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...
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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>AE630-SW</td>
<td>AE1000-SW</td>
<td>AE1250-SW</td>
<td>AE1600-SW</td>
<td>AE2000-SWA</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>—</td>
<td>AE2000-SW</td>
<td>AE2500-SW</td>
<td>AE3200-SW</td>
<td>AE4000-SWA</td>
<td>—</td>
<td>—</td>
<td>AE4000-SW</td>
<td>AE5000-SW</td>
</tr>
</tbody>
</table>

— Not applicable
Best Solution

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

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)</td>
<td>2nd Additional Pre-alarm</td>
<td>Neutral pole 50% protection</td>
</tr>
</tbody>
</table>

Power supply

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

<table>
<thead>
<tr>
<th>P1</th>
<th>P2</th>
<th>P3</th>
<th>P4</th>
<th>P5</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-240V AC-DC</td>
<td>24-60V DC</td>
<td>100-240V AC / 100-125V DC with output contact</td>
<td>24-60V DC with output contact</td>
<td>100-240V DC with output contact (SSR)</td>
</tr>
</tbody>
</table>

Additional function

<table>
<thead>
<tr>
<th>EX1</th>
<th>DP1</th>
<th>TAL</th>
<th>MCR-SW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension module</td>
<td>Display</td>
<td>Temperature alarm</td>
<td>MCR switch</td>
</tr>
<tr>
<td>Module for display and communication</td>
<td>Current, Voltage, Power, Harmonics, Trip current etc.</td>
<td>The TAL is operated by an unusual temperature of the breaker contacts. (see page 32)</td>
<td>Making current release is possible with MCR switch. (see page 32)</td>
</tr>
</tbody>
</table>

Protection with power from Internal CT

The Over current protection and Ground fault protection can work with power from Internal CT, even if the control power source is off. For the Trip indicator LED and the additional functions like EX1, DP1/DP2, TAL and Network, the control power source is required.

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.
Network

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

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 (DP1).

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
  - W1, W2, W3, W4
  - AE630-1800-SW, AE2000-3200-SW, AE4000-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: 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)

- ETR Auxiliary Equipment
  - Temperature alarm (TAL)
  - MCR switch (MCR-SW)

Additional function

- Extension module (EX1)
- Display (DP1)
- Display on panel board (DP2)
- VT unit (VT)

Network

- BIF-CC
- BIF-PR
- BIF-MD

Communication items

- Tripping cause, Tripping current
- Alarm (PAL, TAL, Self diagnosis, etc.)

- Breaker remote control: ON and OFF by CC and SHT
- Spring charge by MD

- Breaker status: ON or OFF or Charge state
- Drawout position
- ETR Setting value

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

Note: Some device types are excluded.

Personal Computer

MELSECNET/10 Interface card

PLC

I/O Unit

Interface Unit

CC-Link® / PROFIBUS-DP / MODBUS®

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 (DP1).

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.

Wire system (when EX1 is specified)

- EX1
- 3φ3W
- 3φ4W
- Normal connection
- Reverse connection
The safety of valuable circuits can be securely maintained.

**High-Performance High-Reliability**

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

In case of 690V AC, $I_{cu}=I_{cs}$ 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

**Wide coordination range by improving rated short-time withstand current**

$I_{cw}$ (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 ($U_{imp}$) for the main circuit is improved from 8 kV to 12 kV.

**Higher reliability by High operating durability**

**Mechanical**

AE-SW series are sharply improved in mechanical durability compared to the former model.
Customer Friendly
Convenience for Customer

3 sizes

<table>
<thead>
<tr>
<th>Size 1</th>
<th>Size 2</th>
<th>Size 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE630-SW</td>
<td>AE1000-SW</td>
<td>AE1250-SW</td>
</tr>
<tr>
<td>AE1600-SW</td>
<td>AE2000-SWA</td>
<td></td>
</tr>
<tr>
<td>AE2000-SW</td>
<td>AE2500-SW</td>
<td>AE3200-SW</td>
</tr>
<tr>
<td>AE4000-SW</td>
<td>AE5000-SW</td>
<td>AE6300-SW</td>
</tr>
</tbody>
</table>

Compact size AE2000-SWA!

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

Replacement from the former model (AE-SS)
- Due to the same installation dimension and outline dimension, the former model (AE-SS) can be replaced with AE-SW series.
- On the replacement of Drawout type, the Drawout frame (Cradle) for AE-SS have to be replaced with one for AE-SW.
- AE-SW can be installed to the existing connection bus bar without any special connection kit. (Except AE2000-SWA and AE4000-SWA)

Replacement from the old model (AE-S)

For the replacement from the old model (AE-S), the special adapter for AE-SW is prepared. (It is available for Drawout type only.) For details, please contact us separately.

Zero arc space

Arc exhaust to the outside of the breaker is drastically reduced for safer operation. (For AE630-SW–AE4000-SWA models, 600V AC or less) (refer to page 56: Insulation distance)

Reverse connection available

Line and Load is not defined on the Main circuit terminals. Therefore, reverse connection is available without any limitation.
**Appearance and Product structure**

### 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 configuration**

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)
   - (Marine Approvals)
     - LR
     - GL
     - BV
     - DNV*
     - ABS
     - CCS*
     - NK

3. **Connection**
   - Vertical terminal
   - Front terminal

4. **Drawout type accessories**
   - Cell switch
   - Shorting b-contact
   - Liftling hooks
   - Safety shutter
   - Safety shutter lock
   - Mis-insertion preventor
   - Test jumper

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

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

7. **Electronic trip relay**
   - General use
     - WS type
   - Generator protection use
     - WM type
   - Special use
     - WB type
   - Protective coordination use
     - WF type
   - Optional
     - G1:Ground fault protection
     - E1:Earth leakage protection
     - AP:2nd Additional Pre-alarm
     - NS:Neutral pole 50% protection

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

9. **Network**
   - CC-Link® Interface unit
   - PROFIBUS-DP Interface unit
   - MODBUS® Interface unit
   - I/O unit

*Except AE4000-SW~AE6300-SW*
### 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 (A)</td>
<td>630</td>
<td>1000</td>
<td>1250</td>
<td>1600</td>
</tr>
<tr>
<td>Rated insulation voltage (UI) (50/60Hz)/AC V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated operational voltage (Ue) (50/60Hz)/AC V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated impulse withstand voltage (Uimp) (kV)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pollution degree</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of poles</td>
<td>3, 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current In (CT rating)</td>
<td>630 (Note 5)</td>
<td>1000</td>
<td>1250</td>
<td>1600</td>
</tr>
<tr>
<td>Current setting I(A) (40°C)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated service breaking capacity Ics (kA rms) %Icu</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated making capacity Icm (kA peak)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated short time withstand current Icw (kA rms)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum total breaking time (ms)</td>
<td>40 (Note 6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum closing time (ms)</td>
<td>80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of operating cycles (Note 2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connecting terminal</td>
<td>Horizontal terminal</td>
<td>Vertical terminal</td>
<td>Front terminal</td>
<td></td>
</tr>
<tr>
<td>Outline dimension (mm) H=W=D</td>
<td>Fixed type</td>
<td>3-pole</td>
<td>410×340×290</td>
<td></td>
</tr>
<tr>
<td>Weight (kg) (without Accessory)</td>
<td>Drawout type</td>
<td>3-pole</td>
<td>430×300×368</td>
<td></td>
</tr>
<tr>
<td>Marine approval</td>
<td>3-pole</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Note 1) This is the Icu value when the bare main body and the external relay are combined.

(Note 2) The number of operating cycles without rated current also include the number of operating cycles with rated current.

(Note 3) AE2000-SWA, AE4000-SWA and AE64000-SW—AE6300-SW apply for only vertical terminal of connecting terminal.

(Note 4) This value is max. operating cycle for just ACB body not including any accessories. (The max. operating cycles for the accessories like AX, MD,CC, SHT and UVT are half of this value.)

(Note 5) Products with low rating types is available.

AE 630-SW 3 kinds of products with low rating types is available.

AE 2000-SW 2 kinds of products with low rating types is available.
All models conform the isolating function according to IEC 60947-2. Reverse connection is possible.

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<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>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>690</td>
<td>690</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3, 4</td>
<td>3, 4</td>
<td>(HN, FN)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1250 ≤ Ir ≤ 2000
800 ≤ Ir ≤ 2000
1600 ≤ Ir ≤ 2500
2000 ≤ Ir ≤ 3200
2500 ≤ Ir ≤ 4000
2500 ≤ Ir ≤ 4000
3150 ≤ Ir ≤ 5000
4000 ≤ Ir ≤ 6300

| | | | | | | | |
| 2000 | 2000 (Note 5) | 2500 | 3200 | 4000 | 4000 (Note 6) | 2500 (5000) (Note 8) | 3150 (6300) (Note 8) |
| 75  | 85         |           |           |           |           |           |           |
| 75  | 85         |           |           |           |           |           |           |
| 85  | 130 (Note 9) |           |           |           |           |           |           |
| 75  | 85         |           |           |           |           |           |           |
| 75  | 85         |           |           |           |           |           |           |
| 75  | 100        |           |           |           |           |           |           |
| 45 (Note 1) | 65 (Note 1) |           |           |           |           |           |           |
| 45 (Note 1) | 65 (Note 1) |           |           |           |           |           |           |
| 100% | 100%      |           |           |           |           |           |           |
| 165 |           |           |           |           |           |           |           |
| 165 |           |           |           |           |           |           |           |
| 165 |           |           |           |           |           |           |           |
| 165 |           |           |           |           |           |           |           |
| 165 | 220        |           |           |           |           |           |           |
| 94.5 | 143        |           |           |           |           |           |           |
| 94.5 | 143        |           |           |           |           |           |           |
| 75  |           |           |           |           |           |           |           |
| 75  |           |           |           |           |           |           |           |
| 75  | 85         |           |           |           |           |           |           |
| 65  |           |           |           |           |           |           |           |
| 40 (Note 6) | 50 (Note 6) |           |           |           |           |           |           |

| | | | | | | | |
| 80 | 80 |           |           |           |           |           |           |

| 1,500 | 1,500 | 1,000 | 500 | 1,000 |
| 1,500 | 1,500 | 1,000 | 500 | 1,000 |

20,000 (Note 4) 10,000 (3P) / 5,000 (4P) 4000 (Note 6)

- (Note 3) - (Note 3) - (Note 3)

410×475≤290 414×673≤290
410×605≤290 414×1003(1133)≤290 (Note 8)

430×435≤368 430×439≤368 430×565≤368 430×569≤368 480×675≤368 480×1005(1135)≤368 (Note 8)

47 60 61 63 81 160 160 160
57 72 73 75 99 160 (Note 8) 180 (200) (Note 8) 180 (200) (Note 8) 180 (200) (Note 8)
70 92 93 95 108 160 233 233 240
84 113 114 116 136 256 (279) (Note 8) 256 (279) (Note 8) 263 (286) (Note 8) 286 (299) (Note 8)
31 35 36 49 118 118 118 118 118
35 43 44 61 133 (148) (Note 8) 133 (148) (Note 8) 140 (155) (Note 8)

(Note 6) This value means the instantaneous breaking time at short-circuit 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.

