

LOW VOLTAGE PRODUCTS

AT THE FOREFRONT FOR YOUR SPECIFIC APPLICATIONS:

OEM | EV | ESS | BPU | BMS | SOLAR INVERTER | WIND CONVERTER



LS Group is a conglomerate based in South Korea. It spun off from LG Group in 2003.
 LS is leading in the field of electric power, automation, machinery, materials and energy.



LS Group	
EMPLOYEES	12,700
AFFILIATES	48
SALES	22.9 B USD
TOTAL ASSET	22.6 B USD

EMPLOYEES	3,500
SALES	1.9 B USD
OPERATION INCOME	150 M USD

* Financial figures in 2019



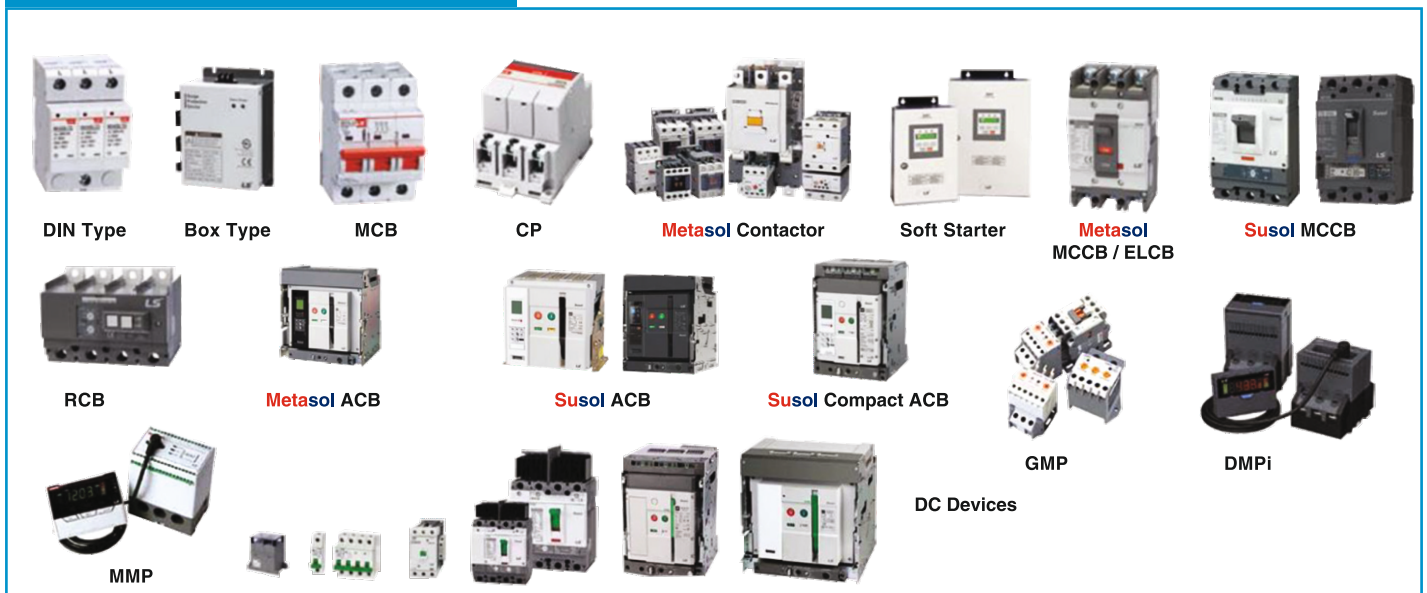
POWER SOLUTION - DEVICES

LS ELECTRIC is providing its competitive edge through various products developed and purchased based on technology of electric power supply in both domestic market and overseas market.

OEM Application



Low Voltage



Medium Voltage



Air Circuit Breakers



3 Pole & 4 Pole

Fixed or Draw Out Type

Compact & Modular Design 3 Frame size

- Wide range, available from 200A rating to 6300A rating.
- Multi-rated operating voltage (690 AC, 500V AC) for all models.
- Rated insulation voltage 1000V AC for all models.
- Very high breaking capacity and $I_{cs} = 100\% I_{cu}$ at 500V AC.
- Product conforming to IEC and ANSI (includes Nuclear Energy plant purpose) standard.
- 'N' Phase current capacity in 4 pole breaker is 100%
- Having high function microprocessor based digital trip relay with communication facility.

