TERASAKI
Innovators in Protection Technology

TemPower PRO

～ Compact ACB ～

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

Catalogue No. '25-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 of·ce. 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 of·ce to confirm the specifications.

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 of·ces, 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.

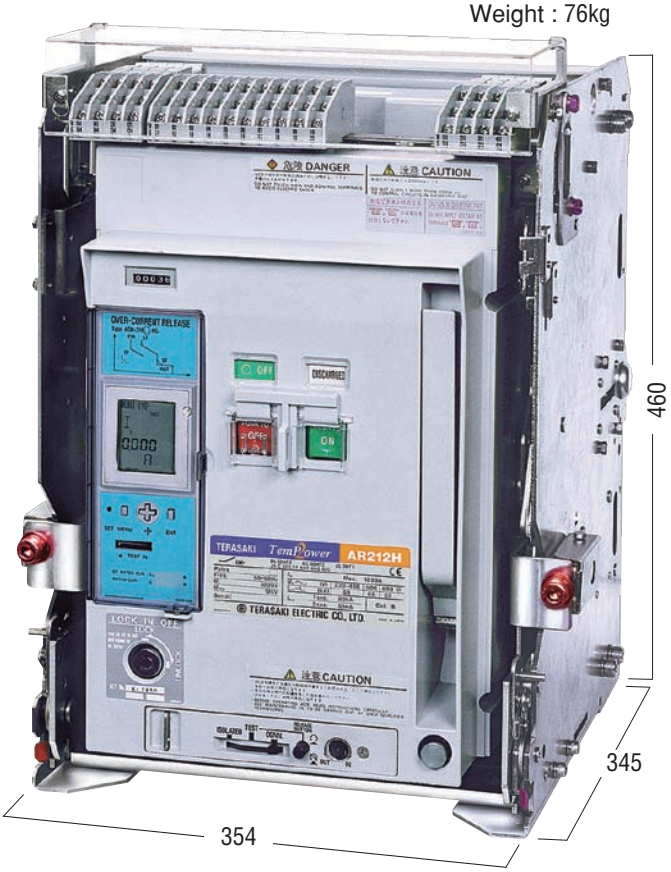
2 Features — Designed for greater convenience and higher safety

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



Previous product 1600AF **TemPower**

Weight : **37kg**

(mm)

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°.

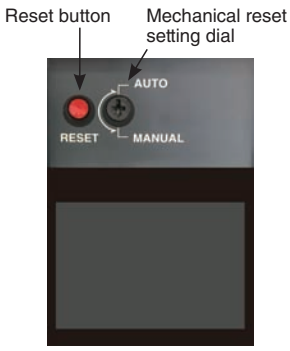
＊In case of AX120S and AX120H, rear connection terminals can not be changed.

Horizontal terminals

Vertical terminals

Even safer

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



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 / ACB State	Discharged / Not ready to close	Charge / Ready to close	Charge / Not ready to close
Indication (TemP2ower)		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.

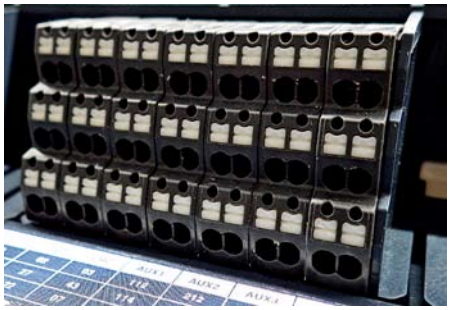
② Double shunt trip devices

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)



2 Features — Designed for greater convenience and higher safety

Even more convenient

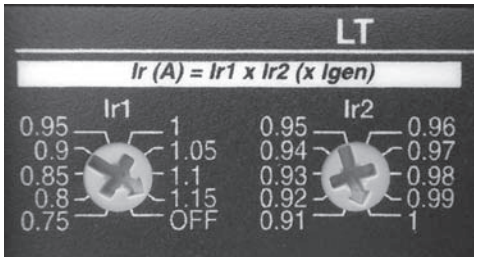
● **Standard type and Smart type of Over-Current Release (OCR) are available depends on the application.**

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 module 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

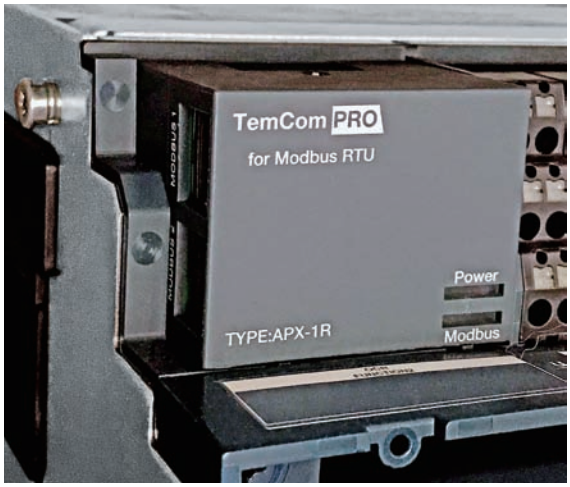
Connecting the TemView PRO remote display with the TemPower PRO and mounting it on the switchboard panel allows the smart type OCR measurement value to be checked using the panel.

＊ 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

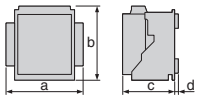
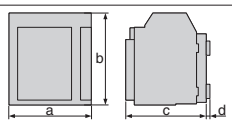
Protocol	Modbus TCP
DPHC settings	OFF/ON (Default seting value : ON)
IP address settings	0.0.0.0 – 255.255.255.255 (Default seting value : 172.16.1.1)
Subnet mask settings	0.0.0.0 – 255.255.255.255 (Default seting value : 255.255.255.0)
Electrostatic gateway settings	0.0.0.0 – 255.255.255.255 (Default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

3 Ratings

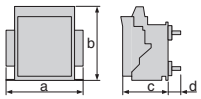
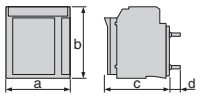
Series			Standard		Standard		Standard		Standard		Standard	
Ampere rating (A)			630		800		1000		1250		1600	
Type			**AX106S**		**AX108S**		**AX110S**		**AX112S**		**AX116S**	
Rated current (max) [I_n] (A)	JIS④, IEC⑤, EN⑥, AS/NZS⑦		630		800		1000		1250		1600	
①②	Marine		630		800		1000		1250		1600	
Neutral 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≦I_{gen}≦400		480≦I_{gen}≦800		600≦I_{gen}≦1000		750≦I_{gen}≦1250		960≦I_{gen}≦1600	
・LSIR specifications ⑩			400＜I_{gen}≦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	High fault	High fault	High fault	High fault	High fault	High fault
2000	630	800	1000	1250	1600	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	400 630	800	1000	1250	1600	2000
—	240≦I_{gen}≦400 400＜I_{gen}≦630	480≦I_{gen}≦800	600≦I_{gen}≦1000	750≦I_{gen}≦1250	960≦I_{gen}≦1600	—
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
18 ⑪ / 22 ⑪	37 / 45	37 / 45	37 / 45	37 / 45	37 / 45	18 ⑪ / 22 ⑪
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	—

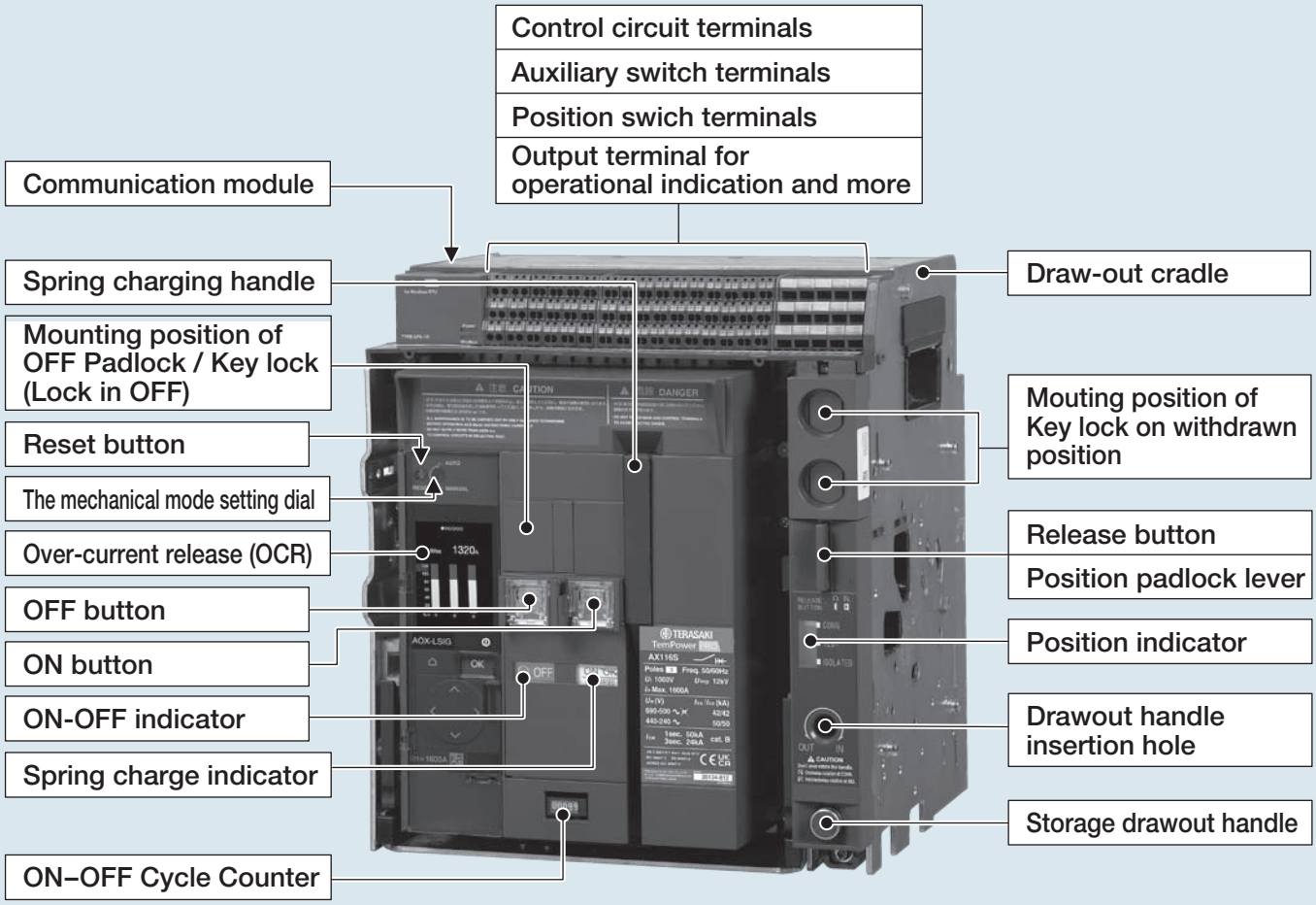
3 Ratings

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			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	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.

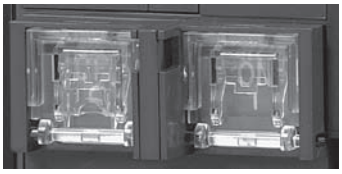
Appearance (For draw-out type)



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

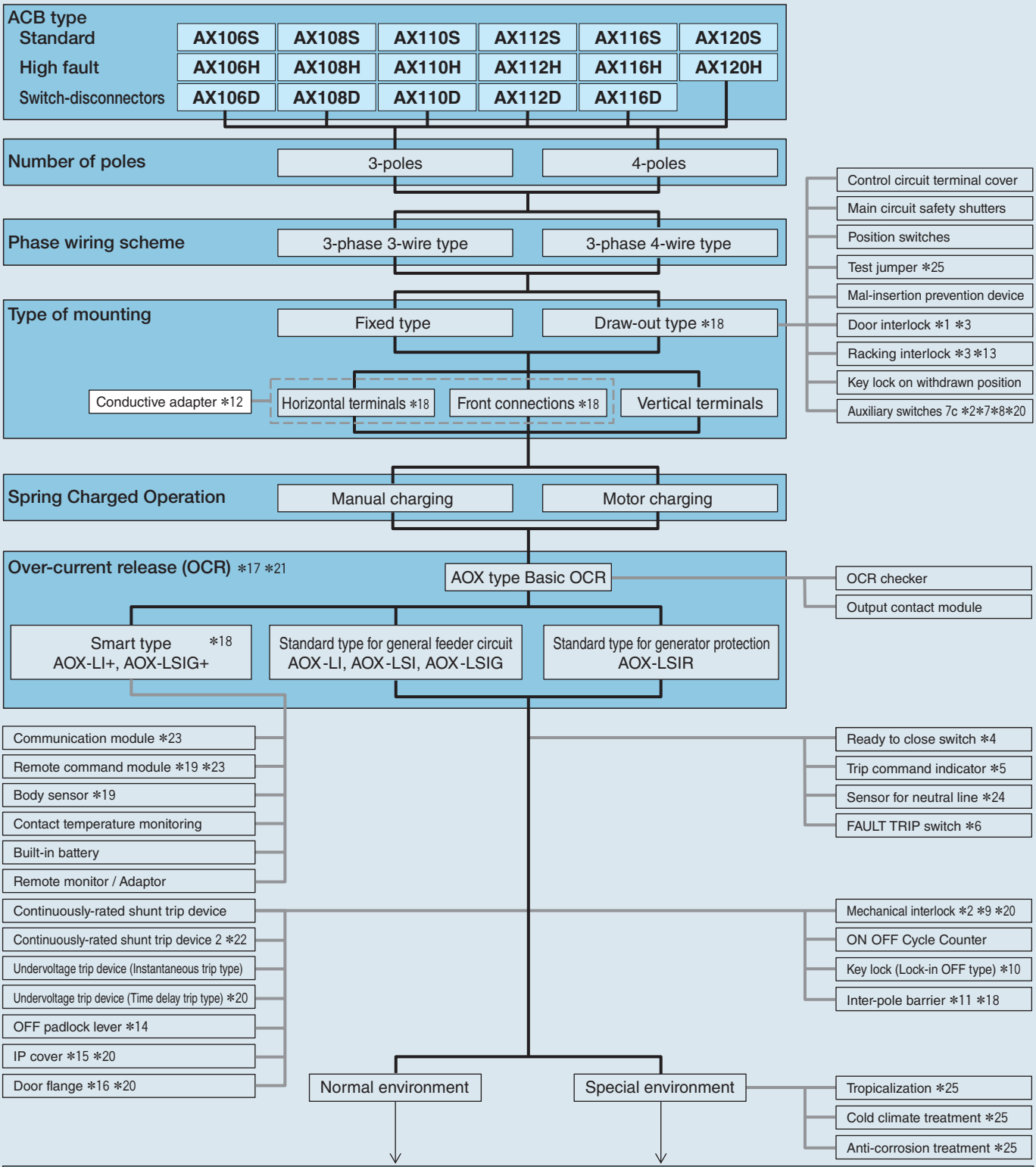
Auxiliary switches indicates the “ON” and “OFF” status of ACB electrically. The auxiliary switches for draw-out type ACBs operate in the “CONNECTED” position and “TEST” position.
＊This accessory can not be used with Auxiliary switches 7c.
＊The connection of Auxiliary switch 4c is disconnected in the 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.

6 Specifications

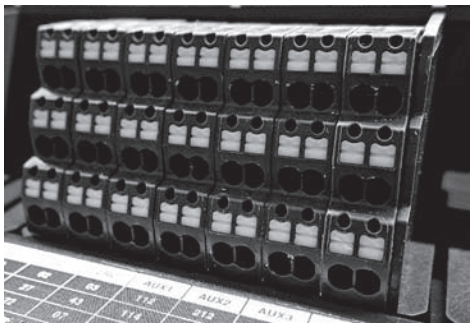


∗1 : Contact TERASAKI to use in combination with a door flange, IP cover, auxiliary switch 7c, undervoltage trip device (Time delay trip type), or mechanical interlock.
∗2 : Contact TERASAKI to use in combination with a racking interlock.
∗3 : When using a door interlock, a racking interlock is available 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 : Cannot select this if using a fixed type 3-pole ACB for 3-phase 4-wire power distribution.
∗24 : Select this if using N-phase protection or Ground fault trip protection on 3-pole ACB for 3-phase 4-wire power distribution.
∗25 : 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

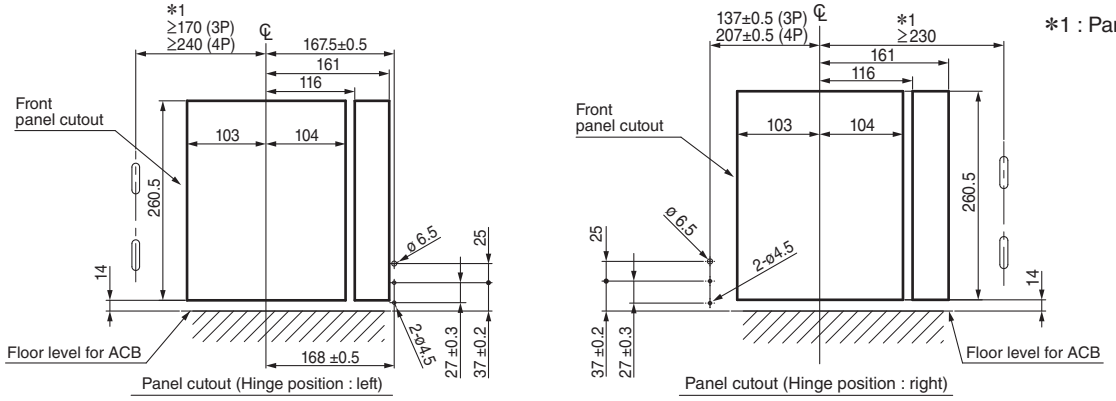
Locking device that prevents ACBs from inadvertently being drawn out. Allows units to be locked in the CONNECTED, TEST or ISOLATED positions. Up to two keys can be installed, and can be selected from two types: Cylinder and Castell.

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

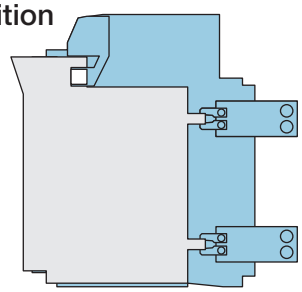
∗1 : When using a door interlock, a racking interlock is available as standard.
∗2 : Specify the hinge position of distribution board door (right side or left side) when placing an order.
∗3 : Contact TERASAKI to use in combination with a door flange, IP cover, auxiliary switch 7c, undervoltage trip device (Time delay trip type), or mechanical interlock.

2 Types of Mounting

Draw-out type

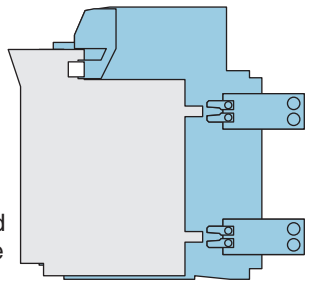
Maintenance and inspection are easy. Consists of a breaker body and a draw-out cradle, where the drawout cradle is fixed in the switchboard and only the breaker body can be drawn out or removed. There are four breaker body positions: CONNECTED, TEST, ISOLATED, and WITHDRAWN.

1 CONNECTED position



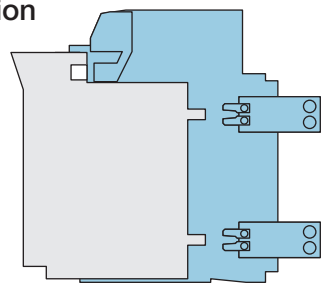
Both the main and control circuits are connected for normal service.

2 TEST position



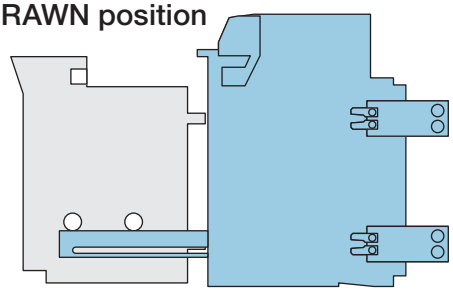
The main circuit is isolated and the control circuits are connected.
This position permits operation tests without the need for opening the switchboard panel door.

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.

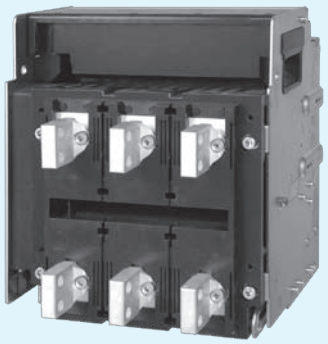
Fixed type

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

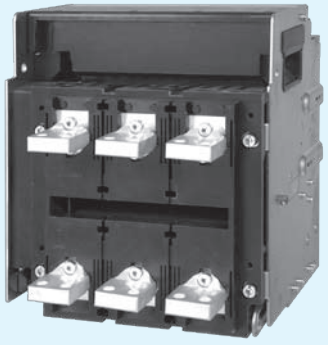
Terminal arrangements

■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).

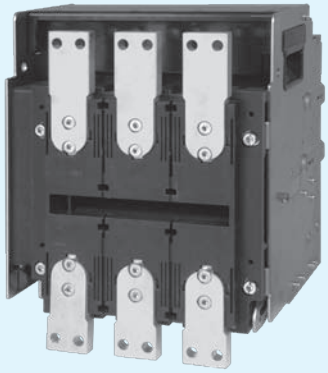
Vertical terminals



Horizontal terminals



Front connections



6 Specifications

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

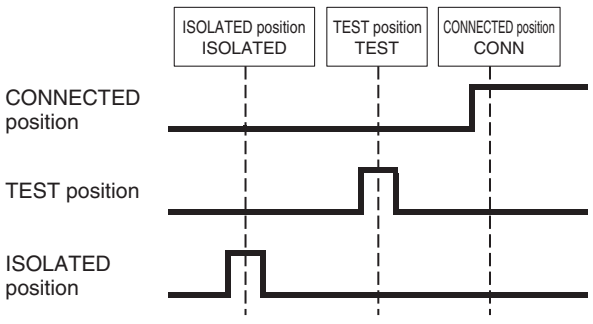
Type	Number of contacts	Contact arrangement		
		ISOLATED	TEST	CONN
ALX-212PA	5c	2	1	2
ALX-211PA	4c	2	1	1
ALX-210PA	3c	2	1	0
ALX-202PA	4c	2	0	2
ALX-201PA	3c	2	0	1
ALX-200PA	2c	2	0	0
ALX-112PA	4c	1	1	2
ALX-111PA	3c	1	1	1
ALX-110PA	2c	1	1	0
ALX-102PA	3c	1	0	2
ALX-101PA	2c	1	0	1
ALX-100PA	1c	1	0	0
ALX-012PA	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) ②		Max. Closing time ①,③ (ms)
		Inrush current (A)	Holding current (mA)	Steady-state	Closing command	
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 36 – 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.

6 Specifications

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)

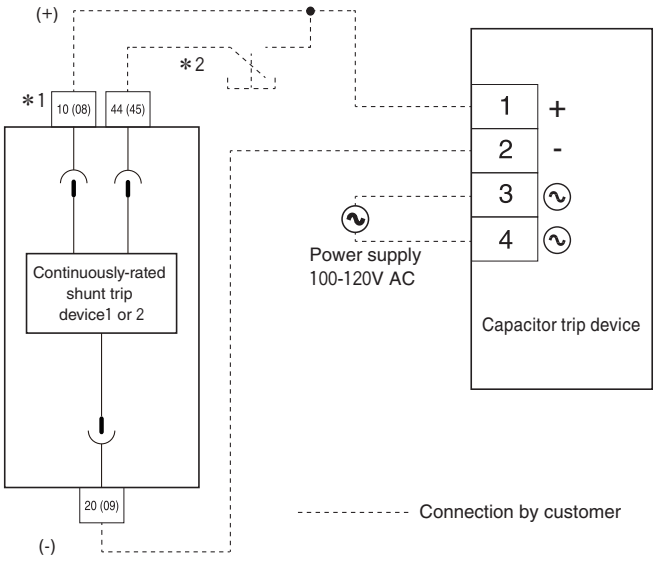
When used together with a continuously-rated shunt trip device, capacitor trip devices can be used to trip ACBs for up to 30 seconds even if there is a large voltage drop caused by a power failure (AC), short-circuit or other faults.

＊Testing the device is not possible when a test jumper is used.

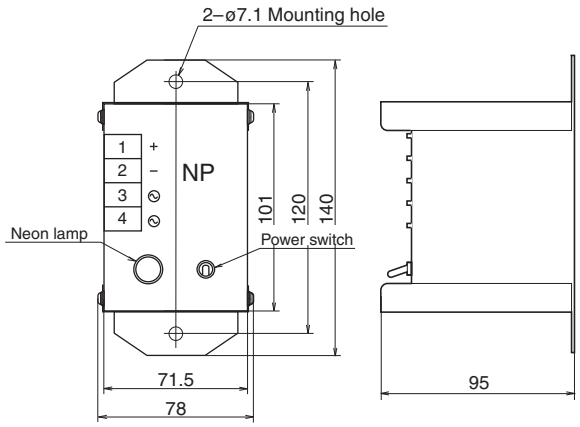
Types	AQR-1
Rated voltage	100–120V AC
Operational voltage	70–110% of rated voltage
Rated frequency	50/60Hz
Rated voltage of Shunt Trip used	100–130V AC/DC
Power consumption (Trip command) ②	200VA ①
Power consumption (Steady-state) ②	5VA

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.

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 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)

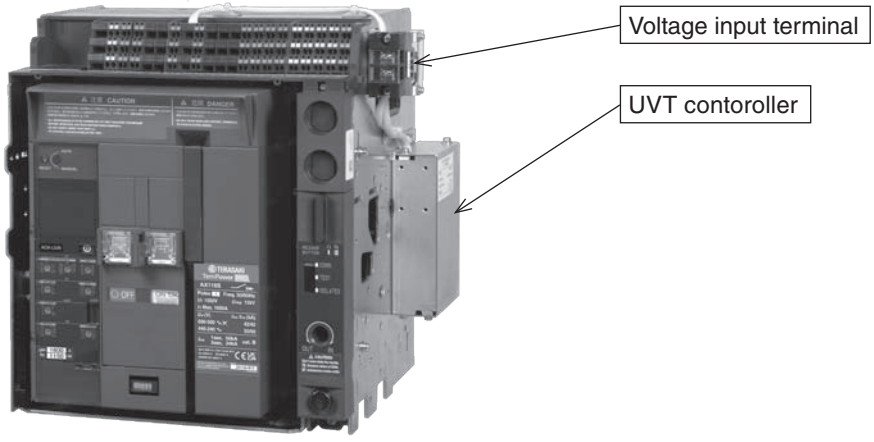
Rated voltage (V)	Opening Voltage (V)	Pick-up Voltage (V)	Coil Excitation Current ①		Power Consumption (VA) ①		Operating time (ms)
			Inrush current (A)	Holding current (mA)	Steady-state	Reset	
AC/DC 24 – 30	10.5 – 16.8	20.4	12	150	5 or less	200 or less ②	200 or less
AC/DC 48 – 60	21 – 33.6	40.8	8	80	5 or less		
AC/DC 100 – 130	45.5 – 70	85	4	40	5 or less		
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	10 or less	200 or less ②	500 or more
AC/DC 100 – 130	45.5 – 70	85	4	100			
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.



Undervoltage trip device (Time delay trip type)

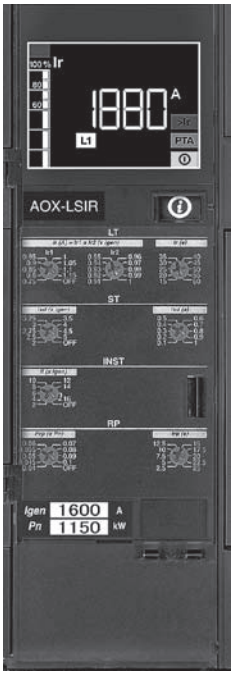
6 Specifications

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) ②④⑦⑱		●	●	●	—	●	●
	Ground fault trip (GF) ②④⑱		—	—	●	—	—	●
	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) ⑨⑰		—	—	—	—	○	○
	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 module ⑨⑲			—	—	—	—	○	○
Remote command module ⑲			—	—	—	—	○	○

● : 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 pririority 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.

