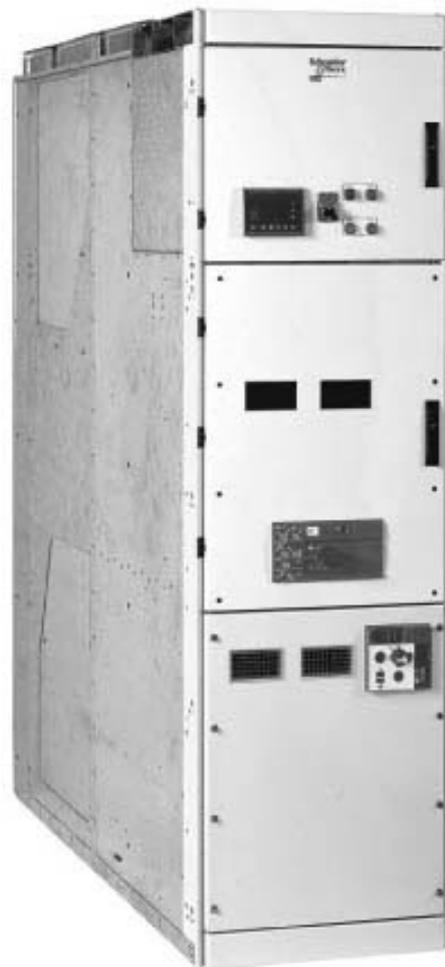


Air Insulated Medium Voltage Equipment

NEX - 24 kV

Withdrawable Circuit Breaker

Civil engineering guide



Contents

General	2
Glossary	2
Recommendations	2
Dimensions and weights	3
Incomer/feeder IF1, IF2, IF3	3
Incomer/feeder with top entry IF1C, IF2C, IF2B, IF3B	3
Bus coupler BC2, BC3	4
Bus coupler with VT BC2, BC3	4
Bus riser RF2, RF3, RW2, RW3	5
Incoming direct ID2, ID3	5
Busbar metering BM	6
Fuse switch LB	6
Space to be provided around a switchboard	7
Civil engineering with cable room or trench	7
Civil engineering with top entry cable	7
Access area to be provided around the switchboard	8
Floor preparation	9
Cable entry from below	9
Floor finishing and functional unit fixing	10
Floor finishing	10
Overview of functional unit fixing method	10
Incoming configuration of MV cables	11
General	11
Building with cable room or cable trench	11
Cable entry	11
Position of MV cables	12
Standard civil engineering reserved slab space	14
Floor plan	14

General

Glossary

FU	Functional unit (cubicle + mobile part + relay unit)
IF	Incomer/Feeder cubicle
BC	Bus coupler
RF	Bus riser fixed type
RW	Bus riser withdrawable type
BM	Busbar metering
LB	Fuse switch feeder cubicle
CB	Circuit breaker
VT	Voltage transformer
CT	Current transformer or current sensor
VPIS	Voltage Presence Indicating System
LV	Low voltage
MV	Voltage class 24kV
ES	Earthing switch
ID	Incoming direct to busbar cubicle

Recommendations

Long term switchgear performance in an MV substation depends on 3 main factors

- The need of proper installation of the MV cables

The new cold slip-on and retractable technologies offer ease of installation. Their design enables operation in polluted environments with harsh atmospheres.

- The influence of the relative humidity factor

The installation of heating resistors is essential in climates with high humidity and large temperature differences.

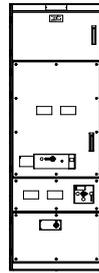
- Ventilation control

cubicle ventilation must not be impeded. This is to ensure air circulation within the switchboard cubicles.

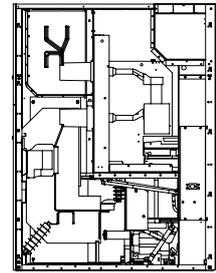
Dimensions and weights

Typical cubicles

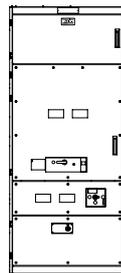
Incomer/feeder
IF1, IF2, IF3



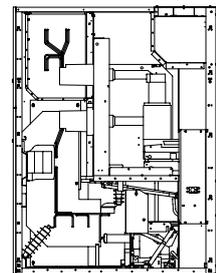
IF1, IF2



IF1, IF2

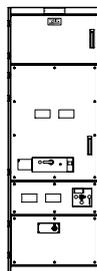


IF3

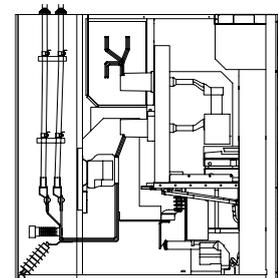


IF3

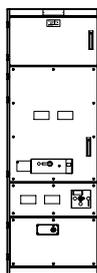
Incomer/feeder with top entry
IF1C and IF2C (via cables)
IF2B and IF3B (via busbars)



