Mitsubishi Presents the WS Series, Satisfied with the High Demands of the 21st Century Global Market.

- **Best-Solution**
  - Various line-up and high flexibility

- **High-Performance**
  - One-rank higher breaking performance

- **High-Reliability**
  - Safety and reliability provided

- **Customer Friendly**
  - Easy handling and retrofitted solution

Global...
Line up (630 to 6300A)

<table>
<thead>
<tr>
<th>Rated current (A)</th>
<th>630</th>
<th>1000</th>
<th>1250</th>
<th>1600</th>
<th>2000</th>
<th>2500</th>
<th>3200</th>
<th>4000</th>
<th>5000</th>
<th>6300</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW series</td>
<td></td>
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</tr>
<tr>
<td>AE630-SW</td>
<td>AE1000-SW</td>
<td>AE1250-SW</td>
<td>AE1600-SW</td>
<td>AE2000-SW</td>
<td>AE2500-SW</td>
<td>AE3200-SW</td>
<td>AE4000-SW</td>
<td>AE4000-SW</td>
<td>AE5000-SW</td>
<td>AE6300-SW</td>
</tr>
<tr>
<td>SH series</td>
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</tbody>
</table>
| Note: Please contact us for the details of AE-SH series.
Through Flexible and Various Options, To be Built up the Suitable Functions.

**Electronic Trip Relay**

**Main setting module**

With interchangeable & add-on modules, flexible functions built up.

<table>
<thead>
<tr>
<th>WS1</th>
<th>General use</th>
<th>WM1</th>
<th>Generator protection use</th>
<th>WB1</th>
<th>Special use</th>
</tr>
</thead>
<tbody>
<tr>
<td>WS2</td>
<td>LTD+STD+INST / MCR</td>
<td>WM2</td>
<td>LTD+STD+INST / MCR</td>
<td>WB2</td>
<td>INST / MCR only</td>
</tr>
<tr>
<td>WS3</td>
<td></td>
<td>WM3</td>
<td></td>
<td>WB3</td>
<td></td>
</tr>
</tbody>
</table>

Note: (1) For optimum protective coordination with upstream and/or downstream protective devices such as fuses and OCRs, WF relay (WF1/WF2/WF3) are provided. As for the details about WF relay, please make inquiries.

**Optional setting module**

With optional setting modules, GFR, ER etc are added easily.

<table>
<thead>
<tr>
<th>G1</th>
<th>E1</th>
<th>AP</th>
<th>N5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground fault protection (GFR)</td>
<td>Earth leakage (ER) (1)</td>
<td>2nd Additional Pre-alarm</td>
<td>Neutral pole (2) 50% protection</td>
</tr>
</tbody>
</table>

Note (1) : combination with ZCT
(2) : With "N5" optional module, Neutral pole protection will be changed from 100% (standard) to 50%.

**Power supply**

It is necessary for Display and LEDs. (see page 19, 20.)

- P1 100-240V AC/DC
- P2 24-60V DC
- P3 100-240V AC / 100-125V DC with output contact
- P4 24-60V DC with output contact
- P5 100-240V DC with output contact (SSR)

**Additional function**

- EX1 Extension module
  - Module for display and communication
- DP1 Display
  - Current, Voltage, Power, Harmonics, Trip current etc.
  - Note: The VT unit is required to display the measured data except the load current.
- TAL Temperature alarm
  - The TAL is operated by an unusual temperature of the breaker contacts.
- MCR-SW MCR switch
  - Making current release is possible with MCR switch.

- Secure protection by actual effective value detection
  - For spread of electronic devices such as inverter, the actual effective value detection method is adopted, which is strong against deformed waveform and is detected from each phase independently.

- Secure protection by actual effective value detection
  - For spread of electronic devices such as inverter, the actual effective value detection method is adopted, which is strong against deformed waveform and is detected from each phase independently.
By using various application software for PLC, users can also connect to the network SCADA system.

**Interface unit**

- CC-Link®
- PROFIBUS-DP
- MODBUS®(RS-485)

**Communication items**

<table>
<thead>
<tr>
<th>Measurement / alarm</th>
<th>Current, Voltage, Power, Harmonics, etc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm (PAL,TAL,Self diagnosis)</td>
<td></td>
</tr>
<tr>
<td>Breaker control</td>
<td>Breaker ON,OFF</td>
</tr>
<tr>
<td>Breaker status</td>
<td>ON/OFF</td>
</tr>
<tr>
<td>Drawout position</td>
<td></td>
</tr>
</tbody>
</table>

Note: The VT unit is required to display the measured data except the load current.

**I/O unit**

ON, OFF, Spring charge, Digital input

Option to interface unit

I/O unit enables to turn ON/OFF the breaker and the spring charge via network.

And by addition of the drawout position switch, it is possible to transmit the breaker drawout position.

**Display unit for Panel board**

It has the same function as the breaker display unit.

In the case where the breaker is installed in the panel, it becomes possible to view the measurement information from the outside of the panel board.

Note: The VT unit is required to display the measured data except the load current.

**VT unit**

VT unit enables to measure voltages, electric powers, harmonics and etc.

**Electronic Trip Relay type code**

- **Main setting module**
  - WS1, WB1, WM1: AE630–1600-SW, AE2000–3200-SW, AE4000-SW
  - WS2, WB2, WM2: AE2000-SWA, AE4000-SWA, AE5000-SW
  - WS3, WB3, WM3: AE6300-SW

- **Optional setting module**
  - G1: Ground fault protection
  - N5: Neutral pole 50% protection
  - E1: Earth leakage protection
  - AP: 2nd Additional Pre-alarm
  - NA: Without optional setting

- **Power supply**
  - P1: ACDC100-240V
  - P2: DC24-60V
  - P3: AC100-240V / DC100-125V with output contact
  - P4: DC24-60V with output contact
  - P5: DC100-240V with output contact (SSR)

- **Additional function**
  - Extension module(EX1)
  - Display(DP1)
  - Display onto panel board(DP2)
  - VT unit(VT)

- **Network**
  - BIF-CC
  - BIF-PR
  - BIF-MD

Note: Some device types are excluded.
The safety of valuable circuits can be securely maintained.

**Higher short circuit protection performance by improving breaking capacity**

In case of 690V AC, Icu = Ics improved from 50 kA to 65 kA for AE630-SW~AE2000-SWA from 50 kA to 75 kA for AE2000-SW~AE4000-SWA from 50 kA to 85 kA for AE4000-SW~AE6300-SW

**Wider choice coordination range by improving rated short-time withstand current**

Icw (1s) improved from 65 kA to 75 kA for AE2000-SW~AE4000-SWA from 85 kA to 100 kA for AE4000-SW~AE6300-SW

**Higher safety by improving insulation performance**

Rated impulse withstand voltage (Uimp) for the main circuit is improved from 8 kV to 12 kV.

**Higher reliability by High operating durability**

- **Mechanical**
  The new models are sharply improved in mechanical durability compared to the former model.

- **Electrical**
  The new models (V2) are sharply improved in electrical durability compared to the former model.

---

### Uimp (Rated impulse withstand voltage)

8kV → 12kV

### Icu=Ics (Rated breaking capacity)

<table>
<thead>
<tr>
<th>V</th>
<th>Former model</th>
<th>New model</th>
</tr>
</thead>
<tbody>
<tr>
<td>50kA</td>
<td>65kA</td>
<td>75kA</td>
</tr>
</tbody>
</table>

### Icw (1s) (Rated short-time withstand current)

<table>
<thead>
<tr>
<th>V</th>
<th>Former model</th>
<th>New model</th>
</tr>
</thead>
<tbody>
<tr>
<td>65kA</td>
<td>75kA</td>
<td>85kA</td>
</tr>
</tbody>
</table>

---

### Mechanical

- Former model
- New model
For convenience

### 3 sizes

![Diagram showing 3 sizes of AE2000-SWA and AE2000-SS](image)

The compact AE2000-SWA can reduce the panel size.

### Compact size AE2000-SWA!

- The compact AE2000-SWA can reduce the panel size.

### The former model (AE-SS) can be retrofitted.

- It is same as the former model (AE-SS) in installation dimension and outline dimension, and the former model can be replaced with the new one.
- ACB main body with drawout frame can be replaced.
- It can be installed to the existing connection bus bar without any special connection kit.
  (Except AE2000-SWA, AE4000-SWA)

### Zero arc space

Arc exhaust to the outside of the breaker is drastically reduced for safer operation.
  (AE630-SW~AE4000-SWA models ≤ 600V AC)
  (refer to page 54 : Insulation distance)

### Reverse connection available

Line and Load is not defined on the Main circuit terminals. Therefore, reverse connection is available without any limitation.
External appearance and skeleton

**Fixed type**

AE-SW Series

1. Arc extinguishing chamber
2. Control circuit terminal block
3. Electronic trip relay
4. OFF button
5. ON button
6. Padlock hook
7. Charging indicator
8. ON/OFF indicator
9. Manual reset button (Optional)

In case of the fixed type, Lifting hooks (HP) are attached.

**Drawout type**

AE-SW Series

1. Cradle
2. Control circuit terminal block
3. Lifting hole
4. Charging handle
5. Drawout position indicator
6. Extension rail
7. Position lock
8. Aperture for the drawout handle
9. Drawout handle

In case of the drawout type, Drawout handle is attached.
**Product Structure**

### Skeleton

**Product introduction**

1. **Type**
   - AE630-SW
   - AE1000-SW
   - AE1250-SW
   - AE1600-SW
   - AE2000-SWA
   - AE2000-SW
   - AE2500-SW
   - AE3200-SW
   - AE4000-SWA
   - AE4000-SW
   - AE5000-SW
   - AE6300-SW

2. **Standard**
   - IEC 60947-2
   - EN 60947-2 (CE)
   - VDE
   - JIS C 8201-2-1
   - GB 14048.2 (CCC)
   - (Shipping Approvals)
     - LR
     - GL
     - BV
     - DNV
     - ABS
     - CCS
     - NK

3. **Connection**
   - **Drawout type**
     - Horizontal terminal
     - Vertical terminal
     - Front terminal
   - **Connection accessories**
     - Cell switch
     - Shorting b-contact
     - Lifting hooks
     - Safety shutter
     - Safety shutter lock
     - Mis-insertion preventor
     - Test jumper

4. **Electrical accessories**
   - Auxiliary switch
   - Motor charging device
   - Closing coil
   - Shunt trip device
   - Under voltage trip device
   - Condenser trip device

5. **Mechanical accessories**
   - Push button cover
   - Counter
   - Cylinder lock
   - Terminal cover
   - Door frame
   - Dust cover
   - Interphase barrier
   - Mechanical interlock
   - Door interlock
   - Cradle

6. **Electronic trip relay**
   - General use
     - WS type
   - Generator protection use
     - WM type
   - Special use
     - WB type
   - Optional
     - G1: Ground fault protection
     - E1: Earth leakage protection
     - A/P: 2nd Additional Pre-alarm
     - N5: Neutral pole 50% protection

7. **Relay accessories**
   - Extension module
   - Display
   - Temperature alarm
   - MCR switch
   - Neutral CT
   - External ZCT
   - VT unit

8. **Network**
   - CC-Link® Interface unit
   - PROFIBUS-DP Interface unit
   - MODBUS® Interface unit
   - I/O unit
### Specification

<table>
<thead>
<tr>
<th>Type</th>
<th>AE630-SW</th>
<th>AE1000-SW</th>
<th>AE1250-SW</th>
<th>AE1600-SW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame size</td>
<td>(A)</td>
<td>(A)</td>
<td>(A)</td>
<td>(A)</td>
</tr>
<tr>
<td>Rated insulation voltage (Ui) (AC.V)</td>
<td>630</td>
<td>1000</td>
<td>1250</td>
<td>1600</td>
</tr>
<tr>
<td>Rated operational voltage (Ue) (AC.V)</td>
<td>1000</td>
<td>1000</td>
<td>1250</td>
<td>1600</td>
</tr>
<tr>
<td>Rated impulse withstand voltage (Uimp) (kV)</td>
<td>690</td>
<td>690</td>
<td>690</td>
<td>690</td>
</tr>
<tr>
<td>Pollution degree</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Number of poles</td>
<td>3, 4</td>
<td>3, 4</td>
<td>3, 4</td>
<td>3, 4</td>
</tr>
<tr>
<td>Rated current In (CT rating)</td>
<td>630</td>
<td>1000</td>
<td>1250</td>
<td>1600</td>
</tr>
</tbody>
</table>

#### Current setting Ir (A) (40˚C)

<table>
<thead>
<tr>
<th>Type</th>
<th>Current setting Ir (A) (40˚C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE630-SW</td>
<td>690V AC 600V AC 240-500V AC</td>
</tr>
<tr>
<td></td>
<td>690V AC 600V AC 240-500V AC</td>
</tr>
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<td></td>
<td>690V AC 600V AC 240-500V AC</td>
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<td>690V AC 600V AC 240-500V AC</td>
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<tr>
<td></td>
<td>690V AC 600V AC 240-500V AC</td>
</tr>
</tbody>
</table>

#### Rated current of neutral pole

<table>
<thead>
<tr>
<th>Type</th>
<th>Rated current of neutral pole (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE630-SW</td>
<td>630 1000 1250 1600</td>
</tr>
</tbody>
</table>

#### Ultimate breaking capacity Icu (kA rms)

- 690V AC 65
- 600V AC 65
- 240-500V AC 65

#### Rated service breaking capacity Ics (kA rms) %Icu

- 690V AC 100%
- 600V AC 100%
- 240-500V AC 100%

#### Rated making capacity Icm (kA peak)

- 690V AC 143
- 600V AC 143
- 240-500V AC 143

#### Rated short time withstand current Icw (kA rms)

<table>
<thead>
<tr>
<th>Type</th>
<th>Rated short time withstand current Icw (kA rms) (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE630-SW</td>
<td>1s ≤ Ir ≤ 630 400 ≤ Ir ≤ 1000 800 ≤ Ir ≤ 1250 1000 ≤ Ir ≤ 1600</td>
</tr>
</tbody>
</table>

