MITSUBISHI

# Mitsubishi Low Voltage Air Circuit Breaker
# AE-SS AE-SH

Super AE



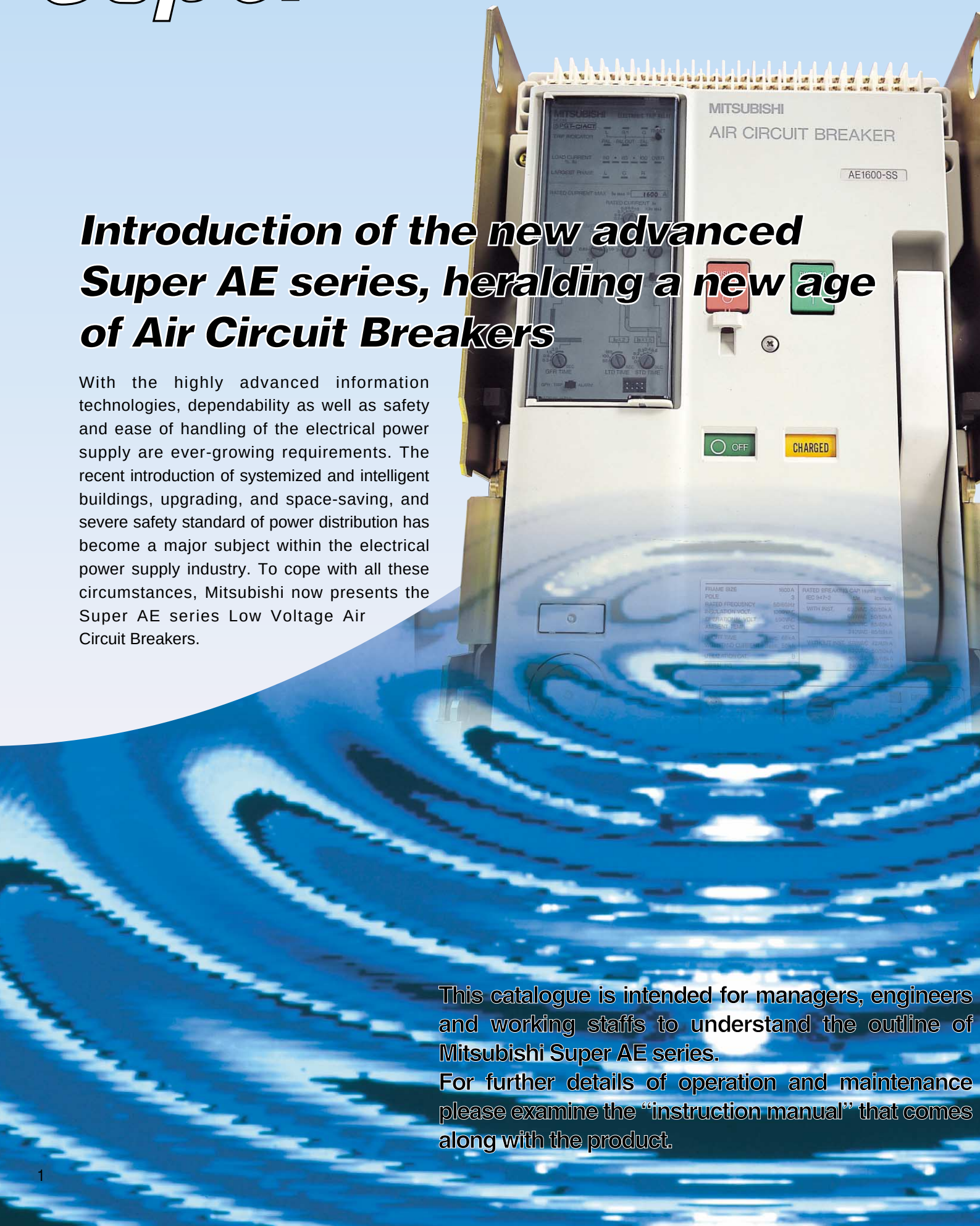
ISO 14001 JACO — JAPAN AUDIT AND CERTIFICATION ORGANIZATION FOR ENVIRONMENT AND QUALITY — NATIONAL ACCREDITATION OF CERTIFICATION BODIES

BVQI ISO 9001 — NATIONAL ACCREDITATION OF CERTIFICATION BODIES

Mitsubishi Electric Corporation's Fukuyama Works, which produces these products, is certified as meeting the ISO 14001 environmental management system standard.

00 B

# Super AE




## *Introduction of the new advanced Super AE series, heralding a new age of Air Circuit Breakers*

With the highly advanced information technologies, dependability as well as safety and ease of handling of the electrical power supply are ever-growing requirements. The recent introduction of systemized and intelligent buildings, upgrading, and space-saving, and severe safety standard of power distribution has become a major subject within the electrical power supply industry. To cope with all these circumstances, Mitsubishi now presents the Super AE series Low Voltage Air Circuit Breakers.

This catalogue is intended for managers, engineers and working staffs to understand the outline of Mitsubishi Super AE series.
For further details of operation and maintenance please examine the "instruction manual" that comes along with the product.

# Contents

# ■ Main unit features

## Easier Operation

### Plenty Type Composition

■ The addition of 4000A, 5000A and 6300A frame to the universal series makes applicable for a wide range of types from 630A to 6300A.
■ The addition of high breaking capacity (AE-SH) series (630A-3200A frame) has enabled the design of economic sequences.

### Expanded selective interruption range

■ With the increased short-time current rating, the selective interruption range can be expanded with the use of the electronic trip relays with MCR function.

| | | |
|---|---|---|
| AE630-SS ~ AE3200-SS 65kA | AE4000-SSC 75kA | AE4000-SS<br>AE5000-SS 85kA<br>AE6300-SS |

### Full moulding

■ Since the breaker is fully insulated with mouldings, it is safe to use for a wide range of applications.

### Long service life

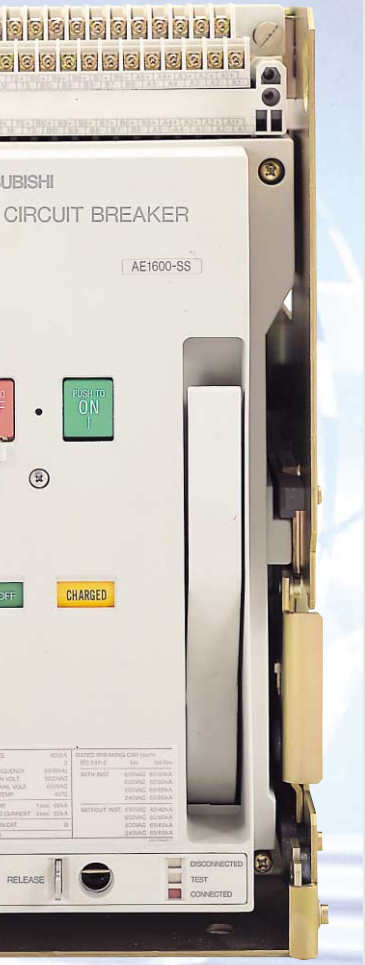
■ 10,000 mechanical open/close operations for all types. (Except for AE4000-SS~AE6300-SS, AE4000-SSC)

### Zero arc space

■ Arc exhaust space to the outside of the breaker is drastically reduced for safer operation. (AE630-SS ~ AE3200-SS, AE4000-SSC ≦ 600VAC)

### Reverse connection available

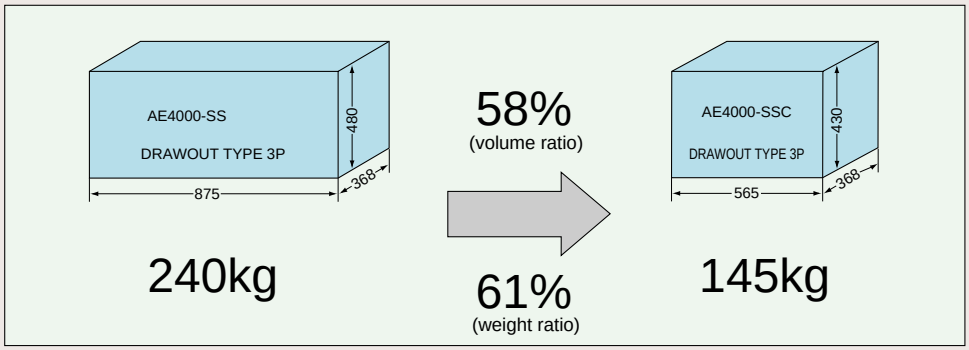
■ Line and Load is not defined on the Main circuit terminals.
Therefore reverse connection is available without any limitation.




## More complete New AE4000-SSC

■The new AE4000-SSC which is smaller and economical makes fill up the AE-SS series.

■AE4000-SSC has realized smaller and lighter than AE4000-SS.

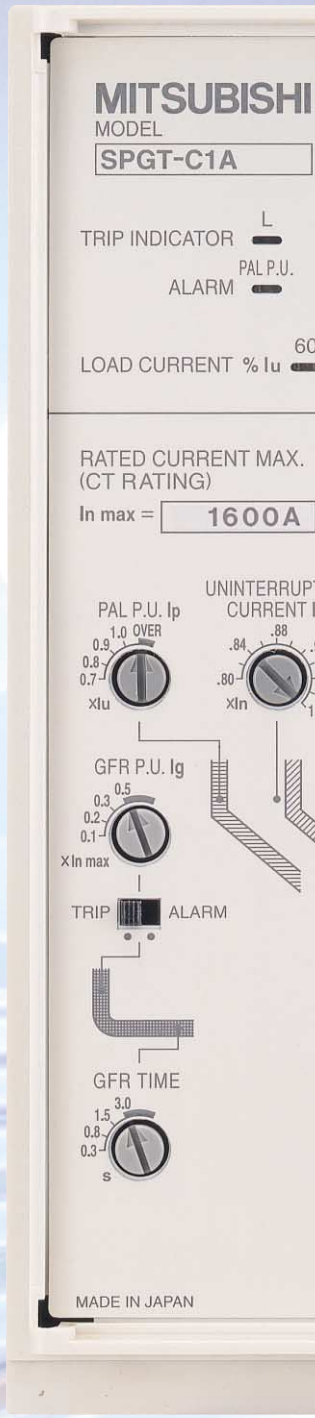



■Number of Operating cycles has been increased (2000 cycles→5000 cycles).

note 1: Only 3-pole type is available.
note 2: The Max. rated current is 3600A on JIS C8372.

# Electronic trip relay features (1/2)

## Multi functions available




## 1 Electronic trip relay series

### Grouped electronic trip relays for easier selection

| Application | Relay type | Remarks | Function |
|---|---|---|---|
| Measuring & Display Communication | US3 | Provides CC-Link communication, data measuring and display for adaption to networking systems. | US3 type: ・Plenty of electrical data is measured and displayed ・Measured data, alarm and setting value is transmitted on CC-Link bus line ・Remote ON/OFF operation |
| General use | S | A multi-function type that provides all the characteristics required for the main circuit. | S, M type: ・Multi-function L, S, I/MCR characteristics ・Ground fault/ Earth leakage protection ・Trip indicator |
| Generator protection use | M | Provided with characteristics for protecting generators for private power generation and marine vessels. | |
| Special use | B-C0A | Only INST/MCR characteristics is provided. | B-C0A: ・INST/MCR characteristics |

- Meets with a wide range of need depending on the application.
- Contributes to selective co-ordination, and ensures fine characteristic setting.

## 2 Common features

Option

### Pre-alarm function (PAL)

The load current exceeds the value of the setting, before the breaker trips, the PAL operates, it contributes electrical continuity and easy maintenance.

Option

### Trip indicator (TI)

The trip indicator (TI) is operated simultaneously with the OCR alarm (AL), when the breaker trips because of Long time delay, short time delay/Instantaneous and Ground fault or Earth leakage. The relavent cause of tripping will be displayed on the appropriate indication LED and a relay contact will provide an output signal.

Option

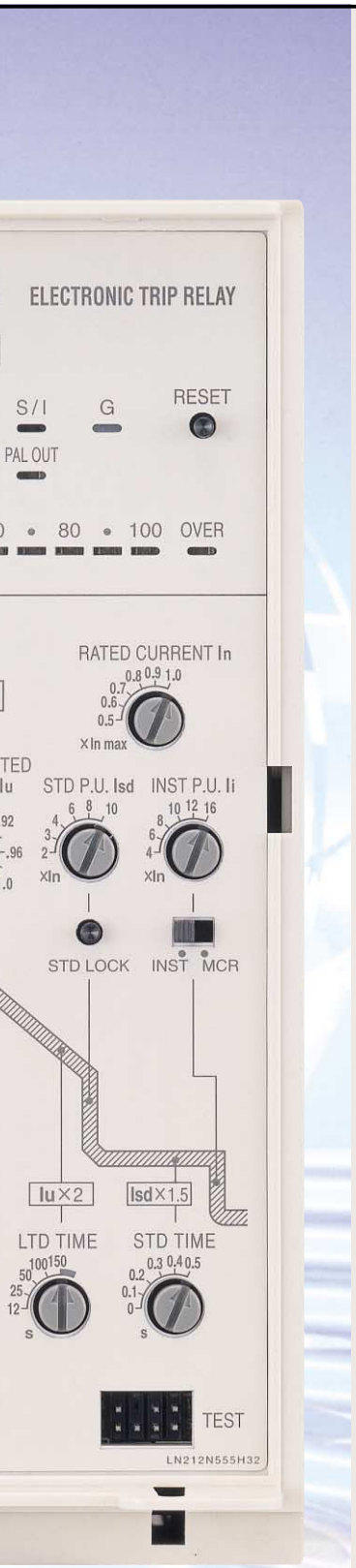
### Temperature alarm (TAL)

The TAL is operated by an unusual temperature of the breaker contacts.

Option

### Earth leakage protection (ER)

A choice of earth leakage alarm or earth leakage tripping function is available improving the discrimination and the safety in circuit design.



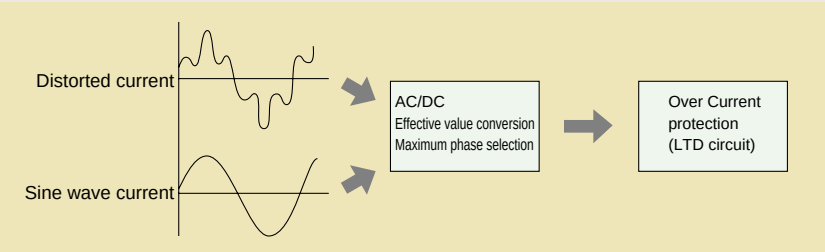

# Meets Many Needs

## Overcurrent protection on the neutral pole (NP)

In a 3-phase 4-wire circuit such that as provided to a computer, DC power unit or other load devices, higher harmonics are liable to be generated which could cause damage as more load current flows in the neutral plole.
NP will eliminate such a possibility.

## More secure protection owing to detection of effective value (RMS)

Effective value detection that is most suitable for the protection of electronic devices.
Effective value detection independently provided for each phase, which is effective for distorted wave forms, is used to cope with the increasing use of electronics devices, including inverters.




Option

## Ground fault protection (GFR)

Either a ground fault trip or alarm function can be selected by a change-over switch.
A control supply is not necessary.

## Load current indication LEDs

The load current can be easily checked with the indication LEDs on the electronic trip relay.

# ■ Electronic trip relay features (2/2)

## MDU (Measuring Display

### Available for AE630-SS~AE6300-SS

The full line up through MCCB 400A to ACB 6300A enables measurements display and transmission of electric circuit information.

**MDU relay types**

| Type | Characteristics | Transmission |
|---|---|---|
| **US3P** | LTD+STD+INST/MCR | CC-Link |
| **US3G** | LTD+STD+INST/MCR+GFR | |
| **US3E** | LTD+STD+INST/MCR+ER | |

PAL and AL are standard function


MDU Display unit

AE-SS MDU

①Electronic trip relay (US3P etc.)
②MDU display unit
③CC-Link Interface unit


CC-Link Interface unit

### Measurement functions

| Measured items (accuracy) | Contents |
|---|---|
| Load current (±2.5%) | Present value ($I_1$, $I_2$, $I_3$, $I_N$※)<br>Demand value ($I_1$, $I_2$, $I_3$, $I_N$※)<br>Maximum demand value (max. phase) |
| Line voltage (±2.5%) | Present value ($V_{1-2}$, $V_{2-3}$, $V_{3-1}$)<br>Demand value ($V_{1-2}$, $V_{2-3}$, $V_{3-1}$)<br>Maximum demand value (max. phase) |
| Phase voltage※ (±2.5%) | Present value ($V_{1-N}$, $V_{2-N}$, $V_{3-N}$)<br>Demand value ($V_{1-N}$, $V_{2-N}$, $V_{3-N}$) |
| Harmonics (±2.5%) | Present value at 3rd, 5th, 7th ($I_1$, $I_2$, $I_3$, $I_N$※)<br>Maximum value at 3rd, 5th, 7th (max. phase)<br>Present value of total harmonics ($I_1$, $I_2$, $I_3$, $I_N$※)<br>Demand value of total harmonics ($I_1$, $I_2$, $I_3$, $I_N$※)<br>Maximum demand value of harmonics (max. phase) |
| Power (±2.5%) | Present value<br>Demand value<br>Maximum demand value |
| Electric energy (±2.5%) | Energy (accumulated value)<br>Time electric energy<br>Maximum time electric energy |
| Reactive power (±2.5%) | Present value<br>Demand value<br>Maximum demand value |
| Reactive energy (±2.5%) | Reactive energy (accumulated value)<br>Time electric energy<br>Maximum time electric energy |
| Power factor (±5%) | Present value |
| Frequency | Present value |

※ In case of 4P AE-SS, $I_N$ and phase voltage measuring are available.

AE1600-SS with MDU

# Unit) lineup for AE-SS

## Transmission items

Incorporation of transmission function

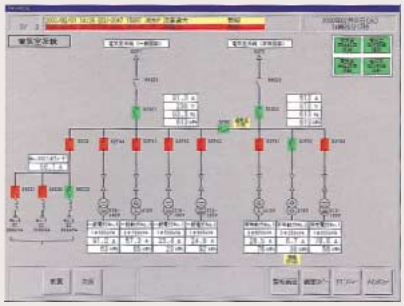
| Function | Contents |
|---|---|
| Remote monitoring | Measured data (refer to page 7)<br>Circuit condition (PAL pickup, PAL OUT, OVER)<br>Fault information (Trip cause & Trip current)<br>Setting of the Electronic trip relay ( $I_n$, $I_p$, $T_L$, $I_{sd}$...)<br>Demand time setting<br>Data clear (Accumulated data, Fault information)<br>Error (Measuring, Transmission) |
| Input | AE-SS ON/OFF status (by AXa) and other two “a” contact inputs |
| Output | For remote ON/OFF |

## PLC networking

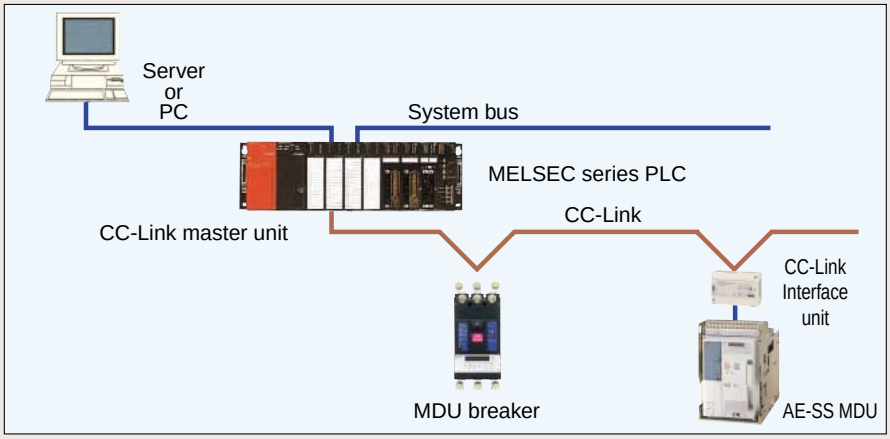
The CC-Link transmission facilitates networking with high level systems (such as SCADA) via PLC

Specifications for CC-Link transmission

| Item | Specifications |
|---|---|
| Transmission speed | Selection from among 156kbps/625kbps/2.5Mbps/5Mbps/10Mbps |
| Connection system | Broadcast polling |
| Number of connectable unit per system | Max. 42unit |
| Maximum transmission distance | Max. 1200m (156kbps, when using a dedicated cable) |
| Unit type | Remote device station<br>(station which can transmit word data as well as input/output) |
| Number of exclusive station | 1 station |

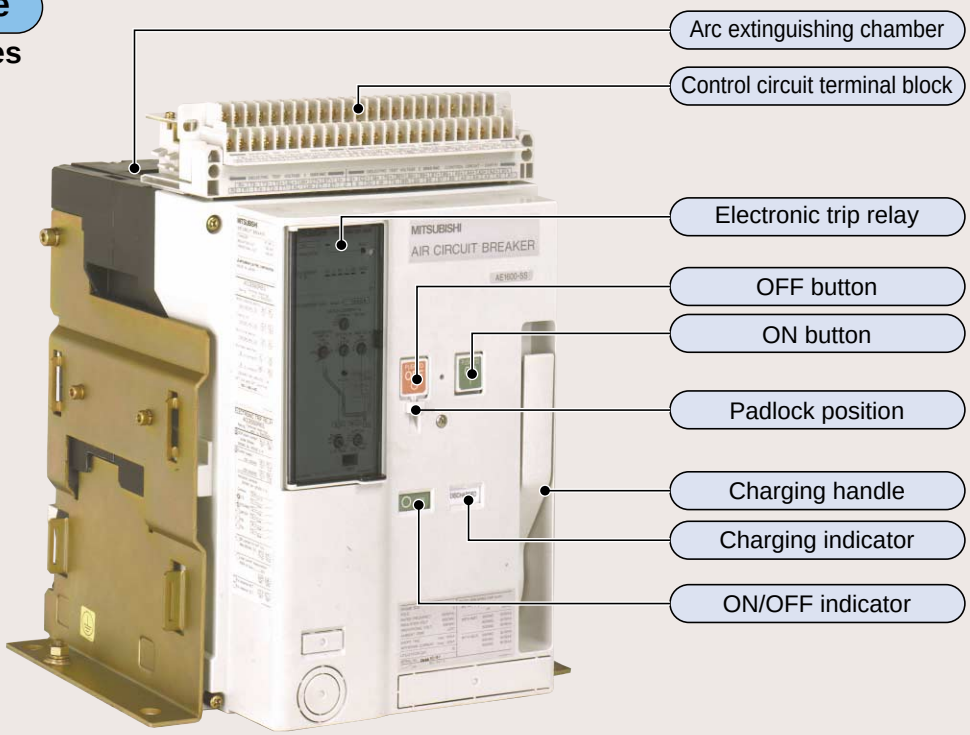


Example of the PC monitoring



# External view and Internal construction

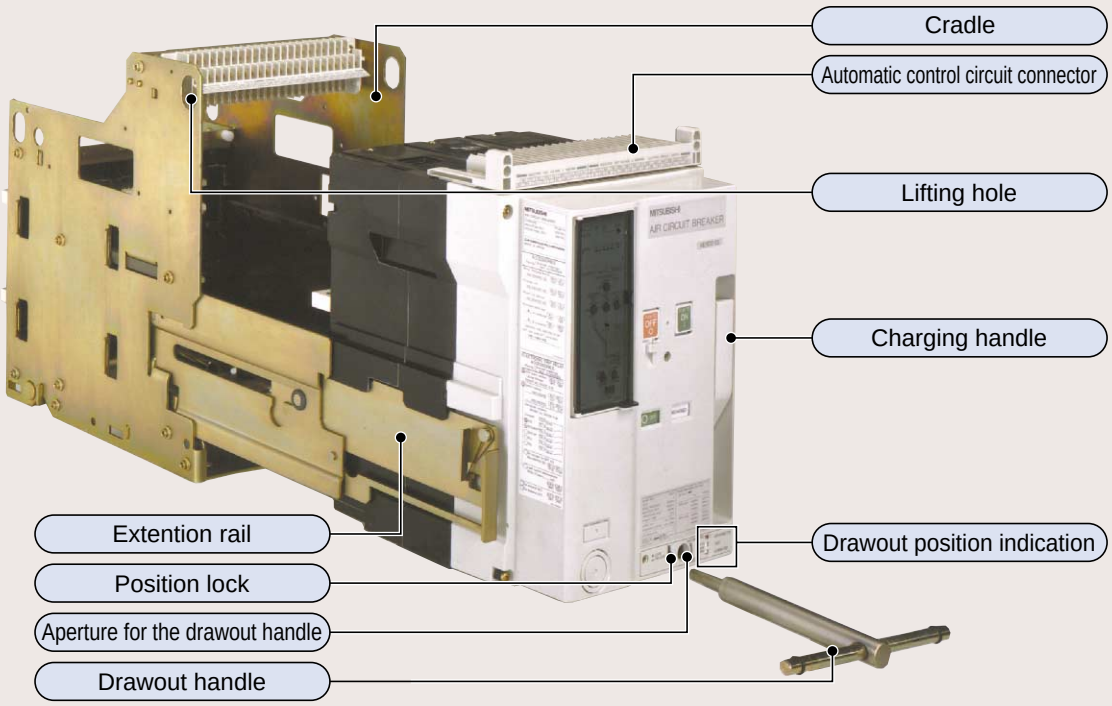
## Fixed type
**AE-SS Series**




Lifting hooks (HP) is supplied in the case of a fixed type AE-SS series.

AE1600-SS 3P

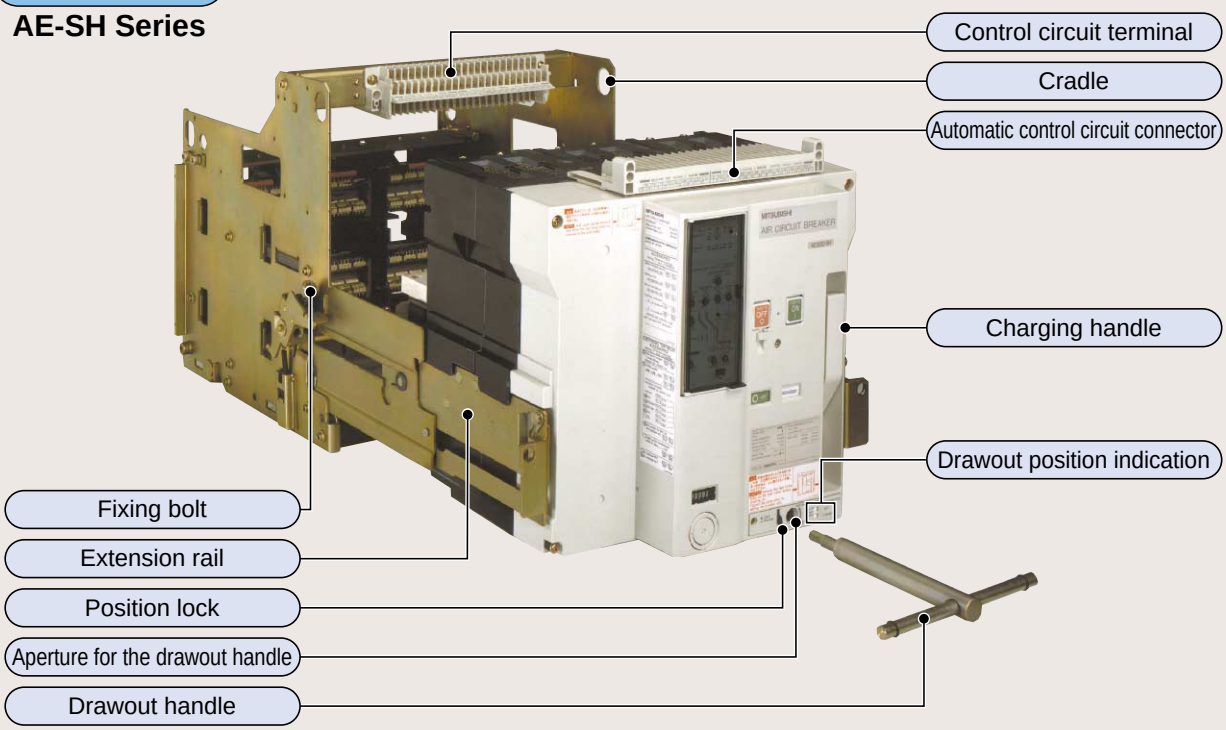
## Drawout type
**AE-SS Series**




AE1600-SS 3P

## Drawout type

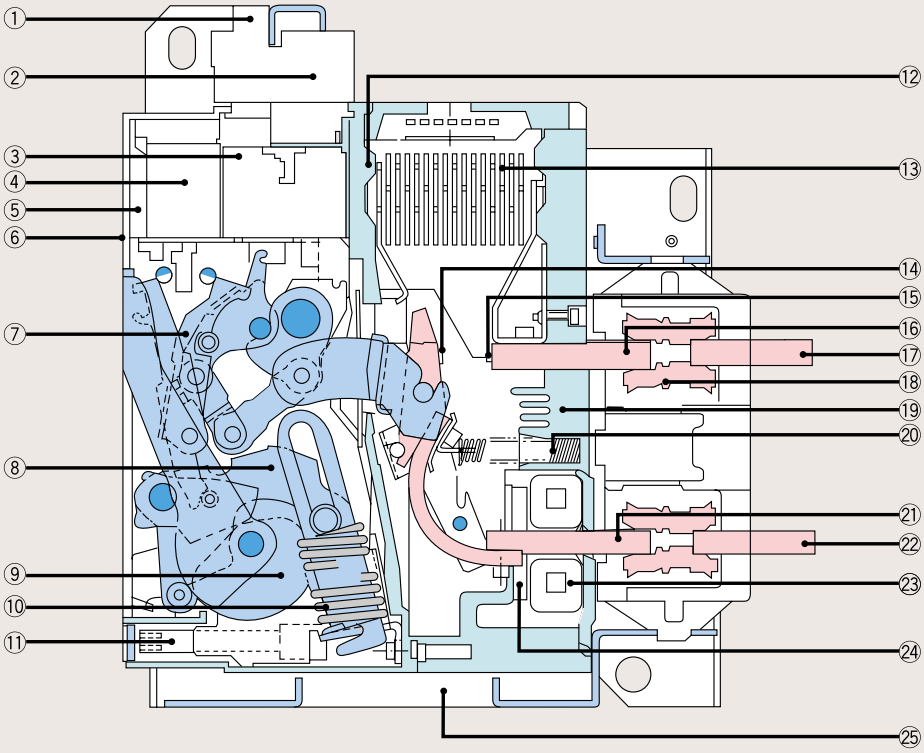
### AE-SH Series




AE3200-SH 3P

## Internal Construction

### AE-SS Series




①Control circuit terminal block
②Automatic control circuit connector
③Auxiliary switches
④Shunt trip device, Closing coil
⑤Electronic trip relay
⑥Front Cover
⑦Tripping mechanism
⑧Closing mechanism
⑨Charging mechanism
⑩Closing spring
⑪Draw-out mechanism
⑫Insulated base
⑬Arc extinguishing chamber
⑭Main movable contacts
⑮Main fixed contacts
⑯Conductors on the breaker
⑰Conductors on the cradle
⑱Main circuit junction
⑲Base
⑳Contact spring
㉑Conductors on the breaker
㉒Conductors on the cradle
㉓Power supply CT
㉔Current sensor coil
㉕Cradle

# *Super AE series allows easier customer selection*

① ② ③

| Type | | Page |
|---|---|---|
| Standard model | AE630-SS<br>AE1000-SS<br>AE1250-SS<br>AE1600-SS<br>AE2000-SS<br>AE2500-SS<br>AE3200-SS<br>AE4000-SSC<br>AE4000-SS<br>AE5000-SS<br>AE6300-SS | 13~16 |
| High breaking model | AE630-SH<br>AE1000-SH<br>AE1250-SH<br>AE1600-SH<br>AE2000-SH<br>AE2500-SH<br>AE3200-SH | |

| Standard | Page |
|---|---|
| IEC 60947-2<br>BS EN 60947-2<br>VDE 0660<br>JIS C8372<br>JIS C8370<br><br>Shipping standard<br>LR<br>GL<br>DNV<br>AB<br>BV<br>NK | 13~16 |

| Connecting method | Page |
|---|---|
| **Draw-out type**<br>● Horizontal terminals<br>● Vertical terminals<br>● Front terminals | 17 |
| **Fixed type** | |

| Cradle | Page |
|---|---|
| Cell switch<br>Shorting-B contact<br>Lifting hooks<br>Safety shutter<br>Safety shutter lock<br>Mis-insertion preventor<br>Test jumper | 23, 24 |

**Electromagnetic Compatibility**

| | Description | Standard | |
|---|---|---|---|
| | | | test procedure |
| Emission | Conducted RF disturbances | IEC60947-2 | EN55011:1991 (Class A, Group 1) |
| | Radiated RF disturbances | | EN55011:1991 (Class A, Group 1) |
| Immunity | Electrostatic discharge | | IEC61000-4-2 (contact Level 4) |
| | Electromagnetic field | | IEC61000-4-3 (Level 3) |
| | Fast transients / burst | | IEC61000-4-4 (Level 4) |
| | Surge | | IEC61000-4-5 (Level 4) |
| | Conducted radio frequency | | IEC61000-4-6 (Level 3) |

Earthleakage protection is not applicable for these tests.

