Motorized change-over switches

Installation and operating instructions
34OTM_C / 1SCC303002M9702
Contents

1. Introduction .............................................................................................................. 4
   1.1 Use of symbols ........................................................................................................ 4
   1.2 Explanations of abbreviations and terms .............................................................. 4
2. Product overview ...................................................................................................... 5
3. Quick start ............................................................................................................... 6
   3.1 Controlling the motorized change-over switch electrically; remote control .......... 6
   3.1.1 Locking electrical control .................................................................................. 6
   3.2 Controlling the motorized change-over switch manually; local operation .......... 7
4. Installation .............................................................................................................. 8
   4.1 Mounting the motorized change-over switch ....................................................... 8
   4.2 Dimensional drawings ......................................................................................... 10
   4.3 Mounting positions ............................................................................................. 14
   4.4 Labelling .............................................................................................................. 14
5. Connecting ................................................................................................................ 15
   5.1 Control circuit ....................................................................................................... 15
6. Operating ................................................................................................................... 16
   6.1 Electrical control .................................................................................................. 16
   6.1.1 Impulse control ............................................................................................... 17
   6.1.2 Continuous control ......................................................................................... 18
   6.2 Manual operation using the handle ...................................................................... 19
   6.3 Locking ............................................................................................................... 20
   6.3.1 Locking the electrical control ......................................................................... 20
   6.3.2 Locking the manual operation ........................................................................ 21
7. Technical data .......................................................................................................... 22
8. Accessories ............................................................................................................... 24
   8.1 Terminal clamp sets ............................................................................................. 24
   8.2 Bridging bars ....................................................................................................... 25
   8.3 Terminal shrouds ............................................................................................... 26
   8.4 Auxiliary contact blocks .................................................................................... 27
9. UL standard switches ............................................................................................... 28
   9.1 Phase barriers .................................................................................................... 29
1. Introduction
This manual describes the installation and the basic operation of the motorized change-over switches (type OTM_C). The instructive part is followed by a section on available accessories.

1.1 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.

Information: provides important information about the equipment.

1.2 Explanations of abbreviations and terms

OTM_C: Motorized change-over switch, the type name
OME_: Motor operator, the type name
OT_C: Change-over switch, the type name
OZXB_ and OZXA_: Terminal clamp sets, the type name, optional
OTZC_: Bridging bars, the type name, optional
OTS_: Terminal shrouds, the type name, optional
OA_: Auxiliary contact blocks, the type name, optional

2. Product overview
Motorized change-over switches (type OTM_C) are suitable for remote control. You can operate the motorized change-over switches either electrically by using the motor operator or manually by using the handle. The operation, either electrical or manual, can be chosen by the selector switch “Motor/Manual” on the motor operator. Motorized change-over switches consist of the change-over switch and the motor operator.

Figure 2.1  Motorized change-over switch (type OTM_C)

1  Change-over switch (type OT_C)
2  Motor operator (type OME_)
3  Switch panel, the operating mechanism
4  Handle for manual operation
5  Motor/Manual selection
6  Terminals for motor operator voltage supply
7  Terminals for push-buttons
8  Fuse (F1) of motor operator
9  Locking latch for releasing the handle and locking electrical control
10  Locking clip for locking manual operation
11  Terminals for locking state information
12  Place for auxiliary contact blocks
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 chapter 6.

3.1 Controlling the motorized change-over switch electrically; remote control

To control the motorized change-over switch electrically:
1. Remove the handle from the change-over switch panel. You can remove the handle in both positions (I, 0, II).
2. Turn the Motor/Manual selector to the Motor (M) position to enable electrical control.

3.2 Controlling the motorized change-over switch manually; local operation

To control the motorized change-over switch manually:
1. Turn the Motor/Manual selector to the Manual (Man.) position to enable manual operation and to prevent electrical operation.
2. Attach the handle to the change-over switch panel. You can attach the handle in both positions (I, 0, II).

To disable the manual (and at the same time also electrical) operation, lift up the locking clip to position 0 and attach the padlock to the handle.