#### Maximum total breaking time (ms)

- 690V AC 5000
- 600V AC 5000

#### Maximum closing time (ms)

- 690V AC 5000
- 600V AC 5000

#### Connecting terminal

- Horizontal terminal
- Vertical terminal
- Front terminal

#### Outline dimension (mm) H×W×D

<table>
<thead>
<tr>
<th>Type</th>
<th>Fixed type 3-pole 4-pole Drawout type 3-pole 4-pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE630-SW</td>
<td>410×340×290 410×425×290 430×300×368 430×385×368</td>
</tr>
</tbody>
</table>

#### Weight (kg) (without Accessory)

<table>
<thead>
<tr>
<th>Type</th>
<th>Fixed type 3-pole 4-pole Drawout type 3-pole 4-pole Cradle only 3-pole 4-pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE630-SW</td>
<td>40 41 50 63 77 26 30</td>
</tr>
</tbody>
</table>

#### Marine approval

- (LR, GL, BV, DNV, ABS, NK, CCS)
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>2000</td>
<td>2000</td>
<td>2500</td>
<td>3200</td>
<td>4000</td>
<td>4000</td>
<td>5000</td>
<td>6300</td>
</tr>
<tr>
<td>1000</td>
<td>1000</td>
<td></td>
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<td>690</td>
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</tr>
<tr>
<td>3, 4</td>
<td>3, 4 (HN, FN) (Note7)</td>
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<tbody>
<tr>
<td>1250 ≤ Ir ≤ 2000</td>
<td>800 ≤ Ir ≤ 2000</td>
<td>1600 ≤ Ir ≤ 2500</td>
<td>2000 ≤ Ir ≤ 3200</td>
<td>2500 ≤ Ir ≤ 4000</td>
<td>2500 ≤ Ir ≤ 4000</td>
<td>3150 ≤ Ir ≤ 5000</td>
<td>4000 ≤ Ir ≤ 6300</td>
</tr>
<tr>
<td>75</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>130 (Note9)</td>
<td>75</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>45 (Note1)</td>
<td>65 (Note1)</td>
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<tbody>
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<td>2000</td>
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<td>2500</td>
<td>3200</td>
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<td>1500</td>
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<td>1000</td>
<td>5000</td>
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<tbody>
<tr>
<td>20000 (Note 4)</td>
<td>10000 (3P) / 5000 (4P)</td>
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<td>(Note 3)</td>
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</tr>
</thead>
<tbody>
<tr>
<td>430×435×368</td>
<td>430×439×368</td>
<td>430×565×368</td>
<td>430×569×368</td>
<td>480×875×368</td>
<td>480×1055×368 (Note 8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>410×475×290</td>
<td>414×873×290</td>
<td>414×605×290</td>
<td>414×1033×290 (Note 8)</td>
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</thead>
<tbody>
<tr>
<td>47</td>
<td>60</td>
<td>61</td>
<td>63</td>
<td>81</td>
<td>160</td>
<td>160</td>
<td>160</td>
</tr>
<tr>
<td>70</td>
<td>72</td>
<td>73</td>
<td>75</td>
<td>99</td>
<td>180 (200) (Note8)</td>
<td>180 (200) (Note8)</td>
<td>180 (200) (Note8)</td>
</tr>
<tr>
<td>84</td>
<td>113</td>
<td>114</td>
<td>116</td>
<td>136</td>
<td>256 (279) (Note8)</td>
<td>256 (279) (Note8)</td>
<td>263 (286) (Note8)</td>
</tr>
<tr>
<td>31</td>
<td>35</td>
<td>36</td>
<td>49</td>
<td>118</td>
<td>118</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>43</td>
<td>44</td>
<td>61</td>
<td>133 (148) (Note8)</td>
<td>133 (148) (Note8)</td>
<td>140 (155) (Note8)</td>
<td></td>
</tr>
</tbody>
</table>

| (LR, GL, BV, DNV, ABS, NK, CCS) |

(Note 6) This value means the instantaneous breaking time at shortcircuit interruption. As for accessories (SHT, UVT), refer to page 13 and 14.

(Note 7) 4(HN) means the neutral poles current capacity is 50% of the rated current, for 4 poles.

4(FN) means the neutral poles current capacity is 100% of the rated current, for 4 poles.

(Note 8) () shows the value for 4P FN type.

(Note 9) Marine approval value is 138kA.

(Remark) All models conform the isolating function according to IEC 60947-2. Reverse connection is possible.
# Connections

## Over view (AE630~1600-SW, AE2000~3200-SW)

<table>
<thead>
<tr>
<th>Connections Type</th>
<th>Horizontal</th>
<th>Vertical (VT)</th>
<th>Front (FT)</th>
<th>Vertical terminal adapter (VTA)</th>
<th>Front terminal adapter (FTA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed type (FIX)</td>
<td><img src="image1" alt="Image" /></td>
<td><img src="image2" alt="Image" /></td>
<td><img src="image3" alt="Image" /></td>
<td><img src="image4" alt="Image" /></td>
<td><img src="image5" alt="Image" /></td>
</tr>
<tr>
<td>Drawout type (DR)</td>
<td><img src="image6" alt="Image" /></td>
<td><img src="image7" alt="Image" /></td>
<td><img src="image8" alt="Image" /></td>
<td><img src="image9" alt="Image" /></td>
<td><img src="image10" alt="Image" /></td>
</tr>
</tbody>
</table>

## Over view (AE2000-SWA, AE4000-SWA, AE4000~6300-SW)

<table>
<thead>
<tr>
<th>Connections Type</th>
<th>Vertical (VT)</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed type (FIX)</td>
<td><img src="image11" alt="Image" /></td>
<td><img src="image12" alt="Image" /></td>
</tr>
<tr>
<td>Drawout type (DR)</td>
<td><img src="image13" alt="Image" /></td>
<td><img src="image14" alt="Image" /></td>
</tr>
</tbody>
</table>

## Available connections

<table>
<thead>
<tr>
<th>Connections Type</th>
<th>Breakers</th>
<th>AE630-SW</th>
<th>AE1000-SW</th>
<th>AE1250-SW</th>
<th>AE1600-SW</th>
<th>AE2000-SW</th>
<th>AE2000-SWA</th>
<th>AE2500-SW</th>
<th>AE3200-SW</th>
<th>AE4000-SW</th>
<th>AE4000-SWA</th>
<th>AE4000-SWA</th>
<th>AE5000-SW</th>
<th>AE6300-SW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed type (FIX)</td>
<td>Horizontal</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
</tr>
<tr>
<td></td>
<td>FIX-VT</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
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<td>● ● ● ● ●</td>
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<td>● ● ● ● ●</td>
</tr>
<tr>
<td></td>
<td>FIX-VTA</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
</tr>
<tr>
<td></td>
<td>FIX-FTA</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
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<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Drawout type (DR)</td>
<td>Horizontal</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
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<td>● ● ● ● ●</td>
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<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
<td>● ● ● ● ●</td>
</tr>
<tr>
<td></td>
<td>DR-VT</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
</tr>
<tr>
<td></td>
<td>DR-FT</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
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<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
</tr>
<tr>
<td></td>
<td>DR-VTA</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
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<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
</tr>
<tr>
<td></td>
<td>DR-FTA</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
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<td>○ ○ ○ ○ ○</td>
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<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○</td>
</tr>
</tbody>
</table>

- ●: Standard
- ○: Optional

- Connection image : AE630~1600-SW, 3-pole type
- Connection image : AE2000-SWA, 3-pole type
- For AE2000-SWA, AE4000-SWA, AE4000-SW, AE5000-SW and AE6300-SW models, vertical terminal only is available.
Manual charging

The closing 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 is completely charged, the charging indicator will show "CHARGED".
- The indicator shows the 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 P7, P17) as standard.

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 operation is also possible.
- 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.

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.

Manual charging operation is also possible.

Polarity of DC circuit use

OFF charging method is also available. The closing spring is charged automatically when the breaker is opened. This is available only by externally connecting b contact (AxB) of the auxiliary switch to the motor charging circuit in series.

In case of DC power supply, please use high capacity auxiliary switch (HAX).

Motor charging rating

<table>
<thead>
<tr>
<th>Rated voltage (V)</th>
<th>Applicable voltage range (V)</th>
<th>Inrush current/Peak value (A)</th>
<th>Steady current (A)</th>
<th>Charging time (s)</th>
<th>Criterion for power requirement (VA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC24</td>
<td>18 ~ 26.4</td>
<td>22</td>
<td>6</td>
<td>≤ 5</td>
<td>500</td>
</tr>
<tr>
<td>DC48</td>
<td>36 ~ 52.8</td>
<td>14</td>
<td>3</td>
<td></td>
<td>700</td>
</tr>
<tr>
<td>AC/DC 100-125</td>
<td>85 ~ 137.5</td>
<td>10(10)</td>
<td>(3)(4)</td>
<td></td>
<td>1000</td>
</tr>
<tr>
<td>AC/DC 200-380</td>
<td>170 ~ 275</td>
<td>5(7)</td>
<td>1(2)</td>
<td></td>
<td>700</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1000</td>
</tr>
</tbody>
</table>

Values in parentheses show values for AE4000-SWA 4 pole and AE4000-SW – AE6300-SW.

Please inquire as to further details of 24V DC and 48V DC.

We cannot manufacture AE4000-SWA 4 pole and AE4000-SW – AE6300-SW in DC 24V and DC 48V rating.
The closing coil is a device to close the breaker by remote control.

- An interlock to prevent pumping is provided electrically.
- Closing time means time from the initial energization of the closing coil up to the complete closing of the main contacts.
- As CC is one-pulse driven, it is not necessary to insert AXb for burning prevention purposes. Inserting AXb will cause anti-pumping function to be ineffective.

### Closing coil (CC)

#### CC circuit diagram

![CC Circuit Diagram](image)

<table>
<thead>
<tr>
<th>Rated voltage (Applicable voltage range)</th>
<th>Operating voltage - Operating inrush current (VA)</th>
<th>Closing time (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC24-48V (16.8-52.8)</td>
<td>DC24V 3.0A (100W)</td>
<td>0.08 s or less</td>
</tr>
<tr>
<td>AC - DC common</td>
<td>DC48V 6.0A (200W)</td>
<td></td>
</tr>
<tr>
<td>100-250V (75-275)</td>
<td>AC100V 0.7A (100W)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AC250V 1.7A (200W)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DC100V 0.6A (100W)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DC250V 1.8A (250W)</td>
<td></td>
</tr>
</tbody>
</table>

**Note 1**: In case of double rating of rated voltage, it is the value for the lower rating.

**Note 2**: Operating time for AE4000-SW~AE6300-SW is 0.05s or less.

### Shunt trip device (SHT)

The shunt trip device is a device to open the breaker by remote control. A cut-off switch is included.

#### SHT circuit diagram

![SHT Circuit Diagram](image)

<table>
<thead>
<tr>
<th>Rated voltage (Applicable voltage range)</th>
<th>Operating voltage - Operating inrush current (VA)</th>
<th>Operating time (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC24-48V (16.8-52.8)</td>
<td>DC24V 2.5A (100W)</td>
<td>0.04 s or less</td>
</tr>
<tr>
<td>AC - DC common</td>
<td>DC48V 6.0A (200W)</td>
<td></td>
</tr>
<tr>
<td>100-250V (75-275)</td>
<td>AC100V 0.4A (100W)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AC250V 1.4A (200W)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AC380V 0.5A (250W)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AC500V 0.7A (300W)</td>
<td></td>
</tr>
</tbody>
</table>

**Note 1**: In case of double rating of rated voltage, it is the value for the lower rating.

**Note 2**: In case of DC24 to 48V, it is operating time for DC24V.
Under voltage trip device (UVT)

This is the device that automatically trips the breaker when the circuit voltage drops below the nominal voltage, and comprises UVT coil and UVT controller. There are 3 kinds of tripping time, INST, 0.5s and 3.0s.

OCR alarm (AL)

OCR alarm (AL) is provided as standard if ETR is equipped. OCR alarm (AL) is the contact (1a) of short-time operation (30ms), being output when the breaker is tripped by the electronic trip relay.

Two types of automatic reset type (standard) and manual reset type (optional) are available. When ordering, specify either automatic reset or Manual reset.

OCR alarm (AL) [Automatic reset type Short-time operation (30ms)]

OCR alarm (AL) is provided as standard if ETR is equipped. OCR alarm (AL) is the contact (1a) of short-time operation (30ms), being output when the breaker is tripped by the electronic trip relay. Two types of automatic reset type (standard) and manual reset type (optional) are available. When ordering, specify either automatic reset or Manual reset.

Switch rating

<table>
<thead>
<tr>
<th>Voltage (V)</th>
<th>AC</th>
<th>DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resitive load</td>
<td>3</td>
<td>0.4</td>
</tr>
<tr>
<td>Inductive load</td>
<td>2</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Not 1: Though the control power supply is unnecessary to activate OCR alarm (AL), the self-holding circuit is necessary since the contact output is activated for the short time (30ms).
Not 2: This works when tripping occurs in LTD, STD, INST, GFR or ER.
Not 3: If any continuous output of OCR alarm (AL) is necessary, use the trip indicator (TI) output contact of the electronic trip relay.

OCR alarm (AL) [MRE : Manual reset type]

On the manual reset type (optional), the gray manual reset button on the front side of the breaker will stick out to continuously output OCR alarm (AL) if the breaker is tripped by the electronic trip relay. After tripping, the breaker can not be turned on unless the manual reset button is pressed for reseting.

Auxiliary switch

Standard (AX) • High capacity type (HAX)

This is the contact that remotely indicates the ON or OFF status of the breaker.

Switch rating

<table>
<thead>
<tr>
<th>Voltage (V)</th>
<th>AC</th>
<th>DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resitive load</td>
<td>5</td>
<td>0.3</td>
</tr>
<tr>
<td>Inductive load</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

NOTE:
- 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. Make inquiries for more details.
**Accessories (for breaker unit)**

**Push button cover (BC-L)**

The cover prevents careless manual operation (ON, OFF) of the push buttons. BC-L can be locked by a padlock (The padlock should be supplied by the customer.) For the suitable size of a padlock, refer to Page 17.

**Cylinder lock (CYL)**

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.

**Counter (CNT)**

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

**Door frame (DF)**

The door frame improves the appearance, after cutting out the panel door to install the breaker. As for panel cut-out dimensions, refer to page 49.