## 4

| Accessories | | Page |
|---|---|---|
| Electrical accessories | Auxiliary switch<br>Motor charging device<br>Closing coil<br>Shunt trip device<br>Under voltage trip device<br>Condenser trip device | 18~20, 22 |
| Mechanical accessories | Push button cover<br>Counter<br>Cylinder lock<br>Door interlock<br>Terminal cover<br>Door frame<br>Dust cover<br>Interphase barrier<br>Mechanical interlock | 21, 22 |

## 5

| Electronic trip relay | Page |
|---|---|
| General use:<br>• S type<br>Generator protection use<br>• M type<br>Special use<br>• B-C0A type | 25~32 |
| General use:<br>• US3 type Data Meauring Display (MDU) with CC-Link communication | 7, 8 |

| Relay accessories | Page |
|---|---|
| Trip indicator<br>Ground fault protection<br>Earth leakage protection<br>Pre-alarm<br>OCR-alarm<br>Temperature alarm | 33, 34 |
| Neutral CT<br>External ZCT<br>Field test device | 34, 35 |

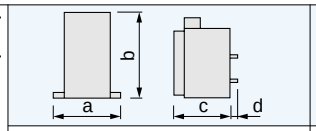
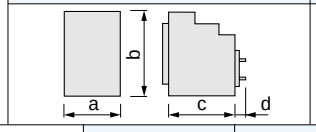
## 6

| Special environment | Page |
|---|---|
| Moisture-fungus treatment<br>Extra-corrosion proof specifications | 58 |

| Terminal adapter | Page |
|---|---|
| Vertical terminal adapter<br>Front terminal adapter | 17, 55 |

# Product Specification

## ● Specification <IEC 60947-2, BS EN60947-2,

| Type | | | SS type (standard model) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | | | AE630-SS | | AE1000-SS | | AE1250-SS | | AE1600-SS | | AE2000-SS | | AE2500-SS | | AE3200-SS | |
| Frame size | | (A) | 630 | | 1000 | | 1250 | | 1600 | | 2000 | | 2500 | | 3200 | |
| Rated insulation voltage | | (VAC) | 1000 | | 1000 | | 1000 | | 1000 | | 1000 | | 1000 | | 1000 | |
| Rated operating voltage | | (VAC) | 690 | | 690 | | 690 | | 690 | | 690 | | 690 | | 690 | |
| Number of poles | | (P) | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 |
| Rated current ( $I_n$) (A) | General use (Current rating adjustable) | | 315-378-441 -504-567-630 250-300-350 -400-450-500 157-189-220 -252-284-315 | | 500-600-700 -800-900-1000 | | 625-750-875 -1000-1125-1250 | | 800-960-1120 -1280-1440-1600 | | 1000-1200-1400 -1600-1800-2000 800-960-1120 -1280-1440-1600 625-750-875 -1000-1125-1250 | | 1250-1500-1750 -2000-2250-2500 | | 1600-1920-2240 -2560-2880-3200 | |
| | Generator protection use (Current rating fixed) | | 200≦$I_n$≦630 | | 500≦$I_n$≦1000 | | 625≦$I_n$≦1250 | | 800≦$I_n$≦1600 | | 625≦$I_n$≦2000 | | 1250≦$I_n$≦2500 | | 1600≦$I_n$≦3200 | |
| Rated current of neutral pole | | (A) | 630 | | 1000 | | 1250 | | 1600 | | 2000 | | 2500 | | 3200 | |
| Rated breaking capacity Ics/Icu (RMS kA) | With instantaneous trip | 690VAC | 50/50 | | 50/50 | | 50/50 | | 50/50 | | 50/65 | | 50/65 | | 50/65 | |
| | | 600VAC | 50/50 | | 50/50 | | 50/50 | | 50/50 | | 65/65 | | 65/65 | | 65/65 | |
| | | 500VAC | 65/65 | | 65/65 | | 65/65 | | 65/65 | | 85/85 | | 85/85 | | 85/85 | |
| | | 240VAC | 65/85 | | 65/85 | | 65/85 | | 65/85 | | 85/85 | | 85/85 | | 85/85 | |
| | With MCR | 690VAC | 42/42 | | 42/42 | | 42/42 | | 42/42 | | 50/50 | | 50/50 | | 50/50 | |
| | | 600VAC | 50/50 | | 50/50 | | 50/50 | | 50/50 | | 65/65 | | 65/65 | | 65/65 | |
| | | 500VAC | 65/65 | | 65/65 | | 65/65 | | 65/65 | | 65/65 | | 65/65 | | 65/65 | |
| | | 240VAC | 65/65 | | 65/65 | | 65/65 | | 65/65 | | 65/65 | | 65/65 | | 65/65 | |
| | Without instantaneous (Note2) | 690VAC | 25/25 | | 25/25 | | 25/25 | | 25/25 | | 45/45 | | 45/45 | | 45/45 | |
| | | 500VAC | 25/25 | | 25/25 | | 25/25 | | 25/25 | | 45/45 | | 45/45 | | 45/45 | |
| Rated making capacity Icm (Peak kA) | With instantaneous trip | 690VAC | 105 | | 105 | | 105 | | 105 | | 143 | | 143 | | 143 | |
| | | 600VAC | 105 | | 105 | | 105 | | 105 | | 143 | | 143 | | 143 | |
| | | 500VAC | 143 | | 143 | | 143 | | 143 | | 187 | | 187 | | 187 | |
| | | 240VAC | 187 | | 187 | | 187 | | 187 | | 187 | | 187 | | 187 | |
| | With MCR | 690VAC | 88.2 | | 88.2 | | 88.2 | | 88.2 | | 105 | | 105 | | 105 | |
| | | 600VAC | 105 | | 105 | | 105 | | 105 | | 143 | | 143 | | 143 | |
| | | 500VAC | 143 | | 143 | | 143 | | 143 | | 143 | | 143 | | 143 | |
| | | 240VAC | 143 | | 143 | | 143 | | 143 | | 143 | | 143 | | 143 | |
| | Without instantaneous (Note2) | 690VAC | 52.5 | | 52.5 | | 52.5 | | 52.5 | | 94.5 | | 94.5 | | 94.5 | |
| | | 500VAC | 52.5 | | 52.5 | | 52.5 | | 52.5 | | 94.5 | | 94.5 | | 94.5 | |
| Rated short time current Icw (RMS kA) | | 1 s | 65 | | 65 | | 65 | | 65 | | 65 | | 65 | | 65 | |
| | | 2 s | 40 | | 40 | | 40 | | 60 | | 65 | | 65 | | 65 | |
| | | 3 s | 30 | | 30 | | 30 | | 50 | | 65 | | 65 | | 65 | |
| Maximum total breaking time | | (s) | 0.04 | | 0.04 | | 0.04 | | 0.04 | | 0.04 | | 0.04 | | 0.04 | |
| Closing time | | (s) | 0.08 | | 0.08 | | 0.08 | | 0.08 | | 0.08 | | 0.08 | | 0.08 | |
| Number of operating cycles. (Note 1) | | With rated current | 5000 | | 5000 | | 5000 | | 5000 | | 1500 | | 1500 | | 1000 | |
| | | Without rated current | 10000 | | 10000 | | 10000 | | 10000 | | 10000 | | 10000 | | 10000 | |
| Outline dimension (mm)   | Fixed type | a | 340 | 425 | 340 | 425 | 340 | 425 | 340 | 425 | 475 | 605 | 475 | 605 | 475 | 605 |
| | | b | 410 | 410 | 410 | 410 | 410 | 410 | 410 | 410 | 410 | 410 | 410 | 410 | 410 | 410 |
| | | c | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 |
| | | d | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 |
|   | Drawout type | a | 300 | 385 | 300 | 385 | 300 | 385 | 300 | 385 | 435 | 565 | 435 | 565 | 435 | 565 |
| | | b | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 |
| | | c | 368 | 368 | 368 | 368 | 368 | 368 | 368 | 368 | 368 | 368 | 368 | 368 | 368 | 368 |
| | | d | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 |
| Weight (kg) | Fixed type | Manual charging type | 40 | 50 | 41 | 51 | 41 | 51 | 42 | 52 | 60 | 72 | 61 | 73 | 63 | 75 |
| | | Motor charging type | 43 | 53 | 44 | 54 | 44 | 54 | 45 | 55 | 63 | 75 | 64 | 76 | 66 | 78 |
| | Drawout type (including cradle) | Manual charging type | 63 | 77 | 64 | 78 | 64 | 78 | 65 | 79 | 92 | 113 | 93 | 114 | 95 | 116 |
| | | Motor charging type | 66 | 80 | 67 | 81 | 67 | 81 | 68 | 82 | 95 | 116 | 96 | 117 | 98 | 119 |
| | Cradle only | | 26 | 30 | 26 | 30 | 26 | 30 | 26 | 30 | 35 | 43 | 35 | 43 | 36 | 44 |

Note 1 : The number of operating cycles without rated current also include the number of operating cycles with rated current.

Note 2 : The columns for “without instantaneous tripping” are the values when the bare (without electronic trip relay) main body and the external relay are combined. Please apply for further detail.

# VDE0660 Ics/Icu>

| | | | | | | | | SH type (High breaking model) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | AE4000-SSC | AE4000-SS | | AE5000-SS | | AE6300-SS | | AE630-SH | | AE1000-SH | | AE1250-SH | | AE1600-SH | | AE2000-SH | | AE2500-SH | | AE3200-SH | |
| | 4000 | 4000 | | 5000 | | 6300 | | 630 | | 1000 | | 1250 | | 1600 | | 2000 | | 2500 | | 3200 | |
| | 1000 | 1000 | | 1000 | | 1000 | | 1000 | | 1000 | | 1000 | | 1000 | | 1000 | | 1000 | | 1000 | |
| | 690 | 690 | | 690 | | 690 | | 690 | | 690 | | 690 | | 690 | | 690 | | 690 | | 690 | |
| | 3 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 |
| | 3200-3600-4000 | 2000-2400-2800 -3200-3600-4000 | | 2500-3000-3500 -4000-4500-5000 | | 3150-3780-4410 -5040-5670-6300 | | 315-378-441 -504-567-630 | | 500-600-700 -800-900-1000 | | 625-750-875 -1000-1125-1250 | | 800-960-1120 -1280-1440-1600 | | 1000-1200-1400 -1600-1800-2000 | | 1250-1500-1750 -2000-2250-2500 | | 1600-1920-2240 -2560-2880-3200 | |
| | 3200≦In≦4000 | 2000≦In≦4000 | | 2500≦In≦5000 | | 3150≦In≦6300 | | 315≦In≦630 | | 500≦In≦1000 | | 625≦In≦1250 | | 800≦In≦1600 | | 1000≦In≦2000 | | 1250≦In≦2500 | | 1600≦In≦3200 | |
| | – | 3200 | | 3200 | | 3200 | | 630 | | 1000 | | 1250 | | 1600 | | 2000 | | 2500 | | 3200 | |
| | 50/50 | 50/50 | | 50/50 | | 50/50 | | 65/65 | | 65/65 | | 65/65 | | 65/65 | | 65/65 | | 65/65 | | 65/65 | |
| | 65/65 | 85/85 | | 85/85 | | 85/85 | | 85/85 | | 85/85 | | 85/85 | | 85/85 | | 85/85 | | 85/85 | | 85/85 | |
| | 85/85 | 130/130 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | |
| | 85/85 | 130/130 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | |
| | 50/50 | 50/50 | | 50/50 | | 50/50 | | – | | – | | – | | – | | – | | – | | – | |
| | 65/65 | 85/85 | | 85/85 | | 85/85 | | – | | – | | – | | – | | – | | – | | – | |
| | 75/75 | 85/85 | | 85/85 | | 85/85 | | – | | – | | – | | – | | – | | – | | – | |
| | 75/75 | 85/85 | | 85/85 | | 85/85 | | – | | – | | – | | – | | – | | – | | – | |
| | 45/45 | 50/50 | | 50/50 | | 50/50 | | – | | – | | – | | – | | – | | – | | – | |
| | 45/45 | 65/65 | | 65/65 | | 65/65 | | – | | – | | – | | – | | – | | – | | – | |
| | 105 | 105 | | 105 | | 105 | | 65/65 | | 65/65 | | 65/65 | | 65/65 | | 65/65 | | 65/65 | | 65/65 | |
| | 143 | 187 | | 187 | | 187 | | 85/85 | | 85/85 | | 85/85 | | 85/85 | | 85/85 | | 85/85 | | 85/85 | |
| | 187 | 286 | | 286 | | 286 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | |
| | 187 | 286 | | 286 | | 286 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | | 130/130 | |
| | 105 | 105 | | 105 | | 105 | | – | | – | | – | | – | | – | | – | | – | |
| | 143 | 187 | | 187 | | 187 | | – | | – | | – | | – | | – | | – | | – | |
| | 165 | 187 | | 187 | | 187 | | – | | – | | – | | – | | – | | – | | – | |
| | 165 | 187 | | 187 | | 187 | | – | | – | | – | | – | | – | | – | | – | |
| | 94.5 | 105 | | 105 | | 105 | | – | | – | | – | | – | | – | | – | | – | |
| | 94.5 | 143 | | 143 | | 143 | | – | | – | | – | | – | | – | | – | | – | |
| | 75 | 85 | | 85 | | 85 | | – | | – | | – | | – | | – | | – | | – | |
| | 65 | 70 | | 70 | | 70 | | – | | – | | – | | – | | – | | – | | – | |
| | 65 | 70 | | 70 | | 70 | | – | | – | | – | | – | | – | | – | | – | |
| | 0.04 | 0.05 | | 0.05 | | 0.05 | | 0.04 | | 0.04 | | 0.04 | | 0.04 | | 0.04 | | 0.04 | | 0.04 | |
| | 0.08 | 0.08 | | 0.08 | | 0.08 | | 0.08 | | 0.08 | | 0.08 | | 0.08 | | 0.08 | | 0.08 | | 0.08 | |
| | 500 | 500 | | 500 | | 500 | | 3000 | | 3000 | | 3000 | | 2000 | | 1500 | | 1500 | | 1000 | |
| | 5000 | 2000 | | 2000 | | 2000 | | 10000 | | 10000 | | 10000 | | 10000 | | 10000 | | 10000 | | 10000 | |
| | 605 | 873 | 1003 | 873 | 1003 | 873 | 1003 | 475 | 605 | 475 | 605 | 475 | 605 | 475 | 605 | 475 | 605 | 475 | 605 | 475 | 605 |
| | 414 | 414 | 414 | 414 | 414 | 414 | 414 | 410 | 410 | 410 | 410 | 410 | 410 | 410 | 410 | 410 | 410 | 410 | 410 | 410 | 410 |
| | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 | 290 |
| | 136 | 136 | 136 | 136 | 136 | 136 | 136 | 68 | 68 | 68 | 68 | 68 | 68 | 68 | 68 | 68 | 68 | 68 | 68 | 68 | 68 |
| | 565 | 875 | 1005 | 875 | 1005 | 875 | 1005 | 485 | 615 | 485 | 615 | 485 | 615 | 485 | 615 | 485 | 615 | 485 | 615 | 485 | 615 |
| | 430 | 480 | 480 | 480 | 480 | 480 | 480 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 |
| | 368 | 368 | 368 | 368 | 368 | 368 | 368 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 | 398 |
| | 151 | 123 | 123 | 123 | 123 | 123 | 123 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 | 61 |
| | 109 | 160 | 180 | 160 | 180 | 160 | 180 | 66 | 79 | 66 | 79 | 66 | 79 | 66 | 79 | 66 | 79 | 66 | 79 | 68 | 81 |
| | 112 | 164 | 184 | 164 | 184 | 164 | 184 | 69 | 82 | 69 | 82 | 69 | 82 | 69 | 82 | 69 | 82 | 69 | 82 | 71 | 84 |
| | 145 | 240 | 263 | 240 | 263 | 240 | 263 | 105 | 127 | 105 | 127 | 105 | 127 | 105 | 127 | 105 | 127 | 105 | 127 | 107 | 129 |
| | 148 | 244 | 267 | 244 | 267 | 244 | 267 | 108 | 130 | 108 | 130 | 108 | 130 | 108 | 130 | 108 | 130 | 108 | 130 | 110 | 132 |
| | 75 | 125 | 140 | 125 | 140 | 125 | 140 | 42 | 50 | 42 | 50 | 42 | 50 | 42 | 50 | 42 | 50 | 42 | 50 | 43 | 51 |

# Product Specification

## ● Specification <JIS C 8372 (o-co-co duty)>

| Type | | | | SS type (standard model) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Type | | | | AE630-SS | AE1000-SS | AE1250-SS | AE1600-SS | AE2000-SS | AE2500-SS | AE3200-SS |
| Frame size (A) | | | | 630 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 |
| Rated insulation voltage (VAC) | | | | 600 | 600 | 600 | 600 | 600 | 600 | 600 |
| Rated operating voltage (VAC) | | | | 550 | 550 | 550 | 550 | 550 | 550 | 550 |
| Number of poles (P) | | | | 3 4 | 3 4 | 3 4 | 3 4 | 3 4 | 3 4 | 3 4 |
| Rated current ($I_n$) (A) | General use (Current rating adjustable) | | | 315-378-441 -504-567-630 250-300-350 -400-450-500 157-189-220 -252-284-315 | 500-600-700 -800-900-1000 | 625-750-875 -1000-1125-1250 | 800-960-1120 -1280-1440-1600 | 1000-1200-1400 -1600-1800-2000 800-960-1120 -1280-1440-1600 625-750-875 -1000-1125-1250 | 1250-1500-1750 -2000-2250-2500 | 1600-1920-2240 -2560-2880-3200 |
| | Generator protection use (Current rating fixed) | | | 200≦$I_n$≦630 | 500≦$I_n$≦1000 | 625≦$I_n$≦1250 | 800≦$I_n$≦1600 | 625≦$I_n$≦2000 | 1250≦$I_n$≦2500 | 1600≦$I_n$≦3200 |
| Rated current of neutral pole (A) | | | | 630 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 |
| Rated breaking capacity (kA RMS symmetrical) / Rated making capacity (kA peak value) Breaking duty O-CO-CO | JIS C8372 O-CO-CO | With instantaneous trip | 550VAC | 50/105 | 50/105 | 50/105 | 50/105 | 65/143 | 65/143 | 65/143 |
| | | | 460VAC | 65/143 | 65/143 | 65/143 | 65/143 | 85/195.5 | 85/195.5 | 85/195.5 |
| | | With MCR | 550VAC | 50/105 | 50/105 | 50/105 | 50/105 | 65/143 | 65/143 | 65/143 |
| | | | 460VAC | 65/143 | 65/143 | 65/143 | 65/143 | 65/143 | 65/143 | 65/143 |
| | | Without instantaneous (Note2) | 550VAC | 25/52.5 | 25/52.5 | 25/52.5 | 25/52.5 | 45/94.5 | 45/94.5 | 45/94.5 |
| | JIS C8370 O-CO | With instantaneous trip | 550VAC | 50/105 | 50/105 | 50/105 | 50/105 | 65/143 | 65/143 | 65/143 |
| | | | 460VAC | 65/143 | 65/143 | 65/143 | 65/143 | 85/195.5 | 85/195.5 | 85/195.5 |
| | | | 220VAC | 85/195.5 | 85/195.5 | 85/195.5 | 85/195.5 | 85/195.5 | 85/195.5 | 85/195.5 |
| | | With MCR | 550VAC | 50/105 | 50/105 | 50/105 | 50/105 | 65/143 | 65/143 | 65/143 |
| | | | 460VAC | 65/143 | 65/143 | 65/143 | 65/143 | 65/143 | 65/143 | 65/143 |
| | | | 220VAC | 65/143 | 65/143 | 65/143 | 65/143 | 65/143 | 65/143 | 65/143 |
| Rated short time current (RMS kA) | | | 1 s | 65 | 65 | 65 | 65 | 65 | 65 | 65 |
| | | | 2 s | 40 | 40 | 40 | 60 | 65 | 65 | 65 |
| | | | 3 s | 30 | 30 | 30 | 50 | 65 | 65 | 65 |
| Maximum total breaking time (s) | | | | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| Closing time (s) | | | | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| Number of operating cycles. (Note 1) | | | With rated current | 5000 | 5000 | 5000 | 5000 | 1500 | 1500 | 1000 |
| | | | Without rated current | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 |

Note 1 : The number of operating cycles without read current also include the number of operating cycles with rated current.
Note 2 : The columns for “without instantaneous tripping” are the values when the bare (without electronic trip relay) main body and the external relay are combined.

## ● Shipping Standard <LR, AB, GL, DNV, BV, NK>

| Type | | | | SS type (standard model) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Type | | | | AE630-SS | AE1000-SS | AE1250-SS | AE1600-SS | AE2000-SS | AE2500-SS | AE3200-SS |
| Frame size (A) | | | | 630 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 |
| Rated insulation voltage (VAC) | | | | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Number of poles (P) | | | | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Rated current ($I_n$) (A) | General use (Fixed rated current) | | | 200≦$I_n$≦630 | 500≦$I_n$≦1000 | 625≦$I_n$≦1250 | 800≦$I_n$≦1600 | 625≦$I_n$≦2000 | 1250≦$I_n$≦2500 | 1600≦$I_n$≦3200 |
| Rated breaking capacity (kA RMS Symmetrical) / Rated making capacity (kA peak value) Breaking duty O-CO-CO | LR | With instantaneous trip | 690VAC | 50/106 | 50/106 | 50/106 | 50/106 | 50/106 | 50/106 | 50/106 |
| | | | 600VAC | – | – | – | – | 65/143 | 65/143 | 65/143 |
| | | | 500VAC | 65/151 | 65/151 | 65/151 | 65/151 | 85/196 | 85/196 | 85/196 |
| | ABS | With instantaneous trip | 690VAC | 50/105 | 50/105 | 50/105 | 50/105 | 50/105 | 50/105 | 50/105 |
| | | | 600VAC | – | – | – | – | 65/143 | 65/143 | 65/143 |
| | | | 500VAC | 65/143 | 65/143 | 65/143 | 65/143 | 85/187 | 85/187 | 85/187 |
| | GL | With instantaneous trip | 690VAC | 50/106 | 50/106 | 50/106 | 50/106 | 50/106 | 50/106 | 50/106 |
| | | | 600VAC | – | – | – | – | 65/143 | 65/143 | 65/143 |
| | | | 500VAC | 65/151 | 65/151 | 65/151 | 65/151 | 85/196 | 85/196 | 85/196 |
| | DNV | With instantaneous trip | 690VAC | 50/106 | 50/106 | 50/106 | 50/106 | 50/106 | 50/106 | 50/106 |
| | | | 600VAC | – | – | – | – | 65/143 | 65/143 | 65/143 |
| | | | 500VAC | 65/151 | 65/151 | 65/151 | 65/151 | 85/196 | 85/196 | 85/196 |
| | BV | With instantaneous trip | 690VAC | 50/105 | 50/105 | 50/105 | 50/105 | 50/105 | 50/105 | 50/105 |
| | | | 600VAC | – | – | – | – | 65/143 | 65/143 | 65/143 |
| | | | 500VAC | 65/143 | 65/143 | 65/143 | 65/143 | 85/187 | 85/187 | 85/187 |
| | NK | With instantaneous trip | 600VAC | 50/112 | 50/112 | 50/112 | 50/112 | 65/143 | 65/143 | 65/143 |
| | | | 500VAC | 65/147 | 65/147 | 65/147 | 65/147 | 85/196 | 85/196 | 85/196 |

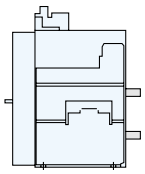
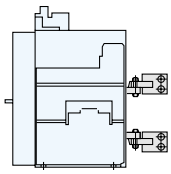
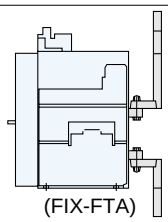
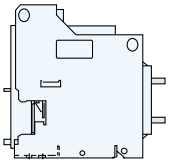
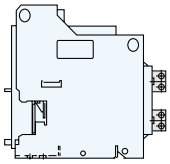
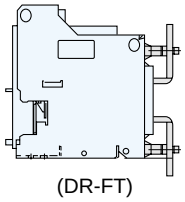
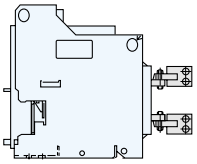
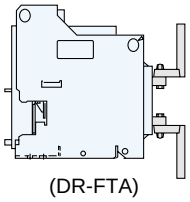
| | | | | | SH type (High breaking model) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | AE4000-SSC | AE4000-SS | AE5000-SS | AE6300-SS | AE630-SH | AE1000-SH | AE1250-SH | AE1600-SH | AE2000-SH | AE2500-SH | AE3200-SH |
| | 4000 | 4000 | 5000 | 6300 | 630 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 |
| | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 |
| | 550 | 550 | 550 | 550 | 550 | 550 | 550 | 550 | 550 | 550 | 550 |
| | 3 | 3 4 | 3 4 | 3 4 | 3 4 | 3 4 | 3 4 | 3 4 | 3 4 | 3 4 | 3 4 |
| | 3200-3600 | 2000-2400-2800 -3200-3600-4000 | 2500-3000-3500 -4000-4500-5000 | 3000-3600-4200 -4800-5400-6000 | 315-378-441 -504-567-630 | 500-600-700 -800-900-1000 | 625-750-875 -1000-1125-1250 | 800-960-1120 -1280-1440-1600 | 1000-1200-1400 -1600-1800-2000 | 1250-1500-1750 -2000-2250-2500 | 1600-1920-2240 -2560-2880-3200 |
| | 3200≦In≦3600 | 2000≦In≦4000 | 2500≦In≦5000 | 3000≦In≦6000 | 315≦In≦630 | 500≦In≦1000 | 625≦In≦1250 | 800≦In≦1600 | 1000≦In≦2000 | 1250≦In≦2500 | 1600≦In≦3200 |
| | – | 3200 | 3200 | 3200 | 630 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 |
| | 65/143 | 85/195.5 | 85/195.5 | 85/195.5 | 85/195.5 | 85/195.5 | 85/195.5 | 85/195.5 | 85/195.5 | 85/195.5 | 85/195.5 |
| | 85/195.5 | 130/299 | 130/299 | 130/299 | 130/299 | 130/299 | 130/299 | 130/299 | 130/299 | 130/299 | 130/299 |
| | 65/143 | 85/195.5 | 85/195.5 | 85/195.5 | – | – | – | – | – | – | – |
| | 75/165 | 85/195.5 | 85/195.5 | 85/195.5 | – | – | – | – | – | – | – |
| | 45/94.5 | 65/143 | 65/143 | 65/143 | – | – | – | – | – | – | – |
| | 65/143 | – | – | – | 85/195.5 | 85/195.5 | 85/195.5 | 85/195.5 | 85/195.5 | 85/195.5 | 85/195.5 |
| | 85/195.5 | – | – | – | 130/299 | 130/299 | 130/299 | 130/299 | 130/299 | 130/299 | 130/299 |
| | 85/195.5 | – | – | – | 130/299 | 130/299 | 130/299 | 130/299 | 130/299 | 130/299 | 130/299 |
| | 65/143 | – | – | – | – | – | – | – | – | – | – |
| | 75/165 | – | – | – | – | – | – | – | – | – | – |
| | 75/165 | – | – | – | – | – | – | – | – | – | – |
| | 75 | 85 | 85 | 85 | – | – | – | – | – | – | – |
| | 65 | 70 | 70 | 70 | – | – | – | – | – | – | – |
| | 65 | 70 | 70 | 70 | – | – | – | – | – | – | – |
| | 0.04 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| | 500 | 500 | 500 | 500 | 3000 | 3000 | 3000 | 2000 | 1500 | 1500 | 1000 |
| | 5000 | 2000 | 2000 | 2000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 | 10000 |

| | | | | | SH type (High breaking model) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | AE4000-SSC | AE4000-SS | AE5000-SS | AE6300-SS | AE630-SH | AE1000-SH | AE1250-SH | AE1600-SH | AE2000-SH | AE2500-SH | AE3200-SH |
| | 4000 | 4000 | 5000 | 6300 | 630 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 |
| | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| | 3200≦In≦3800 3200≦In≦3500 (for NK) | 2000≦In≦4000 | 2500≦In≦5000 | 3150≦In≦6300 3150≦In≦5700 (for NK) | 315≦In≦630 | 500≦In≦1000 | 625≦In≦1250 | 800≦In≦1600 | 1000≦In≦2000 | 1250≦In≦2500 | 1600≦In≦3200 |
| | 51.1/113 | – | – | – | 68/173 | 68/173 | 68/173 | 68/173 | 68/173 | 68/173 | 68/173 |
| | 67/147 | 87/211 | 87/211 | 87/211 | 87/211 | 87/211 | 87/211 | 87/211 | 87/211 | 87/211 | 87/211 |
| | 86.6/199 | 133/330 | 133/330 | 133/330 | 133/330 | 133/330 | 133/330 | 133/330 | 133/330 | 133/330 | 133/330 |
| | – | – | – | – | – | – | – | – | – | – | – |
| | – | 87/211 | 87/211 | 87/211 | – | – | – | – | – | – | – |
| | – | 133/330 | 133/330 | 133/330 | – | – | – | – | – | – | – |
| | – | – | – | – | – | – | – | – | – | – | – |
| | – | – | – | – | – | – | – | – | – | – | – |
| | – | – | – | – | – | – | – | – | – | – | – |
| | – | – | – | – | – | – | – | – | – | – | – |
| | – | – | – | – | – | – | – | – | – | – | – |
| | – | – | – | – | – | – | – | – | – | – | – |
| | – | – | – | – | – | – | – | – | – | – | – |
| | – | – | – | – | – | – | – | – | – | – | – |
| | 65/143 | 87/211 | 87/211 | 87/211 | – | – | – | – | – | – | – |
| | 85/196 | 133/330 | 133/330 | 133/330 | 130/317 | 130/317 | 130/317 | 130/317 | 130/317 | 130/317 | 130/317 |

# Connecting methods

## Connection arrangements

The following connecting methods are available for the AE type air circuit breaker.

| Mounting method \ Connecting method | Horizontal connection (Standard) | Vertical connection (VT) | Front connection (FT) | Vertical terminal adapter (VTA) | Front terminal adapter (FTA) |
|---|---|---|---|---|---|
| Fixed type (FIX) |  | ——— | ——— |  (VTA) |  (FIX-FTA) |
| Draw-out type (DR) |  |  (DR-VT) |  (DR-FT) |  (VTA) |  (DR-FTA) |

●Connecting Methods

| Connecting method \ Type | | AE630-SS | AE1000-SS | AE1250-SS | AE1600-SS | AE2000-SS | AE2500-SS | AE3200-SS | AE4000-SSC | AE4000-SS | AE5000-SS | AE6300-SS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fixed type (FIX) | Horizontal terminal (Standard) | ● | ● | ● | ● | ● | ● | ● | – | – | – | – |
| | Vertical terminal | – | – | – | – | – | – | – | ● | ● | ● | ● |
| Options | (VTA) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | – | – | – | – |
| | (FIX-FTA) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | – | – | – | – |
| Draw-out type (DR) | Horizontal terminal (Standard) | ● | ● | ● | ● | ● | ● | ● | – | – | – | – |
| | (DR-VT) (Note 1) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● |
| | (DR-FT) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | – | – | – | – |
| Options | (VTA) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | – | – | – | – |
| | (DR-FTA) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | – | – | – | – |

| Connecting method \ Type | | AE630-SH | AE1000-SH | AE1250-SH | AE1600-SH | AE2000-SH | AE2500-SH | AE3200-SH |
|---|---|---|---|---|---|---|---|---|
| Fixed type (FIX) | Horizontal terminal (Standard) | ● | ● | ● | ● | ● | ● | ● |
| Options | (VTA) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | (FIX-FTA) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Draw-out type (DR) | Horizontal terminal (Standard) | ● | ● | ● | ● | ● | ● | ● |
| | (DR-VT) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | (DR-FT) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Options | (VTA) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | (DR-FTA) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Note1: The terminal for AE4000-SSC, AE4000-SS ~ AE6300-SS shall be vertical terminal.

(Remarks) The white circle "○" indicates that the product can be manufactured, while the blue "●" indicates the standard connecting method.

# Charging methods

## Manual charging

The spring is charged by the manual charging handle. The breaker is closed when the ON button is pressed, and opened when the OFF button is pressed.

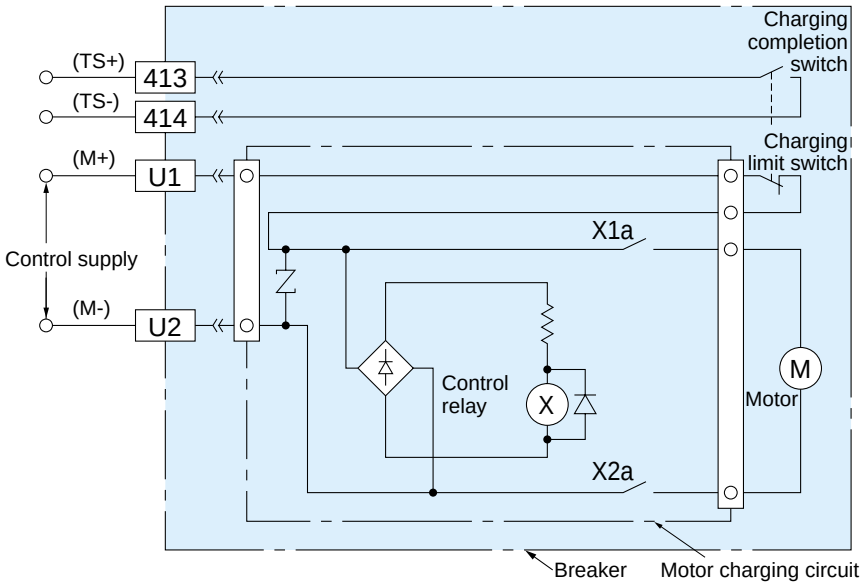
- When the closing spring charging is completed, the charging indicator displays CHARGED.
- The indicator displays ON or OFF state of the main contacts.
- The breaker cannot be closed while the OFF button is being pressed. (Safety feature)
  OFF lock is available by padlock (See P9, P24) as standard.

