INSTALLATION AND OPERATING INSTRUCTION

Automatic transfer switches

OTM_C_D

Automatic transfer switches
34OTM-C-D- rev. L / 1SCC303003M0207

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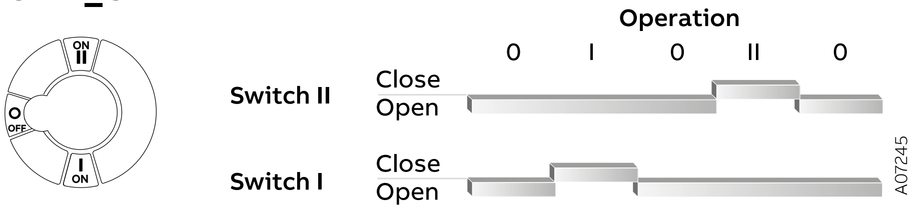
OTM_C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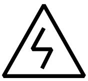
1 Introduction

This manual describes the installation and the basic operation of the OTM_C_D_ automatic transfer switches. The instructive part is followed by a section on available accessories.

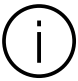
1.1 Use of symbols



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_D_:	Automatic transfer switch, the type name
OME:	Motor operator, the type name
OMD:	The control unit of automatic transfer switching equipment, common type name for the automatic control unit
OMD100:	The automatic control unit, basic version with simplified functionalities
OMD200:	The automatic control unit, standard version
OMD300:	The automatic control unit, standard version with additional power supply control
OMD800:	The automatic control unit, high version with communication and display
DPS:	Dual power source
Modbus RTU:	Bus communication protocol
LN1-Switch I:	Power supply line, eg. the primary line
LN2-Switch II:	Power supply line, eg. the secondary line used in emergency cases
Test sequence:	A sequence to test the functionality of the OMD and the connected change-over switch
Ts	Switching delay
Tt	Delay on transfer
Ds	Dead band I to II delay
TBs	Back switching delay
DBs	Dead band II to I delay
Gs	Generator stop delay
Tp	Pre-transfer I to II delay
TBp	Pre-transfer II to I delay

2 Product overview

Automatic transfer switches (type OTM_C_D_) are designed for diverse applications to choose and to switch between two power supplies. You can operate the OTM_ automatic transfer switches either electrically by choosing the Automatic / Manual Mode 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.

OTM_ automatic transfer switches consist of the change-over switch, the motor operator and the automatic control unit. The automatic control unit (type OMD_) is available in four versions for different purposes.

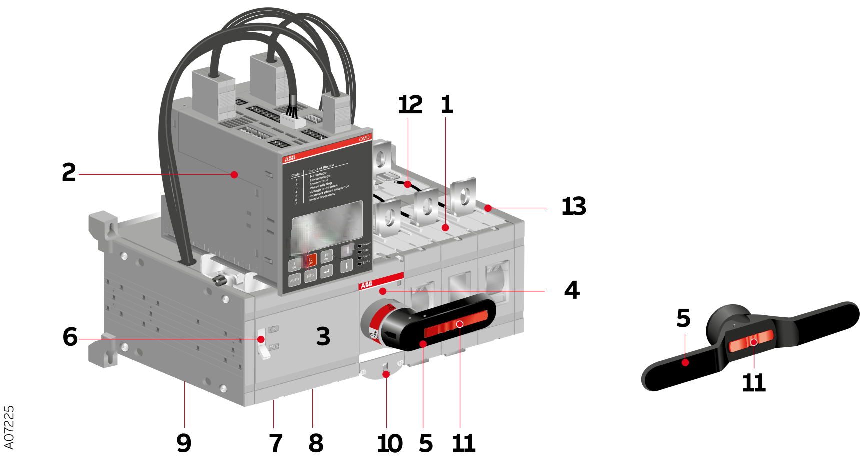


Figure 2.1 OTM_ automatic transfer switch

1 Change-over switch
2 Automatic control unit (four types; OMD100, OMD200, OMD300, OMD800)
3 Motor operator
4 Switch panel, the operating mechanism
5 Handle for manual operation, double grip handle in sizes OTM1000-1600_C_D
6 Motor/Manual selection
7 Terminals for motor operator voltage supply
8 Terminals (X2) for locking state information, optional; see control circuit diagrams, Section 6.2
9 Fuse (F1) of motor operator
10 Locking latch for releasing the handle and locking electrical control
11 Locking clip for locking manualoperation
12 Voltage sensing wires
13 Place for auxiliary contact blocks

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2.1 Functions of automatic control units OMD_

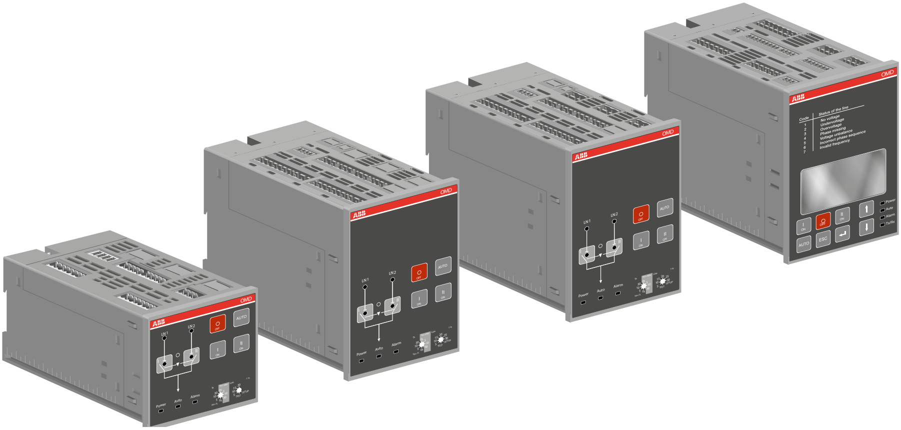


Figure 2.2 Automatic control units from left: OMD100, OMD200, OMD300 and OMD800

OMD100:

Analysing the voltage, frequency and the phase balance.

OMD100 is the basic version of the control unit of automatic switching equipment. It has two sensors to monitor two three-phase power lines, both able to work with single phase, too. OMD100 has the capability to monitor two power supply lines and to manage a single change-over switch. The neutral line has to be always connected.

OMD200:

Analysing the voltage, frequency and the phase balance. Includes the generator START / STOP command.

OMD200 has two sensors to monitor two three-phase power lines, both able to work with single phase, too. It has the capability to monitor two power supply lines and to manage a single change-over switch. With DIP-switches it can be chosen whether or not the neutral line is connected. If OMD200 is used without the neutral line, the external transformer must be used.

OMD300:

Analysing the voltage, frequency and the phase balance. Includes the generator START / STOP command and the dual power supply (DPS) to motor operator.

OMD300 has two sensors to monitor two three-phase power lines, both able to work with single phase, too. It has the capability to monitor two power supply lines and to manage a single change-over switch. OMD300 has integrated voltage supply for the motor operator (Dual power source, DPS). The neutral line has to be always connected.

OMD800:

Analysing the voltage, frequency and the phase balance. Includes the generator START / STOP command. Communication via Modbus.

DI/DO.

The OMD800 has two sensors to monitor two power lines; both sensors are able to work with single phase or three-phase lines. This unit can be supplied with an external auxiliary power supply. Monitoring, configuration and control are possible via Modbus RTU connection. The OMD800 has a graphic display where the user is able to check the settings and get all the information about status of the OMD800.

3 Description

3.1 OMD100 switching sequence

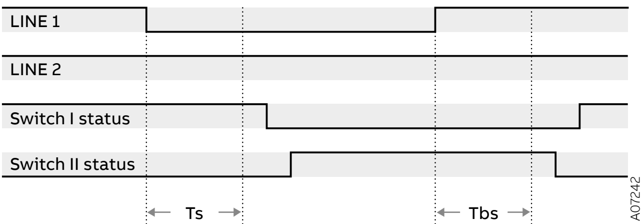
3.1.1 Line 1 priority

The switching sequence OMD100 can be summarized in following steps:

- An anomaly occurs on the Line 1
- Switching delay
- Change-over switch (Switch I) to the position O
- Change-over switch (Switch II) to the position II

And the back switching sequence can be summarized in the following steps:

- The Line 1 will start the normal functioning
- Back switching delay
- Change-over switch (Switch II) to the position O
- Change-over switch (Switch I) to the position I



Ts: Switching delay, **Tbs:** Back switching delay

Figure 3.1 Automatic Switching Sequences in OMD100, Line 1 priority

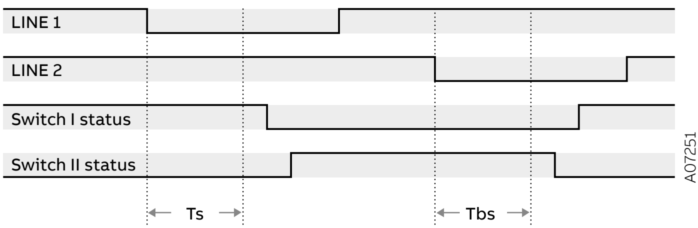
3.1.2 No line priority

The switching sequence of OMD100 can be summarized in following steps:

- An anomaly occurs on the Line 1
- Switching delay
- Change-over switch (Switch I) to the position O
- Change-over switch (Switch II) to the position II

And the back switching sequence can be summarized in the following steps:

- The Line 1 will start the normal functioning
- Change-over switch stays in position II
- An anomaly occurs on the Line 2
- Back switching delay
- Change-over switch (Switch II) to the position O
- Change-over switch (Switch I) to the position I



Ts: Switching delay, **Tbs:** Back switching delay

Figure 3.2 Automatic Switching Sequence in OM100, no line priority

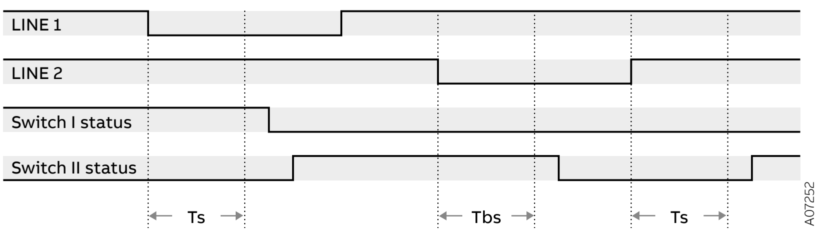
3.1.3 Manual back switching mode

The switching sequence of OMD100 can be summarized in following steps:

- An anomaly occurs on the Line 1
- Switching delay
- Change-over switch (Switch I) to the position O
- Change-over switch (Switch II) to the position II

And the back switching sequence can be summarized in the following steps:

- The Line 1 will start the normal functioning
- Change-over switch stays in position II
- An anomaly occurs on the Line 2
- Back switching delay
- Change-over switch (Switch II) to the position O
- The Line 2 will start the normal functioning
- Switching delay
- Change-over switch (Switch II) to the position II



Ts: Switching delay, **Tbs:**Back switching delay

Figure 3.3 Automatic Switching Sequence in OMD100, manual back switching mode

3.2 OMD200 and OMD300 switching sequence

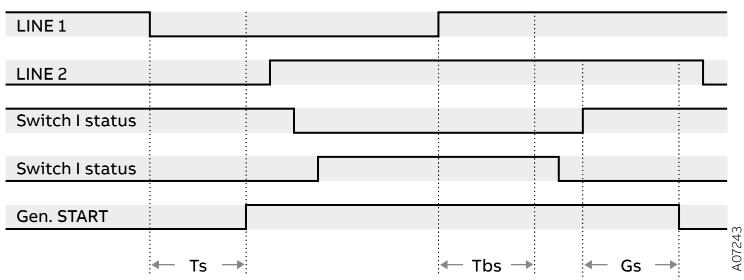
3.2.1 Line 1 priority

The switching sequence of OMD200 and OMD300 can be summarized in following steps:

- An anomaly occurs on the Line 1
- Switching delay
- Generator start
- Change-over switch (Switch I) to the position O
- Change-over switch (Switch II) to the position II

And the back switching sequence can be summarized in the following steps:

- The Line 1 will start the normal functioning
- Back switching delay
- Change-over switch (Switch II) to the position O
- Change-over switch (Switch I) to the position I
- Generator stop delay
- Generator stop



Ts: Switching delay, **Tbs:** Back switching delay, **Gs:** Generator stop delay

Figure 3.4 **Automatic Switching Sequence in OMD200 and OMD 300, Line 1 priority**

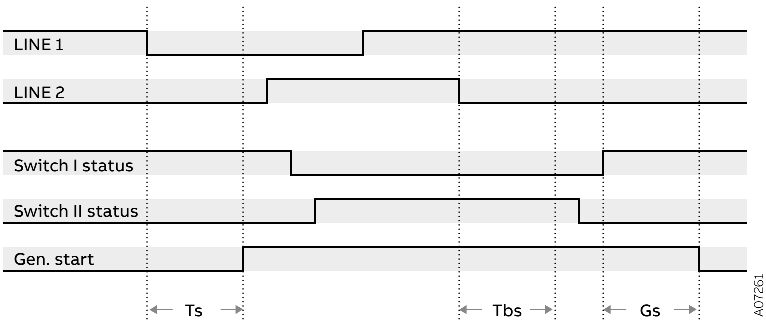
3.2.2 No line priority

The switching sequence of OMD200 and OMD300 can be summarized in following steps:

- An anomaly occurs on the Line 1
- Switching delay
- Generator start
- Change-over switch (Switch I) to the position O
- Change-over switch (Switch II) to the position II

And the back switching sequence can be summarized in the following steps:

- The Line 1 will start the normal functioning
- Change-over switch stays in position II
- An anomaly occurs on the Line 2
- Back switching delay
- Change-over switch (Switch II) to the position O
- Change-over switch (Switch I) to the position I
- Generator stop delay
- Generator stop



Ts: Switching delay, **Tbs:** Back switching delay, **Gs:** Generator stop delay

Figure 3.5 Automatic Switching Sequence in OMD200 and OMD300, no line priority

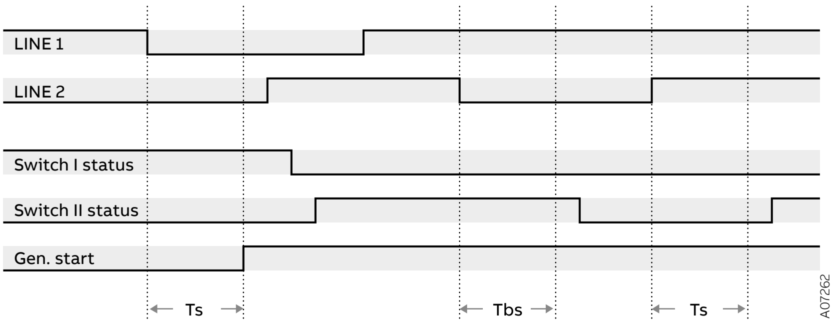
3.2.3 Manual back switching mode

The switching sequence of OMD200 and OMD300 can be summarized in following steps:

- An anomaly occurs on the Line 1
- Switching delay
- Generator start
- Change-over switch (Switch I) to the position O
- Change-over switch (Switch II) to the position II

And the back switching sequence can be summarized in the following steps:

- The Line 1 will start the normal functioning
- Change-over switch stays in position II
- An anomaly occurs on the Line 2
- Back switching delay
- Change-over switch (Switch II) to the position O
- The Line 2 will start the normal functioning
- Switching delay
- Change-over switch (Switch II) to the position II



Ts: Switching delay, **Tbs:** Back switching delay

Figure 3.6 Automatic Switching Sequence in OMD200 and OMD300, manual back switching mode

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3.3 OMD800 switching sequence

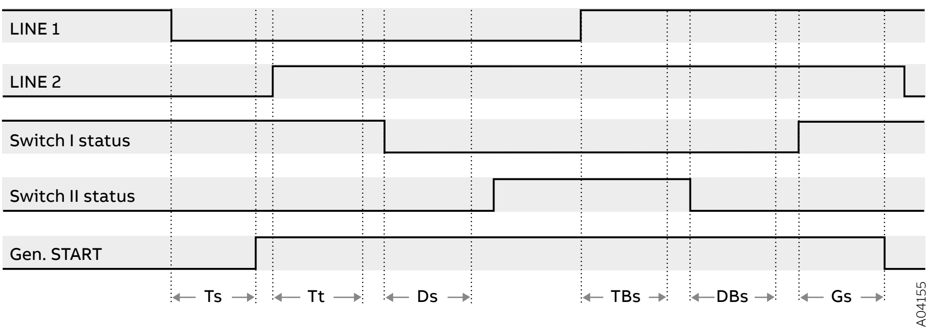
3.3.1 Line 1 priority

The switching sequence of OMD800 can be summarized in following steps:

- An anomaly occurs on the Line 1
- Switching delay
- Generator start
- Delay on transfer
- If Pre-transfer signal active: Pre-transfer signal output on, Pre-transfer I to II delay
- Change-over switch (Switch I) to the position O
- Dead band I to II delay
- Change-over switch (Switch II) to the position II
- If Pre-transfer signal active: Pre-transfer signal output off

And the back switching sequence can be summarized in the following steps:

- The Line 1 will start the normal functioning
- Back switching delay
- If Pre-transfer signal active: Pre transfer output on, Pre-transfer II to I delay
- Change-over switch (Switch II) to the position O
- Dead band II to I delay
- Change-over switch (Switch I) to the position I
- If Pre-transfer signal active: Pre-transfer output off
- Generator stop delay
- Generator stop



Ts: Switching delay, **Tt:** Delay on transfer, **Ds:** Dead band I to II, **TBs:** Back switching delay, **DBs:** Dead band II to I,

Gs: Generator stop delay

Figure 3.7 Automatic Switching Sequences in OMD800, Line 1 priority

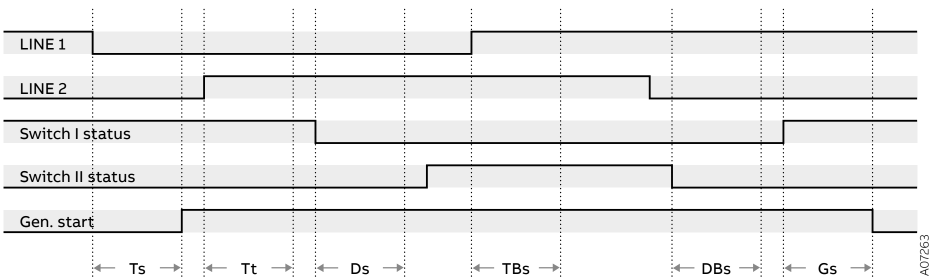
3.3.2 No line priority

The switching sequence of OMD800 can be summarized in following steps:

- An anomaly occurs on the Line 1
- Switching delay
- Generator start
- Delay on transfer
- If Pre-transfer signal active: Pre-transfer signal output on, Pre-transfer I to II delay
- Change-over switch (Switch I) to the position O
- Dead band I to II delay
- Change-over switch (Switch II) to the position II
- If Pre-transfer signal active: Pre-transfer signal output off

And the back switching sequence can be summarized in the following steps:

- The Line 1 will start the normal functioning
- Back switching delay
- If Pre-transfer signal active: Pre transfer output on, Pre-transfer II to I delay
- Change-over switch stays in position II
- An anomaly occurs on the Line 2
- Change-over switch (Switch II) to the position O
- Dead band II to I delay
- Change-over switch (Switch I) to the position I
- If Pre-transfer signal active: Pre-transfer output off
- Generator stop delay
- Generator stop



Ts: Switching delay, **Tt:** Delay on transfer, **Ds:** Dead band I to II, **TBs:** Back switching delay, **DBs:** Dead band II to I, **Gs:** Generator stop delay

Figure 3.8 Automatic Switching Sequence in OMD800, no line priority

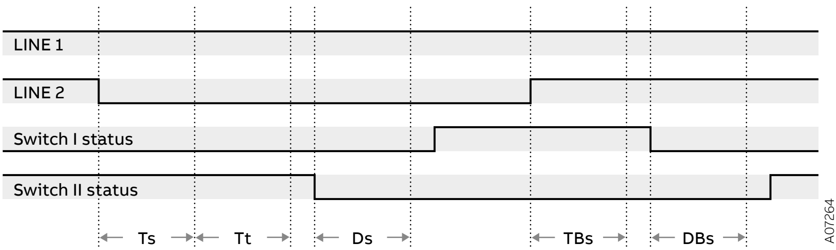
3.3.3 Line 2 priority

The switching sequence of OMD800 can be summarized in following steps:

- An anomaly occurs on the Line 2
- Switching delay
- If Pre-transfer signal active: Pre transfer output on, Pre-transfer II to I delay
- Change-over switch (Switch II) to the position O
- Dead band II to I delay
- Change-over switch (Switch I) to the position I
- If Pre-transfer signal active: Pre-transfer output off

And the back switching sequence can be summarized in the following steps:

- The Line 2 will start the normal functioning
- Back switching delay
- If Pre-transfer signal active: Pre-transfer signal output on, Pre-transfer I to II delay
- Change-over switch (Switch I) to the position O
- Dead band I to II delay
- Change-over switch (Switch II) to the position II
- If Pre-transfer signal active: Pre-transfer signal output off



Ts: Switching delay, **DBs:** Dead band II to I, **TBs:** Back switching delay, **Ds:** Dead band I to II

Figure 3.9 Automatic Switching Sequence in OMD800, Line 2 priority

Please note that generator cannot be in use, when priority is set to Line 2 (see page 110 Generator usage).

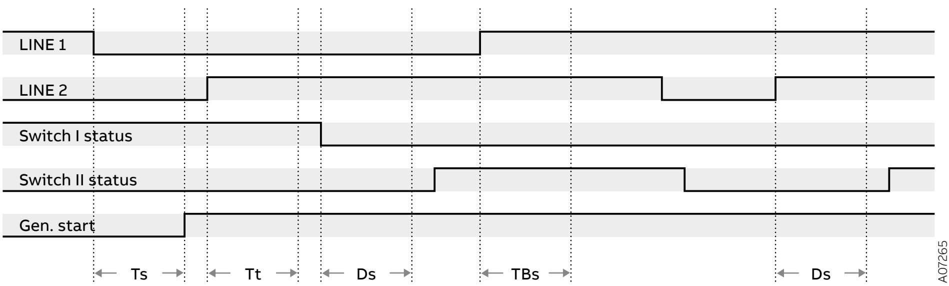
3.3.4 Manual back switching mode

The switching sequence of OMD800 can be summarized in following steps:

- An anomaly occurs on the Line 1
- Switching delay
- Generator start
- Delay on transfer
- If Pre-transfer signal active: Pre-transfer signal output on, Pre-transfer I to II delay
- Change-over switch (Switch I) to the position O
- Dead band I to II delay
- Change-over switch (Switch II) to the position II
- If Pre-transfer signal active: Pre-transfer signal output off

And the back switching sequence can be summarized in the following steps:

- The Line 1 will start the normal functioning
- Back switching delay
- Change-over switch stays in position II
- An anomaly occurs on the Line 2
- If Pre-transfer signal active: Pre transfer output on, Pre-transfer II to I delay
- Change-over switch (Switch II) to the position O
- If Pre-transfer signal active: Pre-transfer output off
- The Line 2 will start the normal functioning
- Dead band I to II delay
- Change-over switch (Switch II) to the position II



Ts: Switching delay, **Tt:** Delay on transfer, **Ds:** Dead band I to II, **TBs:** Back switching delay

Figure 3.10 Automatic Switching Sequence in OMD800, manual back switching mode

4 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 7.

4.1 Operating the switch electrically

To operate the switch electrically:

1. Remove the handle from the switch panel. You can remove the handle in any position.
2. Turn the Motor/Manual selector to the Motor (M) position to enable electrical operation.

After that operation you can operate the switch electrically by two ways; the automatic control unit OMD_ is in Manual Mode or Automatic Mode.

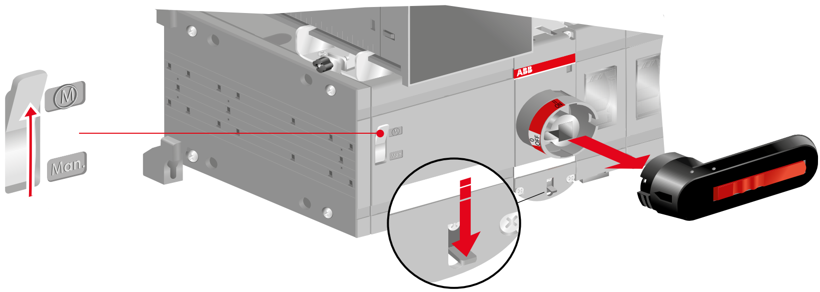


Figure 4.1 Operating the switch electrically

4.1.1 Operating the switch electrically / Manual Mode

Selecting the automatic control unit OMD_ to the Manual Mode:

a. Make sure that power LED is ON, see the Figure 4.2/①.

b. If Auto LED is OFF /②, the automatic control unit is in Manual Mode.

c. If the Auto LED is ON, push the Auto key once /③. The Auto LED switches to OFF and the automatic control unit OMD_ is in Manual Mode /④.

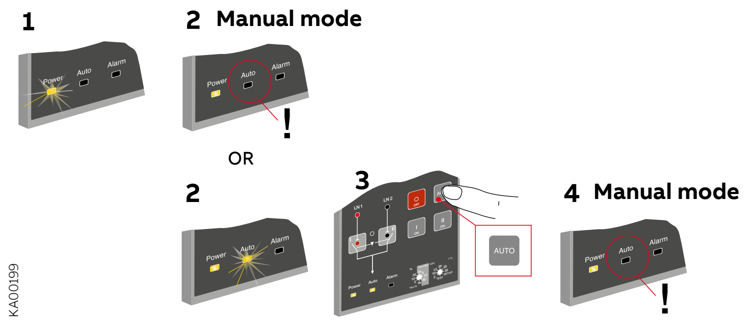


Figure 4.2 **Selecting the automatic control unit OMD_ to Manual Mode**

To select the switch to operate by the automatic control unit OMD_ in Manual Mode:

a. Push the appropriate I, O or II key

b. When pushing the I-key (see the Figure 4.3/① or Figure 4.4/②), the I-switch (lower) will be in the ON position (the status and the line indication, see the Figure 4.3/② or the Figure 4.4/③) and the II-switch (upper) will be in the OFF position. If the I-switch is already in the ON position, pushing the I-key does not have any effect.

c. When pushing the O-key, the I-switch will be in the OFF position. The II-switch remains in the OFF position.

d. When pushing the II-key, the II-switch will be in the ON-position and the I-switch will be in the OFF position.

e. If you push the I-key while the II-switch is in the ON position, first the II-switch opens (OFF position) and then the I-switch closes its contacts (ON position).

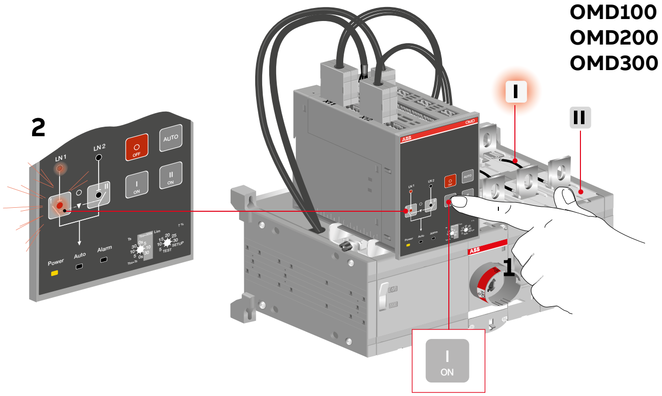


Figure 4.3 **Selecting the switch to operate, the switch status and the chosen line indication with LEDs in OMD100, OMD200 or OMD300**

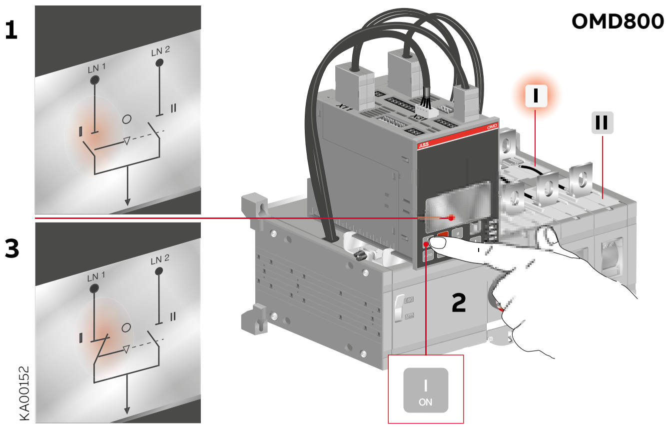


Figure 4.4 **Selecting the switch to operate, the switch status and the chosen line indication in display terminal in OMD800**

4.1.2 Operating the switch electrically / Automatic Mode

Selecting the automatic control unit OMD_ to the Automatic Mode:

a. Make sure that power LED is ON. If Auto LED is ON/①, the automatic control unit is in Automatic Mode.

b. If Auto LED is OFF/①, check that the Lim rotary switch is not in the TEST or SETUP position/②.

c. Push the Auto key once/③. The Auto LED switches ON and the automatic control unit OMD_ is in Automatic Mode/④

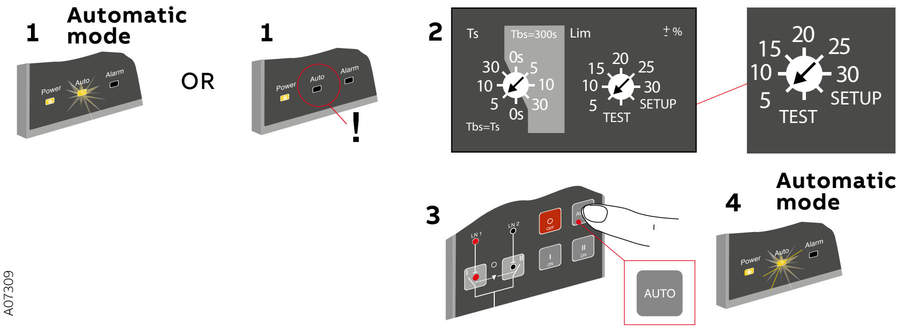


Figure 4.5 Selecting the automatic control unit OMD_ to Automatic Mode

See the OMD_ Automatic Mode operation in Sections 9-13.

4.1.3 Selection of delay time, voltage threshold and TEST function

The delay time and the voltage threshold are set by the rotary switches in automatic control units OMD100, OMD200 and OMD300. For the settings in OMD800, see Section 11.2.2 Device configuration.

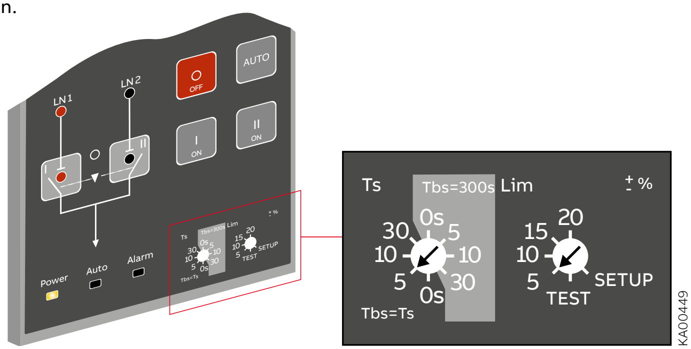
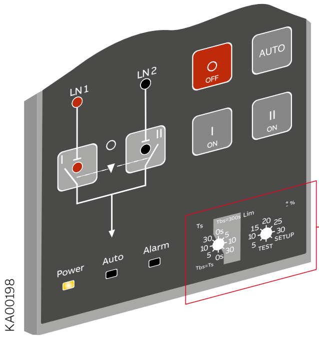


Figure 4.6 Selection of delay time and voltage threshold in OMD100



Main Voltage / V	Voltage threshold
208, 220	+-20%
230	+-25%
380, 400, 415, 440	+-30%
480	+-20%

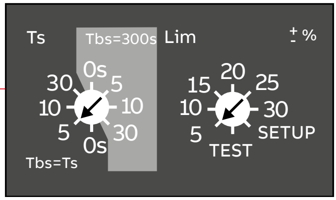


Figure 4.7 **Selection of delay time and voltage threshold in OMD200 and OMD300**

Ts / Tbs = Delay times for automatic switching

The delay time is the time before activating the switching sequence and the back switching sequence. User can choose two types of settings for delay times:

Choice 1: Darker side of the rotary switch

Available selections for the delay times are: 0, 5, 10 and 30 s. When this side is used the back switching delay Tbs is always same as switching delay Ts.

Choice 2: Lighter side of the rotary switch

Available selections for the delay times are: 0, 5, 10 and 30 s. When this side is used the back switching delay Tbs is always set to 300s.

Lim = Voltage threshold with SETUP and TEST function

The available selections for voltage threshold in OMD100 are: ± 5, ± 10, ± 15, ± 20 %. In OMD200 and OMD300 the available selections for voltage threshold are: ± 5, ± 10, ± 15, ± 20, ± 25, ± 30 %, see the available settings / voltage in Figure 4.7. By setting the voltage threshold, the unbalance is also set to the same level.

When the user wants to enter to the SETUP mode, the automatic control unit has to be set to manual mode and Lim rotary switch has to be set to SETUP position. In SETUP mode it is possible to choose between three operating modes: standard switching mode, no priority mode or without back switching mode. In the SETUP –mode user must also choose between automatic OTM_C_D, motorized OTM40...125_CMA_ or motorized OTM_160...2500_CM_ change-over switch.
See Section 7.1.5 Choice of Operating mode.

When the Lim rotary switch is set to the TEST position, the automatic control unit (OMD100, OMD200 or OMD300) enters the test sequence. In test sequence it is possible to simulate switching and back switching sequences step by step by pushing the AUTO key.

4.1.4 Choice of Operating mode in OMD100, OMD200 and OMD300

1. Set device to MANUAL mode according the Figure 4.8.

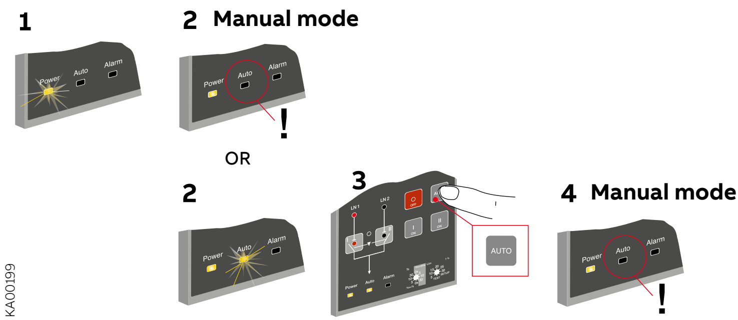


Figure 4.8 **Selecting the automatic control units OMD100, OMD200 and OMD300 to Manual Mode**

2. Choose SETUP mode with Lim rotary switch according to the Figure 4.9

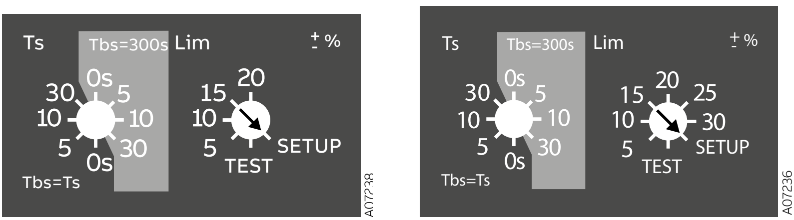


Figure 4.9 **Setting of SETUP mode with Lim rotary switch in automatic control units OMD100 (left), OMD200 and OMD300 (right).**

3. Press AUTO button to choose the mode. The Operation modes are indicated by LEDs according the Table 4.1. See the descriptions of the Operating modes in Section 7.2.

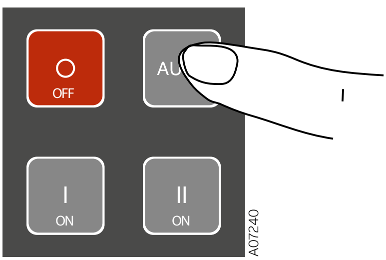


Figure 4.10 **Choosing the Operation mode by pressing the AUTO button. See the Table 4.1 of LED indications for wanted Operation mode.**

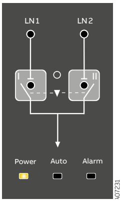
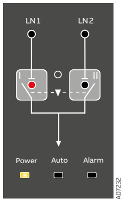
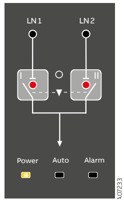
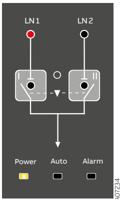
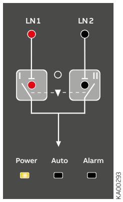
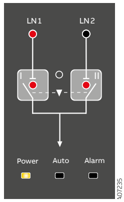
LED indication			
Mode	Line 1 priority + automatic OTM_C_D or motorized OTM40...125_CMA_	No priority mode + automatic OTM_C_D or motorized OTM40...125_CMA_	Manual back switching mode + automatic OTM_C_D or motorized OTM40...125_CMA_
LED indication			
Mode	Line 1 priority + motorized OTM160...2500_CM_	No priority mode + motorized OTM160...2500_CM_	Manual back switching mode + motorized OTM160...2500_CM_

Table 4.1 **Indications of the Operating modes in automatic control units OMD100, OMD200 and OMD300**

4. Set Lim rotary switch back to original position

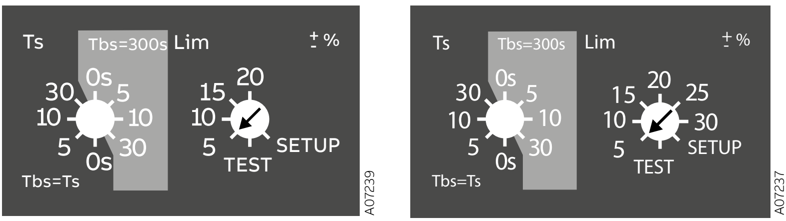


Figure 4.11 **Setting of SETUP mode with Lim rotary switch in automatic control units OMD 100 (left), OMD200 and OMD300 (right)**

5. Set device to AUTO mode according to the Figure 4.12.

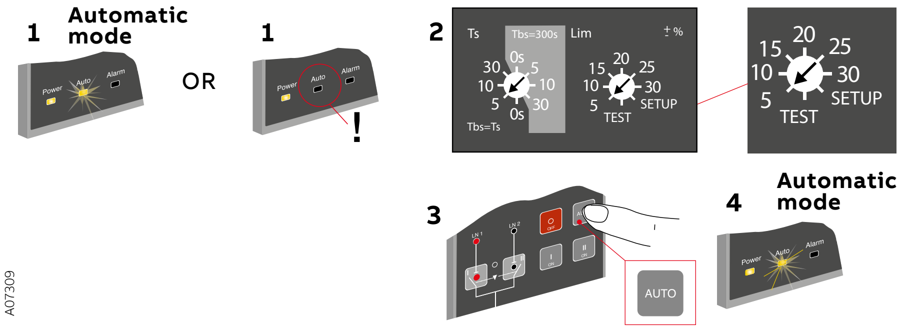


Figure 4.12 **Selecting the automatic control units OMD100, OMD200 and OMD300 to Automatic Mode**

4.1.5 Choice of Operating mode in OMD800

Different working modes are set by the display:

System Configuration

- Line priority
  - Line 1–Switch I
  - Line 2-Switch II
  - No line priority
- Change-over Switch Type
  - Automatic OTM_C_D
  - Motorized OTM_C
- Manual Back Switching
  - Off
  - On

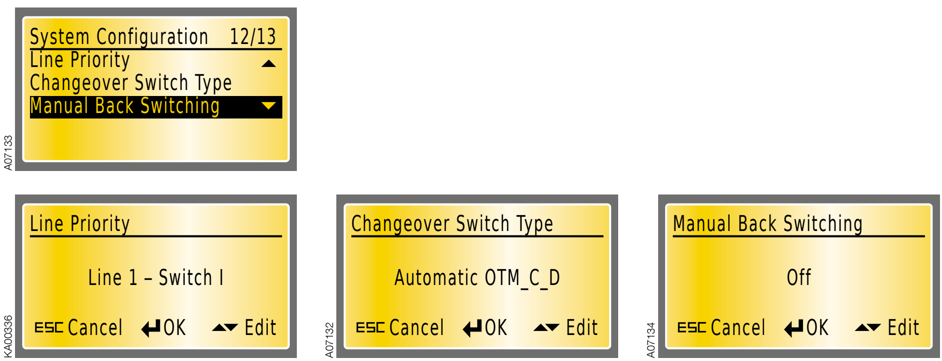


Figure 4.13 **Choosing the Operating mode in the automatic control unit OMD800**

4.1.6 Locking electrical operation

To disable electrical control, 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 any position (I, O, II).

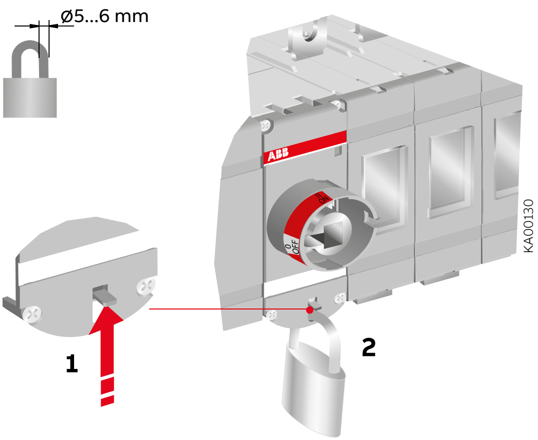


Figure 4.14 Locking electrical control

4.2 Operating the switch manually (local operation)

To operate the 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 switch panel. You can attach the handle in any position.

