	• 255 kinds including change of device status (Information, status, date and time)
Clock		-	• RTC embedded (Back up with battery)	• RTC embedded (Back up with battery)	• RTC embedded (Back up with battery)
Other LED		• Run, Alarm, Self diagnosis	• Run, Alarm, Self diagnosis, Communication	• Run, Alarm, Self diagnosis, Communication	• Run, Alarm, Self diagnosis, Communication
Operating button		• Reset button	• Reset/Menu/Tap/Up, Down/ Enter	• Reset button • LCD Touch	• Reset button • LCD Touch
Self diagnosis	LED	• RUN/AL LED blinking (Red ↔ Blue blinking)	-	• RUN/AL LED blinking (Red ↔ Blue blinking)	• RUN/AL LED blinking (Red ↔ Blue blinking)
	LCD	-	• Displays relevant Segment or error number at LCD	• Can check at self diagnosis screen on LCD	• Can check at self diagnosis screen on LCD
	List	• Battery Low Alarm: Occurs when internal battery is not inserted or battery voltage is low. • Rating Plug Unmatched or Error: Rating Plug is not assembled or there's an error with Rating Plug. • Ampere Frame Error: Value of Rating Plug is not within 45 ~ 100% of AF. • MTD Fail (Wiring check): STU is not assembled with MTD or Trip coil is disconnected. • Factory Cfg Error: Factory mode setting is wrong. • Device Type Error: Rating Plug information is different from CT information. • Over Heat Error: Internal temperature of CPU is over 100 degree (N/A type) or 115 degree (P/S type) • Contact Wear Alarm: Contact wear rate is over 80% • Electrical Open Count Over Alarm: Electrical Open Count is over the tolerable degree of 80%. • Mechanical Open Count Over Alarm: Mechanical Open Count is over the tolerable degree of 80% • RTC Error: There is an error in the internal RTC information. • Memory Error: Duplicated internal setting saved at internal nonvolatile memory was damaged. • CT disconnection Error: CT disconnection occurred (Each phase is monitored). • ROM Err: Occurs when there is a problem with the software ROM • RAM Err: Occurs when there is a problem with the software RAM • CLOCK Err: Occurs when there is a problem with the software clock • PROGRAM Cnt. Err: Occurs when there is a problem with the software program counter • CPU Reg. Err: Occurs when there is a problem with the software CPU Register			

* N type can check the event records through USB communication

Susol ACB (Power circuit breaker)

Ordering - Breaker and accessories

UAS — **16** **D** **3** — **16** **A**

Frame type

Frame size

08	800AF
16	1600AF

Phasing

D	3/4P standard RST(N)
W	4P reversed NRST

Poles

3	3P
4	4P

Sensor rating

04~08	400A~800A
08~16	800A~1600A

Mounting and terminal

	Mounting
A	Drawout
	Fixed
H	Horizontal terminals
V	Vertical terminals
M	Horizontal for line
	Vertical for load
N	Vertical for line
	Horizontal for load
P	Front terminal
G	Horizontal-con type
W	Vertical-con type

UAH — **32** **E** **3** — **32**

Frame type

Frame size

08	800AF
16	1600AF
20	2000AF
25	2500AF
32	3200AF
32	3200AF
40	4000AF
50	5000AF
60	6000AF

Phasing

E	3/4P standard RST(N)
X	4P reversed NRST
G	3/4P standard RST(N)
Z	4P reversed NRST

Poles

3	3P
4	4P
3	3P
4	4P

Sensor rating

04~08	400A~800A
08~16	800A~1600A
10~20	1000A~2000A
12~25	1200A~2500A
16~32	1600A~3200A
16~32	1600A~3200A
20~40	2000A~4000A
25~50	2500A~5000A
30~60	3000A~6000A

* Terminals for P type must be ordered separately
* G and W types are applicable to D-frame only
* Front terminal is only available for 800~2000A
* 3200AF(E, X), 6000AF(G,Z) offers only vertical type terminals (Busbar).
* 6000AF is only available for drawout type

