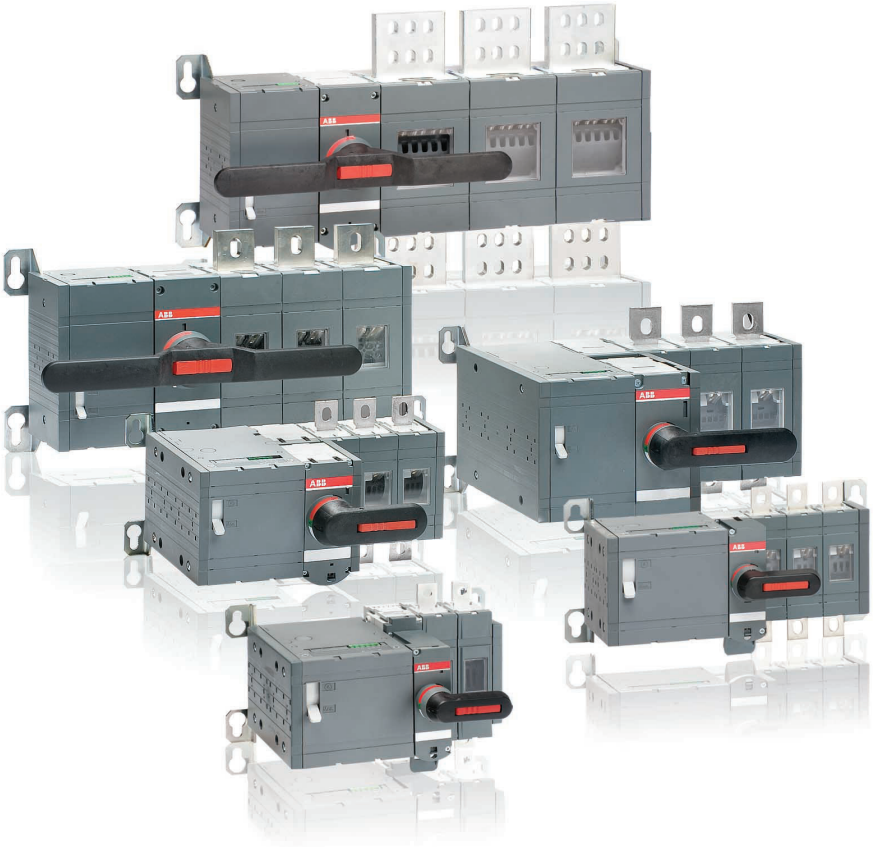
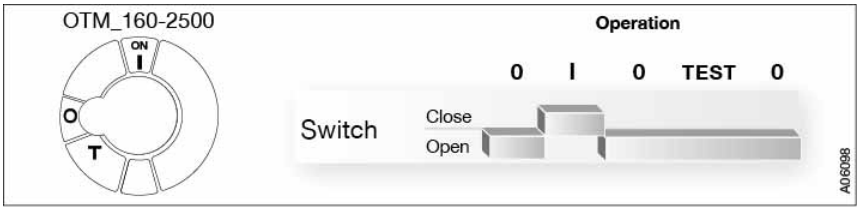
Motorized switch-disconnectors OTM_

Installation and operating instructions
34OTM_ / 1SCC303006M0203



Contents



1. Introduction

This manual describes the installation and the basic operation of the motorized switch-disconnectors, types OTM_. 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_:	Motorized switch-disconnector, the type name
OME_:	Motor operator, the type name
OT_:	Switch-disconnector, the type name
OZXB_ and OZXA_:	Terminal clamp sets, the type name, accessories
OTS_:	Terminal shrouds, the type name, accessories
OA_:	Auxiliary contacts, the type name, accessories
OTVS_:	Mounting accessory for handle and spare fuse storing, the type name, accessories
OTB_:	Phase barriers, the type name, accessories

2. Product overview

Motorized switch-disconnectors (type OTM_) are suitable for remote control. You can operate the motorized switch-disconnectors 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 switch-disconnectors consist of the switch-disconnector and the motor operator.

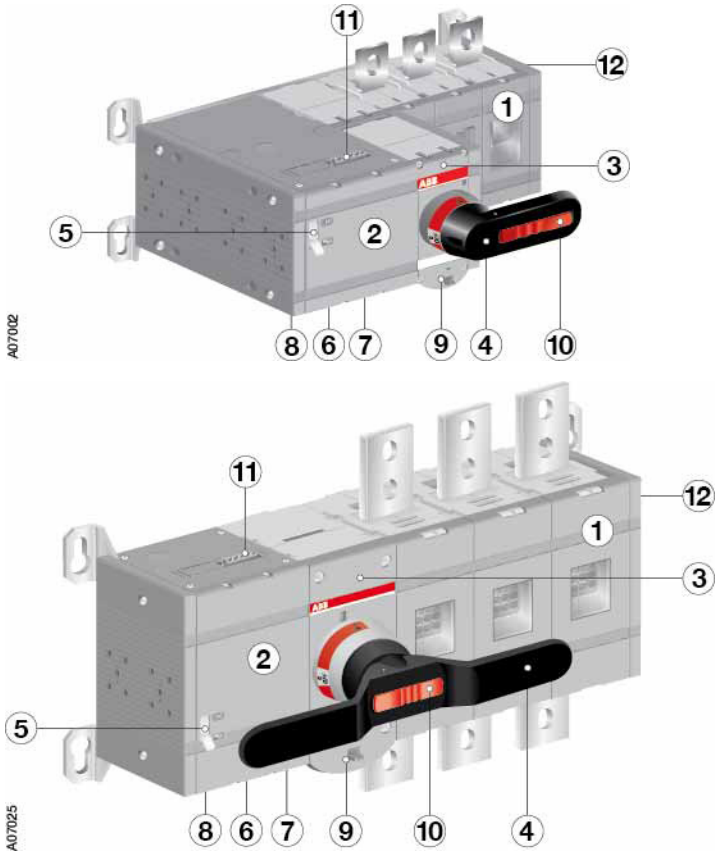


Figure 2.1 Motorized switch-disconnector (type OTM)

1 Switch-disconnector
2 Motor operator
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 Operating the motorized switch-disconnector electrically; remote control

To operate the motorized switch-disconnector electrically:

1. Remove the handle from the switch panel. You can remove the handle in both positions (I or 0).
2. Turn the Motor/Manual selector to the Motor (M) position to enable electrical operate.

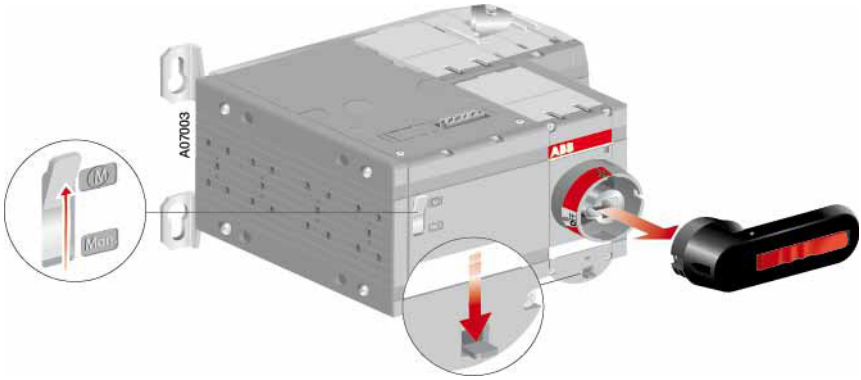


Figure 3.1 Operating the motorized switch-disconnector electrically; remote control

3.1.1 Locking electrical operation

To disable electrical operate, lock the locking latch with a padlock. After the locking latch has been locked, the motorized switch-disconnector cannot be operated electrically. You can lock electrical operation in both positions (I or 0).

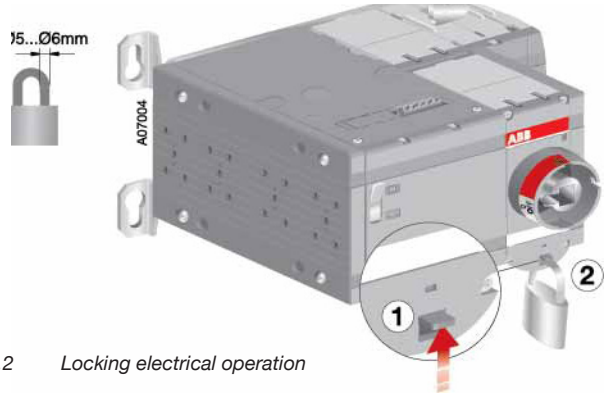


Figure 3.2 Locking electrical operation

3.2 Operating the motorized switch-disconnector manually; local operation

To operate the motorized switch-disconnector 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 switch panel. You can attach the handle in both positions (I or 0).

Figure 3.3 Operating the motorized switch-disconnector manually

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.

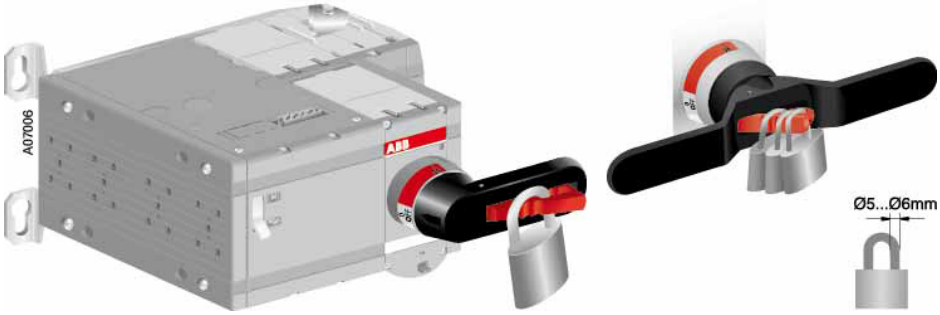


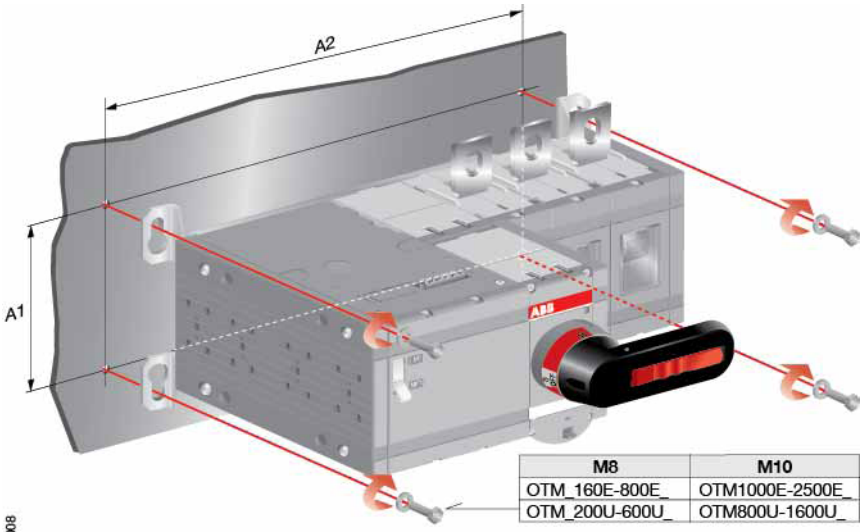
Figure 3.4 Locking the manual operation

4. Installation

4.1 Mounting the motorized switch-disconnector

Use protection against direct contact.