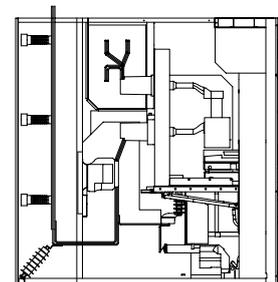
IF1C - IF2C



IF1C - IF2C



IF2B - IF3B



IF2B - IF3B

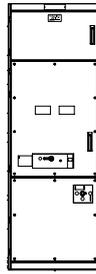
Overall dimensions and approximate weights of the basic cubicles

(with CB, CT, VT, ES)

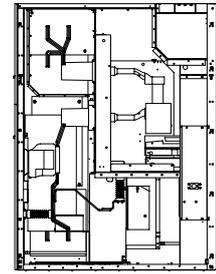
Type	Width (mm)	Height (mm)	Depth (mm)	Weight (kg)
IF1, IF2	800	2300	1750	1200
IF3	1000	2300	1750	1400
IF1C, IF2C, IF2B with top entry	800	2300	2250	1650
IF3B with top entry	1000	2300	2250	1700

Dimensions and weights

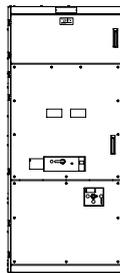
Bus coupler BC2, BC3



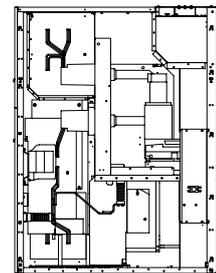
BC2



BC2

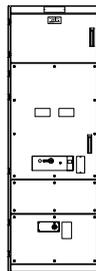


BC3

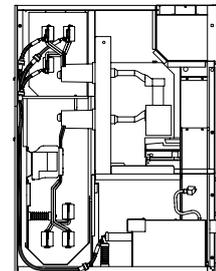


BC3

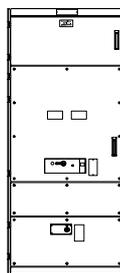
Bus coupler with VT BC2, BC3



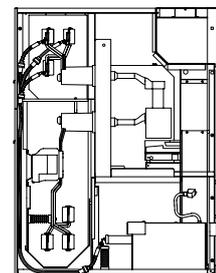
BC2 with VT



BC2 with VT



BC3 with VT



BC3 with VT

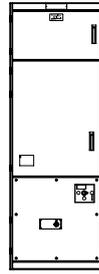
Overall dimensions and approximate weights of the basic cubicles

(with CB, CT, VT, ES)

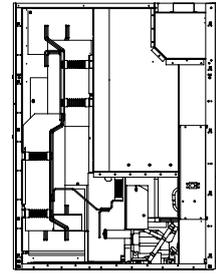
Type	Width (mm)	Height (mm)	Depth (mm)	Weight (kg)
BC2	800	2300	1750	1050
BC3	1000	2300	1750	1200
BC2 with VT	800	2300	1750	1200
BC3 with VT	1000	2300	1750	1350

Dimensions and weights

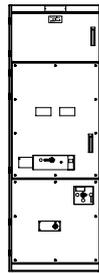
Bus riser RF2, RF3, RW2, RW3



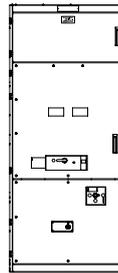
RF2, RF3



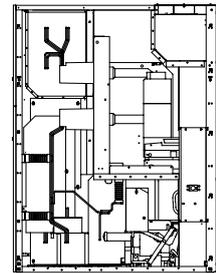
RF2, RF3



RW2

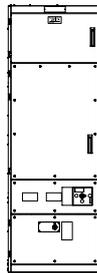


RW3

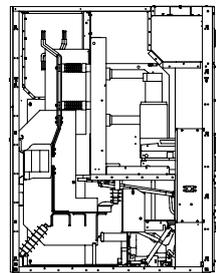


RW2, RW3

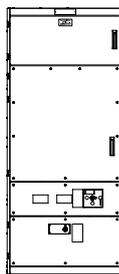
Incoming direct ID2, ID3



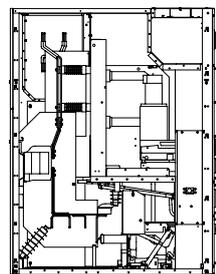
ID2



ID2



ID3



ID3

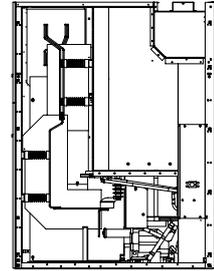
Overall dimensions and approximate weights of the basic cubicles

