

Top 100
Global
Innovator
for 10 years

Susol Super Solution

UL Air Circuit Breakers



LS ELECTRIC

Susol Super Solution

UL ACB

Air Circuit Breakers

Premium Susol ACBs meet your demands for not only the high breaking capacity with its full line-up reaching up to 6000A, with optimized frame sizes for panel designs but also the high max voltage up to 847Vac with harsh environment conditions for renewable energy systems. Our various accessories and terminal configurations allow for user-friendly handling.

Susol ACB provides the 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.



UL listed/ANSI certified
Low-Voltage Power Circuit Breaker UA series



Susol *Super Solution*

UL Air Circuit Breakers

Codes and standards

UA Series Low-Voltage Power Circuit Breakers are manufactured and tested in accordance with the following standards:

- ANSI C37.13
- ANSI C37.16
- ANSI C37.17
- ANSI C37.50
- UL 1066 (cULus Listed)
- CSA C22.2 No.31-10

Note) Throughout this document, the phrase "ANSI Certified" means the product meets the requirements of UL 1066 and ANSI C37

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Susol series



- **Modular design**
- **High (130kA) breaking capacity full line-up to 6000A**
- **Satisfy the needs for compact sized panels**
- **N-Phase conducting capacity 100%**
- **Interchangeable trip unit and rating plug**
- **High rated maximum voltage-Up to 847Vac**

Safety

Monitor temperatures for safety (Optional)

- Careful selection of materials
- Zero arc space
- Perform discriminations between upstream and downstream levels

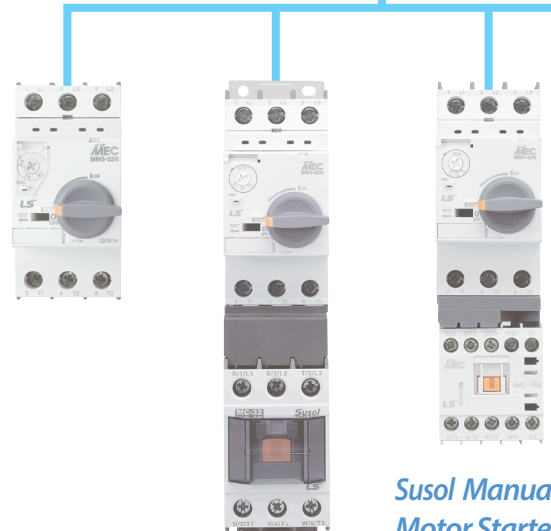
User convenience

Various connection types for main circuit terminals

- Easy installation of accessories
- Interchangeable Trip unit and Rating plug

Intelligent trip relay

Various advanced functions for protection, measurement, diagnosis, analysis, communication



Susol Manual Motor Starters



**UL 1066
ANSI C37**

Smart Air Circuit Breakers



Susol Molded Circuit Breakers



*Susol Magnetic Contactors &
Overload Relays*

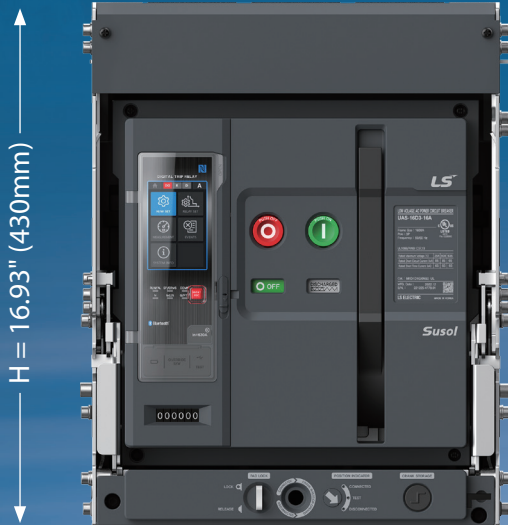


Full line-up & Compact

Up to 6000A, Susol ACB provides a full line-up of 3 compact frame sizes.
Enables users to design panels of optimal volume.

800 ~ 1600 AF

800 ~ 3200 AF



← W = 13.15" (334mm) →

← W = 16.22" (412mm) →

85kA

100kA

UAS-08/16D

08	800AF
16	1600AF

85kA at 508Vac
W=13.15" (334mm) 3p,
16.50" (419mm) 4p

UAH-08~32E

08	800AF
16	1600AF
20	2000AF
25	2500AF
32	3200AF

100kA at 508Vac
W=16.22" (412mm) 3p,
20.75" (527mm) 4p

3200 ~ 6000 AF



130kA

- High breaking capacity:
85/100/130kA (at 508Vac)
- 3 ampere frame sizes:
1600/3200/6000AF
- N phase current conducting capacity: 100%

UAH- 32~60G

32	3200AF
40	4000AF
50	5000AF
60	6000AF

130kA at 508Vac
W=30.91" (785mm) 3p,
39.96" (1015mm) 4p

Trip Relay

Trip relays are classified according to function.

Trip relays are classified according to their usages and functions to maximize customers' satisfaction. Classified trip relays and easy installation.

- Protection: overload, short current, ground fault, earth leakage, under voltage, over voltage, under frequency, over frequency, reverse power, unbalance, etc
- Measurement: voltage, ampere, power, energy, frequency, power factor, Harmonics, etc.
- Event & fault recording: Max. 256 events & faults
- Communication: Modbus/RS-485, Profibus-DP



Susol ACB Trip Relay functioning world-best protection can be interlocked with mechanism. It makes the breaking capacity of ACB improved and ACB's life enhanced, and provides advanced functions - measurement, diagnosis, analysis, and communication.

Susol ACB Trip relay

N type



A type



P type



S type



- L/S/I/G
- Self Power
- RTC Timer mounted
- Fault indicator (LED)

- L/S/I/G (or Gext)
- ZSI (Protective coordination)
- Remote Reset
- Modbus/RS-485
- Profibus-DP (Option)

- Self Power
- AC/DC 85 ~ 264V
- RTC Timer mounted
- Fault Recording (10EA)

- L(N)/S1/I/G(or Gext)
- Thermal(linear hot start)
- UV1/OV1/RV/D/S(V)1/VU/IU
- UF1/OF1/ROCOF/RP/RQ1/OP/OQ/UP
- Measurement: V/A/W/Wh/F/PF
- ZSI (Protective coordination)
- Remote Reset
- ERMS, Local/Remote DI (selectable)

- USB Terminal (Power, Communication)
- Modbus/RS-485
- Bluetooth (Option)
- Ethernet (Optional product required)

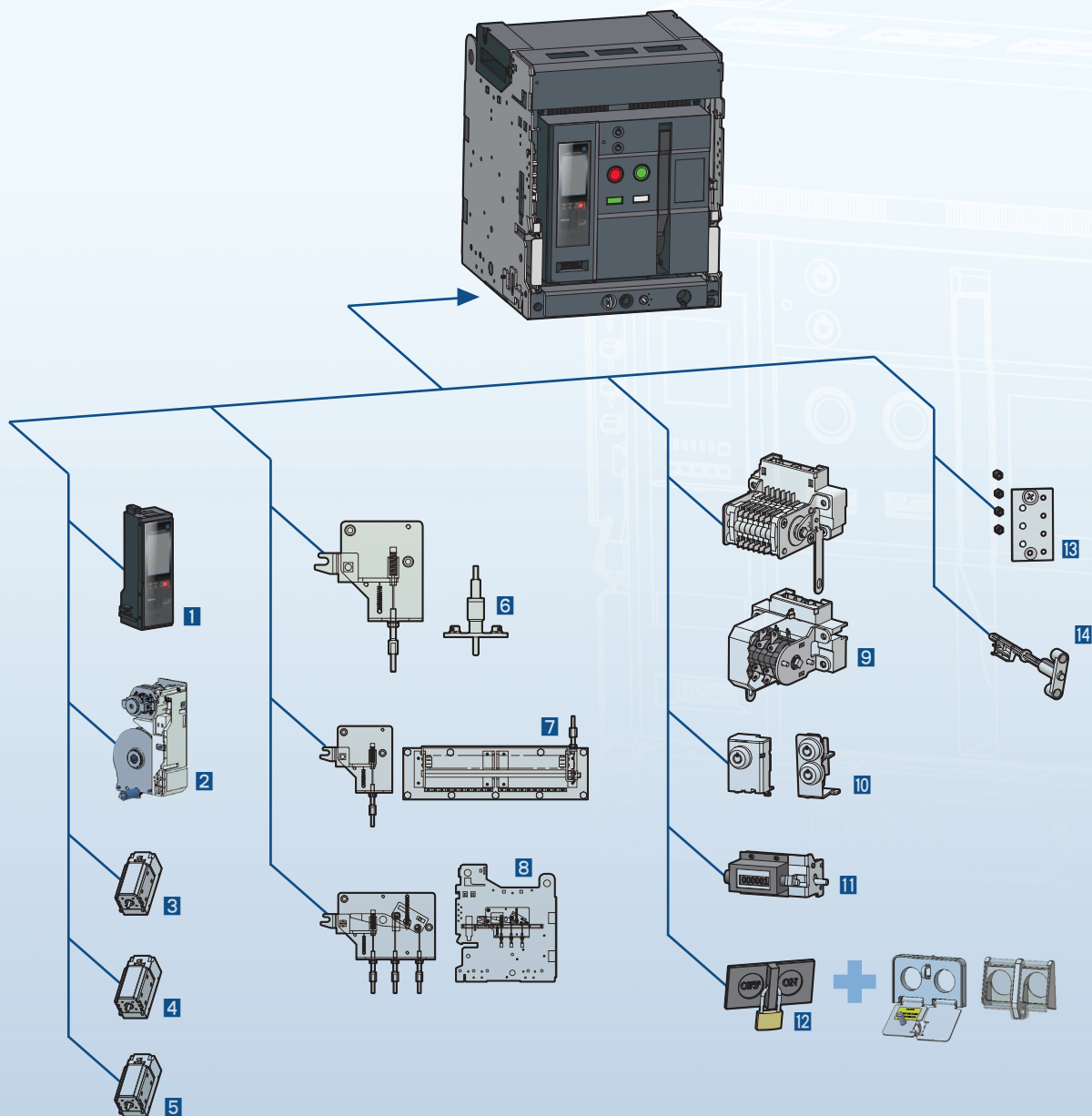
- Self Power
- AC/DC 85 ~ 264V
- RTC Timer mounted
- Event Recording (255EA)
- Fault Recording (127EA)
- Fault Wave (6EA)

- L(N)/S(1,2)/I/G(or Gext)
- Thermal (linear hot start)
- UV(1,2)/OV(1,2)/RV/D/S(V)(1,2)/VU/IU
- UF(1,2)/OF(1,2)/ROCOF/RP/RQ(1,2)/OP/OQ/UP
- Measurement: V/A/W/Wh/F/PF
- Relay Group control (A,B)
- ZSI(Protective coordination)
- Remote Reset
- ERMS, Local/Remote, Group A/B DI (selectable)

- USB Terminal (Power, Communication)
- Modbus/RS-485
- Bluetooth
- Ethernet (Optional product required)
- NFC

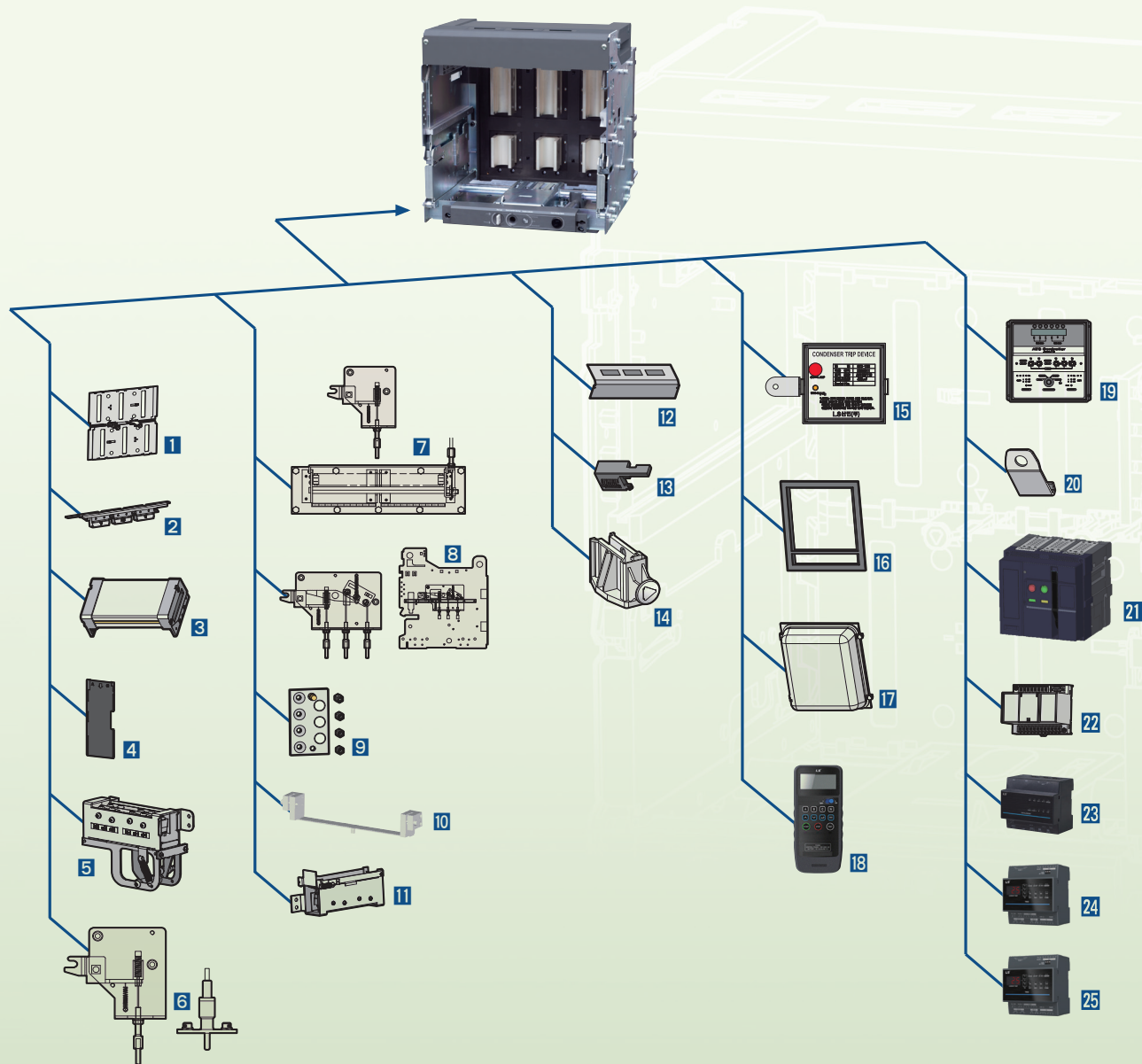
- Self Power
- AC/DC 85 ~ 264V
- RTC Timer mounted
- Event Recording (255EA)
- Fault Recording (127EA)
- Fault Wave (6EA)

Accessories



ACB

- 1** Trip Relay
- 2** Motor (M)
- 3** Closing Coil (CC)
- 4** Shunt Coil (SHT)
- 5** Under Voltage Trip Device (UVT)
- 6** Door Interlock (DI)
- 7** MOC (Mechanical 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** Manual Reset Button (MRB)



Cradle

- | | |
|--|--|
| 1 Safety Shutter (ST) | 8 Mechanical Interlock (MI) |
| 2 Manual Connector | 9 Miss Insertion Prevent Device (MIP) |
| 3 Zero Arc Space (ZAS) | 10 Body Supporter (BSP) |
| 4 Insulation Barrier (IB) | 11 Shorting "b" Contact (SBC) |
| 5 Cell Switch (CEL) | 12 Safety Control Cover (SC) |
| 6 Door Interlock (DI) | 13 Racking Interlock (RI) |
| 7 MOC (Mechanical Operated Cell switch) | 14 Safety Shutter Lock (STL) |

Other

- | |
|---|
| 15 Condenser Trip Device (CTD) |
| 16 Door Frame (DF) |
| 17 Dust Cover (DC) |
| 18 i-Tester (IT) |
| 19 ATS Controller (ATS) |
| 20 Lifting Hook (LM) |
| 21 Dummy ACB |
| 22 UVT Time Delay Controller (UDC) |
| 23 Gateway/Data Logger |
| 24 Profibus-DP |
| 25 Temperature Alarm |

Connection and Installation



Diversified terminal connection methods of the ACB main circuit for users.

Multiple connections

Various installation methods

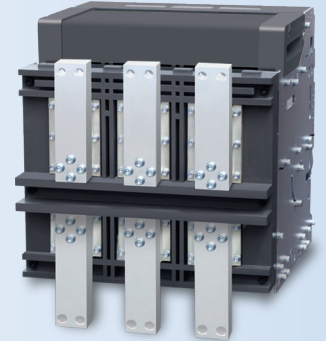
Standard connection



Horizontal type



Vertical type



Front type

Mixed connection



Horizontal / Vertical type



Vertical / Horizontal type



Horizontal / Front type



Vertical / Front type



Front / Horizontal type



Front / Vertical type

- Front connection types are suited for panels with limited installation space.
- The vertical and horizontal type terminals are modular and can be adjusted by rotating the module 90 degrees.
- Please refer to the rating lists (Page 24~25) because the installation method varies according to the rated current.

External configuration

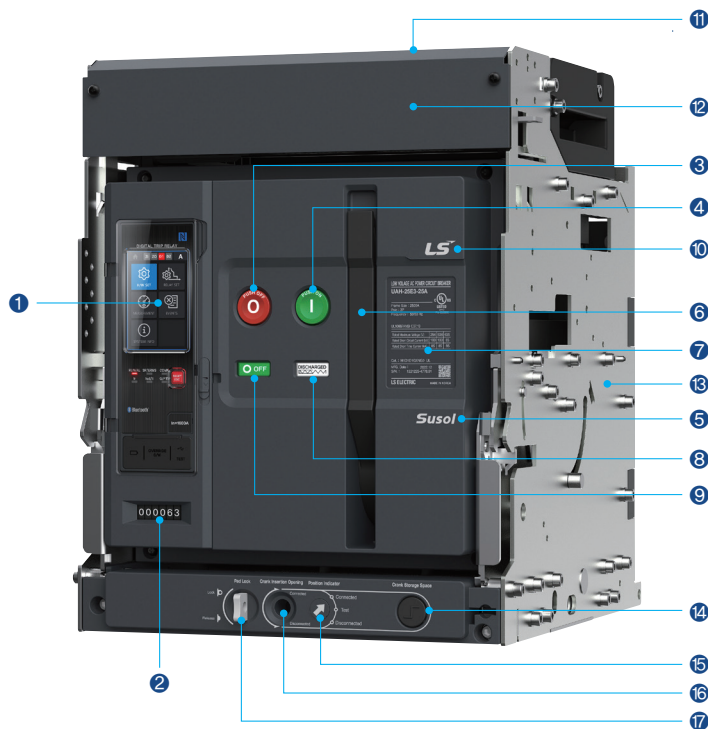
Fixed type ACB



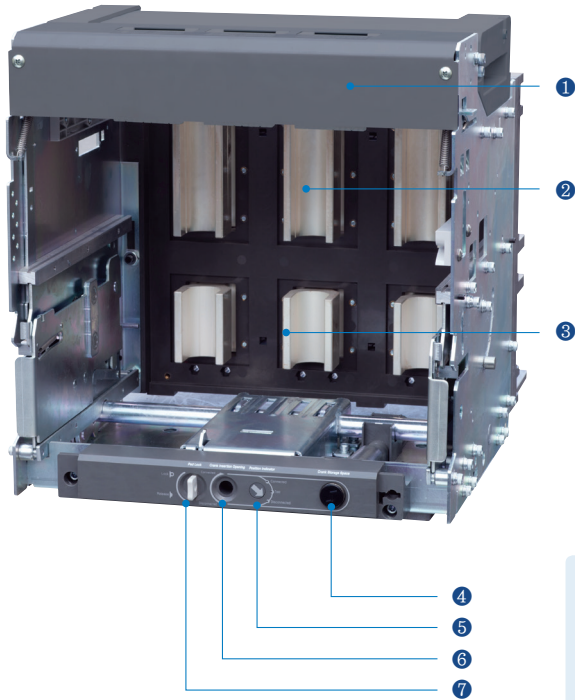
Terms

- ① Trip relay
- ② Counter
- ③ OFF button
- ④ ON button
- ⑤ Series name
- ⑥ Charge handle
- ⑦ Rated name plate
- ⑧ Charge/Discharge indicator
- ⑨ ON/OFF indicator
- ⑩ Corporation logo
- ⑪ Arc cover (Zero Arc Space)
- ⑫ Safety control cover
- ⑬ Cradle
- ⑭ Draw-out handle
- ⑮ Position indicator
- ⑯ Handle inserting hole
- ⑰ Pad lock button
- ⑱ Arc chute
- ⑳ Front cover
- ㉑ Fixed type bracket

Draw-out ACB (Cradle)



Cradle (Internal)



Cradle (Rear)



Terms

- ① Safety control cover
- ② Cradle finger
- ③ Cradle finger
- ④ Draw-out handle
- ⑤ Position indicator
- ⑥ Handle inserting hole
- ⑦ Pad lock button
- ⑧ Connecting terminal
- ⑨ Connecting terminal

Main nameplate


[Acronym explanation]

LOW VOLTAGE AC POWER CIRCUIT BREAKER

Frame Size :

Pole :

Frequency :



LISTED
3WY0
File E326950

UL1066/ANSI C37.13

Rated Maximum Voltage (V)	254	508	635
Rated Short Circuit Current (kA)	<input type="text"/>	<input type="text"/>	<input type="text"/>
Rated Short Time Current (kA)	<input type="text"/>	<input type="text"/>	<input type="text"/>

Cat. :

MFG. Date :

S/N. :

QR

LS ELECTRIC MADE IN KOREA

[Secondary nameplate]

ACCESSORIES

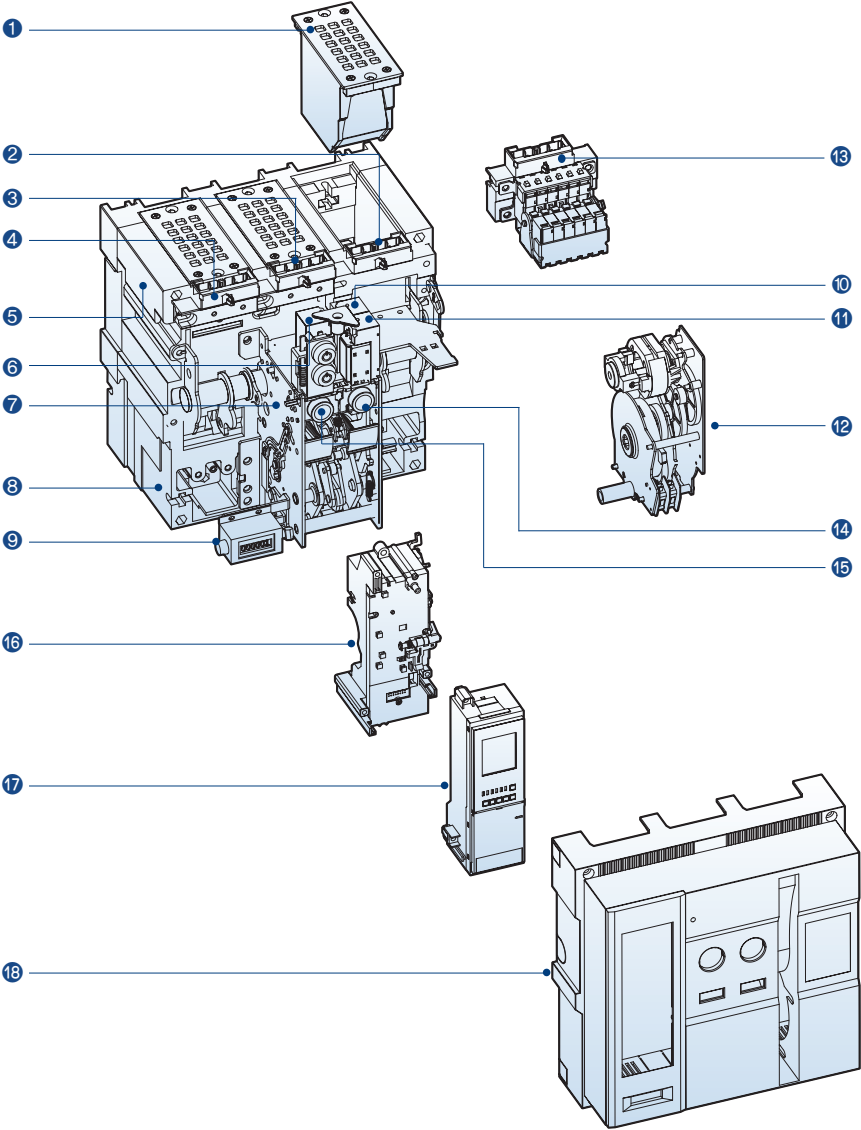
<input type="checkbox"/> Motor charge	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> Closing coil	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> Shunt tripping coil	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> Auxiliary switches	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> OCR Control source	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> Alarm switch	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> Digital Trip Relay(OCR)	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> Alarm(LSIG) Reset	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> Zone Selective Interlocking	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> Communication	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> Earth/Leakage	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> Temperature sensor	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> Available Adaptor	<input type="text"/>	<input type="text"/>

Not For Use As Service Equipment
Instruction manual 79563466001

Explanation of terminologies

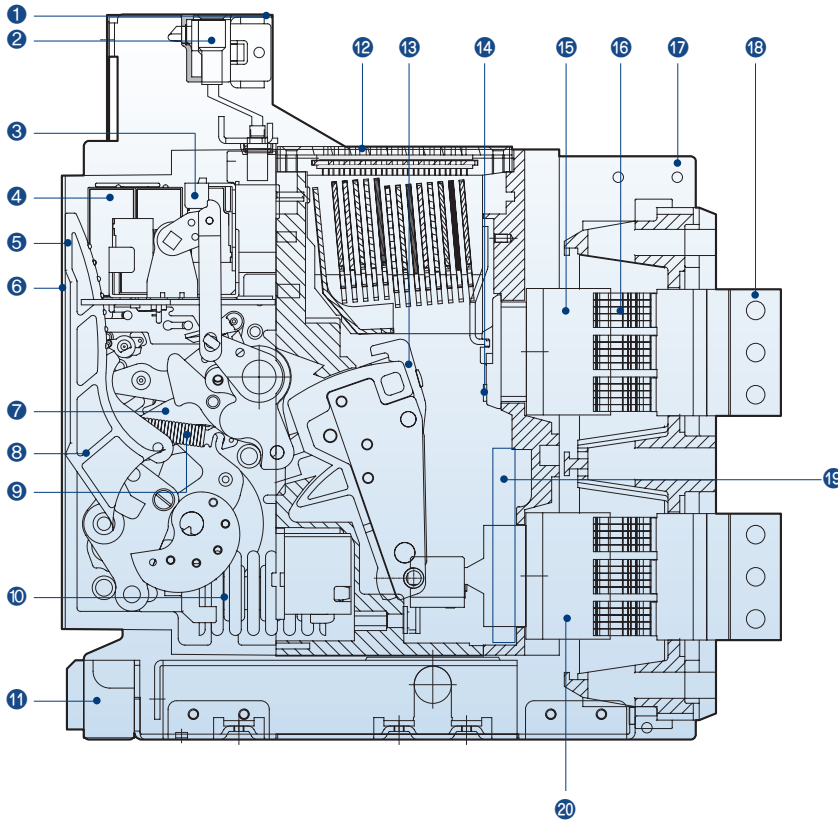
- Motor charge Control power and terminal No.
- Closing coil
- Shunt tripping coil
- Auxiliary switches: Contact specification and terminal No.
- Under voltage trip: UVT terminal No.
- OCR control source: Trip relay control power
- Alarm switch: Alarm and terminal No.
- Digital trip relay: Switching diagram
- Z.S.I: Input/Output terminal No.
- Reset: LED/LCD reset
- Communication: Communication and terminal No.
- Voltage module: Phase voltage and symbol
- Earth/Leakage: Ground fault / Earth leakage input terminal No.

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 Shunt coil
- ⑦ Mechanism
- ⑧ Main body
- ⑨ Counter
- ⑩ Shunt 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

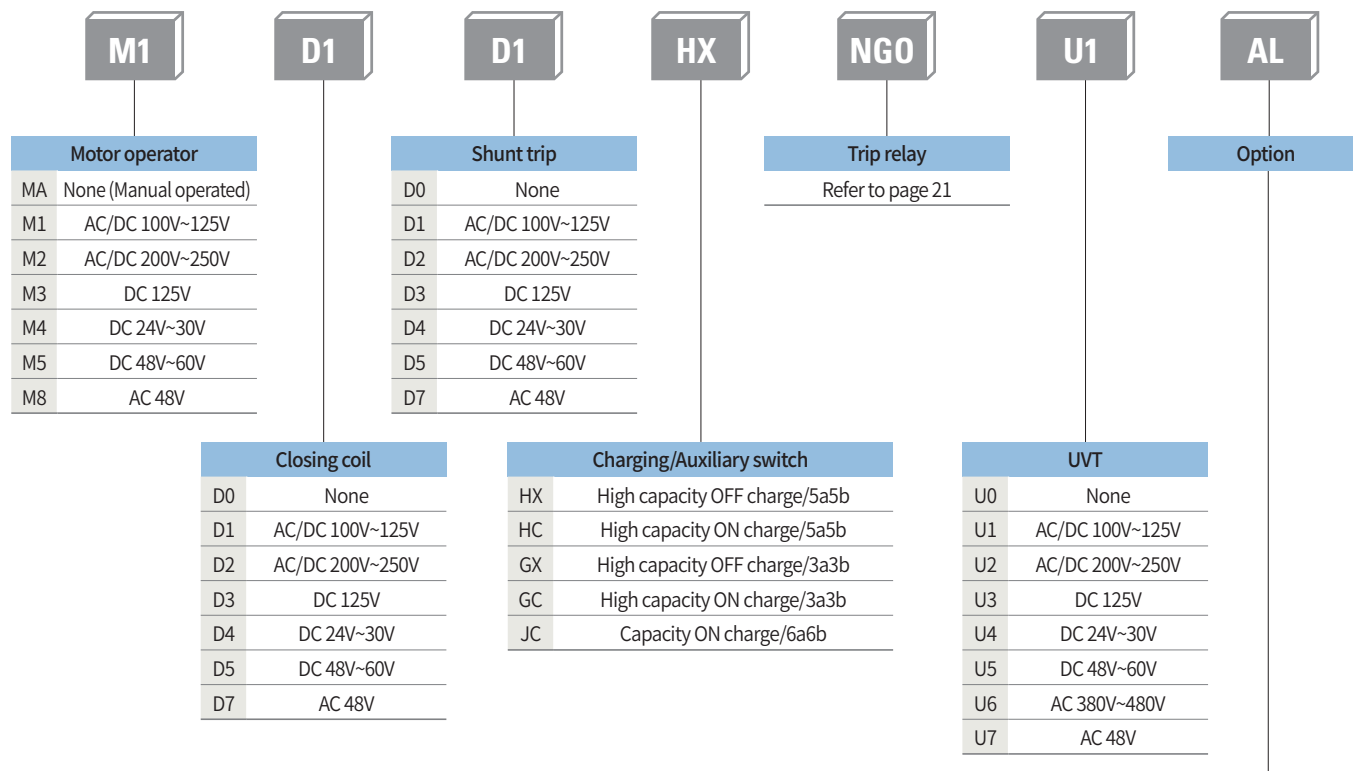
- ① Control circuit terminal block
- ② Control terminal
- ③ Auxiliary switches
- ④ Closing, Shunt, UVT coil
- ⑤ Trip relay
- ⑥ Front cover
- ⑦ Mechanism
- ⑧ Charge handle
- ⑨ Trip spring
- ⑩ Closing spring
- ⑪ Draw-in/out device
- ⑫ Arc chute
- ⑬ Moving contact
- ⑭ Fixed contact
- ⑮ Terminal on line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

Ordering

Breaker and accessories

UAS	16	D	3	16	A
Frame type	Frame size	Phasing	Poles	Sensor rating	Mounting and terminal
	08 800AF 16 1600AF	D 3/4P standard RST(N) W 4P reversed NRST	3 3P 4 4P	04~08 400A~800A 08~16 800A~1600A	Mounting A Drawout Fixed H Horizontal terminals V Vertical terminals M Horizontal for line Vertical for load N Vertical for line Horizontal for load P Front terminal G Horizontal-con type W Vertical-con type
UAH	32	E	3	32	
Frame type	Frame size	Phasing	Poles	Sensor rating	
	08 800AF 16 1600AF 20 2000AF 25 2500AF 32 3200AF 32 3200AF 40 4000AF 50 5000AF 60 6000AF	E 3/4P standard RST(N) X 4P reversed NRST G 3/4P standard RST(N) Z 4P reversed NRST	3 3P 4 4P 3 3P 4 4P	04~08 400A~800A 08~16 800A~1600A 10~20 1000A~2000A 12~25 1200A~2500A 16~32 1600A~3200A 16~32 1600A~3200A 20~40 2000A~4000A 25~50 2500A~5000A 30~60 3000A~6000A	
UAW	32	E	3	32	
Frame type	Frame size	Phasing	Poles	Sensor rating	
	08 800AF 16 1600AF 20 2000AF 25 2500AF 32 3200AF	E 3/4P standard RST(N) X 4P reversed NRST	3 3P 4 4P	04~08 400A~800A 08~16 800A~1600A 10~20 1000A~2000A 12~25 1200A~2500A 16~32 1600A~3200A	
UAA	16	D	3	00	
Frame type	Frame size	Phasing	Poles	Sensor rating	
	08 800AF 16 1600AF 08 800AF 16 1600AF 20 2000AF 25 2500AF 32 3200AF 32 3200AF 40 4000AF 50 5000AF 60 6000AF	D 3/4P standard RST(N) W 4P reversed NRST E 3/4P standard RST(N) X 4P reversed NRST G 3/4P standard RST(N) Z 4P reversed NRST	3 3P 4 4P	Not applied	

* Terminals for P type must be ordered separately
 * G and W types are applicable to D-frame only
 * Front terminal is only available for 800~2000A
 * 3200AF(E, X), 6000AF(G, Z) offers only vertical type terminals (Busbar)
 * 6000AF is only available for drawout type



Code	Description	Code	Description
AL	AL1+MRB	K	K1 Key lock
A1	AL1+MRB +RES (AC110~130V) *AC only	K2	K2 Key Interlock set
A2	AL1+AL2 +MRB	K3	K3 Key Interlock double
A3	AL1+MRB +RES (DC110~125V) *DC only	K5	K5 Note 4 Profalux lock (CAMLOCK type)
A4	AL1+MRB +RES (AC200~250V) *AC only	K6	K6 Note 4 Kirkkey lock (CAMLOCK type)
A5	AL1+MRB +Auto reset	K7	K7 Note 4 Kirkkey lock (CN-22 type)
A6	AL1+AL2 +MRB +Auto reset	R	RCS Ready to close switch
A7	AL1+MRB +RES (DC110~125V) +Auto reset *DC only	T	TM Temperature monitoring
A8	AL1+MRB +RES (AC200~250V) +Auto reset *AC only	H1	AC/DC 100V ~125V, Double shunt coil
A9	AL1+MRB +RES (AC110~130V) +Auto reset *AC only	H2	AC/DC 200V ~250V, Double shunt coil
S	CS2 Charge switch communication	H3	DC 125V, Double shunt coil
B	B Lockable On/Off button cover	H4	DC 24V ~30V, Double shunt coil
M	MI Mechanical interlock	H5	DC 48V ~60V, Double shunt coil
D	D1 or MOC Door interlock or MOC (Mechanism operated cell switch)	H7	AC 48V, Double shunt coil

N01	A4 (AL1+MRB +RES(AC200~250V))+B(Lockable On/Off button cover)+K(Key lock)+R(Ready to close switch)+M(Mechanic interlock)+E(Spring auto release)
N02	AL (AL1+MRB)+K(Key lock(OFF lock))+R(Ready to close switch)+D(Door interlock or MOC)+H1(AC/DC 100V ~ 130V, Double shunt coil)+E(Spring auto release)
N03	B(Lockable On/Off button cover)+K2(Key interlock set)+R(Ready to close switch)+T(Temperature monitoring)
N04	A4(AL1+MRB+RES(AC200~250V))+B(Lockable On/Off button cover)+K(Key lock(OFF lock))+M(Mechanical interlock)+T(Temperature monitoring)
N05	A1(AL1+MRB+RES110~130V)+B(Lockable On/Off button cover)+K(Key lock(OFF lock))+R(Ready to close switch)+M(Mechanical interlock)+T(Temperature monitoring)
N06	A2(AL1+AL2+MRB)+K(Key lock(OFF lock))+R(Ready to close switch)+T(Temperature monitoring)

Note) 1. * Codes for over 5 optional accessories are composed separately.

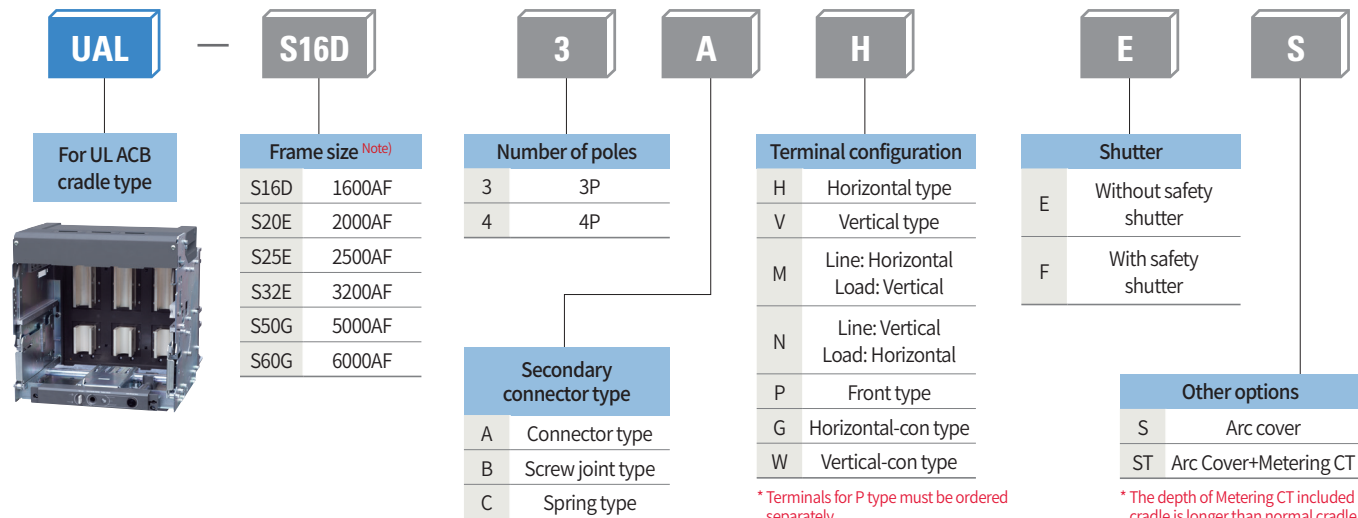
2. UVT and SHT2 can not be selected together. Select one of two.

3. C(counter) is provided as standard.

4. K5, K6, K7 options are factory installed keylock.

Ordering

Adapter (Cradle)



Note) The corresponding Breaker Adapter

Breaker	Adapter	Breaker	Adapter
UAS-08D	UAS-08W	UAH-32E	UAH-32X
UAS-16D	UAS-16W		
UAH-08E	UAH-08X	UAH-32G	UAH-32Z
UAH-16E	UAH-16X		
UAH-20E	UAH-20X	UAH-40G	UAH-40Z
UAH-25E	UAH-25X	UAH-50G	UAH-50Z
		UAH-60G	UAH-60Z
			S60G

* Terminals for P type must be ordered separately

* G and W types are applicable to S16D (1600AF) only.

* Metering CT for ST type must be ordered separately

* The depth of Metering CT included cradle is longer than normal cradle

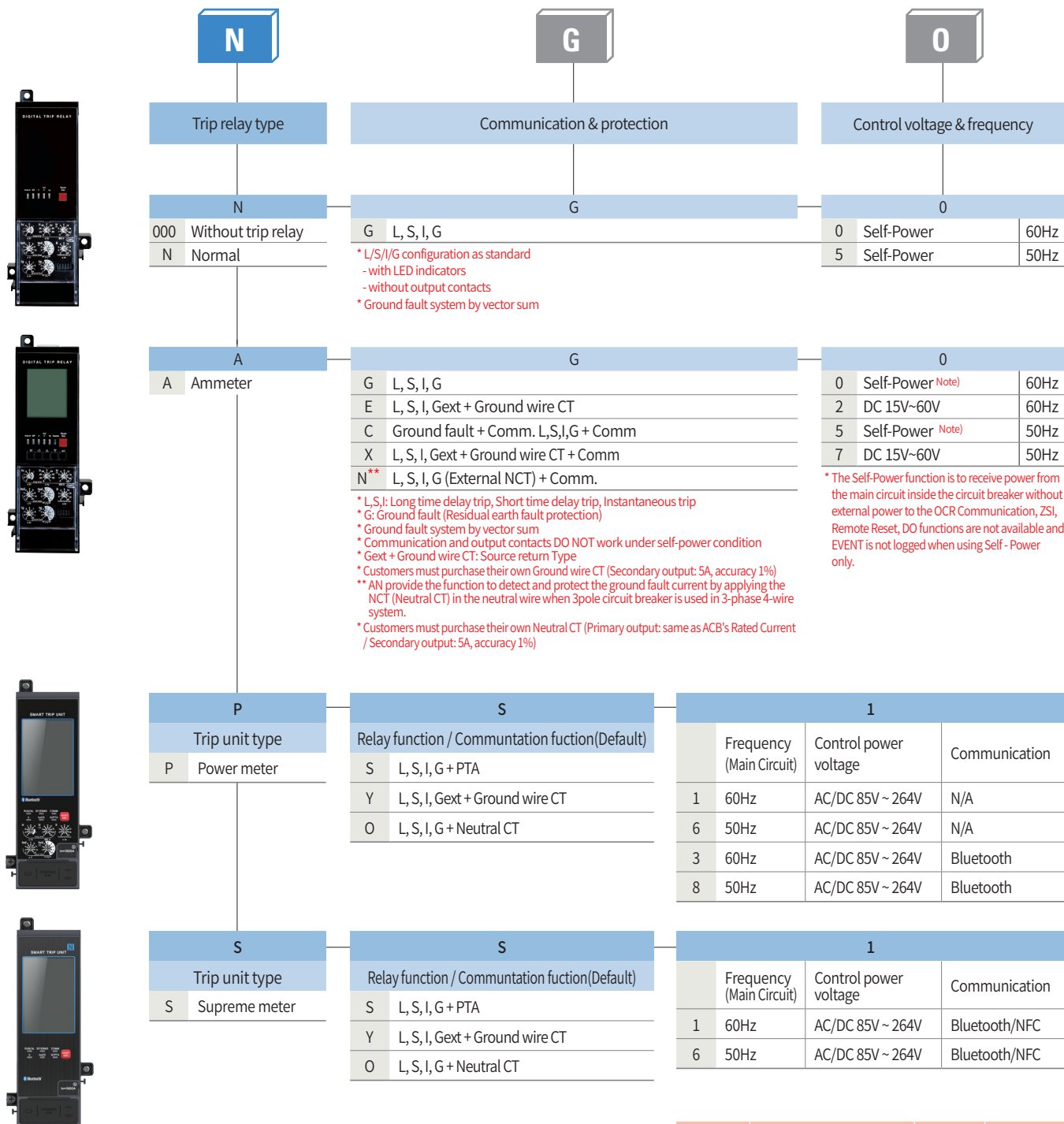
Rating plug

Rating plug classification			ACB ampere frame								
Rating plug code	For none NCT type	For NCT type	Rating	800A	1600A	2000A	2500A	3200A	4000A	5000A	6000A
		73263466352	73263466372	400A	400A~800A						
	73263466353	73263466373	600A								
	73263466354	73263466374	630A								
	73263466355	73263466375	800A								
	73263466356	73263466376	1000A	800A~1600A							
	73263466357	73263466377	1200A								
	73263466358	73263466378	1250A								
	73263466359	73263466379	1600A								
	73263466360	73263466380	2000A	1000A~2000A			1200A~2500A				
	73263466361	73263466381	2500A								
	73263466362	73263466382	3000A								
	73263466363	73263466383	3200A								
	73263466364	73263466384	3600A	1600A~3200A				2000A~4000A			
	73263466365	73263466385	4000A								
	73263466366	73263466386	5000A								
	73263466367	73263466387	6000A								
										2500A~5000A	3000A~6000A

* A rating plug ranging from 50 to 100% of the ACB ampere frame should be used.

* The minimum value of the OCR self-power supply is based on the CT rating, not the rating plug rating.

Trip relay



* Self-power is basic function (Automatic power supply to the Trip Unit without additional control power)
 * L,S,I: Long time delay trip, Short time delay trip, Instantaneous trip
 * G: Ground fault (Residual earth fault protection)
 * Gext + Ground wire CT: Source return Type * PTA: Pre-trip alarm Function
 * Customers must purchase their own Ground wire CT (Secondary output: 5A, accuracy 1%)
 * Customers must purchase their own Neutral CT (Primary output: same as ACB's Rated Current / Secondary output: 5A, accuracy 1%)
 * The STU acceptable voltage range is 100 to 250V.
 * If you want an external VDM, please insert '(V)' at the end of the full ordering.

Item	Description	Features	Remark
72313460708	TOTAL ASS'Y/VDM(Shield Cable), EXTERNAL, STU	Accessory	Separate purchasing

* If you want to apply external VDM separately, please order the code above.

Ratings for UL Listed/ANSI Certified Susol UA Circuit Breakers



Type								
AF								
Rated current (CT Ratio)	(A)			at 40°C				
Rated current (Available Rating plug)	(V)			at 40°C				
Rated maximum voltage	(V)							
Frequency	(Hz)							
Number of poles	(P)							
Type of trip relay (Electronic trip device)								
Rated short circuit current (Sym.) (Duty: 0-15s-CO)	(kA)	With instantaneous	AC	847V(60Hz) 635V 508V 254V				
			AC	847V(60Hz) 635V 508V 254V				
			AC	847V(60Hz) 635V 508V 254V				
		Without instantaneous	AC	847V(60Hz) 635V 508V 254V				
			AC	847V(60Hz) 635V 508V 254V				
			AC	847V(60Hz) 635V 508V 254V				
Rated making current (X/R=more than 6.6)	(kA peak)	With instantaneous	AC	847V(60Hz) 635V 508V 254V				
			AC	847V(60Hz) 635V 508V 254V				
			AC	847V(60Hz) 635V 508V 254V				
		Without instantaneous	AC	847V(60Hz) 635V 508V 254V				
			AC	847V(60Hz) 635V 508V 254V				
			AC	847V(60Hz) 635V 508V 254V				
Rated short time current	(kA)		AC					
Operating time (t)	(ms)	Breaking time						
		Opening time						
		Closing time						
		Charging time						
Endurance Rating (C/O Cycles) (with no maintenance)	(Cycles)	Mechanical						
		Electrical						
Weight (Include Charging motor)	lb (kg)	Drawout type	Main Body with Cradle	3P				
				4P				
				Only Cradle	3P			
			4P					
			Fixed type	3P				
				4P				
External dimension	Draw-out type	in (mm)	H×W×D	3P				
				4P				
				Fixed type	in (mm)	H×W×D	3P	
							4P	
							3P	
							4P	
Enclosure dimension	in (mm)	H×W×D	3P					
			4P					
Certified Standards								

Susol	
UAS-□□D	
08	16
800	1600
400	800
600	1000
630	1200
800	1250
	1600
254V / 508V / 635V	
UAS: 50/60	
3P / 4P	
N, A, P, S (4 type)	
	-
	65
	85
	85
	-
	65
	65
	65
	-
	149.5
	195.5
	195.5
	-
	149.5
	150.5
	151.5
	60
	Less than 30ms
	Less than 50ms
	Less than 80ms
	Less than 5 sec.
	12,500
	2,800
	154 (70)
	187 (85)
	71 (32)
	84 (38)
	77 (35)
	99 (45)
	16.93×13.15×16.02 (430×334×407)
	16.93×16.50×16.02 (430×419×407)
	11.81×11.81×11.61 (300×300×295)
	11.81×15.16×11.61 (300×385×295)
	19.69×15.75×13.39 (500×400×340)
	19.69×19.69×13.39 (500×500×340)
	UL 1066 / ANSI C37.13



Susol				
UAH-□□E / UAW-□□E				
08	16	20	25	32
800	1600	2000	2500	3200
400	800	1000	1200	1600
600	1000	1200	1250	2000
630	1200	1250	1600	2500
800	1250	1600	2000	3000
	1600	2000	2500	3200
254V / 508V / 635V / 847V(UAW)				
UAH: 50/60, UAW: 60				
3P / 4P				
N, A, P, S (4 type)				
85				
85				
100				
100				
85				
85				
85				
85				
195.5				
195.5				
230				
230				
195.5				
195.5				
195.5				
195.5				
85				
Less than 30ms				
Less than 50ms				
Less than 80ms				
Less than 5 sec.				
12,500			5,000	
2,800			1,000	
214 (97)		245 (111)		326 (148)
269 (122)		309 (140)		414 (188)
99 (45)		123 (56)		205 (93)
121 (55)		152 (69)		256 (116)
101 (46)		110 (50)		196 (89)
126 (57)		137 (62)		249 (113)
16.93×16.22×16.02 (430×412×407)				
16.93×20.75×16.02 (430×527×407)				
11.81×14.88×11.61 (300×378×295)				
11.81×19.41×11.61 (300×493×295)				
19.69×19.69×13.39 (500×500×340)				
19.69×24.21×13.39 (500×615×340)				
UL 1066 / ANSI C37.13				

Susol			
UAH-□□G			
32	40	50	60
3200	4000	5000	6000
1600	2000	2500	3000
2000	2500	3000	3200
2500	3000	3200	3600
3000	3200	3600	4000
3200	3600	4000	5000
	4000	5000	6000
254V / 508V / 635V			
UAH: 50/60, UAW: 60			
3P / 4P			
N, A, P, S (4 type)			
-			
100			
130			
130			
-			
100			
100			
100			
-			
230			
230			
230			
-			
230			
230			
100			
Less than 30ms			
Less than 50ms			
Less than 90ms			
Less than 5 sec.			
5,000			
1,000			
489 (222)			
626 (284)			
276 (125)			
355 (161)			
227 (127)			
287 (130)			
18.11×30.91×16.02 (460×785×407)			
18.11×39.96×16.02 (460×1015×407)			
11.81×29.57×11.61 (300×751×295)			
11.81×38.62×11.61 (300×981×295)			
31.50×32.48×13.39 (800×825×340)			
31.50×41.54×13.39 (800×1055×340)			
UL 1066 / ANSI C37.13			

Trip relay

The trip relay of Susol ACB provides the additional protection functions for voltage, frequency, unbalance, and others in addition to main protection functions for over current, short-circuit, ground fault. It supports the advanced measurement functions for voltage, current, power, electric energy, harmonics, communication function, and others.

Analog trip function interlocked with mechanism enhanced a durability of devices as well as the breaking capacity of ACB.

Zone selective interlocking function makes the protective coordination more simple and thermal memory can be applied to various loads.



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Trip relay types

		N-Type	A-Type	P-Type	S-Type
Externals					
Current relay		• L, S, I, G	• L, S, I, G	• L(N), S1, I, G, PTA, Gext • D, S(V)1, IU	• L(N), S1, S2, I, G, PTA, Gext • D, S(V)1, S(V)2, IU
Voltage relay		-	-	• UV1, OV1, RV, VU	• UV1, UV2, OV1, OV2, RV, VU
Frequency relay		-	-	• UF1, OF1, ROCOF	• UF1, UF2, OF1, OF2, ROCOF
Power relay		-	-	• RP, RQ1, OP, OQ, UP	• RP, RQ1, RQ2, OP, OQ, UP
Group control		-	-	-	• A,B (Control by DI and communication)
Relay fine tuning		-	-	• Possible (Adjust knob and freely set operating value current)	• Possible (Freely set operating value current)
ERMS		-	-	• Control by DI and Communication	• Control by DI and Communication
IDMTL Support		-	-	• L relay element (Thermal, DT, SIT, VIT, EIT, EIT50)	• L relay element (Thermal,DT,SIT,VIT, EIT,EIT50)
Trip information Maintenance LED		• L, S, I, G, SP	• L, S, I, G/Gext, SP	• L, S, I, G/Gext, SP	• L, S, I, G/Gext, SP
Incident record	Screen	-	• Saves 10 incident events	• Display of 127 incident events (Incident phase/current/time)	• Display of 127 incident events (Incident phase/current/time)
	Memory	-	-	• Saves 127 incident events • Saves 6 incident waveforms (In case of operation by Self Power, incident waveform is not saved)	• Saves 127 incident events • Saves 6 incident waveforms (In case of operation by Self Power, incident waveform is not saved)

Trip unit

Trip relay types

		N-Type	A-Type	P-Type	S-Type
Measuring function		-	<ul style="list-style-type: none"> • Current [R/S/T/N] • External CT current • Vector Sum zero sequence current 	<ul style="list-style-type: none"> • 3 phase voltage, line - to - line voltage • Current (R/S/T/N) • Frequency • External CT current • Voltage/Current phase (A phase voltage standard) • Total/Each phase power (P, Q, S) • Total/Each phase power factor • Positive/Negative, Effective/Reactive/Apparent energy • Vector sum zero sequence voltage • Vector sum zero sequence current • Positive, Negative sequence voltage • Positive, Negative sequence current • Voltage imbalance rate • Current imbalance rate • Previous current demand for each phase • Previous apparent, reactive and active power demand 	<ul style="list-style-type: none"> • 3 phase voltage, line - to - line voltage • Current (R/S/T/N) • Frequency • External CT current • Voltage/Current phase (A phase voltage standard) • Total/Each phase power (P, Q, S) • Total/Each phase power factor • Positive/Negative, Effective/Reactive/Apparent energy • Vector sum zero sequence voltage • Vector sum zero sequence current • Positive, Negative sequence voltage • Positive, Negative sequence current • Voltage imbalance rate • Current imbalance rate • Previous current demand for each phase • Previous apparent, reactive and active power demand
Accuracy degree of measurement	Current	-	• 6%	• 0.5%	• 0.5%
	Voltage	-	-	• 0.5%	• 0.5%
	Power	-	-	• Class 1 (IEC 62053 - 21, 22)	• Class 1 (IEC 62053 - 21, 22)
	Frequency	-	-	• 0.1% (10 ~ 200Hz)	• 0.1% (10 ~ 200Hz)
PQ function		-	-	<ul style="list-style-type: none"> • Voltage/Current harmonics harmonics 63rd • Voltage THD • Current THD, TDD, K - Factor 	<ul style="list-style-type: none"> • Voltage/Current harmonics harmonics 63rd • Voltage THD • Current THD, TDD, K - Factor
Measurement record		-	-	<ul style="list-style-type: none"> • Max Current demand • Demand for max apparent, reactive and active power • Max active power • Max Vo • Max Io • Max Ext Io • Max In • Max internal temperature 	<ul style="list-style-type: none"> • Max Current demand • Demand for max apparent, reactive and active power • Max active power • Max Vo • Max Io • Max Ext Io • Max In • Max internal temperature
Real time waveform		-	-	<ul style="list-style-type: none"> • Using USB/RS485 communication • Using LCD screen 	<ul style="list-style-type: none"> • Using USB/RS485 communication • Using LCD screen

	N-Type	A-Type	P-Type	S-Type
Communication	-	<ul style="list-style-type: none"> • USB (For site operator) • RS485/Modbus 	<ul style="list-style-type: none"> • USB (For site operator) • RS485/Modbus • BLE (Bluetooth, Option) 	<ul style="list-style-type: none"> • USB (For site operator) • RS485/Modbus • BLE(Bluetooth) • NFC (Near Field communication)
Power	<ul style="list-style-type: none"> • Self Power (Operates when it is higher than 30% of rated current by single phase load) 	<ul style="list-style-type: none"> • Self Power (Operates when it is higher than 30% of rated current by single phase load) • AC/DC 88~264V • DC 24V/48V 	<ul style="list-style-type: none"> • Self Power (Operates when it is higher than 50% of rated current by single phase load) • AC/DC 88~264V 	<ul style="list-style-type: none"> • Self Power (Operates when it is higher than 50% of rated current by single phase load) • AC/DC 88~264V
Event record	-	-	<ul style="list-style-type: none"> • 255 kinds including change of device status (Information, status, date and time) 	<ul style="list-style-type: none"> • 255 kinds including change of device status (Information, status, date and time)
Clock	<ul style="list-style-type: none"> • RTC embedded (Back up with battery) 	<ul style="list-style-type: none"> • RTC embedded (Back up with battery) 	<ul style="list-style-type: none"> • RTC embedded (Back up with battery) 	<ul style="list-style-type: none"> • RTC embedded (Back up with battery)
Other LED	<ul style="list-style-type: none"> • Alarm 	<ul style="list-style-type: none"> • Alarm 	<ul style="list-style-type: none"> • Run, Alarm, Self diagnosis, Communication 	<ul style="list-style-type: none"> • Run, Alarm, Self diagnosis, Communication
Operating button	<ul style="list-style-type: none"> • Reset button 	<ul style="list-style-type: none"> • Reset/Menu/Tap/Up, Down/Enter 	<ul style="list-style-type: none"> • Reset button • LCD Touch 	<ul style="list-style-type: none"> • Reset button • LCD Touch
Self diagnosis	LED	-	-	<ul style="list-style-type: none"> • RUN/AL LED blinking (Red ↔ Blue blinking)
	LCD	-	-	<ul style="list-style-type: none"> • Can check at self diagnosis screen on LCD
	List	<ul style="list-style-type: none"> • Battery Low Alarm: Occurs when internal battery is not inserted or battery voltage is low. • MTD Fail (Wiring check): OCR is not assembled with MTD or Trip coil is disconnected. 	<ul style="list-style-type: none"> • Battery Low Alarm: Occurs when internal battery is not inserted or battery voltage is low. • Rating Plug Unmatched or Error: Rating Plug is not assembled or there's error with Rating Plug. • Ampere Frame Error: Value of Rating Plug is not within 45 ~ 100% of AF. • MTD Fail (Wiring check): STU is not assembled with MTD or Trip coil is disconnected. • Factory Cfg Error: Factory mode setting is wrong. • Device Type Error: Rating Plug information is different from CT information. • Over Heat Error: Internal temperature of CPU is over 100 degree (N/A type) or 115 degree (P/S type) • Contact Wear Alarm: Contact wear rate is over 80% • Electrical Open Count Over Alarm: Electrical Open Count is over the tolerable degree of 80%. • Mechanical Open Count Over Alarm: Mechanical Open Count is over the tolerable degree of 80% • RTC Error: There's error at internal RTC information. • Memory Error: Duplicated internal setting saved at internal nonvolatile memory was damaged. • CT disconnection Error: CT disconnection occurred (Each phase is monitored). 	<ul style="list-style-type: none"> • RUN/AL LED blinking (Red ↔ Blue blinking) • Can check at self diagnosis screen on LCD

* Each OCR type has battery in itself

1. Battery lifespan

1) When turned off: 14~28 years

2) When using 1 LED consecutively or turned off: 7~14 days

2. Minimum current display range

1) A-type: When more 15% than rated current(In)

2) P/S type: When more 1% than rated current(In)

* L/S/I/G(or EL) configuration as standard only.

(Unable to select ground fault and earth leakage, simultaneously)

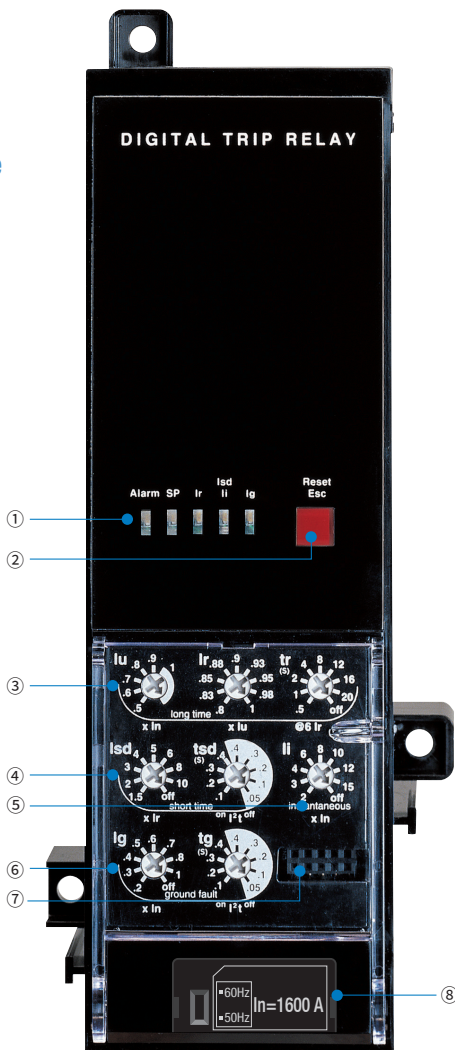
Trip relays

N type: 「Normal」 type

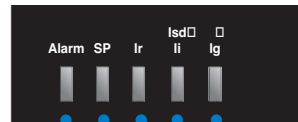
Characteristic

- Overload protection
 - Long-time delay
- Short-circuit protection
 - Short-time delay / Instantaneous
 - I²t On/Off optional (for short-time delay)
- Ground fault protection
 - I²t On/Off optional
- Self-Power

Product appearance and structure



① LED: Indication of trip info. and overload state



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

② Reset Key: Fault reset or battery check

③ lu, lr: Long-time current setting, tr: Long-time tripping delay setting

④ Isd: Short-time current setting, tsd: Short-time tripping delay setting

⑤ li: Instantaneous current setting

⑥ Ig: Ground fault current setting, tg: Ground fault tripping delay setting

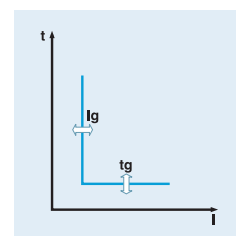
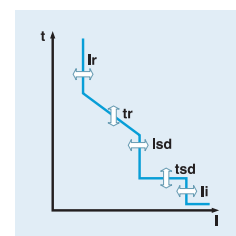
⑦ Test terminal: OCR test terminal (Connected with OCR tester)

⑧ Rating plug

- Rated current setting (45~100% of the AF)
- Frequency selectable(60Hz/50Hz)

Protection

Long time											
Current setting (A)	$I_u = I_n \times \dots$	0.5	0.6	0.7	0.8	0.9	1.0				
	$I_r = I_u \times \dots$	0.8	0.83	0.85	0.88	0.9	0.93	0.95	0.98	1.0	
Time delay (s)	$t_r @ (1.5 \times I_r)$	12.5	25	50	100	200	300	400	500	Off	
Accuracy : $\pm 15\%$ or below 100ms	$t_r @ (6.0 \times I_r)$	0.5	1	2	4	8	12	16	20	Off	
	$t_r @ (7.2 \times I_r)$	0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	Off	
Short time											
Current setting (A)	$I_{sd} = I_r \times \dots$	1.5	2	3	4	5	6	8	10	Off	
Time delay (s)	t_{sd}	I^2t Off	0.05	0.1	0.2	0.3	0.4				
		I^2t On @ $(10 \times I_r)$		0.1	0.2	0.3	0.4				
Accuracy : $\pm 10\%$ or below 50ms	$(I^2t$ Off)	Min. Trip Time (ms)	20	80	160	260	360				
		Max. Trip Time (ms)	80	140	240	340	440				
Instantaneous											
Current setting (A)	$I_i = I_n \times \dots$	2	3	4	6	8	10	12	15	Off	
Tripping time		below 50ms									
Ground fault											
Pick-up (A)	$I_g = I_n \times \dots$	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	Off	
Time delay (s)	t_g	I^2t Off	0.05	0.1	0.2	0.3	0.4				
		I^2t On @ $(1 \times I_r)$		0.1	0.2	0.3	0.4				
Accuracy : $\pm 10\%$ ($I_g \leq 0.4 I_n$) $\pm 20\%$ ($I_g \leq 0.4 I_n$) or below 50ms	$(I^2t$ Off)	Min. Trip Time (ms)	20	80	160	260	360				
		Max. Trip Time (ms)	80	140	240	340	440				



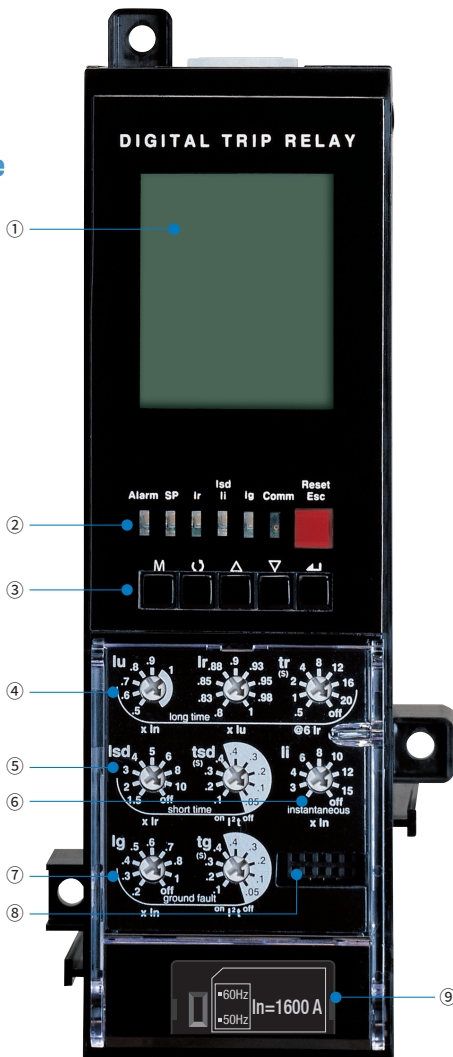
Trip relays

A type: 「Ammeter」 type

Characteristic

- Overload protection
 - Long-time delay
- Short-circuit protection
 - Short-time delay/Instantaneous
 - I²t On/Off optional (for short-time delay)
- Ground fault protection
 - I²t On / Off optional
 - Trip / Alarm selectable (need external power)
 - Blocking Time (0~60s)
 - Does not detect ground fault during Blocking time.
- Realization of protective coordination by ZSI (Zone Selective Interlocking)
 - Disable / Enable Selectable
- Measurement and Display Function
 - High detailed measurement for current
 - character LCD type
- Fault recording
 - Records Max. up to 10 fault information about fault type, fault phase, fault data, occurrence time of fault
- SBO (Select Before Operation)
 - High reliability for control and setting change method
- 3 DO (Digital Output)
 - Fixed
- Communication
 - Modbus/RS485
 - Profibus-DP(need TRIO)
- ERMS
 - Arc Flash Reduction
 - Instantaneous setting value is minimized. (2*In)

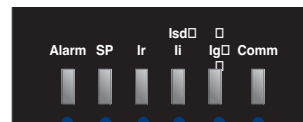
Product appearance and structure



* The phone icon is displayed during the communication.

