



TemPowerACB

Economical series

A lineup from 630A to 1600A frame available

TemPower

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◆ TemPower2 products list

Frame size (A)	630	800	1000	1250	1600	2000	2500	3200	4000	5000	6300
AR-E Economical series	AR206E	AR208E	AR210E	AR212E	AR216E	—	—	—	—	—	—
AR-S Standard series	—	AR208S	—	AR212S	AR216S	AR220S	AR325S	AR332S	AR440SB AR440S	AR650S	AR663S
AR-H High-fault series	—	—	—	AR212H	AR216H AR316H	AR220H AR320H AR420H	AR325H	AR332H	AR440H	—	AR663H

For AR-S Standard series and AR-H High fault series, please refer to the catalogue I55E.

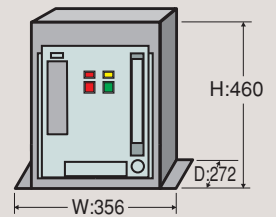
1 Features

TemPower2 economical series air circuit breakers excel in cost performance.



TemPower2 economical series including 630A to 1600A frame breakers

The breakers of this series are the same in enclosure size. Compact and fully equipped with essential functions, this series excels in cost performance.



The ACB panel cutout identical for all the TemPower2 series breakers

The same front panel cutout size for economical, standard, and high-fault series allows easy designing of switchboards.



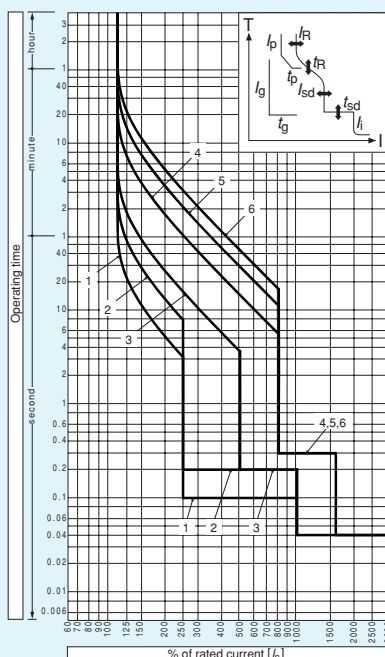
Enhanced selectivity

Full selectivity can be achieved as the rated breaking capacity is identical to the rated short-time withstand current.



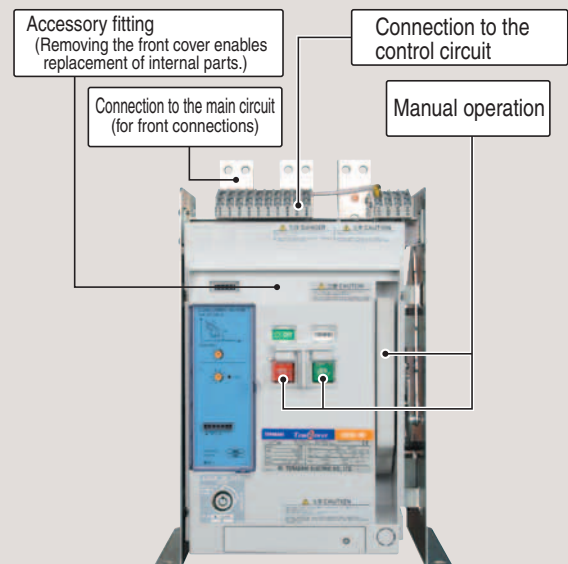
Over-current release (OCR) featuring operational ease

Simply using two dials of the OCR, one for selecting the rated current and the other for selecting a protection characteristic, allows you to set up the OCR. Coming standard with six protection characteristics, the OCR provides optimum selective coordination with upstream high-voltage breakers or relays and downstream breakers or loads.



Increased accessibility from the front

It enhances ease of installation, operation, and maintenance.



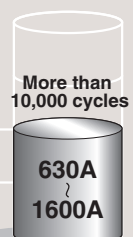
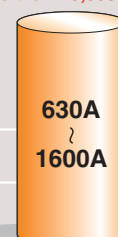
The double insulated design ensures that most accessories can be safely and easily installed by the user. Control and auxiliary switch terminals are mounted at the front on the ACB body for easy access. For the connection to the main circuit, it is easy to access from the front for the front terminals using optional attachments. Due to the increased level of harmonics within the distribution network, the neutral phase is fully rated as standard.



A substantial improvement in life cycles

The TemPower2 economical series has achieved very high life cycles compared with our old models.

More than 20,000 cycles

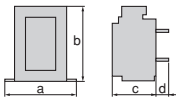


TemPower2 (Economical series)

Old models

Note: above figures are the mechanical endurance with maintenance.

2 Ratings

AMPERE RATING(A)		630	800	1000	1250	1600			
TYPE		AR206E	AR208E	AR210E	AR212E	AR216E			
RATED CURRENT (max) [I_n](A)① ② JIS⑥,IEC, EN, AS		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 CURRENT OF OVER-CURRENT RELEASE [I_n](A)		630	800	1000	1250	1600			
AC RATED INSULATION VOLTAGE [U_i](V. 50/60Hz)		1000	1000	1000	1000	1000			
RATED OPERATIONAL VOLTAGE [U_o](V. 50/60Hz)		690	690	690	690	690			
AC RATED BREAKING CAP [kA sym rms]/MAKING CAP [kA peak]									
JIS⑥, IEC, EN, AS AC 690V ④		30/63	30/63	30/63	30/63	30/63			
[$I_{cs} = I_{cw}$] 440V		50/105	50/105	50/105	50/105	50/105			
RATED IMPULSE WITHSTAND VOLTAGE [U_{imp}](kV)		12	12	12	12	12			
RATED SHORT TIME WITHSTAND 0.5s		50	50	50	50	50			
CURRENT[I_{cw}](kA rms) 1s		42	42	42	42	42			
LATCHING CURRENT (kA)		42	42	42	42	42			
TOTAL BREAKING TIME (s)		0.04	0.04	0.04	0.04	0.04			
CLOSING OPERATION TIME									
SPRING CHARGING TIME (s) max.		10	10	10	10	10			
CLOSE TIME (s) max.		0.08	0.08	0.08	0.08	0.08			
No. of operating cycles									
Mechanical life	with maintenance	20000	20000	20000	20000	20000			
	without maintenance	10000	10000	10000	10000	10000			
Electrical life	without maintenance AC440V	10000	10000	10000	5000	5000			
	AC690V	7000	7000	7000	3500	3500			
Mass (kg)		35 42	35 42	35 42	38 45	38 45			
OUTLINE DIMENSION (mm)									
FIXED TYPE		a	a	a	a	a			
		b	b	b	b	b			
		c	c	c	c	c			
		d	d	d	d	d			
		356 441	356 441	356 441	356 441	356 441			
		460	460	460	460	460			
		272	272	272	272	272			
		63	63	63	63	63			

①: Values in open air at 40°C.

②: Values with horizontal terminals.

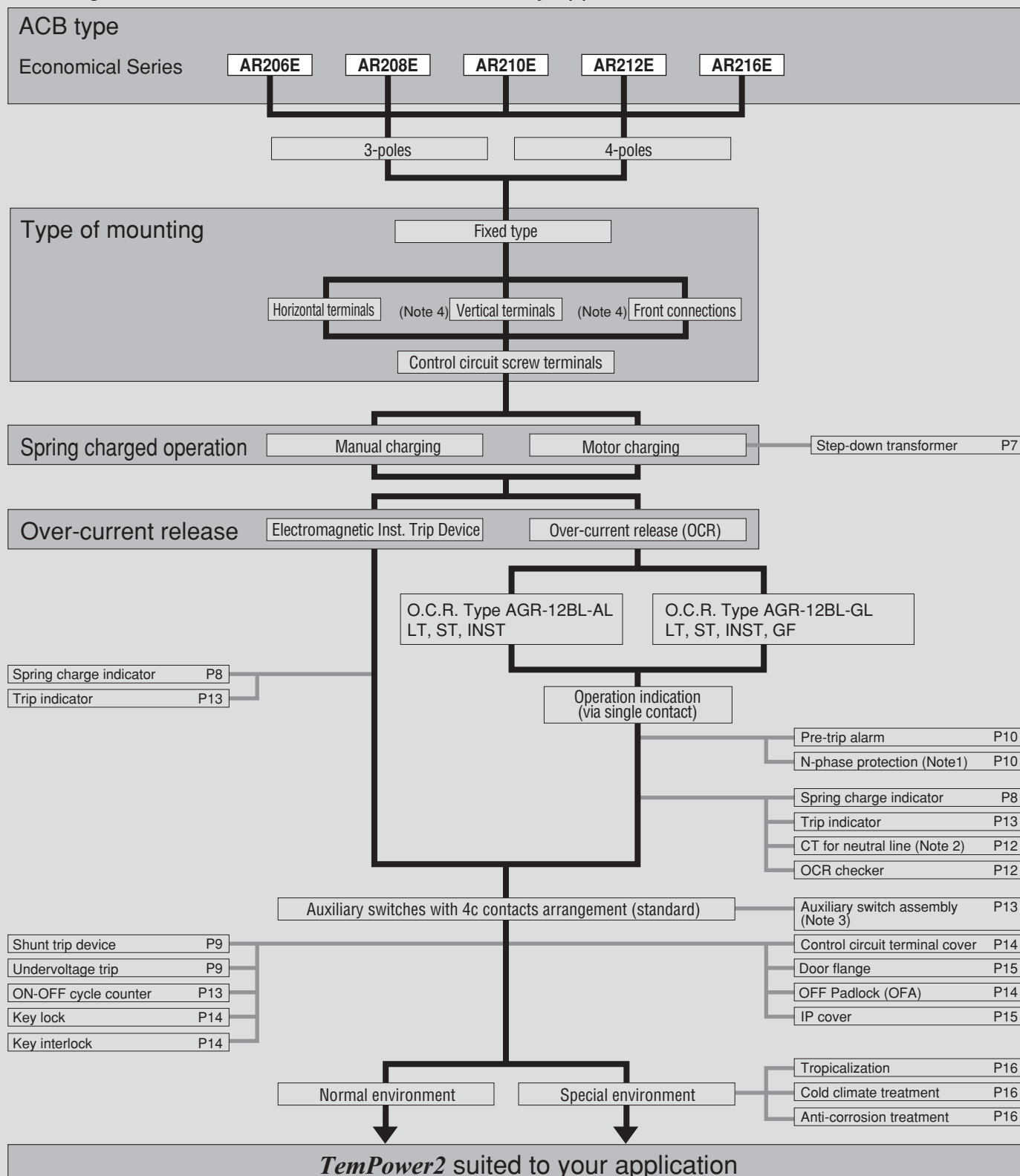
③: 4poles ACBs without Neutral phases protection can not apply IT earthing system.