Metasol Series

Metasol Series ACB has AS type product for the high breaking capacity, and AN type product for various functions at affordable price.



AS Type

0% I_{cu} at 500V AC

2000 AF

70kA

4000 AF

85kA

6300 AF

120kA



AN Type

$I_{cs} = 100\% I_{cu}$ at 500V AC

1600 AF

65kA

3200 AF

70kA

Susol Series

Susol Series ACB has highest breaking capacity and multi-function product at the world class level which is used with P and S type of digital trip relay. It is basically equipped with arc box to assure arc space zero performance. Therefore it is appreciated for important application.



AH Type

$I_{cs} = 100\% I_{cu}$ at 500V AC

2000 AF

85kA

4000 AF

100kA

6300 AF

150kA

Air Circuit Breakers



AV Type

Air Circuit Breaker upto 1150Vac

Latest “AV” series of LS ELECTRIC for PV, ESS, Wind Power Facilities in harsh environment conditions (high altitude, etc).
It also provides smart connectivity and delivers electrical status with Smart Trip Unit (New digital OCR applications).

ACB upto 1150Vac Features

- E-Frame: (3200AF)
- D-Frame: (1600AF)
- 1150Vac, 1000Vac, 900Vac, 800Vac
- PV market, high altitude area, wind power
- New OCR (STU)
 - Current/Voltage : 0.5%
 - Power : Class 1.0

DC Air Circuit Breakers



DC ACB | Switch Disconnecter |

- DC 1500V class 3200AF Air Circuit Breaker
- Intelligent relay built-in for DC protection
- DC Switch-Disconnectors
- DC 1500V class 4000AF Switch-Disconnectors

Applications

- In DC system such as UPS, solar inverter, wind converter and ESS

DC Air Circuit Breakers

- 1500Vdc 3200AF Air Circuit Breaker for low voltage DC power distribution system.
- Optimized breaker for UPS, PV, ESS system application.
- Maximum short-time capacity 65kA/1sec
- DC Multi-Function Relay.
- A, V, W Protection & measurement, self-diagnosis and fault waveform recording.
- Compatible with existing Susol ACB.

Features

- **Basic rating**
 - Rated voltage: 1500Vdc (4p)/1000Vdc(3p)
 - Rated current: 800 - 3200A
 - Short-time capacity: 65kA/1sec
 - Breaking capacity: 70kA@750Vdc, 60kA@ 1500Vdc
- **Multi-function relays dedicated to DC protect and enhancing user convenience**
 - Precise measurement of current, voltage, power and various protection relay functions
 - Self diagnosis function, event and fault waveform recording
- **Electrical endurance:**
 - 10,000 operations (1600A@ 1500Vdc)
 - 3,000 operations (3200A@ 1500Vdc)

Ampere Frame		AV-20D□	AV-40E□
		~ 2000AF	~ 4000AF
Rated current (In) at 40°C (A)	(A)	200 / 400 / 630 / 800 / 1000 / 1250 / 1600 / 2000	400 / 630 / 800 / 1000 / 1250 / 1600 / 2000 / 2500 / 3200 / 4000
Rated ultimate breaking capacity (Icu)	1150V (kA)	30	50
	1000V (kA)	42	65
	900V (kA)	50	75
	800V (kA)	50	75

* AV series are applicable for IT system

Ampere Frame		AW-16C□	AW-20D□	AW-40E□
		~ 1600AF	~ 2000AF	~ 4000AF
Rated current (In) at 40°C (A)	(A)	400 / 630 / 800 / 1000 / 1250 / 1600	200 / 400 / 630 / 800 / 1000 / 1250 / 1600 / 2000	400 / 630 / 800 / 1000 / 1250 / 1600 / 2000 / 2500 / 3200 / 4000
Rated ultimate breaking capacity (Icu)	1150V (kA)	-	-	-
	1000V (kA)	-	-	-
	900V (kA)	-	42	50
	800V (kA)	40	50	65