UAW — **32** **E** **3** — **32**

Frame type

Frame size

08	800AF
16	1600AF
20	2000AF
25	2500AF
32	3200AF

Phasing

E	3/4P standard RST(N)
X	4P reversed NRST

Poles

3	3P
4	4P

Sensor rating

04~08	400A~800A
08~16	800A~1600A
10~20	1000A~2000A
12~25	1200A~2500A
16~32	1600A~3200A

UAA — **16** **D** **3** — **00**

Frame type

Frame size

08	800AF
16	1600AF
08	800AF
16	1600AF
20	2000AF
25	2500AF
32	3200AF
32	3200AF
40	4000AF
50	5000AF
60	6000AF

Phasing

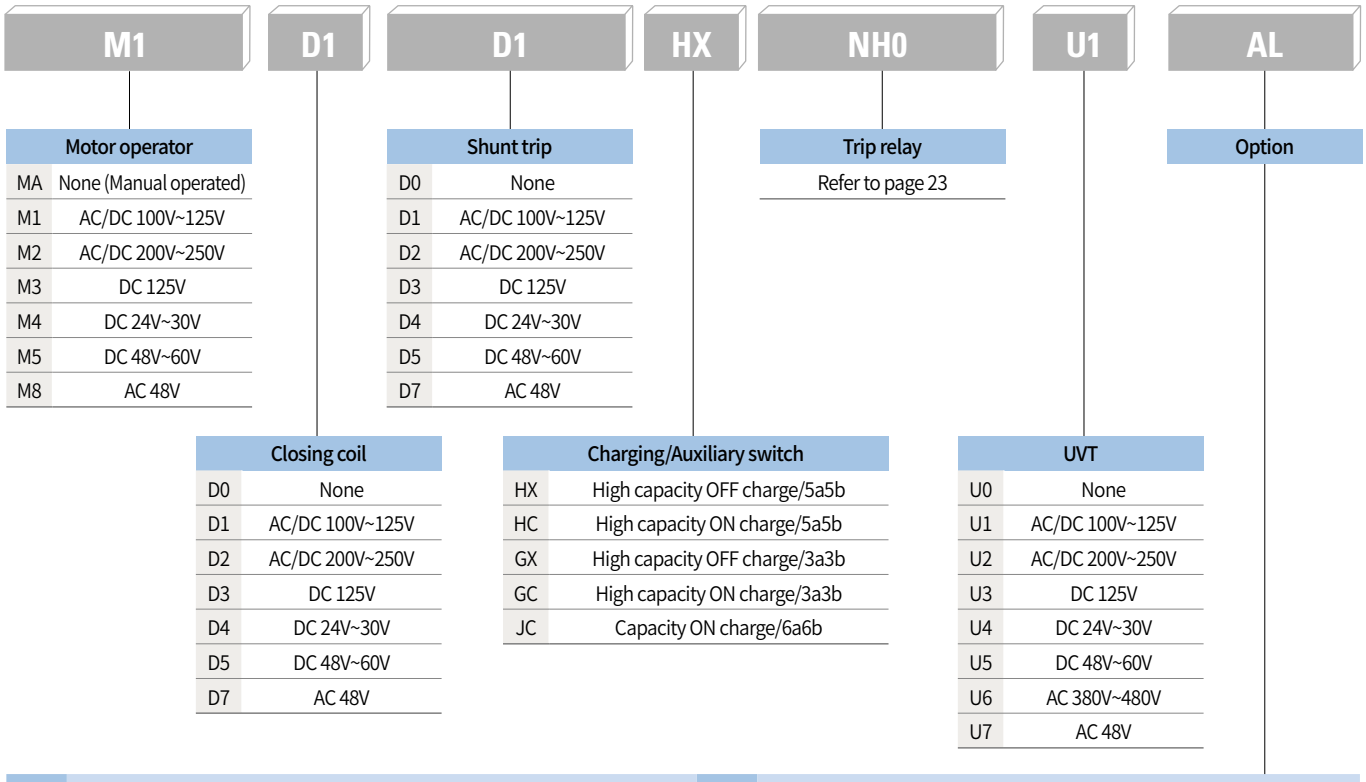
D	3/4P standard RST(N)
W	4P reversed NRST
E	3/4P standard RST(N)
X	4P reversed NRST
G	3/4P standard RST(N)
Z	4P reversed NRST

Poles

3	3P
4	4P

Sensor rating

Not applied



Motor operator	
MA	None (Manual operated)
M1	AC/DC 100V~125V
M2	AC/DC 200V~250V
M3	DC 125V
M4	DC 24V~30V
M5	DC 48V~60V
M8	AC 48V

