

SeT Series

MCS_{SeT}

Digitally Native 24 kV

Air-insulated Switchgear

With EvoPacT HVX Vacuum Circuit Breaker

Civil Engineering Guide

BQT8706400-00

07/2024



Legal Information

The information provided in this document contains general descriptions, technical characteristics and/or recommendations related to products/solutions.

This document is not intended as a substitute for a detailed study or operational and site-specific development or schematic plan. It is not to be used for determining suitability or reliability of the products/solutions for specific user applications. It is the duty of any such user to perform or have any professional expert of its choice (integrator, specifier or the like) perform the appropriate and comprehensive risk analysis, evaluation and testing of the products/solutions with respect to the relevant specific application or use thereof.

The Schneider Electric brand and any trademarks of Schneider Electric SE and its subsidiaries referred to in this document are the property of Schneider Electric SE or its subsidiaries. All other brands may be trademarks of their respective owner.

This document and its content are protected under applicable copyright laws and provided for informative use only. No part of this document may be reproduced or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise), for any purpose, without the prior written permission of Schneider Electric.

Schneider Electric does not grant any right or license for commercial use of the document or its content, except for a non-exclusive and personal license to consult it on an "as is" basis.

Schneider Electric reserves the right to make changes or updates with respect to or in the content of this document or the format thereof, at any time without notice.

To the extent permitted by applicable law, no responsibility or liability is assumed by Schneider Electric and its subsidiaries for any errors or omissions in the informational content of this document, as well as any non-intended use or misuse of the content thereof.

SeT Series

Featuring outstanding medium-voltage (MV) and low-voltage (LV) switchboards, motor control centres and power distribution solutions for high-performance power applications, Schneider Electric's SeT Series is optimized solutions based on high levels of safety and an optimized footprint. Built on a modular architecture and incorporating smart connected devices for maximum safety, reliability, performance and energy efficiency, the SeT Series is delivered to customers directly from our Schneider Electric plants or via a global network of licensed partner panel builders, who are trained and audited to provide quality equipment and support.

Table of Contents

Safety Information.....	5
Safety Precautions	6
About the Document.....	7
Safety Provisions	8
Dimensions and Weights	10
Cubicles without Internal Arc Accessories.....	10
Switchboard Tunnel.....	11
Switchboard with Internal Arc Accessories.....	11
Switchboard Spacing.....	12
Civil Engineering with Maintenance Space	12
Civil Engineering with Cable Trench	13
Spacing Around the Switchboard	14
Position of MV Cables.....	15
Civil Works Slab	18
Reserved Area in Civil Works Slab	18
Switchboard with I/F Cubicle FU and Reserved Space over all Civil Engineering	20
Floor Finishing and Fastening of the Cubicles	21
Assembly.....	21
Floor Finishing.....	22
Fastening of the Cubicles.....	23
Configuration of Incoming MV Cables	26
Civil Engineering with Maintenance Space	27
Civil Engineering with a Cable Trench	29
Glossary	31

Safety Information

Important Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



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 are not followed.



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.

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 knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

Safety Precautions

Safety Rules

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate Personal Protective Equipment (PPE) and follow safe electrical work practices. See standards or local equivalent.
- This EvoPacT HVX Vacuum Circuit Breaker (VCB) and the MCSeT equipment must only be installed and serviced by qualified electrical personnel.
- Perform work only after reading and understanding all of the instructions contained in this guide.
- Turn off all the power sources before working on or inside the equipment.
- Turn off or trip the VCB and discharge the mechanism.
- Always use a properly calibrated voltage sensing device to confirm power is off.
- Use only Schneider Electric specific tools (operating crank, extraction table, and so on).
- Check all devices, covers, and doors are in correct position before turning on the power.
- Beware of potential hazards and carefully inspect the work area for tools and objects that may have been left inside the equipment.
- Do not modify the mechanical or electrical parts.
- Do not bypass the interlocks before operation.
- Do not operate with protective barriers removed.

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

NOTICE

HAZARD OF DEGRADED EQUIPMENT PERFORMANCE

- Comply with the handling rules and avoid causing any shocks to the device.
- If the equipment is stored before its final installation, observe the storage conditions.

Failure to follow these instructions can result in equipment damage.

Cleaning Instructions

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Do not use solvents or alcohol for cleaning the equipment.
- Do not use high-pressure cleaner for cleaning the equipment.

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

About the Document

Intended Use

This civil engineering guide describes about air-insulated MV switchgear units of the MCSeT.

The operations described in this guide should be performed by a qualified personnel with proven experience regarding:

- The MCSeT series
- All relevant safety provisions

This civil engineering guide is the integral part of the product and should be stored such that it is readily accessible at all times and can be used by persons who work on the switchgear. If the switchgear is relocated to another site, this guide should be passed on to the new operator along with the unit.

This guide does not describe every imaginable individual case or every customer-specific version of the product. For more information that is not included in this guide, contact Schneider Electric.

Validity Note

This guide is valid only for MCSeT cubicle. It is an extension of the MCSet range and delivers performances up to 24 kV/31.5 kA/2500 A. It is equipped with a VCB and has other functional trolleys like the EvoPacT Metering Truck (MTX) and the Earthing Switch (E/S).

For product compliance and environmental information (RoHS, REACH, PEP, EOL, and so on), go to the [Green Premium](#) page on the Schneider Electric website.

The information contained in this guide is likely to be updated at any time. Schneider Electric strongly recommends that you have the most recent and up-to-date version available on www.se.com/ww/en/download.

The technical characteristics of the devices described in this guide also appear online. To access the information online, go to the Schneider Electric home page at www.se.com.

Product Related Information

Air-insulated MV switchgear units of the MCSeT series are designed exclusively for switching and distributing electrical power.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

The MCSeT switchgear must be used only in scope of specified standards and specific technical data.

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

Safety Provisions

Introduction

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

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Before removing covers and performing assembly or maintenance work:

- Ensure that the system is isolated from high voltage, supply voltage, and properly grounded.
- Ensure that the VCB is in test condition, the E/S is closed, and access is locked.
- Follow the Lock Out Tag Out (LOTO) process to perform any work on switchboard.
- Install barriers, cables, and polycarbonates in accordance with the design specifications wherever necessary.

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

WARNING

HAZARD OF MOVABLE PARTS IN MECHANICAL DRIVES

Before performing mounting and maintenance work, comply with the below safety rules:

- Isolate from the supply voltage.
- Release the energy-storing device of the VCB by performing the OFF-ON-OFF operation.
- Activate the make-proof E/S to ON position, to ensure that the equipment is ready for use (if any).
- Do not remove the mechanisms during maintenance work.

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

WARNING

HAZARD OF SHARP-EDGED SHEET METAL AND METAL PARTS

During installation and maintenance work, comply with the below safety rules:

- Apply appropriate Personal Protective Equipment (PPE) and follow safe electrical work practices. See standards or local equivalent.
- Always cover sharp edges.

