

Air Circuit Breakers

AME Series

Instruction Manual

Applicable Breaker Types:

AME3B
AME4B
AME6B
AME8B
AME10B

Please retain this manual for future reference.

TERASAKI ELECTRIC CO., LTD.

INTRODUCTION

Thank you for purchasing the Terasaki AME Series Air Circuit Breaker for generator protection (hereinafter referred to as the ACB).

Please read this manual thoroughly to ensure correct use of the ACB.

To Customers:

This manual is to be delivered to the user after completion of the installation work.

To Users:

Please keep this manual safely for later reference.

Safety Notices

Be sure to read this manual and other associated documents accompanying the product thoroughly to be familiarize yourself with the product handling, safety information, and all other precautions before mounting, using, servicing, or inspecting the product.

In this manual, safety notices are divided into "Warning" and "Caution" according to the hazard level:

Warning :

A warning notice with this symbol indicates that neglecting the suggested procedure or practice could be fatal or result in serious personal injury.

Caution :

A caution notice with this symbol indicates that neglecting the suggested procedure or practice could result in moderate or slight personal injury and/or property damage.

Note that failing to observe caution notices could result in serious injury/damage in some situations.

Because safety notices contain important information, be sure to read and observe them.

■ Operation Precautions

See pages 13, 15, 18 and 19.

Warning

- **Never touch live terminal parts
Otherwise, electric shock may result.**

Caution

- **If the ACB trips open automatically, remove the cause before closing the ACB.
Otherwise, a fire could result.**

■ Installation Precautions

See pages 4 to 8.

Warning

- Be sure to open or trip the live ACB before mounting or dismounting it. Otherwise, a fire or personal injury may result.
- Never touch live parts or terminals when mounting or dismounting the live ACB. Otherwise, electric shock may result.

Caution

- Installation work must be performed by competent persons.
- Prior to commencing any work on the ACB, stop the generator and open a disconnect or the like to isolate all sources of power/voltage from both the primary and auxiliary circuits. Otherwise, electric shock may result.
- Be sure to bring the connecting conductors into close contact with the stud bar or the plug-in mounting base terminal. Otherwise, a fire could result.
- When terminating conductors to the ACB, tighten terminal screws to the torque specified in this instruction manual. Otherwise, a fire could result.
- Avoid blocking the arc gas vents of the ACB to ensure adequate arc space (insulation distance). Blocking the vents could result in failure of ACB tripping.
- Do not place the ACB in such an area that is subject to high temperature, high humidity, dusty air, corrosive gas, strong vibration and shock, or other unusual conditions. Mounting in such areas could cause a fire, non-tripping, or malfunction.
- Be careful to prevent foreign objects (debris, concrete powder, iron powder, etc.) and rainwater from entering the ACB. These materials inside the ACB could cause a fire or non-tripping.
- Use both hands to support the ACB when mounting or dismounting it. A heavy ACB should be carried by two persons. Dropping or toppling the ACB may cause damage to it or personal injury.

■ OCR Field Tests Precautions

See pages 20, 21, 23 and 25.

Caution

- Field tests must be performed by competent persons.
- Never touch live terminal parts. Otherwise, electric shock may result.

■ Maintenance and Inspection Precautions

See page 28.

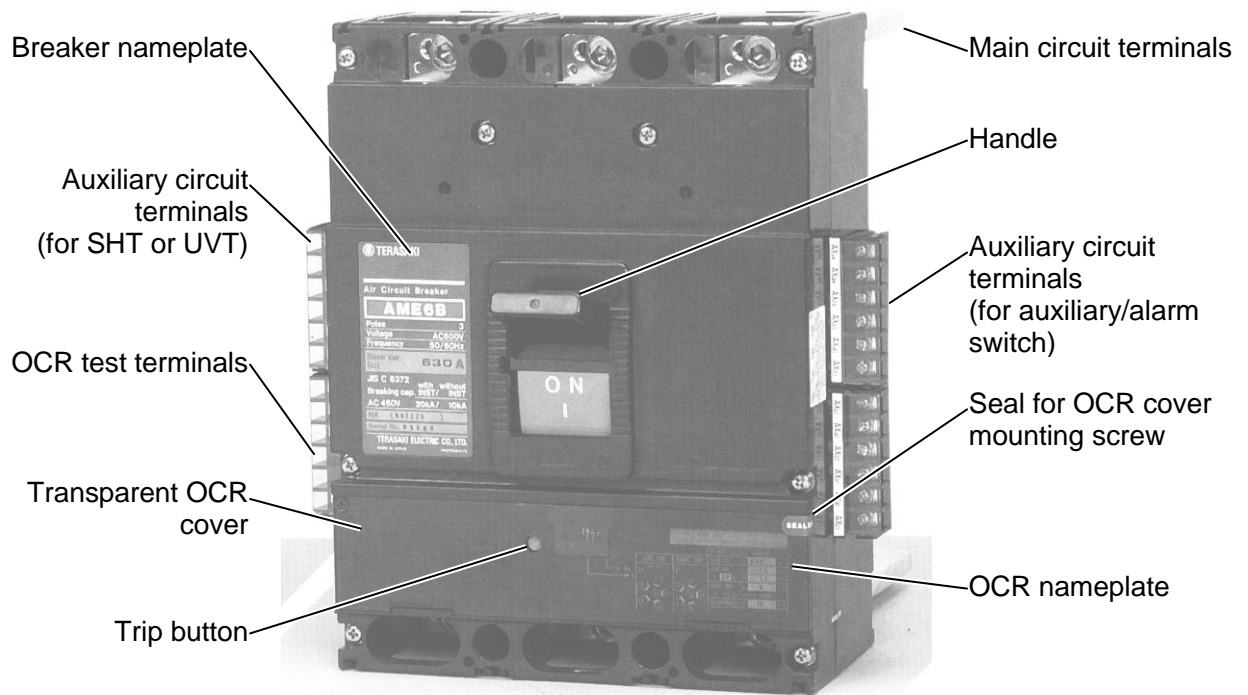
Caution

- ACB maintenance, inspection and/or parts replacement must be performed by competent persons.
- Prior to commencing any work on the ACB, stop the generator and open a disconnect or the like to isolate all sources of power/voltage from both the primary and auxiliary circuits. Otherwise, electric shock may result.
- Retighten the terminal screws periodically to the specified torque. Otherwise, a fire could result.

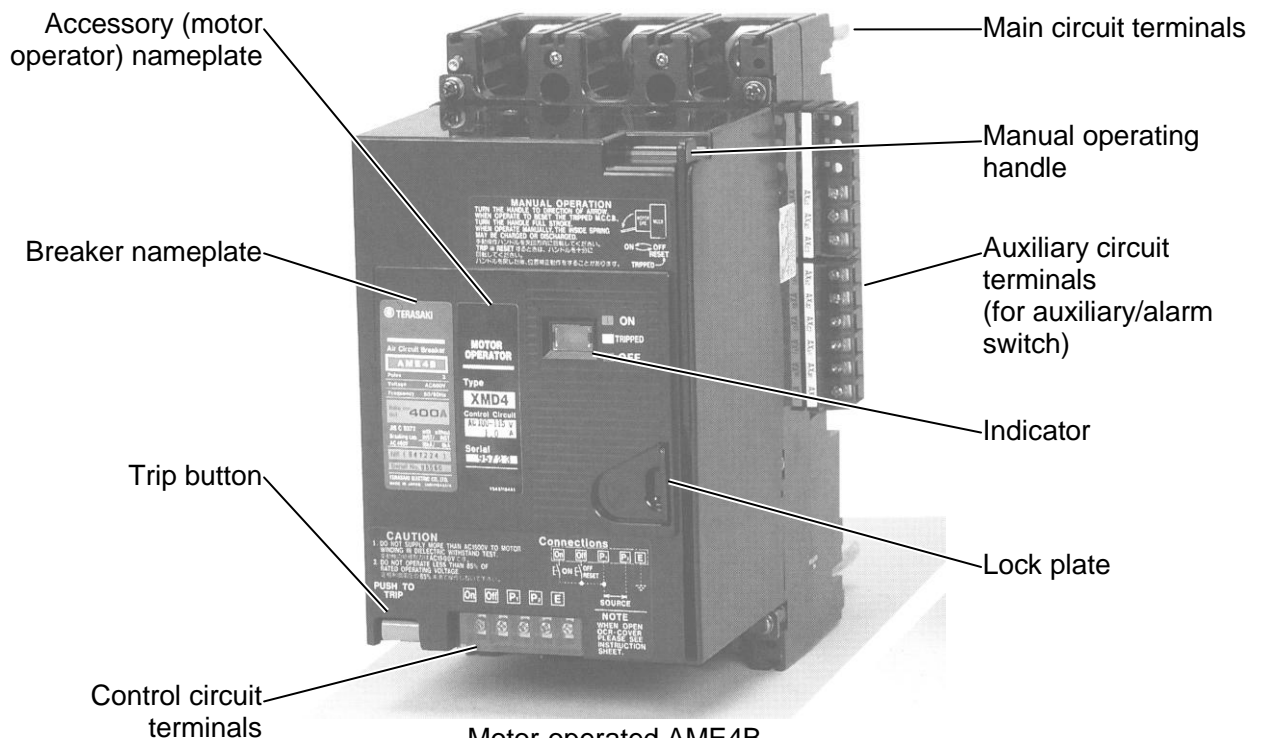
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1. OUTER VIEW



Direct-operated AME6B
(rear-connected type)



Motor-operated AME4B
(rear-connected type)

2. RECEIVING AND HANDLING

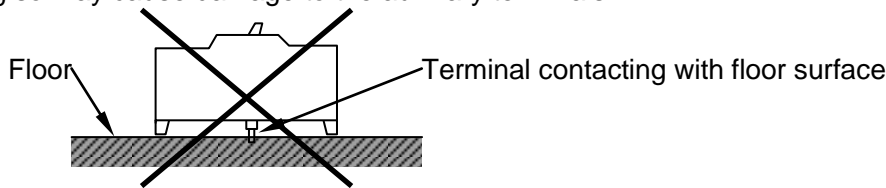
2.1 Unpacking Precautions

The ACB from Terasaki is completely assembled, inspected and tested both electrically and mechanically at the factory, then shipped in fully guaranteed conditions in construction and operation. Upon receipt of your ACB, check the following. If you have any question or any problem, contact your local agent or our branch office.

- 1) Check that the ACB is not damaged during shipment.

Caution: During unpacking, do not lay the plug-in type ACB on a flat surface with the backside down.

Doing so may cause damage to the auxiliary terminals.



- 2) Check that the ratings shown on the ACB nameplate, OCR nameplate, and accessory nameplate are as you specified.
 - When the ACB is equipped with the XMD4M motor operator, remove the motor operator before checking the OCR nameplates. The motor operator is hinged. For procedures for removing and mounting the operator, see [3] *Before and After Checking the Trip Settings, XMD Series Motor Operator - Operating Instructions*.

