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2020

Susol *Super Solution*

UL Low Voltage Arc-resistant Switchgear



LS *ELECTRIC*



Susol *Super Solution*

UL Low Voltage Arc-resistant Switchgear

Susol UL low voltage arc-resistant 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.

Arc-resistant 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.

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Overview



UL Low Voltage Arc-resistant Switchgear

High reliability & safety



- High reliability for all the 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 to protect the personnel in the work environment as well as properties
 - Arc fault containment: up to 100kAIR at 635Vac
- 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 low voltage devices for accurate and optimum operation
- Exclusive insulator for LS switchgears
- 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

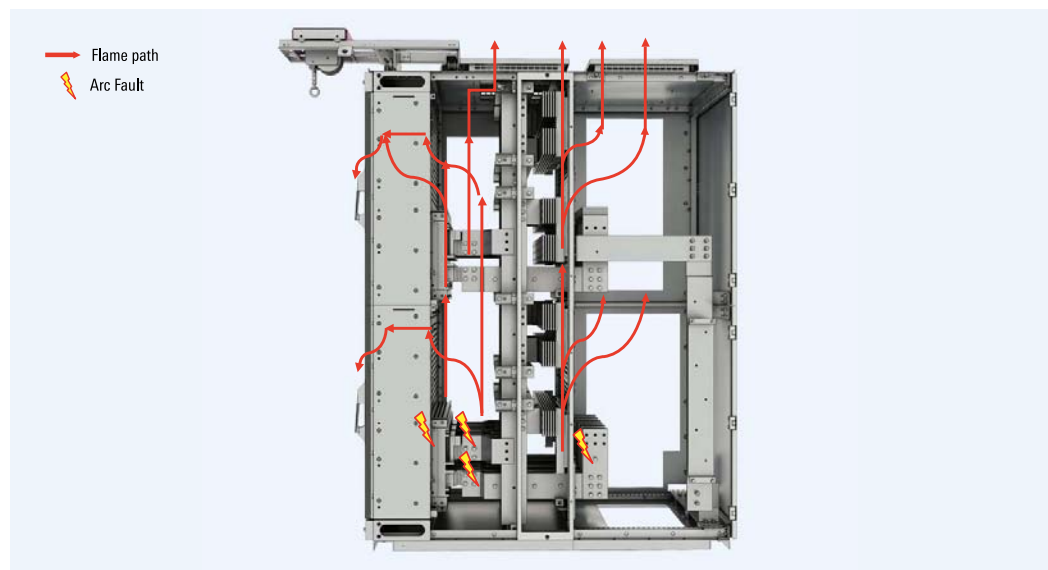
- Power plants
- Wastewater and water treatment
- Airport

Product description

Key features

Arc resistance design

The arc pressure relief vent at the top of the panel is automatically opened by pressure when abnormal pressure is generated inside the section, naturally reducing the pressure inside. Although there is a barrier for each compartment, since ventilation holes are applied, the relief vent at the top can be opened wherever the arc fault point is located. The structure satisfies ANSI Type 2B. Even if the instrument compartment door adjacent to the arc fault position is open, it does not affect the exterior (however, this does not mean that the instrument compartment door can be opened under actual conditions of use). The front vent is processed into a louver to minimize human damage in case of an arc fault.

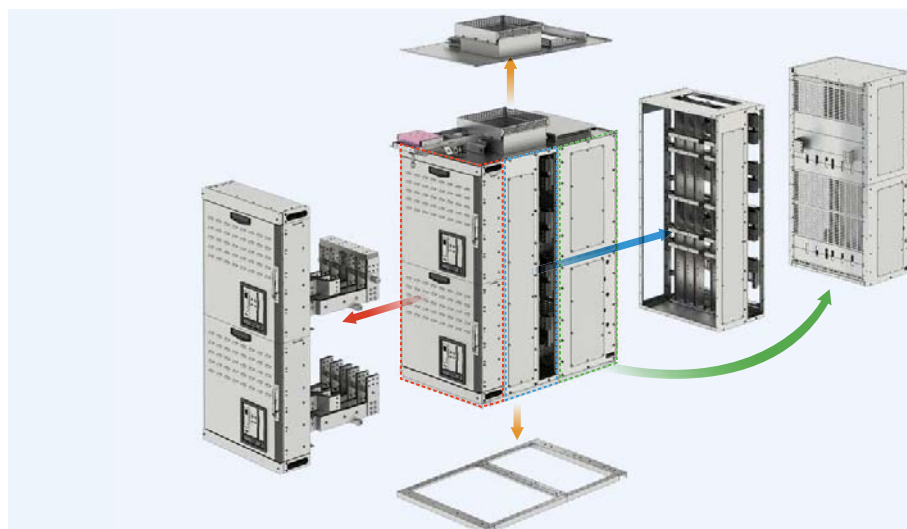


Modular design

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 to have perfect coordination to isolate only the source of abnormal power.

They have long and reliable life expectancy, and are tested short-circuit withstand capability. There are various applicable accessories for the breakers.

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



Exclusive insulator for switchgear

All insulators applied to busbar bracing structures are molded LS-only products, and LS guarantees insulation material performance. Designed to secure all insulation distances in accordance with ANSI C37.20.1, it has excellent product safety.

By applying standardized products, human error is minimized and they are provided for easy assembly.

Furthermore, a part list is provided for assembling sections to reduce material loss. All materials used for assembly are UL listed materials.



Standards

Susol UL low voltage arc-resistant switchgear conforms to the following standards:

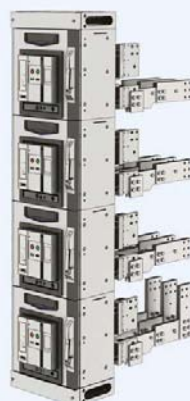
- UL 1558
- ANSI C37.20.1
- ANSI C37.51
- ANSI C37.20.7

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

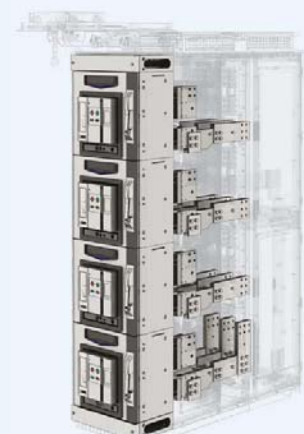
- ANSI C37.13, ANSI C37.16, ANSI C37.17, ANSI C37.50
- UL 1066 (cULus Listed)
- CSA C22.2 No.31-10



CB compartment 1-module



CB compartment ass'y



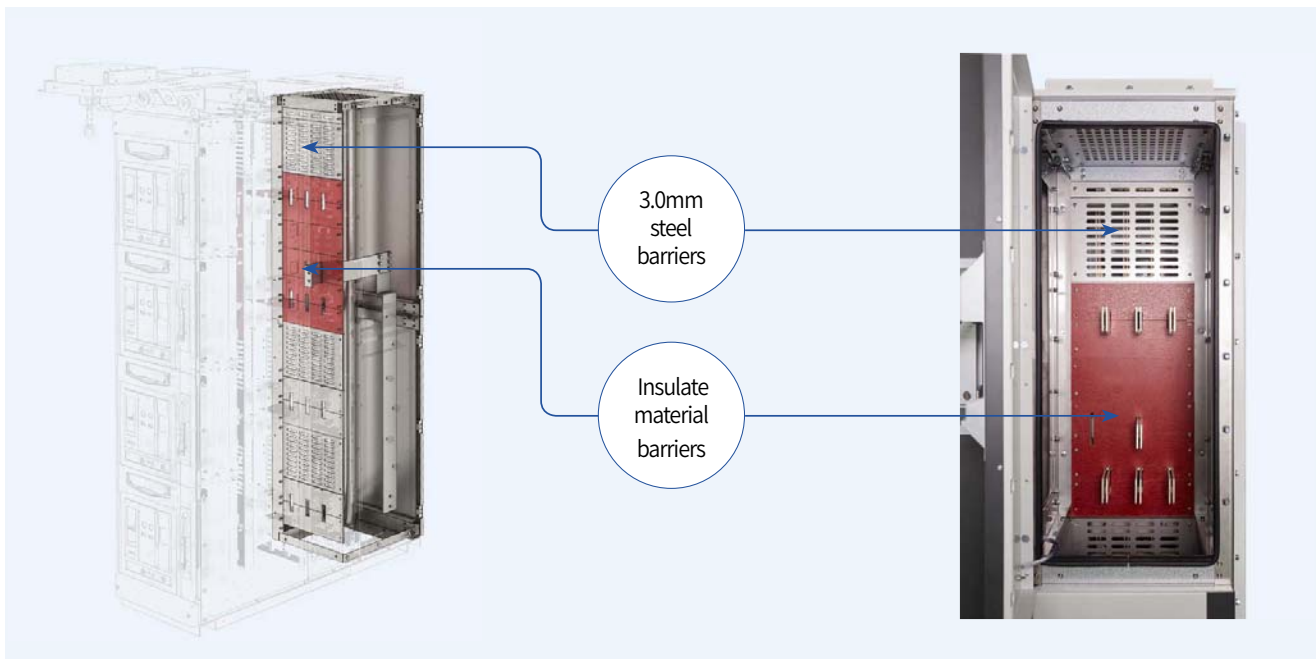
CB compartment in a section
(Maximum 4 stack available)

