

Medium Voltage Distribution

# F400

Air insulated switchboard

Withdrawable circuit breaker 1 to 40.5 kV

Civil engineering guide

March 2022





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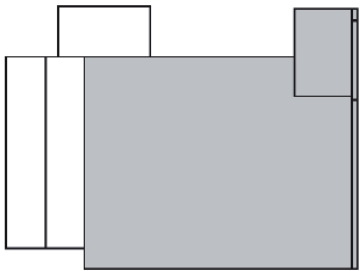
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# Standard cubicle

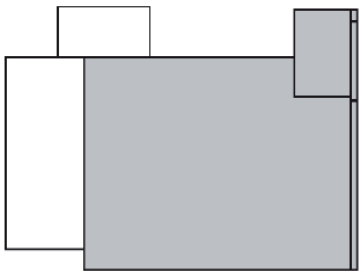
Incoming or outgoing  
type cubicle and voltage  
transformer on busbar VT

simple busbar

1250 A



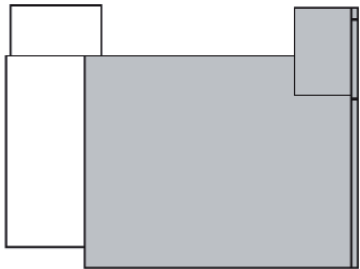
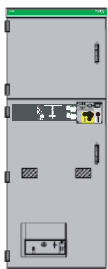
2500 A



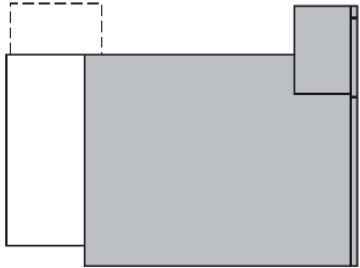
Bus coupler cubicle

simple busbar

1250 A



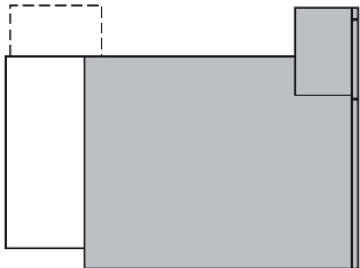
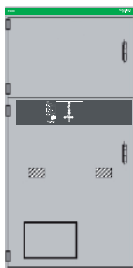
2500 A



Bus riser cubicle

simple busbar

1250 A  
or 2500 A

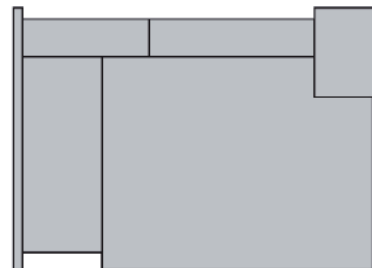
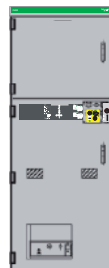


# Cubicle with internal arc withstand option

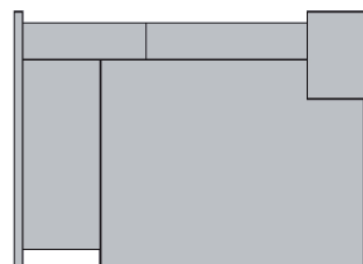
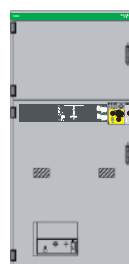
**Incoming or outgoing cubicle and VT on busbar**

simple busbar

1250 A



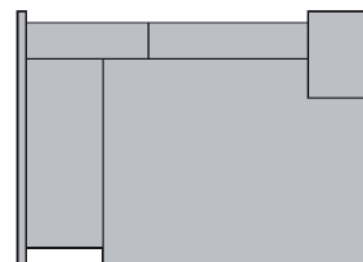
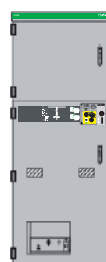
2500 A



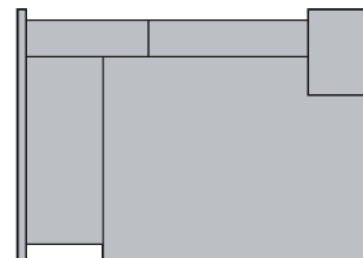
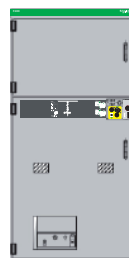
**Bus coupler cubicle**

simple busbar

1250 A



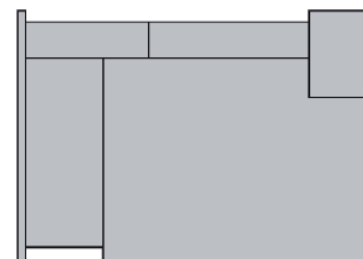
2500 A



**Bus riser cubicle**

simple busbar

1250 A  
or 2500 A



# Dimensions and weight

## Standard cubicle

Dimensions	Incoming or outgoing cables and VT on busbars		Bus coupling		Bus riser duct	
	1250 A	2500 A	1250 A	2500 A	1250 A	2500 A
Width (cm)	90	110	90	110	110	110
Height (cm) without VT	226	226	226	226	226	226
Height (cm) with VT	234	234	234	234	234	234
Depth (cm)	267* 302** 322***	302**	302	302	302	302
(1) Weight (kg) without VT	1095	1560	940	1085	710	740
(1) Weight (kg) with VT	1320	1790	1160	1310	930	970

(1) without removable part

\*: 2 cables per phase maximum.

\*\*: 4 cables per phase maximum.

\*\*\*: additional CT.

Removable part weight (kg):

SF1 1250 A = 240

SF2 1250 A = 300

SF2 2500 A = 340.

## Cubicle with internal arc withstand option

Dimensions	Incoming or outgoing cables and VT on busbars		Bus coupling		Bus riser duct	
	1250 A	2500 A	1250 A	2500 A	1250 A	2500 A
Width (cm)	90	110	90	110	110	110
Height (cm) without VT	226	226	226	226	226	226
Height (cm) with VT	234	234	234	234	234	234
Depth (cm)	307	307	307	307	307	307
(1) Weight (kg) without VT	1246	1710	1090	1235	860	890
(1) Weight (kg) with VT	1467	1930	1312	1462	1080	1120

(1) without removable part.

Removable part weight (kg):

SF1 1250 A = 240

SF2 1250 A = 300

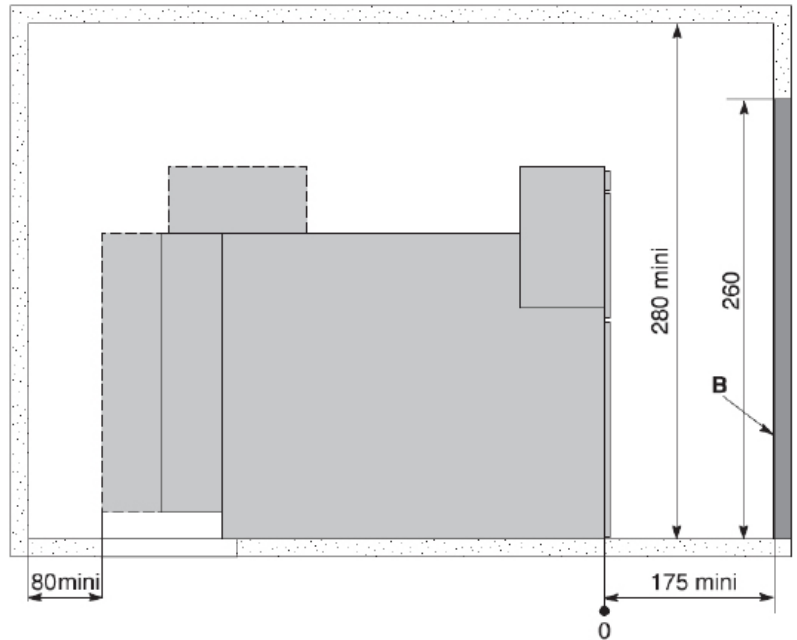
SF2 2500 A = 340.

