

Hitachi Air Circuit Breakers AKH, AKS, AKN series



Full line-up& Compact

Up to 6300A, ACB provides fully lined-up 3 frame.
For each frame, there is just one size, which is smaller and more compact. It makes it possible for you to design the optimized volume panel.



85kA 100kA 150kA

AKH-06 – 20D

06	630AF
08	800AF
10	1000AF
13	1250AF
16	1600AF
20	2000AF

Icu=Ics=85kA/500Vac
W=334(3p), 419(4p)mm

AKH-06 – 40E

06	630AF	20	2000AF
08	800AF	25	2500AF
10	1000AF	32	3200AF
13	1250AF	40	4000AF
16	1600AF		

Icu=Ics=100kA/500Vac
W=412(3p), 527(4p)mm

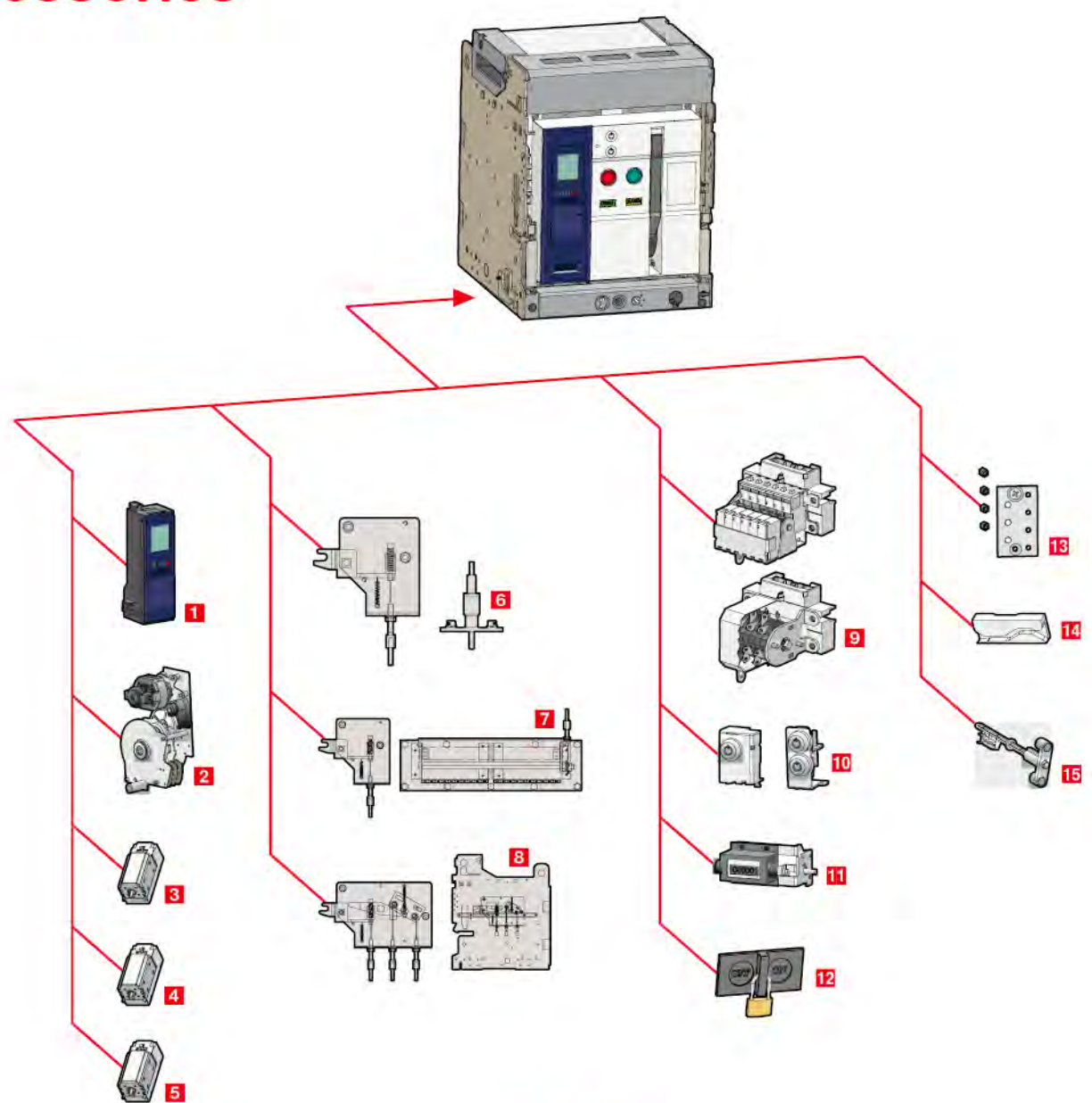
- The highest breaking capacity:
150kA (6300AF at 500VAC)
- 3 ampere frame sizes:
2000/4000/6300AF
- N phase current conducting capacity: 100%

AKH-40 – 63G

40	4000AF
50	5000AF
63	6300AF

Icu=Ics=150kA/500Vac
W=785(3p), 1015(4p)mm

Accessories



ACB

- 1 Trip relay (OCR)

2 Motor (M)

3 Closing Coil (CC)

4 Shunt Coil (SHT)

5 Under Voltage Trip Device (UVT)

6 Door Interlock (DI)

7 MOC (Mechanically Operated Cell Switch)

8 Mechanical Interlock (MI)
- 9 Auxiliary Switch (AX)

10 Key Lock (K1), Double Key Lock (K3)

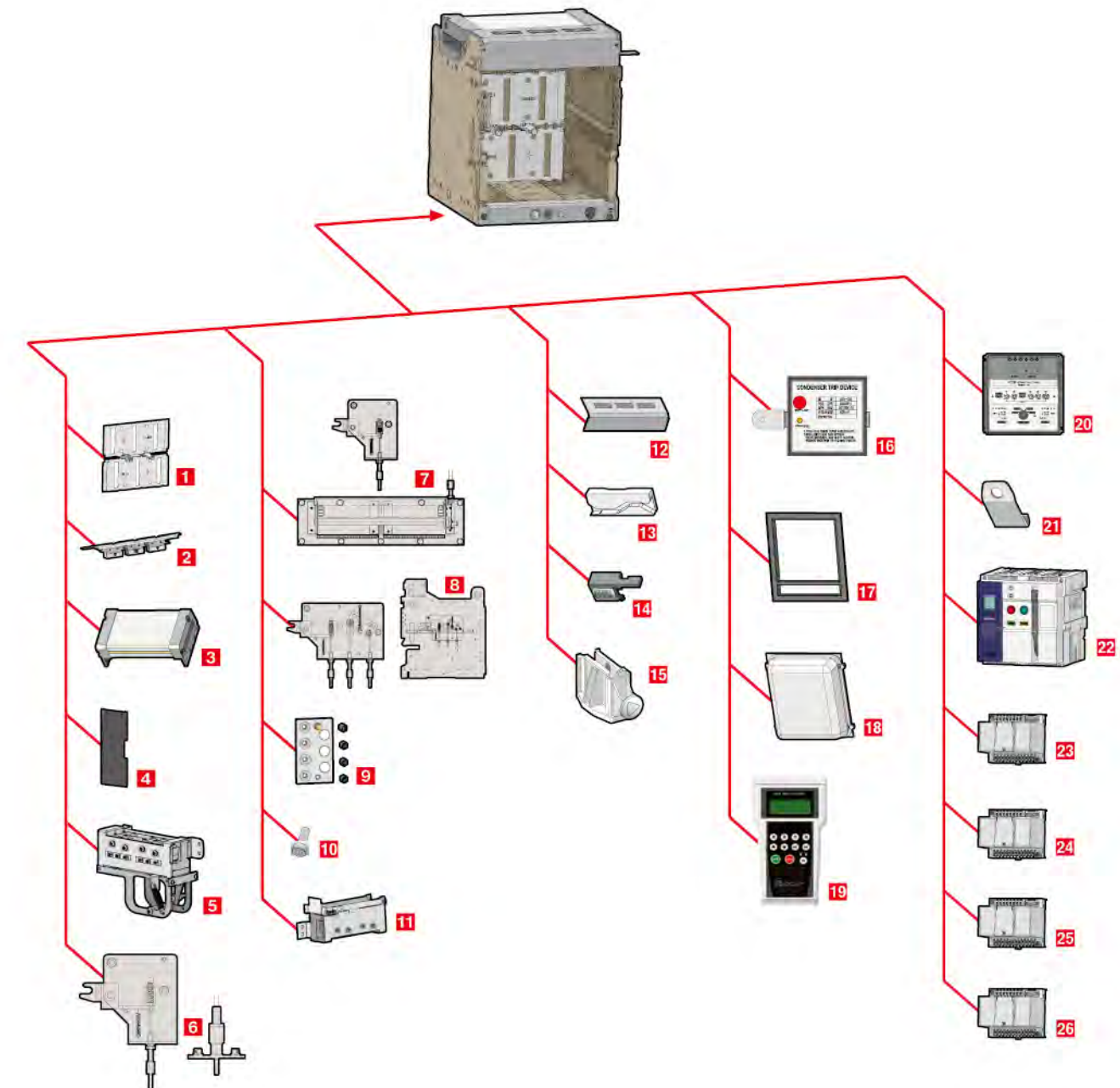
11 Counter (C)

12 On/Off Button Lock (B)

13 Miss Insertion Preventing Device (MIP)

14 Automatically Discharge Mechanism (ADM)

15 Manual Reset Button (MRB)



Cradle

Others

- 1 Safety Shutter (ST)

2 Manual Connector

3 Zero Arc Space (ZAS)

4 Insulation Barrier (IB)

5 Cell Switch (CEL)

6 Door Interlock (DI)

7 MOC (Mechanically Operated Cell Switch)

8 Mechanical Interlock (MI)

9 Miss Insertion Prevent Device (MIP)

10 Cladle Mounting Block (CMB)

11 Shorting "b" Contact (SBC)

12 Safety Control Cover (SC)

13 Automatically Discharge Mechanism (ADM)

14 Racking Interlock (RI)

15 Safety Shutter Lock (STL)
- 16 Condenser Trip Device (CTD)

17 Door Frame (DF)

18 Dust Cover (DC)

19 OCR Tester (OT)

20 ATS Controller (ATS)

21 Lifting Hook (LH)

22 Dummy ACB

23 UVT Time Delay Controller (UDC)

24 Profibus-DP Communication module

25 Remote I/O

26 Temperature Alarm

External configuration

Fixed type ACB

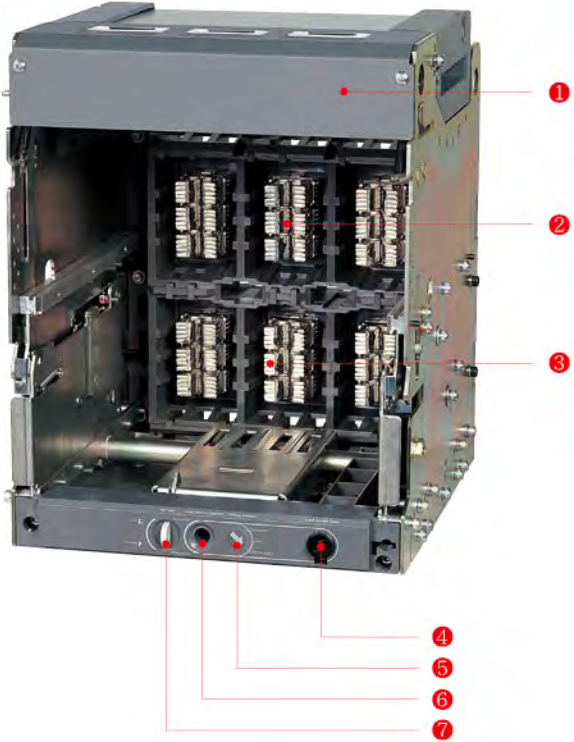


- Terms**
- 1 Trip relay
 - 2 Counter
 - 3 ON button
 - 4 OFF button
 - 5 Charge handle
 - 6 Rated name plate
 - 7 Charge/Discharge indicator
 - 8 ON/OFF indicator
 - 9 Corporation logo
 - 10 Arc cover
 - 11 Terminal cover
 - 12 Cradle
 - 13 Draw-out handle
 - 14 Position indicator
 - 15 Handle storage space
 - 16 Pad lock button
 - 17 Art chute
 - 18 Control cover
 - 19 Fixed type bracket

Draw-out ACB (Cradle)

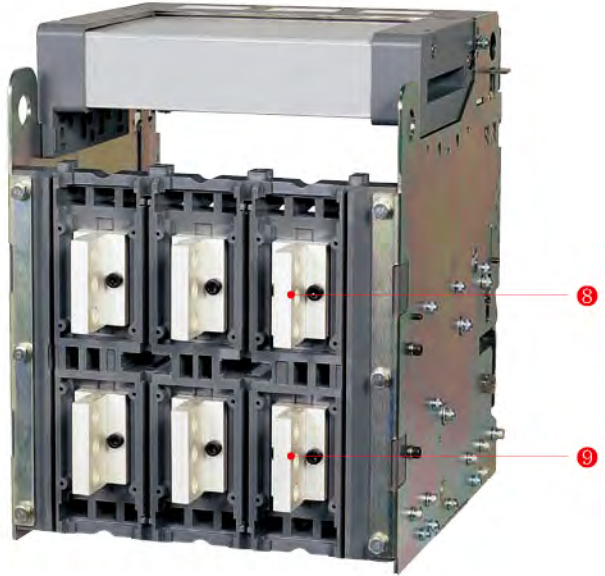


Cradle (Internal)

