Automatic transfer switches (class PC)
OTM_C_D
Installation and instructions

1. Please read the instruction carefully before you use, please retain it for reference.
2. The picture is only for reference, please prevail in kind.
9. Maintenance and troubleshooting

9.1 Maintenance
To ensure the reliability of the changeover switch, and should be periodically (recommended every three months) carried out a transfer test to confirm the changeover switch is working properly.

9.2 Troubleshooting

<table>
<thead>
<tr>
<th>S/N</th>
<th>State</th>
<th>Analysis</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power supply normally, the controller without any display.</td>
<td>1. Cables are not connected terminals. 2. The cable has loosen which it was connected between controller and changeover switch.</td>
<td>1. Check it and connect it again. 2. Check it and plug in again.</td>
</tr>
<tr>
<td>2</td>
<td>Controller or changeover switch is on manual state.</td>
<td>1. Controller or changeover switch is on manual state. 2. Terminal loose. 3. Fuse is broken. 4. Fire fighting single input to controller. 5. Voltage is out of the normal range.</td>
<td>1. Change to automatic Mode or relieve electrical locking or remove the handle. 2. Check it and plug in again. 3. Change fuse. 4. Cancel the fire fighting single. 5. Check voltage, make sure the voltage range in 70% ~ 130%.</td>
</tr>
<tr>
<td>3</td>
<td>OTM_C_D transfer continually.</td>
<td>1. Loose or poor between cable and terminal. 2. Voltage fluctuating, and the fluctuation range beyond the overvoltage or under voltage setting value.</td>
<td>1. Check the connections. 2. Reset the value of overvoltage or undervoltage (e.g., change 115% to 125%) or enlarge changeover delay time setting.</td>
</tr>
<tr>
<td>4</td>
<td>Fire fighting fault.</td>
<td>1. Fire fighting is not 24V d.c.. 2. Fire fighting Polarity reverse connection. 3. Fire fighting single lasts less than 1 second.</td>
<td>Please input the correct fire fighting single, it must be 24V d.c. and lasts more than 1 second.</td>
</tr>
<tr>
<td>5</td>
<td>Power supply normally, but control unit display phase lost.</td>
<td>1. Loose or poor connect between cable and terminal.</td>
<td>Check and troubleshooting.</td>
</tr>
<tr>
<td>6</td>
<td>OTM_C10D remain at fault alarm.</td>
<td>1. Line terminal phase loss. 2. N pole is connected mistakenly to A, B or C phase.</td>
<td>Check and troubleshooting.</td>
</tr>
<tr>
<td>7</td>
<td>OTM_C11D remain at voervoltage alarm.</td>
<td>1. Line terminal overvoltage. 2. N pole is connected mistakenly to A, B or C phase.</td>
<td>Check and troubleshooting.</td>
</tr>
</tbody>
</table>
8.6 Handle and spare fuse storage

<table>
<thead>
<tr>
<th>OTVS1</th>
<th>OTM160-250_C_D_</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTVS2</td>
<td>OTM315-800_C_D_</td>
</tr>
</tbody>
</table>
1. Introduction

This manual describes the installation and the basic operation of the OTM_C_D automatic transfer switch (class PC). The instructive part is followed by a section on available accessories.

Use of symbols

⚠️ Hazardous voltage: warns about a situation where a hazardous voltage may cause physical injury to a person or damage to equipment.

⚠️ General warning: warns about a situation where something other than electrical equipment may cause physical injury to a person or damage to equipment.

❗️ Caution: provides important information or warns about a situation that may have a detrimental effect on equipment.

ℹ️ Information: provides important information about the equipment.

8.5 Phase barriers

Phase barriers are used in ABB SACE Tmax T4-T5 MCCB are also fit to Automatic transfer switch OTM_C_D, the relationship refer to form 8-1. remark: the remained length after cutting of phase barriers is different from Tmax T4-T5 MCCB

Figure 8-10 OTM_C_D 160...800-PC

Form 8-1 Phase barriers selection table

<table>
<thead>
<tr>
<th>Phase barriers of ABB SACE Tmax T4-T5 are used for Automatic transfer switch OTM_C_D</th>
<th>Pole</th>
<th>Qty of Phase barriers</th>
<th>Type of Phase barriers</th>
<th>The retained length after cutting (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTM_C_D160…250</td>
<td>3</td>
<td>4</td>
<td>PB100 or PB200</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>6</td>
<td></td>
<td>55</td>
</tr>
<tr>
<td>OTM_C_D315…400</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>PB100 or PB200</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>6</td>
<td></td>
<td>67</td>
</tr>
<tr>
<td>OTM_C_D630…800</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>PB100 or PB200</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>6</td>
<td></td>
<td>90</td>
</tr>
</tbody>
</table>
8.4 Auxiliary contacts

Automatic transfer switch OTM_C_D is used to ensure power supply for different occasions. You can operate the changeover switch by using either way, manual, remote, or automatic.