(with CB, CT, VT, ES)

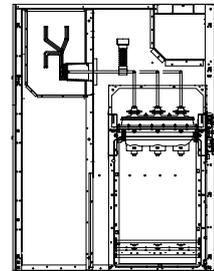
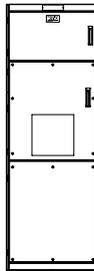
Type	Width (mm)	Height (mm)	Depth (mm)	Weight (kg)
RW2, RF2, RF3	800	2300	1750	850
RW3	1000	2300	1750	1000
ID2	800	2300	1750	900
ID3	1000	2300	1750	950

Dimensions and weights

Busbar metering BM



Fuse switch LB



Overall dimensions and approximate weights of the basic cubicles

(with CB, CT, VT, ES)

Type	Width (mm)	Height (mm)	Depth (mm)	Weight (kg)
BM	800	2300	1750	880
LB	800	2300	1750	550

Space to be provided around a switchboard

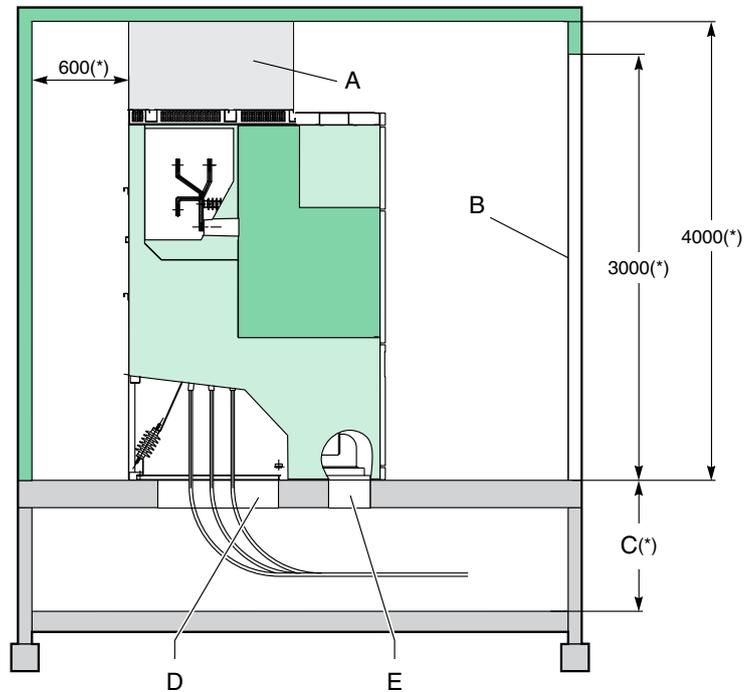
Civil engineering with cable room or trench

* minimum dimension (in mm).

The depth of the cable room can be reduced, but must ensure compliance with recommended bending radius of the cables used.

With smaller distance from the rear wall as 600 mm the cubicle is not accessible from the rear.

- A:** this space must remain free for the gas exhaust outlets. Do not install anything in this zone (lights, cable ducts, equipment storage, etc.)
- B:** access to the premises
- C:** 20 times cable diameter
- D:** space for MV cables
- E:** space for LV cables.

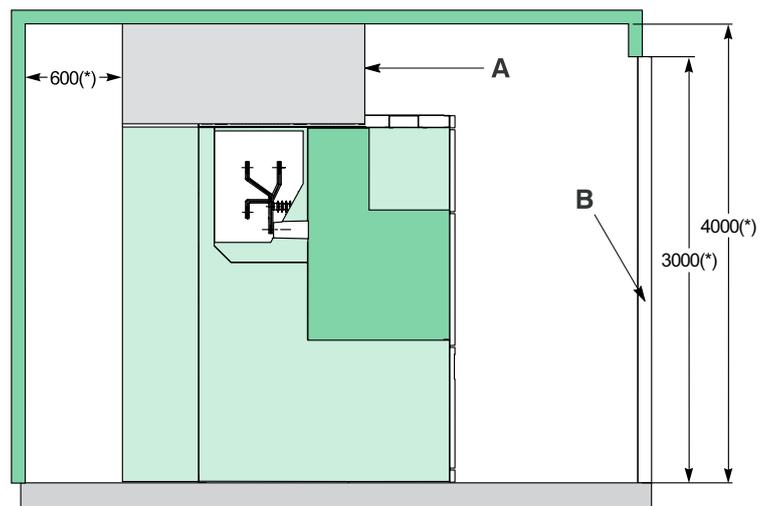


Civil engineering with top entry cable

* minimum dimension (in mm).