Option

## Motor charging device (MD)

The closing spring is charged by an electric motor. When the breaker is closed, the spring is charged automatically (ON-charge method.) The closing coil (CC) is required to remotely close, and the shunt trip device is required to remotely open the breaker.

- Manual charging is also available.
- Pumping prevention is assured both electrically and mechanically.
- As the charging completion contact is separate from the electrical charging circuit, its function in the control scheme can be arranged as desired.




Apply for further details of 24V DC and 48V DC.

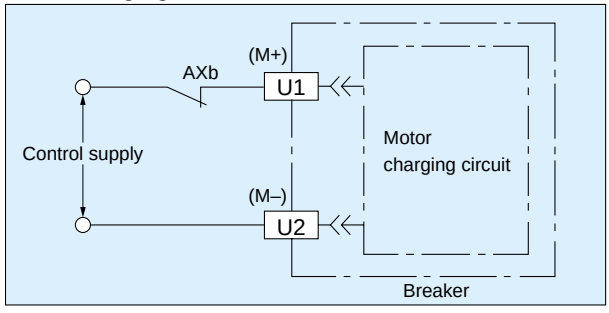
**● Motor charging rating**

| Rated voltage | Applicable voltage range (V) | Applied voltage (V) | Inrush current (peak value)(A) | Steady current (A) | Charging time (s) |
|---|---|---|---|---|---|
| DC24V | 20.4~26.4 | 24 | 22 | 6 | ≦5 |
| DC48V | 36~52.8 | 48 | 14 | 3 | ≦5 |
| AC・DC 100~125V | 85~137.5 | 100 | 10(10) | 3(4) | ≦5 |
| | | 125 | 12(12) | 3(4) | ≦5 |
| AC・DC 200~250V | 170~275 | 200 | 5(7) | 1(2) | ≦5 |
| | | 250 | 6(8) | 1(2) | ≦5 |

( ): AE4000-SS~AE6300-SS

DC24, DC48V is not available for AE4000-SS~AE6300-SS

**●OFF charging method**




A OFF charging method is also available. The closing spring is charged automatically when the breaker is opened. This is available only by externally connecting in series b contact (AXb) of the auxiliary switch to the motor charging circuit.
In case of DC power supply, please use high capacity auxiliary switch (HAX).

# Accessories (for Breaker unit 1/2)

Option

## Closing coil (CC)

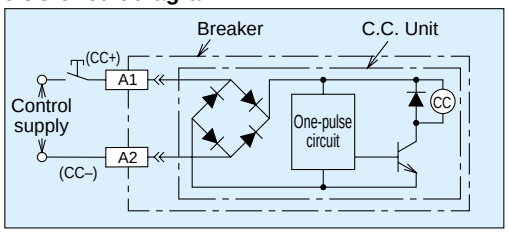
The closing coil is a device to close the breaker by remote control.

- An interlock to prevent pumping is provided electrically.

| Rated voltage (Applicable voltage range) | Operating voltage · Operating inrush current (VA) | | Closing time |
|---|---|---|---|
| | AC | DC | |
| DC24-48V (18~52.8) | – | DC24V 3.5A (100W) | 0.08 s or less |
| | – | DC48V 7.0A (200W) | |
| AC · DC common 100-250V (75-275) | AC100V 0.5A (100VA) | DC100V 0.6A (100W) | |
| | AC250V 1.0A (150VA) | DC250V 1.3A (200W) | |

- Closing time is from the initial energization of the closing coil to the completion of the closing of the main contacts.
- Because of pumping prevention is not performed, do not use AXb contact for a cut-off switch.

**●CC circuit diagram**




Diode rectifier is not used for control source 24-48V DC.

Option

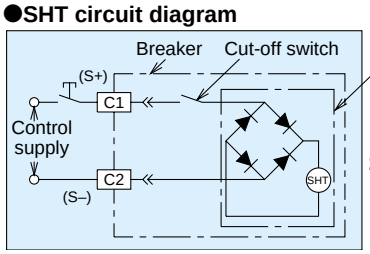
## Shunt trip device (SHT)

This is the switch used to open the breaker by remote control. A cut-off switch is included.

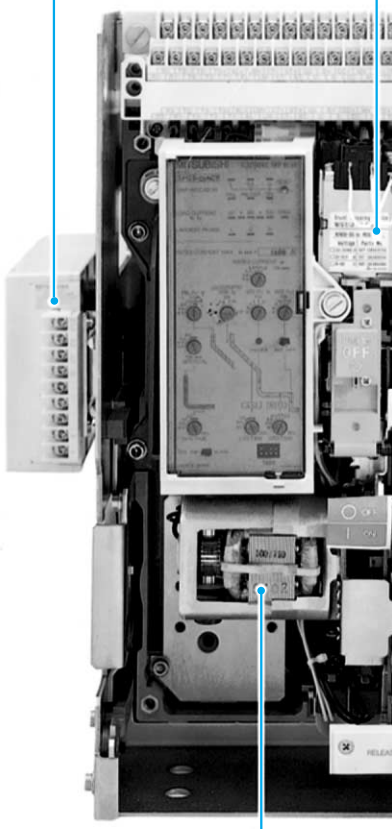
| Rated voltage (Applicable voltage range) | Operating voltage · Operating inrush current (VA) | | Operating time |
|---|---|---|---|
| | AC | DC | |
| DC24~48V (16.8~52.8) | – | DC24V 3.5A (100W) | 0.04s or less |
| | – | DC48V 7.0A (200W) | |
| AC · DC common 100~250V (75~275) | AC100V 0.6A (100VA) | DC100V 0.8A (100W) | |
| | AC250V 1.7A (150VA) | DC250V 2.0A (250W) | |
| AC380~500V (266~550) | AC460V 0.6A (200VA) | – | |

Operating time AE4000-SS~AE6300-SS is 0.05 s or less.

**●SHT circuit diagram**




Diode rectifier is not used for control source 24-48V DC.



Option

## Motor charging device (MD)

The closing spring is charged electrically, and the breaker will be ready to be closed.

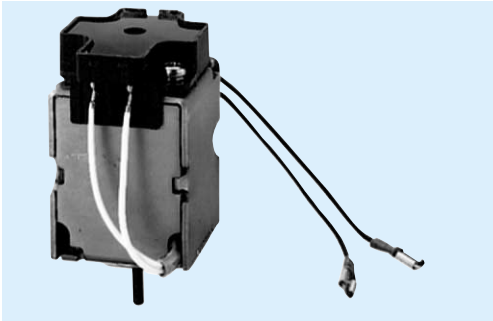
- When specifying the motor charging device, be sure to order the closing coil (CC) and the shunt trip device (SHT) for remote operation.
- Refer to page 18 for details.

Option

## Under voltage trip device (UVT)

This device is used to trip the breaker if the supply voltage is reduced below its nominal value, and consists of a UVT coil and UVT controller. Two types are available: the instantaneous type which trips the breaker instantly, and a time delay type which trips the breaker after a delay of 0.5 or 3 seconds from when the supply voltage has reduced below its nominal value. The UVT controller can be mounted on the lefthand side of the breaker looking from the front.

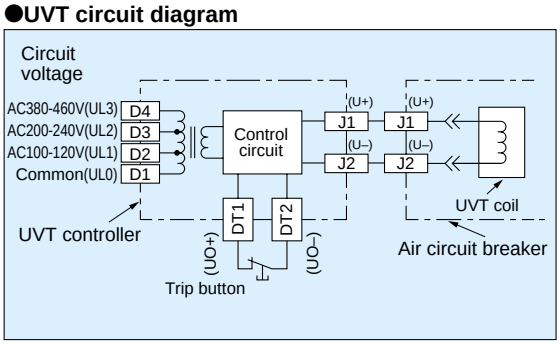
| Type | UVT-SSB* | UVT-05SSB* | UVT-30SSB* |
|---|---|---|---|
| Operation | Instantaneous | Time delay | |
| Operation time(Note 3) | 0.1 s max. | 0.5 s min. | 3 s min. |
| Rated voltage (+10% –15%) | 100-120/200-240/380-460VAC | | |
| | 24VDC | | |
| | 48VDC | | |
| | 100-110VDC | | |
| | 120-125VDC | | |
| Frequency | 50/60 Hz(AC) | | |
| Pick-up voltage | 65~85% (Note 1) | | |
| Drop-out voltage | 45~70% (Note 1) | | |
| Trip function (Note 2) | With open circuit of terminals (DT1, DT2) operation time 0.1 s max. | | |
| Power consumption | 20 VA | | |



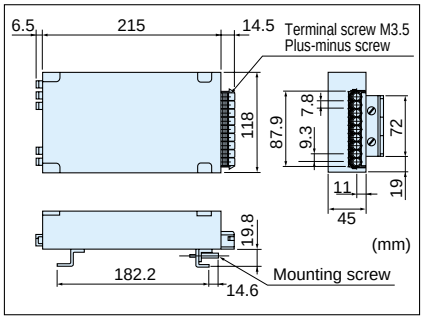
(Note 1) If dual rated voltages are used, a lower value is applied.
(Note 2) If a remote trip function is required remove the wire shorting terminals DT1 DT2 and connect a normally closed switch, rated 1mA at 100VDC across them.
(Note 3) The operating time is a guarantee value when it drops from 85% or more of the rated voltage.

- The following delay should be allowed between applying the voltage to the UVT, and closing the breaker.
  UVT-SSB∗ : 1.5 s, UVT-05SSB∗ : 1.5 s, UVT-30SSB∗ : 3 s

**●UVT circuit diagram**




**●UVT controller**




Option

## Auxiliary switch (AX-standard, HAX-high capacity type)

This is the contact that is used to remotely indicate the ON or OFF status of the breaker.

| Type | | | AX(standard) | | HAX (high capacity type) | |
|---|---|---|---|---|---|---|
| | | | Resistance load | Inductive load | Resistance load | Inductive load |
| Contact capacity (A) | AC | 460V | 5 | 2 | 5 | 2.5 |
| | | 250V | 10 | 10 | 10 | 10 |
| | | 125V | 10 | 10 | 10 | 10 |
| | DC | 250V | 0.3 | 0.3 | 3 | 1.5 |
| | | 125V | 0.6 | 0.6 | 10 | 6 |
| | | 30V | 10 | 6 | 10 | 10 |
| Maximum contacts | | | 5 a 5 b | | 5 a 5 b | |

| Change-over sequence | Breaker state | a-contact (NO) | b-contact (NC) |
|---|---|---|---|
| | ON | ON | OFF |
| | OFF | OFF | ON |

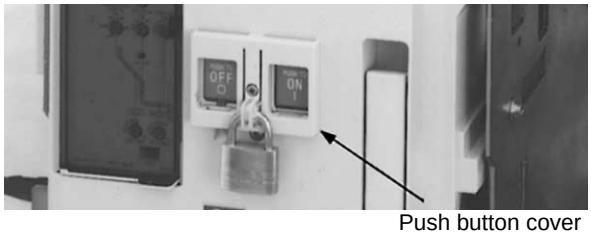
- The a and b contacts may turn simultaneously to ON instantaneously at the time of changing the contact; Pay attention to the contact state when designing circuits.
- The chattering time at the time of contact ON-OFF is below 0.025 s.
- For special environment specification, the contact capacity gets deteriorated. Apply for further detail.

# Accessories (for Breaker unit 2/2)

## Push button cover

Option

The cover is to prevent careless manual operation (ON, OFF) of the push buttons.
BC-L can be locked by a padlock (The padlock being supplied by the customer.)
For the size of the a suitable padlock, refer to Page 24.

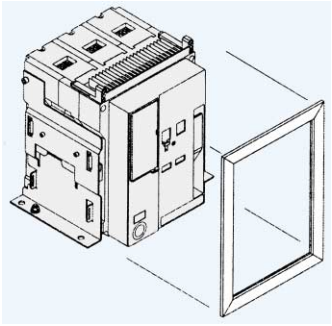



Push button cover

## Door frame (DF)

Option

The door frame improves the appearance, after cutting out the panel door to install the breaker.



## Counter (CNT)

Option

The open/close operations of the breaker are shown on a 5 digit counter.

## Dust cover

Option

Dust cover prevents the dust or water entering into the panel board from the breaker panel cut.
Protection degree IP 54.

## Cylinder lock (CYL)

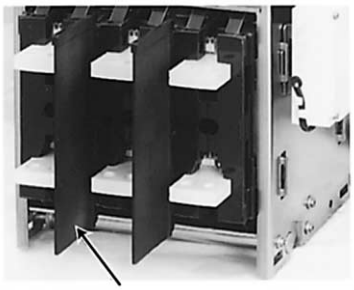
Option

The breaker is locked OFF with the cylinder lock.

- Since it is an interlock which only allows the key to be removed when the breaker is locked off, it can be used for interlocking two or more breakers.

## Interphase Barrier (BA)

The interphase insulation of the circuit breaker has been intensified to prevent the short circuit due to conductive matters or dust. Easily detachable, in design, the barrier is applicable to fixed type, draw-out type, horizontal terminal or vertical terminal. (For further detail, see the “Table of Mountable Barriers” given below.



Interphase barrier (BA)
2 pcs (3-pole), 3 pcs (4-pole)

**●Table of Mountable Barriers**

| | Connecting method | AE630-SS~ AE1600-SS | AE2000-SS~ AE3200-SS | AE-SH Type |
|---|---|---|---|---|
| Fixed type | Horizontal terminal (standerd) | ○ | ○ | – |
| | Vertical terminal adapter | – | – | – |
| | Front terminal adapter | – | – | – |
| Draw-out type | Horizontal terminal (standerd) | ○ | ○ | ○ |
| | Vertical terminal | ○ | – | – |
| | Front terminal | – | – | – |
| | Vertical terminal adapter | – | – | – |
| | Front terminal adapter | – | – | – |

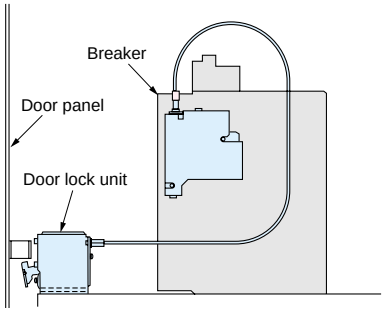
Not available for AE4000-SSC, AE4000-SS~AE6300-SS

## Door interlock (DI)

Option

The panel door cannot be opened unless the breaker is open.

- A wire type mechanical interlock is used to allow flexibility in positioning breakers in the switchboard.
- The parts of the Door panel should be supplied by customer.




## Terminal cover (TTC)

Option

The transparent terminal cover prevents from careless touching to the live control terminals.
Protection degree IP20.

Option

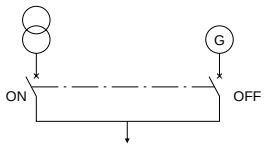
# Mechanical interlock (MI)

The mechanical interlock is a secure interlock prohibiting the parallel closing of two or three breakers.

- Any combination between AE630-SS~AE3200-SH and AE4000-SSC is possible. Please apply for further details of AE4000~6300-SS.
- It can be simply installed on either fixed or drawout type breakers.
- With the drawout type, the interlock operates at the connecting point and can be released at other positions, providing secure maintenance and inspections of the breaker.
- There are restrictions on ordering MI and DI together, please apply for further details.
- It is impossible to secure interlock among 3 pcs of AE4000-SS~AE6300-SS.

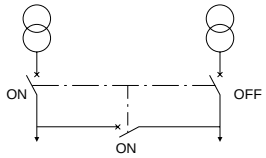
The following interlocks are available.

Change over of two power supplies

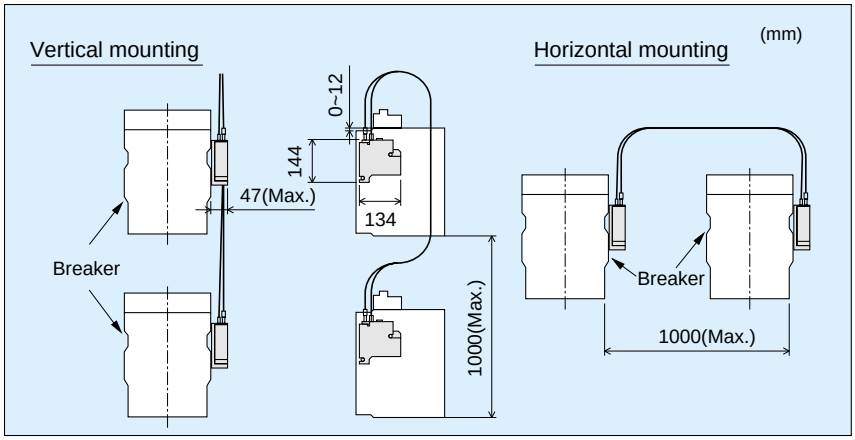



Change over of two supply systems

Up to any two breakers can be closed. (Please apply for further details)




**●Breaker arrangement (630AF~3200AF)**




Option

# Condenser trip device (COT)

Even if the power supply fails, the breaker can be electrically opened by remote operation within a definite time. This device is combined with the shunt trip device (SHT).

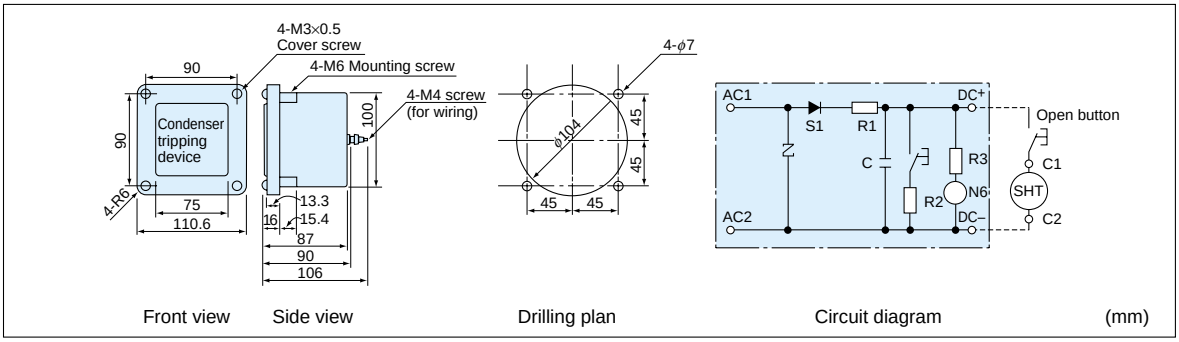
Note 1: The rated charging voltage is the voltage stored during capacitor saturation. It is continuously supplied by the rectified voltage of the rated AC input voltage.

Note 2: The charging time starts when the capacitor begins to supply power at 85% of the rated AC input voltage and continues until the capacitor charging voltage reaches 60% of rating.

Note 3: The time period in which the shunt trip device can perform its one operation starts from when the capacitor is charge to 100% the supply voltage is removed.

| Type | KF-100 | KF-200 |
|---|---|---|
| Rated input voltage | 100/110VAC | 200/220VAC |
| Rated frequency | 50~60Hz | 50~60Hz |
| Rated charging voltage (Note1) | 140/155V | 280/310V |
| Condenser capacity | 660μF | 150μF |
| Voltage range | 60~125% | 60~125% |
| Power supply capacity | 1VA | 1VA |
| Charging time (Note 2) | 0.5 s max. | 0.5 s max. |
| Trip limit time (Note 3) | 15 minutes min. | 5 minutes min. |
| Paint color | Black (N1.5) | Black (N1.5) |
| Withstand voltage (1 minute) | 2000VAC | 2000VAC |
| Applicable shunt trip voltage | 100~250VAC·DC | 100~250VAC·DC |

**● Outline dimensions (mm)**

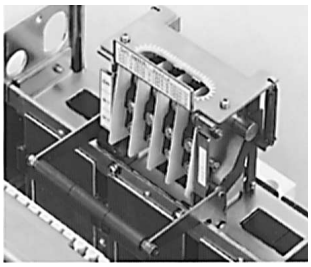


# Accessories (for Drawout frame)

## Cell switch (CL)

Option

The switch is used to indicate the drawout positions (CONNECTED, TEST, DISCONNECTED).



●Operating sequence and contact rating

| Drawout position of breaker | | | Disconnected | | Connected |
|---|---|---|---|---|---|
| Display position of drawout operation | | | DISCON | TEST | CONNECT |
| Switch function | CL-C (CONNECTED) | Change-over sequence (a-contact) | OFF | | ON |
| | CL-T (TEST) | | OFF | ON | |
| | CL-D (DISCONNECTED) | | ON | | OFF |

| Contact capacity (A) | Voltage (V) | | Resistive load | Inductive load |
|---|---|---|---|---|
| | AC | 460 | 5 | 2.5 |
| | | 250 | 10 | 10 |
| | | 125 | | |
| | DC | 250 | 3 | 1.5 |
| | | 125 | 10 | 6 |
| | | 30 | 10 | 10 |
| Number that may be installed | | | Total 4c max. | |

## Shorting b-contact (SBC)

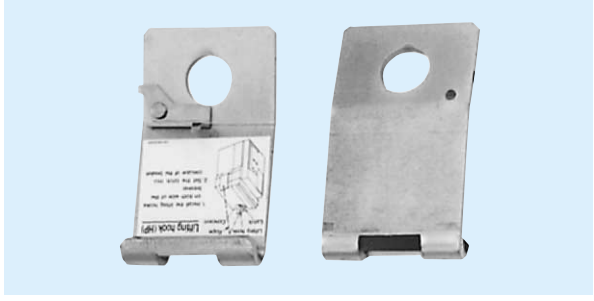
Option

When moving the breaker from the connected to the test positions, use this contact to short circuit auxiliary switch (AXb) thus maintaining the correct sequence of operation of the external control circuit.
When ordered, the same number of shorting b-contacts as auxiliary switches (AXb) will be provided.

## Lifting hooks (HP)

Option

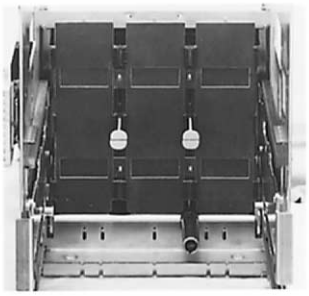
This is used to remove the drawout type breaker from the cradle.
The option is not necessary when the special lifter (bucket type) for AE-SS·SH is used.
The fixed type breaker is equipped with HP as standard.



## Safety shutters (SST)

Option

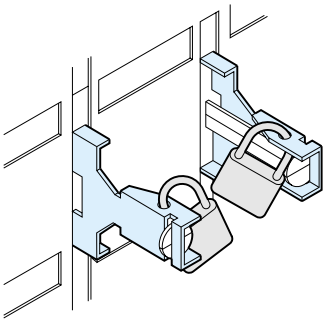
The safety shutters cover the conductors (cradle side) and prevent contact with them when the breaker is drawn out.
●When checking the main circuit, supply and load sides of the shutters can be kept OPEN independently. (they are released automatically when the breaker is pushed in.)



## Safety shutter lock (SST-LOCK)

Option

This kit is used to lock the safety shutters using 2 padlocks (the padlocks to be customer's supply). The safety shutters close when the breakers drawn out to prevent accidental contact with the main contacts.



Option

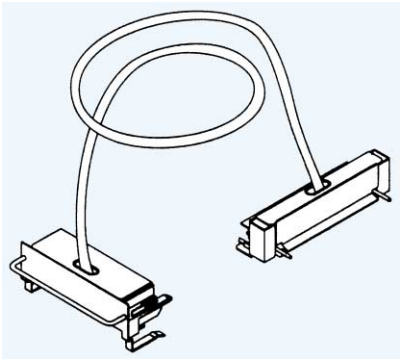
## Mis-insertion preventor (MIP)

This option prevents any other circuit breakers except those specified from being inserted into the cradle, 5 settings are available.
(Note) It is not available for AE4000-SS~AE6300-SS.

Option

## Test jumper (TJ)

With the breaker taken out of its cradle, this device will enable the breaker to be electrically opened and closed, and the operating sequence to be checked.
Note 1: Remove the breaker out of its cradle before using this device.



# Standard equipment

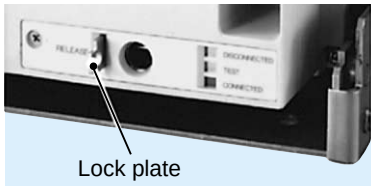
## Drawout interlock

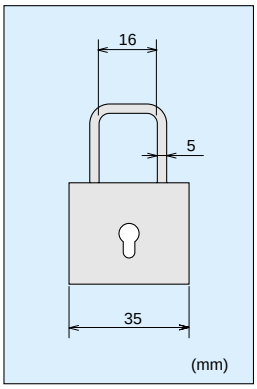
A safety device prohibits push-in and drawout when the breaker is ON. The drawout handle cannot be inserted unless the OFF button is pressed.

## Position lock

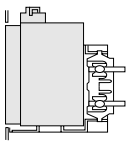
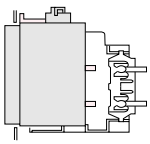
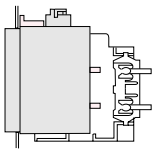
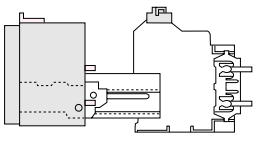
This device is for locking the drawout mechanism at the TEST position this then indicates the “TEST position”. The lock can be used during either the drawing out or pushing in operation.
The lock is released when the lock plate is pushed in, and the next operation becomes possible.
Padlocking is possible at the CONNECTED, TEST, and DISCONNECTED positions. Use this lock to prevent unauthorized changing of positions.

The padlock should be supplied by customer.




# Operating position of drawout type

| CONNECTED position | TEST position | DISCONNECTED position | DRAWOUT position |
|---|---|---|---|
|  |  |  |  |
| ● Both main and control circuits are connected.<br>● Normal in use condition. | ● Main circuit is disconnected, but the control circuit is connected.<br>● The breaker operation can be tested with the door closed. | ● Both main and control circuits are disconnected.<br>● The door can be closed. | ● This is the position for removing the breaker.<br>● The breaker is drawn out of the cradle on the extension rails. |

● The earthling points are located on both sides of the cradle, and they make contact between the breaker and the cradle at CONNECTED, TEST, and DISCONNECTED positions.

# Electronic trip relay specifications table

| Use | General use | | | | | Generator | | |
|---|---|---|---|---|---|---|---|---|
| Type | S | ST | SPT | SPGT | SPET | M | MT | |
| Protection | | | | | | | | |
| Overload, Short circuit (L+S+I) (Note 1) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| Neutral protection (NP) | ○ | ○ | ○ | ○ | ○ | – | – | |
| Making Current Release (MCR) (Note 2) | △ | △ | △ | △ | △ | – | – | |
| Pre-alarm (PAL) | – | – | ○ | ○ | ○ | – | – | |
| Ground fault (GFR) (Note 3) | – | – | – | ○ | – | – | – | |
| Earth leakage (ER) | – | – | – | – | ○ | – | – | |
| Load current indication LEDs, Alarm | | | | | | | | |
| Load current indication LEDs | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| OCR alarm (AL) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| Trip indicator (TI) | – | ○ | ○ | ○ | ○ | – | ○ | |
| Temperature alarm (TAL) | – | – | △ | △ | △ | – | – | |
| Others | | | | | | | | |
| Control power supply | Not required | Required | Required | Required | Required | Not required | Required | |
| Test terminal | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| STD lock button | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |

○ : Standard equipped
△ : Optional equipped
– : Not available

Note 1: L → LTD, S → STD, I → INST
Note 2: MCR function is not available for AE-SH.
Note 3: GFR is not availabe for AE630-SS ($I_{n\,max}$ = 315A, 500A), nor AE630-SH.
Note 4: B-C0A relay and BARE are not available for AE-SH series.

## Classification of types

Example

Type

SPT ——

## Table 1 Control supply voltage code

| Code | Control voltage |
|---|---|
| 0 | Not required |
| 1 | AC100-120/AC200-240V |
| 2 | DC100-125V |
| 4 | DC24-60V |

## Table 2 CT rating (Rated current MAX.)

(A)

| AE630-SS | AE1000-SS | AE1250-SS | AE1600-SS | AE2000-SS | AE2500-SS | AE3200-SS | AE4000-SSC | AE4000-SS | AE5000-SS | AE6300-SS |
|---|---|---|---|---|---|---|---|---|---|---|
| 630<br>500 } Low rating<br>315 } | 1000 | 1250 | 1600 | 2000<br>1600 } Low rating<br>1250 } | 2500 | 3200 | 4000 | 4000 | 5000 | 6300<br>6000 (JIS) |

| AE630-SH | AE1000-SH | AE1250-SH | AE1600-SH | AE2000-SH | AE2500-SH | AE3200-SH |
|---|---|---|---|---|---|---|
| 630 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 |

| | protection use | | Special use | No relay | Remarks | Ref. Page |
|---|---|---|---|---|---|---|
| | MPT | MPGT | B-C0A (Note 4) | BARE (Note 4) | | |
| | | | | | | |
| | ○ | ○ | ○ Only INST | – | LTD, STD and INST characteristics are standard equipped. Only INST is equipped for B-C0A relay | 37~39 |
| | – | – | ○ Only INST | – | NP characteristics is same as live poles. AE-SS 4P | 33 |
| | – | – | ○ | – | With MCR, Instantaneous tripping is only possible if a short circuit occurs during switch-ON. After the initial switch-ON, the Inst characteristic is cancelled to keep selectivity. INST/MCR set is changeable. | – |
| | ○ | ○ | – | – | PAL is indicated LED and a contact output if the load current is exceeded PAL setting value. Operating characteristic is half of LTD characteristic. Auto reset type. | 34 |
| | – | ○ | – | – | GFR ALARM/TRIP is changeable. When the switch is set to "ALARM" position a indicator LED will light up and the relay output will be activated when a ground fault occurs. However ACB will not trip. | 33 |
| | – | – | – | – | External ZCT is reqired. Alarm output (A contact) signal will be activated. Also ACB can be tripped with SHT tripping device. | 33, 35 |
| | | | | | | |
| | ○ | ○ | ○ | – | Indicates load current in percentage indicator LEDs. | 28, 30, 32 |
| | ○ | ○ | ○ | – | 30ms 1pulse output signal will be activated. Self-hold circuit is reqired when continuous signal is needed. It will not activated when ER operates. | 34 |
| | ○ | ○ | – | – | Fault cause is indicated LED and A contact. The signal is reset by pushing reset button or turning off the control power supply of the relay. | 28, 30 |
| | △ | △ | – | – | TAL is indicated LED and a contact output if the temperature around main contacts is exceeded usual level. The signal is reset by pushing reset button or turning off the contorl power supply of the relay. | 34 |
| | | | | | | |
| | Required | Required | Not required | Not required | OperatingVA: 5VA Vairious voltage code is shown below left table 1. | – |
| | ○ | ○ | ○ | – | Operating characteristics (LTD, STD, INST, GFR, PAL) are checked by field test device for AE-SS/AE-SH. Each pole characteristic is is checked individually for M type relay. | 34 |
| | ○ | ○ | – | – | This button is used during characteristic check. | 28, 30 |

| MCR | Control voltage code | OCR alarm | Temperature alarm |
|---|---|---|---|
| C | 2 | A | T |

## Table 3 Contact rating of Trip indicator and alarm

(A)

| Voltage (V) | | Resistive load | Inductive load |
|---|---|---|---|
| AC | 120 | 2 | 2 |
| | 250 | | |
| DC | 30 | | |
| | 125 | 0.2 | 0.1 |

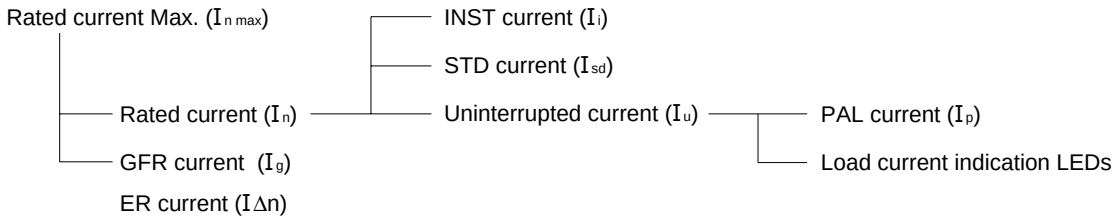
# Electronic trip relay (General use

## S type (General use)

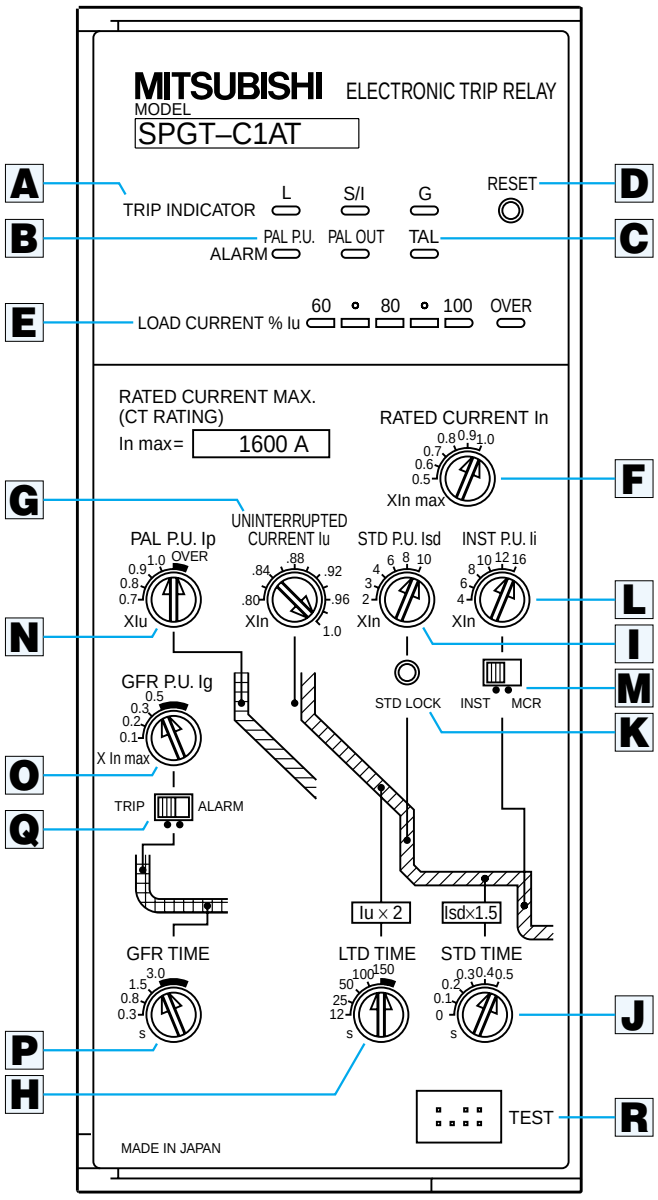
| | | Adjustable setting range |
|---|---|---|
| Rated current Max. ($I_{n\,max}$) | | Refer to P25 Table 2. |
| Rated current ($I_n$) | | 0.5-0.6-0.7-0.8-0.9-1.0 × $I_{n\,max}$<br>0.8-0.9-1.0 × $I_{n\,max}$ (AE4000-SSC) |
| Uninterrupted current ($I_u$) | | 0.8-0.82-0.84-0.86-0.88-0.9-0.92-0.94-0.96-1.0 × $I_n$ |
| Long-time delay | LTD current | 1.15 × $I_u$ ±10% |
| | LTD time ($T_L$) | 12-25-50-100-150 s ±20% (at 2 × $I_u$) |
| Short-time delay | STD current ($I_{sd}$) | 2-3-4-6-8-10 × $I_n$ ±15% |
| | STD time ($T_{sd}$) | 0-0.1-0.2-0.3-0.4-0.5 s ±20% (at 1.5 × $I_{sd}$) |
| Instantaneous | INST current ($I_i$) | 4-6-8-10-12-16 × $I_n$ ±15%<br>4-6-8-10-12 × $I_n$ ±15% (AE5000-SS)<br>4-6-8-10 × $I_n$ ±15% (AE6300-SS) |
| Pre-alarm | PAL current ($I_p$) | 0.7-0.8-0.9-1.0-OVER × $I_u$ ±10% |
| | PAL time ($T_p$) | 0.5 × $T_L$ ±20% |
| Ground-fault protection | GFR current ($I_g$) | 0.1-0.2-0.3-0.5 × $I_{n\,max}$ ±20%<br>0.2-0.3-0.5 × $I_{n\,max}$ ±20% (AE4000-SSC, 4000-SS~6300-SS) |
| | GFR time ($T_g$) | 0.3-0.8-1.5-3 s ±20% (at 1.5 × $I_g$) |
| Earth-leakage protection | ER current (IΔn) | 1-2-3-5 A ±20% |
| | ER time ($T_e$) | 0.3-0.8-1.5-3 s ±20% (at 1.5 × IΔn) |

●Unless specified when ordering the electronic trip relay will be set to in blue.