Figure 4.1 An example of using protection against direct contact



M8	M10
OTM_160E-800E_	OTM1000E-2500E_
OTM_200U-600U_	OTM800U-1600U_

A07008

	OTM160-250_		OTM200_	
	E3M_	E4M_	U3M_	U4M_
A1	118	118	118/4.65	118/4.65
A2	274	309	298/11.74	341/13.43

	OTMDC160-250_		OTMDC100-200_	
	E3M_	E4M_	U3M_	U4M_
A1	118	118	118/4.65	118/4.65
A2	274	309	274/10.79	309/12.17

	OTM315-400_		OTM400_	
	E3M_	E4M_	U3M_	U4M_
A1	136	136	136/5.36	136/5.36
A2	320	364	350/13.79	404/15.92

	OTM630-800_		OTM600_	
	E3M_	E4M_	U3M_	U4M_
A1	180	180	180/7.09	180/7.09
A2	394	459	394/15.52	459/18.08

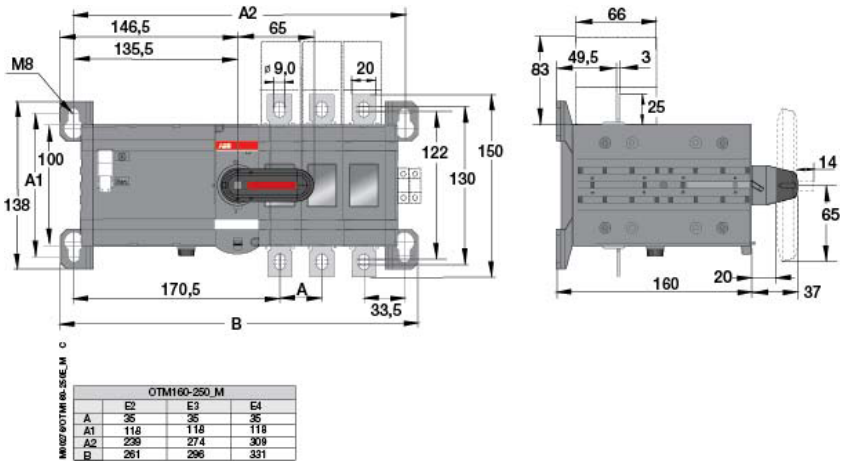
	OTM1000-1250_		OTM1600_		OTM800-1200_	
	E3M_	E4M_	E3M_	E4M_	U3M_	U4M_
A1	230	230	230	230	230/9.06	230/9.06
A2	476,5	556,5	476,5	556,5	476,5/18.77	556,5/21.92

	OTM2000-2500_		OTM1600_	
	E3M_	E4M_	U3M_	U4M_
A1	230	230	230/9.06	230/9.06
A2	614,5	740,5	614,5/24.21	740,5/29.17

Figure 4.2 Motorized switch-disconnectors, drilling hole distances / screw-mounting, [mm]

4.2 Dimensional drawings

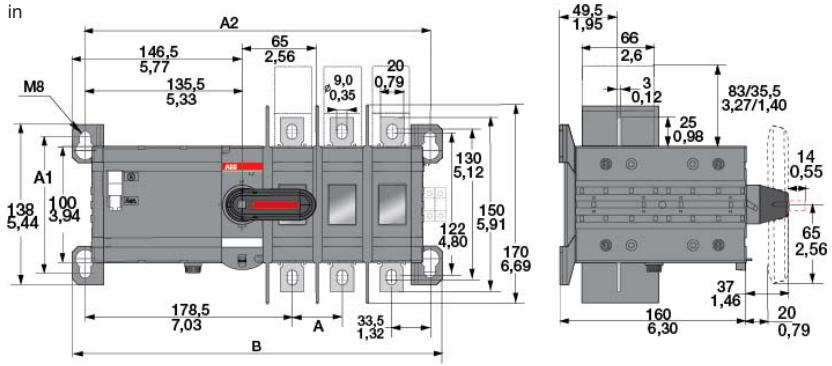
mm



OTM160-250_M			
	E2	E3	E4
A	35	35	35
A1	118	118	118
A2	239	274	309
B	261	296	331

Figure 4.3 OTM160-250E_M

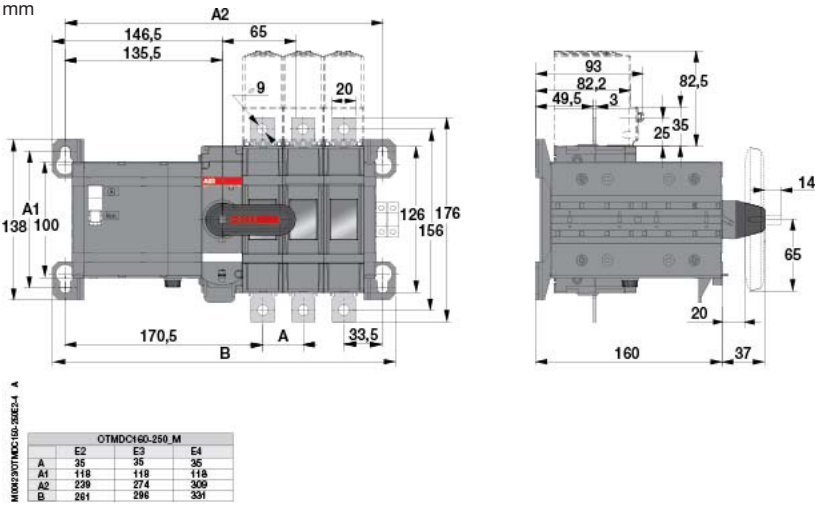
mm
in



OTM200_M			
	U2	U3	U4
A	43/1,69	43/1,69	43/1,69
A1	118/4,65	118/4,65	118/4,65
A2	255/10,05	298/11,74	341/13,43
B	277/10,91	320/12,61	363/14,3

Figure 4.4 OTM200U_M

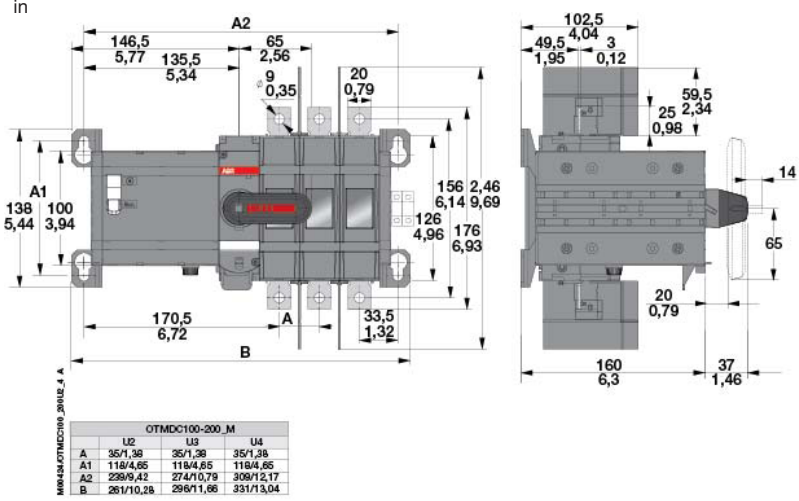
mm



OTMDC160-250_M			
	E2	E3	E4
A	35	35	35
A1	118	118	118
A2	239	274	309
B	261	296	331

Figure 4.5 OTMDC160-250E_M

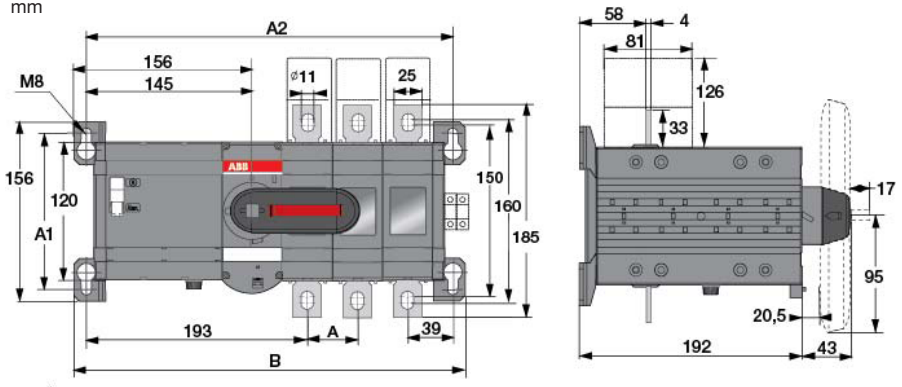
mm
in



OTMDC100-200_M			
	U2	U3	U4
A	35/1,38	35/1,38	35/1,38
A1	118/4,65	118/4,65	118/4,65
A2	239/9,42	274/10,79	309/12,17
B	261/10,28	296/11,66	331/13,04

Figure 4.6 OTMDC100-200U_M

mm

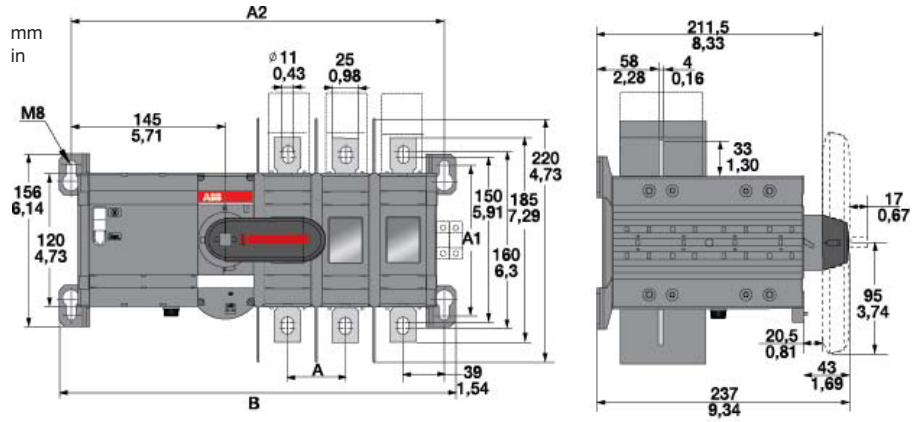


M0029/OTM315-400E_M C

OTM315-400_M			
	E2	E3	E4
A	44	44	44
A1	136	136	136
A2	276	320	364
B	298	342	386

Figure 4.7 OTM315-400E_M

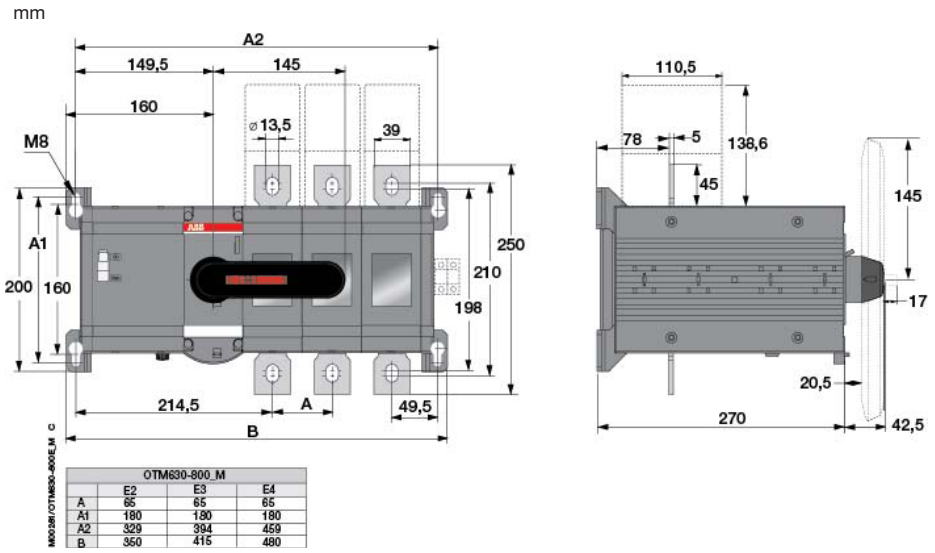
mm
in



M0027/OTM400U3_4 B

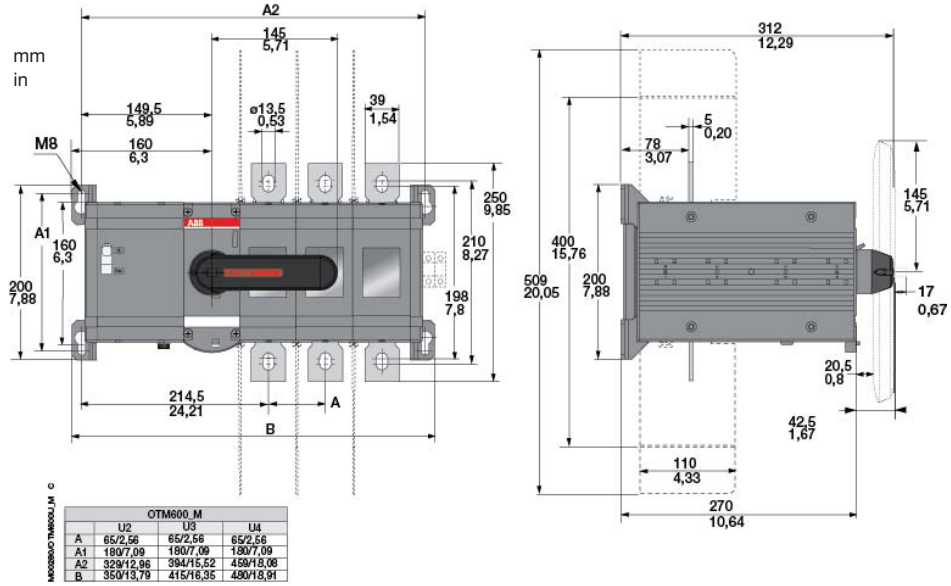
OTM400_M			
	U2	U3	U4
A	54/2,13	54/2,13	54/2,13
A1	136/5,36	136/5,36	136/5,36
A2	296/11,66	350/13,79	404/15,92
B	318/12,53	372/14,65	426/16,78

