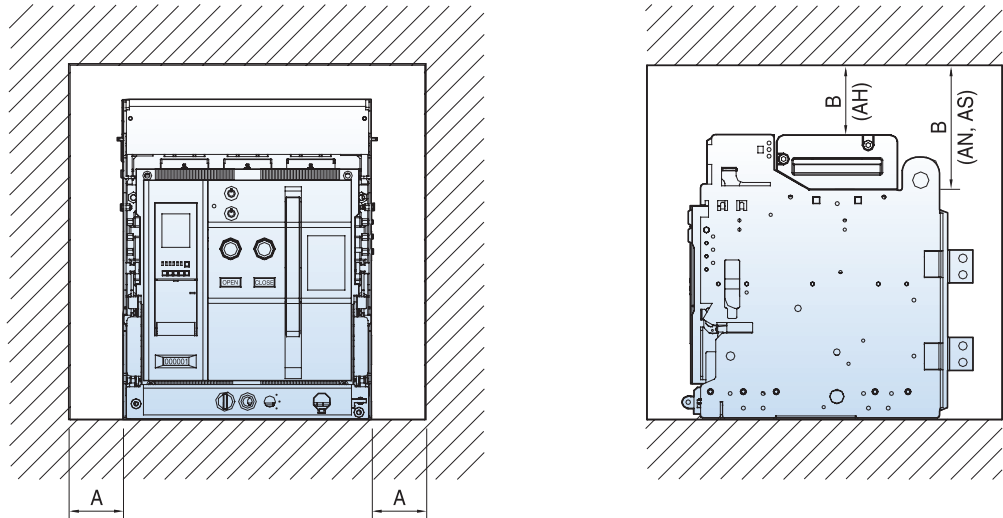


# Technical information

Susol · Metasol

## Insulation voltage

You should keep the isolation distance between ACB and panel as below table.

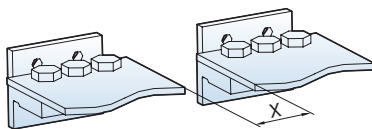


Type		A	B
Fixed	AN/AS	50	150
	AH	50	150
Draw out	AN/AS	50	150
	AH	50	0

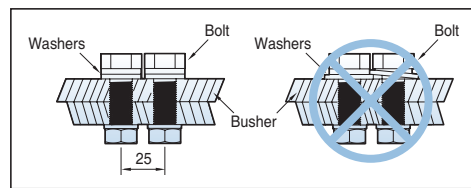
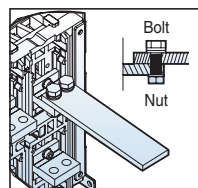
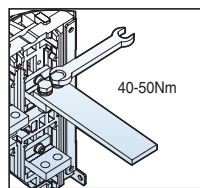
Note) When drawing the distribution panel, it is available to use regardless of the distance between ACB and the wall of the panel because Susol ACB(draw-in/out type) extinguishes the arc in the Arc Chute and Arc Cover clearly.

## Minimum isolation distance

For the safety, all the electric charging parts need to be installed over minimum isolation distance.





Insulating voltage (Ui)	Minimum isolation distance (X min)
600V	8 mm
1000V	14 mm



Screw type	Tightening torque			
	Standard(kgf-cm)	Tolerance	Standard(N.m)	Tolerance
M8	135	±16	13.3	±1.6
M10	270	±32	26.5	±3.2
M12	480	±57	46.6	±5.6

## Temperature derating

The table below indicates the maximum current rating, for each connection type, as a function of the ambient temperature around the circuit breaker and the busbars. Circuit breakers with mixed connections have the same derating as horizontally connected breakers. For ambient temperatures greater than 60°C, consult us. Temperature inside the switchboard around the circuit breaker and its connection: T<sub>i</sub>(IEC 60947-2)