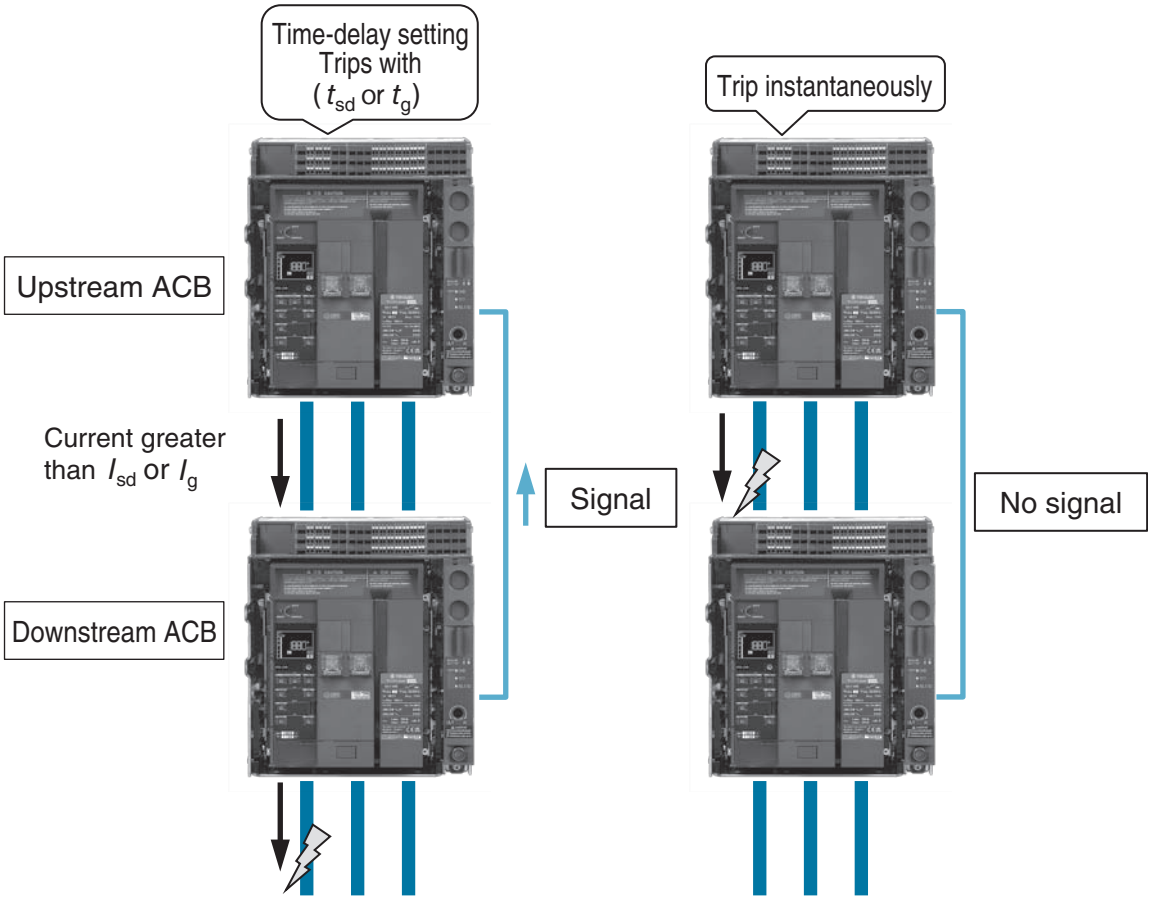
⑱ : Select the Sensor for neutral line if using N-phase protection or Ground fault trip protection on 3-pole ACB for 3-phase 4-wire power distribution.

⑲ : Cannot select this if using a fixed type 3-pole ACB for 3-phase 4-wire power distribution.

6 Specifications

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.



Zone interlock operating schematic

Setting range of protection functions (Standard type)

AOX−LI 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
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	(I_r)×(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)×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差 : –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

① : If the instantaneous trip current is set to OFF, this 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.

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 – <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> Resettable time 25 75 175 375 575 Total breaking time 100 150 250 450 650	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 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.
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 (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> Resettable time 25 75 175 375 575 Total breaking time 100 150 250 450 650	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 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> Resettable time 75 275 475 975 1975 Total breaking time 150 350 550 1050 2050	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 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											
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^2t (EI), I^3t, I^4t (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^2t : ON or OFF													OFF
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%													16
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 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).

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^2t (EI), I^3t, I^4t (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^2t : ON or OFF													OFF
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^2t : 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).

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)	

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

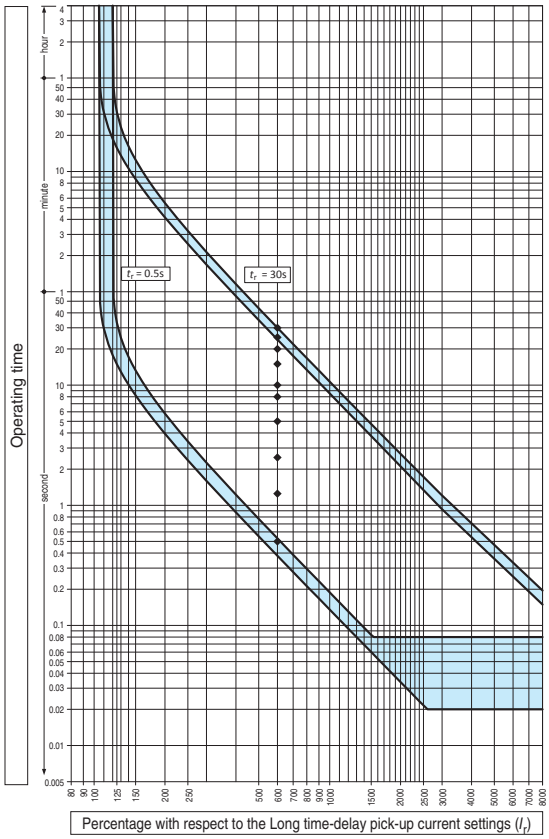
Measurement items		Measurement accuracy ①
Power	Active power (instantaneous)	Class 1
	Active power (maximum)	
	Active power (minimum)	
	Demand value of active power	
	Demand value of active power (maximum)	
	Total active power	
	Reactive power (instantaneous)	Class 2
	Reactive power (maximum)	
	Reactive 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)	

6 Specifications

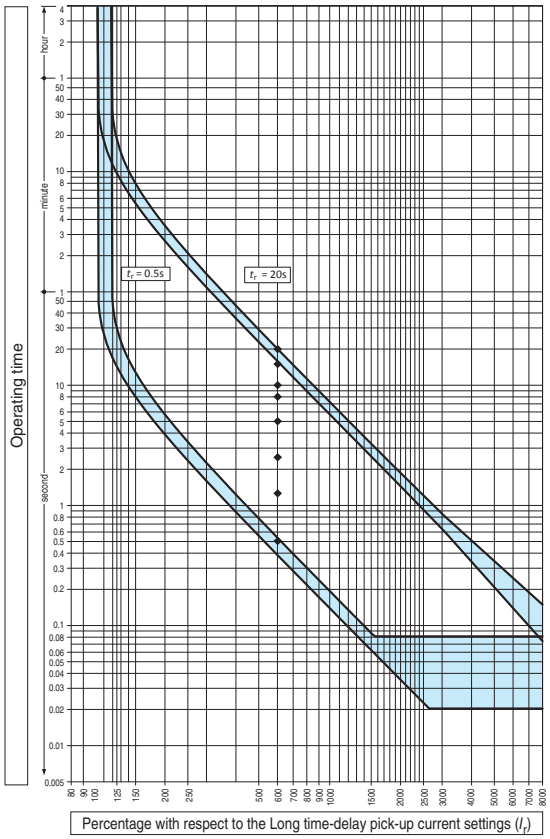
Protection characteristic for standard type (AOX–LI, AOX–LSI, AOX–LSIG)

Long time delay trip characteristics

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

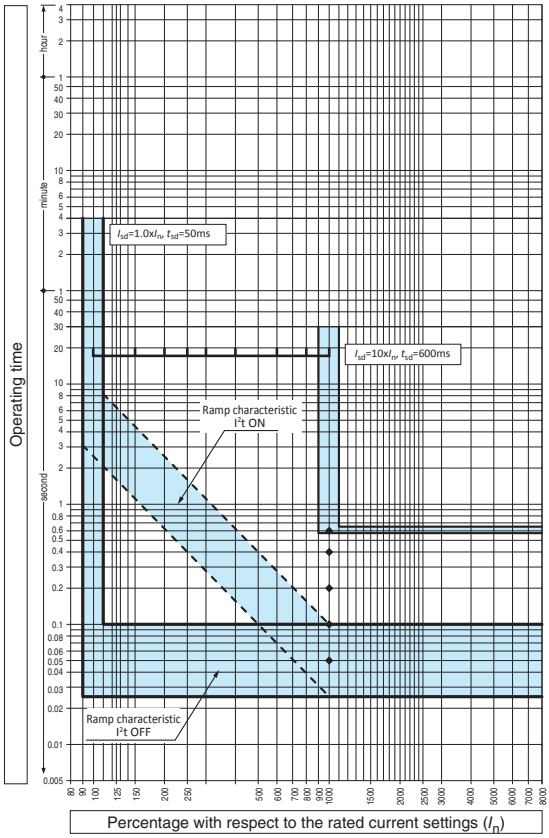


[AX120S, AX120H]

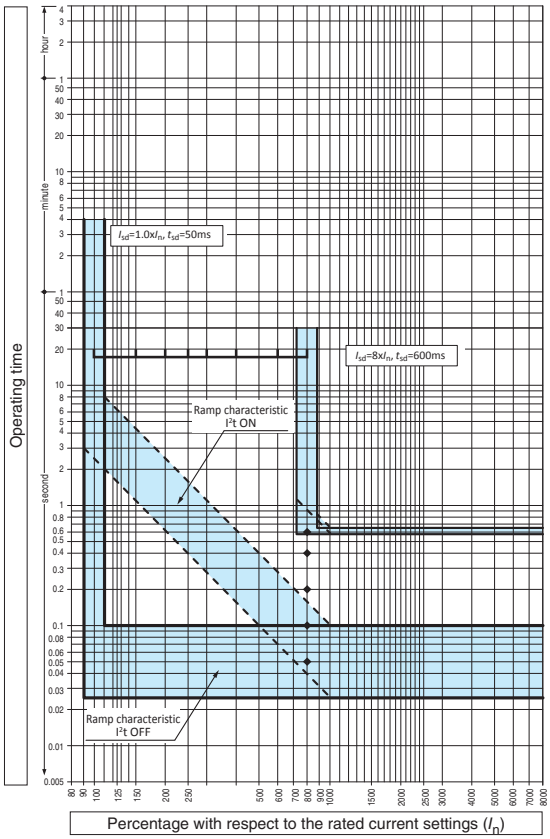


Short time delay trip characteristics

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



[AX120S, AX120H]

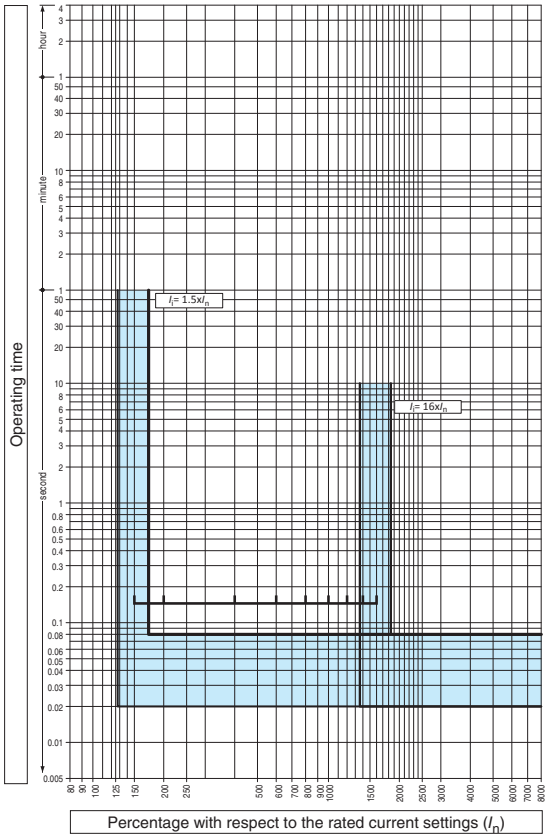


∗ Protection characteristic that is only included with AOX-LSI and AOS-LISG.

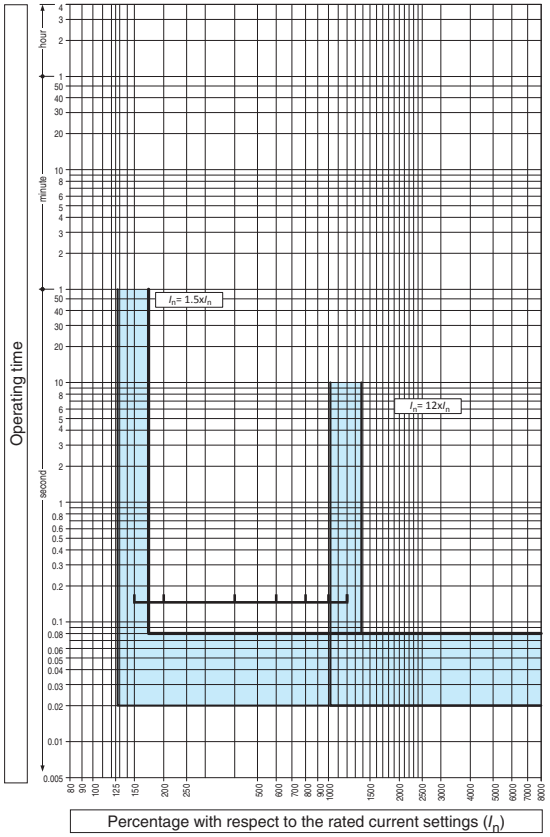
Protection characteristic for standard type (AOX–LI, AOX–LSI, AOX–LSIG)

Instantaneous tripping characteristics

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

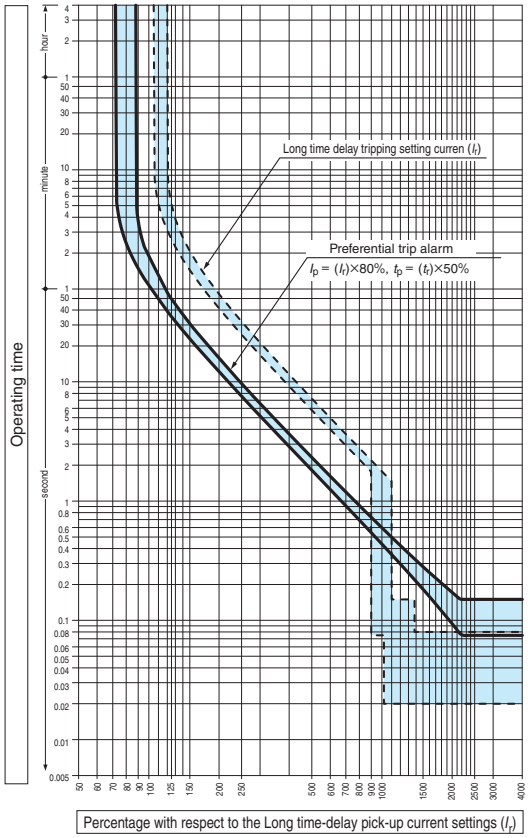


[AX120S, AX120H]



Preferential trip alarm characteristics

[All types]



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

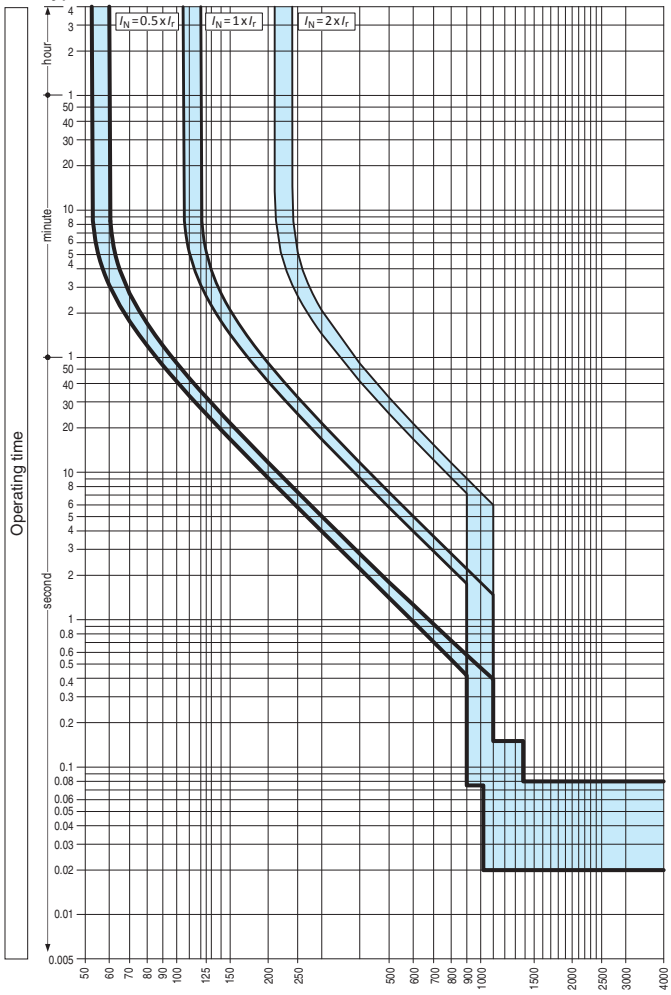
I_r=I_n, t_r=5〔s〕, I_i=12×I_n, I_{sd}=10×I_n, t_{sd}=100〔ms〕, I²t=OFF

6 Specifications

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

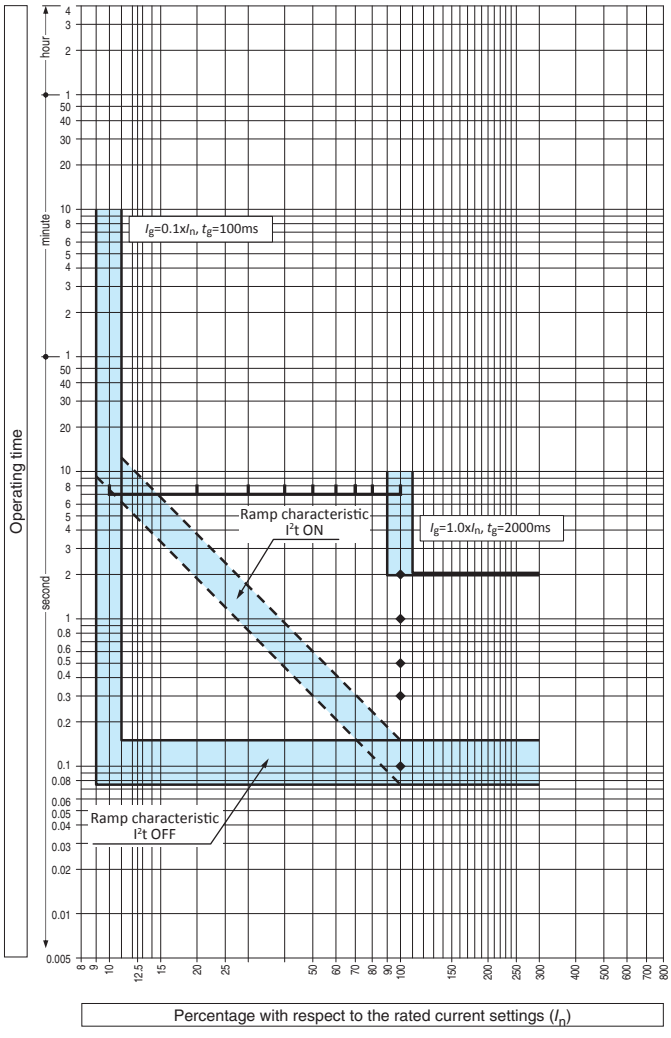
N-phase protection function

[All types]



Ground fault trip characteristics

[All types]

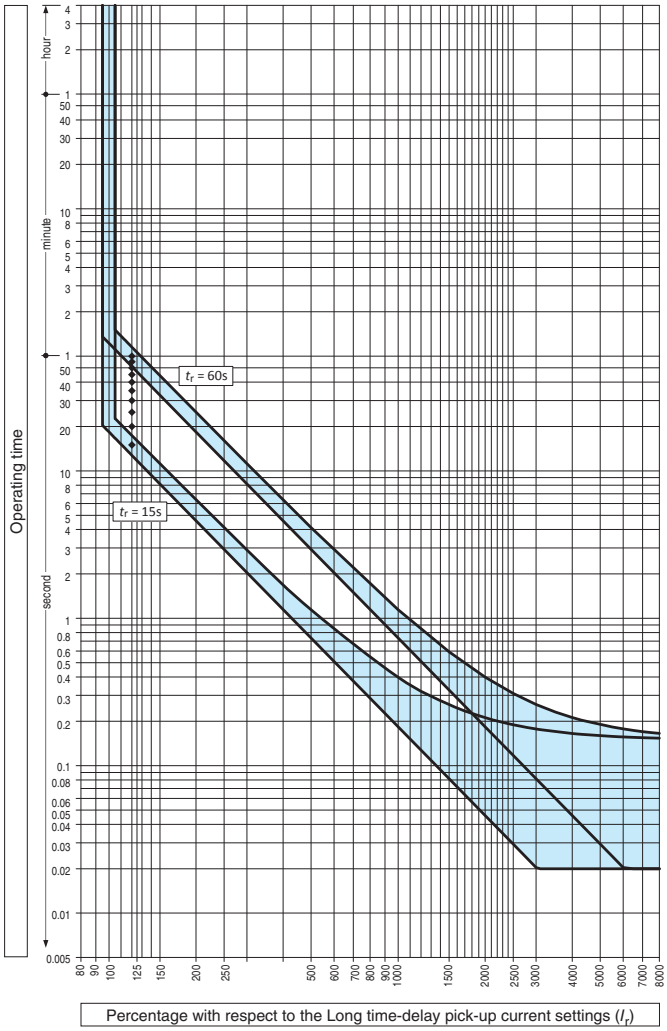


∗ Protection characteristic that is only included with AOX-LSIG.

Protection characteristic for standard type (AOX–LSIR)

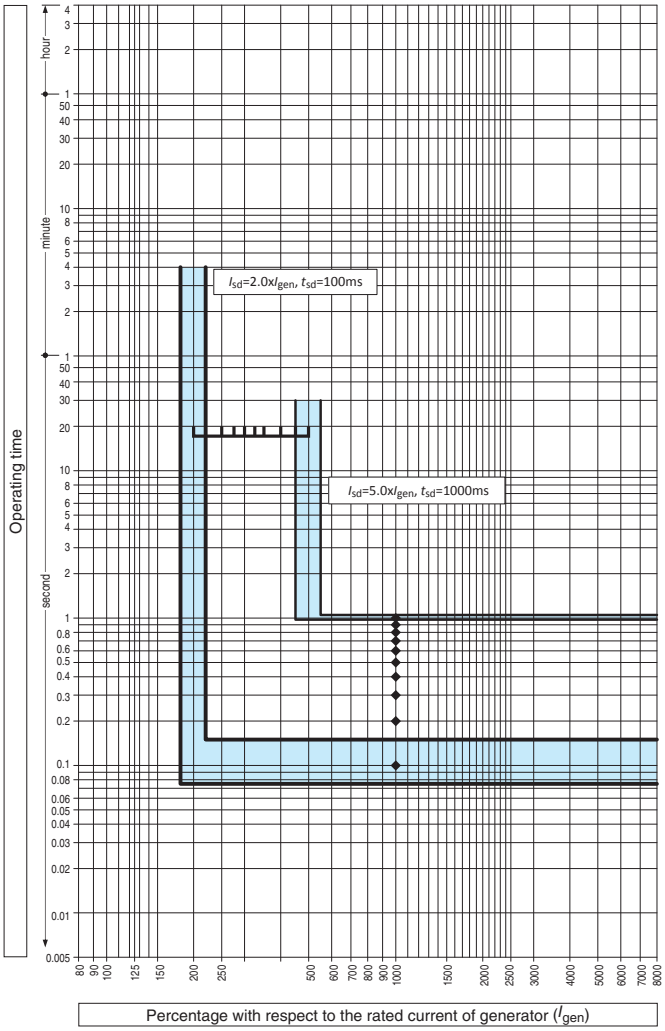
[AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H]

Long time delay trip characteristics



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

Short time delay trip characteristics



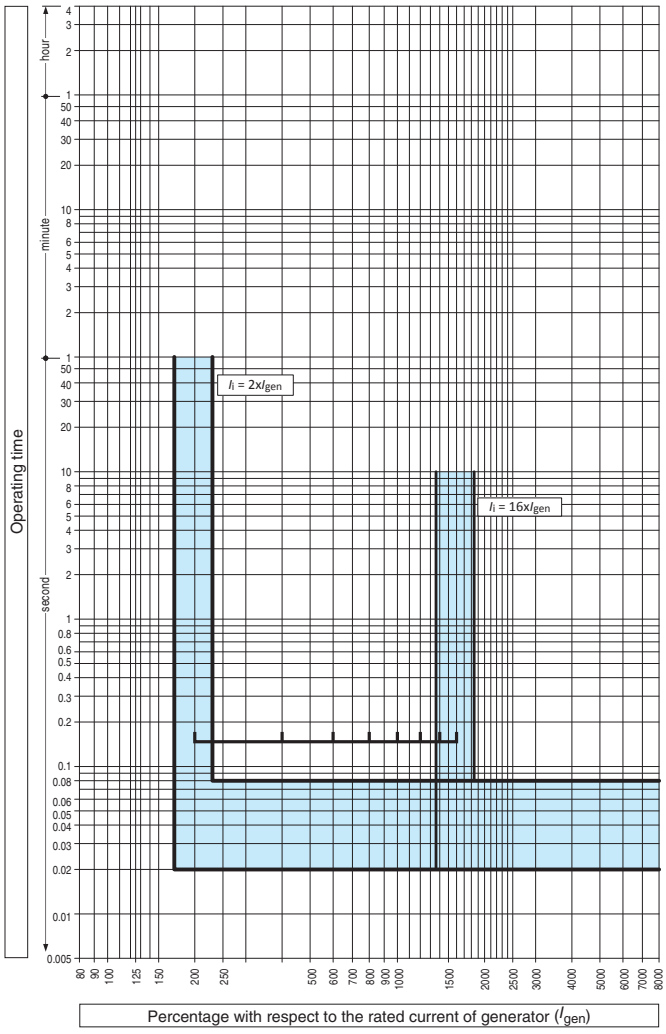
Percentage with respect to the rated current of generator (I_{gen})

6 Specifications

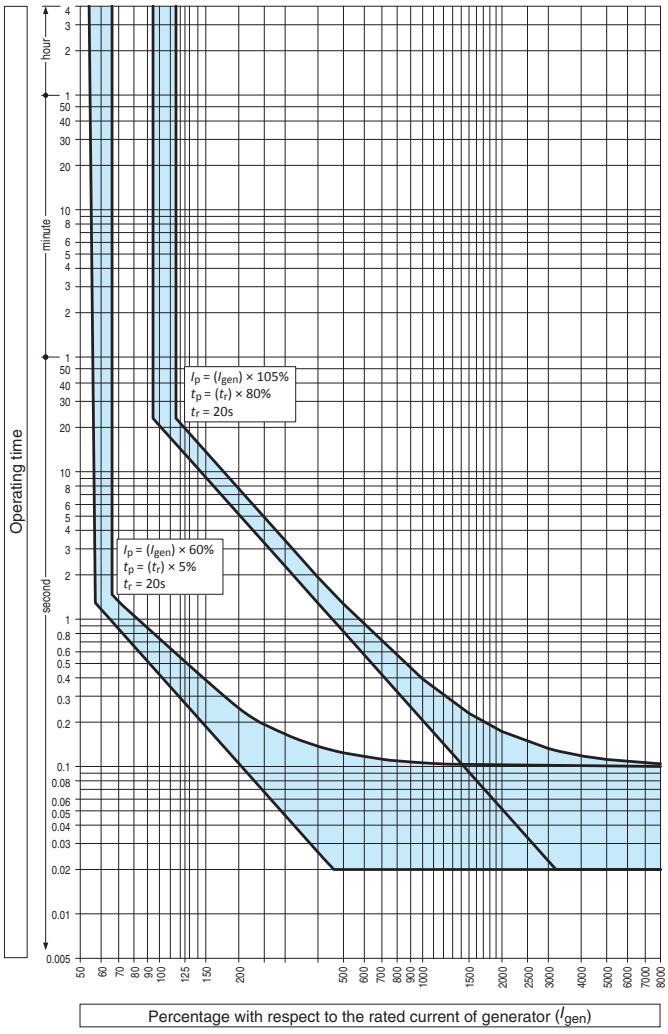
Protection characteristic for standard type (AOX–LSIR)

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

Instantaneous tripping characteristics



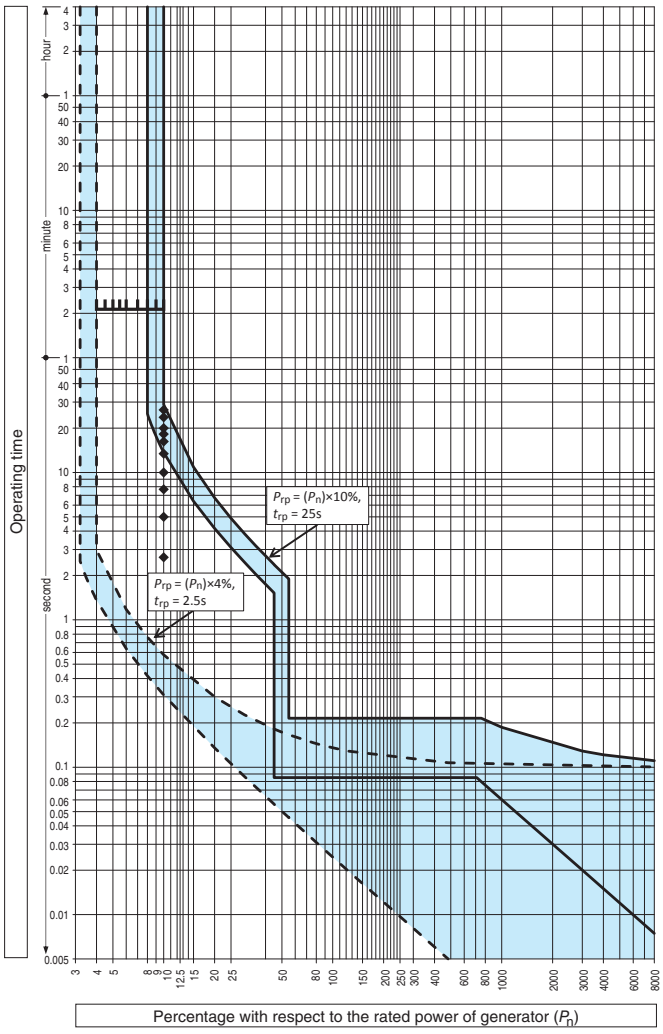
Preferential trip alarm characteristics



Protection characteristic for standard type (AOX–LSIR)