2.2 Transportation Precautions

- 1) Use both hands to transport the ACB. A heavy ACB should be carried by two persons. Dropping or toppling the ACB may cause damage to it or personal injury.

- **ACB Mass (kg)**

ACB type	Manual operated		Motor operated	
	Rear-connected	Plug-in	Rear-connected	Plug-in
AME3B, AME4B	6.5	5	11.2	9.7
AME6B	10	9.6	15.6	15.2
AME8B, AME10B	19.5	16	25.9	22.4

- 2) Do not carry the ACB by the auxiliary terminal block or stud bar. Doing so may cause damage or dropping.
- 3) Avoid strong vibration or shock to the ACB during transportation or installation. Otherwise, damage may result.

2.3 Storage Precautions

It is recommended that the ACB be used as soon as you have received it. If it is necessary to store the ACB for some time before its installation, please note the following for proper storage:

- 1) Store the ACB in a dry indoor location to prevent condensation due to sudden changes in temperature. Condensation has a harmful effect on the ACB insulation.
- 2) Store the ACB in a clean place free of corrosive gases, dirt and dust. In particular, a mixture of cement dust and moisture can cause corrosion in the various metal parts of the ACB, and fully protect the ACB from such mixtures.

- 3) Place the ACB on a flat, level surface in its normal standing position.
(Do not turn the ACB sideways.)
- 4) Do not place the ACB directly on the floor.
- 5) Do not expose the ACB to direct sunlight for a long time.

3. INSTALLATION

3.1 Installing Rear-Connected ACB

- For details of ACB mounting dimensions, see the catalogue.

⚠ Caution

- (1) Installation work must be performed by competent persons.
- (2) Prior to commencing any work on the ACB, stop the generator and open a disconnect or the like to isolate all sources of power/voltage from both the primary and auxiliary circuits. Otherwise, electric shock may result.
- (3) When terminating conductors to the ACB, tighten terminal screws to the torque specified in the following table.
Otherwise, a fire could result.

● Terminal Screws and Tightening Torque

Units in N·m

ACB type	Main circuit		Auxiliary circuit	
	Terminal screw	Tightening torque	Terminal screw	Tightening torque
AME3B, AME4B AME6B, AME8B, AME10B	Hex. socket head screw M12	40.2 - 65.7	Pan head screw M3.5	0.88 - 1.18

- (4) Be sure to bring the connecting conductors into close contact with the stud bars. Otherwise, a fire could result.
- (5) Avoid blockage of the arc gas vents to ensure adequate arc space (insulation distance). Blocking the arc gas vents could prevent the ACB from tripping.
- (6) Do not place the ACB in such an area that is subject to high temperature, high humidity, dusty air, corrosive gas, strong vibration and shock, or other unusual conditions. Mounting in such areas could cause a fire, non-tripping, or malfunction.
- (7) Be careful to prevent foreign objects (debris, concrete powder, iron powder, etc.) and rainwater from entering the ACB. These materials inside the products could cause a fire or non-tripping.

- (8) Use both hands to support the ACB when mounting or dismantling it. A heavy ACB, in particular, should be held by two persons. Dropping or toppling the ACB may cause damage to it or personal injury.

● ACB Mass (kg)

ACB type	Manual operated	Motor operated
AME3B, AME4B	6.5	11.2
AME6B	10	15.6
AME8B, AME10B	19.5	25.9

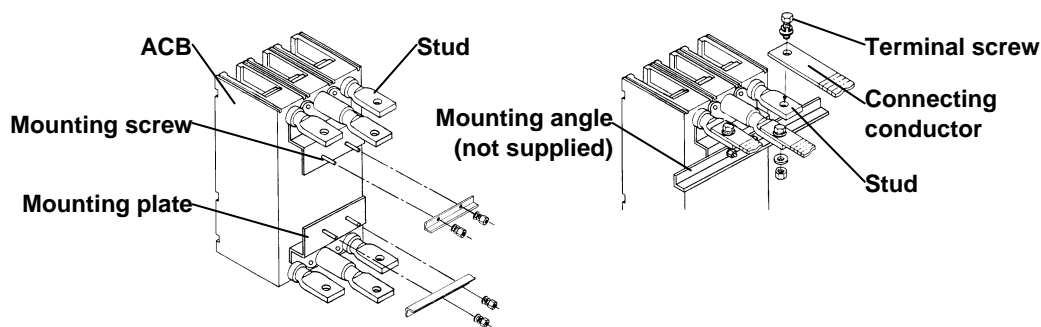


Fig. 1 Installation Example (AME4B with horizontal stud bar)

● ACB Mounting Screws and Tightening Torque

ACB type	Screw diameter	Tightening torque N·m
AME3B, AME4B	M8	11.8 - 18.6
AME6B,	M10	22.5 - 37.2
AME8B, AME10B	M8	11.8 - 18.6

Other Precautions

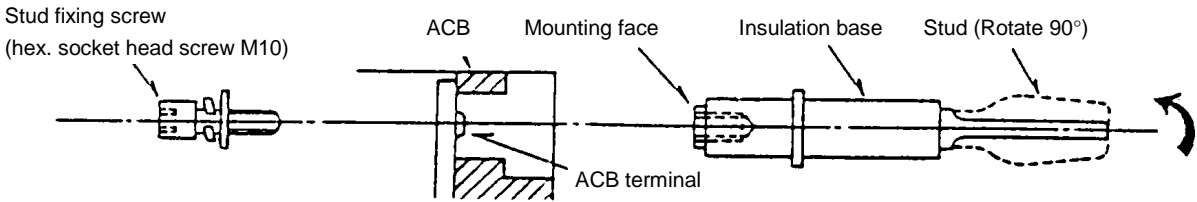
1) Install the ACB main unit vertically.

- For AME3B, AME4B and AME6B, the stud bar direction can be changed from horizontal to vertical in the field.

When changing the stud bar direction, observe the following safety notice. This work must be done by competent persons.

⚠ Caution

(1) Remove the stud fixing screw and then rotate the stud 90° to the vertical position.



**Fig. 2
Stud Assembly**

(2) Clean the stud mounting face which comes into contact with the ACB terminal. Dust or foreign materials on the mounting face may cause a fire.

(3) Insert the stud until it comes into contact with the ACB terminal. Insufficient contact may cause a fire.

(4) Tighten the stud fixing screw to a torque of 19 - 29 N·m. Insufficient torque may cause a fire. Excessive torque may damage the screw.

(5) Attach the accessory insulating tube to the center pole (S phase) in order to ensure the insulation distance between phases.

2) Ensure that a mounting angle has sufficient strength to support the ACB mass.

Vibration, in particular, must be taken into consideration.

Be sure to avoid resonance.

Otherwise, vibration of the switchboard could result in false tripping of the ACB.

3) Do not place the ACB in such an area that is subject to direct sunlight.

4) Clean the connecting surface.

It is recommended that the connecting surface of the connecting conductors be subject to silver-plating or the like in order to reduce the contact resistance on the surface.

5) When applying the frame current continuously, use the connecting conductors whose size is equal to or larger than shown below.

Otherwise, overheat may result.

ACB Type	AME3B	AME4B	AME6B	AME8B	AME10B
Frame current *	250A	400A	630A	800A	1000A
Conductor size	150 mm ²	2 x 100 mm ²	2 x 50 x 5	2 x 50 x 5	2 x 60 x 5

*) At ambient temperature of 45 °C

6) Ensure adequate insulation distance (specified per your switchboard) from bare live parts of terminals and connecting conductors to a mounting angle and bare live parts of other components.

7) attach the accessory insulating tube to the center pole (S-phase) to ensure insulation against other poles.

8) Secure the connecting conductors firmly using supporting means so that an electromagnetic force caused by a large current flowing through the ACB or other harmful force does not directly act upon the ACB stud.

3.2 Installing Plug-in ACB

- For details of ACB mounting dimensions, see the catalogue.

⚠ Warning
<p>(1) Be sure to open or trip the live ACB before mounting or dismantling it. Otherwise, a fire or personal injury may result.</p> <p>(2) Never touch live parts or terminals when mounting or dismantling the live ACB. Otherwise, electric shock may result.</p>

