



Renewable energy solution



LSIS

FUTURING SMART ENERGY

We open up a brighter future through
efficient and convenient energy solutions.



LSIS a leader of the electric power and automation industry, offers smart convergence solutions by combining ICT and DC technology.
Smart Power Transmission Solutions / Smart Power Distribution Solutions Smart Automation Solutions

Renewable Energy is key factor to reduce green home gas emissions for the next generation



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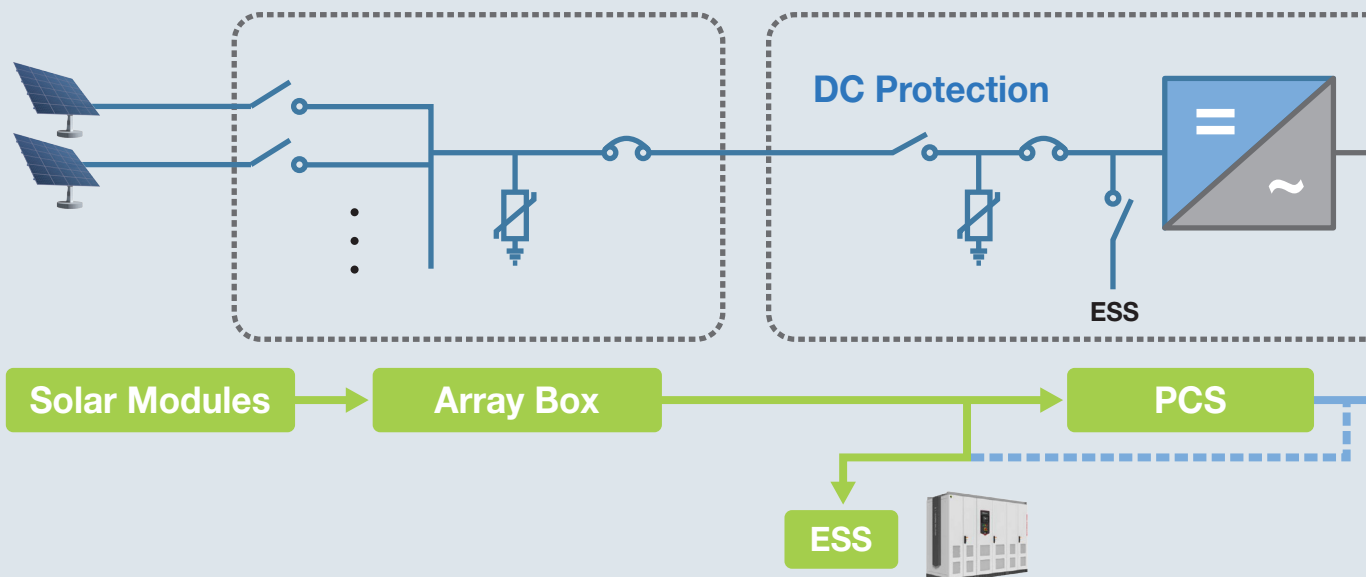
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Products for Photovoltaic Power Generation

DC LINE



P.12 DC MCCB



TD100~TS800

- In 16~800A
- Ue DC 500~1500V
- Icu 40kA

P.24 Switch Disconnecter



TS1600NA

- In 1000~1600A
- Ue DC 1150V
- Icw 25kA 1s

P.34 Switch Disconnecter



DDH / DDV

- In 800~4000AF
- Ue DC 750~1500V
- Icw 100kA 1s

P.26 DC MCB



BK63H

- In 1~63A
- Ue DC 250~1000V
- Icu 10kA

P.28 DC Contactor



MD-30a, 60a, 100a

- Ie 120, 100, 60, 35A
- Ue DC 125,250,500V,1000V
- DC-2~5, DC-1 ratings
- 3.7kW~22kW

P.56 High Voltage DC Relay



GPR010~GPR-H500-A

- Ie 10~500A
- Ue 450~1500V

P.62 Fuse & Holder



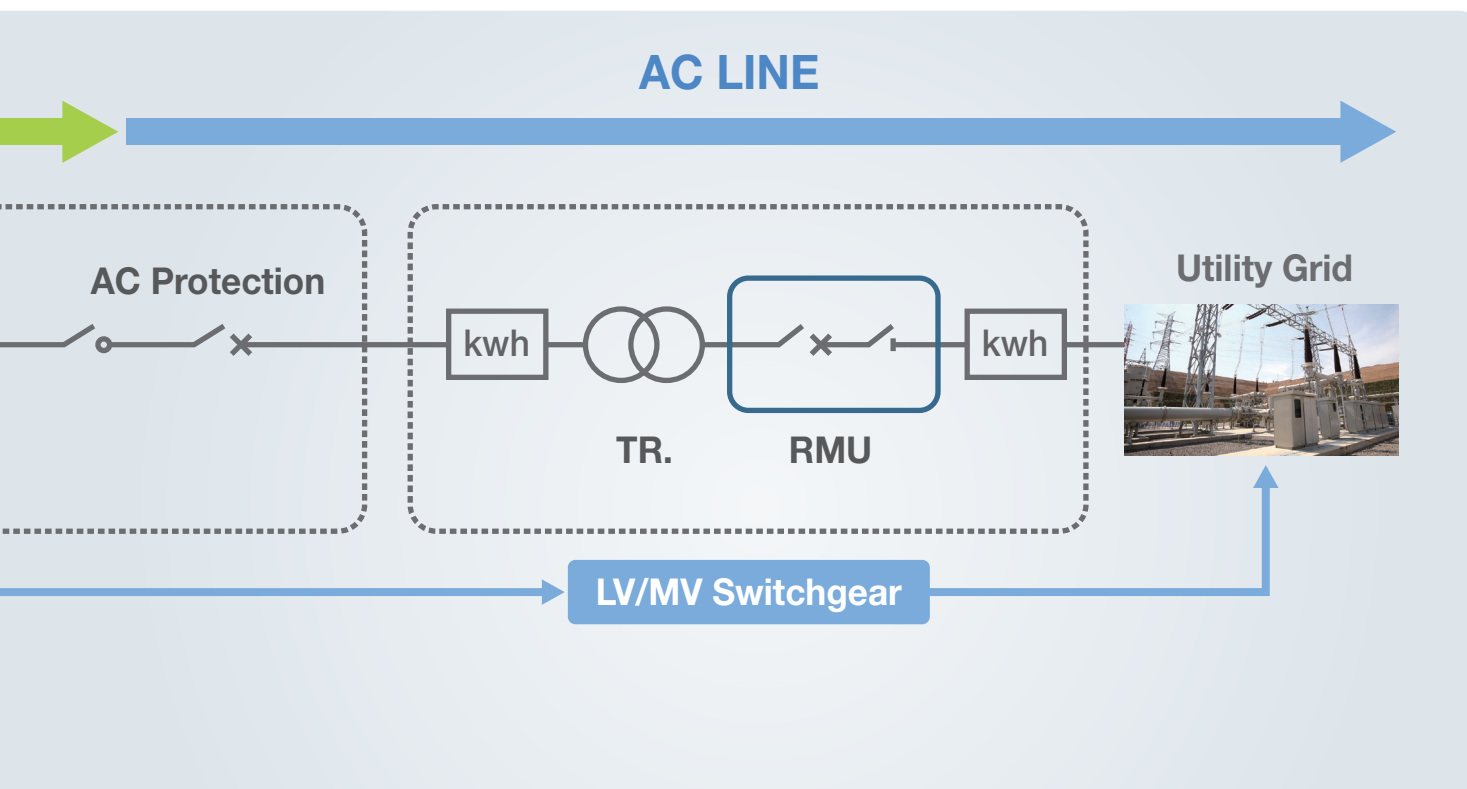
- LSFS-Z15
- In 8~15A, DC 1000V

P.30 DC SPD



BK20S-DC1500

- Un DC 110~1500V
- Up ≤1.0~4.5kV
- Imax 40kA
- ta <25ns



P.70 MCCB



TS1000~1600

- In 1000~1600A
- Icu 50~150kA
- AC380/415V

P.121 Contactors



MC-1260a, 2100a

- Ie 1260~2100A
- Ue AC1000V
- Coil: AC 100~240V
- DC 100~220V

P.149 Cast Resin TR



- Rated Power
 - Up to 25MVA
- Rated Voltage
 - Primary: Up to 36kV
 - Secondary: Up to 1200V

P.141 RMU



- Rated Voltage: Up to 24kV
- Ir: 630A
- Isc 21kA/3s
- M1/E3
- IAC AFAL 21kA/0.5s

P.80 ACB



AH

- In 630~6300A
- Icu 65~150kA
- Ue 690V

P.137 X-GIPAM



- X-GIPAM Bay, F, M, T, DG
- PT : 110V, CT : 5A,
- ZCT : 1.5mA
- AC110V, DC110~125V

P.153 Oil Immersed TR.



- Rated Power
 - Up to 80MVA
- Rated Voltage
 - Up to 72kV

P.141 Packaged Solution

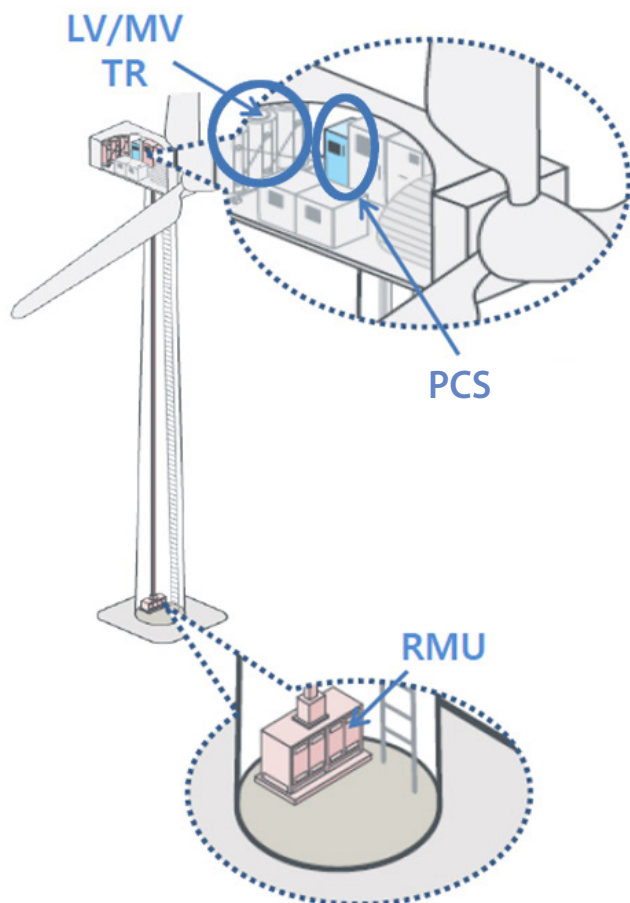
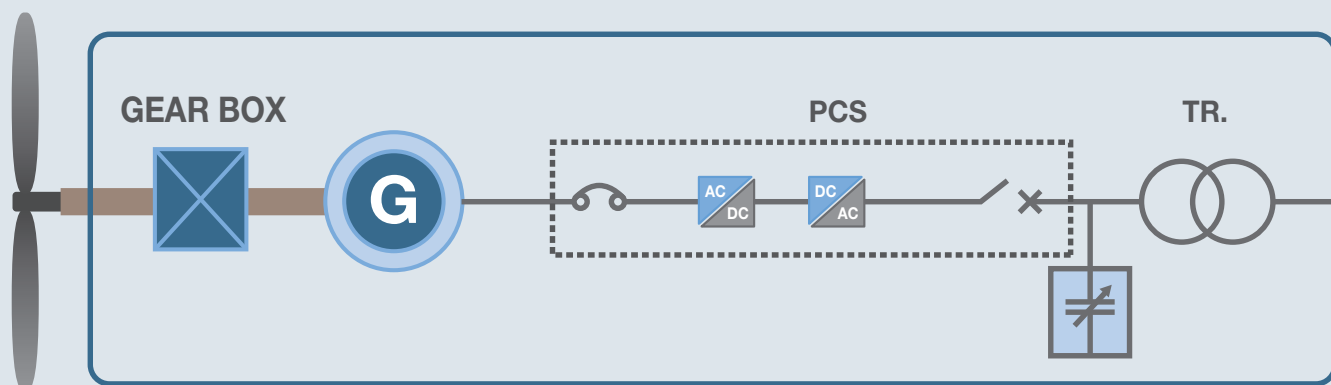


RMU+TR+LV



RMU+TR+PCU

Products for Grid Protection of Wind Power



P.70 MCCB



TS1000~1600

- In 1000~1600A
- Icu 50~150kA
- AC380/415V

P.79 ACB



AH

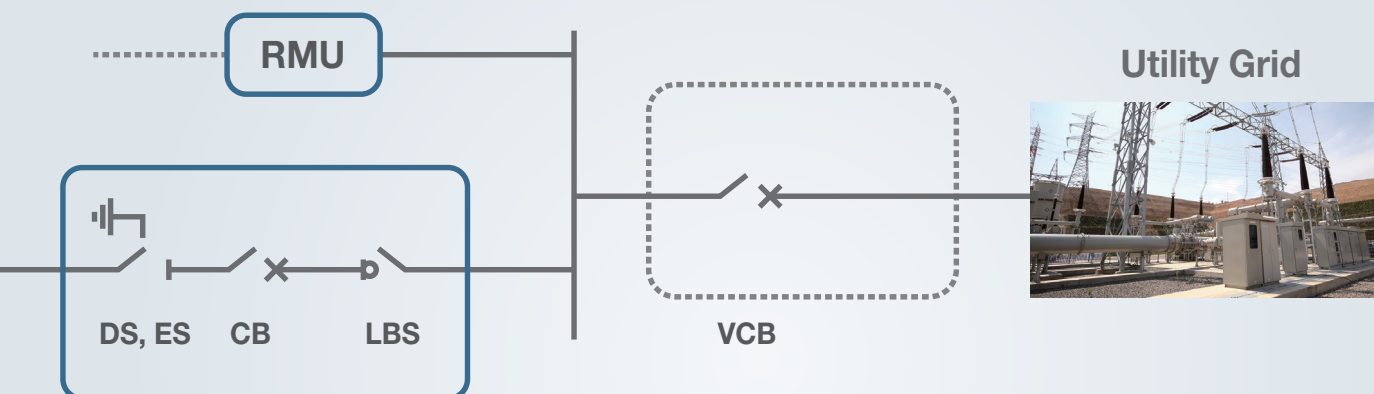
- In 630~6300A
- Icu 65~150kA
- AC380/415V

P.28 DC Contactor



MD-30a, 60a, 100a

- Ie 120, 100, 60, 35A
- Ue DC 125, 250, 500, 1000V
- DC2~5, DC-1 ratings



P.149 Cast Resin TR.



- Rated Power
 - Up to 25MVA
- Rated Voltage
 - Primary: Up to 36kV
 - Secondary: Up to 1200V

P.141 RMU



- Rated Voltage: Up to 24kV
- Ir: 630A
- Isc 21kA/3s
- M1/E3
- IAC AFAL 21kA/0.5s

P.99 VCB



VL~25

- Ir: 630A/24kV
- Breaking current: 25kA
- M2/E2/C2

P.153 Oil Immersed TR.



- Rated Power
 - Up to 80MVA
- Rated Voltage
 - Up to 72kV

- CSS (RMU+TR+LV)

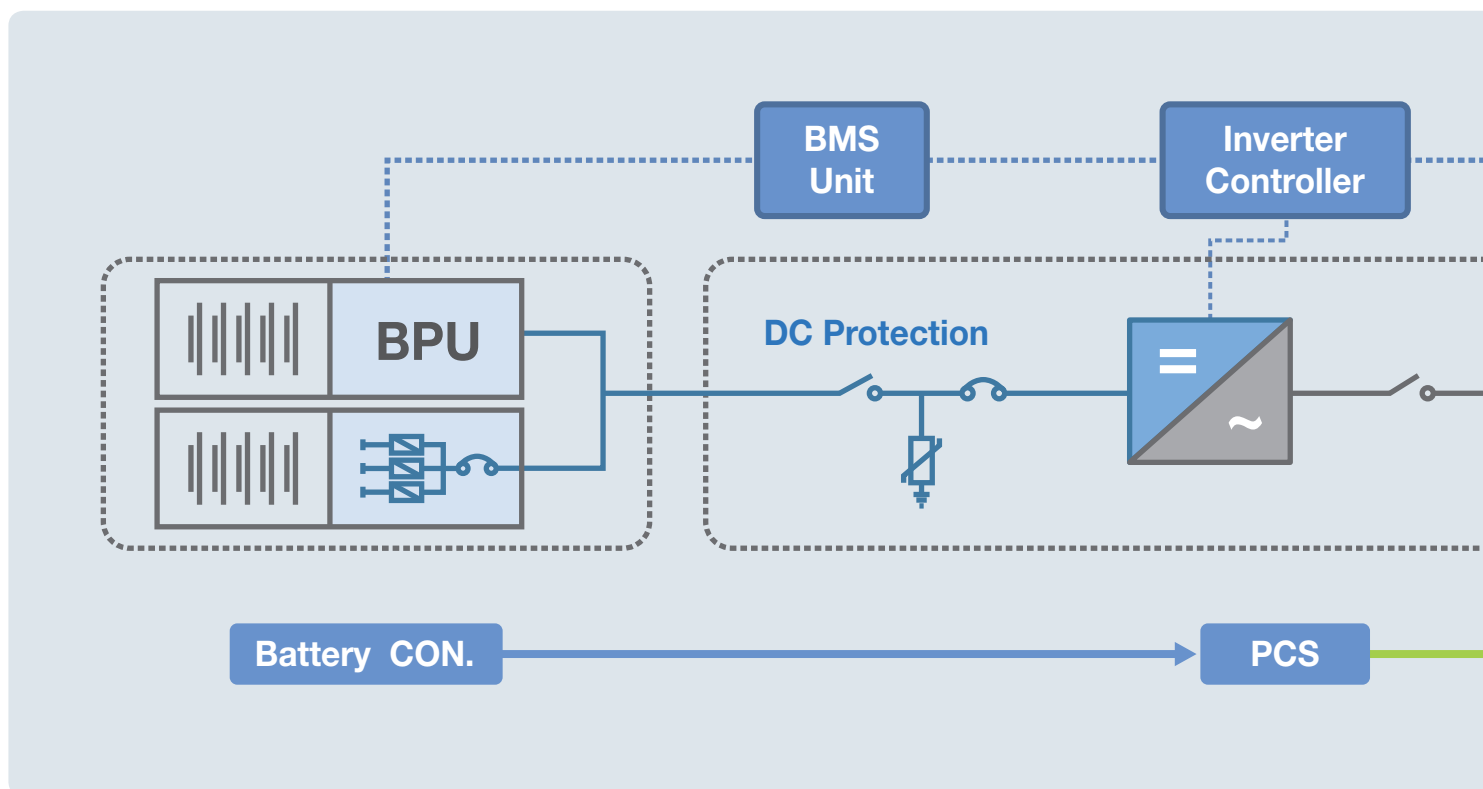


P.101 CB Compartment



- Ir: 630A/24kV
- Breaking current: 25kA
- M2/E2/C2

Products for Energy Storage System



P.12 DC MCCB



TD100~TS800

- In 16~800A
- Ue DC 500~1500V
- Icu 40kA

P.28 DC Contactor



MD-30a,60a,100a

- Ie 120, 100, 60, 35A
- Ue DC 125, 250, 500V, 1000V
- DC-2~5, DC-1 ratings
- 3.7kW~22kW

P.34 Switch Disconnecter



DDH / DDV

- In 800~4000AF
- Ue DC 750~1500V
- Icw 100kA 1s

P.121 Contactor



MC-1260a, 2100a

- Ie 1260~2100A
- Ue AC1000V
- Coil: AC 100~240V
- DC 100~220V

P.62 Fuse & Holder



- LSFS-Z15
- In 8~15A, DC 1000V

P.56 High Voltage DC Relay



GPR010~GPR-H500-A

- Ie 10~500A
- Ue 450~1500V

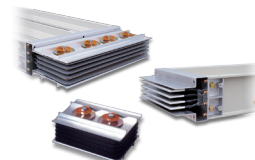
P.30 DC SPD



BK20S-DC1500

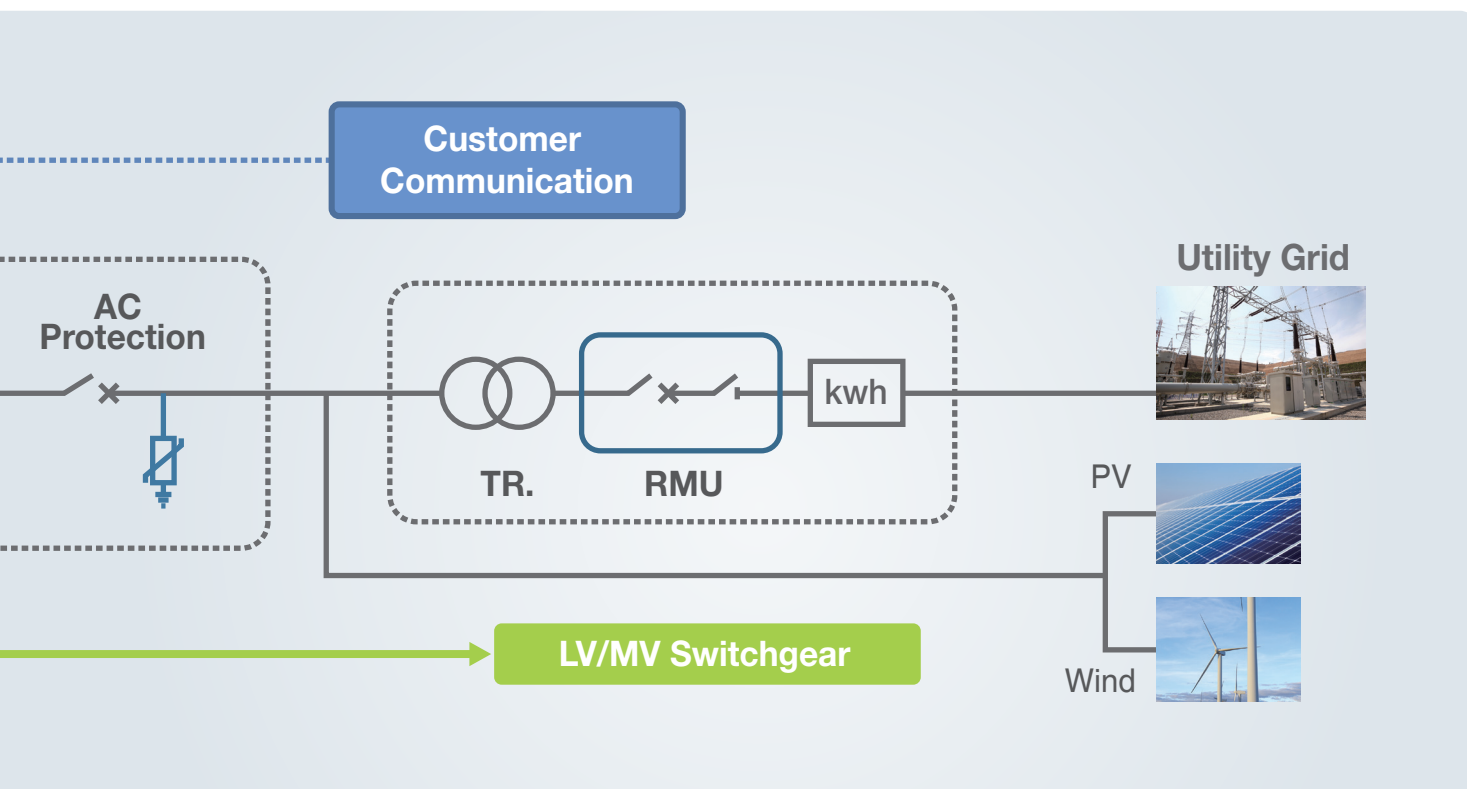
- Un DC 110~1500V
- Up ≤1.0~4.5kV
- Imax 40kA
- t_A <25ns

P.133 Busways



SS type

- In AL 630~6000A
- Cu 630~7500A
- Isc Al 4000A/200kA
- Cu 4000A/220kA for 1s



P.70 MCCB



TS1000~1600

- In 1000~1600A
- Icu 50~150kA
- AC380/415V

P.149 Cast Resin TR.



- Rated Power
 - Up to 25MVA
- Rated Voltage
 - Primary: Up to 36kV
 - Secondary: Up to 1200V

P.141 RMU



- Rated Voltage: Up to 24kV
- Ir: 630A
- Isc 21kA/3s
- M1/E3
- IAC AFAL 21kA/0.5s

P.99 VCB



VL~25

- Ir: 630A/24kV
- Breaking current: 25kA
- M2/E2/C2

P.79 ACB



AH

- In 630~6300A
- Icu 65~150kA
- AC380/415V

P.153 Oil Immersed TR.



- Rated Power
 - Up to 80MVA
- Rated Voltage
 - Up to 72kV

P.137 X-GIPAM



- X-GIPAM Bay, F, M, T, DG
- PT : 110V, CT : 5A, ZCT : 1.5mA
- AC110V, DC110~125V

Susol

Super Solution

Metasol

Meta Solution



DC Components

You can count on us.

Global leader that puts customer values as the highest priority

We promise to return the best value for our customers. Committed to develop global leading products, we endeavor to expand overseas market as well as domestic market. Join us where you can share bright future.

DC MCCB	12
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SPD	30
DC ACB	32
DC Switch Disconnecter	34
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DC MCCB (100~800AF)

- Susol MCCB is suitable for DC application such as Photovoltaic Circuit Breaker, UPS and datacenter
- DC short circuit test tested by VDE
- Higher nominal voltage range up to 1000 VDC
- Rated Current : 16A~800A
- No of Pole: 2/3/4Pole
- Available for AC/DC application



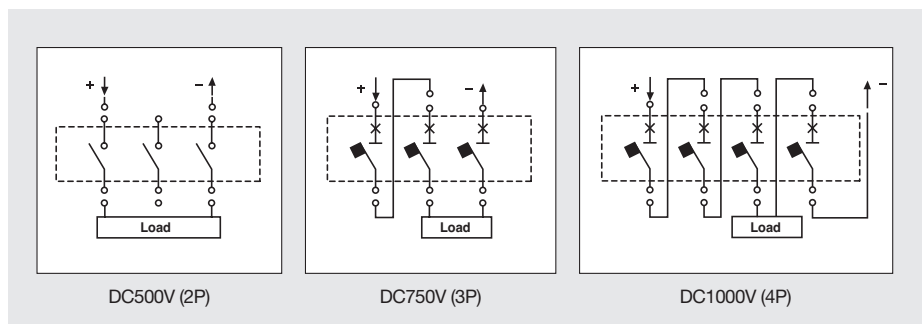
Rating

Model		TD100	TD160	TS100	TS160	TS250	TSD250N	TS400	TS630	TS800
Frame size (AF)		100	160	100	160	250	250	400	550	800
Rated current, In (A)		16, 20, 25, 32, 40, 50, 63, 80, 100	100, 125, 160	40, 50, 63, 80, 100	100, 125, 160	125, 160, 200, 250	250	300, 400	500, 550 ^{Note 5)}	700 ^{Note 6)} , 800
No. of poles (Pole)		2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	4	2, 3, 4	2, 3, 4	2, 3, 4
Rated operational voltage, Ue (Vdc)	2Pole	500	500	500	500	500	-	500	500	500
	3Pole	750	750	750	750	750	-	750	750	750
	4Pole	1000	1000	1000	1000	1000	1500	1000	1000	1000
Rated insulation voltage, Ui (V)	2Pole	800	800	800	800	800	-	800	800	800
	3Pole	800	800	800	800	800	-	800	800	800
	4Pole	1000	1000	1000	1000	1000	1500	1000	1000	1000
Rated impulse withstand voltage Uimp (kV)		8	8	8	8	8	8	8	8	8
Rated ultimate short-circuit breaking capacity, Icu (kA)	Type	H	H	H	H	H	N	H	H	H
Rated service breaking capacity, Ics [%xIcu]	500VDC (2P)	40	40	40	40	40	-	40	40	40
	750VDC (3P)	40	40	40	40	40	-	40	40	40
	1000VDC (4P)	40	40	40	40	40	20kA(DC1500V)	40	40	40
Trip Unit ^{Note 2)} Function	FTU	●	●	●	●	●	●	●	●	●
	FMU	●	●	●	●	●	-	●	●	●
	ATU	-	-	-	●	●	-	●	●	●

Note)

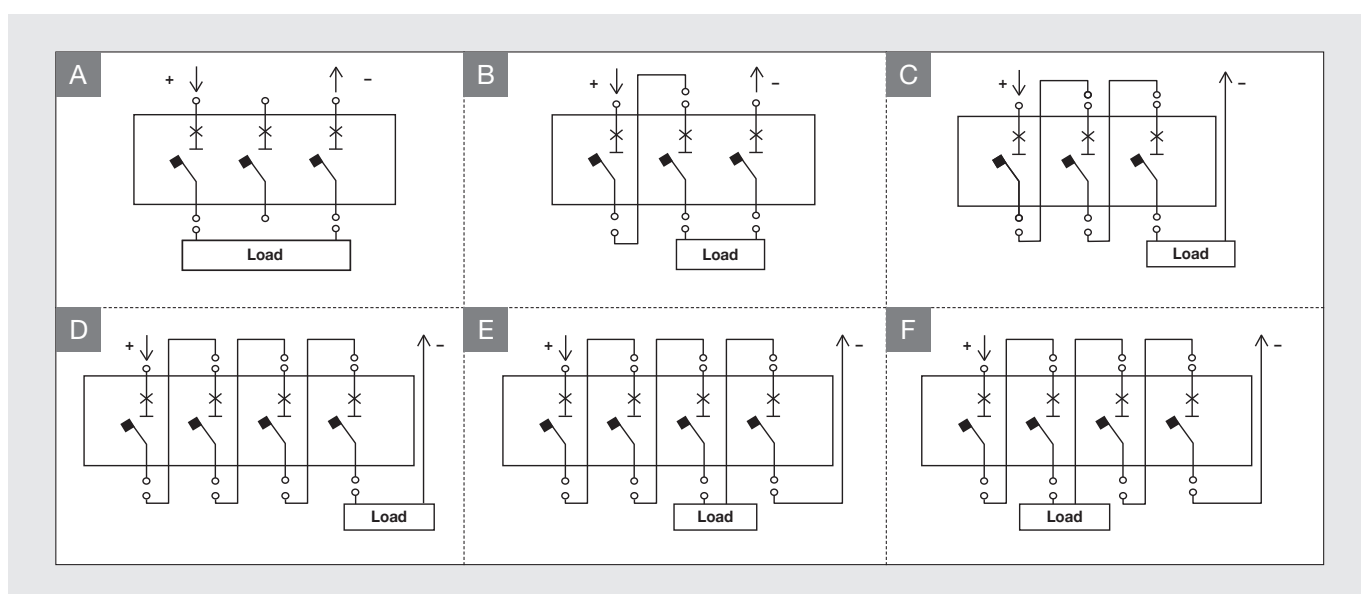
1. Exterior dimensions same as existing Susol product.
2. Trip Unit Function have 3 Types (FTU/FMU/ATU)
 - FTU : Fixed thermal, fixed magnetic unit
 - FMU : Adjustable thermal, fixed magnetic unit
 - ATU : Adjustable thermal, adjustable magnetic unit (Not applicable to TS160 100A ATU)
3. Max. Rating of TS630 is 550A
4. 700A is only available for TS800FTU
5. Electronic trip device is not applicable to DC circuit.
6. 4Pole type MCCB is 4P4T.
7. 100A rating of TS160 is not applicable to ATU.

DC Exemplary circuit diagrams



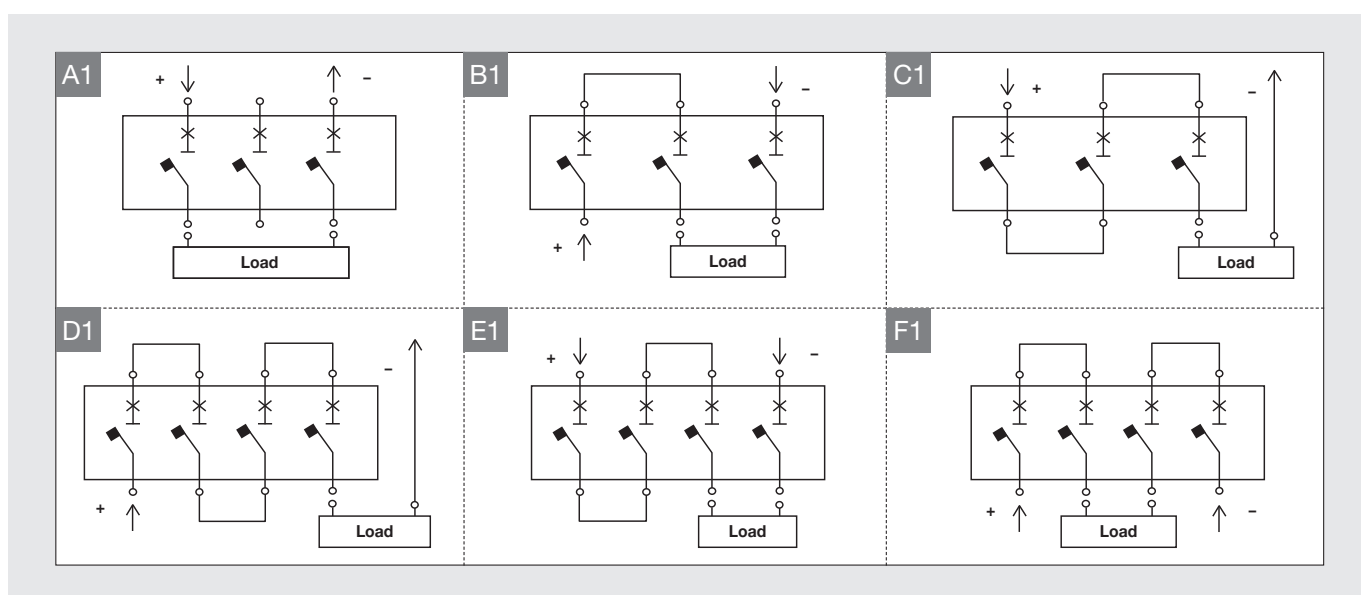
Connection method by DC voltage

Operating voltage (DC)	Center point Connected to earth (A)	One pole connected to earth (B)	Insulated from Earth (C)
~250V	A	A	A
~500V	A	B, C	A
~750V	F	C, E	B
~1000V	F	D	E, F



※ Application of 4P4D product when applying 4-pole product

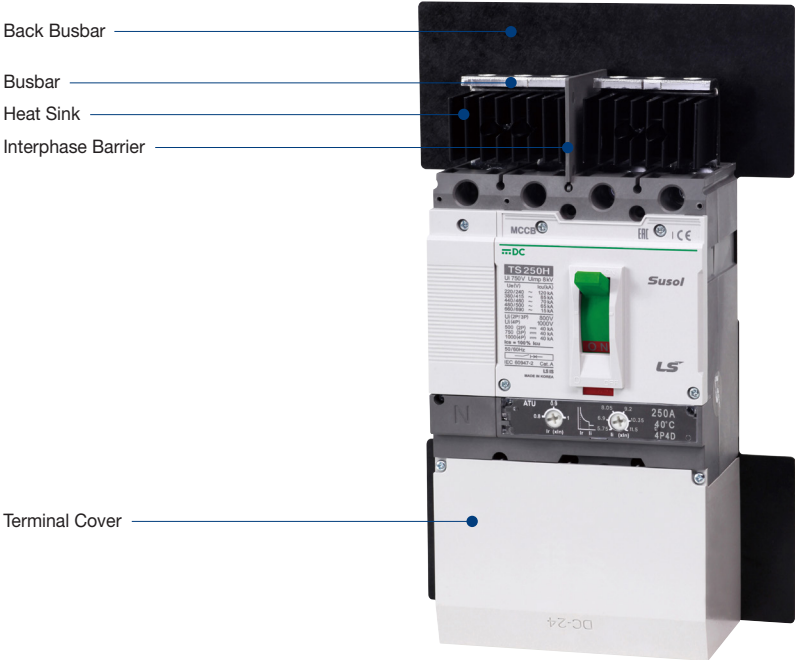
Operating voltage (DC)	Center point Connected to earth (A)	One pole connected to earth (B)	Insulated from Earth (C)
~250V	A1	A1	A1
~500V	A1	B1, C1	A1
~750V	F1	C1, E1	B1
~1000V	F1	D1	E1, F1



※ Application of 4P4D product when applying 4-pole product

DC MCCB (100~800AF)

Susol MCCB PV up to 800A

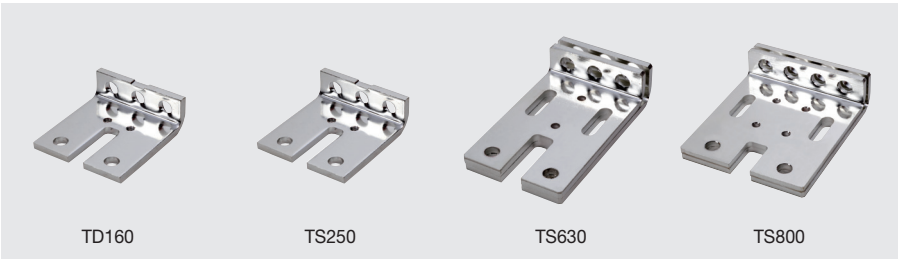


Accessories

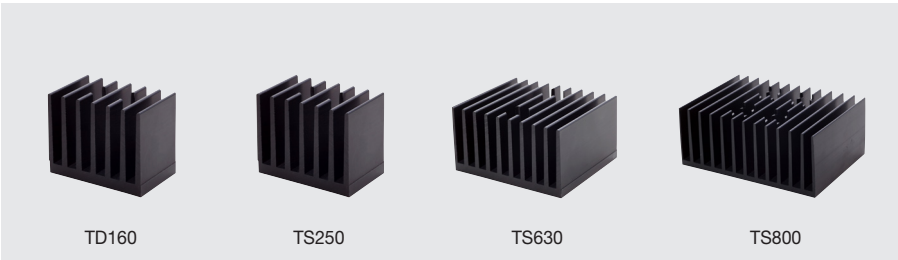
Terminal cover



Busbar



Heatsink



Susol MCCB PV up to 800A

1. Basically, Heat sink and Busbar are optional accessories.
2. A set of Busbar parts is mounted on terminals of the chassis.
3. If Busbar parts are mounted only, it is available to refer to Derating table and if Heat sink parts are mounted additionally, please refer to Rated current table

Derating Table for AF

The following tables are based on the following assumptions;

- Maximum permissible temperature of busbars are 100°C
- T : Temperature around the circuit breaker and its connections

Note) 1. The values presented in the tables are the result of trials and theoretical calculations on the basis of the assumption mentioned above.

2. These tables are intended as an aid in designing connection, however, the actual values must be confirmed by tests on the installation.

Type	Rated Current (A)	Derating Current (A)	Terminal Connection Condition
TD100H	16	16	TD160 Busbar 5t
	20	20	
	25	25	
	32	32	
	40	40	
	50	50	
	63	63	
	80	80	
TD160H	100	100	TD160 Busbar 5t + Heat Sink
	125	113	
	160	144	
	125	125	
TS100H	160	160	TS250 Busbar 5t
	40	40	
	50	50	
	63	63	
	80	80	
TS160H	100	100	TS250 Busbar 5t
	125	125	
	160	160	
	125	125	
TS250H	160	160	TS250 Busbar 5t + Heat Sink
	200	180	
	250	200	
	200	200	
	250	250	
TS400H	300	300	TS630 Busbar Lower & Upper 6t
	400	360	
	400	400	
TS630H	400	400	TS630 Busbar Lower & Upper 6t+Heat Sink
	500	400	
	550	440	
	500	500	
TS800H	550	550	TS630 Busbar Lower & Upper 6t
	700 *	630	
	800	640	
	700 *	700	
	800	800	TS800 Busbar Lower & Upper 6t+Heat Sink

Note) 1. * Only available for TS800H FTU

2. Dimension on the connection & busbar.

3. connection & busbar for PV application is not provided by LSIS.

DC MCCB (100~800AF)

Susol MCCB PV up to 800A

Temperature Derating

Type	Rated Current (A)	Derating Current (A)	Compensated rated current in accordance with ambient temperature (A)																Terminal Connection Condition			
			10℃		20℃		30℃		40℃		45℃		50℃		60℃		70℃					
TD100H	16	16	100%	16	100%	16	100%	16	100%	16	100%	16	100%	15	94%	14	88%	13	81%	TD160 Busbar 5t		
	20	20	100%	20	100%	20	100%	20	100%	20	100%	19	95%	19	95%	18	90%	18	90%			
	25	25	100%	25	100%	25	100%	25	100%	25	100%	24	96%	23	92%	22	88%	21	84%			
	32	32	100%	32	100%	32	100%	32	100%	32	100%	31	97%	30	94%	29	91%	27	84%			
	40	40	100%	40	100%	40	100%	40	100%	40	100%	39	98%	38	95%	35	88%	33	83%			
	50	50	100%	50	100%	50	100%	50	100%	50	100%	49	98%	47	94%	44	88%	41	82%			
	63	63	100%	63	100%	63	100%	63	100%	63	100%	62	98%	60	95%	56	89%	52	83%			
	80	80	100%	80	100%	80	100%	80	100%	80	100%	78	98%	76	95%	71	89%	66	83%			
	100	100	100%	100	100%	100	100%	100	100%	100	100%	98	98%	95	95%	89	89%	83	83%			
TD160H	100	100	100%	100	100%	100	100%	100	100%	100	100%	98	98%	95	95%	89	89%	83	83%	TD160 Busbar 5t + Heat Sink		
	125	113	90%	113	90%	113	90%	113	90%	113	90%	109	87%	105	84%	99	79%	92	74%			
	160	144	90%	144	90%	144	90%	144	90%	144	90%	139	87%	135	84%	127	79%	119	74%			
	125	125	100%	125	100%	125	100%	125	100%	125	100%	122	98%	119	95%	111	89%	104	83%			
	160	160	100%	160	100%	160	100%	160	100%	160	100%	155	97%	150	94%	141	88%	131	82%			
TS100H	40	40	100%	40	100%	40	100%	40	100%	40	100%	39	98%	38	95%	35	88%	33	83%	TS250 Busbar 5t		
	50	50	100%	50	100%	50	100%	50	100%	50	100%	49	98%	47	94%	44	88%	41	82%			
	63	63	100%	63	100%	63	100%	63	100%	63	100%	62	98%	60	95%	56	89%	52	83%			
	80	80	100%	80	100%	80	100%	80	100%	80	100%	78	98%	76	95%	71	89%	66	83%			
	100	100	100%	100	100%	100	100%	100	100%	100	100%	98	98%	95	95%	89	89%	83	83%			
TS160H	100	100	100%	100	100%	100	100%	100	100%	100	100%	98	98%	95	95%	89	89%	83	83%		TS250 Busbar 5t + Heat Sink	
	125	125	100%	125	100%	125	100%	125	100%	125	100%	122	98%	119	95%	111	89%	104	83%			
	160	160	100%	160	100%	160	100%	160	100%	160	100%	155	97%	150	94%	141	88%	131	82%			
TS250H	125	125	100%	125	100%	125	100%	125	100%	125	100%	122	98%	119	95%	111	89%	104	83%			TS630 Busbar Lower & Upper 6t
	160	160	100%	160	100%	160	100%	160	100%	160	100%	155	97%	150	94%	141	88%	131	82%			
	200	180	90%	180	90%	180	90%	180	90%	180	90%	174	87%	168	84%	157	79%	147	74%			
	250	200	80%	200	80%	200	80%	200	80%	200	80%	192	77%	185	74%	172	69%	160	64%			
	200	200	100%	200	100%	200	100%	200	100%	200	100%	196	98%	189	95%	178	89%	166	83%			
TS400H	250	250	100%	250	100%	250	100%	250	100%	250	100%	243	97%	236	94%	221	88%	206	82%	TS630 Busbar Lower & Upper 6t+Heat Sink		
	300	300	100%	300	100%	300	100%	300	100%	300	100%	291	97%	281	94%	264	88%	246	82%			
	400	360	90%	360	90%	360	90%	360	90%	360	90%	348	87%	337	84%	318	80%	305	76%			
	400	400	100%	400	100%	400	100%	400	100%	400	100%	390	98%	378	95%	357	89%	333	83%			
TS630H	500	400	80%	400	80%	400	80%	400	80%	400	80%	387	77%	372	74%	347	69%	322	64%	TS800 Busbar Lower & Upper 6t		
	550	440	80%	440	80%	440	80%	440	80%	440	80%	426	77%	409	74%	382	69%	354	64%			
	500	500	100%	500	100%	500	100%	500	100%	500	100%	488	98%	476	95%	446	89%	416	83%			
	550	550	100%	550	100%	550	100%	550	100%	550	100%	532	97%	515	94%	486	88%	453	82%			
TS800H	700 *	630	90%	630	90%	630	90%	630	90%	630	90%	619	88%	605	86%	584	83%	563	80%	TS800 Busbar Lower & Upper 6t+Heat Sink		
	800	640	80%	640	80%	640	80%	640	80%	640	80%	619	77%	605	76%	584	73%	563	70%			
	700 *	700	100%	700	100%	700	100%	700	100%	700	100%	684	98%	665	95%	626	89%	584	83%			
	800	800	100%	800	100%	800	100%	800	100%	800	100%	772	97%	748	94%	700	88%	652	82%			

Note) * Only available for TS800H FTU

Susol MCCB PV up to 800A

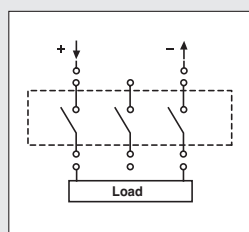
Warnings when using Susol MCCB for PV applications

The following warning must be kept when using Susol MCCB for PV applications
When violated, it can cause serious damages on relevant products or incur injuries.

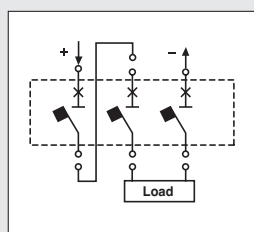


Warning

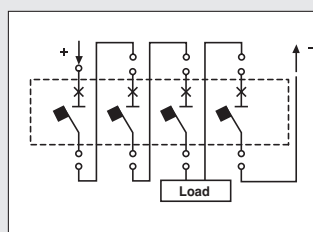
1. Please use wiring in accordance with the diagrams shown below.
Otherwise, usable voltage may be different from the stated requirement.



DC500V (2P)



DC750V (3P)



DC1000V (4P)



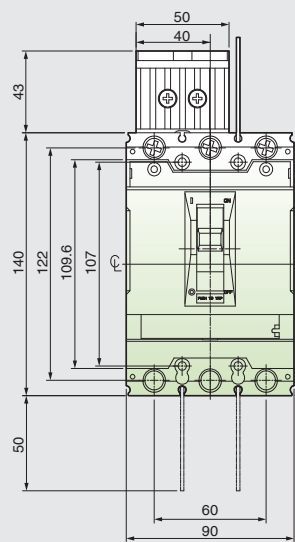
<Figure 1>

2. Wire length should be at least 60cm. Shorter wires can cause increase in temperature.
3. De-rated use is highly recommended when designing circuit by using busbar in a manner shown in Figure 1 on the right. If not, it can cause increase in temperature, erroneous trip, damage or fire due to the shortage of heat release(Please refer to the De-rating Table.)
4. Please use thickness and length of busbar in compliance with the specification drawing.
When used differently, additional de-rating may be required to release the heat.
5. Use of tin-plated busbar is recommended.
6. Inside of the low voltage panel should not exceed 40°C specified in KS/IEC Standard. Install sun screens or ventilation system if necessary. If violated, it can cause increase in temperature, erroneous trip, damage or fire. Also, additional de-rating is required when the temperature exceeds 40°C.
7. If you have additional questions regarding the application method, please consult with us before the use.

DC MCCB (100~800AF)

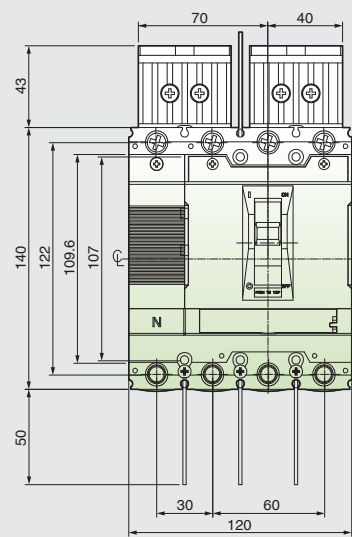
Dimensions

TD100, TD160



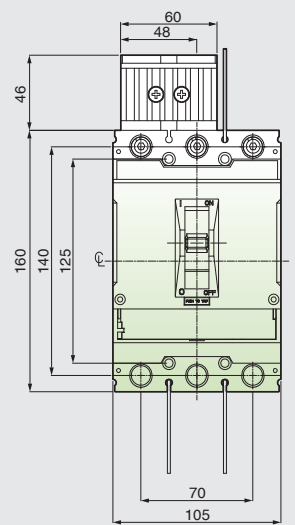
3P

※ R, S Line Common conditions



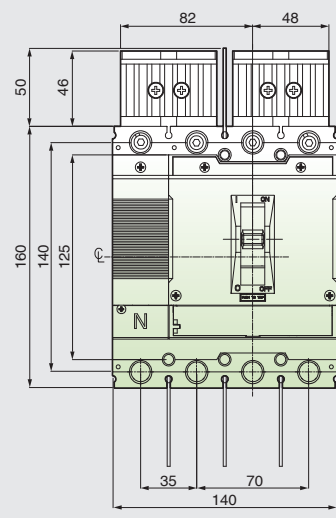
4P (L-type)

TS100, TS160, TS250



3P

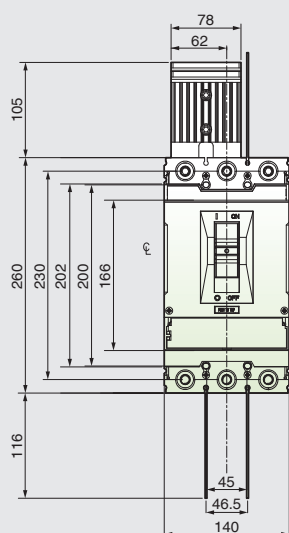
※ R, S Line Common conditions



4P (L-type)

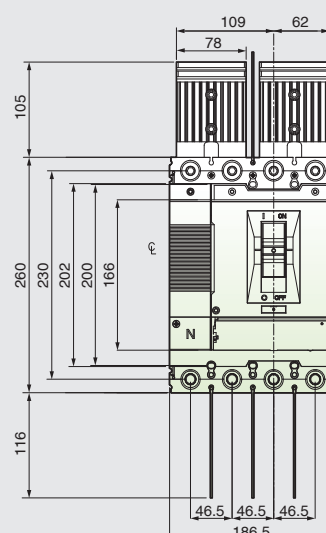
※ L- Type and R-Type is symmetric

TS400, TS630



3P

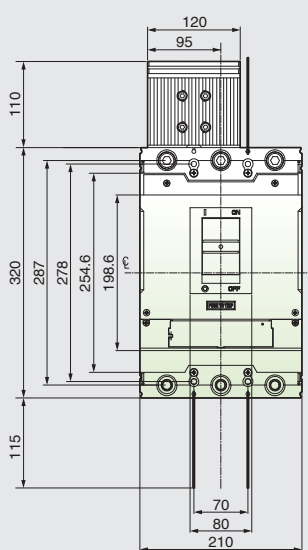
※ R, S Line Common conditions



4P (L-type)

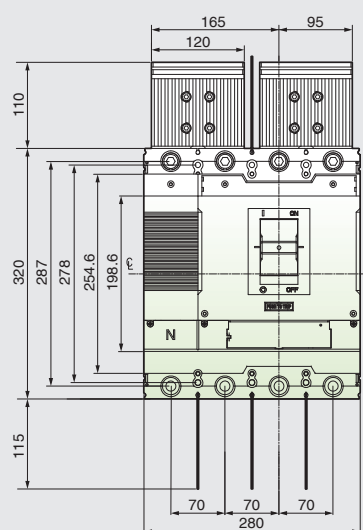
※ L-Type and R-Type is symmetric

TS800



3P

※ R, S Line Common conditions



4P (L-type)

※ L-Type and R-Type is symmetric

DC MCCB (DC 1500V)

Characteristics

- Applications such as photovoltaic (PV) power generation, UPS and data center.
- Compact Size implemented
- Maximum breaking capacity
- Nominal voltage ranges up to 1,500Vdc
- Rated Current & No. of poles:
63~250A, 4Pole



Rating

AF		250AF	
Type		N-Type	H-Type
Model and No. of pole	4 pole	TSD250N	TSD250H
Rated current, In		63, 80, 100, 125, 160, 200, 250A	
Rated operational voltage, Ue		DC 1500V	
Rated insulation voltage, Ui		DC 1500V	
Rated impulse withstand voltage, Uimp		8kV	
Rated short-circuit breaking capacity, Icu		20kA	50kA
Ics = % Icu		100	100
Type of trip unit		Thermal - Magnetic	
Current range	Fixed (Ir)	1 × In	
Magnetic trip range	Fixed (Ii)	6 × In	
Dimension (W×H×D, mm)		140×170×92	

Temperature derating

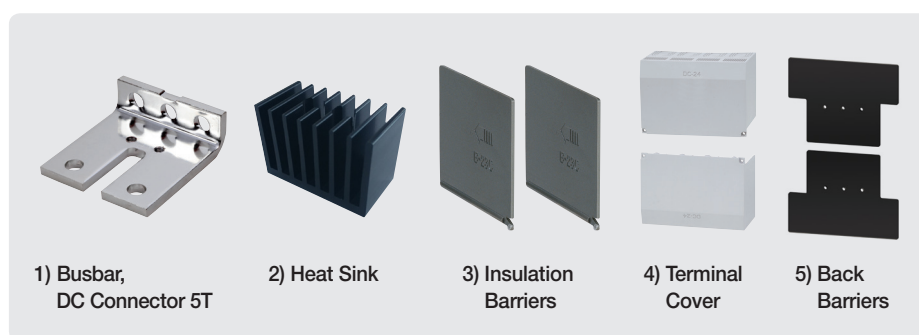
Type	Rated Current (A)	Derating Current (A)		Compensated rated current in accordance with ambient temperature (A)										Terminal Connection
				40°C		45°C		50°C		60°C		70°C		
TSD250	63	63	100%	63	100%	62	98%	60	95%	56	89%	52	83%	TS250 BUSBAR 5T
	80	80	100%	80	100%	78	98%	76	95%	71	89%	66	83%	
	100	100	100%	100	100%	98	98%	95	95%	89	89%	83	83%	
	125	125	100%	125	100%	122	98%	119	95%	111	89%	104	83%	
	160	160	100%	160	100%	155	97%	150	94%	141	88%	131	82%	
	200	200	100%	200	100%	196	98%	190	95%	178	89%	166	83%	
	250	250	100%	250	100%	243	97%	235	94%	220	88%	205	82%	

* Load-side terminal cover using derating current applied to 90%

Altitude derating

Altitude (m)	Ue (Vdc)		250AF
2000	1500V	1.00	100%
3000	1300V	0.87	98%
4000	1150V	0.77	93%
5000	1000V	0.67	90%

External accessories



Possible configuration of electrical auxiliaries



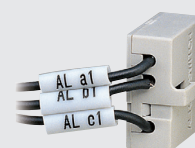
UVT



SHT



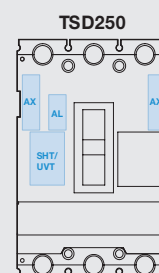
AX



AL

Maximum possibilities

Phase	Accessory	TSD250
R (Left)	AX	1
	AL	1
	SHT, UVT	1
T (Right)	AX	1
	AL	-

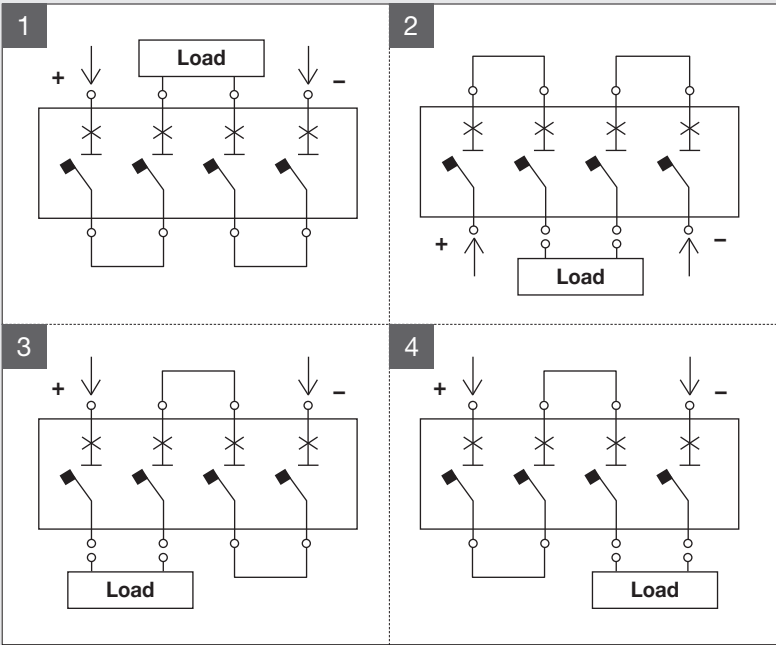


Note) 1. The internal accessories are assembled together with the product, so be careful when ordering.
2. SHT / UVT can not be used simultaneously

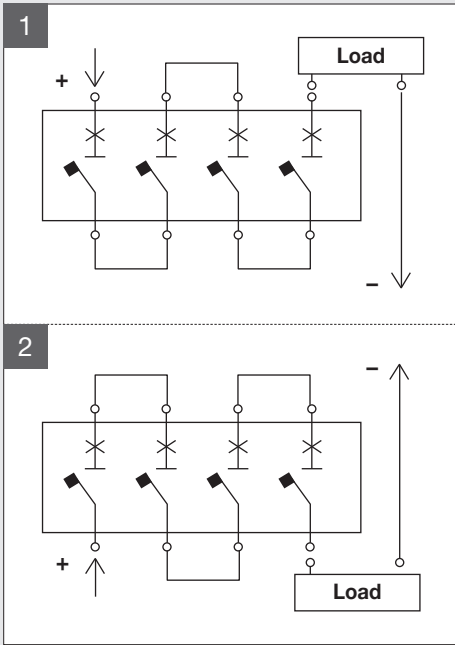
DC MCCB (DC 1500V)