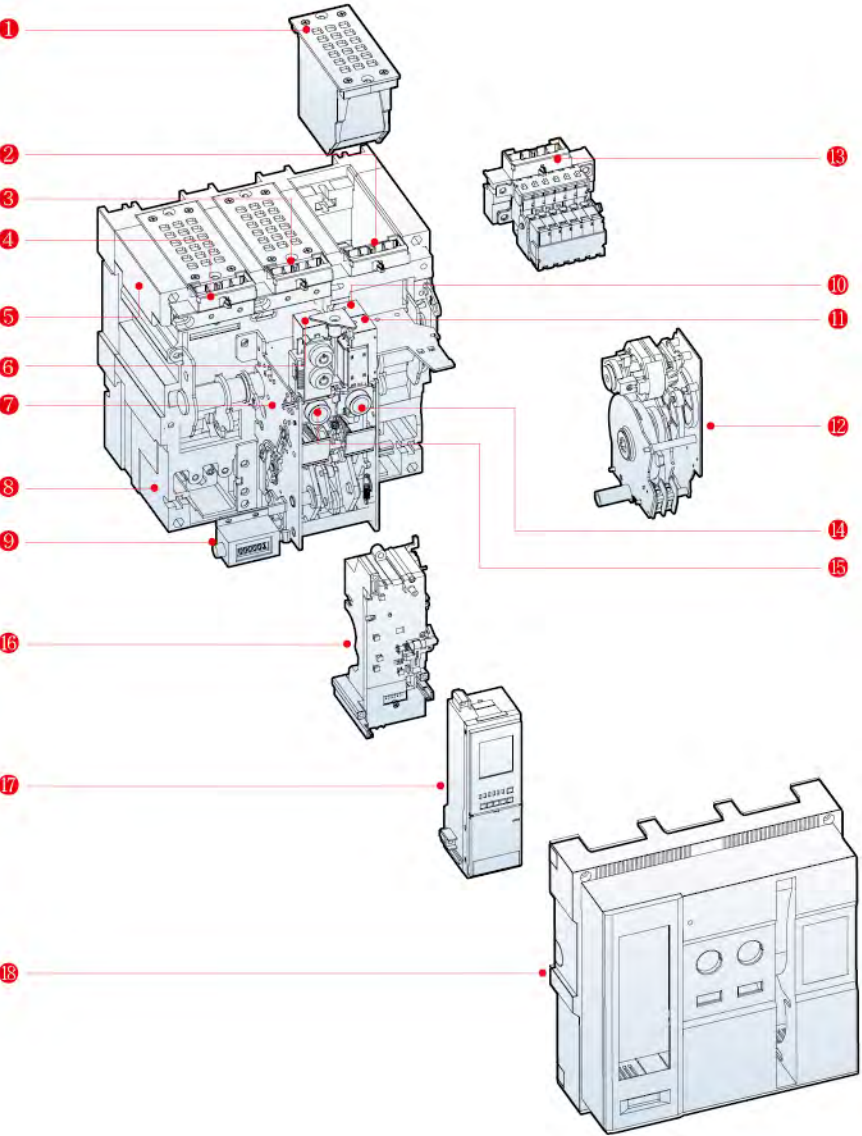


- Terms**
- 1 Terminal cover of control circuit
 - 2 Cradle finger (Line side)
 - 3 Cradle finger (Load side)
 - 4 Draw-out handle
 - 5 Position indicator
 - 6 Handle storage space
 - 7 Pad lock button
 - 8 Connecting conductor (Line side)
 - 9 Connecting conductor (Load side)

Cradle (Rear)

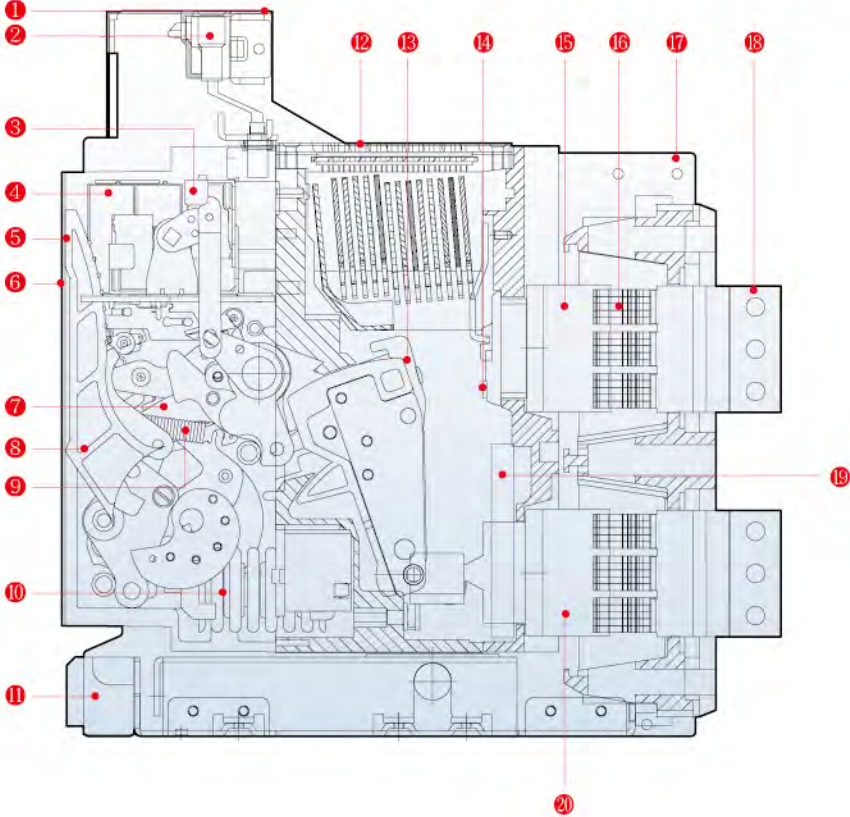


Internal configuration



Terms

- 1 Arc chute
- 2 Aux. switch control terminal
- 3 Control power supply terminal
- 4 Trip relay control terminal
- 5 Carrying grip
- 6 Trip coil or UVT coil
- 7 Mechanism
- 8 Main body
- 9 Counter
- 10 Trip coil
- 11 Closing coil
- 12 Motor Ass'y
- 13 Aux. switch
- 14 ON button
- 15 OFF button
- 16 MTD base
- 17 Trip relay
- 18 Front cover



Terms

- 1 Control circuit terminal block
- 2 Control terminal
- 3 Auxiliary switches
- 4 Closing, Trip, UVT coil
- 5 Trip relay
- 6 Front cover
- 7 Mechanism
- 8 Charge handle
- 9 Trip spring
- 10 Closing spring
- 11 Draw-in/out device
- 12 Arc extinguishing part
- 13 Moving contact
- 14 Fixed contact
- 15 Conductor on line side
- 16 Cradle finger
- 17 Cradle
- 18 Connecting conductor
- 19 Power supply CT
- 20 Conductor on load side



Rating



Type				AKH-06D	AKH-08D	AKH-10D	AKH-13D	AKH-16D	AKH-20D	
Ampere frame		(AF)		630	800	1000	1250	1600	2000	
Rated current (A)	(in max)	at 40°C		200	400					
				400	630	1000	1250	1600	2000	
				630	800					
Setting current (A)*		Control trip relay (... x in max)		(0.4 – 1.0) x in max						
Rated current of neutral pole (A)				400	400					
				630	630	1000	1250	1600	2000	
				630	800					
Rated insulation voltage (V)		(Ui)		1,000						
Rated operating voltage (V)		(Ue)		690						
Rated impulse withstand voltage (kV)		(Uimp)		12						
Frequency (Hz)				50/60						
Number of poles (P)				3, 4						
Rated breaking capacity (kA sym)		(Icu)	IEC 60947-2	220V/230V/380V/415V		85				
AC 50/60Hz				460V/480V/500V		85				
			JISC 8201-2-1	550V/600V/690V		65				
Rated service breaking capacity (kA)		(Ics)	...% x Icu		100%					
Rated making capacity (kA peak)		(Icm)	IEC 60947-2	220V/230V/380V/415V		187				
AC 50/60Hz				460V/480V/500V		187				
			JISC 8201-2-1	550V/600V/690V		143				
Rated short-time		(Icw)	1 sec		65					
withstand current (kA)			2 sec		60					
			3 sec		50					
Operating time (ms)			Maximum total breaking time		40					
			Maximum closing time		80					
Life cycle (time)		Mechanical	Without maintenance		20,000					
			With maintenance		30,000					
		Electrical	Without maintenance		5,000					
			With maintenance		10,000					
Connections**		Draw-out / Fixed	Horizontal connection		●					
			Vertical connection		□					
			Front connection		○					
			Mixed connection		○					
Weight (kg)		Draw-out type	Main body	Motor charging type		63/74				
(3P/4P)			(With cradle)	Manual charging type		61/72				
			Cradle only			29/32				
		Fixed type	Motor charging type		34/44					
			Manual charging type		32/42					
External dimensions (mm)			Draw-out	3P		430 x 334 x 375				
(H x W x D)			type	4P		430 x 419 x 375				
			Fixed type	3P		300 x 300 x 295				
				4P		300 x 385 x 295				
Trip relay				N, A, P, S type						
Certificate & Approval				KEMA / VPC (Taiwan)						

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



AKH-06E	AKH-08E	AKH-10E	AKH-13E	AKH-16E	AKH-20E	AKH-25E	AKH-32E	AKH-40E
630	800	1000	1250	1600	2000	2500	3200	4000
630	800	1000	1250	1600	2000	2500	3200	4000
(0.4 – 1.0) x 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				
				20,000				
				5,000				
				10,000				
				●				○
				○				●
				○				-
				○				-
				87/103		104/147		
				85/101		102/145		
				44/55		58/70		
				44/55		63/100		
				42/53		61/98		
				430 x 412 x 375				
				430 x 527 x 375				
				300 x 378 x 295				
				300 x 493 x 295				
				N, A, P, S type				
				KEMA / VPC (Taiwan)				



AKH-40G	AKH-50G	AKH-63G
4000	5000	6300
4000	5000	6300
(0.4 – 1.0) x In max		
4000	5000	6300
		1,000
		690
		12
		50/60
		3, 4
		150
		150
		100
		100%
		330
		330
		220
		100
		100
		100
		40
		80
		10,000
		15,000
		2,000
		5,000
		○
		●
		-
		-
		181/223
		186/230
		179/221
		184/228
		97/117
		102/124
		98/123
		103/130
		96/121
		101/128
		460 x 785 x 375
		460 x 1,015 x 375
		300 x 751 x 295
		300 x 981 x 295
		N, A, P, S type
		KEMA / VPC (Taiwan)

Rating



Type				AKN-06D	AKN-08D	AKN-10D	AKN-13D	AKN-16D	AKS-20D	
Ampere frame		(AF)		630	800	1000	1250	1600	2000	
Rated current (A)		(in max) at 40°C		200 400 630	400 630 800	1000	1250	1600	2000	
Setting current (A)*		Control trip relay (... x in max)		(0.4 – 1.0) x in max						
Rated current of neutral pole (A)				400 630	400 630 800	1000	1250	1600	2000	
Rated insulation voltage (V)		(Ui)		1,000						
Rated operating voltage (V)		(Ue)		690						
Rated impulse withstand voltage (kV)		(Uimp)		12						
Frequency (Hz)				50/60						
Number of poles (P)				3, 4						
Rated breaking capacity (kA sym)		(Icu)	IEC 60947-2	220V/230V/380V/415V		65		70		
AC 50/60Hz			JISC 8201-2-1	460V/480V/500V		65		70		
				550V/600V/690V		50		65		
Rated service breaking capacity (kA)		(Ics)	...% x Icu		100%		100%			
Rated making capacity (kA peak)		(Icm)	IEC 60947-2	220V/230V/380V/415V		143		154		
AC 50/60Hz			JISC 8201-2-1	460V/480V/500V		143		154		
				550V/600V/690V		105		143		
Rated short-time withstand current (kA)		(Icw)	1 sec		50		65			
			2 sec		42		55			
			3 sec		36		50			
Operating time (ms)		Maximum total breaking time		40						
		Maximum closing time		80						
Life cycle (time)		Mechanical	Without maintenance		20,000					
			With maintenance		30,000					
		Electrical	Without maintenance		5,000					
			With maintenance		10,000					
Connections**		Draw-out / Fixed	Horizontal connection		●				-	
			Vertical connection		□				●	
			Front connection		□				-	
			Mixed connection		□				-	
Weight (kg)		Draw-out type	Main body	Motor charging type		63/74				70/85
(3P/4P)			(With cradle)	Manual charging type		61/72				68/83
			Cradle only			29/32				33/40
		Fixed type	Motor charging type		34/44				38/47	
			Manual charging type		32/42				36/45	
External dimensions (mm)			Draw-out type	3P	430 x 334 x 375					
(H x W x D)				4P	430 x 419 x 375					
			Fixed type	3P	300 x 300 x 295					
				4P	300 x 385 x 295					
Trip relay				N, A, P type						
Certificate & Approval				KEMA / VPC (Taiwan)						

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



AKS-20E	AKS-25E	AKS-32E	AKS-40E
2000	2500	3200	4000
630, 800			
1000, 1250	2500	3200	4000
1600, 2000			
(0.4 – 1.0) x In max			
630, 800			
1000, 1250	2500	3200	4000
1600, 2000			
1,000			
690			
12			
50/60			
3, 4			
85			
85			
85			
100%			
187			
187			
187			
85			
75			
65			
40			
80			
15,000			
20,000			
5,000			
10,000			
●		○	
○		●	
○		-	
○		-	
87/103		104/147	
85/101		102/145	
44/50		58/70	
44/55		63/100	
42/53		61/98	
430 x 412 x 375			
430 x 527 x 375			
300 x 378 x 295			
300 x 493 x 295			
N, A, P type			
KEMA / VPC (Taiwan)			



AKS-40F	AKS-50F
4000	5000
4000	5000
(0.4 – 1.0) x In max	
4000	5000
1,000	
690	
12	
50/60	
3, 4	
100	
100	
85	
100%	
220	
220	
187	
85	
75	
65	
40	
80	
10,000	
15,000	
2,000	
5,000	
○	
●	
-	
-	
145/173	
143/171	
78/90	
76/94	
74/92	
460 x 629 x 375	
460 x 799 x 375	
300 x 597 x 295	
300 x 767 x 295	
N, A, P type	
KEMA / VPC (Taiwan)	



AKS-40G	AKS-50G	AKS-63G
4000	5000	6300
4000	5000	6300
(0.4 – 1.0) x In max		
4000	5000	6300
1,000		
690		
12		
50/60		
3, 4		
120		
120		
100		
100%		
264		
264		
220		
100		
90		
85		
40		
80		
10,000		
15,000		
2,000		
5,000		
○		
●		
-		
-		
181/223		186/230
179/221		184/228
97/117		102/124
98/123		103/130
96/121		101/128
460 x 785 x 375		
460 x 1,015 x 375		
300 x 751 x 295		
300 x 981 x 295		
N, A, P type		
KEMA / VPC (Taiwan)		

Trip relays

Trip relay types

Classification	N type	A type	P type	S type
Externals				
Current protection	L/S/I/G/Thermal	• L/S/I/G/Thermal • ZSI (Protective coordination) • 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 20% of load current.	• Self Power - Power source works over 20% of load current. - External power source are required for comm. • AC/DC 100 – 250V • DC 24 – 60V	• AC/DC 100 – 250V • DC 24 – 60V	• 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

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

Accessories



Mounting	Accessories		AH		AS		AN		Remark
			Default	Option	Default	Option	Default	Option	
Internal	SHT1	Shunt Coil	•		•		•		*
	SHT2	Double Shunt Coil		○		○		○	*
	CC	Closing Coil	•		•		•		*
	M	Motor	•		•		•		*
	CS1	Charge Switch	•		•		•		*
	CS2	Charge Switch Communication		○		○		○	*
	UVT	Under Voltage Trip Device		○		○		○	*
	AL	Trip Alarm Contact		○		○		○	*
	MRB	Manual Reset Button		○		○		○	*
	RES	Remote Reset Switch		○		○		○	*
	RCS	Ready to Close Switch		○		○		○	*
	C	Counter	•		•		•		*
	BX	Auxiliary Switch (5a 5b)	•		•		•		*
	TM	Temperature Alarm		○		○		○	*
External	K1	Key Lock		○		○		○	*
	K2	Key Interlock Set		○		○		○	*
	K3	Double Key Lock		○		○		○	*
	B	On/Off Button Lock		○		○		○	*
	LH	Lifting Hook		○		○		○	
	CTD	Condenser Trip Device		○		○		○	
	ATS	Automatic Transfer Switch Controller		○		○		○	
	DC	Dust Cover		○		○		○	
	OT	OCR Tester		○		○		○	
	J	Manual Connector		○			•		*
	A	Automatic Connector	•			○		○	*

*Separate purchasing is not allowed. Each item should be purchased with the main body.