### S type setting dial operation schematic



# S type)




- **A** Trip indicator
- **B** PAL indicator
- **C** Temperature alarm indicator
- **D** Reset button
- **E** Load current indication LEDs
- **F** Rated current setting dial
- **G** Uninterrupted current setting dial
- **H** LTD time setting dial
- **I** STD current setting dial
- **J** STD time setting dial
- **K** STD lock button
- **L** INST current setting dial
- **M** INST/MCR switch
- **N** PAL current setting dial
- **O** GFR or ER current setting dial
- **P** GFR or ER time setting dial
- **Q** GFR TRIP/ALARM switch
- **R** TEST terminal

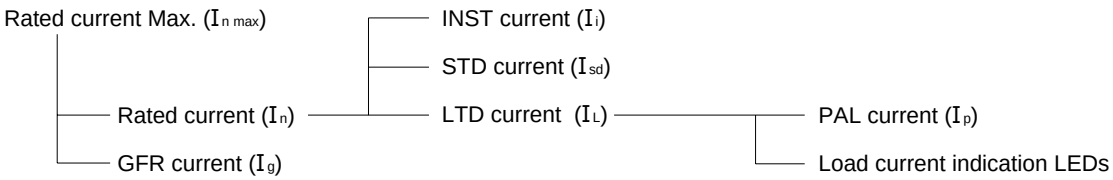
# ■Electronic trip relay (Generator

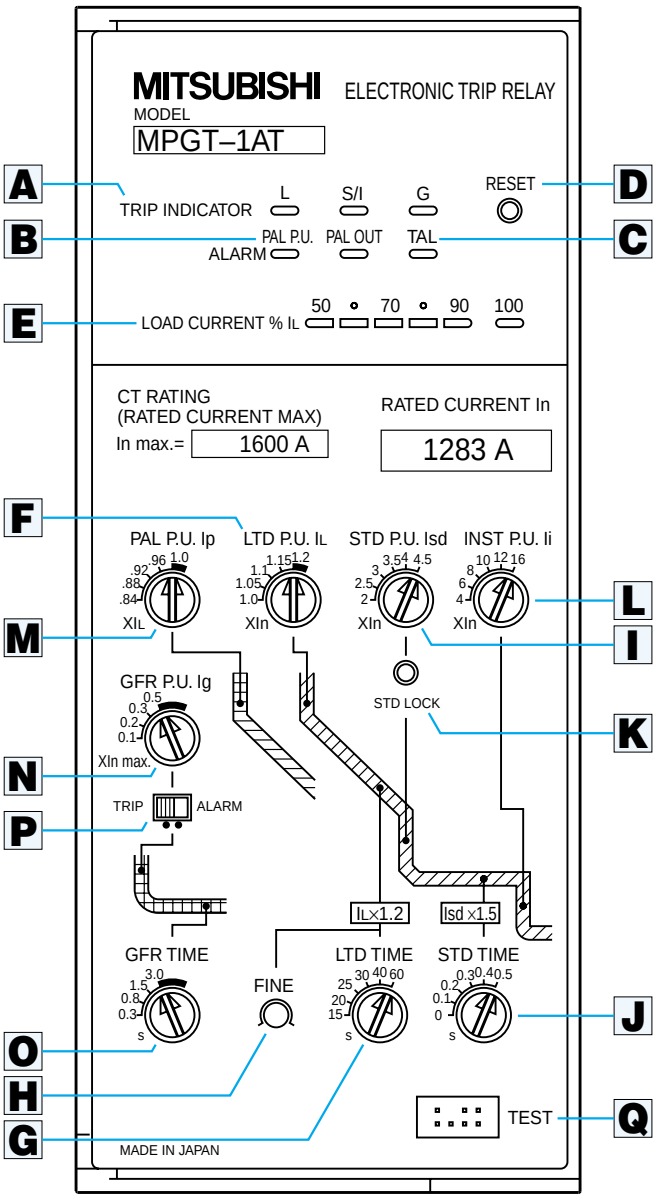
## M type (Generator protector use)

| | | Adjustable setting range |
|---|---|---|
| Rated current Max. ($I_{n\,max}$) | | Refer to P25 Table 2. |
| Rated current ($I_n$) | | 0.5~1.0 × $I_{n\,max}$<br>0.8~1.0 × $I_{n\,max}$ (AE4000-SSC) (setting by factory side) |
| Long-time delay | LTD current ($I_L$) | 1-1.05-1.1-1.15-1.2 × $I_n$ ±5% |
| | LTD time ($T_L$) | 15-20-25-30-40-60 s ±20% (at 1.2 × $I_L$) |
| Short-time delay | STD current ($I_{sd}$) | 2-2.5-3-3.5-4-4.5 × $I_n$ ±15% |
| | STD time ($T_{sd}$) | 0-0.1-0.2-0.3-0.4-0.5 s ±20% (at 1.5 × $I_{sd}$)<br>when "0" setting, operating time is 0.04~0.08 s. |
| Instantaneous | INST current ($I_i$) | 4-6-8-10-12-16 × $I_n$ ±15%<br>4-6-8-10-12 × $I_n$ ±15% (AE5000-SS)<br>4-6-8-10 × $I_n$ ±15% (AE6300-SS) |
| Pre-alarm | PAL current ($I_p$) | 0.84-0.88-0.92-0.96-1.0 × $I_L$ ±5% |
| | PAL time ($T_p$) | 0.5 × $T_L$ ±20% |
| Ground-fault protection | GFR current ($I_g$) | 0.1-0.2-0.3-0.5 × $I_{n\,max}$ ±20%<br>0.2-0.3-0.5 × $I_{n\,max}$ ±20% (AE4000-SSC, 4000-SS~6300-SS) |
| | GFR time ($T_g$) | 0.3-0.8-1.5-3 s ±20% (at 1.5 × $I_g$) |

●Unless specified when ordering the electronic trip relay will be set to in blue.

### M type setting dial operation schematic






- **A** Trip indicator
- **B** PAL indicator
- **C** Temperature alarm indicator
- **D** Reset button
- **E** Load current indication LEDs
- **F** LTD current setting dial
- **G** LTD time setting dial
- **H** LTD time fine setting dial
- **I** STD current setting dial
- **J** STD time setting dial
- **K** STD lock button
- **L** INST current setting dial
- **M** PAL current setting dial
- **N** GFR current setting dial
- **O** GFR time setting dial
- **P** GFR TRIP/ALARM switch
- **Q** TEST terminal

# Electronic trip relay (Special use

## B type (Special use)

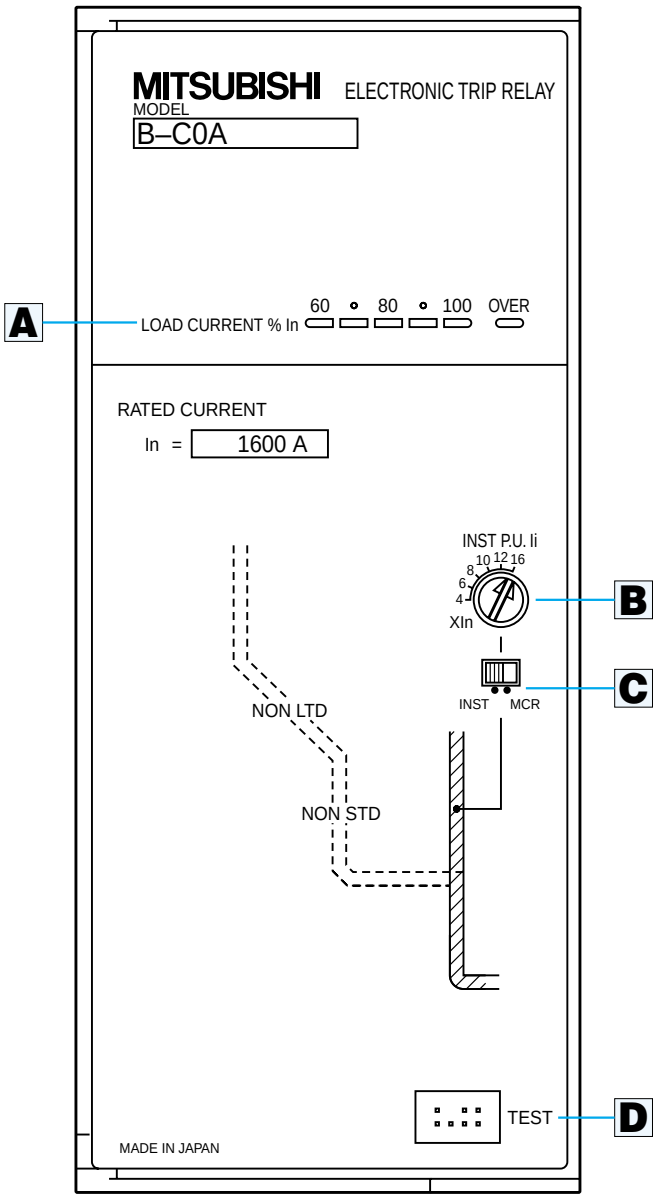
| | | Adjustable setting range |
|---|---|---|
| Rated current Max. ($I_{n\,max}$) | | Refer to P25 Table 2. |
| Rated current ($I_n$) | | 0.5-0.6-0.7-0.8-0.9-1.0 × $I_{n\,max}$ (setting by factory side)<br>0.8-0.9-1.0 × $I_{n\,max}$ (AE4000-SSC) |
| Long-time delay | | Non |
| Short-time delay | | Non |
| Instantaneous | INST current ($I_i$) | 4-6-8-10-12-16 × $I_n$ ±15%<br>4-6-8-10-12 × $I_n$ ±15% (AE5000-SS)<br>4-6-8-10 × $I_n$ ±15% (AE6300-SS) |

●Unless specified when ordering the electronic trip relay will be set to in blue.

### B type setting dial operation schematic

Rated current Max. ($I_{n\,max}$)
- Rated current ($I_n$)
  - INST current ($I_i$)
  - Load current indication LEDs

# B type)




**A** Load current indication LEDs

**B** INST current setting dial

**C** INST/MCR switch

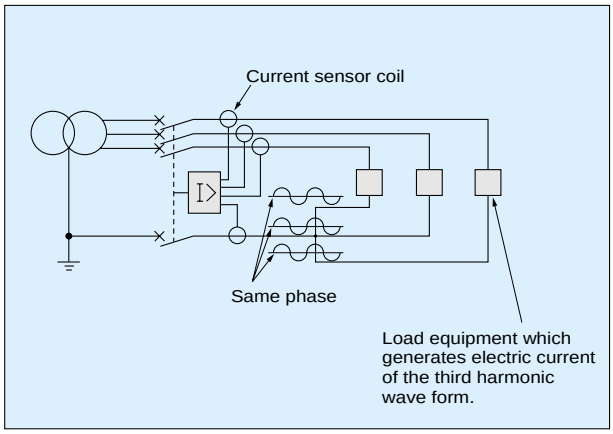
**D** TEST terminal

# Electronic trip relay accessories

## Neutral pole overcurrent protection (NP)

This function protects the neutral pole (4 pole) of the circuit breaker from overcurrent with S type relay. Neutral overcurrent protection can be set to operate at 100% of the rated current. Load equipment (for example: computer equipment, DC power supplies, etc) which is liable to generate third harmonic wave forms that may cause more load current to flow in the neutral pole, which may cause damage, the neutral pole overcurrent protection will prevent damage from occuring.

**●Connection diagram**



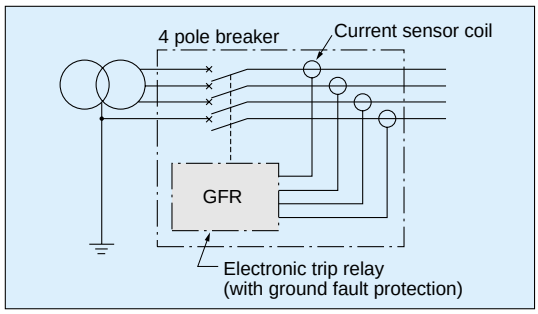

Option

## Ground fault protection (GFR)

Sometimes the Long-time-delay or Short-time-delay functions will not protect a circuit even if there is a ground fault of several hundred amps. In which case, the ground fault protection function (GFR) is used. The sensitivity is selectable in the range of 0.1-0.2-0.3-0.5 times the Rated current MAX. ($I_{n\,max}$), and the operating time is selectable from the range of 0.3-0.8-1.5-3 seconds. A control supply is not required for the operation of the ground fault protection.

Note 1: In a 3-phase, 4-wire circuit, ground fault protection is also possible with a 3 pole breaker and a Neutral CT (NCT) see page 35, 56.

Note 2: The ground fault protection (G) is not available for AE-SS series with the Rated current MAX. ($I_{n\,max}$) coming to 315 A or 500 A, or for AE630-SH.




Option

## Earth leakage protection (ER)

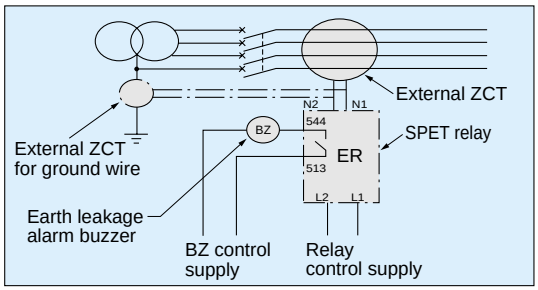
The earth leakage alarm facility is provided by using a electronic trip relay with earth leakage protection and a external ZCT (see page 37, 56.)

Even if several amperes of earth leakage current flow, the alarm alone operates but the breaker does not trip. This is therefore suitable when a continuous power supply is required. Should the breaker be required to trip on earth leakage, the above should be used with a SHT.

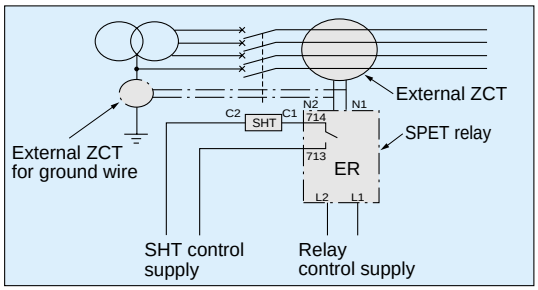
Note 1: The shunt tripping device (SHT) is suitable for 100-250V AC/DC or less.

Note 2: Output contact is self-hold type.
The output contact is turned off when the reset button is pressed or control supply is turned off.

**●Connection diagram (Earth leakage alarm system)**




**●Connection diagram (Earth leakage tripping system)**



## OCR alarm (AL)

The OCR alarm (AL) is a short-time operating switch (1a) for the electrical indication of when the breaker trips due to overcurrent. The AL is an integral part of the electronic trip relay. Though it operates when the breaker trips due to the Long-time-delay, Short-time-delay, Instantaneous/MCR, Ground fault protection (GFR), It does not operate when the breaker trips due to the Earth leakage protection (ER).

Note: Though a control supply is not required for the operation of the OCR alarm (AL), a self-hold circuit is required since the relay output only operates for 0.03 seconds.

Note: When a continuous output signal from the OCR alarm (AL) is required please use the output signal from the trip indicator (TI) which is operated by the same causes as the OCR alarm (AL).

Option

## Pre-alarm (PAL)

If the load current of the breaker exceeds the set value, A “PAL” LED lights and a relay output is energized. This is useful in securing a continuous power supply to a important circuit. The operating characteristic shown on the curve is proportional to half of the Longtime-delay tripping characteristic. The relay output is of an auto reset type.

Option

## Temperature alarm (TAL)

If the temperature of the main contact rises above a pre-determined level, a LED will light and a relay contact (1a) will energize. This will prevent trouble and increase contact life, a useful preventive maintenance feature. (The control supply and the reset button are used in common with the trip indicator.)

Option

## Field test device

The electronic trip relay can be checked without the breaker being connected to the main supply. The breaker will trip when tested.
Y-160 test device is not available for M type relay.

| Type | Y-2000 | Y-160 |
|---|---|---|
| Test function | LTD, STD, INST, GFR<br>Pre-alarm | LTD, STD, INST, GFR |
| Power supply | AC100-240V<br>50-60Hz | Battery use |
| | | ・AC100-120V<br>・AC200-240V |
| Test current signal setting | 10%~2000%<br>(continuously variable) | 6-point setting possible<br>(20%, 50%, 125%, 200%, 500%, 2000%) |
| Ammeter | equipped | – |
| Time counter | equipped | equipped |

# Electronic trip relay accessories

Option

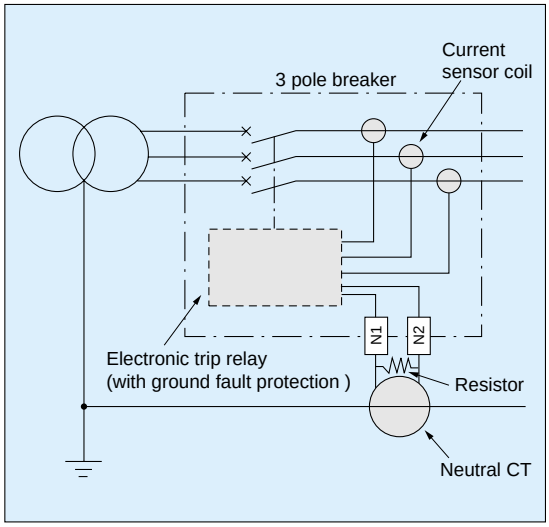
## Neutral CT (NCT)

The neutral CT is used for ground fault protection when a 3 pole breader is used on a 3 phase 4 wires system. It should be used together with the electronic trip relay that has the ground fault protection (G) option. (refer to P56)

| Type | Applicable CT type |
|---|---|
| AE 630-SS/SH | CW-40LM 630A |
| AE 1000-SS/SH | CW-40LM 1000A |
| AE 1250-SS/SH | CW-40LM 1250A |
| AE 1600-SS/SH | CW-40LM 1600A |
| AE 2000-SS/SH | CW-40LM 2000A |
| AE 2500-SS/SH | CW-40LM 2500A |
| AE 3200-SS/SH | CW-40LM 3200A |
| AE 4000-SS, SSC | CW-40LM 4000A |
| AE 5000-SS | CW-40LM 5000A |
| AE 6300-SS | CW-40LM 6300A<br>CW-40LM 6000A (JIS) |

Note: A suitable resistor (0.1Ω 10W) and screened wire (2m) is attached on the product.

**● Wiring diagram**




Option

## External ZCT

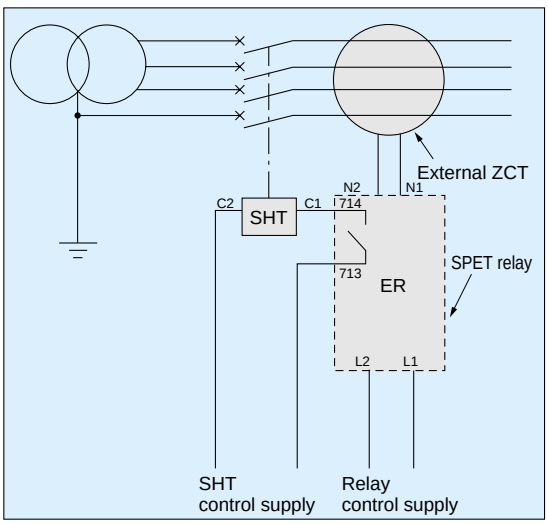
This option is used to detect several amperes of earth leakage when use in combination with a electronic trip relay that has the earth leakage tripping (ER) option.
Two methods are available: The first is where the all load conductors pass through the ZCT. The other method uses a smaller ZCT through which the supply transformer's ground wire passes through to earth. (refer to P56)

**● Type**

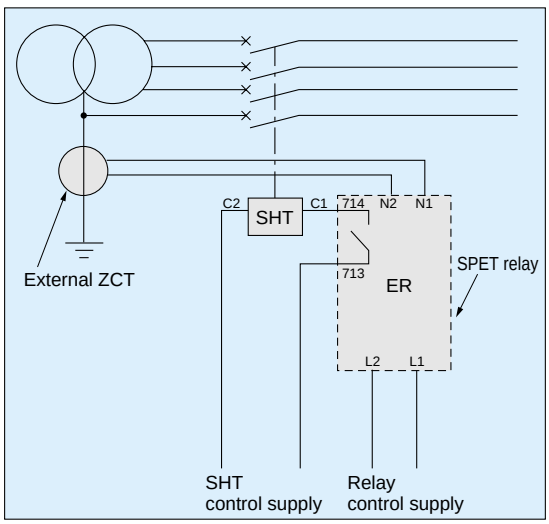
| Application | External ZCT for load circuits | | | External ZCT for transformer ground wire | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Type | ZCT163 | ZCT323 | ZCT324 | ZT15A | ZT30A | ZT40A | ZT60A | ZT80A | ZT100A |

Note: A screened wire (2m) is attached on the product.

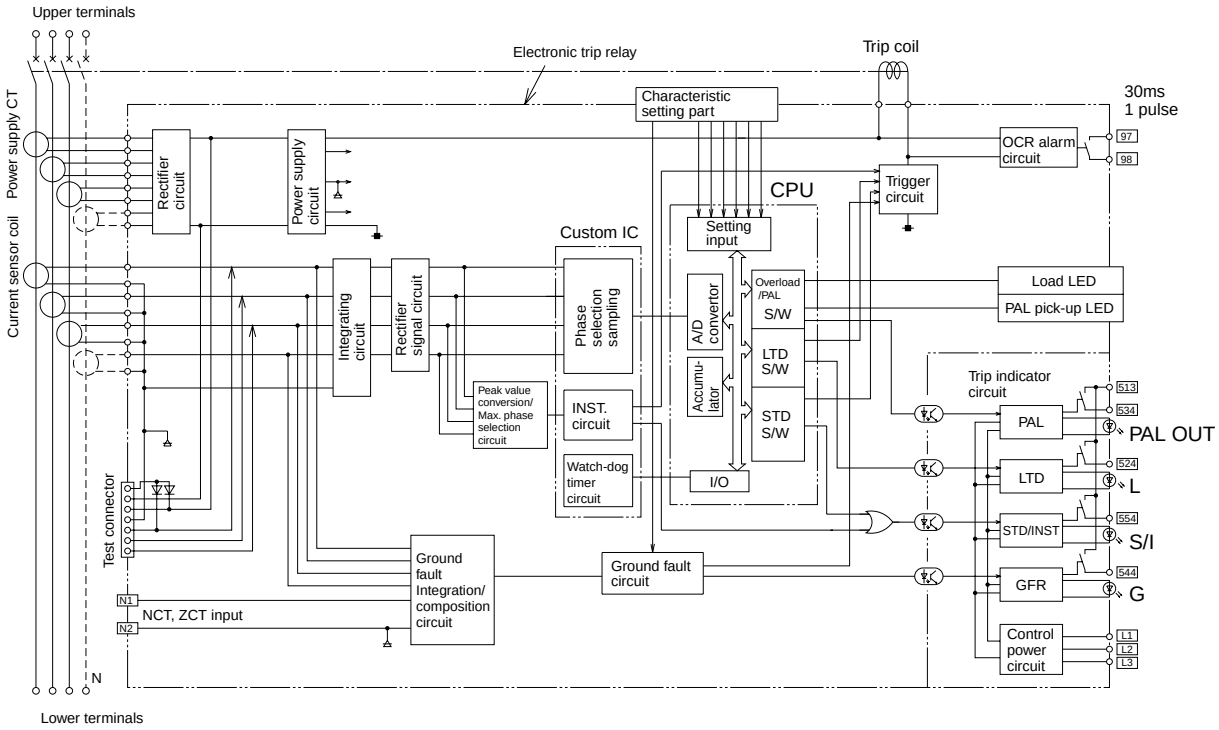
**1. Wiring diagram (load circuit method)**




**2. Wiring diagram (transformer ground wire method)**



## Circuit diagram of the electronic trip relay(SPGT)




## Operating function of each device

① Power supply CT
Energy is supplied for the operation of the overcurrent tripping and ground fault tripping (GFR) function of the electronic trip relay.

② Current sensor coil
The current in each phase flowing through in the breaker is detected. A coreless coil which has good linearity is achieved. The integrating circuit integrates the output voltage and provides a signal voltage waveform which is in proportion with the load current.

③ LTD
This is an effective value detection type which is strong against the distored wave. It has a memory effect for the overcurrent state. If the electronic trip relay is tripped, the overcurrent memory is reset.

④ Pre-alarm
This is an effective value detection system. It has a memory effect for the overcurrent state.

⑤ STD/INST
This is a peak value detection system, and is suitable for short time operation.

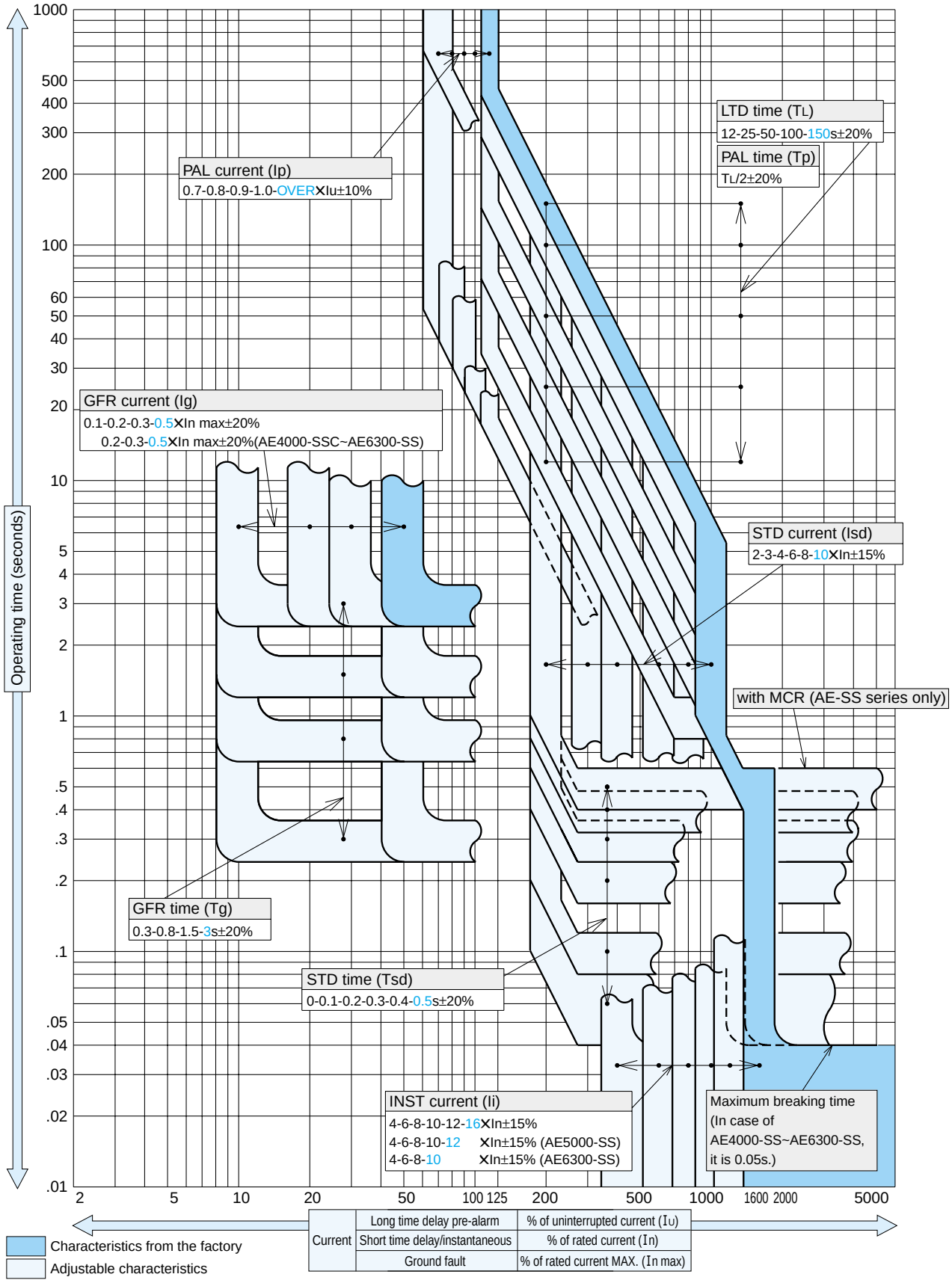
⑥ Ground fault circuit
The signals in each phase are summed in the vector mode in order to detect the ground fault value.

⑦ Trip indicator circuit
Fault cause and pre-alarm is indicated with control power supply.

⑧ OCR alarm circuit
1 pulse 30ms signal output without control power supply.

