Medium-voltage switchgear

MCset 17.5 kV

Air insulated switchgear
Withdrawable circuit breaker SF$_6$ or vacuum technology

Civil engineering guide

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11/2018
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As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.

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Remarks on this manual

This Civil engineering guide describes installation of air-insulated medium-voltage switchgear units of the series MCset 17.5 kV. It is exclusively intended for use by the manufacturer's staff or by persons certified for the MCset series (training certificate).

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it.

This Civil engineering guide is an integral part of the product and must be stored so that it is readily accessible at all times for and can be used by persons who are to work on the switchgear. If the switchgear is relocated to another site, this guide must be passed on to the new operators along with the unit.

As our products are subject to continuous development; we reserve the right to make changes regarding the standards, illustrations and technical data described in this guide.

This Civil engineering guide cannot describe every imaginable individual case or every customer-specific version of the product. For information which is not included in this manual, please contact the manufacturer.

All dimensional data in this manual is in millimetres.

Reference documents

The following additional documents must be complied with:

- purchase agreement with the stipulations regarding the switchgear-specific equipment and the legal details
- the appropriate switchgear-specific circuit diagrams / documentation
- the assembly drawings supplied with the equipment
- the operating and assembling instruction of the MCset 17.5kV
- the Assembly Instructions of the manufacturer of the cable connection systems to be connected to the switchgear
Terms and symbols used

The following special messages may appear throughout this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

The addition of this symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions not followed.

| DANGER | DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury. |
| WARNING | WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury. |
| CAUTION | CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. |
| NOTICE | NOTICE is used to address practices not related to physical injury. |

Please note

Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledges related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.
Abbreviations used

**Electrical dimensions**

- $U_r$: Rated voltage
- $I_r$: Rated current
- LV: Low voltage
- MV: Medium voltage, including levels 7.2 - 12 and 17.5 kV
- AFL: Accessibility of type "A"-Front Lateral
- AFLR: Accessibility of type "A"-Front Lateral Rear

**Panel types**

- FU: Functional Unit (panel + mobile part + relay)
- ADx: Incoming/outgoing panel
- CLx-GLx: Withdrawable line coupling panel
- TTx: Measurement and busbar earthing panel
- RHB: Connection from the top by bar
- RHC: Connection from the top by cable
- MTP: Connection duct between an MCset panel and a MOTORPACT panel
- DLx: Fuse switch outgoing panel

**Components**

- VT: Voltage transformer
- ES: Earthing switch
- CT: Current transformer or current sensor
- VPIS: Voltage Presence Indicating System

**Mobile part**

- LF: Withdrawable circuit-breaker with SF$_6$ breaking technology which is used in AD and CL panels
- EasyPact EXE: Withdrawable circuit-breaker with vacuum breaking technology used in ADx and CLx panels
- Rollarc 400: SF$_6$ breaking withdrawable contactor equipping the AD1 panel
- EVOLIS: Withdrawable circuit-breaker with vacuum breaking technology which is used in AD and CL panels
- CTV1: Vacuum breaking withdrawable contactor equipping the AD1 panel
- OED: Rack-in or rack-out and removal tool of the mobile parts on the ground

Mobile part extraction or insertion table

- Do not allow to place the mobile part on the floor.
Any questions or suggestions?

Do you have any questions or suggestions regarding this Civil engineering guide, or do you require further information?

We always strive to provide you with the best-possible information for optimum, safe use of our products. Thus, do not hesitate to contact us if you have any recommendations, amendments or proposals for improvement.

1 Safety provisions

Before performing work on the panel, it is essential that you comply with the following instructions:

⚠️ DANGER

RISK OF FATALITIES DUE TO ELECTRICAL VOLTAGE!
- Before removing covers and before performing assembly or maintenance work, make sure that you isolate the system from the high voltage and the supply voltage and that you ground it.
- Comply with the five safety rules:
  1. Isolate from the power supply,
  2. make sure that unintentional restart (re closing) is prevented,
  3. verify zero voltage,
  4. earth and short-circuit,
  5. cover or cordon off adjacent live components.

Failure to follow these instructions will result in death and serious injury.

⚠️ WARNING

RISK OF INJURY DUE TO MOVABLE PARTS IN MECHANICAL DRIVES!
Before performing mounting and maintenance work:
- isolate the system from the supply voltage;
- release the circuit-breaker's energy storing device by OFF-ON-OFF operation;
- switch make-proof earthing switches ON.
- Do not remove the mechanisms during maintenance work.

Failure to follow these instructions could result in death, serious injury, or equipment damage.

⚠️ WARNING

RISK OF INJURY DUE TO SHARP-EDGED SHEET METAL AND METAL PARTS!
During installation and maintenance work
- Always wear the approved protective clothing in accordance with the valid accident prevention and work regulations.
- Always cover sharp edges.

Failure to follow these instructions could result in serious injuries.
Applicable standards and regulations:

- Metal-enclosed AC switchgear for rated voltages > 1 kV up to including 52 kV: IEC 62271-200
- The locally applicable accident prevention, operating and work instructions must be complied with.
- Assembly and maintenance: IEC 61936-1 / EN 505221
- Operation of electrical equipment: EN 50110-1

1 The national standards applicable in the country where the equipment is to be installed must be complied with.

Other standards or regulations have to be checked and accessed locally.

Behaviour in case of incidents or accidents

For the case of an internal fault, the switchgear MCset is equipped with pressure relief ports which prevent the panels and the switchgear from bursting.

This Civil engineering guide does not include information regarding the safety of buildings in case of internal faults (pressure load of the switchgear room and necessary pressure relief ports). Pressure calculations for switchgear rooms inclusive recommendations regarding pressure relief ports can be provided on request against a fee. For further details, please contact the manufacturer.

