

RM6

ENGLISH

**MV distribution
factory built assemblies
at your service**

civil engineering and installation manual



Schneider
 **Electric**

Released for Manufacturing
Printed on 2012/09/13

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start-up
training
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maintenance
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who will put you in touch with
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Electric service centers.**

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<http://www.schneider-electric.com>

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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Technique T&D

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symbols and conventions

Caution:
you will find all the symbols
below throughout the document,
indicating
the hazard levels depending on
the
different types of situation.



DANGER: failure to follow this instruction will result in death or serious injury.



WARNING: failure to follow this instruction may result in death or serious injury.

as per iso 3864-2



CAUTION: failure to follow this instruction may result in injuries.

This alert signal can also be used to indicate practices that could damage the SM6 unit.



contact the Schneider
Electric service unit for
diagnosis and advice

call your sales representative who will put
you in contact with the closest SCHNEIDER ELECTRIC service center



You can log on to:
WWW.SCHNEIDER-ELECTRIC.COM

A RESPONSIBLE BEHAVIOR IS THE GUARANTEE OF YOUR SAFETY AND THAT OF OTHERS

distribution rules



CAUTION

The aim of this publication
is to enable the **SM6** unit
to be installed correctly.



CAUTION

This document is not a commercial
document. It is a strictly technical
document drawn up by
Schneider Electric.

safety rules



CAUTION

All the operations described below
must be performed in compliance
with applicable safety standards,
**under the responsibility
of a competent authority.**



WARNING

The contractor must be certified
and authorised to manipulate and
perform work on the **SM6** unit.



CAUTION

Only undertake the work after
having read and understood
all the explanations given in this
document.

If you have any difficulty complying
with these rules, please contact
Schneider Electric.

protective equipment

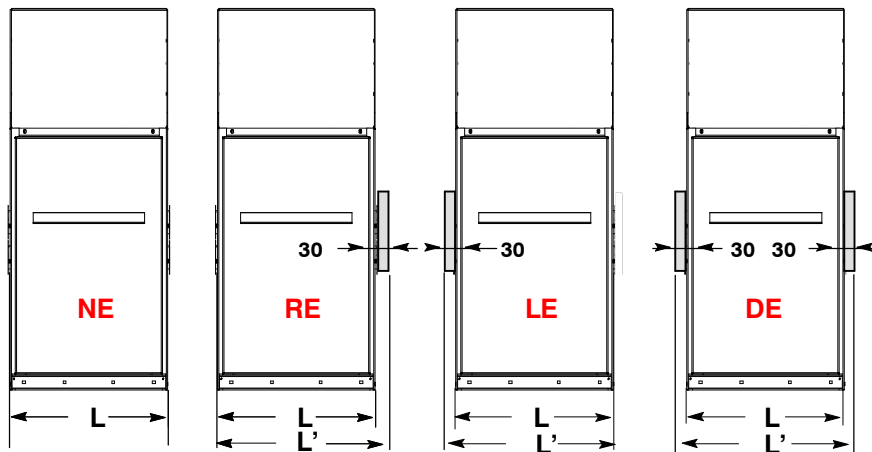
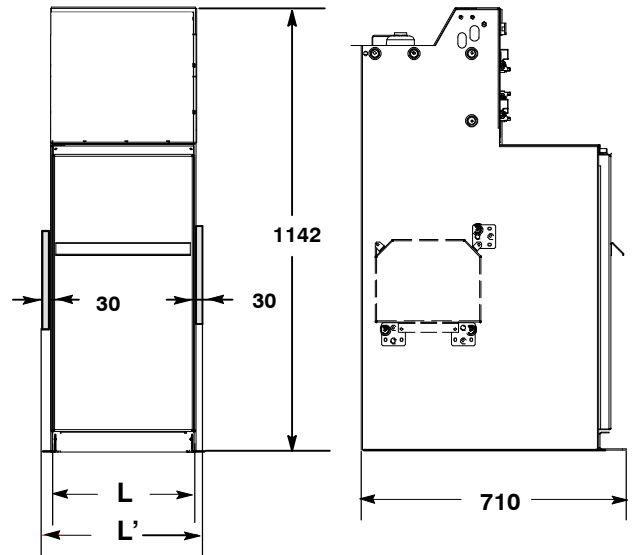
For each operation, it is mandatory
to use safety equipment
appropriate:

- **Personal Protective Equipment (PPE)**
- **Collective Protection Equipment (CPE)**



1 function range

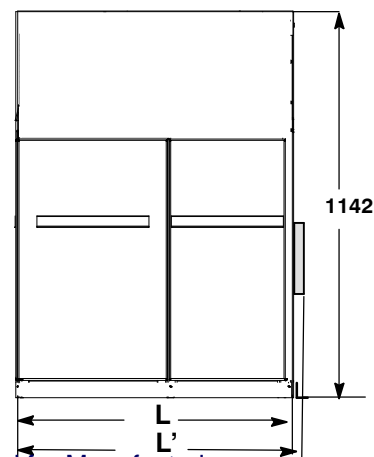
	function	weight (kg)	length (mm)
NE	I	135	L= 472
	D		
	B		
DE	I	135	L'=472+30+30=532
	D		L'=572+30+30=632
	B		
	Q	185	L'=472+30+30=532
cable connection			
RE	O	135	L'=472+30=502
LE			
DE			L'=472+30+30=532
bus coupler			
DE	Ic	145	L'=572+30+30=632
	Bc		



NE = No **E**xtensible
DE = Double **E**xtensible
LE = Left **E**xtensible
RE = Right **E**xtensible

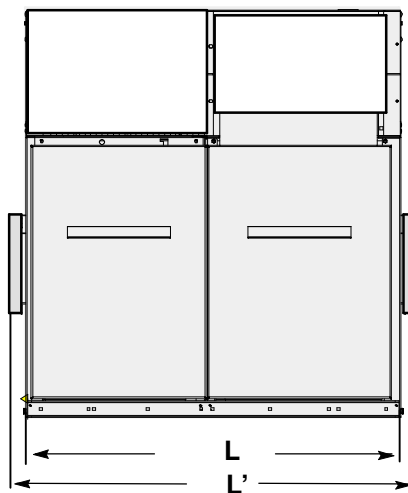
2 functions range basic

	function	weight (kg)	length (mm)
NE	QI	180	L= 829
	DI, BI		
	II	155	
RE	II		L'= 829+30= 859



2 functions range / free combination

function	length (mm)
NE	L = 1052
LE	L' = 1052 + 30 = 1082
RE	
DE	L' = 1052 + 30 + 30 = 1112



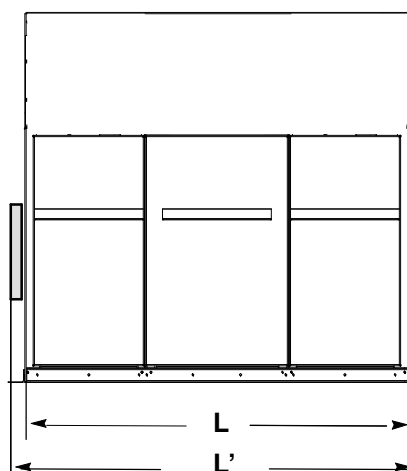
All function can be FREE combination

Below possible example :

function				weight (kg)
II	IO	OI	OO	205
ID	DI	IB	BI	215
IQ	QI	OQ	QO	240
DD	BB			225
DQ	QD	BQ	QB	250
QQ				275

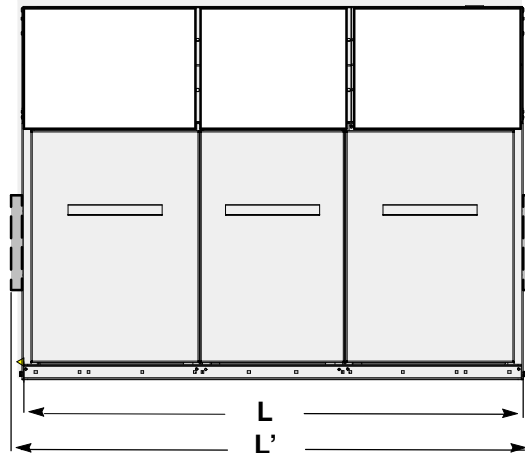
3 functions range basic

	function	weight (kg)	length (mm)
NE	IQI	275	L= 1186
	III	240	
	IDI		
	IBI	250	
RE	RE-IQI	275	L' = 1186+30=1216
	RE-III	240	
	RE-IDI		
	RE-IBI	250	
DE	IQI	275	L' = 1186+30+30=1246
	III	240	
	IDI		
	IBI	250	



3 functions range / free combination

function	length (mm)
NE	L= 1532
LE	L'=1532+30=15622
RE	
DE	L'= 1532+30+30=1592



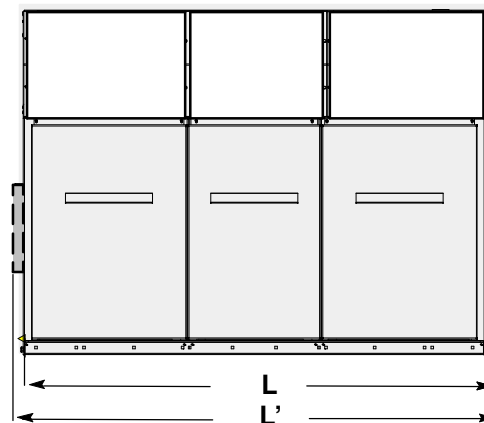
All function can be FREE combination

Below possible example :

function			weight (kg)	function			weight (kg)
III	OOO		305	IQD	IDQ	DIQ	350
IIO	IOI	OII	305	QDI	QID	DQI	350
IOO	OIO	OOI	305	IQQ	QIQ		375
IID	IDI	DII	315	DDD	BBB		335
IIB	IBI	BII	315	QQQ			410
IIQ	IQI	QII	340				
IDD	DID	DDI	325				
IBB	BIB	BBI	325				

free combination with bus coupler

function	length (mm)
RE	L= 1532+30=1562
DE	L'=1532+30+30= 1592

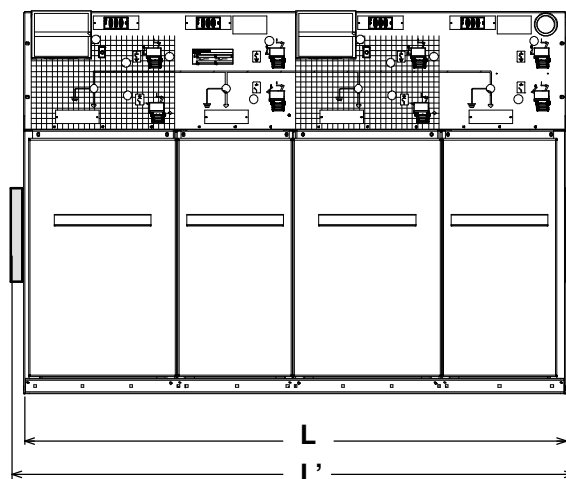


Below possible example :

functions			weight (kg)		functions		weight (kg)
IIIc			320		DDIc	BBIc	340
IIBc	IDIc	IBIc	330		DDBc	BBBc	350
DIIc	BIIc	330			QQIc	390	
IQIc	QIIc	355			QQBc	400	
IQBc	QIBc	365					

4 functions range basic

	function	weight (kg)	length (mm)
NE	IIQI	355	L = 1619
	IIII	320	
	IIDI / IIBI	330	
	QIQI	390	
	BIBI / DIDI	340	
	DIDI	340	
RE	IIQI	355	L' = 1619+30 = 1649
	IIII	320	
	IIDI / IIBI	330	
	QIQI	390	
	BIBI	340	
	DIDI	340	
DE	IIQI	355	L' = 1619+30+30 = 1679
	IIII	320	
	IIDI / IIBI	330	



NE = No Extensible

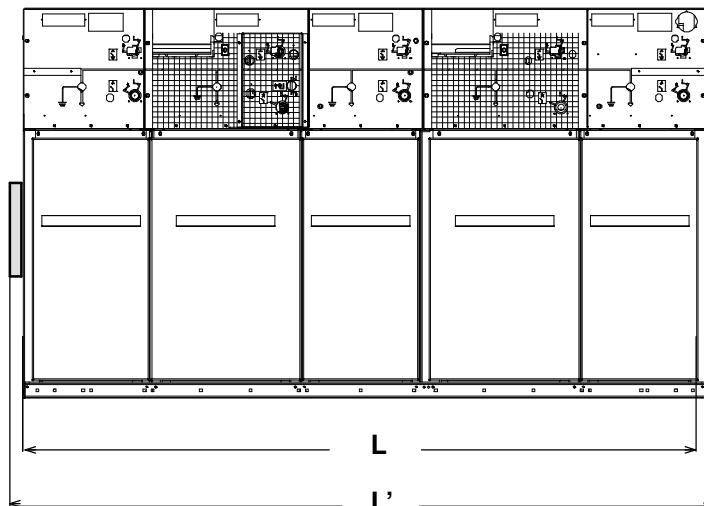
DE = Double Extensible

LE = Left Extensible

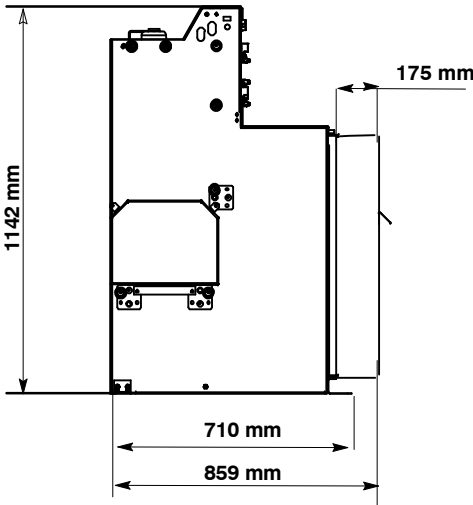
RE = Right Extensible

5 functions

	function	weight (kg)	length (mm)
NE	IIIQI	485	L = 2000
	IBIQI	495	
	IIII	450	
	IIIDI / IIIBI	460	
	IQIQI	520	
	IBIBI / IDIDI	470	
RE/-LE	IIIQI	490	L' = 2000+30 = 2030
	IBIQI	500	
	IIII	455	
	IIIDI / IIIBI	465	
	IQIQI	525	
	IBIBI / IDIDI	475	
DE	IIIQI	495	L' = 2000+30+30 = 2060
	IBIQI	505	
	IIII	460	
	IIIDI / IIIBI	470	
	IQIQI	530	
	IBIBI / IDIDI	480	

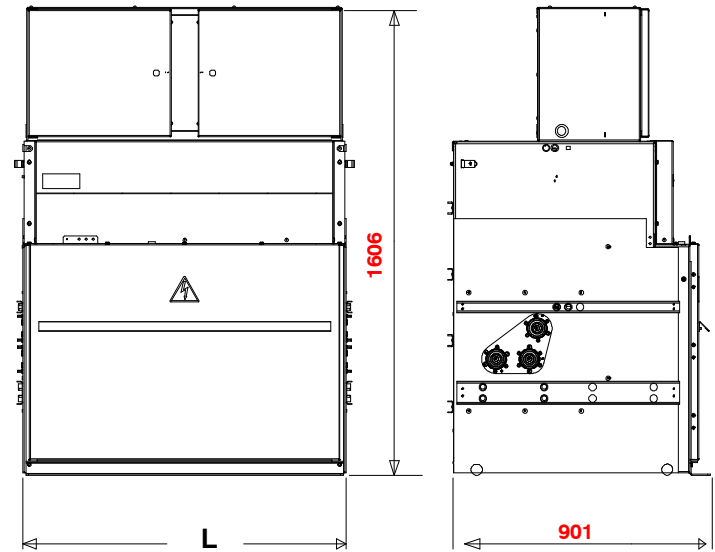


arrester option



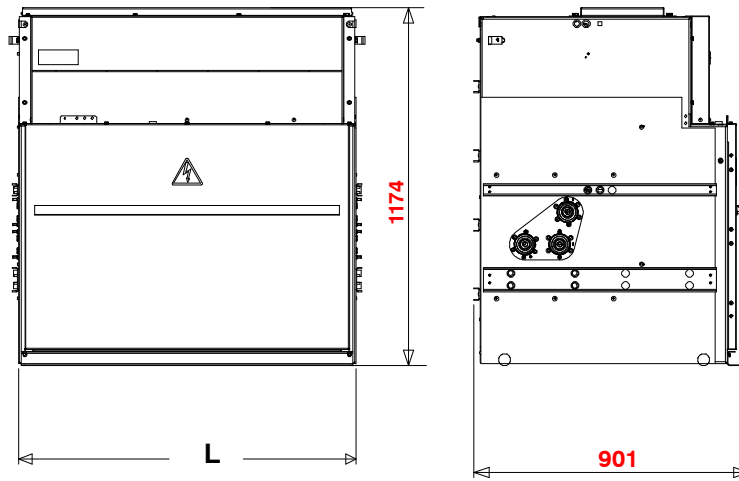
**metering cubicle
with LV compartment**

function	weight (kg)	length (mm)
DE_Mt	420	L= 1106



without LV compartment

function	weight (kg)	length (mm)
DE_Mt	400	L= 1106

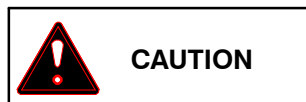


handling

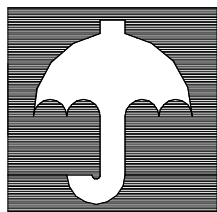
A handling pallet is fixed beneath the **RM6** switchgear.

This device enables fork handling of the devices.

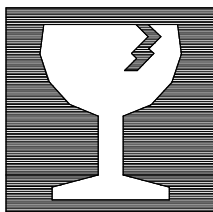
silk-screen printed instructions on the transport cover



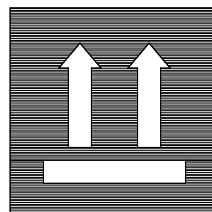
It is important to pay particular attention to the information affixed to the transport cover before carrying out any kind of handling operations.



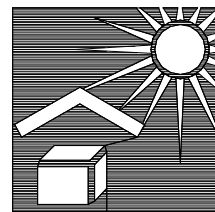
keep away from rain



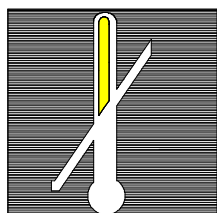
handle with care



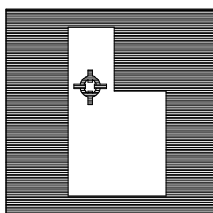
this way up



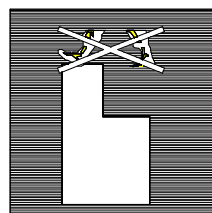
keep away from sunlight



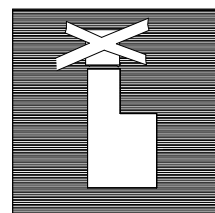
Storage Temp
maxi 70°C
mini -40°C



high gravity center

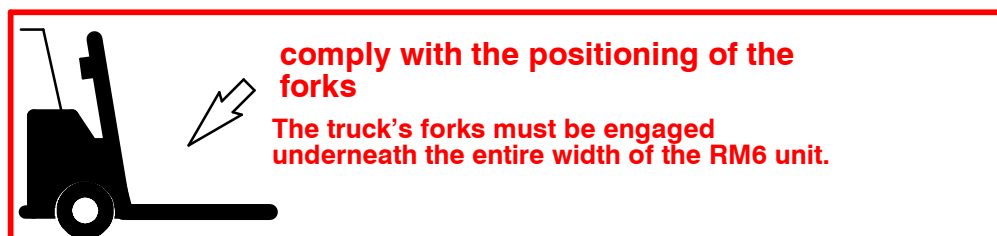
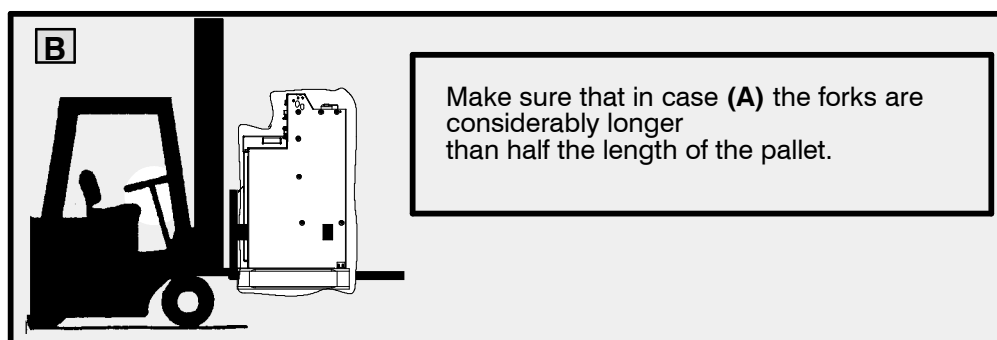
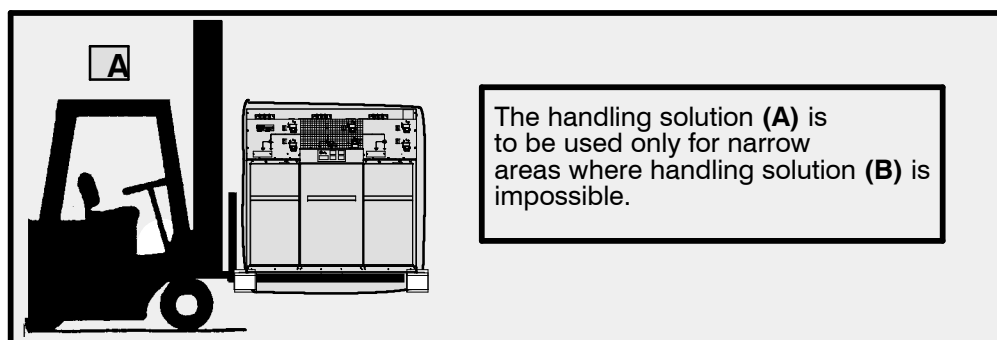


do not walk on it



do not stack

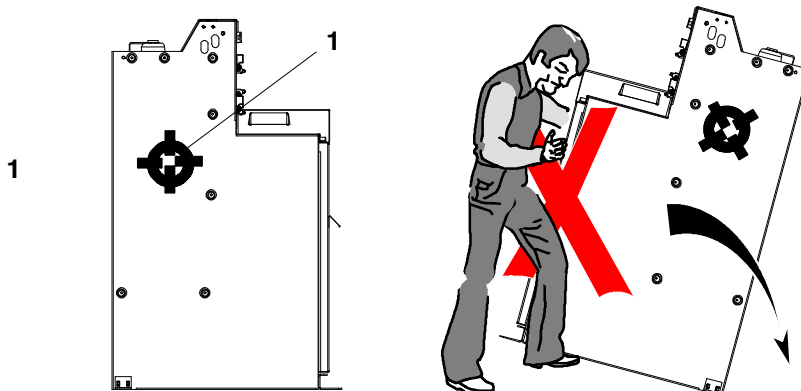
by forklift truck



“centre of gravity” transport

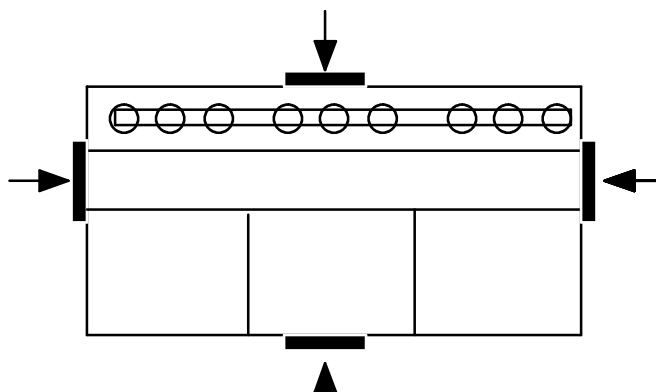


1 : high centre of gravity

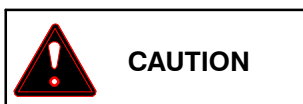


transport conditions

Wedge the RM6 unit securely during transport.

