



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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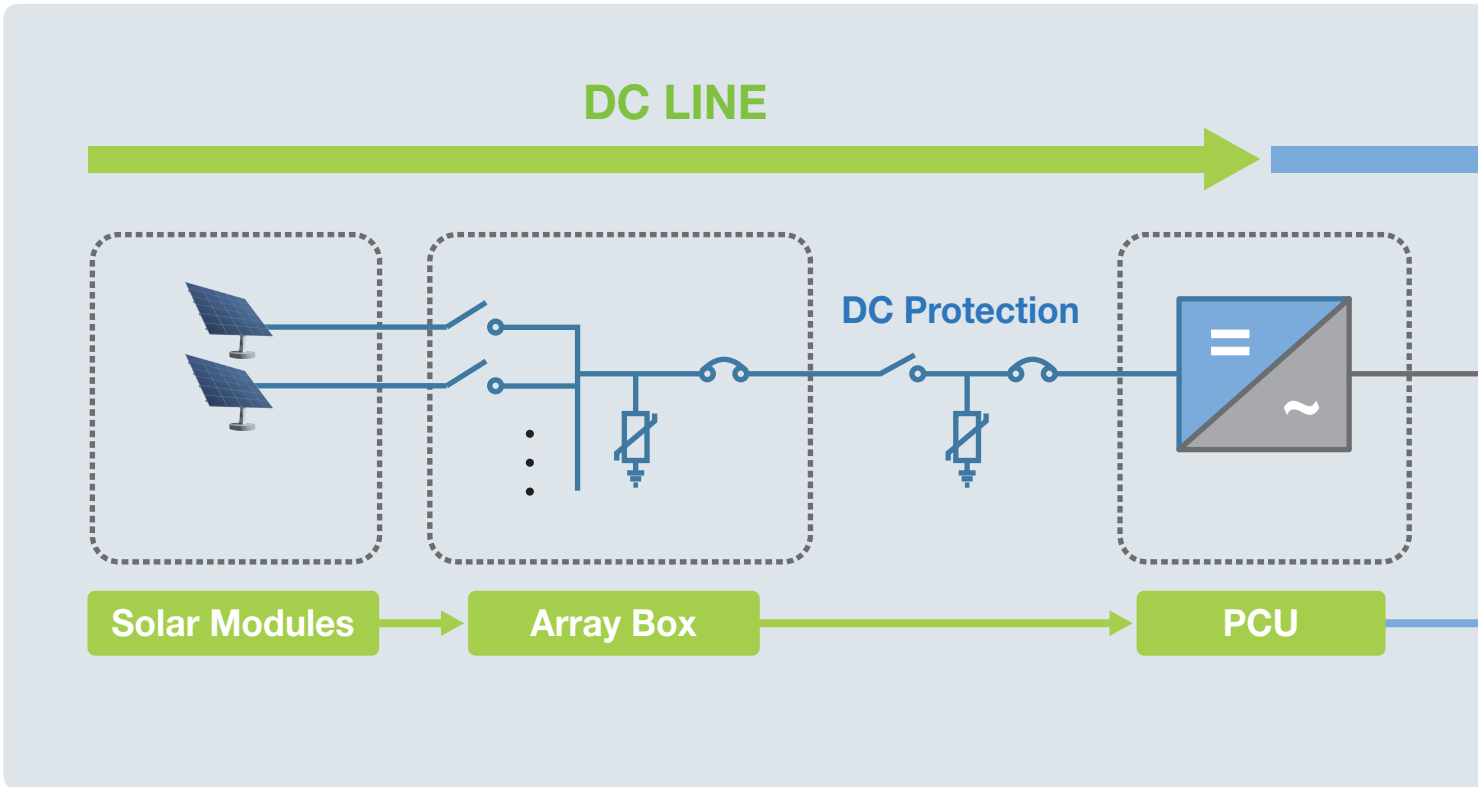
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Products for Photovoltaic Power Generation



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.36 Switch Disconnecter



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

P.28 DC MCB



- BK63H**
- In 1~63A
 - Ue DC 250~1000V
 - Icu 10kA

P.30 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.60 High Voltage DC Relay



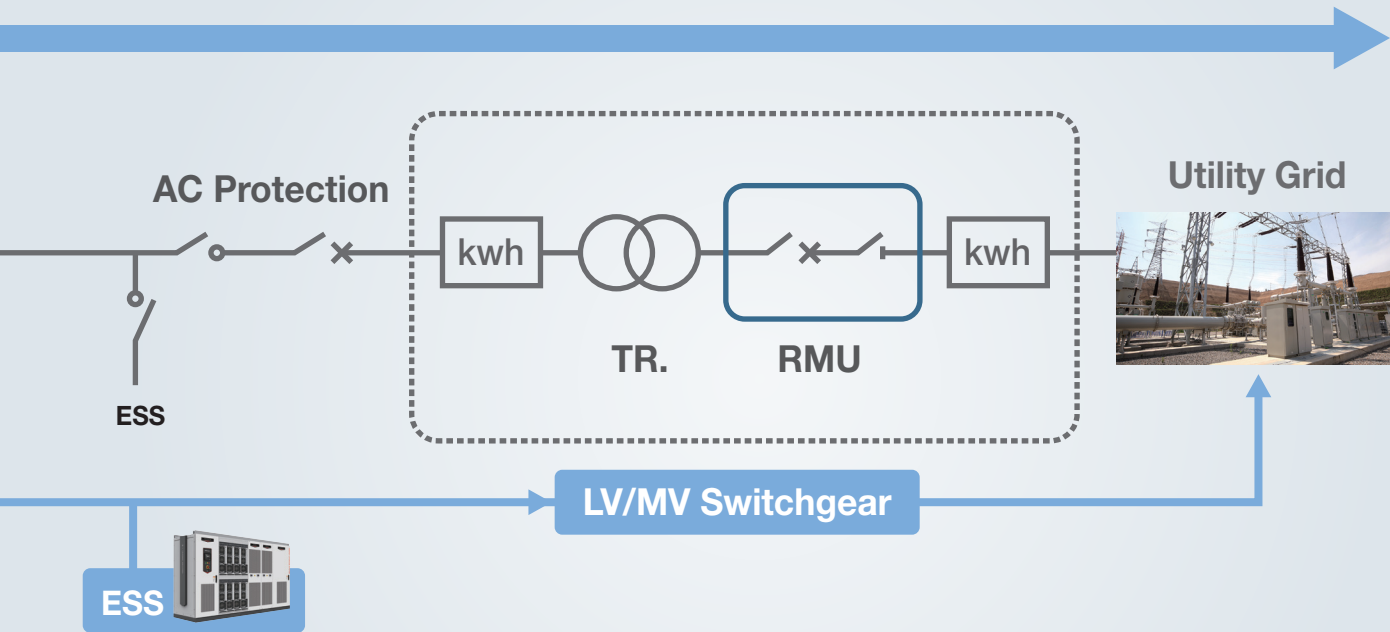
- GPR010~GPR-H500-A**
- Ie 10~500A
 - Ue 450~1500V

P.32 DC SPD



- BK20S-DC1500**
- Un DC 110~1500V
 - Up ≤1.0~4.5kV
 - I_{max} 40kA
 - t_a <25ns

AC LINE



P.72 MCCB



TS1000~1600

- In 1000~1600A
- Icu 50~150kA
- AC 380/415V

P.123 Contactors



MC-1260a, 2650a

- Ie 1260~2650A
- Ue AC 1000V
- Coil: AC 100~240V
DC 100~220V

P.153 Cast Resin TR



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

P.143 RMU



- Rated Voltage: Up to 36kV
- Ir: 630A
- Isc 21kA/3s
- M1/E3
- IAC AFAL 21kA/0.5s

P.81 ACB



AH

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

P.139 X-GIPAM



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

P.157 Oil Immersed TR.



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

P.143 Packaged Solution

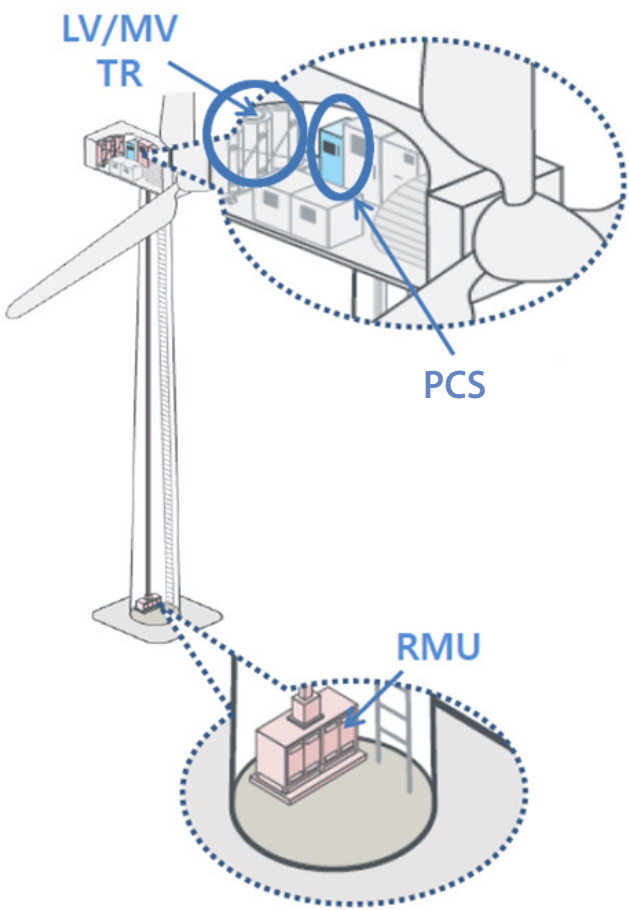
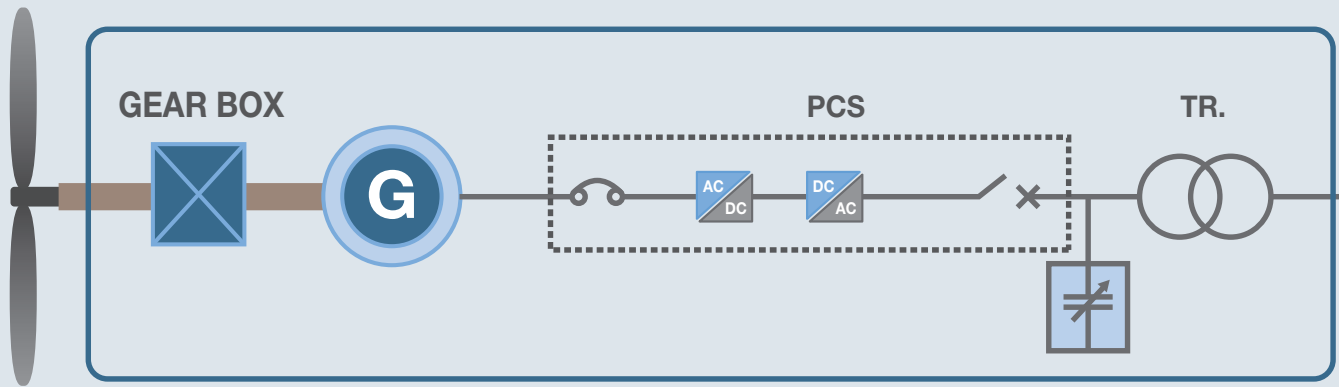


RMU+TR+LV



RMU+TR+PCU

Products for Grid Protection of Wind Power



P.72 MCCB



- TS1000~1600**
- In 1000~1600A
 - Icu 50~150kA
 - AC 380/415V

P.81 ACB

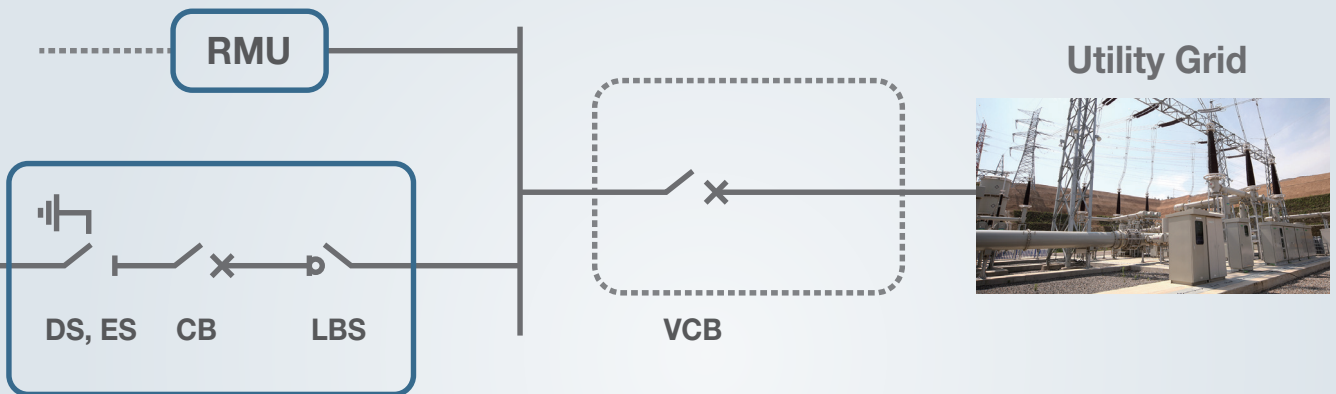


- AH**
- In 630~6300A
 - Icu 65~150kA
 - Ue 690V

P.30 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.153 Cast Resin TR.



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

P.143 RMU



- Rated Voltage: Up to 36kV
- Ir: 630A
- Isc: 21kA/3s
- M1/E3
- IAC AFAL 21kA/0.5s

P.101 VCB



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

P.157 Oil Immersed TR.



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

- CSS (RMU+TR+LV)

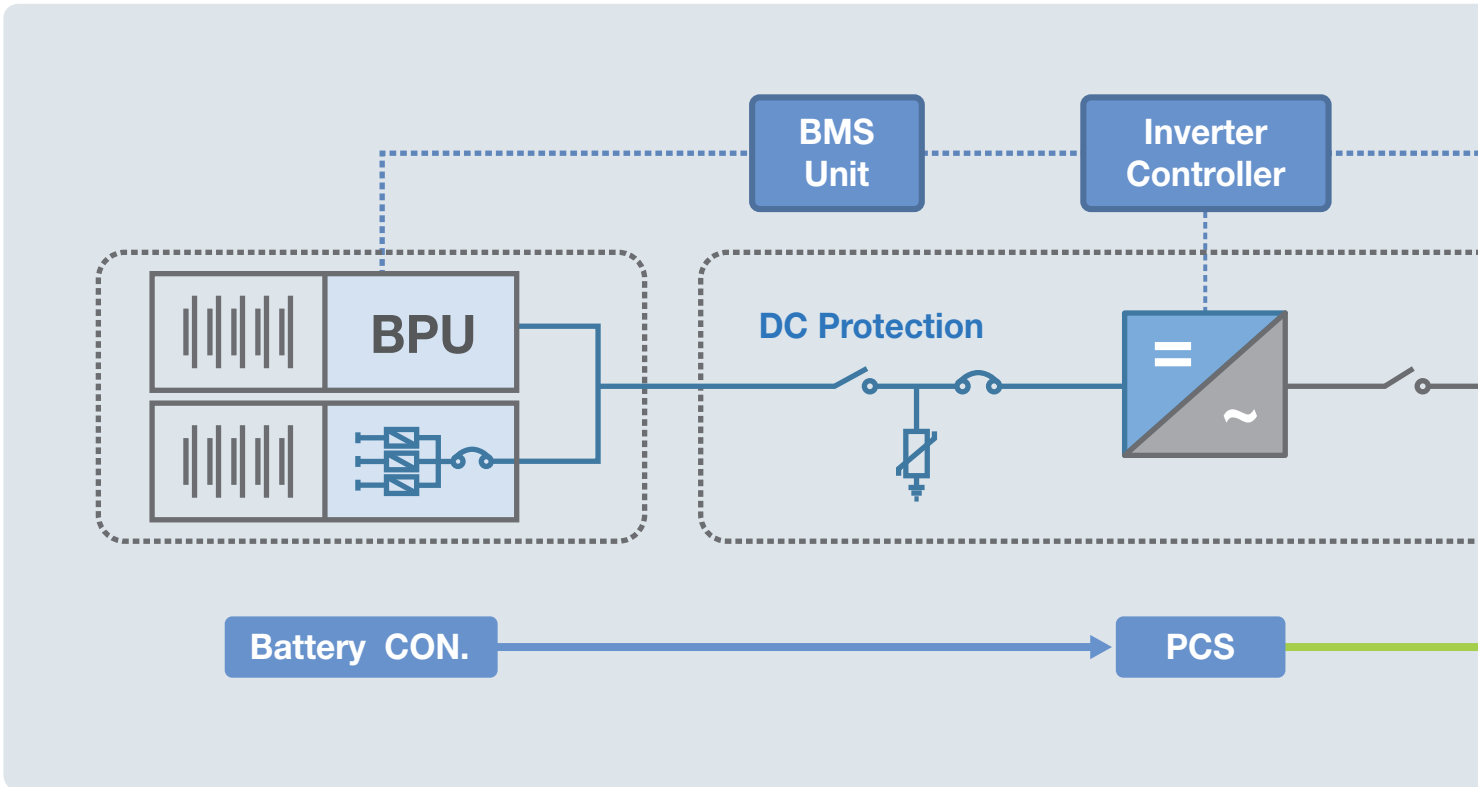


P.103 CB Compartment



- 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.30 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.36 Switch Disconnecter



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

P.123 Contactor



- MC-1260a, 2650a**
- Ie 1260~2650A
 - Ue AC 1000V
 - Coil: AC 100~240V
 - DC 100~220V

P.60 High Voltage DC Relay



- GPR010~GPR-H500-A**
- Ie 10~500A
 - Ue 450~1500V

P.32 DC SPD

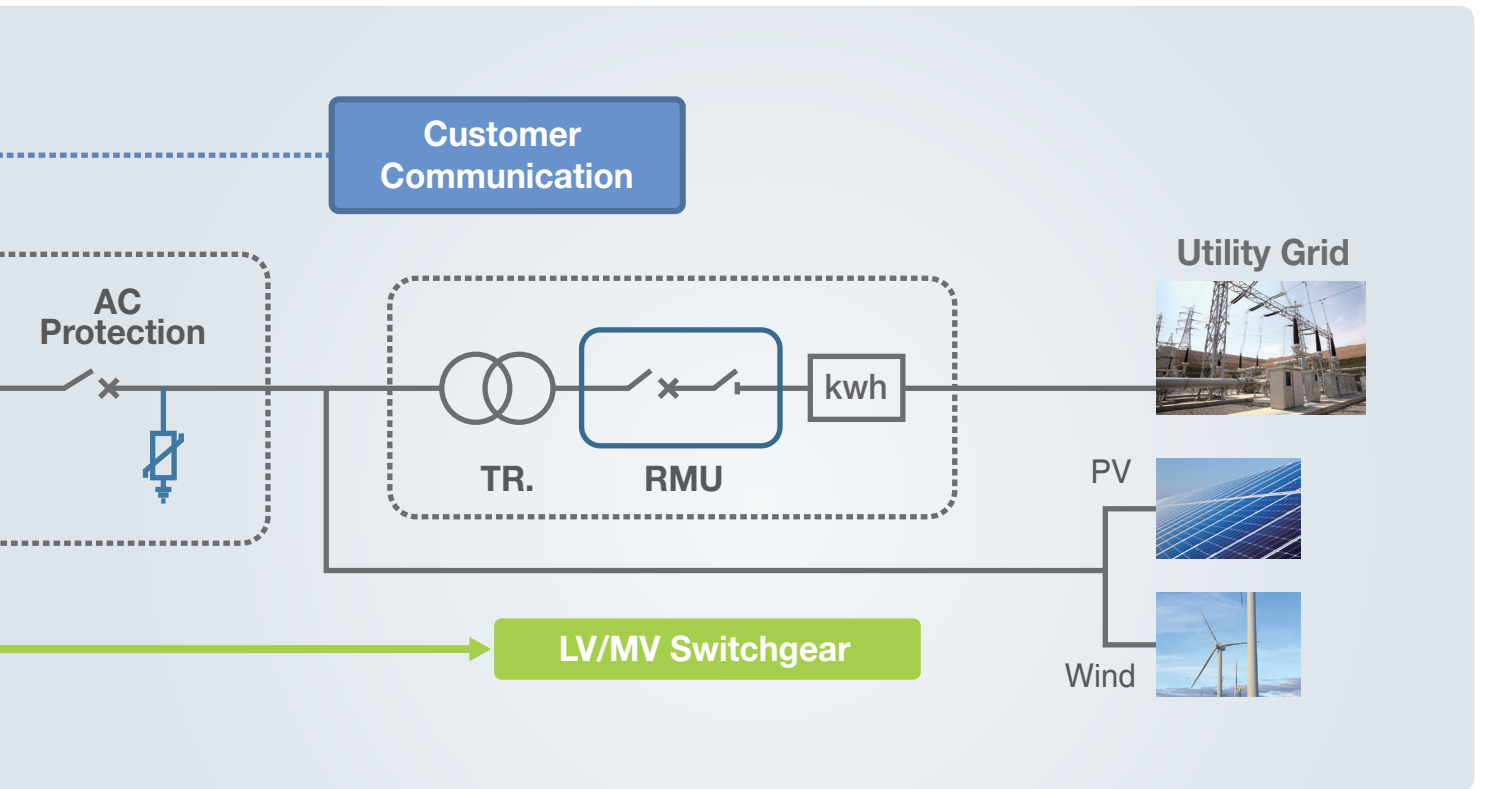


- BK20S-DC1500**
- Un DC 110~1500V
 - Up ≤1.0~4.5kV
 - I_{max} 40kA
 - t_a <25ns

P.135 Busways



- SS type**
- In AL 630~6000A
 - Cu 630~7500A
 - I_{sc} Al 4000A/200kA
 - Cu 4000A/220kA for 1s



P.72 MCCB



TS1000~1600

- In 1000~1600A
- Icu 50~150kA
- AC 380/415V

P.153 Cast Resin TR.



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

P.143 RMU



- Rated Voltage: Up to 36kV
- Ir: 630A
- Isc 21kA/3s
- M1/E3
- IAC AFAL 21kA/0.5s

P.101 VCB



VL~25

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

P.81 ACB



AH

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

P.157 Oil Immersed TR.



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

P.139 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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DC Contactors	30
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DC ACB	34
DC Switch Disconnecter	36
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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



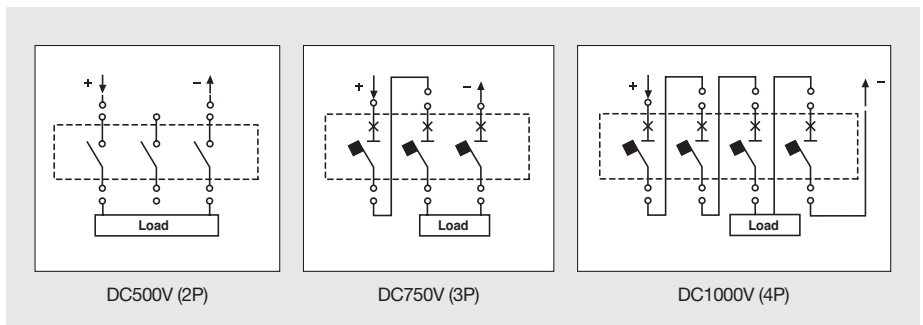
Rating

Model		TD100	TD160	TS100	TS160	TS250	TS400	TS630	TS800
Frame size (AF)		100	160	100	160	250	400	630	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	300, 400	500, 630	700 ^{Note 5)} , 800
No. of poles (Pole)		2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 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	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	1000	1000	1000
Rated impulse withstand voltage Uimp (kV)		8	8	8	8	8	8	8	8
Rated ultimate short-circuit breaking capacity, Icu (kA)	Type	H	H	H	H	H	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
Trip Unit ^{Note 4)} Function	1000VDC (4P)	40	40	40	40	40	40	40	40
	FTU	●	●	●	●	●	●	●	●
	FMU	●	●	●	●	●	●	●	●
	ATU	-	-	-	●	●	●	●	●

Note)

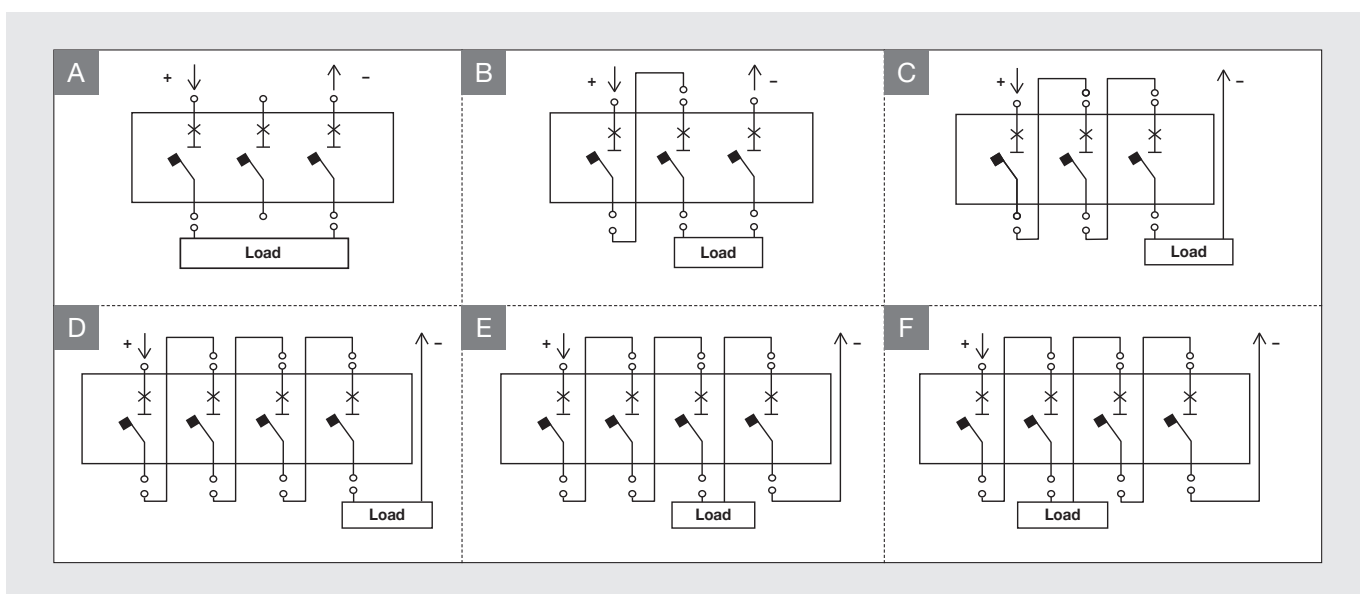
1. TD100/TD160 is the same Construction Frame.
2. TS100/TS160/TS250 is the same Construction Frame.
3. TS400/TS630 is the same Construction Frame.
4. Trip Unit Function have 3 Types (FTU/FMU/ATU)
 - FTU : Fixed thermal, fixed magnetic unit
 - FMU : Adjustable thermal, fixed magnetic unit
 - ATU : Adjustable thermal, adjustable magnetic unit
 (Not applicable to TS160 100A ATU)
5. 700A is only available for TS800FTU
6. 4Pole type MCCB is 4P4T.

DC Exemplary circuit diagrams



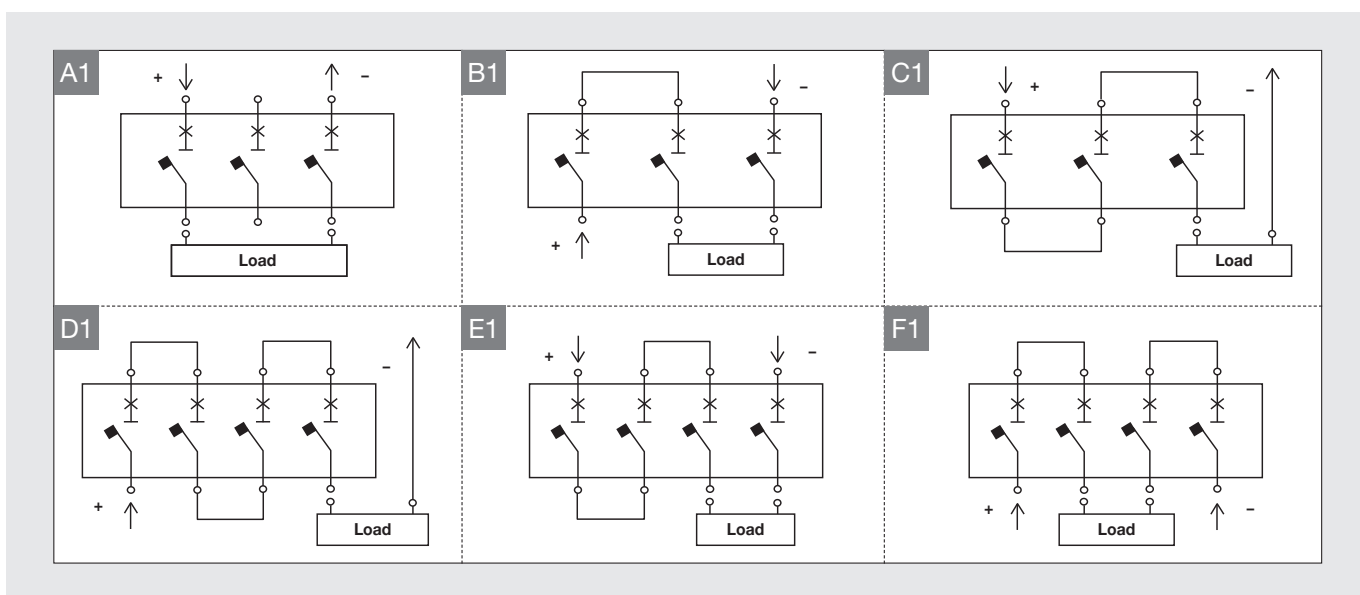
Connection method by DC voltage

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

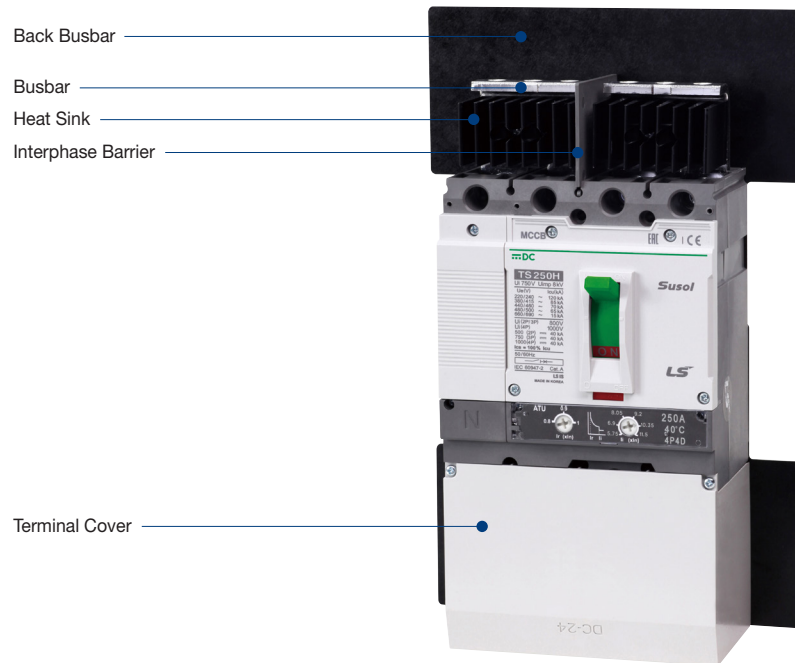
Operating voltage (DC)	Center point Connected to earth (A)	One pole connected to earth (B)	Insulated from Earth (C)
~250V	A1	A1	A1
~500V	A1	B1, C1	A1
~750V	F1	C1, E1	B1
~1000V	F1	D1	E1, F1



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

DC MCCB (100~800AF)

Susol MCCB PV up to 800A

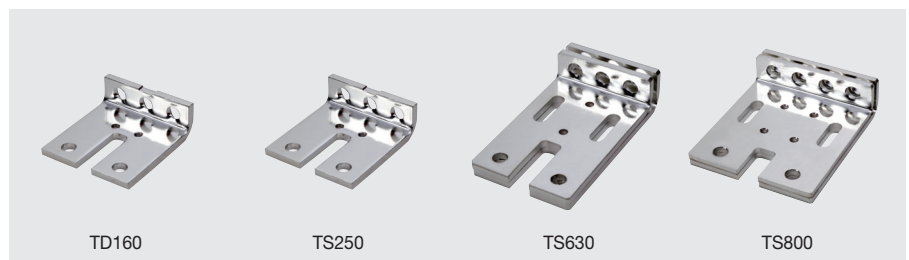


Accessories

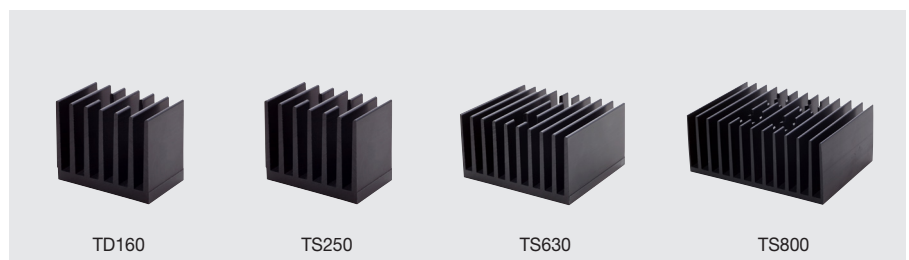
Terminal cover



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
TD100	16	16	TD160 Busbar 5t
	20	20	
	25	25	
	32	32	
	40	40	
	50	50	
	63	63	
	80	80	
TD160	100	100	TD160 Busbar 5t + Heat Sink
	125	113	
	160	144	
	125	125	
TS100	160	160	TS250 Busbar 5t
	40	40	
	50	50	
	63	63	
	80	80	
TS160	100	100	TS250 Busbar 5t
	125	125	
	160	160	
TS250	125	125	TS250 Busbar 5t + Heat Sink
	160	160	
	200	180	
	250	200	
	200	200	
TS400	250	250	TS630 Busbar Lower & Upper 6t
	300	300	
	400	360	
TS630	400	400	TS630 Busbar Lower & Upper 6t+Heat Sink
	500	400	TS630 Busbar Lower & Upper 6t
	550	440	TS630 Busbar Lower & Upper 6t
	500	500	TS630 Busbar Lower & Upper 6t+Heat Sink
	550	550	TS630 Busbar Lower & Upper 6t+Heat Sink
TS800	700 *	630	TS800 Busbar Lower & Upper 6t
	800	640	TS800 Busbar Lower & Upper 6t
	700 *	700	TS800 Busbar Lower & Upper 6t+Heat Sink
	800	800	TS800 Busbar Lower & Upper 6t+Heat Sink

Note) 1. * Only available for TS800 FTU

2. Dimension on the connection & busbar.

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℃			
TD100	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%	
TD160	100	100	100%	100	100%	100	100%	100	100%	100	100%	98	98%	95	95%	89	89%	83	83%	TD160 Busbar 5t + Heat Sink
	100	100	100%	100	100%	100	100%	100	100%	100	100%	98	98%	95	95%	89	89%	83	83%	
	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%	
TS100	125	125	100%	125	100%	125	100%	125	100%	125	100%	122	98%	119	95%	111	89%	104	83%	TS250 Busbar 5t
	160	160	100%	160	100%	160	100%	160	100%	160	100%	155	97%	150	94%	141	88%	131	82%	
	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%	
TS160	80	80	100%	80	100%	80	100%	80	100%	80	100%	78	98%	76	95%	71	89%	66	83%	TS250 Busbar 5t
	100	100	100%	100	100%	100	100%	100	100%	100	100%	98	98%	95	95%	89	89%	83	83%	
	100	100	100%	100	100%	100	100%	100	100%	100	100%	98	98%	95	95%	89	89%	83	83%	
TS250	125	125	100%	125	100%	125	100%	125	100%	125	100%	122	98%	119	95%	111	89%	104	83%	TS250 Busbar 5t + Heat Sink
	160	160	100%	160	100%	160	100%	160	100%	160	100%	155	97%	150	94%	141	88%	131	82%	
	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%	
TS400	200	180	90%	180	90%	180	90%	180	90%	180	90%	174	87%	168	84%	157	79%	147	74%	TS630 Busbar Lower & Upper 6t
	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%	
	250	250	100%	250	100%	250	100%	250	100%	250	100%	243	97%	236	94%	221	88%	206	82%	
TS630	300	300	100%	300	100%	300	100%	300	100%	300	100%	291	97%	281	94%	264	88%	246	82%	TS800 Busbar Lower & Upper 6t
	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%	
TS800	500	400	80%	400	80%	400	80%	400	80%	400	80%	387	77%	372	74%	347	69%	322	64%	TS800 Busbar Lower & Upper 6t+Heat Sink
	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%	
TS800	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 TS800 FTU

Susol MCCB PV up to 800A

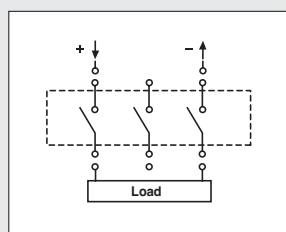
Warnings when using Susol MCCB for PV applications

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.

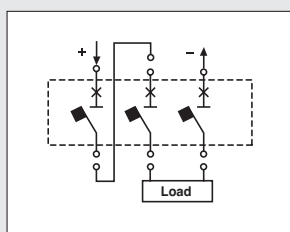


Warning

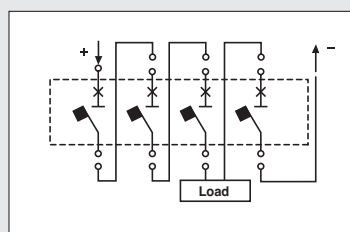
1. Please use wiring in accordance with the diagrams shown below.
Otherwise, usable voltage may be different from the stated requirement.



DC500V (2P)



DC750V (3P)



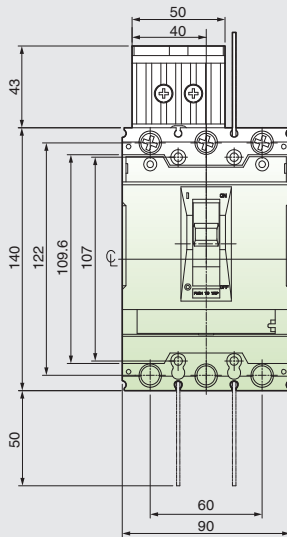
DC1000V (4P)

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)

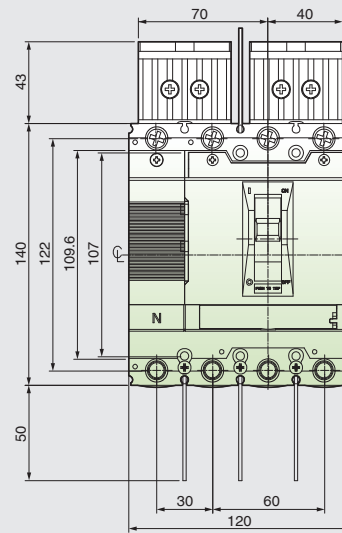
Dimensions

TD100, TD160



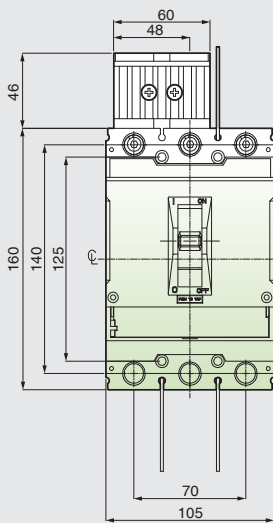
3P

※ R, S Line Common conditions



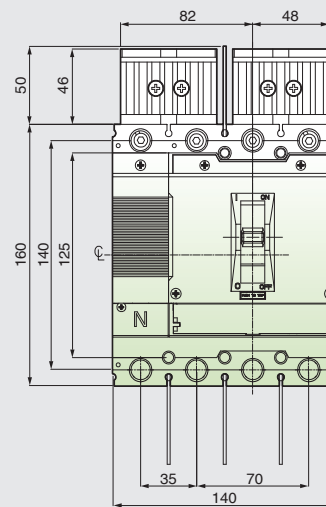
4P (L-type)

TS100, TS160, TS250



3P

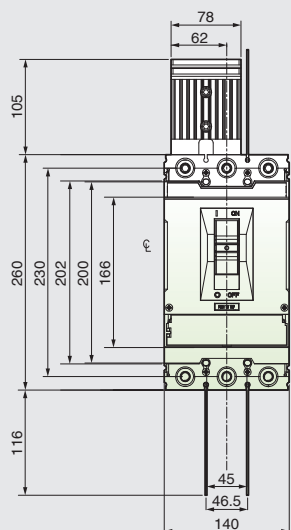
※ R, S Line Common conditions



4P (L-type)

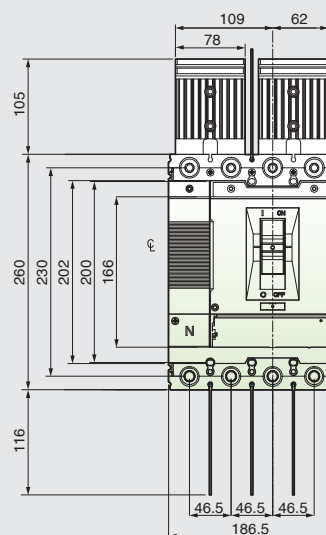
※ L-Type and R-Type is symmetric

TS400, TS630



3P

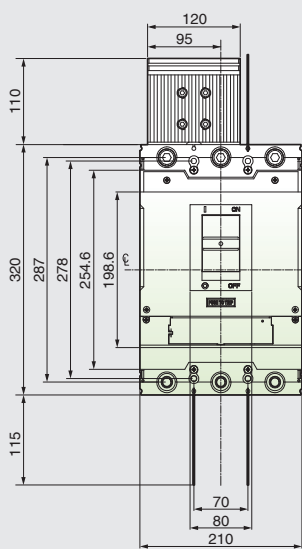
※ R, S Line Common conditions



4P (L-type)

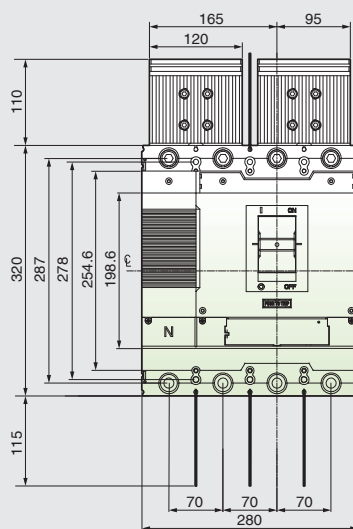
※ L-Type and R-Type is symmetric

TS800



3P

※ R, S Line Common conditions



4P (L-type)

※ L-Type and R-Type is symmetric

DC MCCB (DC 1000 / 1500V)

Characteristics

- Applications such as photovoltaic (PV) power generation, UPS and data center.
- Compact size implemented
- Maximum breaking capacity
- Nominal voltage ranges up to 1000/1500Vdc
- Rated current: 63~250A
- No. of poles: 2/4pole



Rating

AF		250AF			
Type		N-Type	N-Type	H-Type	NA-Type
Model		TSD250N	TSD250N	TSD250H	TSD250NA
Pole		2P	4P		
Rated current, I _n		63**, 80, 100, 125, 160, 200, 250A			200, 250A
Rated operational voltage, U _e		DC 1000V	DC 1500V		
Rated insulation voltage, U _i		DC 1000V	DC 1500V		
Rated impulse withstand voltage, U _{imp}		8kV			
Rated short-circuit breaking capacity, I _{cu}		20kA	20kA	50kA	I _{cw} * 3kA, I _{cm} * 3kA
I _{cs} = % I _{cu}		100			-
Category		A			
Type of trip unit		Thermal-Magnetic			-
Current range	Fixed (I _r)	1 × I _n			-
Magnetic trip range	Fixed (I _i)	6 × I _n			-
Life cycle (time)	Mechanical	10,000			
	Electrical	2,000			1,000
Dimension (W×H×D, mm)		76 × 170 × 92	140 × 170 × 92		
Standards		IEC/EN60947-2, GB14048.2			IEC60947-3 & Annex D(For PV) GB/T14048.3
Certification		CCC, CB			

* I_{cw}: Rated short-circuit withstand current(kA), 1s

I_{cm}: Rated short-circuit making capacity(kA)

** 63A Magnetic trip range: 8×I_n

Temperature derating

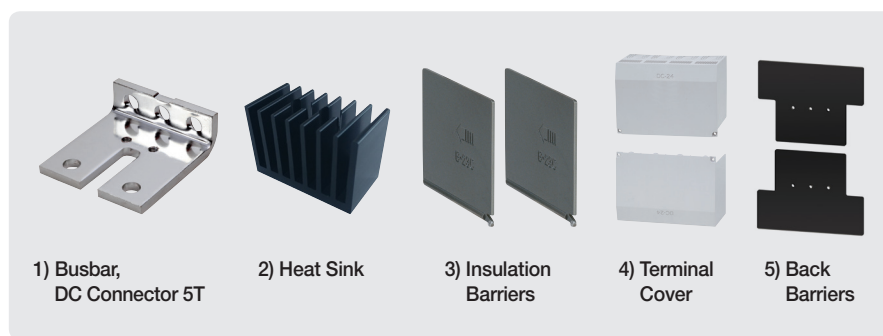
Type	Rated Current (A)		Compensated rated current in accordance with ambient temperature (A)										Terminal Connection	
	Rated	Derating	40°C		45°C		50°C		60°C		70°C			
TSD250	63	63	100%	63	100%	62	98%	60	95%	56	89%	52	83%	TS250 BUSBAR 5T
	80	80	100%	80	100%	78	98%	76	95%	71	89%	66	83%	
	100	100	100%	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
	2P	4P	Compensation constant	
2000	1000V	1500V	1.00	100%
3000	870V	1300V	0.87	98%
4000	770V	1150V	0.77	93%
5000	670V	1000V	0.67	90%


External accessories




Possible configuration of electrical auxiliaries



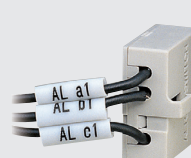
UVT



SHT

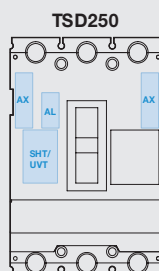


AX



AL

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



TSD250

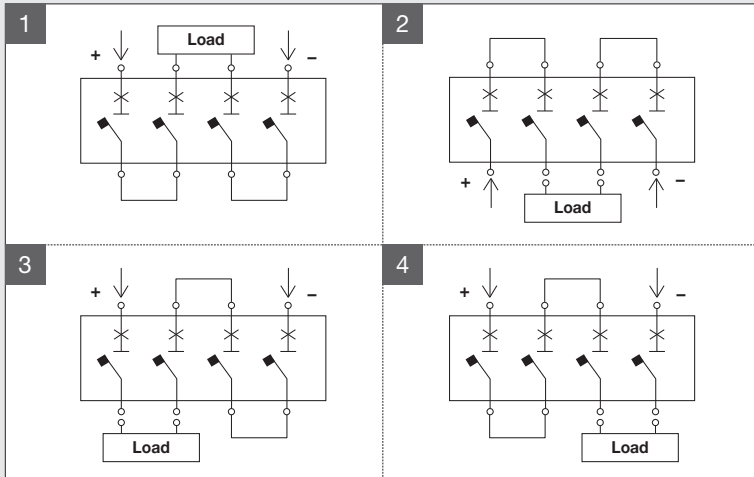
Note) 1. The internal accessories are assembled together with the product, so be careful when ordering.
 2. SHT / UVT can not be used simultaneously

DC MCCB (DC 1000 / 1500V)

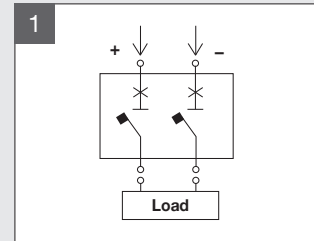
Wiring diagram

1. Unground system

4Pole

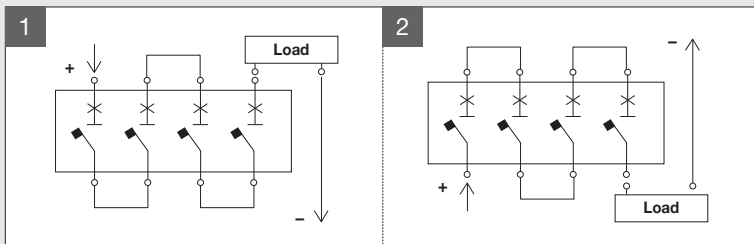


2Pole

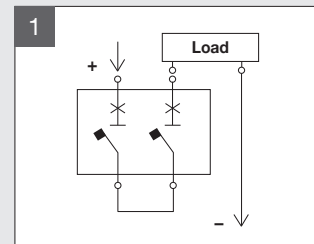


2. Grounded system

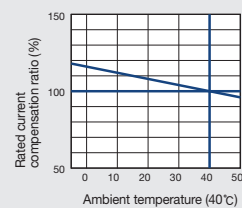
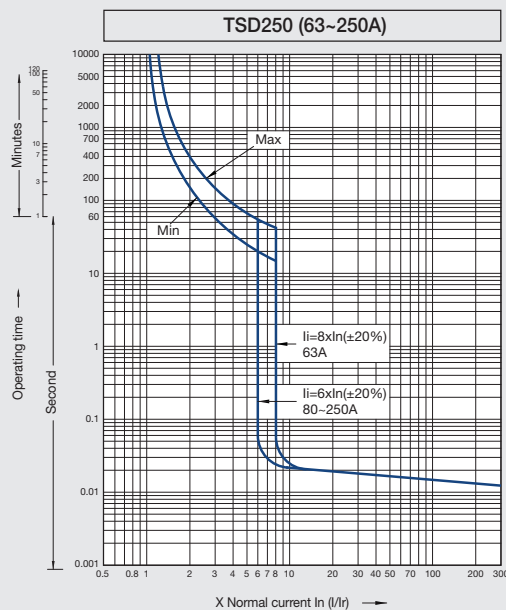
4Pole



2Pole



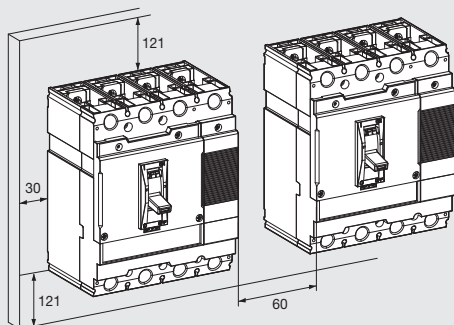
Characteristic curve



Product installation standards

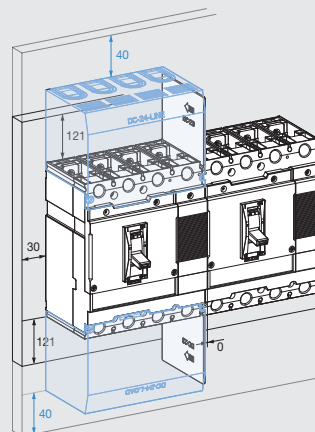
1. By insulation and separation distance

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



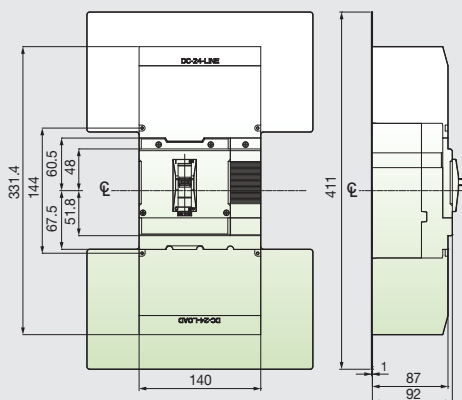
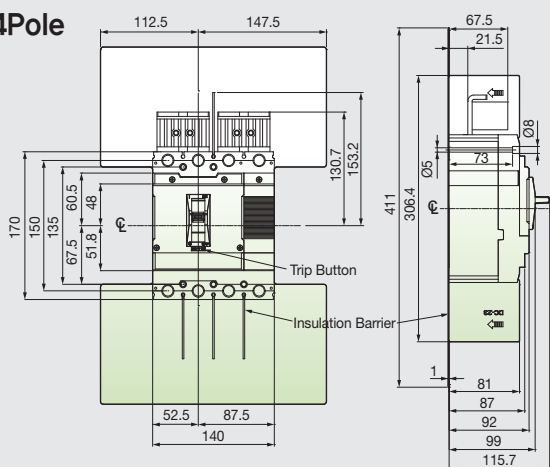
2. Close mounting

- Using barrier between phases

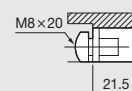
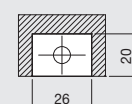


