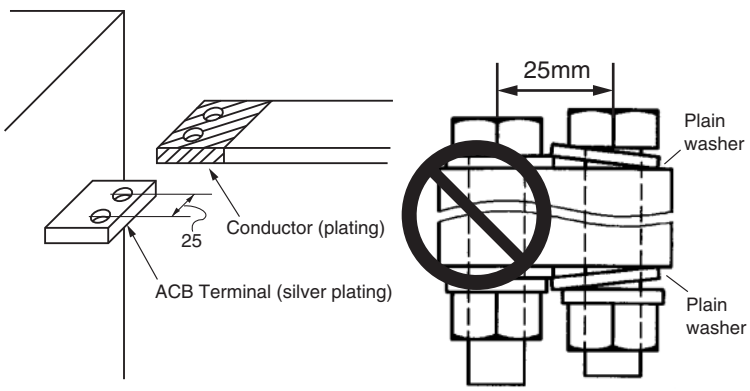
Pre-cautions when making connections

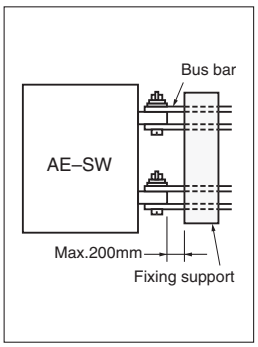
Use M12 bolts, plain washers, and spring lock washers to connect the conductor. There are various size plain washers, but use 24mm or smaller outside diameter washers. The washers may overlap if too large washers are used.
It is recommended to apply silver plating on the contact surface of the conductor which is used to connect with the terminal of circuit breakers in order to prevent the increase of contact resistance due to moisture, etc. Tin plating or nickel plating may be applied, but quickly connect with the circuit breaker terminal if nickel plating is applied because nickel plating is less resistant to sulfur dioxide gas.
Clean the contact surface and securely tighten the bolts with a correct torque (M12: 40 to 50 N•m).
The terminal which is applicable to connect the conductor is different depending on the shape of the terminal. Refer to the outline dimensions of P.39 to P.46.



Standard tightening torque

Screw size	Tightening torque(N•m)
M12	40~50

Since fault current flowing through the conductors cause large electromagnetic forces,the conductors should be secured firmly, using the values in the below table as a reference. Max distance between fixing support and ACB bus bar should be less than 200mm.



Electromagnetic force in N per 1m conductor
(in the case of three phase short circuit) (N)

Type / Conductor distance(mm) / Prospective fault current kA(pf)	AE630-SW~ AE1600-SW	AE2000-SWA		AE2000-SW~ AE3200-SW	AE4000-SWA				AE4000-SW~ AE6300-SW
					Drawout type		Fixed type		
		3-Pole	4-Pole		3-Pole	4-Pole	3-Pole	4-Pole	
	85	115	105	130	190	170	152	145	262
30(0.2)	7700	5700	6300	5100	3500	3900	4300	4500	2500
42(0.2)	15100	11200	12200	9900	6800	7600	8500	8900	5000
50(0.2)	21400	15800	17300	14000	9600	10700	12000	12600	7000
65(0.2)	36100	26700	29300	23600	16200	18100	20200	21200	11800
75(0.2)	-	-	-	31500	21500	24100	26900	28200	15800
85(0.2)	-	-	-	40400	27600	30900	34500	36200	20000
100(0.2)	-	-	-	-	-	-	-	-	27800
130(0.2)	-	-	-	-	-	-	-	-	47000

When selecting conductors to be connected to AE breakers, please ensure that they have a sufficient current capacity. Refer to the right table.