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

There is a cradle in the circuit breaker cell. The rail of the cradle can be extended to facilitate insertion/withdrawal of the breaker and allows the user to easily move the breaker to the service position without much effort.

4-position draw-out design

Breakers can be in service, test, disconnected or withdrawable position. The breaker can be moved between the service, test and disconnected position using a handle in the cradle. For user safety, there is a padlock at each position.

Interlocks

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

Paint

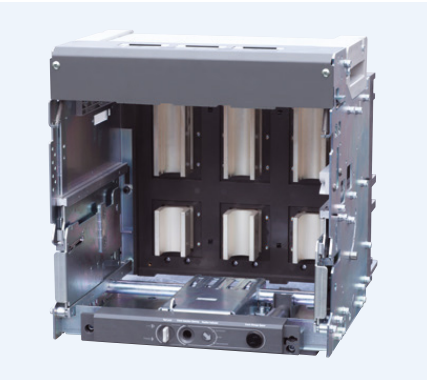
If required, gray paint finish(ANSI 61) is possible.

Optional safety shutters [ST]

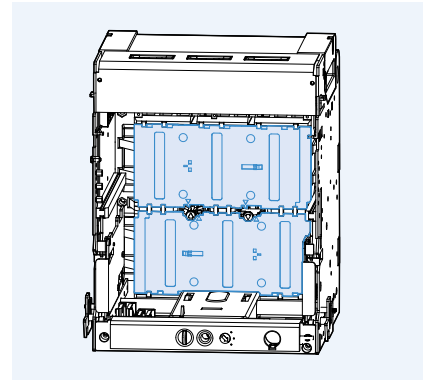
It is the automatic safety device to protect the connectors of main circuit by cutting off dangerous contact from outside while the breaker is drawn out. When the ACB is drawn in, the shutter is automatically opened.



Through-the-door design



Cradle in the breaker cell

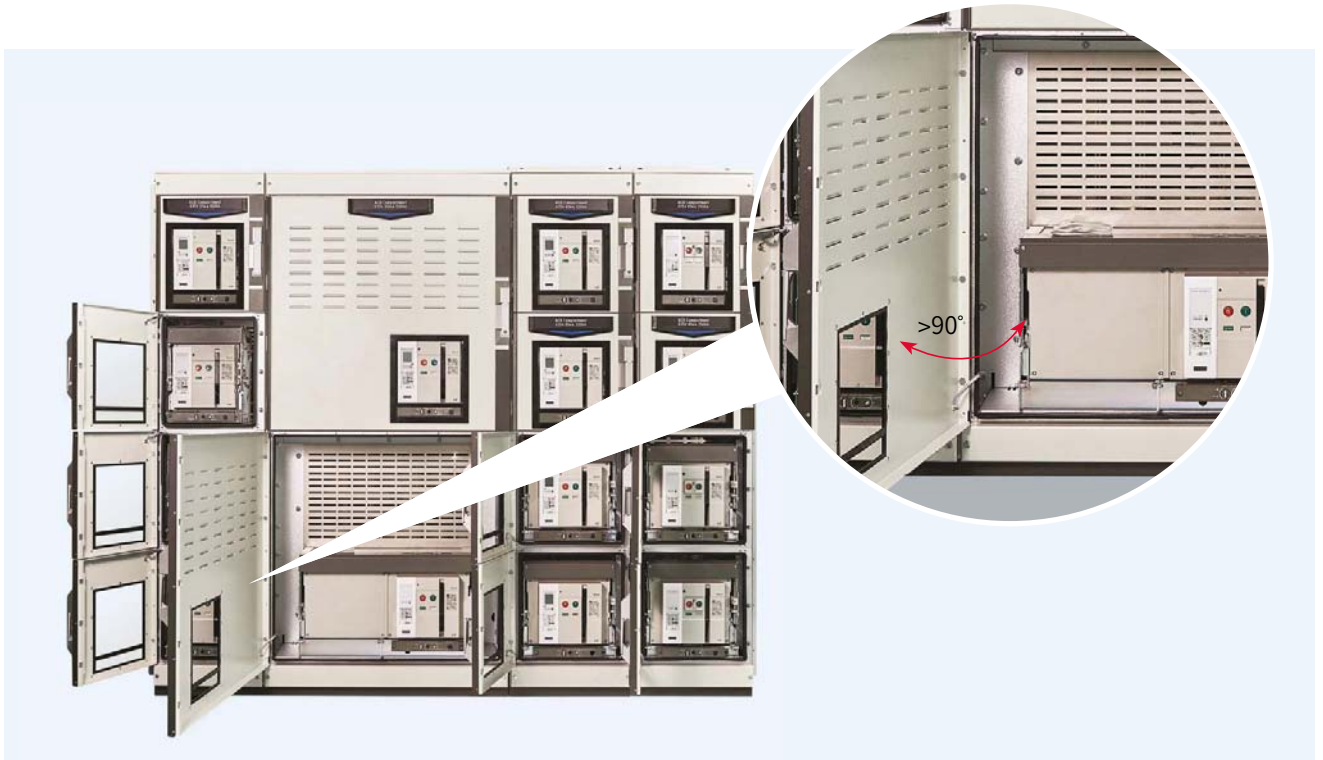


Safety shutter

User-friendly design

Hinged doors with a degree of opening greater than 90° allow enough space for operation and maintenance. Switchgear can be installed regardless position of side walls thanks to the LHS, RHS reversible hinged doors. The doors of each compartment can be opened and closed individually. In addition, robust handles and door lockers are applied for the higher reliability.

Wireways more than 100mm are located at the top and bottom of each panel, providing convenience for wiring between device, instrument and lamp, as well as organizing the control wires efficiently.



Product description

Bus features

Busbar design

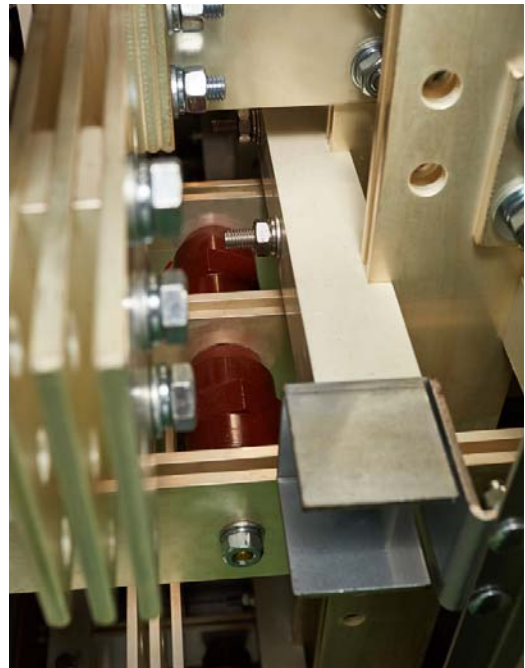
The temperature rise performance of busbars meets the requirements of ANSI C37.20.1, C37.51 and all the busbars are silver plated. M12(8.8) high strength bolt is applied for both vertical and main bus, and spring washer and plain washer are applied. The minimum distance for air clearance is 1". For creepage distance, the minimum distance between phases is 2", and between phase and earth is 1". The thickness of busbar is 1/4", 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 are based on UL and ANSI standard temperature rise of 65K at ambient temperature of 40°C.