The depth of the cable room can be reduced, but must ensure compliance with recommended bending radius of the cables used.

- A:** this space must remain free for the gas exhaust outlets. Do not install anything in this zone (lights, cable ducts, equipment storage, etc.)
- B:** access to the premises.



Space to be provided around a switchboard

Access area to be provided around the switchboard

* minimum dimension (in mm).

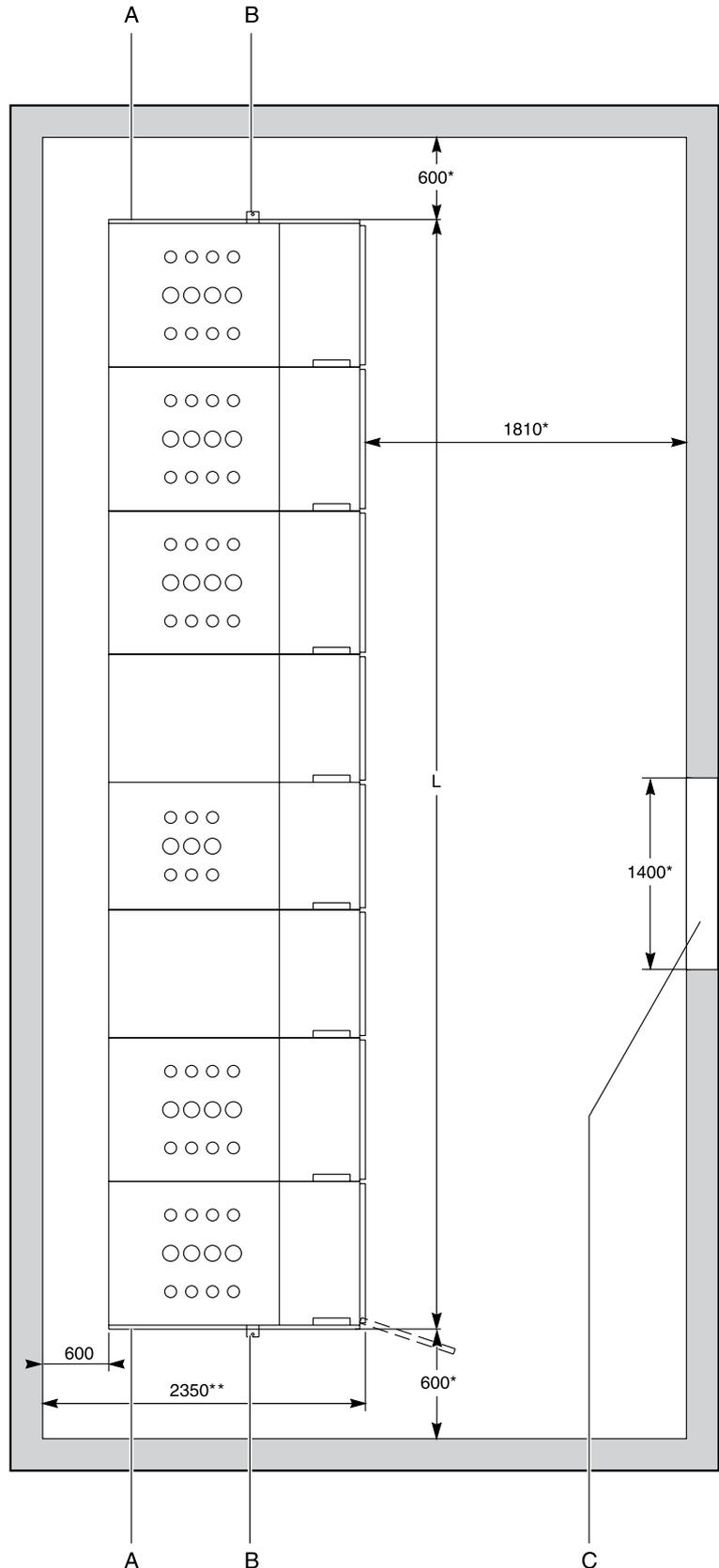
** +500 mm for top entry cubicles.

Dimension L of the cable entry slot in the floor depends on the arrangement of panels within the switchboard.