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

Applicable Standards and Regulations

The applicable standards and regulations are as follows:

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

NOTE:

- The national standards applicable in the country where the equipment is to be installed should be complied.
- Other standards or regulations have to be checked and accessed locally.

Behavior in case of Incidents or Accidents

If an internal arc fault occurs, the MCSeT switchgear is equipped with pressure relief absorbers or ports to help prevent the cubicles and switchgear from being blown off.

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, including recommendations for pressure relief ports, are available upon request for a fee. For more details, contact Schneider Electric.

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

Make sure that the first-aid measures are taken in case of injury to persons.

Dimensions and Weights

Cubicles without Internal Arc Accessories

I/F, BSC, BSR, and BME Cubicles with 1 CT per Phase

Table 1 Dimensions of I/F, BSC, BSR, and BME Cubicles

Dimensions	I/F		BSC		BSR		BME	
Width W (mm)	800	1000	800	1000	800	1000	800	1000
Height H (mm) ⁽¹⁾	2400	2400	2400	2400	2400	2400	2400	2400
Depth D (mm) ⁽²⁾	1860	1860	1860	1860	1860	1860	1860	1860
Approximate weight with packing (kg) ⁽³⁾	1160	1470	1190	1510	800	1030	765	980
Approximate weight without packing (kg) ⁽³⁾	1020	1330	1120	1440	730	960	700	910

(1) The height varies based on customer requirements.

(2) The depth varies based on customer requirements.

(3) Fully equipped cubicle.

NOTE: All weights mentioned in this document may vary. The actual weights are specified on the cubicle packaging.

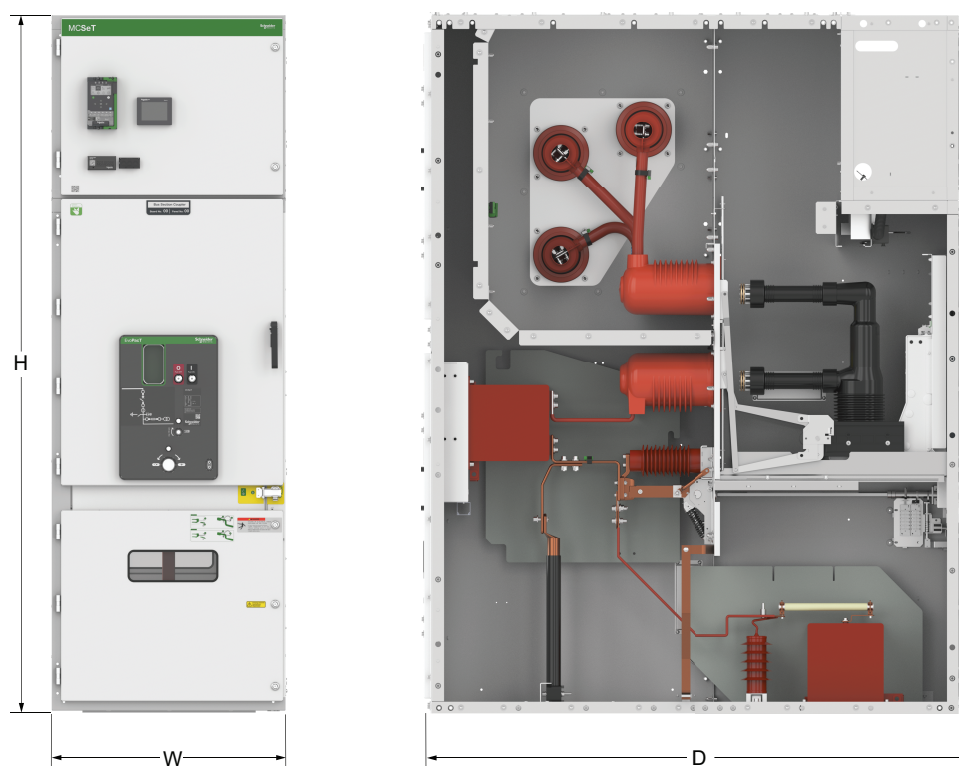


Figure 1
Dimensions of Cubicles

Switchboard Tunnel

Switchboard with Internal Arc Accessories

⚡⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Do not step on the switchboard roof to access the device and avoid installing any devices such as lamps above the switchboard.
- Ensure to maintain Schneider recommended minimum ceiling height for internal and external exhaust. For details, refer to Figure 2 and Figure 3.

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

Recommendations

- The minimum ceiling height for internal exhaust should be 3500 mm.
- The minimum ceiling height for external exhaust should be 3060 mm.

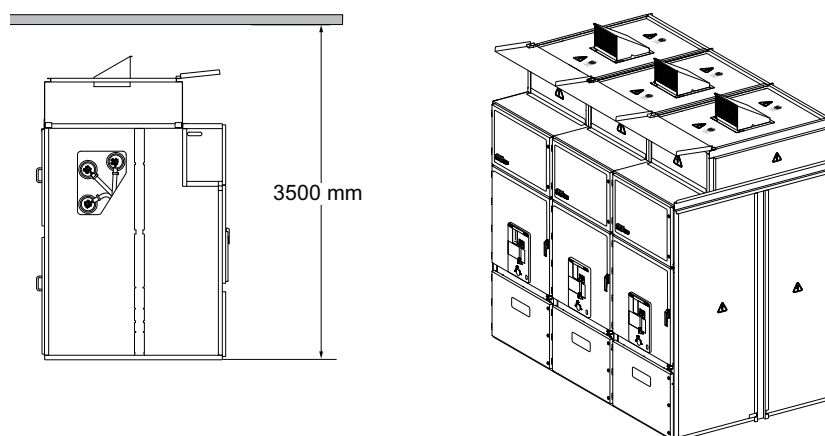


Figure 2
Ceiling Height for Internal Exhaust

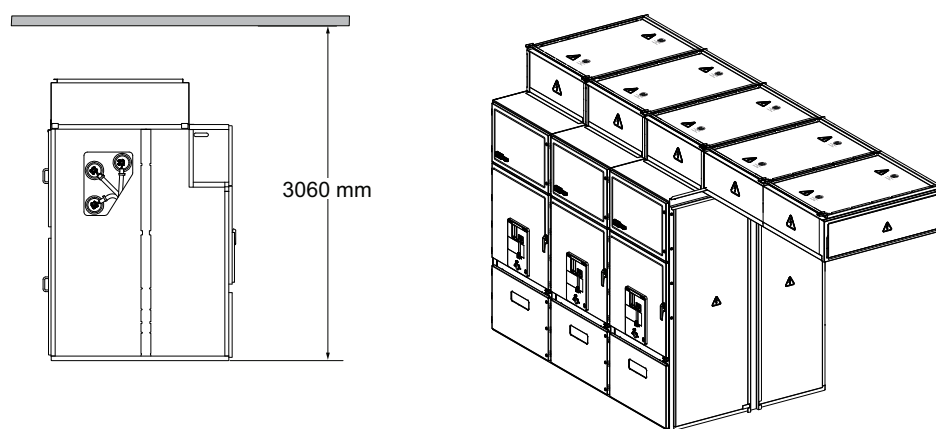


Figure 3
Ceiling Height for External Exhaust

Switchboard Spacing

⚠ CAUTION

HAZARD OF INCORRECT DIMENSIONS

Adhere to the specified spacing dimensions of the switchboard mentioned in Civil Engineering with Maintenance Space, page 12 and Civil Engineering with Cable Trench, page 13.