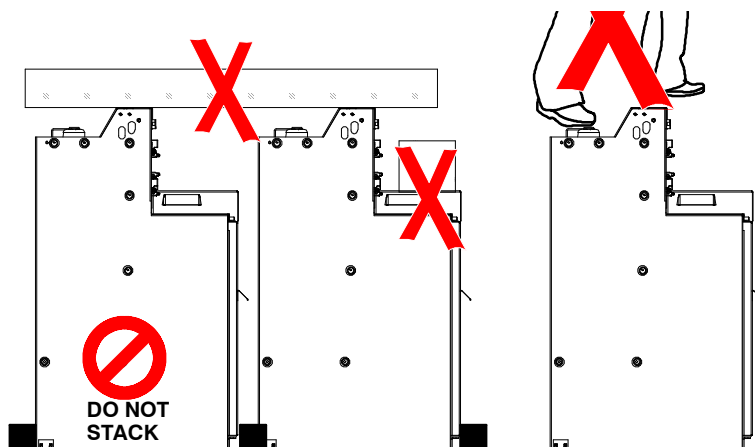


reminder



Do not place anything
on the RM6 unit.

Do not walk on the RM6 unit.

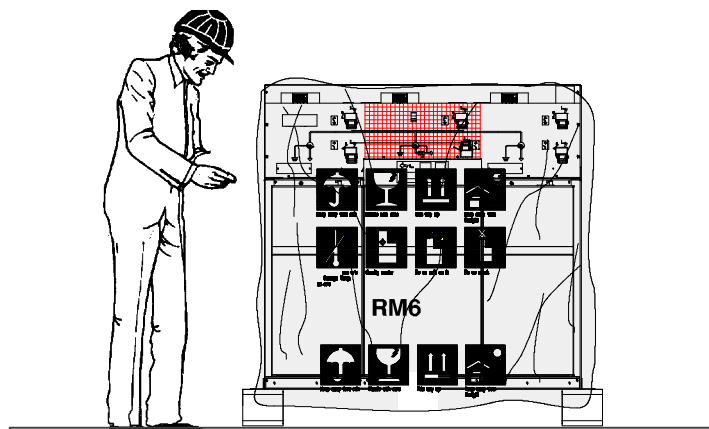


acceptance

- make sure the delivered **RM6 unit** is complete
- carry out a visual inspection of the functional components
- verify the characteristics indicated on the nameplates, compared to the initial order

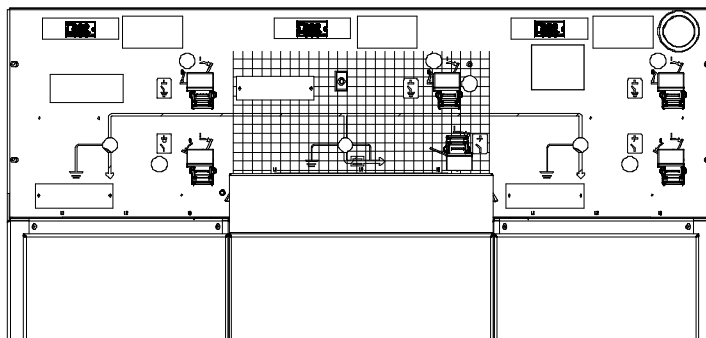
Refer to the “characteristics” chapter :

- the plastic cover must be in position on the **RM6 unit** and in good condition when it arrives.



before installation and energising

Check the SF6 gas pressure for units fitted with a manometer or a pressure switch.



unit with manometer

Case 1: needle in green zone

- The **RM6** unit is in normal operational status (ready for energising).

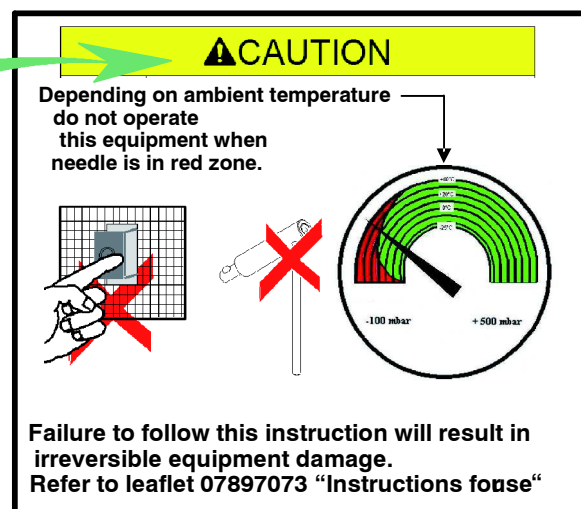
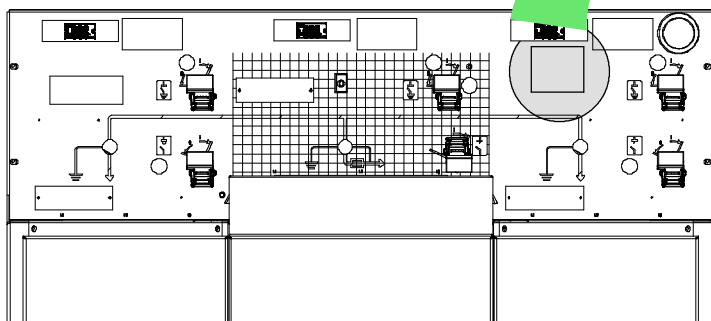
Case 2: needle in red zone



- The **RM6** unit must be replaced.
- The **RM6** unit must not be switched on.

warning label

recalls the safety rules



unit with pressure switch

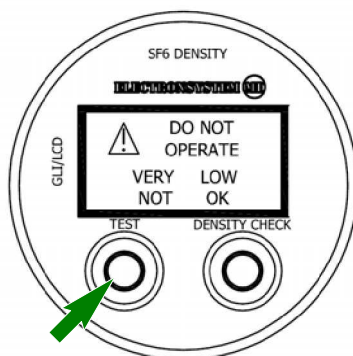
LCD display check



WARNING

Reminder: checks are carried out with **THE POWER OFF**.

Press the “**TEST**” button. The LCD screen should display:



- If nothing is displayed, check that the 8–point connector on the pressure switch wiring harness at the rear of the LCD display is correctly connected.

- Contact the after sales service.

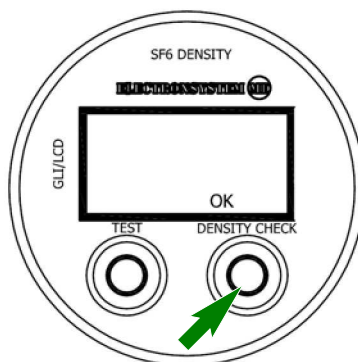
www.schneider–electric.com

Note: The LCD display is self–powered by piezoelectric buttons (“**TEST**” and “**DENSITY SWITCH**”). Pressing on one of these buttons will light up the display for a few seconds.

pressure check

Press the “**DENSITY CHECK**” button. The LCD screen displays:

Case 1: OK

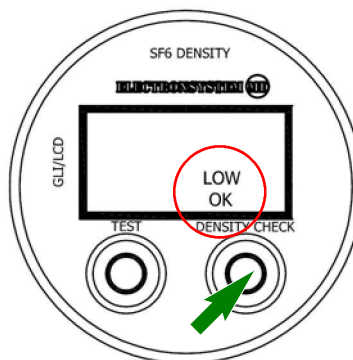


- The **RM6** unit is in normal operational status (ready for energising)

Case 2: LOW / OK



CAUTION

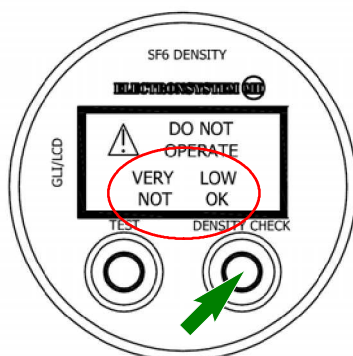


- The **RM6** unit must be replaced.

Case 3: VERY LOW / NOT OK

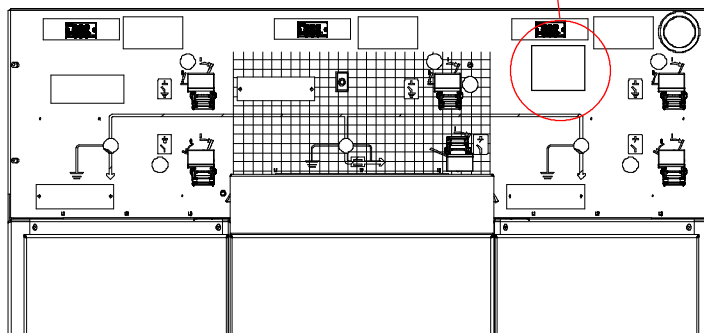
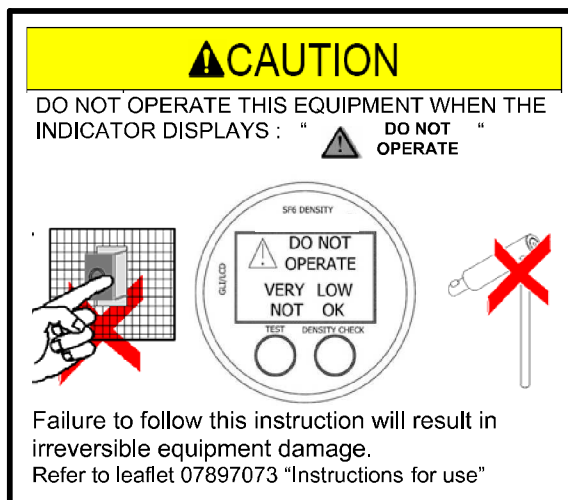


WARNING



- The **RM6** unit must be replaced.
- The **RM6** unit must not be switched on.

warning label
recalls the safety rules



information



In the event of an anomaly, indicate the necessary issues to the carrier.

The functional unit must remain on its base in its original packing materials when it is stored, until it is taken to its installation site.



In a case of visible damage or anomalies, do not install the RM6 unit. Contact SCHNEIDER ELECTRIC immediately.

Reminder: telephone numbers indicated in the first chapter of this document.

handling by slings with hooks

If the minimum sling lengths cannot be implemented, use a lifting beam.

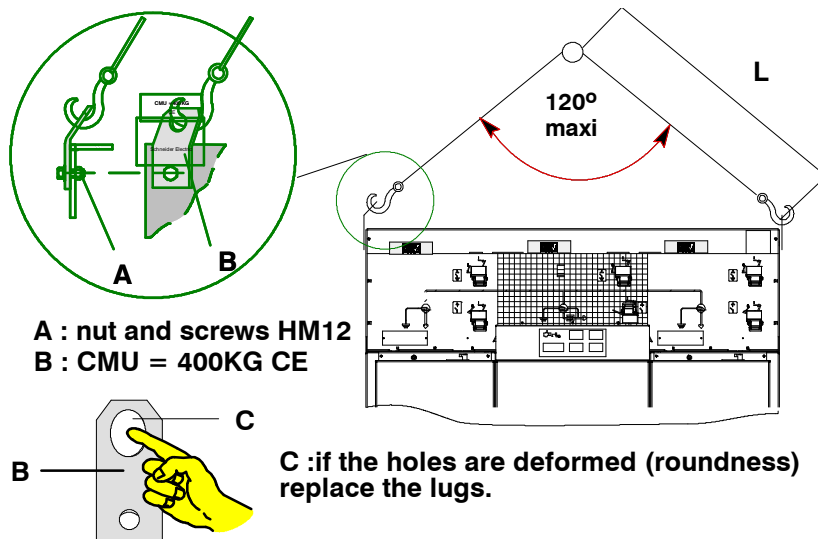


CAUTION

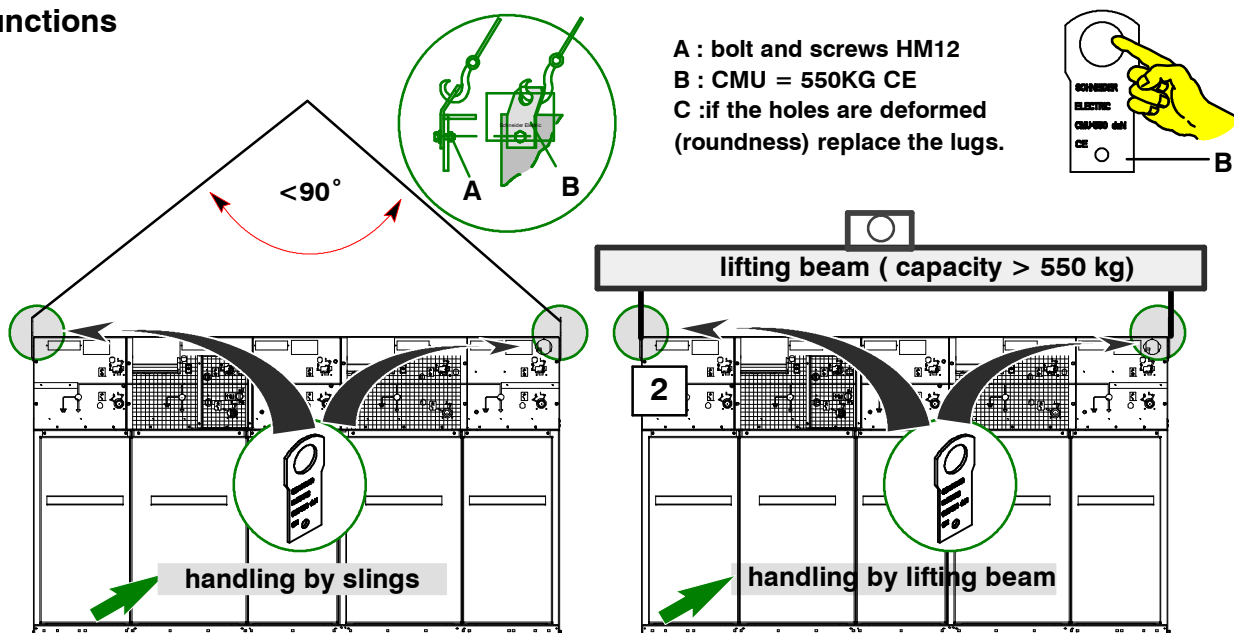
Do not handle a substation using slings, if the LV trunking or mimic panel front plate are not fitted.

The handling by lugs are reserved only for handling RM6 substations.

A : HM12 screws nuts and



for 5 functions



choice of slings to be used

RM6	2 functions (mm)	3 functions (mm)	4 functions (mm)
length cubicle (L)	829	1186	1619
length cable minimum	700	700	1000

for free combination

FREE combination	2 functions for free combination (mm)	3 functions for free combination (mm)	5 functions (mm)
length cubicle (L)	1052	1532	2000
length cable minimum	700	1000	1500

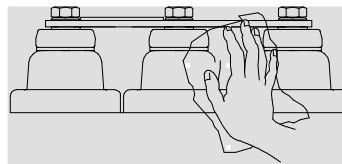
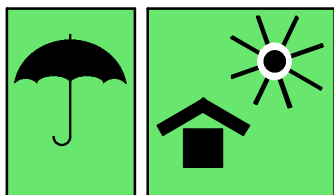
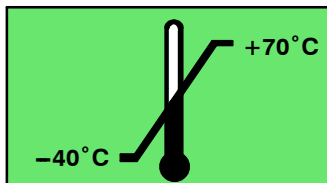
storage



CAUTION

When stored, the equipment must remain in its original packing.

It must be stored under shelter, on a dry floor or on a material insulating it from the damp.

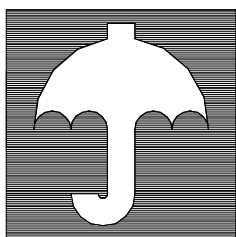


Clean using a sponge and clear water.
Do not use alcohol or other solvents to clean.

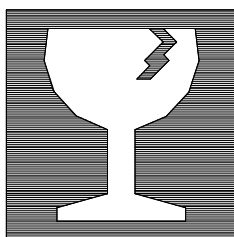
Following prolonged storage, all the insulating parts must be thoroughly cleaned before use.

The panels must be dusted using a dry, clean cloth.

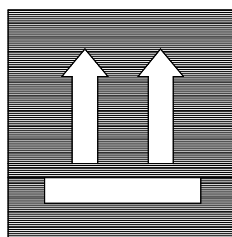
remember



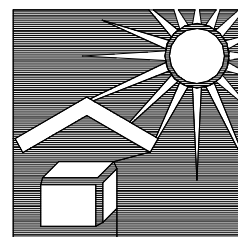
Keep away from rain



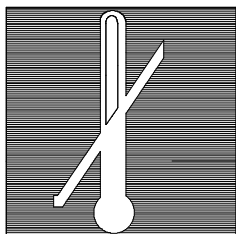
Handle with care



This way up



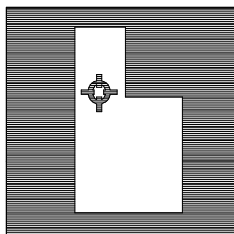
Keep away from
Sunlight



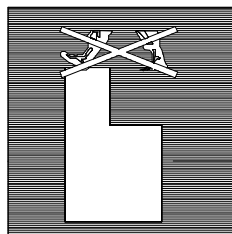
Maxi 70°C

Storage Temp.

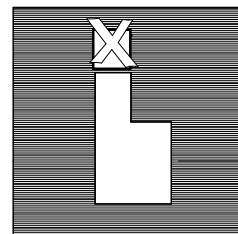
Mini -40°C



High gravity center



Do not walk on it



Do not stack

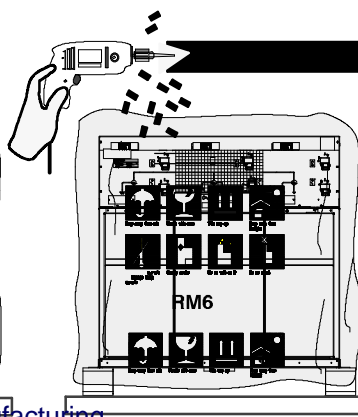
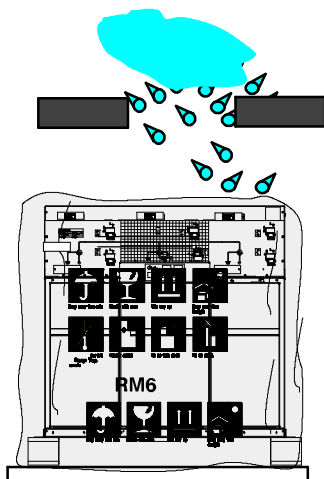
storage (continued)



CAUTION



Keep the RM6 unit under its original plastic cover throughout the whole storage period



specific recommendations for long-term storage

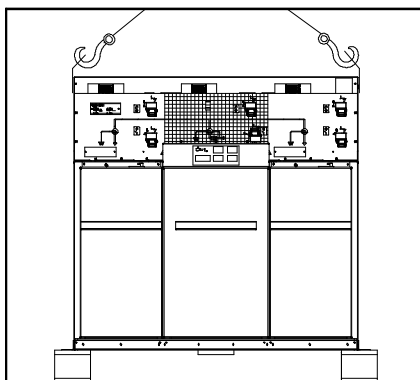
regularly check the condition of the protective cover

unpacking on site

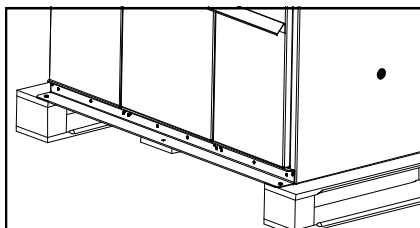


After unpacking, the remaining materials (plastic cover + wooden pallet) must be sorted and routed to the appropriate recycling systems.