Figure 4.8 OTM400U_M



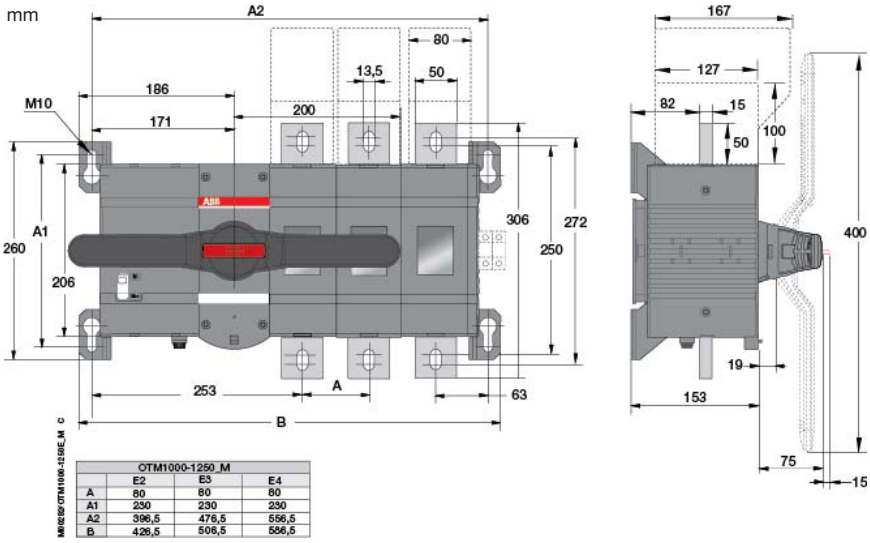
OTM630-800_M			
	E2	E3	E4
A	65	65	65
A1	180	180	180
A2	329	394	459
B	350	415	480

Figure 4.9 OTM630-800E_M



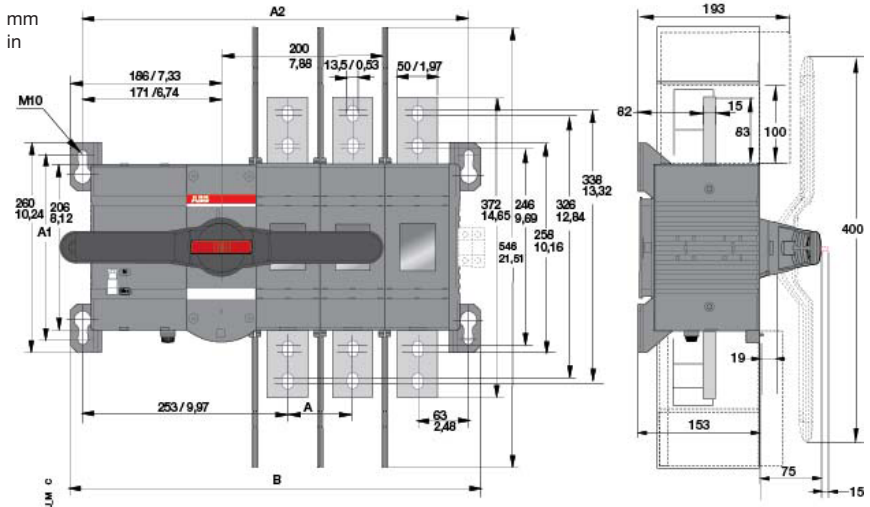
OTM600_M			
	U2	U3	U4
A	65/2,56	65/2,56	65/2,56
A1	180/7,09	180/7,09	180/7,09
A2	329/12,96	394/15,52	459/18,08
B	350/13,79	415/16,35	480/18,91

Figure 4.10 OTM600U_M



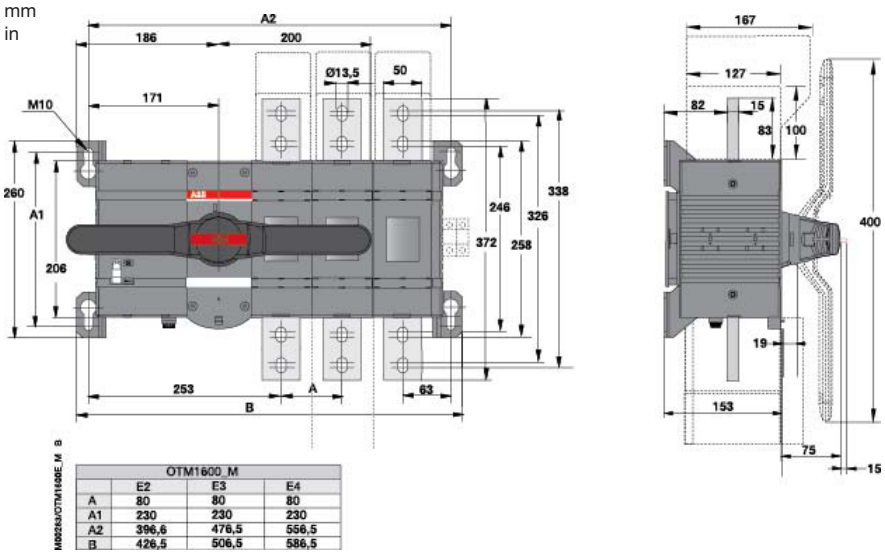
OTM1000-1250_M			
	E2	E3	E4
A	80	80	80
A1	230	230	230
A2	396,5	476,5	556,5
B	426,5	506,5	586,5

Figure 4.11 OTM1000-1250E_M



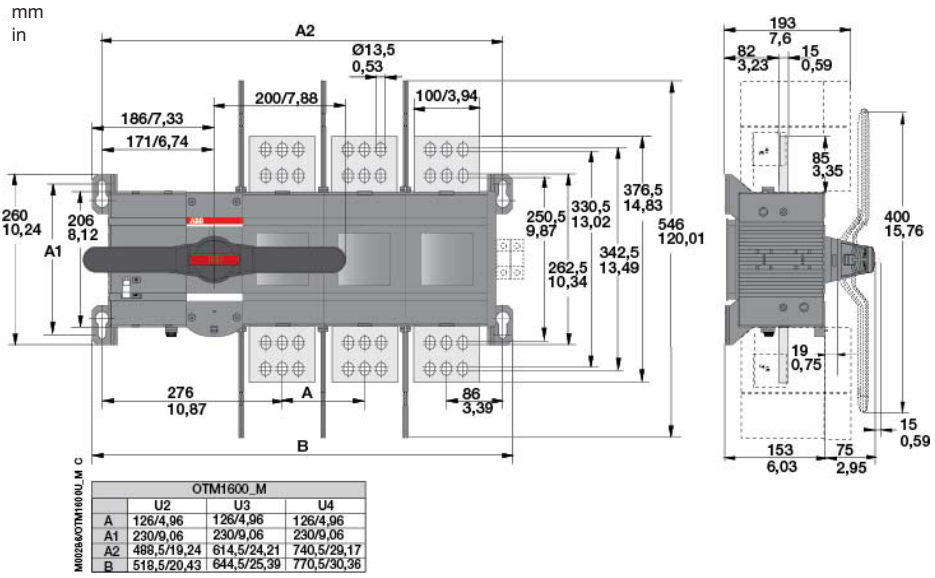
OTM800-1200_M			
	U2	U3	U4
A	80/3,15	80/3,15	80/3,15
A1	230/9,06	230/9,06	230/9,06
A2	396,5/15,62	476,5/18,77	556,5/21,92
B	426,5/16,8	506,5/19,96	586,5/23,11

Figure 4.12 OTM800-1200U_M



OTM1600_M			
	E2	E3	E4
A	80	80	80
A1	230	230	230
A2	396,6	476,5	556,5
B	426,5	506,5	586,5

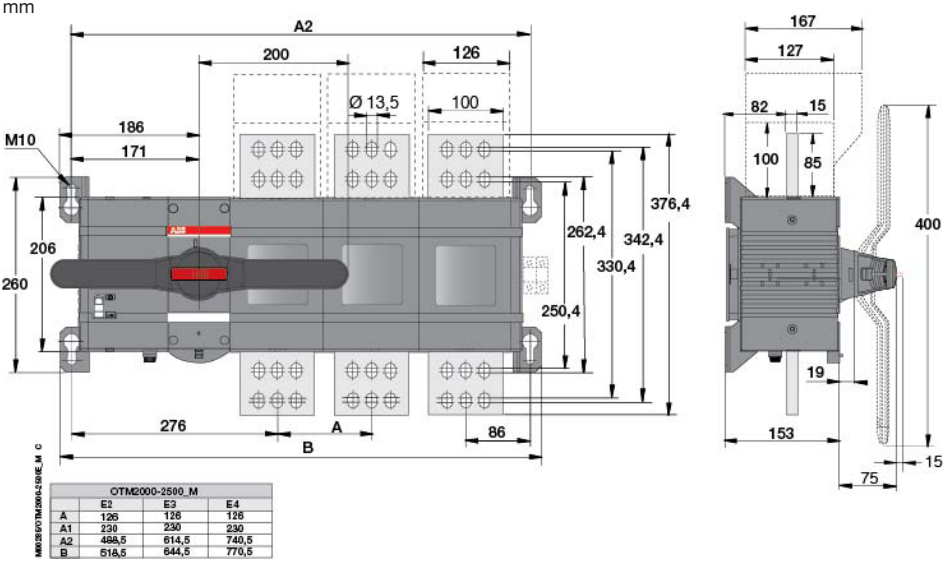
Figure 4.13 OTM1600E_M



OTM1600_M			
	U2	U3	U4
A	126/4,96	126/4,96	126/4,96
A1	230/9,06	230/9,06	230/9,06
A2	488,5/19,24	614,5/24,21	740,5/29,17
B	518,5/20,43	644,5/25,39	770,5/30,36

Figure 4.14 OTM1600U_M

mm



OTM2000-2500_M			
	E2	E3	E4
A	126	126	126
A1	230	230	230
A2	488,5	614,5	740,5
B	518,5	644,5	770,5

Figure 4.15 OTM2000-2500E_M

4.3 Mounting positions

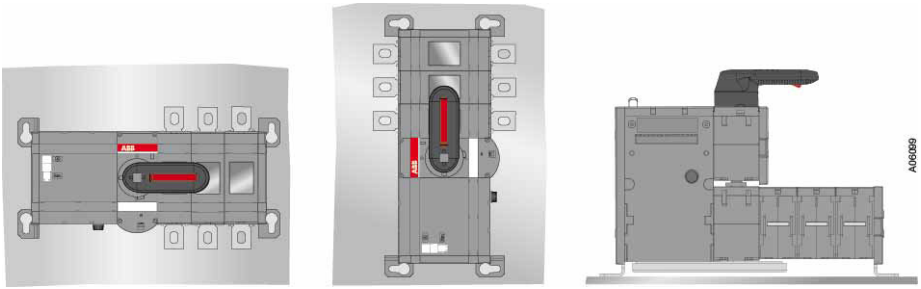


Figure 4.16 Mounting positions

Do not install the motorized switch-disconnectors in any other position than those described above.

