TemPower PRO

~ *Compact ACB* ~

TERASAKI ELECTRIC CO., LTD.
www.terasaki.co.jp

Catalogue No. '24–I58E

The new standard for TERASAKI's air circuit breakers with compact body, high-performance

It's the TemPower PRO

Compact

&

User Friendly

Contents

1 Product warranty

Please confirm the following product warranty before purchasing and using the product.

1. Warranty period and warranty coverage

If any failure found to be the responsibility of Terasaki Electric occurs during use of the product within the warranty period, the product shall be repaired at no cost via the sales representative or Terasaki Electric sales office. However, if repairs are required on-site at domestic or overseas locations, expenses to send an engineer will be charged.

[Warranty period]
The warranty period of the product shall be for 12 months after the date of purchase or delivery to the designated place.
However, the maximum free warranty period is 18 months from the date of manufacture, with a maximum distribution period of 6 months after shipment.
The free-of-charge warranty period of the repaired product will not be extended beyond the free-of-charge warranty period before the repair.

[Warranty coverage]
1) The primary failure diagnosis should be performed by users. However, if required by users, Terasaki Electric or Terasaki Electric Sales office may be able to perform the diagnosis.

2) The coverage shall be limited to ordinary use within the usage state, usage methods, usage environment, and other conditions which follow the instructions and precautions given in the instruction manual, user's manual, and caution labels on the product.

3) Even within the warranty period, repair cost shall be charged for the following cases.

① Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by selection of hardware or software design on the user side.

② Failure caused by modifications, etc. to the product by the user without any approvals from Terasaki Electric.

③ In case Terasaki Electric product is assembled into a user's device, failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.

④ Failure that could have been avoided if the maintenance described in the user's manual has been performed.

⑤ Failure caused by external irresistible forces such as fires or abnormal voltages, and failure caused by natural disasters such as earthquakes, lightning, wind and water damages.

⑥ Failure caused by reasons unpredictable based on scientific technology standards at the time of shipment from Terasaki Electric.

⑦ Any other failure found not to be the responsibility of Terasaki Electric or that admitted not to be so by the user.

＊In addition, the warranty applies only to the product delivered. It does not apply to the any damage that is caused by the failure of the product.

2. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the warranty period, Terasaki Electric shall not be liable for compensation to:

1) Damages caused by any cause found not to be the responsibility of Terasaki Electric.

2) Loss in opportunity, lost profits incurred to the user by failures of Terasaki Electric product.

3) Damages whether foreseeable or not, secondary damages, compensation for accidents, and compensation for damages to products other than Terasaki Electric products, caused by exceptional situations.

4) Compensation for cost occurring secondarily from replacement work by the user, maintenance of on-site equipment and start-up test run and other operations.

3. Product applications

1) When using the products listed in this catalogue, the following conditions must be confirmed and obeyed. The product must be used so that a failure that occurs to the product does not lead to a serious accident. When a damage or failure occurs, the external backup function or fail-safe function must be executed systematically.

2) The products listed in this catalogue are designed and manufactured as general-purpose products for application to the general industry field.
When considering the use of our products for special applications such as the following equipment and systems, please contact Terasaki Electric sales office to confirm the specifications.

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① The use that has a significant influence on the public facilities such as nuclear power plants and other power plants of power companies.

② The use for railway companies, government offices, etc. that require to build the special quality assurance system.

③ The use for aerospace equipment, medical equipment, railway equipment, combustion and fuel equipment, passenger vehicles, manned transportation equipment, recreational equipment, safety equipment, and air conditioner for servers and the cooling facilities that are expected to have a significant influence on life, body, and property.

4. Safety Notices

Before installing, using, or servicing products, read these "Safety Notices" and familiarize yourself with all aspects of products, safety information and precautions.

■ Mounting Precautions

⚠ Caution
● Electrical work must be done by competent persons. ● Do not place the ACB in such an area that is subject to high temperatures, high humidity, dusty air, corrosive gasses, strong vibration and shock, or other unusual conditions. Mounting the ACB in such an area could cause a fire or malfunction. ● Be careful to prevent foreign objects (such as debris, concrete powder, dust, chippings, and iron powder) and oil or rain water from entering the ACB. These materials inside the ACB could cause a fire or malfunction. ● Prior to commencing any work on the ACB, upstream circuit breaker or the like to isolate all sources of power/voltage. Otherwise, electric shock may result. ● Fix the draw-out cradle of the ACB firmly on a flat, level surface using mounting screw. Otherwise, the draw-out operation may cause the breaker body or the draw-out cradle to fall, resulting in damage to the ACB or personal injury. ● For 4-pole ACBs, be sure to connect a 3-phase, 4-wire neutral conductor to the N-phase pole (on the right end). Otherwise, an overcurrent may hinder the ACB from tripping, resulting in a fire.

■ Transportation Precaution

⚠ Danger
● Never stand under the ACB that has been lifted or suspended a lifter of lifting attachments. The weight of the ACB may cause sereious injury.

■ Operation Precaution

⚠ Danger
● Never touch live terminal parts (main terminals or control terminals). Otherwise, electric shock may result. ● Do not leave the ACB body in the draw-out position. If the ACB body is accidentally dropped, its weight may cause serious injury.

[Meaning of indication]

⚠ Danger	A danger notices with this symbol indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury.
⚠ Caution	A caution notices with this symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury and/or property danage.

5. Ordering information

Products and specifications appearing in this catalogue are subject to change (including discontinued sales) due to product improvements and other reasons, therefore contact us or your local dealer prior to using, considering or ordering the shown products to confirm that the information in this catalogue is the up-to-date.

Even more compact

● **Developed with the same external dimensions for the 630AF to 1600AF of draw-out type, making it even more compact than the previous product.**

Now **48%** **in volume** and **49%** **in weight** compared to the previous product.
Can be mounted in a switchboard compartment of 400mm width, height and depth.

Weight : 76kg

460
345
354

Weight : **37kg**

322
291
288
(mm)

Previous product 1600AF *TemPower 2*

New product 1600AF TemPower PRO

Even more convenient

● **The direction of rear connection terminals (horizontal, vertical) can be changed by the customer.**

Easy to change by simply removing two bolts and rotating by 90°.

＊In case of AX120S and AX120H, rear connection terminals can not be changed.

Horizontal terminals

Vertical terminals

4

Even safer

● **The mechanical reset facility that was as an option with the previous product is now supplied as standard.**

Reset button   Mechanical reset setting dial

The mechanical reset is an interlock function that prevents the ACB from being ON again if it has been tripped due to an over-current release, until the reset button is pressed after eliminating the cause.

The mechanical reset can be enabled simply by setting the mechanical reset setting dial on the front of the ACB to "MANUAL".
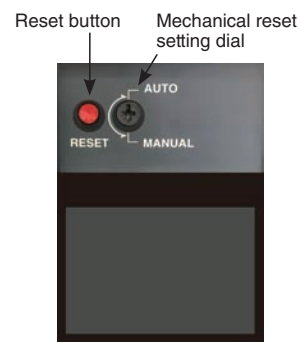
● **New closing spring charge indicator display**

The previous product only displayed the charge status of the closing spring, but *TemPower* PRO⊙ now also shows whether or not the ACB can be closed.

This provides a visual indication that the ACB is not in a ready to close state after the interlock or undervoltage trip device has been activated, a feature that was not available with the previous product.

State	Closing spring charge	Discharged	Charge	Charge
	ACB State	Not ready to close	Ready to close	Not ready to close
Indication (*TemPower*)		DISCHARGED	CHARGED	CHARGED
Indication (TemPower PRO⊙)		ON ~~OK~~ / DISCHARGED	CHARGED / ON OK	CHARGED / ON ~~OK~~

● **The safety functions below are from the previous product**

① No extra arc space required for clearance (For draw-out type)

    Almost all arc energy is dissipated inside when tripping, so there is no need to include space for arc gases on the upper part.

② Double shunt trip devices

    Two continuously-rated shunt trip devices can be mounted, allowing backup trip operation to be built. This makes it suited to critical circuits where reliability is required.

● **Can be used with reverse connections like the previous product. Power receiving and distribution from either top or bottom terminals.**

● **Quick connection terminals used for control circuit terminals**

Eliminates the need to tighten screws with a screwdriver, making connection work much faster.
(Available lead wire size : 0.6 – 2.5mm^2,
 Finished OD : 3.3mm ø or less)
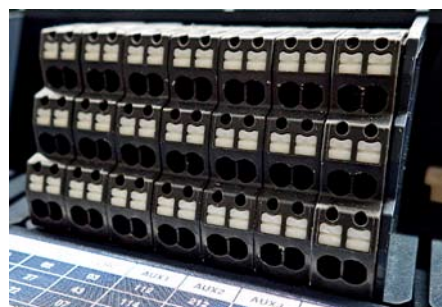
Even more convenient

● **Standard type and Smart type of Over-Current Release (OCR) are available depends on the application.**

Standard type

Smart type

[Standard type]

① Color display as standard. A range of information can be displayed with three types of display modes.
② Three types of general protection specifications are available, as well as a generator protection specification.
③ The long time-delay trip current settings can be configured in detail to suit the applicable load conditions.
Current settings for the standard type long time-delay trip function are configured differently to previous methods, and uses a combination of two dial settings. This approach allows the applicable load conditions to be configured in more detail.
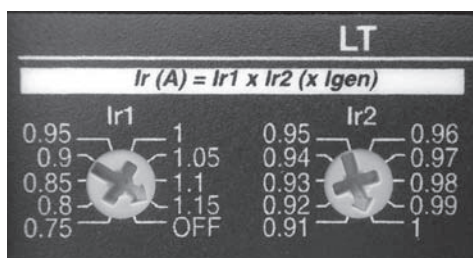

OCR Setting dials for generator protection

AOX-LI, AOX-LSI, AOX-LSIG·········$I_r = I_r1 \times I_r2 \times I_n$

	Setting value								
I_r1	0.4	0.5	0.6	0.7	0.8	0.9	0.95	1	OFF
I_r2	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1

AOX-LSIR·········$I_r = I_r1 \times I_r2 \times I_{gen}$

	Setting value								
I_r1	0.75	0.8	0.85	0.9	0.95	1	1.05	1.1	1.15	OFF
I_r2	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1

[Smart type]

① Includes a measurement function for circuit information, in addition to protection functions.
This enables measurement of various items such as current, voltage, power, energy, power factor, frequency, total harmonic distortion, harmonic current, and harmonic voltage.
② Measurement accuracy has been significantly improved compared to the previous product, with reading accuracy that complies with the IEC61557-12 international standard.
This ensures a high level of accuracy, with ±0.5% for current and voltage measurements, and ±1% for active power measurements.
③ Contact temperature monitoring is available as an optional function.
The temperature can be set from 105°C to 155°C (in 10°C increments), and an alarm output is triggered when the contact temperature of the main circuit exceeds the set temperature.
Combining this with communication functions also allows real-time monitoring of contact temperature.
④ A Dual settings mode is now available.
Various combinations of protection setting values for long time-delay trips, short time-delay trips, instantaneous trips, and ground fault trips can be stored in two types of setting value groups, "Setting A" and "Setting B," which can be switched and used as required.

● **Smart Type OCR has more extensibility**

TemView PRO⊙

Remote display

Connecting the TemView PRO⊙ remote display with the TemPower PRO⊙ using the special cable and mounting it on the switchboard panel allows the smart type OCR measurement value to be checked using the panel.

＊Adaptor (Type: TVPAA) is necessary for the connection between remote display and smart type OCR. When ordering the remote display, be sure to order an adaptor as well.

TemCom PRO⊙

Communication module

Circuit information measured with smart type OCR can be transmitted remotely by using the TemCom PRO⊙ communication module, allowing a communication network that can be monitored and managed to be built. Two types of communication protocols are available: MODBUS RTU (type: APX-1R) and MODBUS TCP (type: APX-1T).

APX-1R

Protocol	Modbus RTU
Address	1 – 247 (Default seting value : 1)
Baud rate	4800/9600/19200/38400 bps (Default seting value : 19200 bps)
Parity	None/ Even / Odd (Default seting value : Even)
Stop bit	1bit (fixed)

APX-1T

Protocol	Modbus TCP
DPHC settings	OFF/ON (Default seting value : ON)
IP address settings	0.0.0.0 – 255.255.255.255 (Default seting value : 172.16.1.1)
Subnet mask settings	0.0.0.0 – 255.255.255.255 (Default seting value : 255.255.255.0)
Electrostatic gateway settings	0.0.0.0 – 255.255.255.255 (Default seting value : 0.0.0.0)
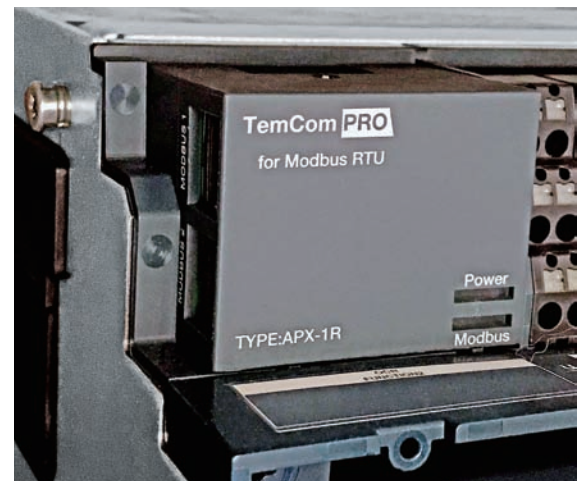
Built-in barttery

Backup power supply available in the event that control power is lost.
This ensures that the following functions remain available even if control power is not being supplied.
   1) Clock function
   2) Accident screen displayed if accident occurs

Built-in barttery

7

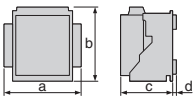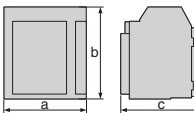| Series	Standard		Standard		Standard		Standard		Standard	
Ampere rating (A)	630		800		1000		1250		1600	
Type	**AX106S**		**AX108S**		**AX110S**		**AX112S**		**AX116S**	
Rated current (max) [I_n] (A) JIS④, IEC⑤, EN⑥, AS/NZS⑦	630		800		1000		1250		1600	
①② Marine	630		800		1000		1250		1600	
Neutral pole amperes frame (A)	630		800		1000		1250		1600	
Number of poles ③	3	4	3	4	3	4	3	4	3	4
Rated primary current of over-current release [I_n](A)	400		800		1000		1250		1600	
· LI, LSI, LSIG, LSI+, LSIG+ specifications ⑩	630									
Rated primary current of over-current release [I_{gen}](A)	$240 \leqq I_{gen} \leqq 400$		$480 \leqq I_{gen} \leqq 800$		$600 \leqq I_{gen} \leqq 1000$		$750 \leqq I_{gen} \leqq 1250$		$960 \leqq I_{gen} \leqq 1600$	
· LSIR specifications ⑩	$400 < I_{gen} \leqq 630$									
[I_{gen}]is rated current of generator.										
AC Rated insulation voltage [U_i] (V. 50/60Hz)	1000		1000		1000		1000		1000	
Rated operational voltage [U_e] (V. 50/60Hz)	690		690		690		690		690	
■ AC Rated breaking cap. [kA sym rms] / Making cap. [kA peak]										
JIS④, IEC, EN, AS AC 690V ⑧	42/88.2		42/88.2		42/88.2		42/88.2		42/88.2	
[I_{cu}](kA) 500V ⑧	42/88.2		42/88.2		42/88.2		42/88.2		42/88.2	
440V	50/105		50/105		50/105		50/105		50/105	
415V	50/105		50/105		50/105		50/105		50/105	
NK AC 690V	42/91.3		42/91.3		42/91.3		42/91.3		42/91.3	
450V	50/112		50/112		50/112		50/112		50/112	
LR, AB, BV AC 690V	42/91.3		42/91.3		42/91.3		42/91.3		42/91.3	
450V	50/112		50/112		50/112		50/112		50/112	
JIS④, IEC, EN, AS AC 690V ⑧	42/88.2		42/88.2		42/88.2		42/88.2		42/88.2	
[I_{cs}](kA) 500V ⑧	42/88.2		42/88.2		42/88.2		42/88.2		42/88.2	
440V	50/105		50/105		50/105		50/105		50/105	
415V	50/105		50/105		50/105		50/105		50/105	
NK AC 690V	42/91.3		42/91.3		42/91.3		42/91.3		42/91.3	
450V	50/112		50/112		50/112		50/112		50/112	
LR, AB, BV AC 690V	42/91.3		42/91.3		42/91.3		42/91.3		42/91.3	
450V	50/112		50/112		50/112		50/112		50/112	
Reverse connected	Yes		Yes		Yes		Yes		Yes	
Rated impulse withstand voltage [U_{imp}] (kV) (Main circuit)	12		12		12		12		12	
Rated short time withstand current 1s	50		50		50		50		50	
[I_{CW}][kA rms.] 3s	24		24		24		24		24	
Rated latching current (kA)	36		36		36		36		36	
Total breaking time (s)	0.08		0.08		0.08		0.08		0.08	
■ Closing operation time										
Spring charging time (s) max.	8		8		8		8		8	
Closing time (s) max.	0.08		0.08		0.08		0.08		0.08	
■ No. of operating cycles ⑨										
Mechanical life	15000		15000		15000		15000		15000	
Electrical life 440V AC	8000		8000		8000		8000		8000	
690V AC	8000		8000		8000		8000		8000	
Weight (kg) for draw-out type	37	45	37	45	37	45	37	45	37	45
■ Outline dimensions (mm) (For vertical terminals and horizontal terminals.)										
Fixed type a	276	346	276	346	276	346	276	346	276	346
b	312.5		312.5		312.5		312.5		312.5	
c	197.5		197.5		197.5		197.5		197.5	
d	42.5		42.5		42.5		42.5		42.5	
Draw-out type a	288	358	288	358	288	358	288	358	288	358
b	322		322		322		322		322	
c	291		291		291		291		291	
d	49		49		49		49		49	

① : Values in open air at 40°C (45°C for marine applications)
② : For vertical terminals.
③ : 4poles ACBs without Neutral phases protection can not apply IT earthing system.
④ : Comply with JIS C 8201-2-1 Ann.1 Ann.2.
⑤ : Comply with IEC60947-2.
⑥ : Comply with EN60947-2.
⑦ : Comply with AS/NZS IEC60947-2.

⑧ : Contact TERASAKI for the details about the application for IT system with special specification.
⑨ : Expected service life based on endurance test. The service life of ACB depends on the working and environmental conditions.
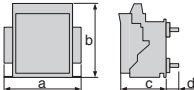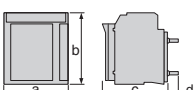⑩ : For OCR specifications, please refer to pages P.22 to P.46.
⑪ : AX120S and AX120H only have Fixed type.

	Standard 2000	High fault 630	High fault 800	High fault 1000	High fault 1250	High fault 1600	High fault 2000
	AX120S	**AX106H**	**AX108H**	**AX110H**	**AX112H**	**AX116H**	**AX120H**
	2000	630	800	1000	1250	1600	2000
	—	630	800	1000	1250	1600	—
	2000	630	800	1000	1250	1600	2000
	3 / 4	3 / 4	3 / 4	3 / 4	3 / 4	3 / 4	3 / 4
	2000	400	800	1000	1250	1600	2000
		630					
	—	240≦I_{gen}≦400	480≦I_{gen}≦800	600≦I_{gen}≦1000	750≦I_{gen}≦1250	960≦I_{gen}≦1600	—
		400<I_{gen}≦630					
	1000	1000	1000	1000	1000	1000	1000
	690	690	690	690	690	690	690
	42/88.2	42/88.2	42/88.2	42/88.2	42/88.2	42/88.2	42/88.2
	42/88.2	42/88.2	42/88.2	42/88.2	42/88.2	42/88.2	42/88.2
	50/105	66/145.2	66/145.2	66/145.2	66/145.2	66/145.2	66/145.2
	50/105	66/145.2	66/145.2	66/145.2	66/145.2	66/145.2	66/145.2
	—	42/91.3	42/91.3	42/91.3	42/91.3	42/91.3	—
	—	66/160	66/160	66/160	66/160	66/160	—
	—	42/91.3	42/91.3	42/91.3	42/91.3	42/91.3	—
	—	66/160	66/160	66/160	66/160	66/160	—
	42/88.2	42/88.2	42/88.2	42/88.2	42/88.2	42/88.2	42/88.2
	42/88.2	42/88.2	42/88.2	42/88.2	42/88.2	42/88.2	42/88.2
	50/105	55/121	55/121	55/121	55/121	55/121	55/121
	50/105	55/121	55/121	55/121	55/121	55/121	55/121
	—	42/91.3	42/91.3	42/91.3	42/91.3	42/91.3	—
	—	55/120	55/120	55/120	55/120	55/120	—
	—	42/91.3	42/91.3	42/91.3	42/91.3	42/91.3	—
	—	55/120	55/120	55/120	55/120	55/120	—
	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	12	12	12	12	12	12	12
	50	55	55	55	55	55	55
	24	30	30	30	30	30	30
	36	36	36	36	36	36	36
	0.08	0.08	0.08	0.08	0.08	0.08	0.08
	8	8	8	8	8	8	8
	0.08	0.08	0.08	0.08	0.08	0.08	0.08
	15000	15000	15000	15000	15000	15000	15000
	4000	8000	8000	8000	8000	8000	4000
	4000	8000	8000	8000	8000	8000	4000
	18⑪ / 22⑪	37 / 45	37 / 45	37 / 45	37 / 45	37 / 45	18⑪ / 22⑪
	276 / 346	276 / 346	276 / 346	276 / 346	276 / 346	276 / 346	276 / 346
	312.5	312.5	312.5	312.5	312.5	312.5	312.5
	197.5	197.5	197.5	197.5	197.5	197.5	197.5
	81.5	42.5	42.5	42.5	42.5	42.5	81.5
	—	288 / 358	288 / 358	288 / 358	288 / 358	288 / 358	—
	—	322	322	322	322	322	—
	—	291	291	291	291	291	—
	—	49	49	49	49	49	—

Switch-disconnectors

Ampere rating (A)		630		800		1000		1250		1600	
Type		**AX106D**		**AX108D**		**AX110D**		**AX112D**		**AX116D**	
Rated current (max) [I_e] (A) JIS③, IEC④, EN⑤, AS/NZS⑥ ①②		630		800		1000		1250		1600	
Marine		630		800		1000		1250		1600	
Neutral pole amperes frame (A)		630		800		1000		1250		1600	
Number of poles		3	4	3	4	3	4	3	4	3	4
AC Rated insulation voltage [U_i] (V. 50/60Hz)		1000		1000		1000		1000		1000	
Rated operational voltage [U_e] (V. 50/60Hz)		690		690		690		690		690	
		440		440		440		440		440	
Utilization category JIS C 8201-3 IEC60947-3		AC-23		AC-23		AC-23		AC-23		AC-23	
Rated impulse withstand voltage [U_{imp}] (kV) (Main circuit)		12		12		12		12		12	
Rated short circuit making capacity AC 690V		88		88		88		88		88	
[I_{cm}] (kA peak) 440V		121		121		121		121		121	
Rated short time withstand current AC 690V 1s		42		42		42		42		42	
[I_{CW}] (kA rms.) 440V 1s		55		55		55		55		55	
Reverse connected		Yes		Yes		Yes		Yes		Yes	
■ Closing operation time											
Spring charging time (s) max.		8		8		8		8		8	
Closing time (s) max.		0.08		0.08		0.08		0.08		0.08	
■ No. of operating cycles ⑥											
Mechanical life without maintenance		15000		15000		15000		15000		15000	
Electrical life without maintenance 440V AC		8000		8000		8000		8000		8000	
690V AC		8000		8000		8000		8000		8000	
Weight (kg) for draw-out type		37	45	37	45	37	45	37	45	37	45
■ Outline dimensions (mm) (For vertical terminals and horizontal terminals.)											
Fixed type	a	276	346	276	346	276	346	276	346	276	346
	b	312.5		312.5		312.5		312.5		312.5	
	c	197.5		197.5		197.5		197.5		197.5	
	d	42.5		42.5		42.5		42.5		42.5	
Draw-out type	a	288	358	288	358	288	358	288	358	288	358
	b	322		322		322		322		322	
	c	291		291		291		291		291	
	d	49		49		49		49		49	

① : Values in open air at 40°C (45°C for marine applications)
② : For vertical terminals.
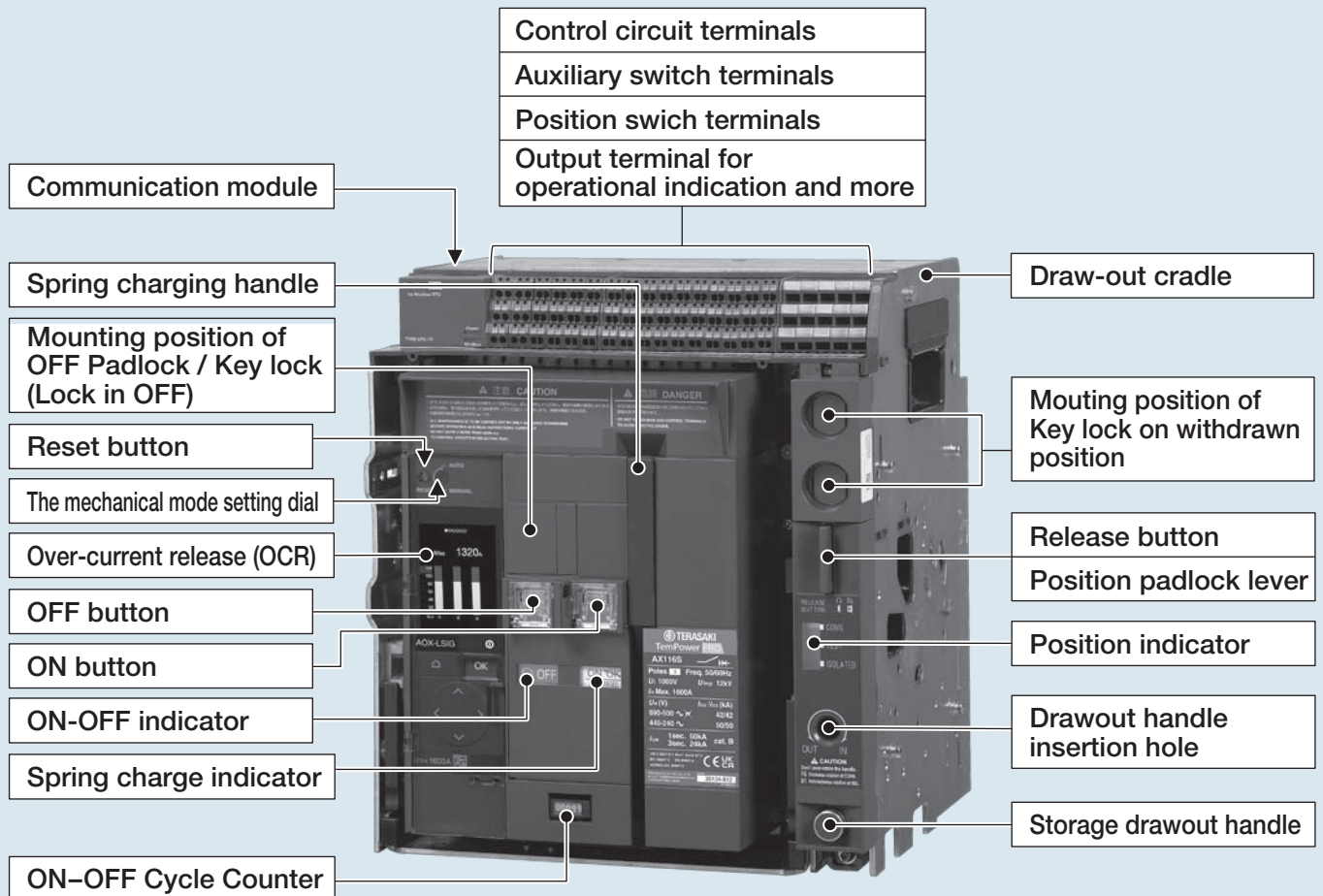③ : Comply with JIS C 8201-3.
④ : Comply with IEC60947-3.
⑤ : Comply with EN60947-3.
⑥ : Comply with AS/NZS IEC60947-3
⑦ : Expected service life based on endurance test. The service life of ACB depends on the working and environmental conditions.

Appearance (For draw-out type)

Control circuit terminals

Auxiliary switch terminals

Position swich terminals

Output terminal for operational indication and more

Communication module

Spring charging handle

Mounting position of OFF Padlock / Key lock (Lock in OFF)

Reset button

The mechanical mode setting dial

Over-current release (OCR)

OFF button

ON button

ON-OFF indicator

Spring charge indicator

ON–OFF Cycle Counter

Draw-out cradle

Mouting position of Key lock on withdrawn position

Release button

Position padlock lever

Position indicator

Drawout handle insertion hole

Storage drawout handle

5 Available as standard

ON-OFF button cover

An ON-OFF button cover prevents inadvertent or unauthorized operation of the ON or OFF button.
It can be locked with one padlock (with ø6 hasp)
Note : The padlock is not supplied.

Spring charge indicator

This switch can be used to indicate that the closing springs have been fully charged. ＊This accessory is included in the motor charging type. Manual charging type is not equipped this accessory.

Ratings of Spring charge indicator

	Groups	Voltage (V)	Current (A)
Utilization category AC-12/DC-12 ①	Standard	AC 250 ②	16.0
		DC 250 ③	5.0

① : Based on IEC60947-5-1.
② : Applies when operation power supply is alternating current. (For details, please refer to P. 18.)
③ : Applies when operation power supply is direct current. (For details, please refer to P. 18.)

Position padlock lever

Using the position padlock lever prevents the breaker body from inadvertently being drawn out. The release button in the pulled-out position locks the breaker body in the CONNECTED, TEST, or ISOLATED position.
Use padlocks with a ø6 hasp. Up to three padlocks (with ø6 hasp) can be installed.

Auxiliary switches 4c

Auxiliary switches indicates the "ON" and "OFF" status of ACB electrically. The auxiliary switches for draw-out type ACBs operate in the "CONNECTED" position and "TEST" position.
＊This accessory can not be used with Auxiliary switches 7c.
＊The connection of Auxiliary switch 4c is disconnected in the process that the breaker body is withdrawn from "TEST" position to "ISOLATED" position.
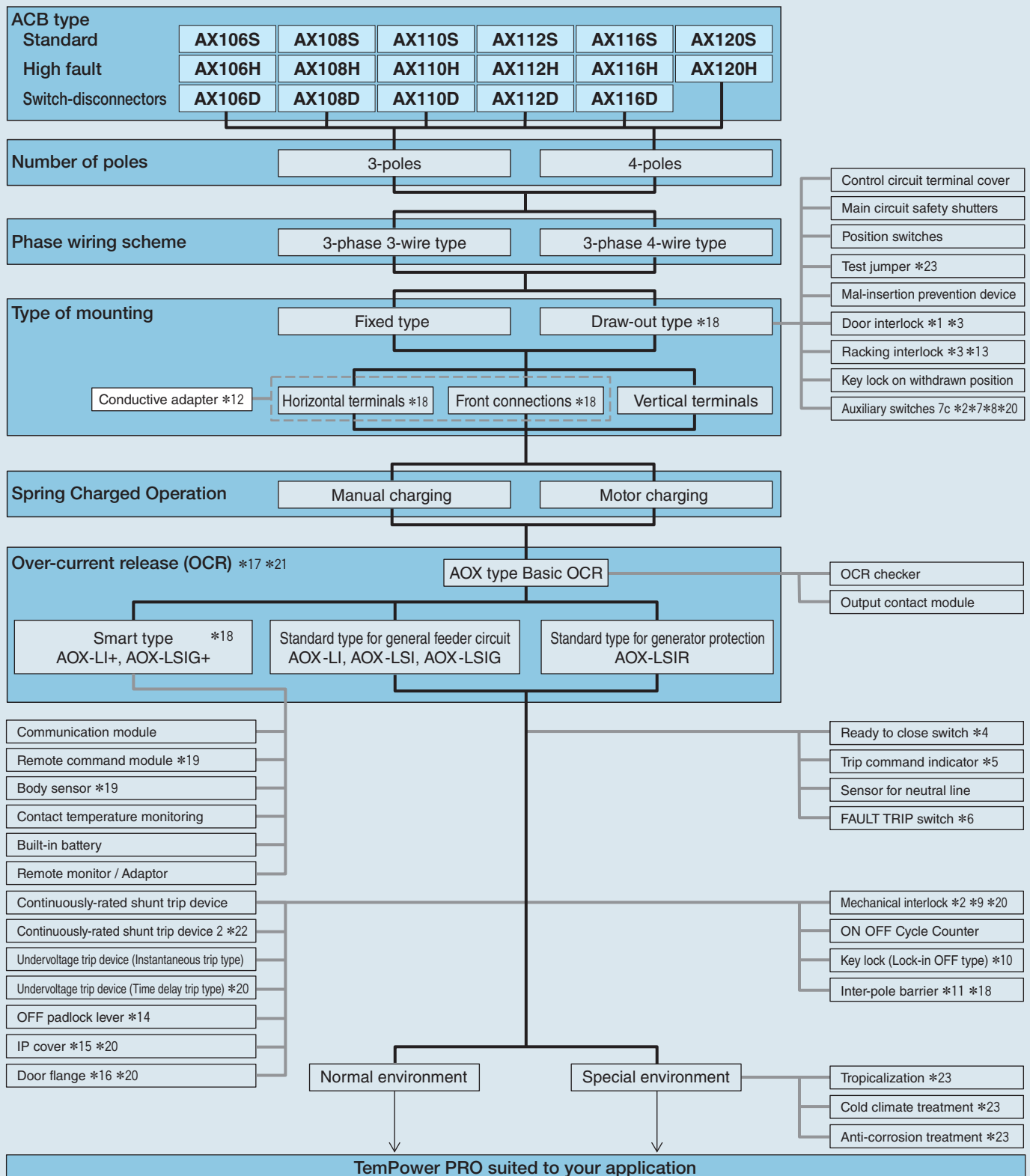
Ratings of auxiliary switch 4c

	Groups	Voltage (V)		Current (A)	Min. applicable load
Utilization category AC-12/DC-12 ①	Standard	AC	100−380	6.0	24V 100mA
			381−480	6.0	
			481−690	6.0	
		DC	24	2.5	
			48	2.5	
			125	0.5	
			250	0.3	
	For microload	AC	100−380	5.0	15V 2mA
			381−480	5.0	
			481−690	5.0	
		DC	24	5.0	
			48	2.5	
			125	0.5	
			250	0.3	

① : Based on IEC60947-5-1.
② : Chattering due to ON-OFF operation of the ACB lasts for less than 30 ms. (There is some fluctuation depend on the ON-OFF cycles of ACB) Take note when applying to circuits.
③ : Do not connect an auxiliary switch to the Latch release coil (LRC), continuously-rated shunt trip device and continuously-rated shunt trip 2 circuits. Doing so may cause failure.

ACB type

Standard	AX106S	AX108S	AX110S	AX112S	AX116S	AX120S
High fault	AX106H	AX108H	AX110H	AX112H	AX116H	AX120H
Switch-disconnectors	AX106D	AX108D	AX110D	AX112D	AX116D	

Number of poles

3-poles — 4-poles

Phase wiring scheme

3-phase 3-wire type — 3-phase 4-wire type

Type of mounting

Fixed type — Draw-out type *18

Conductive adapter *12 — Horizontal terminals *18 — Front connections *18 — Vertical terminals

- Control circuit terminal cover
- Main circuit safety shutters
- Position switches
- Test jumper *23
- Mal-insertion prevention device
- Door interlock *1 *3
- Racking interlock *3 *13
- Key lock on withdrawn position
- Auxiliary switches 7c *2*7*8*20

Spring Charged Operation

Manual charging — Motor charging

Over-current release (OCR) *17 *21

AOX type Basic OCR

- OCR checker
- Output contact module

Smart type *18 AOX-LI+, AOX-LSIG+	Standard type for general feeder circuit AOX-LI, AOX-LSI, AOX-LSIG	Standard type for generator protection AOX-LSIR

- Communication module
- Remote command module *19
- Body sensor *19
- Contact temperature monitoring
- Built-in battery
- Remote monitor / Adaptor

- Ready to close switch *4
- Trip command indicator *5
- Sensor for neutral line
- FAULT TRIP switch *6

- Continuously-rated shunt trip device
- Continuously-rated shunt trip device 2 *22
- Undervoltage trip device (Instantaneous trip type)
- Undervoltage trip device (Time delay trip type) *20
- OFF padlock lever *14
- IP cover *15 *20
- Door flange *16 *20

- Mechanical interlock *2 *9 *20
- ON OFF Cycle Counter
- Key lock (Lock-in OFF type) *10
- Inter-pole barrier *11 *18

Normal environment — Special environment

- Tropicalization *23
- Cold climate treatment *23
- Anti-corrosion treatment *23

TemPower PRO suited to your application

*1 : Contact TERASAKI to use in combination with a door flange, IP cover, auxiliary switch 7c, undervoltage trip device (Time delay trip type), or mechanical interlock.
*2 : Contact TERASAKI to use in combination with a racking interlock.
*3 : When using a door interlock, a racking interlock is available as standard.
*4 : Cannot be fitted with Trip command indicator or FAULT TRIP switch2.
*5 : Cannot be fitted with Ready to close switch or FAULT TRIP switch2.
*6 : Two switches can be mounted (FAULT TRIP switch, FAULT TRIP switch2). FAULT TRIP switch2 cannot be fitted with Ready to close switch or Trip command indicator.
*7 : Cannot be fitted with mechanical interlock or auxiliary switch 4c.
*8 : Tripping mechanism differs from auxiliary switch 4c. For details, please refer to P.49.
*9 : Cannot be fitted with auxiliary switch 7c.
*10 : Cannot be fitted with OFF padlock.
*11 : Cannot be fitted with Draw-out type front connection specifications or conductive adapter.

*12 : Cannot be fitted with Inter-pole barrier.
*13 : Contact TERASAKI to use in combination with a mechanical interlock or auxiliary switch 7c.
*14 : Cannot be fitted with Key lock (Lock in OFF).
*15 : Cannot be fitted with door flange.
*16 : Cannot be fitted IP cover.
*17 : For over-current release (OCR) specifications, please refer to P.22 to P.46.
*18 : Cannot be used for AX120S and AX120H.
*19 : To use these specifications, always also use a communication module.
*20 : Contact TERASAKI to use in combination with a door interlock.
*21 : Cannot be used for switch disconnectors.
*22 : Can not be fitted with Undervoltage trip devices.
*23 : Coming soon.

6 Specifications

■ Control circuit terminals

Quick connection terminals have been used. Cable connection work is simple, with a small flathead screwdriver, the only tool that is required.
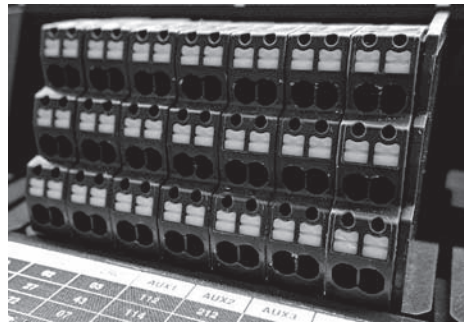
1 Accessories for Draw-out Type

Main circuit safety shutters

The main circuit safety shutters automatically conceal the main circuit contacts on the draw-out cradle when the ACB is drawn out.
- The line side and load side shutters operate independently, and can be separately padlocked in the closed position for safety.
- Each line side and load side can be locked with up to three padlocks (with ø6 hasp).

Mal-insertion prevention device

Interchangeability exists within the TemPower PRO series of ACBs. This is the device to avoid that a different specification of ACB is placed into the Drawout cradle. This device is capable of distinguishing ten different breaker bodies.

Test jumper   Coming soon

Used to conduct an electrical switching test with the ACB outside of the draw-out cradle.
The jumper is connected with a connector of standard length 5 m.

Key lock on withdrawn position

Locking device that prevents ACBs from inadvertently being drawn out. Allows units to be locked in the CONNECTED, TEST or ISOLATED positions. Up to two keys can be installed, and can be selected from five types: Cylinder, Ronis, Proflux, Kirk, or KLS.
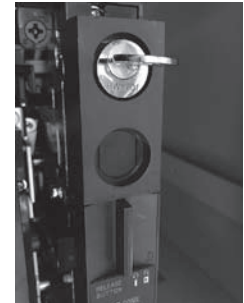
Body sensor

Outputs the ACB's withdrawn position (TEST, CONNECTED) to Over-Current Release (OCR). Using this together with a communication module allows the withdrawn position of the ACB to be checked remotely.
＊Cannot be used for modules mounted with standard type over-current releases.

Door interlock

The door interlock prevents the switchboard door from being opened unless the breaker body is in the ISOLATED position. To use this, install it with the following panel cutout dimensions.

＊1 : Panel hinge position

＊1
≥170 (3P)
≥240 (4P)
167.5±0.5
161
116
Front panel cutout
103
104
260.5
14
ø 6.5
25
2-ø4.5
27 ±0.3
37 ±0.2
Floor level for ACB
168 ±0.5
Panel cutout (Hinge position : left)

137±0.5 (3P)
207±0.5 (4P)
＊1
≥230
161
116
Front panel cutout
103
104
260.5
25
ø 6.5
2-ø4.5
37 ±0.2
27 ±0.3
14
Floor level for ACB
Panel cutout (Hinge position : right)
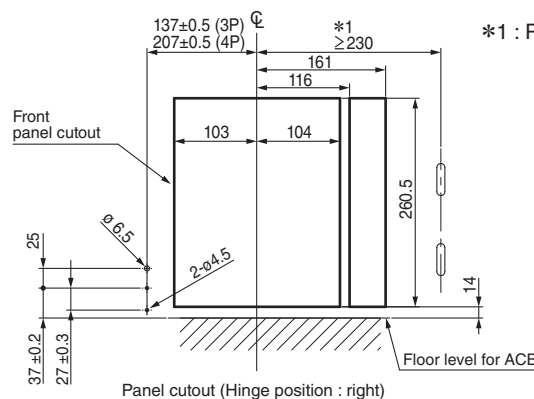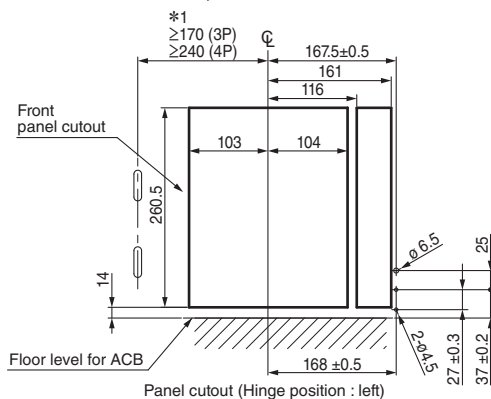
＊1 : When using a door interlock, a racking interlock is available as standard.
＊2 : Specify the hinge position of distribution board door (right side or left side) when placing an order.
＊3 : Contact TERASAKI to use in combination with a door flange, IP cover, auxiliary switch 7c, undervoltage trip device (Time delay trip type), or mechanical interlock.

TemPower PRO

2   Types of Mounting

Draw-out type

Maintenance and inspection are easy. Consists of a breaker body and a draw-out cradle, where the drawout cradle is fixed in the switchboard and only the breaker body can be drawn out or removed. There are four breaker body positions: CONNECTED, TEST, ISOLATED, and WITHDRAWN.

1 CONNECTED position
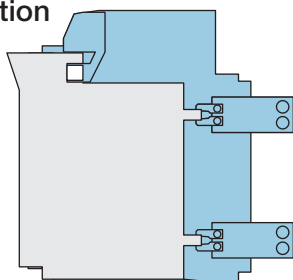
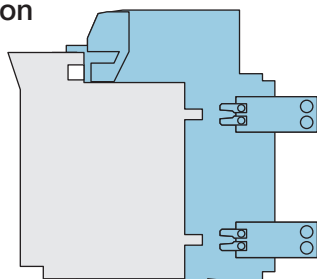Both the main and control circuits are connected for normal service.

2 TEST position
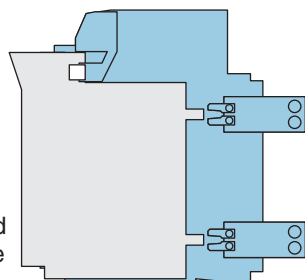
The main circuit is isolated and the control circuits are connected.
This position permits operation tests without the need for opening the switchboard panel door.

3 ISOLATED position

Both the main and control circuits are isolated.

4 WITHDRAWN position
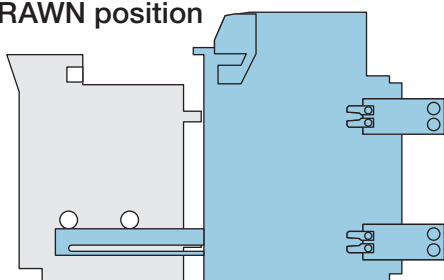
The breaker body is fully withdrawn from the draw-out cradle.