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

Reverse power tripping characteristics

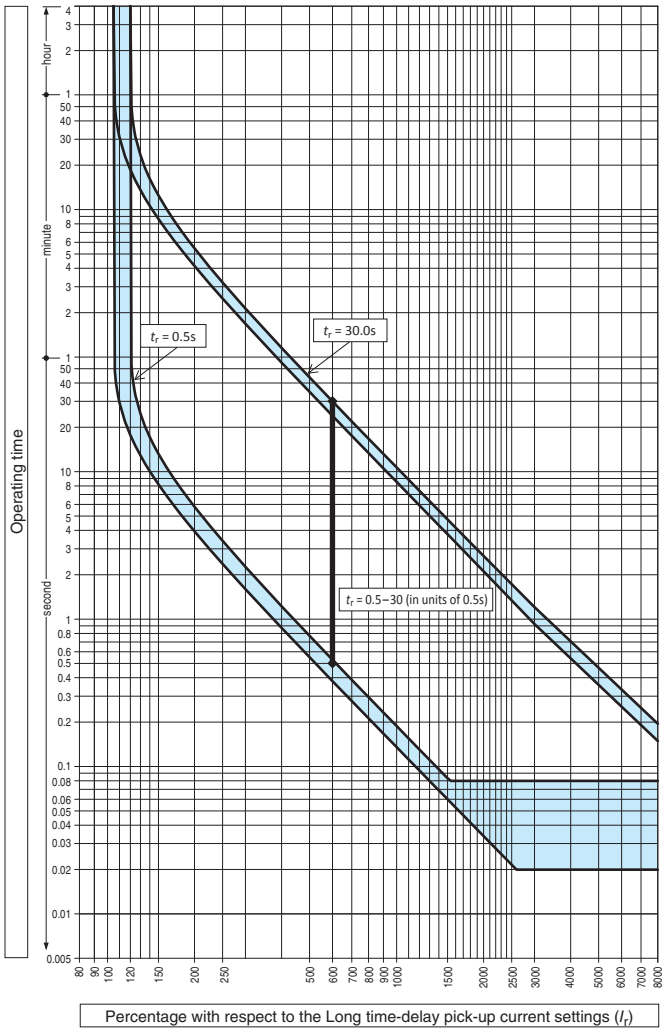


6 Specifications

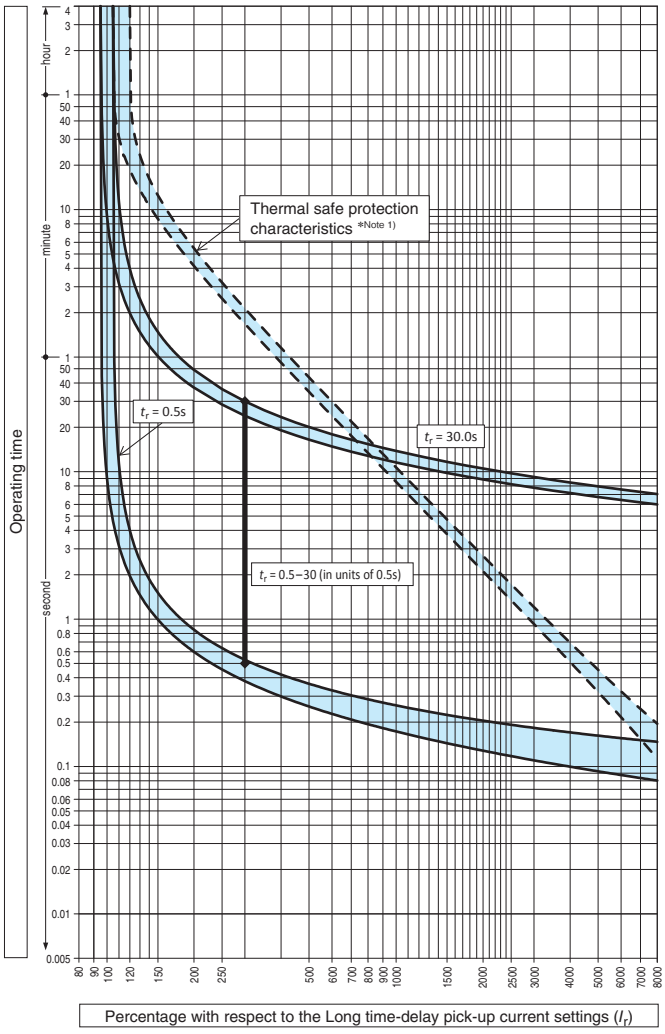
Protection characteristics for smart type (AOX–LSI+, AOX–LSIG+)

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

Long time delay trip characteristics (Thi)



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

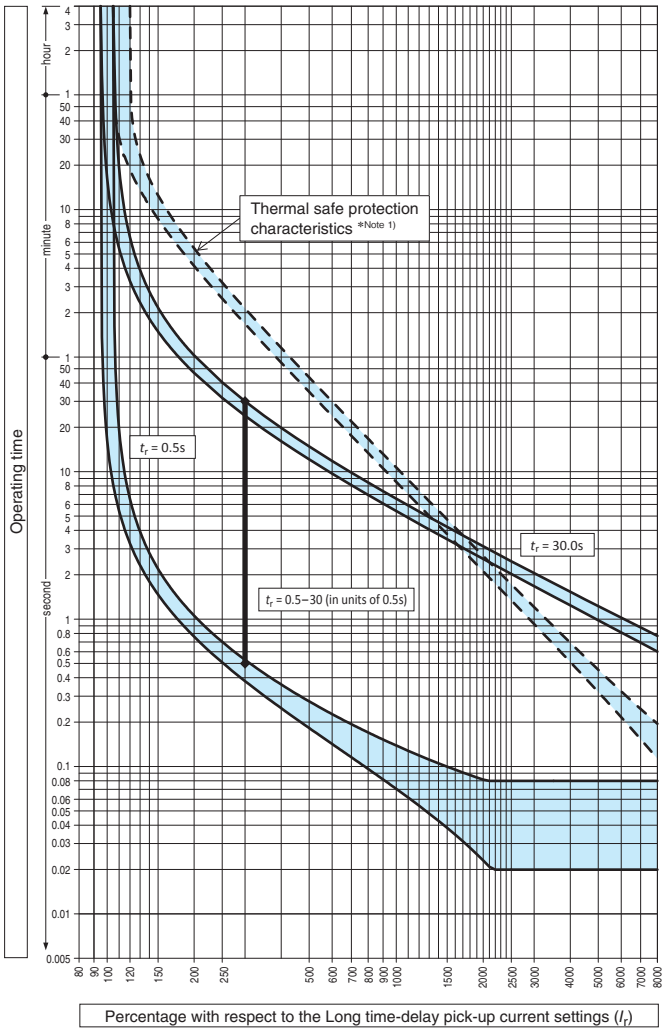


∗Note 1) : Thermal safe protection characteristics refer to the overheating protection characteristics of the ACB.
These characteristic are identical to the characteristic curve for long time delay trip characteristics (Thi) with I_r=I_n, t_r=30.0 s.
In the area where the operating time of thermal safe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

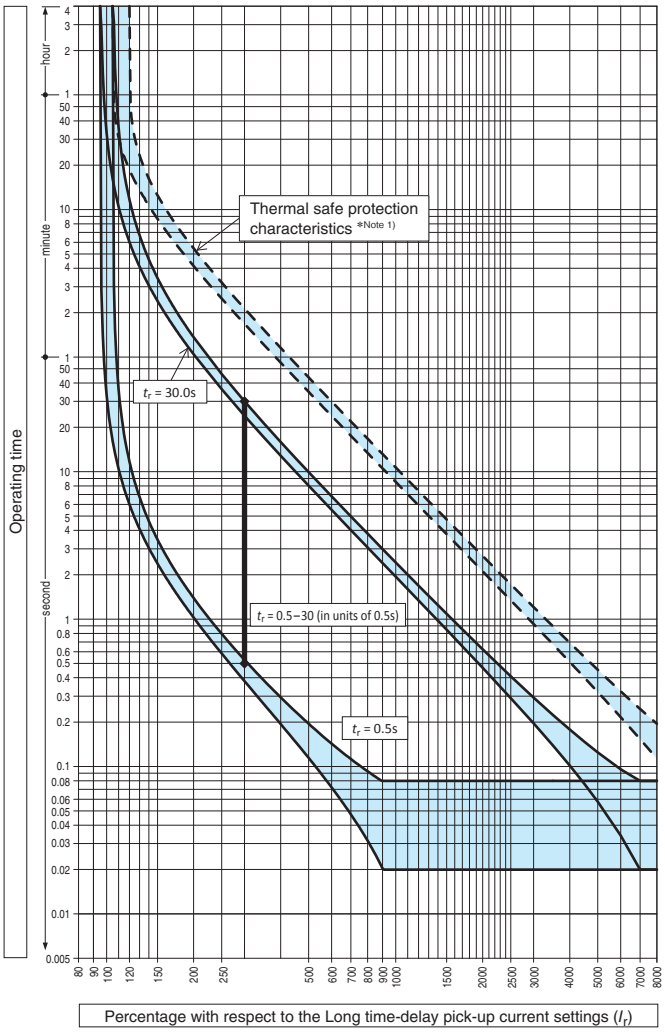
Protection characteristics for smart type (AOX–LSI+, AOX–LSIG+)

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

Long time delay trip characteristics (It)



Long time delay trip characteristics (I^2t)



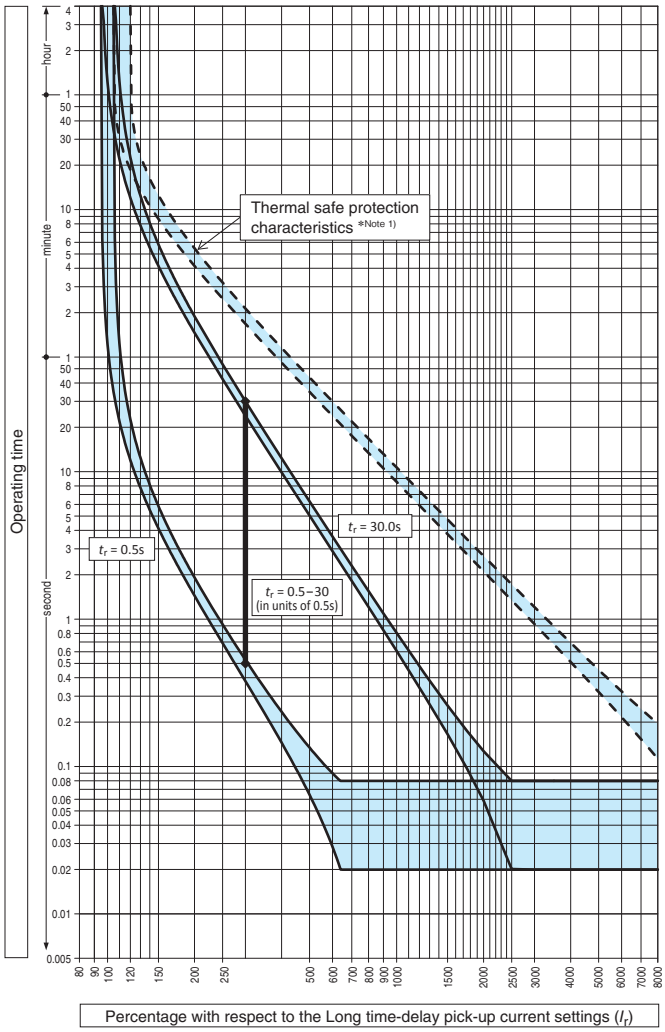
∗Note 1) : Thermal safe protection characteristics refer to the overheating protection characteristics of the ACB.
These characteristic are identical to the characteristic curve for long time delay trip characteristics (Thi) with I_r=I_n, t_r=30.0 s.
In the area where the operating time of thermal safe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

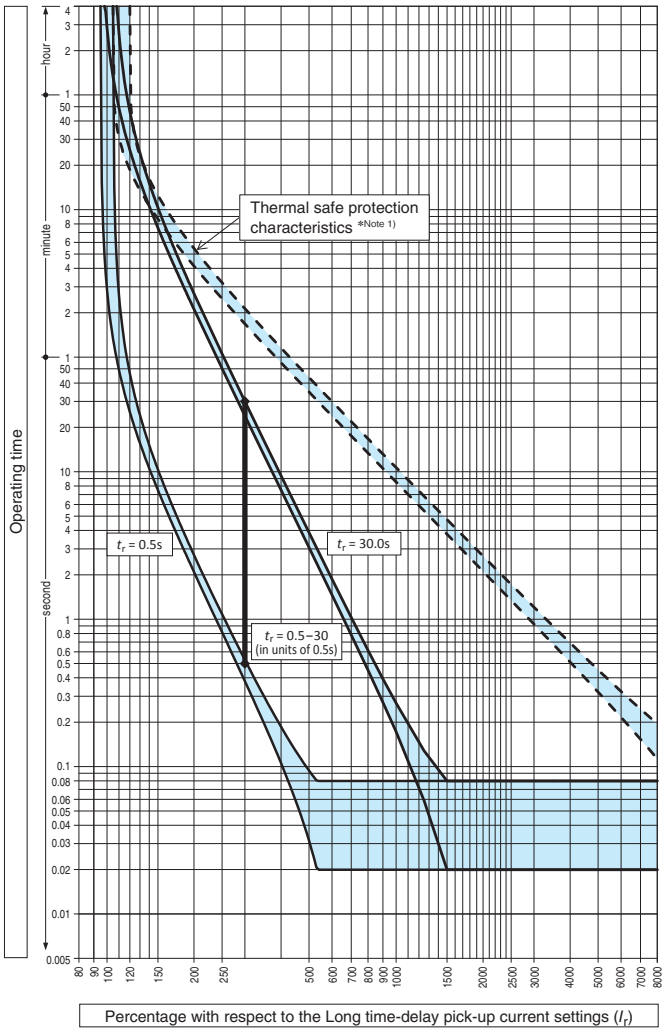
Protection characteristics for smart type (AOX–LSI+, AOX–LSIG+)

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

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



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

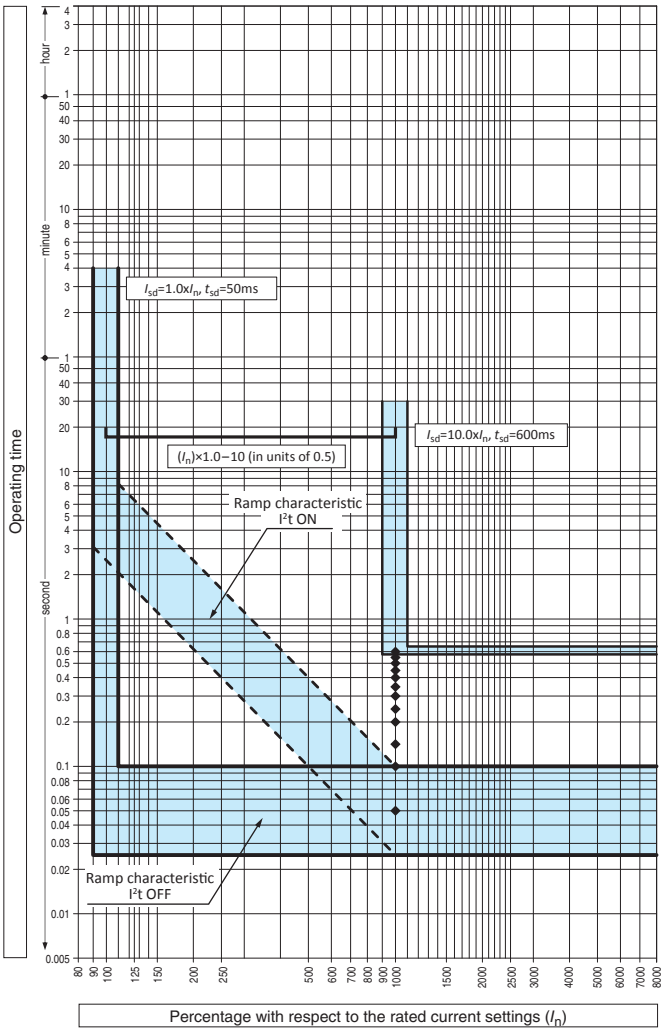


∗Note 1) : Thermal safe protection characteristics refer to the overheating protection characteristics of the ACB.
These characteristic are identical to the characteristic curve for long time delay trip characteristics (Thi) with I_r=I_n, t_r=30.0 s.
In the area where the operating time of thermal safe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

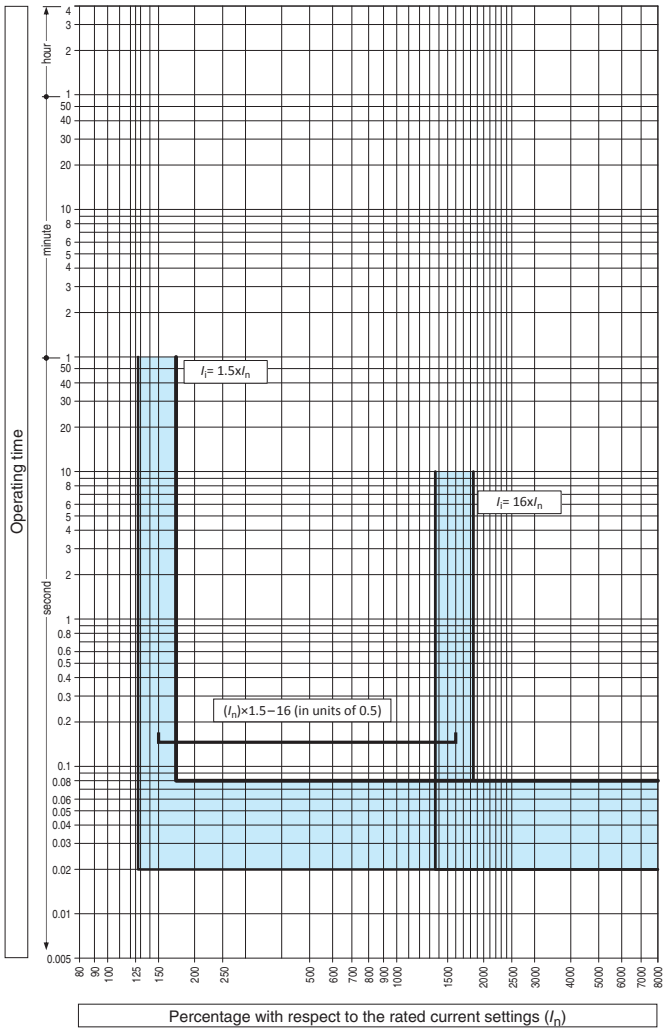
Protection characteristics for smart type (AOX–LSI+, AOX–LSIG+)

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

Short time-delay trip characteristics



Instantaneous tripping characteristics

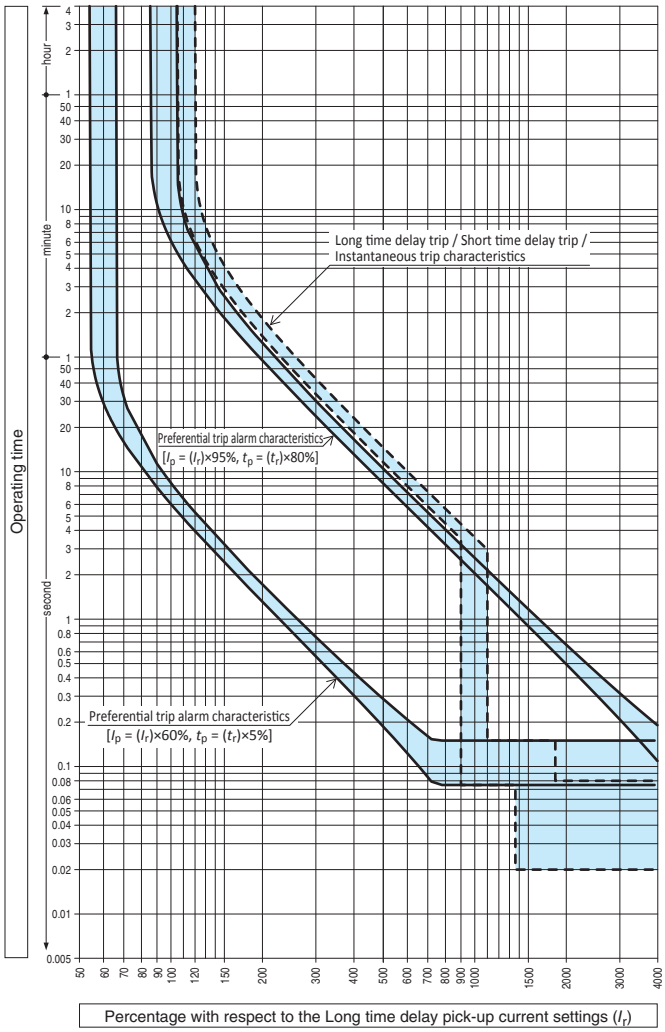


6 Specifications

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

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

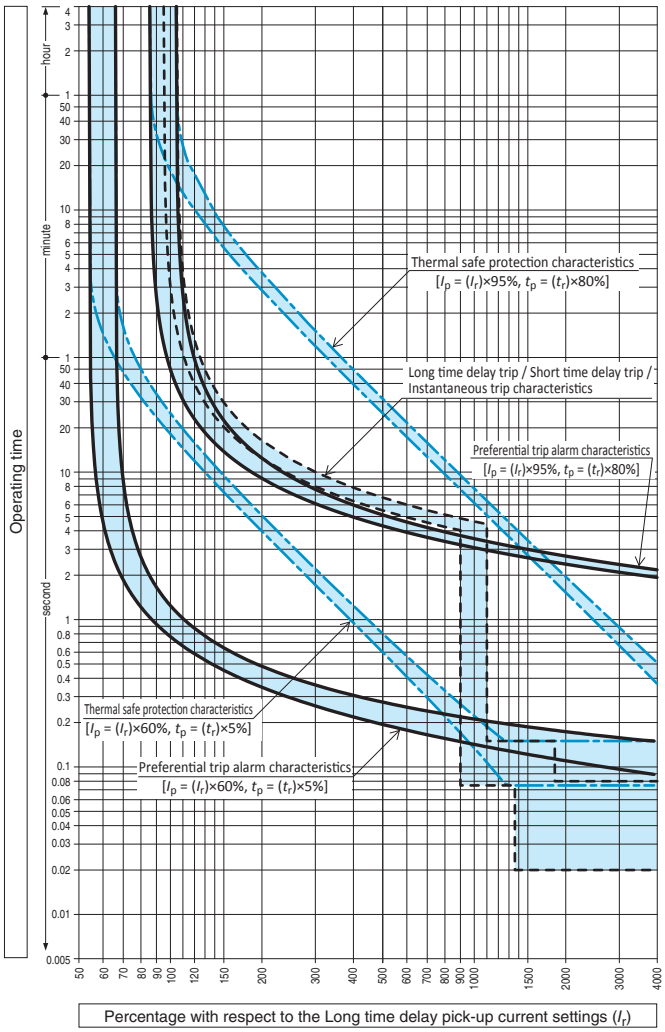
Preferential trip alarm characteristics



∗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



∗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.

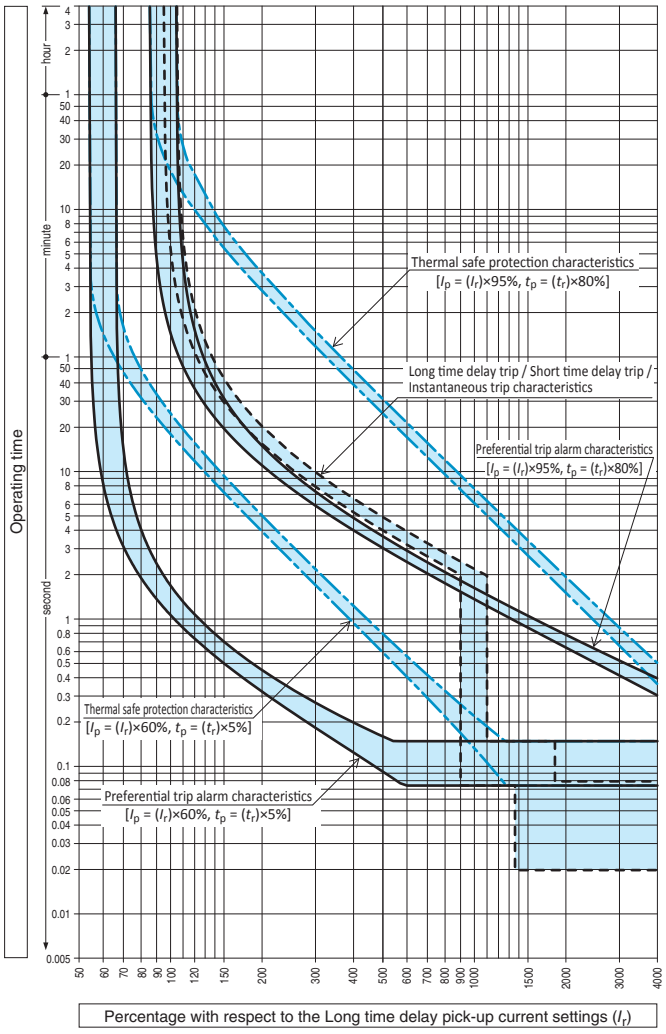
I_r=I_n, t_r=10.0s, I_{sd}=10.0×I_n, t_{sd}=100ms, I_i=16×I_n, I²t=OFF

∗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



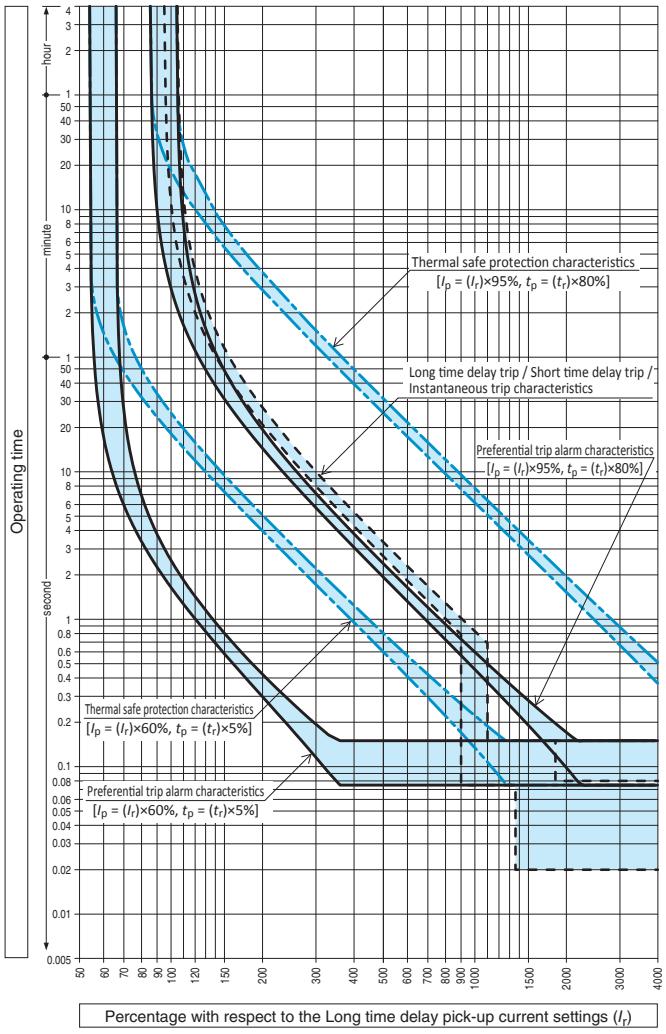
Percentage with respect to the Long time delay pick-up current settings (I_r)

∗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×I_n, I^2t=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 I^2t.

∗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×I_n, I^2t=OFF

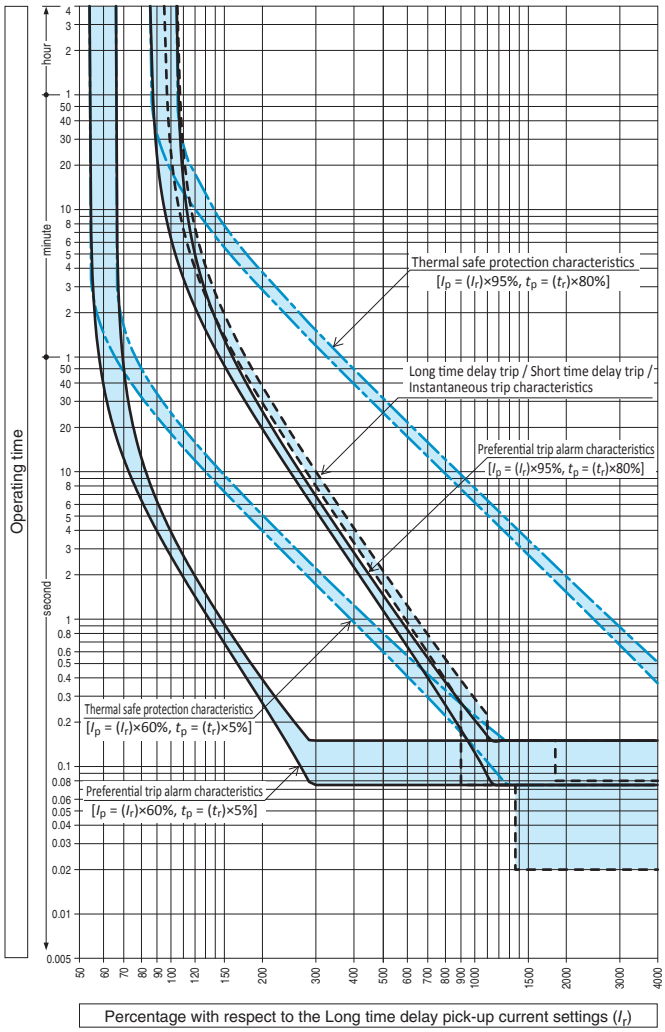
∗3 : The thermal safe protection characteristics are the overheating protection characteristics of the air circuit breaker.
These characteristics are the preferential trip alarm characteristics corresponding to the thermal safe protection characteristics of the long time-delay trip characteristics (I^2t)
(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.