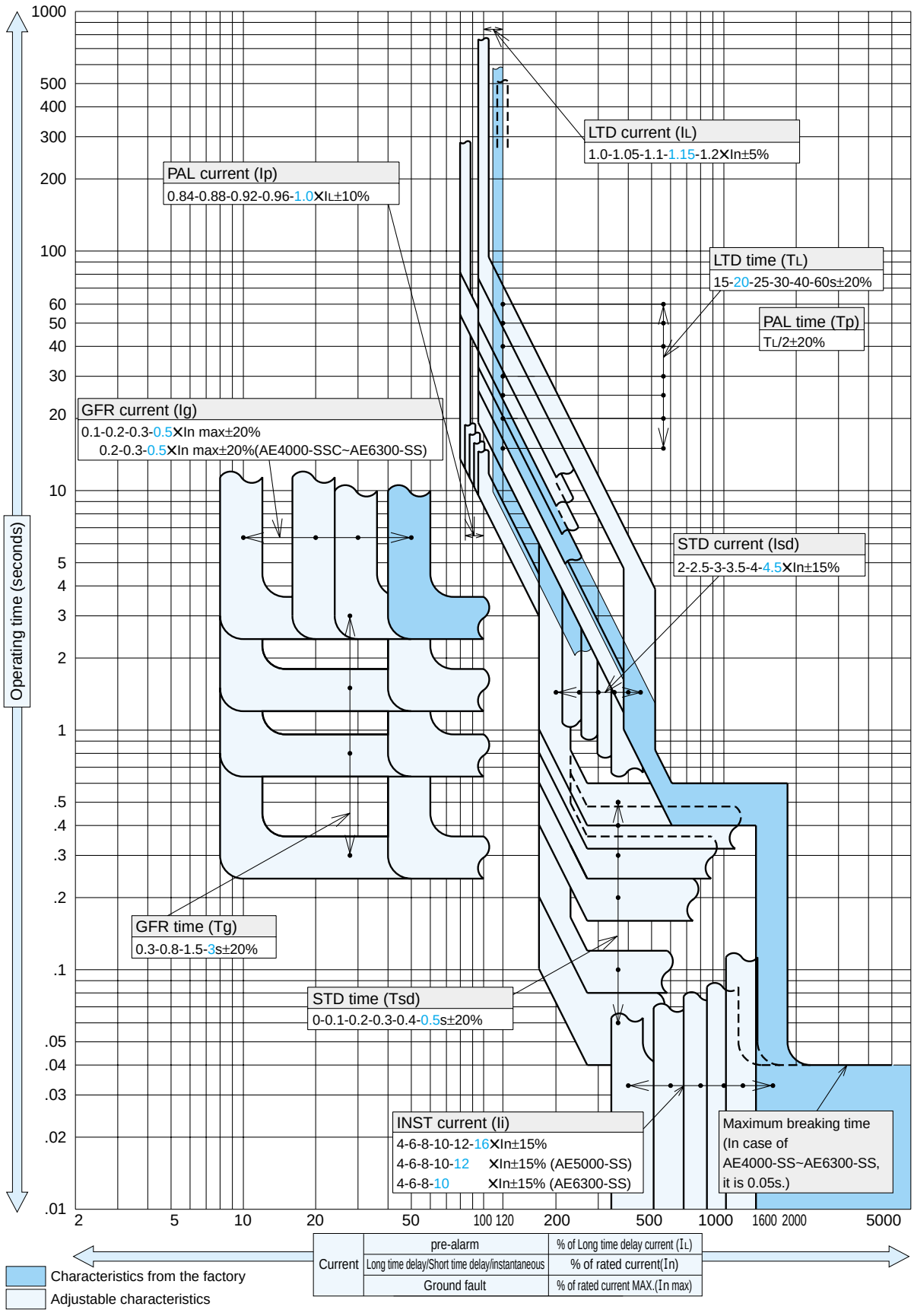
# Operating characteristics (General use)

## S type



# Operating characteristics (Generator protection use)

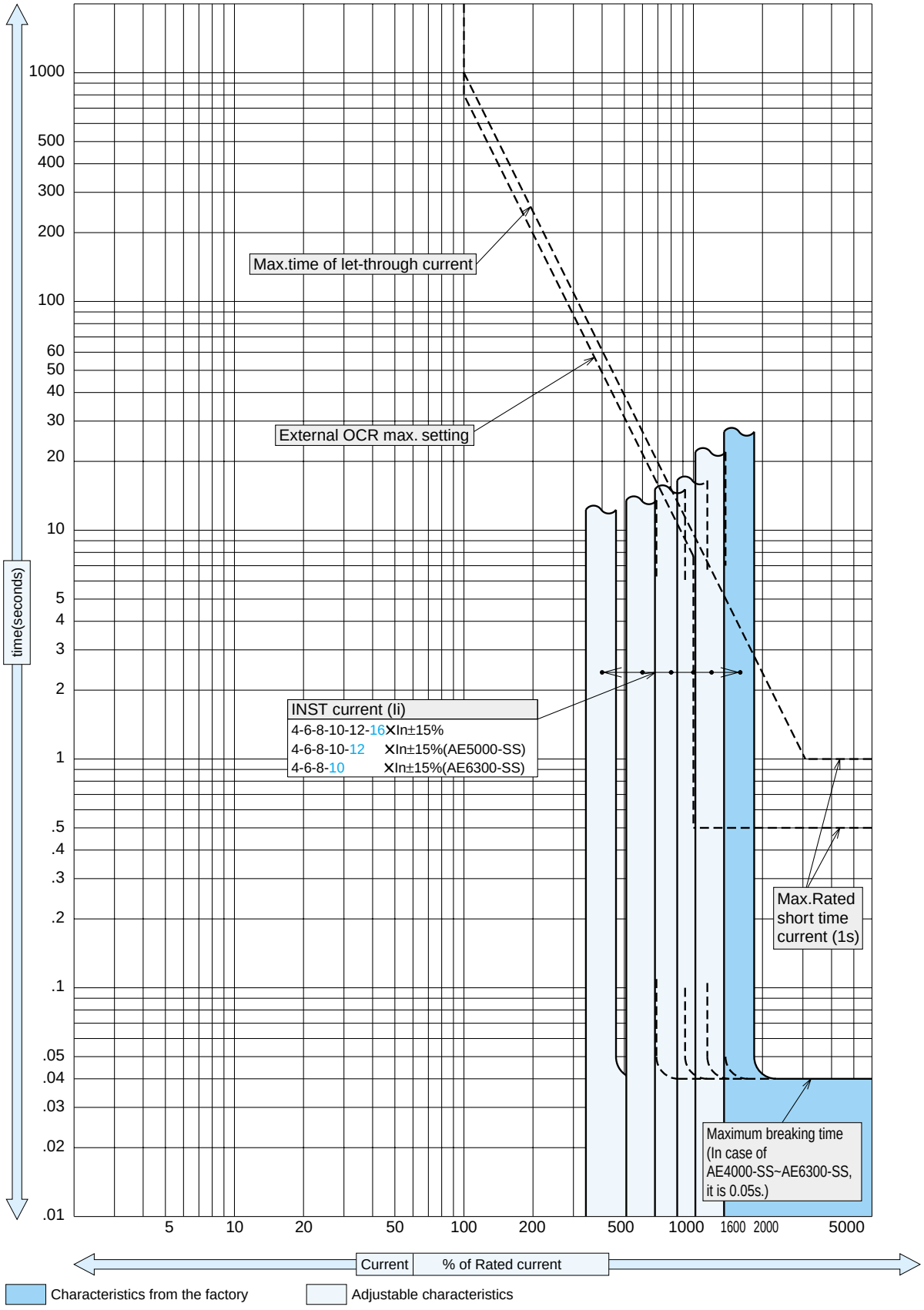
## M type



# MAX. time of let-through current and B type relay characteristics

## B-COA

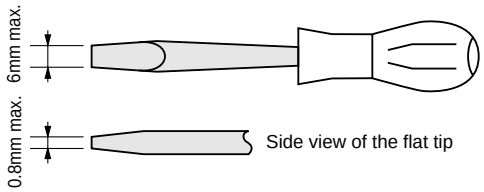
**(Not available for AE-SH)**



# Tripping characteristics setting

## Setting procedure

1. A small flat-tipped screwdriver is prepared.




2. Insert the flat-tipped screwdriver into the opening of the electronic trip relay cover. Then, lightly press the screwdriver leftward, and the cover will open.

3. There are 3 types of switches for setting up the required tripping characteristics and they should be used as follows:-

①Step adjustable type
A rotary switch is used. Do not stop the switch between steps as it would be the same setting value as that associated with the nearest step line. (Operate the switch with a torque of 0.1N•m or less.)

②Slide switch type
Slide the switch to the left or right. (operate the switch with a force of 10N or less.)

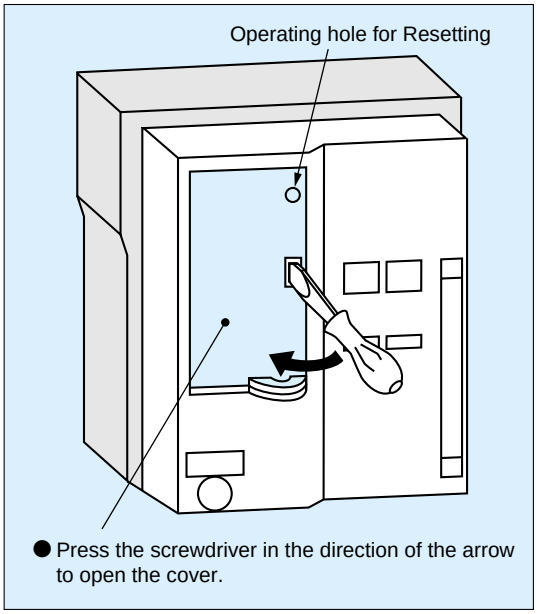
③Pushbutton type
A pushbutton is provided for termporary operation. Press it with a force of 10N or less. Before operating make sure that the push-button is in its initial state.

4. When the characterisitics have been set, they should be checked using a field tester.

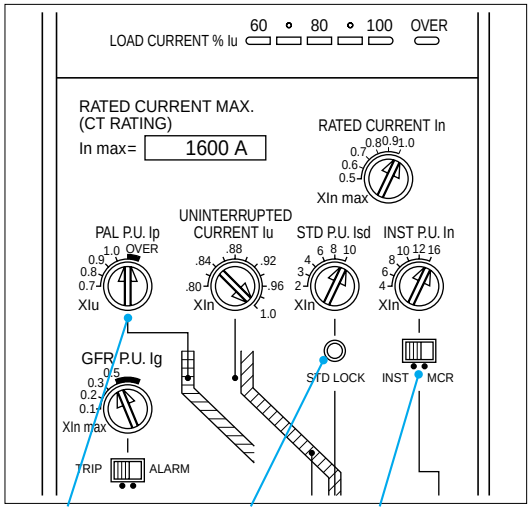
5. Two methods for sealing the cover are provided, select either from the following:

①Stick the sealing label on the opening of the electronic trip relay cover, and close the cover. The cover can not be opened unless the sealing label is removed.
Note: The sealing label is supplied with the relay.

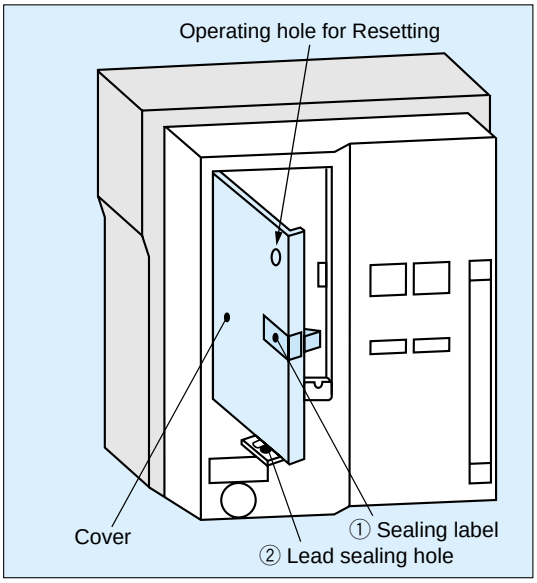
②Seal the electronic trip relay cover by using the lead sealing hole at the bottom of the cover.




● Press the screwdriver in the direction of the arrow to open the cover.




① Step type ③ Push-button type ② Slide switch type

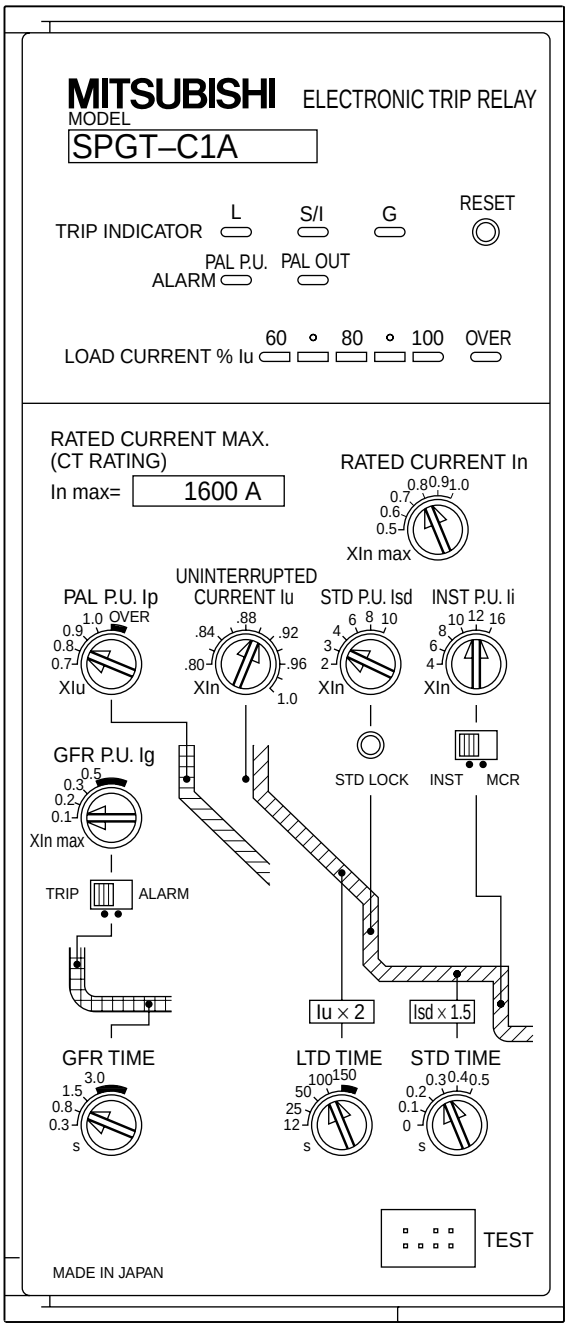


# How to adjust the trip relay

AE-SS has very intelligent relay with multi functions.
But sometime, it seemed to be difficult to adjust it.
This report can help you to solve such questions.

**<Front view of the relay>**

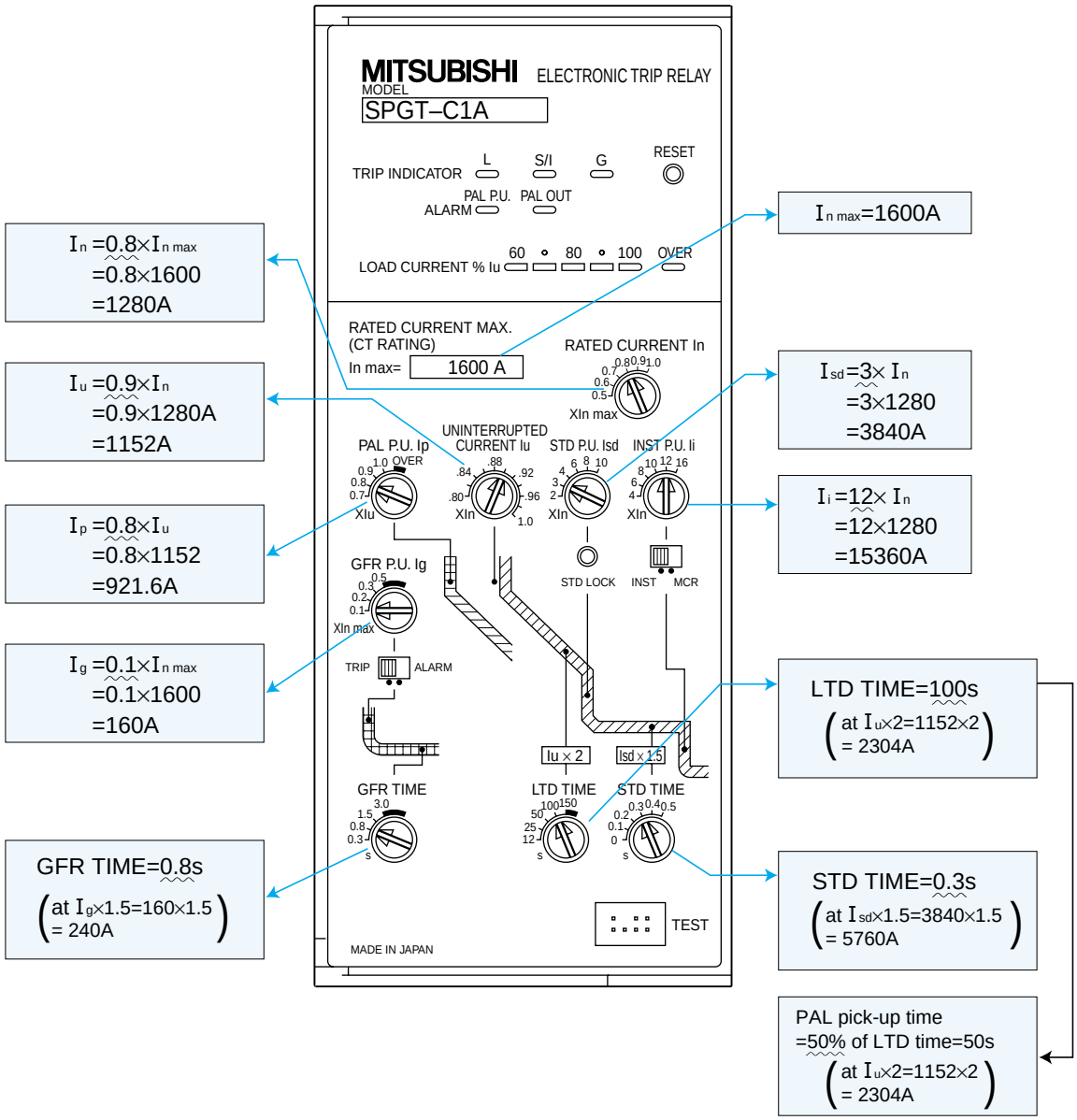
The relay is set as follows.




Here
$I_{n\,max}$ = Maximum rated current
$I_n$ = Rated current
$I_u$ = Uninterrupted current
LTD TIME = Long time delay tripping time
$I_{sd}$ = Short time delay pick-up current
STD TIME = Short time delay tripping time
$I_i$ = Instantaneous pick-up current
$I_p$ = Pre-alarm (PAL) operating current
$I_g$ = Ground fault pick-up current
GFR TIME = Ground fault operating time

## How to get the current settings and operating times

**<Actual setting>**
Current settings and operating times are calculated.




Actual settings are as following table.

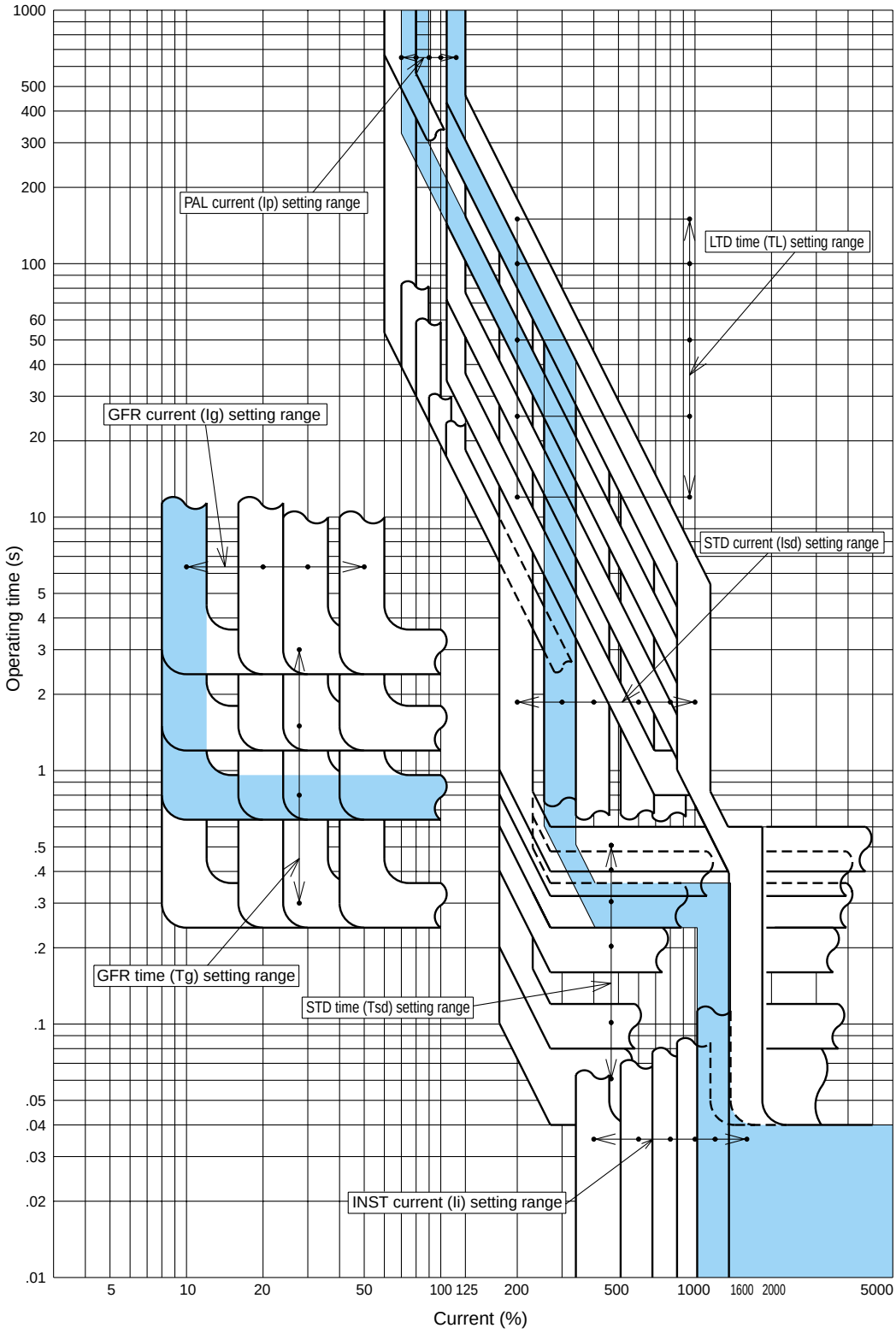
| | | | |
|---|---|---|---|
| $I_{n\,max}$ | =1600A | $I_i$ | =15360A±15% |
| $I_n$ | =1280A | $I_p$ | =921.6A±10% |
| $I_u$ | =1152A | PAL pick-up time | =50s±20% (at 2304A) |
| LTD TIME | =100s±20% (at 2304A) | $I_g$ | =160A±20% |
| $I_{sd}$ | =3840A±15% | GFR TIME | =0.8s±20% (at 240A) |
| STD TIME | =0.3s±20% (at 5760A ) | | – |

# How to get the current settings and operating times

**<Characteristic curve>**

In above settings, operating characteristics are set as follows.

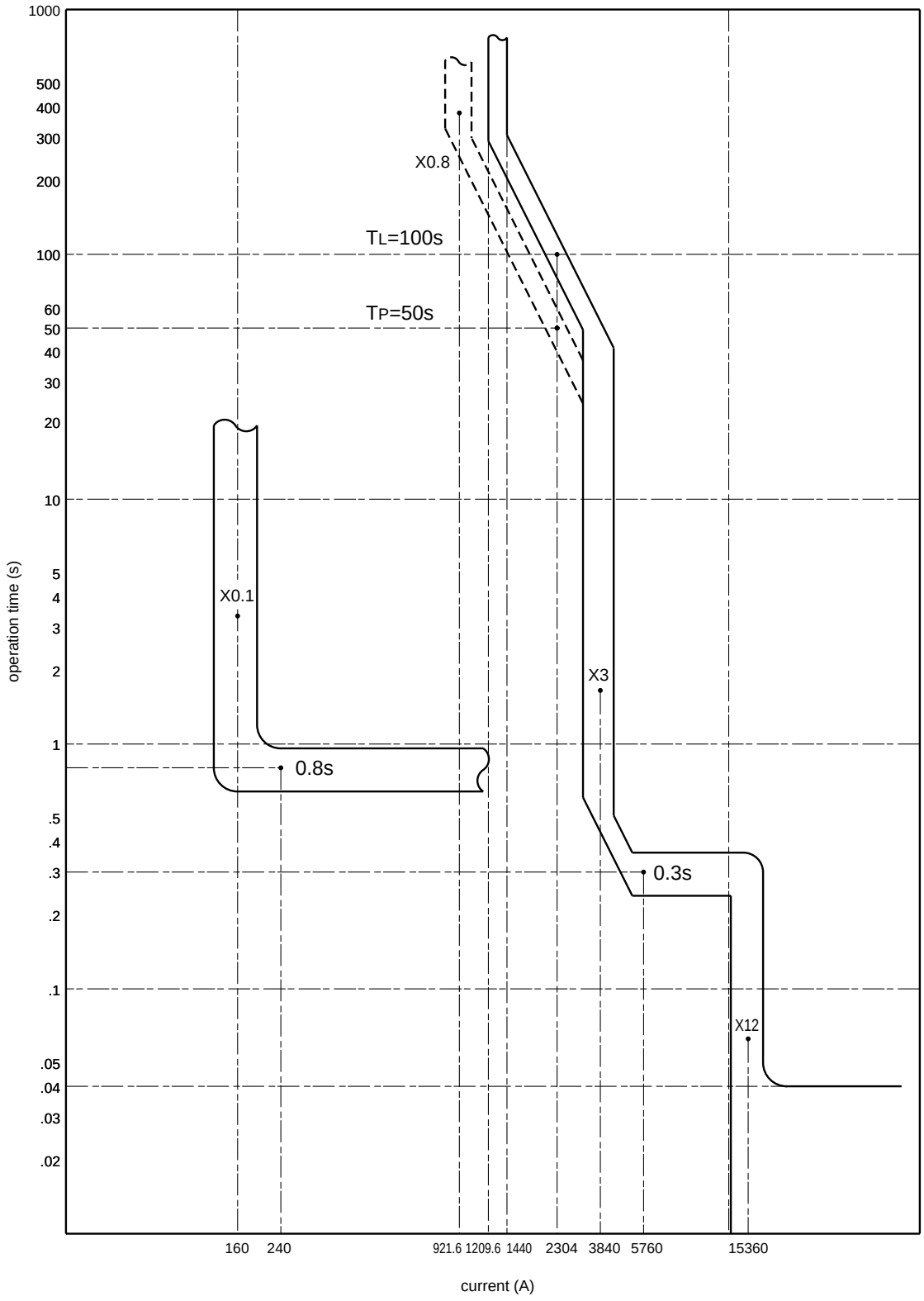
●Characteristic curve



# Tripping characteristics setting (3/3)

Actual operating characteristics are shown is following curve by %-A figure.

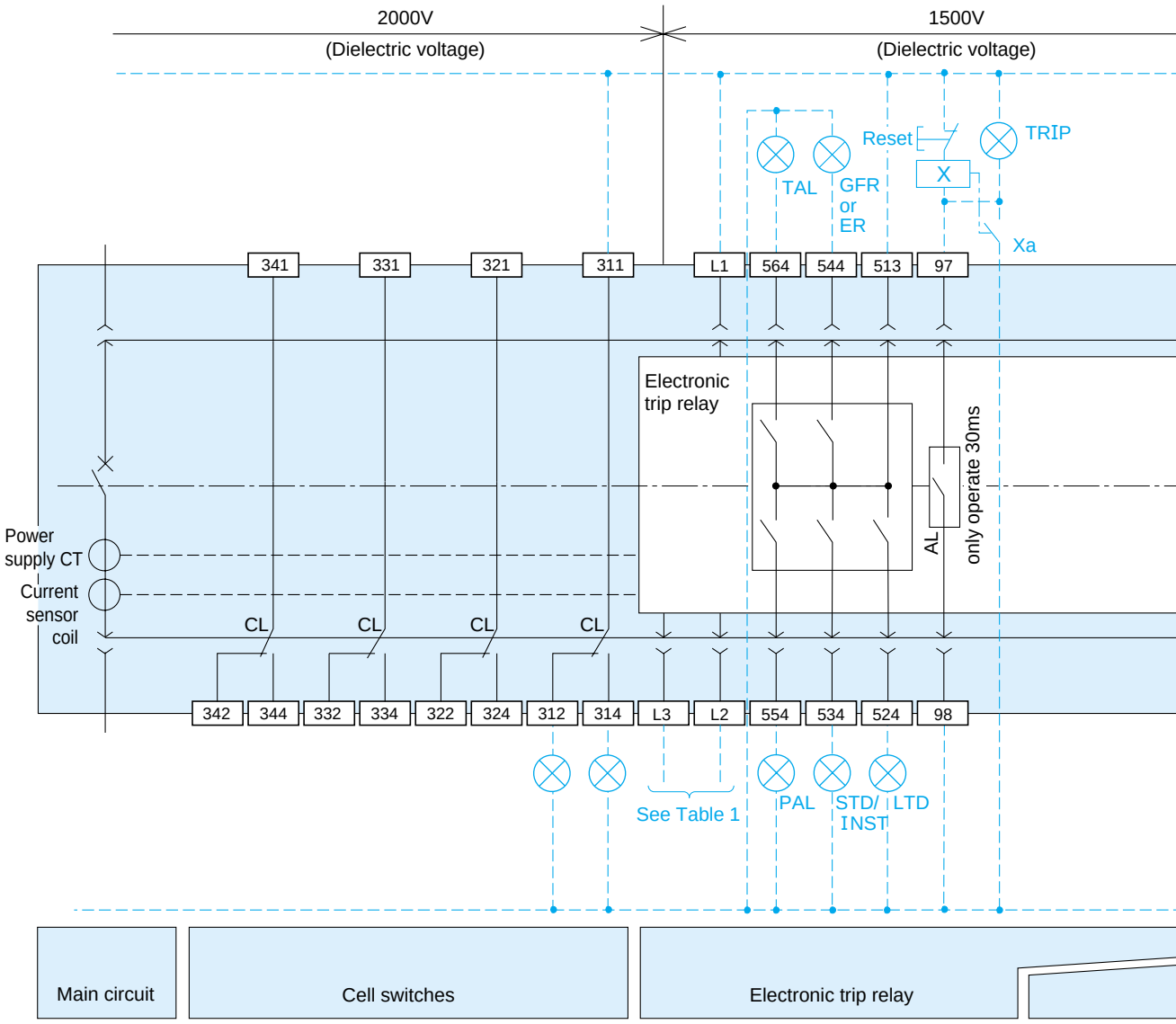
●Characteristic curve



# Wiring diagram (According to EN50005)

## Internal wiring diagram

● The following wiring diagram shown accessories fully equipped.