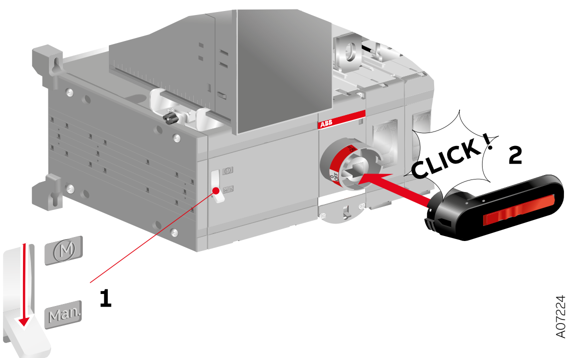


Figure 4.15 Operating the switch manually

When the handle is attached, the automatic control unit OMD_ will automatically be in Manual Mode. The Alarm LED on the automatic control unit is ON with the Power LED. The Auto LED will be OFF. When the handle is removed, the automatic control unit will stay in Manual Mode and the Alarm LED will be OFF.

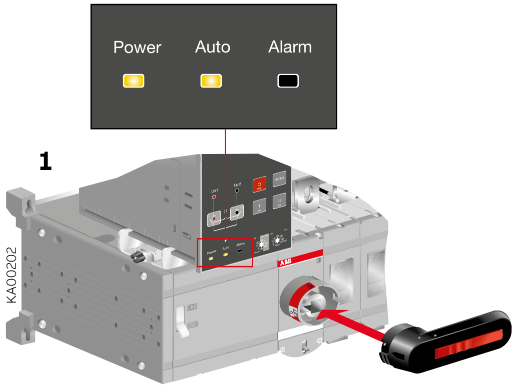


Figure 4.16 **The Alarm LED is ON while the handle is attached and the automatic control unit is in Manual Mode**

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.

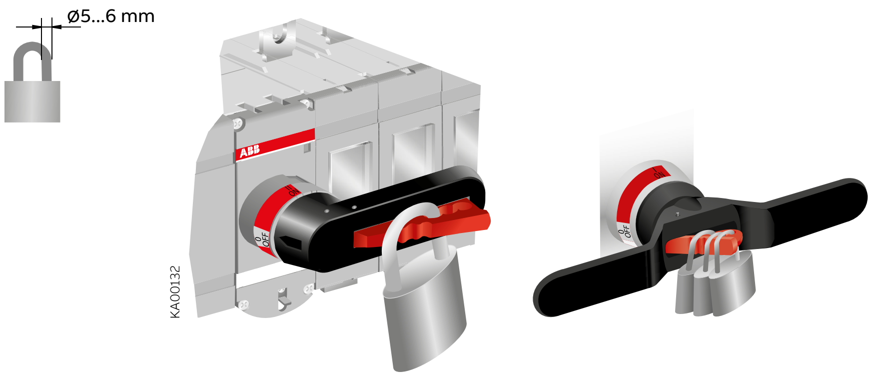


Figure 4.17 **Locking the manual operation**

5 Installation

5.1 Mounting the OTM_ automatic transfer switch

Use protection against direct contact.

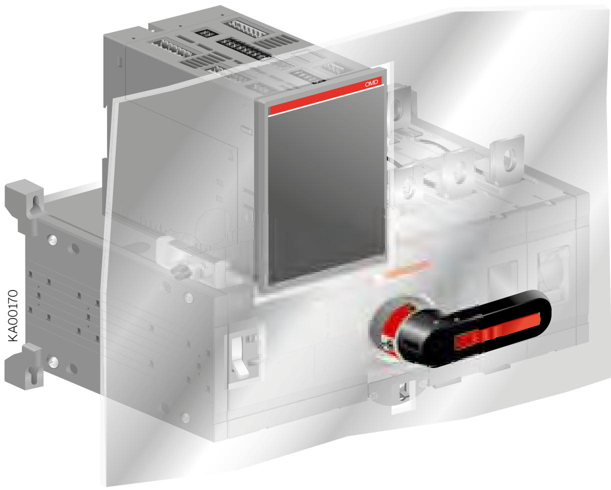
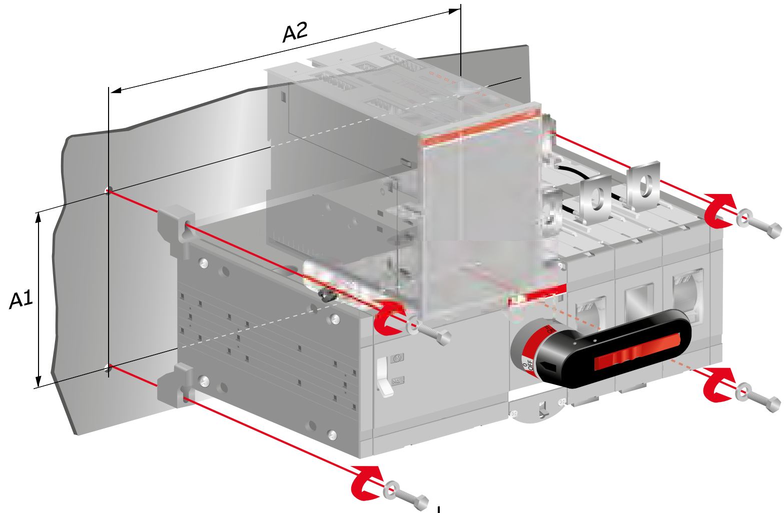


Figure 5.1 An example of using protection against direct contact



M5	M6	M10
3,5...4 Nm 31...35.4 lb.in		
OTM160-250_C_D_ OTM315-400_C_D_	OTM600U_C_D_ OTM630-800E_C_D_	OTM800U_C_D_ OTM1000-1600_C_D_

	OTM160-250_C_D_		OTM160-250_C_D_		OTM200_C_D_	
	E3	E4	E3W	E4W	U3	U4
A1	116	116	116	116	116/4.57	116/4.57
A2	258	293	282	325	282/11.10	325/12.80

	OTM315-400_C_D_		OTM400_C_D_	
	E3	E4	U3	U4
A1	142	142	142/5.59	142/5.59
A2	305	349	335/13.19	389/15.31

	OTM630-800_C_D_		OTM600_C_D_	
	E3	E4	U3	U4
A1	180	180	180/7.09	180/7.09
A2	390	455	390/15.35	455/17.91

	OTM1000-1600_C_D_		OTM800-1200_C_D_	
	E3	E4	U3	U4
A1	230	230	230/9.06	230/9.06
A2	476	556	476/18.77	556/21.9

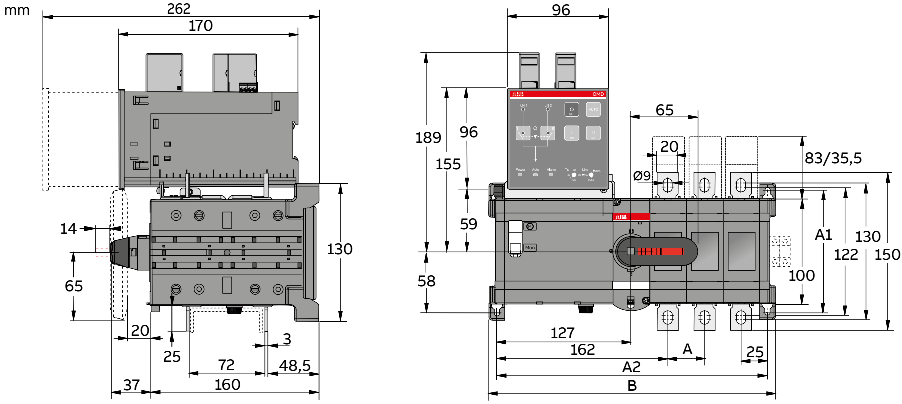
	OTM2000-2500_C_D_	
	E3	E4
A1	230	230
A2	613,5	739,5

	OTM3200-4000_C_D_	
	E3	E4
A1	250	250
A2	661,5	801,5

KA00134

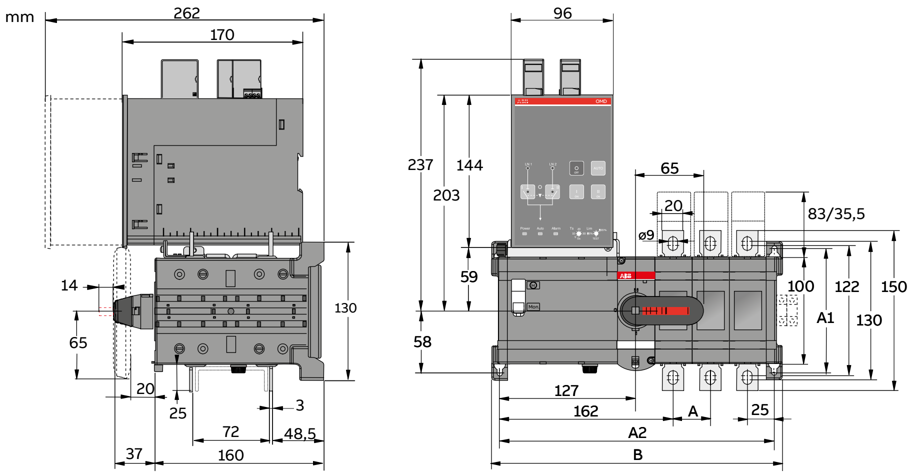
Figure 5.2 **Automatic transfer switches, drilling hole distances / screw-mounting, [mm/in]**

5.2 Dimensional drawings



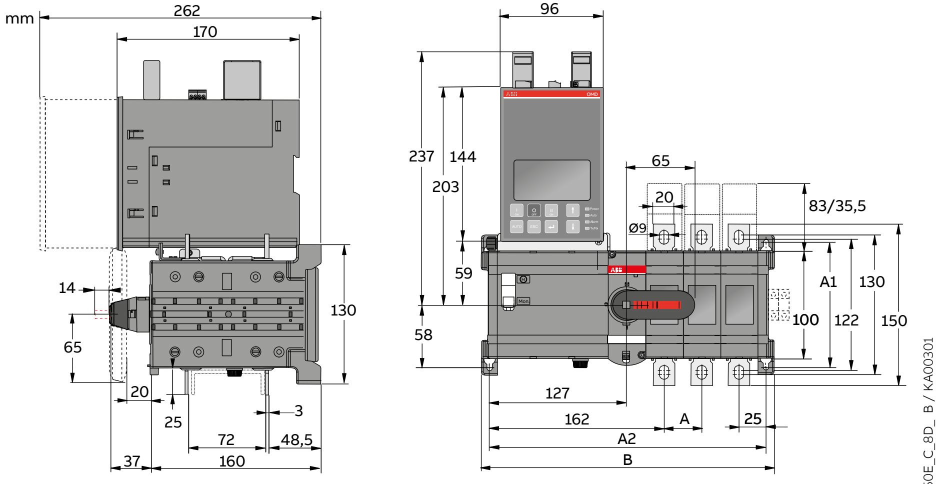
OTM 160-250_C_D_		
	E3	E4
A	35	35
A1	116	116
A2	257	292
B	272	307

Figure 5.3 OTM160-250E_C1D_



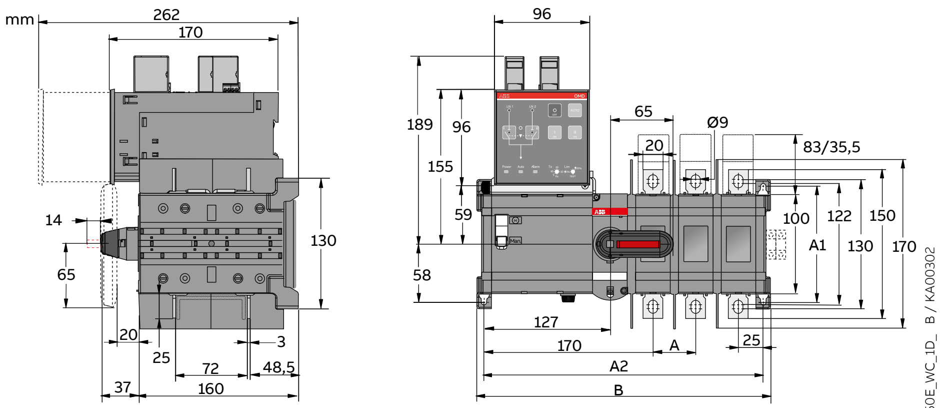
OTM 160-250_C_D_		
	E3	E4
A	35	35
A1	116	116
A2	257	292
B	272	307

Figure 5.4 OTM160-250E_C2D_, OTM160-250E_C3D_



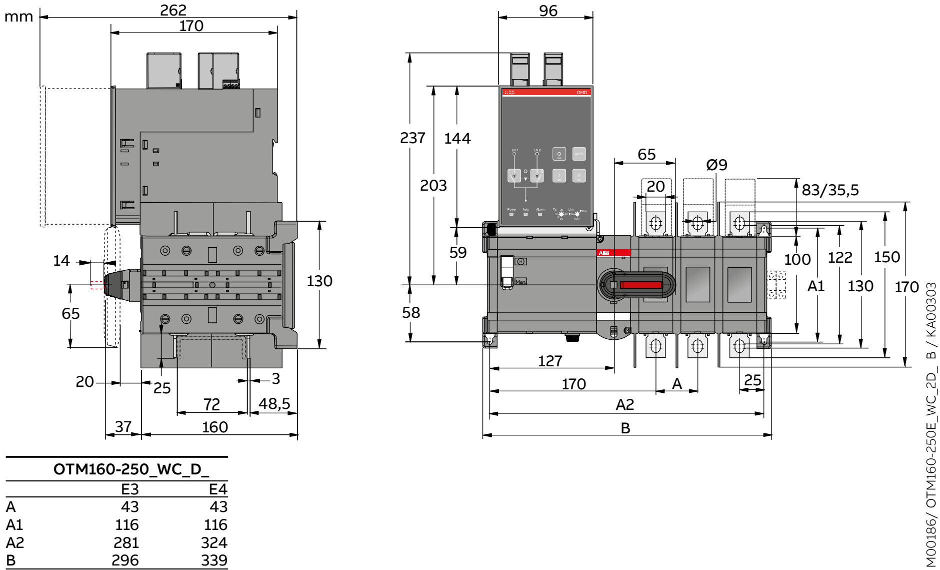
OTM 160-250_C_D_		
	E3	E4
A	35	35
A1	116	116
A2	257	292
B	272	307

Figure 5.5 OTM160-250E_C8D_



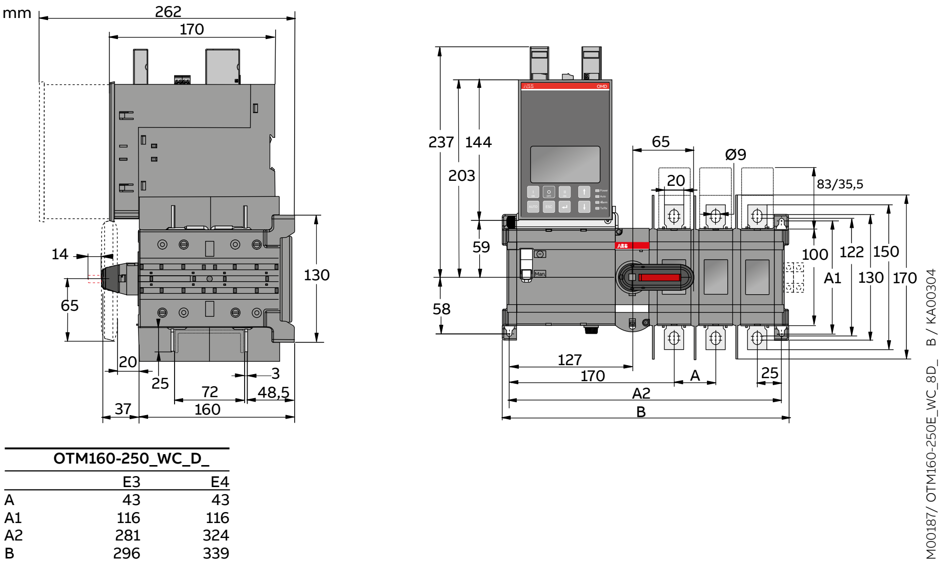
OTM160-250_WC_D_		
	E3	E4
A	43	43
A1	116	116
A2	281	324
B	296	339

Figure 5.6 OTM160-250E_WC1D_



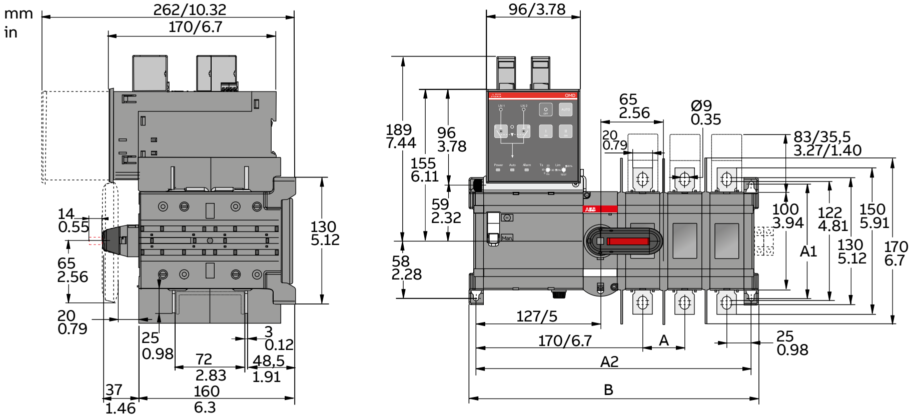
OTM160-250_WC_D_	E3	E4
A	43	43
A1	116	116
A2	281	324
B	296	339

Figure 5.7 OTM160-250E_CW2D_, OTM160-250E_CW3D_



OTM160-250_WC_D_	E3	E4
A	43	43
A1	116	116
A2	281	324
B	296	339

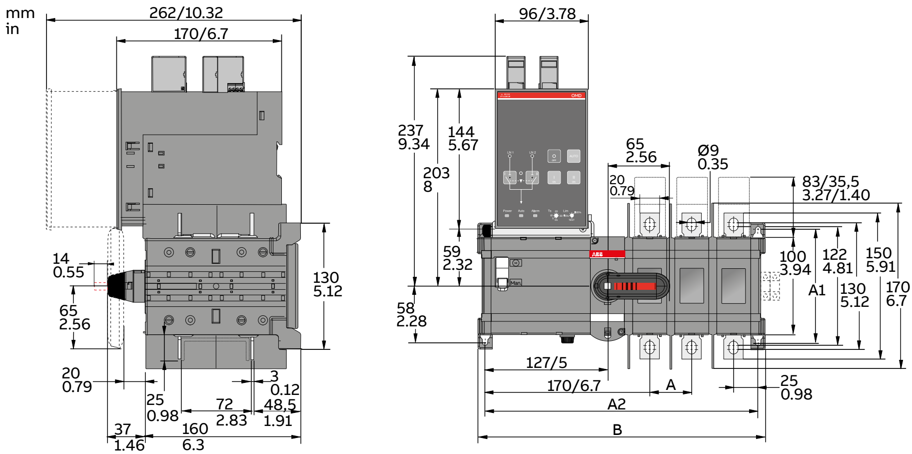
Figure 5.8 OTM160-250E_CW8D_



M00188/ OTM200U_C_1D_ B / KA00305

OTM200_C_D_		
	U3	U4
A	43/1.69	43/1.69
A1	116/4.57	116/4.57
A2	281/11.07	324/12.76
B	296/11.66	339/13.36

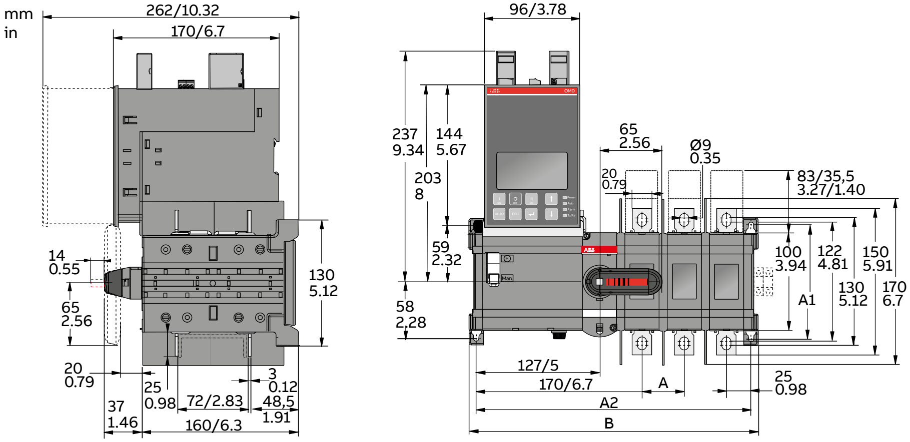
Figure 5.9 **OTM200U_C1D_**



M00189/ OTM200U_C_2D_ B / KA00306

OTM200_C_D_		
	U3	U4
A	43/1.69	43/1.69
A1	116/4.57	116/4.57
A2	281/11.07	324/12.76
B	296/11.66	339/13.36

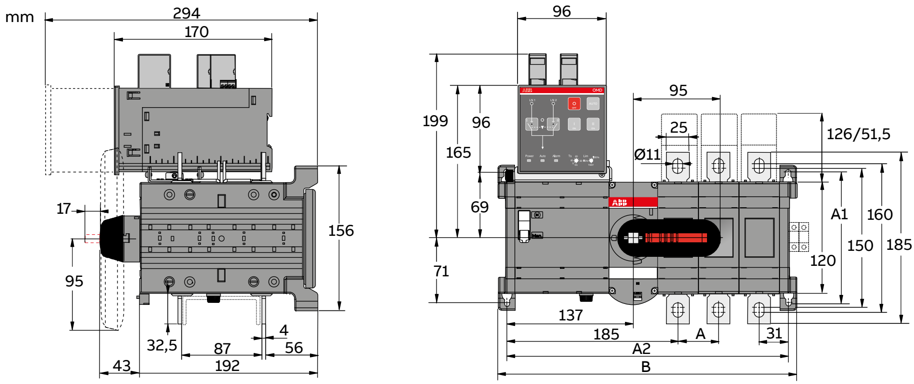
Figure 5.10 **OTM200U_C2D_, OTM200U_C3D_**



M00190/ OTM200U_C_8D_ B / KA00307

OTM200_C_D_	U3	U4
A	43/1.69	43/1.69
A1	116/4.57	116/4.57
A2	281/11.07	324/12.76
B	296/11.66	339/13.36

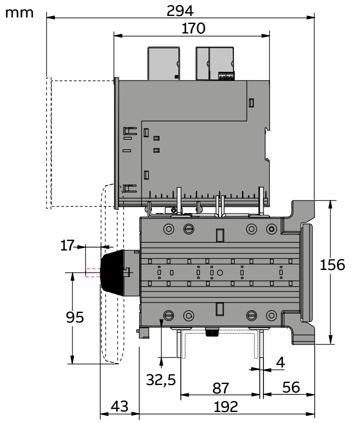
Figure 5.11 OTM200U_C8D_

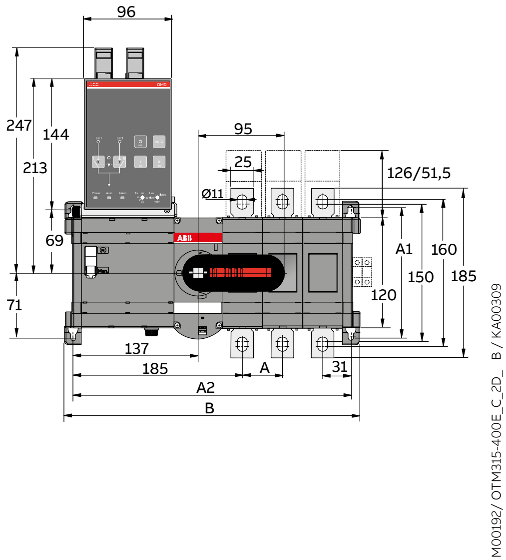


M00191/ OTM315-400E_C1D_ B / KA00308

OTM 315-400_C_D_	E3	E4
A	44	44
A1	142	142
A2	304,5	348,5
B	323	367

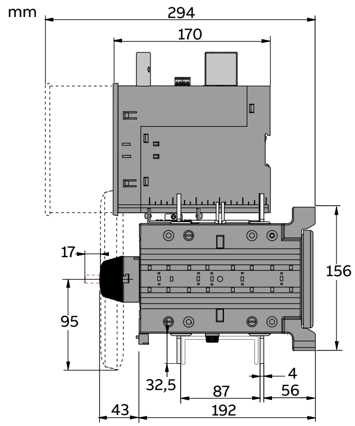
Figure 5.12 OTM315-400E_C1D_

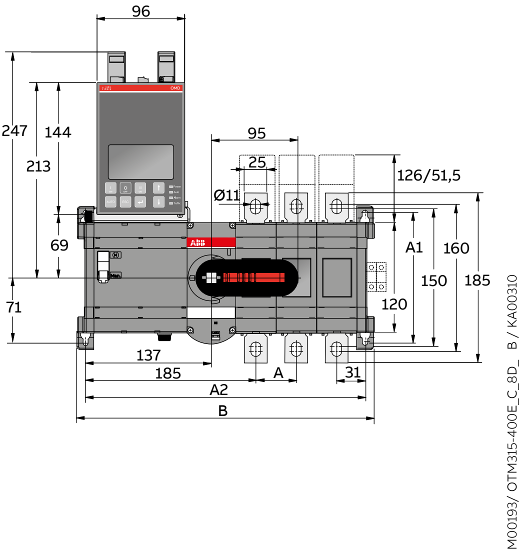




OTM 315-400_C_D_		
	E3	E4
A	44	44
A1	142	142
A2	304,5	348,5
B	323	367

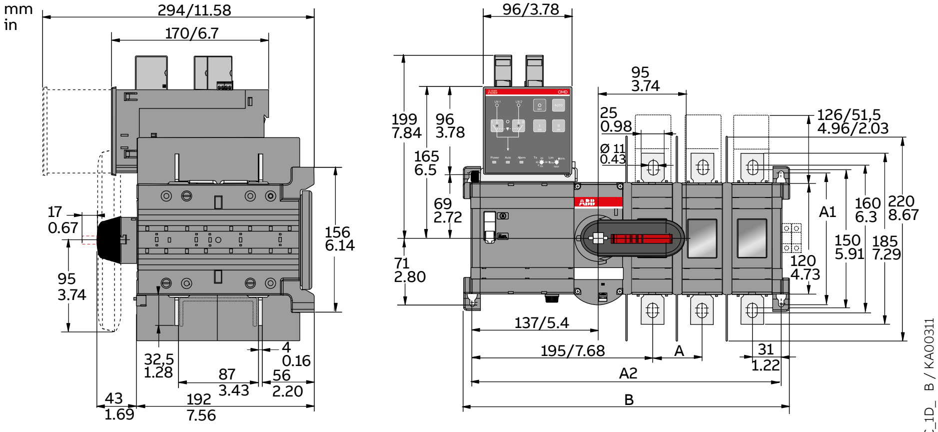
Figure 5.13 OTM315-400E_C2D_, OTM315-400E_C3D_





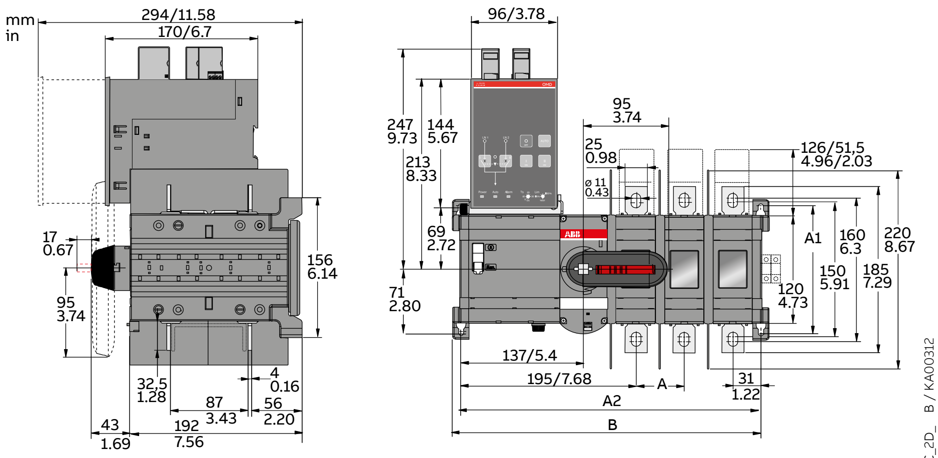
OTM 315-400_C_D_		
	E3	E4
A	44	44
A1	142	142
A2	304,5	348,5
B	323	367

Figure 5.14 OTM315-400E_C8D_



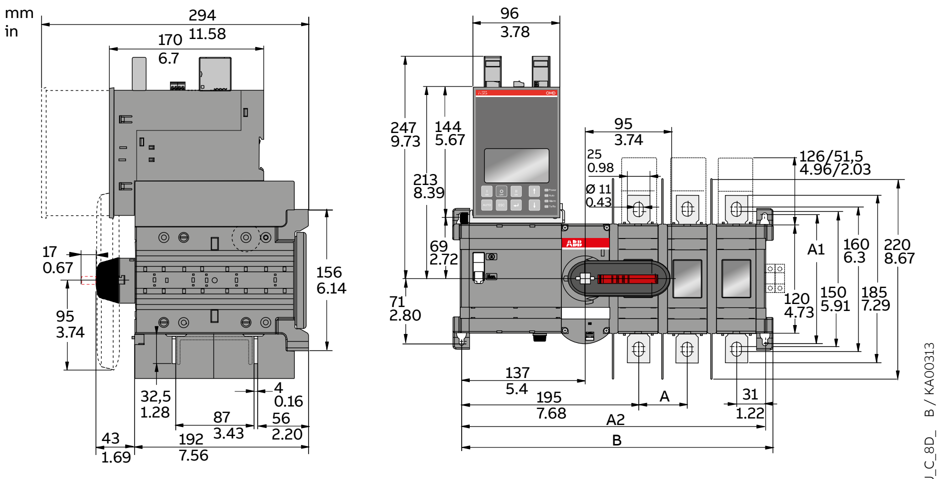
OTM 400_C_D_		
	U3	U4
A	54/2.13	54/2.13
A1	142/5.59	142/5.59
A2	334,5/13.18	388,5/15.3
B	353/13.91	407/16.04

Figure 5.15 **OTM400U_C1D_**



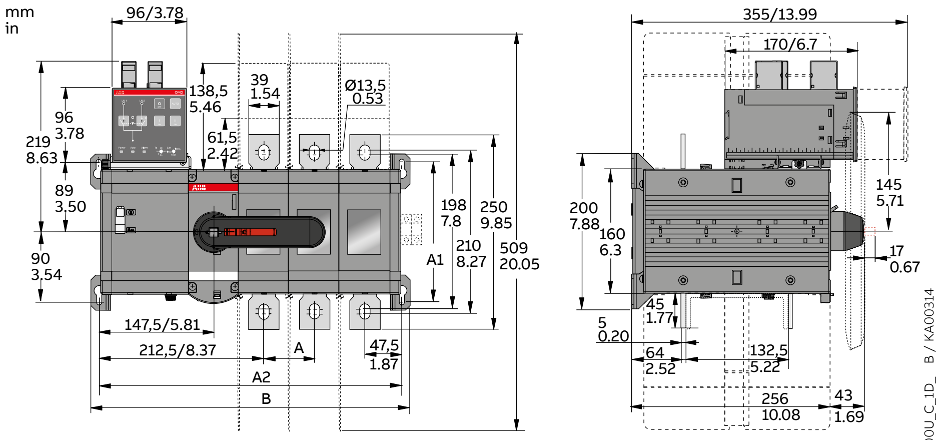
OTM 400_C_D_		
	U3	U4
A	54/2.13	54/2.13
A1	142/5.59	142/5.59
A2	334,5/13.18	388,5/15.3
B	353/13.91	407/16.04

Figure 5.16 **OTM400U_C2D_, OTM400U_C3D_**



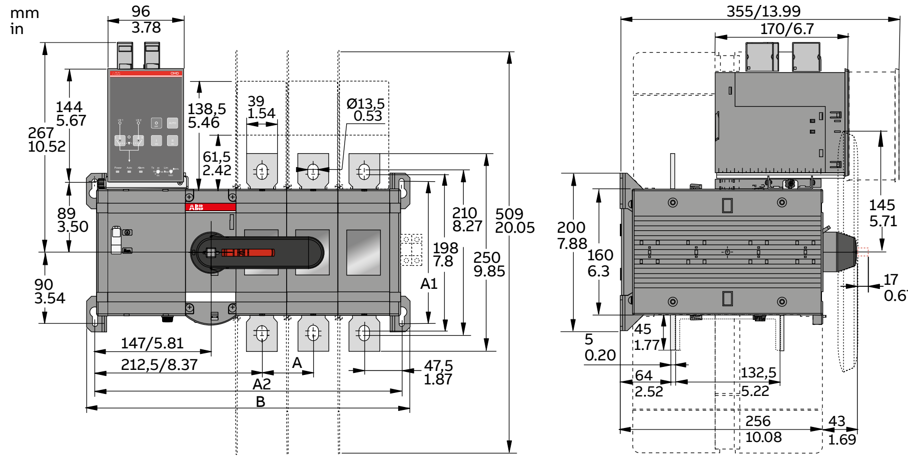
OTM 400_C_D_		
	U3	U4
A	54/2.13	54/2.13
A1	142/5.59	142/5.59
A2	334,5/13.18	388,5/15.3
B	353/13.91	407/16.04

Figure 5.17 OTM400U_C8D_



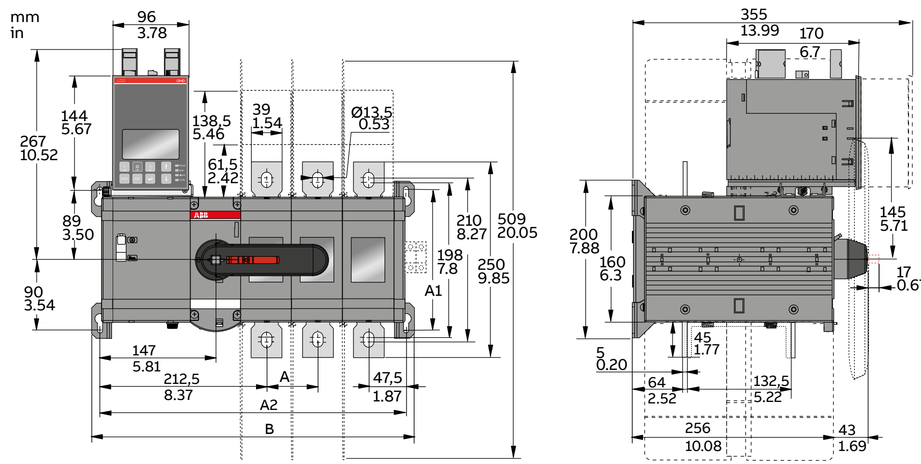
OTM600_C_D_			
	U2	U3	U4
A	65/2.56	65/2.56	65/2.56
A1	180/7.09	180/7.09	180/7.09
A2	325/12.8	390/15.36	455/17.93
B	346/13.63	411/16.19	476/18.75

Figure 5.18 OTM600U_C1D_



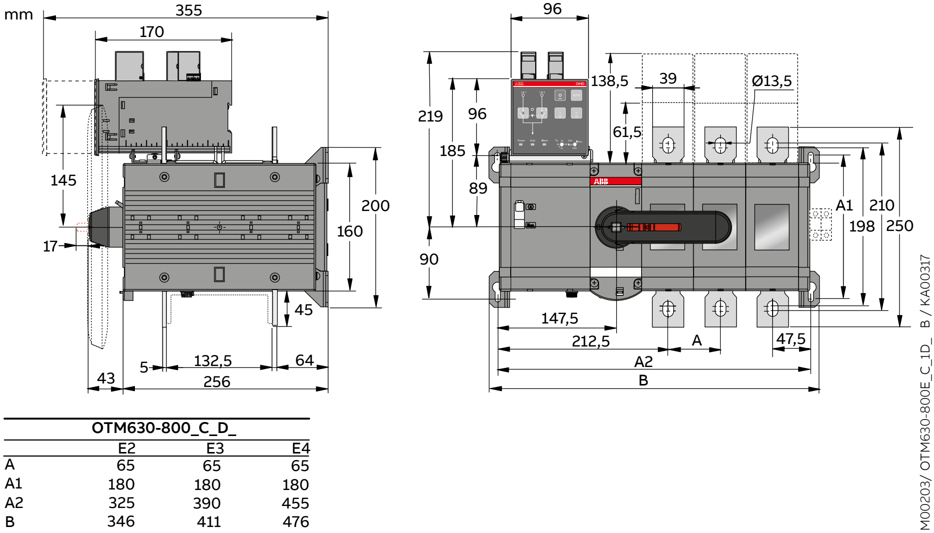
OTM600_C_D_			
	U2	U3	U4
A	65/2.56	65/2.56	65/2.56
A1	180/7.09	180/7.09	180/7.09
A2	325/12.8	390/15.36	45517.93
B	346/13.63	411/16.19	476/18.75

Figure 5.19 **OTM600U_C2D_, OTM600U_C3D_**



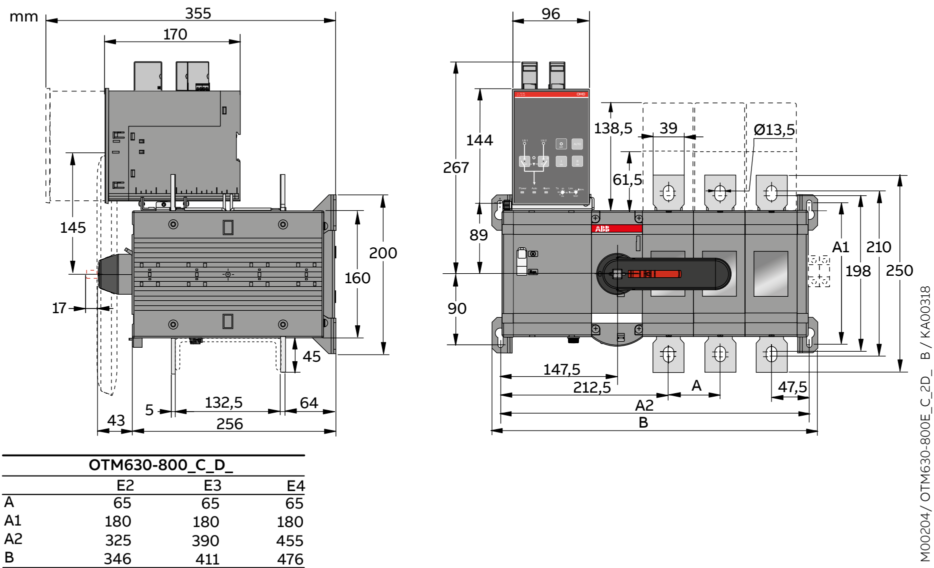
OTM600_C_D_			
	U2	U3	U4
A	65/2.56	65/2.56	65/2.56
A1	180/7.09	180/7.09	180/7.09
A2	325/12.8	390/15.36	45517.93
B	346/13.63	411/16.19	476/18.75

Figure 5.20 **OTM600U_C8D_**



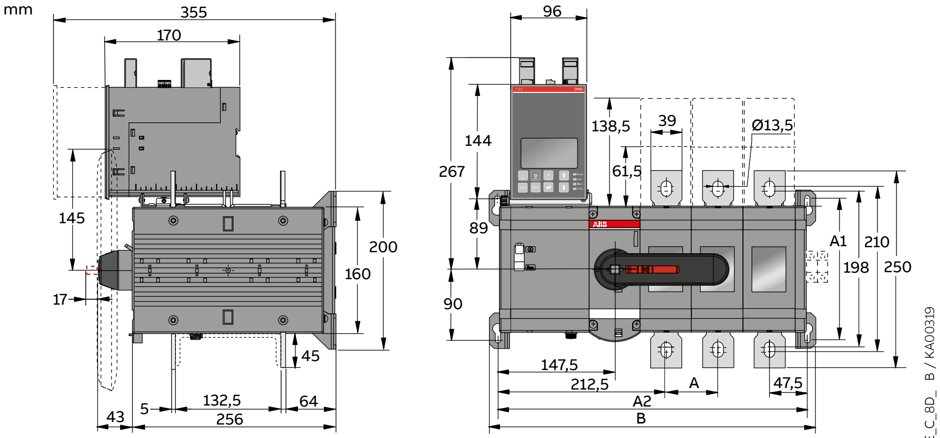
OTM630-800_C_D_	E2	E3	E4
A	65	65	65
A1	180	180	180
A2	325	390	455
B	346	411	476

Figure 5.21 **OTM630-800E_C1D_**



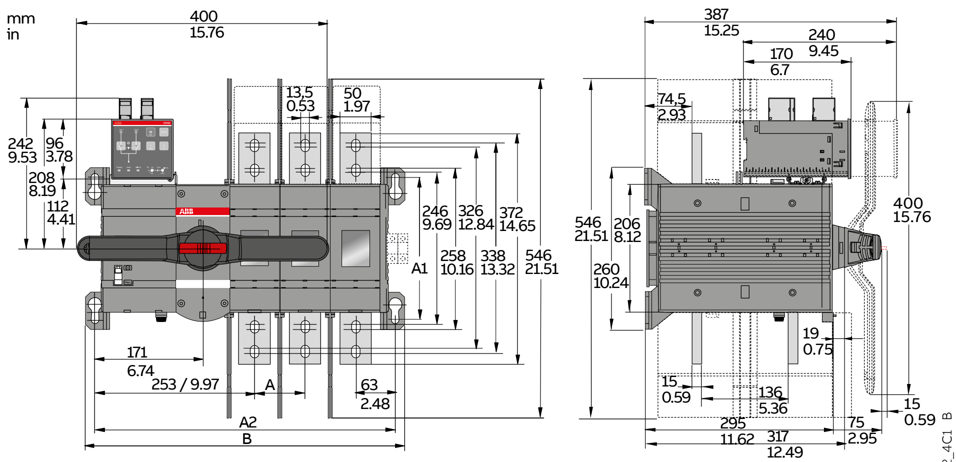
OTM630-800_C_D_	E2	E3	E4
A	65	65	65
A1	180	180	180
A2	325	390	455
B	346	411	476