④: Contact TERASAKI for the details.

⑥: Comply with JIS C 8201-2-1 Ann.1 Ann.2.

3 Specifications

TemPower2 series ACBs have an extensive range of accessories available, enabling the ACBs to be “custom built” to suit every application.



Note 1: Applicable to 4-pole ACBs.

Note 2: Required for ground fault protection for 3-poles ACB on 3-phase, 4-wire systems.

Note 3: Microload switch assembly with 3c arrangement available.

Note 4: The user can change horizontal terminals to vertical or front terminals using optional attachments.

3 Specifications

1 Types of Mounting

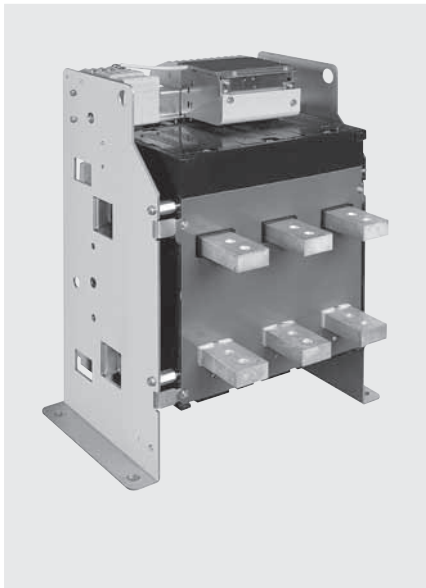
Fixed type

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

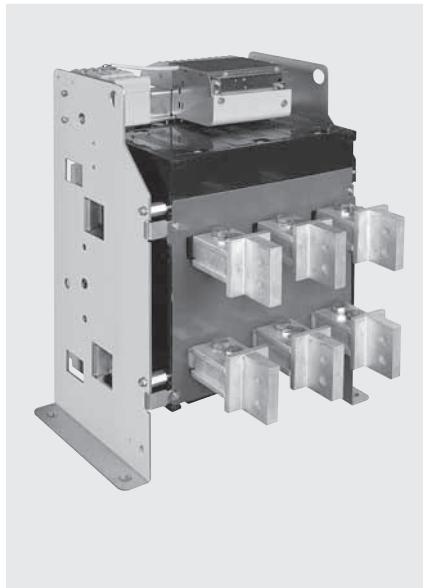
Terminal arrangements

■ Main circuit terminals

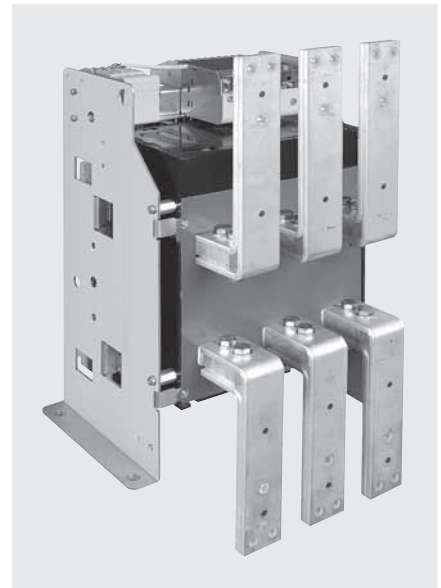
The ACBs come standard with horizontal terminals. The user can change horizontal terminals to vertical or front terminals using optional attachments for any last minute alterations.



▲Horizontal terminals



▲Vertical terminals

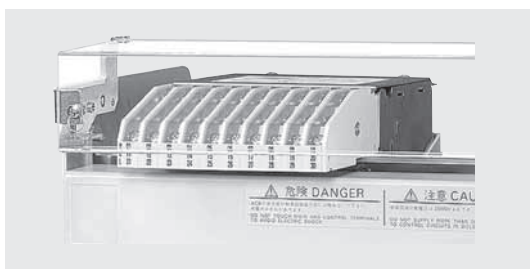


▲Front connections

■ Control circuit terminals

Control circuit terminals are front located to allow easy wiring/access.

- The terminal blocks (for auxiliary switches and control circuits) are positioned on the top of the ACB front panel and can be accessed from the front for wiring.
- M4 screw terminals are standard.



2 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 charges the closing springs.

■ Closing the ACB

Pressing the ON button on the ACB closes the ACB.

■ Opening the ACB

Pressing the OFF button on the ACB opens 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 by means of a motor. ON/OFF operation of the ACB can be performed remotely.

A manual charging mechanism is also fitted to facilitate inspection or maintenance work.

■ Charging the closing springs

A motor is used to charge the closing springs.

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

Turning on "remote" ON switch enables the ACB to be remotely closed.

- Anti-pumping mechanism

Even if the ON switch is kept on, ACB closing operation is performed only once.

To close the ACB again, remove the ON signal to reset the anti-pumping mechanism and then reapply the ON signal.

- If ON and OFF signals are simultaneously given to the ACB, the ON signal is ignored.

■ Opening the ACB

For opening the ACB remotely, specify the shunt trip device (See P. 9) or the undervoltage trip (See P. 9).

3 Specifications

■ Operation power supply

Rated voltage (V)	Applicable voltage range (V)		Operation power supply ratings		
	CHARGE/ ON operation	OFF operation (Note1)	Motor inrush current (peak) (A)	Motor steady-state current (A)	Closing command current (peak) (A)
AC 100	85–110		7	1.1	0.29
AC 110	94–121		7	1.1	0.25
AC 120	102–132		7	1.1	0.22
AC 200	170–220		4	0.7	0.15
AC 220	187–242		4	0.7	0.13
AC 240	204–264		4	0.7	0.11
DC 24	18–26		14	4	1.04
DC 48	36–53		10	1.6	0.51
DC 100	75–110		6	0.8	0.25
DC 110	82–121		6	0.8	0.22
DC 125	93–138		6	0.8	0.21
DC 200	150–220		4	0.5	0.13
DC 220	165–242		4	0.5	0.12

Note 1: For the ratings refer to the shunt trip device of page 9.

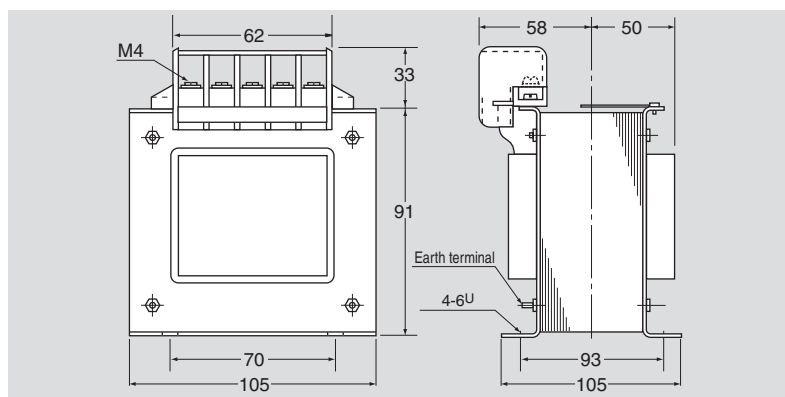
※The split circuit between motor circuit and closing circuit is available as special specification. Contact us for the details.

Step-down transformer (external)

The maximum rated control voltage applicable to the operation power supply is AC240V. For higher voltages, a step-down transformer is needed.

The following step-down transformers are available as options.

Rated control voltage	Transformer		
	Type	Capacity	Voltage ratio
AC410-470V	TSE-30M	300VA	450/220V
AC350-395V	TSE-30M	300VA	380/220V



3 Accessories for Spring Charged Operation

Spring charge indicator

This switch can be used to indicate that the closing springs have been fully charged.

■ Normal contacts for general service

Voltage (V)		Switch contact ratings	
		Resistive load	Inductive load
AC	250	3	3
DC	250	0.1	0.1
	125	0.5	0.5
	30	3	2

Minimum applicable load is DC24V 10mA.