Dimensions

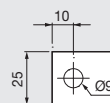
4Pole



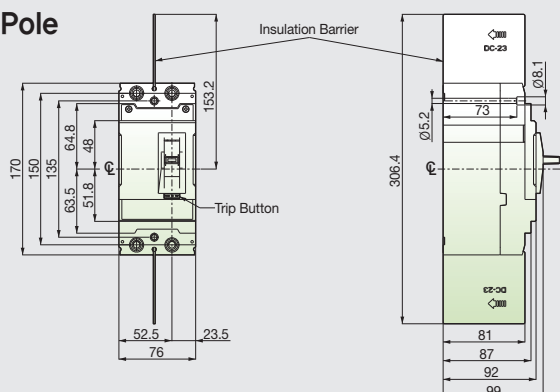
Terminal details



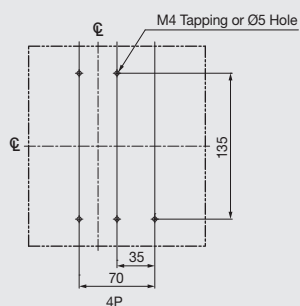
Connecting



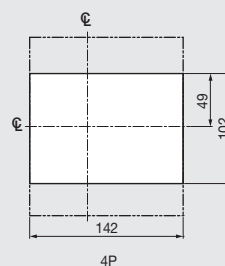
2Pole



Panel drilling



Front panel cutting

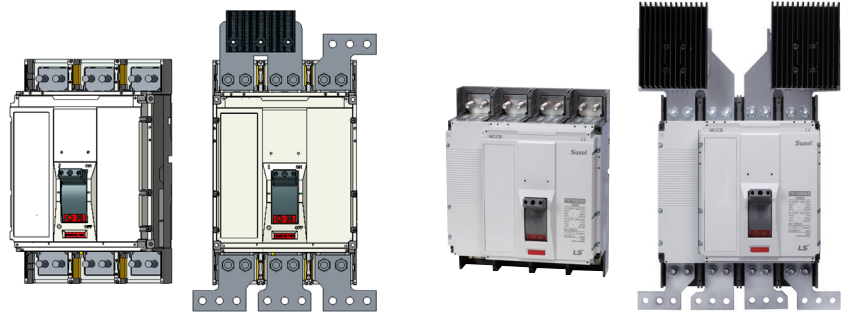


DC Switch-Disconnectors (1600AF)

1600AF Switch-Disconnectors

Characteristics

- 4Pole: DC1150V/AC690V Switch disconnectors
- 3Pole: DC900V/AC690V Switch disconnectors
- 1000/1250/1600A DC
- $U_{imp} = 8kV$
- IEC60947-3



(TS1250NA 3P)

(TS1600NA 4P)

Rating

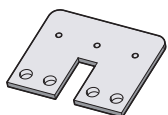
Type		TS1000NA	TS1250NA	TS1600NA
Frame size	[AF]	1000	1250	1600
Conventional thermal current, I _{th}	[A]	1000	1250	1600
Rated operational current, I _e	[A]	1000	1250	1600
No. of poles	[Pole]	3/4	3/4	3/4
Rated operational voltage, U _e	DC/AC 3pole [V]	900/690	900/690	900/690
	DC/AC 4pole [V]	1150/690	1150/690	1150/690
Rated insulation voltage, U _i	DC [V]	1150	1150	1150
	AC [V]	690	690	690
Rated impulse withstand voltage, U _{imp}	[kV]	8	8	8
Rated short-circuit making capacity, I _{cm}	DC [kA peak]	25	25	25
	AC [kA peak]	52.5	52.5	52.5
Rated short-circuit making capacity, I _{cw}	1sec [kA rms]	25	25	25
Utilization category		DC22B/AC23B	DC22B/AC23B	DC22B/AC23B
Isolation behavior		●	●	●
Trip unit (Release)	Disconnector unit DSU	●	●	●
Connection	Fixed	Front-connection	●	●
		Rear-connection	●	●
Mechanical life	[Operations]	10000	10000	10000
Electrical life	@ V DC	[Operations]	500	500
	@ 690V AC	[Operations]	2000	2000
Dimensions without accessories, W×H×D (Front connection)	3pole [mm]	210×327×152.5	210×327×152.5	210×327×152.5
	4pole [mm]	280×327×152.5	280×327×152.5	280×327×152.5
Weight without accessories (Front connection)	3pole [kg]	12	12	12
	4pole [kg]	17.8	17.8	17.8
Reference standard		IEC60947-3	IEC60947-3	IEC60947-3

Accessories

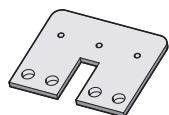
1) For TS1000NA DC

2) For TS1250NA DC

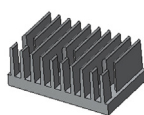
3) For TS1600NA DC



<Busbar>



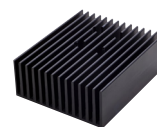
<Busbar>



<Heatsink>



<Busbar>

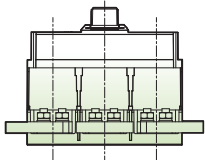
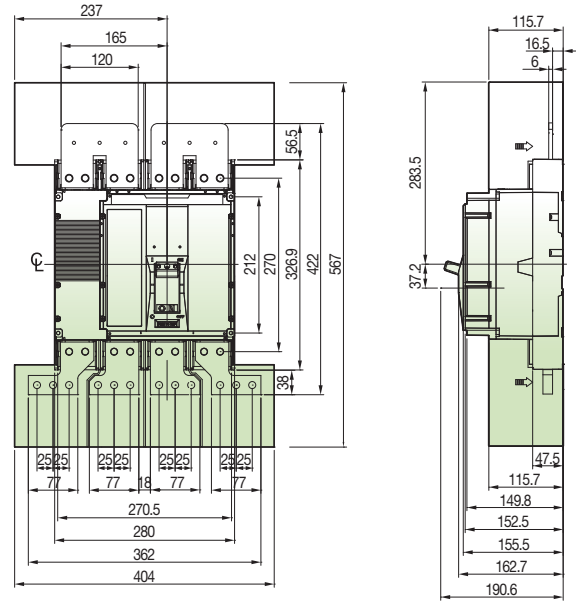
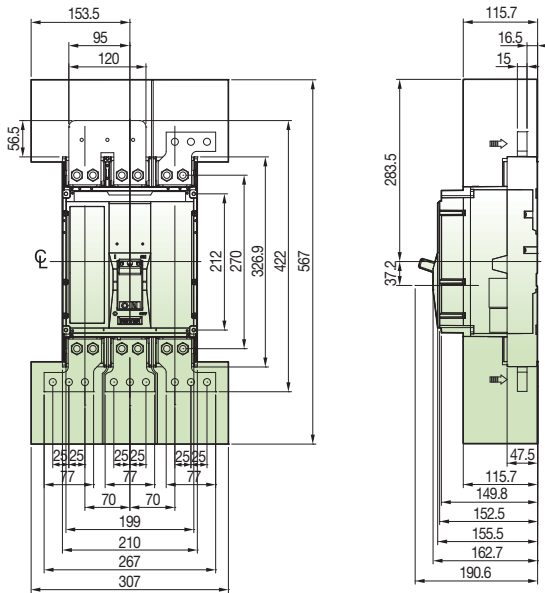


<Heatsink>

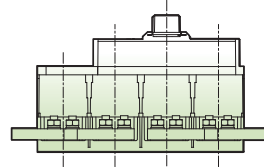
Dimensions

TS1600NA

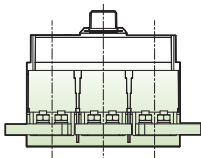
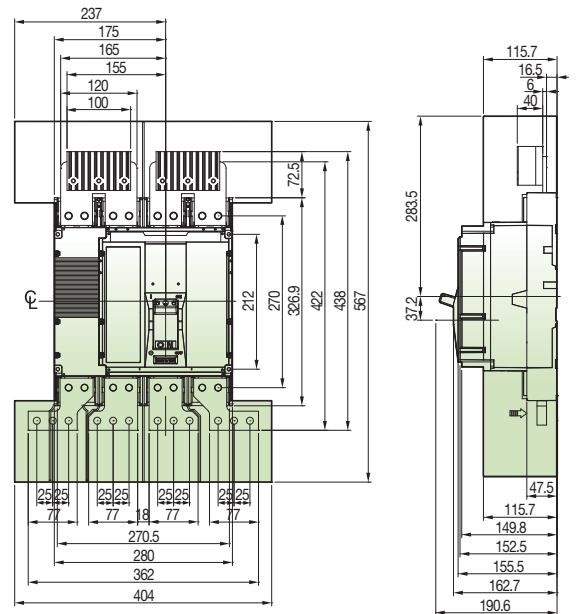
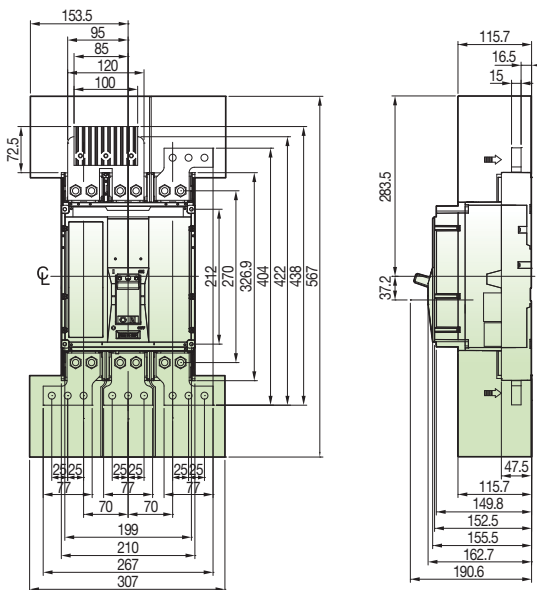
Dimension of MCCB with DC BUSBAR



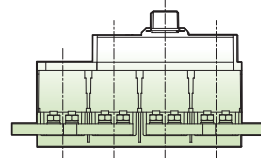
<TS1000NA 3P>



<TS1000NA 4P>



<TS1250NA 3P>



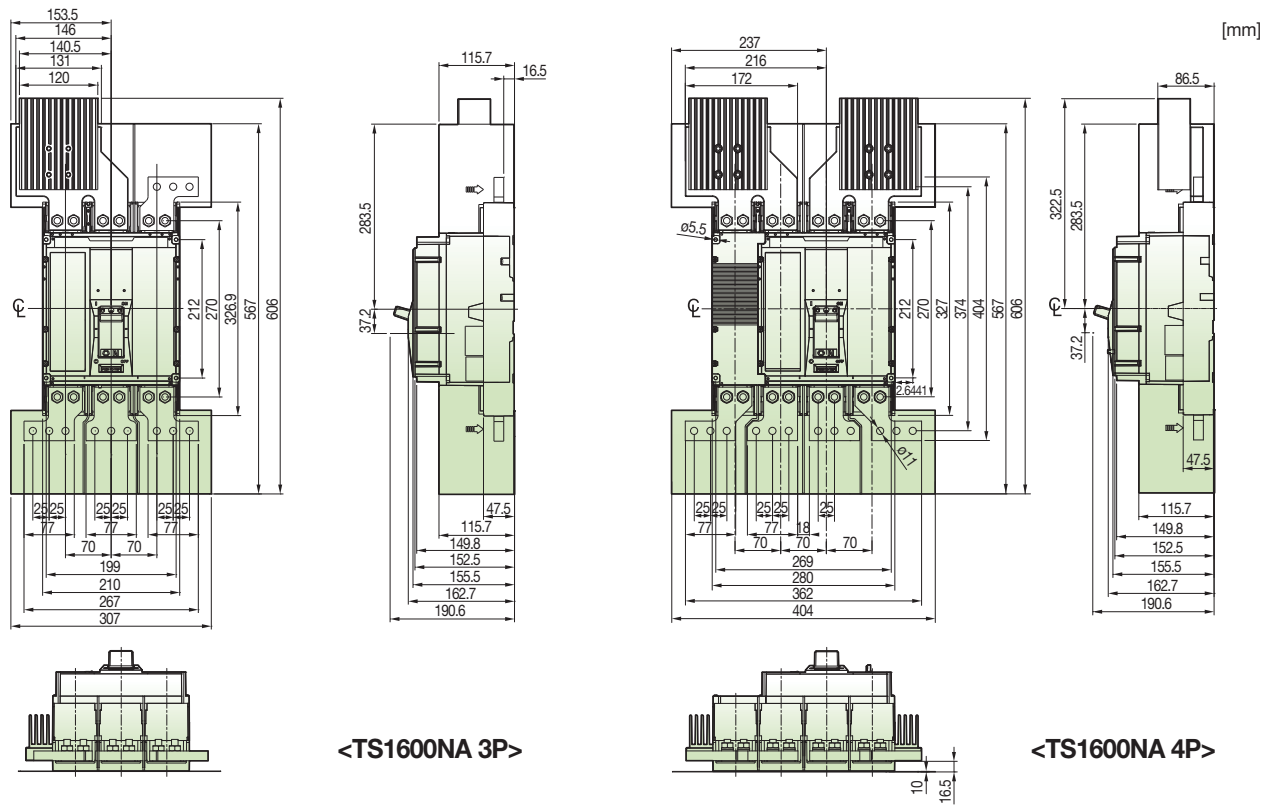
<TS1250NA 4P>

DC Switch-Disconnectors (1600AF)

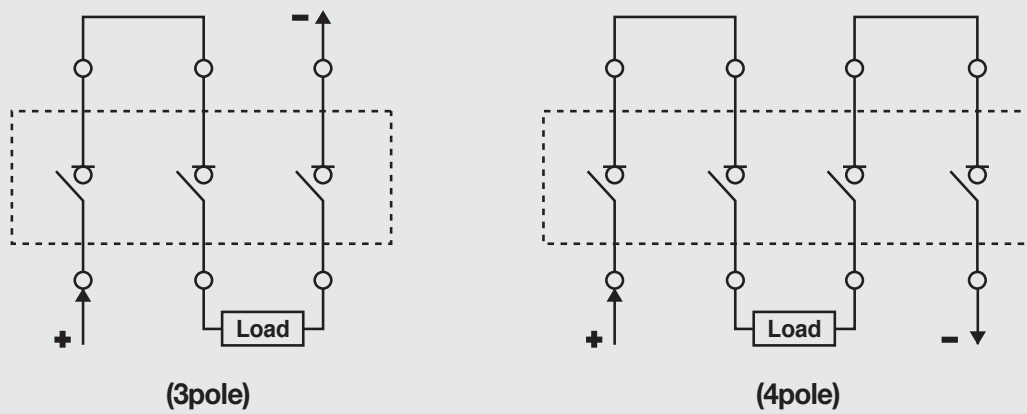
Dimensions

TS1600NA

Dimension of MCCB with DC BUSBAR

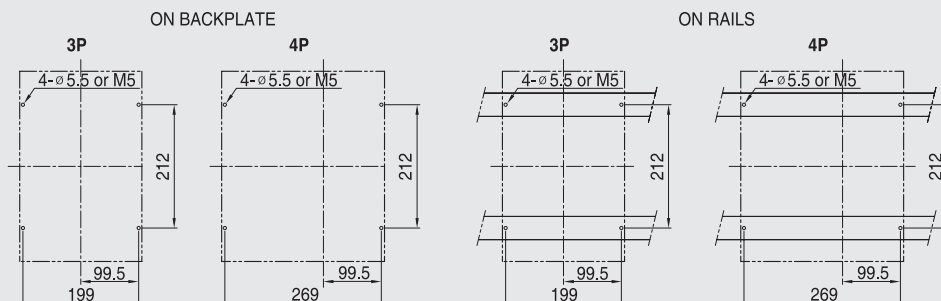


Connection diagrams

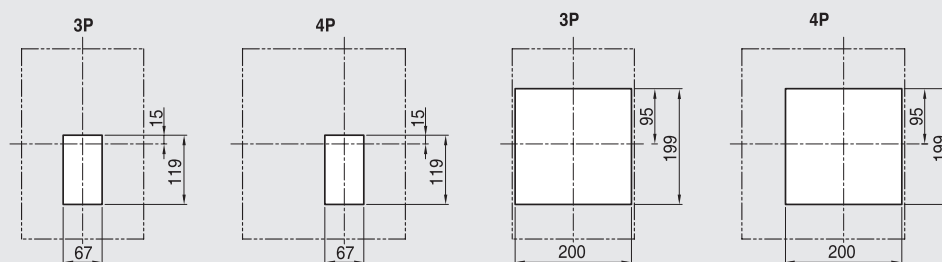


Dimensions

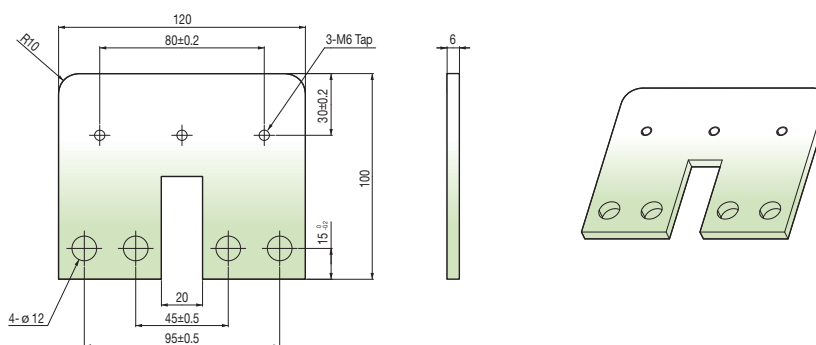
Panel drilling



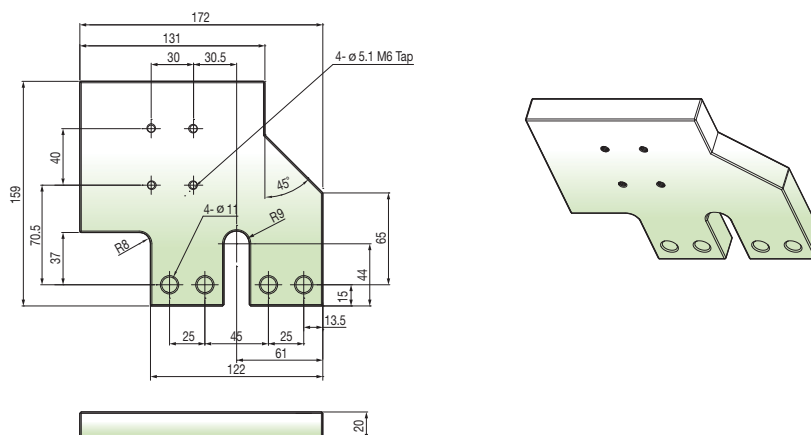
Front panel cutting



TS1000NA/TS1250NA Short BUSBAR dimension



TS1600NA Short BUSBAR dimension



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



ON / OFF
Display Indicator



AX, AL

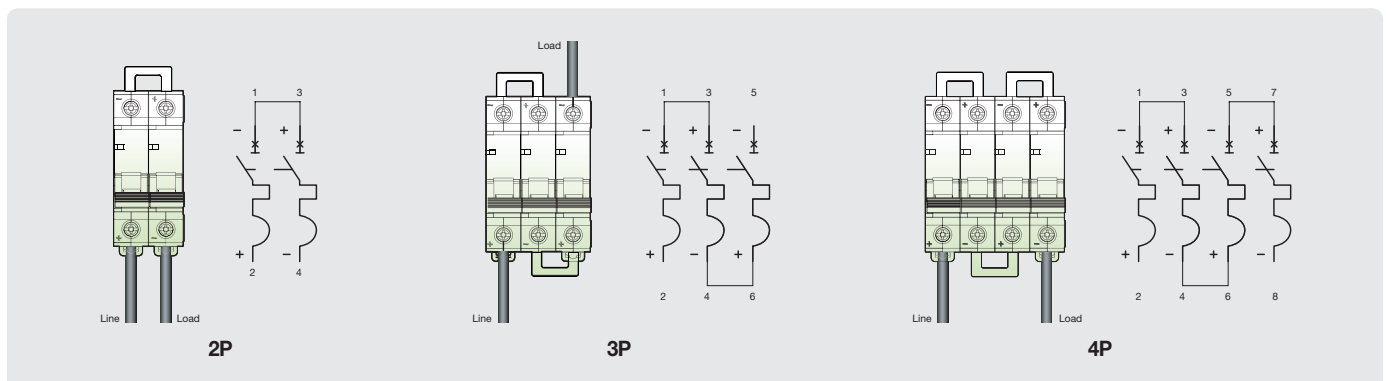


SHT, UVT

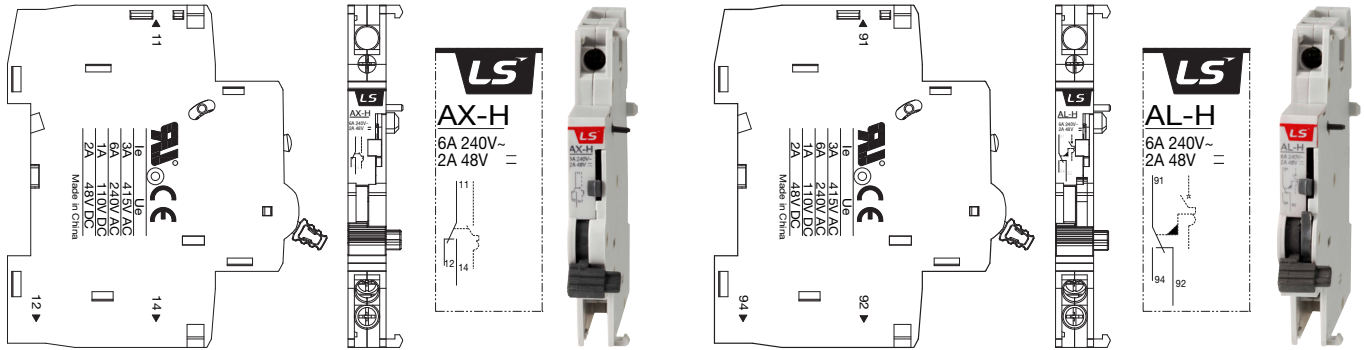
Type		
Frame size		
No. of poles		
Rated current, In		
Rated operational voltage, Ue DC	Reference standard IEC 60947-2, Icu	Poles Rated voltage Breaking current
Rated insulation voltage, Ui AC		
Rated impulse withstand voltage, Uimp AC		
Trip characteristic		
Protection		
Endurance life (times)	Electrical	Mechanical
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
500V			
6kV			
B (5In), C (8In)			
Overload and short circuit			
1,500			
20,000			
IP20			
18-4 AWG (0.75 ... 25mm ²) / 20 Kgf.cm			
Mounting on 35mm DIN rail			
Lug type			
Thermal-Magnetic			
40°C (Standard), -25~ + 55°C (Use)			
CE, SEMKO, CB			

DC Type connection wiring diagram



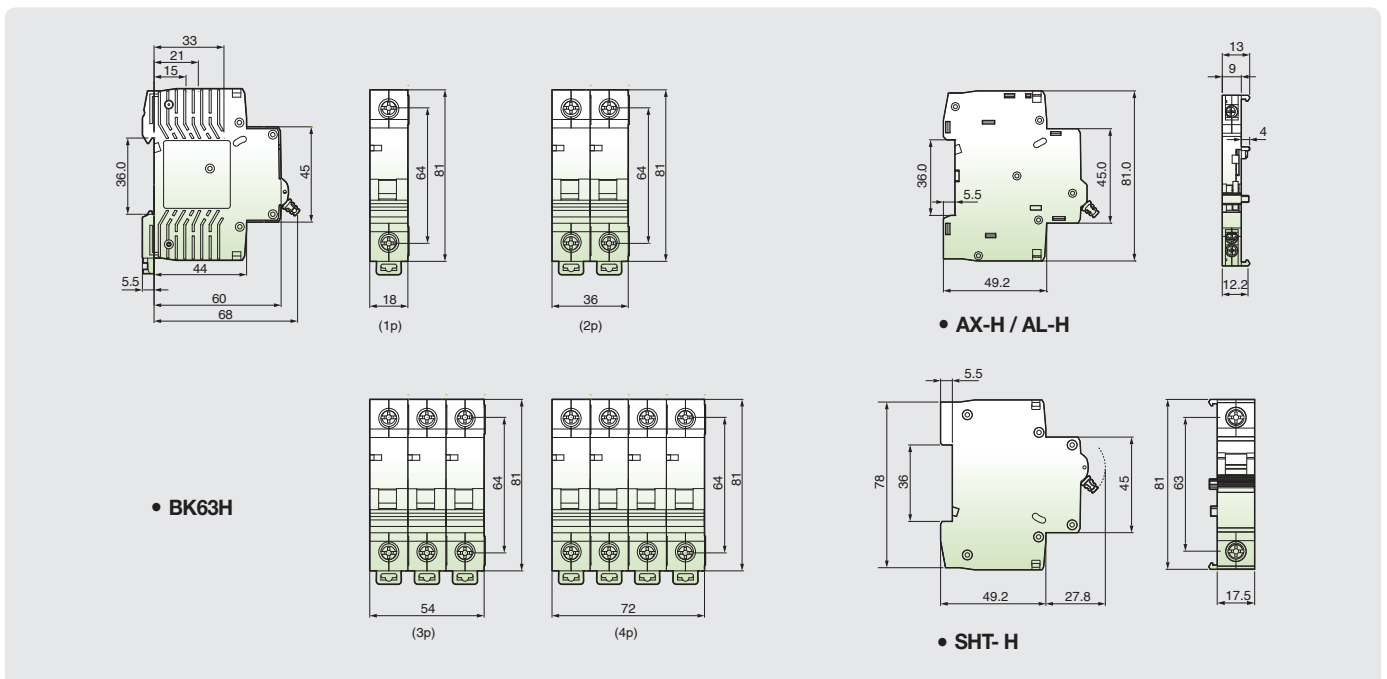
Accessory



Type	AX-H	AL-H	SHT-H
Appearance			
Rated Operational Current (A)	AC 6A@240V / 3A@415V DC 6A@24V / 2A@48V / 1A@125V		DC 24-220V, AC 110-380V
Rated voltage (Ue)	-		85%-110%Ue
Working voltage	-		-
Mechanical Endurance	10,000		-
Cable capacity	0.75~2.5mm ²		≤ 2.5mm ²
Contact			-
Weight (g)	48	48	100

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

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

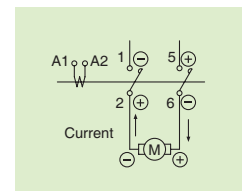


Selection

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										



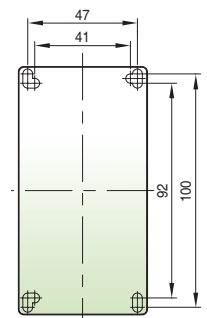
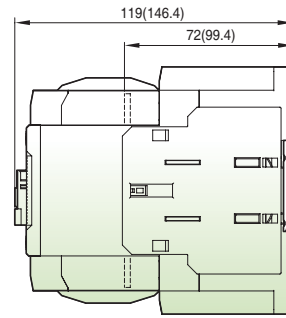
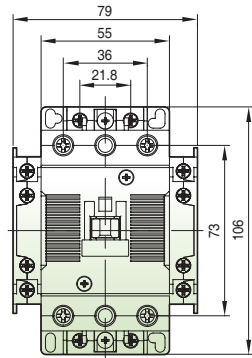
Coil voltage

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)

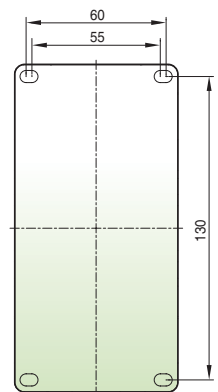
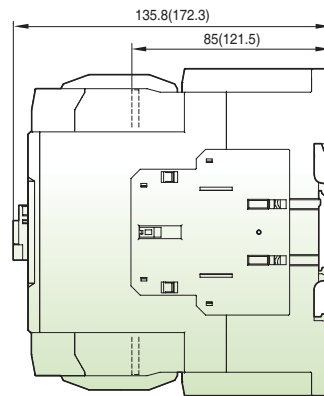
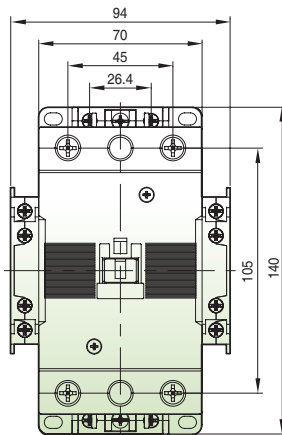
2NO2NC



[mm]

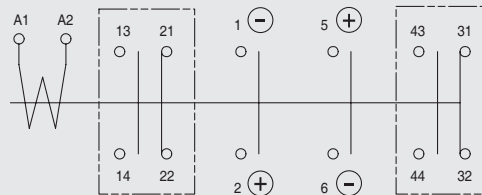
MD-60a,100a AC(DC)

2NO2NC

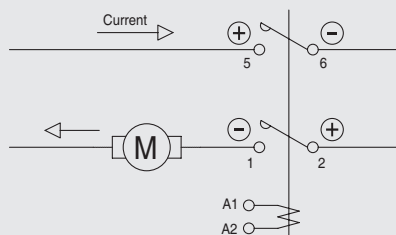


Composition

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	DC1500	
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°C~80°C			
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	-

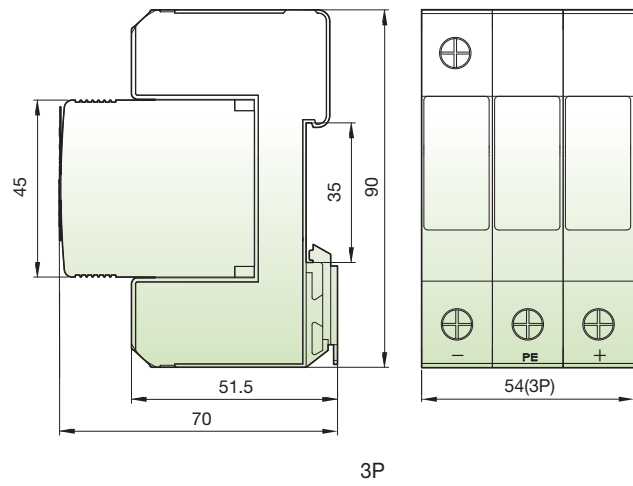
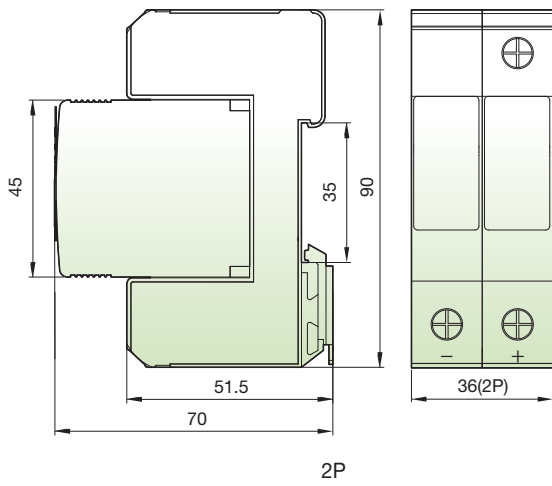
Note) 1. The AL contact accessories are not sold separately. You need to choose these accessories when you place your order for the product. Please be mindful of this fact when you place your order.



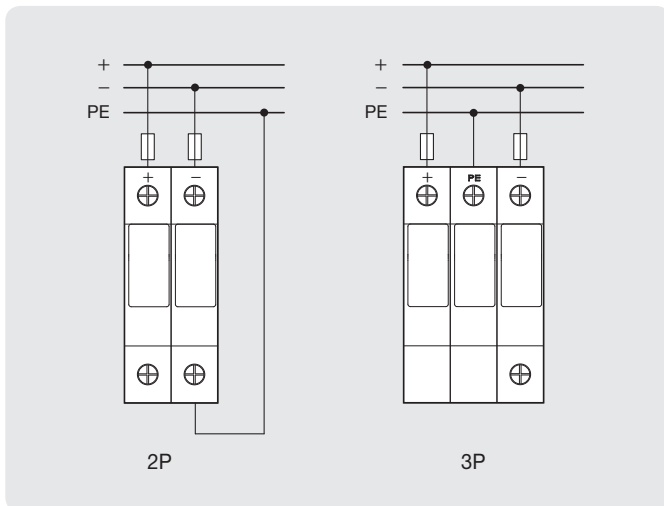
Dimensions

BK20S-DC

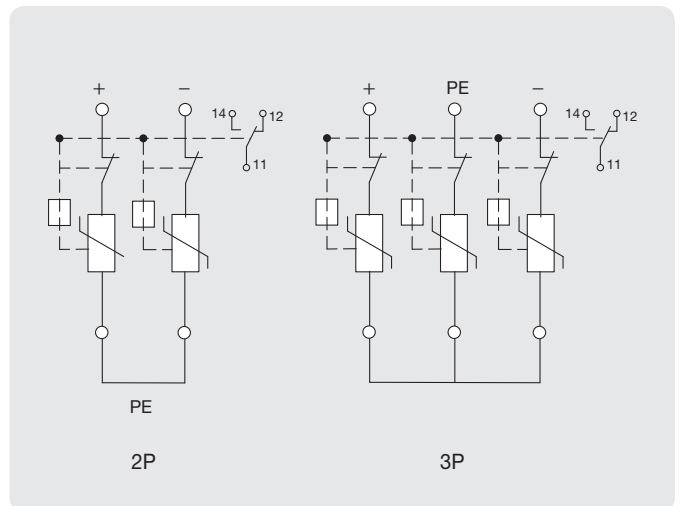
[Unit : mm]



Installation wiring method



Wiring Diagram



DC ACB

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



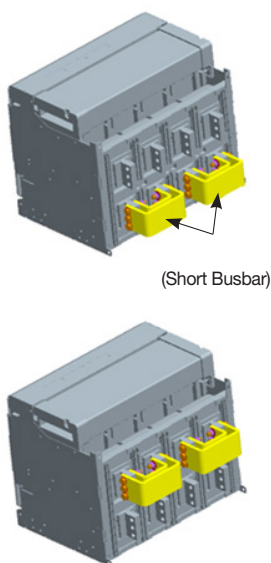
Type and ratings

Type		DC 1200V			DC 1500V			
Number of poles (P)		3 / 4			3 / 4			
Rated operational voltage (Ue) (Vdc)		750 (3P) / 1200 (4P)			1000 (3P) / 1500 (4P)			
Rated insulation voltage (Ui) (V)		1500			1500			
Rated impulse withstand voltage (Uimp) (kV)		12kV			12kV			
Version		Fixed / Withdrawable			Fixed / Withdrawable			
Suitability for isolation								
Degree of pollution	IEC60661-1	3			3			
Certification		CB certification according to IEC 60947-2			CB certification according to IEC 60947-2			
Brand name		Susol			Susol			
Ampere Frame		ADH-16E 1600AF	ADH-25E 2500AF	ADH-32E 3200AF	ADV-16E 1600AF	ADV-25E 2500AF	ADV-32E 3200AF	
Rated current (In) at 40°C (A)		800/1000/ 1250/1600	1600/2000/ 2500	1600 / 2000 / 2500 / 3200	800/1000/ 1250/1600	1600/2000/ 2500	1600/2000/ 2500/3200	
Rated ultimate breaking capacity (Icu) (kA)	(3P)	500V DC	60	85	-			
		750V DC	40		60	70		
		1000V DC	-		50	60		
	(4P)	750V DC	50		-			
		1000V DC	32	40		60	70	
1500V DC	-		50	60				
Rated service breaking capacity (Ics) (%)		100			100			
Rated short-time withstand current (Icw) (kA/1s)	(3P)	500V DC	60 <small>Note1)</small>	65	-			
		750V DC	40	45	50 <small>Note1)</small>	60		
		1000V DC	-		50 <small>Note1)</small>	50		
	(4P)	750V DC	50 <small>Note1)</small>	50		-		
		1000V DC	-	-		50 <small>Note1)</small>	65	
		1200V DC	35	40		-	-	
1500V DC	-		50 <small>Note1)</small>	50				
Rated making capacity (Icm) (kA peak)		100			100			
Utilization category (according to IEC 60947-2)		B			B			
Overcurrent protection	Electronic trip units for DC applications	●			●			
Operation time (ms)	Total Breaking < Icw	max. 70			max. 70			
	time > Icw	max. 30			max. 30			
	Closing time	max. 80			max. 80			
Mechanical and Electrical Life cycle								
Endurance (times) (Without maintenance)	Mechanical		15,000			15,000		
	Electrical (at 1000 V DC)	less than 1600A	10,000			10,000		
		2000A	8,000			8,000		
		2500A	-	5,000	3,000	-	5,000	3,000
Dimension and Weight								
Weight (3P/4P) (mm)	Drawout	Without cradle	43 / 53			43 / 53		
		With cradle	87 / 103			87 / 103		
	Fixed	44 / 55			44 / 55			
External dimensions (HxWxD) (mm)	Drawout	3P(4P)	430x412(527)x375			430x412(527)x375		
	Fixed	3P(4P)	300x378(493)x295			300x378(493)x295		

Note 1) Duration of rated short-time withstand current (Icw) is 0.5s

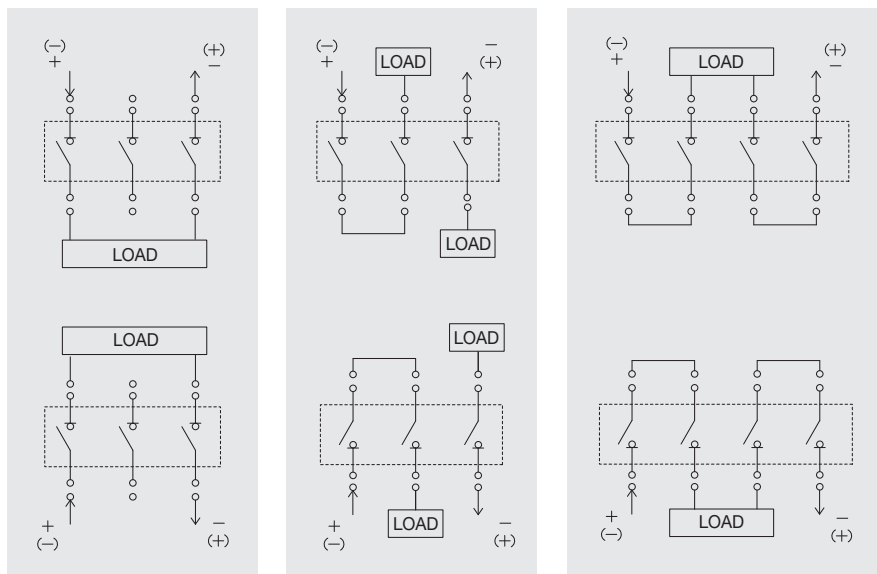
Connection diagram of DC ACB

ADV	750V	1000V	1500V
ADH	500V	750V	1200V



Upper supply

Lower supply



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

Composition of short busbar

1. 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.
2. The tightening torque for assembling short busbars is 40~50N.m

Type	AF	Ordering code & quantity	Appearance	Contents
ADV ADH	800-1600AF	70223464603		Short busbars: 75mm×10T×2ea Bolt : M12×60, 6ea Nut : M12, 6ea Spring washer, Plain washer
		3P: 1ea 4P: 2ea		
ADV ADH	2000-2500AF	70223464604		Short busbars: 125mm×10T×3ea Bolt : M12×80, 6ea Nut : M12, 6ea Spring washer, Plain washer
		3P: 1ea 4P: 2ea		
ADV ADH	3200AF	70223464620		Short busbars: 100mmx10T×1ea 120mmx105mmx10T×1ea (L type) Bolt : M12×60, 8ea Nut : M12, 8ea Spring washer, Plain washer, Heat sink
		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

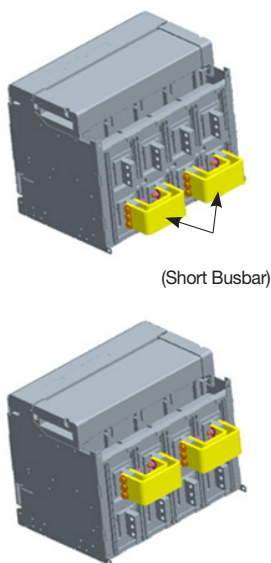
Commonness				Characteristics							
Rated insulation voltage (U _i)	(Vdc)			1500							
Rated impulse withstand voltage (U _{imp})	(kV)			12							
Rated short-time withstand current (I _{cw})	(kA / 1s)			100							
Rated making capacity (I _{cm})	(kA, peak)			100							
Operation time	(ms)	Opening		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 <small>Note1</small>				DC 22A							
Life cycle (Without maintenance)	Mechanical		(times)	15,000							
	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 <small>Note1</small>				DC23A							
Life cycle (Without maintenance)	Mechanical		(times)	15,000							
	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	43	53		
			With cradle	87	103	107	139				
	Fixed type	(kg)		44	55	61	81				
External dimensions (H×W×D)				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.

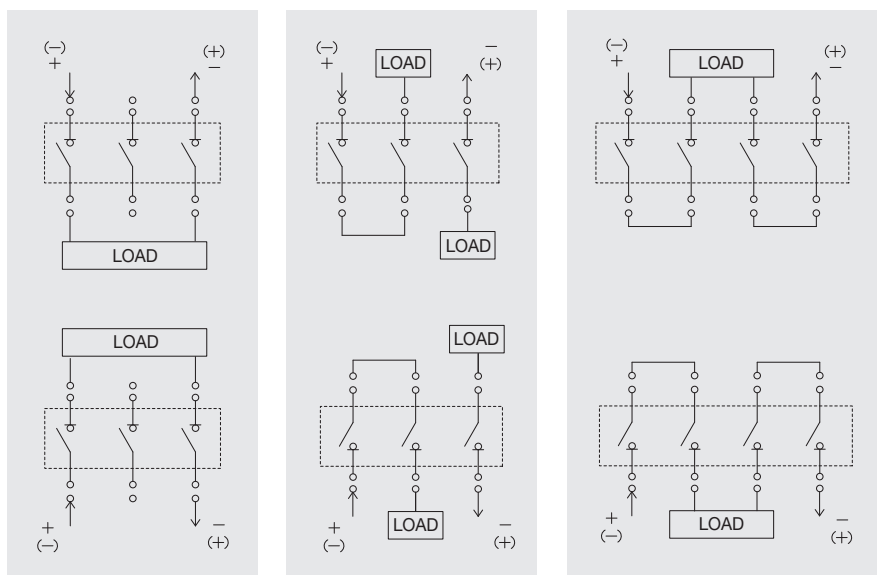
Connection diagram of DC ACB

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

1. 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.
2. The tightening torque for assembling short busbars is 40~50N.m

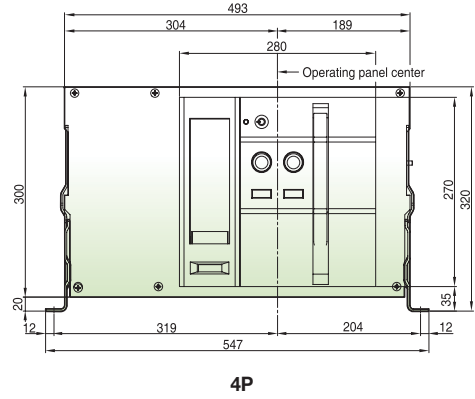
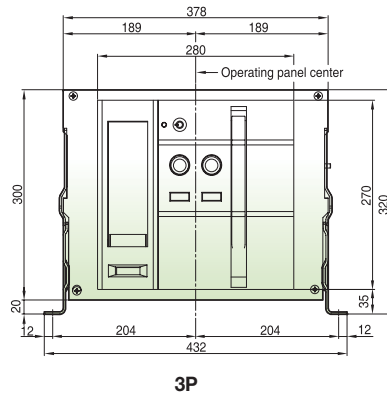
Type	AF	Ordering code & quantity	Appearance	Contents
DDH DDV	800-3200AF	70223464603		Short busbars: 75mm×10T×2ea Bolt : M12×60, 6ea Nut : M12, 6ea Spring washer, Plain washer
		3P: 1ea 4P: 2ea		
DDH DDV	4000AF	70223464604		Short busbars: 125mm×10T×3ea Bolt : M12×80, 6ea Nut : M12, 6ea Spring washer,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

Dimensions

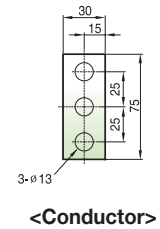
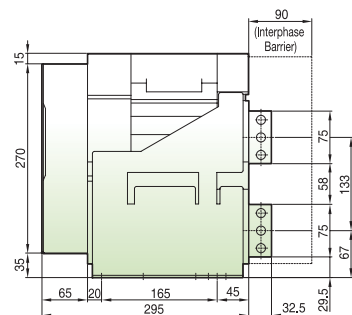
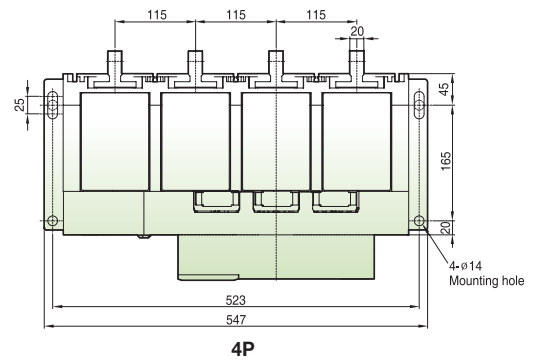
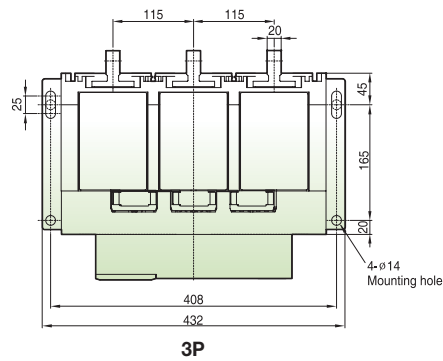
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(Unit : mm)

Front view



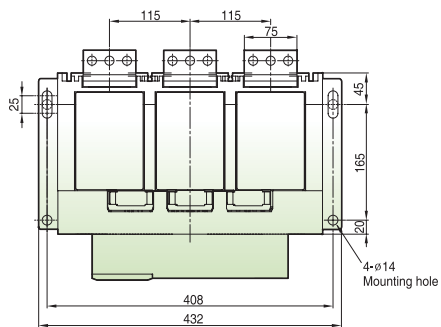
Vertical type



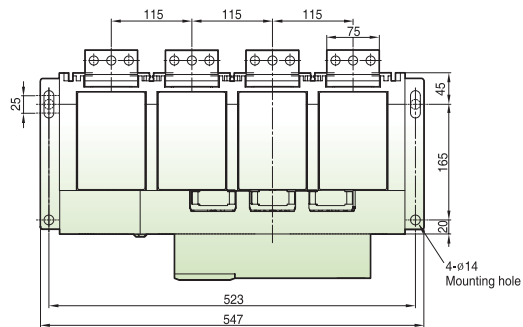
Fixed type (ADV/ADH-08~16E, DDH/DDV-08~32E)

(Unit : mm)

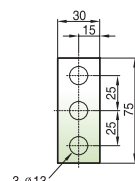
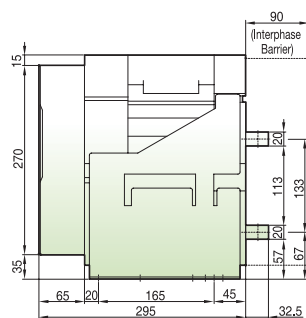
Horizontal
type



3P

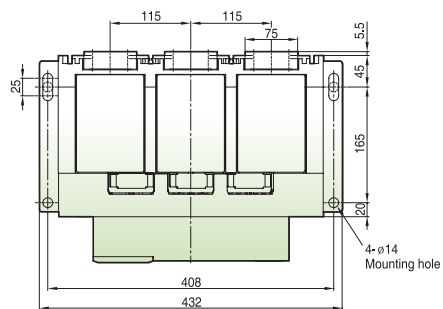


4P

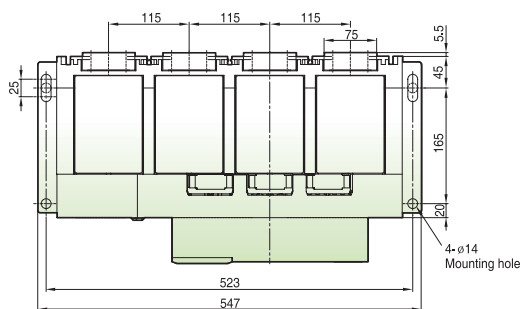


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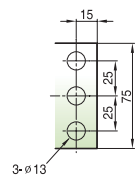
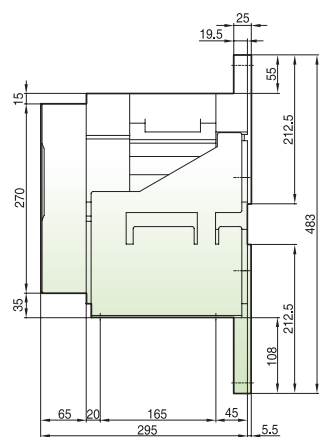
Front
connection
type



3P



4P



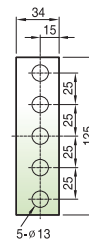
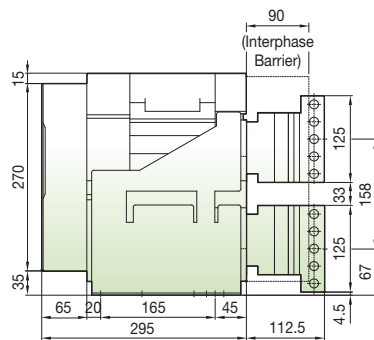
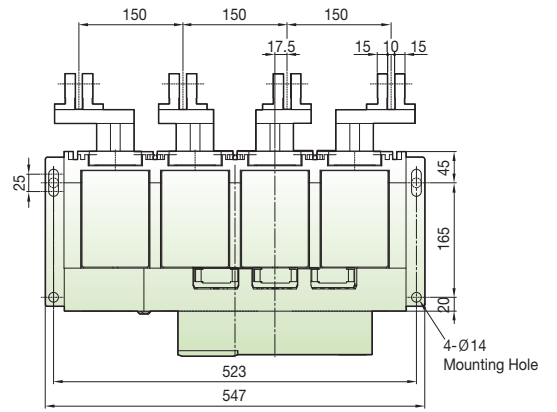
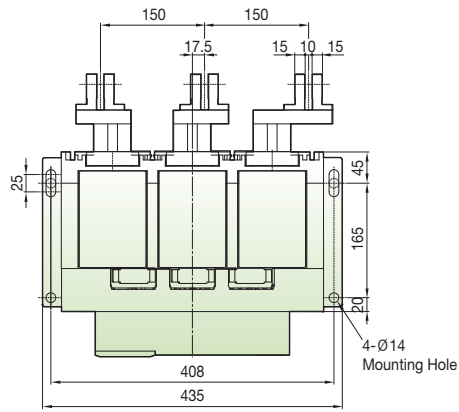
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Dimensions

Fixed type (DDH/DDV 4000AF)

(Unit : mm)

Vertical type

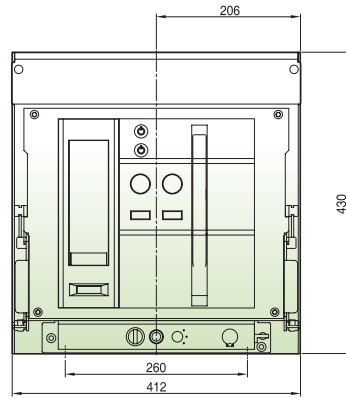


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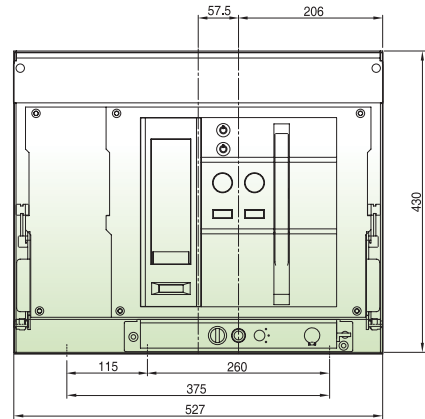
Draw-out type (ADV/ADH-08~25E, DDH/DDV 08~32E)

(Unit : mm)