Frame	Rated current	ACB terminal	Applicable busbar size															
				Horizontal type					Vertical type									
				40°C	45°C	50°C	55°C	60°C	40°C	45°C	50°C	55°C	60°C					
1600AF AN-D AS-D AH-D	200A	15t×50×1EA	5t×50×1EA	200A	200A	200A	200A	200A	200A	200A	200A	200A	200A	200A				
	400A			400A	400A	400A	400A	400A	400A	400A	400A	400A	400A	400A				
	630A		5t×50×2EA 10t×60×1EA	630A	630A	630A	630A	630A	630A	630A	630A	630A	630A	630A	630A			
				800A	6t×50×2EA 10t×60×1EA	800A	800A	800A	800A	800A	800A	800A	800A	800A	800A	800A		
	1,000A		8t×50×2EA			1000A	1000A	1000A	1000A	1000A	1000A	1000A	1000A	1000A	1000A	1000A		
				1,250A	6t×75×2EA 8t×60×2EA 10t×50×2EA	-	-	-	-	-	1250A	1250A	1250A	1250A	1250A	1250A		
	1,600A		6t×75×3EA 10t×60×2EA 8t×60×3EA			-	-	-	-	-	1600A	1600A	1580A	1550A	1500A			
						1600A	1600A	1520A	1480A	1420A	1600A	1600A	1580A	1550A	1500A			
	2000AF AS/AH-D		2,000A	15t×75×1EA	8t×75×3EA 10t×100×2EA	-	-	-	-	-	2000A	2000A	1940A	1860A	1780A			
	3200AF AS-E AH-E		630A	20t×75×1EA	5t×50×2EA 10t×60×1EA	630A	630A	630A	630A	630A	630A	630A	630A	630A	630A	630A		
800A		6t×50×2EA 10t×60×1EA				800A	800A	800A	800A	800A	800A	800A	800A	800A	800A	800A		
			1,000A		8t×50×2EA	1000A	1000A	1000A	1000A	1000A	1000A	1000A	1000A	1000A	1000A	1000A		
1,250A		6t×75×2EA 8t×60×2EA 10t×50×2EA				-	-	-	-	-	1250A	1250A	1250A	1250A	1250A	1250A		
			1,600A		6t×75×3EA 10t×60×2EA 8t×60×3EA	-	-	-	-	-	1600A	1600A	1600A	1600A	1600A			
						1600A	1600A	1600A	1600A	1600A	1600A	1600A	1600A	1600A	1600A			
2,000A		8t×75×3EA 10t×100×2EA	2000A		2000A	2000A	2000A	2000A	2000A	2000A	2000A	2000A	2000A	2000A	2000A			
			2,500A		2500A	2500A	2500A	2400A	2300A	2500A	2500A	2500A	2500A	2500A	2400A			
3,200A		10t×75×3EA 8t×75×4EA 10t×100×3EA 10t×75×4EA	-		-	-	-	-	3200A	3200A	3100A	3000A	2900A	3200A	3200A	3120A	3050A	2950A
			3200A		3200A	3100A	3000A	2900A	3200A	3200A	3100A	3000A	2900A	3200A	3200A	3120A	3050A	2950A
4000AF AS/AH-E	4,000A	10t×100×3EA	10t×100×4EA 10t×75×5EA	-	-	-	-	-	4000A	4000A	3950A	3800A	3680A					
5000AF AS-F	4,000A	20t×125×2EA	10t×100×4EA	4000A	4000A	3920A	3860A	3800A	4000A	4000A	3960A	3900A	3880A					
	5,000A		10t×125×4EA	5000A	5000A	4900A	4800A	4700A	5000A	5000A	4950A	4900A	4850A					
6300AF AS-G AH-G	4,000A	20t×125×2EA	10t×100×4EA	4000A	4000A	4000A	4000A	4000A	4000A	4000A	4000A	4000A	4000A					
	5,000A		10t×125×4EA	5000A	5000A	4900A	4820A	4750A	5000A	5000A	4950A	4870A	4850A					
6,300A	20t×150×2EA	10t×150×4EA	6300A	6300A	6170A	6040A	5900A	6300A	6300A	6220A	6160A	6100A						

## Operating conditions

### Ambient temperature

ACB devices can operate under the following temperature conditions

- The electrical and mechanical characteristics are stipulated for an ambient temperature of -5°C to +40°C
- The average temperature should be within + 35°C
- Reduce the continuous conducting current when the temperature is over 45°C (refer to temperature derating)
- Storage condition : -20°C to + 60°C is recommended.