4.4 Labelling

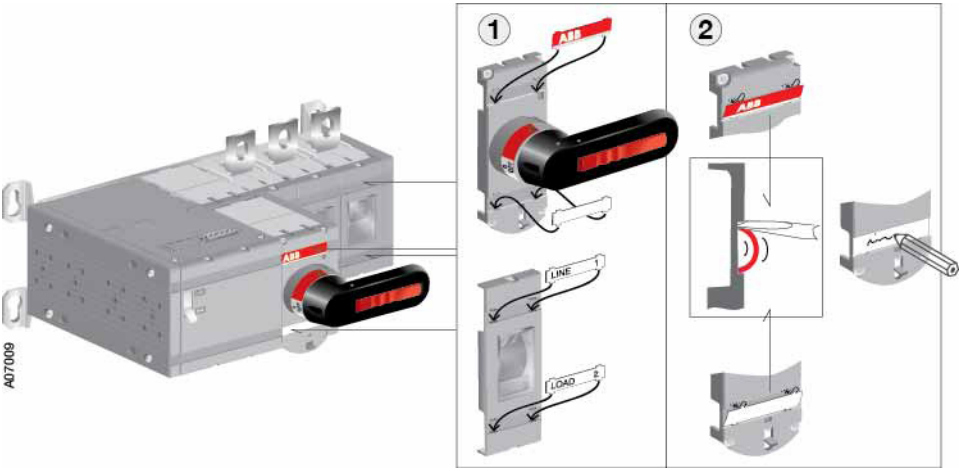


Figure 4.17 Labelling of the motorized switch-disconnectors

5. Connecting

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

5.1 Control circuit

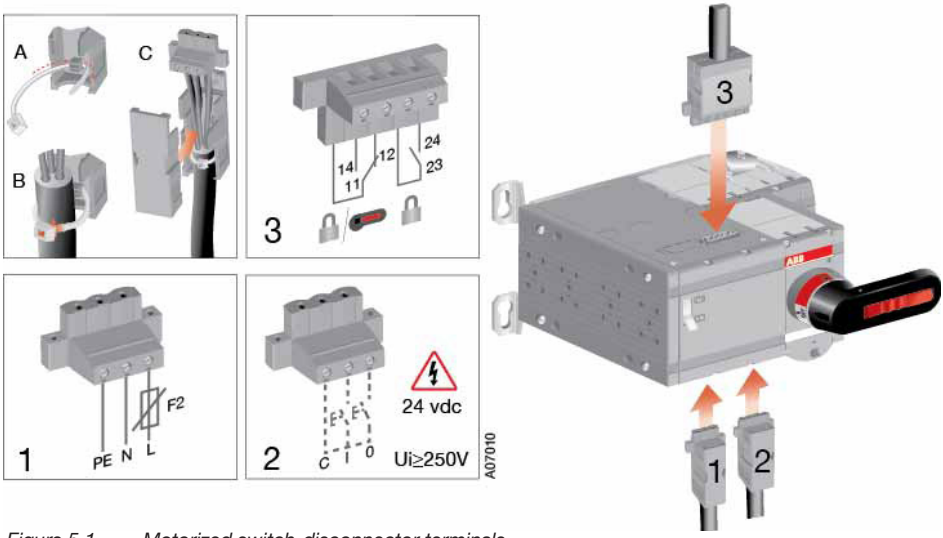


Figure 5.1 Motorized switch-disconnector terminals

1. Terminal for motor operator voltage supply
2. Control terminal for push buttons or selector switch
3. Terminal 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, if the voltage is connected. There may be still dangerous external control voltages inside the motorized switch-disconnector even if the voltage is turned off.
	Never handle control cables when the voltage of the motorized switch-disconnector or external control circuits are connected.
	Exercise sufficient caution when handling the unit.

6.1 Electrical operation

The motorized switch-disconnectors are available for remote control.

To operate the motorized switch-disconnector electrically:

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

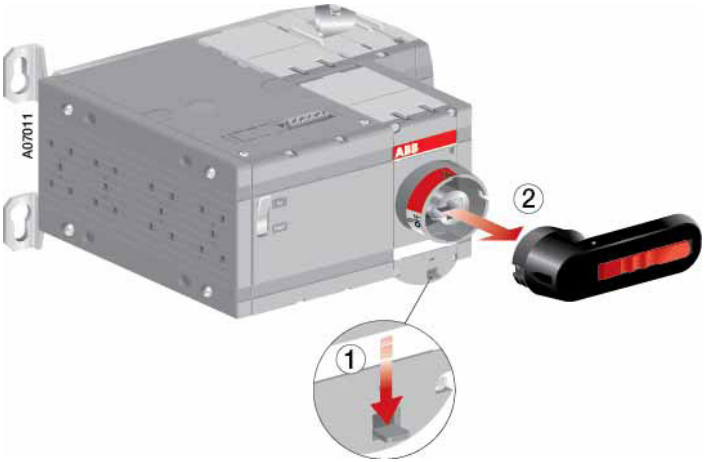


Figure 6.1 Releasing the handle

	Electrical operation 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 6.2.

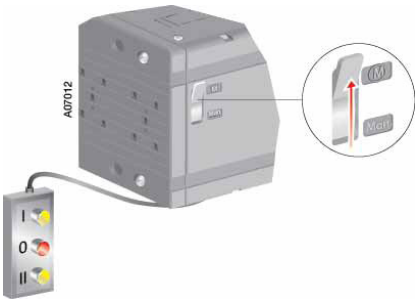


Figure 6.2 Motor/Manual selection switch in the Motor (M) position

3. Operate the motorized switch-disconnector with the push-buttons or selector switch via impulse control or continuous control.

The motor operator is protected from overloading by a fuse (F1) under the motor operator. Only use the same type of fuse that is described on the label close to the fuse.

6.1.1 Impulse control

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

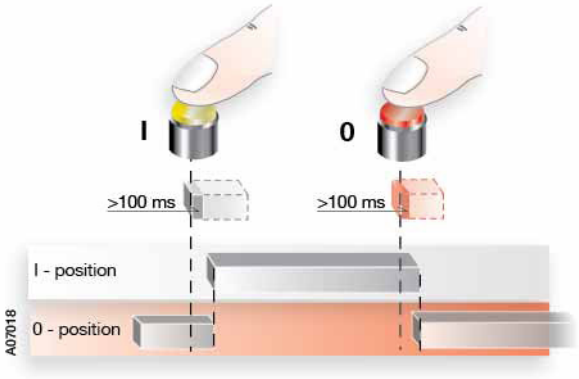


Figure 6.3 Impulse control

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 switch-disconnector is driven to the corresponding position (I or 0). The position will change only when the new command is given. Figure 6.4 shows the operation of the switch-disconnector 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.

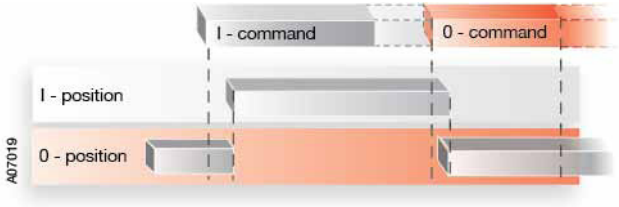


Figure 6.4 Continuous control

6.2 Manual operation using the handle

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

To operate the motorized switch-disconnector manually:

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

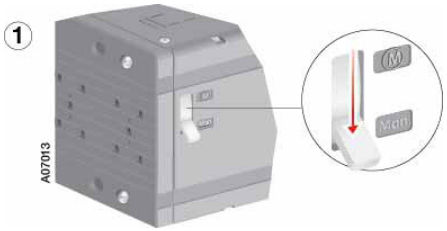


Figure 6.5 Motor/Manual selection in the Man. position

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

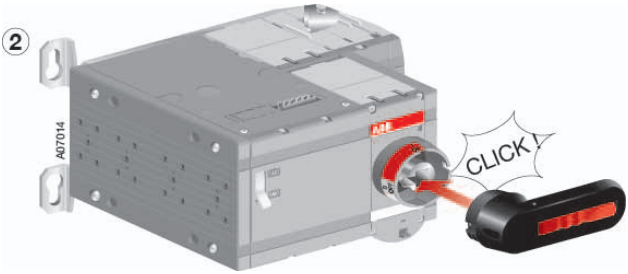


Figure 6.6 Attaching the handle

3. Operate the motorized switch-disconnector by turning the handle to the required position (I or 0).

Electrical operation is prevented when the handle is attached to the switch panel.

6.3 Locking

You can lock the motorized switch-disconnector to a specific position.

6.3.1 Locking the electrical operate

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

To lock electrical operation:

1. Pull up the locking latch under the switch panel.
2. Place the padlock under the latch, see Figure 6.7.

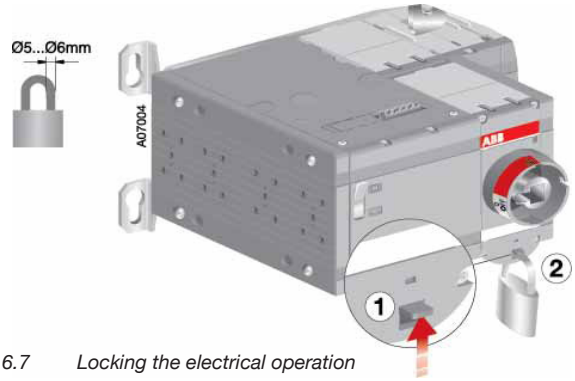


Figure 6.7 Locking the electrical operation

You cannot attach the handle when electrical operation is locked.

6.3.2 Locking the manual operation

By default, manual operation can only be locked to position 0. Locking to position I 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 6.8

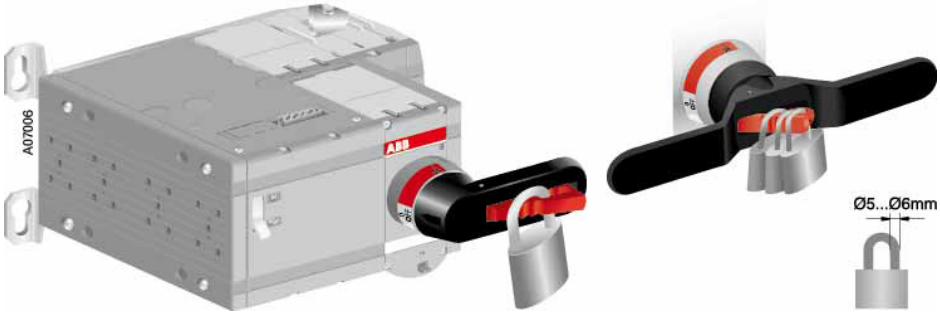


Figure 6.8 Locking the manual operation

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)*).