Fixed type

This type of ACB has no draw-out cradle and is designed to be directly mounted in the switchboard.

### Terminal arrangements

■Main circuit terminals
The design of boards is simple.
Three types of connection methods are available (vertical terminals, horizontal terminals, and front connections).
The vertical terminals and horizontal terminals can be changed from vertical to horizontal and from horizontal to vertical, by simply removing two bolts. Different types of terminal arrangements can be specified for the line and load sides. (AX120S and AX120H only have vertical terminals).
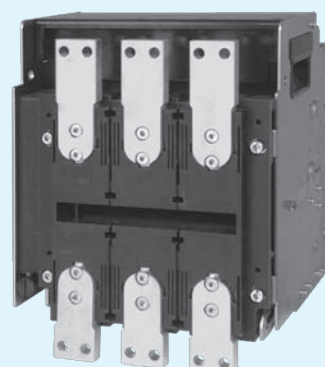
Vertical terminals

Horizontal terminals

Front connections

15
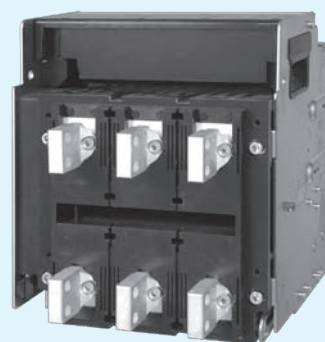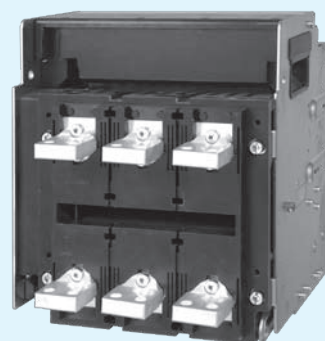
Position switches

The position switch operates to give an indication of the breaker position: CONNECTED, TEST, ISOLATED.
Switches are available in contact arrangements from 1c to 5c.

■ Select the type from the following table when ordering.

Standard

Type	Number of contacts	Contact arrangement		
		ISOLATED	TEST	CONN
ALX-212PB	5c	2	1	2
ALX-211PB	4c	2	1	1
ALX-210PB	3c	2	1	0
ALX-202PB	4c	2	0	2
ALX-201PB	3c	2	0	1
ALX-200PB	2c	2	0	0
ALX-112PB	4c	1	1	2
ALX-111PB	3c	1	1	1
ALX-110PB	2c	1	1	0
ALX-102PB	3c	1	0	2
ALX-101PB	2c	1	0	1
ALX-100PB	1c	1	0	0
ALX-012PB	3c	0	1	2
ALX-011PB	2c	0	1	1
ALX-010PB	1c	0	1	0
ALX-002PB	2c	0	0	2
ALX-001PB	1c	0	0	1

For microload

Type	Number of contacts	Contact arrangement		
		ISOLATED	TEST	CONN
ALX-212PA	5c	2	1	2
ALX-211PA	4c	2	1	1
ALX-210PA	3c	2	1	0
ALX-202PA	4c	2	0	2
ALX-201PA	3c	2	0	1
ALX-200PA	2c	2	0	0
ALX-112PA	4c	1	1	2
ALX-111PA	3c	1	1	1
ALX-110PA	2c	1	1	0
ALX-102PA	3c	1	0	2
ALX-101PA	2c	1	0	1
ALX-100PA	1c	1	0	0
ALX-012PA	3c	0	1	2
ALX-011PA	2c	0	1	1
ALX-010PA	1c	0	1	0
ALX-002PA	2c	0	0	2
ALX-001PA	1c	0	0	1

Ratings of Position switch

	Groups		Voltage (V)	Current (A)	Minimum applicable load
Utilization category AC-12/DC-12 ①	Standard	AC	100–380	8.0	24V 100mA
			381–480	8.0	
			481–690	6.0	
		DC	24	2.5	
			48	2.5	
			125	0.8	
			250	0.3	
	For microload	AC	100–380	5.0	15V 2mA
			381–480	5.0	
			481–690	5.0	
		DC	24	5.0	
			48	5.0	
			125	0.8	
			250	0.3	

① : Based on IEC60947-5-1.

Position switch operation sequence

Status of contact	
a-contact	b-contact
ON	OFF
OFF	ON
ON	OFF
OFF	ON
ON	OFF
OFF	ON
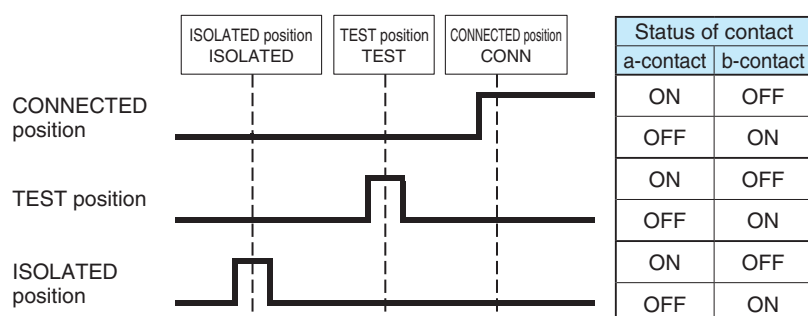
3   Spring Charged Operation

Manual charging type

For this type of ACB, the closing springs are charged by means of the spring charging handle. ON/OFF operation of the ACB is performed by means of ON/OFF buttons on the ACB.

■ Charging the closing springs

Pumping the spring charging handle by hand to charges the closing springs.

■ Closing the ACB

Pressing the ON button on the front of ACB to close the ACB.

■ Opening the ACB

Pressing the OFF button on the front of ACB to open the ACB.
The ACB cannot be closed as long as the OFF button is pressed.

Motor charging type

For this type of ACB, the closing springs are charged automatically by means of a motor. ON/OFF operation of the ACB can be performed remotely.

■ Charging the closing springs

A motor is used to charge the closing springs automatically.
When the closing springs are released to close the ACB, they are automatically charged again by the motor for the next ON operation.

■ Closing the ACB

Closing the "remote" ON switch activates the Latch Release Coil (LRC).
(For details please refer to P. 18)

■ Opening the ACB

For opening the ACB remotely, specify the continuously-rated shunt trip device.
(For details please refer to P.20)

6 Specifications

■ Operation power supply

Rated voltage (V)	Applicable voltage range for ON/CHARGE operation (V)	Ratings of operation power supply ①	
		Motor inrush current (peak) (A)	Motor steady-state current (A)
AC 24	20.4 − 26.4	27.9	7.7
AC 48	40.8 − 52.8	22.4	3.5
AC 100 − 130	85 − 143	10.6	1.6
AC 200 − 250	170 − 275	5.6	0.7
AC 380 − 400	323 − 440	3.0	0.4
AC 415 − 450	352.8 − 495	2.5	0.4
DC 24	18 − 26.4	21.3	6.4
DC 48	36 − 52.8	17.6	3.6
DC 100 − 130	75 − 143	8.1	1.4
DC 200 − 250	150 − 275	4.5	0.7

① : May vary slightly depending on control voltage or other conditions.

■ Ratings of Latch Release Coil (LRC)

Rated voltage (V)	Applicable operational voltage (V)	Coil Excitation Current ①		Power Consumption (VA) ①		Max. Closing time ①,③ (ms)
		Inrush current (A)	Holding current (mA)	Steady-state	Closing command ②	
AC/DC 24 − 30	AC 20.4 − 33	12	150	5 or less	200 or less	80
	DC 18 − 33					
AC/DC 48 − 60	AC 40.8 − 66	6	80			
	DC 26 − 66					
AC/DC 100 − 130	AC 85 − 143	4	40			
	DC 75 − 143					
AC/DC 200 − 250	AC 170 − 275	2	20			
	DC 150 − 275					
AC 380 − 480	AC 323 − 528	1	10			

① : May vary slightly depending on control voltage or other conditions.
② : RMS during 200ms from the moment of excitation.
③ : There is some variation in the closing time depend on the connection method.
  For the details, please refer to P.70 to P.75.

4　Accessories for Spring Charged Operation

Ready to close switch

Switch that provides an electrical indication that the ACB is in a ready to close status.

This switch is activated when the following conditions are met.

• ON/OFF indicator is showing OFF. (ACB is in OFF status)

• Closing spring charge indicator is showing "CHARGED ON OK".

• Undervoltage trip device is energised.

• Continuously-rated shunt trip device is not energised.

• Circuit breaker is in the CONNECTED position or the TEST position.

• Reset setting dial is in "AUTO" or Reset setting dial is in "MANUAL" with pussing the Reset button continuously.

• The key lock and key padlock are unlocked.

• The mechanical interlock is unlocked.

• While the OFF button is not pushed.

Ratings of ready to close switch

	Groups	Voltage (V)		Current (A)	Minimum applicable load
Utilization category AC-12/DC-12 ①	Standard	AC	100－380	5.0	15V 2mA
			381－480	5.0	
		DC	24	5.0	
			48	2.5	
			125	0.4	
			240	0.2	

① : Based on IEC60947-5-1.
② : Chattering time by the operation of ACB is 30ms or less.

5 **Trip Devices**

Continuously-rated shunt trip device

Continuously-rated shunt trip device can remote controll to operate the ACB to "OFF" electrically.
The continuous-rated shunt trip device allows the ACB to be turned OFF when an external protection relay against overcurrent or reverse power is activated.
Because of its continuous rating, it can also be used as an electrical interlock for the ACB.
＊Two shunt trip device can be installed to ensure the tripping operation. In the unlikely event that one of the shunt trip devices fails to operate due to the disconnection of wire or other cause, the other shunt trip device can be used for reliable trip operation. (In this case, Undervoltage trip can not be fitted.)

Ratings of Continuously-rated shunt trip device

Rated voltage (V)	Operational voltage (V)	Coil Excitation Current ①		Power Consumption (VA) ①		Opening time ①, ③ (ms)
		Inrush current (A)	Holding current (mA)	Steady-state	Trip command ②	
AC/DC 24 – 30	16.8 – 33	12	150	5 or less	200 or less	50
AC/DC 48 – 60	33.6 – 66	6	80			
AC/DC 100 – 130	70 – 143	4	40			
AC/DC 200 – 250	140 – 275	2	20			
AC 380 – 480	266 – 528	1	10			

① : May vary slightly depending on control voltage or other conditions.
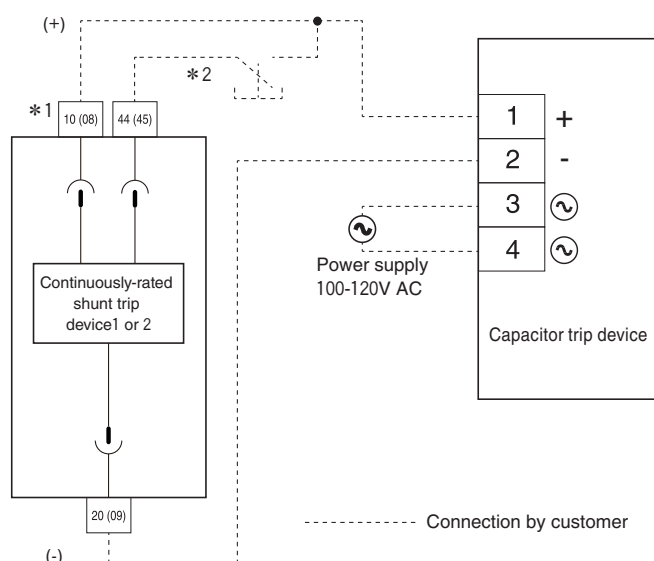② : RMS during 200ms from the moment of excitation.
③ : There is some variation in the opening time depend on the connection method. For the details, please refer to P.70 to P.75.

Capacitor trip device (Separate)

When used together with a continuously-rated shunt trip device, capacitor trip devices can be used to trip ACBs for up to 30 seconds even if there is a large voltage drop caused by a power failure (AC), short-circuit or other faults.
＊Testing the device is not possible when a test jumper is used.

Types	AQR-1
Rated voltage	100 – 120V AC
Operational voltage	70 – 110% of rated voltage
Rated frequency	50/60Hz
Rated voltage of Shunt Trip used	100 – 130V AC/DC
Power consumption (Trip command) ②	200VA ①
Power consumption (Steady-state) ②	5VA

① : RMS during 200ms from the moment of excitation.
② : There is some variation due to the fluctuations in operational voltage.

• Control circuits

• Outline Dimensions

＊1 : The terminal number in brackets indicates the terminal number for continuously-rated shunt trip device2.
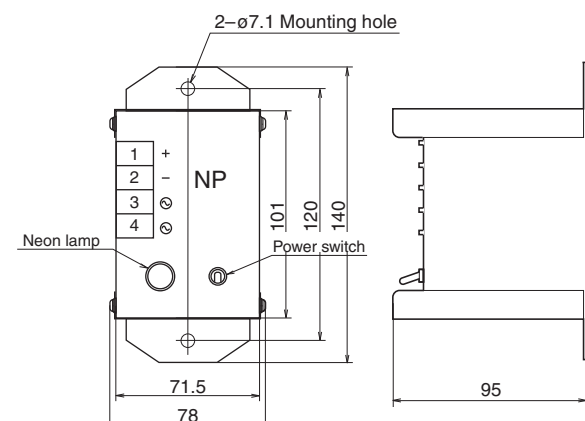＊2 : Please refer to P.70 to P.75 for precautions on the cables connecting the switch with terminal 08 and terminal 10.

TemPower PRO

Undervoltage trip device

The undervoltage trip device (UVT) trips the ACB when the control voltage drops below the opening voltage. When the control voltage is restored to the pick-up voltage, the ACB can be closed. The pick-up voltage is fixed to 85% of the minimum rated voltage.
The undervoltage trip device (UVT) is available in two types. The instantaneous type trips the ACB instantly when the control voltage drops below the opening voltage. The delay type (coming soon) does not trip the ACB instantly, but trips the ACB when the control voltage remains below the opening voltage for a certain period of time.
The delay type has the undervoltage trip device controller (UVT controller) and the relay terminal mounted on the side of the circuit breaker. (For the details, please refer to the outline dimensions.)

Ratings of Undervoltage trip device (Instantaneous trip type)

Rated voltage (V)	Opening Voltage (V)	Pick-up Voltage (V)	Coil Excitation Current ①		Power Consumption (VA) ①		Operating time (ms)
			Inrush current (A)	Holding current (mA)	Steady-state	Reset	
AC/DC 24 – 30	10.5 – 16.8	20.4	12	150	5 or less		
AC/DC 48 – 60	21 – 33.6	40.8	8	80	5 or less		
AC/DC 100 – 130	45.5 – 70	85	4	40	5 or less	200 or less ②	200 or less
AC/DC 200 – 250	87.5 – 140	170	3	20	5 or less		
AC 380 – 480	168 – 266	323	1	10	6 or less		

① : May vary slightly depending on control voltage or other conditions.
② : RMS during 200ms from the moment of excitation.

Ratings of Undervoltage trip device (Time delay trip type)

Rated voltage (V)	Opening Voltage (V)	Pick-up Voltage (V)	Coil Excitation Current ①		Power Consumption (VA) ①		Operating time (ms)
			Inrush current (A)	Holding current (mA)	Steady-state	Reset	
AC/DC 48 – 60	21 – 33.6	40.8	8	120			
AC/DC 100 – 130	45.5 – 70	85	4	100	10 or less	200 or less ②	500 or more
AC/DC 200 – 250	87.5 – 140	170	3	35			
AC 380 – 480	168 – 266	323	1	15			

① : May vary slightly depending on control voltage or other conditions.
② : RMS during 200ms from the moment of excitation.
③ : The UVT controller is mounted on the right side when viewing from the front of the ACB. For details about outline dimensions, please refer to P.56 to P.69.
④ : If using this device, set the short time-delay trip time of the over-current release (OCR) to the following values or less. Contact TERASAKI if a short time-delay trip time setting that exceeds the values below is required.
General protection specifications : 400ms
Generator protection and Smart type OCR : 500ms
⑤ : Contact TERASAKI to use in combination with a door interlock.

Voltage input terminal
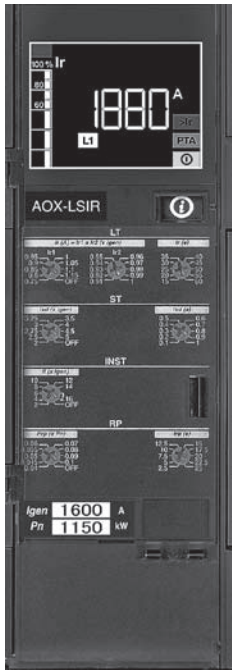
UVT contoroller

Undervoltage trip device (Time delay trip type)

21
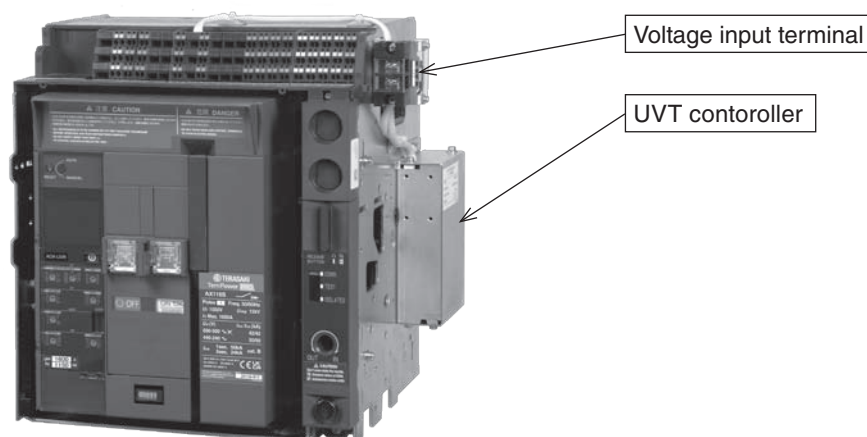
6 Over-current Releases (OCR)

TemPower PRO can be equipped with the high-reliability, high-functionality AOX-type over-current releases (OCRs). OCR has 2 types, Standard type and Smart type. There are some type names as follows depend on the combination of protection characteristics they have.

Over-current release (OCR) types			
For general feeder circuit			For generator protection
Standard type	AOX-LI	AOX-LSI	AOX-LSIG	AOX-LSIR
Smart type	—	AOX-LSI+	AOX-LSIG+	—

Features

	Standard type	Smart type
Appearance		
Set up method for protection function	Set by dial operation	Set by push button operation
Measurement function of circuit information	Non	Yes
Liquid color display	Available	Available
Indication items on display	1. Stand-by mode Pick-up current is indecated on the display when the pick-up occurs by Long time-delay trip and Preferential trip alarm function. 2. Information display mode Protection setting values for several protections are linked to the dial. 3. Trip display mode If the ACB trips when being activated by various protective functions, the display automatically changes to the Trip display mode, and the following details flash in red according to the protective function that was activated. • Activated protective function • Tripped phase • Value causing trip	1. Stand-by mode Display the current status of ACB and indicates on the screen when the trip or alarm has occurred. 2. Over-view mode Indicate all protection setting according to the specification and only measurement items those are selected. It is possible to set the scroll indication on the Stand-by mode. 3. Menu mode Indicate the menu of several information indicate mode. 4. Information indicate mode Indicate the several protection setting, measurement value, display setting and history. 5. Event display mode Indicate the event information of TRIP and ALARM.

Over Current Release (OCR) functional specifications

OCR types (AOX-)			Standard type				Smart type	
			LI	LSI	LSIG	LSIR ⑫	LSI+	LSIG+
Available ACBs	AX106S～ AX116S	Draw-out type	○	○	○	○	○	○
		Fixed type	○	○	○	○	○ ⑰	○ ⑰
	AX106H～ AX116H	Draw-out type	○	○	○	○	○	○
		Fixed type	○	○	○	○	○ ⑰	○ ⑰
	AX120S, AX120H	Fixed type	○	○	○	—	—	—
Protection functions ①	Long time delay trip (LT) ②④		●	●	●	●	●	●
	Short time delay trip (ST) ②④		—	●	●	●	●	●
	Instantaneous trip (INST) ②④		●	●	●	●	●	●
	Making current release (MCR) ⑤		●	●	●	●	●	●
	Instantaneous override trip (IO) ⑥		●	●	●	●	●	●
	N-phase protection (NP) ②④⑦		●	●	●	—	●	●
	Ground fault trip (GF) ②④		—	—	●	—	—	●
	Reverse power trip (RPT) ④⑧⑭		—	—	—	●	●	●
	Under voltage protection (UV) ③⑨		—	—	—	—	●	●
	Over voltage protection (OV) ③⑨		—	—	—	—	●	●
	Unbalance voltage protection (UNBV) ③⑨		—	—	—	—	●	●
	Unbalance current protection (UNBC) ③⑨		—	—	—	—	●	●
	Under frequency protection (UF) ⑨		—	—	—	—	●	●
	Over frequency protection (OF) ⑨		—	—	—	—	●	●
	Contact temperature monitoring (OH) ⑨		—	—	—	—	○	○
	Dual setting ⑬		—	—	—	—	●	●
Zone interlock ⑮	Short time-delay trip		—	●	●	●	●	●
	Ground fault trip		—	—	●	—	—	●
Alarm function	Preferential trip alarm (PTA)		●	●	●	●	—	—
	Preferential trip alarm 1 (PTA1)		—	—	—	—	●	●
	Preferential trip alarm 2 (PTA2)		—	—	—	—	●	●
	Custom alarm		—	—	—	—	●	●
Switching of starting characteristic ⑪⑯	COLD/HOT (Long time delay trip, PTA）		●	●	●	●	●	●
Monitoring ⑩			—	—	—	—	●	●
Control power (24V DC)			Required	Required	Required	Required	Required	Required
Contact module ⑨			○	○	○	○	○	○
Communication ⑨			—	—	—	—	○	○
Remote command module			—	—	—	—	○	○

● : Available as standard   ○ : Optional

－ : "no" or "not available"

① : This protective function will be activated if current equal to or greater than 120 A (RMS value) flows through any pole in the main circuit, or current equal to or greater than 80 A flows through the RST phase, when no control power is supplied.

② : This function employs a calculation method based on RMS current. Current settings are also expressed as RMS values.

③ : This function employs a calculation method based on RMS voltage. Voltage settings are also expressed as RMS values.

④ : Either of the following operation modes can be set: Circuit breaker tripping and activation display are performed, or the function is off (circuit breaker tripping and activation display are not performed).

⑤ : Protective function that trips the ACB if there is a current greater than the pick-up current when the ACB is closed. This function is enabled for 30 msec immediately after the ACB is closed, and the pick-up current is 36 kA (peak value).

⑥ : This protection function is activated with a higher level of priority than an instantaneous trip (INST), and trips the ACB at the set value. The pick-up current is 81.3 kA (peak value) for the standard type, and 89.4 kA (peak value) for the smart type.

⑦ : This function protects the neutral wire of the three-phase four-wire system circuit from overcurrent.

⑧ : The RPT function protects 3-phase generators running in parallel against reverse power.

⑨ : This function requires control power supply. It does not work when control power is lost.

⑩ : This function does not work if control power is lost, and there is not more than 80 A or more current available in the RST phase.

⑪ : LSIR is fixed at COLD.

⑫ : Not applicable to 4-pole circuit breakers.

⑬ : This function allows the setting values for the following protection functions to be stored in two types of setting value groups, "Setting A" and "Setting B."
・ Long time-delay trip (LT) ・ Short time-delay trip (ST)
・ Instantaneous trip (INST)
・ Ground fault trip (GF…for LSIG+)
＊ Cannot be used for zone interlock.

⑭ : For smart types, control power supply is required. They does not work when control power is lost.

⑮ : For standard types, specify whether or not zone interlocks are required when placing an order.

⑯ : For standard types, specify this function when placing an order.

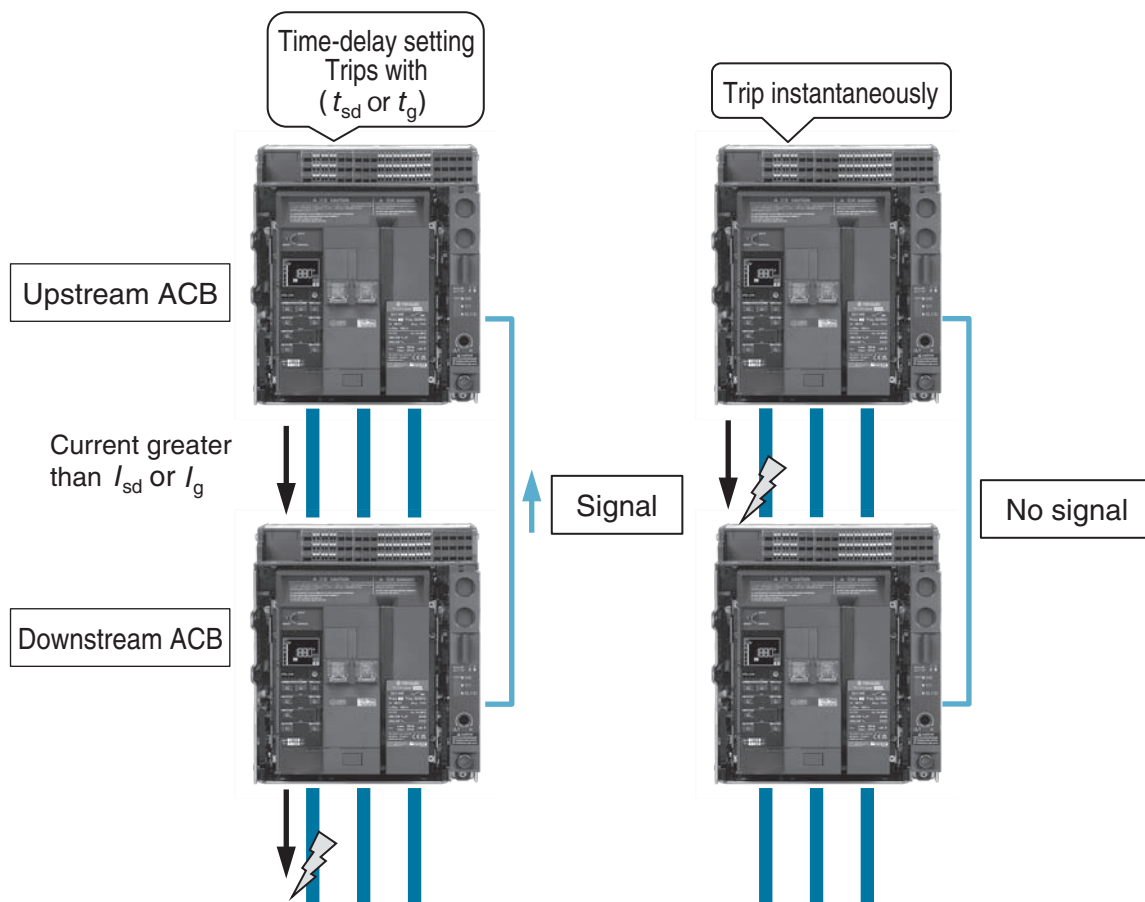⑰ : Contact temperature monitoring can not be used for the fixed type.

Zone interlock

The zone interlock function can be enabled for the corresponding function when the Over-Current Release (OCR) is compatible with short time-delay trips or ground fault trips.

If the zone interlock is enabled, a signal is output to upstream ACB if a downstream ACB detects a current greater than the pick-up current (I_{sd} or I_g).

When the upstream ACB detects a current greater than the pick-up current (I_{sd} or I_g), the signal from the downstream ACB is verified and if the upstream ACB receives the signal, it trips with the set tsd or tg time limit. If no signal is received, it trips with the same time limit as an instantaneous trip.

This function is not only used for linking TemPower PROs together, but can also be used for linking TemPower PROs and TemBreak PRO Smart circuit breakers, or TemPower PROs and TemPower2 air circuit breakers.

Time-delay setting
Trips with
(t_{sd} or t_g)

Trip instantaneously

Upstream ACB

Current greater than I_{sd} or I_g

Signal

No signal

Downstream ACB

Zone interlock operating schematic

Setting range of protection functions (Standard type)

AOX−L I ⑥

Types of ACB	AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H	AX120S, AX120H
Long time delay pick-up current (A) : (I_r)	(I_r1) : 0.40 – 1.00 (in units of 0.10), 0.95 or OFF ③ (I_r2) : 0.91 – 1.00 (in units of 0.01)	(I_r1) : 0.40 – 1.00 (in units of 0.10), 0.95 or OFF ③ (I_r2) : 0.91 – 1.00 (in units of 0.01)
	$(I_r)=(I_r1)\times(I_r2)\times(I_n)$	$(I_r)=(I_r1)\times(I_r2)\times(I_n)$
	Non tripping when load current $\leqq([I_r]\times1.05]$, Tripping when $([I_r]\times1.05)<$load current$\leqq([I_r]\times1.2)$ Tolerance : 105% − 120%	Non tripping when load current $\leqq([I_r]\times1.05]$, Tripping when $([I_r]\times1.05)<$load current$\leqq([I_r]\times1.2)$ Tolerance : 105% − 120%
Long time delay time settings (s) : (t_r)	0.5, 1.25, 2.5, 5, 8, 10, 15, 20, 25, 30 ②	0.5, 1.25, 2.5, 5, 8, 10, 15, 20 ②
	Tolerance : $-20\%\times t_r-20ms - +0\%\times t_r+30ms$	Tolerance : $-20\%\times t_r-20ms - +0\%\times t_r+30ms$
Instantaneous trip pick-up current (A) : (I_i) ①	$(I_n)\times$(1.5, 2, 4, 6, 8, 10, 12, 14, 16) or OFF	$(I_n)\times$(1.5, 2, 4, 6, 8, 10, 12) or OFF
	Tolerance : $\pm15\%$	Tolerance : $\pm15\%$
Neutral protection pick-up current (A) : (I_N) ⑦	$(I_r)\times$(50, 100, 200)% or OFF ⑤	$(I_r)\times$(50, 100, 200)% or OFF ⑤
Neutral protection time settings (s) : (t_N)	Linked to the time settings for long time delay trip or instantaneous trip.	Linked to the time settings for long time delay trip or instantaneous trip.
Preferential trip alarm pick-up current (A) : (I_P)	$(I_r)\times80\%$ (fixed) ③ Tolerance : $\pm10\%$	$(I_r)\times80\%$ (fixed) ③ Tolerance : $\pm10\%$
Preferential trip alarm time settings (s) : (t_P)	$(t_r)\times50\%$ (fixed) ④ Tolerance差 : $-20\%\times t_P-20ms - +0\%\times t_P+30ms$	$(t_r)\times50\%$ (fixed) ④ Tolerance : $-20\%\times t_P-20ms - +0\%\times t_P+30ms$
Switching of starting characteristic	HOT/COLD	HOT/COLD

① : If the instantaneous trip current is set to OFF, this will be activated with the maximum set value $[(I_n\times16)]$

② : Time delay at $(I_r)\times600\%$

③ : When the (I_r1)=OFF, Preferential trip alarm can not work.

④ : Time delay at $(I_p)\times600\%$

⑤ : When the neutral protection pick-up current (I_N) exceeds the rated current (I_n), setting value of (I_N) set to rated current.

⑥ : In case of AX106S or AX106H, please select the value of rated current (I_n) 400A or 630A.

⑦ : If the 3-phase 3-wire configuration is selected, default setting value is set to "OFF".

⑧ : If not otherwise specified, the product will be delivered with the underlined default setting value.

6 Specifications

Setting range of protection functions (Standard type)

AOX−LSI ⑥

Types of ACB	AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H	AX120S, AX120H
Long time delay pick-up current (A) : (I_r)	(I_r1) : 0.40 − 1.00 (in units of 0.10), 0.95 or OFF ③ (I_r2) : 0.91 − 1.00 (in units of 0.01)	(I_r1) : 0.40 − 1.00 (in units of 0.10), 0.95 or OFF ③ (I_r2) : 0.91 − 1.00 (in units of 0.01)
	(I_r)=(I_r1)×(I_r2)×(I_n)	(I_r)=(I_r1)×(I_r2)×(I_n)
	Non tripping when load current ≦([I_r]×1.05], Tripping when ([I_r]×1.05)＜load current≦([I_r]×1.2) Tolerance : 105% − 120%	Non tripping when load current ≦([I_r]×1.05], Tripping when ([I_r]×1.05)＜load current≦([I_r]×1.2) Tolerance : 105% − 120%
Long time delay time settings (s) : (t_r)	0.5, 1.25, 2.5, 5, 8, 10, 15, 20, 25, 30 ②	0.5, 1.25, 2.5, 5, 8, 10, 15, 20 ②
	Tolerance : −20%×t_r−20ms − +0%×t_r+30ms	Tolerance : −20%×t_r−20ms − +0%×t_r+30ms
Short time delay pick-up current (A) : (I_{sd})	(I_n)×(1, 1.5, 2, 2.5, 3, 4, 6, 8, 10) or OFF	(I_n)×(1, 1.5, 2, 2.5, 3, 4, 6, 8) or OFF
	Tolerance : ±10%	Tolerance : ±10%
Short time delay time settings (ms) : (t_{sd})	*(see table below)*	*(see table below)*
Instantaneous trip pick-up current (A) : (I_i) ①	(I_n)×(1.5, 2, 4, 6, 8, 10, 12, 14, 16) or OFF	(I_n)×(1.5, 2, 4, 6, 8, 10, 12) or OFF
	Tolerance : ±15%	Tolerance : ±15%
Neutral protection pick-up current (A) : (I_N) ⑦	(I_r)×(50, 100, 200)% or OFF ⑤ Non tripping when load current ≦([I_N]×1.05], Tripping when ([I_N]×1.05)＜load current≦([I_N]×1.2)	(I_r)×(50, 100, 200)% or OFF ⑤ Non tripping when load current ≦([I_N]×1.05], Tripping when ([I_N]×1.05)＜load current≦([I_N]×1.2)
Neutral protection time settings (s) : (t_N)	Linked to the time settings for long time delay trip or instantaneous trip.	Linked to the time settings for long time delay trip or instantaneous trip.
Preferential trip alarm pick-up current (A) : (I_p)	(I_r)×80% (Fixed) ③ Tolerance : ±10%	(I_r)×80% (Fixed) ③ Tolerance : ±10%
Preferential trip alarm time settings (s) : (t_p)	(t_r)×50% (Fixed) ④ Tolerance : −20%×t_P−20ms − +0%×t_P+30ms	(t_r)×50% (Fixed) ④ Tolerance : −20%×t_P−20ms − +0%×t_P+30ms
Switching of starting characteristic	HOT/COLD	HOT/COLD

Short time delay time settings (ms) : (t_{sd}):

	50	100	200	400	600	
Relay time	50	100	200	400	600	(Adjustable)
Resettable time	25	75	175	375	575	Ramp chracteristic
Total breaking time	100	150	250	450	650	I^2t : ON or OFF

(For AX120S, AX120H):

	50	100	200	400	600	
Relay time	50	100	200	400	600	(Adjustable)
Resettable time	25	75	175	375	575	Ramp chracteristic
Total breaking time	100	150	250	450	650	I^2t : ON or OFF

① : If the short time delay pick-up current and instantaneous trip current are set to OFF, instantaneous trip will be activated with the maximum set value [(I_n×16)]

② : Time delay at (I_r)×600%

③ : When the (I_r1)=OFF, Preferential trip alarm can not work.

④ : Time delay at (I_p)×600%

⑤ : When the neutral protection pick-up current (I_N) exceeds the rated current (I_n), setting value of (I_N) set to rated current.

⑥ : In case of AX106S or AX106H, please select the value of rated current (I_n) 400A or 630A.

⑦ : If the 3-phase 3-wire configuration is selected, default setting value is set to "OFF".

⑧ : If not otherwise specified, the product will be delivered with the underlined default setting value.

Setting range of protection functions (Standard type)

AOX−LSIG ⑥

Types of ACB	AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H	AX120S, AX120H
Long time delay pick-up current (A) : (I_r)	(I_r1) : 0.40 – <u>1.00</u> (in units of 0.10), 0.95 or OFF ③ (I_r2) : 0.91 – <u>1.00</u> (in units of 0.01)	(I_r1) : 0.40 – <u>1.00</u> (in units of 0.10), 0.95 or OFF ③ (I_r2) : 0.91 – <u>1.00</u> (in units of 0.01)
	(I_r)=(I_r1)×(I_r2)×(I_n)	(I_r)=(I_r1)×(I_r2)×(I_n)
	Non tripping when load current ≦([I_r]×1.05], Tripping when ([I_r]×1.05)＜load current≦([I_r]×1.2) Tolerance : 105% − 120%	Non tripping when load current ≦([I_r]×1.05], Tripping when ([I_r]×1.05)＜load current≦([I_r]×1.2) Tolerance : 105% − 120%
Long time delay time settings (s) : (t_r)	0.5, 1.25, 2.5, 5, 8, <u>10</u>, 15, 20, 25, 30 ②	0.5, 1.25, 2.5, 5, 8, <u>10</u>, 15, 20 ②
	Tolerance : −20%×t_r −20ms − +0%×t_r +30ms	Tolerance : −20%×t_r −20ms − +0%×t_r +30ms
Short time delay pick-up current (A) : (I_{sd})	(I_n)×(1, 1.5, 2, 2.5, 3, 4, <u>6</u>, 8, 10) or OFF	(I_n)×(1, 1.5, 2, 2.5, 3, 4, <u>6</u>, 8) or OFF
	Tolerance : ±10%	Tolerance : ±10%

Short time delay time settings (ms) : (t_{sd})	Relay time	50	100	200	<u>400</u>	600	(Adjustable) Ramp chracteristic I^2t : ON or <u>OFF</u>	Relay time	50	100	200	<u>400</u>	600	(Adjustable) Ramp chracteristic I^2t : ON or <u>OFF</u>
	Resettable time	25	75	175	375	575		Resettable time	25	75	175	375	575	
	Total breaking time	100	150	250	450	650		Total breaking time	100	150	250	450	650	

Instantaneous trip pick-up current (A) : (I_i) ①	(I_n)×(1.5, 2, 4, 6, 8, 10, 12, 14, <u>16</u>) or OFF	(I_n)×(1.5, 2, 4, 6, 8, 10, <u>12</u>) or OFF
	Tolerance : ±15%	Tolerance : ±15%
Neutral protection pick-up current (A) : (I_N) ⑦	(I_r)×(50, <u>100</u>, 200)% or OFF ⑤ Non tripping when load current ≦([I_N]×1.05], Tripping when ([I_N]×1.05)＜load current≦([I_N]×1.2)	(I_r)×(50, <u>100</u>, 200)% or OFF ⑤ Non tripping when load current ≦([I_N]×1.05], Tripping when ([I_N]×1.05)＜load current≦([I_N]×1.2)
Neutral protection time settings (s) : (t_N)	Linked to the time settings for long time delay trip or instantaneous trip.	Linked to the time settings for long time delay trip or instantaneous trip.
Ground fault trip pick-up current (A) : (I_g)	(I_n)×0.1 – 0.8 (in unit of 0.1), 1.0 or OFF Default value : 0.2 Tolerance : ±10%	(I_n)×0.1 – 0.8 (in unit of 0.1), 1.0 or OFF Default value : 0.2 Tolerance : ±10%

Ground fault trip time settings (ms) : (t_g)	Relay time	100	<u>300</u>	500	1000	2000	(Adjustable) Ramp chracteristic I^2t : ON or <u>OFF</u>	Relay time	100	<u>300</u>	500	1000	2000	(Adjustable) Ramp chracteristic I^2t : ON or <u>OFF</u>
	Resettable time	75	275	475	975	1975		Resettable time	75	275	475	975	1975	
	Total breaking time	150	350	550	1050	2050		Total breaking time	150	350	550	1050	2050	

Preferential trip alarm pick-up current (A) : (I_p)	(I_r)×80% (Fixed) ③ Tolerance : ±10%	(I_r)×80% (Fixed) ③ Tolerance : ±10%
Preferential trip alarm time settings (s) : (t_p)	(t_r)×50% (Fixed) ④ Tolerance : −20%×t_P −20ms − +0%×t_P+30ms	(t_r)×50% (Fixed) ④ Tolerance : −20%×t_P −20ms − +0%×t_P+30ms
Switching of starting characteristic	HOT/<u>COLD</u>	HOT/<u>COLD</u>

① : If the short time delay pick-up current and instantaneous trip current are set to OFF, instantaneous trip will be activated with the maximum set value [(I_n×16)]

② : Time delay at (I_r)×600%

③ : When the (I_r1)=OFF, Preferential trip alarm can not work.

④ : Time delay at (I_p)×600%

⑤ : When the neutral protection pick-up current (I_N) exceeds the rated current (I_n), setting value of (I_N) set to rated current.

⑥ : In case of AX106S or AX106H, please select the value of rated current (In) 400A or 630A.

⑦ : If the 3-phase 3-wire configuration is selected, default setting value is set to "OFF".

⑧ : If not otherwise specified, the product will be delivered with the underlined default setting value.

6 Specifications

Setting range of protection functions (Standard type)

ＡＯＸ－ＬＳＩＲ ⑤⑥

Long time-delay pick-up current (A) : (I_r) ①	(I_r1) : 0.75 — <u>1.15</u> (in units of 0.05) or OFF										
	(I_r2) : 0.91 — <u>1.00</u> (in units of 0.01)										
	(I_r) = (I_r1)×(I_r2)×(I_{gen})										
	Tolerance : ±5%										
Long time-delay time settings (s) : (t_r)	15 — 60 (in units of 5s) ⑦ Standard setting : 20										
	Tolerance : –15% × t_r – 0ms — +15% × t_r + 150ms										
Short time-delay pick-up current (A) : (I_{sd})	(I_{gen})×(2, 2.5, <u>2.75</u>, 3, 3.25, 3.5, 4, 4.5, 5) or OFF										
	Tolerance : ±10%										
Short time-delay time settings (ms) : (t_{sd})	Relay time	100	<u>200</u>	300	400	500	600	700	800	900	1000	Ramp characteristic I^2t : OFF (fixed)
	Resettable time	75	175	275	375	475	575	675	775	875	975	
	Total breaking time	150	250	350	450	550	650	750	850	950	1050	
Instantaneous trip pick-up current (A) : (I_i) ②	(I_{gen})×2 — <u>16</u> (in units of 2) or OFF										
	Tolerance : ±15%										
Preferential trip alarm pick-up current (A) : (I_p) ③	(I_{gen})×60% — 105% (in units of 1%) Default setting values : (I_{gen})×95%										
	Tolerance : ±10%										
Preferential trip alarm time settings (s) : (t_p) ③	(t_r)×5% — 80% (in units of 1s), Default setting : 50% ⑧										
	Tolerance : –15% × t_p – 0ms — +15% × t_p + 100ms										
Reverse power trip pick-up power (kW) : (P_{rp})	(P_n)×(<u>4</u>, 4.5, 5, 5.5, 6, 7, 8, 9, 10) % or OFF										
	Tolerance : –20% — +0%										
Reverse power trip time settings (s) : (t_{rp})	2.5, <u>5</u>, 7.5, 10, 12.5, 15, 17.5, 20, 22.5, 25 (adjustable) ⑨										
	Tolerance : –15% × t_{rp} – 0ms — +15% × t_{rp} + 100ms										
Reverse power trip normal power feed direction setting	<u>Forward direction</u> / Reverse direction ④										
Phase / wire system	<u>3-phase 3-wire type</u> / 3-phase 4-wire type										
Switching of starting characteristic	COLD (fixed)										

① : When I_r1 = OFF, I_r = I_{gen}

② : If the set current values for both short-time delay tripping and instantaneous tripping are set to OFF, instantaneous tripping will be enabled and activated with the maximum set value (×16).

③ : Specify this function when placing an order. Unless otherwise specified, the product is delivered with the default setting value.

④ : "Forward direction" means the direction from the upper terminal to the lower terminal and "Reverse direction" means the direction from the lower terminal to the upper terminal.

⑤ : Specify the rated current (I_{gen}) for the generator when placing an order. The rated current (I_{gen}) can be specified between 60% and 100% of the rated current (I_n) in units of 1A.

⑥ : Specify the rated power (P_n) for the generator when placing an order. The rated power (P_n) can be specified between 50kW and 9,995kW in units of 5kW.

⑦ : Time limit at (I_r)×120%

⑧ : Time limit at (I_p)×120%

⑨ : Time limit at (P_{rp})×100%

⑩ : If not otherwise specified, the product will be delivered with the underlined values and "Default setting value" in the table.