# Space to be provided around a switchboard Standard cubicle

## Single switchboard

The minimum gaps to be provided around a switchboard are as follows:

- A:** left side gap (to open the door when inserting or extracting the circuit-breaker)
- 110 cm, if end cubicle is 110 cm wide
- 90 cm, if end cubicle is 90 cm wide
- B:** access to room
- C:** closing plates.



## Example of layout

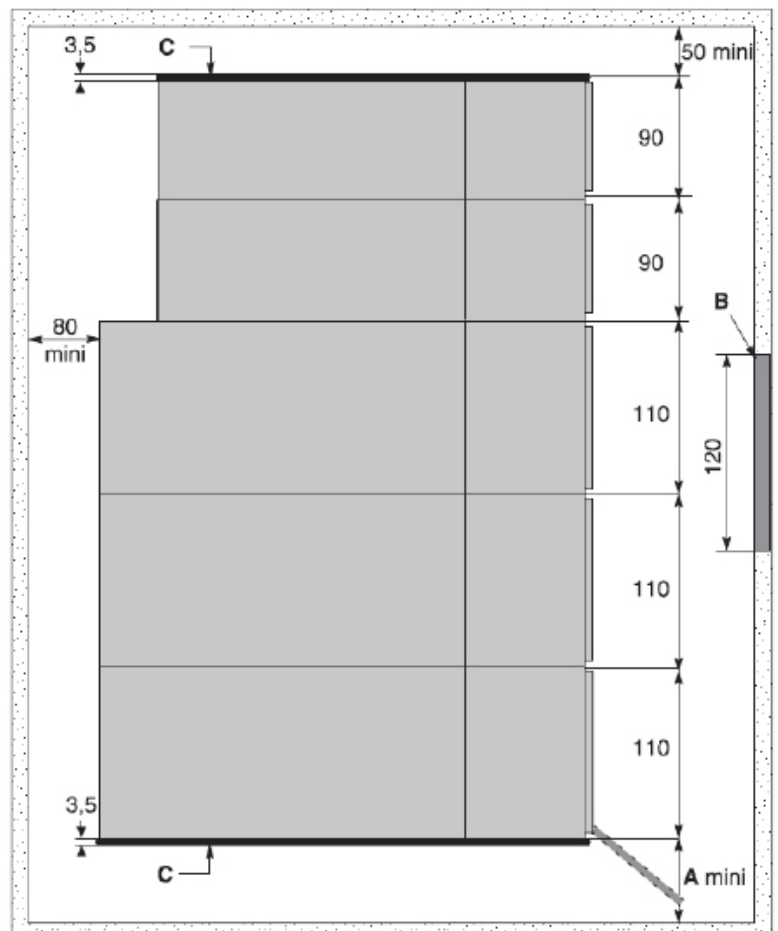
Cubicle 1250 A

Cubicle 1250 A

Bus riser  
cubicle 2500 A

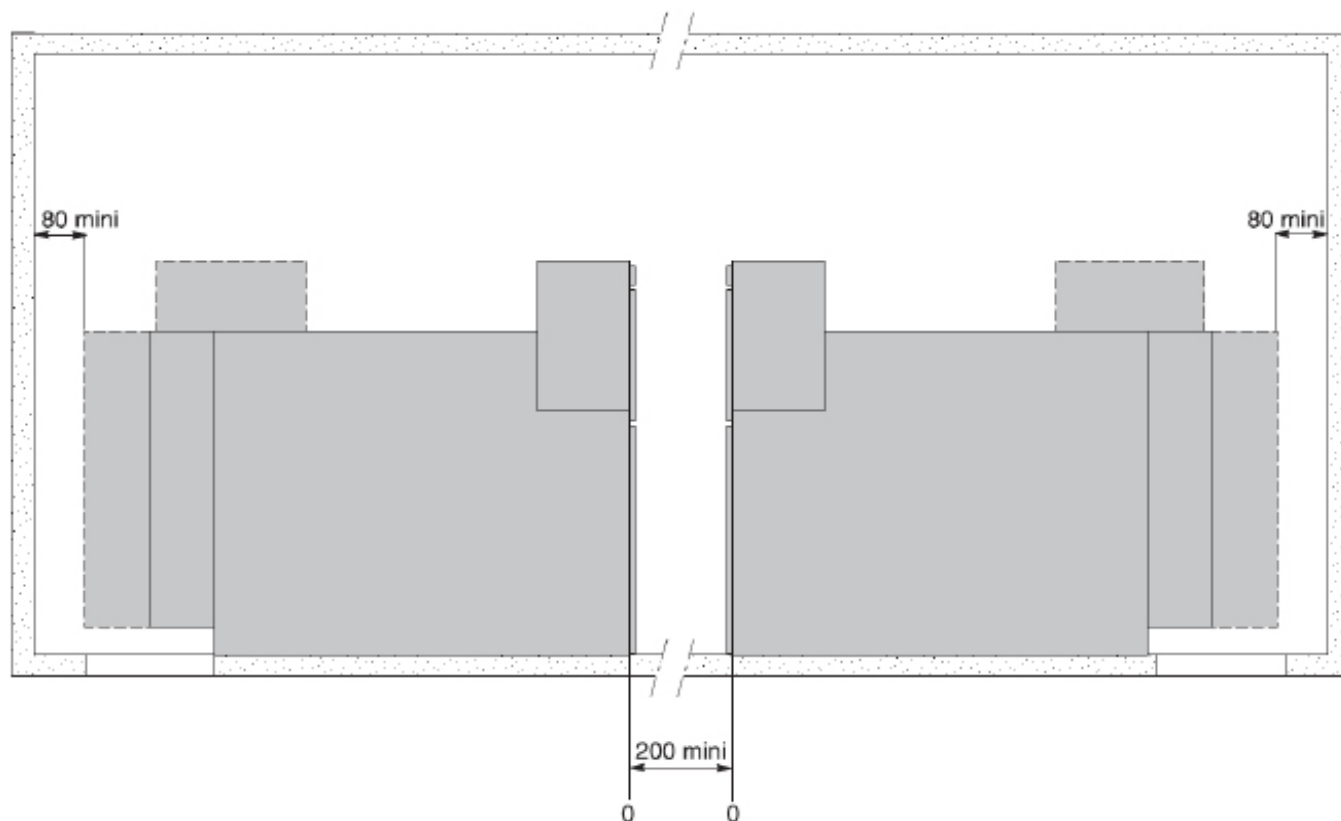
Bus coupler  
cubicle 2500 A

Cubicle 2500 A