Shunt trip	
D0	None
D1	AC/DC 100V~125V
D2	AC/DC 200V~250V
D3	DC 125V
D4	DC 24V~30V
D5	DC 48V~60V
D7	AC 48V

Trip relay
Refer to page 23

Option

Closing coil	
D0	None
D1	AC/DC 100V~125V
D2	AC/DC 200V~250V
D3	DC 125V
D4	DC 24V~30V
D5	DC 48V~60V
D7	AC 48V

Charging/Auxiliary switch	
HX	High capacity OFF charge/5a5b
HC	High capacity ON charge/5a5b
GX	High capacity OFF charge/3a3b
GC	High capacity ON charge/3a3b
JC	Capacity ON charge/6a6b

UVT	
U0	None
U1	AC/DC 100V~125V
U2	AC/DC 200V~250V
U3	DC 125V
U4	DC 24V~30V
U5	DC 48V~60V
U6	AC 380V~480V
U7	AC 48V

Code	Description		Code	Description	
AL	AL1+MRB		K	K1	Key lock
A1	AL1+MRB +RES (AC110~130V) *AC only		K2	K2	Key Interlock set
A2	AL1+AL2 +MRB		K3	K3	Key Interlock double
A3	AL1+MRB +RES (DC110~125V) *DC only		K4	K4	Key lock (Same key)
A4	AL1+MRB +RES (AC200~250V) *AC only		K5	K5 Note 4	Profalux lock (CAMLOCK type)
A5	AL1+MRB +Auto reset		K6	K6 Note 4	Kirkkey lock (CAMLOCK type)
A6	AL1+AL2 +MRB +Auto reset		K7	K7 Note 4	Kirkkey lock (CN-22 type)
A7	AL1+MRB +RES (DC110~125V) +Auto reset *DC only		R	RCS	Ready to close switch
A8	AL1+MRB +RES (AC200~250V) +Auto reset *AC only		T	TM	Temperature monitoring
A9	AL1+MRB +RES (AC110~130V) +Auto reset *AC only		H1	SHT2 Note 2	AC/DC 100V ~125V, Double shunt coil
S	CS2	Charge switch communication	H2		AC/DC 200V ~250V, Double shunt coil
B	B	Lockable On/Off button cover	H3		DC 125V, Double shunt coil
M	MI	Mechanical interlock	H4		DC 24V ~30V, Double shunt coil
D	DI or MOC	Door interlock or MOC (Mechanism operated cell switch)	H5		DC 48V ~60V, Double shunt coil
(-V)	Without VDM module (External type VDM is required to order)		H7		AC 48V, Double shunt coil

N01	A4 (AL1+MRB +RES(AC200~250V))+B(Lockable On/Off button cover)+K(Key lock)+R(Ready to close switch)+M(Mechanic interlock)+E(Spring auto release)
N02	AL (AL1+MRB)+K(Key lock(OFF lock))+R(Ready to close switch)+D(Door interlock or MOC)+H1(AC/DC 100V ~ 130V, Double shunt coil)+E(Spring auto release)
N03	B(Lockable On/Off button cover)+K2(Key interlock set)+R(Ready to close switch)+T(Temperature monitoring)
N04	A4(AL1+MRB+RES(AC200~250V))+B(Lockable On/Off button cover)+K(Key lock(OFF lock))+M(Mechanical interlock)+T(Temperature monitoring)
N05	A1(AL1+MRB+RES110~130V)+B(Lockable On/Off button cover)+K(Key lock(OFF lock))+R(Ready to close switch)+M(Mechanical interlock)+T(Temperature monitoring)
N06	A2(AL1+AL2+MRB)+K(Key lock(OFF lock))+R(Ready to close switch)+T(Temperature monitoring)

Note) 1. * Codes for over 5 optional accessories are composed separately.
2. UVT and SHT2 can not be selected together. Select one of two.
3. C(counter) is provided as standard.
4. K5, K6, K7 options are factory installed keylock.