Wiring diagram

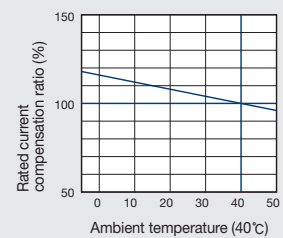
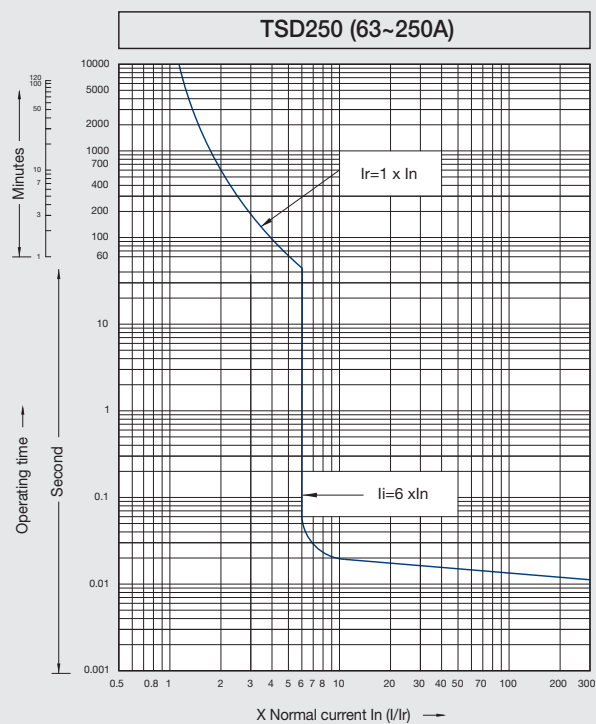
1. Unground system



2. Grounded system



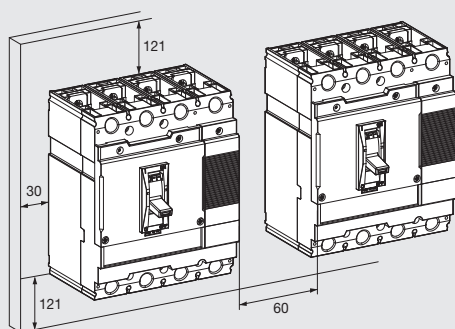
Characteristic curve



Product installation standards

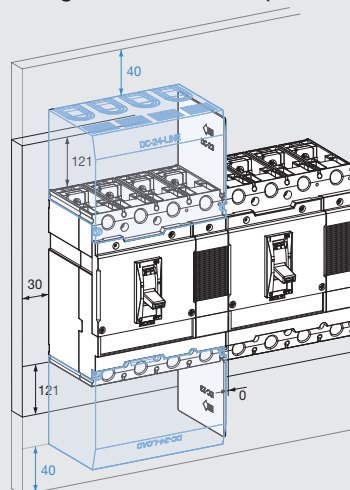
1. By insulation and separation distance

- One side (30mm or more),
- Up & down (121mm or more)
- Between products (60mm or more)

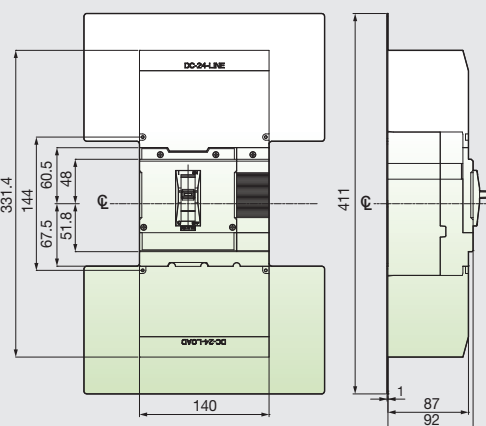
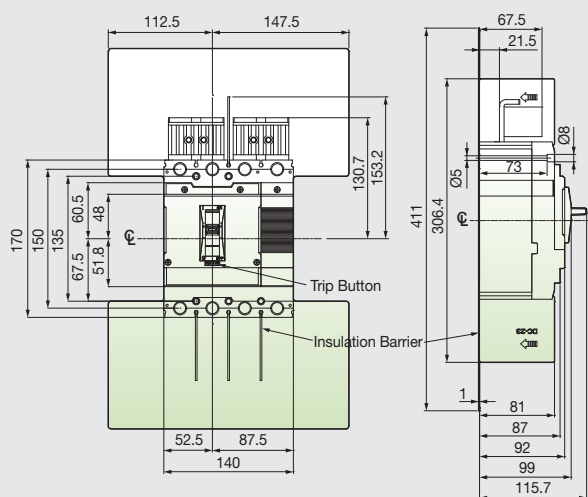


2. Close mounting

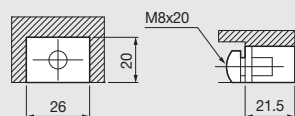
- Using barrier between phases



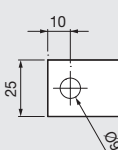
Dimensions



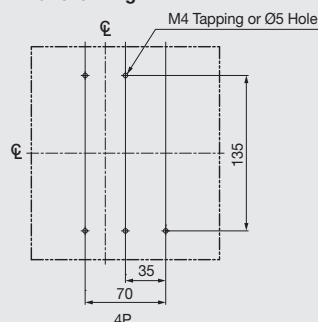
Terminal details



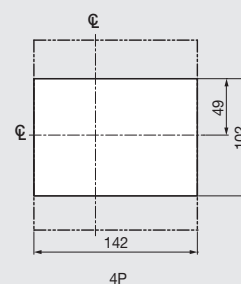
Connecting



Panel drilling



Front panel cutting



DC Switch-Disconnectors (1600AF)

1600AF Switch-Disconnectors

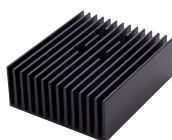
Characteristics

- DC1150V Disconnectors
- 1000/1250/1600A DC
- $U_{imp} = 8kV$
- 4 Pole
- IEC60947-3

Accessories



<Busbar>



<Heatsink>

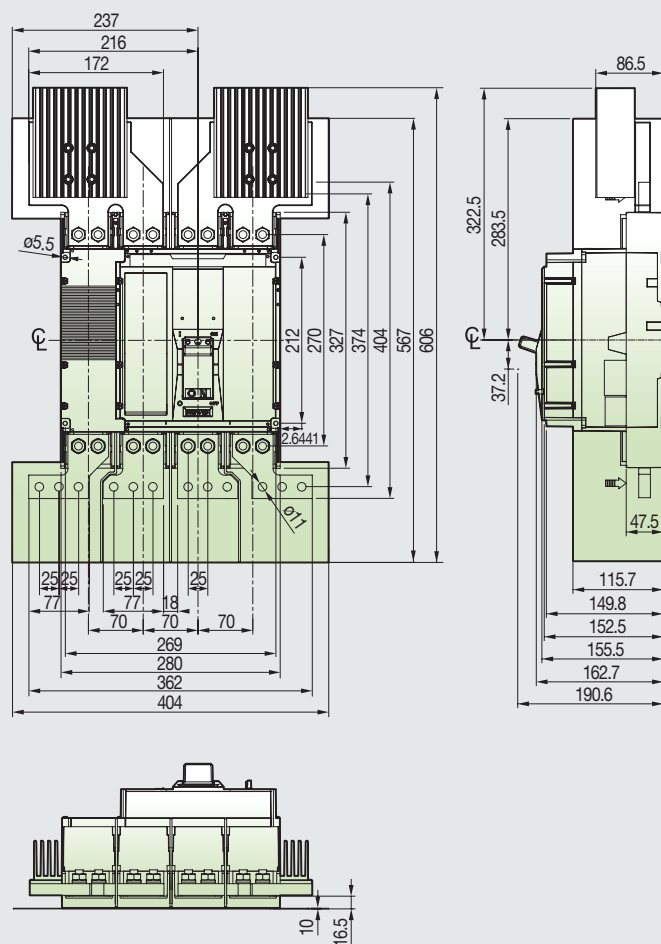


Rating

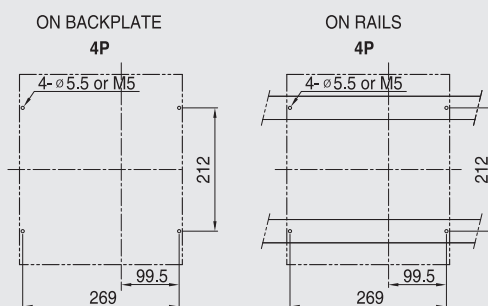
Type		
Frame size		[AF]
Conventional thermal current, I _{th}		[A]
No. of poles		
Rated operational voltage, U _e	DC	[V]
Rated operational current, I _e (Category DC22B)		
Rated impulse withstand voltage, U _{imp}		[kV]
Rated insulation voltage, U _i	DC	[V]
Rated short-circuit making capacity, I _{cm}		[kA peak]
Rated short-time withstand current, I _{cw}	1s	[kA rms]
Isolation behavior		
Trip unit (Release)		
● Disconnector unit		DSU
Connection	Fixed	Front-connection
		Rear-connection
Mechanical life		[Operations]
Electrical life @1150V DC		[Operations]
Basic dimensions, W×H×D (Front connection)	4Pole	[mm]
Weight (Front connection)	4Pole	[kg]
Reference standard		

TS1600NA		
1000	1250	1600
1000	1250	1600
4	4	4
1150	1150	1150
1000	1250	1600
8	8	8
1150	1150	1150
52.5	52.5	52.5
25	25	25
●	●	●
●	●	●
●	●	●
●	●	●
10000	10000	10000
500	500	500
280×327×152.5	280×327×152.5	280×327×152.5
17.8	17.8	17.8
IEC60947-3	IEC60947-3	IEC60947-3

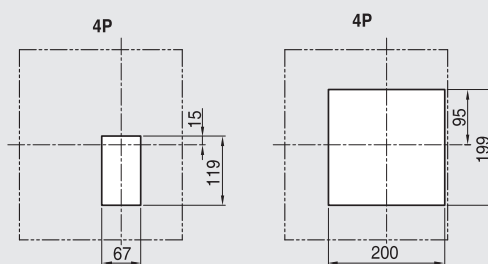
Dimensions



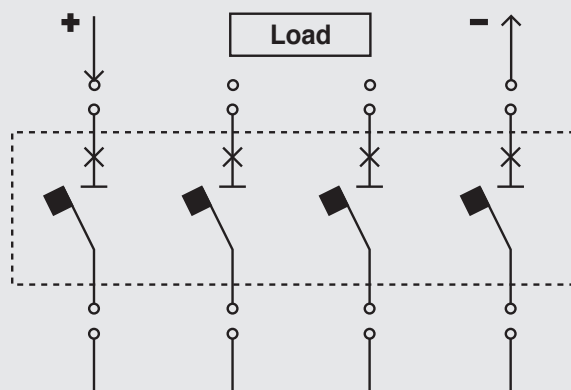
Panel drilling



Front panel cutting



Wiring diagram



DC MCB

Characteristics

- Solar power, renewable suitable for DC power source
- SEMKO CB
- Maximum working voltage: DC1,000V
- Rating and number of poles:
1~63A, 1/2/3/4 pole
- Rated voltage: DC250/500/750/1000V
- Rated breaking capacity: 10kA
- Trip characteristic: B, C
- Accessorys: AX, AL, SHT



Rating

Type		
Frame size		
No. of poles		
Rated current, In		
Rated operational voltage, Ue DC	Reference standard IEC 60947-2, Icu	Poles
		Rated voltage
		Breaking current
Trip characteristic		
Protection		
Electrical endurance		
Degree of protection		
Tightening torque		
Installation		
Type of Terminal		
Type of trip		
Ambient temperature		
Approval		

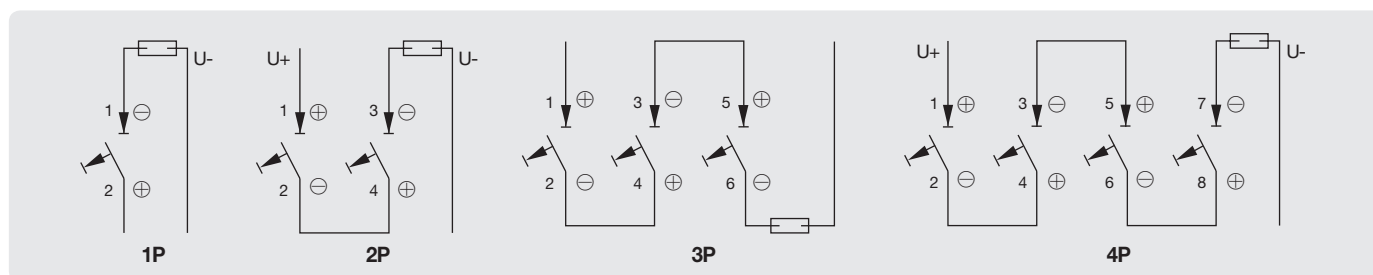
BK63H DC			
63AF			
1P, 2P, 3P, 4P			
1, 2, 3, 4, 6, 10, 16, 20, 25, 32, 40, 50, 63A			
1P	2P	3P	4P
250V	500V	750V	1000V
10kA	10kA	10kA	10kA
B (5In), C (8In)			
Overload and short circuit			
1500			
IP20			
18-4 AWG (0.75 ... 25mm²) / 20 Kgf.cm			
Mounting on 35mm DIN rail			
Lug type			
Thermal-Magnetic			
40°C (Standard), -25~ + 55°C (Use)			
CE, SEMCO, CB			

Accessory

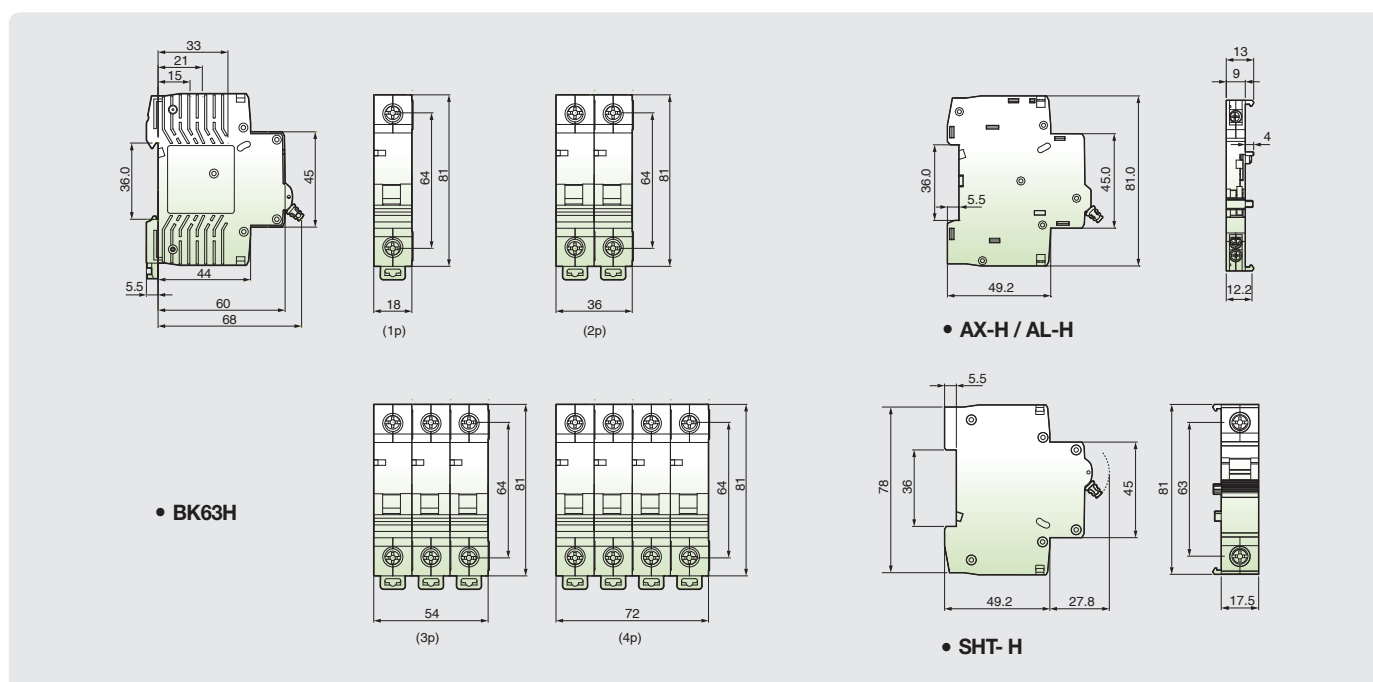
Type		AX-H	AL-H	SHT-H																								
Appearance																												
Rated Operational Current (A)	Rated voltage (Ue)	AC 6A@240V / 3A@415V		DC 24-220V, AC 110-380V																								
	Working voltage	DC 6A@24V / 2A@48V / 1A@125V																										
Mechanical Endurance		10,000		-																								
Cable capacity		0.75~2.5mm²		≤ 2.5mm²																								
Contact		<table border="1"><thead><tr><th></th><th>OFF</th><th>TRIP</th><th>ON</th></tr></thead><tbody><tr><td>MCB</td><td></td><td></td><td></td></tr><tr><td>AX-H</td><td></td><td></td><td></td></tr></tbody></table>		OFF	TRIP	ON	MCB				AX-H				<table border="1"><thead><tr><th></th><th>OFF</th><th>TRIP</th><th>ON</th></tr></thead><tbody><tr><td>MCB</td><td></td><td></td><td></td></tr><tr><td>AX-H</td><td></td><td></td><td></td></tr></tbody></table>		OFF	TRIP	ON	MCB				AX-H				-
	OFF	TRIP	ON																									
MCB																												
AX-H																												
	OFF	TRIP	ON																									
MCB																												
AX-H																												
Weight (g)		48	48	100																								

* 24V only SHT product. Please note when ordering.

DC Type connection wiring diagram



Dimensions



DC Contactors

Characteristics

Products application & Function

- Two normally open main contacts for DC circuit
- Positive and negative poles indicated on the front plate
- Eternal magnet installed for the effective arc extinguishing
- DIN rail or screw mountable
- 2NO+2NC Auxiliary contacts built-in as standard
- AC/DC control voltage
- CE, UL Certified

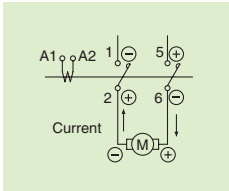


Selection

Contactor types	DC-2~5 ratings			DC-1	Continuous current, I _{th}	Auxiliary contacts
	125V	250V	500V	1000V		
MD-30a	3.7kW 40A	5.5kW 30A	7.5kW 60A	10A	60A	2a(NO)+2b(NC)
MD-60a	7.5kW 80A	11kW 60A	15kW 40A	25A	100A	2a(NO)+2b(NC)
MD-100a	11kW 120A	18.5kW 100A	22kW 60A	35A	135A	2a(NO)+2b(NC)

Ratings of auxiliary contacts

UA-1	AC15 duty						DC13 duty				
	120V	240V	380V	480V	500V	600V	125V	250V	400V	500V	600V
Rated currents	6A	3A	1.9A	1.5A	1.4A	1.2A	1.1A	0.55A	0.31A	0.27A	0.2A
Continuous current, I _{th}	16A										



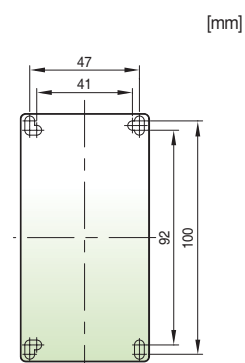
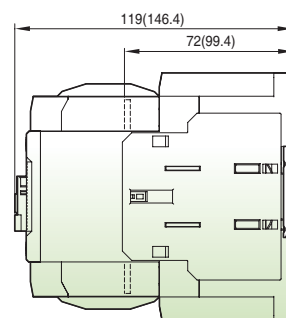
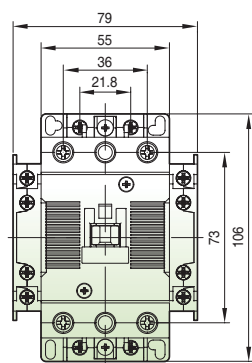
Coil voltage

AC	50/60Hz	24, 48, 100, 110, 120, 200, 220, 230, 240, 380, 400, 415, 440, 500, 550V
DC	DC	12, 20, 24, 48, 60, 80, 100, 110, 125, 200, 220, 250V

Dimensions

MD-30a AC(DC)

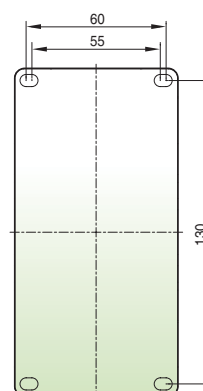
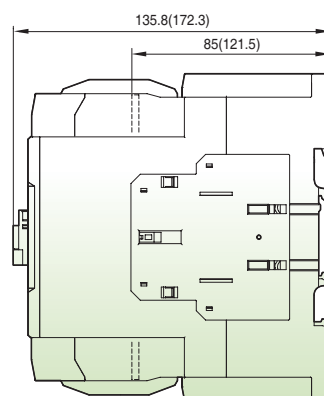
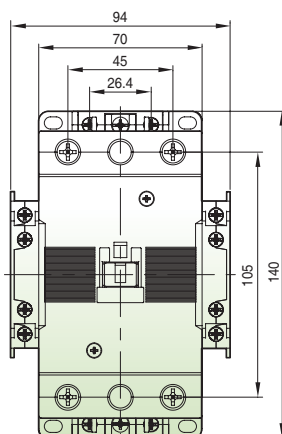
2NO2NC



[mm]

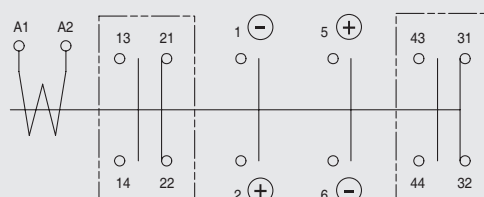
MD-60a,100a AC(DC)

2NO2NC

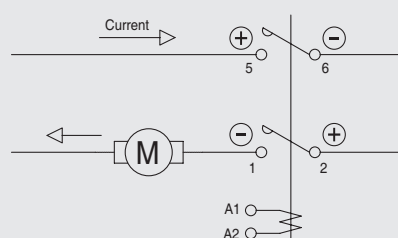


Composition

MD-30a, 60a, 100a



Contact arrangement



BK Series (DC/DIN type)

Characteristics

- DC system surge voltage protection
- Rating: ~ DC 1500V
- Pole: 2P, 3P
- Grades: Class II
- Status indication
 - Steady state: Green
 - After the accident: colorless (black)



Rating

Type		DC Type			
		BK20S-DC110	BK20S-DC600	BK20S-DC1000	BK20S-DC1500
No. of poles	[Pole]	2P	3P		
Rated voltages	Un [V]	DC110	DC600	DC1000	DC1500
Max. continued-operation voltage	Uc [V]	DC220	DC700	DC1200	DC1800
Voltage protection level	Up [kV]	≤1.0	≤2.5	≤3.9	≤4.5
Nominal discharge current	In [kA]	20	20	20	20
Max. discharge current	I _{max} [kA]	40	40	40	40
Impulse current	I _{imp} [kA]	-	-	-	-
Grades	Test Class	Class II			
Reaction time		< 25ns			
Status indication		Have Status indication			
Operating temperature range		-40℃~80℃			
Cross-sectional area of the connecting		6mm ² or more			
Accessories		AL Note1)			
Standard		IEC 61643-11 / UL1449			
Certification		CE	CE, UL	CE, UL	CE
SPD Disconnector	MCCB	TD100 2P 32A	TD100 3P 32A	TD100 4P 32A	TSD250N/H 4P 63A
	MCB	BK63H-DC 2P 40A	BK63H-DC 3P 40A	BK63H-DC 4P 40A	-

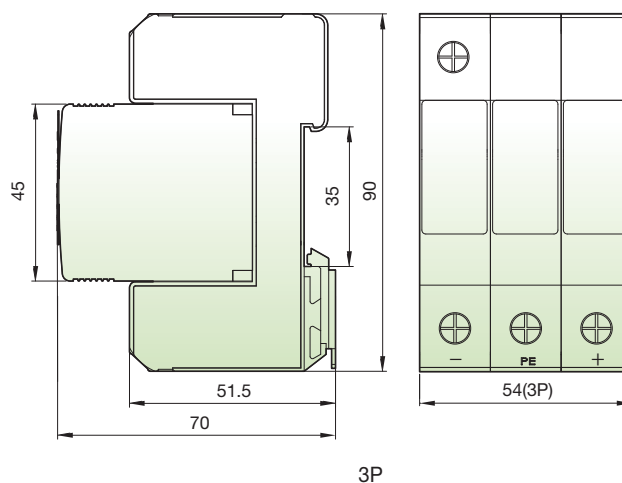
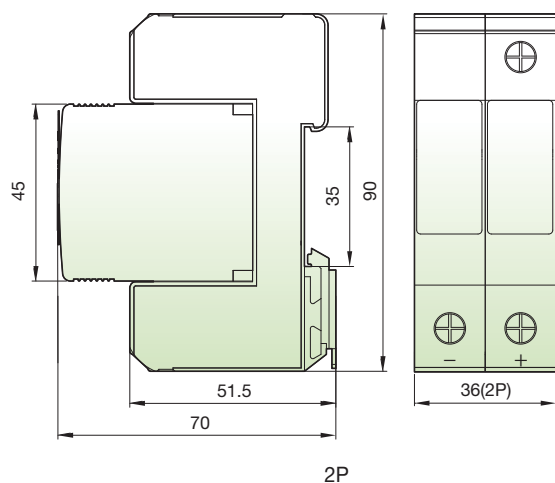
Note) 1. The AL contact accessories are not sole separately. You need to choose these accessories when you place your order for the product.
Please be mindful of this fact when you place your order.



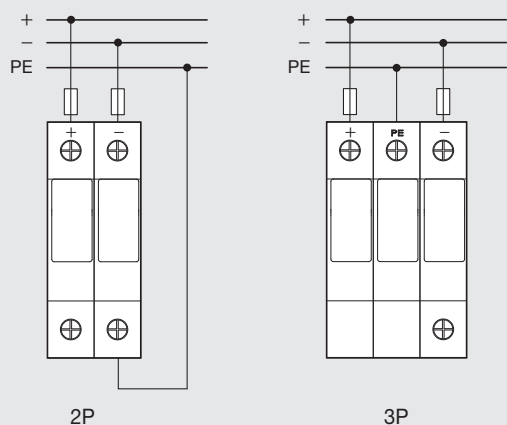
Dimensions

BK20S-DC

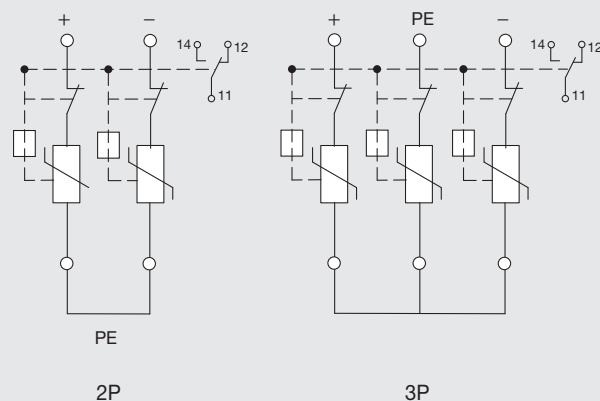
[Unit : mm]



Installation wiring method



Wiring Diagram



DC ACB

- Basic rating
 - Rated voltage: 1000Vdc (4p) / 750Vdc (3p) - Rated current: 800 ~ 2500A
 - Short-time capacity: 65kA/1sec - Breaking capacity: 85kA @ 500Vdc, 40kA @ 1000Vdc
- 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 @ 1000Vdc), 7,000 operations (2500A @ 1000Vdc)
- Isolation function convenient for withstand voltage test of switchgears
- Optional Short-Busbar considering temperature performance
- Compatible with existing Susol ACB
 - Accessories including closing and trip coils
 - Physical sizes for installation
- Applicable standards and tests: IEC 60947-2, DEKRA CB certification



Type and ratings

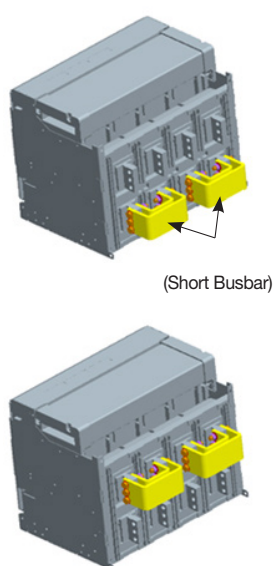
Type				ADH-16E		ADH-25E	
Ampere frame		(AF)		1600		2500	
Rated current (In max, at 40℃)		(A)		800 1000 1250 1600		1600 2000 2500	
Number of poles		(P)		3Pole	4Pole	3Pole	4Pole
Rated operational voltage (Ue)		(Vdc)		750	1000	750	1000
Rated insulation voltage (Ui)		(V)		1000		1000	
Rated impulse withstand voltage (Uimp)		(kV)		12		12	
Rated breaking capacity (Icu) Note2)			500V DC	60	-	85	-
Ics=100%Icu		(kA)	750V DC	40	50	40	50
			1000V DC	-	35	-	40
Utilization category				B		B	
Rated short-time withstand current (Icw)		(kA/1s)	500V DC	60 Note1)	-	65	-
			750V DC	40	50 Note1)	40	50
			1000V DC	-	35	-	40
Rated making capacity (Icm)		(kA, peak)		100% Icw		100% Icw	
Operating time							
	Maximum total breaking time	(ms)	< Icw	75		75	
			≥ Icw	30		30	
	Maximum closing time	(ms)		80		80	
Life cycle (Without maintenance)							
	Mechanical	(time)		15,000		15,000	
			≥ 1600A	10,000		10,000	
			2000A	-		10,000	
			2500A	-		7,000	
Overcurrent protection		DC Trip relay		●		●	
Degree of pollution		IEC60661-1		3		3	
Connections	Draw-out type			●		●	
	Fixed type			●		●	
Suitability for isolation							
Certificate & Approval				DEKRA CB certification, IEC60947-2			
Weight and dimensions				3Pole	4Pole	3Pole	4Pole
Weight	Draw-out type	(kg)	Main body	43	53	43	53
			With cradle	87	103	87	103
	Fixed type	(kg)		44	55	44	55
External dimensions (H×W×D)		(mm)	Draw-out type	430×412×375	430×527×375	430×412×375	430×527×375
			Fixed type	300×378×295	300×493×295	300×378×295	300×493×295

Note 1) The rated short-time current capacity is based on 0.5 sec.

Note 2) Rated breaking current indicates the breaking capacity based on the circuit time constant 15ms.

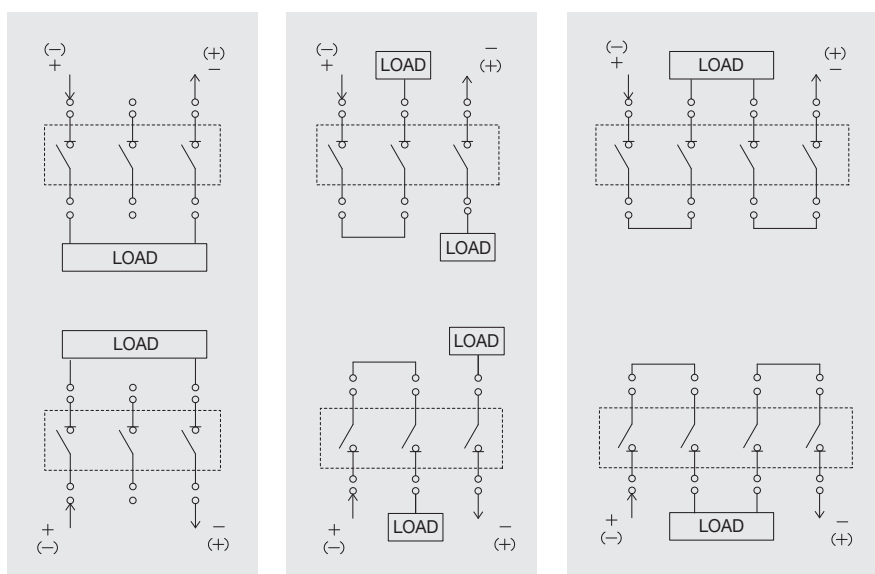
Connection diagram of DC ACB

ADH	500V	750V	1000V
DDH	500V	750V	1200V
DDV	500V	1000V	1500V



Upper
supply

Lower
supply



※ Refer to the following page for product dimensions with short busbar.

Composition of short busbar

- Short busbars can be ordered as shown in the table below, or customer have to make short busbars in accordance with the specified short busbars according to AF.
- The tightening torque for assembling short busbars is 40~50N.m

Type	AF	Ordering code & quantity	Appearance	Contents
ADH	1600AF	70223464603		Short busbars : 75mm×10T×2ea Bolt : M12×60, 6ea Nut : M12, 6ea Spring washer, Plain washer
DDH DDV	800-3200AF	3P : 1ea 4P : 2ea		
ADH	2500AF	70223464604		Short busbars : 125mm×10T×3ea Bolt : M12×80, 6ea Nut : M12, 6ea Spring washer, Plain washer
DDH DDV	4000AF	3P : 1ea 4P : 2ea		

DC Switch-Disconnectors

- Basic rating
 - Rated voltage: 1500Vdc (DDV type), 1200Vdc (DDH type)
 - Rated current: 800 ~ 4000A - I_{cw} = 100kA / 1s
 - Utilization Category: DC-23A
- Electrical endurance:
 - 10,000 operations (1600A @ 1500Vdc)
 - 2,000 operations (4000A @ 1500Vdc)
- Optional Short-Busbar considering temperature performance
- Compatible with existing Susol ACB
 - Accessories including closing and trip coils
 - Physical sizes for installation
- Applicable standards and tests: IEC 60947-3, DEKRA CB, UL listed certification



Type and ratings

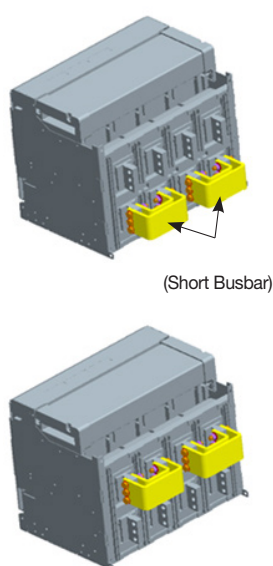
Commonness				Characteristics							
Rated insulation voltage (U _i)		(Vdc)		1500							
Rated impulse withstand voltage (U _{imp})		(kV)		12							
Rated short-time withstand current (I _{cw})		(kA / 1s)		100							
Rated making capacity (I _{cm})		(kA, peak)		100							
Operation time	(ms)	Openning		40							
		Closing		80							
Connections	Draw-out type		●								
	Fixed type		●								
Standard certification				DEKRA CB certification, IEC60947-3							
DC1,200V				DDH							
Type				DDH-08E	DDH-10E	DDH-13E	DDH-16E	DDH-20E	DDH-25E	DDH-32E	DDH-40E
Frame size		(AF)		800	1000	1250	1600	2000	2500	3200	4000
Rated operational voltage (U _e)		(Vdc)	3Pole	750							
			4Pole	1200							
Utilization category Note1)				DC 22A							
Life cycle	Mechanical		(times)	15,000							
(Without maintenance)	Electrical	Time constant	2ms	3,000				2,000	2,000	1,000	1,000
DC1,500V				DDV							
Type				DDV-08E	DDV-10E	DDV-13E	DDV-16E	DDV-20E	DDV-25E	DDV-32E	DDV-40E
Frame size		(AF)		800	1000	1250	1600	2000	2500	3200	4000
Rated operational voltage (U _e)		(Vdc)	3Pole	1000							
			4Pole	1500							
Utilization category Note1)				DC 23A							
Life cycle	Mechanical		(times)	15,000							
(Without maintenance)	Electrical	Time constant	7.5ms	5,000				4,000	2,500	1,500	1,000
			2ms	10,000				8,000	5,000	3,000	2,000
Weight and dimensions				800~3200AF				4000AF			
				3Pole		4Pole		3Pole		4Pole	
Weight	Draw-out type	(kg)	Main body	43		53		43		53	
			With cradle	87		103		107		139	
	Fixed type	(kg)		44		55		61		81	
External dimensions (H×W×D)		(mm)	Draw-out type	430×412×375		430×527×375		430×412×375		430×527×375	
			Fixed type	300×378×295		300×493×295		300×378×295		300×493×295	

Note1) Utilization category
 DC 22A: Switching of mixed resistive and inductive loads, including moderate overloads (i.e. shunt motors)
 DC 23A: Switching of highly inductive loads (i.e. series motors)

Note2) If you are interested in 'UL type', please contact our representative.

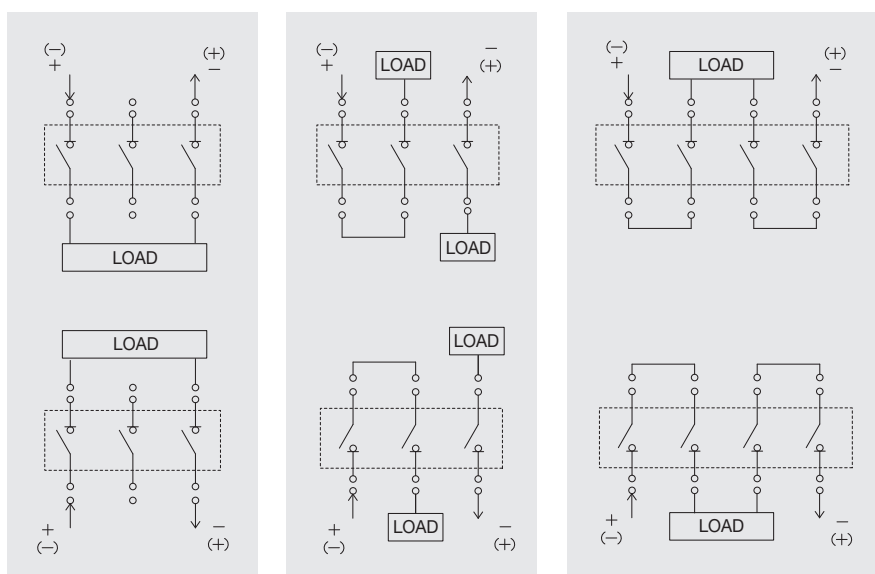
Connection diagram of DC ACB

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DDV	500V	1000V	1500V



Upper
supply

Lower
supply



※ Refer to the following page for product dimensions with short busbar.

Composition of short busbar

- Short busbars can be ordered as shown in the table below, or customer have to make short busbars in accordance with the specified short busbars according to AF.
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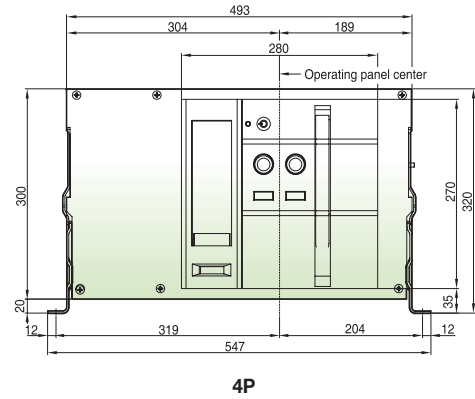
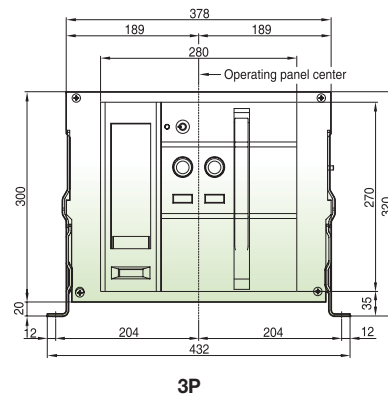
Type	AF	Ordering code & quantity	Appearance	Contents
ADH	1600AF	70223464603		Short busbars : 75mm×10T×2ea Bolt : M12×60, 6ea Nut : M12, 6ea Spring washer, Plain washer
DDH DDV	800- 3200AF	3P : 1ea 4P : 2ea		
ADH	2500AF	70223464604		Short busbars : 125mm×10T×3ea Bolt : M12×80, 6ea Nut : M12, 6ea Spring washer, Plain washer
DDH DDV	4000AF	3P : 1ea 4P : 2ea		

Dimensions

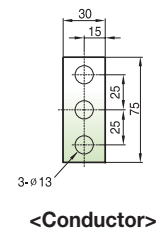
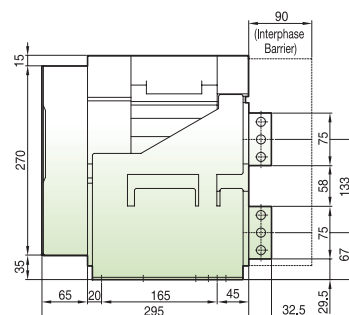
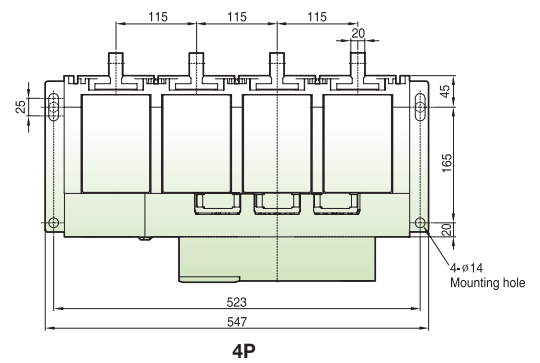
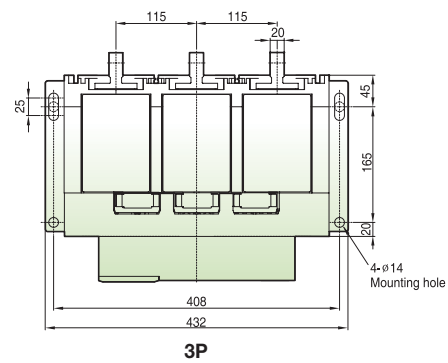
Fixed type (ADH-08~25E, DDH/DDV 08~32E)

(Unit : mm)

Front view



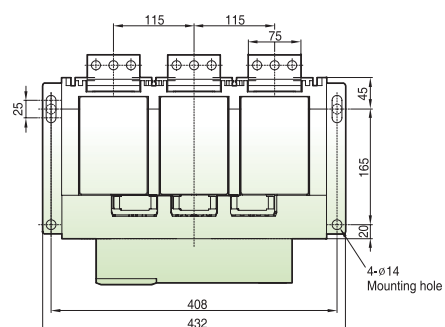
Vertical type



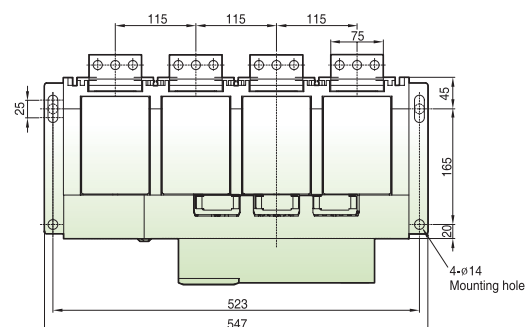
Fixed type (ADH-08~16E, DDH/DDV 08~32E)

(Unit : mm)

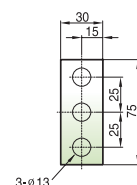
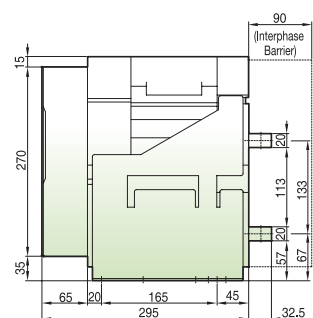
Horizontal type



3P

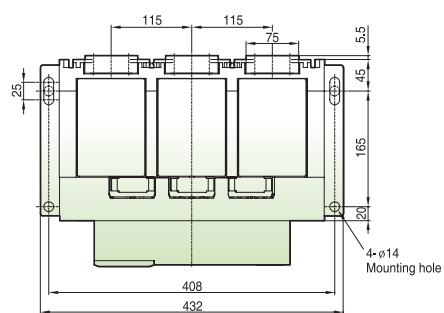


4P

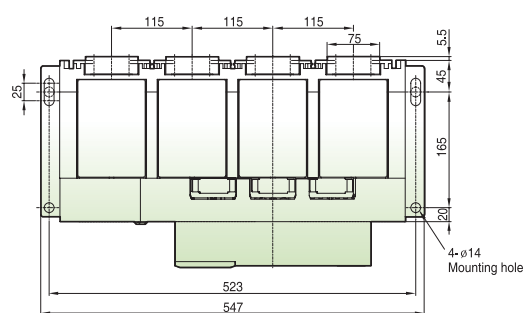


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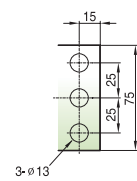
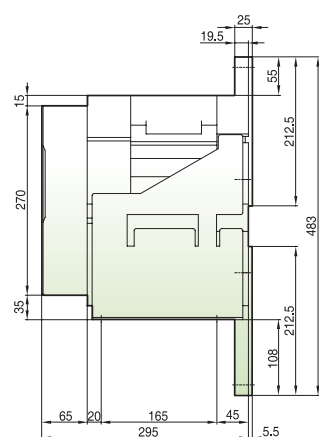
Front connection type



3P



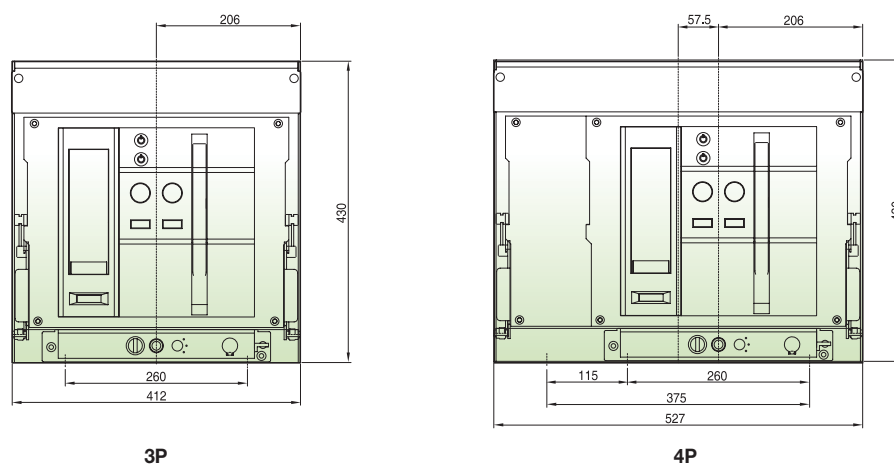
4P



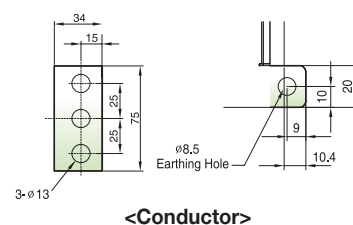
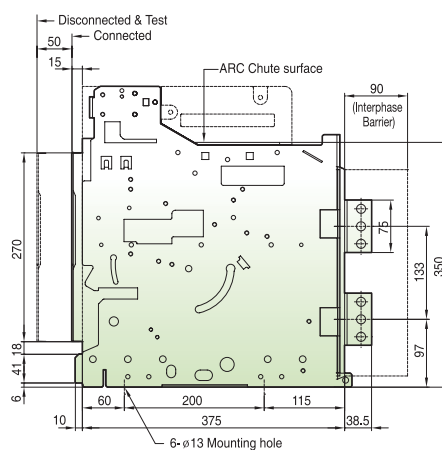
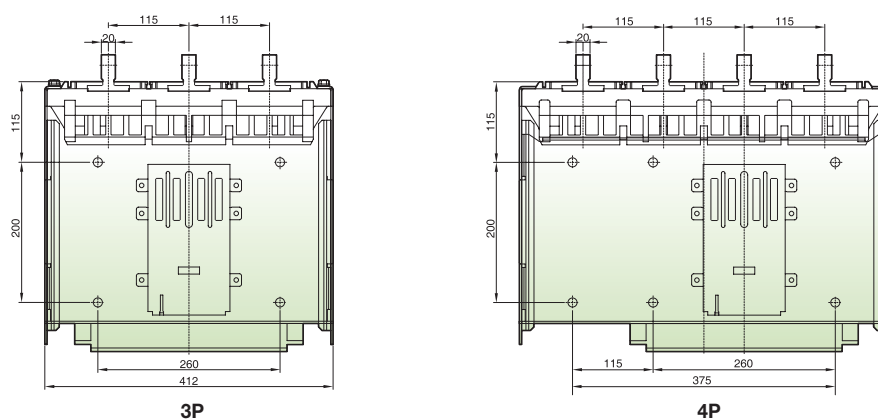
<Conductor>

Draw-out type (ADH-08~25E, DDH/DDV 08~32E) (Unit : mm)

Front view



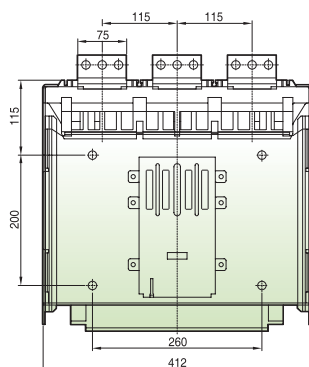
Vertical type



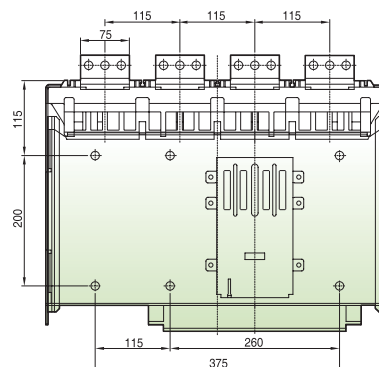
Dimensions

Draw-out type (ADH-08~16E, DDH/DDV 08~32E) (Unit : mm)

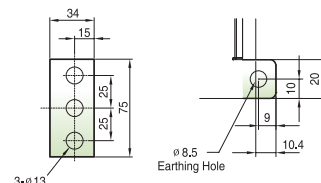
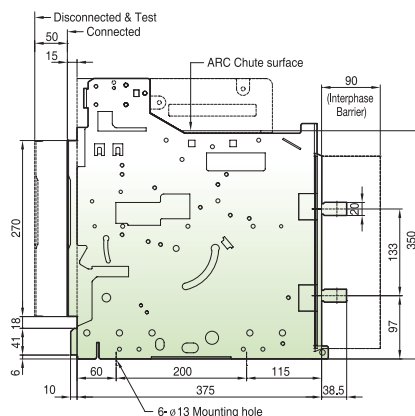
Horizontal type



3P

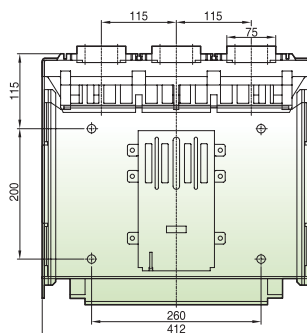


4P

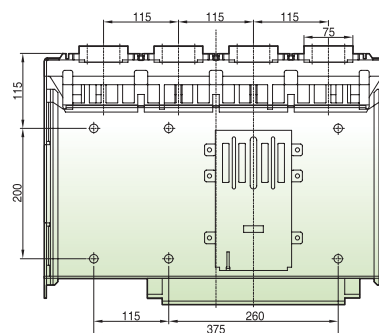


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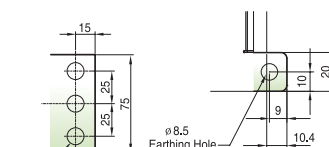
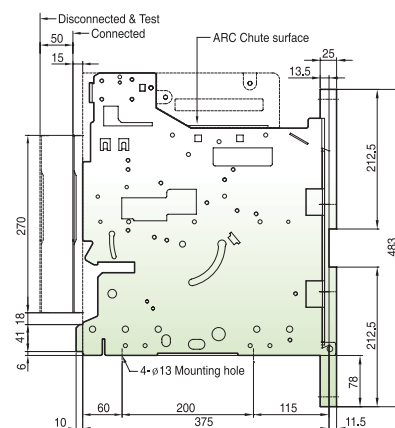
Front connection type



3P



4P

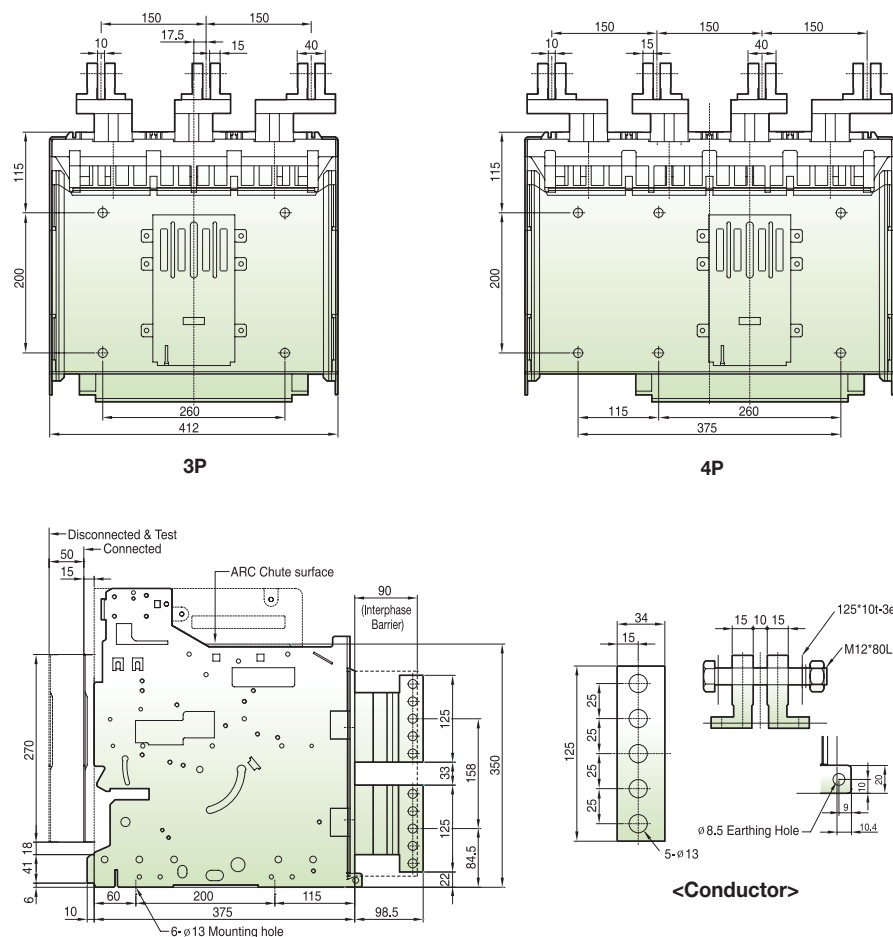


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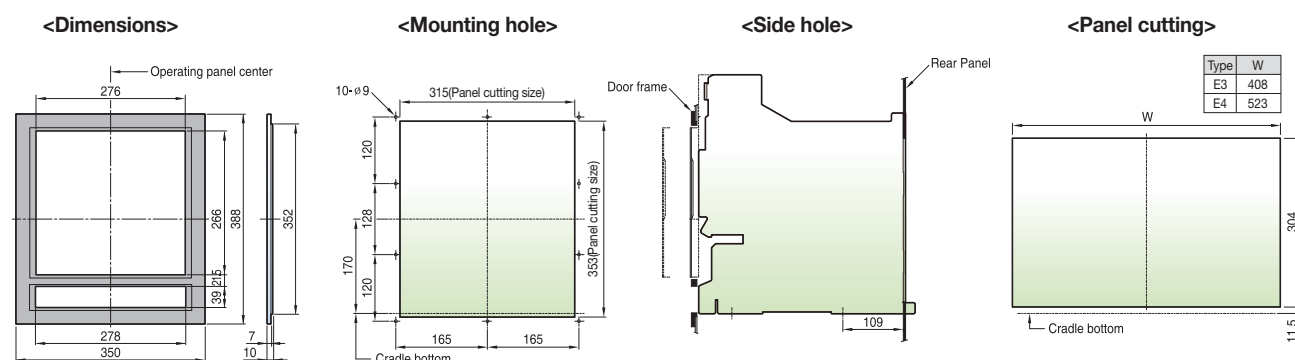
Draw-out type (DDH/DDV 4000AF)

(Unit : mm)

Vertical type



Door Frame



Note) The dimensions are for drawout type.