In case of fire or of internal faults, toxic and caustic decomposition products may be produced. Comply with the locally applicable accident and safety provisions.

Make sure that first-aid measures are taken in case of injury to persons.
## 2 Design and description

### 2.1 AD, CL-GL, TT panels with LF-Circuit breaker

#### 2.1.1 Panels with one current transformer per phase, part of a switchboard with internal arcing withstand on three sides (AFL) or without internal arc withstand

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>AD1</th>
<th>AD2</th>
<th>AD3 (2500 A)</th>
<th>AD3 (3150 A)</th>
<th>AD3 (3600 A - 4000 A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width W [mm]</td>
<td>570</td>
<td>700</td>
<td>900</td>
<td>900</td>
<td>900</td>
</tr>
<tr>
<td>Height^1 H [mm]</td>
<td>2300</td>
<td>2300</td>
<td>2300</td>
<td>2300</td>
<td>2445</td>
</tr>
<tr>
<td>Depth D [mm]</td>
<td>1550</td>
<td>1550</td>
<td>1550</td>
<td>1700</td>
<td>1700</td>
</tr>
<tr>
<td>Mass^2 [kg]</td>
<td>850</td>
<td>1000</td>
<td>1300</td>
<td>1700</td>
<td>1760</td>
</tr>
<tr>
<td>Mass of VT compartment [kg]</td>
<td>120</td>
<td>130</td>
<td>130</td>
<td>130</td>
<td>130</td>
</tr>
</tbody>
</table>

^1 This dimension excludes cable flanges as well as any compartments placed under the panel.

^2 Maximum fully fitted mass
### Dimensions

<table>
<thead>
<tr>
<th></th>
<th>CL1/GL1</th>
<th>CL2/GL2</th>
<th>CL3/GL3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width W [mm]</td>
<td>570 x 2</td>
<td>700 x 2</td>
<td>900 x 2</td>
</tr>
<tr>
<td>Height H [mm]</td>
<td>2300</td>
<td>2300</td>
<td>2300</td>
</tr>
<tr>
<td>Depth D [mm]</td>
<td>1550</td>
<td>1550</td>
<td>1550</td>
</tr>
<tr>
<td>Mass [kg]</td>
<td>650 x 2</td>
<td>750 x 2</td>
<td>850 x 2</td>
</tr>
<tr>
<td>Mass of VT compartment [kg]</td>
<td>120</td>
<td>130</td>
<td>130</td>
</tr>
</tbody>
</table>

1. This dimension excludes cable flanges as well as any compartments placed under the panel.
2. Maximum fully fitted mass
Design and description

MCset 17.5 kV

Dimensions

<table>
<thead>
<tr>
<th></th>
<th>TT1</th>
<th>TT2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width W [mm]</td>
<td>570</td>
<td>700</td>
</tr>
<tr>
<td>Height H [mm]</td>
<td>2300</td>
<td>2300</td>
</tr>
<tr>
<td>Depth D [mm]</td>
<td>1550</td>
<td>1550</td>
</tr>
<tr>
<td>Mass [kg]</td>
<td>500</td>
<td>550</td>
</tr>
<tr>
<td>Mass of VT compartment [kg]</td>
<td>120</td>
<td>130</td>
</tr>
</tbody>
</table>

1 This dimension excludes cable flanges as well as any compartments placed under the panel.
2 Maximum fully fitted mass
2.1.2 Panels with one CT per phase, part of a switchboard with internal arcing withstand on four sides (AFLR)

![Diagram of panels with dimensions](image)

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>AD1</th>
<th>AD2</th>
<th>AD3 2500 A</th>
<th>AD3 3150 A</th>
<th>AD3 3600 A / 4000 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width W [mm]</td>
<td>570</td>
<td>700</td>
<td>900</td>
<td>900</td>
<td>900</td>
</tr>
<tr>
<td>Height H [mm]</td>
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<td>2300</td>
<td>2300</td>
<td>2300</td>
<td>2445</td>
</tr>
<tr>
<td>Depth D [mm]</td>
<td>1725</td>
<td>1725</td>
<td>1725</td>
<td>1725</td>
<td>1725</td>
</tr>
<tr>
<td>Mass [kg]</td>
<td>850</td>
<td>1000</td>
<td>1300</td>
<td>1700</td>
<td>1760</td>
</tr>
<tr>
<td>Mass of VT compartment [kg]</td>
<td>120</td>
<td>130</td>
<td>130</td>
<td>130</td>
<td>130</td>
</tr>
</tbody>
</table>

1. This dimension excludes cable flanges as well as any compartments placed under the panel.
2. Maximum fully fitted mass
### Design and description

**MCset 17.5 kV**

#### Fan

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>CL1/GL1</th>
<th>CL2/GL2</th>
<th>CL3/GL3</th>
<th>TT1</th>
<th>TT2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width W [mm]</td>
<td>570 x 2</td>
<td>700 x 2</td>
<td>900 x 2</td>
<td>900 x 2</td>
<td>570</td>
</tr>
<tr>
<td>Height(^1) H [mm]</td>
<td>2300</td>
<td>2300</td>
<td>2300</td>
<td>2300</td>
<td>2445</td>
</tr>
<tr>
<td>Depth D [mm]</td>
<td>1725</td>
<td>1725</td>
<td>1725</td>
<td>1725</td>
<td>1725</td>
</tr>
<tr>
<td>Mass(^2) [kg]</td>
<td>650 x 2</td>
<td>750 x 2</td>
<td>850 x 2</td>
<td>1250 x 2</td>
<td>1310 x 2</td>
</tr>
<tr>
<td>Mass of VT compartment [kg]</td>
<td>120</td>
<td>130</td>
<td>130</td>
<td>130</td>
<td>130</td>
</tr>
</tbody>
</table>

\(^1\) This dimension excludes cable flanges as well as any compartments placed under the panel.