Setting range of protection functions (Smart type)

ＡＯＸ－ＬＳＩ＋　 ⑨⑯

		Default settings ⑮
Long time-delay pick-up current (A) : (I_r) ①	(I_n)×0.4 – 1.0 (in units of 0.01) or OFF ②	(I_n)×1.00
	Tolerance of Thi(L characteristics) : Non tripping when load current ≦ ([I_r]×1.05), Tripping when ([I_r]×1.05) < load current ≦ ([I_r]×1.2) Tolerance of other characteristics : ±5%	—
Long time-delay time settings (s) : (t_r) ①④	0.5 – 30 (in unitss of 0.5s)　　　　　Tolerance : −20%×t_r −20ms − +0%×t_r +30ms	10.0s
Switching of Long time-delay trip characteristics	Thi (L characteristics), I$^{0.02}$t (SI), It (VI), I^{2}t (EI), I^{3}t, I^{4}t (HVF)	Thi
Short time delay pick-up current (A) : (I_{sd}) ①	(I_n)×1.0 – 10 (in units of 0.5) or OFF ③　　　　Tolerance : ±10%	(I_n)×6

Short time delay time settings (ms) : (t_{sd}) ①	Relay time	50	100	150	200	250	300	350	400	450	500	550	600	400ms
	Resettable time	25	75	125	175	225	275	325	375	425	475	525	575	375ms
	Total breaking time	100	150	200	250	300	350	400	450	500	550	600	650	450ms
	Ramp characteristic I^{2}t : ON or OFF													OFF

		Default settings ⑮
Zone interlock (Short time-delay trip)	ON or OFF	OFF
Instantaneous trip pick-up current (A) : (I_i) ①	(I_n)×1.5 – 16 (in units of 0.5) or OFF ③　　　Tolerance : ±15%	OFF
Neutral protection pick-up current (A) : (I_N)	(I_r)×0.5 – 2.0 (in units of 0.5) or OFF ⑦	OFF (3pole, 3phase 3wire) (I_r)×1.0 (Except for the above)
Neutral protection time settings (s) : (t_N)	Link to the time-delay settings for Long time delay trip and Short time delay trip.	—
Preferential trip alarm1 pick-up current (A) : (I_{P1})	(I_r)×60% – 95% (in units of 5%)　　　　　Tolerance : ±10%	(I_r)×80%
Preferential trip alarm1 time settings (s) : (t_{P1}) ⑤	(t_r)×5% – 80% (in units of 5%)　　　　Tolerance : −20%×t_{P1} −20ms − 0%×t_{P1} ; 30ms	(t_r)×50%
Preferential trip alarm2 pick-up current (A) : (I_{P2})	(I_r)×60% – 95% (in units of 5%) or OFF　　Tolerance : ±10%	(I_r)×80%
Preferential trip alarm2 time settings (s) : (t_{P2}) ⑤	(t_r)×5% – 80% (in units of 5%)　　　　Tolerance : −20%×t_{P2} −20ms − 0%×t_{P2} ; 30ms	(t_r)×50%
Voltage settings for Under voltage protection (V) : (U_{uv}) ⑫⑬	100 – 1000 (in units of 5)　　　　　Tolerance : ±1%	100V
	Working mode : TRIP/ALARM/OFF	OFF
Time settings for Under voltage protection (s) : (t_{uv}) ⑫⑬	0.1 – 300 (in units of 0.1)　　　　Tolerance : ±2%×(t_{uv}) or ±40ms, whichever is lager	10.0s
Voltage settings for Over voltage protection (V) : (U_{ov}) ⑫⑬	100 – 1000 (in units of 5)　　　　　Tolerance : ±1%	725V
	Working mode : TRIP/ALARM/OFF	OFF
Time settings for Over voltage protection (s) : (t_{ov}) ⑫⑬	0.1 – 300 (in units of 0.1)　　　　Tolerance : ±2%×(t_{ov}) or ±40ms, whichever is lager	10.0s
Frequency settings for Under frequency protection (Hz) : (F_{uf}) ⑫	45 – F_n (in units of 0.1) ⑰　　　　Tolerance : ±0.1Hz	45Hz
	Working mode : TRIP/ALARM/OFF	OFF
Time settings for Under frequency protection (s) : (t_{uf}) ⑫	0.1 – 300 (in units of 0.1)　　　　Tolerance : ±2%×(t_{uf}) or ±40ms, whichever is lager	10.0s
Frequency settings for Over frequency protection (Hz) : (F_{of}) ⑫	F_n – 65 (in units of 0.1) ⑰　　　　Tolerance : ±0.1Hz	65Hz
	Working mode : TRIP/ALARM/OFF	OFF
Time settings for Over frequency protection (s) : (t_{of}) ⑫	0.1 – 300 (in units of 0.1)　　　　Tolerance : ±2%×(t_{of}) or ±40ms, whichever is lager	10.0s
Power settings for Reverse power protection (kW) : (P_{rp}) ⑥⑫	(P_n)×4% – 15% (in units of 0.5%)　　Tolerance : −20%～ +0%	4%
	Working mode : TRIP/ALARM/OFF	OFF
Time settings for Reverse power protection (s) : (t_{rp}) ⑪⑫	0.5 – 25 (in units of 0.5)　　　　Tolerance : −15%×(t_{rp}) −0ms − +15%×(t_{rp})+100ms	5s
Current settings for Unbalance current protection (%) : (I_{unbc}) ⑫	2 – 90 (in units of 1)　　　　　Tolerance : ±5%	50%
	Working mode : TRIP/ALARM/OFF	OFF
Time settings for Unbalance current protection (s) : (t_{unbc}) ⑫	0.5 – 60 (in units of 0.1)　　　　Tolerance : ±2%×(t_{unbc}) or ±40ms, whichever is lager	10s
Voltage settings for Unbalance voltage protection (%) : (U_{unbv}) ⑫	2 – 90 (in units of 1)　　　　　Tolerance : ±2%	30%
	Working mode : TRIP/ALARM/OFF	OFF
Time settings for Unbalance voltage protection (s) : (t_{unbv}) ⑫	0.5 – 60 (in units of 0.1)　　　　Tolerance : ±2%×(t_{unbv}) or ±40ms, whichever is lager	10s
Temperature settings for Contact temperature monitoring (℃) : (T_{oh}) ⑧	105 – 155 (in units of 10)　　　　Tolerance : ±10% ⑭	155℃
	Working mode : ALARM/OFF	OFF
Time settings for Contact temperature monitoring (s) : (t_{oh}) ⑧	50ms or less	—
Switching of starting characteristics	COLD/HOT	COLD

① : The setting current and time settings can be set to 2 type values as "Setting A" and "Setting B".
② : If "I_r" is set to "OFF", the Preferential trip alarm1 and Preferential trip alarm2 functions will also be non tripping.
③ : Short time delay trip and instantaneous trip can not both be set to "OFF".
④ : Thi (L characteristic) : Time settings at (I_r)×600% Other characteristics : Time settings at (I_r)×300%
⑤ : If the Long time delay trip characteristic is Thi (L characteristic) : Time setting at (I_P)×600%
　　If the Long time delay characteristic are except for Thi (L characteristic) : Time setting at (I_P)×300%.
⑥ : The rated power (P_n) can be specified between 50kW and 9,995kW in unit of 5kW.
⑦ : If the (I_r)×(0.5 to 2.0) value exceeds the rated current vaue In, the seting current value will be set to the rated current value.
⑧ : This function is optional and can not be install for Fixed type.

⑨ : When placing an order of AX106S and AX106H, specify the rated current "I_n" from 400A and 630A.
⑩ : If the products are used in the condition of 3-phase 3-wire, please set the "OFF" setting.
⑪ : Time setting at (P_{rp})×100%.
⑫ : Working mode can be set to Trip (Trip the ACB at each settingvalue), Alarm (Output the alarm at each setting value), or OFF (disable the function).
⑬ : If the products are used in the 3-phase 3-wire, voltage settings can be selected phase voltage or line voltage.
⑭ : Accuracy at the ambient temperature between 20 – 50℃ .
⑮ : If not otherwise specified, the product will be delivered with "Default settings" in the table.
⑯ : AOX-LSI+ can not be applied to AX120S and AX120H.
⑰ : "F_n" means rated frequency (50Hz or 60Hz).

6 Specifications

Setting range of protection functions (Smart type)

AOX−LSIG+ ⑨⑯

		Default settings ⑮
Long time-delay pick-up current (A) : (I_r) ①	(I_n)×0.4 − 1.0 (in units of 0.01) or OFF ②	(I_n)×1.00
	Tolerance of Thi(L characteristics) : Non tripping when load current ≦ ([I_r]×1.05), Tripping when ([I_r]×1.05) < load current ≦ ([I_r]×1.2) Tolerance of other characteristics : ±5%	—
Long time-delay time settings (s) : (t_r) ①④	0.5 − 30 (in unitss of 0.5s)　　　　Tolerance : −20%×t_r −20ms − +0%×t_r +30ms	10.0s
Switching of Long time-delay trip characteristics	Thi (L characteristics), I$^{0.02}$t (SI), It (VI), I^{2}t (EI), I^{3}t, I^{4}t (HVF)	Thi
Short time delay pick-up current (A) : (I_{sd}) ①	(I_n)×1.0 − 10 (in units of 0.5) or OFF ③　　Tolerance : ±10%	(I_n)×6

Short time delay time settings (ms) : (t_{sd}) ①	Relay time	50	100	150	200	250	300	350	400	450	500	550	600	400ms
	Resettable time	25	75	125	175	225	275	325	375	425	475	525	575		375ms
	Total breaking time	100	150	200	250	300	350	400	450	500	550	600	650	450ms
	Ramp characteristic I^{2}t : ON or OFF													OFF

		Default settings
Zone interlock (Short time-delay trip)	ON or OFF	OFF
Instantaneous trip pick-up current (A) : (I_i) ①	(I_n)×1.5 − 16 (in units of 0.5) or OFF ③　　Tolerance : ±15%	OFF
Neutral protection pick-up current (A) : (I_N)	(I_r)×0.5 − 2.0 (in units of 0.5) or OFF ⑦	OFF (3pole, 3phase 3wire) (I_r)×1.0 (Except for the above)
Neutral protection time settings (s) : (t_N)	Link to the time-delay settings for Long time delay trip and Short time delay trip.	—
Ground fault trip pick-up current (A) : (I_g) ①	(I_n)×0.1 − 1.0 (in units of 0.05) or OFF　　Tolerance : ±10%	(I_n)×0.2
Ground fault trip time settings (ms) : (t_g) ①	Relay time : 50 − 2000ms (in units of 50ms) Resettable time : t_g −25ms Total breaking time : t_g +50ms	300ms
	Ramp characteristic I^{2}t : ON or OFF	OFF
Zone interlock (Ground faut trip)	ON or OFF	OFF
Preferential trip alarm1 pick-up current (A) : (I_{P1})	(I_r)×60% − 95% (in units of 5%)　　Tolerance : ±10%	(I_r)×80%
Preferential trip alarm1 time settings (s) : (t_{P1}) ⑤	(t_r)×5% − 80% (in units of 5%)　　Tolerance : −20%×t_{P1} −20ms − 0%×t_{P1} ; 30ms	(t_r)×50%
Preferential trip alarm2 pick-up current (A) : (I_{P2})	(I_r)×60% − 95% (in units of 5%) or OFF　　Tolerance : ±10%	(I_r)×80%
Preferential trip alarm2 time settings (s) : (t_{P2}) ⑤	(t_r)×5% − 80% (in units of 5%)　　Tolerance : −20%×t_{P2} −20ms − 0%×t_{P2} ; 30ms	(t_r)×50%
Voltage settings for Under voltage protection (V) : (U_{uv}) ⑫⑬	100 − 1000 (in units of 5)　　Tolerance : ±1%	100V
	Working mode : TRIP/ALARM/OFF	OFF
Time settings for Under voltage protection (s) : (t_{uv}) ⑫⑬	0.1 − 300 (in units of 0.1)　　Tolerance : ±2%×(t_{uv}) or ±40ms, whichever is lager	10.0s
Voltage settings for Over voltage protection (V) : (U_{ov}) ⑫⑬	100 − 1000 (in units of 5)　　Tolerance : ±1%	725V
	Working mode : TRIP/ALARM/OFF	OFF
Time settings for Over voltage protection (s) : (t_{ov}) ⑫⑬	0.1 − 300 (in units of 0.1)　　Tolerance : ±2%×(t_{ov}) or ±40ms, whichever is lager	10.0s
Frequency settings for Under frequency protection (Hz) : (F_{uf}) ⑫	45 − F_n (in units of 0.1) ⑰　　Tolerance : ±0.1Hz	45Hz
	Working mode : TRIP/ALARM/OFF	OFF
Time settings for Under frequency protection (s) : (t_{uf}) ⑫	0.1 − 300 (in units of 0.1)　　Tolerance : ±2%×(t_{uf}) or ±40ms, whichever is lager	10.0s
Frequency settings for Over frequency protection (Hz) : (F_{of}) ⑫	F_n − 65 (in units of 0.1) ⑰　　Tolerance : ±0.1Hz	65Hz
	Working mode : TRIP/ALARM/OFF	OFF
Time settings for Over frequency protection (s) : (t_{of}) ⑫	0.1 − 300 (in units of 0.1)　　Tolerance : ±2%×(t_{of}) or ±40ms, whichever is lager	10.0s
Power settings for Reverse power protection (kW) : (P_{rp}) ⑥⑫	(P_n)×4% − 15% (in units of 0.5%)　　Tolerance : −20% − +0%	4%
	Working mode : TRIP/ALARM/OFF	OFF
Time settings for Reverse power protection (s) : (t_{rp}) ⑪⑫	0.5 − 25 (in units of 0.5)　　Tolerance : −15%×(t_{rp}) −0ms − +15%×(t_{rp})+100ms	5s
Current settings for Unbalance current protection (%) : (I_{unbc}) ⑫	2 − 90 (in units of 1)　　Tolerance : ±5%	50%
	Working mode : TRIP/ALARM/OFF	OFF
Time settings for Unbalance current protection (s) : (t_{unbc}) ⑫	0.5 − 60 (in units of 0.1)　　Tolerance : ±2%×(t_{unbc}) or ±40ms, whichever is lager	10s
Voltage settings for Unbalance voltage protection (%) : (U_{unbv}) ⑫	2 − 90 (in units of 1)　　Tolerance : ±2%	30%
	Working mode : TRIP/ALARM/OFF	OFF
Time settings for Unbalance voltage protection (s) : (t_{unbv}) ⑫	0.5 − 60 (in units of 0.1)　　Tolerance : ±2%×(t_{unbv}) or ±40ms, whichever is lager	10s
Temperature settings for Contact temperature monitoring (℃) : (T_{oh}) ⑧	105 − 155 (in units of 10)　　Tolerance : ±10% ⑭	155℃
	Working mode : ALARM/OFF	OFF
Time settings for Contact temperature monitoring (s) : (t_{oh}) ⑧	50ms or less	—
Switching of starting characteristics	COLD/HOT	COLD

① : The setting current and time settings can be set to 2 type values as "Setting A" and "Setting B".
② : If "I_r" is set to "OFF", the Preferential trip alarm1 and Preferential trip alarm2 functions will also be non tripping.
③ : Short time delay trip and instantaneous trip can not both be set to "OFF".
④ : Thi (L characteristic) : Time settings at (I_r)×600% Other characteristics : Time settings at (I_r)×300%
⑤ : If the Long time delay trip characteristic is Thi (L characteristic) : Time setting at (I_P)×600%
　　If the Long time delay characteristic are except for Thi (L characteristic) : Time setting at (I_P)×300.
⑥ : The rated power (P_n) can be specified between 50kW and 9,995kW in unit of 5kW.
⑦ : If the (I_r)×(0.5 to 2.0) value exceeds the rated current vaue In, the seting current value will be set to the rated current value.
⑧ : This function is optional and can not be install for Fixed type.

⑨ : When placing an order of AX106S and AX106H, specify the rated current "I_n" from 400A or 630A.
⑩ : If the products are used in the condition of 3-phase 3-wire, please set the "OFF" setting.
⑪ : Time setting at (P_{rp})×100%.
⑫ : Working mode can be set to Trip (Trip the ACB at each settingvalue), Alarm (Output the alarm at each setting value), or OFF (disable the function).
⑬ : If the products are used in the 3-phase 3-wire, voltage settings can be selected phase voltage or line voltage.
⑭ : Accuracy at the ambient temperature between 20 − 50℃ .
⑮ : If not otherwise specified, the product will be delivered with "Default settings" in the table.
⑯ : AOX-LSI+ can not be applied to AX120S and AX120H.
⑰ : "F_n" means rated frequency (50Hz or 60Hz).

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Measurement items (Smart type)

Main Measurement items and those accuracies are as follows.

Measurement items		Measurement accuracy ①
Voltage	Line voltage (instantaneous)	Class 0.5
	Line voltage (maximum)	
	Line voltage (minimum)	
	Line voltage (average)	
	Phase voltage (instantaneous) ②	Class 0.5
	Phase voltage (maximum) ②	
	Phase voltage (minimum) ②	
	Phase voltage (average) ②	
Voltage unbalance	Line voltage unbalance	Class 1
	Line voltage unbalance (maximum)	
	Line voltage unbalance (minimum)	
	Phase voltage unbalance ②	
	Phase voltage unbalance (maximum) ②	
	Phase voltage unbalance (minimum) ②	
Phase current	Phase current (instantaneous)	Class 0.5
	Phase current (maximum)	
	Phase current (minimum)	
	Phase current (average)	
	Demand value of phase current	
	Demand value of phase current (maximum)	
Current unbalance	Current unbalance (instantaneous)	Class 1
	Current unbalance (maximum)	
	Current unbalance (minimum)	
Power factor	Power factor (instantaneous)	Class 0.5
	Power factor (maximum)	
Frequency	Frequencyr (instantaneous)	Class 0.02
	Frequency (maximum)	
	Frequency (minimum)	

Measurement items		Measurement accuracy ①
Power	Active power (instantaneous)	Class 1
	Active power (maximum)	
	Active power (minimum)	
	Demand value of active power	
	Demand value of active power (maximum)	
	Total active power	
	Reactive power (instantaneous)	Class 2
	Reactive power (maximum)	
	Reactive power (minimum)	
	Demand value of reactive power	
	Demand value of reactive power (maximum)	
	Total reactive power	
	Apparent power (instantaneous)	Class 1
	Apparent power (maximum)	
	Apparent power (minimum)	
	Demand value of apparent power	
	Demand value of apparent power (maximum)	
	Total apparent power	
Energy	Active energy	Class 1
	Reactive energy	Class 2
	Apparent energy	Class 1
Total harmonic distortion	Line voltage (instantaneous)	Class 1
	Line voltage (maximum)	
	Line voltage (minimum)	
	Phase voltage (instantaneous) ②	
	Phase voltage (maximum) ②	
	Phase voltage (minimum) ②	
	Phase current (instantaneous)	
	Phase current (maximum)	
	Phase current (minimum)	

① Class is the measurement accuracy specified in IEC61557-12.
② It is possible to measure if the circuit is 3pole 4wire.

6 Specifications

Protection characteristic for standard type (AOX–LI, AOX–LSI, AOX–LSIG)

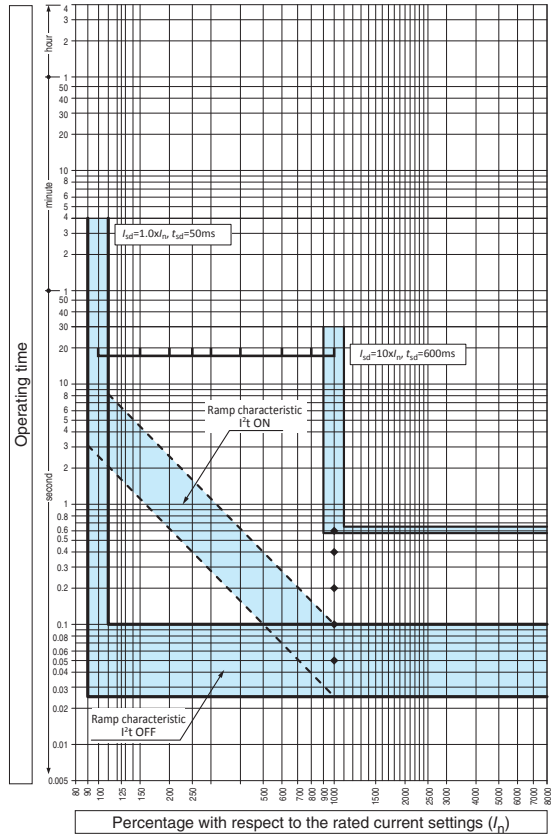### Long time delay trip characteristics

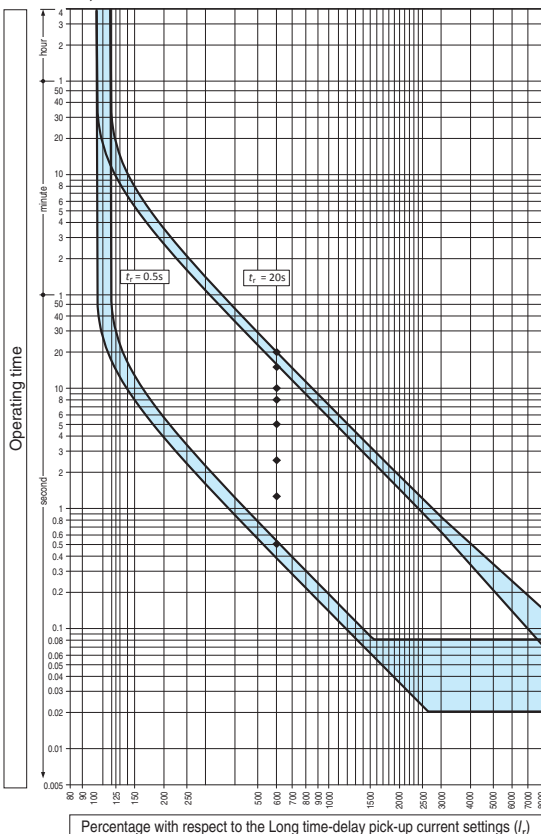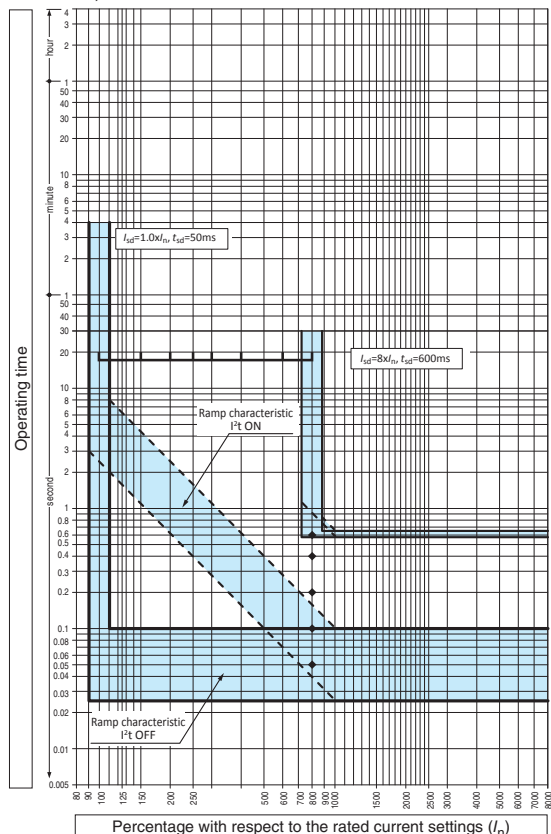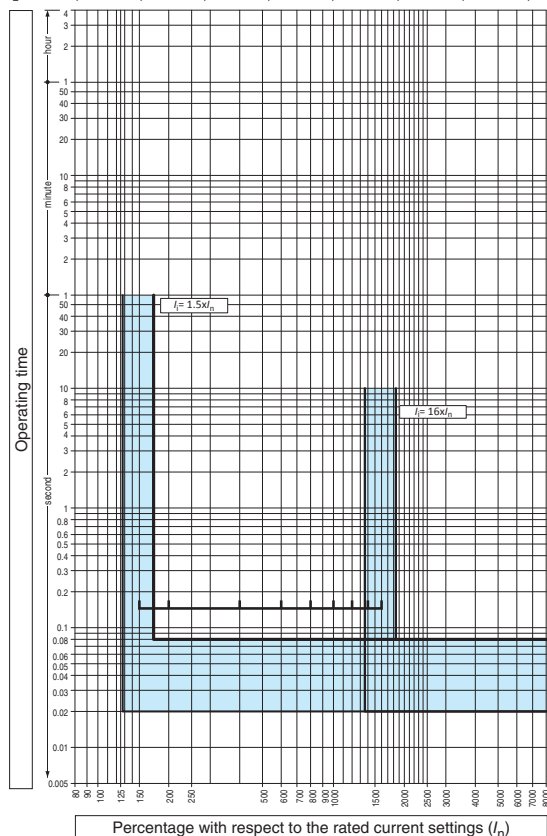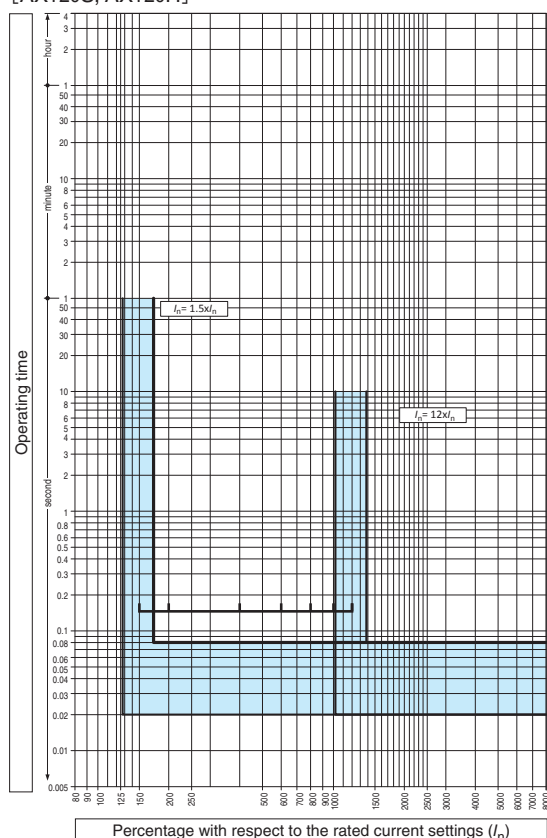[AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H]

$t_r = 0.5s$ $t_r = 30s$

Operating time

Percentage with respect to the Long time-delay pick-up current settings (I_r)

[AX120S, AX120H]

$t_r = 0.5s$ $t_r = 20s$

Operating time

Percentage with respect to the Long time-delay pick-up current settings (I_r)

Short time delay trip characteristics

[AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H]

$I_{sd}=1.0\times I_n$, $t_{sd}=50ms$

$I_{sd}=10\times I_n$, $t_{sd}=600ms$

Ramp characteristic I^2t ON

Ramp characteristic I^2t OFF

Operating time

Percentage with respect to the rated current settings (I_n)

[AX120S, AX120H]

$I_{sd}=1.0\times I_n$, $t_{sd}=50ms$

$I_{sd}=8\times I_n$, $t_{sd}=600ms$

Ramp characteristic I^2t ON

Ramp characteristic I^2t OFF

Operating time

Percentage with respect to the rated current settings (I_n)
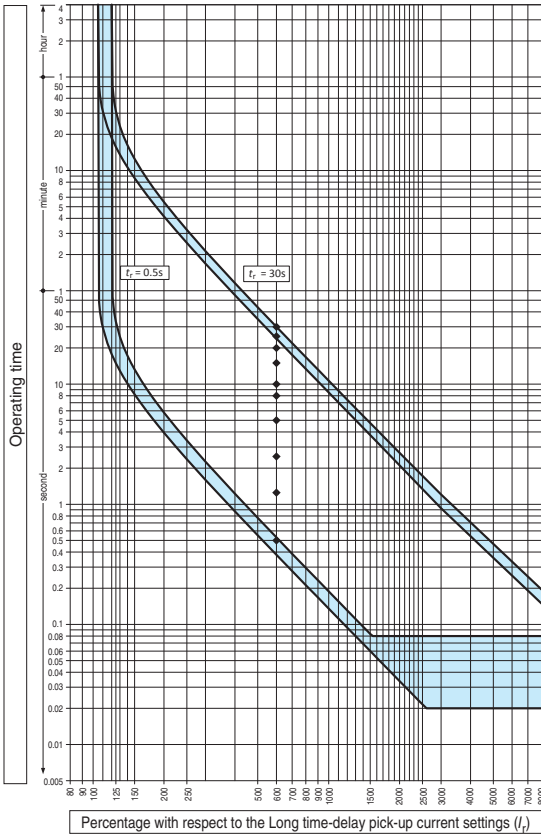
∗ Protection characteristic that is only included with AOX-LSI and AOS-LISG.

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TemPower PRO

Protection characteristic for standard type (AOX–LI, AOX–LSI, AOX–LSIG)

Instantaneous tripping characteristics

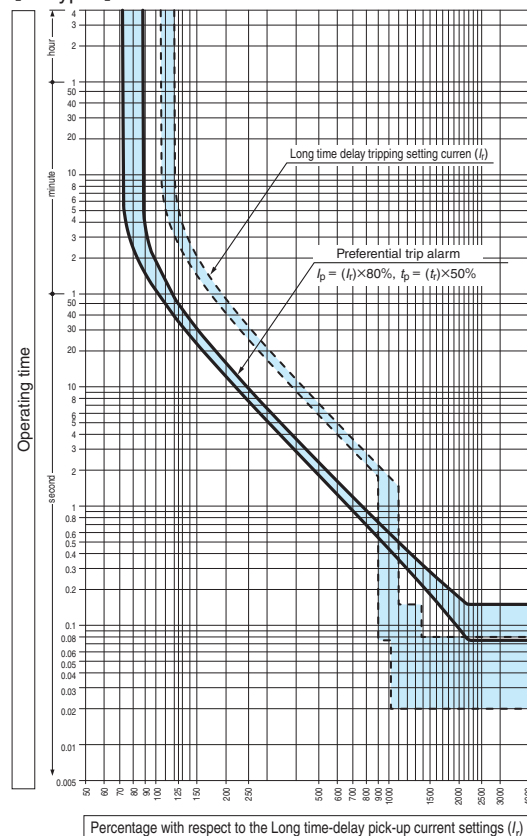[AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H]

$I_i = 1.5 \times I_n$

$I_i = 16 \times I_n$

Operating time

Percentage with respect to the rated current settings (I_n)

[AX120S, AX120H]

$I_n = 1.5 \times I_n$

$I_n = 12 \times I_n$

Operating time

Percentage with respect to the rated current settings (I_n)

Preferential trip alarm characteristics

[All types]

Long time delay tripping setting curren (I_t)

Preferential trip alarm
$I_p = (I_t) \times 80\%$, $t_p = (t_t) \times 50\%$

Operating time

Percentage with respect to the Long time-delay pick-up current settings (I_t)

＊1 : Long time, Short time and Instantaneous trip characteristics shown with the dashed line are characteristics under the following conditions.

$I_r = I_n$, $t_r = 5$ (s), $I_i = 12 \times I_n$, $I_{sd} = 10 \times I_n$, $t_{sd} = 100$ (ms), $I^2t = OFF$

Protection characteristic for standard type (AOX–LI, AOX–LSI, AOX–LSIG)

N-phase protection function

[All types]
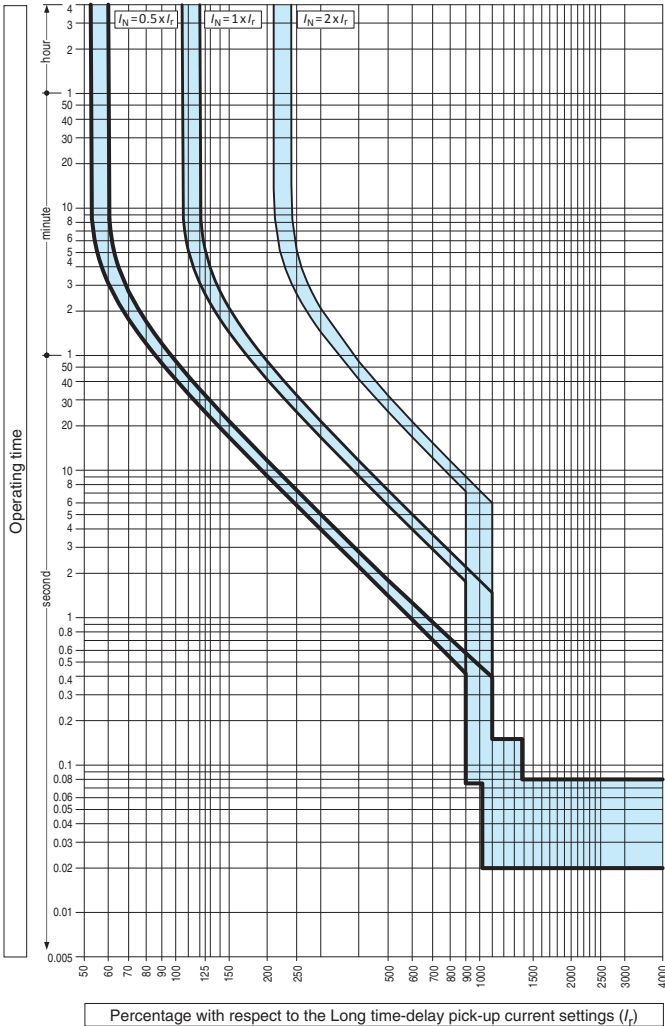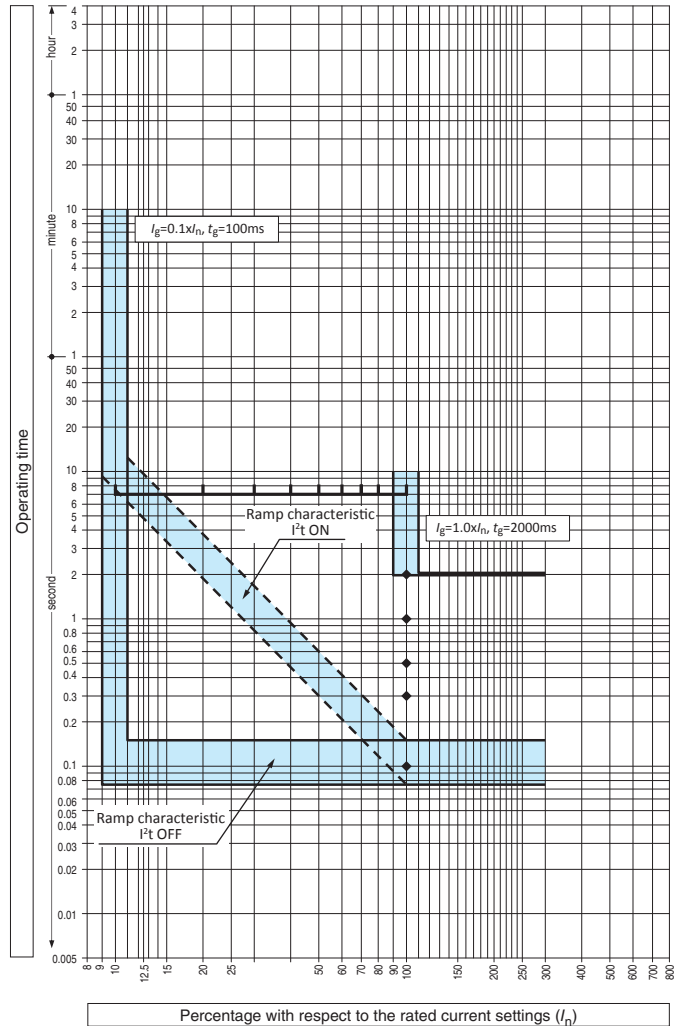
$I_N=0.5 \times I_r$ $I_N=1 \times I_r$ $I_N=2 \times I_r$

Operating time

Percentage with respect to the Long time-delay pick-up current settings (I_r)

Ground fault trip characteristics

[All types]

$I_g=0.1 \times I_n$, $t_g=100ms$

Ramp characteristic
I^2t ON

$I_g=1.0 \times I_n$, $t_g=2000ms$

Ramp characteristic
I^2t OFF

Operating time

Percentage with respect to the rated current settings (I_n)

＊ Protection characteristic that is only included with AOX-LSIG.

TemPower PRO

Protection characteristic for standard type (AOX–LSIR)

[AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H]
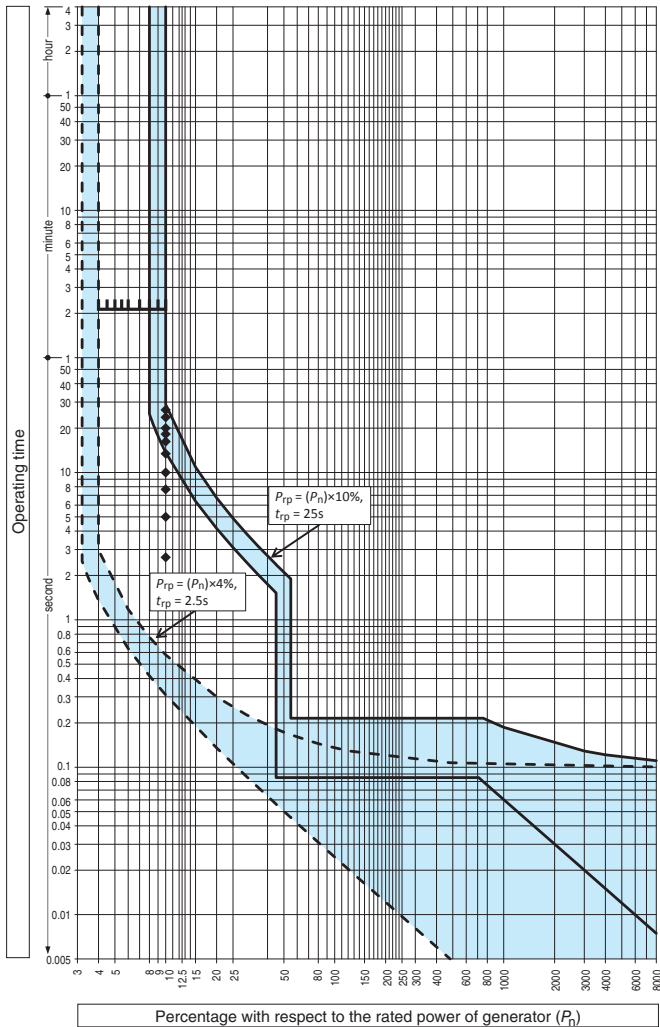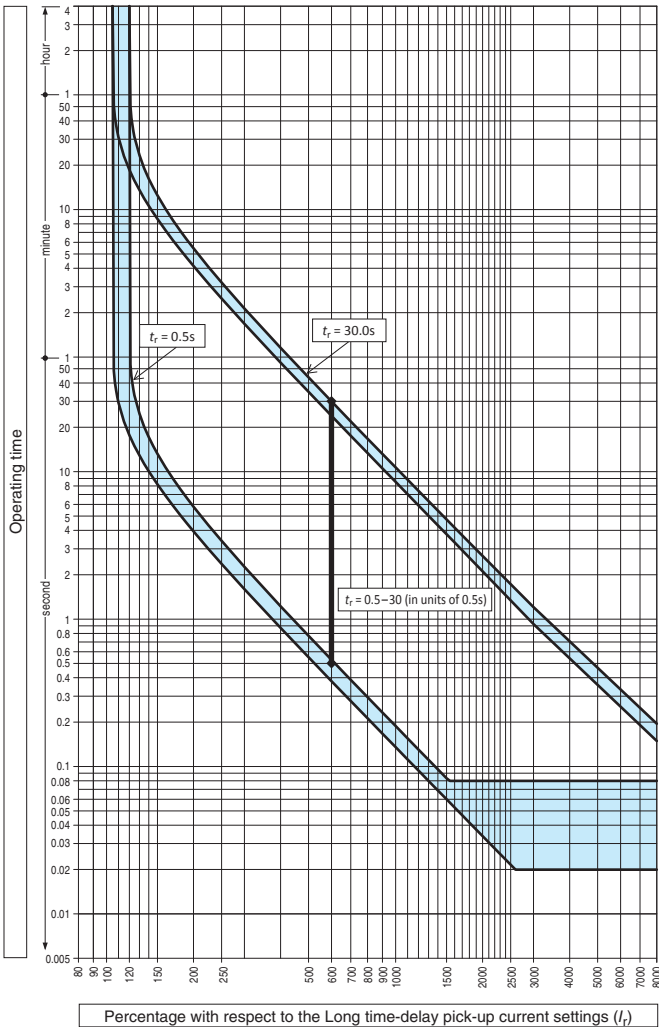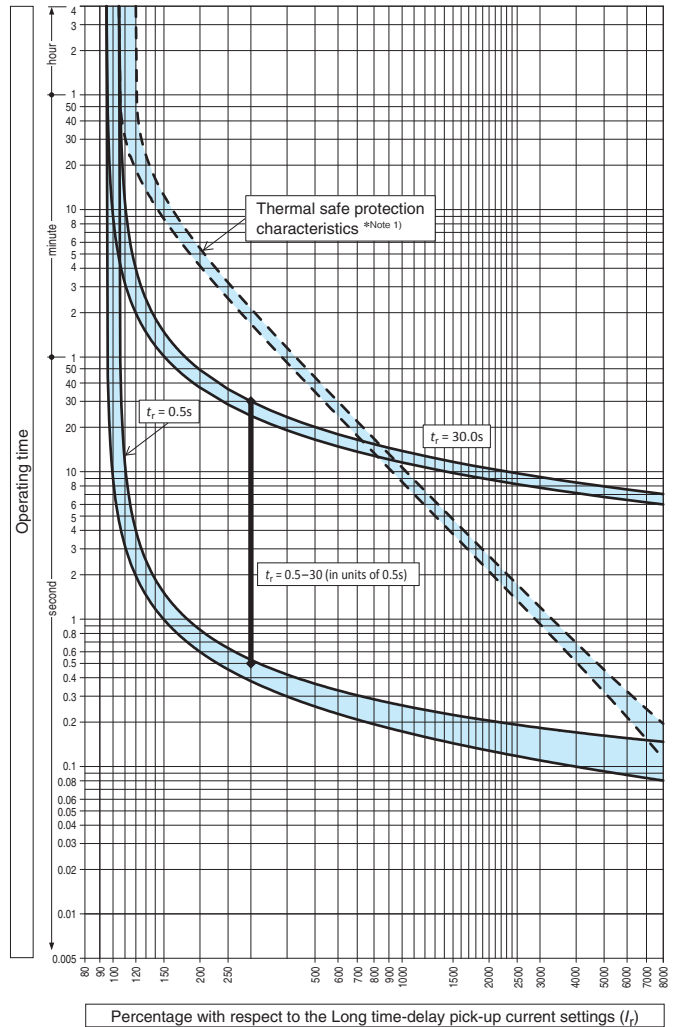
Long time delay trip characteristics

t_r = 60s

t_r = 15s

Operating time

Percentage with respect to the Long time-delay pick-up current settings (I_r)