(Note 10) For WM relay, the current setting Ir can be set by 1A except AE630-SW low rating types “CT315A” and “CT250A”. In case of AE630-SW with “CT315A” and “CT250A”, it can be set by 0.1A.
Connections

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

<table>
<thead>
<tr>
<th>Connections Type</th>
<th>Horizontal Type</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></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drawout type (DR)</td>
<td></td>
<td>DR-VT</td>
<td>DR-FT</td>
<td>DR-VTA</td>
<td>DR-FTA</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>FIX-VT</td>
<td></td>
</tr>
<tr>
<td>Drawout type (DR)</td>
<td>DR-VT</td>
<td></td>
</tr>
</tbody>
</table>

Available connections

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Fixed type</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>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(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>
<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>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
<td>- - - - -</td>
<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>
<td>- - - - -</td>
<td>- - - - -</td>
</tr>
<tr>
<td></td>
<td>FIX-FTA</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>
<td>- - - - -</td>
<td>- - - - -</td>
</tr>
</tbody>
</table>

Drawout type (DR)

| Horizontal | ● ● ● ● ● | - - - - - | ● ● ● ● ● | - - - - - | - - - - - |           |           |           |           |           |           |           |           |           |           |           |
| DR-VT      | ○ ○ ○ ○ ○ | ● ○ ○ ○ ○ | ○ - - - - | ○ ○ ○ ○ ○ | ○ - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - |
| DR-FT      | ○ ○ ○ ○ ○ | - - - - - | ○ ○ ○ ○ ○ | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - |
| DR-VTA     | ○ ○ ○ ○ ○ | - - - - - | ○ ○ ○ ○ ○ | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - |
| DR-FTA     | ○ ○ ○ ○ ○ | - - - - - | ○ ○ ○ ○ ○ | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - | - - - - - |

● Connection image : AE630~1600-SW, 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 design)
- 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.

For 24V DC and 48V DC, the Diode rectifier is not included.

OFF charging method

Polarity of DC circuit use

Motor charging rating

<table>
<thead>
<tr>
<th>Rated voltage (V)</th>
<th>Applicable voltage range (V)</th>
<th>Applied voltage (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 - 28.4</td>
<td>24</td>
<td>&lt; 0.4</td>
<td>6</td>
<td>≤ 5</td>
<td>500</td>
</tr>
<tr>
<td>DC48</td>
<td>36 - 52.8</td>
<td>48</td>
<td>&lt; 0.4</td>
<td>3</td>
<td>700</td>
<td>1000</td>
</tr>
<tr>
<td>AC/DC 100-125</td>
<td>85 - 137.5</td>
<td>100</td>
<td>AC: &lt; 0.46</td>
<td>3(4)</td>
<td>1000</td>
<td>2000</td>
</tr>
<tr>
<td>AC/DC 200-250</td>
<td>170 - 275</td>
<td>200</td>
<td>5(7)</td>
<td>AC: &lt; 0.46</td>
<td>1(2)</td>
<td>700</td>
</tr>
<tr>
<td></td>
<td></td>
<td>250</td>
<td>DC: 0.25</td>
<td>2(2)</td>
<td></td>
<td>1000</td>
</tr>
</tbody>
</table>

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

We cannot manufacture AE4000-SWA 4 pole and AE4000-SW ~ AE6300-SW in DC 24V and DC 48V rating.

Charging completion contact rating

<table>
<thead>
<tr>
<th>Voltage (V)</th>
<th>Resistance load (A)</th>
<th>Inductive load (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>460</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>250</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>125</td>
<td>10</td>
</tr>
<tr>
<td>DC</td>
<td>250</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>125</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>10</td>
</tr>
</tbody>
</table>

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

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.

<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>24-48V DC (16.8-52.8)</td>
<td>–</td>
<td>0.08 s or less</td>
</tr>
<tr>
<td>100-250V AC - DC common (75-275)</td>
<td>24V DC 2.6A (100VA)</td>
<td>0.08 s or less</td>
</tr>
<tr>
<td></td>
<td>48V DC 3.0A (150VA)</td>
<td></td>
</tr>
</tbody>
</table>

Note 1) In case of double rating of rated voltage, it is the value for the lower rating.
(Example) In case of 24-48V DC, it is operating time for 24V DC.

Shunt trip device (SHT)

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

<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>24-48V DC (16.8-52.8)</td>
<td>–</td>
<td>0.04 s or less</td>
</tr>
<tr>
<td>100-250V AC - DC common (75-275)</td>
<td>24V DC 2.6A (100VA)</td>
<td>0.04 s or less</td>
</tr>
<tr>
<td></td>
<td>48V DC 3.0A (150VA)</td>
<td></td>
</tr>
</tbody>
</table>

Note 1) In case of double rating of rated voltage, it is the value for the lower rating.
(Example) In case of 24-48V DC, it is operating time for 24V DC.

Note 2) Operating time for AE4000-SW~AE6300-SW is 0.04s or less.
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. A trip terminal for forced OFF function is included as standard equipment.

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.

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 resetting.

Auxiliary switch

Standard (AX) • High capacity type (HAX)

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

<table>
<thead>
<tr>
<th>Voltage (V)</th>
<th>Standard (AX)</th>
<th>High capacity type (HAX)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>240</td>
<td>250</td>
</tr>
<tr>
<td>DC</td>
<td>125</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>0.2</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td>0.4</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

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.
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.

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.

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

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 51.

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 cannot be installed by combining with “Mechanical interlock(MI)for 3 breakers.”

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>AE6300-SW</th>
<th>AE1600-SW</th>
<th>AE2000-SWA</th>
<th>AE3200-SW</th>
<th>AE32000-SW</th>
<th>AE4000-SW</th>
<th>AE40000-SW</th>
<th>AE63000-SW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed type</td>
<td></td>
<td>●</td>
<td></td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Vertical terminal (VTA)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Front terminal adapter (FTA)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Drawout type</td>
<td>Horizontal (DR)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Vertical terminal (DR-VTA)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Front terminal (DR-FT)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Vertical terminal adapter (VTA)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Front terminal adapter (DR-FTA)</td>
<td>●</td>
<td>●</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

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 of AE630-SW to AE6300-SW.

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).

- **Outline dimensions (mm)**

### Dust cover (DUC)

Dust cover prevents the dust or water entering into the panel board from the breaker panel cut.

Protection degree is IP54.
Operating position of drawout type

**Drawout interlock (standard equipment)**

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 equipment)**

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 to be supplied by the customer. As for outline dimensions of the padlock, please refer to the left figure.

**Operating position of drawout type**

- **CONNECTED position**
  - Both main and control circuits are connected.
  - Normal in use condition.
  - Lock plate is protruding

- **TEST position**
  - Main circuit is disconnected, but the control circuit is connected.
  - The breaker operation can be tested with the door closed.
  - Lock plate is protruding

- **DISCONNECTED position**
  - Both main and control circuits are disconnected.
  - The door can be closed.

- **DRAWOUT position**
  - This is the position for removing the breaker.
  - The breaker is drawn out of the cradle on the extension rails.

**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.

### Switch rating

<table>
<thead>
<tr>
<th>Voltage (V)</th>
<th>Resistant load (A)</th>
<th>Inductive load (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>250, 125</td>
<td>10, 10</td>
</tr>
<tr>
<td>DC</td>
<td>250</td>
<td>3, 1.5</td>
</tr>
<tr>
<td></td>
<td>125</td>
<td>10, 6</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>10, 10</td>
</tr>
</tbody>
</table>

Maximum contacts: Total 4c max.

**Standard pattern**

<table>
<thead>
<tr>
<th></th>
<th>CL-C</th>
<th>CL-T</th>
<th>CL-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL1</td>
<td>1</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>CL2</td>
<td>1</td>
<td>–</td>
<td>1</td>
</tr>
<tr>
<td>CL3</td>
<td>1</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>CL4</td>
<td>2</td>
<td>1</td>
<td>1</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: CL2: CL3: CL4: 1C1D 1C1D 1C1D 1C1D 1C1D

Outline dimensions (reference)
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.

<table>
<thead>
<tr>
<th>Operating sequence</th>
<th>Connected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display position of drawout operation</td>
<td>DISCON</td>
</tr>
<tr>
<td>Change-over sequence of SBC (b-contact)</td>
<td>OFF</td>
</tr>
</tbody>
</table>

Switch rating

<table>
<thead>
<tr>
<th>Voltage (V)</th>
<th>Resitive load</th>
<th>Inductive load</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>250</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>125</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>250</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>125</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>10</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

Refer to the Min. load range graph in Page 14.

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.
Not available for AE4000-SW~AE6300-SW

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.

**Main setting module**
This module provides the characteristic setting function of Over current protection according to application. The modules for general use (WS) and for generator protection use (WM) have the setting dials for LTD, STD and INST operating characteristics. And the module for special use (WB) has setting dials for INST only.

4 pole breaker provides Neutral 100% protection as standard, which becomes 50% protection when installed Optional setting module “N5”.