### Altitude

Susol ACB is designed for operation at altitudes under 2000m. At altitudes higher than 2000m, emitting heat is lowered and operating voltage, continuous current capacity, and breaking capacity will be reduced. Durability of the insulation is also reduced according to the atmosphere pressure.

According to the below table, change the ratings upon a service condition.

Item	Altitude [m]	2000m	3000m	4000m	5000m
Withstand voltage [V]		3500	3150	2500	2100
Average insulating voltage [V]		1000	900	700	600
Max. using voltage [V]		690	590	520	460
Current compensation constant		1×In	0.98×In	0.96×In	0.94×In

### Environment

Under clean air;

Maximum temperature + 40°C (relative humidity should be under 85%)

Maximum temperature + 20°C (relative humidity should be under 90%)

Do not apply under corrosive or ammonia gas circumstances

(H<sub>2</sub>S ≤ 0.01ppm, SO<sub>2</sub> ≤ 0.01ppm, NH<sub>3</sub> ≤ a few ppm)

#### \* Extreme atmosphere conditions

Under high temperature and/or high humidity, the insulation durability, electrical and mechanical features could be deteriorated. At this conditions, increasing corrosion-resistant dealing needs. Corrosion-resistant parts need under this conditions.

### Internal resistance and power consumption (per pole)

AF	Rated current (A)	Fixed type		Draw-out type	
		Inner resistance (mΩ)	Power consumption (W/3Phase)	Inner resistance (mΩ)	Power consumption (W/3Phase)
AN-16D	630	0.02	24	0.04	48
	800	0.02	38	0.04	77
	1,000	0.02	60	0.04	120
	1,250	0.02	94	0.04	188
	1,600	0.02	154	0.04	307
AH/AS-20D	630	0.015	18	0.03	36
	800	0.015	29	0.03	58
	1,000	0.015	45	0.03	90
	1,250	0.015	70	0.03	141
	1,600	0.015	115	0.03	230
AH/AS-32E	2,000	0.013	156	0.027	324
	2,000	0.01	120	0.02	240
	2,500	0.01	188	0.02	375
AH/AS-40E	3,200	0.01	307	0.02	614
	2,000	0.01	120	0.02	240
	2,500	0.01	188	0.02	375
AH/AS-40E	3,200	0.01	307	0.02	614
	4,000	0.008	384	0.011	528
	4,000	0.008	384	0.011	528
AS-50F	5,000	0.008	600	0.011	825
	4,000	0.006	288	0.009	432
AH/AS-63G	5,000	0.006	450	0.009	675
	6,300	0.005	595	0.007	833

Note) 1. Above power consumption is whole power consumption for each Rated current, 50/60Hz, 3/4pole.  
2. This is inner assistant value per 1 pole.