# Space to be provided around a switchboard Standard cubicle

## Switchboards facing each other

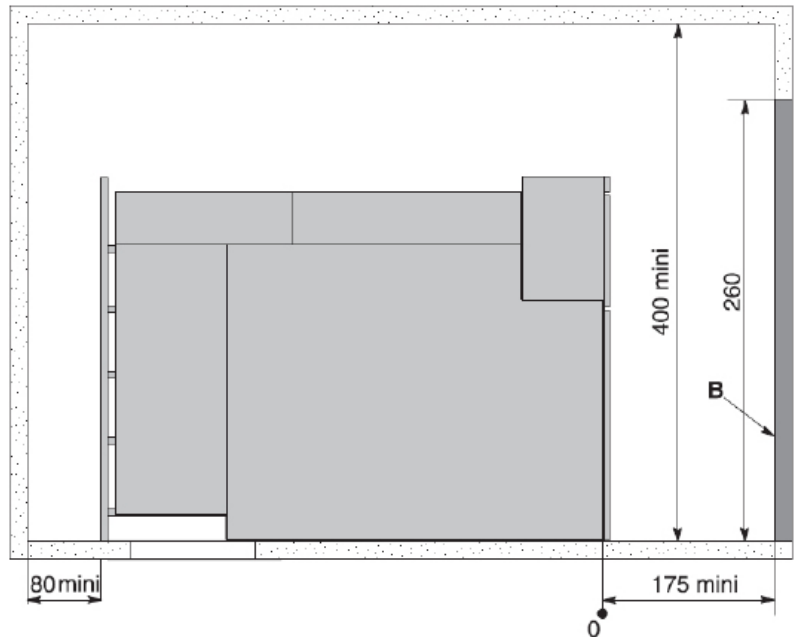


# Space to be provided around a switchboard - Cubicle with internal arc withstand option

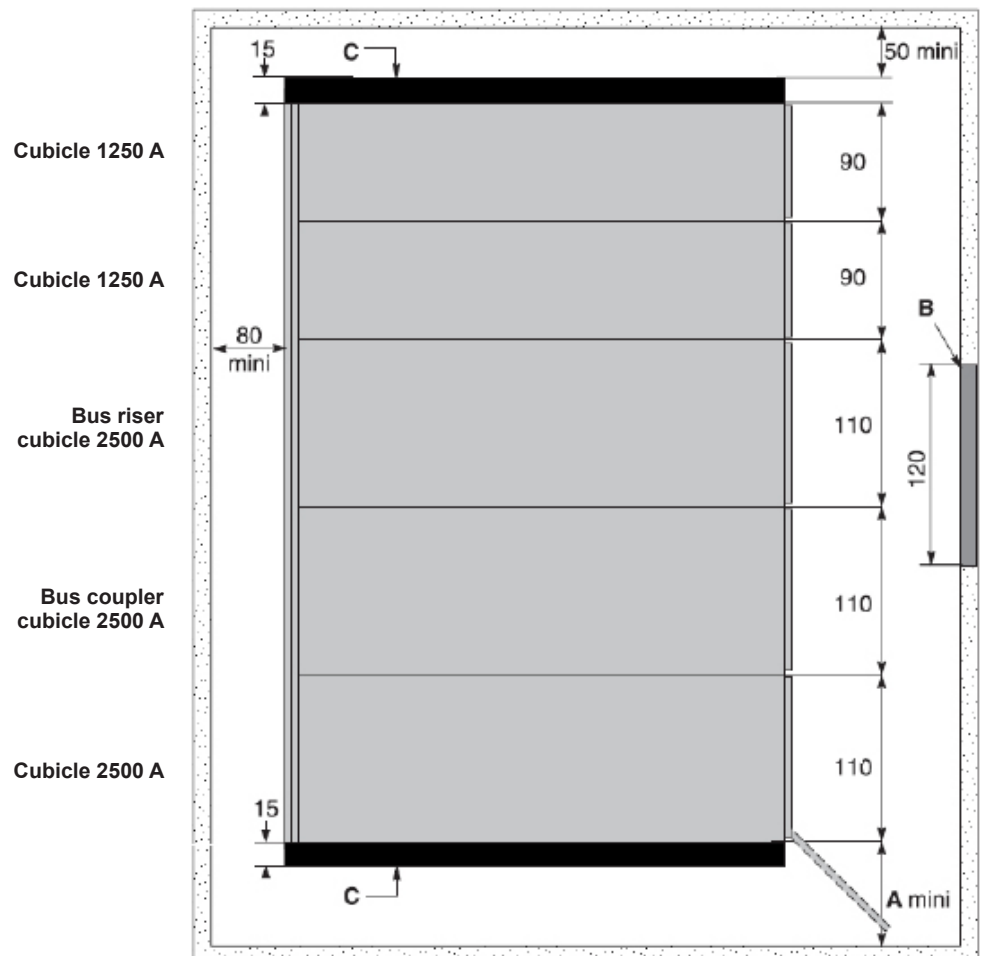
## Single switchboard

The minimum gaps to be provided around a switchboard are as follows:

- A:** left side gap (to open the door when inserting or extracting the circuit-breaker)
- 110 cm, if end cubicle is 110 cm wide
- 90 cm, if end cubicle is 90 cm wide
- B:** access to room
- C:** closing plates.