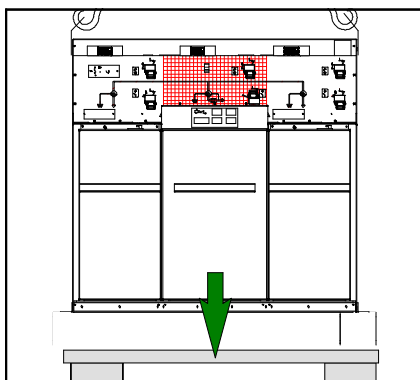
When unpacking, check the functioning of the **RM6 units** by carrying out a few actions.



Remove the packing cover.
Place the device on the ground.



Remove the handling pallet.
NB: the front plinth MUST remain in position.

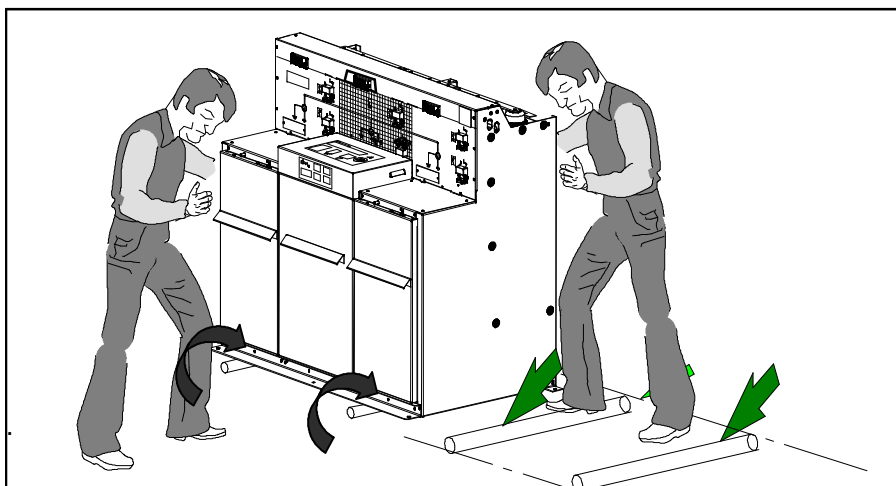


Lift up the substation in order
to remove the handling pallet.

handling using rollers

After unpacking and dismantling
of the handling kit.

Slide the **RM6 unit**
on several cylindrical rollers.
Move it to its definitive installation
position



checking the accessories delivered with the unit



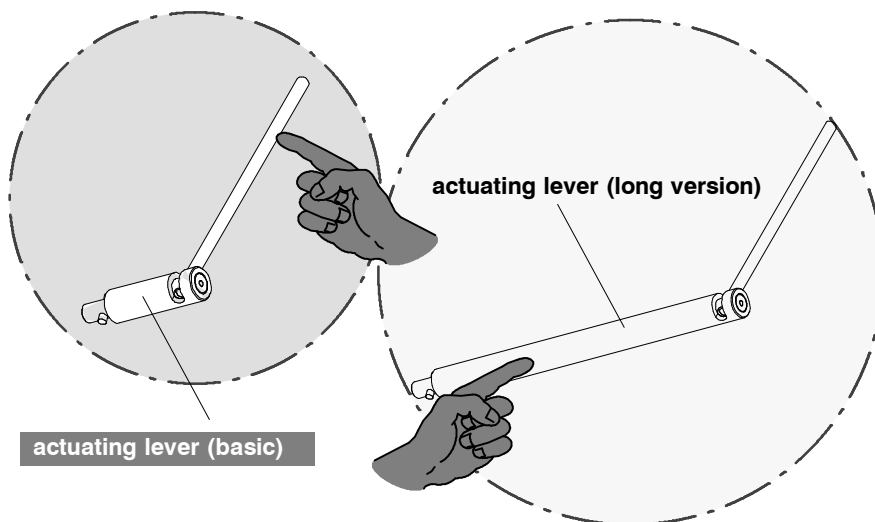
We draw your attention to this specific point.

The actuating lever is a **MANDATORY** requirement in order to install the **RM6 unit** and put it into operation.



CAUTION

Reminder: the original RM6 lever must be used; it is delivered with the RM6 unit.



IF THE LEVER IS MISSING ?

CALL YOUR SALES REPRESENTATIVE WHO WILL PUT YOU

CONTACT WITH THE CLOSEST SCHNEIDER ELECTRIC GROUP SERVICE CENTRE

YOU CAN LOG ON TO :

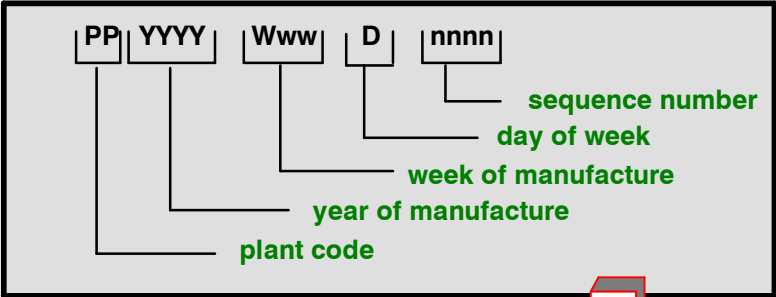
www.schneider-electric.com

technical data




Check that the information marked on the rating plate matches the equipment ordered.





- 1 function switch
- 2 function circuit breaker
- 3 function fuse–switch combination
- 4 connection busbar



plant code

4

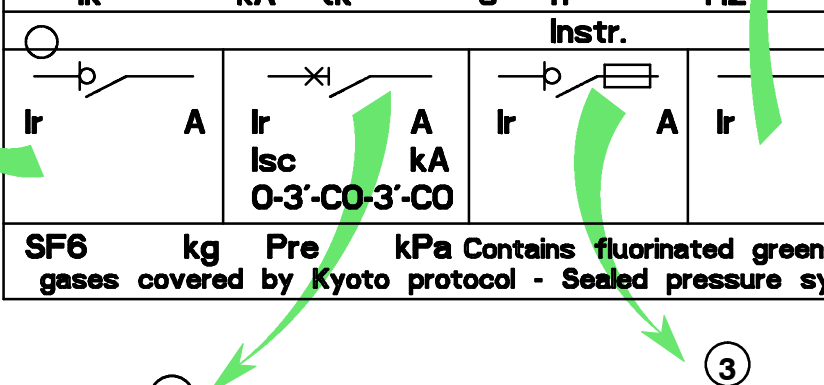


RM6										IEC62271-200									
Type					S/N														
Ur		kV		Ud		kV		Up		kV		Un		kV					
Ik		kA		tk		s		fr		Hz									
Instr.																			
 Ir A					 Ir A Isc kA 0-3'-CO-3'-CO					 Ir A					 Ir A				
SF6 kg Pre kPa										Contains fluorinated greenhouse gases covered by Kyoto protocol - Sealed pressure system									

1

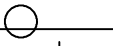
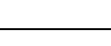
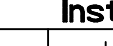

3

2



characteristic for free combination and 5 functions

or free
d 5

RM6										IEC62271-200									
Type					S/N														
Ur		kV		Ud		kV		Up		kV		Un		kV					
Ik		kA		tk		s		fr		Hz									
Instr.																			
 Ir A					 Ir D A B Isc kA 0-3'-CO-3'-CO					 Ir A					 Ir A				
SF6 kg Pre kPa Contains fluorinated greenhouse gases covered by Kyoto protocol - Sealed pressure system																			

①

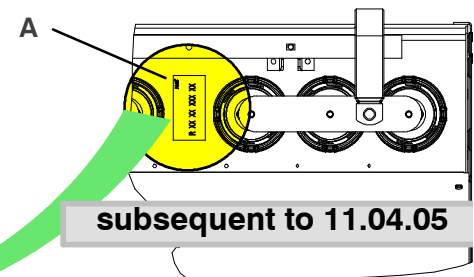
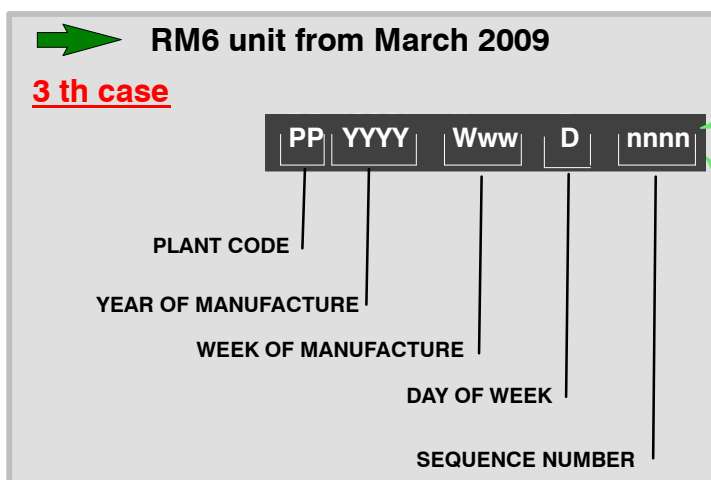
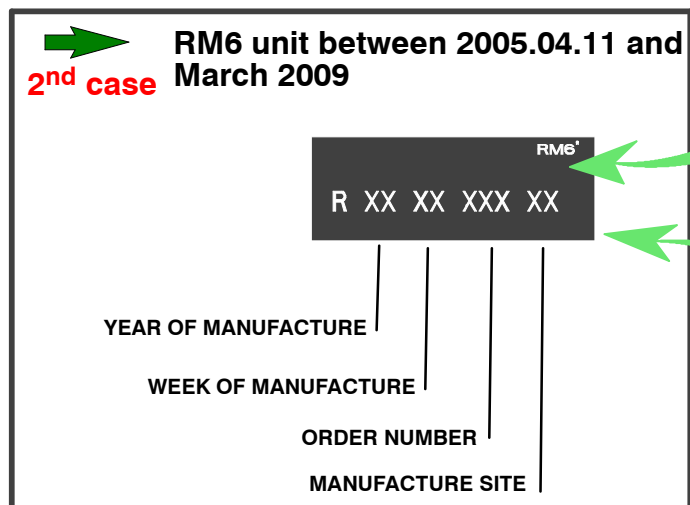
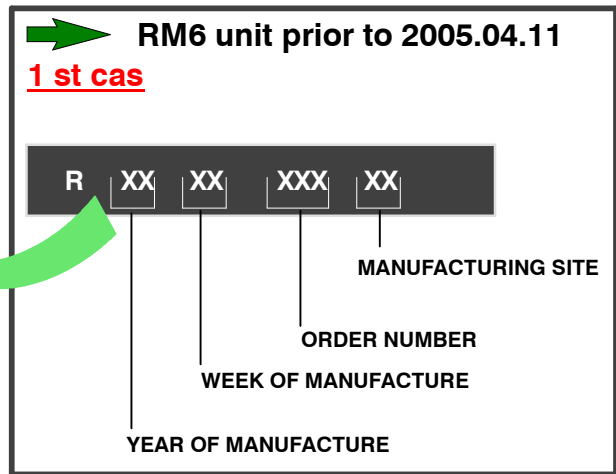
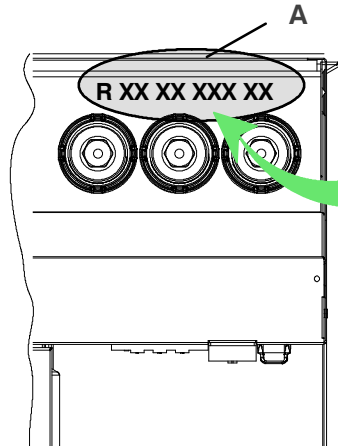
②

③

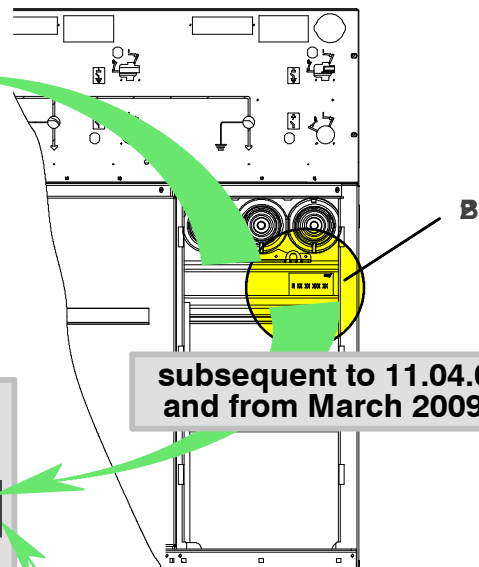
④

identification

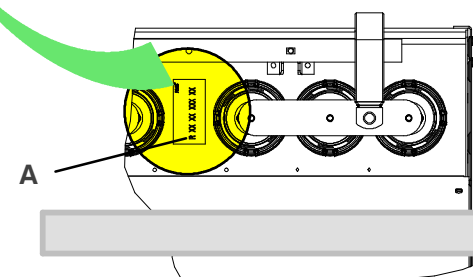
- **A** Unit serial n° engraved on top of the case.
- **B** Unit serial n° engraved on connection bushing access panel



subsequent to 11.04.05



subsequent to 11.04.05 and from March 2009



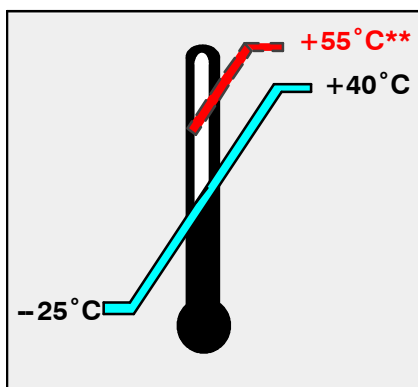
reminder

It is **important** to control heating phenomena causing condensation problems in sub-stations.

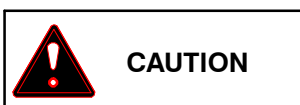
Condensation is determined directly by the temperature of the components and the humidity level of the air introduced by the ventilation.

This humidity level can be modified considerably **by the presence of water in the basement.**

temperature



When the **RM6** is operating, the ambient temperature must be between **-25°C and +40°C.**



**** Above 40°C, but only up to 55°C, carry out a current derating.**

temperature	40°C	45°C	50°C	55°C
nominal current	400A	400A	400A	355A
	630A	575A	515A	460A

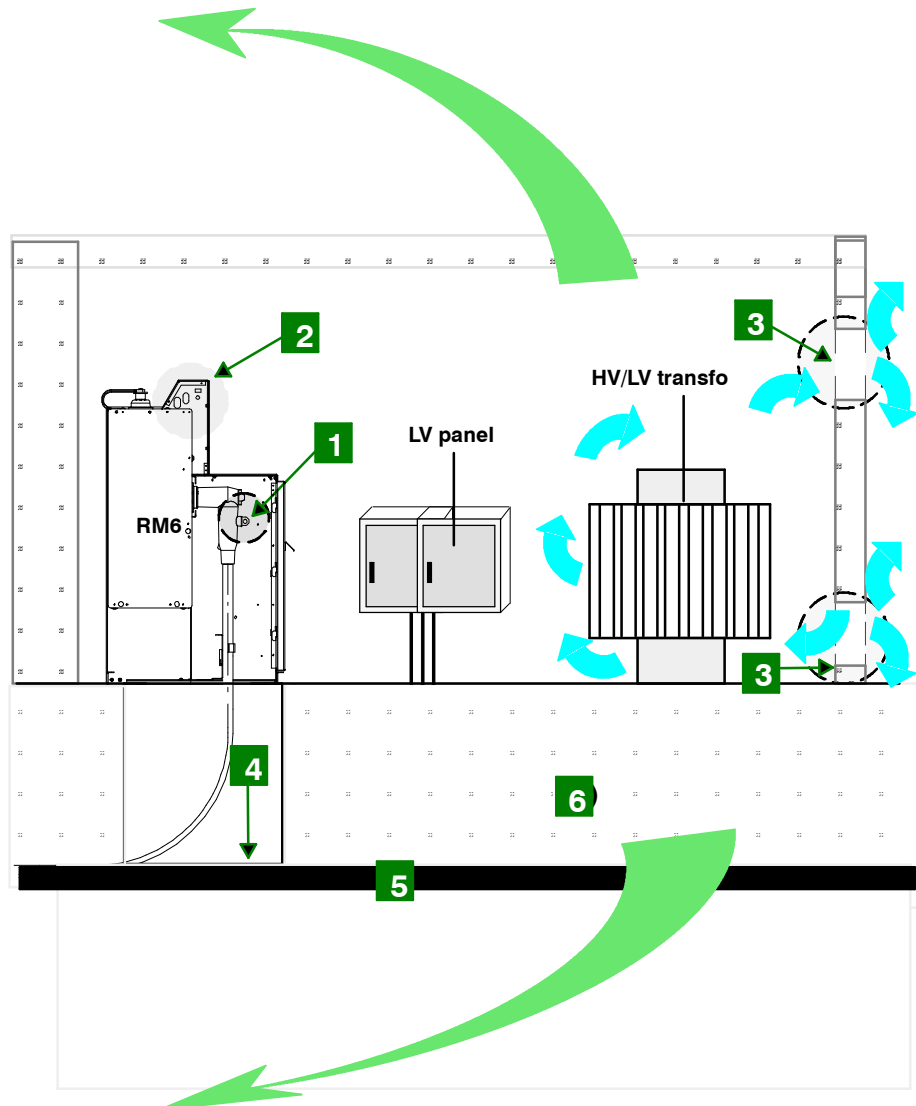
recommendation

Ageing withstand of switchgear in an MV substation depends on several factors that must be complied with before or while installing the equipped substation.

example of correct installation

rules to be complied with

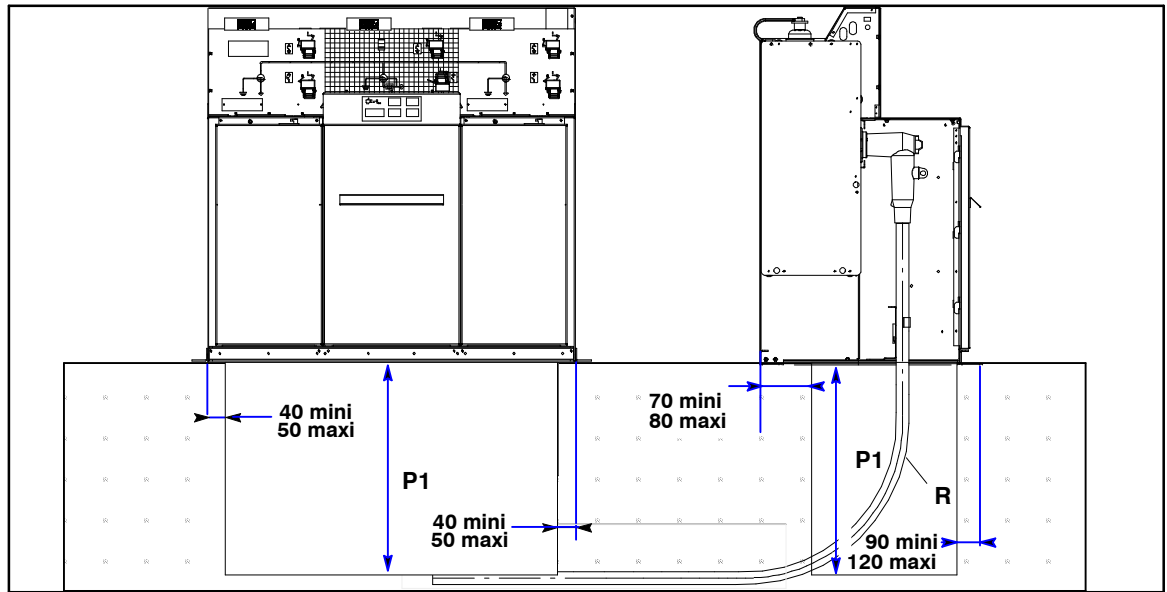
- **1**
Need for proper implementation of connections:
the new cold-slip-on or retractable technologies offer an ease of installation that encourages long-term withstand.
- **2**
The effect of the relative humidity factor:
implementation of a heating resistor in the LV compartment is vital in climates with a high rate of relative humidity and with large temperature differences.
- **3**
Ventilation control:
grid size must be suited to the power lost in the substation. These grids must be placed only near the transformer, to avoid air circulation on the MV switchboard.
- **4**
The need for brickwork construction for the ducts, equipped with a device guaranteeing absence of water stagnation:
either by installation of perfect tightness at cable routing level, at the entrance to the MV substation enclosure or by installation of a device allowing evacuation of water that has accidentally entered the duct.
- **5**
Preparation of the ground guaranteeing absence of water penetration in the ducts and rapid evacuation of water that has accidentally entered the ducts:
by installation of a drain under and around the substation (sufficiently thick gravel layer).
- **6**
Stabilisation of the ground before installing the MV substation guaranteeing absence of all ground movement and thus of the MV substation at a later stage.



for network switch or
network circuit breaker

Cables can be routed from
the front, rear, left or right.