Front view

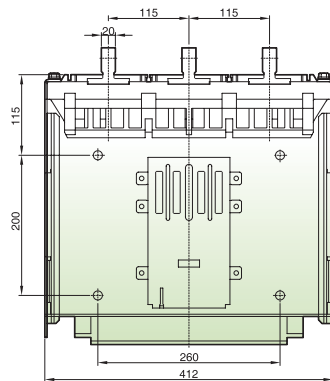


3P

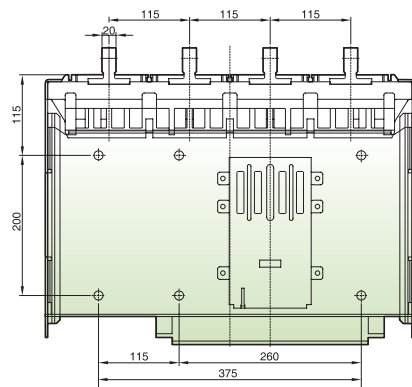


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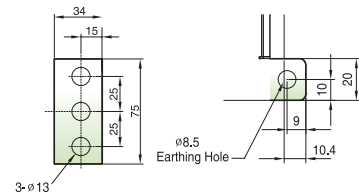
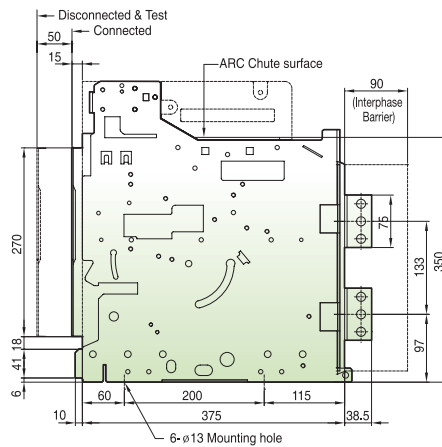
Vertical type



3P



4P



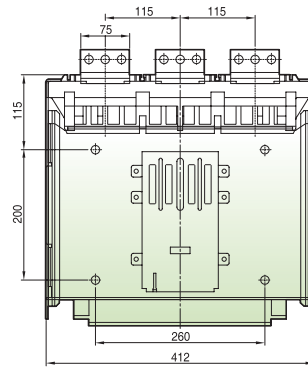
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Dimensions

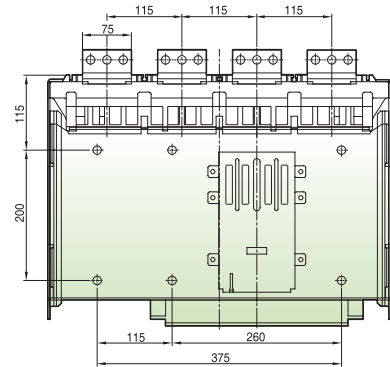
Draw-out type (ADV/ADH-08~16E, DDH/DDV 08~32E)

(Unit : mm)

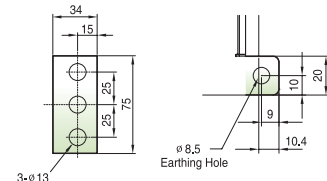
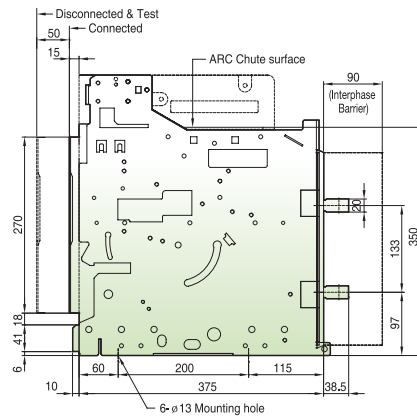
Horizontal type



3P

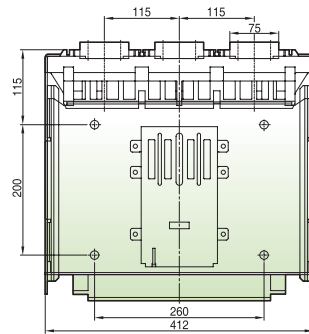


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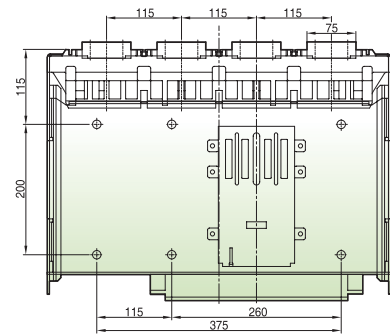


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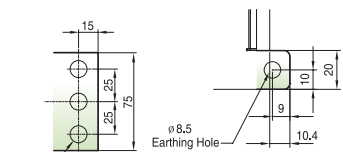
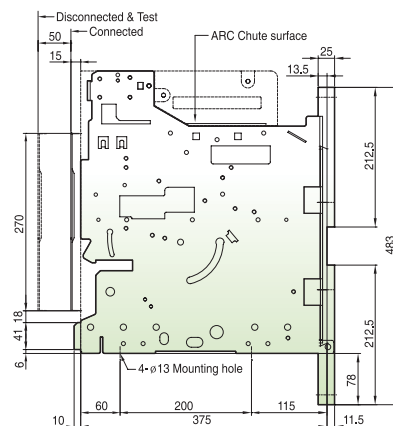
Front connection type



3P



4P

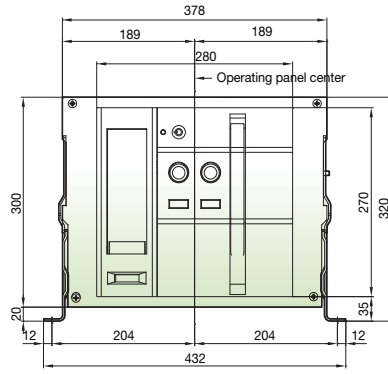


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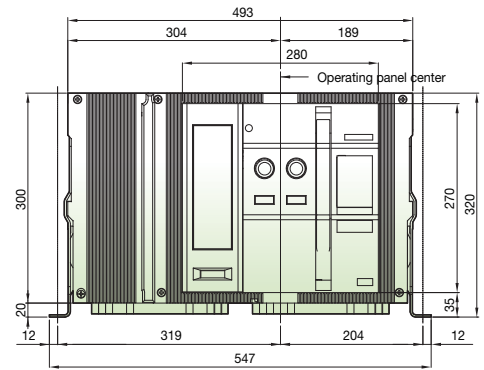
Fixed type (ADV/ADH-32E)

(Unit : mm)

Front view

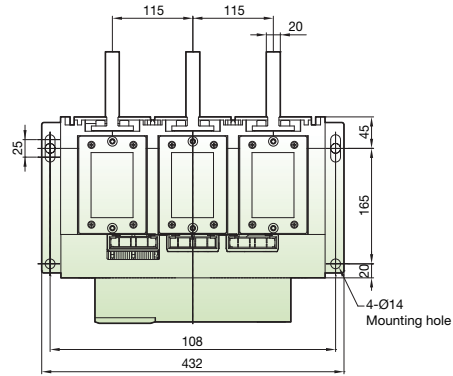


3P

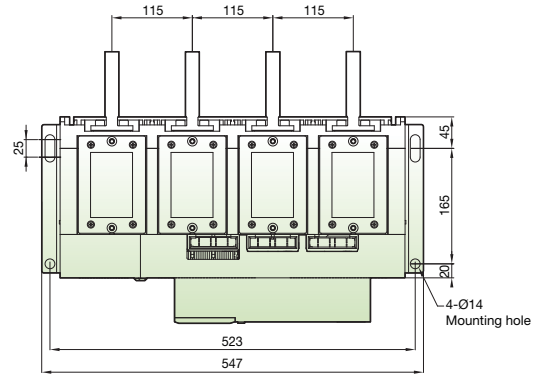


4P

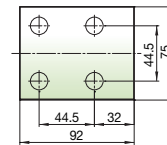
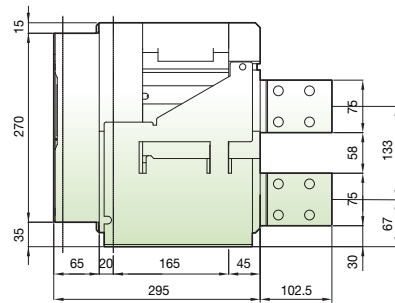
Vertical type



3P



4P

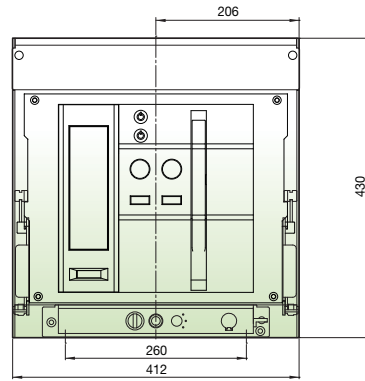


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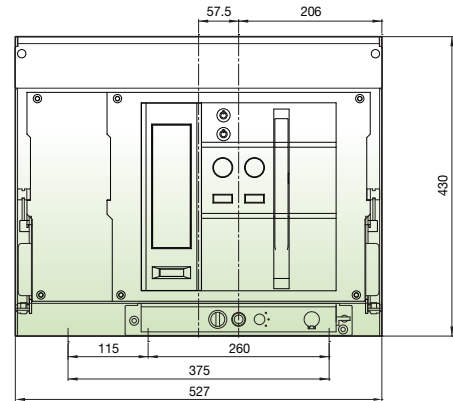
Draw-out type (ADV/ADH-32E)

(Unit : mm)

Front view

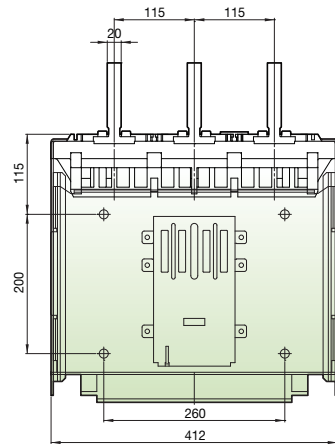


3P

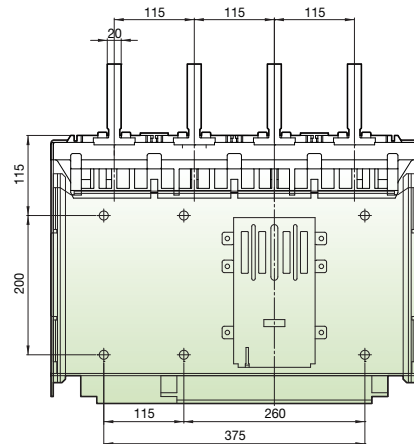


4P

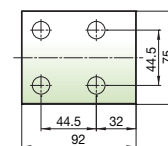
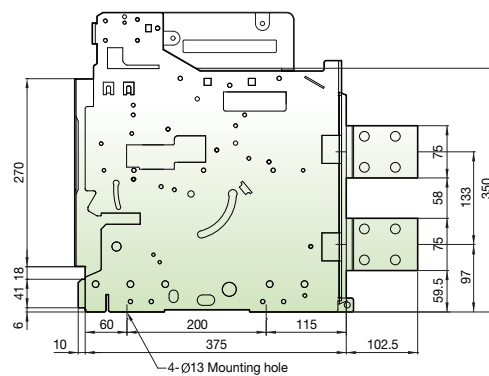
Vertical type



3P



4P

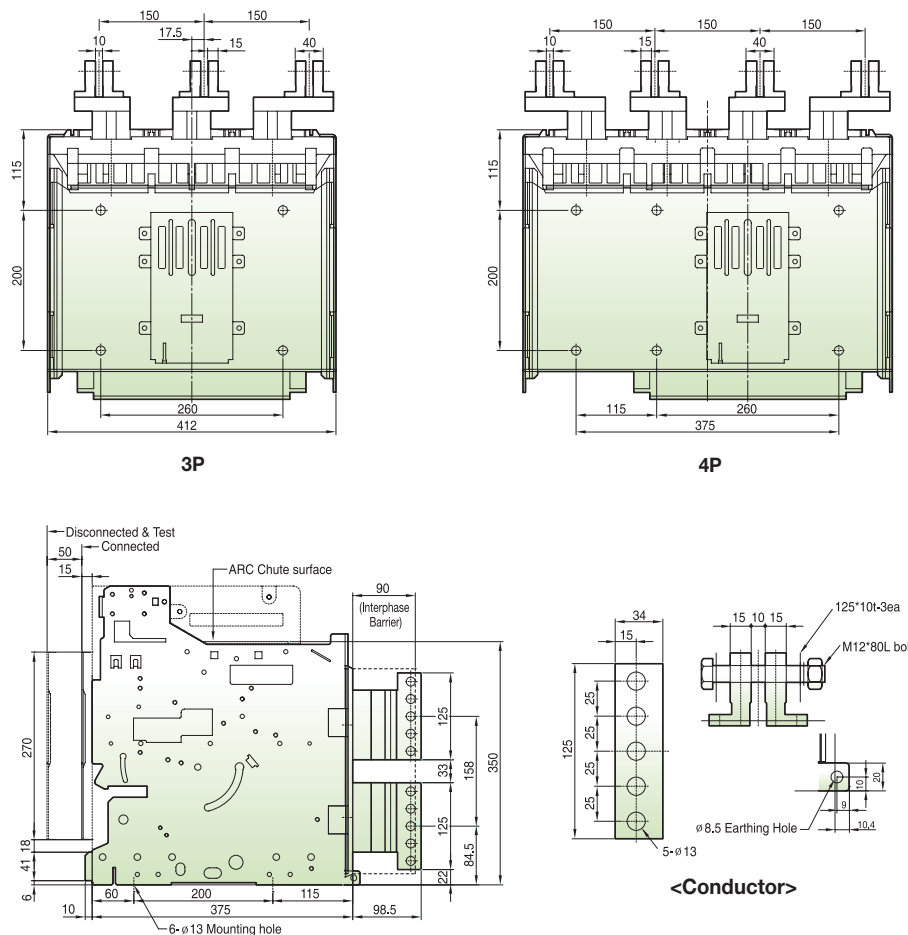


<Conductor>

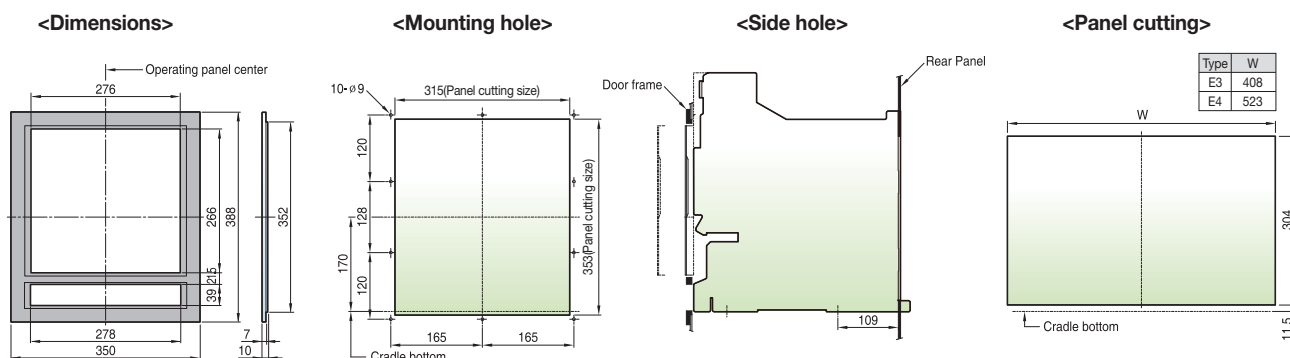
Draw-out type (DDH/DDV 4000AF)

(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
- I²t On/Off optional (for short-time delay)

Ground fault protection

- Ground fault: Available to select I²t 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

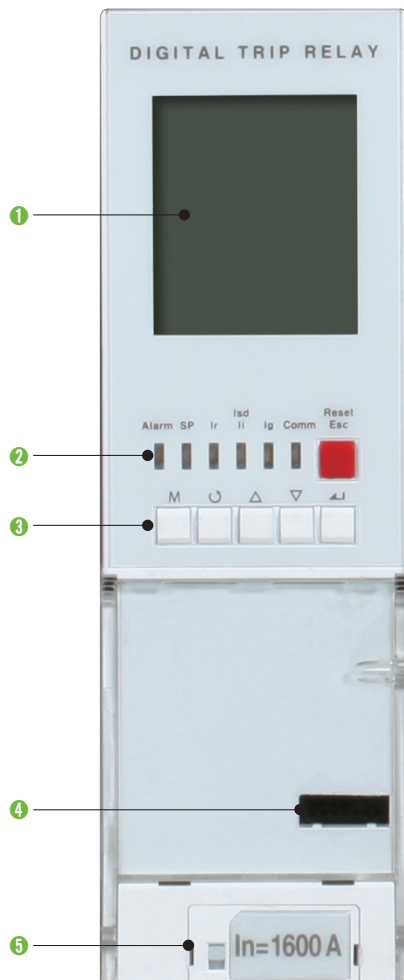
- Records events of device related to setting change, operation and state change. (Max. up to 128)

Self-diagnosis function

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

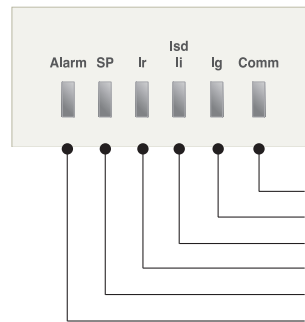
Communication

- Modbus / RS485



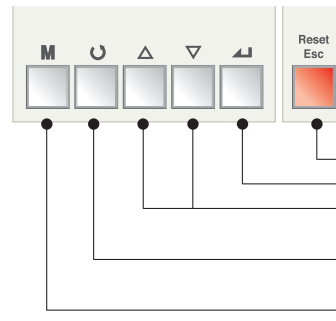
① Graphic LCD: Indication of measurement and information

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

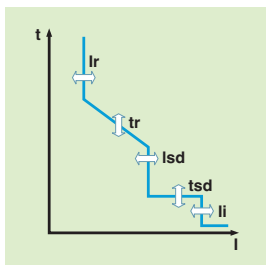


- Reset/ESC: Fault reset or ESC from menu
- Enter: Enter into secondary menu or setting input
- Up/Down: Move the cursor up/down on screen or increase/decrease a setting value
- Right/Left: Move the cursor or setting right/left on screen (Rotation)
- Menu: Menu display Measurement display

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

⑤ Rating Plug: Rated current (In)

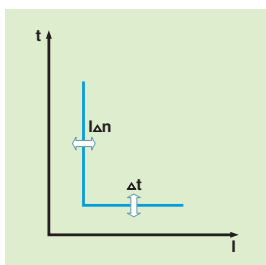
Protection



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)	$I_{sd} = I_r \times \dots$	150%~1000%, Off (5% Step)									
Accuracy : ±10%											
Current setting (s)	t_{sd}	I^2t Off	0.05s~0.4s, 0.05s Step								
Accuracy: ±10% or ±50ms		I^2t On	(In case of I^2t On, @10×I _r)								
Start-up Setting	Pick-up	150%~1000%(×I _r), Off (5% Step)								Start-up function is available	
	Time delay (s)	0.10~30.00s, 0.05s Step								when t_{sd} is set to I^2t Off	

Instantaneous (OCR-I)											
Pick-up (A)	$I_{li} = I_n \times \dots$	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)	$I_g = I_n \times \dots$	20%~100%, Off (5% Step)									
Time delay (s)	t_g	I^2t Off	0.10s~3.00s, 0.05s Step								
Accuracy : ±10% (I _g >0.4I _n) ±20% (I _g ≤0.4I _n)		I^2t On	(In case of I^2t On, @1 × I _n)								
Start-up Setting	Pick-up	150%~1000%(×I _n), Off (5% Step)								Start-up function is available	
	Time delay (s)	0.10~30.00s, 0.05s Step								when t_{sd} is set to I^2t Off	

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

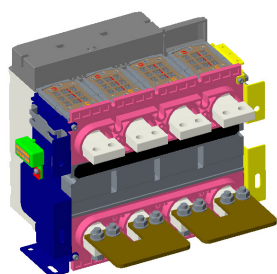


Drawable type

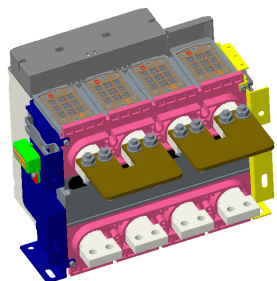
Type and ratings

Commonness		Characteristics								
Rated operational voltage (U _e)	(V)	DC 750V (3P) , DC 1200V (4P)				DC 1000V (3P) , DC 1500V (4P)				
Rated insulation voltage (U _i)	(V)	1500								
Rated impulse withstand voltage (U _{imp})	(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 (I _{cm}) (kA peak)	DC		50							
Rated short-time withstand current (I _{cw}) (kA/1s)	DC		50							
Operation time (ms)	Opening 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	Without cradle	15.5/19				15.5/19			
		With cradle	22/26				22/26			
	Fixed	15.5/19				15.5/19				
External dimensions (W×H×D) (mm)	Draw-out	361.3×267×255.4(3P), 361.3×267×326(4P)								
	Fixed	283×219.5×272.4(3P), 283×219.5×342.4(4P)								

Product connection



Upper Supply



Lower Supply

Operation voltage and connection diagram of DC ACB series

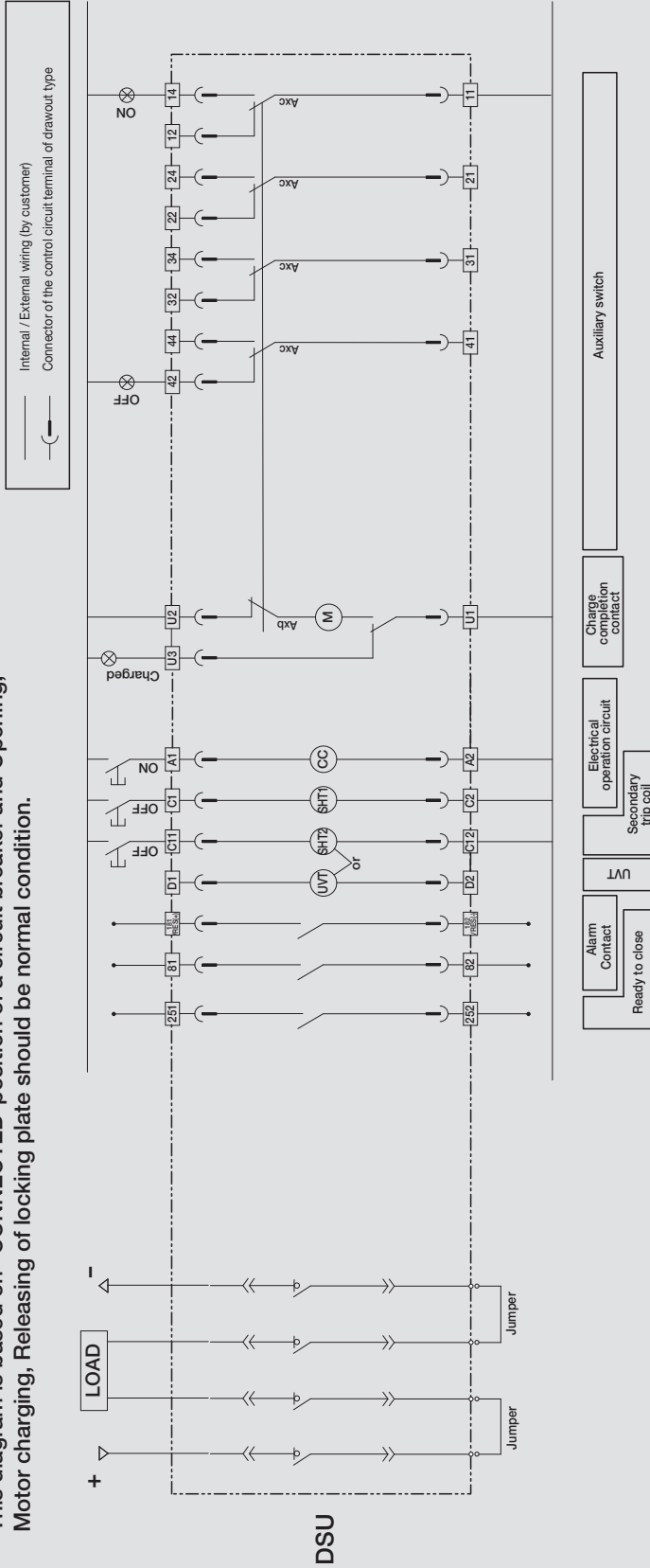
Poles	3P	3P	4P
DDH type	500 Vdc	750 Vdc	1200 Vdc
DDV type	500 Vdc	1000 Vdc	1500 Vdc
Connection diagram			

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, Heatsink : 1ea/unit M10 Nut Set : 4ea/unit, M6 Bolt: 2ea/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

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



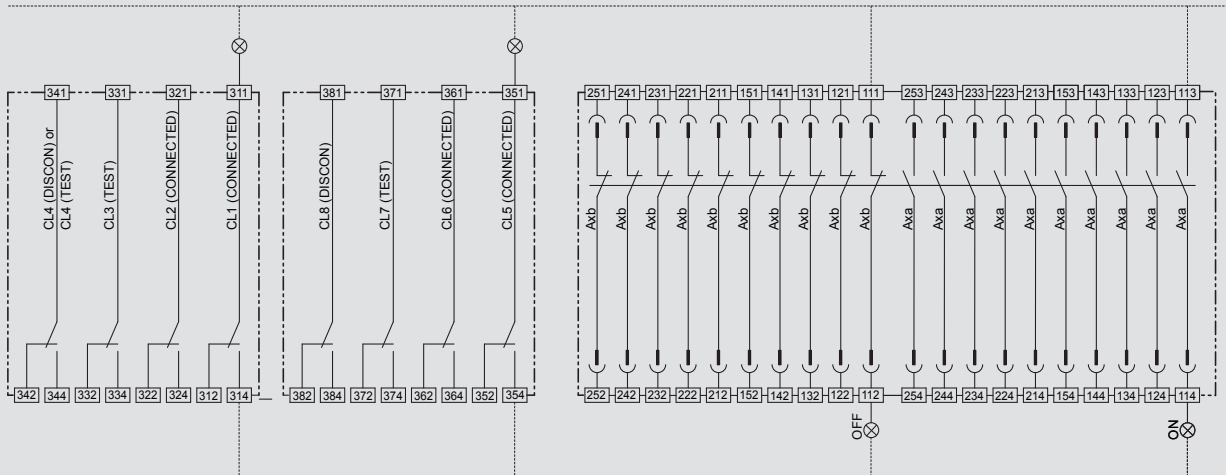
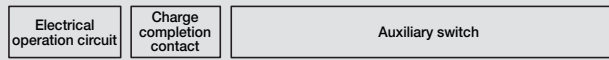
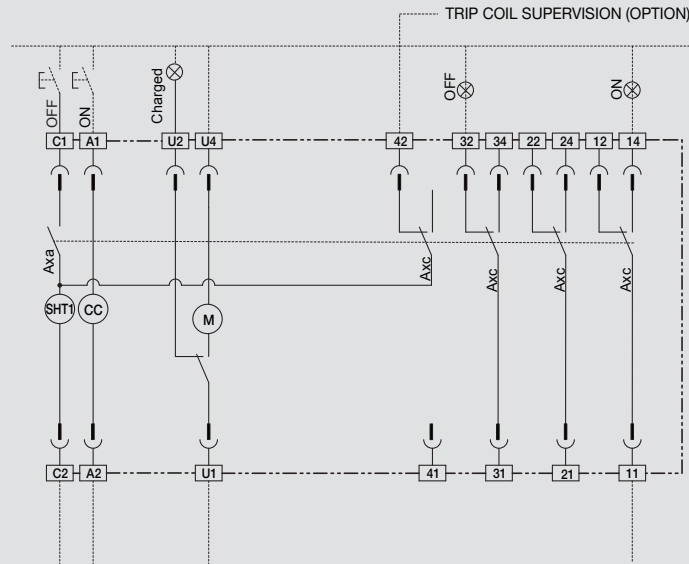
Terminal code description

11	12	~	41	42	Auxiliary switch "b" contact
11	14	~	41	44	Auxiliary switch "a" contact
U1	U3				Charge completion signal
U1	U2				Motor charging
A1	A2				Closing coil
C1	C2				Shunt trip
C11	C12				2nd shunt trip

Accessory code description

Axc	Auxiliary switch
CL1~CL4	Cell switch
(M)	Motor
(CC)	Closing coil
(SHT1)	1st Shunt coil
(SHT2)	2nd Shunt coil
(UVT)	UVT coil

- 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



Cell switch 4C

Cell switch 8C (4C Addition)

MOC (Mechanical Operated Cell switches)

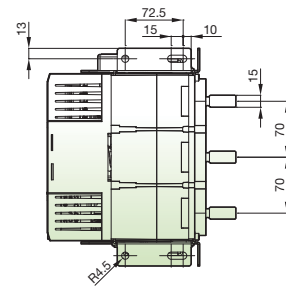
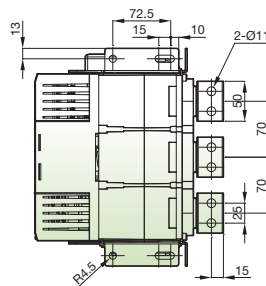
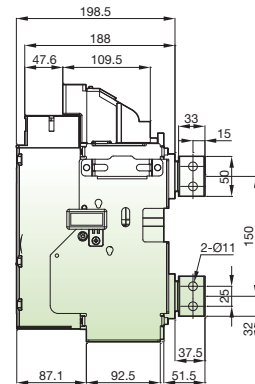
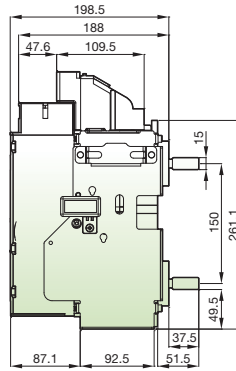
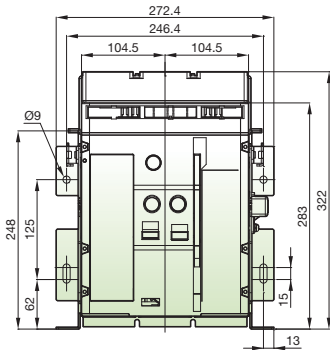
Terminal symbol

311 ~ 344	Cell switch
111 ~ 254	MOC

Dimensions

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

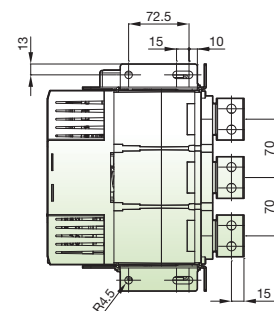
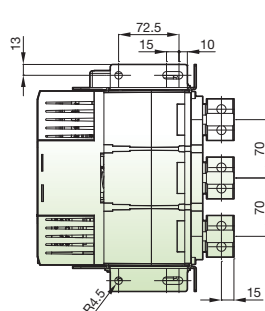
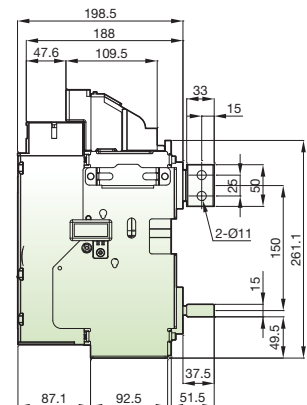
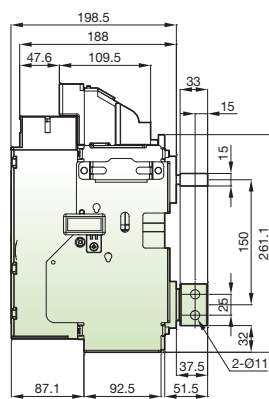
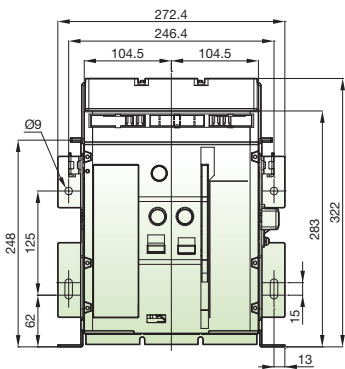
(Unit : mm)



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

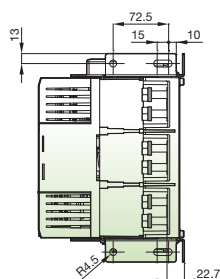
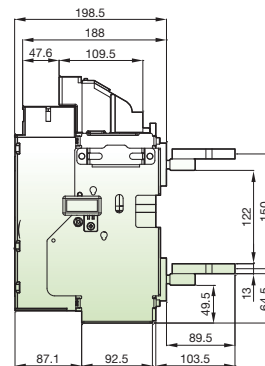
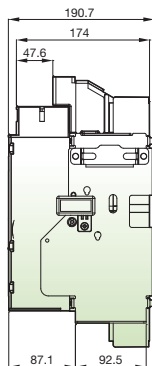
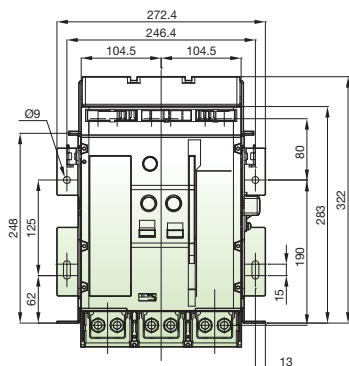
(Upper-Horizontal type, Lower-Vertical type)

N Type

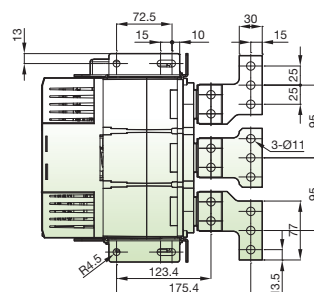
(Upper-Vertical type, Lower-Horizontal type)

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

(Unit : mm)

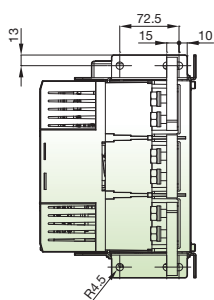
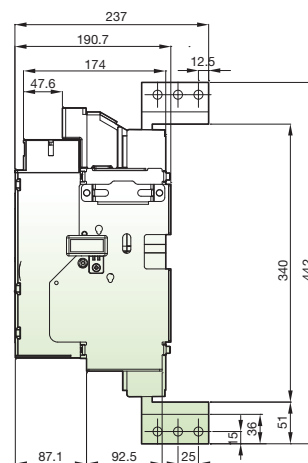
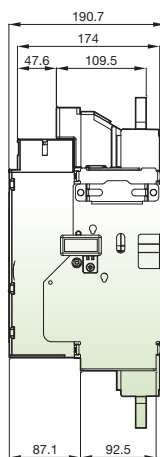
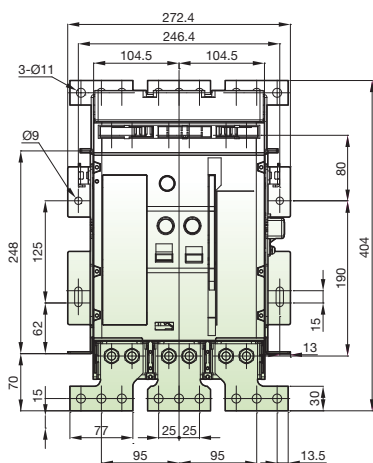


P Type (Plane type)

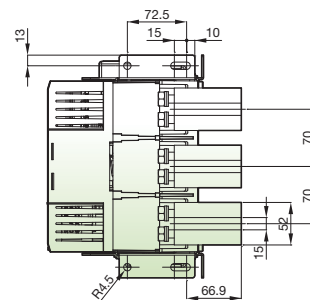


R Type (Spread type)

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



Z Type (Plane spread type)

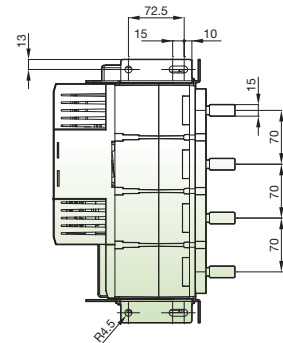
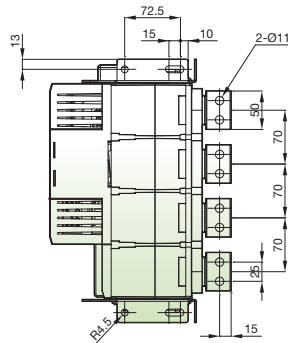
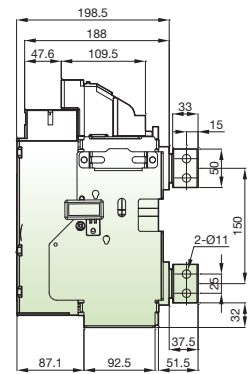
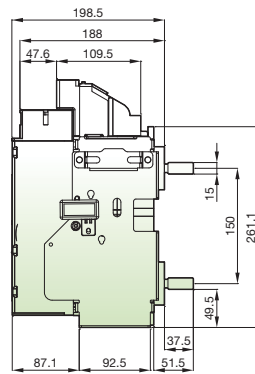
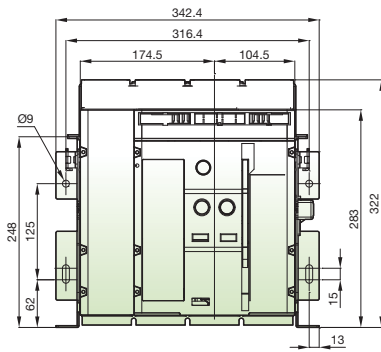


T Type (Plane vertical type)

Dimensions

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

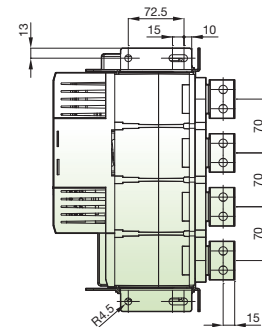
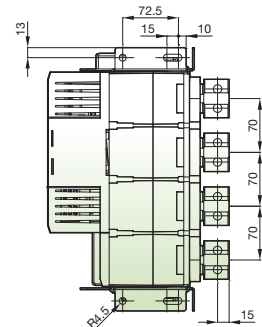
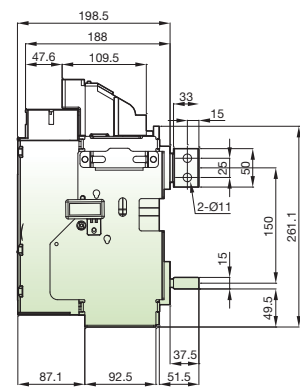
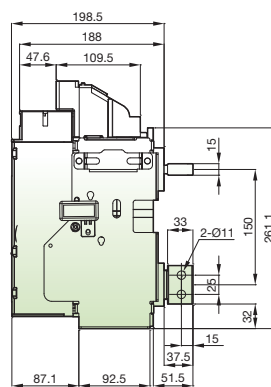
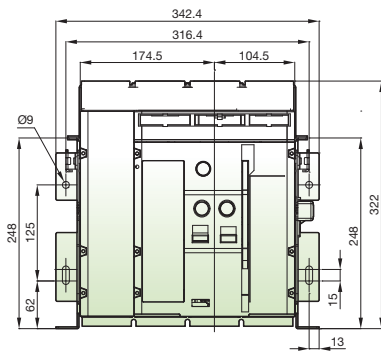
(Unit : mm)



H Type (Horizontal type)

V Type (Vertical type)

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

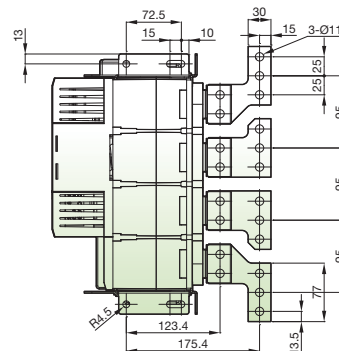
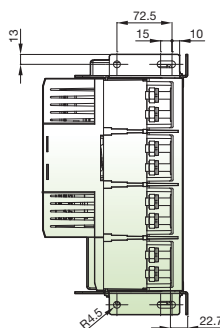
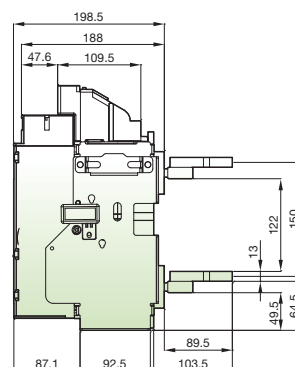
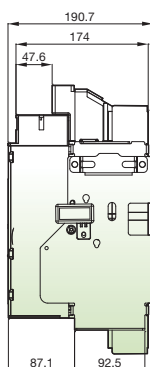
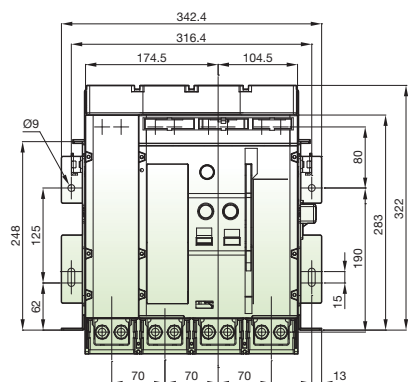


M Type
(Upper-Horizontal type, Lower-Vertical type)

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

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

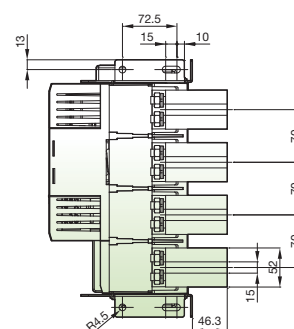
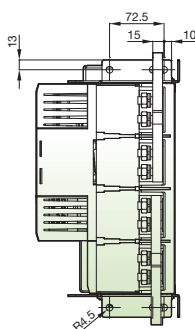
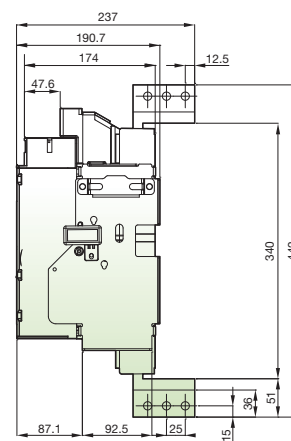
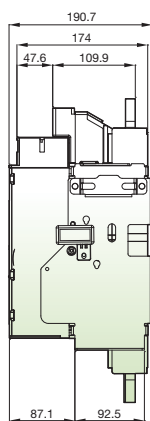
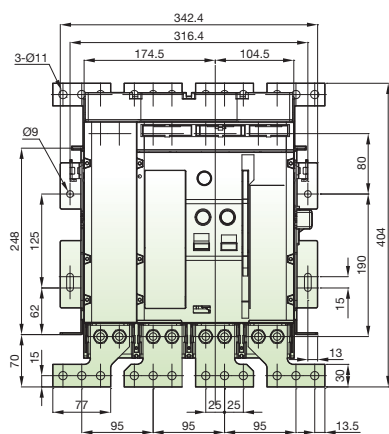
(Unit : mm)



P Type (Plane type)

R Type (Spread type)

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



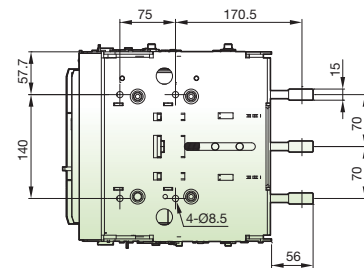
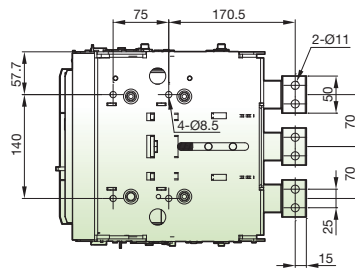
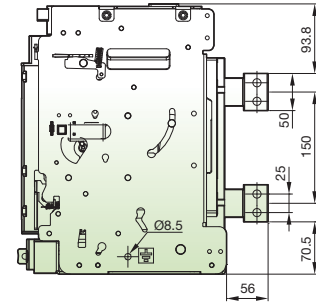
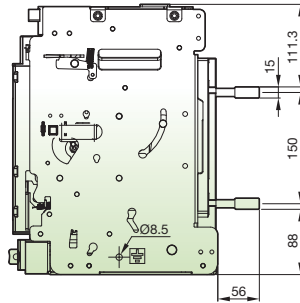
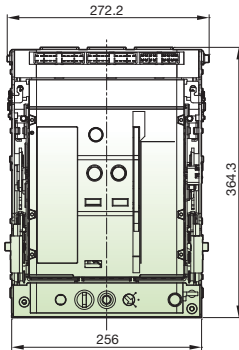
Z Type (Plane spread type)

T Type (Plane vertical type)

Dimensions

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

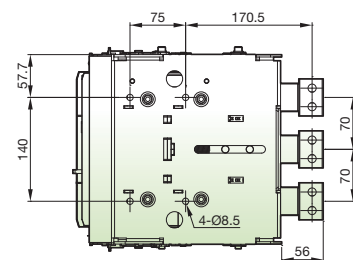
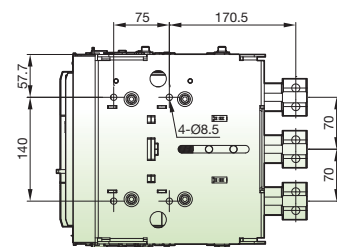
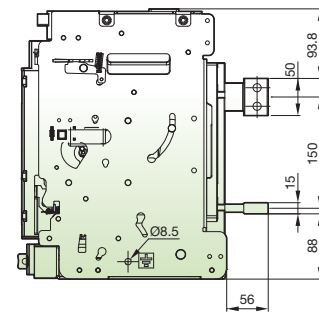
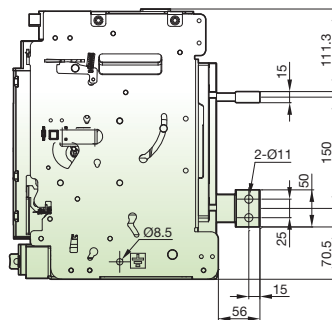
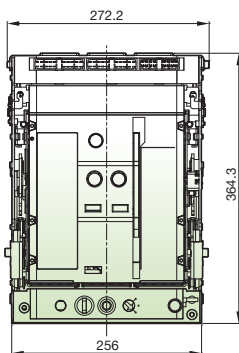
(Unit : mm)



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]

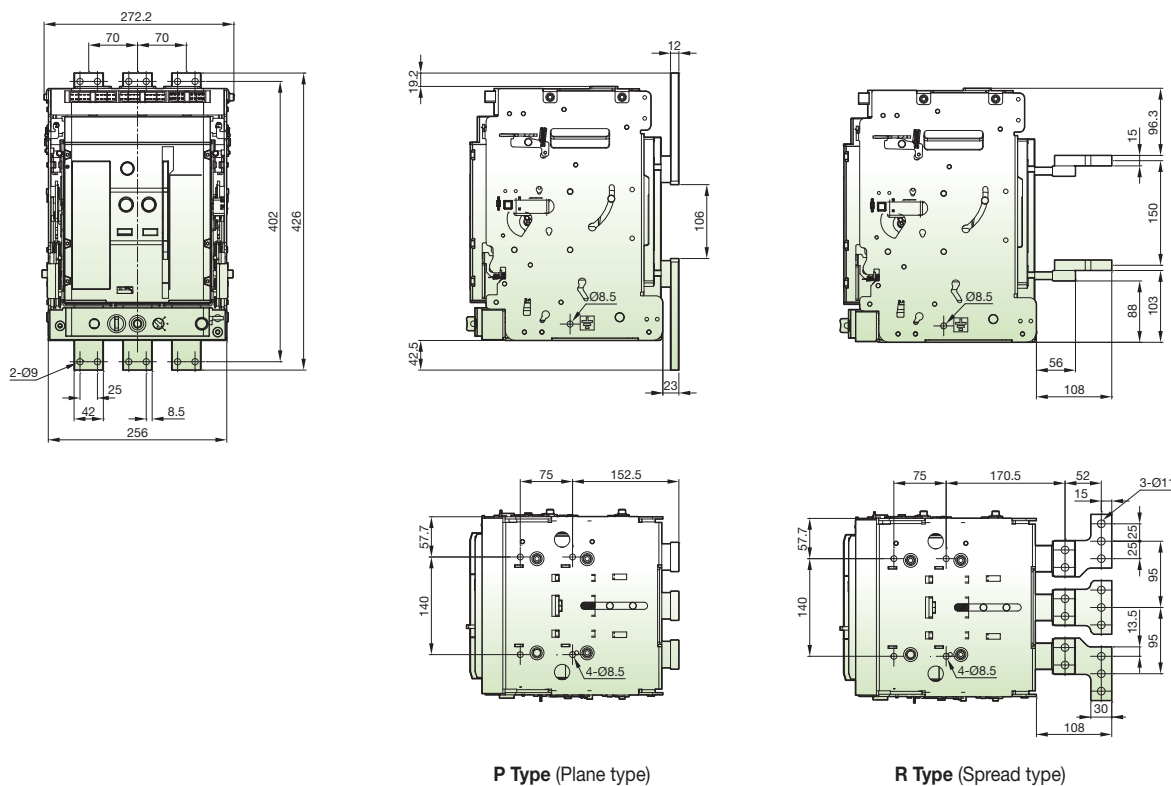


M Type
(Upper-Horizontal type, Lower-Vertical type)

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

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

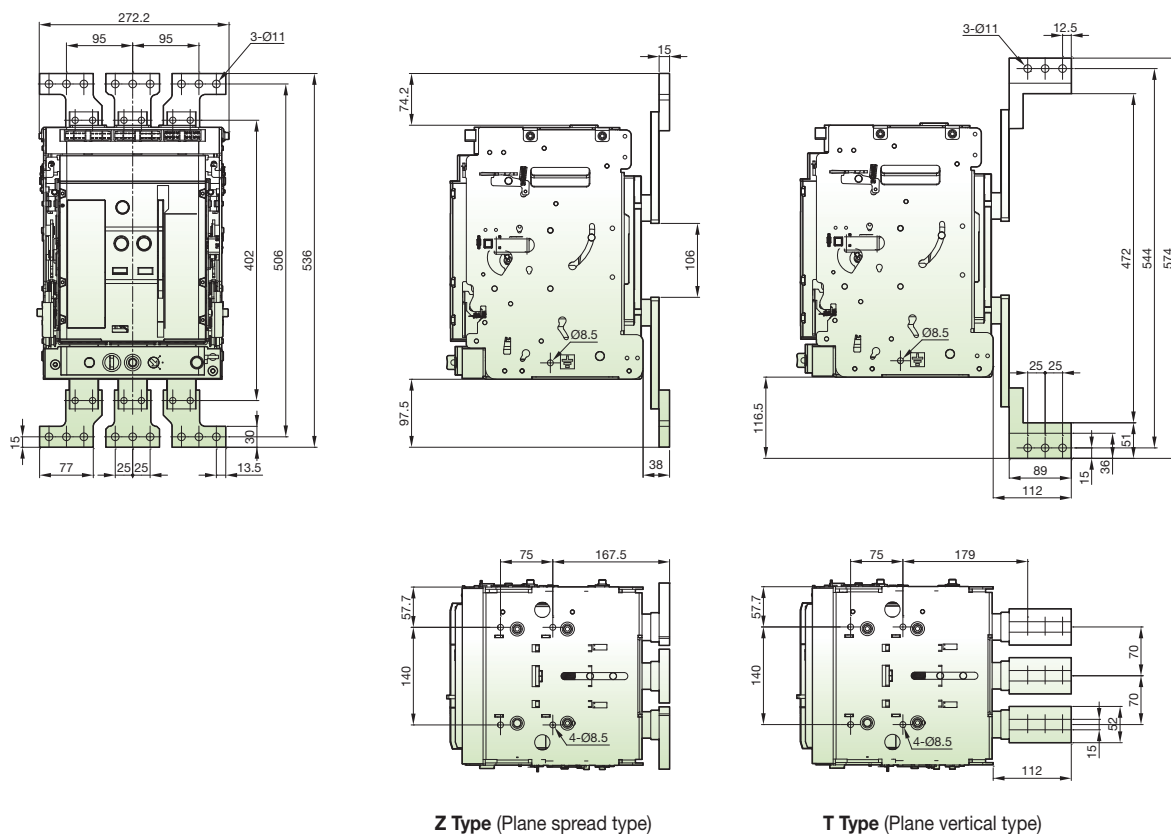
(Unit : mm)



P Type (Plane type)

R Type (Spread type)

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



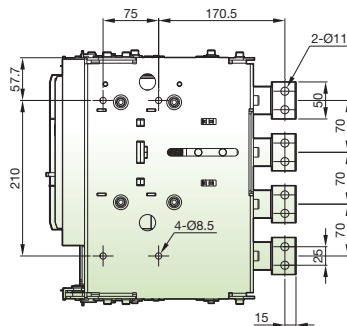
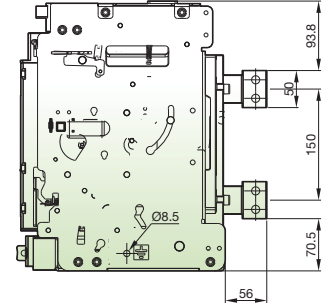
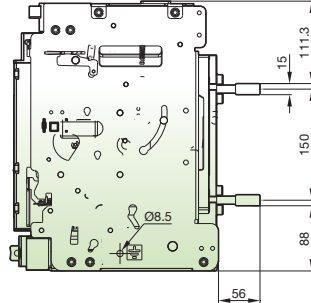
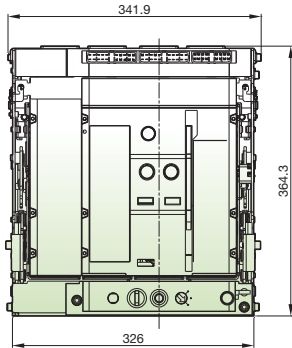
Z Type (Plane spread type)