① LCD: Indication of measurement and information

② LED: Indication of trip info. and overload state



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



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
 Tap: Move setting item / Fix screen
 Menu: Menu display ↔ Measurement display

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

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

⑥ Ii: Instantaneous current setting

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

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

⑨ Rating plug

- Rated current setting (45~100% of the AF)
- Frequency selectable(60Hz/50Hz)

Protection

Long time											
Current setting (A)	$I_u = I_n \times \dots$	0.5	0.6	0.7	0.8	0.9	1.0				
	$I_r = I_u \times \dots$	0.8	0.83	0.85	0.88	0.9	0.93	0.95	0.98	1.0	
Time delay (s)	$t_r @ (1.5 \times I_r)$	12.5	25	50	100	200	300	400	500	Off	
Accuracy : $\pm 15\%$ or below 100ms	$t_r @ (6.0 \times I_r)$	0.5	1	2	4	8	12	16	20	Off	
	$t_r @ (7.2 \times I_r)$	0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	Off	

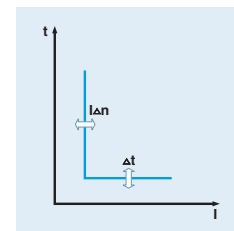
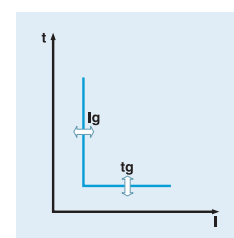
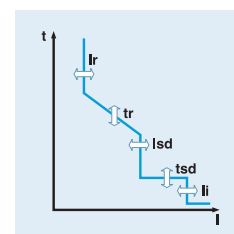
Short time											
Current setting (A)	$I_{sd} = I_r \times \dots$	1.5	2	3	4	5	6	8	10	Off	
Time delay (s)	t_{sd}	I^2t Off	0.05	0.1	0.2	0.3	0.4				
		I^2t On @ $(10 \times I_r)$		0.1	0.2	0.3	0.4				
Accuracy : $\pm 10\%$ or below 50ms	$(I^2t$ Off)	Min. Trip Time (ms)	20	80	160	260	360				
		Max. Trip Time (ms)	80	140	240	340	440				

Instantaneous										
Current setting (A)	$I_i = I_n \times \dots$	2	3	4	6	8	10	12	15	Off
Tripping time		below 50ms								

Ground fault											
Pick-up (A)	$I_g = I_n \times \dots$	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	Off	
Time delay (s)	t_g	I^2t Off	0.05	0.1	0.2	0.3	0.4				
		I^2t On @ $(1 \times I_r)$		0.1	0.2	0.3	0.4				
Accuracy : $\pm 10\%$ ($I_g \geq 0.4I_n$) $\pm 20\%$ ($I_g \leq 0.4I_n$) or below 50ms	$(I^2t$ Off)	Min. Trip Time (ms)	20	80	160	260	360				
		Max. Trip Time (ms)	80	140	240	340	440				

Earth leakage (Option)											
Current setting (A)	$I_{\Delta n}$	0.5	1	2	3	5	10	20	30	Off	
Time delay (ms)	Δt	Alarm Time (ms)	140	230	350	800	950				
		Trip Time (ms)	140	230	350	800					

Note) Current setting values are secondary current of the external CT.
Recommended not to use current setting values more than 5A.



Trip relays

P type: 「Power meter」 type

Characteristic

- Overload protection
 - Long-time delay/Long-time delay neutral
 - Thermal(Hot/Cold) - IDMTL(DT, SIT, VIT, EIT, EIT50)
- Short-circuit protection
 - Short-time delay/Instantaneous
 - I²t On/Off optional (for short-time delay)
- Ground fault protection
 - I²t On/Off optional
- Earth Leakage
 - Applied to use External CT or Private ZCT
 - Available to select Alarm/Trip
- Protection for Over Voltage/Under Voltage/Over Frequency/Under Frequency/Unbalance/Reverse Power
- Voltage & Current Quality measurement
 - 1st~63rd Voltage/current/harmonic measurement
 - THD of Voltage/Current, TDD/K-factor of Current
- Start-up function
 - Select S/I/G/Gext
 - Set the start-up current and time
- Realization of protective coordination by ZSI (Zone Selective Interlocking)
- Fine-adjustable setting by knob and HMI
- ERMS(Energy Reduction Maintenance Setting)
 - To secure safety for electric technician or site operator by reducing ARC Energy.
- Measurement and Display Function
 - 3 phase Current/Voltage/Power/Energy/Phase Angle/Frequency/PF/Demand
 - Indicates Current/voltage Vector Diagram
 - Real-time Oscilloscope Waveform
- Fault recording
 - Records 127ea of fault event information (Fault type, Phase, Value, Current and time)
- Event recording
 - Records events of device related to setting change, operation and state changes up to 256ea
- 3.5 inches Graphic touch LCD
- 3 DO(Digital output)
- Self power
 - Operates when it is higher than 50% of rated current by single phase load
- Communication
 - Modbus/RS485 - USB - BLE(Bluetooth, Option)
- Self diagnosis
 - Battery Low Alarm/Rating Plug - Ampere Frame Error/MTD Fail
 - Device Type/Over Heat/Contact Wear
 - Mechanical/Electrical Open Count Over Alarm
 - RTC/Memory/CT disconnection
 - Factory mode state

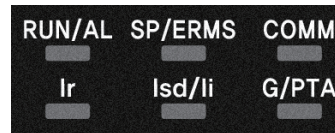
Product appearance and structure



① 3.5 inch graphic LCD (touch): Displaying information of measurement or status

② BLE: Indicating bluetooth function

③ LED: Indicating information of status or measurement



1) RUN/AL

- RUN: Indicating the operation(Blinking blue LED during turn on)
- AL: Indicating an overload(Turn on above 90%, Blink above 105%)
- Self diagnose error: Blinking blue and red LED

2) SP/ERMS

- Override/MCR operation: Red LED
- ERMS operation: Blue LED

3) COMM: Communication display LED(green)

4) Ir: LED Display for long-time over current relay operation

5) Isd/li: LED Display for short-time/INSTANTANEOUS OVER CURRENT Relay Operation

6) G/PTA: LED displaying operation for Ground/Leakage fault protection relay, PTA

④ Reset/ESC Key: Fault/LED reset, Return to menu, Battery test

⑤ Ir: Long-time current setting, tr: Long-time tripping delay setting

⑥ li: Instantaneous current setting

⑦ Isd: Short-time current setting, tsd: Short-time tripping delay setting

⑧ Rating plug

⑨ Battery

⑩ Override setting: DIP switches for override setting

⑪ USB connection terminal (Mini B type)

⑫ TEST : Connected with IPOT(TESTER)

Protection

Long time	Tolerance	Setting										
Operating value		$I_r = I_n \times \dots$	0.4	0.5	0.6	0.7	0.8	0.9	1.0			
Operating time (ms)		$t_r @ (1.5 \times I_r)$	12.5	25	50	100	200	300	400	500	Off	
$\pm 10\%$ ($I_r < 6I_n$), $\pm 20\%$ ($I_r \geq 6I_n$), or Largest of ± 40 ms		$t_r @ (6.0 \times I_r)$	0.5	1	2	4	8	12	16	20	Off	
		$t_r @ (7.2 \times I_r)$	0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	Off	

Note) 1. See manual for checking IDTML and equations. 2. Time tolerance should add +40ms for L/S/I/G, if power does not supply to the trip unit.
3. Threshold(A) value can be adjusted in 1A by touch LCD.

Short time	Tolerance	Setting										
Operating value: $\pm 10\%$		$I_{sd} = I_r \times \dots$	1.5	2	3	4	5	6	8	10	Off	
Operating time (ms)		I^t Off	0.05	0.1	0.2	0.3	0.4					
Accuracy I^t On: $\pm 15\%$ ($I_s \leq 6I_n$), Accuracy I^t Off $\pm 15\%$ or Largest of ± 40 ms, $\pm 20\%$ ($I_s > 6I_n$), or Largest of ± 40 ms	t_{sd}	I^t On @ $(10 \times I_r)$	0.1		0.2	0.3	0.4					
		Min. Trip Time (ms)	20	80	160	260	360					
		Max. Trip Time (ms)	80	140	240	340	440					
ZSI		ZSI Time (s)	0.04 ~ 0.2 (0.01s steps), OFF									
Start up		Pick up (A)	Above $1.2 \times I_{sd}$ (10A steps)									
		Time delay (s)	0.1 ~ 30 (0.01s steps), OFF									

Note) Threshold(A) value can be adjusted in 1A by touch LCD.

Instantaneous	Tolerance	Setting										
Operating value: $\pm 10\%$		$I_i = I_n \times \dots$	2	3	4	6	8	10	12	15	Off	
Operating time (ms): $\pm 10\%$ or Largest of ± 40 ms			Under 50ms									
Start up		Pick up (A)	Above $1.2 \times I_{sd}$ (10A steps)									
		Time delay (s)	0.1 ~ 30 (0.01s steps), OFF									

Note) Threshold(A) value can be adjusted in 1A by touch LCD.

Ground fault	Tolerance	Setting										
Operating value: $\pm 10\%$		$I_g = I_n \times \dots$	0.2 ~ 1.0 (1A steps), OFF									
Operating time (ms)			I^t can choose On/Off									
Accuracy I^t Off: $\pm 10\%$ or Largest of ± 40 ms	t_g		0.05 ~ 3.0 (0.01s steps)									
Accuracy I^t On: $\pm 15\%$ or Largest of ± 40 ms												
ZSI		ZSI Time (s)	0.04 ~ 0.2 (0.01s steps), OFF									
Start up		Pick up (A)	Above $1.2 \times I_{sd}$ (10A steps)									
		Time delay (s)	0.1 ~ 30 (0.01s steps), OFF									

Note) 1. I_g cannot adjust over 1200A. 2. Time tolerance should add +20ms for relaying if power does not supply to the trip unit. 3. Ground fault should be adjusted by touch LCD.

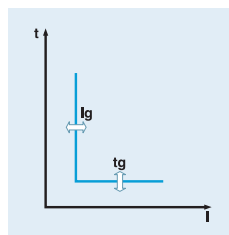
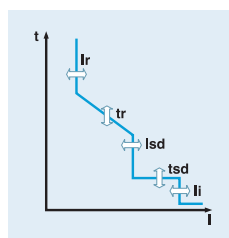
Earth leakage(option)	Tolerance	Setting										
Operating value: $\pm 10\%$		$I_{\Delta n}$	0.1 ~ 30 (1A steps), OFF									
Operating time (ms)			I^t can choose On/Off									
When accuracy = I^t Off		$t_{\Delta n}$	0.1 ~ 1.0 (0.01s steps)									
CT = 5A - Over 2A: Tolerance is 10% or 40ms												
- Under 2A: Tolerance is 20% or 40ms												
CT = 30A - Over 5A: Tolerance is 10% or 40ms												
- Under 5A: Tolerance is 20% or 40ms												
When accuracy = I^t On			- Chose largest value between $\pm 25\%$ or ± 40 ms									
ZSI		ZSI Time (s)	0.04 ~ 0.2 (0.01s steps), OFF									
Start up		Pick up (A)	Above $1.2 \times I_{sd}$ (0.1A steps)									
		Time delay (s)	0.1 ~ 30 (0.01s steps), OFF									

Note) 1. It is impossible to use both ground fault and earth leakage at same time. 2. CT accuracy can be changed by applying CT. 3. Earth leakage should be adjusted by touch LCD.

PTA(Pre Trip Alarm)	Tolerance	Setting										
Operating value: $\pm 5\%$		$I_p = I_r \times \dots$	0.6 ~ 1.0 (1A steps), OFF									
Operating time (ms)			I^t can choose On/Off									
$\pm 10\%$ ($I_p < 1.2I_n$), $\pm 20\%$ ($I_p \geq 1.2I_n$), or Largest of ± 40 ms		$t_p @ (1.2 \times I_p)$	0.1 ~ 45 (0.01s steps)									

Note) PTA should be adjusted by touch LCD.

Protection	Setting range	Step	Tolerance (Operating value)	Setting range	Step	Tolerance (Operating time)
Under voltage	Y-connection	0.1V	$(0.5 \sim 0.98) \times V_n / \sqrt{3}$	0.1 ~ 120s, OFF	0.01s	Choose target value: $\pm 10\%$ or ± 40 ms
	D-connection					
Over voltage	Y-connection	1%	$(1.02 \sim 1.5) \times V_n / \sqrt{3}$	0.5 ~ 60s, OFF	0.01s	Choose target value: $\pm 10\%$ or ± 40 ms
	D-connection					
Current unbalance	5 ~ 90%	1%	Choose target value: Operating value $\pm 10\%$ or abs of operating value $\pm 2\%$	0.5 ~ 60s, OFF	0.01s	Choose target value: $\pm 10\%$ or ± 40 ms
Voltage unbalance	5 ~ 90%	1%	Choose target value: Operating value $\pm 10\%$ or abs of operating value $\pm 2\%$	0.5 ~ 60s, OFF	0.01s	Choose target value: $\pm 10\%$ or ± 40 ms
Under frequency	12 ~ 150	1Hz	$\pm 5\%$	0.2 ~ 120s, OFF	0.01s	Choose target value: $\pm 10\%$ or ± 40 ms
Over frequency	20 ~ 200	1Hz	$\pm 5\%$	0.2 ~ 120s, OFF	0.01s	Choose target value: $\pm 10\%$ or ± 40 ms
Rate of change of frequency	0.4 ~ 10	0.01Hz/s	Choose target value: $\pm 20\%$ or 300 mHz/s	0.5 ~ 10s, OFF	0.01s	Choose target value: $\pm 30\%$ or ± 300 ms
Reverse power/ Reactive power relay	$V_n \times I_n \times 0.1 / \sqrt{3} \sim V_n \times I_n \times 1.2 \times \sqrt{3}$	1W	$\pm 10\%$ ($> 0.2I_n$) $\pm 20\%$ ($\leq 0.2I_n$)	0.5 ~ 100s, OFF	0.01s	Choose target value: $\pm 20\%$ or ± 200 ms
Over power/ Reactive power relay	$V_n \times I_n \times 0.1 / \sqrt{3} \sim V_n \times I_n \times 1.2 \times \sqrt{3}$					
Under power/ Reactive power relay	$V_n \times I_n \times 0.1 / \sqrt{3} \sim V_n \times I_n \times 0.9 \times \sqrt{3}$					
			$\pm 10\%$			



Trip relays

S type: 「Supreme meter」 type

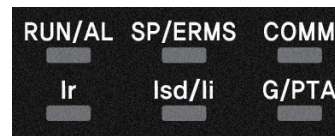
Characteristic

- Overload protection
 - Long-time delay/Long-time delay neutral
 - Thermal(Hot/Cold) - IDMTL(DT, SIT, VIT, EIT, EIT50)
- Short-circuit protection
 - Short-time delay/Instantaneous
 - I²t On/Off optional (for short-time delay)
- Ground fault protection
 - I²t On/Off optional
- Earth Leakage
 - Applied to use External CT or Private ZCT
 - Available to select Alarm/Trip
- Protection for Over Voltage/Under Voltage/Over Frequency/Under Frequency/Unbalance/Reverse Power
- Voltage & Current Quality measurement
 - 1st ~ 63rd Voltage/current/harmonic measurement
 - THD of Voltage/Current, TDD/K-factor of Current
- Group Control(A/B)
 - Available to control the various condition such as parallel feeder
- Start-up function
 - Select S/I/G/Gext
 - Set the start-up current and HMI
- Realization of protective coordination by ZSI (Zone Selective Interlocking)
- Fine-adjustable setting by knob and key
- ERMS(Energy Reduction Maintenance Setting)
 - To secure safety for electric technician or site operator by reducing ARC Energy.
- Measurement and Display Function
 - 3 phase Current/Voltage/Power/Energy/Phase Angle/Frequency/PF/Demand
 - Indicates Current/Voltage Vector Diagram
 - Real-time Oscilloscope Waveform
- Fault recording
 - Records 127ea of fault event information (Fault type, Phase, Value, Current and time)
- Event recording
 - Records events of device related to setting change, operation and state changes up to 256ea
- 3.5 inches Graphic touch LCD
- 3 DO(Digital output)
- Self power
 - Operates when it is higher than 50% of rated current by single phase load
- Communication
 - Modbus/RS485 - USB - BLE(Bluetooth, Option)
- Self diagnosis
 - Battery Low Alarm/Rating Plug - Ampere Frame Error/MTD Fail
 - Device Type/Over Heat/Contact Wear
 - Mechanical/Electrical Open Count Over Alarm
 - RTC/Memory/CT disconnection
 - Factory mode state

Product appearance and structure



- ① NFC : Indicating NFC contact position
- ② 3.5 inch graphic LCD (touch): Displaying information of measurement or status
- ③ LED: Indicating information of status or measurement



- 1) RUN/AL
 - RUN: Indicating the operation(Blinking blue LED during turn on)
 - AL: Indicating an overload(Turn on above 90%, Blink above 105%)
 - Self diagnose error: Blinking blue and red LED
- 2) SP/ERMS
 - Override/MCR operation: Red LED
 - ERMS operation: Blue LED
- 3) COMM: Communication display LED(green)
- 4) Ir: LED Display for long-time over current relay operation
- 5) Isd/li: LED Display for short-time/INSTANTANEOUS OVER CURRENT Relay Operation
- 6) G/PTA: LED displaying operation for Ground/Leakage fault protection relay, PTA

- ④ Reset/Esc Key: Fault/LED reset, Return to menu, Battery test
- ⑤ BLE: Indicating bluetooth function
- ⑥ Rating plug
- ⑦ Battery
- ⑧ Override setting: DIP switches for override setting
- ⑨ USB connection terminal (Mini B type)
- ⑩ TEST : Connected with IPOT(TESTER)

Protection

Long time	Tolerance	Setting	
Operating value		$I_r = I_u \times \dots$	0.4 ~ 1.0 (1A steps), OFF
Operating time (ms) ±10% ($I_r < 6I_n$), ±20% ($I_r \geq 6I_n$), or Largest of ±40ms		$t_r @ (1.5 \times I_r)$	0.5 ~ 24 (0.01s steps)

Note) 1. See manual for checking IDTML and equations. 2. Time tolerance should add +40ms for L/S/I/G, if power does not supply to the trip unit.
3. S-Type should be adjusted by touch LCD.

Short time	Tolerance	Setting	
Operating value: ±10%		$I_{sd} = I_r \times \dots$	1.5 ~ 10 (1A steps), OFF
Operating time (ms) Accuracy I _t On: ±15% ($I_s \leq 6I_n$), Accuracy I _t Off ±15% or Largest of ±40ms, ±20% ($I_s > 6I_n$), or Largest of ±40ms		t_{sd}	I _t can choose On/Off 0.05 ~ 0.8 (0.01s steps)
ZSI		ZSI Time (s)	0.04 ~ 0.2 (0.01s steps), OFF
Start up		Pick up (A)	Above 1.2 × I _{sd} (10A steps)
		Time delay (s)	0.1 ~ 30 (0.01s steps), OFF

Instantaneous	Tolerance	Setting	
Operating value: ±10%		$I_i = I_n \times \dots$	2 ~ 16 (10A steps), OFF
Operating time (ms): ±10% or Largest of ±40ms			Under 50ms
Start up		Pick up (A)	Above 1.2 × I _{sd} (10A steps)
Time delay tolerance		Time delay (s)	0.1 ~ 30 (0.01s steps), OFF

Ground fault	Tolerance	Setting	
Operating value: ±10%		$I_g = I_n \times \dots$	0.2 ~ 1.0 (1A steps), OFF
Operating time (ms) Accuracy I _t Off: ±10% or Largest of ±40ms Accuracy I _t On: ±15% or Largest of ±40ms		t_g	I _t can choose On/Off 0.05 ~ 3.0 (0.01s steps)
ZSI		ZSI Time (s)	0.04 ~ 0.2 (0.01s steps), OFF
Start up		Pick up (A)	Above 1.2 × I _{sd} (10A steps)
		Time delay (s)	0.1 ~ 30 (0.01s steps), OFF

Note) 1. I_g cannot adjust over 1200A. 2. Time tolerance should add +20ms for relaying if power does not supply to the trip unit. 3. Ground fault should be adjusted by touch LCD.

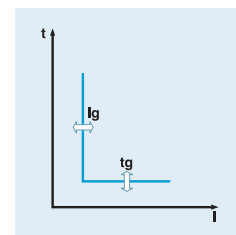
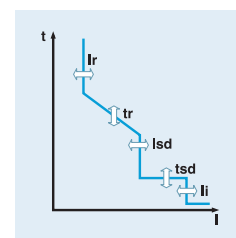
Earth leakage(option)	Tolerance	Setting	
Operating value: ±10%		$I_{\Delta n}$	0.1 ~ 30 (1A steps), OFF
Operating time (ms) When accuracy = I _t Off CT = 5A - Over 2A: Tolerance is 10% or 40ms - Under 2A: Tolerance is 20% or 40ms CT = 30A - Over 5A: Tolerance is 10% or 40ms - Under 5A: Tolerance is 20% or 40ms When accuracy = I _t On - Chose largest value between ±25% or ±40ms		$t_{\Delta n}$	I _t can choose On/Off 0.1 ~ 1.0 (0.01s steps)
ZSI		ZSI Time (s)	0.04 ~ 0.2 (0.01s steps), OFF
Start up		Pick up (A)	Above 1.2 × I _{Δn} (0.1A steps)
		Time delay (s)	0.1 ~ 30 (0.01s steps), OFF

Note) 1. It is impossible to use both ground fault and earth leakage at same time. 2. CT accuracy can be changed by applying CT. 3. Earth leakage should be adjusted by touch LCD.

PTA(Pre Trip Alarm)	Tolerance	Setting	
Operating value: ±5%		$I_p = I_r \times \dots$	0.6 ~ 1.0 (1A steps), OFF
Operating time (ms) ±10% ($I_p < 1.2I_n$), ±20% ($I_p \geq 1.2I_n$), or Largest of ±40ms		$t_p @ (1.2 \times I_p)$	I _t can choose On/Off $t_p = 1 \sim 45$ (0.01s steps)

Note) PTA should be adjusted by touch LCD.

Protection	Setting range	Step	Tolerance (Operating value)	Setting range	Step	Tolerance (Operating time)
Under voltage	Y-connection	0.1V	±5% (> 100V) ±10% (≤ 100V)	0.1 ~ 120s, OFF	0.01s	Choose target value: ±10% or ±40ms
	D-connection					
Over voltage	Y-connection	1%	Choose target value: Operating value ±10% or abs of operating value ±2%	0.5 ~ 60s, OFF	0.01s	Choose target value: ±30% or ±300ms
	D-connection					
Current unbalance	5 ~ 90%	1%				
Voltage unbalance	5 ~ 90%	1%				
Under frequency	12 ~ 150	1Hz	±5%	0.2 ~ 120s, OFF		
Over frequency	20 ~ 200	1Hz	±5%	0.2 ~ 120s, OFF		
Rate of change of frequency	0.4 ~ 10	0.01Hz/s	Choose target value: ±20% or 300 mHz/s	0.5 ~ 10s, OFF		
Reverse power/ Reactive power relay	$V_n \times I_n \times 0.1 / \text{Sqrt}(3) \sim V_n \times I_n \times 1.2 \times \text{Sqrt}(3)$	1W	±10% (> 0.2In) ±20% (≤ 0.2In) ±10%	0.5 ~ 100s, OFF	0.01s	Choose target value: ±20% or ±200ms
Over power/ Reactive power relay	$V_n \times I_n \times 0.1 / \text{Sqrt}(3) \sim V_n \times I_n \times 1.2 \times \text{Sqrt}(3)$					
Under power/ Reactive power relay	$V_n \times I_n \times 0.1 / \text{Sqrt}(3) \sim V_n \times I_n \times 0.9 \times \text{Sqrt}(3)$					



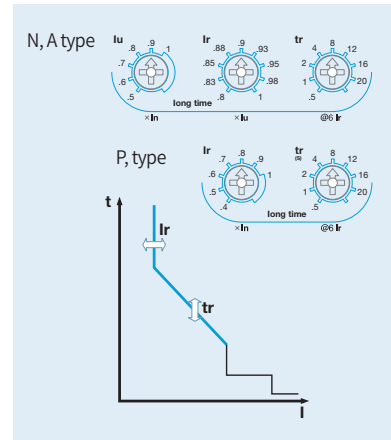
Trip relays

Operation characteristics

Long-time delay (L)

The function for overload protection which has time delayed characteristic in inverse ratio to fault current.

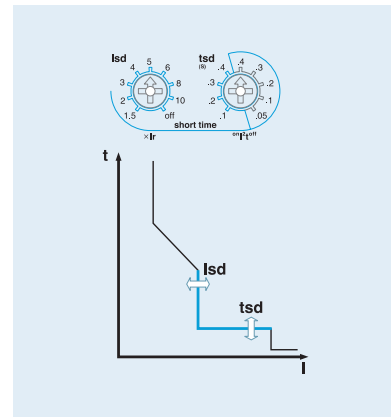
- Standard current setting knob: I_r *The S type STU is set on HMI (No knob exist).
 - Setting range in P type and S type: $(0.4-0.5-0.6-0.7-0.8-0.9-1.0) \times I_n$
 - Setting range in N type and A type: $(0.4 \sim 1.0) \times I_n$
 - I_u : $(0.5-0.6-0.7-0.8-0.9-1.0) \times I_n$
 - I_r : $(0.8-0.83-0.85-0.88-0.9-0.93-0.95-0.98-1.0) \times I_u$
- Time delay setting knob: t_r *The S type STU is set on HMI (No knob exist).
 - Standard operating time is based on the time of $6 \times I_r$
 - Setting range: 0.5-1-2-4-8-12-16-20-Off sec (9 modes)
- Relay pick-up current
 - When current over $(1.15) \times I_r$ flows in, relay is picked up.
- Relay operates based on the largest load current among A/B/C/N phase.



Short-time delay (S)

The function for fault current (over current) protection which has definite time characteristic and time delayed in inverse ratio to fault current.

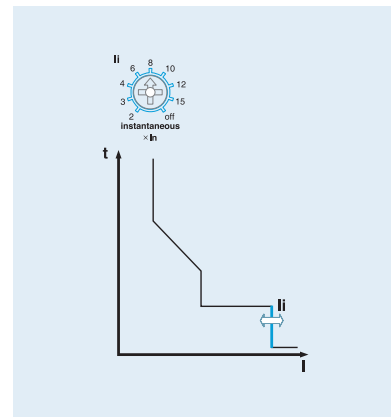
- Standard current setting knob: I_{sd} *The S type STU is set on HMI (No knob exist).
 - Setting range: $(1.5-2-3-4-5-6-8-10-Off) \times I_r$
- Time delay setting knob: t_{sd} *The S type STU is set on HMI (No knob exist).
 - Standard operating time is based on the time of $10 \times I_r$.
 - Inverse time (I^2t On): 0.1-0.2-0.3-0.4 sec
 - Definite time (I^2t Off): 0.05-0.1-0.2-0.3-0.4 sec
- Relay operates based on the largest load current among R/S/T/N phase.
- When ZSI function is set, the protection operation will take place instantaneously when there is no ZSI input signal by downstream devices. Disabling the ZSI function on the last downstream device is advised.



Instantaneous (I)

The function for breaking fault current above the setting value within the shortest time to protect the circuit from short-circuit.

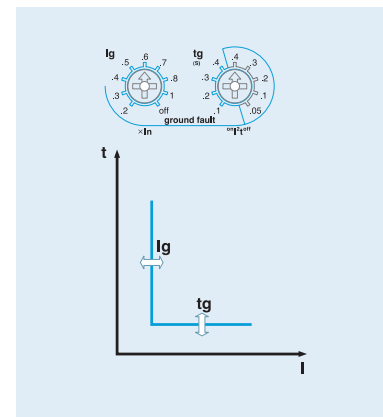
- Standard current setting knob: I_i *The S type STU is set on HMI (No knob exist).
 - Setting range: $(2-3-4-6-8-10-12-15-Off) \times I_n$
 - S type setting range: $(2-16) \times I_n$
- Relay operates based on the largest load current among R/S/T/N phase.
- Total breaking time is below 50ms.



Ground Fault (G)

The function for breaking ground fault current above setting value after time-delay to protect the circuit from ground fault.

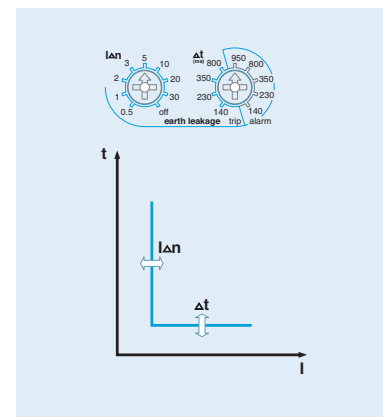
- Standard setting current knob: I_g *The P/S type is set on HMI (No knob exist).
 – Setting range: $(0.2-0.3-0.4-0.5-0.6-0.7-0.8-1.0-Off) \times I_n$
- Time delay setting knob: t_g *The P/S type is set on HMI (No knob exist).
 – Inverse time (I^2t On): 0.1–0.2–0.3–0.4 sec
 – Definite time (I^2t Off): 0.05–0.1–0.2–0.3–0.4 sec
 – P/S type setting range: 0.05 ~ 3.0 sec
- The fault current is the value detected by Vector sum of the current input as the R, S, T phase (3P) or the R, S, T, N (4P).
- When ZSI function is set, the protection operation will take place instantaneously when there is no ZSI input signal by downstream devices. Disabling the ZSI function on the last downstream device is advised.



Earth Leakage (G) - Option

The function for breaking earth leakage current above setting value after time delay to protect the circuit from earth leakage. (A, P, S type)

- Standard setting current knob: $I \Delta n$ *The P/S type is set on HMI (No knob exist).
 – A type setting range: 0.5-1-2-3-5-10-20-30-Off (A)
 – P/S type setting range: 0.1 ~ 30
- Time delay setting knob: Δt *The P/S type is set on HMI (No knob exist).
 A type setting range
 – Trip time: 140–230–350–800 ms – Alarm time: 140–230–350–800–950 ms
 P/S type setting range (Same as Trip/Alarm)
 – Long-time: 0.1 ~ 1.0 sec – Short-time: (0.1 ~ 1.0 sec)@30A
- Setting values within the alarm range will not trip the breaker but will activate its alarm.
- This function is enabled and can be used only with private external CT(secondary output 5A) selected by customers.
- When ZSI function is set, the protection operation will take place instantaneously when there is no ZSI input signal by downstream devices. Disabling the ZSI function on the last downstream device is advised.

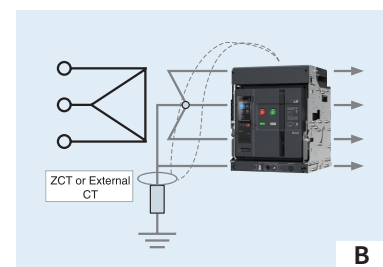
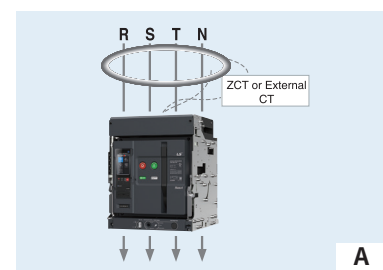


* Use cautions with earth-leakage current settings

- When using ZCT provided by customers, the setting range should be from 0.5 to 5A based on its secondary current.(Secondary output rating: 5A)
 Hence, under 100: 5A CT, if trip relay is set to 0.5A, earth-leakage exceeding 10A will activate its operation ($0.5A \times 20 = 10A$)

※ Guideline for the external CT usage

- Earth-leakage protection characteristics using the standard CT which is installed inside of ACB can protect currents from 20 to 100% range on its rated current.
- As rated currents on ACB increases, current that is covered by its standard CT increase as well. This can not protect against small leakage currents.
 ex) 400A ACB Min. Earth-leakage current $400A \times 20\% = 80A$
 4000A ACB Min. Earth-leakage current $4000A \times 20\% = 800A$
- Therefore, customers are advised to install an external CT in accordance with its rated currents within its systems. And choose trip relay (E, X type) which is required with external CT usage in order to provide earth-leakage functions.



Measurement function

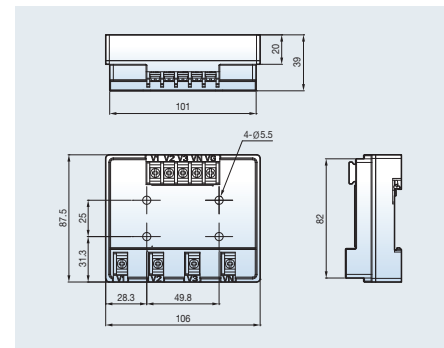
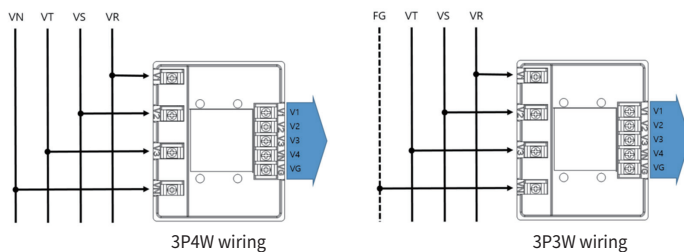
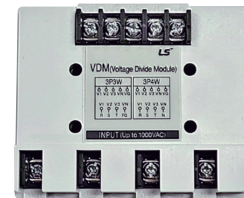
Division	Item	Arithmetic Operation	Type		Remark
			N/A	P/S (STU)	
Current	Ia, Ib, Ic, In	RMS	○	○	
Zero sequence current (internal)	3Io	DFT	○	○	Vector sum
Zero sequence current (external)	IΔn	RMS	○	○	
Colorie	%Q	-	-	○	
Phase voltage	Va, Vb, Vc	RMS	-	○	
Line - to - line voltage	Vab, Vbc, Vca	RMS	-	○	
Zero sequence voltage (internal)	3Vo	RMS	-	○	Vector sum
Power factor	PF	RMS	-	○	
Active power	P_total	RMS	-	○	
Reactive power	Q_total	RMS	-	○	
Apparent power	S_total	RMS	-	○	
Frequency	F	-	-	○	
Active energy	P TotWh	-	-	○	
Reactive energy	Q TotWh	-	-	○	
Reverse active energy	rP TotWh	-	-	○	
Reverse reactive energy	rQ TotVarh	-	-	○	
Positive/Negative sequence voltage	V1, V2	DFT	-	○	
Voltage unbalance	Vun	DFT	-	-	
Positive/Negative sequence current	I1, I2	DFT	○	○	
Current unbalance	Iun	DFT	-	○	
Phase voltage phase	∠Va, ∠Vb, ∠Vc	DFT	-	○	
Line to line voltage angle	∠Vab, ∠Vbc, ∠Vca	DFT	-	○	
Current phase	∠Ia, ∠Ib, ∠Ic	DFT	-	○	
Previous demand power	Demand W	-	-	○	
Previous demand current	Demand Ia, Ib, Ic	-	-	○	
THD	THD Va(Vab), THD Vb(Vbc), THD Vc(Vca), THD Ia, THD Ib, THD Ic	DFT	-	○	
TDD	TDD Ia, TDD Ib, TDD Ic	DFT	-	○	
K Factor	Kf Ia, Kf Ib, Kf Ic	DFT	-	○	
Voltage Harmonic Wave	HAR1 Va(Vab) ~ HAR63 Va(Vab) HAR1 Vb(Vab) ~ HAR63 Va(Vbc) HAR1 Vc(Vca) ~ HAR63 Vc(Vca)	DFT	-	○	
Current Harmonic Wave	HAR1 Ia ~ HAR63 Ia HAR1 Ib ~ HAR63 Ib HAR1 Ic ~ HAR63 Ic	DFT	-	○	

Shield cable

For P/S type trip relay, it is necessary to use voltage trip module for measuring the voltage at the load side of ACB.

Voltage input range

- Phase voltage: 35Vac ~ 973Vac
- Line voltage: 35Vac ~ 1635Vac

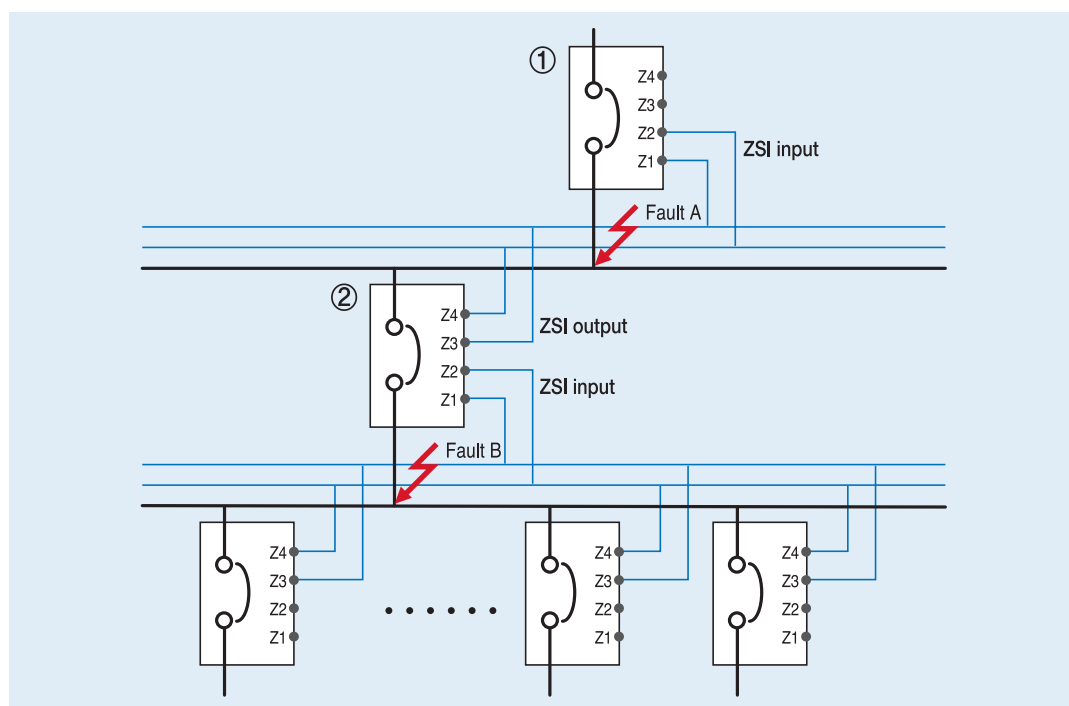


Item	Description	Feature	Remark
72313460708	TOTAL ASS'Y, VDM(Shield Cable), EXTERNAL, STU	Accessory	Separate purchasing

ZSI–Zone Selective Interlocking (A, P, S type)

Zone-selective interlocking drops the delay time for breakers to eliminate faults. It minimizes the shock that all kinds of electric machineries get under fault conditions.

1. During a short-time or ground fault in the system in which ZSI is established, the device at the point of failure generates a ZSI output signal to suppress the operation of the upstream devices.
2. The OCR (Trip Relay) of ACB at the point of failure performs an instantaneous trip without time delay to eliminate the breakdown.
3. The upstream ACB that has received the ZSI input signal operates according to the short-time or ground fault operation delay time set for protection cooperation in the system, but the upstream ACB that has not received the ZSI input signal from the downstream ACB performs an instantaneous trip without time delay.
4. In ZSI operation, in case of overcurrent/short-time/ground fault, the operation time for protection coordination must be set correctly so that the downstream devices operate before the upstream devices.
5. ZSI connecting line needs to be Max. 3m.



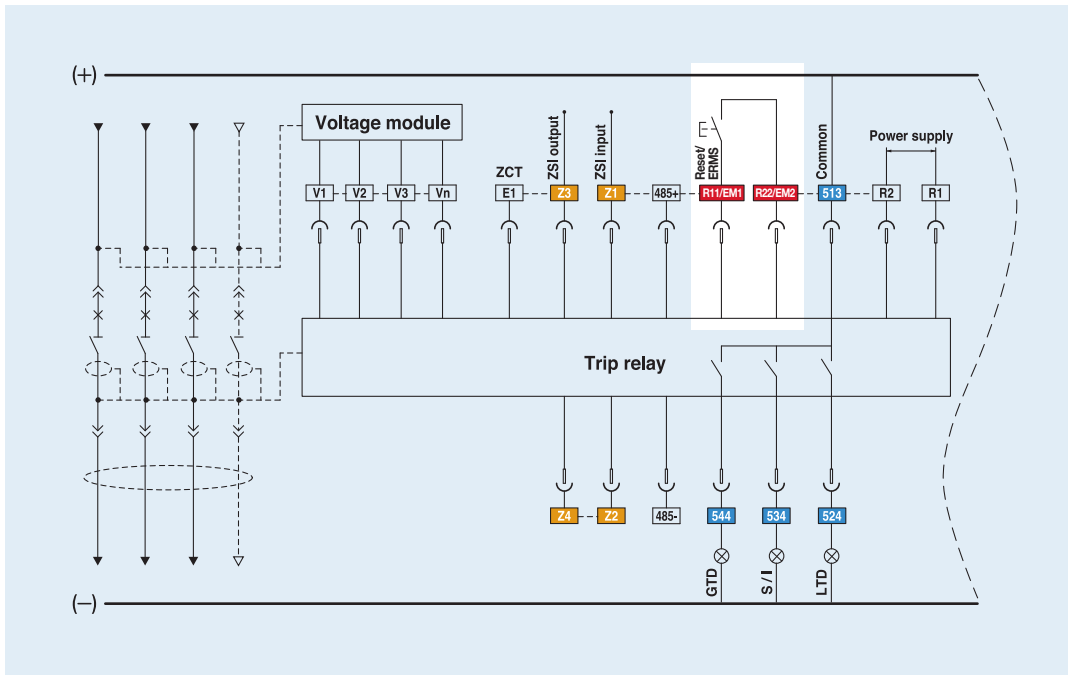
- 1) Occurrence of fault A
 - Only breaker ① performs instantaneous trip operation.
- 2) Occurrence of fault B
 - Breaker ② performs instantaneous trip operation,
 - breaker ① performs trip operation after prearranged delay time
 - But if breaker ② did not break the fault normally,
 - breaker ① performs instantaneous trip operation to protect system.

Trip relays

ERMS and digital I/O (A, P, S type)

ERMS(Energy Reduction Maintenance Setting) is a function to reduce the arc energy to ensure workers' safety. When using the ERMS function, the instantaneous setting value is minimized($2 \cdot I_n$). A, P, and S type trip relays are able to perform the ERMS by digital input and have 3 DO (digital output).

- To use the ERMS function, jump between two ends of ERMS terminal.
- Digital input
 - [EM1-EM2] input: ERMS
 - [Z1-Z2] Input: ZSI input
 - [E1-E2] Input: ZCT for earth leakage detection or external CT input
- ※ All DI are dry contact that has 3.3V of recognition voltage. When inputting close by SSR(Solid State Relay) or open-collector, connect collector (Drain) to EM1.
- Digital output 3a(524, 534, 544-513)
 - Fault output: Long/Short time delay, Instantaneous, Ground fault, UVR, OVR, UFR, OFR, rPower, Vunbal, Iunbal (Maintains state as Latch form until user pushes reset.)
 - General DO: when setting L/R as remote, it is available to control close/open remotely by using communication.



Trip Relay	Digital Output	Long time	Short time	Instantaneous	Ground	Overload Alarm	OVR	UVR	rPower	Vunbal	Iunbal	OFR	UFR	OPR	Note
P,S type	DO1(524)	●	○	○	○	○	○	○	○	○	○	○	○	○	Programmable
	DO2(534)	○	●	●	○	○	○	○	○	○	○	○	○	○	
	DO3(544)	○	○	○	●	○	○	○	○	○	○	○	○	○	
A type	DO1(524)	●	×	×	×	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Fixed
	DO2(534)	×	●	●	×										
	DO3(544)	×	×	×	●										

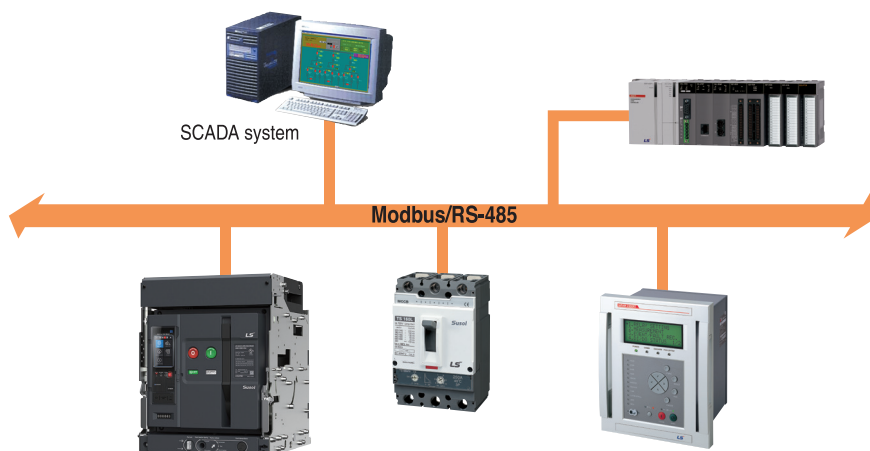
Communication

Modbus/RS-485

- Operation mode: Differential
- Distance: Max. 1.2km
- Cable: General RS-485 shielded twist
2-Pair cable
- Baud rate: 9600bps, 19200bps, 38400bps
- Transmission method: Half-Duplex
- Termination: 100Ω

※ RS485 Communication precautions

- 1) Operation mode and maximum communication distance:
Support up to 1.2km in differential mode.
- 2) Communication line and cable specification:
Use universal AWG22, twisted shield par cable.
- 3) Please make sure to ground the shield of the communication line.

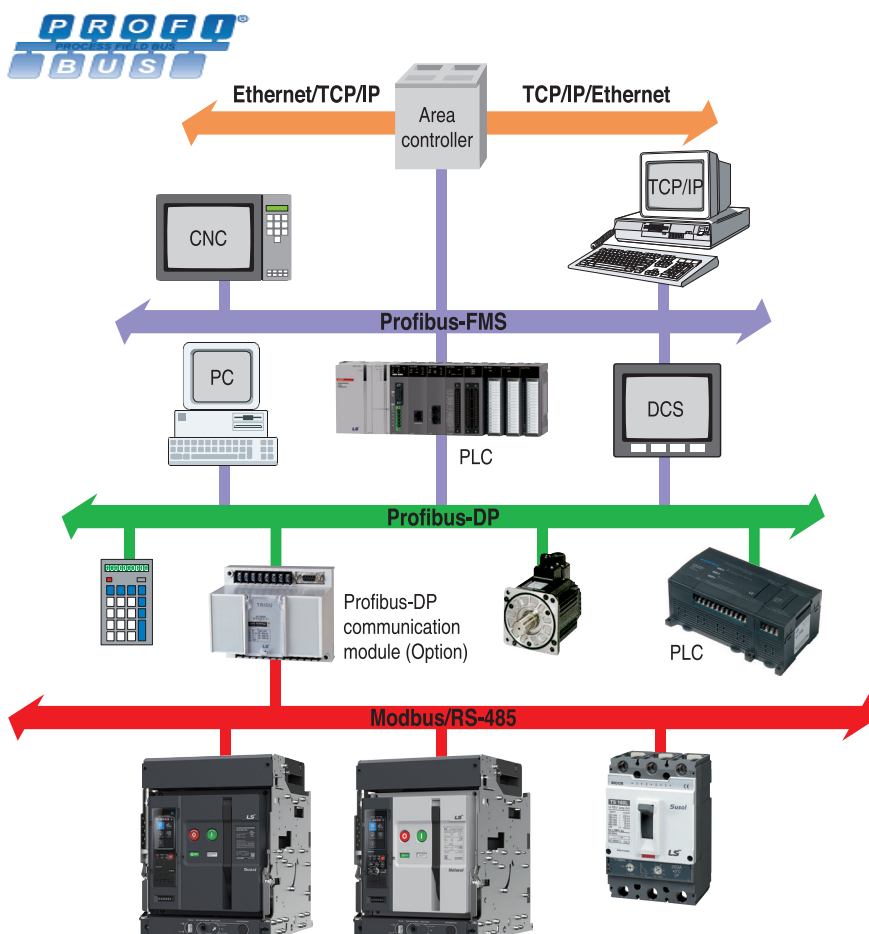


Profibus-DP (A-type OCR Only)

- Profibus-DP module is installed separately (Option)
- Operation mode: Differential
- Distance: Max. 1.2km
- Cable: Profibus-DP Shielded twist
2-Pair cable
- Baud rate: 9600bps~12Mbps
- Transmission method: Half-Duplex
- Termination: 100Ω
- Standard: EN 50170/DIN 19245

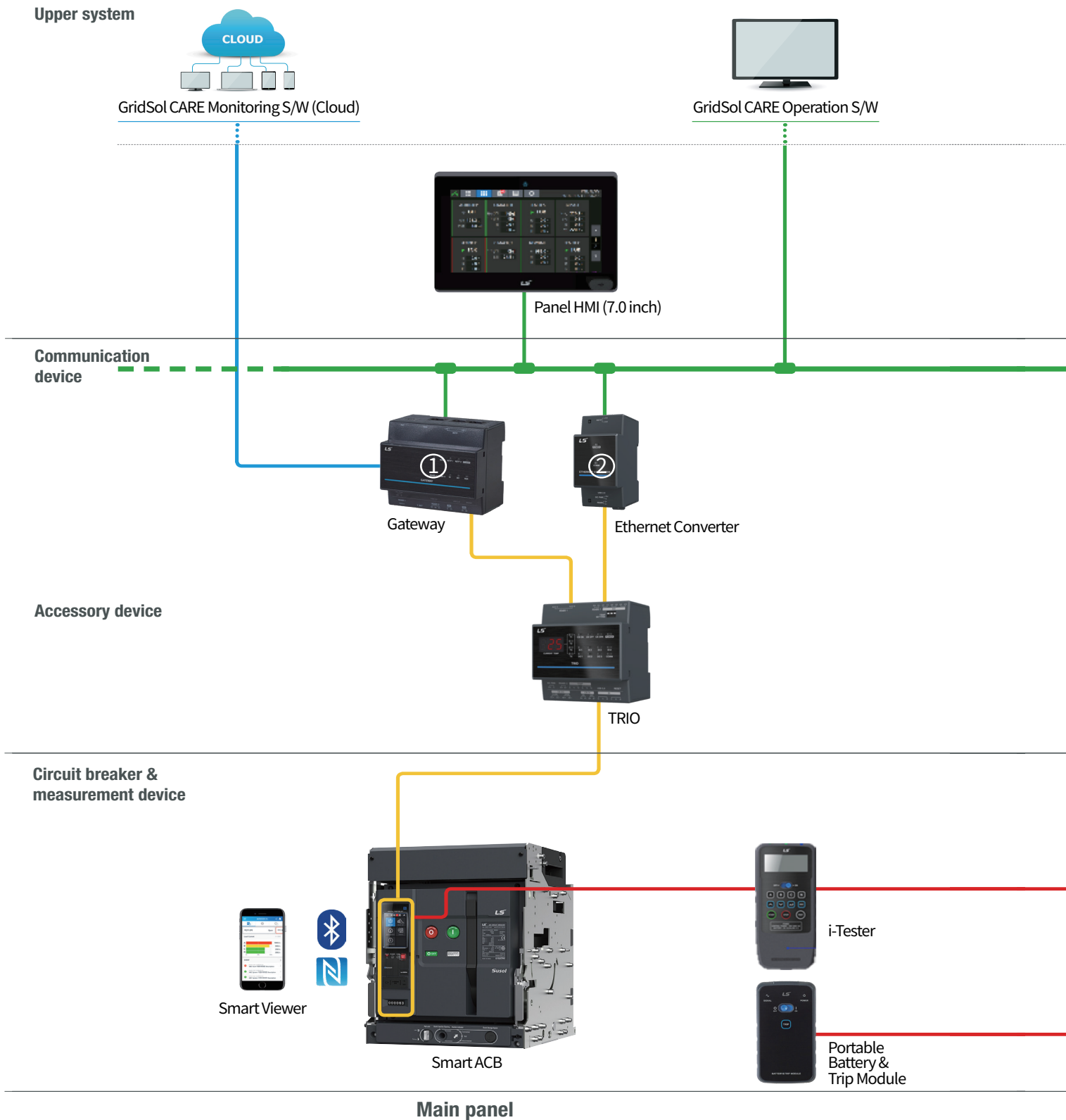


Profibus-DP communication module (Option)

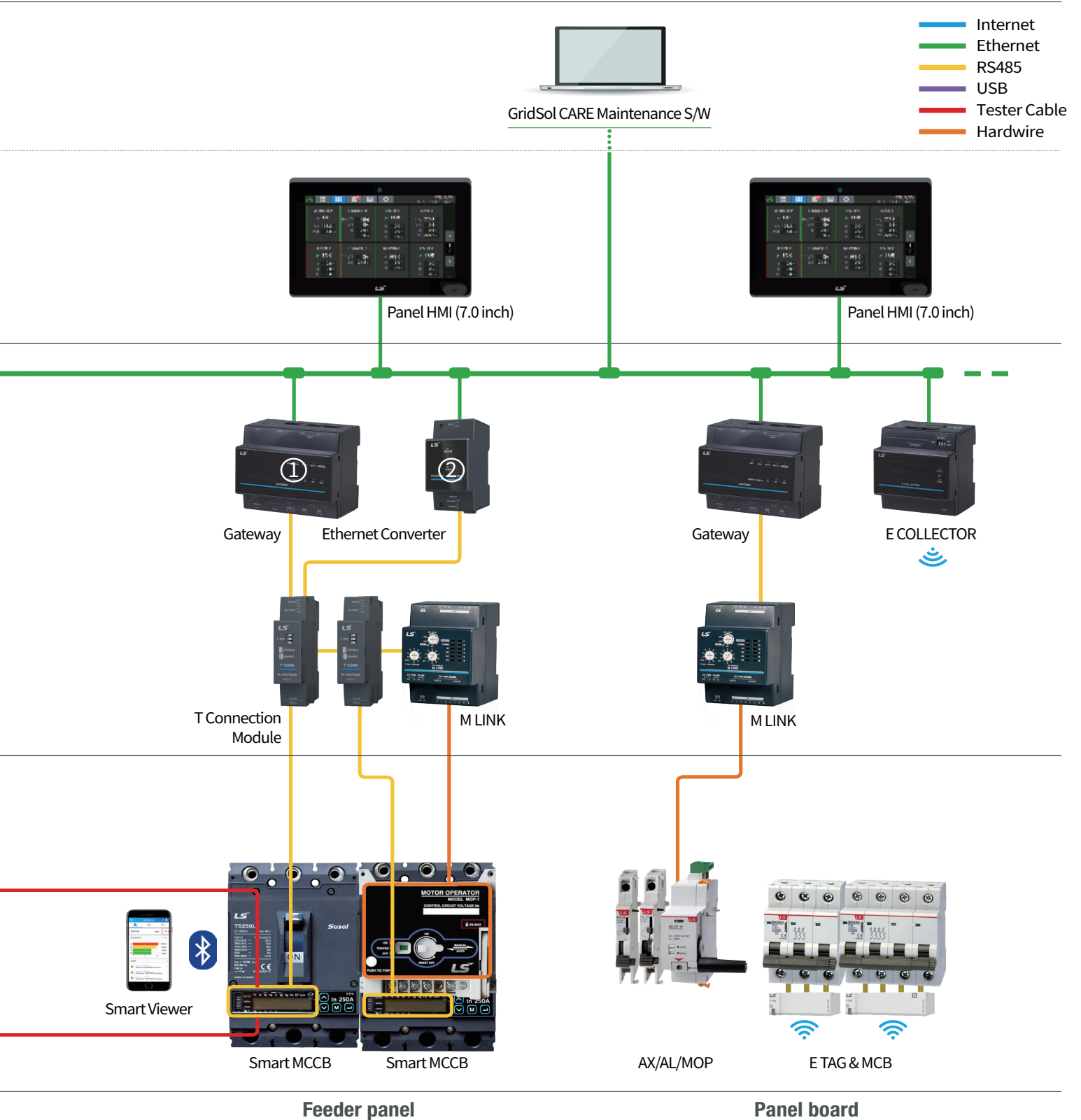


ACB/MCCB/MCB panel configuration

ACB/MCCB/MCB panel configuration

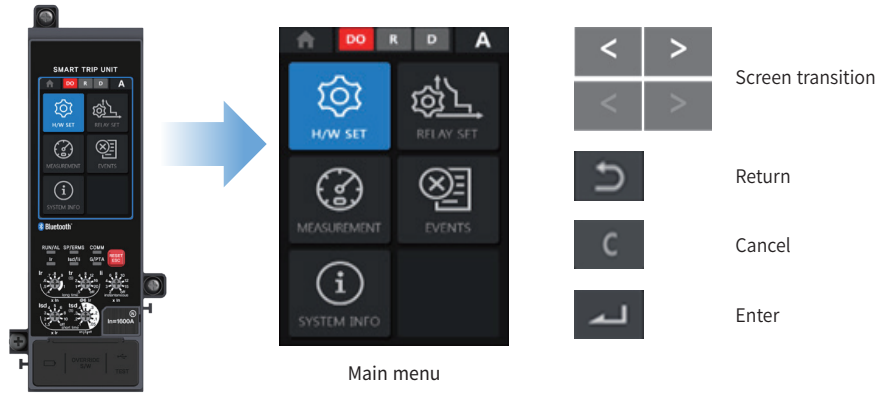


※ Please use one of the communication devices ① (Gateway) or ② (Ethernet Converter). ※ Coamptible devices : GIMAC1000, GIMAC-B, MMP, DMPI
 ※ RSTP (Rapid Spanning Tree Protocol) supported devices : Data Logger, Gateway, Ethernet Converter, E COLLECTOR

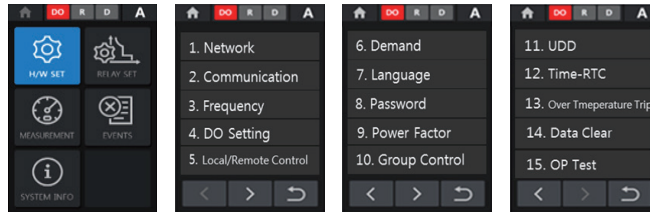


Trip relays

Protection element setting(P/S type)



H/W SET display

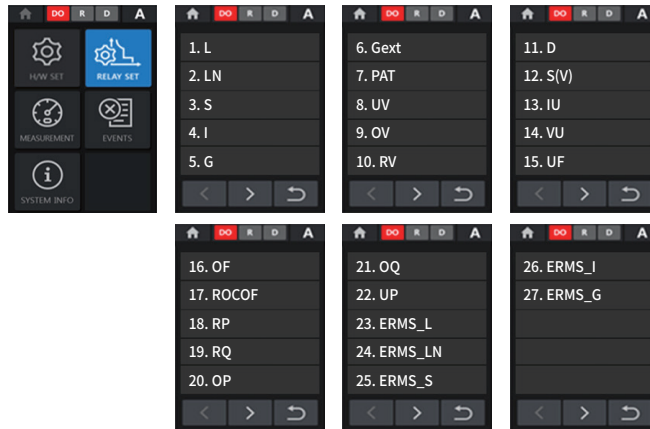


ERMS display

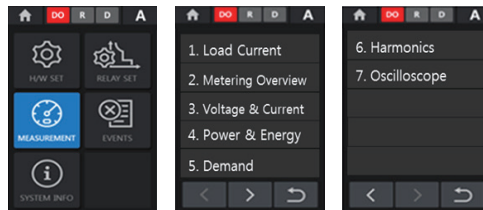


• The Screen during ERMS ON

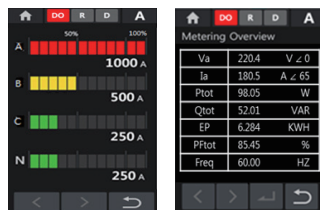
Relay SET display



Measurement display

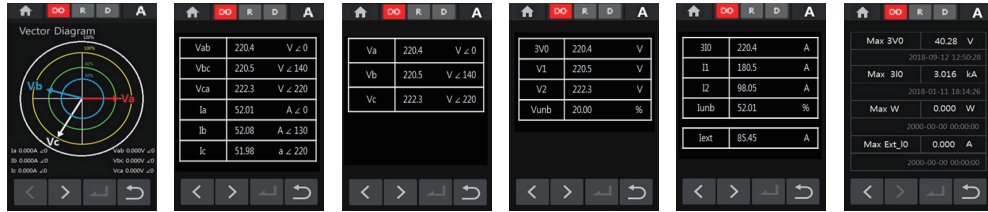


Measurement - Load Current/ Metering Overview

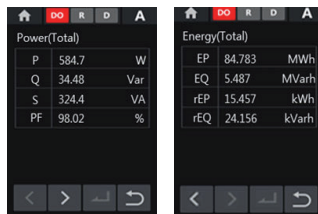


Protection element setting(P/S type)