Failure to follow these instructions can result in injury or equipment damage.

Civil Engineering with Maintenance Space

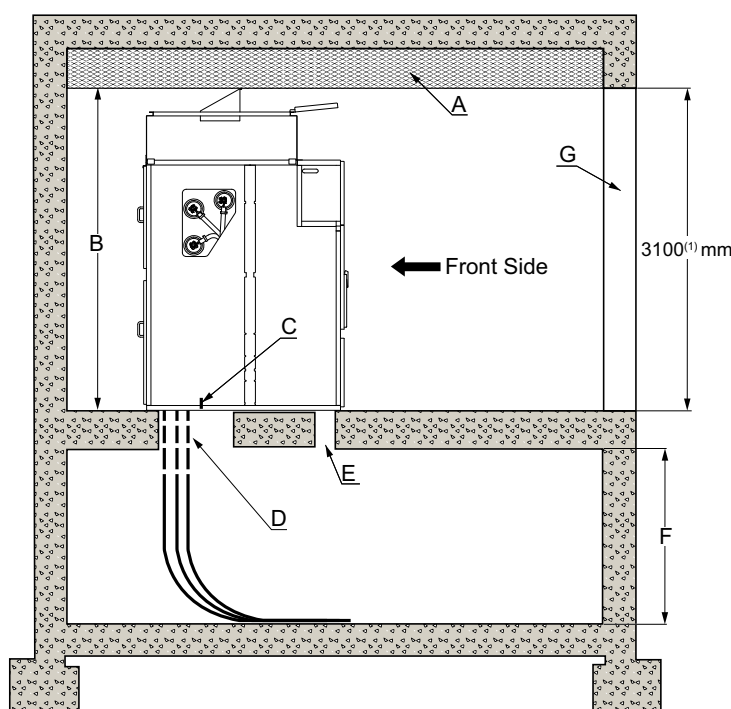


Figure 4
Civil Engineering with Maintenance Space

- A This space should remain free for the opening of the gas exhaust outlets in the event of internal arcing. Do not keep any devices in this zone (lights, equipment storage, cable tray, air condition duct, beam, and so on). It is also the location for the installation of the tunnel.
- B Total height of the cubicle height with internal exhaust is 3080 mm.
- C Main earthing bar.
- D Reserved slab space for routing the MV cables.
- E Reserved slab space for routing of LV cables.
- F Minimum cable basement or cable trench depth must be 1200 mm.
- G Access to room.

⁽¹⁾ Minimum dimensions to be complied with when installing the MCS_eT switchboard with minimum LV box height of 630 mm.

NOTE: The depth of the maintenance space should be equal to the bending radius of the cables being used. This helps to prevent cables from experiencing undue stress.

Civil Engineering with Cable Trench

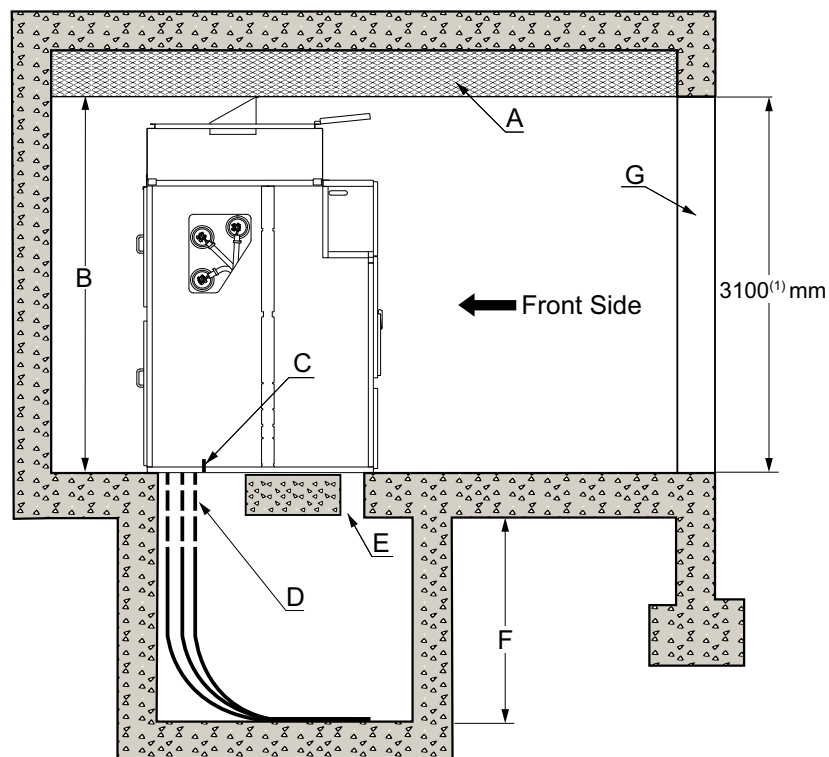


Figure 5
Civil Engineering with Cable Trench

- A This space should remain free for the opening of the gas exhaust outlets in the event of internal arcing. Do not keep any devices in this zone (lights, equipment storage, cable tray, air condition duct, beam, and so on). It is also the location for the installation of the tunnel.
- B Total height of the cubicle height with internal exhaust is 3080 mm.
- C Main earthing bar.
- D Reserved slab space for routing the MV cables.
- E Reserved slab space for routing of LV cables.
- F Minimum cable basement or cable trench depth must be 1200 mm.
- G Access to room.

⁽¹⁾ Minimum dimensions to be complied with when installing the MCS_eT switchboard with minimum LV box height of 630 mm.

NOTE: The depth of the maintenance space should be equal to the bending radius of the cables being used. This helps to prevent cables from experiencing undue stress.

Spacing Around the Switchboard

⚠ CAUTION

HAZARD OF INCORRECT DIMENSIONS

Adhere to the specified spacing dimensions around the switchboard, refer to Figure 6.

Failure to follow these instructions can result in injury or equipment damage.