A: end cover

B: switchboard earth busbar 30 x 10 copper section hole for M12 bolt

C: access to the premises.



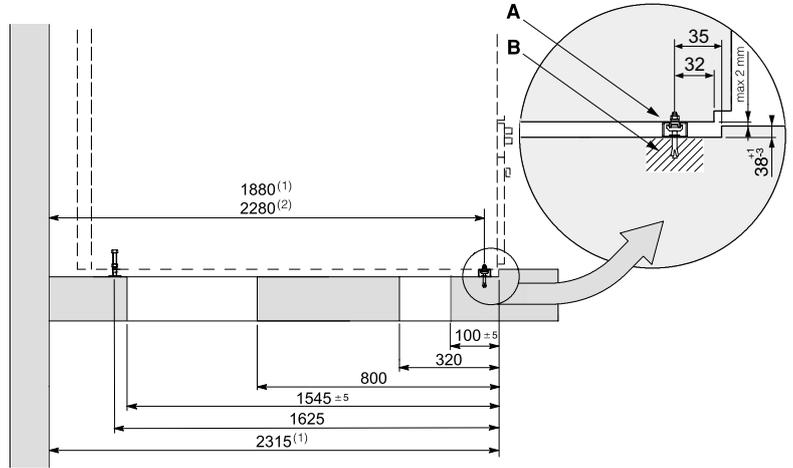
Floor preparation

Cable entry from below

(1): minimum dimension to be complied with for cubicles with no rear access.
 (2): minimum dimension for cubicles with rear access.

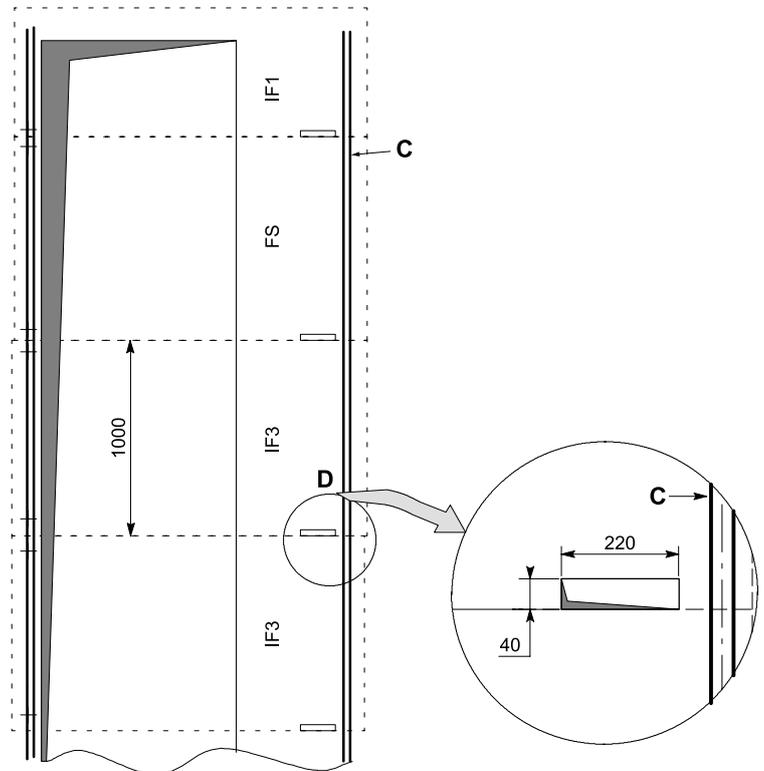
A: fixing channels must be unblocked inside (no cement). They must be level and must not protrude above the surrounding floor by more than 2 mm.

B: drilling area to fix functional units to the floor. This area must be free of any reinforcement.



The channel must be level and must protrude from the floor by no more than 2 mm.

C: front channel.
D: space for LV cables.



Floor finishing and functional unit fixing

Floor finishing

Surface condition

The floor surface must be level (no bumps) and such that a 2 meter rule placed on all surfaces and in every direction shows a clearance of no more than 5mm.

Floor strength characteristics

For easy movement of tools to extract moveable parts (OED, extraction rig, etc.) without damaging the floors, it should have the following characteristics:
- compression strength greater than 33 MPa.

Existing civil works

Should the buildings or civil works already exist, please contact a Schneider Electric representative to study possible solutions.