In the case of civil engineering
without trench, a raising plinth
can be optionally supplied.



determining trench depth (P1)



for more detailed information,
please contact the cable
supplier

connection	cable insulation	cable	cross--se ction (mm2)	radius of curvature (mm)	depth (mm)		
plug--in sockets draw--out sockets	dry insulator	single--pole	≤ 50	370	270		
			70 to 95	440	340		
			120 to 150	500	400		
			185 to 240	590	520		
			300	640	540		
heat--shrinkable ends	dry insulator	single--pole	≤ 50	370	270		
			70 to 95	440	340		
			120 to 150	500	400		
			185 to 240	590	520		
			300	640	540		
			≤95	550	660		
			150	610	720		
			185	650	770		
			paper impregnated with non--draining material	three--pole	≤ 50	550	660
					95	635	750
	150	670			790		
	240	775			900		
	300	835			970		

for fuse-switches

H1 : 700 minimum for changing fuses

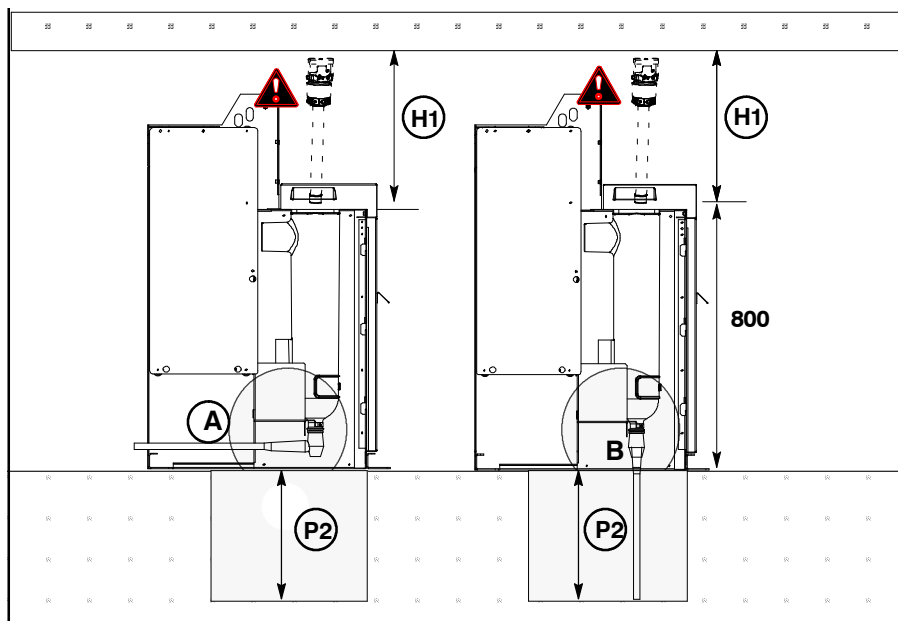
A : plug-in (elbow type socket)

B : plug-in (straight socket)

The sectional area of the “transformer” output cable (functions Q and D) is usually less than that of “network” output cables (functions I and B).

All the cables then pass through the same space.

When using HV straight power outlets or bases, the depth “**P2**” indicated below may be greater than that of “network” “**P1**” cables.

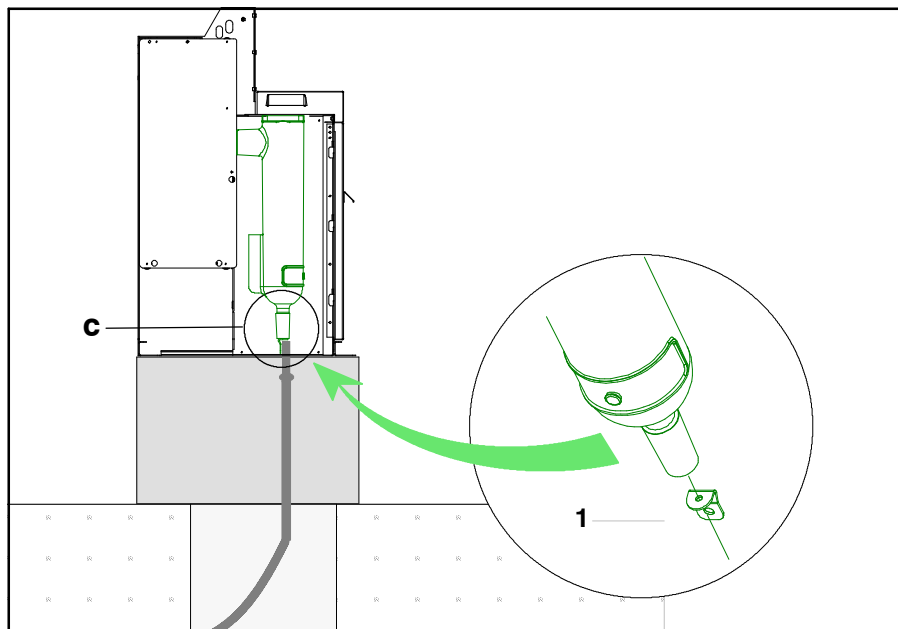


in the case of a connection with heat-shrinkable sleeve

C : heat-retractable

installation of the square of connection TH

1 : to fix the square of connection under the fuse well using screw HM8.20 like its disc diameter 8 (delivered screws and bolts)



CAUTION



The curvature of the cables may cause partial deterioration of the fuse compartments.

It is mandatory to use 520mm bases.

determining trench depth (P2)

cable insulation	cable	cross-section (mm ²)	radius of curvature (mm)	plug-in elbow type	plug-in straight	heat-shrinkable
dry insulator	single-pole	35	335	100	520	335
		50 to 70	400	100	520	400
		95	440	100	550	440
	three-pole	35	435	100	520	725
		50 to 70	500	100	520	800
		95	545	100	550	860

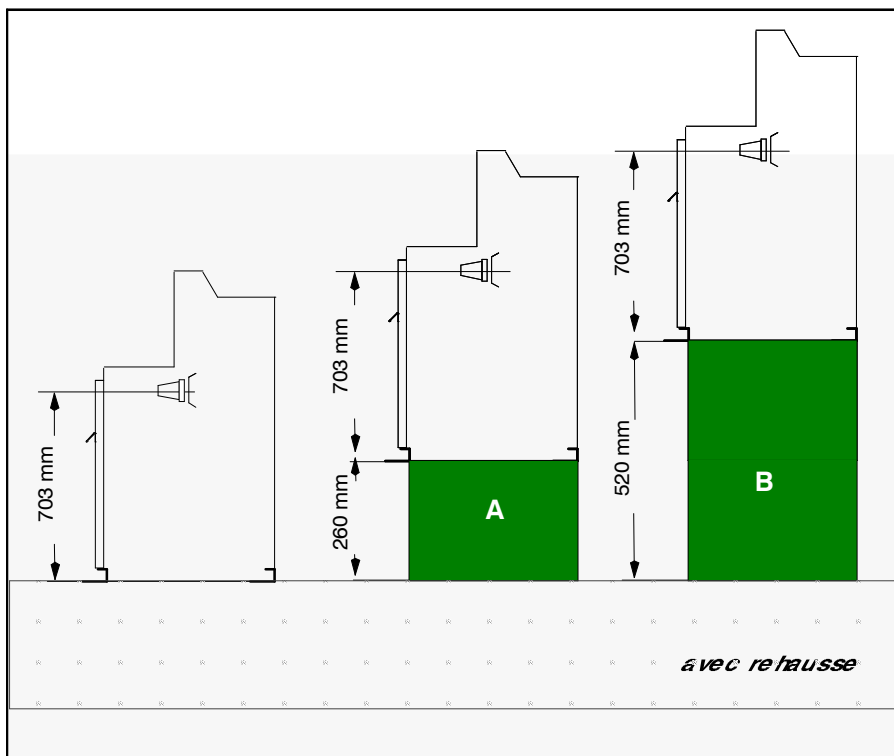
additional raising block

The **RM6** may be optionally equipped with a 260 or 520 mm raising plinth.

This addition, which simplifies civil engineering works, allows a reduction in trench depth or even complete elimination of trenches when cable radius of curvature so allows.



For these bases' Interior Arc resistance, please contact the SCHNEIDER ELECTRIC department.



for DE – Mt metering
cubicle



CAUTION



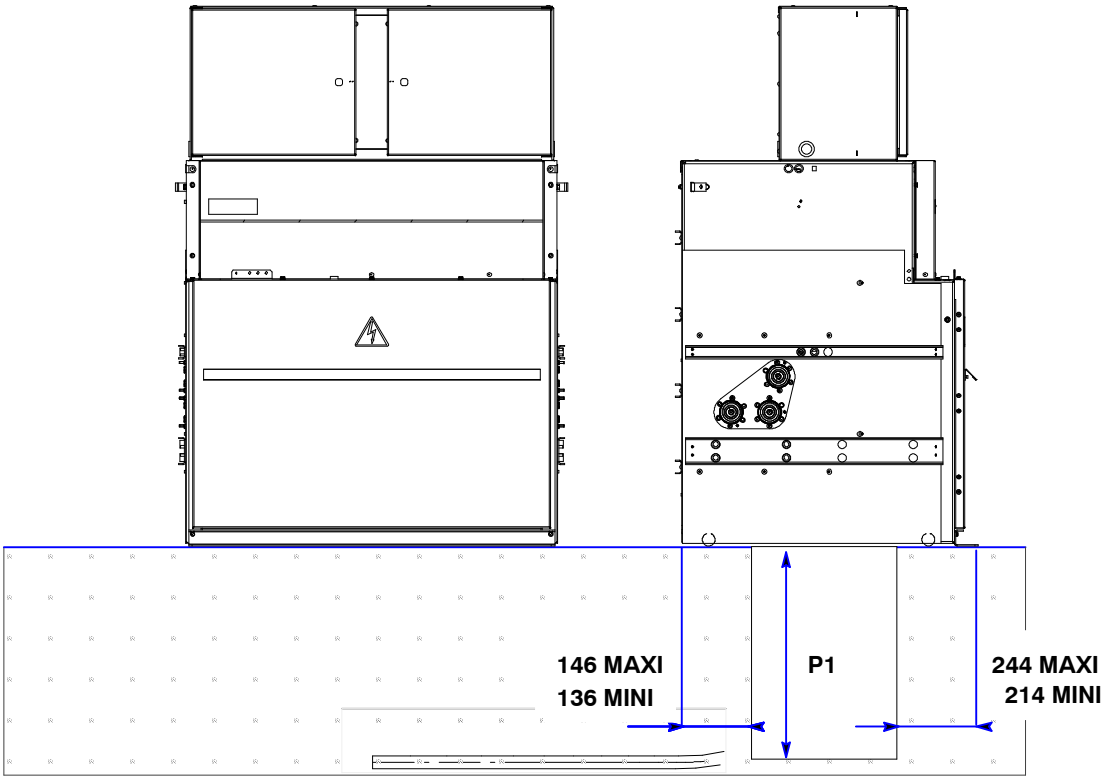
the width of the metering cubicle's
duct must be taken into consideration
in the event of a future extension



CAUTION

**INTERIOR ARC RESISTANCE
OF THE INSTALLATION**

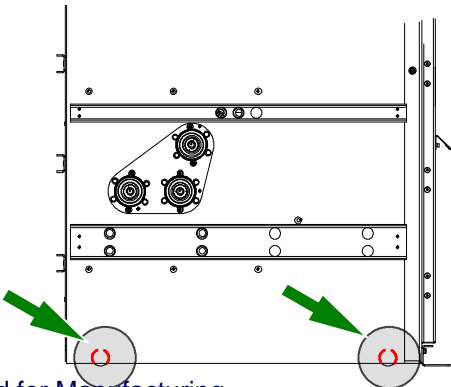
make sure that the positioning of the
evacuation flap on the duct is respected,
as described on the following page



CAUTION



the handling rollers must not be in line
with the duct.



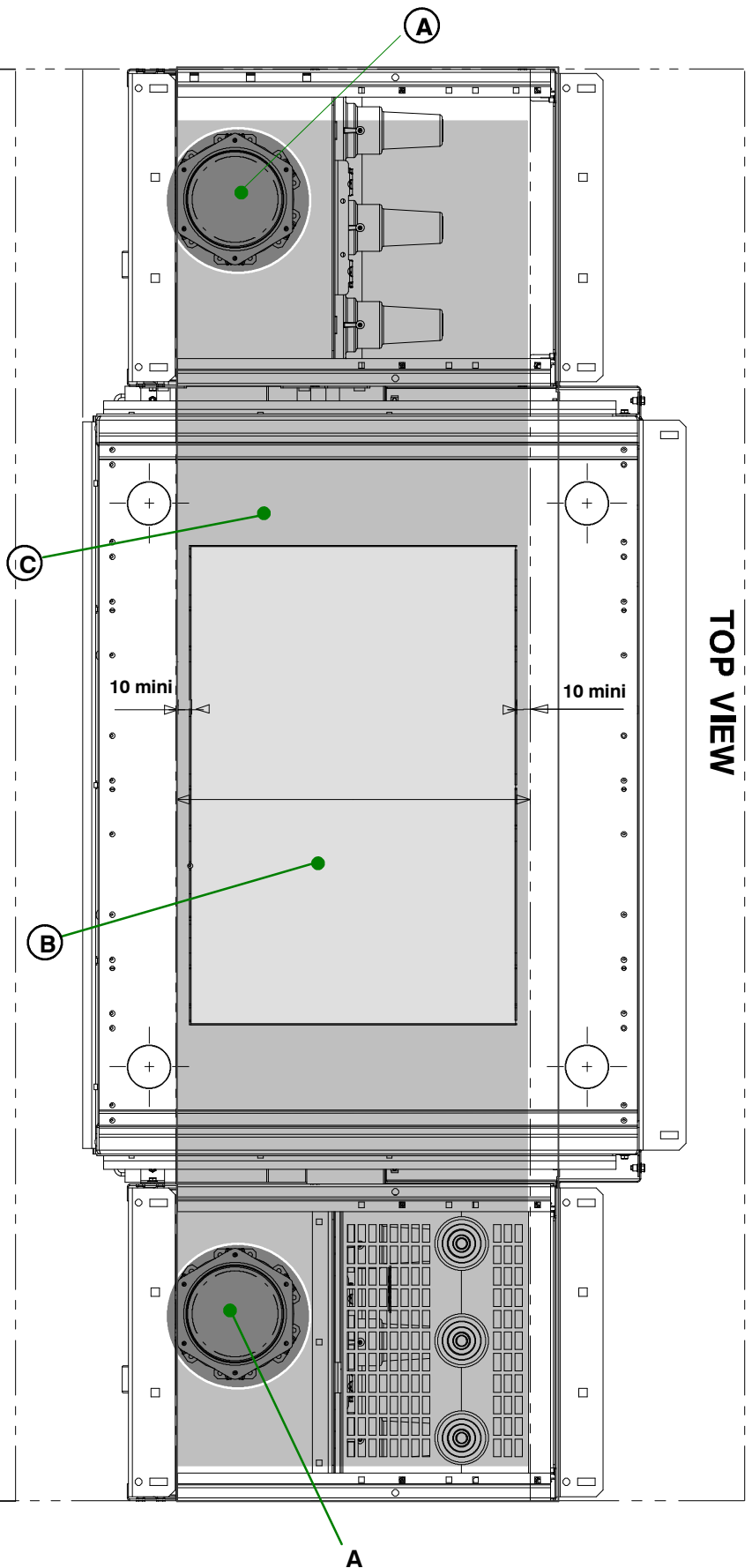
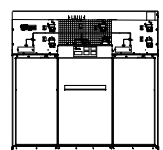
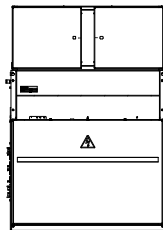
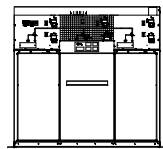
duct detail for switchboard with MV metering

bottom view

A : membrane

B : flap

C : duct



TOP VIEW

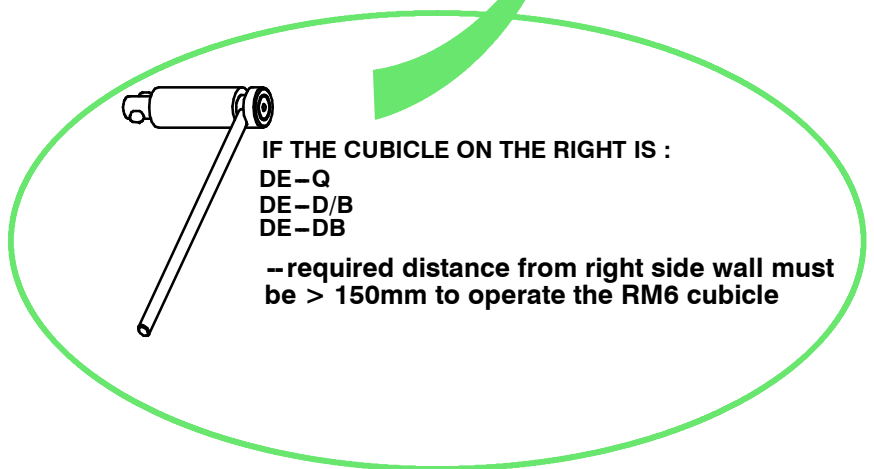
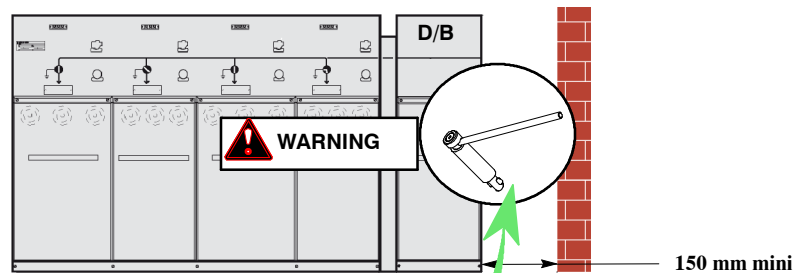
Blank lined area for notes or calculations.

dimensions of RM6 REs with an extension module

■ **RM6 RE 4 functional units with circuit-breaker** **A=2264 mm**
(A=1619+43+572+30)

(*) **B = 900** for **DE** function
B=1600 for 3 **DE** functions standard or **free combinaison** (2 functions)
B=2000 for 4 **DE** functions standard or **free combinaison** (3 functions)

These dimensions can be reduced under special conditions, consult us.



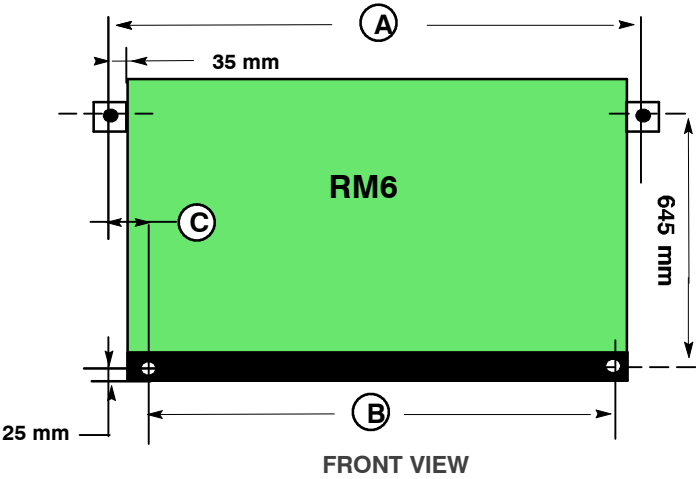
**preparing
the ground fixing**

**Drill the holes in the
ground to the diameter
necessary to fit the M6
screws.**

Fit the suitable dowels.

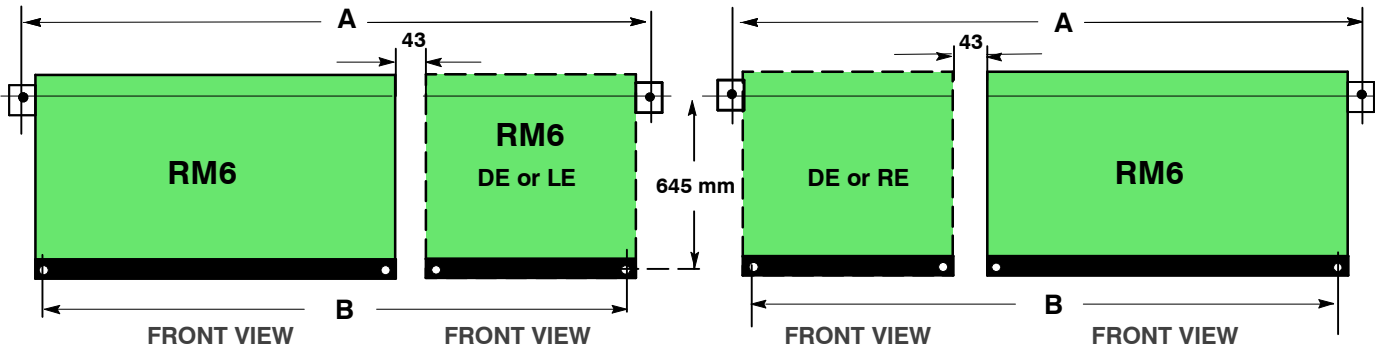
sizing for RM6

function type	A (mm)	B (mm)	C (mm)
RM6 (1 function) basic	542	416	63
RM6 (1 function) basic	642	516	63
RM6 (2 functions) basic	899	773	63
RM6 (2 functions) free combinaison	1122	996	63
RM6 (3 functions) basic	1256	1130	63
RM6 (3 functions) free combinaison	1602	1476	63
RM6 (4 functions) basic	1689	1563	63
RM6 (5 functions)	2073	1959	57



for RM6 extensible to the right (RE) or left (LE) or (DE)

NE = Non Extensible	LE = Left Extensible
DE = Double Extensible	RE = Right Extensible

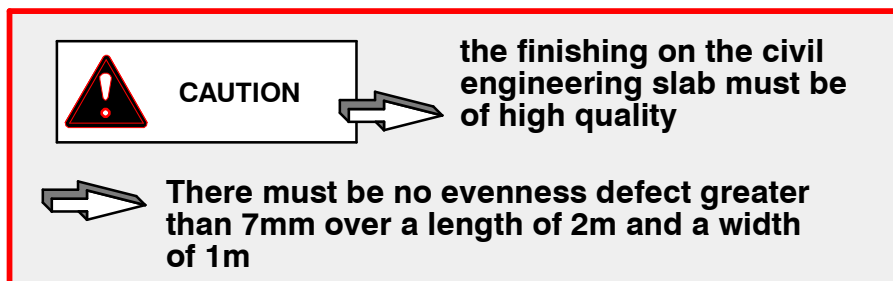


fixing to the ground

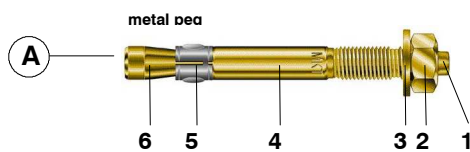
The RM6 must be fixed by at least 3 points.