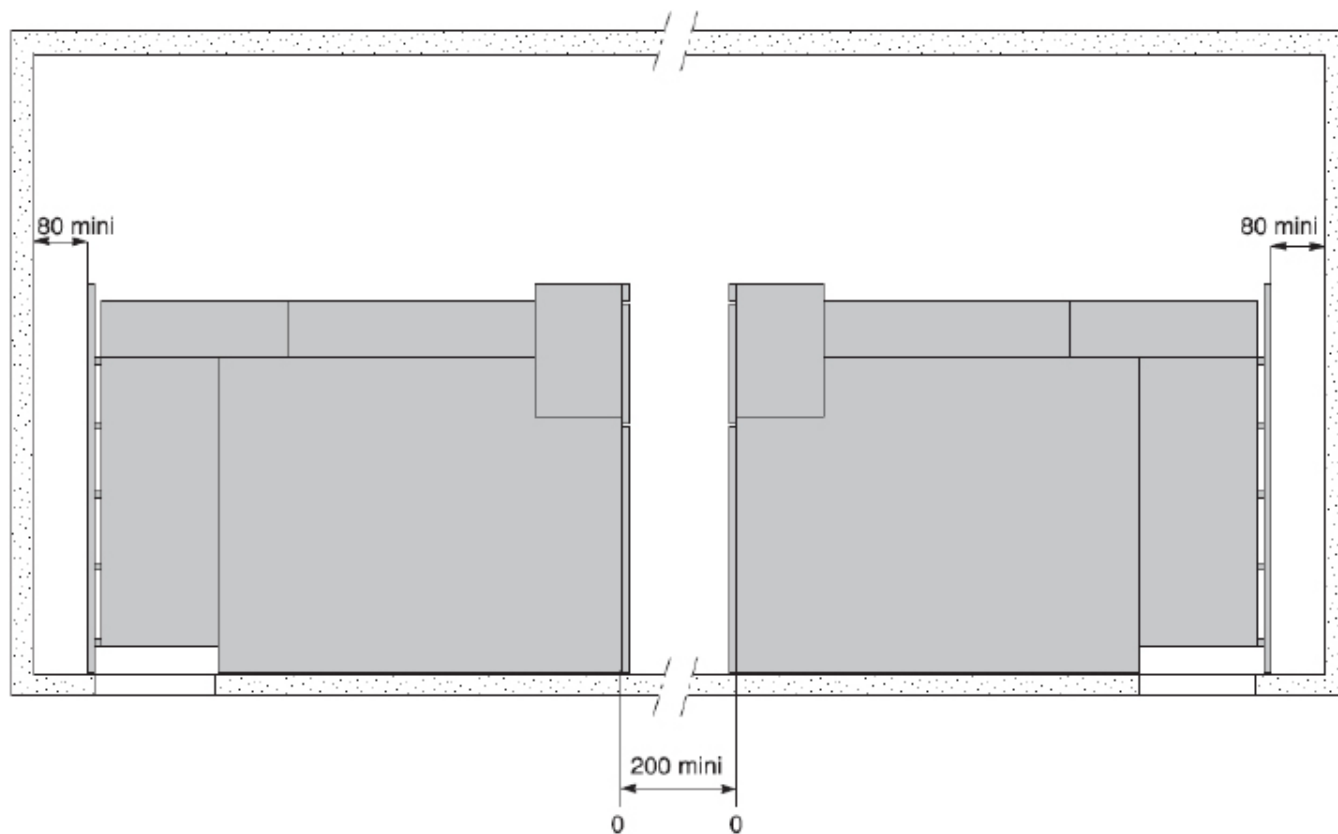


## Example of layout



# Space to be provided around a switchboard - Cubicle with internal arc withstand option

## Switchboards facing each other

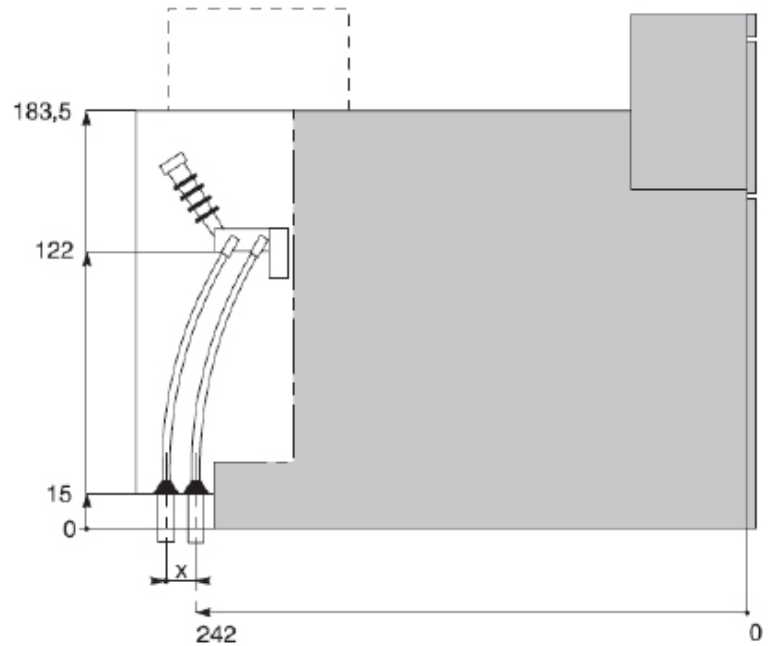


# Position of connections

## Incoming or outgoing cubicle 1250 A

simple busbars

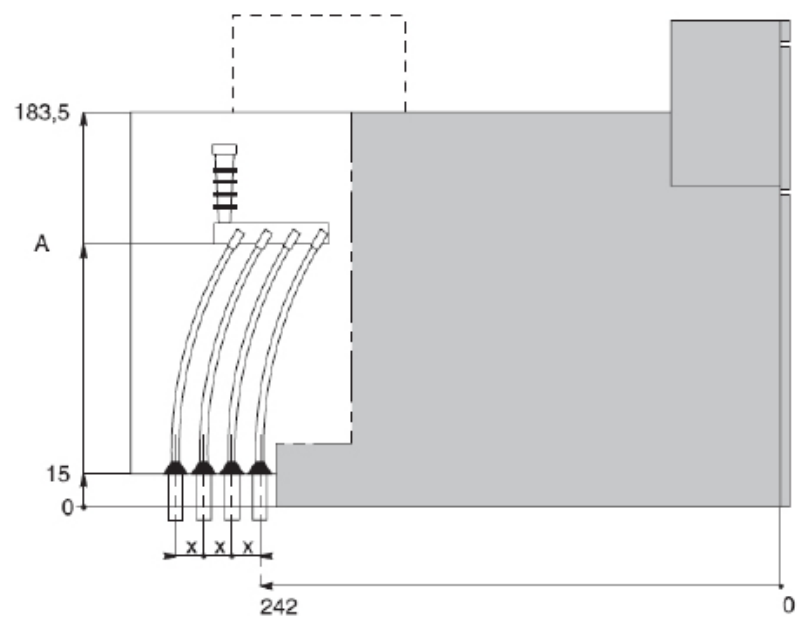
Connection: 2 MV dry cables per phase as a maximum single-pole or three-pole  
dry cables:  $x = 13$  cm.



Connection: 4 MV dry cables per phase as a maximum single-pole or three-pole  
dry cables:  $x = 13$  cm.

A: 122 cm at 1250 A

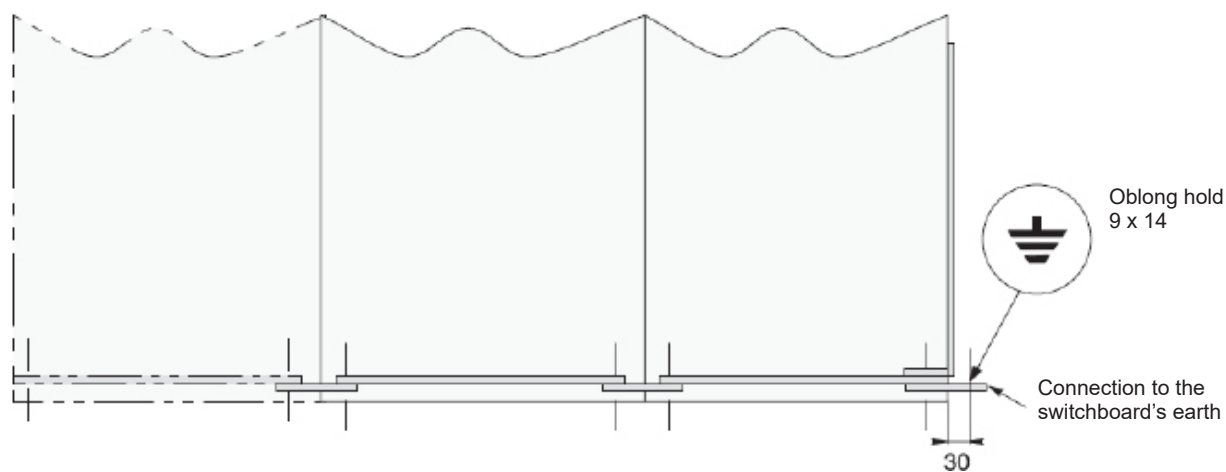
A: 109 cm at 2500 A



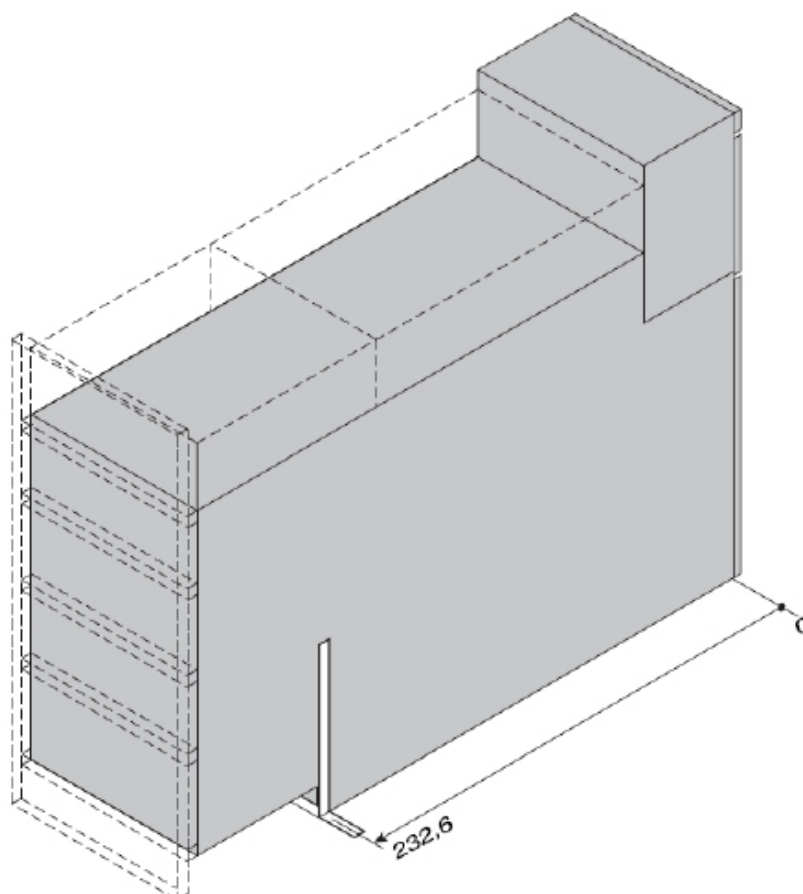
# Position of connections

## Connection of the switchboard earth bar

Fitted with a connection fishplate that can be mounted at the switchboard right or left end.