Top view of the switchboard

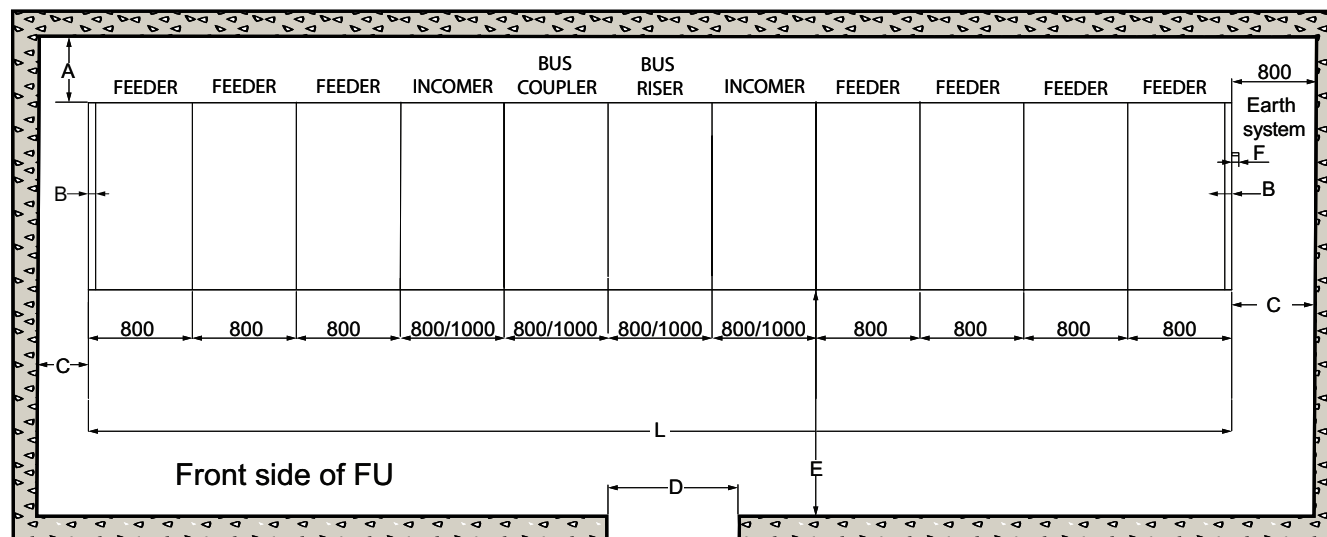


Figure 6
Spacing Around the Switchboard

The L dimension depends on the Functional Unit (FU) of the switchboard.

A: This dimension should be equal to:

- 200 mm for AFL (Accessibility Front Lateral) type of cubicle.
- 800 mm for AFLR (Accessibility Front Lateral Rear) type of cubicle.

B: 35 mm endcover.

C: This dimension should be equal to:

- 800 mm for both AFL and AFLR type of cubicle.
- 100 mm, if no access is required.

D: Minimum 1200 mm for opening the door.

E: The dimensions are as follows:

- Minimum distance for operating must be 1500 mm (minimum distance for face-to-face switchboard configuration must be 2500 mm).
- 1550 mm for operation (extraction and positioning of mobile parts).
- 2060 mm for the extraction of one FU with a depth of 1860 mm without displacing the others.
- 2710 mm for the extraction of one FU with a depth of 2510 mm without displacing the others.

F: Main earth bar for the switchboard.

NOTE:

- The Functional Unit (FU) is used for different cubicle setups, including feeder/incomer, bus coupler, bus riser, and bus metering configurations.
- For details of outgoing feeder with 1000 mm cubicle, contact Schneider Electric.
- For the extraction of the cubicle, contact Schneider Electric.

Position of MV Cables

I/F Cubicle with 1 CT per Phase – 800 mm

The maximum external cable diameter for single-core cables is $\varnothing 50$ mm.

Maximum allowable cable size is 630 mm².