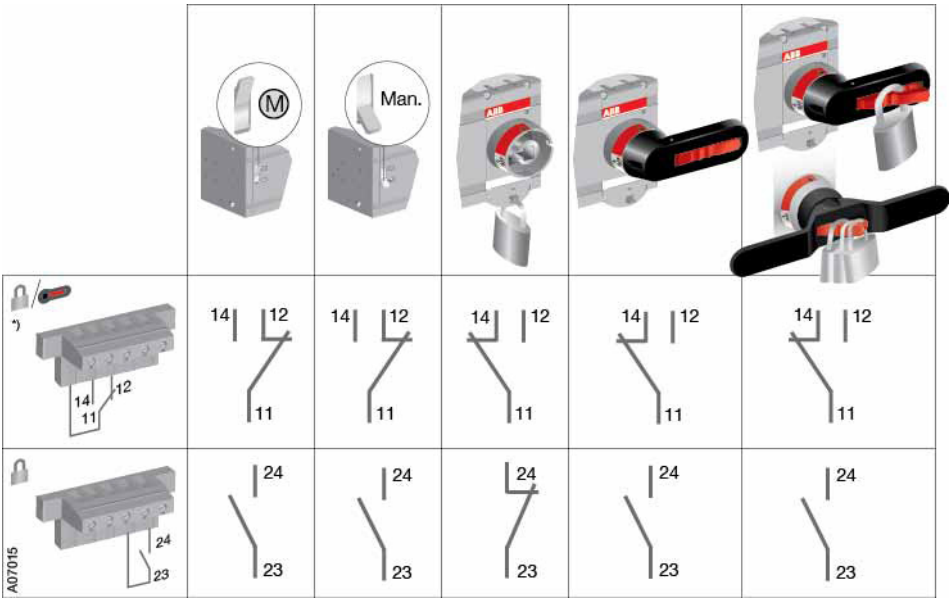


Figure 6.9 Locking state information

7. Technical data

7.1 Motor operator

Motor operator, control circuit	Value	Cabling
Rated operational voltage U [V]	220-240 Vac, 50-60Hz	
Operating voltage range	0,85... 1,1 x U	
Operating angle	90° 0-I, I-0	
Operating time	See Table 7-2	
Protection degree	IP 20, front panel	
Rated impulse withstand voltage U_{imp}	4 kV	
Voltage supply	**PE N L**	1,5 -2,5mm^2
F2	Max. MCB 16A	
Cable of the push-buttons (no SELV)	**C I 0**	1,5 -2,5mm^2
Maximum cable length	100 m	
State information of locking (no SELV)		
Handle attached or motor operator locked	**11-12-14** (C/O)	1,5 -2,5mm^2
Locking motor operator	**23-24** (NO)	1,5 -2,5mm^2
Operating temperature	-25... +55 °C	
Transportation and storage temperature	-40... +70 °C	
Altitude	Max. 2000m	

Table 7.1 General technical data of motor operators

Type	Voltage U_e [V]	Nominal current [a] I_n [A]	Current inrush [a] [A]	Operating time [a] I-0, 0-I, [s]
OTM160…250_	220-240Vac	0,3	1,5	0,5 - 1,0
OTMDC160...250_	220-240Vac	0,3	1,5	0,5 - 1,0
OTM315…400_	220-240Vac	0,5	2,5	0,5 - 1,0
OTM600...800_	220-240Vac	0,9	4,0	0,5 - 1,5
OTM1000...1600_	220-240Vac	1,4	10	1,0 - 2,0
OTM2000…2500_	220-240Vac	1,4	10	1,0 - 2,0

[a] Under nominal conditions

Table 7.2 Specified technical data of motor operators

7.2 State information

Measurement	Value
Handle attached or motor operator locked	11-12-14 (C/O): 5A, AC-1 / 250V
Locking motor operator	23-24 (NO): 5A, AC-1 / 250V
SCPD	Max. MCB C2A

Table 7.3 State information

8. Accessories

8.1 Terminal clamp sets

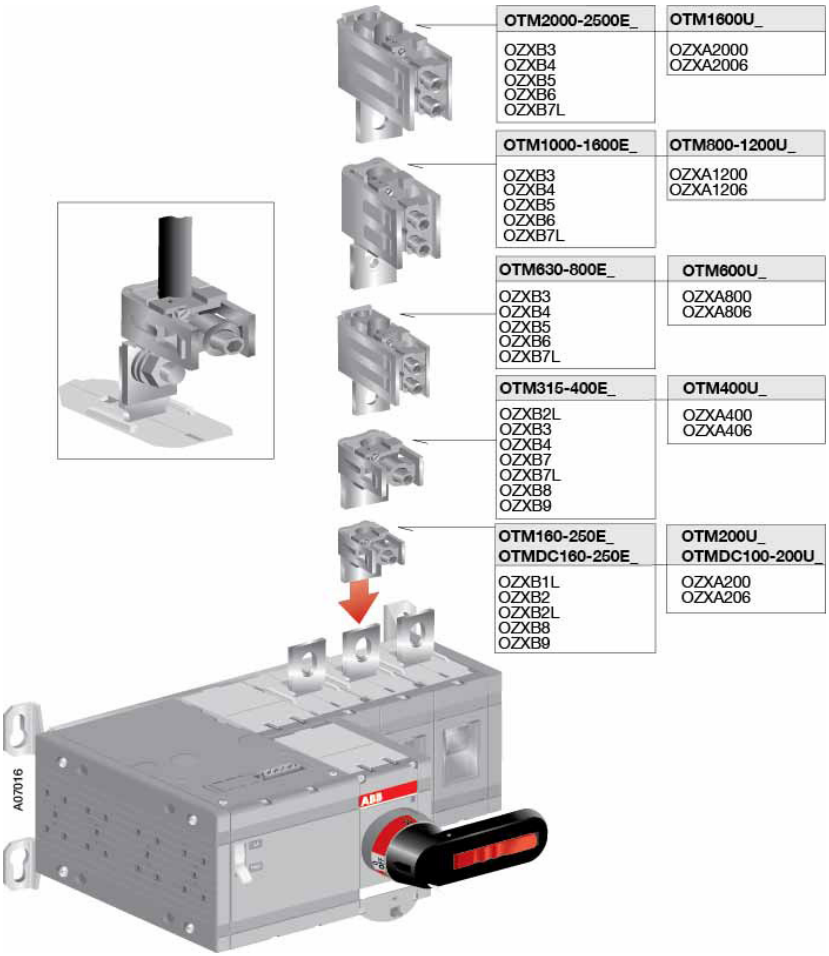


*Figure 8.1 Mounting of the terminal clamp sets, types OZXB_ and OZXA_*

Always use counter torque when tightening terminals.

8.2 Jumper bars

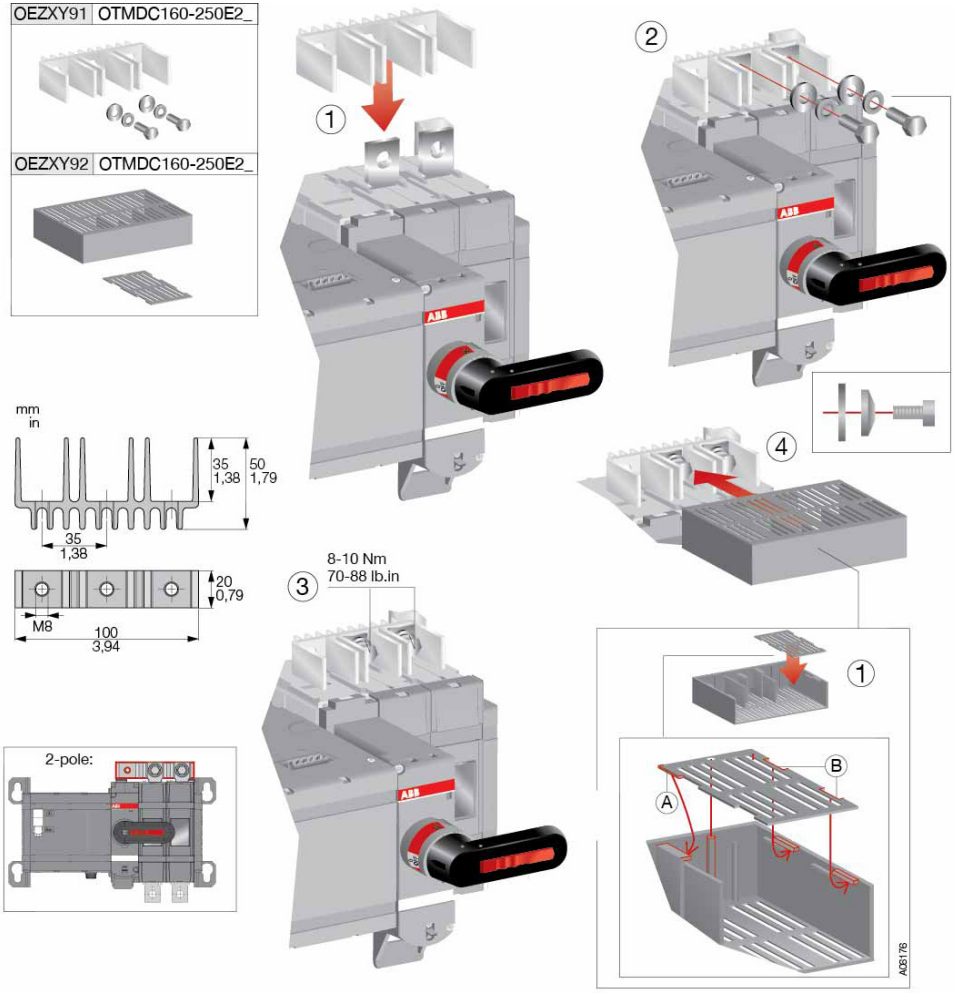
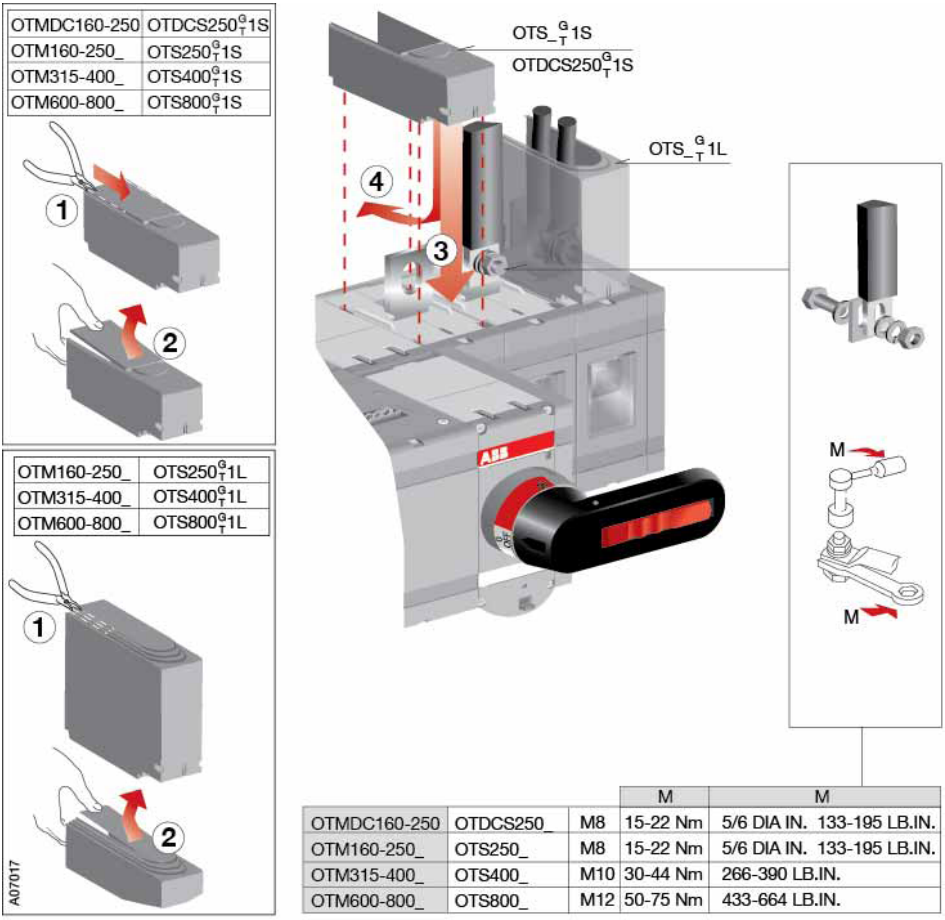


Figure 8.2 *Mounting of the jumper bars, types OEZXY91 and OEZXY92 for the motorized switch-disconnector OTMDC160-250.*

8.3 Terminal shrouds



			M	M
OTMDC160-250	OTDCS250_	M8	15-22 Nm	5/6 DIA IN. 133-195 LB.IN.
OTM160-250_	OTS250_	M8	15-22 Nm	5/6 DIA IN. 133-195 LB.IN.
OTM315-400_	OTS400_	M10	30-44 Nm	266-390 LB.IN.
OTM600-800_	OTS800_	M12	50-75 Nm	433-664 LB.IN.