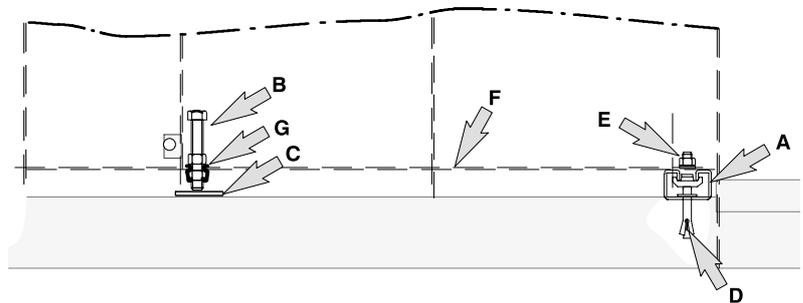
PLEASE NOTE

Improper arrangements of the floor can result in functional problems in the switchboard.

Overview of functional unit fixing method

Standard civil works

- A: profiled channel
- B: adjustment screw
- C: rear support plate
- D: plug + screw
- E: fixing bracket
- F: cubicle floor
- G: captive nut.



Incoming configuration of MV cable

General

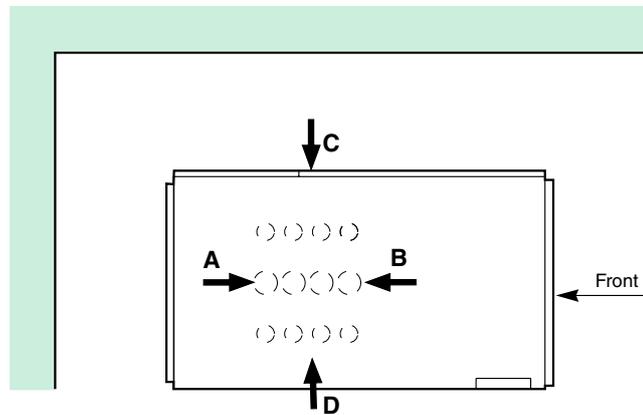
When designing the switchgear building, special attention should be paid to the problems associated with the laying of MV cables:

- The minimum permissible bending radius, this governs the depth of the cable room (trench).
- The need to leave enough slack in the cables so they can be pulled out and pushed back.
- Cabling handling problems depending on the cable entry configuration and the length of free cable after the entry point to the building.
- Cables must be supported prior to entering the switchgear.

Other entry configurations are possible, especially if there is greater height beneath the equipment.

The symbols (*) indicate the minimum dimensions to comply with. Cables can enter from the rear (A) front (B) or either side (C) or (D) of the switchgear.

Building with cable room or cable trench



Cable entry

* minimum dimension (in mm).

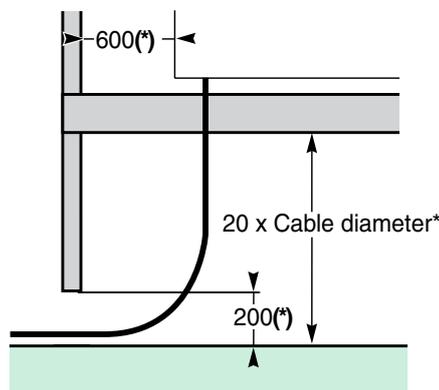
Recommended for:

- XLPE single-core cables (cross-section less than 630 mm²),

- XLPE three-core cables (cross-section up to 300 mm²).

Not recommended for 630 mm² cables.

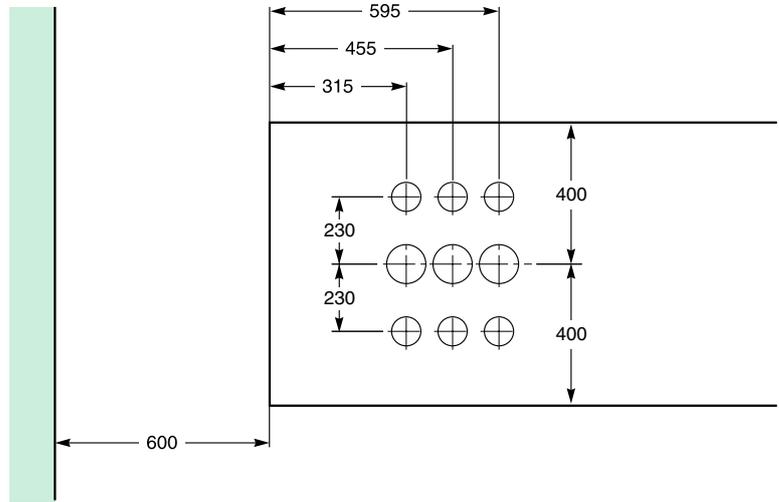
Cable room / trench height = 20 x cable diameter.