6 Specifications

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

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

Preferential trip alarm characteristics

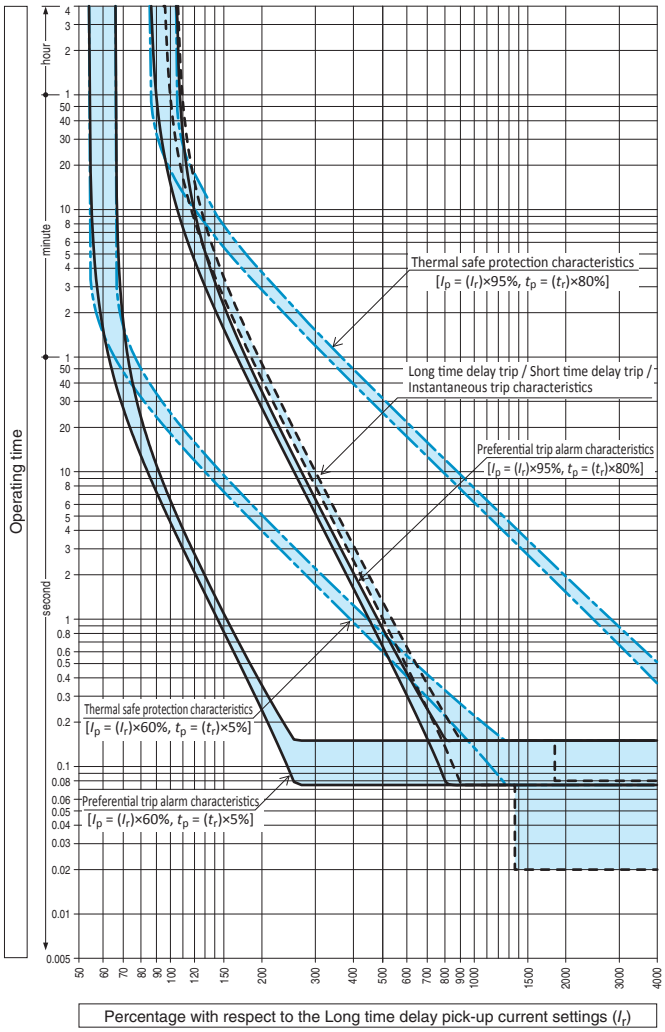


∗1 : Characteristics of preferential trip alarm 1 and preferential trip alarm 2 when the long time-delay trip setting is I^3t.

∗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×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.

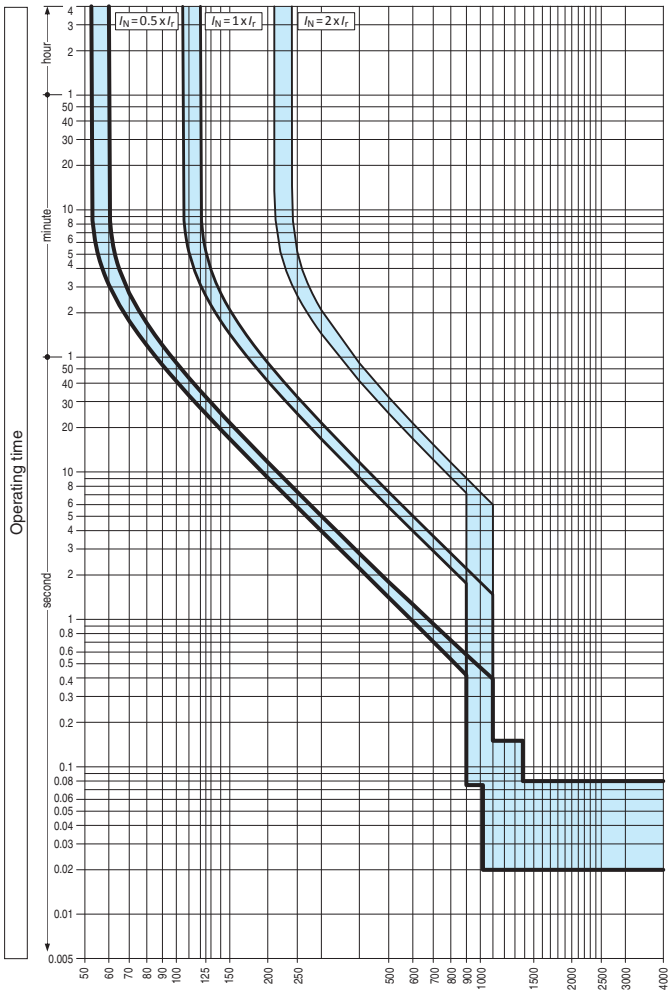
I_r=I_n, t_r=10.0s, I_{sd}=10.0, t_{sd}=100ms, I_i=16×I_n, I^2t=OFF

∗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.

Protection characteristics for smart type (AOX–LSIG+)

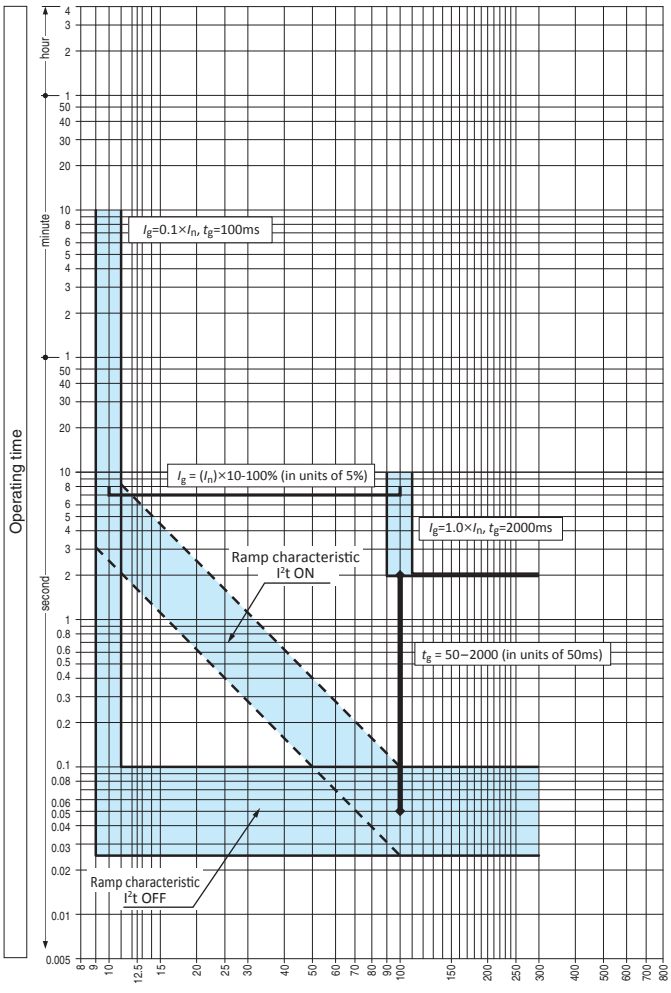
[AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H]

Neutral protection characteristics



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

Ground fault trip characteristics



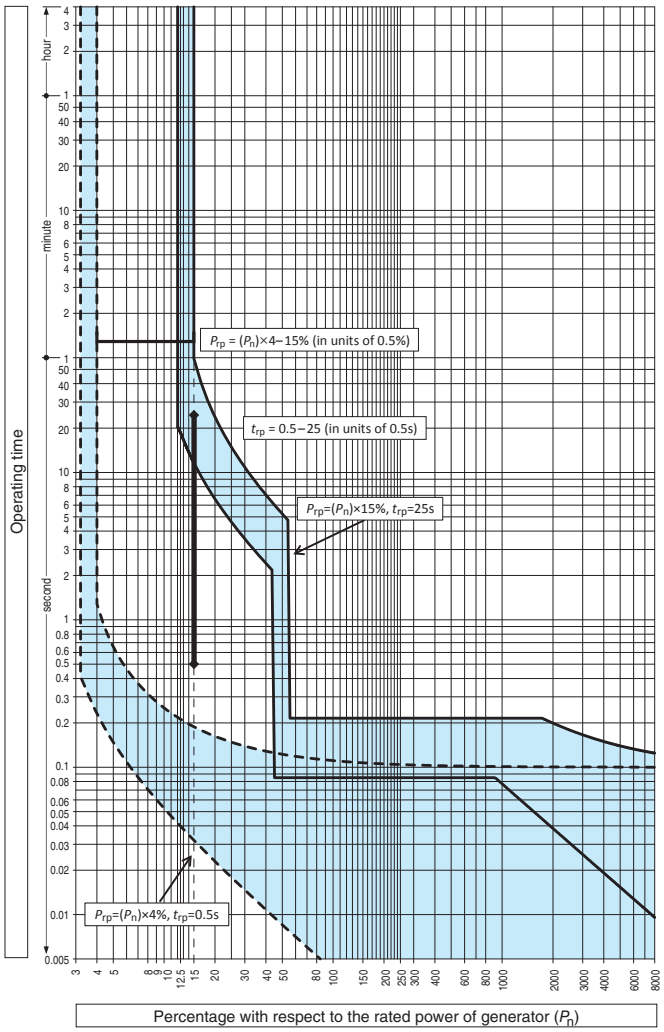
Percentage with respect to the rated current settings (I_n)

6 Specifications

Protection characteristics for smart type (AOX–LSIG+)

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

Reverse power protection charcteristics



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 ⓘ 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
Trip operation	Trip test	Self-hold
	Unbalance voltage protection (UNBV)	Self-hold
	Unbalance current protection (UNBC)	Self-hold
	Over voltage protecton (OV)	Self-hold
	Under voltage protection (UV)	Self-hold
	Ground fault protection (GF)	Self-hold
	Making current release (MCR)	Self-hold
	Instantaneous override trip (IO)	Self-hold
	Instantaneous trip (INST)	Self-hold
	Short time-delay trip (ST)	Self-hold
	Long time-delay trip (LT)	Self-hold
Operation of ACB	Protection function group B	Selectable from Self-hold/Auto-reset/Pulse
	ON operation of ACB	Selectable from Self-hold/Auto-reset/Pulse
	OFF operation of ACB	Selectable from Self-hold/Auto-reset/Pulse
Temporary motion restrain	Temporary stop of protection function ⑤	Selectable from Self-hold/Auto-reset/Pulse

Operation	Contact Output Types	Operational mode ①
Alarm output	Disconnection of N-phase	Selectable from Self-hold/Auto-reset/Pulse
	Malfunction of hardware	Selectable from Self-hold/Auto-reset/Pulse
	Abnormal temperature in OCR	Selectable from Self-hold/Auto-reset/Pulse
	Long time-delay trip pick up	Selectable from Self-hold/Auto-reset/Pulse
	Pretrip alarm 1	Selectable from Self-hold/Auto-reset/Pulse
	Pretrip alarm 2	Selectable from Self-hold/Auto-reset/Pulse
	Voltage drop of built-in battery	Selectable from Self-hold/Auto-reset/Pulse
	Alarm group ②	Selectable from Self-hold/Auto-reset/Pulse
	Custom alarm 1 to 12 ③	Selectable from Self-hold/Auto-reset/Pulse
	Contact temperature monitoring (OH)	Selectable from Self-hold/Auto-reset/Pulse
	Unbalance voltage protection (UNBV)	Selectable from Self-hold/Auto-reset/Pulse
	Unbalance current protection (UNBC)	Selectable from Self-hold/Auto-reset/Pulse
	Reverse power trip function (RP)	Selectable from Self-hold/Auto-reset/Pulse
	Over frequency protection (OF)	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

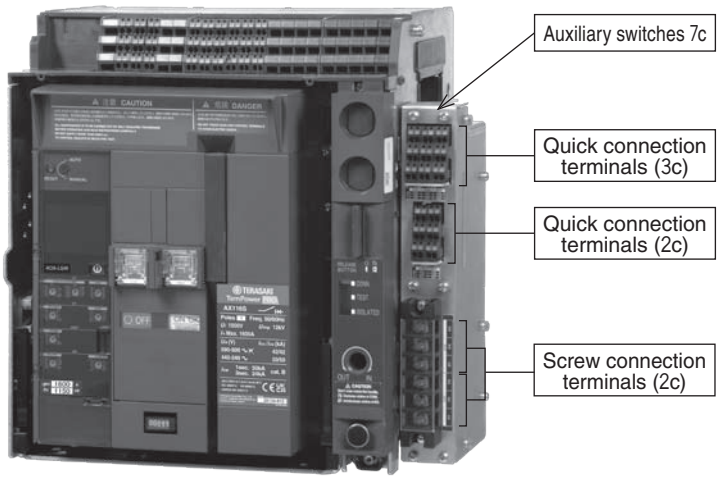
Auxiliary switches 7c

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.

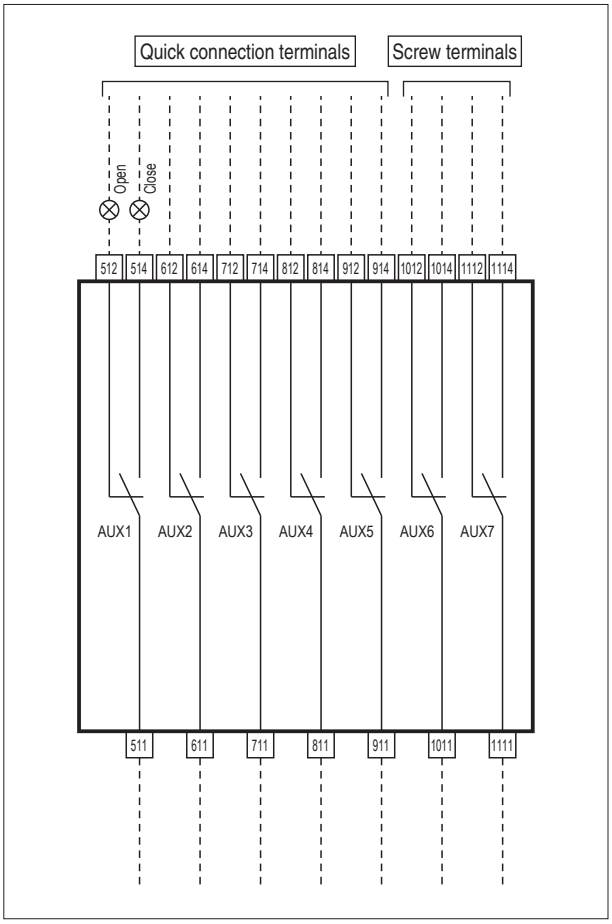
Ratings of auxiliary switch 7c

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



Wiring diagram and terminal number for Auxiliary switch 7c



6 Specifications

Key lock (Lock in OFF)

Device that locks the ACB in the open 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.

* Two types of keys are available: Cylinder and Castell. (selecting a key other than Cylinder, ensure the key is available)

OFF padlock

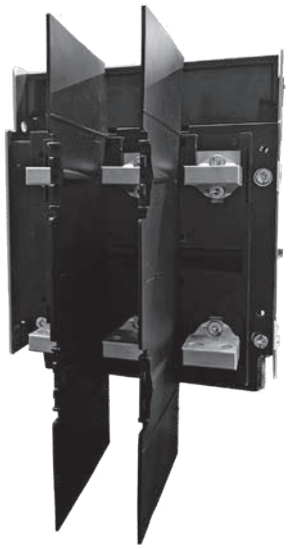
Used to lock the ACB in the open position.
Up to three padlocks with a ø6 hasp can be used.
Padlocking is possible only when the ON–OFF indicator shows OFF.

* 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.

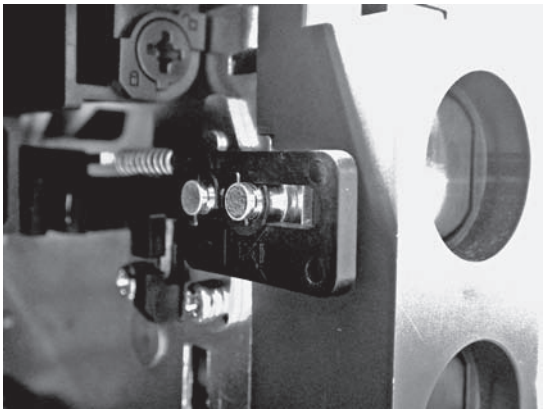
*1 : Interpole-barrier can not be fitted with Conductive adapter.
*2 : Cannot be used for AX120S and AX120H.

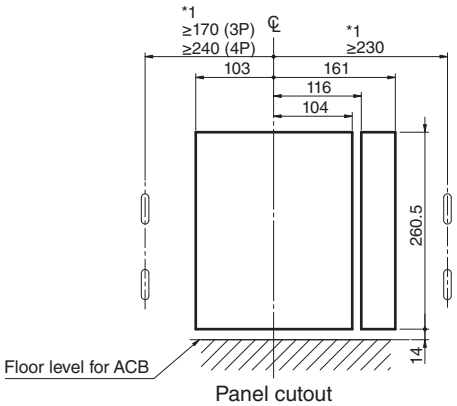


Racking interlock

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.





Panel cutout

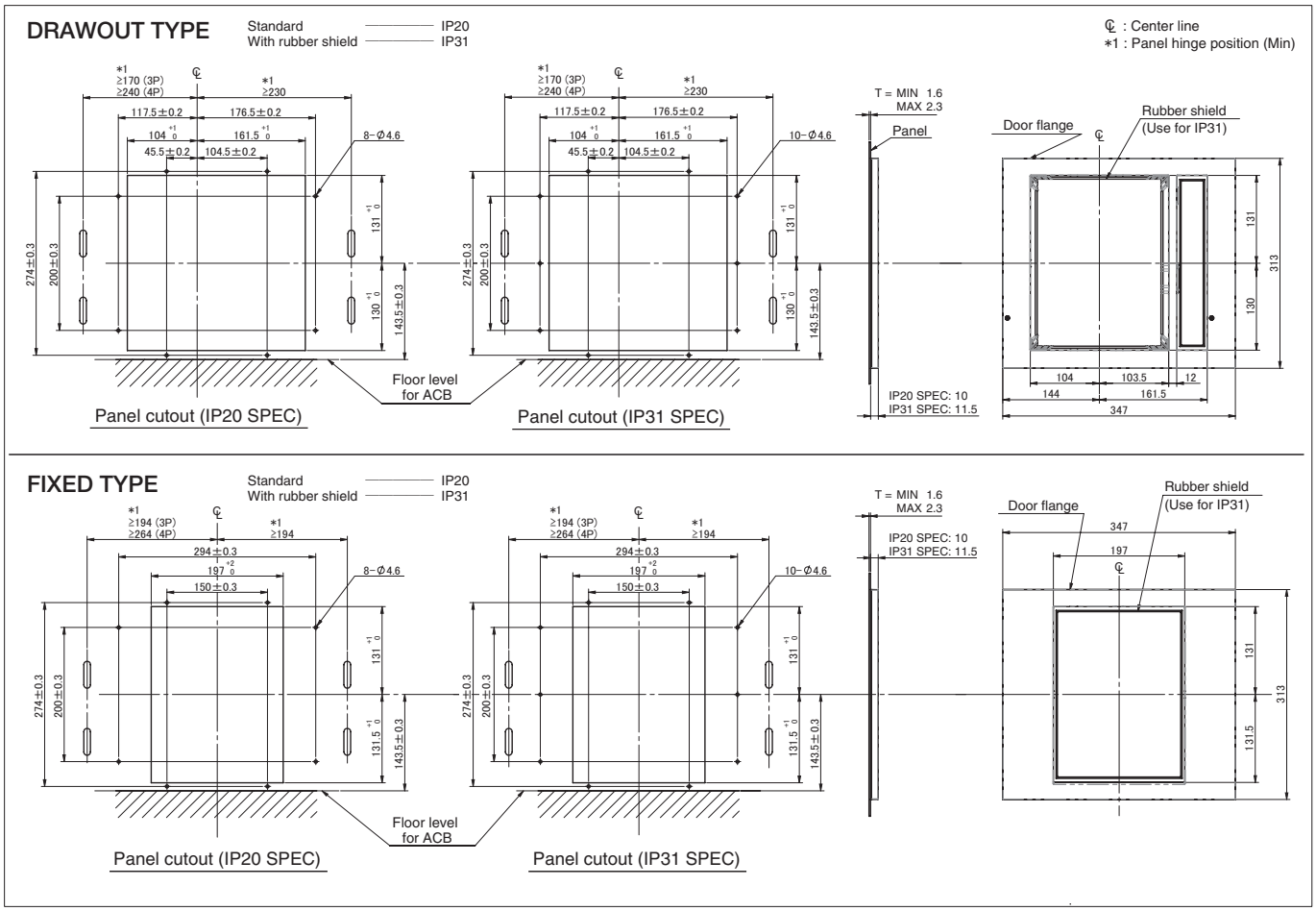
℄ : Center line
*1 : Panel hinge position (Min)

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.

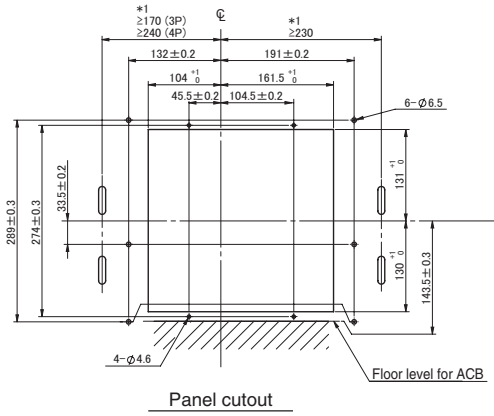


6 Specifications

IP cover

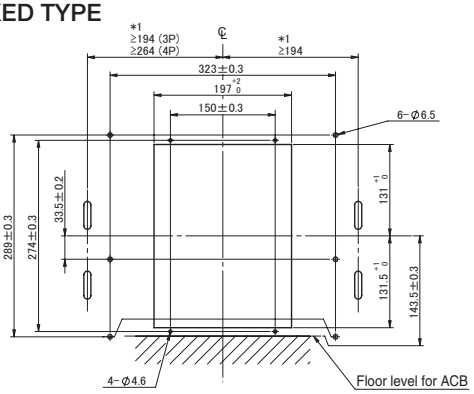
This is a left-opening front protection cover that provides IP55 protection compliant with EC60529 standards.
The IP cover can be installed, even if the ACB is in the ISOLATED position.
Note: 1) Contact TERASAKI to use in combination with a door interlock.
Note: 2) Cannot be fitted with door flange.

DRAWOUT TYPE



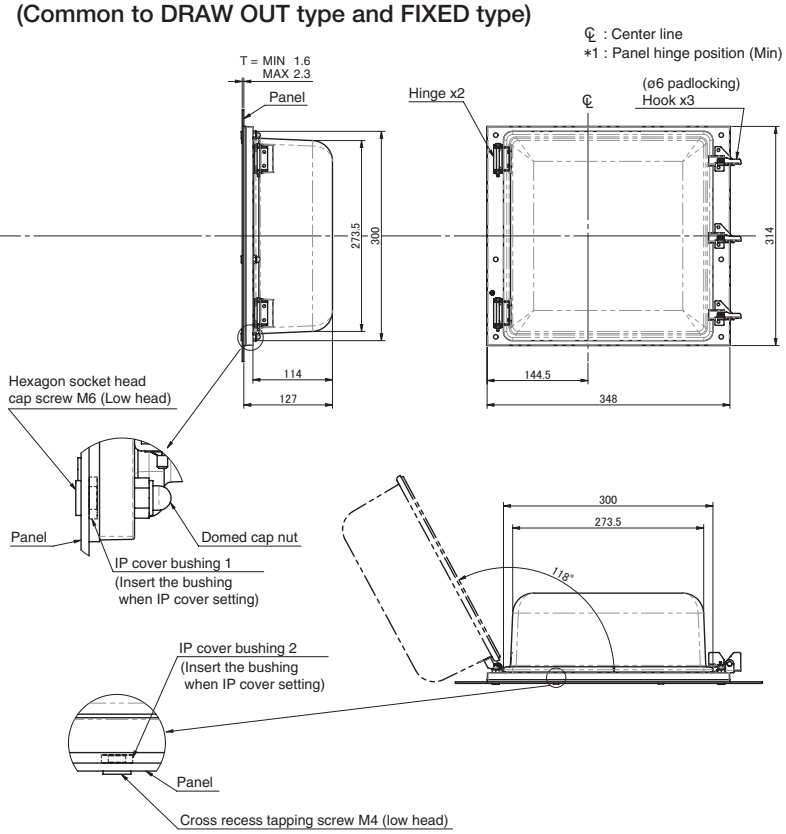
Panel cutout

FIXED TYPE



Panel cutout

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



Sensor for neutral line

This is an externally connected current sensor that provides N-phase protection or Ground fault trip 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 horizontal.
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

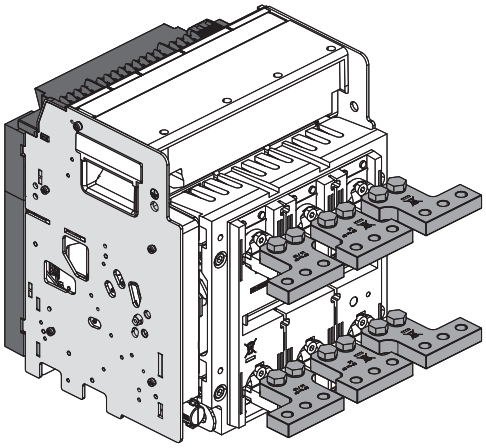
Module that connects a smart type over-current release, continuously-rated shunt trip device and latch release coil, to issue trip commands or closing commands to an ACB via communication module.
＊Select the devices (Continuously-rated shunt trip device, Continuously-rated shunt trip device2 and Latch release coil) to operate by Remote command module for the order.

Conductive adapter

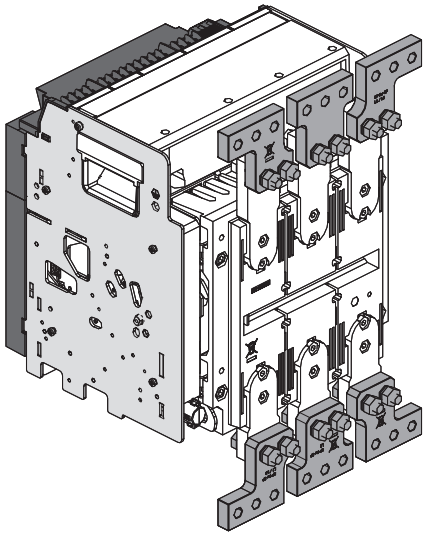
Connection conversion adapter for horizontal terminals and front terminals. Two types are available: horizontal extension adapter and vertical extension adapter. They can be used for both draw-out type and fixed type ACBs.

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

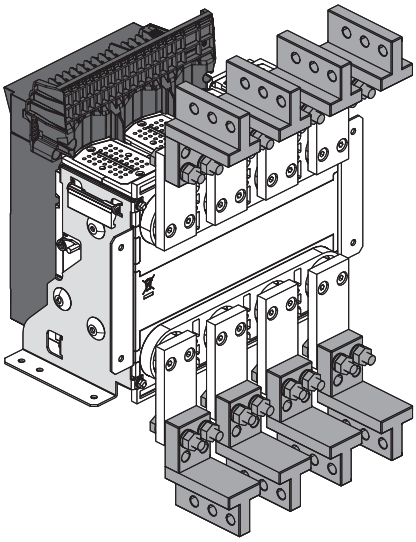
① : When using a conductive adapter with a fixed type ACB, always use an arc shield in the case of connection example 2.



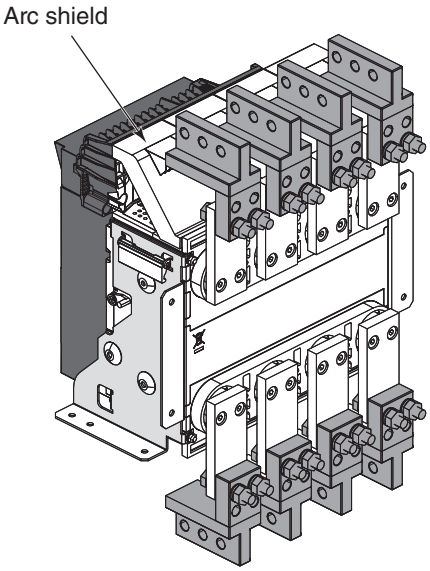
[AZX-1TH Draw-out type, horizontal terminals]



[AZX-1TH Draw-out type, front terminals]



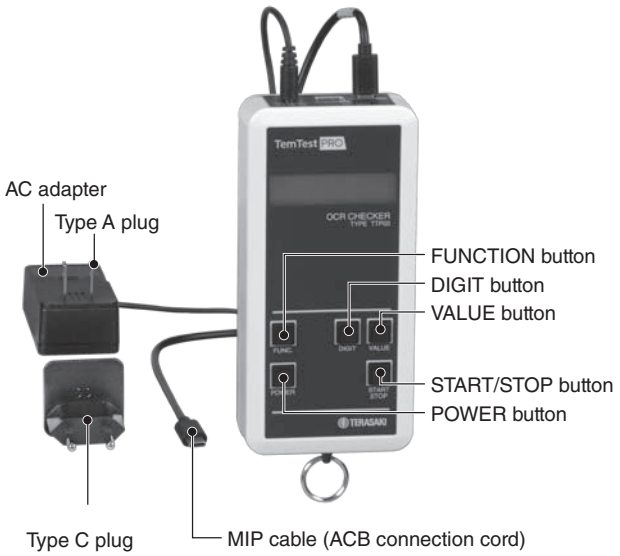
[AZX-1F Fixed-type, connection example1]



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

6 Specifications

OCR checker (TTP00)



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)

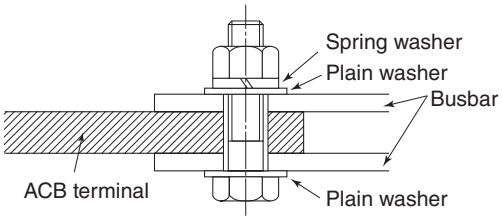
Operating temperature Max. permissible operating temperature +40°C, Min. permissible operating temperature –25°C

Anti-corrosion treatment

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

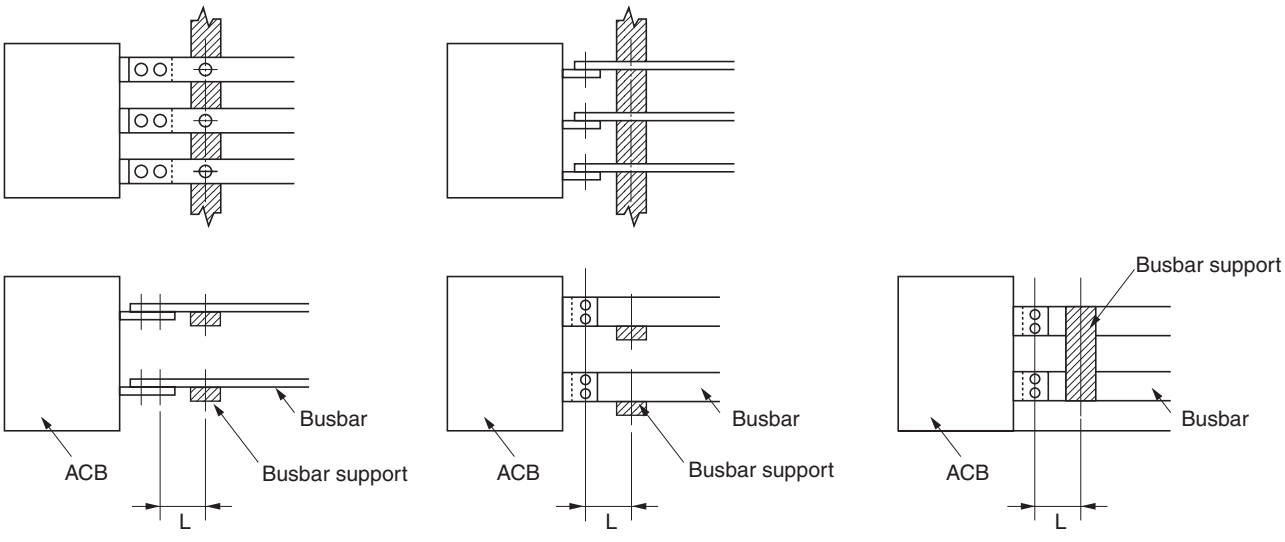
9 Busbars connection

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.