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<p>(1) Installation work must be performed by competent persons.</p> <p>(2) Prior to commencing any work on the ACB, stop the generator and open a disconnect or the like to isolate all sources of power/voltage from both the primary and auxiliary circuits. Otherwise, electric shock may result.</p> <p>(3) Tighten the terminal screws to the torque specified in the following table. Otherwise, a fire could result.</p> <p>● Terminal Screws of Plug-in Mounting Base and Tightening Torque Units in N·m</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th rowspan="2">ACB Type</th> <th colspan="2">Main circuit</th> <th colspan="2">Auxiliary circuit</th> </tr> <tr> <th>Terminal screw</th> <th>Tightening torque</th> <th>Terminal screw</th> <th>Tightening torque</th> </tr> </thead> <tbody> <tr> <td>AME3B, AME4B</td> <td>Hex. nut M10</td> <td>18.6 - 29.4</td> <td rowspan="3" style="text-align: center;">Pan head M3.5</td> <td rowspan="3" style="text-align: center;">0.88 - 1.18</td> </tr> <tr> <td>AME6B</td> <td>Hex. nut M16</td> <td>51.5 - 84.3</td> </tr> <tr> <td>AME8B, AME10B</td> <td>Hex. nut M12</td> <td>40.2 - 65.7</td> </tr> </tbody> </table> <p>(4) Be sure to bring the connecting conductors into close contact with the plug-in mounting base terminal. Otherwise, a fire could result.</p> <p>(5) Avoid blocking the arc gas vents of the ACB to ensure adequate arc space (insulation distance). Blocking the vents could result in failure of ACB tripping.</p> <p>(6) Do not place The ACB in such an area that is subject to high temperature, high humidity, dusty air, corrosive gas, strong vibration and shock, or other unusual conditions. Mounting in such areas could cause a fire, non-tripping, or malfunction.</p> <p>(7) Be careful to prevent foreign objects (debris, concrete powder, iron powder, etc.) and rainwater from entering the ACB. These materials inside the ACB could cause a fire or non-tripping.</p> <p>(8) Use both hands to support the ACB when mounting or dismantling it. A heavy ACB should be carried by two persons. Dropping or toppling the ACB may cause damage to it or personal injury.</p> <p>● ACB Mass (kg)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>ACB type</th> <th>Manual operated</th> <th>Motor operated</th> </tr> </thead> <tbody> <tr> <td>AME3B, AME4B</td> <td style="text-align: center;">5</td> <td style="text-align: center;">9.7</td> </tr> <tr> <td>AME6B</td> <td style="text-align: center;">9.6</td> <td style="text-align: center;">15.2</td> </tr> <tr> <td>AME8B, AME10B</td> <td style="text-align: center;">16</td> <td style="text-align: center;">22.4</td> </tr> </tbody> </table>	ACB Type	Main circuit		Auxiliary circuit		Terminal screw	Tightening torque	Terminal screw	Tightening torque	AME3B, AME4B	Hex. nut M10	18.6 - 29.4	Pan head M3.5	0.88 - 1.18	AME6B	Hex. nut M16	51.5 - 84.3	AME8B, AME10B	Hex. nut M12	40.2 - 65.7	ACB type	Manual operated	Motor operated	AME3B, AME4B	5	9.7	AME6B	9.6	15.2	AME8B, AME10B	16	22.4
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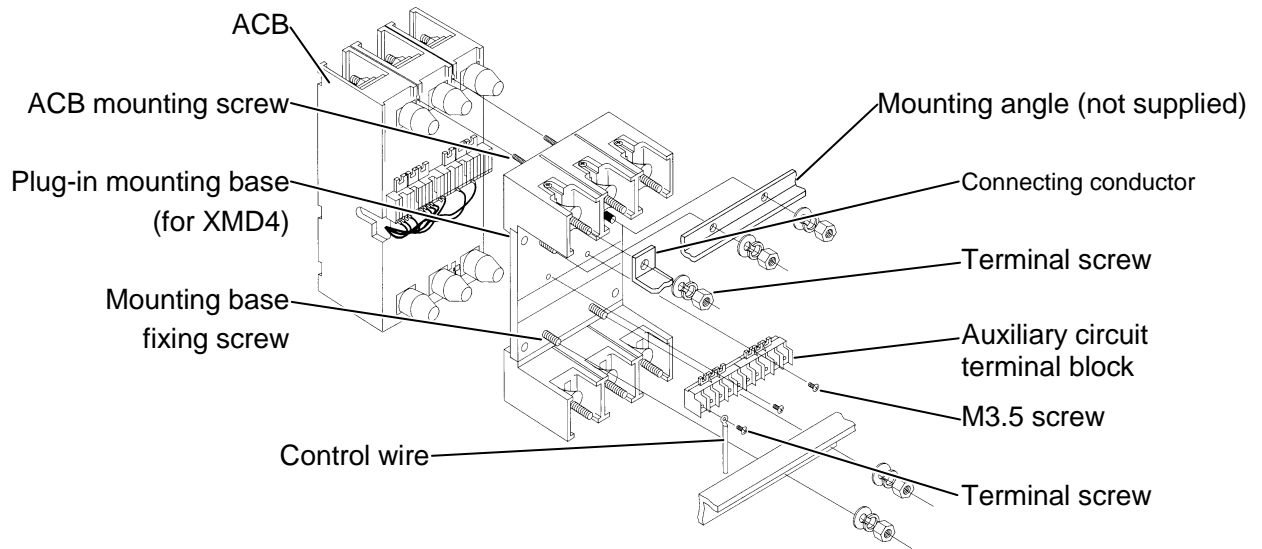


Fig. 3
Mounting and Connection Example (AME4B)

Other Precautions

1) Install the plug-in mounting base vertically with the

ON
SIDE

 label mark upward.

● **Combination of ACB and Mounting Base**

ACB type	Mounting base	Mounting bolt diameter
AME3B, AME4B	XDM4	M8
AME6B	XDM6	M10
AME8B, AME10B	XDM8	M10

2) For the procedure for mounting the auxiliary circuit terminal block see the accompanying document.

Mount the terminal block on the mounting base according to the following arrangement.

● **Terminal Arrangement Viewed from Rear Side**

ACB type	With UVT		With SHT																																									
	Arrangement 1	Arrangement 2 (with alarm switch)	Arrangement 3	Arrangement 4 (with alarm switch)																																								
AME3B AME4B	ON side <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>AXc1</td><td>AXa1</td><td>AXb1</td><td>AXc2</td><td>AXa2</td></tr> <tr><td>AXb2</td><td>T1</td><td>T2</td><td>U1</td><td>U2</td></tr> </table>	AXc1	AXa1	AXb1	AXc2	AXa2	AXb2	T1	T2	U1	U2	ON side <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>AXc1</td><td>AXa1</td><td>AXb1</td><td>ALc1</td><td>ALa1</td></tr> <tr><td>ALb1</td><td>T1</td><td>T2</td><td>U1</td><td>U2</td></tr> </table>	AXc1	AXa1	AXb1	ALc1	ALa1	ALb1	T1	T2	U1	U2	ON side <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>AXc1</td><td>AXa1</td><td>AXb1</td><td>AXc2</td><td>AXa2</td></tr> <tr><td>AXb2</td><td>S1</td><td>S2</td><td></td><td></td></tr> </table>	AXc1	AXa1	AXb1	AXc2	AXa2	AXb2	S1	S2			ON side <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>AXc1</td><td>AXa1</td><td>AXb1</td><td>ALc1</td><td>ALa1</td></tr> <tr><td>ALb1</td><td>S1</td><td>S2</td><td></td><td></td></tr> </table>	AXc1	AXa1	AXb1	ALc1	ALa1	ALb1	S1	S2		
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3) Check to be sure that a mounting angle has sufficient strength to support the ACB mass. Vibration, in particular, must be taken into account. Vibration of the switchboard could result in false tripping of the ACB.
Be sure to avoid resonance.

4) Do not place the ACB in such an area that is subject to direct sunlight.

5) Clean the connecting surface.

It is recommended that the connecting surface of the connecting conductors be subject to silver-plating or the like in order to reduce the contact resistance on the surface.

6) When applying the frame current continuously, use the connecting conductors whose size is equal to or larger than shown below.

Otherwise, overheat could result.

ACB type	AME3B	AME4B	AME6B	AME8B	AME10B
Frame current *	250 A	400 A	630 A	800 A	1000 A
Conductor size	150 mm ²	2 x 100 mm ²	2 x 50 x 5	2x 50 x 5	2x 60 x 5

*) At ambient temperature of 45 °C

7) Ensure adequate insulation distance (specified per your switchboard) from bare live parts of terminals and connecting conductors to a mounting angle and bare live parts of other components.

8) Secure the connecting conductors firmly using supporting means so that an electromagnetic force caused by a large current flowing through the ACB or other harmful force does not directly act upon the ACB plug-in mounting base terminals.

9) How to mount the ACB:

① Open or trip the ACB before mounting it.

(This applies to dismounting.)

② Install the ACB so that the ACB mounting bolts are inserted into the four mounting holes (with cap nuts). (See Fig. 3.)

③ Tighten the four cap nuts gradually in diagonal order

Do not tighten a particular nut intensively.

● **Cap Nut Tightening Torque and Tool**

ACB type	Tightening torque N·m	Tool
AME3B, AME4B	3.6 - 6.0	Flat-head screw driver
AME6B, AME8B, AME10B	8.8 - 14.7	Allen wrench (nominal size 8)

3.3 Connection and Specifications of Accessories

3.3.1 Undervoltage Trip Device (UVT)

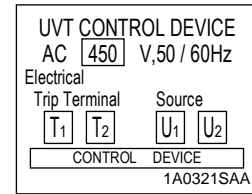
The UVT is optional.

Check if the rated voltage shown on the accessory nameplate (attached on the ACB left side) is suitable for the working voltage.

The UVT trips the ACB when the supply voltage (between U₁ and U₂) lowers to the opening voltage with a delay of 50 ms to 120 ms, and closes the ACB when the supply voltage returns to the resettable voltage.

The UVT also allows ACB remote instantaneous tripping by closing the path between T₁ and T₂.

- The UVT operating mechanism permits the ACB to trip open at the open-circuit voltage or less, only when the ACB operating handle is in the ON position. Accordingly, reset operation is allowed even if the UVT coil is not excited.
- The UVT coil also serves as an overcurrent trip coil.



1) Connection

Connect the trip signal wire and power supply wire to the auxiliary circuit terminals as shown in Fig. 4.

For the rear-connected ACB, connect the wires to the specified terminals on the left side of the ACB.

For the plug-in ACB, connect the wires to the specified terminals on the rear side of the mounting base.

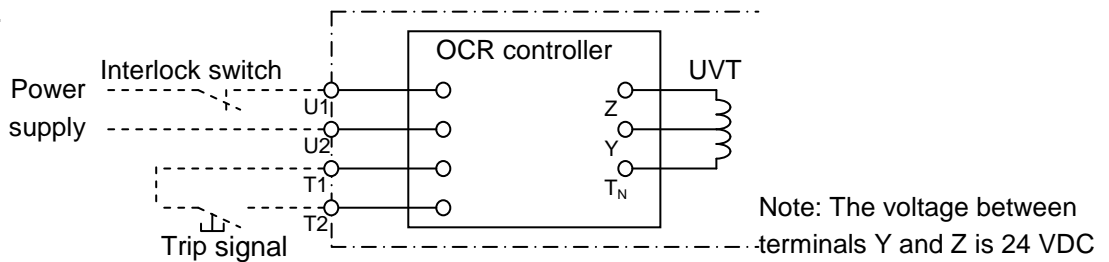


Fig. 4

UVT Connection Diagram

Caution: The voltage between terminals T1 and T2 is 20 VDC and the operating current is 10 mA.

Caution: For rear-connected ACB, be sure to replace the terminal cover (transparent) after connecting the wires.

2) Ratings

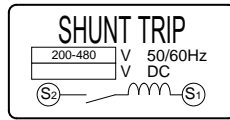
● Operating Voltage and Exciting Current

Rated voltage (at 50/60 Hz)	Opening voltage	Resettable voltage	Exciting current U1 - U2 (at 60 Hz)
100 - 115 VAC	41 - 70 V	85V or less	21 mA
200 - 230 VAC	81 - 140 V	170V or less	11 mA
380 - 450 VAC	158 - 266 V	323V or less	6 mA

3.3.2 Shunt Trip Device (SHT)

The SHT is optional.

Check if the rated voltage shown on the accessory nameplate (attached on the ACB left side) is suitable for the working voltage.



The SHT is used to trip the ACB electrically from a remote position.

- The SHT is equipped with the anti-burnout switch (see Fig. 5), and trips the ACB after it is closed. Consequently, note that the SHT does not provide electrical interlock.

1) Connection

Connect the power supply wire to the auxiliary circuit terminal as shown in Fig. 5.

For the rear-connected ACB, connect the power supply wire to the specified terminal on the left side of the ACB.

For the plug-in ACB, connect the power supply wire to the specified terminal on the rear side of the mounting base.

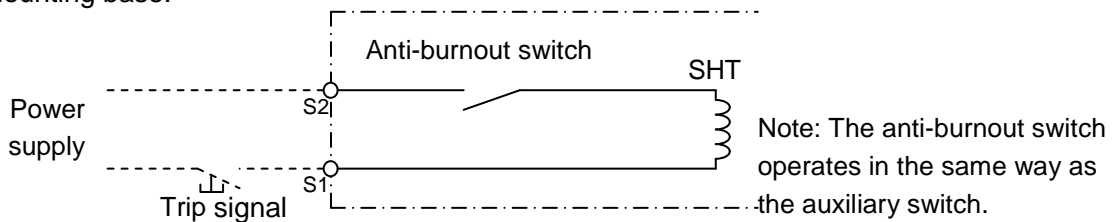


Fig. 5

SHT Connection Diagram

Caution: The SHT is rated for short time. Although it contains a switch which connects to the SHT coil in serial and makes the coil unexcited, continuous signals should not be given to the SHT.