Susol ACB (Power circuit breaker)

Ordering - Adapter (Cradle)

UAL — **S16D** **3** **A** **H** **E** **S**

For UL ACB cradle type

Frame size Note	
S16D	1600AF
S20E	2000AF
S25E	2500AF
S32E	3200AF
S50G	5000AF
S60G	6000AF

Number of poles	
3	3P
4	4P

Secondary connector type	
A	Connector type
B	Screw joint type
C	Spring type

Terminal configuration	
H	Horizontal type
V	Vertical type
M	Line: Horizontal Load: Vertical
N	Line: Vertical Load: Horizontal
P	Front type
G	Horizontal-con type
W	Vertical-con type

* Terminals for P type must be ordered separately
* G and W types are applicable to S16D (1600AF) only
* Metering CT for ST type must be ordered sesparatedly

Shutter	
E	Without safety shutter
F	With safety shutter

Other options	
N	ARC Cover N/A
S	Arc cover
ST	Arc Cover+Metering CT

* The depth of Metering CT included cradle is longer than normal cradle

Note) The corresponding Breaker Adapter

Breaker		Adapter
UAS-08D	UAS-08W	S16D
UAS-16D	UAS-16W	
UAH-08E	UAH-08X	S20E
UAH-16E	UAH-16X	
UAH-20E	UAH-20X	
UAH-25E	UAH-25X	S25E

Breaker		Adapter
UAH-32E	UAH-32X	S32E
UAH-32G	UAH-32Z	S50G
UAH-40G	UAH-40Z	
UAH-50G	UAH-50Z	
UAH-60G	UAH-60Z	S60G

Rating plug

Rating plug classfication				ACB ampere frame							
	For none NCT type	For NCT type	Rating	800A	1600A	2000A	2500A	3200A	4000A	5000A	6000A
Rating plug code	73263466352	73263466372	400A	400A~ 800A							
	73263466353	73263466373	600A								
	73263466354	73263466374	630A								
	73263466355	73263466375	800A		800A~ 1600A						
	73263466356	73263466376	1000A			1000A~ 2000A					
	73263466357	73263466377	1200A				1200A~ 2500A				
	73263466358	73263466378	1250A								
	73263466359	73263466379	1600A					1600A~ 3200A			
	73263466360	73263466380	2000A						2000A~ 4000A		
	73263466361	73263466381	2500A							2500A~ 5000A	
	73263466362	73263466382	3000A								3000A~ 6000A
	73263466363	73263466383	3200A								
	73263466364	73263466384	3600A								
	73263466365	73263466385	4000A								
	73263466366	73263466386	5000A								
	73263466367	73263466387	6000A								

* A rating plug ranging from 50 to 100% of the ACB ampere frame should be used.
* The minimum value of the Trip Relay self-power supply is based on the CT rating, not the rating plug rating.

Ordering - Trip relay

N	H	0
Trip Relay Type	Communication & protection	Control voltage & frequency

N

000	Trip Relay N/A
N	Normal

H

H	L, S, I, G

0

	Frequency used	Control power voltage	Comm.
0	60Hz	Self-Power Note1	NFC
5	50Hz	Self-Power Note1	NFC

A

A	Ammeter

H

H	L, S, I, G
D	L, S, I, G + Comm.
Y	L, S, I, Gext + Ground wire CT + Comm.
O **	L, S, I, G + Neutral CT + Comm.

* L,S,I: Long time delay trip, Short time delay trip, Instantaneous trip
* G: Ground fault (Residual earth fault protection)
* Ground fault system by vector sum
* Communication and output contacts DO NOT work under self-power condition
* Gext + Ground wire CT: Source return type
* Customers must purchase their own ground wire CT (Secondary output: 5A, accuracy 1%)

** AO provide the function to detect and protect the ground fault current by applying the NCT (Neutral CT) in the neutral wire when 3pole circuit breaker is used in 3-phase 4-wire system.
* Customers must purchase their own neutral CT (Primary output: same as ACB's Rated Current / Secondary output: 5A, accuracy 1%)

0

	Frequency used	Control power voltage	Comm.
0	60Hz	Self-Power	N/A
1	60Hz	AC/DC 85V~264V	N/A
2	-	DC 21V~54V	N/A
5	50Hz	Self-Power	N/A
6	50Hz	AC/DC 85V~264V	N/A
7	-	DC 21V~54V	N/A

* The Self-Power function is to receive power from the main circuit inside the circuit breaker without external power to the STU Communication, ZSI, Remote Reset, DO functions are not available and EVENT is not logged when using Self - Power only.