Figure 5.22 **OTM630-800E_C2D_, OTM630-800E_C3D_**



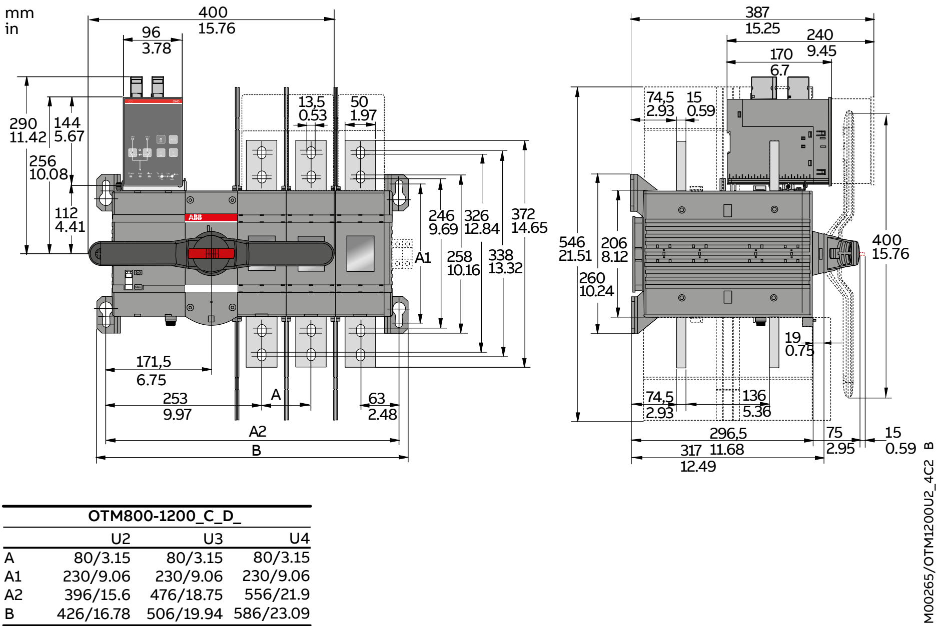
OTM630-800_C_D_			
	E2	E3	E4
A	65	65	65
A1	180	180	180
A2	325	390	455
B	346	411	476

Figure 5.23 **OTM630-800E_C8D_**



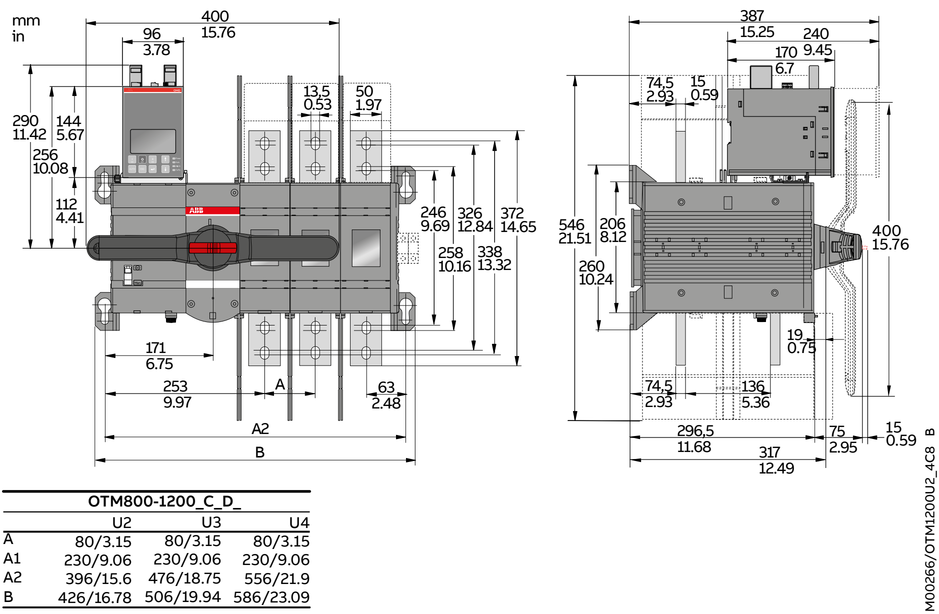
OTM800-1200_C_D_			
	U2	U3	U4
A	80/3.15	80/3.15	80/3.15
A1	230/9.06	230/9.06	230/9.06
A2	396,5/15.62	476,5/18.77	556/21.9
B	426,5/16.8	506/19.94	586/23.09

Figure 5.24 **OTM800-1200U_C1D_**



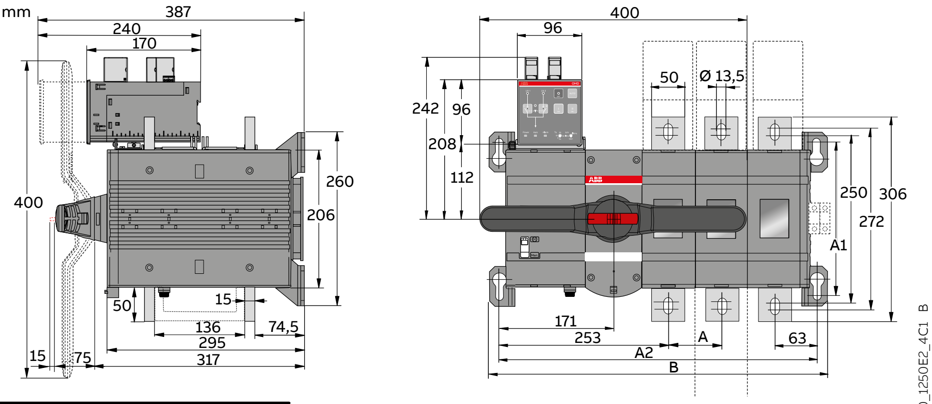
OTM800-1200_C_D_			
	U2	U3	U4
A	80/3.15	80/3.15	80/3.15
A1	230/9.06	230/9.06	230/9.06
A2	396/15.6	476/18.75	556/21.9
B	426/16.78	506/19.94	586/23.09

Figure 5.25 OTM800-1200U_C2D_, OTM800-1200U_C3D_



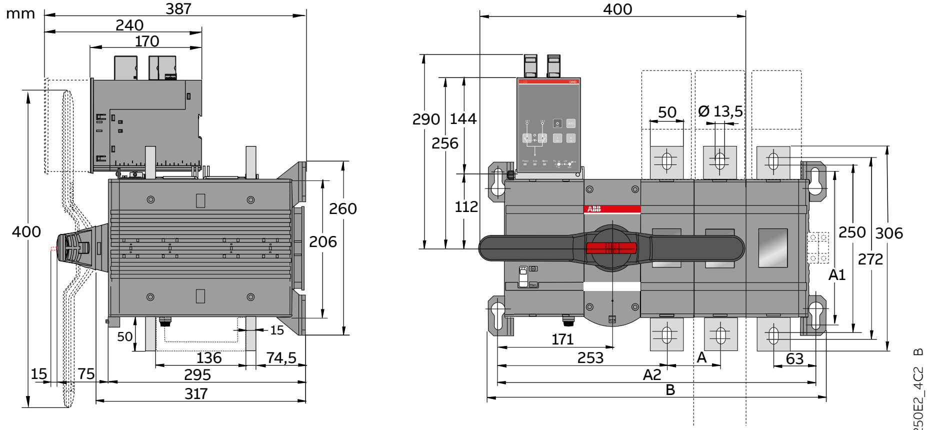
OTM800-1200_C_D_			
	U2	U3	U4
A	80/3.15	80/3.15	80/3.15
A1	230/9.06	230/9.06	230/9.06
A2	396/15.6	476/18.75	556/21.9
B	426/16.78	506/19.94	586/23.09

Figure 5.26 OTM800-1200U_C8D_



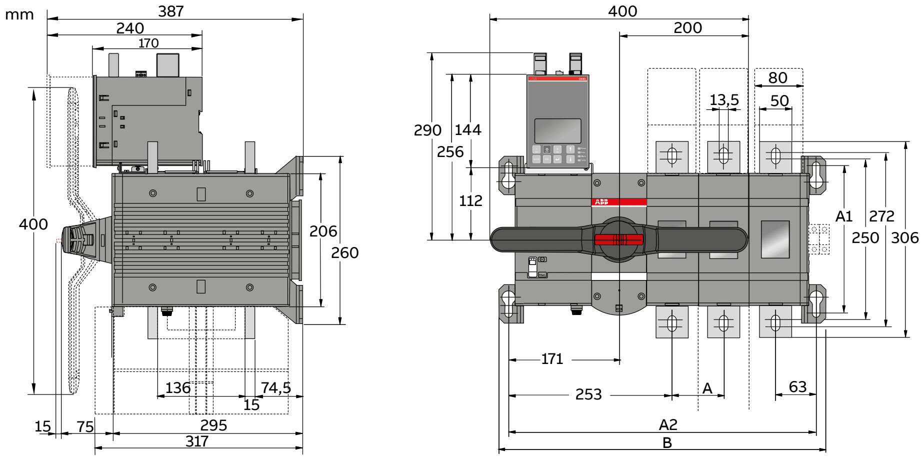
	OTM1000-1250_C_D_		
	E2	E3	E4
A	80	80	80
A1	230	230	230
A2	396	476	556
B	426	506	586

Figure 5.27 OTM1000-1250E_C1D_



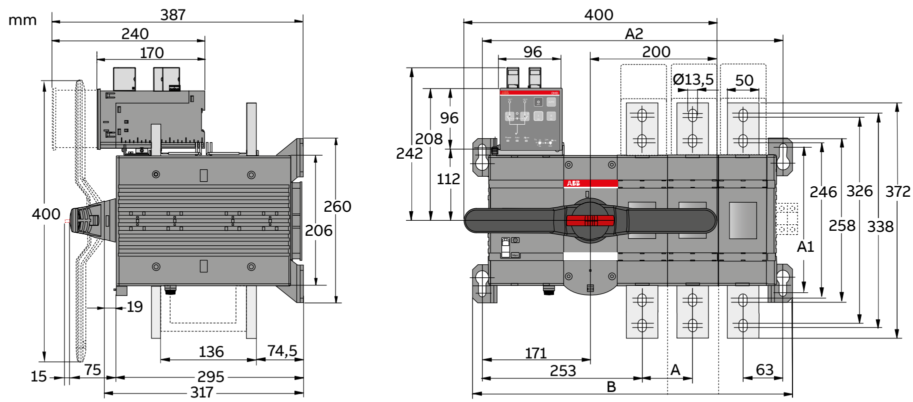
	OTM1000-1250_C_D_		
	E2	E3	E4
A	80	80	80
A1	230	230	230
A2	396	476	556
B	426	506	586

Figure 5.28 OTM1000-1250E_C2D_, OTM1000-1250E_C3D_



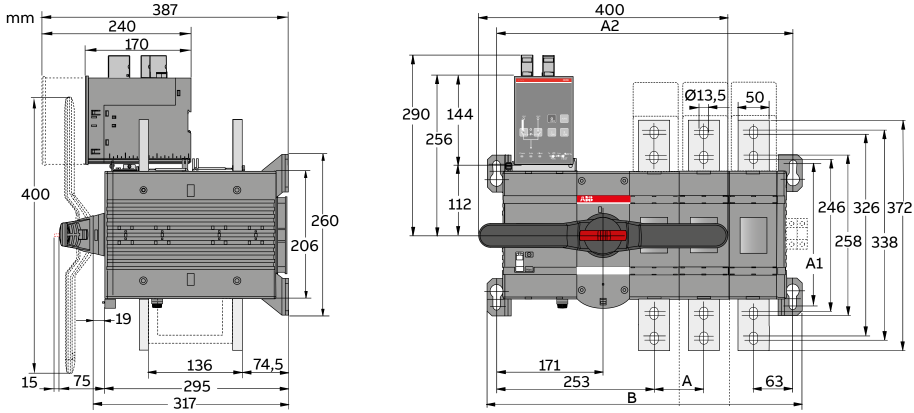
OTM1000-1250_C_D_			
	E2	E3	E4
A	80	80	80
A1	230	230	230
A2	396	476	556
B	426	506	586

Figure 5.29 OTM1000-1250E_C8D_



OTM1600E_C_D_			
	E2	E3	E4
A	80	80	80
A1	230	230	230
A2	396	476	556
B	426	506	586

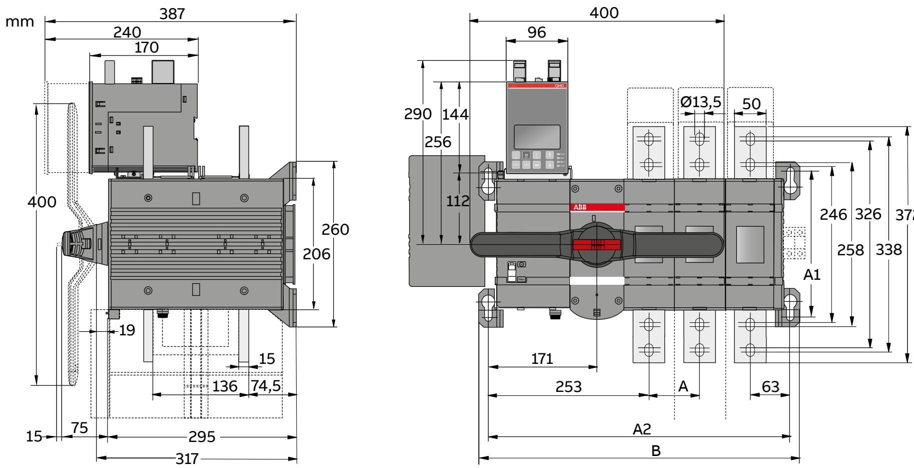
Figure 5.30 OTM1600E_C1D



M00268/OTM1600E2_4C2 B

	OTM1600_C_D_		
	E2	E3	E4
A	80	80	80
A1	230	230	230
A2	396	476	556
B	426	506	586

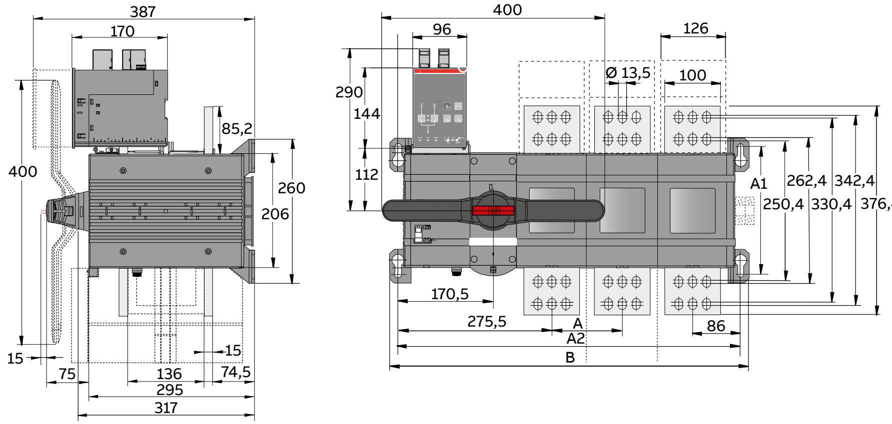
Figure 5.31 **OTM1600E_C2D_, OTM1600E_C3D_**



M00269/OTM1600E2_4C8 B

	OTM1600_C_D_		
	E2	E3	E4
A	80	80	80
A1	230	230	230
A2	396	476	556
B	426	506	586

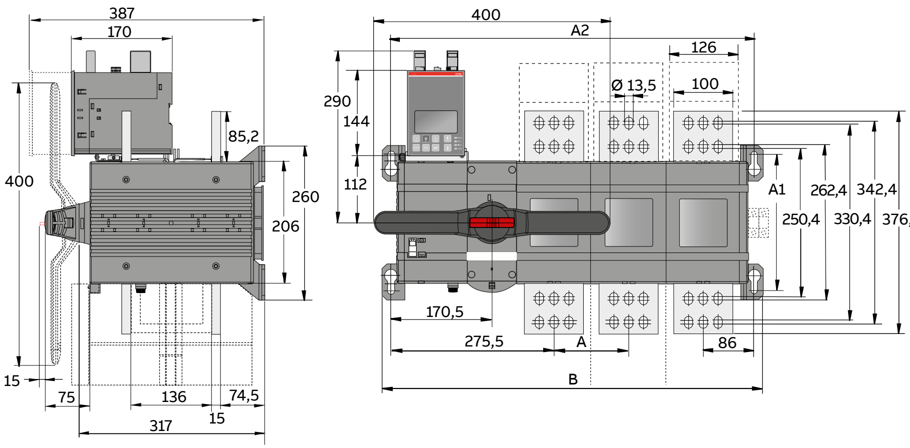
Figure 5.32 **OTM1600E_C8D_**



M00274/OTM2000-2500E2-4C2D_B

OTM2000-2500_C_D_			
	E2	E3	E4
A	126	126	126
A1	230	230	230
A2	487,5	613,5	739,5
B	517,5	643,5	769,5

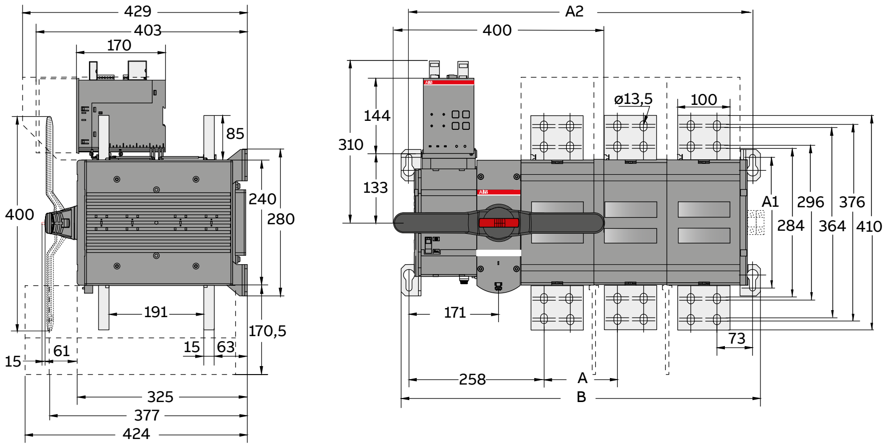
Figure 5.33 **OTM2000-2500_C_D_**



M00275/OTM2500E2_4C8_A

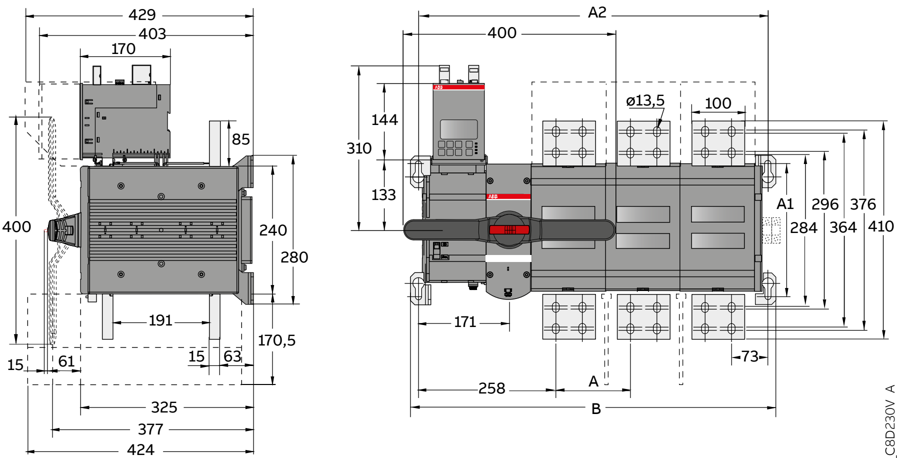
OTM2000-2500E_C8D			
	E2	E3	E4
A	126	126	126
A1	230	230	230
A2	487,5	613,5	739,5
B	517,5	643,5	769,5

Figure 5.34 **OTM2000-2500_C8D**



OTM3200_C2D230V		
mm	E3	E4
A	140	140
A1	250	250
A2	661,5	801,5
B	691,5	831,5

Figure 5.35 OTM3200_C2D230V



OTM3200_C8D230V		
mm	E3	E4
A	140	140
A1	250	250
A2	661,5	801,5
B	691,5	831,5

Figure 5.36 OTM3200_C2D230V

5.3 Mounting positions

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

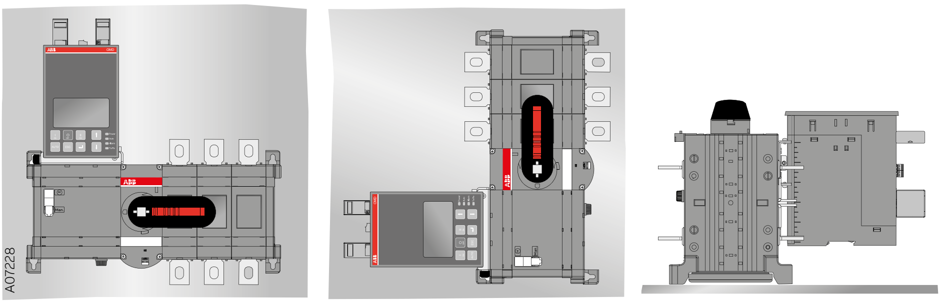


Figure 5.37 Mounting positions

Do not install the Automatic transfer switches in any other position than those described above.

5.4 DIP switches in the automatic control unis OMD100, OMD200 and OMD300

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.

The parameter settings of automatic control units OMD100, OMD200 and OMD300 are performed by the DIP switches. To set the DIP switches, the OMD_ unit has to be removed from the switch, according to Figure 5.38. On the bottom of the OMD_ unit are the DIP switches; see Figure 5.39. After setting the DIP switches you can place the OMD_ unit back on the switch according to Figure 5.40.
For detailed information of the DIP switches see Sections 9 and 10.

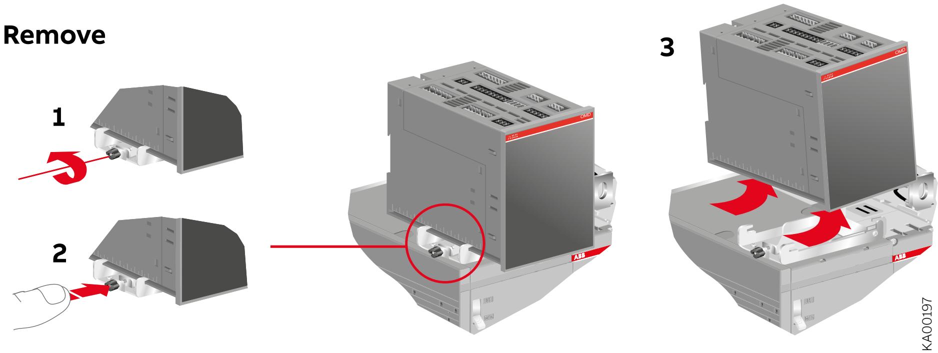


Figure 5.38 **Removing of the OMD_ from the switch**

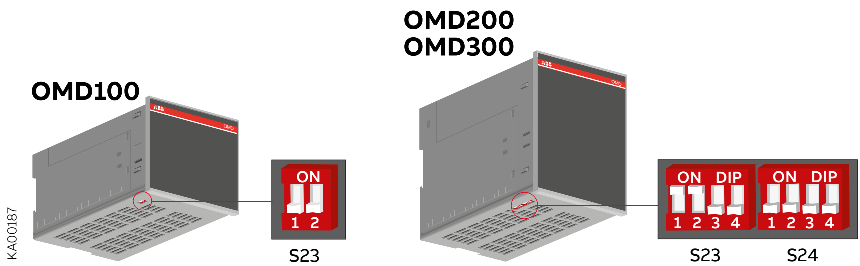


Figure 5.39 **Places of the DIP switches**

If single phase is used, the neutral should be connected.

—

5.5 Mounting the automatic control unit OMD_

The automatic control unit OMD_ can be mounted on the switch, the door or the DIN-rail.

5.5.1 Automatic control unit OMD_ on the switch

The automatic control unit OMD_ can be adjusted according to the mounting depth of the panel, see Figure 5.39.

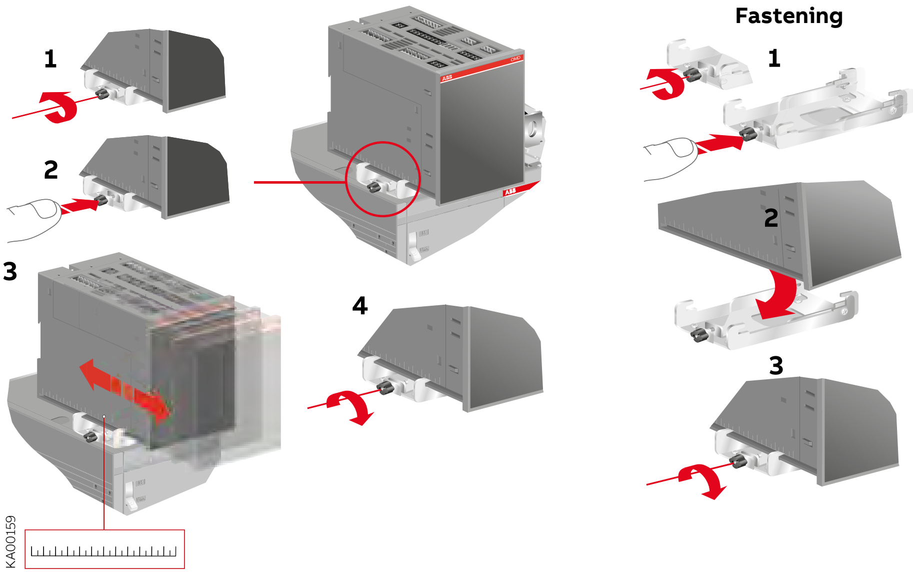


Figure 5.40 Adjusting the mounting depth of the automatic control unit OMD_

Door drilling according to Figure 5.41. As an optional extra you can use the cover plate OMZC2 on the door for OMD200, 300 and 800, see Accessories, Section 14.8, Figure 14.9.

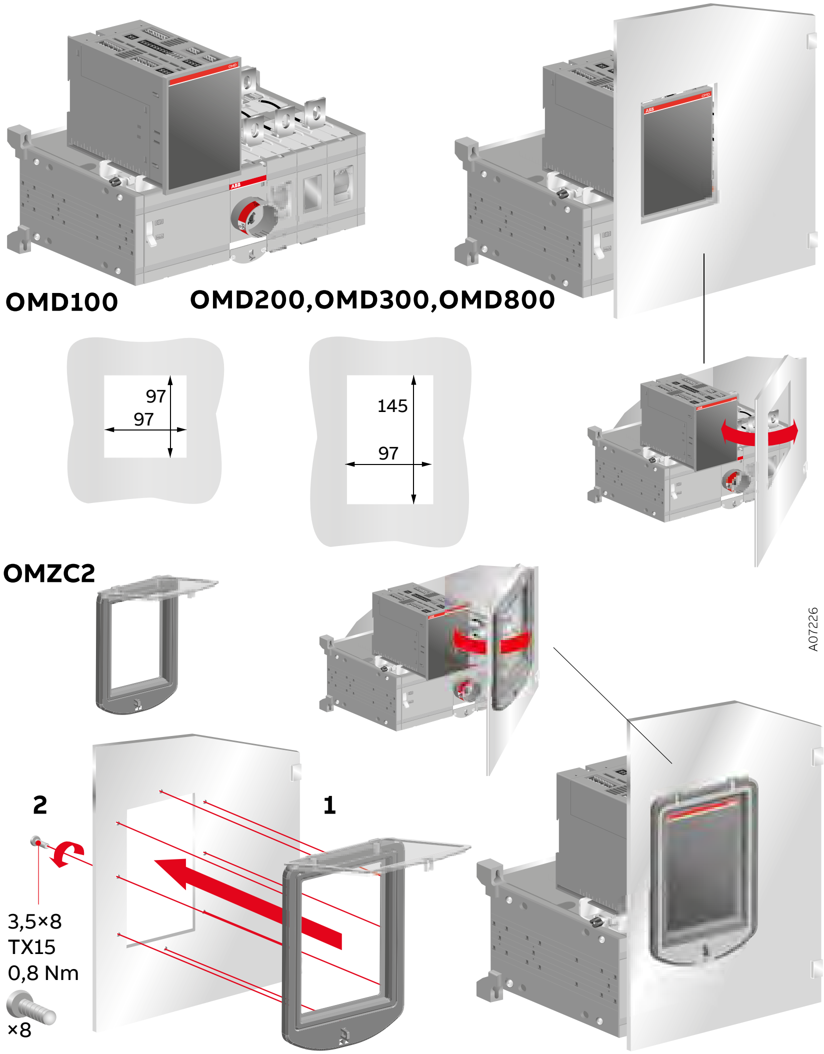


Figure 5.41 **Door drilling for the automatic control unit OMD_ on the switch, door drilling for the cover plate OMZC2, see Accessories, Section 14.8, Figure 14.9**

5.5.2 Automatic control unit OMD_ , door mounting

The automatic control unit OMD_ can be mounted on the door with the fastener OMZD1, see Accessories, Section 14.7, Figure 14.8. Door drilling according to Figure 5.42. As an optional extra you can use the cover plate OMZC2 on the door for OMD200, 300 and 800, see Figure 5.43 on next page and Accessories, Section 14.8, Figure 14.10.

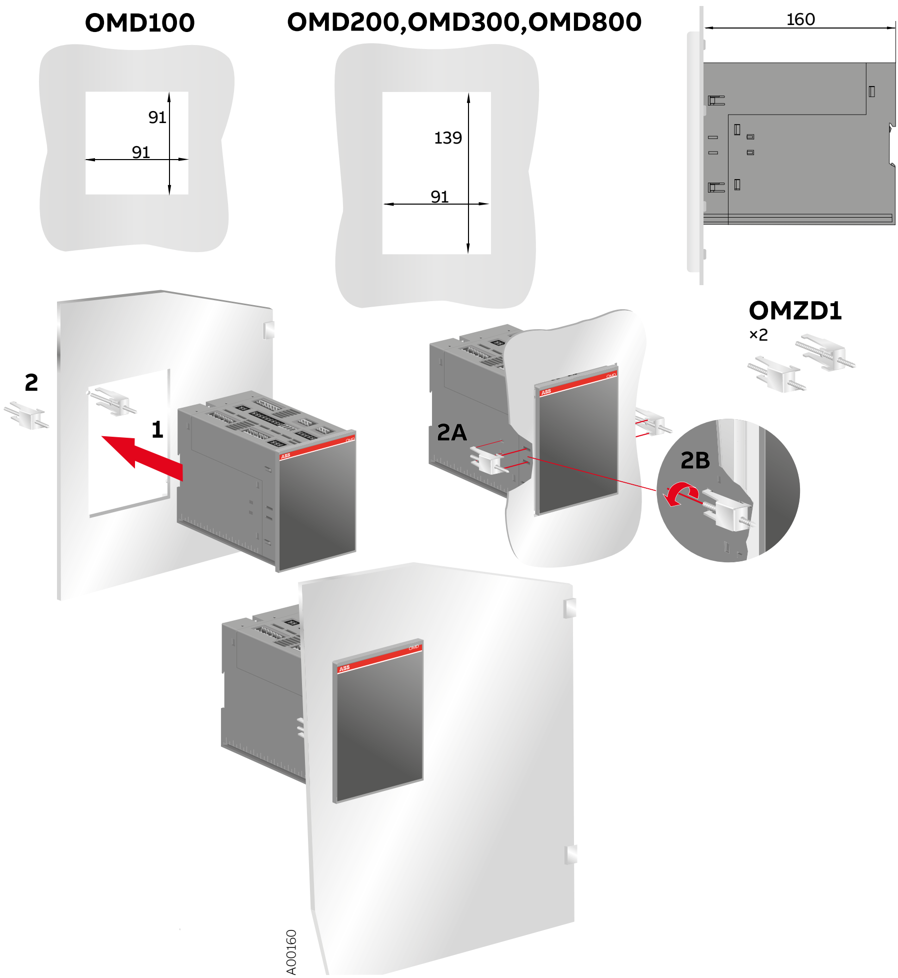


Figure 5.42 Automatic control unit OMD_, door mounting

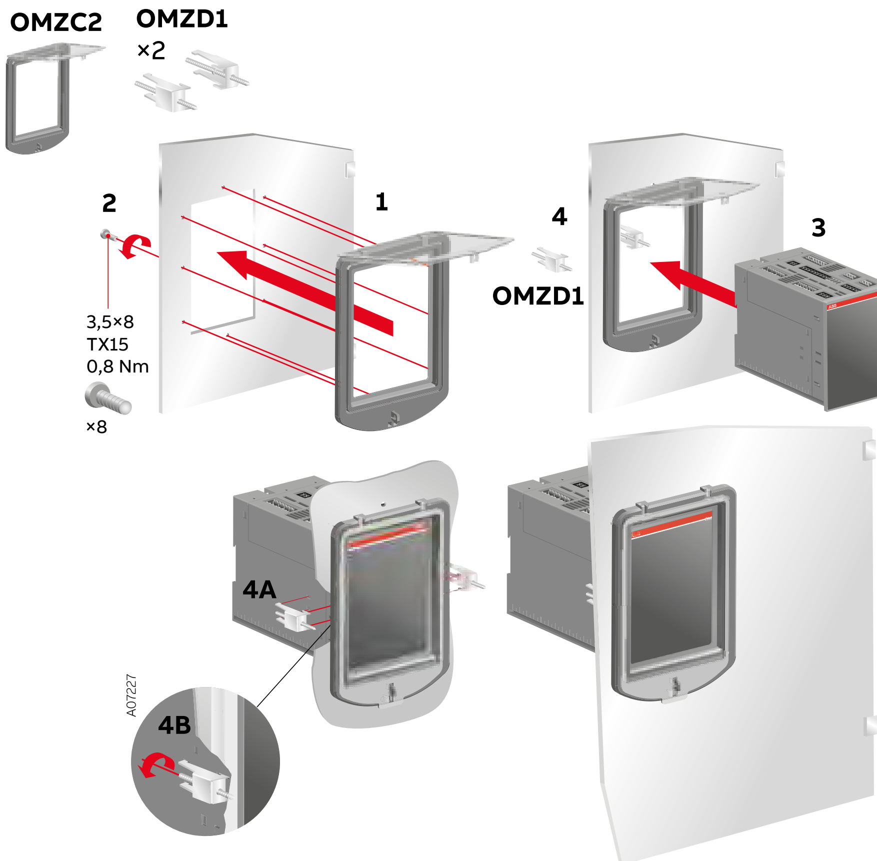


Figure 5.43 **Automatic control unit OMD200, 300 and 800, door mounting with the cover plate, door drilling for the cover plate OMZC2, see Accessories, Section 14.8, Figure 14.10**

5.5.3 Automatic control unit OMD_ , DIN-rail mounting

The automatic control unit OMD_ can be mounted on the 35 mm DIN-rail, see the Figure 5.44. Door drilling, if needed, according to Figure 5.41. As an optional extra you can use the cover plate OMZC2 on the door for OMD200, 300 and 800, see Figure 5.41 and Accessories, Section 14.8.

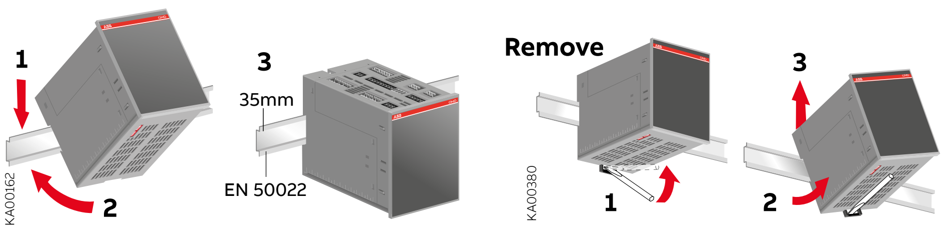


Figure 5.44 **Automatic control unit OMD_, DIN-rail mounting**

6 Connecting

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.

6.1 Power circuit

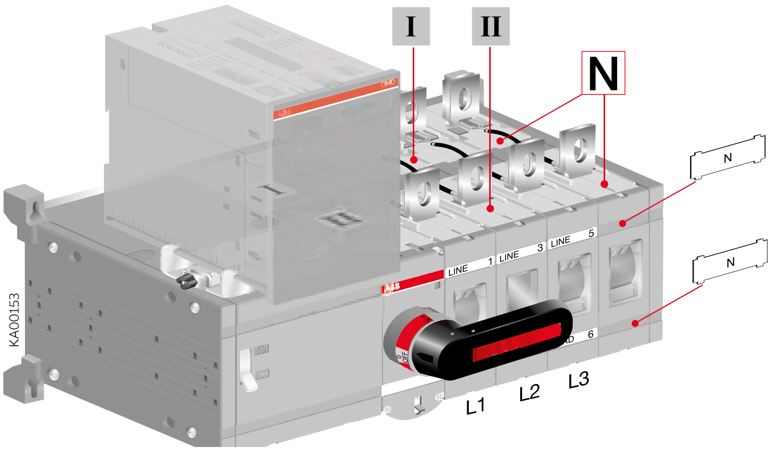


Figure 6.1 **The neutral pole is situated on the right side of the switches. The lower switch is number I and the upper switch is number II**

6.1.1 Voltage sensing wires, neutral pole position

The neutral pole is situated on the right side of the automatic transfer switch. If you need to change the position of the neutral pole to the left side, it will affect to the voltage sensing wires of OMD_. You have to connect the wires according to the Figure 6.2 and Figure 6.3.

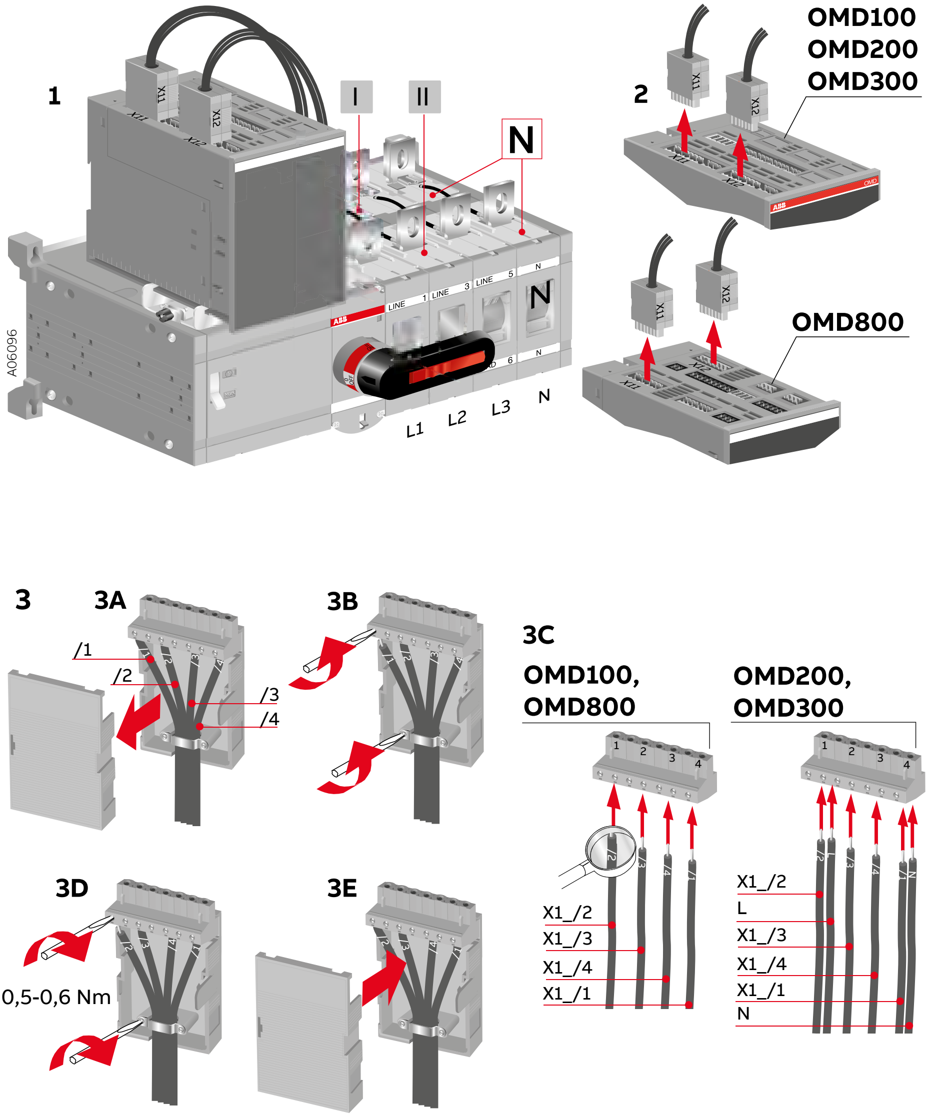


Figure 6.2 Voltage sensing wires; the change of neutral pole from right to left side

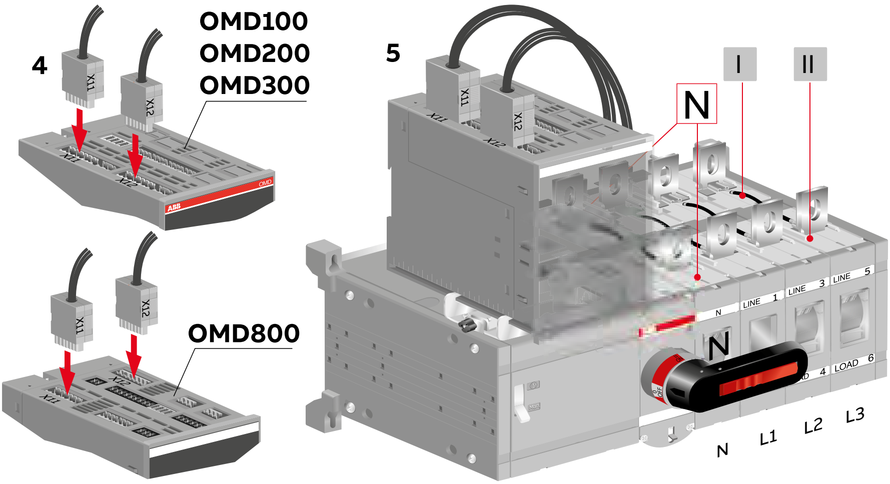


Figure 6.3 **The neutral pole on the left side**

6.1.2 Power circuit of the automatic control unit OMD100

Operating voltage:

Main voltage:	380 Vac (±20 %)
Phase voltage:	220 Vac (±20 %)
Frequency:	50 Hz (±10 %)

Neutral must always be connected.