Caution: Be sure to replace the terminal cover (transparent) after connecting the wires.

2) Ratings

- **Opening Voltage and Exciting Current**

Rated voltage (at 50/60 Hz)	Operating voltage range	Exciting current * (peak value)
100 - 115 VAC	70 - 127 V	1.1 A
200 - 480 VAC	140 - 528 V	0.93 A

*) At max. rated voltage (60 Hz)

3.3.3 Auxiliary Switch (AX) and Alarm Switch (AL)

The auxiliary switch is used to indicate the ON or OFF state of the ACB.

The alarm switch (optional) is used to indicate the TRIPPED state of the ACB.

- **Switch Operation**

Contact arrangement		State of ACB		
		ON	OFF	TRIPPED
AX AXb AXa └──┬── └── AXc	AXc - AXa	Close	Open	
	AXc - AXb	Open	Close	
AL ALb1 ALa1 └──┬── └── ALc1	ALc1 - ALa1	Open		Close
	ALc1 - ALb1	Close		Open

1) Connection

Connect the control wire to the auxiliary terminal.

For the rear-connected ACB, connect the control wire to the specified terminal on the right side of the ACB.

For the plug-in ACB, connect the power supply wire to the specified terminal on the rear side of the mounting base.

2) Contact ratings

Caution: The contact load must fall within the range from the minim load to the rated load.

Caution: The ratings shown on the accessory nameplate are for the resistive/inductive load.

For lamp or motor load, see the following table.

(The lamp load involves an inrush current of 10 times the rated load. The inductive load has a power factor of 0.4 (AC) and a time constant of 7 ms (DC). The motor load involves an inrush current of 6 times the rated load.)

Applied current (at 50/60 Hz)	Current (A)				Minimum load
	Resistive load	Lamp load	Inductive load	Motor load	
480 VAC	1	0.2	1	0.3	30 VDC 26.7 mA, 5 VDC 150 mA
250 VAC	5	1.5	5	2	
125 VAC	5	2	5	3	
250 VDC	0.3	0.05	0.3	0.05	
125 VDC	0.6	0.1	0.6	0.1	
30 VDC	5	3	4	3	

3.3.4 Motor Operator

The motor operator (optional) permits the ACB to be electrically closed, opened (reset) from a remote position.

1) Connection

Remove the terminal cover (transparent) and connect the operating switch control wire and the power supply wire to the control circuit terminals as follows:

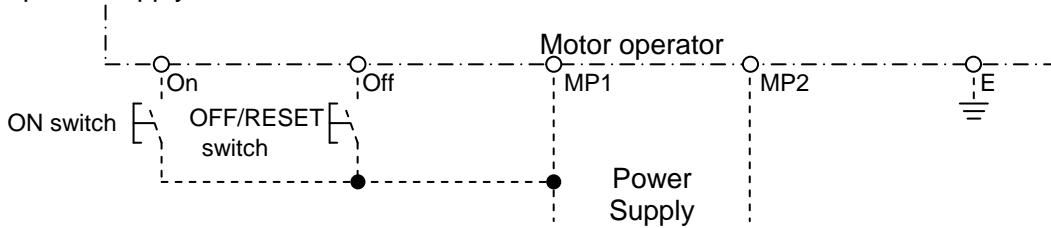


Fig. 6

Motor Operator Connection Diagram

Caution: Be sure to replace the terminal cover (transparent) after connecting the wires.

Caution: Motor operator XMD4M is hinged type. Sag the wire so that the motor operator can be uplifted as shown in Fig. 7. For removing the motor operator, see the *XMD Series Motor Operator - Operating Instructions*.

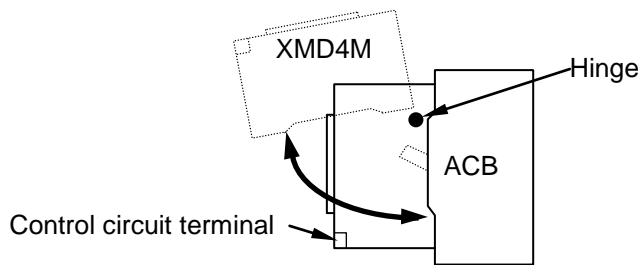


Fig. 7

XMD4M (hinged type)

2) Ratings

The following table shows the operating current at the maximum rated voltage.

The accessory nameplate indicates the steady-state current. For the operating switch ratings and power capacity refer to the starting current.

● Operating Current

Rated current (at 50/60 Hz)	Operation	Steady-state current (A)/Starting current (A, peak)		
		XMD4M	XMD6M	XMD9M
100 - 115 VAC	Close (ON)	-/3.1	-/3.1	-/3.1
	Open(OFF)/Reset	1.2/5.7	1.8/6.0	1.8/6.0
200 - 230 VAC	Close (ON)	-/1.2	-/1.2	-/1.2
	Open(OFF)/Reset	0.7/3.0	1.0/3.2	1.0/3.2

4. OPERATION

4.1 Direct-Manual Operation

⚠ Warning
<ul style="list-style-type: none"> ● Never touch live terminal parts Otherwise, electric shock may result.

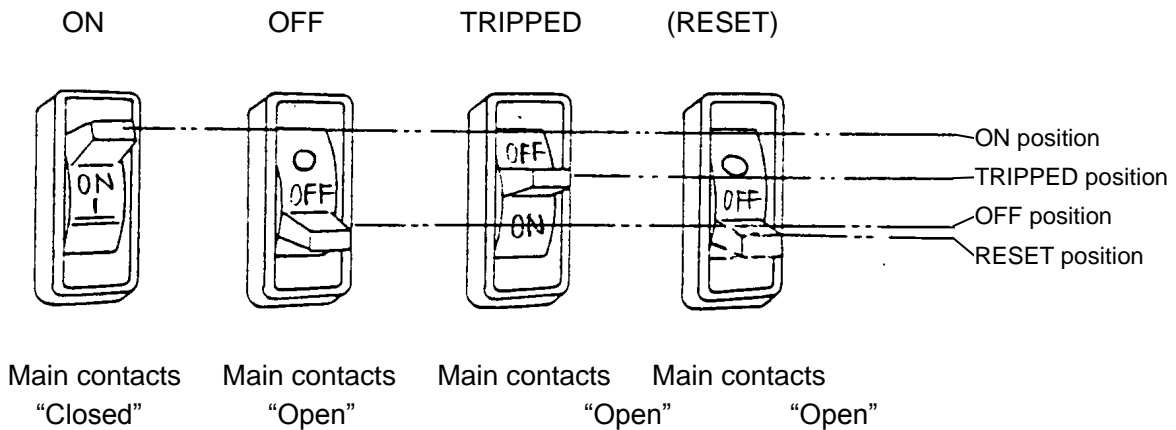


Fig. 8

Handle Positions and Status Indication

1) ON operation

⚠ Caution
<ul style="list-style-type: none"> ● If the ACB trips open automatically, remove the cause before closing the ACB. Otherwise, a fire could result.

To close the ACB, set the operating handle to the ON position.

Caution: When the ACB is equipped with the undervoltage trip device (UVT), the UVT coil must be excited to permit the ON operation.

2) OFF operation

To open the breaker, set the operating handle to the OFF position.

Caution: If the main contacts are damaged (welded), the ACB cannot open. In this case, the operating handle will return to the ON position when the handle is released at the OFF position. Replace the ACB.

3) Tripping operation

When the overcurrent trip device (OCR), UVT, or shunt trip device (SHT) is activated, the ACB trips open and the operating handle moves to the TRIPPED position automatically.

To check the tripping mechanism or the alarm switch, use the trip button. Pressing the trip button will trip the ACB. The trip button operating force is as follows:

ACB type	Trip button operating force N
AME3B, AME4B	19.6
AME6B, AME8B, AME10B	4.9

4) Reset operation

To close the tripped ACB, the reset operation is necessary. To reset the ACB, move the operating handle to the RESET position beyond the OFF position.

- When the UVT coil is not excited, the ACB can be reset but not closed.

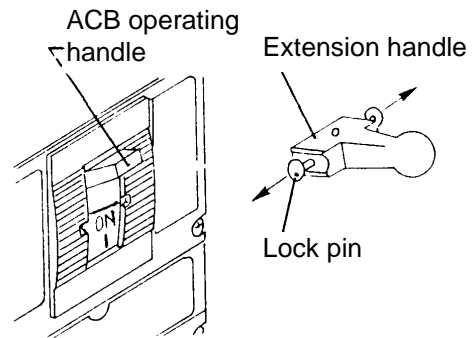
5) Extension handle

The use of the extension handle reduces the operating force as shown in the following table.

● **Operating Force**

ACB type	Operation	Handle operating force N			Extension handle
		OFF ⇒ ON	ON ⇒ OFF	Tripped ⇒ Reset	
AME3B, AME4B	Direct	86.2	68.6	92.1	Not supplied
AME6B	Direct	121	95.1	235	Supplied
	Extension handle used	76.4	59.8	149	
AME8B, AME10B	Direct	157	118	343	Supplied
	Extension handle used	97	72.5	212	

Pulling both the lock pins in the arrow directions will permit the extension handle to be installed. (The extension handle will be spring-locked.) To remove the extension handle, pull the lock pins in the same way. The extension handle will be unlocked and able to be removed.



4.2 External-Manual Operation

This section describes the AFB External Operating Handle which is to be installed on the switchboard.

⚠ Warning
<ul style="list-style-type: none">● Open the ACB (set the external operating handle to the OFF position) to stop the generator operation before opening the switchboard door. Otherwise, touching a live part will cause electric shock.

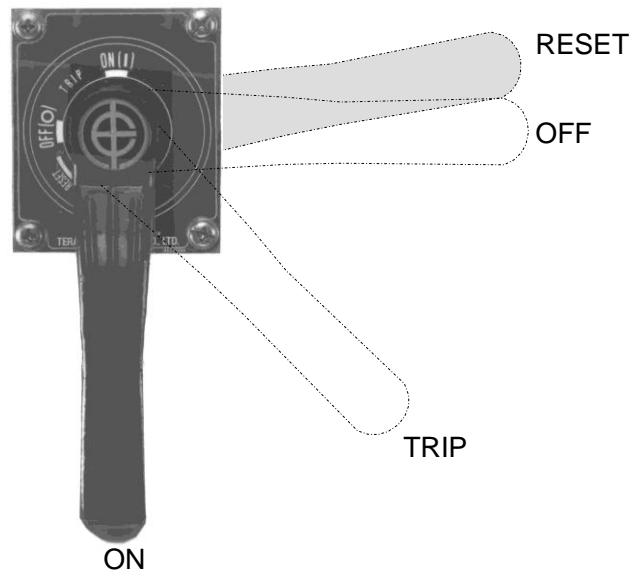


Fig. 9
External Operating Handle

- 1) On operation

⚠ Caution
<ul style="list-style-type: none">● If the ACB trips open automatically, remove the cause before closing the ACB. Otherwise, a fire could result.