■ Gold contacts for microload

Voltage (V)		Switch contact ratings	
		Resistive load	Inductive load
AC	250	0.1	0.1
DC	30	0.1	0.1

Minimum applicable load is DC24V 1mA.

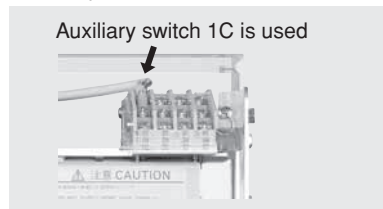
3 Specifications

4 Trip Devices

Instantaneously-rated shunt trip device

The instantaneously-rated shunt trip device allows the ACB to be opened when an external protection relay against overcurrent or reverse power is activated.

Auxiliary switch 1C is used as the anti-burnout switch.



This instantaneously-rated shunt trip can be fitted with undervoltage trip to the same ACB. (except DC 100V UVT)

Shunt Trip Rating (Instantaneously-rated type)

Type	Rated voltage (V)	Operational voltage (V)	Max. excitation current (A)	Opening time (max.) (ms)
AVR-1C	AC100	AC70-110	1.6	40ms
	AC110	AC77-121	1.8	
	AC120	AC84-132	1.9	
	AC200	AC140-220	0.63	
	AC220	AC154-242	0.69	
	AC240	AC168-264	0.76	
	DC24	DC16.8-26.4	2.4	
	DC48	DC33.6-52.8	1.3	
	DC100	DC70-110	0.64	
	DC110	DC77-121	0.70	
	DC125	DC87.5-137.5	0.80	
	DC200	DC140-220	0.33	
	DC220	DC154-242	0.36	

Undervoltage trip device (UVT)

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 rated voltage.

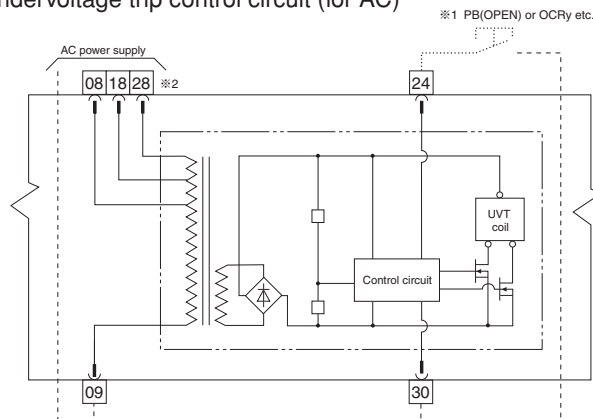
The UVT consists of a tripping mechanism and an undervoltage trip control device. The trip control device is available in two types: AUR-ICS and AUR-ICD.

Type AUR-ICS provides an instantaneous trip to the ACB when the control voltage drops below the opening voltage. Type AUR-ICD provides a delayed trip to the ACB when the control voltage remains below the opening voltage for at least 500 ms.

Adding a pushbutton switch (with normally opened contacts) between terminals 24 and 30 allows the ACB to be tripped remotely.

- 1s or 3s time-delay type are also available as special specification.

Undervoltage trip control circuit (for AC)



※1 Tripping signal is 48 VDC/5 mA. Apply tripping signal for at least 80 ms.

※2 For DC type use 09 as the (-) terminal and 08 as the (+) terminal.

It takes max. 1.5sec. for UVT coil to be adsorbed after the rated voltage is applied to the undervoltage trip device. Therefore, for the closing command, the closing signal should be applied on and over 1.5sec. after the rated voltage is applied.

• Ratings

Type of UVT Control Device	Time-delay	Rated Voltage 50/60Hz (V)	Opening Voltage (V)	Pick-up Voltage (V)	Coil Excitation Current (A)	Power Consumption (VA)	
						Normal	Reset
AUR-1CS	Inst.(below200ms)	AC100	35 - 70	85	0.1	8	10
AUR-1CD	Over 500ms (standard)	AC110	38.5 - 77	93.5			
	Over 1s	AC120	42 - 84	102			
	Over 3s	AC200	70 - 140	170			
		AC220	77 - 154	187			
		AC240	84 - 168	204			
		AC380	133 - 266	323			
		AC415	145 - 290	352			
		AC440	154 - 308	374			
		DC24※2	8.4 - 16.8	20.4			
		DC48※2	16.8 - 33.6	40.8			
		DC100※2※3	35 - 70	85			

※2: Special specification. ※3: DC 100V UVT can not be fitted with instantaneously-rated shunt trip to the same ACB.

5 Over-current Releases (OCR)

TemPower2 economical series are provided with the OCR, which can be operated with only two dials, one for selecting the rated current and the other for selecting a protection characteristic. Available characteristics include long time-delay trip, short time-delay trip, instantaneous trip, ground fault trip, pre-trip alarm (optional), and N-phase protection trip (optional).

Protection Relay Over-current releases (OCR)	Protective functions						
	Long Time LT	Short Time ST	Instantaneous INST	Pre-Trip Alarm PTA	Ground Fault GF	N-phase Protection NP	Control Power
AGR-12BL-AL	●	●	●	○	—	○	Not Required
AGR-12BL-GL	●	●	●	○	●	○	Not Required

●: Available as standard ○: Available as option —: Not available

Protective functions

① Long time-delay trip **LT**, Short time-delay trip **ST**, Instantaneous trip **INST**

Long time-delay trip, Short time-delay trip and Instantaneous trip functions are available as standard. RMS sensing is used to accurately read through distorted waveforms.

Using the dials allows you to select the optimum protection characteristic from six options.

Characteristic	Application
1	Generator protection
2, 3	General feeder circuits
4, 5, 6	Motor protection

② Ground fault trip function **GF**

The peak value sensing is used (the residual current of each phase is detected).

The GF pick-up current is set at 20% of the rated current [I_n] with 0.2 sec. time-delay. The GF protection can be disabled by a DIP switch on the O.C.R.

When using a 3-pole ACB in a 3-phase, 4-wire system, be sure to use an optional CT for neutral line (see P. 12).

③ Pre-trip alarm function **PTA** (Optional)

The pre-trip alarm function provides an alarm signal via the alarm contact (1a-contact) when the load current exceeding a predetermined value lasts for a predetermined time.

The pre-trip alarm is automatically reset when the load current drops to the predetermined value.

Note that this function does not need the control power.

④ N-phase protection function **NP** (Optional)

This NP function is available on 4-pole ACBs and prevents the neutral conductor from suffering damage or burnout due to overcurrent. The NP trip pick-up current can be selected to 100% or 50% of long time-delay trip pick-up current setting [I_R] by a DIP switch on the O.C.R., and also can be disabled.

3 Specifications

Rated current [I_R](A)

Type	Rated current (A): (I_R)
AR206E	630
AR208E	800
AR210E	1000
AR212E	1250
AR216E	1600

Protective function

Characteristic		1	2	3	4	5	6
Long time-delay trip Pick-up current (A) : (I_R)		$(I_R) \times (0.4-0.5-0.63-0.8-0.85-0.9-0.95-1.0)$ • Non tripping when load current $\leq ((I_R) \times 1.05)$. • Tripping when $((I_R) \times 1.05) < \text{load current} \leq ((I_R) \times 1.2)$					
Long time-delay trip Time-delay (s) : (t_R)		5.3	13.3	26.3	10	20	30
		at $200\% \times (I_R)$			at $600\% \times (I_R)$		
		Time-delay setting tolerance $\pm 20\%$, +150ms					
Short time-delay trip (I_R) Pick-up current (A) : (I_{sd})		2.5	2.5	5	8	8	8
		Current setting tolerance: $\pm 15\%$					
Short time-delay trip Time-delay (s) : (t_{sd})		0.1	0.2	0.2	0.3	0.3	0.3
		Total clearing time +70ms, resettable time -25ms					
Instantaneous trip (I_R) Pick-up current (A) : (I_i)		10	10	10	16	16	16
		Current setting tolerance: $\pm 20\%$					
Optional	Pre-trip alarm	$(I_R) \times 80\%$					
	Pick-up current (A) : (I_p)	• Non tripping when load current $\leq ((I_p) \times 1.05)$. • Tripping when $((I_p) \times 1.05) < \text{load current} \leq ((I_p) \times 1.2)$					
	Time-delay (s) : (t_p) (t_R) \times	0.5	0.5	0.5	0.5	0.5	0.5
		at $200\% \times (I_p)$			at $600\% \times (I_p)$		
		Time-delay setting tolerance: $\pm 20\%$, +100ms					
	Ground fault trip	$(I_R) \times 20\%$ Current setting tolerance: $\pm 20\%$					
	Pick-up current (A) : (I_g)	0.2s Definite time					
	Time-delay (s) : (t_g)	Total clearing time+70ms, resettable time -25ms					
	N-phase protection	100% $\times(I_R)$ or 50% $\times(I_R)$ selectable					
	Pick-up current (A) : (I_N)	• Non tripping when load current $\leq ((I_N) \times 1.05)$. • Tripping when $((I_N) \times 1.05) < \text{load current} \leq ((I_N) \times 1.2)$					
	Time-delay (s) : (t_N)	$(t_N) = (t_R)$					

Unless otherwise specified when ordering, the settings will default to characteristic 4.