P

Trip unit type	
P	Power meter

S

Relay function / Communtation (MODBUS)	
S	L, S, I, G + PTA
Y	L, S, I, Gext + Ground wire CT
O	L, S, I, G + Neutral CT

1

	Frequency	Control power voltage	Communication
1	60Hz	AC/DC 85V~264V	N/A
2	60Hz	DC 21V~54V	N/A
3	60Hz	AC/DC 85V~264V	Bluetooth
4	60Hz	DC 21V~54V	Bluetooth
6	50Hz	AC/DC 85V~264V	N/A
7	50Hz	DC 21V~54V	N/A
8	50Hz	AC/DC 85V~264V	Bluetooth
9	50Hz	DC 21V~54V	Bluetooth

S

Trip unit type	
S	Supreme meter

S

Relay function / Communtation (MODBUS)	
S	L, S, I, G + PTA
Y	L, S, I, Gext + Ground wire CT
O	L, S, I, G + Neutral CT

1

	Frequency	Control power voltage	Communication
1	60Hz	AC/DC 85V~264V	Bluetooth, NFC
2	60Hz	DC 21V~54V	Bluetooth, NFC
6	50Hz	AC/DC 85V~264V	Bluetooth, NFC
7	50Hz	DC 21V~54V	Bluetooth, NFC

* Self-power is basic function (Automatic power supply to the trip unit without additional control power)
* L,S,I: Long time delay trip, Short time delay trip, Instantaneous trip
* G: Ground fault (Residual earth fault protection)
* Gext + Ground wire CT: Source return type
* PTA: Pre-trip alarm function
* Customers must purchase their own ground wire CT (Secondary output: 5A, accuracy 1%)
* Customers must purchase their own neutral CT (Primary output: same as ACB's Rated Current / Secondary output: 5A, accuracy 1%)
* The STU acceptable voltage range is 100 to 250V
* If you want an external VDM, please insert '(-V)' at the end of the full ordering

Item	Description	Features	Remarks
72313460708	TOTAL ASS'Y,VDM(Shield Cable), EXTERNAL, STU	Accessory	Separate purchasing

* If you want to apply external VDM separately, please order the code above.

Layouts and dimensions

D-type (800~1600A)

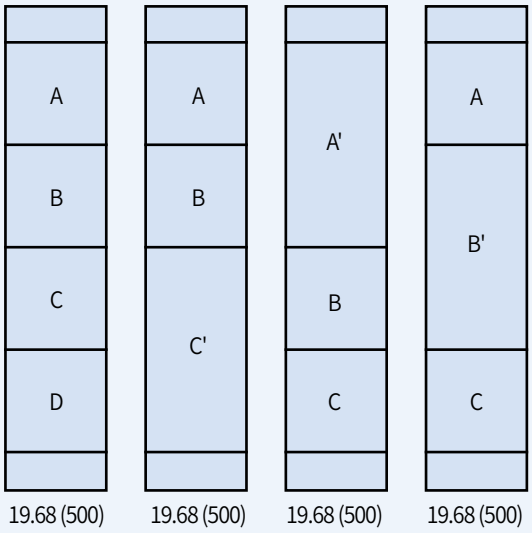
Application rules

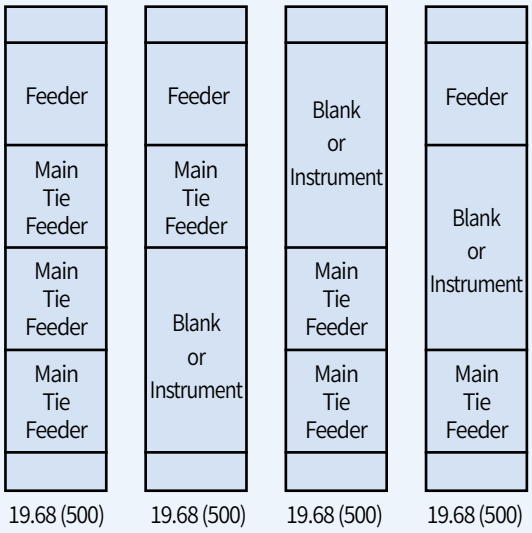
1) Feeder circuit breaker: up to 1600A
2) Main/Tie circuit breaker: up to 1600A
3) Frame size(W×H×D): 19.68"×91.73"×62.0"
   (500×2,330×1,575mm)
4) Bus bracing: Vertical 65kA, Horizontal 100kA
5) It consists of each compartment.
   CB compartment can be provided separately.
6) The height of top & bottom cable raceway is 100mm each.
7) The height of 1 compartment is basically 520mm.
8) 2 or 3 compartments in a combined structure is available. (such as A')