Conductor Size(IEC 60947-1; Ambient 40°C Temp., Open air)

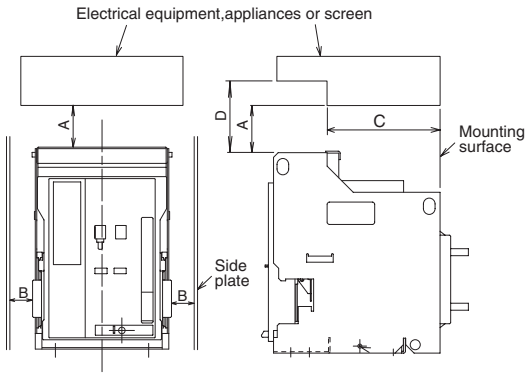
Rated current Max.(A)	Connecting conductors(copper bus bar)		
	Arrangement	Quantity	Conductor size(mm)
630	With long surface vertical	2	40 x 5
1000		2	60 x 5
1250		2	80 x 5
1600		2	100 x 5
2000		3	100 x 5
2500		4	100 x 5
3150(3200)*1		3	100 x 10
4000 (AE4000-SWA Drawout type)		4	150 x 10
4000 (AE4000-SWA Fixed type)		3	150 x 10
4000 (AE4000-SW)		4	100 x 10
5000		4	150 x 10
6300		4	200 x 10

*1 The temperature rise of rated current 3200A conforms to the requirement of IEC 60947-1 for the connecting conductor size of a rated current 3150A. In case of more than 3200A, conductor sizes are not defined in IEC 60947-1.

Insulation distance

When a short-circuit current is interrupted, discharged hot gas blows out from the exhaust port of the arc extinguishing chamber, so provide a clearance as shown in the following table.

Note1:On the fixed type, maintenance is possible with following clearance.



Dimensions (mm)

Type		AE630-SW~AE3200-SW AE2000-SWA AE4000-SWA		AE4000-SW~ AE6300-SW
Applicable voltage		AC600V or less	AC660V, 690V	AC690V or less
Fixed type	A	(Note 1) 0	(Note 1) 100	(Note 1) 200
	B	(Note 3) 50	(Note 3) 50	(Note 3) 50
	C	162	162	-
	D	(Note 2) 50	(Note 2) 50	200
Drawout type	A	0	100	(Note 1) 200
	B	(Note 3) 50	(Note 3) 50	(Note 3) 50
	C	240	240	-
	D	(Note 2) 50	(Note 2) 50	200

Note1:300mm or more clearance is necessary to inspect the arc-extinguishing chamber and contacts.
Note2:The wiring space reguired for the control terminal block.
Note3:When using mechanical interlock, door interlock ,etc., dimension B becomes larger.

Service conditions

1. **Normal service condition**

Under ordinary conditions the following normal working conditions are all satisfied, the AE Series air circuit breaker may be used unless otherwise specified.

1.Ambient temperature	A range of max. +40°C to min. -5°C is recommended. And the average over 24 hours must not exceed +35°C.
2.Altitude	2,000m(6,600 feet) or less
3.Environmental conditions	The air must be clean, and the relative humidity must be 85% or less at max. temp. +40°C.Do not use and store in atmospheres with sulfide gas and ammonia gas etc.($H_2S \leq 0.01$ppm, $SO_2 \leq 0.1$ppm, $NH_3 <$ a few ppm.)
4.Installation conditions	When installing the AE Series air circuit breaker, refer to the installation instructions in the catalogue and instruction manual.
5.Storage temperature	A range of max. +60°C to min. -20°C is recommended to be stored. And the average over 24 hours must not exceed +35°C.
6.Guideline for replacement	Within approx. 15 years.Please refer to the instruction manual.

2. **Special service conditions**

In case of special service condition, service life may become shorter in some cases.

1.Special environmental conditions	High temperature and/or high humidity Corrosive gas
2.High ambient temperature	If the ambient temperature exceeds +40°C, the uninterrupted current rating will be reduced. Since the derating value is different depending on the applicable standard, refer to P56.
3.High altitude	Since the heat radiation rate is reduced for use at the 2,000m or higher, accordingly the operating voltage, continuous current capacity and breaking capacity are derated.Moreover the insulation durability is also decreased owing to the atmospheric pressure. Please inquire us for further detail.