Main bus ratings are 2000, 2500, 3200, 4000, 5000 and 6000A with bus bracing up to 100kA/1s in all types. (Please contact us if you need higher specifications.) Vertical bus ratings are 800, 1000, 1200, 2000, 2500, 3200, 4000, 5000 and 6000A with bus bracing up to 65kA/1s at D-type 800A, 85kA/1s at E-type 800A and 100kA/1s at G-type 3200A. (Please contact us if you need higher specifications.)

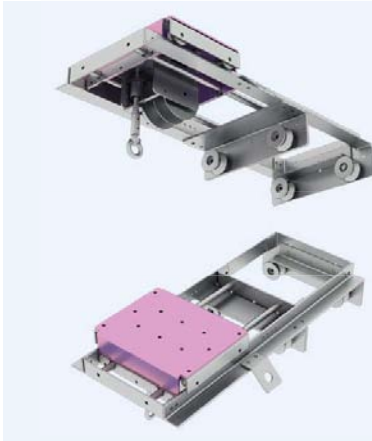
Neutral bus is rated 100% of main bus rating, and the bracing is also same to the main bus. The sectional area for all types of ground busbar is 1/4" X 4". The peak withstand current of ground busbar is 230kA and RMS is 100kA/0.5s.



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 Remote Racking System [RRS]

Although the operators can draw in/out the ACB using a manual handle, they must operate in front of the section which is in live wire condition.

Therefore, LS can provide Arc Safe model of CBS as an option to draw in/out the ACB from a distance. Since it is a portable type with built-in battery, no power supply is required.



RRS [CBS Arc Safe]

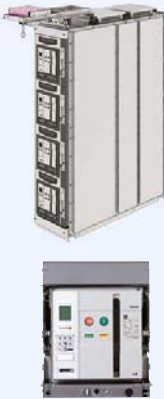
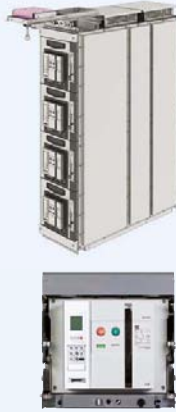

Technical data

Designation

USG	63	A	85	E	20																																																						
Susol UL LV Switchgear	<table><tr><th colspan="2">Voltage</th></tr><tr><td>25</td><td>254V</td></tr><tr><td>50</td><td>508V</td></tr><tr><td>63</td><td>635V</td></tr></table>	Voltage		25	254V	50	508V	63	635V	<table><tr><th colspan="2">Arc resist.</th></tr><tr><td>A</td><td>Arc resistant gear</td></tr><tr><td>N</td><td>Non-arc resistant gear</td></tr></table>	Arc resist.		A	Arc resistant gear	N	Non-arc resistant gear	<table><tr><th colspan="2">S.C STC</th></tr><tr><td>65</td><td>65kA</td></tr><tr><td>85</td><td>85kA</td></tr><tr><td>10</td><td>100kA</td></tr><tr><td>13</td><td>130kA</td></tr></table>	S.C STC		65	65kA	85	85kA	10	100kA	13	130kA	<table><tr><th colspan="2">ACB type</th></tr><tr><td>D</td><td>20" (500mm)</td></tr><tr><td>E</td><td>22" (550mm)</td></tr><tr><td>G</td><td>44" (1,100mm)</td></tr></table>	ACB type		D	20" (500mm)	E	22" (550mm)	G	44" (1,100mm)	<table><tr><th colspan="2">Current</th></tr><tr><td>80</td><td>800A</td></tr><tr><td>10</td><td>100A</td></tr><tr><td>12</td><td>1200A</td></tr><tr><td>16</td><td>1600A</td></tr><tr><td>20</td><td>2000A</td></tr><tr><td>25</td><td>2500A</td></tr><tr><td>32</td><td>3200A</td></tr><tr><td>40</td><td>4000A</td></tr><tr><td>50</td><td>5000A</td></tr><tr><td>60</td><td>6000A</td></tr></table>	Current		80	800A	10	100A	12	1200A	16	1600A	20	2000A	25	2500A	32	3200A	40	4000A	50	5000A	60	6000A
Voltage																																																											
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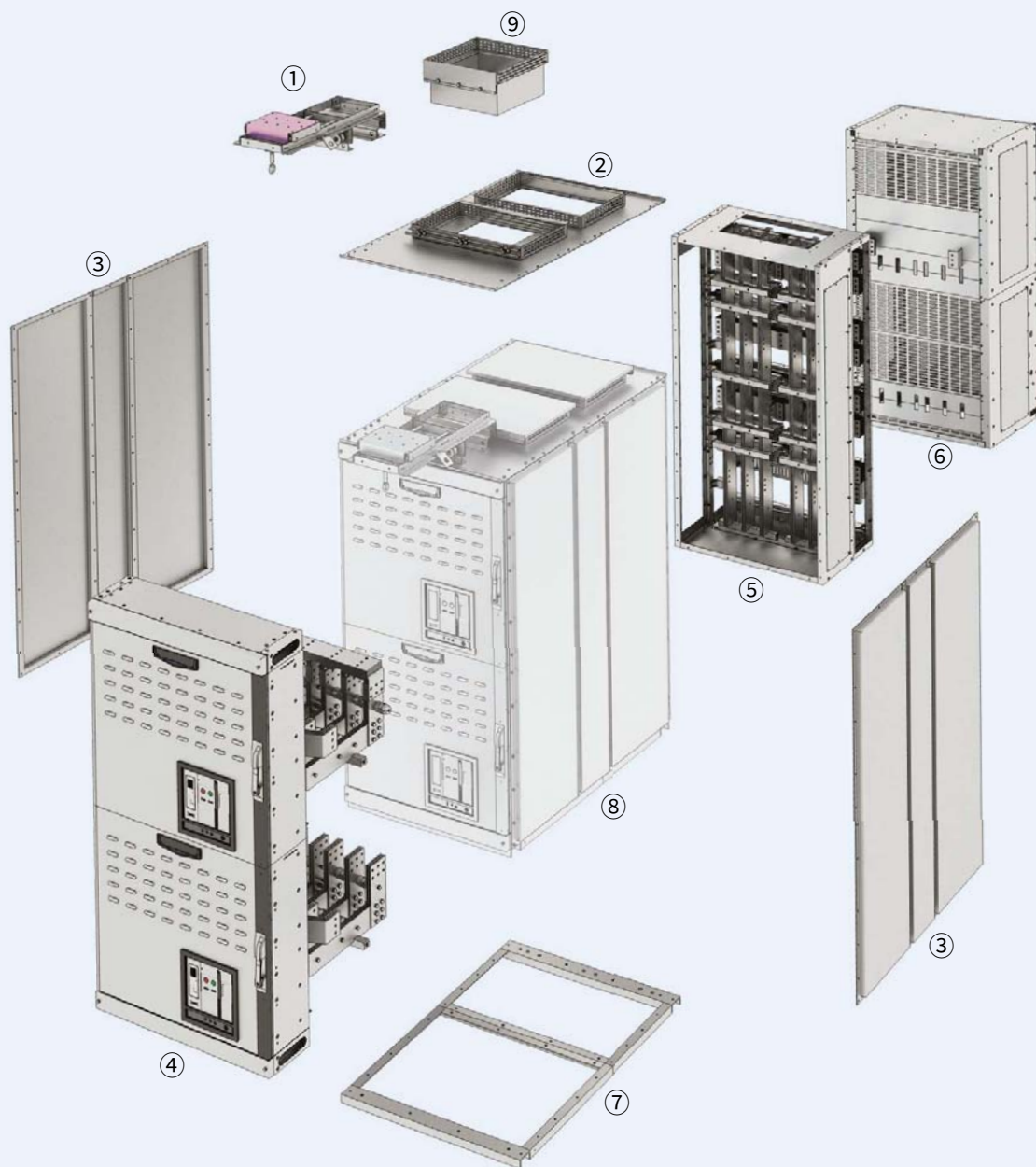
- Susol Low Voltage Switchgear for the Americas can be ordered with the above model name.
- The rated voltage is up to 254V-635V, and the enclosure can be classified into internal arc and non-arc type according to the protection level.
- Busbar bracing structure allows for a selection of up to 65kA-130kA and 20", 22", 44" enclosure size is available for each ACB type. (Please contact us if you need 130kA.)
- Depending on the capacity of the main bus, the last two digits can be selected to determine the representative rating of the switchgear.