1. Motor operator
2. Changeover switch
3. Motor/Manual selection
4. Input terminal for operation power supply
5. Handle for manual operation
6. Place for auxiliary contact blocks
7. Fuse (F1)
8. Output terminal for switch state
9. Locking latch for releasing the handle and locking electrical operation
10. Locking clip for locking manual operation
11. Cable for connection to controller
12. OTM_C10D or OTM_C11D controller
13. Function interface

You can choose OTM_10D or OTM_C11D controller for each type changeover switch.
3. Quick start

This is a quick guide only meant for those who need a reminder of how to operate the unit. For more detailed instructions, see Section 5.

3.1 Operating the switch manually

To operate the switch manually:

1. Turn the knob to the MANU position.
2. Turn the Motor/Manual selector to the Manual (Man) position.
3. Attach the handle to the switch panel by pressing it to the changeover switch until it clicks into place.

To disable the manual (and at the same time also electrical) operation, turn the handle to the position O and attach the padlock to the handle.

8.3 Terminal shrouds

Figure 8-7 OTM_C_D 315...400

Figure 8-8 OTM_C_D 600...800
3.2 Operating the switch electrically—Manual Mode

To operate the switch electrically:

1. Remove the handle from the switch panel. You can remove the handle in all positions.
2. Turn the Motor/Manual selector to the Motor (M) position to enable electrical operation.
3. Turn the knob to the right position what you need. After that, the switch will switching to the right position what you want.

8.2 Bridging bars

Figure 8-3 OTM_C_D 600...800

Figure 8-4 OTM_C_D 32...400

Figure 3-3 Operating the switch electrically/Manual Mode
To disable electrical operation, lock the locking latch with a padlock. After the locking latch has been locked, the motorized changeover switch cannot be operated electrically. You can lock electrical operation in all positions (I, 0, II).

3.3 Operating the switch electrically/Automatic Mode

Operating the switch electrically by Automatic Mode

1. Remove the handle from the change-over switch panel. You can remove the handle in all positions (I, 0, II).
2. Turn the Motor/Manual selector to the Motor (M) position.
3. Turn the knob to the AUTO position.

8.2 Bridging bars

To disable electrical operation, lock the locking latch with a padlock. After the locking latch has been locked, the motorized changeover switch cannot be operated electrically. You can lock electrical operation in all positions (I, 0, II).
8. Accessories

8.1 Terminal clamp sets

To disable electrical control (Automatic Mode), lock the locking latch with a padlock. After the locking latch has been locked, the switch cannot be operated electrically. You can lock electrical operation in all positions (I, 0, II).

Locking state information as below table:

<table>
<thead>
<tr>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Manual Mode</td>
</tr>
<tr>
<td>0</td>
<td>Auto Mode</td>
</tr>
<tr>
<td>II</td>
<td>Auto Mode</td>
</tr>
</tbody>
</table>

Figure 8-1 OTM_C_D32...250

Figure 8-2 OTM_C_D315...400

Figure 3-5 Operating the switch electrically/Automatic Mode
4. Installation

Use protection against direct contact.

4.1 Installation Mode

The recommended mounting positions for automatic transfer switches are horizontal, wall mounted or table mounted.

4.1.1 Separated installation

1) dimension for changeover switch

Figures 4-1 OTM_C_D32...250

7. Data

7.1 Motor operator technical Data

<table>
<thead>
<tr>
<th>Item</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated operational voltage Ue</td>
<td>220V a.c./380V a.c.</td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>(0.85...1.1)×Ue</td>
</tr>
<tr>
<td>Operating angle</td>
<td>90° O-I,I-O,II-II-O, 180° I-O-II</td>
</tr>
<tr>
<td>Operating time</td>
<td>See the Table 7.2</td>
</tr>
<tr>
<td>Protection degree</td>
<td>IP20</td>
</tr>
</tbody>
</table>