DC ACB Trip relays

S type: 'Supreme meter' type

Overload protection

- Long-time delay
- Thermal

Short-circuit protection

- Short-time delay / Instantaneous
- I_{Δt} On/Off optional (for short-time delay)

Ground fault protection

- Ground fault: Available to select I_{Δt} On/Off
- Alarm / Trip selectable

Start-up protection

- Short time, instantaneous, ground fault protection
- Start-up Setting current and holding time setting

Controlling relay group

- Dual setting possible: Group A and B selection

Load control

- Load control setting current input

Fault recording

- Records Max. up to 128 fault information about fault type, fault phase, fault value, occurrence time of fault
- Record the 4 most recent accident waveforms (Accident waveform storage for each 128ms before and after an accident)

Event recording

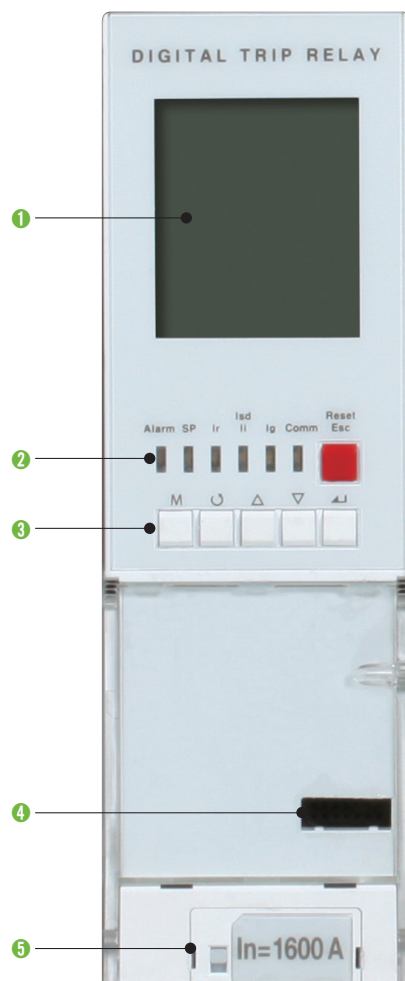
- Records events of device related to setting change, operation and state change. (Max. up to 128)

Self-diagnosis function

- Trip coil connection check
- Rating plug normal check
- Temperature monitoring
- Trip test

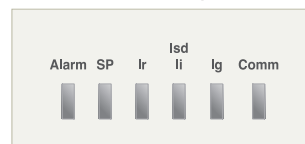
Communication

- Modbus / RS485



① Graphic LCD: Indication of measurement and information

② LED: Indication of trip info. and overload state



- Comm: LED indicating comm. state (Blink when running)
- Ig: LED indicating ground-fault
- Isd/Ii: LED indicating short-time or instantaneous tripping
- Ir: LED indicating long-time delay
- SP: Self-protection LED and battery test LED
- Alarm: LED indicating an overload (Turn on above 90%, Blink above 105%)

③ Key: Move to menu or reset

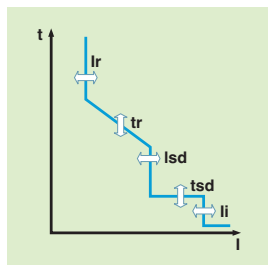


- Reset / ESC: Fault reset or ESC from menu
- Enter: Enter into secondary menu or setting input
- Up / Down: Move the cursor up / down on screen or increase / decrease a setting value
- Right / Left: Move the cursor or setting right / left on screen (Rotation)
- Menu: Menu display Measurement display

④ Test terminal: OCR test terminal (Connected with OCR tester)

⑤ Rating Plug: Rated current (In)

Protection



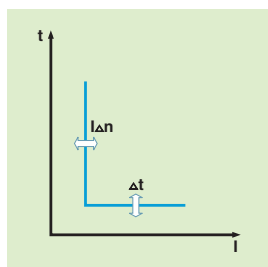
Long-time (OCR-L)											
Pick-up (A)	$I_r = I_n \times \dots$	40%~100% (5% Step) * Tripping between 1.05 and 1.2×I _r									
Time delay (s)	$t_r @ (1.5 \times I_r)$	11.2	22.5	45.1	90.2	180.5	270.8	361.1	451.4	541.7	Off
Accuracy: ±10% or less than ±100ms	$t_r @ (6.0 \times I_r)$	0.5	1	2	4	8	12	16	20	24	Off
	$t_r @ (7.2 \times I_r)$	0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	16.5	Off

Short time (OCR-S / OCR-S2)			
Pick-up (A) Accuracy : ±10%	I _{sd} = I _r ×...		150%~1000%, Off (5% Step)
Current setting (s) Accuracy: ±10% or ±50ms	tsd	I ₂ t Off	0.05s~0.4s, 0.05s Step
		I ₂ t On	(In case of I ₂ t On, @10×I _r)
Start-up Setting	Pick-up	150%~1000%(xI _r), Off (5% Step)	Start-up function is available when tsd is set to I ₂ t Off
	Time delay (s)	0.10~30.00s, 0.05s Step	

Instantaneous (OCR-I)		
Pick-up (A)	$I_i = I_n \times \dots$	150%~1000%, Off (5% Step)
Time delay		50ms
Start-up Setting	Pick-up	150%~1000%(×I _r), Off (5% Step)
	Time delay (s)	0.10~30.00s, 0.05s Step

Ground fault (OCR-Ig)				
Pick-up (A)	Ig = In x...		20%~100%, Off (5% Step)	
Time delay (s) Accuracy : ±10% (Ig>0.4In) ±20% (Ig≤0.4In)	tg	I²t Off	0.10s~3.00s, 0.05s Step (In case of I²t On, @1 x In)	
		I²t On		
Start-up Setting	Pick-up	150%~1000%(x In), Off (5% Step)		Start-up function is available when tsd is set to I²t Off
	Time delay (s)	0.10~30.00s, 0.05s Step		

Note) 1. Switch on to fault time: 100ms



Other Protection	Pick-up			Time delay (s)		
	Setting range	Step	Accuracy	Setting range	Step	Accuracy
Under voltage (UVR)	50%~95%	5%	±5%	1.2s~40.00s	0.1s	±10%
Over voltage (OVR)	105%~120%					
Current unbalance (UNBAL)	5%~90%	5%	±5% (I _{max} -I _{min})×(±2%)	0.50s~60.00s	0.1s	±10%
Reverse power (RPR)	-10%~-30%	5%	10%	0.50s~60.00s	0.1s	±10%

* Under voltage setting

- Rated voltage

1000~160V: 50~95%, 159~146V: 55~95%, 145~134V: 60~95%, 133~124V: 65~95%, 123~115V: 70~95%, 114~107V: 75~95%, 106~110V: 80~95%

* Over voltage setting

- Rated voltage

100~917V: 105~120%, 918~957V: 105~115%, 958~1000V: 105~110%

* Current unbal

DC Compact Switch-Disconnecter

- Rated current 800 ~ 1600A
- Rated operational voltage:
 - DDH type (3P: 750Vdc, 4P: 1200Vdc)
 - DDV type (3P: 1000Vdc, 4P: 1500Vdc)
- Rated short-time current (I_{cw}): 50kA/1s
- Operation durability without maintenance: 12,500 times
- Various control power sources
- Various accessories
- Application Standards and Certification:
 - IEC 60947-3 (DEKRA CB certification),
 - GB 14048.3 (CCC certification)



Fixed type



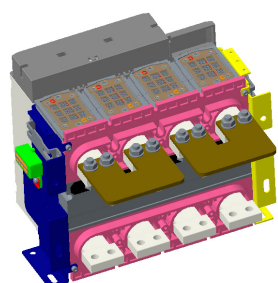
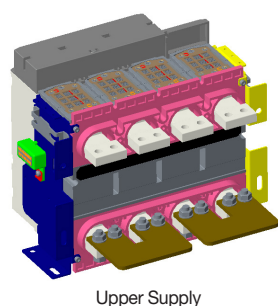
Drawable type

Type and ratings

Commonness			Characteristics							
Rated operational voltage (Ue)		(V)	DC 750V (3P) , DC 1200V (4P)				DC 1000V (3P) , DC 1500V (4P)			
Rated insulation voltage (Ui)		(V)	1500							
Rated impulse withstand voltage (Uimp)		(kV)	12							
Number of poles		(P)	3, 4							
Installation type			Fixed / Draw-out							
Related standards			IEC 60947-3 (DEKRA CB certification), GB 14048.3 (CCC certification)							
Type			DDH				DDV			
			DDH-08C	DDH-10C	DDH-13C	DDH-16C	DDV-08C	DDV-10C	DDV-13C	DDV-16C
Ampere frame		(AF)	800AF	1000AF	1250AF	1600AF	800AF	1000AF	1250AF	1600AF
Utilization category (According to IEC 60947-3)			DC-22A				DC-23A			
Rated making capacity (Icm)		(kA peak) DC	50							
Rated short-time withstand current (Icw)		(kA/1s) DC	50							
Operation time	(ms)	Openning time	max. 40							
		Closing time	max. 80							
Connection		Horizontal type	○							
		Vertical type	● (Default)							
Mechanical and electrical life cycle										
Endurance (times) (Without maintenance)		Mechanical	12,500							
	Electrical		Current		L/R		Current		L/R	
			2ms		7.5ms		2ms		7.5ms	
			~ 800A		2,000 -		~ 800A		4,000 2,000	
		~ 1600A	500 -		~ 1600A		1,000 500			
Demension and weight										
Weight (3P/4P)	(kg)	Draw-out	15.5/19				15.5/19			
			22/26				22/26			
		Fixed	15.5/19				15.5/19			
External dimensions (W×H×D)	(mm)	Draw-out	361.3X267X255.4(3P), 361.3X267X326(4P)							
		Fixed	283X219.5X272.4(3P), 283X219.5X342.4(4P)							

Product connection

Operation voltage and connection diagram of DC ACB series

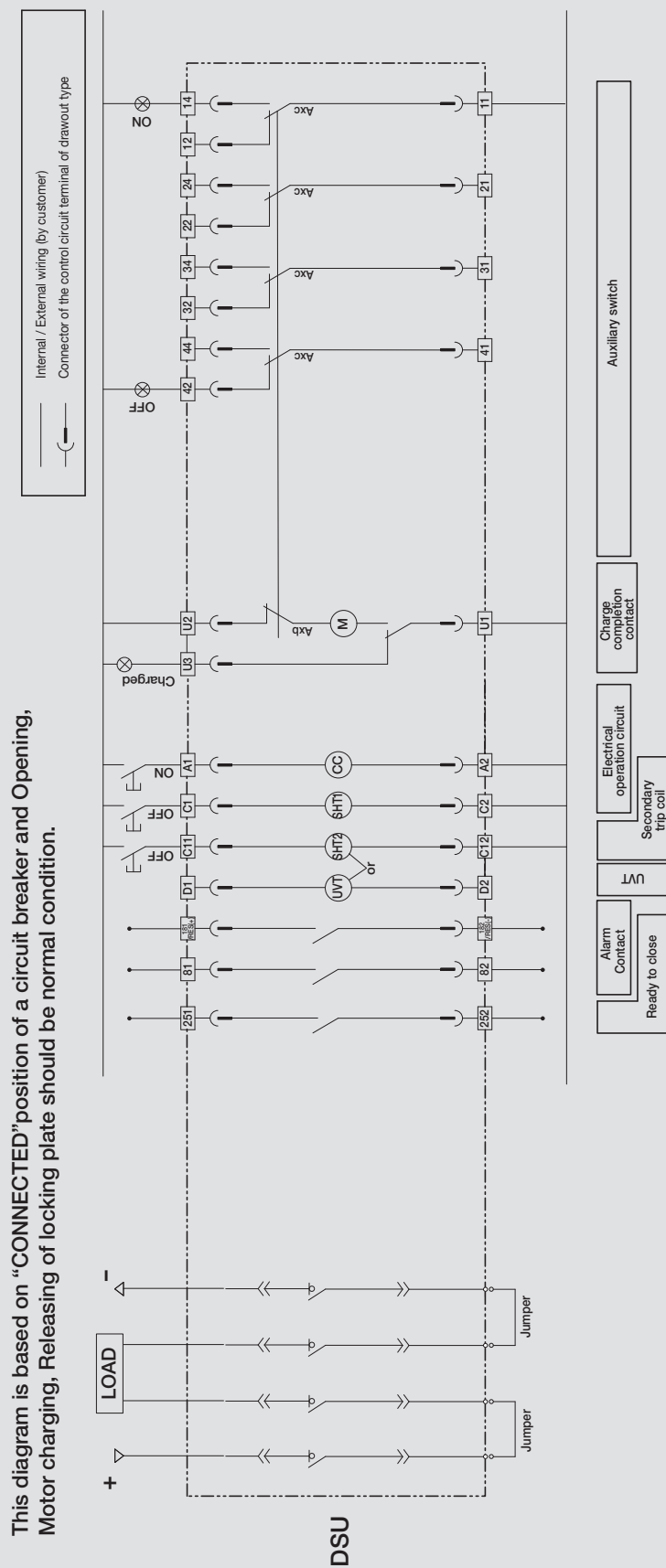


Poles	3P	3P	4P
DDH type	500 Vdc	750 Vdc	1200 Vdc
DDV type	500 Vdc	1000 Vdc	1500 Vdc
Connection diagram			

Note) If different circuit configurations are needed, please contact LS.

Type	Rated current	Busbar connection	Order code	Edifice	Order quantity	Weight (kg/set)
Fixed / Draw-out type	800-1600A	Vertical / Horizontal	70223472600	Short busbar : 1ea/unit, Heatsink : 1ea/unit M10 Bolt Set : 4ea/unit, M6 Bolt: 4ea/unit M4 Screw : 1ea/unit 	3P : 1 unit 4P : 2 unit	2kg/unit
Fixed type	800~1250A	Front	70223472601	Short busbar : 1ea/unit M10 Nut Set. : 4ea/unit 	3P : 1 unit 4P : 2 unit	0.7kg/unit
	1600A	Front	70223472602	Short busbar : 1ea/unit Heatsink : 1ea/unit, Barrier Pad : 1ea/unit M10 Nut Set : 4ea/unit, M6 Bolt: 4ea/unit 	3P : 1 unit 4P : 2 unit	5kg/unit

Control circuit diagram



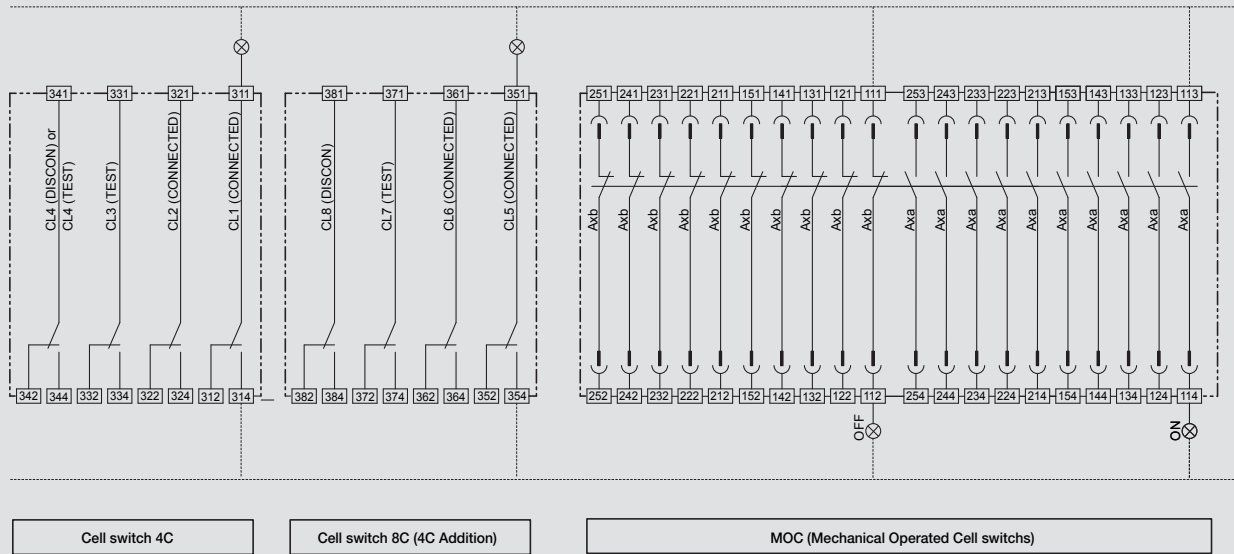
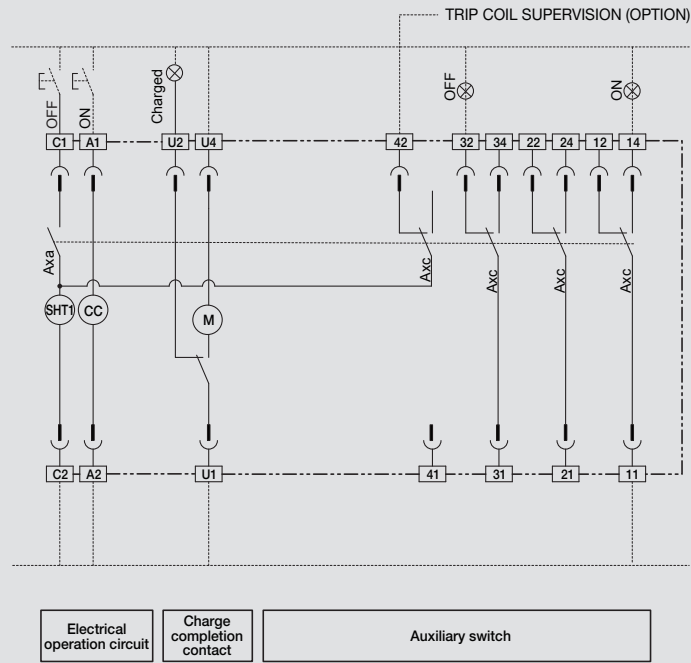
Accessory code description

Accessory code	Description
Axc	Auxiliary switch
CL1~CL4	Cell switch
(M)	Motor
(CC)	Closing coil
(SH1)	1st Shunt coil
(SH2)	2nd Shunt coil
(UVT)	UVT coil

Terminal code description

Terminal code	Description
D1 D2	Voltage input terminal of UVT coil
311 ~ 344	Cell switch
251 252	Ready to close switch
U1 U2	Charge completion signal
A1 A2	Motor charging
C1 C2	Closing coil
C11 C12	Shunt trip
	2nd shunt trip

Note) 1. The diagram is shown with circuit de-energized, all devices open and charged and relays in normal position
2. Relay is normal condition and charging type is "Off-Charging"
3. The standard of auxiliary contact is 4C.
4. Option
5. Contact configuration for Cell Switch can be changeable if necessary



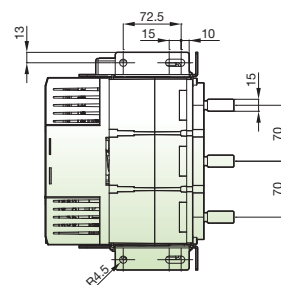
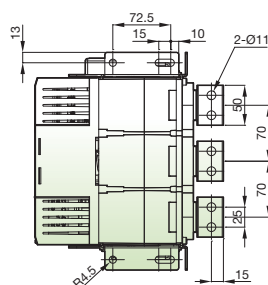
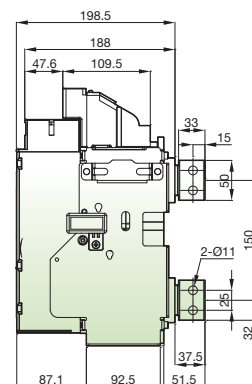
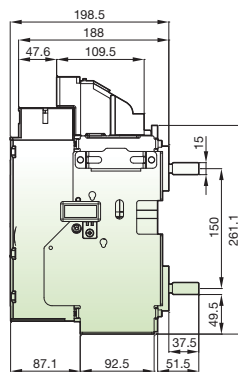
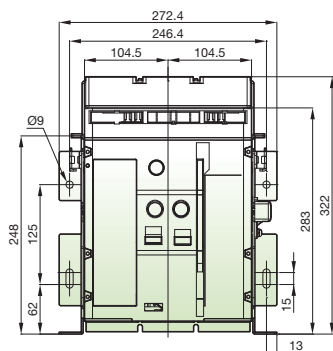
Terminal symbol

311 ~ 344	Cell switch
111 ~ 254	MOC

Dimensions

• 3P [Fixed H: Horizontal type / V: Vertical type]

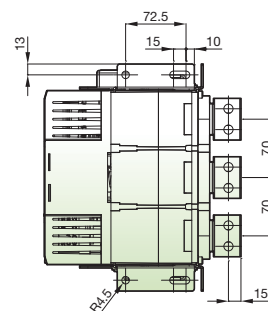
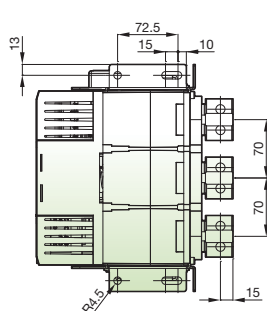
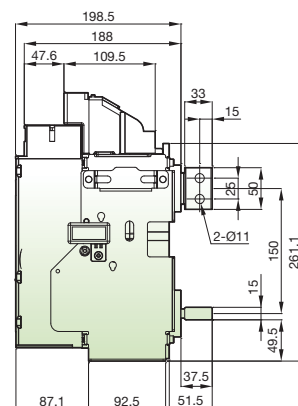
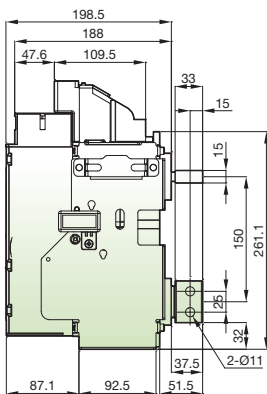
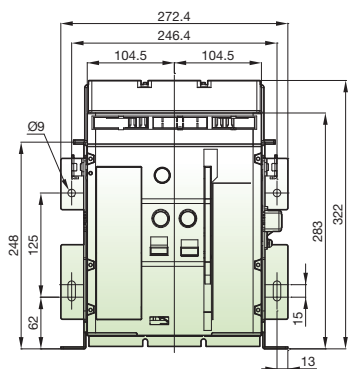
(Unit : mm)



H Type (Horizontal type)

V Type (Vertical type)

• 3P [Fixed M: Upper-Horizontal type, Lower-Vertical type / N: Upper-Vertical type, Lower-Horizontal type]



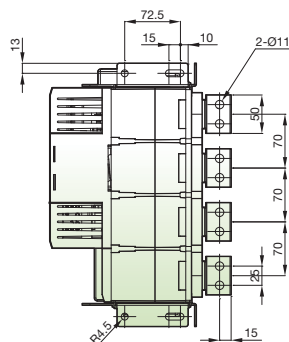
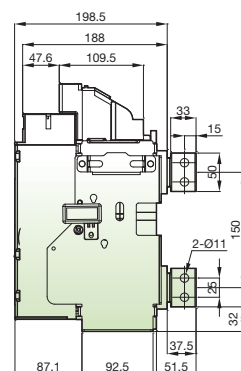
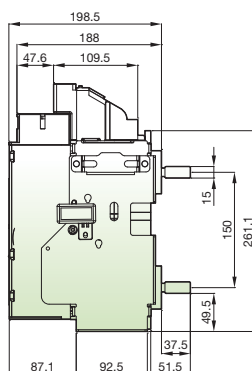
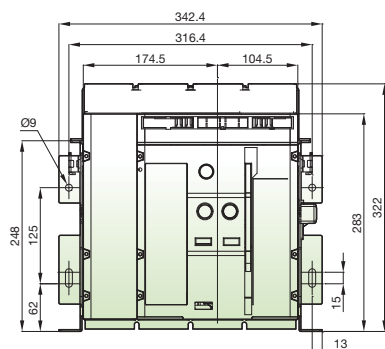
M Type
(Upper-Horizontal type, Lower-Vertical type)

N Type
(Upper-Vertical type, Lower-Horizontal type)

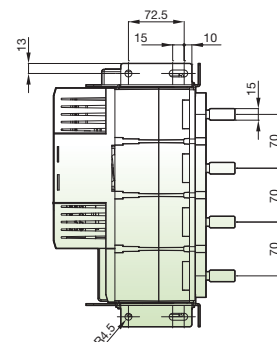
Dimensions

• 4P [Fixed H: Horizontal type / V: Vertical type]

(Unit : mm)

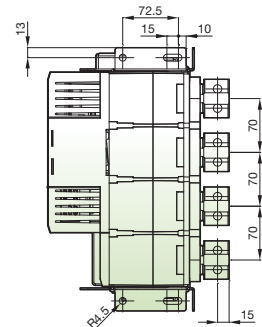
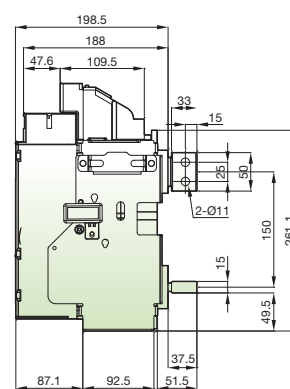
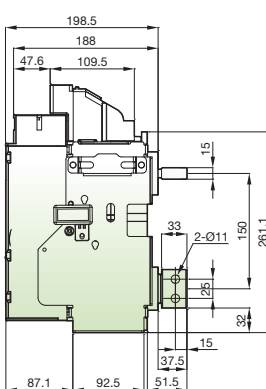
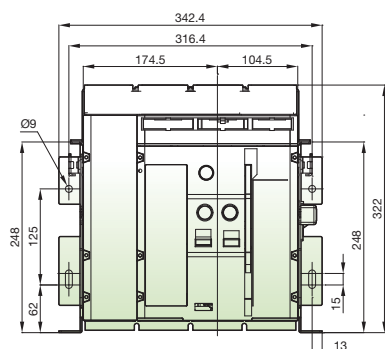


H Type (Horizontal type)



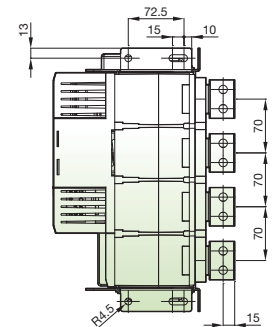
V Type (Vertical type)

• 4P [Fixed M: Upper-Horizontal type, Lower-Vertical type / N: Upper-Vertical type, Lower-Horizontal type]



M Type

(Upper-Horizontal type, Lower-Vertical type)

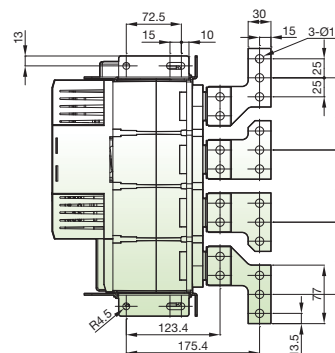
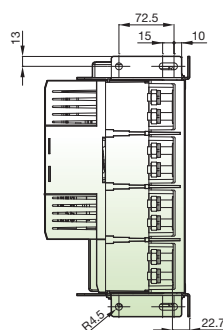
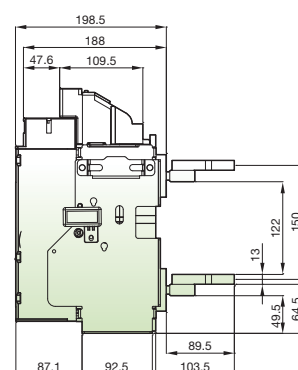
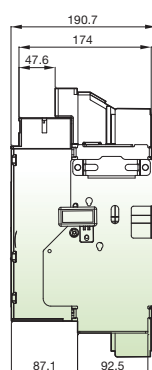
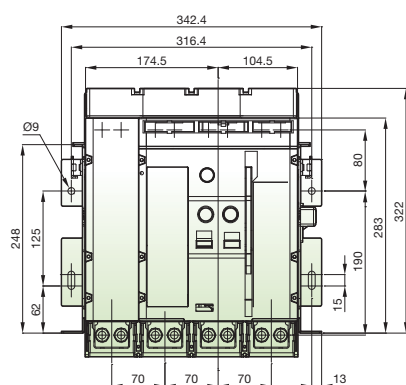


N Type

(Upper-Vertical type, Lower-Horizontal type)

• 4P [Fixed P: Flat type / R: Spread type]

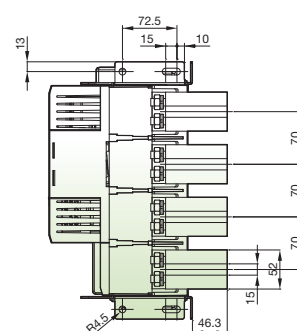
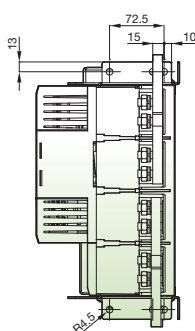
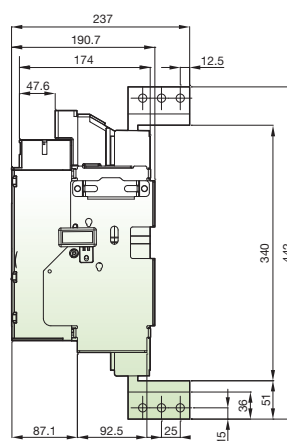
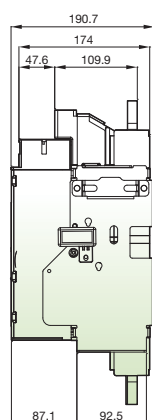
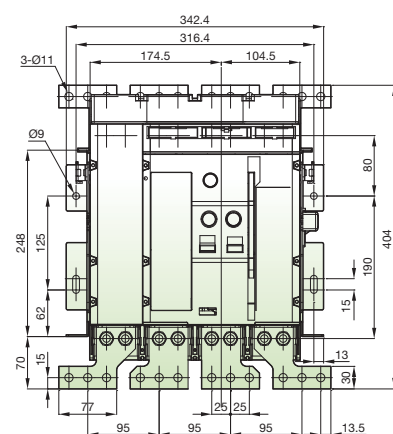
(Unit : mm)



P Type (Plane type)

R Type (Spread type)

• 4P [Fixed Z: Flat spread type / T: Flat vertical type]



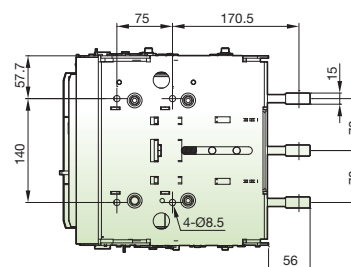
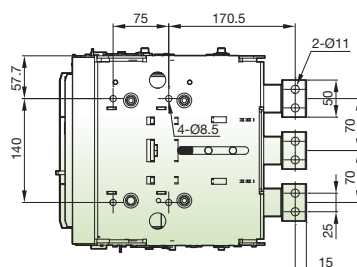
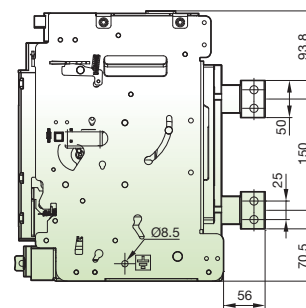
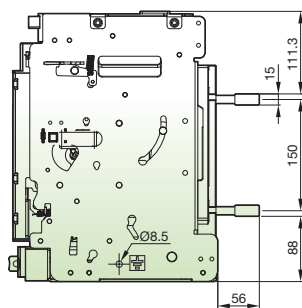
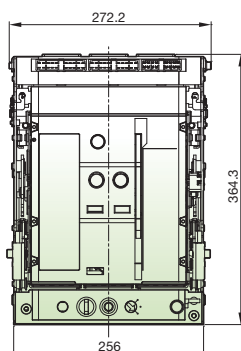
Z Type (Plane spread type)

T Type (Plane vertical type)

Dimensions

• 3P [Draw-out H: Horizontal type / V: Vertical type]

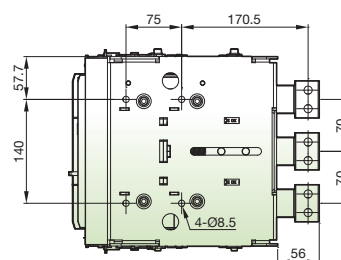
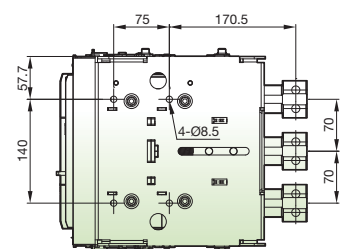
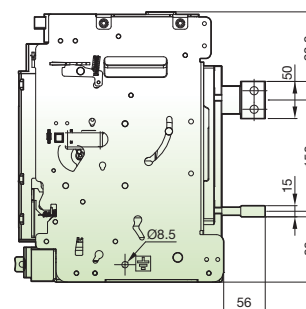
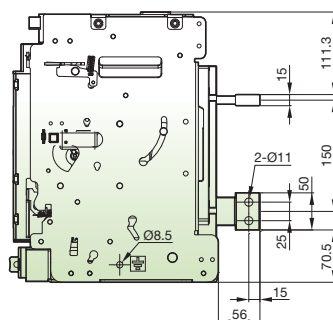
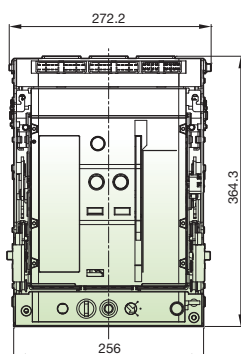
(Unit : mm)



H Type (Horizontal type)

V Type (Vertical type)

• 3P [Draw-out M: Upper-Horizontal type, Lower-Vertical type / N: Upper-Vertical type, Lower-Horizontal type]

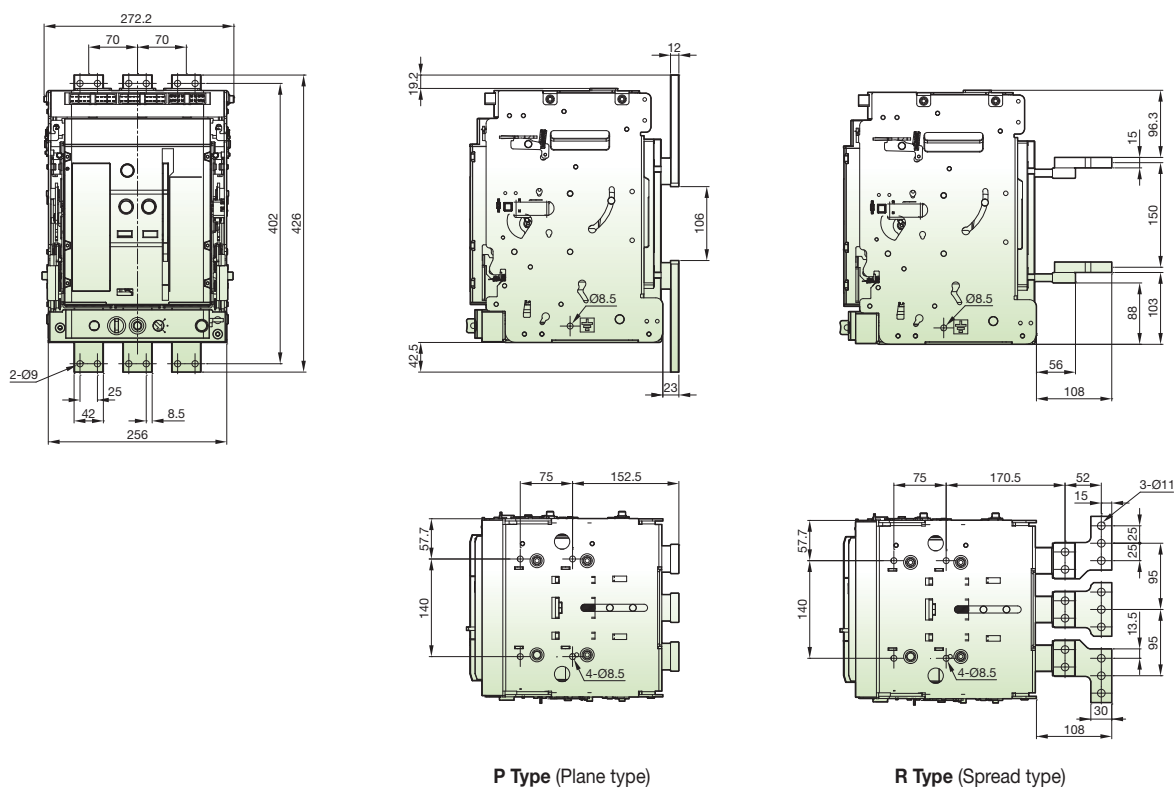


M Type
(Upper-Horizontal type, Lower-Vertical type)

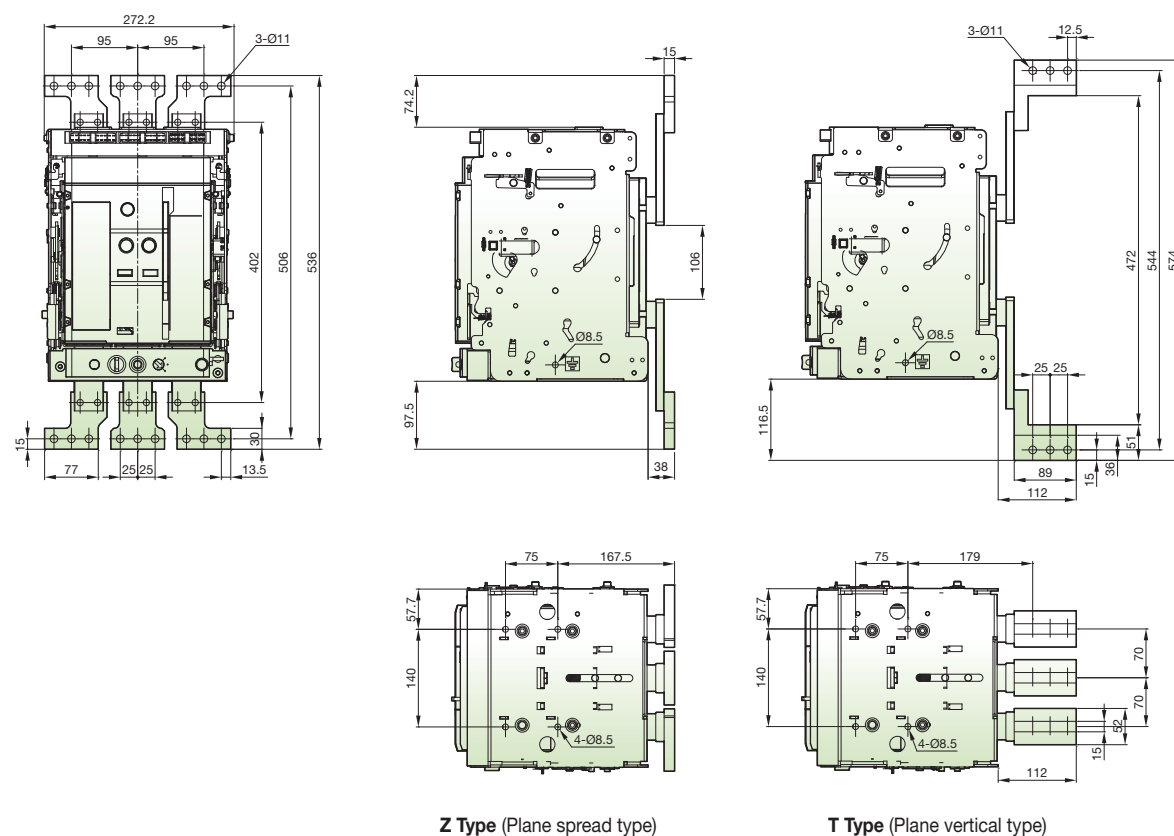
N Type
(Upper-Vertical type, Lower-Horizontal type)

• 3P [Draw-out P: Flat type / R: Spread type]

(Unit : mm)



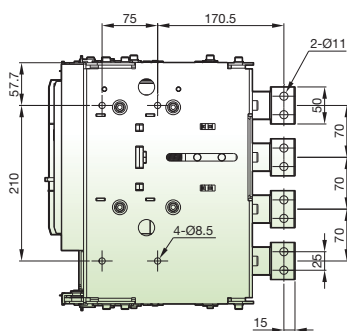
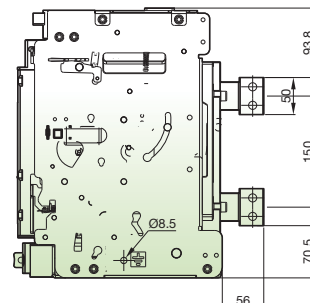
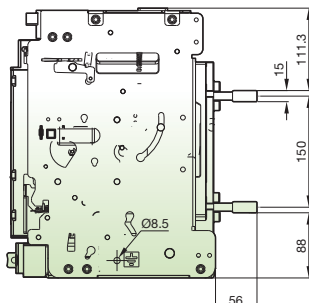
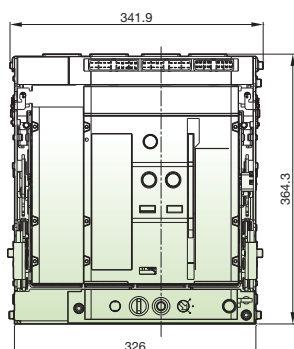
• 3P [Draw-out Z: Flat spread type / T: Flat vertical type]



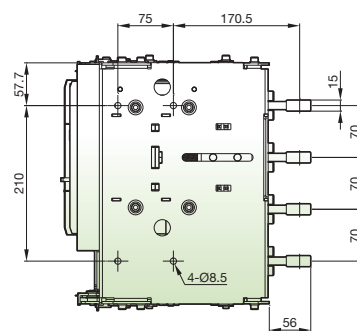
Dimensions

• 4P [Draw-out H: Horizontal type / V: Vertical type]

(Unit : mm)

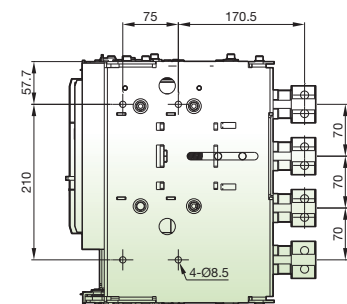
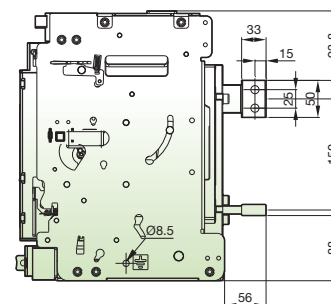
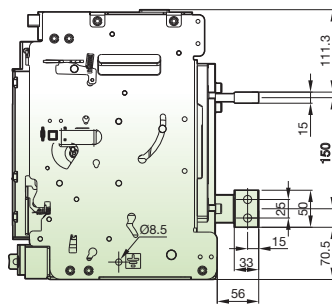
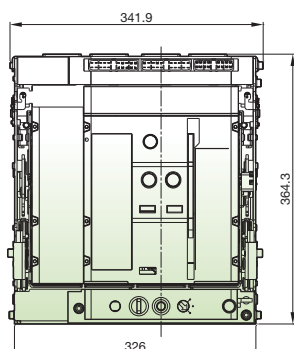


H Type (Horizontal type)

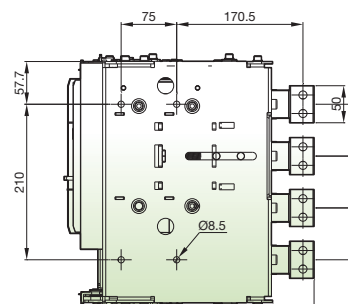


V Type (Vertical type)

• 4P [Draw-out M: Upper-Horizontal type, Lower-Vertical type / N: Upper-Vertical type, Lower-Horizontal type]



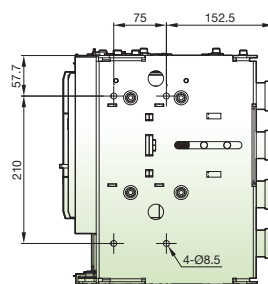
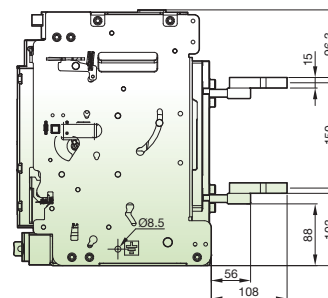
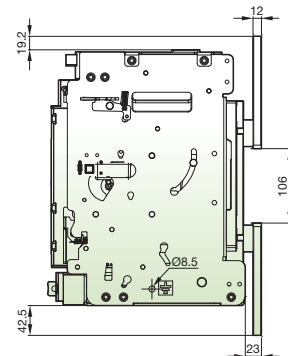
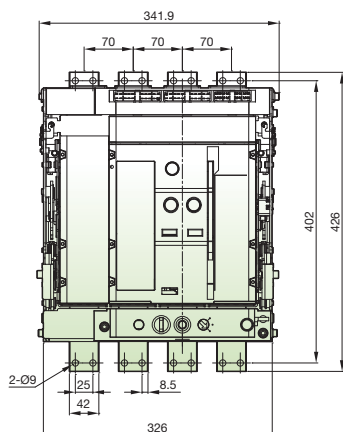
M Type
(Upper-Horizontal type, Lower-Vertical type)



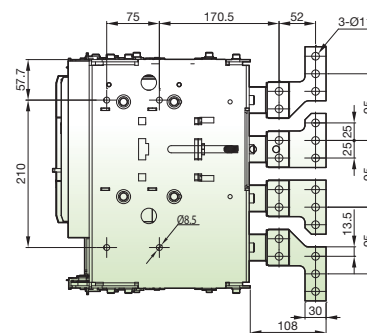
N Type
(Upper-Vertical type, Lower-Horizontal type)

• 4P [Draw-out P: Flat type / R: Spread type]

(Unit : mm)

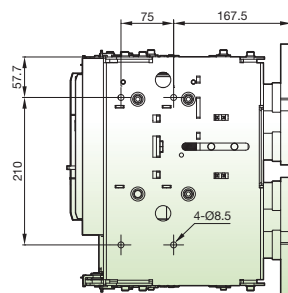
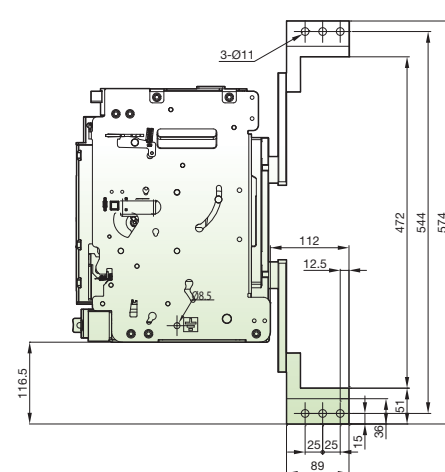
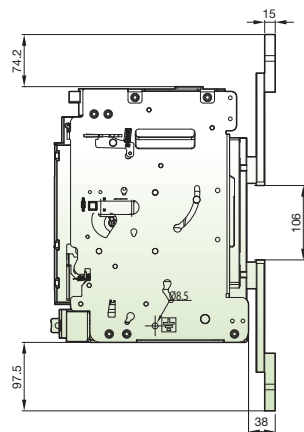
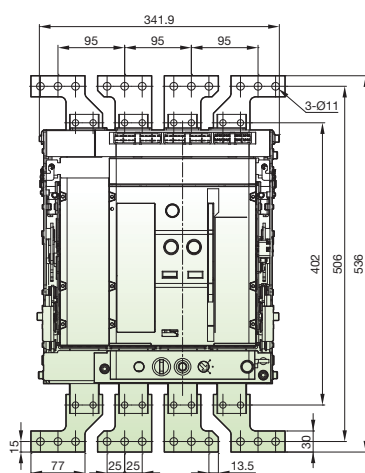


P Type (Plane type)

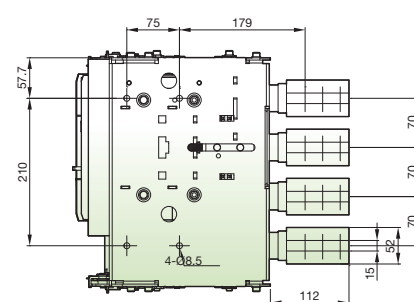


R Type (Spread type)

• 4P [Draw-out Z: Flat spread type / T: Flat vertical type]



Z Type (Plane spread type)



T Type (Plane vertical type)

High Voltage DC Relay

What is LSIS High Voltage DC Relay?

The LSIS High Voltage DC Relay serves to supply and disconnect DC power, and contains hydrogen and nitrogen gas, which is optimized to withstand making and breaking. Therefore, it has excellent electrical durability, compact size, and low noise.



GPR Specifications

Rating



Model		GPR010	GPR040	
Number of poles		1 Pole	1 Pole	
Operating voltage, Ue		DC 450V	DC 450V	
Rated impulse withstand voltage, Uimp		4kV	4kV	
Conventional thermal current, Ith		10A	40A	
Short time withstand current	120s	-	100A	
	15Min	15A	60A	
Durability	Mechanical (*) (3,600 operations per hour)	200,000 cycles	200,000 cycles	
	Electrical	10A, 450VDC, 150,000cycles (at 360cycles/Hr)(only Making)	40A, 450VDC, 1,000cycles (at 1200cycles/Hr)	
Voltage drop (Initial)		0.5V @ 10A	0.2V @ 20A	
Operating time		Max. 50ms	Max. 50ms	
Release time		Max. 30ms	Max. 30ms	
Insulation strength (Initial)		Min. 100MΩ(@500VDC)	Min. 100MΩ(@500VDC)	
Size, W × H × D(mm)		56×28×45	67×35×47	
Temperature range		-40 ~ 85℃	-40 ~ 85℃	
Humidity		5-95% R.H.	5-95% R.H.	
Weight		80g	145g	
Certification		CE CCC	CE CCC	

* The number of Mechanical times is the number that meets the basic performance after durability.

Features

Compact Design

Achieved compact size by filling with hydrogen and nitrogen gas to improve the breaking performance.

Proven Safety

High value of short circuit current withstanding.

Superior Reliability

Excellent performance with electrical and mechanical dururances.



	GPR100	GPR150	GPR250	GPR400
	1 Pole	1 Pole	1 Pole	1 Pole
	DC 450V	DC 450V	DC 450V	DC 450V
	4kV	4kV	4kV	4kV
	100A	150A	250A	400A
	225A	320A	500A	900A
	150A	225A	350A	600A
	200,000 cycles	200,000 cycles	200,000 cycles	200,000 cycles
	100A, 450VDC, 1,000cycles (at 1200cycles/Hr)	150A, 450VDC, 1,000cycles (at 1200cycles/Hr)	250A, 450VDC, 1,000cycles (at 360cycles/Hr)	400A, 450VDC, 1,000cycles (at 360cycles/Hr)
	0.04V @ 20A	0.04V @ 20A	0.02V @ 20A	0.02V @ 20A
	Max. 50ms	Max. 50ms	Max. 30ms	Max. 30ms
	Max. 30ms	Max. 30ms	Max. 10ms	Max. 10ms
	Min. 100MΩ(@500VDC)	Min. 100MΩ(@500VDC)	Min. 100MΩ(@500VDC)	Min. 100MΩ(@500VDC)
	81 × 39 × 70	81 × 39 × 70	92 × 45 × 87	100 × 58 × 91
	-40 ~ 85℃	-40 ~ 85℃	-40 ~ 85℃	-40 ~ 85℃
	5-95% R.H.	5-95% R.H.	5-95% R.H.	5-95% R.H.
	330g	330g	500g	630g
	CE CCC	CE cULus CCC	CE CCC	CE CCC

High Voltage DC Relay

GPR-M/GPR-H Specifications

Rating



Model		GPR-M010	GPR-M040	GPR-M100	
Number of poles		1 Pole	1 Pole	1 Pole	
Operating voltage, Ue		DC 600V	DC 1000V	DC 1000V	
Rated impulse withstand voltage, Uimp		4kV	4kV	6kV	
Conventional thermal current, Ith		10A	40A	100A	
Short time withstand current	120s	-	100A	225A	
	15Min	15A	60A	150A	
Durability	Mechanical (*) (3,600 operations per hour)	200,000 cycles	200,000 cycles	200,000 cycles	
	Electrical	5A, 600VDC, 1,000cycles (at 360cycles/Hr)(only Making)	25A, 1000VDC, 1,000cycles (at 360cycles/Hr)	50A, 1000VDC, 1,000cycles (at 360cycles/Hr)	
Voltage drop (Initial)		0.5V @ 10A	0.2V @ 20A	0.04V @ 20A	
Operating time		Max. 50ms	Max. 50ms	Max. 50ms	
Release time		Max. 30ms	Max. 30ms	Max. 30ms	
Insulation strength (Initial)		Min. 100MΩ (@1000VDC)	Min. 100MΩ (@1000VDC)	Min. 100MΩ (@1000VDC)	
Size, W × H × D(mm)		56 × 28 × 45	67 × 35 × 47	81 × 39 × 70	
Temperature range		-40 ~ 85℃	-40 ~ 85℃	-40 ~ 85℃	
Humidity		5-95% R.H.	5-95% R.H.	5-95% R.H.	
Weight		80g	145g	330g	
Certification		CE cULUS CCC	CE cULUS CCC	CE cULUS CCC	

* The number of Mechanical times is the number that meets the basic performance after durability.

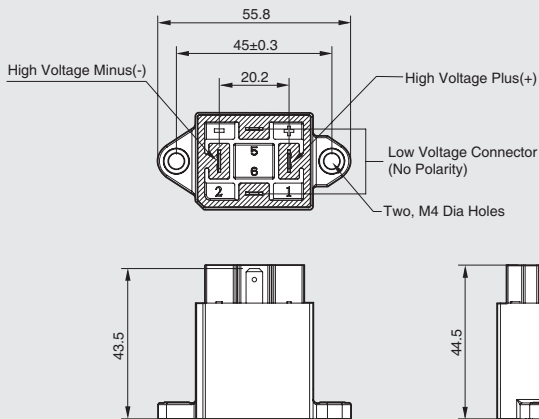


	GPR-M150	GPR-M250	GPR-M400	GPR-M400-A	GPR-H500-A
	1 Pole	1 Pole	1 Pole	1 Pole	1 Pole
	DC 1000V	DC 1000V	DC 1000V	DC 1000V	DC 1500V
	6kV	6kV	6kV	6kV	8kV
	150A	250A	400A	400A	500A
	320A	500A	750A	750A	900A
	225A	350A	500A	500A	750A
	200,000 cycles	200,000 cycles	200,000 cycles	200,000 cycles	200,000 cycles
	75A, 1000VDC, 1,000cycles (at 360cycles/Hr)	125A, 1000VDC, 1,000cycles (at 360cycles/Hr)	200A, 1000VDC, 1,000cycles (at 360cycles/Hr)	200A, 1000VDC, 1,000cycles (at 360cycles/Hr)	200A, 1500VDC, 500cycles (at 360cycles/Hr)
	0.04V @ 20A	0.02V @ 20A	0.02V @ 20A	0.02V @ 20A	0.04V @ 20A
	Max. 50ms	Max. 30ms	Max. 30ms	Max. 30ms	Max. 35ms
	Max. 30ms	Max. 10ms	Max. 10ms	Max. 10ms	Max. 15ms
	Min. 100MΩ(@1000VDC)	Min. 100MΩ(@1000VDC)	Min. 100MΩ(@1000VDC)	Min. 100MΩ(@1000VDC)	Min. 100MΩ(@1000VDC)
	81×39×70	92×45×87	100×58×91	100×58×99	118×70×108
	-40 ~ 85℃	-40 ~ 85℃	-40 ~ 85℃	-40 ~ 85℃	-40 ~ 85℃
	5-95% R.H.	5-95% R.H.	5-95% R.H.	5-95% R.H.	5-95% R.H.
	330g	500g	630g	750g	1.3kg
	CE cRU [®] US (CCC)	CE cRU [®] US (CCC)	CE cRU [®] US (CCC)	CE cRU [®] US	CE cRU [®] US

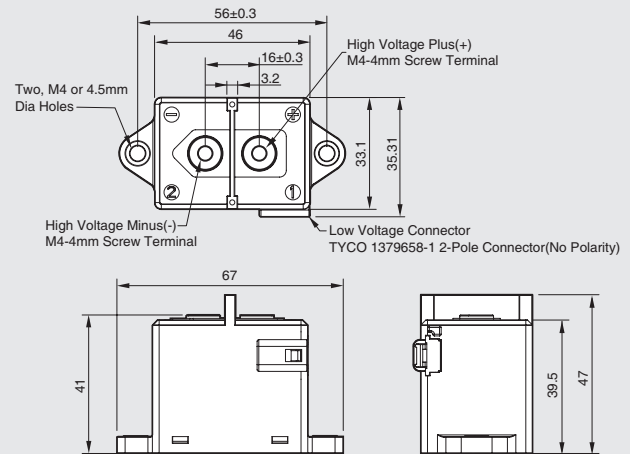
High Voltage DC Relay

Dimensions

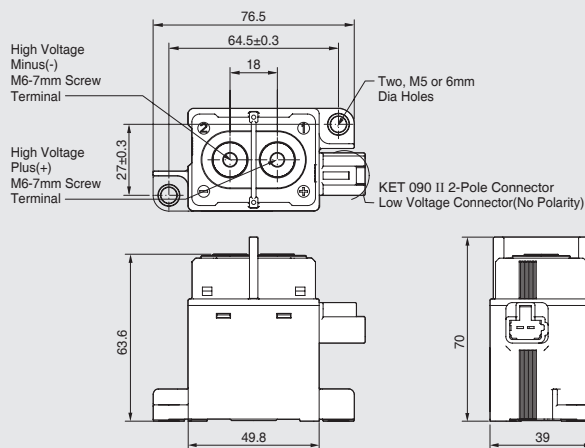
GPR010 / GPR-M010



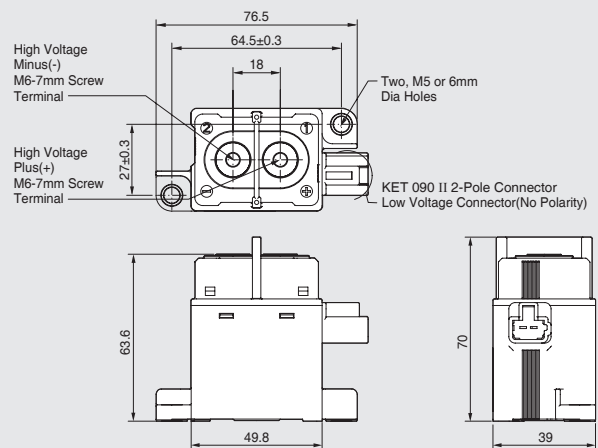
GPR040 / GPR-M040



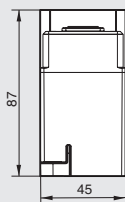
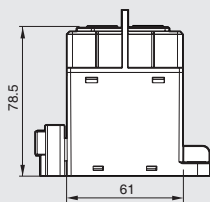
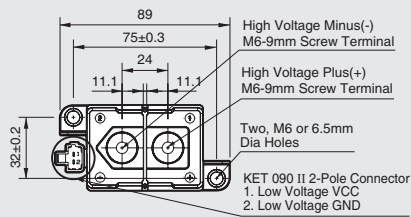
GPR100 / GPR-M100



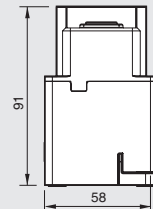
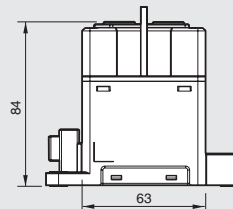
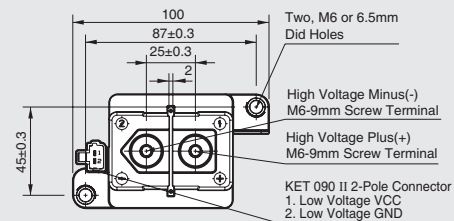
GPR150 / GPR-M150



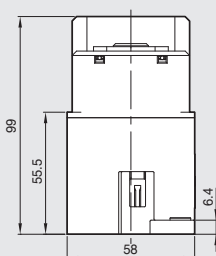
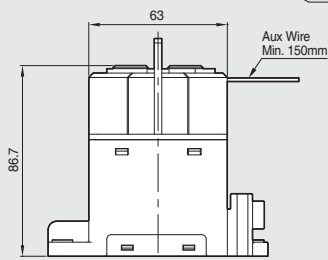
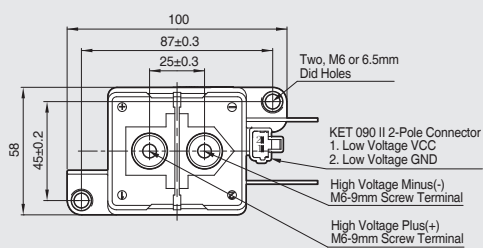
GPR250 / GPR-M250



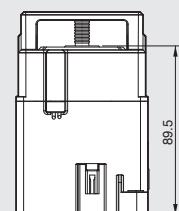
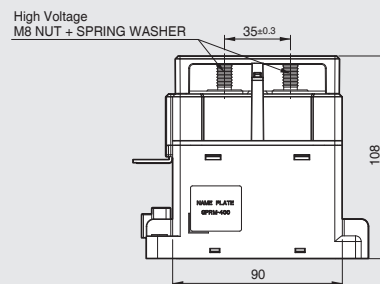
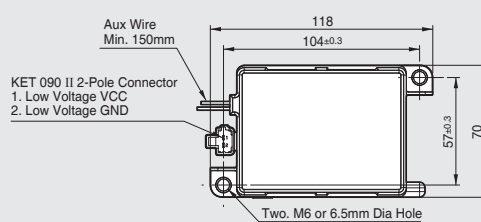
GPR400 / GPR-M400



GPR-M400-A



GPR-H500-A



DC 1000V Fuse & Fuse Holder

Feature & Configuration

- Improve user safety
- Ease of use
- Compact appearance

■LSFS



■LSF-Z16



Fuse Ratings

Type	Size	Voltage	Current	Dimension	
				Diameter	Length
LSFS-ZB08	Ø10 x 38	1000	8	Ø10.0	38
LSFS-ZB10	Ø10 x 38	1000	10	Ø10.0	38
LSFS-ZB12	Ø10 x 38	1000	12	Ø10.0	38
LSFS-ZB16	Ø10 x 38	1000	16	Ø10.0	38

Fuse Holder Ratings

Type	Rating	Insulating Resistance	Withstand Voltage	Withstand Vibration	Temperature	Humidity
LSF-Z16	16A DC 1000V	100MΩ DC 500V	2,500V 1Min 50/60Hz	10~50H zamplitude1.5mm	-40~70℃ No Freezing	85%RH below

Fuse Holder Feature

Transparent & sliding name plate

- Easy to use and visibility

Color code

- Easy identification
- Color B G R W

Hole for expansion

- Simple expansion to 2P,3P

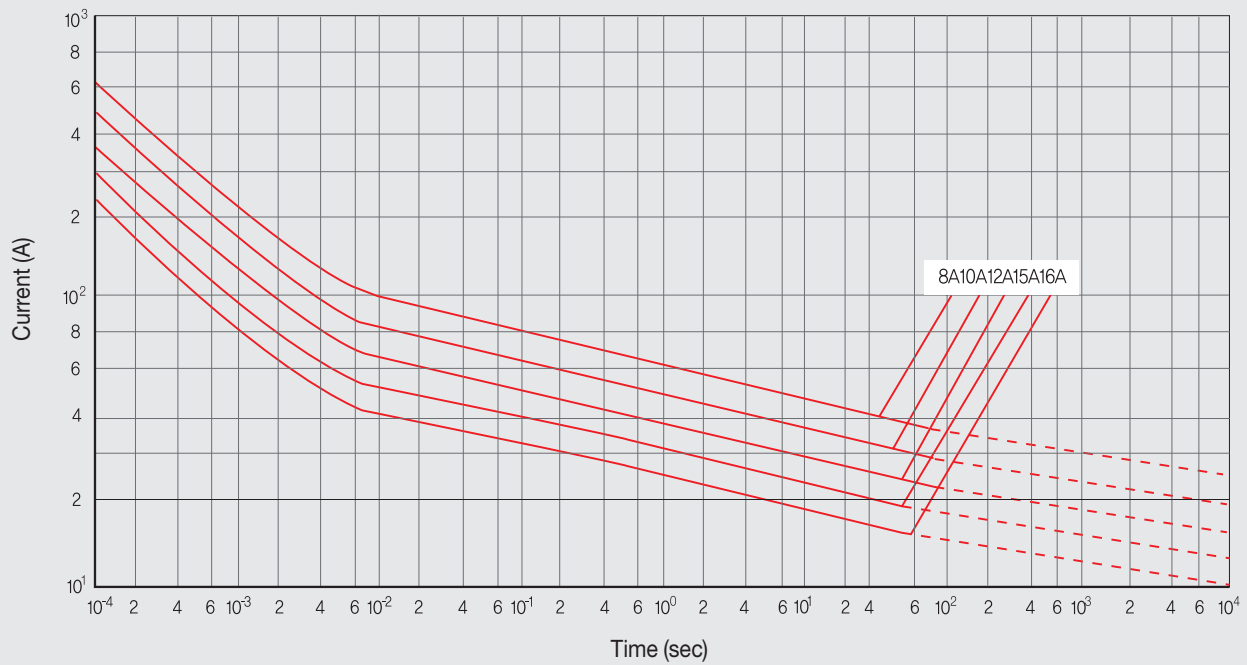
Spare fuse storage

- Removable
- Emergency rapid response possible

Convenient mounting method

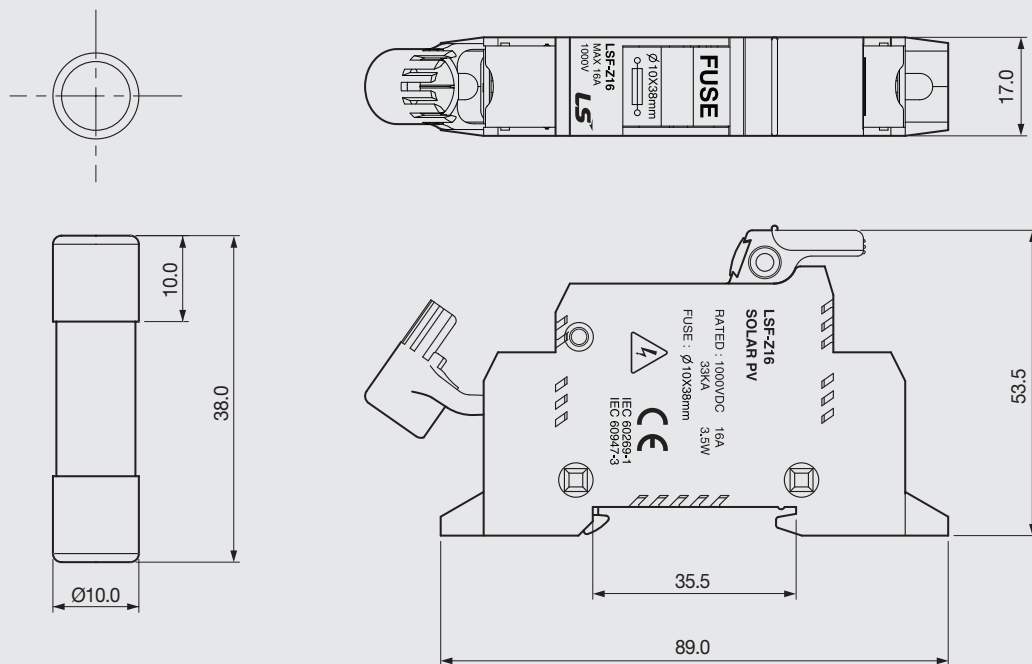
- DIN rail, Screw

Fuse protection curve



Dimension

unit: mm



Susol
Super Solution

Metasol
Meta Solution



AC Components

You can count on us.