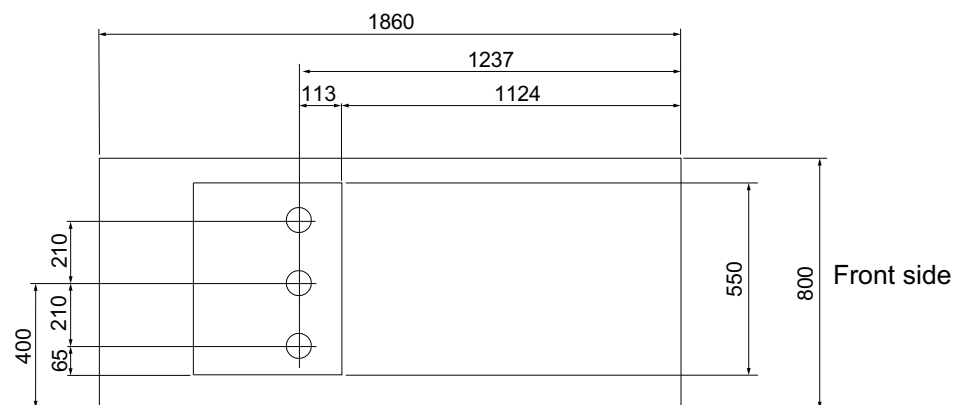


Figure 7
MV Cable Entry with a Single Run

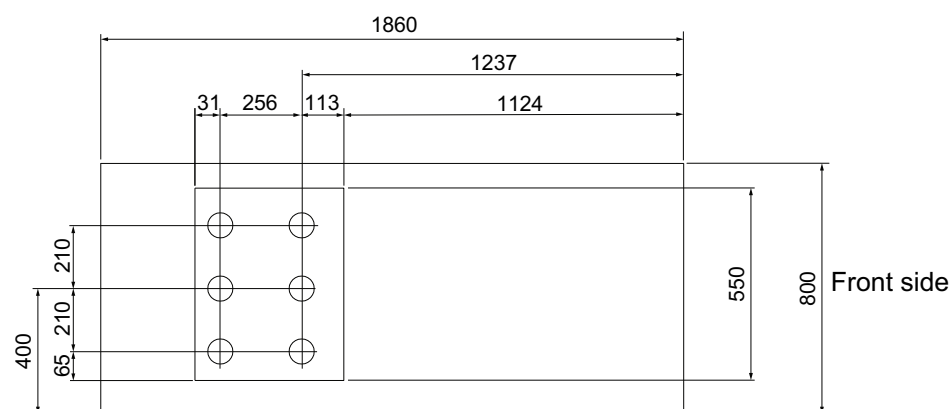


Figure 8
MV Cable Entry with Two Runs

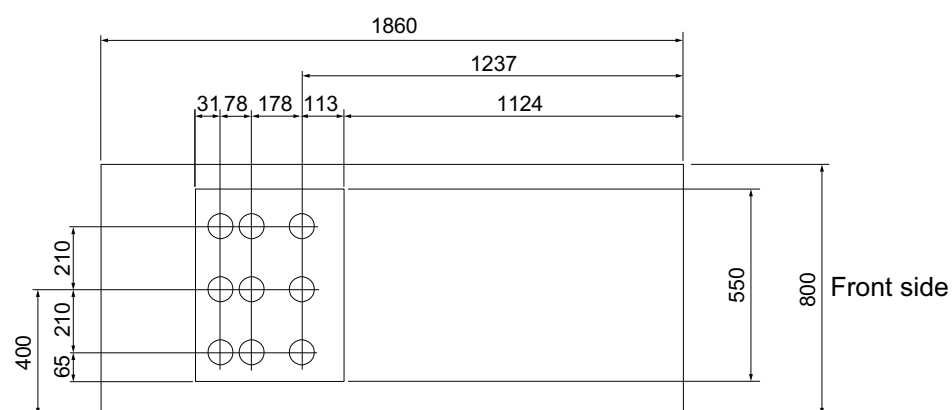


Figure 9
MV Cable Entry with Three Runs

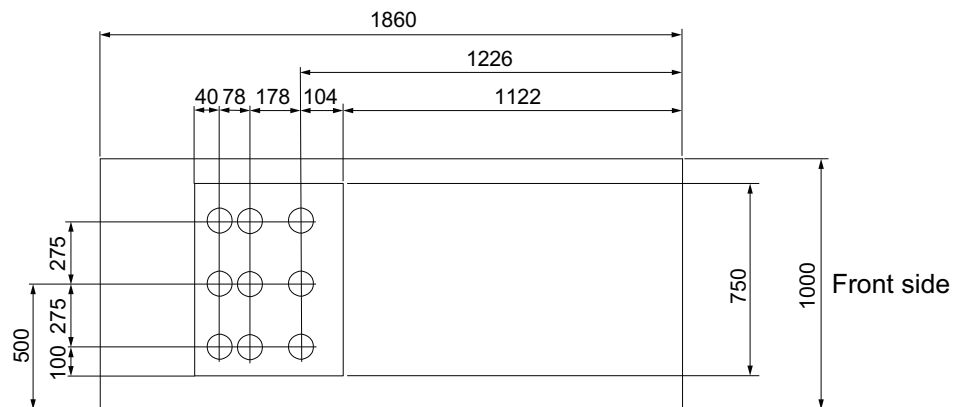


Figure 13
MV Cable Entry with Three Runs

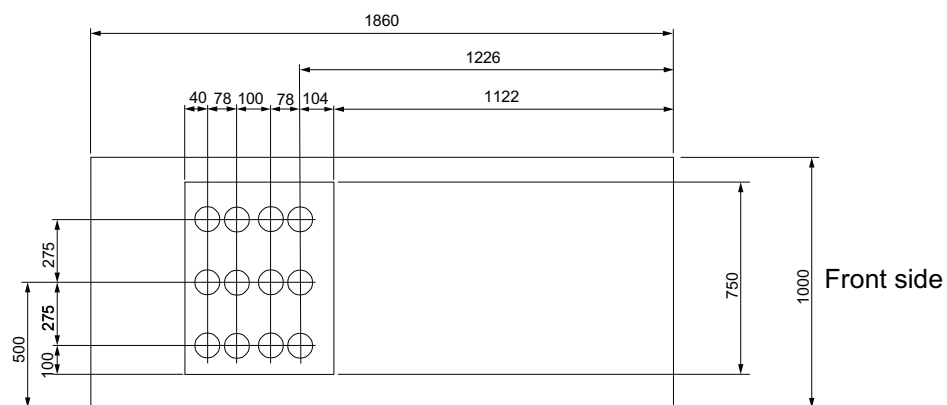


Figure 14
MV Cable Entry with Four Runs

Civil Works Slab

Reserved Area in Civil Works Slab

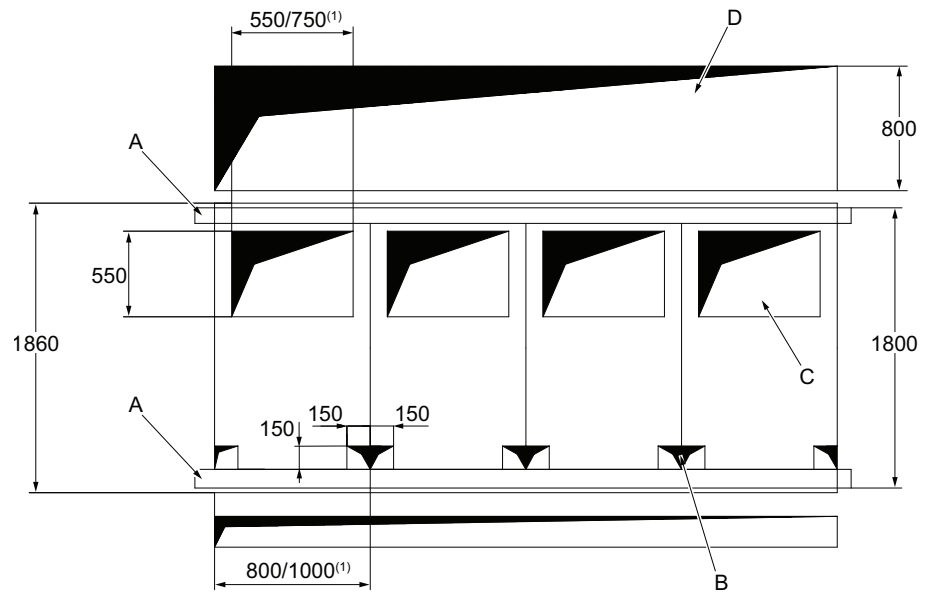


Figure 15
Ground Plan of a MCSeT Switchgear Within a Switchgear Room

- A C-channel rail
- B Opening for routing external low-voltage cables
- C Opening for routing high-voltage cables
- D Power cable trench

⁽¹⁾ For 1000 mm cubicle, the cutout is 750 mm.