Phase setting with DIP switches: Single phase or Three-phase (default).

6.1.3 Power circuit of the automatic control unit OMD200 and OMD300

Operating voltage:

Main voltage:	208 Vac - 480 Vac (±20 %)
Phase voltage:	120 Vac - 277 Vac (±20 %)
Frequency:	50 Hz - 60 Hz (±10 %)

Phase setting with DIP switches: Single phase or Three-phase (default).

OMD200:

If the automatic control unit OMD200 is used without neutral (three-phase connection), the external transformer must be used. The transformer will drop the main voltage to the phase voltage level. Neutral has to be connected when using a single phase connection.

OMD300:

Neutral must always be connected.

6.1.4 Power circuit of the automatic control unit OMD800

Operating and measuring voltage area on 3 phase system:

Main voltage:	100 Vac - 480 Vac (±20 %)
Phase voltage:	57.7 Vac - 277 Vac (±20 %)
AUX voltage:	24 Vdc - 110 Vdc (-10 to +15 %)
Frequency:	50 Hz - 60 Hz (±10 %)

Operating and measuring voltage area on 1 phase system:

Phase voltage:	57,7 Vac - 240 Vac (±20 %)
AUX voltage:	24 Vdc - 110 Vdc (-10 to +15 %)
Frequency:	50 Hz - 60 Hz (±10 %)

Phase setting, see the Section 11.
If 1 phase system is used and the voltage level is between 57,7 Vac-109 Vac the auxiliary power supply (AUX) must be used.

6.2 Control circuit

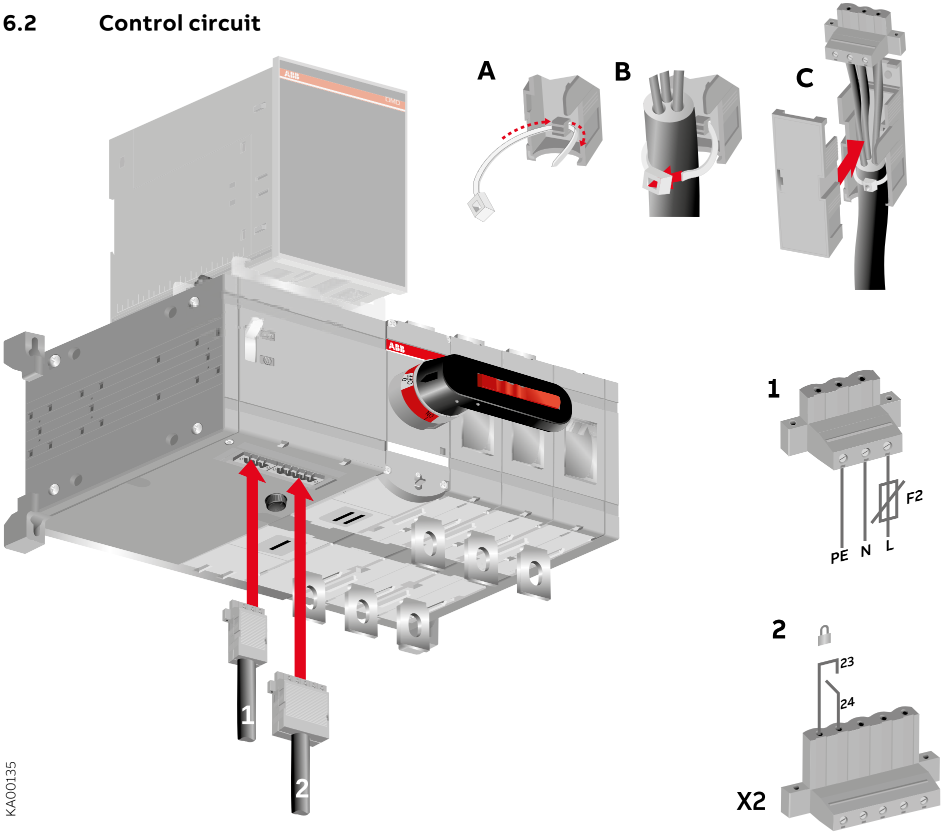


Figure 6.4 OTM_ automatic transfer switch terminals

1. Terminal for motor operator voltage supply

2. Terminal for state information of locking

When relay outputs are used with inductive loads (such as relays, contactors and motors), they must be protected from voltage peaks using varistors, RC-protectors (AC current) or DC current diodes (DC current).

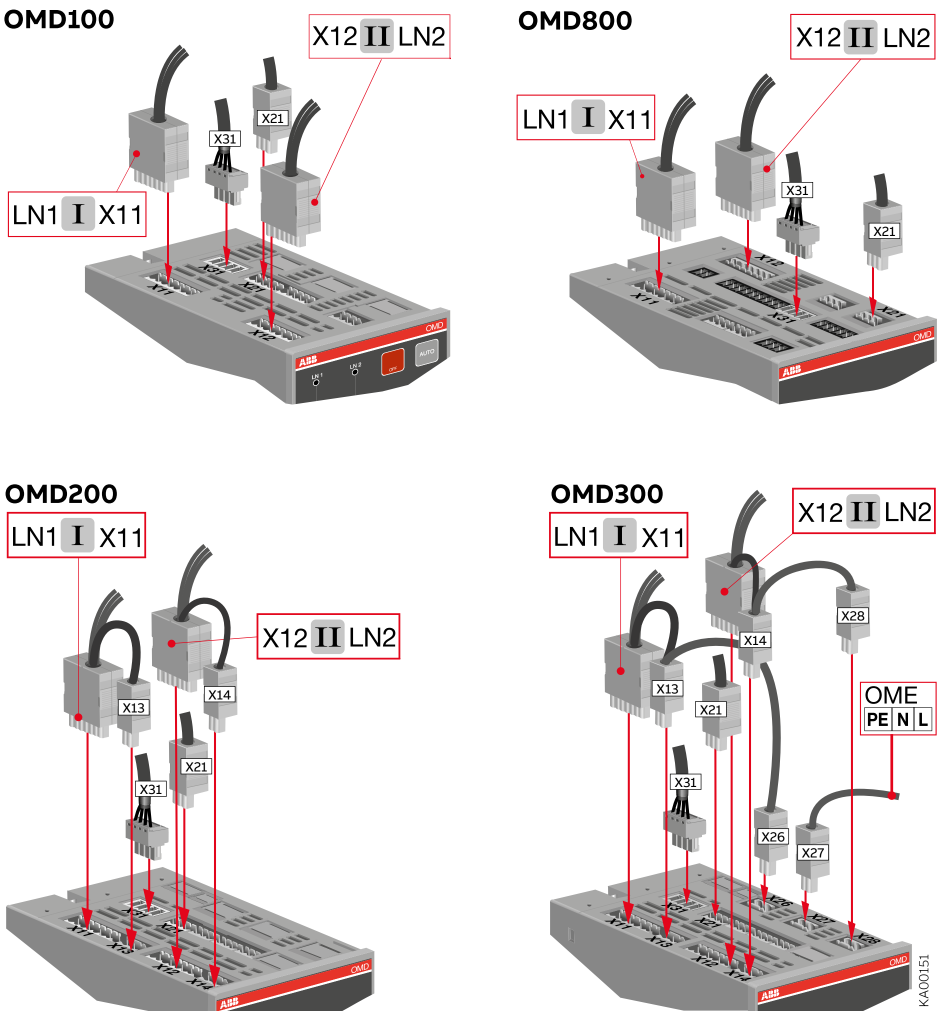


Figure 6.5 **Control circuit connections in OMD_**

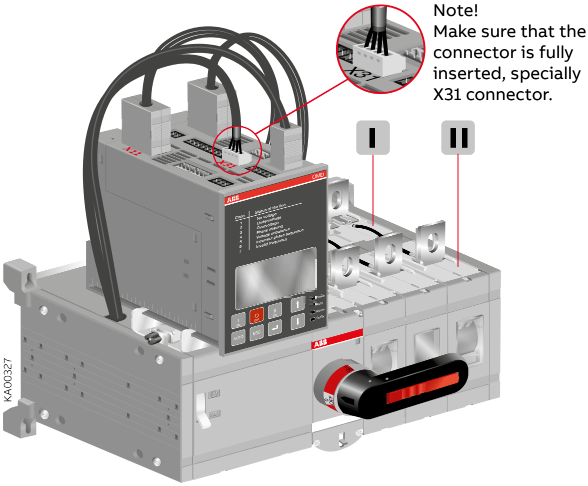


Figure 6.6 **OTM_ automatic transfer switch with control circuit connections**

6.2.1 Control circuit of the automatic control unit OMD100

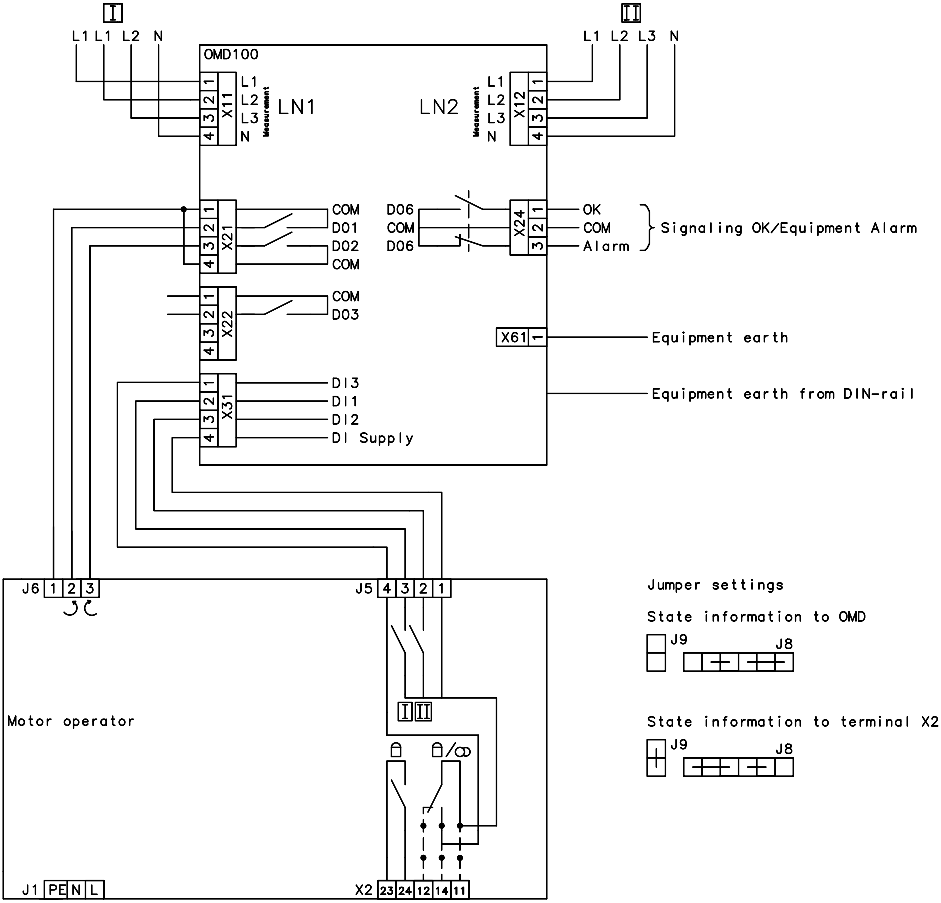


Figure 6.7 **Control circuit diagram OMD100**

Equipment earth must always be connected.

Connectors, OMD100

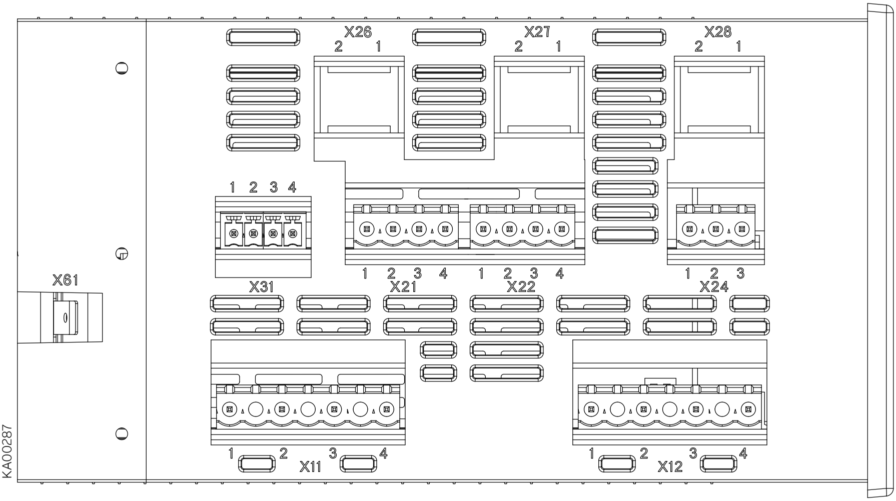


Figure 6.8 **Connectors OMD100**

Connector	Description	
X11:1	Supply I: L1	
X11:2	Supply I: L2	
X11:3	Supply I: L3	
X11:4	Supply I: N	
X12:1	Supply II: L1	
X12:2	Supply II: L2	
X12:3	Supply II: L3	
X12:4	Supply II: N	
X21:1	Voltage supply from motor operator OME_	Common
X21:2	Output to close switch I or open switch II	NO
X21:3	Output to close switch II or open switch I	NO
X21:4	Voltage supply from motor operator OME_	Common
X22:1	Voltage supply from motor operator OME_	Common
X22:2	Output for O command with switch type OTM160...2500_CM_	NO
X22:3	Reserved	
X22:4	Reserved	
X24:1	Output to signal OK (no alarm)	
X24:2	Common	
X24:3	Output to signal Alarm	
X31:1	Manual / Alarm input from handle	
X31:2	Status of switch I auxiliary contact	
X31:3	Status of switch II auxiliary contact	
X31:4	Voltage supply from the automatic control unit OMD_	
X61	Equipment earth	

Table 6.1 **Connectors OMD100**

6.2.2 Control circuit of the automatic control unit OMD200

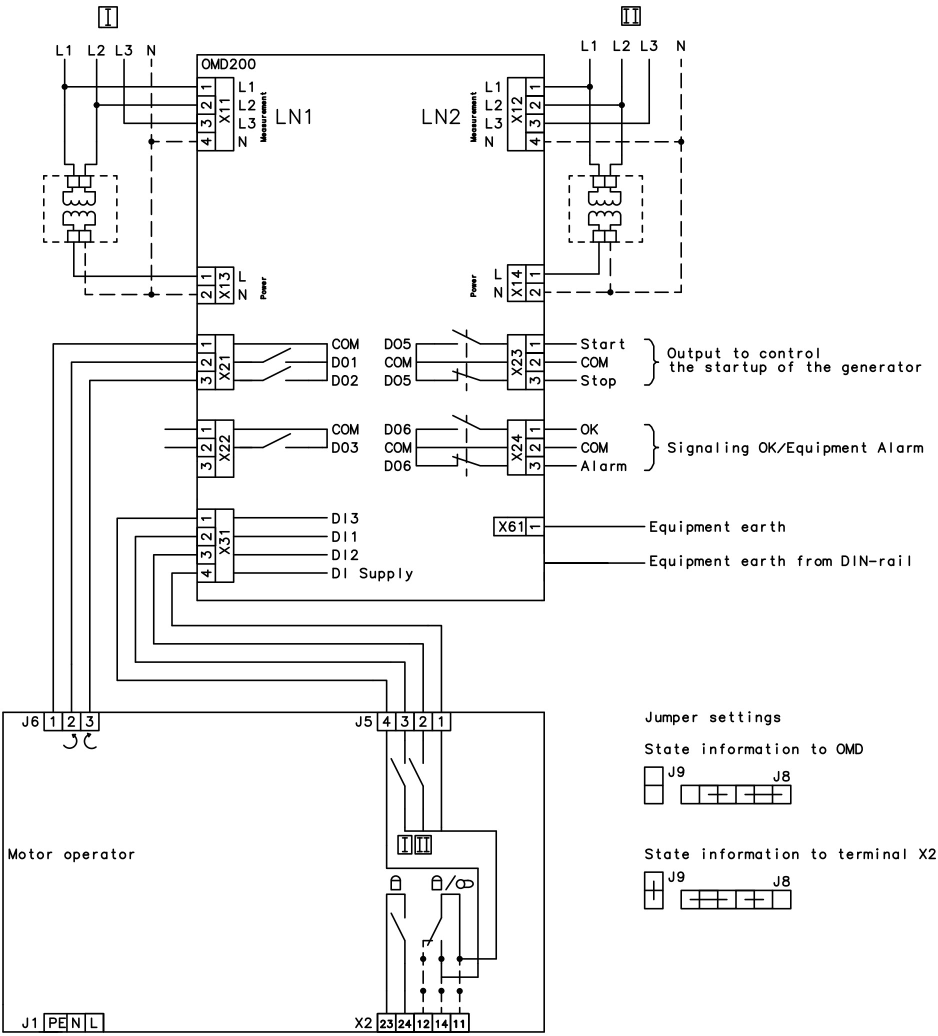


Figure 6.9 Control circuit diagram OMD200

Equipment earth must always be connected.

Connectors, OMD200

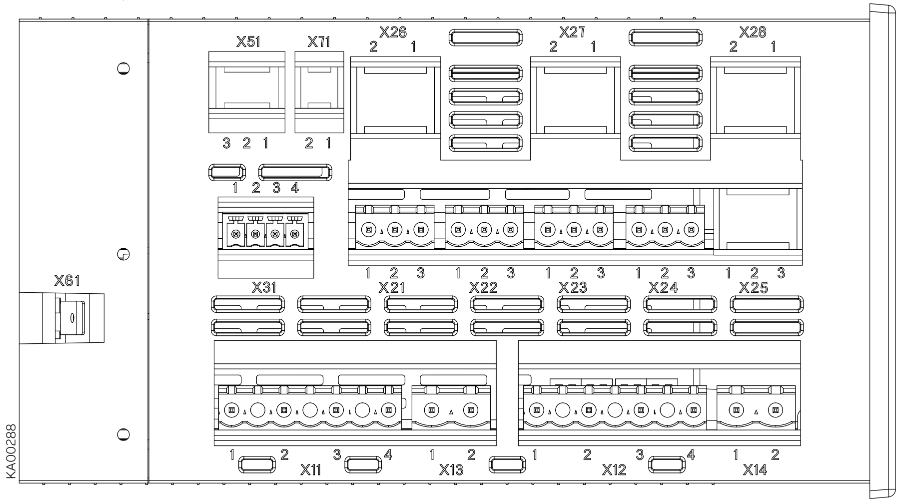


Figure 6.10 Connectors OMD200

	Description
X11:1 X11:2 X11:3 X11:4	Supply I: L1 Supply I: L2 Supply I: L3 Supply I: N
X13:1 X13:2	Supply I (power supply): L1 (default) Supply I (power supply): N
X12:1 X12:2 X12:3 X12:4	Supply II: L1 Supply II: L2 Supply II: L3 Supply II: N
X14:1 X14:2	Supply II (power supply): L1 (default) Supply II (power supply): N
X21:1 X21:2 X21:3 X21:4	Voltage supply from motor operator OME_ Common Output to close switch I or open switch II NO Output to close switch II or open switch I NO Voltage supply motor operator OME_ Common
X22:1 X22:2 X22:3	Voltage supply from motor operator OME_ Common Output for O command with switch type OTM160...2500_CM_, NO Reserved
X23:1 X23:2 X23:3	Output to control the start of the generator, NO Common Output to control the stop of the generator, NC
X24:1 X24:2 X24:3	Output to signal OK (no alarm) Common Output to signal Alarm
X31:1 X31:2 X31:3 X31:4	Manual / Alarm input from handle Status of switch I auxiliary contact Status of switch II auxiliary contact Voltage supply from the automatic control unit OMD_
X61	Equipment earth

Table 6.2 Connectors OMD200

6.2.3 Control circuit of the automatic control unit OMD300

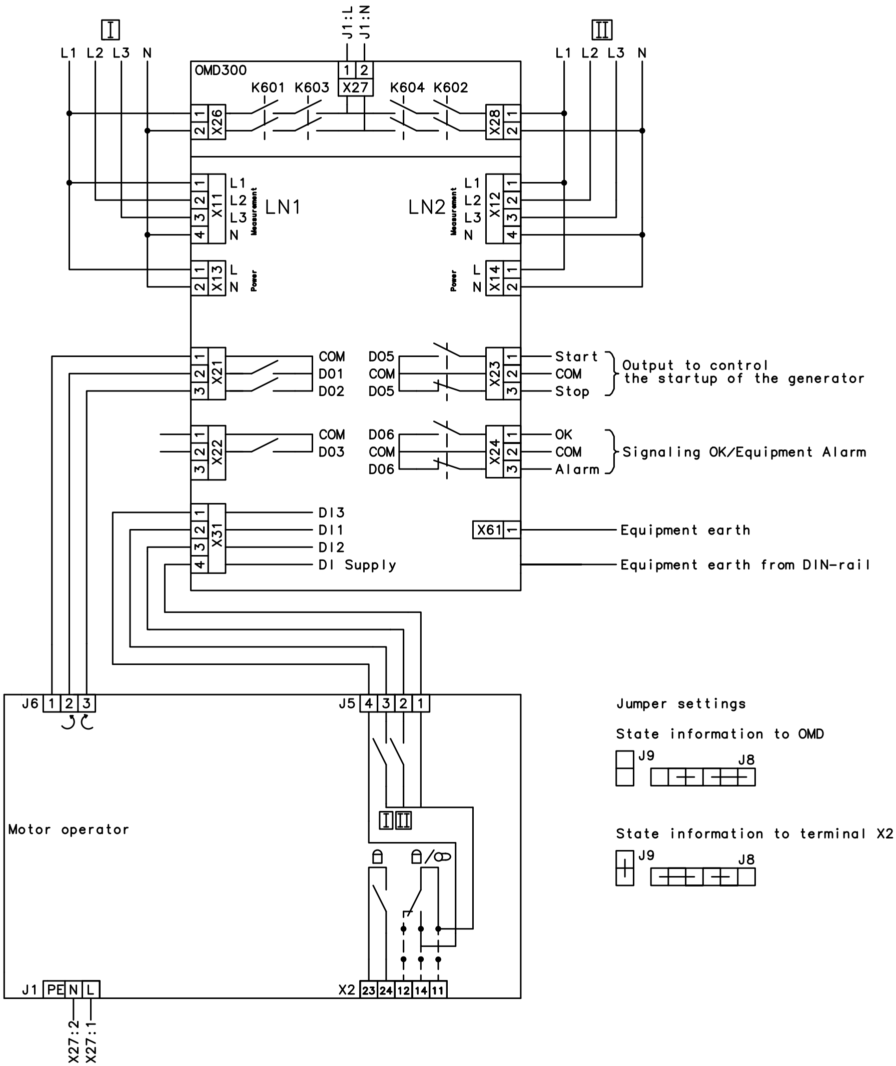


Figure 6.11 **Control circuit diagram OMD300**

Equipment earth must always be connected.

Connectors, OMD300

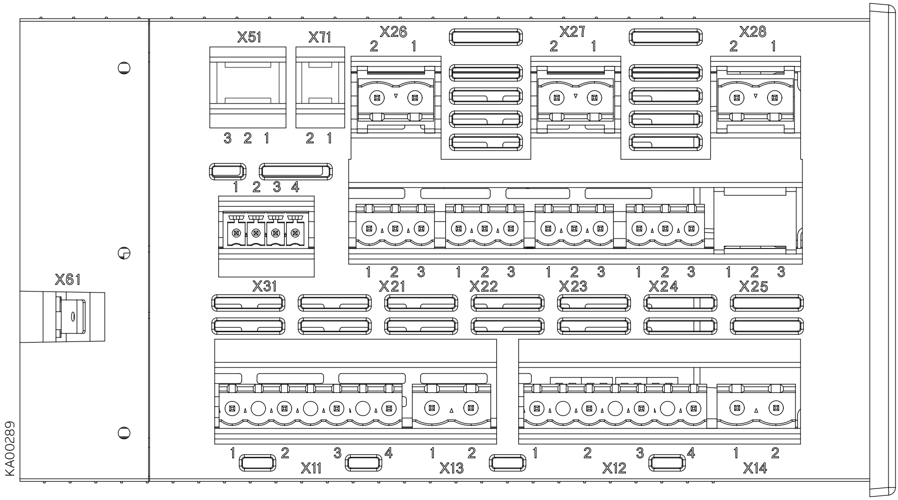


Figure 6.12 Connectors OMD300

Connector	Description
X11:1 X11:2 X11:3 X11:4	Supply I: L1 Supply I: L2 Supply I: L3 Supply I: N
X13:1 13:2	Supply I (power supply): L1 (default) Supply I (power supply): N
X12:1 X12:2 X12:3 X12:4	Supply II: L1 Supply II: L2 Supply II: L3 Supply II: N
X14:1 X14:2	Supply II (power supply): L1 (default) Supply II (power supply): N
X21:1 X21:2 X21:3	Voltage supply from motor operator OME_ Common Output to close switch I or open switch II NO Output to close switch II or open switch I NO
X22:1 X22:2 X22:3	Voltage supply from motor operator OME_, Common Output for O command with switch type OTM160...2500_CM_, NO Reserved
X23:1 X23:2 X23:3	Output to control the start of the generator, NO Common Output to control the stop of the generator, NC

Connector	Description
X24:1 X24:2 X24:3	Output to signal OK (no alarm) Common Output to signal Alarm
X31:1 X31:2 X31:3 X31:4	Manual / Alarm input from handle Status of switch I auxiliary contact Status of switch II auxiliary contact Voltage supply from automatic control unit
X26:1 X26:2	Supply I: L1 Supply I: N
X27:1 X27:2	Motor: L Motor: N
X28:1 X28:2	Supply II: L1 Supply II: N
X61	Equipment earth

Table 6.3 Connectors OMD300

6.2.4 Control circuit of the automatic control unit OMD800

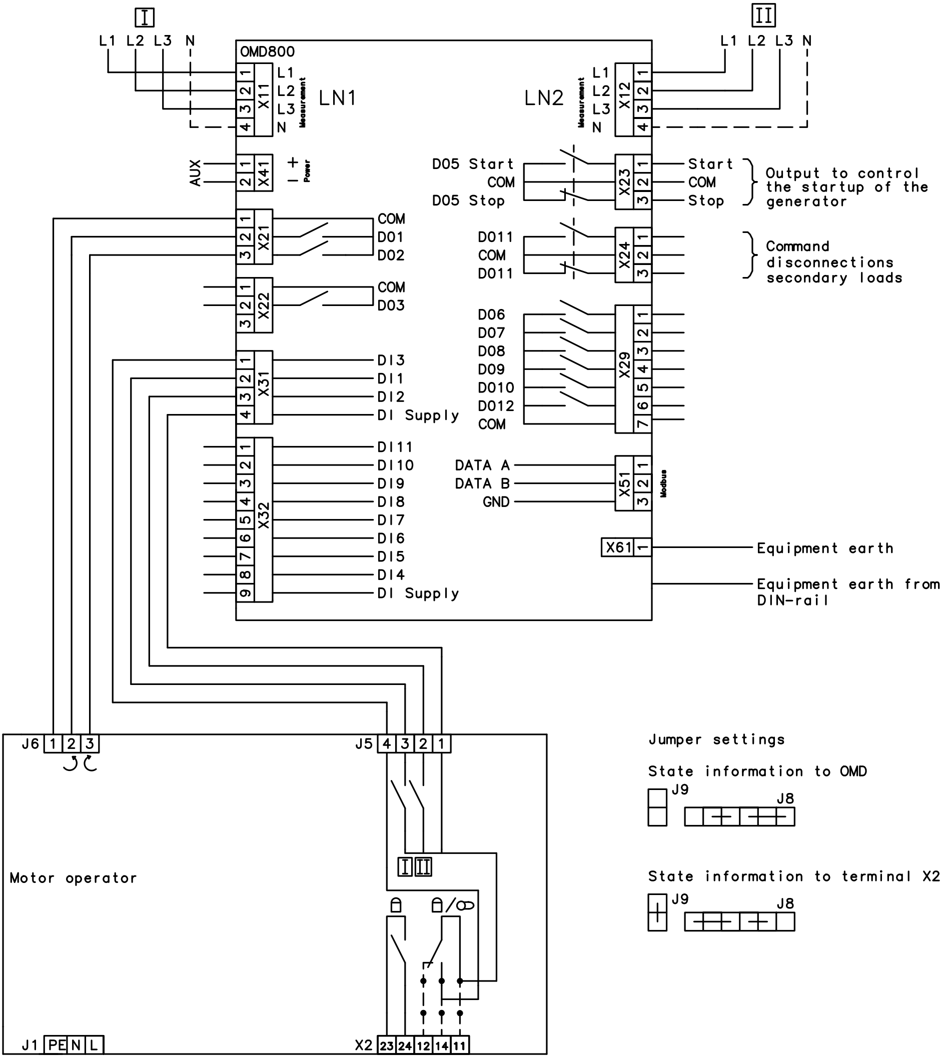


Figure 6.13 Control circuit diagram OMD800

Connectors, OMD800

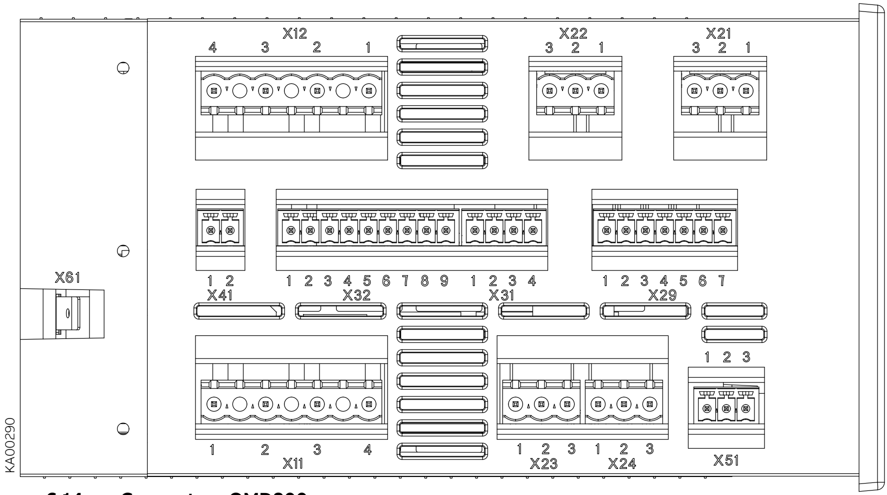


Figure 6.14 Connectors OMD800

Connector	Description
X11:1	Supply I: L1
X11:2	Supply I: L2
X11:3	Supply I: L3
X11:4	Supply I: N
X12:1	Supply II: L1
X12:2	Supply II: L2
X12:3	Supply II: L3
X12:4	Supply II: N
X41:1	AUX +
X41:2	AUX -
X21:1	Voltage supply from motor operator OME_ Common
X21:2	Output to close switch I or open switch II NO
X21:3	Output to close switch II or open switch I NO
X22:1	Voltage supply from motor operator OME_, Common
X22:2	Output for O command with switch type OTM160...2500_ CM_, NO
X22:3	Reserved
X23:1	Output to control the start of the generator, NO
X23:2	Common
X23:3	Output to control the stop of the generator, NC
X24:1	Command disconnection secondary loads, NO
X24:2	Common
X24:3	Command disconnection secondary loads, NC

Connector	Description
X29:1	Emergency/Alarm, NO (Programmable)
X29.2	Line I Status, NO (Programmable)
X29:3	Line II Status, NO (Programmable)
X29:4	Change-over Switch Alarm, NO
X29.5	(Programmable)
X29:6	Manual Mode, NO (Programmable)
X29:7	Disconnect Secondary Loads, NO (Programmable) Common
X31:1	Manual / Alarm input from handle
X31:2	Status of switch I auxiliary contact
X31:3	Status of switch II auxiliary contact
X31:4	Voltage supply from the automatic control unit
X32:1	Status of Secondary Loads, NO (Programmable)
X32.2	External Generator Start, NO (Programmable)
X32:3	Force Commutation, NO (Programmable)
X32:4	Generator Alarm, NO (Programmable)
X32.5	Remote Control to O, NO (Programmable)
X32:6	Inhibit Switching I to II, NO (Programmable)
X32:7	Remote Control to II, NO (Programmable)
X32:8	Remote Control to I, NO (Programmable)
X32.9	Voltage supply from the automatic control unit
X51:1	Modbus DATA B
X51:2	Modbus DATA A
X51:3	Modbus GND
X61	Equipment earth

Table 6.4 Connectors OMD800

6.2.5 OMD100, OMD200 and OMD300 outputs

Opening/closing command to change-over switches, X21 (DO1-DO2) and X22 (DO3)

These outputs command the change-over switch to open and close Switch I or Switch II.
To guarantee the highest-level safety OMD_ monitors the correct operation of the change-over switch after a command has been sent. If the feedback of the switch status is not received within 3 seconds of the sending of the command, the device considers it as a failed command and operates as follows:

- An alarm is generated: DO6 activate.
- Alarm LED is blinking.
- Alarm is set off by pushing the AUTO key. After that the device is always in the Manual Mode to prevent unwanted operation of the change-over switch.

Exactly the same operations are performed on the secondary line (LN2-Switch II) during the back switching sequence.

Gen-Set start/stop, X23 (DO5)

Gen-Set start and stop is handled by a bistable relay. When the relay contact Start (X23:1) is closed, the generator is started. When the relay contact Stop (X23:3) is closed, the generator is stopped.

Alarm signaling, X24 (DO6)

When the relay contact Alarm (X24:3) is open and contact OK (X24:1) is closed, the automatic transfer logic is enabled. If the relay contact Alarm (X24:3) is closed and the contact OK (X24:1) is open the automatic transfer logic is disabled and an alarm is active.

6.2.6 OMD100, OMD200 and OMD300 inputs

Switch status input, X31:2 (DI1), X31:3 (DI2)

These two inputs are connected to change-over switch auxiliary contacts. Input X31:2 (DI1) is connected to LN1-Switch I and input X31:3 (DI2) is connected to LN2-Switch II (Switch I / II open = input inactive, Switch I / II closed = input active).

Force manual, X31:1 (DI3)

When the handle is attached this input is closed and OMD_ is forced to Manual Mode. To set the OMD_ back to the Automatic Mode the handle must be removed and the AUTO key pushed (Auto LED is ON).

6.2.7 OMD800 outputs

Opening/closing command to change-over switches, X21 (DO1-DO2) and X22 (DO3)

These outputs command the change-over switch to open and close Switch I or Switch II.

To guarantee the highest-level safety OMD800 monitors the correct operation of the change-over switch after a command has been sent. If the feedback of the switch status is not received within 3 s econds of the sending of the command, the device considers it as a failed command and operates as follows:

- An alarm is generated: DO6 and DO9 activate.
- Alarm LED is blinking and the alarm is written to Alarm/Event Log
- Alarm is set off by pushing the AUTO key. After that the device is always in the Manual Mode to prevent unwanted operation of the change-over switch.

Exactly the same operations are performed on the secondary line (LN2-Switch II) during the back switching sequence.

Gen-Set start/stop, X23 (DO5)

Gen-Set start and stop is handled by a bistable relay. When the relay contact Start (X23:1) is closed, the generator is started. When the relay contact Stop (X23:3) is closed, the generator is stopped.

Connect/disconnect command to secondary loads, X24 (DO11)

See Secondary Load parameter, Section 11.2.2.

Programmable digital outputs, X29 (DO6-DO10 and DO12)

These outputs can be configured by the user. User can choose the function and the contact type for each of these outputs. For configuration see Section 11.2.2. Default configuration is shown in Section 6.2.4, Table 6.4.

6.2.8 OMD800 inputs

Switch status input, X31:2 (DI1), X31:3 (DI2)

These two inputs are connected to change-over switch auxiliary contacts. Input X31:2 (DI1) is connected to LN1-Switch I and input X31:3 (DI2) is connected to LN2-Switch II (Switch I / II open = input inactive, Switch I / II closed = input active).

Force manual, X31:1 (DI3)

When the handle is attached this input is closed and OMD_ is forced to Manual Mode. To set the OMD800 back to the Automatic Mode the handle must be removed and the AUTO key pushed (Auto LED is ON).

Programmable digital inputs, X32 (DI4...DI11)

These inputs can be configured by the user. User can choose function and contact type for each of these inputs. For configuration, see Section 11.2.2. Default configuration is shown in Section 6.2.4, Table 6.4.

7 Operating

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.

Exercise sufficient caution when handling the unit.

7.1 Electrical operation

You can operate the OTM_ automatic transfer switch electrically by using the keypad of the automatic control unit OMD_ in Manual Mode or automatically in Auto 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 7.1.

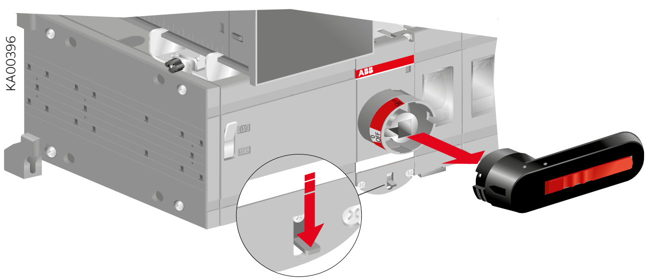


Figure 7.1 Releasing the handle

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 7.2.

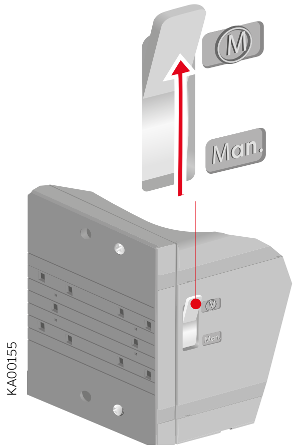


Figure 7.2 Motor/Manual selection switch in the Motor (M) position

3. Operate the OTM_ automatic transfer switch with the keypad of the automatic control unit OMD_ in Manual Mode or automatically in Auto Mode.

In automatic mode OMD200 and OMD300 are always operated from position I to position II (or from II to I) without stopping it in position O. OMD800 can be stopped in position O by setting Dead Band I to II and/or Dead Band II to I delay time on. For details, see Section 11.2.2.

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.

7.1.1 Operating the switch electrically / Manual Mode

Selecting the automatic control unit OMD_ to the Manual Mode:

a. Make sure that the power LED is ON, see the Figure 7.3/①.

b. If the Auto LED is OFF /②, the automatic control unit is in Manual Mode.

c. If the Auto LED is ON, push the Auto key once /③. The Auto LED switches to OFF and the automatic control unit OMD_ is in Manual Mode /④.

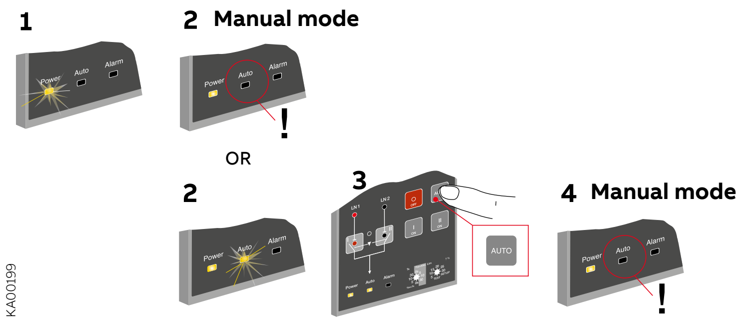


Figure 7.3 Selecting the automatic control unit OMD_ to Manual Mode

To select the switch to operate by the automatic control unit OMD_ in Manual Mode:

a. Push the appropriate I, O or II key.

b. When pushing the I-key (see the Figure 7.4/① or Figure 7.5/②), the I-switch (lower) will be in the ON position (the status and the line indication, see the Figure 7.4/② or the Figure 7.5/③) and the II-switch (upper) will be in the OFF position. If the I-switch is already in the ON position, pushing the I-key does not have any influence.

c. When pushing the O-key, the I-switch will be in the OFF position. The II-switch remains in the OFF position.

d. When pushing the II-key, the II-switch will be in the ON position and the I-switch will be in the OFF position.

e. If you push the I-key while the II-switch is in the ON position, first the II-switch opens (OFF position) and then the I-switch closes its contacts (ON position).

When the automatic control unit OMD200 or OMD300 is in Manual Mode, the generator can't be operated. Manual operation of the generator is possible with automatic control unit OMD800.