Internal resistance, reactance and power consumption (per pole)

Type	Connection	Internal resistance (mΩ)	Reactance (mΩ)	Power consumption (W)
AE630-SW	Fixed type	0.028	0.059	11
	Drawout type	0.042	0.089	17
AE1000-SW	Fixed type	0.026	0.060	26
	Drawout type	0.040	0.091	40
AE1250-SW	Fixed type	0.024	0.060	38
	Drawout type	0.038	0.091	60
AE1600-SW	Fixed type	0.016	0.063	41
	Drawout type	0.030	0.095	77
AE2000-SWA	Fixed type	0.016	0.063	64
	Drawout type	0.025	0.095	100
AE2000-SW	Fixed type	0.010	0.047	40
	Drawout type	0.020	0.071	80
AE2500-SW	Fixed type	0.008	0.047	50
	Drawout type	0.018	0.071	113
AE3200-SW	Fixed type	0.007	0.048	72
	Drawout type	0.014	0.072	143
AE4000-SWA	Fixed type	0.009	0.048	144
	Drawout type	0.015	0.072	240
AE4000-SW	Fixed type	0.010	0.038	160
	Drawout type	0.013	0.062	210
AE5000-SW	Fixed type	0.009	0.038	225
	Drawout type	0.011	0.062	275
AE6300-SW	Fixed type	0.008	0.038	318
	Drawout type	0.0085	0.062	340

The above values are applicable for one pole. (at brandnew product)

Deratings by ambient temperature

(A)

Standard	IEC60947-2, BS, JIS C 8201-2-1 (Standard:40°C) LR, GL, BV, DNV, ABS, NK, CCS (Standard:45°C)				
Ambient Temperature	40°C	45°C	50°C	55°C	60°C
AE630-SW	630	630	630	630	630
AE1000-SW	1000	1000	1000	1000	1000
AE1250-SW	1250	1250	1250	1250	1200
AE1600-SW	1600	1600	1600	1550	1500
AE2000-SWA	2000	2000	1900	1800	1700
AE2000-SW	2000	2000	2000	2000	2000
AE2500-SW	2500	2500	2500	2450	2350
AE3200-SW	3200	3200	3200	3000	2900
AE4000-SWA	4000	4000	4000	3800	3600
AE4000-SW	4000	4000	4000	3900	3750
AE5000-SW	5000	5000	5000	5000	4750
AE6300-SW	6300	6300	5750	5500	5200

With Extension module, Display and Network

In case extension module (EX1), display (DP1) and network are attached, the following derating values shown in this table are applied.

(A)

Standard	IEC60947-2, BS, JIS C 8201-2-1 (Standard:40°C) LR, GL, BV, DNV, ABS, NK, CCS (Standard:45°C)		
Ambient Temperature	40°C	45°C	50°C
AE630-SW	630	630	630
AE1000-SW	1000	1000	1000
AE1250-SW	1250	1250	1250
AE1600-SW	1600	1600	1440
AE2000-SWA	2000	1900	1700
AE2000-SW	2000	2000	2000
AE2500-SW	2500	2500	2500
AE3200-SW	3200	3200	2880
AE4000-SWA	4000	3800	3600

The above table shows the maximum rated current per each ambient temperature for drawout type breaker with vertical connection (at brandnew product), when breaker and bus bar are installed in open air.
Connection bus bar is according to IEC60947-1. For AE3200-SW, AE4000-SWA, AE4000-SW, AE5000-SW and AE6300-SW, it is required to follow the manufacturer recommended size shown in Page 53.
As for ambient temperature exceeding 60°C, please inquire us.

Discrimination table

AE-SW Series air circuit breakers provide easy selective co-ordination with branch circuit breakers.
For selective co-crdinations,refer to the following table.