To close the ACB, set the external operating handle to the ON [I] position.

Caution: When the ACB is equipped with the undervoltage trip device (UVT), the UVT coil must be excited to permit the ON operation.

- 2) OFF operation

To open the breaker, set the external operating handle to the OFF [O] position.

Caution: If the main contacts are damaged (welded), the ACB cannot open. In this case, the external operating handle will return to the ON [I] position when the handle is released at the OFF position. Replace the ACB.

- 3) Tripping operation

When the overcurrent trip device (OCR), UVT, or shunt trip device (SHT) is activated, the ACB trips open and the external operating handle moves to the “TRIP” position automatically.

4) Reset operation

To close the tripped ACB, the reset operation is necessary. To reset the ACB, turn the external operating handle counterclockwise to the RESET position beyond the OFF [O] position.

- When the UVT coil is not excited, the ACB can be reset but not closed.

Caution Before closing the switchboard door:

Set the external operating handle to the OFF [O] or TRIP position. Close the door carefully while checking if the ACB handle is linked with the guide groove of the guide plate as shown in Fig. 10 below:

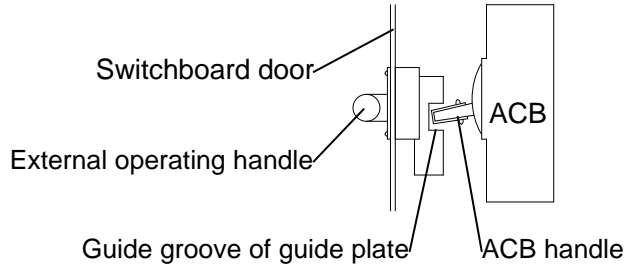


Fig. 10
Linkage of External Operating Handle and ACB Handle
(viewed from the right)

4.3 Motorized Operation

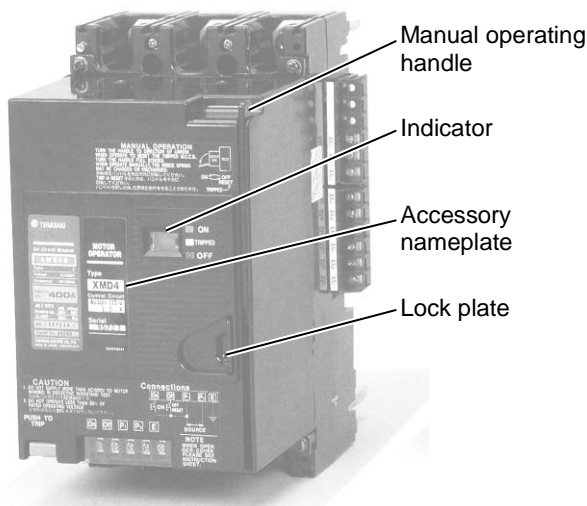
This section describes the XMD Motor Operator which is to be installed on the ACB. For mounting and dismounting procedures of the motor operator see the *XMD Series Motor Operator - Operating Instructions*.

4.3.1 Motorized Operator

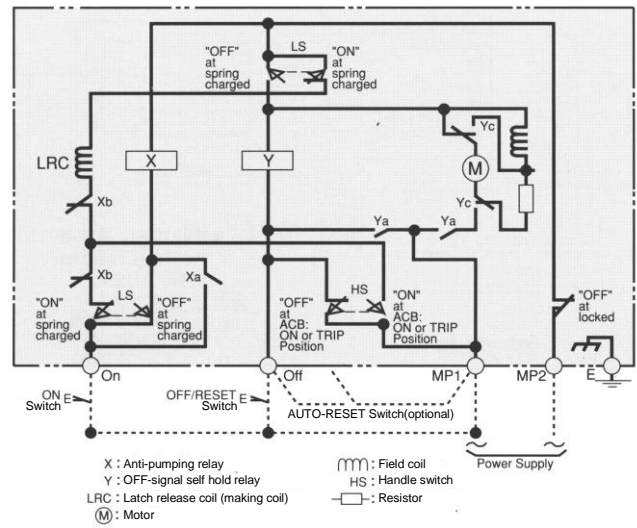
⚠ Caution

- **Be sure to apply the operating (control) voltage shown on the accessory nameplate to the motor operator. (The permissible operating voltage ranges from 85 to 110% of the rated voltage.)**
Undervoltage or overvoltage may cause burnout.
- **The motor is rated for short-time. Repeated open/close operation should not exceed 10 times.**
If repeated continuous open/close operation is inevitable, a pause of at least 15 minutes should be provided after the repetitions of 10 times.
Otherwise, burnout could result.

- The indicator permits you to check if the ACB is open (ON) or closed (OFF). Red shows ON, green OFF, and white TRIPPED.
Electrical check can also be done using the auxiliary switch for ON or OFF state and the alarm switch (optional) for TRIPPED state.



Outer View



Circuit Diagram

Fig. 11
Motor Operator

1) ON operation

 **Caution**

- **If the ACB trips open automatically, remove the cause before closing the ACB. Otherwise, a fire could result.**

Closing an external ON switch (not supplied) will close the ACB within 0.1 second.

Caution: When the ACB is equipped with the undervoltage trip device (UVT), the UVT coil must be excited to permit the ON operation. Apply voltage to the UVT and wait for 120 ms before doing ON operation.

Caution: After ON operation, open an external ON switch. If the external ON switch remains closed, the anti-pumping relay “X” will prevent the ACB from being re-closed (ON) after OFF operation.

Caution: When the lock plate is drawn out, the electric circuit is disconnected and the ACB cannot be closed.

Make sure the lock plate is pushed in securely before ON operation.

2) OFF operation

 **Caution**

- **If the breaker does not close within three seconds after OFF operation, turn off the operating voltage. Otherwise, burnout could result.**

Closing an external OFF switch (not supplied) will open the ACB within 3 seconds.

3) Tripping operation

When the overcurrent trip device (OCR), UVT, or shunt trip device (SHT) is activated, the ACB trips open and the indicator turns white automatically.

Pressing the trip button will lead to the same result.

4) Reset operation

To close the tripped ACB, the reset operation is necessary. To reset the ACB, close an external OFF/RESET switch. The ACB will be reset within 3 seconds.

- When the UVT coil is not excited, the ACB can be reset but not closed.
- If the motor operator is equipped with an auto-reset function (optional), it will be reset whenever the ACB trips open.
- When the auto-reset function is activated, the alarm switch remains ON only for an instant (0.7 to 1 second). If you want to use the alarm switch as a trip signal output, install a self-hold relay between the alarm switch and a trip signal input.

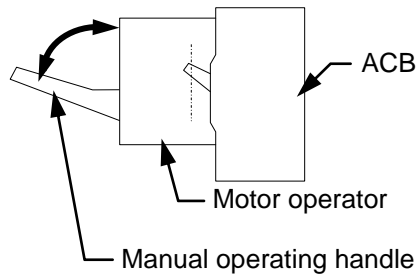
4.3.2 Manual Operation

The manual operating handle is intended to be used for maintenance or inspection, or if operating power fails.

1) ON or OFF/Reset operation

⚠ Warning
<ul style="list-style-type: none"> ● Never touch live terminal parts Otherwise, electric shock may result.

Pulling down the manual operating handle will open (OFF) and close (ON) the ACB alternately. Perform the same operation to reset the ACB.



ACB type	Handle operation angle
AME3B, AME4B	Approx. 85°
AME6B	Approx. 125°
AME8B, AME10B	Approx. 125°

Caution: When the lock plate is drawn out, the manual operating handle cannot be removed. Make sure the lock plate is pushed in securely before removing the manual operating handle.

Caution: The ACB equipped with the undervoltage trip device (UVT) cannot be closed unless the UVT coil is excited.

Caution: Do not apply excessive force to the manual operating handle. Doing so may cause damage to the handle.

Resetting the ACB after tripping, however, will require the sufficient operating force shown in the table below:

ACB type	Handle operating force N	
	ON - OFF	Reset
AME3B, AME4B	120	130
AME6B	90	170
AME8B, AME10B	170	260

Caution: When the manual operating handle is pull down while control voltage is applied to the motor operator, the closing spring is automatically discharged or motor-charged immediately after the handle is retracted. Turning on control voltage after handle operation without control voltage will also cause the same action. This mechanism is provided to make the operator ready for the next motorized operation.

2) Trip button

The trip button is to be used to check the tripping mechanism or the alarm switch, or to trip the ACB in emergency. Pressing the trip button will trip open the ACB.

5. OVERCURRENT TRIP DEVICE

The overcurrent trip device (OCR) is composed of primary current transformers (CT) connected to each pole of the ACB, an electronic OCR controller, and an OCR tripping coil (MHT).

- When the ACB is equipped with the UVT, it does not contain the OCR tripping coil (MHT). The OCR shares with the UVT the UVT coil as the OCR tripping coil.
The following two combinations of protective functions are available. Check the OCR nameplate for the combination.
- When the ACB is equipped with the XMD4M motor operator, remove the motor operator before viewing the OCR nameplate. The motor operator is a hinged type. For procedures for removing and mounting the operator, see [3] *Before and After Checking the Trip Settings, XMD Series Motor Operator - Operating Instructions.*

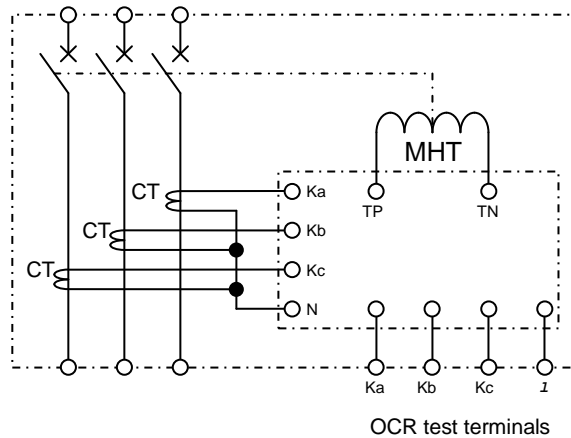


Fig. 12 OCR Circuit Diagram

Combinations of Protective Functions:

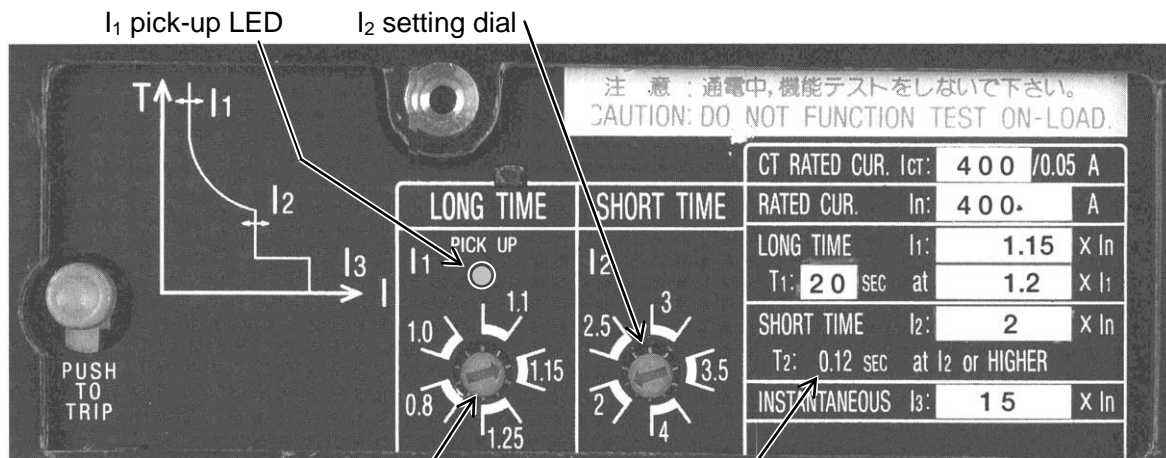
- LTD** + **STD** + **INST** (For operation characteristic curves see page 26.)
- LTD** + **STD**
- STD** + **INST** (Special spec)

Caution: The combination **LTD** + **STD** reduces the rated breaking capacity. Use this combination for the circuits, the rated breaking capacity of which is not more than the WITHOUT INST value indicated on the ACB nameplate.

5.1 Setting Change

⚠ Caution

- Setting change must be performed by competent persons.**
- In (generator rated current), T_1 (time delay), and I_3 (INST trip pick-up current) are factory-set and are not able to be changed in the field. If you want to change these settings, be sure to contact our branch office or your local agent. The setting change is allowed only in our factory.



I_1 setting dial 0.12_{SEC}: Standard, 0.22_{SEC}: Special spec

Fig. 13 OCR Setting Dials and Setting Example

How to change the OCR settings:

- When the ACB is equipped with the XMD4M motor operator, remove the operator before changing the settings.
For procedures for removing and mounting the operator, see [3] *Before and After Checking the Trip Settings, XMD Series Motor Operator - Operating Instructions*.
- ① Remove the sealing label from the OCR transparent cover, unscrew the cover fixing screws, and then remove the cover.
 - ② Turn a setting dial with a flat-head screwdriver so that the arrow points to a position you wish. The scales indicate the I_1 and I_2 values in terms of multiples of the generator rated current I_n . The setting result is the same within the same zone division (see Fig. 13).
 - ③ Change the imprinted set value(s) to the new setting.
 - ④ Reattach the transparent cover.
 - ⑤ Test the OCR for tripping characteristics according to Section 5.2.

5.2 OCR Field Tests

5.2.1 Tests with Current Applied to the Main Circuit

A single-phase, large current is directly applied to the ACB main circuit to check for the long time-delay characteristics.

Caution

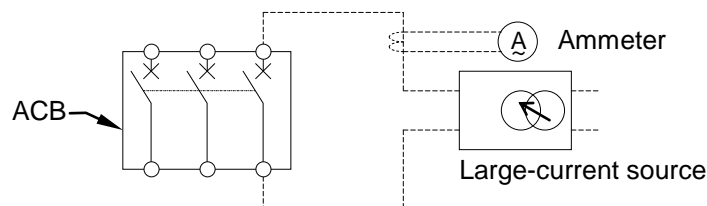
- **OCR field tests must be performed by competent persons.**
- **Never touch the live terminal parts. Otherwise, electric shock may result.**

Before performing the tests:

- Remove the XMD4M motor operator when it is mounted on the ACB. The XMD4M motor operator is a hinged type.
For procedures for removing and mounting the operator, see [3] *Before and After Checking the Trip Settings, XMD Series Motor Operator - Operating Instructions*.
- Apply voltage between auxiliary circuit terminals U_1 and U_2 when the UVT is used.

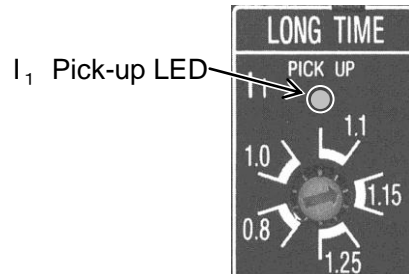
How to test the OCR:

- ① Stop the generator and open a disconnector or the like to isolate all sources of power/voltage from both the primary and auxiliary circuits.
- ② Connect a large-current source to the ACB main circuit terminals.
Caution: To check the OCR characteristics for each pole, apply current to the relevant pole only. When the generator rated current (I_n) is 63 A or less, apply current to the poles of R and S phases, T and S phases, or T and R phases while connecting the two poles in serial. Connection of three poles in serial may cause premature activation of the short time-delay trip function if the trip pick-up current is $1n \times 3$ or less. Avoid such a connection scheme. Use one-pole connection or two-pole serial connection for the testing.



- Use an ammeter with high accuracy.

- ③ Close the ACB.
- ④ Check for the long time-delay trip pick-up current (I_1).
To do this, increase the test current gradually and measure the current at which the I_1 pick-up LED begins to flicker.
It is acceptable when the measured current falls within the range of 92.5 to 107.5% of I_1 (or 92.5 to 117.5% of I_1 when I_1 is 50% or less of I_{CT}).
After testing, decrease the test current. Otherwise, the ACB will trip open.



- ⑤ Check the time delay setting (T_1).
Caution: An error of 1% in test current will lead to an error of 4% in time delay. Apply the accurate test current to the OCR.
To check the time delay setting, apply a test current of $I_1 \times 1.2$ and, using a stopwatch, measure the time from current application to ACB tripping. Note that a gradual increase of the test current could cause erroneous results.
It is acceptable when the measured time falls within the range of 85 to 115% of T_1 (or 80 to 120% of T_1 when I_1 is 50% or less of I_{CT}).
- ⑥ Repeat steps ④ and ⑤ for remaining phases.
- ⑦ After completion of the tests, return the ACB to the original state.
- If the tests show any problem, contact our branch office or your local agency.

5.2.2 Tests with Current Applied to the OCR Test Terminal

The secondary current calculated with the primary current and ACB main circuit CT ratio (I_{CT}) is applied to the OCR test terminal on the left side of the ACB to check for the tripping characteristics.

⚠ Caution

- **OCR field tests must be performed by competent persons.**
- **Never touch the live terminal parts.**
Otherwise, electric shock may result.

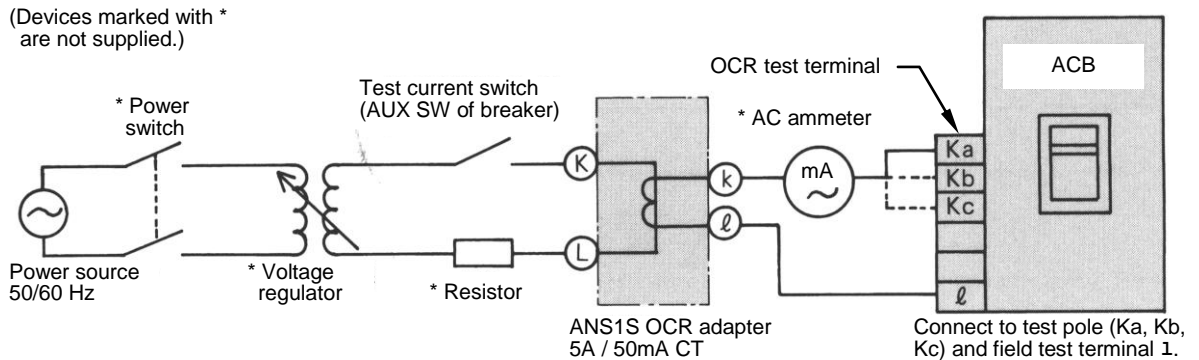


Fig. 14

Test Arrangement (example) and Connections

- The test current must be sinusoidal current with no distortion.
- If the ACB trips open during the test, turn off the power immediately.
- The OCR adapter shown in Fig. 14 is optional. This adapter should be used as a current conversion device.

Caution: Be sure not to open the secondary side of the OCR adapter while applying the test current. Doing so will generate a high dangerous voltage between terminals.

Before performing the tests:

- Remove the XMD4M motor operator when it is mounted on the ACB. The XMD4M motor operator is a hinged type.

For procedures for removing and mounting the operator, see [3] *Before and After Checking the Trip Settings, XMD Series Motor Operator - Operating Instructions*.

- Apply voltage between auxiliary circuit terminals U_1 and U_2 when the UVT is used.

How to test the OCR:

- ① Stop the generator and open a disconnector or the like to isolate all sources of power/voltage from both the primary and auxiliary circuits.
- ② Connect a power supply to the OCR test terminals ℓ and Ka for R-phase test, ℓ and Kb for S-phase test, and ℓ and Kc for T-phase test.
- ③ Calculate the test current.

The main circuit CT ratio (I_{CT}), generator rated current (I_n), and trip pick-up current (I_1 or I_2) are shown on the OCR nameplate.

Calculation Example:

CT RATED CUR. I_{CT} : $\frac{250}{0.05}$ A
 RATED CUR. I_n : 231 A
 LONG TIME I_1 : 1.15 X I_n
 T_1 : 20 SEC at 1.2 X I_1

Assuming the conditions shown above, the test current is given by

$$231 \times \frac{0.05}{250} \times 1.15 \times 1.2 = 0.0638 \text{ (A)}$$

- ④ Close the ACB.
- ⑤ Check for the long time-delay trip pick-up current (I_1).
 To do this, increase the test current gradually and measure the current at which the I_1 pick-up LED begins to flicker.

It is acceptable when the measured current falls within the range of 92.5 to 107.5% of I_1 (or 92.5 to 117.5% of I_1 when I_1 is 50% or less of I_{CT}).

After testing, decrease the test current. Otherwise, the ACB will trip open.

- ⑥ Check the time delay setting (T_1).

Caution: When the ACB trips open, turn off the power immediately.

Caution: An error of 1% in test current will lead to an error of 4% in time delay. Apply the accurate test current to the OCR.

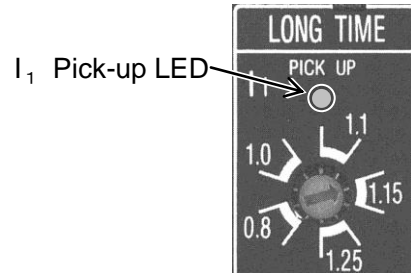
To check the time delay setting, apply the test current obtained at step ③ and, using a stopwatch, measure the time from current application to ACB tripping.