Figure 3.1 Controlling the motorized change-over switch electrically; remote control

3.1.1 Locking electrical control

To disable electrical control, lock the locking latch with a padlock. After the locking latch has been locked, the motorized change-over switch cannot be controlled electrically. You can lock electrical control in both positions (I, 0, II).

Figure 3.2 Locking electrical control

Figure 3.3 Operating the motorized change-over switch manually

Figure 3.4 Locking the manual operation
4. Installation

4.1 Mounting the motorized change-over switch

Use protection against direct contact.

Figure 4.1  An example of using protection against direct contact

Figure 4.2  Motorized change-over switches, drilling hole distances / screw-mounting, [mm/in]
4.2 Dimensional drawings
4.3 Mounting positions
The recommended mounting positions for motorized change-over switches are horizontal, wall mounted or table mounted.

**i** Do not install the motorized change-over switches in any other position than those described above.

4.4 Labelling

**Figure 4.11** Labelling of the motorized change-over switches

5. Connecting

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

5.1 Control circuit

**Figure 5.1** Motorized change-over switch terminals

1. Terminals for motor operator voltage supply
2. Control terminals (push buttons)
3. Terminals for state information of locking

- Do not couple power for the control terminal. See the correct terminal for the power supply in Figure 5.1
- The control voltage (output C = 24Vdc) on the control terminal is non-isolated, see box 2 in Figure 5.1
- When relay outputs are used with inductive loads (such as relays, contactors and motors), they must be protected from voltage spikes using varistors, RC-protectors (AC current) or DC current diodes (DC current).
6. Operating

Never open any covers on the product. There may be dangerous external control voltages inside the motorized change-over switch even if the voltage is turned off.

Never handle control cables when the voltage of the motorized change-over switch or external control circuits are connected.

Exercise sufficient caution when handling the unit.

6.1 Electrical control

The motorized change-over switches are available for remote control.

To control the motorized change-over switch electrically:

1. Release the handle from the change-over switch panel by pressing down the locking latch under the switch panel and pulling the handle off, see Figure 6.1.

2. Turn the Motor/Manual selection switch to the Motor (M) position, see Figure 6.2.

3. Control the motorized change-over switch with the push-buttons via impulse control or continuous control.

Figure 6.2 Motor/Manual selection switch in the Motor (M) position

6.1.1 Impulse control

When using impulse control, the change-over switch is controlled by electric impulses. When you press the control button, the change-over switch is driven to the corresponding position (I, 0, II). The control impulse must last more than 100ms to take effect. A new command cannot be given until the change-over switch has reached the position of the previous command. Figure 6.3 shows the operation of the change-over switch with impulse control.

If a new command is given before the switch has reached the position of the previous command, the fuse (F1) may operate.
6.1.2 Continuous control

When using continuous control, the control command is supplied to the switch continuously. When you press the control button, the change-over switch is driven to the corresponding position (I, 0, II). Control of position 0 will over-run control of the other positions; that is, if you simultaneously give the 0 command and another command, the change-over switch is driven to position 0. Figure 6.4 shows the operation of the change-over switch with continuous control.

The continuous control command can be given with push buttons, cam switches or with relays incorporated in PLC equipment or with other suitable contacts.

---

6.2 Manual operation using the handle

You can operate the motorized change-over switch manually by using the handle that is included in the delivery.

To control the motorized change-over switch manually:

1. Turn the Motor/Manual selector to the Manual (Man.) position, see Figure 6.5. The motor operator is switched off and electrical control is prevented.

2. Attach the handle by pressing it to the change-over switch panel until it clicks into place. You can attach the handle in both positions (I, 0, II), see Figure 6.6.

3. Control the motorized change-over switch by turning the handle to the required position (I, 0, II).

---

Electrical control is prevented when the handle is attached to the change-over switch panel.
6.3 Locking
You can lock the motorized change-over switch to a specific position.

6.3.1 Locking the electrical control
To disable electrical control, lock the locking latch with a padlock. After the locking latch has been locked, the change-over switch cannot be controlled electrically. You can lock the electrical control to both positions (I, 0, II).