**Door interlock (DI)**

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

- A wire type mechanical interlock allows flexibility in positioning breakers in the switchboard.
- The parts of the Door panel should be supplied by the customer.
- DI can not be installed by combining with “Mechanical interlock(MI) for 3 breakers.”

**Interphase Barrier (BA)**

This enhances the interphase insulation between the terminal portions of the breaker, and prevents short-circuit due to conductive inclusion or dust. It can be attached and detached easily. As for its availability, refer to the following table.

<table>
<thead>
<tr>
<th>Type</th>
<th>Connections</th>
<th>AE630-SW / AE1600-SW</th>
<th>AE2000-SW</th>
<th>AE3000-SW / AE3200-SW</th>
<th>AE4000-SWA</th>
<th>AE4000-SW / AE6300-SW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed type (FIX)</td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>–</td>
</tr>
<tr>
<td>Vertical terminal (FIX-VT)</td>
<td></td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
</tr>
<tr>
<td>Vertical terminal adaptor (VTA)</td>
<td></td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
</tr>
<tr>
<td>Front terminal adaptor (FIX-FTA)</td>
<td></td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
</tr>
<tr>
<td>Drawout type (DR)</td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>–</td>
</tr>
<tr>
<td>Vertical terminal (DR-VT)</td>
<td></td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
</tr>
<tr>
<td>Front terminal (DR-FT)</td>
<td></td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
</tr>
<tr>
<td>Vertical terminal adaptor (VTA)</td>
<td></td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
</tr>
<tr>
<td>Front terminal adaptor (DR-FTA)</td>
<td></td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
</tr>
</tbody>
</table>

- ● Available for the insulation
- ▲ Available for separating terminals
- – Not existing type
- – Attachment is impossible

**Terminal Cover (TTC)**

The transparent terminal cover prevents from careless touching to the live control terminals. Protection degree is IP20.
**Mechanical interlock (MI)**

This is the device to prevent parallel charge of 2 or 3 units of breakers, and it can interlock the breakers mechanically without fail. All combinations are available among any models from AE630-SW to AE4000-SWA. Please make inquiries about installation to AE4000-SW–AE6300-SW.

Further the interlock is possible among the different connection types or poles, such as fixed type or drawout type, 3 pole or 4 pole.

In combination with electric interlock, the higher safety interlock system can be secured.

- In case of drawout type, the interlock works at "CONNECTED" position, and in another position the interlock is released, which assures easy maintenance and inspection of the breaker.
- When turning OFF one breaker and then turning ON another breakers, please take an interval 0.5 seconds or more.
- MI for 3 breakers can not be installed by combining with Door Interlock (DI).

**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 used in combination with the shunt trip device (SHT).

<table>
<thead>
<tr>
<th>Type</th>
<th>KF-100CD</th>
<th>KF-200CD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated input voltage (V)</td>
<td>AC100/110</td>
<td>AC200/220</td>
</tr>
<tr>
<td>Rated frequency (Hz)</td>
<td>50-60</td>
<td>50-60</td>
</tr>
<tr>
<td>Rated charging voltage (V)</td>
<td>140/155</td>
<td>820</td>
</tr>
<tr>
<td>Condenser capacity (μF)</td>
<td>140/155</td>
<td>820</td>
</tr>
<tr>
<td>Voltage range</td>
<td>70–105%</td>
<td>70–105%</td>
</tr>
<tr>
<td>Power supply capacity (VA)</td>
<td>1 VA max</td>
<td>1 VA max</td>
</tr>
<tr>
<td>Charging time (s)</td>
<td>30 sec.</td>
<td>30 sec.</td>
</tr>
<tr>
<td>Trip limit time</td>
<td>30 sec.</td>
<td>30 sec.</td>
</tr>
</tbody>
</table>

**Dust cover (DUC)**

Dust cover prevents the dust or water entering into the panel board from the breaker panel cut. Protection degree is IP54.
Accessories (for drawout type)

Drawout interlock (standard)

This is the safety device that prevents insertion and drawout operation. When the breaker is ON, the drawout handle cannot be inserted, and insertion and drawout operation cannot be done unless the OFF button is pressed.

Position lock (standard)

This is the device that locks automatically the drawout mechanism at "TEST" or "CONNECTED" positions during insertion and drawout operation. When the lock plate is pushed in, lock is released and operation can be continued.

Padlock

A padlock can be arranged at the lock plate. Thereby, it is possible to prevent the connection position from being changed unnecessarily. A padlock of φ5 should be supplied by customer. As for outline dimensions of the padlock, please refer to the left figure.

Operating position of drawout type

<table>
<thead>
<tr>
<th>CONNECTED position</th>
<th>TEST position</th>
<th>DISCONNECTED position</th>
<th>DRAWOUT position</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Both main and control circuits are connected.</td>
<td>● Main circuit is disconnected, but the control circuit is connected.</td>
<td>● Both main and control circuits are disconnected.</td>
<td>● This is the position for removing the breaker.</td>
</tr>
<tr>
<td>● Normal in use condition.</td>
<td>● The breaker operation can be tested with the door closed.</td>
<td>● The door can be closed.</td>
<td>● The breaker is drawn out of the cradle on the extension rails.</td>
</tr>
<tr>
<td>● Lock plate is protruding.</td>
<td>● Lock plate is protruding</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cell switch (CL)

This is the switch to show the drawout position (CONNECTED, TEST, and DISCONNECTED) of the breaker. An arbitrary combination up to 4 pieces is available.

<table>
<thead>
<tr>
<th>Operating sequence</th>
<th>Switch rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drawout position of breaker</td>
<td>Voltage (V)</td>
</tr>
<tr>
<td>Display position of thermal operation</td>
<td>Resistive load</td>
</tr>
<tr>
<td>CL-C (CONNECTED)</td>
<td>AC</td>
</tr>
<tr>
<td></td>
<td>DC</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>CL-T (TEST)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>CL-D (DISCONNECTED)</td>
<td></td>
</tr>
</tbody>
</table>

| Note 1: The setting is available for change by customer later. A preliminary setting of CL at factory shipment is as follows. CL1:1C, CL2:1C1D, CL3:1C1T1D, CL4:2C1T1D |

Shorting b-contact (SBC)

When moving the breaker from the connected to the test positions, this contact is used to short circuit auxiliary switch (AXb) thus maintaining the correct sequence of operation of the external control circuit. When ordering, SBC with the same number of contacts as auxiliary switches (AXb) will be provided.

Lifting hook(HP)

This is the metal fitting to suspend the main body when the breaker is removed from the drawout cradle. The fixed type breaker is equipped with HP as standard.

Safety shutter(SST)

The safety shutters cover the conductors (cradle side) and prevent contact with them when the breaker is drawn out.

Safety shutter lock(SST-Lock)

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.

Mis-insertion preventor(MIP)

This prevents other breakers than specified from inserting into the cradle, and max. 5 patterns are available.

Test jumper(TJ)

With the breaker taken out of its cradle, this device enables the breaker to be electrically opened and closed, and the operating sequence to be checked. 3m length of cable is equipped as standard shipment.
Several measuring data (current, voltage, power etc) and alarms can be displayed with this module.

**Display (option)**
Several measuring data (current, voltage, power etc) and alarms can be displayed with this module.

**Extension module (option)**
This module is required when installed VT unit, display module and each interface unit.

**Load current LED (standard)**
This indicator displays the maximum current of phase.

**RUN LED, ERR. LED (standard)**
This indicator displays the ETR situation (Run or Error).

**Trip indicator LED (standard)**
This indicator displays the trip cause.

**Neutral pole overcurrent protection (NP) (standard)**
When harmonics in load current are large, the current on neutral pole exceeding rated current may flow. Harmonics may cause some troubles. Neutral pole overcurrent protection prevents them by operating at 100% of rated current on neutral pole.

**MCR: Making current release (option)**
Just under the breaker closing operation (from open to close), Instantaneous characteristic become effective, but after closing the breaker, instantaneous characteristic become ineffective.

When you order the MCR switch, MCR switch is built in the main body.

If MCR switch is built in the main body and the adjust dial of INST/MCR on main setting module is set the MCR position, MCR function become effective.

**TAL (option)**
When the temperature of main contacts exceed normal temperature level, temperature alarm is indicated at LED (on main setting module) and output by contact (only installed power supply with output contact).

If TAL is installed in the breaker according your order, Temperature alarm (LED) function become effective.

When the temperature goes down within normal temperature level, the temperature alarm will be reset.

**NCT (option)**
Neutral CT is required for Ground fault or Neutral pole protection, when 3 pole breaker is used for 3 phase 4 wires system.

**ZCT (option)**
ZCT is required for a few amperes earth leakage protection, and is combining ER plug.

**OCR alarm (AL) (standard)**
When it happen to trip by over current, ground fault (GFR) and Earth leakage (ER), it issue a warning alarm.

**Main setting module**
This module provides the function of over current protection. It is possible to select the three setting module according to application. (see page 21-26)

**Neutral protection of rated current (100%) function is standard at 4 pole breaker.**

**Optional setting module (option)**
Additional functions and characteristics can be selected by optional setting modules.

**Pre-alarm(PAL) (standard)**
This indicator displays the Pre-Alarm situation when exceed the setting current. When it installed power supply module with contact, the output contact of Pre Alarm is available.

*The output is reset when the electric current goes below the set level after an alarm is set off.

**RESET button (standard)**
When push this reset button, trip indicator, and Pre-Alarm will be reseted. And when the instantaneous test by MITSUBISHI special tester and push this reset button, as a result of LTD and STD function become ineffective.

**TEST terminal (standard)**
This terminal already installed as standard. This terminal is used for testing by the field test device (Y-2000). (see page 30)

* The output is reset when the electric current goes below the set level after an alarm is set off.

**MCR: Making current release**
When you order the MCR switch, MCR switch is built in the main body.

If MCR switch is built in the main body and the adjust dial of INST/MCR on main setting module is set the MCR position, MCR function become effective.

**TAL (option)**
When the temperature of main contacts exceed normal temperature level, temperature alarm is indicated at LED (on main setting module) and output by contact (only installed power supply with output contact).

If TAL is installed in the breaker according your order, Temperature alarm (LED) function become effective.

When the temperature goes down within normal temperature level, the temperature alarm will be reset.

**NCT (option)**
Neutral CT is required for Ground fault or Neutral pole protection, when 3 pole breaker is used for 3 phase 4 wires system.

**ZCT (option)**
ZCT is required for a few amperes earth leakage protection, and is combining ER plug.
Characteristic table

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NA</td>
<td>G1</td>
<td>E1</td>
</tr>
<tr>
<td>WS</td>
<td>Nothing</td>
<td>Ground fault</td>
<td>Earth leakage</td>
</tr>
<tr>
<td>WM</td>
<td>2nd additional Pre-alarm</td>
<td>Earth leakage</td>
<td>Neutral pole 50% protection</td>
</tr>
<tr>
<td>WB</td>
<td>6 output contacts (SSR)</td>
<td>6 output contacts</td>
<td>6 output contacts</td>
</tr>
</tbody>
</table>

Power supply module

<table>
<thead>
<tr>
<th>Type</th>
<th>Rating</th>
<th>alarm output</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>100-240V AC-DC</td>
<td>Nothing</td>
</tr>
<tr>
<td>P2</td>
<td>24-60V DC</td>
<td>Nothing</td>
</tr>
<tr>
<td>P3</td>
<td>100-240V AC 100-125V DC</td>
<td>6 output contacts</td>
</tr>
<tr>
<td>P4</td>
<td>24-60V DC</td>
<td>6 output contacts</td>
</tr>
<tr>
<td>P5</td>
<td>100-240V DC</td>
<td>6 output contacts (SSR)</td>
</tr>
</tbody>
</table>

CT rating table

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>630A</td>
<td>250A</td>
<td>315A</td>
<td>500A</td>
<td>630A</td>
<td>1250A</td>
<td>1600A</td>
<td>2000A</td>
<td>4000A</td>
</tr>
<tr>
<td>2000A</td>
<td>2500A</td>
<td>3200A</td>
<td>4000A</td>
<td>4000A</td>
<td>5000A</td>
<td>6300A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Electronic trip relay(ETR) type code

- **Main setting module**
  - W51, W52, W53
  - AE630-1600-SW
  - AE2000-3200-SW
  - AE4000-SW

- **Optional setting module**
  - G1: Ground fault protection
  - E1: Earth leakage protection
  - N5: Neutral pole 50% protection

- **Power supply**
  - P1: AC100-240V
  - P2: DC24-60V
  - P3: AC100-240V / DC100-125V
  - P4: DC24-60V with output contact
  - P5: DC100-240V with output contact

- **Additional function**
  - Extension module(EX1)
  - Display(DP1)
  - Display onto panel board(DP2)
  - VT unit(VT)
  - Temperature alarm(TAL)
  - MCR switch(MCR-SW)
Electronic trip relay (for general use : WS)

- Trip indicator LED
- Pre-alarm LED
- Temperature alarm LED
- Load current LED
- RUN LED
- ERR. LED
- Current setting dial
- Uninterrupted current setting dial
- LTD time setting dial
- STD pick-up setting dial
- STD time setting dial
- INST/MCR pick-up current setting dial
- Optional setting module (P.27~29)
- Pre-alarm current setting dial
- RESET button (TEST L/S LOCK button)
- TEST terminal

Note: The figure shown WS type with G1 plug. G1 is optional.