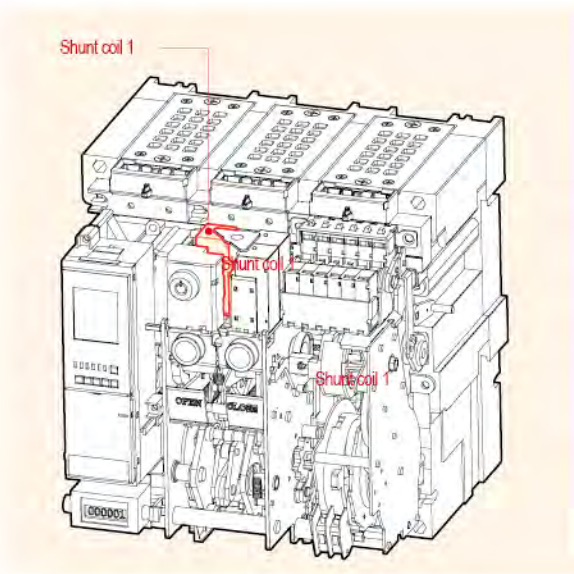
Mounting	Accessories		AH		AS		AN		Remark
			Default	Option	Default	Option	Default	Option	
Trip relay	N	N type		○		○		○	*
	A	A type		○		○		○	*
	P	P type		○		○		○	*
	S	S type		○					*
	ZCT	ZCT for the earth leakage		○		○		○	
Cradle	SBC	Shorting "b" Contact		○		○		○	
	MI	Mechanical Interlock		○		○		○	
	ST	Safety Shutter		○		○		○	*
	STL	Safety Shutter Lock		○		○		○	
	DF	Door Frame		○		○		○	
	MIP	Miss Insertion Prevent Device		○		○		○	
	MOC	Mechanical Operated Cell Switch		○		○		○	
	CEL	Cell Switch		○		○		○	
	DI	Door Interlock		○		○		○	
	ZAS	Zero Arc Space	•			○			*
	SC	Safety Control Cover	•		•		•	○*	*
	CMB	Cradle Mounting Block		○		○		○	*
	RI	Racking Interlock		○		○		○	
	PL	Pad lock/Positon Lock	•		•		•		*
	IB	Insulation Barrier	•			○		○	*
	UDC	UVT Time Delay Controller		○		○		○	
	ADP	Compatible Adapter		○		○		○	

*Separate purchasing is not allowed. Each item should be purchased with the main body.

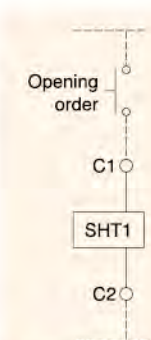
* It is available only when the control block is in the mode of auto-connection.

Accessories

Shunt Coil [SHT1]



- SHT1 is a control device which trips a circuit breaker from remote place, when applying voltage continuously or instantaneously over 200ms to coil terminals (C1, C2).
- When UVT coil is installed, its location is changed.



*The dotted line to be made by the customer

Wiring Diagram

1. Rated voltage and characteristics of Trip coil

Rated voltage [Vn]		Operating voltage range [V]	Power consumption (VA or W)		Trip time [ms]
DC [V]	AC [V]		Inrush	Steady-state	
24 - 30	-	0.6 - 1.1 Vn	200	5	Less than 40ms
48 - 60	48	0.6 - 1.1 Vn			
100 - 130	100 - 130	0.56 - 1.1 Vn			
200 - 250	200 - 250	0.56 - 1.1 Vn			
-	380 - 480	0.56 - 1.1 Vn			

Note) Operating voltage range is the min. rated voltage standard for each rated voltage (Vn).

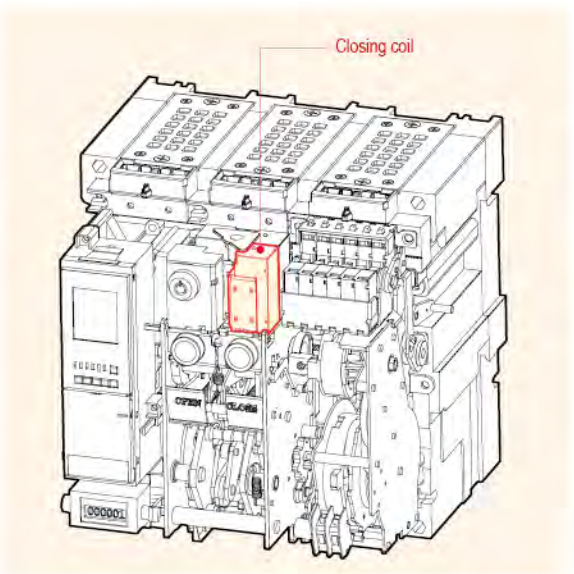
2. Specification of the wire

- Refer to the below table regarding the length and specification of wire when using trip coil with DC 24 - 30 [V] or DC/AC 48 - 60 [V] of rated voltage.

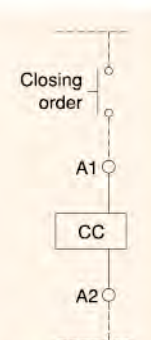
The maximum wire length

Wire type		Rated voltage [Vn]			
		DC 24 - 30 [V]		DC/AC 48 [V]	
		#14 AWG (2.08mm ²)	#16 AWG (1.31mm ²)	#14 AWG (2.08mm ²)	#16 AWG (1.31mm ²)
Operating voltage	100%	95.7m	61m	457.8m	287.7m
	85%	62.5m	38.4m	291.7m	183.2m

Closing Coil [CC]



- It is a control device which close a circuit breaker, when the voltage is applied continuously or instantaneously over 200ms to the coil terminals (C1, C2).



*The dotted line to be made by the customer

Wiring Diagram

1. Rated voltage and characteristics of Closing coil

Rated voltage [Vn]		Operating voltage range [V]	Power consumption (VA or W)		Trip time [ms]
DC [V]	AC [V]		Inrush	Steady-state	
24 - 30	-	0.75 - 1.1 Vn	2005		Less than 80ms
48 - 60	48	0.75 - 1.1 Vn			
100 - 130	100 - 130	0.75 - 1.1 Vn			
200 - 250	200 - 250	0.75 - 1.1 Vn			
-	380 - 480	0.75 - 1.1 Vn			

Note) Operating voltage range is the min. rated voltage standard for each rated voltage (Vn).

2. Specification of the wire

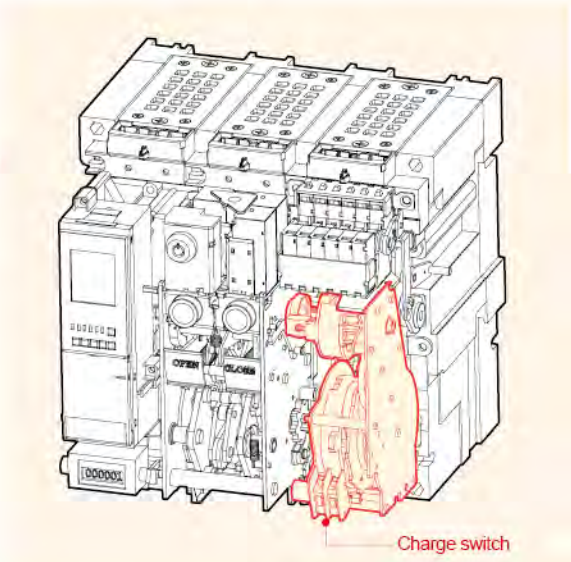
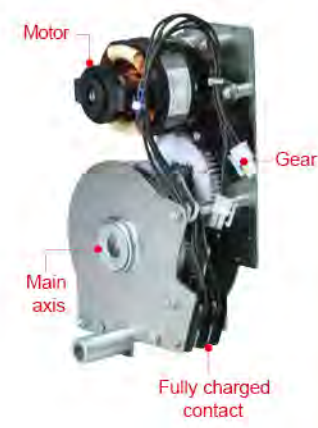
- Refer to the below table regarding the length and specification of wire when using trip coil with DC 24 - 30 [V] or DC/AC 48 - 60 [V] of rated voltage.

The maximum wire length

Wire type		Rated voltage [Vn]			
		DC 24 - 30 [V]		DC/AC 48 [V]	
		#14 AWG (2.08mm ²)	#16 AWG (1.31mm ²)	#14 AWG (2.08mm ²)	#16 AWG (1.31mm ²)
Operating voltage	100%	95.7m	61m	457.8m	287.7m
	85%	62.5m	38.4m	291.7m	183.2m

Accessories

Motor [M]



- Charge the closing spring of a circuit breaker by the external power source. Without the external power source, charge manually.
- Operating voltage range (IEC 60947) 85% – 110%Vn

Input voltage (V)	DC 24 – 30V	AC/DC 48 – 60V	AC/DC 100 – 130V	AC/DC 200 – 250V	AC 380V	AC440 – 480V
Load current (max.)5A		3A	1A	0.5A0.3A0.3A		
Starting current (max.)			5 times of load current			
Load rpm (Motor)			15,000 – 19,000 rpm			
Charge time			Less than 5 sec.			
Dielectric strength			2kV/min			
Using temperature range			-20° – 60°			
Using humidity range			Max. RH 80% (No dew condensation)			
Endurance			15,000 cycle (Load connection, 2 times/min)			
Charge switch			10A at 250VAC			

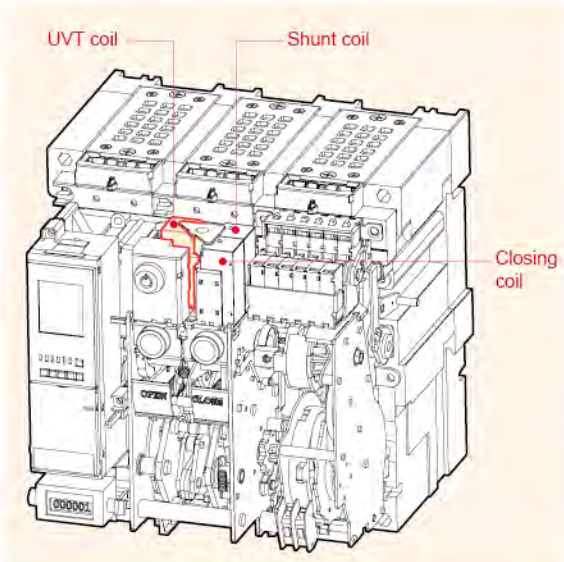
Charge Switch [CS1]

Charge Switch Communication [CS2]

- It is a built-in contact which sends the signal to the outside, when motor charging is completed. (2a)
- It has a “1a” contact for communication and the other “1a” contact for complete charging.
- When using an extra communication module (Reote I/O), the state of contacts can be displayed through the network.
- 10A at 250VAC

*Charge Switch Communication [CS2] is optional only at AKS type.

Under Voltage Trip device [UVT]



- If the voltage of the main or the control power is under voltage, UVT which is installed inside of the breaker breaks the circuit automatically. Please connect with UVT time-delay device in order to present the time-delay function because UVT is technically instantaneous type.
- The closing of a circuit breaker is impossible mechanically or electrically if control power not supplied to UVT. To close the circuit breaker, 65 – 85% of rated voltage should be applied to both terminals of UVT coil (D1, D2).
- When using UVT coil, the double trip coil can not be used, and the location of trip coil is changed.

1. Rated voltage and characteristics of UVT coil

Rated voltage [Vn]		Operating voltage range [V]		Power consumption (VA or W)		Trip time [ms]
DC [V]	AC [V]	Pick up	Drop out	Inrush	Steady-state	
24 – 30	-	0.65 – 0.85 Vn	0.4 – 0.6 Vn	2005		Less than 50ms
48 – 60	48					
100 – 130	100 – 130					
200 – 250	200 – 250					
-	380 – 480					

Note) Operating voltage range is the min. rated voltage standard for each rated voltage (Vn).

2. Specification of the wire

- Refer to the below table regarding the length and specification of wire when using trip coil with DC 24 – 30 [V] or DC/AC 48 – 60 [V] of rated voltage.

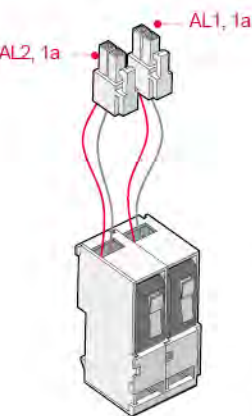
The maximum wire length

		Rated voltage [Vn]			
		DC 24 – 30 [V]		DC/AC 48 [V]	
Wire type	100%	#14 AWG (2.08mm ²)	#16 AWG (1.31mm ²)	#14 AWG (2.08mm ²)	#16 AWG (1.31mm ²)
	85%				
Operating voltage	100%	48.5m	30.5m	233.2m	143.9m
	85%	13.4m	8.8m	62.5m	39.3m

Note) In case of using UVT coil, the location of TC coil is changed.

Accessories

Trip Alarm Contact [AL]

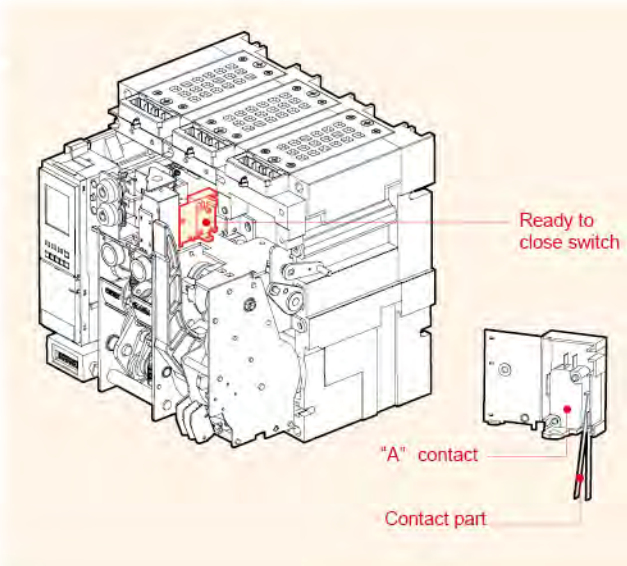


- When a circuit breaker is tripped by OCR which operates against the faulty current (Over Current Relay), Trip Alarm switch provides the information regarding the trip of circuit breaker by sending the electrical signal from the mechanical indicator on main cover of main circuit breaker or internal auxiliary switch. (Installed at the inside of circuit breaker)
- When a circuit breaker tripped by faulty current, a mechanical trip indicator (MRB, Manual Reset Button) pops out fro the main cover and the switch (AL) which sends control signal electrically is conducted to output the information occurred from faulty circuit breaker.
- MRB and AL can be operated only when tripping by OCR, but doesn't be operated by Off button and OFF operation of trip coil.
- To re-close a circuit breaker after a trip, press MRB to reset it for closing.
- 2 pcs of electrical trip switch (AL1, AL2, 1a) are provided (Option)
- Trip alarm contact and MRB (Manual reset button) need to be purchased together.