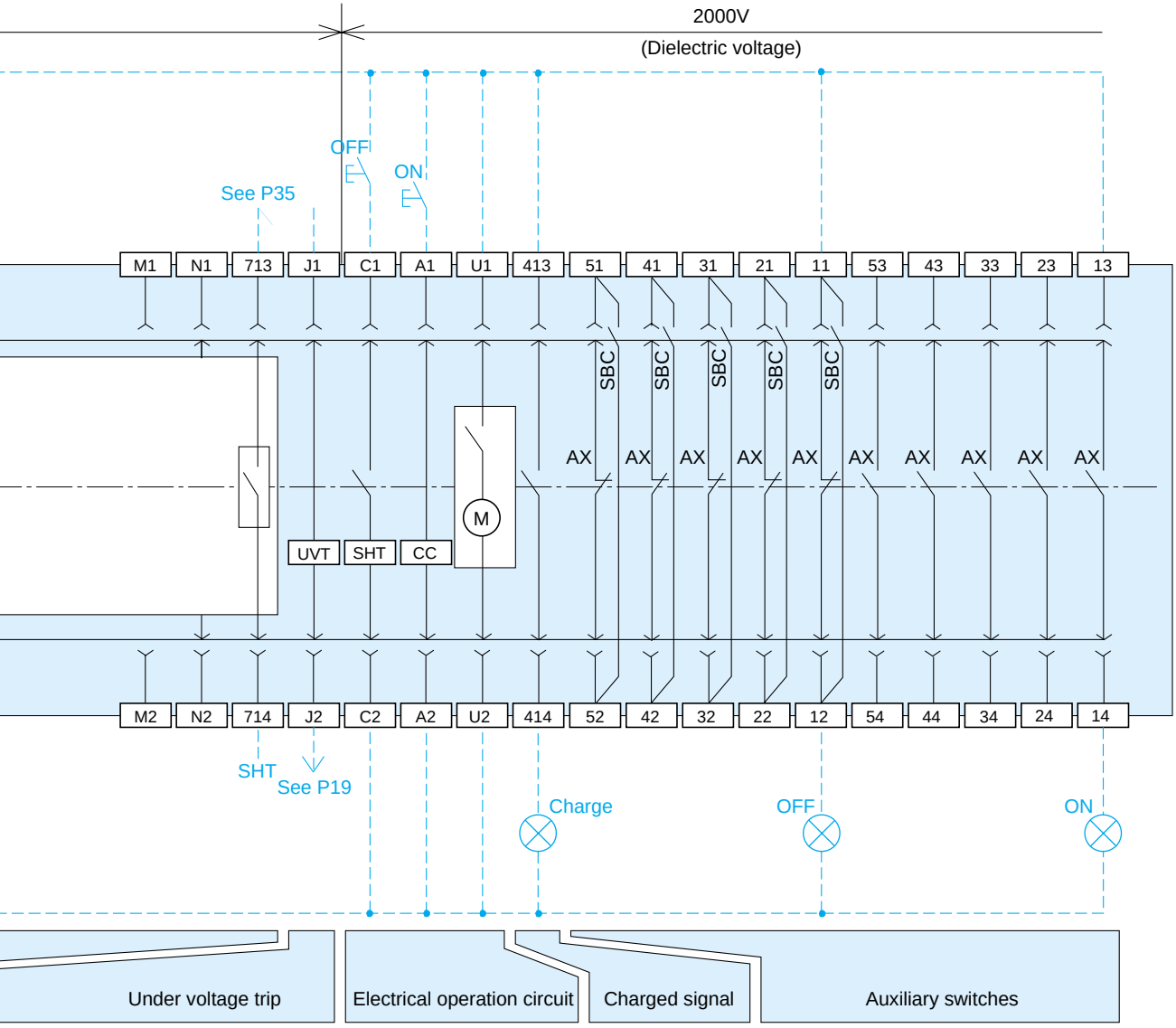

### ●Terminal Symbols

| | | | |
|---|---|---|---|
| 13 ~ 54 | Auxiliary switch contact a | N1 N2 | For N-pole CT or external ZCT connection |
| 11 ~ 52 | Auxiliary switch contact b | M1 M2 | |
| 413 414 | Charged signal a | 97 98 | OCR alarm contact |
| U1 U2 | Motor charging | 524 ~ 544 | Trip indication contact |
| A1 A2 | Closing coil | 554 | Pre-alarm indication contact |
| C1 C2 | Shunt trip | 564 | Temperature alarm contact |
| J1 J2 | Under voltage trip | L1 L2 L3 | Electronic relay unit control power supply |
| 713 714 | Earth leakage trip output (for SHT trip) | 311 ~ 344 | Cell switch |

**(Table-1)**

| Applicable power supply | | | |
|---|---|---|---|
| Voltage(V) | | | Input terminal |
| AC | Common | 100 – 120 | L1 , L2 |
| | | 200 – 240 | L1 , L3 |
| DC | | 100 – 125 | L1 , L2 |
| | | 24 – 60 | |

- The Fig. below is the wiring diagram at fully equipped state.
- CL and SBC are accessories for draw-out type.
- On the draw-out type, the control circuit terminal block should be moved to the left or right by 5mm, after cables connecting.
- When usin coil loads such as DC magnetic switch, etc. as operating voltage in the peripheral circuits, install diodes, surge absorbers, etc. as a countermeasure against the surge (counter electromotive force) at the time of switching.
- Because of pumping prevention is not performed, do not use AXb contact for a cut-off of closing coil.



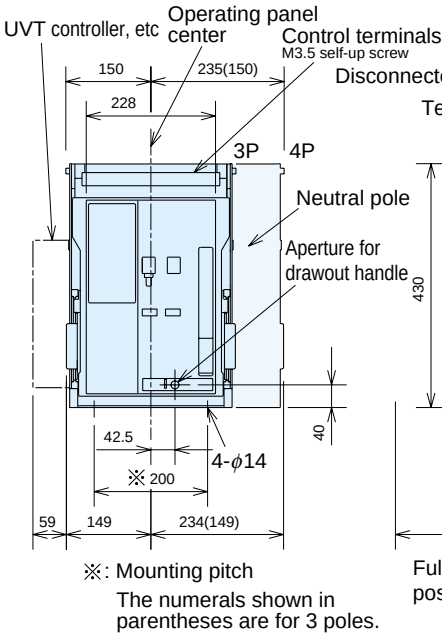

## ●Accessory Symbols

| | | | |
|---|---|---|---|
| M | Motor | GFR or ER | Ground fault trip or earth leakage indication LAMP |
| CC | Closing coil | PAL | Pre-alarm indication LAMP |
| SHT | Shunt trip device | TAL | Temperature alarm indication LAMP |
| UVT | Under voltage trip coil | X | Self-hold relay |
| AL | OCR alarm (30ms) | ——— | Wiring completed by the factory |
| LTD | Long-time-delay trip indication LAMP | – – – | Wiring by the user |
| STD/INST | Short-time-delay or instantaneous trip indication LAMP | | |

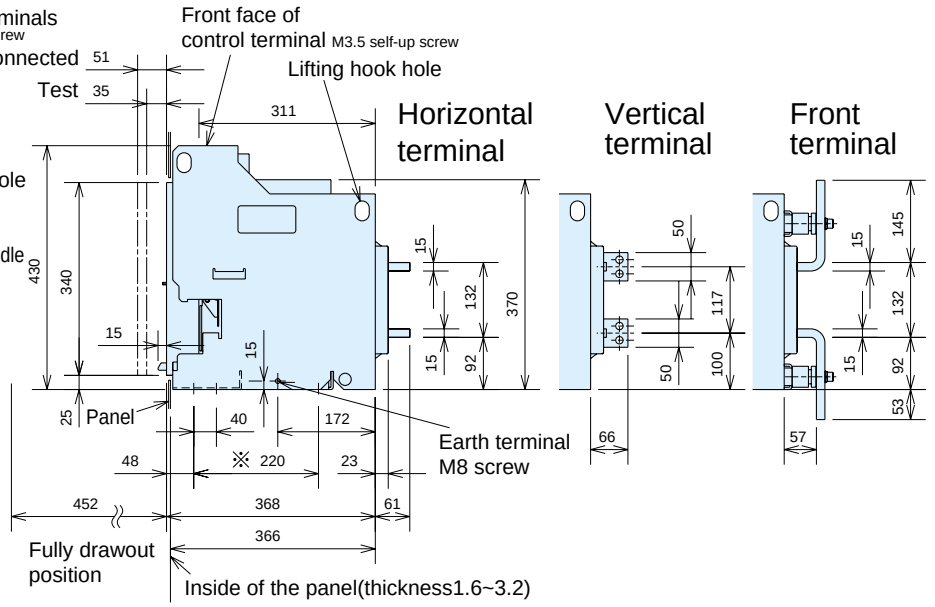
# Outline dimensions (1/5)

## Drawout type AE630-SS~AE1600-SS

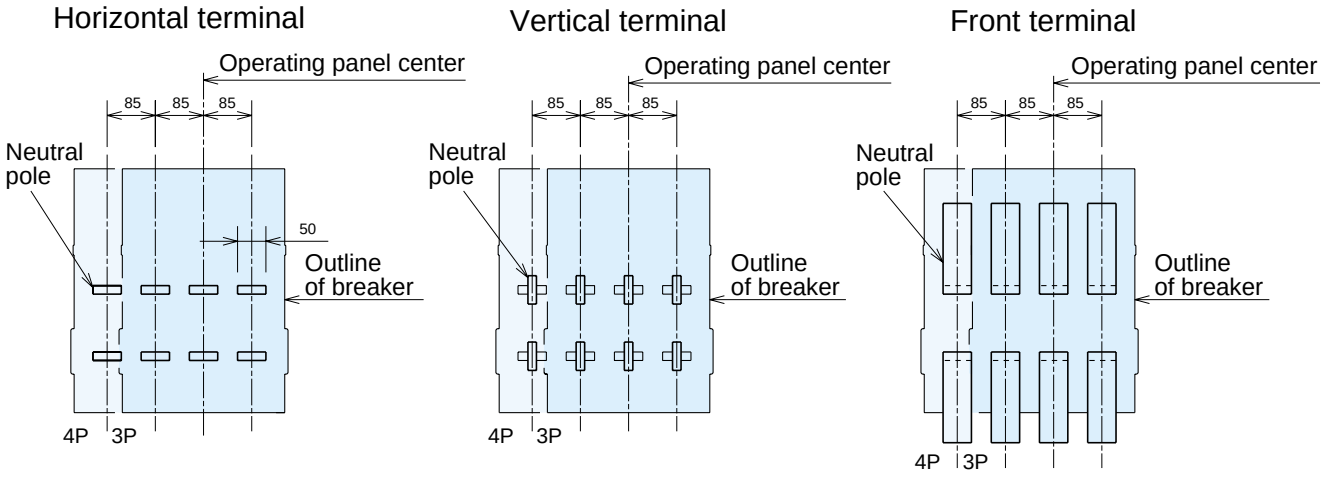
### Front view



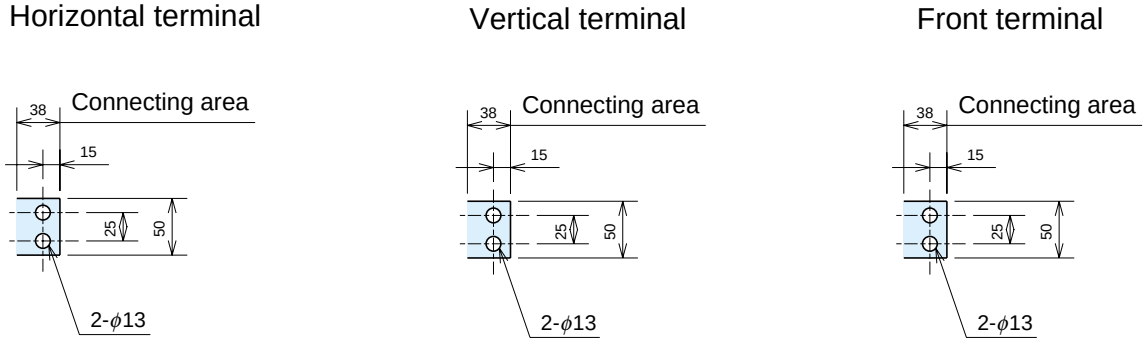

### Side view




### Rear view

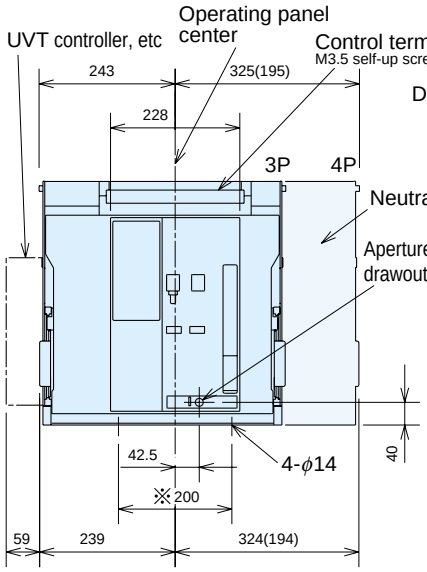



### Main circuit terminal dimensions



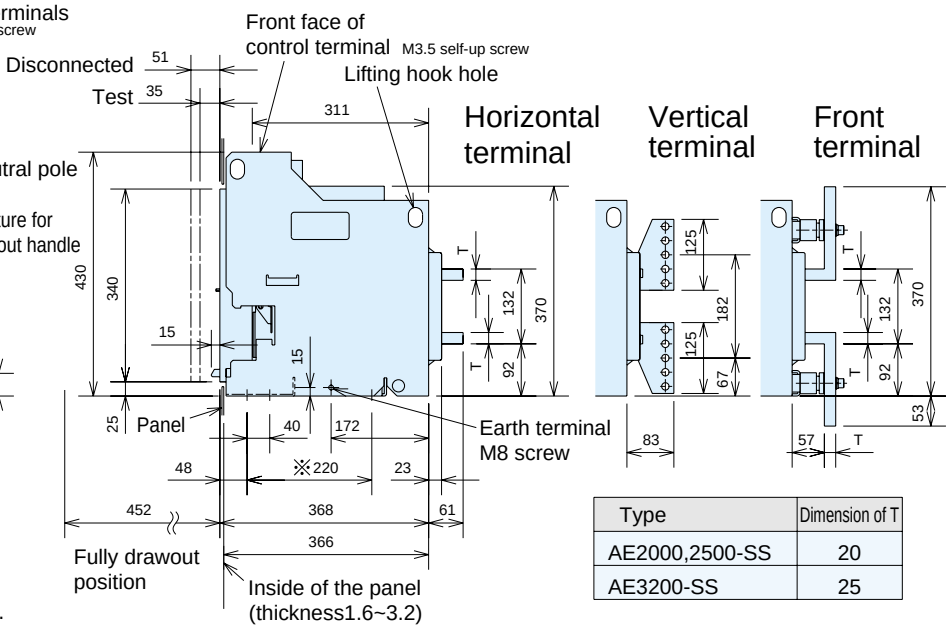
# Drawout type AE2000-SS~AE3200-SS

## Front view



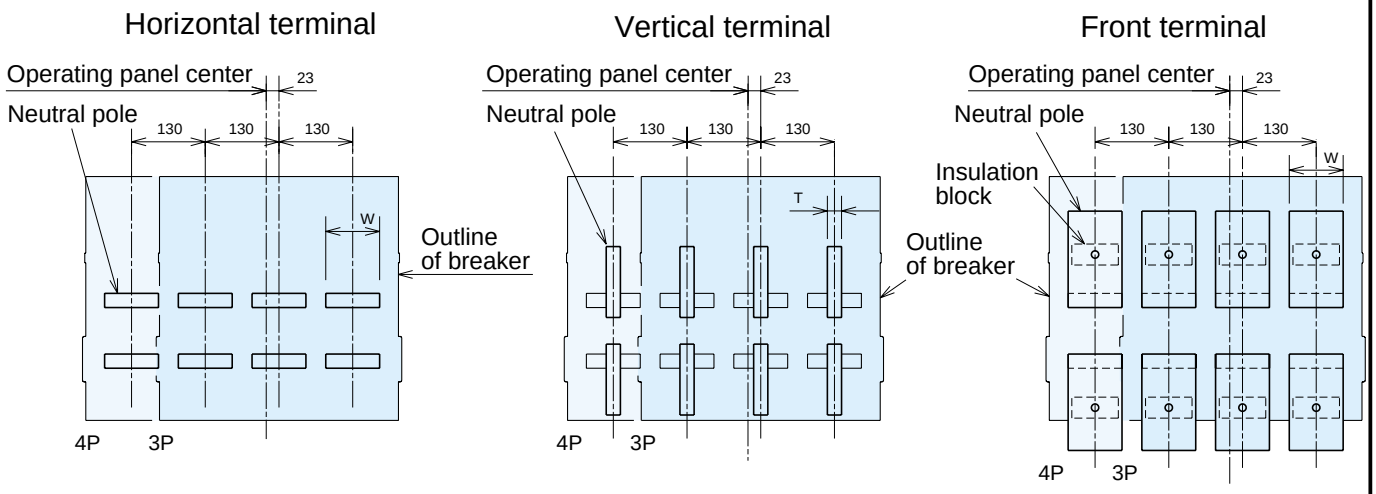

※: Mounting pitch
The numerals shown in parentheses are for 3 poles.

## Side view

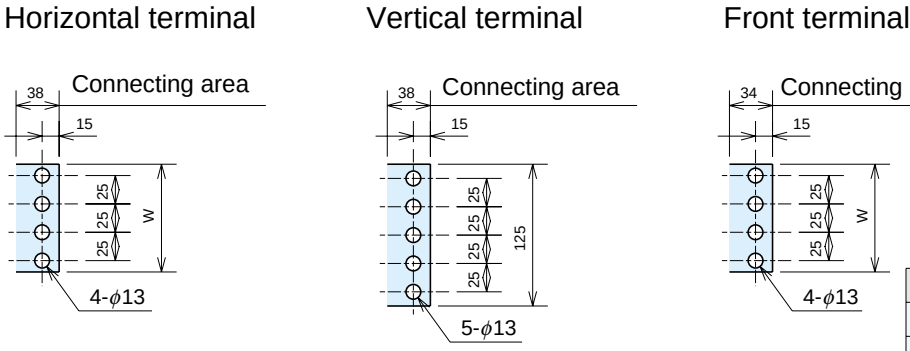



| Type | Dimension of T |
|---|---|
| AE2000,2500-SS | 20 |
| AE3200-SS | 25 |

## Rear view




## Main circuit terminal dimensions

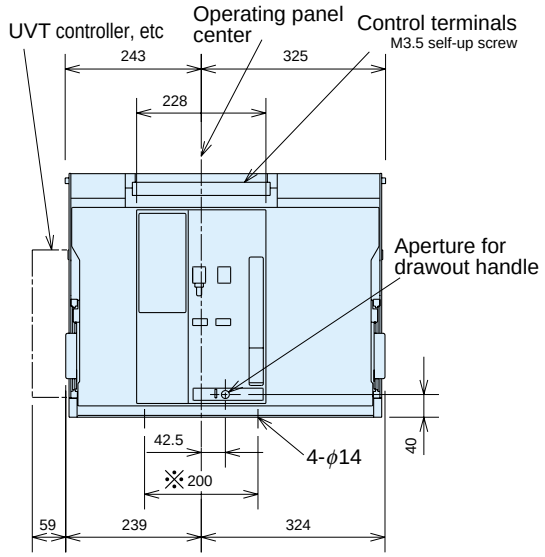



| Type | Dimension of W |
|---|---|
| AE2000,2500-SS | 95 |
| AE3200-SS | 103 |

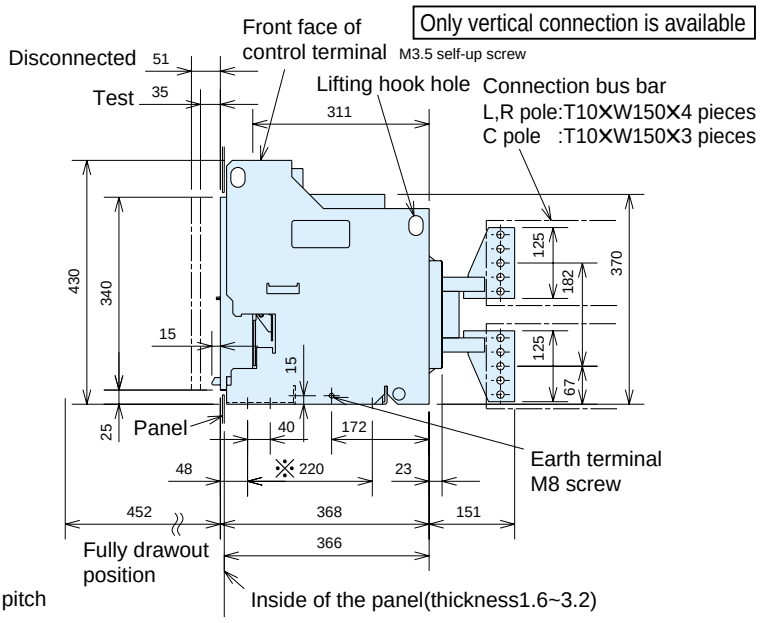
# Outline dimensions (2/5)

## Drawout type AE4000-SSC (3P)

### Front view

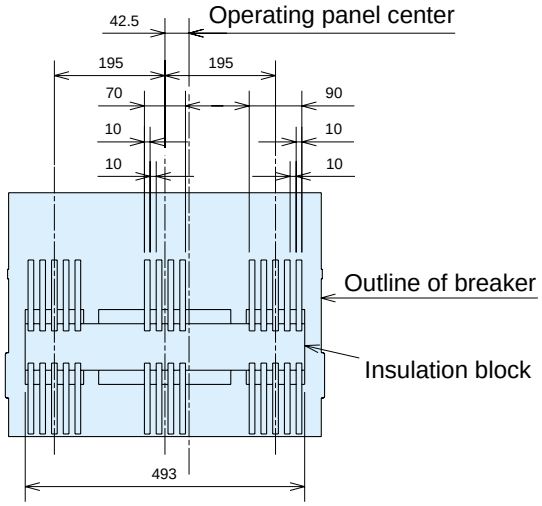



### Side view

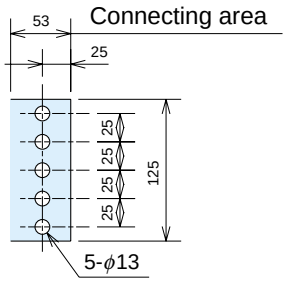



※: Mounting pitch

### Rear view

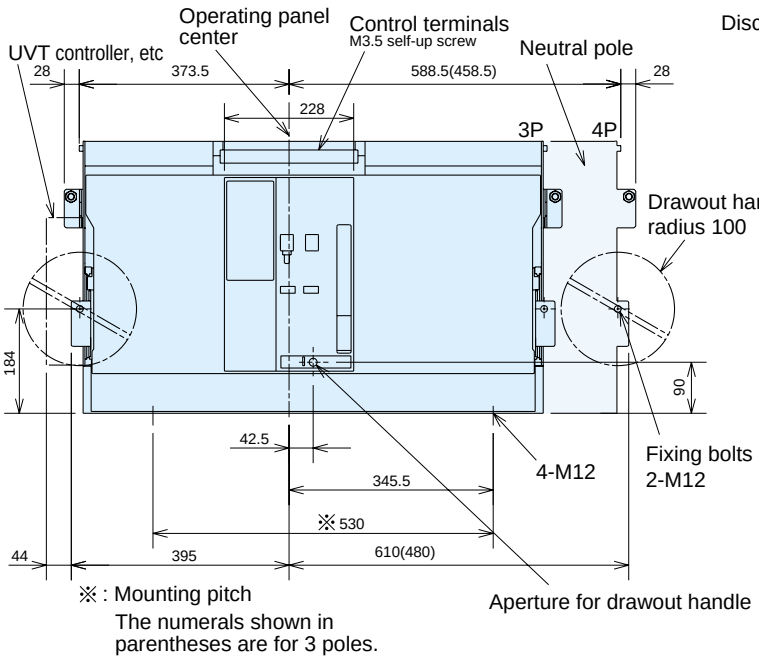



### Main circuit terminal dimensions



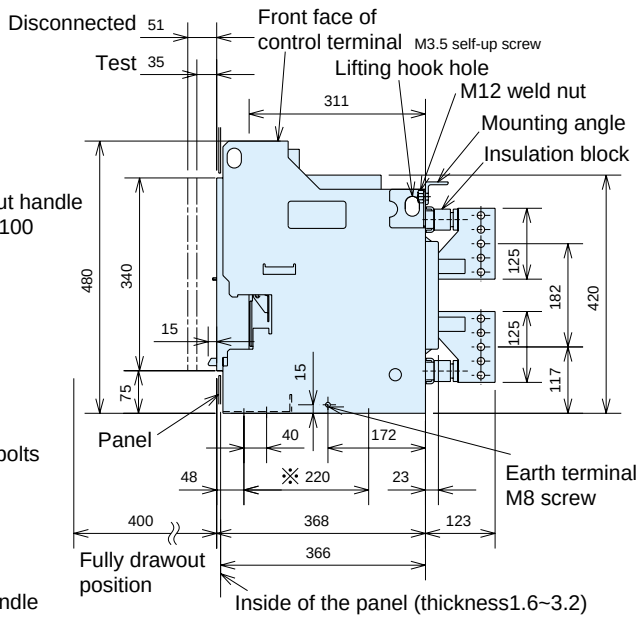
# Drawout type AE4000-SS~AE6300-SS

## Front view

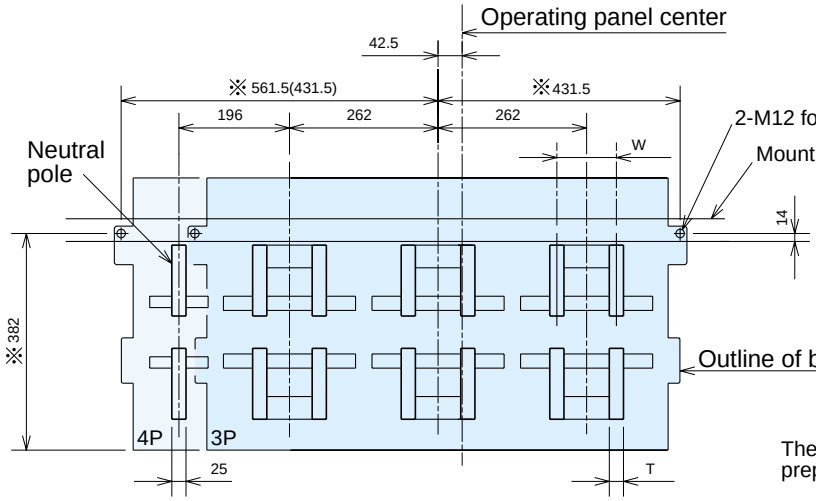



※ : Mounting pitch
The numerals shown in parentheses are for 3 poles.

## Side view



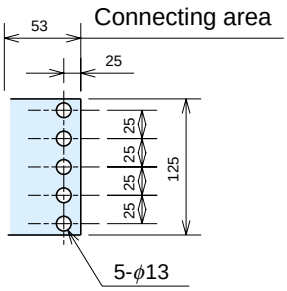

## Rear view




| Type | Dimension of W | Dimension of T |
|---|---|---|
| AE4000,5000-SS | 100 | 20 |
| AE6300-SS | 105 | 25 |

The mounting angle should be prepared by the customer.

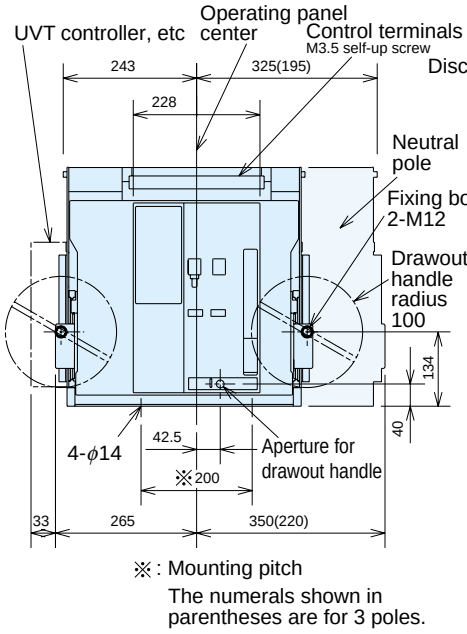
## Main circuit terminal dimensions



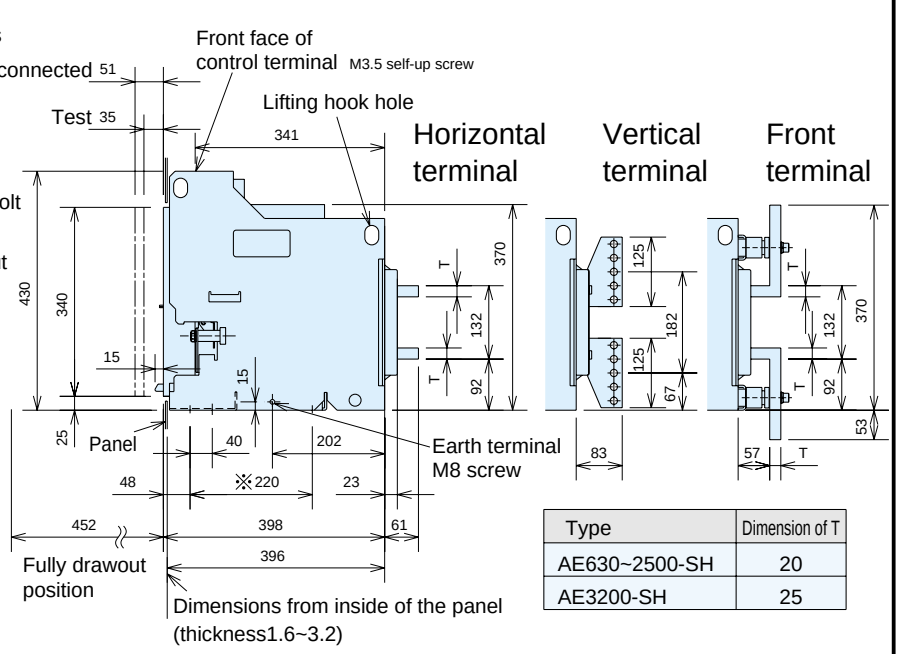
# Outline dimensions (3/5)

## Drawout type AE630-SH~AE3200-SH

### Front view

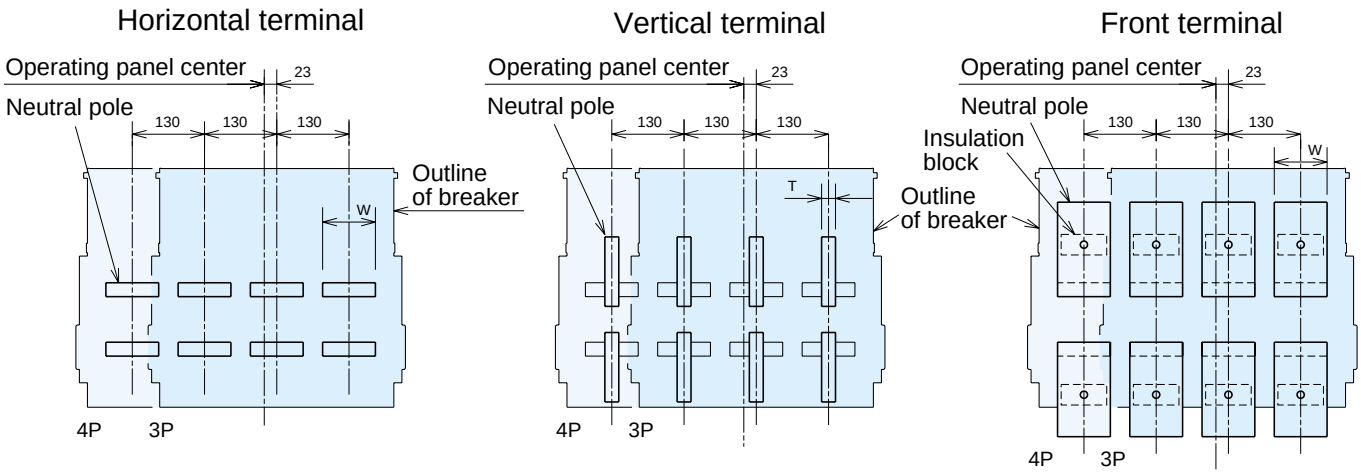



### Side view

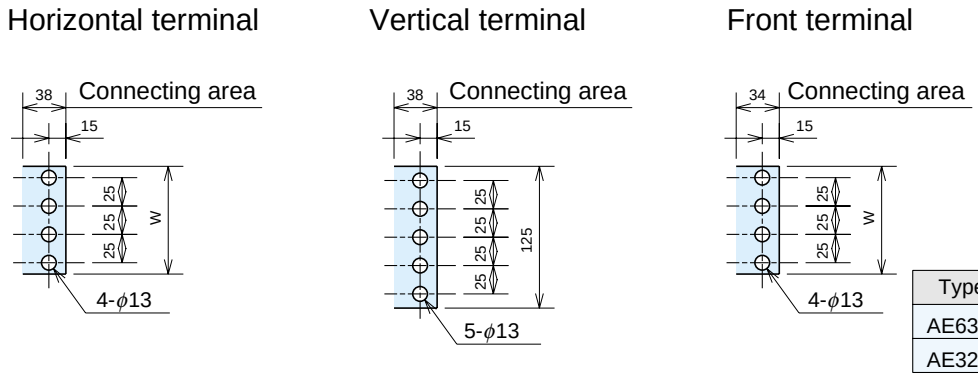



| Type | Dimension of T |
|---|---|
| AE630~2500-SH | 20 |
| AE3200-SH | 25 |

### Rear view




### Main circuit terminal dimensions

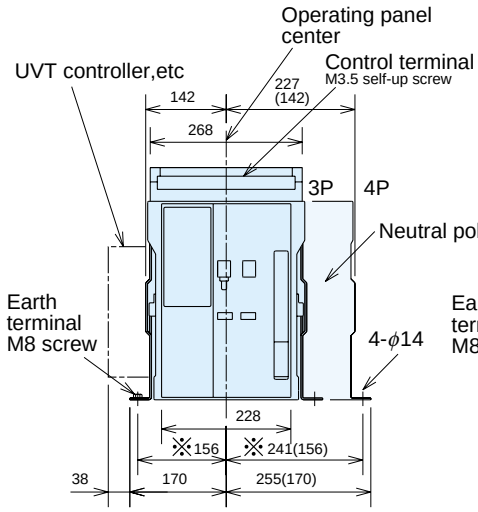



| Type | Dimension of W |
|---|---|
| AE630~2500-SH | 95 |
| AE3200-SH | 103 |

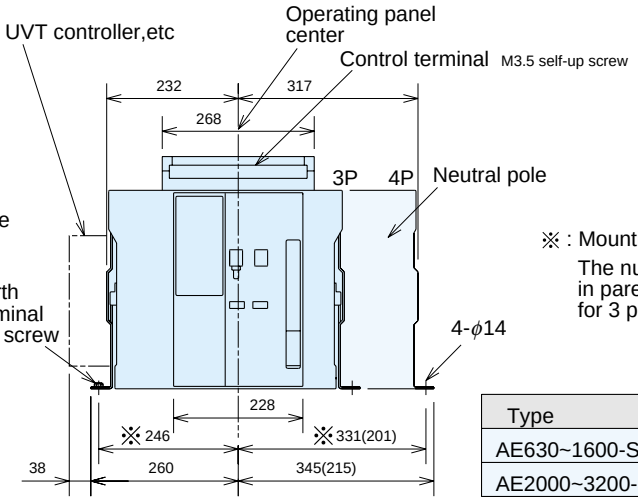
# Fixed type AE630-SS/SH~AE3200-SS/SH

## Front view

AE630~1600-SS




AE2000~3200-SS
AE630~3200-SH

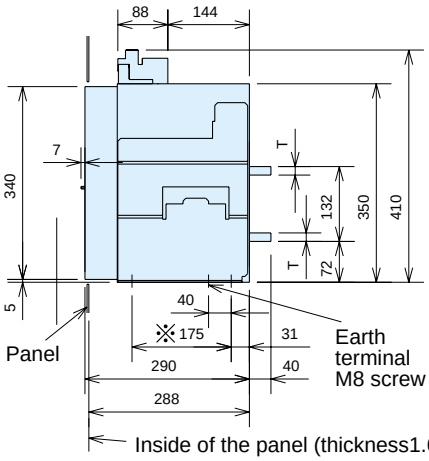



※ : Mounting pitch
The numerals shown in parentheses are for 3 poles.