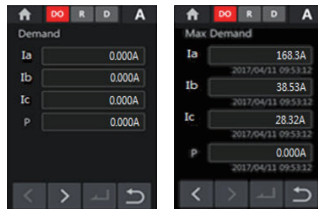
Measurement – Voltage & Current



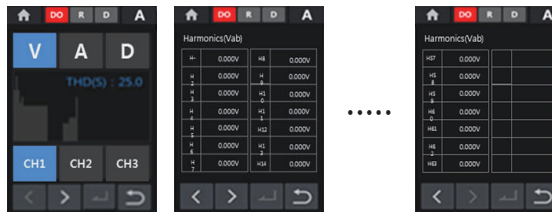
Measurement – Power & Energy



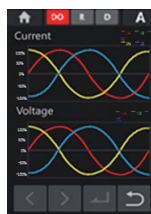
Measurement – Demand



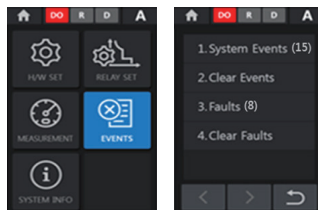
Measurement – Harmonics



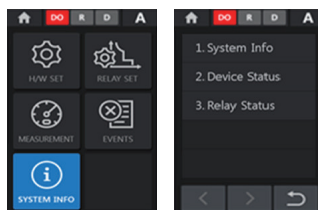
Measurement – Oscilloscope



EVENT display



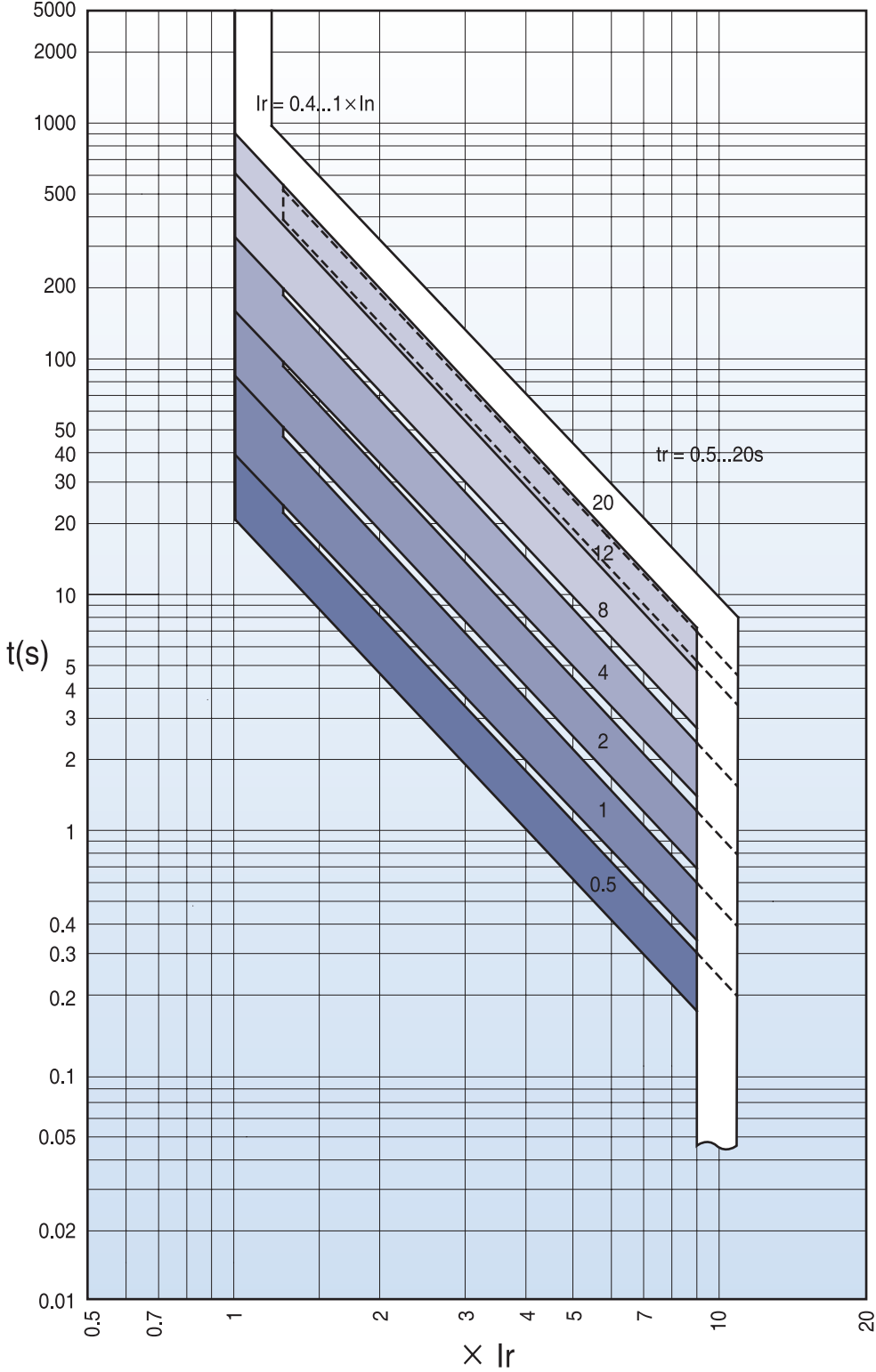
System info display



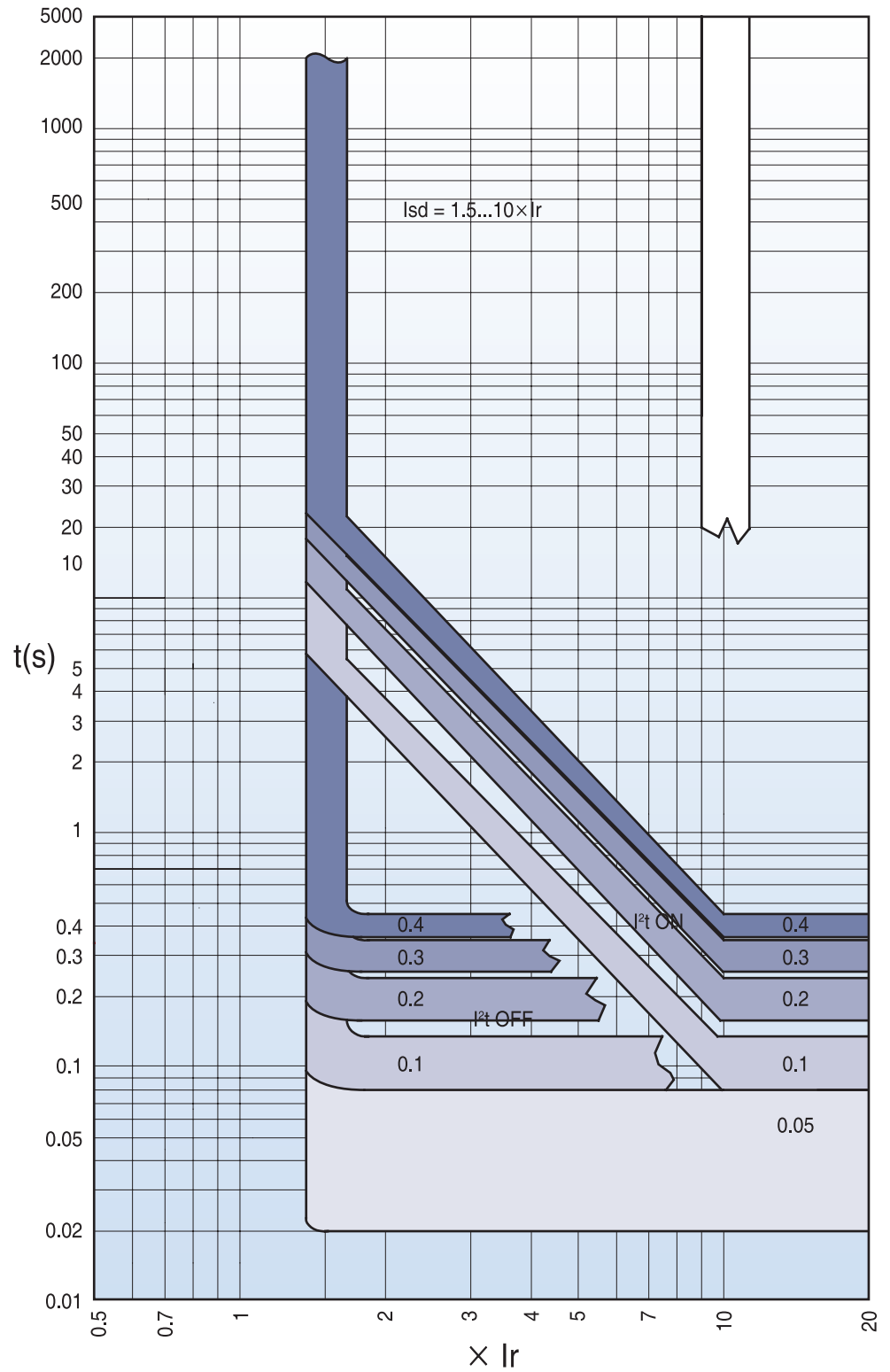
Trip relays

Characteristics curves

Long-time delay (L)



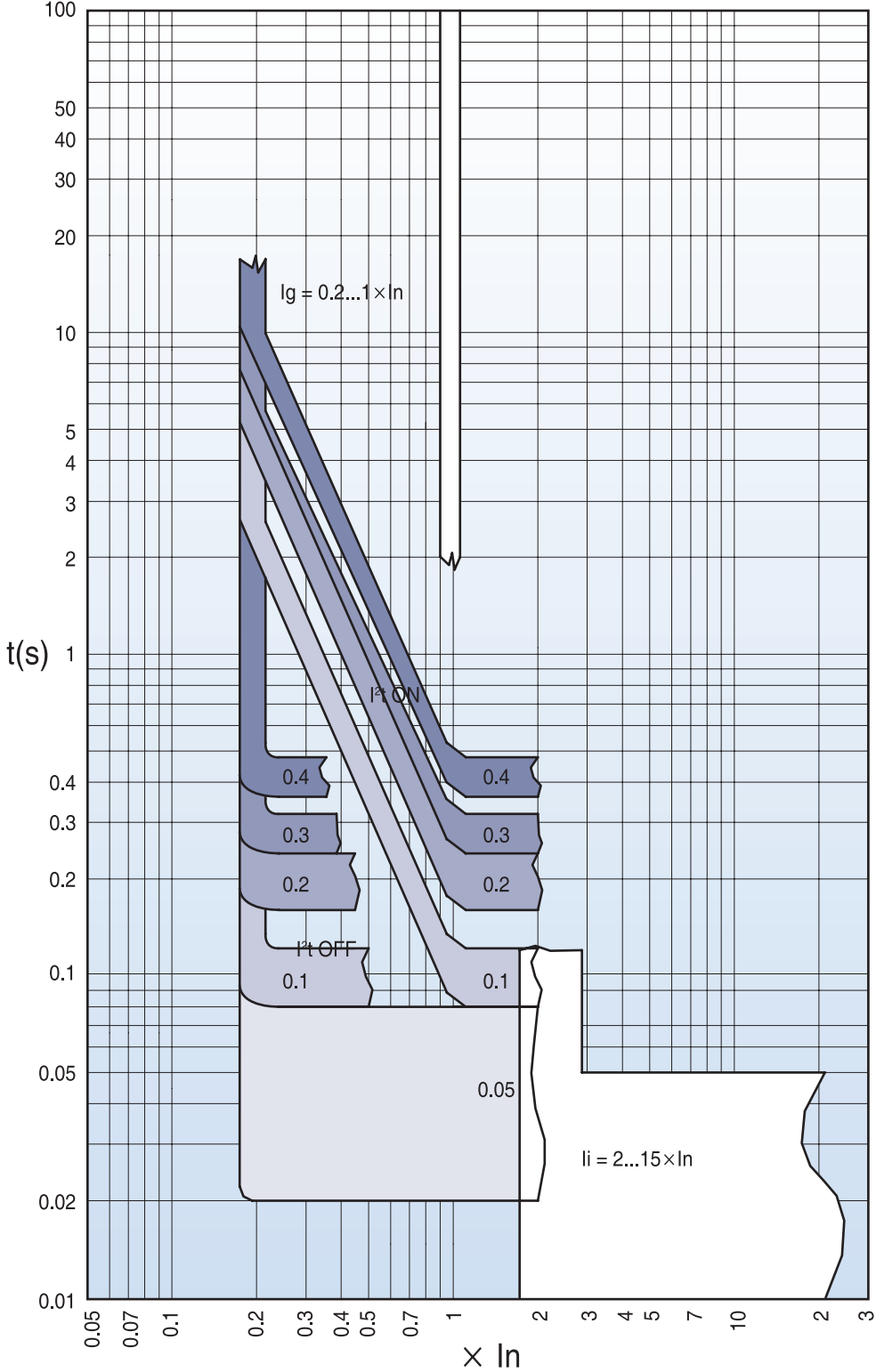
Short-time delay (S)



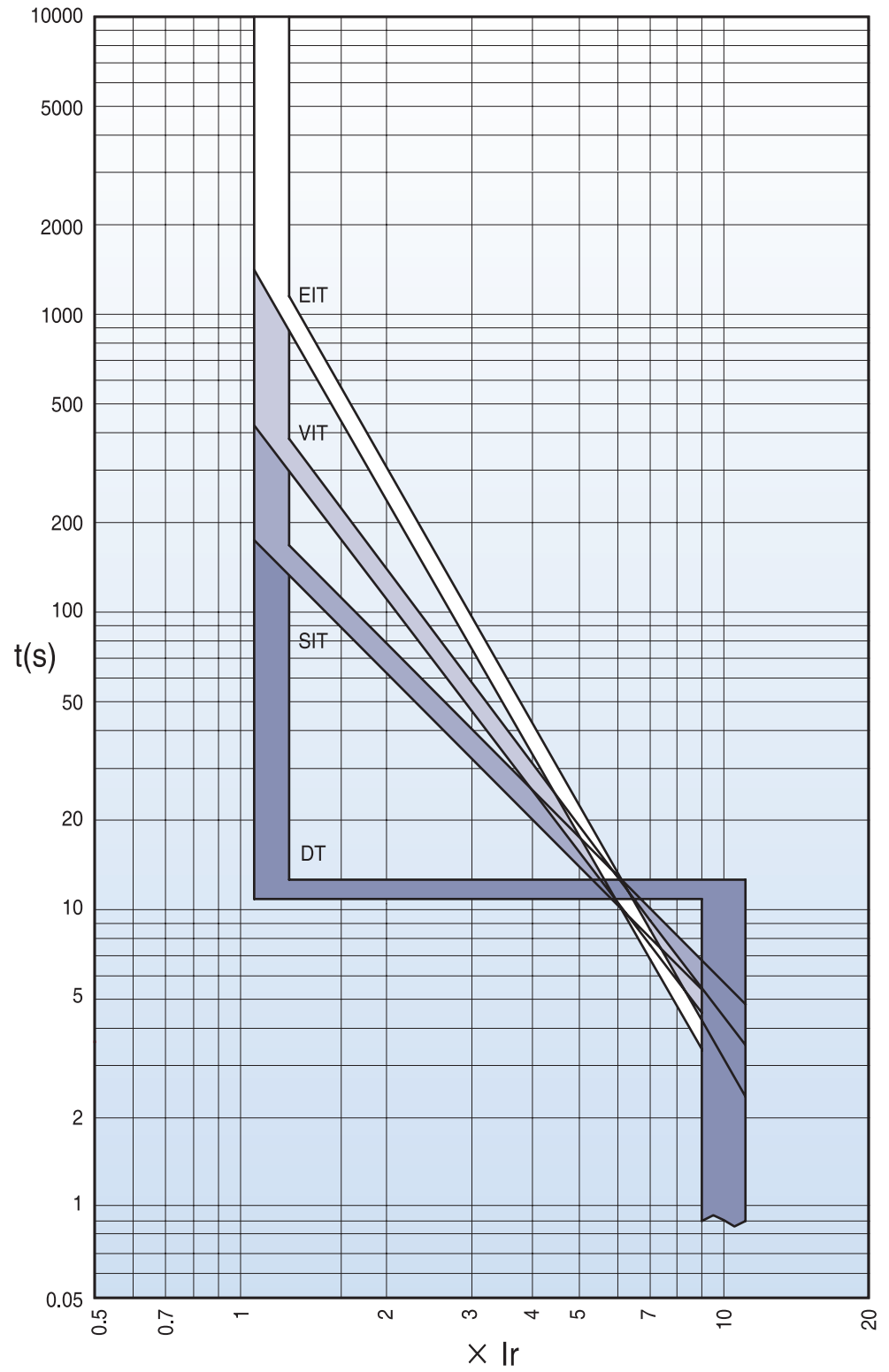
Trip relays

Characteristics curves

Instantaneous (I)
Ground fault (G)



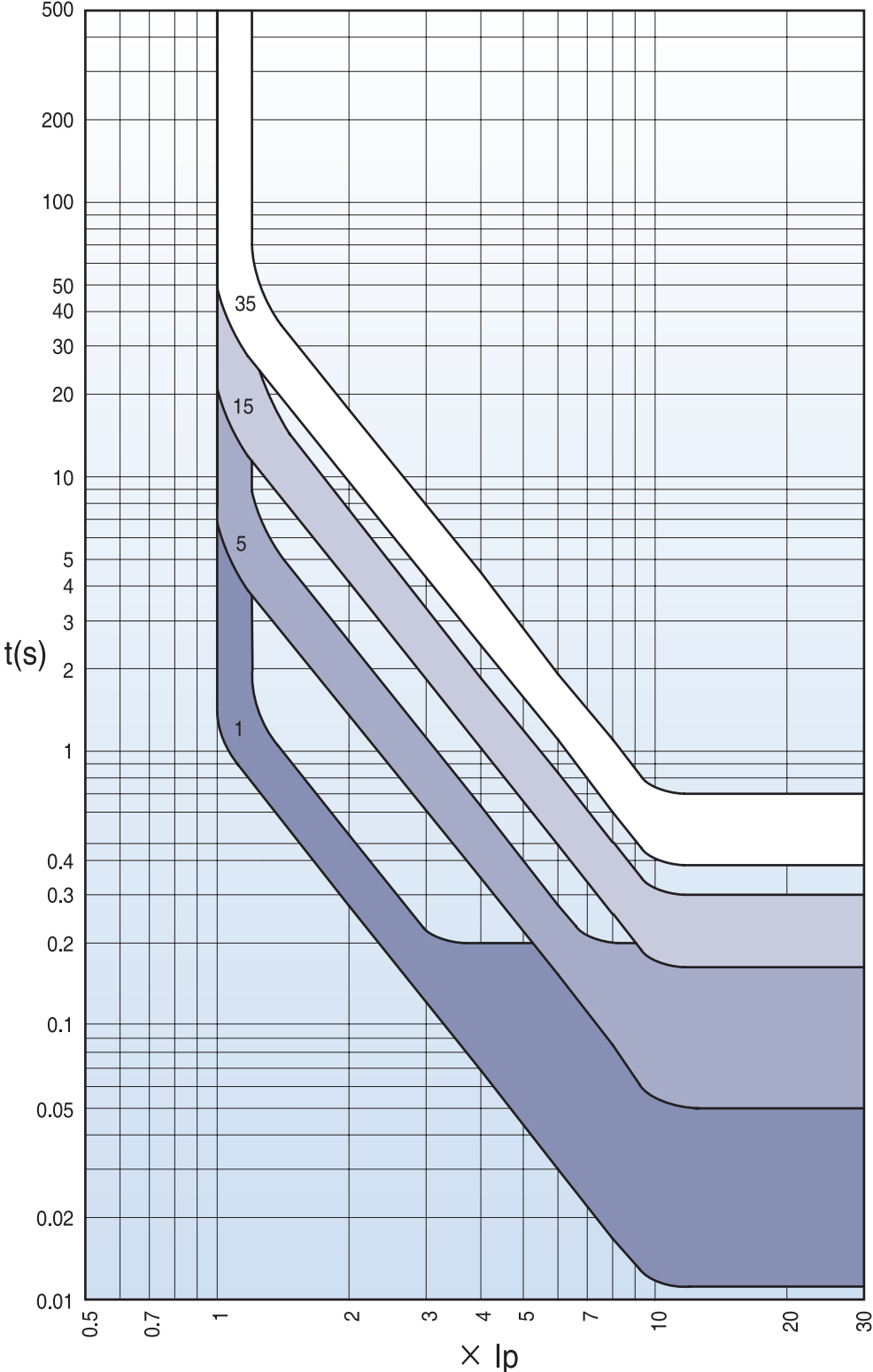
IDMTL



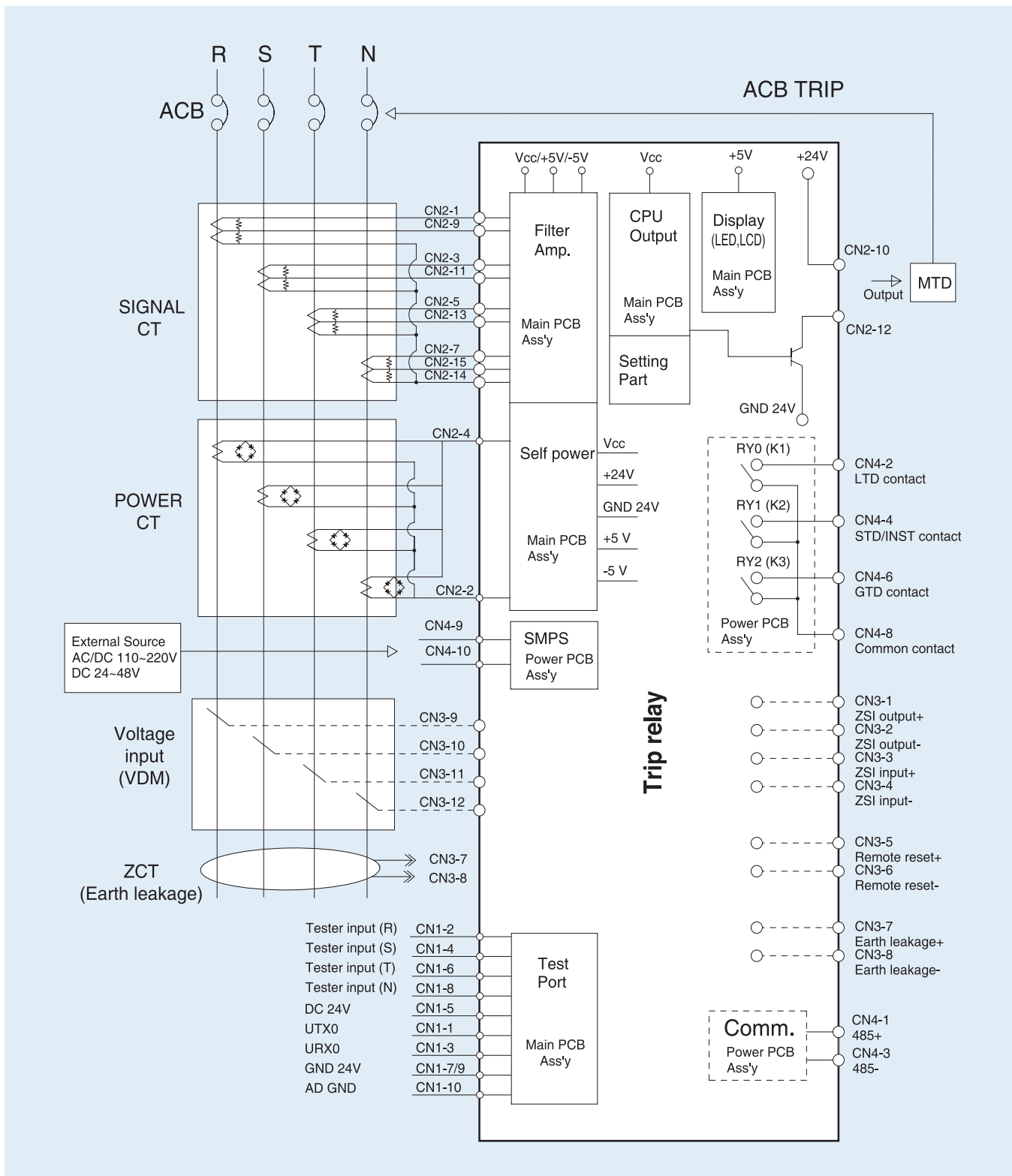
Trip relays

Characteristics curves

Pre Trip Alarm

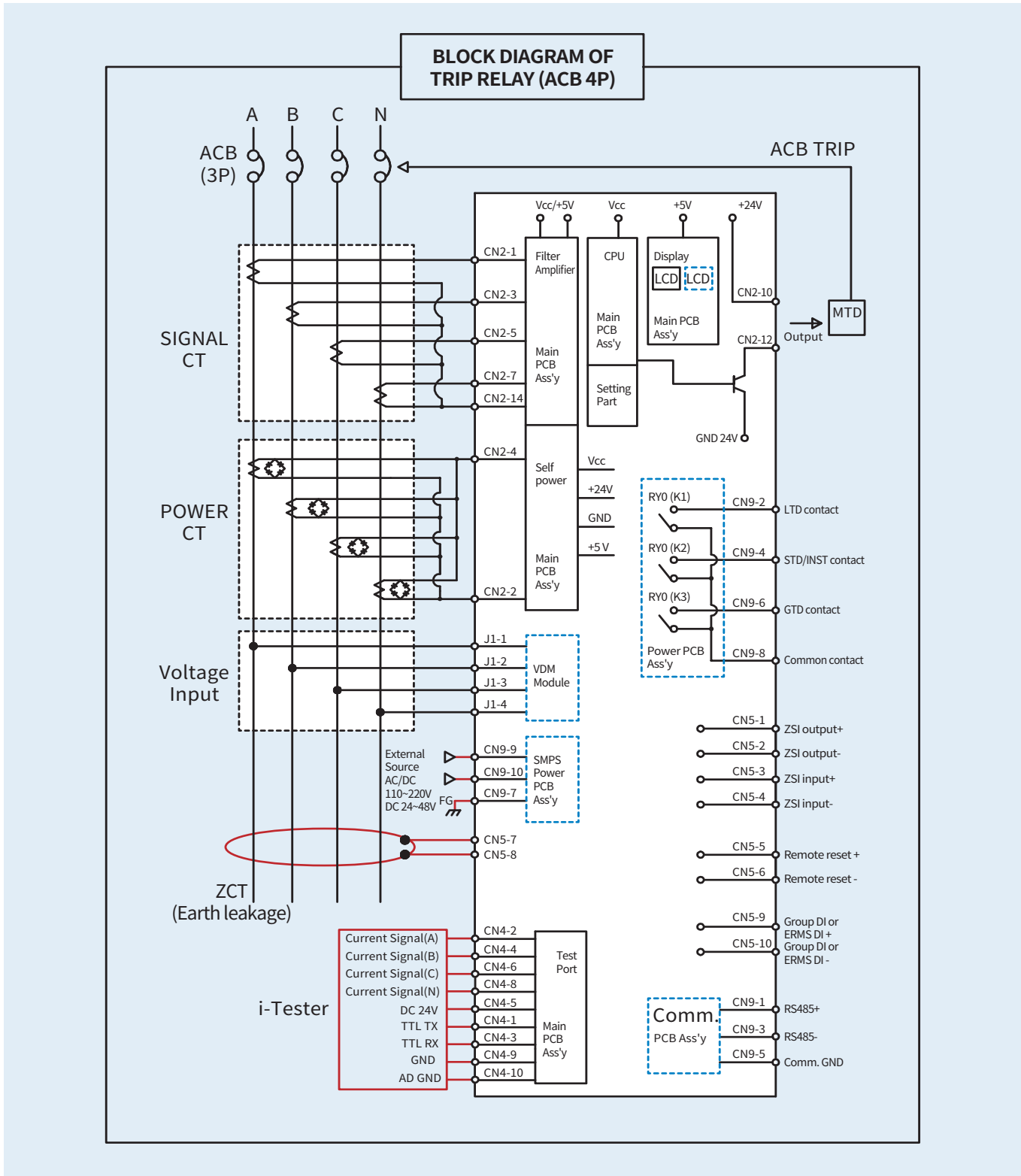


System block diagram(OCR)

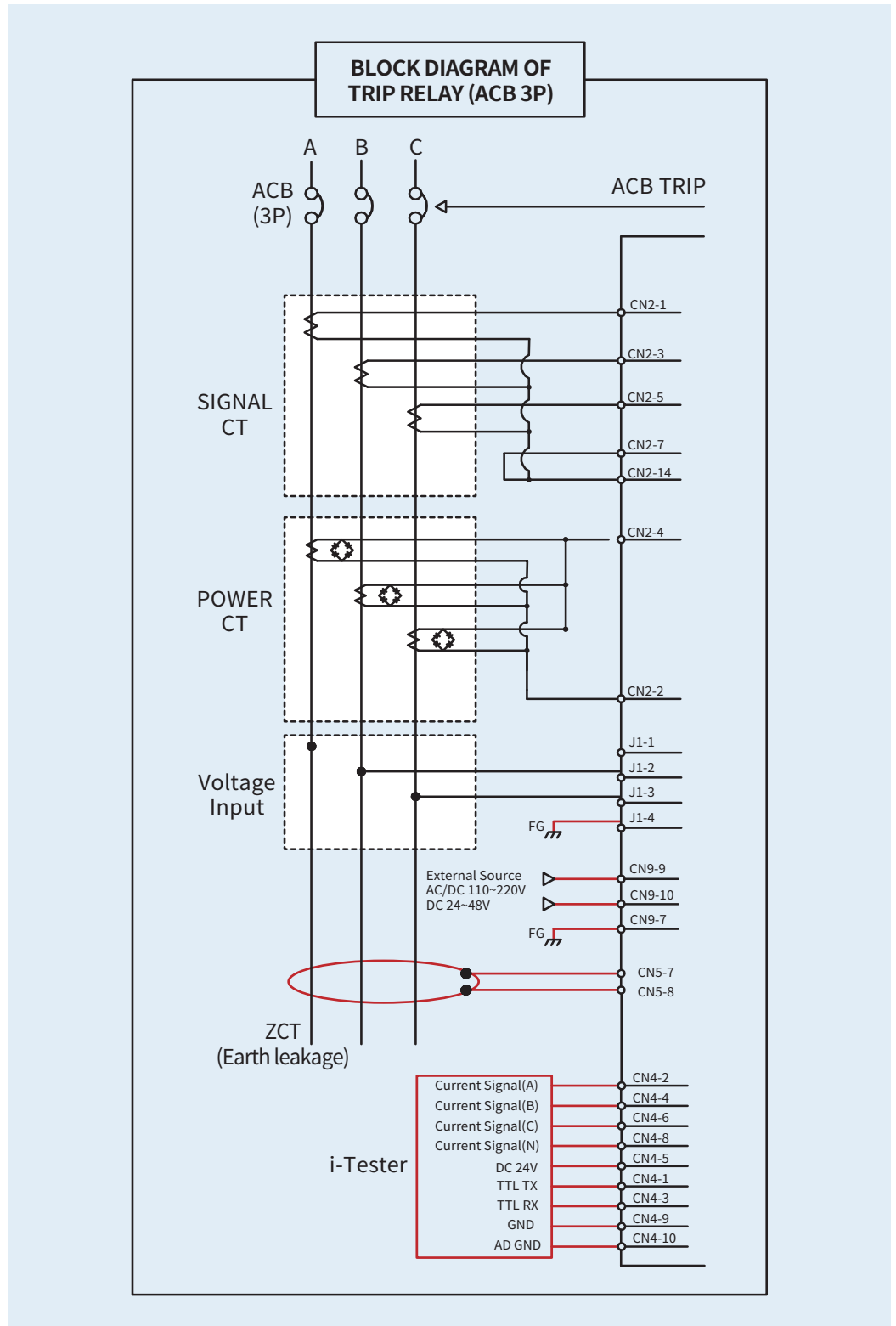


Trip relays

System block diagram(STU)



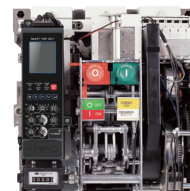
System block diagram(STU)



Accessories

Main body

Mounting	Accessories		AH		Page
			Standard	Option	
Internal	SHT 1	Shunt Coil	-	○	56
	SHT 2	Double Shunt Coil	-	○	57
	CC	Closing Coil	-	○	58
	M	Motor	-	○	59
	CS1	Charge Switch	-	○	59
	CS2	Charge Switch Communication**	-	○	59
	UVT	Under Voltage Trip Device	-	○	60
	AL	Trip Alarm Contact**	-	○	61
	MRB	Manual Reset Button**	-	○	61
	RES	Remote Reset Switch	-	○	62
	RCS	Ready to Close Switch	-	○	62
	C	Counter	●	-	68
	AX	Auxiliary Switch	-	○	63
	TM	Temperature Alarm**	-	○	86
MI	Mechanical Interlock**	-	○	70	
External	K1	Key Lock	-	○	64
	K2	Key Interlock Set	-	○	64
	K3	Double Key Lock	-	○	65
	K5	Profalux Lock (CAMLOCK Type)	-	○	64
	K6	Kirkkey Lock (CAMLOCK Type)	-	○	64
	K7	Kirkkey Lock (CN22 Type)	-	○	64
	B	Lockable ON/OFF Button Cover	-	○	65
	LH	Lifting Hook	-	○	66
	CTD	Condenser Trip Device*	-	○	66
	ATS	Automatic Transfer Switch Controller*	-	○	67
	DC	Dust Cover	-	○	68
	DF	Door Frame	-	○	73
IT	i-Tester*	-	○	82	

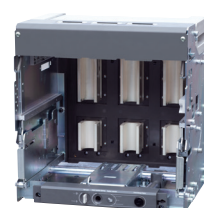


* Non ULL Listed.

** Separate purchase unavailable. Each item must be purchased with the main body.

Cradle

Mounting	Accessories		AH		Page
			Standard	Option	
Trip relay	N	N type	-	○	28
	A	A type	-	○	30
	P	P type	-	○	32
	S	S type	-	○	34
	VM	Voltage Module	-	○	38
Cradle	SBC	Shorting "b" Contact*	-	○	89
	ST	Safety Shutter	-	○	73
	MIP	Mis-Insertion Prevention Device	-	○	80
	MOC	Mechanical Operated Cell Switch	-	○	69
	CEL	Cell Switch	-	○	74
	DI	Door Interlock	-	○	71
	BSP	Body Supporter	-	○	75
	RI	Racking Interlock	-	○	75
	PL	Lockable Position Lock	●	-	72
	T	Metering Current Transformer	-	○	76
	UDC	UVT time delay controller	-	○	81
Other	RCO	Remote I/O	-	○	82
	PC	Profibus-DP comm. module	-	○	

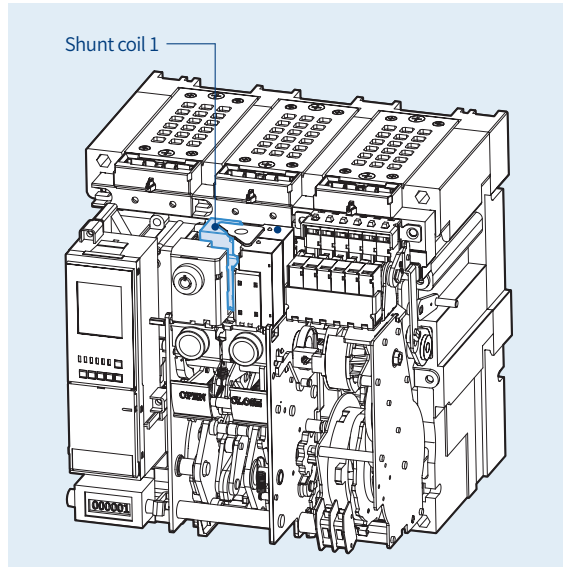


* Non UL Listed.
 ** separate purchase unavailable. Each item must be purchased with the main body.
 *** Voltage module should be purchased with P/S type trip relay.
 **** Available only when the control block is in auto-connection mode.
 ***** Trip unit P type & S type are under development, coming soon.

Accessories

Shunt Coil [SHT1]

- SHT1 is a control device that remotely trips a circuit breaker when voltage is applied to coil terminals (C1, C2) continuously or instantaneously for a minimum of 200ms.
- When UVT coil is installed, the location of the shunt coil changes.



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	-	14 ~ 33	200	5	Less than 40ms under
48~60	48	28 ~ 66			
100~125	100~125	70 ~ 140			
200~250	200~250	140 ~ 280			
-	380~480*	266 ~ 528			

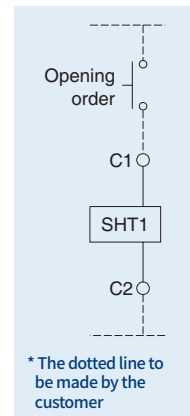
Note) Operating voltage range is the min. rated voltage standard for each rated voltage(Vn).
* Non UL Listed.

2. Specification of the wire

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

The maximum wire length

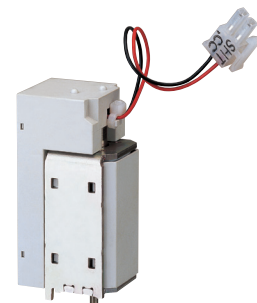
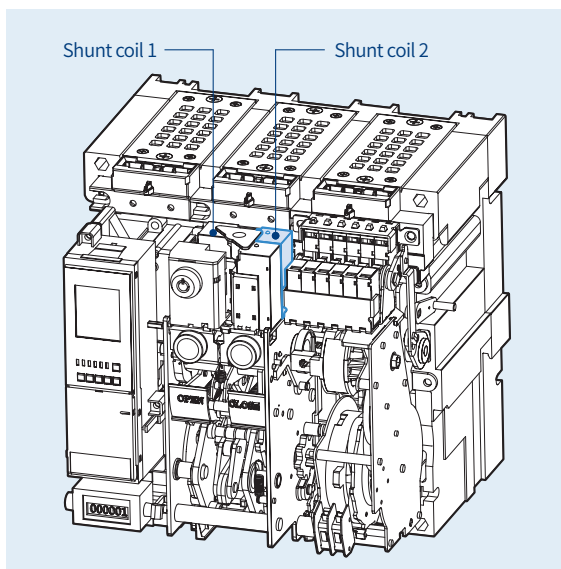
Wire type		Rated voltage (Vn)			
		DC 24~30V		DC/AC 48V	
		#14 AWG (2.08mm ²)	#16 AWG (1.31mm ²)	#14 AWG (2.08mm ²)	#16 AWG (1.31mm ²)
Operating voltage	100%	95.7m	61m	457.8m	287.7m
	85%	62.5m	38.4m	291.7m	183.2m



Wiring Diagram

Double Shunt Coil [SHT2]

- SHT2 is a control device that remotely trips a circuit breaker when SHT1 does not operate normally, allowing the circuit breaker to be tripped safely.
- Shunt coil 1: Install it at existing location.
- Shunt coil 2: Install it on the right side of the Shunt coil 1
- UVT coil is unavailable when installing Double Shunt Coil.



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	-	14 ~ 33	200	5	Less than 40ms
48~60	48	28 ~ 66			
100~125	100~125	70 ~ 140			
200~250	200~250	140 ~ 280			
-	380~480	266 ~ 528			

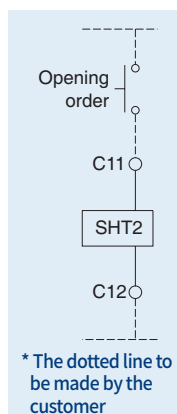
Note) Operating voltage range is the min. rated voltage standard for each rated voltage(Vn).
 * Non UL Listed.

2. Specification of the wire

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

The maximum wire length

Wire type		Rated voltage (Vn)			
		DC 24~30V		DC/AC 48V	
		#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



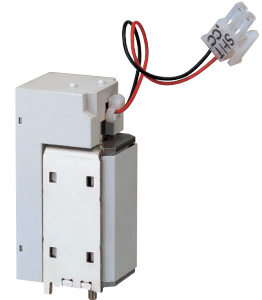
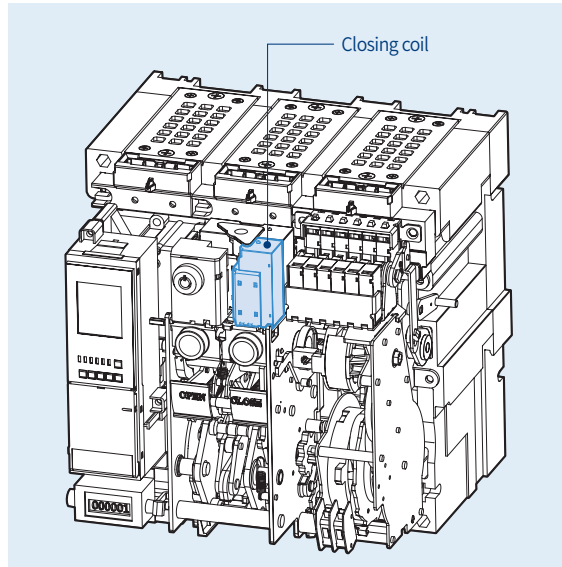
* The dotted line to be made by the customer

Wiring Diagram

Accessories

Closing Coil [CC]

- It is a control device that remotely closes a circuit breaker when voltage is applied to coil terminals (A1, A2) continuously or instantaneously for a minimum of 200ms.



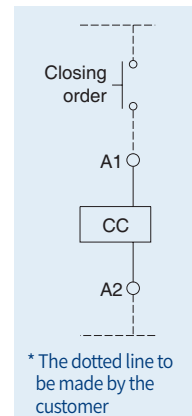
1. Rated voltage and characteristics of closing coil

Rated voltage (Vn)		Operating voltage range (V)	Power consumption (VA or W)		Trip time (ms)
DC (V)	AC (V)		Inrush	Steady-state	
24~30	-	14 ~ 33	200	5	Less than 80ms/90ms** under
48~60	48	28 ~ 66			
100~125	100~125	70 ~ 140			
200~250	200~250	140 ~ 280			
-	380~480	266 ~ 528			

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

* Non UL Listed.

** Close time of G frame (3200~5000A) is less than 95ms.



* The dotted line to be made by the customer

Wiring Diagram

2. Specification of the wire

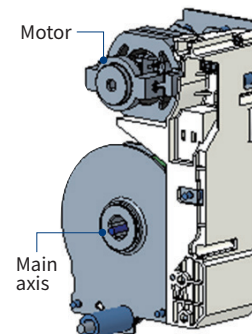
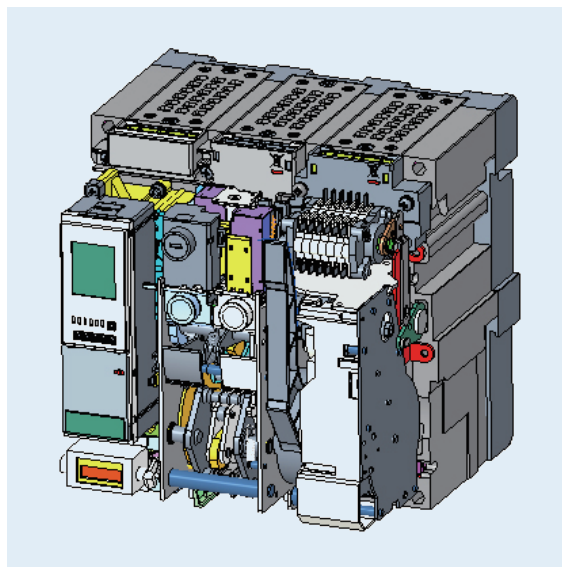
- Refer to the below table regarding the length and specification of wire when using trip coil with DC 24~30V or DC / AC 48~60V of rated voltage.

The maximum wire length

		Rated voltage (Vn)			
		DC 24~30V		DC/AC 48V	
Wire type		#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

Motor [M]

- Charges the closing spring of a circuit breaker using an external power source. Without an external power source, the closing spring can be charged manually.
- Operating voltage range 85%~110%Vn



Input voltage (V)	DC 24~30V	AC/DC 48~60V	AC/DC 100~130V	AC/DC 200~250V	AC 380V *	AC 440~480V *
Load current (max.)	5A	3A	1A	0.5A	0.3A	0.3A
Starting current (Max.)	5 times of load current					
Load rpm (Motor)	15000~19000 rpm					
Charge time	Less than 5sec.					
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					

* Non UL Listed.

Charge Switch [CS1]

Charge Switch Communication [CS2]

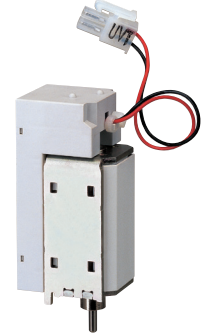
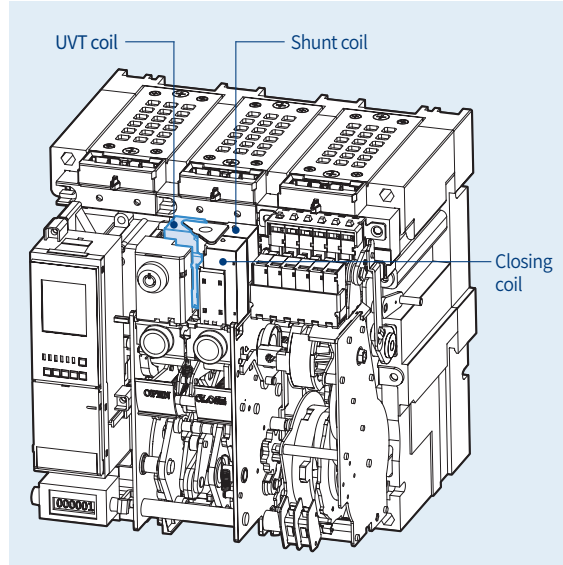
- Built-in contact that sends a signal to an external device when motor charging is complete. (2a)
- Has a “1a” contact for communication and another “1a” contact for complete charging.
- When using an extra communication module (Remote I/O), the state of contacts can be displayed through the network.

Classification	Standard		Remark
Contactor Capacity	250/125 Vac	10 A	
	250 Vdc	0.3 A	
	125 Vdc	0.6 A	
	48 Vdc	3 A	
	24 Vdc	5 A	

Accessories

Under Voltage Trip Device [UVT]

- If the voltage of the main or control power drops to a value between 40% and 60% of its rated voltage, UVT installed inside of the breaker trips the circuit automatically. UVT time-delay controller (UDC) should be connected in order to present the time delay function because UVT operates instantaneously.
- The closing of a circuit breaker is mechanically and electrically impossible if control power is not supplied to UVT. For the circuit breaker to be in ready for closing operation, the UVT needs at least 65% of rated voltage.
- When using UVT coil, the Double Trip Coil(SHT1 and SHT2) 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	200	5	Less than 50ms
48~60	48					
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. Specification of the wire

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

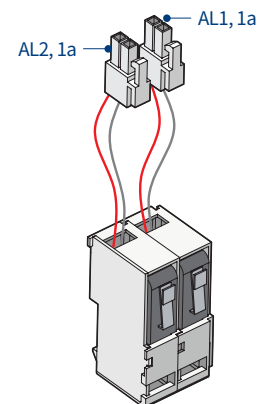
The maximum wire length

Wire type		Rated voltage (Vn)			
		DC 24~30V		DC/AC 48V	
		#14 AWG (2.08mm ²)	#16 AWG (1.31mm ²)	#14 AWG (2.08mm ²)	#16 AWG (1.31mm ²)
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 Shunt coil is changed.

Trip Alarm Contact [AL]

- The Trip Alarm switch, installed inside the circuit breaker, sends a signal to an external device when the circuit breaker is tripped by the OCR (Over Current Relay).
- When a circuit breaker is tripped by fault current, a mechanical trip indicator (MRB, Manual Reset Button) pops out from the front cover and closes the alarm switch (AL) which then sends a signal to an external device that the breaker has been tripped by fault current.
- MRB and AL will be triggered only when the breaker is tripped by OCR; they will not be triggered by the OFF operation of the trip coil or by the OFF button of trip coil.
- To re-close a circuit breaker after a trip, press MRB to reset it for closing.
- 2pcs of electrical trip switch (AL1, AL2, 1a) are provided (Option)
- Trip alarm contact and MRB(Manual reset bottom) need to be purchased together.

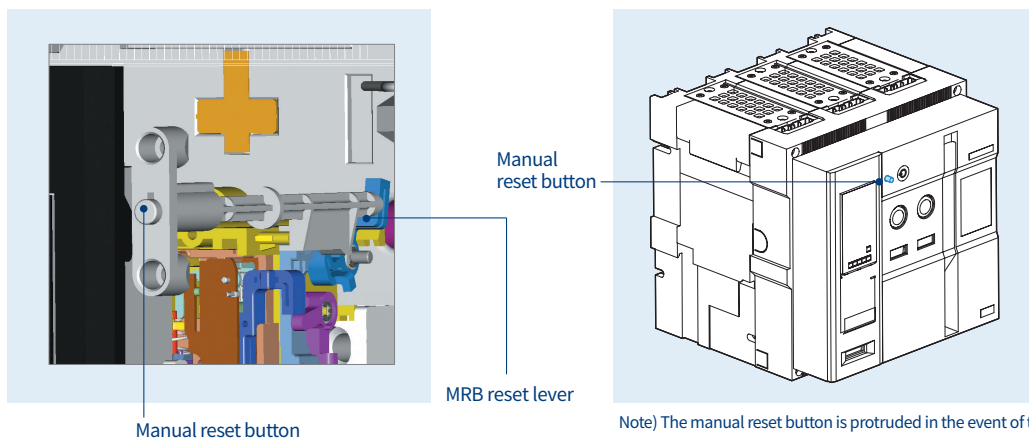
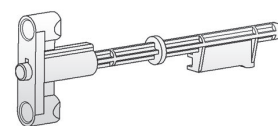


1. Electrical characteristics of trip alarm contact

Classification	Standard		Remark
Contactor	250/125 Vac	10 A	
	250 Vdc	0.3 A	
Capacity	125 Vdc	0.6 A	
	48 Vdc	3 A	
	24 Vdc	5 A	

Manual Reset Button [MRB]

- Function that manually resets a circuit breaker when it is tripped by OCR.
- When a circuit breaker is tripped by fault current, a mechanical trip indicator (MRB, Manual Reset Button) pops out from the front cover and closes the alarm switch (AL) which then sends a signal to an external device that the breaker has been tripped by fault current.
- MRB will only be triggered when the circuit breaker is tripped by OCR (will not trip when you open the breaker). To re-close a circuit breaker after a trip, press MRB to reset it for closing.



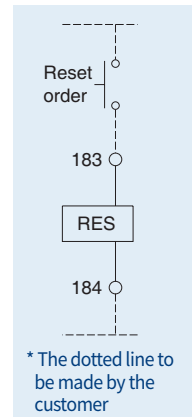
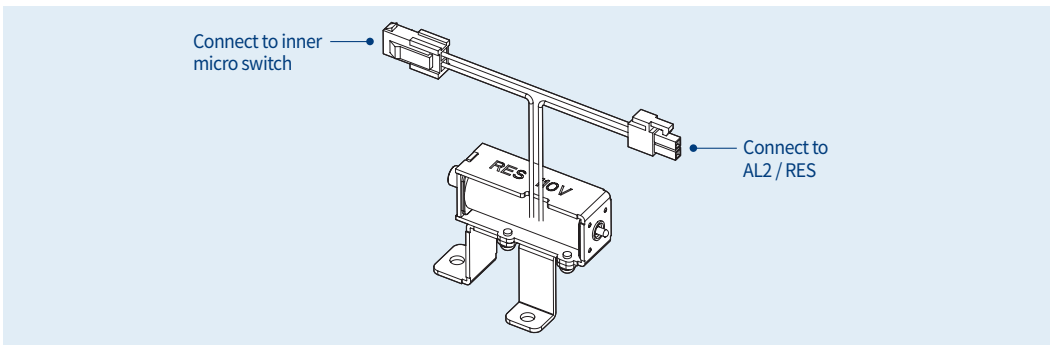
Accessories

Remote Reset Switch[RES]

- After trip operation, this function resets the "fault trip" alarm contacts (AL) and the mechanical indicator (MRB), putting the breaker in "ready to close" position.
Push button switch : AC 125V 10A, AC 250V 6A, DC 110V 2.2A, DC 220V 1.1A Resistive load
- In case of auto reset type circuit breaker:
After a trip operation, you do not need to reset the Manual Reset Button (MRB) or Remote Reset Switch (RES) to put the breaker in "ready to close" position.
The mechanical indicator(MRB) and electrical indicator(AL) remain in fault position until the reset button is pressed.
- AL2 and RES are alternative.

1. Rated voltage and rated current of RES

Rated voltage	Operating current(Max.)		Operating time	Wire spec.
AC/DC 100~130V	AC	6A	Less 40ms	#14 AWG (2.08 mm ²)
	DC	5A		
AC/DC 200~250V	AC	3A		#16 AWG (1.31 mm ²)
	DC	2.5A		

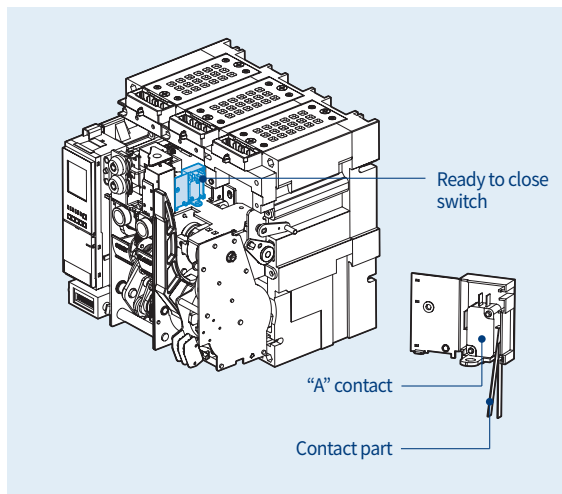


Wiring Diagram

Ready to Close Switch [RCS]

- RCS operates with the mechanism of the Breaker.
- It indicates when the Breaker is ready for closing operation.
- When mechanism is both Charged and in OFF state, the contact will close, which indicates that the mechanism is ready to be closed.

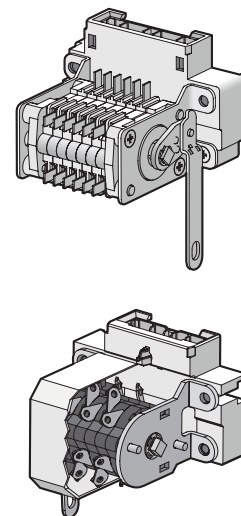
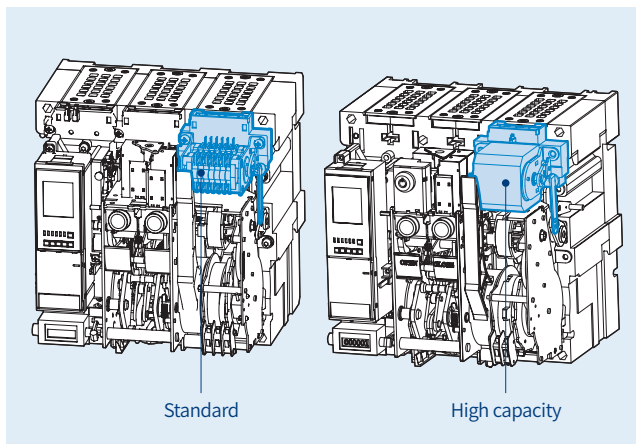
Classification	Standard	Remark
Contactor	250/125 Vac	10 A
	250 Vdc	0.3 A
Capacity	125 Vdc	0.6 A
	48 Vdc	3 A
	24 Vdc	5 A



Auxiliary switch [AX]

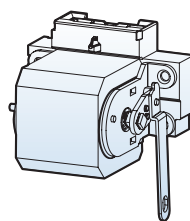
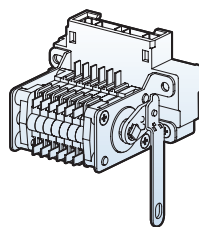
- Contact used to remotely monitor ON/ OFF position of the ACB.

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
GX	High capacity OFF charge 3a3b
GC	High capacity ON charge 3a3b



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			
Minimum current	DC24V, 5mA		DC5V, 1mA				
Contact capacity	AC	490V	5A	2A	5A	2.5A	
		250V	10A	6A	10A	10A	
		125V	10A	6A	10A	10A	
	DC	250V	0.3A	0.3A	3A	1.5A	
		125V	0.6A	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	-		
	GX	-	-	3a3b	-		
	AC	3a3b	-	-	-	Rapid auto-reclosing charging type	
	BC	5a5b	-	-	-		
	CC	6a6b	-	-	-		
	HC	-	-	5a5b	-		
	JC	-	-	6a6b	-		
GC	-	-	3a3b	-			

Accessories

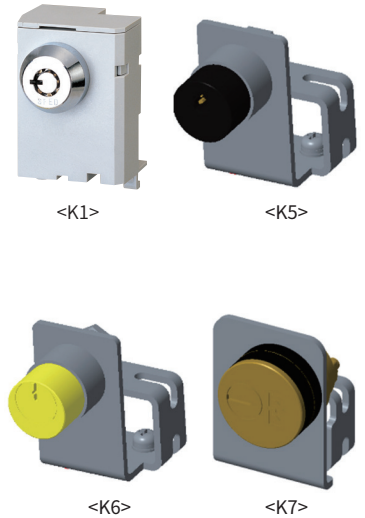
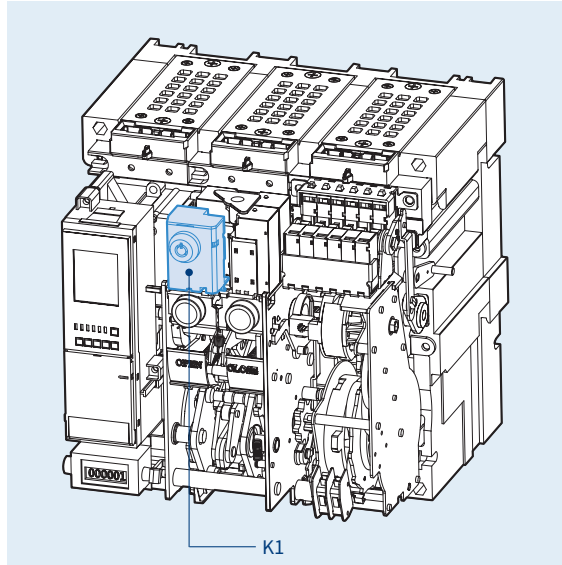
Key Lock

- Device that prevents unauthorized users from operating the circuit breaker when two or more circuit breakers are in use at the same time.
- Factory installed keylock: K1, K5, K6, K7
(Key number, code shall be provided by clients)

Code	Description	Type
K1	NORMAL TYPE KEYLOCK	-
K5	PROFALUX LOCK	CAMLOCK type
K6	KIRKKEY LOCK	CAMLOCK type
K7	KIRKKEY LOCK	CN-22 type

- Mounting Kits for client installed keylock:
Separately sold part

Code	Description	Type	Key part number
72313460861	PROFALUX LOCK	CAMLOCK type	-
72313460862	KIRKKEY LOCK	CAMLOCK type	KCAM00010
72313460863	KIRKKEY LOCK	CAMLOCK type	KC40-10



Key Interlock Set [K2]

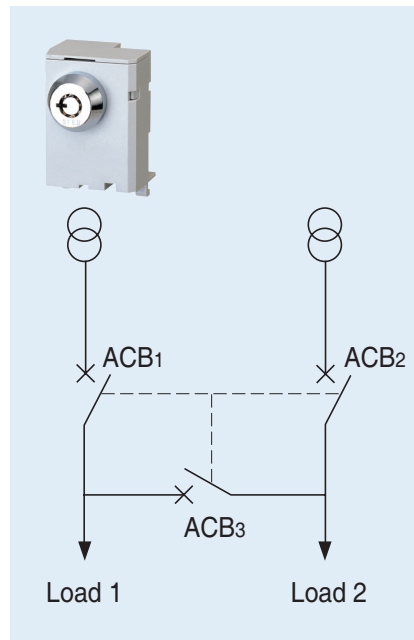
- Three circuit breakers can be arranged to supply continuous power to the load side. They will be interlocked by their attached key locks.

* How to order: 3 breakers must be ordered as a set, and K2 description must be added to the additional breakers. (2 keys are provided per 3 breakers.)

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

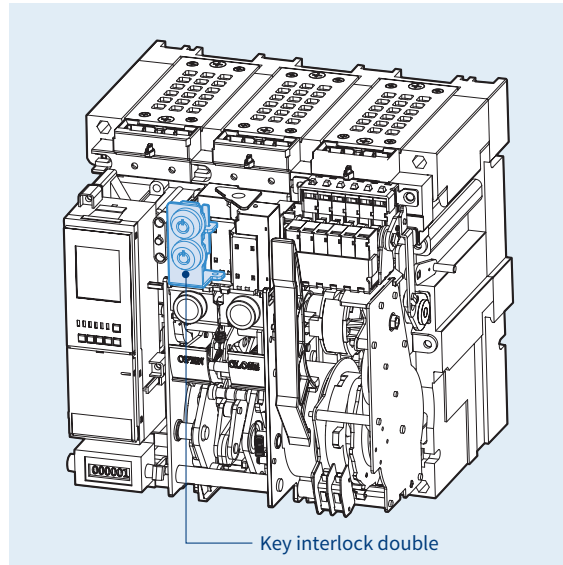
○: Release ●: Lock

Wiring



Double Key Lock [K3]

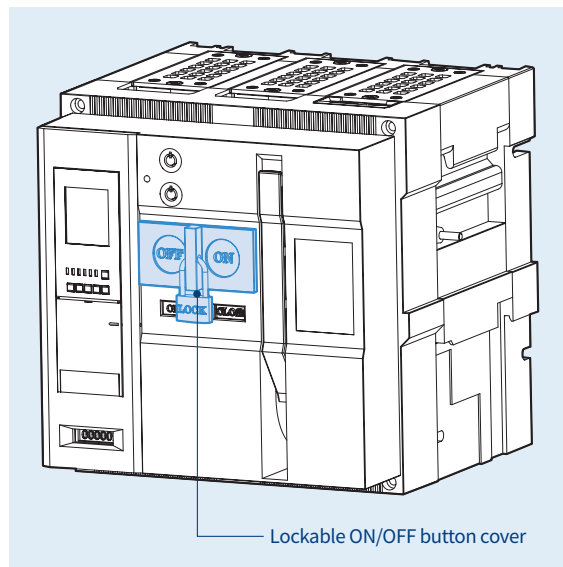
- The circuit breaker operates only when two keys are released at the same time. Handling method is same as K1.



Lockable ON/OFF Button Cover [B]

- Prevents accidents or mishandling of the ACB's manual closing/trip buttons.
- It is not possible to handle ON/OFF operation under the "Button lock" status.

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

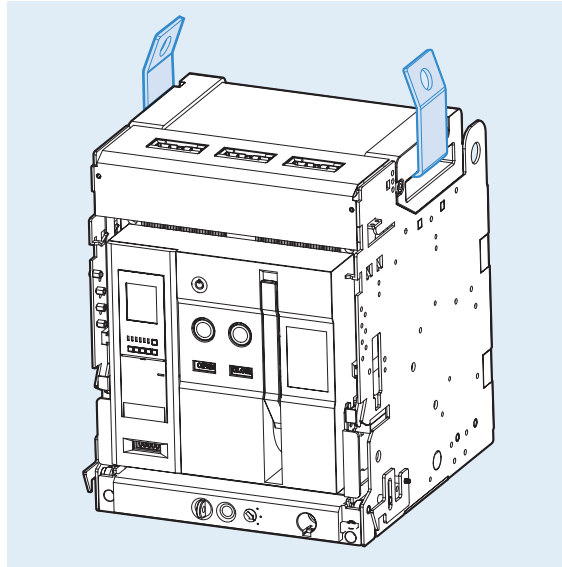


Accessories

Lifting Hook [LH]

- Device that makes an ACB easy to lift.
- Please hang it to both handles of the arc cover.

Code	Description
46513451003	HOOK, LIFT, LBA-C 630~3200A



Condenser Trip Device [CTD]

- When the circuit breaker loses control power supply, the CTD allows a certain period of time before the breaker trips.
- Used in combination with the Trip Coil (Shunt coil, SHT)
- In instances without DC power, it can be used as a rectifier that supplies DC power to a circuit breaker by rectifying AC power.

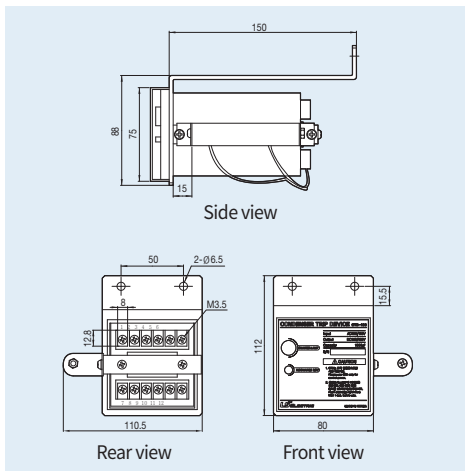
Ratings

Ratings	Specification	
Model	CTD-100	CTD-200
Rated input voltage (V)	AC 100/110	AC 200/220
Frequency (Hz)	50/60	50/60
Rated charge voltage (V)	140/155	280/310
Charging time	Within 5s	Within 5s
Trip possible time	Over 3 min	Over 2 min
Range of Input voltage (%)	85~110	85~111
Condenser capacity	1000 μ F	560 μ F

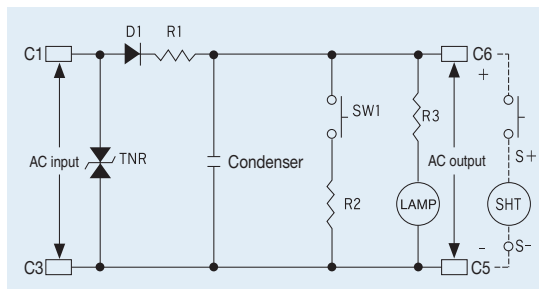


External dimension

Unit (mm)



Circuit diagram



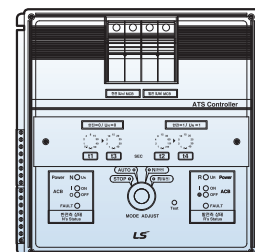
* Non UL Listed.

Voltage	Code	Description
110V	76123460001	CTD ASS'Y, AC100/110V, ACB
220V	76123460002	CTD ASS'Y, AC200/220V, ACB

Automatic Transfer Switch Controller [ATS]

Ratings

Model type	ATSC-110	ATSC-220
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)	●	●
Time setting (t1~t4)	●	●
Fault function (OCR/Circuit breaker trouble)	●	●
Output contact (Auto, Load burden)	●	●



- t1: The delayed time from when UN (power supply of electric company) is OFF until generator start-up signal contact is closed. (t1: 0.2, 0.5, 1, 2, 4, 8, 15, 30, 40, 50secs)
- t2: The delayed time from when UN is turned on until ACB2 is tripped. (t2: 0.2, 1, 2, 4, 8, 15, 30, 60, 120, 240secs)
- t3: The delayed time from when UN is turned on until ACB3 is tripped. (t3: 0.5, 1, 2, 5, 10, 15, 20, 25, 30, 40secs)
- t4: The delayed time from when UN is turned on until ACB4 is tripped. (t4: 0.5, 1, 2, 5, 10, 15, 20, 25, 30, 40secs)
- Stop-mode: Mode to forcibly trip ACB1(electric power company) and ACB2 (power station) when UN (power supply of electric power company) or UR (power supply of power station) is in use.
 - * UN or UR should be kept in ON position
- N mode: Mode by manually turning on ACB1 when UN is in use.
 - * ON or OFF position of UR is irrelevant. If converting to N-mode while UR is in use, generator start-up signal contact will be opened.
- R- mode: Mode for manually turning on ACB2 when UR is in use when N is in use 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 when power supply is not available and it close the circuit breaker when power supply is available.

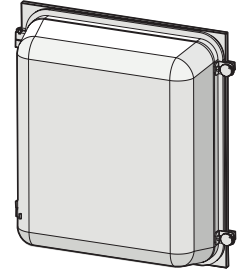
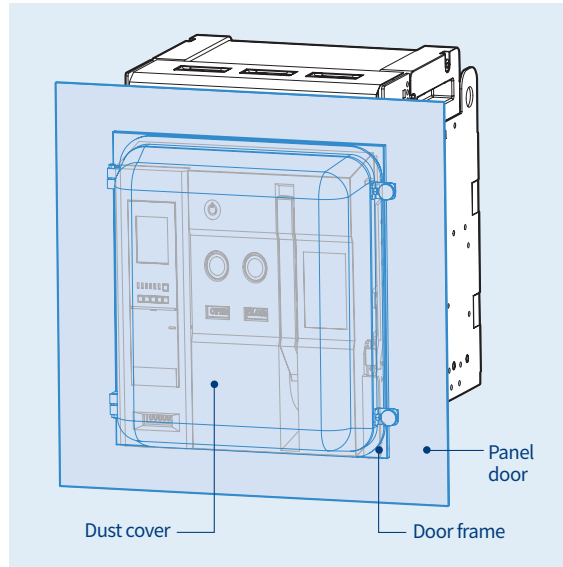
* Non UL Listed.