Customer satisfaction with world-class products and services LSIS is committed to excellence.

LSIS is implementing the 6-Sigma program with the goal of 'zero-defect' to make only the highest quality products. And to secure product reliability, we embody a high quality guarantee system by carrying out product test evaluations that are internationally recognized for their use of the most current technology.

Susol MCCB 66

Susol ACB 79

Susol Compact ACB 90

Susol VCB 99

Metasol Contactors 117

Susol Busways 133

X GIPAM 137

Susol RMU 141

Transformer 149

Susol MCCB (100~800AF)



Rating

			TD100			TD160			TS100			
Frame size		[AF]	100			160			100			
Rated current, In		[A]	16, 20, 25, 32, 40, 50, 63, 80, 100			100, 125, 160			40, 50, 63, 80, 100			
No. of poles			2, 3, 4			2, 3, 4			2, 3, 4			
Rated operational voltage, Ue	AC	[V]	690			690			690			
	DC	[V]	500			500			500			
Rated impulse withstand voltage, Uimp		[kV]	8			8			8			
Rated insulation voltage, Ui		[V]	750			750			750			
Rated ultimate short-circuit breaking capacity, Icu			N	H	L	N	H	L	N	H	L	
AC 50/60Hz	220/240V	[kA]	85	100	200	85	100	200	100	120	200	
	380/415V	[kA]	50	85	150	50	85	150	50	85	150	
	440/460V	[kA]	50	70	130	50	70	130	50	70	130	
	480/500V	[kA]	30	50	65	30	50	65	42	65	85	
	660/690V	[kA]	5	8	10	5	8	10	10	15	20	
DC	250V	[kA]	42	65	100	42	65	100	50	85	100	
	500V	[kA]	42	65	100	42	65	100	50	85	100	
Rated service breaking capacity, Ics		[%Icu]	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Rated short-circuit making capacity, Icm	AC 50/60Hz	220/240V	[kA]	187	220	440	187	220	440	220	264	440
		380/415V	[kA]	105	187	330	105	187	330	105	187	330
		440/460V	[kA]	105	154	286	105	154	286	105	154	286
		480/500V	[kA]	63	105	143	63	105	143	88	143	187
		660/690V	[kA]	8	14	17	8	14	17	17	30	40
Category of utilization			A			A			A			
Isolation behavior			●			●			●			
Thermal-Magnetic	• fixed-thermal, fixed-magnetic	FTU	●			●			●			
	• adjustable-thermal, fixed-magnetic	FMU	●			●			●			
	• adjustable-thermal, adjustable-magnetic	ATU	-			-			-			
Electronic	• LSI	ETS	-			-			●			
	• LSI	ETM	-			-			-			
	Option	Earth-fault protection, Ig	-			-			-			
		Zone selective interlocking, ZSI	-			-			-			
		Ammeter	-			-			-			
		Communication	-			-			-			
Connection	fixed	front-connection	●			●			●			
		rear-connection	●			●			●			
	plug-in	front-connection	●			●			●			
		rear-connection	●			●			●			
Mechanical life		[operations]	25000			25000			25000			
Electrical life		[operations]	10000			10000			10000			
Basic dimensions, W×H×D (front connection)	3-pole	[mm]	90×140×86			90×140×86			105×160×86			
	4-pole	[mm]	120×140×86			120×140×86			140×160×86			
Weight (front connection)	3-pole	[kg]	1.5			1.5			2			
	4-pole	[kg]	1.8			1.8			2.6			
Reference standard			IEC60947-2			IEC60947-2			IEC60947-2			

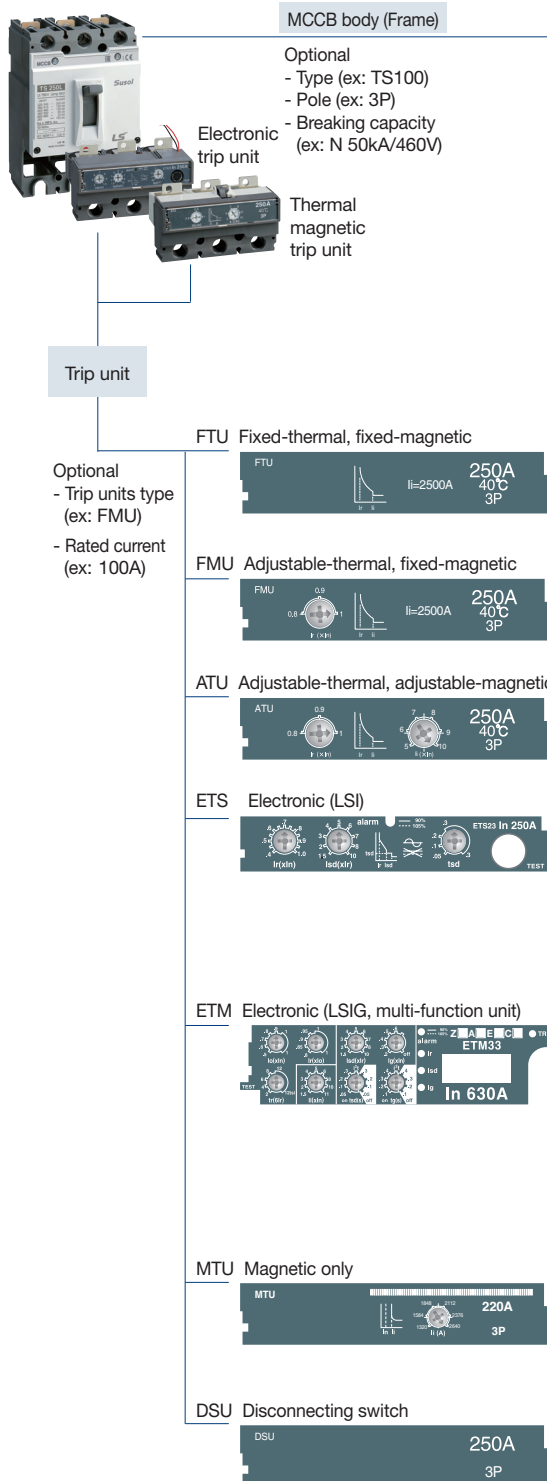
※ The trip unit ATU is available from 125A



TS160				TS250			TS400			TS630			TS800		
160				250			400			630			800		
(100) [*] , 125, 160				125, 160, 200, 250			300, 400			500, 630			700, 800		
2, 3, 4				2, 3, 4			2, 3, 4			2, 3, 4			2, 3, 4		
690				690			690			690			690		
500				500			500			500			500		
8				8			8			8			8		
750				750			750			750			750		
N	H	L		N	H	L	N	H	L	N	H	L	N	H	L
100	120	200		100	120	200	100	120	200	100	120	200	100	120	200
50	85	150		50	85	150	65	85	150	65	85	150	65	100	150
50	70	130		50	70	130	65	85	130	65	85	130	65	100	130
42	65	85		42	65	85	42	65	85	42	65	85	42	85	100
10	15	20		10	15	20	10	20	35	10	20	35	10	20	35
50	85	100		50	85	100	50	85	100	50	85	100	50	85	100
50	85	100		50	85	100	50	85	100	50	85	100	50	85	100
100%	100%	100%		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
220	264	440		220	264	440	220	264	440	220	264	440	220	264	440
105	187	330		105	187	330	143	187	330	143	187	330	143	220	330
105	154	286		105	154	286	143	187	286	143	187	286	143	220	286
88	143	187		88	143	187	88	143	187	88	143	187	88	187	220
17	30	40		17	30	40	17	40	74	17	40	74	17	40	74
A				A			A			A			A		
●				●			●			●			●		
●				●			●			●			●		
●				●			●			●			●		
●				●			●			●			●		
●				●			●			●			●		
-				-			●			●			●		
-				-			●			●			●		
-				-			●			●			●		
-				-			●			●			●		
-				-			●			●			●		
●				●			●			●			●		
●				●			●			●			●		
●				●			●			●			●		
●				●			●			●			●		
25000				25000			20000			20000			10000		
10000				10000			6000			6000			3000		
105×160×86				105×160×86			140×260×110			140×260×110			210×320×135		
140×160×86				140×160×86			186.5×260×110			186.5×260×110			280×320×135		
2				2			5.4			5.4			15.1		
2.6				2.6			7.2			7.2			19.6		
IEC60947-2				IEC60947-2			IEC60947-2			IEC60947-2			IEC60947-2		

Susol MCCB Selection method

Susol MCCB selects ratings of the body and the trip device for circuits breakers, respectively, when selecting products.



MCCB body

Type		TD100			TD160			
Icu size	[AF]	100			160			
No. of poles	[Pole]	2, 3, 4			2, 3, 4			
Rated ultimate short-circuit breaking capacity, Icu	Type	N	H	L	N	H	L	
	660/690V [kA]	5	8	10	5	8	10	
	480/500V [kA]	30	50	65	30	50	65	
	440/460V [kA]	50	70	130	50	70	130	
	380/415V [kA]	50	85	150	50	85	150	
	220/240V [kA]	85	100	200	85	100	200	

Trip units

FTU	Rated current, In	Fixed	16, 20, 25, 32, 40, 50, 63, 80, 100A	100, 125, 160A	
	Instantaneous trip current, Ii	Fixed	400A (In=32A or less) 10×In (In=40A or more)	10×In	
FMU	Rated current, In	Adjustable	16, 20, 25, 32, 40, 50, 63, 80, 100A	100, 125, 160A	
		Adjustment range	(0.8-0.9-1)×In	(0.8-0.9-1)×In	
ATU	Instantaneous trip current, Ii	Fixed	400A (In=32A or less) 10×In (In=40A or more)	10×In	
	Rated current, In	Adjustable	-	-	
ETS		Adjustment range	-	-	
	Instantaneous trip current, Ii	Adjustable	-	-	
ETM	Rated current, In	Adjustable	-	-	
	(Long time trip current, Ir)	Adjustment range	-	-	
MTU	Long time trip time, Ir	Adjustable	-	-	
	Short time characteristics	Current adjustment	-	-	
DSU		Time adjustment	-	-	
	Instantaneous trip current, Ii	Fixed	-	-	
DSU		Adjustable	-	-	
	Rated current, In	Adjustment range	-	-	
DSU	(Long time trip current, Ir)	Primary adjustment	-	-	
		Secondary adjustment	-	-	
DSU	Long time trip time, Ir	Adjustable	-	-	
	Short time characteristics	Current adjustment	-	-	
DSU		Time adjustment	-	-	
	Instantaneous trip current, Ii	Adjustable	-	-	
DSU	Additional function	Standard	-	-	
		Optional	-	-	
DSU	Type		-	-	
	Number of pole	[Pole]	-	-	
DSU	Rated current (Energizing current)	Unprotected	-	-	
	Instantaneous trip current, Ii	Adjustable	-	-	

※ ATU can be adjustable for 125A or more.



	TS100			TS160			TS250			TS400			TS630			TS800		
	100			160			250			400			630			800		
	2, 3, 4			2, 3, 4			2, 3, 4			2, 3, 4			2, 3, 4			2, 3, 4		
	N	H	L	N	H	L	N	H	L	N	H	L	N	H	L	N	H	L
	10	15	20	10	15	20	10	15	20	10	20	35	10	20	35	10	20	35
	42	65	85	42	65	85	42	65	85	42	65	85	42	65	85	42	85	100
	50	70	130	50	70	130	50	70	130	65	85	130	65	85	130	65	100	130
	50	85	150	50	85	150	50	85	150	65	85	150	65	85	150	65	100	150
	100	120	200	100	120	200	100	120	200	100	120	200	100	120	200	100	120	200

	40, 50, 63, 80, 100A	100, 125, 160A	125, 160, 200, 250A	300, 400A	500, 630A	700, 800A
	10×In			10×In		
	40, 50, 63, 80, 100A	100, 125, 160A	125, 160, 200, 250A	300, 400A	500, 630A	800A
	(0.8-0.9-1)×In			(0.8-0.9-1)×In		
	10×In			10×In		
	-	125, 160A	125, 160, 200, 250A	300, 400A	500, 630A	800A
	-	(0.8-0.9-1)×In		(0.8-0.9-1)×In		
	-	(5-6-7-8-9-10)×In				
	In=40, 80A	In=40, 80, 160A	In=40, 80, 160, 250A	In=160, 250, 400A	In=160, 250, 400, 630A	In=630, 800A
	Ir=(0.4~1)×In : Step 13			Ir=(0.4~1)×In : Step 13		
	(1.5~10)×Ir : Step 9			(1.5~10)×Ir : Step 9		
	50, 100, 200, 300ms : Step 4			50, 100, 200, 300ms : Step 4		
	11×In			11×In		
	-	-	-	In=160, 250, 400A	In=160, 250, 400, 630A	In=630, 800A
	-	-	-	Total 30 steps Io=(0.5~1)×In : Step 6 Ir=(0.8~1)×Io : Step 5		
	-	-	-	2, 4, 6, 8, 12sec(at 6×Ir) : Step 5		
	-	-	-	(1.5~10)×Ir : Step 9		
	-	-	-	50, 100, 200, 300ms : Step 4		
	-	-	-	(1.5~11)×Ir : Step 9		
	-	-	-	Show cause of accident (LED)		
	-	--		Ammeter(A), Ground fault protection(E), Communication(C), Optional protection(Z)		

	N	H	L	N	H	L	N	H	L	N	H	L	N	H	L	N	H	L
	3			3			3			3			3			3		
	1.6, 3.2, 6.3, 12, 20, 32, 50, 63A			32, 50, 63, 100, 160			100, 160, 220A			320A			500A			630A		
	(6~12)×In : Step 6									(6~12)×In : Step 6								

been removed in order to use the breaker for opening and closing.

Susol MCCB (1600AF)



Rating

Type			
Ampere frame			
Pole			
Rated current,(A)		In	-5~40℃
			50℃
			65℃
Rated insulation voltage, (V)		Ui	
Rated impulse withstand voltage, (kV)		Uimp	
Rated operational voltage, (V)		Ue	AC50/60Hz
			DC
Rated short-circuit breaking capacity			
IEC60947-2 AC50/60Hz (sym)	Rated ultimate short-circuit breaking capacity, (kA) (Icu)		220/240V
			380/415V
			440/460V
			480/500V
			660/690V
	DC		250V 2P
			500V 2P
			750V 3P
	Rated service		%Icu
	breaking capacity (Ics)		
Rated short-circuit making capacity (kA) (Icw)		AC50/60Hz	1s
			3s
Overriding instantaneous protection			kA peak
Isolation			
Category			
(Life cycle)	Mechanical life (operations)		
	Electrical life (operations)	440V	In/2
			In
		690V	In/2
		In	
Pollution degree			
Dimension (mm)			3-pole
(W×H×D)			4-pole
Weight (kg)			3-pole
			4-pole

TS1000			TS1250		TS1600	
TS1000			TS1250		TS1600	
1000			1250		1600	
3, 4			3, 4		3, 4	
800, 1000			1250		1600	
800, 1000			1250		1560	
800, 1000			1240		1420	
1000			1000		1000	
8			8		8	
690			690		690	
-			-		-	
N	H	L	N	H	N	H
55	75	200	55	75	55	75
50	70	150	50	70	50	70
50	65	130	50	65	50	65
40	50	100	40	50	40	50
35	45	-	35	45	35	45
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
100%	75%	100%	100%	75%	100%	75%
25		12	25		25	
-			-		-	
50		30	50		50	
○			○		○	
B		A	B		B	
10000		4000	10000		10000	
6000		4000	5000		5000	
5000		3000	4000		2000	
4000		3000	3000		2000	
2000		2000	2000		1000	
3			3		3	
210×327×152.5						
280×327×152.5						
13						
16.8						

* Power. Reverse connection of the load side is possible, but use it for normal connection for maintenance, inspection and safety in use.
* 4-pole neutral electrode (N phase) is a method that is blocked after line input.

Overview

Classification	N type	A type	P type	S type
Externals				
Current protection	• L / S / I / G / Thermal	• L / S / I / G / Thermal • ZSI(Protective coordination) • Earth leakage (Option)	• L / S / I / G / Thermal(Continuous) • ZSI(Protective coordination) • Earth leakage(Option) • Over/Under current • Over/Under frequency • Unbalance(Voltage/Current) • Reverse power	• P type
Other protection	-			• P type
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	• P type
Pre Trip Alarm	-	-	• Overload protection relays : DO (Alarm) (Ground fault is not available when using Pre trip alarm)	• P type
Digital Output	-	• 3DO (Fixed) • L, S/I, G Alarm	• 3DO (Programmable) • Trip, Alarm, General	• P type
IDMTL setting	-	-	• Compliance with IEC60255-3 SIT, VIT, EIT, DT	• P type
Communication	-	• Modbus/RS-485 • Profibus-DP	• Modbus / RS-485 • Profibus-DP	• Modbus / RS-485 • Profibus-DP
Power supply	• Self Power -Power source works over 25% of current of In (one pole)	• Self Power - Power source works over 25% of current of In (one pole) - External power source are required for comm. • AC/DC 100~250V • DC 24~60V	• AC/DC 100~250V • DC 24~60V	• AC/DC 100~250V • DC 24~60V
RTC timer	• Available	• Available	• Available	• Available
LED for trip info.	• Long time delay • Short time delay/Instantaneous • Ground fault	• N type	• N type	• N type
Fault recording	-	• 10 records (Fault/Current/Date and Time)	• 256 records (Fault/Current/Date and Time)	• 256 records • Last fault wave recording (3 Phase)
Event recording	-	-	• 256 records(Content, Status, Date)	• P type
Operating button	• Reset button	• Reset, Menu Up/Down, Left/Right, Enter	• A type	• A type

Each type of OCR has a built-in battery.

1. Battery life

- 1) LED is off: 14 ~ 28 years
- 2) 1 LED is continuously on or flashing: 7 ~ 14 days

2. OCR current detectable range

- 1) 10 : 20% or more of the rated current (In) ratio to the value of In regardless of the setting value of Iu and In)
- 2) 30 : 12% or more of the rated current (In)

* RTC Timer : Real Time Clock Timer (required for time alarm and hot start function when event occur)

Susol Switch-Disconnectors (100~800AF)

Electrical characteristics / Trip unit - DSU

Wiring breaker has the same appearance as circuit breakers but has switching function without protection function. Therefore, its basic accessories are the same accessories for circuit breakers.



Rating

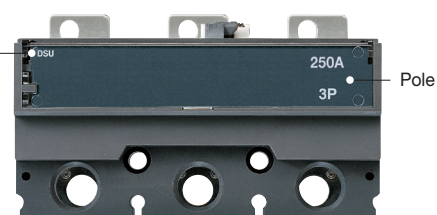
			TD100NA	TD160NA	TS100NA	
Frame size		[AF]	100	160	100	
Conventional thermal current, I _{th}		[A]	100	160	100	
No. of poles			2, 3, 4	2, 3, 4	2, 3, 4	
Rated operational voltage, U _e	AC	[V]	690	690	690	
	DC	[V]	500	500	500	
Rated operational current, I _e			100	160	100	
Rated impulse withstand voltage, U _{imp}		[kV]	8	8	8	
Rated insulation voltage, U _i		[V]	750	750	750	
Rated short-circuit making capacity, I _{cm}		[kA peak]	3.1	3.1	2.8	
Rated short-time withstand current, I _{cw}	1s	[A rms]	2200	2200	2000	
	3s	[A rms]	2200	2200	2000	
	20s	[A rms]	960	960	690	
Isolation behavior			●	●	●	
Trip unit (Release)	Disconnector unit	DSU	●	●	●	
Connection	Fixed	Front-connection	●	●	●	
		Rear-connection	●	●	●	
	Plug-in	Front-connection	●	●	●	
		Rear-connection	●	●	●	
Mechanical life		[Operations]	25000	25000	25000	
Electrical life @415 V AC		[Operations]	10000	10000	10000	
Basic dimensions, W×H×D (Front connection)	3-pole	[mm]	90×140×86	90×140×86	105×160×86	
	4-pole	[mm]	120×140×86	120×140×86	140×160×86	
Weight (Front connection)	3-pole	[kg]	1.5	1.5	2	
	4-pole	[kg]	1.8	1.8	2.6	
Reference standard			IEC60947-3	IEC60947-3	IEC60947-3	



	TS160NA	TS250NA	TS400NA	TS630NA	TS800NA
	160	250	400	630	800
	160	250	400	630	800
	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4
	690	690	690	690	690
	500	500	500	500	500
	160	250	400	630	800
	8	8	8	8	8
	750	750	750	750	750
	3.6	4.9	7.1	8.5	12
	2500	3500	5000	6300	8000
	2500	3500	5000	6300	8000
	960	1350	1930	2320	2560
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	25000	25000	20000	20000	10000
	10000	10000	6000	6000	3000
	105×160×86	105×160×86	140×260×110	140×260×110	210×320×135
	140×160×86	140×160×86	186.5×260×110	186.5×260×110	280×320×135
	2	2	5.4	5.4	15.1
	2.6	2.6	7.2	7.2	19.6
	IEC60947-3	IEC60947-3	IEC60947-3	IEC60947-3	IEC60947-3

Trip unit appearance

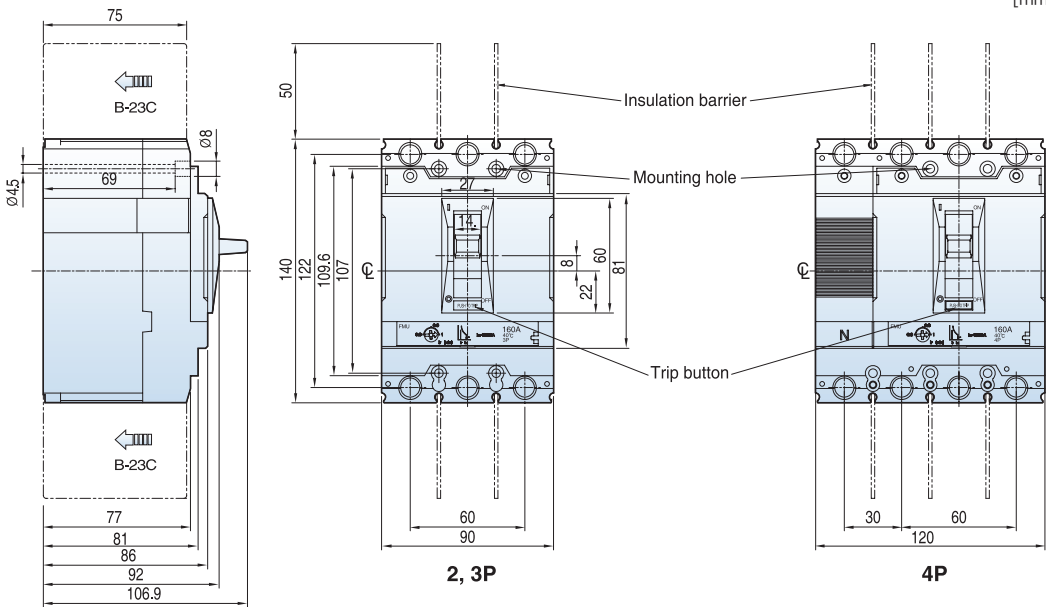
Trip unit identification



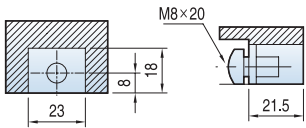
Dimensions of MCCB body

TD100, 160

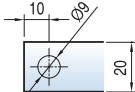
[mm]



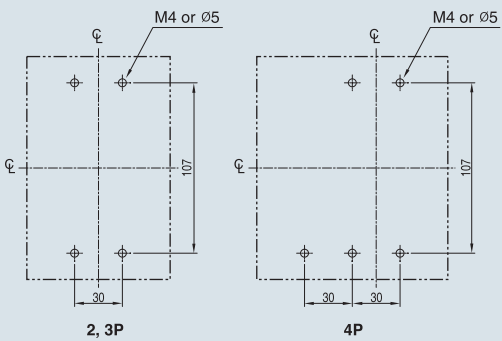
Terminal section



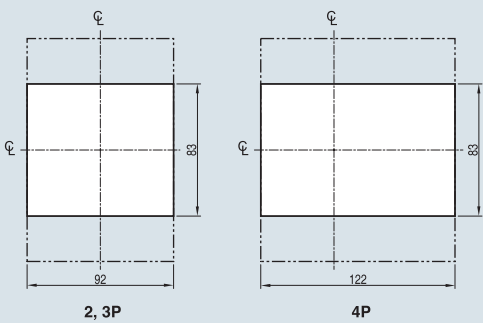
Conductor



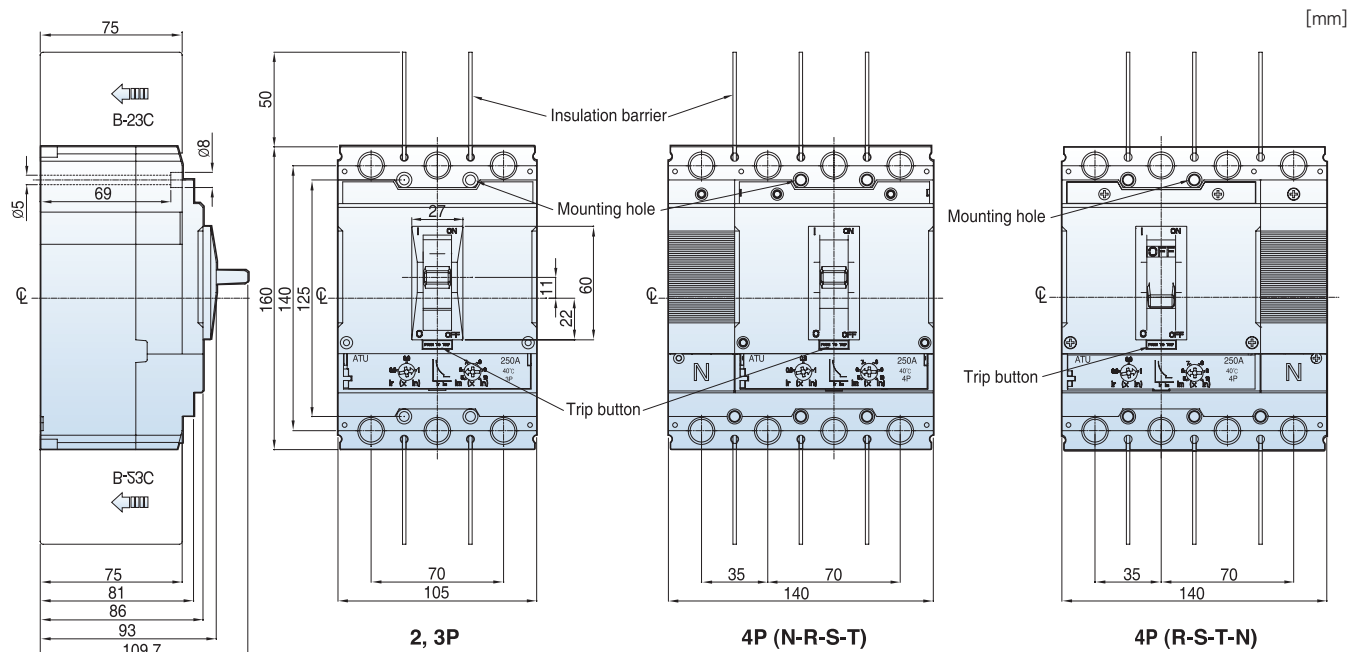
Panel drilling



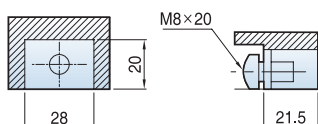
Front panel cutting



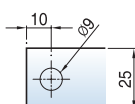
TS100, 160, 250



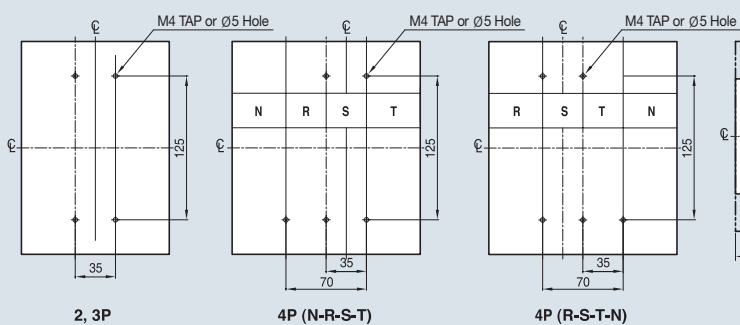
Terminal section



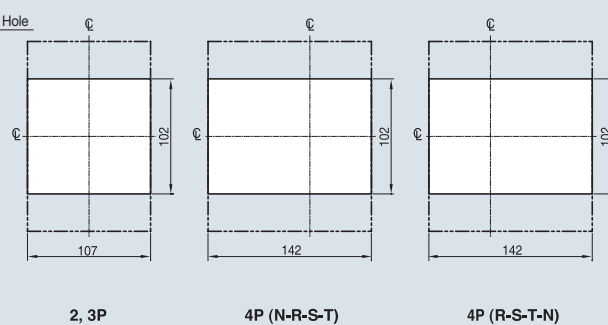
Conductor



Panel drilling



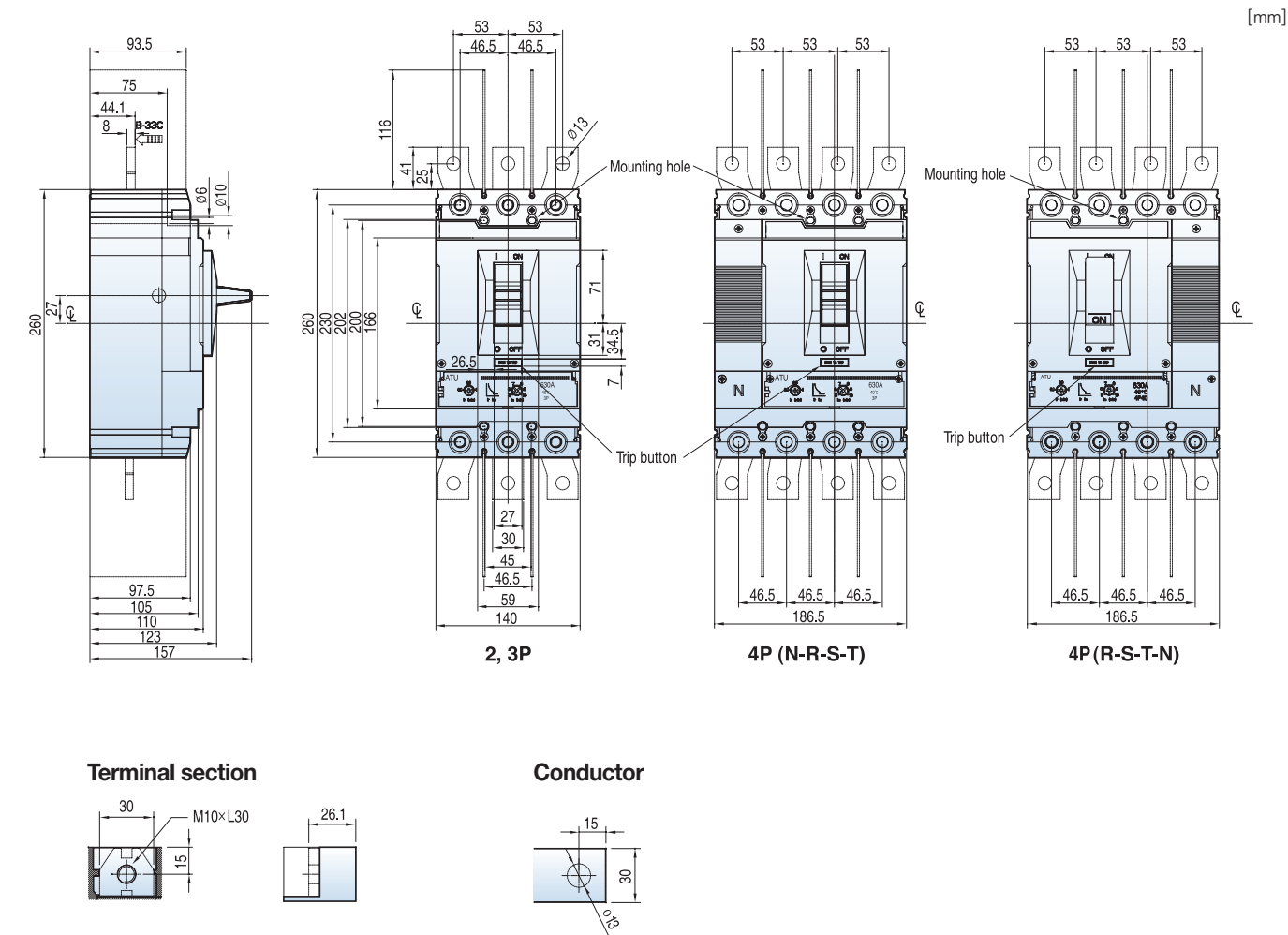
Front panel cutting



Susol MCCB

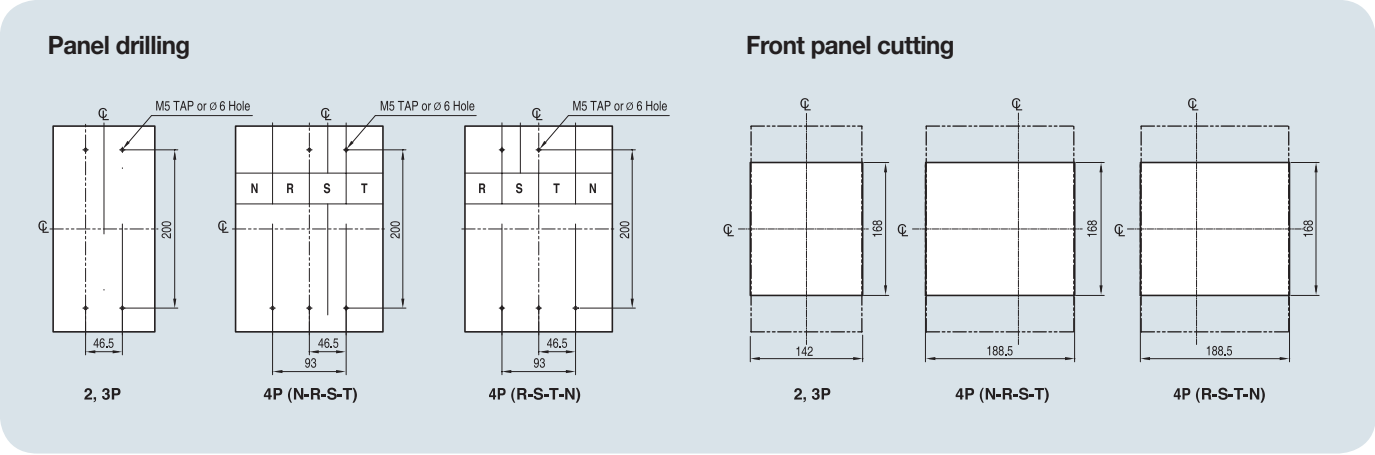
Dimensions of MCCB body

TS400, 630



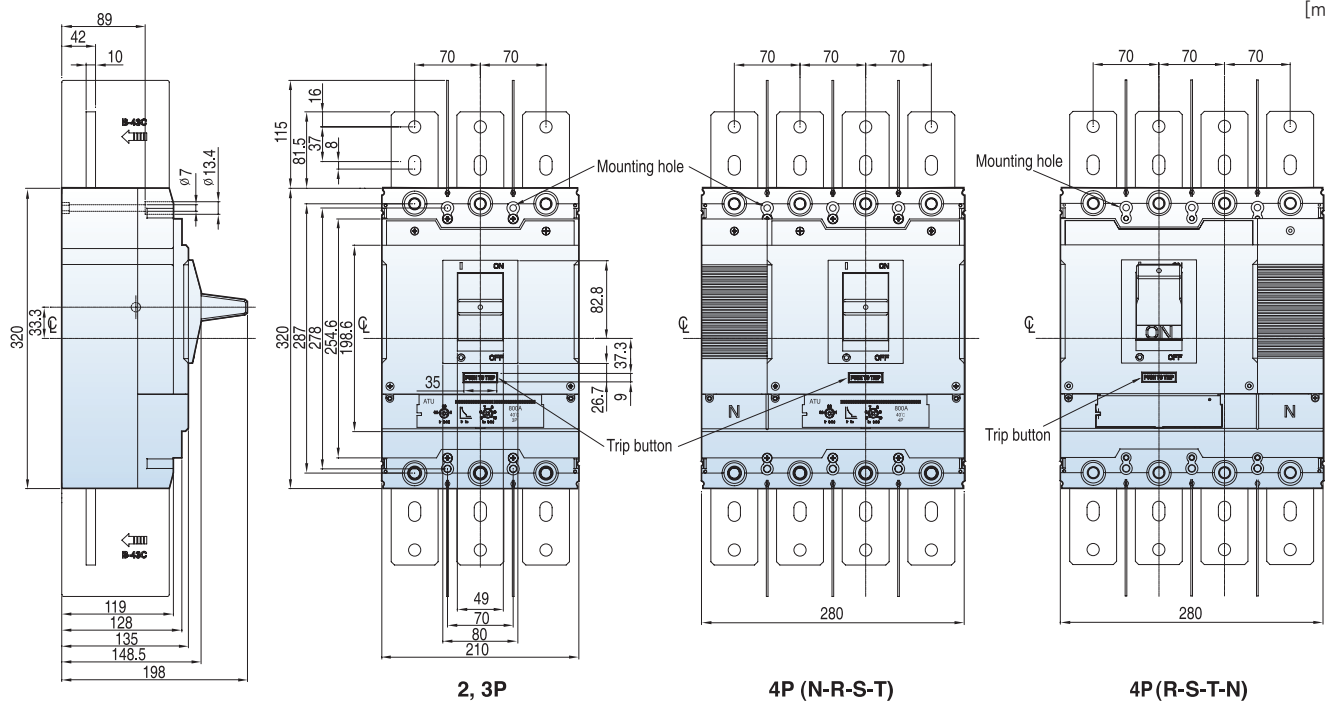
Panel drilling

Front panel cutting

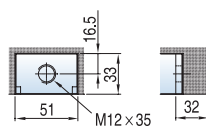


TS800

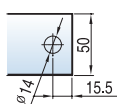
[mm]



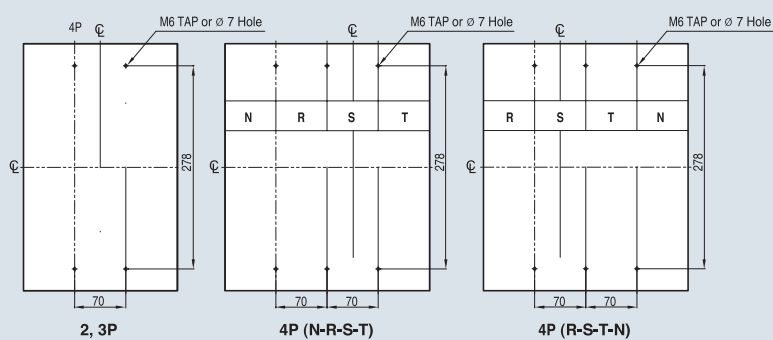
Terminal section



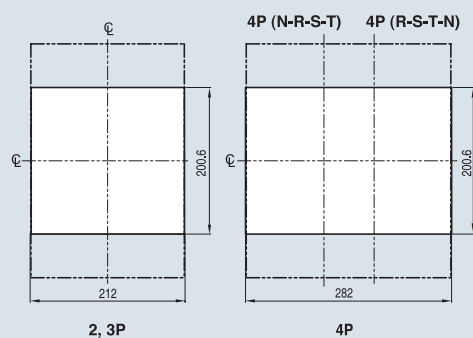
Conductor



Panel drilling



Front panel cutting

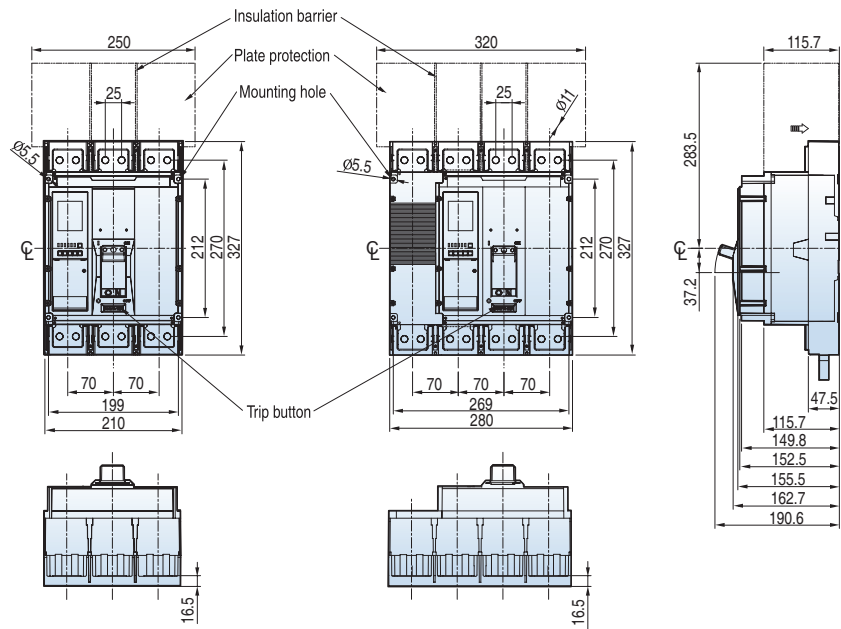


Susol MCCB

TS 1000, 1250, 1600A Dimensions

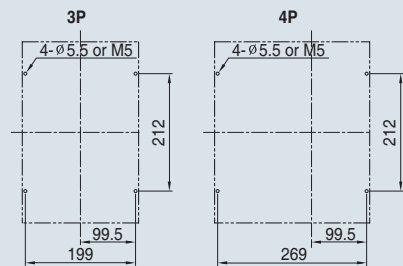
Front Type

[mm]

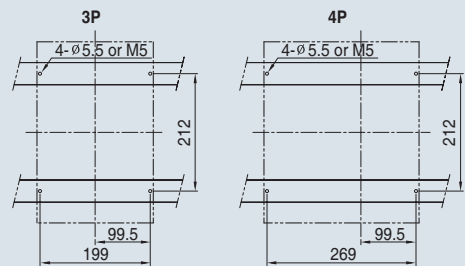


Panel drilling

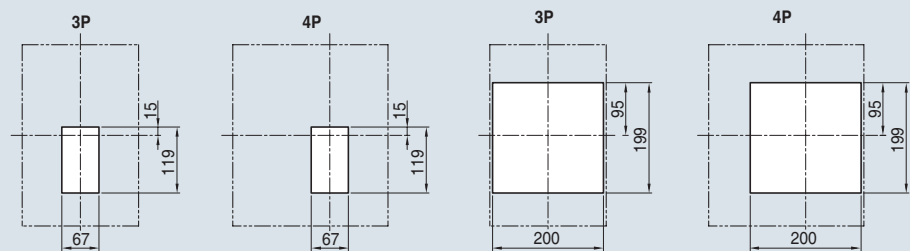
ON BACKPLATE



ON RAILS



Front panel cutting



ACB

Air Circuit Breakers

Premium Susol ACB meets your demands for high breaking capacity, full line-up, and optimized panel size. Various accessories and connection methods create a user-friendly handling. Susol ACB provides 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.

- KS certified (KS C 4620)
- KEPIC(Nuclear rating) and quality (Q-class) certified.
- LR, ABS, DNV, KR, BV, GL, RINA, NK certified
- Maximum breaking capacity : 150kA (6300AF at 500Vac)
- 2000/4000/6300AF, 3 Ampere Frame Sizes
- N phase current conducting capacity : 100%
- Offers variety of accessories including digital trip relay with metering/measuring/analysis/communication functions.
- Rated impulse voltage (Uimp) : 12kV

Ratings

- In : 630~6300AF 3,4 poles, fixed or draw-in/out type
- Ics : 85/100/150kA, 500Vac rating
- Icw : 65/85/100kA

LSIS has passed and achieved Korea's highest and toughest KS rating (KS C 8325 KS C 4620) to prove its safety and functionality in ACB market.



Susol ACB (~6300AF)



Rating

Type			
Ampere frame		(AF)	
Rated current(A)		(In max)	at 40℃
Setting current (A) *		Control trip relay (... × In max)	
Rated current of neutral pole (A)			
Rated insulation voltage(V)		(Ui)	
Rated operational voltage(V)		(Ue)	
Rated impulse withstand voltage (kV)		(Uimp)	
Frequency(Hz)			
Number of poles (P)			
Rated breaking capacity (kA sym)		IEC 60947-2 KS C 4620	220V/230V/380V/415V
AC 50/60Hz	(Icu)		460V/480V/500V
			550V/600V/690V
Rated service breaking capacity (kA)		(Ics)	... % × Icu
Rated making capacity (kA peak)		IEC 60947-2 KS C 4620	220V/230V/380V/415V
AC 50/60Hz	(Icm)		460V/480V/500V
			550V/600V/690V
Rated short-time withstand current (kA)		(Icw)	1 sec
			2 sec
			3 sec
Operating time (ms)		Maximum total breaking time	
		Maximum closing time	
Life cycle (time)		Mechanical	
		Electrical	
Connections **	Draw-out / Fixed		Horizontal connection
			Vertical connection
			Front connection
			Mixed connection
Weight (kg) (3P/4P)	Draw-out type	Main body	Motor charging type
		(With cradle)	Manual charging type
		Cradle only	
	Fixed type	Motor charging type	
		Manual charging type	
External dimensions (mm) (H×W×D)		Draw-out type	3P
			4P
		Fixed type	3P
			4P
Trip relay			
Certificate & Approval			
Marine clasifcation			

AH-D					
AH-06D	AH-08D	AH-10D	AH-13D	AH-16D	AH-20D
630	800	1000	1250	1600	2000
200	400	1000	1250	1600	2000
400	630				
630	800				
(0.4 ~ 1.0) × In max					
400	400	1000	1250	1600	2000
630	630				
	800				
1,000					
690					
12					
50/60					
3/4					
85					
85					
65					
100%					
187					
187					
143					
65					
60					
50					
40					
80					
20,000					
5,000					
●					-
○					●
○					-
○					-
63/74					70/85
61/72					68/83
29/32					33/40
34/44					38/47
32/42					36/45
430×334×375					
430×419×375					
300×300×295					
300×385×295					
N, A, P, S type					
KS / KEMA / KERI / GOST / CCC					
LR, ABS, DNV, KR, BV, GL, RINA, NK					

* Refer to trip relay specification. ** ●: Standard, ○: Option

Note) 1. Life time means not guarantee, but limitation.

Quality guarantee: On/Off frequency on the basis of IEC60947-2 within the term of guarantee

2. In case of Marine ACB, please contact us.

3. The use of AN-D, AS-D, AH-D and AS-F in IT systems is limited to 500 V network voltage.

4. AH-20D, AH-40E types are equipped with vertical-only terminals.

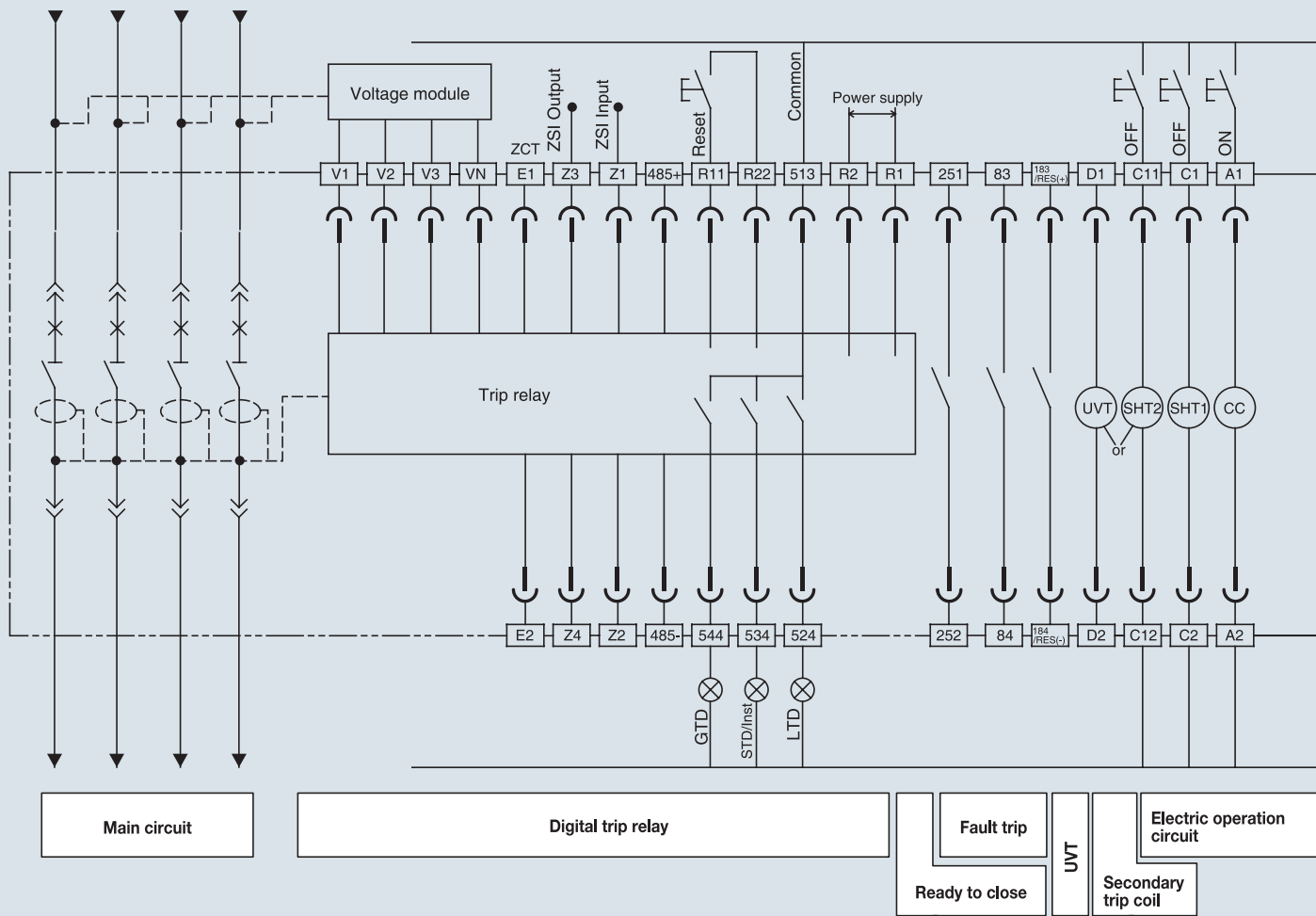


AH-E								
AH-06E	AH-08E	AH-10E	AH-13E	AH-16E	AH-20E	AH-25E	AH-32E	AH-40E
630	800	1000	1250	1600	2000	2500	3200	4000
630	800	1000	1250	1600	2000	2500	3200	4000
(0.4 ~ 1.0) × In max								
630	800	1000	1250	1600	2000	2500	3200	4000
1,000								
690								
12								
50/60								
3/4								
100								
100								
85								
100%								
220								
220								
187								
85								
75								
65								
40								
80								
15,000								
5,000								
●								-
○								●
○								-
○								-
87/103								107/139
85/101								102/145
44/55								65/85
44/55								61/81
42/53								60/80
430×412×375								
430×527×375								
300×378×295								
300×493×295								
N, A, P, S type								
KS / KEMA / KERI / GOST / CCC								
LR, ABS, DNV, KR, BV, GL, RINA, NK								

AH-G		
AH-40G	AH-50G	AH-63G
4000	5000	6300
4000	5000	6300
(0.4 ~ 1.0) × In max		
4000	5000	6300
1,000		
690		
12		
50/60		
3/4		
150		
150		
100		
100%		
330		
330		
220		
100		
85		
75		
40		
80		
10,000		
2,000		
○		
●		
-		
-		
181/223		186/230
179/221		184/228
97/117		102/124
98/123		103/130
96/121		101/128
460×785×375		
460×1015×375		
300×751×295		
300×981×295		
N, A, P, S type		
KS / KEMA / KERI / GOST / CCC		
LR, ABS, DNV, KR, BV, GL, RINA, NK		

※ Derating of the rated current is required according to the ambient temperature around the breaker in a panel if it is higher than the reference value. (See pages 123 to 126)

Electrical diagram



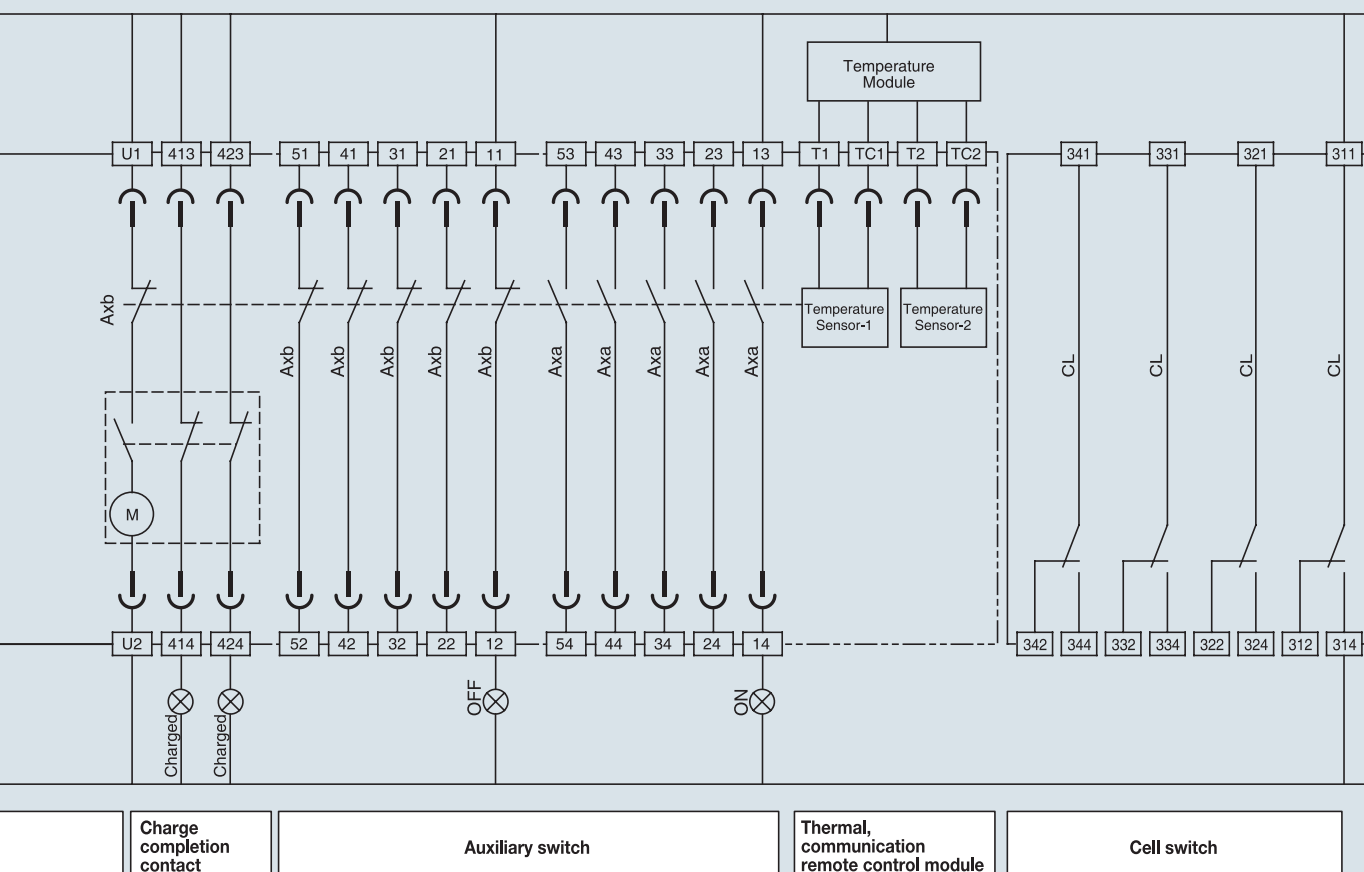
Terminal code description

13	14	~	63	64	Auxiliary switch "a"
11	12	~	61	62	Auxiliary switch "b"
413	414				Charged signal
423	424				Charged signal communication
U1	U2				Motor charging
A1	A2				Closing coil
C1	C2				Shunt trip
C11	C12				2nd shunt trip

D1	D2	Voltage input terminal of UVT
83	84	Alarm1 "a"
183	184	Alarm2 "a"
251	252	Ready to close switch
R1	R2	Control power
513	~ 544	Alarm contact
R11	R22	Alarm reset (Trip cause LED, Alarm contact)
485+	485-	RS-485 communication

Note) 1. The diagram is shown with circuits de-energized, all devices open, connected and charged and relays in normal position
2. Relay is normal condition and charging type is "OFF-Charging"
3. The standard of auxiliary contact is 3a3b. The auxiliary switch in above diagram is composed of 5a5b. See 66 page for more detail on auxiliary switches.
4. Option
- Ready to close contact, Trip alarm contact, UVT coil, Fully charged contact, secondary trip coil
- Cell switch, Temperature module, Voltage module, Remote close-open module, ZCT, ZSI
5. Please consult us for the use of ZSI (Zone selective Interlocking).
6. Refer to the page 47 for the connection of Trip relay and the page 61 for UVT.
7. For connecting RS-485 verify if the polarity is correct

This diagram is based on “CONNECTED” position of a circuit breaker and Opening, Motor charging, Releasing of locking plate should be normal condition.