\(^2\) Maximum fully fitted mass
### Dimensions

<table>
<thead>
<tr>
<th></th>
<th>TT1</th>
<th>TT2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width W [mm]</td>
<td>570</td>
<td>700</td>
</tr>
<tr>
<td>Height H [mm]</td>
<td>2300</td>
<td>2300</td>
</tr>
<tr>
<td>Depth D [mm]</td>
<td>1725</td>
<td>1725</td>
</tr>
<tr>
<td>Mass [kg]</td>
<td>500</td>
<td>550</td>
</tr>
<tr>
<td>Mass of VT compartment [kg]</td>
<td>120</td>
<td>130</td>
</tr>
</tbody>
</table>

1. This dimension excludes cable flanges as well as any compartments placed under the panel.
2. Maximum fully fitted mass
2.2 **AD, CL-GL, TT panels with EasyPact EXE circuit breaker**

2.2.1 Panels with one CT per phase, part of a switchbox with internal arcing withstand on three and four sides

**AD panels**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>AD 1</th>
<th>AD 2</th>
<th>AD 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width W [mm]</td>
<td>570</td>
<td>700</td>
<td>900</td>
</tr>
<tr>
<td>Height H [mm]</td>
<td>2300</td>
<td>2300</td>
<td>2300</td>
</tr>
<tr>
<td>Depth D [mm]</td>
<td>1550 (AFL)</td>
<td>1550 (AFL)</td>
<td>1550 (AFL)</td>
</tr>
<tr>
<td></td>
<td>1750 (AFLR)</td>
<td>1750 (AFLR)</td>
<td>1750 (AFLR)</td>
</tr>
<tr>
<td>Mass [kg]</td>
<td>850</td>
<td>1000</td>
<td>1300</td>
</tr>
<tr>
<td>Mass of VT compartment [kg]</td>
<td>120</td>
<td>130</td>
<td>130</td>
</tr>
</tbody>
</table>

1. This dimension excludes cable flanges as well as any compartments placed under the panel.
2. Maximum fully fitted mass
CL-GL panels

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>CL 1/GL 1</th>
<th>CL 2/GL 2</th>
<th>CL 3/GL 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width W [mm]</td>
<td>570 x 2</td>
<td>700 x 2</td>
<td>900 x 2</td>
</tr>
<tr>
<td>Height H [mm]</td>
<td>2300</td>
<td>2300</td>
<td>2300</td>
</tr>
<tr>
<td>Depth D [mm]</td>
<td>1550 (AFL)</td>
<td>1550 (AFL)</td>
<td>1550 (AFL)</td>
</tr>
<tr>
<td></td>
<td>1750 (AFLR)</td>
<td>1750 (AFLR)</td>
<td>1750 (AFLR)</td>
</tr>
<tr>
<td>Mass [kg]</td>
<td>650 x 2</td>
<td>750 x 2</td>
<td>850 x 2</td>
</tr>
<tr>
<td>Mass of VT compartment [kg]</td>
<td>120</td>
<td>130</td>
<td>130</td>
</tr>
</tbody>
</table>

1. This dimension excludes cable flanges as well as any compartments placed under the panel.
2. Maximum fully fitted mass TT1 and TT2 panels.
TT1 and TT2 panels

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>TT 1</th>
<th>TT 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width W [mm]</td>
<td>570</td>
<td>700</td>
</tr>
<tr>
<td>Height H [mm]</td>
<td>2300</td>
<td>2300</td>
</tr>
<tr>
<td>Depth D [mm]</td>
<td>1550 (AFL) 1750 (AFLR)</td>
<td>1550 (AFL) 1750 (AFLR)</td>
</tr>
<tr>
<td>Mass2 [kg]</td>
<td>500</td>
<td>550</td>
</tr>
<tr>
<td>Mass of VT compartment [kg]</td>
<td>120</td>
<td>130</td>
</tr>
</tbody>
</table>

1. This dimension excludes cable flanges as well as any compartments placed under the panel.
2. Maximum fully fitted mass
2.3 Panels with two current transformers per phase, part of a switchboard with internal arcing withstand on three sides (AFL) or without internal arc withstand

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>AD1</th>
<th>AD2</th>
<th>AD3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width W [mm]</td>
<td>570</td>
<td>700</td>
<td>900</td>
</tr>
<tr>
<td>Height H [mm]</td>
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<tr>
<td>Depth D [mm]</td>
<td>1750</td>
<td>1750</td>
<td>1750</td>
</tr>
<tr>
<td>Mass [kg]</td>
<td>900</td>
<td>1050</td>
<td>1350</td>
</tr>
<tr>
<td>Mass of VT compartment [kg]</td>
<td>120</td>
<td>130</td>
<td>130</td>
</tr>
</tbody>
</table>

1 This dimension excludes cable flanges as well as any compartments placed under the panel.
2 Maximum fully fitted mass
2.4 Panels with two current transformers per phase, part of a switchboard with internal arcing withstand on four sides (AFLR)
(installed in the middle of the room)