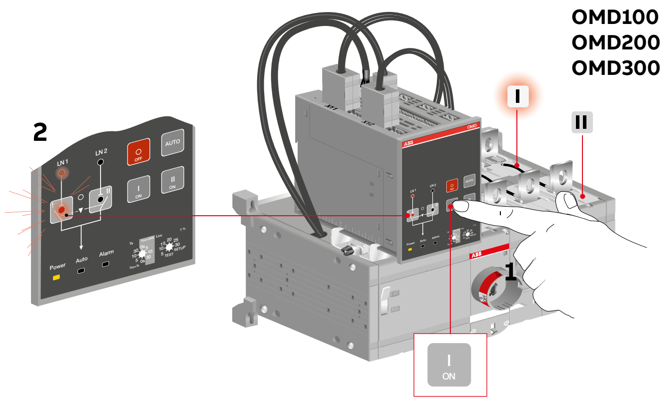


Figure 7.4 Selecting the switch to operate, the switch status and the chosen line indication with LEDs in OMD100, OMD200 or OMD300

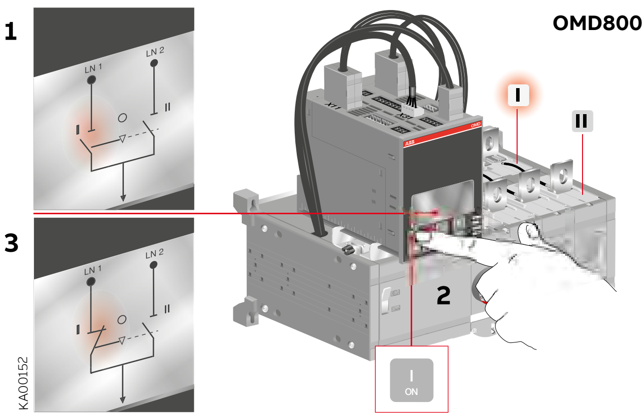


Figure 7.5 Selecting the switch to operate, the switch status and the chosen line indication in display terminal in OMD800

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

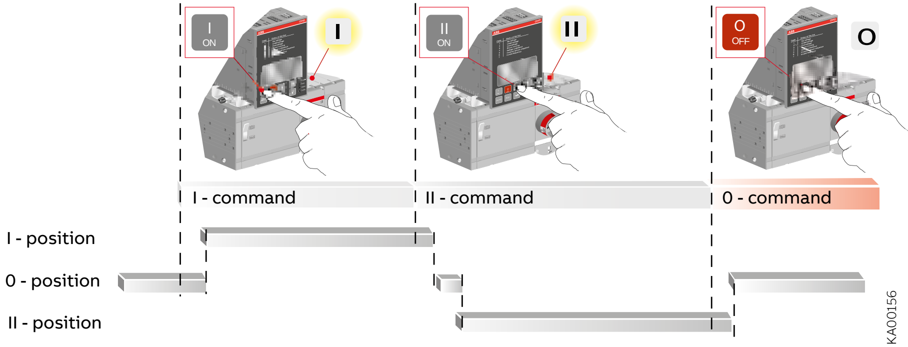


Figure 7.6 Manual Mode control

Pushing of the O-key (= O-command) will override the commands of the other keys. For example, if you simultaneously give an O-command and another command (I or II), the automatic transfer switch OTM_ is driven to the OFF position.

7.1.2 Operating the switch electrically / Automatic Mode

Selecting the automatic control unit OMD_ to the Automatic Mode:

a. Make sure that power LED is ON. If Auto LED is ON/①, the automatic control unit is in Automatic Mode.

b. If Auto LED is OFF/①, check that the Lim rotary switch is not in the TEST or SETUP position/②.

c. Push the Auto key once/③. The Auto LED switches ON and the automatic control unit OMD_ is in Automatic Mode/④

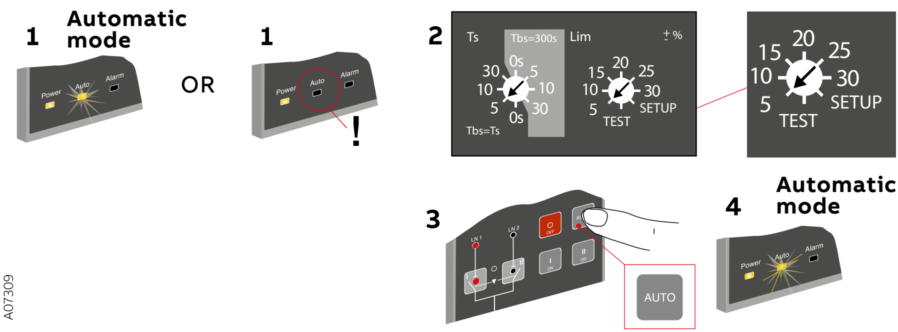


Figure 7.7 Selecting the automatic control unit OMD_ to Automatic Mode

See the OMD_ Automatic Mode operation in Sections 9-13

7.1.3 Selection of delay time, voltage threshold and TEST function

The delay time and the voltage threshold are set by the rotary switches in automatic control units OMD100, OMD200 and OMD300. The settings in OMD800, see the Section 11.

Ts / Tbs = Delay times for automatic switching

The delay time is the time before activating the switching sequence and the back switching sequence. User can choose two types of settings for delay times:

Choice 1: Darker side of the rotary switch

Available selections for the delay times are: 0, 5, 10 and 30 s. When this side is used the back switching delay Tbs is always same as switching delay Ts.

Choice 2: Lighter side of the rotary switch

Available selections for the delay times are: 0, 5, 10 and 30 s. When this side is used the back switching delay Tbs is always set to 300 s.

Lim = Voltage threshold with SETUP and TEST function

The available selections for voltage threshold in OMD100 are: ±5, ±10, ±15, ±20 %. In OMD200 and OMD300 the available selections for voltage threshold are: ±5, ±10, ±15, ±20, ±25, ±30 %, see the available settings / voltage in Figure 7.9. By setting the voltage threshold, the unbalance is also set to the same level.

When the user wants to enter to the SETUP mode, the automatic control unit has to be set to manual mode and Lim rotary switch has to be set to SETUP position. In SETUP mode it is possible to choose between three operating modes: standard switching mode, no priority mode or manual back switching mode. In the SETUP –mode user must also choose between automatic OTM_C_D, motorized OTM40…125_CMA_ or motorized OTM_160…2500_CM_ change-over switch.
See Section 7.1.5 Choice of Operating mode.

When the Lim rotary switch is set to the TEST position, the automatic control unit (OMD100, OMD200 or OMD300) enters the test sequence. In test sequence it is possible to simulate switching and back switching sequences step by step by pushing the AUTO key.

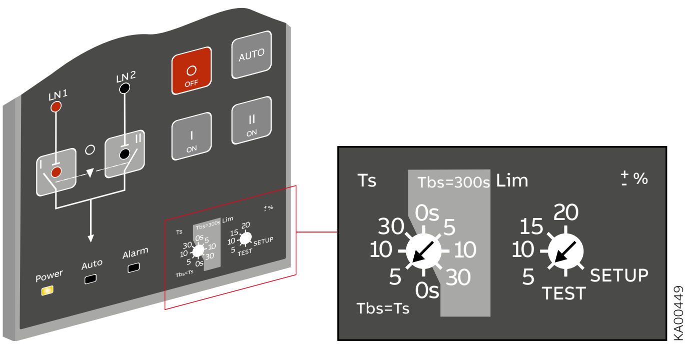
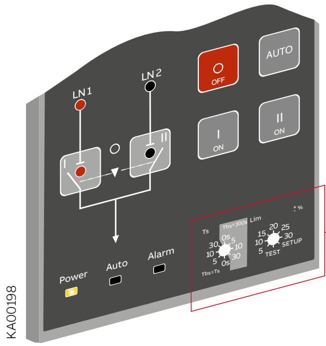


Figure 7.8 **Selection of delay time and voltage threshold in OMD100**



Main Voltage / V	Voltage threshold
208, 220	+-20%
230	+-25%
380, 400, 415, 440	+-30%
480	+-20%

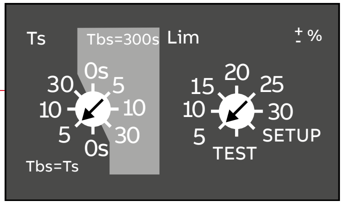


Figure 7.9 **Selection of delay time and voltage threshold in OMD200 and OMD300**

Steps in the TEST sequence are:

1. Push AUTO; generator start (skipped if the generator is not in use)
2. Push AUTO; change-over switch to position II
3. Push AUTO; change-over switch to position I
4. Push AUTO; generator stop (skipped if the generator is not in use)

After final step, the TEST sequence restarts. The user can stop the TEST sequence by turning the Lim rotary switch back to the voltage threshold wanted. After stopping the TEST sequence the device returns to the MANUAL mode. By pushing AUTO key once after stopping test sequence the device is set to the AUTO mode.

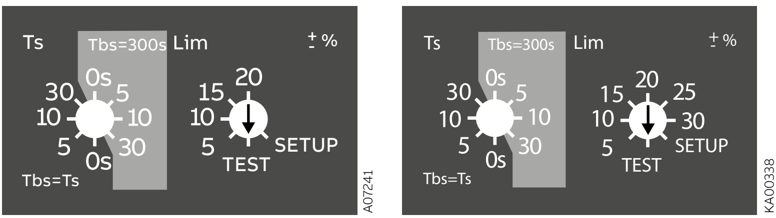


Figure 7.10 **Lim rotary switch is set to the TEST function in OMD100 (left) and in OMD200 and OMD300 (right)**

7.1.4 Operating modes in OMD100, OMD200 and OMD300

Line 1 priority + automatic OTM_C_D or motorized OTM40…125_CMA_

This operating mode is used when user has automatic OTM_C_D change-over switch or motorized OTM40…125_CMA_ and line priority is Line 1 – Switch I.

No priority mode + automatic OTM_C_D or motorized OTM40…125_CMA_

This operating mode is used when user has automatic OTM_C_D change-over switch or motorized OTM40…125_CMA_ and neither of the lines has priority. No line priority means that after switching sequence the device remains on the Line 2 although the Line 1 starts to work properly. The back switching is performed only if the Line 2 fails.

Manual back switching mode + automatic OTM_C_D or motorized OTM40…125_CMA_

This operating mode is used when user has automatic OTM_C_D change-over switch or motorized OTM40…125_CMA_ and the automatic back switching sequence has to be inhibited for example while performing maintenance on the Line 1. If the Line 2 fails the switch is changed to the position O.

Line 1 priority + motorized OTM160…2500_CM_

This operating mode is used when user has motorized OTM160…2500_CM_ change-over switch and line priority is Line 1 – Switch I.

No priority mode + motorized OTM160…2500_CM_

This operating mode is used when user has motorized OTM160…2500_CM_ change-over switch and neither of the lines has priority. No line priority means that after switching sequence the device remains on the Line 2 although the Line 1 starts to work properly. The back switching is performed only if the Line 2 fails.

Manual back switching mode + motorized OTM160…2500_CM_

This operating mode is used when user has motorized OTM160…2500_CM_ change-over switch and the automatic back switching sequence has to be inhibited for example while performing maintenance on the Line 1. If the Line 2 fails the switch is changed to the position O.

7.1.5 Choice of Operating mode in OMD100, OMD200 and OMD300

1. Set device to MANUAL mode according the Figure 7.11

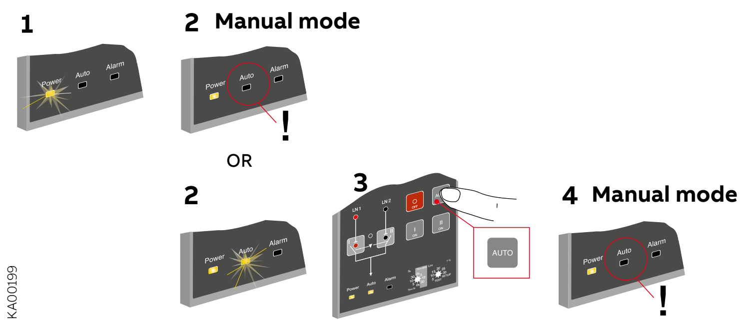


Figure 7.11 Selecting the automatic control units OMD100, OMD200 and OMD300 to Manual Mode

2. Choose SETUP mode with Lim rotary switch according to the Figure 7.12

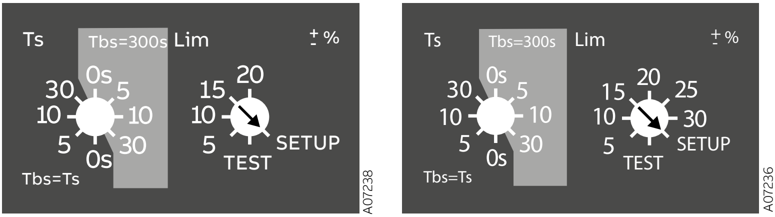


Figure 7.12 Setting of SETUP mode with Lim rotary switch in automatic control units OMD100 (left), OMD200 and OMD300 (right)

3. Press AUTO button to choose the mode. The Operation modes are indicated by LEDs according the Table 7.1

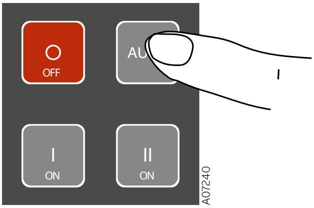


Figure 7.13 Choosing the Operation mode by pressing the AUTO button. See the Table 7.1 of LED indications for wanted Operation mode

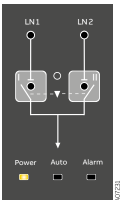
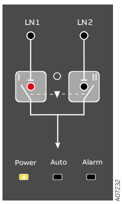
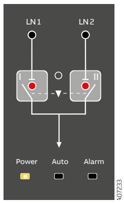
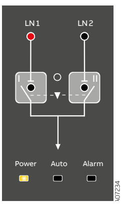
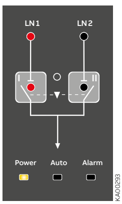
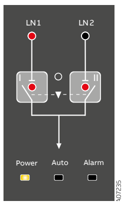
LED indication			
Mode	Line 1 priority + automatic OTM_C_D or motorized OTM40...125_CMA_	No priority mode + automatic OTM_C_D or motorized OTM40...125_CMA_	Manual back switching mode + automatic OTM_C_D or motorized OTM40...125_CMA_
LED indication			
Mode	Line 1 priority + motorized OTM160...2500_CM_	No priority mode + motorized OTM160...2500_CM_	Manual back switching mode + motorized OTM160...2500_CM_

Table 7.1 Indications of the Operating modes in automatic control units OMD100, OMD200 and OMD300

4. Set Lim rotary switch back to original position

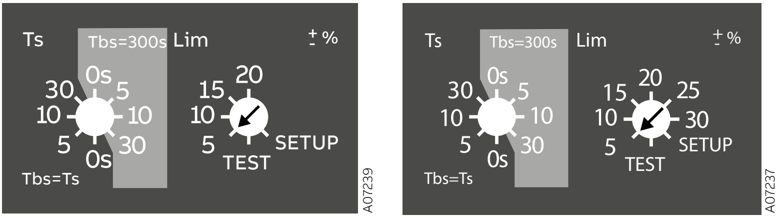


Figure 7.14 **Setting of SETUP mode with Lim rotary switch in automatic control units OMD 100 (left), OMD200 and OMD300 (right)**

5. Set device to AUTO mode according to the Figure 7.15

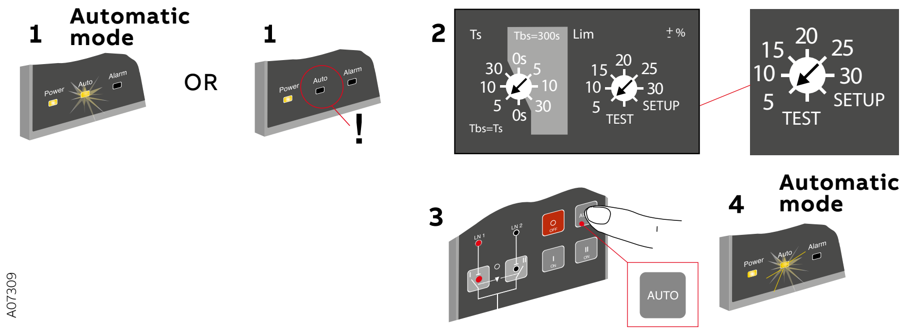


Figure 7.15 Selecting the automatic control units OMD100, OMD200 and OMD300 to Automatic Mode

7.1.6 Operating modes in OMD800

For detailed information see Section 11.2.

7.1.7 Choice of Operating mode in OMD800

Different working modes are set by the display:

System Configuration

- Line priority
  - Line 1–Switch I
  - Line 2-Switch II
  - No line priority

- Change-over Switch Type
  - Automatic OTM_C_D
  - Motorized OTM_C
- Manual Back Switching
  - Off
  - On

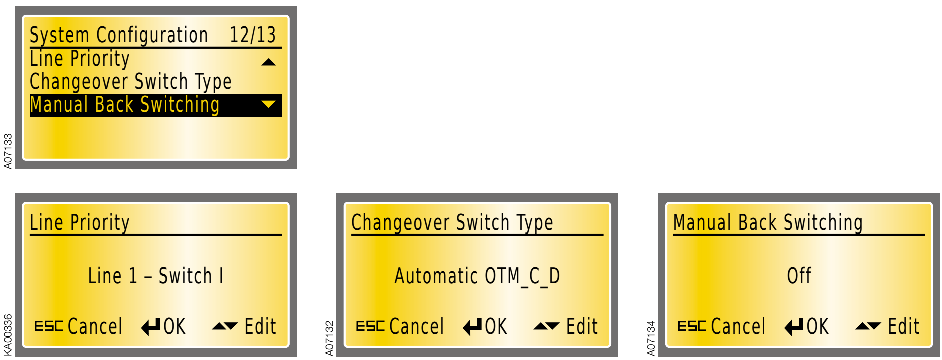


Figure 7.16 **Choosing the Operating mode in the automatic control unit OMD800**

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7.2 Manual operation using the handle

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

To control the switch manually:

1. Turn the Motor/Manual selector to the Manual (Man) position, see Figure 7.17. The motor operator is switched off and electrical control is prevented.

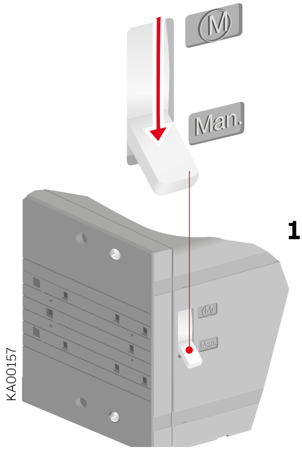

Figure 7.17 Motor/Manual selection in the Man position

2. Attach the handle by pressing it to the switch panel until it clicks into place. You can attach the handle in all positions; see Figure 7.18.

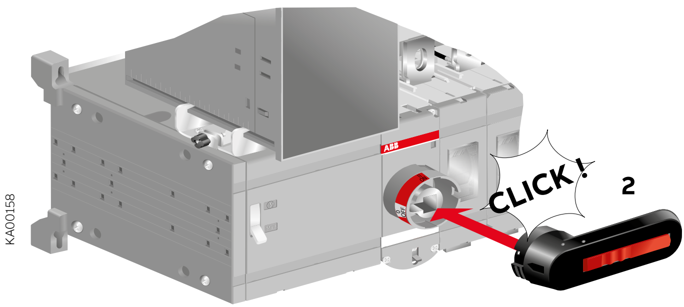

Figure 7.18 Attaching the handle

ⓘ Electrical control is prevented when the handle is attached to the switch panel.

3. Operate the OTM_ automatic transfer switch by turning the handle to the required position (I, O, II).

When the handle is attached, the automatic control unit OMD_ will automatically be in Manual Mode. The Alarm LED on the automatic control unit will light with the Power LED. The Auto LED will be OFF, see Figure 7.19. When the handle is removed, the automatic control unit will stay in Manual Mode and the Alarm LED will be OFF.

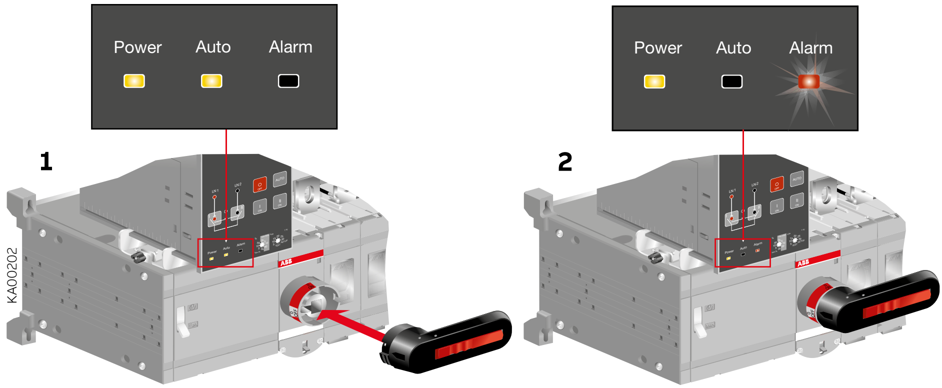

Figure 7.19 **Alarm LED is ON while the handle is attached and the automatic control unit will automatically be in Manual Mode**

When the automatic control unit OMD200 or OMD300 is in Manual Mode, the generator can't be operated. Manual operation of the generator is possible with automatic control unit OMD800.

—

7.3 Locking

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

7.3.1 Locking the electrical operation

To disable electrical operation, lock the locking latch with a padlock. After the locking latch has been locked, the switch cannot be operated electrically. You can lock the electrical operation to any position (I, O, II).

To lock electrical operation:

1. Pull up the locking latch under the switch panel.
2. Place the padlock under the latch, see Figure 7.20.

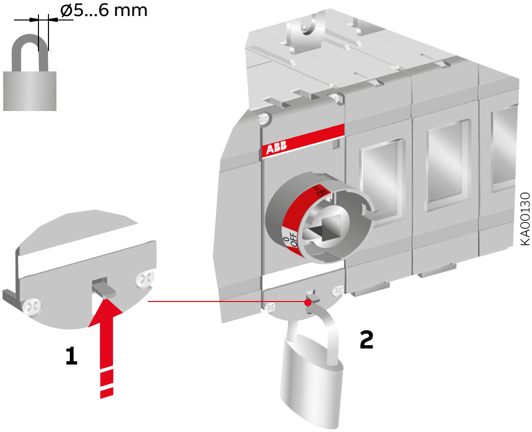

Figure 7.20 Locking the electrical operation

You cannot attach the handle when electrical control is locked.

The following chart shows the locking state information (the voltage on motor operator supply needed). Optional; see X2 in the control circuit diagrams, Section 6.2.

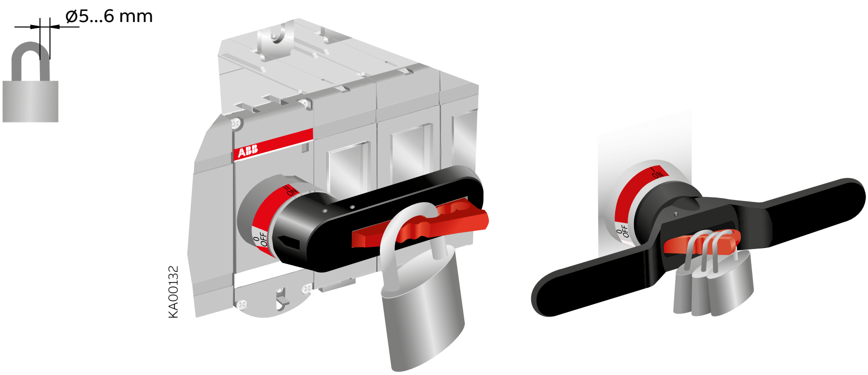

Figure 7.21 Locking the manual operation

7.3.2 Locking the manual operation

By default, manual operation can only be locked to position O. Locking to positions 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 7.21.

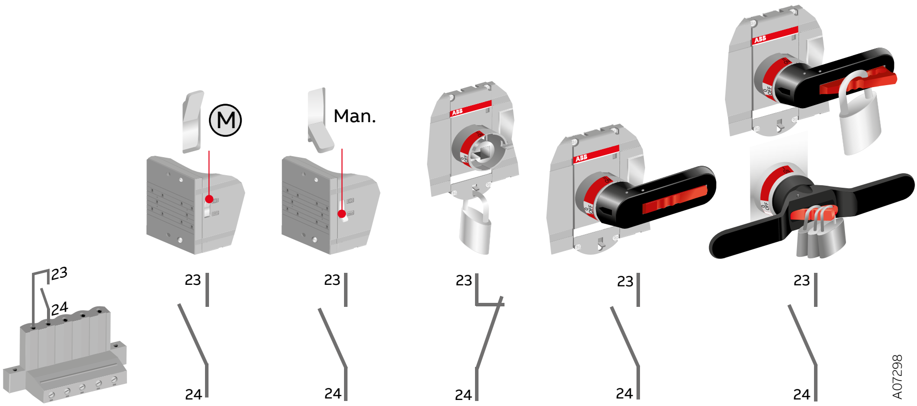

Figure 7.22 Locking state information

The handle cannot be removed when padlocked to position O.

8 Technical data

8.1 Automatic transfer switch OTM_C_D, power circuits

Automatic transfer switch, power circuit	Value
OTM_C1D_ (OMD 100)	
Rated operational voltage U_e	380 Vac ±20 % + N
Phase - neutral	220 Vac ±20 %
Rated frequency	50 Hz ±10 %
Rated impulse withstand voltage U_{imp}	4 kV
OTM_C2D_/OTM_C3D_ (OMD 200/300)	
Rated operational voltage U_e [a)]	208 – 415 Vac ±20 % + N
Phase – neutral[a)]	120 – 240 Vac ±20 %
Rated frequency	50 – 60 Hz ±10 %
Rated impulse withstand voltage U_{imp}	6 kV
OTM_C8D_ (OMD 800)	
Rated operational voltage U_e	100 – 415 Vac ±20 %
Phase – neutral	57,7 – 240 Vac ±20 %
Rated frequency	50 – 60 Hz ±10 %
Rated impulse withstand voltage U_{imp}	6 kV
1 phase system:	
Rated operational voltage U_e	
Phase – neutral	57,7 – 240 Vac ±20 %
AUX voltage, if voltage 57,7 – 109 Vac	24 Vdc – 110 Vdc (-10 to +15 %)
Operating temperature, without derating	-5... +40 °C
Transportation and storage temperature	-25... +70 °C
Altitude	Max. 2000 m

a) OTM_C3D (OMD300): Rated voltage should be 380…415/220…240 Vac +/-20 % in order that the motor operator could work. The voltage supply for the motor operator is taken from the power circuit and the motor operator's rated voltage is 220…240 Vac +/- 20 %. Please see section 8.2 Motor operator OME_, control circuits for more detailed info about motor operators.

Table 8.1 General technical data of automatic transfer switches

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8.2 Motor operator OME_, control circuits

Motor operator, control circuit	Value	Cabling
Rated operational voltage U [V]	220 - 240 Vac 50-60 Hz	
Operating voltage range	0.8 - 1.2 x U	
Operating angle	90° 0-I, I-0, 0-II, II-0; 180° I-0-II	
Operating time	See the Table 8.3	
Protection degree	IP 20, front panel	
Voltage supply	PE N L	1,5 -2,5 mm^2
F2	Max. MCB 16 A	
State information of locking X2 (no SELV): optional		
Locking motor operator	23-24 (NO)	1,5 -2,5 mm^2
Rated impulse withstand voltage U_{imp}	4 kV	
Operating temperature	-25... +55 °C	
Transportation and storage temperature	-40... +70 °C	
Altitude	Max. 2000 m	

Table 8.2 General technical data of motor operators

Type	Voltage U 220-240 VAC [V]	Nominal current [a] I_n [A]	Current Inrush [a] [A]	Operating transfer time [a] I-II, II-I [s]	OFF-time when operating [a] I-II or II-I [s]
OTM160-250_C_1D220C	220 Vac	0,2	1,3	2,5 – 5,0	0,4 – 1,0
OTM160-250_C_2/3D230C	230 Vac	0,2	1,3	2,0 – 4,0	0,4 – 1,0
OTM160-250_C_8D230C	230 Vac	0,2	1,3	1,5 – 3,0	0,4 – 1,0
OTM315-400_C_1D220C	220 Vac	0,5	2,1	2,0 – 5,0	0,4 – 1,0
OTM315-400_C_2/3D230C	230 Vac	0,5	2,1	2,0 – 5,0	0,4 – 1,0
OTM315-400_C_8D230C	230 Vac	0,5	2,1	1,5 – 3,0	0,4 – 1,0
OTM630-800_C_1D220C	220 Vac	0,7	2,8	2,0 – 5,0	0,4 – 1,0
OTM630-800_C_2/3D230C	230 Vac	0,7	2,8	2,0 – 5,0	0,4 – 1,0
OTM630-800_C_8D230C	230 Vac	0,7	2,8	1,5 – 3,0	0,4 – 1,0
OTM1000-1600_C_1D220C	220 Vac	1,8	7,7	3,0 – 6,0	0,6 – 1,5
OTM1000-1600_C_2/3D230C	230 Vac	1,8	7,7	3,0 – 6,0	0,6 – 1,5
OTM1000-1600_C_8D230C	230 Vac	1,8	7,7	2,5 – 4,0	0,6 – 1,5
OTM2000-2500_C_1D220C	230 Vac	1,8	7,7	3,0 – 6,0	0,6 – 1,5
OTM2000-2500_C_2/3D230C	230 Vac	1,8	7,7	3,0 – 6,0	0,6 – 1,5
OTM2000-2500_C_8D230C	230 Vac	1,8	7,7	2,5 – 4,0	0,6 – 1,5
OTM3200_C_1D220C	230 Vac	1,8	7,7	3,0 – 6,0	0,6 – 1,5
OTM3200_C_2/3D230C	230 Vac	1,8	7,7	3,0 – 6,0	0,6 – 1,5
OTM3200_C_8D230C	230 Vac	1,8	7,7	2,5 – 4,0	0,6 – 1,5

[a] Under nominal conditions

Table 8.3 Specified technical data of automatic transfer switches

Measurement	Value
Locking motor operator	23-24 (NO): 5 A AC-1 / 250 V
SCPD	Max. MCB C2A

Table 8.4 Terminals (X2) for state information of locking, optional

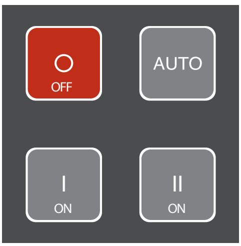
9 Using automatic control unit OMD100

9.1 Interface

KA00291

Figure 9.1 **Interface of OMD100**

9.1.1 Keypad



KA00294

Figure 9.2
Keypad on OMD100

AUTO key

Selecting the automatic control unit OMD100 to the manual or automatic mode. An active alarm can reset by the AUTO key.

O key

Setting the automatic transfer switch OTM_C_D to the OFF position in manual and auto mode; both switches (I and II) are in the OFF position. After pressing the O-key the automatic control unit OMD100 is always in manual mode.

I key

Setting in manual mode the automatic transfer switch OTM_C_D to position I, when the I-switch will be in the ON position and the II-switch will be in the OFF position.

II key

Setting in manual mode the automatic transfer switch OTM_C_D to position II, when the II-switch will be in the ON position and the I-switch will be in the OFF position.

9.1.2 Leds

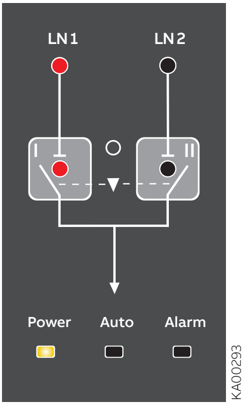


Figure 9.3 LEDs on OMD100

Line 1 status (LN1)

A red LN 1 LED signals the status of the line LN 1. Line status and indication is explained in the Table 9.1.

Line 2 status (LN2)

A red LN 2 LED signals the status of the line LN 2. Line status and indication is explained in the Table 9.1.

Line Status	LED Indication
Voltage OK	ON
No voltage	OFF
Overvoltage	Fast blinking (5 Hz, 50 % ON / 50 % OFF)
Undervoltage	Blinking (1 Hz, 50 % ON / 50 % OFF)
Invalid frequency	Blinking (1 Hz, 90 % ON / 10 % OFF)
Unbalance	Blinking (1 Hz, 10 % ON / 90 % OFF)

Table 9.1 Line status indication

Switch in position I (I)

A red I LED is ON, when the automatic transfer switch OTM_C_D is in the I position (the I-switch is ON and the II-switch is OFF), the LED is OFF otherwise. If transition from the O position to the I position fails, the I LED will blink.

Switch in position II (II)

A red II LED is ON, when the automatic transfer switch OTM_C_D is in the II position (the II-switch is ON and the I-switch is OFF), the LED is OFF otherwise. If transition from the O position to the II position fails, the II LED will blink.

Alarm

A red Alarm LED signals an external alarm. Alarm status is explained in the Table 9.2. An active alarm is set off by pushing the AUTO key.

Alarm Status	LED Indication
Handle attached	ON
Switching logic alarm	Blinking
No alarm	OFF

NOTE: When the handle is removed, the automatic control unit will stay in manual mode and the Alarm LED will be OFF.

Table 9.2 Alarm status indication

When the Alarm LED is ON or blinking, check the state of the automatic transfer switch and repair the possible fault situation. An active alarm is set off by pushing the AUTO key.

Auto

A green Auto LED signals the automatic or the manual mode. When the OMD100 is in automatic mode, the Auto LED is ON. When the device is in manual mode, the Auto LED is OFF. In test sequence the Auto LED is blinking.

Power

A green Power LED signals the power status. When power is ON, the Power LED is ON.

9.2 Configuration

9.2.1 Rotary switches

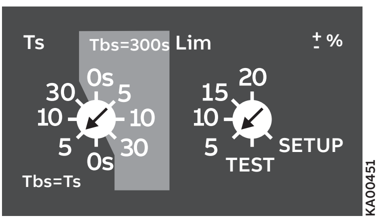


Figure 9.4 Selection of delay time and voltage threshold, the factory settings are shown in the figure

Ts / Tbs = Delay times for automatic switching

The delay time is the time before activating the switching sequence and the back switching sequence. User can choose two types of settings for delay times:

Choice 1: Darker side of the rotary switch
Available selections for the delay times are: 0, 5, 10 and 30 s. When this side is used the back switching delay Tbs is always same as switching delay Ts.
Choice 2: Lighter side of the rotary switch
Available selections for the delay times are: 0, 5, 10 and 30 s. When this side is used the back switching delay Tbs is always set to 300 s.

Lim = Voltage threshold with SETUP and TEST function

The available selections for voltage threshold in OMD100 are: ±5, ±10, ±15, ±20 %.

When the user wants to enter to the SETUP mode, the automatic control unit has to be set to manual mode and Lim rotary switch has to be set to SETUP position. In SETUP mode it is possible to choose between three operating modes: standard switching mode, no priority mode or manual back switching mode. In the SETUP –mode user must also choose between automatic OTM_C_D, motorized OTM40…125_CMA_ or motorized OTM_160…2500_CM_ change-over switch.
See Section 7.1.5 Choice of Operating mode.

When the Lim rotary switch is set to the TEST position, the automatic control unit OMD100 enters the test sequence. In test sequence it is possible to simulate switching and back switching sequences step by step by pushing the AUTO key.

9.2.2 DIP switches / parameter settings

Automatic control unit OMD100 has a total of four (4) adjustable parameters. The parameter settings are performed by the DIP switches and by the rotary switches.

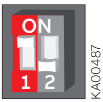
Ph	Number of phases, setting by DIP switch S23-1
Ts	Switching delay, setting by Ts / Tbs rotary switch, see Section 9.2.1
Tbs	Back switching delay, setting by Ts / Tbs rotary switch, see Section 9.2.1
THR	Voltage threshold, setting by Lim rotary switch, see Section 9.2.1

Parameter settings by DIP switches S23

S23

Figure 9.5 **DIP switches in OMD100, the positions are factory default settings**

DIP switch S23-1 to set phase system

S23-1	Position	Phase system
	**OFF**	**three-phase (default)**
	ON	single phase

DIP switch S23-2 is not in use.

—

9.3 TEST sequence

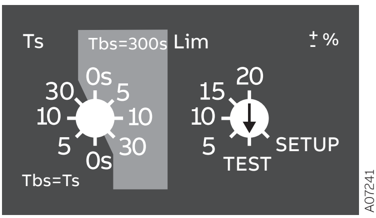


Figure 9.6 **Lim rotary switch is set to the TEST position**

When the Lim rotary switch is set to the TEST position, automatic control unit OMD100 enters the test sequence. While entering the test sequence OMD100 blinks all LEDs twice to give the information that the LEDs are functioning.

In the TEST position it is possible to simulate switching and back switching sequences step-by-step by pressing the AUTO key. The user can interrupt the simulation at any place and return to normal use of the device. More information, see Section 7.1.3.

NOTE: In the TEST sequence the power circuit is switched on!
NOTE: After testing the user must ensure that the device is not left in the TEST position by accident.
NOTE: If TEST sequence is interrupted for example because of power failure, it is continued from that same situation where it was when interrupted.

10 Using automatic control units OMD200 and OMD300

10.1 Interface

Figure 10.1 Interface of OMD200 and OMD300

10.1.1 Keypad

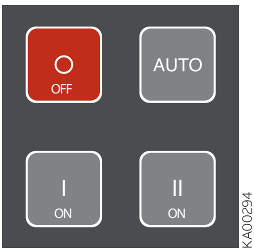


Figure 10.2
Keypad on OMD200 and OMD300

AUTO key

Selecting the automatic control unit OMD200 or OMD300 to the manual or automatic mode. An active alarm can reset by the AUTO key.

O key

Setting the automatic transfer switch OTM_C_D to the OFF position in manual and auto mode; both switches (I and II) are in the OFF position. After pressing the O-key the automatic control unit OMD_ is always in manual mode.

I key

Setting in manual mode the automatic transfer switch OTM_C_D to position I, when the I-switch will be in the ON position and the II-switch will be in the OFF position.

II key

Setting in manual mode the automatic transfer switch OTM_C_D to position II, when the II-switch will be in the ON position and the I-switch will be in the OFF position.

10.1.2 LEDs

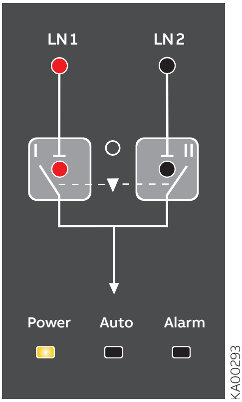


Figure 10.3 LEDs on OMD200 and OMD300

Line 1 status (LN1)

A red LN 1 LED signals the status of the line LN 1. Line status and indication is explained in the Table 9.1.

Line 2 status (LN2)

A red LN 2 LED signals the status of the line LN 2. Line status and indication is explained in the Table 9.1.

Line Status	LED Indication
Voltage OK	ON
No voltage	OFF
Overvoltage	Fast blinking (5 Hz, 50 % ON / 50 % OFF)
Undervoltage	Blinking (1 Hz, 50 % ON / 50 % OFF)
Invalid frequency	Blinking (1 Hz, 90 % ON / 10 % OFF)
Unbalance	Blinking (1Hz, 10 % ON / 90 % OFF)

Table 10.1 Line status indication

Switch in position I (I)

A red I LED is ON, when the automatic transfer switch OTM_C_D is in the I position (the I-switch is ON and the II-switch is OFF), the LED is OFF otherwise. If transition from the O position to the I position fails, the I LED will blink.

Switch in position II (II)

A red II LED is ON, when the automatic transfer switch OTM_C_D is in the II position (the II-switch is ON and the I-switch is OFF), the LED is OFF otherwise. If transition from the O position to the II position fails, the II LED will blink.

Alarm

A red Alarm LED signals an external alarm. Alarm status is explained in the Table 10.2. An active alarm is set off by pushing the AUTO key.

Alarm Status	LED Indication
Handle attached	ON
Switching logic alarm	Blinking
No alarm	OFF

NOTE: When the handle is removed, the automatic control unit will stay in Manual Mode and the Alarm LED will be OFF.

Table 10.2 Alarm status indication

When the Alarm LED is ON or blinking, check the state of the automatic transfer switch and repair the possible fault situation. An active alarm is set off by pushing the AUTO key.

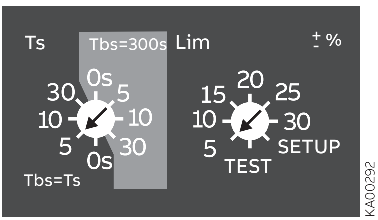
Auto

A green Auto LED signals the automatic or the manual mode. When the OMD200 or OMD300 is in automatic mode, the Auto LED is ON. When the device is in manual mode, the Auto LED is OFF. In the test sequence, the Auto LED is blinking.

Power

A green Power LED signals the power status. When power is ON, the Power LED is ON. The OMD200 or OMD300 will remain in standby state at least one minute after power failure. A blinking Power LED indicates standby mode.

10.2 Configuration



Main Voltage / V	Voltage threshold
208, 220	+-20%
230	+-25%
380, 400, 415, 440	+-30%
480	+-20%

Figure 10.4 Selection of delay time and voltage threshold, the factory settings are shown in the figure, the available voltage threshold settings / voltage in the table

10.2.1 Rotary switches

Ts / Tbs = Delay times for automatic switching

The delay time is the time before activating the switching sequence and the back switching sequence. User can choose two types of settings for delay times:

Choice 1: Darker side of the rotary switch
Available selections for the delay times are: 0, 5, 10 and 30 s. When this side is used the back switching delay Tbs is always same as switching delay Ts.
Choice 2: Lighter side of the rotary switch
Available selections for the delay times are: 0, 5, 10 and 30 s. When this side is used the back switching delay Tbs is always set to 300s.

Lim = Voltage threshold with SETUP and TEST function

The available selections for voltage threshold in OMD200 and OMD300 are: ±5, ±10, ±15, ±20, ±25, ±30 %, see the available settings / voltage in Figure 4.7. By setting the voltage threshold, the unbalance is also set to the same level.

When the user wants to enter to the SETUP mode, the automatic control unit has to be set to manual mode and Lim rotary switch has to be set to SETUP position. In SETUP mode it is possible to choose between three operating modes: standard switching mode, no priority mode or manual back switching mode. In the SETUP mode user must also choose between automatic OTM_C_D, motorized OTM40…125_CMA_ or motorized OTM_160…2500_CM_ change-over switch.
See Section 7.1.5 Choice of Operating mode.

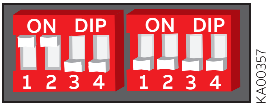
When the Lim rotary switch is set to the TEST position, the automatic control unit OMD200 or OMD300 enters the test sequence. In test sequence it is possible to simulate switching and back switching sequences step by step by pushing the AUTO key.

10.2.2 DIP switches / parameter settings

Automatic control units OMD200 and OMD300 have total of eight (8) adjustable parameters.

The parameter settings are performed by the DIP switches and by the rotary switches.