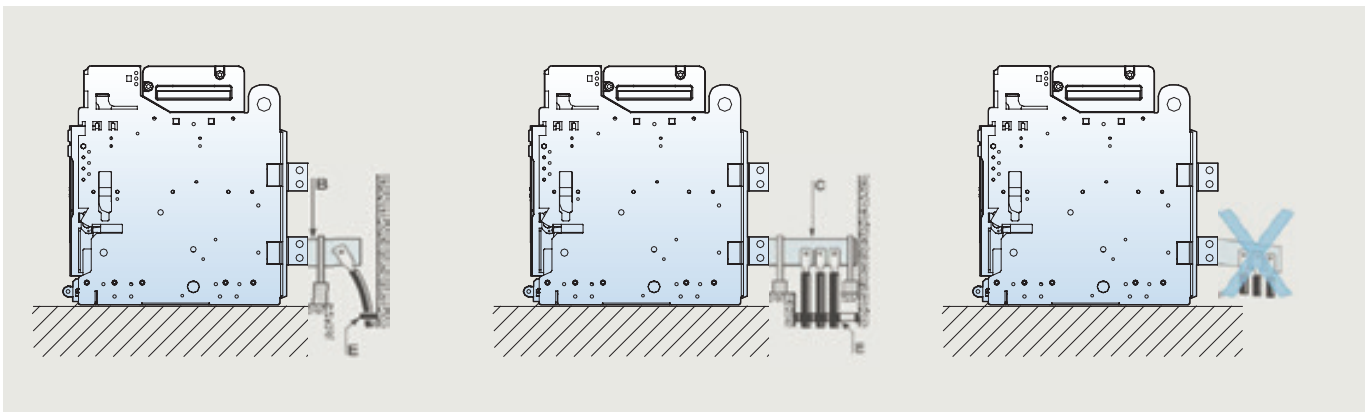
3. Power factor = 1.0

## Installation recommendation

### BUS-BAR Connection

#### Cables connections

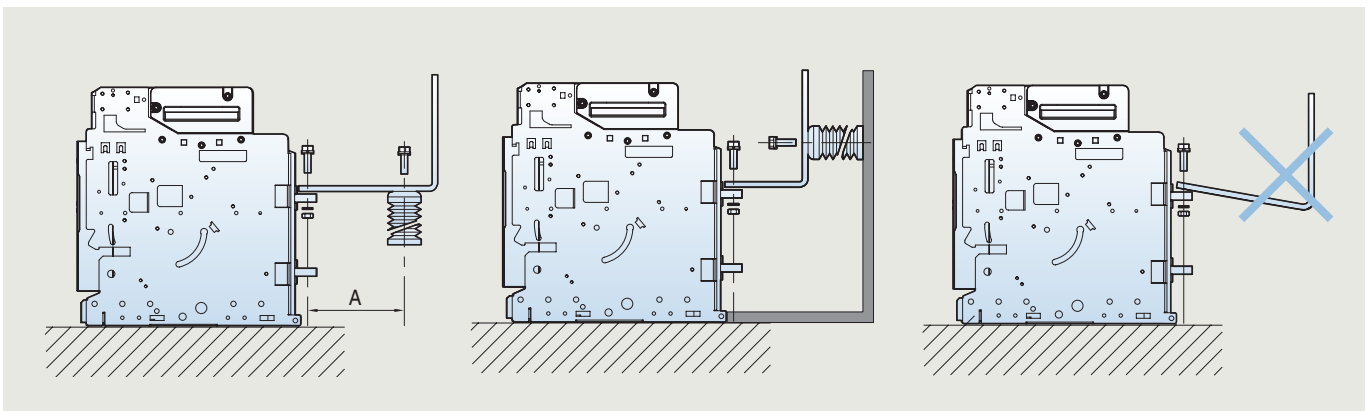
Make sure that no excessive mechanical force put on the rear terminals for cable connection. Extension terminal is fixed such as B, C and cable is to fixed to the frame such as E



#### Bus-bar connection

For busbar connection, connect access parts with a provided torque and fix with parallel installing the support not to apply terminal weight to circuit breaker.

In order to prevent the spread safety or secondary accidents, secure maximum safe distance A (Table 1) from the access area to withstand the electrical force during the short circuit faults.