Figure 8.3 Mounting of the terminal shrouds (type OTS_ , OTDCS_) to the motorized switch-disconnectors OTM160-800E_ and OTMDC160-250.

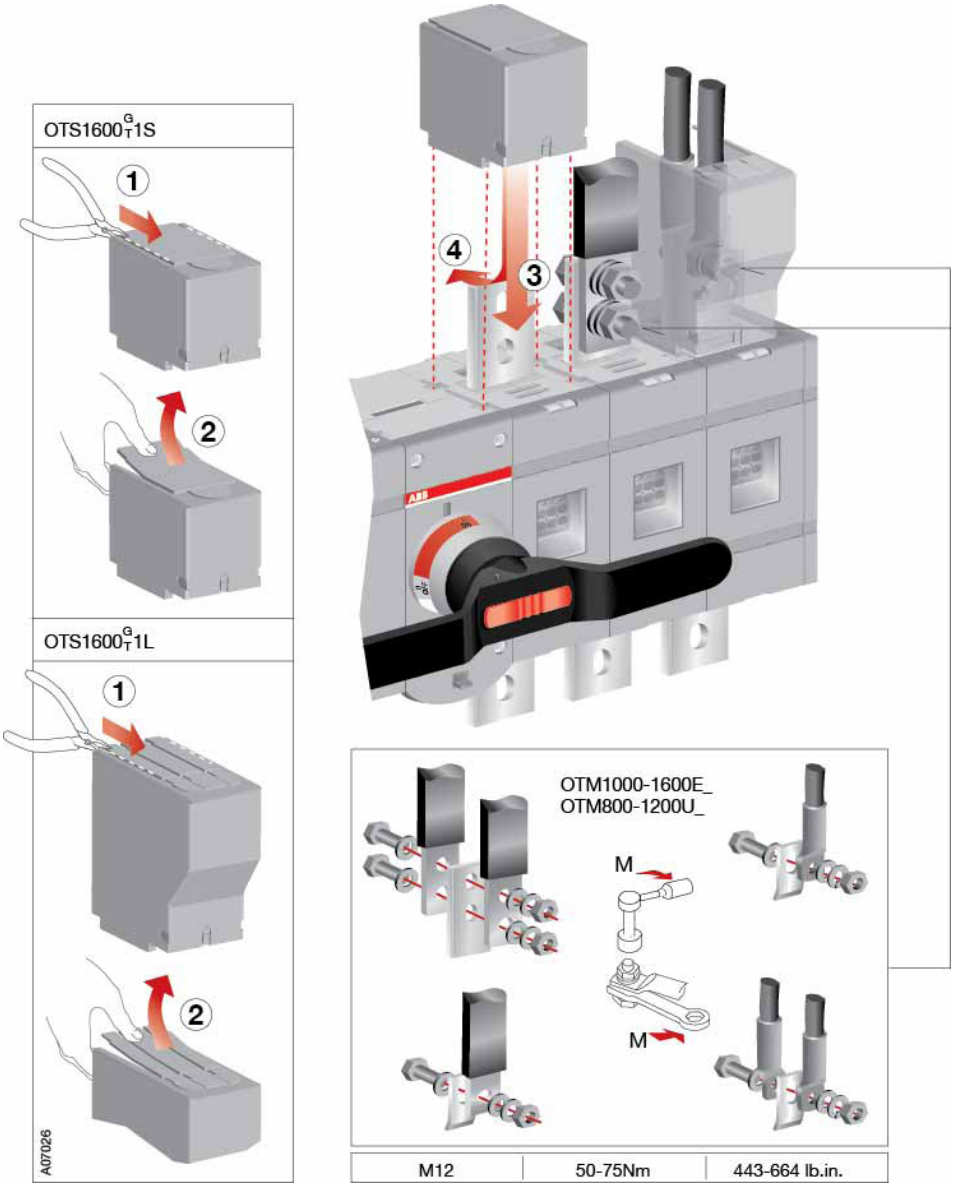


Figure 8.4 *Mounting of the terminal shrouds (type OTS_) to the motorized switch-disconnectors OTM1000-1600E_ and OTM800U-1200U_*

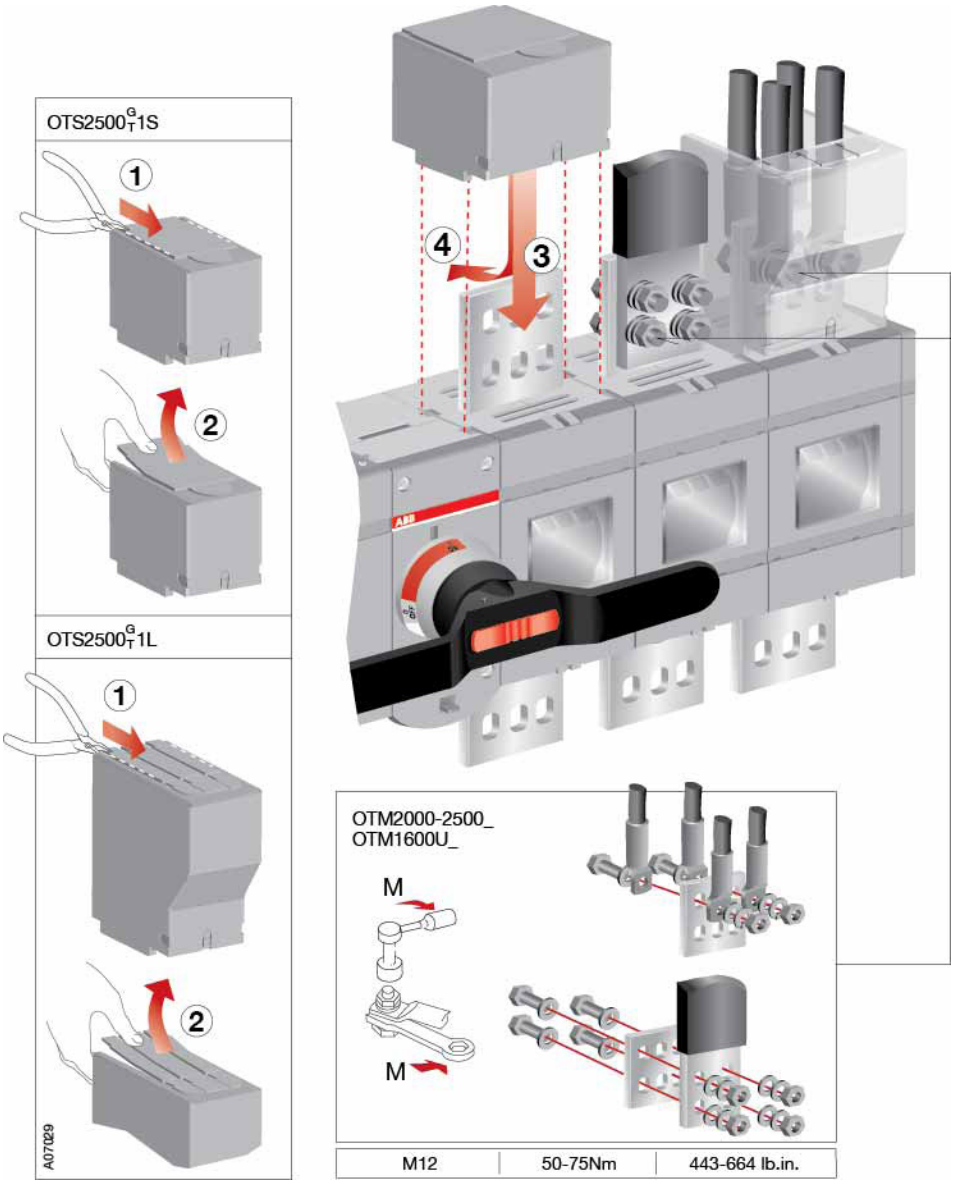


Figure 8.5 *Mounting of the terminal shrouds (type OTS_) to the motorized switch-disconnectors OTM2000-2500E_ and OTM1600U_*

8.4 Auxiliary contacts

8.4.1 Mounting of auxiliary contacts

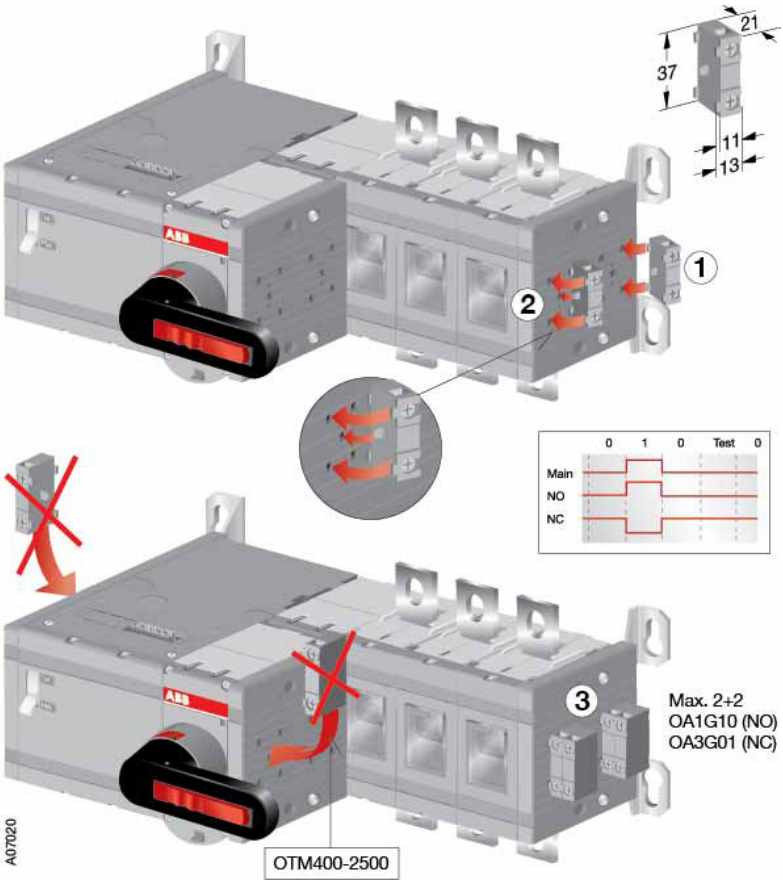


Figure 8.6 Mounting of auxiliary contacts, type OA_ on the right side of the switch-disconnector

8.4.2 Mounting of Test auxiliary contacts

OTM160-250, OTMDC100-250

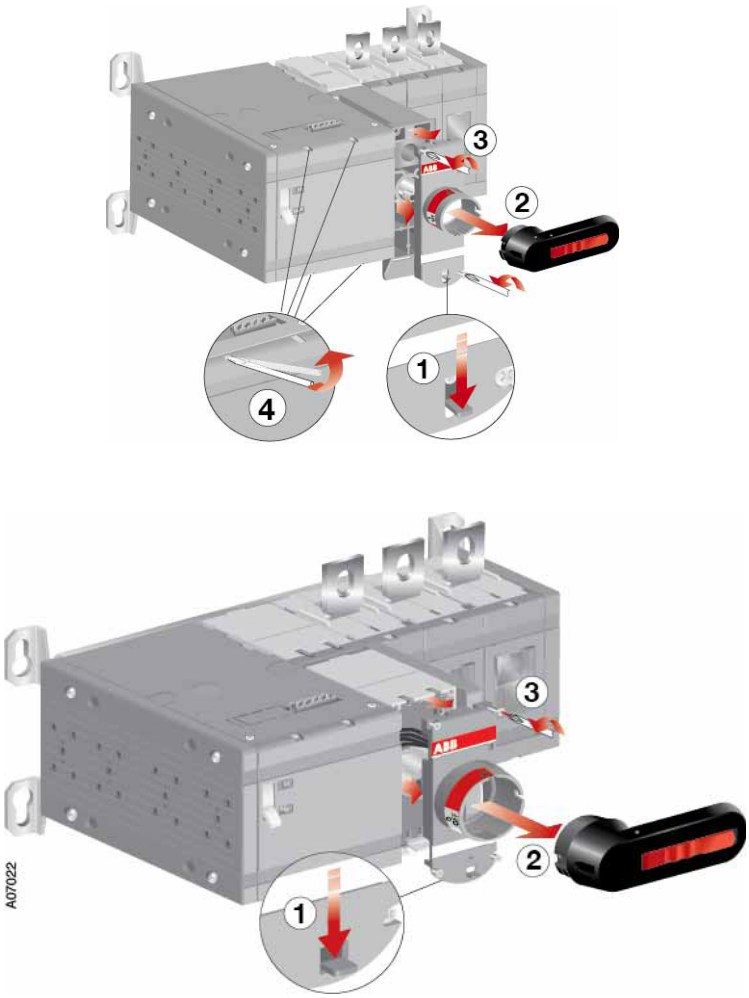


Figure 8.7 *Optional extra; Test auxiliary contacts can be mounted on the switch mechanism, first remove the mechanism cover as shown in the figure*