Relation of setting dial

<table>
<thead>
<tr>
<th>No.</th>
<th>Setting item</th>
<th>Mark</th>
<th>Adjustable setting range</th>
<th>Accuracy</th>
<th>Factory default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Current setting</td>
<td>Ir</td>
<td>0.5 – 1.0 (0.05step) x In (CT rating)</td>
<td>—</td>
<td>1.0</td>
</tr>
<tr>
<td>H</td>
<td>Uninterrupted current</td>
<td>Lu</td>
<td>0.8 – 1.0 x Ir (0.02step), Pick-up current : 1.15 x Lu</td>
<td>± 15%</td>
<td>150</td>
</tr>
<tr>
<td>I</td>
<td>LTD time</td>
<td>Tl</td>
<td>12~25–50–100–150s at Lu x 2</td>
<td>± 20%</td>
<td>150</td>
</tr>
<tr>
<td>J</td>
<td>STD pick-up current</td>
<td>Isd</td>
<td>1.5–2.5–3.5–5–7–8–9–10 x Ir</td>
<td>± 15%</td>
<td>10</td>
</tr>
<tr>
<td>K</td>
<td>STD time</td>
<td>Tsd</td>
<td>0.5–0.4–0.3–0.2–0.1–0.06–0.06–0.1–0.2–0.3–0.4–0.5s</td>
<td>± 20%</td>
<td>0.5 (I²t ON)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>at Isd x 1.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>INST/MCR pick-up current</td>
<td>Li</td>
<td>AE630-SW–AE1600-SW 16–12–10–8–6–4–2–2–4–6–8–10–12–16 x Ir</td>
<td>± 15%</td>
<td>WS1…16 (INST)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AE4000-SW 12–10–8–6–4–2–2–4–6–8–10–12–16 x Ir</td>
<td></td>
<td>WS3…10 (INST)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AE5000-SW 12–10–8–6–4–2–2–4–6–8–10–12–16 x Ir</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>Pre-alarm current</td>
<td>Ip</td>
<td>lu x 0.68 – 1.0 (0.04step) –OVER</td>
<td>± 10%</td>
<td>OVER</td>
</tr>
<tr>
<td></td>
<td>Pre-alarm time</td>
<td>Tp</td>
<td>1/2 Tl at Lu x 2 (after 1/2 Tl, PAL contact output turns on.)</td>
<td>± 20%</td>
<td>—</td>
</tr>
</tbody>
</table>

Upper figure and table denote the case optional MCR function is included.
Operating characteristic curve (for general use: WS)

- PAL current: $I_p\ (0.08-1.0 \times I_u (0.02 \text{step})$)
- Uninterrupted current: $I_u\ (0.8-1.0 \times I_r (0.02 \text{step})$)
- LTD Pick-up: $1.05 \times I_u$ - Non pick-up $1.25 \times I_u$ - Pick-up
- STD pick-up current: $I_{sd}\ (I_x \times 1.5-2-2.5-3-4-5-6-7-8-9-10 \times 15\%$)
- STD time: $T_{sd}\ (0.06-0.1-0.2-0.3-0.4-0.5 (s) \times 20\%$)
- LTD time: $T_L\ (12-25-50-100-150 (s) \times 20\%$)
- LTD Pick-up: $I_{p}\ \%\ of\ Uninterrupted\ current\ I_u$
- Uninterrupted current: $I_u, I_{sd}, I_{r}\ \%\ of\ Current\ setting\ I_r$
- INST/MCR pick-up current: $I_i\ (I_x \times 0.68-1.0 (0.04 \text{step}) - OVER \times 10\%$)
- Max. breaking time: $0.05\ (0.02\ \text{step})$

Note:
The slope of LTD curve can be changed easily in case a relay for protective coordination (WF relay) is used instead of WS relay.
As for the details about WF relay, please make inquiries.
Electronic trip relay (for generator protection use: WM)

- WM1 type with G1 plug and Display (DP1).
- G1 and DP1 are options.

### Adjustable setting range

<table>
<thead>
<tr>
<th>No.</th>
<th>Setting item</th>
<th>Mark</th>
<th>Adjustable setting range</th>
<th>Accuracy</th>
<th>Factory default value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Current setting</td>
<td>Ir</td>
<td>0.63 – 1.0 x In (Adjust by factory: Fixed)</td>
<td>—</td>
<td>Comply with ordering sheet</td>
</tr>
<tr>
<td>G</td>
<td>LTD pick-up current</td>
<td>Ir</td>
<td>1.0–1.05–1.1–1.15–1.2 x Ir</td>
<td>± 5%</td>
<td>1.15</td>
</tr>
<tr>
<td>H</td>
<td>LTD time</td>
<td>Tl</td>
<td>15–20–25–30–40–60s at Ir x 1.2</td>
<td>± 20%</td>
<td>20</td>
</tr>
<tr>
<td>I</td>
<td>STD pick-up current</td>
<td>Isd</td>
<td>1.5–2–2.5–3–3.5–4–4.5–5 x Ir</td>
<td>± 15%</td>
<td>5</td>
</tr>
<tr>
<td>J</td>
<td>STD time</td>
<td>Tsd</td>
<td>0.5–0.4–0.3–0.2–0.1–0.06–0.06–0.1–0.2–0.3–0.4–0.5s (PT ON) at Isd x 1.5</td>
<td>± 20% (It operates in the range between 0.04 and 0.08s when the time set at 0.06s.)</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>INST/MCR pick-up current</td>
<td>Li</td>
<td>AE630-SW–AE1600-SW 16–12–10–8–6–4–2–2–4–6–8–10–12–16 x Ir (INST)</td>
<td>± 15%</td>
<td>WM1–16 (INST)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AE2000-SW–AE3200-SW</td>
<td>WM2–12 (INST)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AE6300–SW</td>
<td>WM4–5 (INST)</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Pre-alarm current</td>
<td>Ip</td>
<td>Ir x 0.68 – 1.0 (0.04 step) –OVER</td>
<td>± 5%</td>
<td>OVER</td>
</tr>
<tr>
<td></td>
<td>Pre-alarm time</td>
<td>Tp</td>
<td>1/2 Tl at Ir x 1.2 (after 1/2 Tl, PAL contact output turns on.)</td>
<td>± 20%</td>
<td>—</td>
</tr>
</tbody>
</table>

Note: The figure shown WM1 type with G1 plug and Display (DP1). G1 and DP1 are options.

### Relation of setting dial

- Load current LED
  - (40, 60, 80, 100%)
- Pre-alarm current LED
- Temperature alarm LED
- RUN LED
- ERR. LED
- LTD pick-up current
- STD pick-up setting dial
- STD time setting dial
- INST/MCR pick-up current setting dial
- Optional setting module (P. 27–29)
- Pre-alarm current setting dial
- RESET button (TEST L/S LOCK button)
- TEST terminal

Upper figure and table denote the case optional MCR function is included.
Pre-alarm current “OVER” setting is equal to 1.0.
Operating characteristic curve (for generator protection use: WM)

Pre-alarm current: \(I_p\)
- \(I_p = l \times 0.68 - 1.0 \times 0.04\) (step) ±5%

LTD pick-up current: \(I_l\)
- \(I_l = 1.0 - 1.05 - 1.1 - 1.15 - 1.2\) ±5%
- Factory setting position is 1.15

STD pick-up current: \(I_s\)
- \(I_s = I_r \times 1.5 - 2 - 2.5 - 3 - 3.5 - 4 - 4.5 - 5\) ±15%

STD time: \(T_{sd}\)
- Note 1: When \(T_{sd} = 0.06\) setting, operating time is 0.04 - 0.08s.
- \(T_{sd} = 0.06 - 0.1 - 0.2 - 0.3 - 0.4 - 0.5\) (at \(I_s d \times 1.5\)) ±20%

Pre-alarm time: \(T_p\)
- \(T_p = T_{l/2\text{max}}\) ±20% (at \(I_l \times 1.2\))

LTD time: \(T_L\)
- \(T_L = 15 - 20 - 25 - 30 - 40 - 60\) (at \(I_l \times 1.2\)) ±20%

INST/MCR pick-up current: \(I_i\)
- \(I_i = I_r \times 2 - 4 - 6 - 8 - 10 - 12\) ±15% (WM1)
- \(I_i = I_r \times 2 - 4 - 6 - 8 - 10 - 12\) ±15% (WM2)

Max. breaking time
- 0.05s (in case of AE4000-SW~6300-SW, it is 0.05s)

Note: When \(T_{sd} = 0.06\) setting, operating time is 0.04 - 0.08s.
- \(T_{sd}\) is ON/OFF selectable.
**Electronic trip relay (for special use: WB)**

**Adjustable setting range**

<table>
<thead>
<tr>
<th>No.</th>
<th>Setting item</th>
<th>Mark</th>
<th>Adjustable setting range</th>
<th>Accuracy</th>
<th>Factory default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Current setting</td>
<td>Ir</td>
<td>0.5 – 1.0 (0.05step) x In (CT rating)</td>
<td>—</td>
<td>1.0</td>
</tr>
<tr>
<td>H</td>
<td>INST/MCR pick-up current</td>
<td>li</td>
<td>AE630-SW–AE1600-SW AE2000-SW–AE3200-SW 16-12-10-8-6-4-2-4-6-8-10-12-16 x Ir</td>
<td>± 15%</td>
<td>WB1…16 (INST)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AE4000-SW</td>
<td></td>
<td>WB2…12 (INST)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AE2000-SWA, AE4000-SWA AE5000-SW 12-10-8-6-4-2-4-6-8-10-12 x Ir</td>
<td></td>
<td>WB3…10 (INST)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AE6300-SW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Pre-alarm current</td>
<td>lp</td>
<td>Ir x 0.68 – 1.0 (0.04step) – OVER</td>
<td>± 10%</td>
<td>OVER</td>
</tr>
<tr>
<td></td>
<td>Pre-alarm time</td>
<td>Tp</td>
<td>75s at Ir x 2 (after 75s, PAL contact output turns on.)</td>
<td>± 20%</td>
<td>—</td>
</tr>
</tbody>
</table>

Upper figure and table denote the case optional MCR function is included.
Operating characteristic curve (for special use: WB)

- Pre-alarm current: $I_p$
  - $I_r \times 0.68 \sim 1.0 (0.04\text{step}) - \text{OVER} \pm 10\%$
  
- Pre-alarm time: $T_p$
  - $75\text{s} \pm 20\%$ at $I_r \times 2$

- Max. time of let-through current

- Max. Setting of External OCR

- INST/MCR pick-up current: $I_i$
  - $I_r \times 2-4-6-8-10-12-16 \pm 15\%$ [WB1]
  - $I_r \times 2-4-6-8-10-12 \pm 15\%$ [WB2]
  - $I_r \times 2-4-6-8-10-12 \pm 15\%$ [WB3]

- Up to $I_{cw}$

- Up to $I_{cw}$

- Max. breaking time
  - (In case of AE4000-SW~6300-SW, it is 0.05s)
The ground fault protection (GFR) of several hundred amperes is possible. This function can be selected for trip and alarm (no trip). Power supply is necessary for this function, even if there is not power supply, it can function at 0.2xIn or higher.

**Ground fault protection (GFR)**

The Neutral CT is used for ground fault protection when the 3 pole breaker is used on a 3 phase 4 wires system and for over current protection on N phase. Please use this CT in combination with ground fault protection (GFR). As for outline dimensions, refer to page 50. The length of the cable (attached) for NCT is 2m.

### Ground fault protection characteristics

<table>
<thead>
<tr>
<th>Ground fault current (% of CT rating In)</th>
<th>Operating time (s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30%</td>
<td>0.1</td>
</tr>
<tr>
<td>60%</td>
<td>1.0</td>
</tr>
<tr>
<td>80%</td>
<td>3.0 ±20%</td>
</tr>
<tr>
<td>100%</td>
<td>0.04~0.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pick-up current : Ig In x 0.1~1.0 ±20% (0.1 step)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.1<del>0.15</del>0.3<del>0.5</del>0.8<del>1.5</del>3.0s</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ground fault time: Tg</th>
<th>Ground fault current (% of CT rating In)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.1<del>0.15</del>0.3<del>0.5</del>0.8<del>1.5</del>3.0s</td>
<td></td>
</tr>
<tr>
<td>0.15 ±20%</td>
<td></td>
</tr>
<tr>
<td>&lt;0.1 (0.04~0.1)</td>
<td></td>
</tr>
</tbody>
</table>

### Settings

<table>
<thead>
<tr>
<th>Setting item</th>
<th>Adjustable setting range</th>
<th>Accuracy</th>
<th>Factory default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GFR pick-up current</td>
<td>Ig 0.1<del>0.2</del>0.3<del>0.5</del>0.6<del>0.7</del>0.8<del>0.9</del>1.0 x In</td>
<td>±20%</td>
<td>1.0</td>
</tr>
<tr>
<td>GFR time</td>
<td>Tg 3<del>1.5</del>0.8<del>0.5</del>0.3<del>0.15</del>&lt;0.1</td>
<td>±20%</td>
<td>3s (TRIP)</td>
</tr>
</tbody>
</table>

### Neutral CT (NCT)

The Neutral CT is used for ground fault protection when the 3 pole breaker is used on a 3 phase 4 wires system and for over current protection on N phase. Please use this CT in combination with ground fault protection (GFR). As for outline dimensions, refer to page 50. The length of the cable (attached) for NCT is 2m.

### Accessories

<table>
<thead>
<tr>
<th>ACB type name / CT rating</th>
<th>Applicable NCT type name</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE630-SW 630A</td>
<td>NCT06</td>
</tr>
<tr>
<td>AE1000-SW 1000A</td>
<td>NCT10</td>
</tr>
<tr>
<td>AE1250-SW 1250A</td>
<td>NCT12</td>
</tr>
<tr>
<td>AE1600-SW 1600A</td>
<td>NCT16</td>
</tr>
<tr>
<td>AE2000-SW 2000A</td>
<td>NCT20</td>
</tr>
<tr>
<td>AE2500-SW 2500A</td>
<td>NCT25</td>
</tr>
<tr>
<td>AE3200-SW 3200A</td>
<td>NCT32</td>
</tr>
<tr>
<td>AE4000-SWA 4000A</td>
<td>NCT40</td>
</tr>
</tbody>
</table>

As for outline dimensional drawing, refer to page 50.
Earth leakage protection (ER)

By combining the ETR with earth leakage protection (ER) and External ZCT, earth leakage protection is possible. Earth leakage protection, earth leakage tripping and earth leakage alarm can be selected. Control supply is necessary for this function.