Short time delay trip characteristics

I_{sd}=2.0xI_{gen}, t_{sd}=100ms

I_{sd}=5.0xI_{gen}, t_{sd}=1000ms

Operating time

Percentage with respect to the rated current of generator (I_{gen})
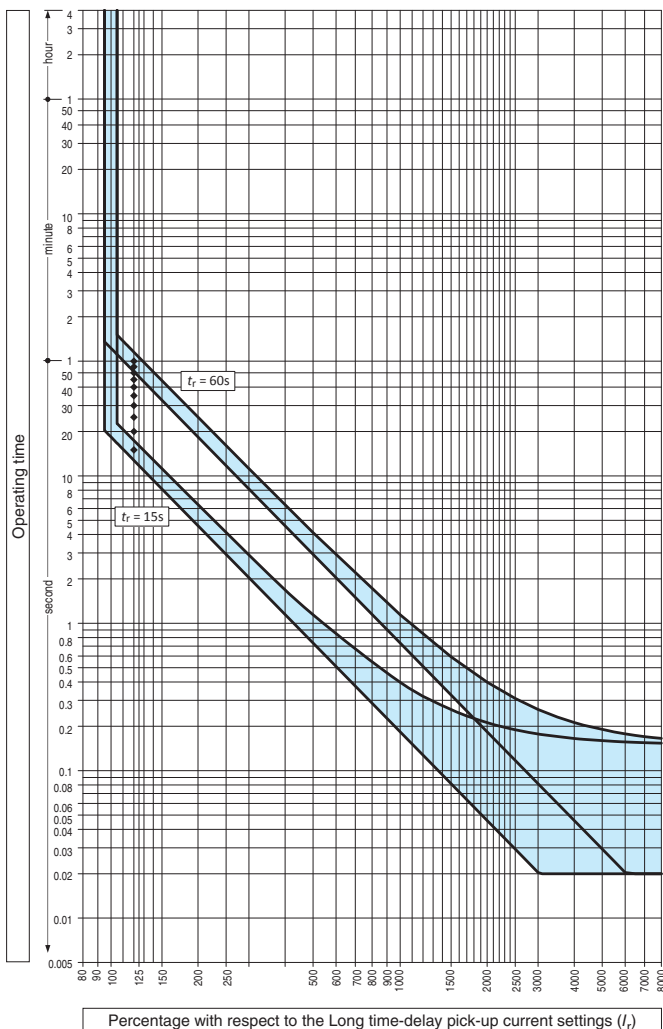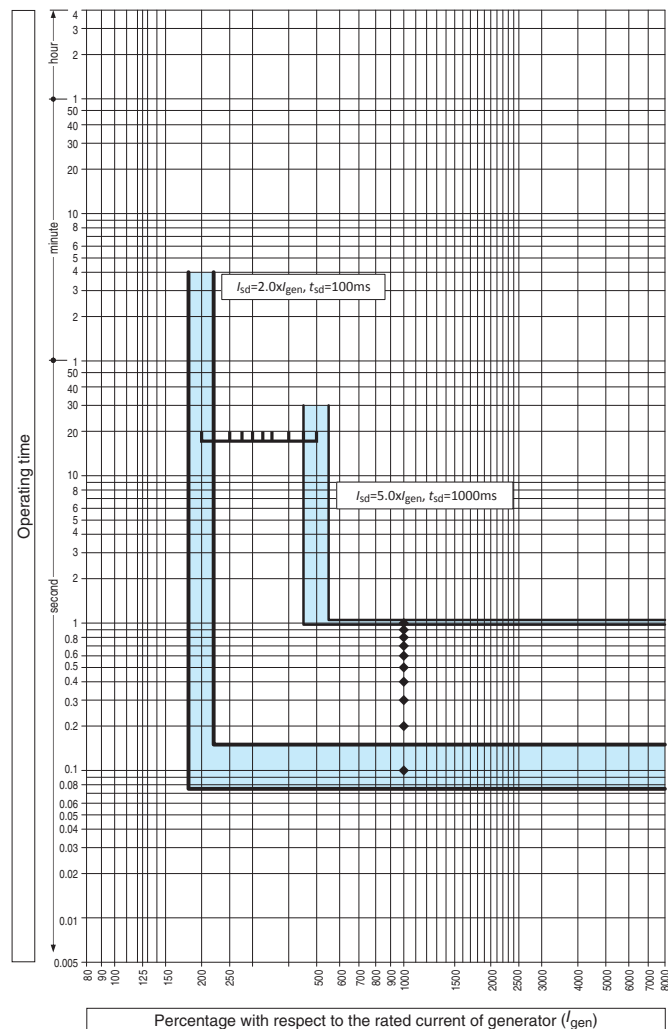
Protection characteristic for standard type (AOX–LSIR)

［AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H］

Instantaneous tripping characteristics
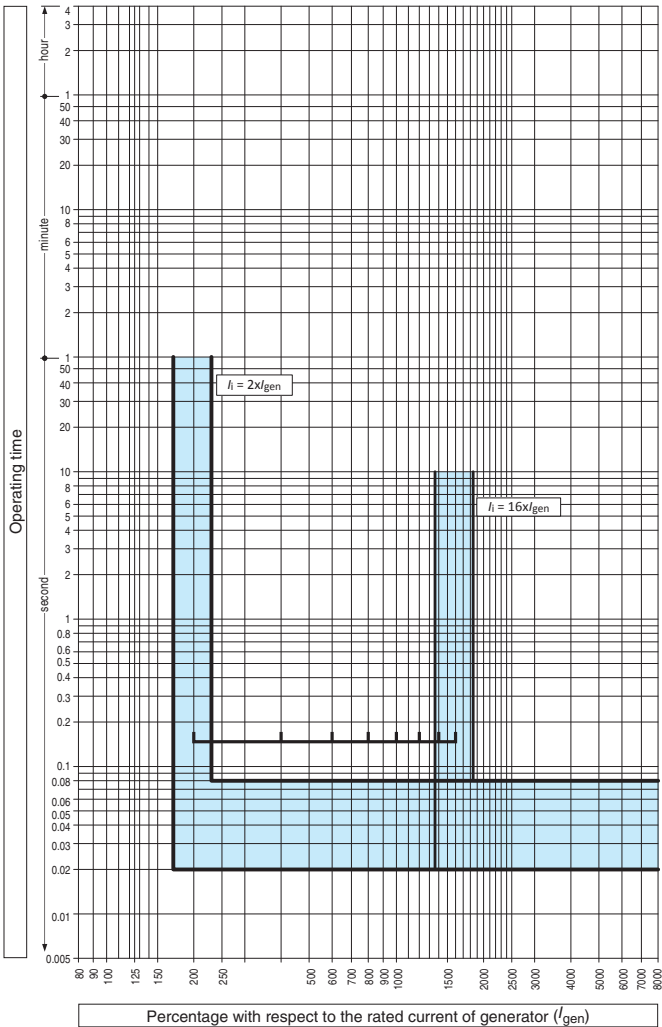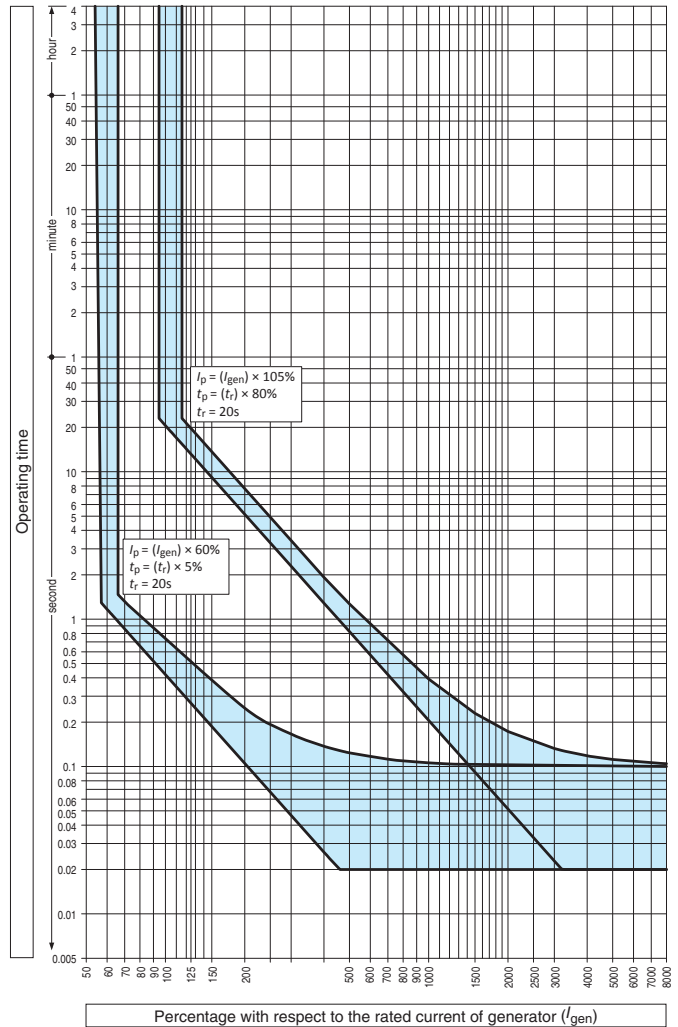
$I_i = 2 \times I_{gen}$

$I_i = 16 \times I_{gen}$

Operating time

Percentage with respect to the rated current of generator (I_{gen})

Preferential trip alarm characteristics

$I_p = (I_{gen}) \times 105\%$
$t_p = (t_r) \times 80\%$
$t_r = 20s$

$I_p = (I_{gen}) \times 60\%$
$t_p = (t_r) \times 5\%$
$t_r = 20s$

Operating time

Percentage with respect to the rated current of generator (I_{gen})

Protection characteristic for standard type (AOX–LSIR)

［AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H］

Reverse power tripping characteristics

$P_{rp} = (P_n) \times 10\%$, $t_{rp} = 25s$

$P_{rp} = (P_n) \times 4\%$, $t_{rp} = 2.5s$

Operating time

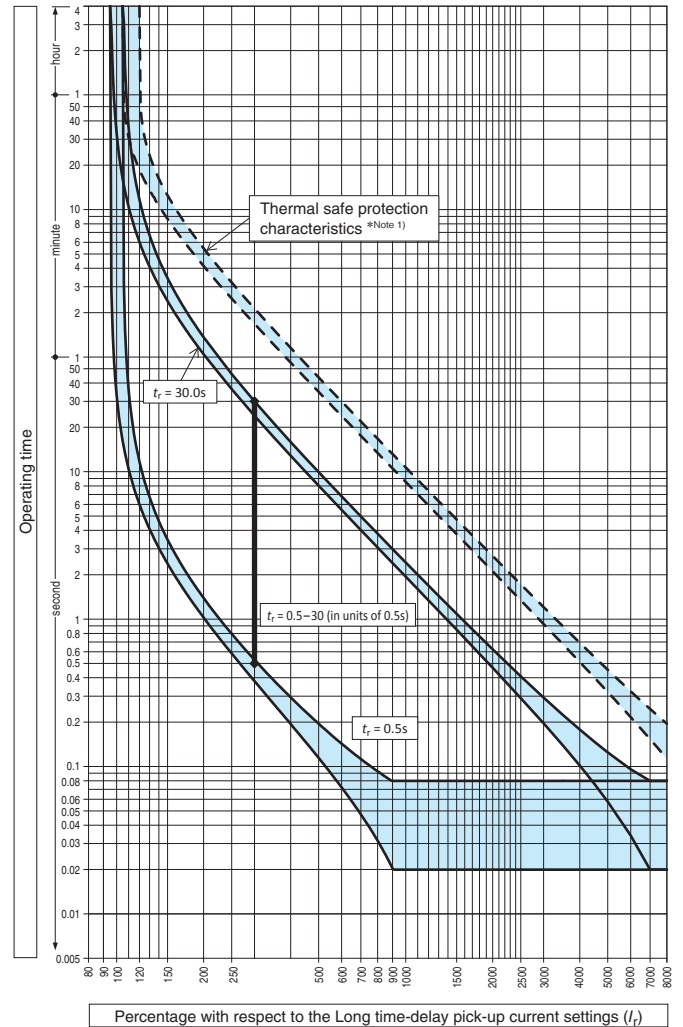Percentage with respect to the rated power of generator (P_n)

Protection characteristics for smart type (AOX–LSI+, AOX–LSIG+)

［AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H］

Long time delay trip characteristics (Thi)

Operating time

$t_r = 0.5s$
$t_r = 30.0s$
$t_r = 0.5-30$ (in units of 0.5s)

Percentage with respect to the Long time-delay pick-up current settings (I_r)

Long time delay trip characteristics ($I^{0.02}t$)

Operating time

Thermal safe protection characteristics *Note 1)

$t_r = 0.5s$
$t_r = 30.0s$
$t_r = 0.5-30$ (in units of 0.5s)

Percentage with respect to the Long time-delay pick-up current settings (I_r)

∗Note 1) : Thermal safe protection characteristics refer to the overheating protection characteristics of the ACB.
These characteristic are identical to the characteristic curve for long time delay trip characteristics (Thi) with $I_r = I_n$, $t_r = 30.0$ s.
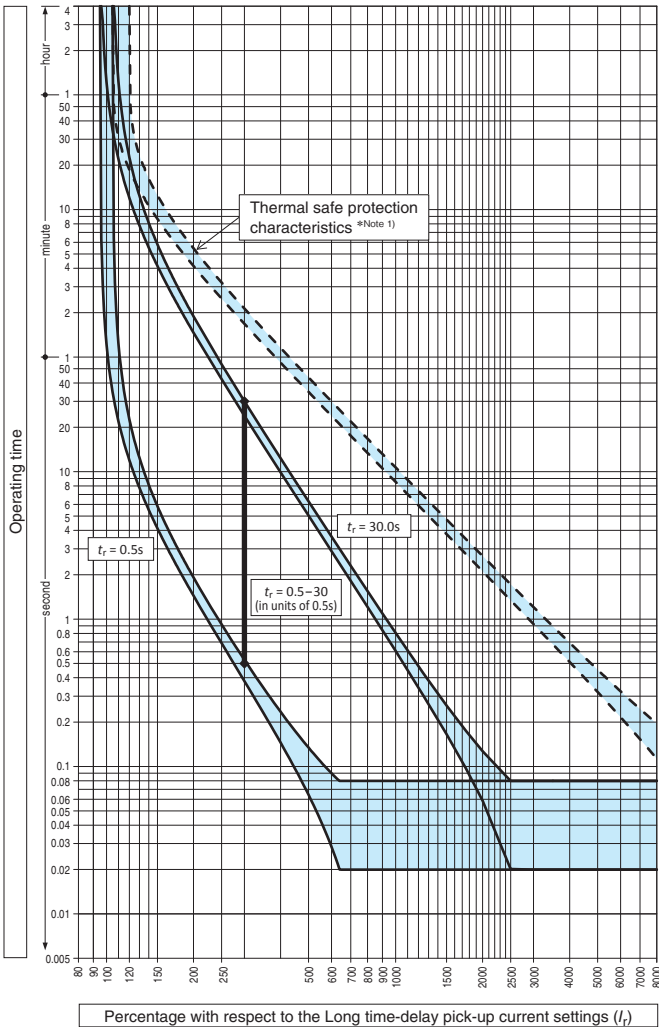In the area where the operating time of thermal safe protection characteristic is faster than the operating time of Long time delay trip characteristic, the thermal safe protection characteristic takes priority and the ACB is tripped.
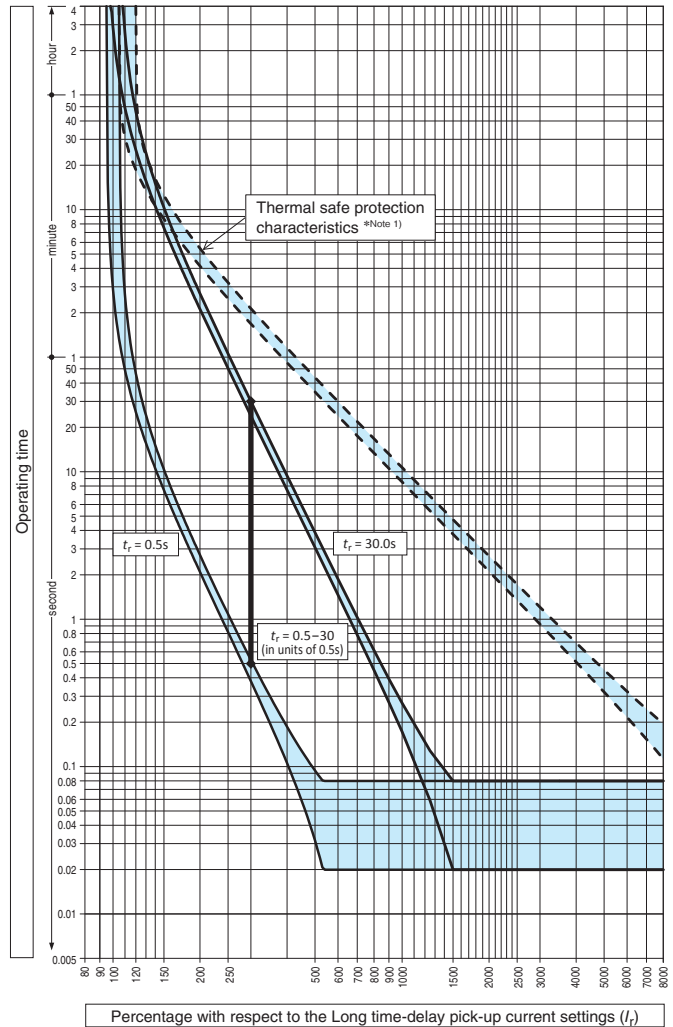
Protection characteristics for smart type (AOX–LSI+, AOX–LSIG+)

［AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H］

Long time delay trip characteristics (It)
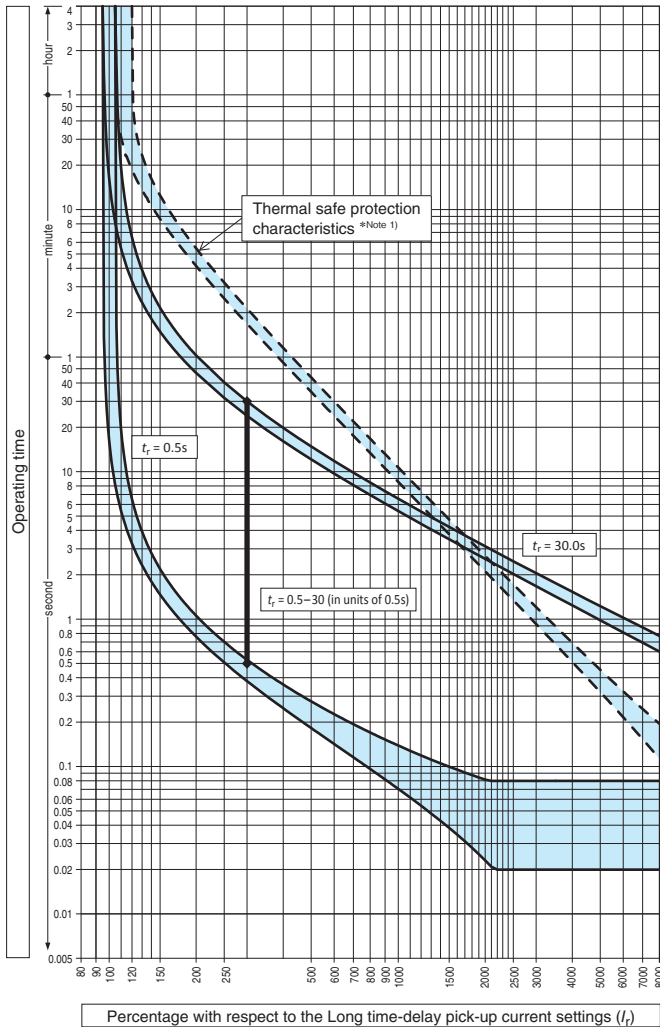
Thermal safe protection characteristics *Note 1)

t_r = 0.5s

t_r = 30.0s

t_r = 0.5−30 (in units of 0.5s)

Operating time

Percentage with respect to the Long time-delay pick-up current settings (I_r)

Long time delay trip characteristics (I^2t)

Thermal safe protection characteristics *Note 1)

t_r = 30.0s

t_r = 0.5−30 (in units of 0.5s)

t_r = 0.5s

Operating time

Percentage with respect to the Long time-delay pick-up current settings (I_r)

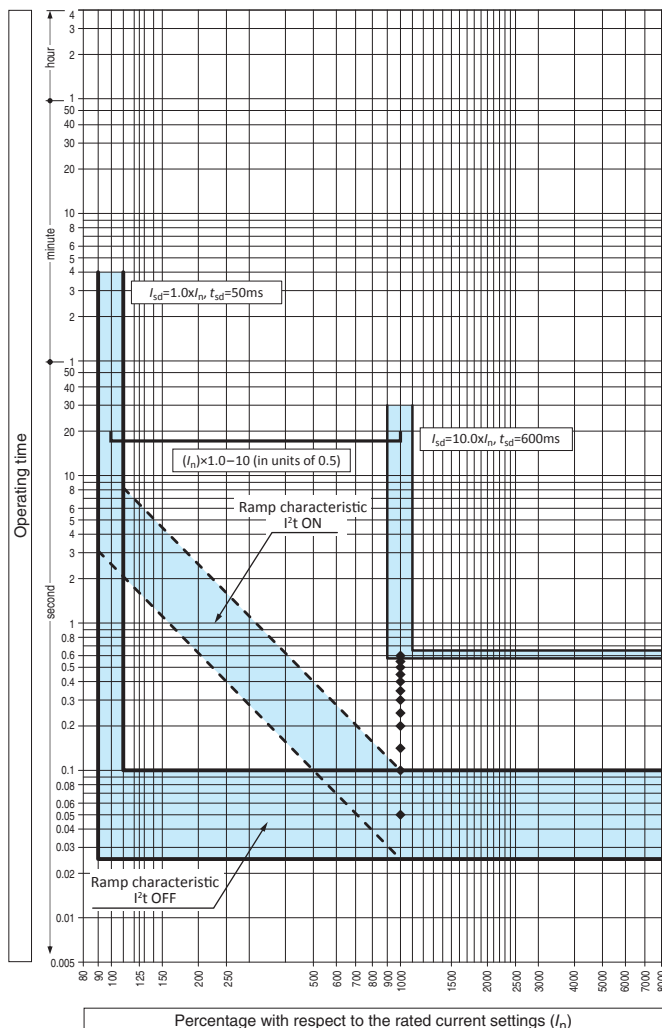∗Note 1) : Thermal safe protection characteristics refer to the overheating protection characteristics of the ACB.
These characteristic are identical to the characteristic curve for long time delay trip characteristics (Thi) with $I_r = I_n$, t_r=30.0 s.
In the area where the operating time of thermal safe protection characteristic is faster than the operating time of Long time delay trip characteristic,
the thermal safe protection characteristic takes priority and the ACB is tripped.
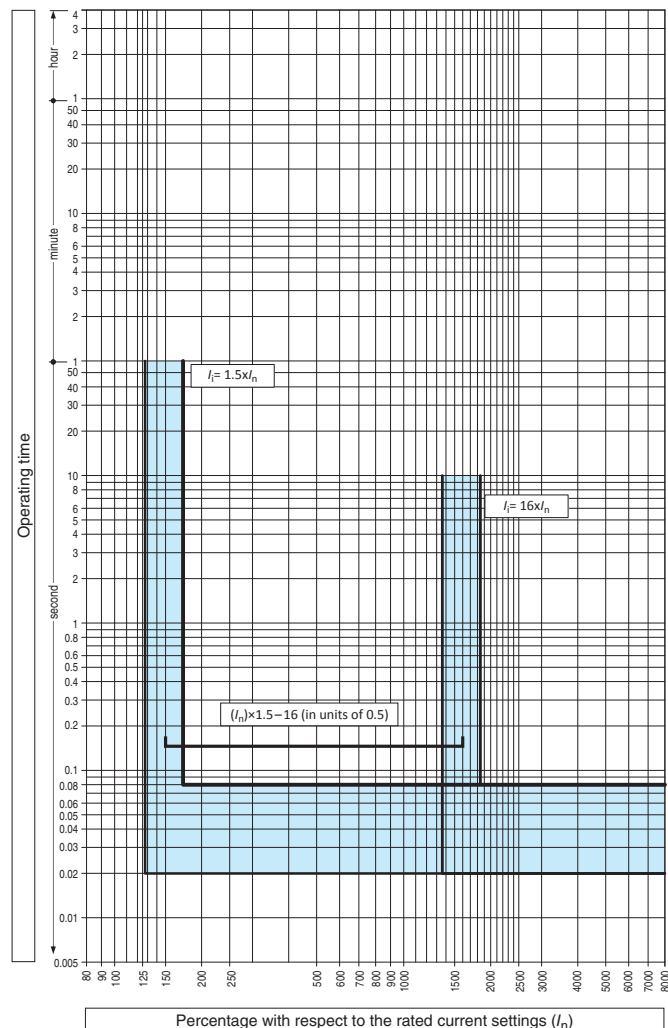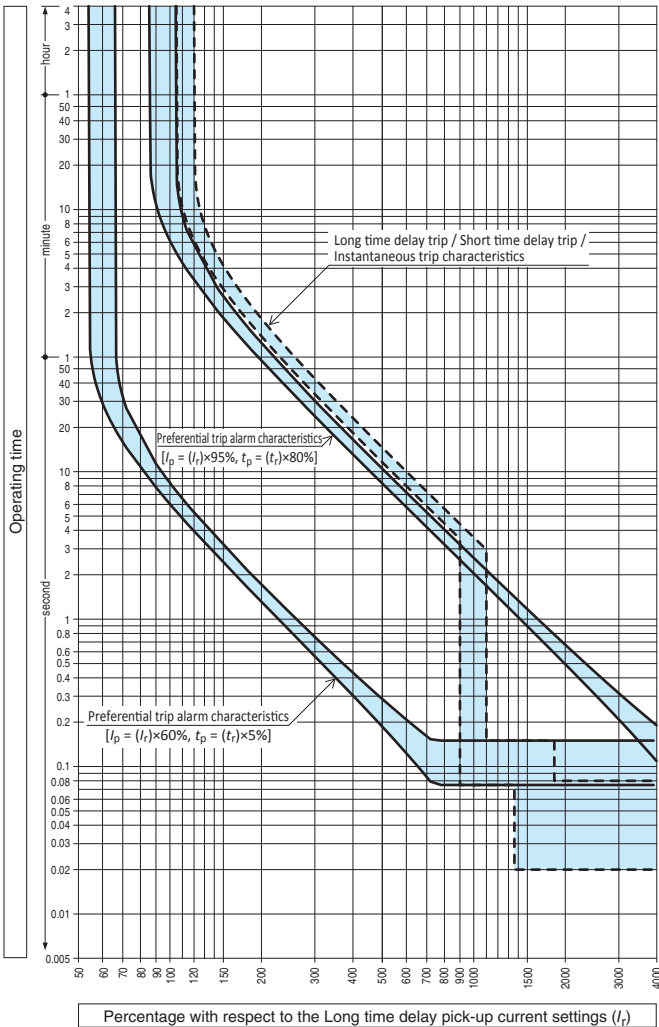
6 Specifications

Protection characteristics for smart type (AOX–LSI+, AOX–LSIG+)

[AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H]

Long time-delay trip characteristics (I^3t)

Operating time / hour / minute / second

Thermal safe protection characteristics *Note 1)

t_r = 30.0s

t_r = 0.5s

t_r = 0.5−30 (in units of 0.5s)

Percentage with respect to the Long time-delay pick-up current settings (I_r)

Long time-delay trip characteristics (I^4t)

Operating time / hour / minute / second

Thermal safe protection characteristics *Note 1)

t_r = 30.0s

t_r = 0.5s

t_r = 0.5−30 (in units of 0.5s)

Percentage with respect to the Long time-delay pick-up current settings (I_r)

∗Note 1) : Thermal safe protection characteristics refer to the overheating protection characteristics of the ACB.
These characteristic are identical to the characteristic curve for long time delay trip characteristics (Thi) with I_r=I_n, t_r=30.0 s.
In the area where the operating time of thermal safe protection characteristic is faster than the operating time of Long time delay trip characteristic, the thermal safe protection characteristic takes priority and the ACB is tripped.

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Protection characteristics for smart type (AOX–LSI+, AOX–LSIG+)

［AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H］

Short time-delay trip characteristics

$I_{sd}=1.0xI_n$, t_{sd}=50ms

$I_{sd}=10.0xI_n$, t_{sd}=600ms

(I_n)×1.0−10 (in units of 0.5)

Ramp characteristic I²t ON

Ramp characteristic I²t OFF

Operating time

Percentage with respect to the rated current settings (I_n)

Instantaneous tripping characteristics

I_i= 1.5xI_n

I_i= 16xI_n

(I_n)×1.5−16 (in units of 0.5)

Operating time

Percentage with respect to the rated current settings (I_n)

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Protection characteristics for smart type (AOX–LSI+, AOX–LSIG+)

［AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H］

Preferential trip alarm characteristics

Operating time

Long time delay trip / Short time delay trip / Instantaneous trip characteristics

Preferential trip alarm characteristics
$[I_p = (I_r)×95\%, t_p = (t_r)×80\%]$

Preferential trip alarm characteristics
$[I_p = (I_r)×60\%, t_p = (t_r)×5\%]$

Percentage with respect to the Long time delay pick-up current settings (I_r)

＊1 : Characteristics of preferential trip alarm 1 and preferential trip alarm 2 when the long time-delay trip setting is Thi (standard setting).

＊2 : Long time, Short time and Instantaneous trip characteristics shown with the dashed line are characteristics under the following conditions.

$I_r=I_n$, t_r=10.0s, I_{sd}=10.0×I_n, t_{sd}=100ms, I_i=16×I_n, I²t=OFF

Operating time

Thermal safe protection characteristics
$[I_p = (I_r)×95\%, t_p = (t_r)×80\%]$

Long time delay trip / Short time delay trip / Instantaneous trip characteristics

Preferential trip alarm characteristics
$[I_p = (I_r)×95\%, t_p = (t_r)×80\%]$

Thermal safe protection characteristics
$[I_p = (I_r)×60\%, t_p = (t_r)×5\%]$

Preferential trip alarm characteristics
$[I_p = (I_r)×60\%, t_p = (t_r)×5\%]$

Percentage with respect to the Long time delay pick-up current settings (I_r)

＊1 : Characteristics of preferential trip alarm 1 and preferential trip alarm 2 when the long time-delay trip setting is $I^{0.02}t$.

＊2 : Long time, Short time and Instantaneous trip characteristics shown with the dashed line are characteristics under the following conditions.

$I_r=I_n$, t_r=10.0s, I_{sd}=10.0×I_n, t_{sd}=100ms, I_i=16×I_n, I²t=OFF

＊3 : The thermal safe protection characteristic is the overheating protection characteristic of the air circuit breaker.
This characteristic is the preferential trip alarm characteristic corresponding to the thermal safe protection characteristic of the long time-delay trip characteristic ($I^{0.02}t$)
(Please refer to P. 38).
In areas where the thermal safe protection characteristic operating time is faster than the preferential trip alarm characteristic operating time, the preferential trip alarm is activated with priority on the thermal safe protection characteristic.
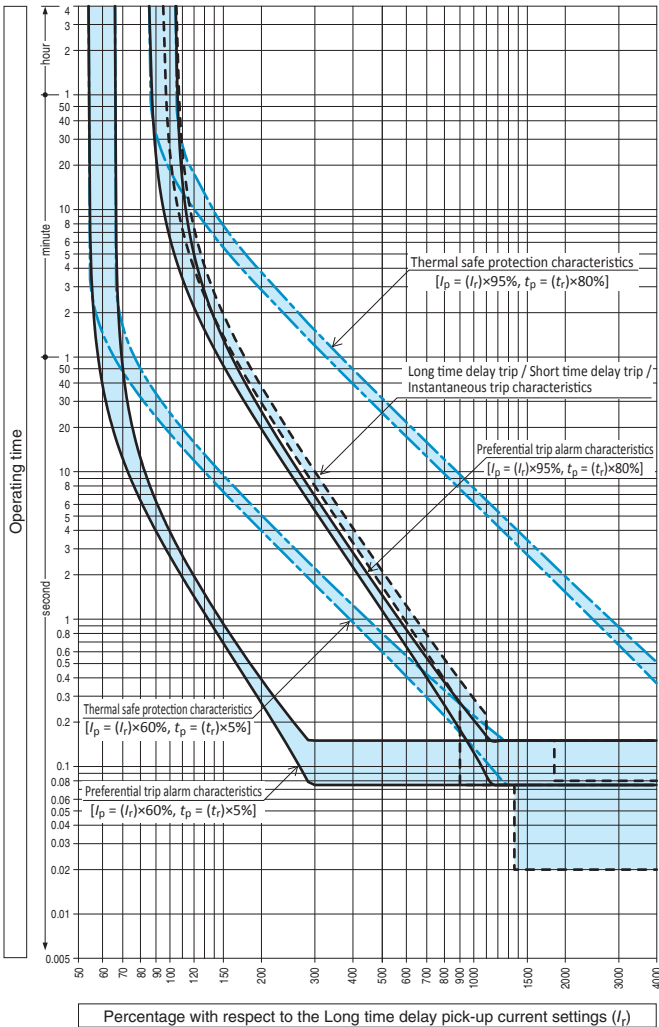
Protection characteristics for smart type (AOX–LSI+, AOX–LSIG+)

[AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H]

Preferential trip alarm characteristics

Percentage with respect to the Long time delay pick-up current settings (I_r)

∗1 : Characteristics of preferential trip alarm 1 and preferential trip
  alarm 2 when the long time-delay trip setting is It.
∗2 : Long time, Short time and Instantaneous trip characteristics
  shown with the dashed line are characteristics under the
  following conditions.

  $I_r=I_n$, $t_r=10.0s$, $I_{sd}=10.0$, $t_{sd}=100ms$, $I_i=16 \times I_n$, I²t=OFF

∗3 : The thermal safe protection characteristic is the overheating
  protection characteristic of the air circuit breaker.
  This characteristic is the preferential trip alarm characteristic
  corresponding to the thermal safe protection characteristic of the
  long time-delay trip characteristic (It)
  (Please refer to P. 39).
  In areas where the thermal safe protection characteristic
  operating time is faster than the preferential trip alarm
  characteristic operating time, the preferential trip alarm is
  activated with priority on the thermal safe protection
  characteristic.

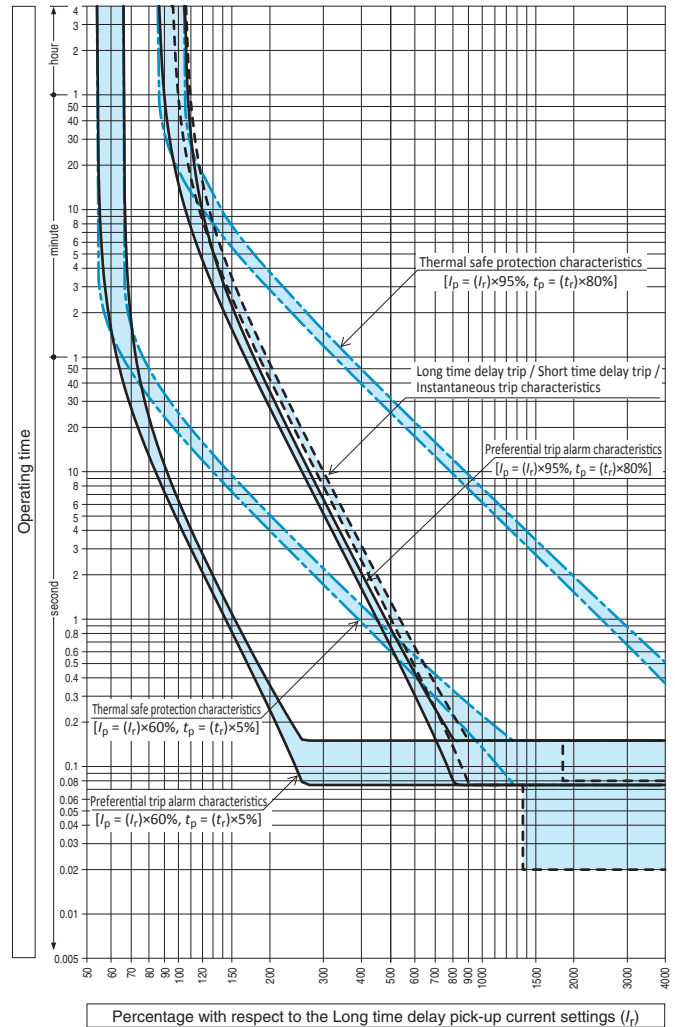Percentage with respect to the Long time delay pick-up current settings (I_r)
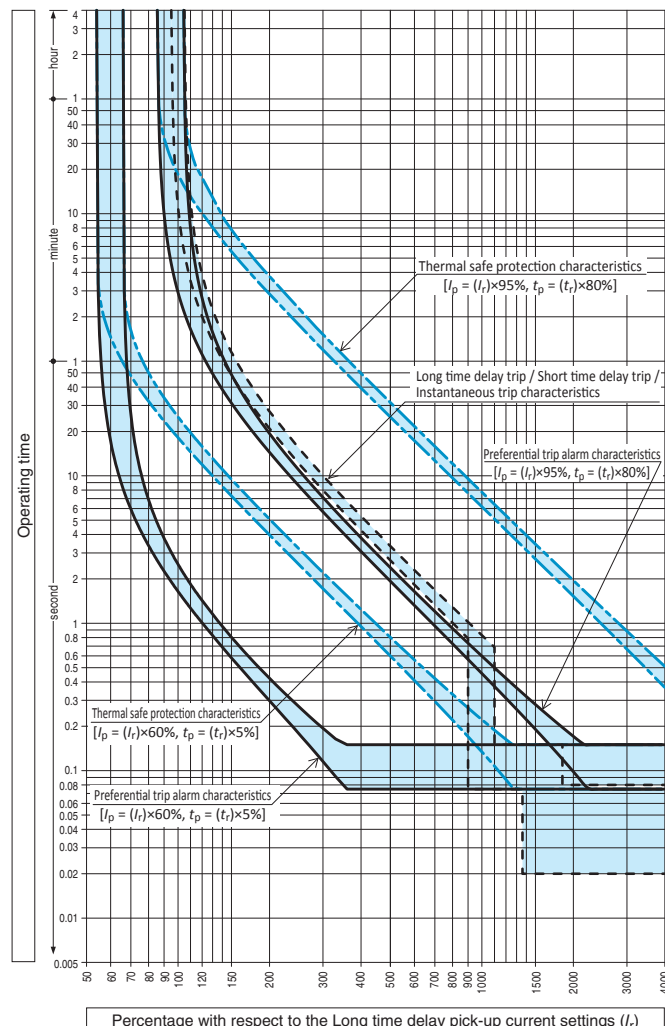
∗1 : Characteristics of preferential trip alarm 1 and preferential trip
  alarm 2 when the long time-delay trip setting is I²t.
∗2 : Long time, Short time and Instantaneous trip characteristics
  shown with the dashed line are characteristics under the
  following conditions.

  $I_r=I_n$, $t_r=10.0s$, $I_{sd}=10.0$, $t_{sd}=100ms$, $I_i=16 \times I_n$, I²t=OFF

∗3 : The thermal safe protection characteristics are the overheating
  protection characteristics of the air circuit breaker.
  These characteristics are the preferential trip alarm
  characteristics corresponding to the thermal safe protection
  characteristics of the long time-delay trip characteristics (I²t)
  (Please refer to P. 39).
  In areas where the thermal safe protection characteristic
  operating time is faster than the preferential trip alarm
  characteristic operating time, the preferential trip alarm is
  activated with priority on the thermal safe protection
  characteristic.

Protection characteristics for smart type (AOX–LSI+, AOX–LSIG+)

［AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H］

Preferential trip alarm characteristics

Thermal safe protection characteristics
$[I_p = (I_r) \times 95\%, t_p = (t_r) \times 80\%]$

Long time delay trip / Short time delay trip / Instantaneous trip characteristics

Preferential trip alarm characteristics
$[I_p = (I_r) \times 95\%, t_p = (t_r) \times 80\%]$

Thermal safe protection characteristics
$[I_p = (I_r) \times 60\%, t_p = (t_r) \times 5\%]$

Preferential trip alarm characteristics
$[I_p = (I_r) \times 60\%, t_p = (t_r) \times 5\%]$

Percentage with respect to the Long time delay pick-up current settings (I_r)

Thermal safe protection characteristics
$[I_p = (I_r) \times 95\%, t_p = (t_r) \times 80\%]$

Long time delay trip / Short time delay trip / Instantaneous trip characteristics

Preferential trip alarm characteristics
$[I_p = (I_r) \times 95\%, t_p = (t_r) \times 80\%]$

Thermal safe protection characteristics
$[I_p = (I_r) \times 60\%, t_p = (t_r) \times 5\%]$

Preferential trip alarm characteristics
$[I_p = (I_r) \times 60\%, t_p = (t_r) \times 5\%]$

Percentage with respect to the Long time delay pick-up current settings (I_r)

＊1 : Characteristics of preferential trip alarm 1 and preferential trip alarm 2 when the long time-delay trip setting is I^3t.

＊2 : Long time, Short time and Instantaneous trip characteristics shown with the dashed line are characteristics under the following conditions.

$I_r = I_n$, $t_r = 10.0s$, $I_{sd} = 10.0$, $t_{sd} = 100ms$, $I_i = 16 \times I_n$, $I^2t = OFF$
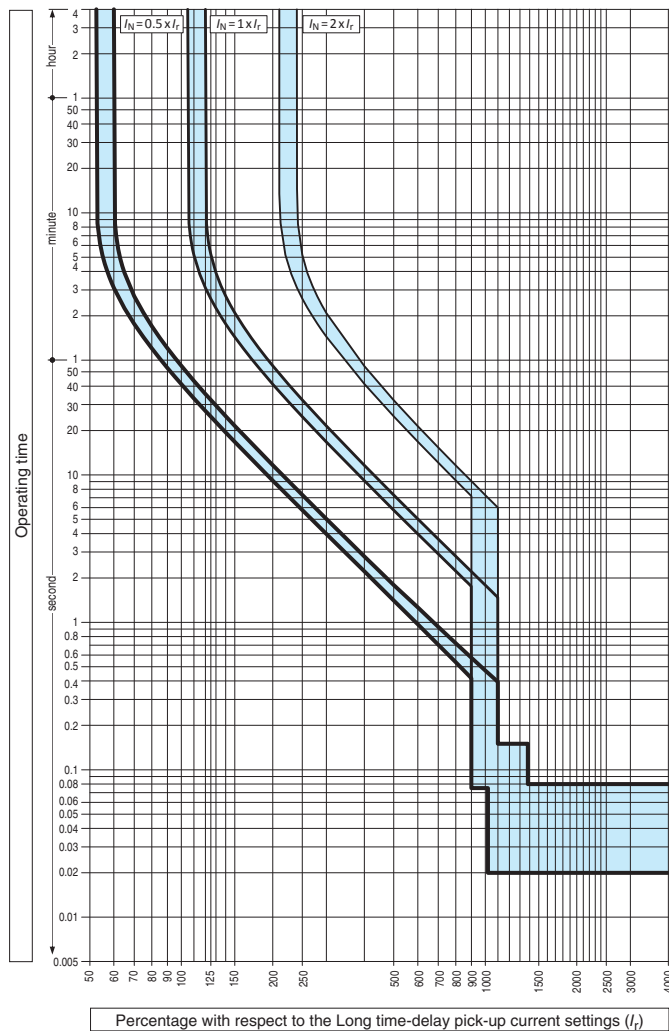
＊3 : The thermal safe protection characteristics are the overheating protection characteristics of the air circuit breaker.
These characteristics are the preferential trip alarm characteristics corresponding to the thermal safe protection characteristics of the long time-delay trip characteristics (I^3t) (Please refer to P. 40).
In areas where the thermal safe protection characteristic operating time is faster than the preferential trip alarm characteristic operating time, the preferential trip alarm is activated with priority on the thermal safe protection characteristic.
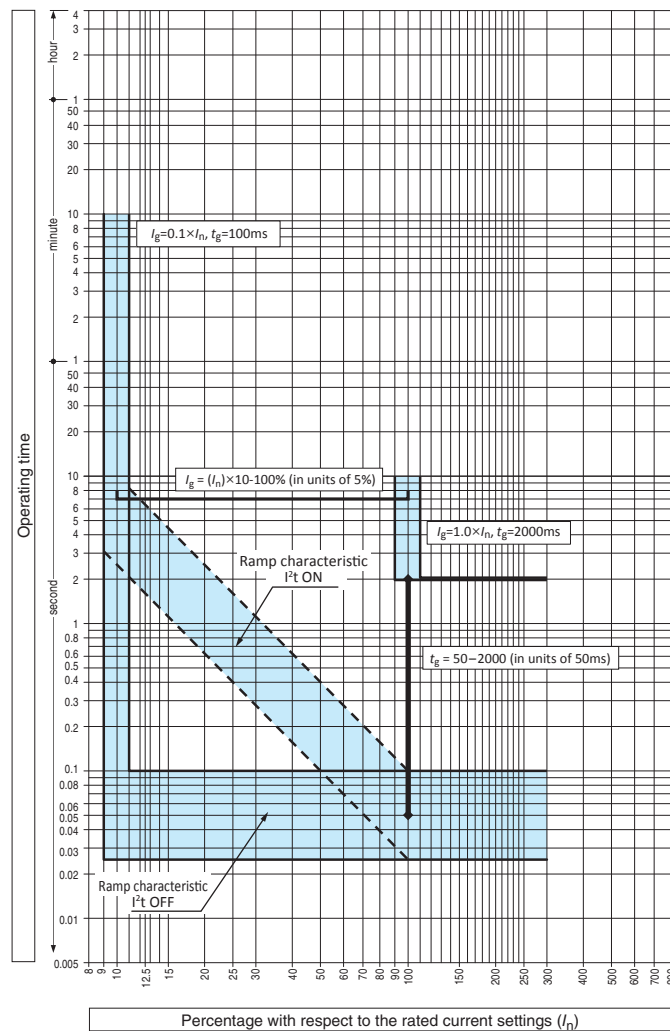
＊1 : Characteristics of preferential trip alarm 1 and preferential trip alarm 2 when the long time-delay trip setting is I^4t.

＊2 : Long time, Short time and Instantaneous trip characteristics shown with the dashed line are characteristics under the following conditions.