* AW-08/16C are applicable for IT system

Metasol MCCB/ELCB



Metasol MCCB

AF Type	30AF	50AF	60AF	100AF	125AF	250AF	400AF	800AF	1000AF	1200AF
ABN		ABN50c 14kA	ABN60c 14kA	ABN100c 18kA ABN100d 26kA ABN100e 31kA		ABN250c 26kA	ABN400c 37kA	ABN800c 37kA		
ABS	ABS30c 14kA	ABS50c 18kA	ABS60c 18kA		ABS125c 37kA	ABS250c 37kA	ABS400c 50kA	ABS800c 65kA	ABS1000b 65kA	ABS1200b 65kA
ABH		ABH50c 50kA			ABH125c 50kA	ABH250c 50kA	ABH400c 65kA			
ABL					ABL125c 60kA	ABL250c 60kA	ABL400c 85kA	ABL800c 85kA	ABL1000b 85kA	ABL1200b 85kA

Note) Dimension is for 3 pole and breaking capacity is for AC460V.

Metasol ELCB

AF Type	30AF	50AF	60AF	100AF	125AF	250AF	400AF	800AF	1000AF1	200AF
EBN		EBN50c 14kA	EBN60c 14kA	EBN100c 18kA		EBN250c 26kA	EBN400c 37kA	EBN800c 37kA		
EBS	EBS30c 14kA	EBS50c 18kA	EBS60c 18kA		EBS125c 37kA	EBS250c 37kA	EBS400c 50kA	EBS800c 65kA	EBS1000 b 85k A	EBS1200b 85kA
EBH		EBH50c 50kA			EBH125c 50kA	EBH250c 50kA	EBH400c 65kA			
EBL							EBL400c 85kA	EBL800c 85kA		

Note) Dimension is for 3 pole and breaking capacity is for AC460V.

Designed to show superior technology: Metasol Series

Sealed structure has improved its safety features so that no ARC flash is exposed. In order to emphasize its durability as an industrial device, Metasol series adopt simple design form and sophisticated shape applying diamond cut concepts on product surface.



- Compact design for space saving
- DIN rail and screw mountable (upto 150AF)
- Overload relays directly mountable to contactors separately
- Finger-proof design
- Easy to combine with manual motor starters
- Broad range of accessories
- World class products conforming to IEC and UL standards

18AF

Contactor

MC-6a, 9a, 12a, 18a

Rated current:
6, 9, 12, 18A

Rated insulation voltage:
690V

Overload relay MT-12

Current range: 0.1~18A
Trip class: Class10A, 20

22AF

Contactor

MC-9b, 12b, 18b, 22b

Rated current:
9, 12, 18, 22A

Rated insulation voltage:
690V

Overload relay MT-32

Current range: 0.1~40A
Trip class: Class10A, 20

40AF

Contactor

MC-32a, 40a

Rated current:
32, 40A

Rated insulation voltage:
1000V

Overload relay MT-32

Current range: 0.1~40A
Trip class: Class10A, 20

65AF

Contactor

MC-50a, 65a

Rated current:
50, 65A

Rated insulation voltage:
1000V

Overload relay MT-63

Current range: 4~65A
Trip class: Class10A, 20

100AF

Contactor

MC-75a, 85a, 100a

Rated current:
75, 85, 100A

Rated insulation voltage:
1000V

Overload relay MT-95

Current range: 7~100A
Trip class: Class10A, 20

150AF

Contactor

MC-130a, 150a

Rated current:
130, 150A

Rated insulation voltage:
1000V

Overload relay MT-150

Current range: 34~150A
Trip class: Class10A, 20

225AF

Contactor

MC-185a, 225a

Rated current:
185, 225A

Rated insulation voltage:
1000V

Overload relay MT-225

Current range: 65~240A
Trip class: Class10A, 20

400AF

Contactor

MC-265a, 330a, 400a

Rated current:
265, 330, 400A

Rated insulation voltage:
1000V

Overload relay MT-400

Current range: 85~400A
Trip class: Class10A, 20

800AF

Contactor

MC-500a, 630a, 800a

Rated current:
500, 630, 800A

Rated insulation voltage:
1000V

Overload relay MT-800

Current range: 200~800A
Trip class: Class10A, 20

1260AF

Contactor

MC-1260a

Rated current:
1260A

Rated insulation voltage:
1000V

2650AF

Contactor

MC-1400a, 1700a, 2100a, 2650a

Rated current:

1400, 1700, 2100, 2650A
Rated insulation voltage:
1000V

3 Frame Size

32AF : 0.1, 0.16, 32A (16 steps)