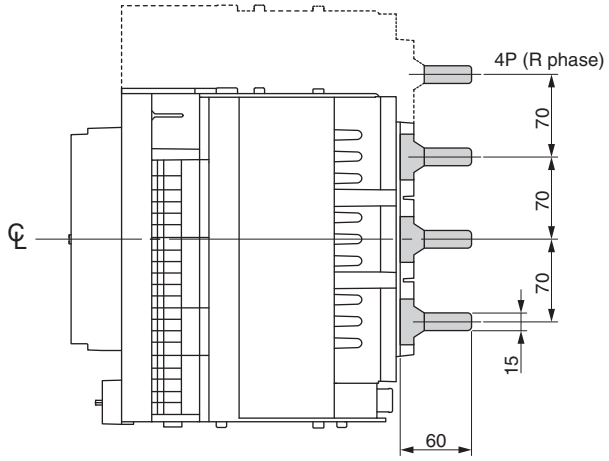
Horizontal terminals　　Vrtical terminals　　Vrtical terminals

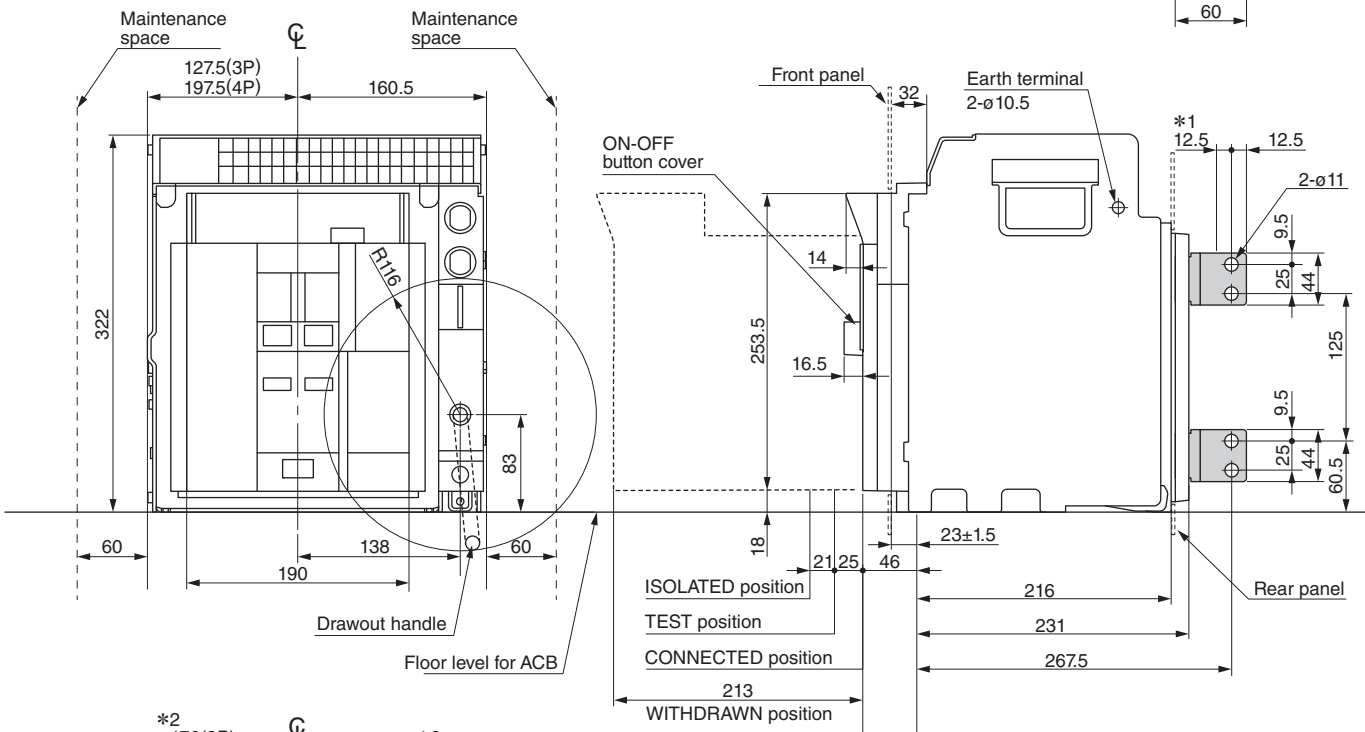
The maximum distance “L” of the connection point of ACB to first basbur support should be 300mm.

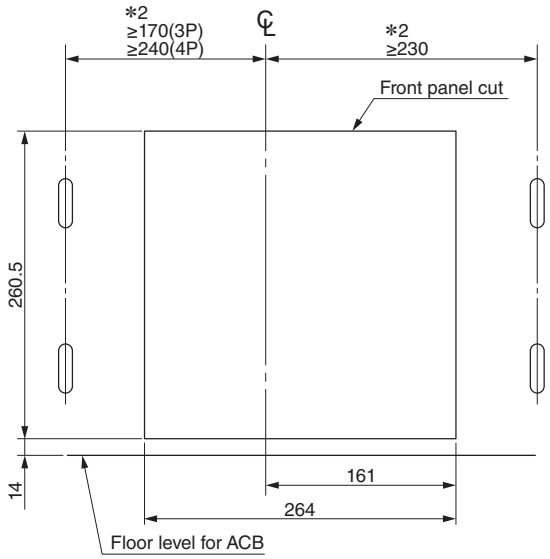
7 Outline Dimensions

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

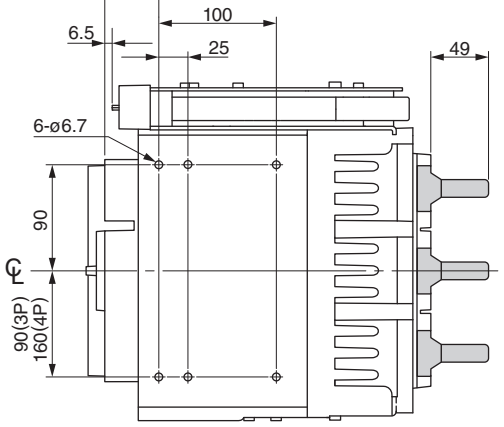
℄ : Center line
∗1 : Conductor overlap. (Max)
∗2 : Panel hinge position (Min)
∗3 : For 4-pole breakers, the position of the N-pole terminal is on the right side when viewing the front of the ACB.



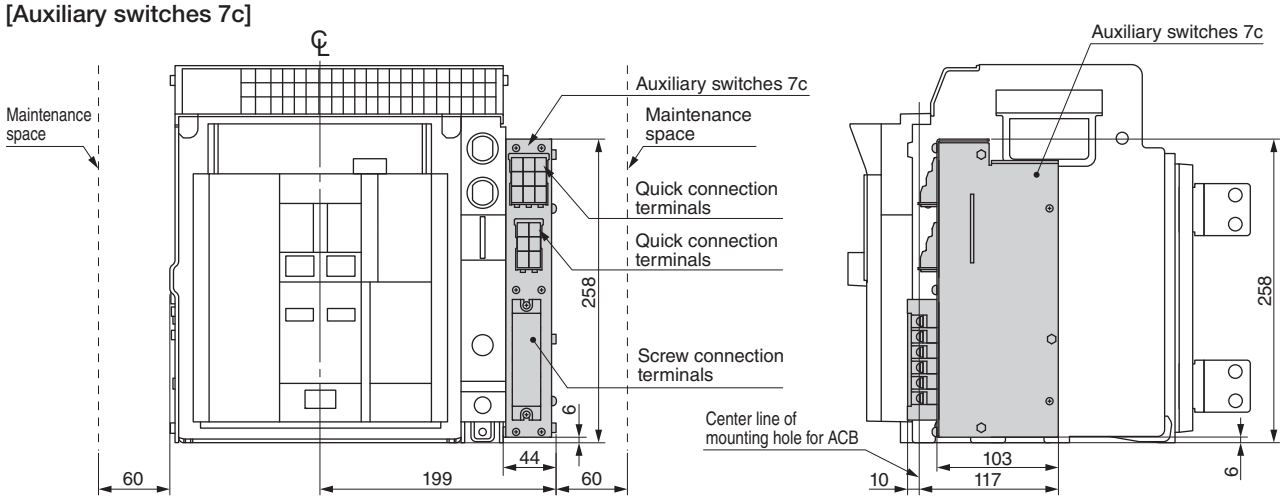


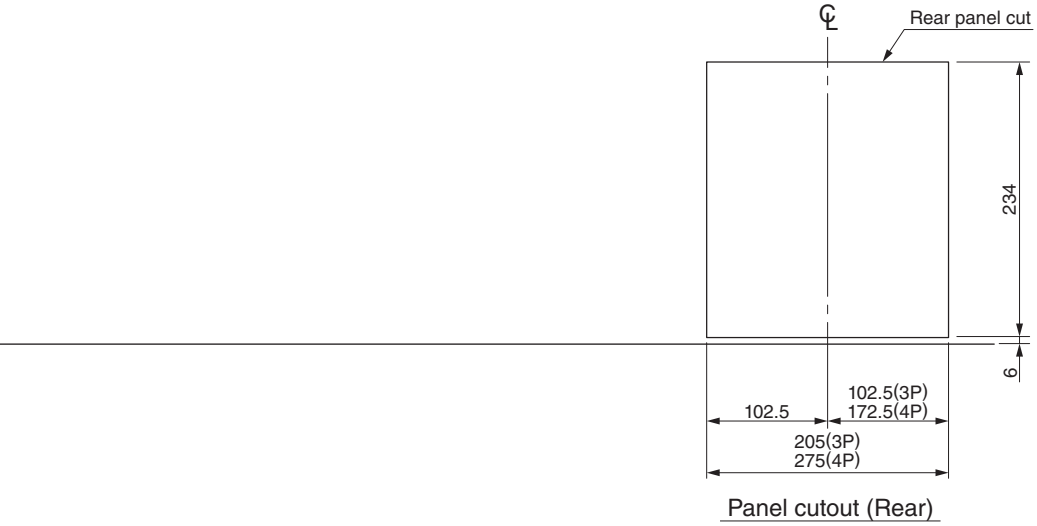


Panel cutout (Front)



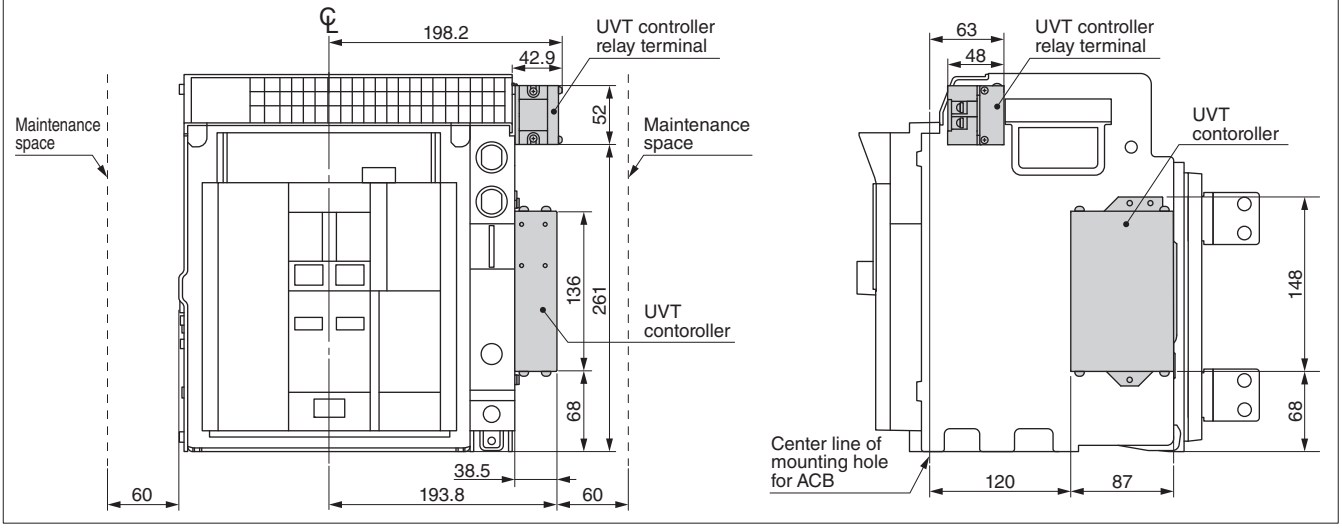
[Auxiliary switches 7c]





Panel cutout (Rear)

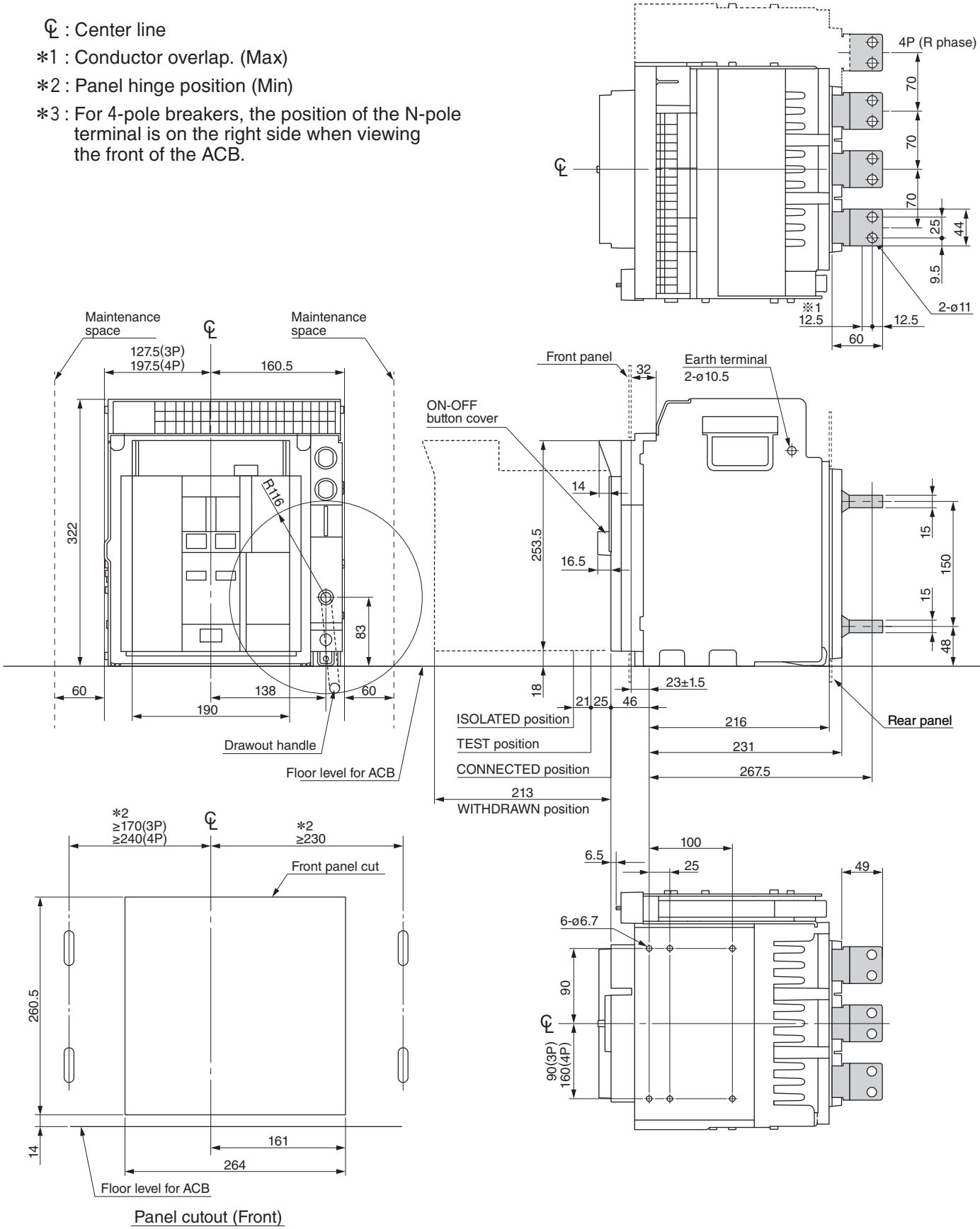
[With undervoltage trip device (time delay tripping type)]



7 Outline Dimensions

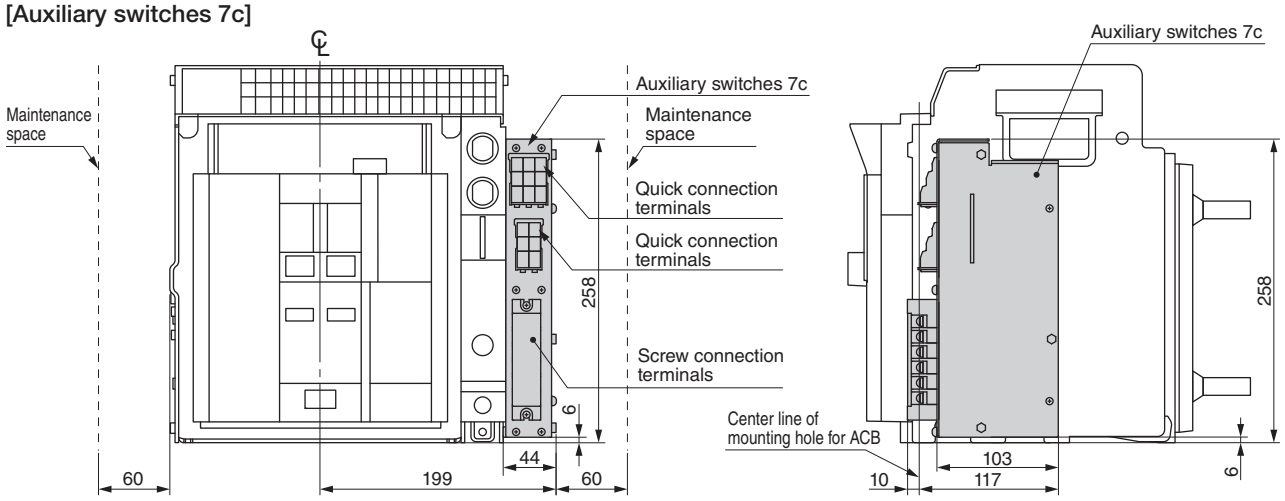
● Types **AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H, AX106D, AX108D, AX110D, AX112D, AX116D** } DRAW-OUT TYPE Horizontal terminals

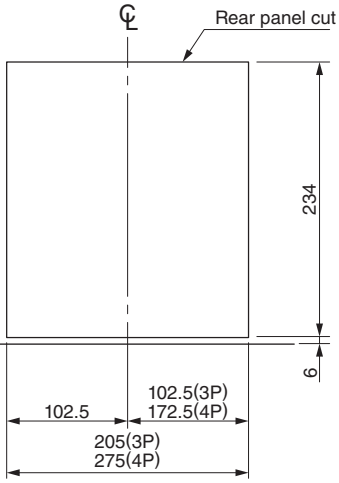
℄ : Center line
∗1 : Conductor overlap. (Max)
∗2 : Panel hinge position (Min)
∗3 : For 4-pole breakers, the position of the N-pole terminal is on the right side when viewing the front of the ACB.



Panel cutout (Front)

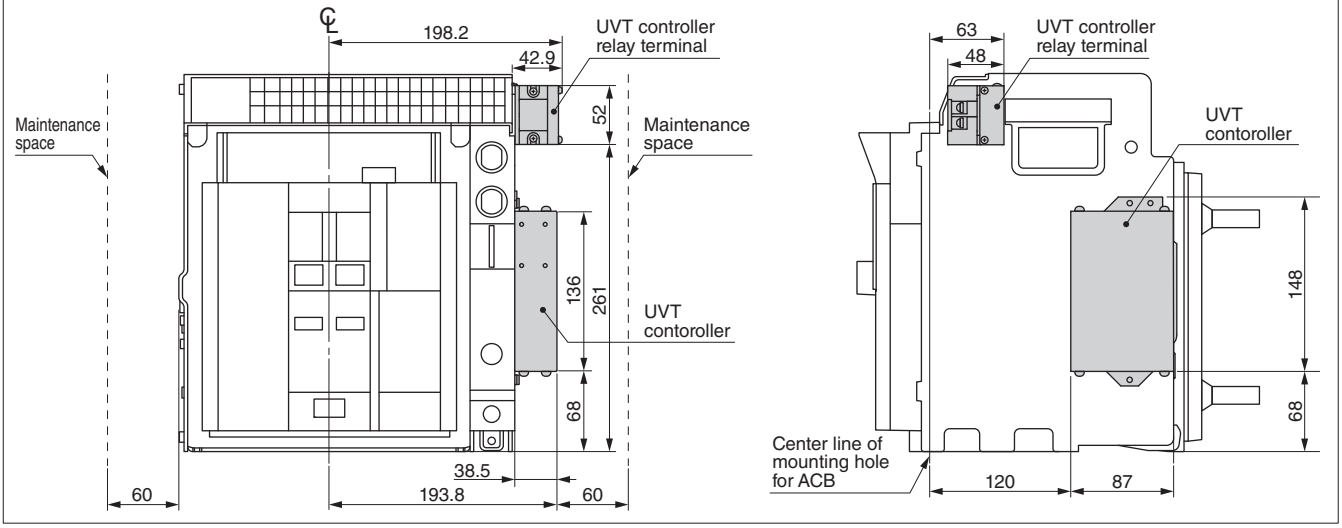
[Auxiliary switches 7c]





Panel cutout (Rear)

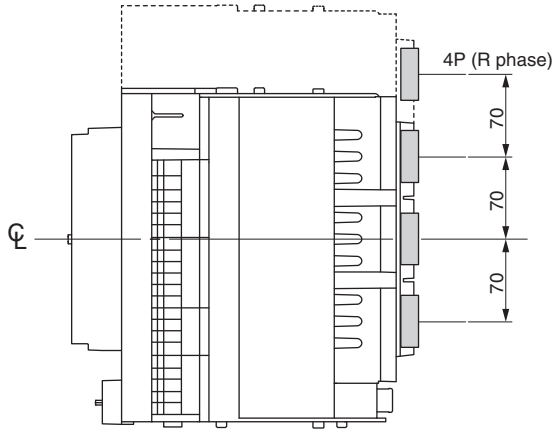
[With undervoltage trip device (time delay tripping type)]

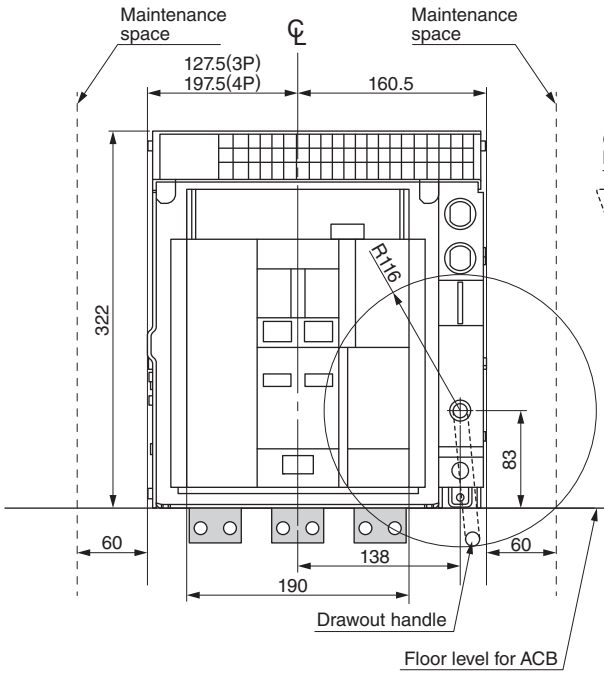


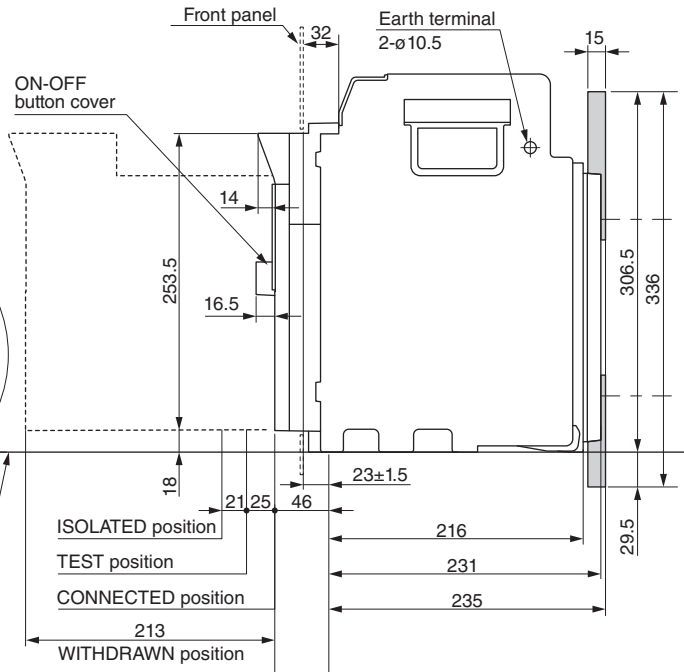
7 Outline Dimensions

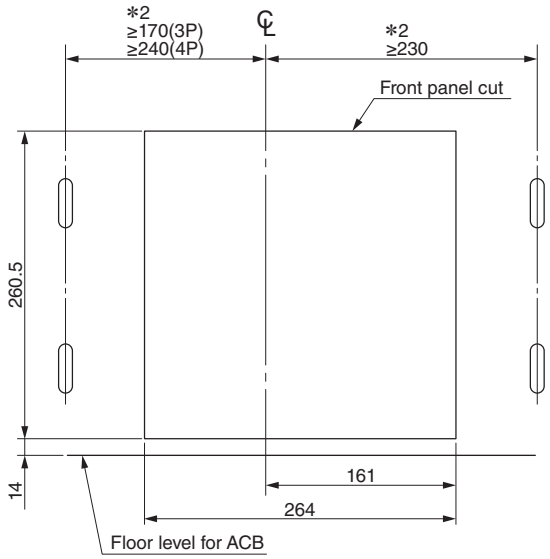
● Types **AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H, AX106D, AX108D, AX110D, AX112D, AX116D** } DRAW-OUT TYPE Front connections

℄ : 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.