D-type ACB

1 CB Module

Layout

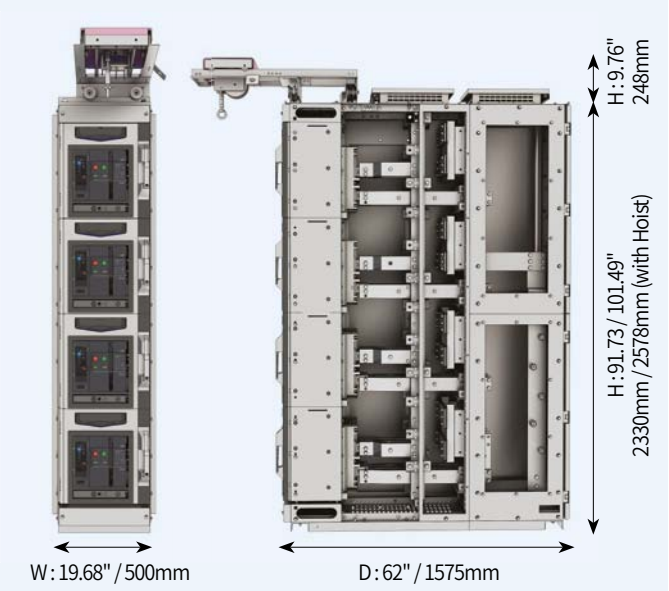




Available ampacity

Comp.	Available ampacity
A	800,1000,1200,1600A
B	800,1000,1200,1600A
C	800,1000,1200,1600A
D	800,1000,1200,1600A
A', B', C'	Blank, Instrument, LV compartment

Dimensions



E-type (800~3200A)

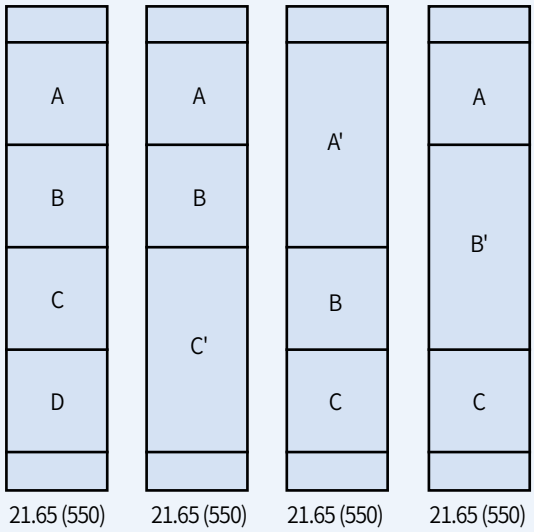
Application rules

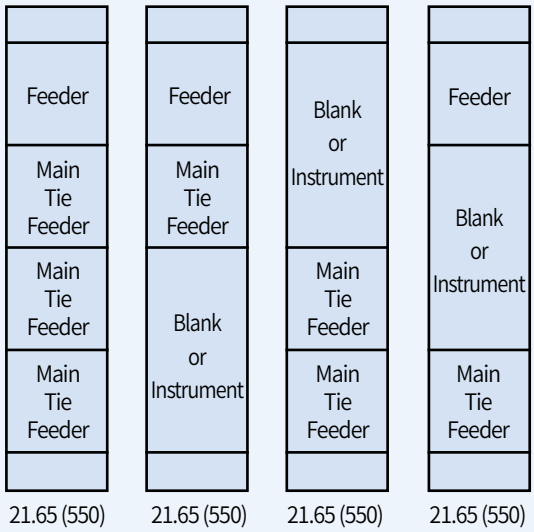
1) Feeder circuit breaker: up to 3200A
2) Main/Tie circuit breaker: up to 3200A
3) Frame size(W×H×D): 21.65"×91.73"×62.0"
   (550×2,330×1,575mm)
4) Bus bracing: Vertical 85kA, Horizontal 100kA
5) It consists of each compartment.
   CB compartment can be provided separately.
6) The height of top & bottom cable raceway is 100mm each.
7) The height of 1 compartment is basically 520mm.
8) 2 or 3 compartments in a combined structure is available. (such as A')