Accessory code description

Z1	Z2	ZSI input
Z3	Z4	ZSI output
E1	E2	ZCT
VN	~ V3	Voltage module
TC1, TC2	~ T1, T2	Temperature module
311	~ 344	Position switch

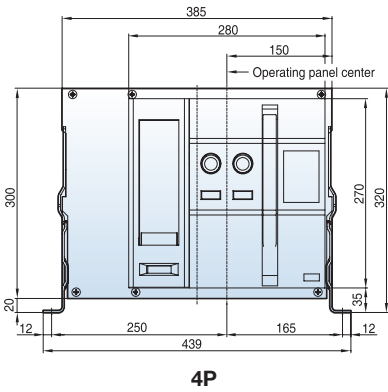
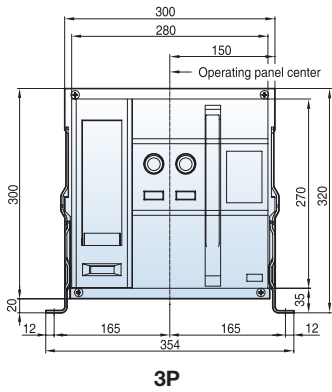
Ax	Auxiliary switch
LTD	Long time delay trip indicator
STD/Inst	Short time delay/instantaneous
GTD	Ground fault trip indicator
CL	Cell switch
(M)	Motor
(CC)	Closing coil
(ST1)	Shunt tripping device 1
(ST2)	Shunt tripping device 2
(UVT)	UVT coil

—	Internal wiring
---	External wiring (by customer)
—C—	Connector of the control circuit terminal of drawout type

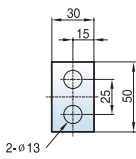
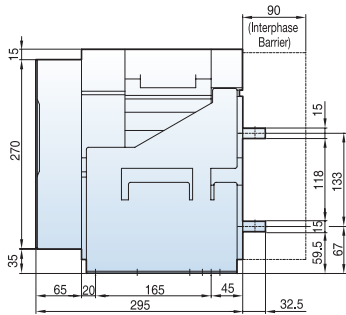
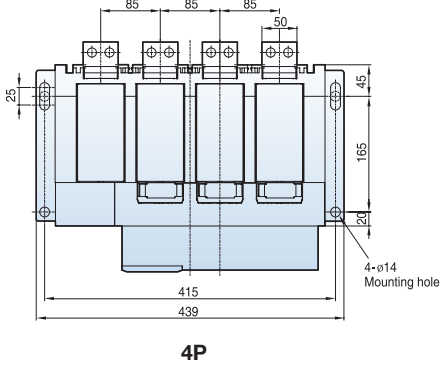
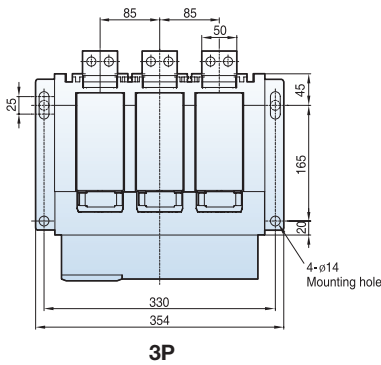
Fixed type 2000AF (630~1600A : AH-06~16D) Dimensions

Dimensions: [mm]

Front view

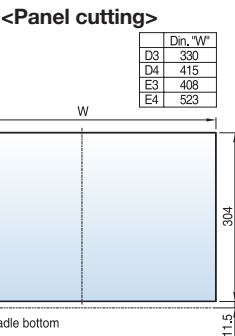
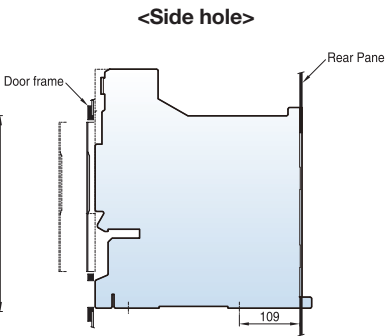
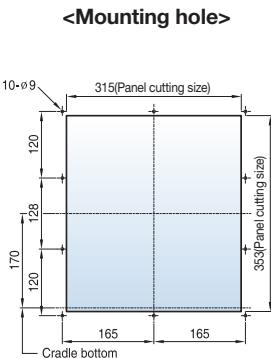
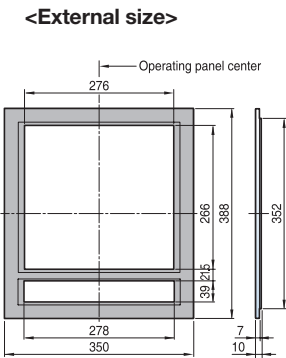


Vertical type



<Conductor>

Door Frame: DF (AH-D/E)

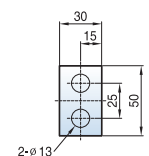
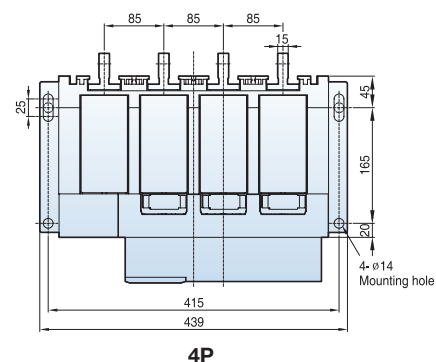
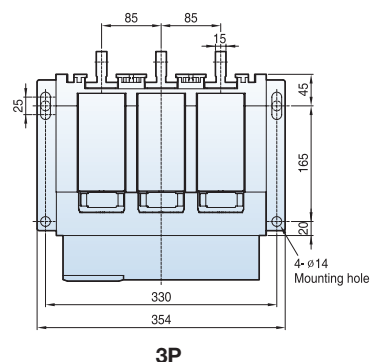


Din. 1W
D3
D4
E3
E4

Note) The dimensions are for drawout type.

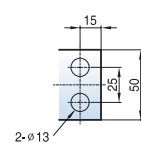
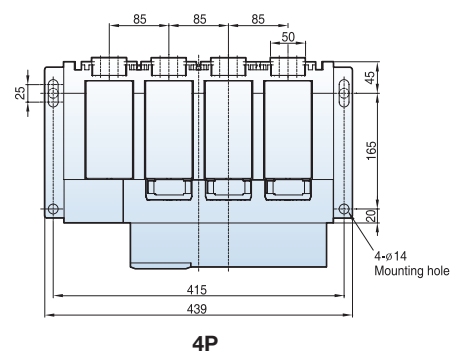
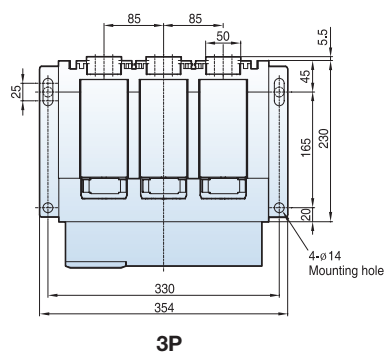
Dimensions: [mm]

Horizontal type



<Conductor>

Front connection type

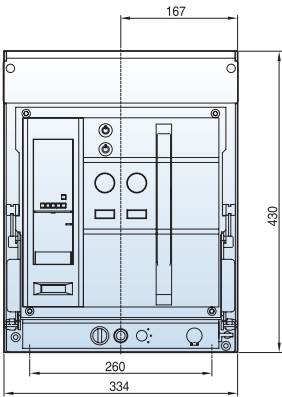


<Conductor>

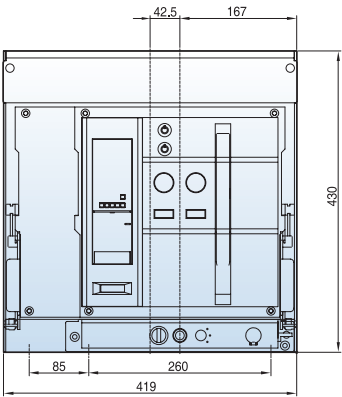
Draw-out type 2000AF (630~1600A : AH-06~16D) Dimensions

Dimensions: [mm]

Front view

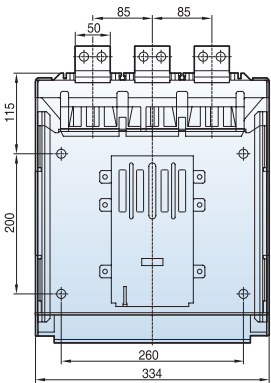


3P

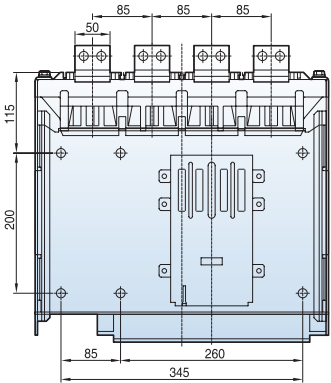


4P

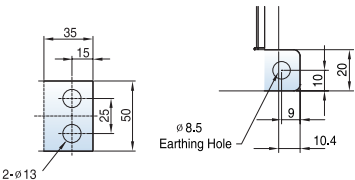
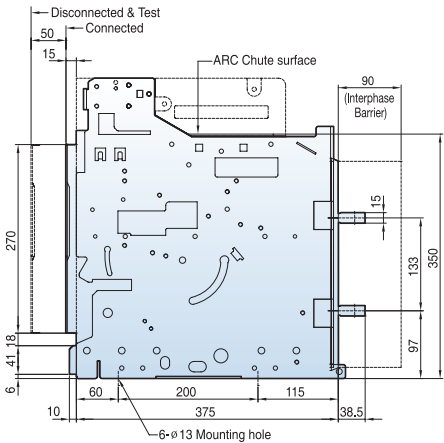
Vertical type



3P

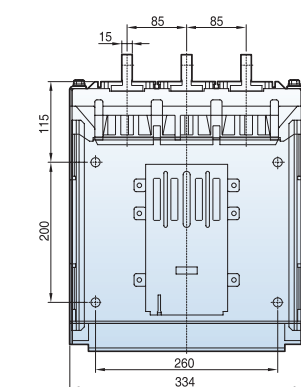


4P

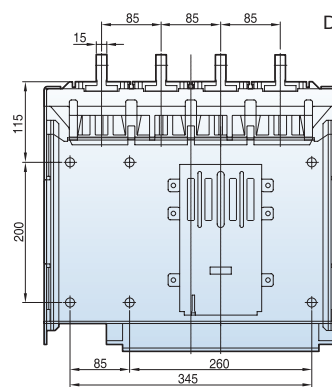


<Conductor>

Horizontal type

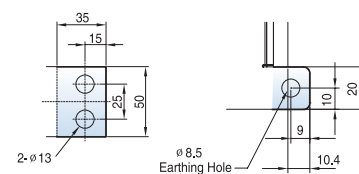
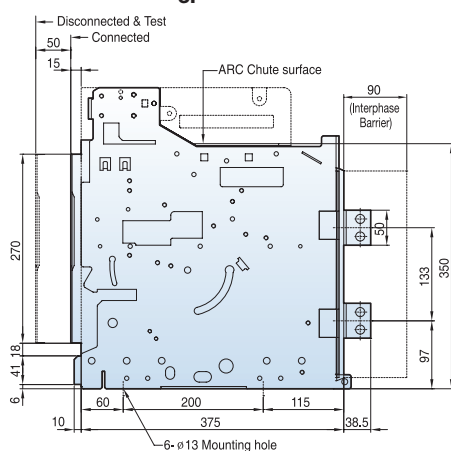


3P



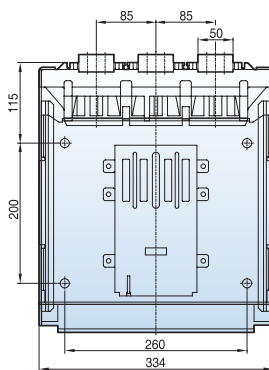
4P

Dimensions: [mm]

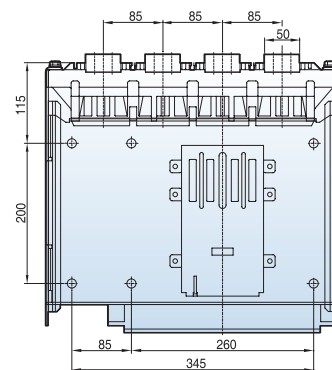


<Conductor>

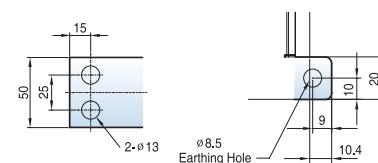
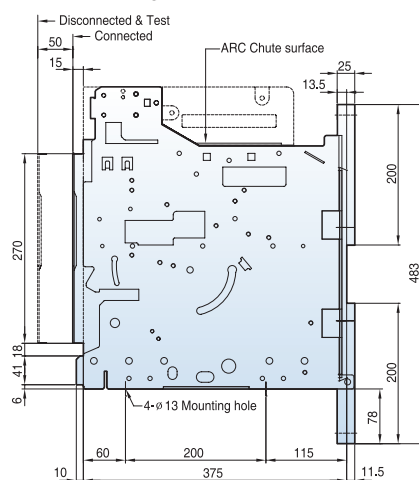
Front connection type



3P



4P



<Conductor>

Susol ACB (~6300AF) Trip relays

Trip relay types

Classification	N type	A type	P type	S type
Externals				
Current protection	• L / S / I / G / Thermal	• L / S / I / G(or EL) • Thermal • ZSI (Protective coordination)	• L / S / I / G(or EL) • Thermal (linear hot start) • ZSI (Protective coordination)	• L / S / I / G(or EL) • Thermal (linear hot start) • ZSI (Protective coordination)
Other protection	-	-	• Over/Under voltage • Over/Under frequency • Unbalance(Voltage/Current) • Reverse power	• 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 source works over 20% of load current.	• Self Power 1) 1 ϕ : Power source works over 30% of load current 2) 3 ϕ : Power source works over 15% of load current - External power source are required for comm. • AC/DC 100~250V • DC 24~60V	• AC/DC 100~250V • DC 24~60V	• AC/DC 100~250V • DC 24~60V
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 form recording (3 Phase)
Event recording	-	-	• 256 records (Content, Status, Date)	• 256 records (Content, Status, Date)
Operating button	• Reset button	• Reset, Menu Up/Down, Left/Right, Enter	• Reset, Menu Up/Down, Left/Right, Enter	• Reset, Menu Up/Down, Left/Right, Enter

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

Each OCR type has Battery in itself.

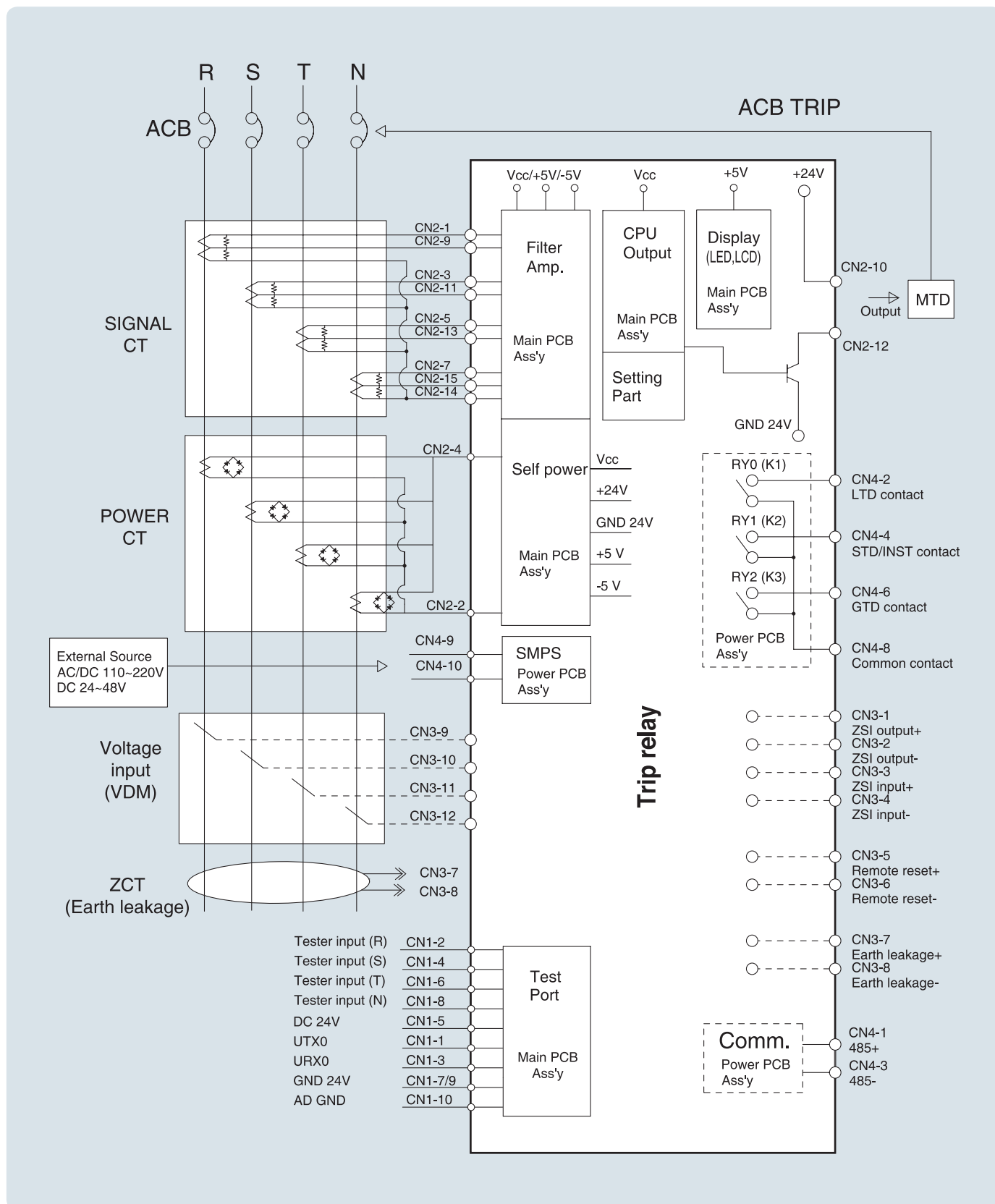
1. Battery lifespan

- 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) OCR-A type : When more 15% than rated current (In)
- 2) OCR-P/S type : When more 12% than rated current (In)

System block diagram



Susol Compact ACB (1600A)



Fixed type



Draw-out type

Rating

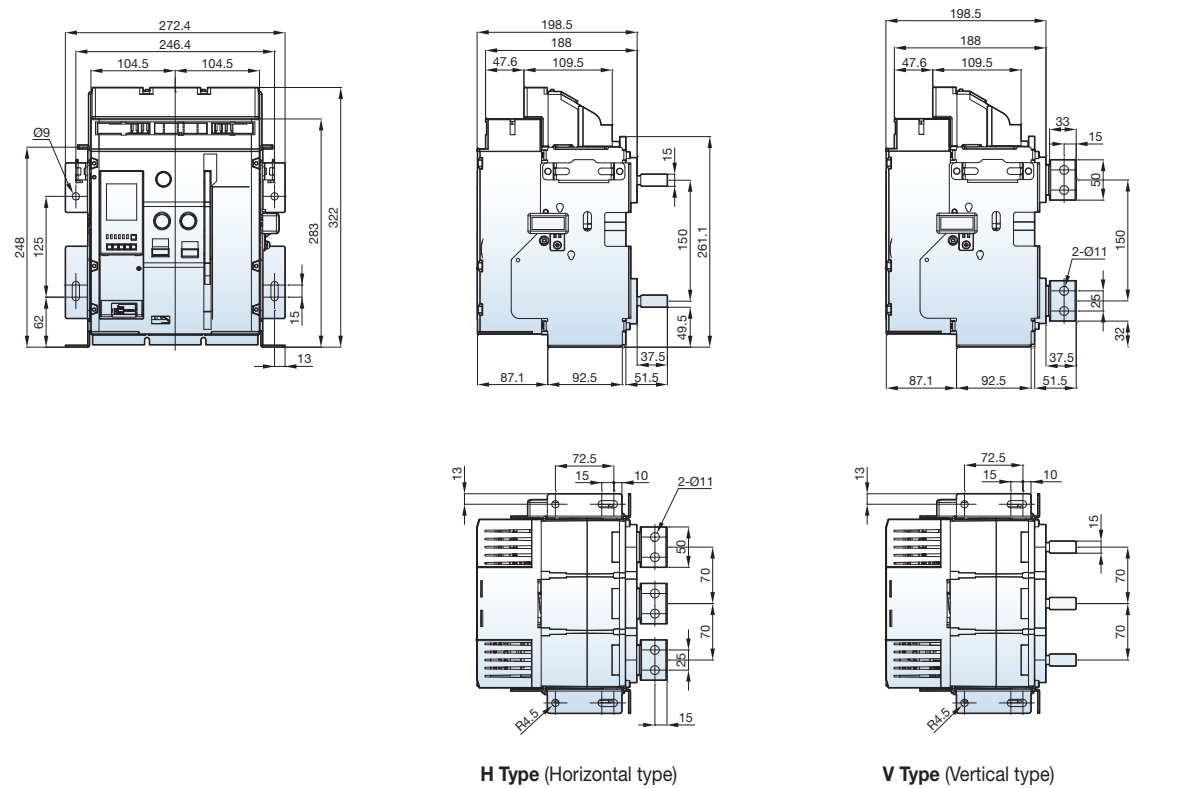
Common characteristics							
Number of poles	(P)	3P / 4P					
Frequency	(Hz)	50 / 60Hz					
Rated operational voltage	(V, Ue)	690V					
Rated insulation voltage	(V, Ui)	1000V					
Rated impulse withstand voltage	(kV, Uimp)	12kV					
Circuit breaker as per IEC60947-2							
Type	AN / AH / AR-C						
Description	AN-08CAN-16CAH-08CAH-16CAR-08CAR-10C						
Ampere Frame	(AF)	800	1600	800	1600	800	1000
Rated current (In Max.) at 40℃	(A)	400	-	400	-	400	-
	(A)	630	-	630	-	630	-
	(A)	800	800	800	800	800	800
	(A)	-	1000	-	1000	-	1000
	(A)	-	1250	-	1250	-	-
	(A)	-	1600	-	1600	-	-
Rated current of neutral pole	(A)	100%					
Rated breaking capacity (Icu)	(kA)	IEC60947-2	AC 690V / 600V / 550V	42	50	-	
			AC 500V / 480V / 460V	42	50	130 ¹⁾	
			AC 415V / 380V / 220V	50	60	150	
Rated service breaking capacity (Ics)	(kA, %×Icu)	100%					
Rated making capacity (Icm)	(kA)	88.2		105		17 ²⁾	
Rated Short-time capacity (Icw)	(kA)	1sec / 3sec	42 / 25	50 / 30		10 ³⁾	
Operating time (t)	(ms)	Total breaking time	40				
		Closing time	80				
Common mechanical and electrical life cycle							
Life cycle	(time)	Mechanical	12,500			5,000	
		Electrical	6,000			3,000	
Common dimension and weight							
Weight	(kg)	Draw-out type (3P / 4P)	16 / 19.5				
		Fixed type (3P / 4P)	16 / 19.5				
		Cradle (3P / 4P)	22 / 26				
Dimension	(mm)	Draw-out type	3P	W: 256 D: 269.5 ⁴⁾ H: 364.3			
			4P	W: 326 D: 269.5 ⁴⁾ H: 364.3			
		Fixed type	3P	W: 272.4 D: 198.5 ⁴⁾ H: 322			
			4P	W: 342.4 D: 198.5 ⁴⁾ H: 322			

1) 130kA/460V, 100kA/500V 2) at 500V 3) 0.5sec 4) Exclude terminal length

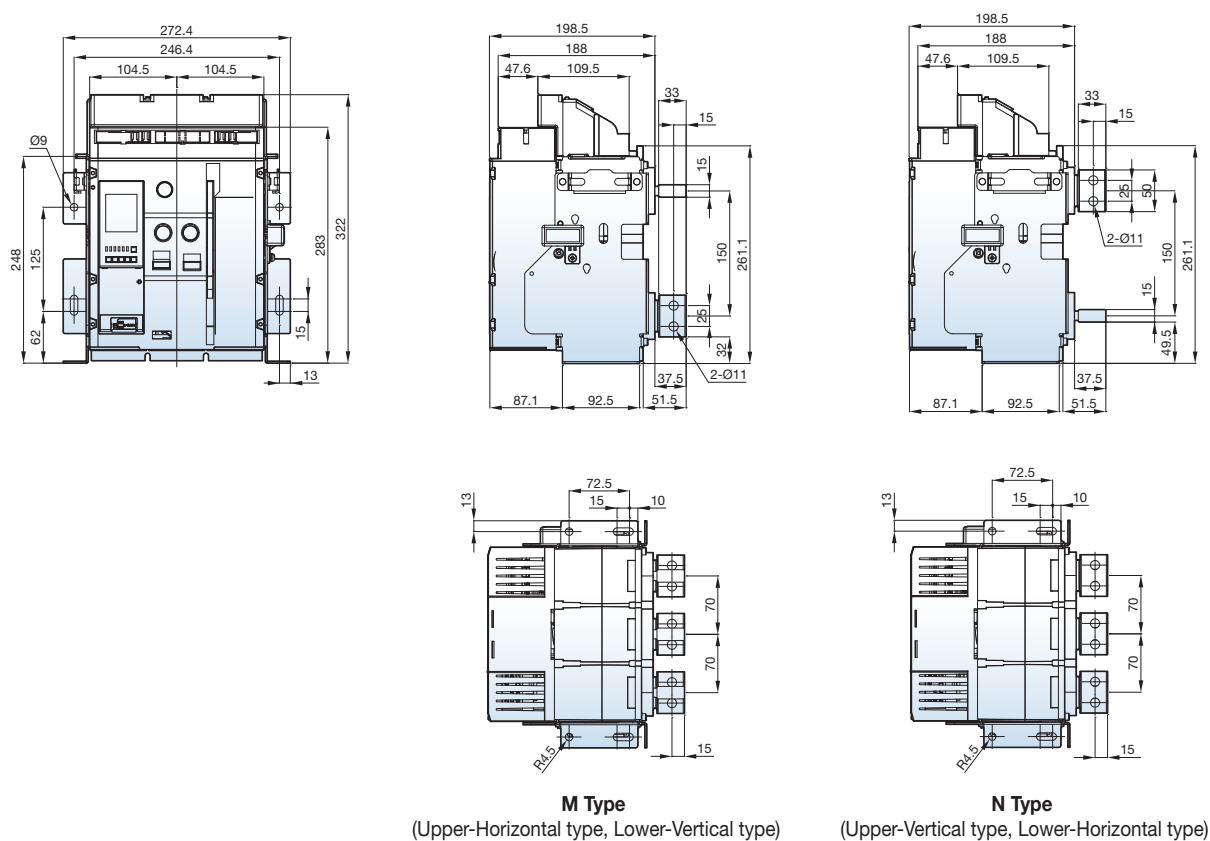
Susol Compact ACB dimensions

• 3P [Fixed H: Horizontal type / V: Vertical type]

(Unit : mm)

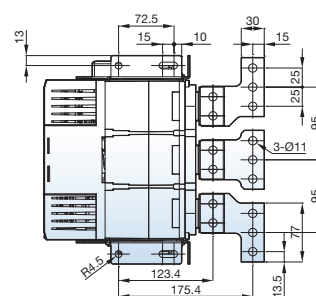
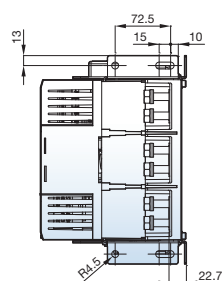
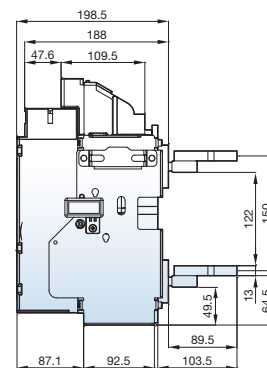
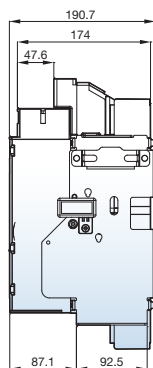
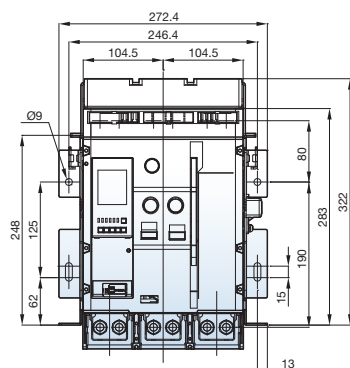


• 3P [Fixed M: Upper-Horizontal type, Lower-Vertical type / N: Upper-Vertical type, Lower-Horizontal type]



• 3P [Fixed P: Plane type / R: Spread type]

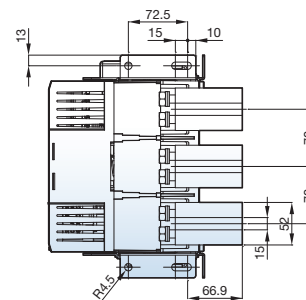
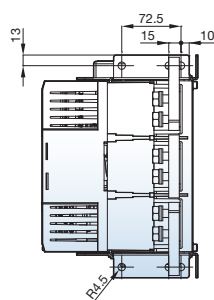
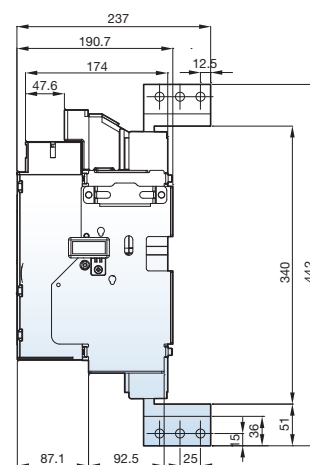
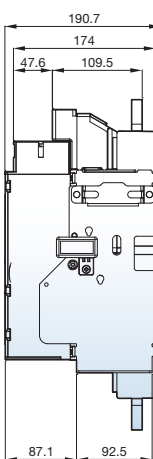
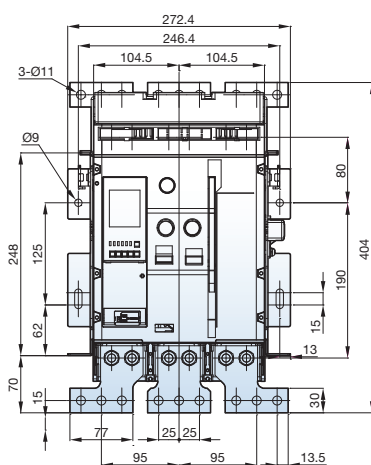
(Unit : mm)



P Type (Plane type)

R Type (Spread type)

• 3P [Fixed Z: Plane spread type / T: Plane vertical type]



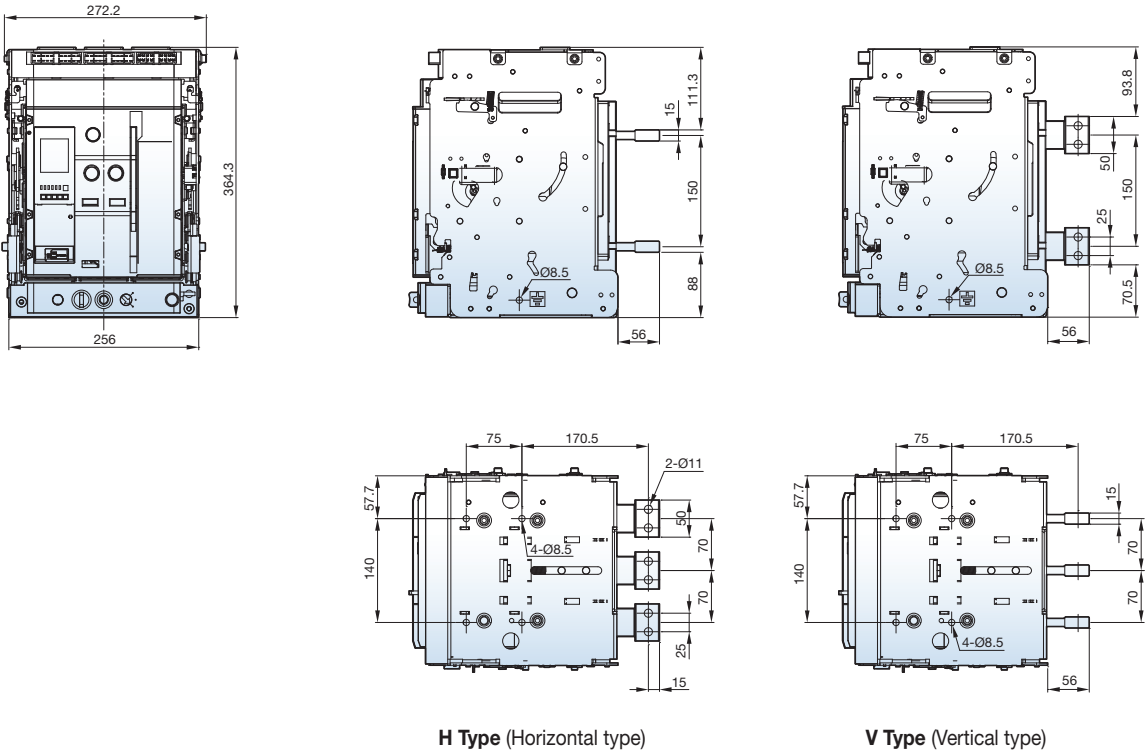
Z Type (Plane spread type)

T Type (Plane vertical type)

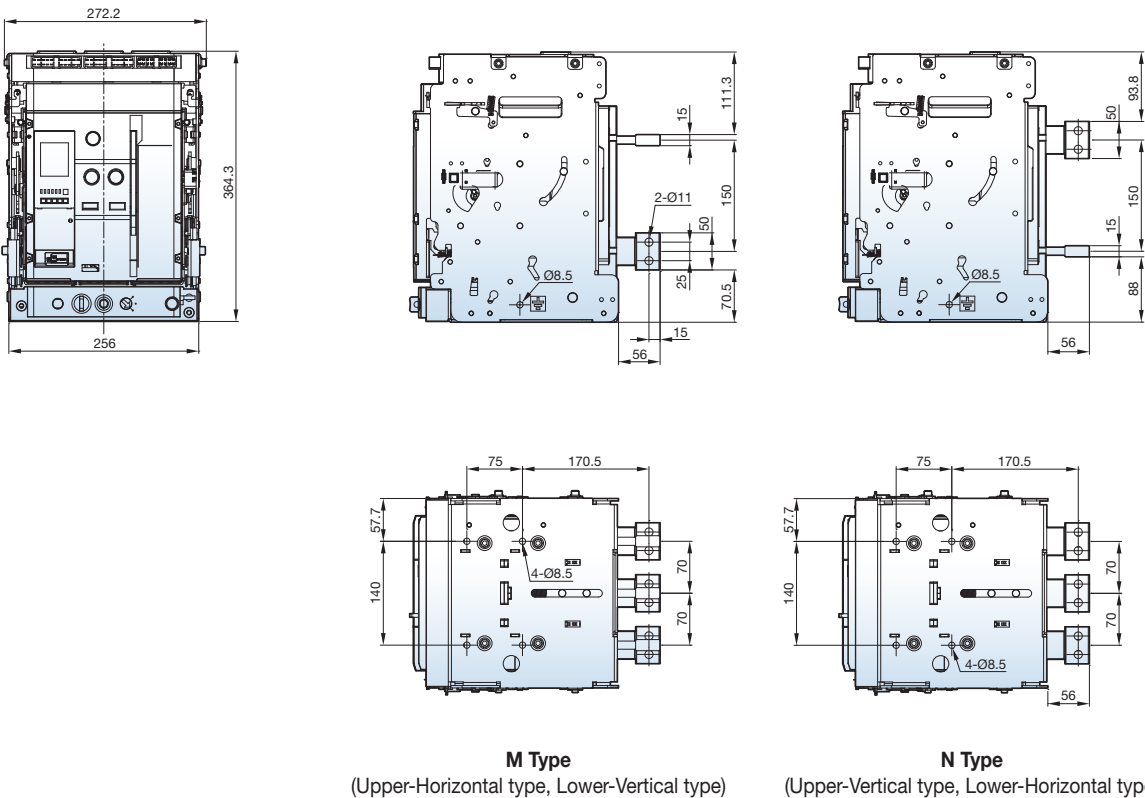
Susol Compact ACB dimensions

• 3P [Draw-out H: Horizontal type / V: Vertical type]

(Unit : mm)

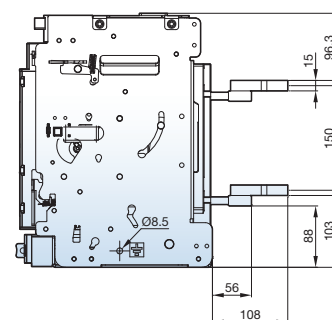
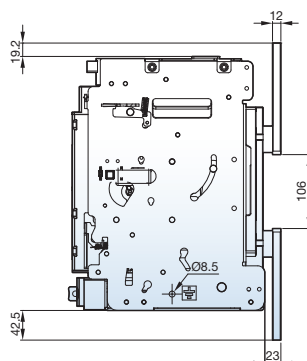
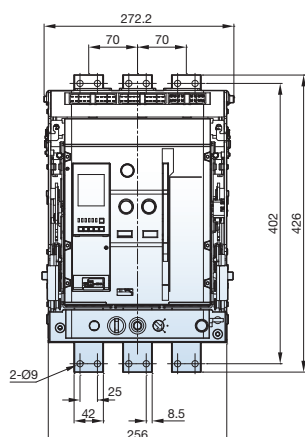


• 3P [Draw-out M: Upper-Horizontal type, Lower-Vertical type / N: Upper-Vertical type, Lower-Horizontal type]

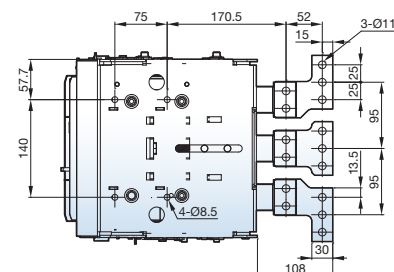


• 3P [Draw-out P: Plane type / R: Spread type]

(Unit : mm)

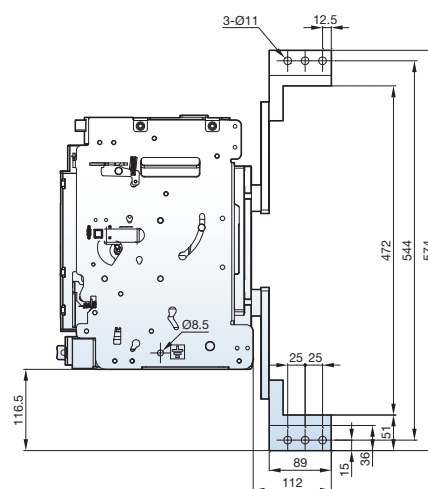
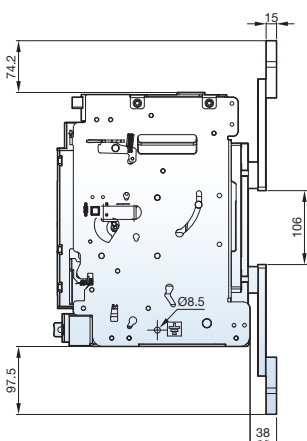
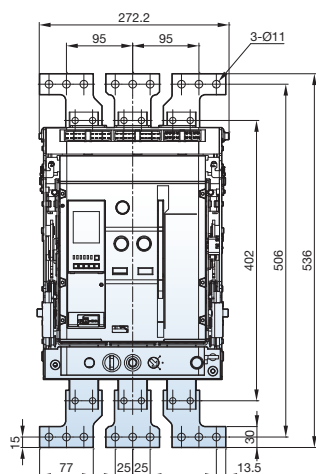


P Type (Plane type)

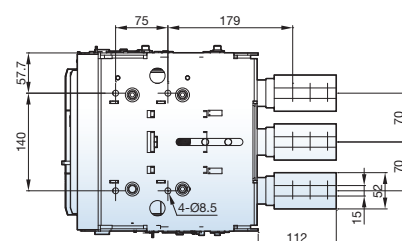


R Type (Spread type)

• 3P [Draw-out Z: Plane spread type / T: Plane vertical type]



Z Type (Plane spread type)



T Type (Plane vertical type)

Susol Compact ACB 1600A Trip relays

Trip relay types

Classification	N type	A type	P type	S type
Externals				
Current protection	• L/S/I/G/Thermal	• L/S/I/G/Thermal • ZSI (Protective coordination)	• L/S/I/G • ZSI (Protective coordination) • Thermal (Linear Hot Start)	• L/S/I/G • ZSI (Protective coordination) • Thermal (Linear Hot Start)
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
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 source worksover 20% of load current.	• Self Power -Power source worksover 20% of load current. -External power source are required for comm. • AC/DC 100~250V • DC 24~60V	• AC/DC 100~250V • DC 24~60V • Basic protection function (L/S/I/G) is still under normal operation without control power.	• AC/DC 100~250V • DC 24~60V • Basic protection function (L/S/I/G) is still under normal operation without control power.
RTC Timer	• Available	• 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	• 256 records • Last fault wave form recording (3 Phase)
Event recording	-	-	• 256 records (Content, Status, Date)	• 256 records (Content, Status, Date)
Operating button	• Reset button	• Reset, Menu Up/Down, Left/Right, Enter	• Reset, Menu Up/Down, Left/Right, Enter	• Reset, Menu Up/Down, Left/Right, 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

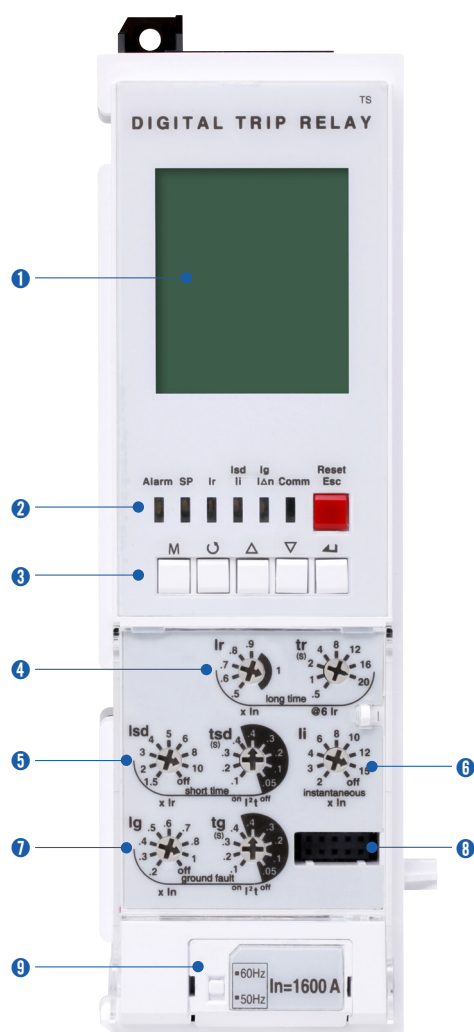
2. The recognizable range of OCR current

1) 10: When more 20% than rated current(In) (ratio to In regardless of Iu and Ir)

2) 30: When more 12% than rated current(In)

S type: 'Supreme meter' type

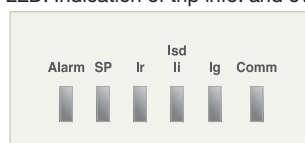
- Overload protection
 - Long-time delay – Thermal
- Short-circuit protection
 - Short-time delay/Instantaneous
 - I_{2t} On/Off optional (for short-time delay)
- Ground fault protection
 - I_{2t} On/Off optional
- Protection for Over voltage/Under voltage/Over frequency/Under frequency/Unbalance/Reverse power
- Realization of protective coordination by ZSI (Zone Selective Interlocking)
- The fine-adjustable setting by knob and key
- IDMTL setting (SIT, VIT, EIT, DT curve)
 - Basic setting : “None”. Thermal curve.
- Measurement and display function
 - High detailed measurement for 3 phase current/Voltage/Power/Energy/Phase angle/Frequency/PF/Demand
 - 128 x 128 Graphic LCD
 - Indicates current/voltage vector diagram and waveform
- Fault recording
 - Records Max. up to 256 fault information about fault type, fault phase, fault value, occurrence time of fault
- Event recording
 - Records events of device related to setting change, operation and state change. (Max. up to 256)
- SBO (Select Before Operation)
 - High reliability for control and setting change method
- 3 DO (Digital output)
 - Programmable for alarm, trip and general DO
- Communication
 - Modbus/RS485 – Profibus-DP
- Rating Plug for selection of rated current(I_n) and frequency
 - Rating Plug type
 - 800AF: 400, 600, 630, 800A (4 types)
 - 1600AF: 800, 1000, 1200, 1250, 1600A (5 types)
 - Frequency selection switch: set to 50Hz or 60Hz



* When communication is flashing phone icon on the LCD.

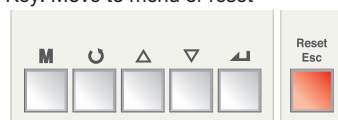
① LCD: Indication of measurement and information

② LED: Indication of trip info. and overload state



- Comm: LED indicating comm. state (Blink when running) *
- Ig: LED indicating ground-fault
- Isd/Ii: LED indicating short-time or instantaneous tripping
- Ir: LED indicating long-time delay
- SP: Self-protection and battery test LED
- Alarm: LED indicating an overload
(Turn on above 90%, Blink above 105%)

③ Key: Move to menu or reset



- Reset/ESC: Fault reset or ESC from menu
- Enter: Enter into secondary menu or setting input
- Up/Down: Move the cursor up/down on screen or increase/decrease a setting value
- Right/Left: Move the cursor or setting right/left on screen (Rotation)
- Menu: Menu display ↔ Measurement display

④ Ir: Long-time current setting, tr: Long-time tripping delay setting

⑤ Isd: Short-time current setting, tsd: Short-time tripping delay setting

⑥ Ii: Instantaneous current setting

⑦ Ig: Ground fault current setting, tg: Ground fault tripping delay setting

⑧ Test terminal: OCR test terminal (Connected with OCR tester)

⑨ Rating Plug: Rated current (I_n) and frequency selection

VCB

Vacuum Circuit Breakers

Vacuum Circuit Breaker, VCB is installed in the medium voltage distribution lines to protect life and load equipment. In case of accidents such as over current, short circuit and ground fault current, VCB works by interrupting the circuit through the inner Vacuum Interrupter which is acted by signal from the outside separate relay.

Suitable for use as the main circuit breaker to protect key installations in the places such as device industry, power plants, high-rise buildings, large ships.

- ▶ **Strengthening of the high interrupting capacity and large current models and full line-up new VCB models to high/middle/low.**
- ▶ **Main circuit structure with high reliability.**
 - Maximizing the durability and reliability of the main circuit contactors (Stego Tulip contactor).
 - Strong structure for the temperature rise (Natural cooling system).
- ▶ **Convenience of switchgear configuration and a variety of accessories.**
 - CB compartment structure: Metal isolation structures to prevent the accident spread and ensure safety. And the convenience of switchgear building is extended by its module style.
 - A variety of accessories: UVT, Locking Magnet, Plug Interlock, Key lock, Temperature Sensor, MOC, TOC, Earthing S/W.
 - Maximizing compatibility with existing products through the dualistic deployment of phases and compact models.

※ Type testing is complete for all models according to latest standard, IEC62271-100 (2012) [M2, E2 (List1 or 3), C2].





Susol VCB Family

Susol VCB series are premium-type products featuring main structure with high reliability application and a variety of accessories and ability to maximize to be suitable for use as the main circuit breaker to protect key installations in the places such as device industry, power plants, high-rise buildings, large ships



7.2kV (VL-06)

- Rated short-time (for withstand current): 3sec.
- Rated operating sequence: O-0.3s-CO-15s-CO
- Type test level: M2, E2 (List1), C2
- 100% Compatibility
 - with existing fixed type breakers
 - with existing drawout type breakers
- Various cradle: E, F and G type
- A variety of control power
 - DC 24~30V, DC 48~60V, DC 110V, DC 125V, DC 220V
 - AC 48V, AC 100~130V, AC 220~250V
- A variety of accessories
 - Charge switch, UVT, Secondary trip Coil, Current trip coil, Trip Latch Checking S/W, Position S/W
 - Key-lock, Button lock, Button cover, Padlock, UVT, Time Delay Controller, Lifting hook, CTD
- Anti Pumping Device
- TEST/SERVICE Automatic Position Indicator
- Standards and certification
 - IEC62271-100 (2012) [M2, C2, E2 (List1)]
 - Tested in enclosure
 - KERI type tested, V-check (KESCO) certification



Ur (kV)	Isc (kA)	Ir (A)
7.2	8	400
	12.5	630

Full line-up & Compact

Full line-up new VCB models to the high interrupting capacity and large current (~ 50kA, ~ 5000A) featuring maximization of compatibility with existing products through the dualistic deployment of phases and compact models

7.2/12/17.5/24/25.8/36kV (VL-06/12/17/20/25/36)

- Rated short-time (to withstand current): 3sec. 4sec*
- Rated operating sequence: O-0.3s-CO-15s-CO, (O-0.3s-CO-3min-CO**)
- Type test level: M2, E2 (List3), C2
- Compatibility with existing Pro-MEC breakers
- Various cradle: E, F, G and H type
- CB Compartment for MCSG available
- A variety of control power
 - DC 24~30V, DC 48~60V, DC 110V, DC 125V, DC 220V
 - AC 48V, AC 100~130V, AC 220~250V
- A variety of accessories
 - VCB part: Charge switch, UVT, Secondary trip coil, Latch checking switch, Position switch, Locking magnet, Plug interlock, Key lock, Button cover, Button padlock, Padlock (H type Door interlock), MOC
 - Cradle part: MOC (Mechanical Operated Cell switch), TOC (Truck Operated Cell switch), Temperature sensor, Earthing switch & accessories, Door, Door interlock, Door emergency button
 - Others: Racking in/out handle, UVT Time delay controller, CTD (Condensor Trip Device), Temperature module
- Anti Pumping Device
- TEST/SERVICE Automatic Position Indicator
- Standards and certification
 - IEC62271-100 (2012) [M2, C2, E2 (List3)]
 - KEMA, KERI type tested, V-check (KESCO) certification

Note) * Please contact us

** Please refer to the ratings.



Ur (kV)	Isc (kA)	Ir (A)
7.2	20	630
		1250
		2000
	25	630
		1250
		2000
12	31.5	630
		1250
		2000
	20	630
		1000
		1250
17.5	25	630
		1000
		1250
	31.5	630
		1250
		2000
24, 25.8	20	630
		1250
		2000
	25	630
		1250
		2000
36	31.5	630
		1250
		2000
	12.5	630
		1250
		2000

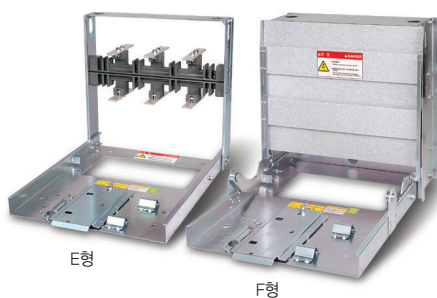
7.2/12/17.5/24/25.8/36kV (VH-06/12/17/20/25/36)

- Rated short-time (to withstand current): 3sec. 4sec*
- Rated operating sequence: O-0.3s-CO-3min-CO
- Type test level: M2, E2 (List3), C2
- Electrical and mechanical life: 20,000 operations
- Various cradle: K and H type
- CB Compartment for MCSG available
- A variety of control power
 - DC 48V, DC 110V, DC 125V, DC 220V
 - AC 48V, AC 110V, AC 220V
- A variety of accessories
 - VCB part: UVT, Secondary trip coil, Latch checking switch, Position switch, Locking magnet, Plug interlock, Key lock, Button cover, Button padlock, Padlock (H type Door interlock), MOC
 - Cradle part: MOC (Mechanical Operated Cell switch), TOC (Truck Operated Cell switch), Temperature sensor, Earthing switch & accessories, Door, Door interlock, Door emergency button
 - Others: Racking in/out handle, Lifting hook, UVT Time delay controller, CTD (Condensor Trip Device), Temperature module
- Anti Pumping Device
- Standards and certification
 - IEC62271-100 (2012) [M2, C2, E2 (List3)]
 - KEMA, KERI type tested, V-check (KESCO) certification

Note) * Please contact us



Ur (kV)	Isc (kA)	Ir (A)
7.2	31.5	1250
		2000
		3150
	40	1250
		2000
		3150
12	50	1250
		2000
		2500
	31.5	1250
		2000
		3150
17.5	31.5	1250
		2000
		3150
	40	1250
		2000
		3150
24, 25.8	25	1250
		2000
		3150
	31.5	1250
		2000
		3150
36	40	1250
		2000
		3150
	25	1250
		2000
		3150



E형

F형



H형

VCB Cradle type

Susol VCB

7.2/12/17.5/24/25.8/36kV (VL-06/12/17/20/25/36)

Ur [kV]	Isc [kA]	Ir[A]					VCB		CRADLE		Connector
		p=130	p=150	p=210	p=265	p=275	Type	Version	Type	Version	
7.2	8	400					VL-06□08A04	P,E,F,G	VCL-06□08A04	E,F,G	A
							VL-06□08B04	P,E,F,G	VCL-06□08B04	E,F,G	A
											A
	12.5	630					VL-06□13A06	P,E,F,G	VCL-06□13A06	E,F,G	A
							VL-06□13B06	P,E,F,G	VCL-06□13B06	E,F,G	A
											A
	20		630				VL-06□20A(K)06	P,E,F,G,H	VCL-06□20A(K)06	E,F,G,K,H	P,E,F,G,K:A/B, H:B
			1250				VL-06□20A(K)13	P,E,F,G,H	VCL-06□20A(K)13	E,F,G,K,H	P,E,F,G,K:A/B, H:B
			2000				VL-06□20A20	P,E,F,G,H	VCL-06□20A20	E,F,G,H	P,E,F,G:A/B, H:B
	25		630				VL-06□25A(K)06	P,E,F,G,K,H	VCL-06□25A06	E,F,G,K,H	P,E,F,G,K:A/B, H:B
			1250				VL-06□25A(K)13	P,E,F,G,K,H	VCL-06□25A13	E,F,G,K,H	P,E,F,G,K:A/B, H:B
			2000				VL-06□25A(K)20	P,E,F,G,K,H	VCL-06□25A20	E,F,G,K,H	P,E,F,G,K:A/B, H:B
12	31.5		630				VL-06□32A06	P,H	VCL-06H32A06	H	B
			1250				VL-06□32A(K)13	P,E,F,G,Gs,K,H	VCL-06□32A13	E,F,G,Gs,K,H	P,E,F,G,Gs,K:A/B, H:B
			2000				VL-06□32A(K)20	P,E,F,G,Gs,K,H	VCL-06□32A20	E,F,G,Gs,K,H	P,E,F,G,Gs,K:A/B, H:B
	20		630				VL-12□20A(K)06	P,K,H	VCL-12□20A06	K,H	K:A/B, H:B
			1250				VL-12□20A(K)13	P,K,H	VCL-12□20A13	K,H	K:A/B, H:B
			2000				VL-12H20A20	H	VCL-12H20A20	H	B
			630				VL-12□20B06	P,E,F,H	VCL-12□20B06	E,F,H	P,E,F:A/B, H:B
			1250				VL-12□20B13	P,E,F,H	VCL-12□20B13	E,F,H	P,E,F:A/B, H:B
			2000				VL-12□20B20	P,E,F,H	VCL-12□20B20	E,F,H	P,E,F:A/B, H:B
			630				VL-12□20F06	E,F	VCL-12□20F06	E,F	A/B
			1250				VL-12□20F13	E,F	VCL-12□20F13	E,F	A/B
	25		630				VL-12□25A(K)06	P,K,H	VCL-12□25A06	K,H	K:A/B, H:B
			1250				VL-12□25A(K)13	P,K,H	VCL-12□25A13	K,H	K:A/B, H:B
			2000				VL-12□25A(K)20	K,H	VCL-12□25A20	K,H	K:A/B, H:B
			630				VL-12□25B06	P,E,F,H	VCL-12□25B06	E,F,H	P,E,F:A/B, H:B
			1250				VL-12□25B13	P,E,F,H	VCL-12□25B13	E,F,H	P,E,F:A/B, H:B
			2000				VL-12□25B20	P,E,F,H	VCL-12□25B20	E,F,H	P,E,F:A/B, H:B
			630				VL-12□25F06	E,F	VCL-12□25F06	E,F	A/B
			1250				VL-12□25F13	E,F	VCL-12□25F13	E,F	A/B
	31.5		630				VL-12□32A06	P,H	VCL-12H32A06	H	B
			1250				VL-12□32A(K)13	P,Gs,K,H	VCL-12□32A13	Gs,K,H	Gs,K:A/B, H:B
			2000				VL-12□32A(K)20	Gs,K,H	VCL-12□32A20	Gs,K,H	Gs,K:A/B, H:B
			630				VL-12□32B06	P,H	VCL-12H32B06	H	B
			1250				VL-12□32B13	P,H	VCL-12H32B13	H	B
			2000				VL-12□32B20	P,H	VCL-12H32B20	H	B
			2500				VL-12□32B25	P,H	VCL-12H32B25	H	B
					2500		VL-12□32D25	P,H	VCL-12H32D25	H	B
	20		630				VL-17H20A06	H	VCL-17H20A06	H	B
			1250				VL-17H20A13	H	VCL-17H20A13	H	B
			2000				VL-17H20A20	H	VCL-17H20A20	H	B
			630				VL-17□20B06	P,E,F,H	VCL-17□20B06	E,F,H	P,E,F:A/B, H:B
			1250				VL-17□20B13	P,E,F,H	VCL-17□20B13	E,F,H	P,E,F:A/B, H:B
			2000				VL-17□20B20	P,E,F,H	VCL-17□20B20	E,F,H	P,E,F:A/B, H:B
			630				VL-17□20F06	E,F	VCL-17□20F06	E,F	A/B
			1250				VL-17□20F13	E,F	VCL-17□20F13	E,F	A/B
17.5	25		630				VL-17H25A06	H	VCL-17H25A06	H	B
			1250				VL-17H25A13	H	VCL-17H25A13	H	B
			2000				VL-17H25A20	H	VCL-17H25A20	H	B
			630				VL-17□25B06	P,E,F,H	VCL-17□25B06	E,F,H	P,E,F:A/B, H:B
			1250				VL-17□25B13	P,E,F,H	VCL-17□25B13	E,F,H	P,E,F:A/B, H:B
			2000				VL-17□25B20	P,E,F,H	VCL-17□25B20	E,F,H	P,E,F:A/B, H:B
			630				VL-17□25F06	E,F	VCL-17□25F06	E,F	A/B
			1250				VL-17□25F13	E,F	VCL-17□25F13	E,F	A/B
	31.5		630				VL-17□32A06	P,H	VCL-17H32A06	H	B
			1250				VL-17□32A13	P,H	VCL-17H32A13	H	B
			2000				VL-17□32A20	H	VCL-17H32A20	H	B
			630				VL-17□32B06	P,H	VCL-17H32B06	H	B
			1250				VL-17□32B13	P,H	VCL-17H32B13	H	B
			2000				VL-17□32B20	P,H	VCL-17H32B20	H	B
			2500				VL-17□32B25	P,H	VCL-17H32B25	H	B
					2500		VL-17□32D25	P,H	VCL-17H32D25	H	B