Operation indication function

① Indication via single contact

When the LT, ST, INST, GF or NP trip function is activated, an output is generated via 1a-contact.

The 1a-contact will turn off after 40 ms or more.

A self-hold circuit is needed.

② LED indicator

When the LT pick up LED will light.

When the PTA operates LED will blink.

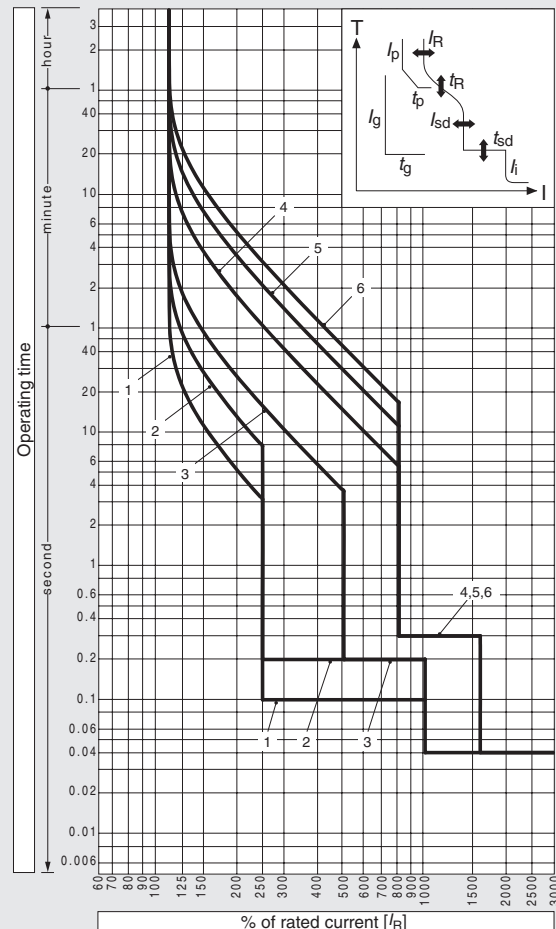
Contact ratings for Operation indication

Voltage (V)		Current (A)	
		Resistive load	Inductive load
AC	250	3	3
	250	0.3	0.15
DC	125	0.5	0.25
	30	3	3

Note: See page 13 for the contact ratings of Trip indicator.

See page 8 for the contact ratings of Spring charge indicator.

Protection characteristic



Electromagnetic Instantaneous Trip Device

The pick-up current of the electromagnetic instantaneous trip device is non-adjustable.

- Specify one of the pick-up current settings from the table below when ordering.

This device can not be used with AGR-12BL OCR.

Pickup current setting of electromagnetic instantaneous trip device (kA)	5
Current setting tolerance: $\pm 20\%$	7.5
	10
	15
	20
	25

6 Other Accessories

OCR test interface unit, type ANS2S

OCR test interface unit ANS2S is a tool designed for checking the functionality of type AGR-12BL over-current release. Using this tool in conjunction with a commercially available relay tester allows easy on-site testing of the OCR.

Be sure to use the OCR test interface unit in conjunction with a relay tester rated at 50A max.

■ Ratings and Specifications

CT ratio	3A/100mA (primary/secondary)
Outline dimensions	W72XH64XD47(mm)
Mass	340g

■ Measurement output

- Long time delay trip pickup current
- Long time delay trip pickup time (simplified testing) *1
- Short time delay trip pickup current
- Instantaneous trip pickup current
- Ground fault trip pickup current
- N-phase protection trip pickup current
- N-phase protection trip pickup time (simplified testing) *1
- Pre-trip alarm pickup current
- Pre-trip alarm pickup time (simplified testing) *1

*1 A stopwatch is required for measurement.

■ Accessories

- Signal connector (to be plugged into the OCR)
- Operation manual

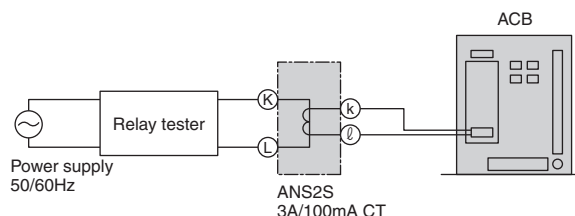


■ Prepare the following tools

- OCR test interface unit, type ANS2S
Do not disconnect the secondary terminal while the power is on.
High voltage will be produced.
- Stopwatch

■ Values of $[I_n]$ and CT ratio

Type	Rated current (I_n) (A)	CT ratio
AR206E	630	630 / 0.1
AR208E	800	800 / 0.1
AR210E	1000	1000 / 0.1
AR212E	1250	1250 / 0.1
AR216E	1600	1600 / 0.1



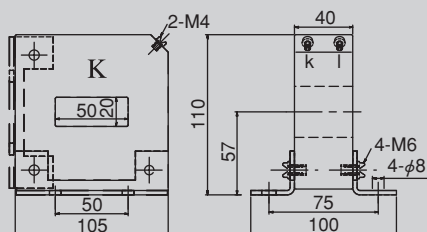
Current transformer for neutral line (separate type)

When using a 3-pole ACB with the ground fault protection function to protect a 3-phase, 4-wire system against ground fault, install an appropriate current transformer (CT) to the neutral line of the system.

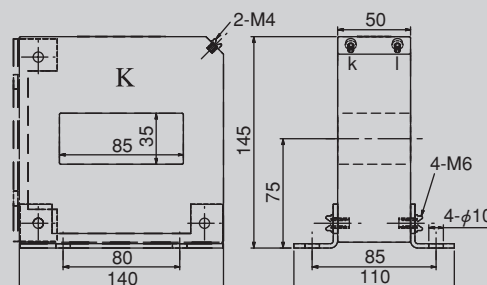
TERASAKI can provide this neutral line CT as an option.

For the 4-pole ACB the neutral line CT is already built into the neutral phase of the ACB when the ground fault protection is fitted.

• Outline dimension of CT for neutral line



Type of ACB	Type of CT	Rated primary current (A)	Rated secondary current (mA)
AR206E	T2GB40N06	630	100
AR208E	T2GB40N08	800	100



Type of ACB	Type of CT	Rated primary current (A)	Rated secondary current (mA)
AR210E	T2GBX6N10	1000	100
AR212E	T2GBX6N12	1250	100
AR216E	T2GBX6N16	1600	100

3 Specifications

ON-OFF cycle counter

The ON-OFF cycle counter is a mechanical 5-digit readout that shows the number of ON-OFF cycles of the ACB.

Counter readings serve as a guide for maintenance or inspection.

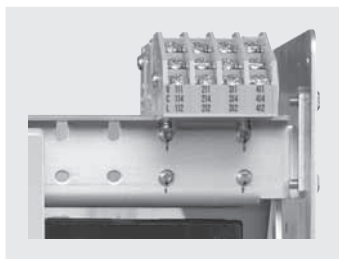


Auxiliary switches

The auxiliary switches operate during the ACB ON/OFF operation.

Connections to the switches are made via screw terminals.

The auxiliary switches have change-over contacts and are available for general service and for microload.



Type	Normal contacts for general service	Gold contacts for microload ※※
※AXR-004	4c	—
AXR-007	7c	—
AXR-304	4c	3c
AXR-010	10c	—
AXR-307	7c	3c

※The standard contact arrangement of the auxiliary switches is 4c.
(Form c: Change-over, single gap, three terminals)

※※Suited to electronic circuits

Auxiliary switch ratings

Category	For general service			For microload ※※			Min. applicable load
	Voltage	Resistive load (A)	Inductive load (A)	AC: $\cos \phi \geq 0.3$ DC: $L/R \leq 0.01$	Resistive load (A)	Inductive load (A)	
AC100-250V	5	5	5	0.1	0.1	—	DC5V 1mA
AC251-500V	5	5	5	—	—	—	
DC30V	1	1	1	0.1	0.1	—	
DC125-250V	1	1	1	—	—	—	

Note 1: The chattering of b-contacts due to ON-OFF operation of the ACB lasts for less than 20 ms.

Note 2: Do not supply different voltages to contacts of a switch.

Trip Indicator

Trip Indicator closes (ON) when the air circuit breaker is tripped by overcurrent release, shunt trip device, undervoltage trip device or manual operation of OFF button. The table summarizes when the trip indicator operates (ON) and when it is reset (OFF). Use a suitable self-hold circuit as necessary for continuous trip alarm indication.

Breaker Tripped by	Operation of Trip Indicator	
	Closing Springs Charged	Closing Spring Discharged
Over-current Trip (OCR)	Switch is ON for 40ms, then reset to OFF.	Switch remains ON until closing springs are charged
Shunt trip	Switch remains ON until undervoltage condition is restored normal.	Switch remains ON until closing springs are charged after undervoltage condition has restored to normal.
Undervoltage trip	Switch remains ON until undervoltage condition is restored normal.	Switch remains ON until closing springs are charged after undervoltage condition has restored to normal.
Remote Opening	Switch remains ON until undervoltage condition is restored normal.	Switch remains ON until closing springs are charged after undervoltage condition has restored to normal.
Undervoltage Condition	Switch remains ON until undervoltage condition is restored normal.	Switch remains ON until closing springs are charged after undervoltage condition has restored to normal.
Manual Opening by PUSH-TO-OPEN button	Switch remains ON until PUSH-TO-OPEN button is released	Switch remains ON until closing springs are charged after PUSH-TO-OPEN button is released.