1. Electrical characteristics of trip alarm contact

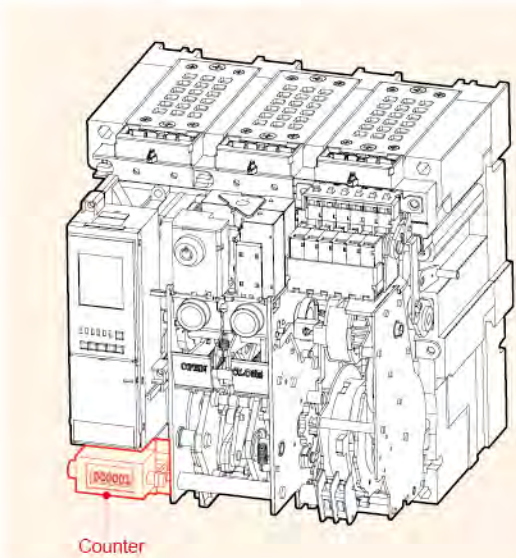
Rated voltage (V)	Non-inductive load (A)		Inductive load (A)		Inrush current
	Resistive load	lamp load	Inductive load (A)	Motor load	
8V DC	11	3	6	3	Max. 24A
30V DC	10	3	6	3	
125V DC	0.6	0.1	0.6	0.1	
250V DC	0.3	0.05	0.3	0.05	
250V AC	11	1.5	6	2	

Ready to Close Switch [RCS]



- It interlocks with mechanism of circuit breaker.
- It indicates the status that the circuit breaker is ready to do dosing operation.
- When mechanism is in OFF position or in Charge, contact is output with "ON" and it indicates that mechanism can be closed.

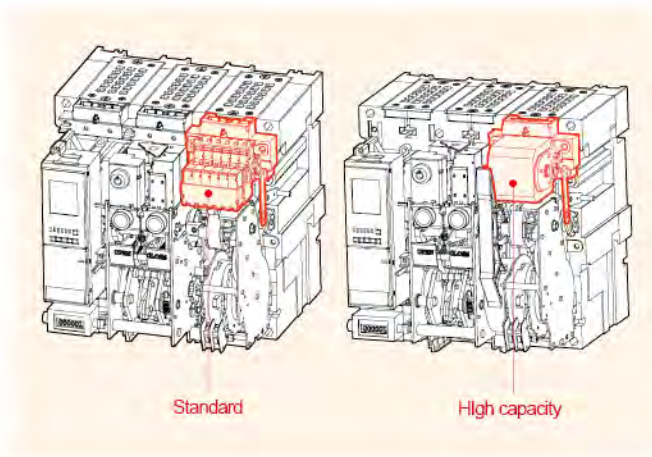
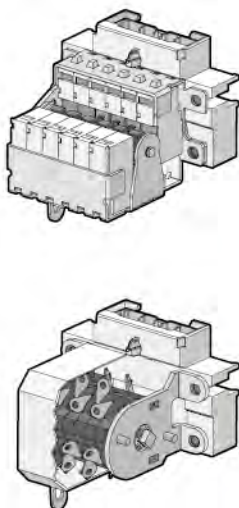
Counter [C]



- It displays the total number of ON/OFF operation of ACB.

Accessories

Auxiliary switch [AX]



- It is a contact used to monitor ON/OFF position of ACB from remote place.

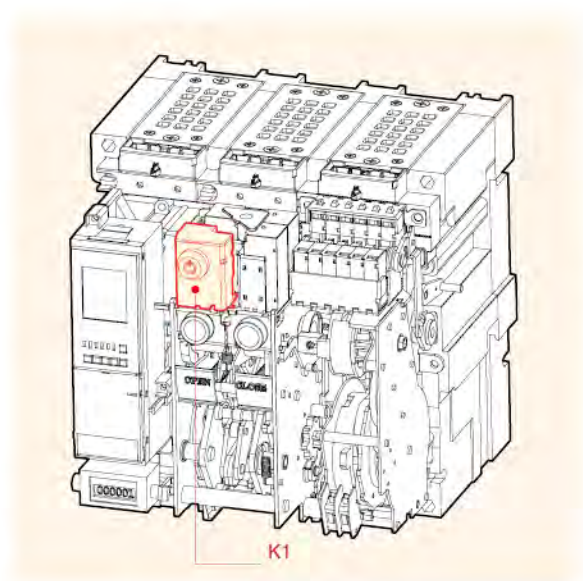
AUX. contact & charging types	
AX	Standard OFF charge 3a3b
AC	Standard ON charge 3a3b
BX	Standard OFF charge 5a5b
BC	Standard ON charge 5a5b
HX	High capacity OFF charge 5a5b
HC	High capacity ON charge 5a5b
CC	Standard ON charge 6a6b
JC	High capacity ON charge 6a6b

Standard classification

Standard		High capacity	
2000, 5000AF	4000, 6300AF	2000, 5000AF	4000, 6300AF

Classification			Standard		High capacity		Remark
			Resistive load	Inductive load	Resistive load	Inductive load	
Contact capacity	AC	490V	5A	6A	5A	2.5A	
		250V	10A	6A	10A	10A	
		125V	10A	6A	10A	10A	
	DC	250V	0.3A	0.3A	3A	1.5A	
		125V	0.5A	0.6A	10A	6A	
		30V	10A	6A	10A	10A	
No. of Contact that can be used		AX	3a3b		-		Standard charging type
		BX	5a5b		-		
		HX	-		5a5b		
		AC	3a3b		-		
		BC	5a5b		-		Rapid auto-reclosing charging type
		CC	6a6b		-		
		HC	-		5a5b		
		JC	-		6a6b		

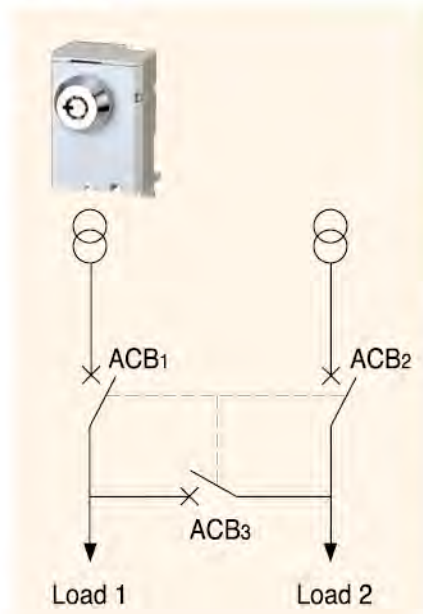
Key Lock [K1]



- It is a device for locking which prevents a certain circuit breaker from being operated by user's discretion when two or more circuit breakers are used at the same time.
- K1: Preventing mechanical closing

Key Interlock Set [K2]

Wiring



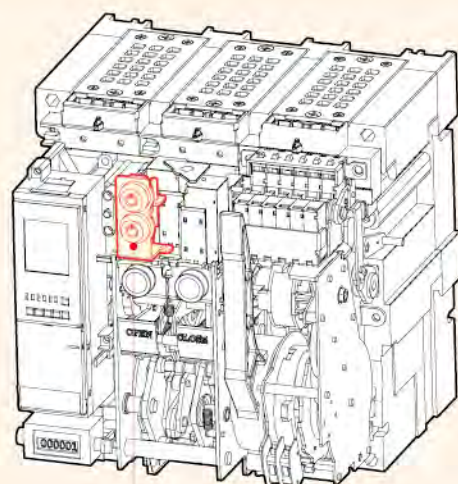
- 3 circuit breakers can be arranged for the continuous power supply to the load side and be interlocked mutually by using Key Lock embedded in each circuit breaker.

ACB-1	ACB-2	ACB-3	Status	
			LOAD1	LOAD2
●●●			OFF	OFF
●○○			OFF	ON
○●○			ON	OFF
○○●			ON	ON
●●○			OFF	OFF
●○●			OFF	ON
○●●			ON	OFF

○: Release ●: Lock

Accessories

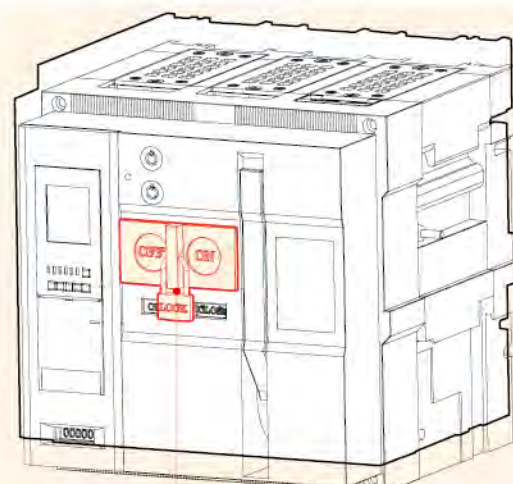
Double Key Lock [K3]



Key interlock double

- When only two keys are released at the same time, circuit breakers operate. Handling method is same as K1.

ON/OFF Button Lock [B]



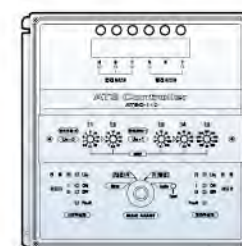
ON/OFF button lock

- It is to prevent manual operation of ACB's closing/tripping button due to user's wrong handling.
- It is not possible to handle ON/OFF operation under the "Button lock" status.

Note) Padlocks (Ø5 - Ø6) are not supplied.

Automatic Transfer Switch Controller [ATS]

Ratings

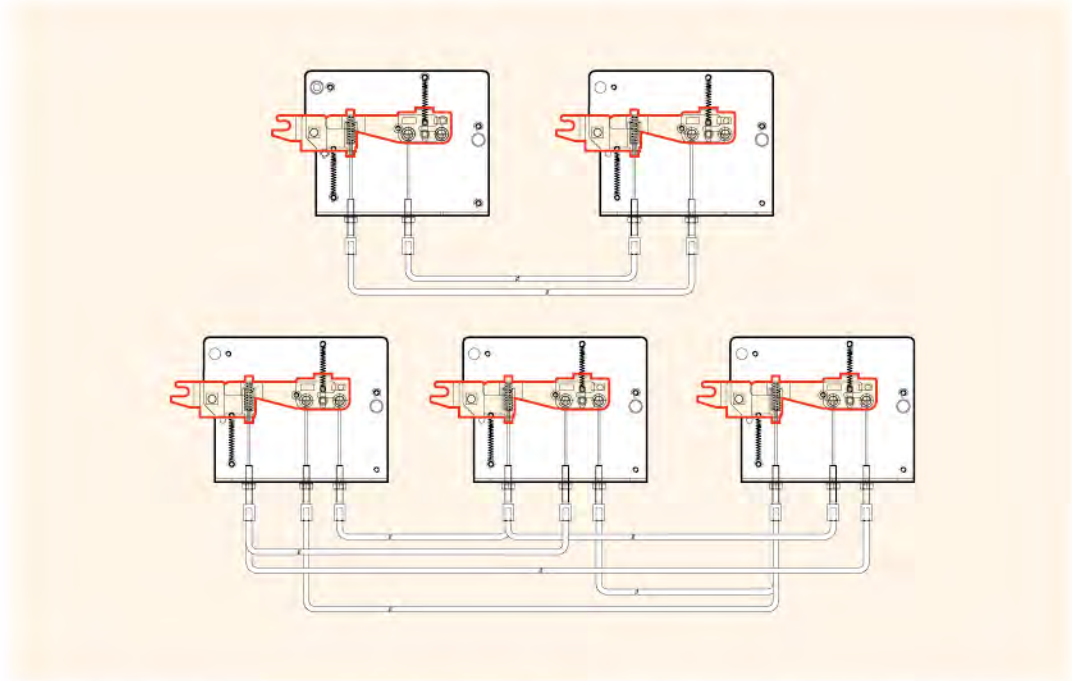


Model Type	ATSC-110	ATSC-110-C	ATSC-220	ATSC-220-C
Rated voltage	AC 110V		AC 220V	
Voltage range	AC 93.5 (±5%) – 126.5V (±5%)		AC 187 (±5%) – 253V (±5%)	
Frequency	50Hz / 60Hz			
Power consumption (apparent power)	15.4W			
4-location switch (stop, N, R, Auto)	■	■	■	■
Test funtion	■	■	■	■
Generator control function	■	■	■	■
NRS function	■	■	■	■
N power source setting (phase-to-phase/3 phases)	■	■	■	■
Time setting (T1 – T6)	■	■	■	■
Fault function (OCR/Circuit breaker trouble)	■	■	■	■
Output contact (Auto, Load burden)	■	■	■	■
Communication function (RS-485)	-	■	-	■

- T₁: The delayed time from when UN (power supply or electric company) is tripped to when generator start-up signal contact is closed. (t₁: 0.1, 0.5, 1, 2, 4, 8, 15, 30, 40, 50secs)
- T₂: The delayed time from when UN is closed to when ACB₂ is tripped. (t₂: 0.1, 1, 2, 4, 8, 15, 30, 60, 120, 240secs)
- T₃: The delayed time from when ACB₁ is tripped to when ACB₂ is closed. (t₃: 0.5, 1, 2, 5, 10, 15, 20, 25, 30, 40secs)
- T₄: The delayed time from when ACB₂ is tripped to when ACB₁ is closed. (t₄: 0.5, 1, 2, 5, 10, 15, 20, 25, 30, 40secs)
- T₅: The delayed time when ACB is closed to when generator start-up signal contact is opened. (t₅: 60, 120, 180, 240, 300, 360, 420, 480, 540, 600secs)
- Stop-mode: This mode is for compulsory closing of ACB (electric power company) or ACB₂ (power station) when UN (power supply of electric power company) or UR (power supply of power station) is available
* UN or UR should be kept in ON position
- N-mode: This mode is for compulsory closing of ACB₁ when UN is available.
* it does not matter to be ON or OFF position of UR and if converting to N-mode while using UR, generator start-up signal contact is opened.
- R-mode: This mode is for compulsory closing of ACB₂ during the use of UR regardless of that UN is available or not.
- Auto-mode: This mode is for transferring a circuit breaker automatically to available power supply of UN or UR. In short, it trips the circuit breaker where power supply is not available and it close to the circuit breaker where supply is available.