To lock electrical control:
1. Pull up the locking latch under the change-over switch panel.
2. Place the padlock under the latch, see Figure 6.7.

Figure 6.7 Locking the electrical control

The handle cannot be attached when electrical control is locked.

6.3.2 Locking the manual operation
By default, manual operation can only be locked to position 0. Locking to position I and II is optional and possible only with modifications to the change-over 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 6.8.

Figure 6.8 Locking the manual operation

The handle cannot be removed when padlocked to position 0.

The following chart shows the locking state information (the voltage on motor operator supply needed).

Figure 6.9 Locking state information
## 7. Technical data

### Table 7.1 General technical data of motor operators

<table>
<thead>
<tr>
<th>Motor operator, control circuit</th>
<th>Value</th>
<th>Cabling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated operational voltage U[V]</td>
<td>220 - 240 Vac, 50-60 Hz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>110 - 125 Vac/dc, 50-60 Hz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>48 Vdc</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24 Vdc</td>
<td></td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>0.85... 1.1 x U</td>
<td></td>
</tr>
<tr>
<td>Operating angle</td>
<td>90°: 0-I, 0-II; 180°: I-0-II</td>
<td></td>
</tr>
<tr>
<td>Operating time</td>
<td>See the Table 7.2</td>
<td></td>
</tr>
<tr>
<td>Protection degree</td>
<td>IP 20, front panel</td>
<td></td>
</tr>
<tr>
<td>Voltage supply</td>
<td>PE N L</td>
<td>1.5 - 2.5 mm²</td>
</tr>
<tr>
<td>Cable of the push-buttons (no SELV)</td>
<td>C III I 0</td>
<td>1.5 - 2.5 mm²</td>
</tr>
<tr>
<td>Maximum cable length</td>
<td>100 m</td>
<td></td>
</tr>
<tr>
<td>F2</td>
<td>Max. MCB 16 A</td>
<td></td>
</tr>
<tr>
<td>State information of locking (no SELV)</td>
<td>11-12-14 (C/O)</td>
<td>1.5 - 2.5 mm²</td>
</tr>
<tr>
<td>Handle attached or motor operator locked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locking motor operator</td>
<td>23-34 (NO)</td>
<td>1.5 - 2.5 mm²</td>
</tr>
<tr>
<td>Rated impulse withstand voltage U&lt;sub&gt;imp&lt;/sub&gt;</td>
<td>4 kV</td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-25... +55 °C</td>
<td></td>
</tr>
<tr>
<td>Transportation and storage temperature</td>
<td>-40... +70 °C</td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>Max. 2000m</td>
<td></td>
</tr>
</tbody>
</table>