**Optional setting module (option)**
With each optional setting modules, the following functions can be added respectively.
G1: Ground fault protection
N5: Neutral pole 50% protection
E1: Earth leakage protection in combination with ZCT
AP: 2nd Additional Pre-alarm

**Pre-alarm (PAL LED and Current setting dial) (standard)**
This indicator displays the Pre-Alarm situation when exceed the setting current. If output contact for this Pre-alarm is required, Power supply module should be selected from P3, P4 or P5. And by adding the Optional setting module “AP”, 2nd Pre-alarm can be added.

**Neutral pole overcurrent protection (NP) (standard)**
When Harmonics in load current become higher, the current on Neutral pole may exceed the rated current. This Neutral pole overcurrent protection prevents the troubles caused by higher Harmonics.

When tripped by Over current, Ground fault (GFR) and Earth leakage (ER), this device outputs alarm signal. There are two types of OCR alarms. One is Automatic reset type with 30ms one pulse output (standard) and the other is Manual reset type with self-holding (optional). For details, refer to Page 14.

Neutral pole overcurrent protection (NP) (standard)
When Harmonics in load current become higher, the current on Neutral pole may exceed the rated current. This Neutral pole overcurrent protection prevents the troubles caused by higher Harmonics.
Characteristic table

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>WS</td>
<td>General use</td>
</tr>
<tr>
<td>WM</td>
<td>Generator protection use</td>
</tr>
<tr>
<td>WB</td>
<td>Special use</td>
</tr>
<tr>
<td>WF</td>
<td>Protective coordination use</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Voltage range (V)</th>
<th>P1 100-240 AC-DC</th>
<th>P2 24-60 DC</th>
<th>P3 100-240 AC-100-125 DC</th>
<th>P4 24-60 DC</th>
<th>P5 100-240 DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Voltage (V)</td>
<td>85-264 AC-DC</td>
<td>18-72 DC</td>
<td>85-264 AC-85-138 DC</td>
<td>18-72 DC</td>
<td>85-264 DC</td>
</tr>
<tr>
<td>Power requirement (VA)</td>
<td>15</td>
<td>10</td>
<td>6 output contacts</td>
<td>6 output contacts</td>
<td>6 output contacts</td>
</tr>
<tr>
<td>Alarm output</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Note1: Over current protection and ground fault protection operates without control power source. Factory setting of 6 output contacts is as follows.

- Self-holding: The output is maintained until it resets.
- Automatic reset: The output will be reset if it backs to normal condition.

CT rating table

- AE630-SW: 630A
- AE1000-SW: 1000A
- AE1250-SW: 1250A
- AE1600-SW: 1600A
- AE2000-SWA: 2000A
- AE2000-SW: 2000A
- AE2500-SW: 2500A
- AE3200-SW: 3200A
- AE4000-SW: 4000A
- AE4000-SW: 4000A
- AE5000-SW: 5000A
- AE6300-SW: 6300A

Note1: AE630-SW and AE2000-SW has low rating type. Please refer to the “Ordering information sheet.” (Page 61-63)

Note2: Low rating type of AE630-SW is not available for the ground fault protection.

Note3: As for details of ratings, refer to page 9 and page 10.

Additional function

- Display(DP1)
- Display onto panel board(DP2)
- VT unit(VT)

Network

- BIF-CC
- BIF-PR
- BIF-MD

Wire system (when EX1 is specified)

- 3φ3W
- 3φ4W
- Normal connection
- Reverse connection
Electronic trip relay (for general use: WS)

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>I_r</td>
<td>0.5 – 1.0 (0.05step) x I_n (CT rating)</td>
<td>—</td>
<td>1.0</td>
</tr>
<tr>
<td>H</td>
<td>Uninterrupted current</td>
<td>I_u</td>
<td>0.8 – 1.0 x I_r (0.02step), Pick-up current : 1.15 x I_u</td>
<td>1.05 x I_u – Non Pick-up: 1.25 x I_u – Pick-up</td>
<td>1.0</td>
</tr>
<tr>
<td>I</td>
<td>LTD time</td>
<td>T_L</td>
<td>12–25–50–100–150s at I_u x 2</td>
<td>± 20%</td>
<td>150</td>
</tr>
<tr>
<td>J</td>
<td>STD pick-up current</td>
<td>Iisd</td>
<td>1.5–2–2.5–3–4–5–6–7–8–9–10 x I_r</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 at Iisd x 1.5</td>
<td>± 20%</td>
<td>0.5 (P4 ON)</td>
</tr>
<tr>
<td>L</td>
<td>INST/MCR pick-up current</td>
<td>I_i</td>
<td>AE630-SW–AE1600-SW 16–10–8–6–4–2–2–4–6–8–10–12–16 x I_r</td>
<td>± 15%</td>
<td>WS1…16 (INST)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AE2000-SW–AE3200-SW (INST)</td>
<td></td>
<td>WS2…12 (INST)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AE6500-SW (MCR)</td>
<td></td>
<td>WS3…10 (INST)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AE6300-SW 10–8–6–4–2–2–4–6–8–10 x I_r (INST)</td>
<td>± 15%</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>Pre-alarm current</td>
<td>I_p</td>
<td>I_u 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>T_p</td>
<td>1/2 T_L at I_u x 2 (after 1/2 T_L, PAL contact output turns on.)</td>
<td>± 20%</td>
<td>—</td>
</tr>
</tbody>
</table>

Note: The figure shows WS1 type with G1 module, Display (DP1) and MCR switch. G1, DP1 and MCR are optional equipments.

Relation of setting dial

In (CT rating) — I_r — I_u — I_p — I_p2

<table>
<thead>
<tr>
<th>Load current LED</th>
</tr>
</thead>
</table>

Adjustable setting range

Upper table denote the case optional MCR function is included.

For WS relay, Pre-alarm current "OVER" setting is I_u x 1.15.
Operating characteristic curve (for general use : WS)

Pre-alarm current : Ip
\( I_{u} \times 0.68 - 1.00 \times 0.4 \text{step} \) OVER ±10%

Uninterrupted current : lu
0.8 - 1.0 \( \times I_{r} \) (0.02 step)

STD Pick-up
1.05 \( \times I_{u} \) - Non pick-up
1.25 \( \times I_{u} \) - Pick-up

Current
LTD Pick-up, Ip... % of Uninterrupted current \( I_{u} \)
Lu, Isd, Ii... % of Current setting \( I_{r} \)

Pre-alarm time : Tp
\( TL \times 2 \pm 20\% \) (at \( I_{u} \times 2 \))

STD Pick-up current : Isd
\( I_{r} \times 1.5 - 2 - 2.5 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 \pm 15\% \)

STD time : Tsd
0.06 - 0.1 - 0.2 - 0.3 - 0.4 - 0.5 (s) ±20%
(at Isd \( \times 1.5 \))

LTD Pick-up current : \( I_{i} \)
Max. breaking time
(In case of AE4000-SW
6300-SW, it is 0.05s)

\( I_{r} \times 2 - 4 - 6 - 8 - 10 - 12 - 16 \pm 15\% \)

Note 1: When \( Tsd \) = 0.06’setting, operating time is 0.04~0.08s.
\( I_{r} \) is selectable ON or OFF.
The figure shows WM1 type with G1 module, Display (DP1) and MCR switch. G1, DP1 and MCR are optional equipments.

Note: The figure shows WM1 type with G1 module, Display (DP1) and MCR switch. G1, DP1 and MCR are optional equipments.

Relation of setting dial

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>To be fixed at Factory default value in the available range, which shows in Page 9 and 10.</td>
<td>—</td>
<td>To be complied with ordering indication</td>
</tr>
<tr>
<td></td>
<td>LTD pick-up current</td>
<td>l</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></td>
<td>LTD time</td>
<td>Tl</td>
<td>15–20–25–30–40–60s at l x 1.2</td>
<td>± 20%</td>
<td>20</td>
</tr>
<tr>
<td></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></td>
<td>STD time</td>
<td>Tsd</td>
<td>0.5–0.4–0.3–0.2–0.1–0.06–0.06–0.1–0.2–0.3–0.4–0.5 x Isd at l x 1.5</td>
<td>± 20%</td>
<td>0.5 (ON)</td>
</tr>
<tr>
<td></td>
<td>INST/MCR pick-up current</td>
<td></td>
<td>16–12–10–8–6–4–2–2–4–6–8–10–12–16 x Ir (INST) (MCR)</td>
<td>± 15%</td>
<td>WM1…16 (INST)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12–10–8–6–4–2–2–4–6–8–10–12 x Ir (INST) (MCR)</td>
<td>± 15%</td>
<td>WM2…12 (INST)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10–8–6–4–2–2–4–6–8–10 x Ir (INST) (MCR)</td>
<td>± 15%</td>
<td>WM3…10 (INST)</td>
</tr>
<tr>
<td></td>
<td>Pre-alarm current</td>
<td>Ip</td>
<td>l 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 Tt. at l x 1.2 (after 1/2 Tt., PAL contact output turns on.)</td>
<td>± 20%</td>
<td>—</td>
</tr>
</tbody>
</table>

Upper table denote the case optional MCR function is included. For WM relay only, when Pre-alarm current Ip is set at "OVER", the Ip value become equal to "l x 1.0".

This WM relay is mainly used for the protection of generator on ship. Current setting Ir (default value) is fixed at the value complying with the rating of generator, which should be indicated when placing an order.
Operating characteristic curve (for generator protection use: WM)

Pre-alarm current: Ip
L x 0.68 ~ 1.00 (0.04 step) ±15%

LTD pick-up current: Isd
1.0 ~ 1.05 ~ 1.1 ~ 1.15 ~ 1.2 ±5%
Factory setting position is 1.15

STD pick-up current: Isd
Ir x 1.5 ~ 2 ~ 2.5 ~ 3 ~ 3.5 ~ 4 ~ 4.5 ~ 5 ±15%

STD time: Tsd
0.06 ~ 0.1 ~ 0.2 ~ 0.3 ~ 0.4 ~ 0.5 (s) ±20%
(at Isd x 1.5)

Max. breaking time
(In case of AE4000-SW~6300-SW, it is 0.05s)
Ir x 2 ~ 4 ~ 6 ~ 8 ~ 10 ~ 12 ±15%
WM1
Ir x 2 ~ 4 ~ 6 ~ 8 ~ 10 ±15%
WM2

INST/MCR pick-up current: Ii
Ir x 2 ~ 4 ~ 6 ~ 8 ~ 10 ±15%
WM1
Ir x 2 ~ 4 ~ 6 ~ 8 ±15%
WM2

With MCR

Note1: When Tsd=0.06 setting, operating time is 0.04 ~ 0.08s.
I2t is ON/OFF selectable.
Electronic trip relay (for special use: WB)

This WB relay is effective for the combination with the external OCR without severely decreasing the breaking capacity. Actually, if ACB is combined with the external OCR only without WB relay, its breaking capacity comes to be reduced drastically. (e.g. For AE1600-SW, it's reduced to 25kA.)