$I_r = I_n$, $t_r = 10.0s$, $I_{sd} = 10.0$, $t_{sd} = 100ms$, $I_i = 16 \times I_n$, $I^2t = OFF$

＊3 : The thermal safe protection characteristics are the overheating protection characteristics of the air circuit breaker.
These characteristics are the preferential trip alarm characteristics corresponding to the thermal safe protection characteristics of the long time-delay trip characteristics (I^4t) (Please refer to P. 40).
In areas where the thermal safe protection characteristic operating time is faster than the preferential trip alarm characteristic operating time, the preferential trip alarm is activated with priority on the thermal safe protection characteristic.
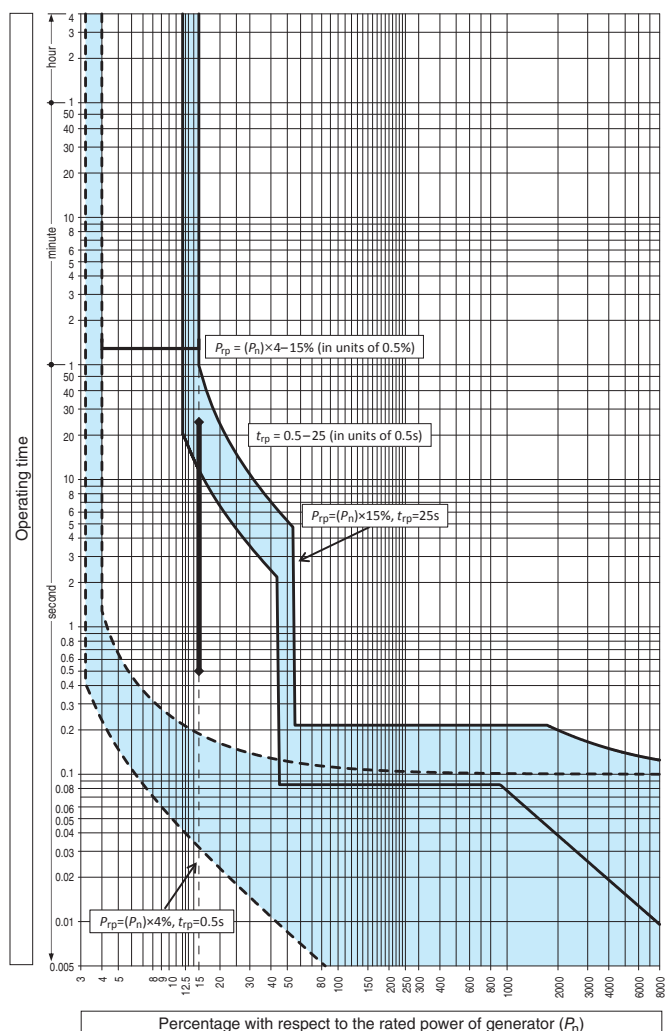
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Protection characteristics for smart type (AOX–LSIG+)

[AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H]

Neutral protection characteristics

Percentage with respect to the Long time-delay pick-up current settings (I_r)

Ground fault trip characteristics

Percentage with respect to the rated current settings (I_n)

6 Specifications

Protection characteristics for smart type (AOX–LSIG+)

[AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H]

Reverse power protection charcteristics

Operating time (vertical axis, hour/minute/second)

$P_{rp} = (P_n) \times 4 - 15\%$ (in units of 0.5%)

$t_{rp} = 0.5 - 25$ (in units of 0.5s)

$P_{rp} = (P_n) \times 15\%,\ t_{rp} = 25s$

$P_{rp} = (P_n) \times 4\%,\ t_{rp} = 0.5s$

Percentage with respect to the rated power of generator (P_n)

Contact module

Contact module that provides a contact output to trip the ACB when the Over-Current Release (OCR) protection function is activated or an alarm, malfunction or switching are triggered.

● Standard type

Contact outputs are provided with the following output terminal layouts. When several trip or alarm function as follows works, the condition of trip or alarm is indicated on the display of OCR.

Output terminal number	Contact Output Type	Operational mode ①	Note
05 — 15	Long time delay trip	Self-hold	—
05 — 25	Short time delay trip, Instantaneous trip, Making current release, Instantaneous override trip	Self-hold	—
05 — 16	Ground fault trip	Self-hold	AOX-LSIG only
	Reverse power trip	Self-hold	AOX-LSIR only
05 — 06	Preferential trip alarm	Auto-reset	—
05 — 26	• Either trip operation occurs, excluding reverse power trip protection	Self-hold	—
	• Pick up operation occurs with long time-delay trip protection • Malfunction of hardware	Auto-reset	

① Self-hold : The contact is closed and held on the closed position when the ACB is tripped by each protection function of above.
　　　　 If the Self-hold is unlocked, contact output condition can be unlocked from "close" to "open", and the indication on the display is reset.
　　　　 ＊ Self-hold can be unlocked in two ways as follows,
　　　　　　・ Long press of " i " button in Over current release.
　　　　　　・ Apply 24V DC to the Digital input terminal.
Auto-reset : The contacts are closed when the working signal is input, the contacts are opened automatically when the working signal is reset.

● Smart type

For smart types, one contact output corresponding to the following protection operation and alarm operation can be assigned to each of the five types of output terminal numbers of above.
When the each operation works, the conditions of operation are indicated on the display of OCR.

Operation	Contact Output Types	Operational mode ①	Operation	Contact Output Types	Operational mode ①
Trip operation	Trip test	Self-hold	Alarm output	Disconnection of N-phase	Selectable from Self-hold/Auto-reset/Pulse
	Unbalance voltage protection (UNBV)	Self-hold		Malfunction of hardware	Selectable from Self-hold/Auto-reset/Pulse
	Unbalance current protection (UNBC)	Self-hold		Abnormal temperature in OCR	Selectable from Self-hold/Auto-reset/Pulse
	Over voltage protecton (OV)	Self-hold		Long time-delay trip pick up	Selectable from Self-hold/Auto-reset/Pulse
	Under voltage protection (UV)	Self-hold		Pretrip alarm 1	Selectable from Self-hold/Auto-reset/Pulse
	Ground fault protection (GF)	Self-hold		Pretrip alarm 2	Selectable from Self-hold/Auto-reset/Pulse
	Making current release (MCR)	Self-hold		Voltage drop of built-in battery	Selectable from Self-hold/Auto-reset/Pulse
	Instantaneous override trip (IO)	Self-hold		Alarm group ②	Selectable from Self-hold/Auto-reset/Pulse
	Instantaneous trip (INST)	Self-hold		Custom alarm 1 to 12 ③	Selectable from Self-hold/Auto-reset/Pulse
	Short time-delay trip (ST)	Self-hold		Contact temperature monitoring (OH)	Selectable from Self-hold/Auto-reset/Pulse
	Long time-delay trip (LT)	Self-hold		Unbalance voltage protection (UNBV)	Selectable from Self-hold/Auto-reset/Pulse
Operation of ACB	Protection function group B	Selectable from Self-hold/Auto-reset/Pulse		Unbalance current protection (UNBC)	Selectable from Self-hold/Auto-reset/Pulse
	ON operation of ACB	Selectable from Self-hold/Auto-reset/Pulse		Reverse power trip function (RP)	Selectable from Self-hold/Auto-reset/Pulse
	OFF operation of ACB	Selectable from Self-hold/Auto-reset/Pulse		Over frequency protection (OF)	Selectable from Self-hold/Auto-reset/Pulse
Temporary motion restrain	Temporary stop of protection function ⑤	Selectable from Self-hold/Auto-reset/Pulse		Under frequency protection (UF)	Selectable from Self-hold/Auto-reset/Pulse
				Over voltage protecton (OV)	Selectable from Self-hold/Auto-reset/Pulse
				Under voltage protection (UV)	Selectable from Self-hold/Auto-reset/Pulse

① : Self-hold :
　a) In case of "Trip operarion"
　　The contact is closed and held on the closed position when the ACB is tripped by each protection function of above.
　　If the Self-hold is unlocked, contact output condition can be unlocked from "close" to "open", and the indication on the display is reset.
　　＊ Self-hold can be unlocked in two ways as follows.
　　　・ Long press of "ON" button in Over current release.
　　　・ Apply 24V DC to the Digital input terminal. (Setting of digital input should be adjusted to "Remote reset")
　b) In case of "Operation of ACB", "Temporary motion restrain" and "Alarm out put"
　　The contact is closed and held on the colsed position when the "Operation of ACB" or "Temporary motion restrain" or "Alarm out put" works.
　　If the Self-hold is unlocked, contact output condition can be unlock from "close" to "open", and the indication on the display is reset.
　　＊ Self-hold can be unlock to apply 24V DC to the Digital input termial.
　　　(Setting of digital input should be adjusted to "Remote reset")
Auto-reset : The contacts are closed when the working signal is input, the contacts are opened automatically when the working signal is reset.
Pulse :Pulse signal outputs when the "Operation of ACB" or "Temporary motion restrain" or "Alarm out put" is detected, and the contact output is automatically reset after the setting time (0.1s – 5s) of pulse signal has passed.

② : If either of the functions selected from the items above are activated, the alarm group provides a contact output.
　Default settings are the four types: Short time-delay trip, Instantaneous trip, Making current release, and Instantaneous override trip.
③ : All 12 types of alarms can be set as functions that output an alarm for each measurement item.
④ : For pulse settings, a pulse time can be set between 0.1 seconds and 5 seconds in 0.1-second increments.
⑤ : Temporary stop for Contact temperature monitoring (OH), Unbalance voltage protection (UNBV), Unbalance current protection (UNBC), Over voltage protection (OV), Under voltage protection (UV), Reverse power trip (RP), Over frequency protection (OF), and Under frequency protection (UF).
⑥ : A delay up to 150 ms occurs from when OCR is activated until a contact signal is output.
⑦ : Operation of contact modules requires control power (24V DC) to be supplied.

Ratings of the contact

Voltage (V)	Resistive load (A)	Min. applicable load
250 AC	3	5V 10mA
30 DC	3	

6 Specifications

FAULT TRIP switch

Switch that provides an electrical indication when the Over-Current Release (OCR) has activated. Max. 2 switches can be installed.

✽ When 2 are installed, they cannot be used in combination with the Ready to close switch and Trip command indicator.

✽ The FAULT TRIP display switch does not function when the mechanical reset setting dial is "AUTO."

Trip command indicator

Switch that provides an electrical indication that a trip command is being applied to the ACB.

Activated with an over-current release, continuously-rated shunt trip device, under voltage trip device, or if the OFF button is pressed.

✽ If the Over-Current Release (OCR) activates when the Mechanical reset setting dial is "AUTO," the total operating time of the Trip command indicator is up to 40ms.

Ratings of FAULT TRIP switch / Trip command indicator

	Groups	Voltage (V)		Current (A)	Min. applicable load
Utilization category AC–12/DC–12 ①	Standard	AC	100－380	5.0	15V 2mA
			381－480	5.0	
		DC	24	5.0	
			48	2.5	
			125	0.4	
			240	0.2	

① : Based on IEC60947-5-1.

ON－OFF Cycle Counter

The ON－OFF cycle counter is a 5-digit readout that shows the number of ON－OFF cycles of the ACB. Counter readings serve as a guide for maintenance or inspection.

7   Other Accessories

Auxiliary switches 7c

Draw-out type switch that provides an electrical indication of the "ON" or "OFF" state of an ACB.
Auxiliary switch 7c is mounted to the side of the draw-out cradle, and comprises five quick connection terminals and two screw connection terminals.
Different from Auxiliary switch 4c, the operating position is only in the connected position.

Ratings of auxiliary switch 7c

Groups		Voltage (V)	Current (A)	Min. applicable load
Utilization category AC-12/DC-12 ①	Standard			
		AC 100–380	5.0	15V 2mA
		AC 381–480	5.0	
		DC 24	5.0	
		DC 48	2.5	
		DC 125	0.4	
		DC 250	0.2	

① : Based on IEC60947-5-1.
② : Chattering due to ON–OFF operation of the ACB lasts for less than 30 ms (There is some fluctuation depend on the ON–OFF cycles of ACB). Take note when applying to circuits.
③ : Do not connect an auxiliary switch to the continuously-rated shunt trip device and continuously-rated shunt trip 2 circuits. Doing so may cause failure.

Auxiliary switches 7c

Quick connection terminals (3c)

Quick connection terminals (2c)

Screw connection terminals (2c)
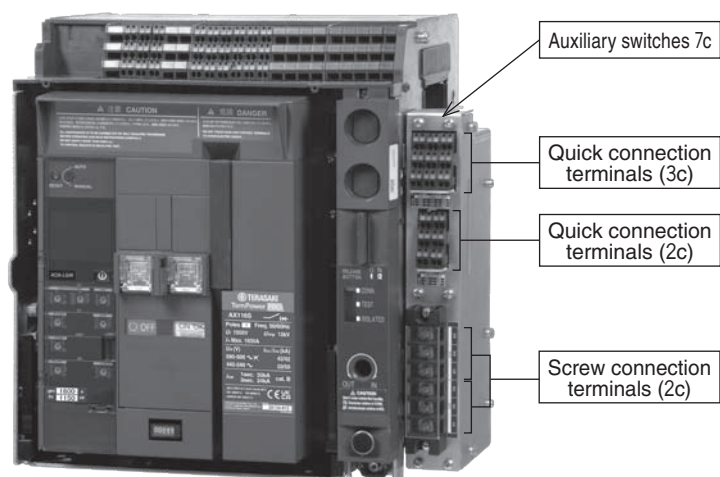
Wiring diagram and terminal number for Auxiliary switch 7c

Quick connection terminals   Screw terminals

Open   Close

| 512 | 514 | 612 | 614 | 712 | 714 | 812 | 814 | 912 | 914 | 1012 | 1014 | 1112 | 1114 |

AUX1   AUX2   AUX3   AUX4   AUX5   AUX6   AUX7

| 511 | 611 | 711 | 811 | 911 | 1011 | 1111 |
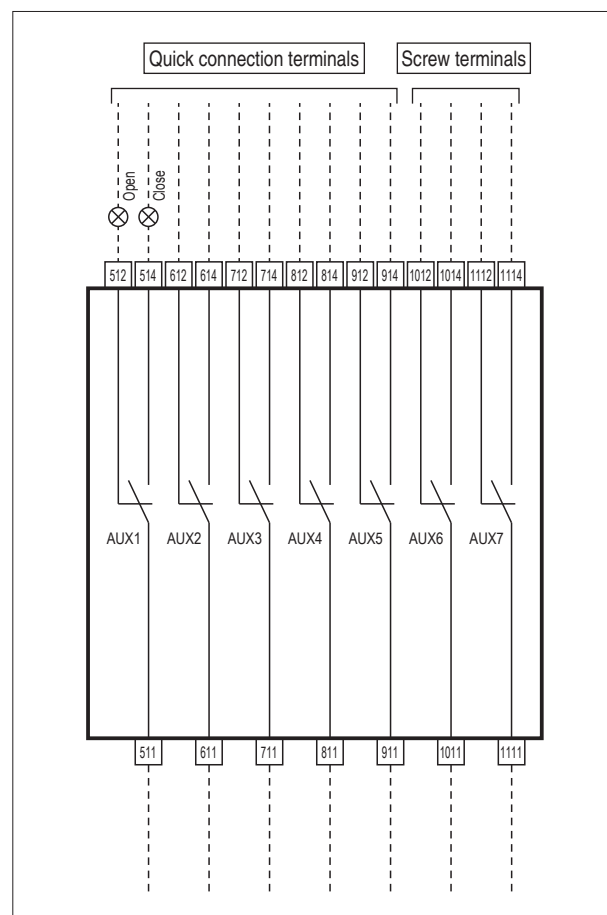
6 Specifications

Key lock

Device that locks the ACB in the closed position and prevents operation without the key.
This is a lock in OFF type that disables the ACB to be placed in the open position.

∗ Five types of keys are available:
  Cylinder, Ronis, Profalux, Kirk, or KLS.
  (selecting a key other than Cylinder, ensure the key is available)

OFF padlock

Used to lock the ACB in the open position.
Up to three padlocks with a ø6 hasp can be used.
Padlocking is possible only when the ON−OFF indicator shows OFF.

∗ OFF padlock can not be fitted with Key lock (Lock in OFF).

Inter-pole barrier

An inter-pole barrier prevents a possible short-circuit due to foreign objects entering between the main circuit terminals, thus enhancing operational reliability of the ACB.
This barrier can be applied to fixed type (front terminals, vertical terminals, horizontal terminals), and draw-out type with the vertical terminals and horizontal terminals.
∗1 : Interpole-barrier can not be fitted with Conductive adapter.
∗2 : Cannot be used for AX120S and AX120H.

Racking interlock

Device that prevents the draw-out handle from being inserted when the switchboard door is open.
To use this device, install it with the following panel cutout dimensions.
∗1 : If using in combination with a door flange or IP cover, install the panel cutout specified for each device.
∗2 : Contact TERASAKI to use in combination with auxiliary switch 7c or a mechanical interlock.

*1
≥170 (3P)
≥240 (4P)
103
*1
≥230
161
116
104
260.5
14

⌁ : Center line
*1 : Panel hinge position (Min)

Floor level for ACB

Panel cutout
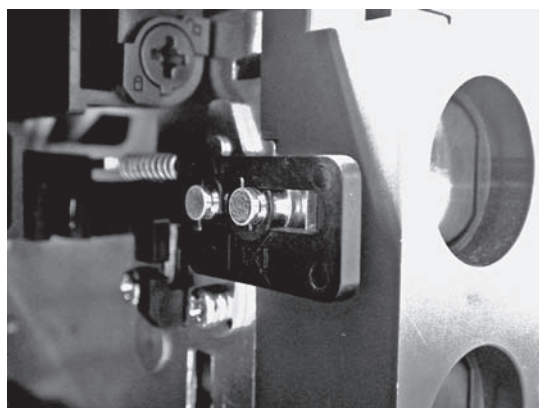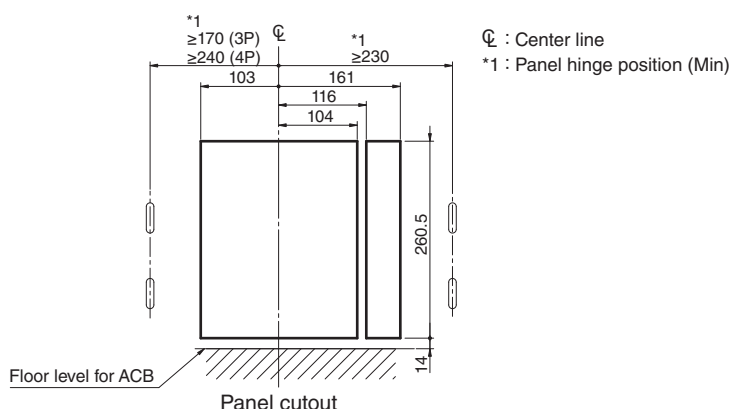
Control circuit terminal cover

A control circuit terminal cover protects the terminal blocks for auxiliary switches, position switches, and control circuits from being accidentally touched, thus enhancing safety.
Note : 1) Can not be used for the fixed type.
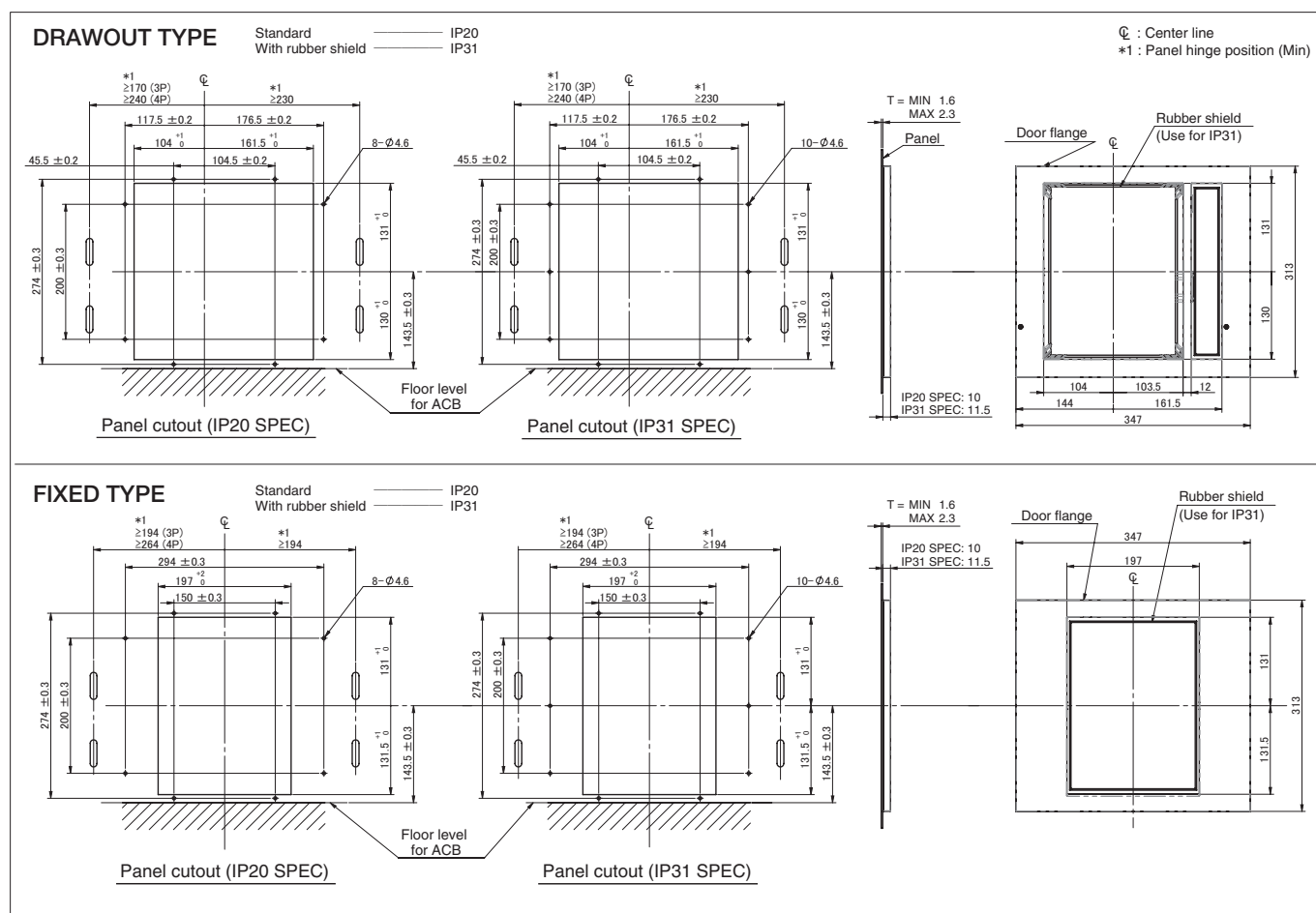Note : 2) Can not be used with Auxiliary 7c.

Door flange

Use this as a decorative panel to cover the panel cutout in the front of the switchboard.
Two protection specifications that comply with IEC60529 standards are available: IP20 and IP31.
Note : 1) Door flange can notbe fitted IP cover.
Note : 2) Contact TERASAKI to use in combination with a door interlock.

DRAWOUT TYPE — Standard / With rubber shield — IP20 / IP31

℄ : Center line
*1 : Panel hinge position (Min)

Panel cutout (IP20 SPEC)   Panel cutout (IP31 SPEC)

Floor level for ACB

FIXED TYPE — Standard / With rubber shield — IP20 / IP31

Panel cutout (IP20 SPEC)   Panel cutout (IP31 SPEC)

Floor level for ACB

IP cover

This is a left-opening front protection cover that provides IP55 protection compliant with EC60529 standards.
The IP cover can be installed, even if the ACB is in the ISOLATED position.
Note: 1) Contact TERASAKI to use in combination with a door interlock.
Note: 2) Cannot be fitted with door flange.

DRAWOUT TYPE

Panel cutout

FIXED TYPE

Panel cutout
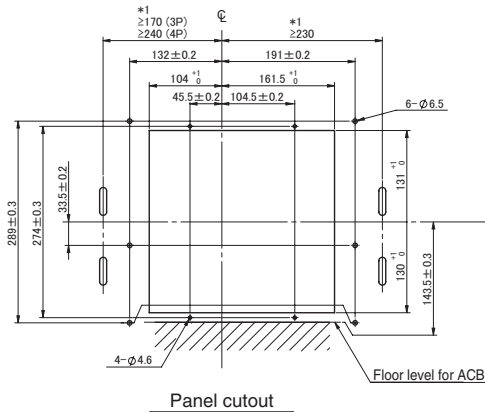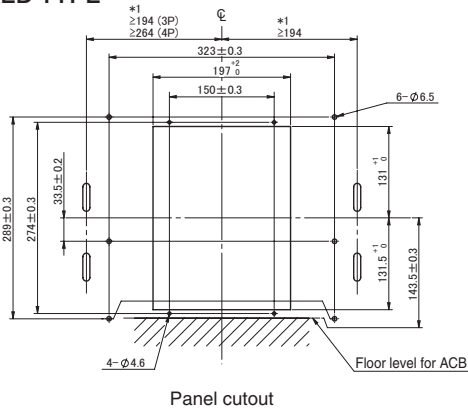
OUTLINE DIMENSION
(Common to DRAW OUT type and FIXED type)

$\mathbb{C}$: Center line
∗1 : Panel hinge position (Min)

T = MIN 1.6
MAX 2.3

Panel

Hinge x2

(ø6 padlocking)
Hook x3

Hexagon socket head cap screw M6 (Low head)

Panel

Domed cap nut

IP cover bushing 1
(Insert the bushing when IP cover setting)

IP cover bushing 2
(Insert the bushing when IP cover setting)

Panel

Cross recess tapping screw M4 (low head)
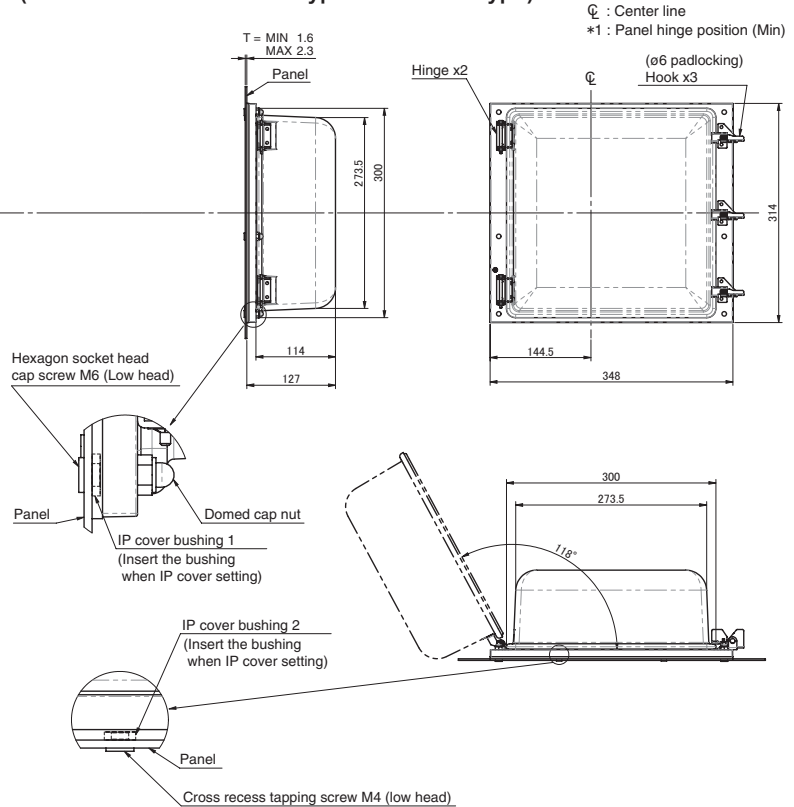
Sensor for neutral line

This is an externally connected sensor that provides N-phase protection using a 3-pole ACB for 3-phase 4-wire power distribution.

Mechanical interlock (side-by-side type)

Device for interlocking two ACBs in either horizontal or vertical arrangements.
Helps to prevent parallel operation of the system when one of the ACBs is closed.
In conjunction with an electrical interlock, it will enhance safety and reliability of power distribution systems.
The following specifications can be selected as the pitch between the left and right ACBs.
- 3-pole breaker : 600mm / 700mm / 800mm
- 4-pole breaker : 600mm / 700mm / 800mm / 900mm

Note: 1) Contact TERASAKI to use in combination with a door interlock or racking interlock.
Note: 2) Cannot be fitted with auxiliary switch 7c.

Remote command module

Module that connects a smart type over-current release, continuously-rated shunt trip device and latch release coil, to issue trip commands or closing commands to an ACB via communication module.

Conductive adapter

Connection conversion adapter for horizontal terminals and front terminals. Two types are available: horizontal extension adapter and vertical extension adapter. They can be used for both draw-out type and fixed type ACBs.

| Conductive adapter	Type	Applicable terminal arrangements
Horizontal extension adapter	AZX-1TH	Horizontal terminals. Front connections.
Vertical extension adapter	AZX-1TF	Front connections

① : When using a conductive adapter with a fixed type ACB, always use an arc shield in the case of connection example 2.
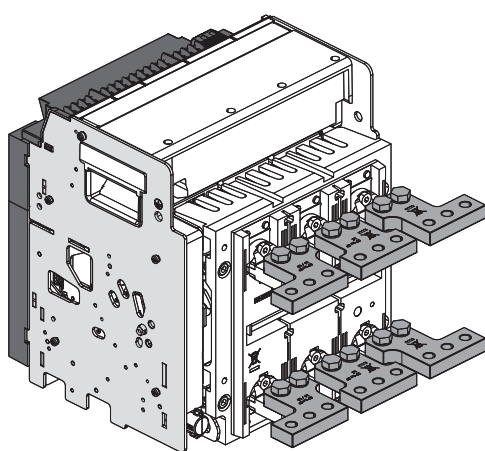
[AZX-1TH Draw-out type, horizontal terminals]
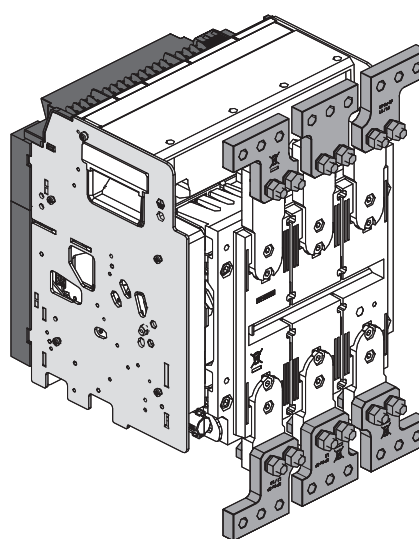
[AZX-1TH Draw-out type, front terminals]
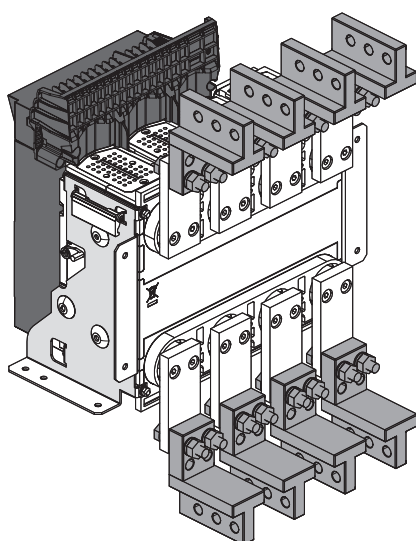
[AZX-1F Fixed-type, connection example1]

Arc shield
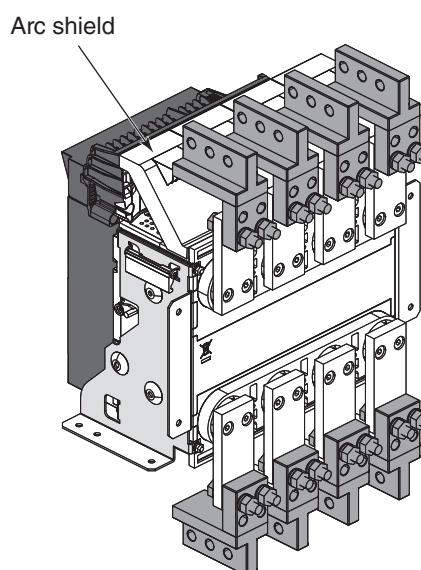
[AZX-1F Fixed-type, connection example2]

6 Specifications

OCR checker (TTP00)

AC adapter
Type A plug
FUNCTION button
DIGIT button
VALUE button
START/STOP button
POWER button
Type C plug
MIP cable (ACB connection cord)
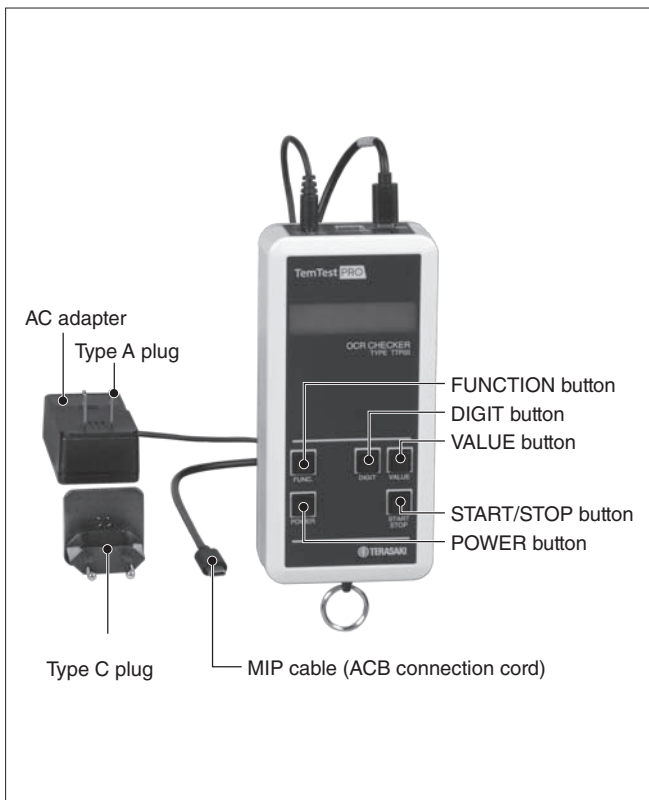
The TTP00 type OCR checker allows the long time-delay trip, short time-delay trip, instantaneous trip, ground fault trip, reverse power trip, and Preferential trip alarm function of over-current releases to be checked in the field.

Ratings / Specifications

Type	TTP00
Power Source	Single-phase 100 to 240V AC, 50/60Hz or A alkaline batteries 1.5V × 4 or nickel-metal hydride rechargeable batteries 1.2V × 4
Power Consumption	3VA
Application	● Long time-delay trip function check (Setting current and time-delay values) ● Short time-delay trip function check (Setting current and time-delay values) ● Instantaneous trip function check (Setting current value) ● Preferential trip alarm function check (Setting current and time-delay values) ● Ground fault trip function check (Setting current and time-delay values) ● Reverse power trip function check (Setting current and time-delay values) ● Setting of Zone interlock (Short time-delay, Ground fault) ● Setting of time
Measurement of set current values ①	● Display 6-digit digital display ● Range 1A – 199,999A
Measurement of tripping time values	● Display Digital display (0.01s unit for 9.99s or less, 0.1s unit for 10.0s or more) ● Range 0.01 – 999.9s
Outline Dimensions	80mm(W) × 165mm(H) × 35mm(D)
Weight	0.4kg (including accessories)
Accessories	MIP cable 2m × 1pc AC adapter (with power cord 1.9m) × 1unit AC adapter plug 　Type A (for domestic use) × 1pc 　Type C (for Europe) × 1pc

① : Measurement method based on digital signal output.

8 Operation Environments

Standard environment

The standard environment for ACBs is as follows:

Storage temperature　Max. permissible storage temperature +60°C, Min. permissible storage temperature –20°C. The average temperature for 24 hours must not exceed 35°C.

Operating temperature　Max. permissible operating temperature +40°C, Min. permissible operating temperature –5°C. The average temperature for 24 hours must not exceed 35°C.

Relative humidity　Below 85%

Vibration / Shock　Not subjected to abnormal vibrations or shocks.

Attitude　Below 2000m

Atmosphere　Excessive water vapor, oil vapor, smoke, dust, or corrosive gases must not exist. Sudden change in temperature, condensation, or icing must not occur.

Mounting condition　According to the instruction of mounting on the catalogue and manuals.

Guideline for renewal　Expected service life is 15 years under the standard environment.

Special environment　Coming soon

Tropicalization (Fungus and moisture treatment)

Specify this treatment when the ACB is used under high temperature and high-humidity conditions.

Ambient temperature　Max. permissible ambient temperature +60°C

Relative humidity　Max. permissible humidity 95% rel (No condensation)

Cold climate treatment

Specify this treatment when the ACB is used in cold areas.

Storage temperature　Max. permissible storage temperature +60°C, Min. permissible storage temperature –40°C (No condensation)

Operating temperature　Max. permissible operating temperature +40°C, Min. permissible operating temperature –25°C

Anti-corrosion treatment

Specify this treatment when the ACB is used in a corrosive atmosphere
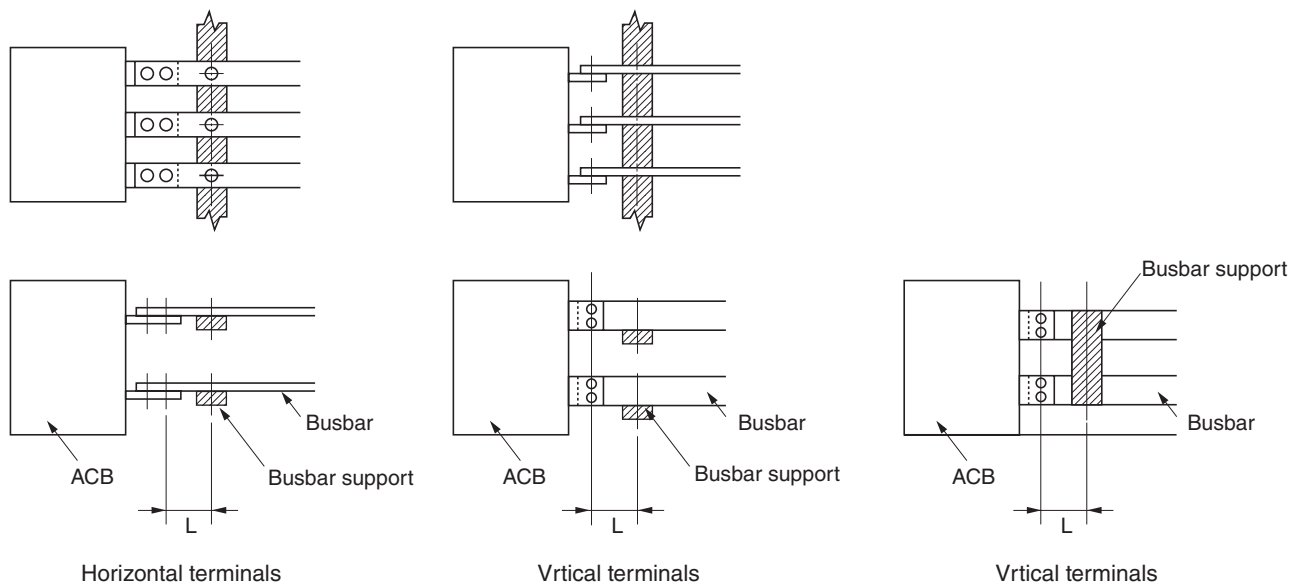
9   Busbars connection

When two busbars are connected to a terminal stud of ACB, sandwich the terminal stud between the two busbars to utilize both surfaces of the terminal. A spring and plain washer must be used in conjunction with the busbar bolt and nut as below.
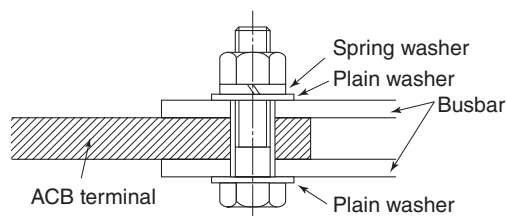
10   Recommendation for Busbars connection

The busbars to the ACB should be firmly supported near the ACB terminal. Fault currents flow through the busbars developing a large electromagnetic force between the busbars. The support must be strong enough to withstand such forces and ensure the enough insulating distance. The ACB should not be relied on as single support.