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	85(@635V)	85(@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 (500)	21.65 (550)	43.3 (1100)
	H	Inch (mm)	91.73 (2330)		
	D	Inch (mm)	62 (1575)		71.85 (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		

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, communication



Susol ACB



Ratings

Type					UAS-□□□D					
AF					08		16			
Rated current (In max)		(A)	at 40°C		800		1600			
Rated current		(A)	at 40°C				800			
					400		1000			
					600		1200			
					630		1250			
					800		1600			
Rated maximum voltage		(V)	254V / 508V / 635V							
Frequency		(Hz)	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 (kA) (Sym.) UL 1066 ANSI C37.13		With instantaneous	AC	635V	65					
				508V	85					
				254V	85					
		With instantaneous	AC	635V	65					
				508V	65					
				254V	65					
Rated short time current		(kA)	65							
Operating time		(t)	(ms)	Maximum total breaking time		50ms				
				Maximum closing time		80ms				
Life cycle		ACB	(time)	Mechanical	Without maintenance		12,500			
					With maintenance		-			
				Electrical	Without maintenance		2,800			
					With maintenance		-			
Weight		lb (kg)	Drawout type	Main Body with Cradle	3P	154 (70)				
					4P	187 (85)				
				Only Cradle	3P	71 (32)				
					4P	84 (38)				
			Fixed type	Motor charging 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	16.93×16.5×16.02 (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)					



UAH-□□E					UAH-□□G				
08	16	20	25	32	32	40	50	60	
800	1600	2000	2500	3200	3200	4000	5000	6000	
400	800	1000	1200	1600	1600	2000	2500	3000	
600	1000	1200	1250	2000	2000	2500	3000	3200	
630	1200	1250	1600	2500	2500	3000	3200	3600	
800	1250	1600	2000	3000	3000	3200	3600	4000	
	1600	2000	2500	3200	3200	3600	4000	5000	
						4000	5000	6000	
254V / 508V / 635V					254V / 508V / 635V				
50 / 60					50 / 60				
3P / 4P					3P / 4P				
N, A, P, S (4 type)					N, A, P, S (4 type)				
85					100				
100					130				
100					130				
85					100				
85					100				
85					100				
85					100				
50ms					50ms				
80ms					90ms				
12,500				12,500	10,000				
-				-	-				
2,800				1,000	1,000				
-				-	-				
214 (97)			245 (111)	326 (148)	489 (222)			709(321)	
269 (122)			309 (140)	414 (188)	626 (284)			919 (417)	
99 (45)			123 (56)	205 (93)	276 (125)			482 (218)	
121 (55)			152 (69)	256 (116)	355 (161)			630 (286)	
101 (46)			110 (50)	196 (89)	227 (103)			433 (196)	
126 (57)			137 (62)	249 (113)	287 (130)			561 (255)	
16.93×16.22×16.02 (430×412×407)					18.11×30.91×16.02 (460×785×407)				
16.93×20.75×16.02 (430×527×407)					18.11×39.96×16.02 (460×1015×407)				
11.81×14.88×11.61 (300×378×295)					11.81×29.57×11.61 (300×751×295)				
11.81×19.41×11.61 (300×493×295)					11.81×38.62×11.61 (300×981×295)				
19.69×19.69×13.39 (500×500×340)					31.5×32.48×13.39 (800×825×340)				
19.69×24.21×13.39 (500×615×340)					31.5×41.54×13.39 (800×1055×340)				

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

Classification	N type	A type	P type	S type
Externals				
Current protection	• L / S / I / G	• L / S / I / G(or Earth leakage) • Thermal • ZSI(Protective coordination) • ERMS	• L / S / I / G(or Earth leakage) • Thermal(Continuous) • ZSI(Protective coordination) • ERMS	• L / S / I / G(or Earth leakage) • Thermal(Continuous) • ZSI(Protective coordination) • ERMS
Other protection	-	• Earth leakage (Option)	• Earth leakage(Option) • Over/Under voltage • Over/Under frequency • Unbalance(Voltage/Current) • Reverse power	• Earth leakage(Option) • Over/Under voltage • Over/Under frequency • Unbalance(Voltage/Current) • Reverse power
Measurement function	-	• Current (R / S / T / N)	• 3 Phase Voltage/Current RMS/Vector • Power(P, Q, S), PF(3-Phase) • Energy(Positive/Negative) • Frequency, Demand	• 3 Phase Voltage/Current RMS/Vector • Power(P, Q, S), PF(3-Phase) • Energy(Positive/Negative) • Frequency, Demand • Voltage/Current harmonics (1st-63th) • 3 Phase Waveforms • THD, TDD, K-Factor
Fine adjustment	-	-	• Fine adjustment for long /short time delay / instantaneous / ground	• Fine adjustment for long /short time delay / instantaneous / ground
Pre Trip Alarm	-	-	• Overload protection relays : DO (Alarm) (Ground fault is not available when using Pre trip alarm)	• Overload protection relays : DO (Alarm) (Ground fault is not available when using Pre trip alarm)
Digital Output	-	• 3DO (Fixed) • L, S/I, G Alarm	• 3DO (Programmable) • Trip, Alarm, General	• 3DO (Programmable) • Trip, Alarm, General
IDMTL setting	-	-	• Compliance with IEC60255-3 • SIT, VIT, EIT, DT	• Compliance with IEC60255-3 • SIT, VIT, EIT, DT
Communication	-	• Modbus / RS-485 • Profibus-DP	• Modbus / RS-485 • Profibus-DP	• Modbus / RS-485 • Profibus-DP
Power supply	• Self Power - Power shource works over 20% of load current.	• Self Power - Power shource works over 20% of load current. - External power source are required for comm. • AC/DC 100~250V • DC 15~60V	• AC/DC 100~250V • DC 15~60V	• AC/DC 100~250V • DC 15~60V
RTC timer	-	• Available	• Available	• Available
LED for trip info.	• Long time delay • Short time delay/Instantaneous • Ground fault	• Long time delay • Short time delay/Instantaneous • Ground fault	• Long time delay • Short time delay/Instantaneous • Ground fault	• Long time delay • Short time delay/Instantaneous • Ground fault
Fault recording	-	• 10 records (Fault/Current/Date and Time)	• 256 records (Fault/Current/Date and Time)	• 256 records • Last fault wave recording (voltage, current are recorded in 3-phase, and can be read only by communication)
Event recording	-	-	• 256 records (Content, Status, Date)	• 256 records (Content, Status, Date)
Operating button	• Reset button	• Reset, Menu Up/Down, Tap, Enter	• Reset, Menu Up/Down, Tap, Enter	• Reset, Menu Up/Down, Tap, Enter

Each OCR type has Battery in itself.