<table>
<thead>
<tr>
<th>Setting item</th>
<th>Mark</th>
<th>Adjustable setting range</th>
<th>Accuracy</th>
<th>Factory default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ER pick-up current</td>
<td>Iₜₐₙ</td>
<td>1A-2A-3A-5A-10A</td>
<td>+0% -30%</td>
<td>10A</td>
</tr>
<tr>
<td>ER time</td>
<td>Te</td>
<td>3-1.5-0.8-0.5-0.3-0.15&lt;0.1 - &lt;0.1-0.15-0.3-0.5-0.8-1.5-3s (at 1.5 x Iₜₐₙ)</td>
<td>±20%</td>
<td>3s (TRIP)</td>
</tr>
<tr>
<td>alarm output</td>
<td>—</td>
<td>TRIP side : Self-holding/ALARM side : Automatic reset</td>
<td>—</td>
<td>TRIP side (Self-holding)</td>
</tr>
</tbody>
</table>

External ZCT

This option is used to detect several amperes of earth leakage when use in combination with an 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.

ZCT for load circuit

<table>
<thead>
<tr>
<th>ZCT type name</th>
<th>ACB type name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZCT163</td>
<td>AE630-SW - AE1600-SW 3-pole</td>
</tr>
<tr>
<td>ZCT323</td>
<td>AE630-SW - AE1600-SW 4-pole</td>
</tr>
<tr>
<td>ZCT324</td>
<td>AE2000-SW - AE3200-SW 3-pole</td>
</tr>
<tr>
<td></td>
<td>AE2000-SW - AE3200-SW 4-pole</td>
</tr>
</tbody>
</table>

As for outline dimensions refer to page 50. Make choice of suitable ZCT in conformity to the BUSBAR size.
Neutral pole overcurrent protection (operating at 100% of rated current) come already equipped with ETR as standard features.

But if you would like to operate at 50% of rated current on neutral pole, neutral pole 50% protection is available with this optional module unit.

### 2nd Additional Pre-alarm (AP)

The Pre-Alarm (1st) function already installed in standard breaker, the 2nd additional Pre-Alarm function can be installed as option, thereby it is possible to monitor (observer) electric circuit in more detail by 2nd additional Pre-Alarm function.

<table>
<thead>
<tr>
<th>Setting item</th>
<th>Mark</th>
<th>Adjustable setting range</th>
<th>Accuracy</th>
<th>Factory default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd Additional Pre-alarm pick-up current</td>
<td>Ip2</td>
<td>0.5-0.6-0.7-0.8-0.84-0.88-0.92-0.96-1.0 x Iu</td>
<td>±10% WS</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.5-0.6-0.7-0.8-0.84-0.88-0.92-0.96-1.0 x Iu</td>
<td>±5% WM</td>
<td></td>
</tr>
<tr>
<td>2nd Additional Pre-alarm time</td>
<td>Ts2</td>
<td>0.8-0.8-0.6-0.5-0.4-0.3 x Tl</td>
<td>±20%</td>
<td>0.9 (x Tl)</td>
</tr>
</tbody>
</table>

**Pre-alarm timing chart**

- **Current**
- **PAL LED** (Blinking)
- **PAL OUT** (contact output)
- **1/2 TL**

### Neutral pole 50% protection (N5)

Neutral pole overcurrent protection (operating at 100% of rated current) come already equipped with ETR as standard features.

But if you would like to operate at 50% of rated current on neutral pole, neutral pole 50% protection is available with this optional module unit.
Temperature alarm (TAL)

The electronic trip relay can be checked by this field test device when the breaker is at test position or disconnect position. The breaker will trip when tested with this device.

If TAL sensor is built in the breaker, temperature alarm is operative. When the temperature of main contact exceeds normal level, temperature alarm is indicated by LED on main setting module and also the output contact is made energize if power supply with output contact is installed.

It is possible to know temperature rising which is caused by wear of main contact because TAL sensor is installed near main contact. When the temperature of main contact goes down to the normal level, temperature alarm turns off automatically.

MCR switch (MCR-SW)

If MCR switch is built in the breaker and the dial for INST/MCR on Main setting module is set to the range of MCR position, MCR function is operative.

MCR function:
During a closing operation of the breaker, Instantaneous characteristics is operative.
And it becomes inoperative when the breaker is in the closed position.

Field test device (Y-2000)

The electronic trip relay can be checked by this field test device when the breaker is at test position or disconnect position. The breaker will trip when tested with this device.

Y-2000 specification

<table>
<thead>
<tr>
<th>TEST ITEM</th>
<th>LTD,STD,INST,GFR,PAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEST SIGNAL RANGE</td>
<td>1% ~ 2500%</td>
</tr>
<tr>
<td>OUTLINE DIMENSION</td>
<td>230(W) x 120(H) x 290(D)</td>
</tr>
<tr>
<td>TIMER</td>
<td>0.000 – 999.999s</td>
</tr>
<tr>
<td>POWER SUPPLY</td>
<td>100 – 240V AC 50 / 60Hz</td>
</tr>
</tbody>
</table>
Additional functions

By adding the extension module unit in ETR, additional functions like measuring, display and communication become available.

List of extension unit

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension module</td>
<td>EX1</td>
<td>Base module for display and interface function (indispensable)</td>
</tr>
<tr>
<td>Display module (relay attachment)</td>
<td>DP1</td>
<td>Display module for ETR</td>
</tr>
<tr>
<td>Display module (panel attachment)</td>
<td>DP2</td>
<td>Display module for panel board</td>
</tr>
<tr>
<td>VT unit</td>
<td>VT</td>
<td>Module for measuring of voltage, active power and active energy</td>
</tr>
<tr>
<td>CC-Link® interface unit</td>
<td>BIF-CC</td>
<td>Interface unit for CC-Link®</td>
</tr>
<tr>
<td>PROFIBUS-DP interface unit</td>
<td>BIF-PR</td>
<td>Interface unit for PROFIBUS-DP</td>
</tr>
<tr>
<td>MODBUS® (RS-485) interface unit</td>
<td>BIF-MD</td>
<td>Interface unit for MODBUS® (RS-485)</td>
</tr>
<tr>
<td>I/O unit</td>
<td>BIF-CON</td>
<td>Module for breaker remote control (Interface unit is required)</td>
</tr>
<tr>
<td>Drawout position switch</td>
<td>BIF-CL</td>
<td>Switch for detecting the drawout position of the breaker (Interface unit and I/O unit are required.)</td>
</tr>
</tbody>
</table>

Selection samples of additional function modules

- **Load current**
- **Voltage**
- **Power**
- **Energy**
- **Harmonics**
- **current etc.**

Electronic trip relay (ETR) type code

- **Main setting module**
- **Optional setting module**
- **Power supply**
  - P1: AC/DC100-240V
  - P2: DC24-60V
  - P3: AC100-240V / DC100-125V with output contact
  - P4: DC24-60V with output contact
  - P5: DC100-240V with output contact (SSR)

Additional function

- **Network**
- **Display**
- **Temperature alarm**
- **MCB switch**

Wire system (when EX1 is specified)

- 3Ø3W
- 3Ø4W
- Normal connection
- Inverse connection
Extension module (EX1)

This is the base module that provides various additional functions with combining Display module (DP1 / DP2), Interface unit (BIF-CC / BIF-PR / BIF-MD) and VT unit (VT).

1 Various measuring elements, high measuring accuracy
   By adopting high-performance ASIC, various measuring elements (load current, voltage, energy, harmonics, etc.) and high measuring accuracy are attained. Refer to page 34 for more details.

2 Communication function
   2 display modules and 1 interface unit can be connected simultaneously with its advanced internal communication.

Display module (DP1/DP2)

This is the module that displays and sets various information, for example, displays of measurement, trip and alarm, setting of output contacts and so on.

1 Multi display of measuring element
   It enables to easily monitor the comparison of each measuring element with its multi display (4 phases multi display of load current and voltage) on one screen.

2 Two-color back light
   Under trip or alarm, back light color changes from green to red automatically, which visually shows an abnormal situation.

3 Graphical display
   By adopting dot matrix type LCD, graphical display such as bar graph display of load current, harmonic currents and characteristic curve is available.

There are 2 types of display module. One is the ETR attachment type (DP1). Another is the panel attachment type (DP2), which can be connected to extension terminals of control circuit with 2m cable. 2 units of display modules (DP1 and DP2) can be attached on one breaker. (As for outline dimensions of DP2, refer to page 51.)

Note;
- Extension module (EX1) is required.
- VT unit (VT) is required to display the measured data except load current.

VT unit (VT)

VT unit enables to measure voltages, powers, energies, harmonic currents and etc. by connecting the ETR with Extension module (EX1). (outline dimensions are shown in page 52.)

Note;
- The length of the cable attached for VT unit is 2m.
These Interface units can expand the future possibility in various communication and Intelligent control.

1. Applicable to various open networks.
   These units are applicable to various open network systems such as CC-Link®, PROFIBUS-DP and MODBUS® (RS-485), which can be built in easily.

2. Intelligent control by Multi-data communication
   It comes into being the Intelligent control by Multi-data communication through these interface units to PLC/SCADA, which transfer the measurement Information, setting values, error information and trip and alarm informations.


By using various application softwares for PLC, users can also connect to the network SCADA system.

I/O unit (BIF-CON)

The Input & Output Controlling Unit (BIF-CON) is available for the remote controlling and remote monitoring of the breaker condition through the various network systems.

With this BIF-CON unit in addition to the Interface Unit, it become possible to control the breaker remotely, like a ON or OFF operations or Spring-charging.

### Function Description

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Breaker ON operation</td>
<td>1a contact for Closing coil (CC)</td>
</tr>
<tr>
<td></td>
<td>Breaker OFF operation</td>
<td>1a contact for Shunt trip device (SHT)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(not applicable for AC380-500V rating)</td>
</tr>
<tr>
<td></td>
<td>Spring charge</td>
<td>1a contact for Motor charging (MD)</td>
</tr>
<tr>
<td>Monitor</td>
<td>Digital Input (DI) monitoring</td>
<td>For BIF-CC and BIF-MD, Max. 3 contacts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>monitoring are available.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For BIF-PR, 1 contact monitoring is available.</td>
</tr>
</tbody>
</table>

Note: Some device types are excluded.

- Extension module (EX1) is required.
- VT unit (VT) is required to transmit the measured data except load current.

I/O unit (BIF-CON)

By using various application softwares for PLC, users can also connect to the network SCADA system.

Note: Some device types are excluded.

- Extension module (EX1) is required.
- VT unit (VT) is required to transmit the measured data except load current.

I/O unit (BIF-CON)

With this Drawout position switch (BIF-CL) in addition to Interface unit and I/O unit (BIF-CON), the remote monitoring of draw-out position become available in case of the breaker draw-out type.
<table>
<thead>
<tr>
<th>Type</th>
<th>➀</th>
<th>➁</th>
<th>➂</th>
<th>Note 1</th>
<th>➀</th>
<th>➁</th>
<th>➂</th>
<th>Note 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>① Main setting module</td>
<td>WS</td>
<td>WM</td>
<td>WB</td>
<td>;EX1,DP1,DP2</td>
<td>WS</td>
<td>WM</td>
<td>WB</td>
<td>;EX1,DP1,DP2,VT</td>
</tr>
<tr>
<td>② Optional setting module</td>
<td>NA</td>
<td>AP</td>
<td>G1</td>
<td>E1</td>
<td>NA</td>
<td>AP</td>
<td>G1</td>
<td>E1</td>
</tr>
<tr>
<td>Power supply</td>
<td>P1–P5</td>
<td>P1–P5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Measurement
- Load current (±2.5%)
- Leakage current (±15%)
- Power (active, reactive, apparent) (±2.5%)
- Power factor (±5%)
- Energy (active, reactive) (±2.5%)
- Frequency (±2.5%)
- Voltage (±2.5%)
- Harmonics current (±2.5%)
- Trip history
- Power (active, reactive, apparent) (±2.5%)
- Power factor (±5%)
- Energy (active, reactive) (±2.5%)
- Frequency (±2.5%)

### Trip history
- LTD
- STD
- INST
- GFR
- ER
- UVT

### Alarm history
- PAL1
- PAL2
- OVER
- GFR
- EPAL
- ER

### Characteristic setting (panel attachment product [DP2] only)
- LTD
- STD
- INST
- PAL1
- PAL2
- GFR
- EPAL
- ER

### Setting
- Contact outputs setting change
- Date & Time
- Demand time
- Alarm holding method

### Reset
- Trip and alarm information
- Measurement information (min. and max. values)
- ETR information
- Main / Optional setting module information
- Error information
- CT rating (In)
- Phase line method
- Normal connection or reverse connection

---

**Note 1**: 2 units of display modules can be attached.
**Note 2**: Display is available only when UVT module is attached.
**Note 3**: Display is available only when TAL sensor is attached.
**Note 4**: Included the accuracy of ZCT.
Electronic trip relay circuit diagram

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 air core coil which has good linearity is achieved.

3. **Power supply circuit**
   This part convert power supply CT energy to constant voltage for respective circuits in the ETR.

4. **ASIC**
   This amplifies signal detected by the current sensor coil, and detects ground fault current by vector composition.

5. **Microprocessor**
   The microprocessor integrates each phase current waveforms from the ASIC and performs processing for overcurrent protection and others.

6. **Characteristic setting module**
   The module for the characteristic setting of the ETR.

7. **Several LEDs**
   The load current LED give a figure of current in percent by CT energy.
   Trip indicator and pre-alarm are indicated by control power supply.
   RUN and ERR. LED indicate breaker’s condition by control power supply or ten-odd percent of CT energy.

8. **Power supply with contact output**
   This outputs contact signal at fault cause (including pre-alarm) and at other alarms.
   A control supply is necessary for this function.
Setting procedure

1. Prepare a small flat tipped screwdriver.

   ![Side view of the flat tip]

2. Insert the flat tipped screwdriver into the opening of the ETR cover. Then, lightly turn the screwdriver to the upside as shown in the left figure, and the ETR cover will open.

3. There are two kinds of switches for characteristics setting and for trip indicator reset. They should be used as follows.

   ① Adjustable in steps
   Rotary code switch is used. Do not set the switch at points between steps. The setting value is same when the switch is positioned at the thick line. (Set the switch with a torque of 0.02N·m or below.)

   ② Push-button
   This is for temporary operation, and press it with force of 3N or less.

4. When the characteristic is set up, use a device like a field tester, etc to make sure that the required characteristic has been set.

5. At sealing, seal the ETR cover by using the sealing hole at the top of the ETR cover.
The following diagram shown accessories fully equiped.