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>AD1</th>
<th>AD2</th>
<th>AD3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width W [mm]</td>
<td>570</td>
<td>700</td>
<td>900</td>
</tr>
<tr>
<td>Height H [mm]</td>
<td>2300</td>
<td>2300</td>
<td>2300</td>
</tr>
<tr>
<td>Depth D [mm]</td>
<td>1750</td>
<td>1750</td>
<td>1750</td>
</tr>
<tr>
<td>Mass [kg]</td>
<td>900</td>
<td>1110</td>
<td>1400</td>
</tr>
<tr>
<td>Mass of VT compartment [kg]</td>
<td>120</td>
<td>130</td>
<td>130</td>
</tr>
</tbody>
</table>

1 This dimension excludes cable flanges as well as any compartments placed under the panel.
2 Maximum fully fitted mass
2.5 Panel fitted with IPX1/IPX2 roofs
(e.g.: AD1 with internal arcing withstand on four sides)

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>AD1 IPX1</th>
<th>AD1 IPX2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width W [mm]</td>
<td>570</td>
<td>570</td>
</tr>
<tr>
<td>Height H [mm]</td>
<td>2732</td>
<td>2732</td>
</tr>
<tr>
<td>Depth D tunnel [mm]</td>
<td>1815</td>
<td>2485</td>
</tr>
</tbody>
</table>
2.6 DI2 panel
(Rear anti-arcing panel, internal arcing withstand on three or four sides)

Dimensions and masses

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>DI2</th>
<th>Internal arcing withstand on 3 sides (AFL)</th>
<th>Internal arcing withstand on 4 sides (AFLR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width W [mm]</td>
<td>700</td>
<td>700</td>
<td>700</td>
</tr>
<tr>
<td>Height H [mm]</td>
<td>2300</td>
<td>2300</td>
<td>2300</td>
</tr>
<tr>
<td>Depth D tunnel [mm]</td>
<td>1550</td>
<td>1550</td>
<td>1750</td>
</tr>
<tr>
<td>Mass [kg]</td>
<td>750</td>
<td>800</td>
<td>800</td>
</tr>
</tbody>
</table>
## 2.7 RHB and RHC panels

Panels with two CTs per phase, part of a switchboard with internal arcing withstand on four sides (installed in the middle of the room, no wall-mounting)

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>RHB1 RHC1</th>
<th>RHB1 RHC1</th>
<th>RHB2 RHC2</th>
<th>RHB2 RHC2</th>
<th>RHB3 (2500 A) RHC3 (2500 A)</th>
<th>RHB3 (3150 A) RHC3 (3150 A)</th>
<th>RHB3 (3600 A) RHC3 (3600 A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width W [mm]</td>
<td>570 570 700 700</td>
<td>570 570 700 700</td>
<td>900 900 900 900</td>
<td>900 900 900 900</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height H [mm]</td>
<td>2300 2300 2300 2300</td>
<td>2300 2300 2300 2300</td>
<td>2300 2300 2300 2750</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass1 [kg]</td>
<td>950 950 1100 1100</td>
<td>1100 1100 1400 1400</td>
<td>1800 1800</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass of VT compartment [kg]</td>
<td>120 120 130 130</td>
<td>130 130 130 130</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Maximum fully fitted mass
2.8 Transition Panel MTP (Motorpact Transition Panel)

This duct is factory-mounted to the right or left of an MCset (depends on switchboard configuration).

For more details see the "MOTORPACT civil engineering guide: 46032-700-07A.

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>1250 A</th>
<th>2500 A</th>
<th>3150 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width W [mm]</td>
<td>375</td>
<td>375</td>
<td>375</td>
</tr>
<tr>
<td>Height H [mm]</td>
<td>2300</td>
<td>2300</td>
<td>2300</td>
</tr>
<tr>
<td>Depth D tunnel [mm]</td>
<td>1550</td>
<td>1550</td>
<td>1550</td>
</tr>
<tr>
<td>Mass [kg]</td>
<td>240</td>
<td>275</td>
<td>310</td>
</tr>
</tbody>
</table>
3 Switchboard with a tunnel

3.1 Recommendations

Ceiling clearance \( H \) for installing an anti-arcing tunnel

- If the ceiling height \( H > 4 \, \text{m} \) (up to 25 kA / 1 s):
  installation of a tunnel is not necessary for anti-arcing withstand.

- For all configurations > 25 kA or \( H < 4 \, \text{m} \):
  tunnel is needed

- If the panel width \( L < 3 \, \text{m} \), external extraction should be provided (contact Schneider Electric).

- According to switchboard configuration, external extraction may be recommended (consult us).

Installation above the switchboard

All installation of equipment, such as lamps or light fittings is prohibited to avoid using the switchboard cover plates to gain access to this equipment.

Version 3600 A / 4000 A

For proper switchboard ventilation, external extraction is required so as not to accumulate hot air in the tunnel.

3.2 Installation

Wall mounting

**NOTICE**

To use the standard tunnel, the wall surface must be able to support brackets. If this is not possible, contact Schneider Electric.
Middle of the room mounting

H: ceiling height

2732
4 Space to be provided around a switchboard

4.1 Civil engineering with maintenance space

AD1, AD2, AD3 panels

NOTICE

- For core drillings, contact Schneider Electric.
- For fire protection between the service space and the panel, contact Schneider Electric.

---

A | Access to room
B | Main earthing bar
C | Reserved slab space, if necessary, for routing of low voltage cables
D | Reserved slab space for routing of MV cables
E | Medium voltage cable
F | Cable connection compartment space (option)
G | This space must remain free for the opening of the gas exhaust outlets in the event of internal arcing. Put nothing in this zone (lights, cable ducts, equipment storage, etc.), or if the tunnel is to be installed.