Un	Rated voltage, setting by DIP switches S23-1...3
fn	Rated frequency, setting by DIP switch S23-4
N	Neutral in use, setting by DIP switch S24-1
Ph	Number of phases, setting by DIP switch S24-2
Gen	Generator in use, setting by DIP switch S24-3
Gs	Generator stop delay, setting by DIP switch S24-4
Ts	Switching delay, setting by Ts / Tbs rotary switch, see Section 10.2.1
Tbs	Back switching delay, setting by Ts / Tbs rotary switch, see Section 10.2.1
THR	Voltage threshold, setting by Lim rotary switch, see Section 10.2.1

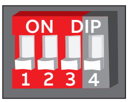
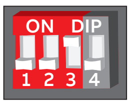
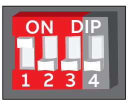
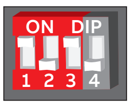
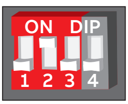
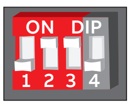
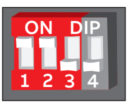
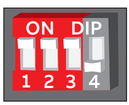


S23 **S24**

Figure 10.5 DIP switches in OMD200 and OMD300, the positions are factory default settings

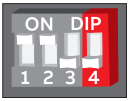
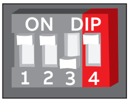
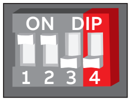
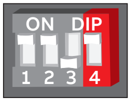
DIP switches S23

DIP switches S23-1...3 to set the rated voltage of monitored lines

S23-1...3	Positions	Main/phase voltage (Un)		Positions	Main/phase voltage (Un)
	OFF, OFF, OFF	Un = 480/277 V		OFF, OFF, ON	Un = 380/220 V
	ON, OFF, OFF	Un = 440/254 V		ON, OFF, ON	Un = 230/130 V
	OFF, ON, OFF	Un = 415/240 V		OFF, ON, ON	Un = 220/127 V
	ON, ON, OFF	Un = 400/230 V (default)		ON, ON, ON	Un = 208/120 V

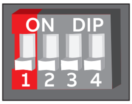
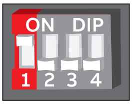
KA00488

DIP-switch S23-4 to set rated frequency of the monitored lines

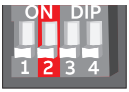
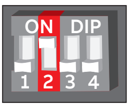
S23-4	Position	Rated frequency fn		Position	Rated frequency fn
 KA00489	**OFF**	**50Hz (default)**	 KA00489	ON	60Hz

DIP switches S24

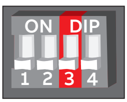
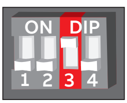
DIP-switch S24-1 to set neutral

S24-1	Position	Neutral N
	**OFF**	**N used (default)**
 KA00490	ON	N not in use

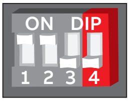
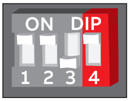
DIP- switch S24-2 to set phase system

S24-2	Position	Phase system
	**OFF**	**three-phase (default)**
 KA00491	ON	single phase

DIP-switch S24-3 to set the generator in use

S24-3	Position	Generator
	**OFF**	**not in use (default)**
 KA00492	ON	in use

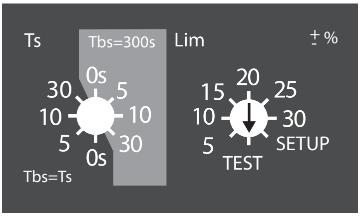
DIP-switch S24-4 to set the generator stop delay Gs

S24-4	Position	Generator stop delay Gs
	OFF	Gs = Switching delay Ts (default)
 KA00489	ON	Gs = 300 seconds

NOTE: see Section 10.2.1 Delay time (Ts)

—

10.3 TEST sequence



KA00338

Figure 10.6 Lim -rotary switch is set to the TEST position

When the Lim rotary switch is set to the TEST position, automatic control unit OMD200 or OMD300 enters the test sequence. While entering the test sequence OMD200 or OMD300 blinks all LEDs twice to give the information that the LEDs are functioning.

In the TEST position it is possible to simulate switching and back switching sequences step-by-step by pressing the AUTO key. The user can interrupt the simulation at any place and return to normal use of the device. More information, see Section 7.1.3.

NOTE: In the TEST sequence the power circuit is switched on!

NOTE: After testing the user must ensure that the device is not left in the TEST position by accident.

NOTE: If TEST sequence is interrupted for example because of power failure, it is continued from that same situation where it was when interrupted.

11 Using automatic control unit OMD800

11.1 Interface

Figure 11.1 Interface of OMD800

11.1.1 Keypad

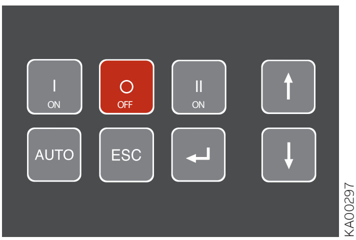


Figure 11.2 Keypad of OMD800

AUTO

Selecting the automatic control unit OMD800 to the manual or automatic mode. An active alarm is set off by pushing the AUTO key.

O key

Setting the automatic transfer switch OTM_C_D to the OFF position in manual and auto mode; both switches (I and II) are in the OFF position. After pressing the O-key the automatic control unit OMD800 is always in manual mode.

I key

Setting in manual mode the automatic transfer switch OTM_C_D to position I, when the I-switch will be in the ON position and the II-switch will be in the OFF position.

II key

Setting in manual mode the automatic transfer switch OTM_C_D to position II, when the II-switch will be in the ON position and the I-switch will be in the OFF position.

11.1.2 LEDs

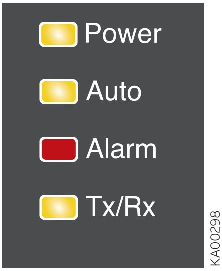


Figure 11.3 LEDs on OMD800

Alarm

A red Alarm LED signals an external alarm. Alarm status is explained in the Table 11.1. An active alarm is set off by pushing the AUTO key.

Alarm Status	LED Indication
Handle attached	ON
Switching logic alarm	Blinking
No alarm	OFF

NOTE: When the handle is removed, the automatic control unit will stay in Manual Mode and the Alarm LED will be OFF.

Table 11.1 Alarm status indication

When the Alarm LED is ON or blinking, check the state of the automatic transfer switch and repair the possible fault situation. An active alarm is set off by pushing the AUTO key.

Auto

A green Auto LED signals the automatic or the manual mode. When the automatic control unit OMD800 is in automatic mode, the Auto LED is ON. When the device is in manual mode,the Auto LED is OFF. In test sequence the Auto LED is blinking.

Power

A green Power LED signals the power status. When power is ON, the Power LED is ON. The automatic control unit OMD800 will remain in standby state at least one minute after power failure. A blinking Power LED indicates standby mode.

Tx/Rx

A green Tx/Rx LED signals the state of communication bus. When the LED is blinking, the automatic control unit OMD800 is sending data to the bus.

11.2 Configuration

11.2.1 Menu browsing keys

Enter is used to enter a new menu page and to accept function

ECS is used to exit a menu page

UP is used to move one step up on the menu

DOWN is used to move one step down on the menu

The default password is 0001.

11.2.2 Display

The display is a graphic display with following menu pages:

Default page

From default page the user can monitor following statuses:

- Status of the change-over switch
- Status of the monitored lines
- Status of the generator
- Status of the secondary load
- Status of the Modbus Local/Remote parameter
- Name and residual value of delay times

Code	Status of the line	Explanation
1	No voltage	Value of voltage on the line is under 10% of the Rated Voltage
2	Undervoltage	Value of voltage is under defined settings
3	Overvoltage	Value of voltage is over defined settings
4	Phase missing	There is one or more phases missing
5	Voltage unbalance	Difference between lowest and highest phase voltage is higher than defined setting
6	Incorrect phase sequence	Order of phases is incorrect
7	Invalid frequency	Value of frequency is out of defined settings

Table 11.2 Line status codes

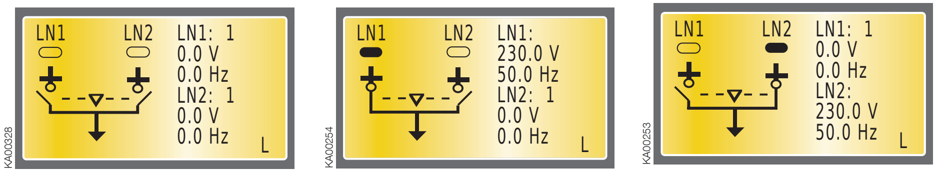


Figure 11.4 **The Default pages show the status of the change-over switch and the monitored lines**

When the generator is started, the letter G and the “arrow up” symbol are shown on the default page. When the generator is stopped, the letter G and the “arrow down” symbol are shown on the default page. If the letter G is blinking on the default page, there is an active generator alarm. When the generator is not used, there is no symbol on the default page.
Generator Usage, see Section 11.2.2 System Configuration.

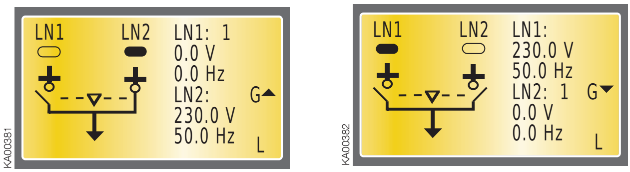


Figure 11.5 **The Default pages show the status of the generator; started or stopped**

During delay the name of the delay and residual time is shown in default page. When the device is used in Local -mode, the letter L is in the default page in right lower corner. If the device is used in Remote-mode, the letter R is shown in the default page in right lower corner.

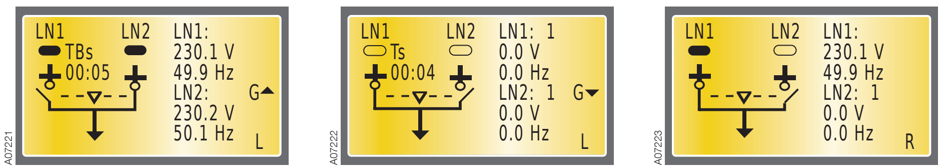


Figure 11.6 **The default pages show the name and residual value of the Delay Times and the status of the Modbus Local/Remote parameter**

When Secondary Load parameter is set to Opening Only or Opening and Closing the status of the device used for controlling the secondary load is shown on the default page. Please notice that the status (open/closed) of the secondary load controlling device on the display is related to the status of the corresponding digital input. E.g. when the corresponding digital input (DI 11 as default) is activated, the display shows that secondary loads are connected. If the corresponding digital input is de-activated, the display shows that the secondary loads are disconnected.

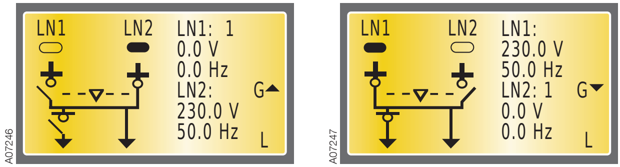


Figure 11.7 **The Default pages show the status of secondary load; open or closed**

Main Menu page

From Default page is entered to Main Menu page by pushing the ENTER key. Main Menu page is the main page that allows entering in all the configuration subpages.

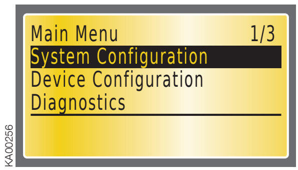


Figure 11.8 **The Main Menu page allows the entering in all the configuration subpages**

System Configuration

In the System Configuration subpage user can configure parameters of the monitored lines; see Table 11.3. The parameter selection and its value changes are made by using UP, DOWN and ENTER keys.

The System Configuration subpage requires a password. Password consists of 4 numbers, it is given by UP, DOWN and ENTER keys. The default password is 0001. Please, change the default password to your own. The password is valid one minute after leaving the password protected subpage. If the password is forgotten or lost, please, contact product support.

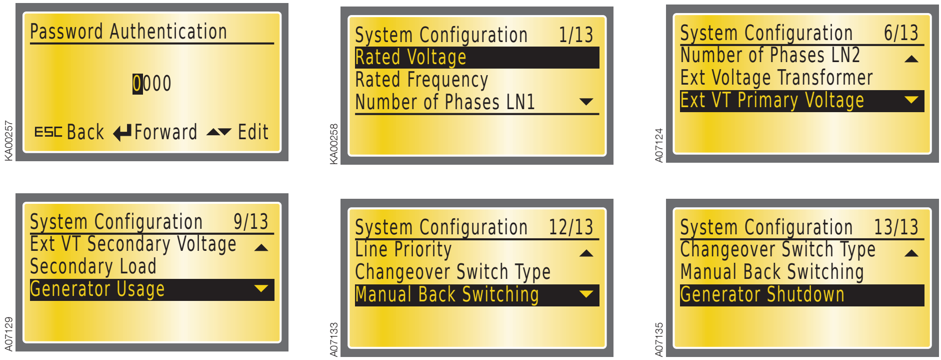


Figure 11.9 System Configuration requires a password

Parameter	Values
Rated Voltage	100/57 V - 115/66 V - 120/70 V - 208/120 V - 220/127 V - 230/132 V - 240/138 V - 277/160 V - 347/200 V - 380/220 V - 400/230 V - 415/240 V - 440/254 V - 480/277 V
Rated Frequency	50 Hz and 60 Hz
Number of Phases LN1	3 phases with N / 3 phases without N / 1 phase
Number of Phases LN2	3 phases with N / 3 phases without N / 1 phase
Ext. Voltage Transformer	Absent / Present
Ext. VT Primary Voltage	100/57 V - 115/66 V - 120/70 V - 208/120 V - 220/127 V - 230/132 V - 240/138 V - 277/160 V - 347/200 V - 380/220 V - 400/230 V - 415/240 V - 440/254 V - 480/277 V - 500/288 V - 550/317 V - 600/347 V - 660/380 V - 690/400 V - 910/525 V - 950/550 V - 1000/577 V - 1150/660 V
Ext. VT Secondary Voltage	100/57 V - 115/66 V - 120/70 V - 208/120 V - 220/127 V - 230/132 V - 240/138 V - 277/160 V - 347/200 V - 380/220 V - 400/230 V - 415/240 V - 440/254 V - 480/277 V
Secondary Load	Not Used / Opening Only / Opening And Closing / Opening Pulse / Opening/Closing Pulse
Generator Usage	No Generator / Generator In Use
Line Priority	Line 1 – Switch I / Line 2 – Switch II / No Line Priority
Changeover Switch Type	Automatic OTM_C_D / Motorized OTM_C
Manual Back Switching	Off / On
Generator Shutdown	Off / On

Table 11.3 Parameters and values of the System Configuration

Rated Voltage

Rated Voltage is the rated voltage of the system. Value is announced as main voltage/phase voltage, Volts. Factory setting is 400/230 V.

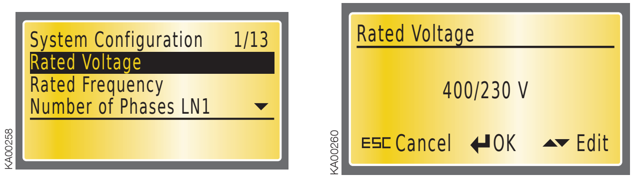


Figure 11.10 Rated Voltage, factory setting is 400/230 V

Rated Frequency

Rated Frequency means assigned frequency of the system. Value is announced as Hertz. Factory setting is 50 Hz.

Figure 11.11 Rated Frequency, factory setting is 50 Hz

Number of Phases LN1

In Line 1 user can choose between a one-phase and a three-phase system with or without N. Three-phase system with N is the default.

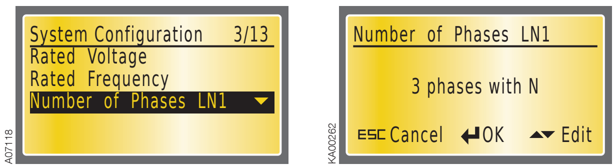


Figure 11.12 Number of phase LN1, 3 phases with N is the default

Number of Phases LN2

In Line 2 user can choose between a one-phase and a three-phase system with or without N. Three-phase system with N is the default.

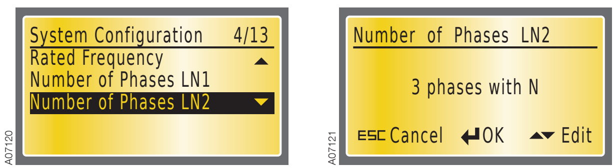


Figure 11.13 Number of phases LN2, 3 phases with N is the default

External Voltage Transformer

User can choose whether the voltage transformers are used in measured lines or not. When the external voltage transformers are present user must set also parameters Ext VT Primary Voltage and Ext VT Secondary Voltage according to transformer ratio. Absent is the default.

Figure 11.14 Ext Voltage Transformer, Absent is the default

External Voltage Transformer Primary Voltage

If external voltage transformer is present user has to set primary voltage of the external voltage transformer. Primary voltage is set according to rated operational voltage of the system. Factory setting is 690/400 V.

Figure 11.15 Ext VT Primary Voltage, factory setting is 690/400V

External Voltage Transformer Secondary Voltage

If external voltage transformer is present user has to set secondary voltage of the external voltage transformer. Secondary voltage is set according to transformer ratio. Factory setting is 400/230 V.

Figure 11.16 Ext VT Secondary Voltage, factory setting is 400/230

Secondary Load

User can choose whether secondary load is Not Used, Opening Only, Opening and Closing, Opening Pulse or Opening/Closing Pulse. Not Used is the default. Secondary load open and close commands are controlled with output relay X24. Open command is sent during switching sequence and close command is sent during back switching sequence.

Output relay X24 (see control circuit diagram, Section 6.2.4) operates in two cases:

1. Secondary Load parameter value is Opening Only or Opening Pulse and OMD800 automatic control unit performs switching sequence.
2. Secondary Load parameter value is Opening and Closing or Opening/Closing Pulse and OMD800 automatic control unit performs switching sequence or back switching sequence.

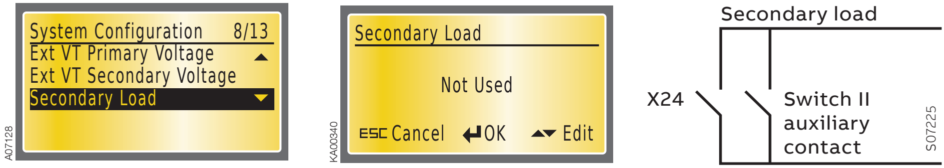


Figure 11.17 **Secondary Load, Not Used is the default**

Output relay X24 de-actives in case of loss of power. If the device controlling the secondary load is powered it may close when the output relay X24 de-activates. Use Switch II auxiliary contact type OA1G10 in parallel with output relay X24 to prevent unwanted close command, see the rightmost figure above.

Generator Usage

User can choose No Generator, when generator is not used or Generator in Use, when it is used in the Line 2 (LN 2) - Switch II. No Generator is the default.

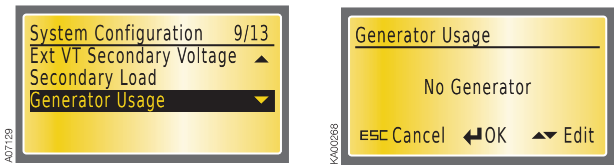


Figure 11.18 **Generator Usage, No Generator is the default**

Generator should always be connected to the Line 2 (LN 2) - Switch II. When generator is in use, line priority can't be set to value Line 2 (LN 2) - Switch II.

Line Priority

User can select the Line Priority to the Line 1 (LN 1) - Switch I, Line 2 (LN 2) - Switch II or No Line Priority. Line 1 (LN 1) - Switch I is the default.

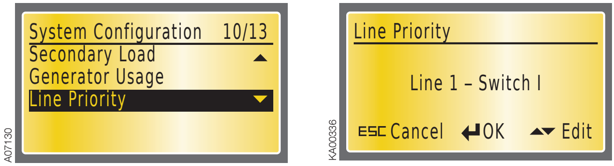


Figure 11.19 Line Priority, Line 1 - Switch I is the default

Changeover Switch Type

User can choose Changeover Switch Type between Automatic OTM_C_D and Motorized OTM_C. Always use Automatic OTM_C_D when you have automatic transfer switch OTM_C_D or motorized OTM40...125_CMA_ change-over switch in use. Choose Motorized OTM_C when you have motorized OTM160...2500_CM_ in use. Automatic OTM_C_D is the default.

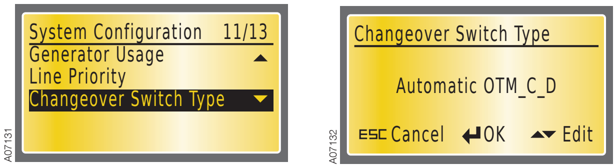


Figure 11.20 Changeover Switch Type, Automatic OTM_C_D is the default

Manual Back Switching

With this parameter user can inhibit the automatic back switching sequence for example while performing maintenance on Line 1. The switch is changed to position O, if the Line 2 fails. Off is the default.

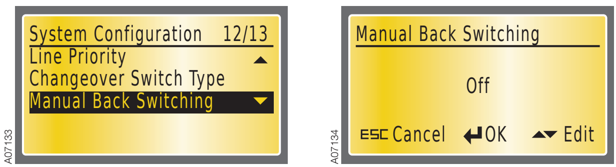


Figure 11.21 Manual Back Switching, Off is the default

Generator Shutdown

With this parameter user can choose between two strategies how OMD800 operates after receiving a generator alarm. If the Generator Shutdown is set to On, the generator stop command will be sent immediately after receiving the generator alarm. In this case also back switching delay is overridden and the back switching to Line 1 will take place immediately. If the Line 1 is not available the switch will change to position O. If the Generator Shutdown is set to Off, loads are supplied from generator line also after receiving a generator alarm. In this case user is informed about the generator alarm by blinking the letter G on the default page. Off is the default.

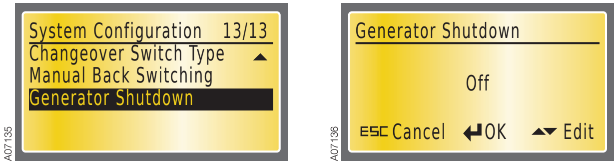


Figure 11.22 Generator Shutdown, Off is the default

Device Configuration

In the Device Configuration subpage user can configure programmable digital inputs and outputs, the thresholds and hysteresis for voltage and frequency, the delay times and the MODBUS communication protocol. User can also select the language and change the password in this subpage. The attribute selection and its value changes are made by using UP, DOWN and ENTER keys.

The Device Configuration subpage requires a password. Password consists of 4 numbers, it is given by UP, DOWN and ENTER keys. The default password is 0001. Please, change the default password to your own. The password is valid one minute after leaving the password-protected subpage. If the password is forgotten or lost, please, contact product support.

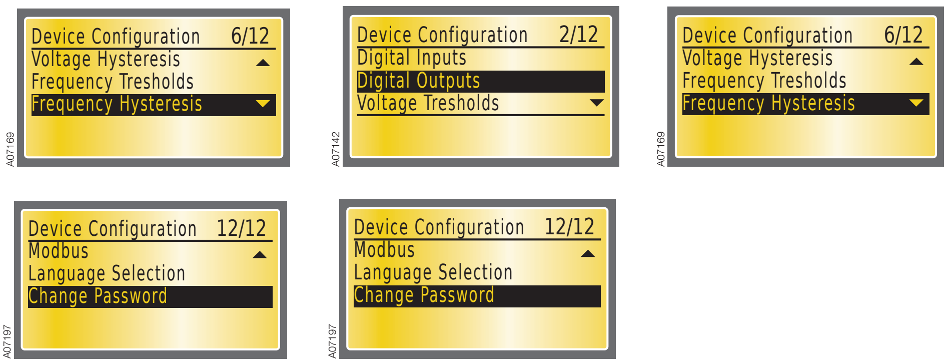


Figure 11.23 Device Configuration requires a password

Parameter	Values
Digital Inputs	Digital Input 4 Digital Input 5 Digital Input 6 Digital Input 7 Digital Input 8 Digital Input 9 Digital Input 10 Digital Input 11
Digital Outputs	Digital Output 6 Digital Output 7 Digital Output 8 Digital Output 9 Digital Output 10 Digital Output 12
Voltage Thresholds	Volt Threshold Min LN1, -30 %, -29 %, …, -5 % Volt Threshold Min LN2, -30 %, -29 %, …, -5 % Volt Threshold Max LN1, +5 %, +6 %, …, +30 % Volt Threshold Max LN2, +5 %, +6 %, …, +30 %
Voltage Hysteresis	Volt Hysteresis Min LN1, -29 %, -28 %, …, -4 % Volt Hysteresis Min LN2, -29 %, -28 %, …, -4 % Volt Hysteresis Max LN1, +4 %, +5 %, …, +29 % Volt Hysteresis Max LN2, +4 %, +5 %, …, +29 %
Frequency Thresholds	Freq Threshold Min LN1, -10 %, -9 %, …, -1 % Freq Threshold Min LN2, -10 %, -9 %, …, -1 % Freq Threshold Max LN1, +1 %, +2 %, …, +10 % Freq Threshold Max LN2, +1 %, +2 %, …, +10 %
Frequency Hysteresis	Freq Hysteresis Min LN1, -9.8 %, -9.6 %, …, -0.8 % Freq Hysteresis Min LN2, -9.8 %, -9.6 %, …, -0.8 % Freq Hysteresis Max LN1, +0.8 %, +1.0 %, …, +9.8 % Freq Hysteresis Max LN2, +0.8 %, +1.0 %, …, +9.8 %
Delay Times	Switching, 0…60 s Delay on Transfer, 0…10 min Pre-trans I to II, 0...120 s Dead Band I to II, 0…60 s Back Switching, 0…90 min Pre-trans II to I, 0...120 s Dead Band II to I, 0…60 s Generator Stop, 0…30 min
Auto Switch to O	Off LN1 to O LN2 to O LN1 & LN2 to O
LCD Backlight Timer Modbus	Always On / 1 sec, …, 59 sec, 1 min, …, 60 min Modbus Address Modbus Baud Rate Modbus Stop Bits Modbus Parity Local / Remote
Language Selection	English Deutsch Francais Italiano Espanol Suomi Russian Chinese
Change Password	Retype New Password INVALID PASSWORD PASSWORD CHANGED

Table 11.4 Parameters and values of the Device Configuration

Digital Inputs

User can configure Function and Contact Type (NO/NC) for Digital Inputs 4-11. Available functions are described in Table 11.5. Factory settings are described in Section 6.2.4.

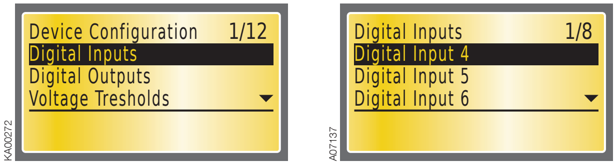


Figure 11.24 **Digital Inputs, user can configure Function (see Table 11.5) and Contact Type for Digital Inputs 4-11**

Digital Inputs 4-11, Function

Function	Description
No function	Digital input disabled
Emergency stop	Digital input to command changeover switch to position O in case of emergency, overrides all other commands
Inhibit switching I to II	Digital input to prevent switching from Line 1 to Line 2
Remote control to O	Digital input to command changeover switch to position O in AUTO mode
Remote control to I	Digital input to command changeover switch to position I in AUTO mode
Remote control to II	Digital input to command changeover switch to position II in AUTO mode
Inhibit remote control	Digital input to inhibit all remote control commands
Generator alarm	Digital input to indicate generator failure
Force commutation	Digital input to force switching from primary to secondary line in AUTO mode
External generator start	Digital input to start generator externally
Status of secondary loads	Digital input to connect feedback from secondary loads control device
Manual back switching mode	Digital input to prevent automatic switching to primary line
Remote reset	Digital input to reset active alarm
Line Priority I	Digital input to set priority to Line 1
Line Priority II	Digital input to set priority to Line 2
External Alarm	Digital input to indicate external alarm

Table 11.5 **The available Functions for Digital Inputs 4-11**

Figure 11.25 **Digital Input 4 - Function, Remote Control to I is the default**

Figure 11.26 **Digital Input 4 - Contacat Type, NO is the default**

Digital Outputs

User can configure Function and Contact Type (NO/NC) for Digital Outputs 6-10 and Digital Output 12. Available functions are described in Table 11.6. Factory settings are described in Section 6.2.4.

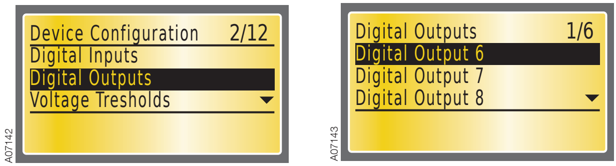


Figure 11.27 **Digital Outputs, user can configure Function and Contact Type for Digital Outputs 6-10 and Digital Output 12**

Digital Outputs 6-10 and 12, Function

Function	Description
No function	Digital output disabled
Emergency/alarm	Digital output to signal changeover switch control failure, handle attached, external fault or generator alarm.
Line I status	Digital output to signal status of the Line 1
Line II status	Digital output to signal status of the Line 2
Change-over switch alarm	Digital output to signal changeover switch control failure
Manual mode	Digital output to signal manual operating mode
Disconnect secondary loads[1)]	Digital output to control disconnection of the secondary loads
Pre-transfer Signal	Digital output to signal upcoming switch from I to II or from II to I
I Status	Digital output to signal switch position I
O Status	Digital output to signal switch position O
II Status	Digital output to signal switch position II

1) Digital outputs 6-10 and 12, Function Disconnect secondary loads can be only controlled via Modbus communication interface. This way user can have different loads which can be controlled independently via Modbus communication interface.

Table 11.6 **The available Functions for Digital Outputs 6-10 and 12**

Digital Outputs 6-10 and 12, Contact status

		Contact type NO	Contact type NC
Function	**Function status**	**Contact status**	
No function	Digital output disabled		
Emergency/alarm	Emergency/alarm (ON)	Closed	Open
	Emergency/alarm (OFF)	Open	Closed
Line 1 status	Line 1 status (OK)	Open	Closed
	Line 1 status (NOT OK)	Closed	Open
Line 2 status	Line 2 status (OK)	Open	Closed
	Line 2 status (NOT OK)	Closed	Open
Change-over switch alarm	Change-over switch alarm (ON)	Closed	Open
	Change-over switch alarm (OFF)	Open	Closed
Manual mode	Manual mode (ON)	Closed	Open
	Manual mode (OFF)	Open	Closed
Disconnect secondary loads[1)]	Disconnect secondary loads (ON)	Closed	Open
	Disconnect secondary loads (OFF)	Open	Closed
Pre-transfer signal	Pre-transfer signal (ON)	Closed	Open
	Pre-transfer signal (OFF)	Open	Closed
I Status	I Status (ON)	Closed	Open
	I Status (OFF)	Open	Closed
O Status	O Status (ON)	Closed	Open
	O Status (OFF)	Open	Closed
II Status	II Status (ON)	Closed	Open
	II Status (OFF)	Open	Closed

1) Digital outputs 6-10 and 12, Function Disconnect secondary loads can be only controlled via Modbus communication interface. This way user can have different loads which can be controlled independently via Modbus communication interface.

Table 11.7 Digital Outputs 6-10 and 12, contact status

Figure 11.28 Digital Output 6 - Function, Emergency/Alarm is the default

Figure 11.29 Digital Output 6 – Contact Type, NO is the default

Voltage Thresholds

User can set separately Line 1 and Line 2 voltage thresholds both minimum and maximum values. Factory settings are min -20 % and max +20 %. On the Table 11.8 are shown values, which are valid when auxiliary power supply (AUX) is not used. Values of the Voltage Threshold Max LN1 and Voltage Threshold Max LN2 are also used as the voltage unbalance level.

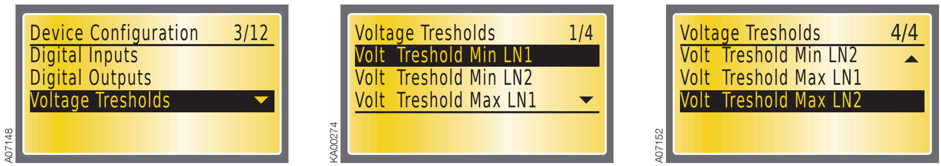


Figure 11.30 Voltage Thresholds (min and max) settings for Line 1 and Line 2

3 phases		
Voltage / V	**Voltage threshold**	
	Min	**Max**
100/57	-20 %	+30 %
115/66	-30 %	+30 %
120/70	-30 %	+30 %
208/120	-30 %	+30 %
220/127	-30 %	+30 %
230/132	-30 %	+30 %
240/138	-30 %	+30 %
277/160	-30 %	+30 %
347/200	-30 %	+30 %
380/220	-30 %	+30 %
400/230	-30 %	+30 %
415/240	-30 %	+30 %
440/254	-30 %	+30 %
480/277	-30 %	+20 %

1 phases		
Voltage / V	**Voltage threshold**	
	Min	**Max**
208/120	-20 %	+30 %
220/127	-20 %	+30 %
230/132	-25 %	+30 %
240/138	-30 %	+30 %
277/160	-30 %	+30 %
347/200	-30 %	+30 %
380/220	-30 %	+30 %
400/230	-30 %	+30 %
415/240	-30 %	+30 %
440/254	-30 %	+30 %
480/277	-30 %	+20 %

Table 11.8 Values for Voltage Thresholds suitable for different Rated Voltages in 3 phases and 1 phase system.

If the AUX is used, Min is -30 % and Max is according to this table.

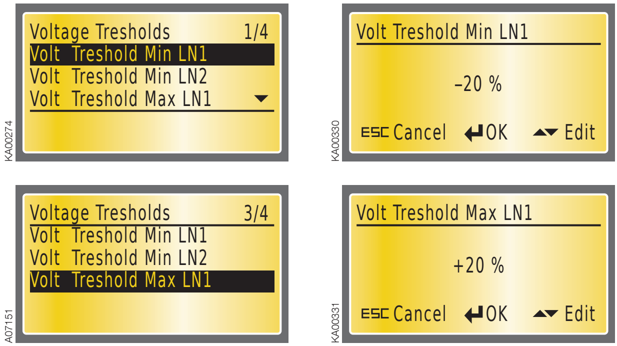


Figure 11.31 Voltage Threshold LN1, factory settings: min -20 %, max 20 %

Voltage Hysteresis

User can set separately Line 1 and Line 2 voltage hysteresis both minimum and maximum values. Factory settings are min -19 % and max +19 %.

Figure 11.32 Voltage Hysteresis (min and max) settings for Line 1 and Line 2

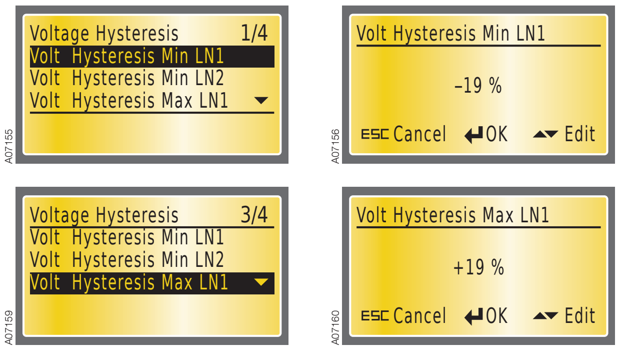


Figure 11.33 Voltage Hysteresis LN1, factory settings: min -19 %, max 19 %

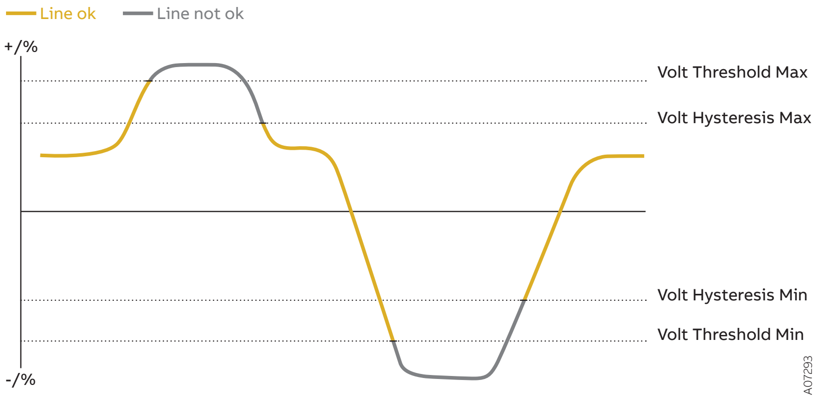


Figure 11.34 **Interaction of the parameters Voltage Threshold and Voltage Hysteresis**

Frequency Thresholds

User can set separately Line 1 and Line 2 frequency thresholds both minimum and maximum values. Factory settings are min -1 % and max 1 %.

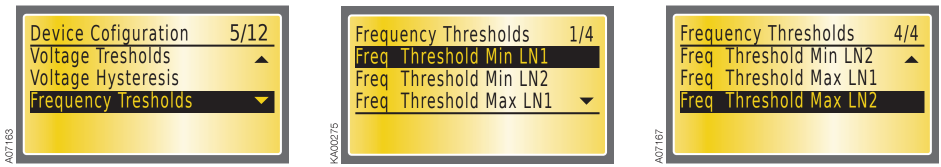


Figure 11.35 **Frequency Thresholds (min and max) settings for Line 1 and Line 2**

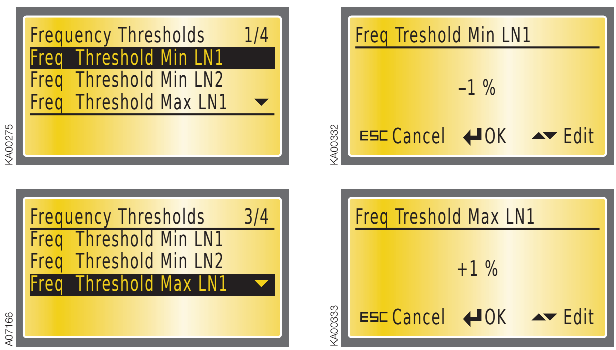


Figure 11.36 **Frequency Threshold LN1, factory settings: min -1 %, max 1 %**

Frequency Hysteresis

User can set separately Line 1 and Line 2 frequency hysteresis both minimum and maximum values. Factory settings are min -0.8 % and max 0.8 %.

Figure 11.37 **Frequency Hysteresis (min and max) settings for Line 1 and Line 2**

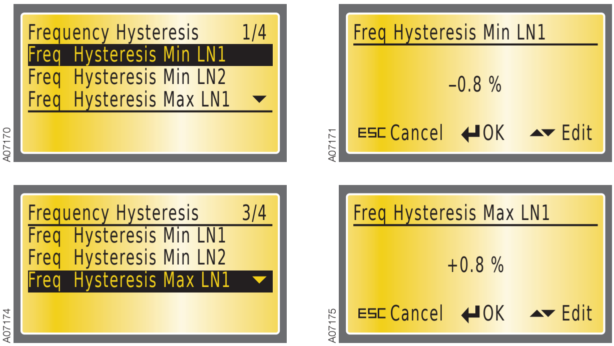


Figure 11.38 **Frequency Hysteresis LN1, factory settings: min -0.8 %, max 0.8 %**

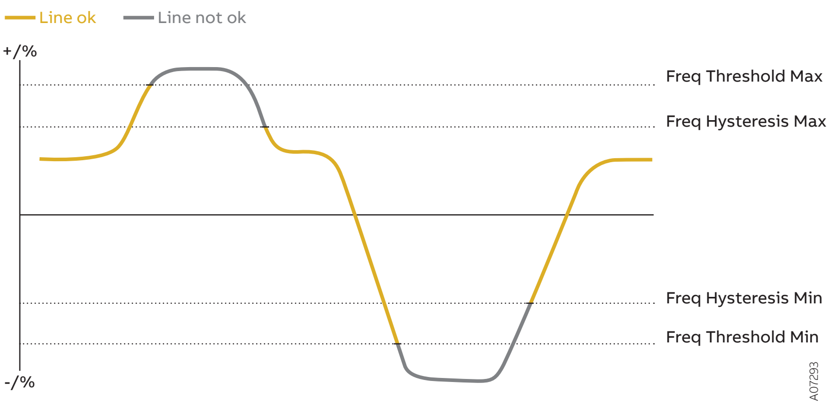
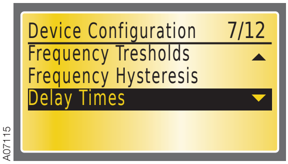


Figure 11.39 **Interaction of the parameters Frequency Threshold and Frequency Hysteresis**

Delay Times

User can set delay times for Switching delay (Ts), Delay on Transfer (Tt), Pre-Transfer I to II (Tp), Dead Band I to II (Ds), Back Switching delay (TBs), Pre-transfer II to I (TBp), Dead Band II to I (DBs), and Generator Stop delay (Gs). Values for delays are in the Table 11.4. Factory settings for delay times: Switching 0 s, Delay on Transfer 0 s, Pre-transfer I to II 0 s, Dead Band I to II 0 s, Back Switching 0 s, Pre-transfer II to I 0 s, Dead Band II to I 0 s, Generator Stop 5 s.



The switching sequence and the operation of corresponding Delay Times are shown in Section 3.3.

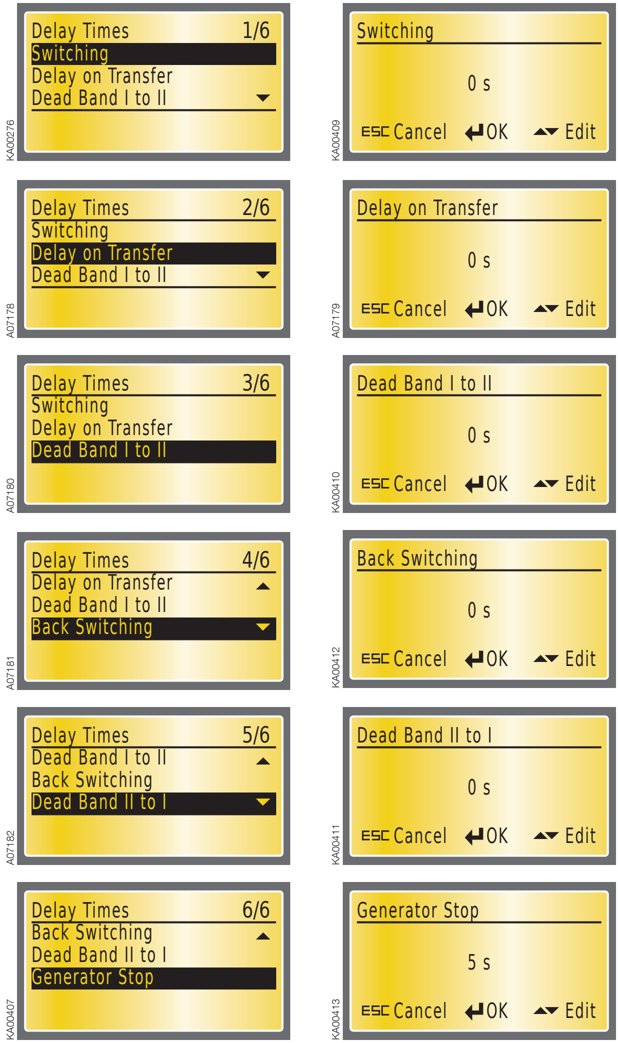


Figure 11.40 **Switching 0 s, Delay on Transfer 0 s, Dead Band I to II 0 s, Back Switching 0 s, Dead Band II to I 0 s, Generator Stop 5 s**

Auto Switch to O

According to Auto Switch to O parameter the changeover switch is controlled to position O automatically in case of Line 1 or Line 2 anomalies. Available parameter values are described in Table 11.9. Off is the default.