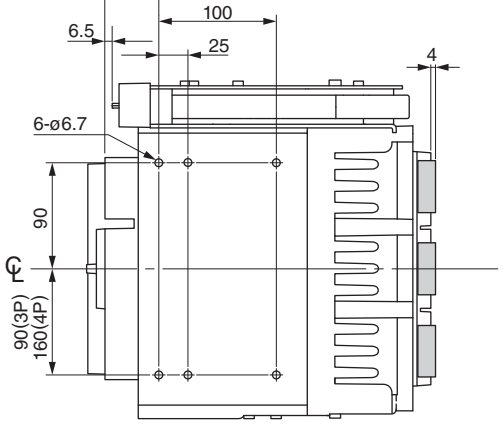




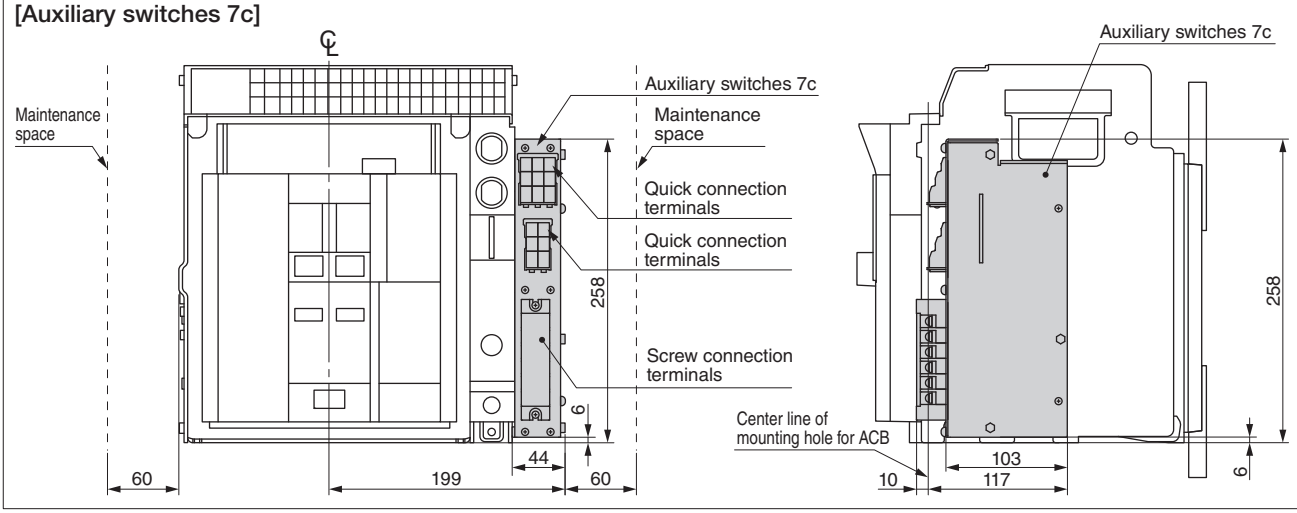


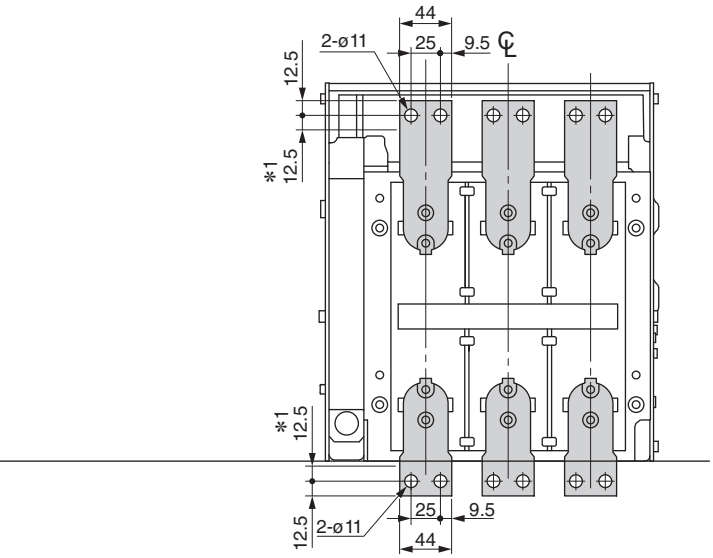


Panel cutout (Front)

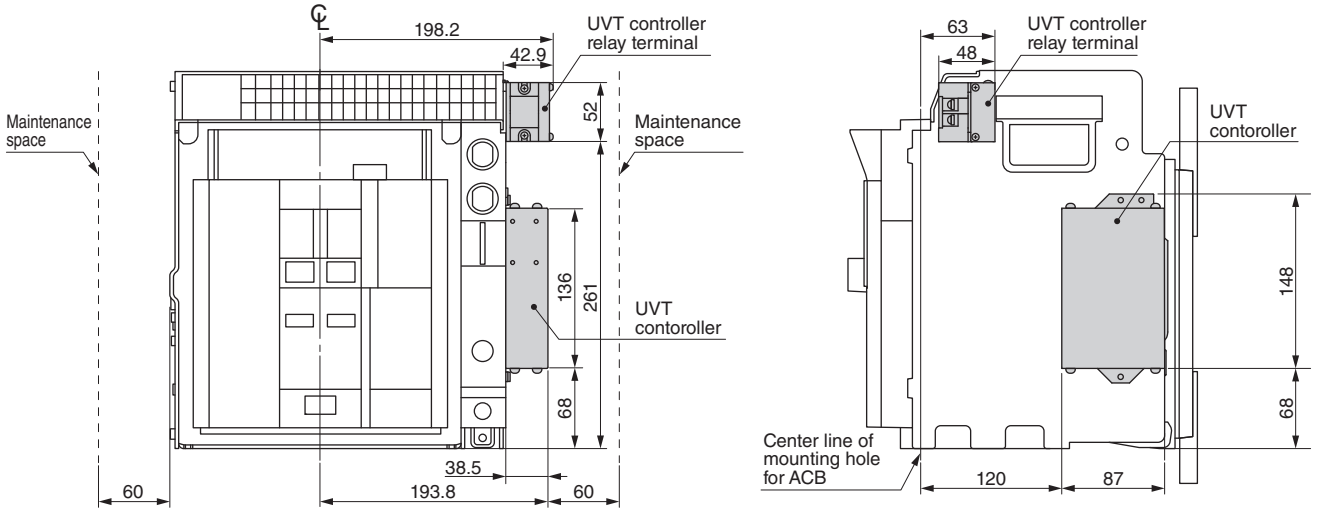


[Auxiliary switches 7c]





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



7 Outline Dimensions

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

℄ : Center line

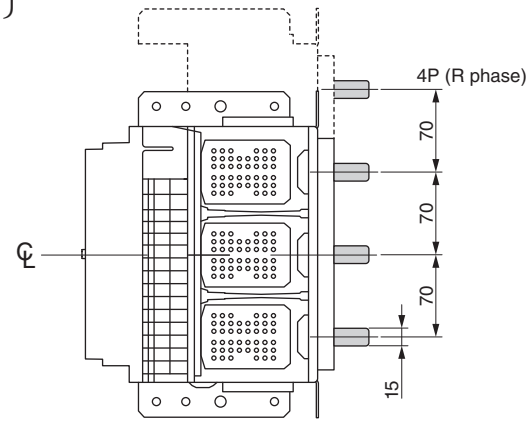
∗1 : Conductor overlap. (Max)

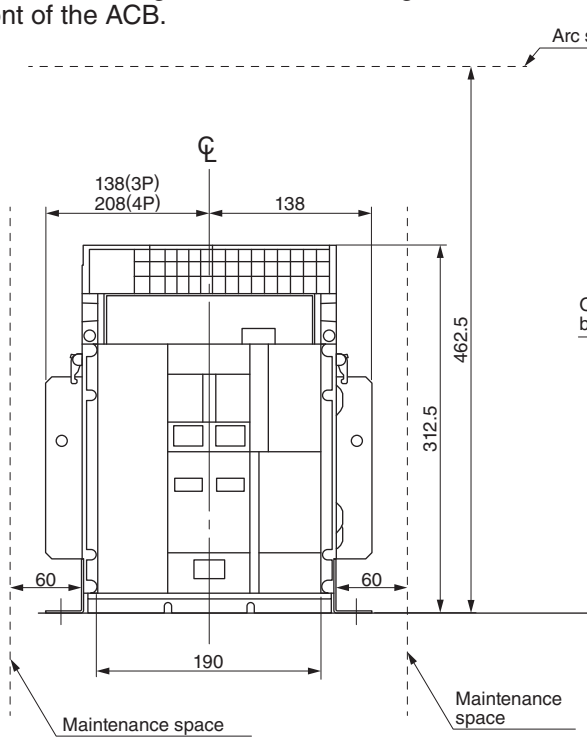
∗2 : Panel hinge position (Min)

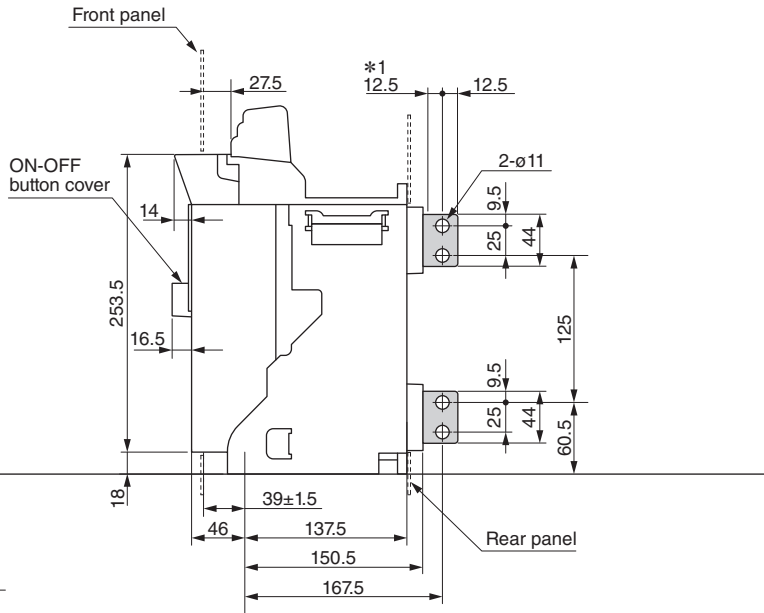
∗3 : Only use an earth terminal on either the bottom or rear surfaces.

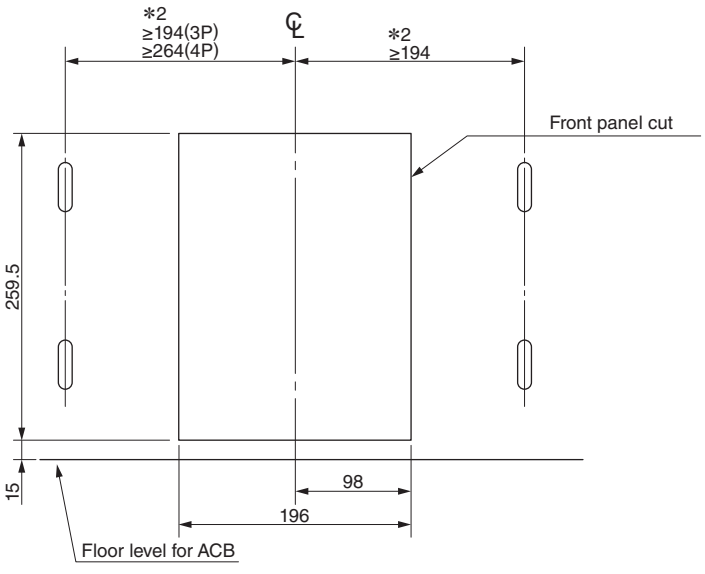
∗4 : To use an earth terminal (rear), a ø9 hole must be machined.

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

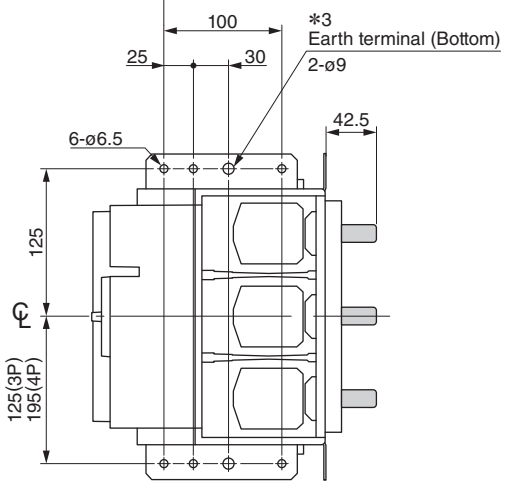


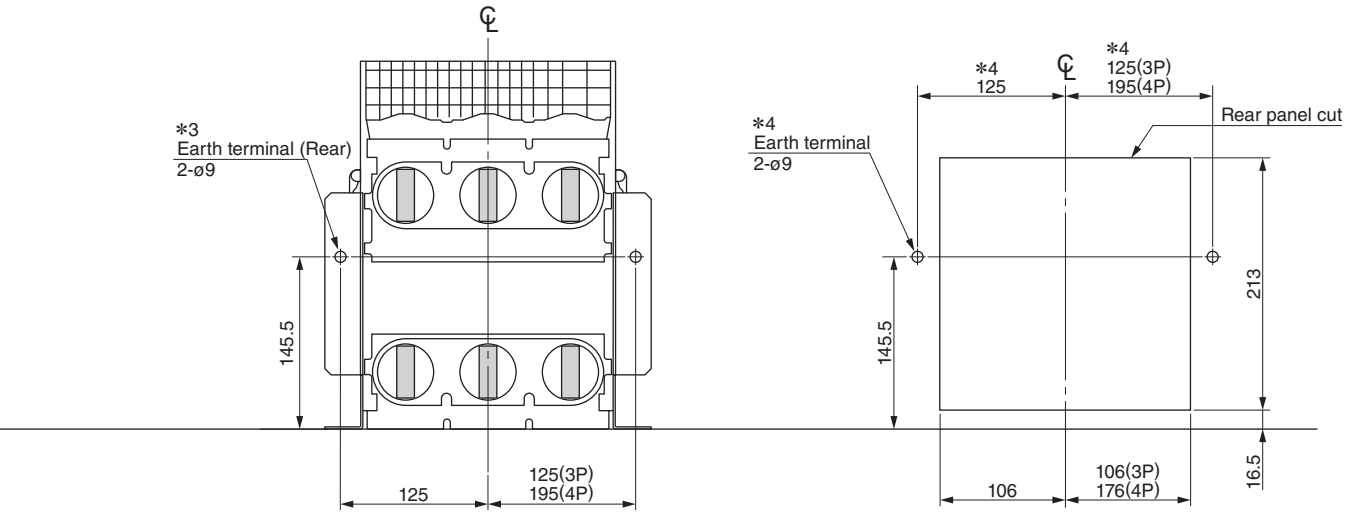






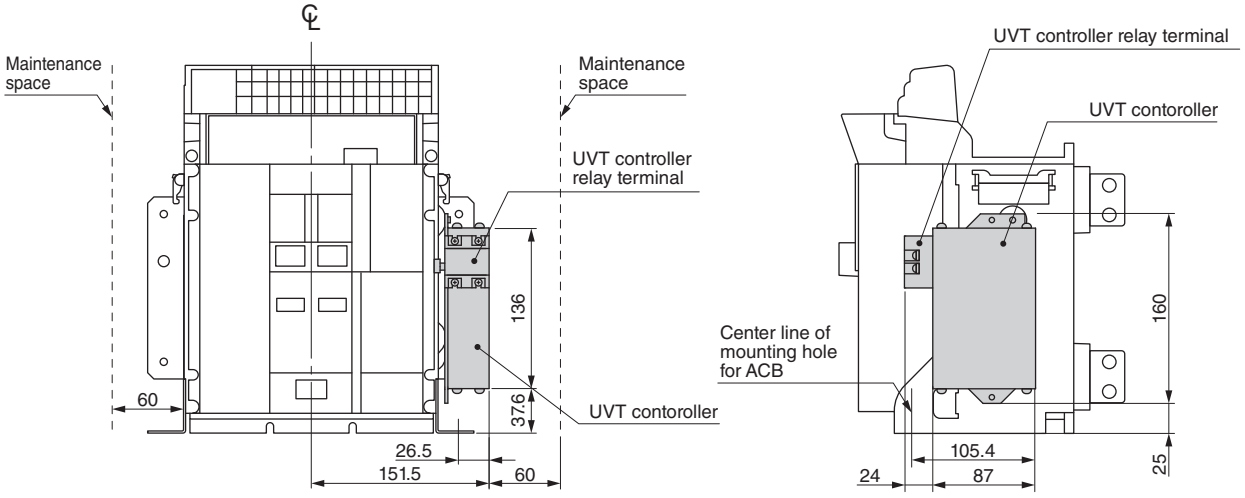
Panel cutout (Front)





Panel cutout (Rear)

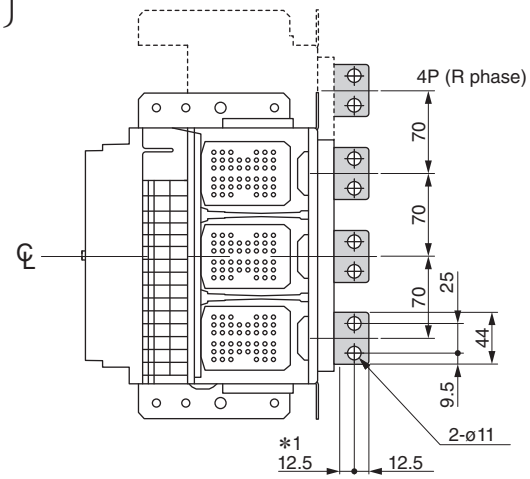
[With undervoltage trip device (time delay tripping type)]

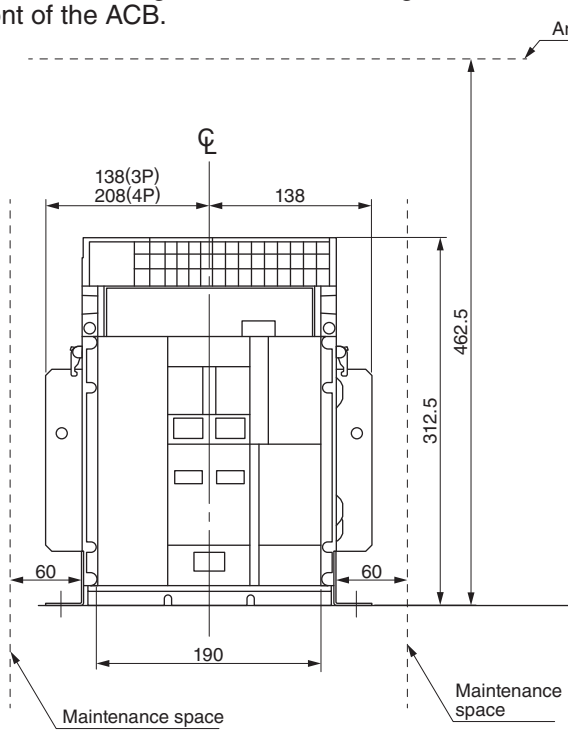


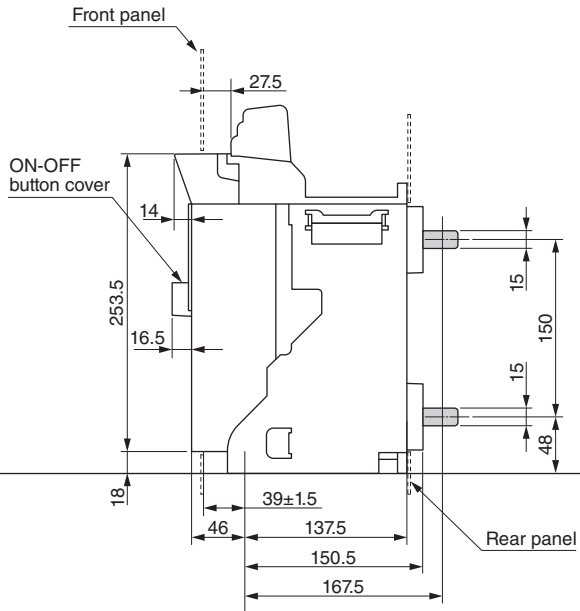
7 Outline Dimensions

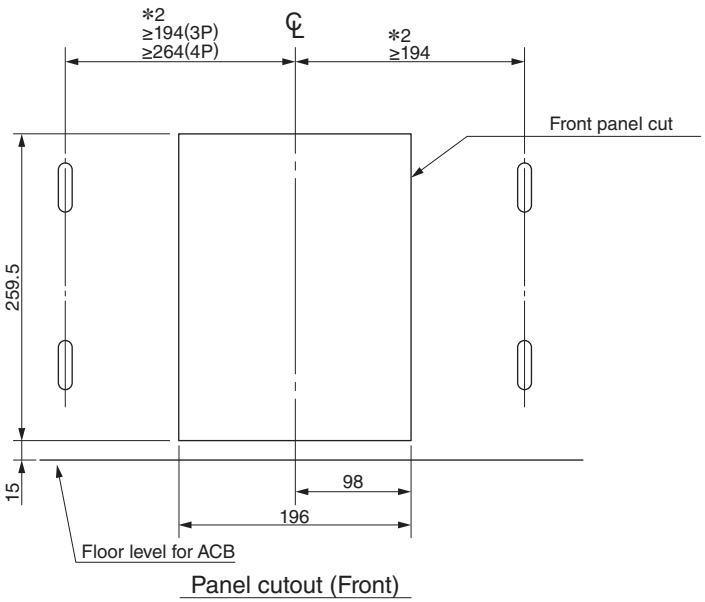
● Types **AX106S, AX108S, AX110S, AX112S, AX116S, AX106H, AX108H, AX110H, AX112H, AX116H, AX106D, AX108D, AX110D, AX112D, AX116D** } FIXED TYPE Horizontal terminals

℄ : 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.

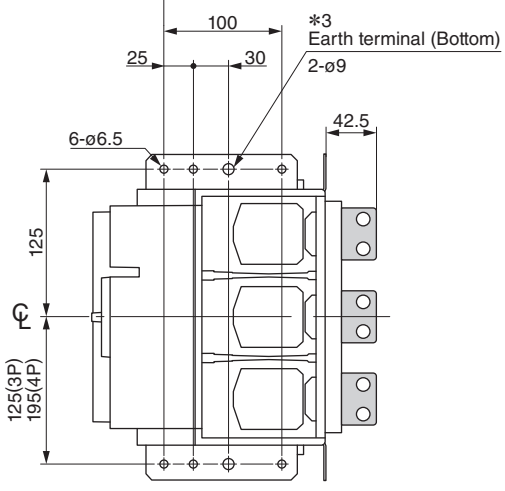


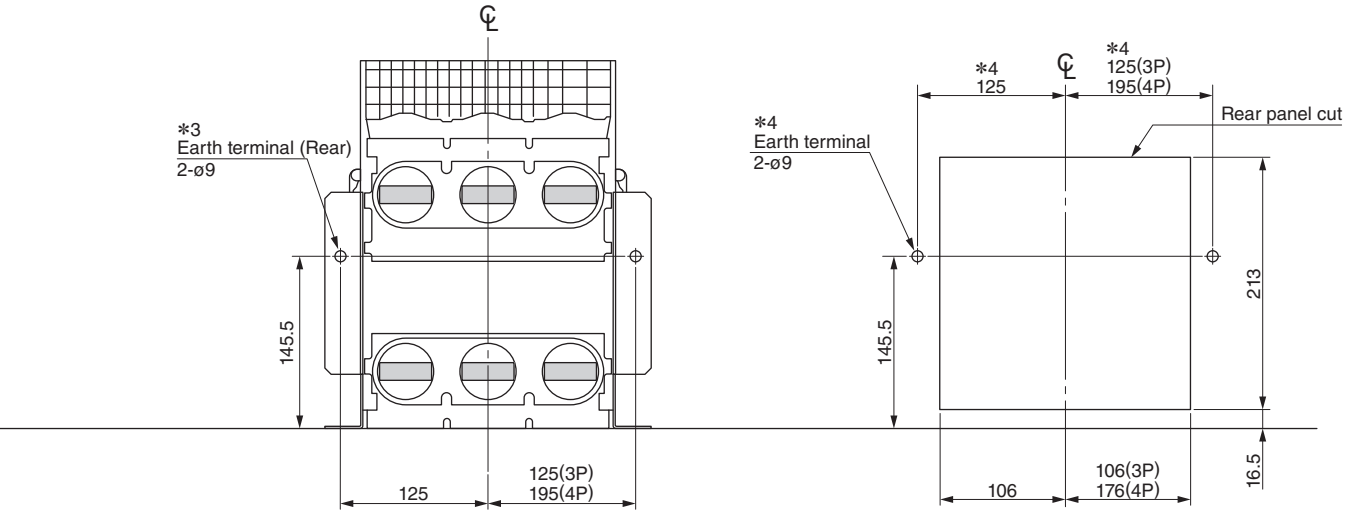






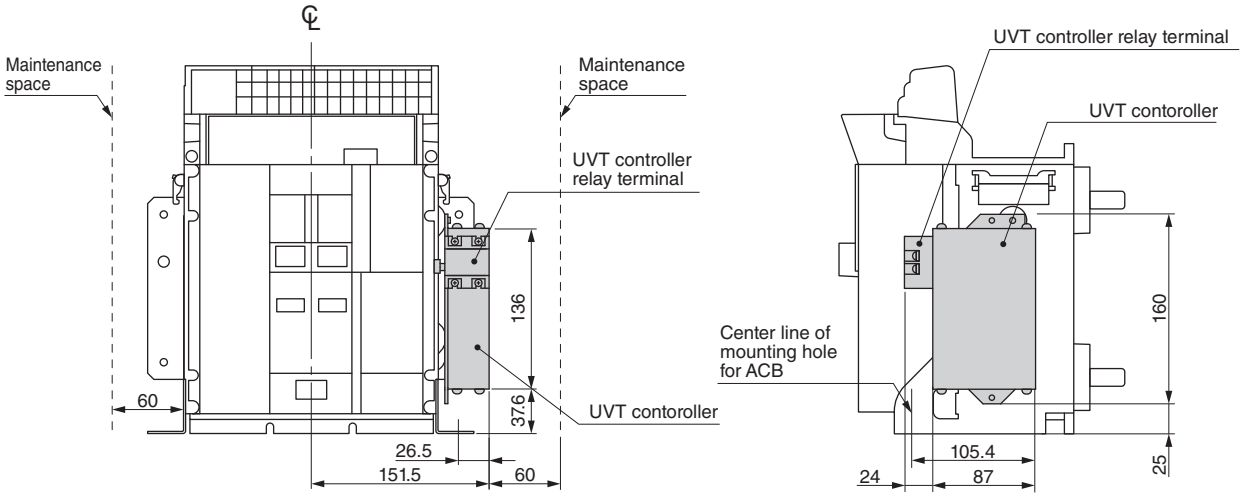
Panel cutout (Front)





Panel cutout (Rear)

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



7 Outline Dimensions

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

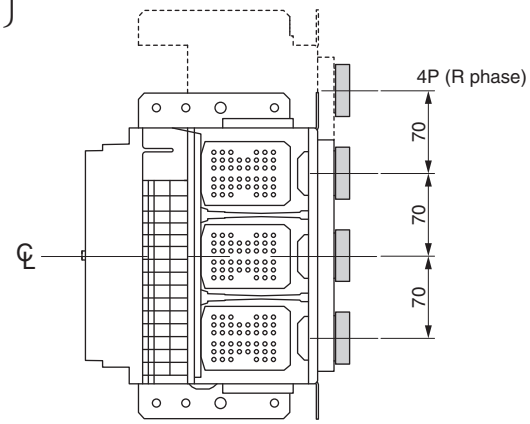
℄ : Center line

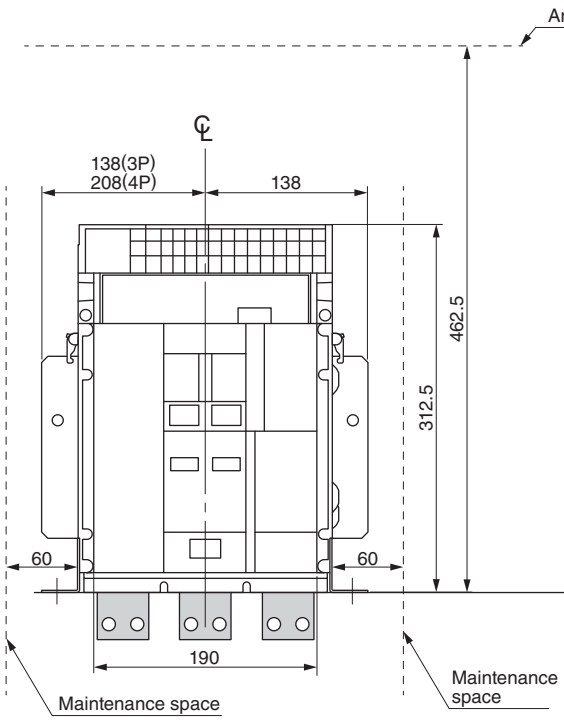
∗1 : Conductor overlap. (Max)

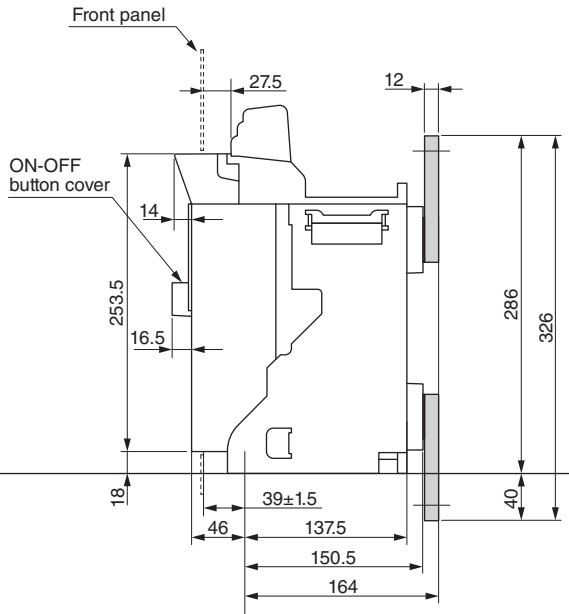
∗2 : Panel hinge position (Min)

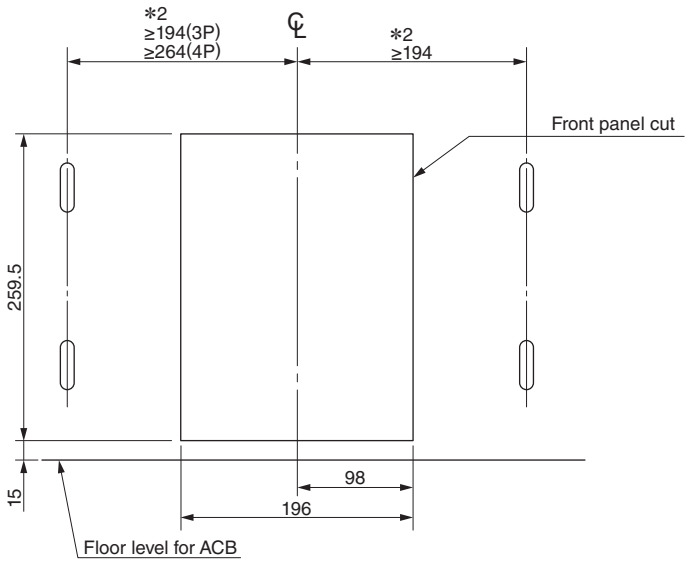
∗3 : Only use an earth terminal on either the bottom or rear surfaces.