1 Minimum dimension (in mm)

<table>
<thead>
<tr>
<th>Panel type / Rating</th>
<th>Tunnel</th>
<th>H [mm]</th>
<th>R [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFL &amp; short circuit ≤ 25 kA</td>
<td>No</td>
<td>4000</td>
<td>200</td>
</tr>
<tr>
<td>AFL &amp; short circuit &gt; 25 kA</td>
<td>Yes</td>
<td>3370</td>
<td>200</td>
</tr>
<tr>
<td>AFLR &amp; short circuit ≤ 25 kA</td>
<td>No</td>
<td>4000</td>
<td>800</td>
</tr>
<tr>
<td>AFLR &amp; short circuit &gt; 25 kA</td>
<td>Yes</td>
<td>3370</td>
<td>800</td>
</tr>
</tbody>
</table>
**NOTICE**

- For core drillings, contact Schneider Electric.
- For fire protection between the service space and the panel, contact Schneider Electric.

---

A Access to room  
B Main earthing bar  
C Reserved slab space for routing of MV cables  
D This space must remain free for the opening of the gas exhaust outlets in the event of internal arcing. Put nothing in this zone (lights, cable ducts, equipment storage, etc.), or if the tunnel is to be installed.

1 Minimum dimension (in mm)

<table>
<thead>
<tr>
<th>Panel type / Rating</th>
<th>Tunnel</th>
<th>H [mm]</th>
<th>R [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFL &amp; short circuit ≤ 25 kA</td>
<td>No</td>
<td>4000</td>
<td>200</td>
</tr>
<tr>
<td>AFL &amp; short circuit &gt; 25 kA</td>
<td>Yes</td>
<td>3370</td>
<td>200</td>
</tr>
<tr>
<td>AFLR &amp; short circuit ≤ 25 kA</td>
<td>No</td>
<td>4000</td>
<td>800</td>
</tr>
<tr>
<td>AFLR &amp; short circuit &gt; 25 kA</td>
<td>Yes</td>
<td>3370</td>
<td>800</td>
</tr>
</tbody>
</table>
**Motorpact Transition Panel - MTP**

---

A  Access to room  
B  Main earthing bar  
C  Reserved slab space for routing of low voltage cables.  
D  Reserved slab space for routing of MV MCset 123 cables (see the chapter "Civil engineering reserved slab space") (option)  
E  Reserved slab space for routing of MV MOTORPACT cables\(^2\)  
F  This space must remain free for the opening of the gas exhaust outlets in the event of internal arcing. Put nothing in this zone (lights, cable ducts, equipment storage, etc.), or if the tunnel is to be installed.

\(^1\) Minimum dimension [mm].  
\(^2\) For more details see the "MOTORPACT civil engineering guide: 46032-700-07A".

<table>
<thead>
<tr>
<th>Panel type / Rating</th>
<th>Tunnel</th>
<th>H [mm]</th>
<th>R [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFL &amp; short circuit ≤ 25 kA</td>
<td>No</td>
<td>4000</td>
<td>200</td>
</tr>
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<td>Yes</td>
<td>3370</td>
<td>200</td>
</tr>
<tr>
<td>AFLR &amp; short circuit ≤ 25 kA</td>
<td>No</td>
<td>4000</td>
<td>800</td>
</tr>
<tr>
<td>AFLR &amp; short circuit &gt; 25 kA</td>
<td>Yes</td>
<td>3370</td>
<td>800</td>
</tr>
</tbody>
</table>
4.2 Civil engineering with duct

AD1, AD2, AD3 panels

NOTICE

The depth of the maintenance space must respect the bending radius of the cables used.

<table>
<thead>
<tr>
<th>Panel type / Rating</th>
<th>Tunnel</th>
<th>H [mm]</th>
<th>R [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFL &amp; short circuit ≤ 25 kA</td>
<td>No</td>
<td>4000</td>
<td>200</td>
</tr>
<tr>
<td>AFL &amp; short circuit &gt; 25 kA</td>
<td>Yes</td>
<td>3370</td>
<td>200</td>
</tr>
<tr>
<td>AFLR &amp; short circuit ≤ 25 kA</td>
<td>No</td>
<td>4000</td>
<td>800</td>
</tr>
<tr>
<td>AFLR &amp; short circuit &gt; 25 kA</td>
<td>Yes</td>
<td>3370</td>
<td>800</td>
</tr>
</tbody>
</table>

1 Minimum dimension [mm].
DI2 panels

**NOTICE**

The depth of the maintenance space must respect the bending radius of the cables used.

---

**A** Access to room  
**B** Main earthing bar  
**C** Reserved slab space for routing of medium voltage cables  
**D** This space must remain free for the opening of the gas exhaust outlets in the event of internal arcing. Put nothing in this zone (lights, cable ducts, equipment storage, etc.), or if the tunnel is to be installed.

---

<table>
<thead>
<tr>
<th>Panel type / Rating</th>
<th>Tunnel</th>
<th>H [mm]</th>
<th>R [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFL &amp; short circuit ≤ 25 kA</td>
<td>No</td>
<td>4000</td>
<td>200</td>
</tr>
<tr>
<td>AFL &amp; short circuit &gt; 25 kA</td>
<td>Yes</td>
<td>3370</td>
<td>200</td>
</tr>
<tr>
<td>AFLR &amp; short circuit ≤ 25 kA</td>
<td>No</td>
<td>4000</td>
<td>800</td>
</tr>
<tr>
<td>AFLR &amp; short circuit &gt; 25 kA</td>
<td>Yes</td>
<td>3370</td>
<td>800</td>
</tr>
</tbody>
</table>
Space to be provided around a switchboard

Motorpact Transition Panel - MTP

A Access to room
B Main earthing bar
C Reserved slab space for routing of low voltage cables.
D Reserved slab space for routing of medium voltage MCset 123 cables (see the chapter "Civil engineering reserved slab space") (option)
E Reserved slab space for routing of MV MOTORPACT cables
F This space must remain free for the opening of the gas exhaust outlets in the event of internal arcing. Put nothing in this zone (lights, cable ducts, equipment storage, etc.), or if the tunnel is to be installed.