Ur [kV]	Isc [kA]	Ir[A]					VCB		CRADLE		Connector
		p=130	p=150	p=210	p=265	p=275	Type	Version	Type	Version	
24	12.5			630			VL-20□13B06	K,H	VCL-20□13B06	K,H	K:A/B, H:B
				1250			VL-20□13B13	K,H	VCL-20□13B13	K,H	K:A/B, H:B
					630		VL-20□13F06	P,E,F,G,K	VCL-20□13F06	E,F,G,K	A/B
					630		VL-20□13G06	E,F	VCL-20□13G06	E,F	A/B
					1250		VL-20□13F13	P,E,F,G,K	VCL-20□13F13	E,F,G,K	A/B
					1250		VL-20□13G13	E,F	VCL-20□13G13	E,F	A/B
						630	VL-20H13D06	H	VCL-20H13D06	H	B
						1250	VL-20H13D13	H	VCL-20H13D13	H	B
				630			VL-20□16B06	K,H	VCL-20□16B06	K,H	K:A/B, H:B
				1250			VL-20□16B13	K,H	VCL-20□16B13	K,H	K:A/B, H:B
	16				630		VL-20□16F06	P,E,F,G,K	VCL-20□16F06	E,F,G,K	A/B
					630		VL-20□16G06	E,F	VCL-20□16G06	E,F	A/B
					1250		VL-20□16F13	P,E,F,G,K	VCL-20□16F13	E,F,G,K	A/B
					1250		VL-20□16G13	E,F	VCL-20□16G13	E,F	A/B
						630	VL-20H16D06	H	VCL-20H16D06	H	B
						1250	VL-20H16D13	H	VCL-20H16D13	H	B
				630			VL-20□25B06	K,H	VCL-20□25B06	K,H	K:A/B, H:B
				1250			VL-20□25B13	K,H	VCL-20□25B13	K,H	K:A/B, H:B
	25			2000			VL-20H25B20	H	VCL-20H25B20	H	B
					630		VL-20□25F06	P,E,F,G,K	VCL-20□25F06	E,F,G,K	A/B
					630		VL-20□25G06	E,F	VCL-20□25G06	E,F	A/B
					1250		VL-20□25F13	P,E,F,G,K	VCL-20□25F13	E,F,G,K	A/B
					1250		VL-20□25G13	E,F	VCL-20□25G13	E,F	A/B
					2000		VL-20□25F20	P,E,F,K	VCL-20□25F20	E,F,K	A/B
					2000		VL-20□25G20	E,F	VCL-20□25G20	E,F	A/B
						630	VL-20H25D06	H	VCL-20H25D06	H	B
						1250	VL-20H25D13	H	VCL-20H25D13	H	B
						2000	VL-20H25D20	H	VCL-20H25D20	H	B
						2500	VL-20H25D25	H	VCL-20H25D25-AS	H	B
	12.5			630			VL-25□13B06	K,H	VCL-25□13B06	K,H	K:A/B, H:B
				1250			VL-25□13B13	K,H	VCL-25□13B13	K,H	K:A/B, H:B
					630		VL-25□13F06	P,E,F,G,K	VCL-25□13F06	E,F,G,K	A/B
					630		VL-25□13G06	E,F	VCL-25□13G06	E,F	A/B
					1250		VL-25□13F13	P,E,F,G,K	VCL-25□13F13	E,F,G,K	A/B
					1250		VL-25□13G13	E,F	VCL-25□13G13	E,F	A/B
						630	VL-25H13D06	H	VCL-25H13D06	H	B
						1250	VL-25H13D13	H	VCL-25H13D13	H	B
				630			VL-25□16B06	K,H	VCL-25□16B06	K,H	K:A/B, H:B
				1250			VL-25□16B13	K,H	VCL-25□16B13	K,H	K:A/B, H:B
25.8	16				630		VL-25□16F06	P,E,F,G,K	VCL-25□16F06	E,F,G,K	A/B
					630		VL-25□16G06	E,F	VCL-25□16G06	E,F	A/B
					1250		VL-25□16F13	P,E,F,G,K	VCL-25□16F13	E,F,G,K	A/B
					1250		VL-25□16G13	E,F	VCL-25□16G13	E,F	A/B
						630	VL-25H16D06	H	VCL-25H16D06	H	B
						1250	VL-25H16D13	H	VCL-25H16D13	H	B
				630			VL-25□25B06	K,H	VCL-25□25B06	K,H	K:A/B, H:B
				1250			VL-25□25B13	K,H	VCL-25□25B13	K,H	K:A/B, H:B
	25			2000			VL-25H25B20	H	VCL-25H25B20	H	B
					630		VL-25□25F06	P,E,F,G,K	VCL-25□25F06	E,F,G,K	A/B
					630		VL-25□25G06	E,F	VCL-25□25G06	E,F	A/B
					1250		VL-25□25F13	P,E,F,G,K	VCL-25□25F13	E,F,G,K	A/B
					1250		VL-25□25G13	E,F	VCL-25□25G13	E,F	A/B
					2000		VL-25□25F20	P,E,F,K	VCL-25□25F20	E,F,K	A/B
					2000		VL-25□25G20	E,F	VCL-25□25G20	E,F	A/B
						630	VL-25H25D06	H	VCL-25H25D06	H	B
						1250	VL-25H25D13	H	VCL-25H25D13	H	B
						2000	VL-25H25D20	H	VCL-25H25D20	H	B
						2500	VL-25H25D25	H	VCL-25H25D25-AS	H	B
	12.5				630		VL-25□13B06	K,H	VCL-25□13B06	K,H	K:A/B, H:B
					1250		VL-25□13B13	K,H	VCL-25□13B13	K,H	K:A/B, H:B
					630		VL-25□13F06	P,E,F,G,K	VCL-25□13F06	E,F,G,K	A/B
					630		VL-25□13G06	E,F	VCL-25□13G06	E,F	A/B
					1250		VL-25□13F13	P,E,F,G,K	VCL-25□13F13	E,F,G,K	A/B
36	25				1250		VL-25□13G13	E,F	VCL-25□13G13	E,F	A/B
						630	VL-25H13D06	H	VCL-25H13D06	H	B
						1250	VL-25H13D13	H	VCL-25H13D13	H	B
						2000	VL-25H16D06	H	VCL-25H16D06	H	B
						2500	VL-25H16D13	H	VCL-25H16D13	H	B

Note) 1. Ur = Rated voltage
 2. Isc = Rated short-circuit current
 3. Ir = Rated normal current
 4. p = Phase distance
 5. E,F and G types are cradles for MESG(Metal Enclosed Switchgear) and H type for MCSG(Metal Clad Switchgear)
 6. For the partial replacement of 7.2kV 8/12.5kA VCB, in case of using the existing old type cradle and replacing breaker only, please order type B (Compatible with existing breaker). Compatible busbars are required for fixed version.
 To replace VCB fully(breaker and cradle) please order type A for breaker and compatible cradle B.

Susol VCB

7.2/12/17.5/24/25.8/36kV (VH-06/12/17/20/25/36)

Ur [kV]	Isc [kA]	Ir[A]					VCB		CRADLE		Connector
		p=150	p=210	p=254	p=275	p=320	Type	Version	Type	Version	
7.2	31.5	1250					VH-06□32A13	P,E,F,G	VCH-06□32A13	E,F,G	A/B
							LVB-06□-32L/12	P,E,F,G,G/T	LCL-06□-32D/12	E,F,G,G/T	
		2000					VH-06□32A20	P,E,F,G	VCH-06□32A20	E,F,G	A/B
							LVB-06□-32L/20	P,E,F,G,G/T	LCL-06□-32D/20	E,F,G,G/T	
			3150				VH-06□32B32	P,E,F,Fs,K,H	VCH-06□32B32	E,F,K,H	P,E,F,K: A/B,H:B
							LVB-06□-32L/30	P,E,F,G/T	LCL-06□-32D/30	E,F,G,G/T	
	40	1250	1250				VH-06□40A13	P,E,F,Fs,G,Gs,K,H	VCH-06□40A13	E,F,Fs,G,Gs,K,H	P,E,F,Fs,G,Gs, K:A/B,H:B
							LVB-06□-40L/12	P,E,F,G,G/T	LCL-06□-40D/12	E,F,G,G/T	
		2000	2000				VH-06□40A20	P,E,F,Fs,G,Gs,K,H	VCH-06□40A20	E,F,Fs,G,Gs,K,H	P,E,F,Fs,G,Gs, K:A/B,H:B
							LVB-06□-40L/20	P,E,F,G,G/T	LCL-06□-40D/20	E,F,G,G/T	
			1250				VH-06□40B13	K,H	VCH-06□40B13	K,H	B
			2000				VH-06□40B20	K,H	VCH-06□40B20	K,H	B
							VH-06□40B32	P,E,F,Fs,Gs,K,H	VCH-06□40B32	E,F,Fs,Gs,K,H	P,E,F,K:A/B, Fs,Gs,H:B
			3150				LVB-06□-40L/30	P,E,F,G/T	LCL-06□-40D/30	E,F,G,G/T	
					3150		VH-06□40D32	K,H	VCH-06□40D32	K,H	K:A/B, H:B
					4000		VH-06□40D40	P,K,H	VCH-06□40D40	K,Ha,Hb	B
						5000	VH-06H40L50	H	VCH-06Ha40L50	Ha	B
	50		1250				VH-06□50B13	P,H	VCH-06H50B13	H	B
			2000				VH-06□50B20	P,H	VCH-06H50B20	H	B
					2500		VH-06□50D25	P,H	VCH-06H50D25	H	B
					3150		VH-06□50D32	P,H	VCH-06H50D32	H	B
					4000		VH-06□50D40	P,K,H	VCH-06□50D40	K,Ha,Hb	B
						5000	VH-06H50L50	H	VCH-06Ha50L50	Ha	B
	12	1250	1250				LVB-12G-32L/12-T2	G/T	LCL-12G-32D/12-T2	G/T	A/B
		2000					LVB-12G-32L/20-T2	G/T	LCL-12G-32D/20-T2	G/T	Gs,A/B, H:B
			3150				VH-12□32B32	K,H	VCH-12□32B32	K,H	A/B
							LVB-12G-32L/30-T2	G/T	LCL-12G-32D/30-T2	G/T	A/B
		1250	1250				VH-12□40A(K)13	Gs,K,H	VCH-12□40A(K)13	Gs,K,H	Gs,A/B, H:B
							LVB-12G-40L/12-T2	G/T	LCL-12G-40D/12-T2	G/T	A/B
		2000	2000				VH-12□40A(K)20	Gs,K,H	VCH-12□40A(K)20	Gs,K,H	K:A/B, Gs, H:B
							LVB-12G-40L/20-T2	G/T	LCL-12G-40D/20-T2	G/T	A/B
			1250				VH-12□40B13	K,H	VCH-12□40B13	K,H	B
			2000				VH-12□40B20	K,H	VCH-12□40B20	K,H	B
							VH-12□40B32	Gs,K,H	VCH-12□40B32	Gs,K,H	K:A/B, Gs,H:B
			3150				LVB-12G-40L/30-T2	G/T	LCL-12G-40D/30-T2	G/T	A/B
					3150		VH-12H40D32	H	VCH-12H40D32	H	B
					4000		VH-12□40D40	P,K,H	VCH-12□40D40	K,Ha,Hb	B
						5000	VH-12H40L50	H	VCH-12Ha40L50	Ha	B
			1250				VH-12□50B13	P,H	VCH-12H50B13	H	B
			2000				VH-12□50B20	P,H	VCH-12H50B20	H	B
					2500		VH-12□50D25	P,H	VCH-12H50D25	H	B
					3150		VH-12□50D32	P,H	VCH-12H50D32	H	B
					4000		VH-12□50D40	P,K,H	VCH-12□50D40	K,Ha,Hb	B
						5000	VH-12H50L50	H	VCH-12Ha50L50	Ha	B
17.5	31.5		3150				VH-17H32B32	H	VCH-17H32B32	H	B
					3150		VH-17H32D32	H	VCH-17H32D32	H	B
	40		1250				VH-17□40B13	K,H	VCH-17□40B13	K,H	K:A/B, H:B
			2000				VH-17□40B20	K,H	VCH-17□40B20	K,H	K:A/B, H:B
			3150				VH-17H40B32	H	VCH-17H40B32	H	B
					3150		VH-17K40C32	K	VCH-17K40C32	K	A/B
					3150		VH-17H40D32	H	VCH-17H40D32	H	B
					4000		VH-17□40D40	P,K,H	VCH-17□40D40	Ha,Hb	B

Ur [kV]	Isc [kA]	Ir[A]				VCB		CRADLE		Connector
		p=150	p=210	p=275	p=300	Type	Version	Type	Version	
17.5	50		1250			VH-17□50B13	P,H	VCH-17H50B13	H	B
			2000			VH-17□50B20	P,H	VCH-17H50B20	H	B
				2500		VH-17□50D25	P,H	VCH-17H50D25	H	B
				3150		VH-17□50D32	P,H	VCH-17H50D32	H	B
				4000		VH-17□50D40	P,H	VCH-17□50D40	Ha,Hb	B
24	25			2500		VH-20□25D25	P,H	VCH-20H25D25	H	B
	31.5		1250			VH-20□32B13	P,H	VCH-20H32B13	H	B
								VCH-20H32F13	H	B
			2000			VH-20□32B20	P,H	VCH-20H32B20	H	B
								VCH-20H32F20	H	B
				1250		VH-20□32D13	P,H	VCH-20H32D13	H	B
				2000		VH-20□32D20	P,H	VCH-20H32D20	H	B
				3150		VH-20□32D32	P,H	VCH-20H32D32	H	B
	40		1250			VH-20□40B13	P,H	VCH-20H40B13	H	B
								VCH-20H40F13	H	B
			2000			VH-20□40B20	P,H	VCH-20H40B20	H	B
								VCH-20H40F20	H	B
				1250		VH-20□40D13	P,H	VCH-20H40D13	H	B
				2000		VH-20□40D20	P,H	VCH-20H40D20	H	B
				3150		VH-20□40D32	P,H	VCH-20H40D32	H	B
25.8	25			2500		VH-25□25D25	P,H	VCH-25H25D25	H	B
	31.5		1250			VH-25□32B13	P,H	VCH-25H32B13	H	B
								VCH-25H32F13	H	B
			2000			VH-25□32B20	P,H	VCH-25H32B20	H	B
								VCH-25H32F20	H	B
				1250		VH-25□32D13	P,H	VCH-25H32D13	H	B
				2000		VH-25□32D20	P,H	VCH-25H32D20	H	B
				3150		VH-25□32D32	P,H	VCH-25H32D32	H	B
	40		1250			VH-25□40B13	P,H	VCH-25H40B13	H	B
								VCH-25H40F13	H	B
			2000			VH-25□40B20	P,H	VCH-25H40B20	H	B
								VCH-25H40F20	H	B
				1250		VH-25□40D13	P,H	VCH-25H40D13	H	B
				2000		VH-25□40D20	P,H	VCH-25H40D20	H	B
				3150		VH-25□40D32	P,H	VCH-25H40D32	H	B
27	25				1200	VH-27□25E12	P,H	VCH-27H25E12	H	B
					2000	VH-27□25E20	P,H	VCH-27H25E20	H	B
36	25				1250	VH-36□25E13	P,H	VCH-36H25E13	H	B
					2000	VH-36□25E20	P,H	VCH-36H25E20	H	B
					3150	VH-36□25E32	P,H	VCH-36H25E32	H	B
	31.5				1250	VH-36□32E13	P,H	VCH-36H32E13	H	B
					2000	VH-36□32E20	P,H	VCH-36H32E20	H	B
					3150	VH-36□32E32	P,H	VCH-36H32E32	H	B
	40				1250	VH-36□40E13	P,H	VCH-36H40E13	H	B
					2000	VH-36□40E20	P,H	VCH-36H40E20	H	B
					3150	VH-36□40E32	P,H	VCH-36H40E32	H	B

Note) 1. Ur = Rated voltage

2. Isc = Rated short-circuit current

3. Ir = Rated normal current

4. p = Phase distance

5. H type is MCSG style drawables type with a box type cradle for CB compartment construction.

6. G/T types are MCSG style drawables types with a cradle for building in the switchgear, not a box type. (K of VCL type name indicates 4000A)

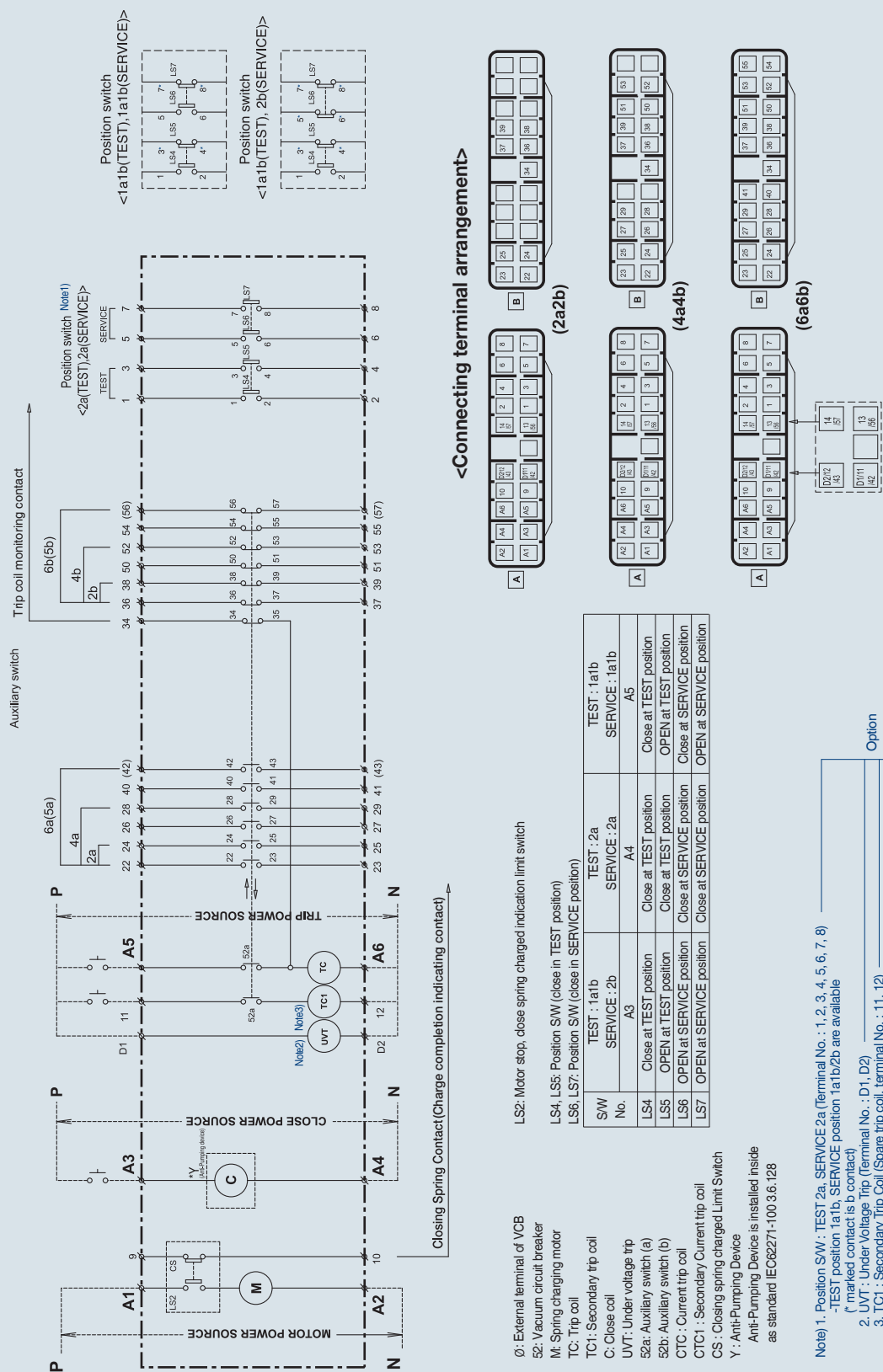
Example of G/T type : LVB-06G-32L/12-T2, LCL-06G-32D/12-T2

7. G/T types use LVB and LCL names.

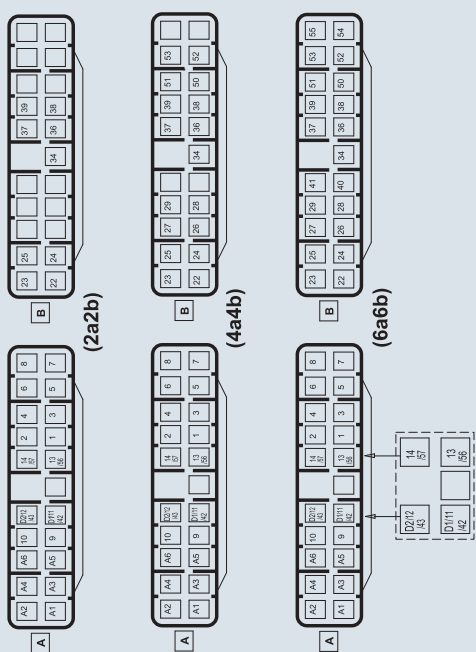
8. E, F and G types provide cradles for MESG(Metal Enclosed Switchgear) and H, G/T types for MCSG(Metal Clad Switchgear).

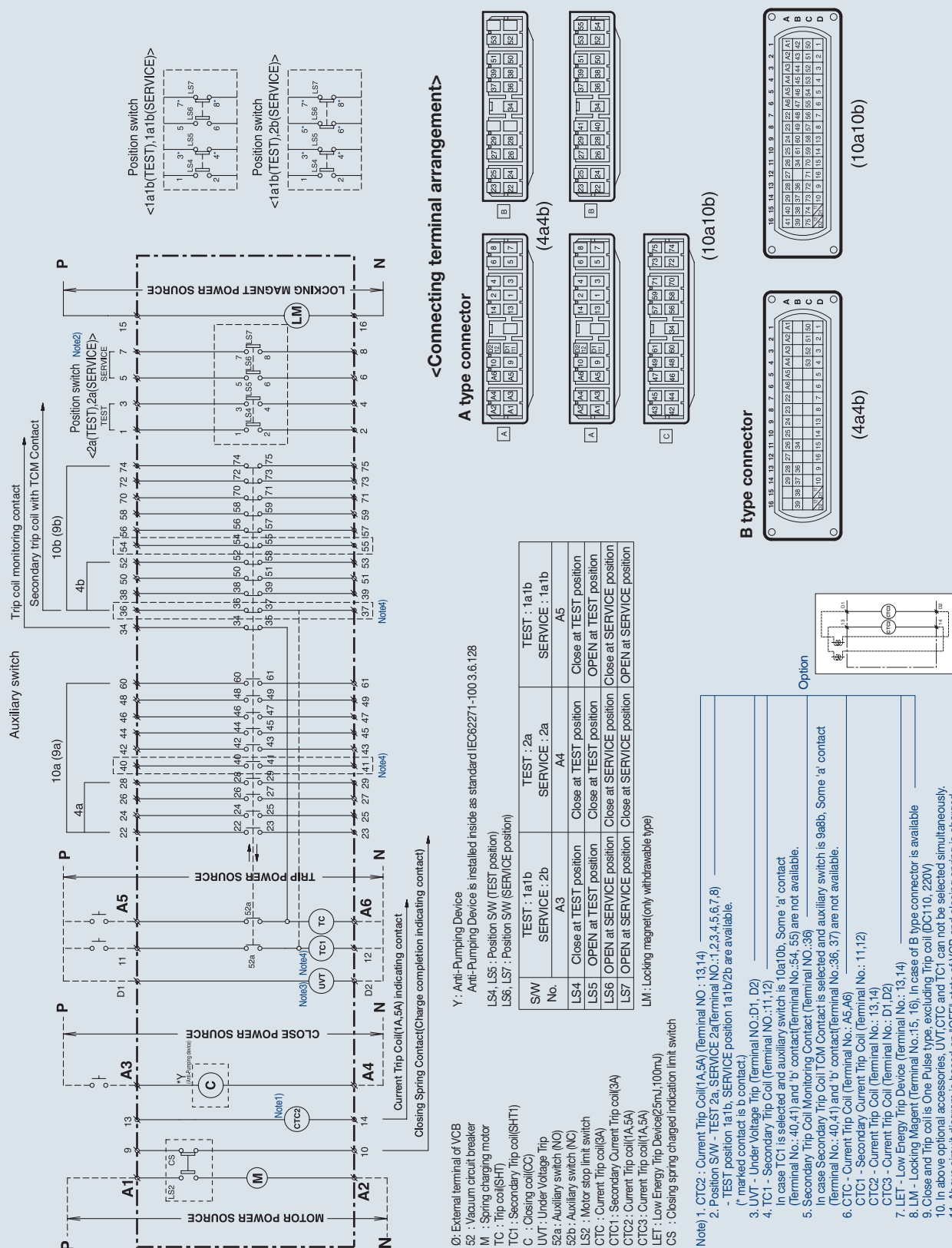
9. In case of 7.2/12kV, 31.5kA/40kA H type: Please contact us.

Control circuit diagram (VL-06)



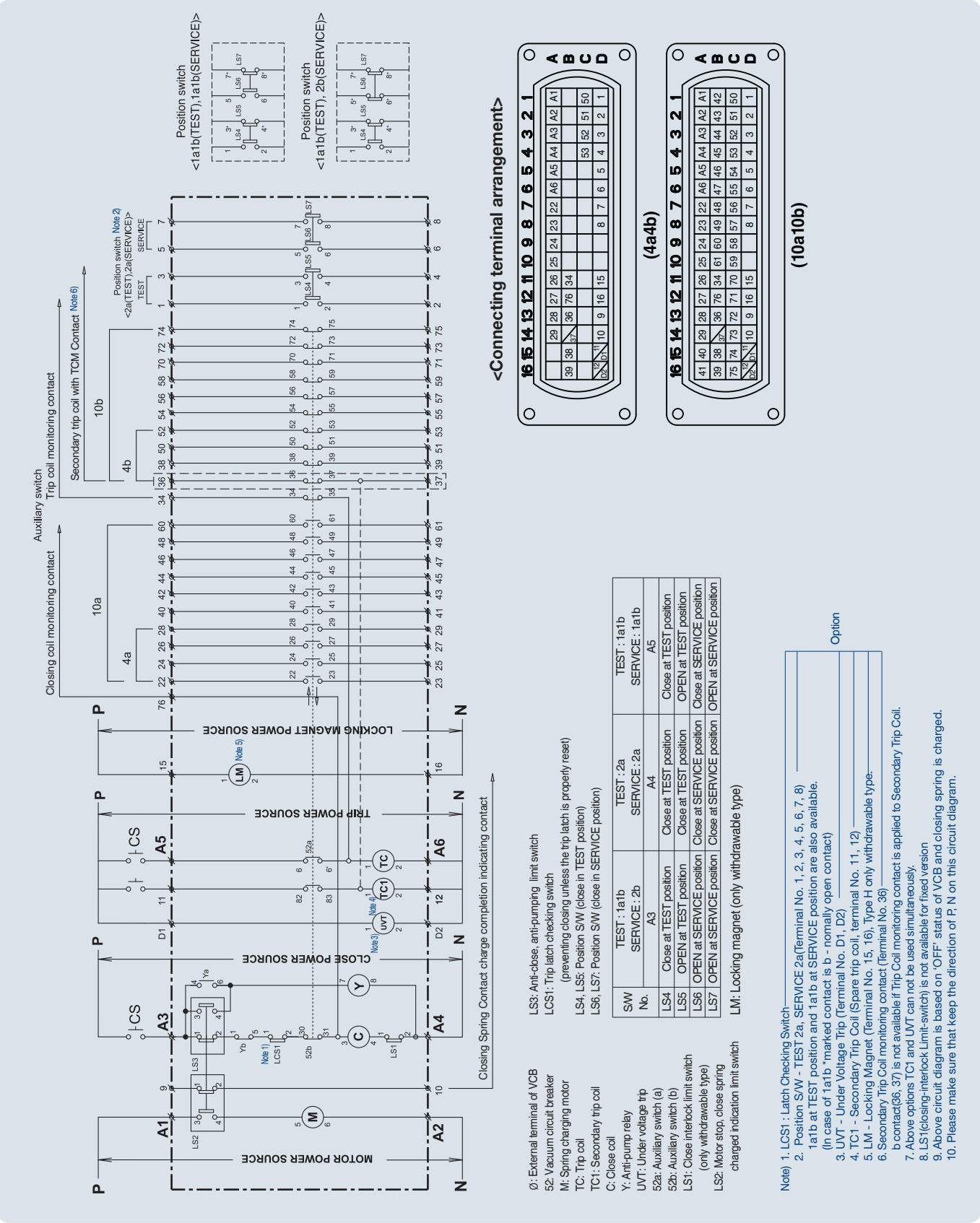
<Connecting terminal arrangement>

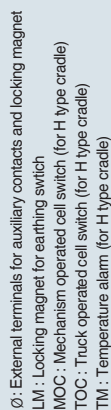




Anti-pumping device Y supply anti-pumping function to VCB as below. It is composed with circuit in close coil and mechanism. Anti-pumping device X becomes permanently energized, the circuit breaker remains in the open position after it has been opened, either by manual or electrical operation. The circuit breaker can be closed only if the closing coil(C) is momentarily de-energized.

Control circuit diagram (VH-06/12/17/20/25/36)





Note) 1. LM - If it is energized with the rated power the earthing switch can be closed or opened (for H type cradle)
2. MOC - This auxiliary switch is used to indicate the Close/Open of VCB (for H type cradle)
3. TOC - This auxiliary switch is used to indicate the 'SERVICE' position of VCB (for H type cradle)
4. TM - Temperature Alarm Unit displays the input temperature detected through the temperature sensor installed in H-type cradle. Temperature sensor can be installed in each phase and can be connected with the temperature module.
5. Please make sure that keep the direction of P, N on this circuit diagram.

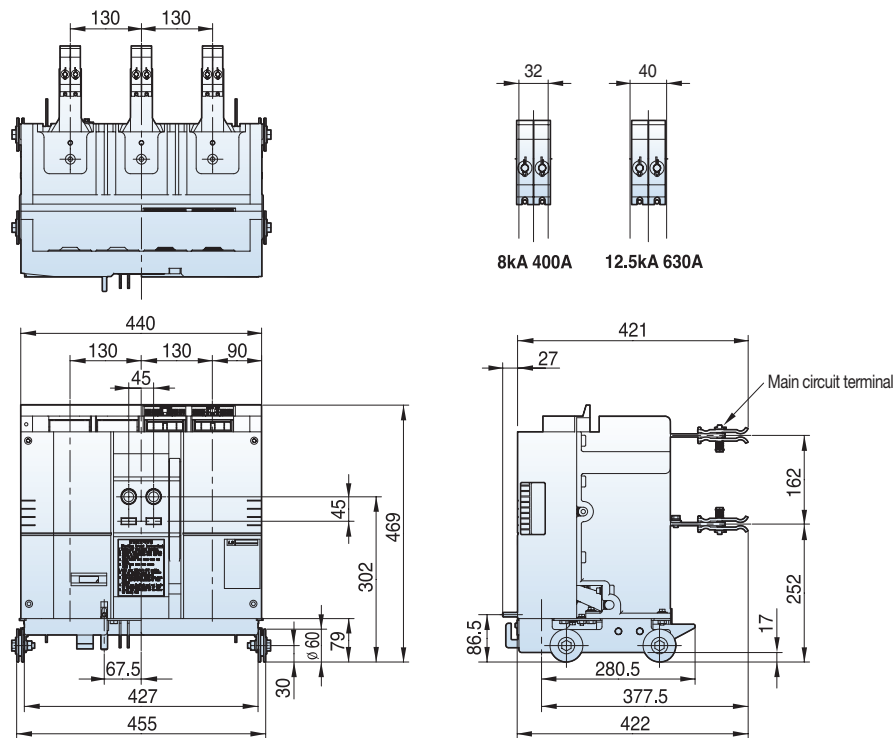
* Above circuit diagram is based on the status that the earthing SW is Open and the breaker is at Test or between Test and Service position. MOC indicates the Open of the breaker. If the breaker is Closed from Service, the contacts configuration is displayed on the contrary.

Susol VCB

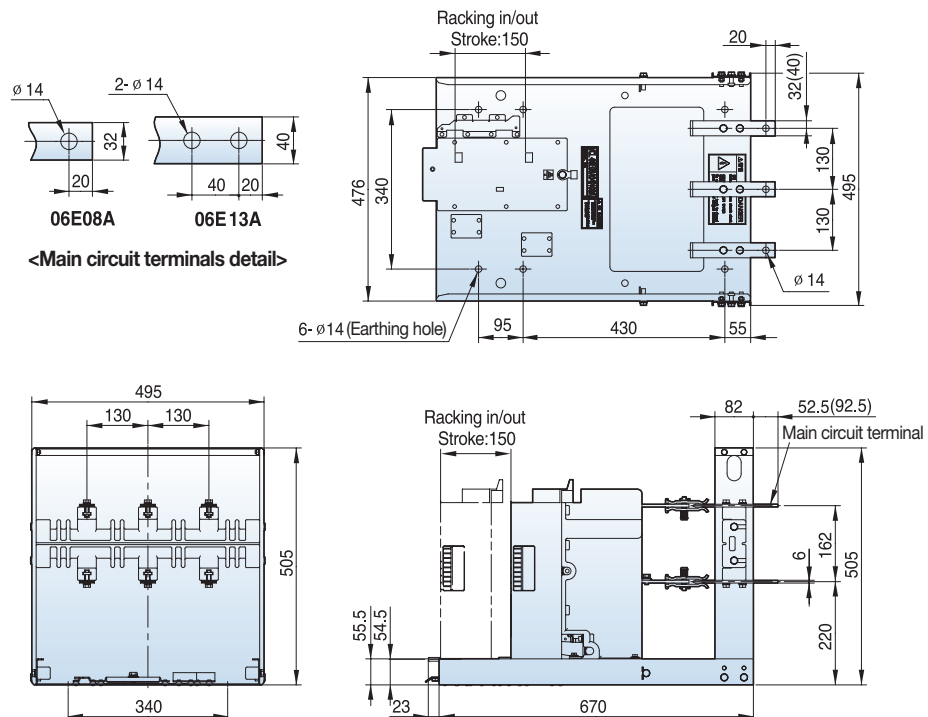
VL-06 Dimensions

7.2kV, 8/12.5kA, 400/630A

Withdrawable (Compatible with existing breaker E/F/G type, phase distance 130mm)

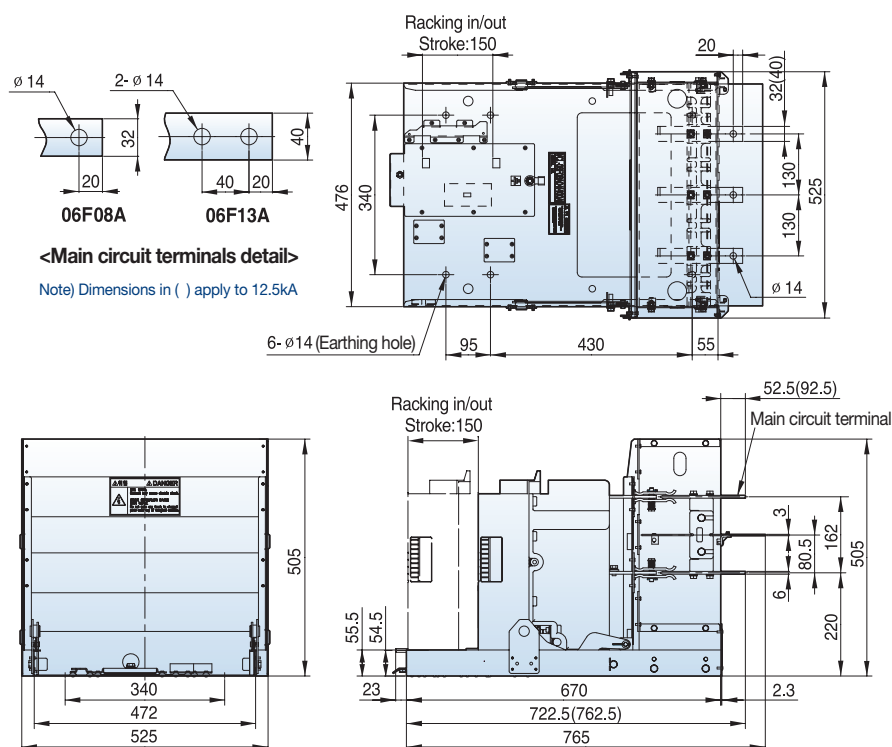


Withdrawable (E type cradle, phase distance 130mm)

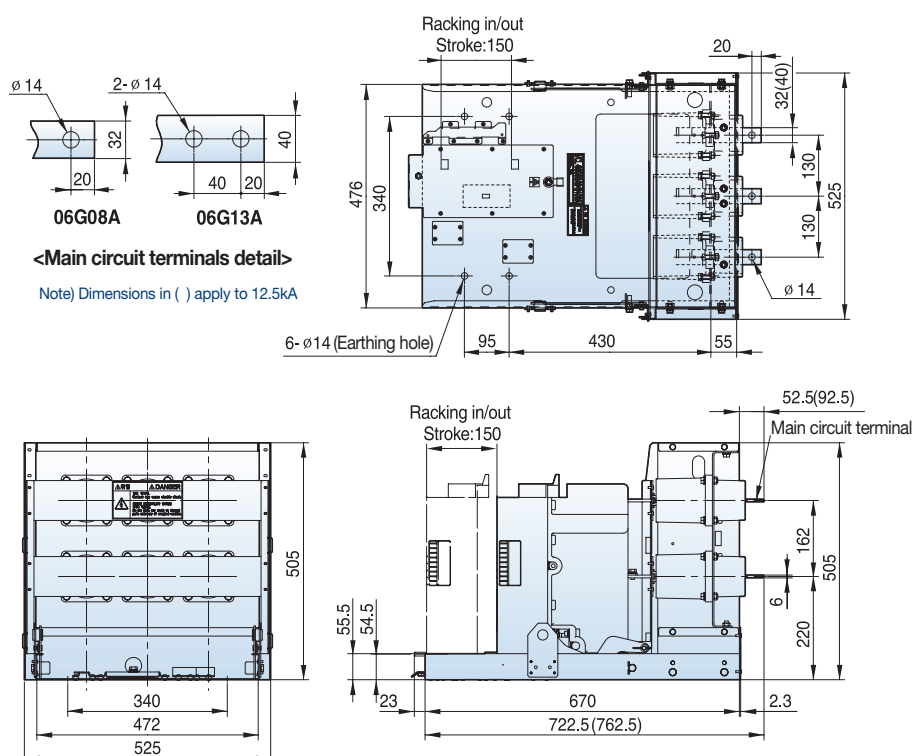


7.2kV, 8/12.5kA, 400/630A

Withdrawable (F type cradle, phase distance 130mm)



Withdrawable (G type cradle, phase distance 130mm)

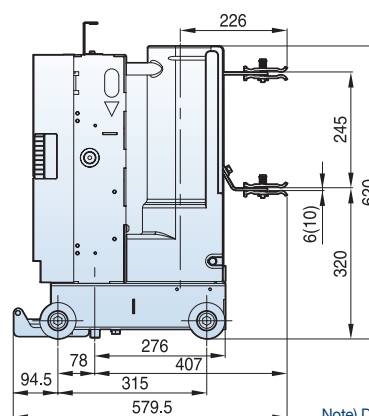
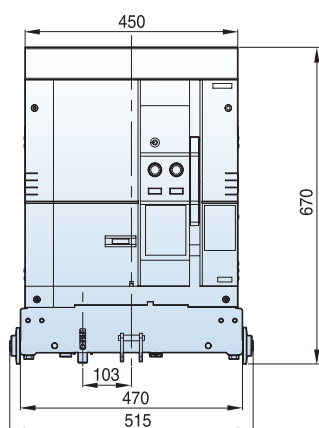
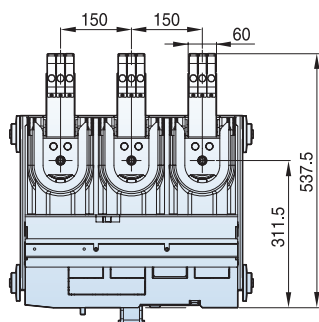


Susol VCB

VL-
06/12/17/20/25/36
Dimensions

7.2kV, 20/25kA, 630/1250A

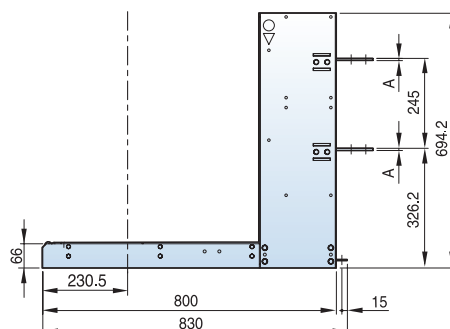
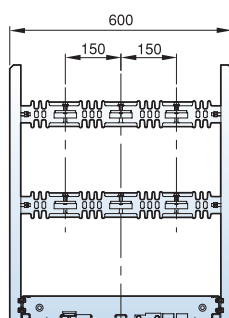
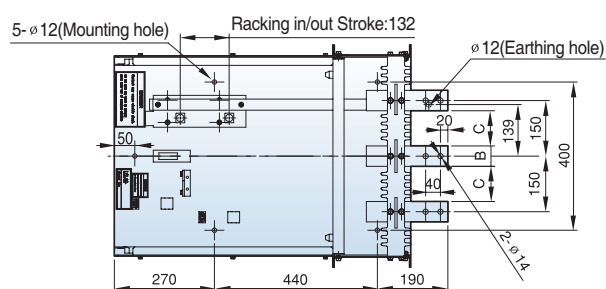
Withdrawable (E type unit, phase distance 150mm)



Note) Dimensions in () apply to 1250A

Withdrawable (E type cradle, phase distance 150mm)

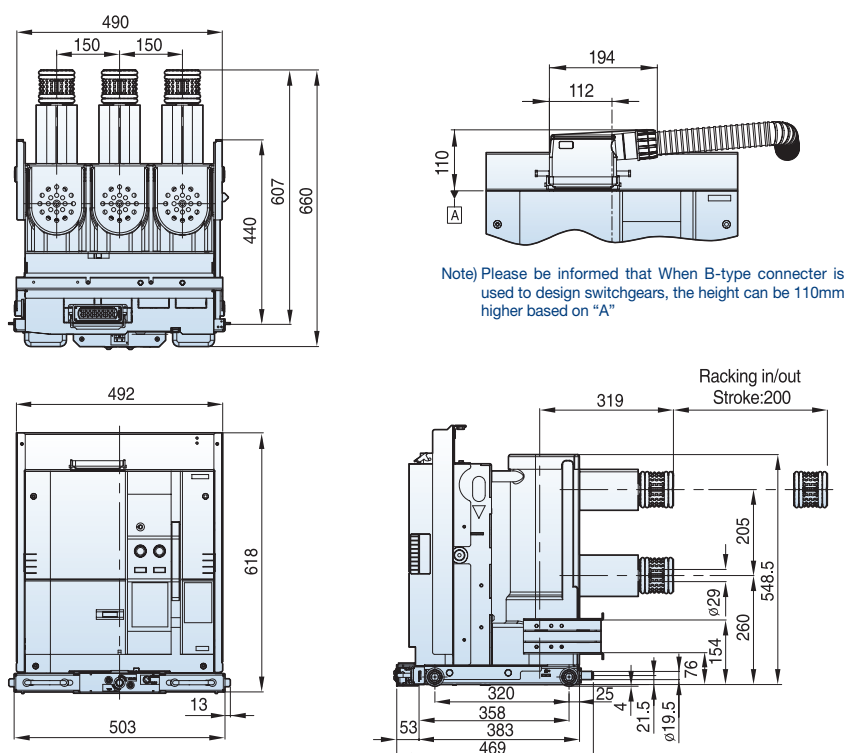
Rating	630A	1250A
A	6	10
B	55	60
C	95	90



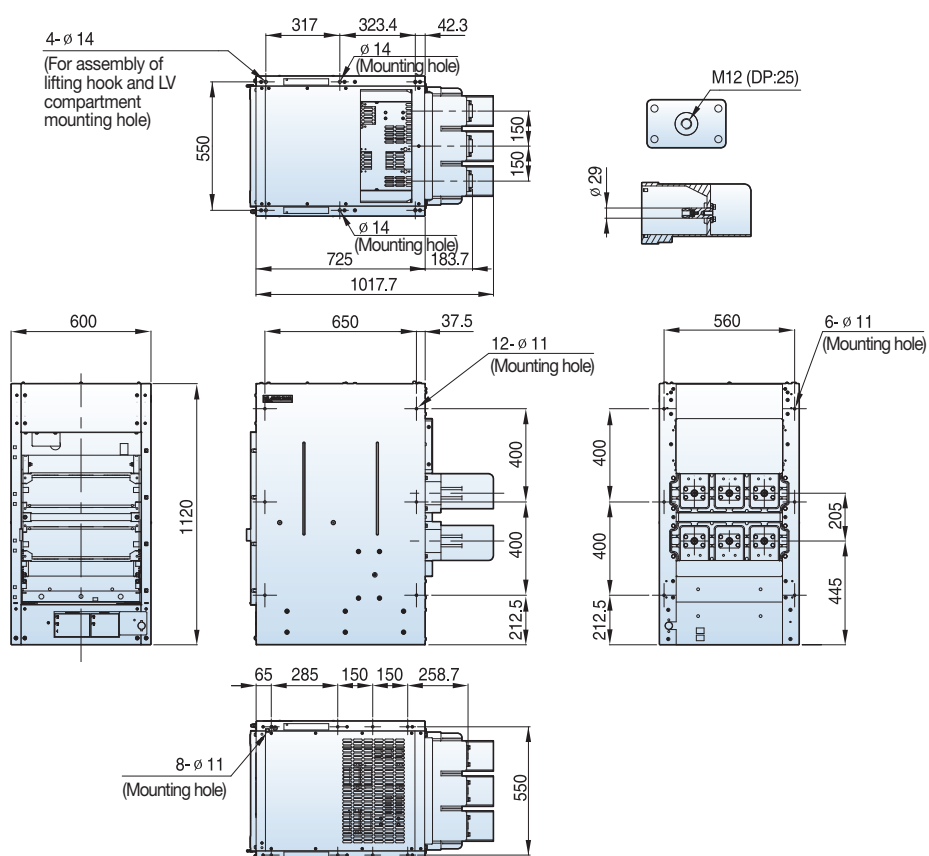
* Please be informed that the switchgear IP cover has to be back of — — — mark.

7.2kV, 20/25kA, 630/1250A

Withdrawable (H type unit, phase distance 150mm)



Withdrawable (H type cradle, phase distance 150mm)

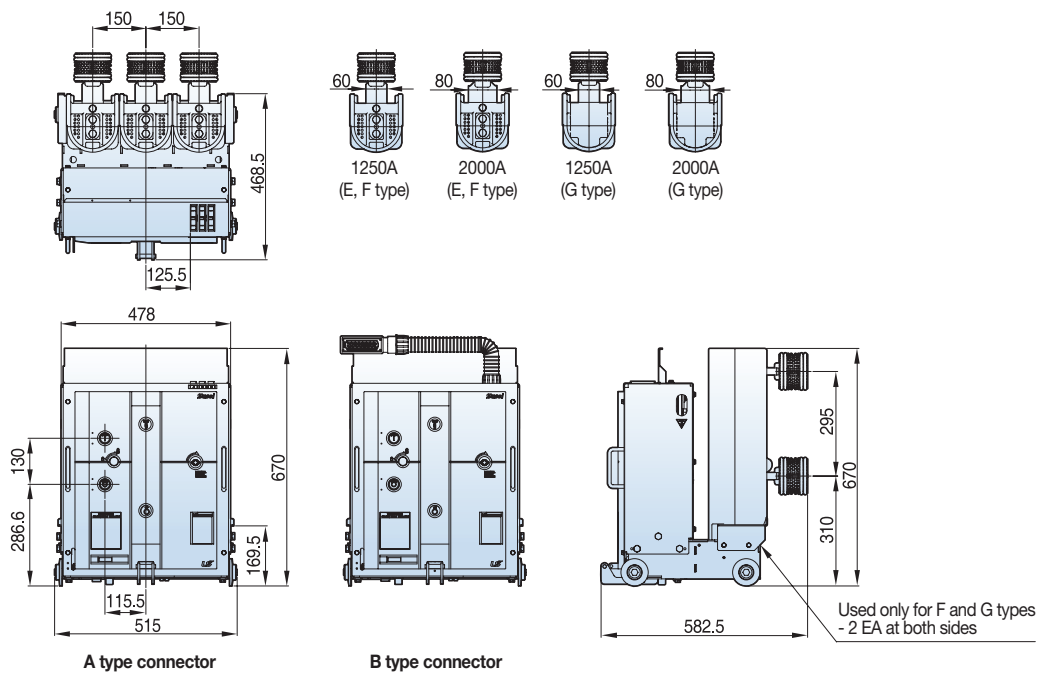


Susol VCB

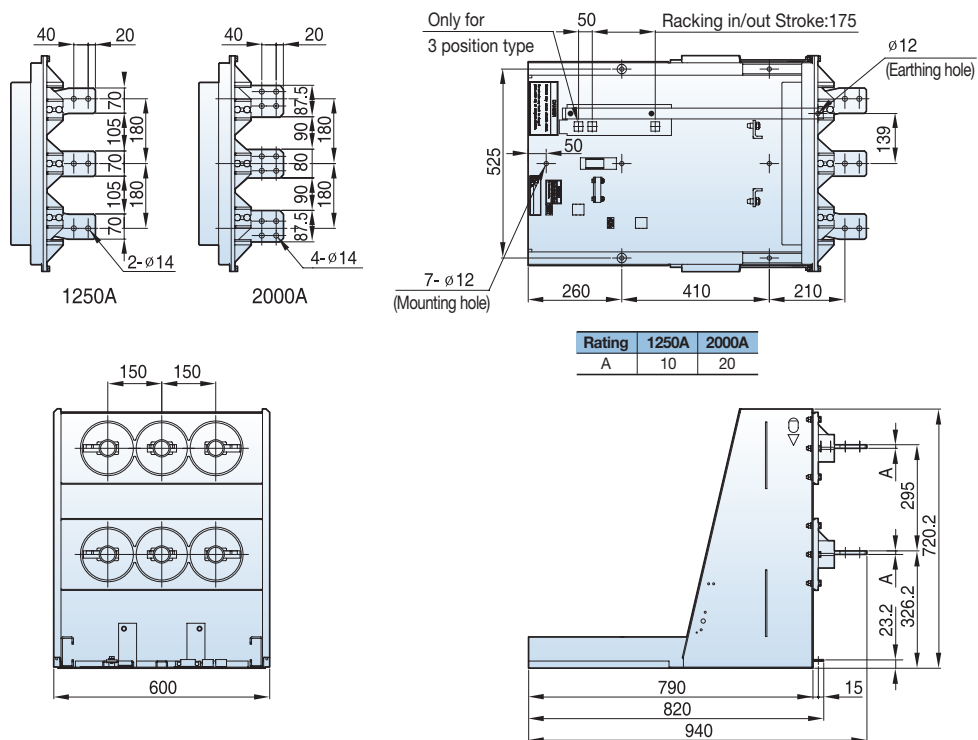
VH-
06/12/17/20/25/36
Dimensions

7.2kV, 31.5/40kA, 1250/2000A

Withdrawable (E, F G type unit, phase distance 150mm)

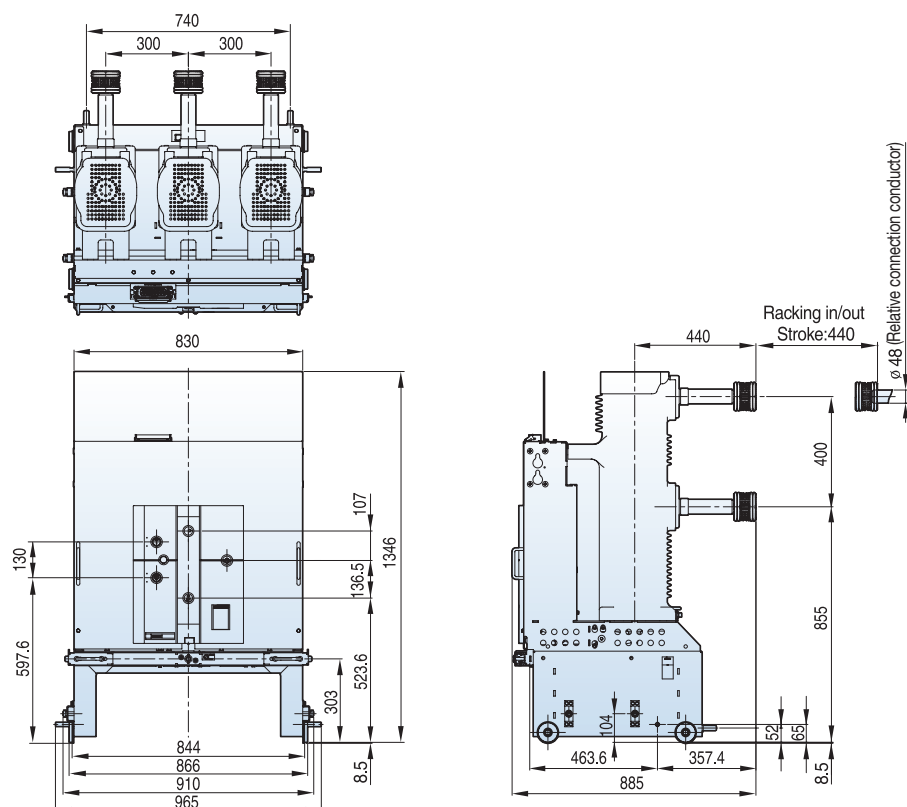


Withdrawable (E type cradle, phase distance 150mm)

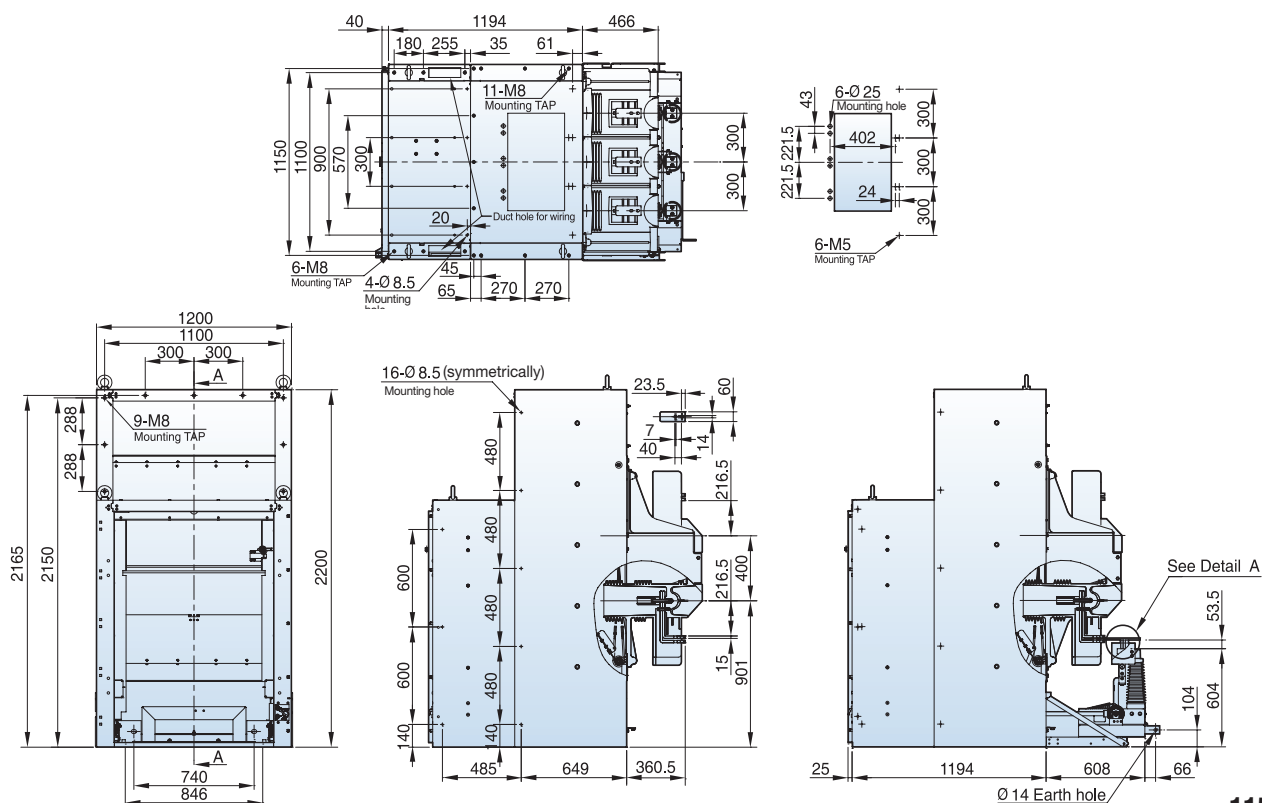


36kV, 25/31.5/40kA, 1250/2000A

Withdrawable (H type unit, phase distance 300mm)



Withdrawable (H type cradle, phase distance 300mm)



MS

Contactors and Overload relays

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.