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

OTM160-250, OTMDC100-250

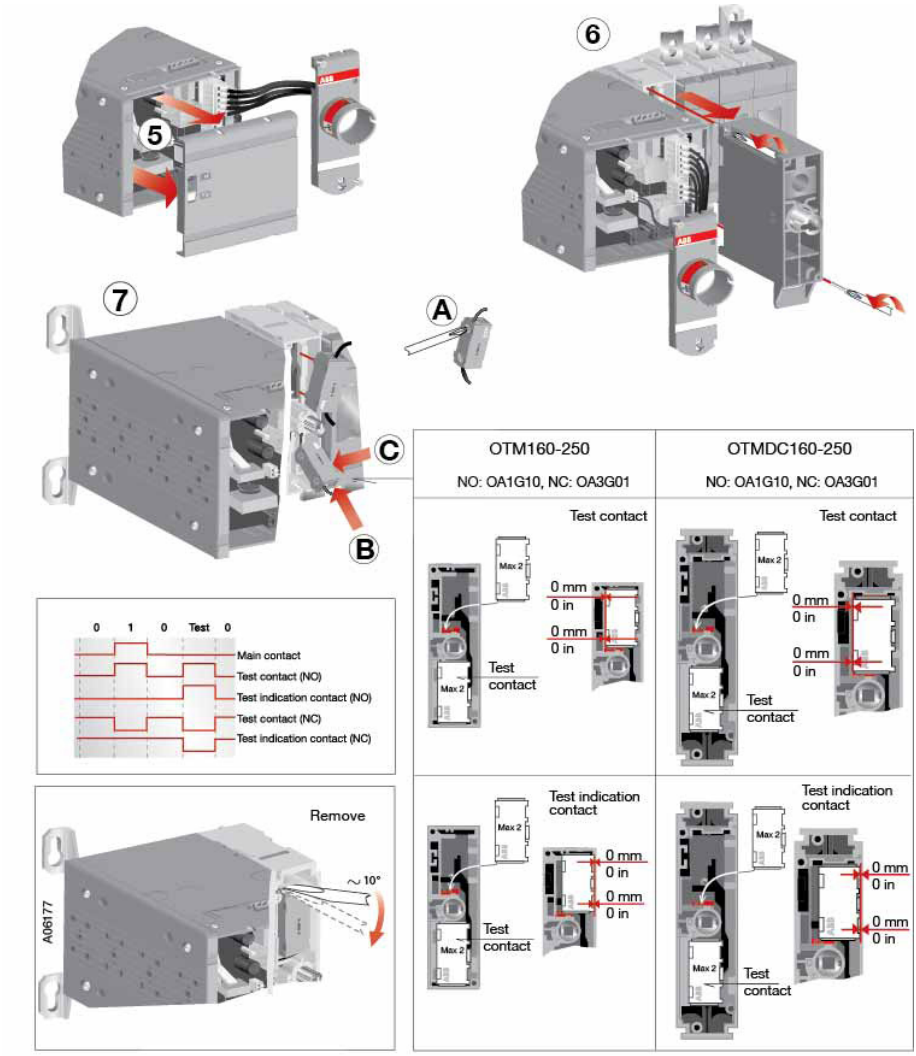


Figure 8.8 *Mounting of the Test auxiliary contacts, type OA_ to the switch mechanism of the motorized switch-disconnectors OTM160-250 and OTMDC100-250*

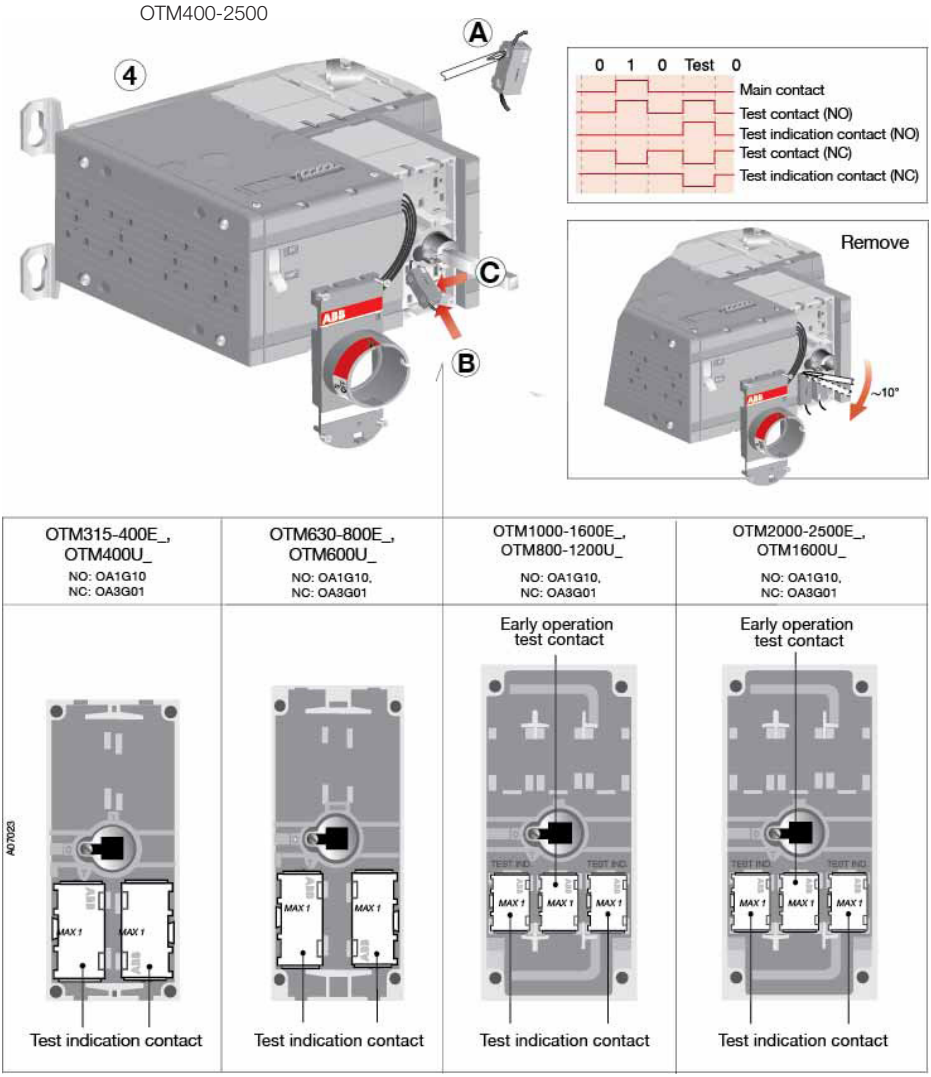
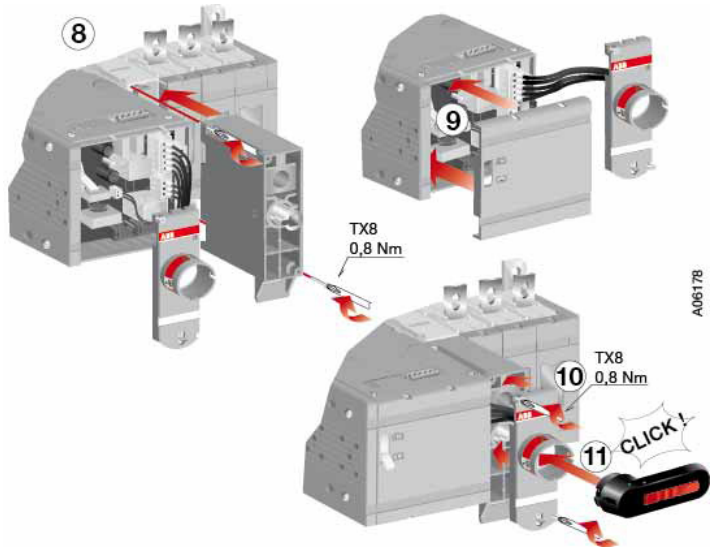


Figure 8.9 *Mounting of the Test auxiliary contacts, type OA_ to the switch mechanism of the motorized switch-disconnectors OTM400-2500*

OTM160-250, OTMDC100-250



OTM400-2500

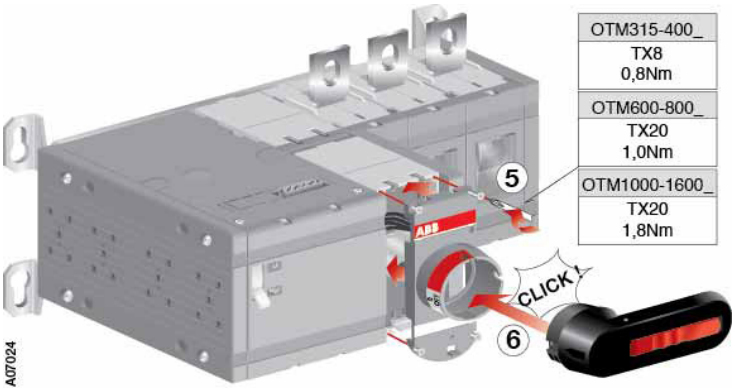


Figure 8.10 Closing the mechanism cover after the mounting of the Test auxiliary contacts on the switch mechanism