Horizontal terminals   Vrtical terminals   Vrtical terminals

The maximum distance "L" of the connection point of ACB to first basbur support should be 300mm.
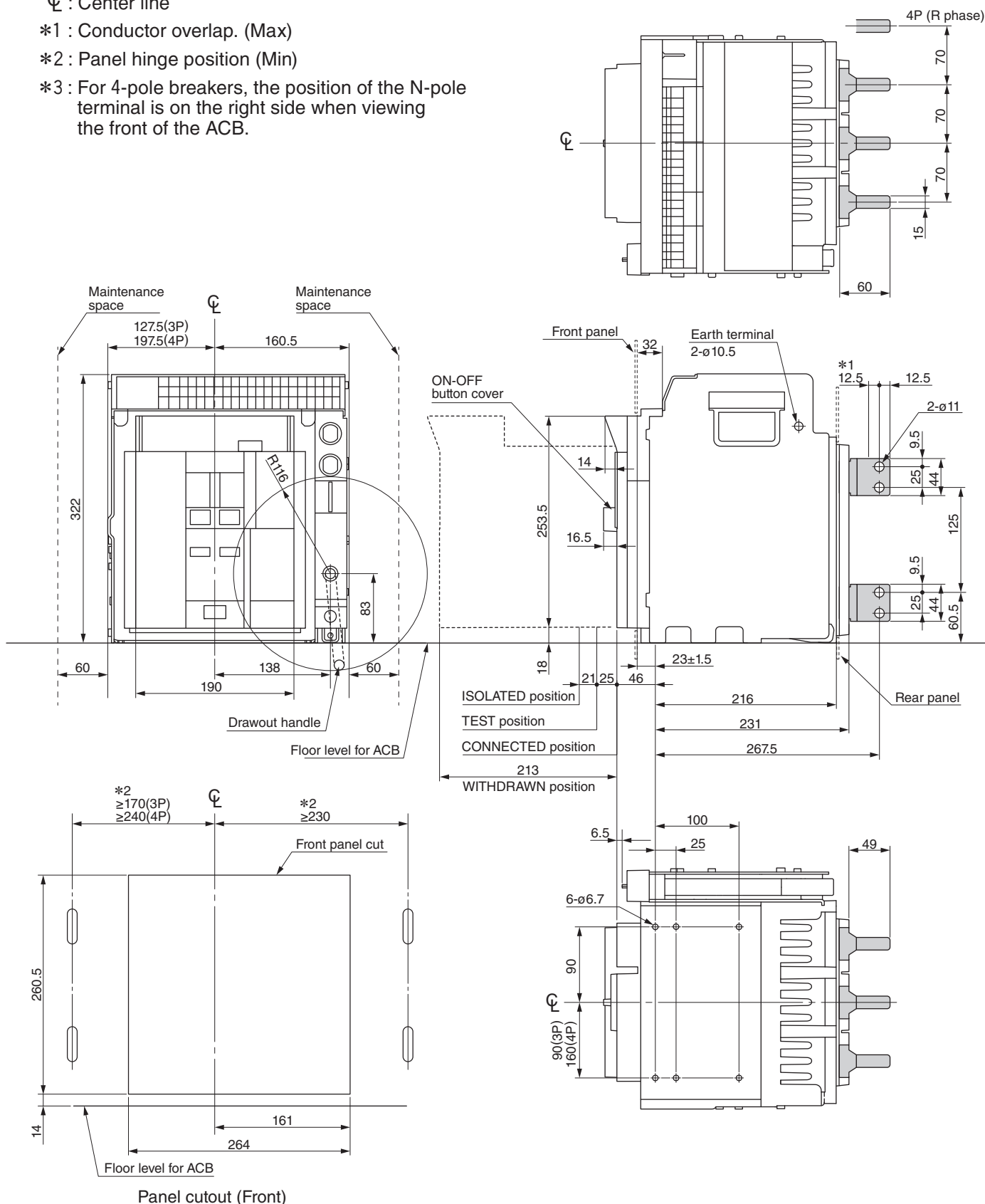
● Types **AX106S, AX108S, AX110S, AX112S, AX116S,**
AX106H, AX108H, AX110H, AX112H, AX116H,
AX106D, AX108D, AX110D, AX112D, AX116D
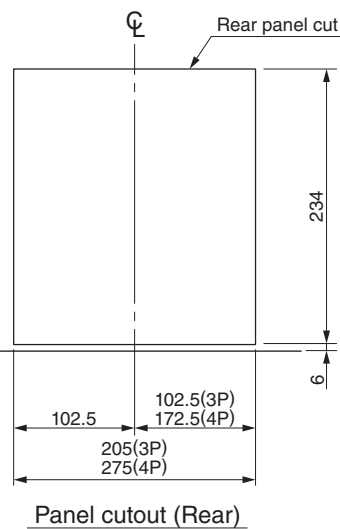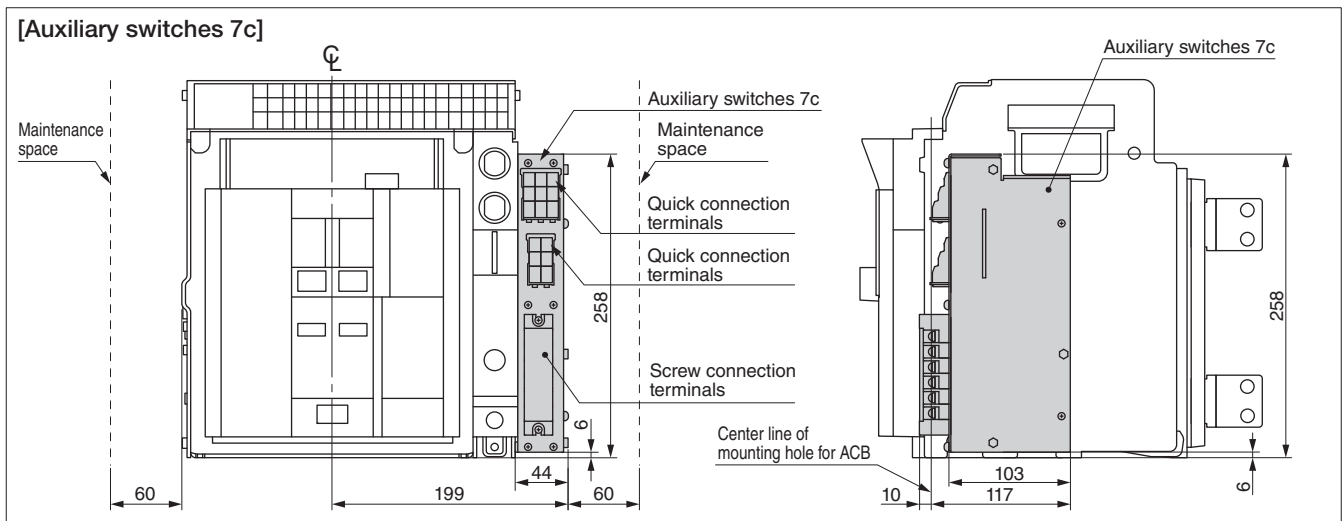
DRAW-OUT TYPE
Vertical terminals

℄ : Center line
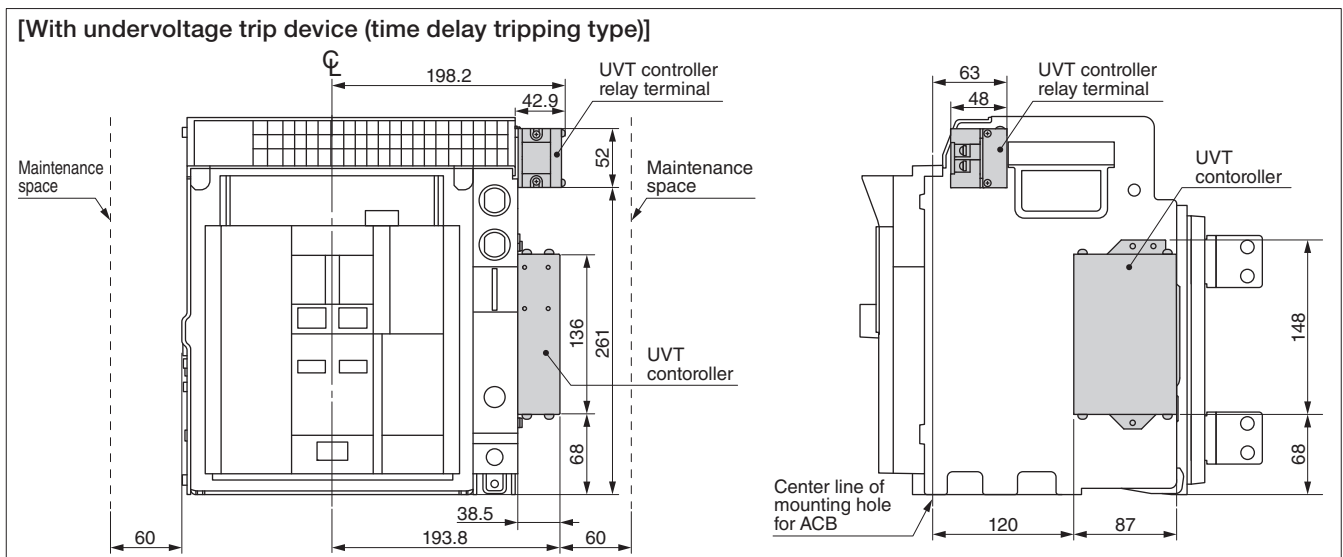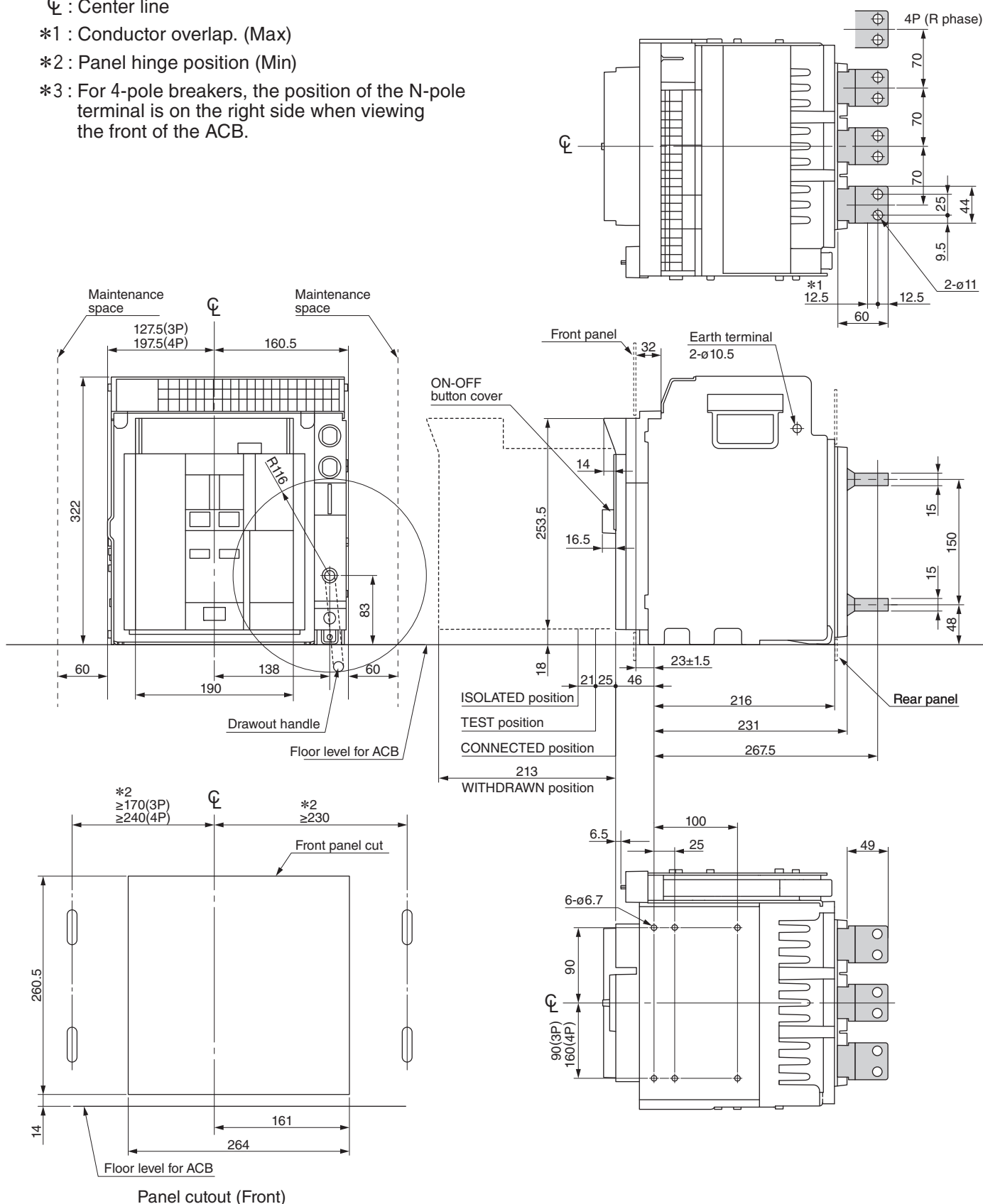∗1 : Conductor overlap. (Max)
∗2 : Panel hinge position (Min)
∗3 : For 4-pole breakers, the position of the N-pole
terminal is on the right side when viewing
the front of the ACB.

4P (R phase)

70
70
70
15
60

Maintenance space
Maintenance space
127.5(3P)
197.5(4P)
160.5

Front panel
32
ON-OFF button cover
Earth terminal 2-ø10.5
∗1
12.5   12.5
2-ø11

R116
322
253.5
14
16.5
9.5
25
44
125
9.5
25
44
60.5
83

60   138   60
190

18
21,25   46
23±1.5

ISOLATED position
TEST position
CONNECTED position
WITHDRAWN position
213
216
231
267.5
Rear panel

Drawout handle
Floor level for ACB

∗2
≥170(3P)
≥240(4P)
∗2
≥230
Front panel cut

6.5   100   25   49
6-ø6.7
90
90(3P)
160(4P)

260.5
14   161
264

Floor level for ACB

Panel cutout (Front)

[Auxiliary switches 7c]

Maintenance space

Auxiliary switches 7c
Maintenance space
Quick connection terminals
Quick connection terminals
Screw connection terminals
Center line of mounting hole for ACB

Auxiliary switches 7c

258
6
60
199
44
60
258
6
10
103
117

Rear panel cut

234
6
102.5
102.5(3P)
172.5(4P)
205(3P)
275(4P)

Panel cutout (Rear)

[With undervoltage trip device (time delay tripping type)]

Maintenance space

198.2
42.9
UVT controller relay terminal
52
Maintenance space
136
261
UVT contoroller
68
60
38.5
193.8
60

63
48
UVT controller relay terminal
UVT contoroller
148
68
Center line of mounting hole for ACB
120
87

● **Types**　**AX106S, AX108S, AX110S, AX112S, AX116S,**
　　　　　　AX106H, AX108H, AX110H, AX112H, AX116H,
　　　　　　AX106D, AX108D, AX110D, AX112D, AX116D　**DRAW-OUT TYPE**
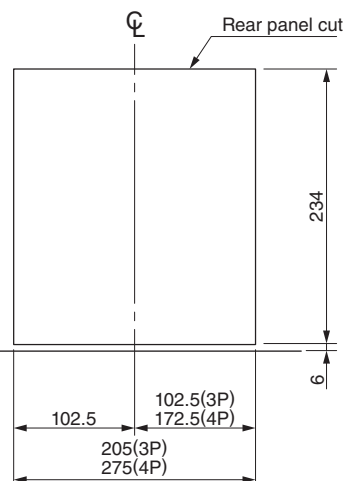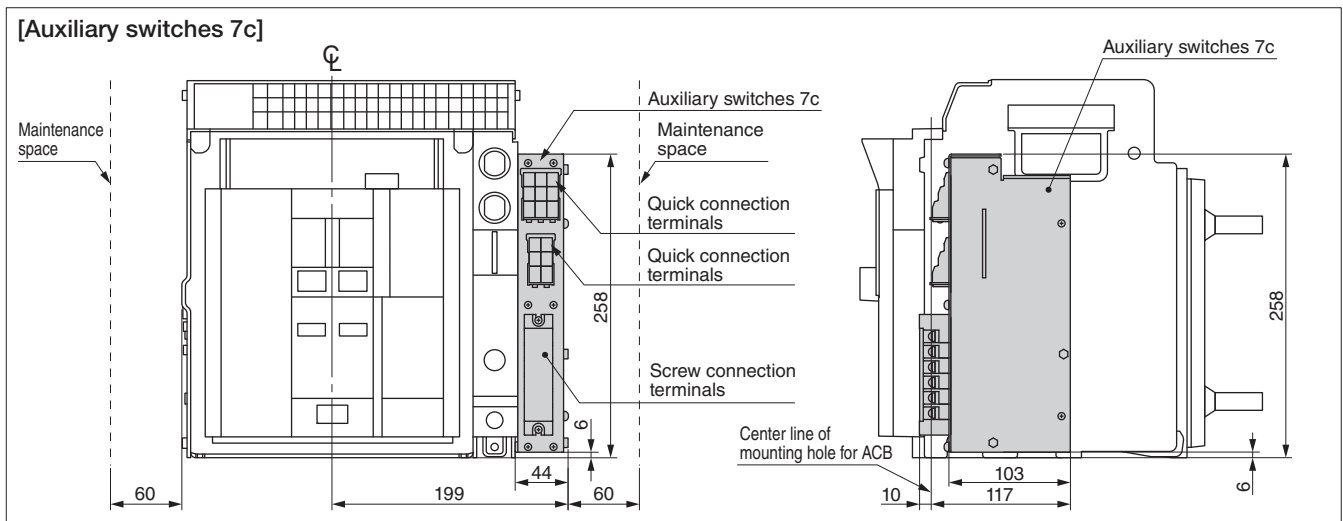**Horizontal terminals**

℄ : Center line
*1 : Conductor overlap. (Max)
*2 : Panel hinge position (Min)
*3 : For 4-pole breakers, the position of the N-pole
terminal is on the right side when viewing
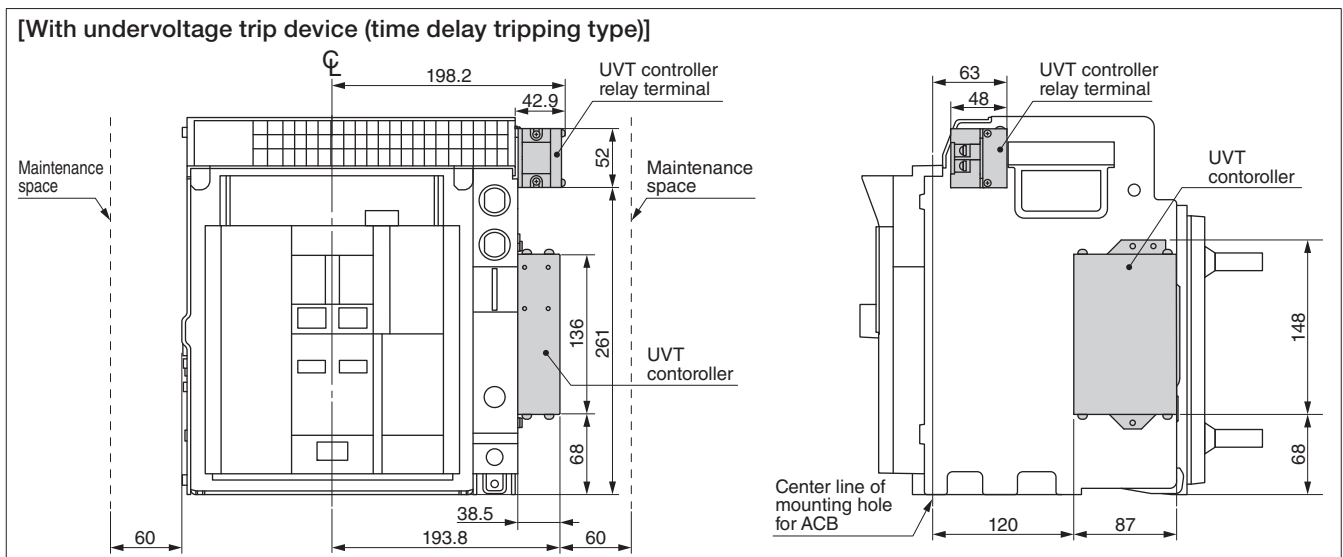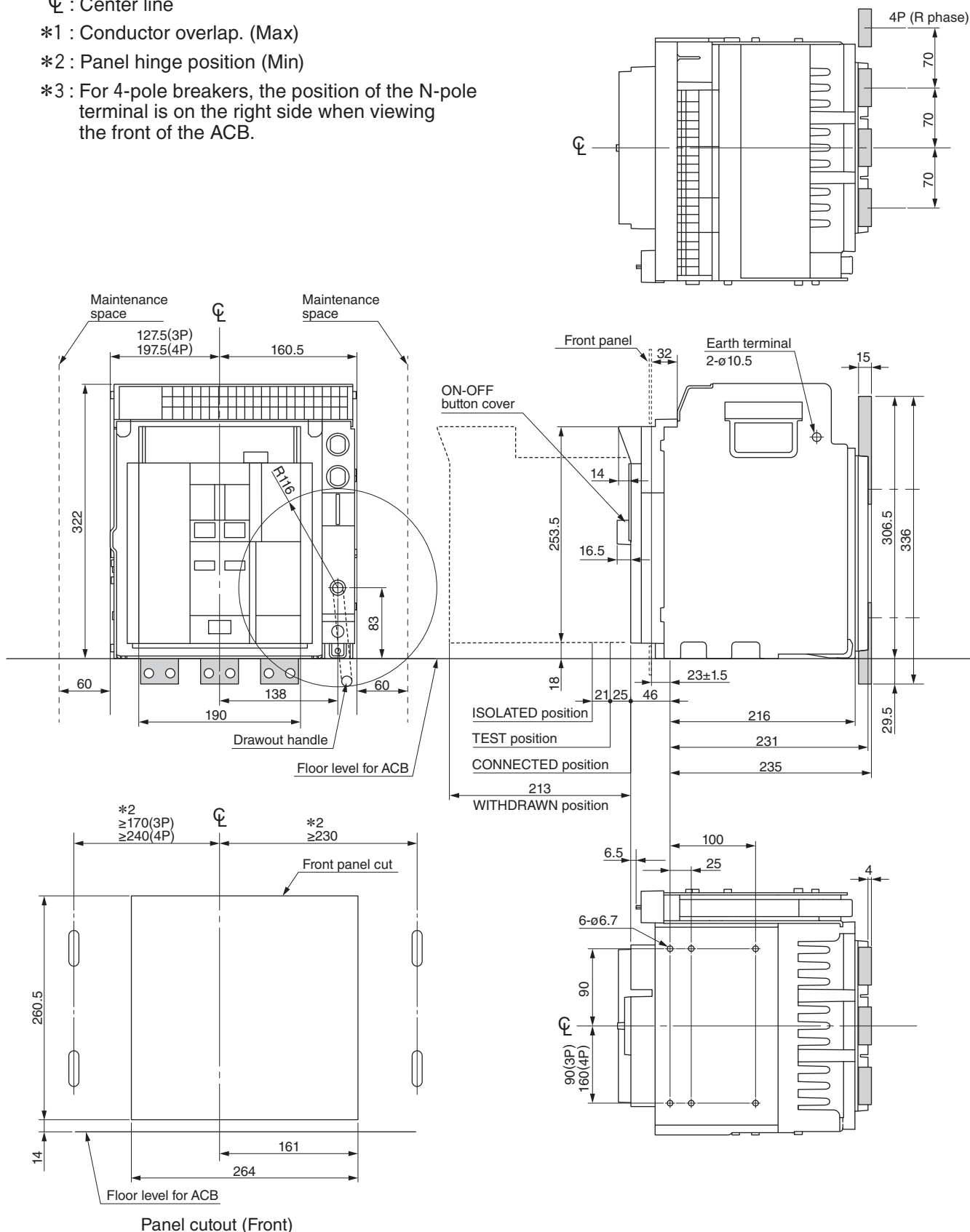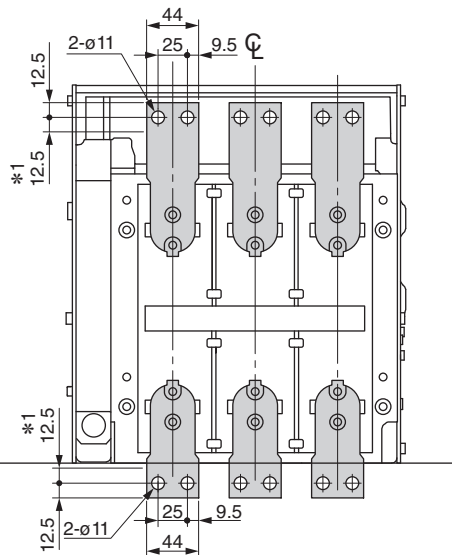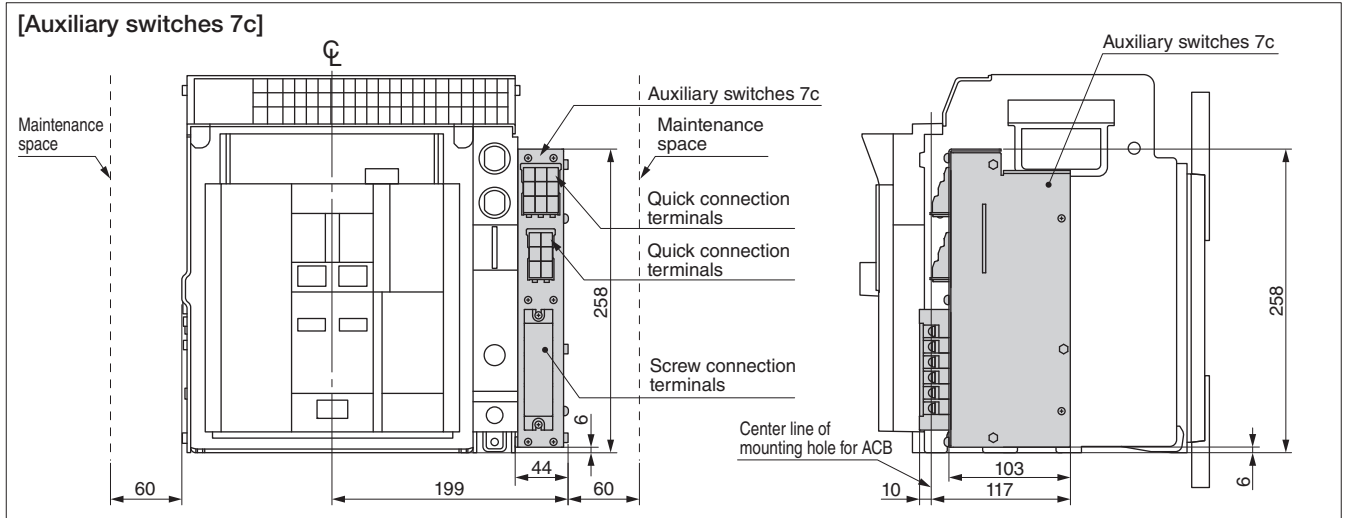the front of the ACB.

Maintenance space

127.5(3P)
197.5(4P)　160.5

322

R116

83

60　138　60
190

Drawout handle

Floor level for ACB

4P (R phase)

70

70

70

25　44

9.5

*1
12.5　12.5

60

2-ø11

Front panel　32

Earth terminal
2-ø10.5

ON-OFF
button cover

14

253.5

16.5

18

21,25　46

23±1.5

216

231

267.5

ISOLATED position

TEST position

CONNECTED position

213
WITHDRAWN position

15

150

15

48

Rear panel

*2
≥170(3P)
≥240(4P)

*2
≥230

Front panel cut

260.5

14

161

264

Floor level for ACB

Panel cutout (Front)

6.5

100

25

49

6-ø6.7

90

90(3P)
160(4P)

[Auxiliary switches 7c]

Maintenance space

Auxiliary switches 7c

Maintenance space

Quick connection terminals

Quick connection terminals

Screw connection terminals

Center line of mounting hole for ACB

Auxiliary switches 7c

258

6

60 · 199 · 44 · 60

258

6

10 · 117 · 103

Rear panel cut

234

6

102.5 · 102.5(3P) 172.5(4P)

205(3P) 275(4P)

Panel cutout (Rear)

[With undervoltage trip device (time delay tripping type)]

Maintenance space

198.2

42.9

UVT controller relay terminal

52

Maintenance space

136 · 261

UVT contoroller

68

60 · 193.8 · 38.5 · 60

63

48

UVT controller relay terminal

UVT contoroller

UVT contoroller

148

68

Center line of mounting hole for ACB

120 · 87

● Types   **AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H, AX106D, AX108D, AX110D, AX112D, AX116D**

DRAW-OUT TYPE Front connections

Ȼ : Center line
∗1 : Conductor overlap. (Max)
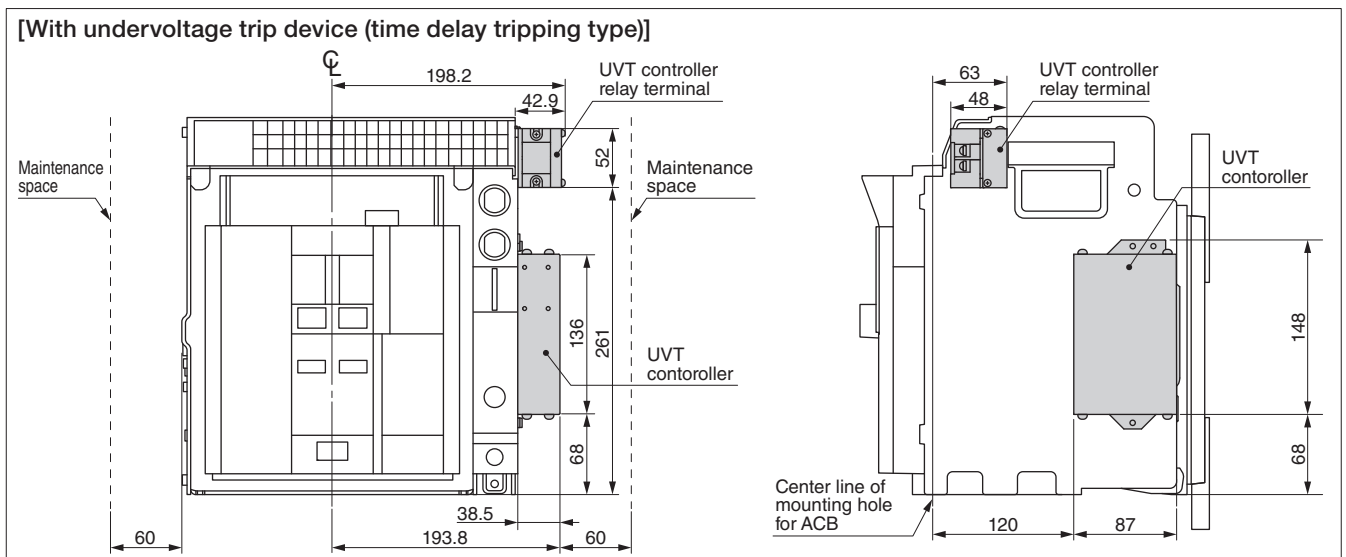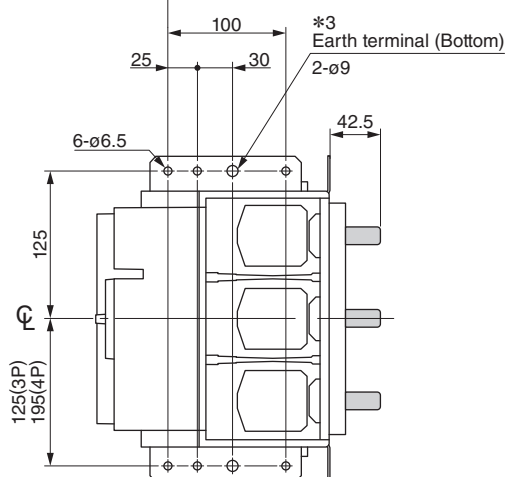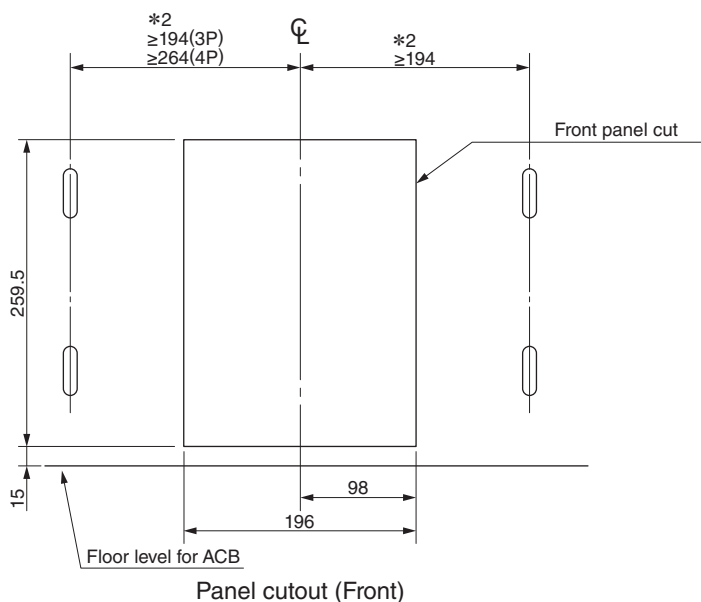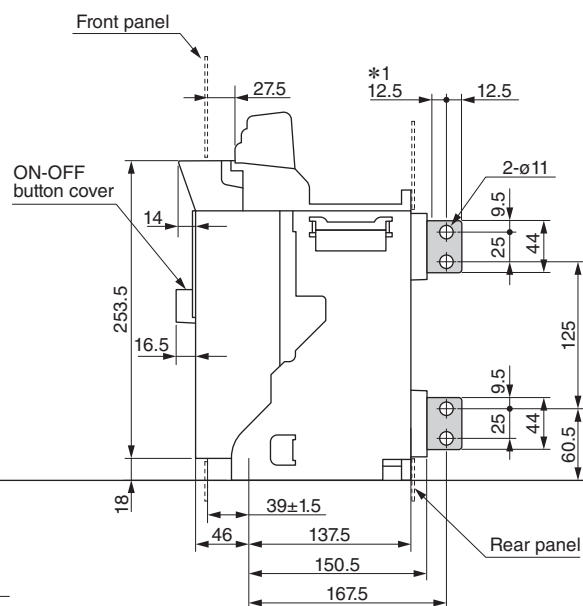∗2 : Panel hinge position (Min)
∗3 : For 4-pole breakers, the position of the N-pole terminal is on the right side when viewing the front of the ACB.

4P (R phase)

Maintenance space   Maintenance space
127.5(3P)   160.5
197.5(4P)

Front panel   Earth terminal 2-ø10.5   15
32
ON-OFF button cover

322

R116
83

253.5
14
16.5

306.5
336

60   138   60
190

18
21,25   46
23±1.5
216
231
235
29.5

Drawout handle

ISOLATED position
TEST position
CONNECTED position
213
WITHDRAWN position

Floor level for ACB

∗2 ≥170(3P)   ∗2 ≥230
≥240(4P)

Front panel cut

6.5   100
25
4

6-ø6.7

260.5

90

90(3P)
160(4P)

14

161
264

Floor level for ACB

Panel cutout (Front)

[Auxiliary switches 7c]

Maintenance space

Auxiliary switches 7c

Auxiliary switches 7c

Maintenance space

Quick connection terminals

Quick connection terminals

Screw connection terminals

Center line of mounting hole for ACB

258

6

60 199 44 60

10 103 117 6

258

44
2-ø11 25 9.5
12.5
*1 12.5
*1 12.5
12.5 2-ø11 25 9.5 44

[With undervoltage trip device (time delay tripping type)]

Maintenance space

198.2
42.9

UVT controller relay terminal

Maintenance space

UVT contoroller

63
48

UVT controller relay terminal

UVT contoroller

52
136
261
68

60 38.5 193.8 60

Center line of mounting hole for ACB

120 87

148
68

● Types **AX106S, AX108S, AX110S, AX112S, AX116S,**
AX106H, AX108H, AX110H, AX112H, AX116H,
AX106D, AX108D, AX110D, AX112D, AX116D } **FIXED TYPE Vertical terminals**

4P (R phase)

⅊ : Center line

＊1 : Conductor overlap. (Max)

＊2 : Panel hinge position (Min)

＊3 : Only use an earth terminal on either the bottom or rear surfaces.

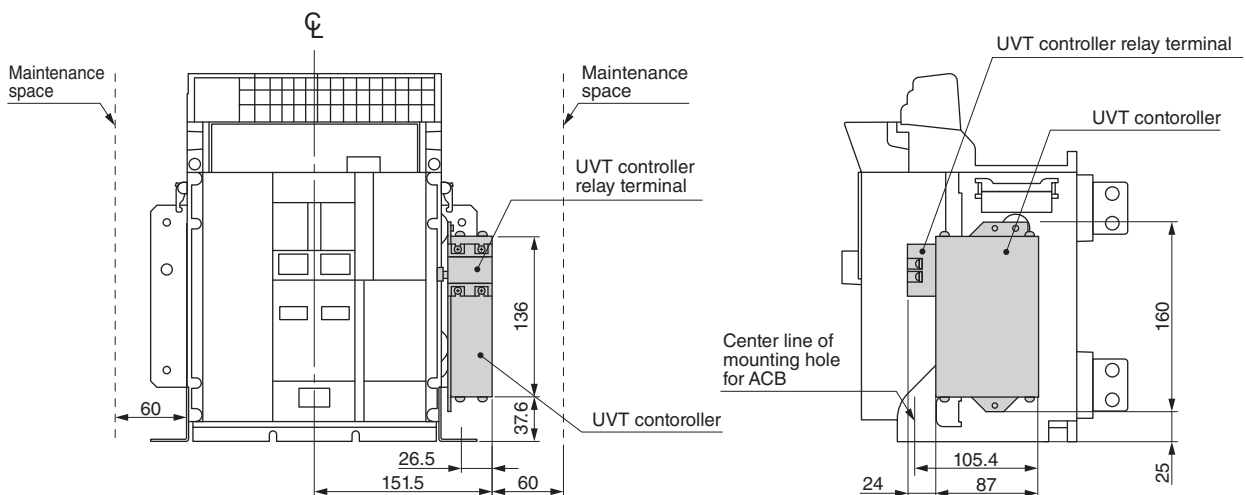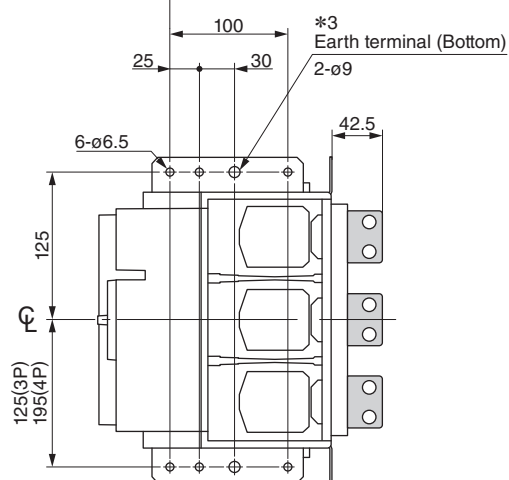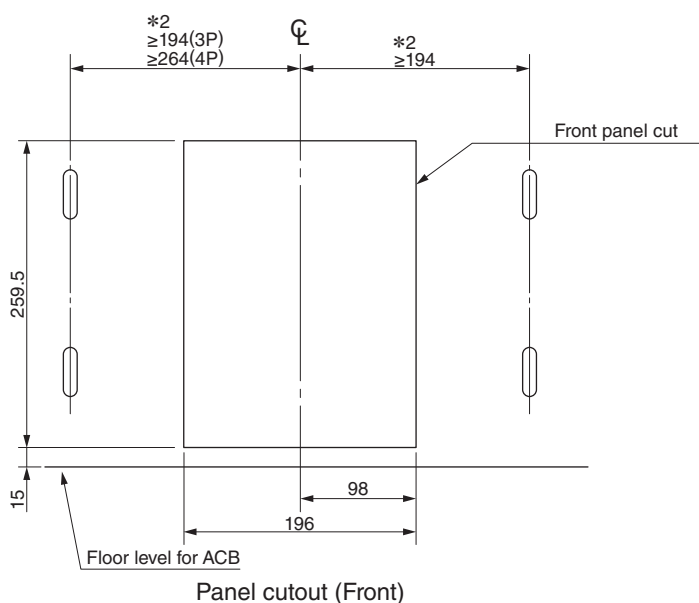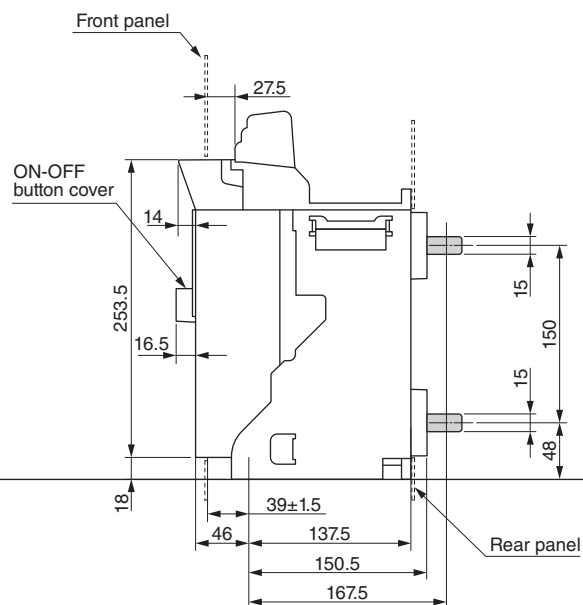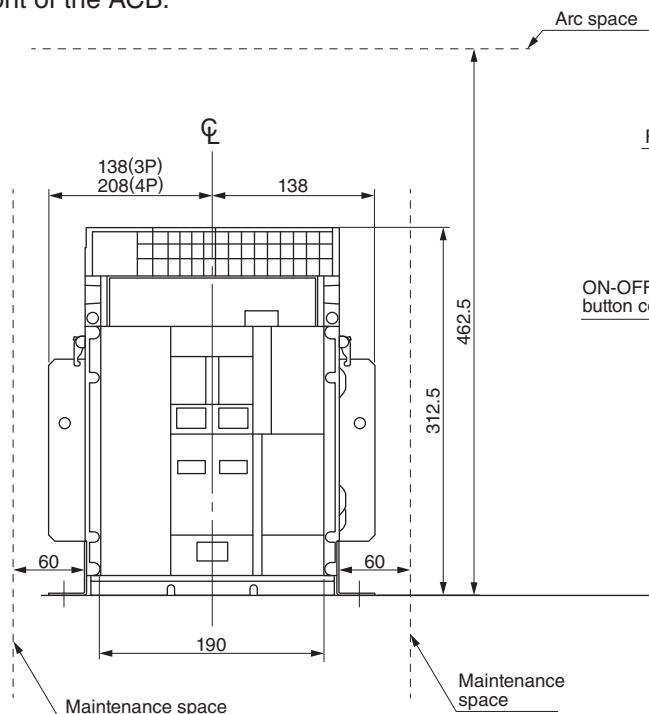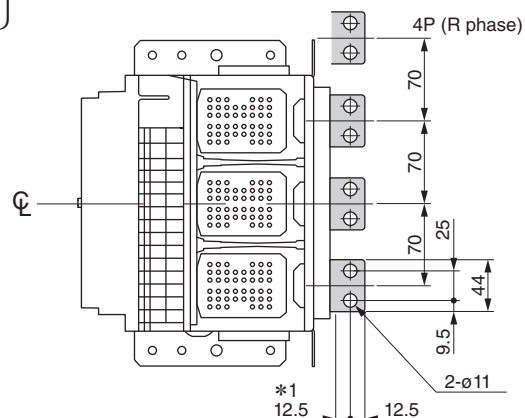＊4 : To use an earth terminal (rear), a ø9 hole must be machined.

＊5 : For 4-pole breakers, the position of the N-pole terminal is on the right side when viewing the front of the ACB.

Arc space

138(3P)
208(4P)   138

462.5

312.5

60   60

190

Maintenance space

Maintenance space

Front panel

27.5

＊1
12.5   12.5

ON-OFF button cover

14

16.5

253.5

18

2-ø11

9.5
25   44

125

9.5
25   44

60.5

39±1.5

46   137.5

150.5

167.5

Rear panel

＊2
≥194(3P)
≥264(4P)

＊2
≥194

Front panel cut

259.5

15

98

196

Floor level for ACB

Panel cutout (Front)

100

＊3
Earth terminal (Bottom)
2-ø9

25   30

6-ø6.5

42.5

125

125(3P)
195(4P)

*3
Earth terminal (Rear)
2-ø9

145.5

125

125(3P)
195(4P)

*4
125

*4
125(3P)
195(4P)

Rear panel cut

*4
Earth terminal
2-ø9

145.5

213

16.5

106

106(3P)
176(4P)

Panel cutout (Rear)

[With undervoltage trip device (time delay tripping type)]

Maintenance
space

Maintenance
space

UVT controller relay terminal

UVT controller
relay terminal

UVT contoroller

UVT controller
relay terminal

UVT contoroller

Center line of
mounting hole
for ACB

136

37.6

60

26.5

151.5

60

160

105.4

24

87

25

7 Outline Dimensions

● Types   **AX106S, AX108S, AX110S, AX112S, AX116S,**
           AX106H, AX108H, AX110H, AX112H, AX116H,   FIXED TYPE Horizontal terminals
           AX106D, AX108D, AX110D, AX112D, AX116D
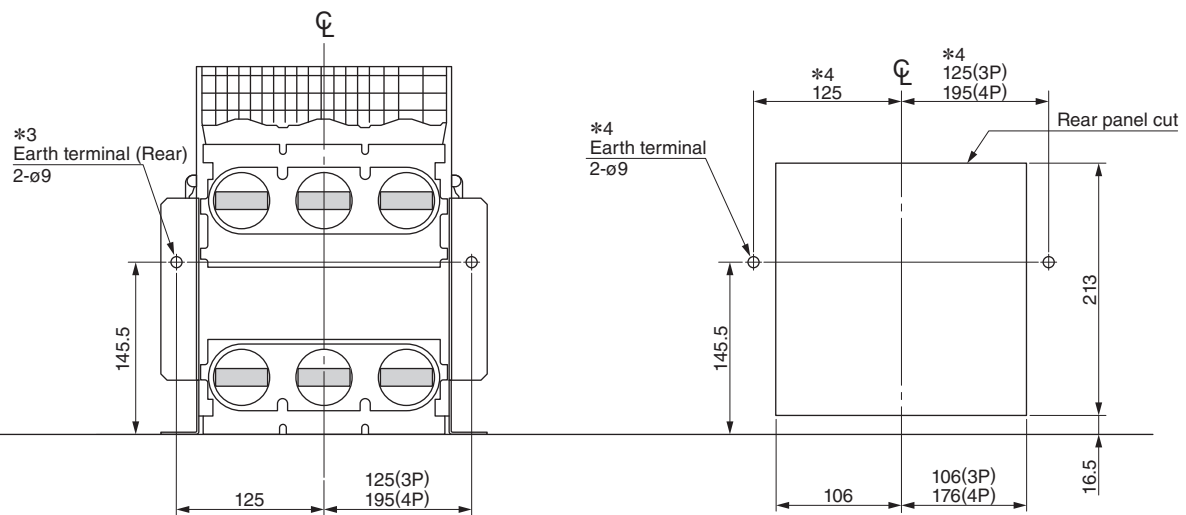
℄ : Center line

∗1 : Conductor overlap. (Max)

∗2 : Panel hinge position (Min)

∗3 : Only use an earth terminal on either the bottom
     or rear surfaces.