**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>C</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, AE4000-SW 16-12-10-8-6-4-2-2-4-6-8-10-12-16 x Ir (INST) (MCR) WB1</td>
<td>± 15%</td>
<td>WB1–16 (INST)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AE2000-SWA, AE4000-SWA, AE5000-SW 12-10-8-6-4-2-2-4-6-8-10-12 x Ir (INST) (MCR) WB2</td>
<td></td>
<td>WB2–12 (INST)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AE6300-SW 10-8-6-4-2-2-4-6-8-10 x Ir (INST) (MCR) WB3</td>
<td></td>
<td>WB3–10 (INST)</td>
</tr>
<tr>
<td>I</td>
<td>Pre-alarm current</td>
<td>Ip</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 table denote the case optional MCR function is included. For WB relay, when Pre-alarm current Ip is set at "OVER", the Ip value is "Ir x 1.15".
Operating characteristic curve (for special use: WB)

Pre-alarm current: \( I_p \)
\[ I_r \times 0.68 \sim 1.0 \times (0.04 \text{step}) - \text{OVER} \pm 10\% \]

Pre-alarm time: \( T_p \)
75s \pm 20\% at \( I_r \times 2 \)

Max. time of let-through current

Max. Setting of External OCR

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

Max. breaking time
(In case of AE4000-SW to 6300-SW, it is 0.05s)
Electronic trip relay (for protective coordination use: WF)

WF relay incorporates five kinds of LTD characteristics. Protective coordination with upstream OCRs and/or Fuses can be more easily achieved.

Operating characteristic curve

[LTD curve setting “a=2”]

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 (0.05 step) x In (CT rating)</td>
<td>1.10 x Ir – Non Pick-up</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LTD pick-up current : 1.15 x Ir</td>
<td>1.20 x Ir – Pick-up</td>
<td>1.0</td>
</tr>
<tr>
<td>H</td>
<td>LTD time</td>
<td>Tt</td>
<td>1–2–3–4–5–6–8–10–12–15–18s</td>
<td>± 30% (1.5 Ir/load current)</td>
<td>18</td>
</tr>
<tr>
<td>I</td>
<td>LTD curve setting</td>
<td>a</td>
<td>0.02–1–2–3–4</td>
<td>—</td>
<td>2</td>
</tr>
<tr>
<td>J</td>
<td>STD pick-up current</td>
<td>Isd</td>
<td>1.5–2.5–3.5–4.5–6–7–8–9–10 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 (AT ON)</td>
</tr>
<tr>
<td>L</td>
<td>INST/MCR pick-up current</td>
<td>Li</td>
<td>AE630-SW–AE1600-SW</td>
<td>± 15%</td>
<td>WF1–16 (INST)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AE4000–SW</td>
<td>10–8–6–4–2–2.4–6–8–10–12 x Ir</td>
<td>—</td>
<td>WF3–10 (INST)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AE6300–SW</td>
<td>6–4–2–2.4–6–8–10–12 x Ir</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

For WF relay, when Pre-alarm current Ip is set at “OVER”, the Ip value is “Ir x 1.15”.

Upper table denote the case optional MCR function is included.

Relation of setting dial

\[
\text{In (CT rating)} = \frac{\text{Ir}}{\text{Ig (P.29)}}
\]

Test terminal

- Test terminal
- Test button (TEST L/S LOCK button)
- Pre-alarm current setting dial
- Optional setting module (P.29–31)
- INST/MCR pick-up current setting dial
- STD pick-up current setting dial
- STD time setting dial
- LTD curve setting dial
- LTD pick-up current setting dial
- LTD time setting dial
- LTD characteristic curves

Note:
- The figure shows WF1 type with G1 module, Display (DP1) and MCR switch.
- G1, DP1 and MCR are optional equipments.

- Pre-alarm current setting dial
- Upper table denote the case optional MCR function is included.
- For WF relay, when Pre-alarm current Ip is set at “OVER”, the Ip value is “Ir x 1.15”.

- Pre-alarm time Tp at Ir x 4 (after 1/2 Tt, PAL contact output turns on.)
Operating characteristic curve (for protective coordination use : WF)

[LTD curve setting "a=0.02"]

[LTD curve setting "a=1"]

[LTD curve setting "a=3"]

[LTD curve setting "a=4"]

Note 1: LTD operating time is calculated by the following equations.

\[ t_{LTD} = x TL(4/1.1155)^a - 1 \]

Note 2: PAL operating time is calculated by the following equations.

\[ t_{PAL} = (4/0.877)x - 1.1555 \]

Note 3: When Tsd = "0.06" setting, operating time is 0.04~0.08s.
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 52.

The length of the cable (attached) for NCT is 2m.

<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>GFR pick-up current</td>
<td>Ig</td>
<td>0.1-0.2-0.3-0.4-0.5-0.6-0.7-0.8-0.9-1.0 x In</td>
<td>±20%</td>
<td>1.0</td>
</tr>
<tr>
<td>GFR time</td>
<td>Tg</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</td>
<td>±20%</td>
<td>3s (TRIP)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Alarm output</th>
<th>TRIP side : Self-holding/ALARM side : Automatic reset</th>
<th>TRIP side Self-holding</th>
</tr>
</thead>
</table>

### Ground fault protection characteristics

- **Pick-up current**: Ig
  - In x 0.1 - 1.0 ±20% (0.1 step)

- **Ground fault time**: Tg
  - <0.1 - 0.15 - 0.3 - 0.5 - 0.8 - 1.5 - 3s ±20%

- **Ground fault current**: Ig
  - ±20%

### Ground fault protection characteristics

- **ACB**
- **ETR**
- **Control**
- **Power supply**
- **Alarm contact output**
- **GFR function block diagram (In case of 4pole breaker)**

### Block diagram with NCT function

<table>
<thead>
<tr>
<th>NCT type name</th>
<th>ACB type name / CT rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCT06</td>
<td>AE630-SW 630A</td>
</tr>
<tr>
<td>NCT10</td>
<td>AE1000-SW 1000A</td>
</tr>
<tr>
<td>NCT12</td>
<td>AE1250-SW 1250A, AE2000-SW 1250A</td>
</tr>
<tr>
<td>NCT16</td>
<td>AE1600-SW 1600A, AE2000-SW 1600A</td>
</tr>
<tr>
<td>NCT25</td>
<td>AE2500-SW 2500A</td>
</tr>
<tr>
<td>NCT32</td>
<td>AE3200-SW 3200A</td>
</tr>
<tr>
<td>NCT40</td>
<td>AE4000-SWA 4000A, AE4000-SW 4000A</td>
</tr>
<tr>
<td>NCT50</td>
<td>AE5000-SW 5000A</td>
</tr>
<tr>
<td>NCT63</td>
<td>AE6300-SW 6300A</td>
</tr>
</tbody>
</table>

Refer to Outline dimensions in page 52.
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>Iₙn</td>
<td>1A-2A-3A-5A-10A</td>
<td>±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 - 0.1-0.15-0.3-0.5-0.8-1.5-3s TRIP</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.

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

ZCT for transformer ground wire

<table>
<thead>
<tr>
<th>ZCT type name</th>
<th>ACB type name / Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZT15B</td>
<td>ZT30B</td>
</tr>
<tr>
<td>ZT40B</td>
<td>ZT60B</td>
</tr>
<tr>
<td>ZT80B</td>
<td>ZT100B</td>
</tr>
</tbody>
</table>

ZCT with primary conductors

<table>
<thead>
<tr>
<th>ZCT type name</th>
<th>ACB type name / Pole</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZTA2000A</td>
<td>AE1250-SW / 3P, AE1600-SW / 3P</td>
</tr>
</tbody>
</table>

As for outline dimensions refer to page 52. Make choice of suitable ZCT in conformity to the BUSBAR size.

Earth leakage protection characteristics

- Pick-up current: $I_n \cdot {\Delta n}\cdot 1-2-3-5-10A <0.1$
- Operating time: $T_e <0.1-0.15-0.3-0.5-0.8-1.5-3s \pm 20\%$
- Earth leakage protection operating time: $T_e <0.1-0.15-0.3-0.5-0.8-1.5-3s \pm 20\%$
- Earth leakage protection operating time: $T_e <0.1-0.15-0.3-0.5-0.8-1.5-3s \pm 20\%$
When used OA equipment or DC power source to bring the third higher harmonic in 3 phases 4 wires circuit, sometimes it comes to give the other peripheral equipments an electrical damage due to the superposition of the third higher harmonic on Neutral pole.

This Neutral Pole 50% Protection (N5) is useful to protect the other peripheral equipments from such an electrical damage and also to prevent some troubles with the Pre-Alarm function (AP).

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

But, if the operation at 50% of rated current is required on Neutral pole, it become 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.

### Setting item

<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</td>
<td>±10%</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-1.0 x Iu WS</td>
<td>WS</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.5-0.6-0.7-0.8-0.84-0.88-0.92-0.96</td>
<td>±5%</td>
<td>WM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-1.0 x Iu WM</td>
<td>WM</td>
<td></td>
</tr>
<tr>
<td>2nd Additional Pre-alarm time</td>
<td>Tp2</td>
<td>0.8-0.8-0.8-0.8-0.84-0.88-0.92-0.96</td>
<td>±20%</td>
<td>0.9 (x TL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>x TL</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(x TL)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Pre-alarm timing chart

PAL LED starts to blink at time when the actual current exceed the setting current and then after it passed a half of LTD time (TL) it starts to light and simultaneously the contact output starts. As for its operating time, refer to the Operating characteristic curves in Page 22, 24 and 26.