8.5 Electric locking

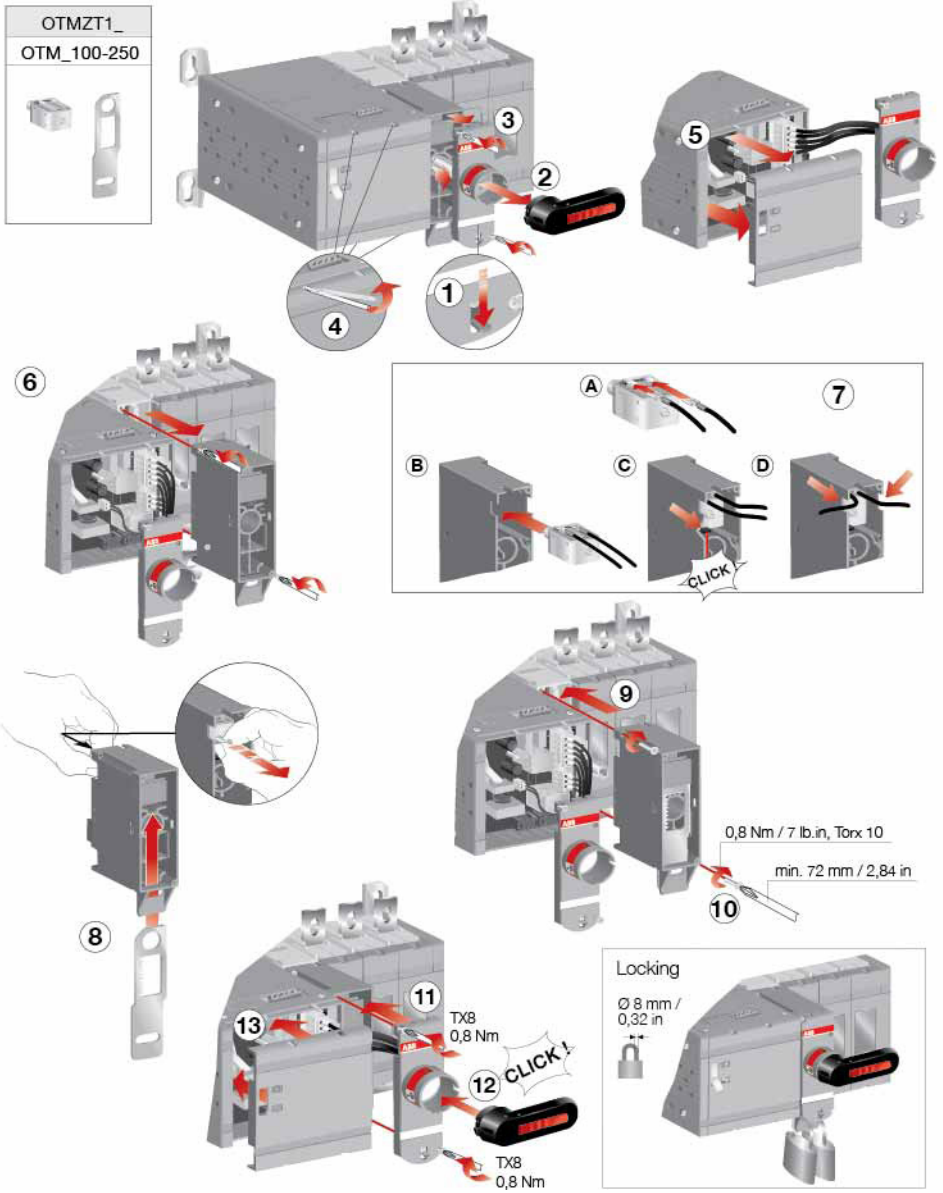


Figure 8.11 Mounting the accessory OTMZT1_ to the motorized switch-disconnector OTM_100-250

8.6 Handle and spare fuse storage

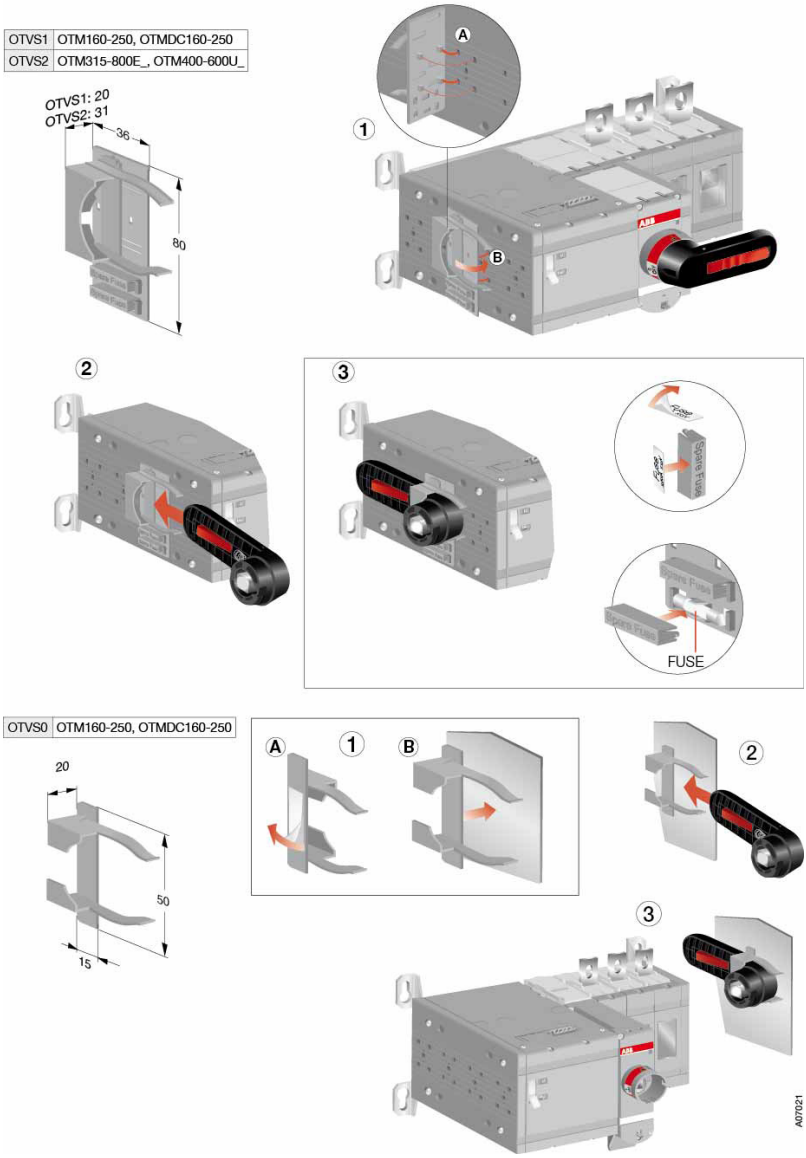
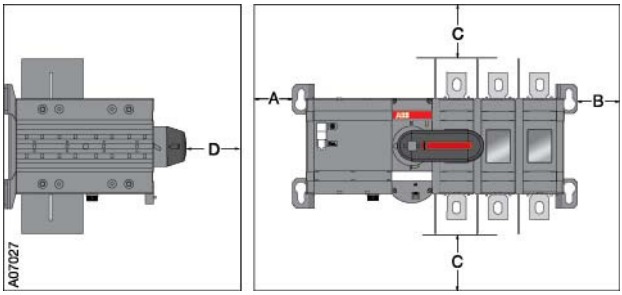


*Figure 8.12 Handle and spare fuses can be stored on the motorized switch-disconnector by mounting the accessory OTVS_*

9. UL standard switches

9.1 AC-switches



	Current	Height	Width	Depth
OTM200U_	200 A	406 mm/16 in	255 mm/10 in	255 mm/10 in
OTM400U_	400 A	600 mm/24 in	350 mm/14 in	300 mm/12 in
OTM600U_	600 A	600 mm/24 in	700 mm/28 in	350 mm/14 in
OTM800U_	800 A	1220 mm/48 in	610 mm/24 in	305 mm/12 in
OTM1200U_	1200 A	700 mm/28 in	900 mm/36 in	400 mm/16 in
OTM1600U_	1600 A	1200 mm/47 in	750 mm/30 in	400 mm/16 in

	A	B	D
OTM600-800U_	0	13 mm/0,5 in	13 mm/0,5 in
OTM800-1200U_	0	13 mm/0,5 in	36 mm/1,4 in

OTM200U_			
Cable size		Cable size	
AWG	C	MCM	C
4-3	100 mm/4 in	250	200 mm/8 in
2	100 mm/4 in	300	250 mm/10 in
1	100 mm/4 in		
1/0	125 mm/5 in		
2/0	150 mm/6 in		
3/0-4/0	175 mm/7 in		

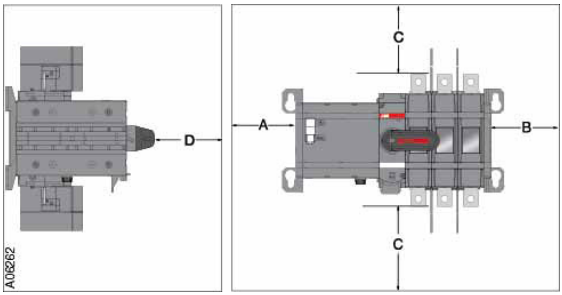
OTM400U_			
Cable size		Cable size	
AWG	C	MCM	C
2	100 mm/4 in	250	250 mm/8 in
1	100 mm/4 in	300	250 mm/10 in
1/0	125 mm/5 in	350	350 mm/12 in
2/0	150 mm/6 in		
3/0-4/0	175 mm/7 in		

OTM600-1200U_			
Cable size		Cable size	
AWG	C	MCM	C
2	100 mm/4 in	250	200 mm/8 in
1	100 mm/4 in	300	250 mm/10 in
1/0	125 mm/5 in	350	300 mm/12 in
2/0	150 mm/6 in	400	330 mm/13 in
3/0-4/0	175 mm/7 in	500	356 mm/14 in
		600	381 mm/15 in

OTM1600U_	
Cable size	
MCM	C
250	200 mm/8 in
300	250 mm/10 in
350	300 mm/12 in
400	330 mm/13 in
500	356 mm/14 in
600	381 mm/15 in

Figure 9.1 Clearances per UL 98, minimum enclosure size or equivalent volume, AC-switches

9.2 DC-switches



	Current	Height	Width	Depth
OTMDC100-200U_	200 A	300 mm/12 in	350 mm/14 in	200 mm/8 in

	A	B	D
OTMDC100-200U_	0	13 mm/0,5 in	13 mm/0,5 in

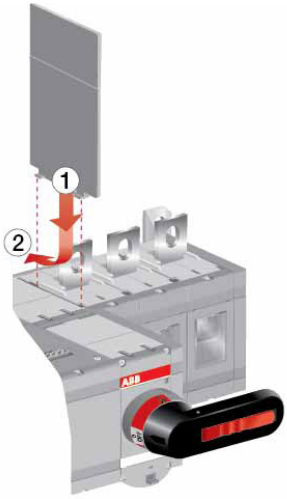
OTMDC100-200U_			
Cable size		Cable size	
AWG	C	MCM	C
4-3	100 mm/4 in	250	200 mm/8 in
2	100 mm/4 in	300	250 mm/10 in
1	100 mm/4 in		
1/0	125 mm/5 in		
2/0	150 mm/6 in		
3/0-4/0	175 mm/7 in		

Figure 9.2 Clearances per UL 98, minimum enclosure size or equivalent volume, DC-switches

9.3 Phase barriers

Phase barriers or shrouds (see section 8.2) must be used to maintain a clearance of 1 inch on the motorized switch-disconnector types:
- OTMDC100-200U_ (phase barrier 69445)
- OTMDC100-250E_ , if clearance between poles is less than 14 mm (phase barrier 69445)
- OTM600U_, if the conductors are wider than 39 mm /1,54 in (phase barrier 68838)
- OTM800-1200U_, if the lugs are wider than 54 mm /2,13 in (phase barrier 68912)
- OTM1600U_, if the lugs are wider than 100 mm / 3,94 in (phase barrier 68912)

The types for the package of 6 barriers are:
- OTDCB250/6
- OTB800/6
- OTB1600/6



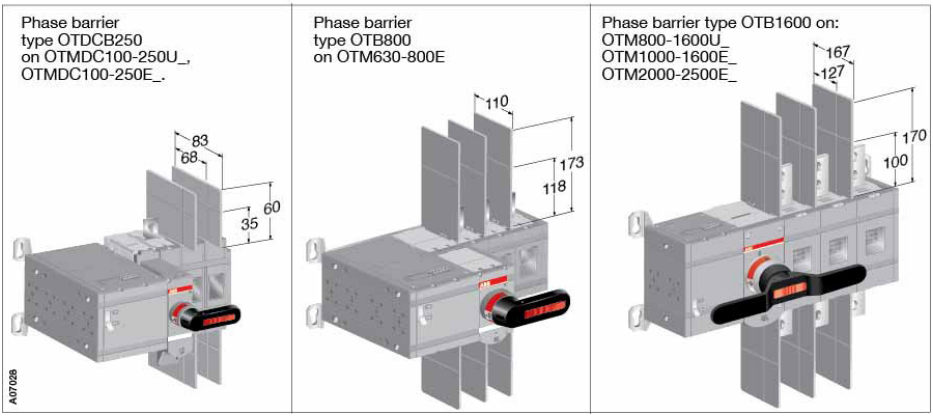


Figure 9.3 OTMDC100-200U_, OTMDC100-250E_, OTM600U_, OTM800-1600U_ and OTM1000-2500E_ mounting of phase barriers

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Producted by: GRAFIMER, Vaasa, Finland

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