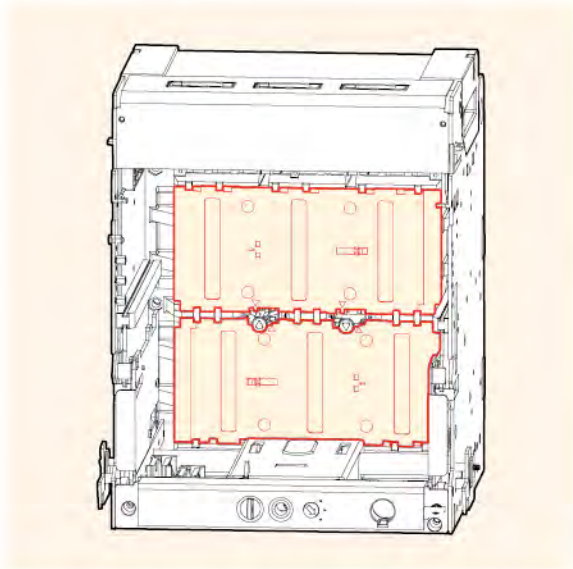
Accessories

Mechanical Interlock [MI]



- It is used to interlock closing and trip between two or three breakers mechanically so as to prevent unintended operation at the same time.
- Wire type interlock can be applied upto 3 breakers

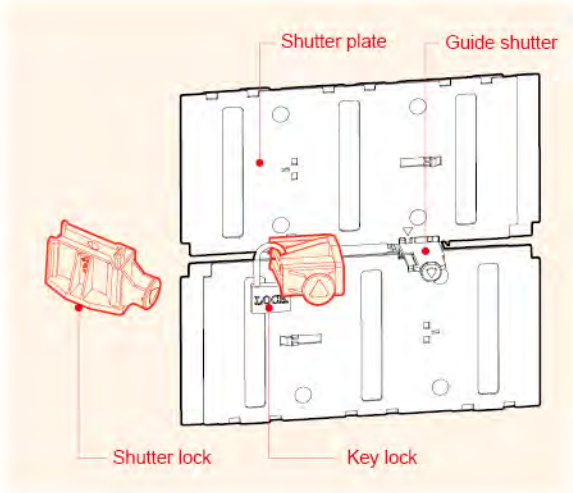
Safety Shutter [ST]



- It is the automatic safety device to protect the connectors of main circuit by cutting off dangerous contact from outside while the breaker is drawn out. When the ACB is drawn in, the shutter is automatically opened.
- There are 4 types of Safety Shutter and they are divided as shown in figure below.

The types of safety shutter plate	
2000/5000AF, 3P	4000/6300AF, 3P
2000/5000AF, 4P	4000/6300AF, 3P

Safety Shutter Lock [STL]

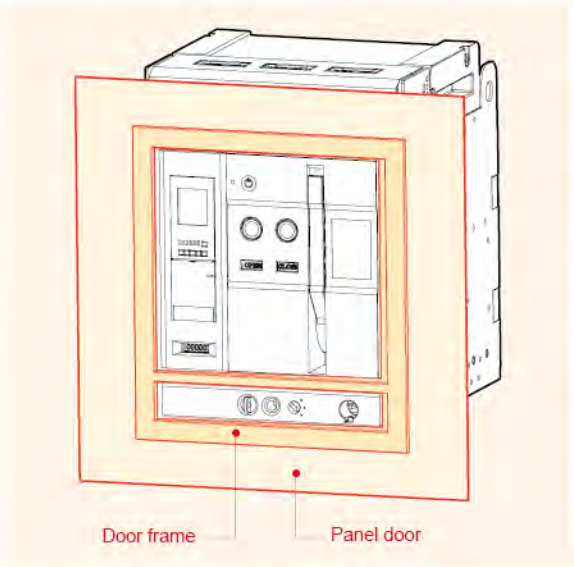
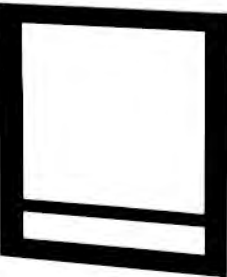


- It is locking device which prevents safety shutter from being opened when it is closed.
- If shutter lock is connected with guide shutter, the guide shutter can not be pushed structurally. Thus, it is not available to open the safety shutter.

Note) Padlocks (Ø5 – Ø6) are not supplied.

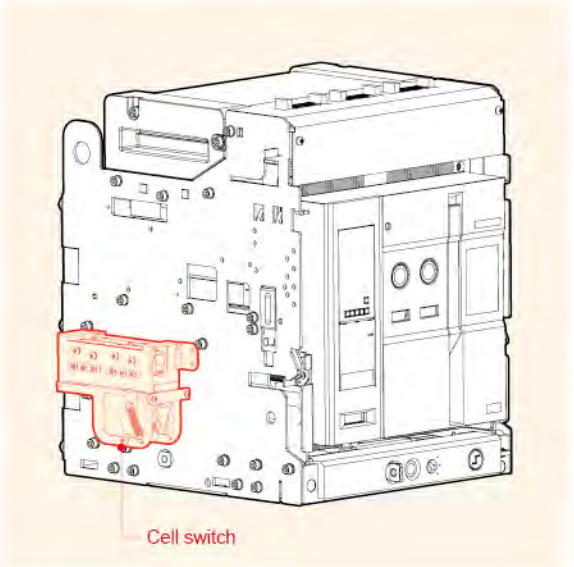
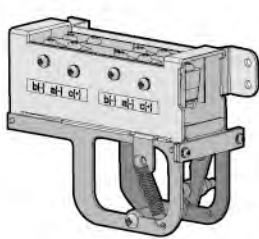
Accessories

Door Frame [DF]



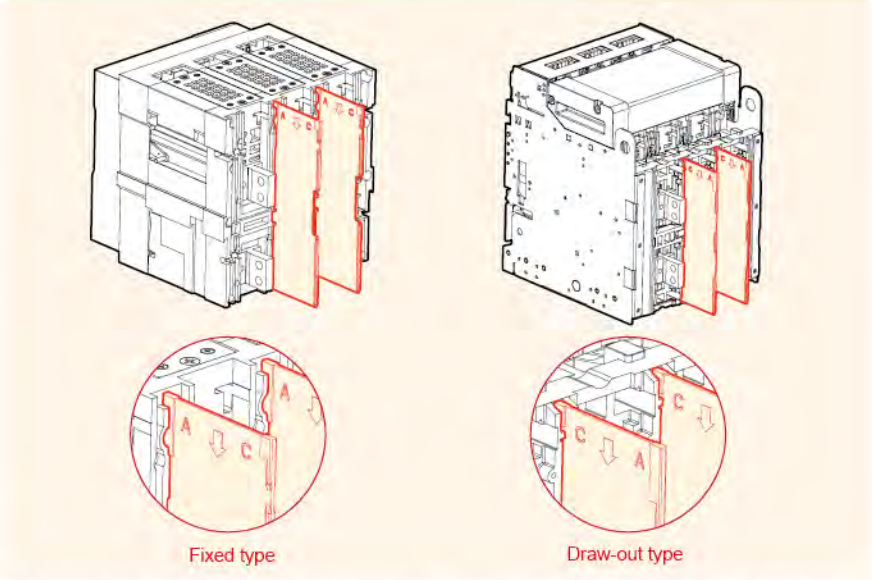
- When structuring the embedded type of ACB panel, it protects the protrude front of ACB and the cutting side of panel door by attaching it to the panel door.

Cell Switch [CEL]



- It is a contact which indicates the present position of ACB.
(CONNECTED, TEST, DISCONNECTED)
- <Contact configuration>
4C: 1Disconnected + 1Test + 2Connected
8C: 2Disconnected + 2Test + 4Connected
*Contact configuration can be changeable if necessary.

Insulation Barrier [IB]

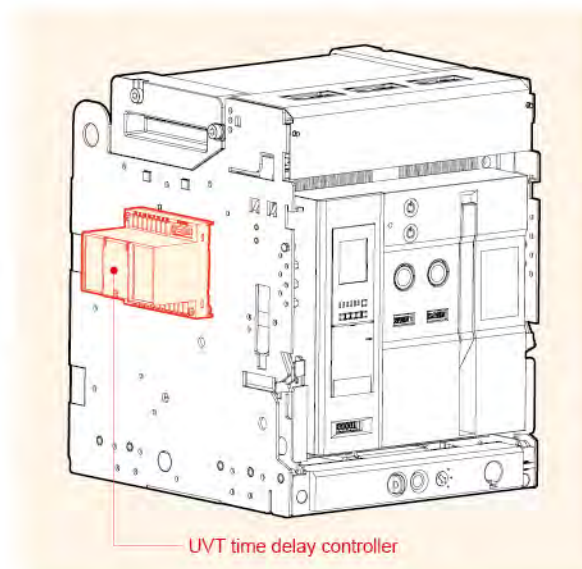
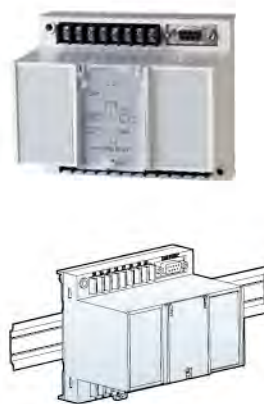


- Insulation barrier prevents the arc which may arise and result in short-circuit between phases in advance
- As "C" stands for "CRADLE", install the insulation barrier in the direction of "C" in case of Draw-out type.
- As "A" stands for "ACB main frame", install the insulation barrier in the direction of "A" in case of Fixed type.

ACB position			DISCONNECTED		CONNECTED
Draw-in and draw-out position			DISCONNECTED	TEST	CONNECTED
Contact operation	CL-C (Connected)		OFF	ON	
	CL-T (Test)		OFF	ON	
	CL-D (Disconnected)		ON		OFF
Contact capacity	Voltage (V)		Revised load		Inductive load
	AC	460V	5		2.5
		250V	10		10
		125V			
	DC	250V	3		1.5
		125V	10		10
		30V	10		10
Contact number			4C		

Accessories

UVT Time Delay Controller [UDC]



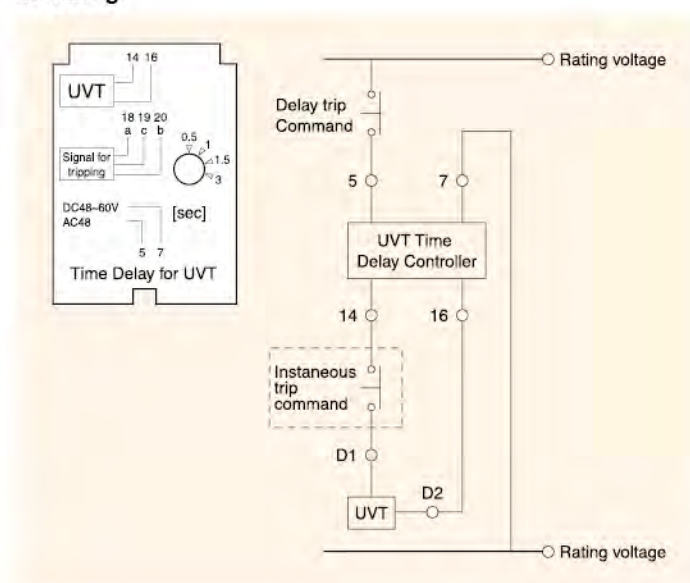
- UVT is a device which makes ACB tripped automatically to prevent the accident on load side due to under voltage or power breakdown. There are two types, Instantaneous type and time delay type.
- It can be installed on the rail or to the cradle.
- Instantaneous type: only available with UVT coil.
- Time delay type: available by connecting UVT coil and UVT time delay controller.
- Common use for the all types.

1. The rated voltage and characteristics of UVT time delay controller

Rated voltage [Vn]		Operating voltage range [V]		Power consumption (VA or W)		Trip time [ms]
DC [V]	AC [V]	Pick up	Drop out	Inrush	Steady-state	
48 – 60	48	0.65 – 0.85 Vn	0.4 – 0.65 Vn	200	5	0.5, 1, 1.5, 3
100 – 130	100 – 130					
200 – 250	200 – 250					
–	380 – 480					

Note) Operating voltage range is the min. rated standard for each rated voltage (Vh).

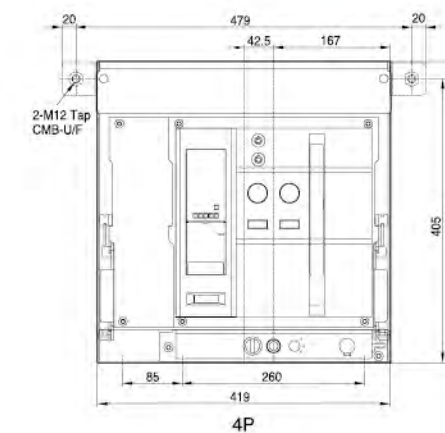
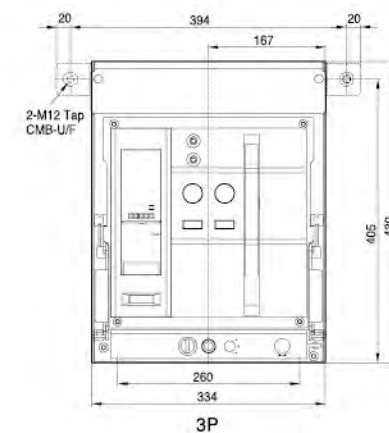
2. Wiring



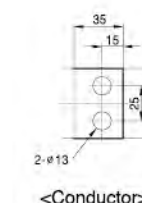
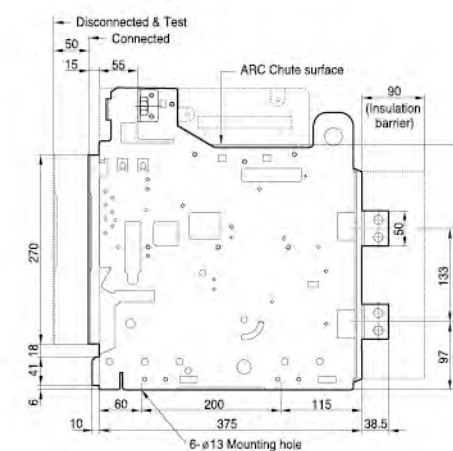
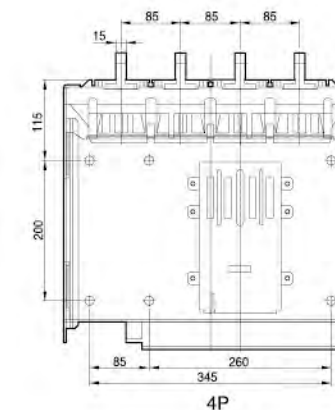
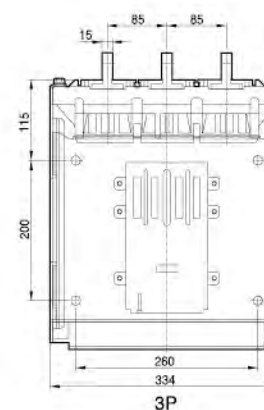
Dimensions

Draw-out type 2000AF (630 – 1600A: AKH/AKN/AKS-06 – 16D)