1 Minimum dimension [mm].
2 For more details see the "MOTORPACT civil engineering guide: 46032-700-07A".

<table>
<thead>
<tr>
<th>Panel type / Rating</th>
<th>Tunnel</th>
<th>H [mm]</th>
<th>R [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFL &amp; short circuit ≤ 25 kA</td>
<td>No</td>
<td>4000</td>
<td>200</td>
</tr>
<tr>
<td>AFL &amp; short circuit &gt; 25 kA</td>
<td>Yes</td>
<td>3370</td>
<td>200</td>
</tr>
<tr>
<td>AFLR &amp; short circuit ≤ 25 kA</td>
<td>No</td>
<td>4000</td>
<td>800</td>
</tr>
<tr>
<td>AFLR &amp; short circuit &gt; 25 kA</td>
<td>Yes</td>
<td>3370</td>
<td>800</td>
</tr>
</tbody>
</table>
4.3 Civil engineering without duct or maintenance space

4.3.1 Incomer through the top version (RHB or RHC)

Withdrawable line coupling panels (CL-GL)

**NOTICE**

- For core drillings, contact Schneider Electric.
- For fire protection between the service space and the panel, contact Schneider Electric.

---

A Access to room
B Main earthing bar
C Space necessary for ventilation of the FU in version 3150 A / 3600 A / 4000 A (RHB3, RHC3, CL3 / GL3) and version 1250 A (CL1 / GL1, RHC1, RHB1).
D This space must remain free for the opening of the gas exhaust outlets in the event of internal arcing. Put nothing in this zone (lights, cable ducts, equipment storage, etc.), or if the tunnel is to be installed.

1 Minimum dimension (in mm)
2 Minimum dimension as per RHB or RHC connection
### Dimensions

| Dimensions | Depth [mm] of the panels |
|---|---|---|---|---|
| | 1550 | 1700/1725 | 2000 | 2275 |
| Depth X [mm] | 1025 | 1200 | 1500 | 1775 |

| Dimensions | Width [mm] of the panels |
|---|---|---|
| | 570 | 900 |
| Width Y [mm] | 150 | 200 |
| Width Z [mm] | 270 | 500 |
4.4 Requirements regarding the switchgear room dimensions

The W dimension depends on the number and FU types building up the switchboard.

- **A** This dimension must be equal to:
  - 1550 mm* for operation (extraction and positioning of moving parts)
  - 1750 mm* for the extraction of one FU with a depth of 1550 mm without displacing the others
  - 1925 mm* for the extraction of one FU with a depth of 1725 mm without displacing the others
  - 2200 mm* for the extraction of one FU with a depth of 2000 mm without displacing the others
  - 2475 mm* for the extraction of one FU with a depth of 2275 mm without displacing the others

- **B** This dimension must be equal to:
  - 800 mm* for a 900 mm long FU at the end of the switchboard
  - 500 mm* for all other FUs.

- **C** This dimension must be equal to:
  - 200 mm for a 1550 mm long FU with internal arcing withstand on 3 sides
  - 50 mm for a 1700 mm long panel with internal arcing withstand on 3 sides
  - 800 mm* for RHC and RHB type FUs (rear access essential)

- **D** Access to room
- **E** Main earthing bar of switchboard
- **F** Closing plates
- **G** Free space to work on MOTORPACT panels (access through the lower part of the Motorpact Transition Panel (MTP)).

* Minimum dimension [mm]
1. AD1, CL1, TT1
2. AD2, TT2, CL2, DI2
3. AD3, CL3
4.5 Position of medium voltage cables

AD1 panel
Maximum Ø external cables:
Single-pole Ø 70 mm
Three-pole Ø 90 mm.

AD2 panel
Maximum Ø external cables:
Single-pole Ø 70 mm
Three-pole Ø 90 mm.

AD3 panel (1250 A)
Maximum Ø external cables:
Single-pole Ø 70 mm
Three-pole Ø 90 mm.
AD3 panel (2500 A)
Maximum Ø external cables:
Single-pole Ø 70 mm
Three-pole Ø 90 mm.

AD3 panel (3150 A)
Maximum Ø external cables:
Single-pole Ø 70 mm
Three-pole Ø 90 mm.

AD3 panel (3600 and 4000 A)
Maximum Ø external cables:
Single-pole Ø 70 mm
Three-pole Ø 90 mm.
**DI2 panel**

Maximum Ø external cables:
Single-pole Ø 70 mm
Three-pole Ø 90 mm.

**MOTORPACT panel**

See "MOTORPACT civil engineering guide: 46032-700-07A".
5 Assembly

5.1 Safety provisions

The switchgear panels may only be installed and assembled by the manufacturer’s staff or by persons who have been certified for this work.

⚠️ DANGER

RISK OF FATALITIES DUE TO ELECTRICAL VOLTAGE!

- Before removing covers and before performing assembly or maintenance work, make sure that you isolate the system from the high voltage and the supply voltage and that you ground it.

- Comply with the five safety rules:
  1. Isolate from the power supply,
  2. make sure that unintentional restart (re-closing) is prevented,
  3. verify zero voltage,
  4. earth and short-circuit,
  5. cover or cordon off adjacent live components.

Failure to follow these instructions will result in death and serious injury.