## Neutral pole 50% protection (N5)

When used OA equipment or DC power source to bring the third higher harmonic in 3 phases 4 wires circuit, sometimes it comes to give the other peripheral equipments an electrical damage due to the superposition of the third higher harmonic on Neutral pole.

This Neutral Pole 50% Protection (N5) is useful to protect the other peripheral equipments from such an electrical damage and also to prevent some troubles with the Pre-Alarm function (AP).

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

But, if the operation at 50% of rated current is required on Neutral pole, it become available with this optional module unit.
When TAL sensor is installed 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.

Temperature alarm (TAL)

With this MCR switch, at the time of breaker closing from OFF to ON the INST (Instantaneous) characteristic works, and then after breaker is in closed (ON) position the INST characteristic becomes ineffective. This controlling function of INST characteristic is useful for the protection on the short-circuit fault at the time of closing and also for expanding the selective combination with branch breakers after closed.

The factory default setting of "INST/MCR pick-up current setting dial" is usually set at "INST", so if the function of this MCR switch is required, the dial should be changed to set to "MCR".

MCR switch (MCR-SW)

Field test device (Y-2005)

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-2005 specification

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input voltage</td>
<td>100-240V AC 50/60Hz (available voltage range: 85-264V AC)</td>
</tr>
<tr>
<td>Power consumption VA</td>
<td>100VA or less</td>
</tr>
<tr>
<td>Range of signal output</td>
<td>Voltage signal equivalent to 1%–2500% of Rated current In (CT rating) (continuously adjustable). * The output at 100% of CT rating is 141mV at 50Hz or 170mV at 60Hz.</td>
</tr>
<tr>
<td>Test power output and trip check power output</td>
<td>30V DC 5W</td>
</tr>
<tr>
<td>Terminal for checking the signal output</td>
<td>The same signal as the signal output is output to the terminal on the back side (load impedance: 100kΩ or more).</td>
</tr>
<tr>
<td>Stop signal input</td>
<td>&quot;a&quot; contact, &quot;b&quot; contact or test terminal (ETR)</td>
</tr>
<tr>
<td>Test items</td>
<td>LTD, STD, INST/MCR, GFR, PAL, PAL2 and Trip check * ER check is not available.</td>
</tr>
<tr>
<td>Signal level</td>
<td>Max. 2500% of Rated current setting (Ir) (accuracy: ±2.5% at CT rating)</td>
</tr>
<tr>
<td>Time counter</td>
<td>0.000s ±2ms – 999.999s ±1%</td>
</tr>
<tr>
<td>Working temperature range</td>
<td>0 – 40°C (humidity: 85%Rh or less)</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td>-10°C – 50°C (humidity: 85%Rh or less)</td>
</tr>
<tr>
<td>Dimensions</td>
<td>220mm(W) x 150mm(H) x 340mm(D) (excluding protruding portions)</td>
</tr>
<tr>
<td>Weight</td>
<td>4.5kg</td>
</tr>
<tr>
<td>Attachments</td>
<td>AC power cord, test cable, carry case</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 (Option)

<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 (○:required optional modules)

<table>
<thead>
<tr>
<th>Additional function</th>
<th>Name</th>
<th>Extension module</th>
<th>Display</th>
<th>VT unit</th>
<th>Interface unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load current</td>
<td>Display</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Communication</td>
<td>CC-Link®</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>PROFIBUS-DP</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>MODBUS®</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Display &amp; Communication</td>
<td>CC-Link®</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>PROFIBUS-DP</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>MODBUS®</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Voltage, Power, Energy, Harmonics, current etc.</td>
<td>Display</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Communication</td>
<td>CC-Link®</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>PROFIBUS-DP</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>MODBUS®</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Display &amp; Communication</td>
<td>CC-Link®</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>PROFIBUS-DP</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>MODBUS®</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Electronic trip relay (ETR) Type designation breakdown

Main setting module
- INST, WT, WRT, W1T
- 1A, 1B, 1C, 1D, 1E, 1F
- 2A, 2B, 2C, 2D, 2E, 2F
- 3A, 3B, 3C, 3D, 3E, 3F
- 4A, 4B, 4C, 4D, 4E, 4F
- 5A, 5B, 5C, 5D, 5E, 5F

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

ETR Auxiliary Equipment
- Temperature alarm (TAL)
- MCR switch (MCR-SW)

Power supply
- 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

Neutral CT (NCT)

External ZCT

Additional function
- Extension module (EX1)
- Display (DP1)
- Display (DP2)
- VT unit

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

Wire system (when EX1 is specified)
- 34W
- 34W
- Normal connection
- Reverse 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
With the advanced internal communication function of this EX1 module, it is achieved rapid transmission of data between ETR and Displays or Interface units. Besides, it can be extended the function by connecting with Max. 2 display modules and 1 interface unit in parallel.

Display module (DP1/DP2)

This is the module for display and setting of the various information like measured value, trip and alarm status, ETR status for display and output contacts setting etc...

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 53.)

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 54.)

Note:
- The length of the cable attached for VT unit is 2m.
**Network**

**Interface unit (BIF-CC/BIF-PR/BIF-MD)**

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.

- BIF-CC (CC-Link®)
- BIF-PR (PROFIBUS-DP)
- BIF-MD (MODBUS®(RS-485))

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

The length of the cable for interface unit is 2m.

**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)**

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**

<table>
<thead>
<tr>
<th>Description</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breaker ON operation</td>
<td>1a contact for Closing coil (CC)</td>
</tr>
<tr>
<td>Breaker OFF operation</td>
<td>1a contact for Shunt trip device (SHT)</td>
</tr>
<tr>
<td></td>
<td>(not applicable for AC380–500V rating)</td>
</tr>
<tr>
<td>Spring charge</td>
<td>1a contact for Motor charging (MD)</td>
</tr>
</tbody>
</table>

**Digital Input (DI) monitoring**

- For BIF-CC and BIF-MD, Max. 3 contacts monitoring are available.
- For BIF-PR, 1 contact monitoring is available.

**Drawout position switch (BIF-CL)**

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>Function</th>
<th>Description</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor</td>
<td>Breaker Drawout position</td>
<td>Position : Connect or Test or Disconnect</td>
</tr>
<tr>
<td>Combination sample</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>-------------------</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

**Type**
- Main setting module
- Optional setting module
- Power supply

**Measurement**
- Load current (±2.5%)
- Leakage current (±15%)
- Power (active, reactive, apparent) (±2.5%)
- Energy (active, reactive) (±2.5%)
- Frequency (±2.5%)

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

**Alarm history**
- PAL1
- PAL2
- OVER
- GFR
- EPAL
- ER
- TAL

**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 (ln)
- Phase line method
- Normal connection or reverse connection

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

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 the breaker is detected. A air core coil which has good linearity is adopted.

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

4. **ASIC**
   This ASIC amplifies the signal detected by the current sensor coil and the detected signal of ground fault current which is vector composed from the detected signals of each phases.

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.

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\(\cdot\)m or below.)
   - Note) If the switch is set at points between steps, the characteristics setting value will be decided at either end of steps.

   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 shows the case that accessories are fully equipped.
For Power supply type P3 and P4, the high sensitive relay used in contact output may cause the chattering noise (wrong output of 1ms level) during ON and OFF operation, depending on the Panel placing condition. When it used in the quick responsive sequence, the filter circuit of a few milli-second (ms) should be provided or the double reading sampling should be implemented.

From some terminals are polarized, the wiring should be done correctly as to the polarity shown in the wiring diagram when the control voltage is DC. Auxiliary switch (AX) Standard type has no polarity.

Alarm reset (Terminal: RS1 and RS2) is available only for Power supply type P3, P4 and P5. In case of Power supply type P1 and P2, it can not be reset from the Control circuit terminal block (RS1 and RS2).

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.

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.

Alarm contacts (Terminal: RS1 and RS2) are also reset by removing PT1, PT2 power supply voltage. (longer than 1sec.)

From some terminals are polarized, the wiring should be done correctly as to the polarity shown in the wiring diagram when the control voltage is DC. Auxiliary switch (AX) Standard type has no polarity.

Note:
- On the drawout type, the cables should have the length which allow the control circuit terminal block to be moved to the left or right by 5mm.
- When a coil load is connected in the same control circuit as the ETR, surge absorbers are required to absorb the surge voltage.
- 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.
- For Power supply type P3 and P4, the high sensitive relay used in contact output may cause the chattering noise (wrong output of 1ms level) during ON and OFF operation, depending on the Panel placing condition. When it used in the quick responsive sequence, the filter circuit of a few milli-second (ms) should be provided or the double reading sampling should be implemented.
- 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.
Drawout type AE630-SW, AE1000-SW, AE1250-SW, AE1600-SW

**Main circuit terminal dimension**

**Front view**

- Operating panel center
- Control terminal (M3.5 screw)
- Neutral pole
- Aperture for the drawout handle

**Side view**

- Front face of control terminal
- Lifting hook hole
- Horizontal terminal (standard)
- Inside of the panel (thickness 1.6–3.2)

**Rear view**

- Operating panel center
- Neutral pole
- Outline of breaker

**Front view**

- Operating panel center
- Neutral pole
- Outline of breaker

**Side view**

- Vertical terminal
- Earth terminal M8 screw
- Fully drawout position

**Rear view**

- Operating panel center
- Neutral pole
- Outline of breaker

- Operating panel center
- Neutral pole
- Outline of breaker

- Operating panel center
- Insulation block
- Outline of breaker

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

Front view

- Operating panel center: 150 mm
- Control terminal (M3.5 screw): 235(150) mm
- Neutral pole: 42.5 mm
- Aperture for the drawout handle: 4 ø14 mm

Side view

- Disconnected: 54 mm
- Test: 35 mm
- Front face of control terminal: 283 mm
- Lifting hook hole: 17 mm
- Fully drawout position: 366 mm
- Inside of the panel (thickness: 1.6~3.2 mm)
- Earth terminal M8 screw: 452 mm

Rear view

- Operating panel center: 115 mm
- Neutral pole: 10 mm
- Outline of breaker: 105 mm