It is acceptable when the measured time falls within the range of 85 to 115% of T_1 (or 80 to 120% of T_1 when I_1 is 50% or less of I_{CT}).

- ⑦ Repeat steps ⑤ and ⑥ for remaining phases.
- ⑧ After completion of the tests, return the ACB to the original state.
 - If the tests show any problem, contact our branch office or your local agency.

Caution: When checking the short time-delay trip characteristics

- 1) Apply the test current for 150 ms as a guideline.
- 2) Set the test current to $I_2 \times 1.6$ as a guideline. Never increase the test current to the instantaneous trip pick-up current (I_3) or more.
- 3) Applying the test current close to the short time-delay trip pick-up current (I_2) may somewhat lengthen the operating time. See the operation characteristic curves on page 26.
- 4) Test procedures:
 Close the ACB.
 Apply the test current of not more than 85% of I_2 and check if the ACB does not trip.
 Then apply the test current of 120 to 160% of I_2 and check if the ACB trips open within approx. 150 ms.



5.2.3 Tests Using OCR Checker (type ANS1)

The ANS1 type OCR checker is used to check for instantaneous trip function.

- Two or more ACB's cannot be tested using the OCR checker at the same time.

⚠ Caution
<ul style="list-style-type: none">● OCR field tests must be performed by competent persons.● Never touch the live terminal parts. Otherwise, electric shock may result.

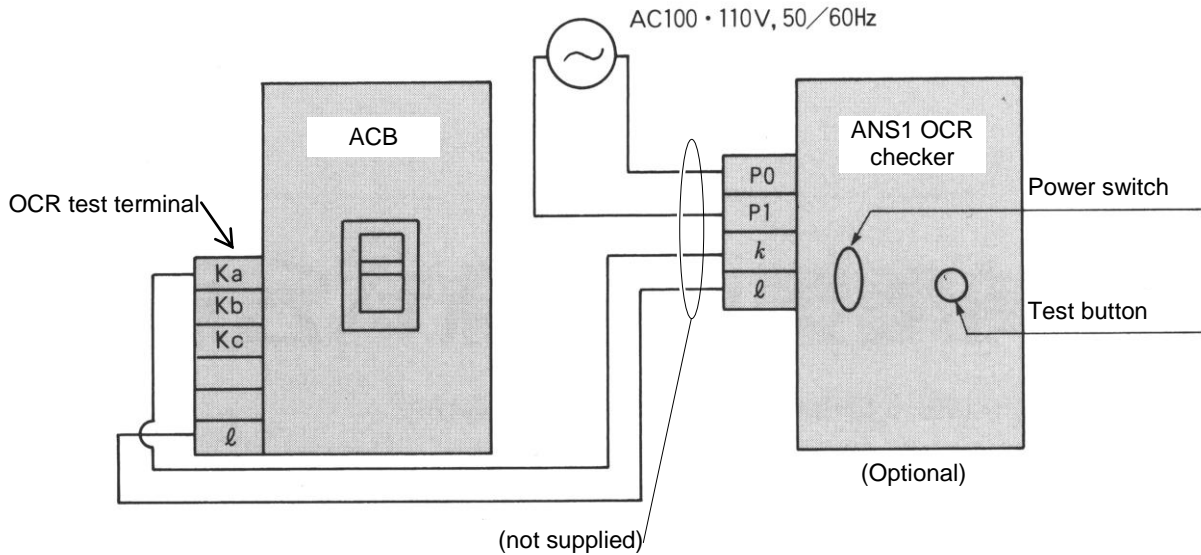


Fig. 15

OCR Checker Connection Diagram

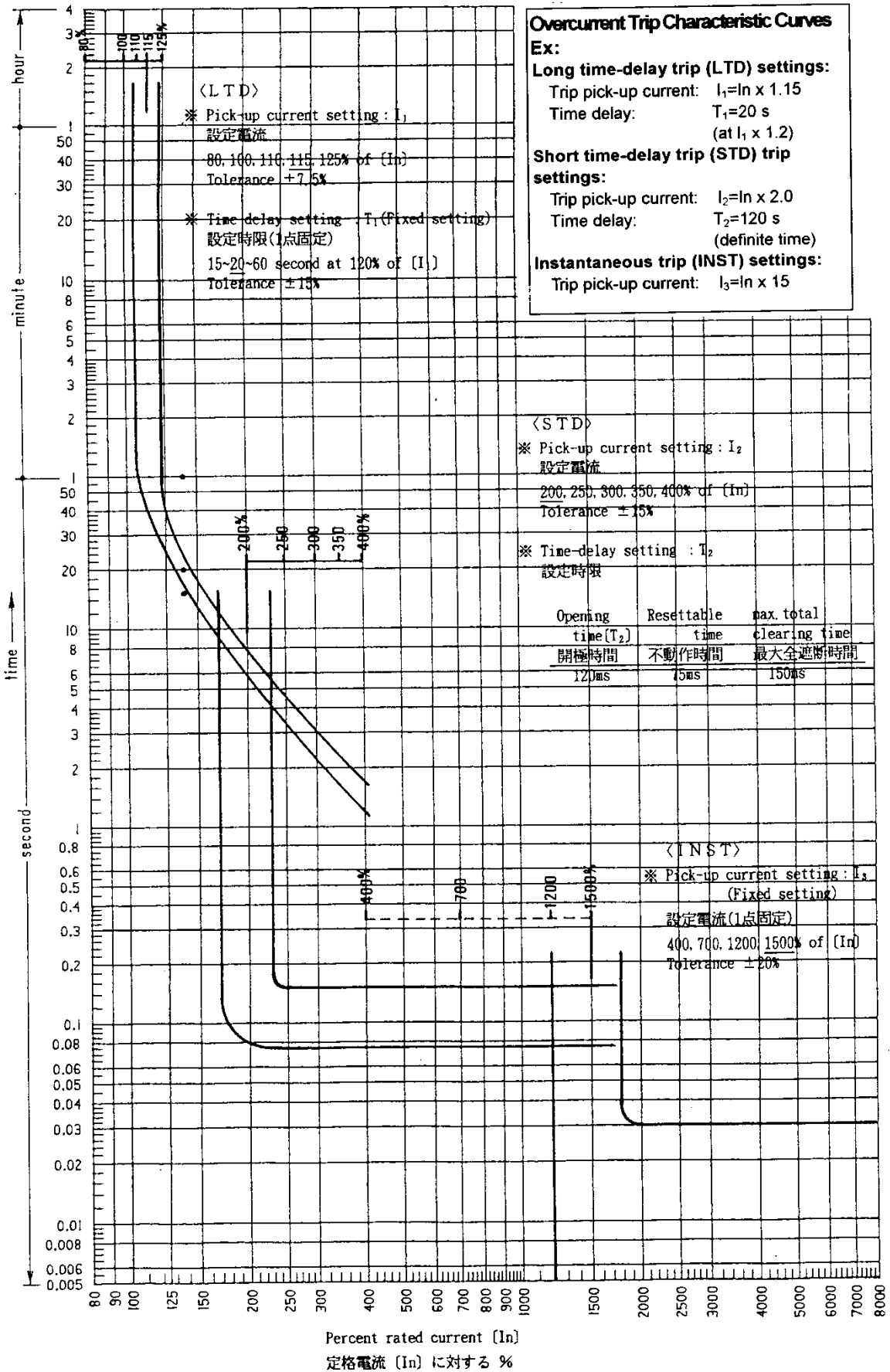
Before performing the tests:

- Apply the rated voltage between auxiliary circuit terminals U_1 and U_2 when the ACB is equipped with the UVT.

How to test the OCR:

- ① Stop the generator and open a disconnector or the like to isolate all sources of power/voltage from both the primary and auxiliary circuits.
 - ② Connect the OCR checker power terminals (l and k) to the OCR test terminals l and ka for R-phase test, l and kb for S-phase test, and l and kc for T-phase test.
 - ③ Close the ACB.
 - ④ Supply power (100 - 110 VAC, 50/60 Hz, 3 VA) to OCR checker terminals P_0 and P_1 and turn on the power switch.
 - ⑤ Wait three seconds after turning on the power switch, press the test button to check if the ACB trips instantaneously.
 - ⑥ After completion of the test, turn off the power switch and return the ACB to the original state.
- If the tests show any problem, contact our branch office or your local agency.

5.3 Operation Characteristic Curves



6. PRECAUTIONS ON TEMPERATURE-RISE TEST

When performing a temperature-rise test using a single-phase power supply, set the short time-delay trip pick-up current (I_2) to $I_n \times 2.5$ or more. A temperature-rise test with I_2 set to $I_n \times 2$ and three poles connected in serial may cause the ACB to trip open.

After completion of the test for which the trip pick-up current setting (I_2) of the ACB have been changed, be sure to set the I_2 back to the original value.

7. PRECAUTIONS ON INSULATION RESISTANCE TEST AND DIELECTRIC WITHSTAND VOLTAGE TEST

7.1 Insulation Resistance Measurement

Use a 500 VDC insulation-resistance tester to check if the insulation resistance is not less than 5 M Ω .

Caution: The following terminals must not be subject to the insulation resistance test.

- T_1 and T_2 (UVT circuit)
- Ka, Kb, Kc, and I (OCR test circuit)

7.2 Dielectric Withstand Voltage Test

7.2.1 Main Circuit

The withstand voltage of the main circuit is 2500 VAC for one minute between terminals with different poles; between ON and OFF terminals; and between main circuit terminals and ground.

Do not subject the ACB main circuit to test conditions that are severer than shown above.

7.2.2 Auxiliary and Control Circuits

Caution: The following terminals must not be subject to the dielectric withstand voltage test.

- T_1 and T_2 (UVT circuit)
- Ka, Kb, Kc, and I (OCR test circuit)

Caution: Do not perform the dielectric withstand voltage test between terminals. The withstand voltages of auxiliary and control circuits are as follows:

- U_1 and U_2 (UVT circuit): 2500 VAC for one minute between terminal group and ground
- S1 and S2 (SHT circuit): 2500 VAC for one minute between terminal group and ground
- Auxiliary/alarm switch circuits: 2500 VAC for one minute between terminal group and ground
- Motor operator circuit: 1500 VAC for one minute between control terminal group and terminal "E" (ground)

8. MAINTENANCE AND INSPECTION

Caution

- (1) Maintenance and inspection of the ACB must be performed by competent persons.
- (2) Prior to commencing maintenance and/or inspection work on the ACB, stop the generator and open a disconnect or the like to isolate all sources of power/voltage from both the primary and auxiliary circuits.
Otherwise, electric shock may result.
- (3) When terminating conductors to the ACB, tighten terminal screws to the torque specified in 3. INSTALLATION of this manual.
Otherwise, a fire could result.