- Advanced technology & Expert solution
 - Offering economical solution with compact size & easy connection
 - Ensure reliability in the system: Type II Coordination
 - Perfect system with peripheral devices
 - Environment friendly product: complies with International environment standard RoHS
 - 25Models in 9 Frames
-
- Compact design for space saving
 - DIN rail and screw mountable (upto 150AF)
 - Finger-proof design
 - World class products conforming to IEC and UL standards



Metasol Contactors

MC type Magnetic Contactors



Frame size				18AF				22AF			
Type				MC-6a	MC-9a	MC-12a	MC-18a	MC-9b	MC-12b	MC-18b	MC-22b
Screw clamp terminals				●	●	●	●	●	●	●	●
Lug clamp terminals				-	-	-	-	-	-	-	-
Number of poles				3P				3P			
Rated operational voltage, Ue				690V				690V			
Rated insulation voltage, Ui				690V				690V			
Rated frequency				50/60Hz				50/60Hz			
Rated impulse withstand voltage, Uimp				6kV				6kV			
Maximum operating rate in operating cycles per hour(AC3)				1,800 operations per hour				1,800 operations per hour			
Durability (mil. operations)	Mechanical			1500				1500			
	Electrical			250				250			
Current and power (IEC)	AC-1, Thermal current		A	25	25	25	32	27	27	32	45
	AC-3	200/240V	kW	2.2	2.5	3.5	4.5	2.5	3.5	4.5	5.5
			A	9	11	13	18	11	13	18	22
		380/440V	kW	3	4	5.5	7.5	4	5.5	7.5	11
			A	7	9	12	18	9	12	18	22
	500/550V	kW	3	4	7.5	7.5	4	7.5	7.5	15	
			A	6	7	12	13	7	12	13	20
	690V	kW	3	4	7.5	7.5	4	7.5	7.5	15	
			A	4	5	9	9	6	9	9	18
	1000V	kW	-	-	-	-	-	-	-	-	-
			A	-	-	-	-	-	-	-	-
	Rated Short-time withstand current (IEC 60947)	1s	A	210	250	280	300	250	280	300	400
10s		A	105	110	120	130	110	120	154	186	
30s		A	70	70	80	85	70	80	100	130	
1min		A	61	61	61	70	61	61	84	90	
3min		A	40	45	47	50	45	50	60	60	
10min		A	30	30	30	40	30	30	40	50	
≥15min		A	25	26	28	40	26	28	40	45	
Rating (UL)	Continuous current		A	25	25	25	32	27	27	32	45
	Single phase	110~120V	HP	0.5	0.5	0.75	1	0.5	0.75	1	2
		220~240V	HP	1.5	1.5	2	3	1.5	2	3	3
	Three phase	200~208V	HP	2	2	3	7.5	2	3	7.5	7.5
		220~240V	HP	3	3	5	7.5	3	5	7.5	10
		440~480V	HP	5	5	7.5	10	5	7.5	10	15
		550~600V	HP	7.5	7.5	10	15	7.5	10	15	20
	NEMA size			00	00	0	1	00	0	1	
Size and weight		AC control	Weight	0.33				0.34			
			Size(W×H×D)	45×73.5×80.4				45×73.5×87.4			
		DC control	Weight	0.4				0.41			
			Size(W×H×D)	45×73.5×96.6				45×73.5×103.6			
Auxiliary(standard)				1NO or NC				1NO1NC			
Auxiliary	Side mount			UA-1				UA-1			
	Front mount			UA-2, UA-4				UA-2, UA-4			



40AF	
MC-32a	MC-40a
•	•
-	-
3P	
1000V	
1000V	
50/60Hz	
8kV	
1,800 operations per hour	
1200	
200	
55	60
7.5	11
32	40
15	18.5
32	40
18.5	22
28	32
18.5	22
20	23
22	22
17	17
600	700
260	300
160	160
100	100
70	70
55	55
50	50
55	60
2	2
5	5
7.5	15
10	15
20	30
25	30
1P	2
0.55	
69×83×90	
0.77	
69×83×117.1	
2NO2NC	
UA-1	
UA-2, UA-4	

65AF	
MC-50a	MC-65a
•	•
•	•
3P	
1000V	
1000V	
50/60Hz	
8kV	
1,200 operations per hour	
1200	
200	
100	115
15	18.5
55	65
22	30
50	65
30	33
43	60
30	33
28	35
30	30
23	23
1000	1050
550	700
330	380
250	270
150	200
90	120
87	100
100	115
3	5
10	15
20	25
25	30
40	50
50	60
1.05	
79×106×119	
1.3	
79×106×146.4	
2NO2NC	
UA-1	
UA-2, UA-4	

100AF		
MC-75a	MC-85a	MC-100a
•	•	•
•	•	•
3P		
1000V		
1000V		
50/60Hz		
8kV		
1,200 operations per hour		
1200		
200		
125	135	160
22	25	30
75	85	105
37	45	55
75	85	105
37	45	55
64	75	85
37	45	55
42	45	65
37	37	37
28	28	28
1100	1200	1320
750	800	900
400	450	500
300	350	400
220	270	270
140	170	180
114	150	160
125	135	160
5	7.5	10
15	15	20
25	30	30
30	40	40
50	60	75
60	75	75
1.93		
94×140×135.8		
2.8		
94×140×172.3		
2NO2NC		
UA-1		
UA-2, UA-4		

150AF	
MC-130a	MC-150a
•	•
•	•
3P	
1000V	
1000V	
50/60Hz	
8kV	
1,200 operations per hour	
500	
100	
200	250
37	45
130	150
60	75
130	150
60	70
90	100
55	55
60	60
75	75
53	53
1350	1800
950	1200
700	800
550	600
350	450
200	300
175	280
200	250
10	15
20	25
40	40
40	50
75	100
75	75
2.4	
119×158×130.3	
2NO2NC	
UA-1	
UA-2, UA-4	

Metasol Contactors

MC type Magnetic Contactors



Frame size				
Type				
Screw clamp terminals				
Lug clamp terminals				
Number of poles				
Rated operational voltage, Ue				
Rated insulation voltage, Ui				
Rated frequency				
Rated impulse withstand voltage, Uimp				
Maximum operating rate in operating cycles per hour(AC3)				
Durability	Mechanical			
	(mil. operations)			
Current and power (IEC)	AC-1, Thermal current	A		
	AC-3	200/240V	kW	
			A	
		380/440V	kW	
			A	
		500/550V	kW	
			A	
		690V	kW	
			A	
		1000V	kW	
			A	
Rated Short-time withstand current (IEC 60947)	1s	A		
	10s	A		
	30s	A		
	1min	A		
	3min	A		
	10min	A		
	≥15min	A		
Rating (UL)	Continuous current	A		
	Single phase	110~120V	HP	
		220~240V	HP	
	Three phase	200~208V	HP	
		220~240V	HP	
		440~480V	HP	
		550~600V	HP	
	NEMA size			
Size and weight	AC control	Weight	kg	
		Size(W×H×D)	mm	
	DC control	Weight	kg	
		Size(W×H×D)	mm	
Auxiliary(standard)				
Auxiliary				
Side mount				
Front mount				

225AF	
MC-185a	MC-225a
●	●
-	-
3P	
1000V	
1000V	
50/60Hz	
8kV	
1,200 operations per hour	
500	
100	
300	350
55	75
185	225
90	132
185	225
110	132
180	200
110	140
120	150
132	132
90	90
2000	2500
1500	1700
1000	1200
800	1000
520	700
350	500
320	400
300	350
15	15
30	40
60	60
60	75
125	150
125	150
5.4	
138×203×185.1	
2NO2NC	
AU-100, AU-100E (Max.4NO4NC)	
-	

400AF		
MC-265a	MC-330a	MC-400a
●	●	●
-	-	-
3P		
1000V		
1000V		
50/60Hz		
8kV		
1,200 operations per hour		
500		250
100		50
400	500	520
80	90	125
265	330	400
147	160	200
265	330	400
147	160	225
225	250	350
160	200	250
185	220	300
147	147	147
105	105	105
3500	4000	4600
2400	3000	4400
1500	2500	2974
1100	1700	1846
800	1000	1313
600	620	760
500	553	699
400	500	520
-	-	-
-	-	-
75	100	125
100	100	150
200	200	300
200	200	300
5		
9.2		
163×243×204.4		
2NO2NC		
AU-100, AU-100E (Max.4NO4NC)		
-		



800AF		
MC-500a	MC-630a	MC-800a
●	●	●
-	-	-
3P		
1000V		
1000V		
50/60Hz		
8kV		
1,200 operations per hour		
250		
50		
700	900	1050
147	190	220
500	630	800
265	330	440
500	630	800
265	330	500
400	500	720
300	400	500
380	420	630
280	280	280
220	220	220
6000	7000	7500
5050	6400	7000
4400	4500	4900
3400	3500	3800
2000	2200	2500
1400	1550	1550
1100	1300	1300
700	900	1050
-	-	-
-	-	-
150	200	200
200	250	300
400	500	600
400	500	600
6		7

22.4
285×312×245.3

2NO2NC
AU-100, AU-100E (Max.4NO4NC)
-

1260AF
MC-1260a
●
-
3P
1000V
1000V
50/60Hz
8kV
300 operations per hour
50
5
1260
-
-
900
1450
-
-
-
-
-
8000
7200
5200
4000
2300
3000
1500
-
-
-
-
-
-
-
-
-

23.5
285×352×246

2NO2NC
AU-100, AU-100E (Max.4NO4NC)
-

2100AF		
MC-1400a	MC-1700a	MC-2100a
●	●	●
-	-	-
3P		
1000V		
1040V		
50/60Hz		
8kV		
300 operations per hour		
50		
5		
1400	1600	2100
290	310	-
860	1050	-
550	700	900
860	1050	1450
-	-	-
-	-	-
800	1000	-
800	950	-
-	-	-
-	-	-
-	-	-
8000	10000	10000
-	-	-
4500	5500	5500
-	-	-
2600	3000	3000
-	-	-
1400	1700	2100
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

33.8
431×380×246

2NO2NC
AU-100, AU-100E (Max.4NO4NC)
-

Metasol Contactors



MC type Magnetic Contactors (4pole)

Frame size			
Type			
Screw clamp terminal			
Number of poles			
Rated operational voltage (Ue)			
Rated insulation voltage (Ui)			
Rated frequency			
Rated impulse withstand voltage, Uimp			
Maximum operating rate in operating cycles per hour(AC3)			
Durability	Mechanical		
	Electrical		
Current and Power (IEC)	Thermal current		A
	AC-1	200/240V	kW
			A
		380/400V	kW
			A
		500/550V	kW
			A
		690V	kW
UL rating (UL)	Continuous current		A
	Single Phase	110~120V	HP
		220~240V	HP
		200~208V	HP
	Three Phase	220~240V	HP
		440~480V	HP
		550~600V	HP
Size and weight	AC	Weight	kg
	Control	Size(W×H×D)	mm
	DC	Weight	kg
	Control	Size(W×H×D)	mm
Auxiliary(standard)			
Auxiliary			
Side Mount			
Front Mount			



18AF			
MC-6a/4	MC-9a/4	MC-12a/4	MC-18a/4
●			
4P			
690V			
690V			
50/60Hz			
6kV			
1,800 operations per hour			
1500			
50		80	
25	25	25	40
9	9	9	15
25	25	25	40
17	17	17	27
25	25	25	40
21	21	21	35
25	25	25	40
27	27	27	44
25	25	25	40
25	25	25	40
0.5	0.5	0.75	1
1.5	1.5	2	3
2	2	3	5
3	3	5	7.5
5	5	7.5	10
7.5	7.5	10	15
0.33			
45×73.5× 79			
0.4			
45×73.5×96.6			
-			
UA-1			
UA-2, UA-4			

**22AF**

MC-22a/4

●

4P

690V

690V

50/60Hz

6kV

1,800 operations per hour

1500

100

40

15

40

27

40

35

40

44

40

40

2

3

7.5

7.5

10

15

0.4

47.2×80×86.8

0.5

47.2×80×113.2

-

AU-1

UA-2, UA-4

40AF

MC-32a/4

MC-40a/4

●

4P

690V

690V

50/60Hz

6kV

1,800 operations per hour

1500

100

50

60

18

22

50

60

35

42

50

60

43

52

50

60

55

66

50

60

50

60

2

3

5

5

7.5

10

10

10

20

25

20

25

0.59

59×83.5×94.5

0.7

59×83.5×121

-

AU-1

UA-2, UA-4

85AF

MC-50a/4

MC-65a/4

MC-75a/4

MC-85a/4

●

4P

690V

1000V

50/60Hz

8kV

1,800 operations per hour

1200

100

80

100

110

135

30

37

41

51

80

100

110

135

56

70

76

95

80

100

110

135

70

88

97

120

80

100

110

135

88

110

120

150

80

100

110

135

80

100

110

135

3

5

5

7.5

7.5

10

15

15

10

15

20

25

15

20

25

30

30

40

50

50

30

40

50

50

1.2

91×123.5×117.8

1.29

91×123.5×117.8

-

AU-1

UA-2, UA-4

Metasol Contactors

MC type Magnetic Contactors (4pole)



Frame size			
Type	Screw clamp terminal		
Number of poles			
Rated operational voltage (Ue)			
Rated insulation voltage (Ui)			
Rated frequency			
Rated impulse withstand voltage, Uimp			
Maximum operating rate in operating cycles per hour(AC3)			
Durability	Mechanical		
	Electrical		
Current and Power (IEC)	Thermal current	A	
	AC-1	200/240V	kW
			A
		380/400V	kW
			A
		500/550V	kW
			A
		690V	kW
			A
UL rating (UL)	Continuous current		A
	Single Phase	110~120V	HP
		220~240V	HP
		200~208V	HP
	Three Phase	220~240V	HP
		440~480V	HP
		550~600V	HP
Size and weight	AC	Weight	kg
	Control	Size(W×H×D)	mm
	DC	Weight	kg
	Control	Size(W×H×D)	mm
Auxiliary(standard)			
Auxiliary	Side Mount		
	Front Mount		

* - FLA = 722 A, LRA = 5618 A

** - FLA = 566 A, LRA = 4495 A

225AF				
MC-100a/4	MC-130a/4	MC-150a/4	MC-185a/4	MC-225a/4
●				
4P				
690V				
1000V				
50/60Hz				
8kV				
1,200 operations per hour				
500				
80				
200	250	275	300	350
57	60	76	87	100
200	250	275	300	350
106	110	142	165	185
200	250	275	300	350
132	137	180	205	230
160	165	250	300	330
165	170	225	255	290
160	165	250	300	330
200	250	275	300	350
7.5	10	15	15	15
15	20	25	30	40
30	40	40	60	60
30	40	50	60	75
60	75	100	125	150
60	75	100	125	150
5.6				
175×203×185				
2NO2NC				
AU-100, AU-100E				
-				

**400AF**

MC-265a/4	MC-330a/4	MC-400a/4
●		
4P		
690V		
1000V		
50/60Hz		
8kV		
1,200 operations per hour		
250		
50		
400	500	520
115	135	160
400	500	520
215	250	300
400	500	520
265	315	375
360	420	520
335	390	470
360	420	520
400	500	520
-	-	-
-	-	-
75	100	125
100	125	150
200	250	300
200	250	300

9.9

206×243×205

2NO2NC

AU-100, AU-100E

-

**800AF**

MC-500a/4	MC-630a/4	MC-800a/4
●		
4P		
690V		
1000V		
50/60Hz		
8kV		
1,200 operations per hour		
250		
50		
700	900	1050
245	255	310
700	900	1050
450	470	570
700	900	1050
560	590	710
630	750	900
710	740	900
630	750	900
700	900	1050
-	-	-
-	-	-
150	200	200
200	250	300
400	500	600 *
400	500	600 **

26.3

346×310 ×244

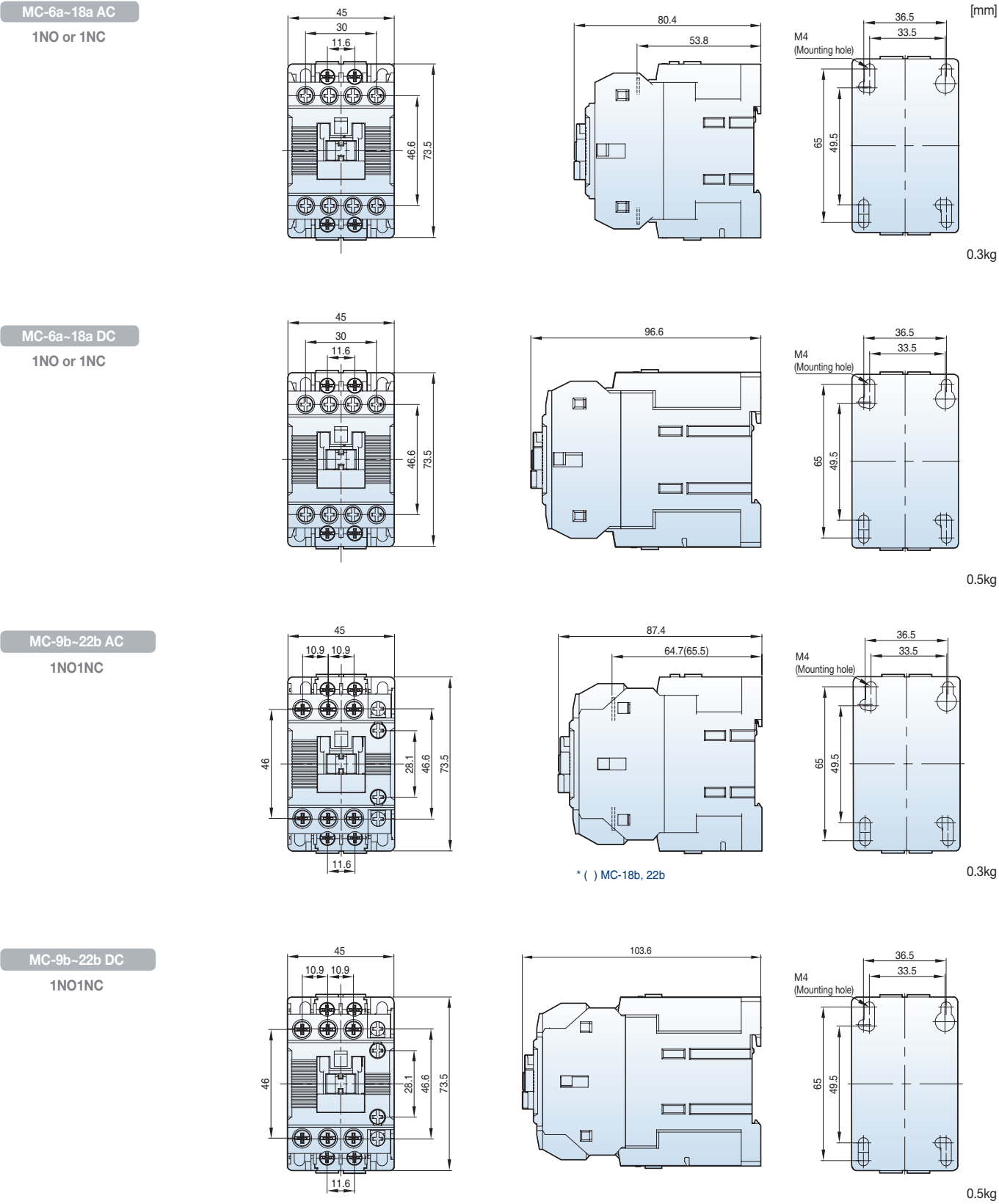
2NO2NC

AU-100, AU-100E

-

Metasol Contactors

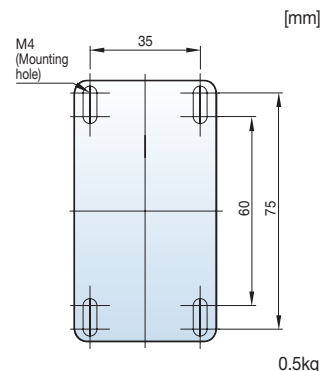
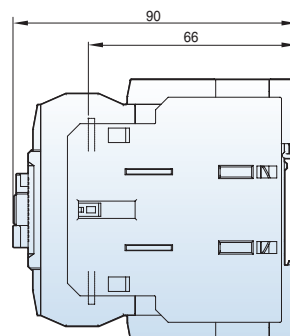
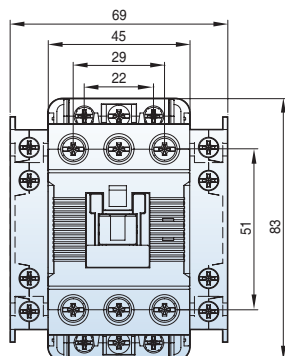
Dimensions (18AF/22AF)



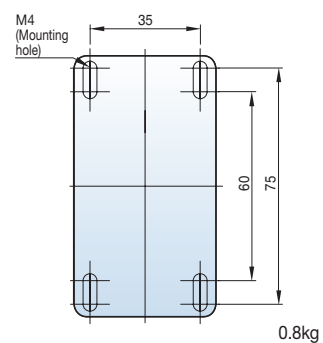
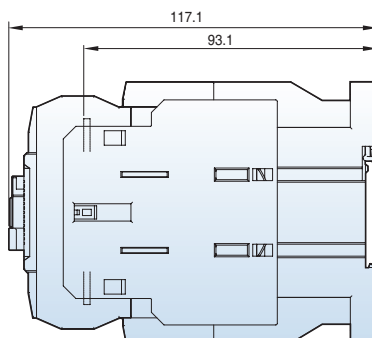
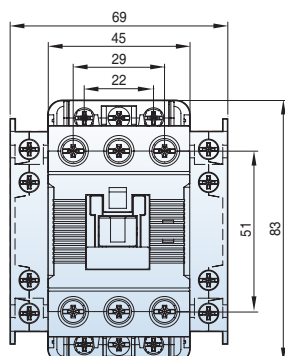
* () MC-18b, 22b

Dimensions (40AF/65AF)

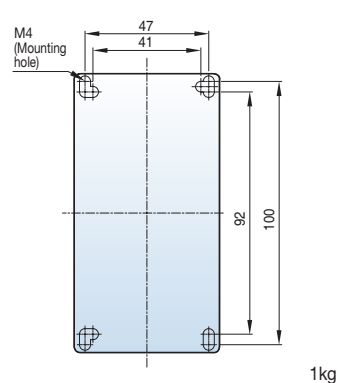
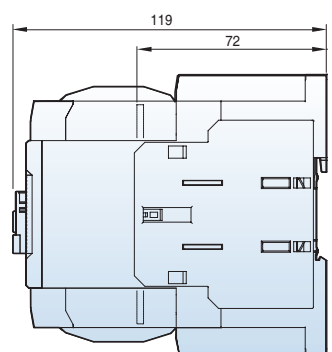
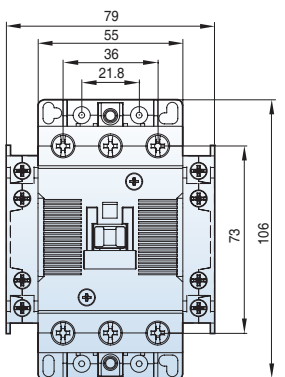
MC-32a~40a AC
2NO2NC



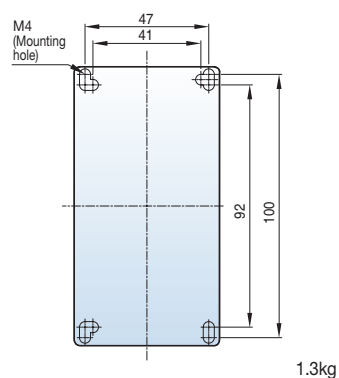
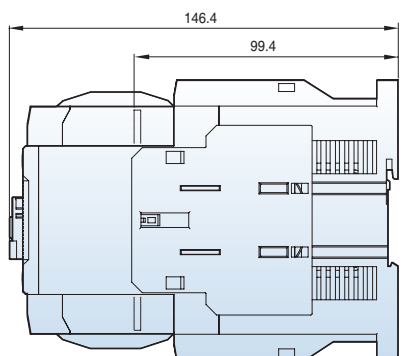
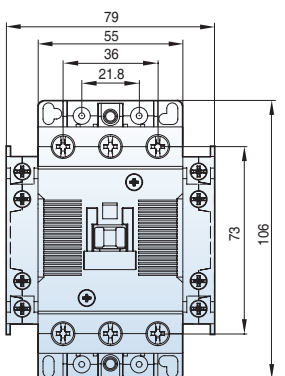
MC-32a~40a DC
2NO2NC



MC-50a~65a AC
2NO2NC



MC-50a~65a DC
2NO2NC

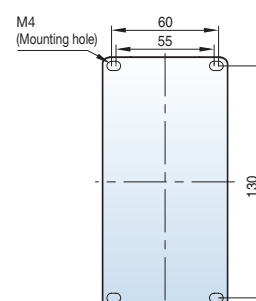
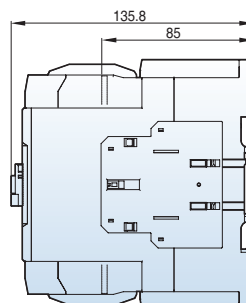
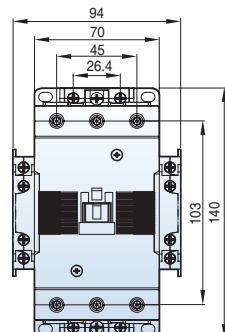


Metasol Contactors

Dimensions (100AF~225AF)

MC-75a~100a AC

2NO2NC

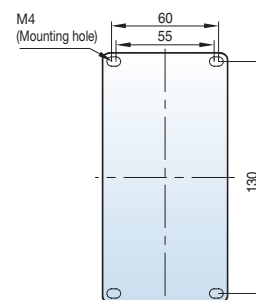
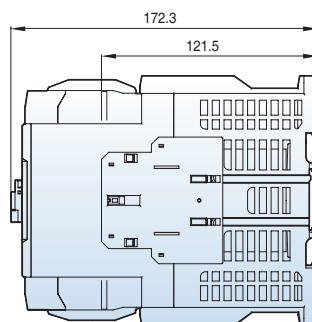
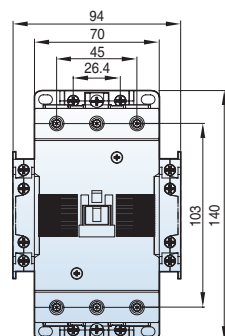


[mm]

1.9kg

MC-75a~100a DC

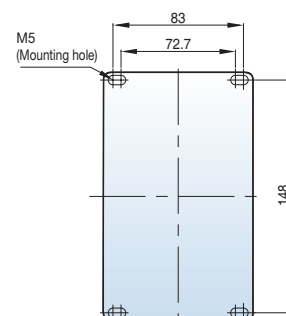
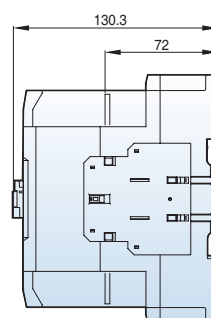
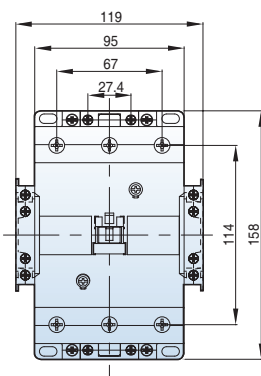
2NO2NC



2.8kg

MC-130a

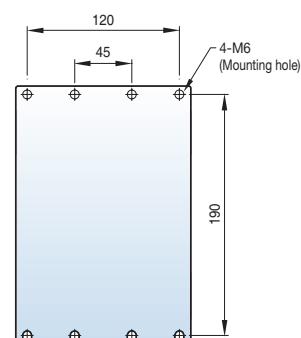
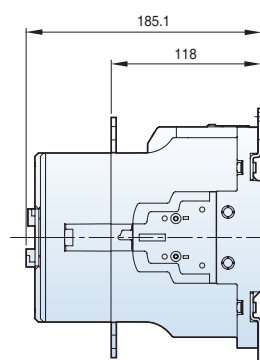
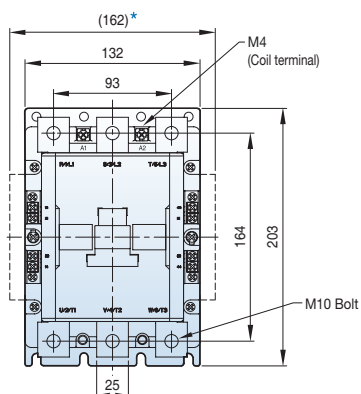
MC-150a



2.4kg

MC-185a

MC-225a



5.4kg

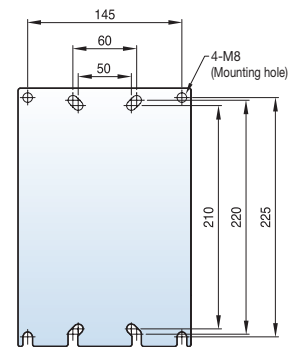
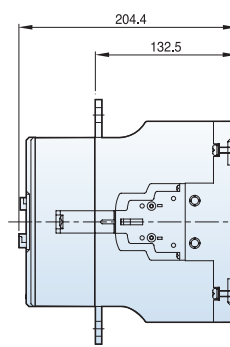
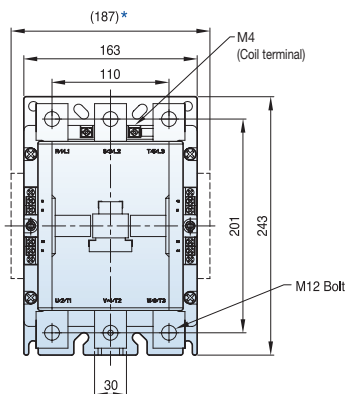
* Optional auxiliary contact unit (side mount type)

Dimensions (400AF~2100AF)

MC-265a

MC-330a

MC-400a



[mm]

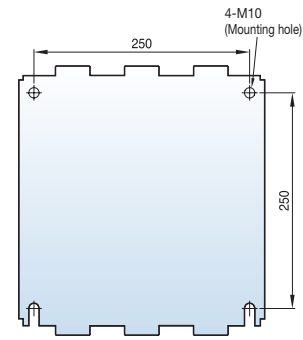
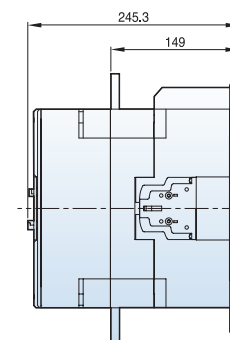
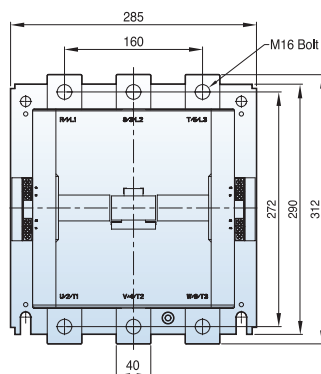
9.2kg

* Optional auxiliary contact unit (side mount type)

MC-500a

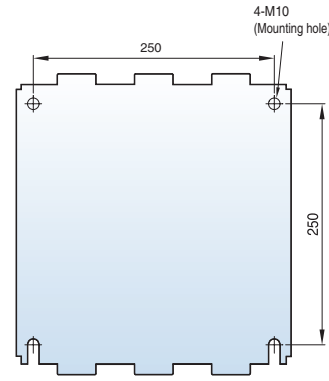
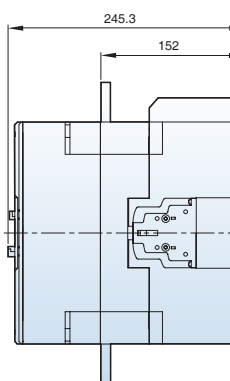
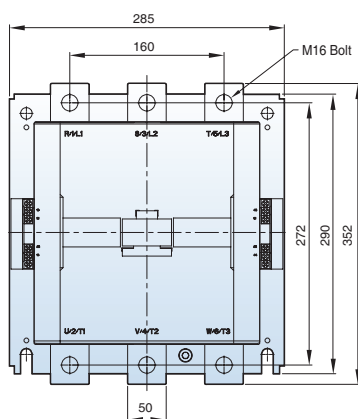
MC-630a

MC-800a



22.4kg

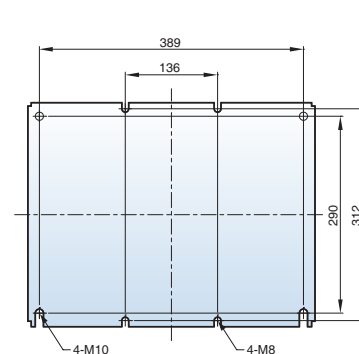
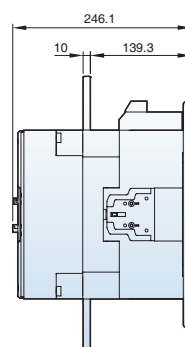
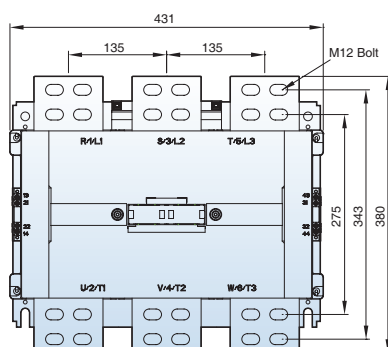
MC-1260a



MC-1400a

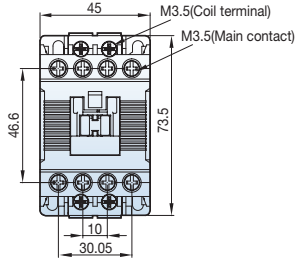
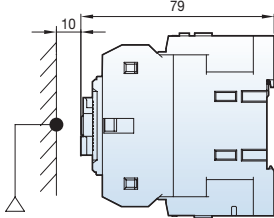
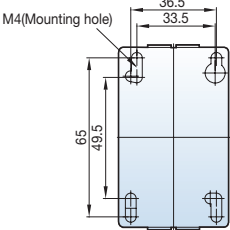
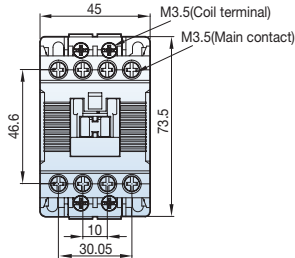
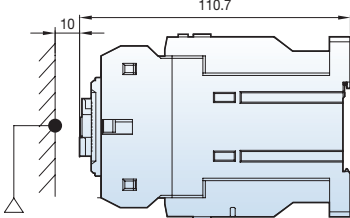
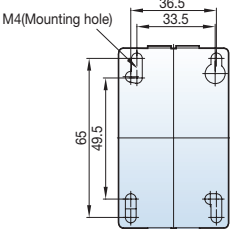
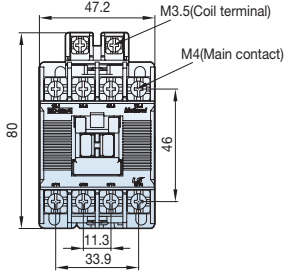
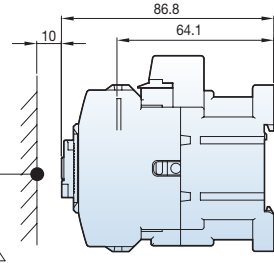
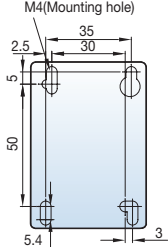
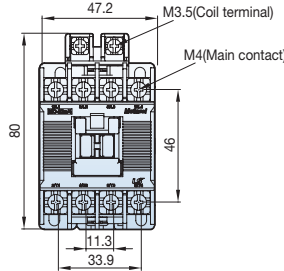
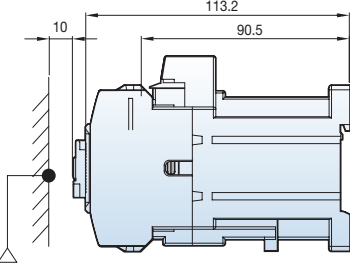
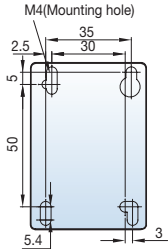
MC-1700a

MC-2100a



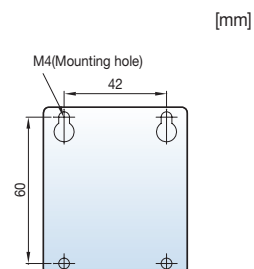
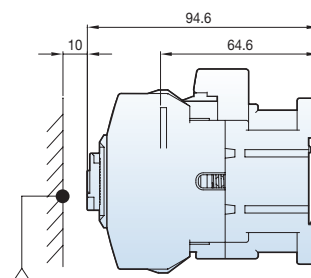
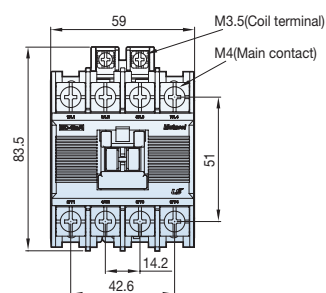
Metasol Contactors

Dimensions (MC-6a/4~22a/4)

MC-6a/4~18a/4 AC				[mm]
				0.3kg
MC-6a/4~18a/4 DC				
				0.45kg
MC-22a/4 AC				
				0.4kg
MC-22a/4 DC				
				0.5kg

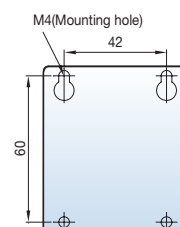
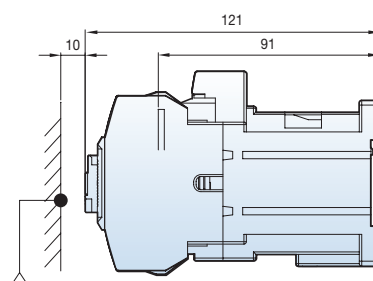
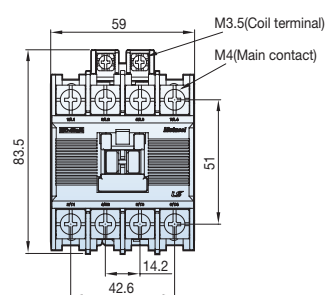
Dimensions (MC-32a/4~85a/4)

MC-32a/4~40a/4 AC



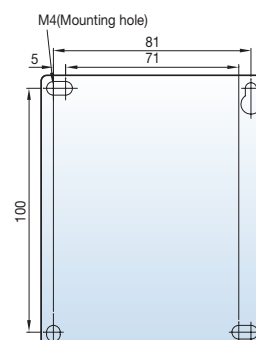
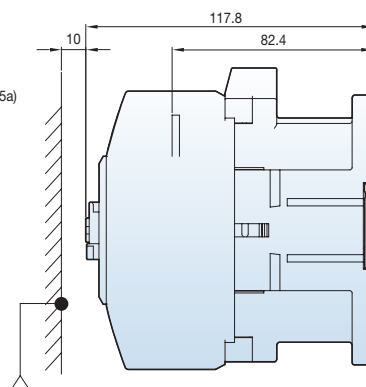
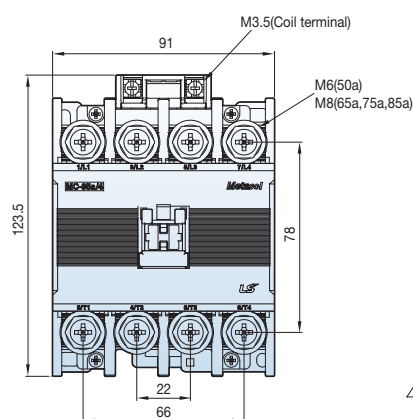
0.59kg

MC-32a/4~40a/4 DC



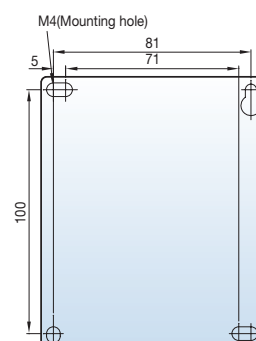
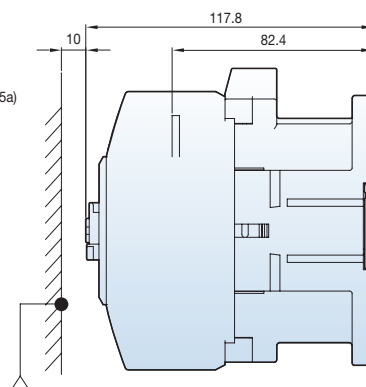
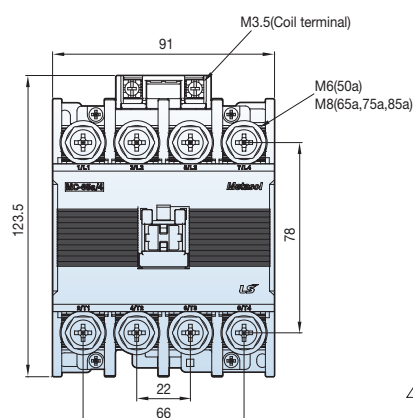
0.7kg

MC-50a/4~85a/4 AC



1.2kg

MC-50a/4~85a/4 DC



Metasol Contactors

Dimensions (MC-100a/4~800a/4)

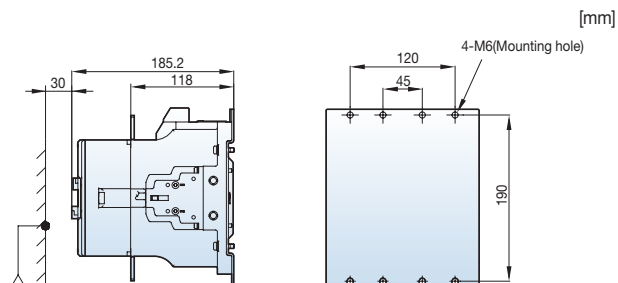
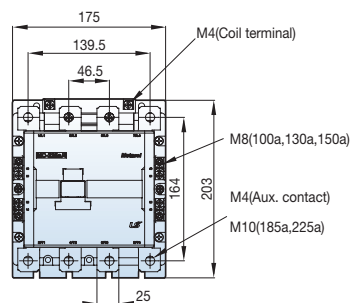
MC-100a/4

MC-130a/4

MC-150a/4

MC-185a/4

MC-225a/4

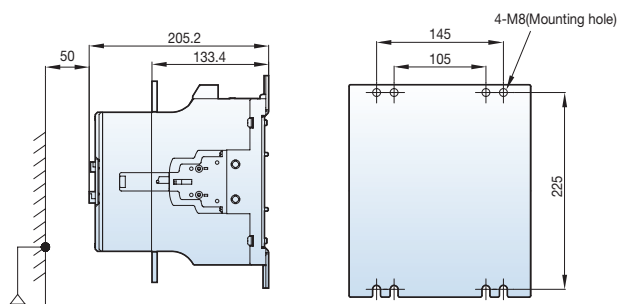
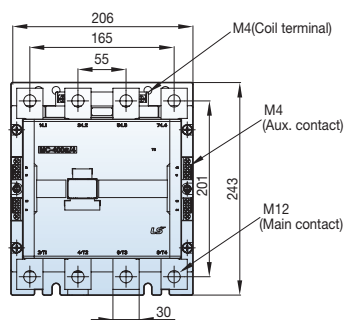


5.6kg

MC-265a/4

MC-330a/4

MC-400a/4

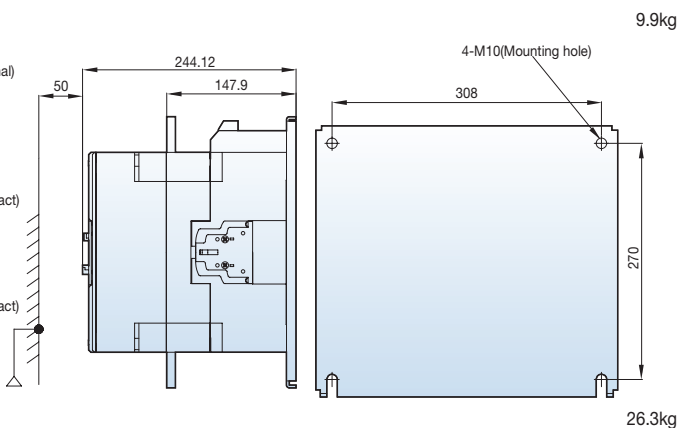
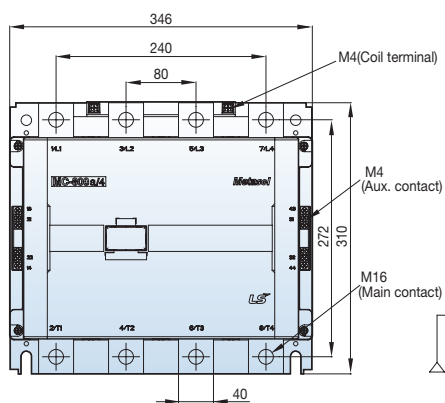


9.9kg

MC-500a/4

MC-630a/4

MC-800a/4



26.3kg

Susol Busways

Characteristics

- AC 1000V or less/DC 1500V or less, 50/60Hz, Al/Cu conductor
- Compact enclosure minimizes footprint.
- Sealed Enclosure: Protection class IP54 (Indoor)/65 (Outdoor)
- High reliability with short-circuit strength and fire resistance
- Eco-friendly lightweight product with batch extrusion insulation coating and aluminum alloy material
- Easy installation and maintenance through joint pack assembly
- Up to 7,500A current capacity (Cu type) ensuring large capacity of power supply
- Al-Al Type, Total capacity (A) KS certification and ASTA certificate



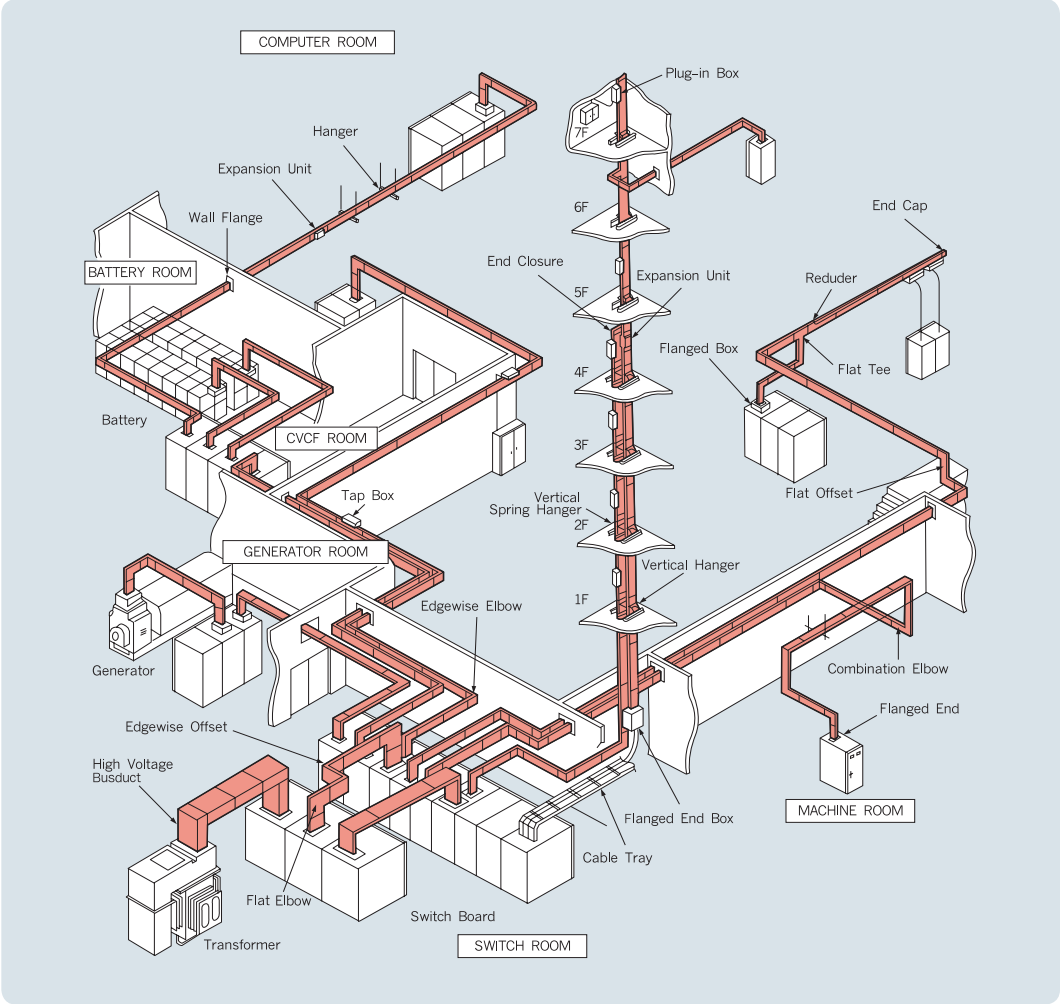
Rating

Item	Rating		
Rated voltage	AC1000V/DC1500V		
Rated current	Al		630 ~ 6000A
	Cu		630 ~ 7500A
Rated frequency	50/60Hz		
Short-time withstand current	Al	2000A	121kA/1sec
		4000A	200kA/1sec
	Cu	2000A	135kA/1sec
		4000A	220kA/1sec
Wiring system	3W, 4W, 5W		
Grounding	Basic method		Grounding to housing
	Maximum capacity		Over 200%
	Grounding type		Housing : over 100%
			Internal Type : 50/100 %
Resistance to fire, optional	AC 1000V : 840℃ / 180min.		
Degree of protection	Indoor		IP54
	Outdoor		IP65
Enclosure material	High Strength Aluminum Extrusion (Thickness : 3mm)		
Insulation material	Insulation Coating : Polyvinyl Chloride Insulation Spacer : Lexan Resin		
Conductor material	Aluminum or Copper		
Environment	Altitude		Below 1000m
	Ambient temp		Max. 40 , min. -5 (min. -25 for Outdoor Type)
	Humidity		Below 95%
Allowable temp. (IEC standard)	Housing		55K
	Joint part		95K
Color of painting	MUNSELL No.		5Y 7/1
			7.5 BG 6/1.5
Standard	IEC 60439 - 1, 2		

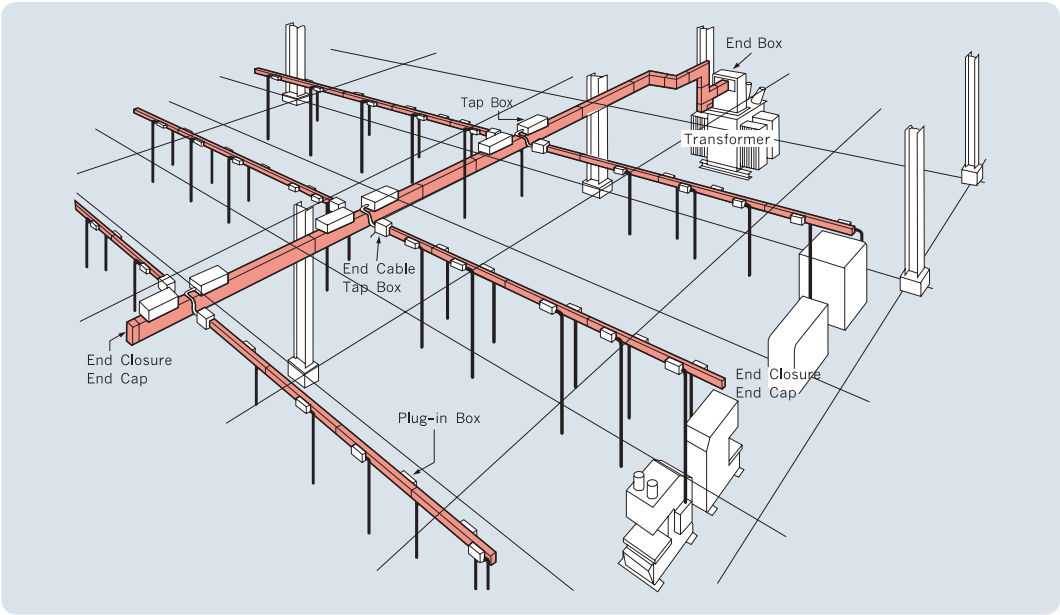
Susol Busways

Application

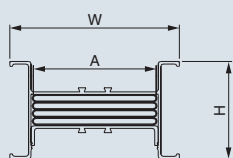
Building distribution system



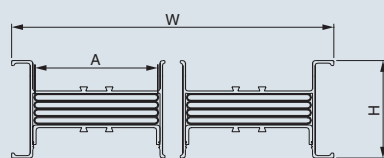
Plant distribution system



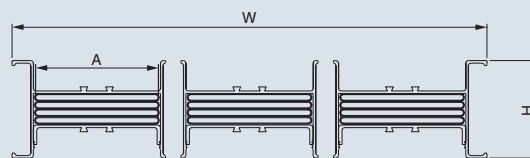
Cross section and dimensions (Indoor type)



<Fig.1>



<Fig.2>



<Fig.3>

Aluminum Conductor

Rated current (A)	Fig.	Al Busbar		3W				4W				5W			
		T (mm)	A (mm)	W (mm)	H (mm)	Weight(kg/m)		W (mm)	H (mm)	Weight(kg/m)		W (mm)	H (mm)	Weight(kg/m)	
						3W	50%E			4W	50%E			5W	50%E
630	Fig.1	6,35	41	96	106	6	6.4	96	115	6.5	7	96	124	7.7	8.1
800			62	117		7.5	8	117		9	9.5	117		10.1	10.6
1000			86	141		8.5	9	141		10.5	11	141		12.5	13.2
1250			108	163		10	11	163		12	13	163		14.8	15.6
1600			164	219		14	15.5	219		17	18.5	219		20.5	21.7
2000	210		265	17		18.5	265	21		22.5	265	25.1		26.8	
2500	Fig.2		126 × 2	342		23	25	342		27.5	29.5	342		32.5	34.4
3200			164 × 2	418		28.5	31	418		34	36.5	418		40.2	42.8
3600			184 × 2	458		31	34	458		37.5	40.5	458		44.2	47.1
4000			210 × 2	510		35	38.5	510		42	45.5	510		49.6	52.8
5000			184 × 3	677		46.5	50.5	677		56.5	60.5	677		65.9	70.2
6000	Fig.3		210 × 3	755		51.5	56.5	755		63	67.5	755		74.0	78.9

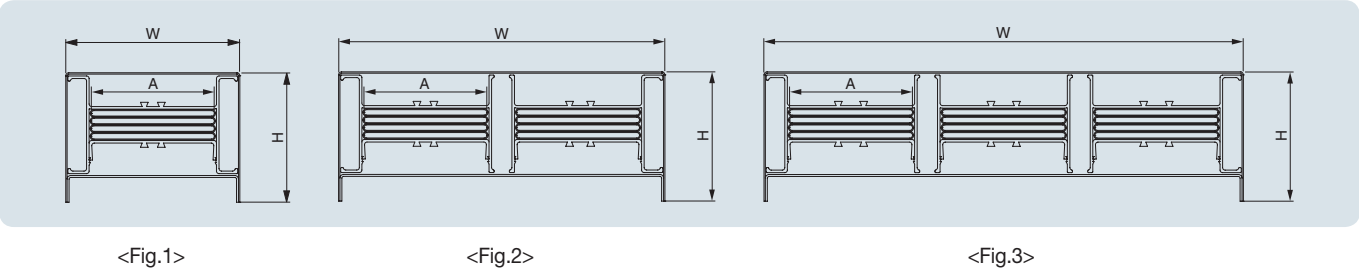
Copper Conductor

Rated current (A)	Fig.	Al Busbar		3W				4W				5W			
		T (mm)	A (mm)	W (mm)	H (mm)	Weight(kg/m)		W (mm)	H (mm)	Weight(kg/m)		W (mm)	H (mm)	Weight(kg/m)	
						3W	50%E			4W	50%E			5W	50%E
630	Fig.1	6.35	41	96	106	10.5	11.5	96	115	13	14	96	124	15.6	16.7
800			41	96		10.5	11.5	96		13	14	96		15.6	16.7
1000			57	112		13.5	15	112		17	18.5	112		20.7	22.1
1250			73	128		16.5	18.5	128		20.5	22.5	128		25.6	27.4
1600			108	163		23	26	163		29	32	163		36.3	39.1
2000			145	200		30	33.5	200		38.5	42	200		47.6	51.4
2500			195	250		39	44.5	250		50	55.5	250		62.9	68.0
3200	Fig.2	6.35	108 × 2	306	106	46	52	306	115	58.5	64.5	306	124	72.0	77.5
3600			126 × 2	342		52.5	59.5	342		67	74	342		83.0	89.5
4000			145 × 2	380		60	67	380		77.5	84.5	380		94.6	102.1
5000			195 × 2	480		78	88.5	480		101	111.5	480		125.2	135.3
6000	Fig.3		145 × 3	560		89.5	100.5	560		115.5	126.5	560		141.1	152.3
7500			195 × 3	710		117	133.5	710		151	167.5	710		187.0	202.2

Note) 5W is applied to the structure of 4W+100%E and 3P+N200%

Susol Busways

Cross section and dimensions (Outdoor type)



Aluminum Conductor

Rated current (A)	Fig.	Al Busbar		3W				4W				5W			
		T (mm)	A (mm)	W (mm)	H (mm)	Weight(kg/m)		W (mm)	H (mm)	Weight(kg/m)		W (mm)	H (mm)	Weight(kg/m)	
						3W	50%E			4W	50%E			5W	50%E
630	Fig.1	6.35	41	101	143.5	7.3	7.6	101	152.5	8.2	8.5	101	161.5	9.1	9.5
800			62	122		9.0	9.5	122		10.3	10.8	122		11.5	12.0
1000			86	146		10.7	11.4	146		12.3	13.0	146		14.0	14.7
1250			108	169		12.3	13.1	169		14.3	15.1	169		16.4	17.2
1600			164	224		16.2	17.5	224		19.2	20.5	224		22.3	23.5
2000			210	270		19.5	21.1	270		23.2	24.9	270		27.0	28.7
2500	Fig.2		126 × 2	347		25.3	27.2	347		30.0	31.9	347		34.6	36.5
3200			164 × 2	423		30.7	33.3	423		36.6	39.2	423		42.6	45.2
3600			184 × 2	463		33.5	36.4	463		40.2	43.1	463		46.7	49.6
4000			210 × 2	515		37.3	40.5	515		44.7	48.0	515		52.3	55.5
5000	Fig.3		184 × 3	682		19.4	53.8	682		60.1	63.7	682		69.1	73.4
6000			210 × 3	760		55.0	59.9	760		66.2	71.1	760		77.5	82.4

Copper Conductor

Rated current (A)	Fig.	Al Busbar		3W				4W				5W			
		T (mm)	A (mm)	W (mm)	H (mm)	Weight(kg/m)		W (mm)	H (mm)	Weight(kg/m)		W (mm)	H (mm)	Weight(kg/m)	
						3W	50%E			4W	50%E			5W	50%E
630	Fig.1	6.35	41	101	143.5	12.1	13.1	101	152.5	14.6	15.5	101	161.5	17.0	18.1
800			41	101		12.1	13.1	101		14.6	15.5	101		17.0	18.1
1000			57	117		15.3	16.8	117		18.8	20.1	117		22.1	23.5
1250			73	133		18.3	20.2	133		22.7	24.5	133		27.1	28.9
1600			108	168		25.0	27.8	168		31.2	34.2	168		37.9	40.7
2000			145	205		32.0	35.7	205		40.3	44.5	205		49.3	53.1
2500			195	255		14.3	46.4	255		52.6	58.3	255		64.8	69.9
3200	Fig.2		108 × 2	311		48.2	53.7	311		61.3	66.8	311		74.0	79.5
3600			126 × 2	347		54.9	61.5	347		70.3	76.8	347		85.1	91.6
4000			145 × 2	385		62.2	69.7	385		79.9	87.3	385		96.9	104.4
5000			195 × 2	485		81.0	91.1	485		105.0	115.0	485		127.8	137.9
6000	Fig.3		145 × 3	565		92.3	103.5	565		118.5	129.7	565		143.9	155.1
7500			195 × 3	715		120.7	135.8	715		156.2	171.3	715		190.3	205.5

Note) 5W is applied to the structure of 4W+100%E and 3P+N200%

X GIPAM

Characteristics

- Protective use model (F, B, M, T, DG)
- 8.4 inches of color Touch Screen
- Performing 0.2% measurement accuracy for Current and Voltage
- Sag, Swell, Interruption & Harmonic analysis of 1~63rd orders
- Increasing reliability/Flexibility through Duplex communication



Type of Protection

Type	Vsage	Protection
X GIPAM - F	Feeder/Incomming	OCR(50/51), OCGR(50/51N), UVR(27), OVR(59), SGR(67G), DGR(67N) ^{Note)} , OVGR(64I/D), NSOVR(47N), POR(47), SYNC Check(25), Reclosing(79), Temperature(38)
X GIPAM - B	Bay controller	OCR(50/51), OCGR(50/51N), UVR(27), OVR(59), SGR(67G), DGR(67N) ^{Note)} , OVGR(64I/D), NSOVR(47N), POR(47), SYNC Check(25), Reclosing(79), Temperature(38), DOCR(67I/D), NSOCR(46I/D), UFR(81U), OFR(81O), DPR(32P), DQR(32Q)
X GIPAM - M	Motor	OCR(50/51), OCGR(50/51N), UVR(27), OVR(59), SGR(67G), DGR(67N) ^{Note)} , OVGR(64I/D), NSOVR(47N), POR(47), Temperature(38), Stall/Locked Rotor(48/51LR), THR(49), DOCR(67I/D), UCR(37), NCH(66), NSOCR(46I/D)
X GIPAM - T	Transformer	OCR(50/51)×2, OCGR(50/51N), UVR(27), OVR(59), Temperature(38), DPR(32P), DFR(87T)
X GIPAM - DG	Distributed Generator	OCR(50/51), OCGR(50/51N), UVR(27), OVR(59), DPR(32P), UPR(37P), DQR(32Q), UFR(81U), OFR(81O), DGR(67N) ^{Note)} , SYNC Check(25), DOCR(67I/D), NSOCR(46I/D), POR(47), NSOVR(47N), ROCOF(81R), SGR(67G), OVGR(64I/D)
X GIPAM - 3wT	Transformer (3권선)	OCR(50/51)×3, OCGR(50N/51N), UVR(27), OVR(59), OVGR(64I/D), DFR(3W87T)

Note) DGR is the same as DOGR.