### Table 7.2 Specified technical data of motor operators

<table>
<thead>
<tr>
<th>Type</th>
<th>Voltage U [V]</th>
<th>Nominal current I&lt;sub&gt;n&lt;/sub&gt; [A]</th>
<th>Current Inrush I&lt;sub&gt;n&lt;/sub&gt; [A]</th>
<th>Operating time I-0, 0-I, 0-II, II-0 [s]</th>
<th>Operating transfer time I-II or II-I [s]</th>
<th>OFF-time when operating I-II or II-I [s]</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTM160...250_C</td>
<td>220-240 Vac</td>
<td>0.2</td>
<td>1.3</td>
<td>0.4 - 1.0</td>
<td>1.0 - 2.0</td>
<td>0.4 - 1.0</td>
</tr>
<tr>
<td>OTM160...250_C</td>
<td>110-125 Vac/dc</td>
<td>0.45</td>
<td>2.1</td>
<td>0.5 - 1.5</td>
<td>1.1 - 2.5</td>
<td>0.4 - 1.0</td>
</tr>
<tr>
<td>OTM160...250_C</td>
<td>48 Vdc</td>
<td>1.1</td>
<td>4.4</td>
<td>0.5 - 1.5</td>
<td>1.4 - 2.5</td>
<td>0.5 - 1.1</td>
</tr>
<tr>
<td>OTM160...250_C</td>
<td>24 Vdc</td>
<td>3.3</td>
<td>16.8</td>
<td>0.4 - 1.0</td>
<td>1.0 - 2.0</td>
<td>0.4 - 1.0</td>
</tr>
<tr>
<td>OTM315...400_C</td>
<td>220-240 Vac</td>
<td>0.5</td>
<td>2.1</td>
<td>0.4 - 1.0</td>
<td>0.9 - 2.0</td>
<td>0.4 - 1.0</td>
</tr>
<tr>
<td>OTM315...400_C</td>
<td>110-125 Vac/dc</td>
<td>0.6</td>
<td>2.5</td>
<td>0.5 - 1.5</td>
<td>1.2 - 2.6</td>
<td>0.5 - 1.5</td>
</tr>
<tr>
<td>OTM315...400_C</td>
<td>48 Vdc</td>
<td>2.1</td>
<td>8.3</td>
<td>0.4 - 1.0</td>
<td>1.0 - 2.0</td>
<td>0.4 - 1.0</td>
</tr>
<tr>
<td>OTM315...400_C</td>
<td>24 Vdc</td>
<td>4.2</td>
<td>17.5</td>
<td>0.4 - 1.0</td>
<td>1.0 - 2.0</td>
<td>0.4 - 1.0</td>
</tr>
<tr>
<td>OTM630...800_C</td>
<td>220-240 Vac</td>
<td>0.7</td>
<td>2.8</td>
<td>0.4 - 1.0</td>
<td>0.9 - 2.0</td>
<td>0.4 - 1.0</td>
</tr>
<tr>
<td>OTM630...800_C</td>
<td>110-125 Vac/dc</td>
<td>0.8</td>
<td>4.6</td>
<td>0.6 - 1.2</td>
<td>1.2 - 3.0</td>
<td>0.4 - 1.0</td>
</tr>
<tr>
<td>OTM630...800_C</td>
<td>48 Vdc</td>
<td>2.6</td>
<td>8.4</td>
<td>0.6 - 1.6</td>
<td>1.3 - 3.0</td>
<td>0.4 - 1.0</td>
</tr>
<tr>
<td>OTM630...800_C</td>
<td>24 Vdc</td>
<td>4.0</td>
<td>22.4</td>
<td>0.5 - 1.5</td>
<td>1.1 - 2.5</td>
<td>0.4 - 1.0</td>
</tr>
</tbody>
</table>

* Under nominal conditions

### Table 7.3 State information

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handle attached or motor operator locked</td>
<td>11-12-14 (C/O): 5A / 250V / cosφ = 1</td>
</tr>
<tr>
<td>Locking motor operator</td>
<td>23-24 (NO): 5A / 250V / cosφ = 1</td>
</tr>
<tr>
<td>SCPD</td>
<td>Max. MCB C2A</td>
</tr>
</tbody>
</table>
8. Accessories

8.1 Terminal clamp sets

Figure 8.1 Mounting of the terminal clamp sets, types OZXB_ and OZXA_.

8.2 Bridging bars

Figure 8.2 Mounting of the bridging bars (type OTZC_) to the motorized change-over switches.
8.3 Terminal shrouds

Figure 8.3  Mounting of the terminal shrouds (type OTS_) to the motorized change-over switches

<table>
<thead>
<tr>
<th>OTM160...250_C</th>
<th>OTM315...400_C</th>
<th>OTM600...800_C</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTS250_1S</td>
<td>OTS400_1S</td>
<td>OTS800_1S</td>
</tr>
</tbody>
</table>

| OTS250_1L     | OTS400_1L      | OTS800_1L      |

8.4 Auxiliary contact blocks

Figure 8.4  Mounting of the auxiliary contact blocks, type OA_
9. UL standard switches

9.1 Phase barriers

If the conductors are wider than 39 mm (1.54 inch), phase barriers of type 68838 or shrouds must be used on OTM600U_C to maintain a clearance of 1 inch.
Low Voltage Products
P.O Box 622
FI-65101 VAASA, Finland
Telephone +358 10 22 11
Telefax +358 10 22 45708
www.abb.com

The technical data and dimensions are valid at the time of printing. We reserve the right to subsequent alterations.