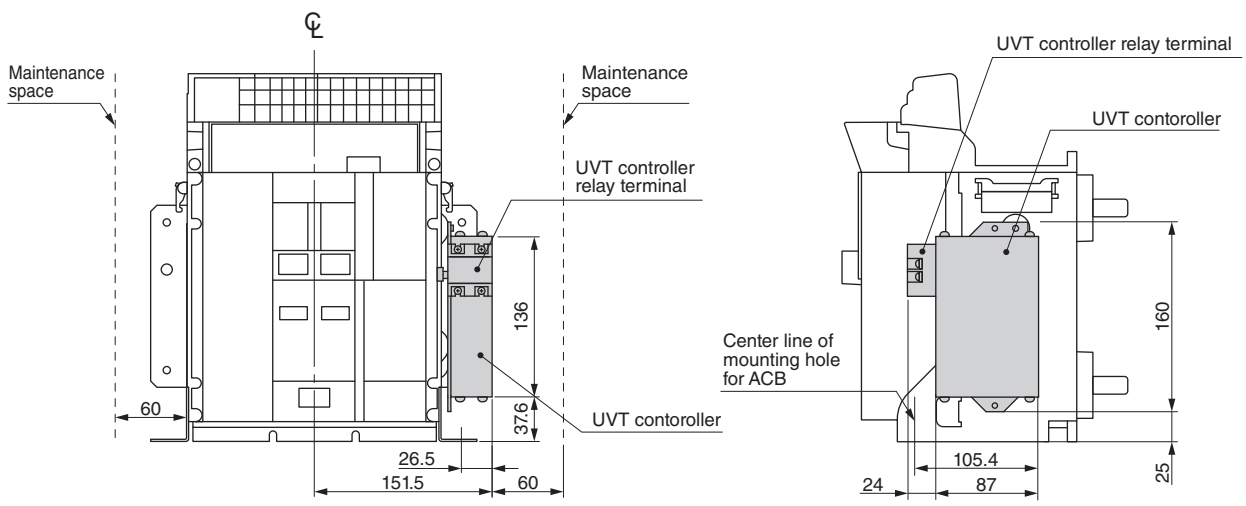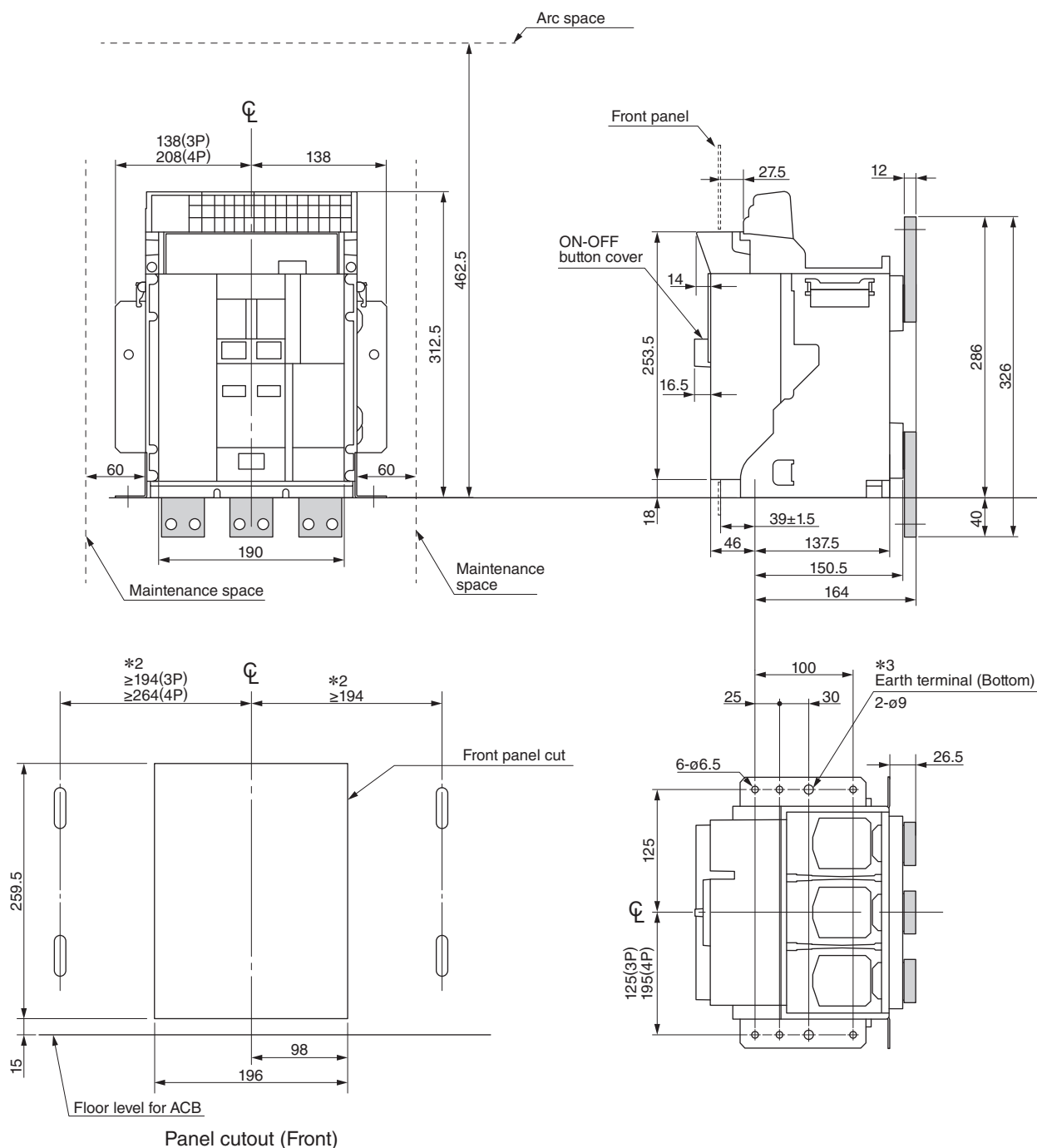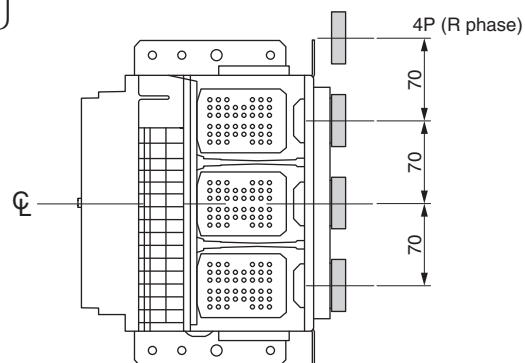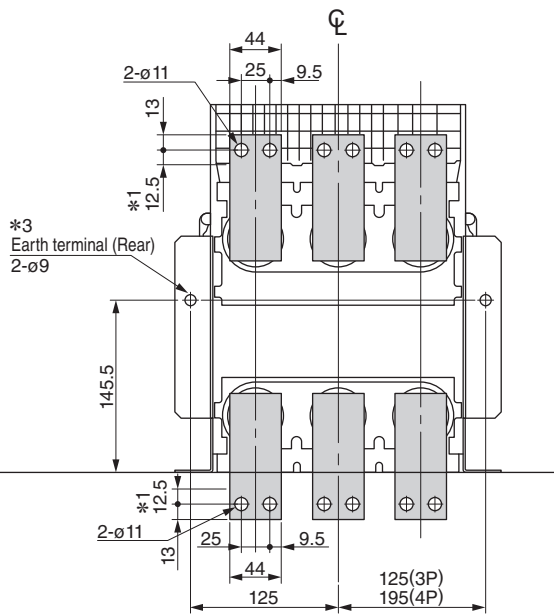∗4 : To use an earth terminal (rear), a ø9 hole must
     be machined.

∗5 : For 4-pole breakers, the position of the N-pole
     terminal is on the right side when viewing
     the front of the ACB.

4P (R phase)
70
70
70   25
44
9.5
∗1   2-ø11
12.5   12.5

Arc space

℄
138(3P)
208(4P)   138
462.5
312.5
60   60
190
Maintenance space   Maintenance space

Front panel
27.5
ON-OFF button cover
14
253.5
16.5
15
150
15
48
18
39±1.5
46   137.5
150.5
167.5
Rear panel

∗2
≥194(3P)
≥264(4P)   ℄   ∗2
≥194

Front panel cut
259.5
15
98
196
Floor level for ACB

Panel cutout (Front)

100   ∗3
Earth terminal (Bottom)
2-ø9
25   30
42.5
6-ø6.5
125
℄
125(3P)
195(4P)

64

*3
Earth terminal (Rear)
2-ø9

145.5

125

125(3P)
195(4P)

*4
125

*4
125(3P)
195(4P)

Rear panel cut

*4
Earth terminal
2-ø9

145.5

213

16.5

106

106(3P)
176(4P)

Panel cutout (Rear)

[With undervoltage trip device (time delay tripping type)]

Maintenance space

Maintenance space

UVT controller relay terminal

UVT controller relay terminal

UVT controller

136

37.6

60

26.5

151.5

60

UVT contoroller

UVT controller relay terminal

UVT contoroller

Center line of mounting hole for ACB

160

105.4

24

87

25

65

7 Outline Dimensions

● Types　AX106S, AX108S, AX110S, AX112S, AX116S,
　　　　　AX106H, AX108H, AX110H, AX112H, AX116H,　FIXED TYPE Front connections
　　　　　AX106D, AX108D, AX110D, AX112D, AX116D

Ҁ : Center line
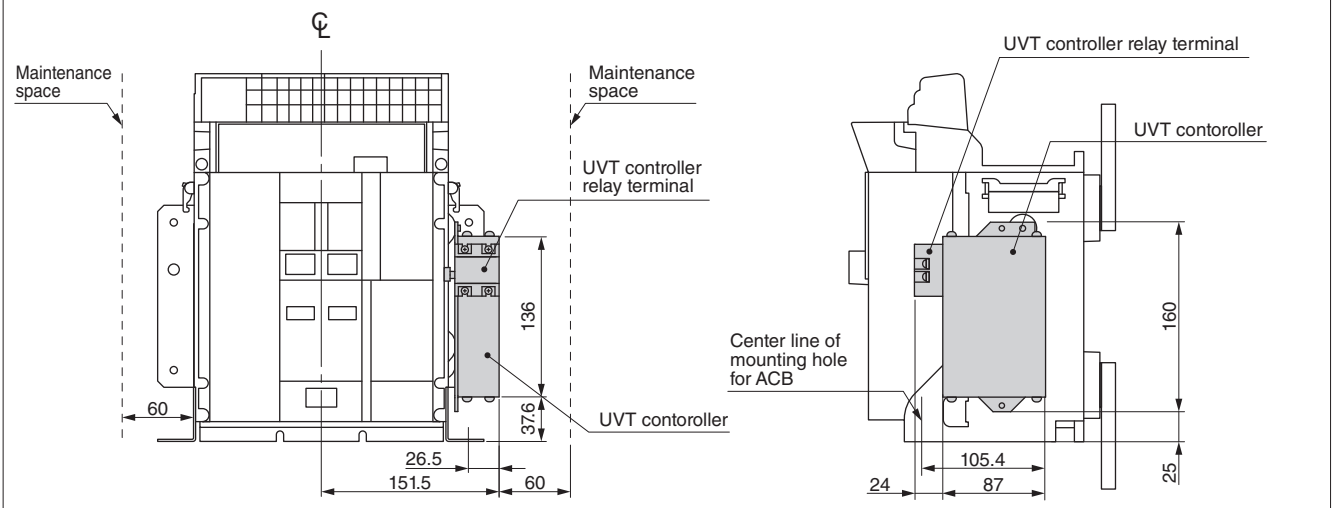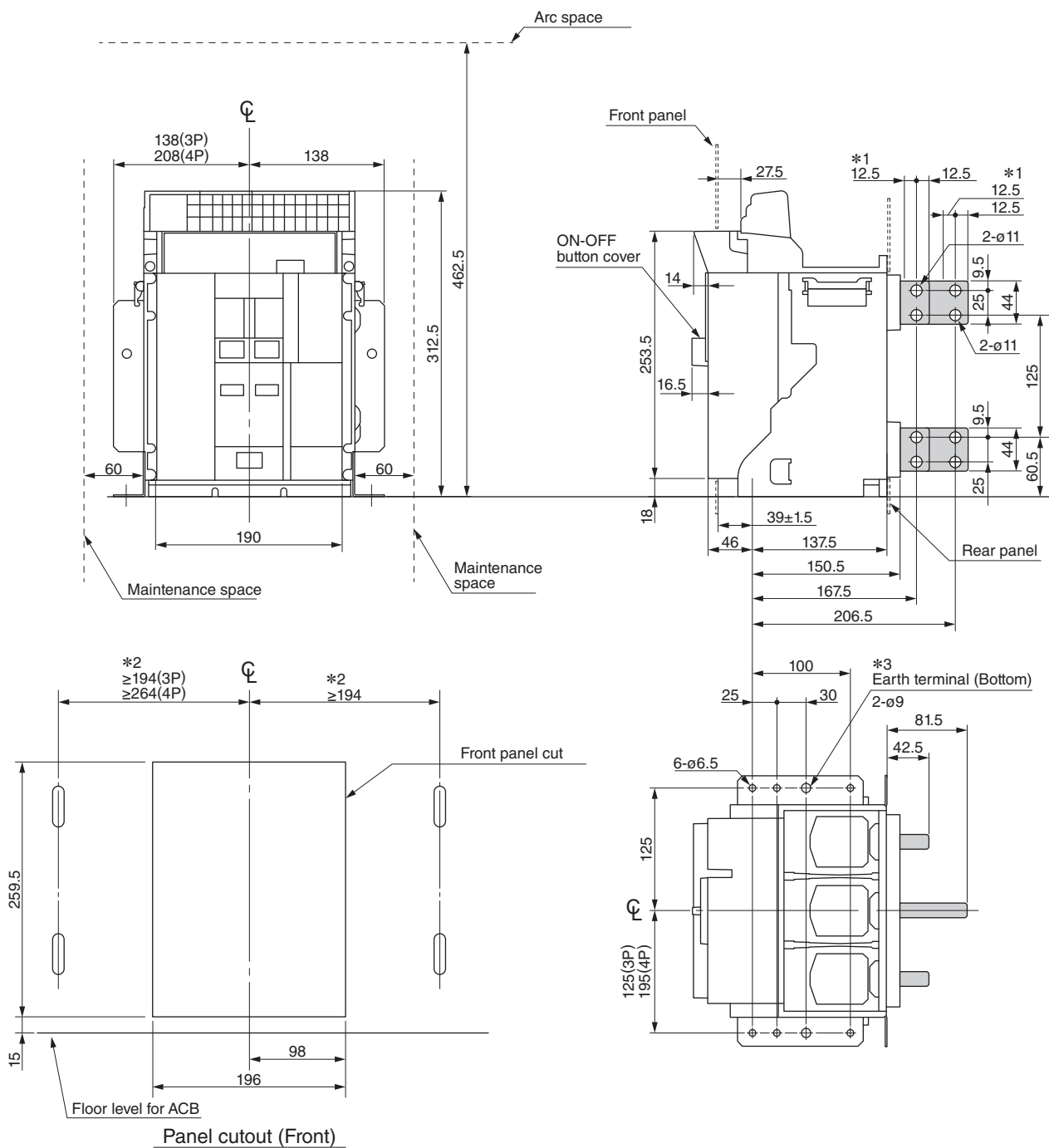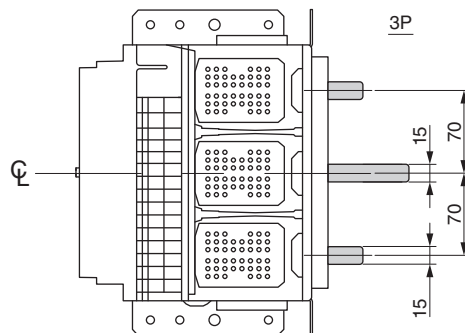＊1 : Conductor overlap. (Max)
＊2 : Panel hinge position (Min)
＊3 : Only use an earth terminal on either the bottom
　　　or rear surfaces.
＊4 : For 4-pole breakers, the position of the N-pole
　　　terminal is on the right side when viewing
　　　the front of the ACB.

4P (R phase)
70 / 70 / 70 / 70

Arc space

Front panel

138(3P) 208(4P) / 138
462.5 / 312.5
ON-OFF button cover
27.5 / 12
14 / 253.5 / 16.5
286 / 326
60 / 60
190
18 / 46 / 39±1.5 / 137.5 / 150.5 / 164 / 40
Maintenance space

＊2 ≥194(3P) ≥264(4P) / ＊2 ≥194
Front panel cut
100 / ＊3 Earth terminal (Bottom) 2-ø9
25 / 30 / 26.5
6-ø6.5
259.5 / 125 / 125(3P) 195(4P)
15 / 98 / 196
Floor level for ACB

Panel cutout (Front)

66

44
2-ø11
25
9.5
13
*1
12.5

*3
Earth terminal (Rear)
2-ø9

145.5

*1
12.5
2-ø11
13
25
44
9.5
125(3P)
195(4P)
125

[With undervoltage trip device (time delay tripping type)]

Maintenance space

Maintenance space

UVT controller relay terminal

UVT contoroller

UVT controller relay terminal

UVT contoroller

Center line of mounting hole for ACB

UVT controller relay terminal

UVT contoroller

136
37.6
60
26.5
151.5
60

24
105.4
87
160
25

● Types AX120S, AX120H

Ꮯᒪ : Center line
∗1 : Conductor overlap. (Max)
∗2 : Panel hinge position (Min)
∗3 : Only use an earth terminal on either the bottom or rear surfaces.
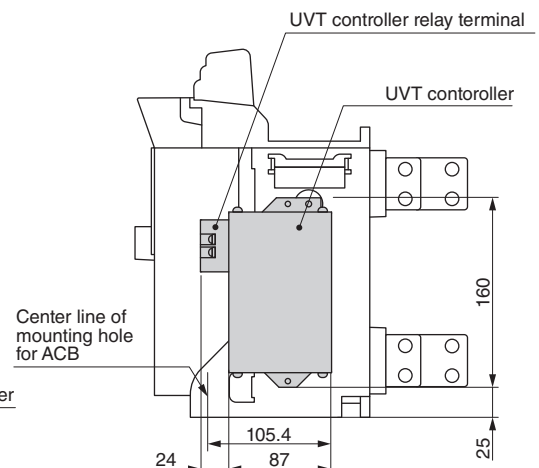∗4 : To use an earth terminal (rear), a ø9 hole must be machined.
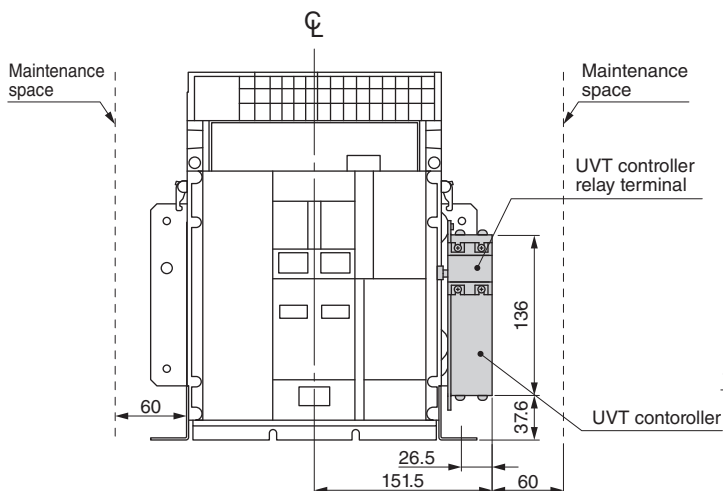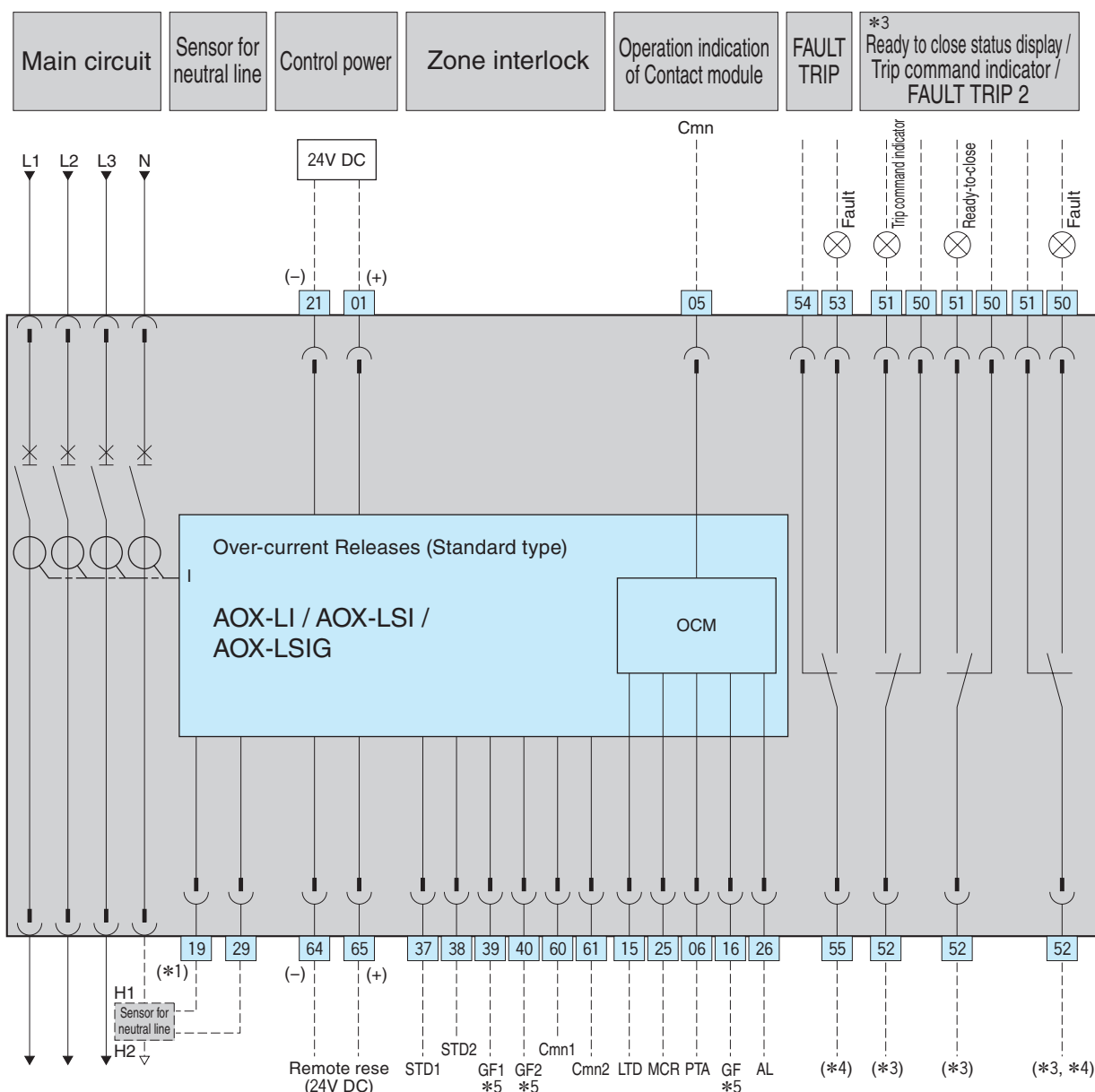∗5 : For 4-pole breakers, the position of the N-pole terminal is on the right side when viewing the front of the ACB.

3P

Arc space

Front panel

138(3P)
208(4P)   138

462.5
312.5

60   60

190

Maintenance space

Maintenance space

ON-OFF button cover

27.5   ∗1 12.5   12.5   ∗1 12.5 12.5

2-ø11

14

253.5

16.5

25 9.5 44

2-ø11

125

9.5 44 60.5 25

18

39±1.5

46   137.5

150.5

167.5

206.5

Rear panel

∗2
≥194(3P)
≥264(4P)   ∗2 ≥194

Front panel cut

259.5

15

98

196

Floor level for ACB

Panel cutout (Front)

100   ∗3 Earth terminal (Bottom)
25   30   2-ø9

81.5
42.5

6-ø6.5

125

125(3P)
195(4P)

4P

4P
(R phase)

70

15

70

15

70

C L

*3
Earth terminal (Rear)
2-ø9

145.5

125

125(3P)
195(4P)

C L

*4
Earth terminal
2-ø9

145.5

106

*4
125

*4
125(3P)
195(4P)

C L

Rear panel cut

213

16.5

106(3P)
176(4P)

Panel cutout (Rear)

[With undervoltage trip device (time delay tripping type)]

Maintenance
space

Maintenance
space

UVT controller
relay terminal

C L

136

37.6

UVT contoroller

60

26.5

151.5

60

UVT controller relay terminal

UVT contoroller

Center line of
mounting hole
for ACB

24

105.4

87

160

25

Main circuit	Sensor for neutral line	Control power	Zone interlock	Operation indication of Contact module	FAULT TRIP	*3 Ready to close status display / Trip command indicator / FAULT TRIP 2

L1 L2 L3 N

24V DC

Cmn

Fault — Trip command indicator — Ready-to-close — Fault

(−) (+)

21 01

05

54 53 51 50 51 50 51 50

Over-current Releases (Standard type)

AOX-LI / AOX-LSI / AOX-LSIG

OCM

I

19 29 | 64 65 | 37 38 39 40 60 61 15 25 06 16 26 | 55 52 | 52 | 52

(*1)

H1
Sensor for neutral line
H2

Remote rese (24V DC) STD1 STD2 GF1 *5 GF2 *5 Cmn1 Cmn2 LTD MCR PTA GF *5 AL

(−) (+)

(*4) (*3) (*3) (*3, *4)

Terminal description

01(+) — 21(−) Control power 24V DC
05 — 15 Operation indication of Long time-delay trip
05 — 25 Short time-delay trip (ST) / Instantaneous trip (INST) / Making current release(MCR)
Operation indicaton of Instantaneous override tripping (IO) *6
05 — 06 Operation indication of Preferential trip alarm
05 — 16 Operation indication of Ground-fault trip *5
05 — 26 Multi operation indication (Trip alarm / Level of impact severe error)
19 — 29 Sensor for neutral line (Polarity : 19 - H1, 29 - H2)
65(+) — 64(−) Input for Remote reset (24V DC) *7
37 — 60 Input for Zone interlock (Short time delay)
38 — 61 Output for Zone interlock (Short time delay)
39 — 60 Input for Zone interlock (Ground fault) *5
40 — 61 Output for Zone interlock (Ground fault) *5
53 — 55 FAULT TRIP switch
51 — 52 Ready to close switch
50 — 52 Trip command indicator or FAULT TRIP switch 2
08(+) — 09(−) Under voltage trip device (Instantaneous trip type) or Continuously-rated shunt trip device 2
81(+) — 91(−) Under voltage trip device (Time delay trip type)
44(+) — 20(−) Continuously-rated shunt trip
27 — 22 Spring charge indicator
02(+) — 22(−) Motor charging operation circuit
43(+) — 07(−) Latch Release Coil (LRC)

Symbols for accessories

OCM : Contact module
MOT : Charging motor
LRC : Latch release coil
SHT, SHT2 : Continuously-rated shunt trip device
UVT : Undervoltage trip device
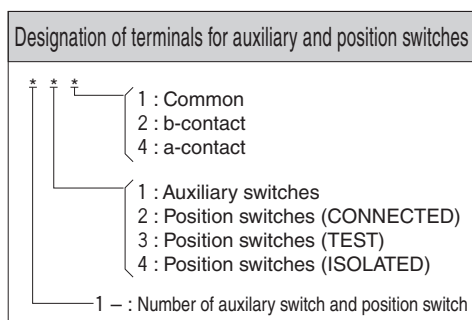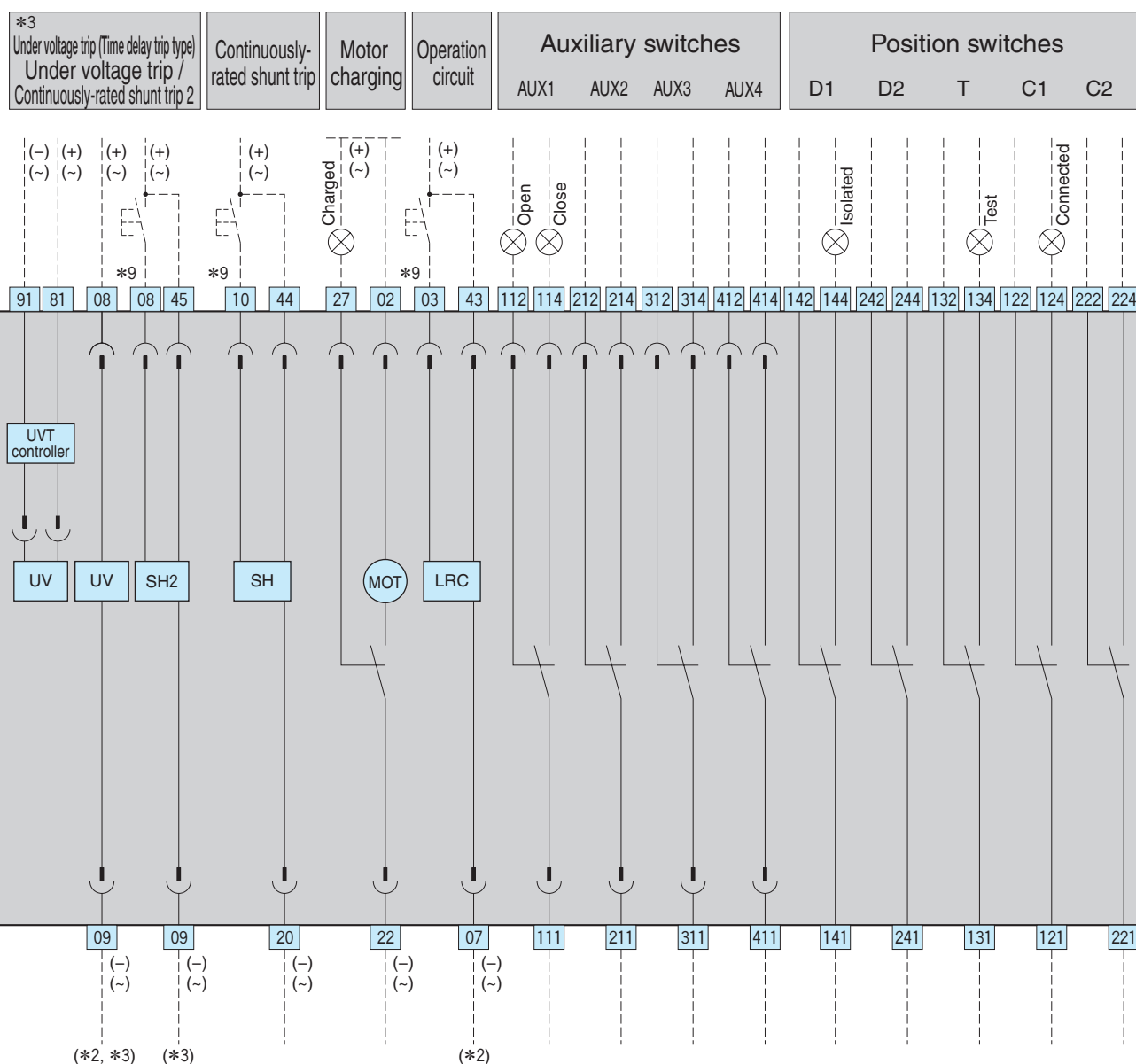⊶ Isolating terminal connector (Draw-out type)

*9 : Connecting continuously-rated shunt trip devices and operation circuits.

Ensure that the cables connecting the switch with terminals 03, 08 and 10 are 5 m or less in length, and keep them as far away as possible from power supply cables. If the cables exceed 5 m in length, or if using a AC380−480V rated voltage continuously-rated shunt trip device and latch release coil, use either of the following connection methods, as there is the risk of incorrect device operation caused by stray capacitance between cables.
1) Connect a relay near the ACB, and control the relay remotely.
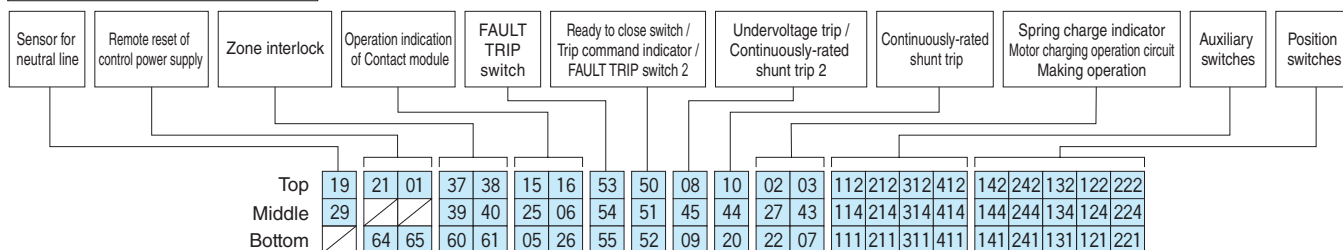2) Short-circuit the terminals as shown below.
Note that there will be an inrush current at the switch when using this connection method, so select a switch capable of handling the inrush current values in the table below.

Continuously-rated shunt trip device
(+)

Operation circuit
(+)

(+)

08 45 10 44 03 43

Rated voltage (V)	Inrush current (A)
AC/DC24−30	12
AC/DC48−60	6
AC/DC100−130	4
AC/DC200−250	2
AC380−480	1

*3 Under voltage trip (Time delay trip type) **Under voltage trip / Continuously-rated shunt trip 2**	Continuously-rated shunt trip	Motor charging	Operation circuit	Auxiliary switches AUX1 AUX2 AUX3 AUX4	Position switches D1 D2 T C1 C2

Terminal labels (top): 91 | 81 | 08 | 08 | 45 | 10 | 44 | 27 | 02 | 03 | 43 | 112 | 114 | 212 | 214 | 312 | 314 | 412 | 414 | 142 | 144 | 242 | 244 | 132 | 134 | 122 | 124 | 222 | 224

Internal blocks: UVT controller, UV, UV, SH2, SH, MOT, LRC

Terminal labels (bottom): 09 | 09 | 20 | 22 | 07 | 111 | 211 | 311 | 411 | 141 | 241 | 131 | 121 | 221

(*2, *3) (*3) (*2)

Designation of terminals for auxiliary and position switches

* * *
1 : Common
2 : b-contact
4 : a-contact

1 : Auxiliary switches
2 : Position switches (CONNECTED)
3 : Position switches (TEST)
4 : Position switches (ISOLATED)

1 – : Number of auxiliary switch and position switch

*1 : Supplied when installing a 3-pole ACB for a 3-phase, 4-wire system.
*2 : It takes the instantaneous type max. 0.2 sec. for the UVT coil to be adsorbed after the rated voltage is applied to the undervoltage trip device. The closing command should apply a closing signal of 0.2 sec. or more for the instantaneous type after the rated voltage is applied.
*3 : Please specify the function to be used when ordering.
*4 : No contact output when the reset setting dial is in "AUTO".
*5 : Only supplied for the AOX-LSIG.
*6 : The AOX-LI is not supplied with a short time-delay (ST) trip indicator.
*7 : After tripping, apply 24V DC for 10ms to 60s to release the trip state.
*8 : Do not connect the continuously-rated shunt trip and continuously-rated shunt trip 2 terminals with the auxiliary switch terminals in series.

Terminal arrangement

	Sensor for neutral line	Remote reset of control power supply	Zone interlock	Operation indication of Contact module	FAULT TRIP switch	Ready to close switch / Trip command indicator / FAULT TRIP switch 2	Undervoltage trip / Continuously-rated shunt trip 2	Continuously-rated shunt trip	Spring charge indicator Motor charging operation circuit Making operation	Auxiliary switches	Position switches
Top	19	21 01	37 38	15 16	53	50	08	10	02 03	112 212 312 412	142 242 132 122 222
Middle	29		39 40	25 06	54	51	45	44	27 43	114 214 314 414	144 244 134 124 224
Bottom		64 65	60 61	05 26	55	52	09	20	22 07	111 211 311 411	141 241 131 121 221

Main circuit	Control power	Zone interlock	Operation indication of Contact module	FAULT TRIP	*3 Ready to close status display / Trip command indicator / FAULT TRIP 2

Over-current Releases (Standard type)

AOX-LSIR

OCM

L1 L2 L3

24V DC

Cmn

Fault

Trip command indicator

Ready-to-close

Fault

(−) 21 (+) 01 05 54 53 51 50 51 50 51 50

I
V

112 64 65 37 38 60 61 15 25 06 16 26 55 52 52 52

(*1) (*7) (−) (+) STD2 Cmn2

Vₙ Remote reset (24V DC) STD1 Cmn1 LTD MCR PTA RP AL (*4) (*3) (*3) (*3, *4)

Terminal description

01(+) — 21(−)	Control power 24V DC
05 — 15	Operation indication of Long time-delay trip
05 — 25	Short time-delay trip (ST) / Instantaneous trip (INST) / Making current release(MCR) Operation indicaton of Instantaneous override tripping (IO)
05 — 06	Operation indication of Preferential trip alarm
05 — 16	Operation indication of Reverse power trip (RPT)
05 — 26	Multi operation indication (Trip alarm / Level of impact severe error)
65(+) — 64(−)	Input for Remote reset (24V DC)*5
37 — 60	Input for Zone interlock (Short time delay)
38 — 61	Output for Zone interlock (Short time delay)
53 — 55	FAULT TRIP switch
51 — 52	Ready to close switch
50 — 52	Trip command indicator or FAULT TRIP switch 2
08(+) — 09(−)	Under voltage trip device (Instantaneous trip type) or Continuously-rated shunt trip device 2
81(+) — 91(−)	Under voltage trip device (Time delay trip type)
44(+) — 20(−)	Continuously-rated shunt trip
27 — 22	Spring charge indicator
02(+) — 22(−)	Motor charging operation circuit
43(+) — 07(−)	Latch Release Coil (LRC)

Symbols for accessories

OCM   : Contact module
MOT   : Charging motor
LRC   : Latch release coil
SHT, SHT2 : Continuously-rated shunt trip device
UVT   : Undervoltage trip device
⊸   Isolating terminal connector (Draw-out type)

*8 : Connecting continuously-rated shunt trip devices and operation circuits.

Ensure that the cables connecting the switch with terminals 03, 08 and 10 are 5 m or less in length, and keep them as far away as possible from power supply cables. If the cables exceed 5 m in length, or if using a AC380−480V rated voltage continuously-rated shunt trip device and latch release coil, use either of the following connection methods, as there is the risk of incorrect device operation caused by stray capacitance between cables.
1) Connect a relay near the ACB, and control the relay remotely.
2) Short-circuit the terminals as shown below.
   Note that there will be an inrush current at the switch when using this connection method, so select a switch capable of handling the inrush current values in the table below.
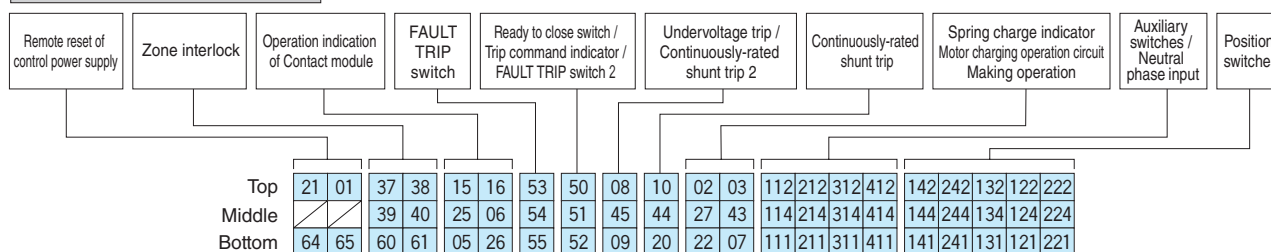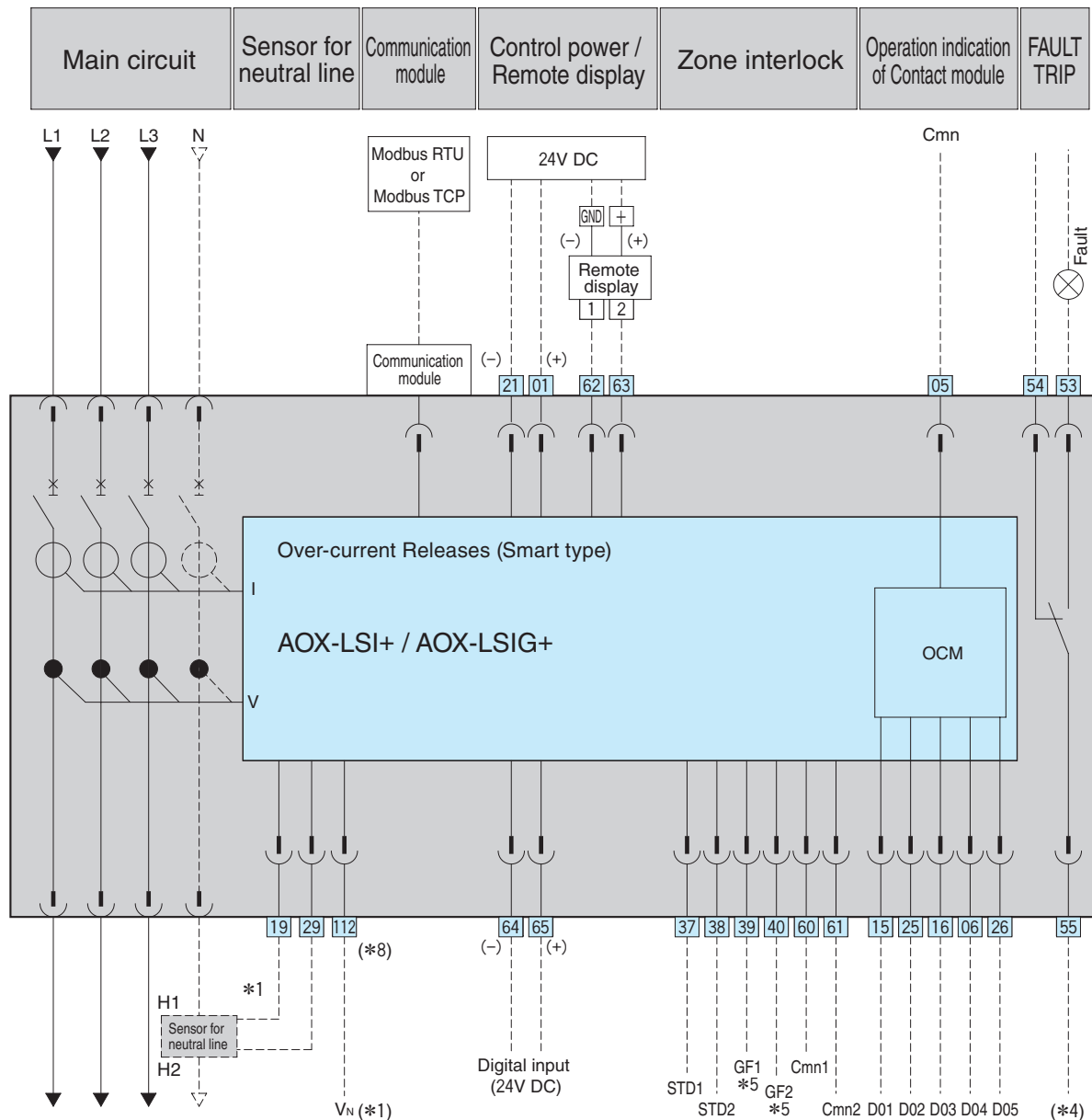
Continuously-rated shunt trip device (+)   Operation circuit (+)   (+)

08 45   10 44   03 43

Rated voltage (V)	Inrush current (A)
AC/DC24−30	12
AC/DC48−60	6
AC/DC100−130	4
AC/DC200−250	2
AC380−480	1

Wiring diagram top labels

*3 Under voltage trip (Time delay trip type) Under voltage trip / Continuously-rated shunt trip 2	Continuously-rated shunt trip	Motor charging	Operation circuit	Auxiliary switches *7 AUX1 AUX2 AUX3 AUX4	Position switches D1 D2 T C1 C2

Top terminal polarity markings: (−)(~) (+)(~) (+)(~) (+)(~) | (+)(~) | Charged (+)(~) | (+)(~) | Open Close | Isolated | Test | Connected

Top terminal numbers:
91 | 81 | 08 | 08 | 45 | 10 | 44 | 27 | 02 | 03 | 43 | 112 | 114 | 212 | 214 | 312 | 314 | 412 | 414 | 142 | 144 | 242 | 244 | 132 | 134 | 122 | 124 | 222 | 224

*8 (on 08/08/45), *8 (on 10/44), *8 (on 03), (*7) (on 43)

Internal blocks: UVT controller, UV, UV, SH2, SH, MOT, LRC

Bottom terminal numbers:
09 | 09 | 20 | 22 | 07 | 111 | 211 | 311 | 411 | 141 | 241 | 131 | 121 | 221

Bottom polarity: (−)(~) on 09, 09, 20, 22, 07

(*2, *3) (*3)   (*2)

Designation of terminals for auxiliary and position switches

* * *
```
1 : Common
2 : b-contact
4 : a-contact

1 : Auxiliary switches
2 : Position switches (CONNECTED)
3 : Position switches (TEST)
4 : Position switches (ISOLATED)

1 – : Number of auxilary switch and position switch
```

*1 : Neutral phase input. Supplied when installing a 3-pole ACB for a 3-phase, 4-wire system. AUX1 cannot be used in this case.
*2 : It takes the instantaneous type max. 0.2 sec. for the UVT coil to be adsorbed after the rated voltage is applied to the undervoltage trip device.
The closing command should apply a closing signal of 0.2 sec. or more for the instantaneous type after the rated voltage is applied.
*3 : Please specify the function to be used when ordering.
*4 : No contact output when the reset setting dial is in "AUTO".
*5 : After tripping, apply 24V DC for 10ms to 60s to release the trip state.
*6 : Do not connect the continuously-rated shunt trip and continuously-rated shunt trip 2 terminals with the auxiliary switch terminals in series.
*7 : Always connect the neutral phase input to terminal 112.