Accessories

Dust Cover [DC]

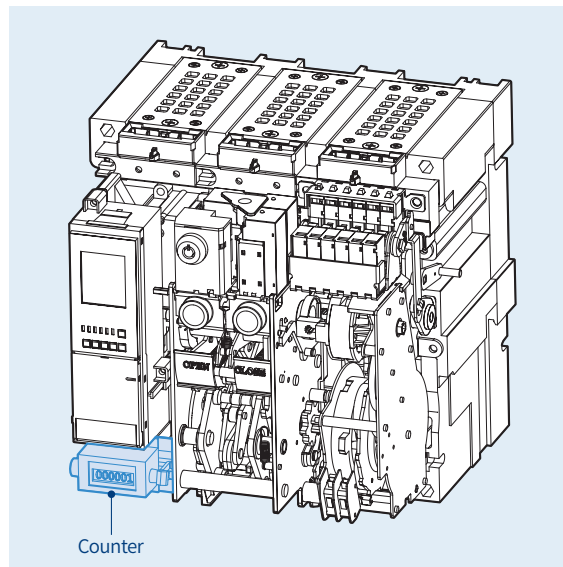
- Attaches to the door frame.
- Improves the seal and protects the product from dust and moisture that may interfere with the regular operation of the circuit breaker (IP5X).
- Transparent to allow the front of the ACB to be visible. Cover can be opened/closed until ACB is drawn out past TEST position.

Type	Code	Description
With door frame	64623460502	COVER ASS'Y,DUST & DOOR FRAME,AN/AS/AH-DEFG
Without door frame	64623460501	COVER ASS'Y, DUST, AN, AH-D, E, F, G

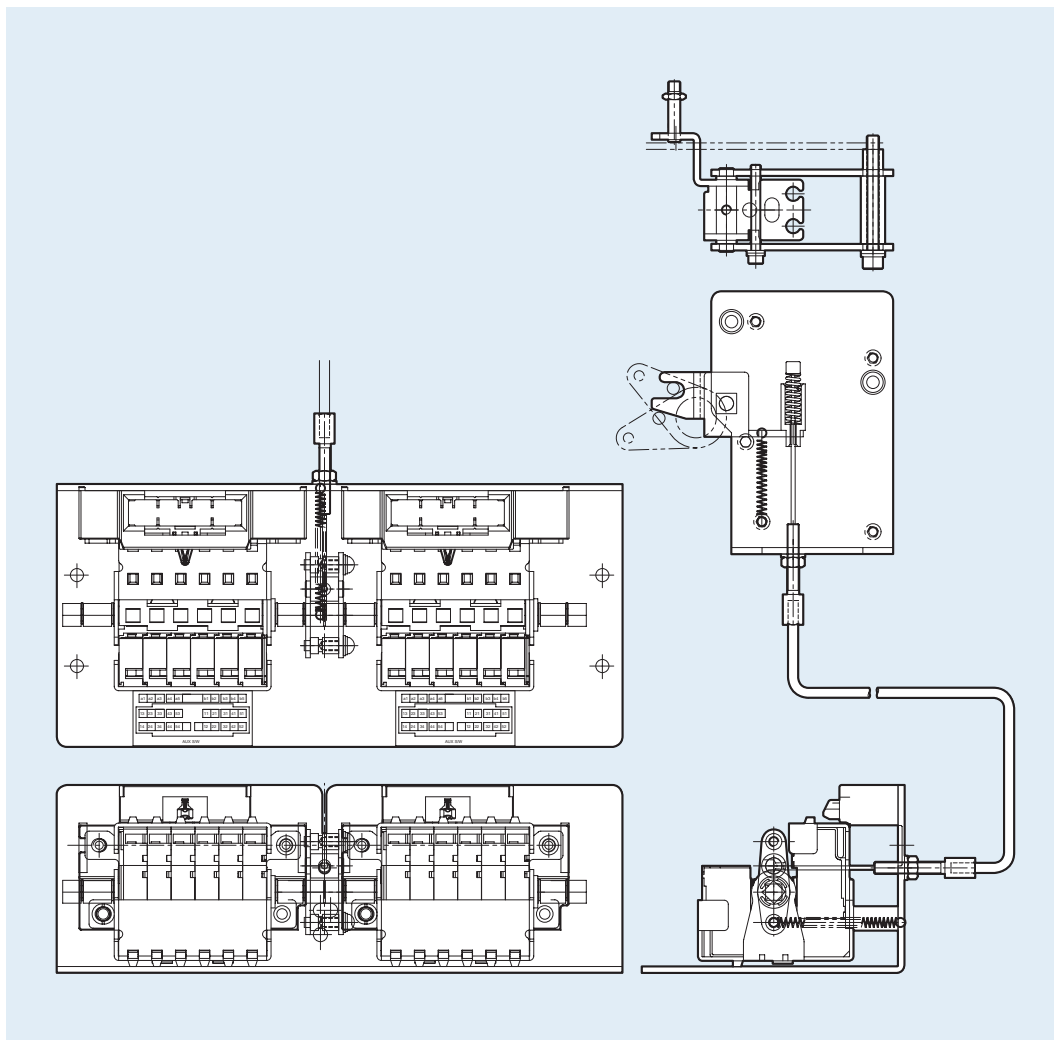


Counter [C]

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



Mechanical Operated Cell Switch [MOC]

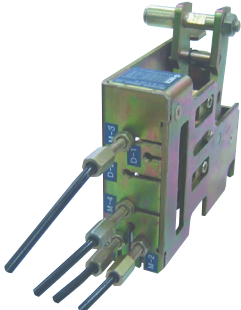
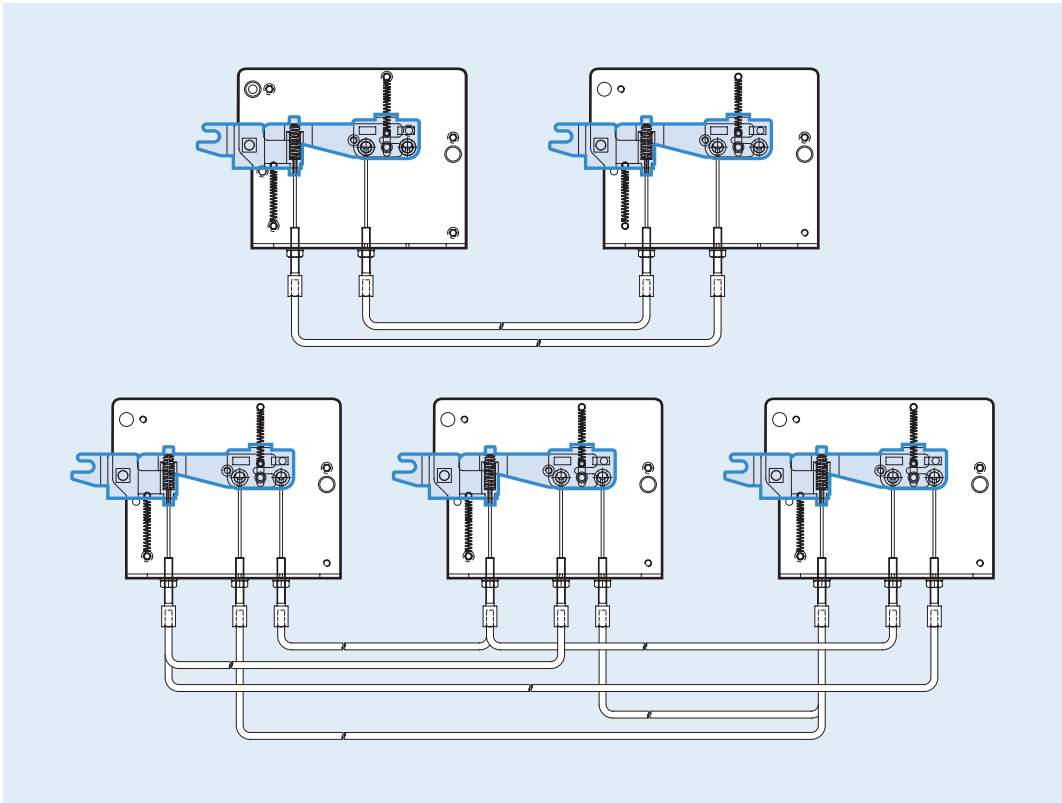


- The contact (10a10b) which displays the ON/OFF condition of ACB. Mechanically operates only when the breaker is in "CONNECTED" position. A standard type and a high capacity type are available.
- The contact capacity is the same as the ratings of aux. contacts.
- When MOC link is installed on cradle, MOC can be equipped inside the panel.

Code	Description
72313460659	TOTAL ASS'Y, MOC, AN, AS, AH, 200-6300A, ROTARY

Accessories

Mechanical Interlock [MI]



- Mechanically interlocks closing and trip between two or three breakers to prevent unintended operation at the same time.
- Wire type interlock can be applied to up to 3 breakers

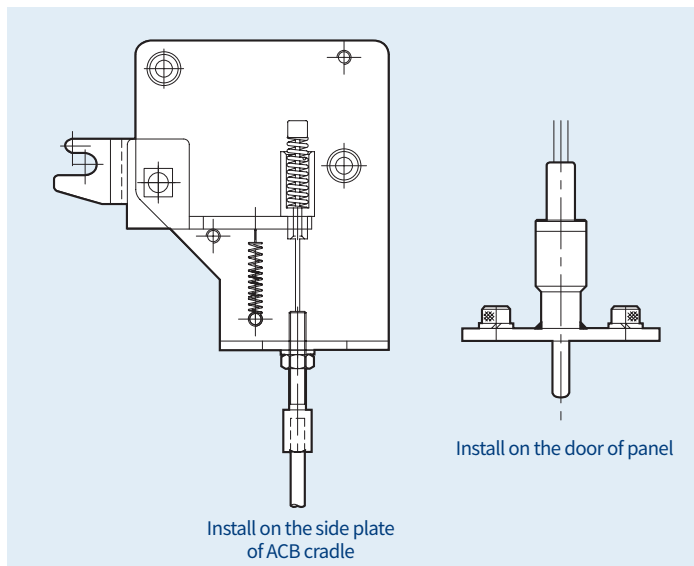
Type	Code	Description
2-Way	56123460502	INTERLOCK ASS'Y, MECHANICAL, WIRE-2WAY
3-Way	56123460503	INTERLOCK ASS'Y, MECHANICAL, WIRE-3WAY

Door Interlock [DI]

Normal type

- Safety device that prevents the panel door from being opened when the circuit breaker is in the “ON” position.

Code	Description
56123460504	INTERLOCK ASS'Y, DOOR, AN, AS, AH-D, E, F, G

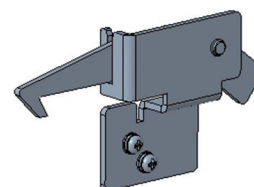
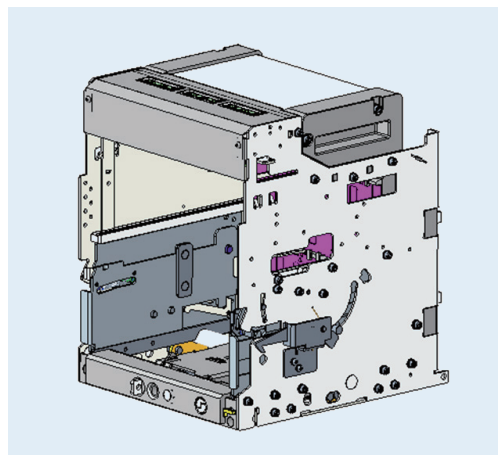


Catch type

- Door interlock catch type is installed to cradle which allow to open panel door when the breaker is on the 'Disconnected' position.

Circuit breaker	Disconnected	Test	Connected
Panel door	Open	Close	Close

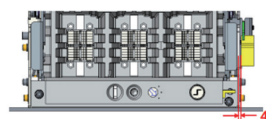
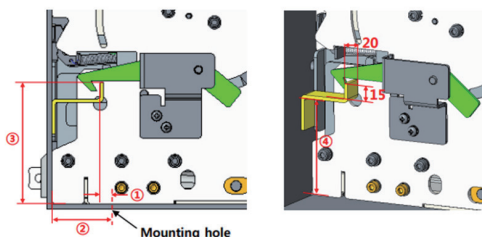
- It is possible to choose Left/Right type which depends on the door direction.



Catch type guide

1. The panel door will not be open when the circuit break in on the 'Test' or 'Connected'.

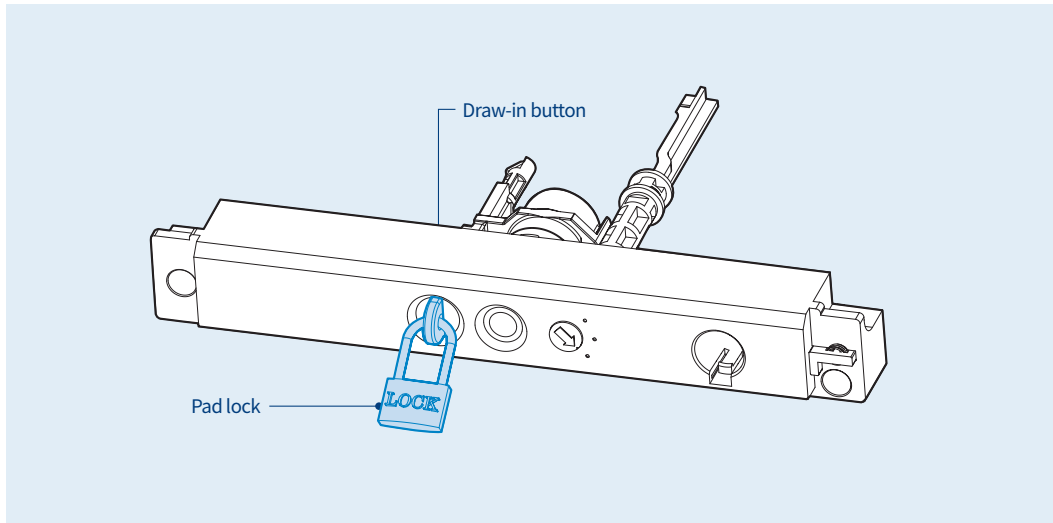
2. The panel door will be open when the circuit break in on the 'Disconnected'.



Frame	①	②	③	④
D	15	60	113	min 60
E	15	60	113	min 60
F	15	60	143	min 90
G	15	60	143	min 90

Accessories

Lockable Position Lock [PL]





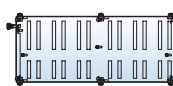
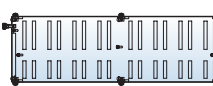


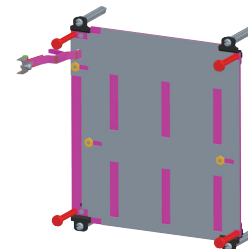
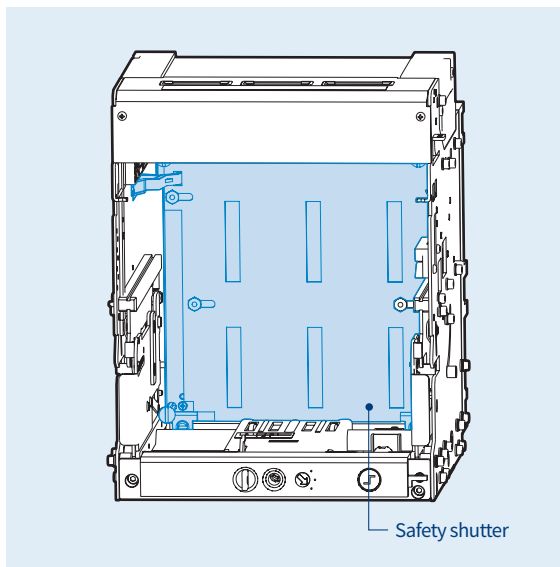
ACB is subject to restriction regarding moving in connected, test, disconnected when drawing in or out.

- As shown in the figure, if draw-in/out button pops out, it means locking is operating.
- To continue Draw-in/out operation, release lock by pushing Draw-in/out button
- When locked as shown in the figure above, the main body of ACB can not be drawn in or out into the cradle.
- User must provide padlock. (Ø5 ~ Ø6)

Safety Shutter [ST]

- Automatic safety device that protects the connectors of the 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 3 types of Safety Shutters and they are divided as shown in the figure below.

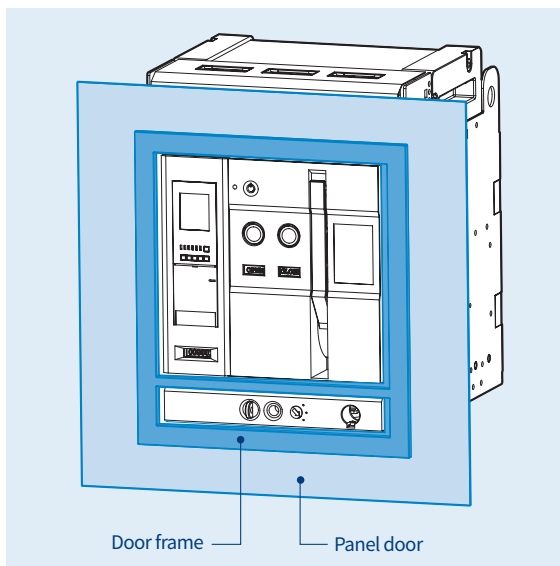
The types of safety shutter plate	
1600AF, 3P	1600AF, 4P
	
3200AF, 3P	3200AF, 4P
	
6000AF, 3P	6000AF, 4P
	



Door Frame [DF]

- Provides a frame and seal for the circuit breaker, protecting the front portion of the ACB that protrudes out.

Type	Code	Description
Drawout	64723460501	DOOR ASS'Y, FRAME Drawout
Fixed	64723460502	DOOR ASS'Y, FRAME FIXED



Fixed type



Draw-out type

Accessories

Cell Switch [CEL]

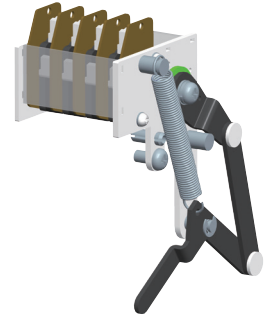
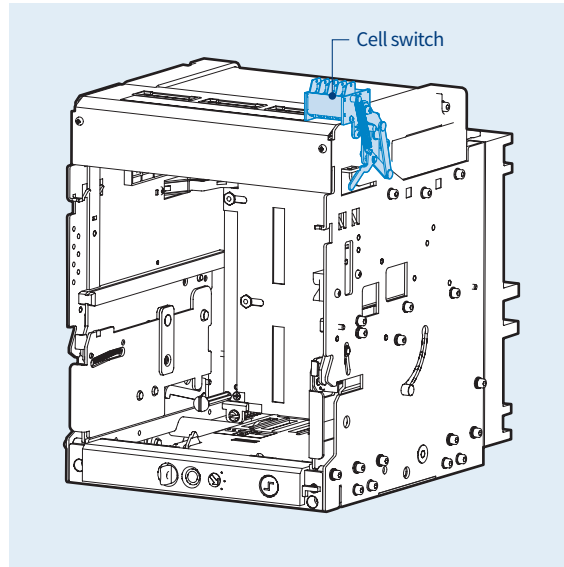
- Contact that indicates the current position of ACB.(CONNECTED, TEST, DISCONNECTED)

<Contact configuration>

4C: 1Disconnected +1Test +2Connected

※ Contact configuration can be changeable if necessary.

Code	Description
62503466401	SWITCH ASS'Y, UL CELL

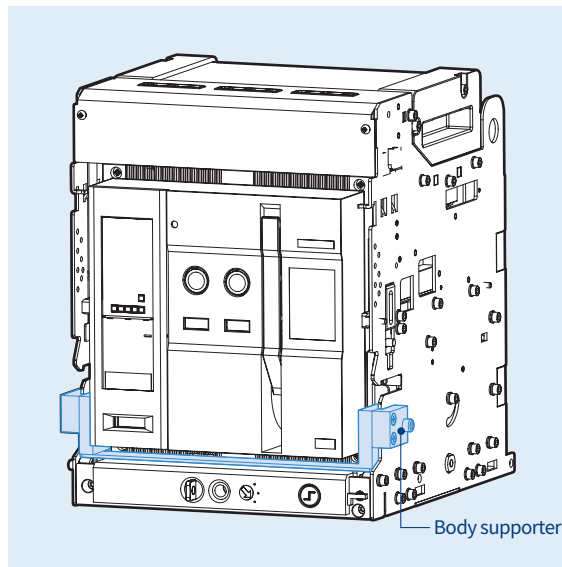


ACB position		DISCONNECTED		CONNECTED
Draw-in and draw-out position		DISCONNECTED	TEST	CONNECTED
Contact operation	CL-C (CONNECTED)	OFF	OFF	ON
	CL-T (TEST)	OFF	ON	OFF
	CL-D (DISCONNECTED)	ON	OFF	OFF
Classification		Standard		
Contact capacity	250/125 Vac			10 A
	250 Vdc			0.3 A
	125 Vdc			0.6 A
	48 Vdc			3 A
	24 Vdc		5 A	
Contact number		4C		

Body Supporter [BSP]

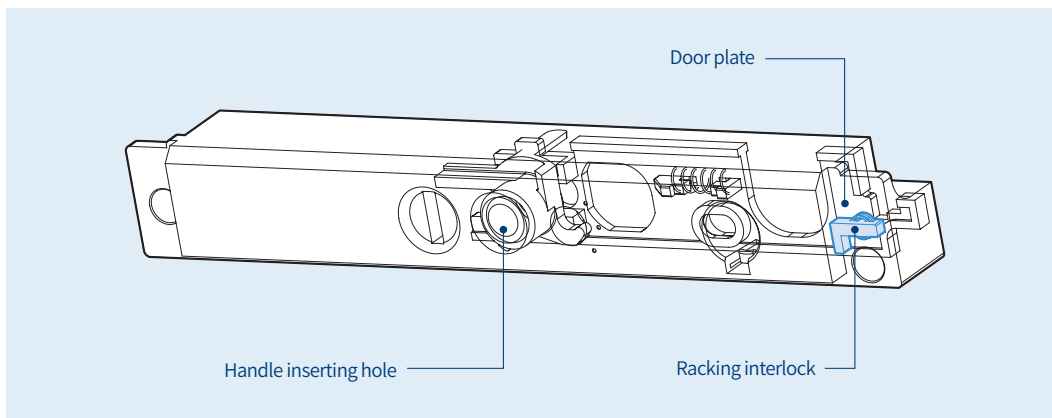
- Interlocks the main body of the circuit breaker and the cradle mechanically to fix the breaker in connected position. Therefore, all draw-in/outs are not available.

Pole	Frame	Code	Description
3	D	72313460373	TOTAL ASS'Y, BODY SUPPORTER, AN/AS/AH-D3
	E	72313463501	TOTAL ASS'Y, BODY SUPPORTER, AN/AS/AH-E3
	F	72313465501	TOTAL ASS'Y, BODY SUPPORTER, AN/AS/AH-F3
4	G	72313465503	TOTAL ASS'Y, BODY SUPPORTER, AN/AS/AH-G3
	D	72313462501	TOTAL ASS'Y, BODY SUPPORTER, AN/AS/AH-D4
	E	72313464501	TOTAL ASS'Y, BODY SUPPORTER, AN/AS/AH-E4
	F	72313465502	TOTAL ASS'Y, BODY SUPPORTER, AN/AS/AH-F4
	G	72313465504	TOTAL ASS'Y, BODY SUPPORTER, AN/AS/AH-G4



* Non UL Listed.

Racking Interlock [RI]



- When panel door is opened, Draw in/out handle cannot be inserted. Thus, panel handle can be inserted only when panel door is closed.

Code	Description
56123460501	INTERLOCK ASS'Y, RACKING

Accessories

Metering Current Transformer (For Cradle)

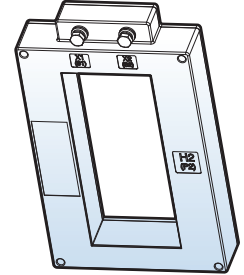
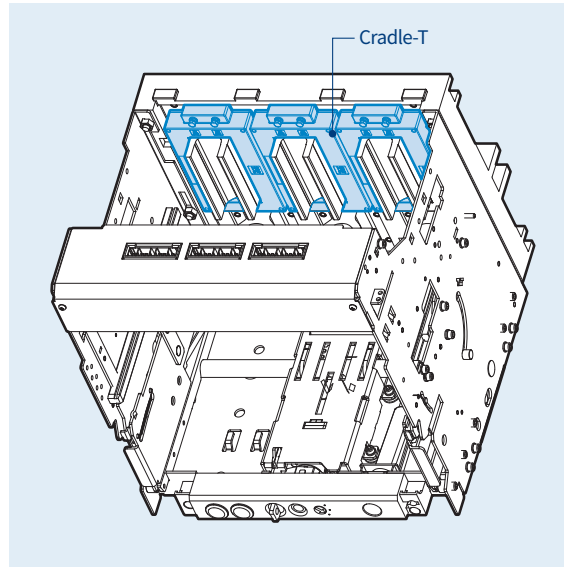
Metering Current Transformer allows maintenance on the front of the Switchgear when the Switchgear door is closed. These features bring convenience and safety to engineers.

This CT is developed for LS UL Type ACB and can be applied to D, E, and G Frame. You can refer to the detailed specification rating table for CT.

- Standards: UL1066/ANSI C37.13(ACB), ANSI C57.13(Metering Current Transformer)
- Applicable Frame: D-Frame / E-Frame / G-Frame

Note) The same CT applies for E-Frame and G-Frame

- Specification:



D-Frame

Rating (A)	Output (A)	Item code	Description
400	5	77123466101	COIL ASS'Y,BUILT-IN CRADLE,400A,UL/ANSI-D
600	5	77123466102	COIL ASS'Y,BUILT-IN CRADLE,600A,UL/ANSI-D
800	5	77123466103	COIL ASS'Y,BUILT-IN CRADLE,800A,UL/ANSI-D
1000	5	77123466104	COIL ASS'Y,BUILT-IN CRADLE,1000A,UL/ANSI-D
1200	5	77123466105	COIL ASS'Y,BUILT-IN CRADLE,1200A,UL/ANSI-D
1600	5	77123466106	COIL ASS'Y,BUILT-IN CRADLE,1600A,UL/ANSI-D
400	5	77123466201	COIL ASS'Y,BUILT-IN CRADLE,400A,UL/ANSI-D,3POLES
600	5	77123466202	COIL ASS'Y,BUILT-IN CRADLE,600A,UL/ANSI-D,3POLES
800	5	77123466203	COIL ASS'Y,BUILT-IN CRADLE,800A,UL/ANSI-D,3POLES
1000	5	77123466204	COIL ASS'Y,BUILT-IN CRADLE,1000A,UL/ANSI-D,3POLES
1200	5	77123466205	COIL ASS'Y,BUILT-IN CRADLE,1200A,UL/ANSI-D,3POLES
1600	5	77123466206	COIL ASS'Y,BUILT-IN CRADLE,1600A,UL/ANSI-D,3POLES
400	5	77123466207	COIL ASS'Y,BUILT-IN CRADLE,400A,UL/ANSI-D,4POLES
600	5	77123466208	COIL ASS'Y,BUILT-IN CRADLE,600A,UL/ANSI-D,4POLES
800	5	77123466209	COIL ASS'Y,BUILT-IN CRADLE,800A,UL/ANSI-D,4POLES
1000	5	77123466210	COIL ASS'Y,BUILT-IN CRADLE,1000A,UL/ANSI-D,4POLES
1200	5	77123466211	COIL ASS'Y,BUILT-IN CRADLE,1200A,UL/ANSI-D,4POLES
1600	5	77123466212	COIL ASS'Y,BUILT-IN CRADLE,1600A,UL/ANSI-D,4POLES

E-Frame

Rating (A)	Output (A)	Item code	Description
400	5	77123467101	COIL ASS'Y,BUILT-IN CRADLE,400A,UL/ANSI-E
600	5	77123467102	COIL ASS'Y,BUILT-IN CRADLE,600A,UL/ANSI-E
800	5	77123467103	COIL ASS'Y,BUILT-IN CRADLE,800A,UL/ANSI-E
1000	5	77123467104	COIL ASS'Y,BUILT-IN CRADLE,1000A,UL/ANSI-E
1200	5	77123467105	COIL ASS'Y,BUILT-IN CRADLE,1200A,UL/ANSI-E
1600	5	77123467106	COIL ASS'Y,BUILT-IN CRADLE,1600A,UL/ANSI-E
2000	5	77123467107	COIL ASS'Y,BUILT-IN CRADLE,2000A,UL/ANSI-E
2500	5	77123467108	COIL ASS'Y,BUILT-IN CRADLE,2500A,UL/ANSI-E
3000	5	77123467109	COIL ASS'Y,BUILT-IN CRADLE,3000A,UL/ANSI-E
3200	5	77123467110	COIL ASS'Y,BUILT-IN CRADLE,3200A,UL/ANSI-E
400	5	77123467201	COIL ASS'Y,BUILT-IN CRADLE,400A,UL/ANSI-E,3POLES
600	5	77123467202	COIL ASS'Y,BUILT-IN CRADLE,600A,UL/ANSI-E,3POLES
800	5	77123467203	COIL ASS'Y,BUILT-IN CRADLE,800A,UL/ANSI-E,3POLES
1000	5	77123467204	COIL ASS'Y,BUILT-IN CRADLE,1000A,UL/ANSI-E,3POLES
1200	5	77123467205	COIL ASS'Y,BUILT-IN CRADLE,1200A,UL/ANSI-E,3POLES
1600	5	77123467206	COIL ASS'Y,BUILT-IN CRADLE,1600A,UL/ANSI-E,3POLES
2000	5	77123467207	COIL ASS'Y,BUILT-IN CRADLE,2000A,UL/ANSI-E,3POLES
2500	5	77123467208	COIL ASS'Y,BUILT-IN CRADLE,2500A,UL/ANSI-E,3POLES
3000	5	77123467209	COIL ASS'Y,BUILT-IN CRADLE,3000A,UL/ANSI-E,3POLES
3200	5	77123467210	COIL ASS'Y,BUILT-IN CRADLE,3200A,UL/ANSI-E,3POLES
400	5	77123467211	COIL ASS'Y,BUILT-IN CRADLE,400A,UL/ANSI-E,4POLES
600	5	77123467212	COIL ASS'Y,BUILT-IN CRADLE,600A,UL/ANSI-E,4POLES
800	5	77123467213	COIL ASS'Y,BUILT-IN CRADLE,800A,UL/ANSI-E,4POLES
1000	5	77123467214	COIL ASS'Y,BUILT-IN CRADLE,1000A,UL/ANSI-E,4POLES
1200	5	77123467215	COIL ASS'Y,BUILT-IN CRADLE,1200A,UL/ANSI-E,4POLES
1600	5	77123467216	COIL ASS'Y,BUILT-IN CRADLE,1600A,UL/ANSI-E,4POLES
2000	5	77123467217	COIL ASS'Y,BUILT-IN CRADLE,2000A,UL/ANSI-E,4POLES
2500	5	77123467218	COIL ASS'Y,BUILT-IN CRADLE,2500A,UL/ANSI-E,4POLES
3000	5	77123467219	COIL ASS'Y,BUILT-IN CRADLE,3000A,UL/ANSI-E,4POLES
3200	5	77123467220	COIL ASS'Y,BUILT-IN CRADLE,3200A,UL/ANSI-E,4POLES

Note) The same CT applies for E-Frame and G-Frame

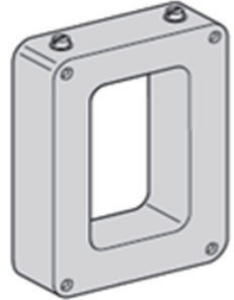
Accessories

NCT (external Neutral Current Transformer)

The NCT(Neutral CT) allows to use following protecting functions when using 3-pole circuit breaker in WYE connection(3-phase, 4-line Y-line).

- Overload protection of neutral phase
- Residual Earth Fault protection

Note) The 4-pole circuit breaker does not need to this accessory because of the NCT is already included.



Application (OCR type) :

OCR Type	Communication & Function
AN	Ground fault (External NCT) + Comm.
PO	L,S, I, G + Neutral CT
SO	L,S, I, G + Neutral CT

Application (OCR type) :

See wiring diagram(page 79) before wiring.

The ACB may malfunction when the NCT wires incorrectly.

The wiring cable of NCT should satisfy the conditions below.

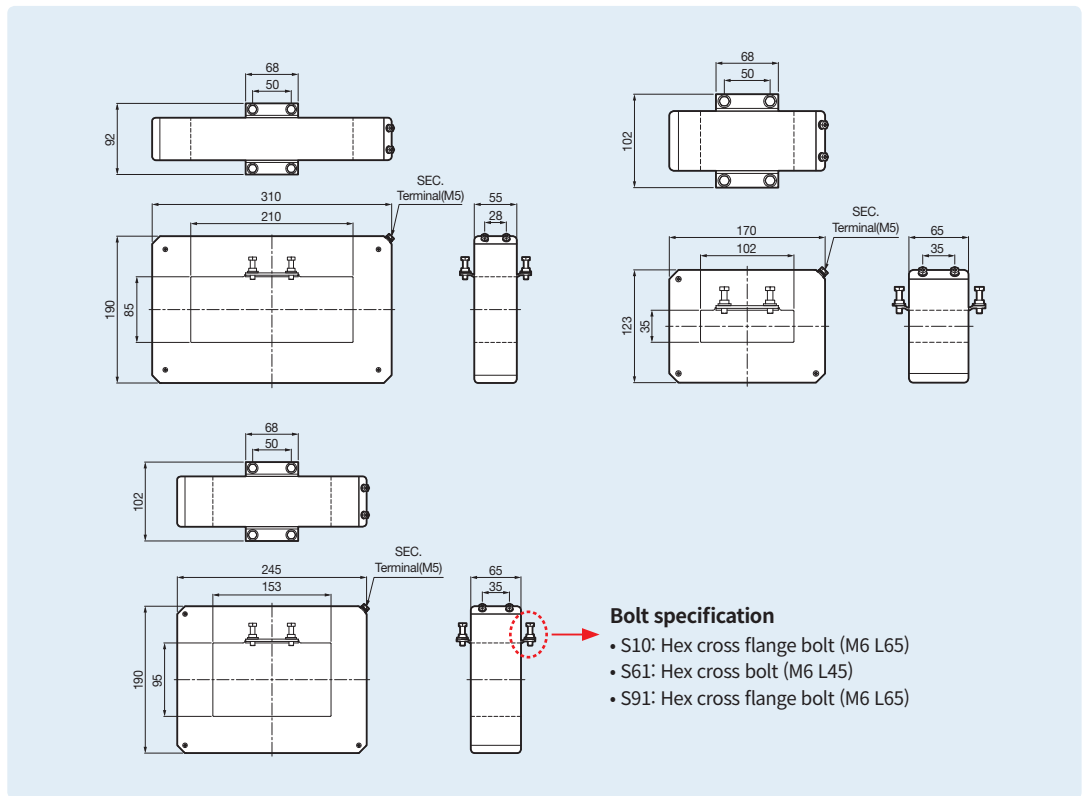
- Unshielded cable with 1 twisted pair
- Shielding connected to GND on one end only
- Maximum length 5 meters
- Cable cross-sectional area between AWG 16 to 20 (0.5mm² to 1.25mm²)

* See page 79 for NCT dimension.

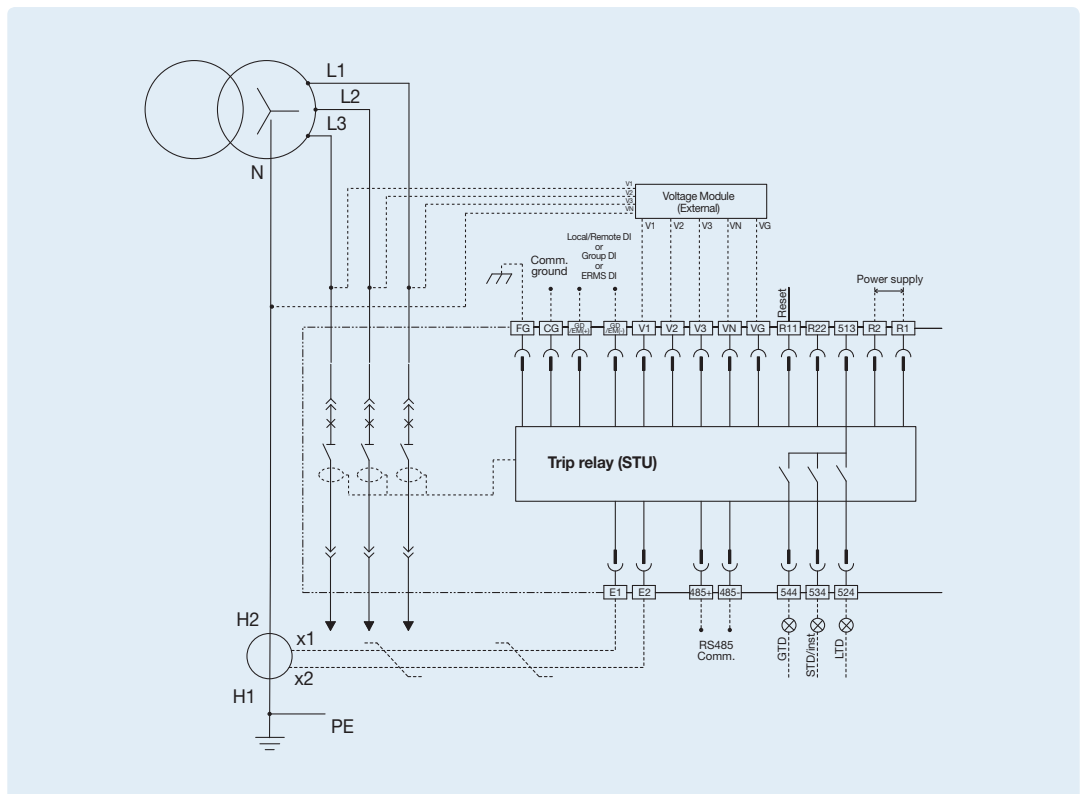
Specification and ordering codes for NCT

Standard	Item Code	Description	CT spec.			
			CT ratio	Burden	Frequency	Part size
UL	76313460018	NCT, UL-LSC-S91-LV, 0.6kV 400/5A C20 60Hz	400 / 5A	5VA	60Hz	S91
	76313460003	NCT, UL-LSC-S61-LV, 0.6kV 600/5A C20 60Hz	600 / 5A	5VA	60Hz	S61
	76313460004	NCT, UL-LSC-S61-LV, 0.6kV 630/5A C20 60Hz	630 / 5A	5VA	60Hz	S61
	76313460005	NCT, UL-LSC-S61-LV, 0.6kV 800/5A C20 60Hz	800 / 5A	5VA	60Hz	S61
	76313460006	NCT, UL-LSC-S61-LV, 0.6kV 1000/5A C20 60Hz	1000 / 5A	5VA	60Hz	S61
	76313460007	NCT, UL-LSC-S61-LV, 0.6kV 1200/5A C20 60Hz	1200 / 5A	5VA	60Hz	S61
	76313460008	NCT, UL-LSC-S61-LV, 0.6kV 1250/5A C20 60Hz	1250 / 5A	5VA	60Hz	S61
	76313460009	NCT, UL-LSC-S61-LV, 0.6kV 1600/5A C20 60Hz	1600 / 5A	5VA	60Hz	S61
	76313460010	NCT, UL-LSC-S91-LV, 0.6kV 2000/5A C20 60Hz	2000 / 5A	5VA	60Hz	S91
	76313460011	NCT, UL-LSC-S91-LV, 0.6kV 2500/5A C20 60Hz	2500 / 5A	5VA	60Hz	S91
	76313460012	NCT, UL-LSC-S10-LV, 0.6kV 3000/5A C20 60Hz	3000 / 5A	5VA	60Hz	S10
	76313460013	NCT, UL-LSC-S10-LV, 0.6kV 3200/5A C20 60Hz	3200 / 5A	5VA	60Hz	S10
	76313460014	NCT, UL-LSC-S10-LV, 0.6kV 3600/5A C20 60Hz	3600 / 5A	5VA	60Hz	S10
	76313460015	NCT, UL-LSC-S10-LV, 0.6kV 4000/5A C20 60Hz	4000 / 5A	5VA	60Hz	S10
	76313460016	NCT, UL-LSC-S10-LV, 0.6kV 5000/5A C20 60Hz	5000 / 5A	5VA	60Hz	S10
	76313460017	NCT, UL-LSC-S10-LV, 0.6kV 6000/5A C20 60Hz	6000 / 5A	5VA	60Hz	S10

NCT Dimensions

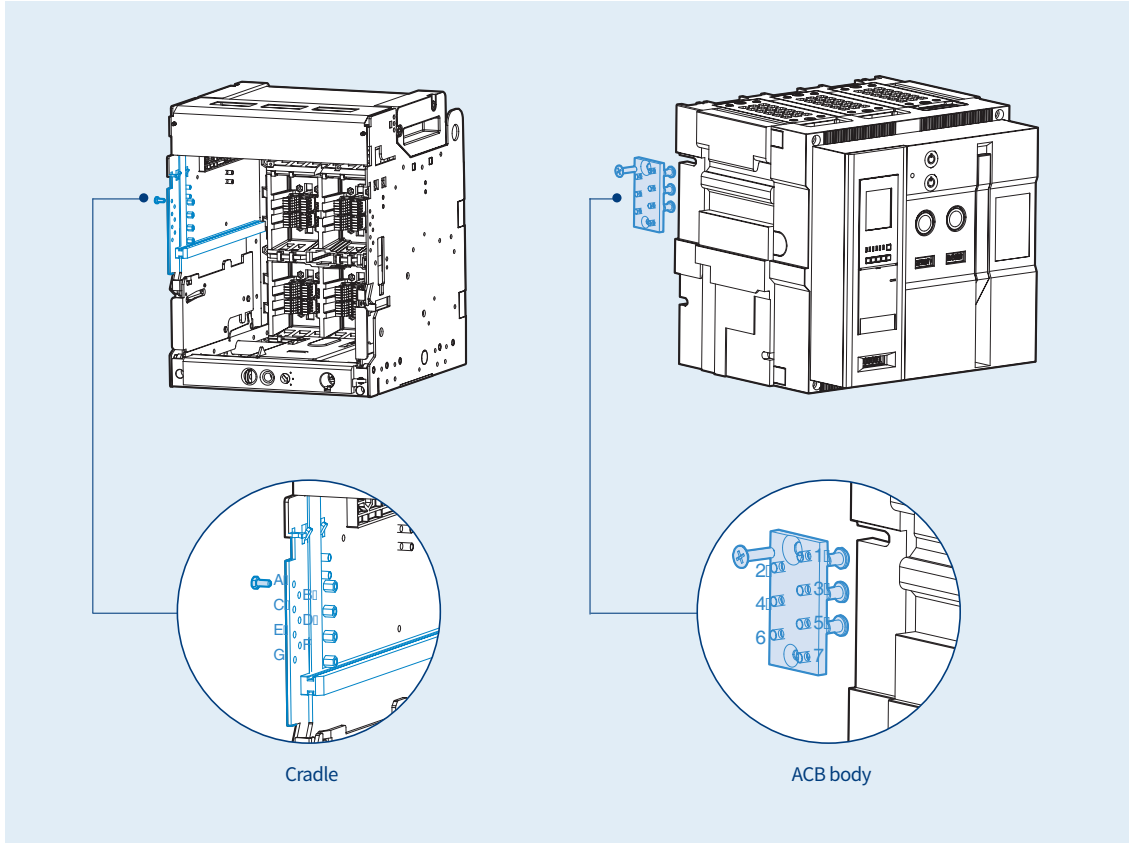


NCT installation schematic



Accessories

Mis-Insertion Prevention Device [MIP]



- Mechanically prevents the ACB from being inserted into the cradle if the rating of the ACB does not match that of the cradle.
- The installation method is variable according to ratings.

Cradle	ACB
ABCD	567
ABCE	467
ABCF	457
ABCG	456
ABDE	367
ABDF	357
ABDG	356
ABEF	347

Cradle	ACB
ADEF	237
ADEG	236
ADFG	235
AEFG	234
BCDE	167
BCDF	157
BCDG	156
BCEF	147

Cradle	ACB
ABEG	346
ABFG	345
ACDE	267
ACDF	257
ACDG	256
ACEF	247
ACEG	246
ACFG	245

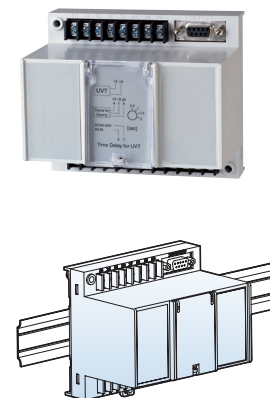
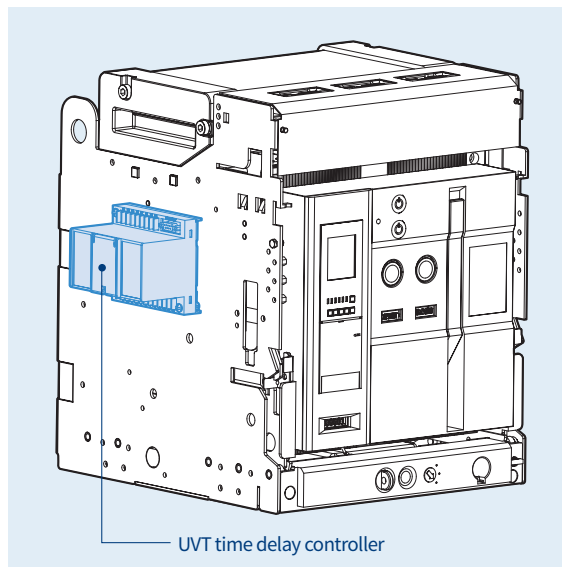
Cradle	ACB
BCEG	146
BDEF	137
BDEG	136
BDFG	135
CDEF	127
CDEG	126
CEFG	124
DEFG	123

Code	Description
84113460501	MIP ASS'Y, 630-6300A, AN, AS, AH-D, E, F, G

UVT Time Delay Controller [UDC]

- UVT is a device that trips the ACB automatically to prevent the accident on load side.
- Can be installed on the rail or the cradle.
- Instantaneous type: using only UVT coil.
- Time delay type: available by connecting UVT coil and UVT Time Delay Controller (UDC).
- Common use for all ACBs.

UVT	Code	Description
U5,U7	52773460271	DEVICE ASS'Y, UVT DELAY, DC48~60V, AC48V
U1,U3	52773460272	DEVICE ASS'Y, UVT DELAY, ADC100~130V
U2	52773460273	DEVICE ASS'Y, UVT DELAY, ADC200~250V
U6	52773460274	DEVICE ASS'Y, UVT DELAY, AC380~480V

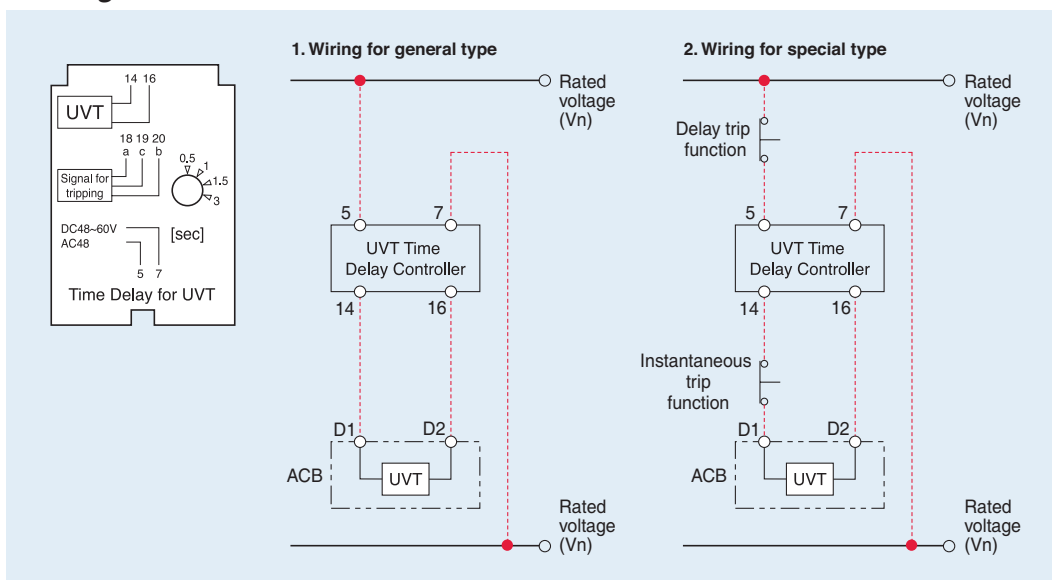


1. The rated voltage and characteristic of UVT time delay controller

Rated voltage (Vn)		Operating voltage range (V)		Power consumption (VA or W)		Trip time (s)
DC (V)	AC (V)	Pick up	Drop out	Inrush	Steady-state	
48~60	48	0.65~0.85 Vn	0.4~0.6 Vn	200	5	0.5,
100~130	100~130					1,
200~250	200~250					1.5,
-	380~480					3

- Note) 1. Operating voltage range is the min. rated standard for each rated voltage (Vn).
 2. It will operate on time when the power is supplied enough to the UDC over the set of trip time.

2. Wiring



* The wiring presented with red color should be set by users.

Accessories

i-Tester

The i-Tester (Intelligent Tester) is an accessory to test-drive ACB/MCCB. As a stand-alone type, it not only performs various relay tests such as manual/auto/user tests, but also has various functions such as self-calibration function, device information setting, relay setting, and device status checking. In addition, it supports 256×128 graphic LCD and supports not only English but also Chinese and Russian languages. It has the function to output the test and test results in the same way using the upper Manager S/W.

Features

- **Calibration function**
 - The calibration function of i-Tester is used to calibrates the error using the output value set in i-Tester and the measurement current data.
- **Device H/W setting function**
 - It consists of the part to set the system configuration and time of the device and the part to set the language and time of the i-Tester itself.
- **Relay setting function**
 - It consists of the part to check the current relay element of the device and the part to set the relay.
- **Relay test**
 - As a part for testing the relay, it is composed of manual/automatic/user tests so that various relay tests can be conducted.
- **Control function**
 - It provides a function to clear or reset the device data and to control DO and CB.
- **System information**
 - It consists of the device information, relay status, and tester system information.
- **Test history**
 - It consists of a part to check the test history stored in i-Tester and a part to delete the saved history information.



Specification

Type	Details
Model name	IPOT
Rated voltage	DC24V adapter, 9V alkaline battery 3EA, USB or rechargeable battery (10000mAH or more)
HMI	Graphic LCD module(256×128 Graphic LCD)
Supported language	English, Chinese, Russian
Key functions	<ul style="list-style-type: none"> · Device information checking function (information, DI, DO, self-diagnosis) · Relay and H/W information setting function · Device control and reset function · Relay test function <ul style="list-style-type: none"> - Manual/auto/user test function · Test history storage (up to 255) and output (PDF) function
LCD composition	Navigation TREE configuration for all
Size	98(W)×210.5(H)×43.5(D), unit : mm

Code	Description
46513451003	HOOK, LIFT, LBA-C 630~3200A

Exterior description

Type	Details
① Power switch	Power On/Off function
② LCD	256 × 128 graphic LCD
③ KEY PAD	Menu navigation, setting and operation buttons
④ Adapter terminal	DC24V power input terminal
⑤ USB terminal	USB communication connection terminal (USB2.0)
⑥ Signal port	Signal terminals for device testing
⑦ Battery	Equipped with 9V alkaline batteries (×3ea)

Device usage example



* IPOT : Intelligent Potable OCR TESTER

Target device

Circuit breaker Smart ACB(STU), Susol/Metasol ACB(OCR), Smart MCCB, TS1600

Accessories

TRIO

This device is a device used to monitor ACB status, remote open/close operation control and temperature measurement by being installed on the LV panel or distribution panel. It is also capable of expanding DI/DO through communicating with DTR.



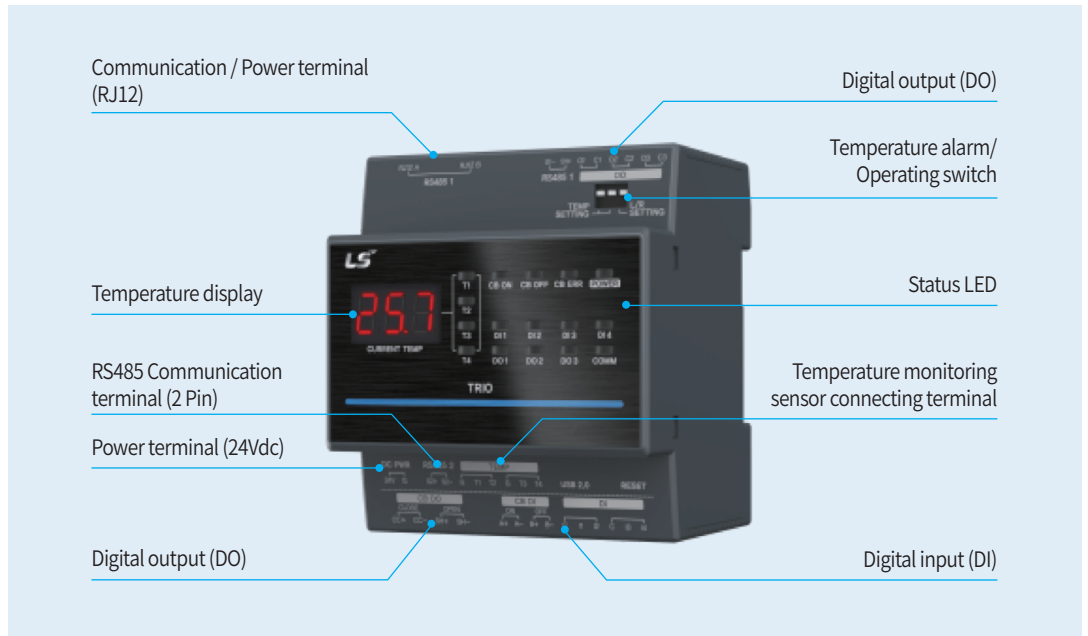
Characteristic

- Monitoring the temperature by using external temperature sensor.
- Monitoring the ACB status through the built-in function of DI/DO expansion.
- Compare with old TRIO, the number of DI/DO contact increased.
- Temperature display improved to 7S-egment level.

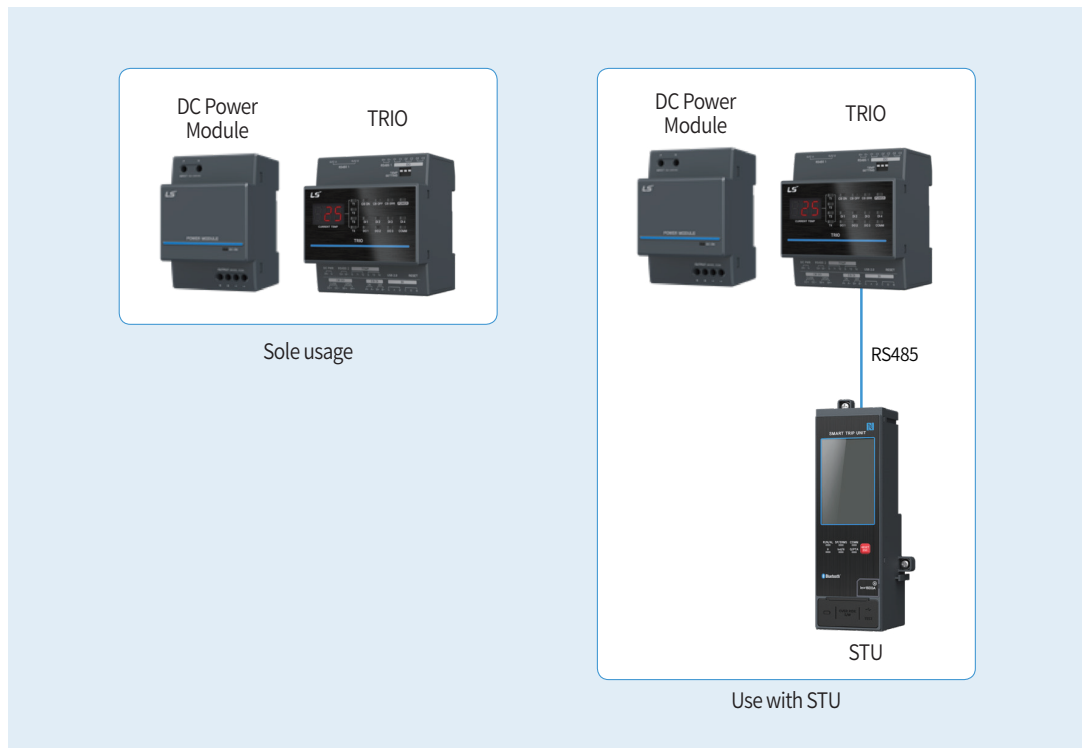
Rating

Item	Description	Remark
Rating voltage	DC24V (±10%)	21.6~26.4Vdc
Power consumption	Up to 6W	
Temperature monitoring sensor	4ea • Range: 0~150°C • Tolerance - Contact type: ±3°C - Non-contact type: 5°C • Alarming temperature - 55°C, 65°C, 70°C, 80°C • DO link available	Separate sale
DI	• Normal: 4ea • CB type: 2ea	• Cradle status monitoring • Closing spring status monitoring
DO	• Normal: 3ea • CB type: 2ea	• LATCH • Set 500ms available(CB control available)
LED	• Power LED • Comm. LED • CB LED: 3ea • DI LED: 4ea • DO LED: 3ea • Temperature sensor: 4ea	Temperature display – 7 segment - Under 100°C : display to 1 decimal place - Over 100°C : display to 1 digit place
Protocol	Modbus RTU	
Communication	RS485	Link with STU
Attachment method	• Din-rail • Screw	
Dimension(W×H×D)	72mm×81mm×65mm	
Battery	Applied 0.1F Supper CAP (up to 72 hours backup)	
Ambient air temperaturefor operation	-25 °C ~ +60 °C	
Ambient air temperaturefor Storage	-30 °C ~ +70 °C	
Humidity	Under 85% (Dew will not form)	

Exterior



Example



Device

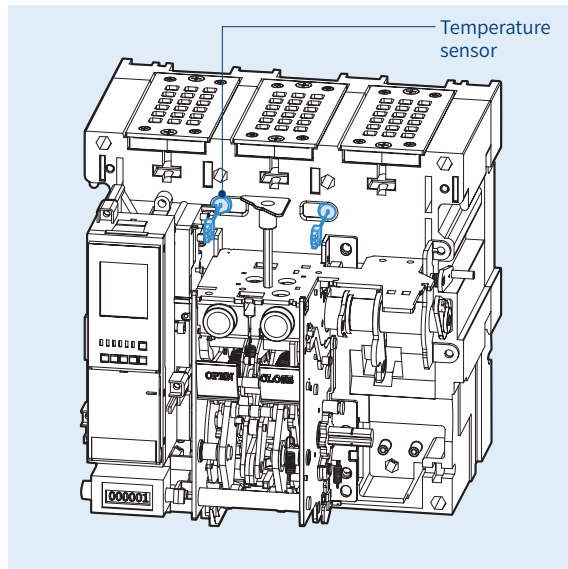
Circuit breaker	Susol/Metasol ACB with STU
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※ Can be used alone

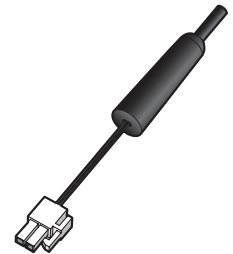
Accessories

TRIO

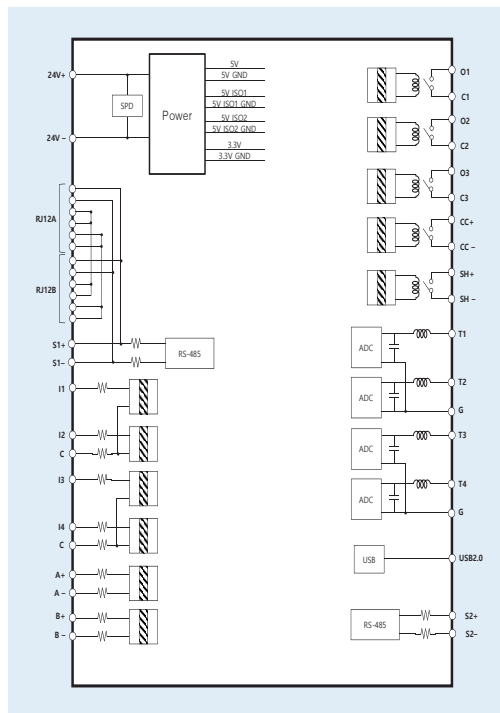
Temperature monitoring



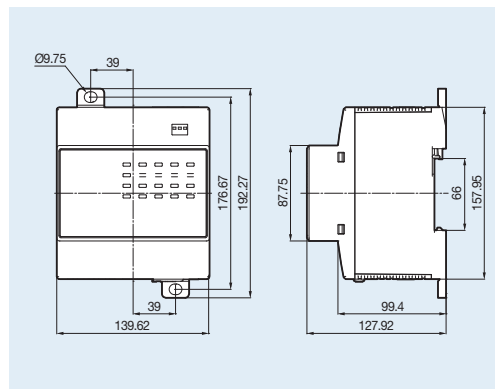
- TRIO unit is a device that indicates the temperature through a sensor inside/outside of the ACB.
- Up to 2 contactless tempe sensors can be installed and the output is connected to control terminal blocks.
- The contact temperature sensor is installed outside the ACB and can be installed in each phase.
- Displays the measured temperature for each sensor for 2 seconds.
- Temperature alarm can be set, and if the temperature rises above the set value, 7 Segments will flash every 1 second and DO contacts will be output.
- TRIO unit communicates with Modbus / RS-485 basically



■ Circuit Diagram

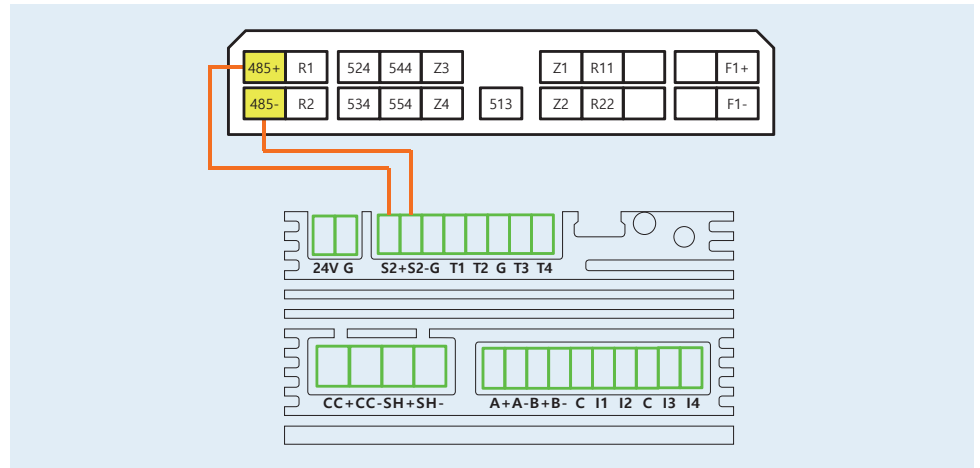


■ Dimension

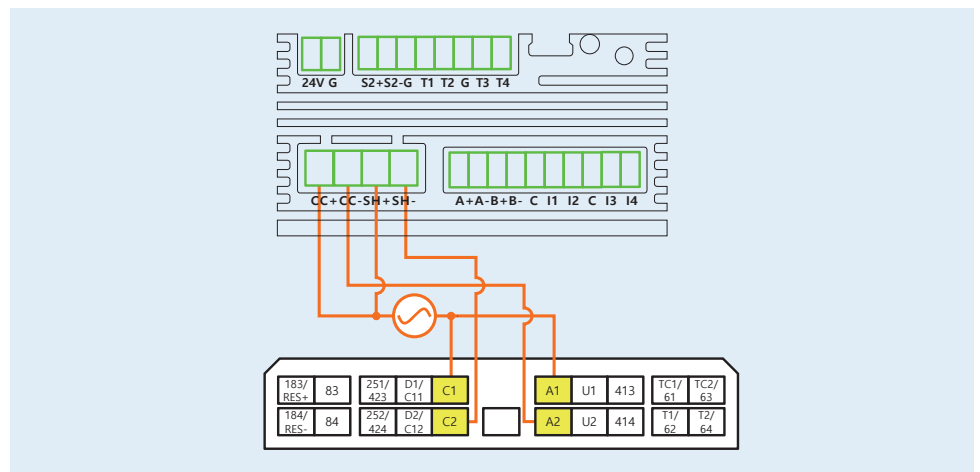


Wiring

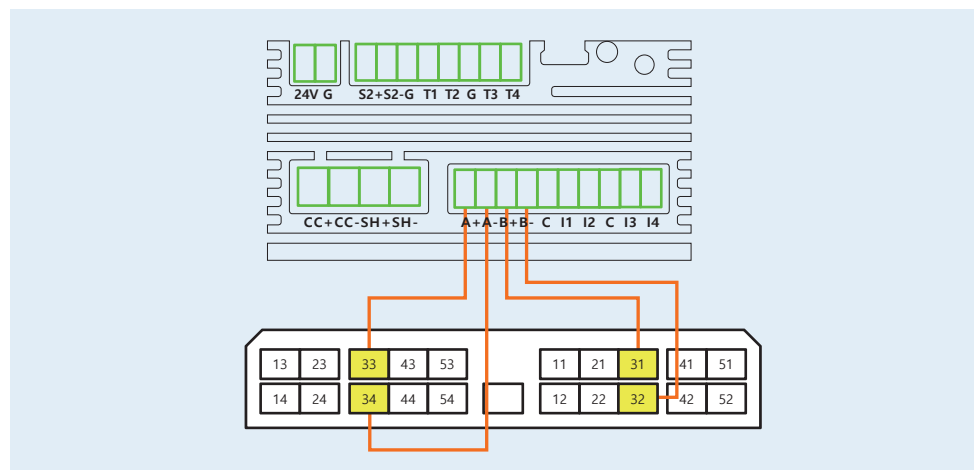
■ Connecting both ACB and RS485 Communication



■ Connecting with ACB control circuit

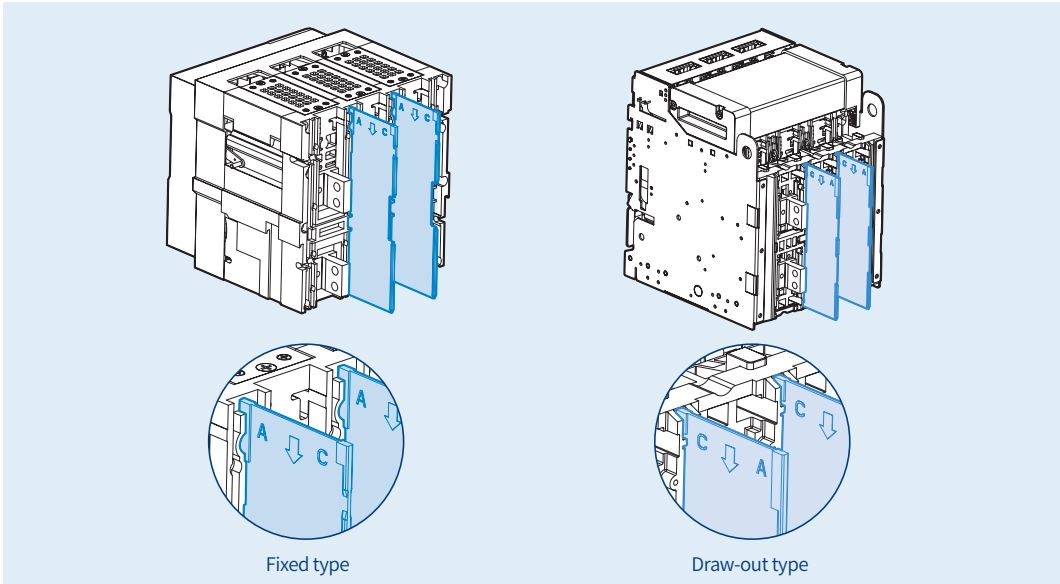


■ Connecting with ACB Auxiliary switch(status)



Accessories

Interphase Barrier [IB]



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

Code	Description
67213460001	BARRIER, INSULATION, LS-C, 630-6300A

Extended type handle

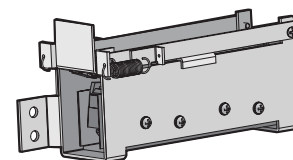
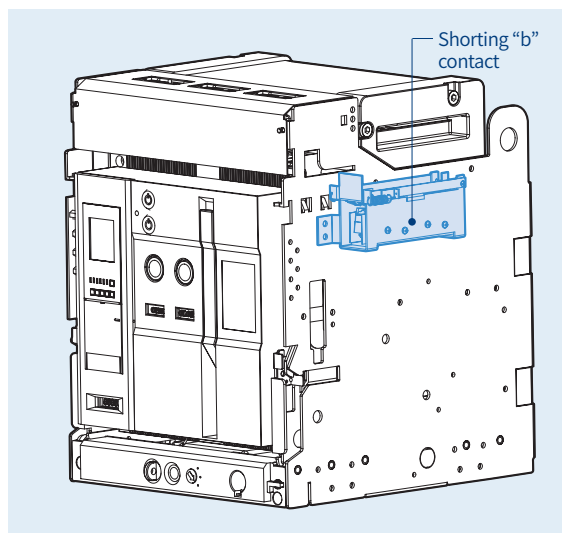
Extended type handle for draw in/out.