Position the **RM6** on the civil engineering.
Secure the unit using **HM6** screws.

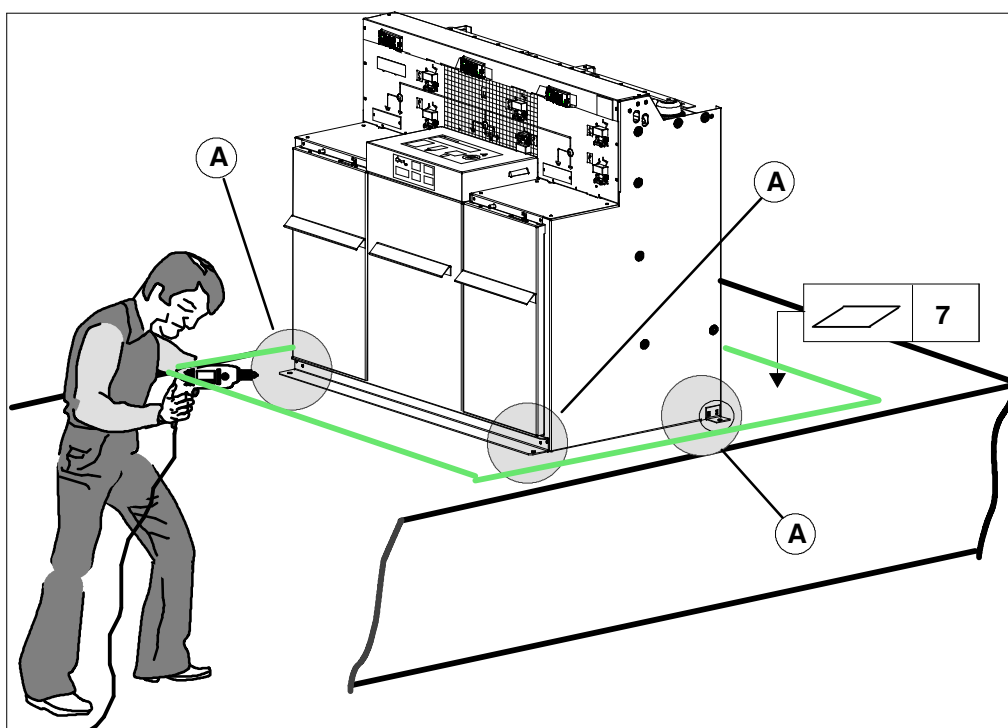
verification before installation



description



- 1 – chamfered extremity of the stud making it possible to hammer it in without damaging the threads**
- 2 – class 8 nut for bichromate steel or A4 stainless steel studs depending on the version**
- 3 – washer**
- 4 – smoothe stud shaft without marking**
- 5 – rolled expansion ring made up of two segments linked together on one side. Each segment has a boss**
- 6 – tapered part of the stud performing expansion**



installing the substation for resistance to internal arcing

When an installation is requested with protection against internal arcing faults, consult the diagrams below.

The parts to guide the gases towards the evacuation openings (stacks) and the cooling walls are not part of the switchgear supply. These components should be adapted to each type of use.



The gas evacuation kits listed below are available in the RM6 accessories.

exhaust gas to the rear adaptation kit

Classification according to IEC62271-200: IAC AFL

Internal arc resistance

Maxi 24kV-16kA.1s.



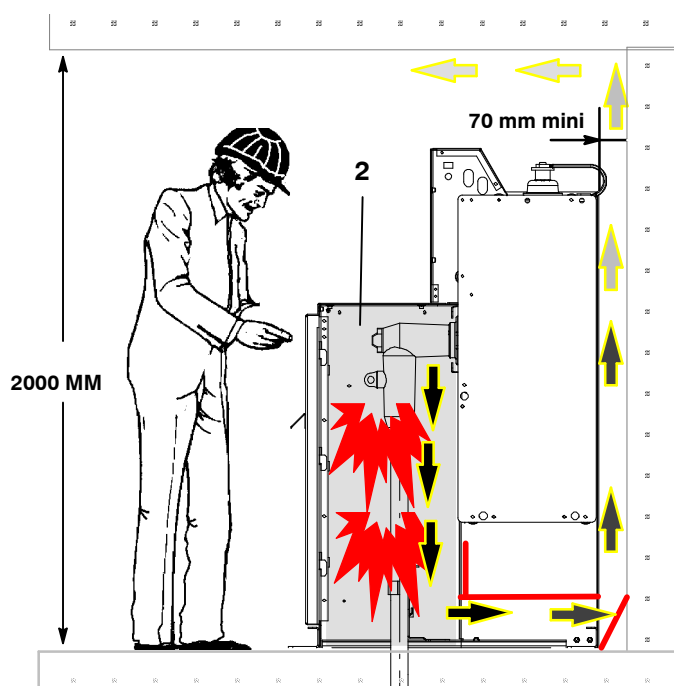
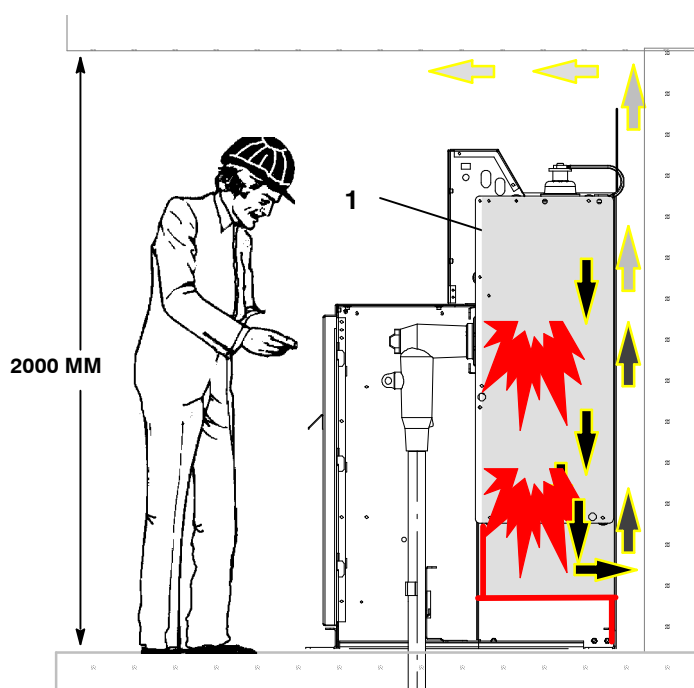
evacuation of the SF₆ gas after ignition of the internal arc



internal arc ignition zone in the case (1)



internal arc ignition zone in the cable box (2)



exhaust gas to the bottom adaptation kit

Classification according to
IEC62271 – 200 : IAC AFL

Interior arc resistance

Maxi 24kV – 20kA.1s.



evacuation of the SF₆
gas after ignition of the
internal arc



interior arc
zone in the case
(1)

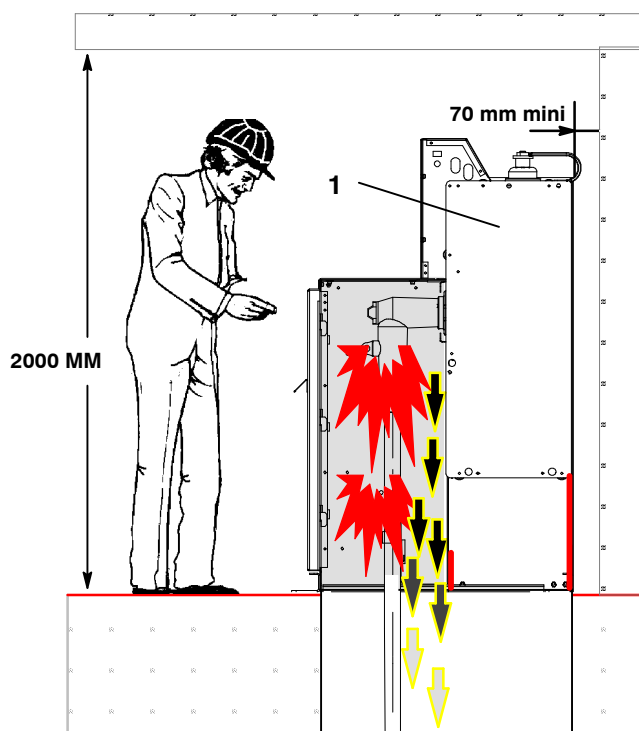
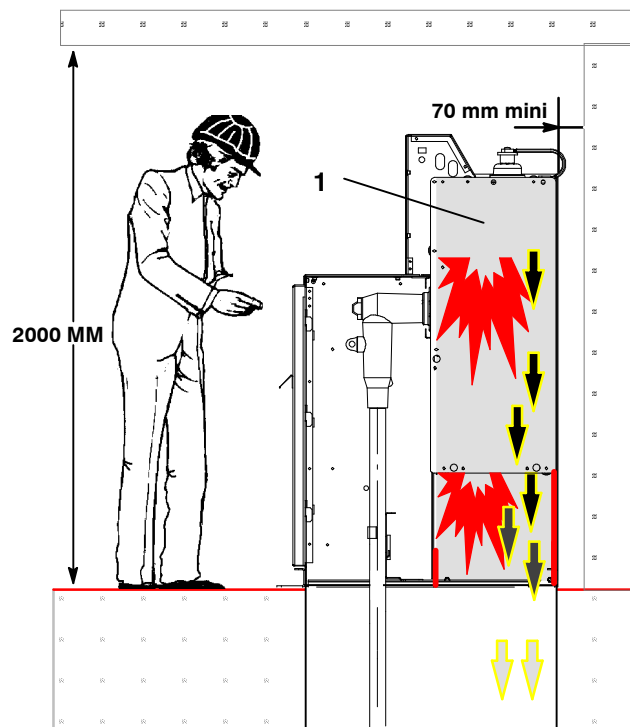


internal arc
zone in the cable box
(2)



If possible the downstream
compartment should open into a
room that is not used.

Otherwise, keep to a minimum
volume of 1.5m³.



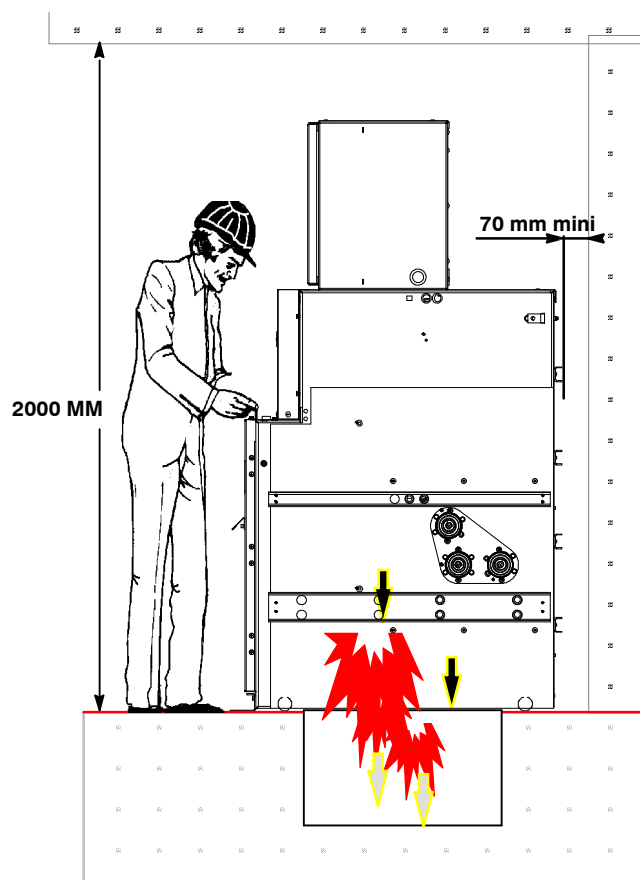
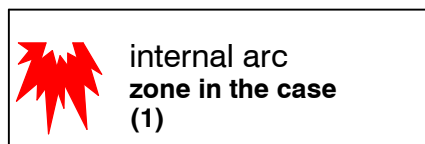
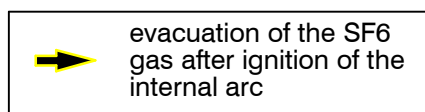
exhault gas to the bottom
adaptation kit

for DE_mt cubicle

Classification according to
IEC62271-200: IAC AFL

Internal arc resistance

Maxi 24kV-16kA.1s.



connecting the HV cables foreword



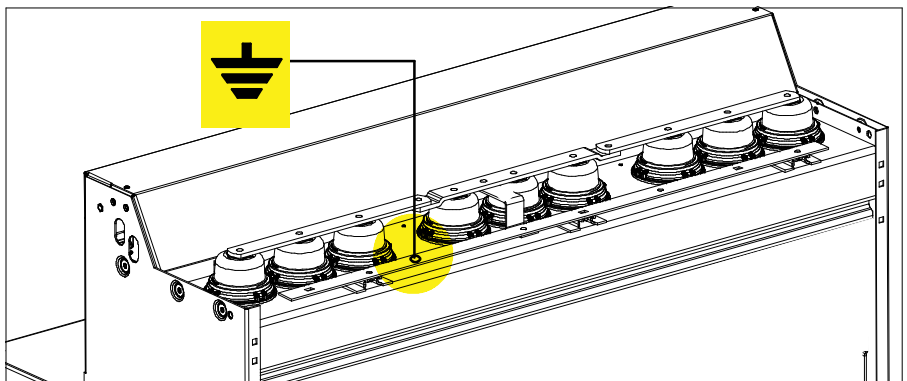
Before connecting the cables, ensure that the functional unit is in the earthing switch closed position.

The cables **MUST** be connected with the **RM6** substation fixed to the ground.

The operations described below apply to all connection types.

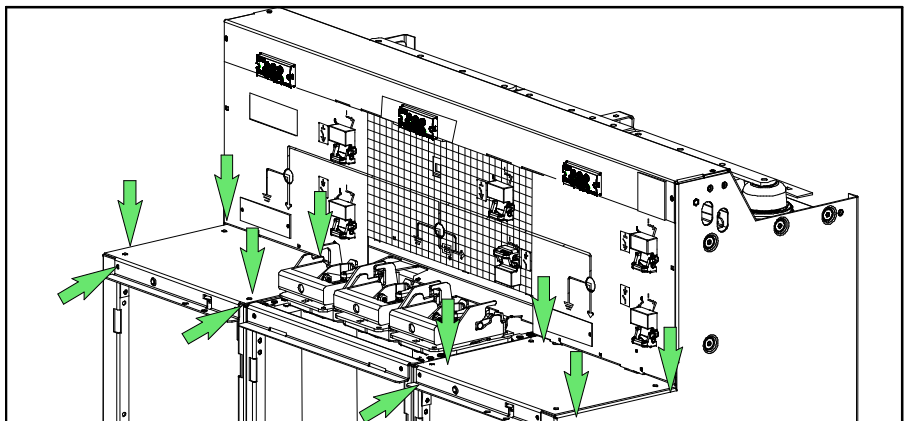
The connections will be made and used according to the manufacturer's manual.

connecting the RM6 frame to the substation earth



Before connecting the HV cables, you must connect the **RM6 frame** to the main earth bar.

access to the HV connection bushings removing the panels



Remove the fuse compartment cover (lift and pull it towards you), then remove the 3 front panels (2 screws per panel).

Remove the 2 top plates on the cable connection compartments (6 screws per plate).

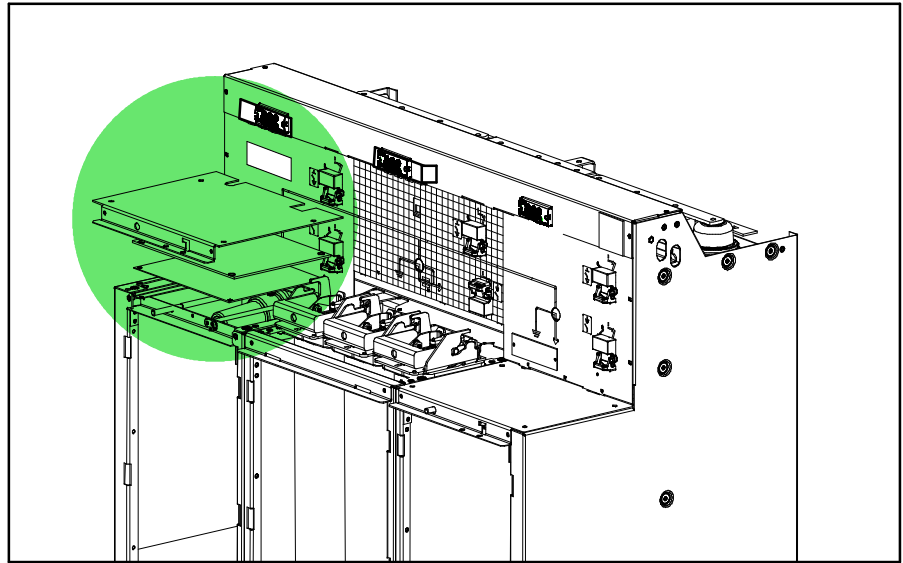
If the cable compartment is equipped with bottom plates, dismantle the front bottom plate and the tightness horns.

(Optional supplies)

case of a compartment with resistance to internal arcing

Remove the fuse compartment cover (lift and pull it towards you), then remove the 3 front panels.

Remove the 2 top plates from the cable connection compartments (6 screws per plate), then withdraw the internal arcing protection (1 plate+1 insulator), 4 F/90M5 screws.



type of usable connections

The **RM6** connection interfaces are defined by draft project **PREN50181**.

The type of connections to be used depend on the interface equipping your **RM6**.

It is defined when you place your order and depends on very precise criteria such as:

The current of the connected equipment :

200A, 400A, 630A

Short-time withstand current:
12,5 KA ;16KA ;25KA

Socket type:

Draw-out: sliding contact.

Disconnectable: screw-on lug.

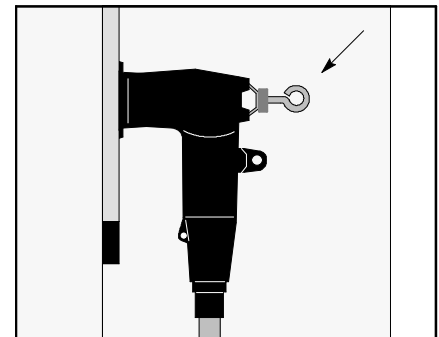
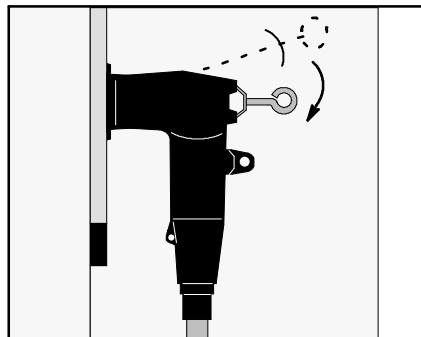


Use the connectors indicated in the catalogue.

We do not guarantee the dielectric withstand over time if other types of connectors are used.

If 2 cables are connected to the same bushing, use connectors designed for this purpose.

draw-out sockets with controlled field



Mount on the interface:

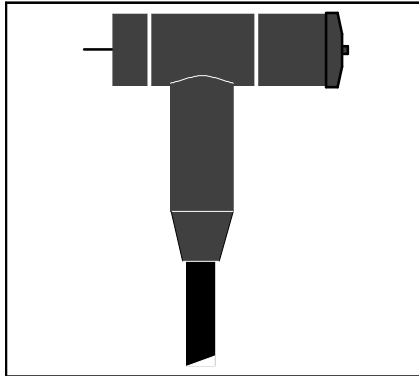
–200A ; 12,5KA 1s ; 31,5 KA peak (A type).

–400A ; 16KA 1s ; 40KA peak (A type).

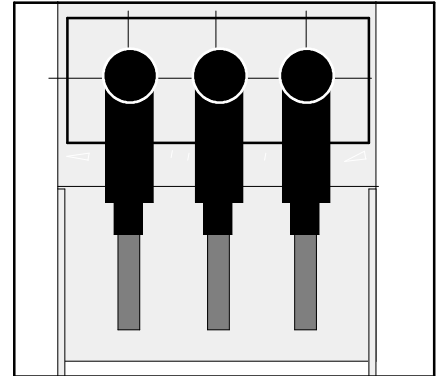
Interface fitted with a sliding contact.