Terminal arrangement

	Remote reset of control power supply	Zone interlock	Operation indication of Contact module	FAULT TRIP switch	Ready to close switch / Trip command indicator / FAULT TRIP switch 2	Undervoltage trip / Continuously-rated shunt trip 2	Continuously-rated shunt trip	Spring charge indicator Motor charging operation circuit Making operation	Auxiliary switches / Neutral phase input	Position switches
Top	21 01	37 38	15 16	53	50 08	10 02 03	112 212 312 412	142 242 132 122 222		
Middle		39 40	25 06	54	51 45	44 27 43	114 214 314 414	144 244 134 124 224		
Bottom	64 65	60 61	05 26	55	52 09	20 22 07	111 211 311 411	141 241 131 121 221		

Main circuit	Sensor for neutral line	Communication module	Control power / Remote display	Zone interlock	Operation indication of Contact module	FAULT TRIP

L1 L2 L3 N

Modbus RTU or Modbus TCP

24V DC

GND +

(−) (+)

Remote display

1 2

Communication module

(−) (+)

21 01 62 63

Cmn

Fault

05 54 53

Over-current Releases (Smart type)

I

AOX-LSI+ / AOX-LSIG+

OCM

V

19 29 112 (*8)

64 65 (−) (+)

37 38 39 40 60 61 15 25 16 06 26 55

H1
Sensor for neutral line
H2

*1

V_N (*1)

Digital input (24V DC)

STD1
STD2
GF1 *5
GF2 *5
Cmn1
Cmn2
D01 D02 D03 D04 D05
(*4)

Terminal description

01(+) — 21(−) Control power 24V DC
63(+) — 62(−) Connection of Remote display
05 — 15
05 — 25
05 — 16 } Multi operation indication
05 — 06
05 — 26
19 — 29 Sensor for neutral line (Polarity : 19 - H1, 29 - H2)
65(+) — 64(−) Digital input (24V DC) *6
37 — 60 Input for Zone interlock (Short time delay)
38 — 61 Output for Zone interlock (Short time delay)
39 — 60 Input for Zone interlock (Ground fault) *5
40 — 61 Output for Zone interlock (Ground fault) *5
50 — 52 FAULT TRIP switch 2
51 — 52 Trip command indicator or Ready to close switch
53 — 55 FAULT TRIP switch
08(+) — 09(−) Under voltage trip device (Instantaneous trip type)
81(+) — 91(−) Under voltage trip device (Time delay trip type)
44(+) — 20(−) Continuously-rated shunt trip
02(+) — 22(−) Motor charging operation circuit
27 — 22 Spring charge indicator
43(+) — 07(−) Latch release coil (LRC)

Symbols for accessories

OCM : Contact module
MOT : Charging motor
LRC : Latch release coil
SHT, SHT2 : Continuously-rated shunt trip device
UVT : Undervoltage trip device
⊸ Isolating terminal connector (Draw-out type)

*9 : Connecting continuously-rated shunt trip devices and operation circuits.
Ensure that the cables connecting the switch with terminals 03, 08 and 10 are 5 m or less in length, and keep them as far away as possible from power supply cables. If the cables exceed 5 m in length, or if using a AC380–480V rated voltage continuously-rated shunt trip device and latch release coil, use either of the following connection methods, as there is the risk of incorrect device operation caused by stray capacitance between cables.
1) Connect a relay near the ACB, and control the relay remotely.
2) Short-circuit the terminals as shown below.
   Note that there will be an inrush current at the switch when using this connection method, so select a switch capable of handling the inrush current values in the table below.

Continuously-rated shunt trip device (+) (+)

Operation circuit (+)

08 45 10 44 03 43

Rated voltage (V)	Inrush current (A)
AC/DC24–30	12
AC/DC48–60	6
AC/DC100–130	4
AC/DC200–250	2
AC380–480	1

Note: 1) If using a communication module and remote command module together with a product mounted with an over-current release, connection method 2) cannot be used.
Note: 2) Contact TERASAKI if using the communication module + remote command module combination for a product mounted with an over-current release, in combination with an AC380-480V rated voltage continuously-rated shunt trip device and latch release coil (LRC).

Diagram column headers

*3 Ready to close status display / Trip command indicator / FAULT TRIP 2	*3 Under voltage trip (Time delay trip type) Under voltage trip / Continuously-rated shunt trip 2	Continuously-rated shunt trip	Motor charging	Operation circuit	Auxiliary switches *8 AUX1 AUX2 AUX3 AUX4	Position switches D1 D2 T C1 C2

Indicator labels: Trip command indicator, Ready-to-close, Fault, Charged, Open, Close, Isolated, Test, Connected

UVT controller — UV — UV — SH2 — SH — LRC — MOT

Top terminals: 51 50 51 50 51 50 91 81 08 08 45 10 44 27 02 03 43 112 114 212 214 312 314 412 414 142 144 242 244 132 134 122 124 222 224

*9 markers above terminals 08/45, 10/44, 03/43 region

(−)(+) (~)(~) ; (+)(~) markers

Bottom terminals: 52 52 52 09 09 20 22 07 111 211 311 411 141 241 131 121 221

(−)(~) markers on several

Bottom annotations: (*3) (*3) (*3, *4) (*2,*3) (*3) (*2)

Designation of terminals for auxiliary and position switches

```
* * *
        1 : Common
        2 : b-contact
        4 : a-contact

      1 : Auxiliary switches
      2 : Position switches (CONNECTED)
      3 : Position switches (TEST)
      4 : Position switches (ISOLATED)

  1 – : Number of auxiliary switch and position switch
```

Notes

*1 : Neutral phase input. Connect when installing a 3-pole ACB for a 3-phase, 4-wire system. AUX1 cannot be used in this case.

*2 : It takes the instantaneous type max. 0.2 sec. for the UVT coil to be adsorbed after the rated voltage is applied to the undervoltage trip device.
The closing command should apply a closing signal of 0.2 sec. or more for the instantaneous type after the rated voltage is applied.

*3 : Please specify the function to be used when ordering.

*4 : No contact output when the reset setting dial is in "AUTO".

*5 : Only supplied for the AOX-LSIG+.

*6 : Perform input operation selected from the following.
1) Remote reset
2) Tariff input
3) Temporary motion restrain state switching
4) Dual setting switching

*7 : Do not connect the continuously-rated shunt trip device and continuously-rated shunt trip device 2 terminals and auxiliary switch terminals in series.

*8 : Always connect the neutral phase input to terminal 112.

Terminal arrangement

	Sensor for neutral line	Control power / Remote display	Zone interlock	Multi operation indication of Contact module	FAULT TRIP switch	FAULT TRIP switch 2 / Trip command indicator or Ready to close switch	Undervoltage trip / Continuously-rated shunt trip 2	Continuously-rated shunt trip	Motor charging operation circuit Spring charge indicator Latch release coil (LRC)	Auxiliary switches / Neutral phase input	Position switches
Top	19	21 01	37 38	15 16	53	50	08	10	02 03	112 212 312 412	142 242 132 122 222
Middle	29	62 63	39 40	25 06	54	51	45	44	27 43	114 214 314 414	144 244 134 124 224
Bottom		64 65	60 61	05 26	55	52	09	20	22 07	111 211 311 411	141 241 131 121 221

9 Technical and Application Data

Dielectric strength

Circuit			Withstand voltage (50/60Hz)			limpulse withstand voltage [U_{imp}]
Main circuit		Between terminals, terminal group to earth	3500V AC	1 minute	12kV	
Control circuits	Over-current release (OCR)	Terminal group to earth	2000V AC	1 minute	1.5kV	
	Zone interlock	Terminal group to earth	2000V AC	1 minute	1.5kV	
	Operation indication of Contact module	Terminal group to earth	2000V AC	1 minute	1.5kV	
	Remote reset	Terminal group to earth	2000V AC	1 minute	1.5kV	
	Digital input	Terminal group to earth	2000V AC	1 minute	1.5kV	
	LRC	Terminal group to earth	2500V AC	1 minute	6kV	
	Continuously-rated shunt trip device	Terminal group to earth	2500V AC	1 minute	6kV	
	Undervoltage trip device (Instantaneous trip type / Time-delay type)	Terminal group to earth	2500V AC	1 minute	6kV	
	FAULT TRIP switch	Terminal group to earth	2500V AC	1 minute	6kV	
	Ready to close switch	Terminal group to earth	2500V AC	1 minute	6kV	
	Trip command indicator	Terminal group to earth	2500V AC	1 minute	6kV	
	Motor charging — 380-480V AC	Terminal group to earth	2500V AC	1 minute	6kV	
	Motor charging — Other than above	Terminal group to earth	2000V AC	1 minute	4kV	
	Spring charge indicator	Terminal group to earth	2000V AC	1 minute	4kV	
	Auxiliary switches 4c	Terminal group to earth	2500V AC	1 minute	8kV	
	Position switches	Terminal group to earth	2500V AC	1 minute	8kV	
	Neutral phase input	Terminal group to earth	2500V AC	1 minute	8kV	
	Auxiliary switches 7c — Quick connection terminal	Terminal group to earth	2500V AC	1 minute	4kV	
	Auxiliary switches 7c — Screw connection terminal	Terminal group to earth	2500V AC	1 minute	6kV	

Internal resistance and Power consumption

	Type	Terminal arrangements	DC internal resistance (mΩ)	Power consumption (W) (Values for 3 poles)
DRAW–OUT TYPE	AX106S AX106H AX106D	Horizontal terminals	0.039	91
		Vertical terminals	0.039	74
		Front connections	0.039	99
	AX108S AX108H AX108D	Horizontal terminals	0.039	127
		Vertical terminals	0.039	120
		Front connections	0.039	139
	AX110S AX110H AX110D	Horizontal terminals	0.039	196
		Vertical terminals	0.039	176
		Front connections	0.039	194
	AX112S AX112H AX112D	Horizontal terminals	0.039	318
		Vertical terminals	0.039	266
		Front connections	0.039	308
	AX116S AX116H AX116D	Horizontal terminals	0.039	335 ③ / 502 ④
		Vertical terminals	0.039	441
		Front connections	0.039	502
FIXED TYPE	AX106S AX106H AX106D	Horizontal terminals	0.024	58
		Vertical terminals	0.024	49
		Front connections	0.024	66
	AX108S AX108H AX108D	Horizontal terminals	0.024	100
		Vertical terminals	0.024	75
		Front connections	0.024	100
	AX110S AX110H AX110D	Horizontal terminals	0.024	143
		Vertical terminals	0.024	107
		Front connections	0.024	148
	AX112S AX112H AX112D	Horizontal terminals	0.024	185
		Vertical terminals	0.024	180
		Front connections	0.024	226
	AX116S AX116H AX116D	Horizontal terminals	0.024	318
		Vertical terminals	0.024	185
		Front connections	0.024	329
	AX120S AX120H	Vertical terminals	0.024	297

① : The resistance is a general reference value. It can not be used for inspections when receiving goods.
② : The power consumptions are calculated on the basis of the DC internal resistance.
③ : Value when connecting three 80 mm wide, 5 mm thick bus bars.
④ : Value when connecting two 100 mm wide, 5 mm thick bus bars.

Derating ①

[DRAW–OUT TYPE]

Based Standards	Ambient temperature (°C)			AX106S	AX108S	AX110S	AX112S	AX116S	
		Type		AX106H	AX108H	AX110H	AX112H	AX116H	
				AX106D	AX108D	AX110D	AX112D	AX116D	
		Connecting bar	Sizes	W : 40mm, T : 5mm	W : 50mm, T : 5mm	W : 60mm, T : 5mm	W : 80mm, T : 5mm	W : 100mm, T : 5mm	W : 80mm, T : 5mm
			Qty.	2 pcs	2 pcs	2 pcs	2 pcs	2 pcs	3 pcs
		Terminal arrangements		Available current [A]					
JIS C 8201-2-1 Ann-1, Ann-2 IEC60947-2 EN60947-2 AS/NZS IEC60947-2 ④ JIS C 8201-3 IEC60947-3	40 (Standard ambient temperature)	Horizontal terminals		630	800	1000	1250	1560	1600
		Vertical terminals		630	800	1000	1250	1600	—
		Front connections		630	800	1000	1250	1600	—
	45	Horizontal terminals		630	800	1000	1250	1490	1540
		Vertical terminals		630	800	1000	1250	1600	—
		Front connections		630	800	1000	1250	1600	—
	50	Horizontal terminals		630	800	1000	1250	1420	1470
		Vertical terminals		630	800	1000	1250	1600	—
		Front connections		630	800	1000	1250	1600	—
	55	Horizontal terminals		630	800	1000	1240	1340	1390
		Vertical terminals		630	800	1000	1250	1540	—
		Front connections		630	800	1000	1250	1580	—
	60	Horizontal terminals		630	800	1000	1170	1270	1310
		Vertical terminals		630	800	1000	1250	1460	—
		Front connections		630	800	1000	1250	1500	—

[FIXED TYPE]

Based Standards	Ambient temperature (°C)			AX106S	AX108S	AX110S	AX112S	AX116S	AX120S
		Type		AX106H	AX108H	AX110H	AX112H	AX116H	AX120H
				AX106D	AX108D	AX110D	AX112D	AX116D	—
		Connecting bar	Sizes	W : 40mm, T : 5mm	W : 50mm, T : 5mm	W : 60mm, T : 5mm	W : 80mm, T : 5mm	W : 100mm, T : 5mm	W : 100mm, T : 5mm
			Qty.	2 pcs	2 pcs	2 pcs	2 pcs	2 pcs	3 pcs
		Terminal arrangements		Available current [A]					
JIS C 8201-2-1 Ann-1, Ann-2 IEC60947-2 EN60947-2 AS/NZS IEC60947-2 ④ JIS C 8201-3 IEC60947-3	40 (Standard ambient temperature)	Horizontal terminals		630	800	1000	1250	1600	—
		Vertical terminals		630	800	1000	1250	1600	2000
		Front connections		630	800	1000	1250	1600	—
	45	Horizontal terminals		630	800	1000	1250	1600	—
		Vertical terminals		630	800	1000	1250	1600	2000
		Front connections		630	800	1000	1250	1600	—
	50	Horizontal terminals		630	800	1000	1250	1550	—
		Vertical terminals		630	800	1000	1250	1600	2000
		Front connections		630	800	1000	1250	1600	—
	55	Horizontal terminals		630	800	1000	1250	1480	—
		Vertical terminals		630	800	1000	1250	1600	1900
		Front connections		630	800	1000	1250	1530	—
	60	Horizontal terminals		630	800	1000	1250	1400	—
		Vertical terminals		630	800	1000	1250	1600	1800
		Front connections		630	800	1000	1250	1450	—

① : Can be used with fixed type and draw-out type ACBs.
② : If the upper terminal and lower terminal types differ, contact TERASAKI for the available current value.
③ : Actual value of conductor size (cross-section area) in accordance with IEC60947 at ambient temperature 40°C and in open air.
   The values above differ depending on the structure of the switchboard.
④ : Applicable standards for AX106D, AX108D, AX110D, AX112D, and AX116D.

Standard type for general feeder circuit (AOX-LI, AOX-LSI, AOX-LSIG)

Compamany name :   Order number :

Quantity / Delivery time request	_____ Units	Year	Month	Date

Enter your choice in the boxes provided

① Type	☐AX106S ☐AX108S ☐AX110S ☐AX112S ☐AX116S ☐AX120S ☐AX106H ☐AX108H ☐AX110H ☐AX112H ☐AX116H ☐AX120H
② Number of poles	☐3-poles ☐4-poles
③ Applicable main circuit voltage / Frequency	_____V AC _____Hz ☐3-phase 3-wire ☐3-phase 4-wire
④ Applicable standard / Standard ambient temperature	Applicable standard_____ ☐40℃ ☐45℃

⑤ Types of Mounting	☐Fixed type
	
	 ☐Draw-out type ☐Standard drawout handle_____units ☐Mal-insertion prevention device
	 ＊3 ☐Storage drawout handle_____units ☐Position switches Type ALX-_____PA
	     ☐Main circuit safety shutters ALX-_____PB
	     ☐Control circuit terminal cover ☐Test jumper ＊22
	     ☐Key lock on withdrawn position (Max. 2 can be installed) _____units
	     ⇒☐Silinder ☐KLS (☐CSM1Z-E22M ☐CSM1Z-E22MA)
	        ☐RONIS (☐1351 ☐1351-1) ☐Proflux ☐KIRK
	     ☐Racking interlock ＊2 ＊20
	     ☐Door interlock ＊1 ＊2 (Hinge position of distribution board door : ☐Right side ☐Left side)
	
	 Line side : ☐Horizontal terminals＊3 ☐Vertical terminals ☐Front connections＊3
	          ☐Conductive adapter (AZX-1_____) ＊8
	 Load side : ☐Horizontal terminals＊3 ☐Vertical terminals ☐Front connections＊3
	          ☐Conductive adapter (AZX-1_____) ＊8

⑥ Operation method	☐Manual charging
	    ☐Latch release coil Operational voltage _____V AC, _____V DC
	 ☐Motor charging Operational voltage _____V AC, _____V DC
	    ☐Latch release coil Operational voltage _____V AC, _____V DC

⑦ Over-current Releases (OCR) ＊16		
☐AOX-LI ☐AOX-LSI ☐AOX-LSIG		☐Contact module
I_n : _____A Control power : 24V DC Mechanical reset : ☐AUTO ☐MANUAL		
Long time-delay trip setting current ☐ON ☐OFF		**Default setting values**
$[I_r]$(A) I_r1 : _____ I_r2 : _____	$I_r = (I_r1) \times (I_r2) \times (I_n)$	$I_r1 : 1/I_r2 : 1$
$[t_r]$(s) t_r : _____s	Time-delay at $I_r \times 600\%$	10
Starting characteristic : ☐HOT ☐COLD ＊21		COLD
Short time delay trip settings (Only for LSI and LSIG) ☐ON ☐OFF		**Default setting values**
$[I_{sd}]$(A) I_{sd} : _____$\times I_n$(A)		6
$[t_{sd}]$ (ms) t_{sd} : _____(ms)		400
Ramp characteristic I^2t : ☐ON ☐OFF		OFF
Zone interlock settings : ☐ON ☐OFF		OFF
Instantaneous trip settings ☐ON ☐OFF		**Default setting values**
$[I_i]$(A) I_i : _____$\times I_n$(A)		12 (for AX120S, AX120H) 16 (Except for above)
Preferential trip alarm settings ☐ON ☐OFF ＊21		
Default setting values		
$[I_p]$(A) $I_p : I_r \times 80\%$(fixed)		OFF (3pole, 3-phase, 3-wire) 1 (Except for above)
$[t_p]$(s) $tp : t_r \times 50\%$(fixed)		—
Neutral protection settings ☐ON ☐OFF		**Default setting values**
$[I_N]$(A) IN : _____$\times I_r$(A)		—
$[t_N]$(s) Link to the time-delay settings for Long-time deay trip and Short-time delay trip.		—
Ground fault protection settings (Only for LSIG) ☐ON ☐OFF		**Default setting values**
$[I_g]$(A) I_g : _____$\times I_n$(A)		0.2
$[t_g]$(ms) t_g : _____ms		300
Ramp characteristic I^2t : ☐ON ☐OFF		OFF
Zone interlock settings : ☐ON ☐OFF		OFF

8 Trip Devices	☐Continuously-rated shunt trip device _____V AC, _____V DC ☐Capacitor trip device ☐Continuously-rated shunt trip device 2 _____V AC, _____V DC *22 ☐Undervoltage trip device (Instantaneous trip type) _____V AC, _____V DC ☐Undervoltage trip device (Time delay trip type) *17 _____V AC, _____V DC

9 Other Accessories	☐Auxiliary switches 4c ☐General ☐Micro load
	☐Auxiliary switches 7c *4 *5 *17 *18 ☐General
	☐ON–OFF Cycle Counter
	☐Inter-pole barrier *3 *6
	☐OFF padlock lever *8
	☐Key lock (Lock-in OFF type) *9
	   ☐Silinder ☐KLS (☐CSM1Z-E22M ☐CSM1Z-E22MA)
	   ☐RONIS (☐1351 ☐1351-1) ☐Proflux ☐KIRK
	☐Mechanical interlock *10 *17 *18
	   (Pitch between ACBs ☐600mm ☐700mm ☐800mm ☐900mm)
	☐Ready to close switch *11
	☐FAULT TRIP switch
	☐FAULT TRIP switch 2 *12
	☐Trip command indicator *13
	☐Sensor for neutral line *19
	☐IP cover *14 *17
	☐Door flange *15 *17
	   ☐IP20 ☐IP31

10 Special environments *22	☐Unnecessary ☐Tropicalization (Fungus and moisture treatment) ☐Cold climate treatment ☐Anti-corrosion treatment
11 Spare parts	☐Unnecessary ☐Necessary (Contact TERASAKI for parts)
12 Test report	☐Japanese ☐English _____copies
13 Others	☐OCR checker

*1 : Contact TERASAKI to use in combination with a door flange, IP cover, auxiliary switch 7c, undervoltage trip device (Time delay trip type), or mechanical interlock.

*2 : When using a door interlock, always use a racking interlock.

*3 : Cannot be used for AX120S and AX120H.

*4 : Cannot be fitted with mechanical interlock or auxiliary switch 4c.

*5 : Working mechanism differs from auxiliary switch 4c, these switches work only on the connected position.

*6 : Cannot be fitted with Draw-out type front connection specifications or conductive adapter.

*7 : Conductive adapter can not be fitted with Inter-pole barrier.

*8 : OFF padlock lever can not be fitted with Key lock (Lock in OFF).

*9 : Key lock (Lock in OFF) cannot be fitted with OFF padlock.

*10 : Cannot be fitted with auxiliary switch 7c.

*11 : Cannot be fitted with Trip command indicator or FAULT TRIP switch2.

*12 : Cannot be fitted with Ready to close switch or Trip command indicator.

*13 : Cannot be fitted with Ready to close switch or FAULT TRIP switch2.

*14 : Cannot be fitted with door flange.

*15 : Door flange can notbe fitted IP cover.

*16 : For details about each setting, please refer to P.25 to P.27.

*17 : Contact TERASAKI to use in combination with a door interlock.

*18 : Contact TERASAKI to use in combination with a racking interlock.

*19 : Select this if using a 3-pole ACB for 3-phase 4-wire power distribution.

*20 : Contact TERASAKI to use in combination with a mechanical interlock or auxiliary switch 7c.

*21 : Details of settings specified in this section cannot be changed by customers.

*22 : Can not be fitted with Undervoltage trip devices.

*23 : Coming soon.

Standard type for generator protection (AOX-LSIR)

Compamy name :   Order number :

Quantity / Delivery time request	_____ Units	_____ Year	_____ Month	_____ Date

Enter your choice in the boxes provided

1 Type	□AX106S □AX108S □AX110S □AX112S □AX116S □AX106H □AX108H □AX110H □AX112H □AX116H
2 Number of poles	□3-poles
3 Applicable main circuit voltage / Frequency	_____V AC _____Hz □3-phase 3-wire □3-phase 4-wire
4 Applicable standard / Standard ambient temperature	Applicable standard_____ □40℃ □45℃

5 Types of Mounting	□Fixed type
	
	□Draw-out type □Standard drawout handle_____units □Mal-insertion prevention device
	               □Storage drawout handle_____units □Position switches TypeALX-_____PA
	               □Main circuit safety shutters ALX-_____PB
	               □Control circuit terminal cover □Test jumper ＊22
	               □Key lock on withdrawn position (Max. 2 can be installed) _____units
	               ⇒□Silinder □KLS (□CSM1Z-E22M □CSM1Z-E22MA)
	                  □RONIS (□1351 □1351-1) □Proflux □KIRK
	               □Racking interlock ＊2 ＊19
	               □Door interlock ＊1＊2 (Hinge position of distribution board door : □Right side □Left side)
	
	Line side : □Horizontal terminals □Vertical terminals □Front connections
	              □Conductive adapter (AZX-1_____) ＊6
	Load side : □Horizontal terminals □Vertical terminals □Front connections
	              □Conductive adapter (AZX-1_____) ＊6

6 Operation method	□Manual charging
	    □Latch release coil Operational voltage _____V AC, _____V DC
	□Motor charging Operational voltage _____V AC, _____V DC
	    □Latch release coil Operational voltage _____V AC, _____V DC

7 Over-current Releases (OCR) ＊15	□AOX-LSIR □Contact module

I_{gen} : _____A   Control power : 24V DC

Long time-delay trip setting current □ON □OFF			Default setting values
$[I_r]$(A) I_r1 : _____	I_r2 : _____	$I_r=(I_r1)\times(I_r2)\times(I_{gen})$	I_r1 : 1.15/I_r2 : 1
$[t_r]$(s) t_r : _____s (Time-delay at $I_r\times$120%)			10

Short time delay trip settings □ON □OFF		Default setting values
$[I_{sd}]$(A) I_{sd} : _____$\times I_{gen}$(A)		2.75
$[t_{sd}]$(ms) t_{sd} : _____(ms)		200
Zone interlock settings : □ON □OFF		OFF

Instantaneous trip settings □ON □OFF	Default setting values
$[I_i]$(A) I_i : _____$\times I_{gen}$(A)	16

Preferential trip alarm settings □ON □OFF ＊20	Default setting values
$[I_p]$(A) I_p : _____$\times I_{gen}$(A)	95%
$[t_p]$(s) t_p : _____$\times t_r$(s)	50%

Settings for Reverse power protection □ON □OFF		Default setting values
$[P_{rp}]$(kW) P_{rp} : _____$\times P_n$(kW)	P_n : _____(kW)	4%
$[t_{rp}]$(s) t_{rp} : _____s (Time-delay at $P_{rp}\times$100%)		5

Reverse power trip function Normal-time power supply direction setting	
□Forward direction □Reverse direction	Forward direction
Phase / wire system	
□3-phase 3-wire type □3-phase 4-wire type ＊18	3-phase 3-wire type

8 Trip Devices	☐Continuously-rated shunt trip device _____V AC, _____V DC ☐Capacitor trip device ☐Continuously-rated shunt trip device 2 _____V AC, _____V DC ∗21 ☐Undervoltage trip device (Instantaneous trip type) _____V AC, _____V DC ☐Undervoltage trip device (Time delay trip type) ∗16 _____V AC, _____V DC

9 Other Accessories	☐Auxiliary switches 4c ☐General ☐Micro load
	☐Auxiliary switches 7c ∗3 ∗4 ∗17 ∗18 ☐General
	☐ON–OFF Cycle Counter
	☐Inter-pole barrier ∗5
	☐OFF padlock lever ∗7
	☐Key lock (Lock-in OFF type) ∗8
	   ☐Silinder ☐KLS (☐CSM1Z-E22M ☐CSM1Z-E22MA)
	   ☐RONIS (☐1351 ☐1351-1) ☐Proflux ☐KIRK
	☐Mechanical interlock ∗9 ∗16 ∗17
	   (Pitch between ACBs ☐600mm ☐700mm ☐800mm ☐900mm)
	☐Ready to close switch ∗10
	☐FAULT TRIP switch
	☐FAULT TRIP switch 2 ∗11
	☐Trip command indicator ∗12
	☐Sensor for neutral line ∗18
	☐IP cover ∗13 ∗16
	☐Door flange ∗14 ∗16
	   ☐IP20 ☐IP31

10 Special environments ∗22	☐Unnecessary ☐Tropicalization (Fungus and moisture treatment) ☐Cold climate treatment ☐Anti-corrosion treatment
11 Spare parts	☐Unnecessary ☐Unnecessary (Contact TERASAKI for parts)
12 Test report	☐Japanese ☐English _____copies
13 Others	☐OCR checker

∗1 : Contact TERASAKI to use in combination with a door flange, IP cover, auxiliary switch 7c, undervoltage trip device (Time delay trip type), or mechanical interlock.

∗2 : When using a door interlock, always use a racking interlock.

∗3 : Cannot be fitted with mechanical interlock or auxiliary switch 4c.

∗4 : Working mechanism differs from auxiliary switch 4c, these switches work only on the connected position.

∗5 : Cannot be fitted with Draw-out type front connection specifications or conductive adapter.

∗6 : Conductive adapter can not be fitted with Inter-pole barrier.

∗7 : OFF padlock lever can not be fitted with Key lock (Lock in OFF).

∗8 : Key lock (Lock in OFF) cannot be fitted with OFF padlock.

∗9 : Cannot be fitted with auxiliary switch 7c.

∗10 : Cannot be fitted with Trip command indicator or FAULT TRIP switch2.

∗11 : Cannot be fitted with Ready to close switch or Trip command indicator.

∗12 : Cannot be fitted with Ready to close switch or FAULT TRIP switch2.

∗13 : Cannot be fitted with door flange.

∗14 : Door flange can notbe fitted IP cover.

∗15 : For details about each setting, please refer to P.28.

∗16 : Contact TERASAKI to use in combination with a door interlock.

∗17 : Contact TERASAKI to use in combination with a racking interlock.

∗18 : Select this if using a 3-pole ACB for 3-phase 4-wire power distribution.

∗19 : Contact TERASAKI to use in combination with a mechanical interlock or auxiliary switch 7c.

∗20 : Details of settings specified in this section cannot be changed by customers.

∗21 : Can not be fitted with Undervoltage trip devices.

∗22 : Coming soon.

Smart type (AOX-LSI+, AOX-LSIG+)

Company name : _____   Order number : _____

Quantity / Delivery time request	_____ Units	_____ Year	_____ Month	_____ Date

Enter your choice in the boxes provided

1 Type	☐AX106S ☐AX108S ☐AX110S ☐AX112S ☐AX116S
	☐AX106H ☐AX108H ☐AX110H ☐AX112H ☐AX116H

2 Number of poles	☐3-poles ☐4-poles

3 Applicable main circuit voltage / Frequency	_____V AC _____Hz ☐3-phase 3-wire ☐3-phase 4-wire

4 Applicable standard / Standard ambient temperature	Applicable standard _____ ☐40℃ ☐45℃

5 Types of Mounting	☐Fixed type

☐Draw-out type ☐Standard drawout handle_____units   ☐Mal-insertion prevention device
　　　　　　　　☐Storage drawout handle_____units   ☐Position switches Type ALX-_____PA
　　　　　　　　☐Main circuit safety shutters　　　　　　　　　　　　　　　ALX-_____PB
　　　　　　　　☐Control circuit terminal cover ☐Body sensor ＊18 ☐Test jumper ＊24
　　　　　　　　☐Key lock on withdrawn position (Max. 2 can be installed) _____units
　　　　　　　　⇒☐Silinder ☐KLS (☐CSM1Z-E22M ☐CSM1Z-E22MA)
　　　　　　　　　　☐RONIS (☐1351 ☐1351-1) ☐Proflux ☐KIRK
　　　　　　　　☐Racking interlock ＊2
　　　　　　　　☐Door interlock ＊1＊2 (Hinge position of distribution board door : ☐Right side ☐Left side)

Line side : ☐Horizontal terminals ☐Vertical terminals ☐Front connections ☐Conductive adapter (AZX-1_____) ＊7
Load side : ☐Horizontal terminals ☐Vertical terminals ☐Front connections ☐Conductive adapter (AZX-1_____) ＊7

6 Operation method	☐Manual charging

　　☐Latch release coil Operational voltage _____V AC, _____V DC
☐Motor charging Operational voltage _____V AC, _____V DC
　　☐Latch release coil Operational voltage _____V AC, _____V DC

7 Over-current Releases (OCR) ＊16	☐AOX-LSI+ ☐AOX-LSIG+　　　　　　　　　　　　　　　　☐Contact module

Control power : 24V DC   Dual settings : ☐ON ☐OFF

Long time-delay trip setting current (Setting A)☐ON ☐OFF / (Setting B)☐ON ☐OFF ＊Select (Setting B) below if dual settings is ON.		Default setting values
$[I_r]$(A) (Setting A) I_r : _____$\times I_n$(A)	(Setting B) I_r : _____$\times I_n$(A)	1.0
$[t_r]$(s) (Setting A) t_r : _____s	(Setting B) t_r : _____s	10
Switching of starting characteristic : (Setting A) ☐COLD ☐HOT	(Setting B) ☐COLD ☐HOT	COLD
Characteristic switching : (Setting A) ☐Thi ☐$I^{0.02}t$(SI) ☐It(VI) ☐I^2t(EI) ☐I^3t ☐I^4t(HVF)	(Setting B) ☐Thi ☐$I^{0.02}t$(SI) ☐It(VI) ☐I^2t(EI) ☐I^3t ☐I^4t(HVF)	Thi

Short time-delay trip settings (Setting A)☐ON ☐OFF / (Setting B)☐ON ☐OFF ＊Select (Setting B) below if dual settings is ON.		Default setting values
$[I_{sd}]$(A) (Setting A) I_{sd} : _____$\times I_n$(A)	(Setting B) I_{sd} : _____$\times I_n$(A)	6
$[t_{sd}]$(ms) (Setting A) t_{sd} : _____ms	(Setting B) t_{sd} : _____ms	400
Ramp characteristic I^2t : (Setting A)☐ON ☐OFF	(Setting B) ☐ON ☐OFF	OFF
Zone interlock settings : (Setting A)☐ON ☐OFF	(Setting B) ☐ON ☐OFF	OFF

Instantaneous trip settings (Setting A)☐ON ☐OFF / (Setting B)☐ON ☐OFF ＊Select (Setting B) below if dual settings is ON.		Default setting values
$[I_i]$(A) (Setting A) I_i : _____$\times I_n$(A)	(Setting B) I_i : _____$\times I_n$(A)	16

Neutral protection settings		Default setting values
$[I_N]$(A) I_N : _____$\times I_n$(A)		OFF (3pole, 3-phase, 3-wire) 1 (Except for above)
$[t_N]$(s) Link to the time-delay settings for Long-time deay trip and Short-time delay trip.		—

Ground fault protection settings (Setting A)☐ON ☐OFF / (Setting B)☐ON ☐OFF ＊Select (Setting B) below if dual settings is ON.		Default setting values
$[I_g]$(A) (Setting A) I_g : _____$\times I_n$(A)	(Setting B) I_g : _____$\times I_n$(A)	0.2
$[t_g]$(s) (Setting A) t_g : _____ms	(Setting B) t_g : _____ms	300
Ramp characteristic I^2t : (Setting A)☐ON ☐OFF	(Setting B) ☐ON ☐OFF	OFF
Zone interlock settings : (Setting A)☐ON ☐OFF	(Setting B) ☐ON ☐OFF	OFF

Preferential trip alarm1 settings	Default setting values
$[I_{p1}]$(A) I_{p1} : _____$\times I_r$(A)	80%
$[t_{p1}]$(s) t_{p1} : _____$\times t_r$(s)	50%

Preferential trip alarm2 settings ☐ON ☐OFF	Default setting values
$[I_{p2}]$(A) I_{p2} : _____$\times I_r$(A)	80%
$[t_{p2}]$(s) t_{p2} : _____$\times t_r$(s)	50%

Measurement calculation method	Default setting values
☐Vector ☐Calculation	Vector

Phase order	
☐Forward direction (R phase, S phase, T phase from front left of ACB)	Forward direction
☐Reverse direction (R phase, T phase, S phase from front left of ACB)	

Power feed direction	
☐Forward direction (power supplied from upper terminal of ACB)	Forward direction
☐Reverse direction (power supplied from lower terminal of ACB)	

Measurement method for power factor	
☐IEC type ☐IEEE type	IEC type

Demand mode	
☐Fixed type ☐Slide type ☐Sync type	Fixed type

Demand time	
_____mins (can be set from 1 min to 60 mins in 1-minute increments)	30 minutes

＊Cannot be set if "Sync type" is selected for demand mode.

7 Over-current Releases (OCR) ＊16		
Settings for Under voltage protection		Default setting values
$[U_{uv}]$(V)	U_{uv} : _____V	100
$[t_{uv}]$(s)	t_{uv} : _____s	10
Working mode : □TRIP □ALARM □OFF		OFF
Settings for Over voltage protection		Default setting values
$[U_{ov}]$(V)	U_{ov} : _____V	725
$[t_{ov}]$(s)	t_{ov} : _____s	10
Working mode : □TRIP □ALARM □OFF		OFF
Settings for Under frequency protection		Default setting values
$[F_{uf}]$(Hz)	F_{uf} : _____Hz	45
$[t_{uf}]$(s)	t_{uf} : _____s	10
Working mode : □TRIP □ALARM □OFF		OFF
Settings for Over frequency protection		Default setting values
$[F_{of}]$(Hz)	F_{of} : _____Hz	65
$[t_{of}]$(s)	t_{of} : _____s	10
Working mode : □TRIP □ALARM □OFF		OFF
Settings for Reverse power protection		Default setting values
$[P_{rp}]$(kW) P_{rp} : _____× P_n(kW)	P_n : _____(kW)	4%
$[t_{rp}]$(s) t_{rp} : _____s		5
Working mode : □TRIP □ALARM □OFF		OFF
Settings for Unbalance current protection		Default setting values
$[I_{unbc}]$(%)	I_{unbc} : ____%	50
$[t_{unbc}]$(s)	t_{unbc} : ____s	10
Working mode : □TRIP □ALARM □OFF		OFF
Settings for Unbalance voltage protection		Default setting values
$[U_{unbv}]$(%)	U_{unbv} : ____%	30
$[t_{unbv}]$(s)	t_{unbv} : ____s	10
Working mode : □TRIP □ALARM □OFF		OFF
Settings for Contact temperature monitor (Optional)＊21		Default setting values
T_{oh}(℃)	T_{oh} : _____℃	155
Working mode : □ALARM □OFF		OFF

8 Trip Devices	
□Continuously-rated shunt trip device _____V AC, _____V DC □Capacitor trip device	
□Continuously-rated shunt trip device 2 _____V AC, _____V DC ＊23	
□Undervoltage trip device (Instantaneous trip type) _____V AC, _____V DC	
□Undervoltage trip device (Time delay trip type) ＊17 _____V AC, _____V DC	

9 Other Accessories	
□Auxiliary switches 4c □General □Micro load	
□Auxiliary switches 7c ＊4 ＊5 ＊17 ＊19 □General	
□ON–OFF Cycle Counter □Inter-pole barrier ＊3 ＊6	
□OFF padlock lever ＊8	
□Key lock (Lock-in OFF type) ＊9	
□Silinder □KLS (□CSM1Z-E22M □CSM1Z-E22MA)	
□RONIS (□1351 □1351-1) □Proflux □KIRK	
□Mechanical interlock ＊10 ＊17 ＊19	
(Pitch between ACBs □600mm □700mm □800mm □900mm)	
□Ready to close switch ＊12	
□FAULT TRIP switch □FAULT TRIP switch 2 ＊12	
□Trip command indicator ＊13 □IP cover ＊14 ＊17 □Sensor for neutral line ＊20	
□Door flange ＊15 ＊17	
□IP20 □IP31	

10 Special environments ＊23	
□Unnecessary	
□Tropicalization (Fungus and moisture treatment) □Cold climate treatment □Anti-corrosion treatment	

11 Spare parts	
□Unnecessary □Necessary (Contact TERASAKI for parts)	

12 Test report	
□Japanese □English _____copies	

13 Others	
□Lifter □Communication module : APX-1_____ □Remote display □Adapter for remote display	
□OCR checker □Built-in battery □Remote command module	

＊1 : Contact TERASAKI to use in combination with a door flange, IP cover, auxiliary switch 7c, undervoltage trip device (Time delay trip type), or mechanical interlock.

＊2 : When using a door interlock, always use a racking interlock.

＊3 : Thi (L characteristic) : Time settings at $(I_r)×600\%$
Other characteristic : Time settings at $(I_r)×300\%$

＊4 : Cannot be fitted with mechanical interlock or auxiliary switch 4c.

＊5 : Working mechanism differs from auxiliary switch 4c, these switches work only on the connected position.

＊6 : Cannot be fitted with Draw-out type front connection specifications or conductive adapter.

＊7 : Conductive adapter can not be fitted with Inter-pole barrier.

＊8 : OFF padlock lever can not be fitted with Key lock (Lock in OFF).

＊9 : Key lock (Lock in OFF) cannot be fitted with OFF padlock.

＊10 : Cannot be fitted with auxiliary switch 7c.

＊11 : Can not be fitted with Trip command indicator or Fault trip switch2.

＊12 : Cannot be fitted with Ready to close switch or Trip command indicator.

＊13 : Cannot be fitted with Ready to close switch or Fault trip switch2.

＊14 : Cannot be fitted with door flange.

＊15 : Door flange can notbe fitted IP cover.

＊16 : For details about each setting, please refer to P.29 and P.30.

＊17 : Contact TERASAKI to use in combination with a door interlock.

＊18 : To use a body sensor, always also use a communication module.

＊19 : Contact TERASAKI to use in combination with a racking interlock.

＊20 : Select this if using a 3-pole ACB for 3-phase 4-wire power distribution.

＊21 : Cannot be used for fixed types.

＊22 : Contact TERASAKI to use in combination with a mechanical interlock or auxiliary switch 7c.

＊23 : Can not be fitted with Undervoltage trip devices.

＊24 : Coming soon.

Switch-disconnectors

Compamy name :   Order number :

Quantity / Delivery time request	_____ Units	_____ Year	_____ Month	_____ Date

Enter your choice in the boxes provided

1 Type	☐AX106D ☐AX108D ☐AX110D ☐AX112D ☐AX116D
2 Number of poles	☐3-poles ☐4-poles
3 Applicable main circuit voltage / Frequency	AC_____V _____Hz
4 Applicable standard / Standard ambient temperature	Applicable standard_____ ☐40℃
5 Types of Mounting	☐Fixed type

5 Types of Mounting (continued)

☐Draw-out type   ☐Standard drawout handle_____units   ☐Mal-insertion privention device
               ☐Strage drawout handle_____units   ☐Position switch Type ALX-_____PA
               ☐Main circuit safety shutters   ALX-_____PB
               ☐Control circuit terminal cover
               ☐Test jumper ＊18
               ☐Key lock on withdrawn position (Max. 2 can be installed) _____units
               ⇒☐Silinder   ☐KLS (☐CSM1Z-E22M   ☐CSM1Z-E22MA)
                  ☐RONIS (☐1351   ☐1351-1)   ☐Proflux   ☐KIRK
               ☐Racking interlock＊2 ＊16
               ☐Door interlock ＊1 ＊2 (Hinge position of distribution board door : ☐Right side   ☐Left side)

Line side :   ☐Horizontal terminals   ☐Vertical terminals   ☐Front connections
               ☐Conductive adapter (AZX-1_____) ＊6
Load side :   ☐Horizontal terminals   ☐Vertical terminals   ☐Front connections
               ☐Conductive adapter (AZX-1_____) ＊6

6 Operation method	☐Manual charging
	    ☐Latch release coil Operational voltage _____V AC, _____V DC
	☐Motor charging Operational voltage _____V AC, _____V DC
	    ☐Latch release coil Operational voltage _____V AC, _____V DC

7 Trip Devices	☐Continuously-rated shunt trip device AC_____V, DC_____V ☐Continuously-rated shunt trip device2 AC_____V, DC_____V ☐Undervoltage trip device (Instantaneous trip type) AC_____V, DC_____V ☐Undervoltage trip device (Time delay trip type)＊16 AC_____V, DC_____V

8 Other Accessories	☐Auxiliary switch 4c ☐General ☐Micro load
	☐Auxiliary switch 7c ＊3 ＊4 ＊14 ＊15 ☐General
	☐ON-OFF Cycle Counter ☐Inter-pole barrier ＊5 ☐OFF padlock lever ＊7
	☐Key lock (Lck-in OFF type) ＊9
	    ☐Silinder ☐KLS (☐CSM1Z-E22M ☐CSM1Z-E22MA)
	    ☐RONIS (☐1351 ☐1351-1) ☐Proflux ☐KIRK
	☐Mechanical interlock ＊9 ＊13 ＊15 ☐Ready to close switch ＊10
	☐Trip command indicator ＊13 ☐IP cover ＊12 ＊14
	☐Door flange ＊13 ＊14
	    ☐IP20 ☐IP31

9 Special environments ＊18	☐Unnecessary ☐Tropicalization(Fungus and moisture treatment) ☐Cold climate treatment ☐Anti-corrosion treatment
10 Spare parts	☐Unnecessary ☐Necessary (Contact TERASAKI for parts)
11 Test report	☐Japanese ☐English _____copies

＊1 : Contact TERASAKI to use in combination with a door flange, IP cover,Auxiliary switch 7c, Undervoltge trip device (Time delay trip type), or mechanical interlock.
＊2 : When using a door interlock, always use a racking interlock.
＊3 : Can not be fitted with mechanical interlock or auxiliary switch 4c.
＊4 : Working mechanism differs from auxiliary switch 4c, these switches work only on the connected position.
＊5 : Can not be fitted with Draw-out type front connection specifications or conductive adapter.
＊6 : Conductive adapter can not be fitted with Inter-pole barrier.
＊7 : OFF padlock lever can not be fitted with Key lock (Lock in OFF).
＊8 : Key lock (Lock in OFF) can not be fitted with OFF padlock.

＊9 : Can not be fitted with auxiliary switch 7c.
＊10 : Can not be fitted with Trip command indicatior.
＊11 : Can not be fitted with Ready to close switch.
＊12 : Can not be fitted with door flange.
＊13 : Door flange can not be fitted with IP cover.
＊14 : Contact TERASAKI to use in combination with a door interlock.
＊15 : Contact TERASAKI to use in combination with a racking interlock.
＊16 : Contact TERASAKI to use in combination with a mechanical interlock.
＊17 : Can not be fitted with Undervoltage trip devices.
＊18 : Coming soon.

TERASAKI Global Network

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Since 1971 when we established TERASAKI ELECTRIC Europe, our first overseas subsidiary, in the UK, we have assembled a global network of 10 overseas subsidiaries and 72 agents to provide sales and technical supports to customers worldwide.

⚠ Safety Notice

Carefully read instruction manual to ensure proper installation, connection, operation, handling and maintenance of the product.

⊕ TERASAKI ELECTRIC CO., LTD.

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