Rear view of cubicles:



# Floor finishing and cubicle mounting

## Surface condition

The floor surface evenness must allow for a 2 meters ruler to be placed on it in any direction and on all sides without generating a deflection higher than 5 mm.  
Moreover, the "local surface evenness" of the floor must allow for a 0.2 meter rule to be placed in any direction and on all sides without generating a deflection higher than 2 mm (DTU No. 21 of September 1984).

## Flooring quality

To roll removable parts without damaging the floor, it must meet the following criteria:

- Resistance to compression  $\geq 33$  MPa.

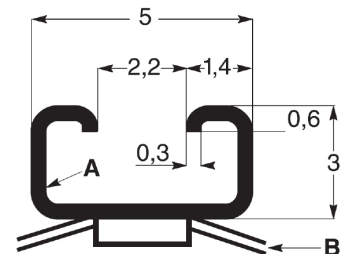
## Description of irons and accessories for sealing purposes on civil engineering

**A: mounting rail**  
No 1 946 010.

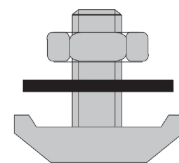
**Characteristics:**  
in lengths of 3 m  
weight: 2.878 kg per m.

**B: anchoring strip**  
(supplied with the mounting rails)  
No 1 946 010.

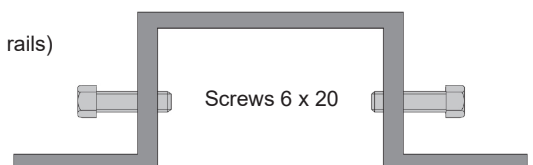
**Characteristics:**  
2 x 0.3 m  
2 cm wide, 0.3 cm thick  
10 cm long  
every 50 cm.



**Bag of screws and bolts**  
(supplied with the mounting rails)  
No 51164357FQ containing:  
3 x bolts M 16 x 30  
3 x screws M6 x 20  
3 x washers  $\varnothing$  16.



**Adjustment clamp**  
(supplied with the mounting rails)  
No 1 945 967.



# Floor finishing and cubicle mounting

## Sealing front irons

### Set up

■ Set up iron **A** with its adjustment clamps **C**, 1 every 1.20 m and its anchoring strips **B**, 1 every 2 clefts (sketch 1)

■ Using a chalk line, align the adjustment clamps on the floor and anchor them using quick-setting cement (sketch 2).

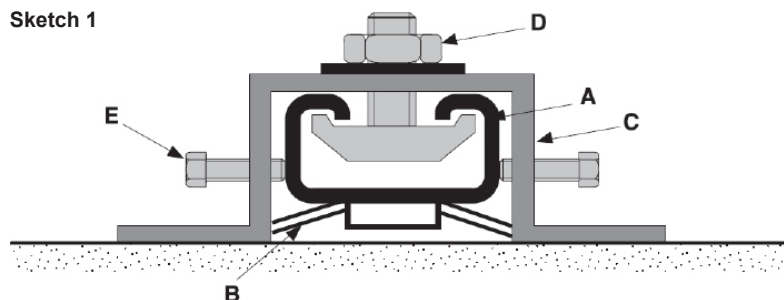
### Adjusting the iron

■ If iron **A** is bowed, distribute loads along its length

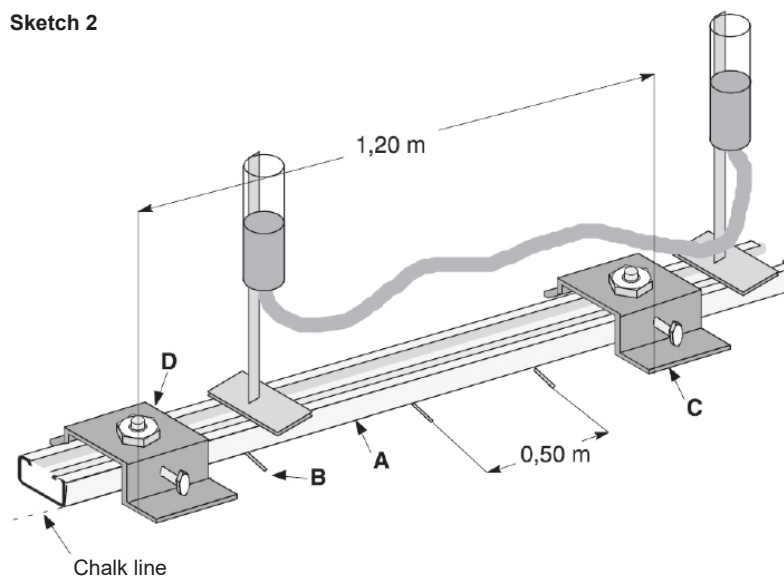
■ Longitudinal adjustment using a level and by means of suspension screws **D** (sketches 1 and 2)

■ Transversal adjustment using a water level and by means of adjustment screws **E** (sketches 1 and 3).

Sketch 1



Sketch 2



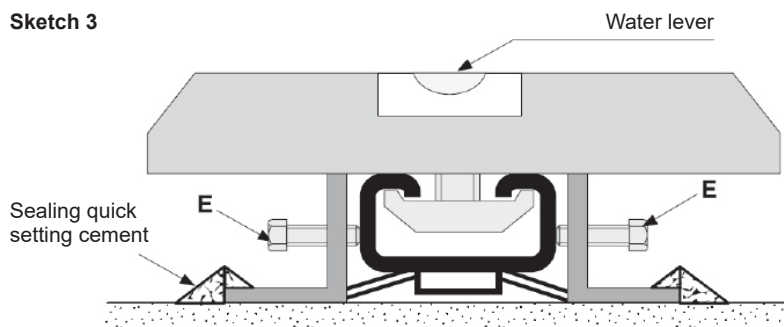
## Sealing

■ After adjusting, seal the anchoring strips using quick-setting cement braces

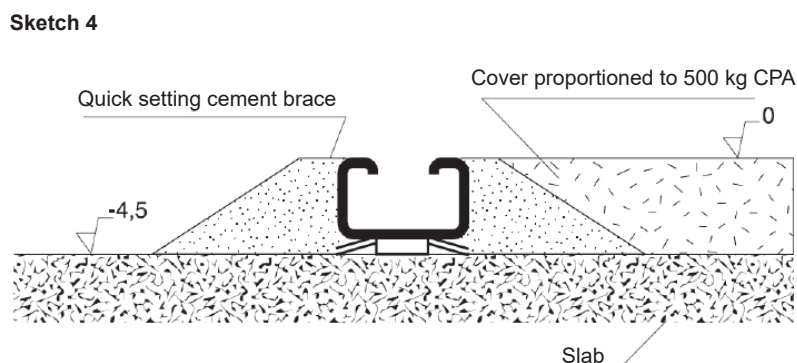
■ Remove and unseal the adjustment clamps when the sealing process has been completed and the cement has set

■ Pull the cement cover forward and level with the iron (sketch 4).