Front view

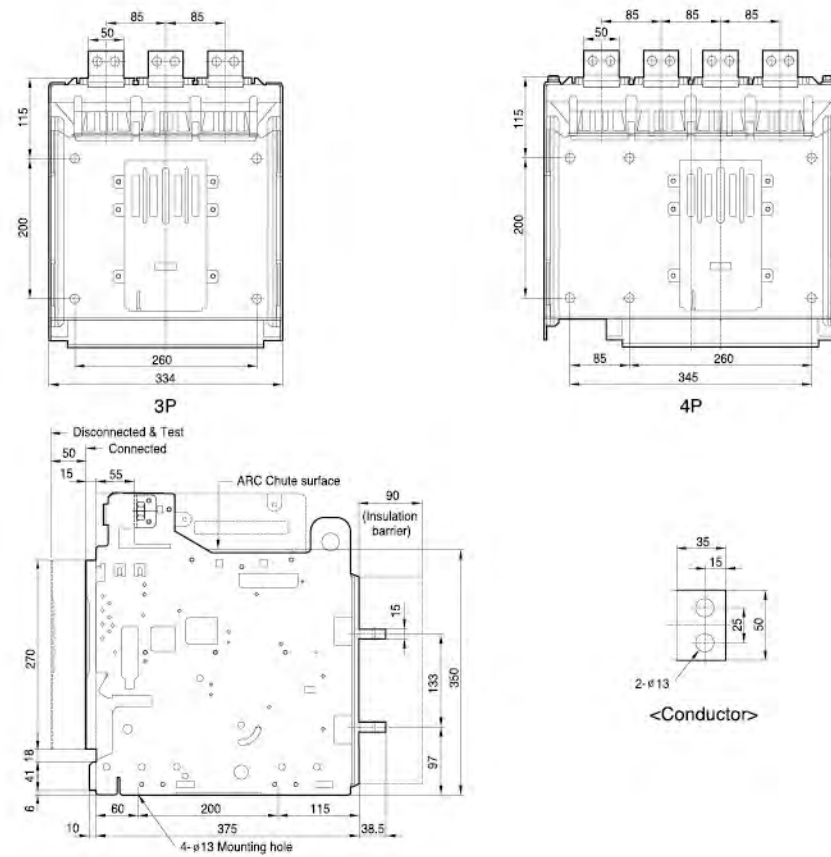


Vertical type

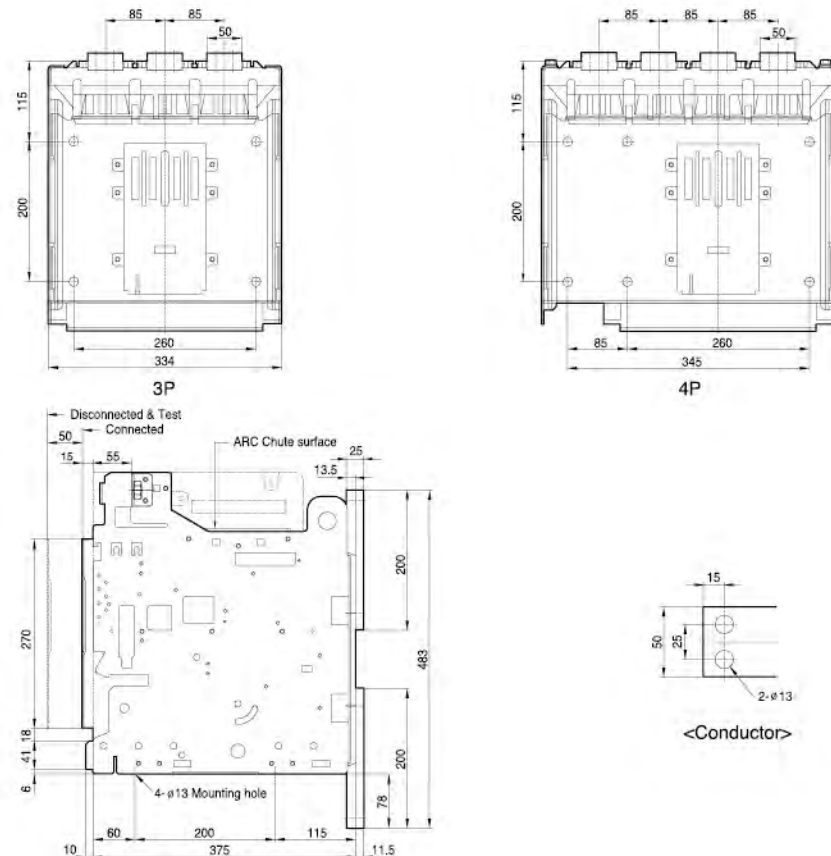


Dimensions

Horizontal type

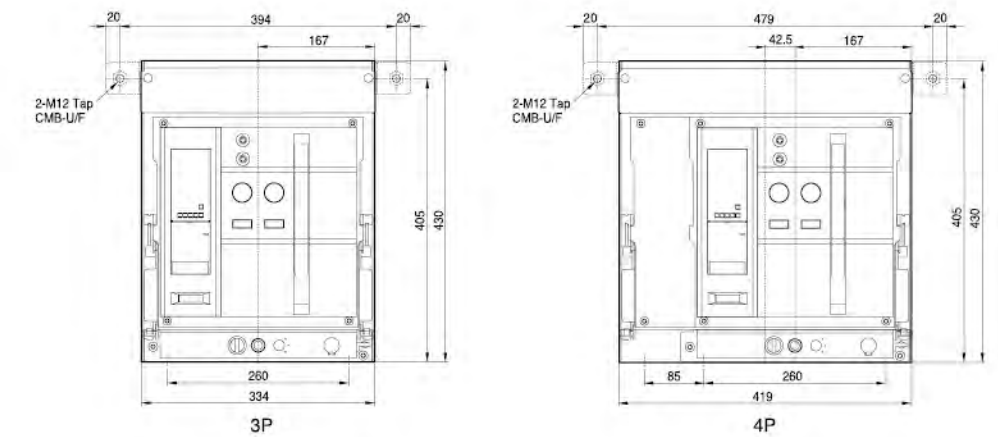


Front connection type

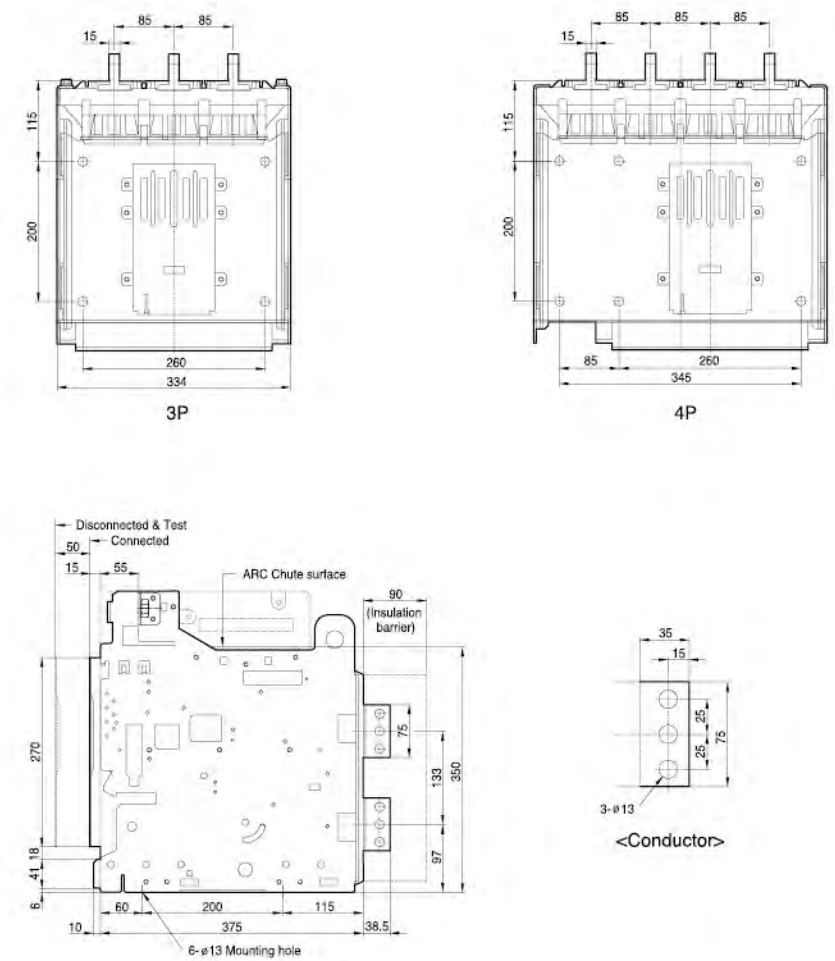


Draw-out type 2000AF (2000A: AKH/AKS-20D)

Front view



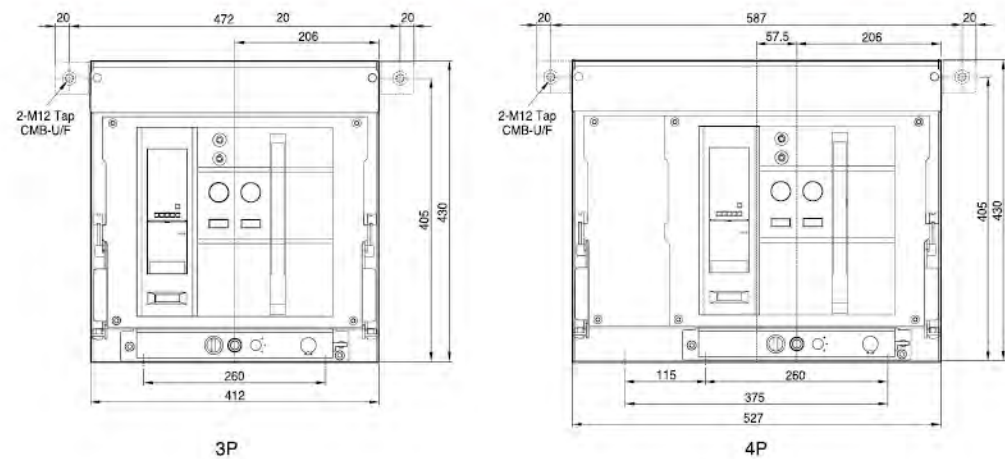
Vertical type



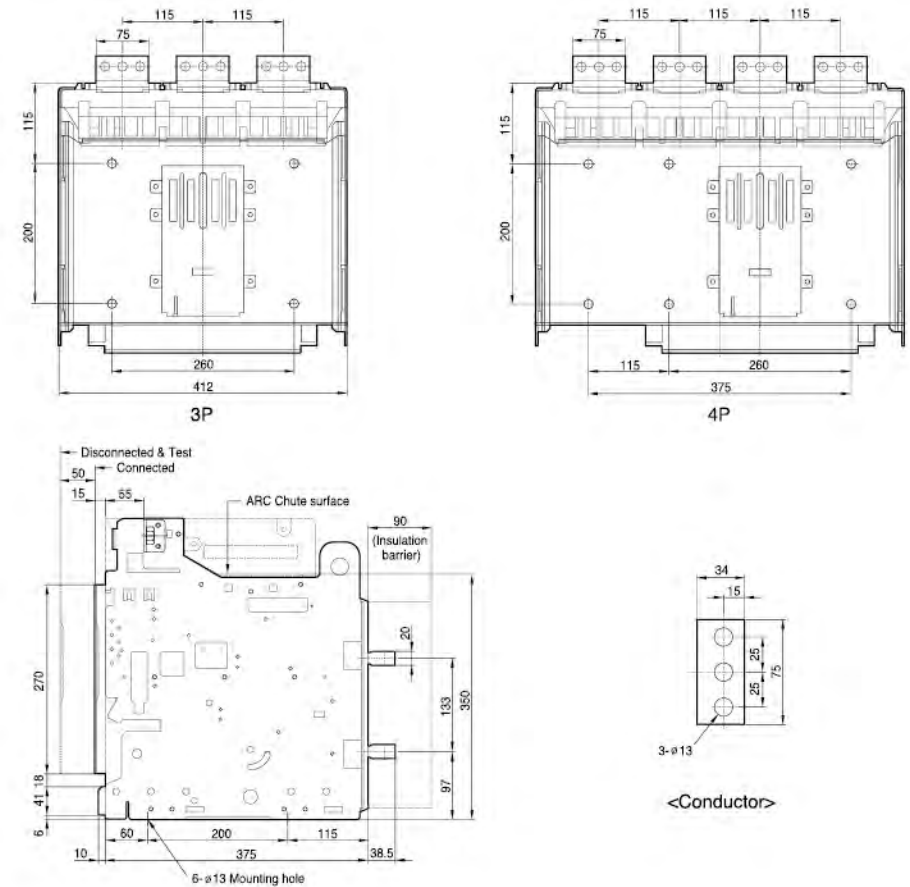
Dimensions

Draw-out type 4000AF (2000 – 3200A: AKH/AKN/AKS-20 – 32E)