Locking information

| Locking the electrical operation | X1-X2(NO), 3A/250V/cosφ=1 |
| Rated impulse withstand voltage Uimp | 4kV |
| Voltage between terminals | 4kV |
| Voltage between contacts | 4kV |

Operating temperature

-25...+40°C

Transportation and storage temperature

-40...+70°C

Altitude

Max.2000m

Table 7-2 General technical data of motor operators

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>OTM_C_D32...250</td>
<td>220V a.c.</td>
<td>0.2</td>
<td>1.8</td>
<td>0.4-0.8</td>
<td>1.1-1.5</td>
<td>0.4-0.8</td>
</tr>
<tr>
<td></td>
<td>380V a.c.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTM_C_D315...400</td>
<td>220V a.c.</td>
<td>0.5</td>
<td>3.5</td>
<td>0.4-0.8</td>
<td>1.1-1.5</td>
<td>0.4-0.8</td>
</tr>
<tr>
<td></td>
<td>380V a.c.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTM_C_D600...800</td>
<td>220V a.c.</td>
<td>0.8</td>
<td>5</td>
<td>0.7-1</td>
<td>1.5-2</td>
<td>0.7-1</td>
</tr>
<tr>
<td></td>
<td>380V a.c.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Under nominal conditions

Must use the same type of fuse is described on the label close to the fuse.

7.2 Terminal for state information after pad-lock

Table 7-3 Terminal for state information of locking

<table>
<thead>
<tr>
<th>State</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>locking the electrical operation X1-X2(NO)</td>
<td>3A/250V/cosφ=1</td>
</tr>
</tbody>
</table>
4. Installation

Figure 4-2 OTM_C_D32...250

Alarm Generator
Start Q1 close Q2 close Q1 trip Q2 trip fire fighting terminal 23, 24 for customers connecting fire fighting single that lasts more than 1 second is activate.

*terminal 25~36 are idle contact for customers connecting (3A/250V a.c., 3A/28V d.c.)

*terminal 25~28 are unuseful at OTM motor operation primary line input secondary line input

E3  | E4
---|---
A  | 35  | 35
A1 | 116 | 116
A2 | 258 | 293
B  | 273 | 308

Figure 4-3 OTM_C_D315...400

24V d.c. fire fighting
6.4 OTM_C_D connections

Main circuit connections

<table>
<thead>
<tr>
<th>Terminals</th>
<th>3 poles</th>
<th>4 poles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L1A</td>
<td>L1D</td>
</tr>
<tr>
<td>2</td>
<td>L1B</td>
<td>L1C</td>
</tr>
<tr>
<td>3</td>
<td>L2A</td>
<td>L2B</td>
</tr>
<tr>
<td>4</td>
<td>L2C</td>
<td>L2D</td>
</tr>
<tr>
<td>5</td>
<td>L3A</td>
<td>L3B</td>
</tr>
<tr>
<td>6</td>
<td>L3C</td>
<td>L3D</td>
</tr>
</tbody>
</table>

Control circuit connections

For 3 poles connections

<table>
<thead>
<tr>
<th>Terminals</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1, X2</td>
<td>Motor supply power 1</td>
</tr>
<tr>
<td>X3, X4</td>
<td>Motor supply power 2</td>
</tr>
</tbody>
</table>

* terminal on the switch

Alarm Generator
Start Q1 close Q2 close Q1 trip Q2 trip Fire fighting terminal 23, 24 for customers connecting 24 V d.c. fire fighting. Please test the delay motor. If the second is inadequate, terminate 25~36 are idle contacts for customers connecting 1~3 A/250 V a.c., 3 A/28 V d.c. terminal 25~28 are useless at OTM. Terminal 30~36 are useless at OTM.

Monitored signals for two switches

<table>
<thead>
<tr>
<th>Terminals</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>U1N, U2N, U3N</td>
<td>Single output for electrical locking</td>
</tr>
</tbody>
</table>

MT6 5.5 , 6.8 in.WebElement: 18...33 lb. in.
Press the reset button to reset the control unit to automatic Mode after the fire fighting command relieved.

7. Gen-Set start
If the primary power comes from transformer and the secondary power come for generator, the controller will send a command to start the generator after the failure happens in the primary power. The switch will transfer to the secondary power after the generator’s voltage was stable. Please see the connections in figure 6.4.

8. Reset button function
1) If the controller go into death-loop, you can press the reset button to resume normal operation.
2) If the fire fighting signals has been canceled, you can press the reset button reset to automatic mode.
3) Refusing to perform alarm, after the failure is solved, you need to press the reset button to reset to automatic mode.
4) The function of the controller is valid after pressed the reset button.