Main circuit terminal dimension

- Connecting area: 4 ø13 mm
- Earth terminal M8 screw: 36 mm
- Inside of the panel (thickness: 1.6~3.2 mm)

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE2000-SW</td>
<td>95</td>
</tr>
<tr>
<td>AE2500-SW</td>
<td>95</td>
</tr>
<tr>
<td>AE3200-SW</td>
<td>103</td>
</tr>
</tbody>
</table>

* : Mounting pitch
The numerals shown in parentheses are for 3 poles.
Drawout type AE4000-SWA

Front view

Operating panel center
Control terminal (M3.5 screw)
Neutral pole
Aperture for the drawout handle

Side view

Front face of control terminal
Lifting hook hole
Disconnected
Test
Connecting busbar size
All poles: T10xW150x4BUS/pole

Earth terminal
M8 screw
Panel
Inside of the panel (thickness 1.6~3.2)

Fully drawout position

Rear view

Operating panel center
Outline of breaker
Neutral pole

Note) 11

Inside of the panel (thickness 1.6~3.2)

Main circuit terminal dimension

Connecting area

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.
Outline dimensions

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

Front view

- Operating panel center
- Control terminals (M3.5 screw)
- Neutral pole
- Drawout handle radius 100
- Fixing bolts 2-M12
- Aperture for the drawout handle

Side view

- Disconnected S4
- Front face of control terminal
- Lifting hook hole
- M12 Weld nut
- Insulation block
- Earth terminal M8 screw
- Bus bar
- Fully drawout position
- Inside of the panel (thickness 1.6~3.2)

Rear view

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

Main circuit terminal dimension

The mounting angle should be prepared by the customer.

4P FN type

- Operating panel center
- Control terminals (M3.5 screw)
- Neutral pole
- Drawout handle radius 100
- Fixing bolts 2-M12
- Aperture for the drawout handle

Side view dimensions are same as 3 pole.
Fixed type AE630-SW, AE1000-SW, AE1250-SW, AE1600-SW

Front view

Operating panel center

Neutral pole

Earth terminal M8 screw (Left side)

Control terminal (M3.5 screw)

* : 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 1.6~3.2)

Rear view

Operating panel center

Neutral pole

Outline of breaker

Main circuit terminal dimension

Connecting area

Lifting hooks (HP)

HP is supplied with ACB Fixed type.
Outline dimensions

Fixed type AE2000-SWA

Front view

Side view

Rear view

Main circuit terminal dimension

Lifting hooks (HP)

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

HP is supplied with ACB Fixed type.
Fixed type AE2000-SW, AE2500-SW, AE3200-SW

Front view

Side view

Rear view

Main circuit terminal dimension

Lifting hooks (HP)
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

Panel

Earth terminal
M8 screw
(Left side)

Inside of the panel (thickness 1.6~3.2)

Rear view

Operating panel center

Outline of breaker

Neutral pole

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

Lifting hooks (HP)

HP is supplied with ACB Fixed type.
Fixed type AE4000-SW, AE5000-SW, AE6300-SW

Front view

Side view

Rear view

Main circuit terminal dimension

Lifting hooks (HP)

4P FN type

Front view

Rear view

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, Condenser trip device

Panel cut-out dimensions

Door frame panel cut-out dimensions

Operating panel center

Breaker mounting frame

Panel cut-out dimensions

Outline

Dimensions (mm)

Type | A
---|---
AE630-SW-AE1600-SW | 175
AE2000-SW-AE3200-SW | 195
AE2000-SA, AE4000-SWA | 179
AE4000-SW-AE6300-SW | 245

Vertical terminal adapter

Front terminal adapter

AE630~1600-SW

AE2000~3200-SW

Dimensions (mm)

Type | C | D | T
---|---|---|---
AE630-SW-AE1600-SW | 15 | 25 | 20
AE2000-SW-AE3200-SW | 15 | 25 | 20
AE2000-SA, AE4000-SWA | 25 | 95 | 20
AE4000-SW-AE6300-SW | 25 | 95 | 20

Drawout handle dimensions

Condenser trip device (COT)

Dimensions (mm)

Type | C | D | T
---|---|---|---
AE630-SW-AE1600-SW | 15 | 25 | 20
AE2000-SW-AE3200-SW | 15 | 25 | 20
AE2000-SA, AE4000-SWA | 25 | 95 | 20
AE4000-SW-AE6300-SW | 25 | 95 | 20

* : 345 (Fixed type)

4-M4 screw (for wiring)

2-M6 Mounting screw

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

### Neutral CT (NCT)

#### 630~2000A

- **ZT15B**: 48 15 29 62 46 15 70 25
- **ZT30B**: 68 30 37 82 66 30 90 50
- **ZT40B**: 85 40 43 92 81 40 100 50

#### 2500~4000A

- **ZT60B**: 140 60 73 150 46
- **ZT80B**: 160 80 82 169 48
- **ZT100B**: 185 100 93 190 50

#### 5000, 6300A

- **ZCT163**: 230 60 323 250 47
- **ZCT323**: 370 108 460 400 47
- **ZCT324**: 500 108 600 550 48

### External ZCT for transformer ground wire

- **Dimensions**: A B C D E (mm)
- **ZTA1200A (1200A)**
  - **A**: 227 197 140
  - **B**: 178 15 78.5
  - **C**: 360 203 203

- **ZTA2000A (2000A)**
  - **A**: 504 320 203
  - **B**: 214 117

### External ZCT for load circuits

- **Dimensions**: A B C D (mm)
  - **ZT15B**: 97 106
  - **ZT30B**: 122 142
  - **ZT40B**: 160 185

### ZCT with primary conductors

- **ZTA1200A (1200A)**
  - **Dimensions**: A B C D E (mm)
  - **ZT60B**: 140 60 73 150 46
  - **ZT80B**: 160 80 82 169 48
  - **ZT100B**: 185 100 93 190 50

- **ZTA2000A (2000A)**
  - **Dimensions**: A B C D (mm)
  - **ZT15B**: 97 106
  - **ZT30B**: 122 142
  - **ZT40B**: 160 185
Outline dimensions

UVT external unit

UVT external unit (380 ~ 460V AC)

Display onto panel board (DP2)

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

Panel attachment metal

Fixed screw M3

DP2 connection cable connection position (connector)

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

Terminal

Frame Ground

M3 terminal screws

IEC35mm rail holder

Power supply (100-240V AC/DC)

Terminal

Frame Ground

Mounting ø4.5 long hole

IEC35mm rail holder

P1 P2 SLD DG DA

Power supply (100-240V AC/DC)

MODBUS®

P1 P2 COM TR- TR+ SLD

Ter Ter FG
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.41 to P.50.

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.

When selecting conductors to be connected to AE breakers, please ensure that they have a sufficient current capacity. Refer to the right table.
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.

Dimensions (mm)

<table>
<thead>
<tr>
<th>Type</th>
<th>AE630-SW~AE3200-SW</th>
<th>AE2000-SWA</th>
<th>AE4000-SWA</th>
<th>AE6300-SW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable voltage</td>
<td>600V AC or less</td>
<td>660V AC, 690V AC or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>(Note 1) 0</td>
<td>(Note 1) 100</td>
<td>(Note 1) 200</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>(Note 3) 50</td>
<td>(Note 3) 50</td>
<td>(Note 3) 50</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>162</td>
<td>162</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>(Note 2) 50</td>
<td>(Note 2) 50</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Drawout type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>0</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>(Note 3) 50</td>
<td>(Note 3) 50</td>
<td>(Note 3) 50</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>240</td>
<td>240</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>(Note 2) 50</td>
<td>(Note 2) 50</td>
<td>(Note 2) 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 P58.

3. High altitude
   Since the heat radiation rate is reduced for use at 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.

Guarantee

1. Free guarantee period
   The free guarantee period of the product is one year from the day of purchase.

2. Scope of guarantee
   (1) We will repair the product free of charge within the guarantee period on condition that it has been used under the standard working conditions in conformity with the operating conditions, operating procedures, environmental conditions and instructions specified in the catalogs, manuals and caution labels on the product body.
   (2) In the following cases, the product will be repaired at your expense even within the free guarantee period.
   - Failure caused by your improper storage or handling, carelessness or negligence
   - Failure caused by inadequacies of installation
   - Failure caused by mis-operation or improper modification
   - Failure caused by external factors due to acts of God, such as fire and abnormal voltage, and natural disasters, such as earthquake, windstorm and flood
   - Failure caused by reasons that could not be foreseen on the level of science and technology at the time of delivery
   The term “guarantee” used in this section refers to the guarantee only of the delivered product. We are not liable to compensate for any damage induced by the failure of the delivered product.

3. Repair parts supplying period
   The supply of the repair parts is warranted for 5 years after discontinuation of the production. The supply is terminated as soon as the repair parts run out after the 5 years.
## Internal resistance, reactance and power consumption (per pole)

<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>0.0085</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)
## Deratations by ambient temperature

### (Table 1) Deratations of Max. rated current by ambient temperature

<table>
<thead>
<tr>
<th>Standard</th>
<th>Ambient Temperature</th>
<th>40°C</th>
<th>45°C</th>
<th>50°C</th>
<th>55°C</th>
<th>60°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE630-SW</td>
<td>630</td>
<td>630</td>
<td>630</td>
<td>630</td>
<td>630</td>
<td></td>
</tr>
<tr>
<td>AE1000-SW</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>AE1250-SW</td>
<td>1250</td>
<td>1250</td>
<td>1250</td>
<td>1250</td>
<td>1200</td>
<td></td>
</tr>
<tr>
<td>AE1600-SW</td>
<td>1600</td>
<td>1600</td>
<td>1600</td>
<td>1550</td>
<td>1500</td>
<td></td>
</tr>
<tr>
<td>AE2000-SWA</td>
<td>2000</td>
<td>2000</td>
<td>1900</td>
<td>1800</td>
<td>1700</td>
<td></td>
</tr>
<tr>
<td>AE2500-SW</td>
<td>2500</td>
<td>2500</td>
<td>2500</td>
<td>2450</td>
<td>2350</td>
<td></td>
</tr>
<tr>
<td>AE3200-SW</td>
<td>3200</td>
<td>3200</td>
<td>3200</td>
<td>3000</td>
<td>2900</td>
<td></td>
</tr>
<tr>
<td>AE4000-SWA</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td>3800</td>
<td>3600</td>
<td></td>
</tr>
<tr>
<td>AE4000-SW</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td>3900</td>
<td>3750</td>
<td></td>
</tr>
<tr>
<td>AE5000-SW</td>
<td>5000</td>
<td>5000</td>
<td>5000</td>
<td>5000</td>
<td>4750</td>
<td></td>
</tr>
<tr>
<td>AE6300-SW</td>
<td>6300</td>
<td>6300</td>
<td>5750</td>
<td>5500</td>
<td>5200</td>
<td></td>
</tr>
</tbody>
</table>