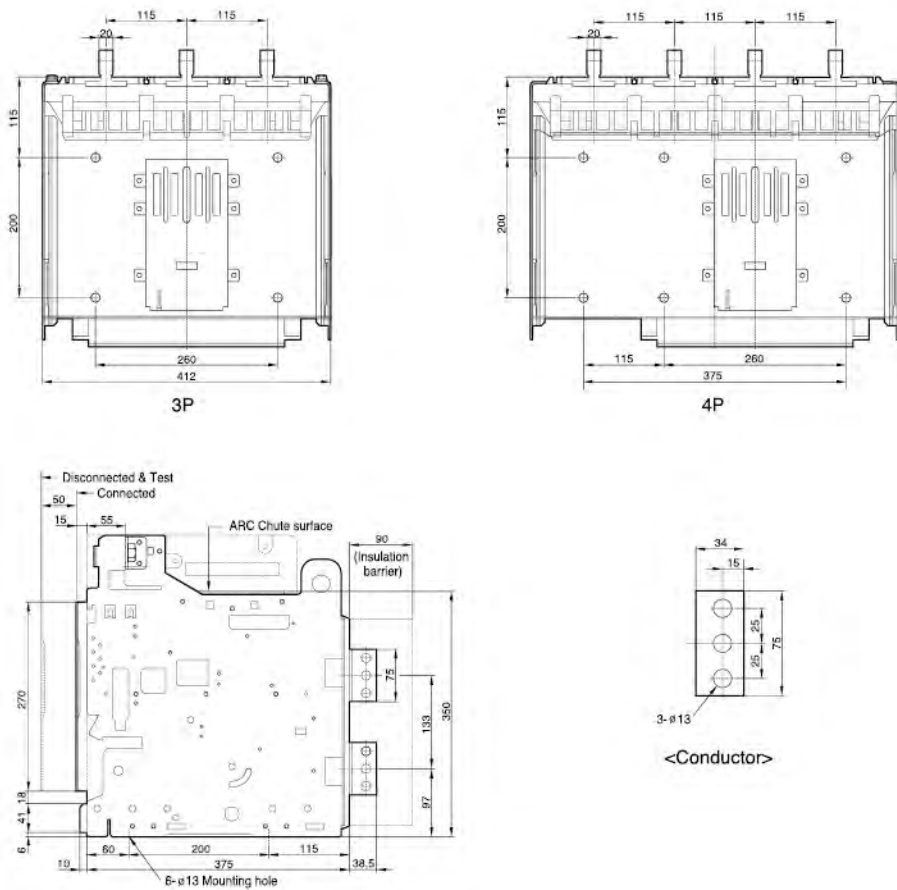
Front view



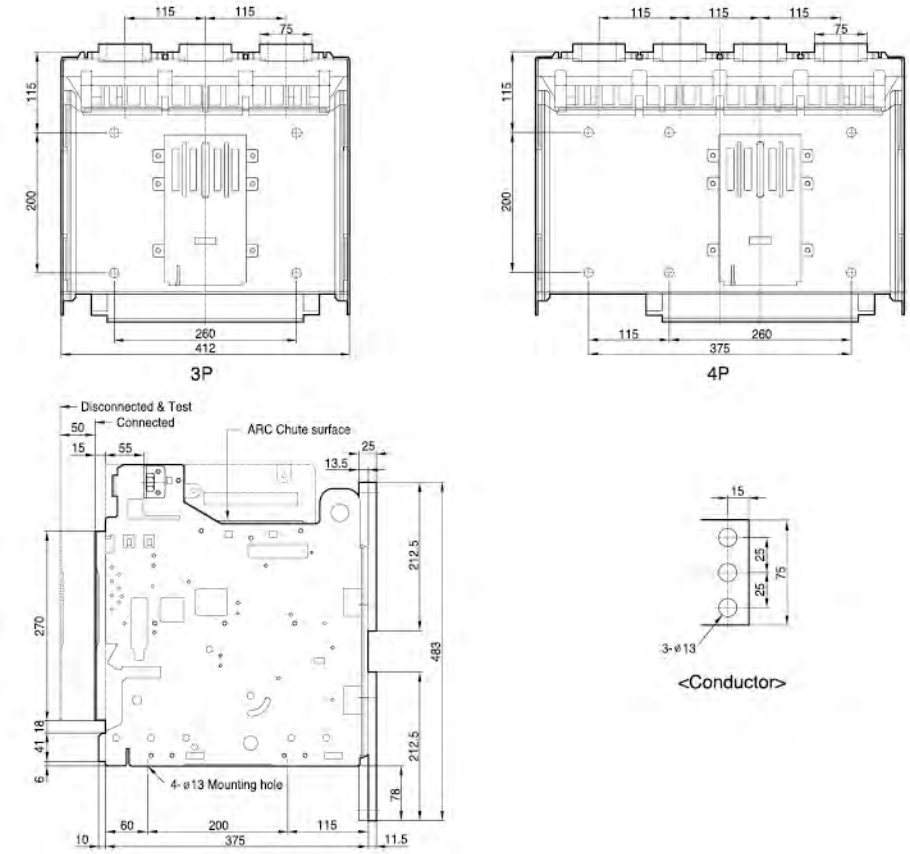
Horizontal type



Vertical type



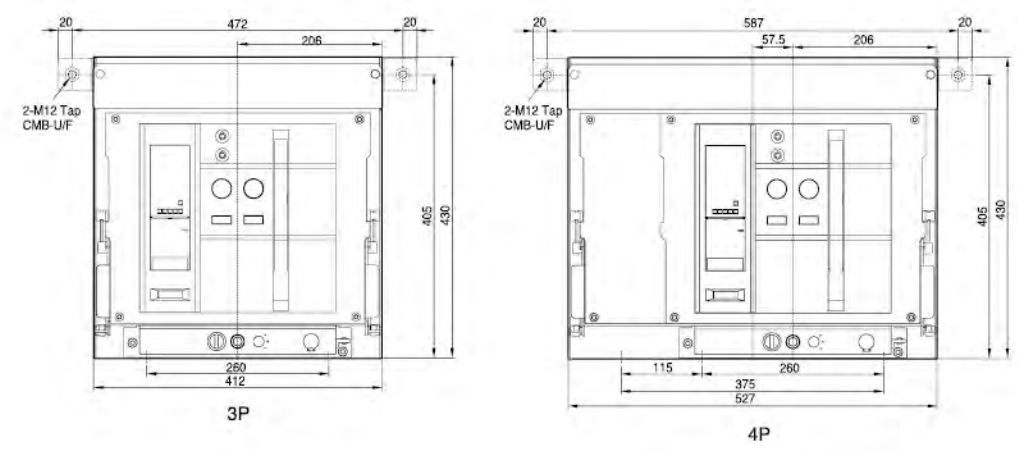
Front connection type



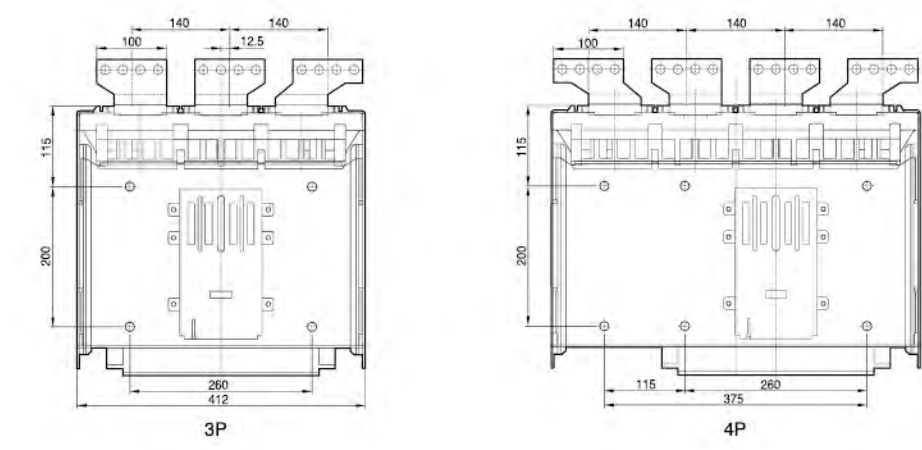
Dimensions

Draw-out type 4000AF (4000A: AKH/AKS-40E)

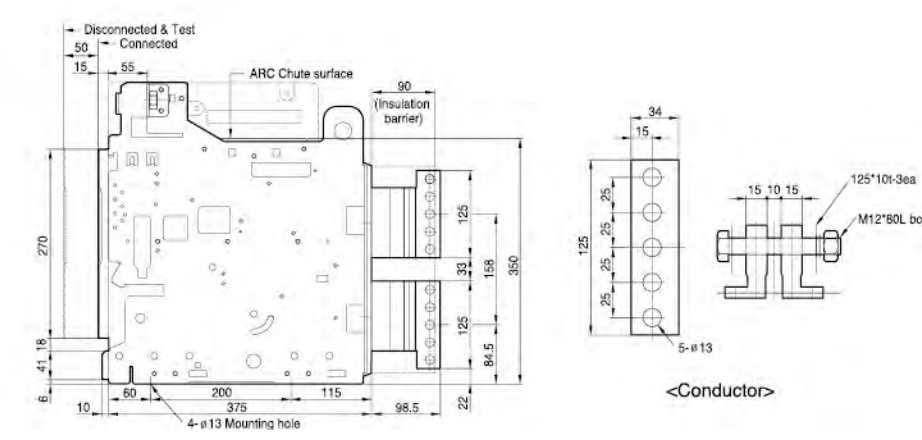
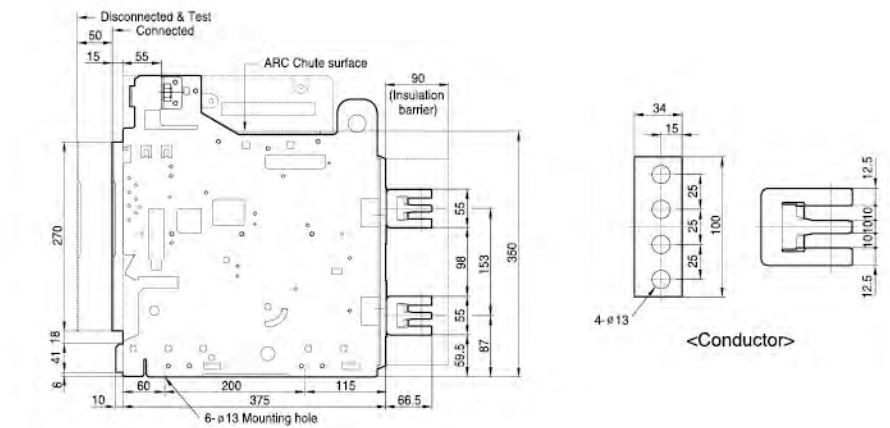
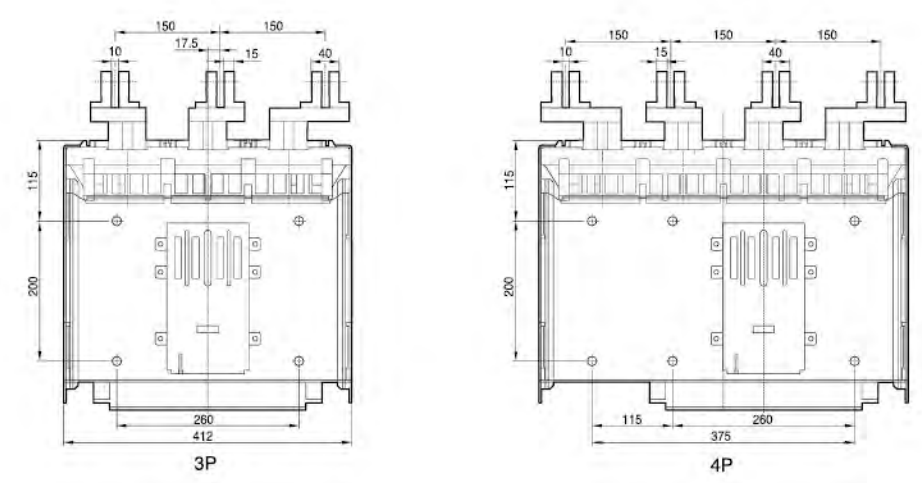
Front view



Horizontal type



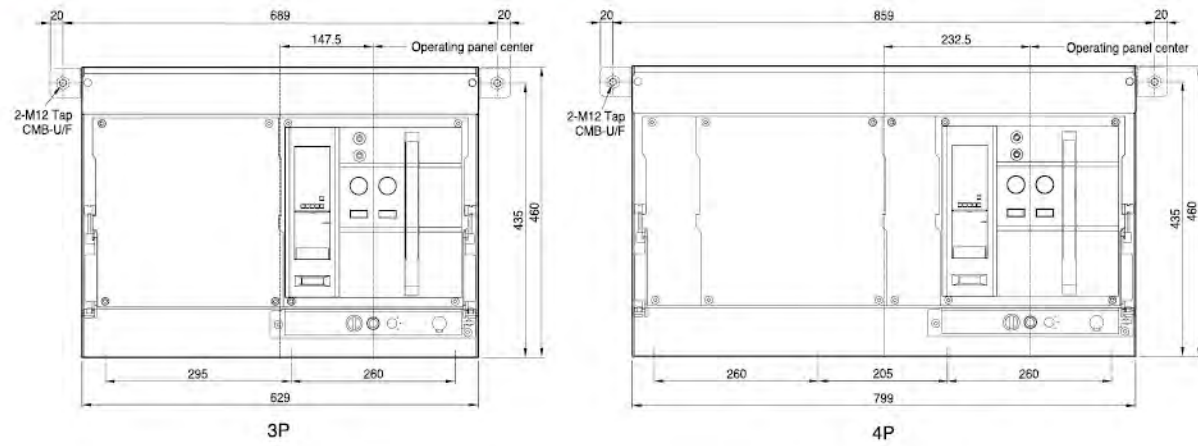
Vertical type



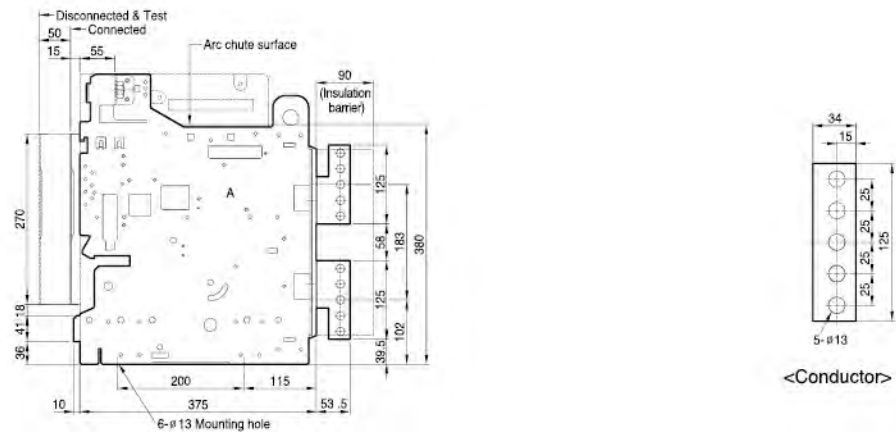
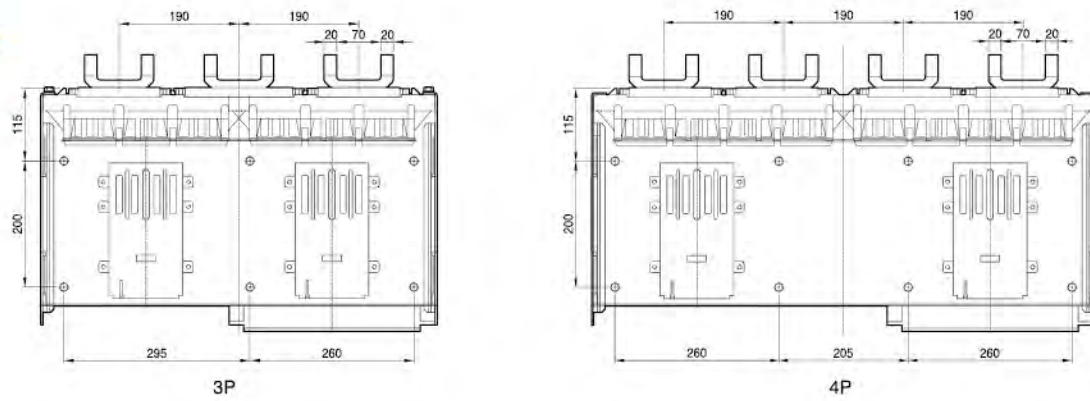
Dimensions

Draw-out type 5000AF (4000 – 5000A: AKS-40 – 50F)

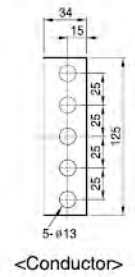
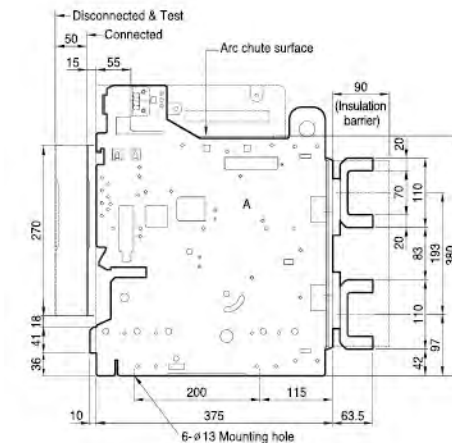
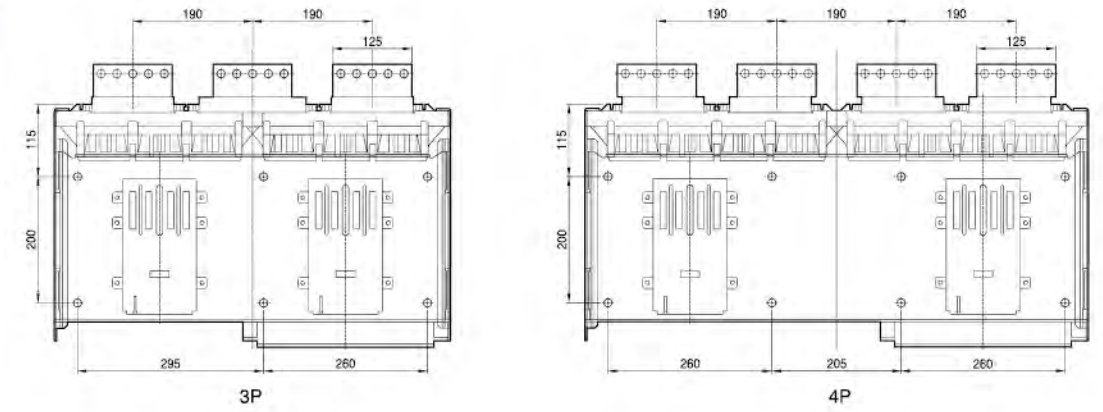
Front view