⚠️ WARNING

RISK OF INJURY DUE TO MOVABLE PARTS IN MECHANICAL DRIVES!

Before performing mounting and maintenance work.

- isolate the system from the supply voltage;
- release the circuit-breaker’s energy storing device by OFF-ON-OFF operation;
- switch make-proof earthing switches ON.
- Do not remove the mechanisms during maintenance work.

Failure to follow these instructions could result in death, serious injury, or equipment damage.

⚠️ WARNING

RISK OF INJURY DUE TO SHARP-EDGED SHEET METAL AND METAL PARTS!

During installation and maintenance work

- Always wear the approved protective clothing in accordance with the valid accident prevention and work regulations.
- Always cover sharp edges.

Failure to follow these instructions could result in serious injury.
5.2 Instructions for assembly

MCset panels are delivered with the earthing switch ON.

In the case of panels with a width of 800 mm, the trucks can be delivered within the panels. They are in “disconnected” position. The circuit breakers are always shipped in open state (“OFF”) with the energy storing device released.

**NOTICE**

- Condensation, dirt and dust should be avoided during assembly on all accounts, in order to prevent damage to the panels.
- For assembly, observe the assembly drawings supplied with the equipment. Read them before you commence assembly work. The drawing numbers are specified in this manual in the description of the assembly work in question.
5.3 Floor finishing

Surface condition
The floor’s surface evenness must allow for a 2 meter rule to be placed on it in any direction and on all sides so that there are no deflections greater than 5 mm.

Quality of flooring
To roll extraction tools for moving parts (ERT, OESD, etc.) without damaging the floor, it must meet the following criteria:
- compressive strength $H \geq 33$ MPa.

5.4 Panel mounting

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>For a civil engineering structure built with a false floor or beams, consult Schneider Electric.</td>
</tr>
</tbody>
</table>

For standard or earthquake-resistant civil engineering, see installation manual no. 7897301.
5.5 Summary of different mounting methods

**NOTICE**
The ground must be perfectly smooth and free from any surface irregularity.

Non earthquake-resistant civil works

Earthquake-resistant civil engineering

A Front rail, supply on switchboard installation
B Low voltage cable opening
C Cable opening
D Horizontal adjustment with the rear
E Rear supporting plate
F Rear rail, supply on switchboard installation
G Rubber anti-vibration plate on the floor.
6  Incoming configuration of medium voltage cables

6.1  General information

The production of civil engineering and the installation of medium voltage cables must take several factors into account:

- The bending radius of the cables.
- The possibility of having slack, for pulling and then re-pushing cables.
- Cable handling, varying in ease according to incoming configurations and free cable length from its point of insertion in the maintenance space.

Some recommendations are given below.

Other incoming configurations are possible, particularly if there is greater clearance under the FUs.

**NOTICE**

If a cable chamber is used, adapt the depth of the maintenance space.

Should you have questions concerning a configuration, contact your nearest group Schneider Electric representative.

6.2  Civil engineering with maintenance space

6.2.1  Medium voltage cables incoming from the rear

Intended for cables up to 240 mm².

Not recommended for 630 mm² cables.

A  Cable compartment if necessary
6.2.2 **Medium voltage incoming from the front**

Not recommended for 630 mm² cables

![Diagram of medium voltage incoming from the front]

A  Cable compartment if necessary

6.2.3 **Medium voltage cables incoming laterally near a wall**

Intended for cables up to 240 mm².

Not recommended for 630 mm² cables.

![Diagram of medium voltage cables incoming laterally near a wall]

A  Cable compartment if necessary
6.2.4 **Medium voltage incoming laterally at a distance from a wall**

Possible for all cable diameters up to 630 mm².

According to the distance from the wall, the dimension E must be ≥ 2 m for 630 mm² cables.

![Diagram of medium voltage incoming laterally at a distance from a wall]

A  Cable compartment if necessary

6.3 **Civil engineering with duct**

6.3.1 **Medium voltage cables incoming from the rear**

Intended for cables up to 240 mm².

Not recommended for 630 mm² cables.

![Diagram of medium voltage cables incoming from the rear]

A  Cable compartment if necessary
6.3.2 Medium voltage cables incoming from the front

Intended for cables up to 240 mm².

Incoming by nozzle is not recommended if duct dimensions are limited to the minimum dimensions.

A Cable compartment if necessary

6.3.3 Medium voltage cables incoming laterally near a wall

Intended for cables up to 240 mm².

Not recommended for 630 mm² cables.

A Cable compartment if necessary
7 Reserved area in non earthquake-resistant civil works slab

7.1 Switchboard with FU AD, reserved space at the FU

A Positioning of rear
B Medium voltage cable opening
C Low voltage cable opening
D Front rail for switchboard installation
E Horizontal adjustment with rear
F Rear supporting plate
G Fixing drilling of front rails
H Place a rubber anti-vibration plate on the floor.
7.2 Switchboard with FU AD, reserved space over all civil engineering

- A Positioning of rear
- B Medium voltage cable opening
- C Front rail for switchboard installation
- D Horizontal adjustment with rear
- E Rear supporting plate
- F Fixing drilling of front rails
- G Place a rubber anti-vibration plate on the floor.
7.3 Switchboard with FU AD and DI2, reserved space at the FU

A Positioning of rear
B AD cable opening
C Low voltage cable opening
D Front rail for switchboard installation
E Horizontal adjustment with rear
F Rear supporting plate
G Fixing drilling of front rails
H D12 cable opening
I Place a rubber anti-vibration plate on the floor
7.4 Switchboard with FU AD and DI2, reserved space over all civil engineering