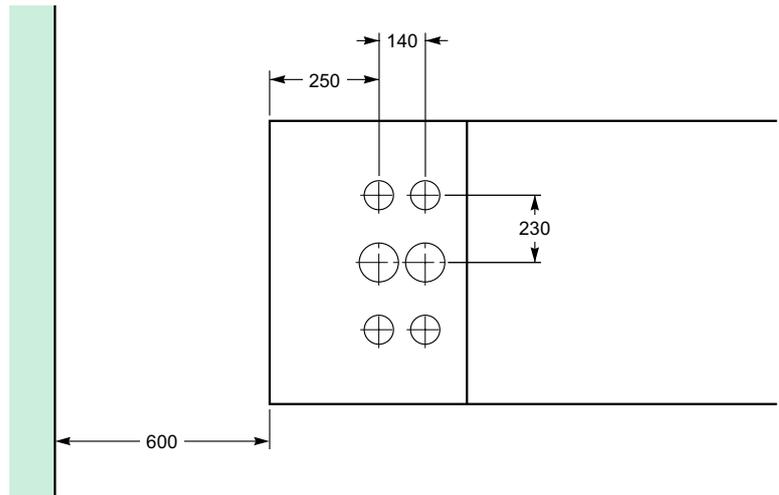
Incoming configuration of MV cable

Position of MV cables

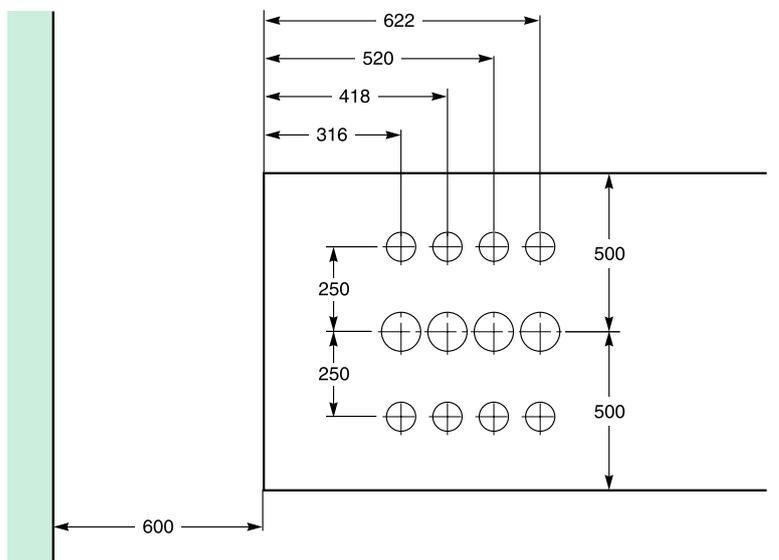
**MV cable entrance location IF1/IF2/ID2
bottom entry**



**MV cable entrance location IF1/IF2
top entry**



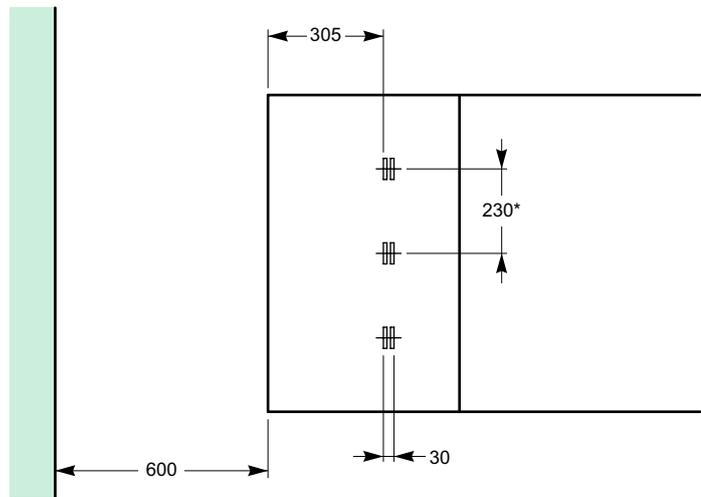
**MV cable entrance location IF3/ID3
bottom entry**