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Main circuit breaker / Unit breaking capacity / Branch circuit breaker			AE-SW											
			AE630-SW	AE1000-SW	AE1250-SW	AE1600-SW	AE2000-SWA	AE2000-SW	AE2500-SW	AE3200-SW	AE4000-SWA	AE4000-SW	AE5000-SW	AE6300-SW
			65	65	65	65	65	85	85	85	85	130	130	130
NF・S・H・MB・NV・S・H	NF32-SW MB30-SW MB50-CW	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
	NV32-SW	10	9(10)	10	10	10	10	10	10	10	10	10	10	10
	NF63-SW MB50-SW NV63-SW	15	9(10)	10	10	10	10	10	10	10	10	10	10	10
	NF63-HW NV63-HW	25	9(25)	25	25	25	25	25	25	25	25	25	25	25
	NF125-SW MB100-SW NV125-SW	50	9(50)	45(50)	50	50	50	50	50	50	50	50	50	50
	NF125-HW NV125-HW	100	9(65)	50(65)	65	65	65	85	85	85	85	100	100	100
	NF250-SW MB225-SW NV250-SW NV250-SEW	50	9(50)	20(50)	22(50)	42(50)	42(50)	50	50	50	50	50	50	50
	NF250-HW NV250-HW	100	9(65)	25(65)	40(65)	65	65	85	85	85	85	100	100	100
	NF400-SW NV400-SW	85	-	-	20(65)	27(65)	27(65)	42(75)	70(75)	85	85	85	85	85
	NF400-SEW NV400-SEW	85	9(65)	15(65)	20(65)	27(65)	27(65)	42(75)	70(75)	85	85	85	85	85
	NF400-HEW NV400-HEW	100	9(65)	15(65)	20(65)	27(65)	27(65)	42(75)	70(75)	85	85	100	100	100
	NF400-REW NV400-REW	150	9(65)	15(65)	20(65)	27(65)	27(65)	42(75)	70(75)	85	85	130	130	130
	NF630-SW NV630-SW	85	-	-	-	24(65)	24(65)	30(75)	40(75)	60(75)	60(75)	85	85	85
	NF630-SEW NV630-SEW	85	-	15(65)	18(65)	24(65)	24(65)	30(75)	40(75)	60(75)	60(75)	85	85	85
	NF630-HEW NV630-HEW	100	-	15(65)	18(65)	24(65)	24(65)	30(75)	40(75)	60(75)	60(75)	85(100)	85(100)	85(100)
	NF630-REW	150	-	15(65)	18(65)	24(65)	24(65)	30(75)	40(75)	60(75)	60(75)	85(100)	85(100)	85(100)
	NF800-SEW NV800-SEW	85	-	-	18(65)	24(65)	24(65)	30(75)	40(75)	60(75)	60(75)	85	85	85
	NF800-HEW NV800-HEW	100	-	-	18(65)	24(65)	24(65)	30(75)	40(75)	60(75)	60(75)	85(100)	85(100)	85(100)
	NF800-REW	150	-	-	18(65)	24(65)	24(65)	30(75)	40(75)	60(75)	60(75)	85(100)	85(100)	85(100)
NF・C・NV・C	NF63-CW NV63-CW	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
	NF125-CW NV125-CW	30	9(30)	15(30)	18(30)	24(30)	24(30)	30	30	30	30	30	30	30
	NF250-CW NV250-CW	35	9(35)	15(35)	18(35)	24(35)	24(35)	35	35	35	35	35	35	35
	NF400-CW NV400-CW	50	-	15(50)	18(50)	24(50)	24(50)	30(50)	37(50)	48(50)	48(50)	50	50	50
	NF630-CW NV630-CW	50	-	-	-	24(50)	24(50)	30(50)	37(50)	48(50)	48(50)	50	50	50
	NF800-CEW	50	-	-	-	24(50)	24(50)	30(50)	37(50)	48(50)	48(50)	50	50	50
NF・U	NF125-RGW	125	65	65	65	65	65	85	85	85	85	125	125	125
	NF125-UGW	200	65	65	65	65	65	85	85	85	85	130	130	130
	NF250-RGW	125	9(65)	65	65	65	65	85	85	85	85	125	125	125
	NF250-UGW	200	9(65)	65	65	65	65	85	85	85	85	130	130	130
	NF400-UEW	200	9(65)	15(65)	18(65)	29(65)	29(65)	48(75)	85	85	85	130	130	130
	NF800-UEW	200	-	-	18(65)	24(65)	24(65)	30(75)	37(75)	68(75)	68(75)	85(100)	85(100)	85(100)

- The values in the table represent the max.rated current for both Series AE-SW air circuit breakers and branch breakers,and the selective co-ordination applies when the AE-SW series air circuit breakers instantaneous pick up is set to maximum.
- The numerals shown in parentheses are for AE-SW with MCR.(When set MCR).