Normal contacts for general service

Voltage (V)		Switch contact ratings	
		Resistive load	Inductive load
AC	250	3	3
	250	0.1	0.1
	125	0.5	0.5
	30	3	2

Minimum applicable load is DC24V 10mA.

Gold contacts for microload

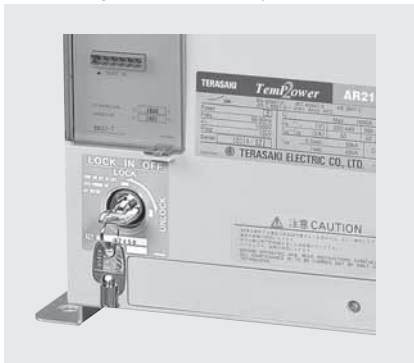
Voltage (V)		Switch contact ratings	
		Resistive load	Inductive load
AC	250	0.1	0.1
DC	30	0.1	0.1

Minimum applicable load is DC24V 1mA.

Key lock

The key lock is available in two types: the lock-in ON type that locks the ACB in the closed position, and the lock-in OFF type that locks the ACB in the open position.

When the ACB is fitted with a key lock, the operator cannot operate the ACB unless using a matched key.



Key interlock

The key interlock is a system of interlocking between ACBs, each fitted with a key lock of lock-in OFF type.

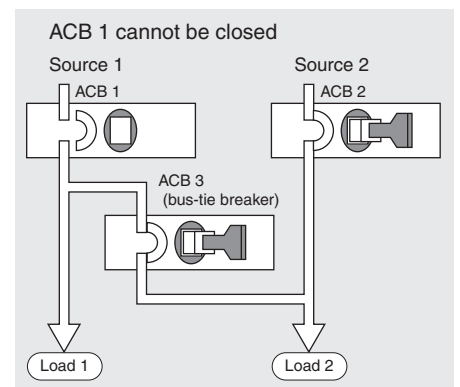
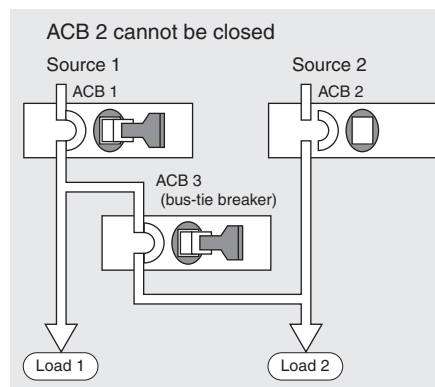
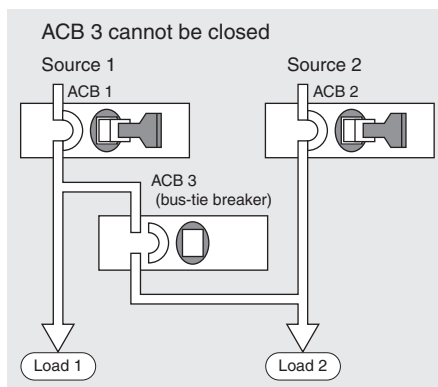
- A key must be inserted to release the lock before the ACB can be closed.
- The ACB must be opened and locked in the OFF position before the key can be removed.

By utilizing the lock-in OFF type key lock feature, and then a limited number of keys by default provides an effective and reliable interlock system.

Using the same keys also allows interlocking between an ACB and other devices (such as a switchboard door).

ACBs can be supplied with a cylinder lock or type FS-2 Castell lock (with an angular movement 90° clockwise to trap key).

Example: Interlock for prevention of parallel feeding from two sources



ON-OFF button cover ※

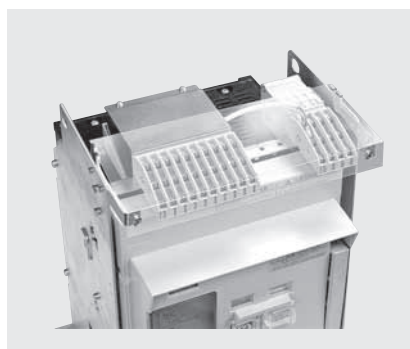
※: Standard equipment

An ON-OFF button cover prevents inadvertent or unauthorized operation of the ON or OFF button. It can be locked with up to three padlocks with ø6 hasp. Padlocks are not supplied.



Control circuit terminal cover

A control circuit terminal cover protects the terminal blocks for auxiliary switches and control circuits from being accidentally touched, thus enhancing safety.



OFF padlock (OFA)

Permits the ACB to be padlocked in the OFF position. Max. three padlocks with ø6 hasp can be fitted. Padlocking is possible only when ON-OFF indicator shows OFF. When the ACB is padlocked in the OFF position both manual and electrical closing become inoperative, but the charging of the closing spring by manual or motor is still possible.

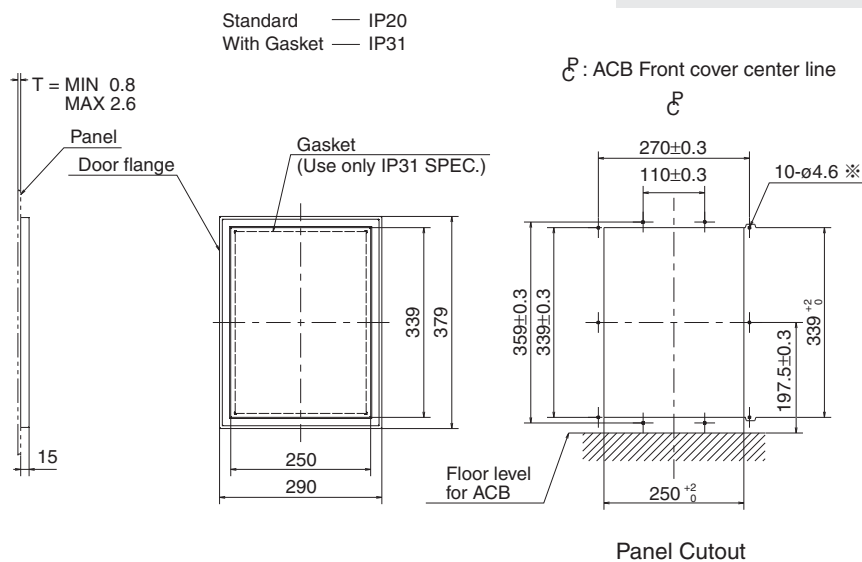
Note1: OFF padlock facility cannot be fitted with key lock or key interlock.

3 Specifications

Door flange

A door flange can be used as a decoration panel that covers the cutout on the switchboard panel, and provides IP20 protection. For IP31 protection please specify the door flange with a gasket.

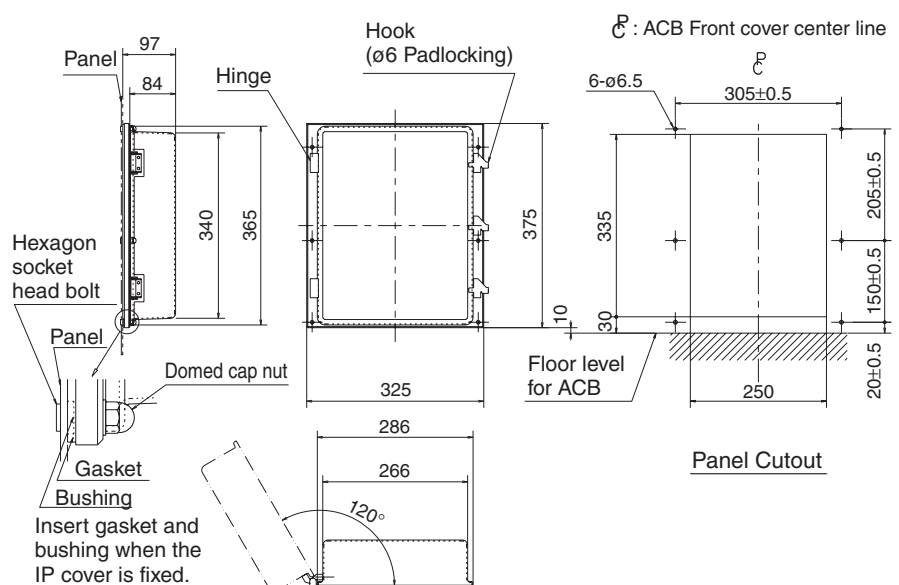
Note: Door flange can not be fitted with IP cover.



※: Mount IP20 door flange through 6 mounting holes and IP31 door flange through 10 mounting holes.

IP cover

An IP cover provides an IP55 grade of protection as defined in IEC 60529.