### (Table 2) Deratations of Max. rated current by ambient temperature 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>Ambient Temperature</th>
<th>40°C</th>
<th>45°C</th>
<th>50°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE630-SW</td>
<td>630</td>
<td>630</td>
<td>630</td>
<td></td>
</tr>
<tr>
<td>AE1000-SW</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>AE1250-SW</td>
<td>1250</td>
<td>1250</td>
<td>1250</td>
<td></td>
</tr>
<tr>
<td>AE1600-SW</td>
<td>1600</td>
<td>1600</td>
<td>1440</td>
<td></td>
</tr>
<tr>
<td>AE2000-SWA</td>
<td>2000</td>
<td>1900</td>
<td>1700</td>
<td></td>
</tr>
<tr>
<td>AE2500-SW</td>
<td>2500</td>
<td>2500</td>
<td>2500</td>
<td></td>
</tr>
<tr>
<td>AE3200-SW</td>
<td>3200</td>
<td>3200</td>
<td>2880</td>
<td></td>
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<td>AE6300-SW</td>
<td>6300</td>
<td>5750</td>
<td>5200</td>
<td></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 55. As for ambient temperature exceeding 60°C, please inquire us.
# Technical Information

## AE-SW Series Air Circuit Breakers

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

<table>
<thead>
<tr>
<th>Branch circuit breaker</th>
<th>AE630-SW</th>
<th>AE1000-SW</th>
<th>AE1250-SW</th>
<th>AE1600-SW</th>
<th>AE2000-SW</th>
<th>AE2500-SW</th>
<th>AE3200-SW</th>
<th>AE4000-SW</th>
<th>AE5000-SW</th>
<th>AE6300-SW</th>
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</tr>
</tbody>
</table>

*The values in the table represent the maximum current at which the branch circuit breakers may operate before tripping.*

*The numbers shown in parentheses are for AE-SW with MCR.(When set MCR).*
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).
## Ordering information for Mitsubishi AE-SW series air circuit breaker

### (General use—WS Type, Special use—WB Type, Protective coordination use—WF Type)

<table>
<thead>
<tr>
<th>Customer (name)</th>
<th>Order No.</th>
<th>Type</th>
<th>Order Issuer</th>
</tr>
</thead>
</table>

### Order No. Number of units

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of units</th>
</tr>
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<tbody>
<tr>
<td>AE</td>
<td>1600-SW</td>
</tr>
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</table>

### Number of poles

<table>
<thead>
<tr>
<th>3P</th>
<th>4P</th>
</tr>
</thead>
</table>

### Current setting lr

| 1600 | A |

### CT rating

| A |

### Applicable standard

| EEC 60947-2 |

### Ambient temperature

| 40°C (Standard) |

### Connection

| Fixed type |

### Main circuit terminal

| Vertical terminal (DRVT) standard | Horizontal terminal (FXVT) |

### Electronic trip relay (ETR)

| With ETR |

### Reset type

| Automatic Reset (Standard) | Manual Reset (MRE) |

### Power supply

| P1: 100–240V A/C | P2: 24–60V DC |

### Addtional function

| Extension module (EX1) |

### Network

| BIF-CC |

### Condenser trip device

| 100–110V AC | 200–220V AC |

### Condenser trip device (COT)

| 100–110V AC | 200–220V AC |

### Note1: In case of AE630-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 58.

### Note3: For the terminal for AE630-SW, AE2000-SWA, and AE4000-SWA to AE6300-SW, Vertical terminal type only is available. (FXVT or DRVT)

### Note4: Refer to Page 11 and Page 41-43.

### Note5: Neutral CT is required for ground fault or neutral pole protection, when 3 Pole breaker is used for 3 phase 4 wire system.

### Note6: Neutral CT is required for ground fault or neutral pole protection, when 3 Pole breaker is used for 3 phase 4 wire system.

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

### Note8: Some module types are not provided BA. Refer to Page 15.

### Note9: Door interlock is available for 2 units (MII).

### Note10: Power Supply comes from the top terminals.

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

### Note12: Current capacity of the neutral poles

### Note13: Power Supply comes from the bottom terminals.

### Note14: FN: 100% of the rated current (See page 45, 50 for the outline and dimensions.)

### Remark

|  |

### Electrical accessories

| Auxiliary switch (Standard/AX) | High capacity (HAX) |
| 2 or 4 or 6 or 8 or 10 | 2 or 4 or 6 or 8 or 10 |

### Motor charging (MD)

| 100–125V AC | 200–250V AC | 204V DC |

### Closing coil (CC)

| 100–250V AC | 24–48V DC |

### Shunt trip device (SHT)

| 100–250V AC | 380–500V AC | 24–48V DC |

### Under voltage trip device (UVT)

| 1200–240V AC | 380–460V AC | 24V DC |

### Mechanical accessories

| Push button cover (BC-L) | Counter (CNT) |
| Cylinder lock (CVL) | Door interlock (DI) |
| Terminal cover (TTC) | Door frame (DF) |
| Dust cover (DUC) | Interpose barrier (BA) |
| Mechanical interlock (MI) | for 2 units (MII) |

### Wiring system

| Vertical terminal (DRVT) standard | Horizontal terminal (FXVT) |

### Shutter lock (SST-LOCK)

| MI3 |

### Interphase barrier (BA)

| 3P |

### Door frame (DF)

| 3P |

### Dust cover (DUC)

| 3P |

### Terminal cover (TTC)

| 3P |

### Door interlock (DI)

| 3P |

### Cylinder lock (CVL)

| 3P |

### Push button cover (BC-L)

| 3P |

### Counter (CNT)

| 3P |

### Auxiliary switch (Standard/AX) | High capacity (HAX) |

| 2 or 4 or 6 or 8 or 10 | 2 or 4 or 6 or 8 or 10 |

### Motor charging (MD)

| 100–125V AC | 200–250V AC | 204V DC |

### Closing coil (CC)

| 100–250V AC | 24–48V DC |

### Shunt trip device (SHT)

| 100–250V AC | 380–500V AC | 24–48V DC |

### Under voltage trip device (UVT)

| 1200–240V AC | 380–460V AC | 24V DC |

### Electrical accessories

| Auxiliary switch (Standard/AX) | High capacity (HAX) |
| 2 or 4 or 6 or 8 or 10 | 2 or 4 or 6 or 8 or 10 |

### Motor charging (MD)

| 100–125V AC | 200–250V AC | 204V DC |

### Closing coil (CC)

| 100–250V AC | 24–48V DC |

### Shunt trip device (SHT)

| 100–250V AC | 380–500V AC | 24–48V DC |

### Under voltage trip device (UVT)

| 1200–240V AC | 380–460V AC | 24V DC |
## Ordering information for Mitsubishi AE-SW series air circuit breaker

### General use: WS Type, Special use: WB Type, Protective coordination use: WF Type

<table>
<thead>
<tr>
<th>Customer(name)</th>
<th>Order Issuer</th>
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<table>
<thead>
<tr>
<th>Type</th>
<th>Number of poles</th>
<th>Order No.</th>
<th>Number of units</th>
<th>units</th>
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<tbody>
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### Current setting Ir

<table>
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<td>IEC</td>
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<tr>
<td>CCC</td>
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### Applicable standard

<table>
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<tr>
<th>40°C (Standard)</th>
<th>Others</th>
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<tr>
<td>C</td>
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### Ambient temperature

<table>
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<tr>
<th>Connection</th>
<th>Fixed type</th>
<th>Drawout type</th>
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</thead>
<tbody>
<tr>
<td>P.11</td>
<td></td>
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</tbody>
</table>

### Main circuit terminal

- **Horizontal terminal (FIX):** Vertical terminal (FIX-VT)
- **Vertical terminal (DR):** Vertical terminal (DR-VT)
- **Front terminal (DR-FT):** Vertical terminal (DR-FT)

### Electronic trip relay (ETR)

- **With ETR Type**
  - Optional setting module
    - Ground fault protection: G1
    - Neutral pole 50% protection: N1
  - Earth leakage protection: AP
  - Additional Pre-alarm: NA
  - Without optional setting: N

### Reset type

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

### Additional function

- **Extension module (EX1):**
  - Display (DP1)
  - Display (DP2)

### Power supply

- **100–240V AC**
- **100–125V DC**
- **24–48V DC**
- **380–500V AC**
- **200–220V AC**
- **200–240V AC**
- **48V DC**

### Electrical accessories

- **Auxiliary switch (AX):**
  - Standard: 2 or 4 or 6 or 8 or 10
  - High capacity: 2 or 4 or 6 or 8 or 10
- **Motor charging (MD):**
  - 100–125V AC
  - 200–250V AC
  - 48V DC
- **Closing coil (CC):**
  - 100–250V AC
  - 24–48V DC
- **Shunt trip device (SHT):**
  - 100–380V AC
  - 24–48V DC

### Under voltage trip device (UVT)

- **100–120V AC**
- **200–240V AC**
- **380–400V AC**
- **48V DC**
- **100–110V DC**
- **120–125V DC**

### 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):**

### Condenser trip device

- **COT:** 100–110V AC
- **200–220V AC**

### Note

1. In case of AE630-SW and AE2000-SW Low rating type, please specify CT rating. Refer to Page 9 and Page 20.
2. There is a case to be derated by ambient temperature. Refer to Page 58.
3. As for the terminal for AE2000-SWA, AE4000-SWA and AE4000-SW~AE6300-SW, Refer to Page 11 and Page 41–43.
4. This setting is available for change by customer later. A preliminary setting of CL at factory shipment is as follows.
5. Neutral CT is required for Ground fault or Neutral pole protection, when 3 Pole breaker is used for 3 phase 4 wires system.
6. Neutral CT is required for Ground fault or Neutral pole protection, when 3 Pole breaker is used for 3 phase 4 wires system.
7. Not available for WB1, WB2 and WB3 Main setting module.
8. Not available for WB1, WB2 and WB3 Main setting module.
9. Not available for AE4000-SWA 4P and AE4000-SWA~AE6300-SW.
10. The combined installation of DI and MI is not available.
11. Some module types are not provided BA. Refer to Page 15.
12. Power Supply comes from the top terminals.
13. Power Supply comes from the bottom terminals.
14. Current capacity of the neutral poles
15. HK: 50% of the rated current
16. FN: 100% of the rated current (See page 45, 50 for the outline and dimensions.)