T Type (Plane vertical type)

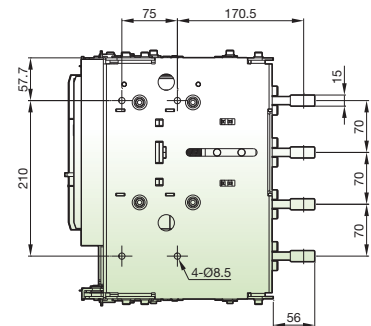
Dimensions

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

(Unit : mm)

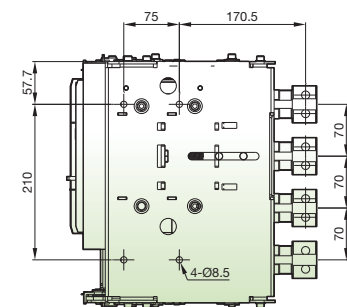
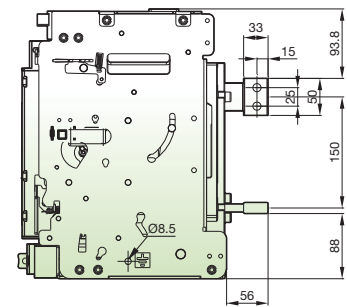
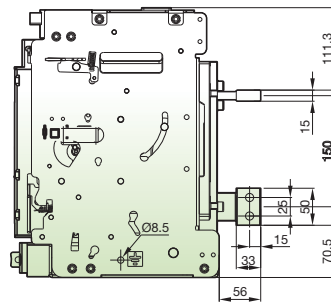
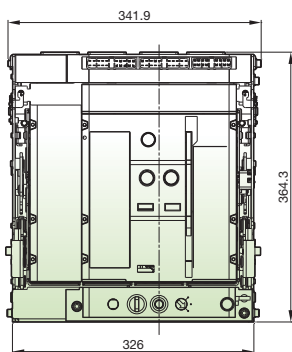


H Type (Horizontal type)

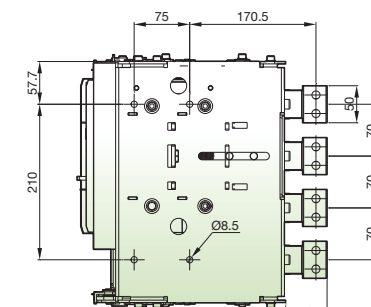


V Type (Vertical type)

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



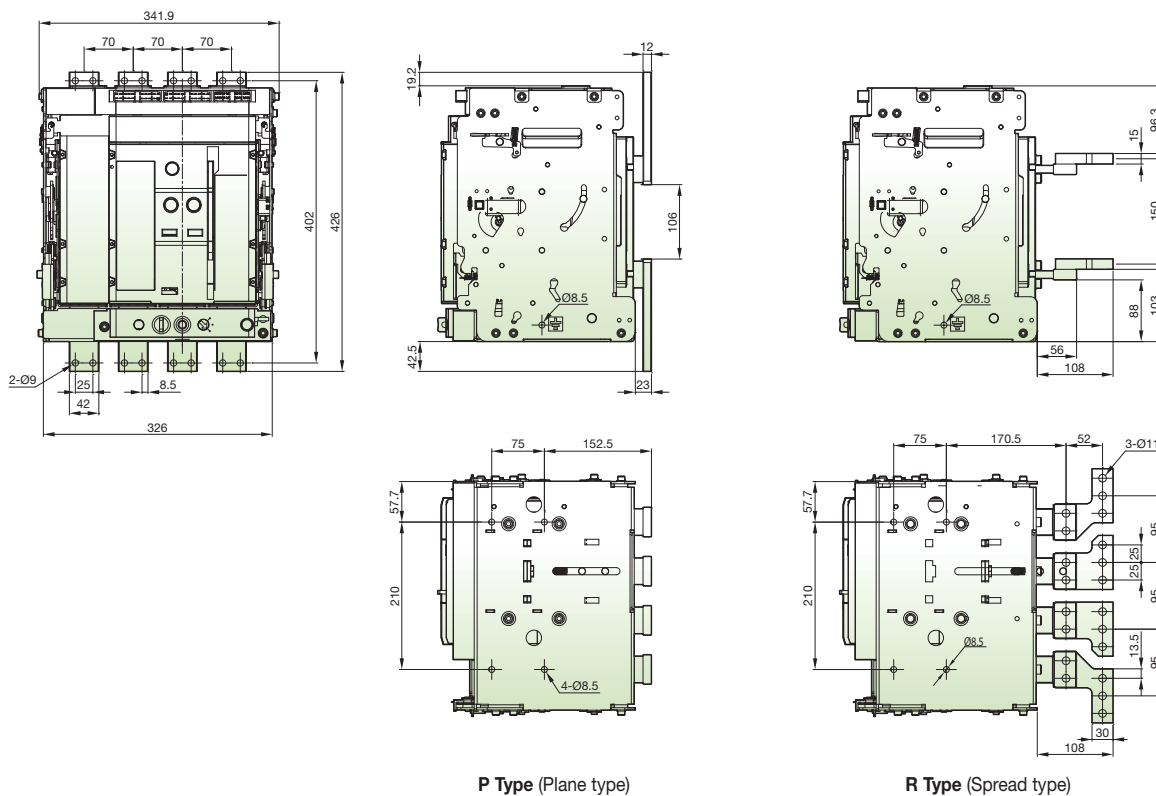
M Type
(Upper-Horizontal type, Lower-Vertical type)



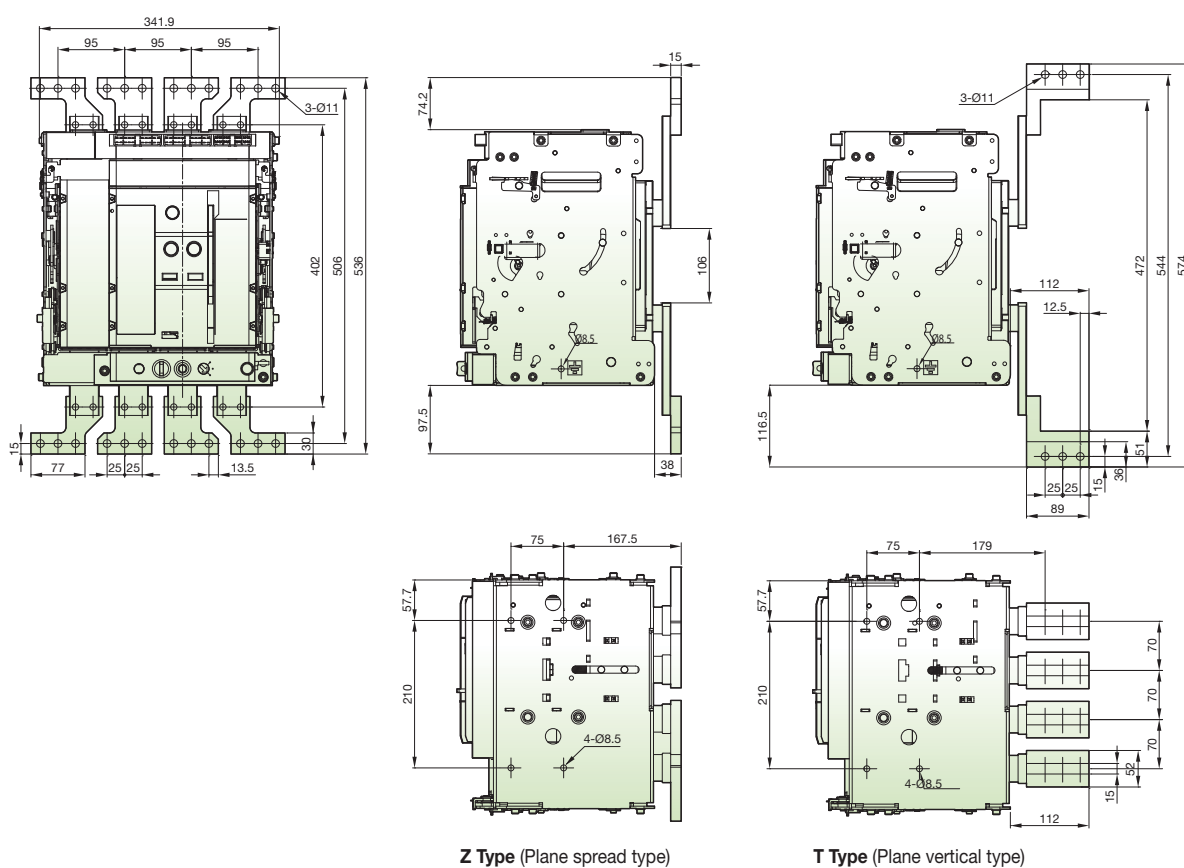
N Type
(Upper-Vertical type, Lower-Horizontal type)

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

(Unit : mm)



• 4P [Draw-out Z: Flat spread type / T: Flat 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 1,200cycles/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 1,200cycles/Hr)	150A, 450VDC, 1,000cycles (at 1,200cycles/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°C	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C
	5-95% R.H.	5-95% R.H.	5-95% R.H.	5-95% R.H.
	330g	330g	500g	630g
	CE CCC	CE cRU US 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 cRUUS CCC	CE cRUUS CCC	CE cRUUS CCC

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

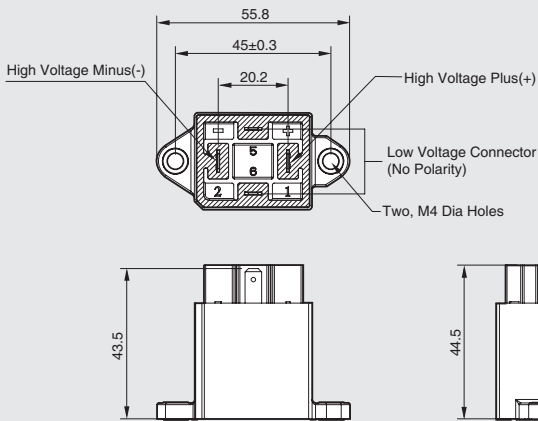


	GPR-M150	GPR-M250	GPR-M400	GPR-M400-A	GPR-H500-A
	1 Pole	1 Pole	1 Pole	1 Pole	1 Pole
	DC 1000V	DC 1000V	DC 1000V	DC 1000V	DC 1500V
	6kV	6kV	6kV	6kV	8kV
	150A	250A	400A	400A	500A
	320A	500A	750A	750A	900A
	225A	350A	500A	500A	750A
	200,000 cycles	200,000 cycles	200,000 cycles	200,000 cycles	200,000 cycles
	75A, 1000VDC, 1,000cycles (at 360cycles/Hr)	125A, 1000VDC, 1,000cycles (at 360cycles/Hr)	200A, 1000VDC, 1,000cycles (at 360cycles/Hr)	200A, 1000VDC, 3,000cycles (at 360cycles/Hr)	200A, 1500VDC, 1,000cycles (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°C	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C	-40 ~ 85°C
	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

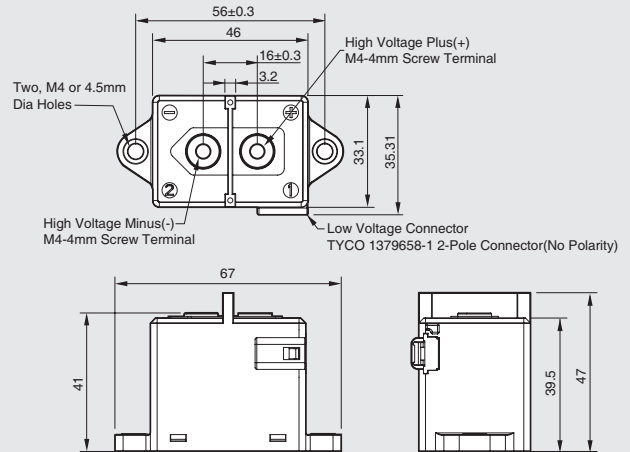
High Voltage DC Relay

Dimensions

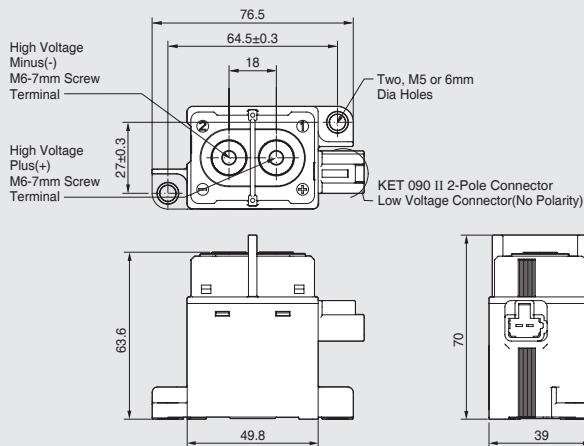
GPR010 / GPR-M010



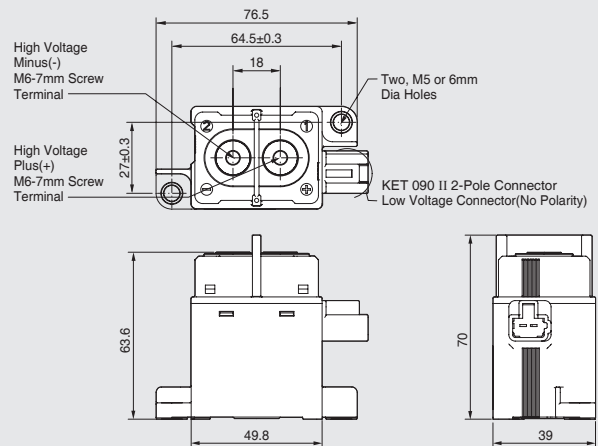
GPR040 / GPR-M040



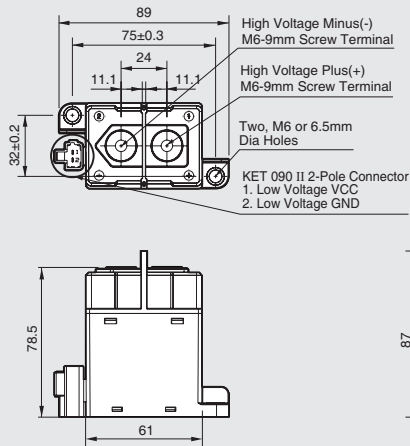
GPR100 / GPR-M100



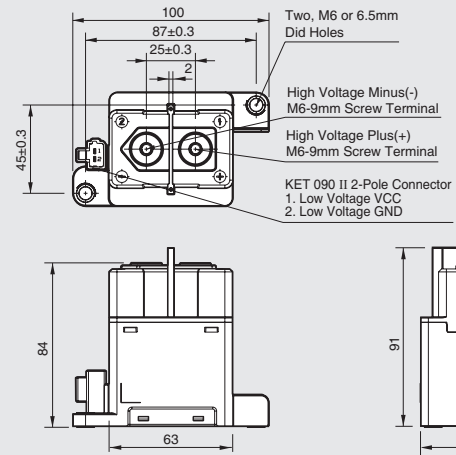
GPR150 / GPR-M150



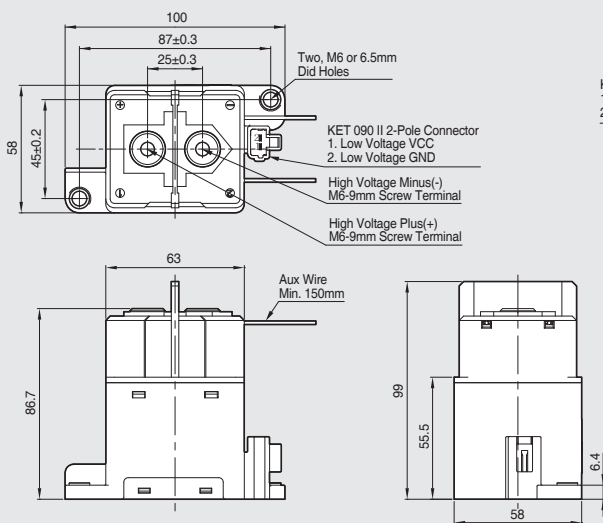
GPR250 / GPR-M250



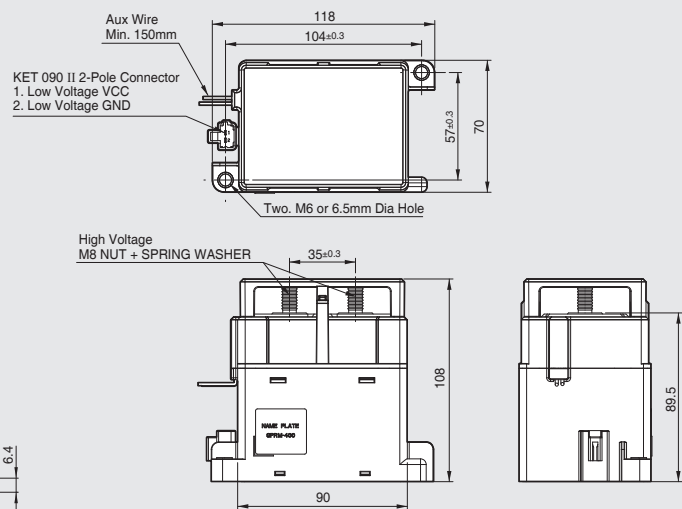
GPR400 / GPR-M400



GPR-M400-A



GPR-H500-A



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	68
Susol ACB	81
Susol Compact ACB	92
Susol VCB	101
Metasol Contactors	119
Susol Busways	135
X GIPAM	139
Susol RMU	143
Transformer	153

Susol MCCB (100~800AF)



Rating

			TD100			TD160			TS100				
Frame size	[AF]		100			160			100				
Rated current, I _n	[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, U _e	AC	[V]	690			690			690				
	DC	[V]	500			500			500				
Rated impulse withstand voltage, U _{imp}		[kV]	8			8			8				
Rated insulation voltage, U _i		[V]	750			750			750				
Rated ultimate short-circuit breaking capacity, I _{cu}	AC 50/60Hz	220/240V	[kA]	N	H	L	N	H	L	N	H	L	
		380/415V	[kA]	85	100	200	85	100	200	100	120	200	
	DC	440/460V	[kA]	50	85	150	50	85	150	50	85	150	
		480/500V	[kA]	50	70	130	50	70	130	50	70	130	
		660/690V	[kA]	30	50	65	30	50	65	42	65	85	
		250V	[kA]	5	8	10	5	8	10	10	15	20	
	DC	500V	[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, I _{cs}		[%I _{cu}]	100%	100%	100%	100%	100%	100%	100%	100%	100%		
Rated short-circuit making capacity, I _{cm}	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, I _g	Zone selective interlocking, ZSI		-			-			-			
		Ammeter		-			-			-			
		Communication		-			-			-			
		Connection		-			-			-			
		Connection		-			-			-			
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				

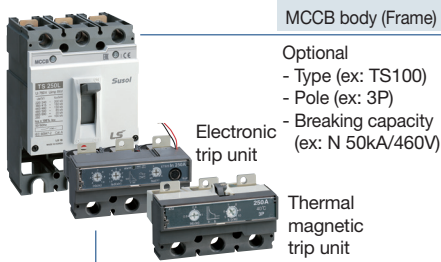
※ The trip unit ATU is available from 125A



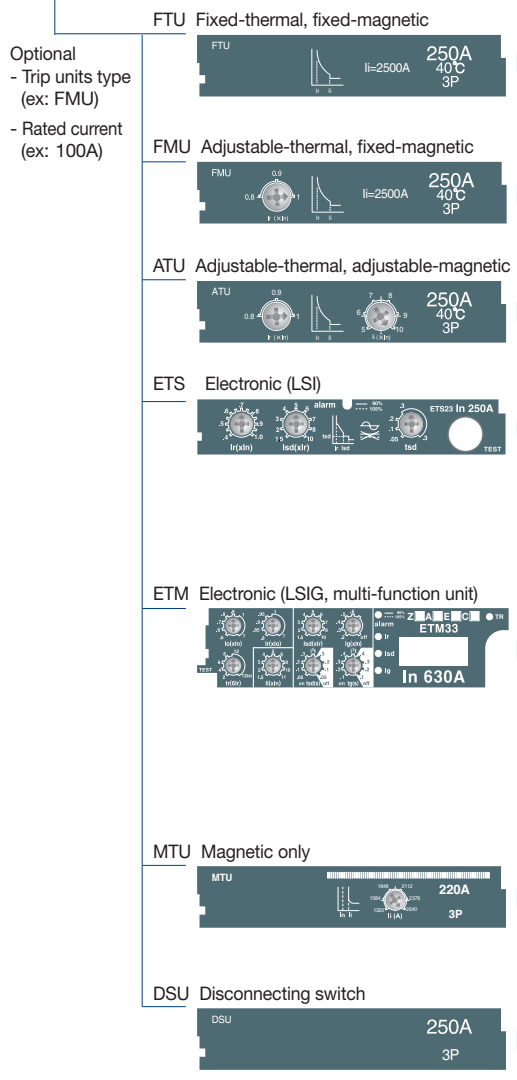
TS160			TS250			TS400			TS630			TS800		
160			250			400			630			800		
(100) [*] , 125, 160			125, 160, 200, 250			300, 400			500, 630			700, 800		
2, 3, 4			2, 3, 4			2, 3, 4			2, 3, 4			2, 3, 4		
690			690			690			690			690		
500			500			500			500			500		
8			8			8			8			8		
750			750			750			750			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.



Trip unit



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
	Instantaneous trip current, Ii	Adjustment range	(0.8-0.9-1)×In	(0.8-0.9-1)×In
ATU	Rated current, In	Adjustable	-	-
	Instantaneous trip current, Ii	Adjustment range	-	-
ETS	Rated current, In	Adjustable	-	-
	(Long time trip current, Ir)	Adjustment range	-	-
	Short time characteristics	Current adjustment	-	-
	Instantaneous trip current, Ii	Fixed	-	-
ETM	Rated current, In	Adjustable	-	-
	(Long time trip current, Ir)	Adjustment range	-	-
	Long time trip time, Ir	Primary adjustment	-	-
	Short time characteristics	Secondary adjustment	-	-
	Instantaneous trip current, Ii	Adjustable	-	-
	Additional function	Standard	-	-
		Optional	-	-

	Type		
Number of pole	[Pole]	-	-
Rated current (Energizing current)	Unprotected	-	-
Instantaneous trip current, Ii	Adjustable	-	-

DSU is a device from which all protection (trip) function have

※ 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		
I _r =(0.4~1)×In : Step 13						I _r =(0.4~1)×In : Step 13											
(1.5~10)×I _r : Step 9						(1.5~10)×I _r : 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					
-						-						I _o =(0.5~1)×In : Step 6					
-						-						I _r =(0.8~1)×I _o : Step 5					
-						-						2, 4, 6, 8, 12sec(at 6×I _r) : Step 5					
-						-						(1.5~10)×I _r : Step 9					
-						-						50, 100, 200, 300ms : Step 4					
-						-						(1.5~11)×I _r : 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	
	Rated service %Icu breaking capacity (Ics)	250V 2P	
Rated short-circuit making capacity (kA) (Icw)	AC50/60Hz	1s	
		3s	
		750V 3P	
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)	• P type
Other protection	-		• Over/Under current • Over/Under frequency • Unbalance(Voltage/Current) • Reverse power	• 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 Ir)

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.



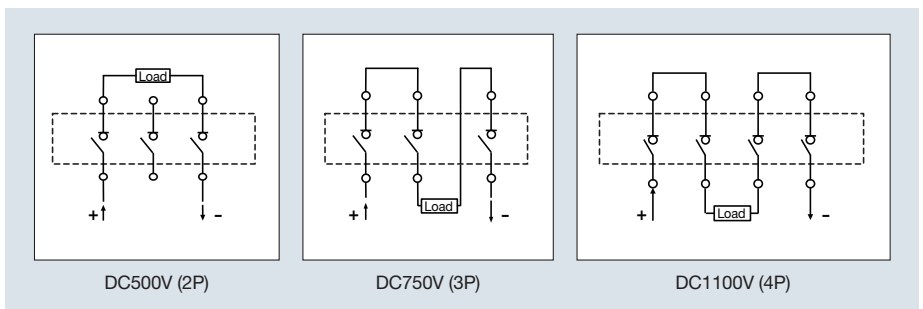
Rating

		TD100NA	TD160NA		TS100NA
Frame size	[AF]	100	160	160	100
Conventional thermal current, I _{th}	[A]	100	100	160	100
No. of poles		2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4
Rated operational voltage, U _e	AC	690	-	690	690
	DC	500	500, 750, 1100	500, 750, 1100	500
Rated operational current, I _e		100	-	160	100
Rated impulse withstand voltage, U _{imp}	[kV]	8	8	8	8
Rated insulation voltage, U _i	AC	750	-	750	750
	DC	-	1100	1100	-
Rated short-circuit making capacity, I _{cm}	AC	3.1	-	3.1	2.8
	DC	-	1.92	1.92	-
Rated short-time withstand current, I _{cw}	AC	1s	2200	-	2200
		3s	2200	-	2200
		20s	960	-	960
	DC	1s	-	1920	1920
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	10000	-	10000	10000
	DC	-	1500	1000	-
Basic dimensions, W×H×D (Front connection)	3-pole	90×140×86	90×140×86		105×160×86
	4-pole	120×140×86	120×140×86		140×160×86
Weight (Front connection)	3-pole	1.5	1.5		2
	4-pole	1.8	1.8		2.6
Reference standard		IEC60947-3	IEC60947-3		IEC60947-3

Note)

1. Rating of TD160NA is 100,160A
2. Rating of TS250NA is 200, 250A
3. DC Rating of TS630NA is 500A

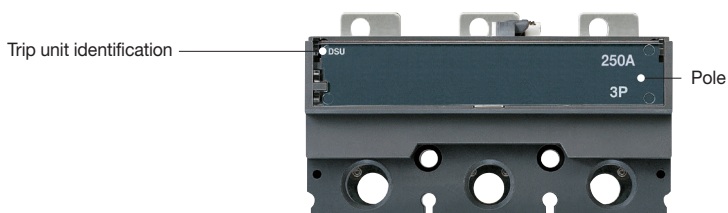
DC Exemplary circuit diagrams





	TS160NA	TS250NA		TS400NA	TS630NA	TS800NA
	160	250	250	400	630	800
	160	200	250	400	630 (500) ^{Note 3)}	800
	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4	2, 3, 4
	690	-	690	690	690	690
	500	500, 750, 1100	500, 750, 1100	500	500, 750, 1100	500, 750, 1100
	160	-	250	400	630	800
	8	8	8	8	8	8
	750	-	750	750	750	750
	-	1100	1100	-	1100	1100
	3.6	-	4.9	7.1	8.5	12
	-	3.0	3.0	-	6.0	9.6
	2500	-	3500	5000	6300	8000
	2500	-	3500	5000	6300	8000
	960	-	1350	1930	2320	2560
	-	3000	3000	-	6000	9600
	●	●	●	●	●	●
	●	●	●	●	●	●
	●	●	●	●	●	●
	●	●	●	●	●	●
	●	●	●	●	●	●
	●	●	●	●	●	●
	25000	-	25000	20000	20000	10000
	10000	10000	10000	6000	6000	3000
	-	1000	1000	-	1000	500
	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

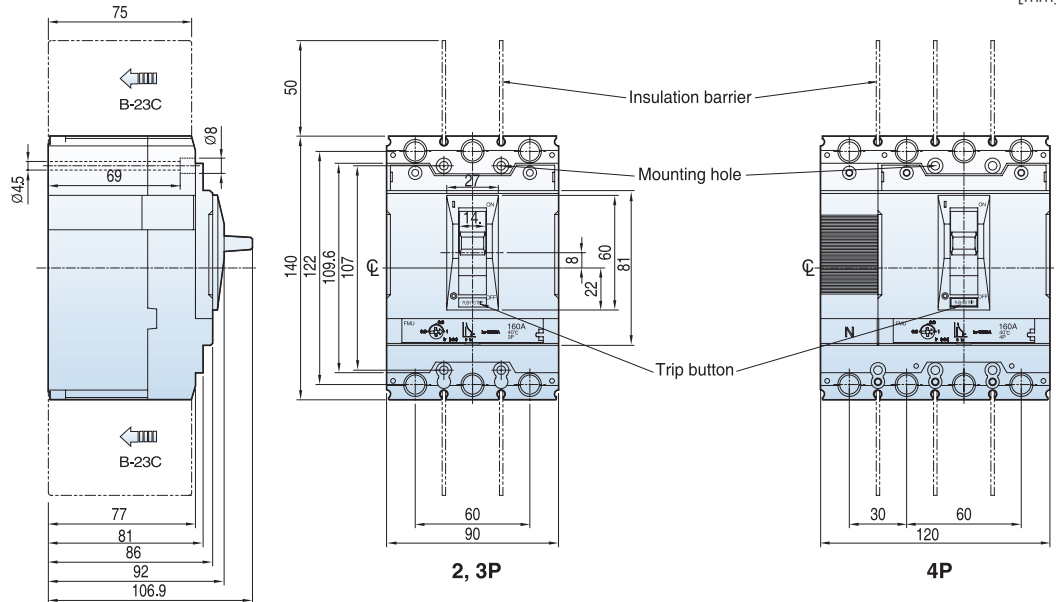


Susol MCCB

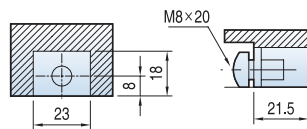
Dimensions of MCCB body

TD100, 160

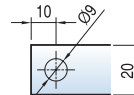
[mm]



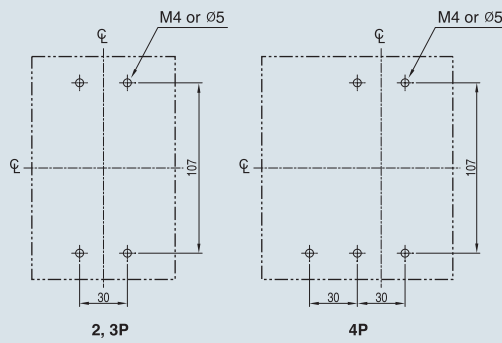
Terminal section



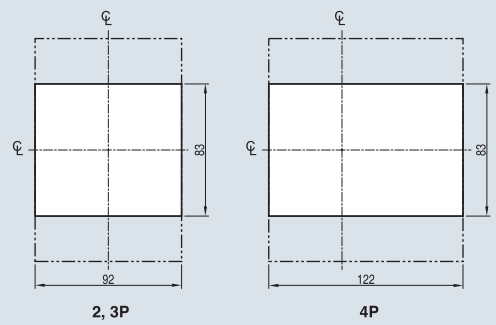
Conductor



Panel drilling

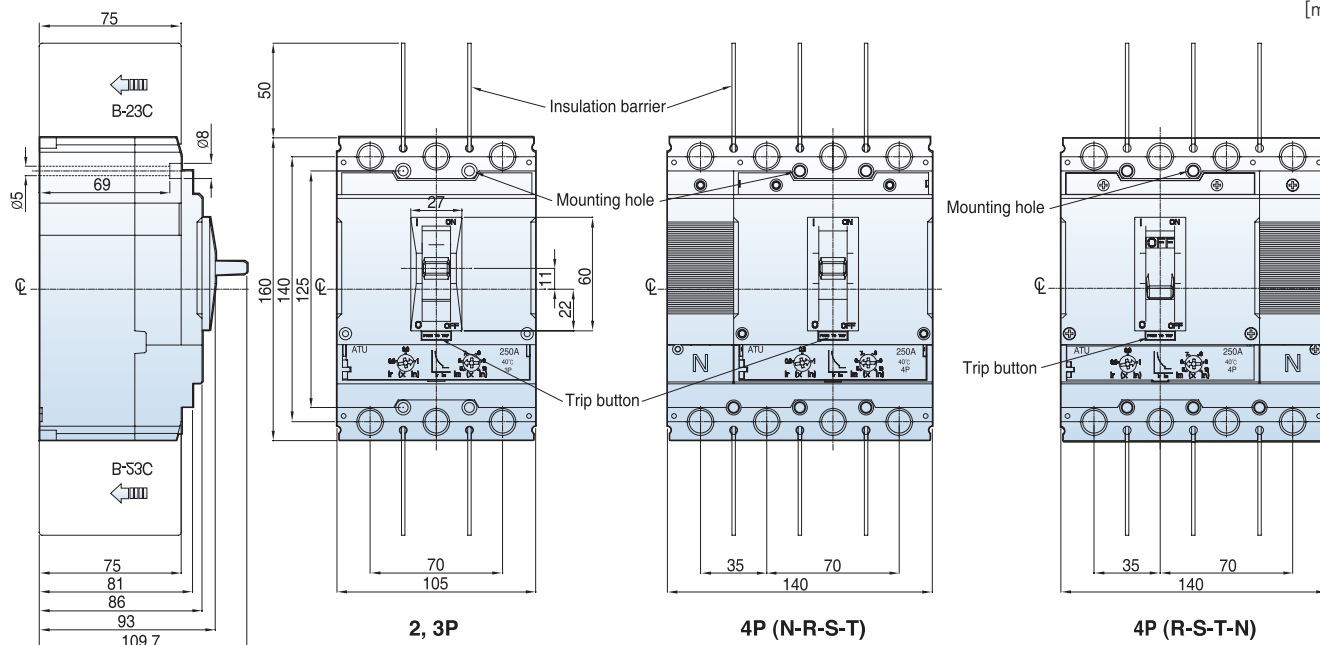


Front panel cutting

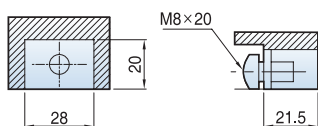


TS100, 160, 250

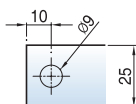
[mm]



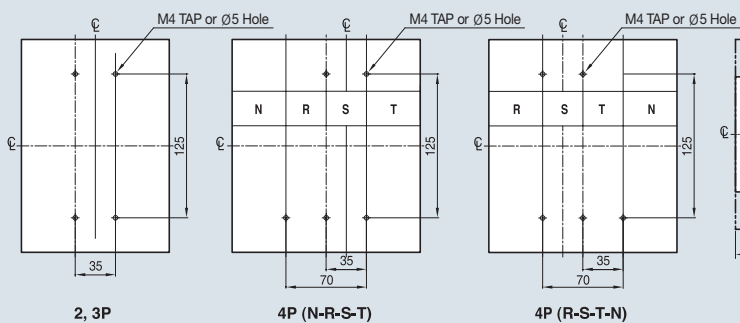
Terminal section



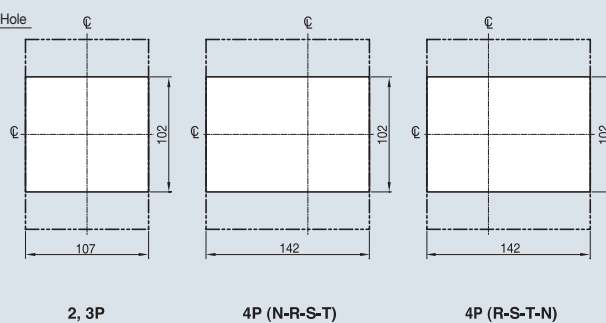
Conductor



Panel drilling



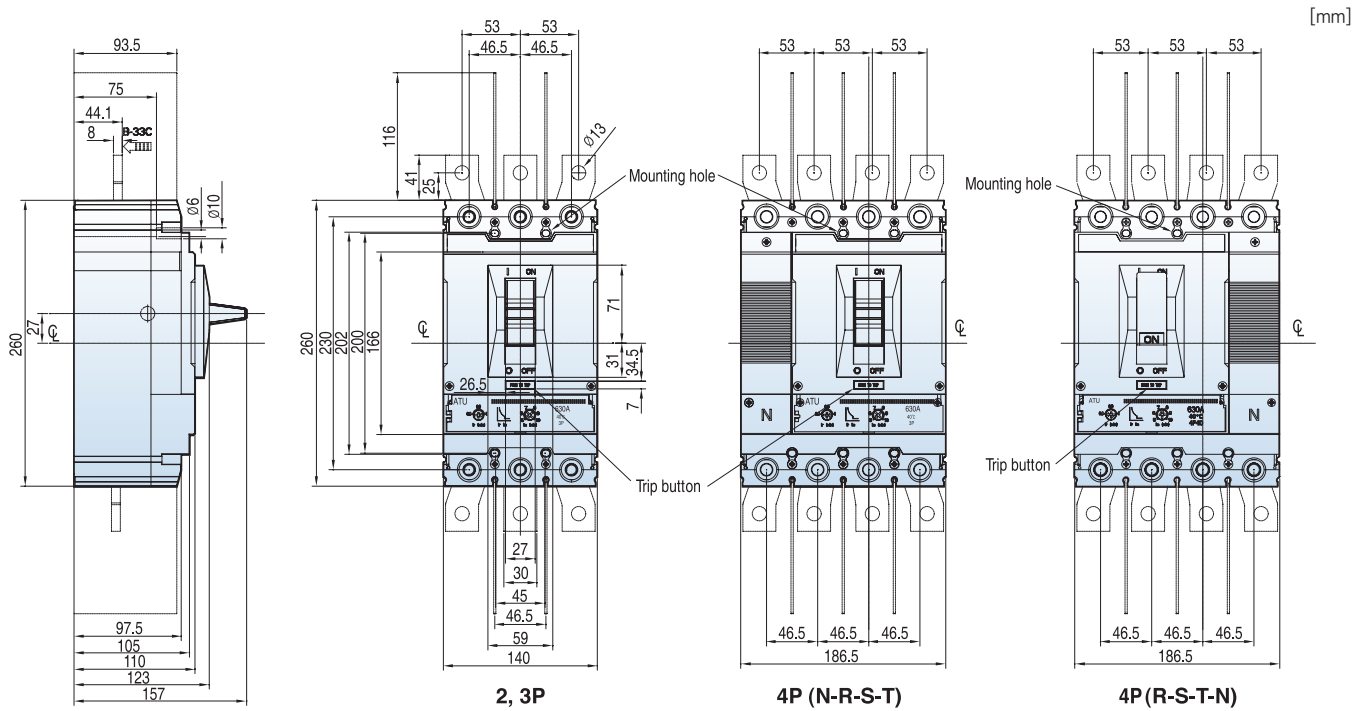
Front panel cutting



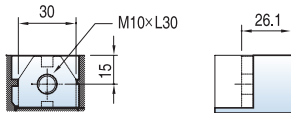
Susol MCCB

Dimensions of MCCB body

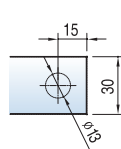
TS400, 630



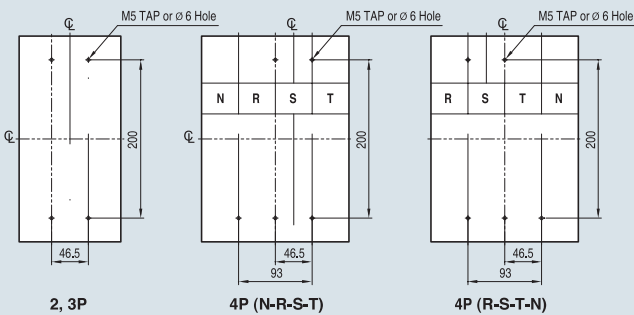
Terminal section



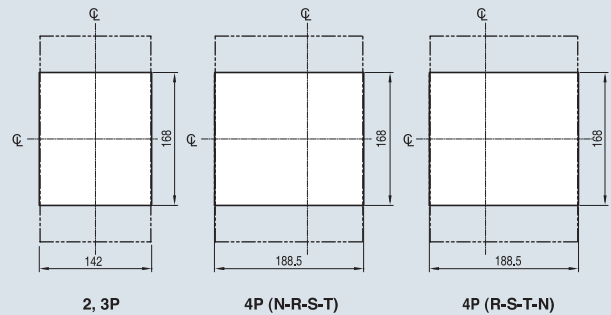
Conductor



Panel drilling

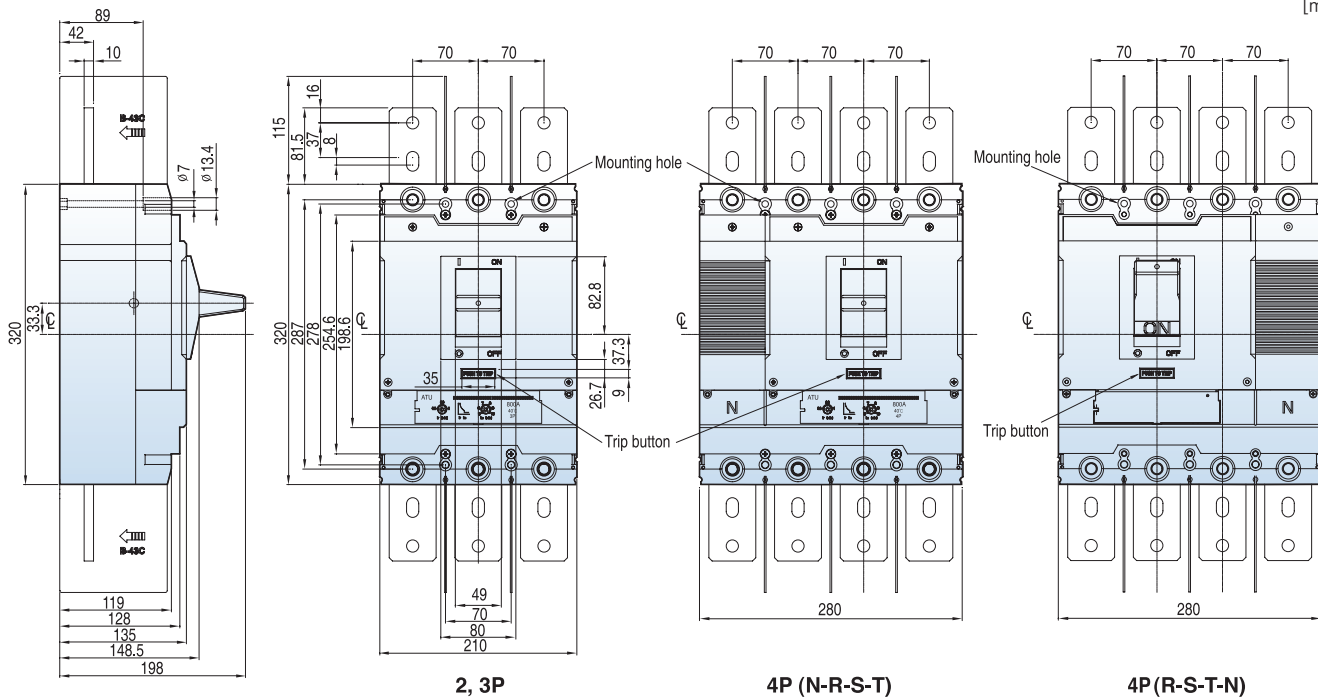


Front panel cutting

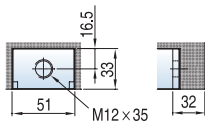


TS800

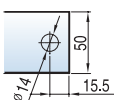
[mm]



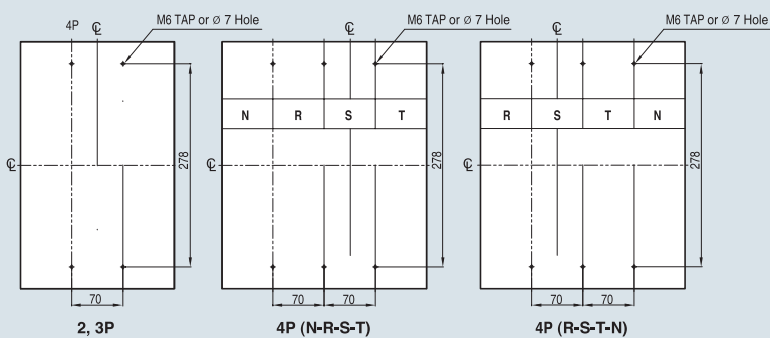
Terminal section



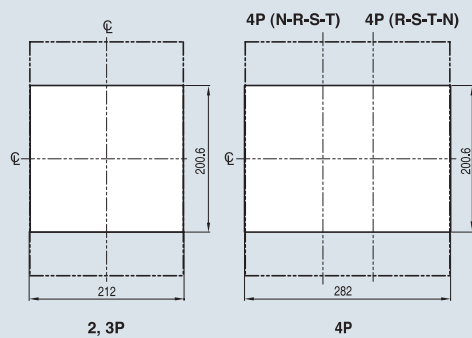
Conductor



Panel drilling



Front panel cutting

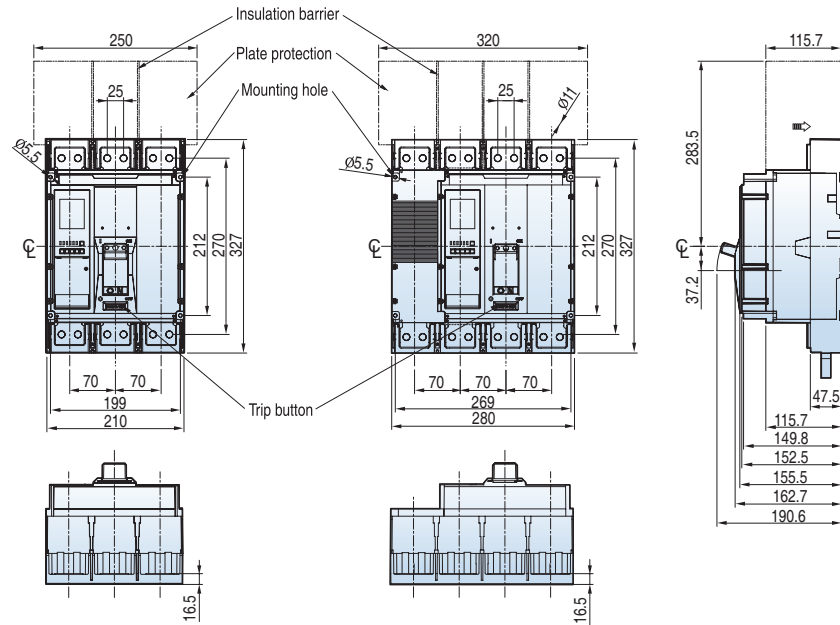


Susol MCCB

TS 1000, 1250, 1600A Dimensions

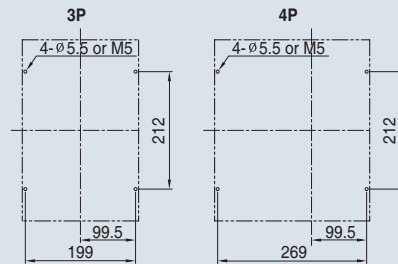
Front Type

[mm]

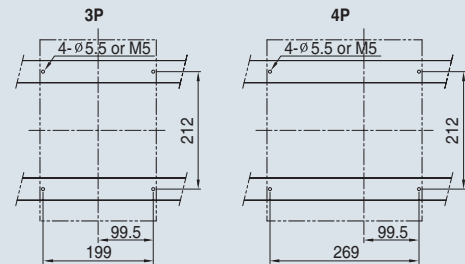


Panel drilling

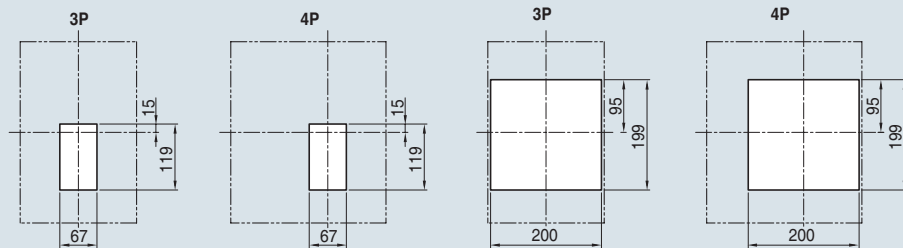
ON BACKPLATE



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 function-ality in ACB market.



Susol ACB (~6300AF)



Rating

Type		
Ampere frame	(AF)	
Rated current(A)	(In max)	at 40°C
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)		220V/230V/380V/415V
AC 50/60Hz	(Icu) IEC 60947-2 KS C 4620	460V/480V/500V 550V/600V/690V
Rated service breaking capacity (kA)	(Ics)	... % × Icu
Rated making capacity (kA peak)		220V/230V/380V/415V
AC 50/60Hz	(Icm) IEC 60947-2 KS C 4620	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	20,000 5,000
Connections **	Draw-out / Fixed	Horizontal connection Vertical connection Front connection Mixed connection
Weight (kg)	Draw-out type	Main body (With cradle) Cradle only
(3P/4P)	Fixed type	Motor charging type Manual charging type
External dimensions (mm)		3P 4P
(H×W×D)		3P 4P
Trip relay		
Certificate & Approval		
Marine classification		

AH-D					
AH-06D	AH-08D	AH-10D	AH-13D	AH-16D	AH-20D
630	800	1000	1250	1600	2000
200	400				
400	630	1000	1250	1600	2000
630	800				
(0.4 ~ 1.0) × In max					
400	400				
630	630	1000	1250	1600	2000
	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					
		●			
		○	●		
		○	-		
		○	-		
Weight (kg)	Draw-out type	63/74	70/85		
(3P/4P)	Fixed type	61/72	68/83		
		29/32	33/40		
		34/44	38/47		
		32/42	36/45		
External dimensions (mm)		430×334×375			
(H×W×D)		430×419×375			
		300×300×295			
		300×385×295			
Trip relay					
N, A, P, S type					
Certificate & Approval					
KS / KEMA / KERI / GOST / CCC					
Marine classification					
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.