9. Delay time setting
T1: Power state confirmation. It means that the time from the controller monitor a failure to confirm it or from monitor the failure is recovered to confirm it.
T2: Power supply close delay time. It means that the shortest delay time from O position to I or II position.
Remark: delay time threshold: 0, 3, 5, 10, 15, 20, 30 seconds. delay time knob is shown in Figure 6-5

2) Dimension for controller
3) Control unit connections

Only an authorised electrician may perform the electrical installation and maintenance of OTM automatic transfer switches. Do not attempt any installation or maintenance actions when an OTM automatic transfer switch is connected to the electrical mains. Before starting work, make sure that the switch is de-energised.

4. Alarm
When controller sent a switching signal, the change-over switch executes command failed, then controller will stop to sent the other switching signal and it will sent a alarm signal.
OTM C10D Fault light and alarm light on, and has an alarm sound.
OTM C11D Refusing to perform light and alarm light on, and has an alarm sound.

Refusing to perform light

OTM C10D does not have refusing to perform light.

Refusing to perform alarm, after the failure is solved, then you need to press the reset button to reset to automatic mode of control unit.

5. Alarm for N pole wrong connection
For 4 poles, if you connect N pole to A, B or C phase
OTM C10D failure light and alarm light blinks, and has an alarm sound.
OTM C11D overvoltage light and alarm light blinks, and has an alarm sound.

6. Fire fighting
When fire fighting control centre sent a fire fighting signal to controller, controller will sent a switching signal to transfer the switch to O position.
Connection is shown in Figure 6.4

The signal is sent by fire fighting control centre should be 24V d.c., it must last more than 1 second.
6.3 OTM_C_D function and threshold setting

Function below as control unit is on automatic mode:
1. under-voltage transfer
   If the power has a under-voltage failure, the controller will control the switch to transfer to the normal power.
   The value of under-voltage threshold is adjustable, the range: 70%~90% Ue
2. Over-voltage transfer
   If the power has a over-voltage failure, the controller will control the switch to transfer to the normal power.
   Then value of over-voltage threshold is adjustable, the range: 110%~130% Ue.

![Figure 6-4 under-voltage/over-voltage range setting](image)

If OTM_10D measures the power having under-voltage failure or over-voltage failure the corresponding light and alarm light blink, and has an alarm sound.
If OTM_11D measures the power having under-voltage failure or over-voltage failure from both power the same time, controller will control the switch switching to the OFF position.

3. Phase loss transfer
   If the power has phase loss failure, the controller will control the switch to transfer to the normal power, and when the controller monitors the phase loss failure.
   OTM_C10D : alarm light and alarm light blink, and has an alarm sound.
   OTM_C11D : phase missing light and alarm light blink, and has an alarm sound.
   If OTM_C11D monitors the power having phase loss failure from both power at the same time, the controller will control the switch switching to the OFF position.

*If the both power lose A-phase or C-phase at the same time, or the both power voltage less than 70% Ue, then the motor operator isn’t working.*

![Installation and instructions](image)
4.1.2 Integral installation

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>E1</th>
<th>E2</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTM_C_D32...250</td>
<td>480</td>
<td>430</td>
<td>196</td>
<td>30</td>
<td>160</td>
<td>258</td>
<td>35</td>
<td>116</td>
</tr>
<tr>
<td>OTM_C_D315...400</td>
<td>545</td>
<td>500</td>
<td>229</td>
<td>30</td>
<td>180</td>
<td>304.5</td>
<td>44</td>
<td>142</td>
</tr>
<tr>
<td>OTM_C_D600...800</td>
<td>610</td>
<td>560</td>
<td>293</td>
<td>12</td>
<td>132</td>
<td>390</td>
<td>65</td>
<td>180</td>
</tr>
</tbody>
</table>

6.2.2 The selection of Automatic Operation Mode

The original setting is U1 priority, you can change the function mode base on your need. The function mode setting must be on automatic mode, and your new setting is effective after pressing reset button.

The diagram shows the selection buttons for OTM_C10D and OTM_C11D, with configuration options for DIP-switches.

The table lists the settings for different models:
- OTM_C10D: U1 priority/No line priority
- OTM_C11D: U1 priority/No line priority

The function mode must be in the automatic mode, and pressing the reset button will activate the new setting.
6.2 OTM_C_D Operation Mode setting

Normally U1 is primary line, U2 is secondary line.