7 Operation Environments

Standard environment

The standard environment for ACBs is as follows:

Ambient temperature	<p>–5°C to +40°C</p> <p>The average temperature for 24 hours must not exceed 35°C.</p>
Relative humidity	Below 85%
Attitude	Below 2000 m
Atmosphere	<p>Excessive water vapor, oil vapor, smoke, dust, or corrosive gases must not exist.</p> <p>Sudden change in temperature, condensation, or icing must not occur.</p>
Vibration	<p>The TemPower 2 ACB is designed to withstand electromagnetic and mechanical vibrations in accordance to IEC 68-2-6. (2-13.2 Hz with amplitude of +/- 1mm; 13.2 to 100Hz with an acceleration of 0.7g).</p>

Special environment

Tropicalization (Fungus and moisture treatment)

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

Conditions: Max. permissible ambient temperature 60°C
 Max. permissible humidity 95% rel.
 No condensation

Cold climate treatment

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

Conditions: Min. permissible storage temperature –40°C
 Min. permissible operating temperature –25°C
 No condensation

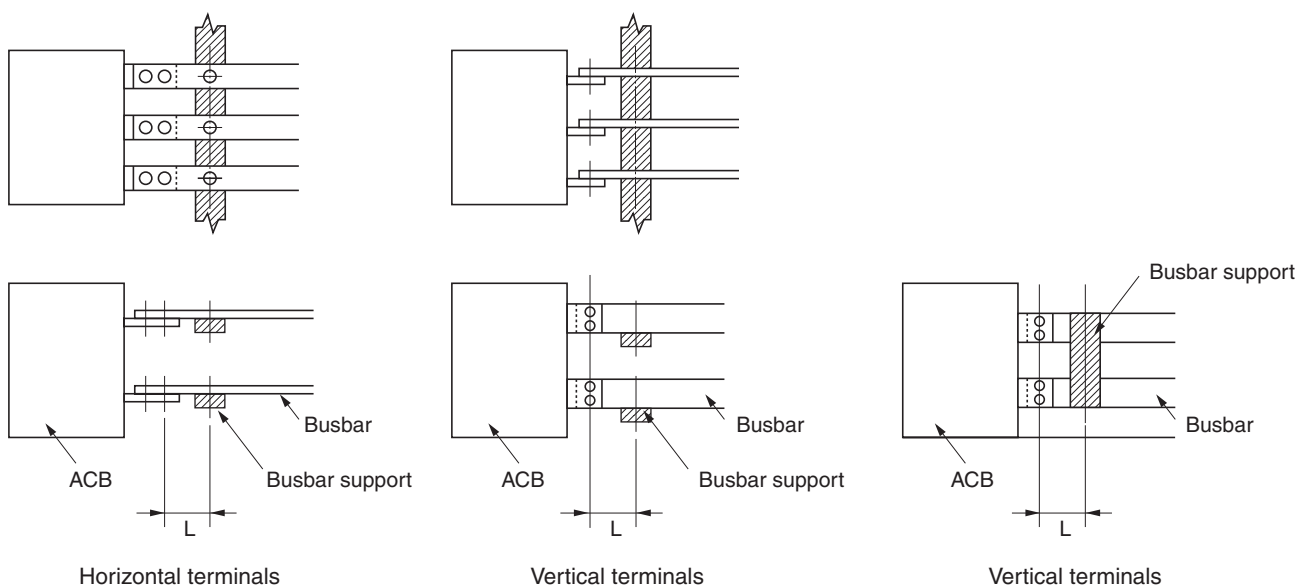
Anti-corrosion treatment

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

Contact Terasaki for details.

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 a single support.



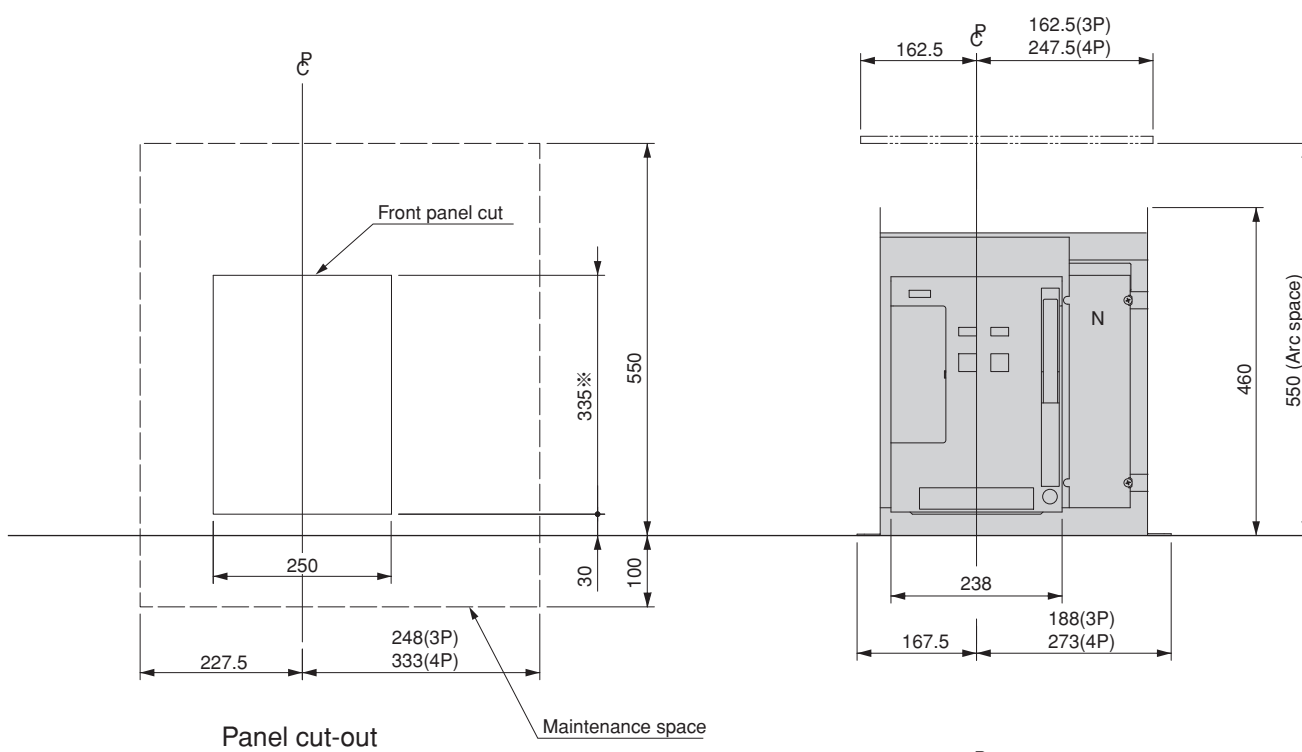
The maximum distance of the connection point of ACB to the first busbar support

Short-circuit current (kA)			30	50
Distance L(mm)	AR206E~AR216E	Horizontal terminals	200	150
		Vertical terminals	150	100

4 Outline Dimensions

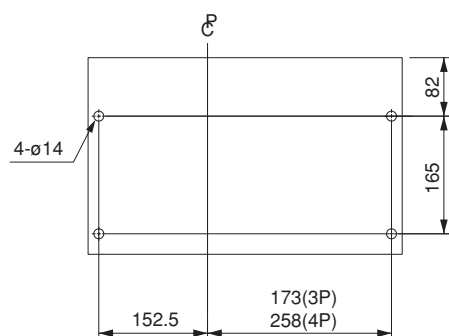
- **Type** AR206E, AR208E, AR210E, AR212E, AR216E } **Fixed type**

Ⓒ: ACB Front cover center line



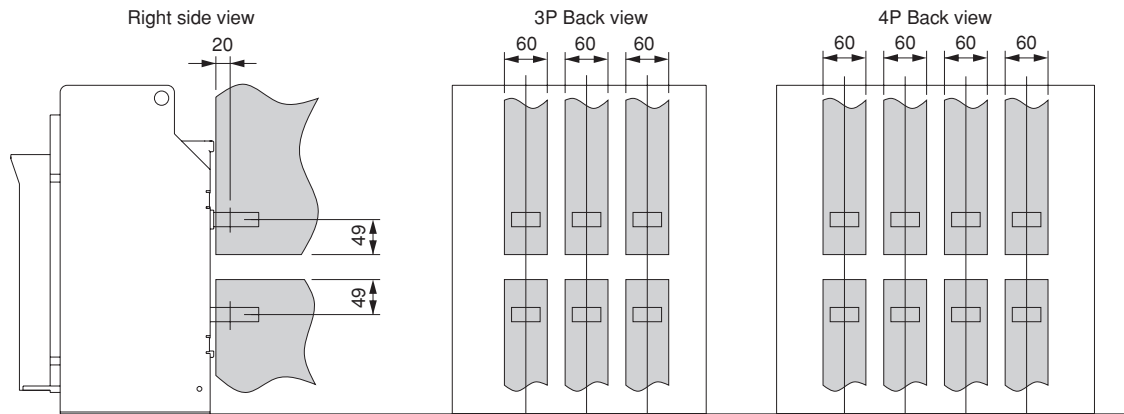
※: Panel cut should be 339 mm not 335 mm when the door flange is used. Refer to page 15.

• N represents the neutral pole of 4-pole ACBs.