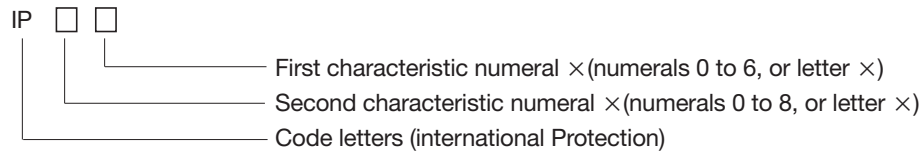


(Table 1) Maximum safe distance A

Short capacity (kA)	30	50	65	80	100	150
Length A (mm)	350	300	250	150	150	150

## Installation recommendation

### Protection degree provided by enclosures (IP Code) IEC 60529



#### First characteristic numeral

	Degree of protection	
	Brief description	Definition
0	Non-protected	-
1	Protected against solid foreign objects of 50mm Ø and greater	The object probe sphere of 50mm Ø, shall not fully penetrate
2	Protected against solid foreign objects of 12.5mm Ø and greater	The object probe sphere of 12.5mm Ø, shall not fully penetrate
3	Protected against solid foreign objects of 2.5mm Ø and greater	The object probe sphere of 2.5mm Ø, shall not penetrate at all
4	Protected against solid foreign objects of 1.0mm Ø and greater	The object probe of 1.0mm Ø, shall not penetrate at all
5	Dust-protected	Ingress of dust is not totally prevented, but dust shall not penetrate in a quantity to interfere with satisfactory operation of the apparatus or to impair safety
6	Dust-tight	No ingress of dust

#### Second characteristic numeral

	Degree of protection	
	Brief description	Definition
0	Non-protected	-
1	Protected against vertically falling water drops	Vertically falling drops shall have no harmful effects
2	Protected against vertically falling water drops when enclosure tilted up to 15°	Vertically falling drops shall have no harmful effects when the enclosure is tilted at any angle up to 15° on either side of the vertical
3	Protected against spraying water	Water sprayed at an angle up to 60° on either side of the vertical shall have no harmful effects
4	Protected against spraying water	Water splashed against the enclosure from any direction shall have no harmful effects
5	Protected against spraying jets	Water projected in powerful jets against the enclosure from any direction shall have no harmful effects
6	Protected against powerful water jets	Water projected in powerful jets against the enclosure from any direction shall have no harmful effects
7	Protected against the effects of temporary immersion in water	Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is temporarily immersed in water under standardized conditions of pressure and time
8	Protected against the effects of continuous immersion in water	Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is continuously immersed in water under conditions which shall be agreed between manufacturer and user but which are more severe than for numeral 7

## Derating table

ambient temperature outside of the switchboard: Ta (IEC 60439-1)

Switchboard composition (2300×800×900)												
Connection type		Model type AS/AH-06/08E, AN-06/08D					AS/AH-10E, AN-10D					
Model type		2EA-50×6					2EA-50×8					
Busbar dimensions(mm)		2EA-50×6					2EA-50×8					
Ventilated switchboard(IP31)  Area of outlet vents: 350cm <sup>2</sup> Area of inlet vents: 350cm <sup>2</sup>	Ta=35°C	4					800 ↓					
		3					800 ↓	800 ↓				1000
		2			800 ↓	800 ↓	800 ↓				1000	1000
		1	800 ↓	800 ↓	800 ↓	800 ↓	800 ↓	800 ↓	1000	1000	1000	1000
	Ta=45°C	4					800 ↓					
		3					800 ↓	800 ↓				1000
		2			800 ↓	800 ↓	800 ↓				1000	1000
		1	800 ↓	800 ↓	800 ↓	800 ↓	800 ↓	800 ↓	1000	1000	1000	1000
	Ta=55°C	4					800 ↓					
		3					800 ↓	800 ↓				1000
		2			800 ↓	800 ↓	800 ↓				1000	1000
		1	800 ↓	800 ↓	800 ↓	800 ↓	800 ↓	800 ↓	1000	1000	1000	1000
Non Ventilated switchboard(IP41/54) 	Ta=35°C	4					800 ↓					
		3					800 ↓	800 ↓				1000
		2			800 ↓	800 ↓	800 ↓				1000	1000
		1	800 ↓	800 ↓	800 ↓	800 ↓	800 ↓	800 ↓	1000	1000	1000	1000
	Ta=45°C	4					800 ↓					
		3					800 ↓	800 ↓				1000
		2			800 ↓	800 ↓	800 ↓				1000	1000
		1	800 ↓	800 ↓	800 ↓	800 ↓	800 ↓	800 ↓	1000	1000	1000	1000
	Ta=55°C	4					800 ↓					
		3					800 ↓	800 ↓				1000
		2			800 ↓	800 ↓	800 ↓				1000	1000
		1	800 ↓	800 ↓	800 ↓	800 ↓	800 ↓	800 ↓	1000	1000	1000	1000