63AF : 6, 10, 63A (9 steps)

100AF : 11, 17, 100A (10 steps)

High Breaking Capacity

- 15kA to 100 kA at 415V AC

Various Accessories

- Front Mounting Auxiliary Switch
- Side Mounting Auxiliary Switch
- Any Trip Alarm Switch
- Magnetic Trip Alarm Switch
- Shunt Release
- Under Voltage Release
- Under Voltage Release with Switch
- Insulation Barrier
- Extended Handle
- Phase BusBar Device
- Enclosure



Complete Range upto 100A

Overload Relay

General Descriptions

Type MT, bimetal-style, overload relays are designed to protect AC circuits and motor against overloads, phase failure, long starting times and prolonged stalling of the motor.

Four versions are available according to the protection function and trip class as below.

- Non-differential: 3 pole - 2 bimetal (Heater) and trip class 10A
- Non-differential: 3 pole - 3 bimetal (Heater) and trip class 10A
- Differential: 3 pole - 3 bimetal (Heater) and trip class 10A
- Differential: 3 pole - 3 bimetal (Heater) and trip class 20



Digital Motor Protection Relay

Standard: OEC60947, KSC 4504



PROTECTION

Over Current	According to the setting time
Phase Failure	3 Sec.
Reverse Phase	Within 0.1 sec.
Asymmetry	5 sec.
Stall	5 sec.
Locked Rotor	Within 0.5 sec.
Under Current	3 sec.
Ground Fault	Within 0.05 - 1.0 sec, selectable
Short Circuit	Within 50 m secs.
Alarm	Variable (60-410% of the setting current)

Inverse & Definite time Characteristic
Cause of Fault Display
Phase Current Display

Basic Rating: 0.5-6A & 5-60A. Can protect Motors up to 600A with suitable CTs
For Ground fault Protection additional Zero Sequence CT required

Electronic Motor Protection Relay

Inverse Time Characteristics Type (GMP 22/40/80)



Model	Various Protection Functions				
	Protection				
	Over Current	Phase Failure	Stall	Asymmetry	Reverse Phase
2P/2S/2T	⊙	⊙	⊙	X	X
3P/3S/3T	⊙	⊙	⊙	⊙	X
3PR/3SR/3TR	⊙	⊙	⊙	⊙	⊙

Adjustable trip time (Trip Class 5-10-15-20-30)
Direct Contactor Mounting up to MC-40a Separate Mounting available

Definite Time Characteristics Type (GMP 60T) / 60T(R)



	MODEL	
	GMP60-T	GMP60-3T/ 3T(R)
No. of CTs	2	3
Protections:-	●	●
Over Current	●	●
Phase Failure	●	●
Lock / Stall	●	●
Reverse Phase	—	● [R Type]
Reverse Unbalance	—	●

Miniature Circuit Breakers

Isolator

- Rated current Upto 63A
- Number of pole 14P
- Standards
ISIEC608981



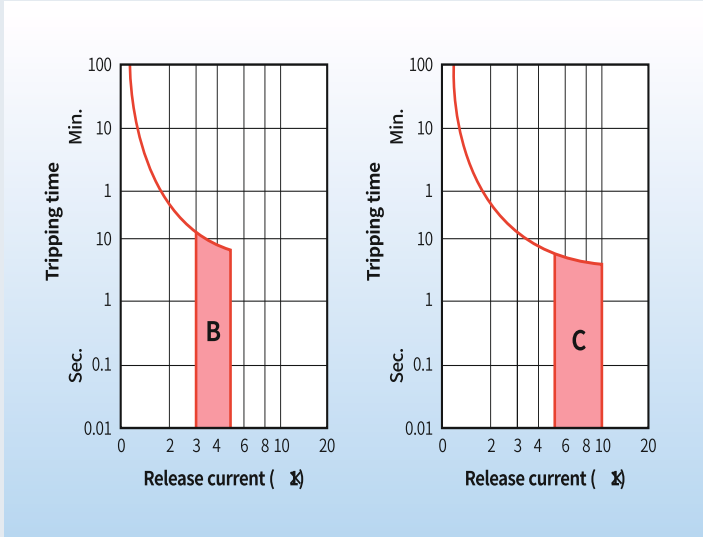
- Rated current Upto 125A
- Number of pole 14P
- Standards
ISIEC69473