Vertical type



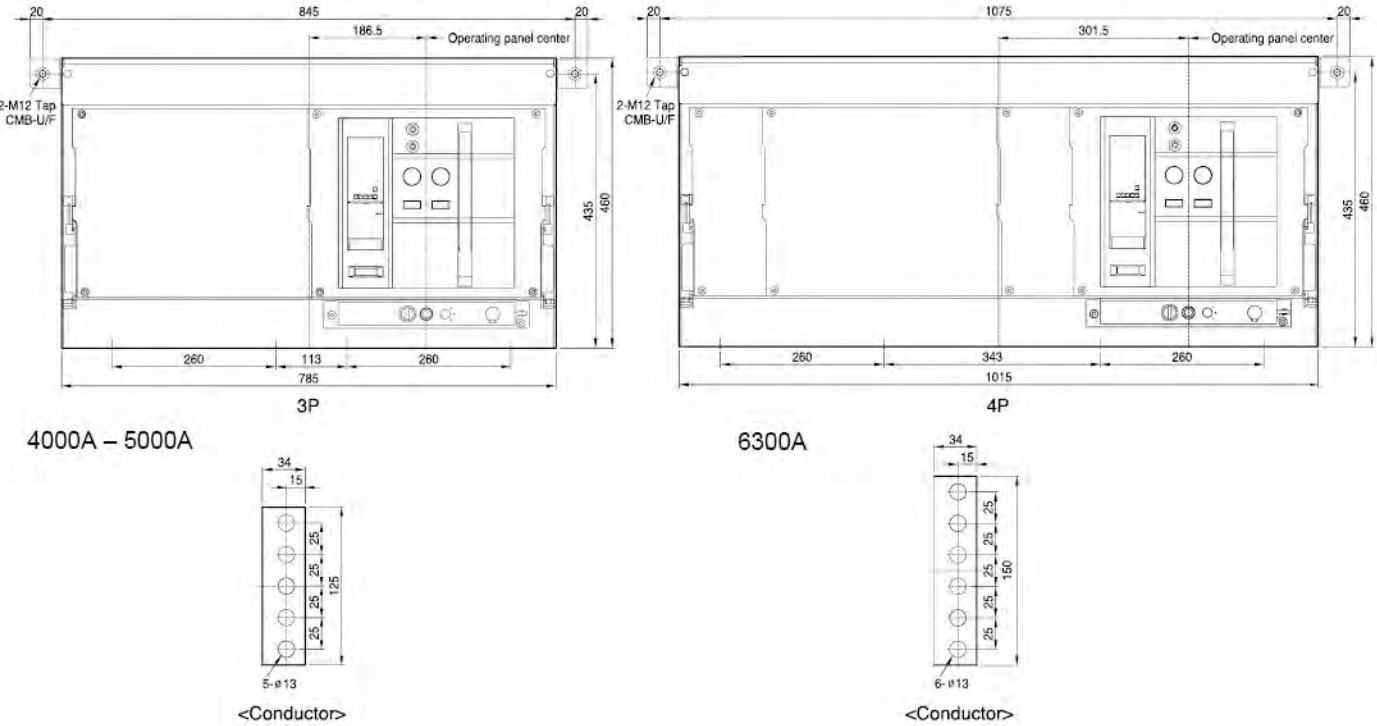
Horizontal type



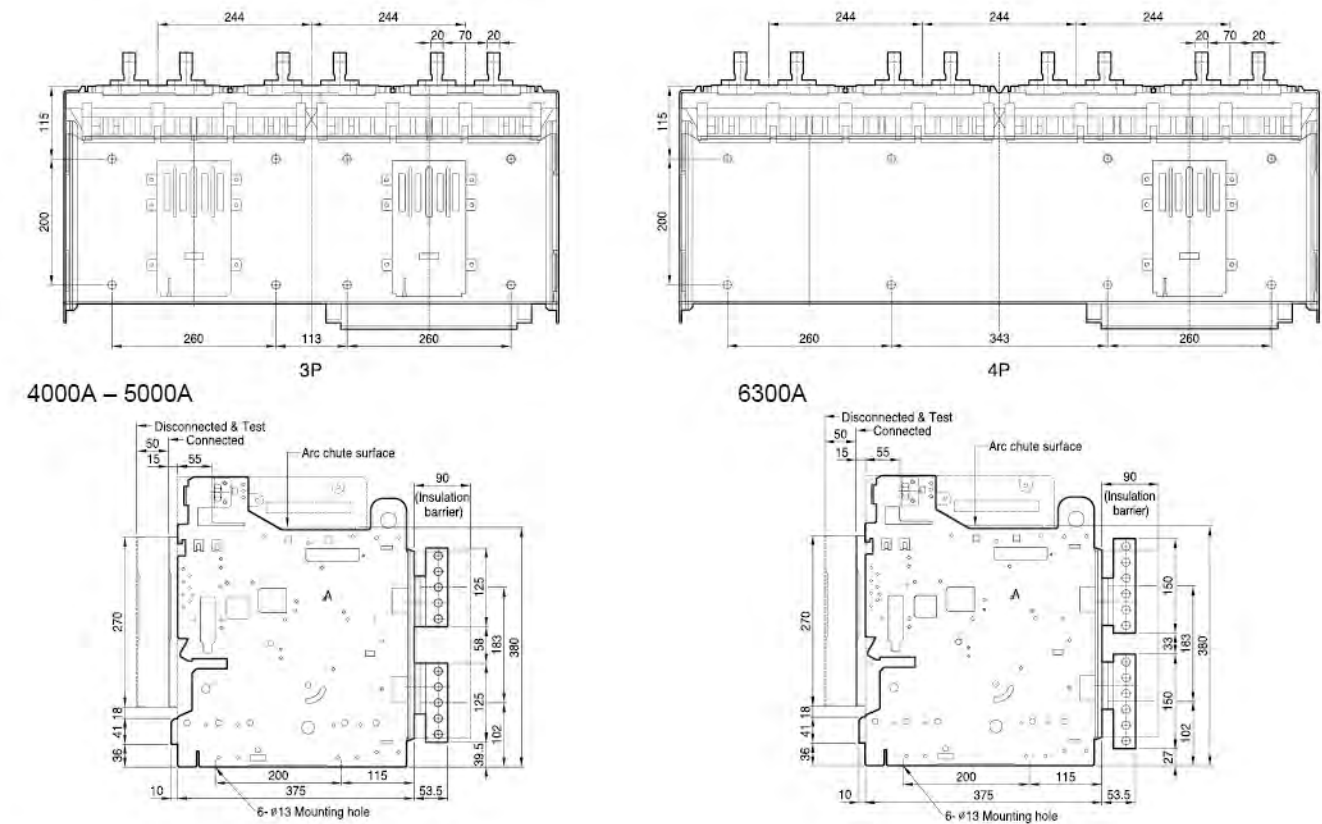
Dimensions

Draw-out type 6300AF (4000 – 6300A: AKH/AKS-40 – 50G)

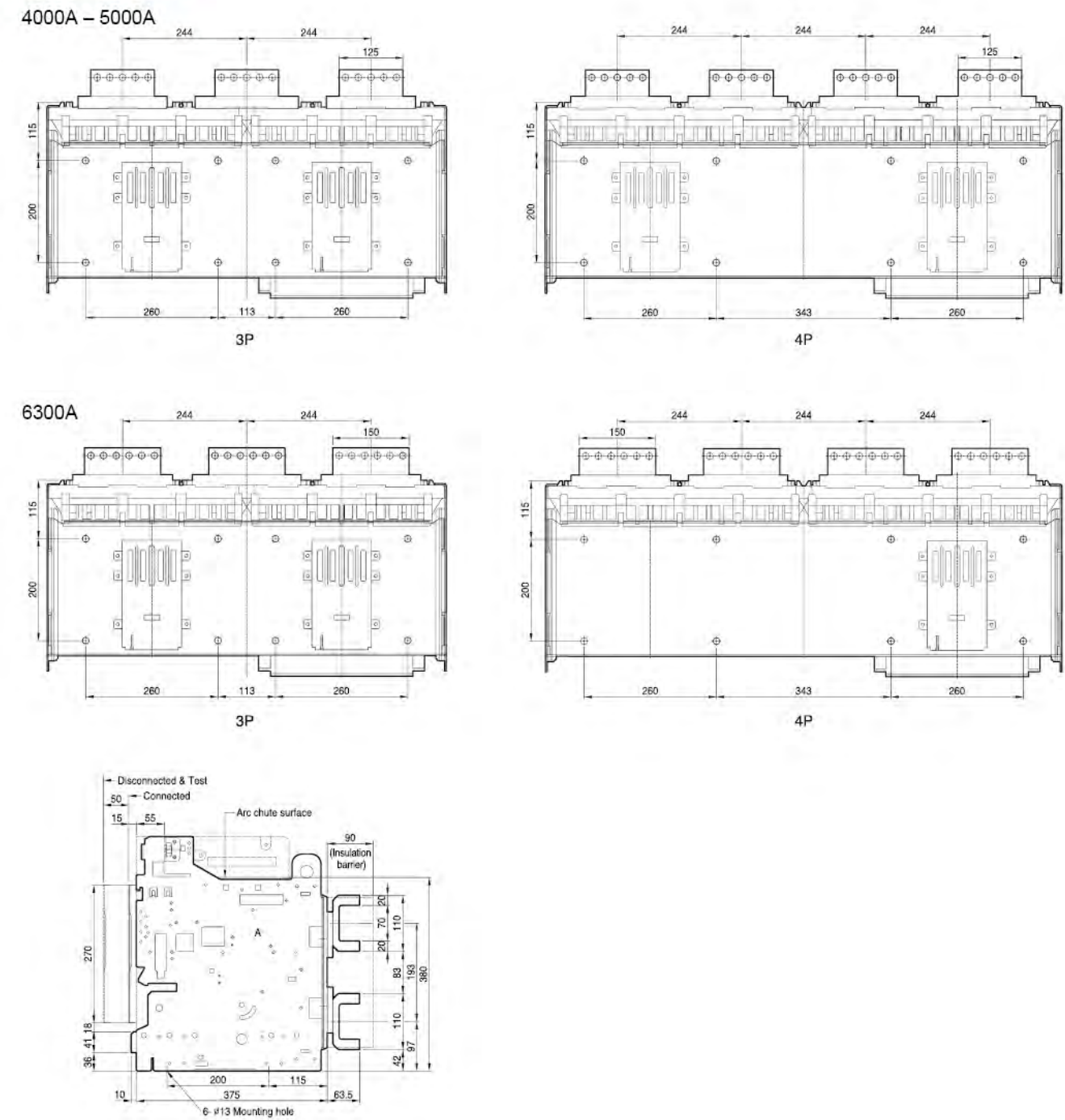
Front view



Vertical type

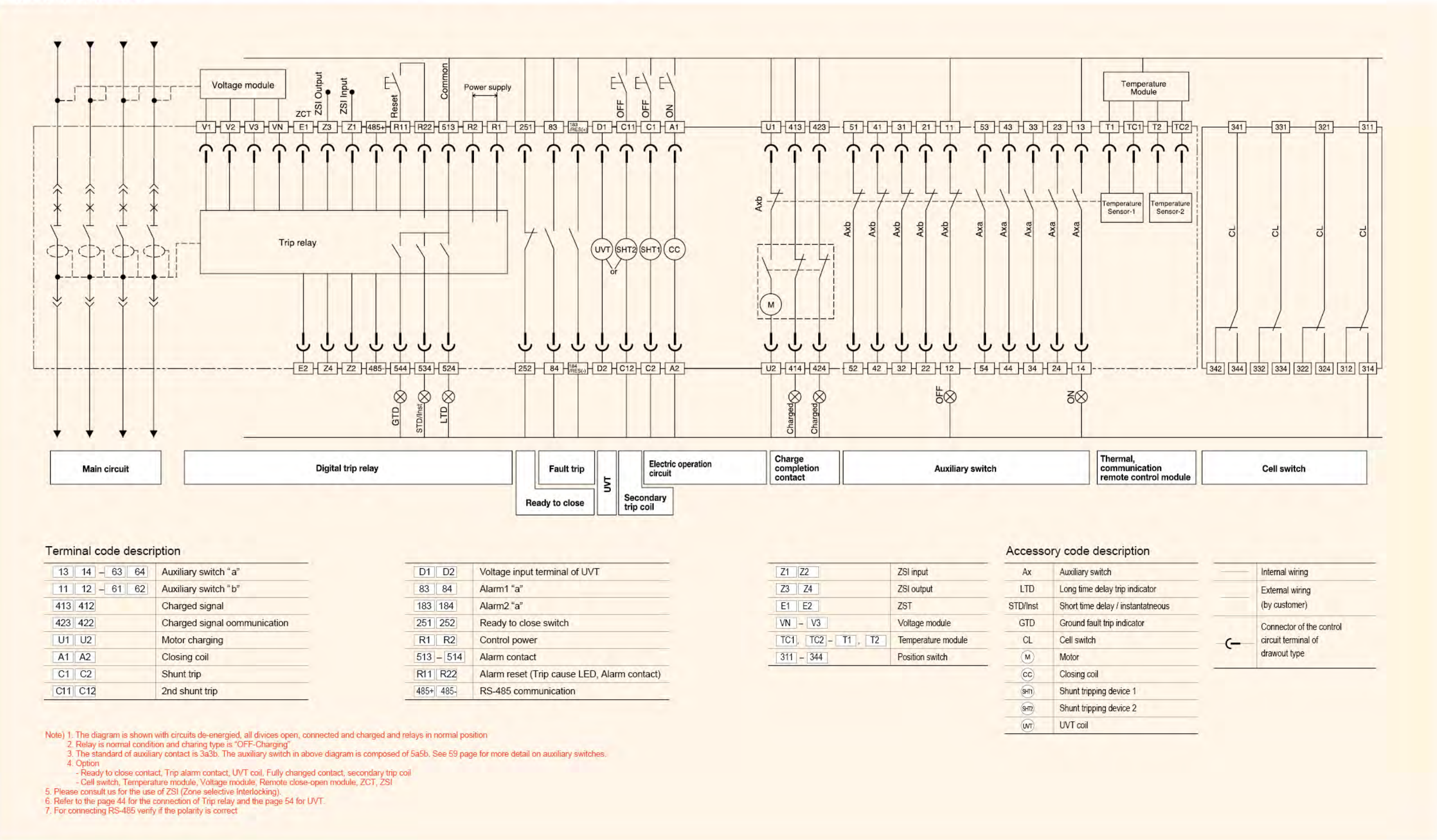


Horizontal type



Electrical diagram

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



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 **Hitachi Industrial Equipment Systems Co., Ltd.**