Value	Description
Off	Automatic switching to position O disabled
LN1 to O	Automatic switching to position O in case of Line 1 anomaly.
LN2 to O	Automatic switching to position O in case of Line 2 anomaly
LN1 & LN2 to O	Automatic switching to position O in case of Line 1 or Line 2 anomaly.

Table 11.9 **Values and description of Auto Switch to O**

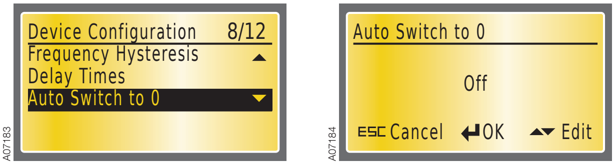


Figure 11.41 **Auto Switch to O, Off is the default**

Both OMD800 and motor operator of the change-over switch need to be energized to enable the automatic switching to position O.

LCD Backlight Timer

User can choose when to switch off the LCD backlight after the latest user interaction.

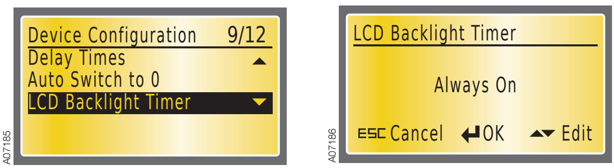


Figure 11.42 **LCD Backlight Timer, Always On is the default**

Modbus

User can set Address, Baud Rate, Stop Bits, Parity and Local/Remote for the Modbus. When Local is used device can’t be neither controlled nor configured through Modbus, only monitoring is possible. When Remote is used it is also possible to control and configure the device through Modbus. Available parameter values for Modbus are described in Table 11.10. Factory settings are Modbus address 1, Modbus Baud Rate 9600, Modbus Stop Bit 1, Modbus Parity None and Modbus Local/Remote Local.

Parameter	Value
Modbus Address	1…247
Modbus Baud Rate	9600 bps
	19200 bps
	38400 bps
Modbus Stop Bits	1 Stop Bit
	2 Stop Bits
Modbus Parity	None
	Even
	Odd
Local / Remote	Local
	Remote

Table 11.10 Parameters and values of Modbus

Tx/Rx LED indicates data transmission: LED is blinking only when data is transmitted from the OMD800.

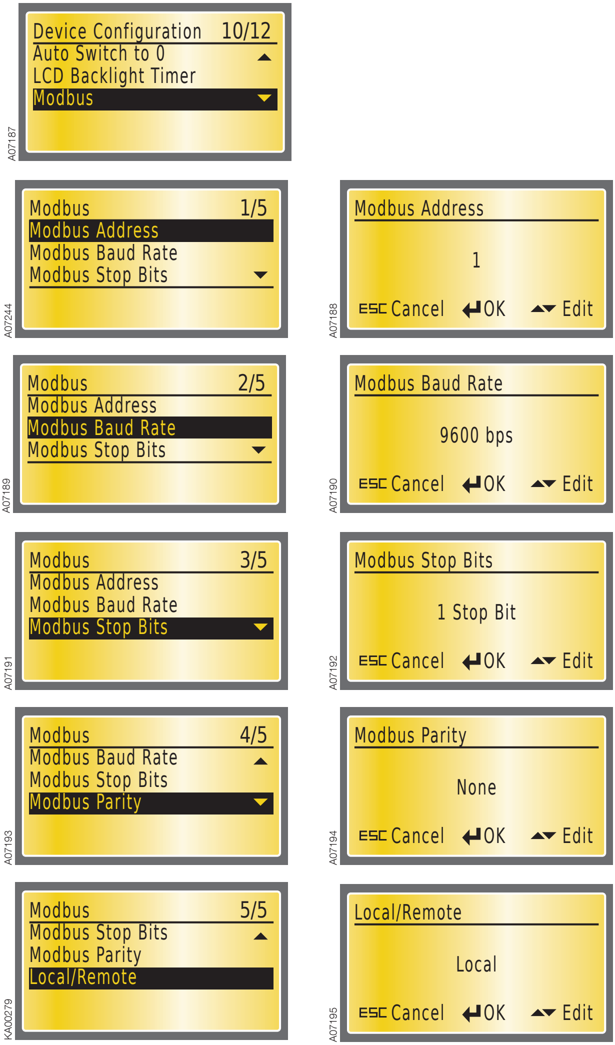


Figure 11.43 **Modbus, the factory settings are Modbus address 1, Modbus Baud Rate 9600, Modbus Stop Bit 1, Modbus Parity None and Modbus Local/Remote Local**

Language Selection

In this page it is possible to choose the Language. The choices are English, French, Italian, Spanish, Finnish, German, Russian and Chinese. Factory setting is English.

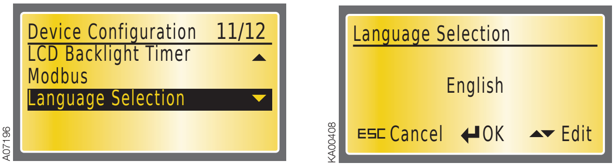


Figure 11.44 **Language Selection, English as default**

Change Password

In this page it is possible to change password. The password consists of four numbers. The new password is set by using UP, DOWN and ENTER keys. 0001 is the default password.

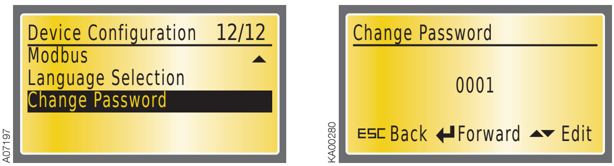


Figure 11.45 **Change Password, 0001 is the default password**

Retype New Password

The new password has to be confirmed by retyping it. After confirmation, the user is returned to the Device Configuration menu and on the bottom of the display the message PASSWORD CHANGED is shown. If password confirmation does not succeed, on the bottom of the display is shown the message INVALID PASSWORD and the old password is still valid. If the password is forgotten/lost, please, contact product support.

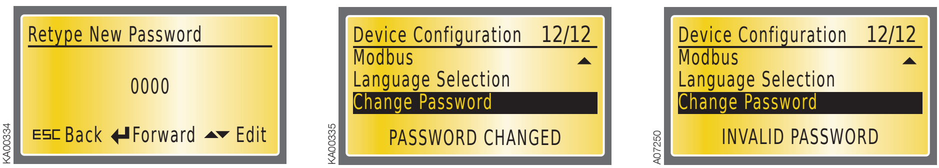


Figure 11.46 **Confirmation of the new password**

Diagnostics

Under Diagnostics are submenus: Measured Values, Alarm/Event Log, Counters, Generator Control, Test Sequence and Secondary Loads.

Attribute	Value
Measured Values	L-N Voltages
	L-L Voltages
Alarm / Event Log	View Log
	Clear Log
Counters	Operations
Generator Control	Generator Started
	Generator Stopped
Test Sequence	
Secondary Loads	Secondary Loads Connected
	Secondary Loads Disconnected

Table 11.11 Diagnostics submenus

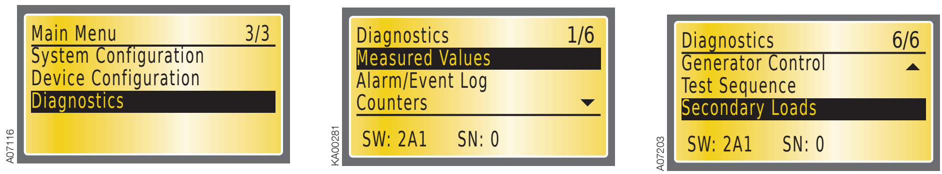


Figure 11.47 Diagnostics

Measured Values

On these pages the measurement values of main and phase voltages are shown. Measurement value of frequency is also shown on the both pages.

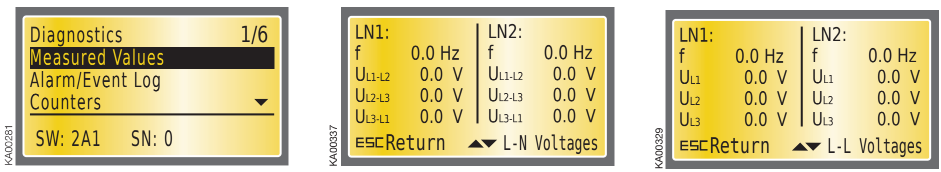


Figure 11.48 Measured Values: Main Voltages with frequency and Phase Voltages with frequency

Alarm/Event log

Under Alarm/Event Log are submenus: View Log and Clear Log.

View log

On this page the latest alarms and events are shown. The number of alarms and events is shown at the top of the page. The log can contain 50 latest alarms/events at the maximum. The latest alarm/event is always at the top of the list.

Clear log does not have its own page. The log is cleared when Clear Log is chosen and the Enter key is pressed. Alarms must be reset when clearing alarms/events.

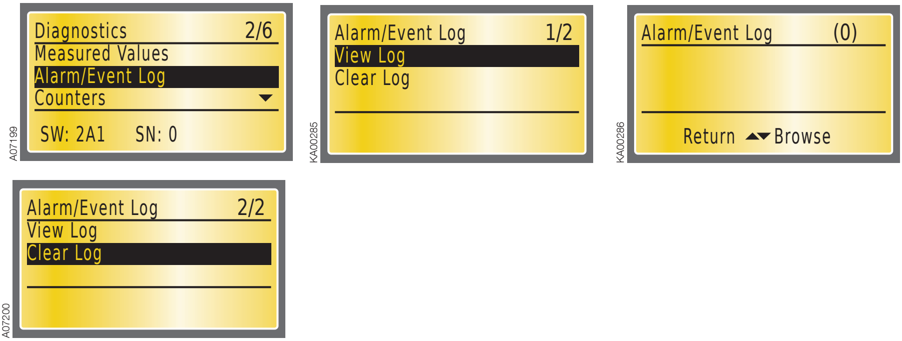


Figure 11.49 **Alarm/Event Log: View Log will show 50 latest alarms and events, Clear Log will empty the log**

Counters

On this page the summary of switching operations is shown. One operation is from I to O or from II to O or from O to I or from O to II, eg. the total summary of the operations from I to II is two operations. Return back to Diagnostics menu by pushing the ESC key.

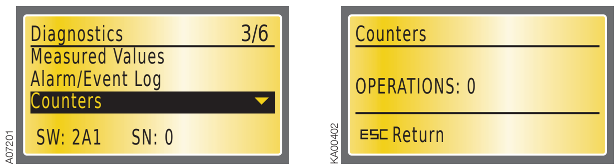


Figure 11.50 **Counters page will show the summary of operations**

Generator Control

On this page the user can start or stop the generator if generator is in use (see the selection of “Generator Usage” in Section 11.2.2.). Start and Stop commands are given with UP and DOWN arrow keys. OMD800 must be on Manual mode when starting the generator manually.

Return back to Diagnostics menu by pushing the ESC key.

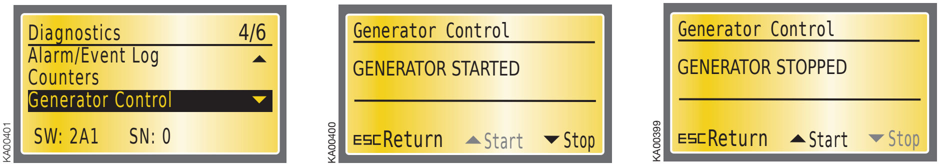


Figure 11.51 **Generator Control if generator is in use**

OMD800 must be in manual mode when controlling the generator manually.

Test Sequence

Test Sequence carries out the automatic switching sequence with delay times and generator control. The OMD800 has to be in manual mode to start the Test Sequence. When user starts the Test Sequence the device blinks LEDs (Power, Auto, Alarm) twice and returns to default page to show the status of the change-over switch, delay times and generator. If the change-over switch is in position I, normal switching sequence with generator start is executed. If in position O or II, back switching sequence is executed and generator stopped. Test Sequence can be interrupted by pressing the AUTO key. Auto LED blinks during Test Sequence.

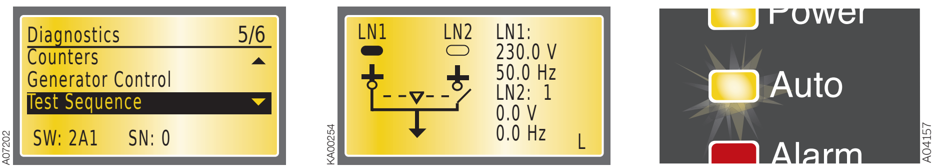
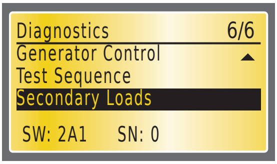
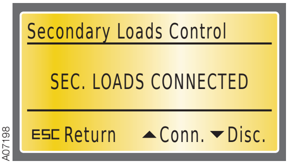


Figure 11.52 **Test Sequence carries out the automatic switching sequence, the Auto LED blinks during Test Sequence**

Secondary Loads

On this page the user can connect or disconnect the secondary loads if the Secondary Load –parameter is set in System Configuration subpage (see the selection of “Secondary Load” on Section 11.2.2.). Connect and Disconnect commands are given with UP and DOWN arrow keys. Return back to Diagnostics menu by pushing the ESC key.





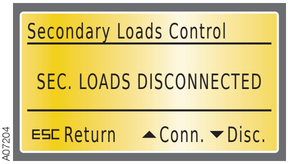


Figure 11.53 Secondary Loads page, secondary loads can be connected and disconnected

11.2.3 OMD800 communication via Modbus

Monitoring, configuration and control are possible via OMD800 Modbus communication interface. Configuration and control are enabled by Local/Remote parameter (see the selection of “Local/Remote” on Section 11.2.2.). The following Modbus functions are supported:

Function	Name
3 (0x03)	Read Holding Registers
4 (0x04)	Read Input Registers
6 (0x06)	Write Single Register
16 (0x10)	Write Multiple Registers
17 (0x11)	Report Slave ID

Table 11.12 Supported Modbus functions

Information of registers, values and access is available in following table:

Register	Address	R/W	Values
REG_CONTROL	0	W	1 = Reset
			10 = Change-over switch to position I
			11 = Change-over switch to position O
			12 = Change-over switch to position II
			13 = Test Sequence
			21 = Open sec. loads
			22 = Close sec. loads
			30 = Start generator
			31 = Stop generator
REG_STATUS	40	R	Bits 0-2 = LN1 line status
			0 = Voltage OK
			1 = No voltage
			2 = Undervoltage
			3 = Overvoltage
			4 = Phase missing
			5 = Voltage unbalance
			6 = Incorrect phase sequence
			7 = Invalid frequency
			Bits 3-5 = LN2 status
			0 = Voltage OK
			1 = No voltage
			2 = Undervoltage
			3 = Overvoltage
			4 = Phase missing
			5 = Voltage unbalance
			6 = Incorrect phase sequence
			7 = Invalid frequency
			Bits 6-8 = Switching status
			0 = Sequence not required (line used = primary)
			1 = Sequence in progress (primary secondary)
			2 = Sequence completed (line used = secondary)
			3 = Sequence rev in progress (secondary primary)
			4 = Sequence failed
			Bit 9 = Generator status
			0 = Stopped
			1 = Started
REG_ALARMS	54	R	0 = No Alarms
			Bit 0 = Open 1 Failure
			Bit 1 = Open 2 Failure
			Bit 2 = Disconnect SL Failure
			Bit 3 = Close 1 Failure
			Bit 4 = Close 2 Failure
			Bit 5 = Connect SL Failure
			Bit 8 = Force manual (handle attached)
			Bit 9 = External fault
			Bit 10 = External alarm
			Bit 12 = Generator alarm

Register	Address	R/W	Values
REG_I_STATUS	58	R	0 = Open
			1 = Closed
REG_II_STATUS	59	R	0 = Open
			1 = Closed
REG_SL_STATUS	60	R	0 = Disconnected
			1 = Connected
REG_GENERATOR_ALARM	61	R	0 = Inactive
			1 = Active
REG_FORCE_MANUAL	62	R	0 = Inactive
			1 = Active
REG_FORCE_COMMUTATION	63	R	0 = Inactive
			1 = Active
REG_GENERATOR_START	64	R	0 = Inactive
			1 = Active
REG_INHIBIT_SWITCHING	65	R	0 = Inactive
			1 = Active
REG_INHIBIT_REMOTE	66	R	0 = Inactive
			1 = Active
REG_REMOTE_O	67	R	0 = Inactive
			1 = Active
REG_REMOTE_I	68	R	0 = Inactive
			1 = Active
REG_REMOTE_II	69	R	0 = Inactive
			1 = Active
REG_MAN_BACK_SWITCHING	70	R	0 = Inactive
			1 = Active
REG_EMERGENCY_STOP	71	R	0 = Inactive
			1 = Active
REG_REMOTE_RESET	72	R	0 = Inactive
			1 = Active
REG_LINE_PRIORITY_I	73	R	0 = Inactive
			1 = Active
REG_LINE_PRIORITY_II	74	R	0 = Inactive
			1 = Active
REG_EXTERNAL_ALARM	75	R	0 = Inactive
			1 = Active
REG_LN1_U1	150	R	Voltage at 0.1 V accuracy (2300 = 230.0 V)
REG_LN1_U2	152	R	Voltage at 0.1 V accuracy (2300 = 230.0 V)
REG_LN1_U3	154	R	Voltage at 0.1 V accuracy (2300 = 230.0 V)
REG_LN1_U12	158	R	Voltage at 0.1 V accuracy (2300 = 230.0 V)
REG_LN1_U23	160	R	Voltage at 0.1 V accuracy (2300 = 230.0 V)
REG_LN1_U31	162	R	Voltage at 0.1 V accuracy (2300 = 230.0 V)
REG_LN2_U1	164	R	Voltage at 0.1 V accuracy (2300 = 230.0 V)
REG_LN2_U2	166	R	Voltage at 0.1 V accuracy (2300 = 230.0 V)
REG_LN2_U3	168	R	Voltage at 0.1 V accuracy (2300 = 230.0 V)
REG_LN2_U12	172	R	Voltage at 0.1 V accuracy (2300 = 230.0 V)
REG_LN2_U23	174	R	Voltage at 0.1 V accuracy (2300 = 230.0 V)
REG_LN2_U31	176	R	Voltage at 0.1 V accuracy (2300 = 230.0 V)
REG_LN1_F	250	R	Frequency at 0.1 Hz accuracy (500 = 50.0 Hz)
REG_LN2_F	252	R	Frequency at 0.1 Hz accuracy (500 = 50.0 Hz)

Register	Address	R/W	Values
REG_SLAVE_ID	500	R	Fixed value 49
REG_SW_VERSION	501	R	Bits 8-15 = SW Version number in ASCII format
			Bits 0-7 = SW Version letter in ASCII format
REG_OPERATION_COUNTER	502	R	Number of switch position transitions
REG_SERIAL_NUMBER_0	560	R	Serial number digit 0
REG_SERIAL_NUMBER_1	561	R	Serial number digit 1
REG_SERIAL_NUMBER_2	562	R	Serial number digit 2
REG_SERIAL_NUMBER_3	563	R	Serial number digit 3
REG_SERIAL_NUMBER_4	564	R	Serial number digit 4
REG_SERIAL_NUMBER_5	565	R	Serial number digit 5
REG_SERIAL_NUMBER_6	566	R	Serial number digit 6
REG_SERIAL_NUMBER_7	567	R	Serial number digit 7
REG_OPERATING_MODE	600	R/W	0 = Local
			1 = Remote
REG_ADDRESS	604	R/W	1...247
REG_BAUD_RATE	605	R/W	0 = 9600
			1 = 19200
			2 = 38400
REG_PROTOCOL	606	R/W	0 = Even parity / 8 data bits / 1 stop bit
			1 = Odd parity / 8 data bits / 1 stop bit
			2 = No parity / 8 data bits / 1 stop bit
			3 = Even parity / 8 data bits / 2 stop bits
			4 = Odd parity / 8 data bits / 2 stop bits
			5 = No parity / 8 data bits / 2 stop bits
REG_TAG_NAME_0	607	R/W	Letter 0 in ASCII format
REG_TAG_NAME_1	608	R/W	Letter 1 in ASCII format
REG_TAG_NAME_2	609	R/W	Letter 2 in ASCII format
REG_TAG_NAME_3	610	R/W	Letter 3 in ASCII format
REG_TAG_NAME_4	611	R/W	Letter 4 in ASCII format
REG_DEVICE_STATUS	622	R/W	0 = Auto
			1 = Manual
			2 = Test
			3 = Powersave
REG_LN1_PHASES	623	R/W	0 = 1 phase
			1 = 3 phases without N
			2 = 3 phases with N
REG_RATED_VOLTAGE	624	R/W	0 = 100/57 V
			1 = 115/66 V
			2 = 120/70 V
			3 = 208/120 V
			4 = 220/127 V
			5 = 230/132 V
			6 = 240/138 V
			7 = 277/160 V
			8 = 347/200 V
			9 = 380/220 V
			10 = 400/230 V
			11 = 415/240 V
			12 = 440/254 V
			13 = 480/277 V

Register	Address	R/W	Values
REG_RATED_FREQUENCY	625	R/W	1 = 50 Hz
			2 = 60 Hz
REG_SECONDARY_LOAD	626	R/W	0 = Not Used
			1 = Opening Only
			2 = Opening And Closing
			3 = Opening Pulse
			4 = Opening/Closing Pulse
REG_GENERATOR_USAGE	627	R/W	0 = No Generator
			1 = Generator In Use
REG_LINE_PRIORITY	628	R/W	0 = No Priority
			1 = Line I - Switch 1
			2 = Line II - Switch 2
REG_LANGUAGE	629	R/W	0 = English
			1 = German
			2 = French
			3 = Italian
			4 = Spanish
			5 = Finnish
			6 = Russian
			7 = Chinese
REG_PASSWORD	630	R/W	0000...9999
REG_EXT_VT_PRESENT	631	R/W	0 = Absent
			1 = Present
REG_EXT_VT_PRIMARY	632	R/W	0 = 100/57 V
			1 = 115/66 V
			2 = 120/70 V
			3 = 208/120 V
			4 = 220/127 V
			5 = 230/132 V
			6 = 240/138 V
			7 = 277/160 V
			8 = 347/200 V
			9 = 380/220 V
			10 = 400/230 V
			11 = 415/240 V
			12 = 440/254 V
			13 = 480/277 V
			14 = 500/288 V
			15 = 550/317 V
			16 = 600/347 V
			17 = 660/380 V
			18 = 690/400 V
			19 = 910/525 V
			20 = 950/550 V
			21 = 1000/577 V
			22 = 1150/660 V

Register	Address	R/W	Values
REG_EXT_VT_SECONDARY	633	R/W	0 = 100/57 V
			1 = 115/66 V
			2 = 120/70 V
			3 = 208/120 V
			4 = 220/127 V
			5 = 230/132 V
			6 = 240/138 V
			7 = 277/160 V
			8 = 347/200 V
			9 = 380/220 V
			10 = 400/230 V
			11 = 415/240 V
			12 = 440/254 V
			13 = 480/277 V
REG_LN2_PHASES	634	R/W	0 = 1 phase
			1 = 3 phases without N
			2 = 3 phases with N
REG_MANUAL_BACK_SWITCHING	635	R/W	0 = Off
			1 = On
REG_GENERATOR_SHUTDOWN	636	R/W	0 = Off
			1 = On
REG_AUTO_SWITCH_TO_O	637	R/W	0 = Off, 1: LN1, 2: LN2, 3: LN1 & LN2
			1 = LN1 to O
			2 = LN2 to O
			3 = LN1 & LN2 to O
REG_SWITCH_TYPE	638	R/W	0 = Automatic OTM_C_D
			1 = Motorized OTM_C
REG_DI4_FUNCTION	639	R/W	0 = No function
			1 = Emergency stop
			2 = Inhibit switching I to II
			3 = Remote control to O
			4 = Remote control to I
			5 = Remote control to II
			6 = Inhibit remote control
			7 = Generator alarm
			8 = Force commutation
			9 = External generator start
			10 = Status of secondary loads
			11 = Manual back switching mode
			12 = Remote reset
			13 = Line priority I
			14 = Line priority II
			15 = External alarm
REG_DI5_FUNCTION	640	R/W	See REG_DI4_FUNCTION values
REG_DI6_FUNCTION	641	R/W	See REG_DI4_FUNCTION values
REG_DI7_FUNCTION	642	R/W	See REG_DI4_FUNCTION values
REG_DI8_FUNCTION	643	R/W	See REG_DI4_FUNCTION values
REG_DI9_FUNCTION	644	R/W	See REG_DI4_FUNCTION values
REG_DI10_FUNCTION	645	R/W	See REG_DI4_FUNCTION values
REG_DI11_FUNCTION	646	R/W	See REG_DI4_FUNCTION values
REG_DI4_CONTACT_TYPE	647	R/W	0 = NO
			1 = NC

Register	Address	R/W	Values
REG_DI5_CONTACT_TYPE	648	R/W	See REG_DI4_CONTACT_TYPE values
REG_DI6_CONTACT_TYPE	649	R/W	See REG_DI4_CONTACT_TYPE values
REG_DI7_CONTACT_TYPE	650	R/W	See REG_DI4_CONTACT_TYPE values
REG_DI8_CONTACT_TYPE	651	R/W	See REG_DI4_CONTACT_TYPE values
REG_DI9_CONTACT_TYPE	652	R/W	See REG_DI4_CONTACT_TYPE values
REG_DI10_CONTACT_TYPE	653	R/W	See REG_DI4_CONTACT_TYPE values
REG_DI11_CONTACT_TYPE	654	R/W	See REG_DI4_CONTACT_TYPE values
REG_DO6_FUNCTION	655	R/W	0 = No function
			1 = Emergency/alarm
			2 = Line I status
			3 = Line II status
			4 = Change-over switch alarm
			5 = Manual mode
			6 = Disconnect secondary loads
			7 = Pre-transfer signal
			8 = I Status
			9 = O Status
			10 = II Status
REG_DO7_FUNCTION	656	R/W	See REG_DO6_FUNCTION values
REG_DO8_FUNCTION	657	R/W	See REG_DO6_FUNCTION values
REG_DO9_FUNCTION	658	R/W	See REG_DO6_FUNCTION values
REG_DO10_FUNCTION	659	R/W	See REG_DO6_FUNCTION values
REG_DO12_FUNCTION	660	R/W	See REG_DO6_FUNCTION values
REG_DO6_CONTACT_TYPE	661	R/W	0 = NO
			1 = NC
REG_DO7_CONTACT_TYPE	662	R/W	See REG_DO6_CONTACT_TYPE values
REG_DO8_CONTACT_TYPE	663	R/W	See REG_DO6_CONTACT_TYPE values
REG_DO9_CONTACT_TYPE	664	R/W	See REG_DO6_CONTACT_TYPE values
REG_DO10_CONTACT_TYPE	665	R/W	See REG_DO6_CONTACT_TYPE values
REG_DO12_CONTACT_TYPE	666	R/W	See REG_DO6_CONTACT_TYPE values
REG_VOLT_THRESHOLD_LN1_MIN	881	R/W	5...30 %
REG_VOLT_THRESHOLD_LN1_MAX	882	R/W	5...30 %
REG_VOLT_THRESHOLD_LN2_MIN	883	R/W	5...30 %
REG_VOLT_THRESHOLD_LN2_MAX	884	R/W	5...30 %
REG_VOLT_HYSTERESIS_LN1_MIN	885	R/W	4...29 %
REG_VOLT_HYSTERESIS_LN1_MAX	886	R/W	4...29 %
REG_VOLT_HYSTERESIS_LN2_MIN	887	R/W	4...29 %
REG_VOLT_HYSTERESIS_LN2_MAX	888	R/W	4...29 %
REG_FREQ_THRESHOLD_LN1_MIN	891	R/W	1...10 %
REG_FREQ_THRESHOLD_LN1_MAX	892	R/W	1...10 %
REG_FREQ_THRESHOLD_LN2_MIN	893	R/W	1...10 %
REG_FREQ_THRESHOLD_LN2_MAX	894	R/W	1...10 %
REG_FREQ_HYSTERESIS_LN1_MIN	895	R/W	8...98 (0.8 ... 9.8 %)
REG_FREQ_HYSTERESIS_LN1_MAX	896	R/W	8...98 (0.8 ... 9.8 %)
REG_FREQ_HYSTERESIS_LN2_MIN	897	R/W	8...98 (0.8 ... 9.8 %)
REG_FREQ_HYSTERESIS_LN2_MAX	898	R/W	8...98 (0.8 ... 9.8 %)
REG_DELAY_TS	901	R/W	0...60 s
REG_DELAY_DS	902	R/W	0...60 s
REG_DELAY_TBS	903	R/W	0...5400 s
REG_DELAY_DBS	904	R/W	0...60 s
REG_DELAY_GS	905	R/W	0...1800 s
REG_DELAY_TT	906	R/W	0...600 s
REG_LCD_TIMER	907	R/W	0...3600 s
REG_DELAY_TP	908	R/W	0...120 s
REG_DELAY_TBP	909	R/W	0...120 s

Register	Address	R/W	Values
REG_ALARM_EVENT_LOG_0	2000	R	Alarm / Event Log item 0
REG_ALARM_EVENT_LOG_1	2001	R	Alarm / Event Log item 1
REG_ALARM_EVENT_LOG_2	2002	R	Alarm / Event Log item 2
REG_ALARM_EVENT_LOG_3	2003	R	Alarm / Event Log item 3
REG_ALARM_EVENT_LOG_4	2004	R	Alarm / Event Log item 4
REG_ALARM_EVENT_LOG_5	2005	R	Alarm / Event Log item 5
REG_ALARM_EVENT_LOG_6	2006	R	Alarm / Event Log item 6
REG_ALARM_EVENT_LOG_7	2007	R	Alarm / Event Log item 7
REG_ALARM_EVENT_LOG_8	2008	R	Alarm / Event Log item 8
REG_ALARM_EVENT_LOG_9	2009	R	Alarm / Event Log item 9
REG_ALARM_EVENT_LOG_10	2010	R	Alarm / Event Log item 10
REG_ALARM_EVENT_LOG_11	2011	R	Alarm / Event Log item 11
REG_ALARM_EVENT_LOG_12	2012	R	Alarm / Event Log item 12
REG_ALARM_EVENT_LOG_13	2013	R	Alarm / Event Log item 13
REG_ALARM_EVENT_LOG_14	2014	R	Alarm / Event Log item 14
REG_ALARM_EVENT_LOG_15	2015	R	Alarm / Event Log item 15
REG_ALARM_EVENT_LOG_16	2016	R	Alarm / Event Log item 16
REG_ALARM_EVENT_LOG_17	2017	R	Alarm / Event Log item 17
REG_ALARM_EVENT_LOG_18	2018	R	Alarm / Event Log item 18
REG_ALARM_EVENT_LOG_19	2019	R	Alarm / Event Log item 19
REG_ALARM_EVENT_LOG_20	2020	R	Alarm / Event Log item 20
REG_ALARM_EVENT_LOG_21	2021	R	Alarm / Event Log item 21
REG_ALARM_EVENT_LOG_22	2022	R	Alarm / Event Log item 22
REG_ALARM_EVENT_LOG_23	2023	R	Alarm / Event Log item 23
REG_ALARM_EVENT_LOG_24	2024	R	Alarm / Event Log item 24
REG_ALARM_EVENT_LOG_25	2025	R	Alarm / Event Log item 25
REG_ALARM_EVENT_LOG_26	2026	R	Alarm / Event Log item 26
REG_ALARM_EVENT_LOG_27	2027	R	Alarm / Event Log item 27
REG_ALARM_EVENT_LOG_28	2028	R	Alarm / Event Log item 28
REG_ALARM_EVENT_LOG_29	2029	R	Alarm / Event Log item 29
REG_ALARM_EVENT_LOG_30	2030	R	Alarm / Event Log item 30
REG_ALARM_EVENT_LOG_31	2031	R	Alarm / Event Log item 31
REG_ALARM_EVENT_LOG_32	2032	R	Alarm / Event Log item 32
REG_ALARM_EVENT_LOG_33	2033	R	Alarm / Event Log item 33
REG_ALARM_EVENT_LOG_34	2034	R	Alarm / Event Log item 34
REG_ALARM_EVENT_LOG_35	2035	R	Alarm / Event Log item 35
REG_ALARM_EVENT_LOG_36	2036	R	Alarm / Event Log item 36
REG_ALARM_EVENT_LOG_37	2037	R	Alarm / Event Log item 37
REG_ALARM_EVENT_LOG_38	2038	R	Alarm / Event Log item 38
REG_ALARM_EVENT_LOG_39	2039	R	Alarm / Event Log item 39
REG_ALARM_EVENT_LOG_40	2040	R	Alarm / Event Log item 40
REG_ALARM_EVENT_LOG_41	2041	R	Alarm / Event Log item 41
REG_ALARM_EVENT_LOG_42	2042	R	Alarm / Event Log item 42
REG_ALARM_EVENT_LOG_43	2043	R	Alarm / Event Log item 43
REG_ALARM_EVENT_LOG_44	2044	R	Alarm / Event Log item 44
REG_ALARM_EVENT_LOG_45	2045	R	Alarm / Event Log item 45
REG_ALARM_EVENT_LOG_46	2046	R	Alarm / Event Log item 46
REG_ALARM_EVENT_LOG_47	2047	R	Alarm / Event Log item 47
REG_ALARM_EVENT_LOG_48	2048	R	Alarm / Event Log item 48
REG_ALARM_EVENT_LOG_49	2049	R	Alarm / Event Log item 49
REG_TEST_DAY	7009	R/W	1...31
REG_TEST_MONTH	7010	R/W	1...12
REG_TEST_YEAR	7011	R/W	2011...9999

Table 11.13 Modbus register map

12 Technical data of automatic control units OMD_

12.1 OMD100

Operating voltage	
Main voltage	380 Vac (±20 %) + N
Phase voltage	220 Vac (±20 %)
Frequency	50 Hz (±10 %)
Voltage and frequency sensing precision	
Voltage	5 %
Frequency	1 %
Relay utilization category	
X21, X22	12 A, AC1, 250 V / 12 A, DC1, 24 V
X24	8 A, AC1, 250 V / 5 A, DC1, 24 V
Over voltage category	III, U_{imp} 4 kV
IP rating	IP40 for the front panel
Temperature area	– 20 to + 60 °C
Transportation and storage temperature	– 40 to + 90 °C
Humidity	
with condensation	5 % - 98 %
without condensation	5 % - 90 %

Table 12.1 Technical data of OMD100

12.2 OMD200 / OMD300

Operating voltage	
Main voltage	208 Vac - 480 Vac (±20 %) + N
Phase voltage	120 Vac - 277 Vac (±20 %)
Frequency	50 Hz, 60 Hz (±10 %)
Voltage and frequency sensing precision	
Voltage	5 %
Frequency	1 %
Relay utilization category	
X21, X22	12 A, AC1, 250 V / 12 A, DC1, 24 V
X23	8 A, AC1, 250 V / 8 A, DC1, 24 V
X24	8 A, AC1, 250 V / 8 A, DC1, 24 V
X26, X27, X28	10 A, AC1, 250 V / 5 A, DC1, 24 V
1/3 phase	
Over voltage category	III, U_{imp} 6 kV
IP rating	IP40 for the front panel
Temperature area	– 20 to + 60 °C
Transportation and storage temperature	– 25 to + 80 °C
Humidity	
with condensation	5 % - 98 %
without condensation	5 % - 90 %

Table 12.2 Technical data of OMD200 and OMD300

12.3 OMD800

Operating and measuring voltage area on 3 phase system:	
Main voltage	100Vac - 480Vac (±20 %)
Phase voltage	57,7Vac - 277Vac (±20 %)
AUX voltage	24Vdc - 110Vdc (-10 % to +15 %)
Frequency	50Hz and 60Hz (±10 %)
Operating and measuring voltage area on 1 phase system:	
Phase voltage	57,7Vac - 277Vac[1)] (±20 %)
AUX voltage	24Vdc - 110Vdc (-10 % to +15 %)
Frequency	50Hz and 60Hz (±10 %)
Voltage and frequency sensing precision	
Voltage	1 %
Frequency	1 %
Relay utilization category	
X21, X22, X24	12 A, AC1, 250 V / 12 A, DC1, 24 V
X23	8 A, AC1, 250 V / 8 A, DC1, 24 V
X29	5 A, AC1, 250 V / 6 A, DC1, 24 V
Over voltage category	III, U_{imp} 6 kV
IP rating	IP40 for the front panel
Temperature area	– 20 to + 60 °C
Transportation and storage temperature	– 25 to + 80 °C
Humidity	
with condensation	5 % - 98 %
without condensation	5 % - 90 %

1) If 1 phase system is used and the voltage level is between 57,7 Vac - 109 Vac the auxiliary power supply (AUX) must be used.

Table 12.3 Technical Data of OMD800

13 Troubleshooting

13.1 OMD100, OMD200 or OMD300

State	Action
Switching from position I to position O fails. After 3 seconds the Alarm LED blinks and the I LED is ON.	The alarm can be reset by pressing the AUTO key. If the alarm does not disappear, please check that the handle has been removed from the change-over switch and the change-over switch is not padlocked from the front panel. If the alarm can be reset but it activates again after trying to operate the switch, please check that the Motor/Manual selector of the change-over switch (only with motorized change-over switches OTM160...2500_CM) is in Motor (M) position and check the fuse (F1) of the motor operator.
Switching from position II to position O fails. After 3 seconds the Alarm LED is blinking and the II LED is ON.	The alarm can be reset by pressing the AUTO key. If the alarm does not disappear, please check that the handle has been removed from the change-over switch and the change-over switch is not padlocked from the front panel. If the alarm can be reset but it activates again after trying to operate the switch, please check that the Motor/Manual selector of the change-over switch (only with motorized change-over switches OTM160...2500_CM) is in Motor (M) position and check the fuse (F1) of the motor operator.
Switching from position O to position I fails. After 3 seconds the Alarm LED and the I LED are blinking.	The alarm can be reset by pressing the AUTO key. If the alarm does not disappear, please check that the handle has been removed from the change-over switch and the change-over switch is not padlocked from the front panel. If the alarm can be reset but it activates again after trying to operate the switch, please check that the Motor/Manual selector of the change-over switch (only with motorized change-over switches OTM160...2500_CM) is in Motor (M) position and check the fuse (F1) of the motor operator.
Switching from position O to position II fails. After 3 seconds the Alarm LED and the II LED are blinking.	The alarm can be reset by pressing the AUTO key. If the alarm does not disappear, please check that the handle has been removed from the change-over switch and the change-over switch is not padlocked from the front panel. If the alarm can be reset but it activates again after trying to operate the switch, please check that the Motor/Manual selector of the change-over switch (only with motorized change-over switches OTM160...2500_CM) is in Motor (M) position and check the fuse (F1) of the motor operator.