8.1 Guideline of Inspection Interval

Prior to commencing the initial current application to the ACB and one month after commencing generator operation, inspect the ACB according to 8.2 Inspection Procedure. Thereafter, the ACB requires to be inspected at appropriate intervals, which vary depending on the environmental and operating conditions such as installation site, number of operation cycles, trip pick-up current, breaking current and the like. Tables 1, 2, and 3 summarize the guidelines of inspection intervals.

Table 1: Environmental Conditions

Installation site	Example	Guideline of inspection intervals
1	Interior where air is always kept clean and dry	<ul style="list-style-type: none"> • Within 10 years after installation: Every 2 or 3 years • 10 years or more after installation: Every year • 15 years or more after installation: Every 6 months
2	Interior which is free from corrosive gases and excessively dusty air	<ul style="list-style-type: none"> • Within 10 years after installation: Every year • 10 years or more after installation: Every 6 months • 15 years or more after installation: Every month

Table 2: Number of Operation Cycles

Operating condition	Guideline of inspection intervals		
	AME3B	AME4B	AME6B, AME8B, AME10B
Nearly no load	2000	2000	1000
Rated current	2000	1000	500
Overcurrent (approx. 6 times the frame current) and short-circuit current	Every operation	Every operation	Every operation

Table 3: Endurance in terms of Number of Operation Cycles

Operating condition	Endurance (No. of operation cycles)		
	AME3B	AME4B	AME6B, AME8B, AME10B
Actual load	2000	1000	500
Mechanical operation	* 10000	* 10000	* 5000

* Including the number of operation cycles with actual load

8.2 Inspection Procedures

In order to keep the intended performance and ensure safety of the ACB, it is necessary to inspect the ACB at intervals recommended in the previous section.

For details of inspection procedures see the following tables.

- Before inspecting the internal mechanism of the ACB, loosen the molded-cover fixing screws and remove the cover.

When the ACB is equipped with the motor operator, remove the motor operator before removing the cover.

For procedures for removing and mounting the operator, see [3] *Before and After Checking the Trip Settings, XMD Series Motor Operator - Operating Instructions*.

■ General

Inspection item	Tool/method	Criteria	Action/remedy
Looseness of terminal screws	Try to tighten screws with screwdriver or wrench	No looseness	<ul style="list-style-type: none"> ● Retighten loose screws to the torque specified in this manual.
Dust and/or foreign materials	Visual check	No dust or foreign materials on ACB	<ul style="list-style-type: none"> ● Remove dust or foreign materials with a cleaner. ● Wipe dust or foreign materials with a clean and dry cloth.
Open/close operation	<ul style="list-style-type: none"> ● Manual operation with operating handle or trip button ● Electrical operation with UVT or SHT 	Smooth ON/OFF/Reset operation	<ul style="list-style-type: none"> ● Replace ACB or, if identified, its defective parts. (Consult Terasaki for advice)
Crack, damage, or discoloration on the cover or mounting base	Visual check	<ul style="list-style-type: none"> ● No crack or damage ● No discoloration due to overheat 	<ul style="list-style-type: none"> ● Replace ACB.
Insulation resistance	500 V insulation-resistance tester	5 M Ω or more	<ul style="list-style-type: none"> ● If insulation resistance is less than 5 MΩ, replace ACB.

■ Main conductors

Inspection item	Tool/method	Criteria	Action/remedy
Roughness of main-contact surface	<ul style="list-style-type: none"> ● Visual check ● Contact-resistance tester (between I/O terminals) 	<ul style="list-style-type: none"> ● No wear and roughness on contact surface ● No increase in contact resistance 	<ul style="list-style-type: none"> ● If internal resistance exceeds its limit after several times of open/close operation (see Table 4), polish contact surface with emery paper. If polishing does not decrease internal resistance, replace ACB.
Roughness and/or wear of arc horn or arcing contacts	Visual check	Remaining thickness: approx. 1/3	<ul style="list-style-type: none"> ● Polish contact surface to remove roughness. ● If thickness decreased to 1/3 or less, replace moving or stationary arc horn or arcing contact.
Looseness of arc horn or arcing contact fixing screws	Try to tighten screws with screwdriver or wrench	No looseness	<ul style="list-style-type: none"> ● Retighten loose screws.

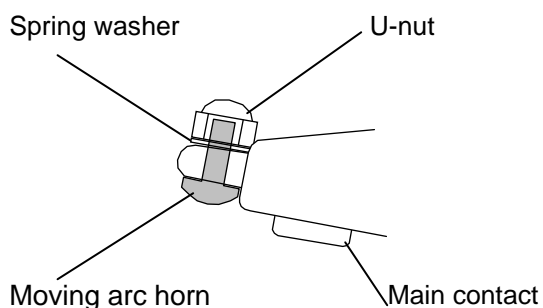
Table 4: ACB Internal Resistance (per pole)

ACB type	Rated current (In) A	Internal resistance (mΩ)		Limit resistance (mΩ)	
		Rear-connected	Plug-in	Rear-connected	Plug-in
AME3B	16 < In ≤ 31.5	0.25	0.3	0.5	0.6
	31.5 < In ≤ 250	0.15	0.2	0.3	0.4
AME4B	250 < In ≤ 400	0.15	0.2	0.3	0.4
AME6B	315 < In ≤ 630	0.08	0.12	0.16	0.24
AME8B	500 < In ≤ 800	0.045	0.053	0.09	0.11
AME10B	800 < In ≤ 1000	0.045	0.053	0.09	0.11

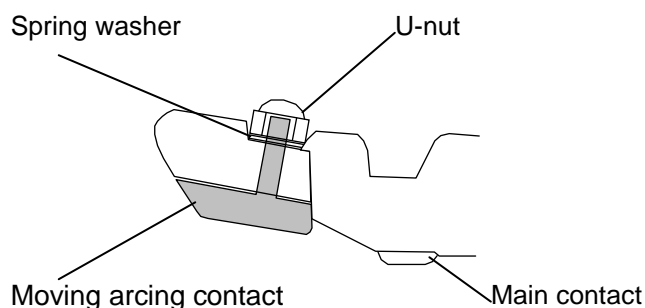
Note: The internal resistance shown in the table above is the reference resistance between I/O terminals and is to be used as a guideline for inspection.

How to replace the arc horns (arcing contacts):

- ① Remove the U-nut and replace the moving arc horn (moving arcing contact).
 - Take care not to drop the spring washer.
 - Tighten the U-nut to the standard torque of 1.3 - 2.2 N·m.

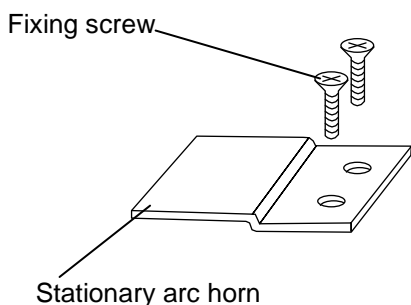


(AME3B, AME4B, AME6B)

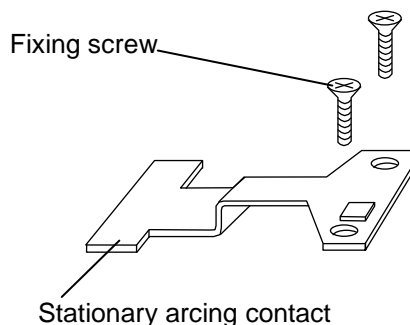


(AME8B, AME10B)

- ② Remove the fixing screws and replace the stationary arc horn (stationary arcing contact).
 - Tighten the fixing screws to the standard torque of 1.3 - 2.2 N·m.



(AME3B, AME4B, AME6B)



(AME8B, AME10B)

- ③ After replacement, perform open/close operation 10 to 20 times and retighten both the U-nut and fixing screws.

9. TROUBLESHOOTING

If a trouble occurs, take appropriate measures according to the following table.

Symptom	Possible cause	Action/remedy
ACB trips open immediately after closing operation.	<ol style="list-style-type: none"> Inrush current is too large. A short-circuit occurs somewhere. There is erroneous connection in UVT or SHT control circuit. 	<ul style="list-style-type: none"> Review starting method of load, or change short time-delay trip pick-up current (I_2) setting. Check electrical distribution system. Check wire connection
Closing operation is impossible.	<ol style="list-style-type: none"> Voltage is not applied to UVT, or applied voltage is too low. UVT is defective. <ul style="list-style-type: none"> Coil disconnection or layer short-circuit Moving core reset unsuccessfully OCR controller malfunction SHT is defective. <ul style="list-style-type: none"> Moving core reset unsuccessfully Handle is not reset. Tripping mechanism is out of order. <ul style="list-style-type: none"> Latch worn out Spring broken or out of order. 	<ul style="list-style-type: none"> Apply voltage of rated voltage x 85 % or more to UVT. Replace defective UVT. Consult Terasaki for advice. Replace defective SHT. Reset handle. Repair tripping mechanism. Consult Terasaki for advice. <p>An excessive number of operation cycles will cause tripping mechanism to wear out. Replace ACB.</p>
Opening operation is impossible.	Main contact is welded.	<ul style="list-style-type: none"> Replace ACB.
Tripping operation is impossible.	<ol style="list-style-type: none"> OCR is defective. UVT is defective. <ul style="list-style-type: none"> Blockage of moving coil UVT or SHT circuit is defective. SHT is defective. <ul style="list-style-type: none"> Insufficient stroke of moving core Coil disconnection or layer short-circuit Anti-burnout switch is defective. Voltage applied to SHT is too low. Tripping mechanism is out of order. <ul style="list-style-type: none"> Increase of friction in mechanism Corrosion, wear, and/or deformation of latch and/or roller Spring broken or out of position 	<ul style="list-style-type: none"> Replace ACB. Consult Terasaki for advice. Replace UVT. Consult Terasaki for advice. Check for looseness of wire connections and switch contacts. Replace SHT. Apply voltage of rated voltage x 70% or more. Lubricate mechanism to reduce friction. An excessive number of operation cycles will cause tripping mechanism to wear out. Replace ACB.

Symptom	Possible cause	Action/remedy
There is no continuity.	<ol style="list-style-type: none"> 1. Main contact surface is worn and roughened. 2. Contact lead is disconnected (due to an excessive number of operation cycles or corrosive gases). 3. Foreign materials are deposited on auxiliary circuit terminal contactor (for plug-in type ACB). 	<ul style="list-style-type: none"> • Replace ACB. • Replace ACB. • Clean auxiliary circuit terminals.
Molded case overheats.	<ol style="list-style-type: none"> 1. Main contact surface roughens. 2. Terminal screws or stud fixing screws loosen. 3. ACB mounting screws is insufficiently tightened (for plug-in type ACB). 	<ul style="list-style-type: none"> • Polish contact surface with emery paper. If contact surface has excessively roughened and internal resistance exceeds its limit (see Table 4 on page 30), replace ACB. • Retighten screws to the standard torque. • Tighten screws securely.

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