Ratings

Type	Specification
Wiring	3P3W, 3P4W
Input	Frequency 60Hz (50Hz *)
	Voltage PT: 100/ $\sqrt{3}$, 110/ $\sqrt{3}$, 120/ $\sqrt{3}$, 190/ $\sqrt{3}$, 100, 110, 120V GPT: 100~190V
	Current CT: 5A, ZCT: 1.5mA
	Power consumption Normal: Max. 30W, Operating: Max. 70W
	Control voltage AC 110V, DC 110~125V
	Burden PT: Max. 0.5VA (Phase PT Standard), CT: Max. 1.0VA Input contact Digital Input, AC/DC 110V
Output contact	TRIP Rated AC 250V 10A / DC 30V 10A, Resistive Load Open AC 2500VA, DC 300W
	ALARM Close AC 250V 5A / DC 30V 5A, Resistive Load Open AC 1250VA, DC 150W
Insulation Resistance	Over DC 500V 10M Ω
Dielectric Strength	Electric circuits to Earth : AC 2kV(1kV) / for 1 min Between electric circuits : AC 2kV(1kV) / for 1 min Between terminals of contact circuit: AC 1kV(1kV) / for 1 min
Overload withstand	Current circuit 3 In for 3 hours, 20 In for 2 seconde Voltage circuit 1.15Vn for 3 hours
Fast Transient Disturbance	Power Input 4kV, Other Input 2kV
Electrostatic Discharge(ESD)	Air 8kV, Contact 6kV
Operation temperature	-10°C ~ 55°C
Storage temperature	-25°C ~ 70°C
Humidity	30% ~ 80%
Height above sea level	1500m or less
Others	Non-impact place, Non-air pollution place
Weight	7kg (HMI: 2kg)

* Please contact the sales department for 50Hz in parentheses.

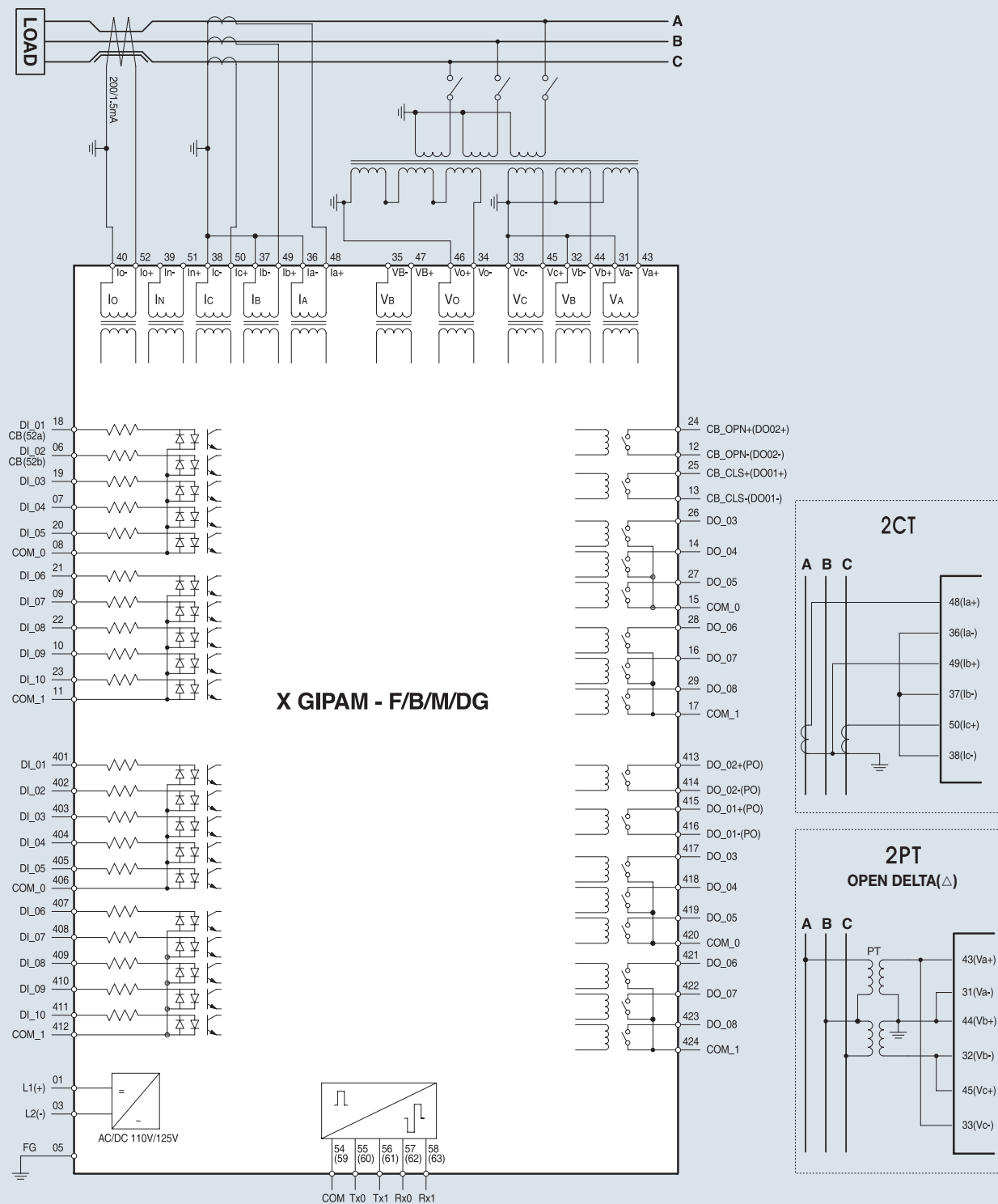
X GIPAM

X GIPAM - F Characteristics

Protection	Operating part	Setting range	Operating characteristics	Operating time	Delay time	Remarks
OCR (50)	Stage 1	OFF, 0.10~32.00In/0.01In	Instantaneous Definite	30msec and below 0.050~300.000s/0.001s	-	-
	Stage 2					
OCR (51)	Stage 1	OFF, 0.02~10.00In/0.01In	Definite Inverse	0.050~300.000s/0.001s 0.05~1.2/0.01	- 0~300.000s/0.001s	IEC SI/VI/EI/LI ANSI SI/VI/LI KEPCO SI/VI
	Stage 2					
OCGR (50N)	Stage 1	OFF, 0.1~32.00In/0.01In	Instantaneous Definite	30msec and below 0.050~300.000s/0.001s	-	-
	Stage 2					
OCGR (51N)	Stage 1	OFF, 0.02~10.00In/0.01In	Definite Inverse	0.050~300.000s/0.001s 0.05~1.2/0.01	- 0~300.000s/0.001s	IEC SI/VI/EI/LI ANSI SI/VI/LI KEPCO SI/VI
	Stage 2					
SGR (67G)	Stage 1	OFF, 0.6~6.0mA/0.1mA Vo: 0V, 8V~80V/1V Characteristics angle: 0~±90°/1°	Definite	0.050~10.000s/0.001s	-	-
	Stage 2					
DGR (67N)	Stage 1	OFF, 0.02~10.00In/0.01In Vo: 8~80V/1V Characteristics angle: 0~±90°/1° Operating range: 60~87°/1°	Instantaneous Definite Inverse	50msec and below 0.050~300.000s/0.001s 0.05~1.20/0.01	- - 0~300.000s/0.001s	IEC SI/VI/EI/LI ANSI SI/VI/LI KEPCO SI/VI
	Stage 2					
UVR (27)	Stage 1	OFF, 0.10~1.10Vn/0.01Vn Auto Reset: Enable/Disable	Definite	0.050~300.000s/0.001s	-	Dead Voltage Block: 0.05Vn
	Stage 2					
OVR (59)	Stage 1	OFF, 0.80~1.60Vn/0.01	Definite Inverse	0.050~300.000s/0.001s 0.01~1.20/0.01	- 0~300.000s/0.001s	IEC SI/VI/EI/LI ANSI SI/VI/EI
	Stage 2					
OVGR (64I)	Stage 1	OFF, 5~80V/1V	Instantaneous Definite	30msec and below 0.050~300.000s/0.001s	-	-
	Stage 2					
OVGR (64D)	Stage 1	OFF, 5~80V/1V	Definite Inverse	0.050~300.000s/0.001s 0.05~1.20/0.01	0~300.00s/0.001s	IEC SI/VI/EI/LI ANSI SI/VI/EI
	Stage 2					
NSOVR (47N)	Stage 1	OFF, 11~120V/1V	Definite	0.050~300.000s/0.001s	-	-
	Stage 2					
POR (47)	Stage 1	OFF, 2.0~100%/1%	Definite	0.050~300.000s/0.001s	-	-
	Stage 2					
Synchro-check (25)	Stage 1	V Diff: OFF, 2~50V/1V Phase Diff: OFF, 5~45/1° F Diff: 0.01~0.50/0.01Hz Dead V: 0.2~0.4Vn/0.01Vn	-	After the synchronous Conditions are satisfied, it operate within 1sec.	-	Synchronous allowable voltage 0.5Vn~1.2Vn
Temperature (38)	Stage 1	OFF, 20~180℃/1℃	Definite	0.050~300.000s/0.001s	-	Range setting required for stage 2 on AI set to relay
	Stage 2					
Reclosing (79)	Stage 1	Reclosing counts: 1 ~ 5 times • Prepare Timer : 0.020 s ~ 60.000 s (0.001 s) • Dead Timer : 5, 0.060 s ~ 300.000 s (0.001 s) • CB Operation Timer : 0.05 s ~ 0.500 s (0.001s) • Reclaim Time : 1.000 s ~ 300.000 s (0.001s) • Scheme : Dead Bus-Dead Line, Dead Bus-Live Line, Live Bus-Dead Line, Live Bus-Live Line • Dead: 0 ~ 0.1Vn • Live: 0.5Vn ~				

* When the relay element OVGR (64I) is operated instantaneously using VectorSum (vector sum, Vo), its operation time will be within 50msec.

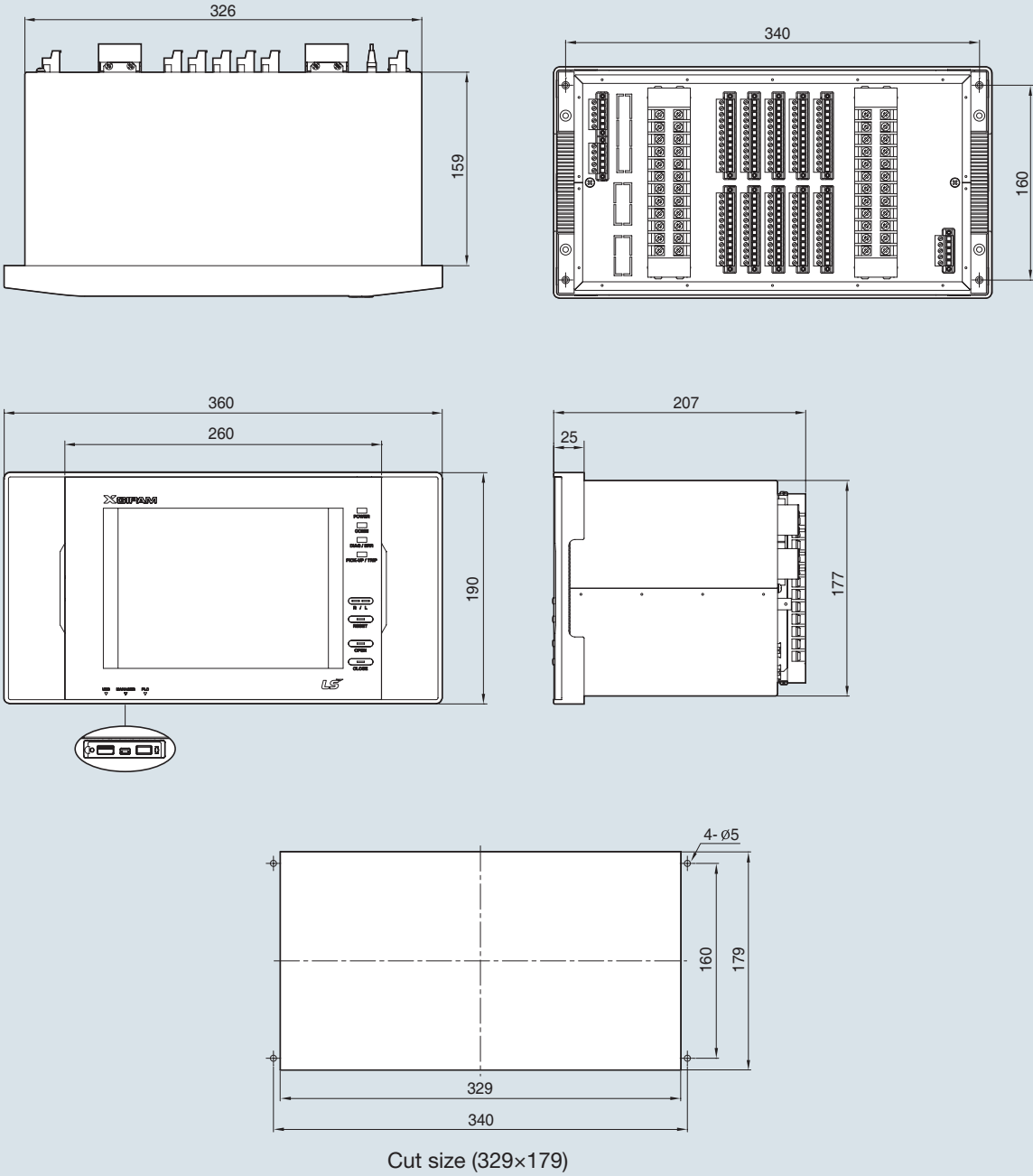
X GIPAM - F/B/M/DG (3P3W) Wiring



* For example is Number 413 described 13 in slot #4

X GIPAM

with integrated HMI)



Susol RMU

Characteristics

- Applicable to renewable electricity generation (wind, solar)
- Configurable TR Container Pack



Susol RMU

Ratings

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

Applicable type



LCL type



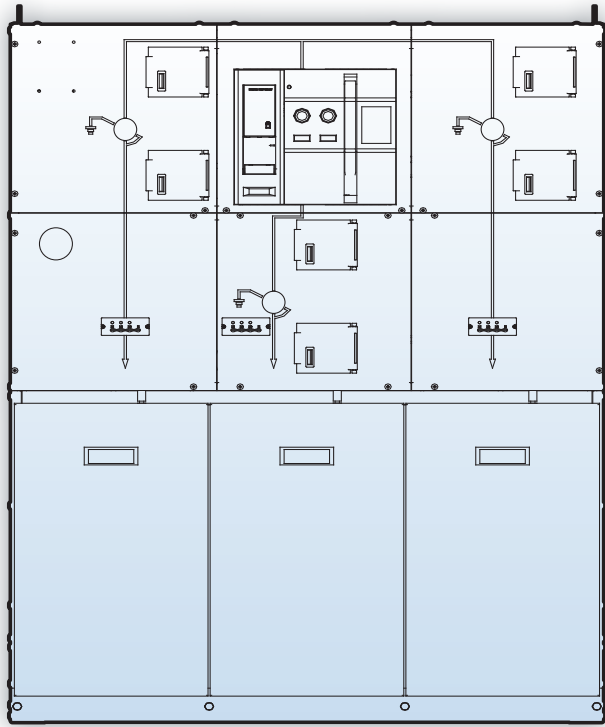
LFL type



Extensible type

Susol RMU

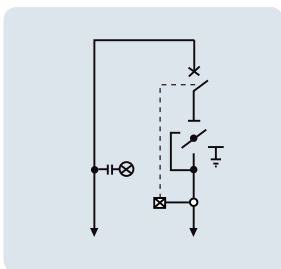
Non-Extensible RMU with CB Feeder



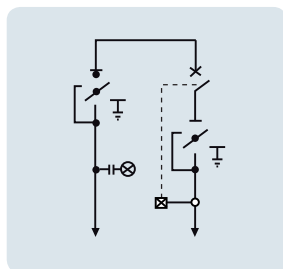
- Consists of two circuit LBS and one circuit CB-DS in a single chamber
- Protects equipment using Circuit Breaker
- Complete Sealing System
- Increases durability through S/S application
- L: Load break switch
- C: Vacuum circuit breaker

Applicable type

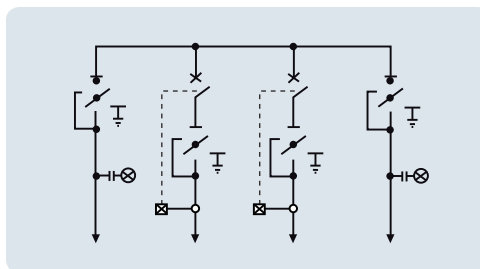
RC (1R1C)



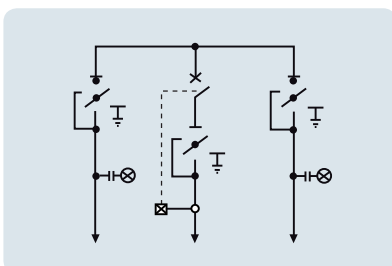
LC (1L1C)



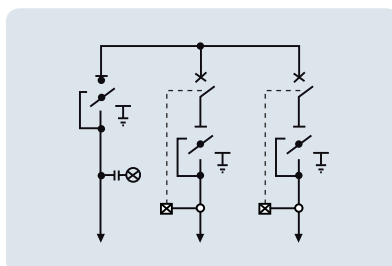
LCCL (2L2C)



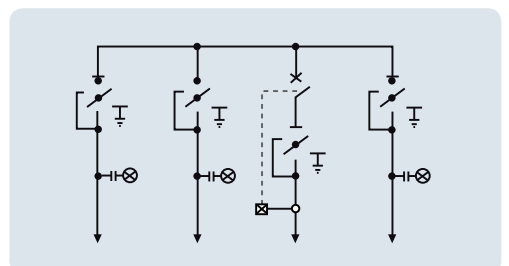
LCL (2L1C)



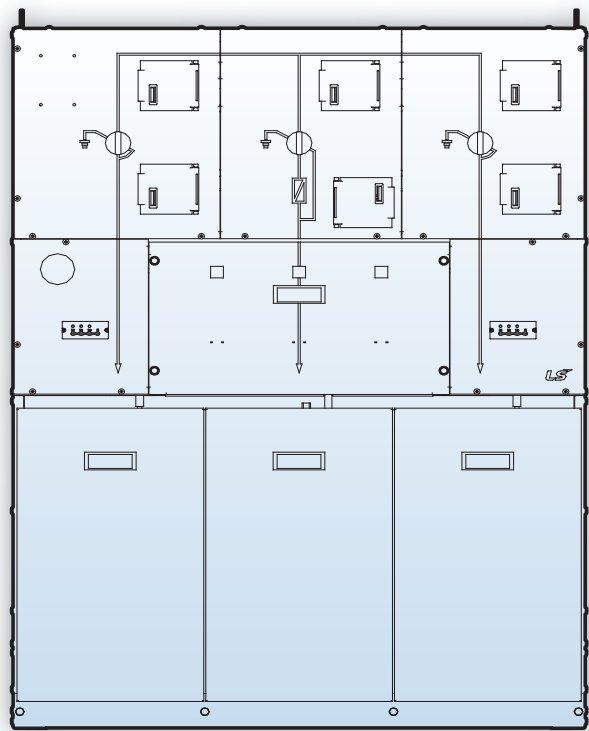
LCC (1L2C)



LLCL (3L1C)



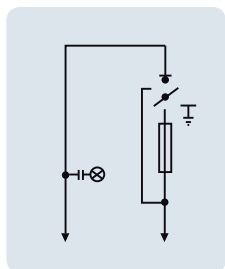
Non-Extensible RMU with Switch-Fuse Feeder



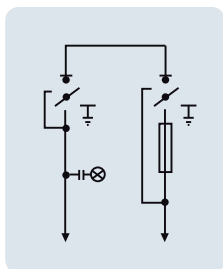
- Consists of two circuit LBS and one circuit Switch-Fuse in a single chamber
- Protects equipment using Switch Fuse
- Complete Sealing System
- Increase durability through S/S application
- L: Load break switch
- C: Vacuum circuit breaker

Applicable type

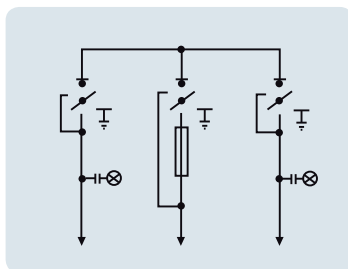
RF (1R1F)



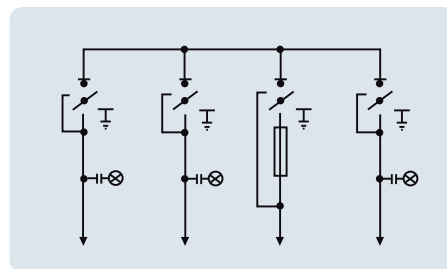
LF (1L1F)



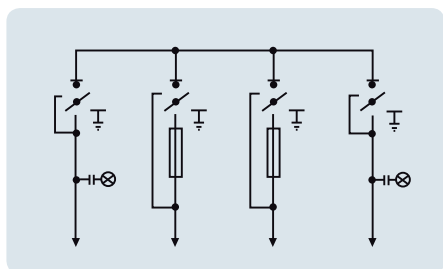
LFL (2L1F)



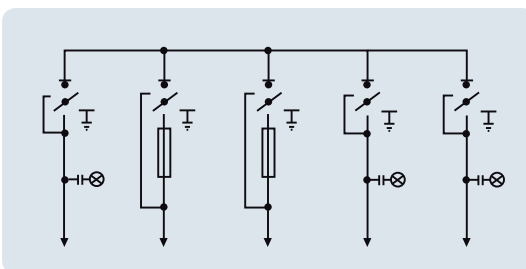
LLFL (3L1F)



LFFL (2L2F)

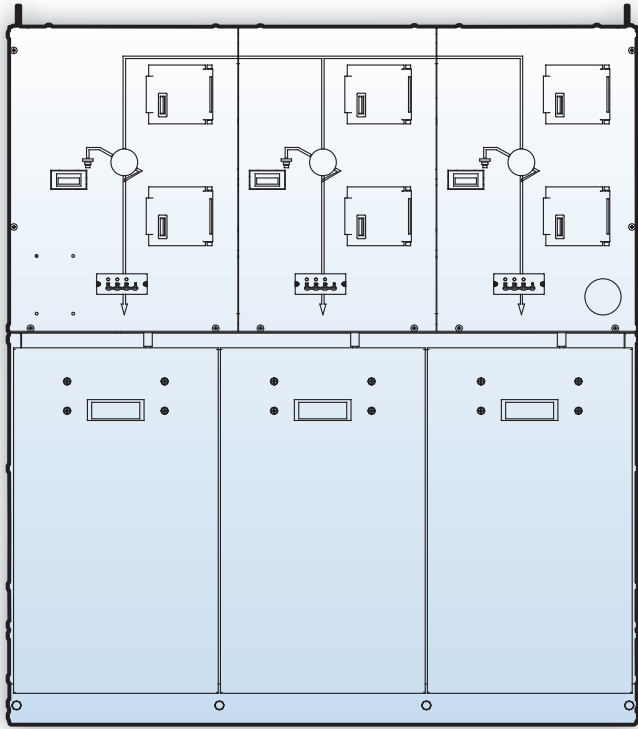


LFLLL (3L2F)



Susol RMU

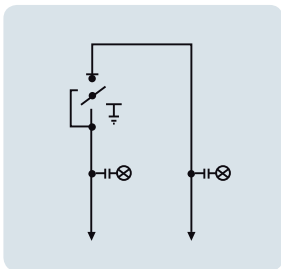
Non-Extensible RMU with LBS Feeder



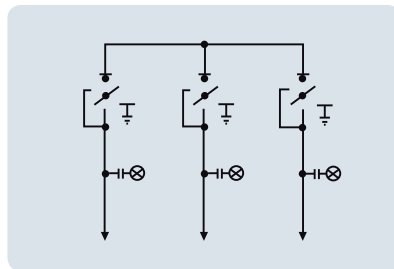
- Complete Sealing System
- Increase durability through S/S application
- L: Load break switch

Applicable type

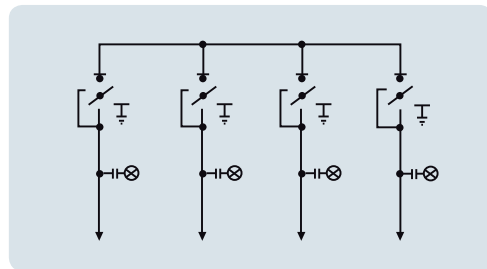
LR (1L1R)



LLL (3L)



LLLL (4L)

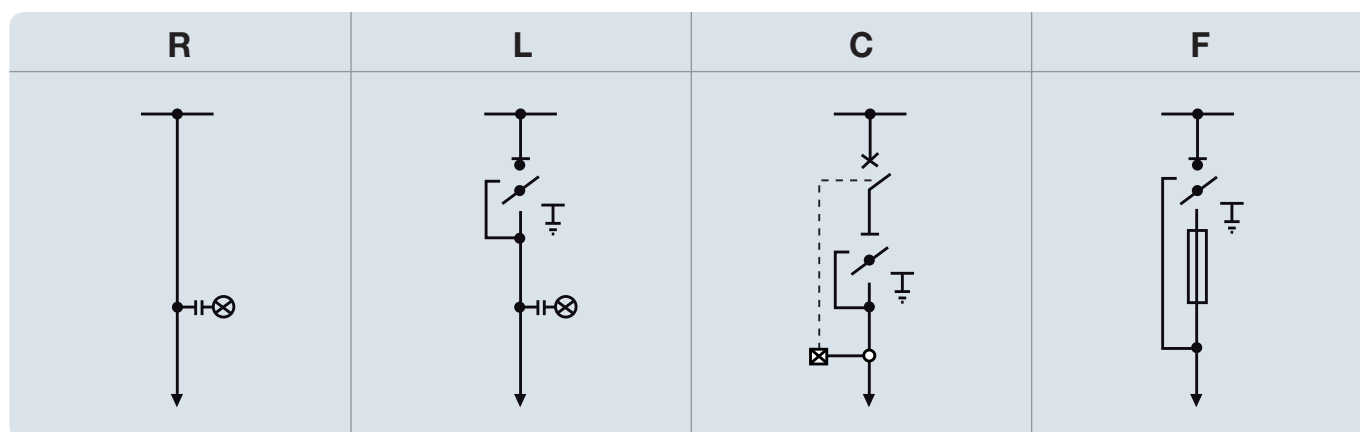


Extensible RMU

- Protects equipment using Switch Fuse
- Complete Sealing System
- Increase durability through S/S application
- L: Load break switch
- C: Vacuum circuit breaker



Applicable type



Susol RMU

Trip Relay

- Performing optimum relay operation
- Overload protection switchfuse
- Ground fault protection
- Remote Trip funtion
- Self Powered
- Viewing fault records via PC Manager



1 LED: Indication of trip information and power status



- 2 Reset key: CPU initialization
- 3 I>: 51T current setting, tI>: 51T time delay and lever setting
- 4 Cv: 51T operation curve setting
- 5 I>>: 51D current setting, tI>>: 51D time delay setting
- 6 In: rated current setting
- 7 Ie>: ground fault current setting, tIe>: ground fault time delay setting
- 8 Communication terminal: PC Manager connection terminal

Optional components

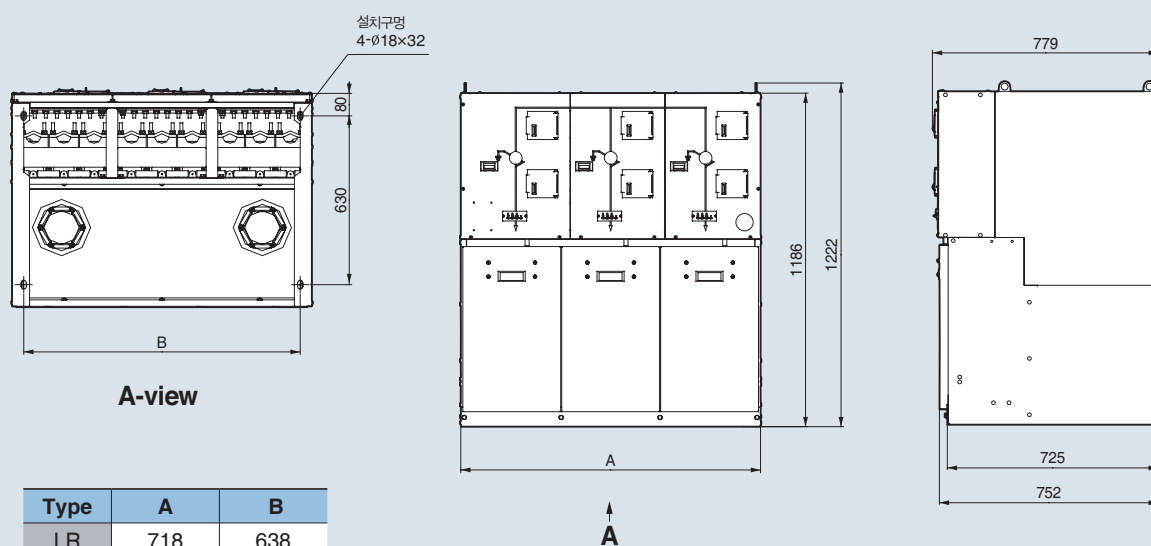
CT (Current transformer)



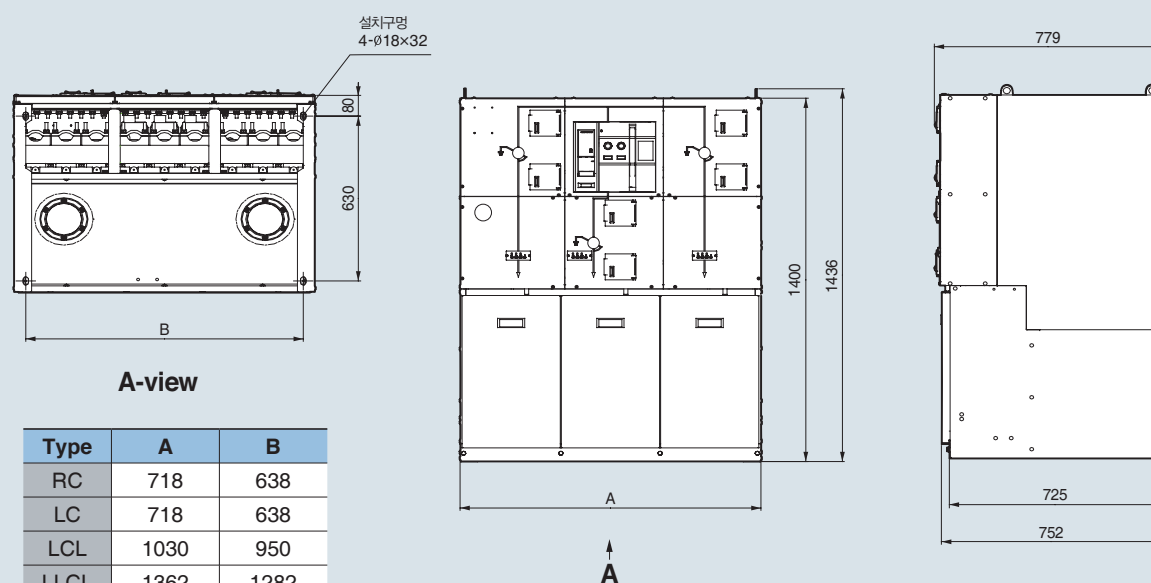
Max. system voltage	kV	0.6
Primary current	A	7.2~230.4
Secondary current	A	0.075
Rated burden	VA	0.1
Accuracy class		10P80
Short time-current	KA / 1s	20
Rated frequency	Hz	50 / 60

Dimensions

1. Load break switch combinations



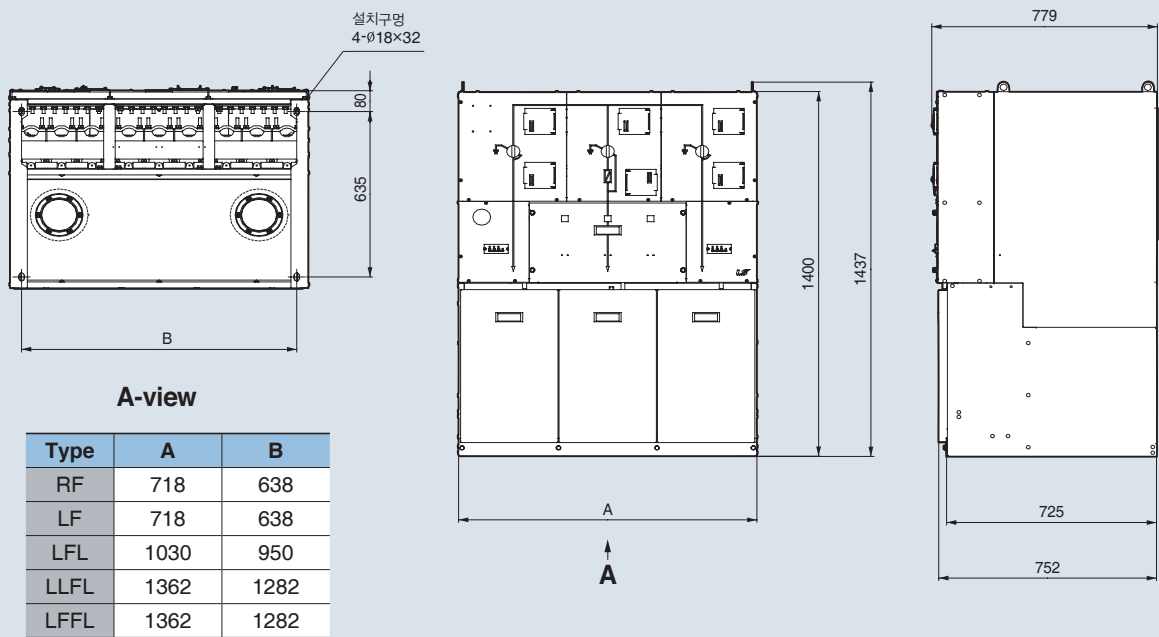
2. Transformer protection by circuit breakers



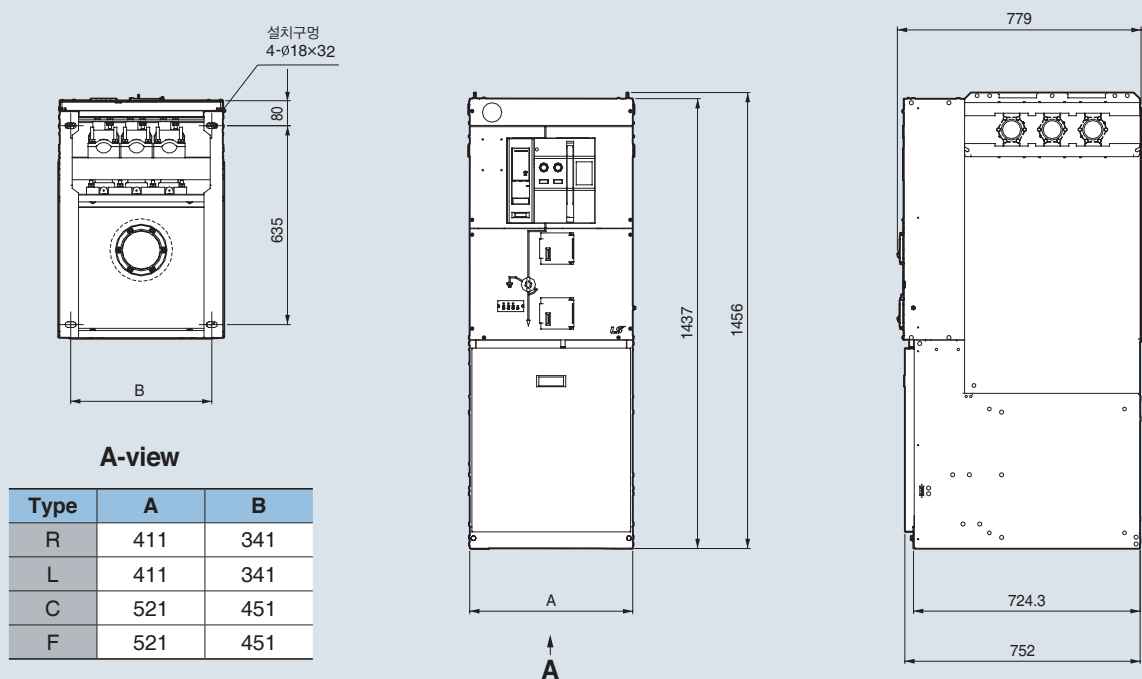
Susol RMU

Dimensions

3. Transformer protection by fuses



4. Extensible type



Cast Resin Transformer

Characteristics

- Applicable to wind power plant
- Superior shock voltage (125kV BIL)
- Strengthening seismic performance (scale 8.0)
- Low noise and high efficiency
- Up to 36kV voltage and 25MVA capacity



Ratings

Division			Standard specification					
Installation place			Indoor(Enclosure needed for outdoor)					
Applicable standard			KS C 4311					
Frequency			60					
Insulation kind			F type					
Coil temperature rise			100K					
1st rated voltage	kA		22.9kV			6.6 or 3.3kV		
1st tap voltage	V		F23900-R22900-21900-20900-19900			F6900-R6600-6300-6000-5700 F3450-R3300-3150-3000-2850		
2nd rated voltage			6.6 or 3.3kV	380-220V	220-110V	380-220V	220-110V	
Phase			3P	3P	1P	3P	1P	
Angular displacement			Dd0	Dyn11	-	Dyn11	-	
Impulse withstand voltage	(1st/ 2nd)	kV	95 / 40(20) 125 / 40(20)	95 / - 125 / -	95 / - 125 / -	40(20) / -	40(20) / -	
Normal frequency withstand voltage	(1st/ 2nd)	kV	50 / 20(10)	50 / 3	50 / 3	20(10) / 3	20(10) / 3	
Rated capacity	kVA			100	100	100	100	
				200	200	200	200	
				300	300	300	300	
				400	400	400	400	
			500	500	500	500	500	
			600	600	600	600	600	
			750	750	750	750	750	
			1000	1000	1000	1000	1000	
			1250	1250		1250		
			1500	1500		1500		
			2000	2000		2000		
			2500	2500		2500		
			3000	3000		3000		
			4000					
			5000					
			6000					
			7500					
			8500					
			10000					

* The above descriptions are standard specifications, but other specifications are available according to orders. (~36kV, ~25MVA)

* The () in the impulse withstand voltage and the normal frequency withstand voltage is insulation classes for 3.6kV.

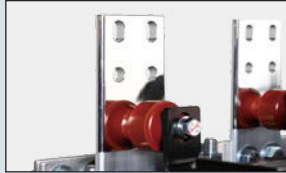
Cast Resin Transformer

Standard components



1st terminal

This is connected to the inlet cable, so check the bolt tightening condition before inputting power.



2nd terminal

This is connected to the flexible bus and cable in the 2nd load side, so check the bolt tightening condition before inputting power.



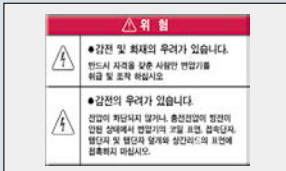
Grounding terminal

This is attached on the bottom frame, so check the grounding condition before inputting power.



Tap change terminal

To change the 2nd voltage of the transformer, turn off the tap and adjust the tap terminal.



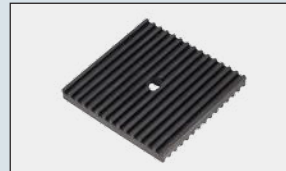
Danger mark

Touching the coil surface during operation of the transformer can cause danger, so never touch it during operation



Lifting eye

This is attached on the top of the top frame, so use it to lift the trans-former.



Cushion rubber

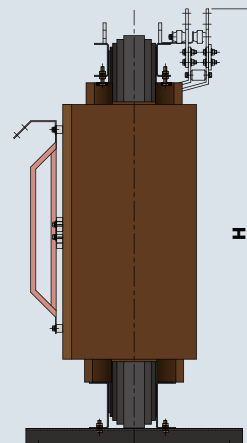
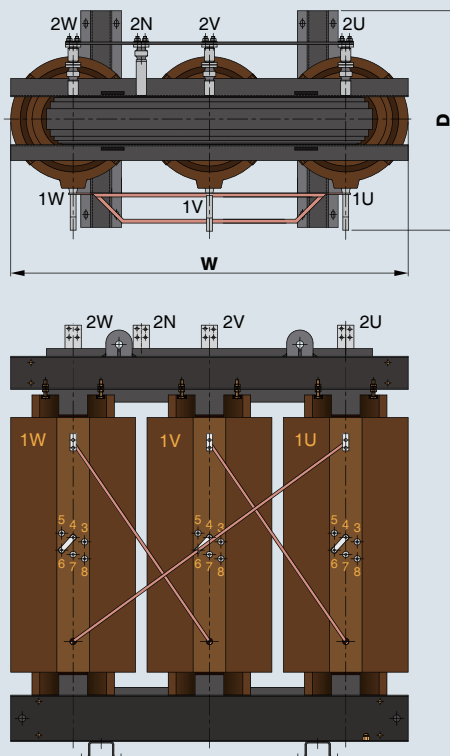
Insert cushion rubber between the transformer bed frame and the ground to prevent iron core vibrations from transferring to the floor during operation to reduce noises.



Tap change terminal cover Insulate

The conductor part of the tap terminals to secure an insulation distance and improve safety.

Dimensions



Installation and operation conditions

Pre-checking and maintenance are essential to increase the lifespan and efficiency of the product. Maintaining by all means because the maintenance of cast resin transformers is simple compared to other kinds.

Checkpoints when installing cast resin transformers

- **Installation condition**

- The installation place shall be clean, have no worry of flooding, and have no danger of water falling from the ceiling.
- The installation place shall have a ventilation structure to ventilate the heat generated from the transformer enough.

- **Checking of cast resin transformers that are in a long-term storage condition**

- If dust is accumulated after long-term storage of cast resin transformers, then remove dust using a vacuum cleaner or blow out dust using a compressor and wipe out dust using a dry cloth.

- **The vinyl packing for prevention of foreign substances such as dust, screws, nuts and washers from invading shall be maintained until power is inputted after installation.**

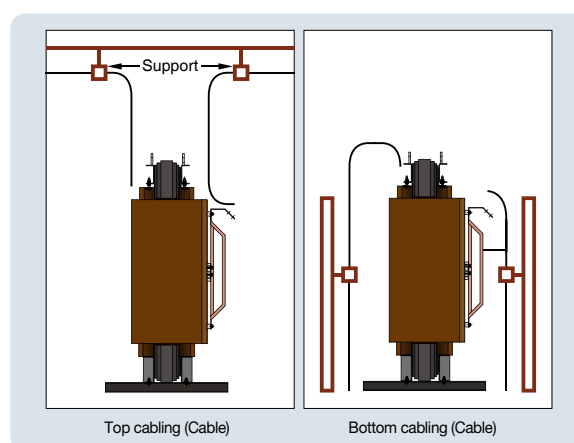
- **Torque management when connecting the low voltage terminal**

Bolt	M8	M10	M12	M16
Torque	125	250	405	1500

Unit: kgf.cm

Caution when connecting the terminals

When connecting cables or busbars to the 1st, 2nd terminals, avoid mechanical stresses to the 1st, 2nd terminals, and especially when connecting busbars, use flexible busbars by all means to reduce mechanical stresses due to transformer vibrations. Connecting busbars directly to the 1st, 2nd terminals can loosen the connection parts or cause abnormal noises due to transformer vibrations during operation.



How to minimize transformer noises when installing transformers

- Install cushion rubber beneath the bed frame.
- When installing transformers, separate them mechanically from their enclosures to prevent vibrations of the enclosures.
- When connecting terminals, use flexible busbars.
- The transformer installation places shall be rigid and maintain horizons well.
- Large-capacity transformers shall be installed near pillars of the building to reduce vibrations.
- Avoid corners of the wall for installation.
- Install non-flammable sound-absorbing materials inside the panels if necessary.

Cast Resin Transformer

Considerations for ventilation

Vent height and vent area

- In the case of natural cooling, ventilation of the enclosure shall discharge the heat generated from total heat loss of the transformer enough via natural convection.
- Proper ventilation is realized by the inflow of cold air from the inlet A and the outflow of hot air through the outlet A' located at a height H.

Forced ventilation

- When the average ambient temperature is higher than 20°C or the transformer is operated often in an overload condition, forced ventilation using fans is necessary if the vent area is less than the standard.

$$A = \frac{HL}{0.1 \sqrt{H \Delta \theta a^3}} \quad (m^2)$$

$$A' > A \times 110\%(\text{min.})$$

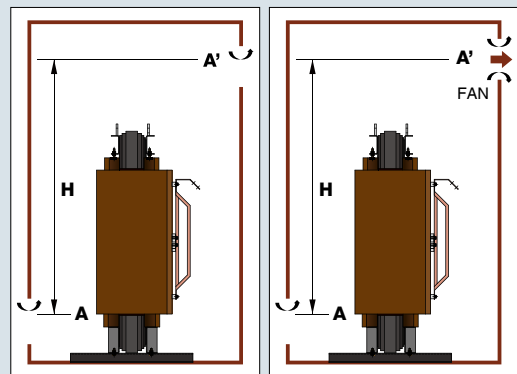
A : Required inlet area (m²)

A' : Required outlet area (m²)

$\Delta \theta a$: Air temperature rise (K) = 15K (Approximate value)

HL : Heat loss (kW)

H : Distance from the center of the outlet and the center of the TR (m)



Minimum isolation distance

- Epoxy resin surface - Ground
- Insulation-reinforced inter-phase lead surface – Insulation cable

Voltage	Withstand voltage (kV)	Impulse voltage (kV)	Isolation distance (mm)
1.1kV or less	3	-	10
6.6kV or less	20	60	50
15kV or less	38	75	70
22.9kV or less	50	95	100
		125	150

Checkpoints before receiving power

- Remove the packing vinyl cover and check the wiring condition, isolation distance, foreign substance residuals, component breakage, bolt torque, etc.
- Check if the wiring was realized according to the nameplate.
- Measure the insulation resistance using a DC1000V insulation tester(Megger).

Maintenance / Repair

General use environment

Remove dust using a vacuum cleaner and blow out the overaccumulated dust using a dry compressor every year. the cleaning period can differ depending on the use environment. during maintenance work, check the bolt mounting conditions using a torque wrench.

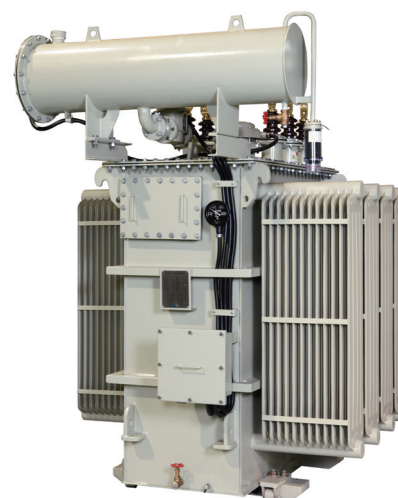
A/S requesting method

If transformer-related A/S is necessary, tell the serial number on the nameplate of the cast resin transformer and the phenomenon exactly for quick and exact A/S.

Oil-Immersed Transformer

Characteristics

- Applicable to solar/wind power plant
- Mobile transformer (Connection type)
- Quality control through multiple tests
- Various accessories available
- Up to 72kV voltage and 80MVA capacity



LSIS transformer adopts a structure that can reduce the loss, and it ensures the electrical stability of the transformer by selecting the high efficiency and the optimum insulation structure. Also, it realizes the optimum cooling system, seismic condition considering the short-circuit mechanical power and external shock occurred in the transformer in case of system failure. And strong design of structure that can endure the impact during transportation.

Ratings

Applicable specifications		
Applicable standard		IEC 60076 / ANSI(IEEE) C57
Installation location		Outdoor / Indoor
Frequency		50 / 60Hz
Thermal class		A type 105℃
Winding temp. rising		65K
Oil Temp. rising		60K
Cooling method	Internal	ON / OF / OD
	External	AN / AF / WF
Voltage		Up to 69kV
Capacity (MVA)		Up to 80MVA
Conductor		Al or Cu

Oil-Immersed Transformer

Standard components



Tap changer

The tap changer is a device for adjusting the voltage, No load tap changer and on-load tap-changer, etc. use.



Breather

Breather is used to prevent deterioration and aging of insulating oil. It consists of two containers filled with moisture absorbent and insulating oil.

* 3000kVA or less is not required.



Winding temperature indicator

Winding temperature indicator do not directly measure the winding temperature but indirectly measure it using a current transformer (BCT) and a temperature detector. It can be used by alarm or break contact.



Oil temperature indicator

Oil temperature indicator is located in the protective pipe attached to the transformer enclosure and indicates the temperature of oil level of the top of transformer during operation. It can be used by alarm or break contact.



Oil level gauge

This displays the height of the oil level of the tank and the conservator.



Buchholz relay

Buchholz relay is installed between the pipes connecting the transformer and the controller. Alarm and trip signal is generated by detecting changes of gas and flow rate when any internal error occurs.



Pressure relief device

Pressure relief device releases the pressure generated by an accident of the transformer to the outside air, and is attached to the cover of the transformer enclosure. It has a alarm and a break contact.



Sudden pressure relay

Sudden pressure relay is operated at the time of accident such as short circuit and flash over of the transformer, and has alarm and trip contact.



Conservator

It is responsible for contraction and expansion of insulation oil due to changes in oil temperature.

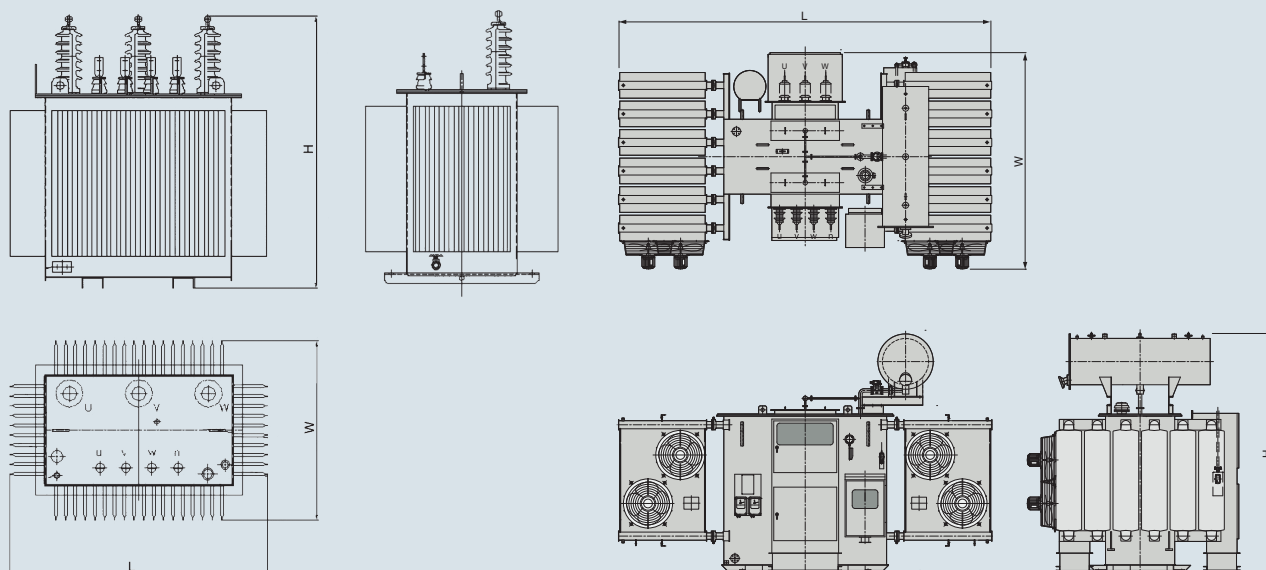
* 3000kVA or less is not required.



Ratings

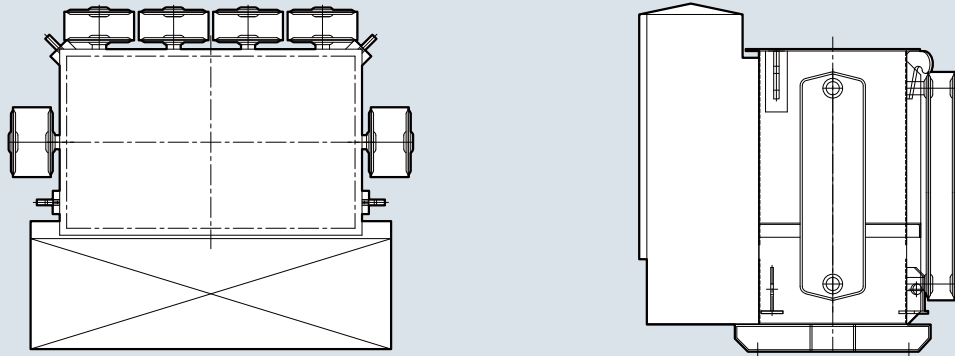
Applicable specifications	
Applicable standard	ANSI, IEEE, NEMA and IEC
Voltage	Up to 138kV
Capacity	Up to 50MVA
Available fluids	Mineral oil, silicon oil and FR3 (Vegetable oil)
Tap changer type	DETC and OLTC

Dimensions



Oil-Immersed Transformer

Dimensions



Information required for Order

1. Details of markings to be applied to the transformer (for example IEC 60076-1 or ANSI/IEEE 57.12.40)
2. Constant of the system
3. Frequency
4. Cooling type (for example, self-cooling or forced cooling)
5. Rated voltages of primary and secondary windings
6. Whether tabs are required Mark type of tap changer, if necessary
7. Number and range of tabs
8. The maximum voltage of the device for each winding
9. Method of system grounding (for each winding)
10. Isolation rating for each winding
11. Winding symbol and neutral terminal (Vector Group)
12. Characteristics of installation, assembly, transportation and handling Limitations on Dimensions and Weights
13. Auxiliary power (fans, switches, alarms, etc.)
14. Attachment location of other necessary equipment, instruments and nameplate
15. Types of Oil Preservation Methods
16. For multi-winding transformers, especially in case of multi-winding single phase transformers, active and reactive outputs are required for combination and statement of power load.
17. Specified impedance for a pair of windings, in case of a short-circuit impedance multi-winding transformer
18. Altitude, when it exceeds 1,000m above sea level
19. Installation area where seismic activity is expected
20. Possibility of unbalanced load Describe unbalanced conditions if possible
21. Frequent overcurrent effects of the transformer
22. Overload of the intended periodic cycle
23. Whether an parallel operation is used or not

Memo



A PROVIDER OF LEADING SOLUTIONS TO THE WORLD

Following a strategic separation from the LG Group in 2003, LSIS has achieved accelerated growth to become a paradigm of successful corporate segmentation. The LS Group is currently made up of 24 subsidiaries, with 7 of them being key players within the group by holding the number 1 position in their respective fields. the LS Group's advanced technology and customer-oriented solutions will be fully utilized to develop each and every one of its subsidiaries into a global leader.



We open up a brighter future through
efficient and convenient energy solutions.



Safety Instructions

- For your safety, please read user's manual thoroughly before operating.
- Contact the nearest authorized service facility for examination, repair, or adjustment.
- Please contact qualified service technician when you need maintenance.
Do not disassemble or repair by yourself!
- Any maintenance and inspection shall be performed by the personnel having expertise concerned.



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