To install the socket at the end of the cable, comply with the accessory manufacturer's manual.

**disconnectable sockets
with controlled field
or non-controlled field**



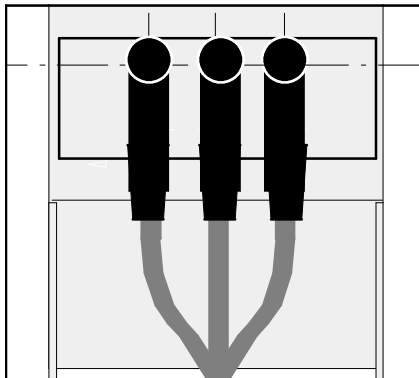
Mount on the interface:
630A ; 25KA 1s ; 62,5 KA peak
(C type)
Interface containing a M16
tapping.



To install the socket at the end
of the cable, comply with
the accessory manufacturer's
manual

**Tightening torque
on the interface is 50 Nm.**

**cable ends with
heat-shrinkable elements**



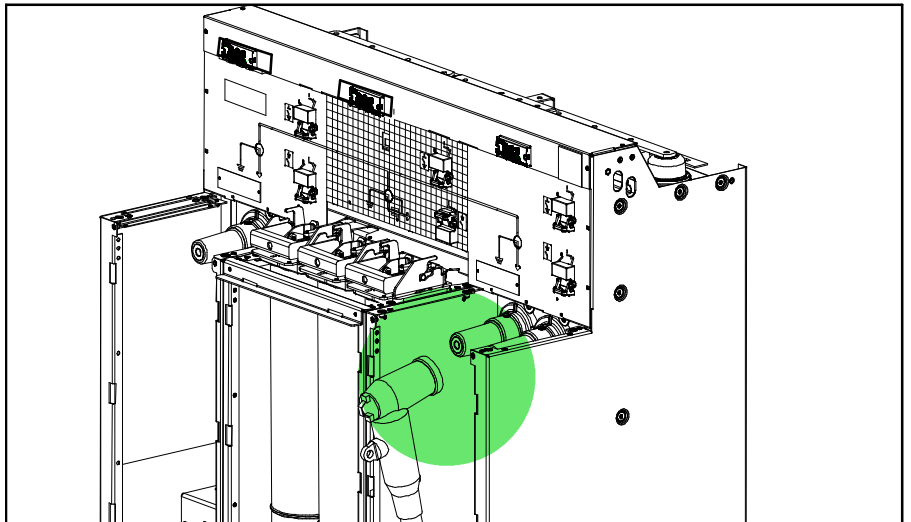
Mount on the interface :
630A ; 25KA 1s ; 62,5 KA peak
(C type)

Interface containing a M16
tapping.

For implementation
of heat-shrinkable elements,
comply with the accessory
manufacturer's manual.

**Tightening torque
on the interface is 50 Nm.**

**connecting the HV
cables
preparing the cable ends**



The curvature and length of the
cables must be adjusted so that
no stress is exerted on the
connection interfaces.

Fit the tightness horns on the
cables, if the cable compartment
is equipped with bottom plates.
Prepare the cable ends according
to the instructions of the
accessory manufacturer

instructions



The MV cable characteristics must be taken into account when the connectors are installed on the product's bushings.

Since no mechanical load is exerted on the bushing it is possible to guarantee complete absence of damage to the product during installation.

recommendation for connecting cables

■ types of MV cables (single pole or three pole)

The depth of the cable duct must be compatible with the cable's curvature radius.

Refer to the following chapter: **civil engineering dimensioning.**

The unit must fixed to the ground before the MV cables are connected.

details

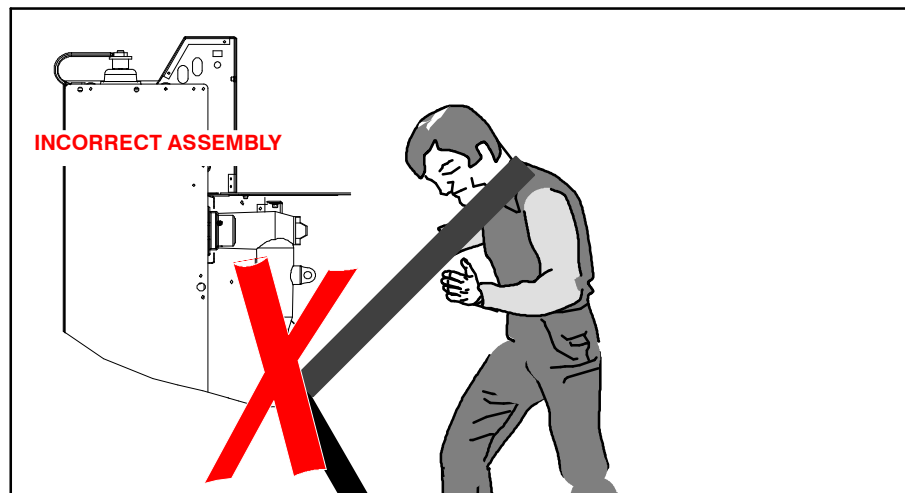
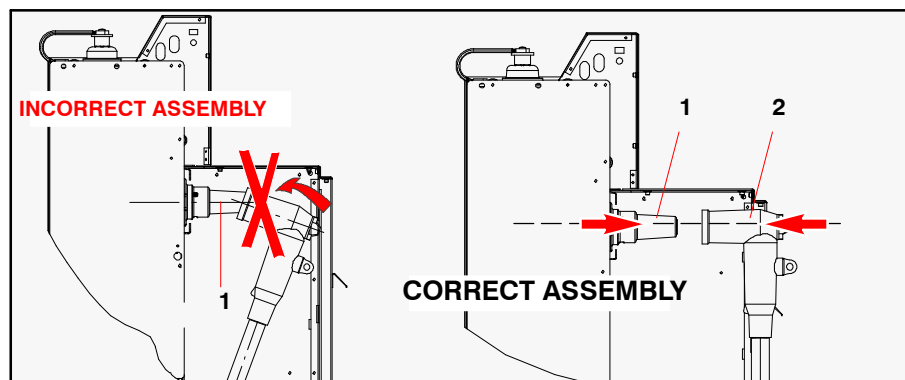
In the absence of any mechanical load, the terminal line must be perfectly aligned with the line of the bushing.

Only the tool recommended by the socket manufacturer must be used to facilitate installation of the socket on the bushings.

The cut length of the MV cable must be adjusted for each phase (three pole cables in particular).

Never use a bar to pull the cable and bring the connection eyelet onto the bushing.

This could damage the bushing and irrevocably damage the unit.



■ Incorrect assembly:

Make sure the cable does not pull on the bushing (1) otherwise there is a risk of damage being caused to the RM6 unit.

■ Correct assembly:

It is mandatory to correctly align the plug-in socket (2) on the bushing (1).



remember

■ comply with the tightening torque values indicated in the "connection instructions" chapter.

■ when installation of the MV cables is completed, check no load is exerted by installation of the cable tightening clamps.

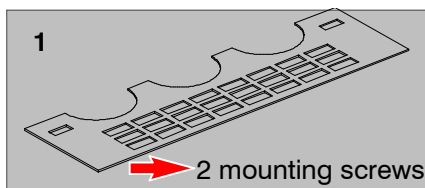
The force exerted by the cable on the bushing should not exceed 30 daN.

(standard IEC 137 and NFC 66-550)

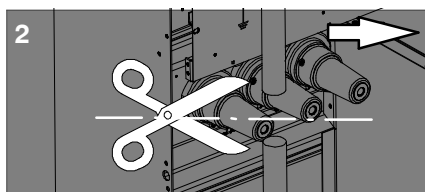


the following operation
should be performed with
the unit **POWERED DOWN**

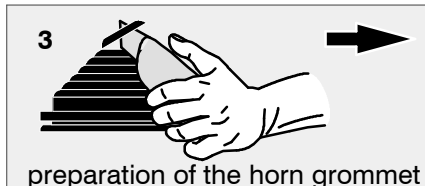
methods and fabrication of cable connections for single pole cables



1 : remove the front bottom panel
(a).

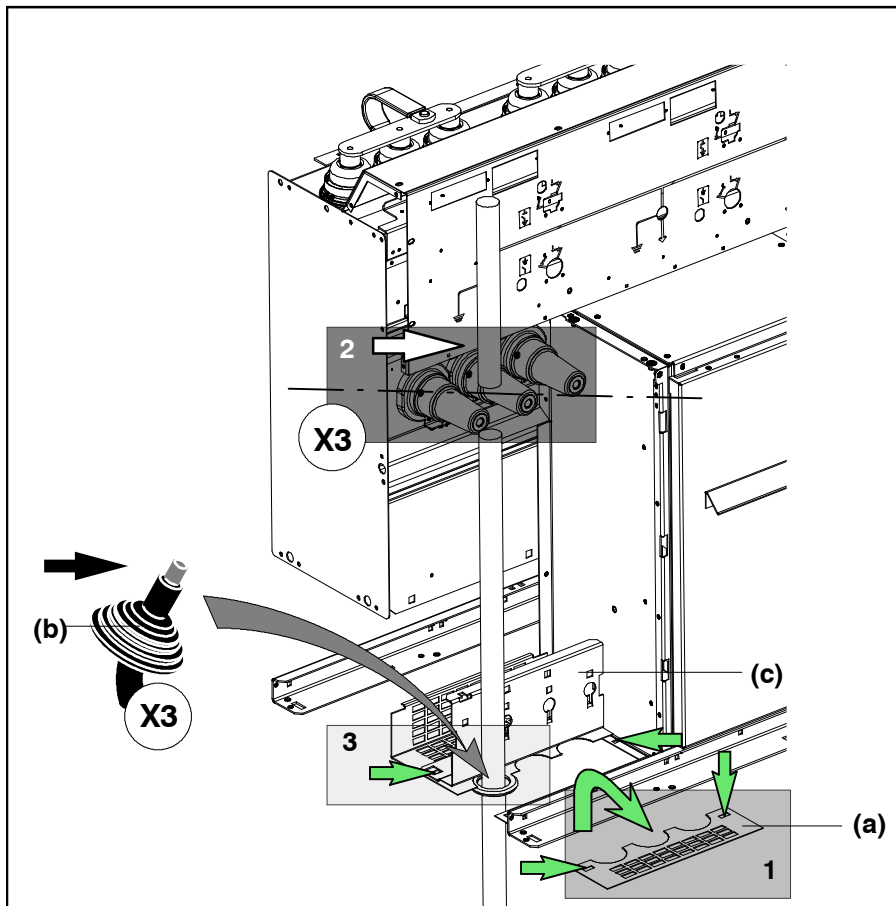


2 : cut the incoming cable
to the right length.
Adjust the cable length with
the bushing of the **RM6** unit.



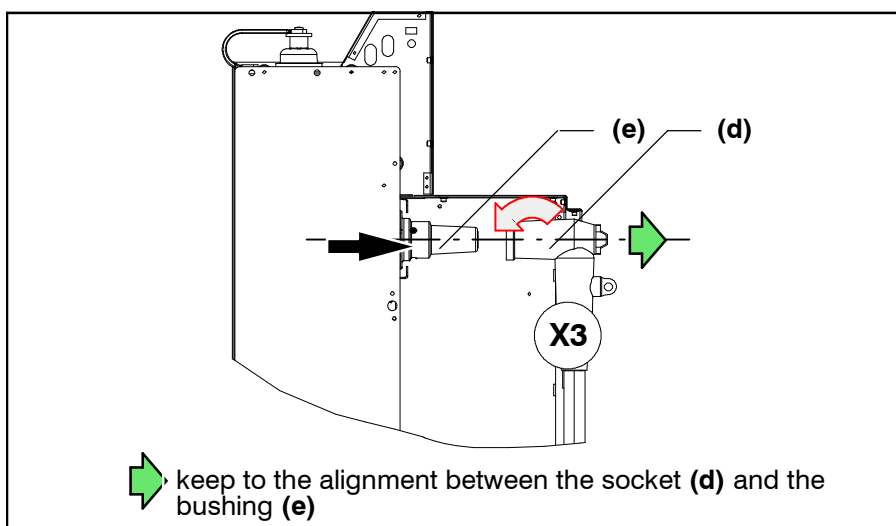
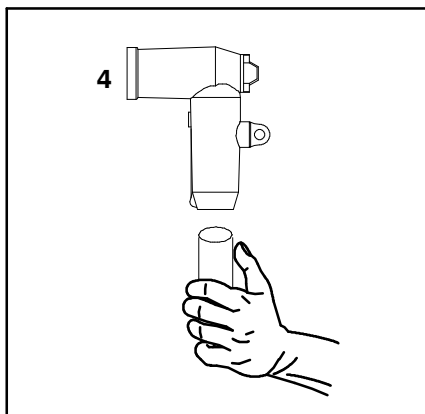
preparation of the horn grommet

3 : slide the horn (b) inside the
cable until it is embedded in the
rear bottom panel (c).



fabrication of cable heads

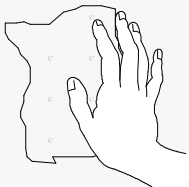
■ Refer to the socket
manufacturer .



keep to the alignment between the socket (d) and the
bushing (e)

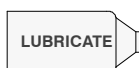
plugging the socket on the bushing

5



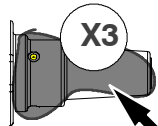
Before plugging the socket in remember to clean the bushing and the inside of the socket with a clean cloth and then lubricate (see details below).

5 bis



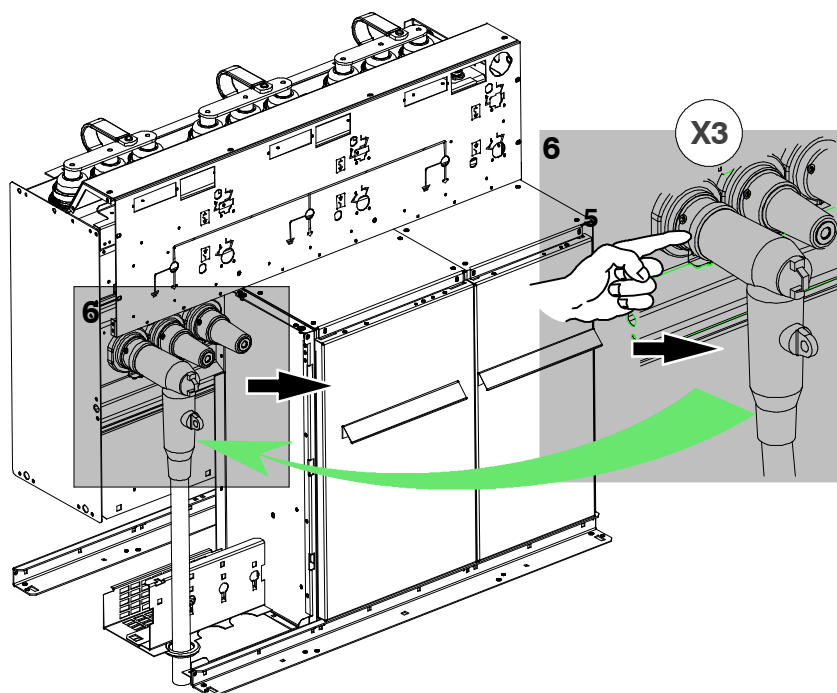
lubricate the inside of the socket

X3

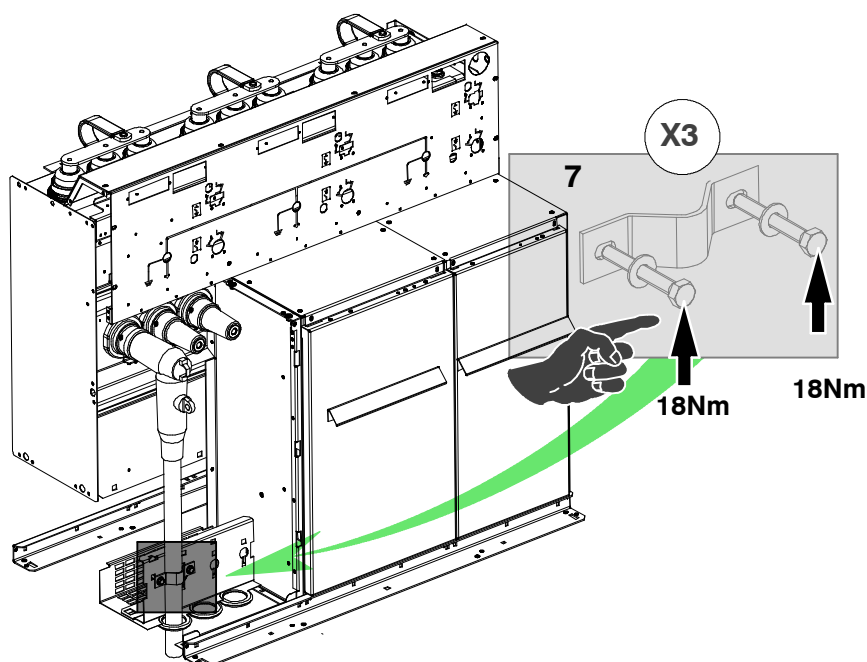


lubricate the bushing complement

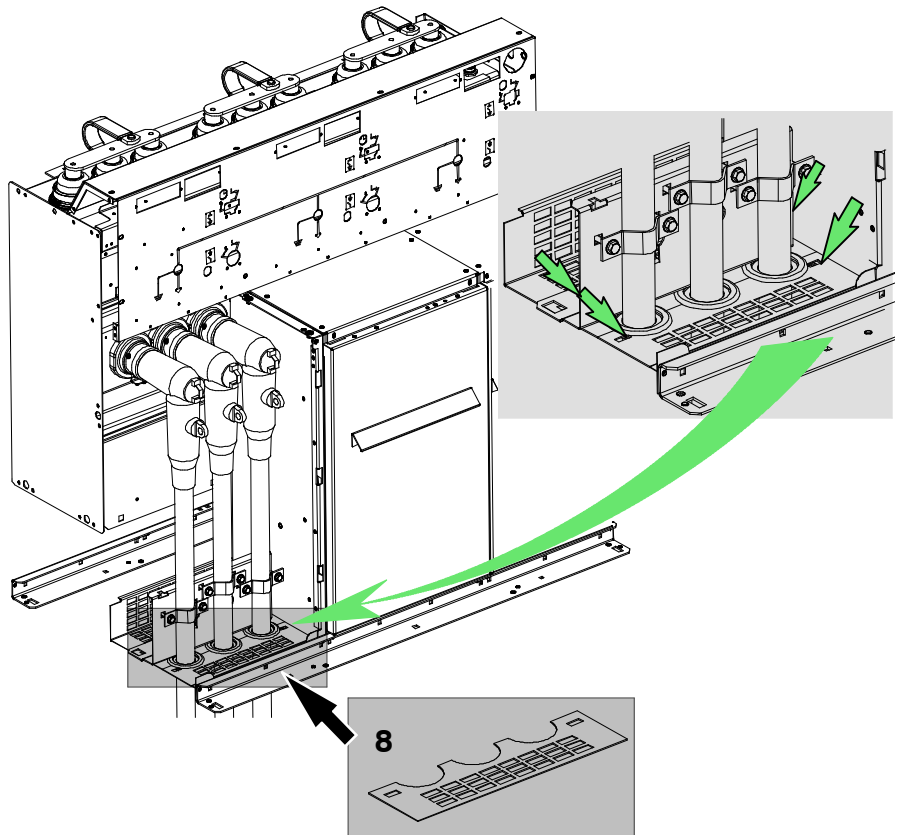
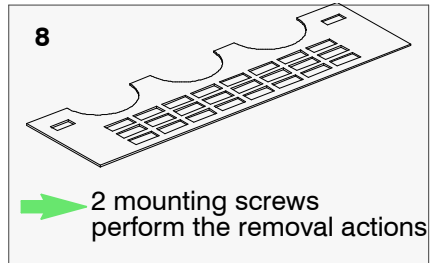
to order the lubricant
contact the connector supplier



cable clamping

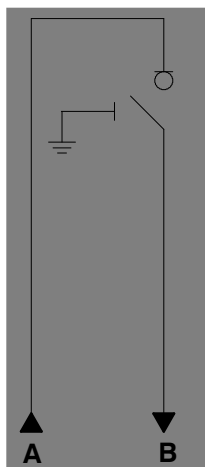


lift up the front bottom panel

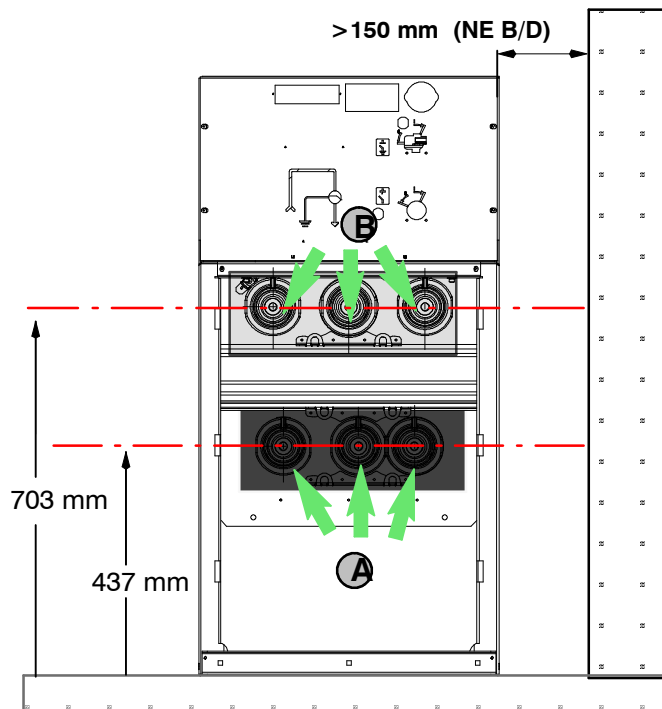


connection for NE function cubicle 1

A : incoming power
B : outgoing power



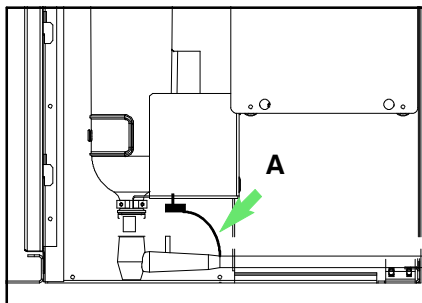
NE-I



connection of cable earth straps

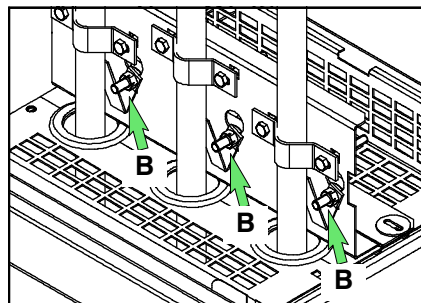
A : transformer protection function

B : loop switch function



Connect the earth straps of the 3 cables to the fuse compartment foil acting as the earth collector (M10 nuts).