1. Battery lifespan

1) When turned off: 14~28years

2) When using 1 LED consecutively or turned off: 7~14days

2. The display minimum range of OCR current

1) A type: When more 15% than rated current (In)

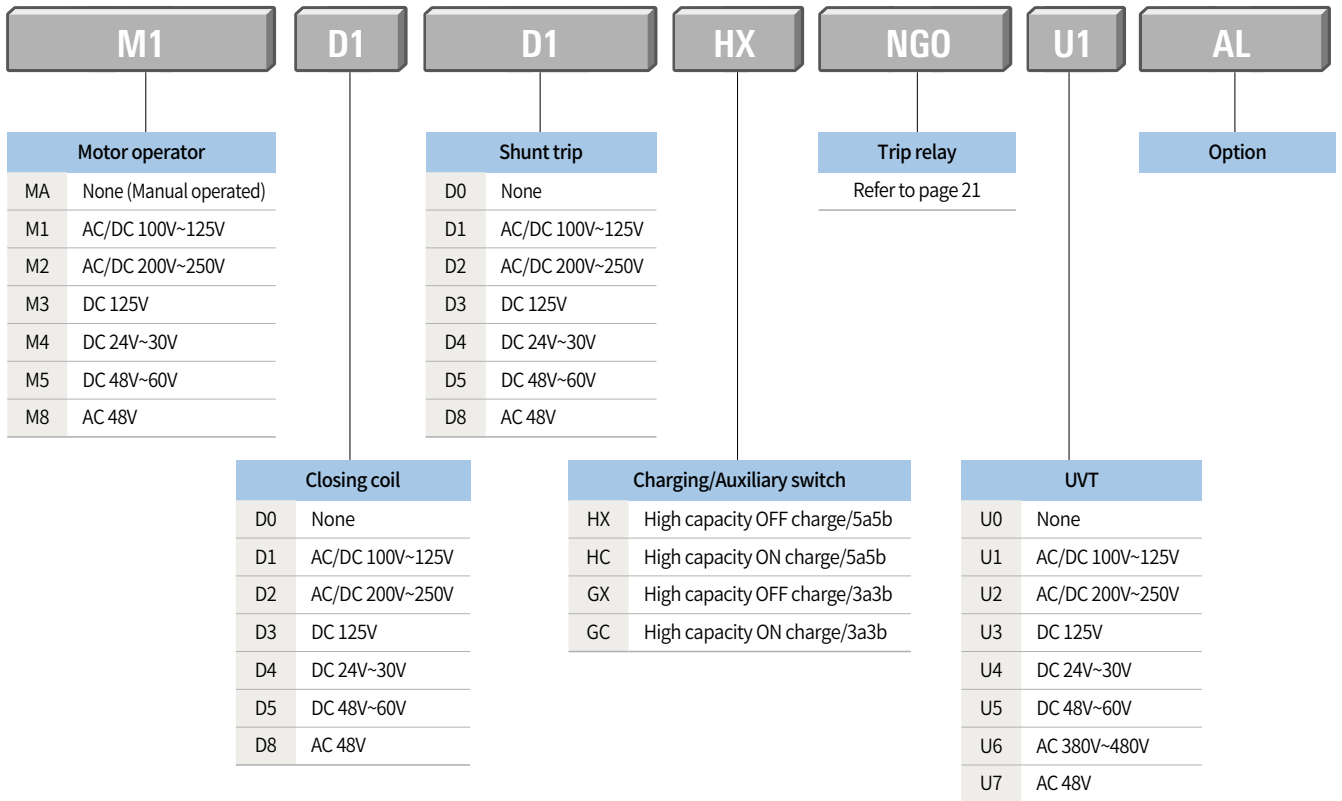
2) P/S type: When more 12% than rated current (In)

* L/S/I/G(or EL)configuration as standard (Only. Unable to select ground fault and earth leakage, simultaneously)

Ordering - Breaker and accessories

UAS	16	D	3	16	A
Frame type	Frame size	Phasing	Poles	Sensor rating	Mounting and terminal
	08 800AF 16 1600AF	D 3/4P standard RST(N) W 4P reversed NRST	3 3P 4 4P	04~08 400A~800A 08~16 800A~1600A	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	Phasing	Poles	Sensor rating	
	08 800AF 16 1600AF 20 2000AF 25 2500AF 32 3200AF	E 3/4P standard RST(N) X 4P reversed NRST	3 3P 4 4P	04~08 400A~800A 08~16 800A~1600A 10~20 1000A~2000A 12~25 1200A~2500A 16~32 1600A~3200A	
	32 3200AF 40 4000AF 50 5000AF 60 6000AF	G 3/4P standard RST(N) Z 4P reversed NRST	3 3P 4 4P	16~32 1600A~3200A 20~40 2000A~4000A 25~50 2500A~5000A 30~60 3000A~6000A	
UAA	16	D	3	00	
Frame type	Frame size	Phasing	Poles	Sensor rating	
	08 800AF 16 1600AF	D 3/4P standard RST(N) W 4P reversed NRST	3 3P 4 4P	Not applied	
	08 800AF 16 1600AF 20 2000AF 25 2500AF 32 3200AF	E 3/4P standard RST(N) X 4P reversed NRST			
	32 3200AF 40 4000AF 50 5000AF 60 6000AF	G 3/4P standard RST(N) Z 4P reversed NRST			

* Terminals for P type must be ordered separately
 * G and W types can be 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).



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	K5	K5 Profalux lock (CAMLOCK Type)
A4	AL1+MRB +RES (AC200~250V) *AC only	K6	K6 Kirkkey lock (CAMLOCK Type)
A5	AL1+MRB +Auto Reset	K7	K7 Kirkkey lock (CN22 Type)
A6	AL1+AL2 +MRB +Auto Reset	R	RCS Ready to close switch
A7	AL1+MRB +RES (DC110~125V) +Auto Reset *DC only	T	TM Temperature monitoring
A8	AL1+MRB +RES (AC200~250V) +Auto Reset *AC only	H1	AC/DC 100V ~125V, Double shunt coil
A9	AL1+MRB +RES (AC110~130V) +Auto Reset *AC only	H2	AC/DC 200V ~250V, Double shunt coil
S	CS2 Charge switch communication	H3	DC 125V, Double shunt coil
B	B Lockable On/Off button cover	H4	DC 24V ~30V, Double shunt coil
M	MI Mechanical interlock	H5	DC 48V ~60V, Double shunt coil
D	DI or MOC Door interlock or MOC (Mechanism operated cell switch)	H7	AC 48V, Double shunt coil

N01	A4 (AL1+MRB+RES(AC200~250V))+B(ON/OFF button lock)+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(ON/OFF button lock)+K2(Key interlock set)+R(Ready to close switch)+T(Temperature monitoring)
N04	A4(AL1+MRB+RES(AC200~250V))+B(ON/OFF button lock)+K(Key lock(OFF lock))+M(Mechanical interlock)+T(Temperature monitoring)
N05	A1(AL1+MRB+RES110~130V)+B(ON/OFF button lock)+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.

Susol ACB

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

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

Shutter

E	Without safety shutter
F	With safety shutter

Secondary
connector type

A	Connector type
B	Screw joint type

Other options

S	Arc cover
---	-----------

^{Note)} The corresponding
Breaker Adapter

* Terminals for P type must be ordered separately
* G and W types can be applicable to S16D (1600AF) only.