*Bcurve product can be ordered from 6A to 63A
*Suitable for performance at +55°C

Miniature Circuit Breakers Type	S60	
	N	H
Protection	Overcurrent / Short circuit	
Poles	1P, 1P+N, 2P, 3P, 3P+N, 4P	
Rated current InA*	6, 10, 16, 20, 25, 32, 40, 50, 63A	0.5, 1, 2, 3, 4, 5, 6, 10, 16, 20, 25, 32, 40, 50, 63A
Rated voltage UeV	240 / 415 Vac	
Trip characteristics	B, C	
Rated Insulation Voltage	690V	
Rated Impulse Voltage (Uimp)	4kV	
Rated Frequency (Hz)	50/60 Hz.	
Rated Short Circuit Breaking Capacity (Icn)	6kA	10kA
Service short circuit breaking capacity Ics	6kA	7.5kA
Electrical life	10,000	
Mechanical life	20,000	
Degree of protection	IP 20	
Operating temperature	- 5 to + 40°C	
Mounting Clip on Din rail	35mm Din-Rail	
Terminal	Lug / Busbar	
Terminal tightening torque	2 Nm	
Terminal Capacity max	25sqmm	35sqmm
Dimensions mm	65.4 × 85.5 × 17.5 (1P)	
Energy limiting class	3	
Standard	IS / IEC60898 -1	
Isolator Type	SD125	
Poles	1P, 2P, 3P, 4P	
Rated current InA	40, 63, 80, 100, 125A	
Rated voltage UeV	240 / 415 Vac	
Rated insulation voltage	690V	
Rated impulse voltage (Uimp)	6kV	
Utilisation category	AC 22A	
Dielectric strength	2.5kV	
Rated short time withstand current Icw	1.5kA/1s	
Rated frequency (Hz)	50/60 Hz.	
Bus bar connection	Pin type/Fork type (Both side)	
Degree of protection	IP 20	
Operating temperature	- 5 to + 40°C	
Mounting clip on din rail	35mm Din-Rail	
Terminal tightening torque	2.5 Nm	
Terminal capacity (max.)	50 sqmm	
Shock resistance	40mm freefall	
Vibration	3G	
Case & Cover	Flame retardant thermoplastic material	
Dimensions H × D × W mm	65.4 × 85.5 × 7.5 (1P)	
Standard	IS / IEC6947-3	

Characteristics curves(S60N, S60H)

Operating curves



Temperature derating

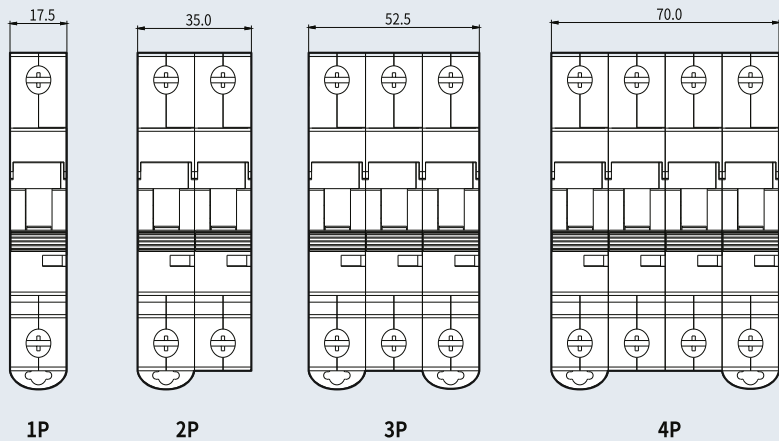
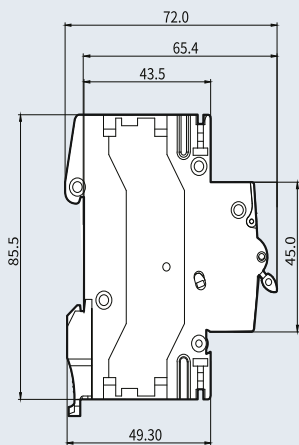
MCBs are redesigned and calibrated at 30°C as per IEC 60898-1 to carry rated current and to operate within time limits. If the MCB is required to operate at higher ambient temperature than 30°C, derating factors shall be considered.