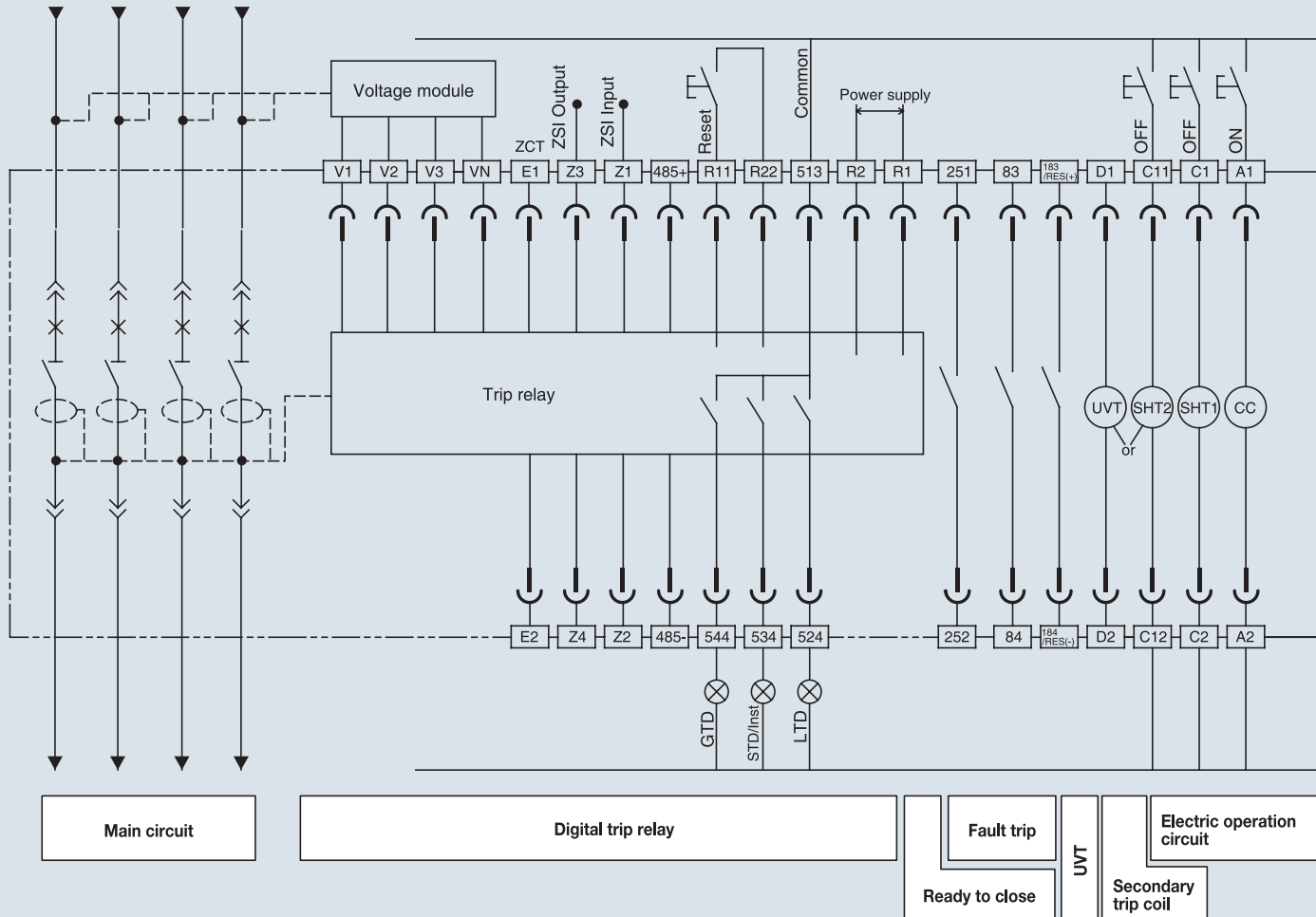
AH-E								
AH-06E	AH-08E	AH-10E	AH-13E	AH-16E	AH-20E	AH-25E	AH-32E	AH-40E
630	800	1000	1250	1600	2000	2500	3200	4000
630	800	1000	1250	1600	2000	2500	3200	4000
(0.4 ~ 1.0) × In max								
630	800	1000	1250	1600	2000	2500	3200	4000
				1,000				
				690				
				12				
				50/60				
				3/4				
				100				
				100				
				85				
				100%				
				220				
				220				
				187				
				85				
				75				
				65				
				40				
				80				
				15,000				
				5,000				
				●				
				○				
				○				
				○				
				○				
				87/103				
				85/101				
				44/55				
				44/55				
				42/53				
				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
		179/221
		97/117
		98/123
		96/121
		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)

Susol ACB

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

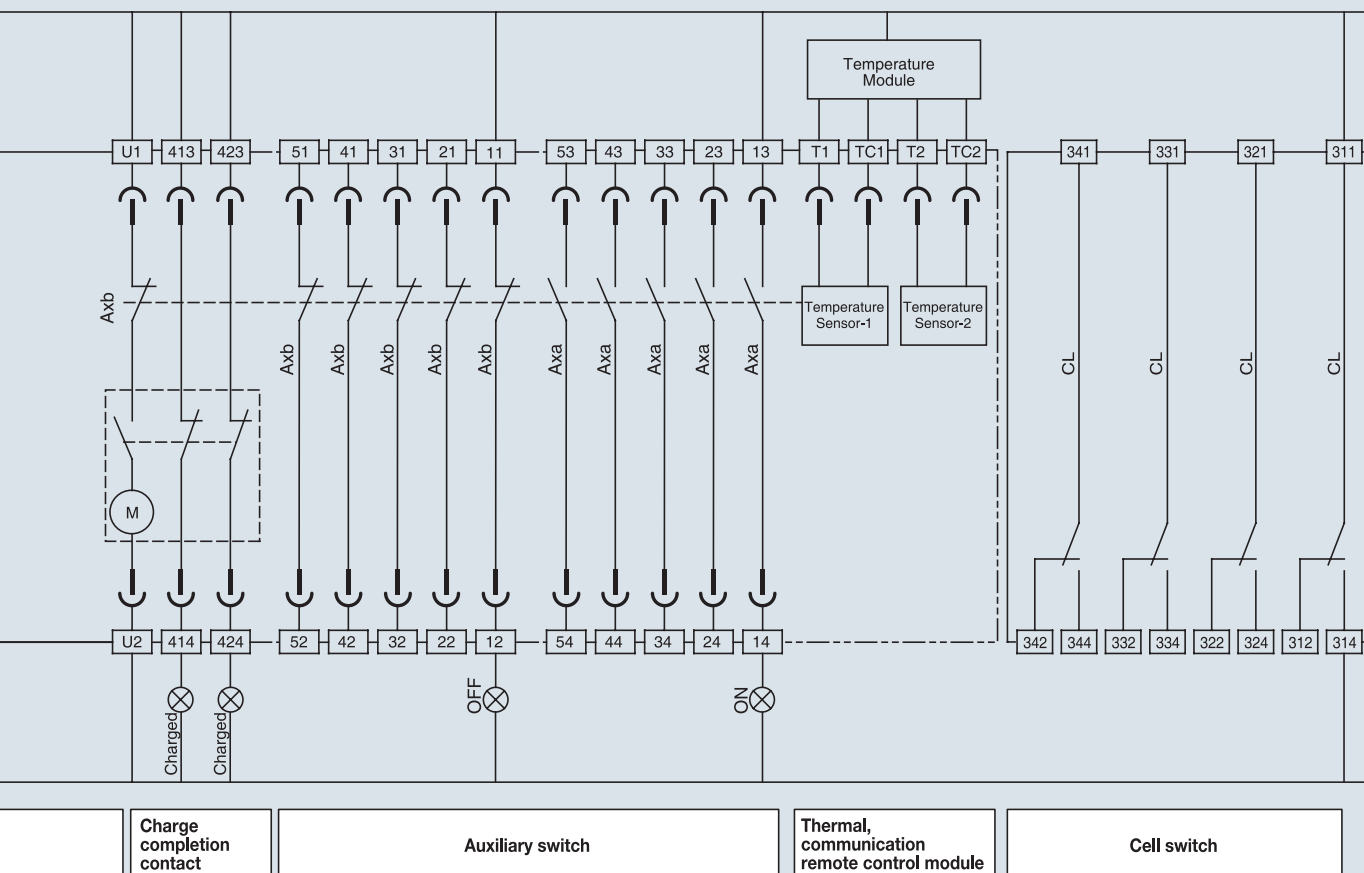
- Cell switch, Temperature module, Voltage module, Remote close-open module, ZCT, ZSI

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

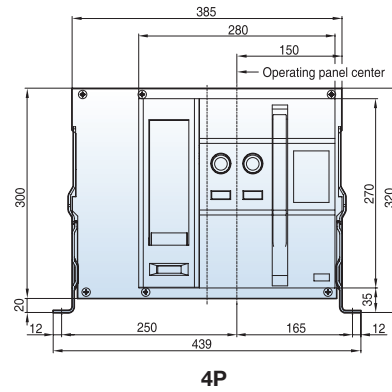
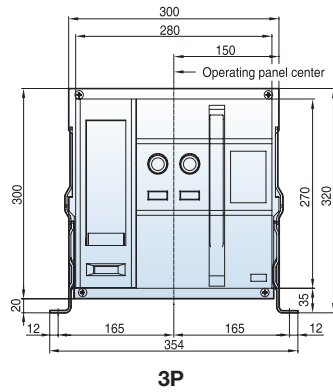
—	Internal wiring
—	External wiring (by customer)
⌋	Connector of the control circuit terminal of drawout type

Susol ACB

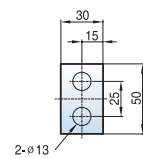
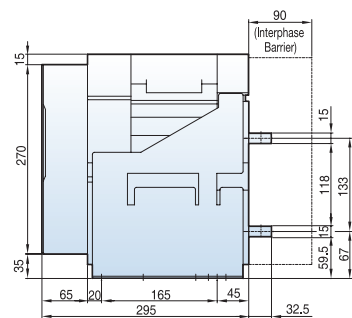
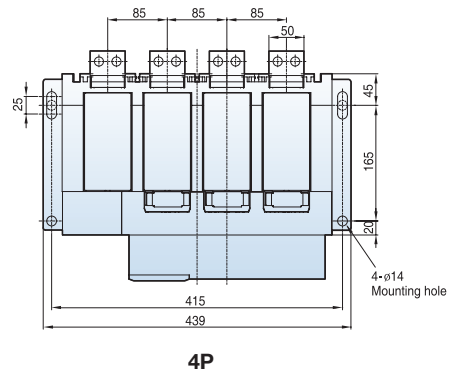
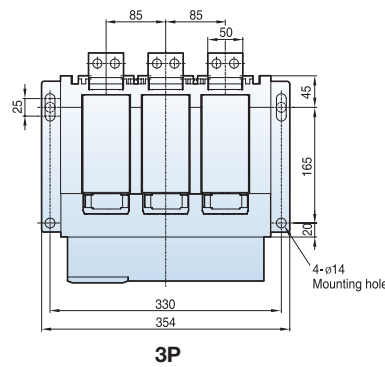
Fixed type 2000AF (630~1600A : AH-06~16D) Dimensions

Dimensions: [mm]

Front view



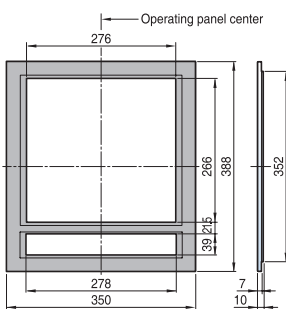
Vertical type



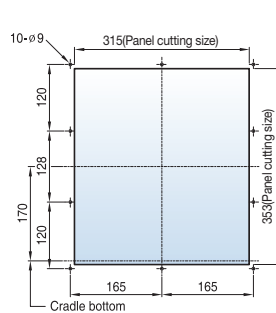
<Conductor>

Door Frame: DF (AH-D/E)

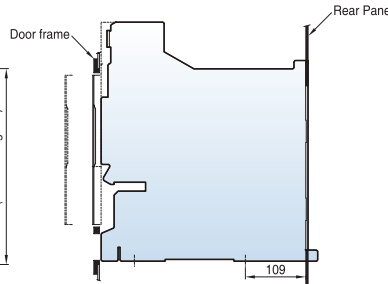
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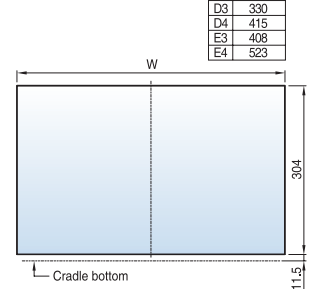
<Mounting hole>



<Side hole>



<Panel cutting>

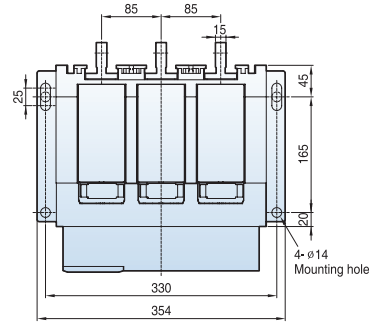


Din.	W
D3	330
D4	415
E3	408
E4	523

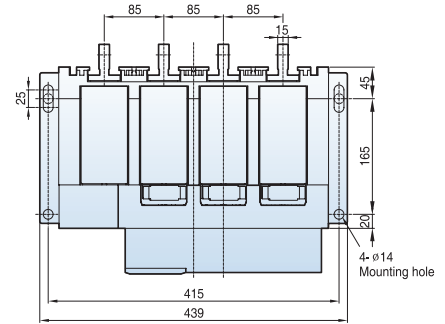
Note) The dimensions are for drawout type.

Dimensions: [mm]

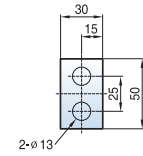
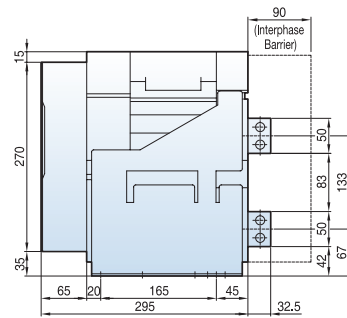
Horizontal type



3P

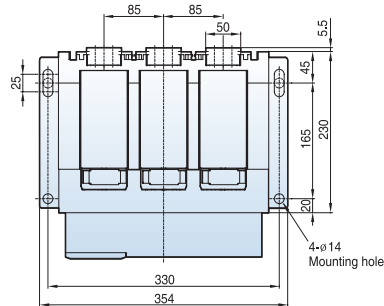


4P

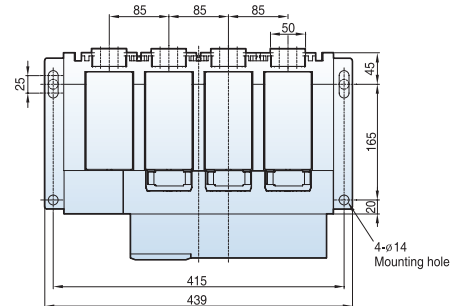


<Conductor>

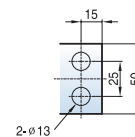
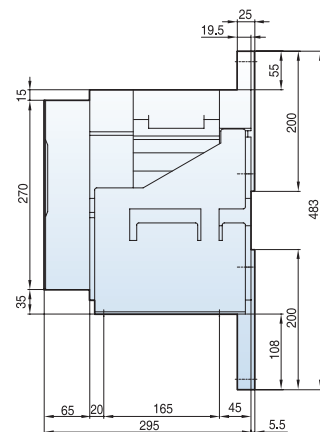
Front connection type



3P



4P



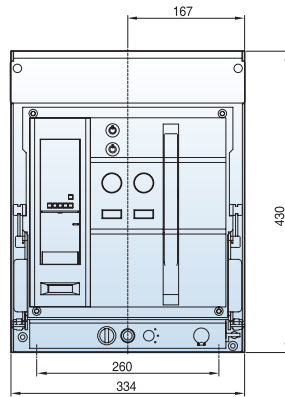
<Conductor>

Susol ACB

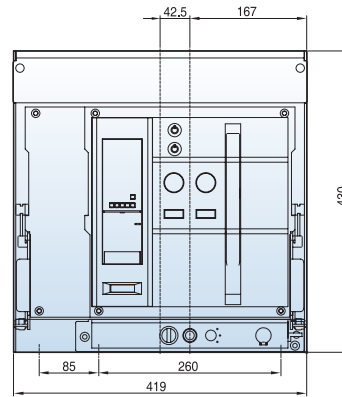
Draw-out type 2000AF (630~1600A : AH-06~16D) Dimensions

Dimensions: [mm]

Front view

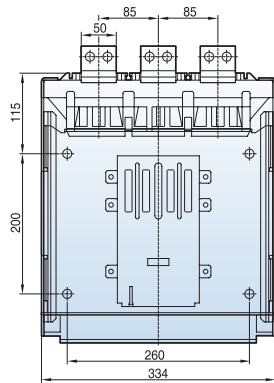


3P

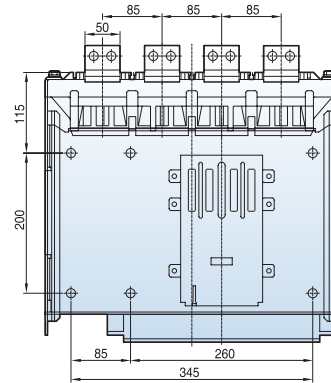


4P

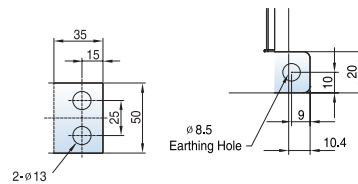
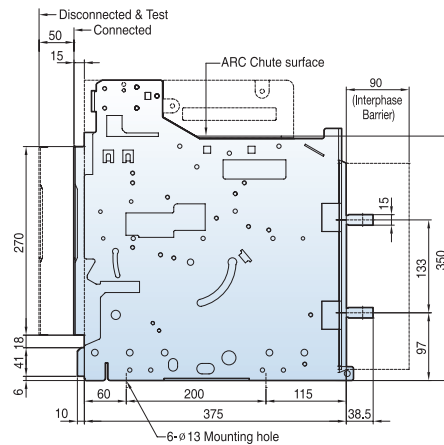
Vertical type



3P

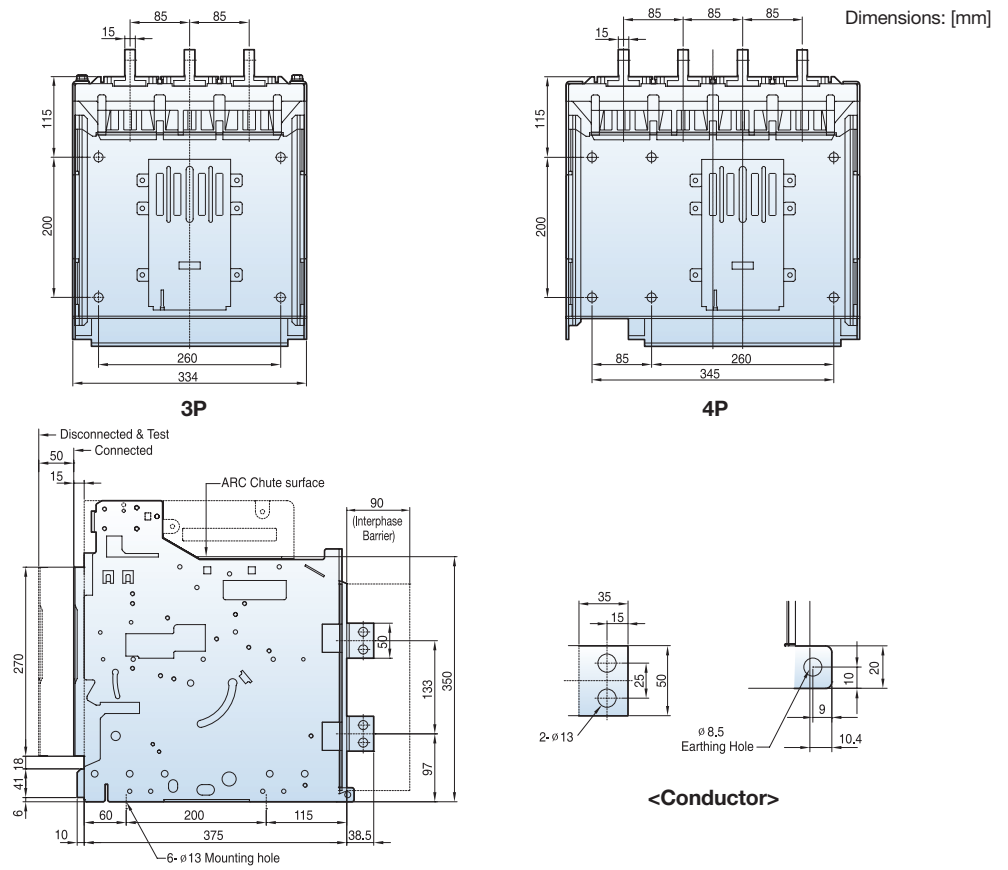


4P

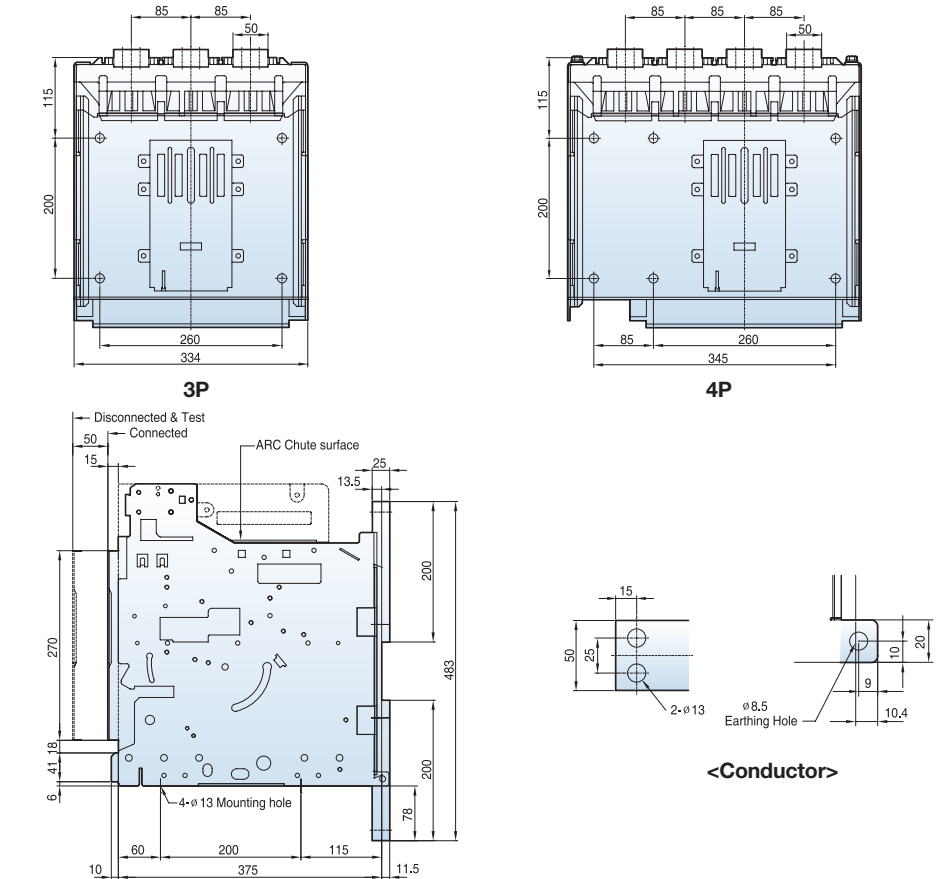


<Conductor>

Horizontal type







Front connection type



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 15~60V	• AC/DC 100~250V • DC 15~60V	• AC/DC 100~250V • DC 15~60V
RTC timer	-	• Available	• Available	• Available
LED for trip info.	• Long time delay • Short time delay/Instantaneous • Ground fault	• Long time delay • Short time delay/Instantaneous • Ground fault	• Long time delay • Short time delay/Instantaneous • Ground fault	• Long time delay • Short time delay/Instantaneous • Ground fault
Fault recording	-	• 10 records (Fault/Current/Date and Time)	• 256 records (Fault/Current/Date and Time)	• 256 records • Last fault wave form recording (Voltage, current are recorded in 3-phase, and can be read only by communication)
Event recording	-	-	• 256 records (Content, Status, Date)	• 256 records (Content, Status, Date)
Operating button	• Reset button	• Reset, Menu Up/Down, Tap, Enter	• Reset, Menu Up/Down, Tap, Enter	• Reset, Menu Up/Down, Tap, Enter

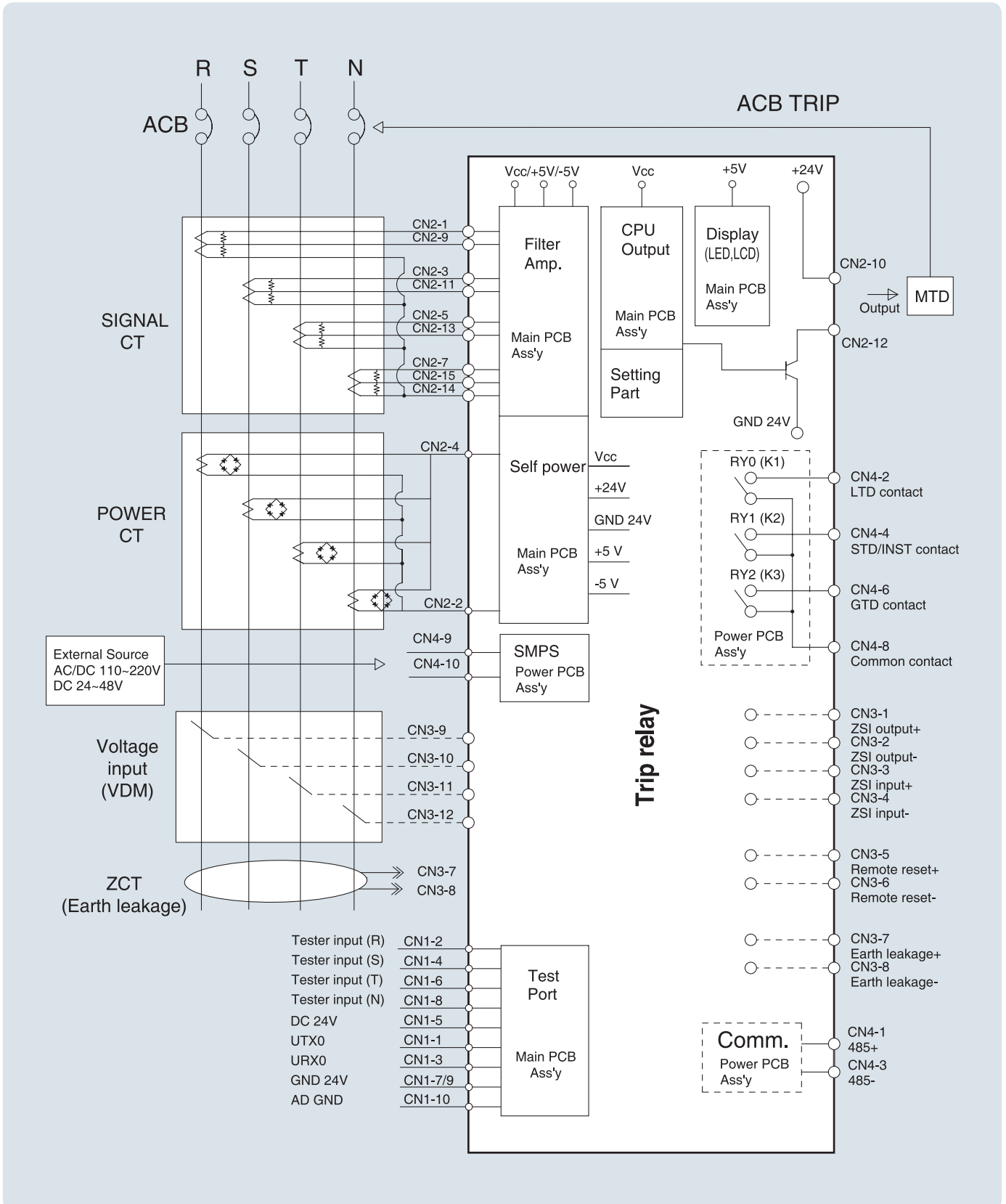
Basic protection function(L / S / I / G) is still under normal operation without control power.

Each OCR type has Battery in itself.

- Battery lifespan
 - When turned off : 14~28years
 - When using 1 LED consecutively or turned off : 7~14days
- The display minimum range of OCR current
 - OCR-A type : When more 15% than rated current (In)
 - OCR-P/S type : When more 12% than rated current (In)

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

System block diagram



Susol Compact ACB (1600A)



Fixed type



Draw-out type

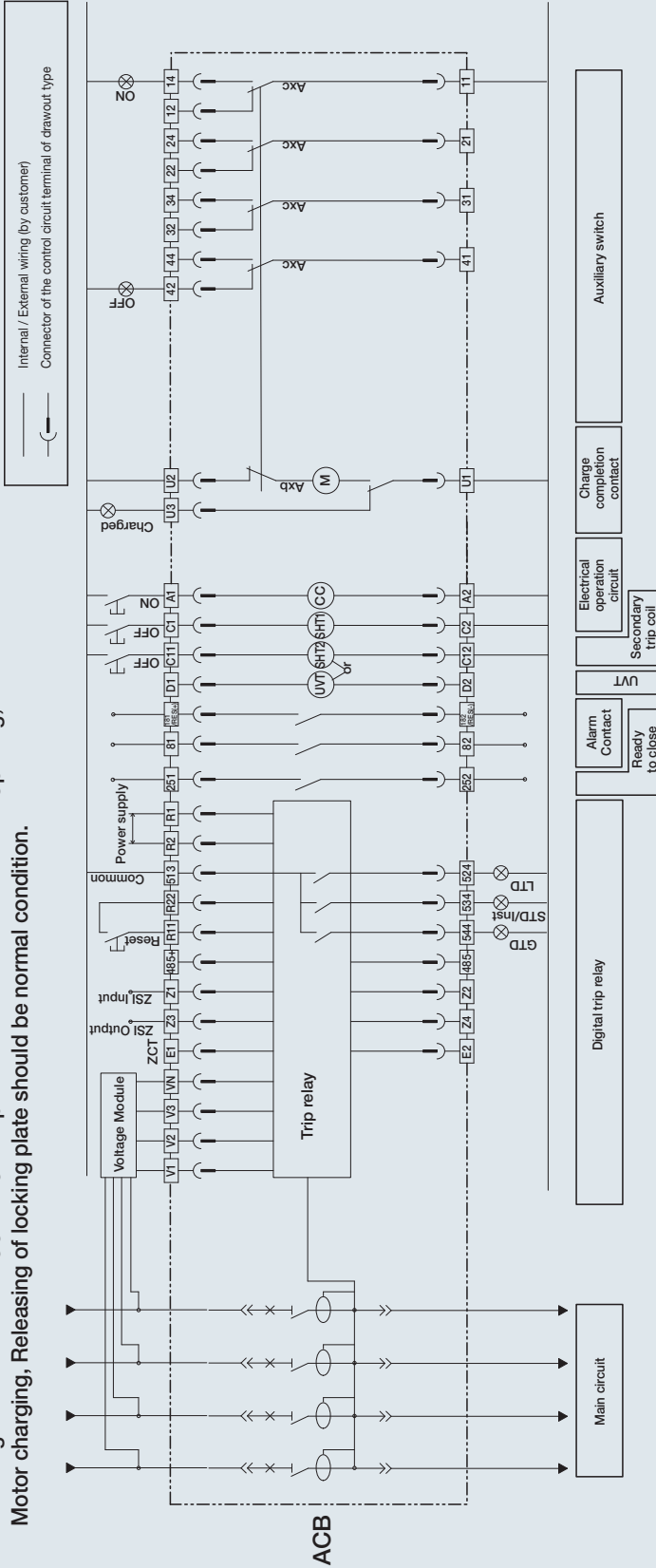
Rating

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-08C	AN-16C	AH-08C	AH-16C	AR-08C	AR-10C
Ampere Frame	(AF)		800	1600	800	1600	800	1000
Rated current (In Max.) at 40°C	(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)		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

Electrical diagram

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



Terminal code description

11	12	~	41	42	Auxiliary switch "b" contact
11	14	~	41	44	Auxiliary switch "a" contact
U1	U3				Charge completion signal
U1	U2				Motor charging
A1	A2				Closing coil
C1	C2				Shunt trip
C11	C12				2nd shunt trip
D1	D2				Voltage input terminal of UVT coil
81	82				Alarm1 "a" contact
181	182				Alarm2 "a" contact or RES Coil
251	252				Ready to close switch
R1	R2				Control power for trip unit
513	~	544			Fault cause indication contacts
R11	R22				Alarm reset (Trip cause LEDs, contacts)
Z1	Z2				ZSI input
Z3	Z4				ZSI output
E1	E2				ZCT
VN	~	V3			Voltage module
485+	~	485+			RS-485 Communication
311	~	344			Cell switch

Accessory code description

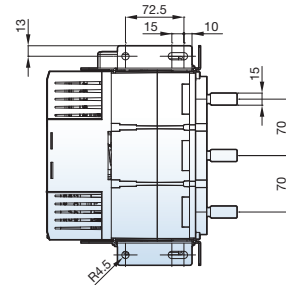
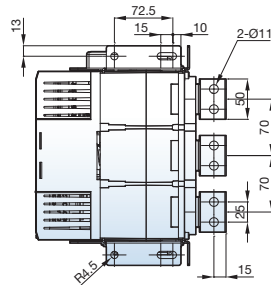
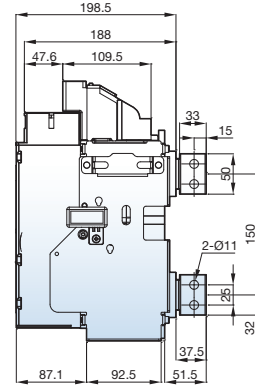
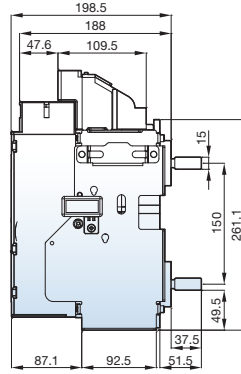
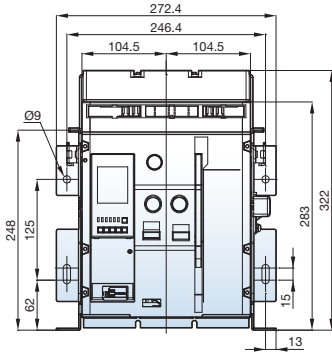
Axc	Auxiliary switch
LTD	Long time delay trip indicator
STD/Inst	Short time delay/instantaneous
GTD	Ground fault trip indicator
CL1-CL4	Cell switch
(M)	Motor
(CC)	Closing coil
(SH1)	1st Shunt coil
(SH2)	2nd Shunt coil
(UVT)	UVT coil

- 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
 - Ready to close contact, Trip alarm contact, UVT coil, Fully charged contact, secondary trip coil
 - Temperature module, Voltage module, ZCT, ZSI
 5. Please consult us for the use of ZSI (Zone selective Interlocking)
 6. For connecting RS-485 verify if the polarity is correct
 7. Contact configuration for Cell Switch can be changeable if necessary

Susol Compact ACB dimensions

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

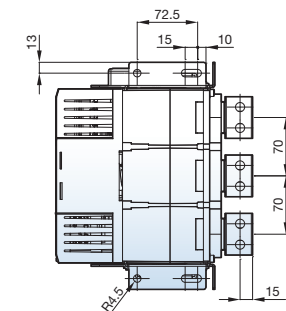
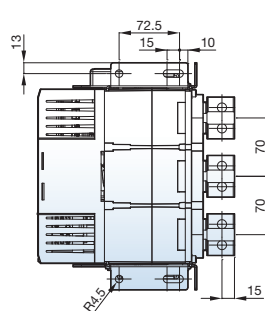
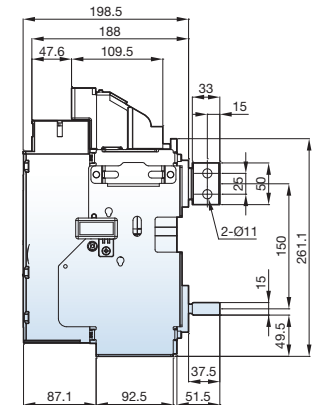
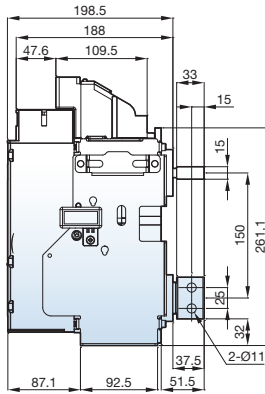
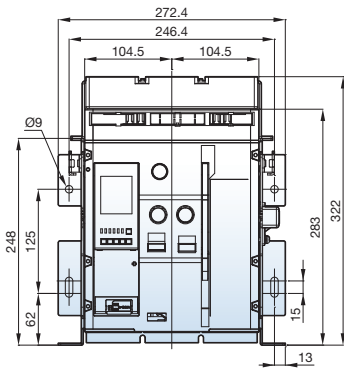
(Unit : mm)



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

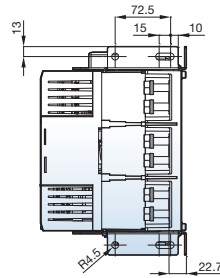
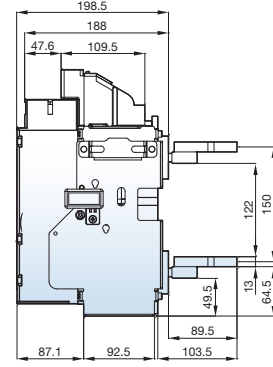
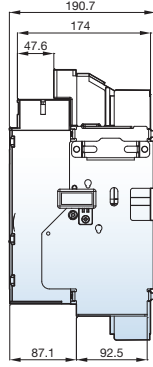
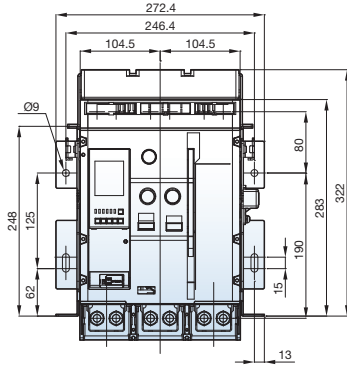
(Upper-Horizontal type, Lower-Vertical type)

N Type

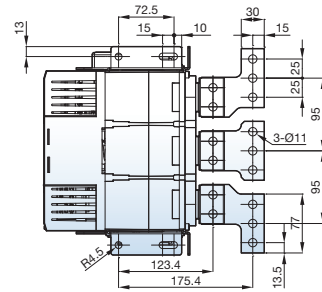
(Upper-Vertical type, Lower-Horizontal type)

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

(Unit : mm)

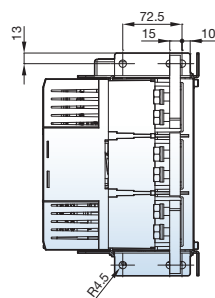
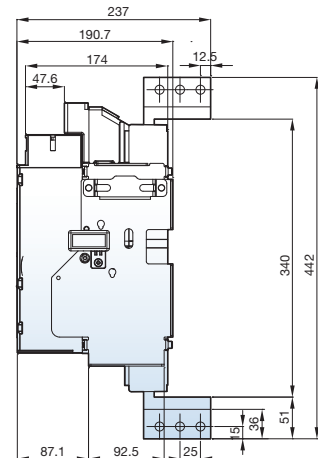
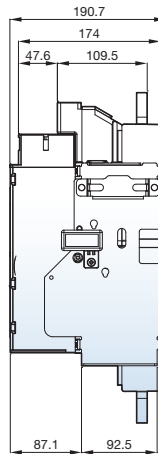
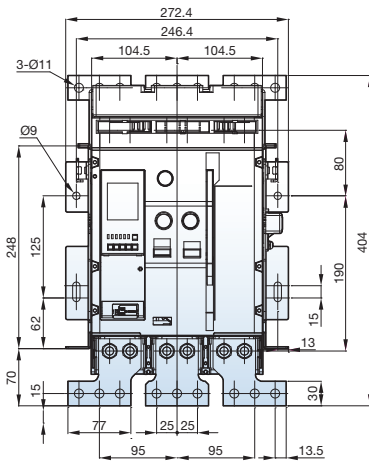


P Type (Plane type)

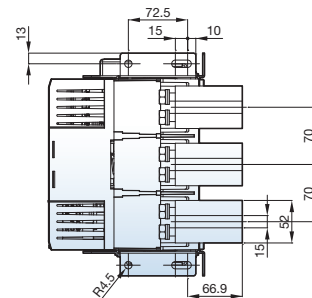


R Type (Spread type)

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



Z Type (Plane spread type)

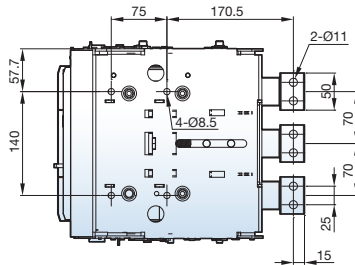
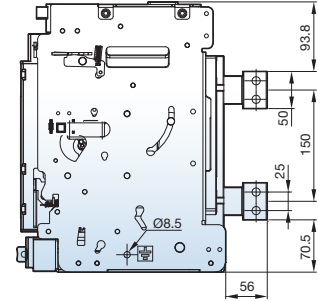
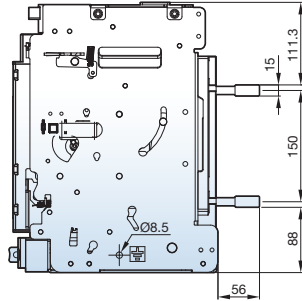
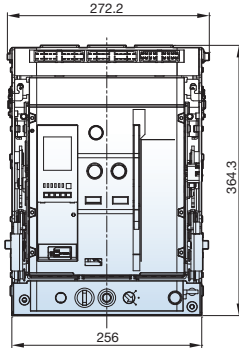


T Type (Plane vertical type)

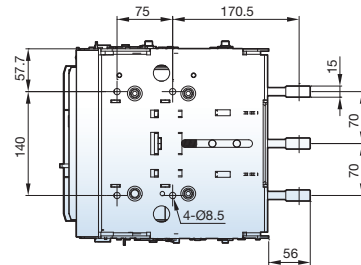
Susol Compact ACB dimensions

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

(Unit : mm)

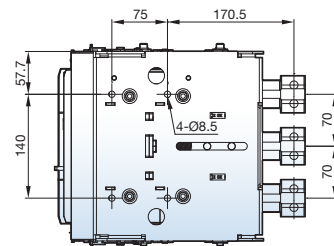
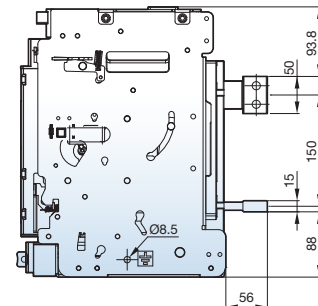
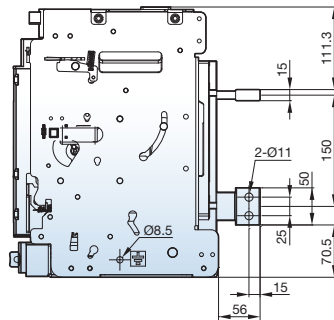
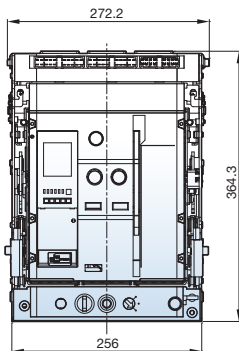


H Type (Horizontal type)

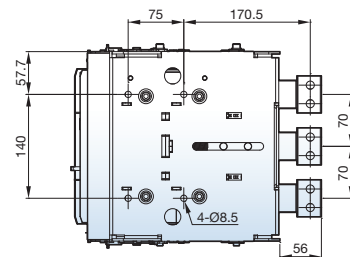


V Type (Vertical type)

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



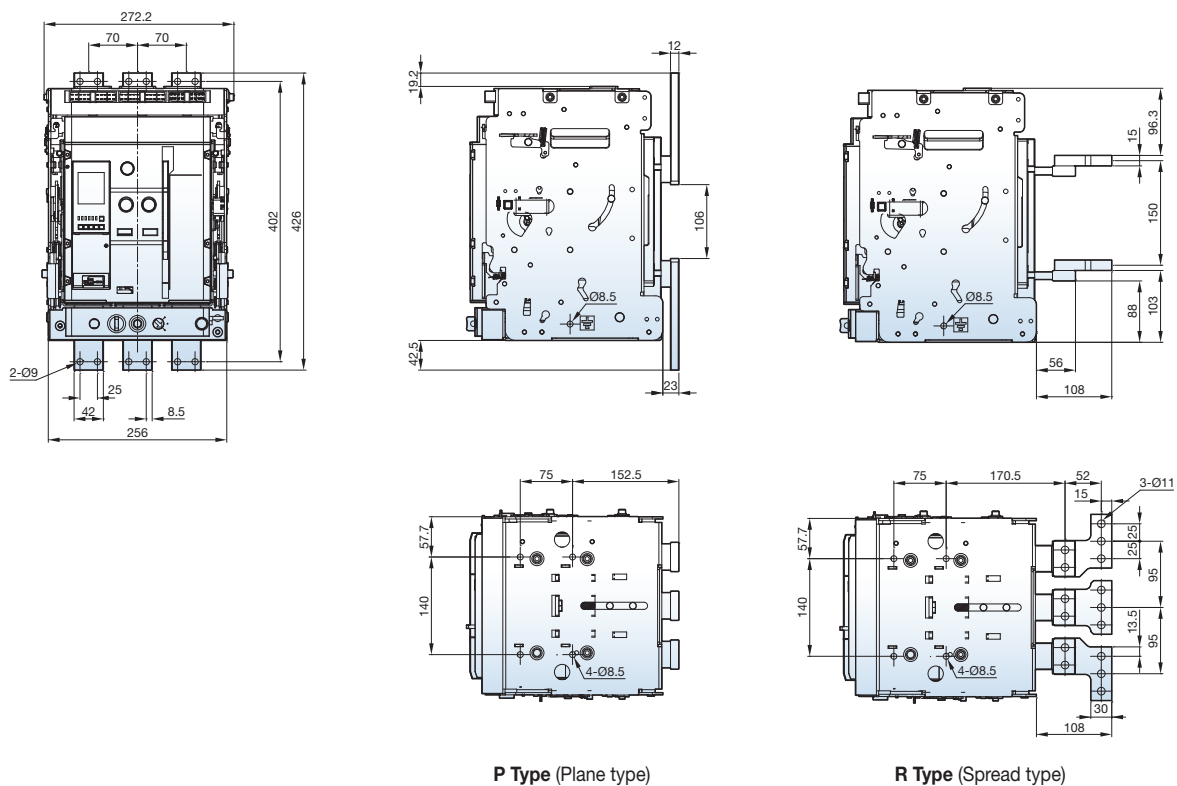
M Type
(Upper-Horizontal type, Lower-Vertical type)



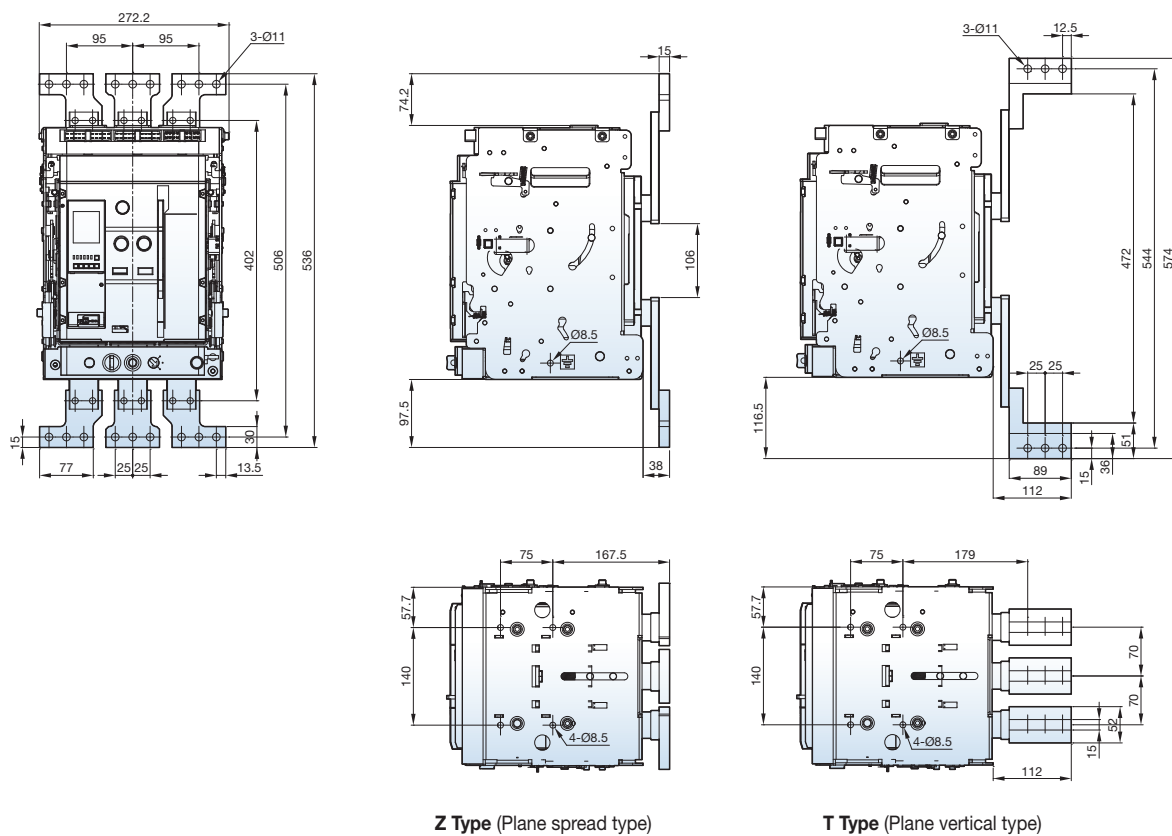
N Type
(Upper-Vertical type, Lower-Horizontal type)

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

(Unit : mm)







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



Susol Compact ACB 1600A Trip relays

Trip relay types

Classification	N type	A type	P type	S type
Externals				
Current protection	<ul style="list-style-type: none"> L/S/I/G/Thermal 	<ul style="list-style-type: none"> L/S/I/G/Thermal ZSI (Protective coordination) 	<ul style="list-style-type: none"> L/S/I/G ZSI (Protective coordination) Thermal (Linear Hot Start) 	<ul style="list-style-type: none"> L/S/I/G ZSI (Protective coordination) Thermal (Linear Hot Start)
Other protection	-	<ul style="list-style-type: none"> Earth leakage (Option) 	<ul style="list-style-type: none"> Earth leakage (Option) Over/Under voltage Over/Under frequency Unbalance (Voltage/Current) Reverse power 	<ul style="list-style-type: none"> Earth leakage (Option) Over/Under voltage Over/Under frequency Unbalance (Voltage/Current) Reverse power
Measurement function	-	<ul style="list-style-type: none"> Current (R/S/T/N) 	<ul style="list-style-type: none"> 3 Phase Voltage/Current RMS/Vector Power (P, Q, S), PF (3-Phase) Energy (Positive/Negative) Frequency, Demand 	<ul style="list-style-type: none"> 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	-	-	<ul style="list-style-type: none"> Fine adjustment for long/short time delay/instantaneous/ ground 	<ul style="list-style-type: none"> Fine adjustment for long/short time delay/instantaneous/ ground
Digital Output	-	<ul style="list-style-type: none"> 3DO (Fixed) L, S/I, G Alarm 	<ul style="list-style-type: none"> 3DO (Programmable) Trip, Alarm, General 	<ul style="list-style-type: none"> 3DO (Programmable) Trip, Alarm, General
IDMTL setting	-	-	<ul style="list-style-type: none"> Compliance with IEC60255-3: SIT, VIT, EIT, DT 	<ul style="list-style-type: none"> Compliance with IEC60255-3: SIT, VIT, EIT, DT
Communication	-	<ul style="list-style-type: none"> Modbus/RS-485 Profibus-DP 	<ul style="list-style-type: none"> Modbus/RS-485 Profibus-DP 	<ul style="list-style-type: none"> Modbus/RS-485 Profibus-DP
Power supply	<ul style="list-style-type: none"> Self Power Power source worksover 20% of load current. 	<ul style="list-style-type: none"> Self Power Power source worksover 20% of load current. External power source are required for comm. AC/DC 100~250V DC 24~60V 	<ul style="list-style-type: none"> AC/DC 100~250V DC 24~60V Basic protection function (L/S/I/G) is still under normal operation without control power. 	<ul style="list-style-type: none"> AC/DC 100~250V DC 24~60V Basic protection function (L/S/I/G) is still under normal operation without control power.
RTC Timer	<ul style="list-style-type: none"> Available 	<ul style="list-style-type: none"> Available 	<ul style="list-style-type: none"> Available 	<ul style="list-style-type: none"> Available
LED for trip info.	<ul style="list-style-type: none"> Long time delay Short time delay/Instantaneous Ground fault 	<ul style="list-style-type: none"> Long time delay Short time delay/Instantaneous Ground fault 	<ul style="list-style-type: none"> Long time delay Short time delay/Instantaneous Ground fault 	<ul style="list-style-type: none"> Long time delay Short time delay/Instantaneous Ground fault
Fault recording	-	<ul style="list-style-type: none"> 10 records (Fault/Current/Date and Time) 	<ul style="list-style-type: none"> 256 records 	<ul style="list-style-type: none"> 256 records Last fault wave form recording (3 Phase)
Event recording	-	-	<ul style="list-style-type: none"> 256 records (Content, Status, Date) 	<ul style="list-style-type: none"> 256 records (Content, Status, Date)
Operating button	<ul style="list-style-type: none"> Reset button 	<ul style="list-style-type: none"> Reset, Menu Up/Down, Left/Right, Enter 	<ul style="list-style-type: none"> Reset, Menu Up/Down, Left/Right, Enter 	<ul style="list-style-type: none"> Reset, Menu Up/Down, Left/Right, Enter

Each OCR type has Battery in itself.