Detailed View of Bottom Plate

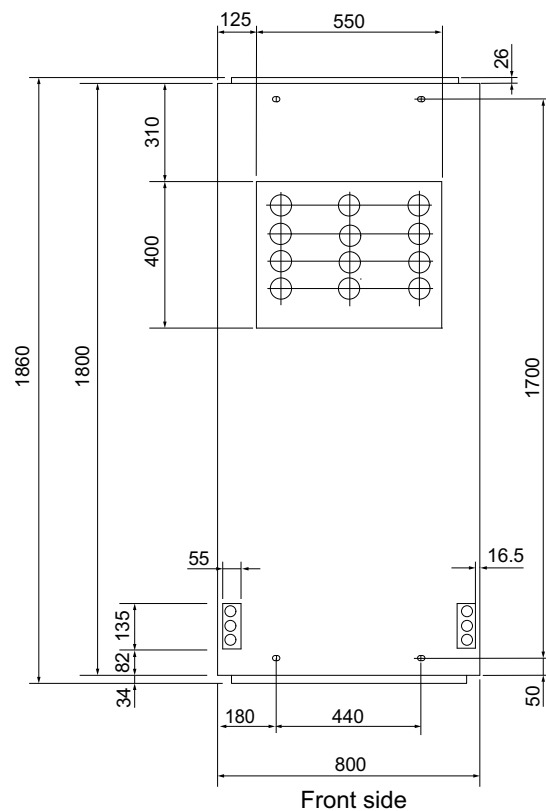


Figure 16
Bottom Plate of 800 mm Cubicle

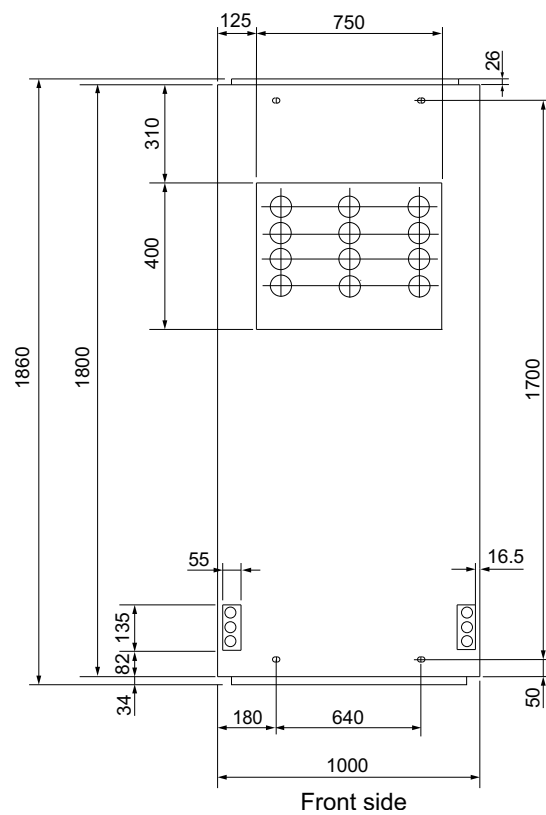


Figure 17
Bottom Plate of 1000 mm Cubicle

Switchboard with I/F Cubicle FU and Reserved Space over all Civil Engineering

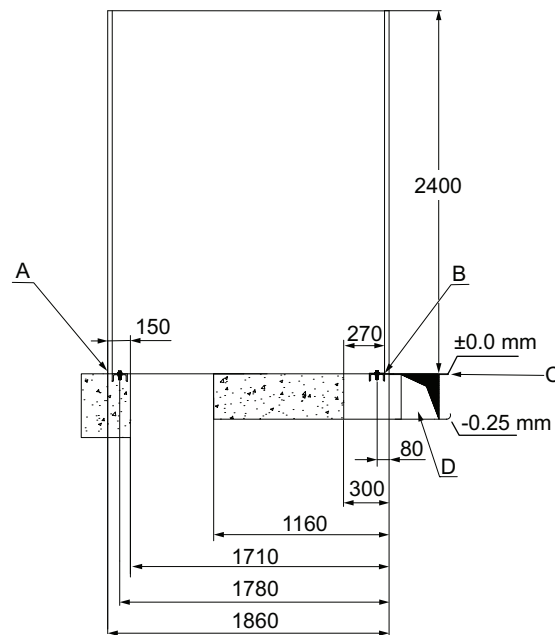


Figure 18
General Arrangement for Cable Entry

- A Foundation rail
- B Top surface of the foundation from 3...5 mm above the floor
- C Cover of the control cable conduit $\delta = 5$ mm corrugated steel plate
- D Control cable trench 250 x 250 mm

Floor Finishing and Fastening of the Cubicles

Assembly

Safety Provisions

⚠ WARNING

HAZARD OF TOPPLING

When handling the moving devices, pay attention to uneven floor surfaces (for example, cracks, projections and so on) of the switchgear room.

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

⚠ WARNING

HAZARD OF FALLING

- Do not walk upon the topsides of the switchgear cubicles.
- During civil engineering activities, when working on the top of the switchgear cubicles (such as during the installation of deflectors, fans, or pressure relief ducts), temporarily attach a sturdy base plate that is walkable.

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

Instructions for Assembly

MCS-eT cubicles are delivered with E/S in ON position.

The VCBs are always shipped in open state (OFF) with the energy-storing device released.

NOTICE

HAZARD OF NON-COMPLIANCE TO ASSEMBLY INSTRUCTIONS

- Ensure there is no condensation, dirt, and dust during assembly of cubicles on all accounts.
- Observe and read assembly drawings before commencing the assembly work.

Failure to follow these instructions can result in equipment damage.

Floor Finishing

Surface Condition

Before the switchgear is positioned at its site of installation, check that the fastening points are at level.

NOTICE

HAZARD OF INSTALLING UNDER INADEQUATE CONDITIONS

- Before positioning the switchgear at its installation site, ensure that the fastening points are at the correct level.
- Unevenness should not exceed ± 2 mm/m and there should not be a height difference of more than 6 mm over the entire width of the switchgear.

Failure to follow these instructions can result in equipment damage.

Laser check is required for accurate check of the floor levelness. Floor level is more essential for correct assembly and performance of the product.

Floor Strength

The floor should have a compression withstand ≥ 33 MPa to roll the extraction tool on it without any damage.

Fastening of the Cubicles

⚠ WARNING

HAZARD OF INSTALLING UNDER INADEQUATE CONDITIONS

If a cubicle is found to be raised after the next one is installed, there is a risk of experiencing vibrations, depending on the load.

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

NOTICE

HAZARD OF INSTALLING UNDER INADEQUATE CONDITIONS

- Before positioning the switchgear at its installation site, ensure that the fastening points are at the correct level.
- Unevenness should not exceed ± 2 mm/m and there should not be a height difference of more than 6 mm over the entire width of the switchgear.

Failure to follow these instructions can result in equipment damage.

NOTICE

HAZARD OF INAPPROPRIATE ASSEMBLY

Comply with precise measurements for the placement of the cubicle, as the positioning of the first cubicle determines the placement of the remaining cubicles.

Failure to follow these instructions can result in equipment damage.

Fastening on Concrete Foundations

Follow the below steps to fasten the cubicle to the floor on standard civil engineering works:

1. Position first cubicle on the floor in accordance with the switchgear-specific space assignment plan, *Reserved Area in Civil Works Slab*, page 18.
2. Remove the cable compartment cover. Refer to *Access to the Main Circuit Compartments*, User Guide (BQT8706400).
3. Once the cubicle is positioned:
 - Verify that the cubicle front is correctly aligned both horizontally and vertically.
 - If necessary, raise the cubicle and insert shims below the cubicle near the fastening points until the correct horizontal position is achieved, refer to Figure 19.
4. Fasten the cubicle with screws to the two fastening points on both the front end and the rear end.