Sketch 3



Sketch 4



**Warning:**  
to correctly install cubicles, it is recommended to allow for a tolerance of  $\pm 1 \text{ mm/m}$  and a maximum deviation of  $\pm 3 \text{ mm}$  along the switchboard length.

# Slab preparation

## Cubicle mounting and MV and LV cable routing

The cubicles are mounted on front iron **A**, sealed to the floor.

They also rest on 4 support irons **B**.

**MV cables can be routed** through a duct or an opening, at the customer's option (for example: **C** duct, **D** cable inlet).

Width shall be determined according to the number of MV cables.

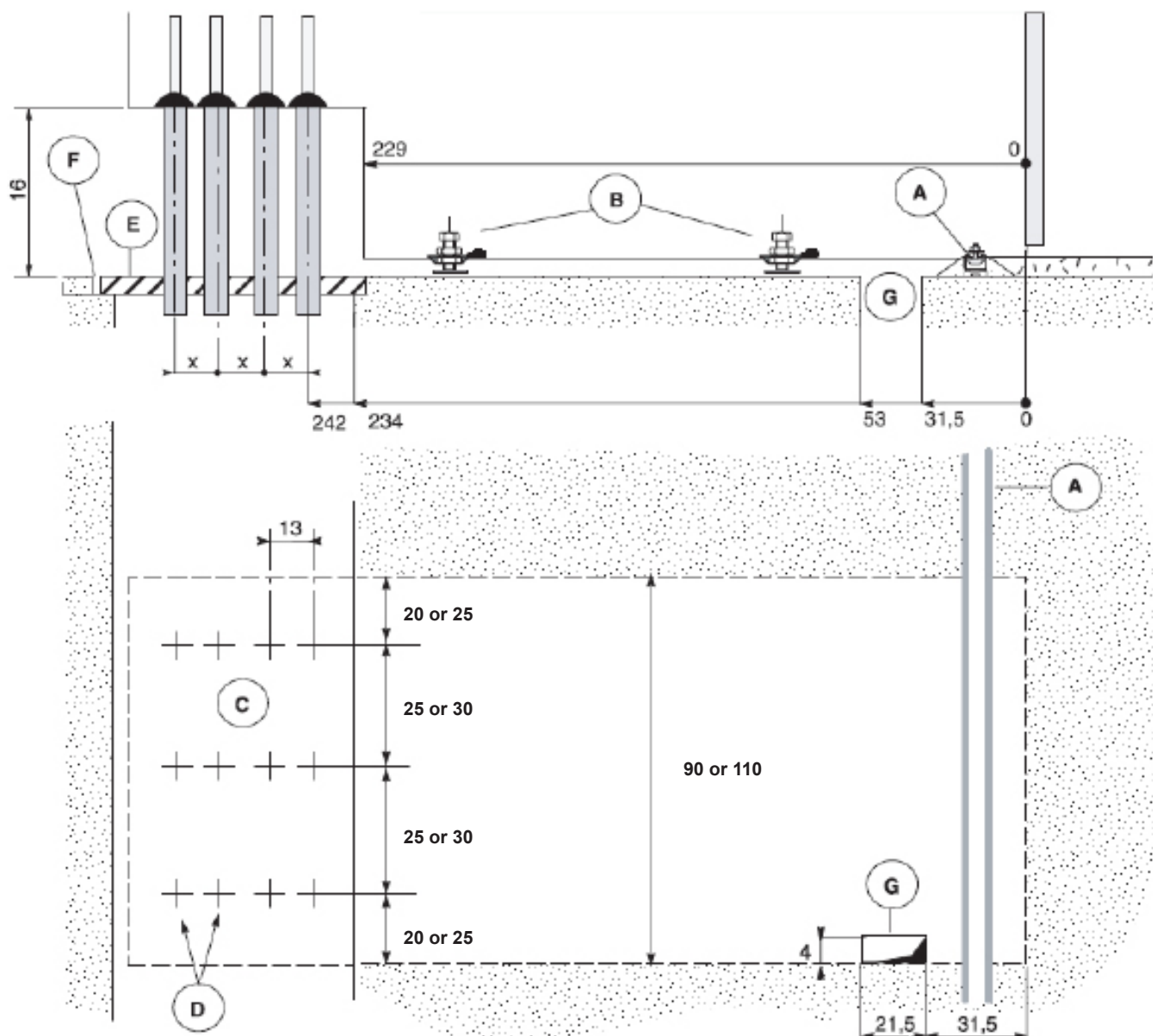
Duct depth shall be determined according to the bending radius of MV cables.

**The type of covering** of the duct or opening shall be determined by the customer (for example: **E** drilled sealing plates for the routing of MV cables).

Rabbets **F** may be needed depending on the method used.

**LV cables can be routed** through a duct or an opening at the customer's option.

The minimum dimensions to be provided for an opening are indicated below (for example: **G** LV opening).



**Note:** single-pole or three-pole dry cables:  $X = 13$  cm.

# Slab preparation

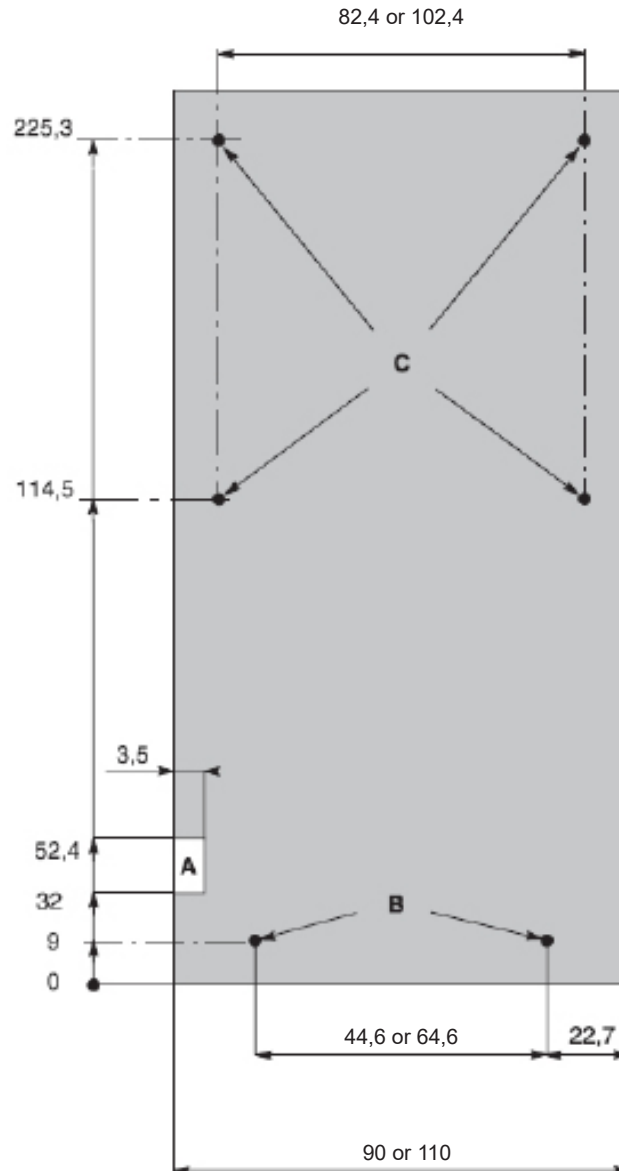
## Mounting points and LV cable inlets

The following shall be provided on the back of the cubicles:

**A:** opening in the floor of each cubicle to allow for LV cables

**B:** mounting points on the sealed front iron

**C:** support points of the 4 rear actuators.



## Front iron and support iron mounting detail

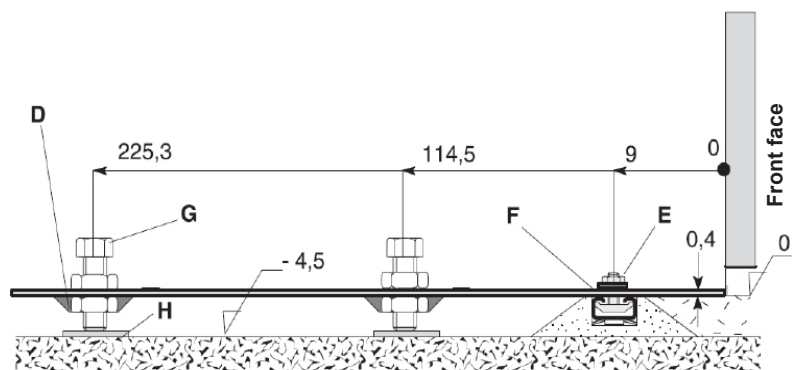
**D:** cage nut

**E:** screws and bolts for anchoring the cubicle to the front iron

**F:** washer

**G:** actuator

**H:** support iron.



## Reinforced civil engineering

## Cubicle mounting and MV and LV cable routing

**The cubicles are mounted** on the front and rear irons **A**, sealed to the floor. They also rest on 2 support irons **B**.

**MV cables can be routed** through a duct or an opening, at the customer's option (for example: **C** duct, **D** cable inlet).

Width shall be determined according to the number of MV cables.

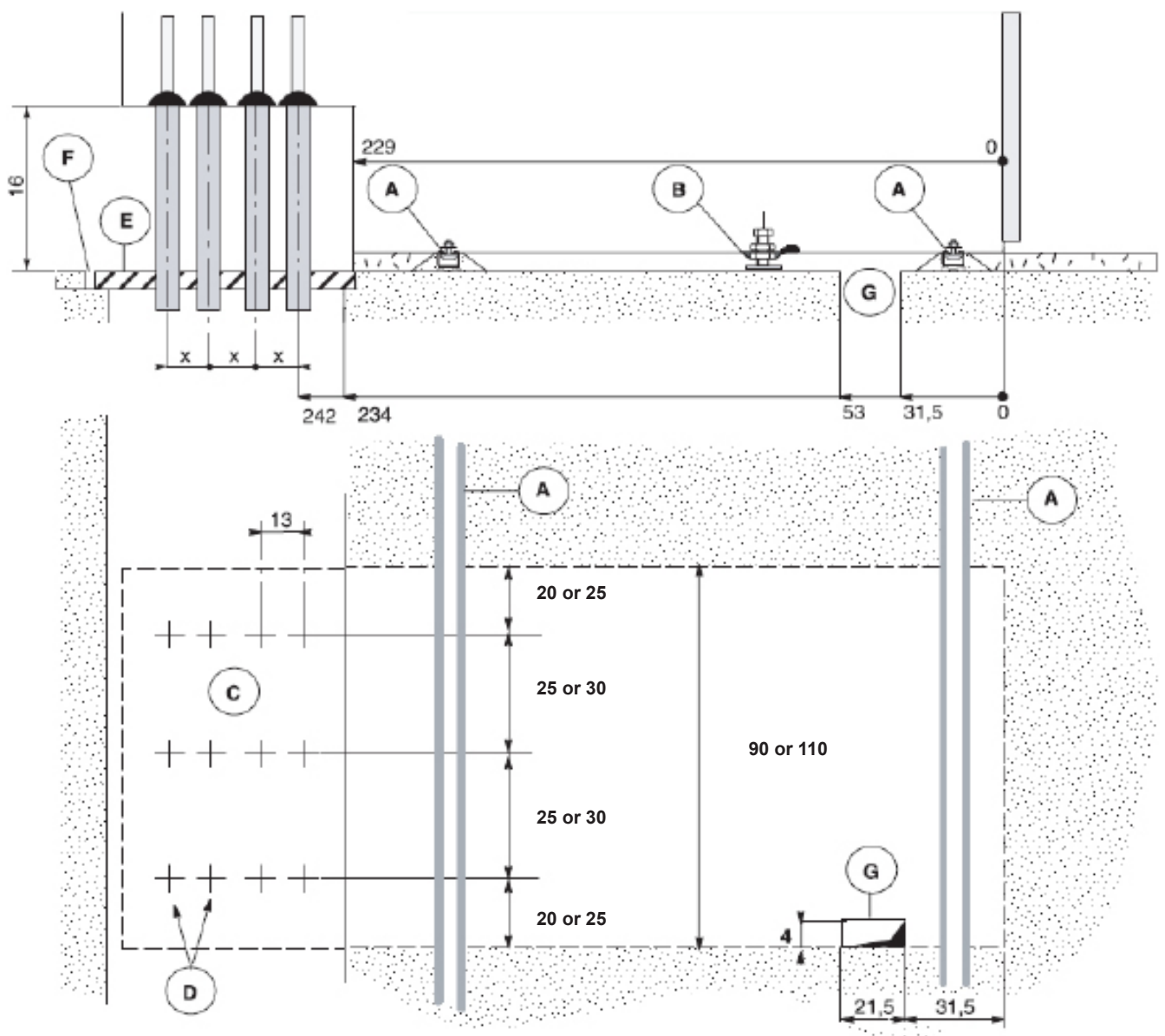
Duct depth shall be determined according to the bending radius of MV cables.

**The type of covering** of the duct or opening shall be determined by the customer (for example: **E** drilled sealing plates for the routing of MV cables).

Rabbits F may be needed depending on the method used.

**LV cables can be routed** through a duct or an opening at the customer's option.

The minimum dimensions to be provided for an opening are indicated below (for example: **G** LV opening).



**Note:** single-pole or three-pole dry cables:  $X = 13 \text{ cm}$ .

# Slab preparation

## Reinforced civil engineering

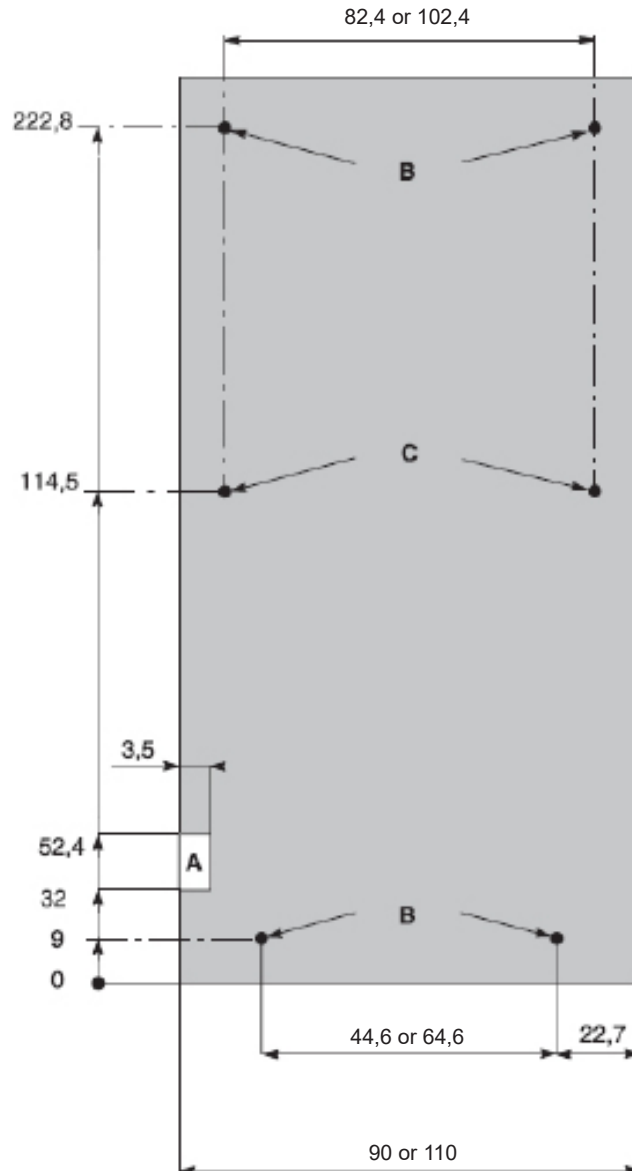
### Mounting points and LV cable inlets

The following shall be provided on the back of the cubicles:

**A:** opening in the floor of each cubicle to allow for LV cables

**B:** mounting points on the sealed front iron

**C:** support points of the 2 rear actuators.



### Front and rear iron and support iron mounting detail

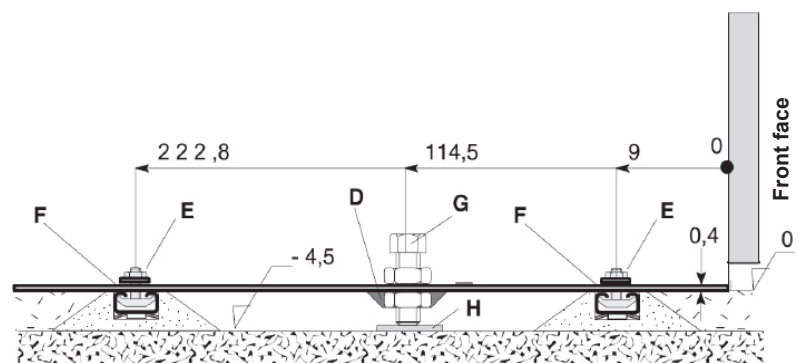
**D:** cage nut

**E:** screws and bolts for anchoring the cubicle to the front iron

**F:** washer

**G:** actuator

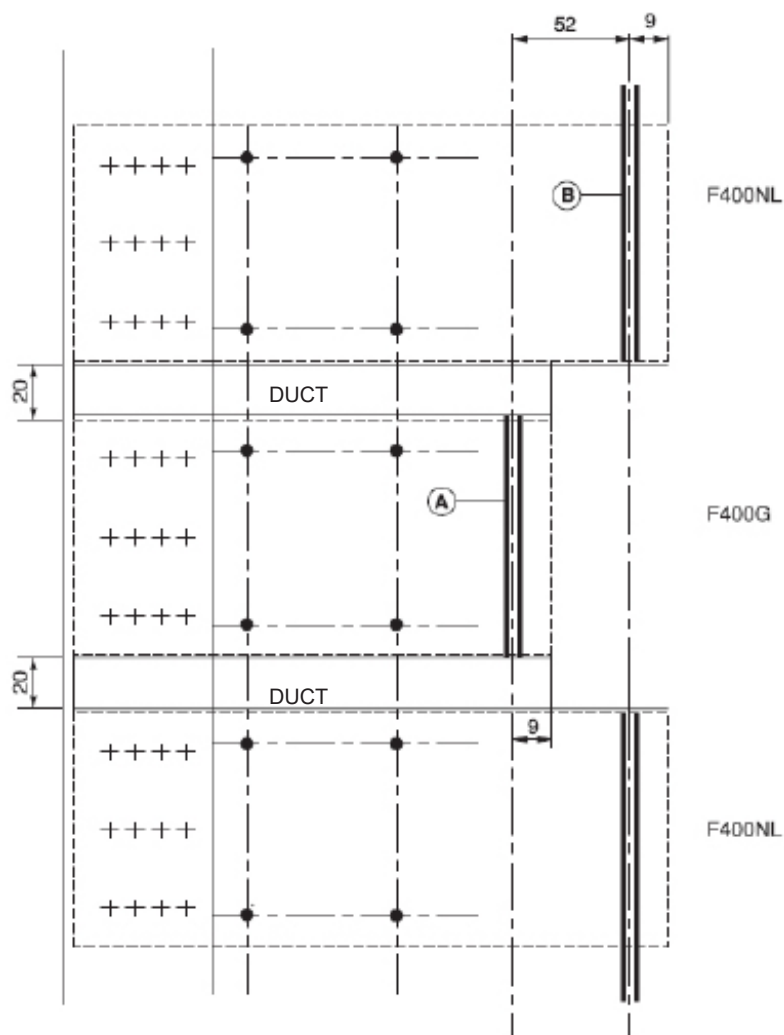
**H:** support iron.



# Position of irons between F400G and F400NL Standard cubicle

## Extension of a cubicle F400G righward or leftward

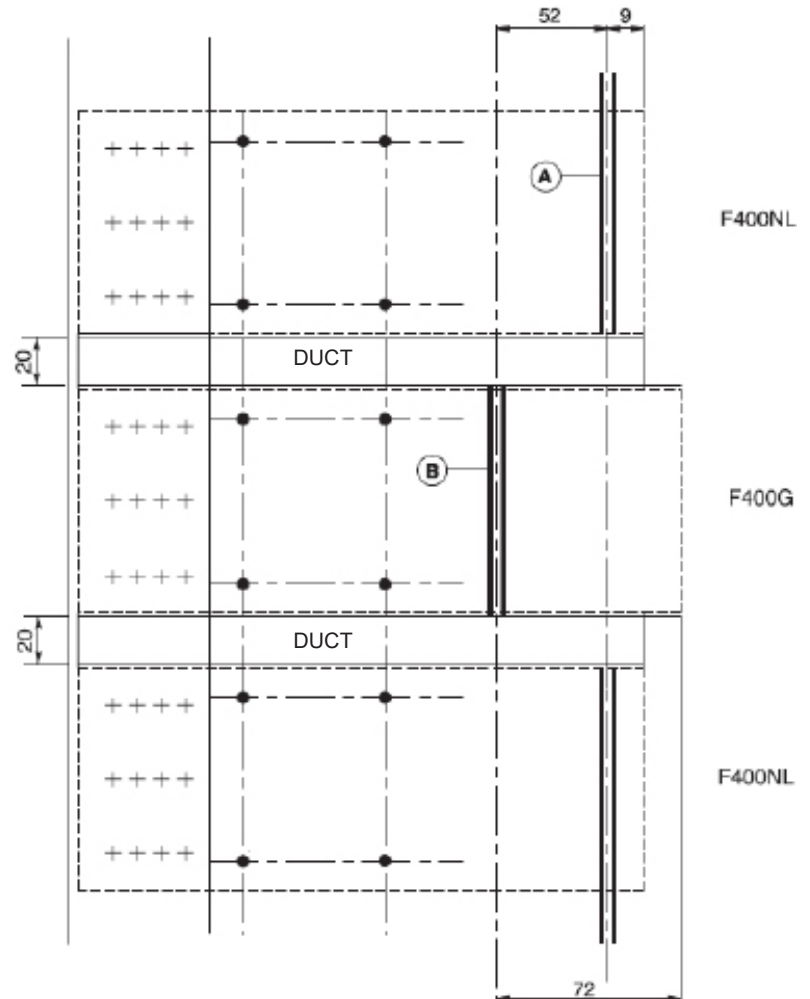
Position iron **A** 52 cm away from iron **B**.  
The duct is not mounted on irons **A** or **B**, it is mounted on cubicle F400G and F400NL.



# Position of irons between F400G and F400NL - Cubicle with internal arc withstand option

## Extension of a cubicle F400G rightward or leftward

Position iron **A** 52 cm away from iron **B**.  
The duct is not mounted on irons **A** or **B**, it is mounted on cubicle F400G and F400NL.



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