7.4.1 First solution

A Positioning of rear
B AD cable opening
C Low voltage cable opening
D Front rail for switchboard installation
E Horizontal adjustment with rear
F Rear supporting plate
G Fixing drilling of front rails.
H D12 cable opening
I Place a rubber anti-vibration plate on the floor
7.4.2 Second solution

AD and DI2 panel

A Positioning of rear
B LV cable opening
C Front rail for switchboard installation
D Horizontal adjustment with rear
E Rear supporting plate
F Fixing drilling of front rails
G Place a rubber anti-vibration plate on the floor.
7.5 Switchboard with FU AD and MTP, reserved space at the FU

AD panel

Transition panel

MOTORPACT panel

See "MOTORPACT civil engineering guide: 46032-700-07A"

A Positioning of rear
B AD cable opening
C Low voltage cable opening
D Front rail for switchboard installation
E Horizontal adjustment with rear
F Rear supporting plate
G Fixing drilling of front rails
H Medium voltage FU MOTORPACT cable opening
I Place a rubber anti-vibration plate on the floor.

MTP: MOTORPACT– MCset transition panel
7.6 Switchboard with FU AD and MTP, reserved space over all civil engineering

MCset 17.5 kV
Reserved area in non earthquake-resistant civil works slab

BOM

AD panel
Transition panel
MOTORPACT panel

See "MOTORPACT civil engineering guide: 46032-700-07A"

A Positioning of rear
B Medium voltage cable opening
C Front rail for switchboard installation
D Horizontal adjustment with rear
E Rear supporting plate

F Fixing drilling of front rails
G Place a rubber anti-vibration plate on the floor

MTP: MOTORPACT–MCset transition panel
7.7 Switchboard with FU RHB, RHC, CL/GL

NOTICE

No reserved space for switchboards made up of FU RHB / RHC.

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RHB / RHC panels

(1) RHB / RHC FU: 2000 mm depth
(2) RHC FU: 2275 mm depth

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CL / GL panels

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A Positioning of FU AD rear
B Positioning of FU RHB rear
C Low voltage cable opening
D Front rail for switchboard installation
E Horizontal adjustment with rear
F Rear supporting plate
G Fixing drilling of front rails
H Space necessary for ventilation of the FU in version RHB3, RHC3, CL3/GL3 (3150 A/3600 A/4000 A) version CL1/GL1,RHC1, RHB1 (1250 A)
I Place a rubber anti-vibration plate on the floor.
Dimensions

<table>
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<tr>
<th>Dimensions</th>
<th>Depth [mm] of the panels</th>
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<tbody>
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<td>Depth X</td>
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<th>Dimensions</th>
<th>Width [mm] of the panels</th>
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<td>270</td>
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8 Civil engineering earthquake-resistant reserved slab space

8.1 Switchboard with FU AD, reserved space at the FU

A Fixing drilling of rear rails
B Rear rail for switchboard installation
C Medium voltage cable opening
D Fixing drilling of front rails
E Front rail for switchboard installation
F Low voltage cable opening
8.2 Switchboard with FU AD, reserved space over all civil engineering

A Fixing drilling of rear rails
B Rear rail for switchboard installation
C Medium voltage cable opening
D Fixing drilling of front rails
E Front rail for switchboard installation
8.3 Switchboard with FU AD and DI2, reserved space at the FU

A Fixing drilling of rear rails
B Rear rail for switchboard installation
C Medium voltage FU AD cable opening
D Fixing drilling of front rails
E Front rail for switchboard installation
F Low voltage cable opening
G Medium voltage FU DI2 cable opening
8.4 Switchboard with FU AD and DI2, reserved space on the FU

8.4.1 First solution

A Fixing drilling of rear rails
B Rear rail for switchboard installation
C Medium voltage FU AD cable opening
D Medium voltage FU DI2 cable opening
E Fixing drilling of front rails
F Front rail for switchboard installation
G Low voltage cable opening
8.4.2 Second solution

AD and DI2 panels

A Fixing drilling of rear rails
B Positioning of rear rail
C Low voltage cable opening
D Fixing drilling of front rails
E Front rail for switchboard installation
8.5 Switchboard with FU AD and MTP, reserved space over all civil engineering

MCset 17.5 kV Civil engineering earthquake-resistant reserved slab space

8.5 Switchboard with FU AD and MTP, reserved space over all civil engineering

A Fixing drilling of rear rails
B Rear rail for switchboard installation
C Medium voltage FU AD cable opening
D Fixing drilling of front rails
E Front rail for switchboard installation
F LOW voltage cable opening
G Medium voltage FU MOTORPACT cable opening

MTP: MOTORPACT–MCset transition panel

See "MOTORPACT civil engineering guide: 46032-700-07A"
8.6 **Switchboard with FU AD and MTP, reserved space over all civil engineering**

![Diagram of switchboard with FU AD and MTP, reserved space over all civil engineering](image)

**AD panel**

- A Fixing drilling of rear rails
- B Rear rail for switchboard installation
- C Medium voltage FU AD cable opening
- D Fixing drilling of front rails

**Transition panel**

- E Front rail for switchboard installation
- F Cable opening MTP

**MOTORPACT panel**

See "MOTORPACT civil engineering guide: 46032-700-07A"
8.7 Switchboard with FU RHB, RHC, CL/GL

**NOTICE**

No reserved space for switchboards made up of FU RHB / RHC.

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(1) RHB / RHC FU: 1879 mm depth
(2) RHC FU: 2154 mm depth

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A Rear front rail fixation line
C Low voltage FU AD cable opening
D Front rail for switchboard installation
H FU ventilation intake required for FU ≥ 1250 A
### Dimensions

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