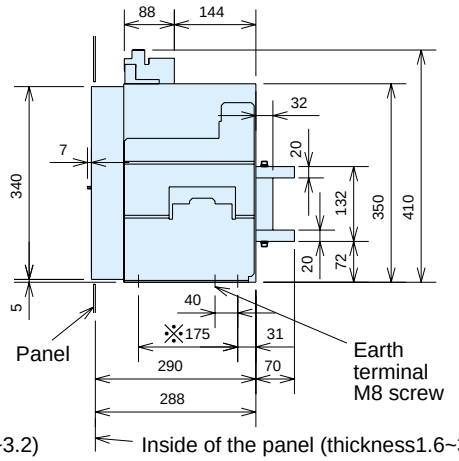
| Type | Dimension of T |
|---|---|
| AE630~1600-SS | 15 |
| AE2000~3200-SS | 20 |

## Side view

AE630~3200-SS

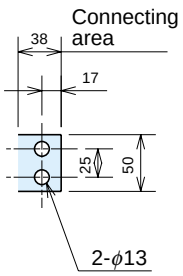



AE630~3200-SH

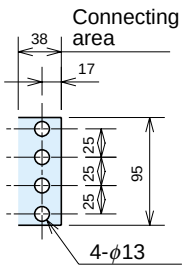



## Main circuit terminal dimensions

AE630~ 1600-SS

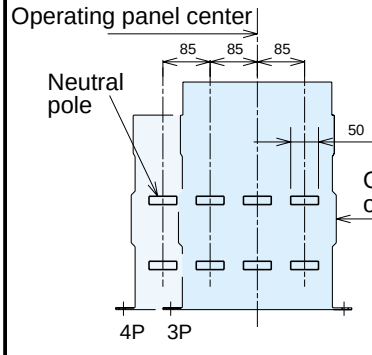



AE2000~3200-SS
AE630~ 3200-SH

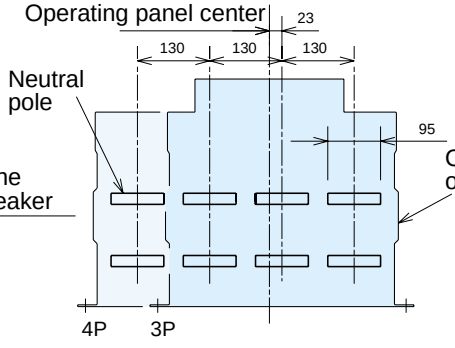



## Rear view

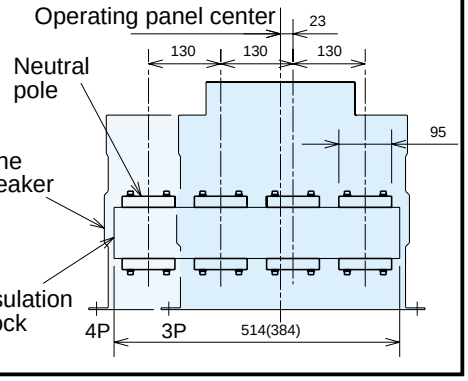
AE630~1600-SS




AE2000~3200-SS



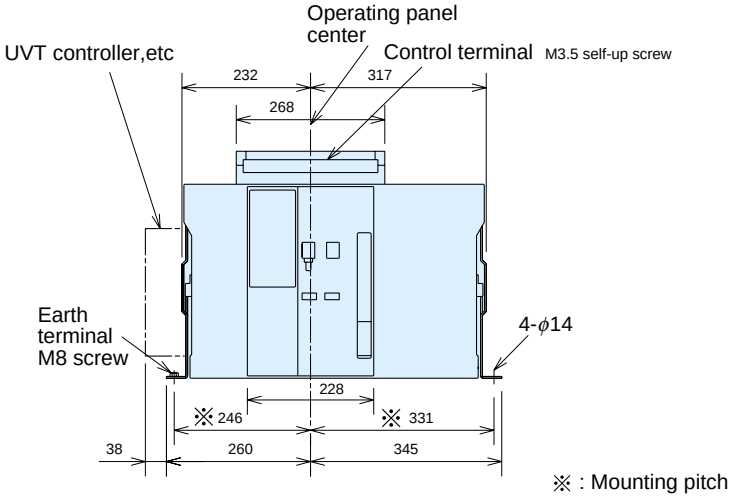

AE630~3200-SH



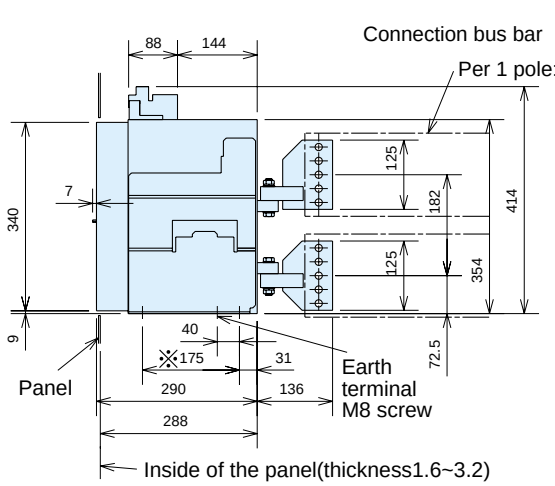
# Outline dimensions (4/5)

## Fixed type AE4000-SSC (3P)

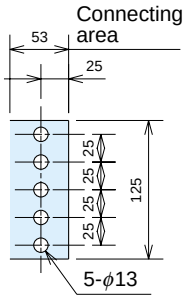
### Front view



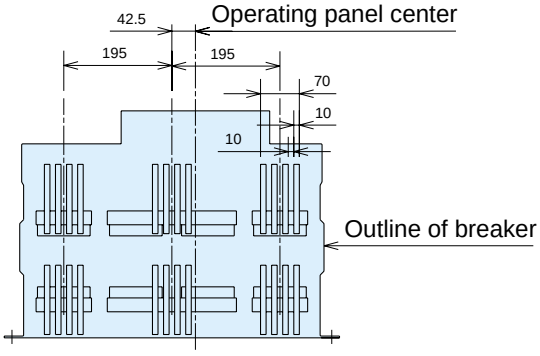

### Side view




### Main circuit terminal dimensions

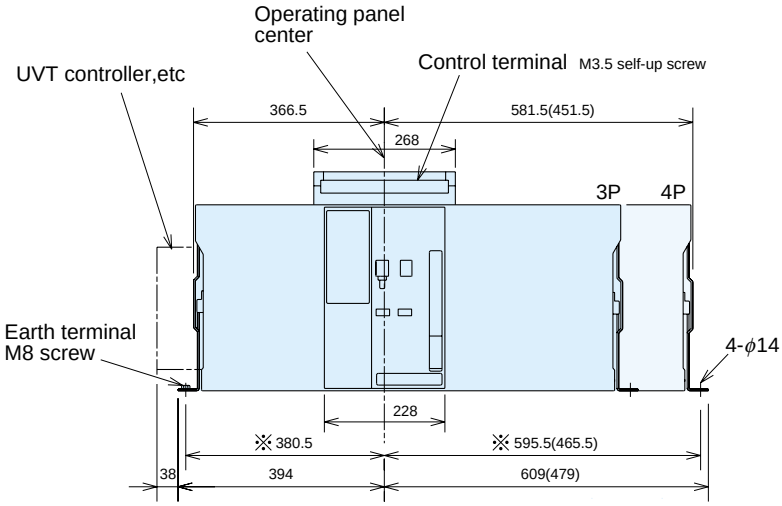



### Rear view

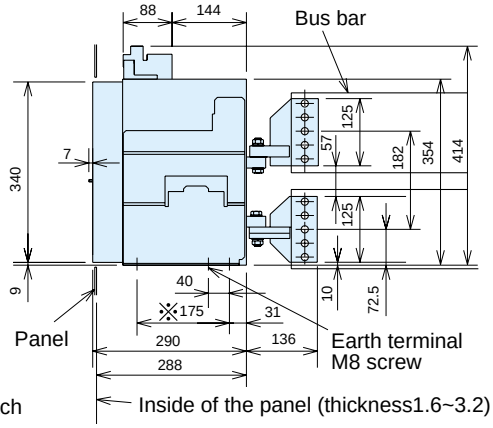


# Fixed type AE4000-SS~AE6300-SS

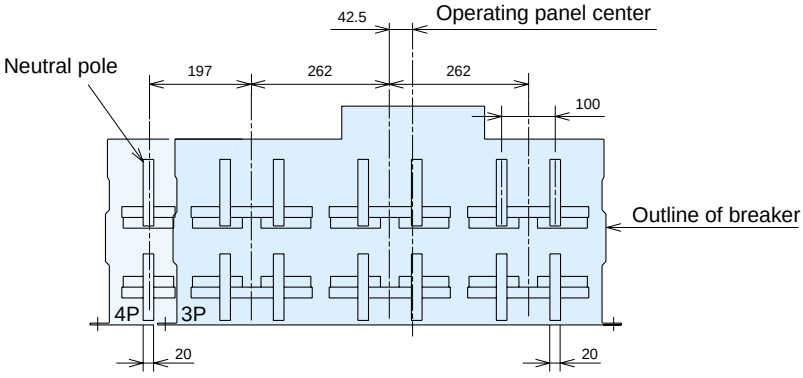
## Front view



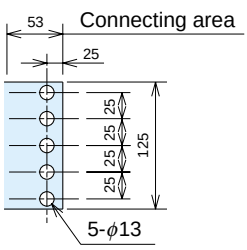

## Side view




## Rear view




## Main circuit terminal dimensions



# Outline dimensions (5/5)

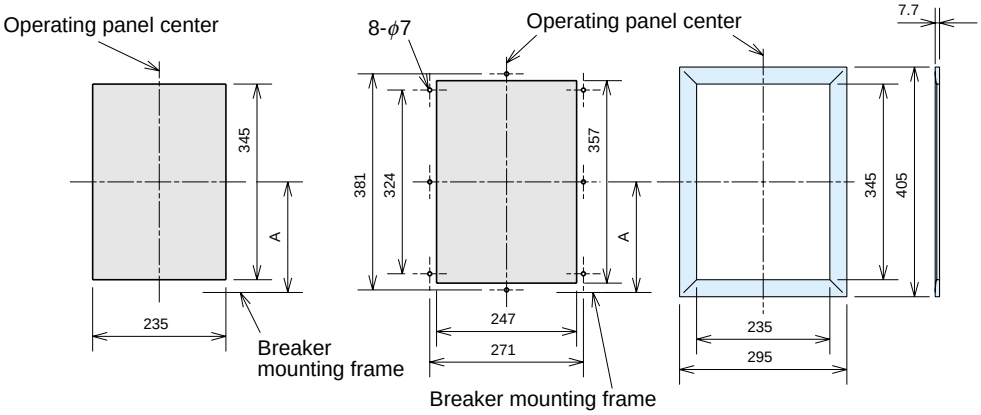
## Panel-cut, Drawout handle, Terminal adapter

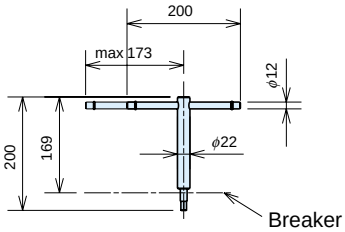
### Panel-cut dimensions

### Door frame panel-cut dimensions

### Drawout handle dimensions

Panel-cut dimensions Outline

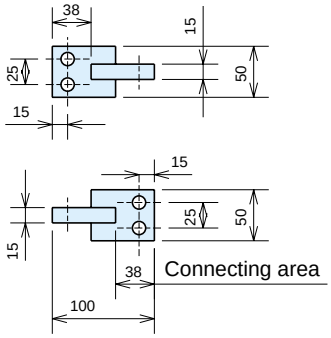


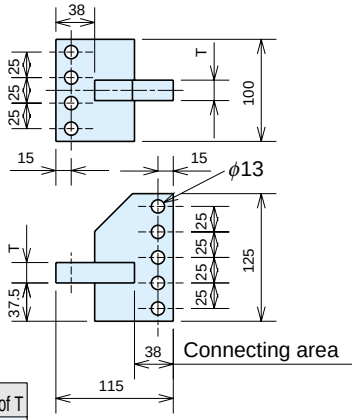

| Type | Dimension of A |
|---|---|
| Fixed Type | 175 |
| Drawout Type | 195 |
| AE4000-SSC (FIX) | 179 |
| AE4000~6300-SS | 245 |

### Vertical terminal adapter

AE630~1600-SS




AE2000~3200-SS
AE630~3200-SH

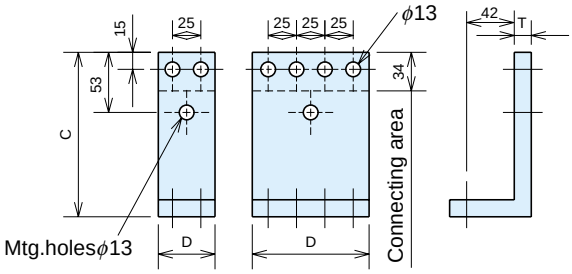



| Type | Dimension of T |
|---|---|
| AE2000,2500-SS AE630~2500-SH | 20 |
| AE3200-SS AE3200-SH | 25 |

### Front terminal adapter

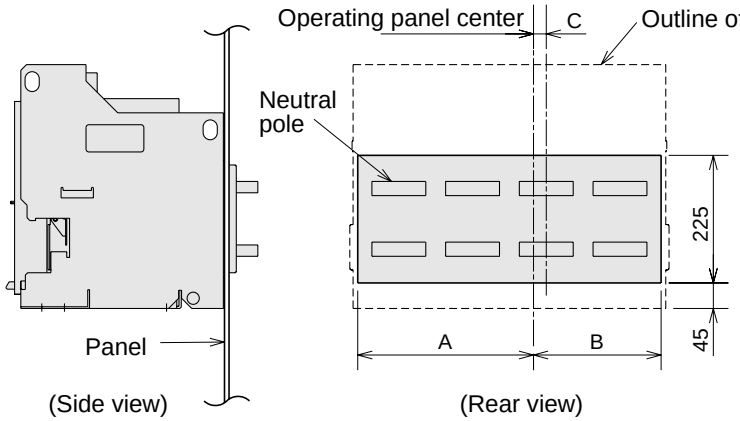
AE630~ 1600-SS

AE2000~3200-SS
AE630~3200-SH




| Type | | | Dimension of C | Dimension of D | Dimension of T |
|---|---|---|---|---|---|
| AE630~1600-SS | Fixed type | Up side | 258.5 | 50 | 15 |
| | | Down side | 145 | 50 | 15 |
| | Drawout type | | 145 | 50 | 15 |
| AE2000,2500-SS AE630~2500-SH | Fixed type | Up side | 258.5 | 95 | 20 |
| | | Down side | 145 | 95 | 20 |
| | Drawout type | | 145 | 95 | 20 |
| AE3200-SS AE3200-SH | Fixed type | Up side | 258.5 | 95 | 25 |
| | | Down side | 145 | 95 | 25 |
| | Drawout type | | 145 | 103 | 25 |

### Panel-cut dimensions (Breaker rear side)



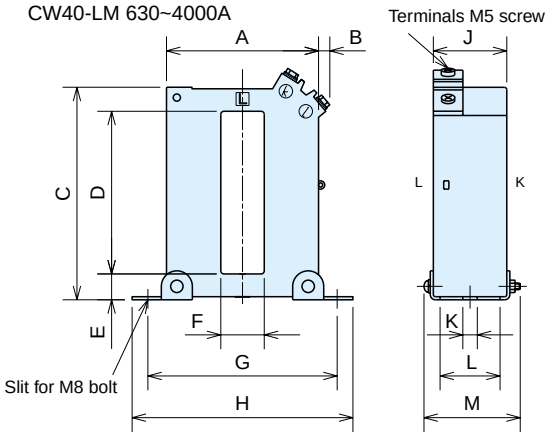

Dimensions

| Type | Number of poles | Dimensions | | |
|---|---|---|---|---|
| | | A | B | C |
| AE630~1600-SS | 3 | 135 | 135 | 0 |
| | 4 | 220 | 135 | 0 |
| AE2000~3200-SS AE630~3200-SH | 3 | 180 | 225 | 23 |
| | 4 | 310 | 225 | 23 |

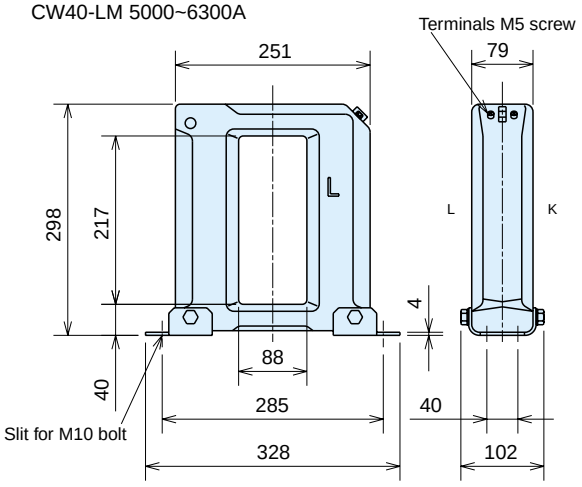
# Neutral CT (NCT), External ZCT

## Neutral CT (NCT)

CW40-LM 630~4000A



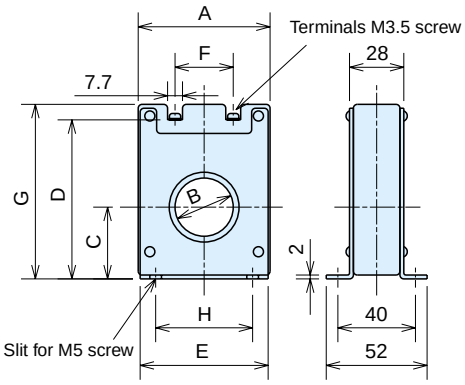

CW40-LM 5000~6300A

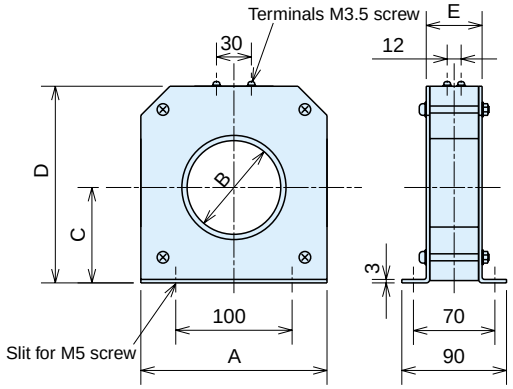



Dimensions(mm)

| | A | B | C | D | E | F | G | H | J | K | L | M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CW40-LM 630~2000A | 97 | 5.5 | 137 | 105 | 16.5 | 28 | 122 | 142 | 51 | 9 | 38 | 66 |
| CW40-LM 2500~4000A | 162 | 4 | 219 | 160 | 31 | 48 | 192 | 212 | 68 | 11 | 55 | 87 |

## External ZCT for transformer ground wire



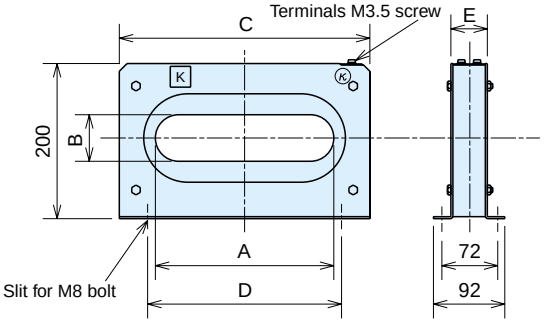

Dimensions(mm)

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| ZT15A | 48 | 15 | 29 | 62 | 46 | 15 | 70 | 25 |
| ZT30A | 68 | 30 | 37 | 82 | 66 | 30 | 90 | 50 |
| ZT40A | 85 | 40 | 43 | 92 | 81 | 40 | 100 | 50 |

Dimensions(mm)

| | A | B | C | D | E |
|---|---|---|---|---|---|
| ZT60A | 140 | 60 | 73 | 150 | 46 |
| ZT80A | 160 | 80 | 82 | 169 | 48 |
| ZT100A | 185 | 100 | 93 | 190 | 50 |

## External ZCT for load circuits



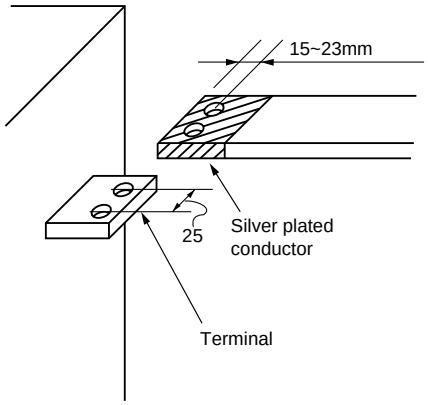

Dimensions(mm)

| | A | B | C | D | E |
|---|---|---|---|---|---|
| ZCT163 | 230 | 60 | 323 | 250 | 47 |
| ZCT323 | 370 | 108 | 460 | 400 | 47 |
| ZCT324 | 500 | 108 | 600 | 550 | 48 |

# Technical information (1/3)

## 1 Pre-cautions when making connections

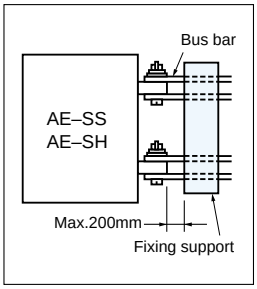
For the terminal connections, use M12 bolts, washers and spring washers.
In order to prevent increased contact resistance due to humidity, silver plating of the contact surface of the conductor which is connected to the terminal of the breaker, is recommended. Also clean the contact surface, and securely connect them at a suitable torque.




**Standard Tightening Torque**

| Screw size | Tightening torque (N • m) |
|---|---|
| M12 | 40~50 |

Since fault current flowing through the conductors cause large electromagnetic forces, the conductors should be secured firmly, using the values in Table on the right as a reference. Max busbar supporting distance nearest to ACB is less than 200mm.




**Electromagnetic force in N per 1m conductor (in the case of three phase short circuit)**

(N)

| Type (A) / Conductor distance (mm) / Prospective fault current kA (pf) | AE630-SS ~ AE1600-SS | AE2000-SS ~ AE3200-SS AE–SH | AE4000-SSC | AE4000-SS ~ AE6300-SS |
|---|---|---|---|---|
| | 85 | 130 | 195 | 262 |
| 30 (0.2) | 7500 | 4500 | 3400 | 2300 |
| 42 (0.2) | 14600 | 8900 | 6700 | 4500 |
| 50 (0.2) | 20800 | 12500 | 9400 | 6300 |
| 65 (0.2) | 35100 | 21200 | 15900 | 10600 |
| 85 (0.2) | 60200 | 36200 | 27200 | 18100 |
| 100 (0.2) | —— | 50100 | —— | 25100 |
| 130 (0.2) | —— | 84700 | —— | 42400 |

When selecting conductors for connection to a Series AE breaker, ensure that they have a sufficient current capacity, refer to Table on the right.

**Conductor Size (IEC-60947-1 ; 40°C Ambient Temp., Open air)**

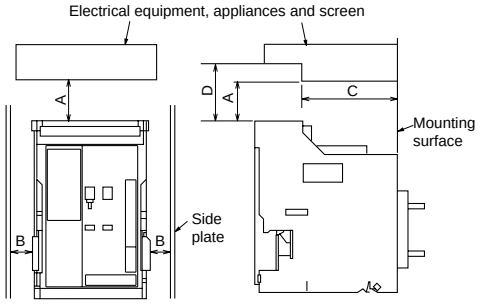
| Rated current Max. (A) | Connecting conductors (copper bus bar) | | |
|---|---|---|---|
| | Arrangement | Quantity | Conductor size(mm) |
| 630 | With long surface vertical | 2 | 40X5 |
| 1000 | With long surface vertical | 2 | 60X5 |
| 1250 | With long surface vertical | 2 | 80X5 |
| 1600 | With long surface vertical | 2 | 100X5 |
| 2000 | With long surface vertical | 3 | 100X5 |
| 2500 | With long surface vertical | 4 | 100X5 |
| 3150(3200)*1 | With long surface vertical | 3 | 100X10 |
| 4000*2 | With long surface vertical | 4 | 100X10 |
| 5000 | With long surface vertical | 4 | 150X10 |
| 6300 | With long surface vertical | 4 | 200X10 |

∗1. The temperature rise of rated current 3200A conforms to the requirement of IEC 60947-1 for the connecting conductor size of a rated current of 3150A.
In case of more then 3200A, conductor sizes are not given in IEC 60947-1.
∗2. In case of AE-4000-SSC, refer to P49, 53.

# 2 Line side insulation clearance

When a short-circuit current is interrupted, hot gas blows out discharged from the exhaust port of the arc extinguishing chamber, so provid a clearance as shown in the following table.

●On the fixed type, maintenance is possible with following clearance.




●**Dimensions** (mm)

| Type | | AE630-SS ~ AE3200-SS AE4000-SSC | | AE4000-SS ~ AE6300-SS AE-SH |
|---|---|---|---|---|
| Applicable voltage | | AC600V or less | AC660V,690V | AC690V or less |
| Fix type | A | (Note 1) 0 | (Note 1) 100 | (Note 1) 200 |
| | B | (Note 3) 50 | (Note 3) 50 | (Note 3) 50 |
| | C | 162 | 162 | – |
| | D | (Note 2) 50 | (Note 2) 50 | 200 |
| Drowout type | A | 0 | 100 | (Note 1) 200 |
| | B | (Note 3) 50 | (Note 3) 50 | (Note 3) 50 |
| | C | 240 | 240 | – |
| | D | (Note 2) 50 | (Note 2) 50 | 200 |

Note 1 : 300mm or more clearance is necessary to inspect the arc-extinguishing chamber and contacts.

Note 2 : The wiring space reguired for the control terminal block.

Note 3 : In case dimension B becomes larger when the UVT controller, the mechanical interlock, door interlock, etc, are installed.

# 3 Service conditions

## 1 Normal service condition

If under ordinary conditions the following normal working conditions are all satisfied, the AE Series air circuit breaker may be used unless otherwise specified.

1. Ambient air temperature
   A range of max. +40˚C to min. –5˚C is recommended. However, the average over 24 hours must not exceed +35˚C.
2. Altitude
   2,000m (6,600 feet) or less
3. Environmental conditions
   The air must be clean, and the relative humidity 85% or less at a max. of +40˚C. Do not use and store in atmospheres with sulfide gas, ammonia gas etc. ($H_2S$ ≦ 0.01ppm $SO_2$ ≦ 0.1ppm $NH_3$ ≦ a few ppm.)
4. Installation conditions
   When installing the AE Series air circuit breaker, refer to the installation instructions in the catalogue and instruction manual.
5. Strage temperature
   A range of max. +60˚C to min. –20˚C is recommended to store. However, the average over 24 hours must not exceed +35˚C.
6. Replacement
   Approx. 15 years.
   Please refer to the instruction manual.

## 2 Special service conditions

In the case of special service condition, modified air circuit breakers are available. Please specify when ordering. Service life may be shorter depend on service conditions.

1. Special environmental conditions
   If it is used at high temperature and/or high humidity, the insulation durability and other electrical/mechanical features may deteriorate. Therefore, the breaker should be specially treated. Moisture fungus treatment with increased corrosion-resistance is recommended. Since some parts may pose problems due to corrosion in the environments where corrosive gas results from the corrosion, the increased Extra-corrosion proof specifications is recommended.
2. Special ambient temperature
   If the ambient temperature exceeds +40˚C, the uninterrupted current rating will be reduced. Since the reduction value is different depending on the applicable standard, refer to P60.
3. Special altitude
   If it is used at the 2,000m or higher the heat radiation rate is reduced decreasing the operating voltage rating, continuous current capacity and breaking capacity. Moreover the durability of the insulation is also decreased owing to the atmospheric pressure. Apply for further detail.

# Technical information (2/3)

## 4 Internal resistance, reactance and power consumption (per pole)

| Type | Connection | Internal resistance (mΩ) | Reactance (mΩ) | Power consumption (W) |
|---|---|---|---|---|
| AE630-SS | Fixed type | 0.028 | 0.059 | 11 |
| | Drawout type | 0.042 | 0.089 | 17 |
| AE630-SH | Fixed type | 0.020 | 0.047 | 8 |
| | Drawout type | 0.030 | 0.071 | 12 |
| AE1000-SS | Fixed type | 0.026 | 0.060 | 26 |
| | Drawout type | 0.040 | 0.091 | 40 |
| AE1000-SH | Fixed type | 0.018 | 0.047 | 18 |
| | Drawout type | 0.028 | 0.071 | 28 |
| AE1250-SS | Fixed type | 0.024 | 0.060 | 38 |
| | Drawout type | 0.038 | 0.091 | 60 |
| AE1250-SH | Fixed type | 0.016 | 0.047 | 25 |
| | Drawout type | 0.026 | 0.071 | 41 |
| AE1600-SS | Fixed type | 0.016 | 0.063 | 41 |
| | Drawout type | 0.030 | 0.095 | 77 |
| AE1600-SH | Fixed type | 0.014 | 0.047 | 36 |
| | Drawout type | 0.024 | 0.071 | 61 |
| AE2000-SS | Fixed type | 0.010 | 0.047 | 40 |
| | Drawout type | 0.020 | 0.071 | 80 |
| AE2000-SH | Fixed type | 0.012 | 0.047 | 48 |
| | Drawout type | 0.022 | 0.071 | 88 |
| AE2500-SS | Fixed type | 0.008 | 0.047 | 50 |
| | Drawout type | 0.018 | 0.071 | 113 |
| AE2500-SH | Fixed type | 0.010 | 0.047 | 63 |
| | Drawout type | 0.020 | 0.071 | 125 |
| AE3200-SS | Fixed type | 0.008 | 0.048 | 72 |
| | Drawout type | 0.014 | 0.072 | 143 |
| AE3200-SH | Fixed type | 0.009 | 0.048 | 92 |
| | Drawout type | 0.016 | 0.072 | 164 |
| AE4000-SSC | Fixed type | 0.008 | 0.048 | 128 |
| | Drawout type | 0.014 | 0.072 | 224 |
| AE4000-SS | Fixed type | 0.010 | 0.038 | 160 |
| | Drawout type | 0.013 | 0.062 | 210 |
| AE5000-SS | Fixed type | 0.009 | 0.038 | 225 |
| | Drawout type | 0.011 | 0.062 | 275 |
| AE6300-SS | Fixed type | 0.008 | 0.038 | 318 |
| | Drawout type | 0.0085 | 0.062 | 340 |

●The above values are applicable for one pole.

# 5 Deratings by ambient temperature

(A)

| Standard | Ambient temperature | AE630-SS AE630-SH | AE1000-SS AE1000-SH | AE1250-SS AE1250-SH | AE1600-SS AE1600-SH | AE2000-SS AE2000-SH | AE2500-SS AE2500-SH | AE3200-SS AE3200-SH | AE4000-SSC | AE4000-SS | AE5000-SS | AE6300-SS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IEC60947-2 BS (Standard : 40°C) | 40°C | 630 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 4000 | 4000 | 5000 | 6300 |
| | 45°C | 630 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 3800 | 4000 | 5000 | 6300 |
| | 50°C | 630 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 3650 | 4000 | 5000 | 5750 |
| | 55°C | 630 | 1000 | 1250 | 1550 (1600) | 2000 | 2450 | 3000 | 3500 | 3900 | 5000 | 5500 |
| | 60°C | 630 | 1000 | 1200 (1250) | 1500 (1600) | 2000 | 2350 | 2900 | 3300 | 3750 | 4750 | 5200 |
| JISC8372 (Standard : 40°C) | 40°C | 630 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 3600 | 4000 | 5000 | 6000 |
| | 45°C | 630 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 3500 | 4000 | 5000 | 5800 |
| | 50°C | 630 | 1000 | 1250 | 1500 (1600) | 2000 | 2500 | 3000 | 3350 | 4000 | 5000 | 5600 |
| | 55°C | 630 | 1000 | 1200 (1250) | 1450 (1600) | 2000 | 2350 | 2900 | 3200 | 4000 | 4900 | 5450 |
| | 60°C | 630 | 1000 | 1150 (1250) | 1400 (1600) | 2000 | 2250 | 2800 | 3050 | 4000 | 4700 | 5250 |
| LR,AB,GL DNV,BV (Standard : 45°C) | 45°C | 630 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | —— | 4000 | 5000 | 6300 |
| | 50°C | 630 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | —— | 4000 | 5000 | 5750 |
| | 55°C | 630 | 1000 | 1250 | 1550 (1600) | 2000 | 2450 | 3050 | —— | 3900 | 5000 | 5500 |
| | 60°C | 630 | 1000 | 1200 | 1500 (1600) | 2000 | 2350 | 2900 | —— | 3750 | 4750 | 5200 |
| NK (Standard : 45°C) | 45°C | 630 | 1000 | 1250 | 1600 | 2000 | 2500 | 3200 | 3500 | 4000 | 5000 | 5700 |
| | 50°C | 630 | 1000 | 1250 | 1500 (1600) | 2000 | 2500 | 3000 | 3350 | 4000 | 5000 | 5500 |
| | 55°C | 630 | 1000 | 1200 (1250) | 1450 (1600) | 2000 | 2350 | 2900 | 3200 | 4000 | 4800 | 5300 |
| | 60°C | 630 | 1000 | 1150 (1250) | 1400 (1600) | 2000 | 2250 | 2800 | 3050 | 4000 | 4600 | 5100 |

Note : The figures in ( ) in the above Table indicate reduced current values exclusive to AE-SH series.