1. Battery lifespan

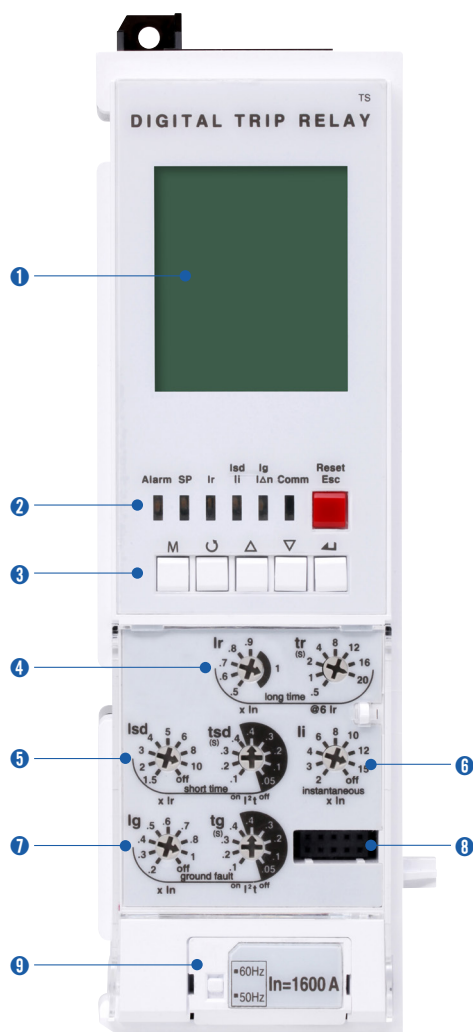
- When turned off: 14~28years
- When using 1 LED consecutively or turned off: 7~14days

2. The recognizable range of OCR current

- 10: When more 20% than rated current(I_n) (ratio to I_n regardless of I_u and I_r)
- 30: When more 12% than rated current(I_n)

S type: 'Supreme meter' type

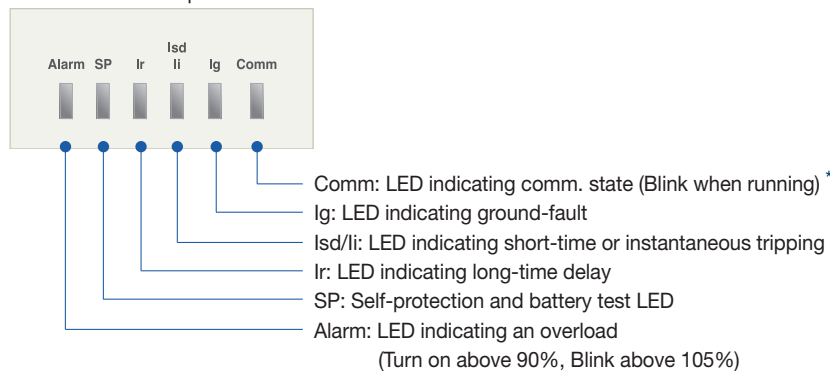
- Overload protection
 - Long-time delay - Thermal
- Short-circuit protection
 - Short-time delay/Instantaneous
 - I²t On/Off optional (for short-time delay)
- Ground fault protection
 - I²t On/Off optional
- Protection for Over voltage/Under voltage/Over frequency/Under frequency/Unbalance/Reverse power
- 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



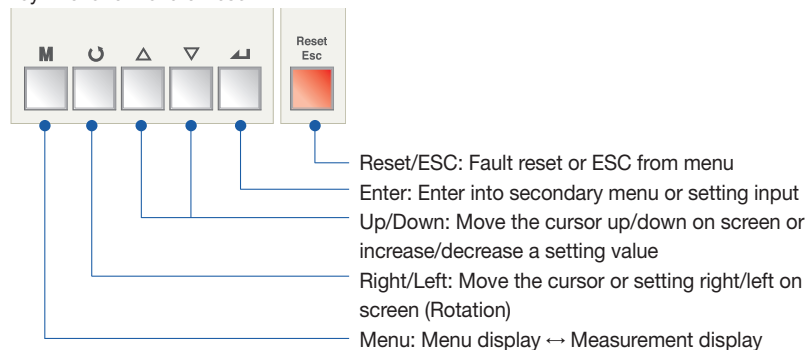
* When communication is flashing phone icon on the LCD.

1 LCD: Indication of measurement and information

2 LED: Indication of trip info. and overload state



3 Key: Move to menu or reset



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

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

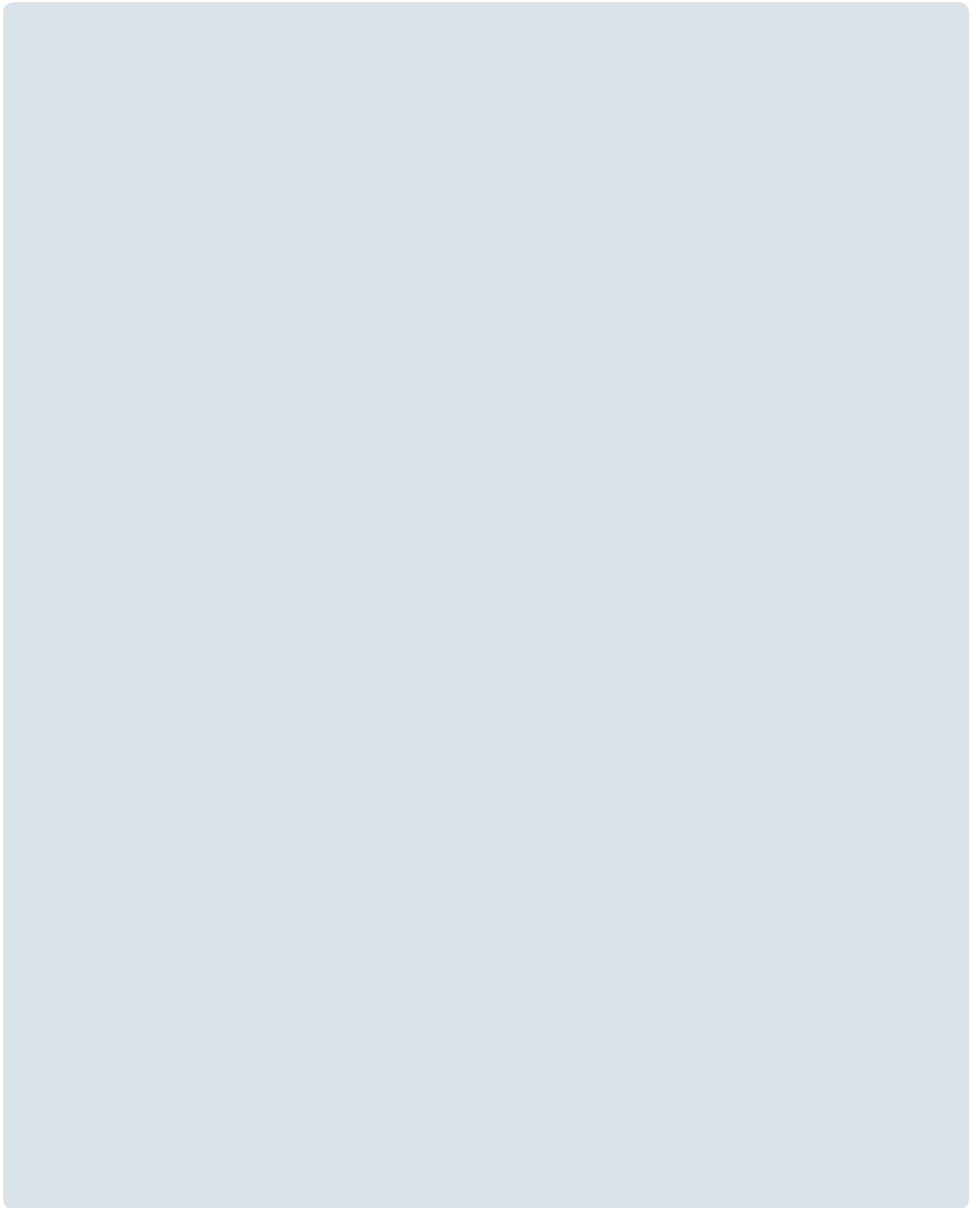
6 li: Instantaneous current setting

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

Memo



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
	25	630
		1250
	31.5	630
		1250
12	20	630
		1000
	25	630
		1000
	31.5	630
		1250
17.5	20	630
		1250
	25	630
		1250
	31.5	630
		1250
24, 25.8	12.5	630
		1250
	16	630
		1250
	25	630
		1250
36	25	630
		1250
	2500	

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
	40	1250
		2000
	50	1250
		2000
12	31.5	1250
		2000
	40	1250
		2000
	50	1250
		2000
17.5	31.5	1250
		2000
	40	1250
		2000
	50	1250
		2000
24, 25.8	25	2500
		3150
	31.5	1250
		2000
	40	1250
		2000
36	25	1250
		2000
	31.5	1250
		2000
	40	1250
		2000



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
	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
	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
							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
							VL-06□20A20	P,E,F,G,H	VCL-06□20A20	E,F,G,H	P,E,F,G:A/B, H:B
		1250					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
							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
							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
2000					VL-06□32A06	P,H	VCL-06H32A06	H	B		
					VL-06□32A(K)13	P,E,F,Fs,G,Gs,K,H	VCL-06□32A13	E,F,Fs,G,Gs,K,H	P,E,F,Fs,G,Gs,K:A/B,H:B		
					VL-06□32A(K)20	P,E,F,Fs,G,Gs,K,H	VCL-06□32A20	E,F,Fs,G,Gs,K,H	P,E,F,Fs,G,Gs,K:A/B,H:B		
12	20	630				VL-12□20A(K)06	P,K,H	VCL-12□20A06	K,H	K:A/B, H:B	
						VL-12□20A(K)13	P,K,H	VCL-12□20A13	K,H	K:A/B, H:B	
						VL-12H20A20	H	VCL-12H20A20	H	B	
		1250				VL-12□20B06	P,E,F,H	VCL-12□20B06	E,F,H	P,E,F:A/B, H:B	
						VL-12□20B13	P,E,F,H	VCL-12□20B13	E,F,H	P,E,F:A/B, H:B	
						VL-12□20B20	P,E,F,H	VCL-12□20B20	E,F,H	P,E,F:A/B, H:B	
	2000				VL-12□20F06	E,F	VCL-12□20F06	E,F	A/B		
					VL-12□20F13	E,F	VCL-12□20F13	E,F	A/B		
					VL-12□25A(K)06	P,K,H	VCL-12□25A06	K,H	K:A/B, H:B		
	25	630				VL-12□25A(K)13	P,K,H	VCL-12□25A13	K,H	K:A/B, H:B	
						VL-12□25A(K)20	K,H	VCL-12□25A20	K,H	K:A/B, H:B	
						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		
					VL-12□25B20	P,E,F,H	VCL-12□25B20	E,F,H	P,E,F:A/B, H:B		
					VL-12□25F06	E,F	VCL-12□25F06	E,F	A/B		
2000				VL-12□25F13	E,F	VCL-12□25F13	E,F	A/B			
				VL-12□32A06	P,H	VCL-12H32A06	H	B			
				VL-12□32A(K)13	P,Gs,K,H	VCL-12□32A13	Gs,K,H	Gs,K:A/B, H:B			
31.5	630				VL-12□32A(K)20	Gs,K,H	VCL-12□32A20	Gs,K,H	Gs,K:A/B, H:B		
					VL-12□32B06	P,H	VCL-12H32B06	H	B		
					VL-12□32B13	P,H	VCL-12H32B13	H	B		
	1250				VL-12□32B20	P,H	VCL-12H32B20	H	B		
					VL-12□32B25	P,H	VCL-12H32B25	H	B		
					VL-12□32D25	P,H	VCL-12H32D25	H	B		
17.5	20	630				VL-17H20A06	H	VCL-17H20A06	H	B	
						VL-17H20A13	H	VCL-17H20A13	H	B	
						VL-17H20A20	H	VCL-17H20A20	H	B	
		1250				VL-17□20B06	P,E,F,H	VCL-17□20B06	E,F,H	P,E,F:A/B, H:B	
						VL-17□20B13	P,E,F,H	VCL-17□20B13	E,F,H	P,E,F:A/B, H:B	
						VL-17□20B20	P,E,F,H	VCL-17□20B20	E,F,H	P,E,F:A/B, H:B	
	2000				VL-17□20F06	E,F	VCL-17□20F06	E,F	A/B		
					VL-17□20F13	E,F	VCL-17□20F13	E,F	A/B		
					VL-17H25A06	H	VCL-17H25A06	H	B		
	25	630				VL-17H25A13	H	VCL-17H25A13	H	B	
						VL-17H25A20	H	VCL-17H25A20	H	B	
						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		
					VL-17□25B20	P,E,F,H	VCL-17□25B20	E,F,H	P,E,F:A/B, H:B		
					VL-17□25F06	E,F	VCL-17□25F06	E,F	A/B		
2000				VL-17□25F13	E,F	VCL-17□25F13	E,F	A/B			
				VL-17□32A06	P,H	VCL-17H32A06	H	B			
				VL-17□32A13	P,H	VCL-17H32A13	H	B			
31.5	630				VL-17□32A20	H	VCL-17H32A20	H	B		
					VL-17□32B06	P,H	VCL-17H32B06	H	B		
					VL-17□32B13	P,H	VCL-17H32B13	H	B		
	1250				VL-17□32B20	P,H	VCL-17H32B20	H	B		
					VL-17□32B25	P,H	VCL-17H32B25	H	B		
					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	G,K,H	VCL-20□13B06	G,K,H	G,K:A/B, H:B	
				1250			VL-20□13B13	G,K,H	VCL-20□13B13	G,K,H	G,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	G,K,H	VCL-20□16B06	G,K,H	G,K:A/B, H:B	
					1250		VL-20□16B13	G,K,H	VCL-20□16B13	G,K,H	G,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	G,K,H	VCL-20□25B06	G,K,H	G,K:A/B, H:B	
					1250		VL-20□25B13	G,K,H	VCL-20□25B13	G,K,H	G,K:A/B, H:B	
					2000		VL-20□25B20	G,H	VCL-20□25B20	G,H	G:A/B, H:B	
		25				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		
25.8	12.5			630			VL-25□13B06	G,K,H	VCL-25□13B06	G,K,H	G,K:A/B, H:B	
				1250			VL-25□13B13	G,K,H	VCL-25□13B13	G,K,H	G,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	
		16				630		VL-25□16B06	G,K,H	VCL-25□16B06	G,K,H	G,K:A/B, H:B
						1250		VL-25□16B13	G,K,H	VCL-25□16B13	G,K,H	G,K:A/B, H:B
					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	
	25					630		VL-25□25B06	G,K,H	VCL-25□25B06	G,K,H	G,K:A/B, H:B
						1250		VL-25□25B13	G,K,H	VCL-25□25B13	G,K,H	G,K:A/B, H:B
					2000		VL-25□25B20	G,H	VCL-25□25B20	G,H	G:A/B, 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	
	36	25					630	VL-36□25D06	P,H	VCL-36□25D06	H	P:A/B, H:B
							1250	VL-36□25D13	P,H	VCL-36□25D13	H	P:A/B, H:B
							2000	VL-36□25D20	P,H	VCL-36□25D20	H	P:A/B, H:B
							2500	VL-36□25D25	P,H	VCL-36□25D25	H	P:A/B, 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 MESH(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

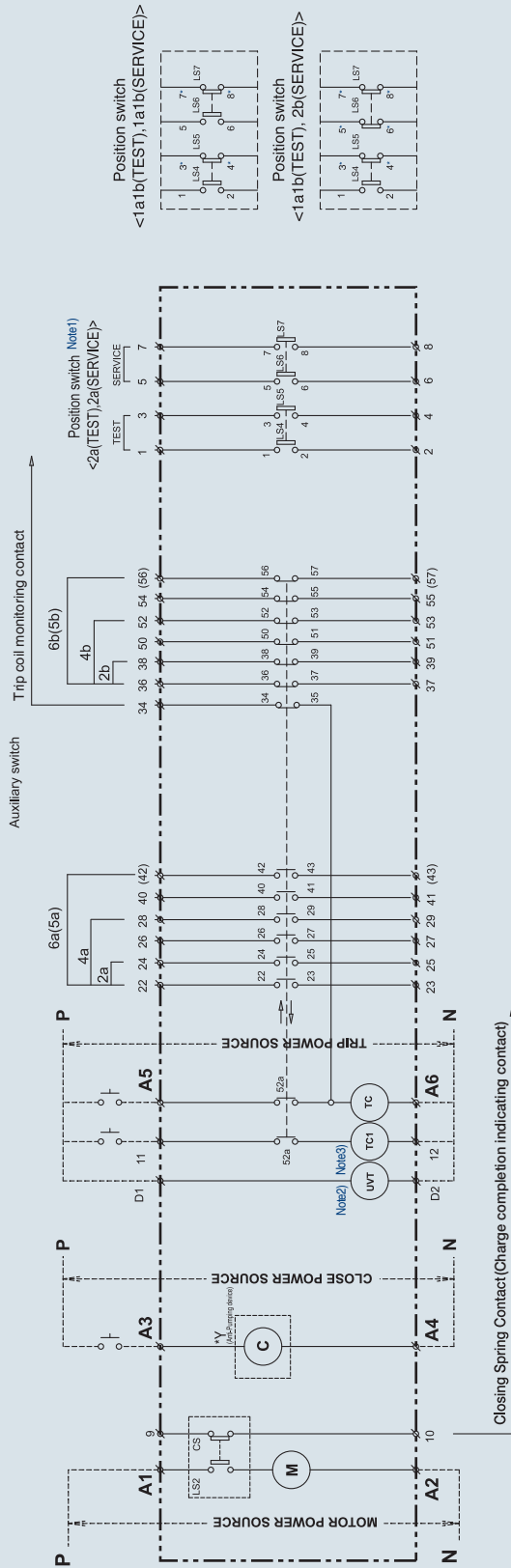
7.2/12/17.5/24/25.8/36kV (VH-06/12/17/20/25/36)

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					LVB-06□-32L/12	P,E,F,G,G/T	LCL-06□-32D/12	E,F,G,G/T	A/B					
		2000					LVB-06□-32L/20	P,E,F,G,G/T	LCL-06□-32D/20	E,F,G,G/T	A/B					
			3150				VH-06□32B32	Fs,Gs,K,H	VCH-06□32B32	Fs,Gs,K,H	K:A/B, Fs,Gs,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						
			3150					VH-06□40B32	Fs,Gs,K,H	VCH-06□40B32	Fs,Gs,K,H	K:A/B, Fs,Gs,H:B				
								LVB-06□-40L/30	P,E,F,G/T	LCL-06□-40D/30	E,F,G,G/T					
								VH-06□40D32	K,H	VCH-06□40D32	K,H	K:A/B, H:B				
								VH-06□40D40	P,K,H	VCH-06□40D40	K,Ha,Hb	B				
	50		1250				VH-06□50B13	P,H	VCH-06H50B13	H	B					
							VH-06□50B20	P,H	VCH-06H50B20	H	B					
				2500				VH-06□50D25	P,H	VCH-06H50D25	H	B				
								VH-06□50D32	P,H	VCH-06H50D32	H	B				
				4000				VH-06□50D40	P,K,H	VCH-06□50D40	K,Ha,Hb	B				
								VH-06H50L50	H	VCH-06Ha50L50	Ha	B				
									5000							
12	31.5	1250	1250				LVB-12G-32L/12-T2	G/T	LCL-12G-32D/12-T2	G/T	A/B					
							LVB-12G-32L/20-T2	G/T	LCL-12G-32D/20-T2	G/T	A/B					
			3150					VH-12□32B32	Gs,K,H	VCH-12□32B32	Gs,K,H	K:A/B, Gs,H:B				
								LVB-12G-32L/30-T2	G/T	LCL-12G-32D/30-T2	G/T	A/B				
	40	1250	1250				VH-12□40A(K)13	Gs,K,H	VCH-12□40A(K)13	Gs,K,H	Gs,K: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				
								VH-12□40B20	K,H	VCH-12□40B20	K,H	B				
			3150					VH-12□40B32	Gs,K,H	VCH-12□40B32	Gs,K,H	K:A/B, Gs,H:B				
								LVB-12G-40L/30-T2	G/T	LCL-12G-40D/30-T2	G/T	A/B				
	VH-12H40D32							H	VCH-12H40D32	H	B					
	VH-12□40D40							P,K,H	VCH-12□40D40	K,Ha,Hb	B					
	50		1250				VH-12□50B13	P,H	VCH-12H50B13	H	B					
							VH-12□50B20	P,H	VCH-12H50B20	H	B					
				2500				VH-12□50D25	P,H	VCH-12H50D25	H	B				
								VH-12□50D32	P,H	VCH-12H50D32	H	B				
				4000				VH-12□50D40	P,K,H	VCH-12□50D40	K,Ha,Hb	B				
								VH-12H50L50	H	VCH-12Ha50L50	Ha	B				
								5000								
17.5	31.5		3150				VH-17H32B32	H	VCH-17H32B32	H	B					
							VH-17H32D32	H	VCH-17H32D32	H	B					
	40	1250						VH-17□40B13	K,H	VCH-17□40B13	K,H	K:A/B, H:B				
								VH-17□40B20	K,H	VCH-17□40B20	K,H	K:A/B, H:B				
			3150						VH-17H40B32	H	VCH-17H40B32	H	B			
									VH-17K40C32	K	VCH-17K40C32	K	A/B			
				3150					VH-17H40D32	H	VCH-17H40D32	H	B			
									VH-17□40D40	P,K,H	VCH-17□40D40	Ha,Hb	B			

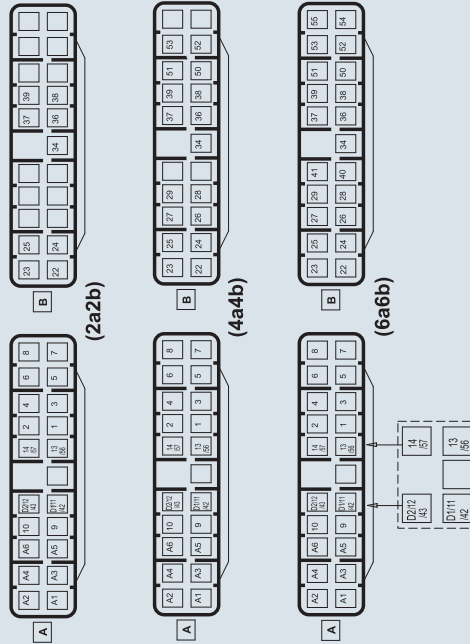
Ur [kV]	Isc [kA]	Ir[A]				VCB		CRADLE		Connector
		p=150	p=210	p=275	p=300	Type	Version	Type	Version	
17.5	50		1250			VH-17□50B13	P,H	VCH-17H50B13	H	B
			2000			VH-17□50B20	P,H	VCH-17H50B20	H	B
				2500		VH-17□50D25	P,H	VCH-17H50D25	H	B
				3150		VH-17□50D32	P,H	VCH-17H50D32	H	B
				4000		VH-17□50D40	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		
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 drawable type with a box type cradle for CB compartment construction.
6. G/T types are MCSG style drawable 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>

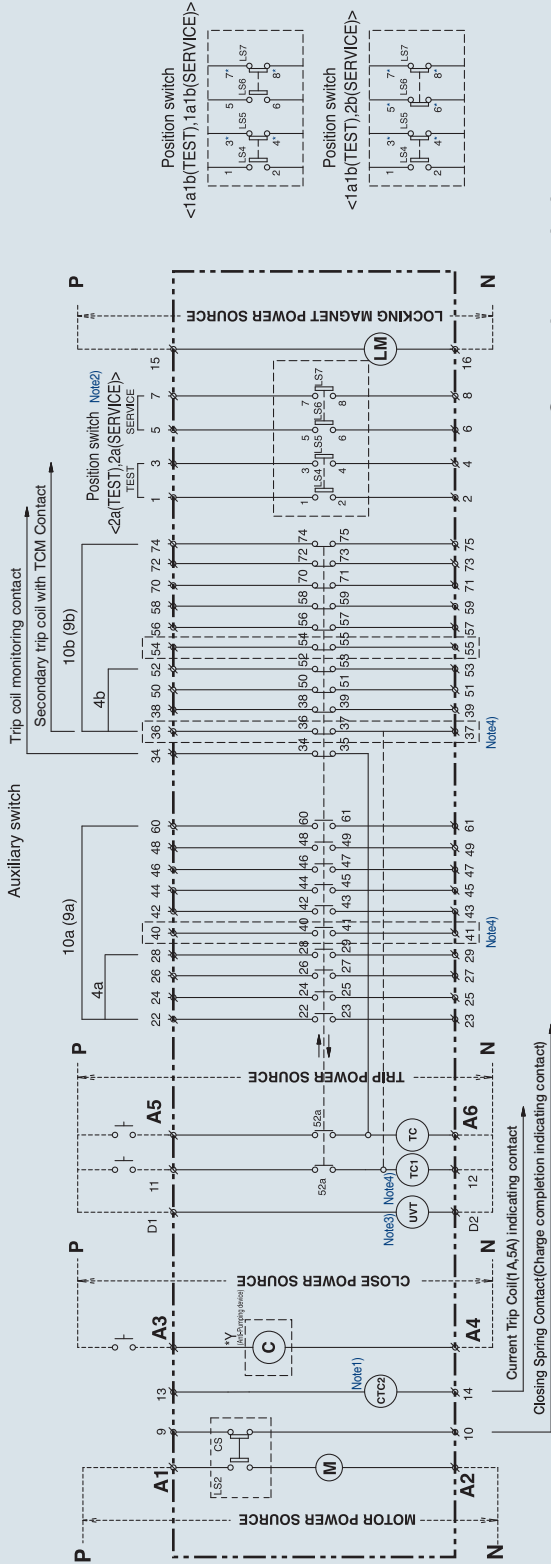


- 0: External terminal of VCB
- S2: Vacuum circuit breaker
- M: Spining charging motor
- TC: Trip coil
- TC1: Secondary trip coil
- C: Close coil
- UVT: Under voltage trip
- S2a: Auxiliary switch (a)
- S2b: Auxiliary switch (b)
- CTC: Current trip coil
- CTC1: Secondary Current trip coil
- CS: Closing spring charged Limit Switch
- Y: Anti-Pumping Device
- Anti-Pumping Device is installed inside as standard IEC62271-100.3.6.128

SW No.	TEST : 1a1b	TEST : 2a	TEST : 1a1b
LS4	Close at TEST position	A4	Close at TEST position
LS5	OPEN at TEST position	A5	OPEN at TEST position
LS6	OPEN at SERVICE position	A6	Close at SERVICE position
LS7	OPEN at SERVICE position	A7	OPEN at SERVICE position

- Note) 1. Position SW : TEST 2a, SERVICE 2a (Terminal No. : 1, 2, 3, 4, 5, 6, 7, 8)
 * marked contact is b contact
2. UVT : Under Voltage Trip (Terminal No. : D1, D2)
 3. CTC1 : Secondary Trip Coil (Spare trip coil, terminal No. : 11, 12)
 4. CTC : Current Trip Coil (Terminal No. : A5, A6)
 - CTC1 : Secondary Current Trip Coil (Terminal No. : 11, 12)
 5. Close and Trip coil is One Pulse type, excluding trip coil (DC110/220V)
 6. In above optional accessories, UVT, CTC and TC1 can not be selected simultaneously
 7. UVT, TC1 are selected, Maximum auxiliary switch is 4#4#
 8. Above circuit diagram is based on "OFF" status of VCB and closing spring is charged
 9. Please make sure that keep the direction of PN on this circuit diagram
 - *Y : Anti-pumping device
- Anti-pumping device Y supply anti-pumping function to VCB as below. It is composed with circuit in close coil and mechanism. In case the closing coil(C) 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 (VL-06/12/17/20/25/36)



<Connecting terminal arrangement>

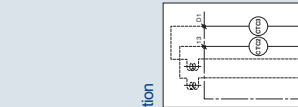
- Ø: External terminal of VCB
- 52 : Vacuum circuit breaker
- M : Spring charging motor
- TC : Trip coil(SHT)
- TC1 : Secondary Trip coil(SHT1)
- C : Closing coil(C)
- UVT : Under Voltage Trip
- 52a : Auxiliary switch (NO)
- 52b : Auxiliary switch (NC)
- LS2 : Motor stop limit switch
- CTC : Current Trip coil(CA)
- CTC1 : Secondary Current Trip coil(3A)
- CTC2 : Current Trip coil(A,5A)
- CTC3 : Current Trip coil(A,5A)
- LET : Low Energy Trip Device(25m,100m)
- CS : Closing spring charged indication limit switch

SW No.	TEST : 1a1b	TEST : 2a	TEST : 1a1b
LS4	A3	A4	A5
LS5	Close at TEST position	Close at TEST position	Close at TEST position
LS6	OPEN at TEST position	Close at TEST position	OPEN at TEST position
LS7	OPEN at SERVICE position	Close at SERVICE position	OPEN at SERVICE position

- Y : Anti-Pumping Device
- Anti-Pumping Device is installed inside as standard EC62271-100 3.6.128
- LS4, LS5 : Position SW (TEST position)
- LS6, LS7 : Position SW (SERVICE position)
- LM : Locking magnet(only withdrawable type)

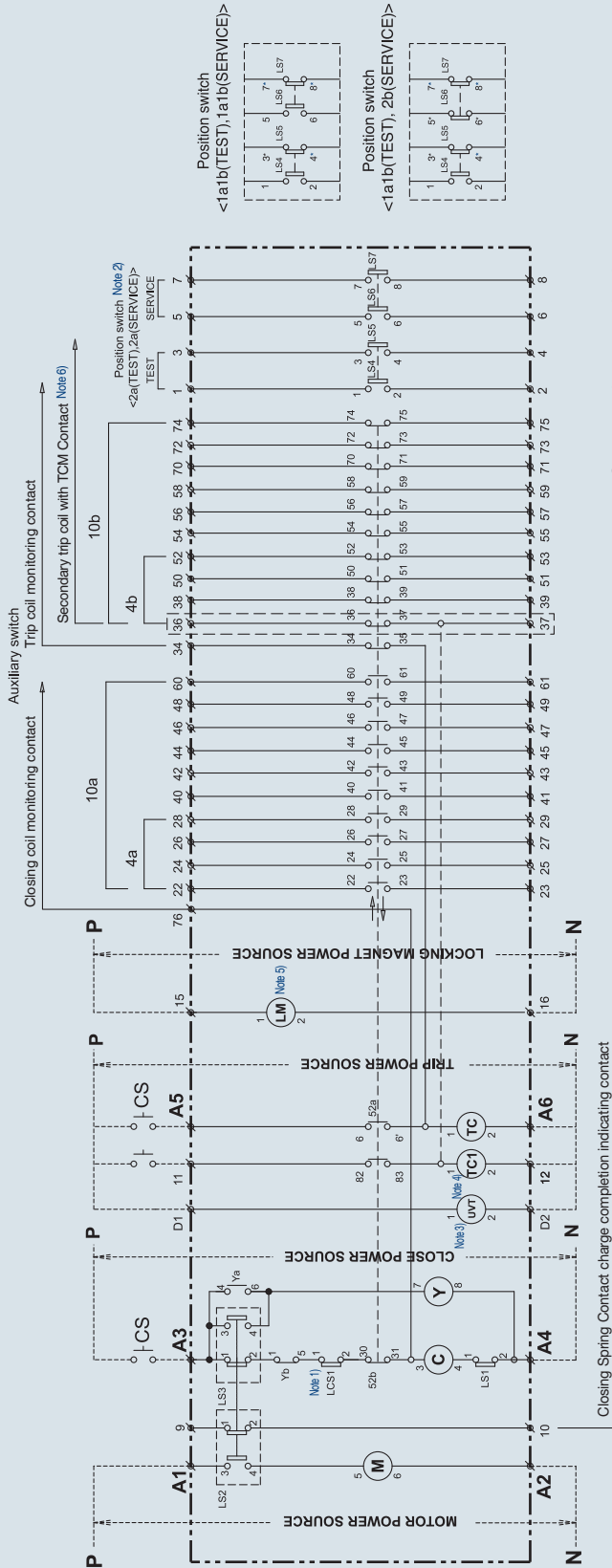


- Note) 1. CTC2 : Current Trip Coil(A,5A) (Terminal NO : 13,14)
 2. Position S/W - TEST 2a, SERVICE 2a(Terminal NO.:1,2,3,4,5,6,7,8)
 - TEST position 1a1b, SERVICE position 1a1b/2b are available.
 (* marked contact is b contact)
 3. UVT - Under Voltage Trip (Terminal NO.:D1, D2)
 4. TC1 - Secondary Trip Coil (Terminal NO.:11,12)
 In case TC1 is selected and auxiliary switch is 10a10b, Some 'a' contact (Terminal No.:40,41) and 'b' contact(Terminal No.:54, 55) are not available.
 5. Secondary Trip Coil Monitoring Contact (Terminal NO.:36)
 In case Secondary Trip Coil TCM Contact is selected and auxiliary switch is 98b, Some 'a' contact (Terminal No.:40,41) and 'b' contact(Terminal No.:36, 37) are not available.
 6. CTC - Current Trip Coil (Terminal No.: A5,A6)
 CTC1 - Secondary Current Trip Coil (Terminal No.: 11,12)
 CTC2 - Current Trip Coil (Terminal No.: 13,14)
 CTC3 - Current Trip Coil (Terminal No.: D1,D2)
 7. LET - Low Energy Trip Device (Terminal No.: 13,14)
 8. LM - Locking Magnet (Terminal No.:15, 16), In case of B type connector is available
 9. Close and Trip coil is One Pulse type, excluding Trip coil (DC110, 220V)
 10. In above optional accessories, UVT,CTC and TC1 can not be selected simultaneously.
 11. Above circuit diagram is based on "OFF" state of VCB and closing spring is charged.
 12. Please, keep the direction of PN on this circuit diagram.
 *Y : Anti-pumping device

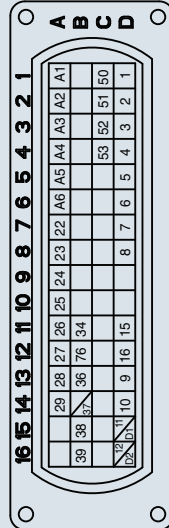


Anti-pumping device Y supply anti-pumping function to VCB as below. It is composed with circuit in close coil and mechanism. In case the closing coil(C) becomes permanently energized, the circuit breaker remains in the open position after it has been opened, either by manual or electrical operation.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

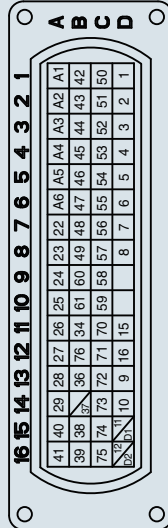
Control circuit diagram (VH-06/12/17/20/25/36)



<Connecting terminal arrangement>



(4a4b)

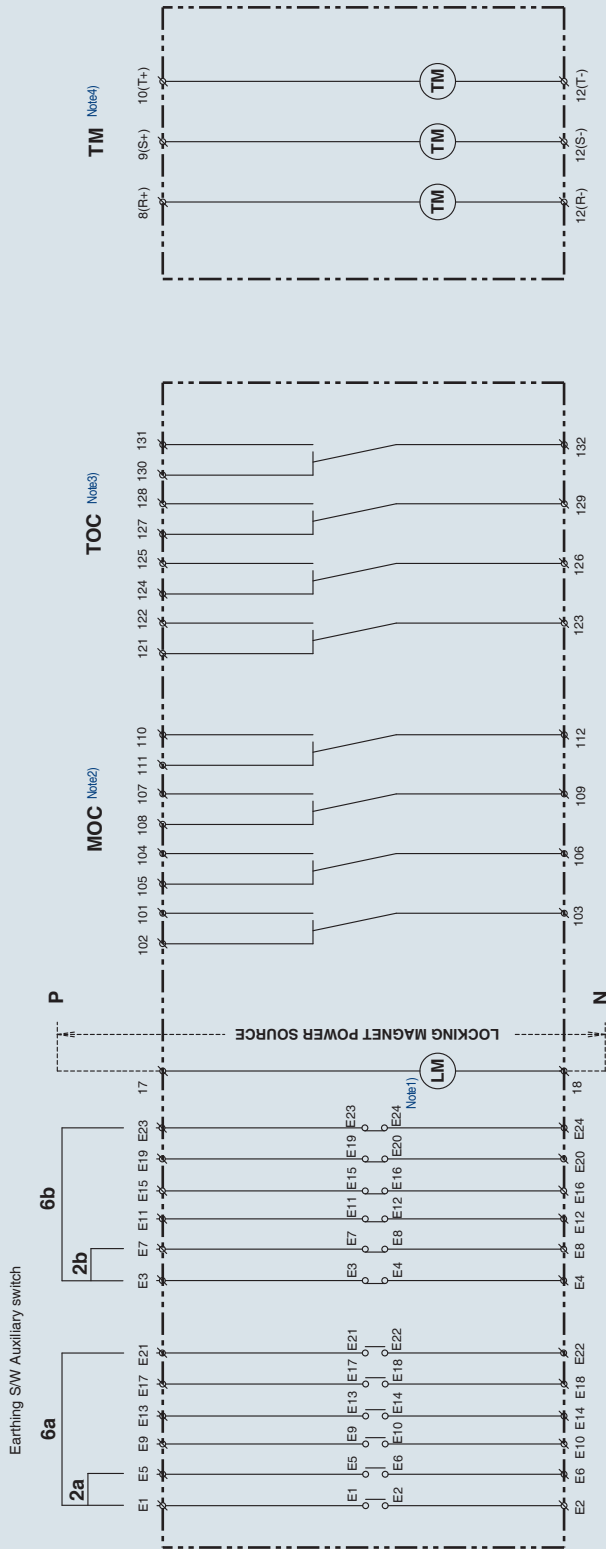


(10a10b)

SW No.	TEST : 1a1b	TEST : 2a	TEST : 1a1b	TEST : 1a1b
LS4	Close at TEST position	Close at TEST position	Close at TEST position	Close at TEST position
LS5	OPEN at TEST position	Close at TEST position	Close at TEST position	Close at TEST position
LS6	OPEN at SERVICE position	Close at SERVICE position	Close at SERVICE position	Close at SERVICE position
LS7	OPEN at SERVICE position	Close at SERVICE position	Close at SERVICE position	Close at SERVICE position
LM	Locking magnet (only withdrawable type)			

- Note) 1. LCS1 : Latch Checking Switch
 2. Position S/W - TEST 2a, SERVICE 2a(Terminal No. 1, 2, 3, 4, 5, 6, 7, 8) 1a1b at TEST position and 1a1b at SERVICE position are also available.
 (In case of 1a1b *marked contact is b - normally open contact)
 3. UVT - Under Voltage Trip (Terminal No. D1, D2)
 4. TC1 - Secondary Trip Coil (Spare trip coil, terminal No. 11, 12)
 5. LM - Locking Magnet (Terminal No. 15, 16), Type H only withdrawable type.
 6. Secondary Trip Coil monitoring contact (Terminal No. 36)
 b contact(36, 37) is not available if Trip Coil monitoring contact is applied to Secondary Trip Coil.
 7. Above options TC1 and UVT can not be used simultaneously.
 8. LS1(closing-interlock Limit-switch) is not available for fixed version
 9. Above circuit diagram is based on 'OFF' status of VCB and closing spring is charged.
 10. Please make sure that keep the direction of P, N on this circuit diagram.

Compartment Control circuit diagram



Ø: External terminals for auxiliary contacts and locking magnet

LM: Locking magnet for earthing switch

MOC: Mechanism operated cell switch (for H type cradle)

TOC: Truck operated cell switch (for H type cradle)

TM: Temperature alarm (for H type cradle)

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.

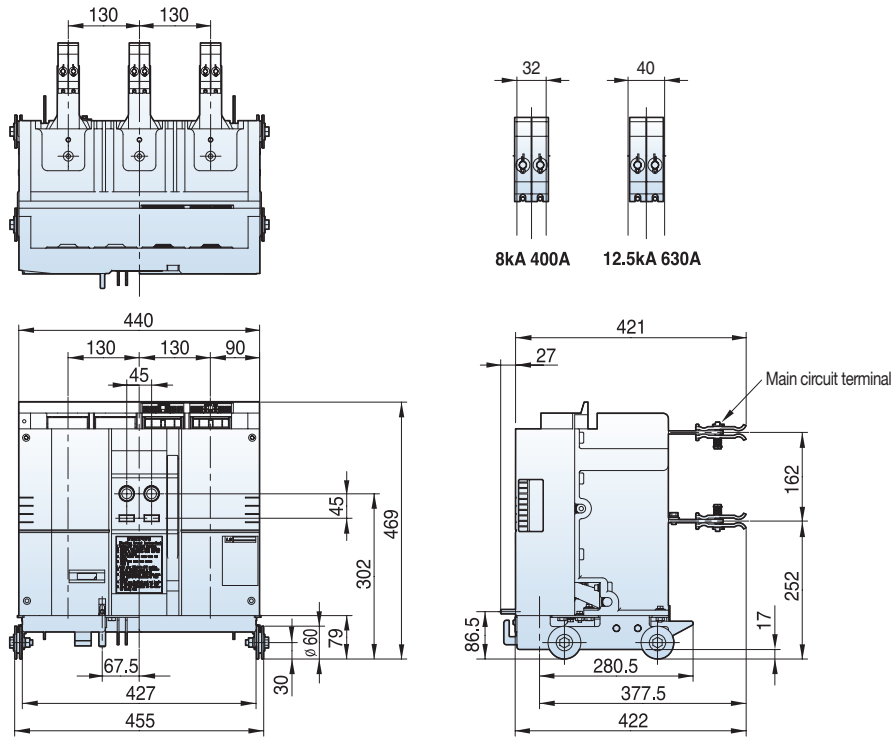
* Above circuit diagram is based on the status that the earthing S/W is Open and the breaker is at Test or between Test and Service position. MOC indicates the Open of the breaker. If the breaker is Closed from Service, the contacts configuration is displayed on the contrary.

Susol VCB

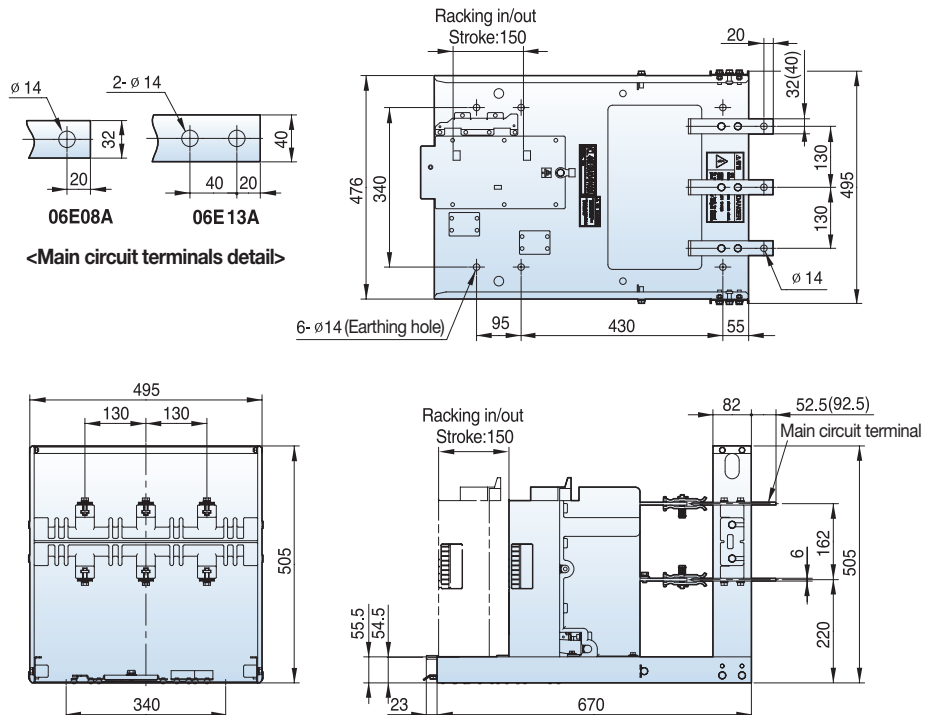
VL-06 Dimensions

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

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

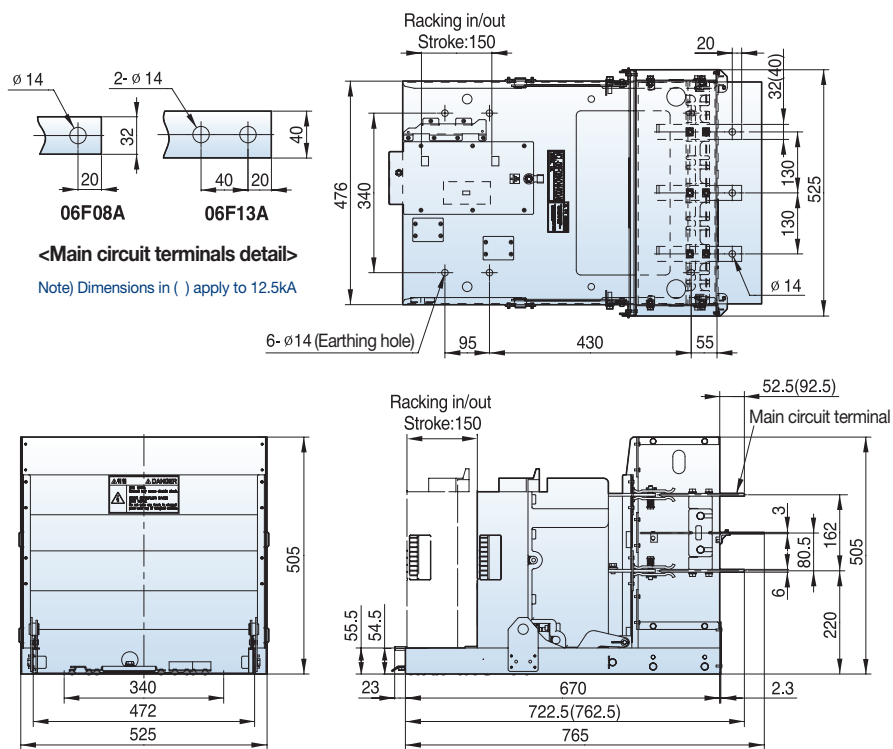


Withdrawable (E type cradle, phase distance 130mm)

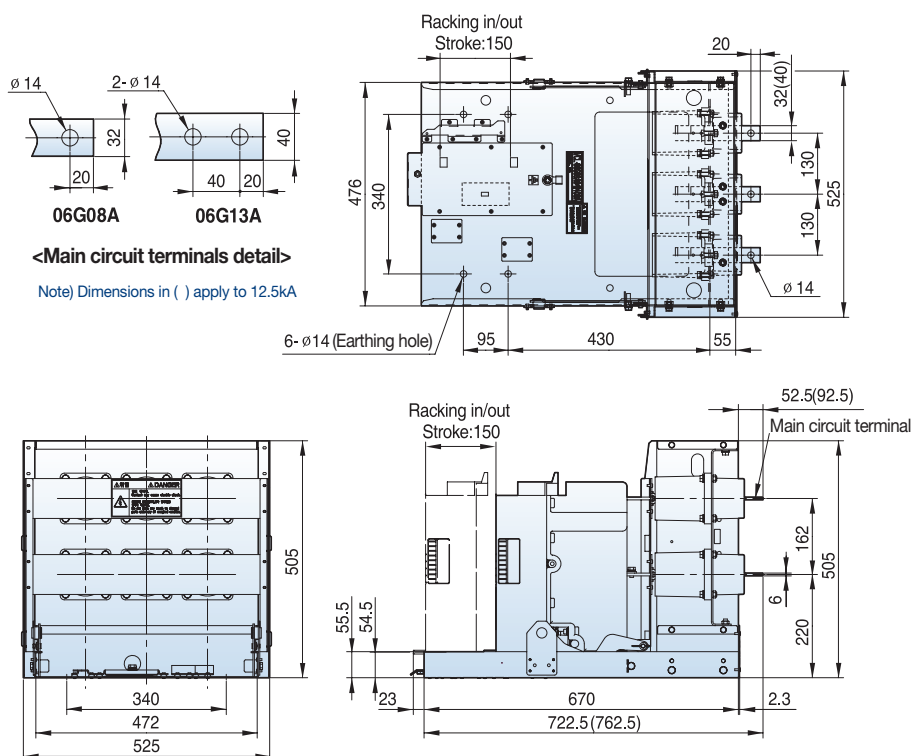


7.2kV, 8/12.5kA, 400/630A

Withdrawable (F type cradle, phase distance 130mm)



Withdrawable (G type cradle, phase distance 130mm)

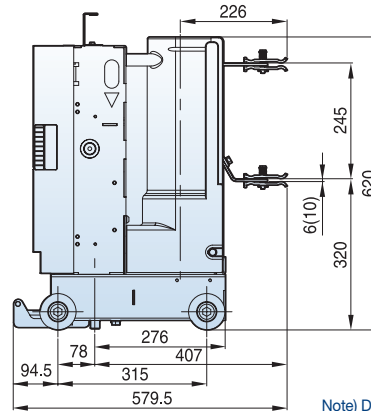
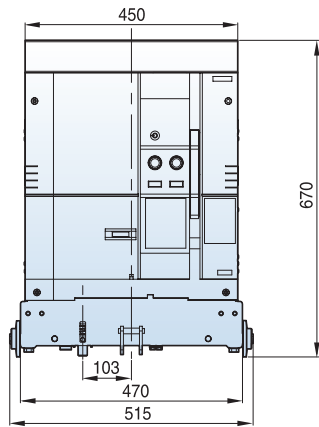
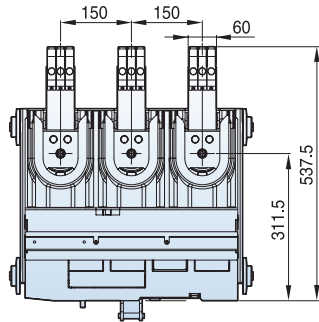


Susol VCB

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

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

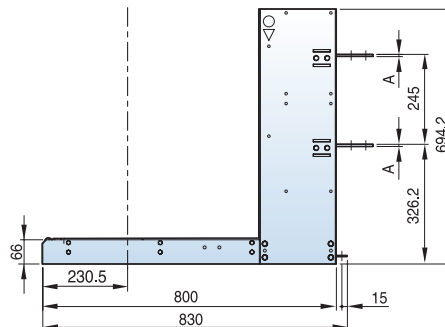
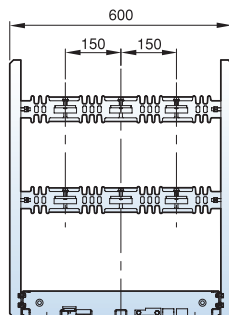
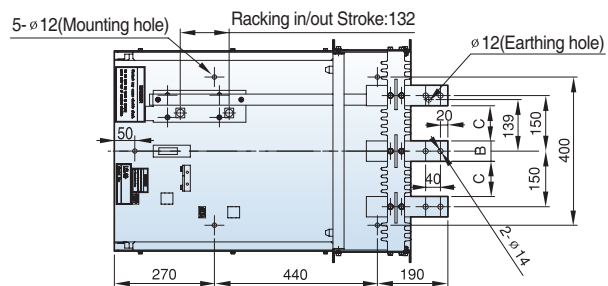
Withdrawable (E type unit, phase distance 150mm)



Note) Dimensions in () apply to 1250A

Withdrawable (E type cradle, phase distance 150mm)

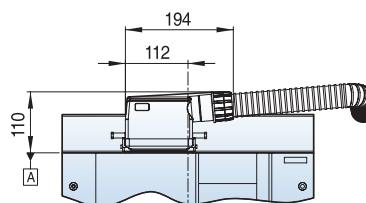
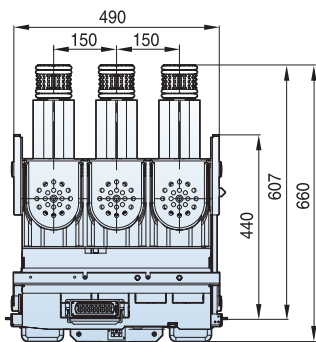
Rating	630A	1250A
A	6	10
B	55	60
C	95	90



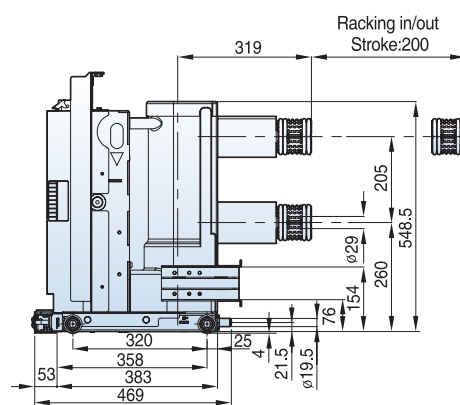
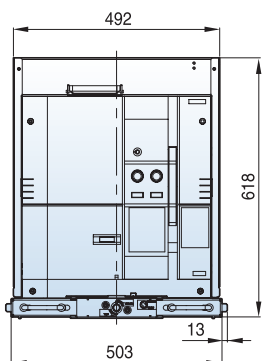
* Please be informed that the switchgear IP cover has to be back of - - - - mark.