Ambient Temperature	Derating factor
20°C	1.04In
25°C	1.02In
30°C	1.00In
35°C	0.96In
40°C	0.92In
45°C	0.88In
50°C	0.84In
55°C	0.80In

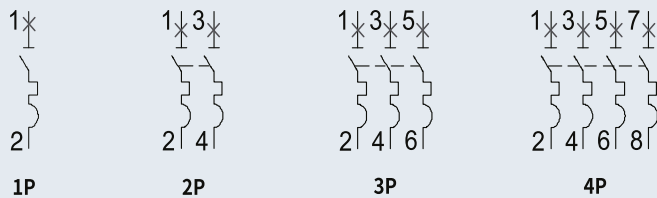
Dimensions(S60N, S60H)

Dimensions

(unit: mm)



Diagram



Accessory

Auxiliary switch for S60H

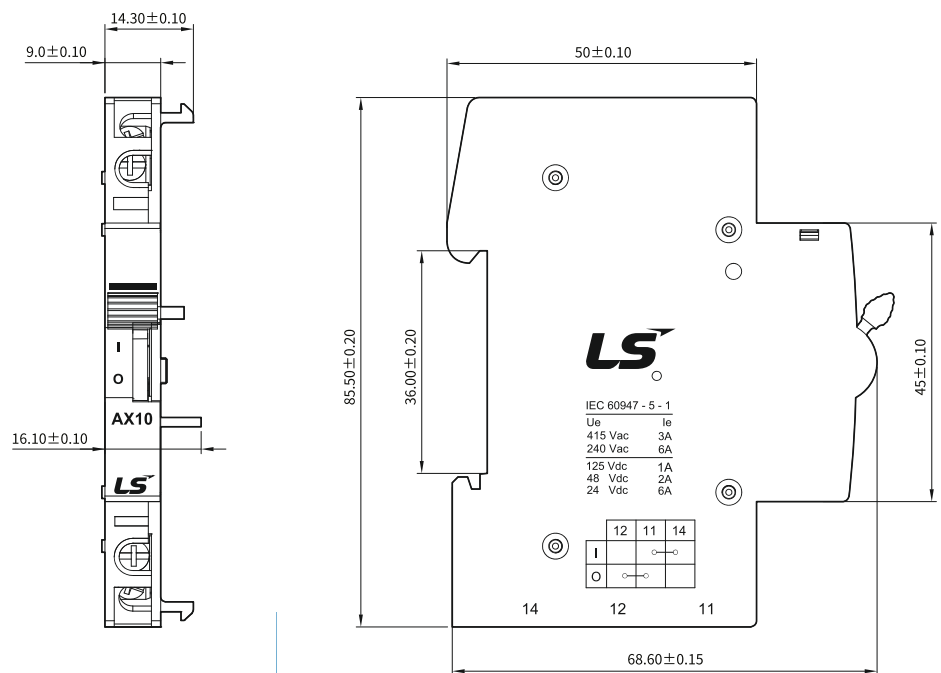
Rating



Product	AX10	
Rating	AC circuit	DC Circuit
	6A @ 240 Vac	6A @ 24 Vdc
	3A @ 415 Vac	2A @ 48 Vdc
	-	1A @ 125 Vdc
Contact configuration	1NO + 1NC	
Type of terminals	Lug type	
Terminal size	2.5 mm ²	
Width	9 mm	