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

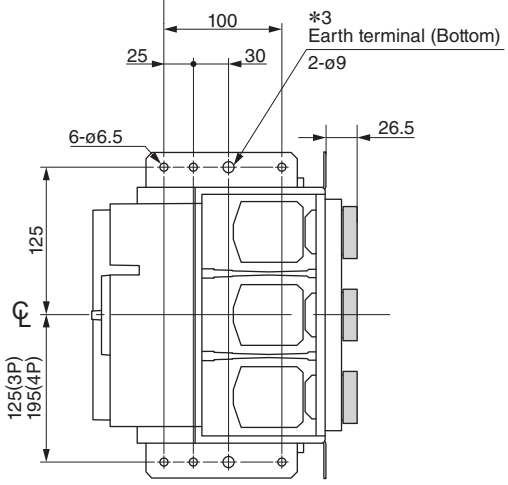


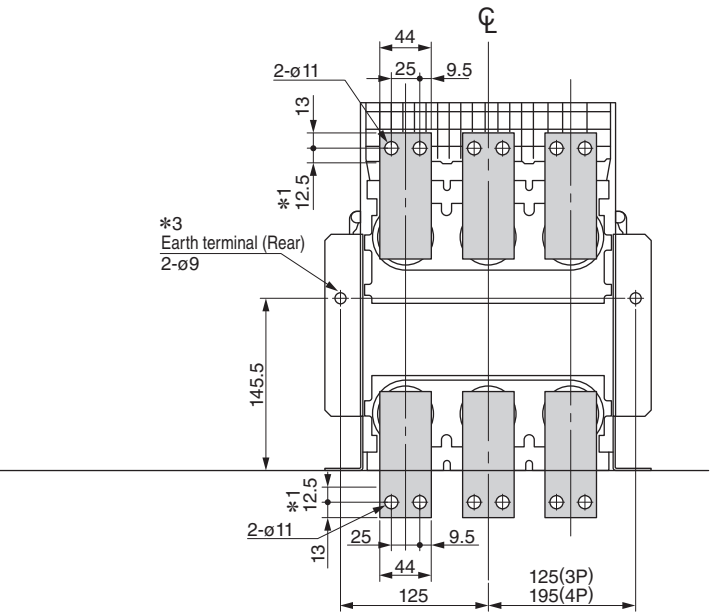




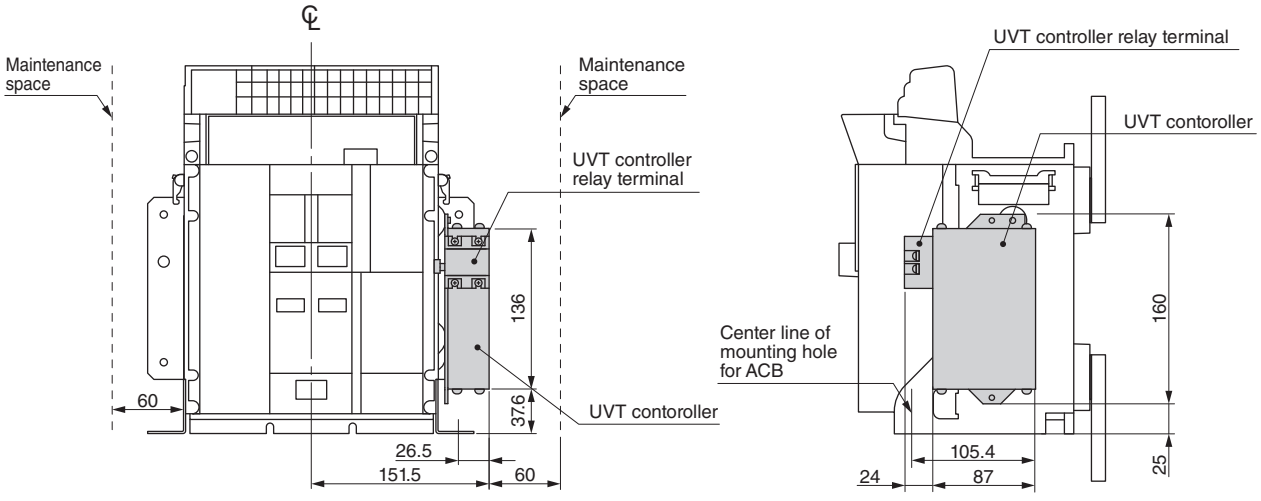


Panel cutout (Front)





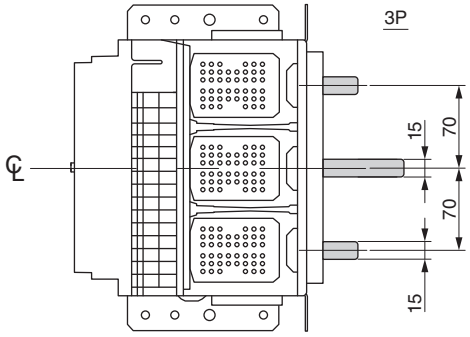
[With undervoltage trip device (time delay tripping type)]

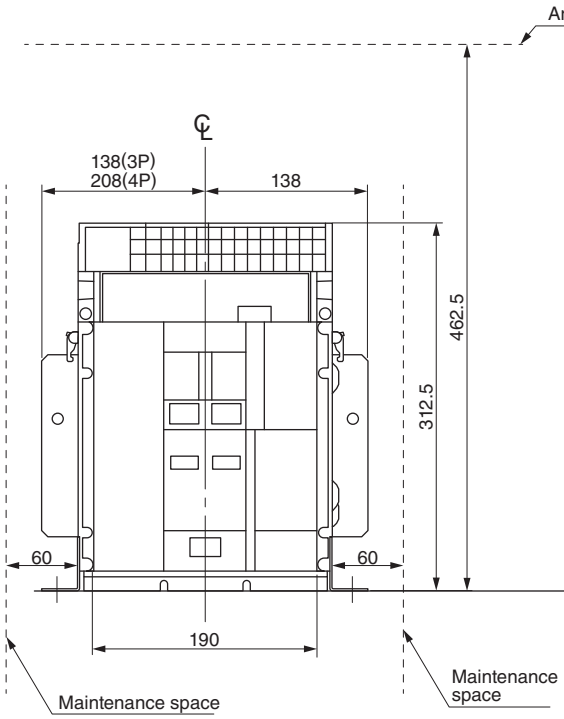


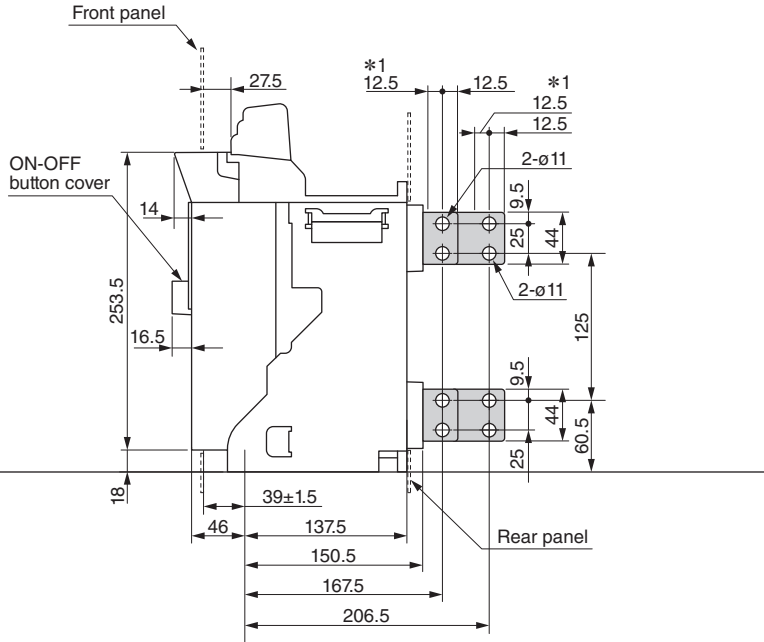
7 Outline Dimensions

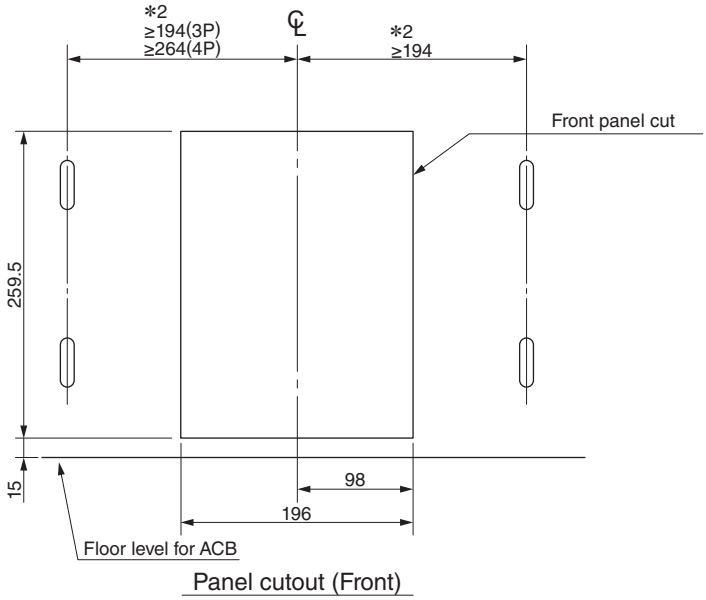
● Types AX120S, AX120H

℄ : 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.

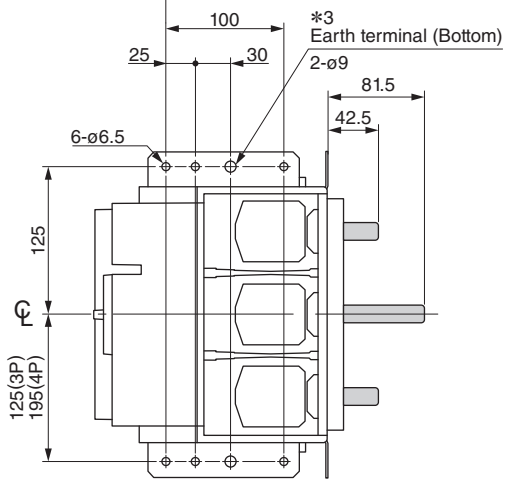


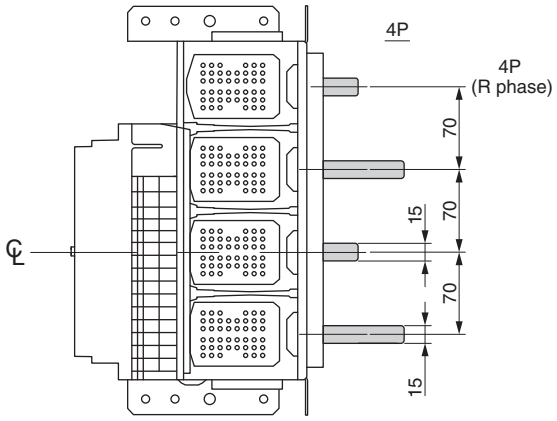


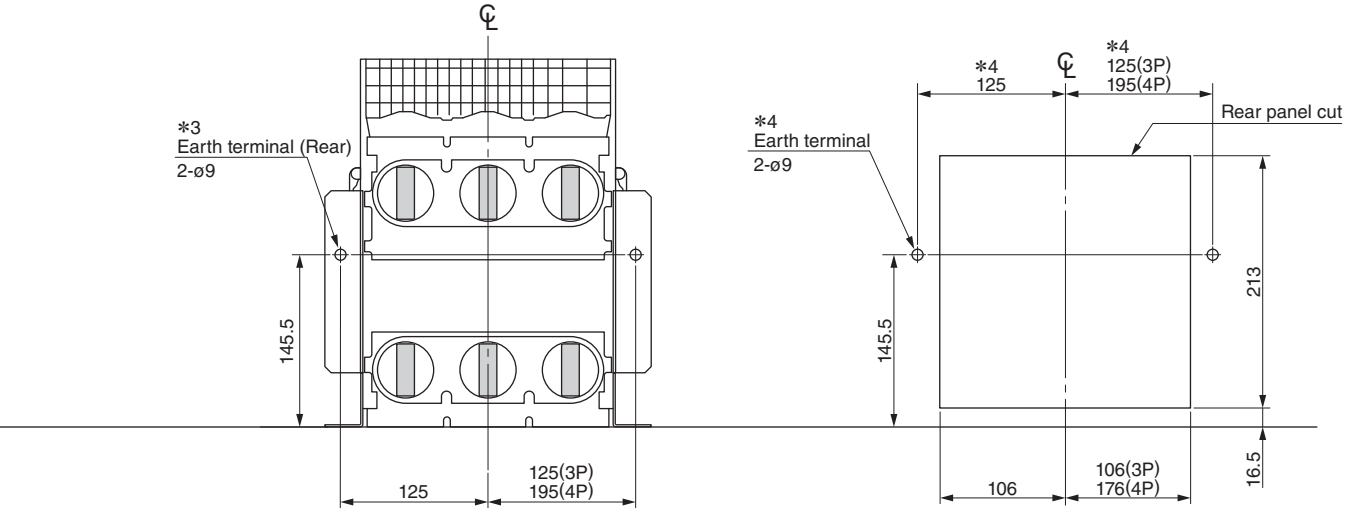




Panel cutout (Front)

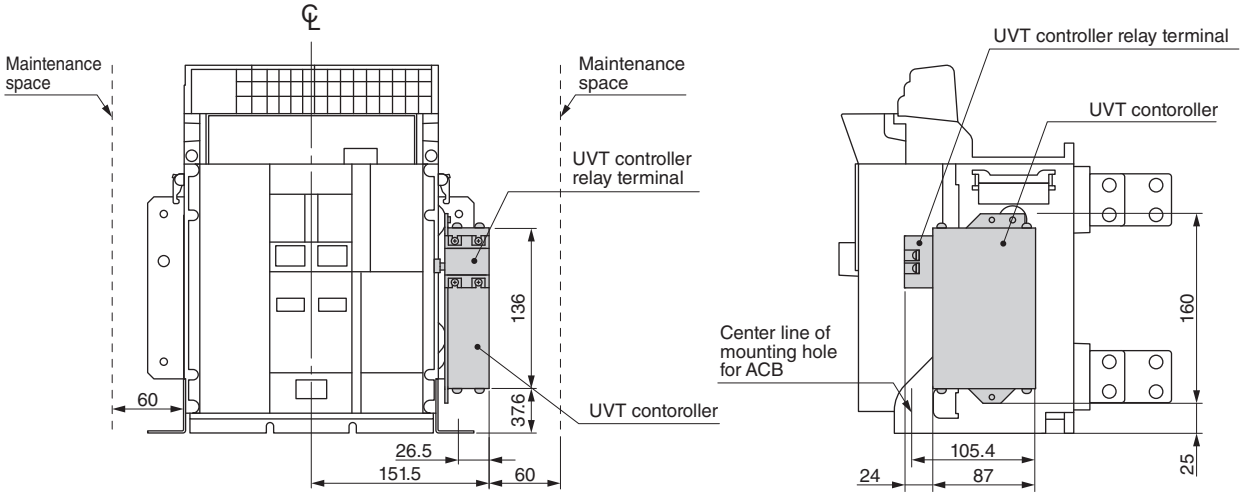




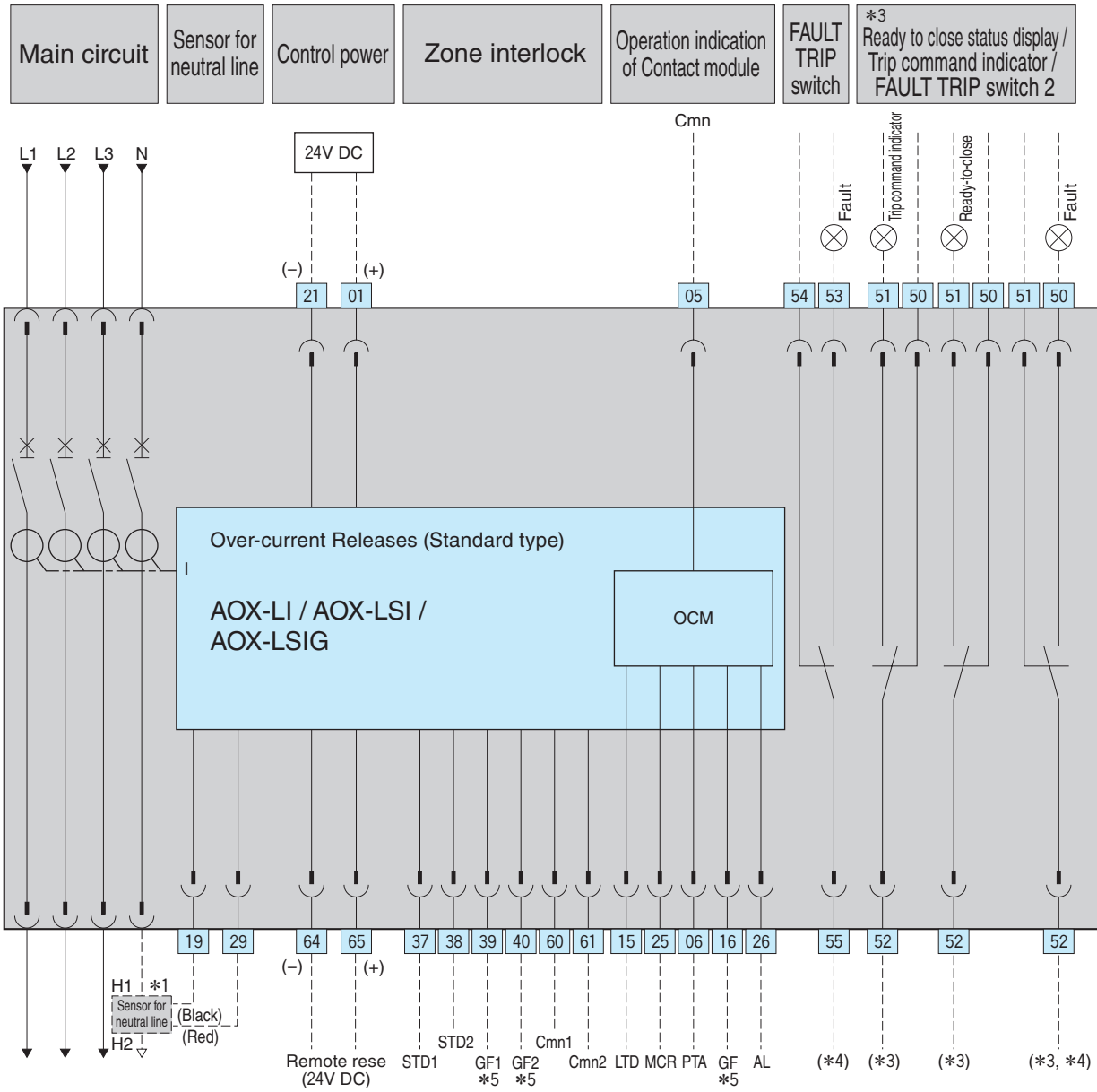


Panel cutout (Rear)

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



8 Circuit Diagram (AOX-LI, LSI, LSIG)



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)

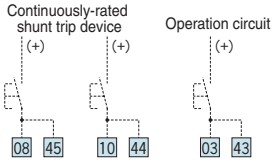
Symbols for accessories

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)

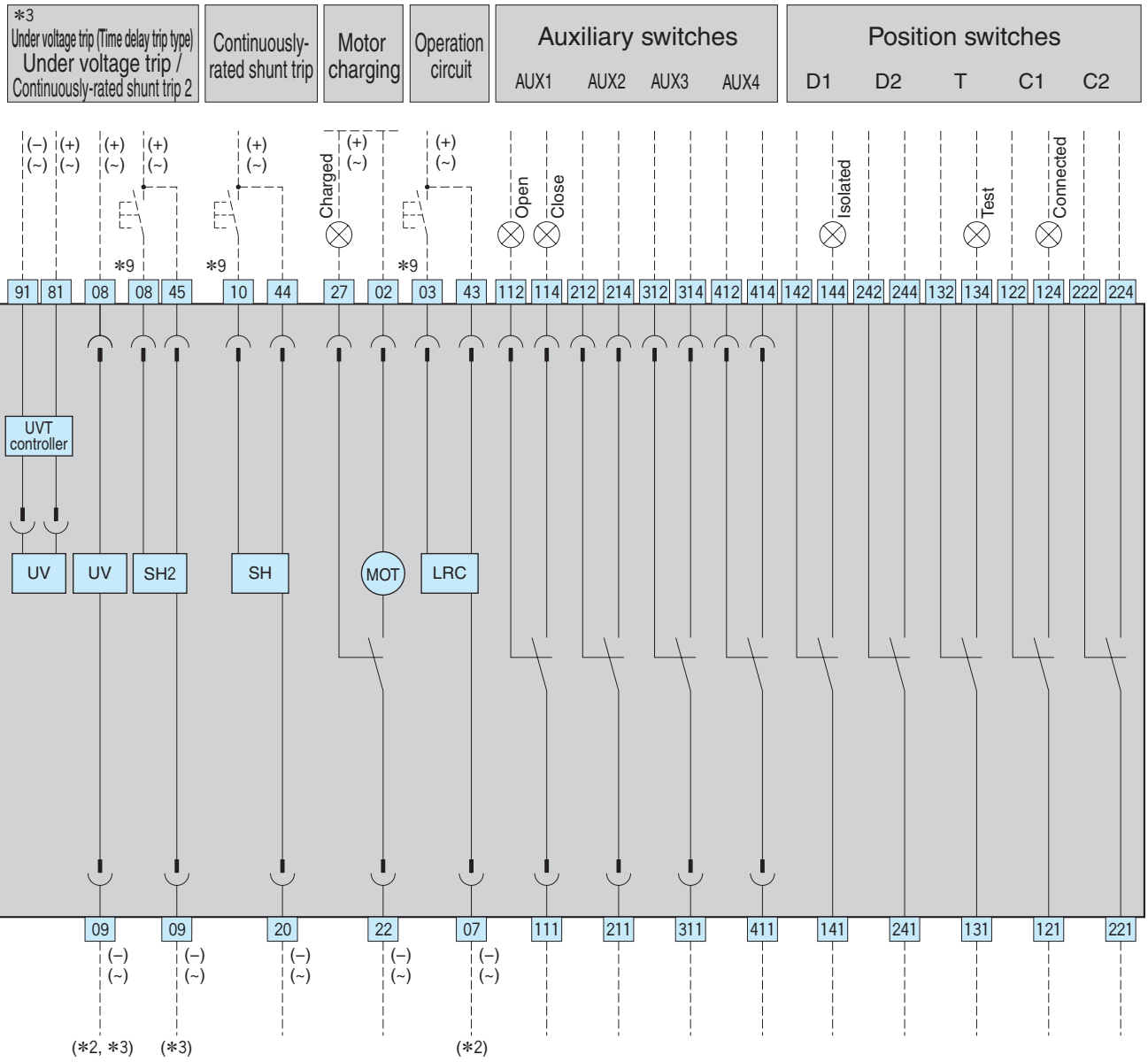
*9 : Connecting continuously-rated shunt trip devices and operation circuits.

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.



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



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 : This is necessary if using N-phase protection or Ground fault trip protection on 3-pole ACB for 3-phase 4-wire distribution.

*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”.

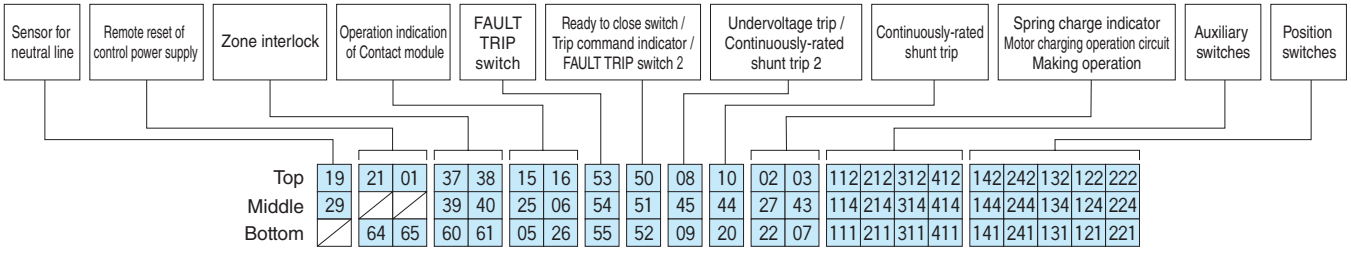
*5 : Only supplied for the AOX-LSIG.

*6 : The AOX-LI is not supplied with a short time-delay (ST) trip indicator.

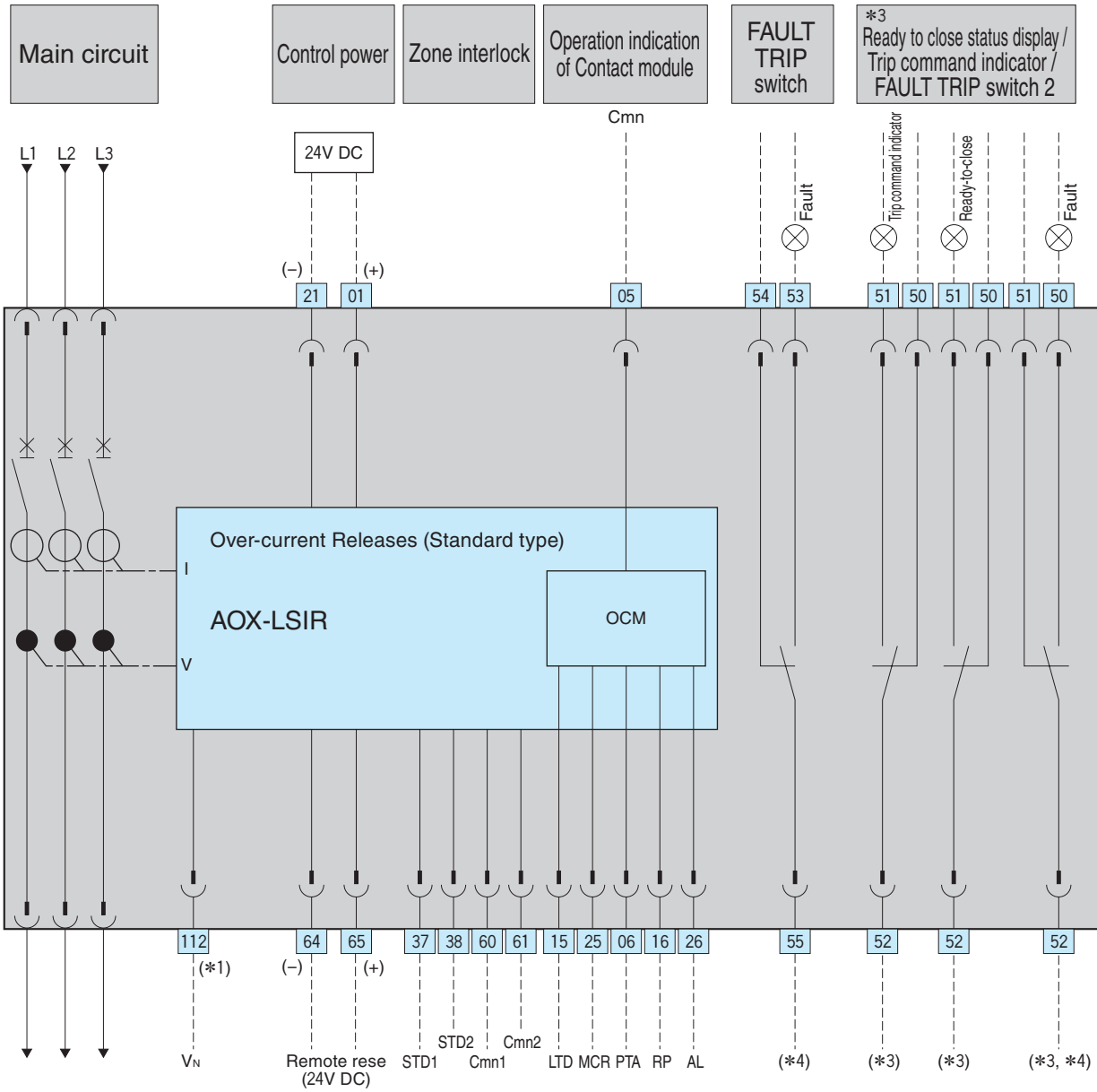
*7 : After tripping, apply 24V DC for 10ms to 60s to release the trip state.