Tightening torque: 28 Nm.



Connect the earth straps from the switch's 3 cables (**B**) to the flange support acting as the earth collector (M10 screws).

Tightening torque: 28 Nm.

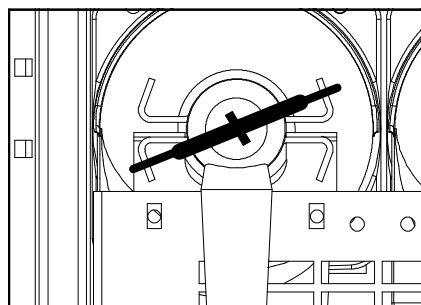
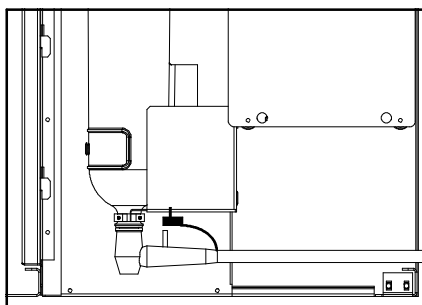
RM6 incorporating a general cable earth collector (**option**).

Connect the straps to the collector located at the bottom of the cable compartment.

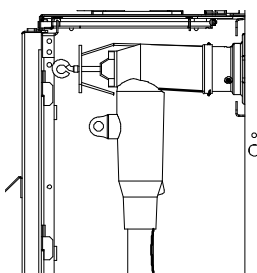
installing the sockets on the RM6 interfaces

Follow the instructions of the accessory's manufacturer.

Make sure you comply with the phases: L1 – L2 – L3.



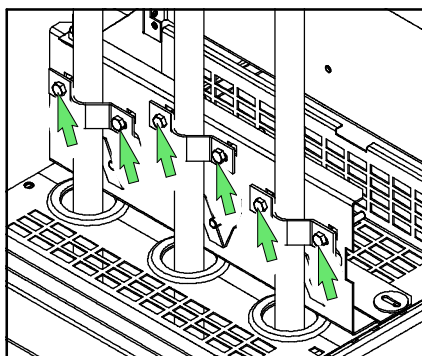
In the case of detachable sockets installation of the pin under the fuse compartment.



Before using the silicon lubricant supplied with the connection accessories, clean the interfaces with a dry cloth.

cable clamping assembly of bottom panels

Single pole cable.



It is essential to clamp the cables. Whatever type of cable is used:

Tightening torque: 18 Nm.

Embed the sealing horns in the rear bottom panel.
Assemble the front bottom panel (**a**) (4 HM6 screws).



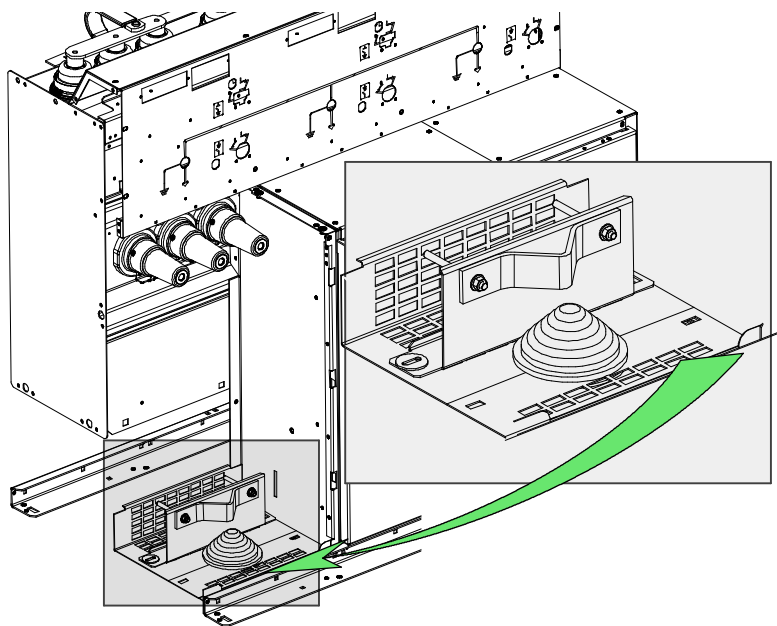
the following operation
should be performed with
the unit POWERED DOWN

methods and fabrication of cable connections for three pole cables

The **RM6** unit arrives on the operator's site equipped with these fittings in order to connect the cables.

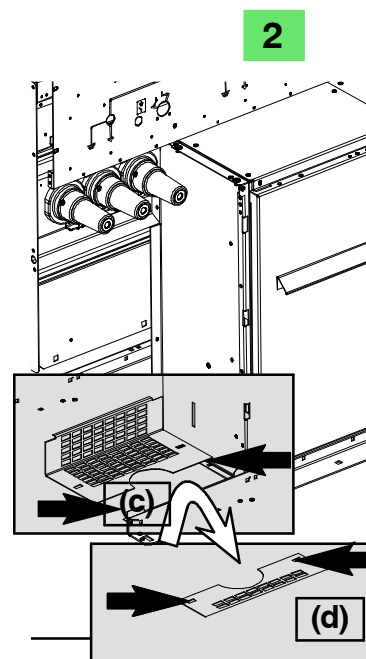
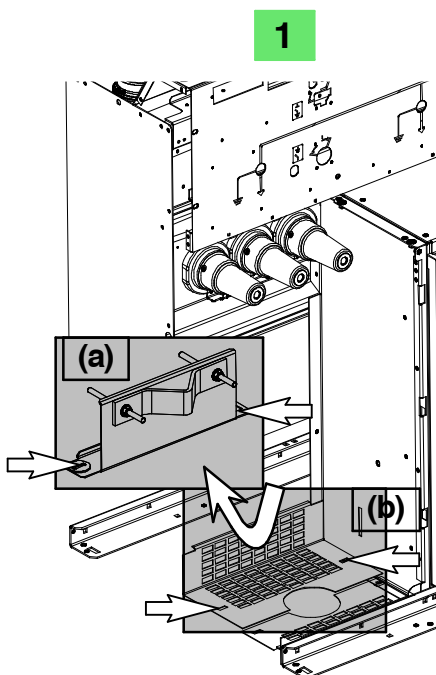
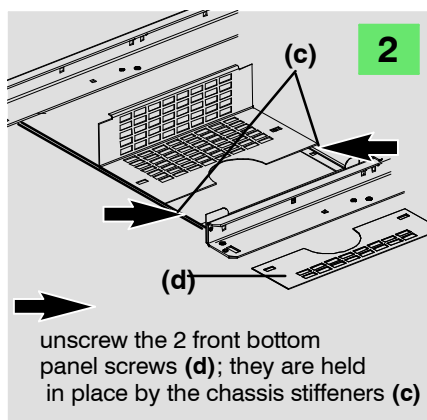
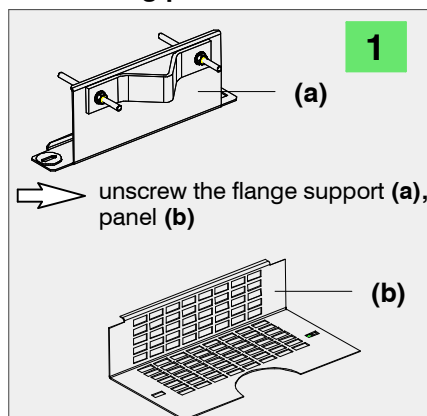


It is recommended to carefully follow the instructions below.



preparation of the cable compartment

dismantling procedure



Remember to recover the grommet.



REMINDER

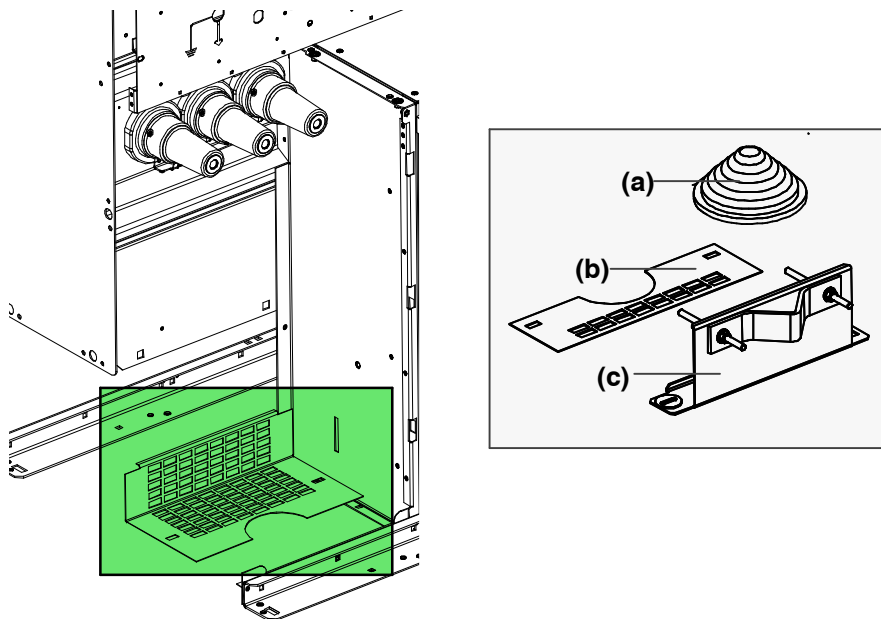
i

for the rest of the intervention, you must be positioned as shown in the illustration below

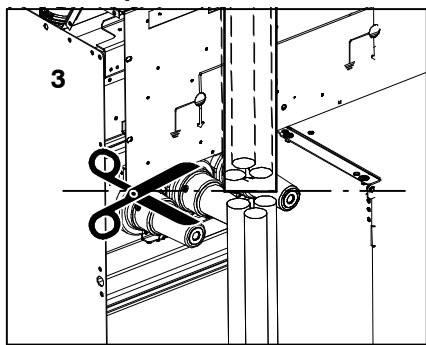
correct visual

You must have in your possession the following 3 items:

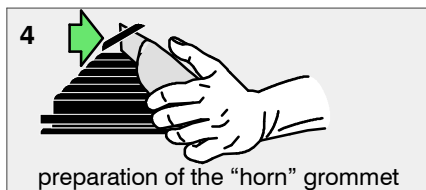
- (a): "horn" grommet
- (b): front bottom plate
- (c): cable flange support



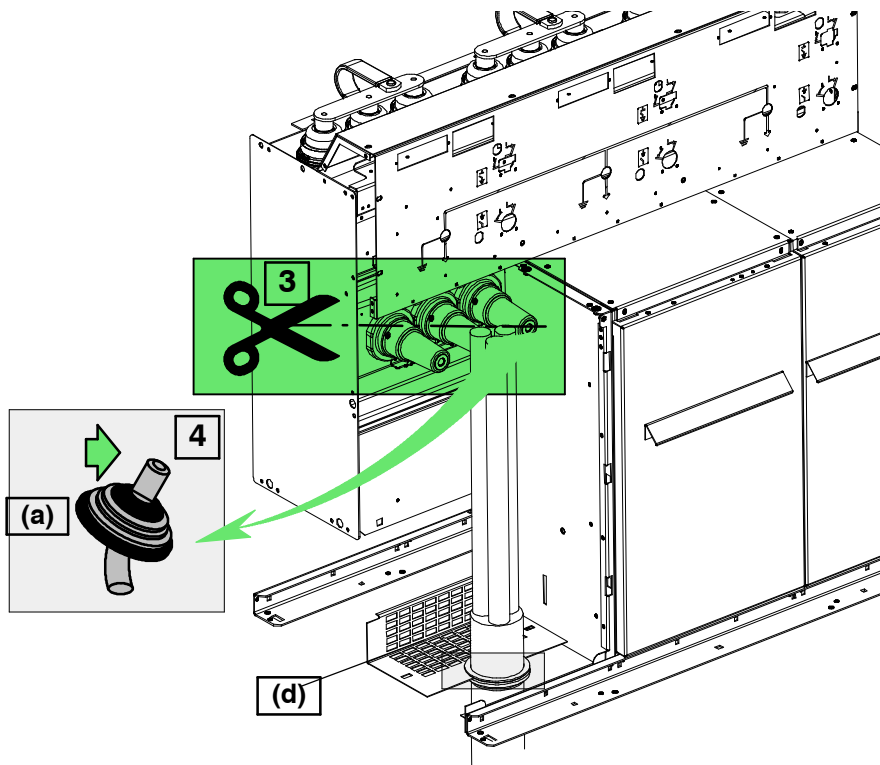
cable fabrication for three pole cable



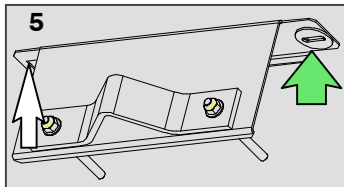
3 : cut the incoming cable to the right length.
Adjust the cable length with the bushing of the **RM6** unit.



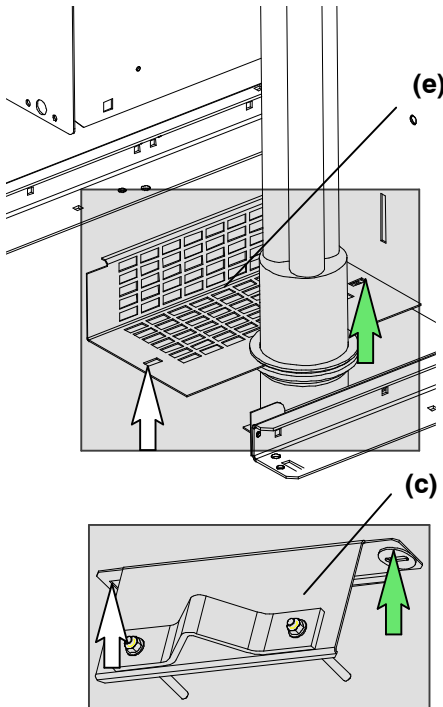
4 : slide the horn (a) inside the cable until it is embedded in the rear bottom panel (d).



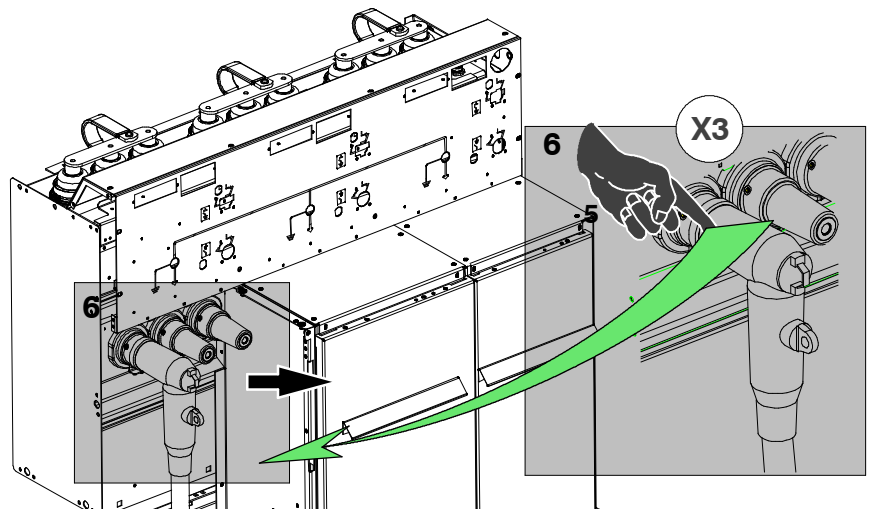
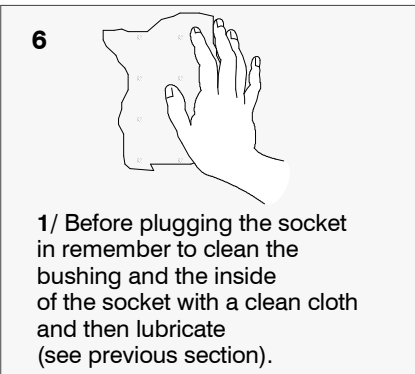
fitting the cable flange support



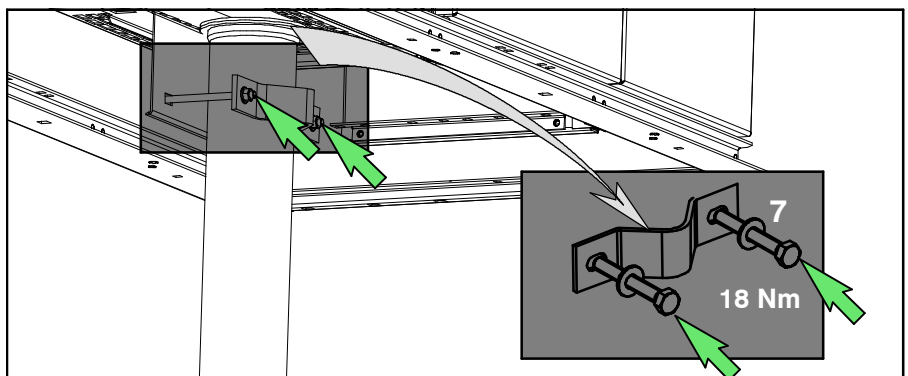
5 : fix the cable flange support **(c)** under the rear bottom panel using the 2 screws **(e)**.



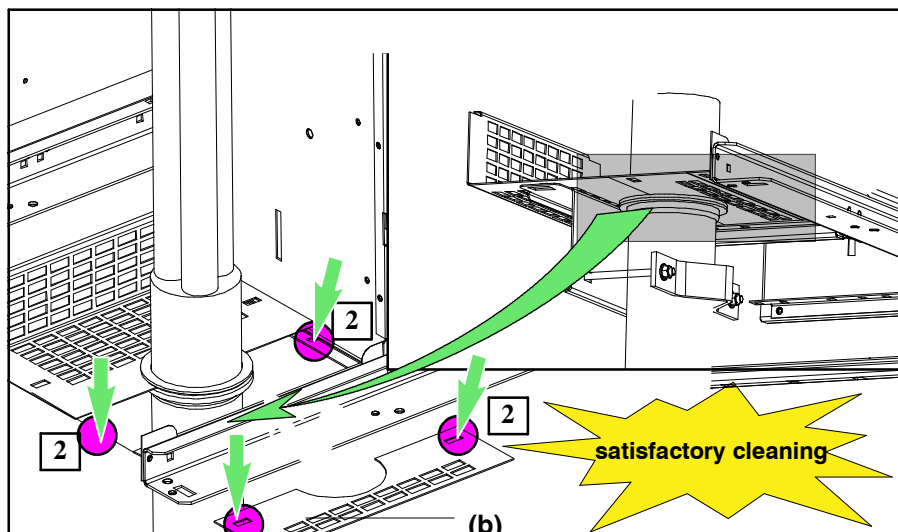
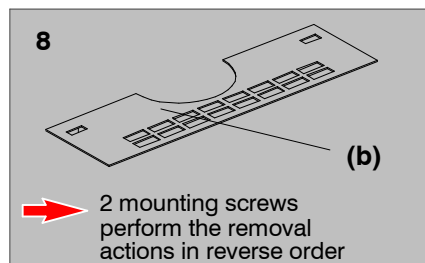
plugging the socket on the bushing



cable clamping



reassemble the front bottom panel



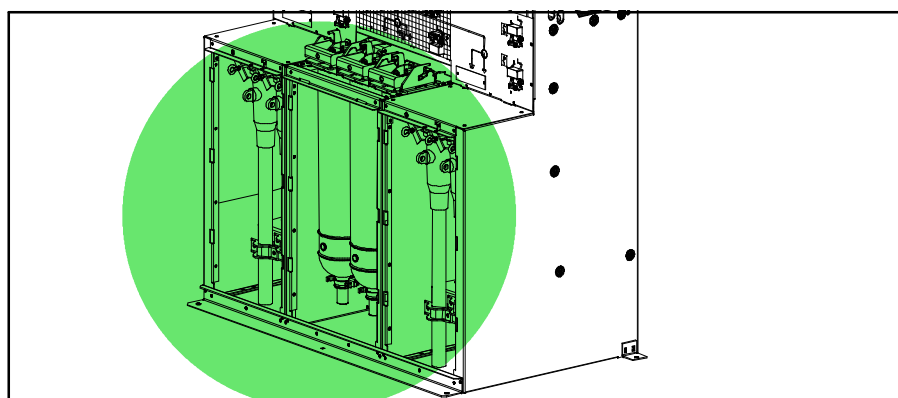
fitting the panels

Fit the 2 top plates on the cable connection compartments, (6 screws per HM6X16 plate).