E-type ACB

1 CB Module

Layout

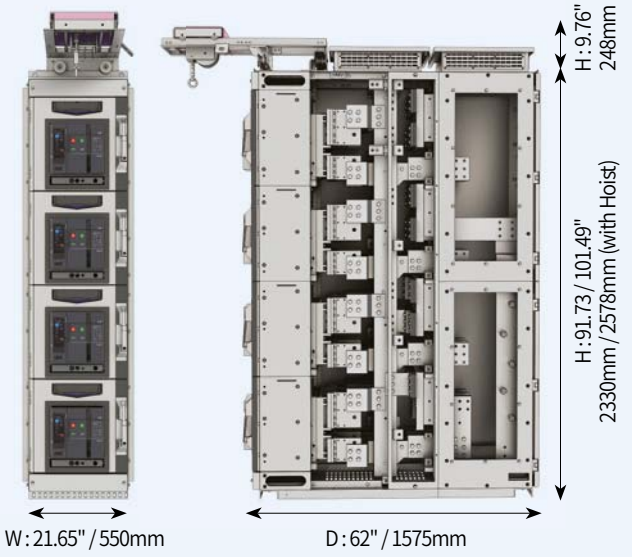




Available ampacity

Comp.	Available ampacity
A	800,1000,1200,1600,2000,2500A
B	800,1000,1200,1600,2000,2500,3200A
C	800,1000,1200,1600,2000,2500,3200A
D	800,1000,1200,1600,2000,2500,3200A
A', B', C'	Blank, Instrument, LV compartment

Dimensions



Layouts and dimensions

G-type (3200~6000A)

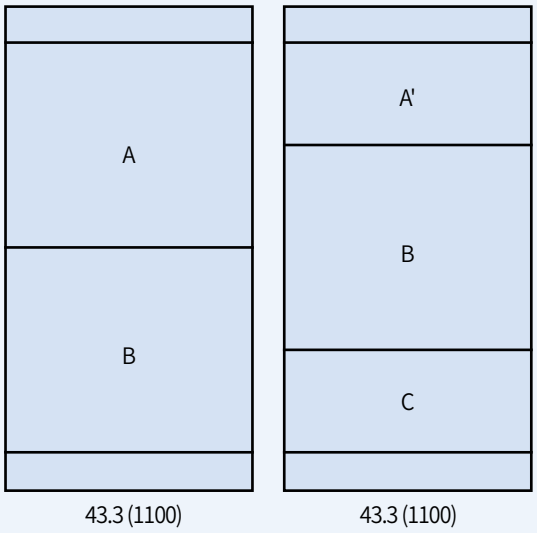
Application rules

1) Feeder circuit breaker: up to 6000A
2) Main/Tie circuit breaker: 3200, 4000, 5000A, 6000A
3) Frame size(W×H×D): 43.3"×91.73" ×71.85"
   (1,100×1,825×2,330mm)
4) Bus bracing: Vertical 100kA, Horizontal 100kA
5) It consists of each compartment.
   CB compartment can be provided separately.
6) The height of top & bottom cable raceway is 100mm each.
7) The height of 1 compartment is basically 1,040mm.
8) Half size compartment is available. (such as A')

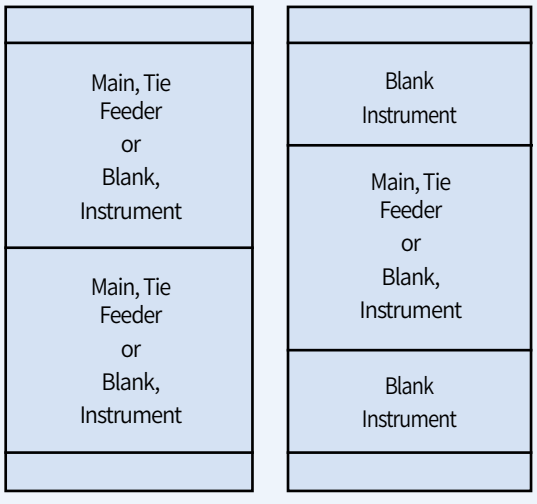
G-type ACB

1 CB Module

Layout



43.3 (1100) 43.3 (1100)