# Technical information (3/3)

## Selective interrupting combinations table

AE-SS Series air circuit breakers provide easy selective co-ordination with branch circuit breakers.
For selective co-ordinations, refer to the following table.

**AC220V sym kA**

| Branch circuit breaker | | Unit breaking capacity | Main circuit breaker: AE-SS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AE630-SS | AE1000-SS | AE1250-SS | AE1600-SS | AE2000-SS | AE2500-SS | AE3200-SS | AE4000-SSC | AE4000-SS | AE5000-SS | AE6300-SS |
| | | | **65** | **65** | **65** | **65** | **85** | **85** | **85** | **85** | **130** | **130** | **130** |
| NF-S • MB | NF30-SP<br>MB30-SP<br>MB50-CP | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| | NF50-SP<br>NF60-SP<br>MB50-SP | 10 | 9(10) | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| | NF50-HP<br>NF60-HP | 25 | 9(25) | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| | NF50-HRP | 85 | 9(65) | 50(65) | 65 | 65 | 85 | 85 | 85 | 85 | 85 | 85 | 85 |
| | NF100-SP<br>NF100-SEP<br>MB100-SP | 50 | 9(50) | 45(50) | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | NF100-HP | 100 | 9(65) | 50(65) | 65 | 65 | 85 | 85 | 85 | 85 | 100 | 100 | 100 |
| | NF250-SP<br>NF250-SEP<br>MB250-SP | 50 | 9(50) | 20(50) | 22(50) | 42(50) | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | NF250-HP | 100 | 9(65) | 25(65) | 40(65) | 65 | 85 | 85 | 85 | 85 | 100 | 100 | 100 |
| | NF400-SP | 85 | – | – | 20(65) | 27(65) | 42(65) | 70 | 85 | 85 | 85 | 85 | 85 |
| | NF400-SEP | 85 | 9(65) | 15(65) | 20(65) | 27(65) | 42(65) | 70 | 85 | 85 | 85 | 85 | 85 |
| | NF400-HEP | 100 | 9(65) | 15(65) | 20(65) | 27(65) | 42(65) | 70 | 85 | 85 | 100 | 100 | 100 |
| | NF400-REP | 125 | 9(65) | 15(65) | 20(65) | 27(65) | 42(65) | 70 | 85 | 85 | 125 | 125 | 125 |
| | NF630-SP | 85 | – | – | – | 24(65) | 30(65) | 40(65) | 60(65) | 85 | 85 | 85 | 85 |
| | NF630-SEP | **85** | – | 15(65) | 18(65) | 24(65) | 30(65) | 40(65) | 60(65) | 85 | 85 | 85 | 85 |
| | NF630-HEP | **100** | – | 15(65) | 18(65) | 24(65) | 30(65) | 40(65) | 60(65) | 85 | 85 | 85 | 85 |
| | NF630-REP | **125** | – | 15(65) | 18(65) | 24(65) | 30(65) | 40(65) | 60(65) | 85 | 85 | 85 | 85 |
| | NF800-SEP | **85** | – | – | 18(65) | 24(65) | 30(65) | 40(65) | 60(65) | 85 | 85 | 85 | 85 |
| | NF800-HEP | **100** | – | – | 18(65) | 24(65) | 30(65) | 40(65) | 60(65) | 85 | 85 | 85 | 85 |
| | NF800-REP | **125** | – | – | 18(65) | 24(65) | 30(65) | 40(65) | 60(65) | 85 | 85 | 85 | 85 |
| NF-C | NF50-CP<br>NF60-CP | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| | NF100-CP | 25 | 9(25) | 15(25) | 18(25) | 24(25) | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| | NF250-CP | 30 | 9(30) | 15(30) | 18(30) | 24(30) | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| | NF400-CP | 50 | – | 15(50) | 20(50) | 27(50) | 42(50) | 50 | 50 | 50 | 50 | 50 | 50 |
| | NF630-CP | 50 | – | – | – | 24(50) | 30(50) | 40(50) | 50 | 50 | 50 | 50 | 50 |
| | NF800-CEP | 50 | – | – | 18(50) | 24(50) | 30(50) | 40(50) | 50 | 50 | 50 | 50 | 50 |
| NF-U | NF100-RP | 125 | 65 | 65 | 65 | 65 | 85 | 85 | 85 | 85 | 125 | 125 | 125 |
| | NF100-UP | 200 | 65 | 65 | 65 | 65 | 85 | 85 | 85 | 85 | 130 | 130 | 130 |
| | NF250-RP | 125 | 9(65) | 65 | 65 | 65 | 85 | 85 | 85 | 85 | 125 | 125 | 125 |
| | NF250-UP | 200 | 9(65) | 65 | 65 | 65 | 85 | 85 | 85 | 85 | 130 | 130 | 130 |
| | NF400-UEP | 200 | 9(65) | 15(65) | 18(65) | 29(65) | 48(65) | 85 | 85 | 85 | 130 | 130 | 130 |
| | NF630-UEP | 200 | – | 15(65) | 18(65) | 24(65) | 30(65) | 37(65) | 68 | 85 | 120 | 120 | 120 |
| | NF800-UEP | 200 | – | – | 18(65) | 24(65) | 30(65) | 37(65) | 68 | 85 | 120 | 120 | 120 |

- The values in the table represent the max. rated current for both Series AE-SS air circuit breakers and branch breakers, and the selective co-ordination applies when the AE-SS series air circuit breakers instantaneous pick up is set to maximum.
- The numerals shown in parentheses are for AE-SS with MCR. (When set MCR).
- Please apply in case of AE-SH.

## AC460V sym kA

| Branch circuit breaker / Main circuit breaker: Unit breaking capacity | | | AE-SS | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | AE630-SS | AE1000-SS | AE1250-SS | AE1600-SS | AE2000-SS | AE2500-SS | AE3200-SS | AE4000-SSC | AE4000-SS | AE5000-SS | AE6300-SS |
| | | | 65 | 65 | 65 | 65 | 85 | 85 | 85 | 85 | 130 | 130 | 130 |
| NF-S • MB | NF30-SP<br>MB30-SP<br>MB50-CP | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| | NF50-SP<br>NF60-SP<br>MB50-SP | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 | 7.5 |
| | NF50-HP<br>NF60-HP | 10 | 9(10) | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| | NF50-HRP | 30 | 9(30) | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| | NF100-SP<br>NF100-SEP<br>MB100-SP | 25 | 7(25) | 20(25) | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| | NF100-HP | 50 | 9(50) | 30(50) | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | NF250-SP<br>NF250-SEP<br>MB250-SP | 25 | 7(25) | 14(25) | 19(25) | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| | NF250-HP | 50 | 7(50) | 15(50) | 25(50) | 42(50) | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| | NF400-SP | 50 | – | – | 18(50) | 24(50) | 33(50) | 45(50) | 50 | 50 | 50 | 50 | 50 |
| | NF400-SEP | 50 | 9(50) | 15(50) | 18(50) | 24(50) | 33(50) | 45(50) | 50 | 50 | 50 | 50 | 50 |
| | NF400-HEP | 65 | 9(65) | 15(65) | 18(65) | 24(65) | 33(65) | 45(65) | 65 | 65 | 65 | 65 | 65 |
| | NF400-REP | 125 | 9(65) | 15(65) | 18(65) | 24(65) | 33(65) | 45(65) | 80 | 85 | 110 | 110 | 110 |
| | NF630-SP | 50 | – | – | – | 24(50) | 33(50) | 45(50) | 50 | 50 | 50 | 50 | 50 |
| | NF630-SEP | 50 | – | 15(50) | 18(50) | 24(50) | 30(50) | 40(50) | 50 | 50 | 50 | 50 | 50 |
| | NF630-HEP | 65 | – | 15(65) | 18(65) | 24(65) | 30(65) | 40(65) | 60(65) | 65 | 65 | 65 | 65 |
| | NF630-REP | 125 | – | 15(65) | 18(65) | 24(65) | 30(65) | 40(65) | 60(65) | 85 | 85 | 85 | 85 |
| | NF800-SEP | 50 | – | – | 18(50) | 24(50) | 30(50) | 40(50) | 60(50) | 50 | 50 | 50 | 50 |
| | NF800-HEP | 65 | – | – | 18(65) | 24(65) | 30(65) | 40(65) | 60(65) | 65 | 65 | 65 | 65 |
| | NF800-REP | 125 | – | – | 18(65) | 24(65) | 30(65) | 40(65) | 60(65) | 85 | 85 | 85 | 85 |
| NF-C | NF50-CP<br>NF60-CP | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| | NF100-CP | 10 | 9(10) | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| | NF250-CP | 15 | 9(15) | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| | NF400-CP | 25 | – | 15(25) | 18(25) | 24(25) | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| | NF630-CP | 35 | – | – | – | 24(35) | 30(35) | 35 | 35 | 35 | 35 | 35 | 35 |
| | NF800-CEP | 35 | – | – | 18(35) | 24(35) | 30(35) | 35 | 35 | 35 | 35 | 35 | 35 |
| NF-U | NF100-RP | 125 | 35(65) | 65 | 65 | 65 | 85 | 85 | 85 | 85 | 125 | 125 | 125 |
| | NF100-UP | 200 | 50(65) | 65 | 65 | 65 | 85 | 85 | 85 | 85 | 130 | 130 | 130 |
| | NF250-RP | 125 | 9(65) | 50(65) | 65 | 65 | 85 | 85 | 85 | 85 | 125 | 125 | 125 |
| | NF250-UP | 200 | 9(65) | 65 | 65 | 65 | 85 | 85 | 85 | 85 | 130 | 130 | 130 |
| | NF400-UEP | 200 | 9(65) | 15(65) | 18(65) | 29(65) | 48(65) | 85 | 85 | 85 | 130 | 130 | 130 |
| | NF630-UEP | 200 | – | 15(65) | 18(65) | 24(65) | 30(65) | 37(65) | 68 | 85 | 120 | 120 | 120 |
| | NF800-UEP | 200 | – | – | 18(65) | 24(65) | 30(65) | 37(65) | 68 | 85 | 120 | 120 | 120 |

- The values in the table represent the max. rated current for both Series AE-SS air circuit breakers and branch breakers, and the selective co-ordination applies when the AE-SS series air circuit breakers instantaneous pick up is set to maximum.
- The numerals shown in parentheses are for AE-SS with MCR. (When set MCR).
- Please apply in case of AE-SH.

# Ordering information for Mitsubishi AE-SS series air circuit breaker (General use ·····S Type)

Customer(name) _____ Order No. _____ Number of units 2 units

Type P13~16 AE 1600 -SS __ AE _____ -SH

Example

Number of poles ☑3P ☐4P Note1

Rated current 1600 A

Applicable standard ☑IEC 60947-2 ☐JIS C8372 ☐Others _____

Ambient temperature ☑40°C ☐Others _____ °C Note2

Connection P17 ☐Fixed type(FIX) Note4 ☑Drawout type(DR) Note4

Main circuit terminal — Only for Horizontal terminals: ☑Horizontal terminals(standard) ☐Vertical terminals(DR-VT) ☐Front terminals(DR-FT)

Drawout type accessories P23~24
- ☑Cell switch CL- 2C / T / D (Maximum: 4 pcs.)
- ☐Shorting-B contact(SBC)
- ☐Lifting hooks(HP)
- ☑Safety shutter(SST)
  - ☑Shutter lock(SST-LOCK)
- ☐Mis-insertion preventer(MIP) Note3
- ☐Test jumper(TJ) _____ units

☐Vertical terminal adapter(VTA) ☐Front terminal adapter(FTA) — Can be connected to the Horizontal terminals

Electronic trip relay P25~36

SPGT — [ ] 2 ; AT

| Electronic trip relay type | |
|---|---|
| S | S···Standard |
| ST | T···Trip indication |
| SPT | P···Pre-alarm |
| SPGT | G···Ground fault protection Note5 |
| SPET | E···Earth leakage protection Note6 |
| BARE | Relay not require Note7 |

| Tripping characteristics Note5 | |
|---|---|
| Blank | LTD+STD+INST |
| C Note7 | LTD+STD+INST/MCR |

| Control supply | |
|---|---|
| 0 | Not required(Only for S type) |
| 1 | AC100–120/200–240V |
| 2 | DC100–125V |
| 4 | DC24–60V |

| Electronic trip relay accessories | |
|---|---|
| A | OCR alarm(30ms 1 pulse) |
| T | Temperature alarm(LED & 1a contact) |

☐Neutral CT(NCT)
☐External ZCT(ZCT) Type _____ Refer P37

☑Y-2000 field test device — AC100–240V
☐Y-160 field test device — ☐AC100–120V ☐AC200–240V

Electrical accessories P18~20
- ☑Auxiliary switch — 5A 5B Max.5A5B
  - ☑Standard(AX)
  - ☐High capacity(HAX)

  "A"and"B"should be same.
- ☑Motor charging(MD) — ☑AC・DC100–125V ☐AC・DC200–250V ☐DC24V ☐DC48V
  Note:When specifying MD, be sure to order the closing coil(CC)and shunt trip device(SHT)for remote operation.
- ☑Closing coil(CC) — ☑AC・DC100–250V ☐DC24–48V
- ☑Shunt trip device (SHT) — ☑AC・DC100–250V ☐AC380–500V ☐DC24–48V
- ☐Under voltage trip device — ☐AC100–120 /200–240 /380–460V ☐DC24V ☐DC48V ☐DC100–110V ☐DC120–125V
  - ☐Instantaneous(UVT-SSB)
  - ☐0.5 s Time-delay type (UVT-05SSB)
  - ☐3 s Time-delay type (UVT-30SSB)

P22 ☑Condenser trip device (COT) — ☑AC100–110V ☐AC200–220V

Machine accessories P21~22
- ☑Push button cover(BC-L)
- ☑Counter(CNT)
- ☐Cylinder lock(CYL)
- ☐Door interlock(DI) Note8
- ☐Terminal cover(TTC)
- ☐Door frame(DF)
- ☐Dust cover(DUC)
- ☑Interphase barrier(BA) Note1,3 — ☐for 2units ☐for 3units
- ☐Mechanical interlock(MI) — ☐for 2units ☐for 3units

Special environments P58 ☐Moisture-fungus treatment ☐Extra-corrosion proof specification

Data ☑Specifications ☑Test report

Note1. Not available for AE4000-SSC.
Note2. There is case to derate by ambient temperature.
Note3. Not available for AE4000~6300-SS.
Note4. The terminal for AE4000-SSC, AE4000~6300-SS shall be vertical terminal.
Note5. Not available for AE-SS series with maximum rated current (In max) coming to 315A or 500A, nor AE630-SH.
Neutral CT is needed for Ground fault protection when a 3 pole breaker is used on a 3 phase 4 wires system.
Note6. In case of Earth leakage alarm, It need external ZCT.
In case of Earth leakage tripping, It also need SHT.
Note7. Not available for AE-SH.
Note8. If install together with MI, Please ask us.

Remark

Production date

# Ordering information for Mitsubishi AE-SS series air circuit breaker (General use ……S Type)

Customer(name) _____ Order No. _____ Number of units _____ units

Type P13~16 AE _____-SS __ AE _____-SH

Number of poles ☐ 3P ☐ 4P Note1

Rated current _____ A

Applicable standard ☐ IEC 60947-2 ☐ JIS C8372 ☐ Others _____

Ambient temperature ☐ 40°C ☐ Others _____ °C Note2

Connection P17 ☐ Fixed type(FIX) Note4 ☐ Drawout type(DR) Note4

Main circuit terminal
- Horizontal terminals
  - ☐ Horizontal terminals(standard)
  - ☐ Vertical terminals(DR-VT)
  - ☐ Front terminals(DR-FT)

Drawout type accessories P23~24
- ☐ Cell switch CL- C T D (Maximum: 4 pcs.)
- ☐ Shorting-B contact(SBC)
- ☐ Lifting hooks(HP)
- ☐ Safety shutter(SST)
  - ☐ Shutter lock(SST-LOCK)
- ☐ Mis-insertion preventer(MIP) Note3
- ☐ Test jumper(TJ) _____ units

☐ Vertical terminal adapter(VTA)
☐ Front terminal adapter(FTA)
Can be connected to the Horizontal terminals

Electronic trip relay P25~36 ——— ; ;

| Electronic trip relay type | |
|---|---|
| S | S…Standard |
| ST | T…Trip indication |
| SPT | P…Pre-alarm |
| SPGT | G…Ground fault protection Note5 |
| SPET | E…Earth leakage protection Note6 |
| BARE | Relay not require Note7 |

| Tripping characteristics Note5 | |
|---|---|
| Blank | LTD+STD+INST |
| C Note7 | LTD+STD+INST/MCR |

| Electronic trip relay accessories | |
|---|---|
| A | OCR alarm(30ms 1 pulse) |
| T | Temperature alarm(LED & 1a contact) |

| Control supply | |
|---|---|
| 0 | Not required(Only for S type) |
| 1 | AC100－120/200－240V |
| 2 | DC100－125V |
| 4 | DC24－60V |

☐ Neutral CT(NCT)
☐ External ZCT(ZCT) Type _____ Refer P37

☐ Y-2000 field test device — AC100－240V
☐ Y-160 field test device — ☐ AC100－120V ☐ AC200－240V

P22 ☐ Condenser trip device (COT) — ☐ AC100－110V ☐ AC200－220V

Electrical accessories P18~20
- ☐ Auxiliary switch — A B Max.5A5B
  - ☐ Standard(AX)
  - ☐ High capacity(HAX)

  "A"and"B"should be same.
- ☐ Motor charging(MD) — ☐ AC・DC100－125V ☐ AC・DC200－250V ☐ DC24V ☐ DC48V

  Note:When specifying MD, be sure to order the closing coil(CC)and shunt trip device(SHT)for remote operation.
- ☐ Closing coil(CC) — ☐ AC・DC100－250V ☐ DC24－48V
- ☐ Shunt trip device (SHT) — ☐ AC・DC100－250V ☐ AC380－500V ☐ DC24－48V
- ☐ Under voltage trip device — ☐ AC100－120 /200－240 /380－460V ☐ DC24V ☐ DC48V ☐ DC100－110V ☐ DC120－125V
  - ☐ Instantaneous(UVT-SSB)
  - ☐ 0.5 s Time-delay type (UVT-05SSB)
  - ☐ 3 s Time-delay type (UVT-30SSB)

Machine accessories P21~22
- ☐ Push button cover(BC-L)
- ☐ Counter(CNT)
- ☐ Cylinder lock(CYL)
- ☐ Door interlock(DI) Note8
- ☐ Terminal cover(TTC)
- ☐ Door frame(DF)
- ☐ Dust cover(DUC)
- ☐ Interphase barrier(BA) Note1,3
- ☐ Mechanical interlock(MI) — ☐ for 2units ☐ for 3units

Special environments P58 ☐ Moisture-fungus treatment ☐ Extra-corrosion proof specification

Data
- ☐ Specifications
- ☐ Test report

Note1. Not available for AE4000-SSC.
Note2. There is case to derate by ambient temperature.
Note3. Not available for AE4000~6300-SS.
Note4. The terminal for AE4000-SSC, AE4000~6300-SS shall be vertical terminal.
Note5. Not available for AE-SS series with maximum rated current (In max) coming to 315A or 500A, nor AE630-SH.
Neutral CT is needed for Ground fault protection when a 3 pole breaker is used on a 3 phase 4 wires system.
Note6. In case of Earth leakage alarm, It need external ZCT.
In case of Earth leakage tripping, It also need SHT.
Note7. Not available for AE-SH.
Note8. If install together with MI, Please ask us.

Remark

Production date

# Ordering information for Mitsubishi AE-SS series air circuit breaker (Generator protection use ……M Type)

Customer(name) _____ Order No. _____ Number of units _____ units

Type P13~16 AE _____ -SS __ AE _____ -SH

Number of poles ☐ 3P ☐ 4P Note1, Note2

Rated current _____ A

Applicable standard ☐ LR ☐ AB ☐ GL ☐ DNV ☐ BV ☐ NK ☐ IEC 60947-2 ☐ Others _____

Ambient temperature ☐ 45°C ☐ Others _____ °C Note3

Connection P17 ☐ Fixed type(FIX) Note5 ☐ Drawout type(DR) Note5

Main circuit terminal — Only for Horizontal terminals:
- ☐ Horizontal terminals(standard)
- ☐ Vertical terminals(DR-VT)
- ☐ Front terminals(DR-FT)

Drawout type accessories P2324
- ☐ Cell switch CL- [C][T][D] (Maximum: 4 pcs.)
- ☐ Shorting-B contact(SBC)
- ☐ Lifting hooks(HP)
- ☐ Safety shutter(SST)
  - ☐ Shutter lock(SST-LOCK)
- ☐ Mis-insertion preventer(MIP) Note4
- ☐ Test jumper(TJ) _____ units

☐ Vertical terminal adapter(VTA)
☐ Front terminal adapter(FTA)
Can be connected to the Horizontal terminals

Electronic trip relay P25~36 [ ] — [ ] ; [ ]

| Electronic trip relay accessories | |
|---|---|
| A | OCR alarm(30ms 1 pulse) |
| T | Temperature alarm(LED & 1a contact) |

| Electronic trip relay type | |
|---|---|
| M | M…Standard |
| MT | T…Trip indication |
| MPT | P…Pre-alarm |
| MPGT | G…Ground fault protection Note6 |

| Control supply | |
|---|---|
| 0 | Not required(Only for M type) |
| 1 | AC100–120/200–240V |
| 2 | DC100–125V |
| 4 | DC24–60V |

Specify the tripping characteristics Refer to P28, 46, 47.

| | | |
|---|---|---|
| LTD Current | | % of Rated Current |
| LTD Time | | s at 120% of LTD Current |
| STD Current | | % of Rated Current |
| STD Time | | s at 150% of STD Current |
| INST Current | | % of Rated Current |
| PAL Current | | % of LTD Current |
| PAL Time | 50 | % of LTD Time |
| GFR Current | | % of Rated Current MAX. |
| GFR Time | | s at 150% of GFR Current |

☐ Neutral CT(NCT)
☐ Y-2000 field test device — AC100–240V

Electrical accessories P18~20
- ☐ Auxiliary switch — A B Max.5A5B
  - ☐ Standard(AX)
  - ☐ High capacity(HAX)

  "A"and"B"should be same.
- ☐ Motor charging(MD) — ☐ AC・DC100–125V / ☐ AC・DC200–250V / ☐ DC24V Note4 / ☐ DC48V Note4
  Note:When specifying MD, be sure to order the closing coil(CC)and shunt trip device(SHT)for remote operation.
- ☐ Closing coil(CC) — ☐ AC・DC100–250V / ☐ DC24–48V
- ☐ Shunt trip device (SHT) — ☐ AC・DC100–250V / ☐ AC380–500V / ☐ DC24–48V
- ☐ Under voltage trip device
  - ☐ Instantaneous(UVT-SSB)
  - ☐ 0.5 s Time-delay type (UVT-05SSB)
  - ☐ 3 s Time-delay type (UVT-30SSB)

  ☐ AC100–120 /200–240 /380–460V
  ☐ DC24V
  ☐ DC48V
  ☐ DC100–110V
  ☐ DC120–125V

P22 ☐ Condenser trip device (COT) — ☐ AC100–110V / ☐ AC200–220V

Machine accessories P21~22
- ☐ Push button cover(BC-L)
- ☐ Counter(CNT)
- ☐ Cylinder lock(CYL)
- ☐ Door interlock(DI) Note7
- ☐ Terminal cover(TTC)
- ☐ Door frame(DF)
- ☐ Dust cover(DUC)
- ☐ Interphase barrier(BA)
- ☐ Mechanical interlock(MI) — ☐ for 2units / ☐ for 3units

Special environments P58 ☐ Moisture-fungus treatment ☐ Extra-corrosion proof specification

Data ☐ Specifications ☐ Test report

Note1. Not available for 4 pole breaker with LR, AB, GL, DNV, BV, NK standard.
Note2. Not available for AE4000-SSC.
Note3. There is case to derate by ambient temperature.
Note4. Not available for AE4000~6300-SS.
Note5. The terminal for AE4000-SSC, AE4000~6300-SS shall be vertical terminal.
Note6. Not available for AE-SS series with maximum rated current (In max) coming to 315A or 500A, nor AE630-SH. Neutral CT is needed for Ground fault protection when a 3 pole breaker is used on a 3 phase 4 wires system.
Note7. If install together with MI, Please ask us.

Remark

Production date

# Service network

| Country / Region | Company | Address | Telephone |
|---|---|---|---|
| U.K. | Mitsubishi Electric Europe B.V.<br>UK-Branch. | Travellers Lane, Hatfield, Herts, AL10 8xB, U.K. | 44-1707-276-100 |
| Ireland | Mitsubishi Electric Europe B.V. Irish Branch. | Westgate Business Park, Ballymount, Dublin 24, Ireland. | 353-1-4505007 |
| Germany | Mitsubishi Electric Europe B.V. German Branch. | Gothaer Strasse 8, 40880 Ratingen, Germany. | 49-2102-4860 |
| Italy | Carpaneto & C. S.P.A | 10090 CASCINE VICA-RIVOLI (TO)<br>Via Ferrero, 10-Ang. Pavia 6 Italy. | 39-11-9590111 |
| Spain | Mitsubishi Electric Europe B.V.<br>Spanish Branch. | Polingono Industrial "Can Magi", Calle Joan<br>Buscalla 2-4, Apartado de Correos 420,08190<br>Sant Cugat del Valles, Barcelona, Spain. | 34-93-565-3131 |
| Sweden | Euro Energy Components AB | Energigatan 15 Box 10161, S-434 22 Kungsbacka, Sweden | 46-300-518-00 |
| Norway | SCANELEC | Leivikasen 43B, P.O. box 55, 5074 Godvik, Norway | 47-55-506000 |
| Denmark | Louis Poulsen CO. A/S | Geminivej 32, DK-2670 Greve, Denmark. | 45-43-95-95-95 |
| Greece | Antonios Drepanias. S.A. | 52, Arkadias<br>STR.GR 121 32. Peristeri Athens Greece. | 30(1)5781599, 30(1)5781699 |
| The Netherlands | R+H Technology BV. | 3361 HJ Sliedrecht Industrieweg 30. Netherland. | 31-104871251 |
| Switzerland | Trielec A G | Mühlentalstrasse 136, 8201 Schaffhausen,<br>Switzerland | 41-52-6258425 |
| Belgium | Emac S.A. | 1702 Groot-Bijgaarden Industrialaan 1, Belgium. | 32-2-4810211 |
| Poland | MPL Technology Sp zo.o. | 30011 Krakow Ul. Wroclawska 53 Poland. | 48-12-322885 |
| Turkey | HEDEF | Barboros Bulv. iba Bloklari<br>Gazi Umur P. So Balmumcu-Istanbul Turkey. | 90-212-2754876 |
| Slovania | INEA | 61230 Domzale Ljubljanska 80 Slovenia. | 386-61-718000 |
| South Africa | M.S.A.MANUFACTURING(PTY)LTD. | Bramley 2018, Johannesburg, South Africa. | 27-11-444-8080 |
| Lebanon | COMPTOIR D'ELECTRICITE<br>GENERALE INTERNATIONAL | Cebaco Center-Block A. Autostrade Dora,<br>P.O. BOX: 90-1314 Beirut-Lebanon. | 961-1-240430 |
| Saudi Arabia | CENTER OF ELECTRICAL GOODS | Al-Nabhaniya Street-4Th Crossing,<br>Al-Hassa Road, P.O. BOX: 15955, Riyadh 11454,<br>Saudi Arabia. | 966-1-4770149 |
| Egypt | CAIRO ELECTRICAL GROUP | 9 Rostoum Street Garden City, APT. 5,<br>P.O. BOX: 165-11516,<br>Cairo-Egypt. | 20-2-7961337 |
| Kuwait | SALEM M AL-NISF ELECTRICAL CO.W.L.L. | P.O. Box 4784. Safat. 13048 Kuwait. | 965-484-5660 |
| China | SHANGHAI SETSUYO TRADING CO., LTD. | Building of Innovation Center, Room No. 406A,<br>680 Guiping Road Shanghai, P.R.China | 021-6485-6611 |
| | RYODEN INTERNATIONAL LTD. | (Shanghai) 3F, Block 5, 103<br>Cao Bao Road, Shanghai, China | 021-6475-3228 |
| Hong Kong | Ryoden international Ltd. | 10/F Manulife Tower 169 Electric Road North<br>Point. Hong Kong. | 28878870 |
| Taiwan | Setsuyo Enterprise Co., Ltd. | 6F, NO. 105 Wu-Kung 3rd rd., Wu-Ku Hsiang,<br>Taipei Hsien Taiwan | 02-2298-8889 |
| Korea | HAN NEUNG TECHNO Co., Ltd. | 2 Fl. Dong Seo Game Channel Bldg ., 1F 660-11<br>Deungchon-Dong, Kanguseo-Ku, Seoul, 157-030 Korea | 017-255-0174 |
| Singapore | MITSUBISHI ELECTRIC ASIA PTE LTD. | 307 Alexandra Road #05-01/02 Mitsubishi<br>Electric Building Singapore 159943 | 65-473-2308 |
| Indonesia | P.T.SAHABAT INDONESIA. | JL Muara Karang Selatan Blok A/Utara No.1<br>kav. NO.11 P.O. Box 5045/Jakarta/11050.<br>Jakarta Indonesia. | 021-6621780 |
| Philippines | EDISON ELECTRIC INTEGRATED, INC. | 24th Fl. Galleria Corporate Center Edsa Cr, Ortigas Ave.<br>Quezon City, Metro Manila. Philippines. | 02-643-8691 |
| Thailand | UNITED TRADING & IMPORT CO. LTD. | 77/12 Bumrungmuang Road, Klong Mahanak,<br>Pomprab Bangkok 10100. | 223-4220-3 |
| Pakistan | Prince Electric Co. | 16 Brandreth Road Lahore 54000. Pakistan. | 042-7654342 |
| Vietnam | Sa Giang Techno Co., Ltd. | 207/4 Nguyen Van Thu St., Dist 1, Ho Chi Minh City, Vietnam | 848-821-6453 |
| Lao PDR | SOCIETE LAO IMPORT-EXPORT | 43-47 Lane Xang Road P.O. BOX 2789 VT<br>Vientiane Lao PDR. | 21-215043, 21-215110 |
| Myanmer | PEACE MYANMAR ELECTRIC CO., LTD. | NO. 216, Bo Aung Gyaw Street,<br>Botataung 11161, Yangon, Myanmar. | 951-295426 |
| Nepal | Watt & Volt House Co., Ltd. | KHA 2-65, Volt House Dilli Bazar Post Box: 2108,<br>kathmandu, Nepal | 977-1-411330 |
| Australia | Mitsubishi Electric Australia Pty. Ltd | 348 Victoria Road, Rydalmere, N.S.W. 2116, Australia | 612-9684, 7586 |
| New Zealand | Melco Sales (N.Z.) Ltd. | 1 Parliament Street Lower Hutt. New Zealand. | 644-569-7350 |
| Colombia | Proelectrico Representaciones S.A. | Cra 53 No 29C-73 U.I.C.- Medellin.<br>COLOMBIA. | 574-235-00-28 |
| Chile | RHONA S.A. | Vte. Agua Santa 4211 Casilla 30-D (P.O. Box)<br>Viña Del Mar. Chile | (32)-611896 |
| Uruguay | Fierro Vignoli S.A. | P.O. box 20022/Suc Upae, Montevideo. Uruguay. | 598-2-92-08-08 |
| Peru | I.T.E. | Ingenieros s.a. Paseo de la Republica 3573<br>Lima 27. Peru. | (1) 221-2710 |
| Venezuela | ADESCO C.A. | Lle 8, Calpon Elinsu,<br>La Urbina-EDO, Miranda P.O.<br>BOX 78034 Caracas 1074A., Venezuela | 58-2-241-7634 |

**Safety Tips :** Be sure to read the instruction manual fully before using this product.

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE: MITSUBISHI DENKI BLDG., MARUNOUCHI, TOKYO 100-8310. TELEX: J24532 CABLE: MELCO TOKYO

Catalogue NO. Y-0446-M 0010(ROD) Printed in Japan
This catalogue is made from recycled paper.
New publication, effective Sept. 2000
Specifications subject to change without notice.