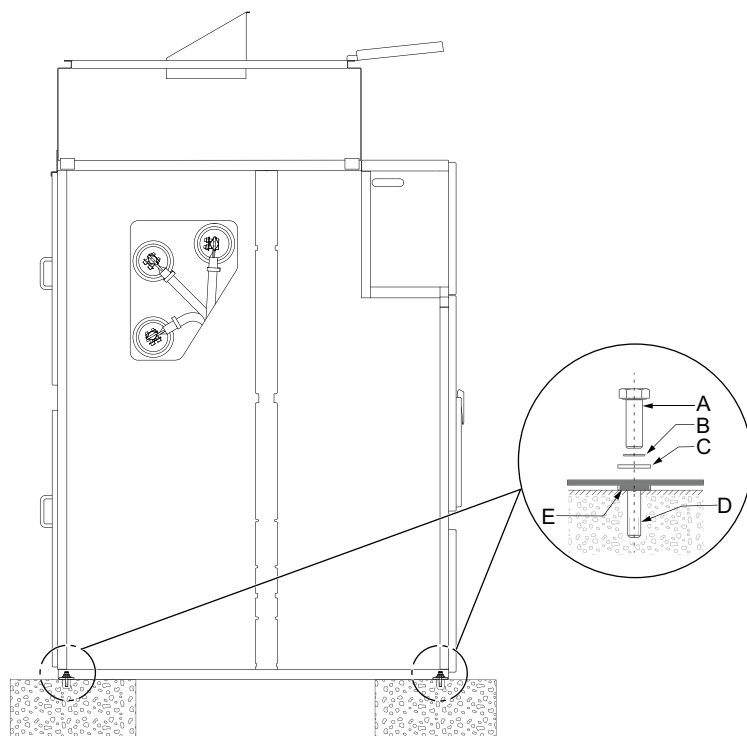


Figure 19
Cubicle Fastening on Concrete Foundation

A	Allen screw M12 x 45	D	Dowel pin
B	Washer M12	E	Shims
C	Square washer		

Additional Fastening Variant (C-Channel)

Follow the below steps to fasten the cubicle on C-channel rails on standard civil engineering works:

1. Drill holes into the C-channel frames at the intended cubicle fastening points, refer to Figure 20.
2. Position the cubicle on the C-channel rails, aligning the fastening points.
3. Insert dowel pin and other suitable fasteners (provided by Schneider Electric).
4. Securely fasten the cubicle to the C-channel rails at the designated points.

NOTE:

- The additional fastening variants are available on request. For details, contact Schneider Electric.
- C-channel rails are not be provided by Schneider Electric.

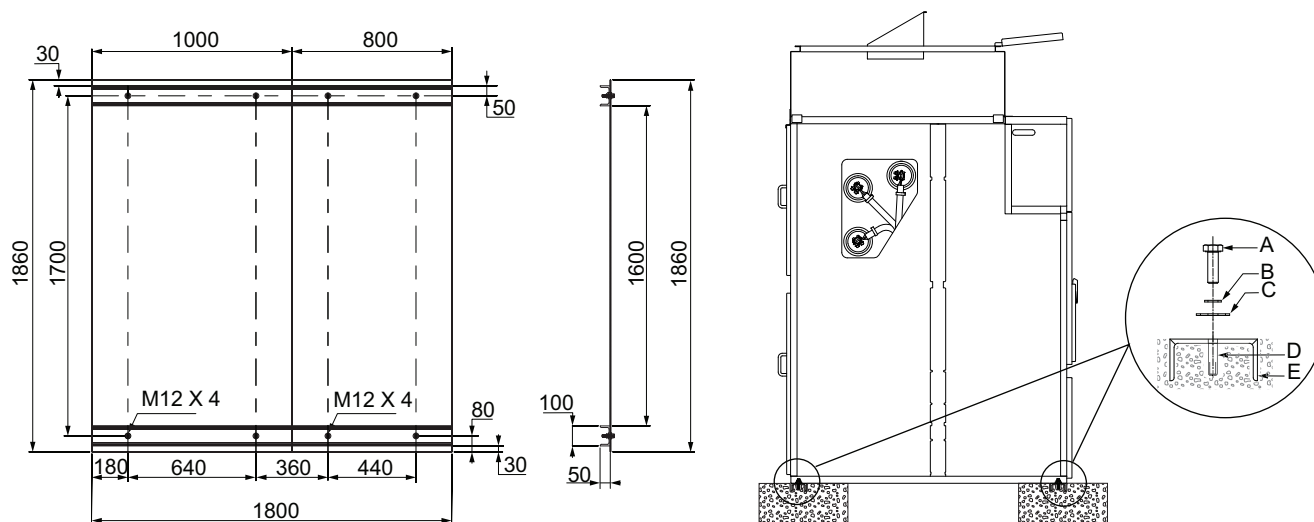


Figure 20
Cubicle Arrangement

- | | | | |
|---|----------------------|---|----------------|
| A | Allen screw M12 x 45 | D | Dowel pin |
| B | Washer M12 | E | C-channel rail |
| C | Square washer | | |

Configuration of Incoming MV Cables

⚠ CAUTION

HAZARD OF INCORRECT CABLE INSTALLATION

Comply with the guidelines specified by the manufacturer for the following:

- Adhere to the specified bending radius for the cables.
- Ensure appropriate cable laying/installation methods, the correct force, and techniques for pulling or pushing the cables.
- While handling the cables, ensure that the cables are within the maintenance space as per the specific configuration from insertion point to the cable initiation joint at the transformer.

Failure to follow these instructions can result in injury or equipment damage.

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

NOTE: If the cable box is used, adapt the depth of the maintenance space.

For any queries regarding the configuration, contact Schneider Electric customer support.

Civil Engineering with Maintenance Space

MV Cables Rear Entry

Intended for cables up to 240 mm².

Not recommended for 630 mm² cables.

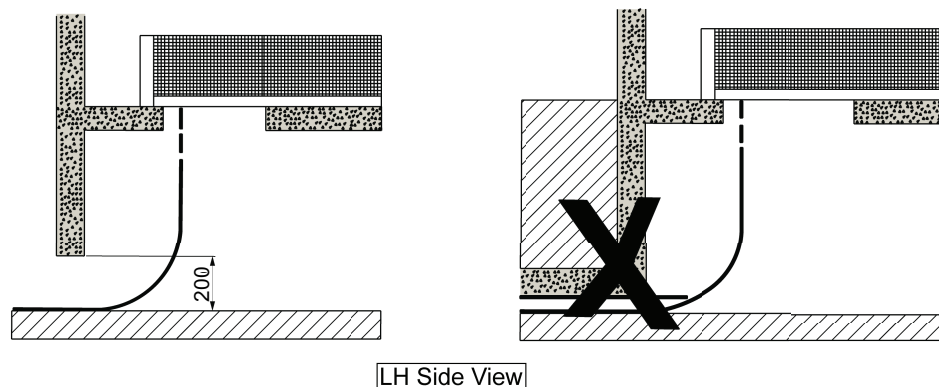


Figure 21
MV Cables Rear Entry

MV Cables Entry from the Side Near a Wall

Intended for cables up to 240 mm².