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Main circuit breaker / Unit breaking capacity / Branch circuit breaker			AE-SW											
			AE630-SW	AE1000-SW	AE1250-SW	AE1600-SW	AE2000-SWA	AE2000-SW	AE2500-SW	AE3200-SW	AE4000-SWA	AE4000-SW	AE5000-SW	AE6300-SW
			65	65	65	65	65	85	85	85	85	130	130	130
NF・S・H・MB・NV・S・H	NF32-SW MB30-SW MB50-CW	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	NV32-SW	5	5	5	5	5	5	5	5	5	5	5	5	5
	NF63-SW MB50-SW NV63-SW	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
	NF63-HW NV63-HW	10	9(10)	10	10	10	10	10	10	10	10	10	10	10
	NF125-SW MB100-SW NV125-SW	25	7(25)	20(25)	25	25	25	25	25	25	25	25	25	25
	NF125-HW NV125-HW	50	9(50)	30(50)	50	50	50	50	50	50	50	50	50	50
	NF250-SW MB225-SW NV250-SW NV250-SEW	25	7(25)	14(25)	19(25)	25	25	25	25	25	25	25	25	25
	NF250-HW NV250-HW	50	7(50)	15(50)	25(50)	42(50)	42(50)	50	50	50	50	50	50	50
	NF400-SW NV400-SW	42	-	-	18(42)	24(42)	24(42)	33(42)	42	42	42	42	42	42
	NF400-SEW NV400-SEW	42	9(42)	15(42)	18(42)	24(42)	24(42)	33(42)	42	42	42	42	42	42
	NF400-HEW NV400-HEW	65	9(65)	15(65)	18(65)	24(65)	24(65)	33(65)	45(65)	65	65	65	65	65
	NF400-REW NV400-REW	125	9(65)	15(65)	18(65)	24(65)	24(65)	33(75)	45(75)	80	80	100	100	100
	NF630-SW NV630-SW	42	-	-	-	24(42)	24(42)	33(42)	42	42	42	42	42	42
	NF630-SEW NV630-SEW	42	-	15(42)	18(42)	24(42)	24(42)	30(42)	40(42)	42	42	42	42	42
	NF630-HEW NV630-HEW	65	-	15(65)	18(65)	24(65)	24(65)	30(65)	40(65)	60(65)	60(65)	65	65	65
	NF630-REW	125	-	15(65)	18(65)	24(65)	24(65)	30(75)	40(75)	60(75)	60(75)	75(100)	75(100)	75(100)
	NF800-SEW NV800-SEW	42	-	-	18(42)	24(42)	24(42)	30(42)	40(42)	42	42	42	42	42
	NF800-HEW NV800-HEW	65	-	-	18(65)	24(65)	24(65)	30(65)	40(65)	60(65)	60(65)	65	65	65
	NF800-REW	125	-	-	18(65)	24(65)	24(65)	30(75)	40(75)	60(75)	60(75)	75(100)	75(100)	75(100)
NF・C・NV・C	NF63-CW NV63-CW	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	NF125-CW NV125-CW	10	9(10)	10	10	10	10	10	10	10	10	10	10	10
	NF250-CW NV250-CW	15	9(15)	15	15	15	15	15	15	15	15	15	15	15
	NF400-CW NV400-CW	25	-	15(25)	18(25)	24(25)	24(25)	25	25	25	25	25	25	25
	NF630-CW NV630-CW	36	-	-	-	24(36)	24(36)	30(36)	36	36	36	36	36	36
	NF800-CEW	36	-	-	-	24(36)	24(36)	30(36)	36	36	36	36	36	36
NF・U	NF125-RGW	125	35(65)	65	65	65	65	85	85	85	85	125	125	125
	NF125-UGW	200	50(65)	65	65	65	65	85	85	85	85	130	130	130
	NF250-RGW	125	9(65)	50(65)	65	65	65	85	85	85	85	125	125	125
	NF250-UGW	200	9(65)	65	65	65	65	85	85	85	85	130	130	130
	NF400-UEW	200	9(65)	15(65)	18(65)	29(65)	29(65)	48(75)	85	85	85	130	130	130
	NF800-UEW	200	-	-	18(65)	24(65)	24(65)	30(75)	37(75)	68(75)	68(75)	85(100)	85(100)	85(100)

• The values in the table represent the max.rated current for both Series AE-SW air circuit breakers and branch breakers,and the selective co-ordination applies when the AE-SW series air circuit breakers instantaneous pick up is set to maximum.
• The numerals shown in parentheses are for AE-SW with MCR.(When set MCR).