Terminal description

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I3</td>
<td>14</td>
<td>S3</td>
<td>S4</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>12</td>
<td>S1</td>
<td>S2</td>
<td></td>
</tr>
<tr>
<td>U1</td>
<td>U2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>413</td>
<td>414</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D1</td>
<td>D2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DT1</td>
<td>DT2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1</td>
<td>A2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1</td>
<td>C2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>97</td>
<td>98</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1</td>
<td>P2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RS1</td>
<td>RS2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>513</td>
<td>524</td>
<td>574</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z1</td>
<td>Z2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N1</td>
<td>N2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Accessory Symbols

- **SHT**: Shunt tripping device
- **CC**: Closing coil
- **M**: Motor (Motor charging device)
- **UVT**: UVT coil
- **AX**: Auxiliary switch
- **AL**: OCR alarm switch
- **CLS**: Charge limit switch
- **SBC**: Shorting b-contact
- **CL**: Cell switch

Terminal description:

- **I3 14 S3 S4**: Auxiliary switch "a"
- **11 12 S1 S2**: Auxiliary switch "b"
- **U1 U2**: Motor charging
- **413 414**: Charged signal
- **D1 D2**: Voltage Input terminal of UVT
- **DT1 DT2**: Trip terminal of UVT (Remote trip)
- **A1 A2**: Closing coil
- **C1 C2**: Shunt trip
- **97 98**: OCR alarm
- **P1 P2**: Power supply for ETR
- **P4**: FG of power supply (FG:Frame Ground)
- **RS1 RS2**: Alarm reset (Trip cause LED, alarm contact)
- **513 524 574**: Alarm contacts
- **Z1 Z2**: For external ZCT
- **N1 N2**: For Neutral CT (Note)
- **Extension terminals**: For external display DP2

Electrical operation circuit

**Note:** Do not connect the NCT type CW-40LM (for AE-SS series).
OCR alarm (AL)

The contact output of the OCR alarm (Standard type AL) is the one-pulse output and the output time is 30~50ms. For this reason, this output needs self-holding circuit.

As CC is one-pulse driven, it is not necessary to insert AXb for burning prevention purposes. Inserting AXb will cause anti-pumping function to be ineffective.

When a coil load is connected in the same control circuit as the ETR, surge absorbers are required to absorb the surge voltage.

Under voltage trip device (UVT)

Use the switch that can open and close DC150V, 0.5A to remote trip. Remote trip terminal has short bar at shipment, so remove it before using this function. Disconnect the voltage input wires during dielectric testing of main circuit.

Closing coil (CC)

As CC is one-pulse driven, it is not necessary to insert AXb for burning prevention purposes. Inserting AXb will cause anti-pumping function to be ineffective.

Alarm contacts 573, 524, 574 are also reset by removing PT, PF power supply voltage. (longer than 1sec.)
Outline dimensions

Drawout type AE630-SW, AE1000-SW, AE1250-SW, AE1600-SW

Front view

Side view

Rear view

Main circuit terminal dimension

* : Mounting pitch
The numerals shown in parentheses are for 3 poles.
Drawout type AE2000-SWA

Front view

Side view

Rear view

Main circuit terminal dimension
Outline dimensions

Drawout type AE2000-SW, AE2500-SW, AE3200-SW

Front view

Side view

Rear view

Main circuit terminal dimensions

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

Dimensions (mm)

<table>
<thead>
<tr>
<th>Type</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE2000-SW AE2500-SW</td>
<td>20</td>
</tr>
<tr>
<td>AE3200-SW</td>
<td>25</td>
</tr>
</tbody>
</table>

Dimensions (mm)

<table>
<thead>
<tr>
<th>Type</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE2000-SW AE2500-SW</td>
<td>95</td>
</tr>
<tr>
<td>AE3200-SW</td>
<td>103</td>
</tr>
</tbody>
</table>
**Drawout type AE4000-SWA**

**Front view**

Operating panel center

240 228 325(195)

Control terminal

(M3.5 screw)

Neutral pole

239 324 (194)

Aperture for
the drawout handle

200 4.14

**Side view**

Disconnected

3P 4P

Front face of control terminal

Earth terminal

M8 screw

Connecting busbar size

All poles: T10xW150x4BUS/pole

Panel

430

Lifting hook hole

340 15 1826

125 125

283 23

Test

54

Inside of the panel (thickness 1.6–3.2)

**Rear view**

Operating panel center

23

3P 4P

Outline of breaker

Neutral pole

52 10

Note) Spacers are not required when fastening connecting conductors (T10). The necessary contact area can be obtained with ACB terminal bent by tightening the screw.

**Main circuit terminal dimension**

Connecting area

48

20

5.1+13.5

42
Outline dimensions

Drawout type AE4000-SW, AE5000-SW, AE6300-SW

**Front view**

- Operating panel center: 373.5
- Control terminals (M3.5 screw): 588.5 (458.5)
- Neutral pole: 610 (480)
- Drawout handle radius 100
- Aperture for the drawout handle

**Side view**

- Front face of control terminal: 283
- Test: 35
- Panel: 400
- Lifting hook hole: 220
- Earth terminal M8 screw: 172
- Inside of the panel (thickness 1.6~3.2)
- Fully drawout position

**Rear view**

- Operating panel center: *382
- 2-M12 for mounting
- Mounting angle (non-magnetic steel)
- Outline of breaker

**Main circuit terminal dimension**

<table>
<thead>
<tr>
<th>Type</th>
<th>W</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE4000-SW</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>AE5000-SW</td>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>AE6300-SW</td>
<td>100</td>
<td>25</td>
</tr>
</tbody>
</table>

**4P FN type**

- Operating panel center: 503.5
- Control terminals (M3.5 screw): 588.5
- Neutral pole: 610
- Drawout handle radius 100
- Aperture for the drawout handle

**Side view**

- Side view dimensions are same as 3 pole.

The mounting angle should be prepared by the customer.

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

4P: 4P FN type

- Fixing bolts: 2-M12
- 6-M12
- 8-M12
- 10-M12
- M12 Weld nut
- Test
- Disconnected 54
Fixed type AE630-SW, AE1000-SW, AE1250-SW, AE1600-SW

Front view

Operating panel center

Control terminal (M3.5 screw)

Neutral pole

Earth terminal M8 screw (Left side)

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

Side view

Panel

Earth terminal M8 screw (Left side)

Inside of the panel (thickness 1.6~3.3)

Rear view

Operating panel center

Neutral pole

Outline of breaker

Main circuit terminal dimension

Connecting area

2φ13

3φ85

17

38
Outline dimensions

Fixed type AE2000-SWA

Front view

Side view

Rear view

Main circuit terminal dimension

* : Mounting pitch
The numerals shown in parentheses are for 3 poles.
Fixed type AE2000-SW, AE2500-SW, AE3200-SW

Front view

- Operating panel center
- Control terminal (M3.5 screw)
- Earth terminal M8 screw (Left side)

Side view

- Panel
- Earth terminal M8 screw (Left side)

Rear view

- Operating panel center
- Neutral pole

Main circuit terminal dimension

- Connecting area

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

Fixed type AE2000-SW, AE2500-SW, AE3200-SW
Outline dimensions

**Fixed type AE4000-SWA**

### Front view

- Operating panel center
- Control terminal (M3.5 screw)
- Neutral pole
- Earth terminal M8 screw (Left side)
- Connecting busbar size
  - All poles: T10xW150x3BUS/pole

### Side view

- Operating panel center
- Connecting busbar size
  - All poles: T10xW150x3BUS/pole
- Earth terminal M8 screw (Left side)
- Inside of the panel (thickness 1.6~3.2)

### Rear view

- Operating panel center
- Neutral pole
- Outline of breaker

**Note:** Spacers are not required when fastening connecting conductors (T10). The necessary contact area can be obtained with ACB terminal bent by tightening the screw.

### Main circuit terminal dimension

- Connecting area
- 5 x 13.5

The numerals shown in parentheses are for 3 poles.
Fixed type AE4000-SW, AE5000-SW, AE6300-SW

Front view

- Operating panel center
- Control terminals (M3.5 screw)
- Neutral pole

Side view

- Bus bar
- Panel
- Earth terminal M8 screw (Left side)

Rear view

- Operating panel center
- Outline of breaker

Main circuit terminal dimension

- Connecting area

4P FN type

Front view

- Earth terminal M8 screw (Left side)
- Operating panel center
- Control terminals (M3.5 screw)

Rear view

- Neutral pole
- Operating panel center

Side view dimensions are same as 3 pole.

* : Mounting pitch
The numerals shown in parentheses are for 3 poles.
### Outline dimensions

#### Panel cut-out, Drawout handle, Terminal adapter

**Panel cut-out dimensions**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE2000-SW,2500-SW</td>
<td>20</td>
</tr>
<tr>
<td>AE3200-SW</td>
<td>25</td>
</tr>
</tbody>
</table>

**Door frame panel cut-out dimensions**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE630-SW~1600-SW</td>
<td>20</td>
</tr>
<tr>
<td>AE2000-SW~3200-SW</td>
<td>25</td>
</tr>
</tbody>
</table>

**Outline**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>(mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>C</td>
</tr>
<tr>
<td>AE630-SW~1600-SW</td>
<td>Fixed type</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>AE2000-SW~3200-SW</td>
<td>Fixed type</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drawout type</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Vertical terminal adapter

**AE630~1600-SW**

**AE2000~3200-SW**

**Front terminal adapter**

**AE630~1600-SW**

**AE2000~3200-SW**

#### Condenser trip device (COT)

---

**Drawout handle dimensions**

**Condenser trip device (COT)**
Neutral CT (NCT), External ZCT

Neutral CT (NCT)

External ZCT for transformer ground wire

External ZCT for load circuits
Outline dimensions

UVT external unit

UVT external unit (AC380 ~ 460V)

Display onto panel board (DP2)

Note : Use the panel of thickness 1mm ~ 3.2mm.

ETR external units

Panel attachment metal
Fixed screw M3

Panel attachment metal
DP2 connection cable connection position (connector)

Panel (Note) Note : Use the panel of thickness 1mm ~ 3.2mm.

Operation display surface side
Surface plate hole dimension

CC-Link®, MODBUS® interface unit (BIF-CC, BIF-MD)

M3 terminal screws
35mm IEC rail holder

Power supply (100-240V AC-DC)

Power supply (100-240V AC-DC)
I/O unit (BIF-CON)

PROFIBUS-DP interface unit (BIF-PR)

VT unit (VT)

Disconnect the voltage input wires during dielectric testing of main circuit.
Pre-cautions when making connections

Use M12 bolts, plain washers, and spring lock washers to connect the conductor. There are various size plain washers, but use 24mm or smaller outside diameter washers. The washers may overlap if too large washers are used. It is recommended to apply silver plating on the contact surface of the conductor which is used to connect with the terminal of circuit breakers in order to prevent the increase of contact resistance due to moisture, etc. Tin plating or nickel plating may be applied, but quickly connect with the circuit breaker terminal if nickel plating is applied because nickel plating is less resistant to sulfur dioxide gas.

Clean the contact surface and securely tighten the bolts with a correct torque (M12: 40 to 50 Nm).

The terminal which is applicable to connect the conductor is different depending on the shape of the terminal. Refer to the outline dimensions of P.39 to P.46.

Since fault current flowing through the conductors cause large electromagnetic forces, the conductors should be secured firmly, using the values in the below table as a reference. Max distance between fixing support and ACB bus bar should be less than 200mm.

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Conductor distance (mm)</th>
<th>Conductor size (AE630-SW)</th>
<th>Conductor size (AE1600-SW)</th>
<th>Conductor size (AE2000-SWA)</th>
<th>Conductor size (AE4000-SWA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drawout type</td>
<td>85</td>
<td>115</td>
<td>105</td>
<td>130</td>
<td>190</td>
</tr>
<tr>
<td>Drawout type</td>
<td>42(0.2)</td>
<td>15100</td>
<td>11200</td>
<td>12200</td>
<td>9900</td>
</tr>
<tr>
<td>Drawout type</td>
<td>50(0.2)</td>
<td>21400</td>
<td>15800</td>
<td>17300</td>
<td>14000</td>
</tr>
<tr>
<td>Drawout type</td>
<td>65(0.2)</td>
<td>36100</td>
<td>26700</td>
<td>29300</td>
<td>23800</td>
</tr>
<tr>
<td>Drawout type</td>
<td>75(0.2)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>31500</td>
</tr>
<tr>
<td>Drawout type</td>
<td>85(0.2)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>40400</td>
</tr>
<tr>
<td>Drawout type</td>
<td>100(0.2)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Drawout type</td>
<td>130(0.2)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Conductor size (IEC 60947-1: Ambient 40°C Temp., Open air)

<table>
<thead>
<tr>
<th>Rated current Max.(A)</th>
<th>Connecting conductors (copper bus bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Arrangement</td>
</tr>
<tr>
<td>630</td>
<td>2</td>
</tr>
<tr>
<td>1000</td>
<td>2</td>
</tr>
<tr>
<td>1250</td>
<td>2</td>
</tr>
<tr>
<td>1600</td>
<td>2</td>
</tr>
<tr>
<td>2000</td>
<td>3</td>
</tr>
<tr>
<td>2500</td>
<td>4</td>
</tr>
<tr>
<td>3150(3200)*1</td>
<td>3</td>
</tr>
<tr>
<td>4000 (AE4000-SWA)</td>
<td>4</td>
</tr>
<tr>
<td>4000 (AE4000-SWA)</td>
<td>4</td>
</tr>
<tr>
<td>5000</td>
<td>4</td>
</tr>
<tr>
<td>6300</td>
<td>4</td>
</tr>
</tbody>
</table>

*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 3150A. In case of more than 3200A, conductor sizes are not defined in IEC 60947-1.
Insulation distance

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

Note1: On the fixed type, maintenance is possible with following clearance.