Code	Description
55223460402	HANDLE ASS'Y, DRAW, LONG

Shorting “b” Contact [SBC]

- It is the contact which keeps the external control circuit in normal by Aux. contact which disconnects “Axb” when ACB is moved from CONNECTED position to TEST position. The number of “shorting b-contact” corresponds to the number of “Axb” (4b)

Code	Description
62503460401	SWITCH ASS'Y, SHORT/B, CONTACT



Contact condition (Link between Axb and shorting “b” contact)

ACB position	ACB condition	Close position [Auxiliary contact(Axb):OFF]	Open position [Auxiliary contact(Axb):ON]
Connected position (Shorting b contact : OFF)			
Test position (Shorting b contact : ON)			

Adapter kit for front/mixed type ACB

The Front connection type is suitable for the panel that demands narrow depth for stallation.

- The connection can be modified between vertical type and horizontal type by rotating the terminals through 90 degrees for the breakers such as UAS-06~16D, UAH-06E~32E.

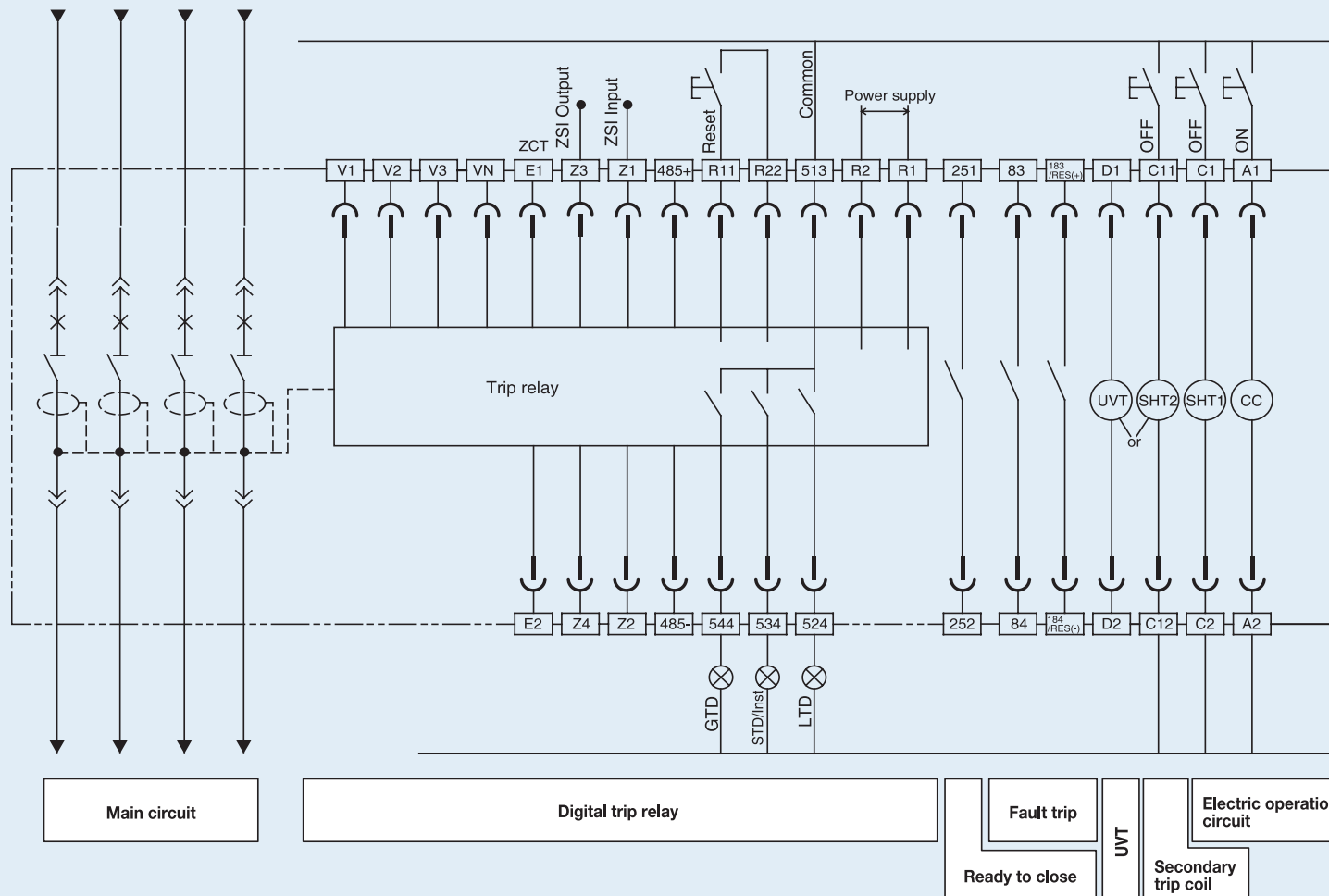
Note) AS-20D, AH-20D, AS-40E, AH-40E types are equipped with vertical-only terminals.

- Please refer to the rating lists (Page 34~37) because the installation method is various according to the rated current.

Code	Description	Code	Description
62363461507	SUB ASS'Y, ADAPTER KIT ASS'Y_FRONT, AN/AS/AH-D3	62363461508	SUB ASS'Y, ADAPTER KIT ASS'Y_F&V/H, AN/AS/AH-D3
62363462510	SUB ASS'Y, ADAPTER KIT ASS'Y_FRONT, AN/AS/AH-D4	62363462511	SUB ASS'Y, ADAPTER KIT ASS'Y_F&V/H, AN/AS/AH-D4
62363463507	SUB ASS'Y, ADAPTER KIT ASS'Y_FRONT, AN/AS/AH-E3	62363463506	SUB ASS'Y, ADAPTER KIT ASS'Y_F&V/H, AN/AS/AH-E3
62363464512	SUB ASS'Y, ADAPTER KIT ASS'Y_FRONT, AN/AS/AH-E4	62363464511	SUB ASS'Y, ADAPTER KIT ASS'Y_F&V/H, AN/AS/AH-E4

Electrical diagram

Trip relay (N, A type OCR)



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

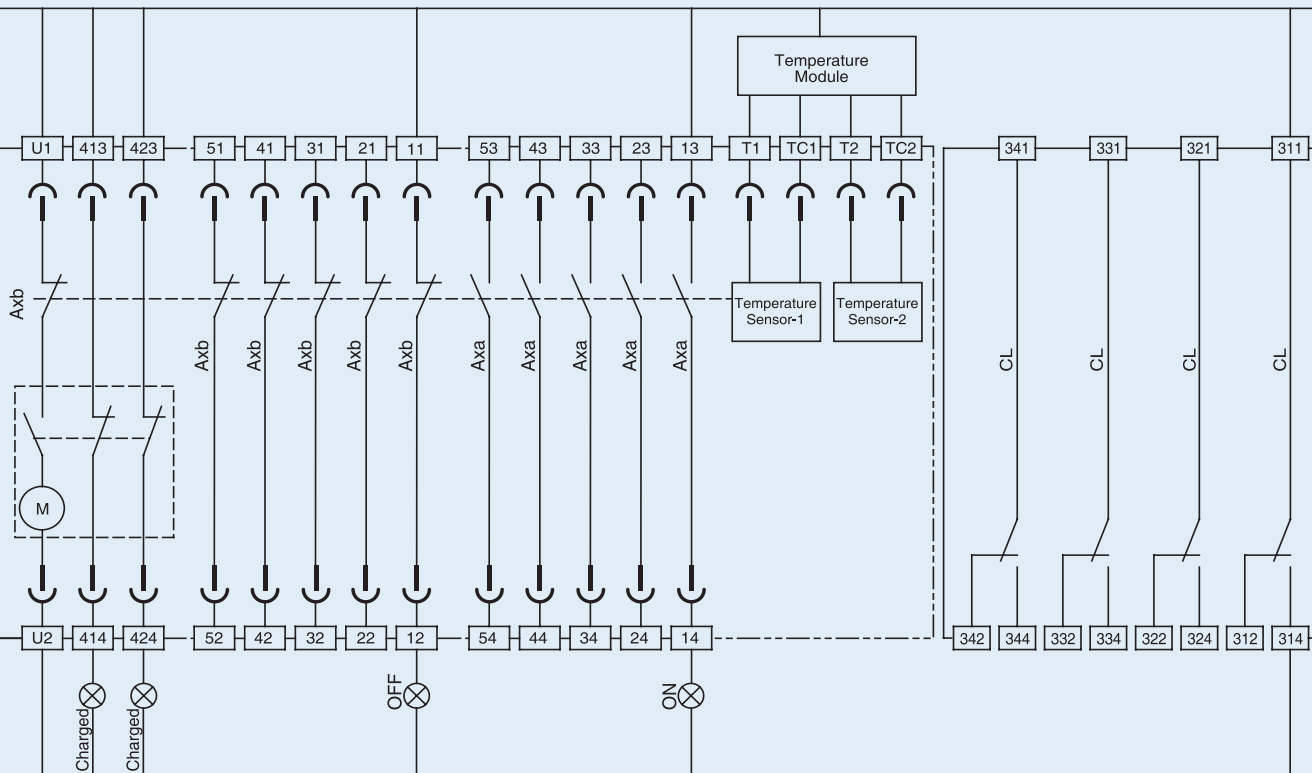
- Ready to close contact, Trip alarm contact, UVT coil, Fully charged contact, secondary trip coil
- Cell switch, Temperature module, Voltage module, Remote close-open module, ZCT, ZSI

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.



Charge completion contact

Auxiliary switch

Thermal, communication remote control module

Cell switch

Accessory code description

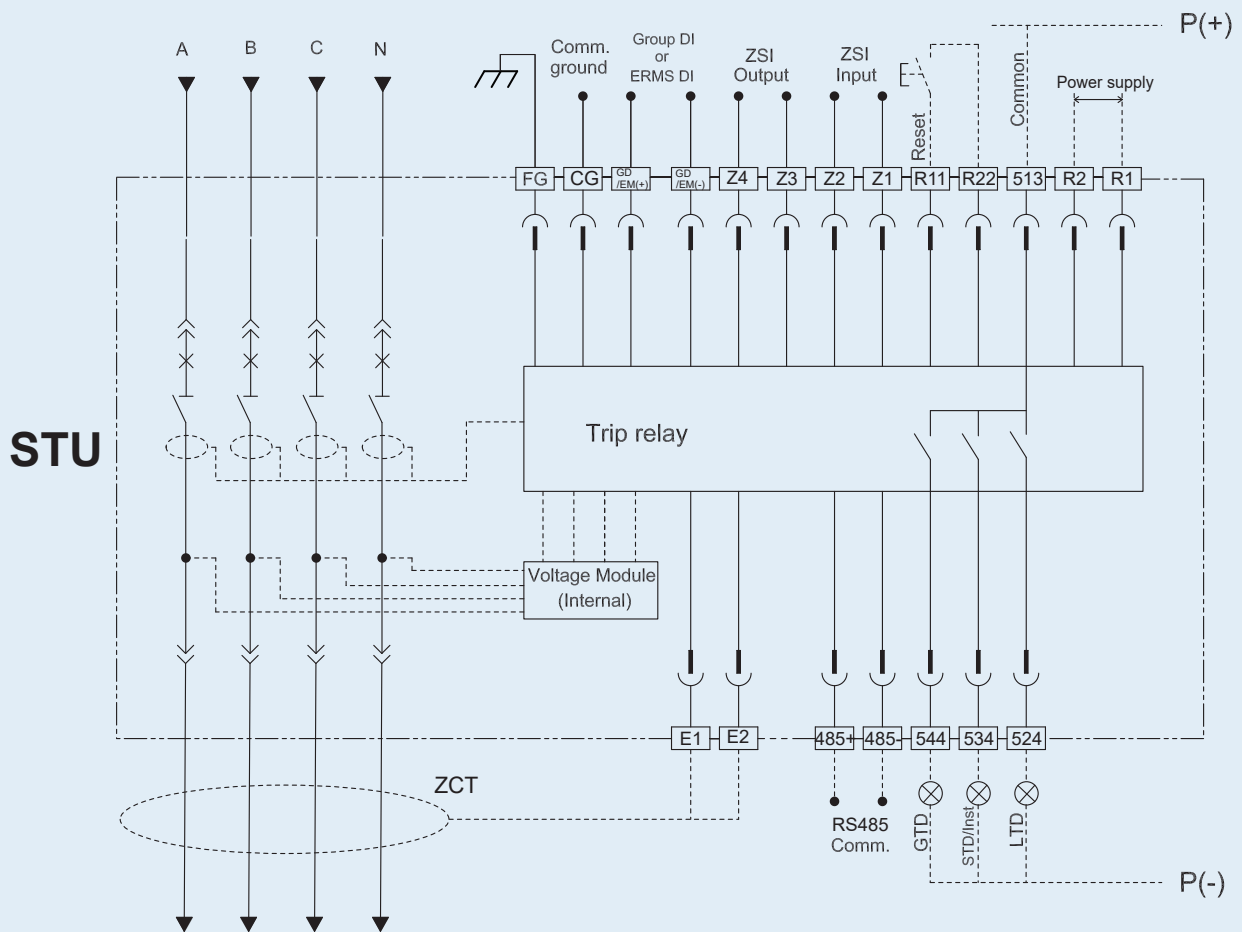
Z1 Z2	ZSI input
Z3 Z4	ZSI output
E1 E2	ZCT
VN ~ V3	Voltage module
TC1, TC2 ~ T1, T2	Temperature module
311 ~ 344	Position switch

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
(SHT1)	Shunt tripping device 1
(SHT2)	Shunt tripping device 2
(UVT)	UVT coil

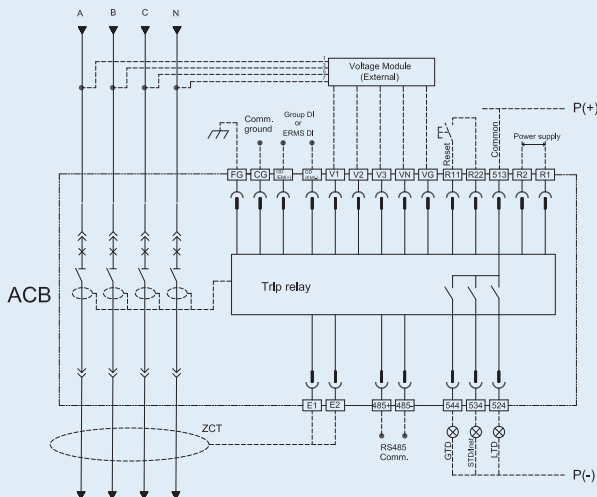
—	Internal wiring
—	External wiring (by customer)
⌋	Connector of the control circuit terminal of drawout type

Electrical diagram

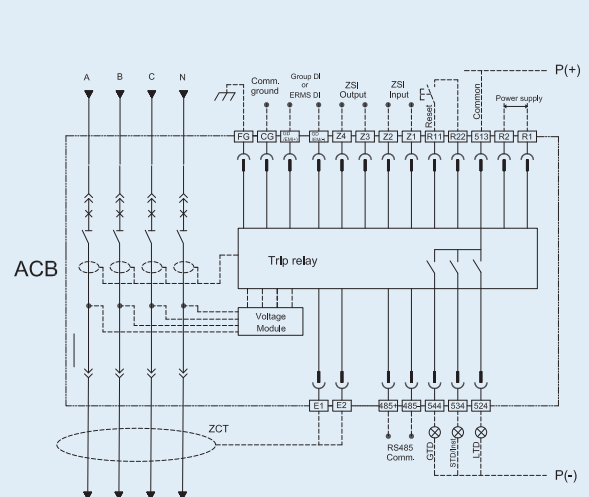
Trip relay (STU)

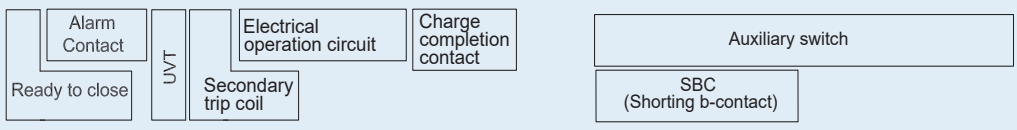
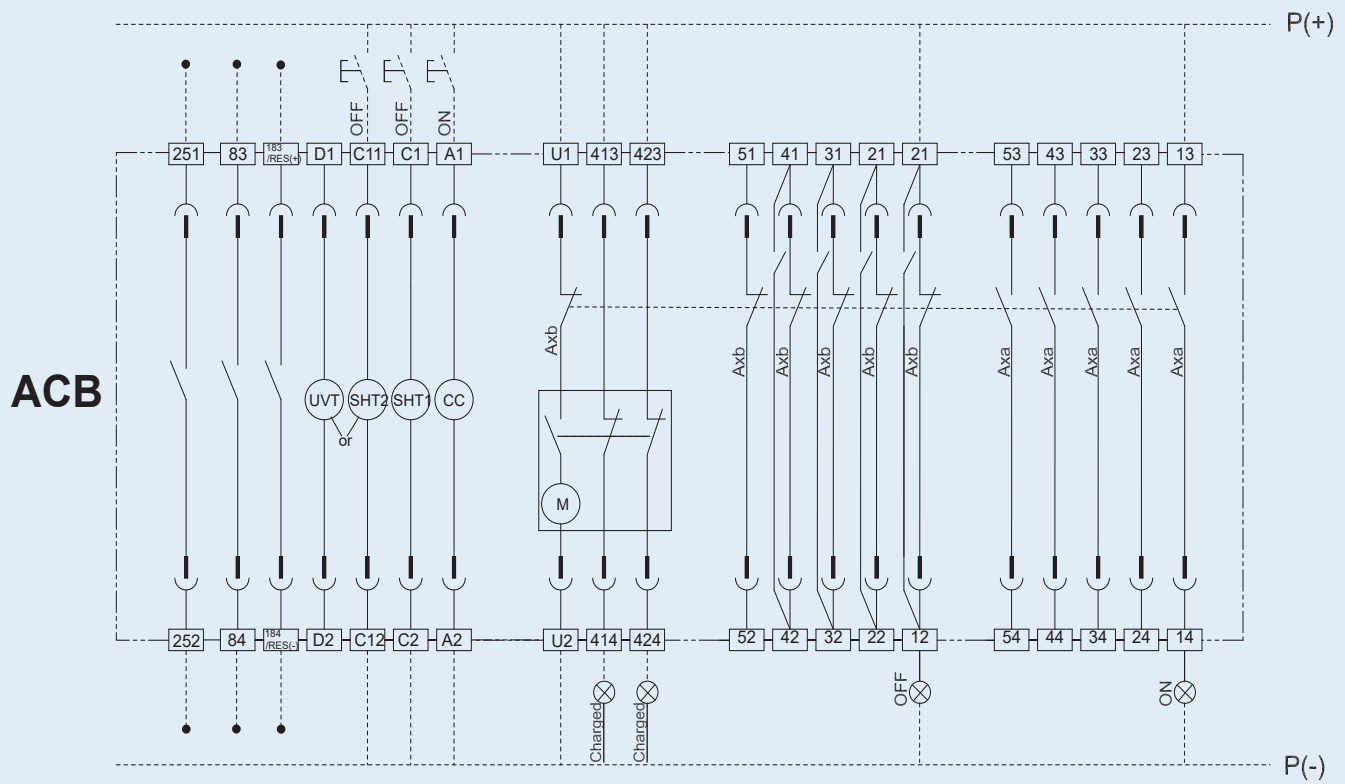


Wiring Diagram for External type VDM



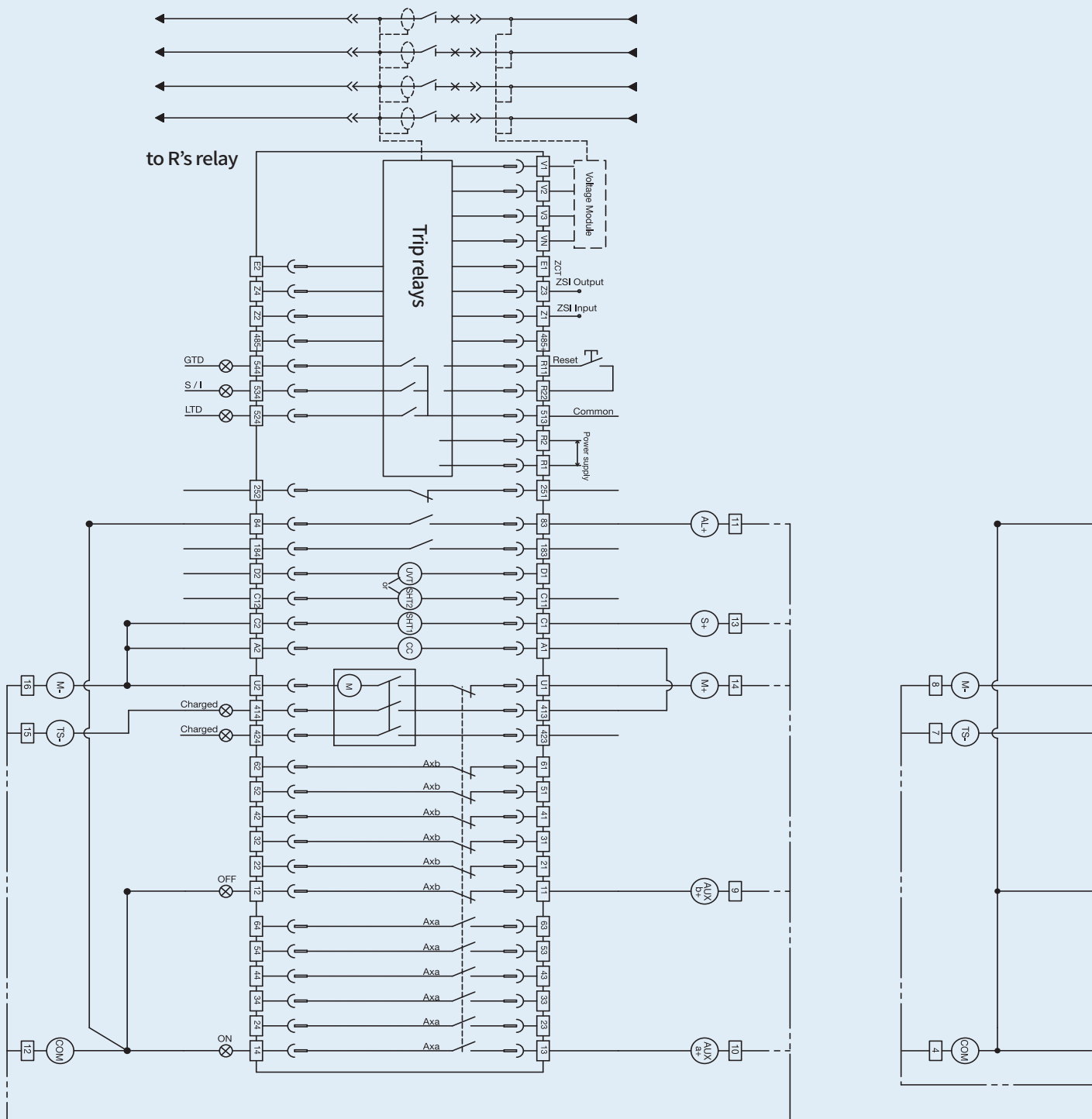
Wiring Diagram for Internal type VDM



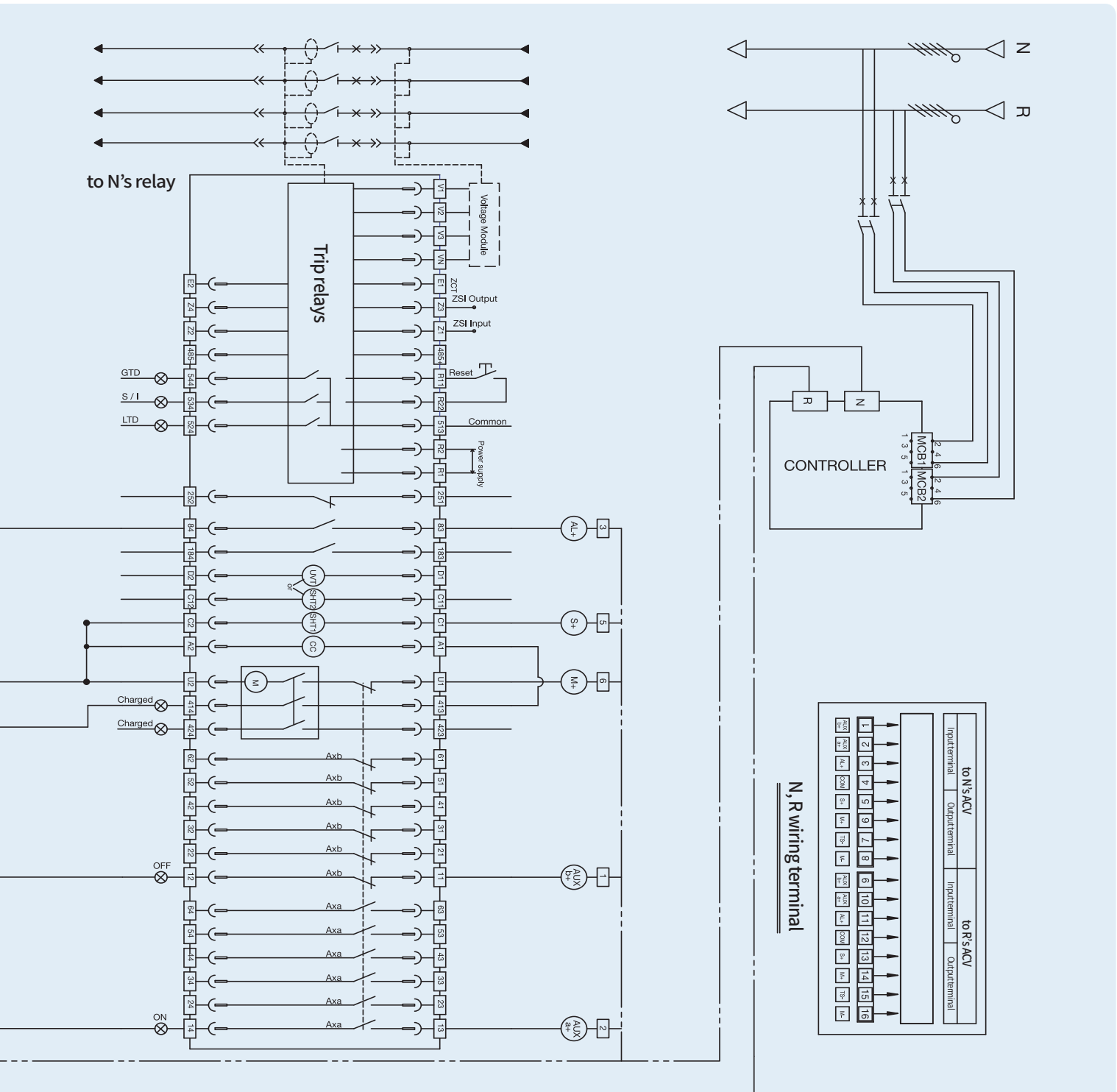


Electrical diagram

ATS controller



- Note) 1. The circuit breaker "N" & "R" have same circuit diagram.
 2. The MCB1 & MCB2 which are assembled on the controller must supply the power from "Line" side power source.
 (If power is connected to the "load" side, ATS does not operate when the trip device operates "OFF" function)
 3. In this circuit diagram, the ACB is in "Connected" position and the circuit breaker is the closing spring charged and the "OFF" status.

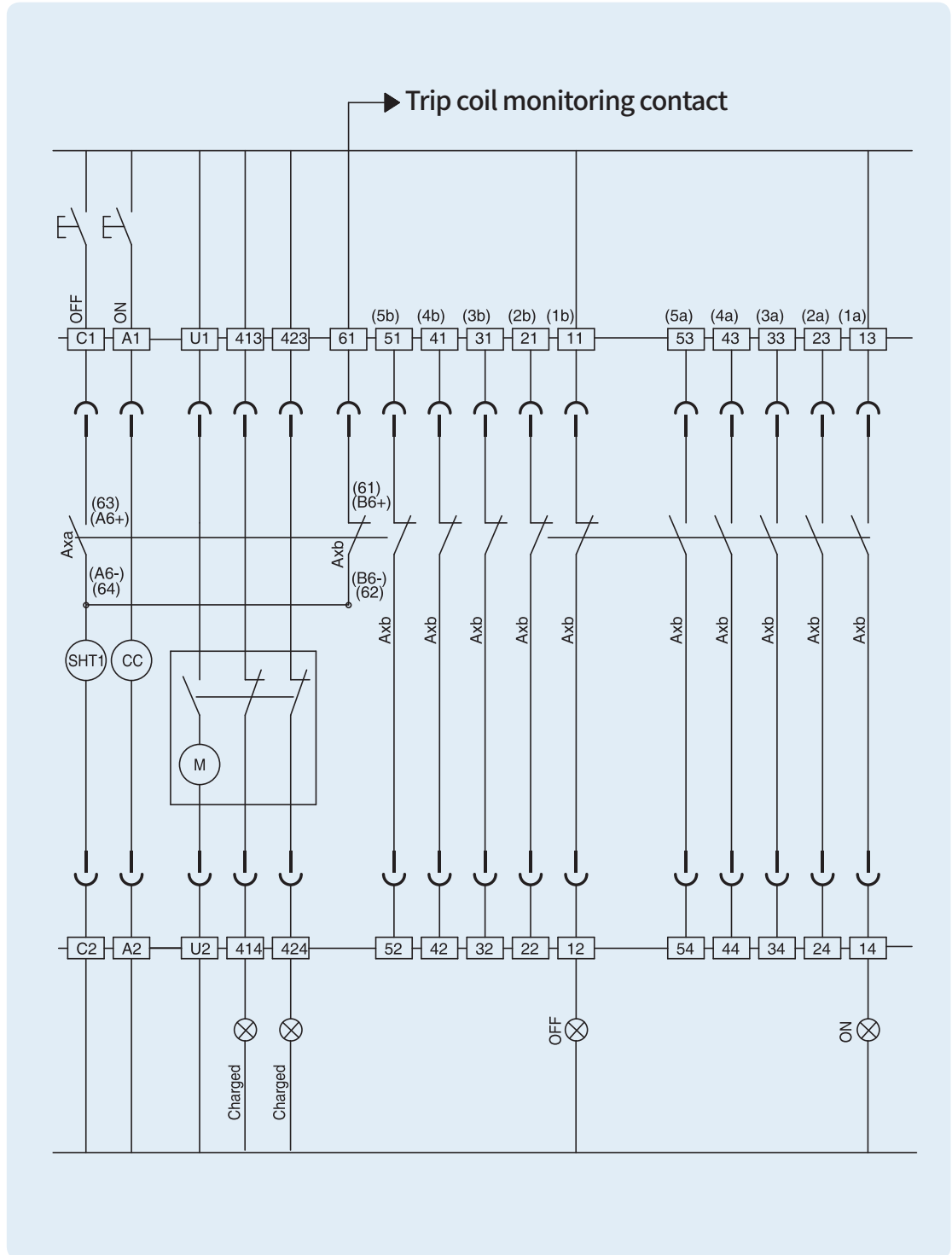


* For working the trip coil monitoring contact, see page 114-115.

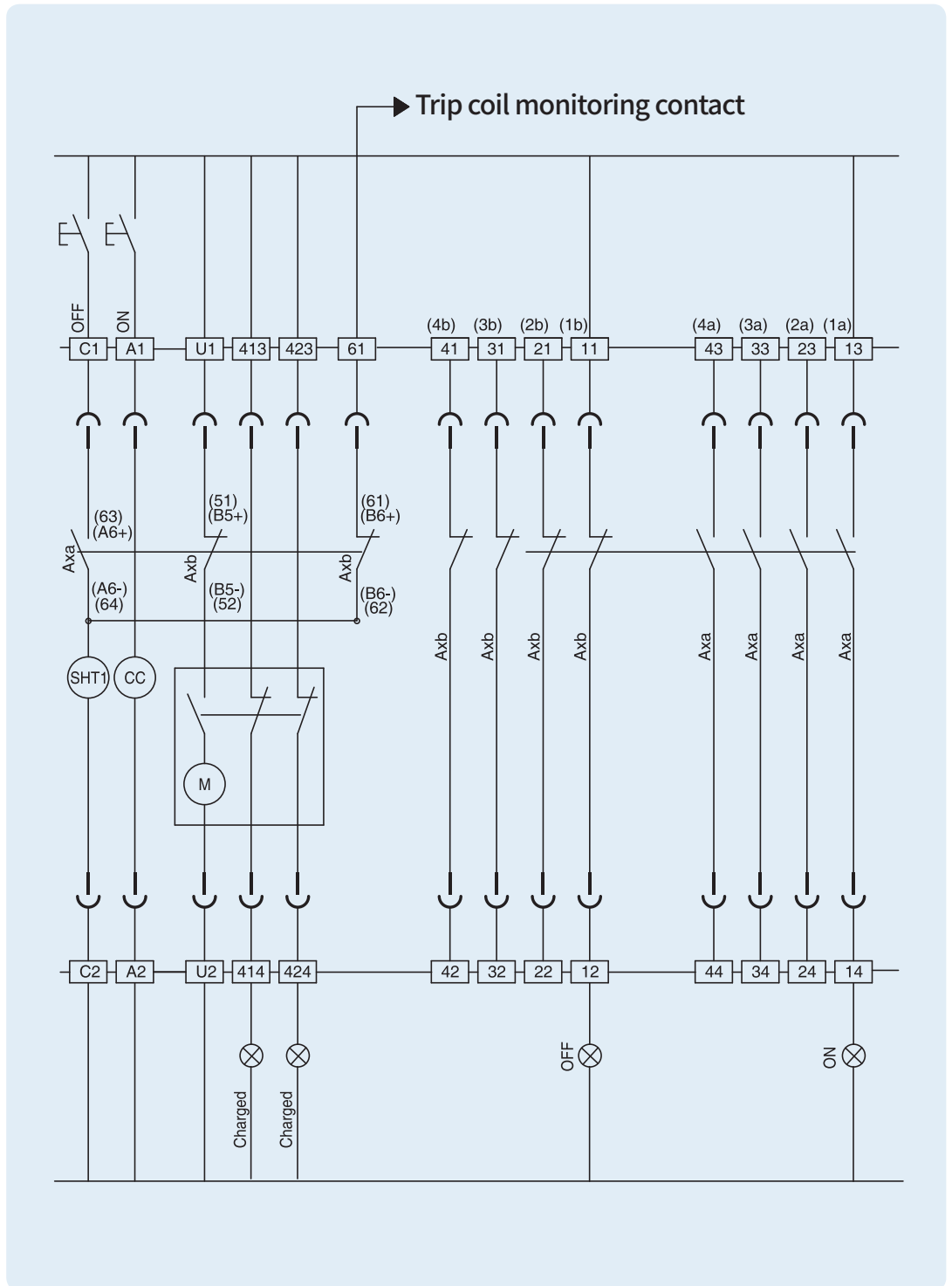
Electrical diagram

Trip relay (STU)

TC(TCS ON-charge)
'5a5b'



TC(TCS OFF-charge)
'4a4b'

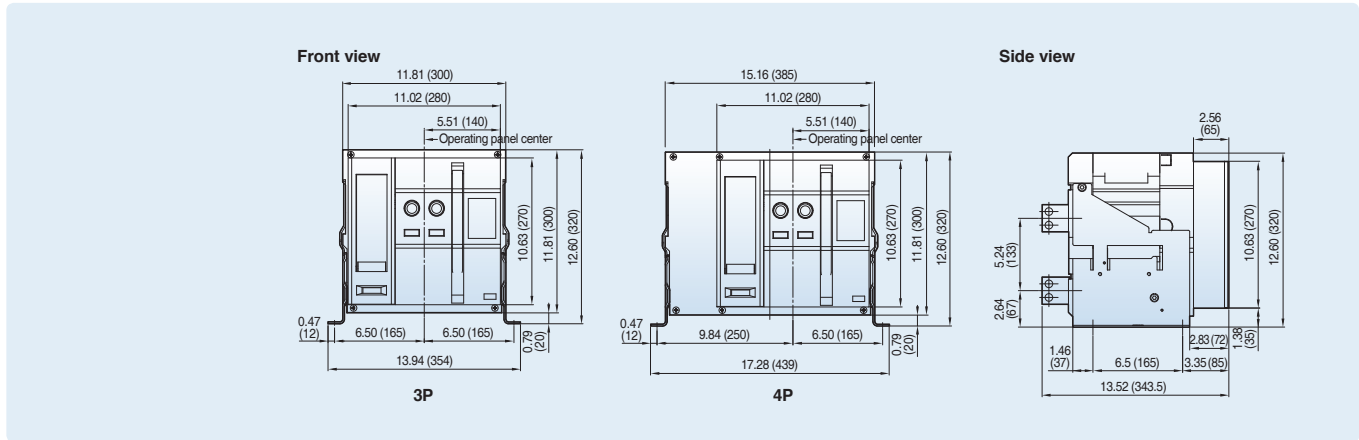


Dimensions

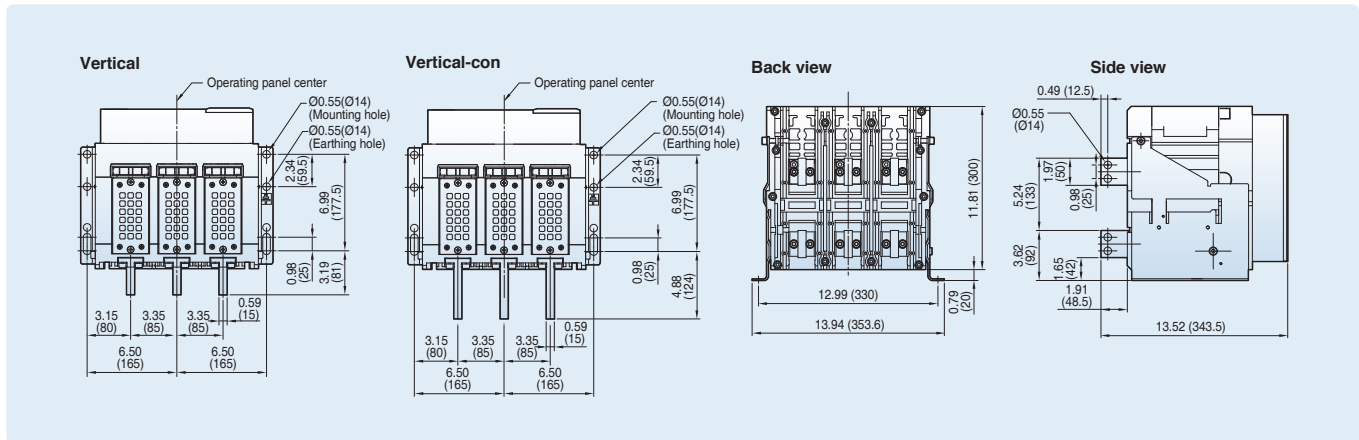
Fixed type 800~1600A (UAS-08/16D)

Front view

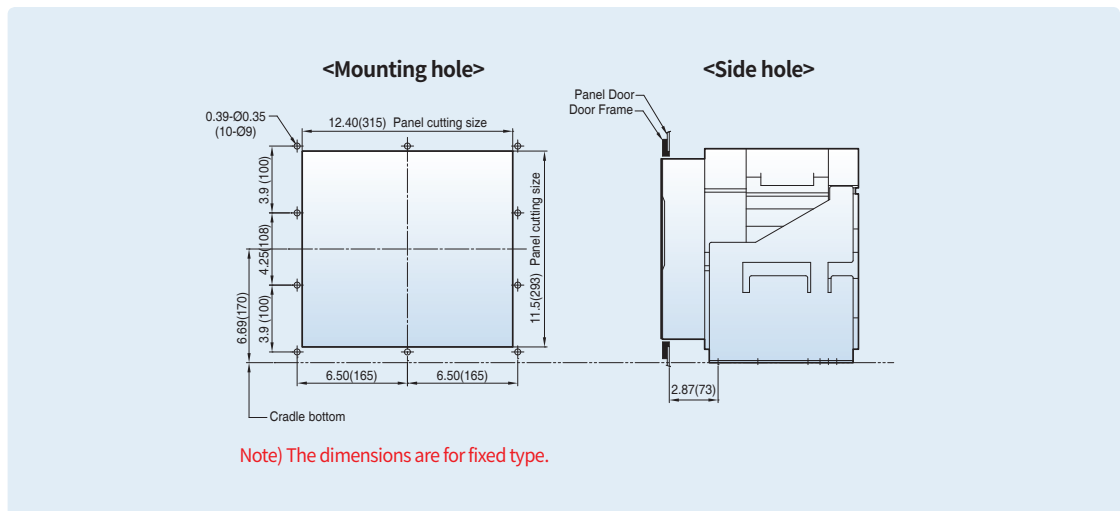
[inch (mm)]



Vertical type_3P

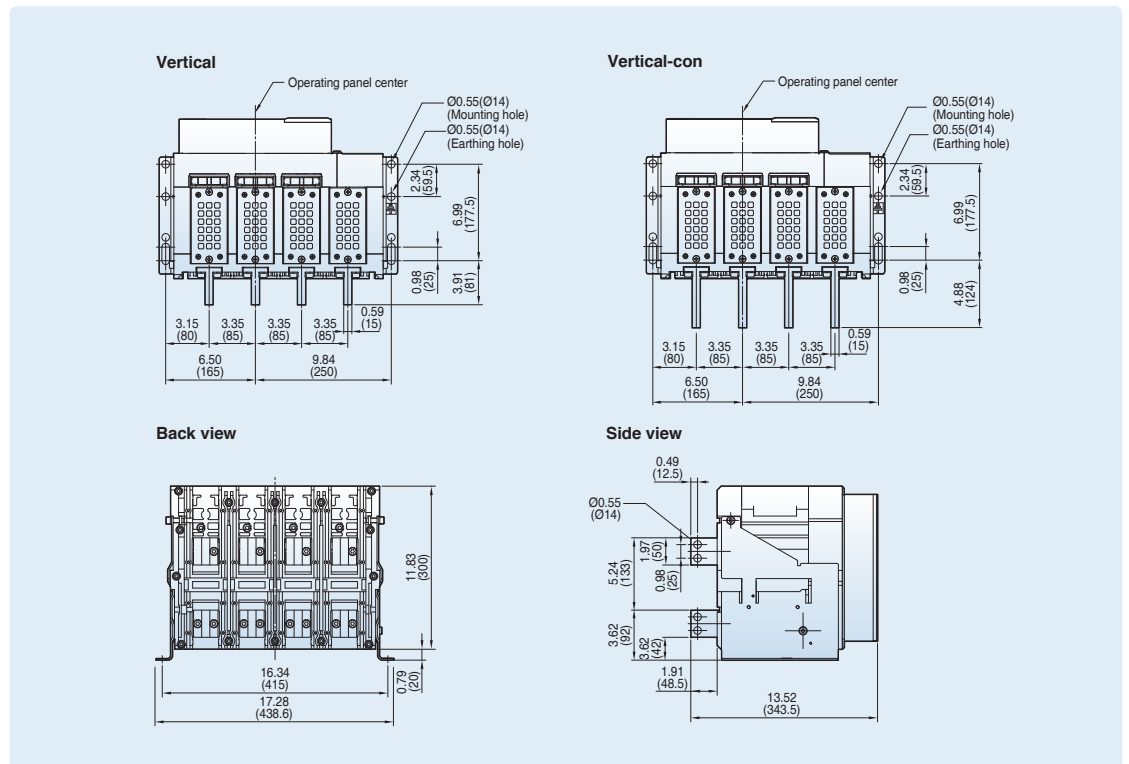


Door Frame: DF (UAS/UAH-D/E)

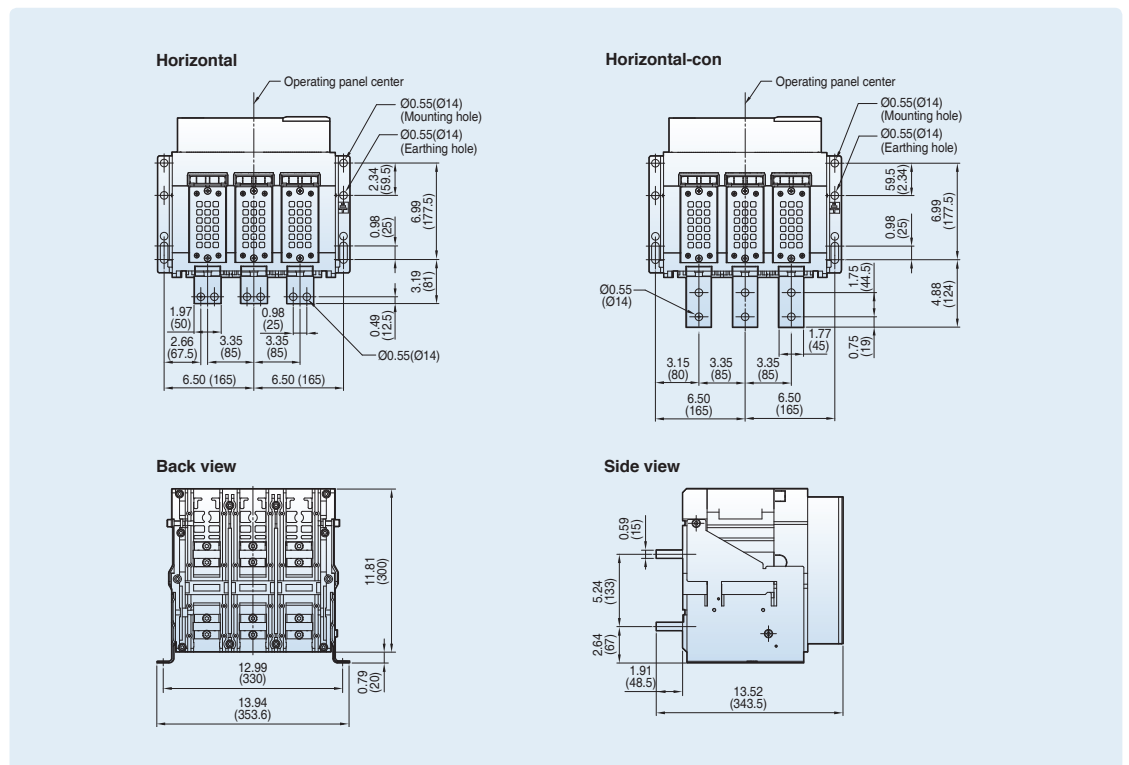


[inch (mm)]

Vertical
type_4P



Horizontal
type_3P

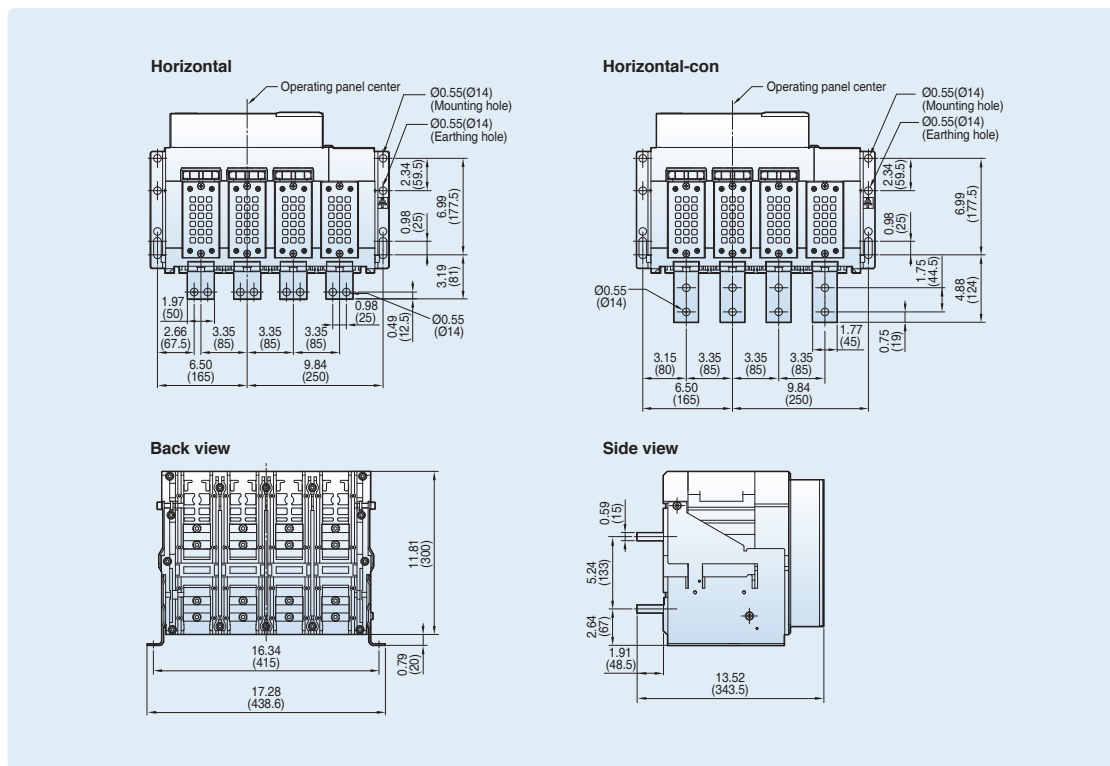


Dimensions

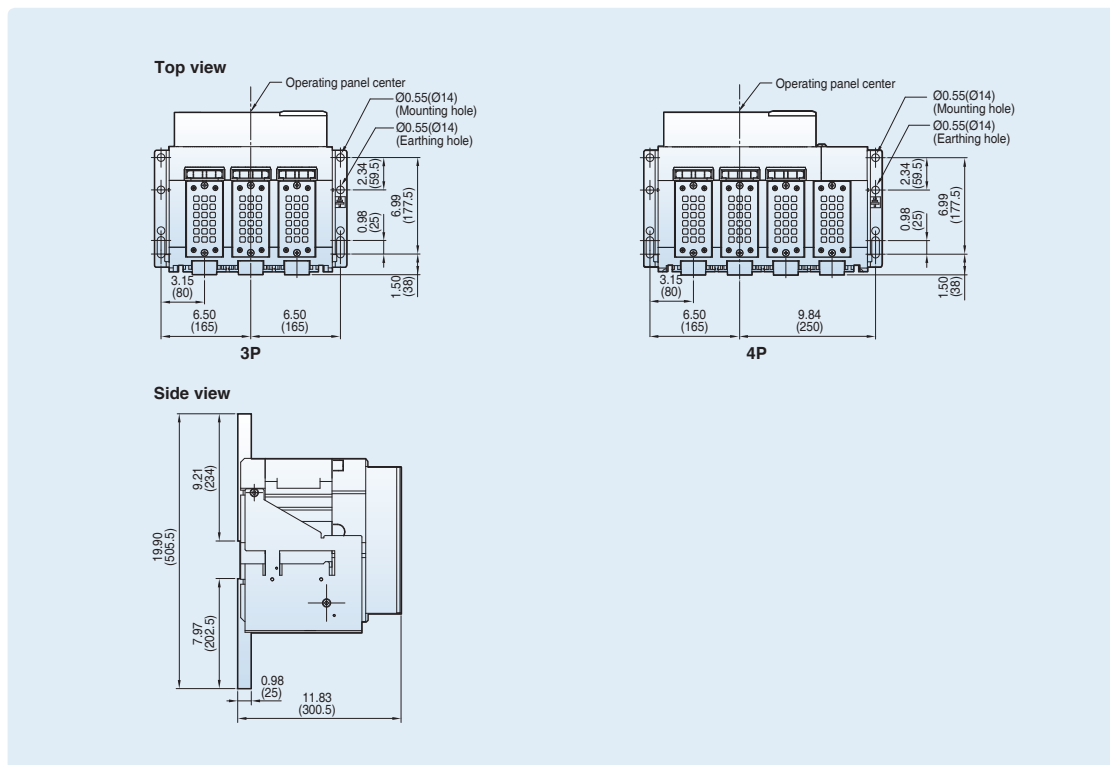
Fixed type 800~1600A (UAS-08/16D)

[inch (mm)]

Horizontal type_4P



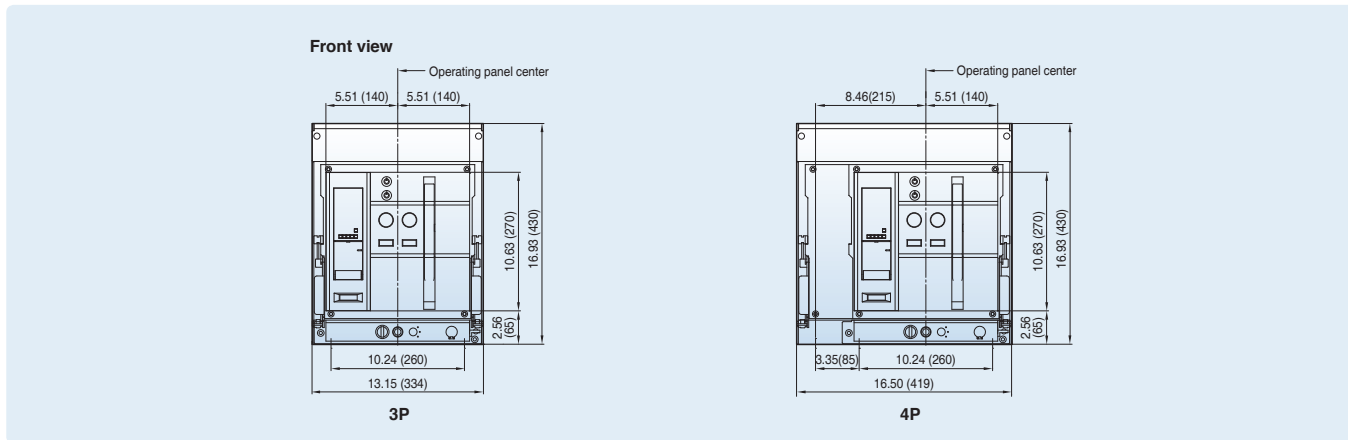
Front connection type



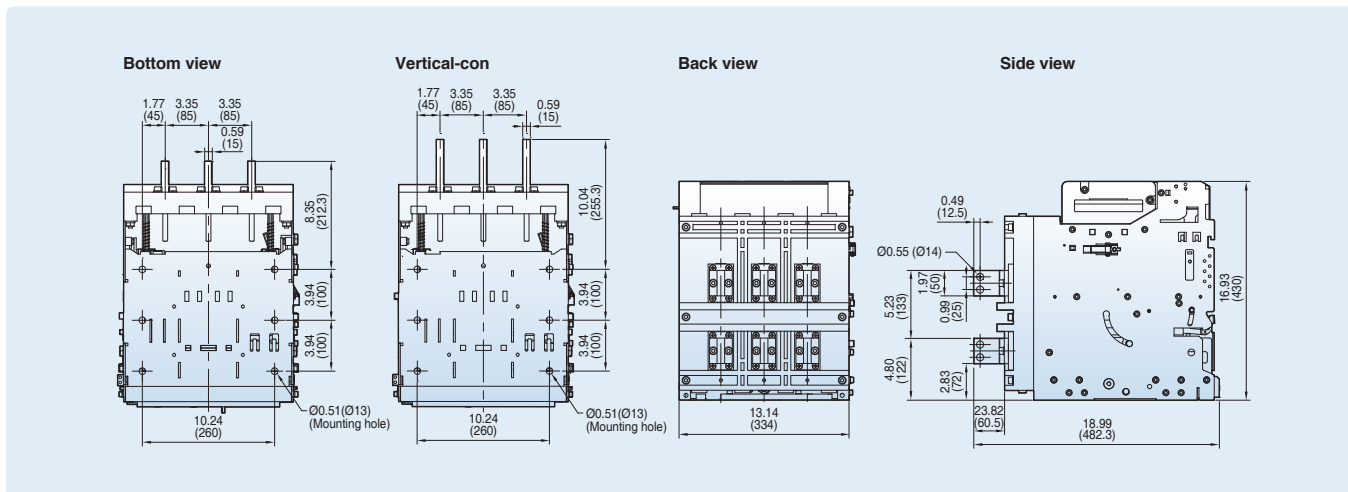
Draw-out type 800~1600A (UAS-08/16D)

Front view

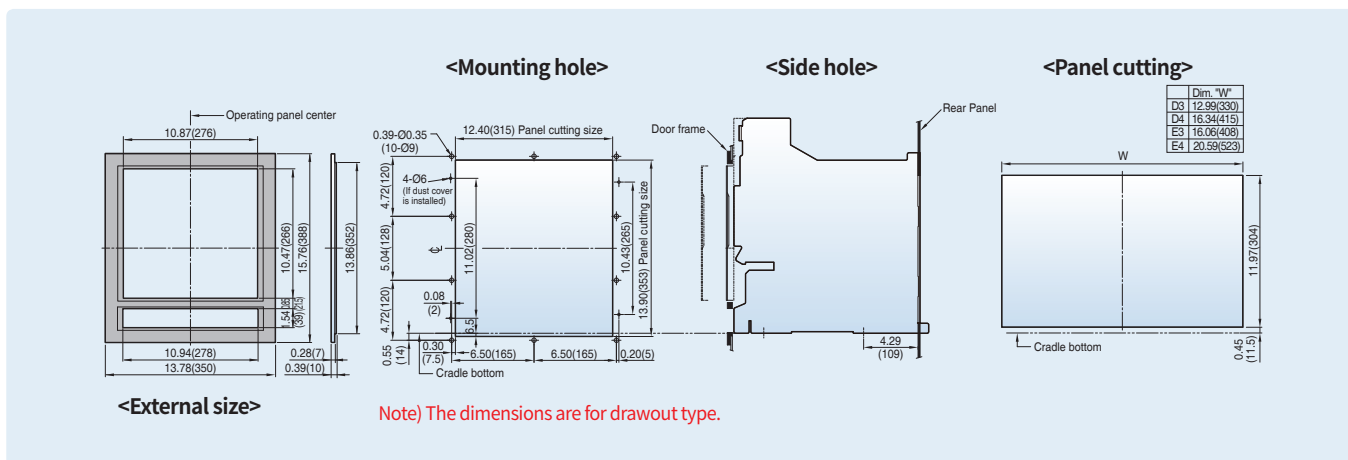
[inch (mm)]



Vertical type_3P



Door Frame: DF (UAS/UAH-D/E)

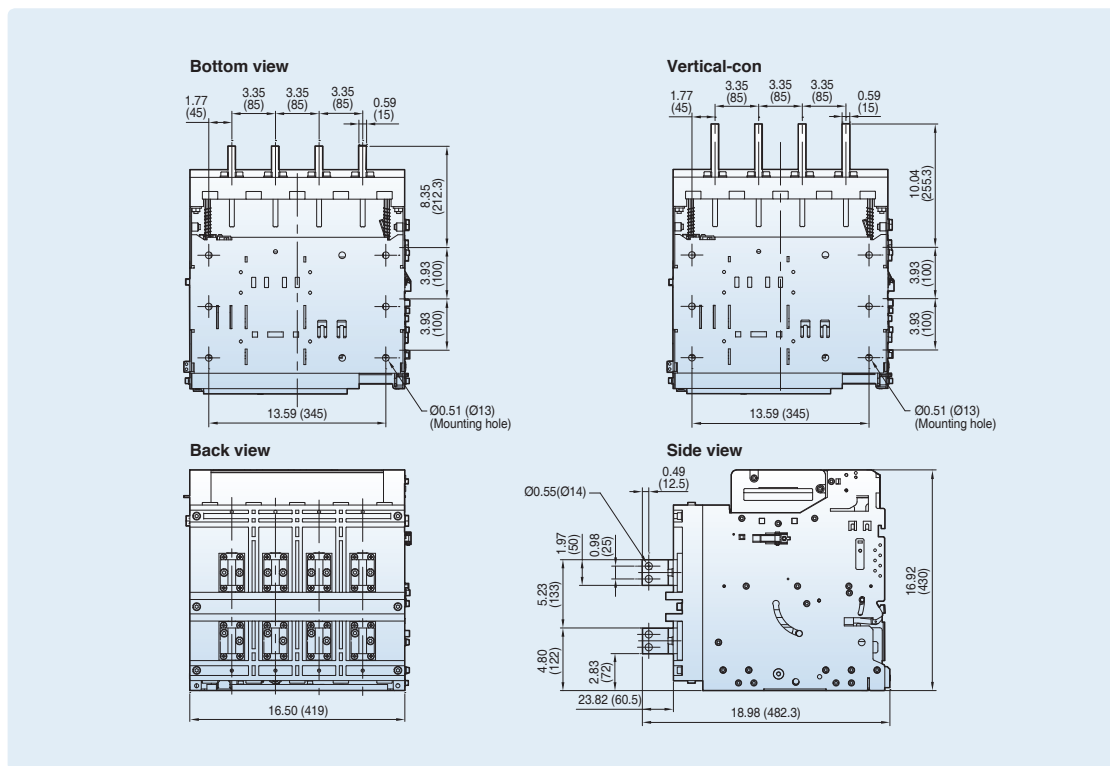


Dimensions

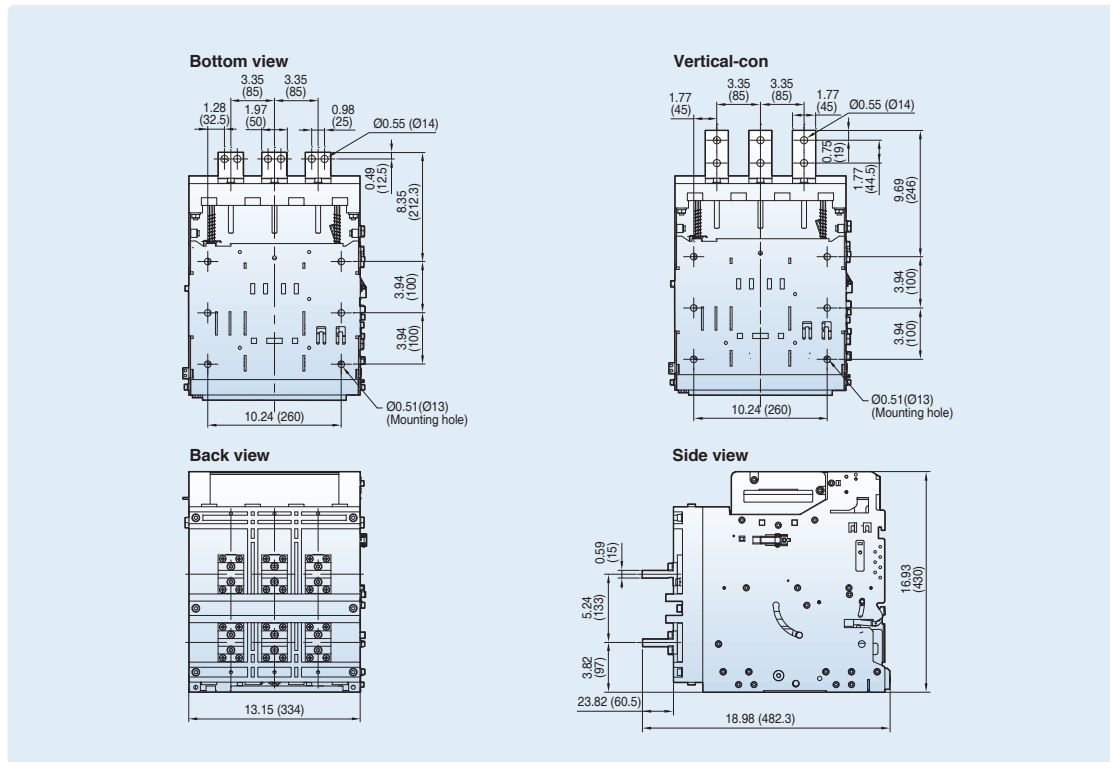
Draw-out type 800~1600A (UAS-08/16D)