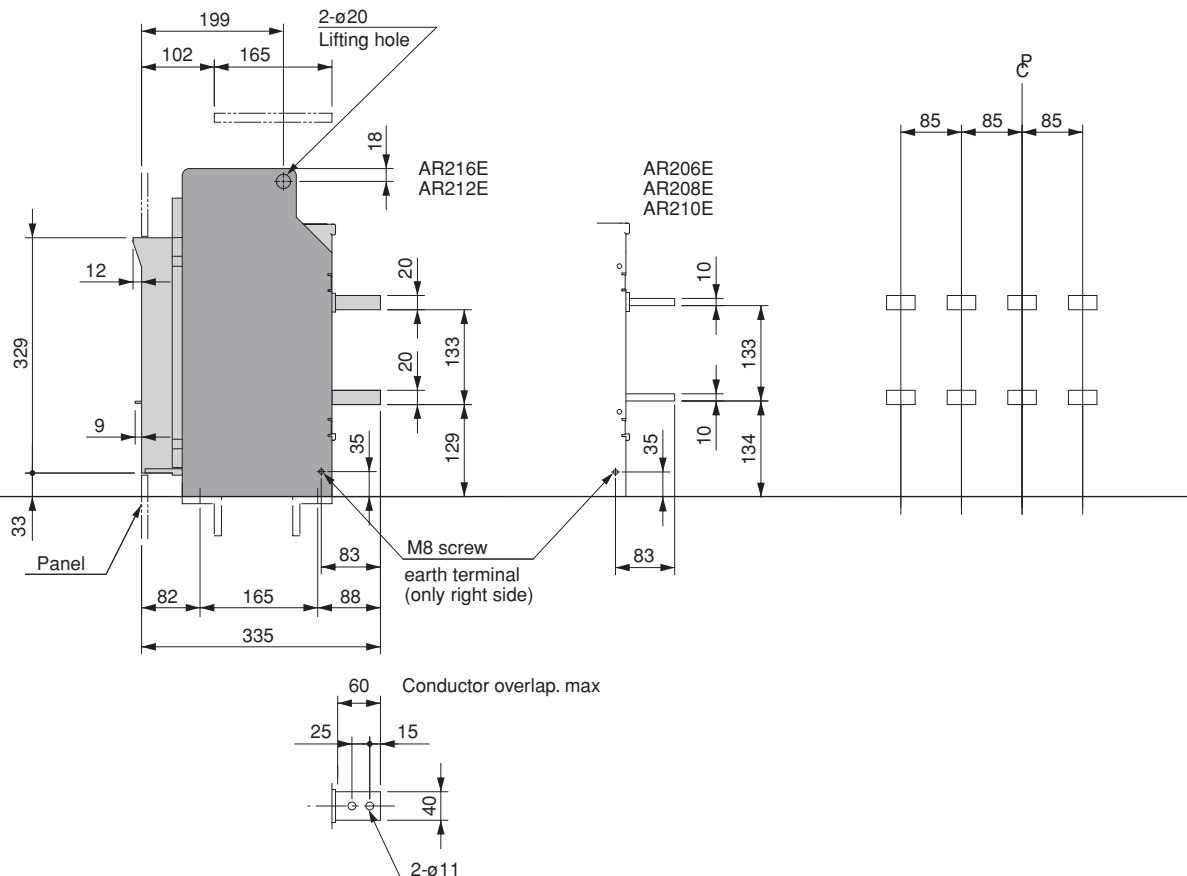


Mounting holes

Details



Connect conductors to the main circuit terminals in the conductor connection.
Insulation distance of conductor connection area and earth metal is more than 12.5mm.



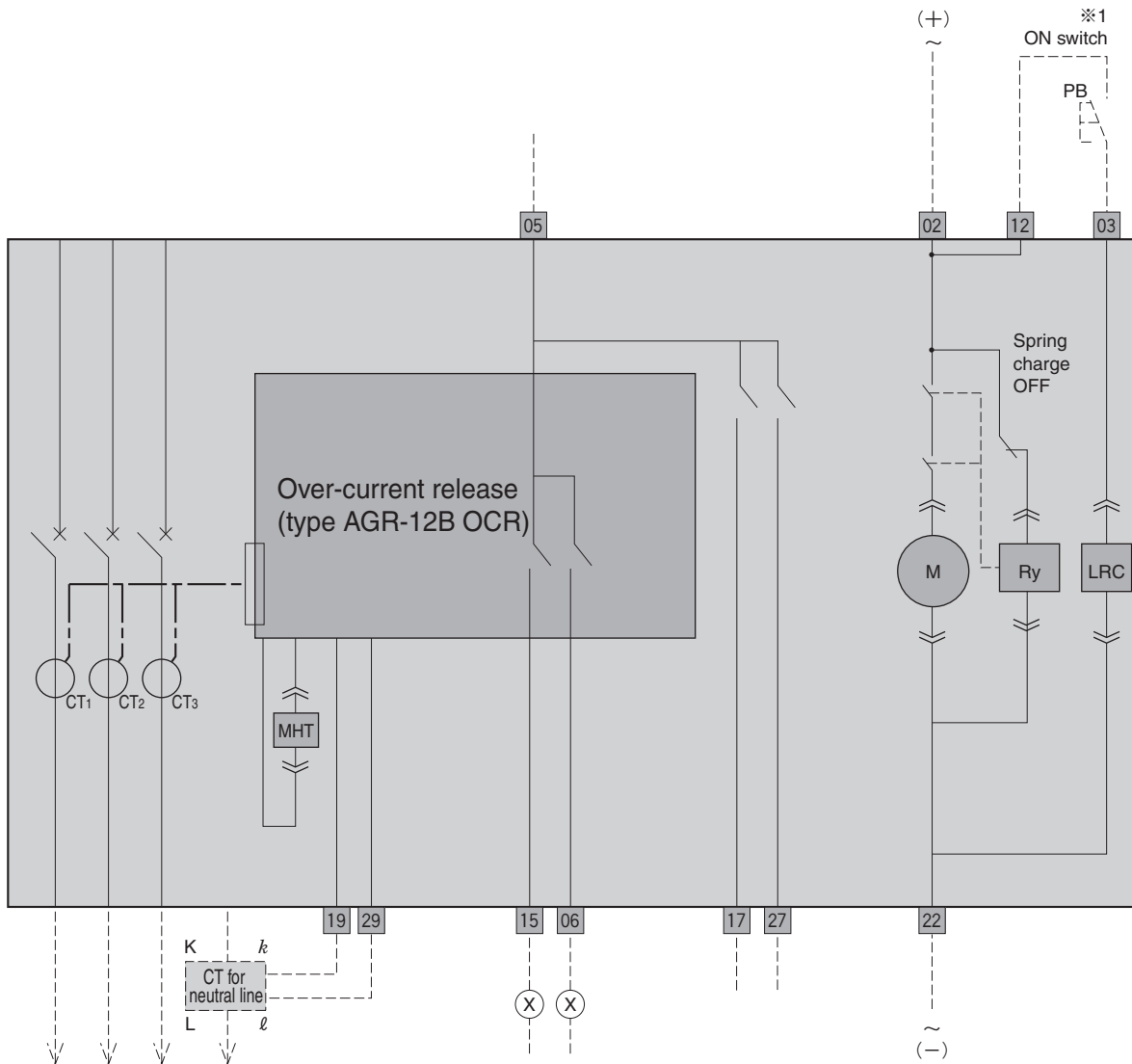
5 Circuit Diagram

Main circuit

CT for
neutral line

Operation

※3 Motor charging/
Operation circuit



Terminal description

02 22 Control power supply AC100 - 240V, DC100 - 250V, DC24V, DC48V

12 Operation switch, common

03 ON switch

05 Operation indication terminal, common

15 OCR trip indication or single-contact trip indication (40ms signal)

06 PTA indication

17 Trip indicator

27 Spring charge indicator

10 20 Instantaneously-rated shunt trip

19 Separate CT for neutral line (k)

29 Separate CT for neutral line (ℓ)

08, 18, 28 UVT power supply

09 UVT power supply common

UVT power supply

Term. No.	AC100V unit	AC200V unit	AC400V unit	AC450V unit
08 — 09	100V	200V	380V	450V
18 — 09	110V	220V	415V	480V
28 — 09	120V	240V	440V	400V

Term. No.	DC24V unit	DC48V unit	DC100V unit	DC110V unit
08 — 09	24V	48V	100V	110V