*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



8 Circuit Diagram (AOX-LSIR)



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)

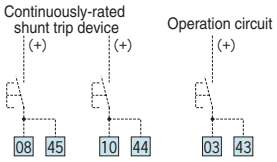
Symbols for accessories

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)

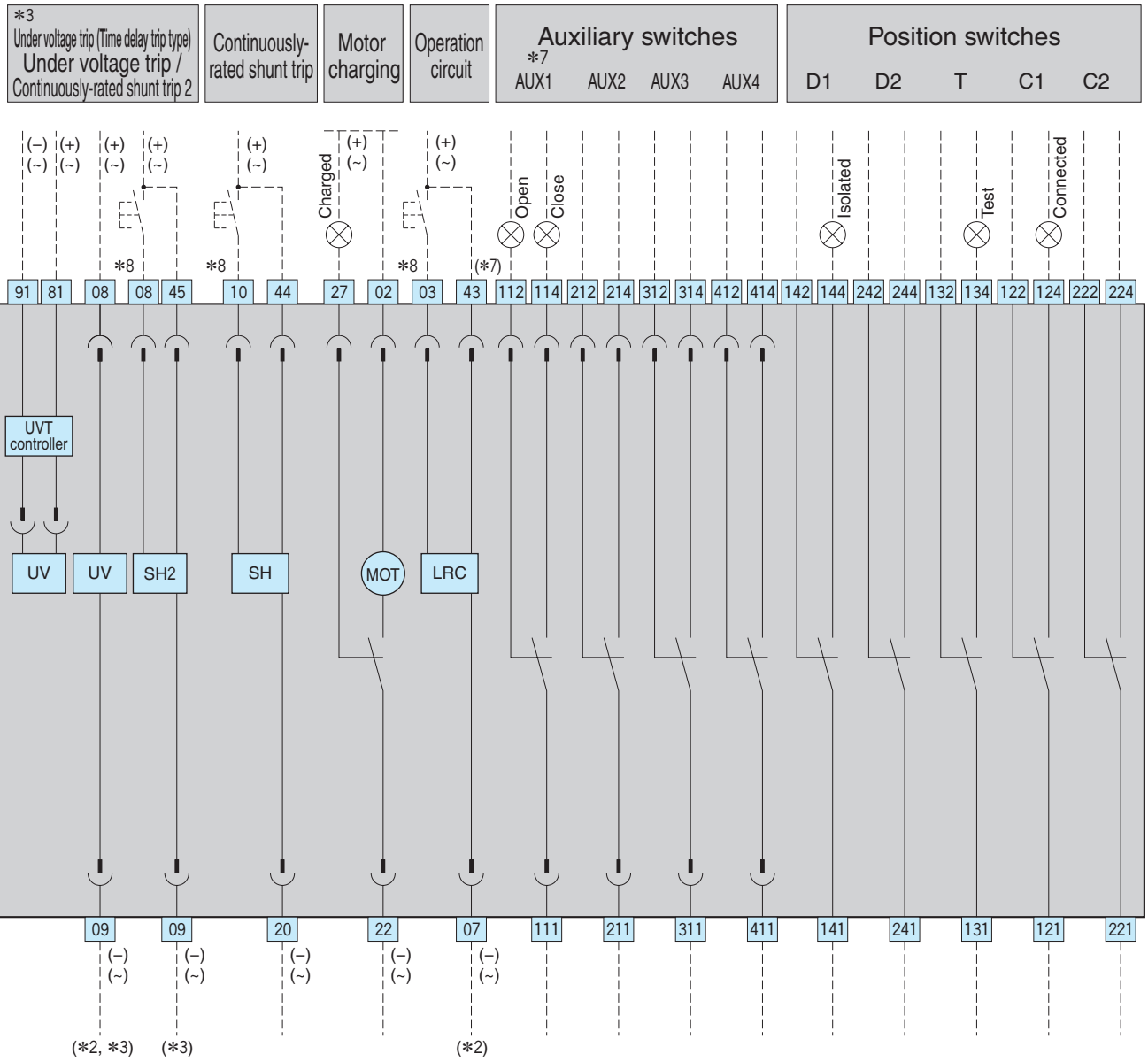
*8 : Connecting continuously-rated shunt trip devices and operation circuits.

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.



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



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 ACB for a 3-phase, 4-wire system. Always connect the neutral phase input to terminal 112. 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.

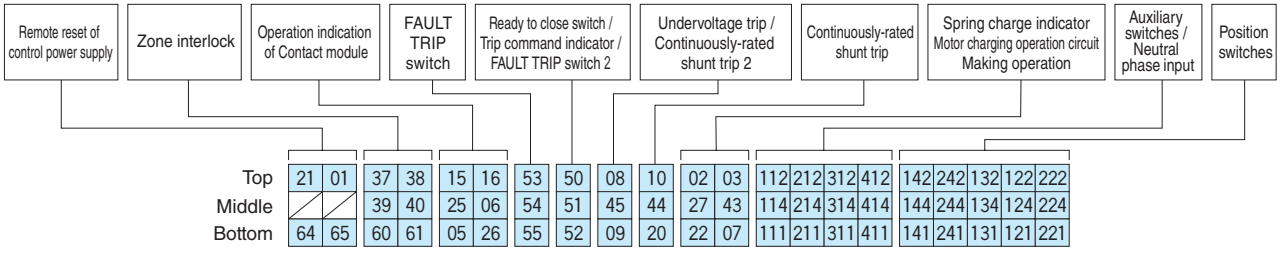
*3 : Please specify the function to be used when ordering.

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

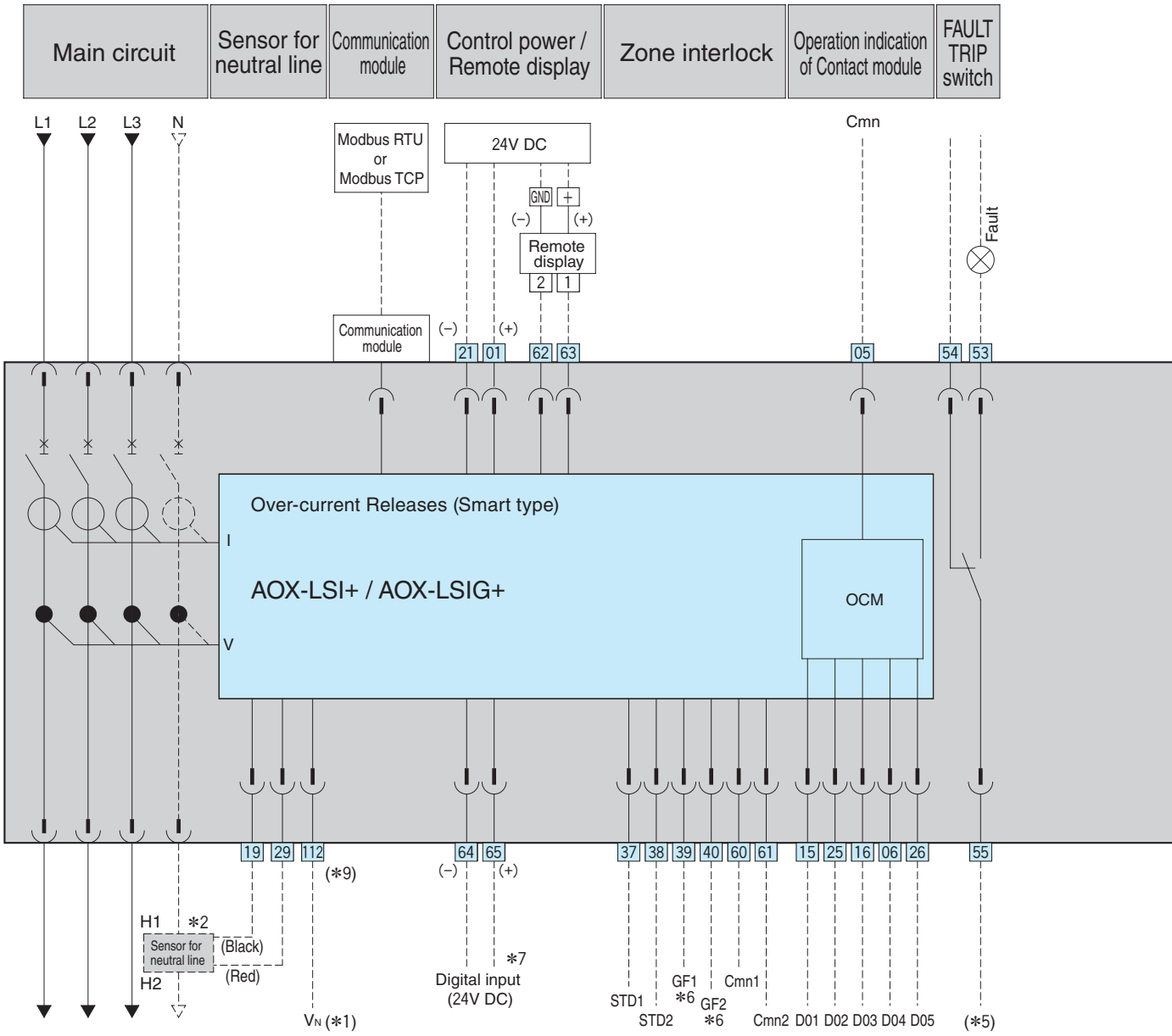
*5 : After tripping, apply 24V DC for 10ms to 60s to release the trip state.

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

Terminal arrangement



8 Circuit Diagram (AOX-LSI+, AOX-LSIG+)



Terminal description

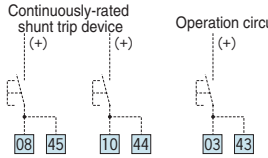
01(+) — 21(−)	Control power 24V DC
63(+) — 62(−)	Connection of Remote display
05 — 15	Multi operation indication
05 — 25	
05 — 16	
05 — 06	
05 — 26	
19 — 29	Sensor for neutral line (Polarity : 19 - H1, 29 - H2)
65(+) — 64(−)	Digital input (24V DC) ∗7
37 — 60	Input for Zone interlock (Short time delay)
38 — 61	Output for Zone interlock (Short time delay)
39 — 60	Input for Zone interlock (Ground fault) ∗6
40 — 61	Output for Zone interlock (Ground fault) ∗6
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)

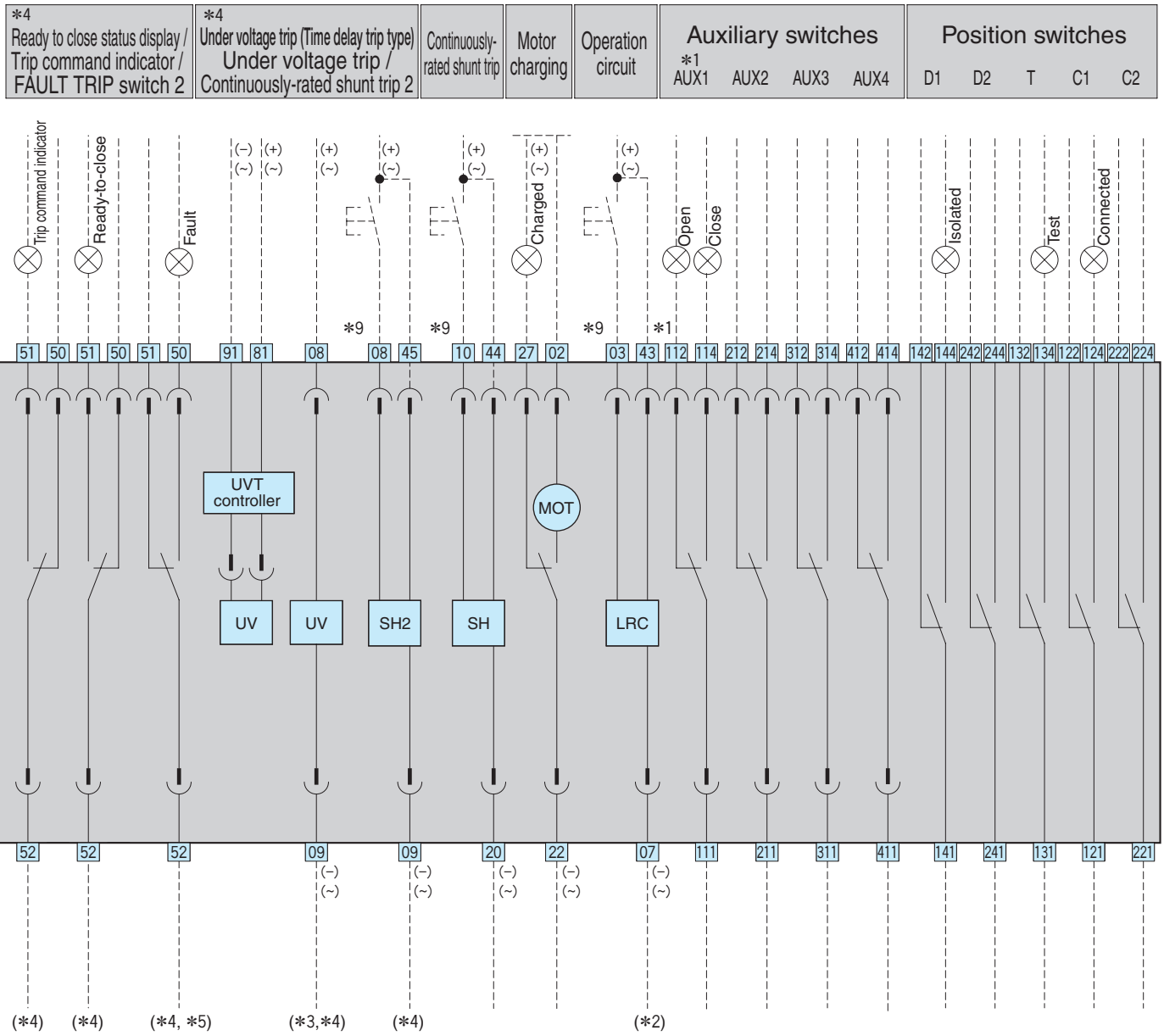
∗9 : Connecting continuously-rated shunt trip devices and operation circuits.
Ensure that the cables connecting the switch with terminals 03, 08 and 10 are 5 m or less in length, and keep them as far away as possible from power supply cables. If the cables exceed 5 m in length, or if using a AC380–480V 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.



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).



Designation of terminals for auxiliary and position switches

* * *

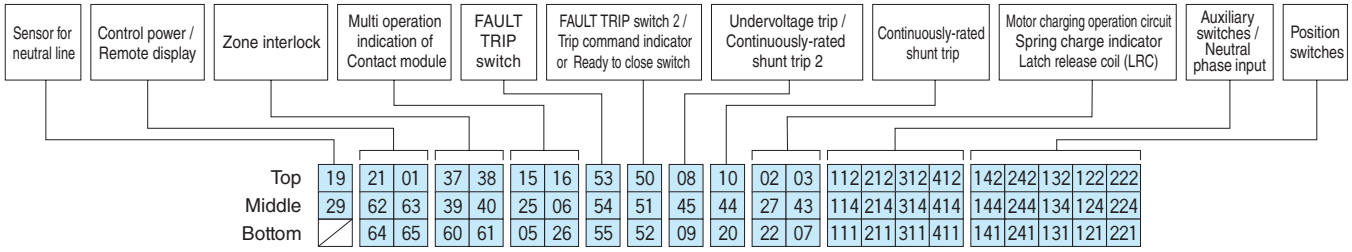
- 1 : Common
- 2 : b-contact
- 4 : a-contact

- 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. Connect when installing ACB for a 3-phase, 4-wire system. Always connect the neutral phase input to terminal 112. AUX1 cannot be used in this case.
*2 : This is necessary if using N-phase protection or Ground fault trip protection on 3-phase 4-wire power distribution.
*3 : 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.
*4 : Please specify the function to be used when ordering.
*5 : No contact output when the reset setting dial is in “AUTO”.
*6 : Only supplied for the AOX-LSIG+.
*7 : Perform input operation selected from the following.
1) Remote reset
2) Tariff input
3) Temporary motion restrain state switching
4) Dual setting switching
*8 : Do not connect the continuously-rated shunt trip device and continuously-rated shunt trip device 2 terminals and auxiliary switch terminals in series.

Terminal arrangement



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
		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
		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	Vertical terminals	0.024	297
	AX120H			

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)	Type		AX106S	AX108S	AX110S	AX112S	AX116S	
				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)	Type		AX106S	AX108S	AX110S	AX112S	AX116S	AX120S
				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)

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 ☐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 ＊4
☐Standard drawout handle_____units ＊1
☐Storage drawout handle_____units
☐Main circuit safety shutters
☐Control circuit terminal cover
☐Test jumper ＊25
☐Key lock on withdrawn position (Max. 2 can be installed) _____units
⇒☐Cylinder ☐Castell ＊25
☐Racking interlock ＊3 ＊21
☐Door interlock ＊2＊3 (Hinge position of distribution board door : ☐Right side ☐Left side)
☐Mal-insertion prevention device
Category_____＊24_____ units
Category_____＊24_____ units
☐Position switches Type ALX-_____PA
ALX-_____PB

Line side (Upper) : ☐Horizontal terminals＊4 ☐Vertical terminals ☐Front connections＊4
☐Conductive adapter (AZX-1_____)＊8
Load side (Lower) : ☐Horizontal terminals＊4 ☐Vertical terminals ☐Front connections＊4
☐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) ＊17

☐AOX-LI ☐AOX-LSI ☐AOX-LSIG Control power : 24V DC
I_n : _____A ☐Contact module Mechanical reset : ☐AUTO ☐MANUAL
☐Default setting values : If specified setting value is unnecessary on all settings as follows, please check this box. Setting values are set to default setting value.

			Default setting values
Long time-delay trip setting current ☐ON ☐OFF			
[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 $I_r\times600\%$	10
Starting characteristic : ☐HOT ☐COLD＊22			COLD
Short time delay trip settings (Only for LSI and LSIG) ☐ON ☐OFF			Default setting values
[I_{sd}](A)	I_{sd} : _____× 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 : _____× I_n(A)		12 (for AX120S, AX120H) 16 (Except for above)
Preferential trip alarm settings ☐ON ☐OFF＊22			Default setting values
[I_p](A)	I_p : $I_r\times80\%$(fixed)		OFF (3pole, 3-phase, 3-wire) 1 (Except for above)
[t_p](s)	tp : $t_r\times50\%$(fixed)		—
Neutral protection settings＊20 ☐ON ☐OFF			Default setting values
[I_N](A)	IN : _____×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)＊20 ☐ON ☐OFF			Default setting values
[I_g](A)	I_g : _____× 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

(Continued on P.79)

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) ＊18 _____V AC, _____V DC
9 Other Accessories	Auxiliary switches 4c (Standard) ☐General ☐Micro load ☐Auxiliary switches 7c ＊5 ＊6 ＊18 ＊19 ☐ON–OFF Cycle Counter ☐Inter-pole barrier ＊4 ＊7 ☐OFF padlock lever ＊9 ☐Key lock (Lock-in OFF type) ＊10 ☐Cylinder ☐Castell ＊25 ☐Mechanical interlock ＊11 ＊18 ＊19 (Pitch between ACBs ☐600mm ☐700mm ☐800mm ☐900mm) ☐Ready to close switch ＊12 ☐FAULT TRIP switch ☐FAULT TRIP switch 2 ＊13 ☐Trip command indicator ＊14 ☐Sensor for neutral line ＊20 ☐IP cover ＊15 ＊18 ☐Door flange (☐IP20 ☐IP31) ＊16 ＊18
10 Special environments ＊25	☐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 : One is supplied with every five ACBs. Please specify if more required.

＊2 : 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.

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

＊4 : Cannot be used for AX120S and AX120H.

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

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

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

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

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

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

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

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

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

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

＊15 : Cannot be fitted with door flange.

＊16 : Door flange can notbe fitted with IP cover.

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

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

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

＊20 : Select the Sensor for neutral line if using N-phase protection or Ground fault trip protection on 3-pole ACB for 3-phase 4-wire power distribution.

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

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

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

＊24 : The categories of Mal-insertion prevention device is shown in the table as follows.

Category	1	2	3	4	5	6	7	8	9	10
Cradle	123	124	125	134	135	145	234	235	245	345
ACB	DE	CE	CD	BE	BD	BC	AE	AD	AC	AB

＊25 : 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 ＊1 ☐Mal-insertion prevention device
☐Storage drawout handle_____units Category_____＊23_____ units
☐Main circuit safety shutters Category_____＊23_____ units
☐Control circuit terminal cover ☐Position switches Type ALX-_____PA
☐Test jumper ＊24 ALX-_____PB
☐Key lock on withdrawn position (Max. 2 can be installed) _____units
⇒☐Cylinder ☐Castell ＊24
☐Racking interlock ＊3 ＊20
☐Door interlock ＊2＊3 (Hinge position of distribution board door : ☐Right side ☐Left side)

Line side (Upper) : ☐Horizontal terminals ☐Vertical terminals ☐Front connections
☐Conductive adapter (AZX-1_____) ＊7
Load side (Lower) : ☐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-LSIR Control power : 24V DC Mechanical reset : ☐AUTO ☐MANUAL
I_{gen} : _____A P_n : _____kW ☐Contact module
☐Default setting values : If specified setting value is unnecessary on all settings as follows, please check this box. Setting values are set to default setting value.

		Default setting values
Long time-delay trip setting current ☐ON ☐OFF		
$[I_r]$(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 $I_r\times120\%$)	20
Short time delay trip settings ☐ON ☐OFF		Default setting values
$[I_{sd}]$(A)	I_{sd} : _____× 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 :_____× I_{gen}(A)	16
Preferential trip alarm settings ☐ON ☐OFF ＊21		Default setting values
$[I_p]$(A)	I_p : _____× I_{gen}(A)	95%
$[t_p]$(s)	t_p : _____× t_r(s)	50%
Settings for Reverse power protection ☐ON ☐OFF		Default setting values
$[P_{rp}]$(kW)	P_{rp} : _____× P_n(kW) P_n : _____(kW)	4%
$[t_{rp}]$(s)	t_{rp} : _____s (Time-delay at $P_{rp}\times100\%$)	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 ＊19		3-phase 3-wire type

(Continued on P.81)

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 (Standard) ☐General ☐Micro load ☐Auxiliary switches 7c ＊4 ＊5 ＊17 ＊18 ☐ON–OFF Cycle Counter ☐Inter-pole barrier ＊6 ☐OFF padlock lever ＊8 ☐Key lock (Lock-in OFF type) ＊9 ☐Cylinder ☐Castell ＊24 ☐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 ☐IP cover ＊14 ＊17 ☐Door flange (☐IP20 ☐IP31) ＊15 ＊17
10 Special environments ＊24	☐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 : One is supplied with every five ACBs. Please specify if more required.

＊2 : 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.

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

＊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 with IP cover.

＊16 : For details about each setting, please refer to P.28.

＊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 : The categories of Mal-insertion prevention device is shown in the table as follows.

Category	1	2	3	4	5	6	7	8	9	10
Cradle	123	124	125	134	135	145	234	235	245	345
ACB	DE	CE	CD	BE	BD	BC	AE	AD	AC	AB

＊24 : Coming soon.

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

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 ☐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 ＊1
☐Storage drawout handle_____units
☐Main circuit safety shutters
☐Control circuit terminal cover
☐Body sensor ＊19 ☐Test jumper ＊28
☐Key lock on withdrawn position (Max. 2 can be installed) _____units
⇒☐Cylinder ☐Castell ＊28
☐Racking interlock ＊3
☐Door interlock ＊2＊3 (Hinge position of distribution board door : ☐Right side ☐Left side)
☐Mal-insertion prevention device
Category_____ ＊25_____ units
Category_____ ＊25_____ units
☐Position switches Type ALX-_____PA
ALX-_____PB

Line side (Upper) : ☐Horizontal terminals ☐Vertical terminals ☐Front connections ☐Conductive adapter (AZX-1_____) ＊8
Load side (Lower) : ☐Horizontal terminals ☐Vertical terminals ☐Front connections ☐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) ＊17

☐AOX-LSI+ ☐AOX-LSIG+ Control power : 24V DC Rated primary current I_n : _____A
Rated voltage U_n : _____V Rated power P_n : _____kW
☐Contact module Dual settings : ☐ON ☐OFF
☐Default setting values : If specified setting value is unnecessary on all settings as follows, please check this box. Setting values are set to default setting value.

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 : _____× I_n(A)	(Setting B) I_r : _____× 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} : _____× I_n(A)	(Setting B) I_{sd} : _____× 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 : _____× I_n(A)	(Setting B) I_i : _____× I_n(A)	16
Neutral protection settings ＊21		Default setting values
[I_N](A) I_N : _____× 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 ＊21 (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 : _____× I_n(A)	(Setting B) I_g : _____× 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} : _____× I_r(A)		80%
[t_{p1}](s) t_{p1} : _____× t_r(s)		50%
Preferential trip alarm2 settings ☐ON ☐OFF		Default setting values
[I_{p2}](A) I_{p2} : _____× I_r(A)		80%
[t_{p2}](s) t_{p2} : _____× 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

(Continued on P.83)

7 Over-current Releases (OCR) ＊17

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.

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) ＊22		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 ＊24
☐Undervoltage trip device (Instantaneous trip type) _____V AC, _____V DC
☐Undervoltage trip device (Time delay trip type) ＊18 _____V AC, _____V DC

9 Other Accessories

Auxiliary switches 4c (Standard) ☐General ☐Micro load
☐Auxiliary switches 7c ＊5 ＊6 ＊18 ＊20
☐ON–OFF Cycle Counter ☐Inter-pole barrier ＊4 ＊7 ☐OFF padlock lever ＊9
☐Key lock (Lock-in OFF type) ＊10
☐Cylinder ☐Castell ＊28
☐Mechanical interlock ＊11 ＊18 ＊20
(Pitch between ACBs ☐600mm ☐700mm ☐800mm ☐900mm)
☐Ready to close switch ＊12
☐FAULT TRIP switch ☐FAULT TRIP switch 2 ＊13
☐Trip command indicator ＊14 ☐IP cover ＊15 ＊18 ☐Sensor for neutral line ＊21
☐Door flange (☐IP20 ☐IP31) ＊16 ＊18

10 Special environments ＊28

☐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_____＊26 ☐Remote display ☐Adapter for remote display
☐OCR checker ☐Built-in battery ☐Remote command module ＊19 ＊26
☐SHT1 ☐SHT2 ☐LRC ＊27

＊1 : One is supplied with every five ACBs. Please specify if more required.
＊2 : 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.
＊3 : When using a door interlock, always use a racking interlock.
＊4 : Thi (L characteristic) : Time settings at (I_r)×600%
Other characteristic : Time settings at (I_r)×300%
＊5 : Cannot be fitted with mechanical interlock or auxiliary switch 4c.
＊6 : Working mechanism differs from auxiliary switch 4c, these switches work only on the connected position.
＊7 : Cannot be fitted with Draw-out type front connection specifications or conductive adapter.
＊8 : Conductive adapter can not be fitted with Inter-pole barrier.
＊9 : OFF padlock lever can not be fitted with Key lock (Lock in OFF).
＊10 : Key lock (Lock in OFF) cannot be fitted with OFF padlock.
＊11 : Cannot be fitted with auxiliary switch 7c.
＊12 : Can not be fitted with Trip command indicator or Fault trip switch2.
＊13 : Cannot be fitted with Ready to close switch or Trip command indicator.
＊14 : Cannot be fitted with Ready to close switch or Fault trip switch2.
＊15 : Cannot be fitted with door flange.
＊16 : Door flange can notbe fitted with IP cover.
＊17 : For details about each setting, please refer to P.29 and P.30.
＊18 : Contact TERASAKI to use in combination with a door interlock.
＊19 : To use a body sensor or Remote command module, always also use a communication module.
＊20 : Contact TERASAKI to use in combination with a racking interlock.
＊21 : Select this if using a 3-pole ACB for 3-phase 4-wire power distribution.
＊22 : Cannot be used for fixed types.
＊23 : Contact TERASAKI to use in combination with a mechanical interlock or auxiliary switch 7c.
＊24 : Can not be fitted with Undervoltage trip devices.
＊25 : The categories of Mal-insertion prevention device is shown in the table as follows.

Category	1	2	3	4	5	6	7	8	9	10
Cradle	123	124	125	134	135	145	234	235	245	345
ACB	DE	CE	CD	BE	BD	BC	AE	AD	AC	AB

＊26 : Cannot select this if using a 3-pole ACB for 3-phase 4 wire power distribution.
＊27 : If Latch release coil (LRC) on 6 and Continuously-rated shunt trip device (SHT1) or continuously-rated shunt trip device2 (SHT2) are selected, please select devices these are necessary to work by Remote command module.
＊28 : 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

☐Draw-out type
☐Standard drawout handle_____units＊1
☐Strage drawout handle_____units
☐Main circuit safety shutters
☐Control circuit terminal cover
☐Test jumper ＊20
☐Key lock on withdrawn position (Max. 2 can be installed) _____units
⇒☐Cylinder ☐Castell ＊20
☐Racking interlock＊3 ＊17
☐Door interlock ＊2 ＊3 (Hinge position of distribution board door : ☐Right side ☐Left side)
☐Mal-insertion privention device
Category_____＊19_____ units
Category_____＊19_____ units
☐Position switch Type ALX-_____PA
ALX-_____PB

Line side (Upper) : ☐Horizontal terminals ☐Vertical terminals ☐Front connections
☐Conductive adapter (AZX-1_____)＊7
Load side (Lower) : ☐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 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)＊15 AC_____V, DC_____V

8 Other Accessories
Auxiliary switch 4c (Standard) ☐General ☐Micro load
☐Auxiliary switch 7c ＊4 ＊5 ＊15 ＊16
☐ON-OFF Cycle Counter ☐Inter-pole barrier ＊6 ☐OFF padlock lever ＊8
☐Key lock (Lck-in OFF type) ＊10
☐Cylinder ☐Castell ＊20
☐Mechanical interlock ＊10＊15＊16 ☐Ready to close switch ＊11
(Pitch between ACBs ☐600mm ☐700mm ☐800mm ☐900mm)
☐Trip command indicator ＊12 ☐IP cover ＊13＊15 ☐Door flange (☐IP20 ☐IP31) ＊14＊15

9 Special environments ＊20
☐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 : One is supplied with every five ACBs. Please specify if more required.
＊2 : 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.
＊3 : When using a door interlock, always use a racking interlock.
＊4 : Can not 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 : Can not be fitted with Draw-out type front connection specifications or conductive adopter.
＊7 : Conductive adopter 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) can not be fitted with OFF padlock.
＊10 : Can not be fitted with auxiliary switch 7c.
＊11 : Can not be fitted with Trip command indicatior.
＊12 : Can not be fitted with Ready to close switch.
＊13 : Can not be fitted with door flange.
＊14 : Door flange can not be fitted with IP cover.
＊15 : Contact TERASAKI to use in combination with a door interlock.
＊16 : Contact TERASAKI to use in combination with a racking interlock.
＊17 : Contact TERASAKI to use in combination with a mechanical interlock or Auxiliary 7c.
＊18 : Can not be fitted with Undervoltage trip devices.
＊19 : The categories of Mal-insertion prevention device is shown in the table as follows.

Category	1	2	3	4	5	6	7	8	9	10
Cradle	123	124	125	134	135	145	234	235	245	345
ACB	DE	CE	CD	BE	BD	BC	AE	AD	AC	AB

＊20 : Coming soon.

TERASAKI ELECTRIC (EUROPE) LTD.
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(China)

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.

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