[inch (mm)]

Horizontal type_4P

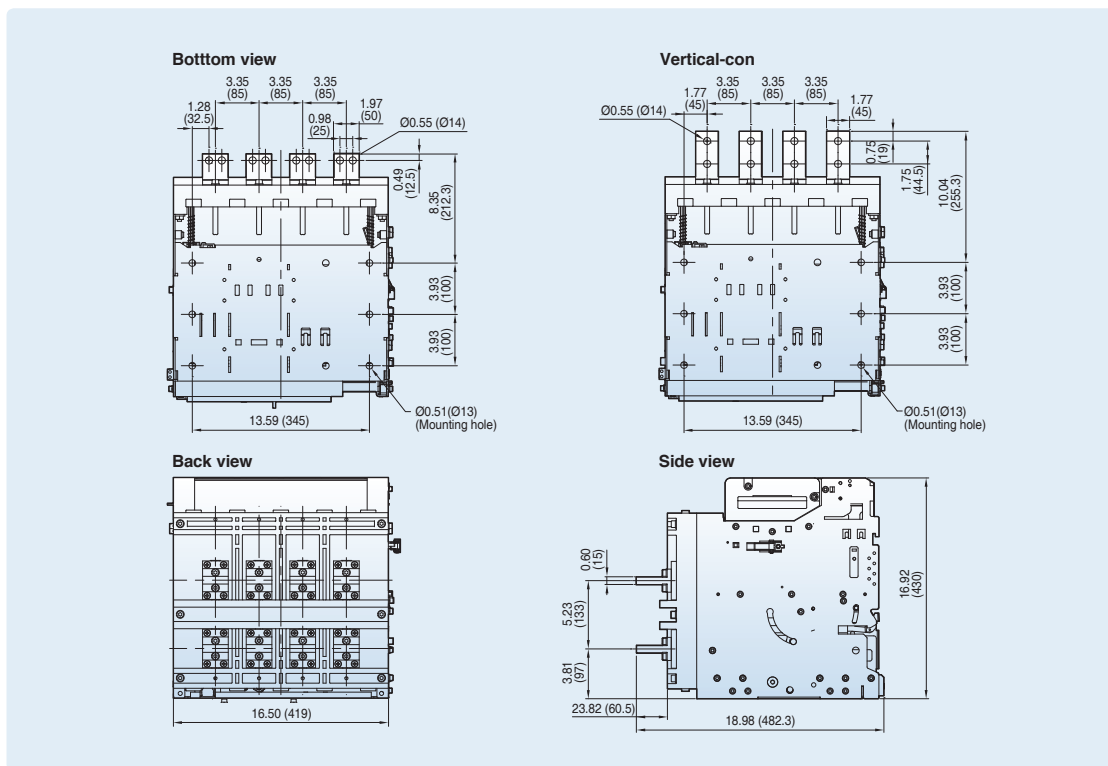


Horizontal type_3P

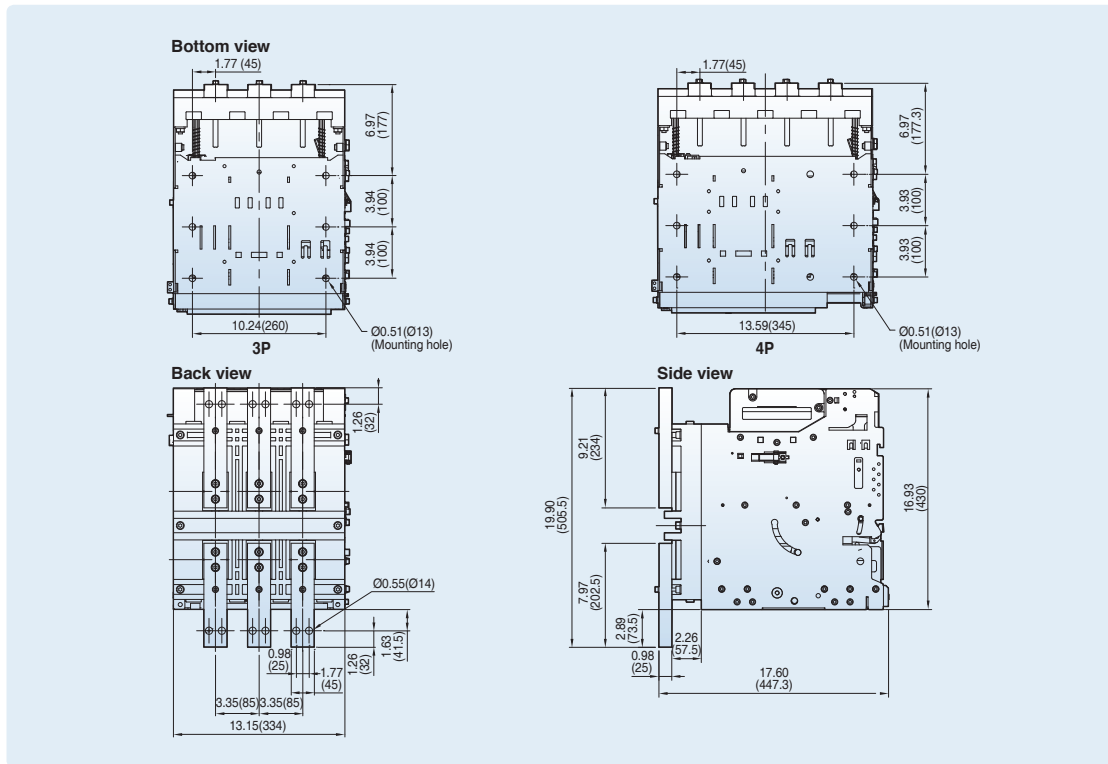


[inch (mm)]

**Horizontal
type_4P**



**Front
connection
type**

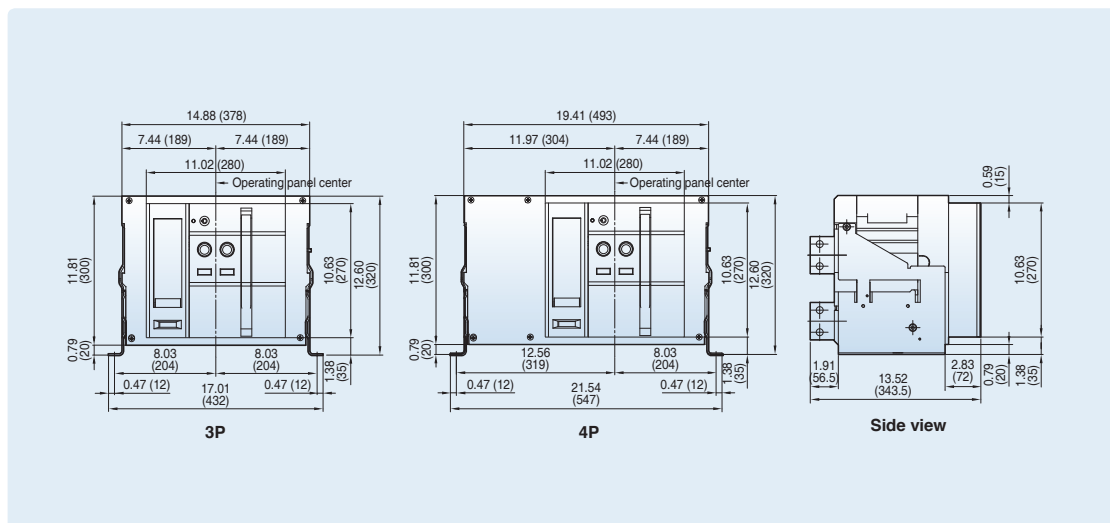


Dimensions

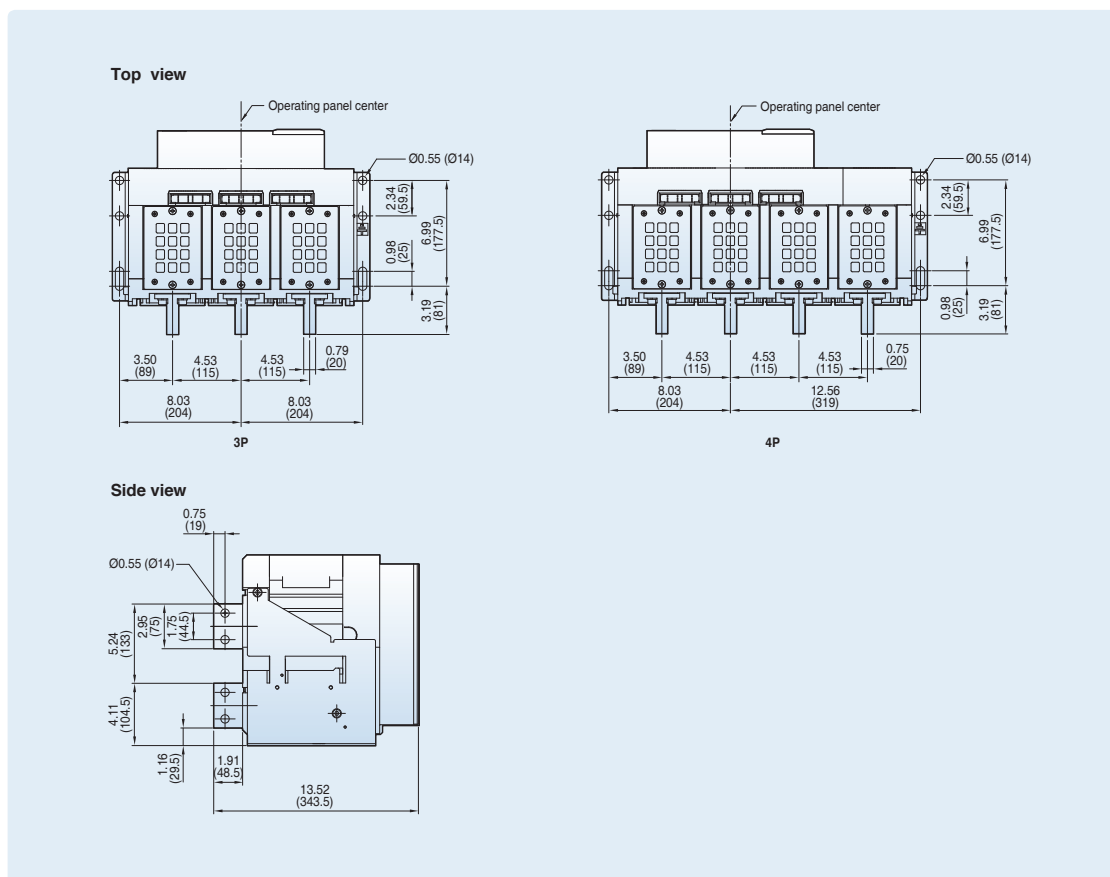
Fixed type 800~2000A (UAH-08~20E/UAW-08~20E)

[inch (mm)]

Front view

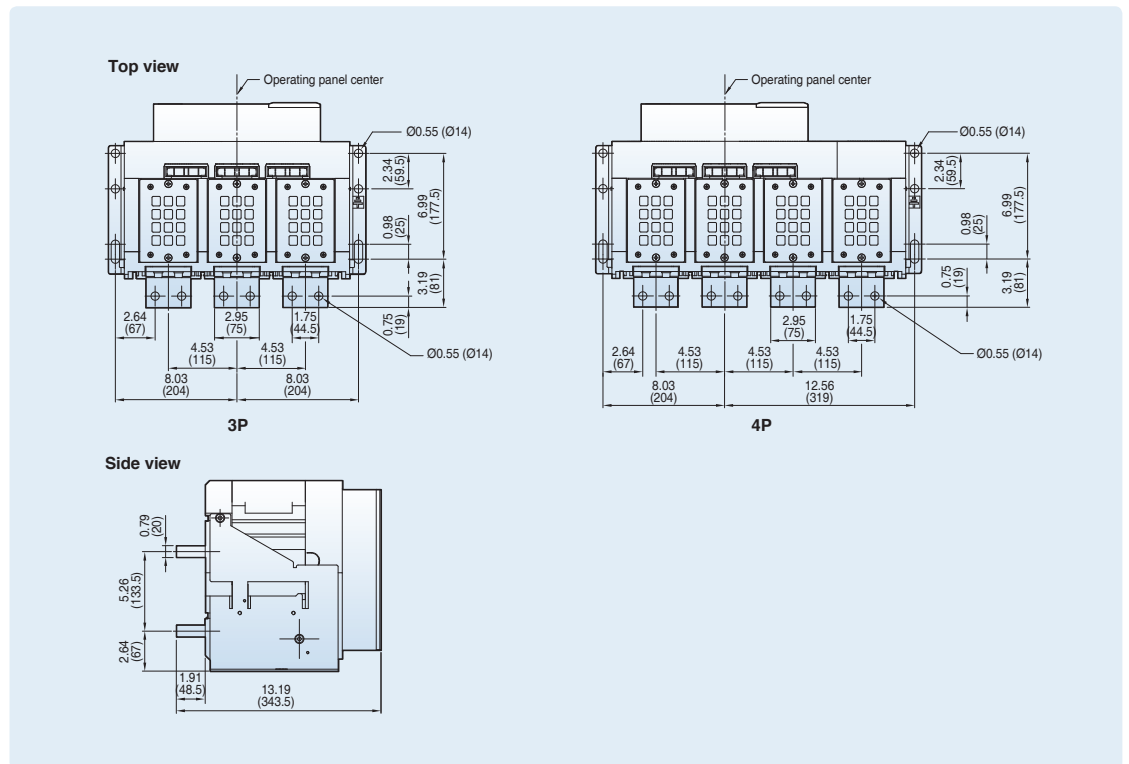


Vertical type

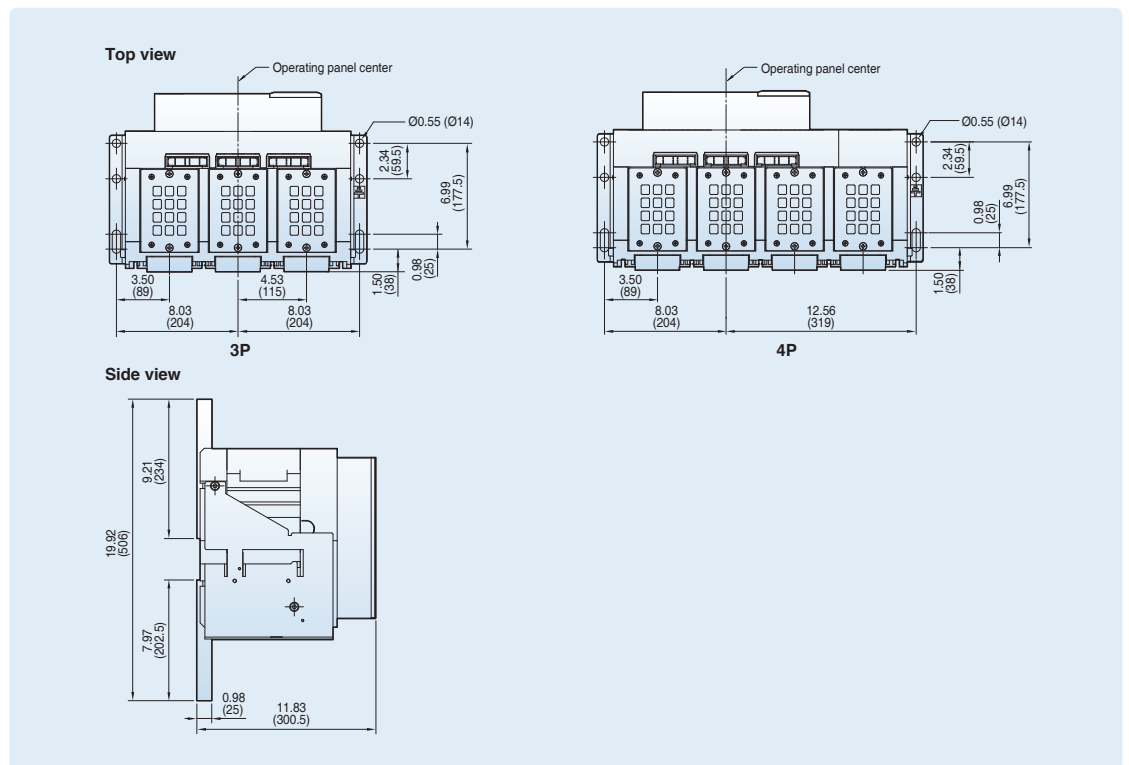


[inch (mm)]

Horizontal type



Front connection type

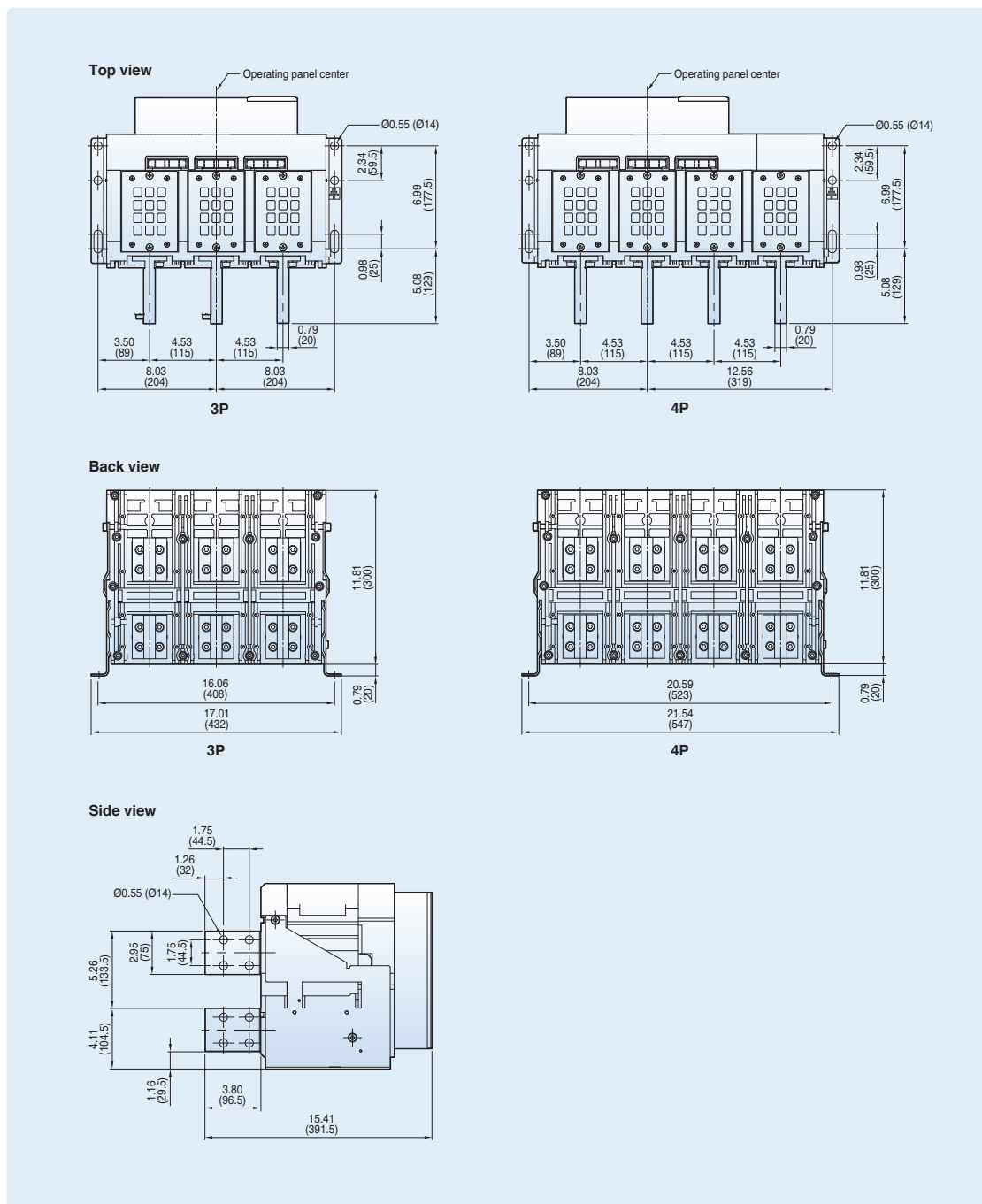


Dimensions

Fixed type 2500A (UAH-25E/UAW-25E)

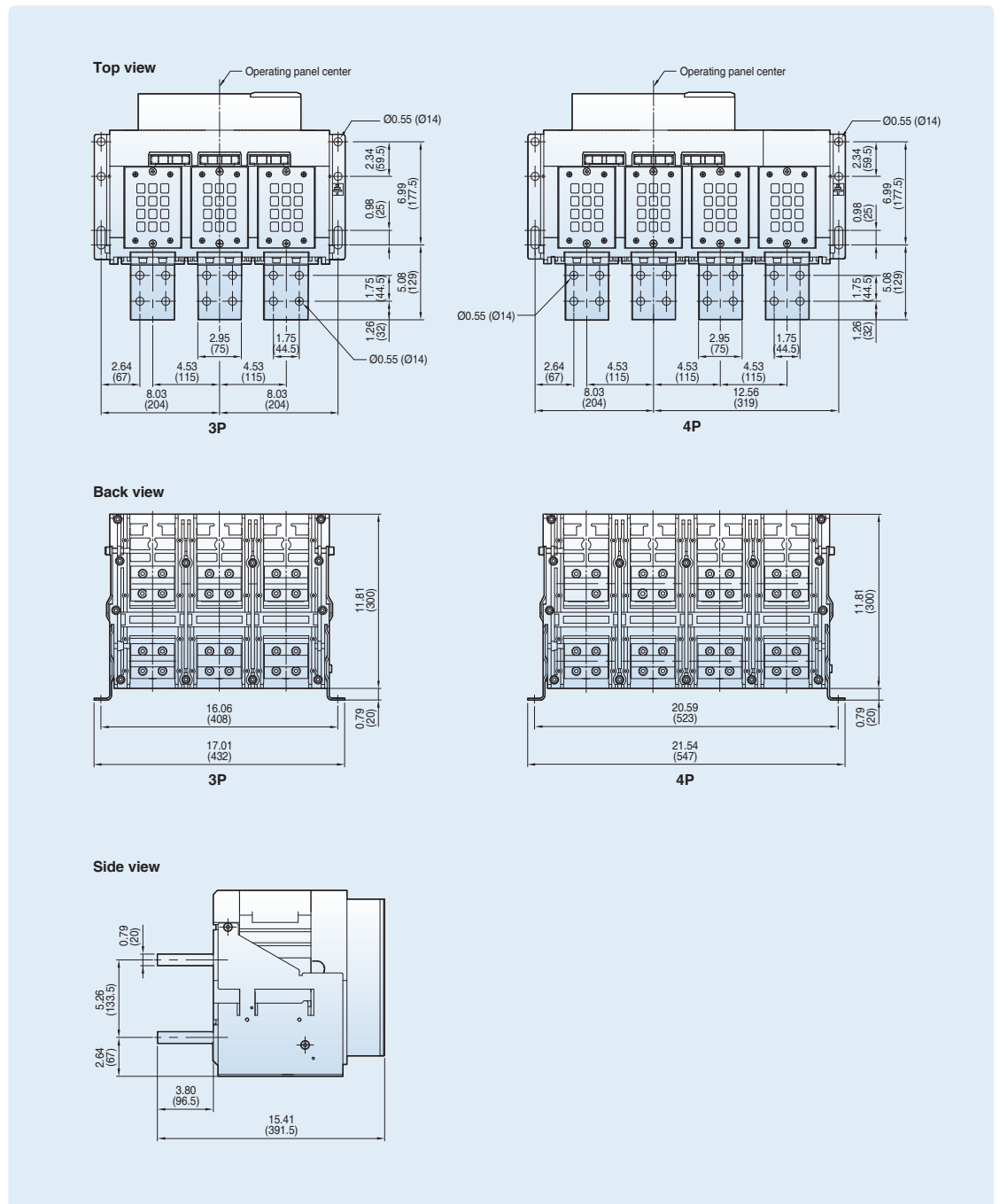
[inch (mm)]

Vertical type



[inch (mm)]

Horizontal type



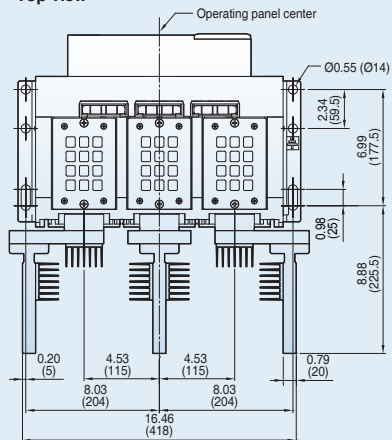
Dimensions

Fixed type 3200A (UAH-32E/UAW-32E)

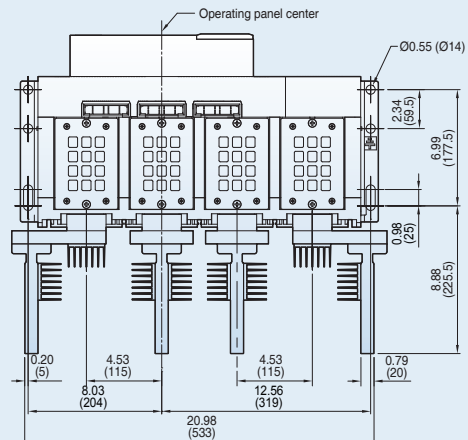
[inch (mm)]

Vertical type

Top view

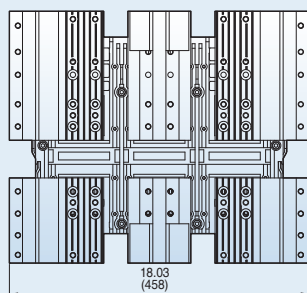


3P

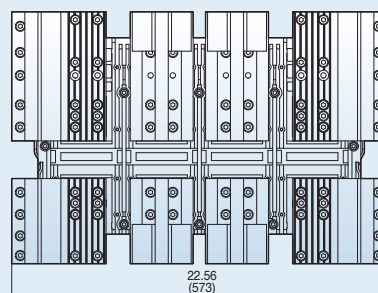


4P

Back view

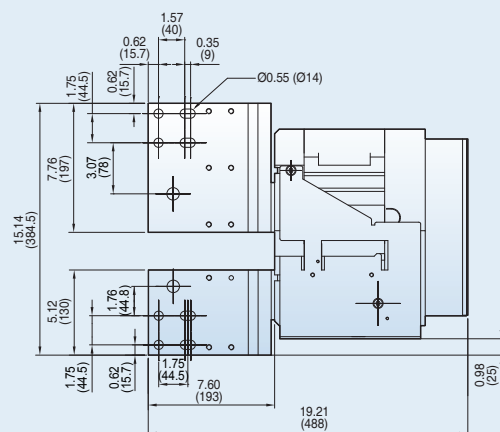


3P



4P

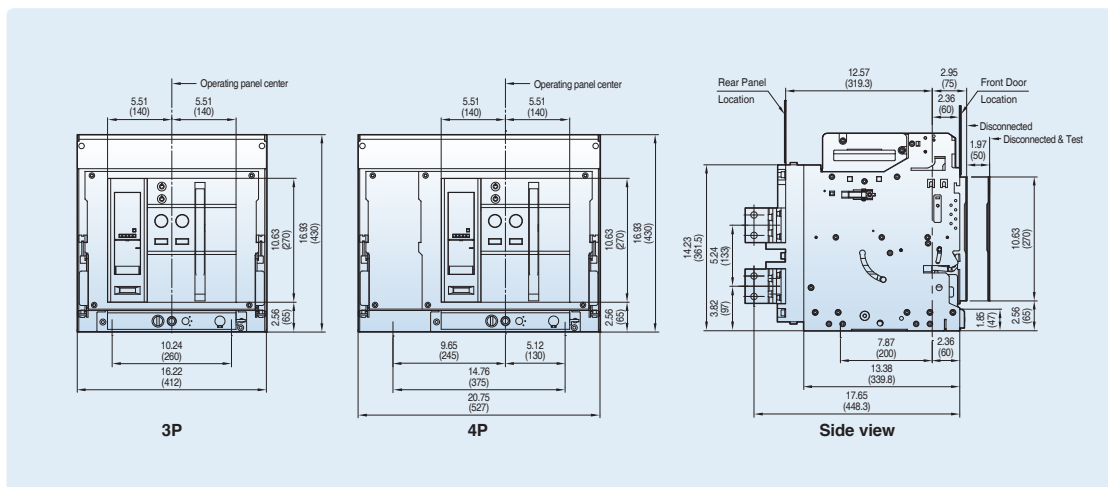
Side view



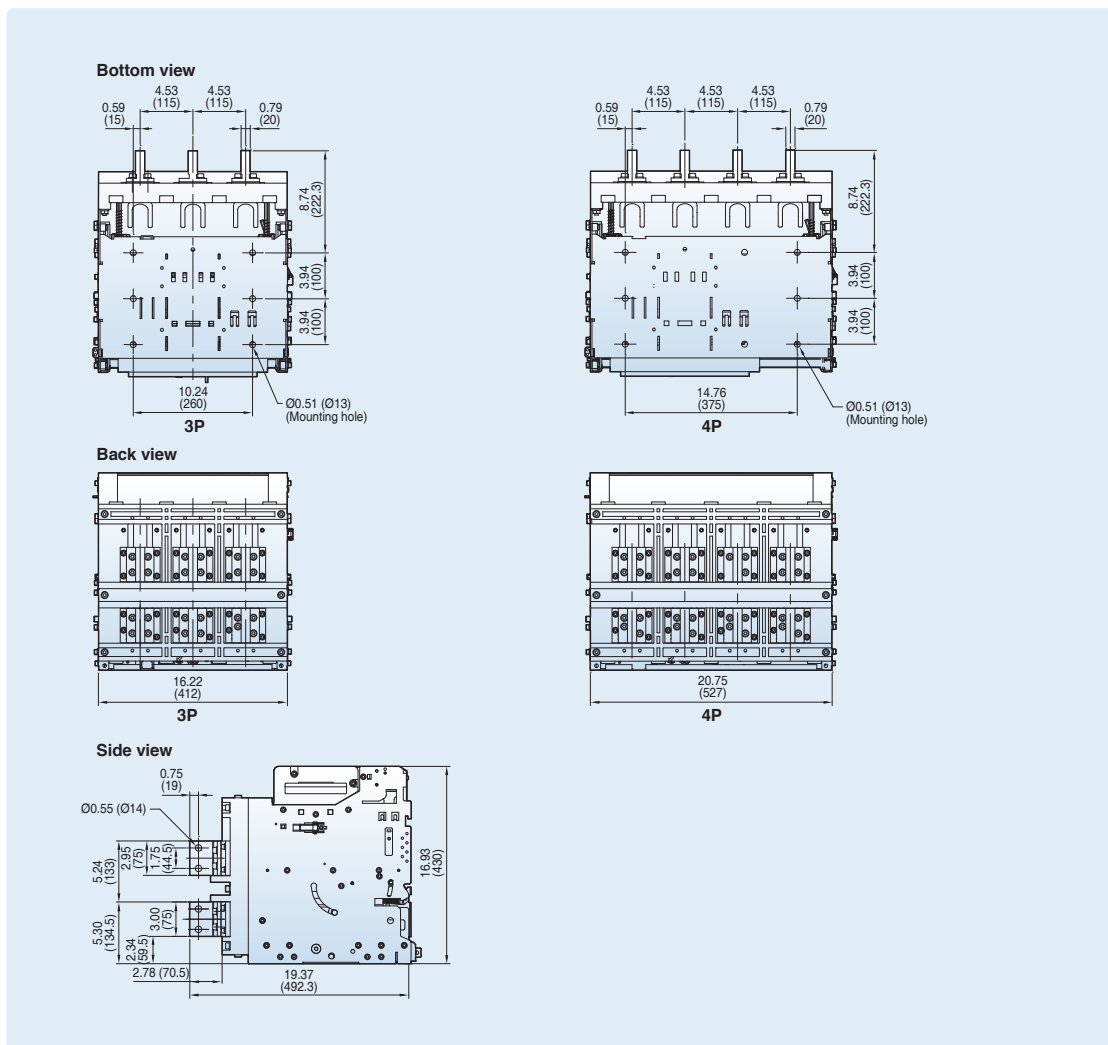
Draw-out type 800~2000A (UAH-08~20E/UAW-08~20E)

[inch (mm)]

Front view



Vertical type



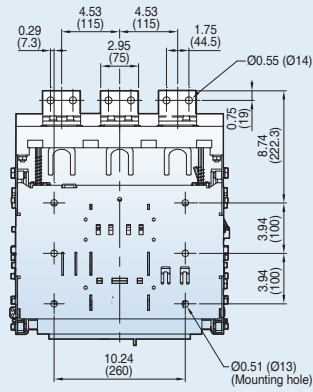
Dimensions

Draw-out type 800~2000A (UAH-08~20E/UAW-08~20E)

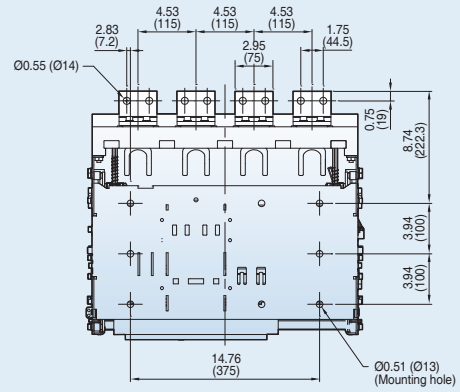
[inch (mm)]

Horizontal type

Bottom view

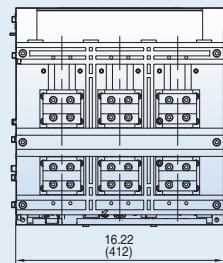


3P

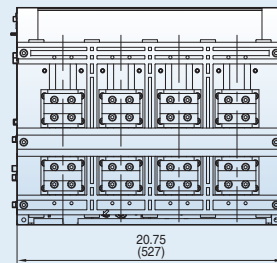


4P

Back view

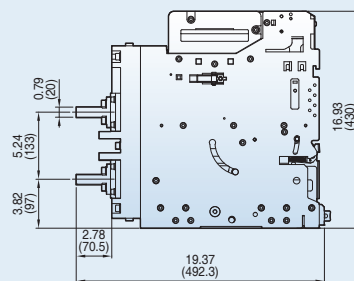


3P



4P

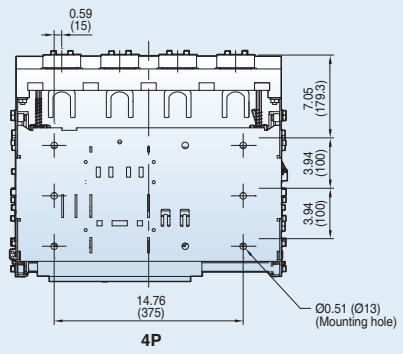
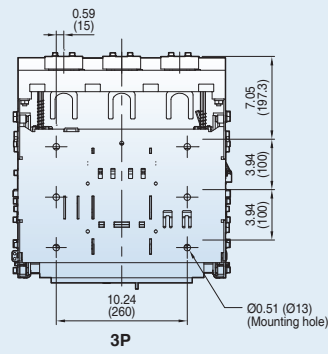
Side view



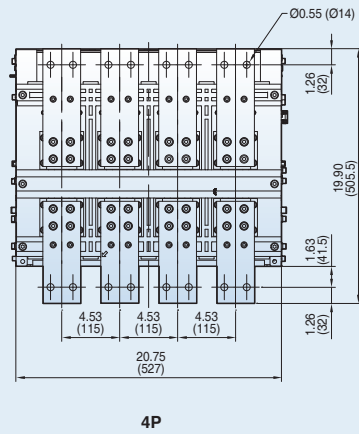
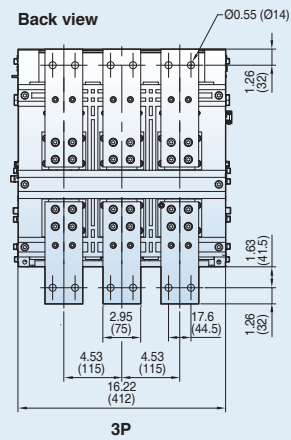
[inch (mm)]

Front connection type

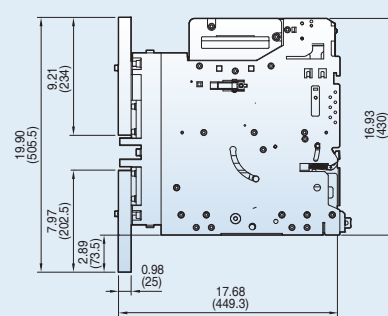
Bottom view



Back view



Side view



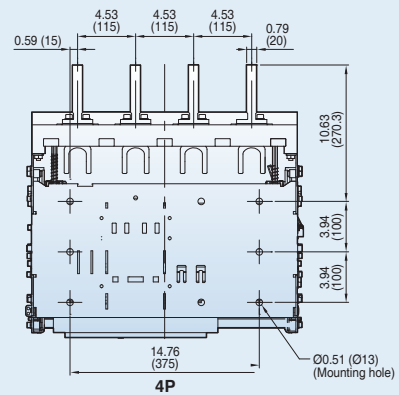
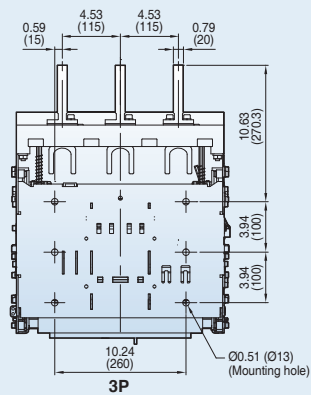
Dimensions

Draw-out type 2500A (UAH-25E/UAW-25E)

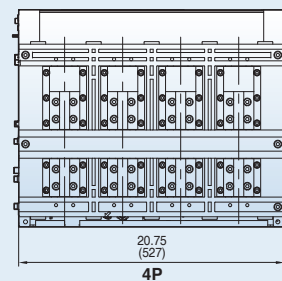
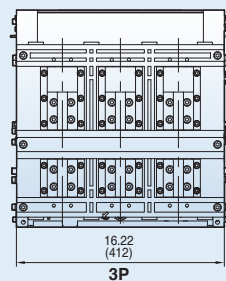
[inch (mm)]

Vertical type

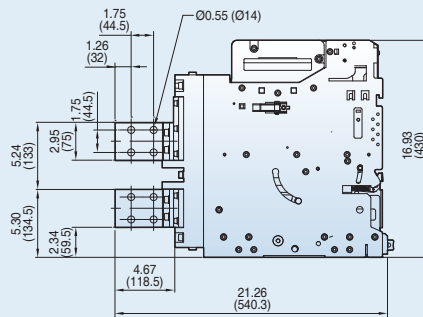
Bottom view



Back view



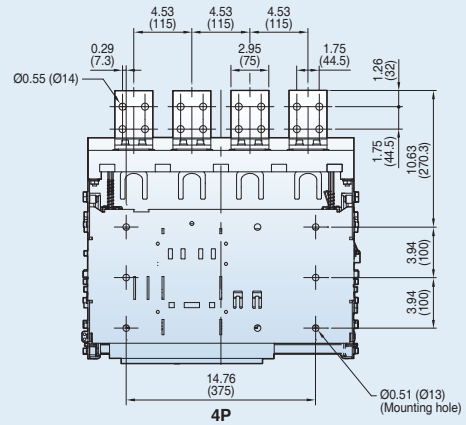
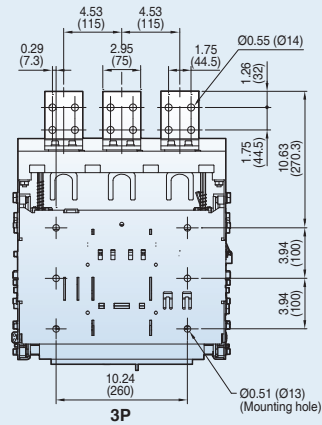
Side view



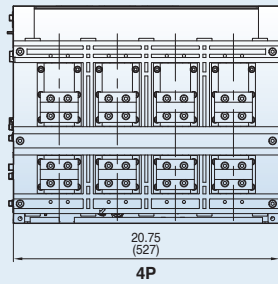
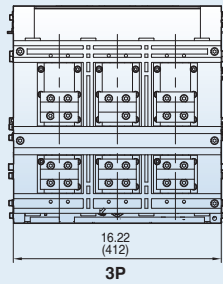
[inch (mm)]

Horizontal type

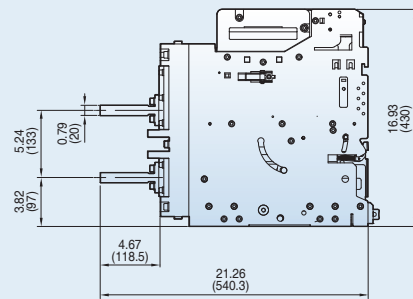
Bottom view



Back view



Side view



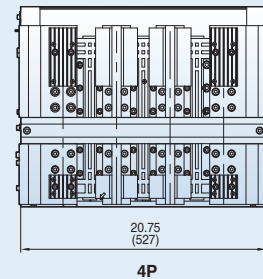
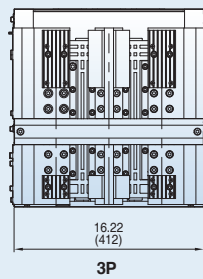
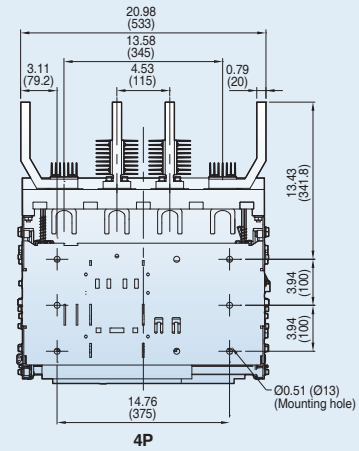
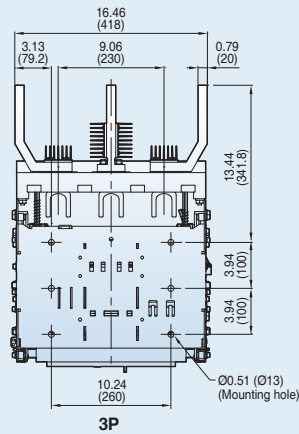
Dimensions

Draw-out type 3200A (UAH-32E/UAW-32E)

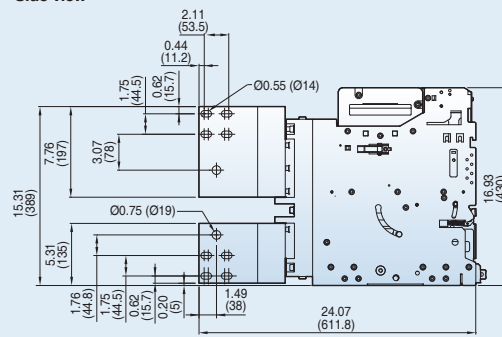
[inch (mm)]

Vertical type

Bottom view



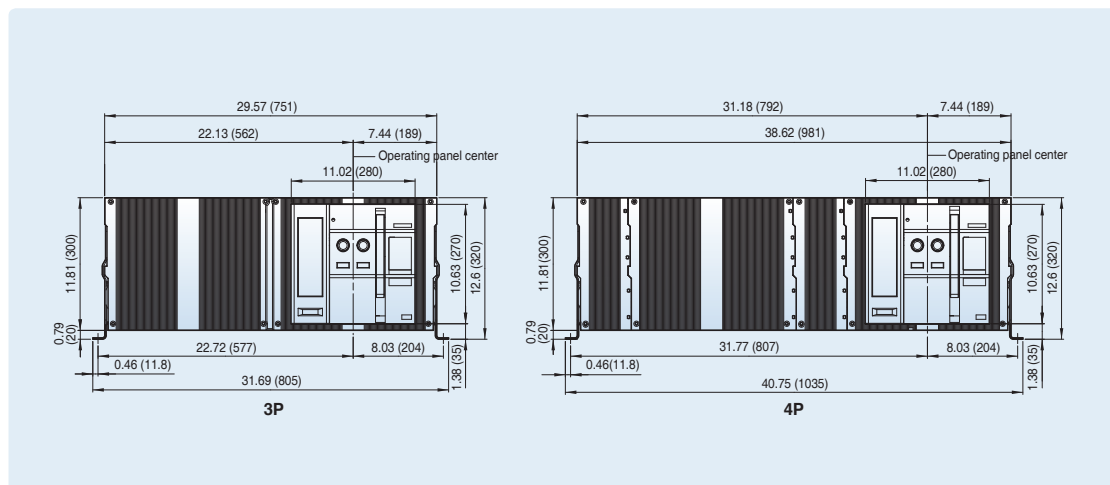
Side view



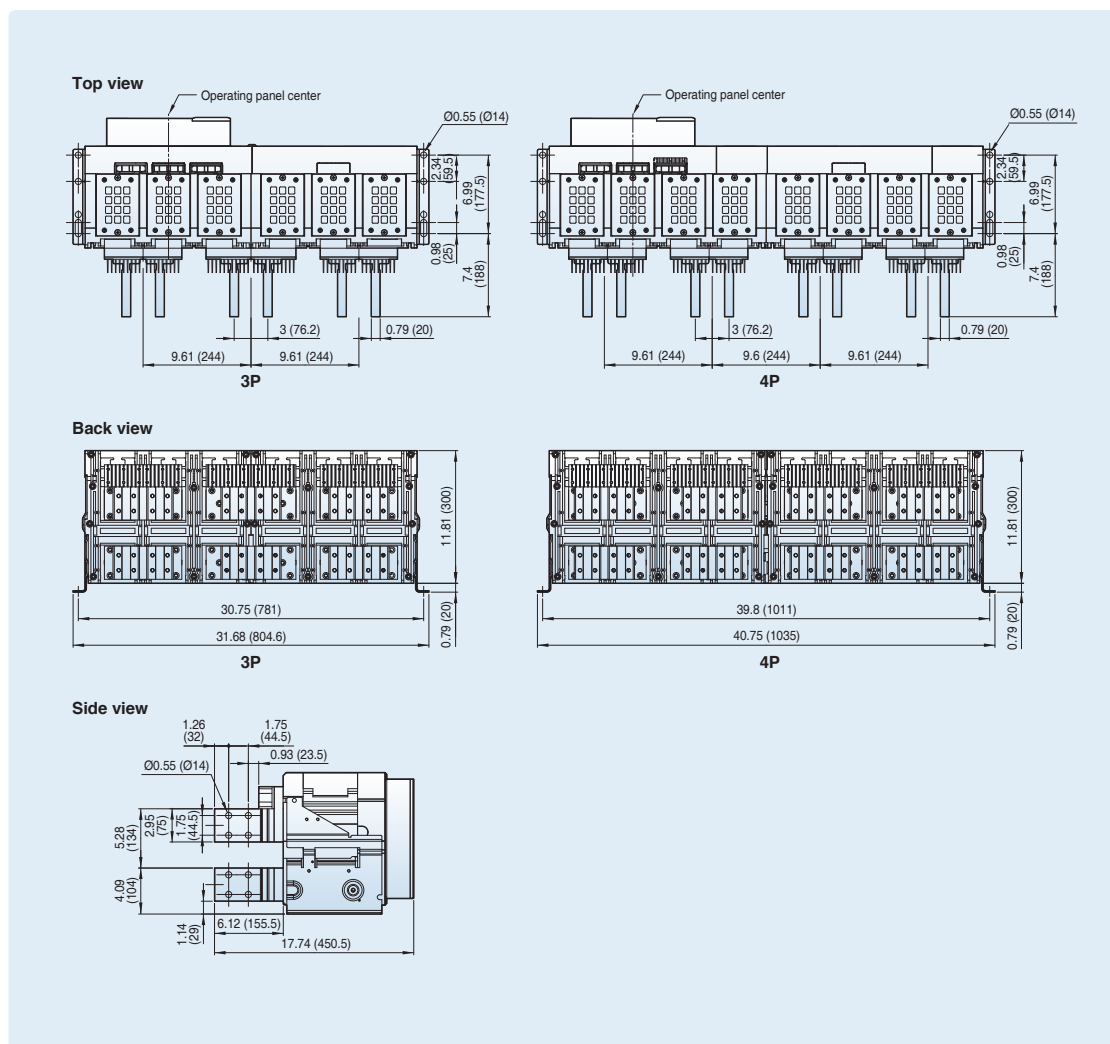
Fixed type 3200~5000A (UAH-32~50G)

[inch (mm)]

Front view



Vertical type

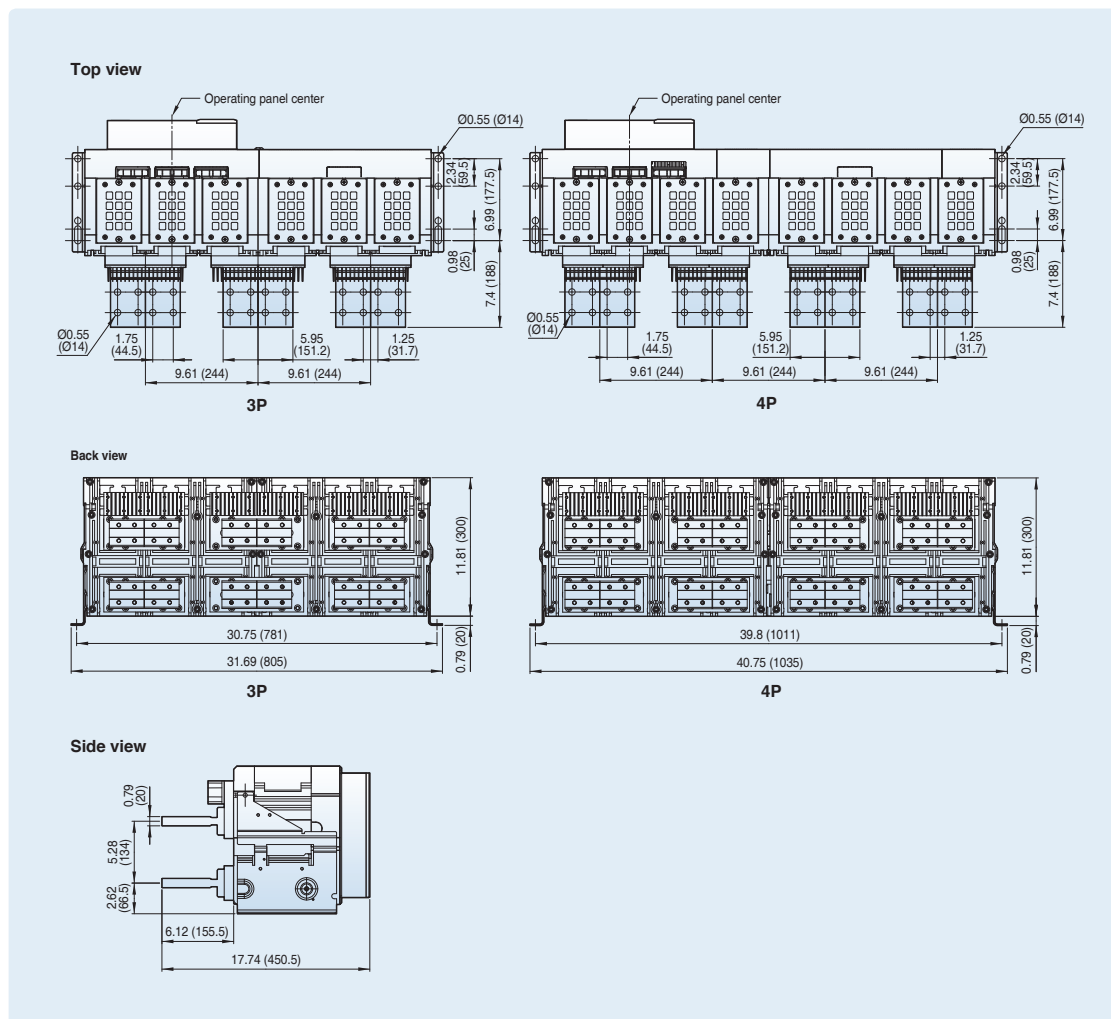


Dimensions

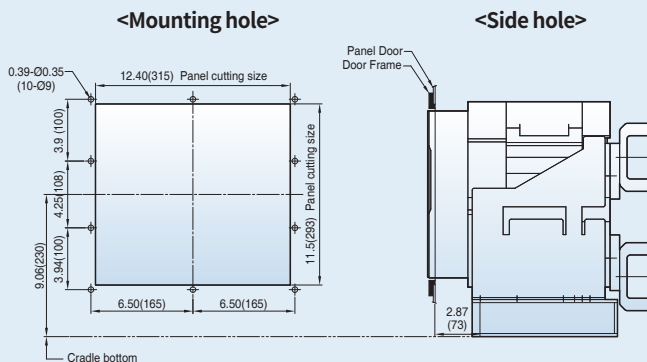
Fixed type 3200~5000A (UAH-32~50G)

[inch (mm)]

Horizontal type



Door Frame: DF (UAH-G)

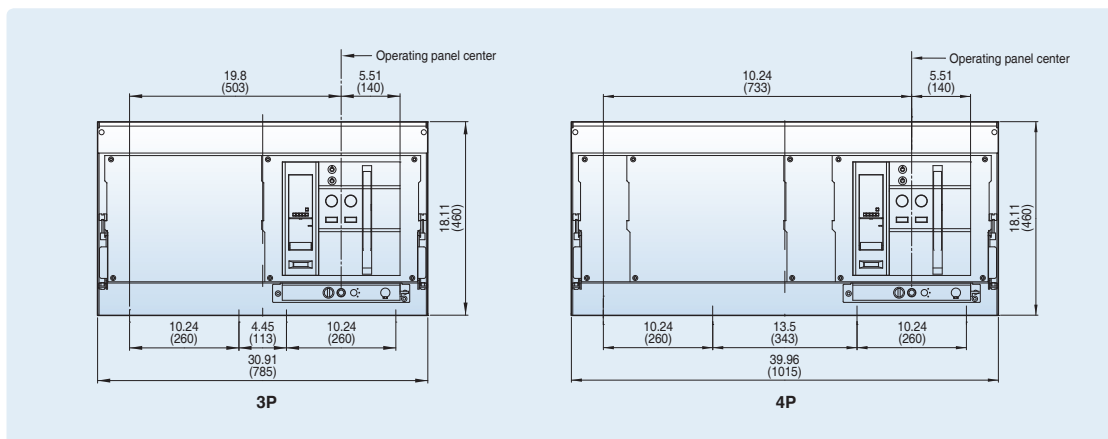


Note) The dimensions are for fixed type.

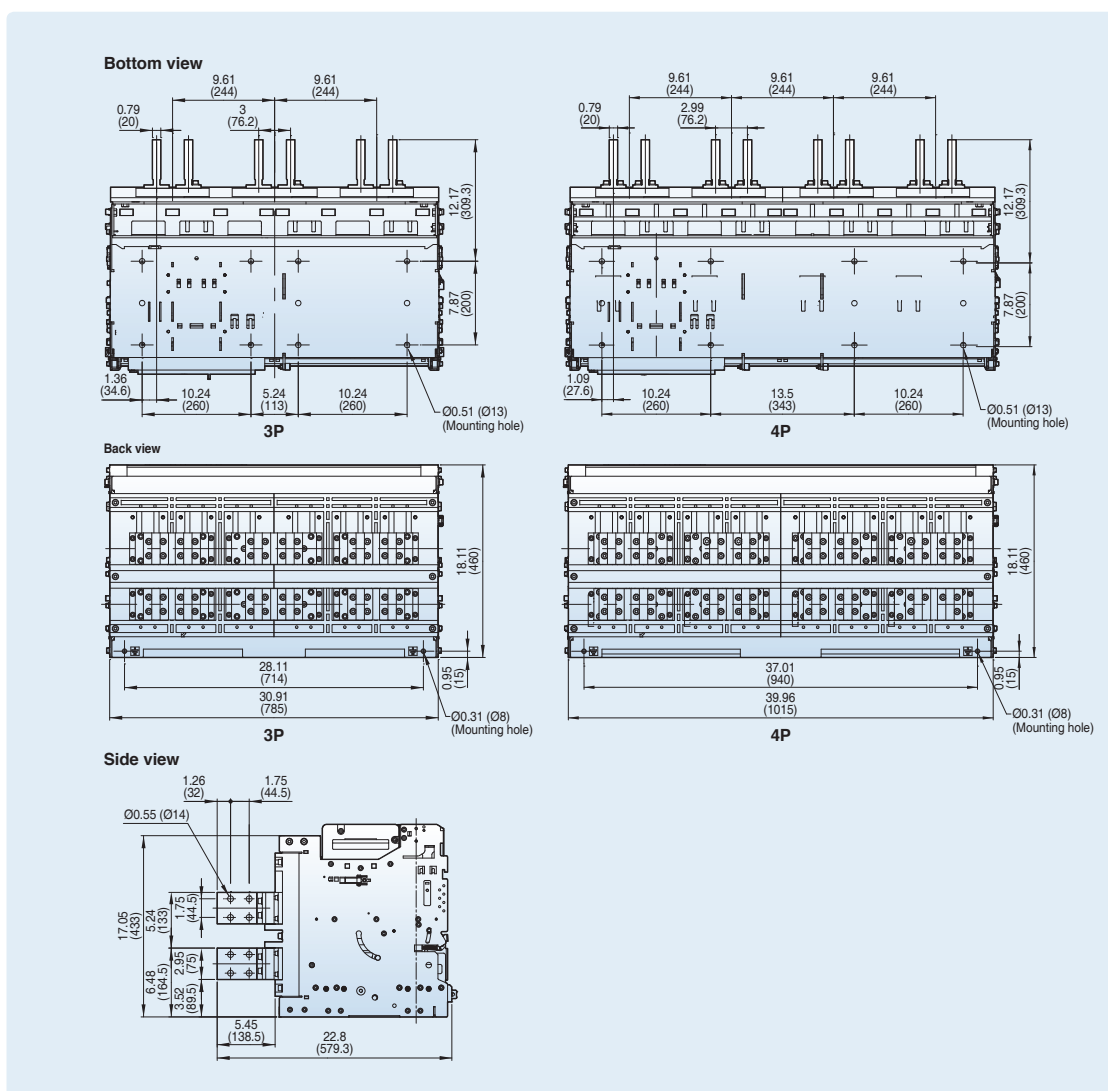
Draw-out type 3200~5000A (UAH-32~50G)

[inch (mm)]

Front view



Vertical type

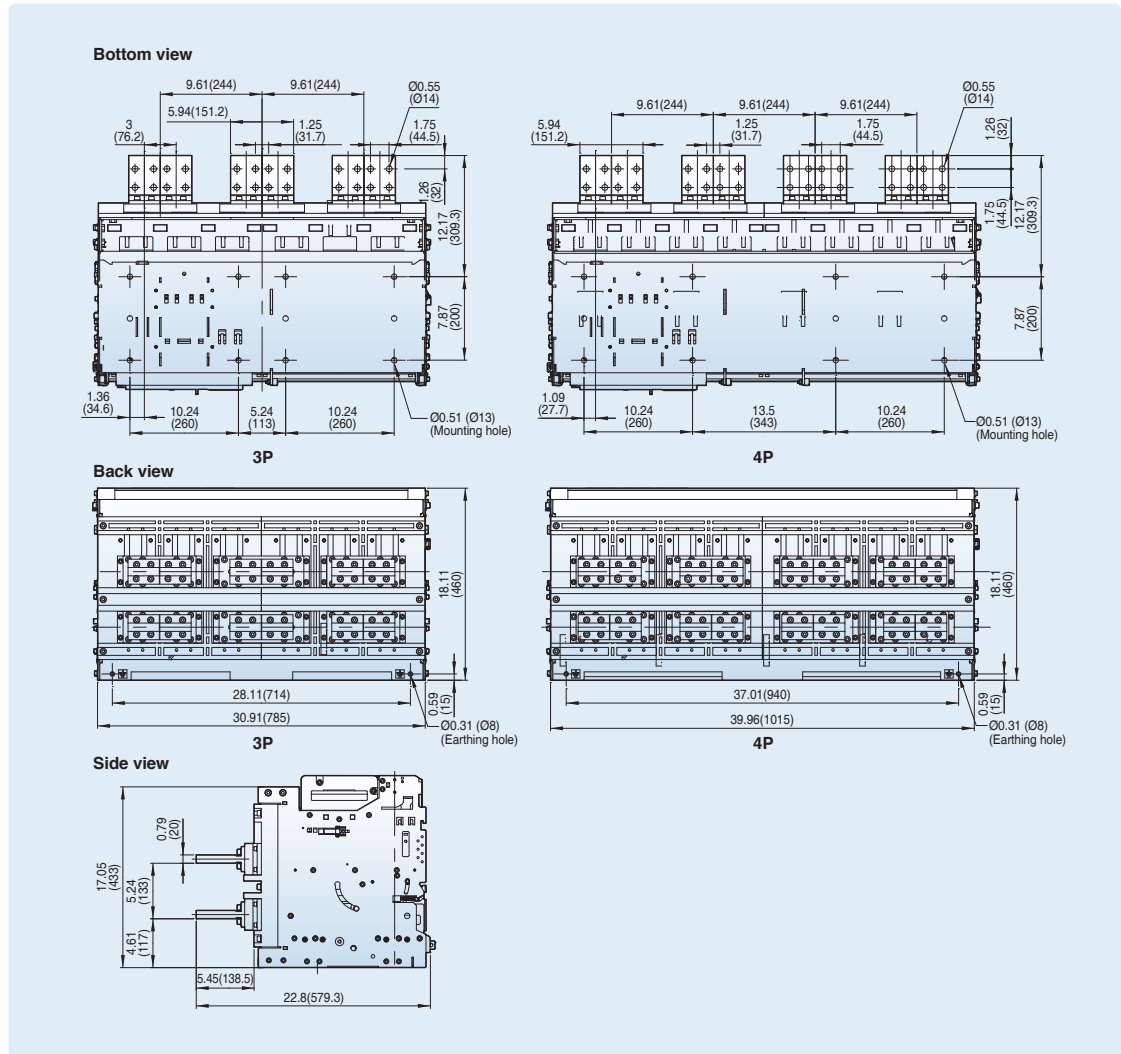


Dimensions

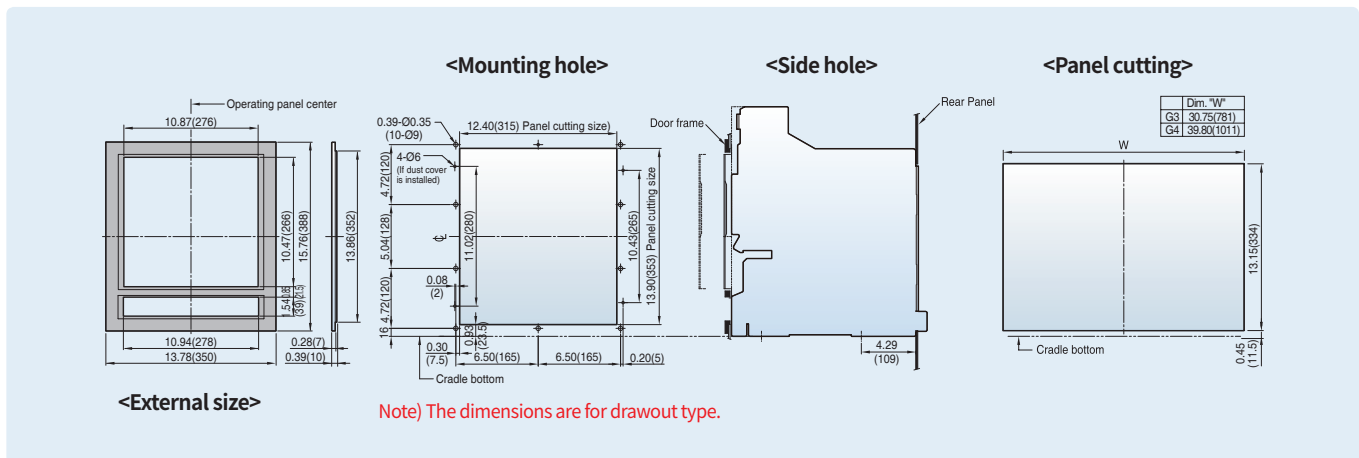
Draw-out type 3200~5000A (UAH-32~50G)

[inch (mm)]