Breaker		Adapter
UAS-08D	UAS-08W	S16D
UAS-16D	UAS-16W	
UAH-08E	UAH-08E	S20E
UAH-16E	UAH-16X	
UAH-20E	UAH-20X	
UAH-25E	UAH-25X	S25E
UAH-32E	UAH-32X	S32E
UAH-32G	UAH-32Z	S50G
UAH-40G	UAH-40Z	
UAH-50G	UAH-50Z	
UAH-60G	UAH-60Z	

Rating plug

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

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

Ordering - Trip relay

	N		G		O	
	Trip relay type		Communication & protection		Control voltage & frequency	
	N		G		O	
	000	Without trip relay	G	Ground fault	0	Self-Power ^{Note1)} 60Hz
	N	Normal	<div>* L/S/I/G configuration as standard - with LED indicators - without output contacts * Ground fault detection by vector sum</div>		A	Self-Power ^{Note1)} 50Hz
	A				O	
	A	Ammeter	G	Ground fault	0	Self-Power 60Hz
			I	Ground fault + ERMS	1	AC/DC 100V~250V 60Hz
			E	Earth leakage(External CT, Earth leakage over 30A)	2	DC 15V~60V 60Hz
			T	Earth leakage(External CT, Earth leakage over 30A) + ERMS	3	Self-Power 50Hz
			C	Ground fault + Comm.	4	AC/DC 100V~250V 50Hz
			Q	Ground fault + Comm. + ERMS	7	DC 15V~60V 50Hz
			X	Earth leakage(External CT, Earth leakage over 30A) + Comm.		
			R	Earth leakage(External CT, Earth leakage over 30A) + Comm. + ERMS		
			N **	Ground fault (External NCT) + Comm.		
			M **	Ground fault (External NCT) + Comm. + ERMS		
			<div>* L/S/I/G(or Earth leakage) configuration as standard (Only. Unable to select ground fault and earth leakage, simultaneously) * Ground fault system by vector sum(G,C) * Earth leakage system - E,X: External CT - Private ZCT applied(faultt current >30A)</div>		<div>* Earth leakage system - E,X: External CT - Private ZCT applied(faultt current >30A) * Comm. And output contacts DO NOT work under self-power condition. (Only checking LED available)</div>	
	P		C		1	
	P	Power meter	C	Ground fault + Comm.	1	AC/DC 100V~250V 60Hz
			Q	Ground fault + Comm. + ERMS	2	DC 15V~60V 60Hz
			X	Earth leakage(External CT, Earth leakage over 30A) + Comm.	6	AC/DC 100V~250V 50Hz
			R	Earth leakage(External CT, Earth leakage over 30A) + Comm. + ERMS	7	DC 15V~60V 50Hz
			N **	Ground fault (External NCT) + Comm.		
			M **	Ground fault (External NCT) + Comm. + ERMS		
			<div>* L/S/I/G(or Earth leakage) configuration as standard (Only. Unable to select ground fault and earth leakage, simultaneously) * Ground fault system by vector sum * Earth leakage system - X: External CT - Private ZCT applied(faultt current >30A)</div>		<div>* Applicable to generator protection purpose * Comm. And output contacts DO NOT work under self-power condition. (Only checking LED available)</div>	
	S		C		1	
	S	Supreme meter	C	Ground fault + Comm.	1	AC/DC 100V~250V 60Hz
			Q	Ground fault + Comm. + ERMS	2	DC 15V~60V 60Hz
			X	Earth leakage(External CT, Earth leakage over 30A) + Comm.	6	AC/DC 100V~250V 50Hz
			R	Earth leakage(External CT, Earth leakage over 30A) + Comm. + ERMS	7	DC 15V~60V 50Hz
			N **	Ground fault (External NCT) + Comm.		
			M **	Ground fault (External NCT) + Comm. + ERMS		

GROUND FAULT RELAY

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- Note) 1. L/S/I/G(or Earth leakage) configuration as standard (Unable to select ground fault and earth leakage simultaneously)
 2. Ground fault, earth leakage and pre-trip alarm functions are mutually exclusive.
 3. Functions like Metering, Communication, ZSI, Remote reset and Digital output are NOT available only under Self-power condition.
 4. P and S types require voltage module to be purchased separately

- * L/S/I/G(or Earth leakage) configuration as standard (Only. Unable to select ground fault and earth leakage, simultaneously)
 * Ground fault system by vector sum
 * Earth leakage system
 - X: External CT - Private ZCT applied(fault current >30A)
 ** AN, PN, SN 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. Please use NCT with the secondary output of 5A rating. (NCT is not provided)

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(WxHxD): 19.68"x91.73"x62.0" (500x2,330x1,575mm)
- 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 combined structure is available. (such as A')

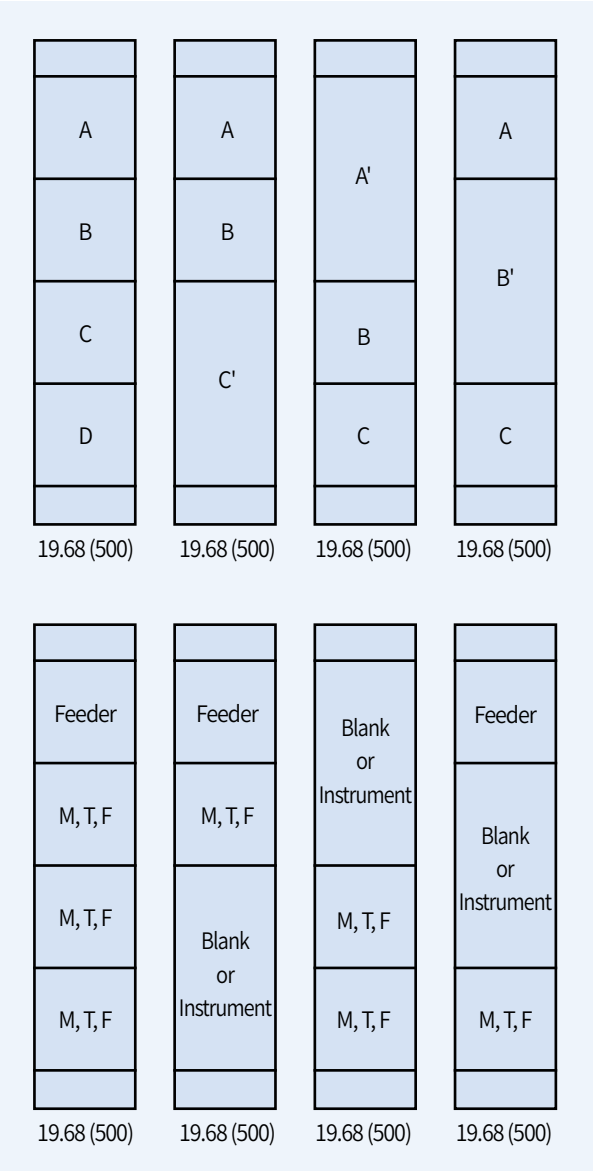


D-type ACB



1 CB Module

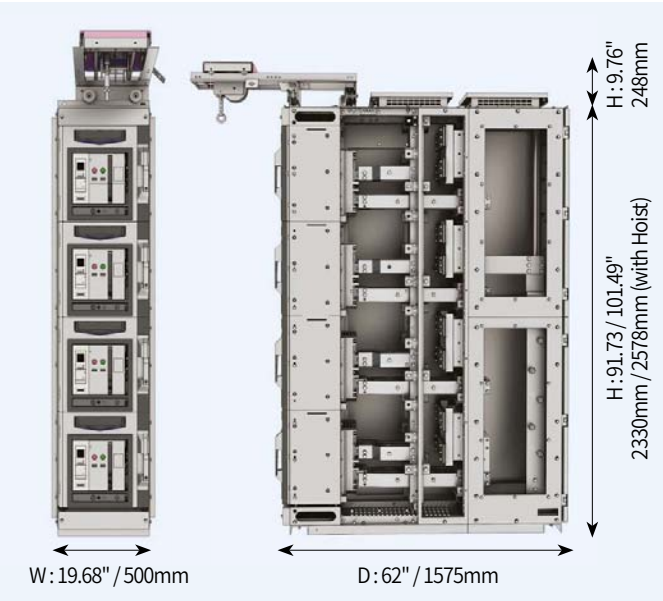
Layout



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(WxHxD): 21.65"x91.73"x62.0" (550x2,330x1,575mm)
- 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 combined structure is available. (such as A')