# Technical information

Susol · Metasol

## Installation recommendation

### Derating table

ambient temperature outside of the switchboard: Ta (IEC 60439-1)

Switchboard composition (2300×800×900)									
Connection type									
Model type		AS/AH-13E, AN-13D				AS/AH-16E, AN-16D			
Busbar dimensions(mm)		2EA-75×6				2EA-60×10			
<b>Ventilated switchboard(IP31)</b>  Area of outlet vents: 350cm <sup>2</sup> Area of inlet vents: 350cm <sup>2</sup>	Ta=35℃	4							
		3				1250			
		2			1250	1250			1600
		1	1250	1250	1250	1250	1600	1600	1600
	Ta=45℃	4							
		3				1250			
		2			1250	1250			1600
		1	1250	1250	1250	1250	1600	1600	1600
	Ta=55℃	4							
		3				1250			
		2			1250	1250			1470
		1	1250	1250	1250	1250	1500	1600	1600
<b>Non Ventilated switchboard(IP41/54)</b> 	Ta=35℃	4							
		3				1250			
		2			1250	1250			1600
		1	1250	1250	1250	1250	1600	1600	1600
	Ta=45℃	4							
		3				1250			
		2			1250	1250			1500
		1	1250	1250	1250	1250	1480	1600	1600
	Ta=55℃	4							
		3				1250			
		2			1250	1250			1400
		1	1250	1250	1250	1250	1400	1520	1500

## Derating table

ambient temperature outside of the switchboard: Ta (IEC 60439-1)

Switchboard composition (2300×800×900)										
Connection type										
Model type		AS/AH-20E,			AS/AH-25E		AS/AH-32E		AS/AH-40E	
Busbar dimensions(mm)		2EA-75×10			3EA-75×10		4EA-75×10		4EA-75×10	
Ventilated switchboard(IP31)  Area of outlet vents: 350cm <sup>2</sup> Area of inlet vents: 350cm <sup>2</sup>	Ta=35℃	4								
		3			2000					
		2	2000	2000	2000	2400	2500	3100	3200	3750
	Ta=45℃	4								
		3			2000					
		2	2000	2000	2000	2300	2400	2900	3100	3550
	Ta=55℃	4								
		3			2000					
		2	2000	2000	2000	2200	2300	2700	2900	3300
Non Ventilated switchboard(IP41/54) 	Ta=35℃	4								
		3			2000					
		2	2000	2000	2000	2115	2275	2650	2850	3320
	Ta=45℃	4								
		3			1900					
		2	1900	1960	1960	2000	2150	2550	2700	3120
	Ta=55℃	4								
		3			1780					
		2	1800	1920	1920	1900	2020	2370	2530	2960
		1								





# Technical information

Susol · Metasol

## Installation recommendation

### Derating table

ambient temperature outside of the switchboard: Ta (IEC 60439-1)

Switchboard composition (2300×800×900)		AS-40F		AS-50F		AS/AH-40G		AS/AH-50G		AS/AH-63G	
Connection type		AS-40F		AS-50F		AS/AH-40G		AS/AH-50G		AS/AH-63G	
Model type		AS-40F		AS-50F		AS/AH-40G		AS/AH-50G		AS/AH-63G	
Busbar dimensions(mm)		4EA-100×10		4EA-125×10		4EA-100×10		4EA-125×10		4EA-150×10	
Ventilated switchboard(IP31)  Area of outlet vents: 500cm <sup>2</sup> Area of inlet vents: 500cm <sup>2</sup>	Ta=35°C	4									
		3									
		2	3900	4000	4750	4800	4000	4000	4750	5000	5850
		1									
	Ta=45°C	4									
		3									
		2	3850	3900	4350	4650	4000	4000	4450	4850	5670
		1									
	Ta=55°C	4									
		3									
		2	3800	3850	4200	4400	4000	4000	4200	4600	5350
		1									
Non Ventilated switchboard(IP41/54) 	Ta=35°C	4									
		3									
		2	3800	3900	4200	4550	4000	4000	4400	4650	5290
		1									
	Ta=45°C	4									
		3									
		2	3650	3800	3950	4250	4000	4000	4100	4400	5040
		1									
	Ta=55°C	4									
		3									
		2	3550	3650	3700	4050	3900	3950	3850	4150	4730
		1									