Horizontal type



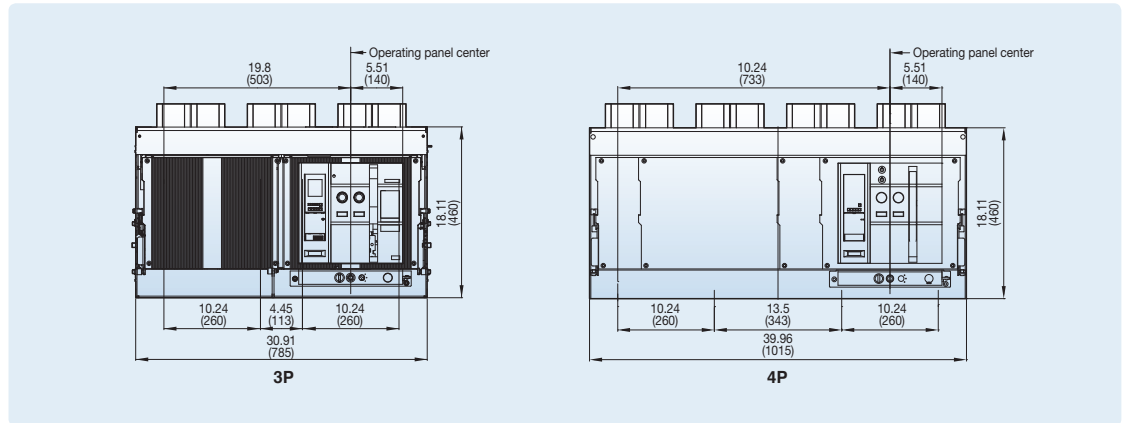
Door Frame: DF (UAH-G)



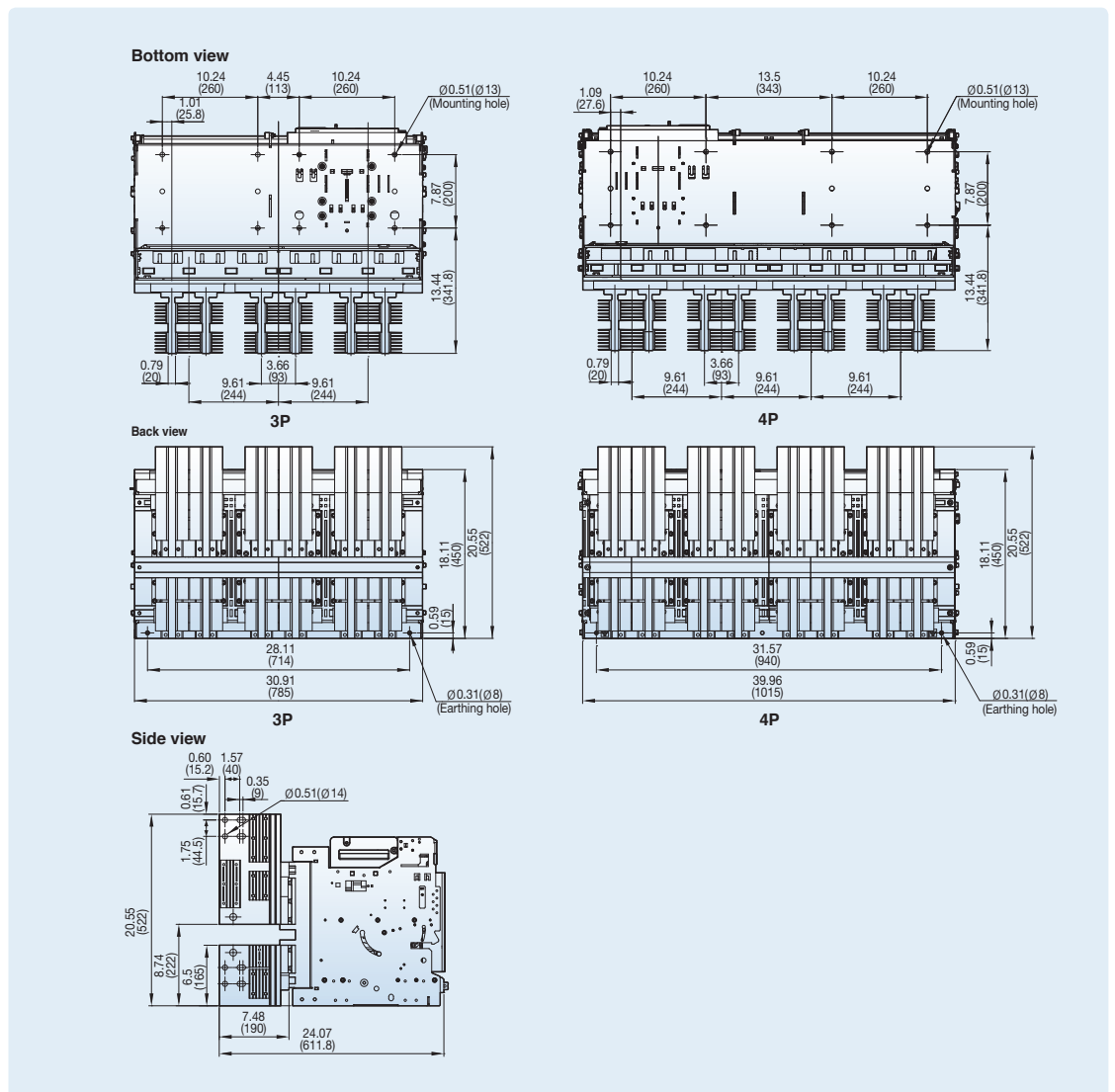
Draw-out type 3200~6000A (UAH-32~60G)

[inch (mm)]

Front view



Vertical type

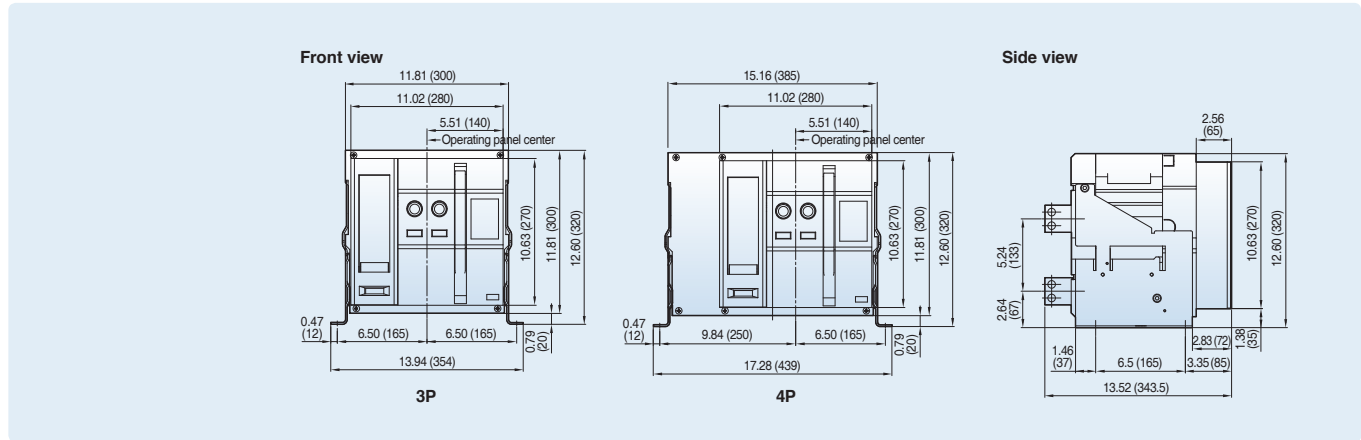


Dimensions [Metering Current Transformer (For Cradle)]

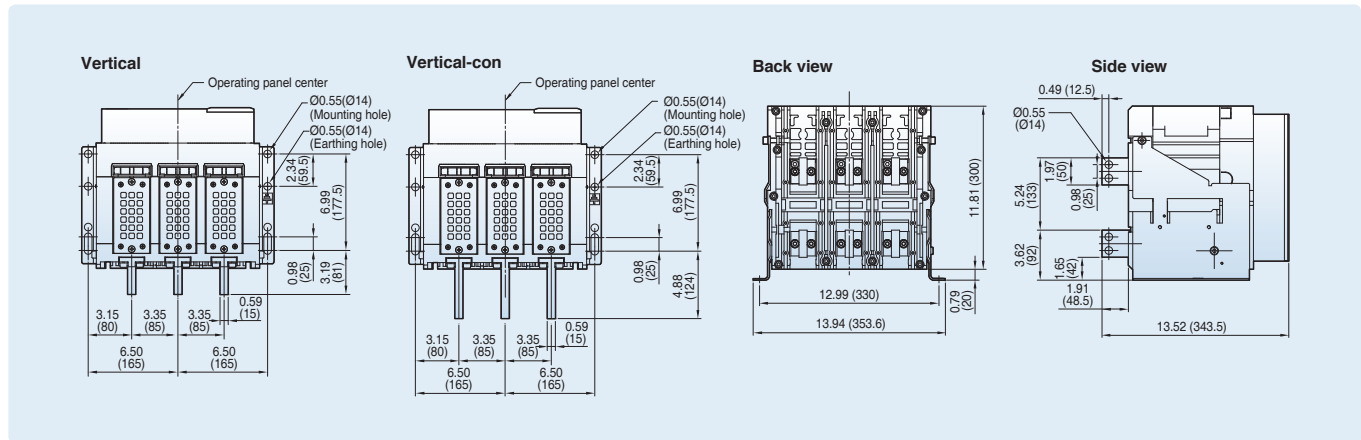
Fixed type 800~1600A (UAS-08/16D)

Front view

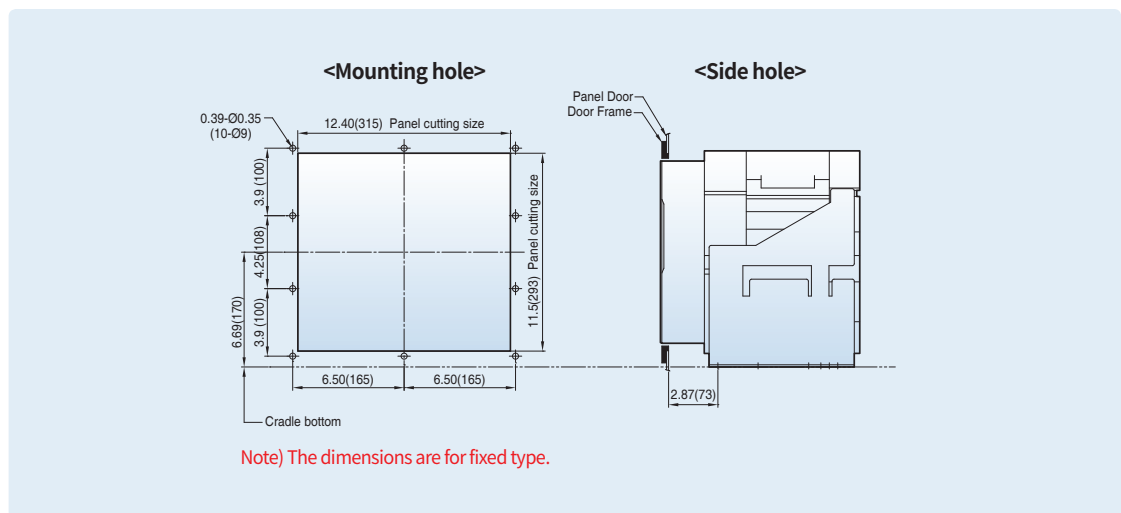
[inch (mm)]



Vertical type_3P

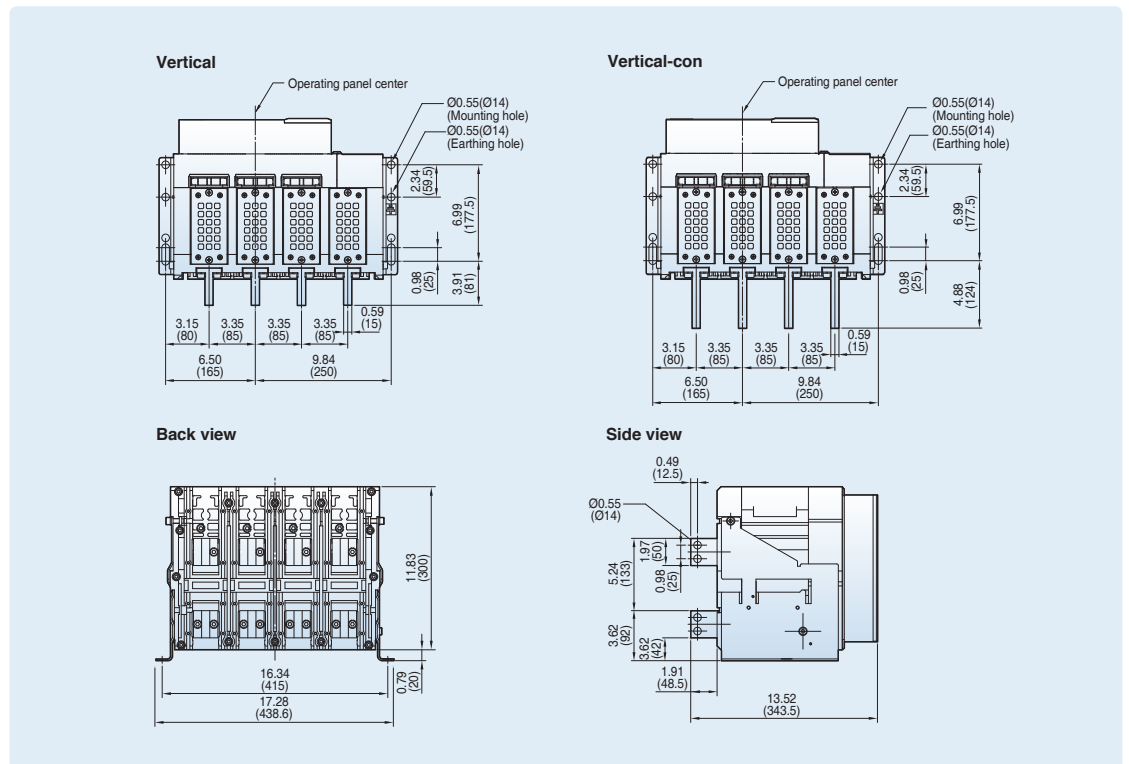


Door Frame: DF (UAS/UAH-D/E)

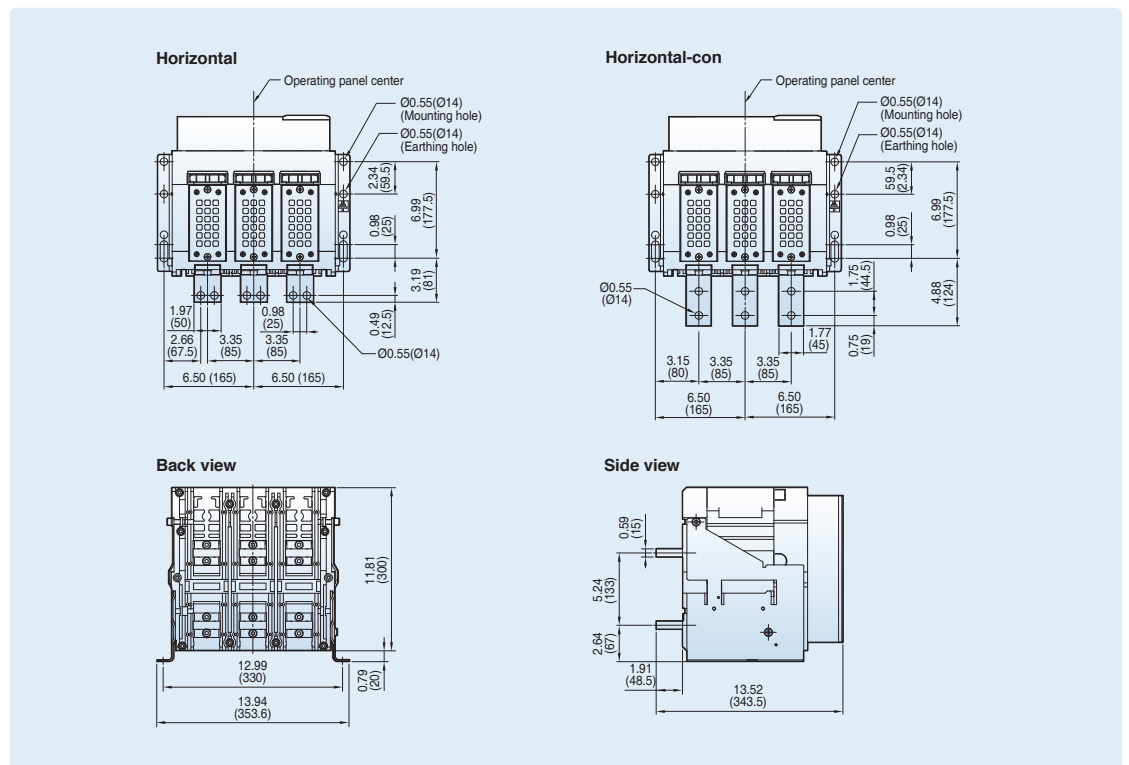


[inch (mm)]

Vertical
type_4P



Horizontal
type_3P

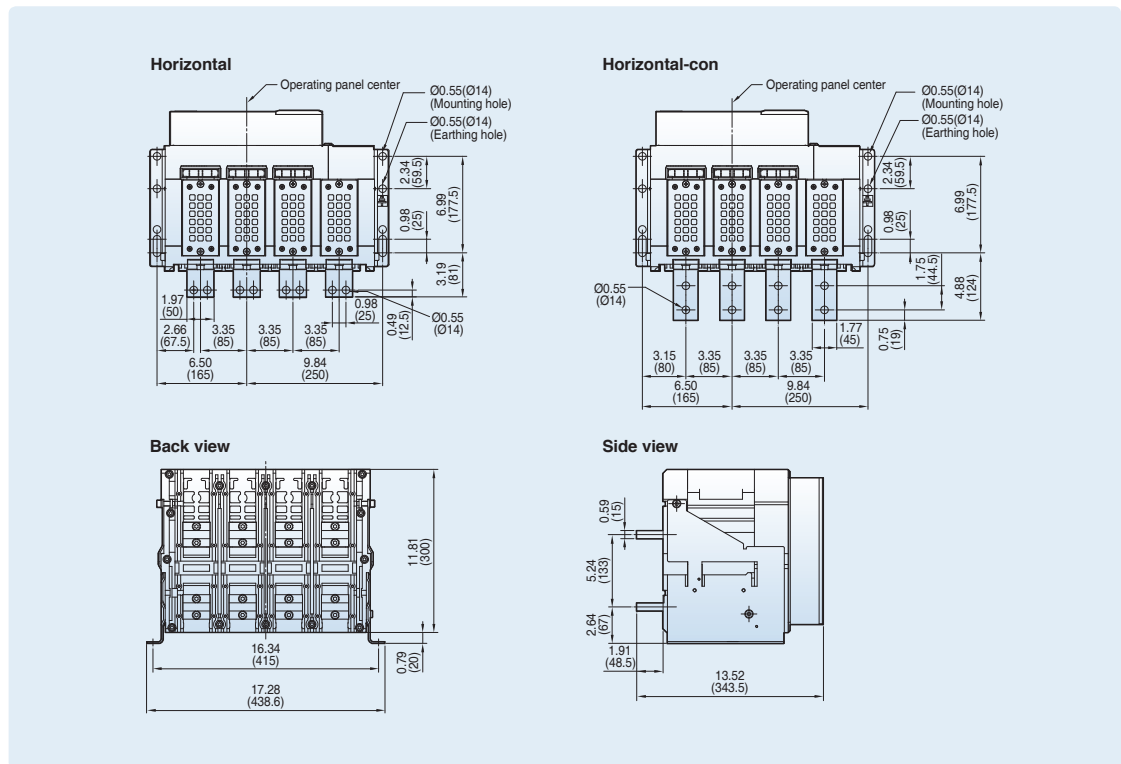


Dimensions [Metering Current Transformer (For Cradle)]

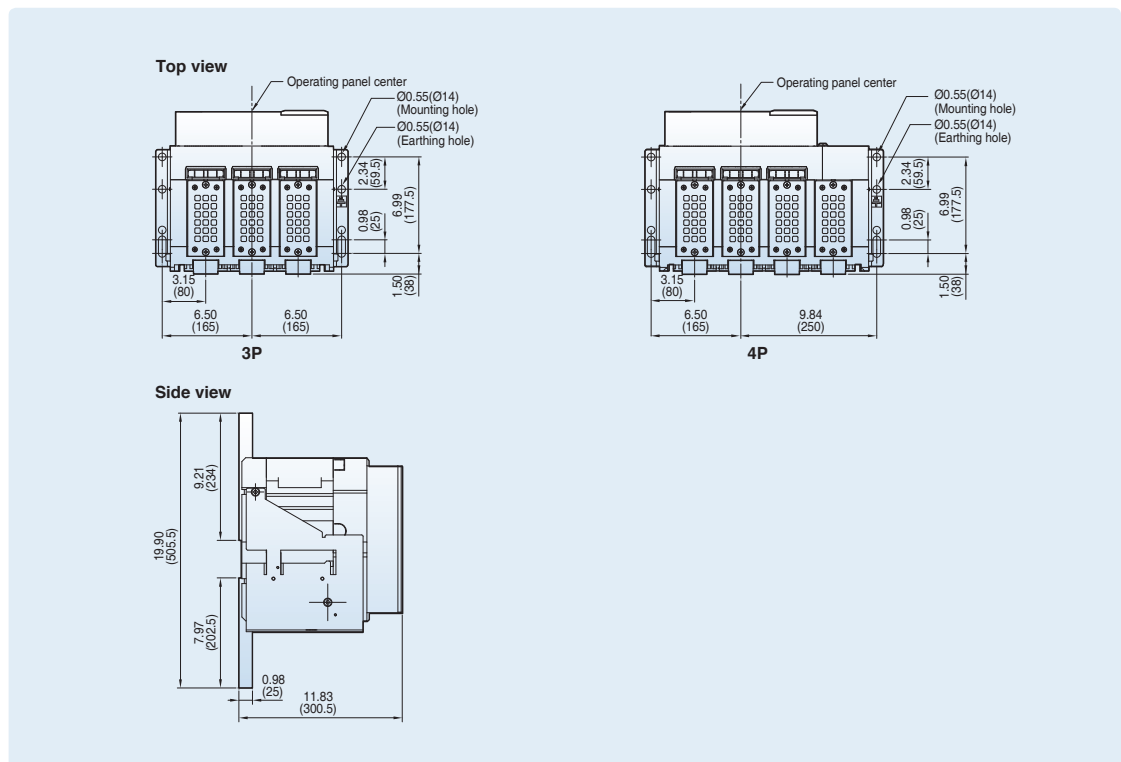
Fixed type 800~1600A (UAS-08/16D)

[inch (mm)]

Horizontal type_4P



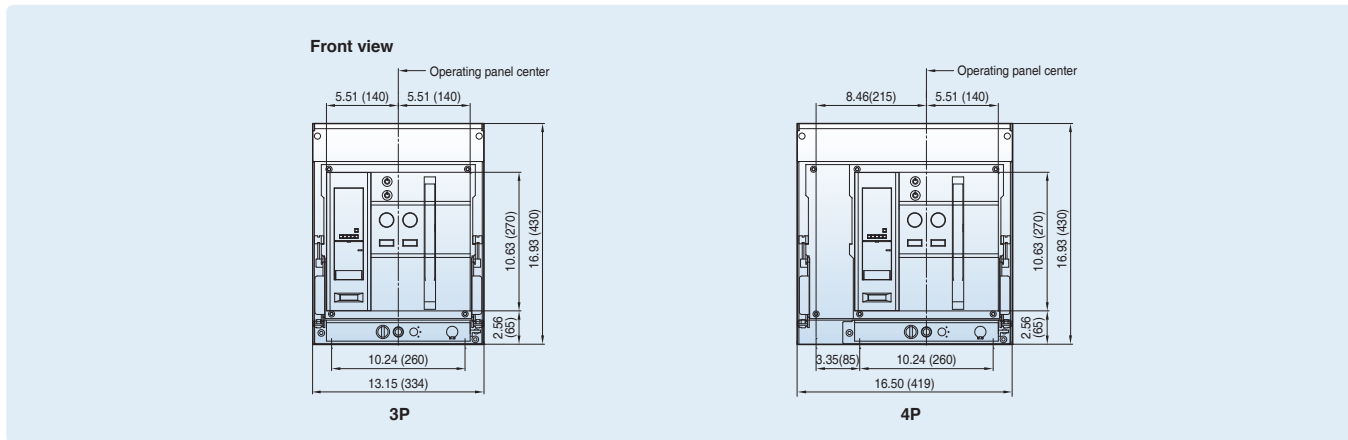
Front connection type



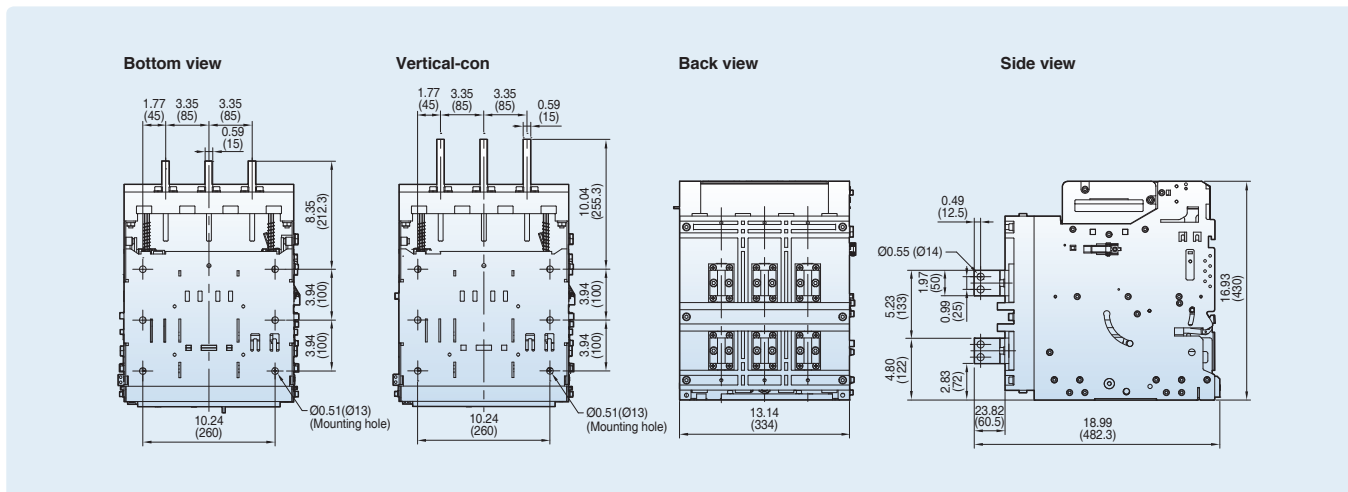
Draw-out type 800~1600A (UAS-08/16D)

Front view

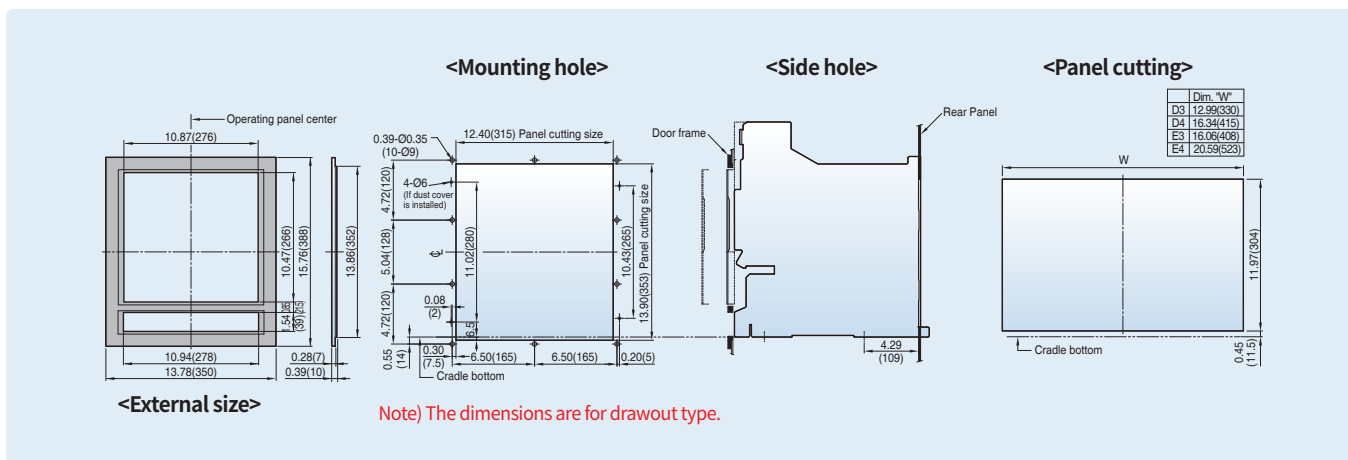
[inch (mm)]



Vertical type_3P



Door Frame: DF (UAS/UAH-D/E)

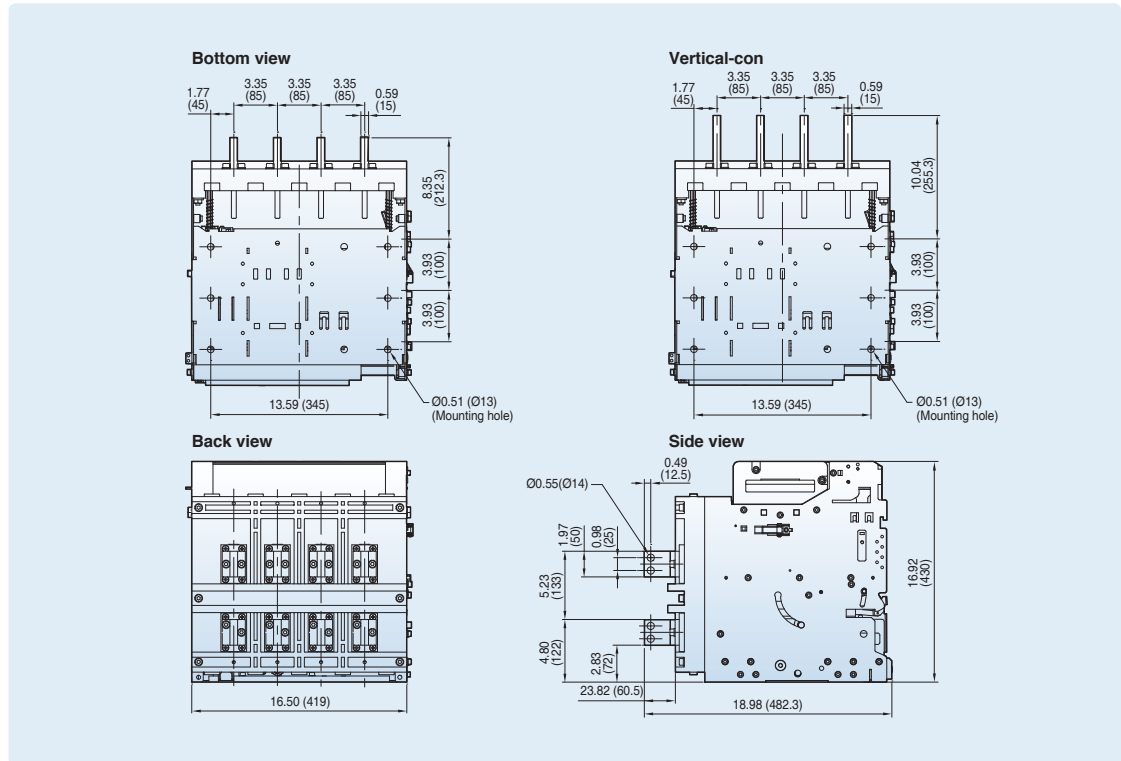


Dimensions [Metering Current Transformer (For Cradle)]

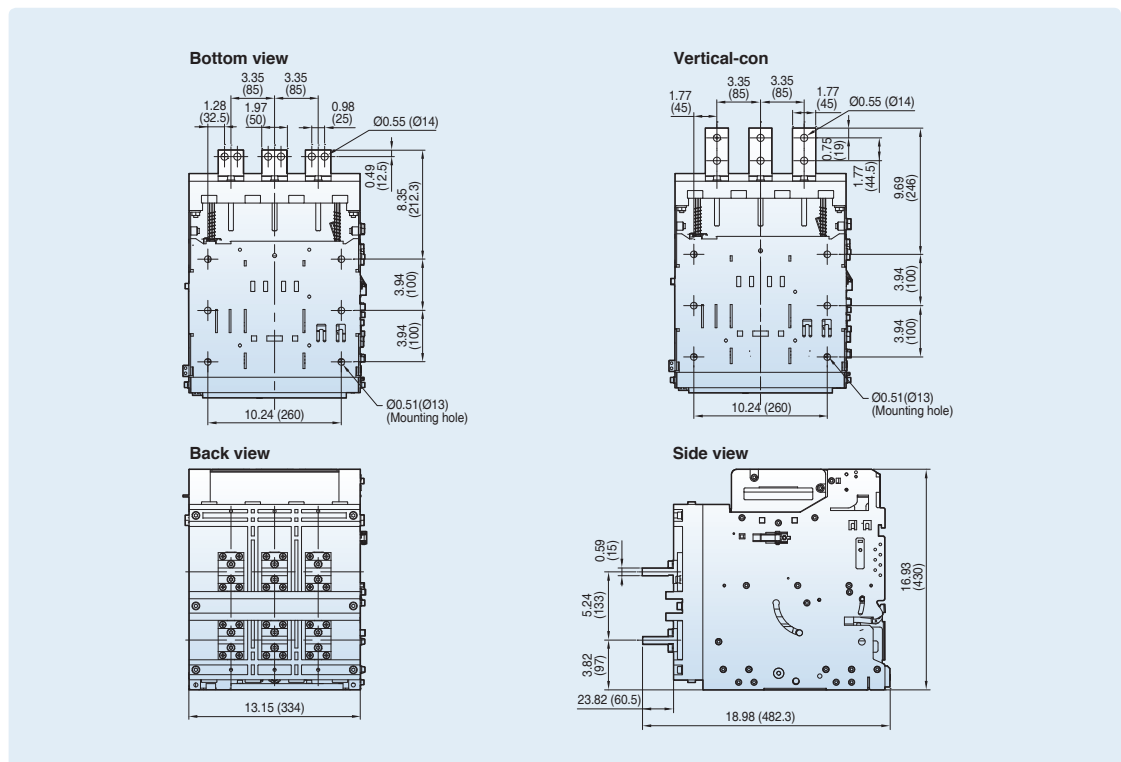
Draw-out type 800~1600A (UAS-08/16D)

[inch (mm)]

Horizontal type_4P

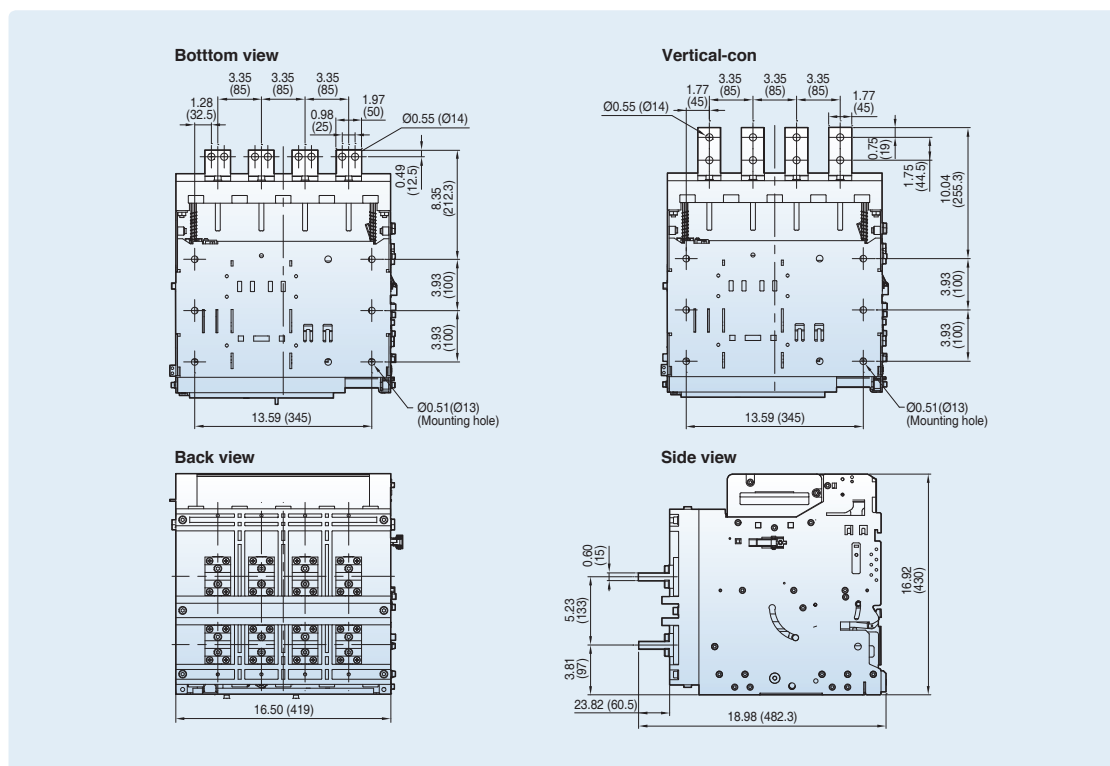


Horizontal type_3P

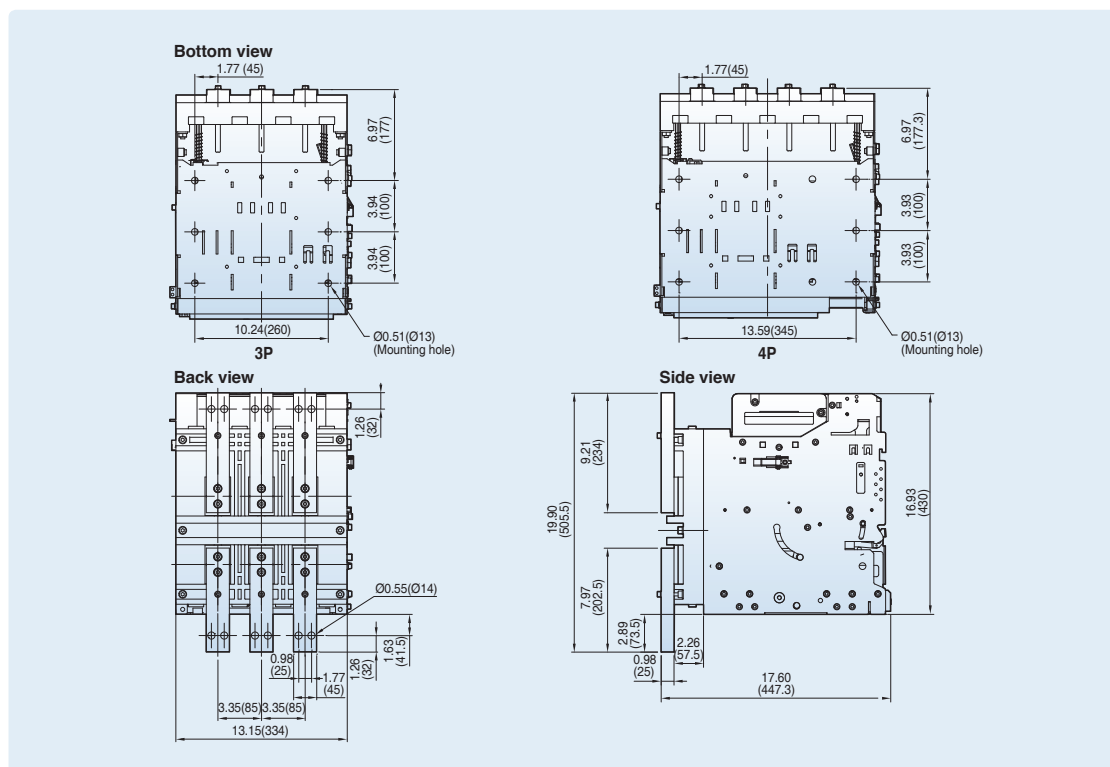


[inch (mm)]

Horizontal type_4P



Horizontal type_3P

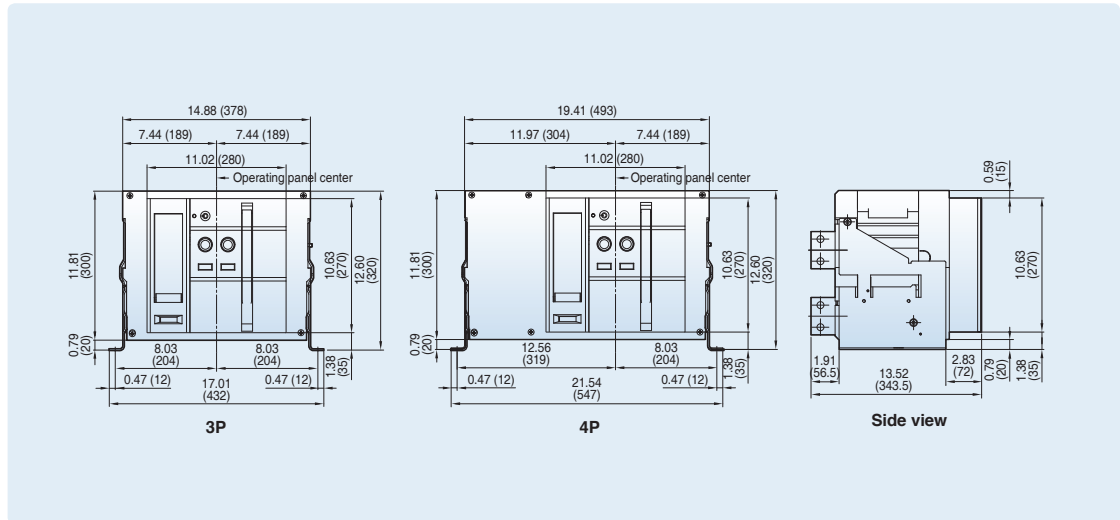


Dimensions [Metering Current Transformer (For Cradle)]

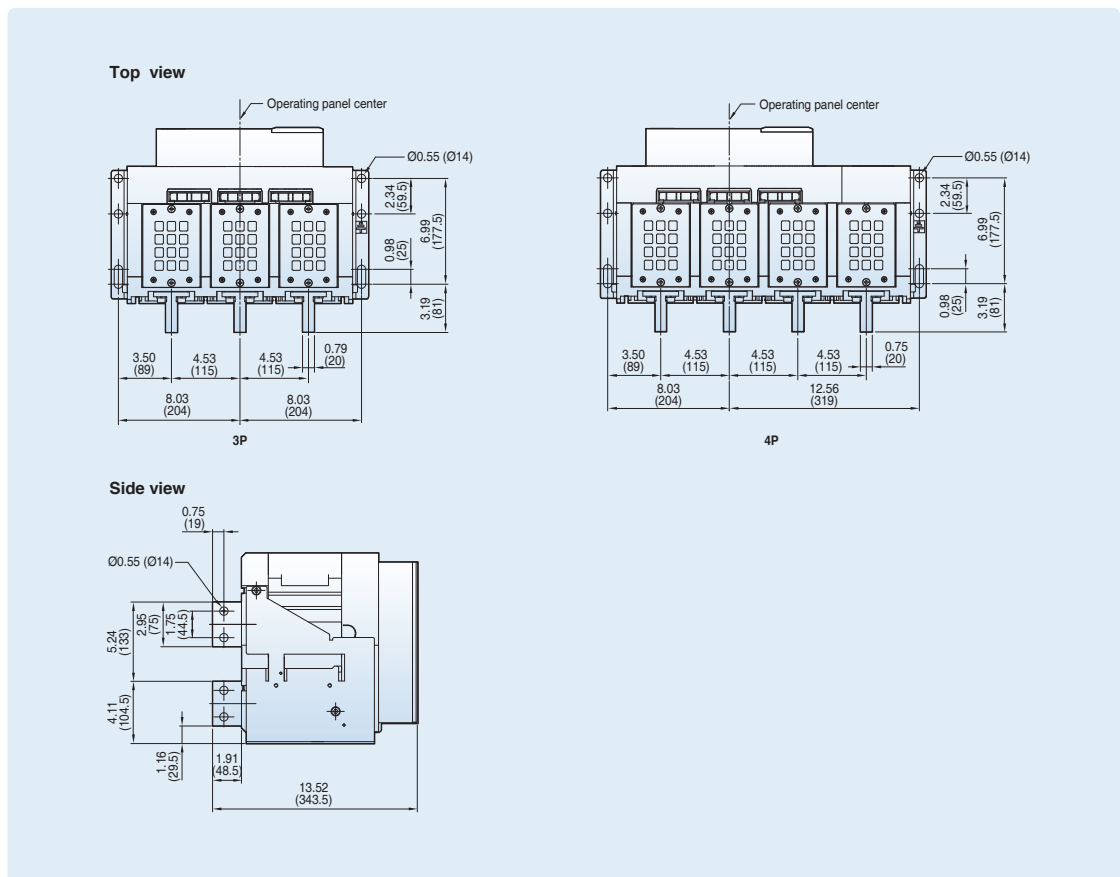
Fixed type 800~2000A (UAH-08~20E/UAW-08~20E)

[inch (mm)]

Front view

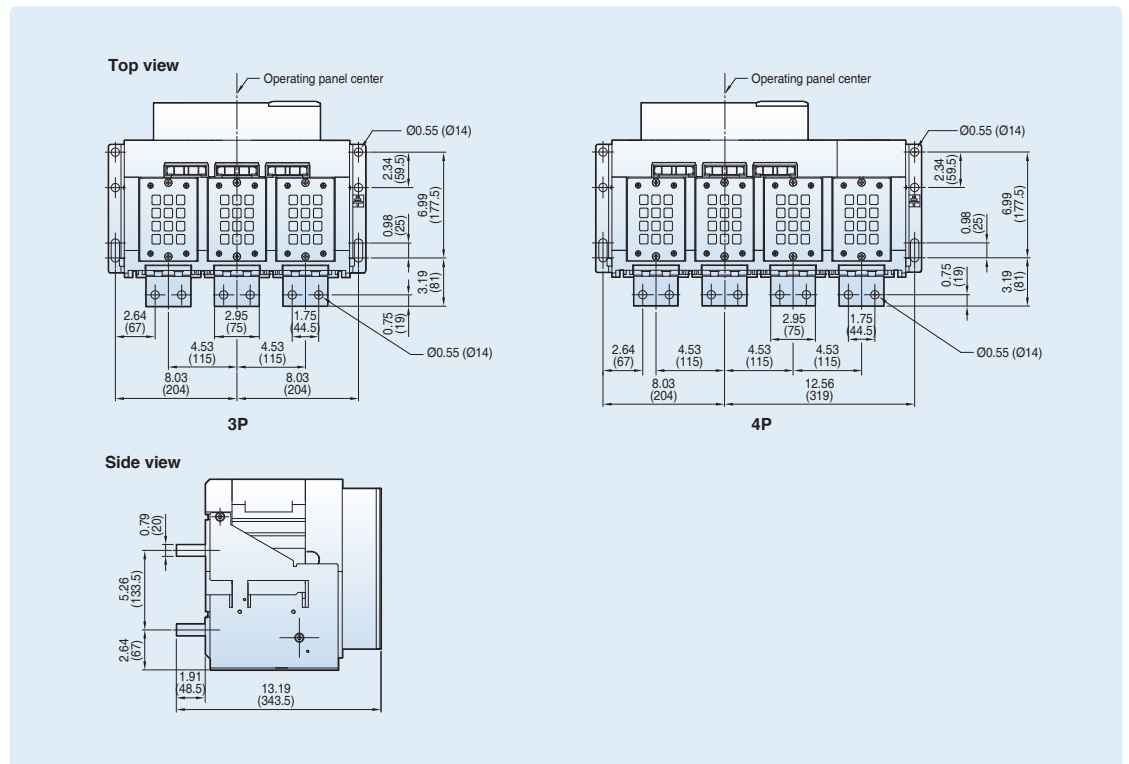


Vertical type

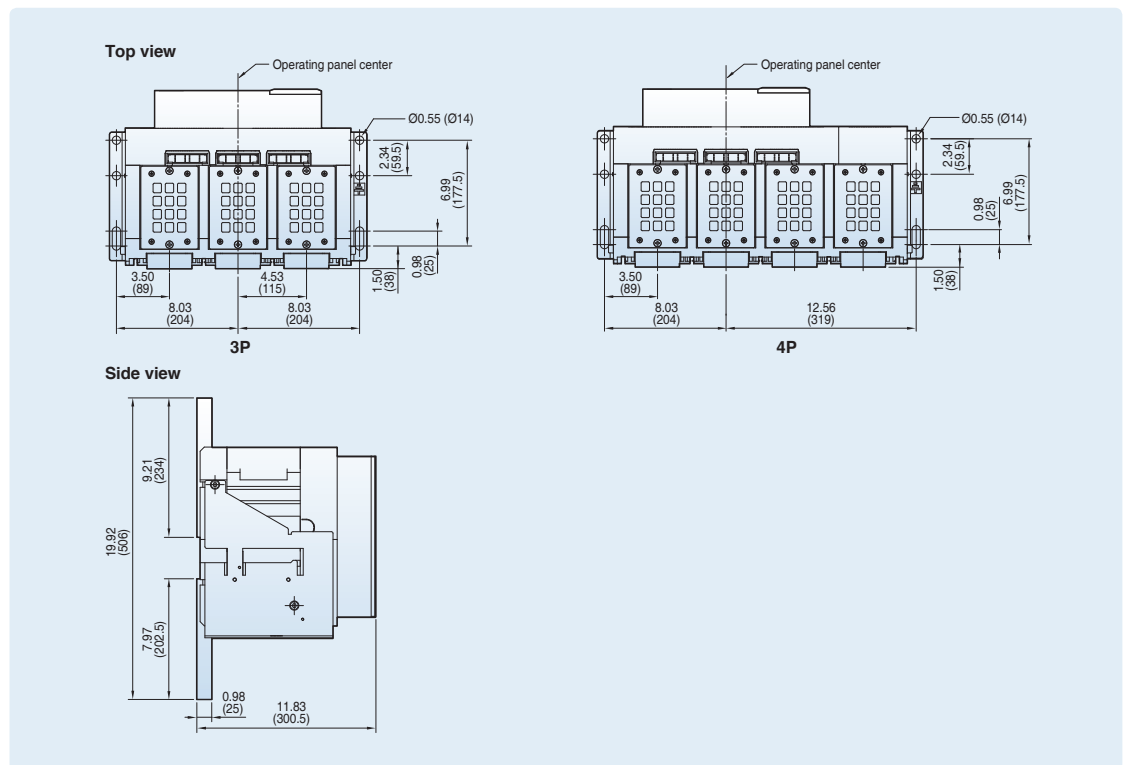


[inch (mm)]

Horizontal type



Front connection type

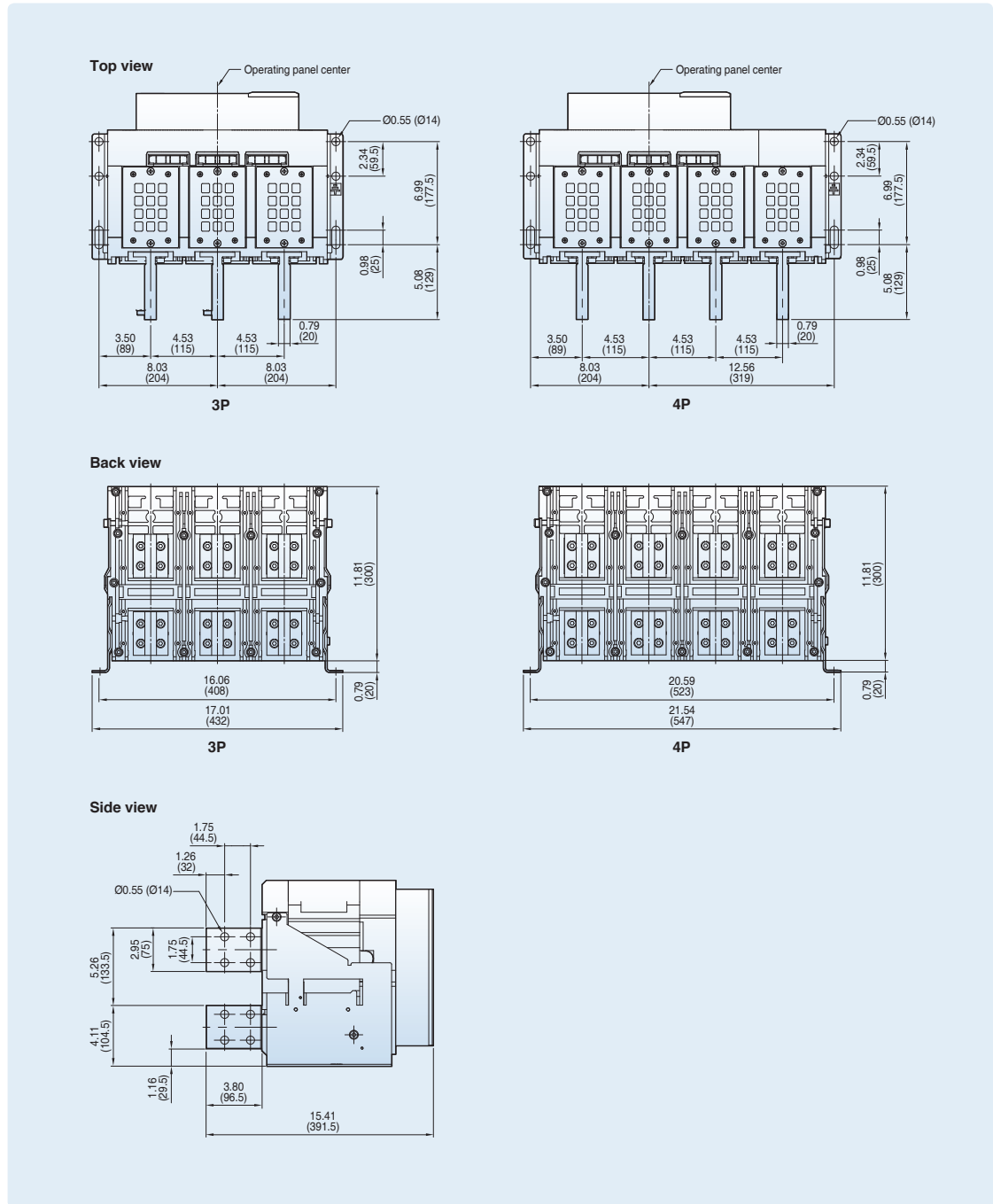


Dimensions [Metering Current Transformer (For Cradle)]

Fixed type 2500A (UAH-25E/UAW-25E)

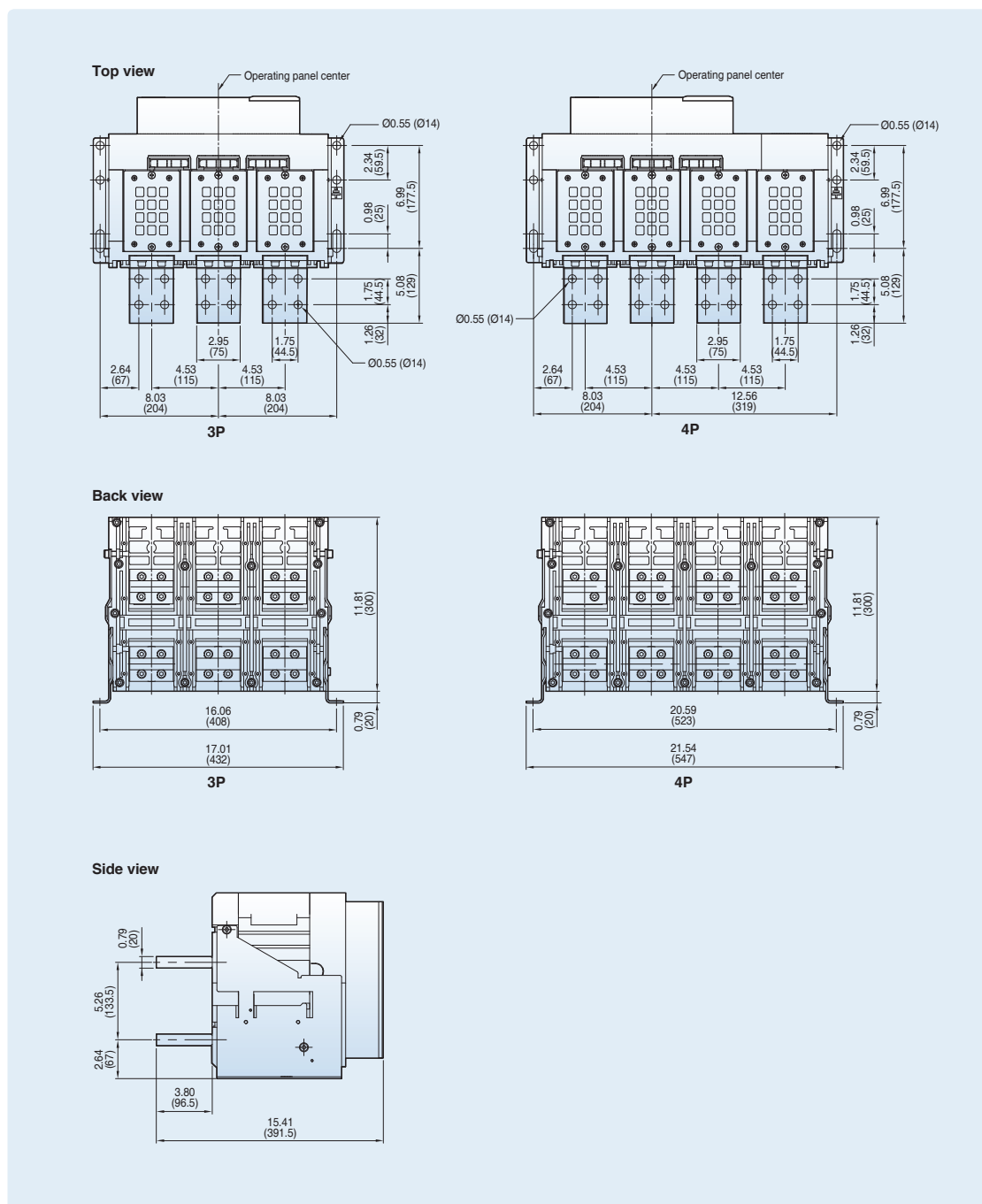
[inch (mm)]

Vertical type



[inch (mm)]

Horizontal type

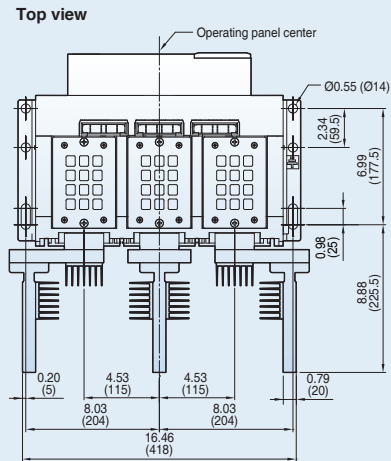


Dimensions [Metering Current Transformer (For Cradle)]

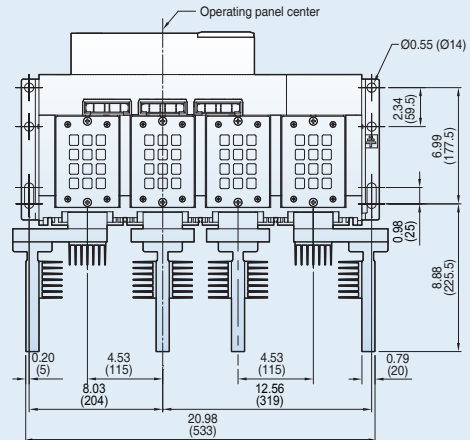
Fixed type 3200A (UAH-32E/UAW-32E)

[inch (mm)]

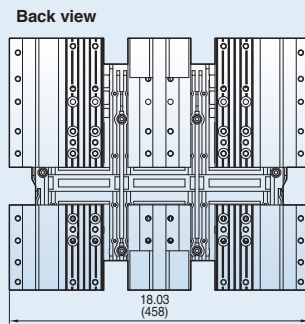
Vertical type



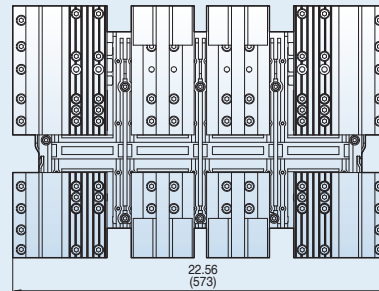
3P



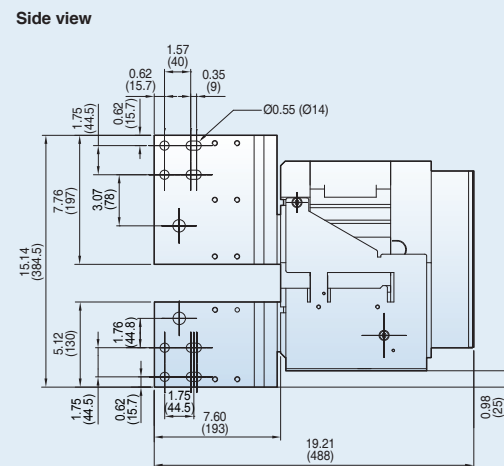
4P



3P



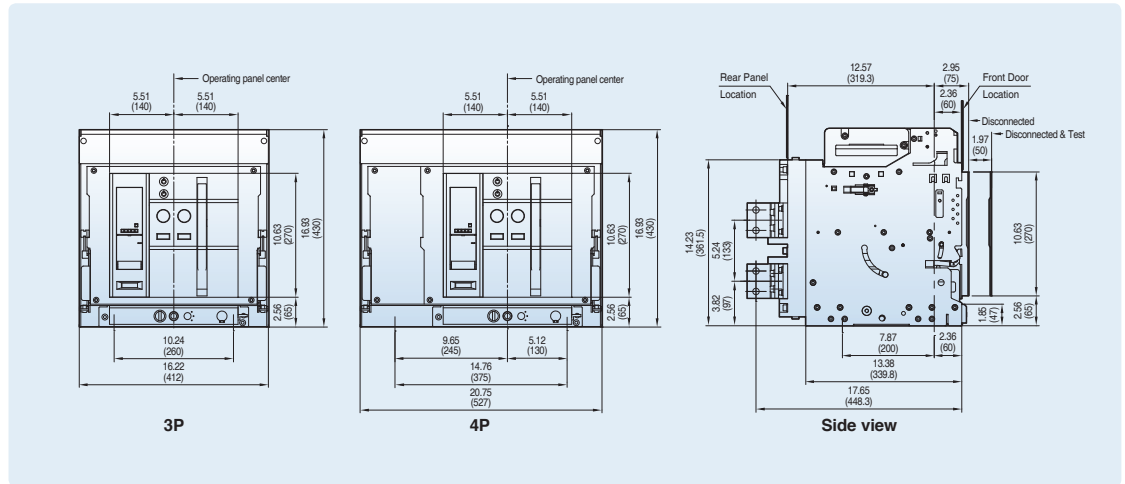
4P



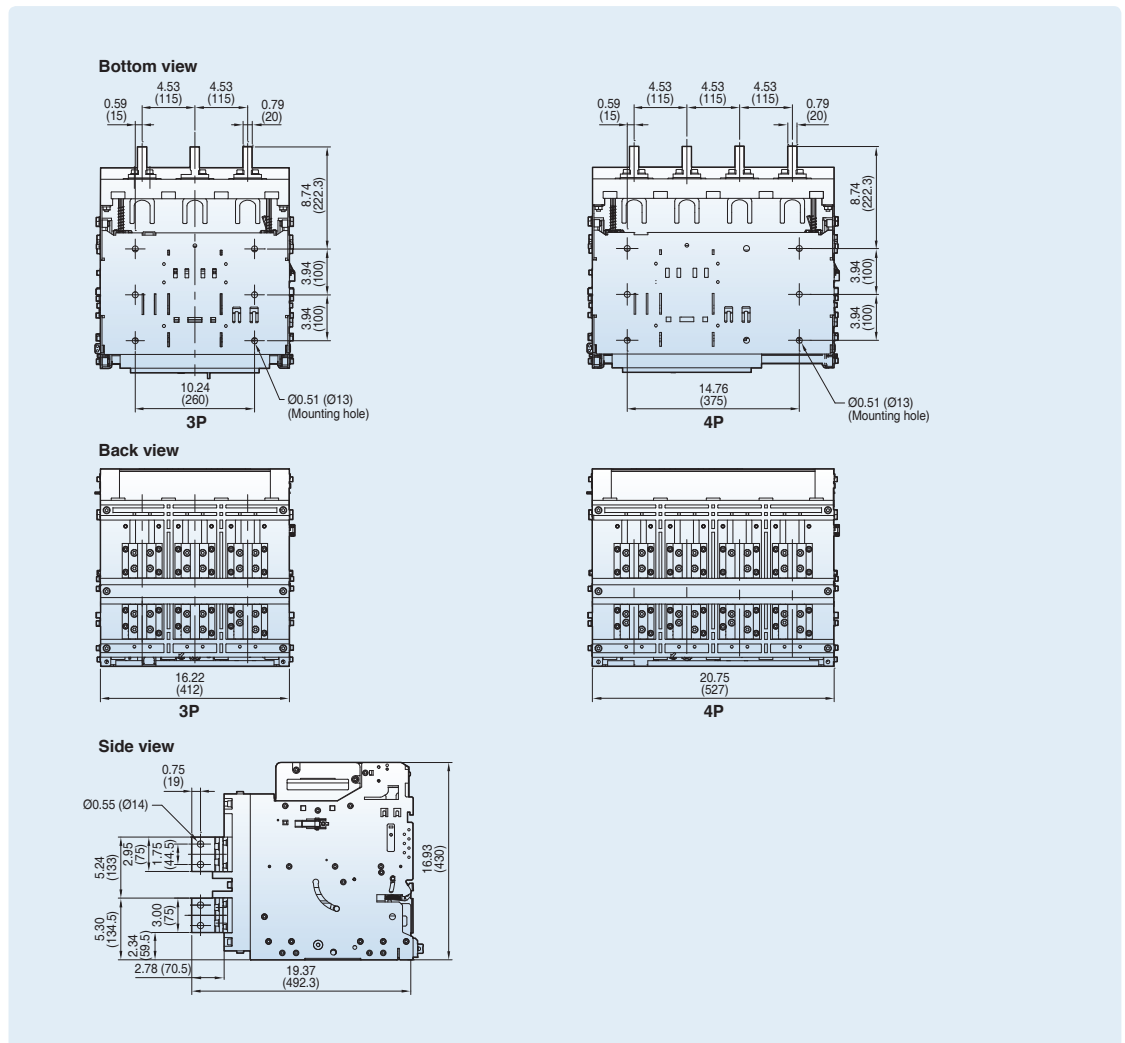
Draw-out type 800~2000A (UAH-08~20E/UAW-08~20E)