6.2.1 OTM_C_D The selection of Operation Mode

Automatic Mode  Manual Mode  U1 close

U1, U2 open  U2 close

Running light will be off when the controller is selected on manual mode, in this case, you can operate the changeover switch by handle, and the controller still monitor the dual power and has corresponding indication. But it doesn’t send any operating and alarm signal.

When you adjust the knob, the setting will be effective after you keep the knob at the same position last more than 1 second.

Never open any covers on the product. There may be dangerous external control voltages inside the OTM_ automatic transfer switch even if the voltage is turned off.

Never handle control cables when the voltage of the OTM_ automatic transfer switch or external control circuits are connected.

You must operate automatic transfer switch manually before the voltage is connected.

5.1 Manual operating

You can operate the automatic transfer switch manually by using the handle that is including in the delivery.

1. Turn the knob to the MANU position.
2. Turn the Motor/Manual selector to the Manual (Man.) position, see Figure 5-2. The motor operator is switched off and electrical operation is prevented.

![Figure 5-2 Motor/Manual selection in the Man. position](image)

3. Attach the handle by pressing it to the changeover switch panel until it clicks into place. You can attach the handle in all positions (I, O, II), see Figure 5-3.

![Figure 5-3 Attaching the handle](image)

4. Operate the motorized change-over switch by turning the handle to the required position (I, O, II).

![Electrical operation is prevented when the handle is attached to the change-over switch panel.](image)

### 6. OTM_C_D controller

**OTM_C_D controller must be disconnected from the main circuit during the insulation test.**

Base on difference function configuration, we have OTM_C10D and OTM_C11D for you to choose.

<table>
<thead>
<tr>
<th>OTM_C_D controller</th>
<th>Under-voltage/over-voltage transfer</th>
<th>Phase loss transfer</th>
<th>Delay time setting</th>
<th>Refusing to perform alarm</th>
<th>Phase loss alarm</th>
<th>Under-voltage/over-voltage alarm</th>
<th>Phase error alarm</th>
<th>Phase loss alarm</th>
<th>Auto Generator start</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTM_C10D</td>
<td>-</td>
<td>✓</td>
<td>1.5s</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>OTM_C11D</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

*Threshold: 0, 3, 5, 10, 15, 20, 30s

### 6.1 Interface

![Figure 6-1 Interface](image)
5.4.2 Locking the manual operation

By default, manual operation can only be locked to position O. Locking to position I and II is optional and possible only with modifications to the switch panel.

To lock manual operation:
1. Turn the handle to the required position.
2. Pull out the clip from the handle and place the padlock on the handle, see Figure 5-9. (You can place 3 padlocks at most)

---

5.2 Electrical operating/Manual Mode

To operate the switch electrically:
1. Release the handle from the switch panel by pushing down the locking latch under the switch panel and pulling the handle off, see Figure 5-4.

Electrical control is disabled if the handle is attached to the switch panel.

2. Turn the Motor/Manual selection switch to the Motor(M) position, see Figure 5-5.
3. Turn the right function position on the function selection interface what you need.

![Function selection interface](image1)

- U1 close
- U1, U2 open
- U2 close

Figure 5-6 the function selection interface

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>U1 close</td>
<td>U1, U2 open</td>
<td>U2 close</td>
</tr>
</tbody>
</table>

When you adjust the knob, the setting will be effective after you keep the knob at the same position last more than 1 second.

5.3 Electrical operating/Automatic Mode

To operate the switch electrically:
1. Release the handle from the switch panel by pushing down the locking latch under the switch panel and pulling the handle off, see Figure 5-4

Electrical control is disabled if the handle is attached to the switch panel.

2. Turn the Motor/Manual selection switch to the Motor (M) position, see Figure 5-5.
3. Turn the knob to the Auto position, see Figure 5-7.

Figure 5-7 the function selection interface

4. OTM_C_D controller can automatically control the switch switching.

For more details about OTM_C_D control unit function and use, please see Section 6.

5.4 Locking

You can lock the OTM automatic transfer switch to a specific position.

5.4.1 Locking the electrical operating

You can lock the electrical operation to all positions (I, 0, II).

To lock electrical operation:
1. Pull up the locking latch under the switch panel.
2. Place the padlock under the latch, see Figure 5-8.

You cannot attach the handle when electrical control is locked.

Figure 5-8 Locking the electrical operation