Not recommended for 630 mm² cables.

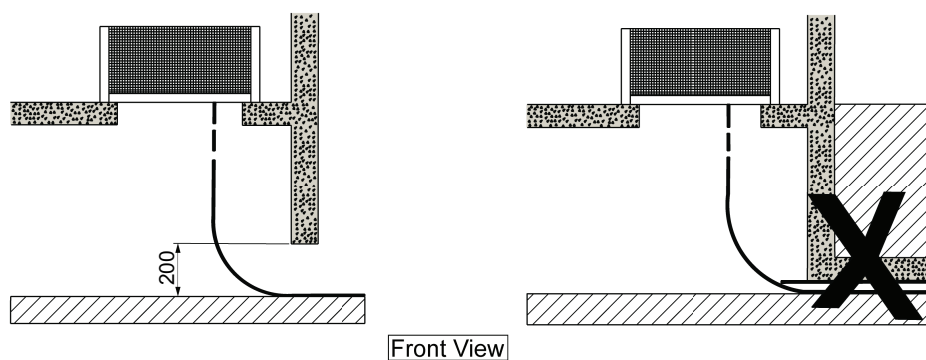


Figure 22
MV Cables Entry from the Side near Wall

MV Cables Entry from the Side at a Distance from a Wall

It is recommended for all cable diameters up to 630 mm².

According to the distance from the wall to the nearest MV cable (A), the dimension should be ≥ 2000 mm for 630 mm² cables.

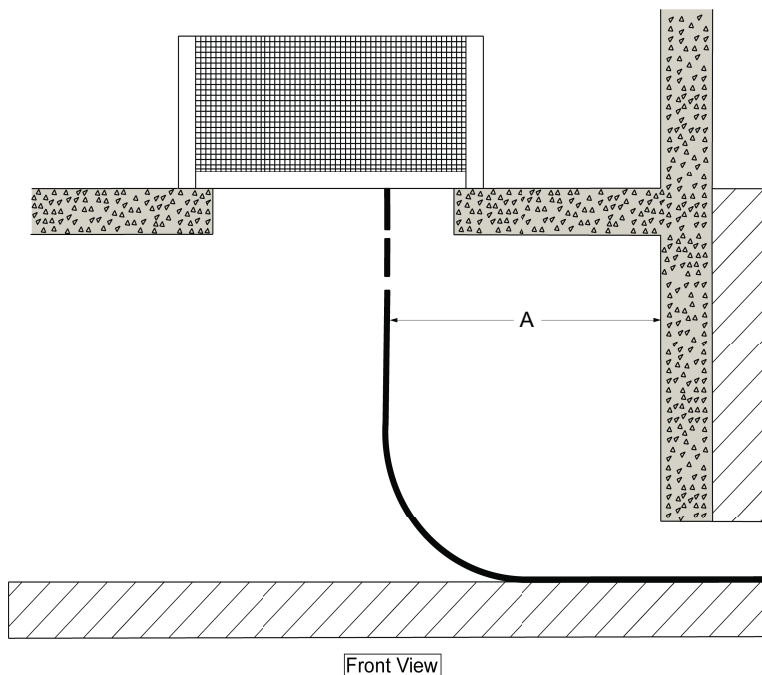


Figure 23
MV Cables Entry from the Side at a Distance from a Wall

Civil Engineering with a Cable Trench

MV Cables Rear Entry

Intended for cables up to 240 mm².

Not recommended for 630 mm² cables.

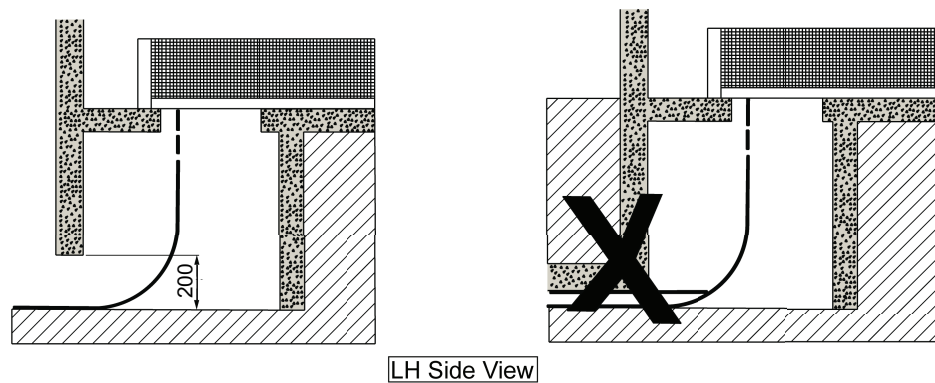


Figure 24
MV Cables Rear Entry

MV Cables Entry from the Side Near a Wall

Intended for cables up to 240 mm².

Not recommended for 630 mm² cables.

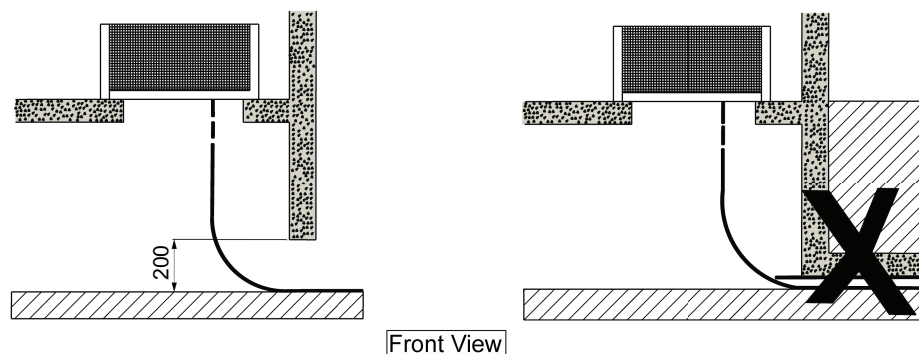


Figure 25
MV Cables Entry from the Side near a Wall

Glossary

A

AFL: Accessibility Front Lateral

AFLR: Accessibility Front Lateral Rear

B

BME: Busbar Metering and Earthing

BSC: Bus Section Coupler

BSR: Bus Section Riser

C

CT: Current Transformer

E

E/S: Earthing Switch

EvoPacT HVX: Vacuum Circuit Breaker

EvoPacT MTX: Metering Truck

F

F: Feeder

FU: Functional Unit (cubicle + mobile part)

I

I: Incomer

L

LV: Low Voltage

M

MV: Medium Voltage (voltage class up to 24 kV)

V

VCB: Vacuum Circuit Breaker

VDIS: Voltage Detecting and Indicating System

VT: Voltage Transformer

Schneider Electric
35 rue Joseph Monier
92500 Rueil Malmaison
France

+ 33 (0) 1 41 29 70 00

www.se.com

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

© 2024 Schneider Electric. All rights reserved.

BQT8706400-00