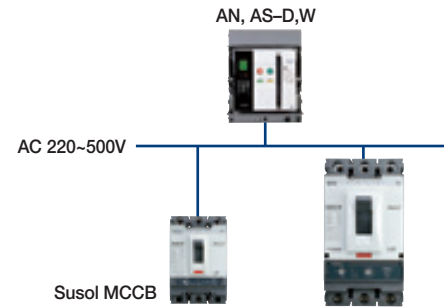
## Protective coordination

Rated voltage: AC 220~500V

Main breaker(Main ACB): Metasol ACB

Downstream breaker(Downstream MCCB): Susol MCCB TD/TS series

Below protective coordination table is based on ACB equipped with OCR under arrangement of short time delay trip current as 10 times of rated current.



Upstream breaker		Product type	Metasol AN, AS series												
			AN, AS-D,W										AS-F,Y		
			AN, AS-06D			AN, AS-06D			AN, AS-10D	AN, AS-13D	AN, AS-13D	AN, AS-16D	AS-40F	AS-50F	
			Rated current [A]	200	400	630	400	630	800	1000	1250	1600	2000	4000	5000
Downstream breaker		Short time delay trip current (Max. 10In) Is[kA]	2	4	6.3	4	6.3	8	10	12.5	16	20	40	50	
			Model	Rated current [A]	Ultimate breaking capacity Icu [kA]	AN : 65kA / AS : 70kA									
Susol MCCB	TD100N	100	85	T	T	T	T	T	T	T	T	T	T	T	T
	TD100H	100	100	T	T	T	T	T	T	T	T	T	T	T	T
	TD100L	100	200	T	T	T	T	T	T	T	T	T	T	T	T
	TD160N	160	85	T	T	T	T	T	T	T	T	T	T	T	T
	TD160H	160	100	T	T	T	T	T	T	T	T	T	T	T	T
	TD160L	160	200	T	T	T	T	T	T	T	T	T	T	T	T
	TS100N	100	100	T	T	T	T	T	T	T	T	T	T	T	T
	TS100H	100	120	T	T	T	T	T	T	T	T	T	T	T	T
	TS100L	100	200	T	T	T	T	T	T	T	T	T	T	T	T
	TS160N	160	100	T	T	T	T	T	T	T	T	T	T	T	T
	TS160H	160	120	T	T	T	T	T	T	T	T	T	T	T	T
	TS160L	160	200	T	T	T	T	T	T	T	T	T	T	T	T
	TS250N	250	100	-	T	T	T	T	T	T	T	T	T	T	T
	TS250H	250	120	-	T	T	T	T	T	T	T	T	T	T	T
	TS250L	250	200	-	T	T	T	T	T	T	T	T	T	T	T
	TS400N	400	100	-	-	T	-	T	T	T	T	T	T	T	T
	TS400H	400	120	-	-	T	-	T	T	T	T	T	T	T	T
	TS400L	400	200	-	-	T	-	T	T	T	T	T	T	T	T
	TS630N	630	100	-	-	-	-	-	T	T	T	T	T	T	T
	TS630H	630	120	-	-	-	-	-	T	T	T	T	T	T	T
TS630L	630	200	-	-	-	-	-	T	T	T	T	T	T	T	
TS800N	800	100	-	-	-	-	-	-	T	T	T	T	T	T	
TS800H	800	120	-	-	-	-	-	-	T	T	T	T	T	T	
TS800L	800	200	-	-	-	-	-	-	T	T	T	T	T	T	

Note) 1. On table, protective coordination is not available for areas where number is missing.  
 2. On table, areas that is marked as T are capable of total discrimination up to its Downstream breaker's rated short breaking capacity.