Symbols for accessories

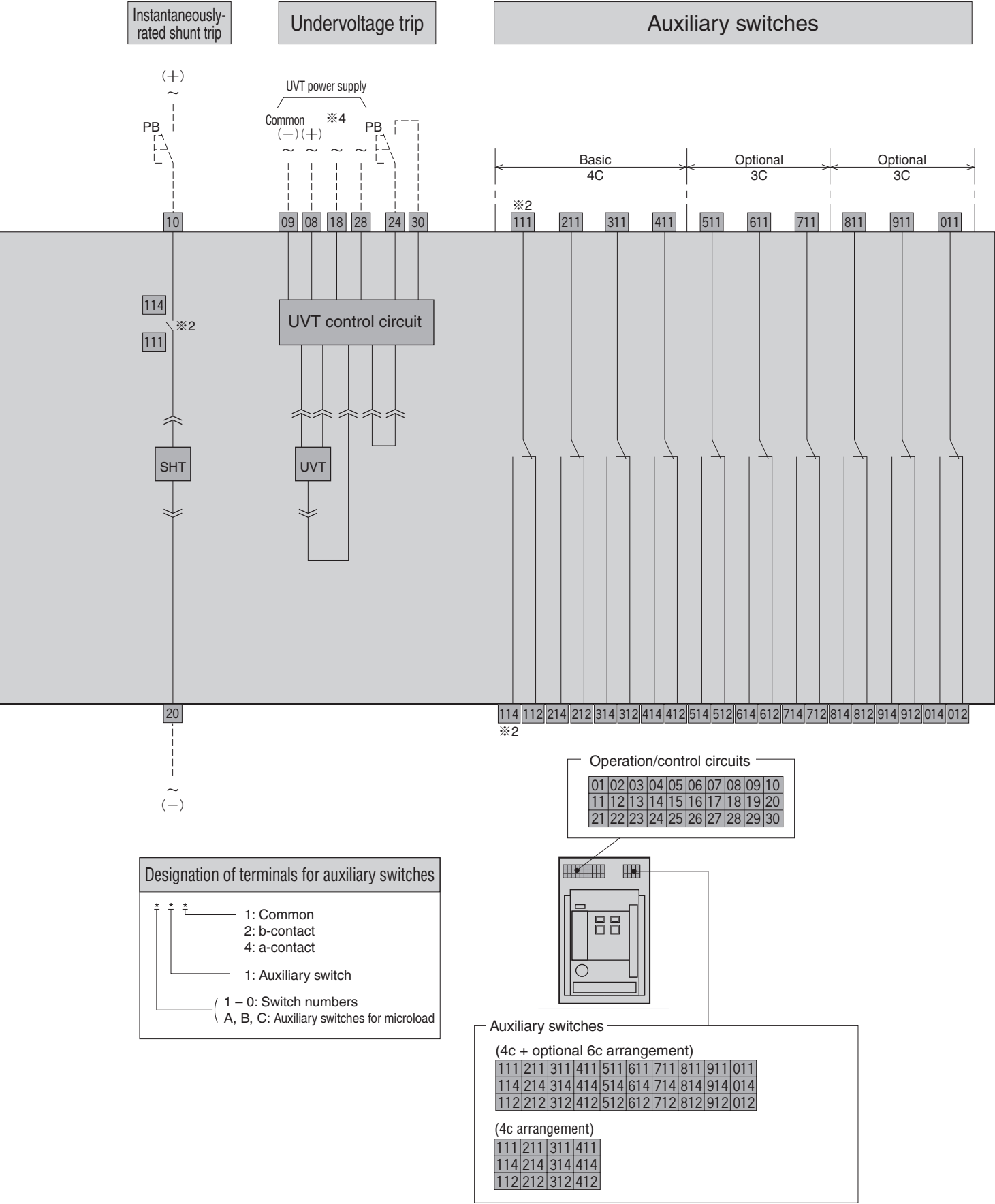
LRC : Latch release coil
M : Charging motor
CT1 - CT3 : CT for OCR
MHT : Magnetic Hold Trigger
Manual connector
User wiring
Relay or indicator lamp

※1: Do not connect "b" contact of auxiliary switch to ON switch in series, otherwise, pumping may occur.

※2: To be connected to auxiliary switch terminals 111 and 114 to prevent burnout.

※3: The split circuit between motor circuit and closing circuit is available as special specification.

※4: Only one of terminals 08, 18, 28 must be used as this is a single phase UVT.



6 Technical and Application Data

Dielectric strength

Circuit			Withstand voltage (at 50/60 Hz)		Rated Impulse withstand voltage U_{imp}
Main circuit			Between terminals, terminal group to earth	AC3500V for 1 minute	12kV
Control circuits	Auxiliary switches	For general service	Terminal group to earth	AC2500V for 1 minute	6kV
		For microload	Terminal group to earth	AC2000V for 1 minute	4kV
	Position switches		Terminal group to earth	AC2000V for 1 minute	4kV
	Over-current release (OCR)		Terminal group to earth	AC2000V for 1 minute	4kV
	Undervoltage trip device		Terminal group to earth	AC2500V for 1 minute	6kV
Other accessories			Terminal group to earth	AC2000V for 1 minute	4kV

Note: The values shown above are those measured on phase connections and cannot be applied to control terminals on the ACB.

Internal resistance and power consumption

• Economical Series

Type	AR206E	AR208E	AR210E	AR212E	AR216E
Rated current (A)	630	800	1000	1250	1600
DC internal resistance per pole (mΩ)	0.027	0.027	0.027	0.024	0.024
Power consumption for 3 poles (W)	45	75	120	175	260

Derating

• Economical Series

Based Standards	Ambient temperature (°C)	Type Connecting bar sizes	AR206E 2×40×5t	AR208E 2×50×5t	AR210E 2×60×5t	AR212E 2×80×5t	AR216E 2×100×5t
JIS C 8201-2-1	40 (Standard ambient temperature)		630	800	1000	1250	1600
Ann.1 Ann.2	45		630	800	1000	1250	1530
IEC60947-2	50		630	800	1000	1250	1470
EN 60947-2	55		630	800	1000	1250	1400
AS3947.2	60		630	800	970	1210	1330

Note: Values with horizontal terminals.

Above figures are subject to the design of the enclosure and rating of busbar.

TemPower Order Form

Please check boxes and fill in underlined spaces as appropriate.

Your company name: _____ Order Number: _____

Quantity _____ Delivery time required _____

Your specifications

1 Type	<input type="checkbox"/> AR206E <input type="checkbox"/> AR208E <input type="checkbox"/> AR210E <input type="checkbox"/> AR212E <input type="checkbox"/> AR216E
2 Number of poles	<input type="checkbox"/> 3-pole <input type="checkbox"/> 4-pole For the requirement of 2-pole type, specify 3-pole type and use 2 poles on both sides.
3 Circuit voltage and frequency	AC _____ V. _____ Hz. DC _____ V. <input type="checkbox"/> 3ø3W <input type="checkbox"/> 3ø4W
4 Applicable standard and ambient temperature	Applicable standard _____ <input type="checkbox"/> 40°C
5 Type of mounting	<input type="checkbox"/> Fixed type, Horizontal terminals <input type="checkbox"/> Vertical terminals with attachments <input type="checkbox"/> Front terminals with attachments
6 Type of spring charged operation	<input type="checkbox"/> Manual charging <input type="checkbox"/> Motor charging Supply voltage AC _____ V, DC _____ V <input type="checkbox"/> Step-down transformer _____ sets <input type="checkbox"/> Split circuit for motor and closing circuit (closing coil AC _____ V, DC _____ V) <input type="checkbox"/> Spring charge indicator (<input type="checkbox"/> for general service <input type="checkbox"/> for microload)
7 Over-current release (OCR)	(1) OCR type AGR-12BL- <input type="checkbox"/> L- <input type="checkbox"/> <div style="margin-left: 150px;"> P : PTA N : N-phase protection { A : LT+ST+INST G : LT+ST+INST+GF </div> <div style="display: flex; justify-content: space-between;"> <div> (2) Characteristic Application <input type="checkbox"/> 1 Generator protection <input type="checkbox"/> 2 General feeder circuits <input type="checkbox"/> 3 General feeder circuits <input type="checkbox"/> 4 Motor protection <input type="checkbox"/> 5 Motor protection <input type="checkbox"/> 6 Motor protection </div> <div> (3) I_R Long time-delay trip pick-up current <input type="checkbox"/> $(I_n) \times 0.4$ <input type="checkbox"/> $(I_n) \times 0.5$ <input type="checkbox"/> $(I_n) \times 0.63$ <input type="checkbox"/> $(I_n) \times 0.8$ <input type="checkbox"/> $(I_n) \times 0.85$ <input type="checkbox"/> $(I_n) \times 0.9$ <input type="checkbox"/> $(I_n) \times 0.95$ <input type="checkbox"/> $(I_n) \times 1.0$ </div> </div> (4) <input type="checkbox"/> CT for neutral line
8 Electromagnetic Instantaneous Trip Device	<input type="checkbox"/> 5kA <input type="checkbox"/> 7.5kA <input type="checkbox"/> 10kA <input type="checkbox"/> 15kA <input type="checkbox"/> 20kA <input type="checkbox"/> 25kA
9 Trip devices	<input type="checkbox"/> Instantaneously-rated shunt trip device AC _____ V, DC _____ V <input type="checkbox"/> Undervoltage trip device AC _____ V※1 <input type="checkbox"/> AUR-1CS <input type="checkbox"/> AUR-1CD
10 Other accessories	<input type="checkbox"/> ON-OFF cycle counter <input type="checkbox"/> Auxiliary switches type AXR-_____ <input type="checkbox"/> Key lock (<input type="checkbox"/> Lock-in OFF <input type="checkbox"/> Lock-in ON) <input type="checkbox"/> Key interlock (<input type="checkbox"/> Cylinder lock <input type="checkbox"/> Castell lock) (Castell lock not supplied) <input type="checkbox"/> Control circuit terminal cover <input type="checkbox"/> IP cover <input type="checkbox"/> OFF padlock (OFA) <input type="checkbox"/> Door flange <input type="checkbox"/> Trip indicator (<input type="checkbox"/> for general service <input type="checkbox"/> for microload)
11 Special environment specification	<input type="checkbox"/> Not required <input type="checkbox"/> Tropicalization (fungus and moisture treatment) <input type="checkbox"/> Cold climate treatment <input type="checkbox"/> Anti-corrosion treatment
12 Spare parts	<input type="checkbox"/> Not required <input type="checkbox"/> Required (Contact Terasaki for recommended spare parts)
13 Test report	<input type="checkbox"/> English _____ copies
14 Other	<input type="checkbox"/> OCR test interface unit (ANS2S)



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