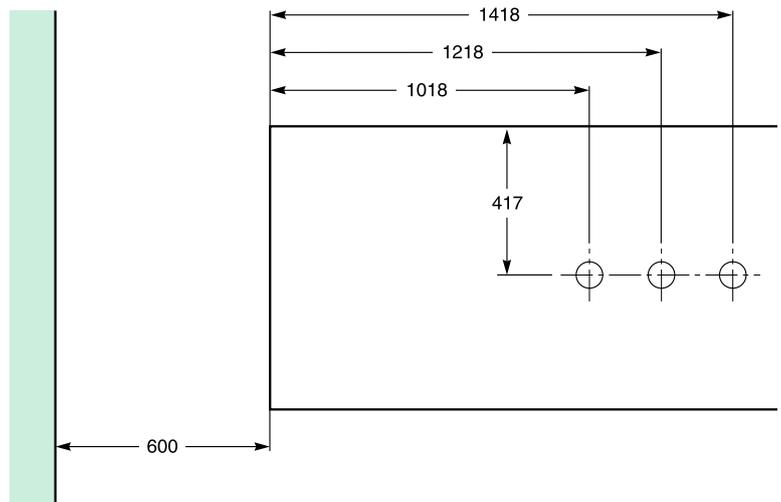
Incoming configuration of MV cable

MV cable entrance location IF2/IF3 top entry busbars

* 250 mm for IF3.



MV cable entrance location LB



Standard civil engineering reserved slab space

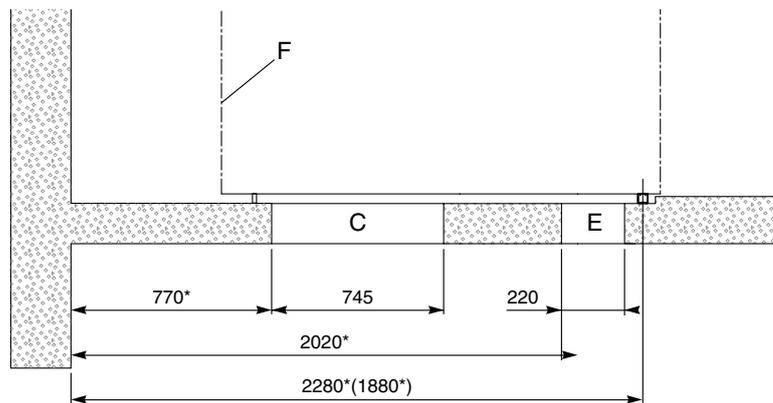
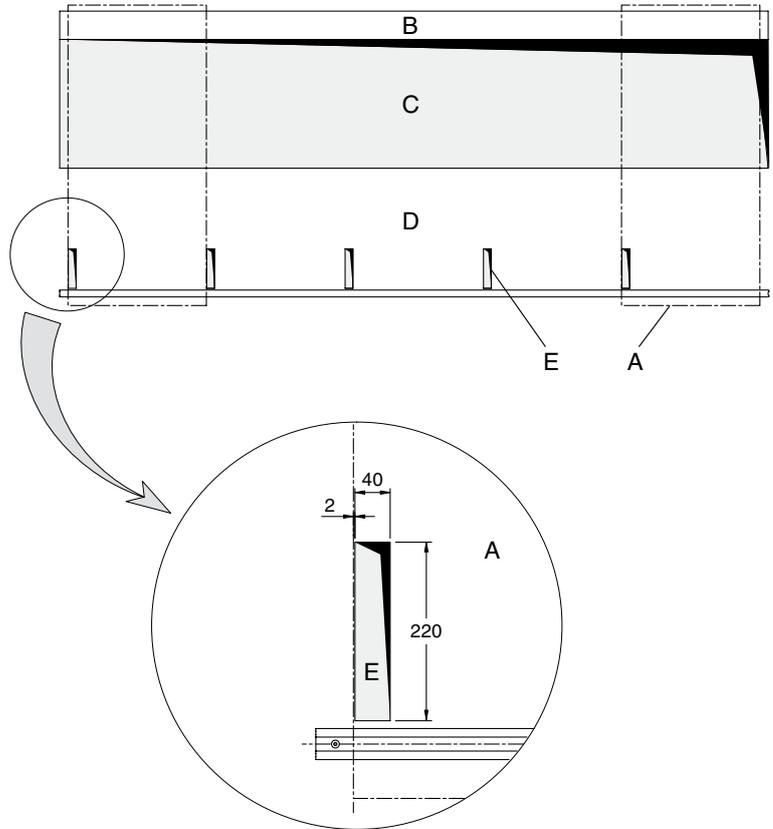
Floor plan

* minimum dimension (in mm).

Dimensions in parentheses:
- cubicles not accessible from rear.

Dimensions out of parentheses:
- cubicles accessible from rear.

- A: cubicle
- B: recess for rear jacks
- C: space for MV cables
- D: front channel
- E: space for LV cables (if required)
- F: rear cover of cubicle.



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