Table 13.1 Fault situations in OMD100, OMD200 or OMD300

13.2 OMD800

Alarms and events are presented with a dedicate message on the Alarm/Event Log. Alarms are explained in the table below:

Message	Fault	Action	Value
Open 1 Failure	Switching from position I to position O fails. After 3 seconds the Alarm LED blinks.	The alarm can be reset by pressing the AUTO key. If the alarm activates again after trying to operate the switch, please check that the Motor/Manual selector of the change-over switch (only with motorized change-over switches OTM160...2500_CM) is in Motor (M) position and check the fuse (F1) of the motor operator.	1
Open 2 Failure	Switching from position II to position O fails. After 3 seconds the Alarm LED blinks.	The alarm can be reset by pressing the AUTO key. If the alarm activates again after trying to operate the switch, please check that the Motor/Manual selector of the change-over switch (only with motorized change-over switches OTM160...2500_CM) is in Motor (M) position and check the fuse (F1) of the motor operator.	2
Open SL	Device controlling opening of the secondary loads fails. After 3 seconds the Alarm LED blinks.	The alarm can be reset by pressing the AUTO key. If the alarm activates again after trying to operate the secondary load, please check status of the secondary load control device according to instructions provided by the manufacturer.	4
Close 1 Failure	Switching from position O to position I fails. After 3 seconds the Alarm LED blinks.	If the alarm activates again after trying to operate the switch, please check that the Motor/Manual selector of the change-over switch (only with motorized change-over switches OTM160...2500_CM) is in Motor (M) position and check the fuse (F1) of the motor operator.	8
Close 2 Failure	Switching from position O to position II fails. After 3 seconds the Alarm LED blinks.	If the alarm activates again after trying to operate the switch, please check that the Motor/Manual selector of the change-over switch (only with motorized change-over switches OTM160...2500_CM) is in Motor (M) position and check the fuse (F1) of the motor operator.	16
Close SL Failure	Device controlling closing of the secondary loads fails. After 3 seconds the Alarm LED blinks.	If the alarm activates again after trying to operate the secondary load, please check status of the secondary load control device according to instructions provided by the manufacturer.	32
Force Manual	Handle mounted.	Please check that the handle has been removed from the change-over switch and the change-over switch is not padlocked from the front panel.	256
External Fault	Both automatic transfer switch position status inputs are active.	Check connections between OMD and the change-over switch	512
External Alarm	External malfunction	Check the device connected to the external alam input	1024
Generator Alarm	Generator malfunctioning.	Check generator according to instructions provided by the manufacturer.	4096

Table 13.2 Alarms in OMD800

Events are explained in the table below:

Message	Description	Value
LN1 No Voltage	No voltage on line I	0
LN1 Undervoltage	Undervoltage on line I	1
LN1 Overvoltage	Overvoltage on line I	2
LN1 Phase Loss	Phase missing on line I	3
LN1 Unbalance	Voltage unbalance on line I	4
LN1 Phase Sequence	Incorrect phase sequence on line I	5
LN1 Inv. Frequency	Invalid frequency on line I	6
LN2 No Voltage	No voltage on line II	7
LN2 Undervoltage	Undervoltage on line II	8
LN2 Overvoltage	Overvoltage on line II	9
LN2 Phase Loss	Phase missing on line II	10
LN2 Unbalance	Voltage unbalance on line II	11
LN2 Phase Sequence	Incorrect phase sequence on line II	12
LN2 Inv. Frequency	Invalid frequency on line II	13
Opening I	Switching I -> O	14
Opening II	Switching II -> O	15
Opening Sec. Loads	Disconnecting secondary loads	16
Closing I	Switching O -> I	17
Closing II	Switching O -> II	18
Closing Sec. Loads	Connecting secondary loads	19
I Open	Switch I open	20
II Open	Switch II open	21
Sec. Loads Open	Secondary loads disconnected	22
I Closed	Switch I closed	23
II Closed	Switch II closed	24
Sec. Loads Closed	Secondary loads connected	25
Generator Started	Generator start activated	26
Generator Stopped	Generator stop activated	27
Handle attached	Changeover switch handle mounted	28
Handle Detached	Changeover switch handle dismounted	29
Force Commutation On	Force commutation signal activated	30
Force Commut. Off	Force commutation signal inactivated	31
Generator Start On	External generator start signal activated	32
Gen. Start Off	External generator start signal inactivated	33
Inhibit Switching On	Inhibit switching signal activated	34
Inhibit Sw. Off	Inhibit switching signal inactivated	35
Remote I On	Remote control to position I activated	36
Remote I Off	Remote control to position I inactivated	37
Remote O On	Remote control to position O activated	38
Remote O Off	Remote control to position O inactivated	39
Remote II On	Remote control to position II activated	40

Message	Description	Value
Remote II Off	Remote control to position II inactivated	41
Manual BS (back switching) On	Manual back switching signal activated	42
Manual BS Off	Manual back switching signal inactivated	43
Emergency Stop On	Emergency stop signal active	44
Emergency Stop Off	Emergency stop signal inactive	45
Inhibit Remote On	Inhibit remote control signal active	46
Inhibit Remote Off	Inhibit remote control signal inactive	47
Manual To Auto	Operating mode changed from Manual to Auto	48
Auto To Manual	Operating mode changed from Auto to Manual	49
Manual To Test	Operating mode changed from Manual to Test	50
Test To Manual	Operating mode changed from Test to Manual	51
Remote Reset On	Remote reset signal activated	52
Remote Reset Off	Remote reset signal inactivated	53
Pre-transfer Signal On	Pre-transfer signal activated	54
Pre-transfer Signal Off	Pre-transfer signal inactivated	55
Priority I Signal On	Priority I signal activated	56
Priority I Signal Off	Priority I signal inactivated	57
Priority II Signal On	Priority II signal activated	58
Priority II Signal Off	Priority II signal inactivated	59
External Alarm Signal On	External alarm signal activated	60
External Alarm Signal Off	External alarm signal inactivated	61

Table 13.3 Events in OMD800

Some of the events include information about current operating mode or event source. Information is presented with a capital letter in brackets after the event:

Letter	Source	Description	Value
M	Manual	Event initiated by user action in manual mode	1
A	Auto	Event initiated by automatic switching logic	2
T	Test	Event initiated by user action in test mode	3
H	Handle	Event initiated while handle attached	4
F	Fieldbus (Modbus)	Event initiated by fieldbus command	5
I	Digital Input	Event initiated by digital input	6

Table 13.4 Event operating mode and source information

Event/Alarm Log can be read through Modbus registers (see 11.2.3 OMD800 communication via Modbus). Return value of the register can be interpreted as following:

Alarm/Event flag	Event value	Event source
Bit 15 (1 = Event)	Bits 8-14 (see Table 13.3)	Bits 0-7 (See Table 13.4)

Alarm/Event flag	Event value
Bit 15 (0 = Alarm)	Bits 0-12 (see Table 13.2)

13.3 Explanations of internal faults OMD100, OMD200, OMD300, OMD800

When digital Input 1 and 2 are both active, logic is locked and the Alarm LED is ON.
When digital Input 3 is active, logic is locked and the Alarm LED is ON.

13.4 Change-over switch does not respond

During the switching sequence, the OMD_ operates the change-over switch (Switch I) first to the position O from position I. If this transition is not completed in three seconds, the Open 1 Failure is activated. If switching to the position O is completed, but the transition (Switch II) from O to II fails, the Close 2 Failure is activated. These alarms will lock the switching logic and can only be reset by pushing the AUTO key.

During the back switching sequence, similiar transitions will be perfomed from II to O and from O to I, possibly activating Open 2 Failure or Close 1 Failure.

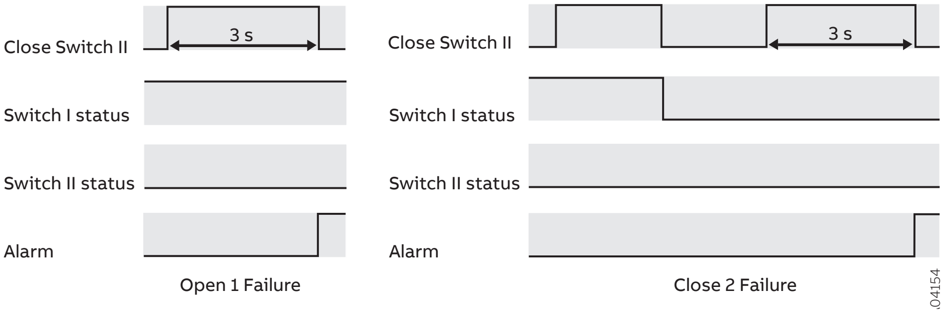


Figure 13.1 **Unsuccesful switching sequence**

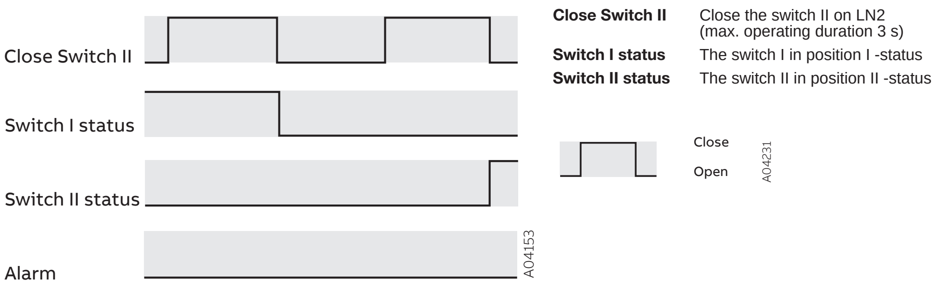


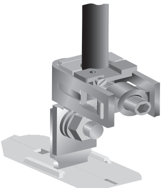
Figure 13.2 **Succesful switching sequence**

13.5 Missing of both lines

The missing of both lines is indicated by a blinking Power LED. In this case, the OMD_ will be in a power saving state. If both lines are missing more than one minute, the OMD_ will shut down.

14 Accessories

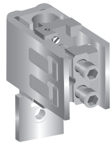
14.1 Terminal clamp



OTM1000-1600E_C_D_
OZXB3
OZXB4
OZXB5
OZXB6*
OZXB7L

OTM800-1200U_C_D_
OZXA-1200_
OZXA-1206_

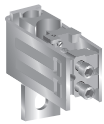
* max. 1 pcs/side



OTM630-800E_C_D_
OZXB3
OZXB4
OZXB5
OZXB6*
OZXB7L

OTM600U_C_D_
OZXA-800_
OZXA-806_

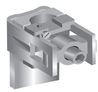
* max. 1 pcs/side



OTM315-400E_C_D_
OZXB2L
OZXB3
OZXB7
OZXB7L
OZXB8
OZXB9

OTM400U_C_D_
OZXA-400_
OZXA-406_

* max. 1 pcs/side



OTM160-250E_C_D_
OZXB1L
OZXB2
OZXB2L
OZXB8
OZXB9

OTM200U_C_D_
OZXA-200_
OZXA-206_

* max. 1 pcs/side

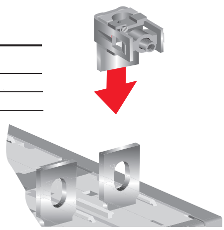


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Figure 14.1 **Mounting of the terminal clamp sets, types OZXB_ and OZXA_**

14.2 Bridging bars

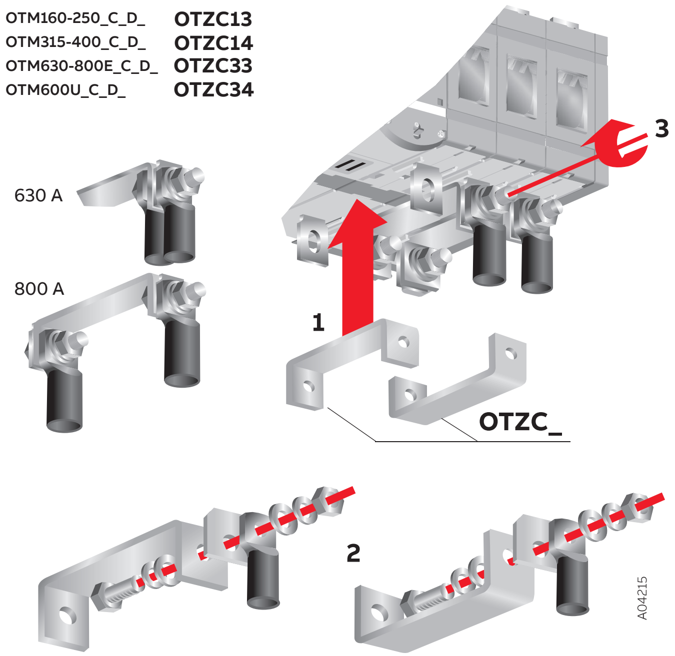

Figure 14.2 **Mounting of the bridging bars (type OTZC_) to the automatic transfer switches OTM160-800E_C_D_ and OTM200-600U_C_D_**

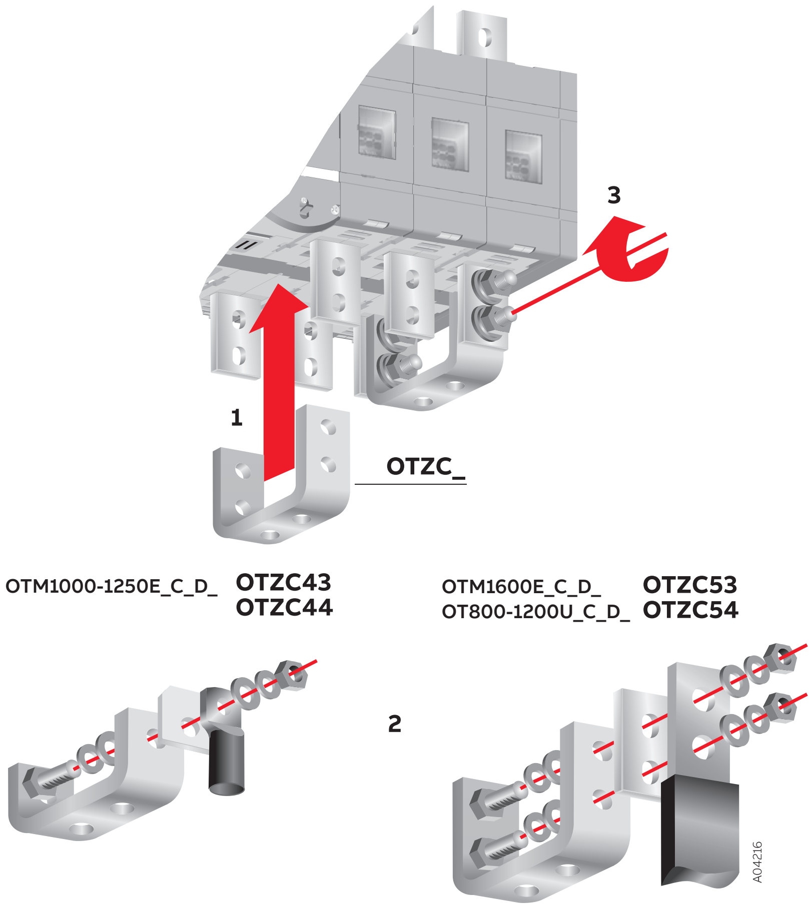

Figure 14.3 **Mounting of the bridging bars (type OTZC_) to the automatic transfer switches OTM1000-1600E_C_D_ and OTM800-1200U_C_D_**

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14.3 Terminal shrouds

			M	M
OTM160-250_C_D_	OTS250_	M8	15-22 Nm	5/6DIA in 133-195 lb.in
OTM315-400_C_D_	OTS400_	M10	30-44 Nm	266-390 lb.in
OTM630-800E_C_D_ OTM600U_C_D_	OTS800_	M12	50-75 Nm	433-664 lb.in

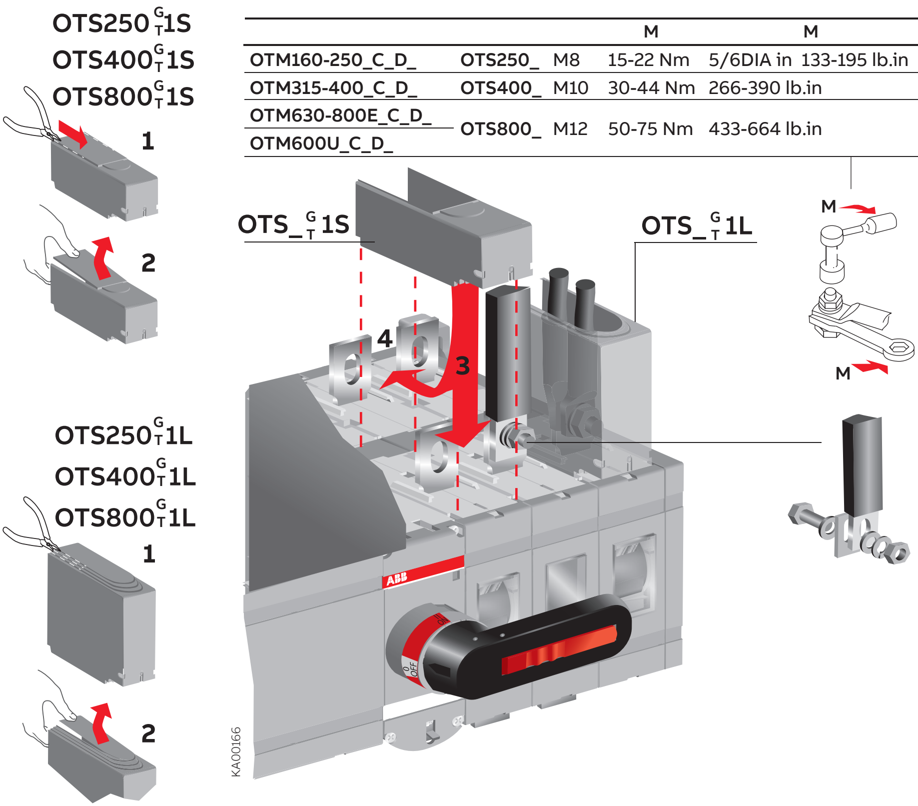

Figure 14.4 **Mounting of the terminal shrouds (type OTS_) to the automatic transfer switches OTM160-800E_C_D_ and OTM200-600U_C_D_**

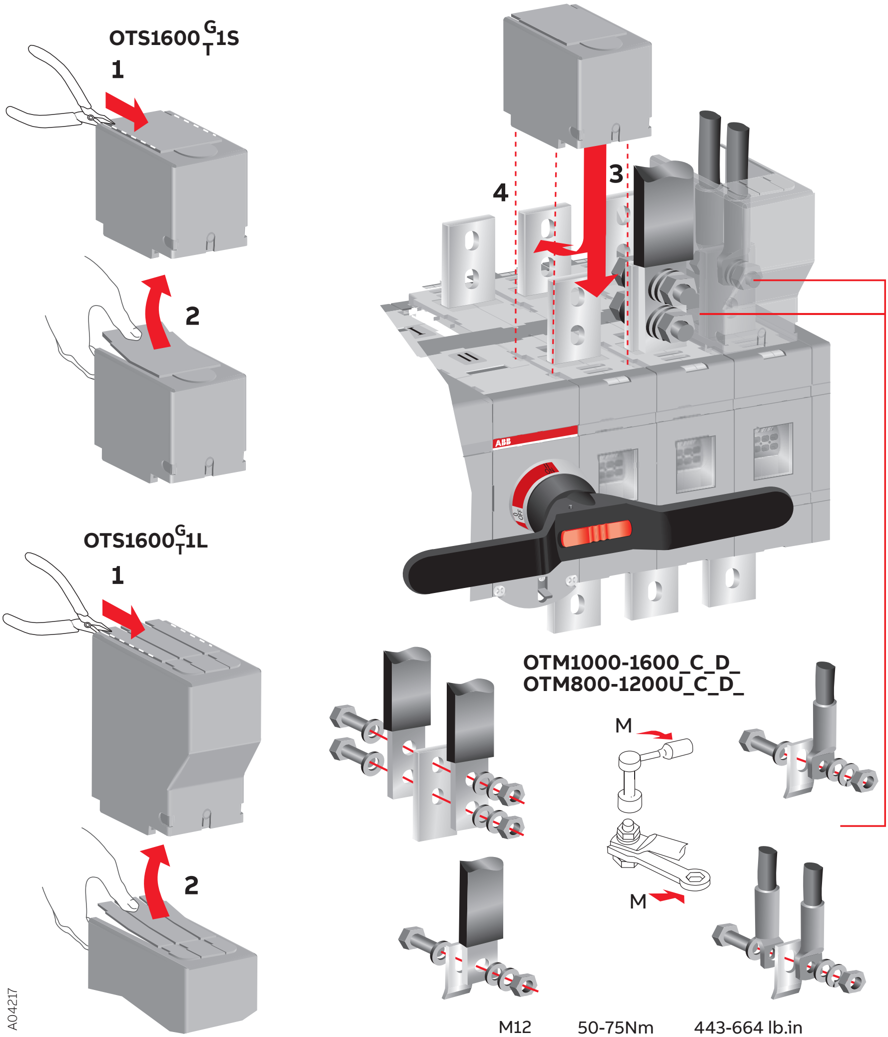

Figure 14.5 Mounting of the terminal shrouds (type OTS_) to the automatic transfer switches OTM1000-1600E_C_D_ and OTM800-1200U_C_D_

14.4 Auxiliary contact blocks

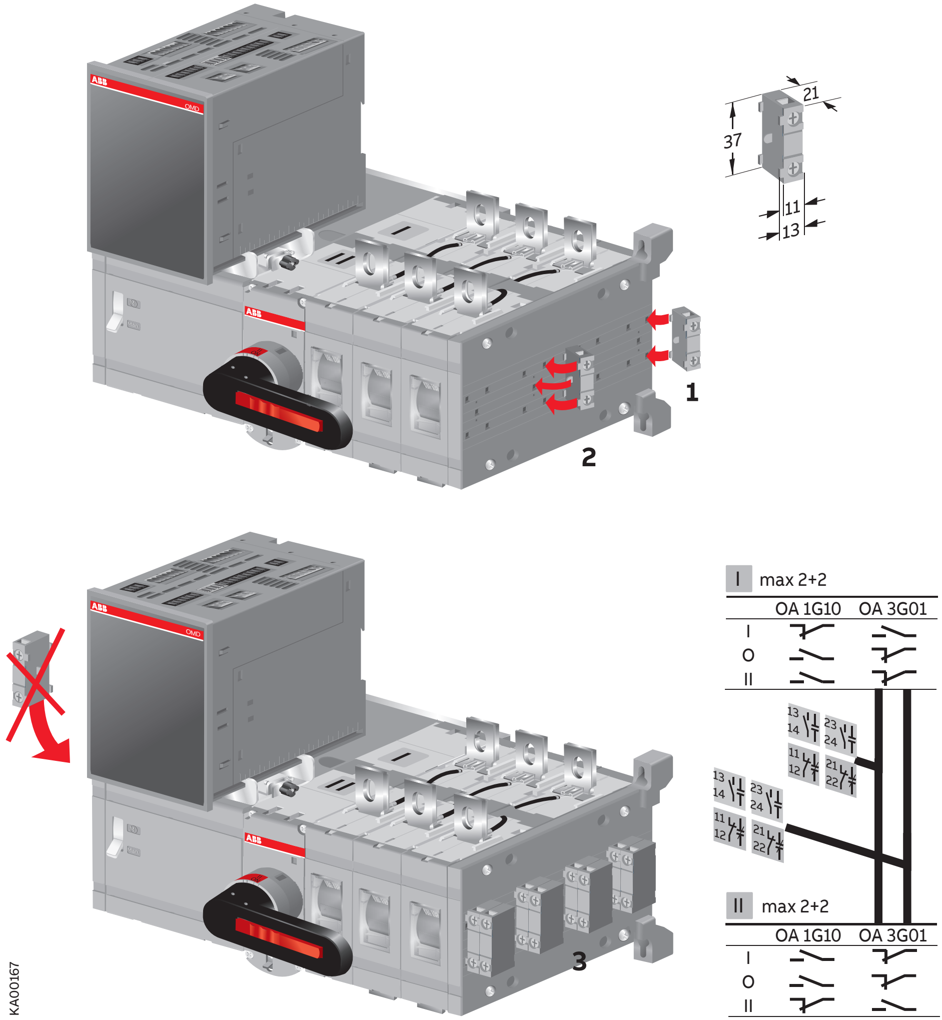

Figure 14.6 **Mounting of the auxiliary contact blocks, type OA_**

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14.5 Handle and spare fuse storage

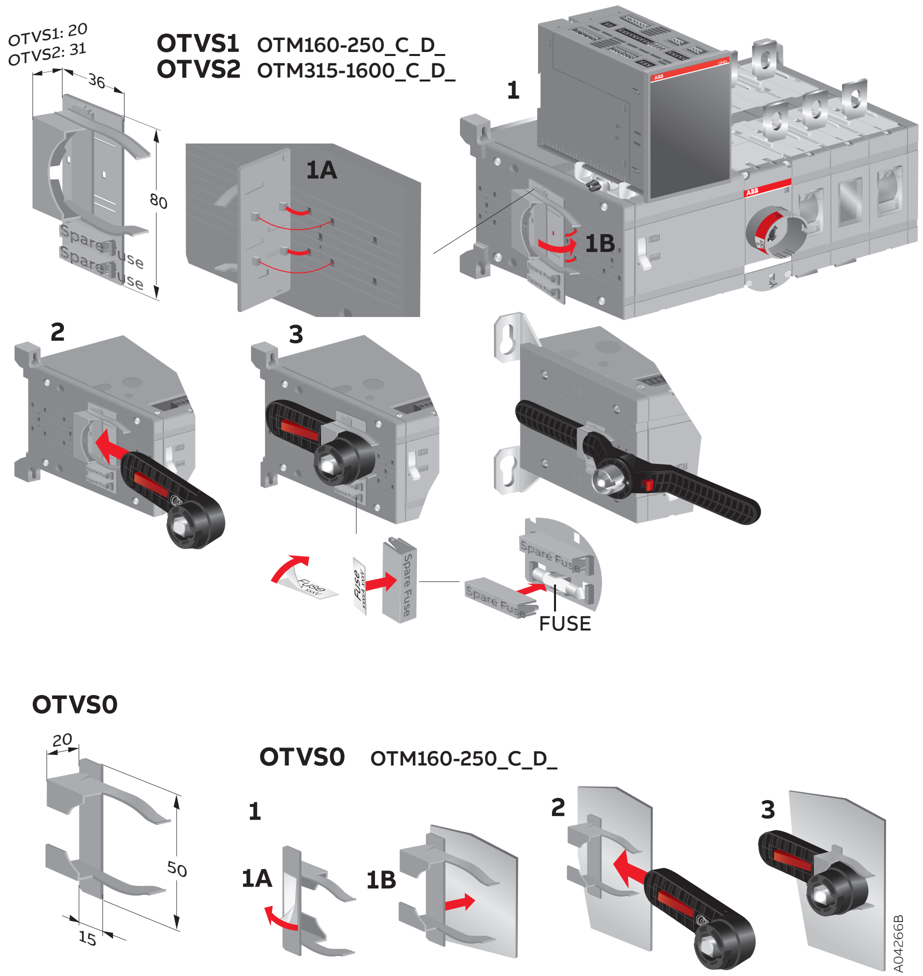


Figure 14.7 **Handle and spare fuses can be stored on the automatic transfer switch by mounting the accessory OTVS1. OTVS0 is for handle only, mounting on the cabinet door or wall**

14.6 Fastener

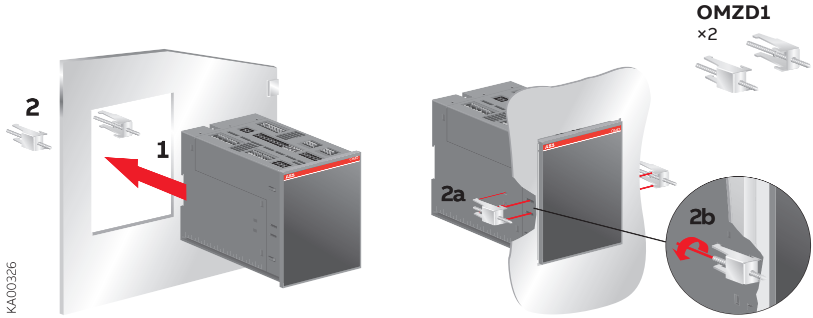
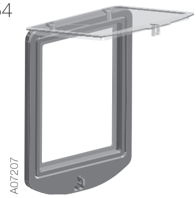


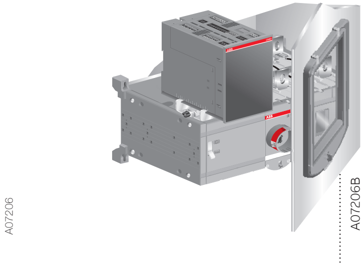
Figure 14.8 **Fastener OMZD1, used when the automatic control unit OMD_ is mounted on the door**

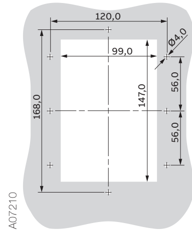
14.7 Cover plate

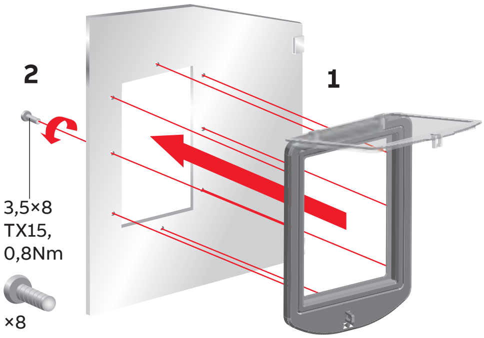
OMZC2

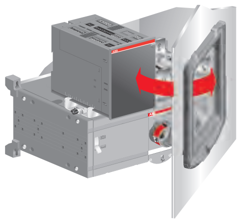
IP54

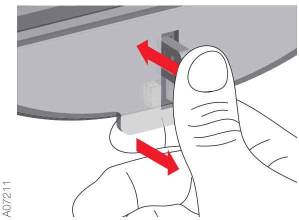


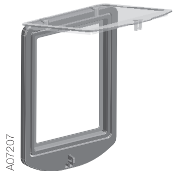


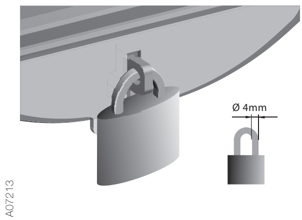


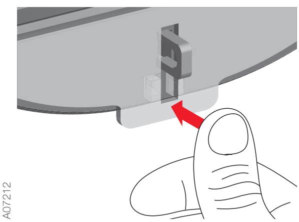


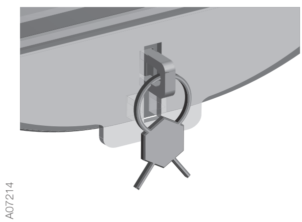












OMZC2
IP54

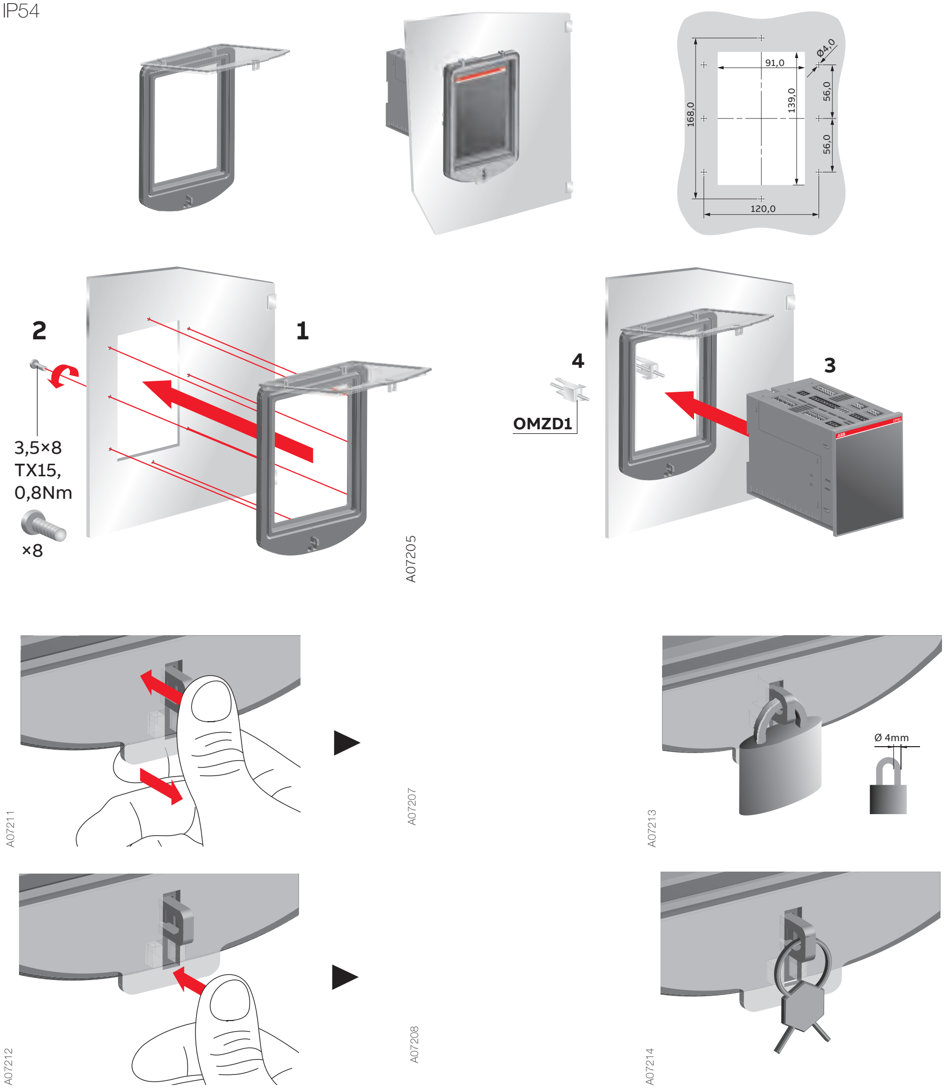


Figure 14.9 **Door drilling and mounting of the cover plate OMZC2 , when the automatic control unit OMD200, 300 or 800 is mounted on the door**

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14.8 Dual Power Source

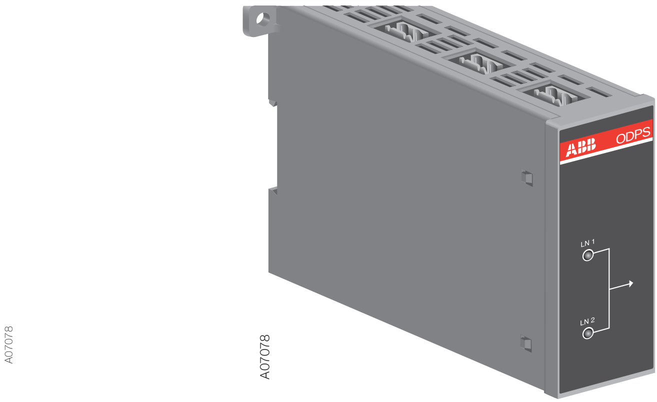


Figure 14.10 **Dual power source ODPSE230C can be used to provide power supply for motor operator by using two lines, Line 1 and Line 2.**

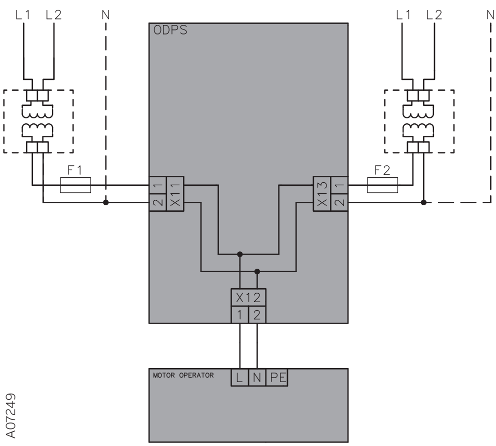
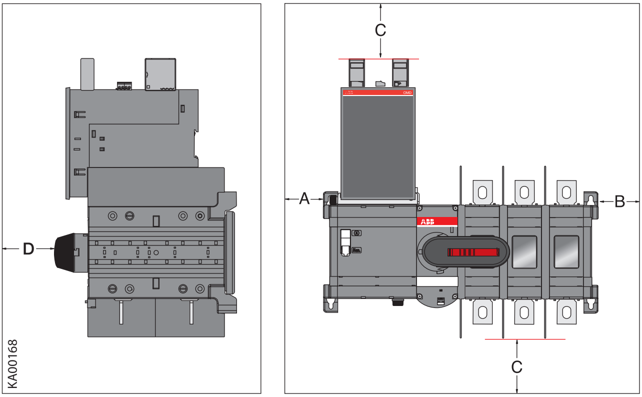


Figure 14.11 **Connection diagram ODPSE230C**

15 UL standars switches



	Height	Width	Depth
OTM200U_C_D_	406 mm/16 in	305 mm/12 in	203 mm/8 in
OTM400U_C_D_	610 mm/24 in	356 mm/14 in	254 mm/10 in
OTM600U_C_D_	600 mm/24 in	700 mm/28 in	400 mm/16 in

	A	B	D
OTM200U_C_D_ OTM400U_C_D_ OTM600U_C_D_	0	13 mm/0.5 in	70 mm/2.8 in

OTM200U_C_D_			
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_C_D_			
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		
3/0-4/0	175 mm/7 in		

OTM600-1200U_C_D_			
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

Figure 15.1 **UL standard switches, OTM200U_C_D_, OTM400U_C_D_, OTM600U_C_D_, OTM800U_C_D_ and OTM1200U_C_D_**

15.1 Phase barriers

Phase barriers or shrouds (see section 14.3) must be used to maintain a clearance of 1 inch on the automatic transfer switch types: OTM600U_C_D_, if the conductors are wider than 39 mm /1,54 in (phase barrier 68838) and on OTM800-1200U_C_D_, if the lugs are wider than 54 mm /2,13 in (phase barrier 68912).

Phase barriers 68912 must be used on automatic transfer switches types OTM1000-2500_C_D_ if the voltage is > 415 V.

The types for the package of 6 barriers are: 68838 = OTB800/6C and 68912 = OTB1600/6C.

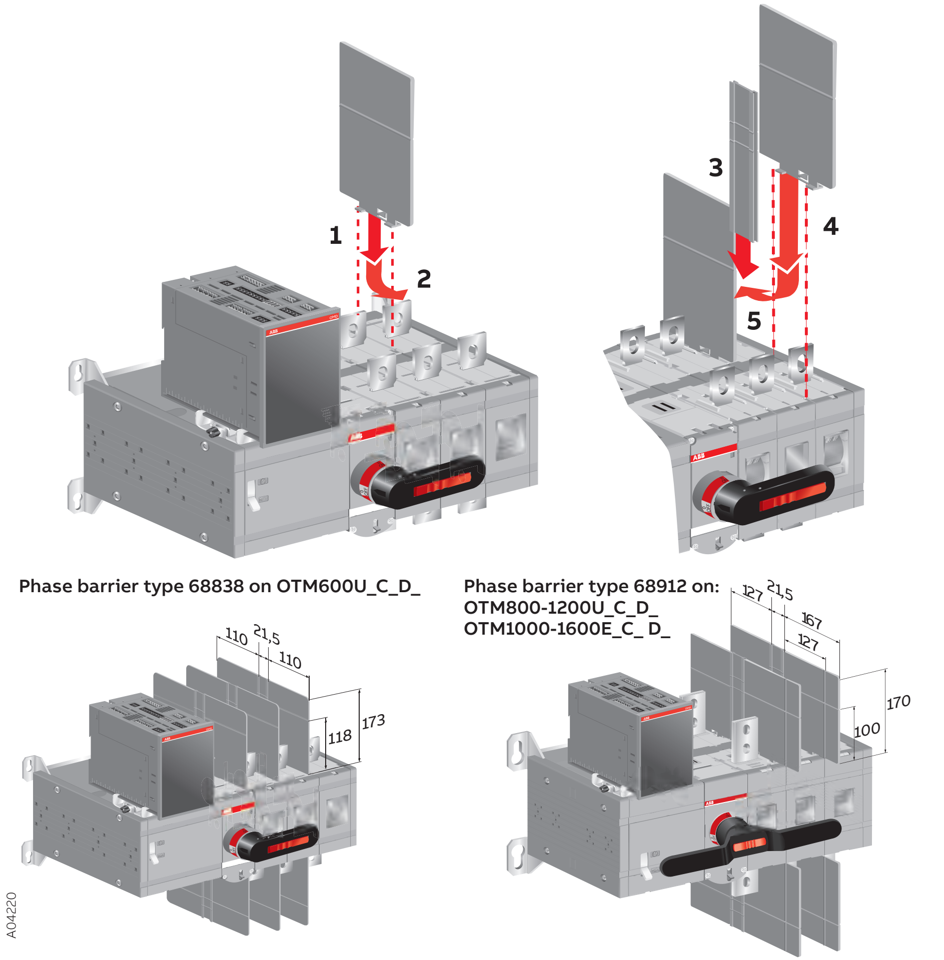


Figure 15.2 **OTM600-1200U_C_D_ and OTM1000-1600E_C_D_, mounting of phase barriers**

BG Внимание! Опасно напрежение! Да се монтира само от лице с електротехническа квалификация.
CN 警告！电压危险！只能由专业电工进行安装。
CZ Varování! Nebezpečné napětí! Montáž smí provádět výhradně elektrotechnik!
DA Advarsel! Farlig elektrisk spænding! Installation må kun foretages af personer med elektroteknisk ekspertise.
DE Warnung! Gefährliche Spannung! Installation nur durch elektrotechnische Fachkraft.
EL Προειδοποίηση! Υψηλή τάση! Η εγκατάσταση πρέπει να γίνεται μόνο από εξειδικευμένους ηλεκτροτεχνικούς.
EN Warning! Hazardous voltage! Installation by person with electrotechnical expertise only.
ES ¡Advertencia! ¡Tensión peligrosa! La instalación deberá ser realizada únicamente por electricistas especializados.
ET Hoiatus! Ohtlik pinge. Paigaldada võib ainult elektrotehnika-alane ekspert.
FI Varoitus! Vaarallinen jännite! Asennuksen voi tehdä vain sähköalan ammattihenkilö.
FR Avertissement! Tension électrique dangereuse! Installation uniquement par des personnes qualifiées en électrotechnique.
HR Upozorenje! Opasan napon! Postavljati smije samo elektrotehnički stručnjak.
HU Figyelmeztetés! Veszélyes feszültség! Csak elektrotechnikai tapasztalattal rendelkező szakember helyezheti üzembe.
IE Rabhadh! Voltas guaiseach! Ba chóir do dhuine ag a bhfuil saineolas leictriteicniúil, agus an té sin amháin, é seo a shuiteáil.
IT Avvertenza! Tensione pericolosa! Fare installare solo da un elettricista qualificato.
LT Dėmesio! Pavojinga įtampa! Dirbti leidžiama tik elektrotechniko patirties turintiems asmenims.
LV Uzmanību! Bīstami - elektrība! Montāžas darbus drīkst veikt tikai personas, kurām ir atbilstošas elektrotehniskās zināšanas.
MT Twissija! Vultaġġ perikoluż! Għandu jiġi installat biss minn persuna b'kompetenza elettroteknika.
NL Waarschuwing! Gevaarlijke spanning! Mag alleen geïnstalleerd worden door een deskundige elektrotechnicus.
NO Advarsel! Farlig spenning! Montering skal kun utføres av kvalifiserte personer med elektrokompetanse.
PL Ostrzeżenie! Niebezpieczne napięcie! Instalacji może dokonać wyłącznie osoba z fachową wiedzą w dziedzinie elektrotechniki.
PT Aviso! Tensão perigosa! A instalação só deve ser realizada por um eletricista especializado.
RO Avertizare! Tensiune periculoasă! Instalarea trebuie efectuată numai de către o persoană cu experienţă în electrotehnică.
RU Осторожно! Опасное напряжение! Монтаж должен выполняться только специалистом-электриком.
SE Varning! Farlig spänning! Installation får endast utföras av en elektriker.
SK Varovanie! Nebezpečné napätie! Montáž môže vykonávať iba skúsený elektrotechnik.
SL Opozorilo! Nevarna napetost! Vgradnjo lahko opravi le oseba z elektrotehničnim strokovnim znanjem.

Contact us

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FI-65101 Vaasa
Finland

abb.com/lowvoltage

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