[inch (mm)]

Front view



Vertical type



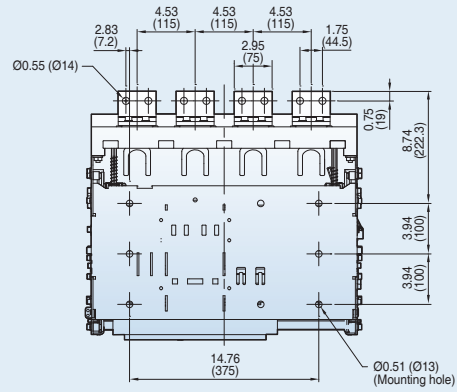
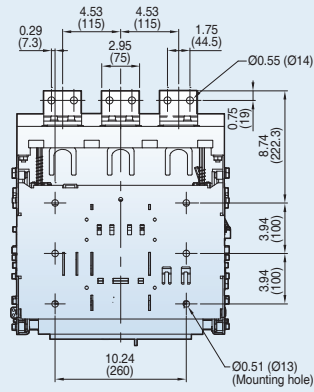
Dimensions [Metering Current Transformer (For Cradle)]

Draw-out type 800~2000A (UAH-08~20E/UAW-08~20E)

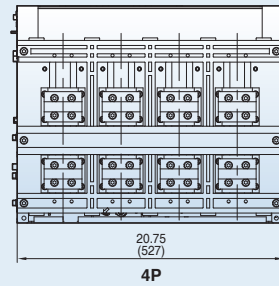
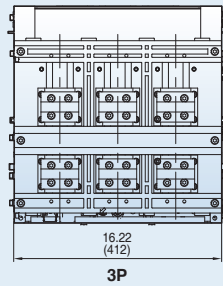
[inch (mm)]

Horizontal type

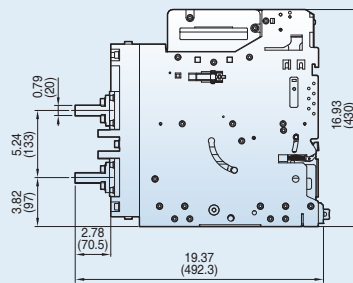
Bottom view



Back view



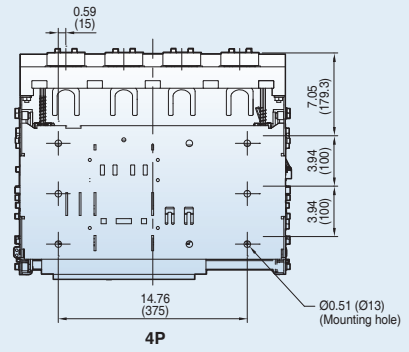
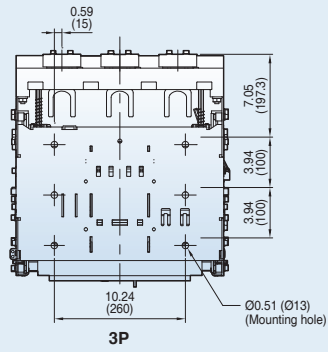
Side view



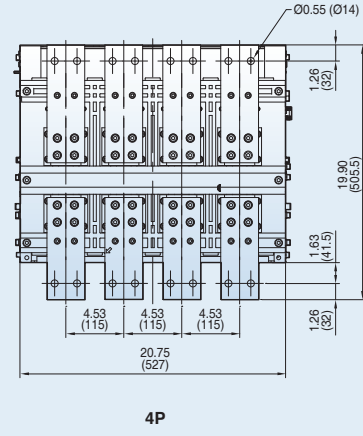
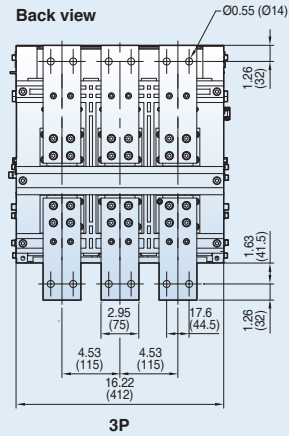
[inch (mm)]

Front connection type

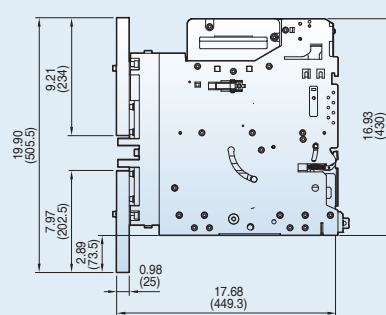
Bottom view



Back view



Side view



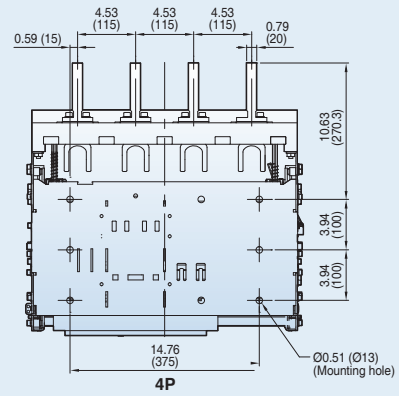
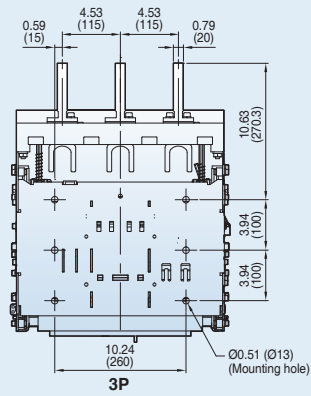
Dimensions [Metering Current Transformer (For Cradle)]

Draw-out type 2500A (UAH-25E/UAW-25E)

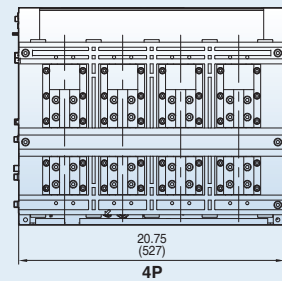
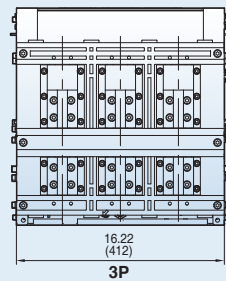
[inch (mm)]

Vertical type

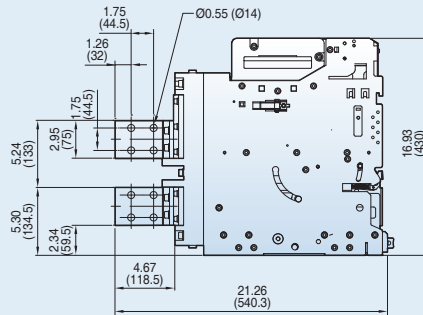
Bottom view



Back view



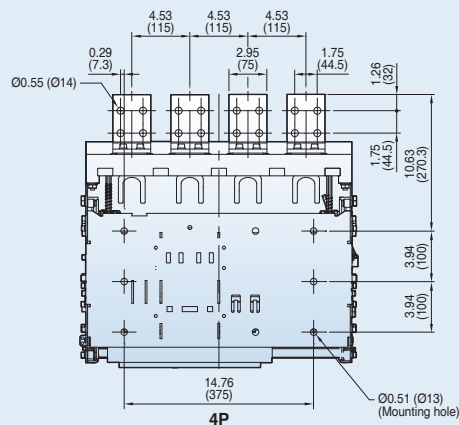
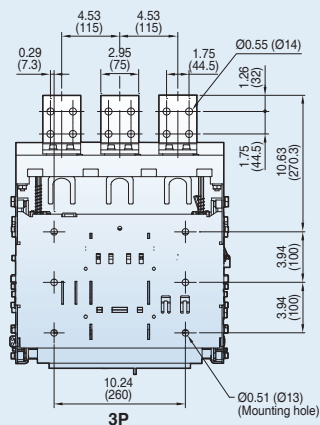
Side view



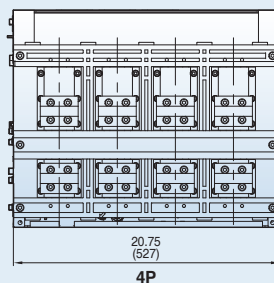
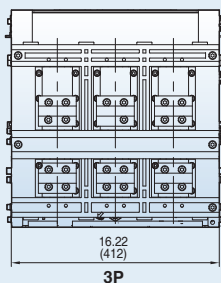
[inch (mm)]

Horizontal type

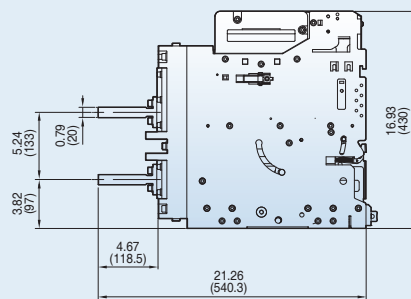
Bottom view



Back view



Side view



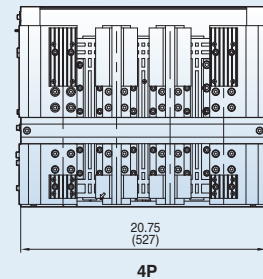
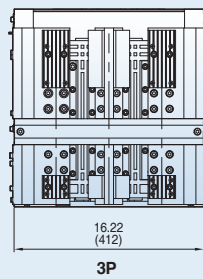
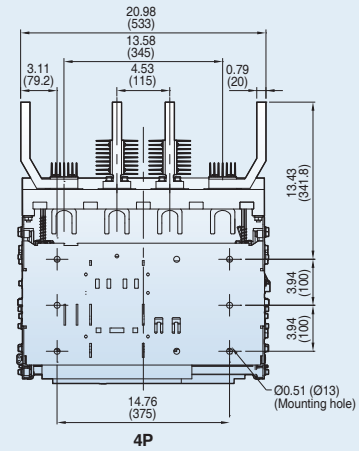
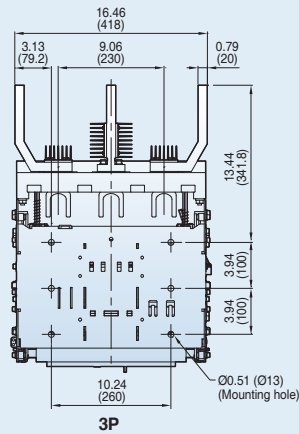
Dimensions [Metering Current Transformer (For Cradle)]

Draw-out type 3200A (UAH-32E/UAW-32E)

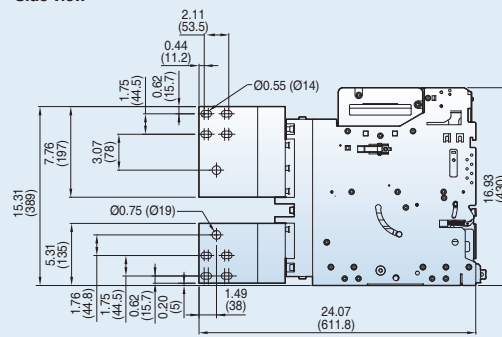
[inch (mm)]

Vertical type

Bottom view



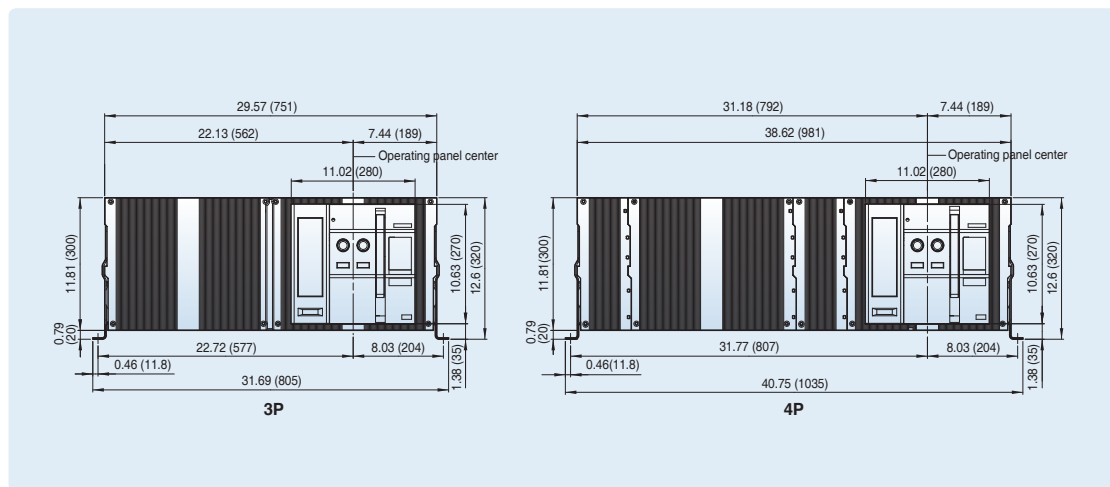
Side view



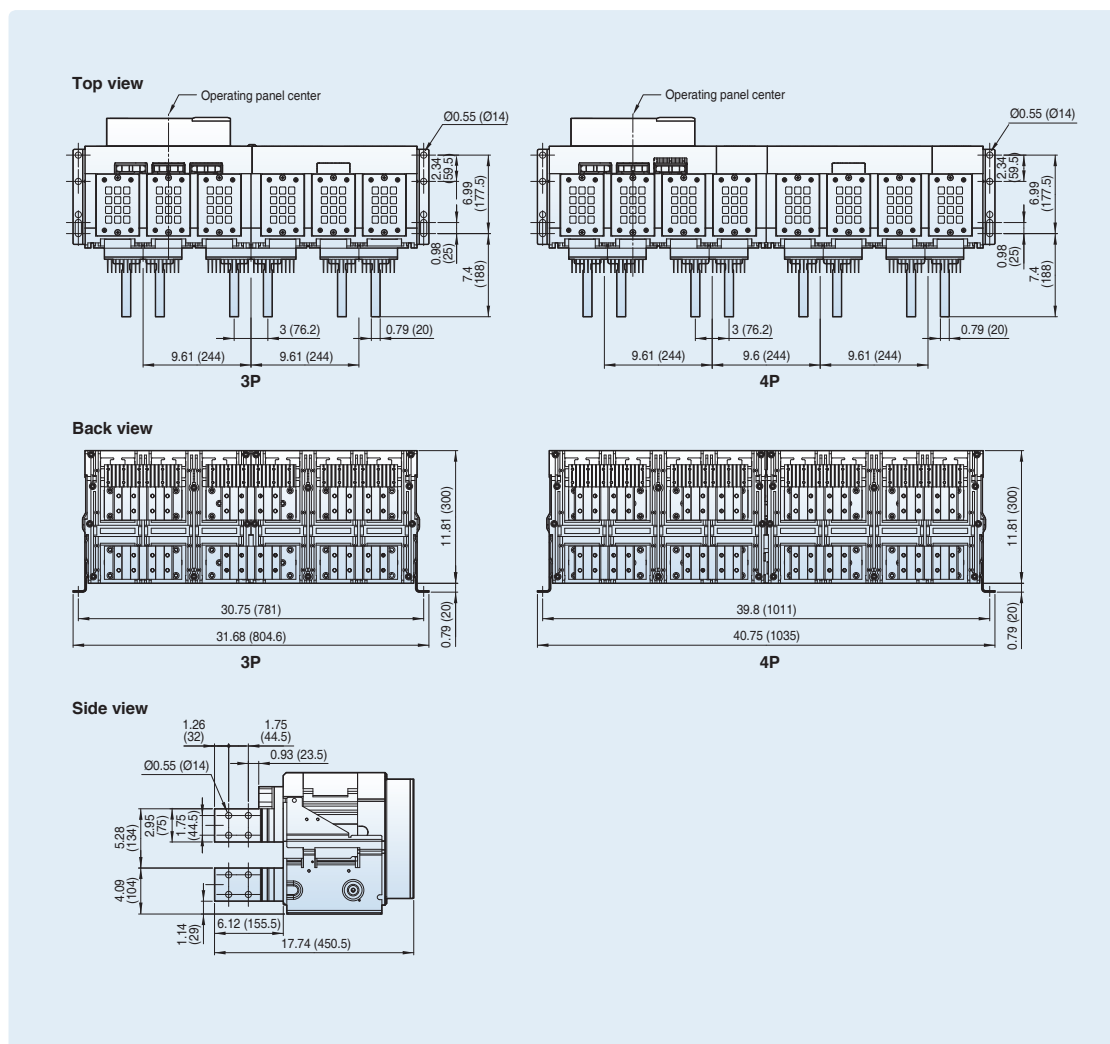
Fixed type 3200~5000A (UAH-32~50G)

[inch (mm)]

Front view



Vertical type

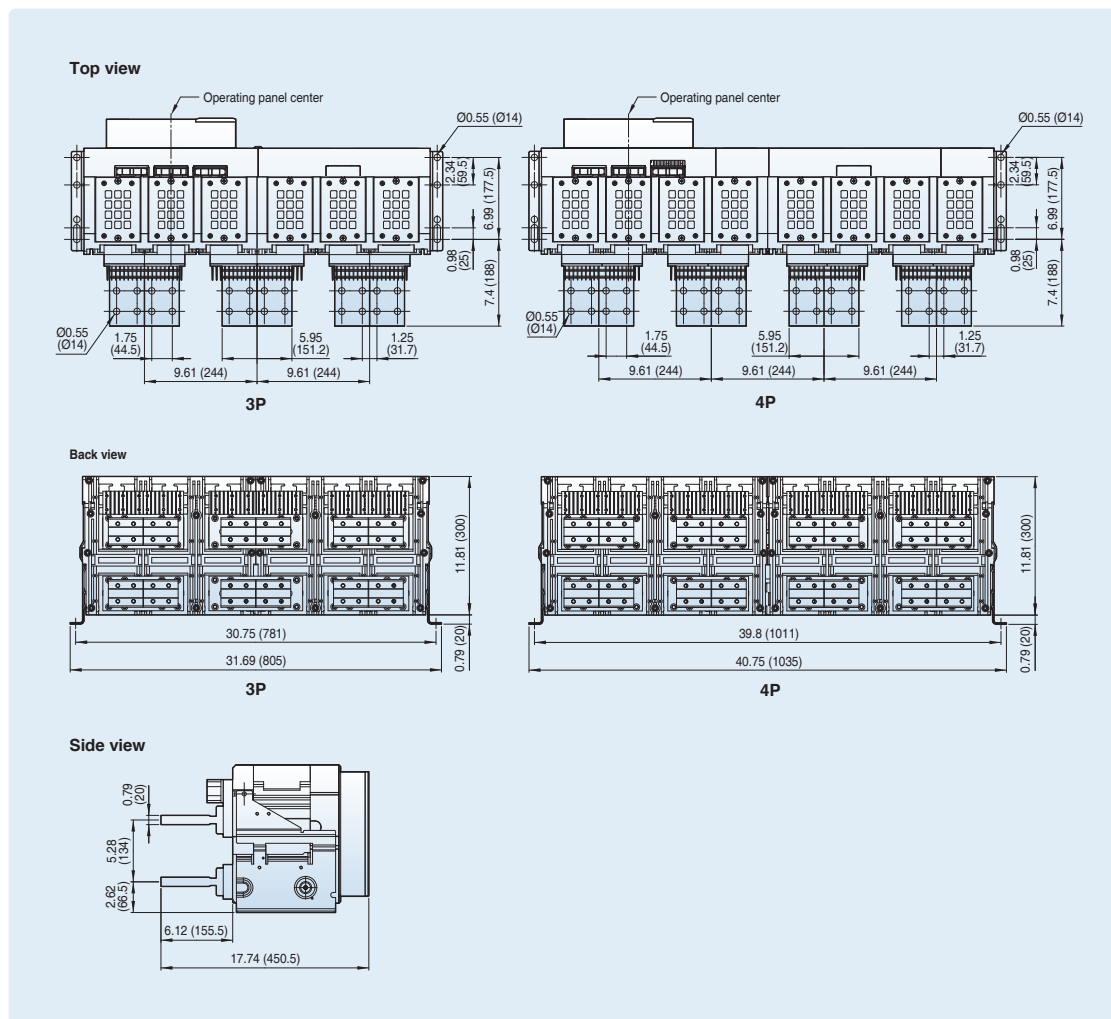


Dimensions [Metering Current Transformer (For Cradle)]

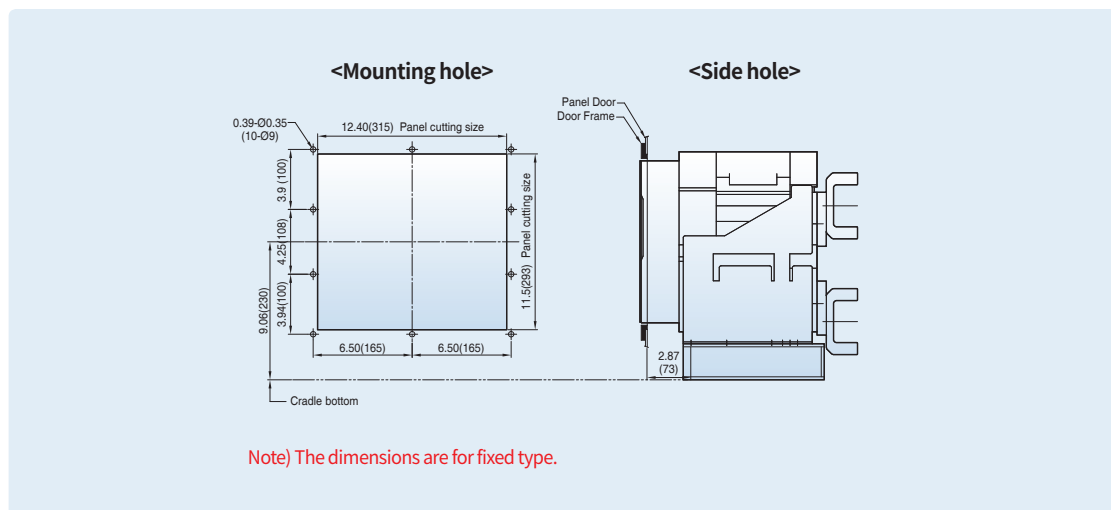
Fixed type 3200~5000A (UAH-32~50G)

[inch (mm)]

Horizontal type



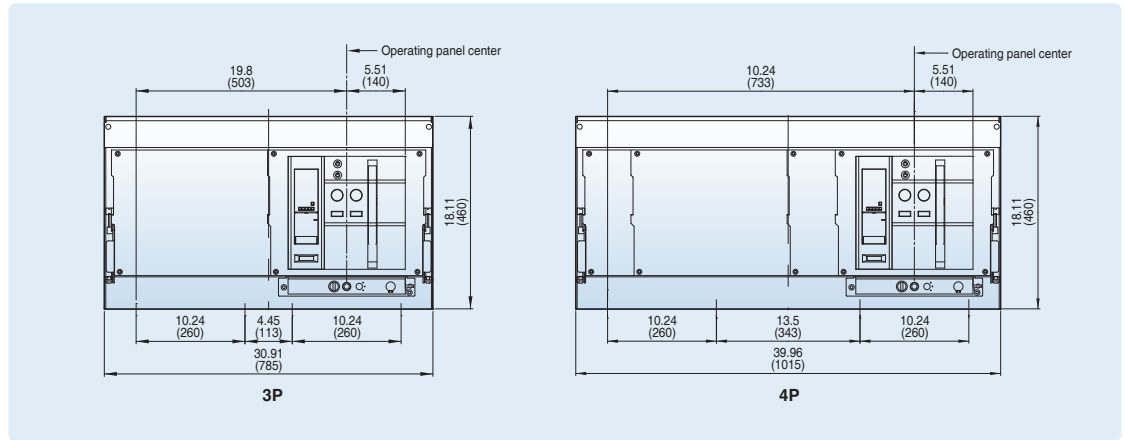
Door Frame: DF (UAH-G)



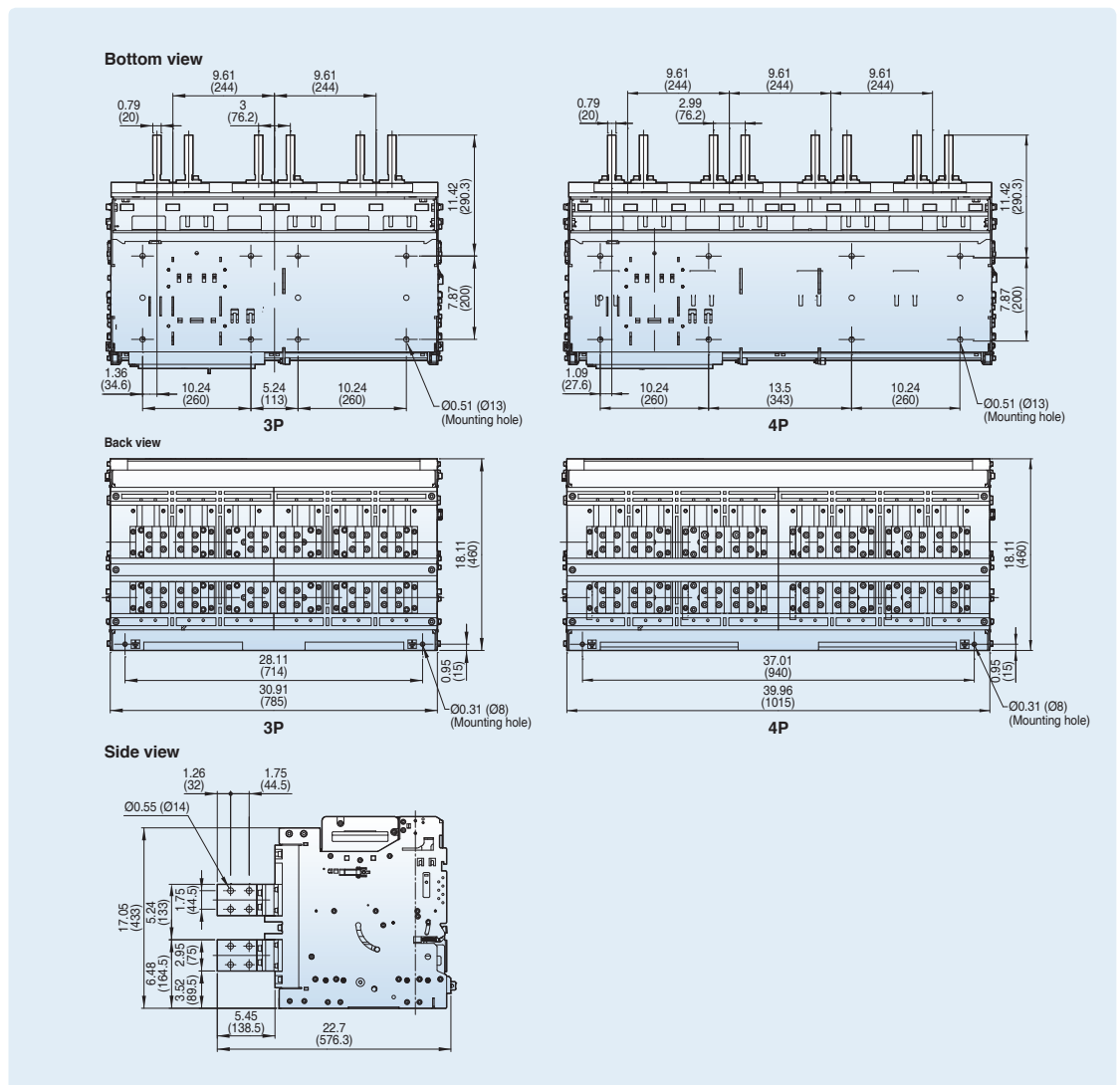
Draw-out type 3200~5000A (UAH-32~50G)

[inch (mm)]

Front view



Vertical type

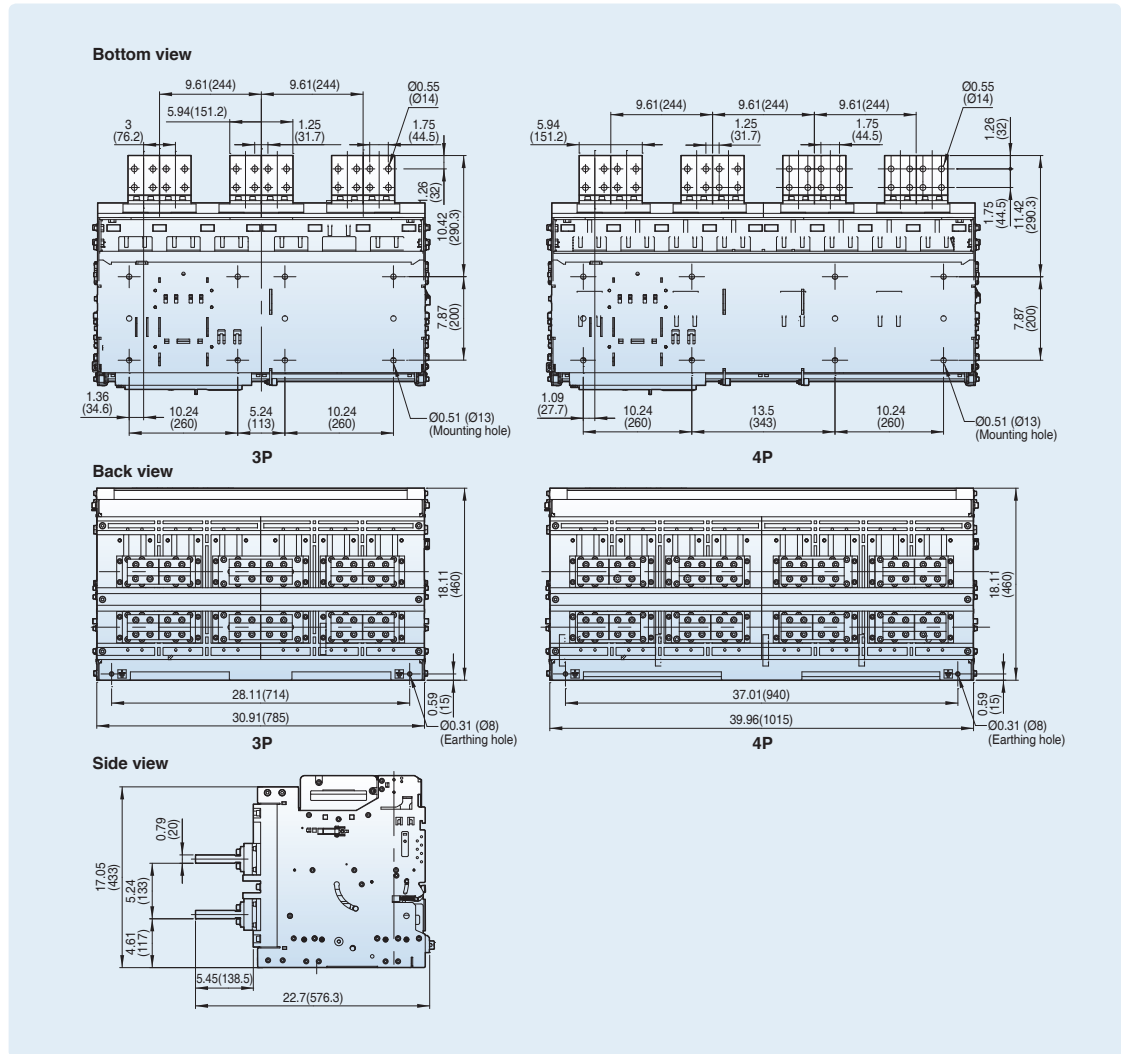


Dimensions [Metering Current Transformer (For Cradle)]

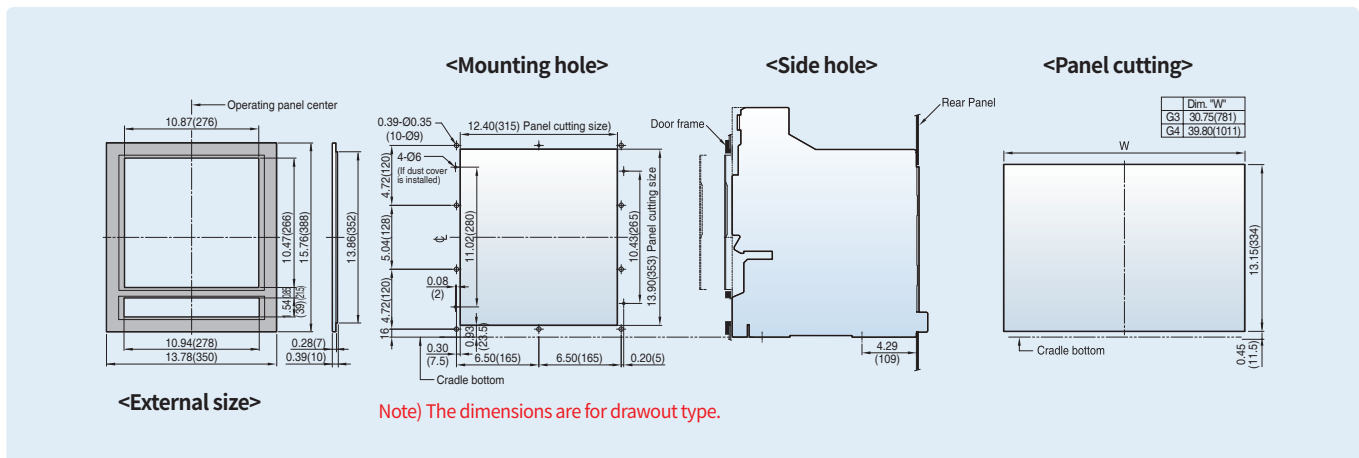
Draw-out type 3200~5000A (UAH-32~50G)

[inch (mm)]

Horizontal type



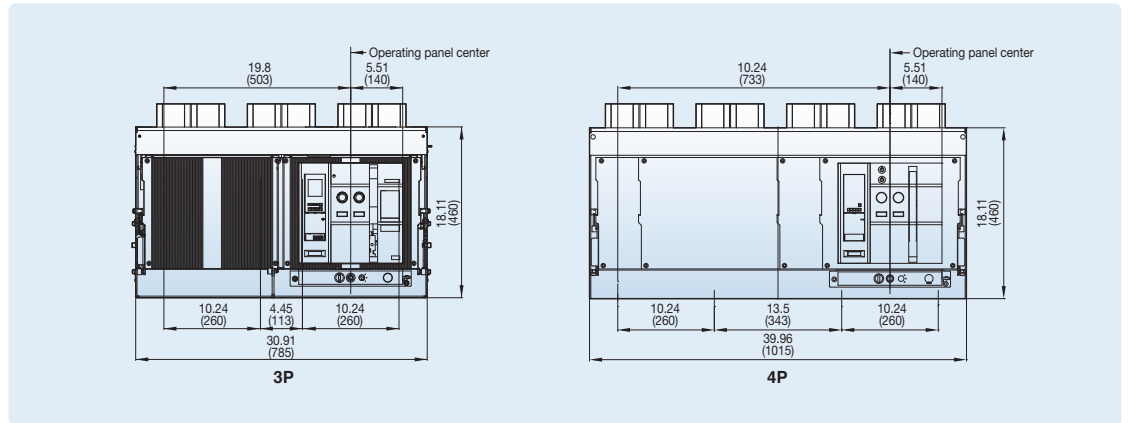
Door Frame: DF (UAS/UAH-D/E)



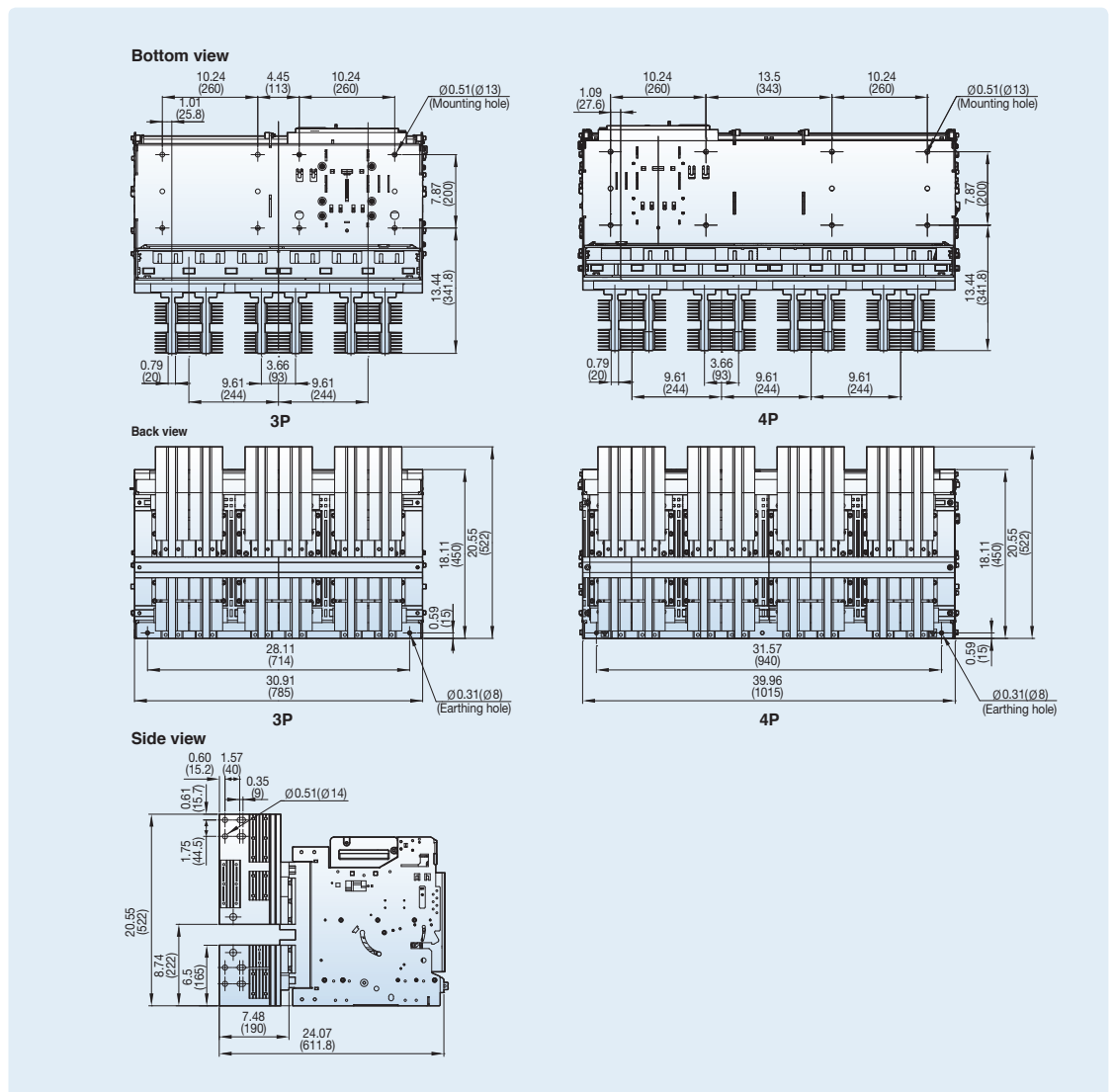
Draw-out type 3200~6000A (UAH-32~60G)

[inch (mm)]

Front view



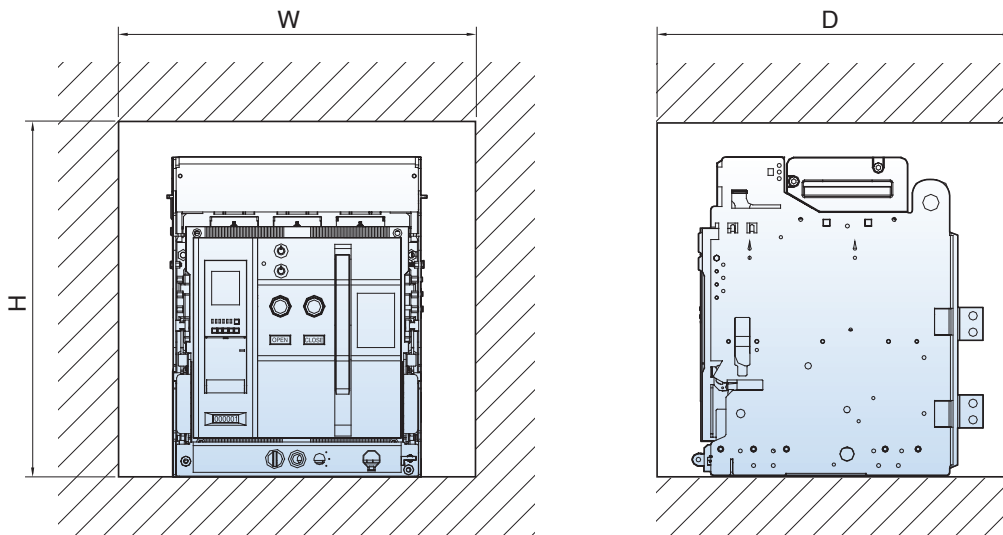
Vertical type



Technical information

Insulation voltage

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

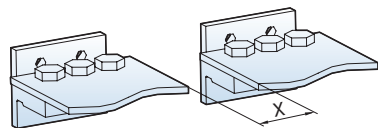


Enclosure Dimension		UAS-□□D			UAH-□□E			UAH-□□G		
		H	W	D	H	W	D	H	W	D
3P	In	19.69	15.75	13.39	19.69	19.69	13.39	31.5	32.48	13.39
	mm	500	400	340	500	500	340	800	825	340
4P	In	19.69	19.69	13.39	19.69	24.21	13.39	31.5	41.54	13.39
	mm	500	500	340	500	615	340	800	1055	340

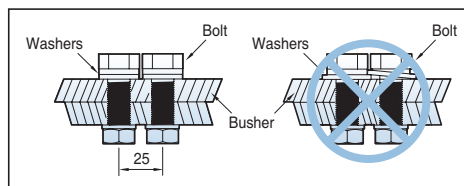
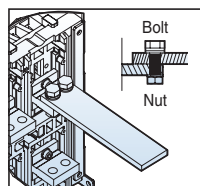
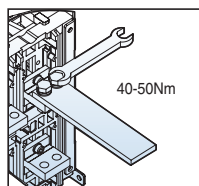
Note) 1. Enclosure dimension also in page 23-24.
2. Enclosure dimension is followed by UL/ANSI Standard.

Minimum isolation distance

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





Insulating voltage	Minimum isolation distance
600V	8 mm
1000V	14 mm



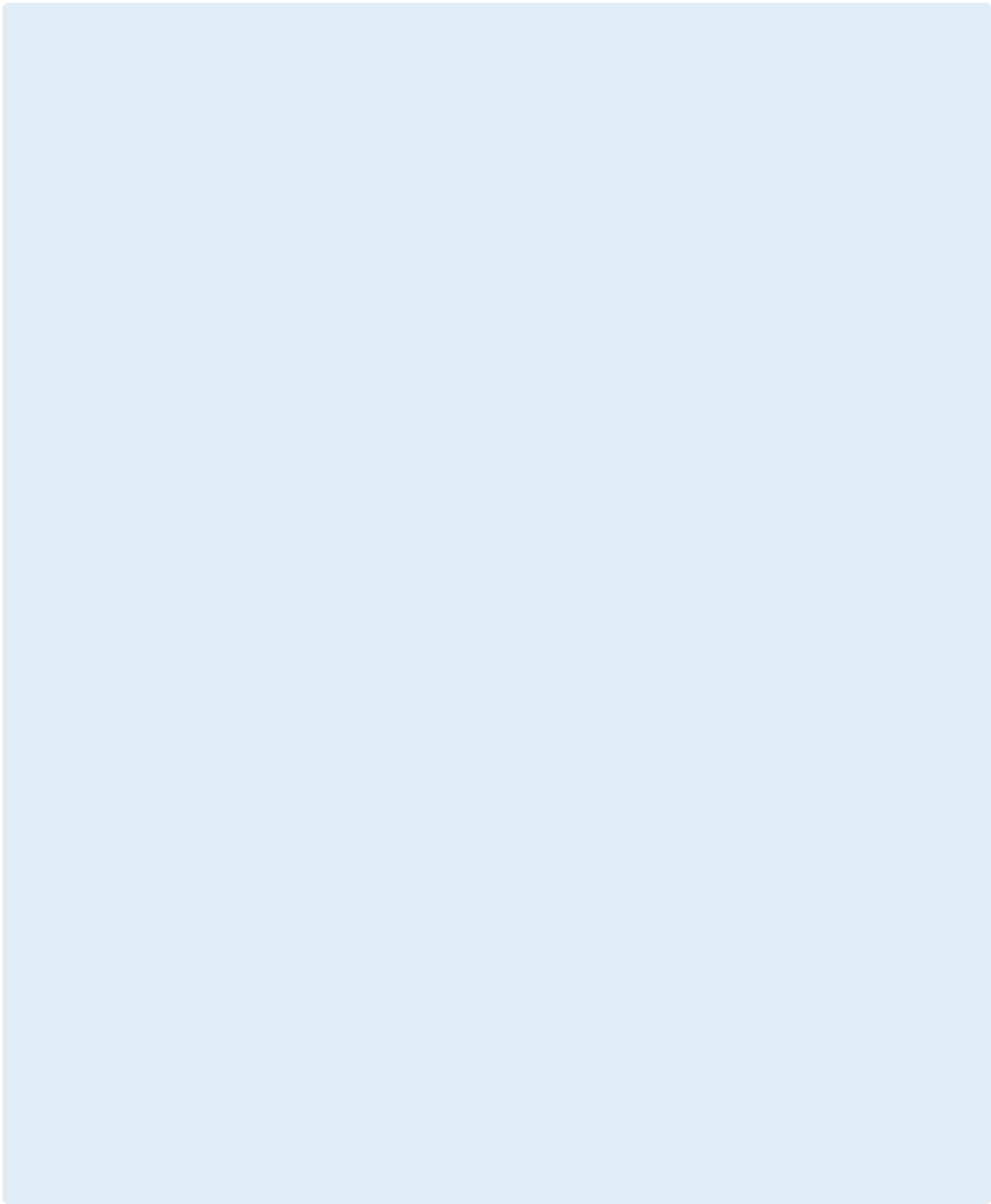
Screw type	Tightening torque			
	Standard(kgf-cm)	Tolerance	Standard(N.m)	Tolerance
M8	135	±16	13.3	±1.6
M10	270	±32	26.5	±3.2
M12	480	±57	46.6	±5.6

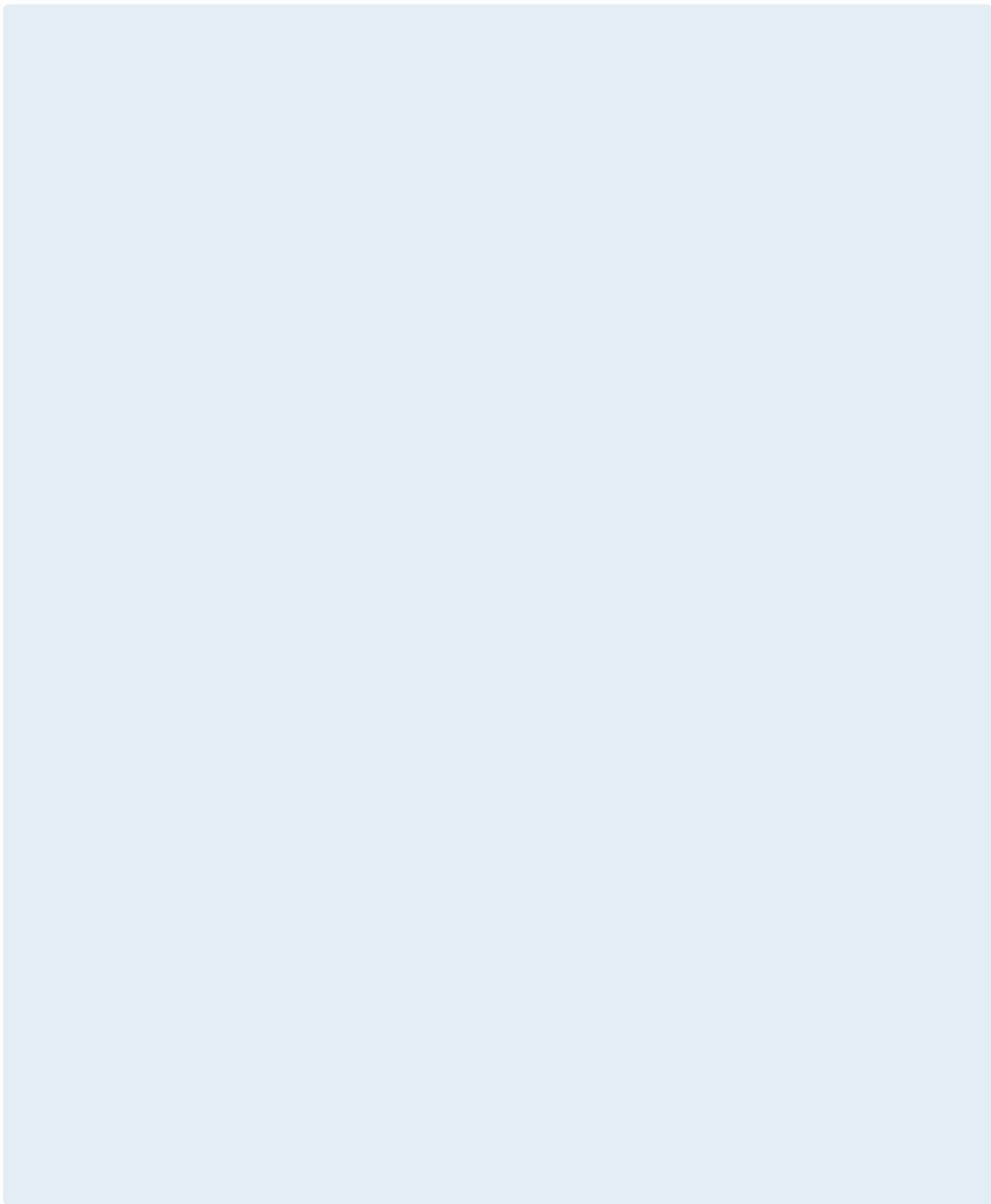
Temperature derating

Product model	Rated current	Applicable busbar size (mm)																
			Horizontal type								Vertical type							
			40°C	45°C	50°C	55°C	60°C	65°C	70°C	40°C	45°C	50°C	55°C	60°C	65°C	70°C		
UAS-08D	800A	6.4T×76.2×1ea (Inch: 1/4×3×1ea)	-	-	-	-	-	-	-	800A	800A	800A	800A	800A	800A	800A		
		5T×100×1ea	-	-	-	-	-	-	-									
		6T×80×1ea	-	-	-	-	-	-	-									
		5T×50×2ea	800A	800A	800A	800A	800A	800A	800A									
UAS-16D	1600A	6.4T×76.2×2ea (Inch: 1/4×3×2ea)	-	-	-	-	-	-	-	1600A	1600A	1600A	1544A	1464A	1381A	1291A		
		10T×100×1ea	-	-	-	-	-	-	-									
		6T×80×2ea	-	-	-	-	-	-	-									
		10T×50×2ea	1600A	1600A	1600A	1600A	1600A	1600A	1600A									
UAH-20E	800A	6.4T×76.2×1ea (Inch: 1/4×3×1ea)	800A	800A	800A	800A	800A	800A	800A	800A	800A	800A	800A	800A	800A	800A		
		5T×100×1ea																
		6T×80×1ea																
	1600A	6.4T×76.2×2ea (Inch: 1/4×3×2ea)	1600A	1600A	1600A	1600A	1600A	1600A	1600A	1600A	1600A	1600A	1600A	1600A	1600A	1600A		
		10T×100×1ea																
		6T×80×2ea																
	2000A	6.4T×101.6×2ea (Inch: 1/4×4×2ea)	-	-	-	-	-	-	-									
		5T×125×2ea	-	-	-	-	-	-	-	2000A	2000A	2000A	1930A	1831A	1726A	1614A		
		10T×100×2ea	2000A	2000A	1923A	1833A	1739A	1640A	1534A									
UAH-25E	2500A	6.4T×127×2ea (Inch: 1/4×5×2ea)	-	-	-	-	-	-	-									
		8T×100×2ea								2500A	2500A	2484A	2368A	2247A	2118A	1981A		
		5T×100×3ea	2500A	2464A	2359A	2250A	2134A	2012A	1882A									
		10T×80×2ea																
UAH-32E	3200A	6.4T×127×3ea (Inch: 1/4×5×3ea)	-	-	-	-	-	-	-									
		10T×125×2ea	-	-	-	-	-	-	-	3200A	3200A	3091A	2947A	2796A	2636A	2466A		
		8T×100×3ea	3,200A	3,067A	2,936A	2,800A	2,656A	2,504A	2,342A									
UAH-40G	4000A	6.4T×127×4ea (Inch: 1/4×5×4ea)	4000A	4000A	3915A	3733A	3541A	3339A	3123A	4000A	4000A	4000A	3929A	3728A	3514A	3287A		
		10T×150×2ea																
		10T×125×3ea																
UAH-50G	5000A	6.4T×152×5ea (Inch: 1/4×6×5ea)	5000A	4929A	4719A	4499A	4268A	4024A	3764A	5000A	5000A	4967A	4736A	4493A	4236A	3962A		
		6.4T×203×4ea (Inch: 1/4×8×4ea)																
		10T×125×4ea																
UAH-60G	6000A	6.4T×152×6ea (Inch: 1/4×6×6ea)	-	-	-	-	-	-	-	6000A	6000A	5795A	5525A	5242A	4942A	4623A		
		6.4T×203×5ea (Inch: 1/4×8×5ea)																
		10T×100×6ea																
		10T×150×4ea																

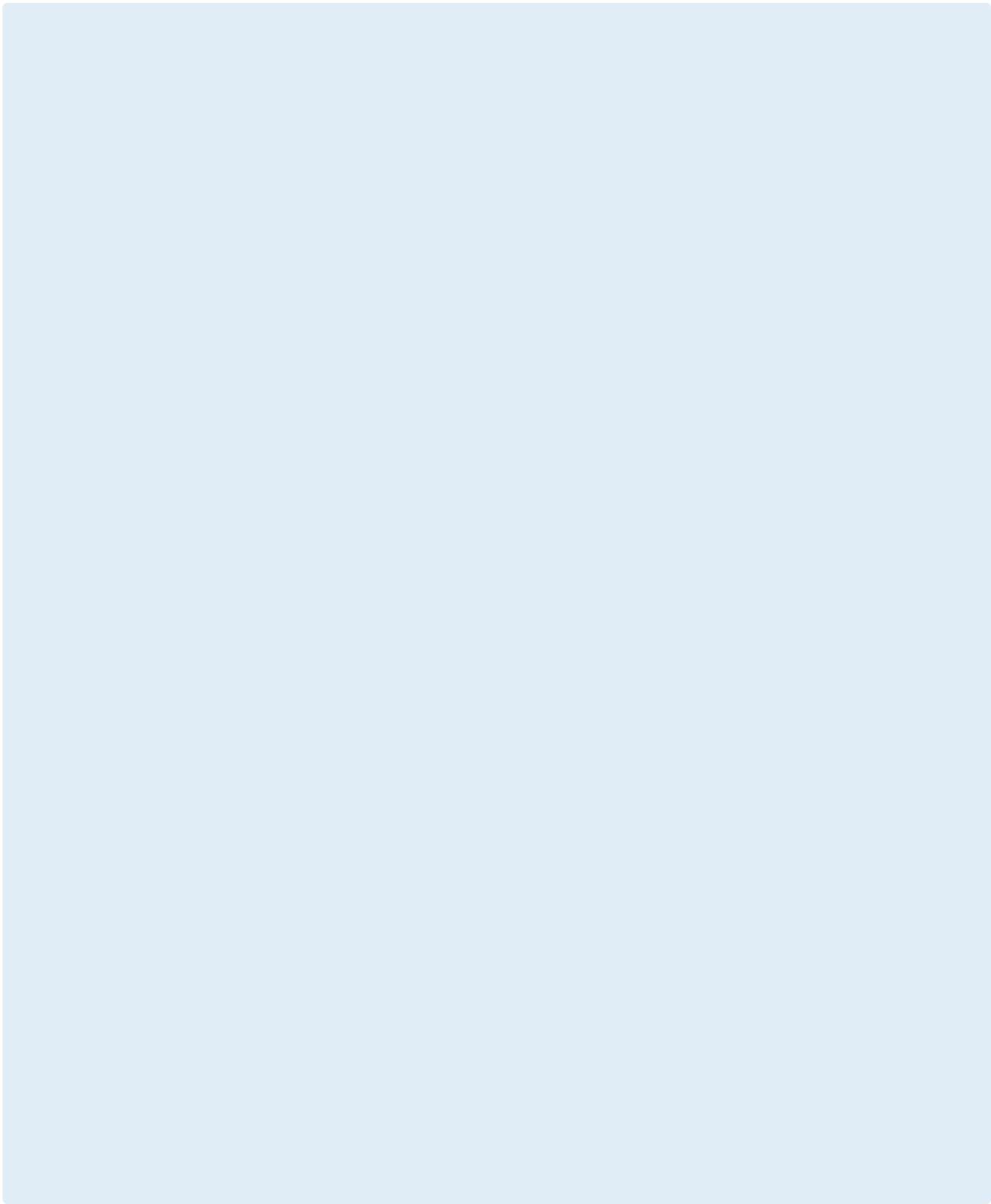
* Ambient temperature is greater than 60°C, consult us.
 * Total temperature limit is 105°C according to UL/ANSI standard.

Memo





Memo



Ordering sheet

If rated current or the order you placed is different from the ordering sheet listed below, please fill out another ordering sheet upon your specification

Receipt	LS ELECTRIC Co., Ltd.		Order date		Distributor name
Project			Contractor		
Delivery place			Delivery date		PNL Maker

ACB main body	Type of ACB	<input type="checkbox"/> UAS <input type="checkbox"/> UAH		Quantity																																																																																																																																																																																																																																																																																																																																																																																																																		
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		<input type="checkbox"/> DC 125V <input type="checkbox"/> A/DC 200V-250V <input type="checkbox"/> AC 48V																																																																																																																																																																																																																																																																																																																																																																																																																				
Closing voltage	<input type="checkbox"/> DC 24V-30V <input type="checkbox"/> DC 48V-60V <input type="checkbox"/> A/DC 100V-130V		<input type="checkbox"/> DC 125V <input type="checkbox"/> A/DC 200V-250V <input type="checkbox"/> AC 48V																																																																																																																																																																																																																																																																																																																																																																																																																			
Tripping voltage	<input type="checkbox"/> DC 24V-30V <input type="checkbox"/> DC 48V-60V <input type="checkbox"/> A/DC 100V-130V		<input type="checkbox"/> DC 125V <input type="checkbox"/> A/DC 200V-250V <input type="checkbox"/> AC 48V																																																																																																																																																																																																																																																																																																																																																																																																																			
ACB cradle	<input type="checkbox"/> No safety shutter (E class) <input type="checkbox"/> Safety shutter attachment (F class)																																																																																																																																																																																																																																																																																																																																																																																																																					
Terminal connection	<input type="checkbox"/> Manual connection		<input type="checkbox"/> Automatic connection (Connector type)		<input type="checkbox"/> Automatic connection (Screw Joint type)																																																																																																																																																																																																																																																																																																																																																																																																																	
	Connections																																																																																																																																																																																																																																																																																																																																																																																																																					
		<input type="checkbox"/> Vertical	<input type="checkbox"/> Horizontal	<input type="checkbox"/> Front connection	<input type="checkbox"/> Line: Horizontal Load: Vertical <input type="checkbox"/> Line: Vertical Load: Horizontal <input type="checkbox"/> Customer mounting																																																																																																																																																																																																																																																																																																																																																																																																																	
ACB accessory	ACB Main body	Standard accessory	• Double shunt coil(SHT2)		<input type="checkbox"/> Non-attachment type	<input type="checkbox"/> Attachment type																																																																																																																																																																																																																																																																																																																																																																																																																
			• Aux. contact(AX)		<input type="checkbox"/> Extended type (5a5b, ON/OFF charge)																																																																																																																																																																																																																																																																																																																																																																																																																	
			• Undervoltage trip device (UVT, Instantaneous)																																																																																																																																																																																																																																																																																																																																																																																																																			
			<input type="checkbox"/> DC 24V-30V <input type="checkbox"/> DC 48V-60V <input type="checkbox"/> A/DC 100V-130V <input type="checkbox"/> DC 125V <input type="checkbox"/> A/DC 200V-250V <input type="checkbox"/> AC 48V																																																																																																																																																																																																																																																																																																																																																																																																																			
			• Trip alarm switch, Manual reset button(AL, MRB)		<input type="checkbox"/> Non-attachment type	<input type="checkbox"/> Attachment type																																																																																																																																																																																																																																																																																																																																																																																																																
	• Remote Reset Switch		<input type="checkbox"/> Non-attachment type	<input type="checkbox"/> Attachment type																																																																																																																																																																																																																																																																																																																																																																																																																		
	• Ready-to-close switch(RCS)		<input type="checkbox"/> Non-attachment type	<input type="checkbox"/> Attachment type																																																																																																																																																																																																																																																																																																																																																																																																																		
	• Counter(C)		<input type="checkbox"/> Non-attachment type	<input type="checkbox"/> Attachment type																																																																																																																																																																																																																																																																																																																																																																																																																		
	• Key Lock(K)		<input type="checkbox"/> K1 (Normal type) <input type="checkbox"/> K2 (Key Interlock Set) <input type="checkbox"/> K3 (Double keylock)	<input type="checkbox"/> K4 (Kirkkey lock type(CAMLOCK)) <input type="checkbox"/> K5 (Kirkkey lock type(CN-22))																																																																																																																																																																																																																																																																																																																																																																																																																		
	• Locakable On/OFF Button Cover (B)		<input type="checkbox"/> Non-attachment type	<input type="checkbox"/> Attachment type																																																																																																																																																																																																																																																																																																																																																																																																																		
• Mechanical operation contact (MOC)																																																																																																																																																																																																																																																																																																																																																																																																																						
ACB cradle	Standard accessory	• Safety Shutter (ST)		<input type="checkbox"/> Non-attachment type	<input type="checkbox"/> Attachment type																																																																																																																																																																																																																																																																																																																																																																																																																	
		• Cell Switch (CEL)		<input type="checkbox"/> Non-attachment type	<input type="checkbox"/> Attachment type																																																																																																																																																																																																																																																																																																																																																																																																																	
		• Body Supporter (BSP)		<input type="checkbox"/> Non-attachment type	<input type="checkbox"/> Attachment type																																																																																																																																																																																																																																																																																																																																																																																																																	
		• Lockable Position Lock (PL)		<input type="checkbox"/> Non-attachment type	<input type="checkbox"/> Attachment type																																																																																																																																																																																																																																																																																																																																																																																																																	
		• Metering Current Transformer (T)		<input type="checkbox"/> Non-attachment type	<input type="checkbox"/> Attachment type																																																																																																																																																																																																																																																																																																																																																																																																																	
Separate purchase	Main body mounting	<input type="checkbox"/> Interphase Barrier (IB)																																																																																																																																																																																																																																																																																																																																																																																																																				
		<input type="checkbox"/> Slow closing lever (SL)																																																																																																																																																																																																																																																																																																																																																																																																																				
	Cradle mounting	<input type="checkbox"/> Door interlock (DI)																																																																																																																																																																																																																																																																																																																																																																																																																				
		<input type="checkbox"/> Mechanical operation contact (MOC)																																																																																																																																																																																																																																																																																																																																																																																																																				
		<input type="checkbox"/> Mechanical interlock(MI)																																																																																																																																																																																																																																																																																																																																																																																																																				
		• Shortening b-contact (SBC, 4b Max)		<input type="checkbox"/> 1a	<input type="checkbox"/> Wire type (2 terminals)	<input type="checkbox"/> Wire type (3 terminals)																																																																																																																																																																																																																																																																																																																																																																																																																
		• Miss insertion preventive device (MIP)		<input type="checkbox"/> 2a <input type="checkbox"/> 3b <input type="checkbox"/> 4a	<input type="checkbox"/> Attachment type																																																																																																																																																																																																																																																																																																																																																																																																																	
		<input type="checkbox"/> Cradle mounting block (CMB) <input type="checkbox"/> Safety control cover (SC)																																																																																																																																																																																																																																																																																																																																																																																																																				
	<input type="checkbox"/> Racking interlock (RI) <input type="checkbox"/> Interphase Barrier (IB)																																																																																																																																																																																																																																																																																																																																																																																																																					
	External mounting	• UVT time delay controller (UDC)																																																																																																																																																																																																																																																																																																																																																																																																																				
<input type="checkbox"/> DC 24V-30V <input type="checkbox"/> DC 48V-60V <input type="checkbox"/> A/DC 100V-130V <input type="checkbox"/> DC 125V		<input type="checkbox"/> A/DC 200V-250V <input type="checkbox"/> AC 48V																																																																																																																																																																																																																																																																																																																																																																																																																				
<input type="checkbox"/> Door frame (DF) <input type="checkbox"/> Dust cover (DC)		<input type="checkbox"/> Condenser trip device (CTD)																																																																																																																																																																																																																																																																																																																																																																																																																				
<input type="checkbox"/> Profibus-DP Comm. (PC)		<input type="checkbox"/> Temperature alarm (TM)		<input type="checkbox"/> Remote I/O (RCO)																																																																																																																																																																																																																																																																																																																																																																																																																		
ETC	<input type="checkbox"/> i-Tester (IT) <input type="checkbox"/> Lifting Hook (LH)																																																																																																																																																																																																																																																																																																																																																																																																																					



Safety Instructions

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



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