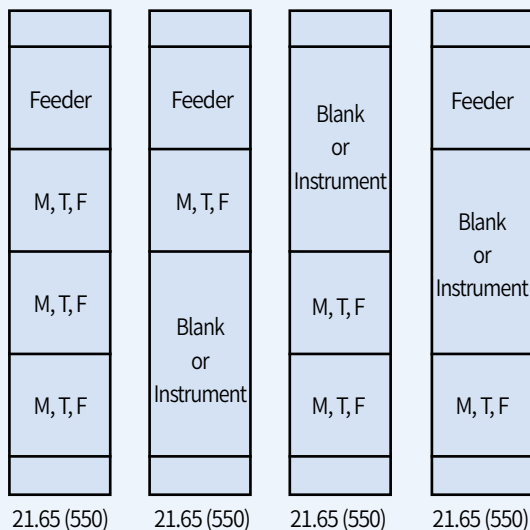
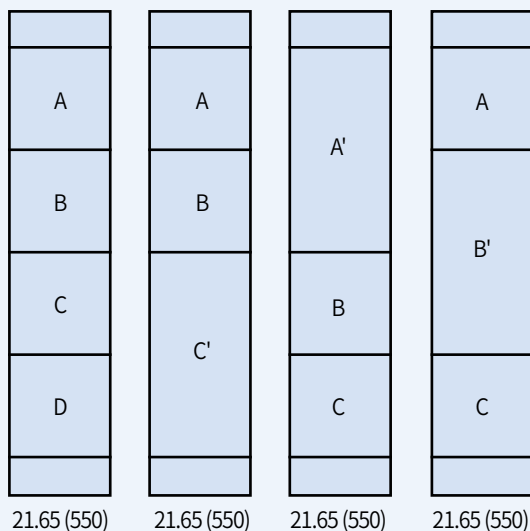


E-type ACB



1 CB Module

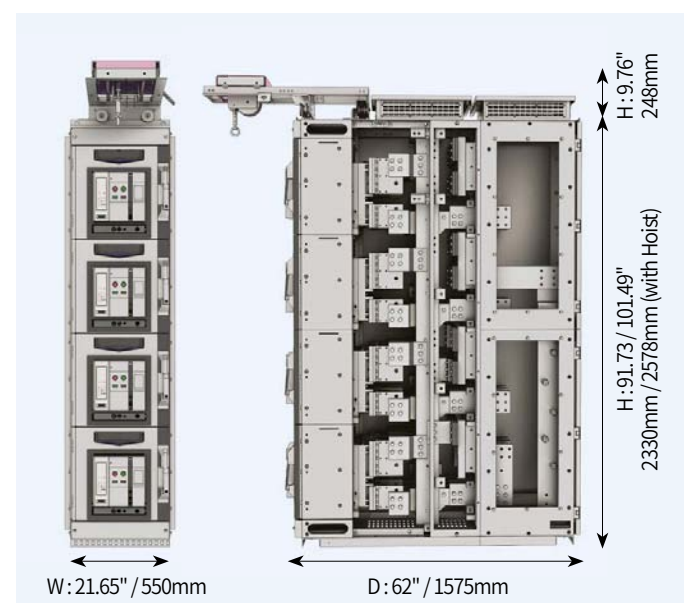
Layout



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

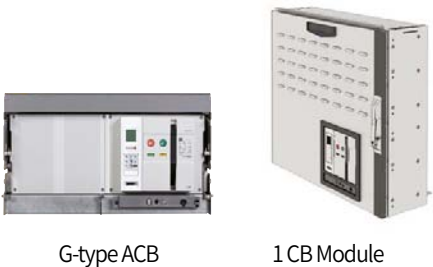


Layouts and dimensions

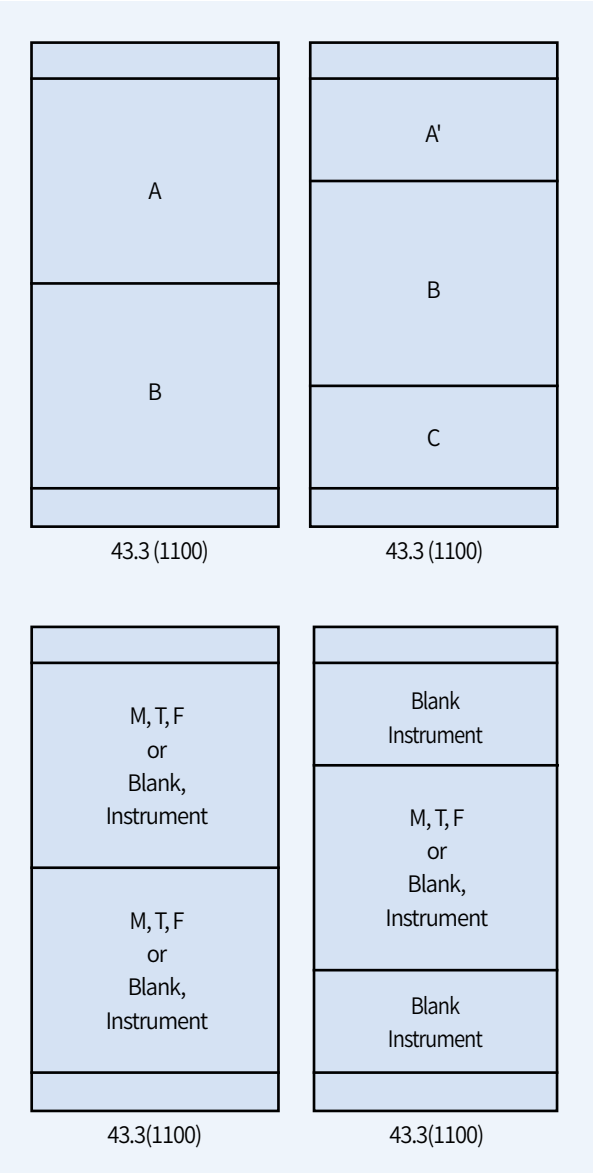
G-type (3200~6000A)

Application rules

- 1) Feeder circuit breaker: up to 6000A
- 2) Main/Tie circuit breaker: 3200, 4000, 5000A, 6000A
- 3) Frame size(WxHxD): 43.3"x91.73" x71.85" (1,100x1,825x2,330mm)
- 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')