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

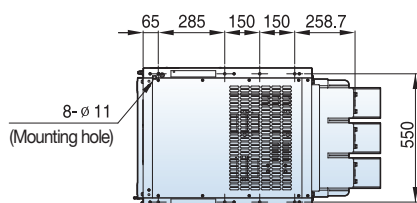
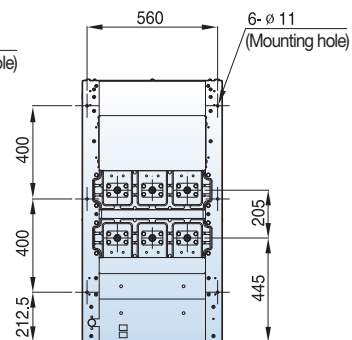
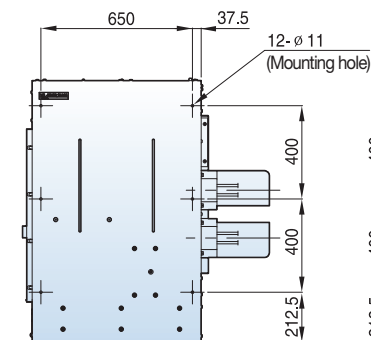
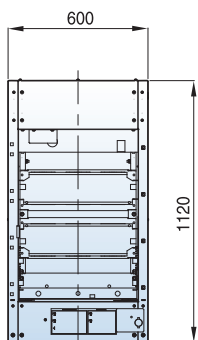
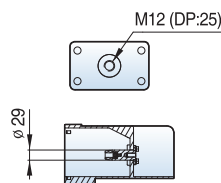
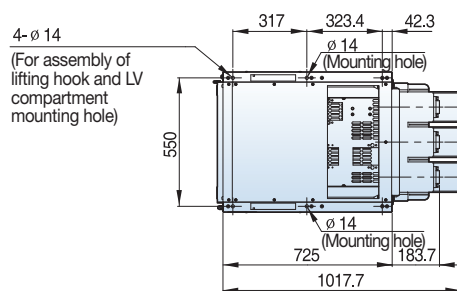
Withdrawable (H type unit, phase distance 150mm)



Note) Please be informed that When B-type connector is used to design switchgears, the height can be 110mm higher based on "A"



Withdrawable (H type cradle, phase distance 150mm)

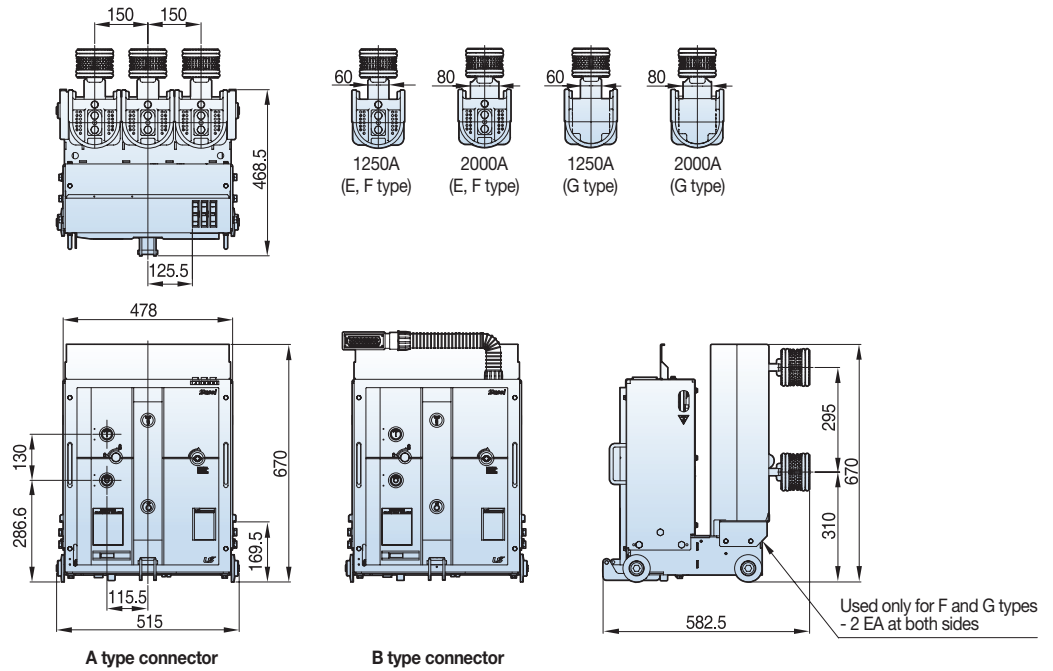


Susol VCB

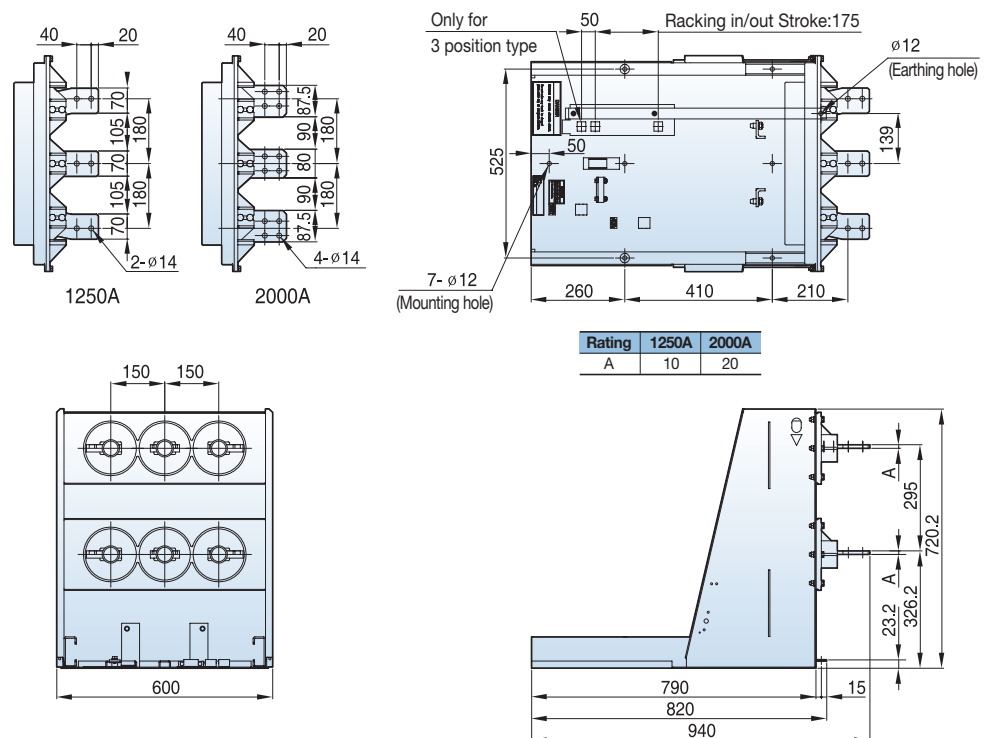
VH- 06/12/17/20/25/36 Dimensions

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

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

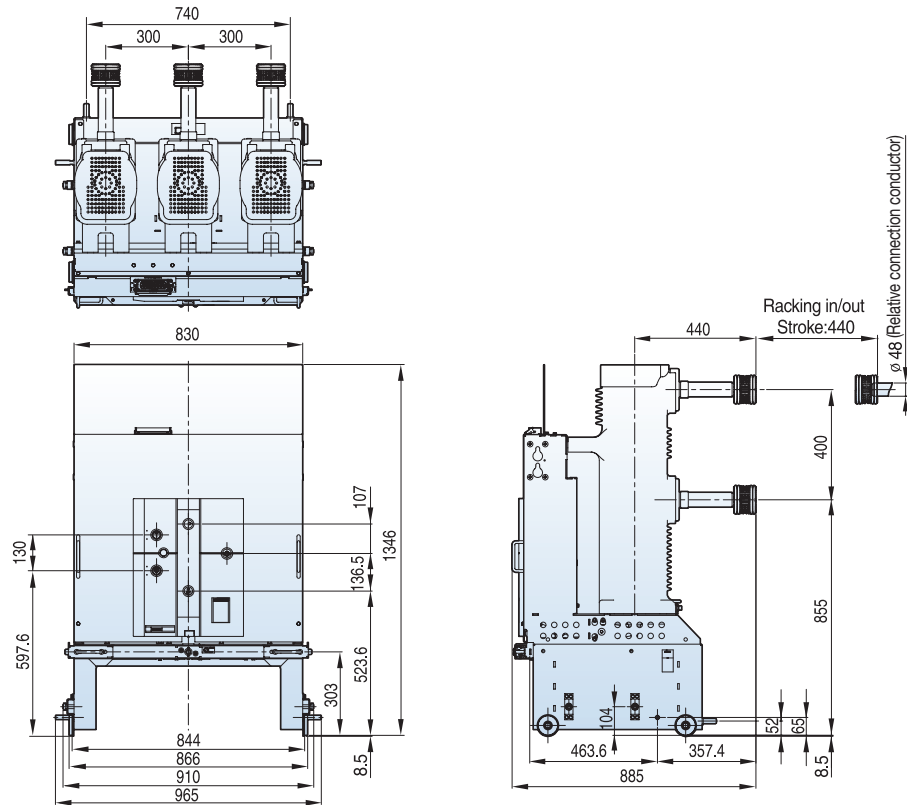


Withdrawable (E type cradle, phase distance 150mm)

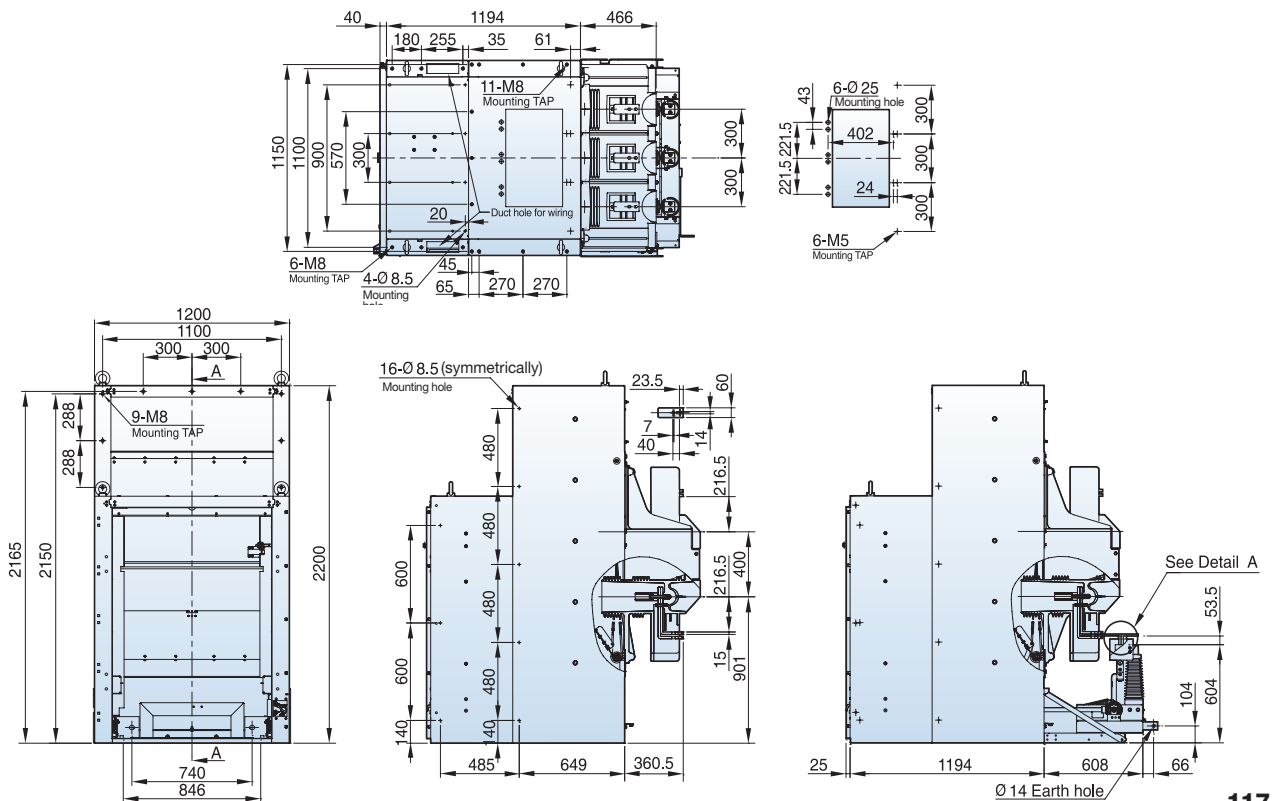


36kV, 25/31.5/40kA, 1250/2000A

Withdrawable (H type unit, phase distance 300mm)



Withdrawable (H type cradle, phase distance 300mm)



Memo

A large, empty, light blue rectangular area with rounded corners, intended for writing a memo. It is positioned below the title and above the footer.

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				1500				1500			
Mechanical (mil. operations)				250				250			
Electrical				25	25	25	32	25	27	32	45
Current and power (IEC)				2.2	2.5	3.5	4.5	2.5	3.5	4.5	5.5
AC-1, Thermal current				9	11	13	18	11	13	18	22
AC-3 200/240V kW				3	4	5.5	7.5	4	5.5	7.5	11
380/440V kW				7	9	12	18	9	12	18	22
A				3	4	7.5	7.5	4	7.5	7.5	15
500/550V kW				6	7	12	13	7	12	13	20
A				3	4	7.5	7.5	4	7.5	7.5	15
690V kW				4	5	9	9	6	9	9	18
A				-	-	-	-	-	-	-	-
1000V kW				-	-	-	-	-	-	-	-
A				210	250	280	300	250	280	300	400
Rated Short-time withstand current (IEC 60947)				105	110	120	130	110	120	154	186
1s A				70	70	80	85	70	80	100	130
10s A				61	61	61	70	61	61	84	90
30s A				40	45	47	50	45	50	60	60
1min A				30	30	30	40	30	30	40	50
3min A				25	26	28	30	26	28	30	45
10min A				25	25	25	32	25	25	40	40
≥15min A				0.5	0.5	0.75	1	0.5	0.75	1	2
Rating (UL)				1.5	1.5	2	3	1.5	2	3	3
Continuous current				2	2	3	7.5	2	3	7.5	7.5
Single phase 110~120V HP				3	3	5	7.5	3	5	7.5	10
220~240V HP				5	5	7.5	10	5	7.5	10	15
Three phase 200~208V HP				7.5	7.5	10	15	7.5	10	15	20
220~240V HP				00	00	0	1	00	0	1	
440~480V HP				0.33				0.34			
550~600V HP				45×73.5×80.4				45×73.5×87.4			
NEMA size				0.4				0.41			
Size and weight				45×73.5×96.6				45×73.5×103.6			
AC control				1NO or NC				1NO1NC			
Weight kg				UA-1				UA-1			
Size(W×H×D) mm				UA-2, UA-4				UA-2, UA-4			
DC control											
Weight kg											
Size(W×H×D) mm											
Auxiliary(standard)											
Auxiliary											
Side mount											
Front mount											



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	190
100	120
70	80
55	65
50	60
50	60
2	3
5	7.5
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	96
70	100
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		100
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
110	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
50	50
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				225AF		400AF		
Type	Screw clamp terminals			MC-185a	MC-225a	MC-265a	MC-330a	MC-400a
	Lug clamp terminals			-	-	-	-	-
Number of poles				3P		3P		
Rated operational voltage, Ue				1000V		1000V		
Rated insulation voltage, Ui				1000V		1000V		
Rated frequency				50/60Hz		50/60Hz		
Rated impulse withstand voltage, Uimp				8kV		8kV		
Maximum operating rate in operating cycles per hour(AC3)				1,200 operations per hour		1,200 operations per hour		
Durability (mil. operations)	Mechanical			500		500		250
	Electrical			100		100		50
Current and power (IEC)	AC-1, Thermal current	200/240V	A	300	350	400	500	520
			kW	55	75	80	90	125
	AC-3	380/440V	A	185	225	265	330	400
			kW	90	132	147	160	200
		500/550V	A	185	225	265	330	400
			kW	110	132	147	160	225
		690V	A	180	200	225	280	350
			kW	110	140	160	200	250
		1000V	A	120	150	185	220	300
			kW	132	132	147	147	147
		A	90	90	105	105	105	
Rated Short-time withstand current (IEC 60947)	1s	A	2000	2500	3500	4000	4600	
	10s	A	1500	1700	2400	3000	4400	
	30s	A	1000	1200	1500	2500	2974	
	1min	A	800	1000	1100	1700	1846	
	3min	A	520	700	800	1000	1313	
	10min	A	350	500	600	620	760	
	≥15min	A	320	400	500	553	699	
Rating (UL)	Continuous current		A	300	350	400	500	520
	Single phase	110~120V	HP	15	15	-	-	-
		220~240V	HP	30	40	-	-	-
	Three phase	200~208V	HP	60	60	75	100	125
		220~240V	HP	60	75	100	100	150
		440~480V	HP	125	150	200	200	300
		550~600V	HP	125	150	200	200	300
NEMA size					5			
Size and weight	AC control	Weight	kg	5.4		9.2		
		Size(W×H×D)	mm	138×203×185.1		163×243×204.4		
	DC control	Weight	kg					
		Size(W×H×D)	mm					
Auxiliary(standard)				2NO2NC		2NO2NC		
Auxiliary	Side mount			AU-100, AU-100E (Max.4NO4NC)		AU-100, AU-100E (Max.4NO4NC)		
	Front mount							



800AF			1260AF	2650AF			
MC-500a	MC-630a	MC-800a	MC-1260a	MC-1400a	MC-1700a	MC-2100a	MC-2650a
●	●	●	●	●	●	●	●
-	-	-	-	-	-	-	-
3P			3P	3P			
1000V			1000V	1000V			
1000V			1000V	1000V			
50/60Hz			50/60Hz	50/60Hz			
8kV			8kV	8kV			
1,200 operations per hour			300 operations per hour	300 operations per hour			
250			50	50			30
50			5	5			2
700	900	1050	1260	1400	1700	2100	2650
147	190	220	-	290	310	-	-
500	630	800	-	860	1050	-	-
265	330	440	900	550	700	900	-
500	630	800	1450	860	1050	1450	-
265	330	500	-	-	-	-	-
400	500	720	-	-	-	-	-
300	400	500	-	800	1000	-	-
380	420	630	-	800	950	-	-
280	280	280	-	-	-	-	-
220	220	220	-	-	-	-	-
6000	7000	7500	8000	-	-	-	-
5050	6400	7000	7200	8000	10000	10000	10000
4400	4500	4900	5200	-	-	-	-
3400	3500	3800	4000	4500	5500	5500	5500
2000	2200	2500	2300	-	-	-	-
1400	1550	1550	3000	2600	3000	3000	3000
1100	1300	1300	1500	-	-	-	-
700	900	1050	1260	1400	1700	2100	2650
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
150	200	200					
200	250	300					
400	500	600					
400	500	600					
6		7					
22.4 285×312×245.3			23.5 285×352×246	33.8 431×380×246			47 431×392×246
2NO2NC			2NO2NC	2NO2NC			
AU-100, AU-100E (Max.4NO4NC)			AU-100, AU-100E (Max.4NO4NC)	AU-100, AU-100E (Max.4NO4NC)			
-			-	-			

Metasol Contactors



MC type Magnetic Contactors (4pole)

Frame size			
Type	Screw clamp terminal		
Number of poles	4P		
Rated operational voltage (Ue)	690V		
Rated insulation voltage (Ui)	690V		
Rated frequency	50/60Hz		
Rated impulse withstand voltage, Uimp	6kV		
Maximum operating rate in operating cycles per hour(AC3)	1,800 operations per hour		
Durability	Mechanical		
	Electrical		
Current and Power (IEC)	Thermal current	A	
	AC-1	200/240V	kW
			A
	380/400V	kW	
			A
	500/550V	kW	
		A	
UL rating (UL)	Continuous current	A	
	Single	110~120V	HP
	Phase	220~240V	HP
Three	200~208V	HP	
Phase	220~240V	HP	
	440~480V	HP	
	550~600V	HP	
Size and weight	AC Control	Weight	kg
		Size(W×H×D)	mm
	DC Control	Weight	kg
		Size(W×H×D)	mm



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	32
0.5	0.5	0.75	1
1.5	1.5	2	3
2	2	3	7.5
3	3	5	7.5
5	5	7.5	10
7.5	7.5	10	15
0.33			
45×73.5×80.4			
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
32
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
45	50
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
70	80	90	100
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	4P		
Rated operational voltage (Ue)	690V		
Rated insulation voltage (Ui)	1000V		
Rated frequency	50/60Hz		
Rated impulse withstand voltage, Uimp	8kV		
Maximum operating rate in operating cycles per hour(AC3)	1,200 operations per hour		
Durability	Mechanical		500
	Electrical		80
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	110~120V	HP
		Phase	220~240V
	Three	200~208V	HP
		Phase	220~240V
	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



* - 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
200	250	275	300	350
165	170	225	255	290
200	250	275	300	350
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
400	500	520
335	390	470
400	500	520
400	500	520
-	-	-
-	-	-
75	100	125
100	125	150
200	200	300
200	200	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
700	900	1050
710	740	900
700	900	1050
700	900	1050
-	-	-
-	-	-
150	200	200
200	250	300
400	500	600 *
400	500	600 **

26.3
346×310 ×244

2NO2NC

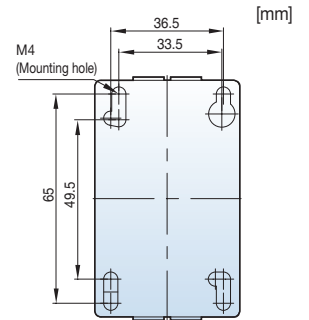
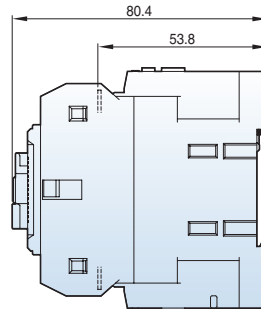
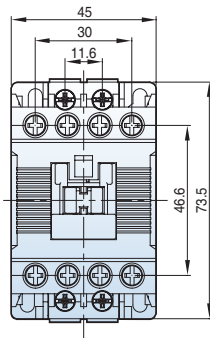
AU-100, AU-100E		
-		

Metasol Contactors

Dimensions (18AF/22AF)

MC-6a-18a AC

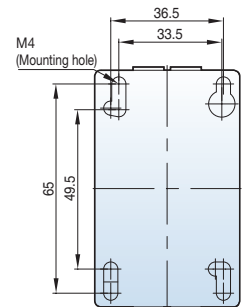
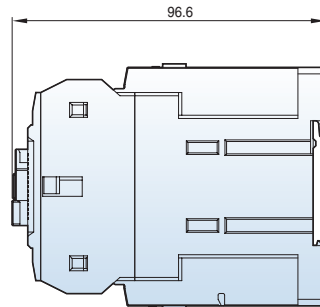
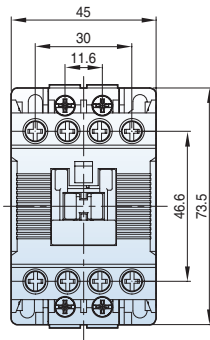
1NO or 1NC



0.3kg

MC-6a-18a DC

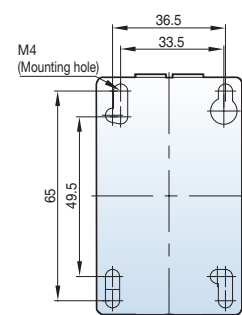
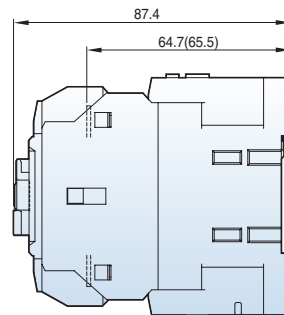
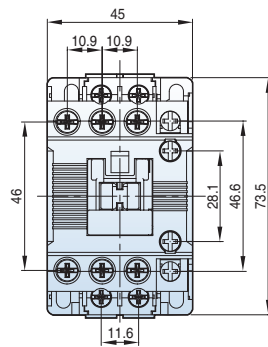
1NO or 1NC



0.5kg

MC-9b-22b AC

1NO1NC

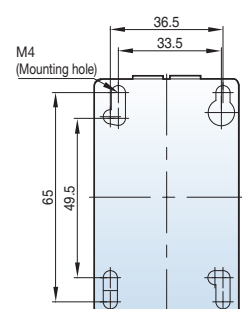
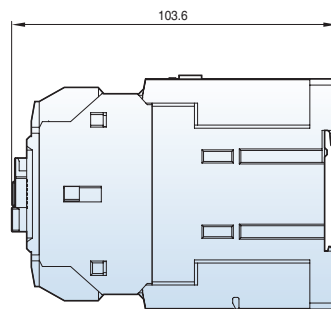
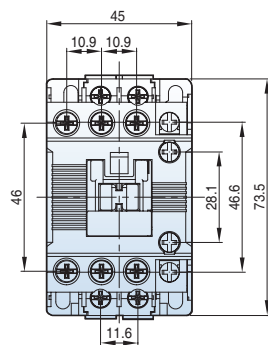


* () MC-18b, 22b

0.3kg

MC-9b-22b DC

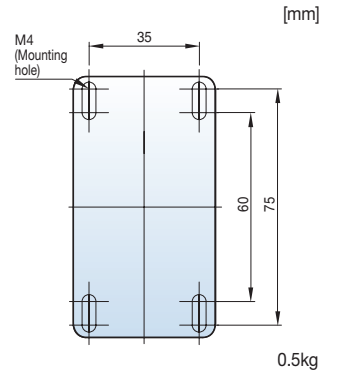
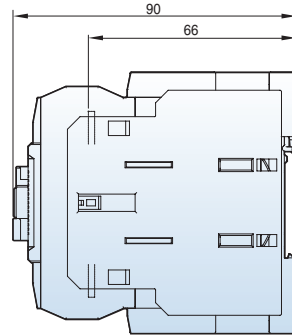
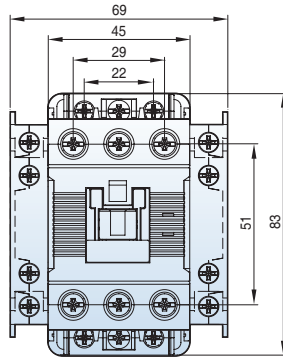
1NO1NC



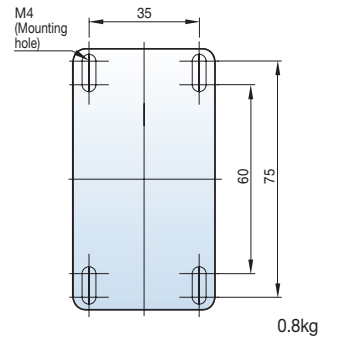
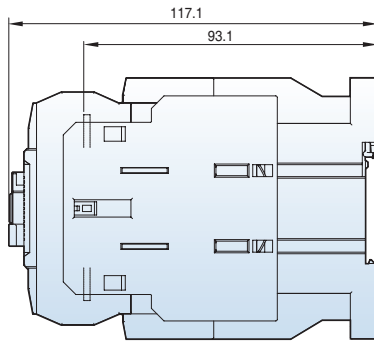
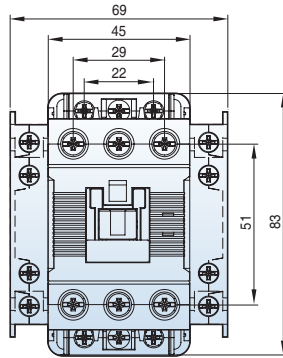
0.5kg

Dimensions (40AF/65AF)

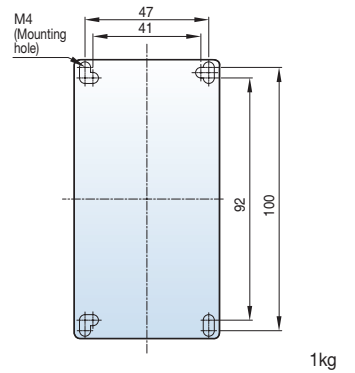
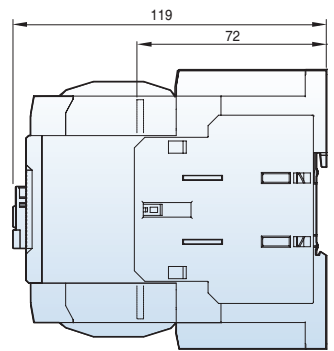
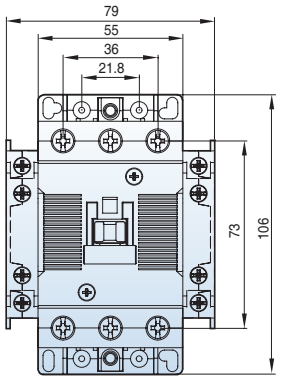
MC-32a-40a AC
2NO2NC



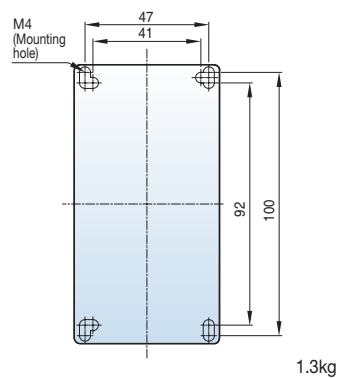
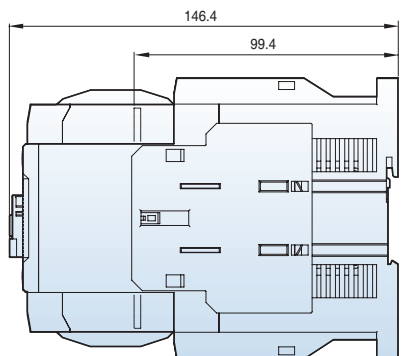
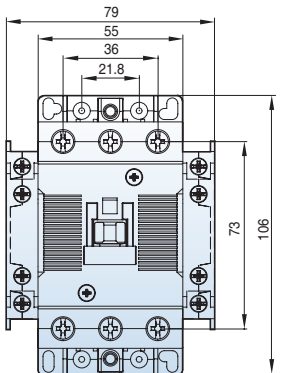
MC-32a-40a DC
2NO2NC



MC-50a-65a AC
2NO2NC



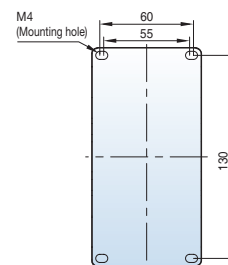
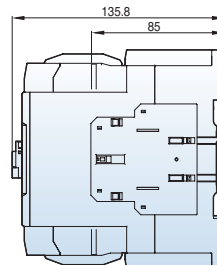
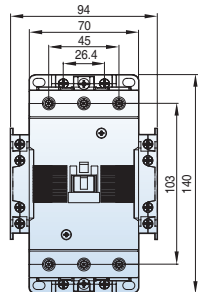
MC-50a-65a DC
2NO2NC



Metasol Contactors

Dimensions (100AF~400AF)

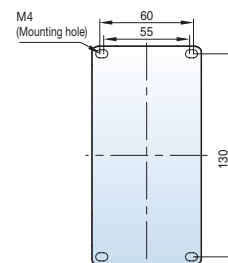
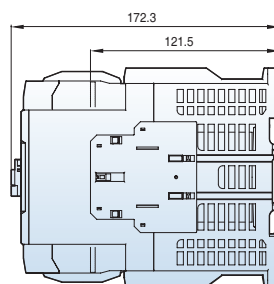
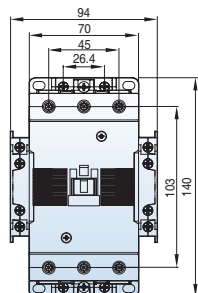
MC-75a~100a AC
2NO2NC



[mm]

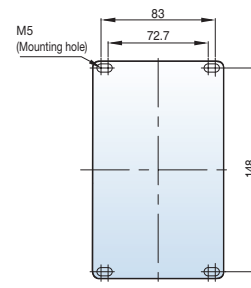
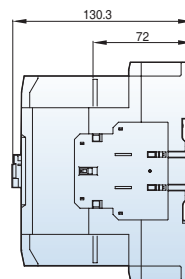
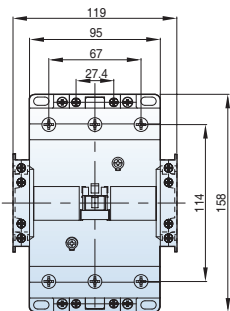
1.9kg

MC-75a~100a DC
2NO2NC



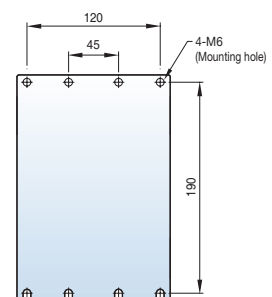
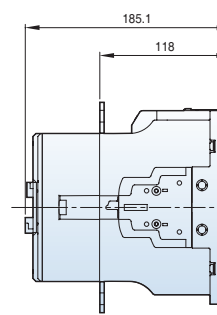
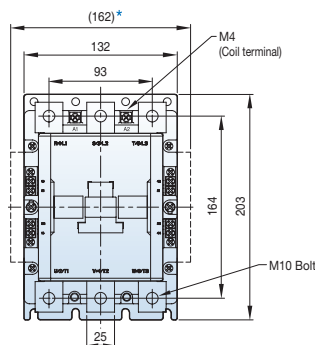
2.8kg

MC-130a
MC-150a



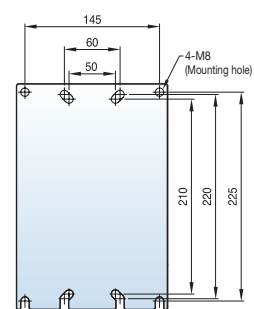
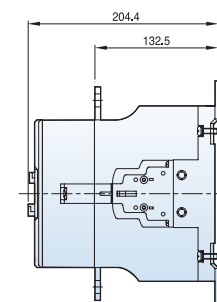
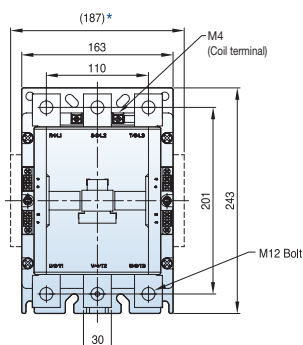
2.4kg

MC-185a
MC-225a



5.4kg

MC-265a
MC-330a
MC-400a



9.2kg

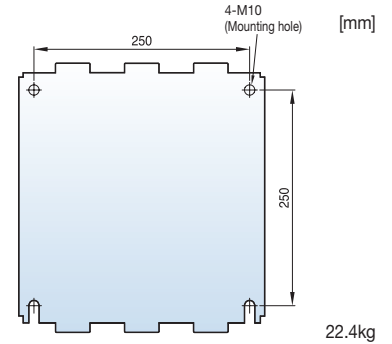
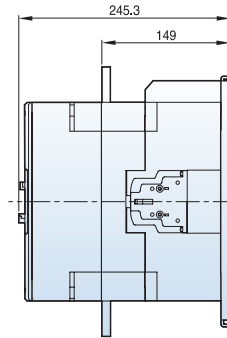
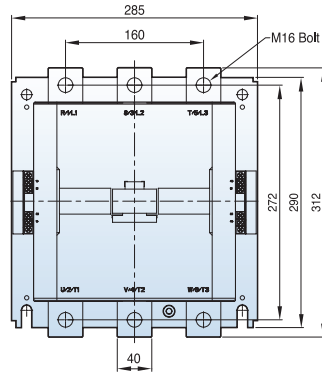
* Optional auxiliary contact unit (side mount type)

Dimensions (800AF~2650AF)

MC-500a

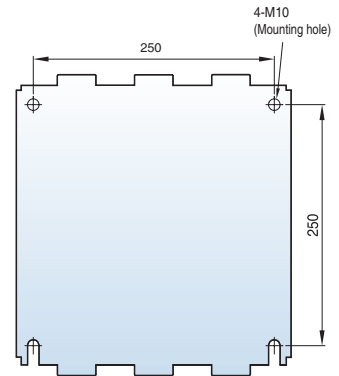
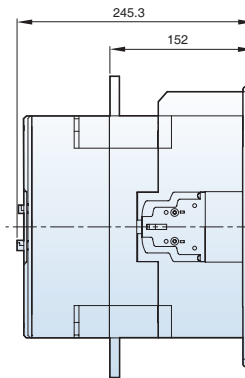
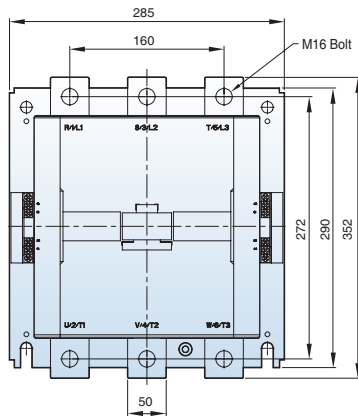
MC-630a

MC-800a



22.4kg

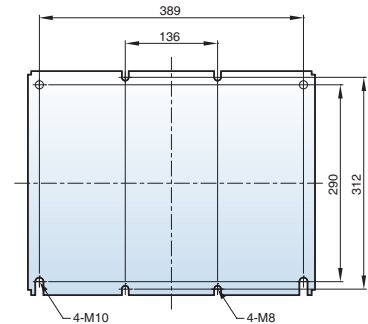
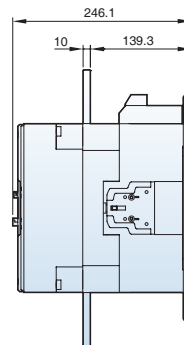
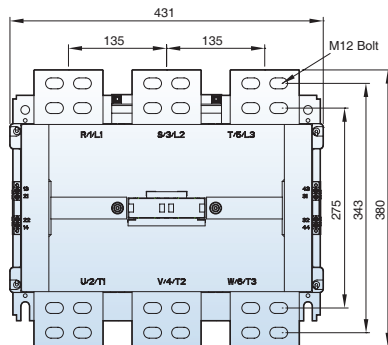
MC-1260a



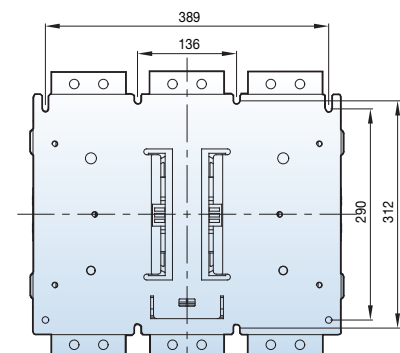
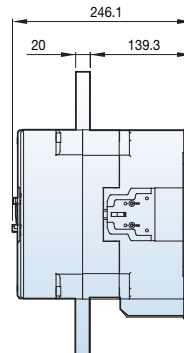
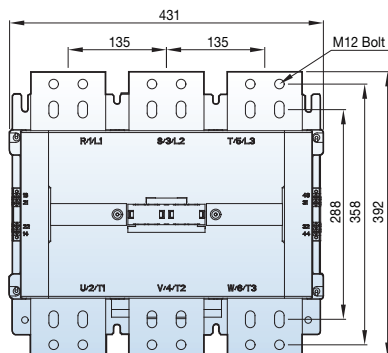
MC-1400a

MC-1700a

MC-2100a



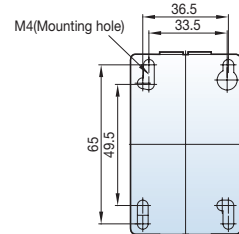
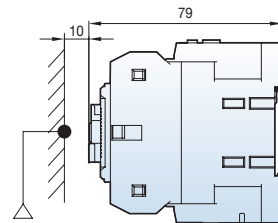
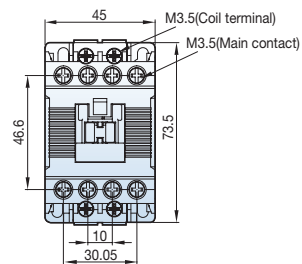
MC-2650a



Metasol Contactors

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

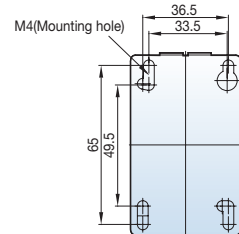
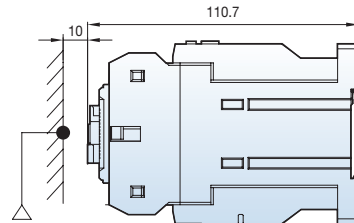
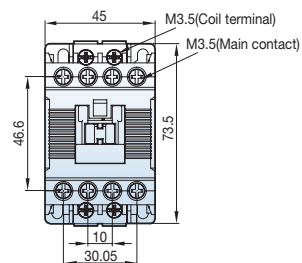
MC-6a/4~18a/4 AC



[mm]

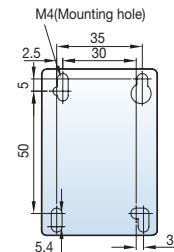
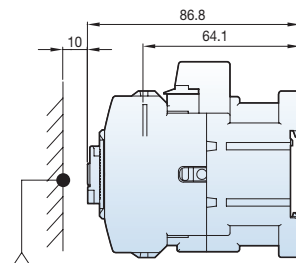
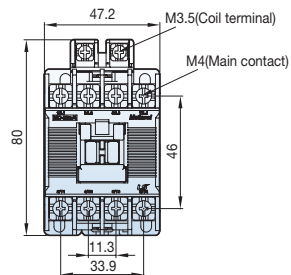
0.3kg

MC-6a/4~18a/4 DC



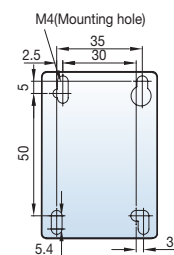
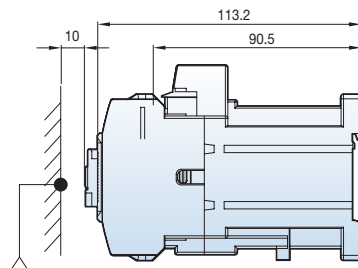
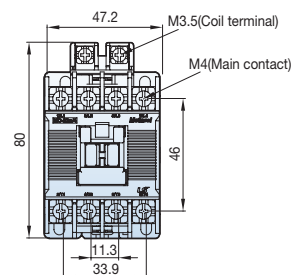
0.45kg

MC-22a/4 AC



0.4kg

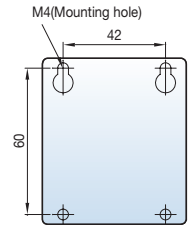
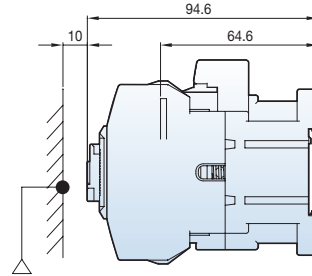
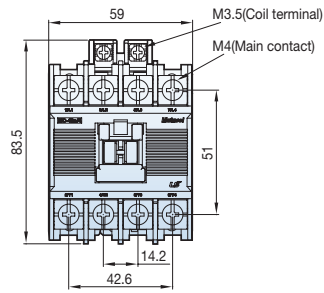
MC-22a/4 DC



0.5kg

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

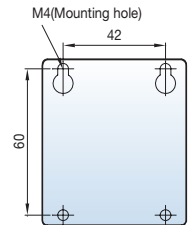
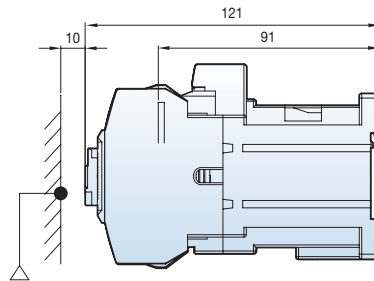
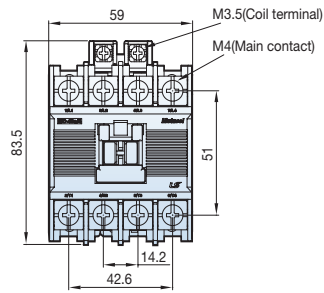
MC-32a/4~40a/4 AC



[mm]

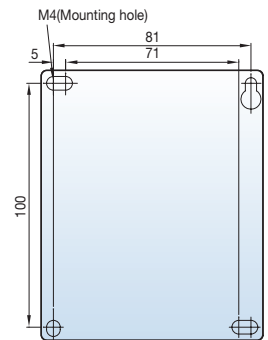
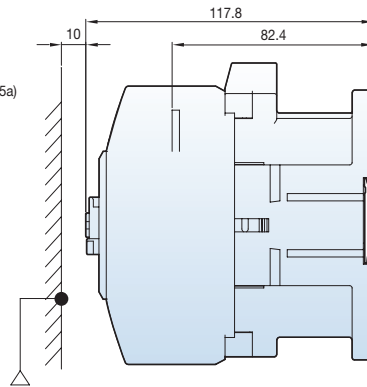
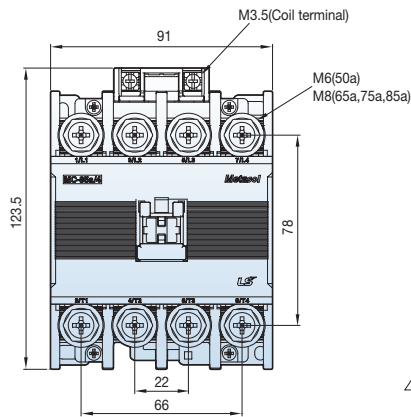
0.59kg

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



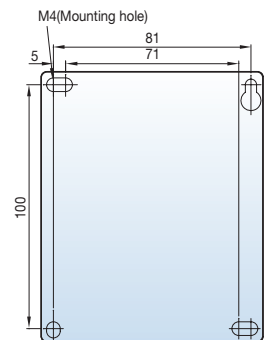
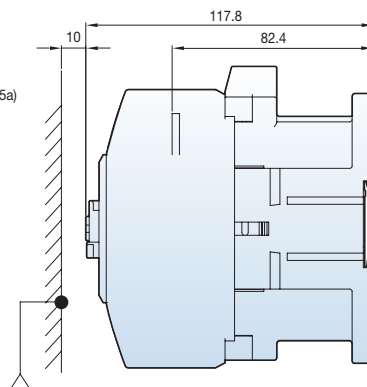
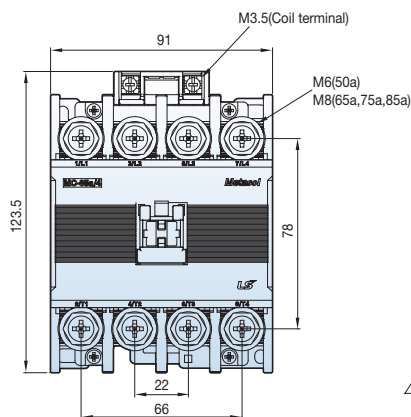
0.7kg

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



1.2kg

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

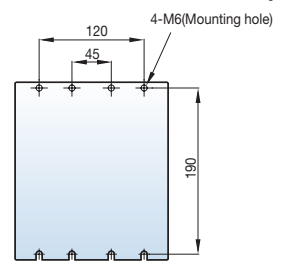
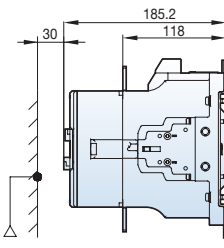
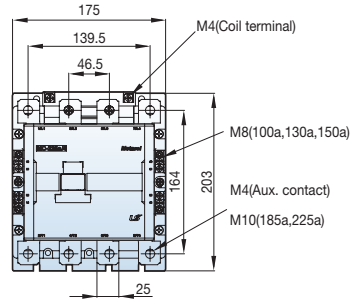


Metasol Contactors

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

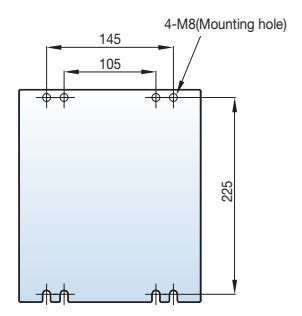
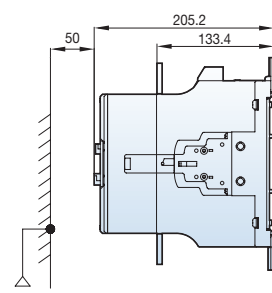
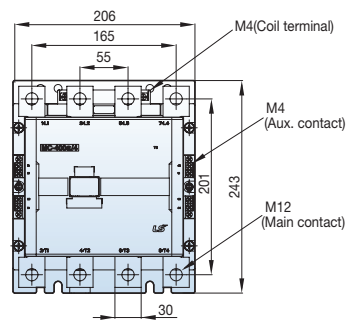
[mm]

- MC-100a/4
- MC-130a/4
- MC-150a/4
- MC-185a/4
- MC-225a/4



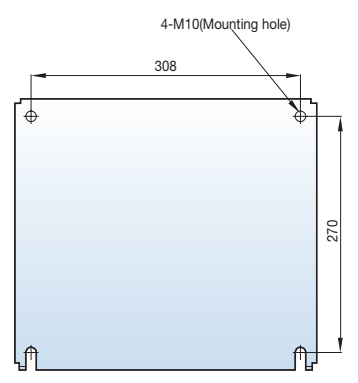
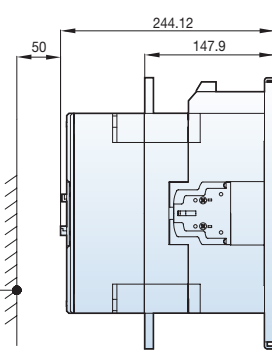
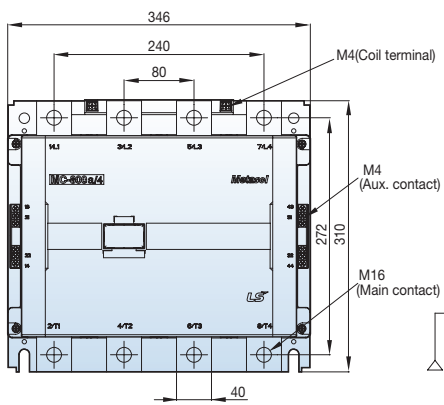
5.6kg

- 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



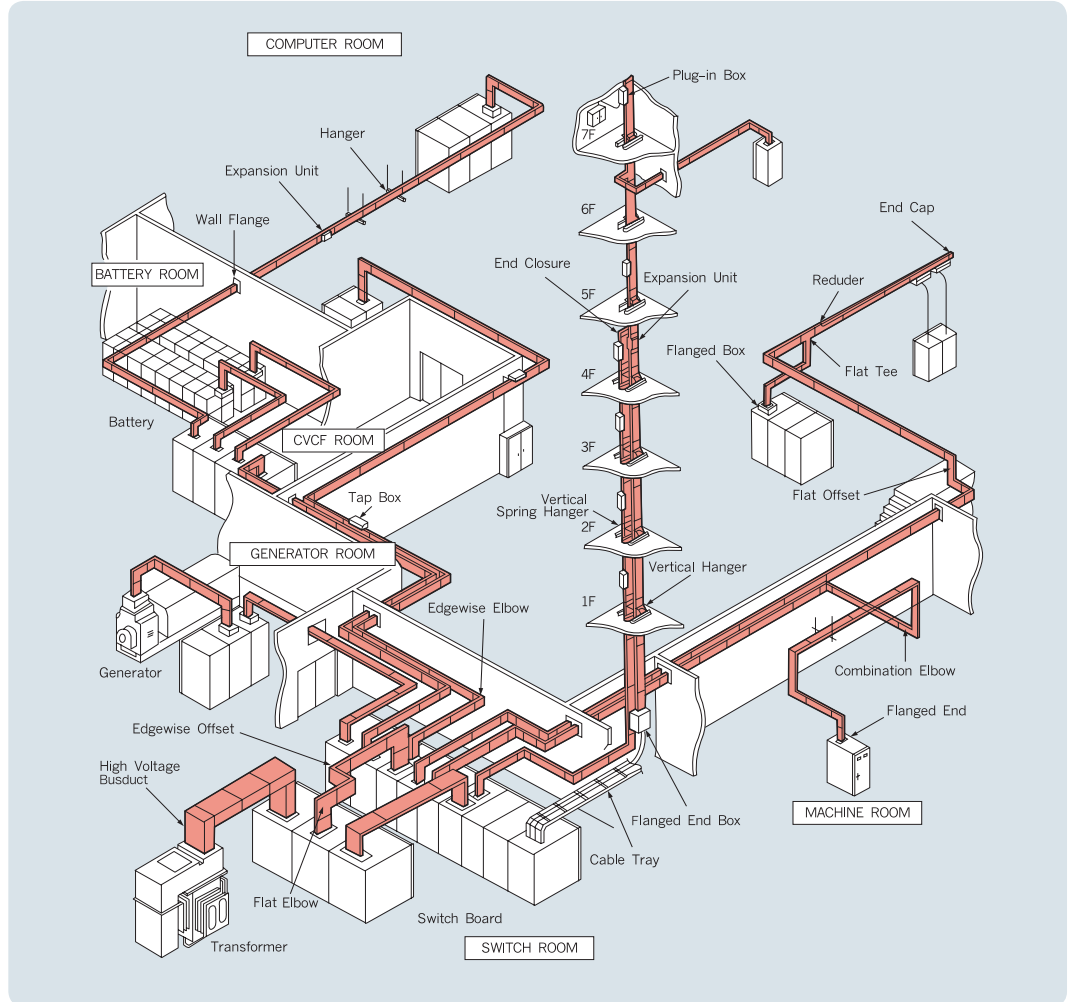
Rating

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°C / 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		

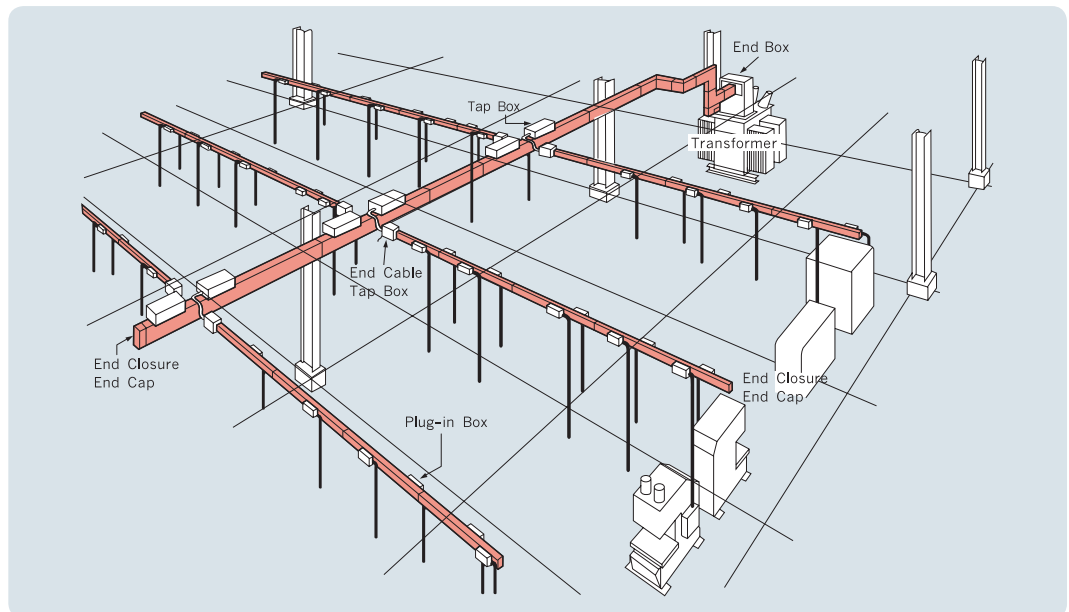
Susol Busways

Application

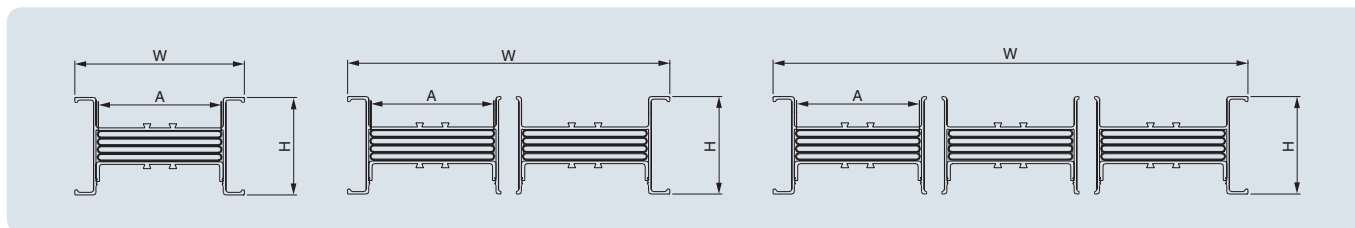
Building distribution system



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	Fig.2	6,35	210	265	106	17	18.5	265	115	21	22.5	265	124	25.1	26.8
2500			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	Fig.3	6,35	184 × 3	677	106	46.5	50.5	677	115	56.5	60.5	677	124	65.9	70.2
6000			210 × 3	755		51.5	56.5	755		63	67.5	755		74.0	78.9

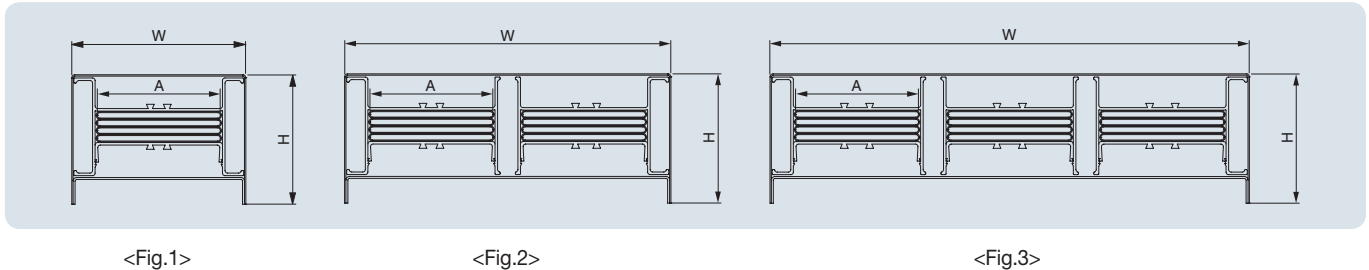
Copper Conductor

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	Fig.2	6,35	145	200	106	30	33.5	200	115	38.5	42	200	124	47.6	51.4
2500			195	250		39	44.5	250		50	55.5	250		62.9	68.0
3200			108 × 2	306		46	52	306		58.5	64.5	306		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	Fig.3	6,35	195 × 2	480	106	78	88.5	480	115	101	111.5	480	124	125.2	135.3
6000			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	Fig.2	210	270	143.5	19.5	21.1	270	152.5	23.2	24.9	270	161.5	27.0	28.7	
2500		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	143.5	19.4	53.8	682	152.5	60.1	63.7	682	161.5	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	Fig.2	145	205	143.5	32.0	35.7	205	152.5	40.3	44.5	205	161.5	49.3	53.1	
2500		195	255		14.3	46.4	255		52.6	58.3	255		64.8	69.9	
3200		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	Fig.3	195 × 2	485	143.5	81.0	91.1	485	152.5	105.0	115.0	485	161.5	127.8	137.9	
6000		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/√3, 110/√3, 120/√3, 190/√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 10MΩ		
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.