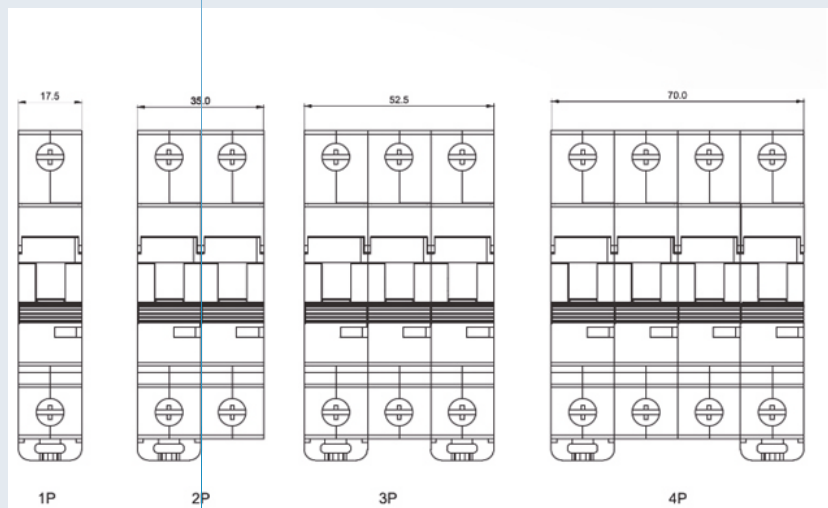
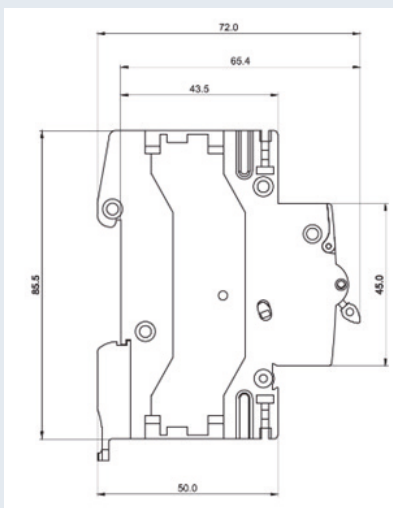
Dimensions

(unit: mm)



Dimensions (SD125)

(unit: mm)



intertek
Total Quality Assured.

ASTA
TYPE TEST
CERTIFICATION

Product Safety & Quality Assurance



LS modular type LV PCC is designed and produced to construct high quality power system. With high performance and high quality, it can be applied to various industrial fields. With our modular LV PCC, your electric system can be optimized. You can easily customize, install and maintain our product which is compliant with **IEC 61439-1&2 standard.**

Stability and reliability

- Fully typed tested according to IEC 61439-1&2 standard
- ASTA certificate of verification tests
- Partitioning up to form 4b
- Degree of protection : upto IP 55

Customization

- Modular structure, excellent assemblability

Busbar system

- Aluminium & Copper Busbar

Adopted LS ACB & MCCB

- For accurate operation and optimization of the solution, LS components are implemented to establish protection and communication network.
- LS low voltage devices comply with the applicable standards.

Applications

- Manufacturing industry
- Railway and airport
- Water and wastewater
- Commercial and residential complexes
- Hospitals, hotels, resort and shopping malls



Specification of MDB

Type	EMSOL LV MDB					
Busbar system	Copper busbar			Aluminum busbar		
Rated current (*at 50°C ambient)	4000 A*	2500 A*	1600 A*	4000 A	2500 A	1600 A
Rated insulation voltage (Ui)	1000 V			750 V		
Rated operating voltage (Ue)	415 V					
Rated impulse withstand voltage (Uimp)	12 / 8 kV			8 kV		
Frequency	50 / 60 Hz					
Rated Short-time withstand current (Icw)						
Main horizontal busbar	65 kA / 3 sec 65 kA / 1 sec	50 kA / 3 sec 50 kA / 1 sec	50 kA / 3 sec 50 kA / 1 sec	65 kA / 1 sec 65 kA / 1 sec	65 kA / 1 sec 65 kA / 1 sec	50 kA / 1 sec 50 kA / 1 sec
Vertical distribution busbar						
Rated peak withstand current (Ipk)	143 kA peak	105 kA peak	105 kA peak	143 kA peak	143 kA peak	105 kA peak
Installation	Indoor in dry conditions or in moderate humidity levels and factors of air pollution ("Normal operating conditions" as in IEC 61439-2)					
Form of internal separation	Form 4b Type 7					
Degree of protection according to IEC 60529	IP 43 / 54 / 55			IP 43		
Test certificates	DEKRA			ASTA		
Standard	IEC 61439-2:2020, Ed 3.0			IEC 61439-2:2011, Ed 2.0		

Configuration



Busbar system	Current (A)	Typical size (mm)					
		A	B	C	D	E	F
Copper	~ 1600	600	300	660	960	100	2220
		660					
	720						
	~ 2500	840					
~ 4000	960	420	1200				
Aluminum	~ 1600	600	420	720	960	100	2100 2220
		720					
	~ 2500	720					
	840						
	~ 4000	840	540		1320		
	960						

Current (A)	Typical size (mm)						
	A	B	C	D	E	F	G
~ 100	210	300	300	600	960 1200	100	2220
~ 160	240						
~ 250	300						
~ 400	300						
~ 630	300						
~ 100	360						
~ 160	360						
~ 250	360						
~ 400	420						
~ 630	420						
		540					
		600					

Test certificate

DEKRA



<1600A>



<2500A>



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ASTA



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Partnership

Becoming an advanced global partner means increasing the partner's value through following works in your place.