### Remark
### Ordering information

**Ordering information for Mitsubishi AE-SW series air circuit breaker (Generator protection use... WM Type)**

<table>
<thead>
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<th>Customer (name)</th>
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<td>AE_SWA</td>
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**Number of poles**

<table>
<thead>
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<th>3P</th>
<th>4P</th>
</tr>
</thead>
</table>

**Main circuit terminal**

- Horizontal terminal (FX-VT)
- Vertical terminal (BD-VT)
- Front terminal (DR-VT)

**Electronic trip relay (ETR)**

<table>
<thead>
<tr>
<th>With ETR</th>
<th></th>
<th></th>
</tr>
</thead>
</table>

**Reset type**

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

**Power supply**

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

**Additional function**

- Neutral CT (NCT)
- External ZCT
- ZT
- VT unit

**Wire system (when EX1 is specified)**

- EX1
  - 34W

**Electrical accessories**

- Auxiliary switch
- Motor charging
- Closing coil
- Shunt trip device
- Under voltage trip device

**Mechanical accessories**

- Push button cover
- Cylinder lock
- Door interlock
- Door interlock cover
- Interphase barrier
- Mechanical interlock

**Condenser trip device**

- 100–110V AC
  - 200–220V AC

**Other details**

- Order issuer

---

**Notes**

1. Please specify current setting (Ir) from the specification table. Refer to Page 9 and 1 and 10.
2. There is a case to be derated by ambient temperature. Refer to Page 58.
3. As for the terminal for AE2000-SWA, AE4000-SWA and AE4000-SW~AE6300-SW, vertical terminal type only is available. (FX-VT or DR-VT)
4. Refer to Page 11 and Page 41~43.
5. This setting is available for change by customer later. A preliminary setting of CL at factory shipment is as follows.
6. Not available for AE6300-SW with CT rating: 250A or 315A or 500A.
7. N5 optional setting module is used for 3 phase 4 wires system. (4 Pole breaker or 3 pole breaker with Neutral CT)
8. Neutral CT is required for Ground fault or Neutral pole protection, when 3 Pole breaker is used for 3 phase 4 wires system.
9. In case of Earth leakage protection, it is required External ZCT.
10. DC24V and DC48V are not available for AE4000-SWA 4P and AE4000-SW~AE6300-SW.
11. The combined installation of DI and MI3 is not available.
12. Some module types are not provided BA. Refer to Page 15.
13. Power Supply comes from the top terminals.
14. Power Supply comes from the bottom terminals.
15. Current capacity of the neutral poles
16. 50% of the rated current

---

**Remark**

- Order issuer
<table>
<thead>
<tr>
<th>Country/Region</th>
<th>Corporation Name</th>
<th>Address</th>
<th>Telephone</th>
</tr>
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<tbody>
<tr>
<td>Austria</td>
<td>Mitsubishi Electric Austria Pty. Ltd.</td>
<td>348 Victoria Road, Rydalmer, N.S.W. 2116, Australia</td>
<td>+61-2-9684-7777</td>
</tr>
<tr>
<td>Belarus</td>
<td>Tehniskiy</td>
<td>Oktjabrskaya 19, Off. 705, BY-22000 Minsk, Belarus</td>
<td>+375 (017) 210 46 26</td>
</tr>
<tr>
<td>Belgium</td>
<td>Koning &amp; Hartman B.V.</td>
<td>Woluwed大街17, BE-1690 Vivy, Belgium</td>
<td>+32 (02) 929 79 40</td>
</tr>
<tr>
<td>Chile</td>
<td>Phoenix S.A.</td>
<td>Via Atauro 421A, 36-D P.O. Box Vina del Mar, Chile</td>
<td>+56-33-3 250 600</td>
</tr>
<tr>
<td>China</td>
<td>Mitsubishi Electric Automation (China) Ltd.</td>
<td>5F, Office Tower 3, Jinjiang Centre, 18 Janggunnam Road, Daejeon, 200100, South Korea</td>
<td>+82-10-1232-3208</td>
</tr>
<tr>
<td></td>
<td>Mitsubishi Electric Automation (China) Ltd. BeiJing Branch</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mitsubishi Electric Automation (China) Ltd.</td>
<td>Room 2512-2516, Great China International Exchange Square, Jiangtai Rd., Futian District, Shenzhen, 518034</td>
<td>+86-10-6558-8830</td>
</tr>
<tr>
<td></td>
<td>Mitsubishi Electric Automation (China) Ltd. ShangZhen Branch</td>
<td>Room 1606, No. 1680 Guang East Road, Hasu District, GuangZhou, China 510305</td>
<td>+86-20-8093-6730</td>
</tr>
<tr>
<td></td>
<td>Mitsubishi Electric Automation (China) Ltd.</td>
<td>Room 1605, No. 1680, Guang East Road, Hasu District, GuangZhou, China 510305</td>
<td>+86-20-8093-6730</td>
</tr>
<tr>
<td></td>
<td>Mitsubishi Electric Automation (Hong Kong) Ltd.</td>
<td>Block B, Room 407-408, Shanghai Center Office Building, No. 9 ShanJiang East Road, ChengDu, China 610021</td>
<td>+86-28-8486-8030</td>
</tr>
<tr>
<td>Colombia</td>
<td>Proelectro Representaciones S.A.</td>
<td>Carretera a 42 km 5,867, Cand 109, Bagua Colombia</td>
<td>+57-4-4414284</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>AUTOCONTROL SYSTEMS S.R.O.</td>
<td>Technologická 3748, CZ-708 00 Ostrava - Puertovec</td>
<td>+420 595 619 151</td>
</tr>
<tr>
<td>Denmark</td>
<td>BEBEL ELECTRONICS A/S</td>
<td>LYKKEGARDSVEJ 17, DK-4000 RISKBJERG</td>
<td>+45 (0456) 75 66 69</td>
</tr>
<tr>
<td>Egypt</td>
<td>Cairo Electrical Group</td>
<td>9, Rosstum St. Garden City P.O. Box 165-11516 Maglis El-Shaab, Cairo - Egypt</td>
<td>+20-2-2979-1337</td>
</tr>
<tr>
<td>France</td>
<td>Mitsubishi Electric Europe B.V.</td>
<td>25, Boulevard des Broux, F-94701 Nanterre Cedex</td>
<td>+33 (0) 1 58 88 55 68</td>
</tr>
<tr>
<td>Germany</td>
<td>Mitsubishi Electric Europe B.V.</td>
<td>Goehte Str. 8, 40880 Ratingen, Germany</td>
<td>+49 (0) 2152 480-0</td>
</tr>
<tr>
<td>Greece</td>
<td>KALAMARIKIS - SAPOUNAS S.A.</td>
<td>IONIAS &amp; NEROMILIOU STR., CHAMOMILLOS ACHARNES, ATHENS, 13679 Greece</td>
<td>+30-2102-406000</td>
</tr>
<tr>
<td>Hungary</td>
<td>Meltpro Ltd.</td>
<td>Farti utca 14, HU-1107 Budapest, Hungary</td>
<td>+36 (01) 413-9726</td>
</tr>
<tr>
<td>India</td>
<td>Mitsubishi Electric India Private Limited</td>
<td>2nd Floor, Tower A&amp;B, Cyber Greens, DLF Cyber City, DLF Phase III, Gurgaon - 122 022, Haryana, India</td>
<td>+91-124-663000</td>
</tr>
<tr>
<td></td>
<td>Mitsubishi Electric Co. Pvt. Ltd.</td>
<td>Plot No.32 G/F, Sector-6, RTM, Manesar, Hisar - 125050, India</td>
<td>+91-124-669-5300</td>
</tr>
<tr>
<td>Indonesia</td>
<td>P.T. Sahabat Indonesia</td>
<td>P.O.Box 5045 Kawasaki Indi. Perumgutan, Jakarta, Indonesia</td>
<td>+62-21-6106151-9</td>
</tr>
<tr>
<td>Israel</td>
<td>Gino Industries Ltd.</td>
<td>28, Schiff 2, L2332301 Na, Israel</td>
<td>+972 (0)4-856-9666</td>
</tr>
<tr>
<td>Italy</td>
<td>Mitsubishi Electric Europe B.V.</td>
<td>Viale Colonetti 1, 1-20441 Aradir Franea (MI), Italy</td>
<td>+39-093-69053</td>
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<tr>
<td>Kazakhstan</td>
<td>Kazpromovmatokoa</td>
<td>ul. Zhambyla 28, KAZ - 10017 Karaganda</td>
<td>+7-712-50-1000</td>
</tr>
<tr>
<td>Korea</td>
<td>Mitsubishi Electric Automation Korea Co., Ltd.</td>
<td>1496-6, Gayang-Dong, Gangseo-Gu, Seoul, Korea</td>
<td>+82-2-366-9672</td>
</tr>
<tr>
<td>Lebanon</td>
<td>Le Comptoir d'Electricite Generale-Lebanon</td>
<td>Cibacso Center - Block A Autostate Dora, P.O. Box 11-2597 Beirut - Lebanon</td>
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</table>
For Safety: Please read the instruction manual carefully before using the products in this catalog. Wiring and connection must be done by the person have a specialized knowledge of electric construction and wiring.

Eco Changes is the Mitsubishi Electric Group’s environmental statement, and expresses the Group’s stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.

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