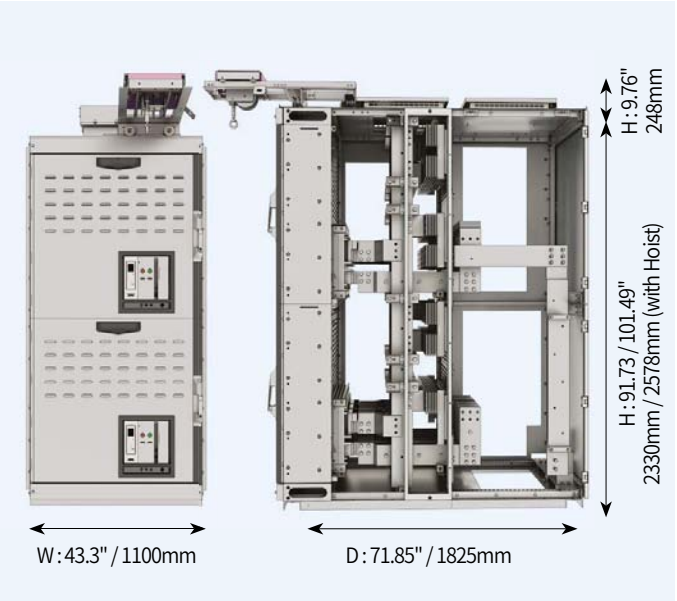
Layout



Available ampacity

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

Dimensions



Bus

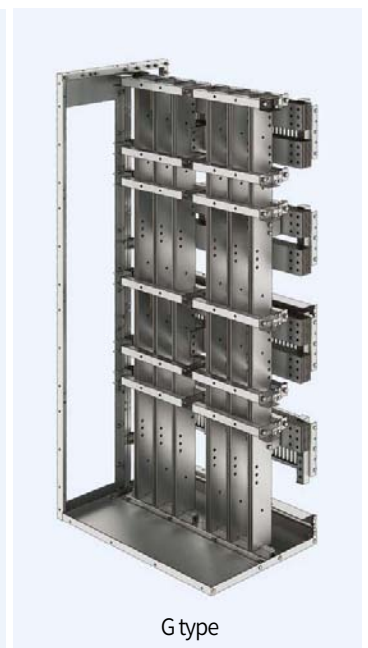
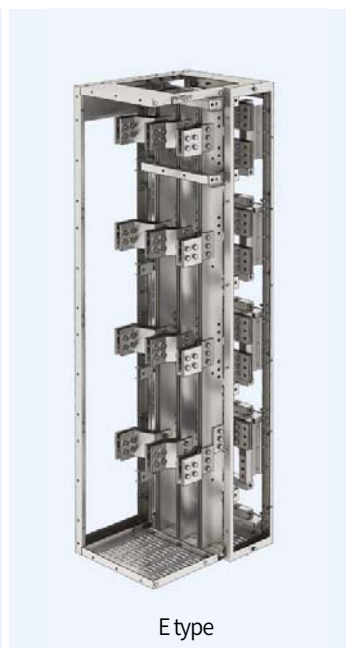
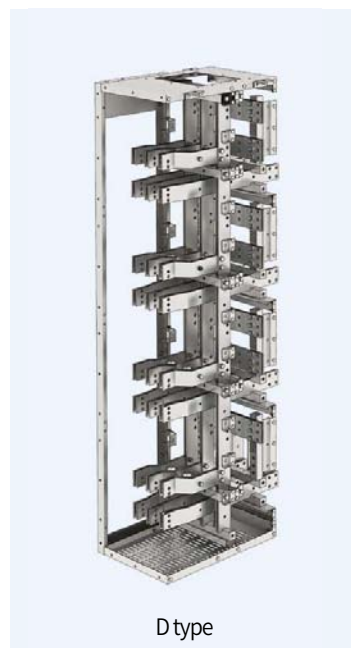
Application rules

- 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 3200A
- 4) G-type vertical busbar applied up to 6000A

Busbar data

D-type					E-type / G-type				
Current (A)	Number of busbar	Size (in ²)	Area [mm ²]	Current density	Current (A)	Number of busbar	Size (in ²)	Area [mm ²]	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

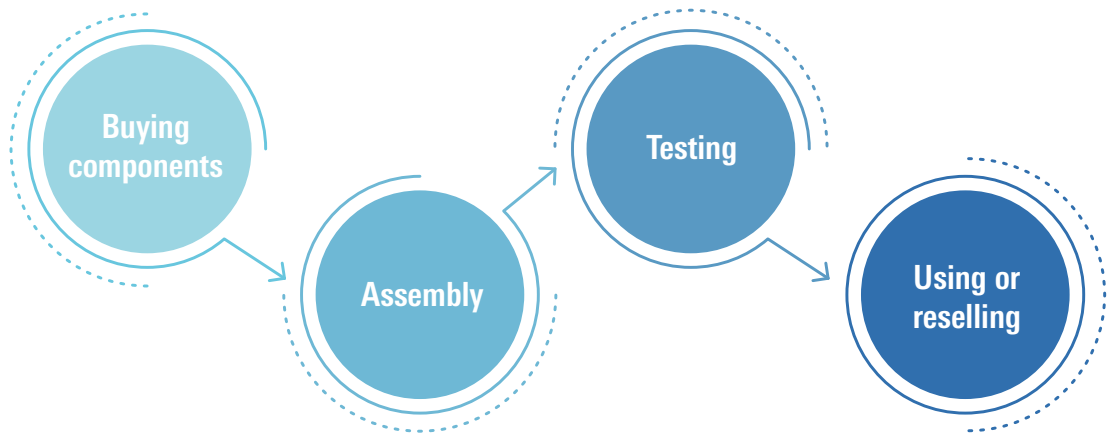
Structure



Partnership

Partnership

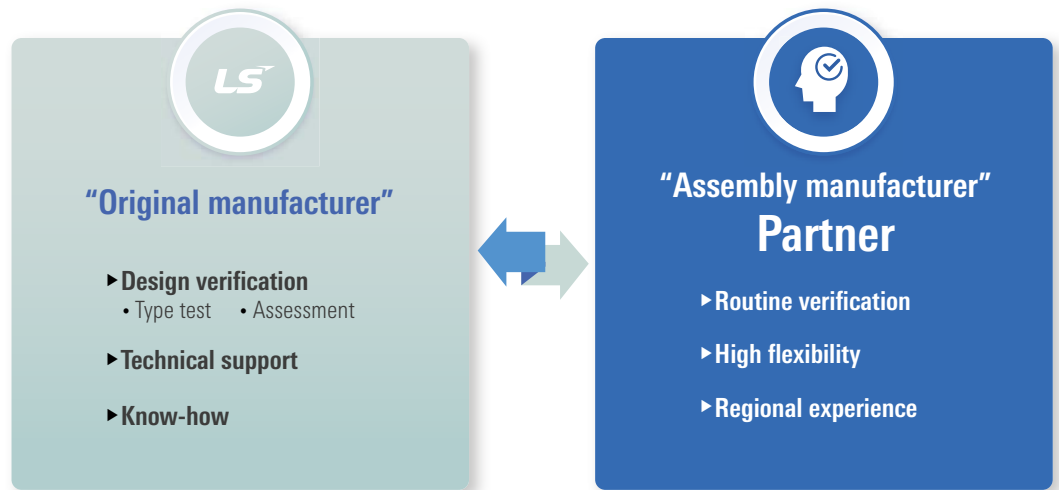
Becoming an advanced global partner means increasing the partner's value through following works in your place. We provide consulting service and technical assistance to our partners.



Business package

Business concept	Full package	Technical agreement	ACB component
● : Supply ◐ : Discussable - : N.A			
CB compartment	●	◐	-
Busbar compartment (drawing)	◐	◐	-
Cable compartment (drawing)	◐	◐	-
ACB	●	●	◐
Technical consulting	●	●	●
Technical specification	◐	●	●
Drawing	-	●	●
Assembly guide / Manual	●	●	●
QC process drawing	●	●	●
Technical training	●	●	●
Assembly training	●	●	●
Inspection training	●	●	●

If you become an "Assembly manufacturer", LS will provide consulting services and technical assistance according to the stage of business.



Support & service

Consulting service and technical assistance are provided according to the stage of business.

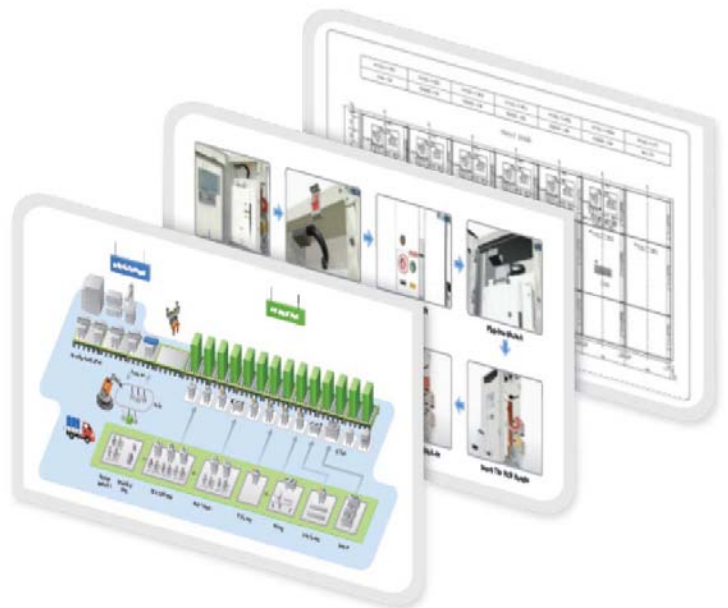
Technical documentation

- Design drawings
- Assembly guide / manual
- Operation & maintenance

Production training & support

- Technical training
- Assembly training
- Inspection training

Test certificates



Memo



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.



- According to The WEEE Directive, please do not discard the device with your household waste.



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Technical Question or After-sales Service

Customer Center-Quick Responsive
Service, Excellent technical support

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