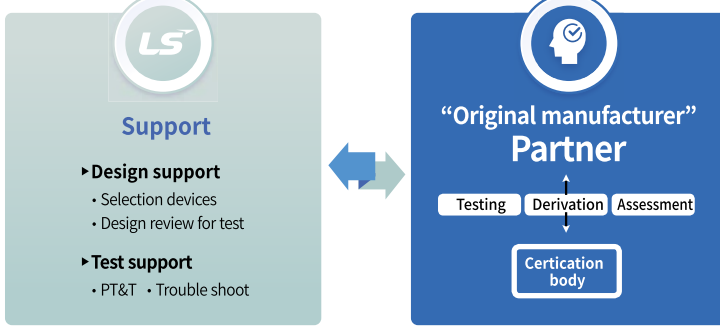
1st partnership

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



2nd partnership

If you want to become a "Original manufacturer", LS will also support you.



PT&T POWER TESTING & TECHNOLOGY INSTITUTE



7th largest testing capacity lab in the world

Short circuit test capacity : 4,000MVA



Resolute investment for development and competitiveness

22.5 million USD investment plan for the 2nd short circuit generator



Global standard activities with IEC

IEC TC : Technical Committee activities

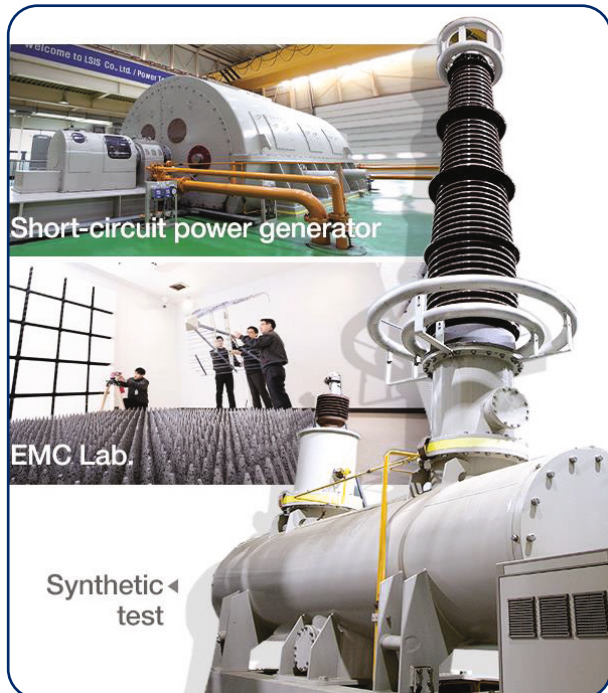


Rigorous performance test for credibility of products

- MV/LV (-36kV) MV test & direct test for short-circuit generator
- Ultra high voltage (-170kV) Composite test
- Credibility test considering real-use situation EMC, environment / proof test



Persuing global reputation with international certificate associations



Short-circuit power generator

EMC Lab.

Synthetic test

AC LOW VOLTAGE SWITCHGEAR



Metasol MCCB / ELCB



EMPR Series



Metasol MC / TOR



Susol Air Circuit Breaker

DC LOW VOLTAGE SWITCHGEAR



DC Relay



Renewable Energy Solution

Global Network



Your Total Solution Provider

- **Overseas Subsidiary Office**
 Amsterdam(Netherlands), Chicago(USA), Dubai(UAE), Wuxi/Dalian(China), Tokyo(Japan), Hanoi(Vietnam)
 LS ENERGY SOLUTIONS LLC, Istanbul(Turkey)
- **Overseas Branch Office**
 Moscow(Russia), Shanghai/Beijing/Guangzhou/Qingdao/Chengdu/Nanjing(China)
 Tokyo(Japan), Ho Chi Minh(Vietnam), Jakarta(Indonesia), Bangkok(Thailand), Irvine(USA), India, Singapore
- **Worldwide Presence**
 106 Countries



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Technical Question or After-sales Service

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