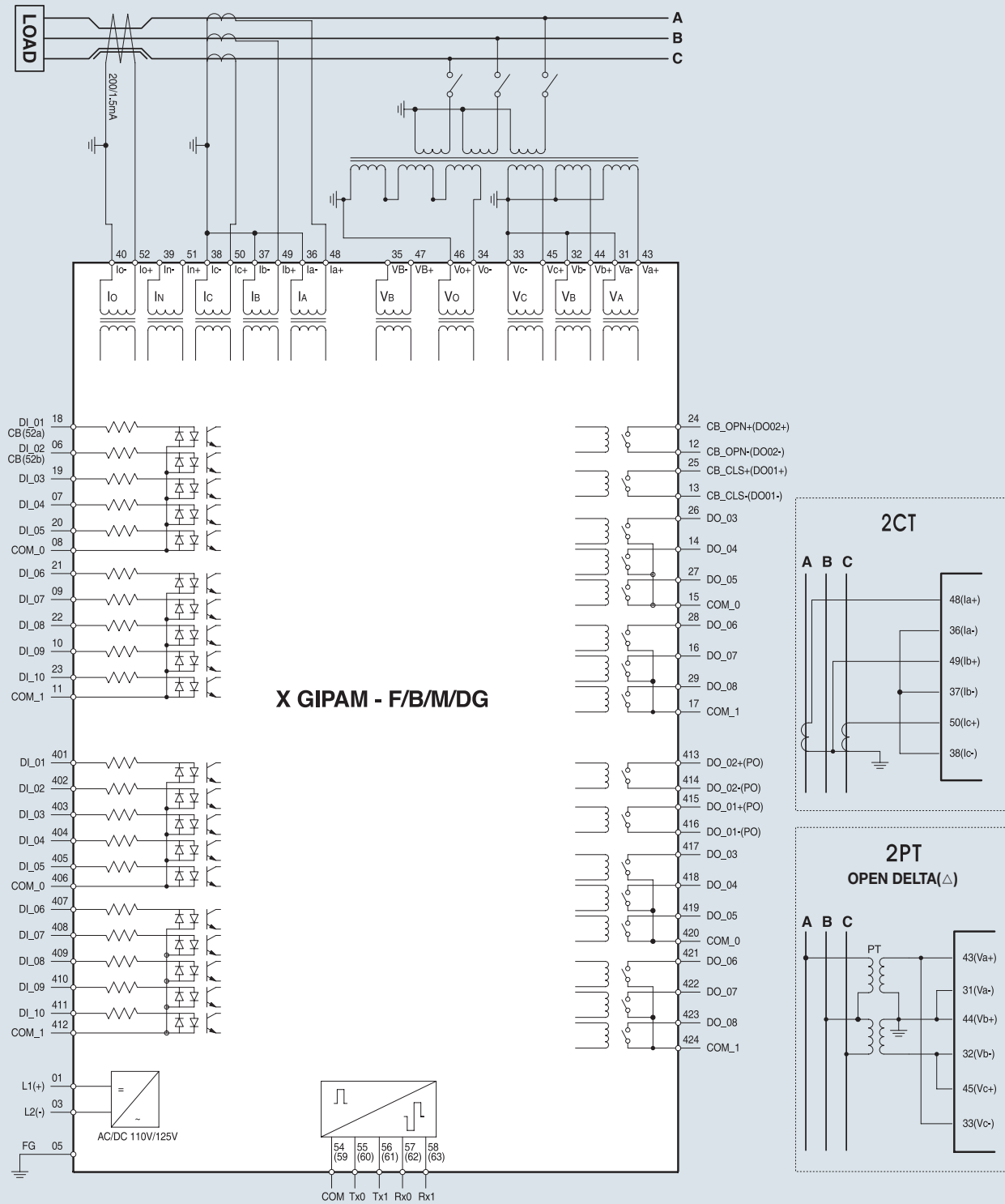
X GIPAM

X GIPAM - F Characteristics

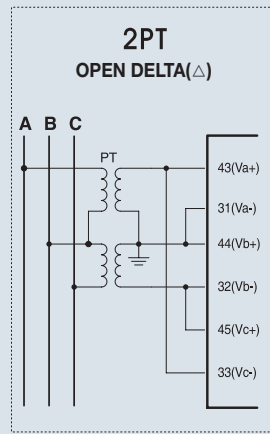
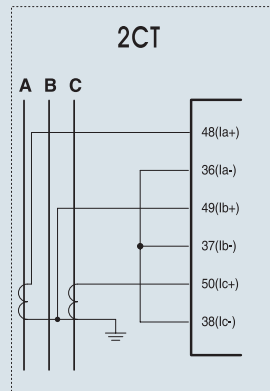
Protection	Operating part	Setting range	Operating characteristics	Operating time	Delay time	Remarks
OCR (50)	Stage 1	OFF, 0.10~32.00In/0.01In	Instantaneous Definite	30msec and below 0.050~300.000s/0.001s	-	-
	Stage 2					
OCR (51)	Stage 1	OFF, 0.02~10.00In/0.01In	Definite Inverse	0.050~300.000s/0.001s 0.05~1.2/0.01	-	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	-	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	-	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	-	IEC SI/VI/EI/LI ANSI SI/VI/EI
	Stage 2					
OVGR (64)	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	-	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°C/1°C	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 (64) is operated instantaneously using VectorSum (vector sum, Vo), its operation time will be within 50msec.

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



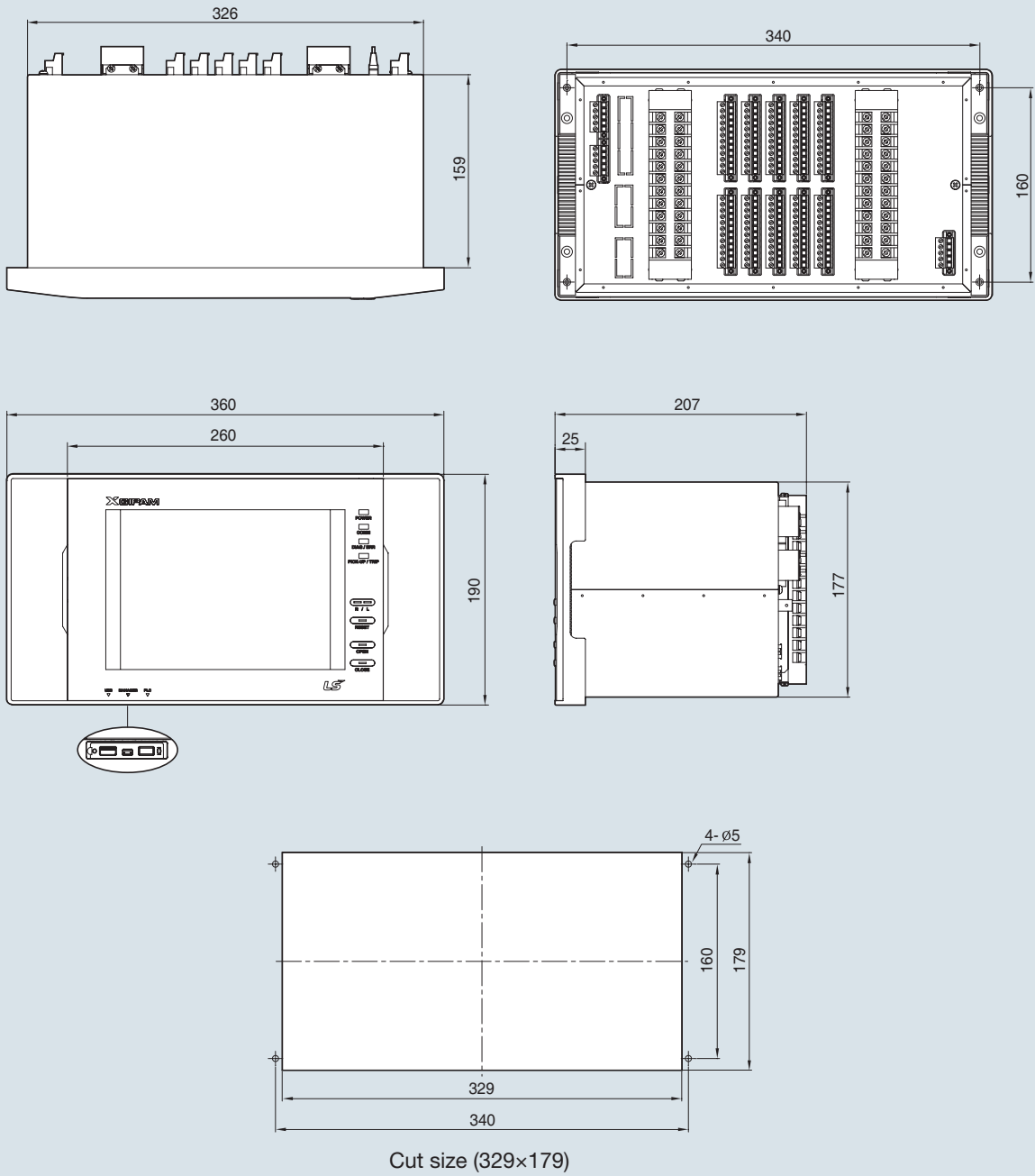
X GIPAM - F/B/M/DG



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

Applicable type



24kV LFL type



24kV LCL type



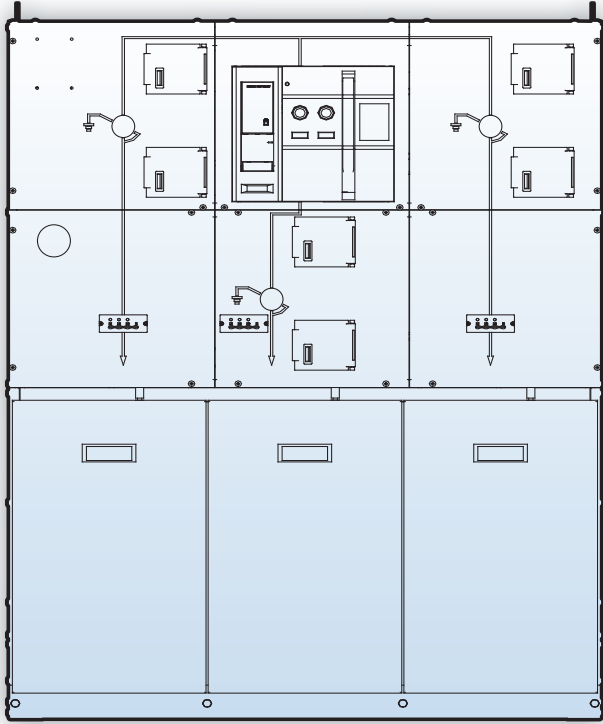
24kV Extensible type



36kV LCL type

Susol RMU

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

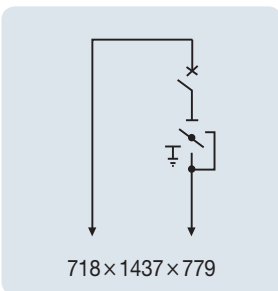


- Consists of two circuit LBS and one circuit CB-DS in a single chamber
- Protects equipment using Circuit Breaker
- Complete Sealing System
- Increases durability through S/S application
- L: Load break switch
- C: Vacuum circuit breaker

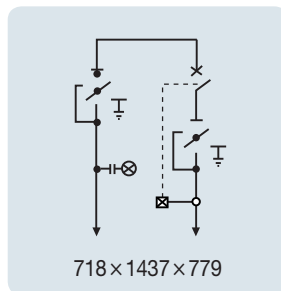
Applicable type

[W×H×D, mm]

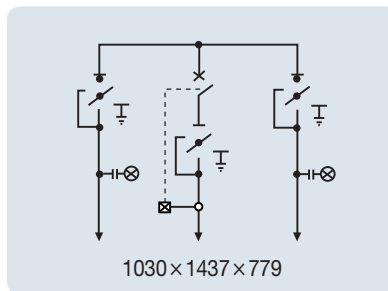
RC (1R1C)



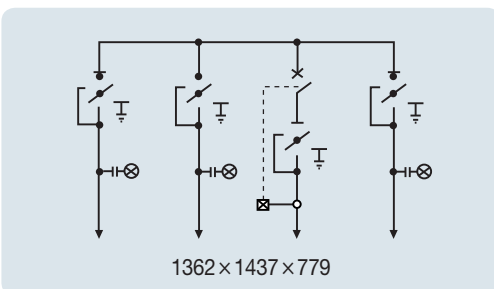
LC (1L1C)



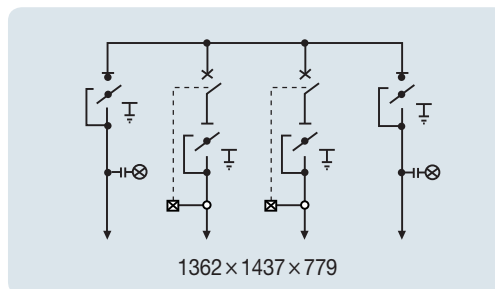
LCL (2L1C)



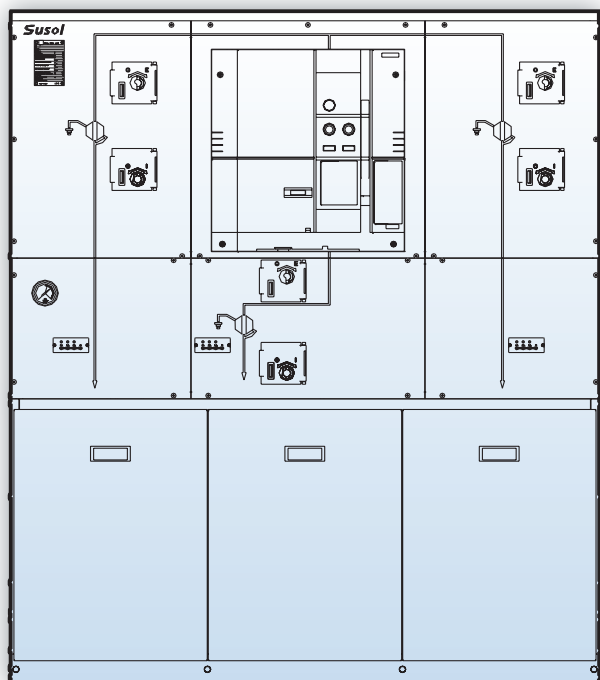
LLCL (3L1C)



LCCL (2L2C)



36kV CB Feeder Non-Extensible RMU

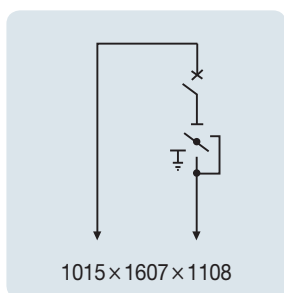


- Consists of two circuit LBS and one circuit Switch-Fuse in a single chamber
- Protects equipment using Switch Fuse
- Complete Sealing System
- Application of high grade OCR
- Increase durability through S/S application
- L: Load break switch
- C: Vacuum circuit breaker

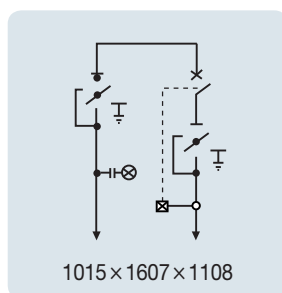
Applicable type

[W×H×D, mm]

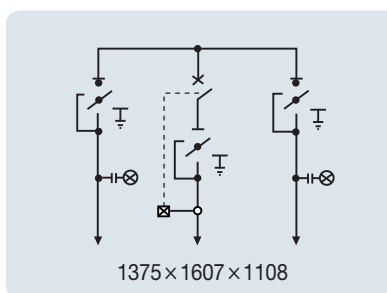
RC (1R1C)



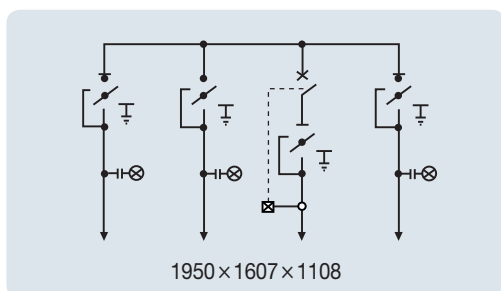
LC (1L1C)



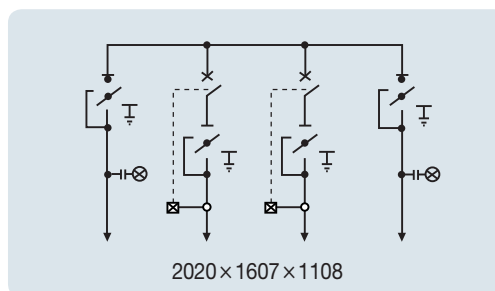
LCL (2L1C)



LLCL (3L1C)

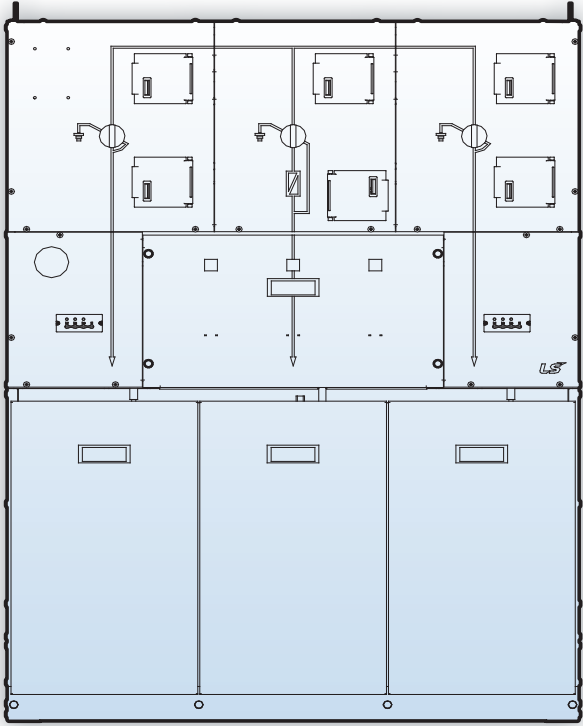


LCCL (2L2C)



Susol RMU

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

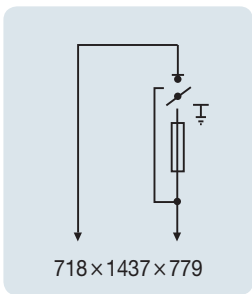


- Consists of two circuit LBS and one circuit Switch-Fuse in a single chamber
- Protects equipment using Switch Fuse
- Complete Sealing System
- Increase durability through S/S application
- L: Load break switch
- C: Vacuum circuit breaker

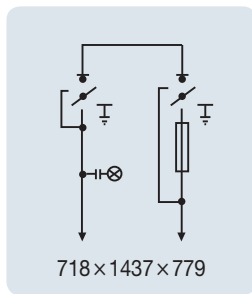
Applicable type

[W×H×D, mm]

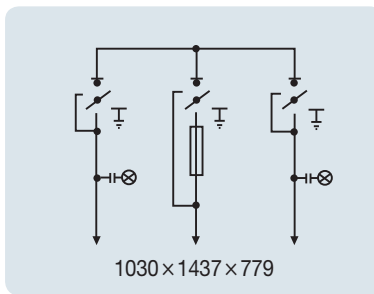
RF (1R1F)



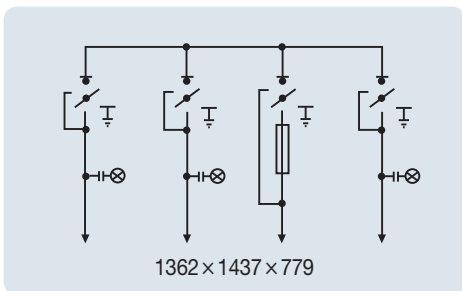
LF (1L1F)



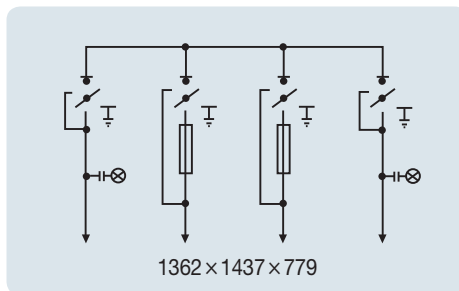
LFL (2L1F)



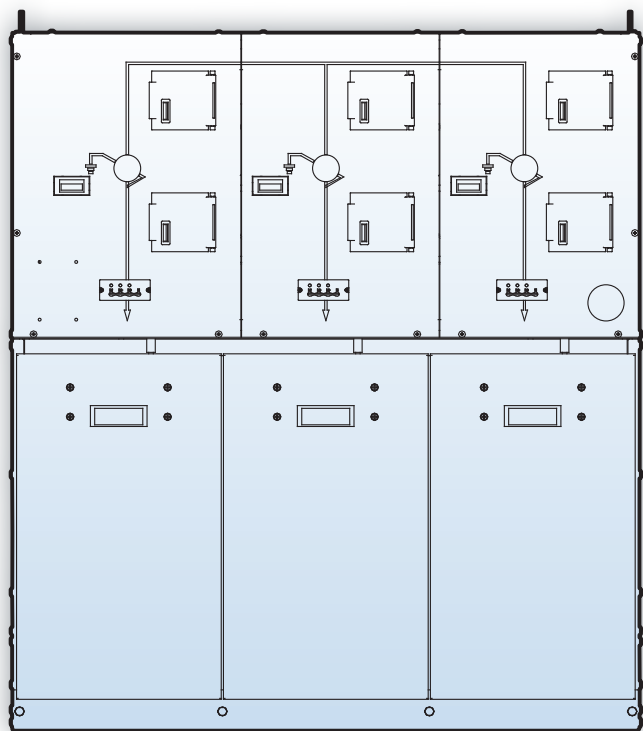
LLFL (3L1F)



LFFL (2L2F)



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

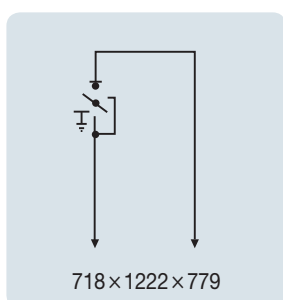


- Complete Sealing System
- Increase durability through S/S application
- L: Load break switch

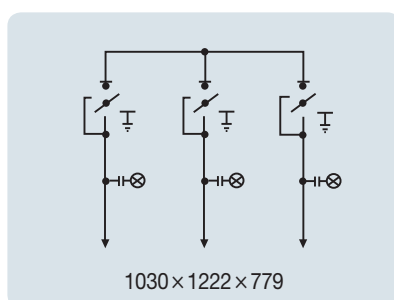
Applicable type

[W×H×D, mm]

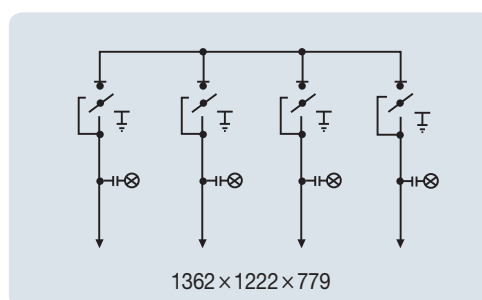
LR (1L1R)



LLL (3L)



LLLL (4L)



Susol RMU

Extensible RMU

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



12/17.5/24kV Extensible RMU

[W×H×D, mm]

R	L	C	F
411 × 1456 × 779	411 × 1456 × 779	521 × 1456 × 779	521 × 1456 × 779

Trip Relay

Standard OCR

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



1 LED: Indication of trip information and power status



2 Reset key: Trip initialization

Premium OCR

- Dual-powered protective relay
 - Self-Power (CT)
 - Auxiliary Power: AC/DC 100~220V 50/60Hz
- Overload protection
 - Low current region (definite/inverse time characteristics)
 - High current region (instantaneous time characteristic)

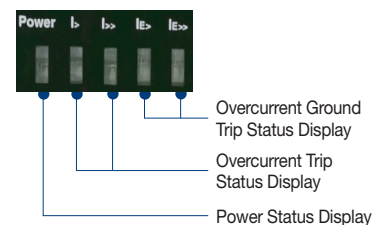


2 User interface button



- Ground fault protection
 - Low current region (definite/inverse time characteristics)
 - High current region (instantaneous time characteristic)
- LCD user interface
- Event/Fault history search function
 - 128 system events can be saved
 - 10 fault events can be saved
 - 1 fault waveform can be saved
- Remote monitoring function (RS-485 network)

1 LED: Indication of trip information and power status



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

Optional components

CT (Current transformer)

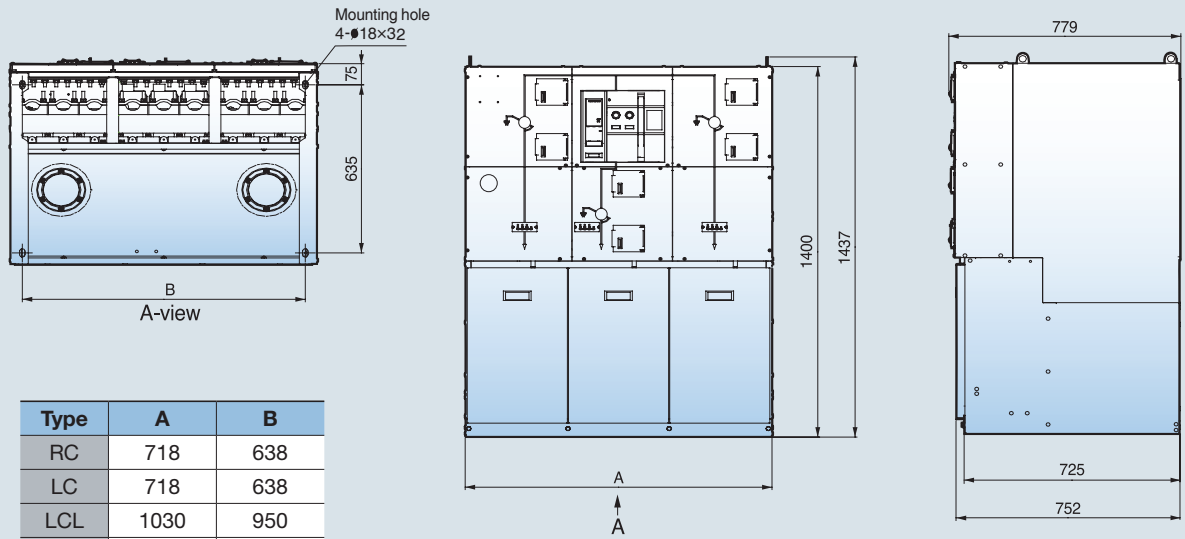


Max. system voltage	kV	0.6
Primary current	A	7.2 / 14/4 / 28.8 / 57.6 / 115.2 / 230.4
Secondary current	A	0.075
Rated burden	VA	0.1
Accuracy class		10P80
Short time-current	KA / 1s	21
Rated frequency	Hz	50 / 60

Susol RMU

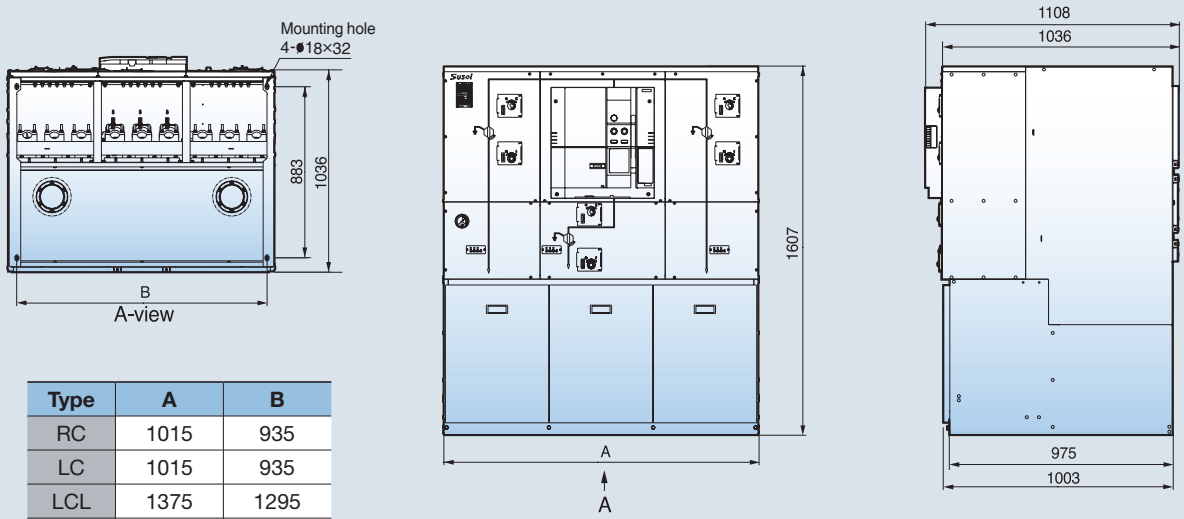
Dimensions

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



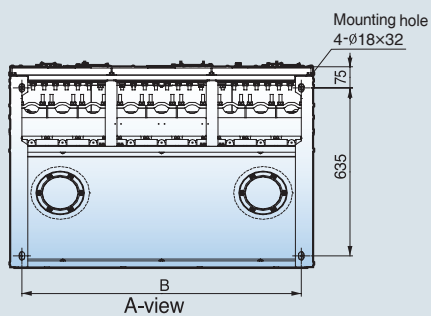
Type	A	B
RC	718	638
LC	718	638
LCL	1030	950
LLCL	1362	1282
LCCL	1362	1282

36kV Non-Extensible CB Feeder RMU

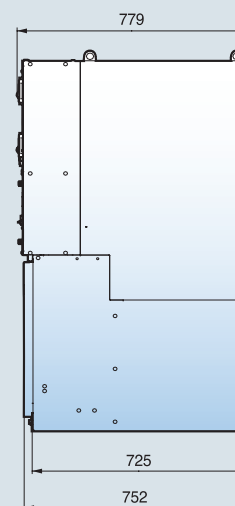
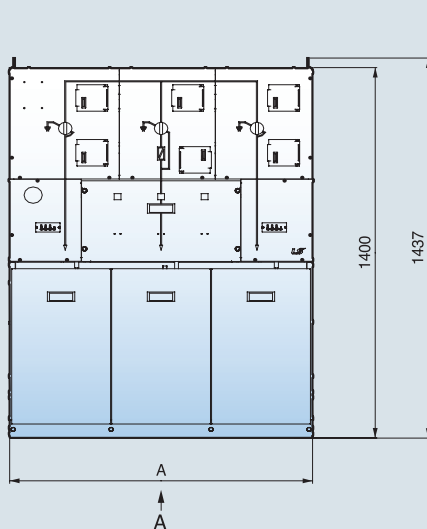


Type	A	B
RC	1015	935
LC	1015	935
LCL	1375	1295
LLCL	1950	1870
LCCL	2020	1940

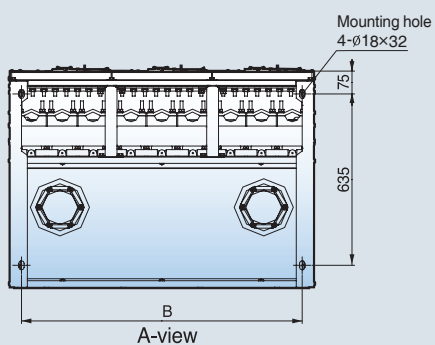
12/17.5/24kV Non-Extensible Switch-Fuse Feeder RMU



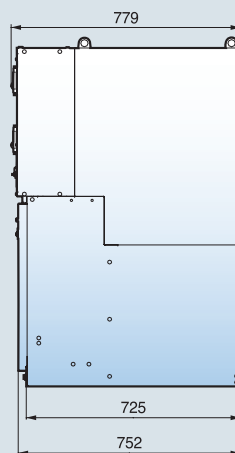
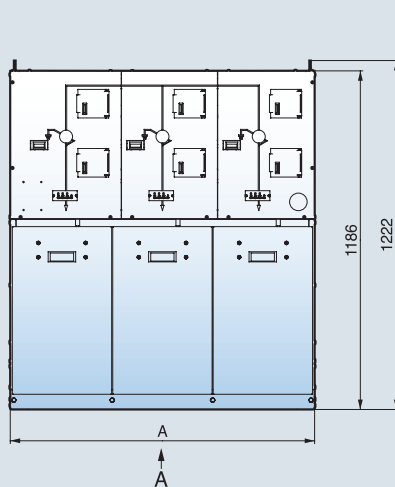
Type	A	B
RF	718	638
LF	718	638
LFL	1030	950
LLFL	1362	1282
LFFL	1362	1282



36kV Non-Extensible CB Feeder RMU



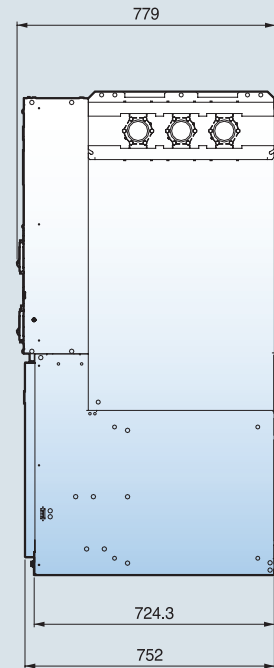
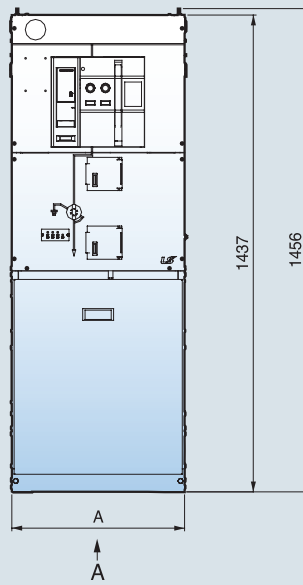
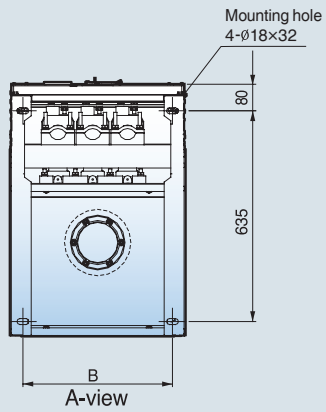
Type	A	B
LR	718	638
LLL	1030	950
LLLL	1362	1282



Susol RMU

Dimensions

12/17.5/24kV Extensible RMU



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

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.



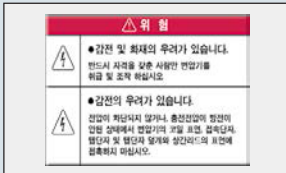
Grounding terminal

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.



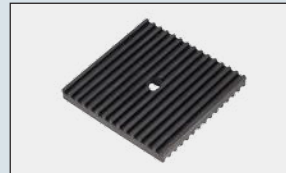
Danger mark

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 transformer.



Cushion rubber

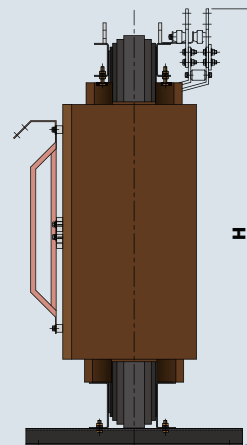
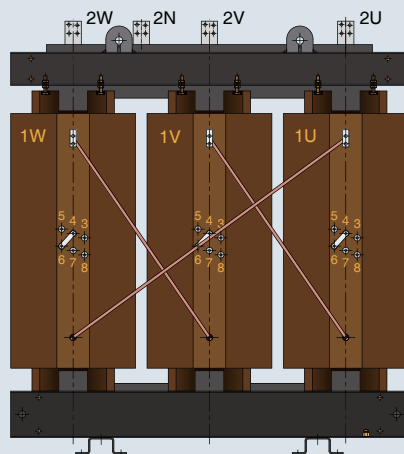
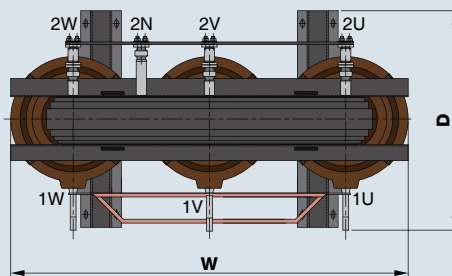
Insert cushion rubber between the transformer bed frame and the ground to prevent iron core vibrations from transferring to the floor during operation to reduce noises.



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 trans-formers, 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.**

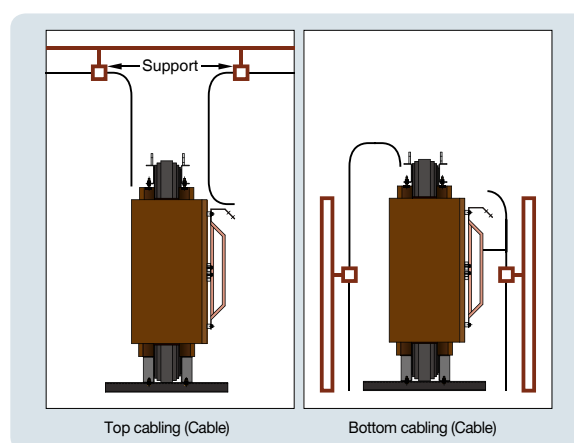
- **Torque management when connecting the low voltage terminal**

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.

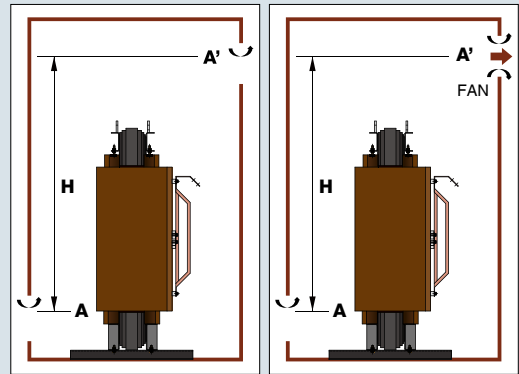
Forced ventilation

- 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 (m)
- A' : Required outlet area (m)
- $\Delta \theta a$: 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.

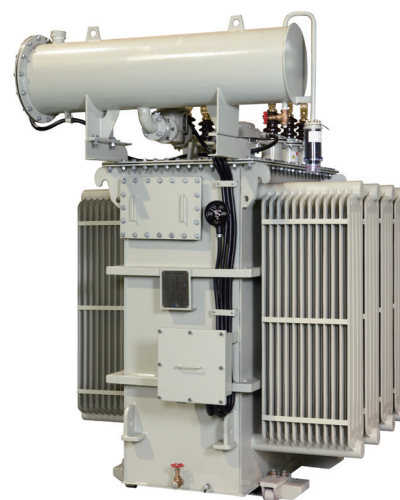
A/S requesting method

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



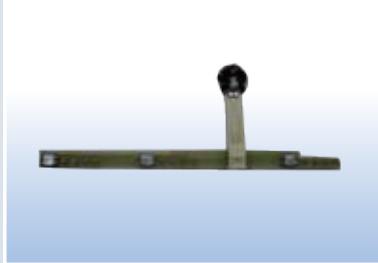
LSIS transformer adopts a structure that can reduce the loss, and it ensures the electrical stability of the transformer by selecting the high efficiency and the optimum insulation structure. Also, it realizes the optimum cooling system, seismic condition considering the short-circuit mechanical power 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°C
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.

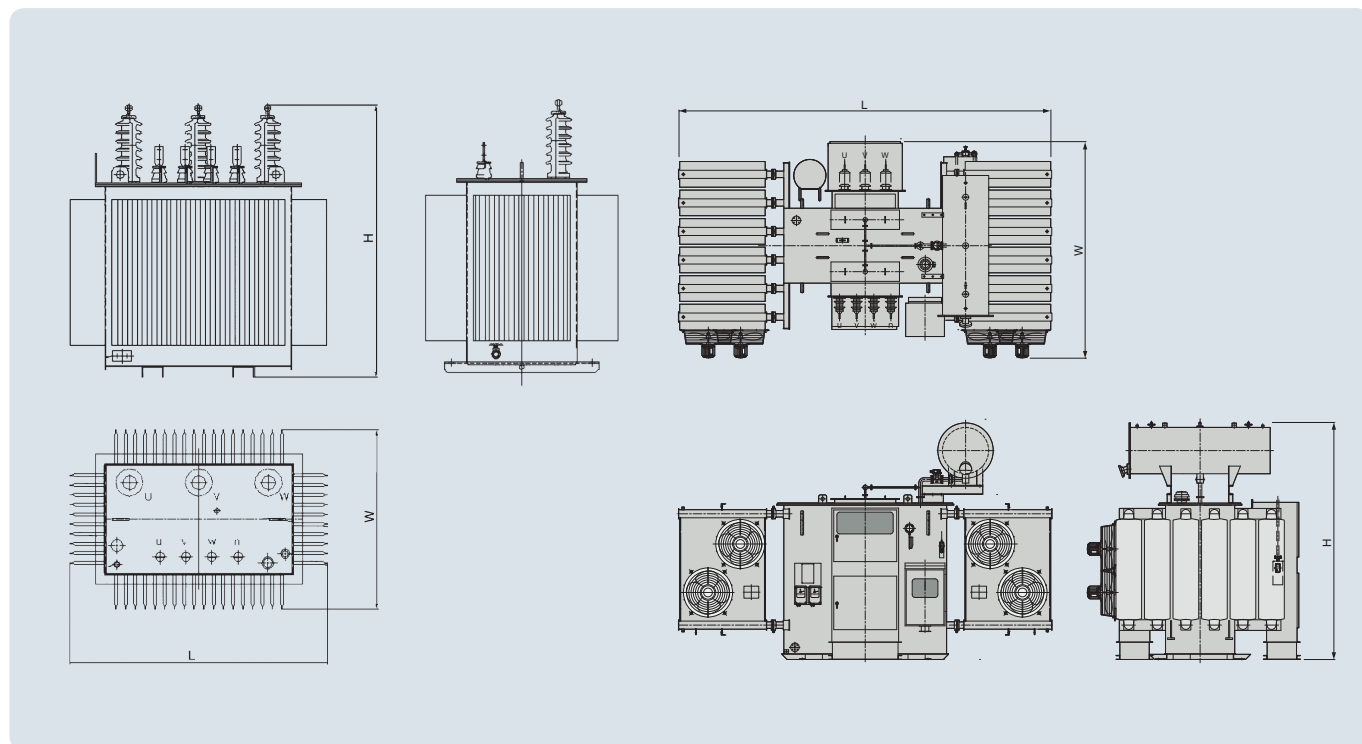
* 3000kVA or less is not required.



Ratings

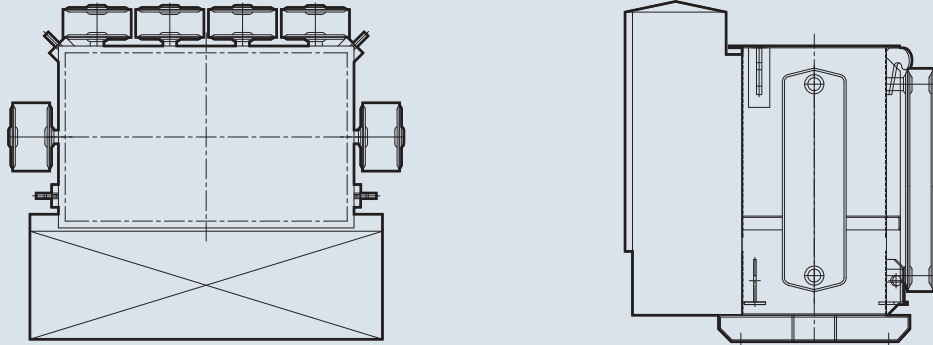
Applicable specifications	
Applicable standard	ANSI, IEEE, NEMA and IEC
Voltage	Up to 138kV
Capacity	Up to 50MVA
Available fluids	Mineral oil, silicon oil and FR3 (Vegetable oil)
Tap changer type	DETC and OLTC

Dimensions



Oil-Immersed Transformer

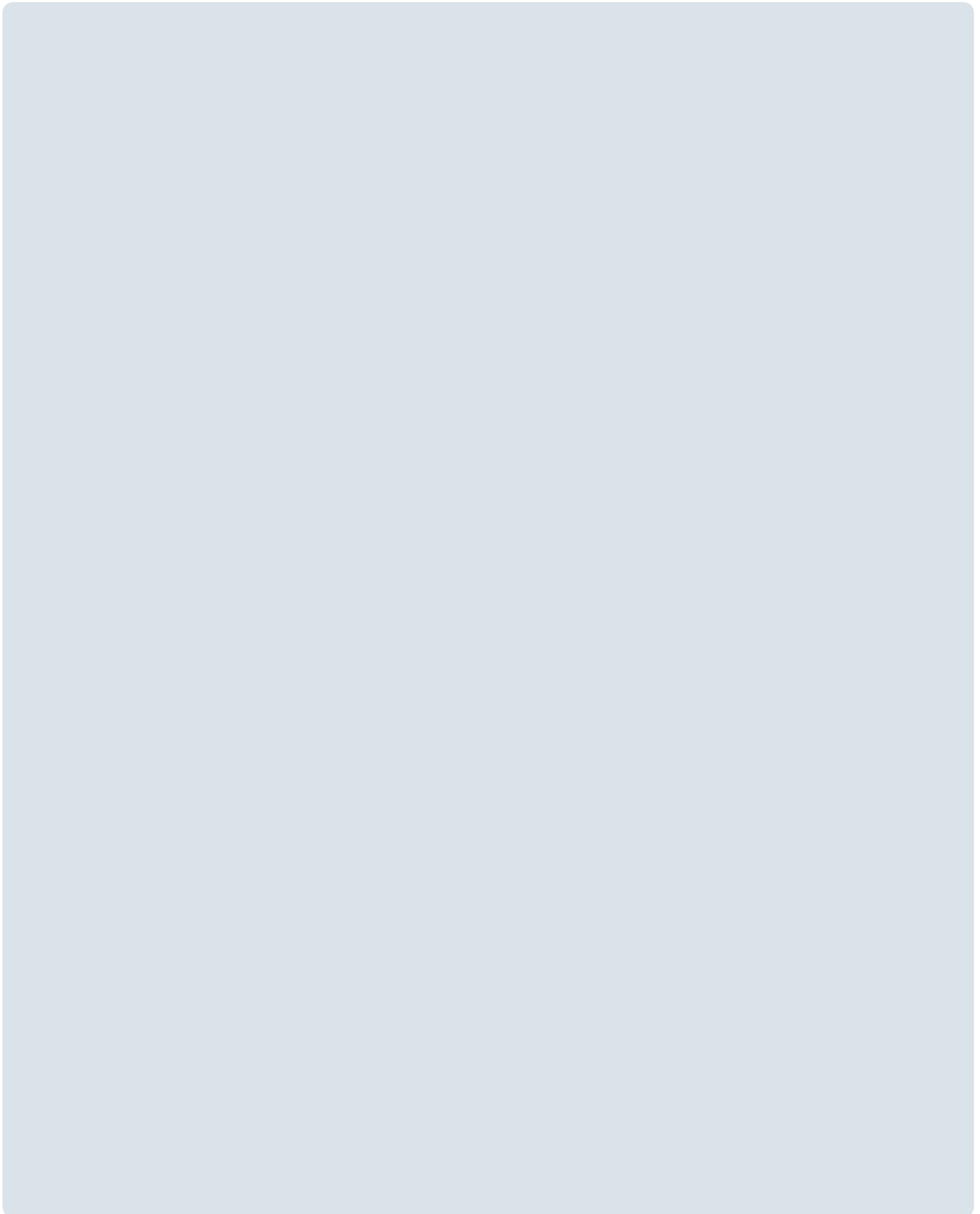
Dimensions



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.

F*FUTURING SMART ENERGY*

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.



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



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Technical Question or After-sales Service

Customer Center-Quick Responsive Service, Excellent technical support

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