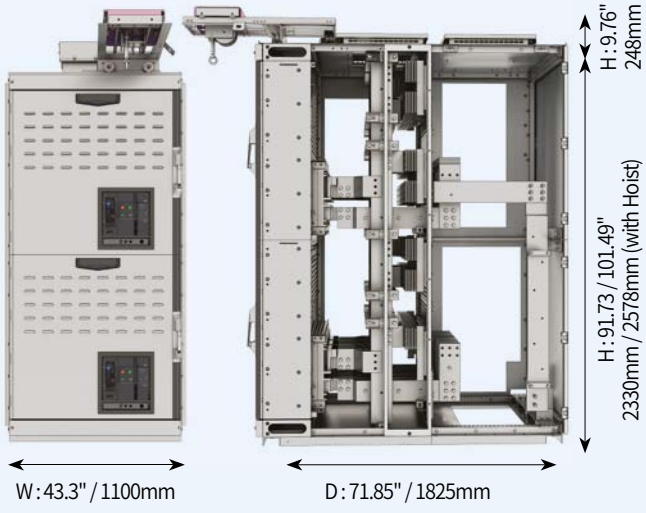


43.3(1100) 43.3(1100)

Available ampacity

Comp.	Available ampacity
A	3200,4000,5000,6000A
B	3200,4000,5000,6000A
A', C	Blank, Instrument, LV compartment

Dimensions



Bus

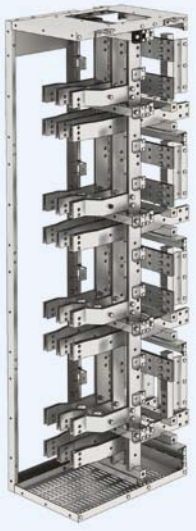
Application rules

1) All type horizontal busbar up to 6000A
2) D-type vertical busbar applied up to 1600A
3) E-type vertical busbar applied up to 4755A
4) G-type vertical busbar applied up to 6000A

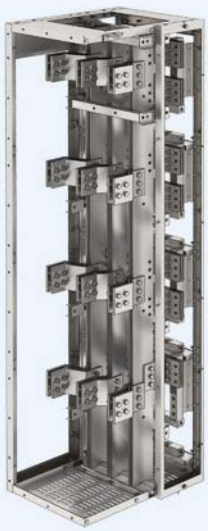
Busbar data

D-type					E-type / G-type				
Current (A)	Number of busbar	Size (in²)	Area [mm²]	Current density	Current (A)	Number of busbar	Size (in²)	Area [mm²]	Current density
6000	6	6*1/4	5791	1.04	6000	6	6*1/4	5791	1.04
	8	5*1/4	6452	0.93		8	5*1/4	6452	0.93
5000	5	6*1/4	4826	1.04	5000	5	6*1/4	4826	1.04
	6	5*1/4	4839	1.03		6	5*1/4	4839	1.03
4000	4	5*1/4	3226	1.24	4000	4	5*1/4	3226	1.24
3200	3	5*1/4	2419	1.32	3200	3	5*1/4	2419	1.32
2500	3	4*1/4	1943	1.29	2500	3	4*1/4	1943	1.29
2000	2	4*1/4	1295	1.54	2000	2	4*1/4	1295	1.54
1600	2	3*1/4	968	1.65	1600	2	4*1/4	1295	1.24
1000/1200	2	3*1/4	968	1.24	1000/1200	1	4*1/4	806	1.49
800	1	3*1/4	484	1.65	800	1	3*1/4	648	1.24

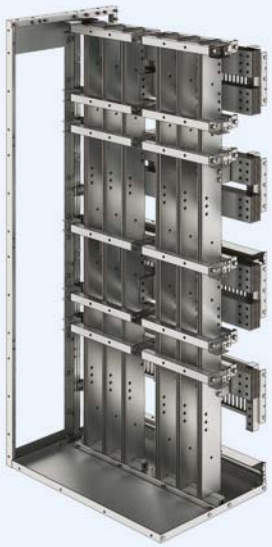
Structure



D type



E type



G type

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