# Technical information

Metasol

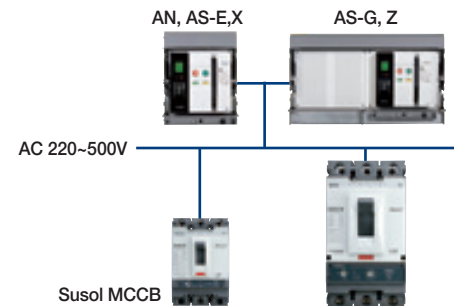
## Protective coordination

Rated voltage: AC 220~500V

Main breaker(Main ACB): Metasol ACB

Downstream breaker(Downstream MCCB): Susol MCCB TD/TS series

Below protective coordination table is based on ACB equipped with OCR under arrangement of short time delay trip current as 10 times of rated current.



Upstream breaker		Product type	Metasol AN, AS series													
			AN, AS-E,X										AS-G,Z			
			AS-06E		AS-08E	AS-10E	AS-13E	AS-16E	AN, AS-20E	AN, AS-25E	AN, AS-32E	AS-40E	AS-40G	AS-50G	AS-63G	
Downstream breaker	Rated current [A]	400	630	800	1000	1250	1600	2000	2500	3200	4000	4000	5000	6300		
	Short time delay trip current (Max. 10In) Is[kA]	4	6.3	8	10	12.5	16	20	25	32	40	40	50	63		
Model	Rated current [A]	Ultimate breaking capacity Icu [kA]	AN: 70kA / AS: 85kA										AS: 120kA			
Susol MCCB	TD100N	100	85	T	T	T	T	T	T	T	T	T	T	T	T	T
	TD100H	100	100	T	T	T	T	T	T	T	T	T	T	T	T	T
	TD100L	100	200	T	T	T	T	T	T	T	T	T	T	T	T	T
	TD160N	160	85	T	T	T	T	T	T	T	T	T	T	T	T	T
	TD160H	160	100	T	T	T	T	T	T	T	T	T	T	T	T	T
	TD160L	160	200	T	T	T	T	T	T	T	T	T	T	T	T	T
	TS100N	100	100	T	T	T	T	T	T	T	T	T	T	T	T	T
	TS100H	100	120	T	T	T	T	T	T	T	T	T	T	T	T	T
	TS100L	100	200	T	T	T	T	T	T	T	T	T	T	T	T	T
	TS160N	160	100	T	T	T	T	T	T	T	T	T	T	T	T	T
	TS160H	160	120	T	T	T	T	T	T	T	T	T	T	T	T	T
	TS160L	160	200	T	T	T	T	T	T	T	T	T	T	T	T	T
	TS250N	250	100	T	T	T	T	T	T	T	T	T	T	T	T	T
	TS250H	250	120	T	T	T	T	T	T	T	T	T	T	T	T	T
	TS250L	250	200	T	T	T	T	T	T	T	T	T	T	T	T	T
	TS400N	400	100	-	T	T	T	T	T	T	T	T	T	T	T	T
	TS400H	400	120	-	T	T	T	T	T	T	T	T	T	T	T	T
	TS400L	400	200	-	T	T	T	T	T	T	T	T	T	T	T	T
	TS630N	630	100	-	-	T	T	T	T	T	T	T	T	T	T	T
	TS630H	630	120	-	-	T	T	T	T	T	T	T	T	T	T	T
TS630L	630	200	-	-	T	T	T	T	T	T	T	T	T	T	T	
TS800N	800	100	-	-	-	T	T	T	T	T	T	T	T	T	T	
TS800H	800	120	-	-	-	T	T	T	T	T	T	T	T	T	T	
TS800L	800	200	-	-	-	T	T	T	T	T	T	T	T	T	T	

Note) 1. On table, protective coordination is not available for areas where number is missing.  
 2. On table, areas that is marked as T are capable of total discrimination up to its Downstream breaker's rated short breaking capacity.