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Type</th>
<th>AE630-SW~AE3200-SW</th>
<th>AE2000-SWA</th>
<th>AE4000-SWA</th>
<th>AE4000-SW~AE6300-SW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable voltage</td>
<td>AC600V or less</td>
<td>AC660V, 690V</td>
<td>AC690V or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed type</td>
<td>A (Note 1)</td>
<td>0</td>
<td>(Note 1)100</td>
<td>(Note 1)200</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B (Note 3)</td>
<td>50</td>
<td>(Note 3)50</td>
<td>(Note 3)50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>162</td>
<td>162</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D (Note 2)</td>
<td>50</td>
<td>(Note 2)50</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Drawout type</td>
<td>A (Note 1)</td>
<td>0</td>
<td>(Note 1)100</td>
<td>(Note 1)200</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B (Note 3)</td>
<td>50</td>
<td>(Note 3)50</td>
<td>(Note 3)50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>240</td>
<td>240</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D (Note 2)</td>
<td>50</td>
<td>(Note 2)50</td>
<td>200</td>
<td></td>
</tr>
</tbody>
</table>

Note1: 300mm or more clearance is necessary to inspect the arc-extinguishing chamber and contacts.  
Note2: The wiring space required for the control terminal block.  
Note3: When using mechanical interlock, door interlock, etc., dimension B becomes larger.

Service conditions

1. Normal service condition

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 temperature
   A range of max. +40°C to min. -5°C is recommended. And 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 must be 85% or less at max. temp. +40°C. Do not use and store in atmospheres with sulfide gas and ammonia gas etc. (H₂S ≤ 0.01ppm, SO₂ ≤ 0.1ppm, NH₃ < 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. Storage temperature
   A range of max. +60°C to min. -20°C is recommended to be stored. And the average over 24 hours must not exceed +35°C.

6. Guideline for replacement
   Within approx. 15 years. Please refer to the instruction manual.

2. Special service conditions

In case of special service condition, service life may become shorter in some cases.

1. Special environmental conditions
   High temperature and/or high humidity  
   Corrosive gas

2. High ambient temperature
   If the ambient temperature exceeds +40°C, the uninterrupted current rating will be reduced. Since the derating value is different depending on the applicable standard, refer to P56.

3. High altitude
   Since the heat radiation rate is reduced for use at the 2,000m or higher, accordingly the operating voltage, continuous current capacity and breaking capacity are derated. Moreover the insulation durability is also decreased owing to the atmospheric pressure. Please inquire us for further detail.
<table>
<thead>
<tr>
<th>Type</th>
<th>Connection</th>
<th>Internal resistance (mΩ)</th>
<th>Reactance (mΩ)</th>
<th>Power consumption (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE630-SW</td>
<td>Fixed type</td>
<td>0.028</td>
<td>0.059</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Drawout type</td>
<td>0.042</td>
<td>0.089</td>
<td>17</td>
</tr>
<tr>
<td>AE1000-SW</td>
<td>Fixed type</td>
<td>0.026</td>
<td>0.060</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Drawout type</td>
<td>0.040</td>
<td>0.091</td>
<td>40</td>
</tr>
<tr>
<td>AE1250-SW</td>
<td>Fixed type</td>
<td>0.024</td>
<td>0.060</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>Drawout type</td>
<td>0.038</td>
<td>0.091</td>
<td>60</td>
</tr>
<tr>
<td>AE1600-SW</td>
<td>Fixed type</td>
<td>0.016</td>
<td>0.063</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Drawout type</td>
<td>0.030</td>
<td>0.095</td>
<td>77</td>
</tr>
<tr>
<td>AE2000-SWA</td>
<td>Fixed type</td>
<td>0.016</td>
<td>0.063</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>Drawout type</td>
<td>0.025</td>
<td>0.095</td>
<td>100</td>
</tr>
<tr>
<td>AE2000-SW</td>
<td>Fixed type</td>
<td>0.010</td>
<td>0.047</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Drawout type</td>
<td>0.020</td>
<td>0.071</td>
<td>80</td>
</tr>
<tr>
<td>AE2500-SW</td>
<td>Fixed type</td>
<td>0.008</td>
<td>0.047</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Drawout type</td>
<td>0.018</td>
<td>0.071</td>
<td>113</td>
</tr>
<tr>
<td>AE3200-SW</td>
<td>Fixed type</td>
<td>0.007</td>
<td>0.048</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>Drawout type</td>
<td>0.014</td>
<td>0.072</td>
<td>143</td>
</tr>
<tr>
<td>AE4000-SWA</td>
<td>Fixed type</td>
<td>0.009</td>
<td>0.048</td>
<td>144</td>
</tr>
<tr>
<td></td>
<td>Drawout type</td>
<td>0.015</td>
<td>0.072</td>
<td>240</td>
</tr>
<tr>
<td>AE4000-SW</td>
<td>Fixed type</td>
<td>0.010</td>
<td>0.038</td>
<td>160</td>
</tr>
<tr>
<td></td>
<td>Drawout type</td>
<td>0.013</td>
<td>0.062</td>
<td>210</td>
</tr>
<tr>
<td>AE5000-SW</td>
<td>Fixed type</td>
<td>0.009</td>
<td>0.038</td>
<td>225</td>
</tr>
<tr>
<td></td>
<td>Drawout type</td>
<td>0.011</td>
<td>0.062</td>
<td>275</td>
</tr>
<tr>
<td>AE6300-SW</td>
<td>Fixed type</td>
<td>0.008</td>
<td>0.038</td>
<td>318</td>
</tr>
<tr>
<td></td>
<td>Drawout type</td>
<td>0.0085</td>
<td>0.062</td>
<td>340</td>
</tr>
</tbody>
</table>

The above values are applicable for one pole. (at brandnew product)
### Deratings by ambient temperature

<table>
<thead>
<tr>
<th>Standard</th>
<th>IEC60947-2, BS, JIS C 8201-2-1 (Standard:40°C)</th>
<th>IEC60947-2, BS, JIS C 8201-2-1 (Standard:45°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient Temperature</td>
<td>40°C</td>
<td>45°C</td>
</tr>
<tr>
<td>AE630-SW</td>
<td>630</td>
<td>630</td>
</tr>
<tr>
<td>AE1000-SW</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>AE1250-SW</td>
<td>1250</td>
<td>1250</td>
</tr>
<tr>
<td>AE1600-SW</td>
<td>1600</td>
<td>1600</td>
</tr>
<tr>
<td>AE2000-SWA</td>
<td>2000</td>
<td>2000</td>
</tr>
<tr>
<td>AE2500-SW</td>
<td>2500</td>
<td>2500</td>
</tr>
<tr>
<td>AE3200-SW</td>
<td>3200</td>
<td>3200</td>
</tr>
<tr>
<td>AE4000-SWA</td>
<td>4000</td>
<td>4000</td>
</tr>
<tr>
<td>AE4000-SW</td>
<td>4000</td>
<td>4000</td>
</tr>
<tr>
<td>AE5000-SW</td>
<td>5000</td>
<td>5000</td>
</tr>
<tr>
<td>AE6300-SW</td>
<td>6300</td>
<td>6300</td>
</tr>
</tbody>
</table>

With Extension module, Display and Network

In case extension module (EX1), display (DP1) and network are attached, the following derating values shown in this table are applied.

<table>
<thead>
<tr>
<th>Standard</th>
<th>IEC60947-2, BS, JIS C 8201-2-1 (Standard:40°C)</th>
<th>IEC60947-2, BS, JIS C 8201-2-1 (Standard:45°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient Temperature</td>
<td>40°C</td>
<td>45°C</td>
</tr>
<tr>
<td>AE630-SW</td>
<td>630</td>
<td>630</td>
</tr>
<tr>
<td>AE1000-SW</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>AE1250-SW</td>
<td>1250</td>
<td>1250</td>
</tr>
<tr>
<td>AE1600-SW</td>
<td>1600</td>
<td>1600</td>
</tr>
<tr>
<td>AE2000-SWA</td>
<td>2000</td>
<td>1900</td>
</tr>
<tr>
<td>AE2500-SW</td>
<td>2500</td>
<td>2500</td>
</tr>
<tr>
<td>AE3200-SW</td>
<td>3200</td>
<td>3200</td>
</tr>
<tr>
<td>AE4000-SWA</td>
<td>4000</td>
<td>3800</td>
</tr>
</tbody>
</table>

The above table shows the maximum rated current per each ambient temperature for drawout type breaker with vertical connection (at brandnew product), when breaker and bus bar are installed in open air. Connection bus bar is according to IEC60947-1. For AE3200-SW, AE4000-SWA, AE4000-SW, AE5000-SW and AE6300-SW, it is required to follow the manufacturer recommended size shown in Page 53. As for ambient temperature exceeding 60°C, please inquire us.
AE-SW Series air circuit breakers provide easy selective co-ordination with branch circuit breakers. For selective co-ordinations, refer to the following table.

**AC230V sym kA**

### Discrimination table

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AE2000-CW</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
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<td>200</td>
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<td>200</td>
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<tr>
<td>AE2500-CW</td>
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<td>300</td>
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<td>300</td>
<td>300</td>
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</tr>
<tr>
<td>AE3200-CW</td>
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<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>AE4000-CW</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
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<td>500</td>
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<tr>
<td>AE5000-CW</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>AE6300-CW</td>
<td>700</td>
<td>700</td>
<td>700</td>
<td>700</td>
<td>700</td>
<td>700</td>
<td>700</td>
<td>700</td>
<td>700</td>
<td>700</td>
<td>700</td>
<td>700</td>
</tr>
</tbody>
</table>

* The values in the table represent the max. rated current for both Series AE-SW air circuit breakers and branch breakers, and the selective co-ordination applies when the AE-SW series air circuit breakers instantaneous pick up is set to maximum.

* The numerals shown in parentheses are for AE-SW with MCR (When set MCR).
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AE-300-SW</td>
<td>65</td>
<td>66</td>
<td>66</td>
<td>65</td>
<td>65</td>
<td>86</td>
<td>86</td>
<td>85</td>
<td>85</td>
<td>130</td>
</tr>
<tr>
<td>AE-1000-SW</td>
<td>65</td>
<td>66</td>
<td>66</td>
<td>65</td>
<td>65</td>
<td>86</td>
<td>86</td>
<td>85</td>
<td>85</td>
<td>130</td>
</tr>
<tr>
<td>AE-1250-SW</td>
<td>65</td>
<td>66</td>
<td>66</td>
<td>65</td>
<td>65</td>
<td>86</td>
<td>86</td>
<td>85</td>
<td>85</td>
<td>130</td>
</tr>
<tr>
<td>AE-1600-SW</td>
<td>65</td>
<td>66</td>
<td>66</td>
<td>65</td>
<td>65</td>
<td>86</td>
<td>86</td>
<td>85</td>
<td>85</td>
<td>130</td>
</tr>
<tr>
<td>AE-2000-SW</td>
<td>65</td>
<td>66</td>
<td>66</td>
<td>65</td>
<td>65</td>
<td>86</td>
<td>86</td>
<td>85</td>
<td>85</td>
<td>130</td>
</tr>
<tr>
<td>AE-2500-SW</td>
<td>65</td>
<td>66</td>
<td>66</td>
<td>65</td>
<td>65</td>
<td>86</td>
<td>86</td>
<td>85</td>
<td>85</td>
<td>130</td>
</tr>
<tr>
<td>AE-3200-SW</td>
<td>65</td>
<td>66</td>
<td>66</td>
<td>65</td>
<td>65</td>
<td>86</td>
<td>86</td>
<td>85</td>
<td>85</td>
<td>130</td>
</tr>
<tr>
<td>AE-4000-SW</td>
<td>65</td>
<td>66</td>
<td>66</td>
<td>65</td>
<td>65</td>
<td>86</td>
<td>86</td>
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<td>85</td>
<td>130</td>
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<tr>
<td>AE-5000-SW</td>
<td>65</td>
<td>66</td>
<td>66</td>
<td>65</td>
<td>65</td>
<td>86</td>
<td>86</td>
<td>85</td>
<td>85</td>
<td>130</td>
</tr>
<tr>
<td>AE-6300-SW</td>
<td>65</td>
<td>66</td>
<td>66</td>
<td>65</td>
<td>65</td>
<td>86</td>
<td>86</td>
<td>85</td>
<td>85</td>
<td>130</td>
</tr>
</tbody>
</table>

* The values in the table represent the max. rated current for both Series AE-SW air circuit breakers and branch breakers, and the selective co-ordination applies when the AE-SW series air circuit breaker instantaneous trip up is set to maximum.

* The numerals shown in parentheses are for AE-SW with MCR (When set MCR).
Ordering information for Mitsubishi AE-SW series air circuit breaker (General use…WS Type, Special use…WB Type)

<table>
<thead>
<tr>
<th>Customer(name)</th>
<th>Order No.</th>
<th>Number of units</th>
<th>units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>AE 1600-SW</td>
<td>AE 1600-SWA</td>
<td></td>
</tr>
<tr>
<td>Number of poles</td>
<td>3P</td>
<td>4P</td>
<td></td>
</tr>
<tr>
<td>Number rating</td>
<td>40</td>
<td>4P</td>
<td></td>
</tr>
<tr>
<td>CT rating</td>
<td>60947-2</td>
<td>60947-2</td>
<td></td>
</tr>
<tr>
<td>Applicable standard</td>
<td>IEC</td>
<td>IEC</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>40°C</td>
<td>40°C</td>
<td></td>
</tr>
<tr>
<td>Reset type</td>
<td>Automatic Reset</td>
<td>Manual Reset(MRE)</td>
<td></td>
</tr>
<tr>
<td>Main circuit terminal</td>
<td>Horizontal terminal</td>
<td>Vertical terminal</td>
<td></td>
</tr>
<tr>
<td>Terminal adapter</td>
<td>Vertical terminal</td>
<td>Vertical terminal</td>
<td></td>
</tr>
<tr>
<td>Terminal cover</td>
<td>Horizontal terminal</td>
<td>Vertical terminal</td>
<td></td>
</tr>
<tr>
<td>Door interlock</td>
<td>Front terminal adapter</td>
<td>Horizontal terminals</td>
<td></td>
</tr>
<tr>
<td>Door frame</td>
<td>Can be connected to the Horizontal terminals.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Electronic trip relay (ETR)**

**Main setting module**

- **Type**
  - WST
  - G1
  - P1
- **WS1, WS2, WS3, WS4, WS5, WS6**
  - AE600-SW
  - AE400-SW
  - AE200-SW
  - AE200-SWA
  - AE400-SWA
  - AE600-SWA
- **WS7, WB1, WB2**
  - AE200-SW
  - AE200-SWA
  - AE400-SWA
  - AE600-SWA

**Optional setting module**

- **P1**
  - G1: Ground fault protection
  - N5: Neutral pole 50% protection
  - E1: Earth leakage protection
  - AP: 2nd Additional Pre-alarm
  - NA: Without optional setting

**Power supply**

- P1: AC100–110V
- P2: DC24–48V
- P3: AC100–125V / DC100–125V
- P4: DC24–48V with output contact
- P5: DC100–240V with output contact

**Condenser trip device**

- **COT**
  - AC100–110V
  - AC200–220V

**Electrical accessories**

- **Standard (AX)**
  - 2 or 4 or 6 or 8 or 10
  - 2 or 4 or 6 or 8 or 10
- **High capacity (HAX)**
  - 2 or 4 or 6 or 8 or 10
- **Motor charging (MD)**
  - AC – DC100–125V
  - AC – DC24V
  - AC – DC48V
- **Closing coil (CC)**
  - AC – DC125V
  - DC24–48V
- **Shunt trip device (SHT)**
  - AC – DC125V
  - AC – DC380–500V
  - AC – DC24–48V
- **Under voltage trip device (UVT)**
  - AC100–240V
  - AC380–460V
  - DC24V
  - DC48V
  - DC110–125V
  - DC120–125V
- **Time delay**
  - Inst(IST)
  - 0.5s(05)
  - 3.0s(30)

**Mechanical accessories**

- **Push button cover (BC-L)**
  - Counter (CNT)
  - Cylinder lock (CYL)
  - Door interlock (DI)
  - Terminal cover (TC)
  - Door frame (DF)
  - Dust cover (DUC)
  - Interphase barrier (BA)
  - Mechanical interlock (MI)
  - Bare (ETR not required)
  - Shunt trip device
  - Crossing coil (CC)
  - Motor charging (MD)
  - Under voltage trip device (SHT)
  - Condenser trip device (COT)

**Drawout type accessories**

- **Cell switch (CL)**
  - 1 or 2 or 3 or 4
- **Shunting b-contact (SBC)**
  - 1 or 2 or 3 or 4
- **Lifting hooks (HP)**
  - Shutter lock (SST-LOCK)
  - Mis-insertion preventor (MIP)
  - Test jumper (TJ)

**Order Issuer**

*Remark*

- Remark 1
- Remark 2
- Remark 3
- Remark 4
- Remark 5
- Remark 6
- Remark 7
- Remark 8
- Remark 9
- Remark 10
- Remark 11
- Remark 12
- Remark 13
- Remark 14
- Remark 15

*Note1*: In case of AE600-SW and AE2000-SW Low rating type, please specify CT rating. Refer to Page 9 and Page 20.

*Note2*: There is a case to be derated by ambient temperature. Refer to Page 54.

*Note3*: As for the terminal for AE2000-SWA, AE4000-SWA and AE4000-SW~AE6300-SW, Vertical terminal type only is available. (FIX-VT or DR-VT)

*Note4*: Refer to Page 11 and Page 39–46.

*Note5*: This setting is available for change by customer later. A preliminary setting of CL at factory shipment is as follows:

- **CL1**: 1C
- **CL2**: 1C
- **CL3**: 1C
- **CL4**: 2C1T1D

*Note6*: Not available for AE600-SW with CT rating : 250A or 315A or 500A.

*Note7*: Not available for WB1, WB2 and WB3 Main setting module.

*Note8*: Neutral CT is required for Ground fault or Neutral pole protection, when 3 Pole breaker is used for 3 phase 4 wire system.

*Note9*: Neutral CT is required for Ground fault or Neutral pole protection, when 3 Pole breaker is used for 3 phase 4 wire system.

*Note10*: In case of Earth leakage protection, it is required External ZCT.

*Note11*: Not available for AE4000-SWA 4P and AE4000-SW~AE6300-SW.

*Note12*: The combined installation of DI and MI3 is not available.

*Note13*: Supply connect to the top terminals.

*Note14*: Supply connect to the bottom terminals.

*Note15*: Current capacity of the neutral poles

*Remark 1*: In case of AE600-SW and AE2000-SW Low rating type, please specify CT rating. Refer to Page 9 and Page 20.

*Remark 2*: There is a case to be derated by ambient temperature. Refer to Page 54.

*Remark 3*: As for the terminal for AE2000-SWA, AE4000-SWA and AE4000-SW~AE6300-SW, Vertical terminal type only is available. (FIX-VT or DR-VT)


*Remark 5*: This setting is available for change by customer later. A preliminary setting of CL at factory shipment is as follows:

- **CL1**: 1C
- **CL2**: 1C
- **CL3**: 1C
- **CL4**: 2C1T1D

*Remark 6*: Not available for AE600-SW with CT rating : 250A or 315A or 500A.

*Remark 7*: Not available for WB1, WB2 and WB3 Main setting module.

*Remark 8*: Neutral CT is required for Ground fault or Neutral pole protection, when 3 Pole breaker is used for 3 phase 4 wire system.

*Remark 9*: Neutral CT is required for Ground fault or Neutral pole protection, when 3 Pole breaker is used for 3 phase 4 wire system.

*Remark 10*: In case of Earth leakage protection, it is required External ZCT.

*Remark 11*: Not available for AE4000-SWA 4P and AE4000-SW~AE6300-SW.

*Remark 12*: Some module types are not provided BA. Refer to Page15.

*Remark 13*: Supply connect to the top terminals.

*Remark 14*: Supply connect to the bottom terminals.

*Remark 15*: Current capacity of the neutral poles

*FN*: 100% of the rated current (See page 43, 48 for the outline and dimensions.)
## Ordering Information for Mitsubishi AE-SW Series Air Circuit Breaker (General Use····WB Type)

### Customer Information

<table>
<thead>
<tr>
<th>Customer (Name)</th>
<th>Order No.</th>
<th>Number of units</th>
<th>Details</th>
</tr>
</thead>
</table>

### Technical Specifications

- **Type**: AE-SW
- **Number of poles**: 3P, 4P
- **CT rating**: according to IEC 60947-2
- **Ambient temperature**: 40°C (Standard)其他的°C
- **Connection**:
  - **Main circuit terminal**
    - Horizontal terminal (FIX)
    - Vertical terminal (FIX-FT)
  - **Reset type**
    - Automatic Reset (Standard)
    - Manual Reset (MRE)
  - **Current setting Ir**
    - 3P: AE4000-SW~AE6300-SW
    - 4P: AE2000-SWA, AE4000-SWA

### Optional Accessories

- **Electrical accessories**
  - Auxiliary switch (AX)
  - Motor charging (MD)
  - Closing coil (CC)
  - Shunt trip device (SHT)
  - Under voltage trip device (UVT)
  - Condenser trip device (COT)

- **Mechanical accessories**
  - Push button cover (BC-L)
  - Counter (CNT)
  - Cylinder lock (CYL)
  - Door interlock (DI)
  - Terminal cover (TTC)
  - Door frame (DF)
  - Dust cover (DUC)
  - Interphase barrier (BA)
  - Mechanical interlock (MI)

### Additional Information

- **Power supply**
  - P1: AC100-240V
  - P2: DC DC24-48V

- **Network**
  - P3: DC AC200~220V

- **Technical Details**
  - P17~18

### Drawout Type Accessories

- **Cell switch (CL)**
  - 1 or 2 or 3 or 4
- **Shunting b-contact (SBC)**
  - 1 or 2 or 3 or 4 or 5
- **Safety shatter (SST)**
- **Lifting hooks (HP)**
- **Safety shutter (SST-LOCK)**
- **Mis-insertion preventor (MIP)**
- **Test jumper (TJ)**

- **Vertical terminal (VT)**
- **Front terminal (FT)**

### Notes

- **Note 1**: In case of AE630-SW and AE2000-SW Low rating type, please specify CT rating.
- **Note 2**: There is a case to be derated by ambient temperature. Refer to Page 54.
- **Note 3**: As for the terminal for AE2000-SWA, AE4000-SWA and AE4000-SW~AE6300-SW, Vertical terminal type only is available. (FIX-FT or DR-FT)
- **Note 4**: Refer to Page 11 and Page 39~46.
- **Note 5**: This setting is available for change by customer later. A preliminary setting of CT at factory shipment is as follows.
- **Note 6**: Not available for AE630-SW with CT rating : 250A or 315A or 500A.
- **Note 7**: Not available for WB1, WB2 and WB3 Main setting module.
- **Note 8**: Neutral CT is required for Neutral pole protection, when 3 Pole breaker is used for 3 phase 4 wires system.
- **Note 9**: In case of Earth leakage protection, it is required External ZCT.
- **Note 10**: DC24V and DC48V are not available for AE4000-SWA and AE4000-SW~AE6300-SW.
- **Note 11**: The combined installation of DI and MI3 is not available.
- **Note 12**: DC24V and DC48V are not available for AE4000-SWA and AE4000-SW~AE6300-SW.
- **Note 13**: Supply connect to the top terminals.
- **Note 14**: Supply connect to the bottom terminals.
- **Note 15**: Current capacity of the neutral poles: 50% of the rated current. FN: 100% of the rated current (See page 43, 48 for the outline and dimensions.)

### Table Example

<table>
<thead>
<tr>
<th>Customer (name)</th>
<th>Order No.</th>
<th>Number of units</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order Issuer</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Ordering information for Mitsubishi AE-SW series air circuit breaker (Generator protection use...WM Type)

### Table: Ordering information

<table>
<thead>
<tr>
<th>Customer (name)</th>
<th>Order No.</th>
<th>Number of units</th>
<th>units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>P.9–10 AE-SW</td>
<td>AE-SWA</td>
<td></td>
</tr>
</tbody>
</table>

#### Number of poles

- **3P**: AE630-3200-SW, AE4000-SW
- **4P**: AE6300-SW

#### Current setting Ir

**A**

#### Applicable standard

- **LR**: CCS IEC 60947-2
- **GL**: ABS
- **BV**: DNV
- **HN**: Others

#### Ambient temperature

- **40°C**: Standard
- **Others**: Others

#### Reset type

- **Automatic Reset (Standard)**
- **Manual Reset (MRE)**

#### Drawout type accessories

- **Cell switch (CL)**
- **Shunting b-contact (SBC)**
- **Lifting hooks (HP)**
- **Safety shutter (SST)**
- **Shutter lock (SST-LOCK)**
- **Mis-insertion preventor (MIP)**
- **Test jumper (TJ)**

#### Connection

- **Fixed type**
- **Drawout type**

#### Main circuit terminal

- **Horizontal terminal (FX)**
- **Vertical terminal (FX-VT)**
- **Horizontal terminals (DR) (standard)**
- **Vertical terminals (DR-VT)**
- **Front terminals (DR-FT)**

#### Electronic trip relay (ETR)

- **With ETR**

#### Main setting module

- **AE30–1600-SW**: AE2000–3200-SW, AE4000-SW
- **AE4000–6300-SW**: Vertical terminal type only is available. (FIX-VT or DR-VT)

#### Optional setting module

- **G1**: Ground fault protection
- **N5**: Neutral pole 50% protection
- **E1**: Earth leakage protection
- **AP**: 2nd Additional Pre-alarm

#### Power supply

- **P1**: AC-DC100-240V
- **P2**: AC-DC200-250V
- **P3**: AC-100-240V / DC-100-125V with output contact
- **P4**: DC-DC24-60V with output contact
- **P5**: DC-100-240V with output contact (SSR)

#### Additional function

- **Extension module (EX1)**
- **Network (EX1)**

#### Electrical accessories

- **Auxiliary switch (AX)**
- **Motor charging (MD)**
- **Closing coil (CC)**
- **Shunt trip device (SHT)**
- **Under voltage trip device (UVT)**

#### Mechanical accessories

- **Push button cover (BC-L)**
- **Counter (CNT)**
- **Cylinder lock (CVL)**
- **Door interlock (DI)**
- **Door frame (DF)**
- **Dust cover (DUC)**
- **Interphase barrier (BA)**
- **Mechanical interlock (MI)**

#### Condenser trip device (COT)

- **AC100–110V**: AC100–220V

### Note

- **Note1**: Please specify current setting (Ir) from the specification table.
- **Note2**: High capacity (HAX) of 2 or 4 or 6 or 8 or 10 is used for 3P and/or 4P. Also, please use for 3P or 4P units.
- **Note3**: Please specify (Note 3) for 2 or 4 units (MI2), 3 units (MI3), or 4 units (MI4). If only MI2, specify MI2.
- **Note4**: This setting is available for change by customer later. A preliminary setting of CL at factory shipment is as follows.
  - **CL1**: 1C
  - **CL2**: 1C1D
  - **CL3**: 1C1T1D
  - **CL4**: 2C1T1D

### Remarks

- **Remark**: Condenser trip device (COT)

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**Note15**: The combined installation of DI and MI3 is not available.

**Note14**: Some module types are not provided BA. Refer to Page 15.

**Note13**: Supply connect to the top terminals.

**Note12**: Supply connect to the bottom terminals.

**Note11**: The combined installation of DI and MI3 is not available.

**Note10**: Some module types are not provided BA. Refer to Page 15.

**Note9**: In case of Earth leakage protection, it is required External ZCT.

**Note8**: Neutral CT is required for Ground fault or Neutral pole protection, when 3 Pole breaker (with Neutral CT)

**Note7**: N5 optional setting module is used for 3 phase 4 wires system (4 Pole breaker or 3 pole breaker with Neutral CT)

**Note6**: Not available for AE6030-SW with CT rating: 250A or 315A or 500A.

**Note5**: NS optional setting module is used for 3 phase 4 wires system. (4 Pole breaker or 3 pole breaker with Neutral CT)

**Note4**: Refer to Page 11 and Page 39–46.

**Note3**: As for the terminal for AE2000-SWA, AE4000-SWA and AE4000-SW~AE6300-SW,Specify a setting value, if required.

**Note2**: With ETR

**Note1**: Some mod ule types are not provided BA. Refer to Page 15.
<table>
<thead>
<tr>
<th>Country / Region</th>
<th>Company</th>
<th>Address</th>
<th>Telephone</th>
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</thead>
<tbody>
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</tr>
</tbody>
</table>

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