If the cable compartment is fitted with an internal arcing protection, put back the protection.

Ensure that you respect the layers.

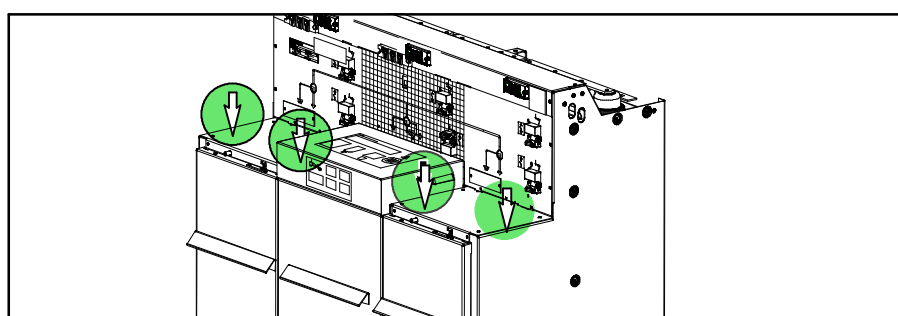
1 plate + 1 insulator + top plate.



access to the MV compartment

Put back the front panels on the cable connection compartments (2 HM6x16 screws per panel).

Put back the fuse compartment cover.

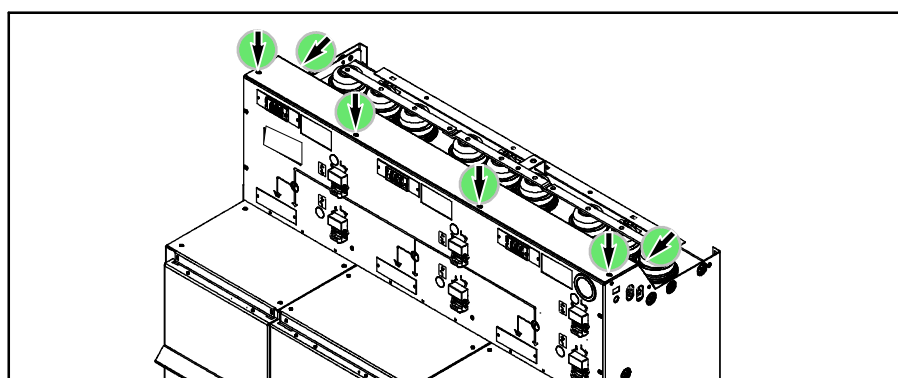


LV connection

Access to the LV compartment

Open the LV compartment access trunking by removing the 6 HM 6X16 screws.

Remove the trunking vertically.

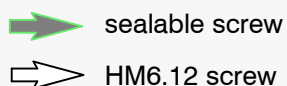


LV compartment customer power supply

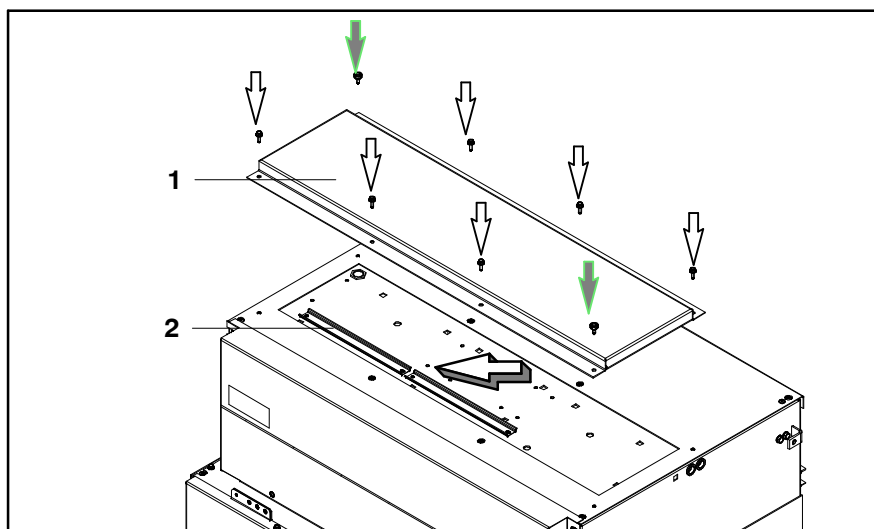


the following operation
should be performed with
the unit **POWERED DOWN**

without LV compartment



- 1 : Remove the 6 HM6.12 screws,
and the 2 sealable screws.
2 : LV connecting terminal



access preparation customer LV power supply

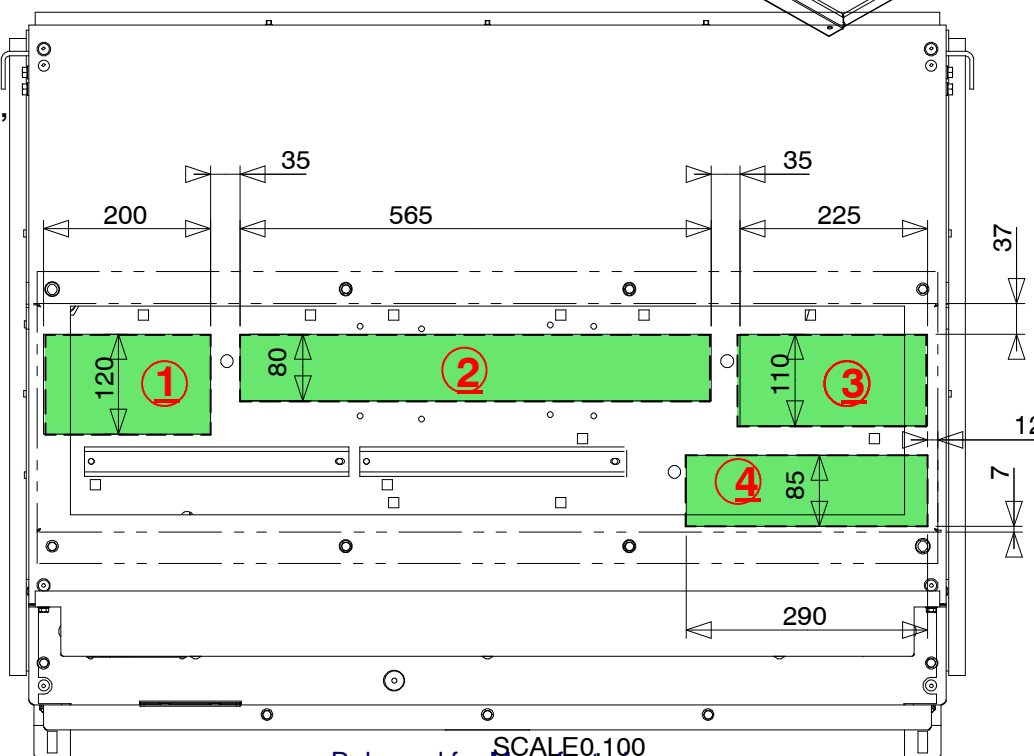
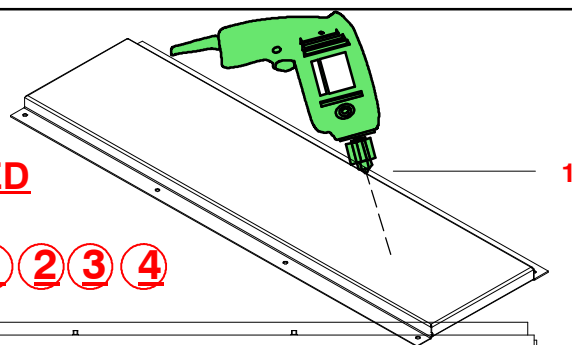
A : drill a hole in the
LV compartment sheeting (1)
to the desired diameter.



to avoid all risk of damage,
the drilling zones must
be respected

**AUTHORISED
DRILLING
ZONE**

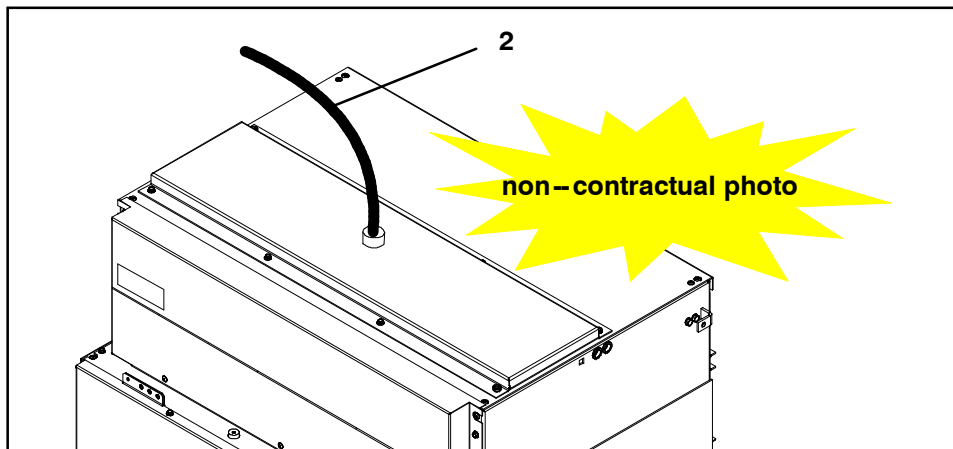
① ② ③ ④



SCALE 0.100

customer connection example

2 : power supply cable provided by the customer



The customer connection must guarantee a protection index of IP3X.

current transformer (CT) intensities and temperatures for DE_mt cubicle

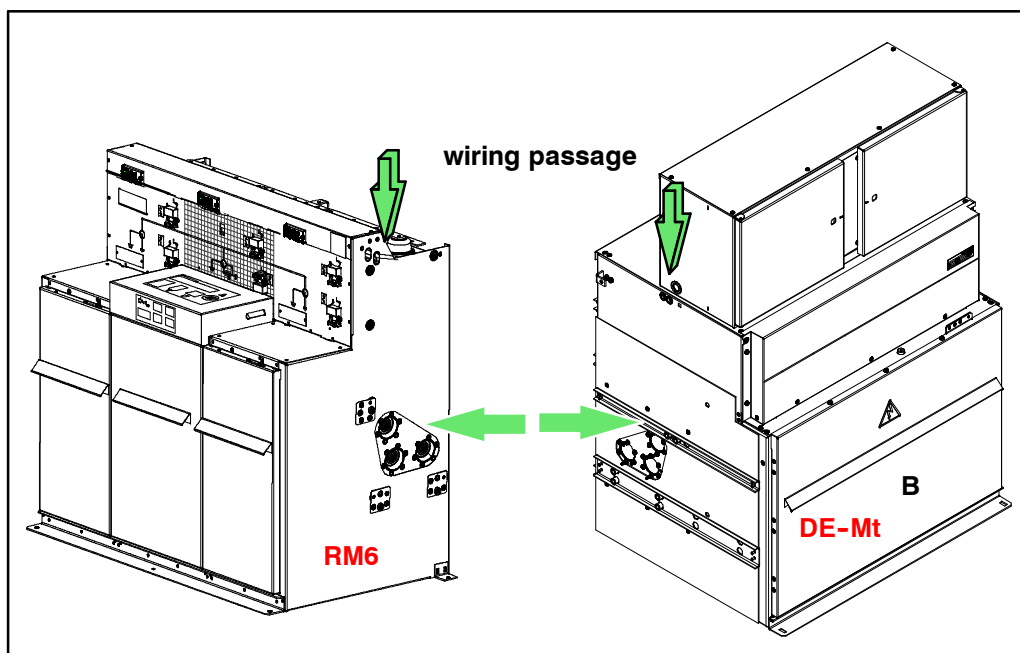
CHECK and RESPECT:

The maximum allowable intensity. This depends on the type of CT (and primary ratio used).

CHECK and RESPECT:

The maximum ambient temperature. This depends on the type of CT installed.

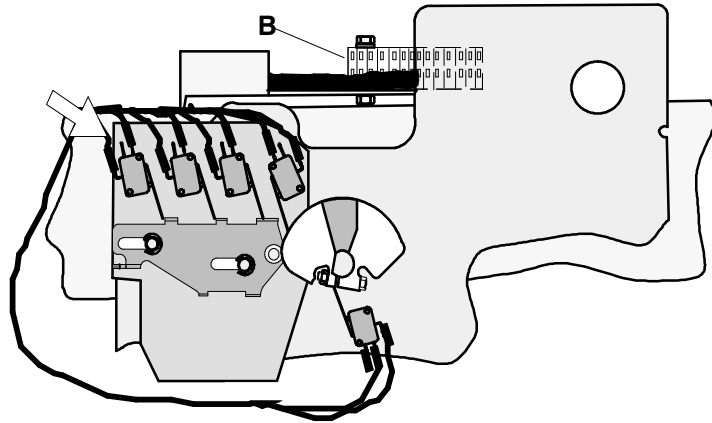
intercubicle link



switch, circuit-breaker, earthing switch indication

2O+2C

B : connection terminal block.
(supplied alone or with
the motor mechanism option)



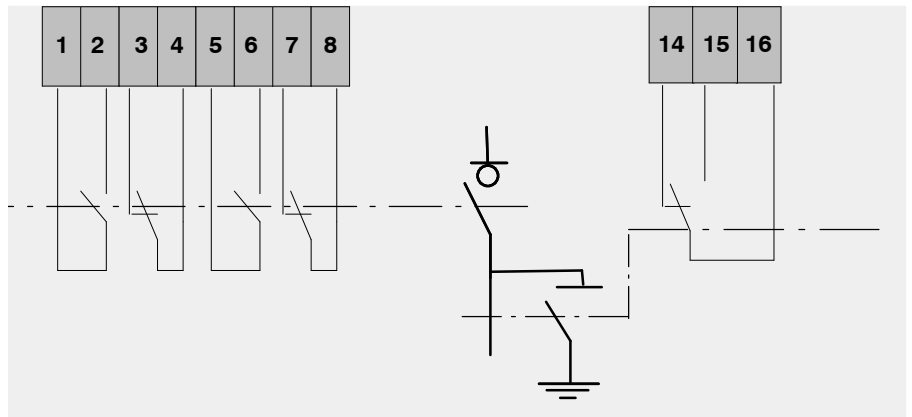
marking the connection terminal block

Position of the closed HV switch:
terminals **1–2** and **5–6**.

Position of the open HV switch:
terminals **3–4** and **7–8**.

Position of the closed earthing
switch: terminals **16–15**

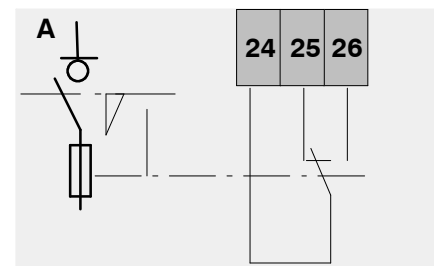
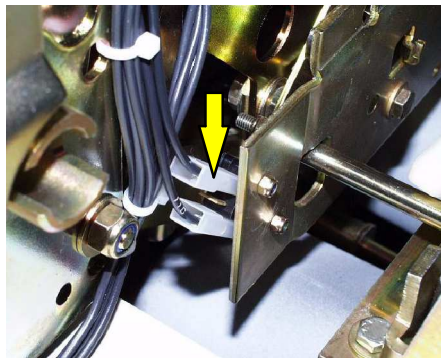
Position of the open earthing
switch: terminals **14–16**



fuse blowing indication

(optional supply)

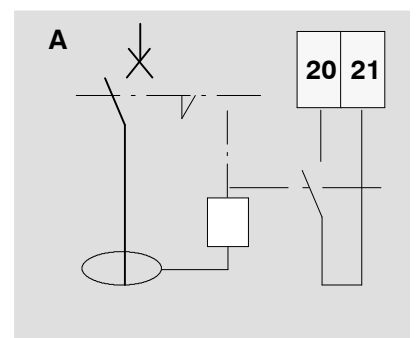
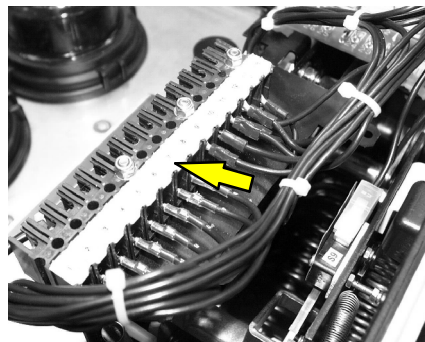
A ; marking the connection
terminal block



fault tripping indication circuit-breaker function only

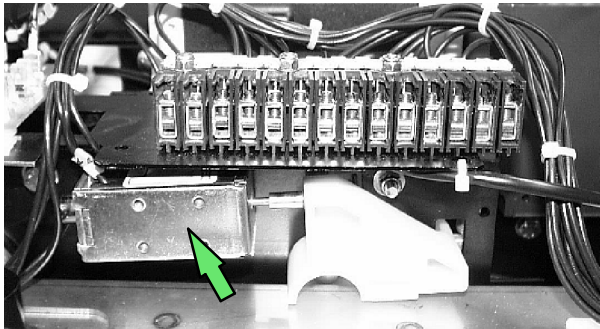
(optional supply)

A ; marking the connection
terminal block



tripping coil

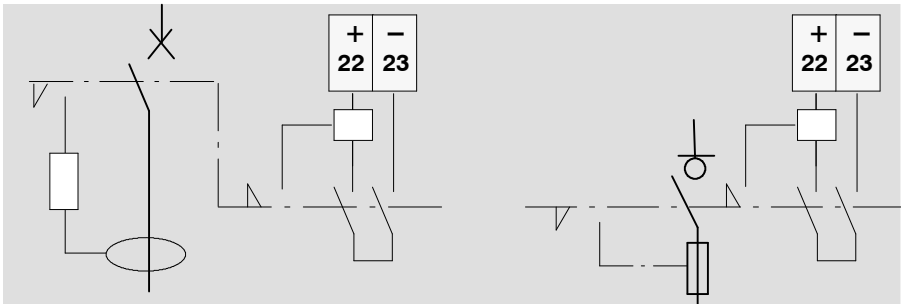
The operation of this accessory is guaranteed for a supply voltage of +10% and -15% of nominal voltage.
(optional supply)



marking the connection terminal block

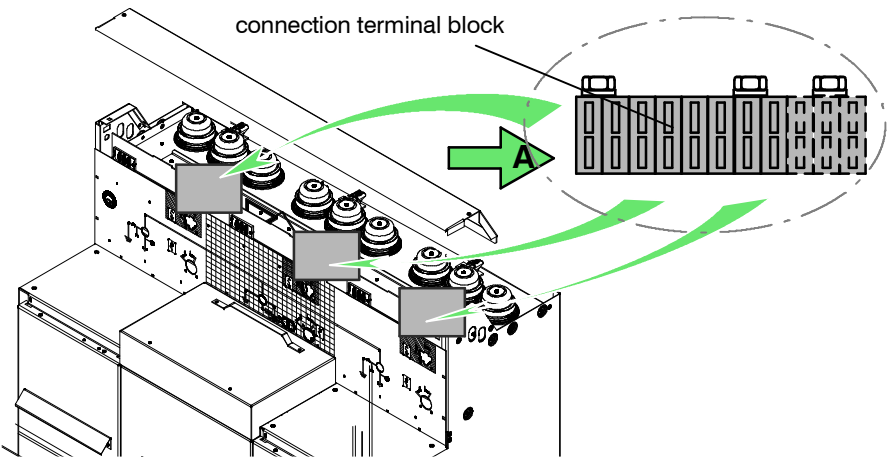


follow the polarity of the 24VDC coil

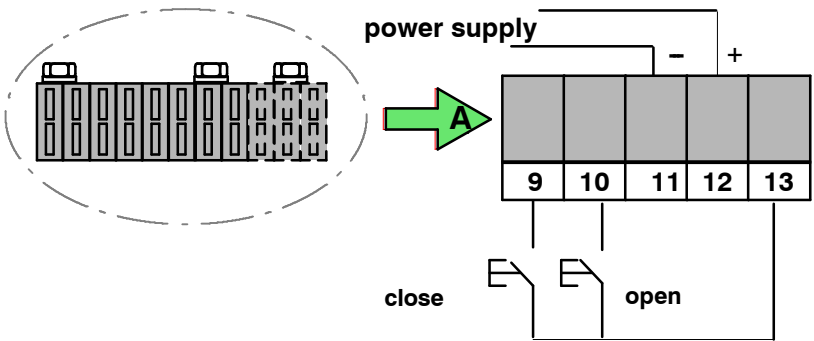


gear motor on fuse-switches or switch or circuit breaker operating mechanism

(optional supply)
The operation of this accessory is guaranteed for a supply voltage of +10% and -15% of nominal voltage.



marking the connection terminal block



pressure switch connection

The pressure switch checks the pressure of the **RM6** unit and transmits the data via 2 auxiliary contacts: "Level 1" and "Level 2".

pressure switch functional table

Pressure "P" of the RM6 unit (absolute bar)	contact status "Level 1"	contact status "Level 2"	Pressure check on LCD display ("DENSITY SWITCH" button(2))
$P > 1,08 \text{ bar}$	Closed	Closed	Case 1: OK
$1,04 \text{ bar} < P \leq 1,08 \text{ bar}$	Closed	Open	Case 2: OK/LOW
$P \leq 1,04 \text{ bar}$	Open	Open	Case 3: NOT OK/VERY LOW

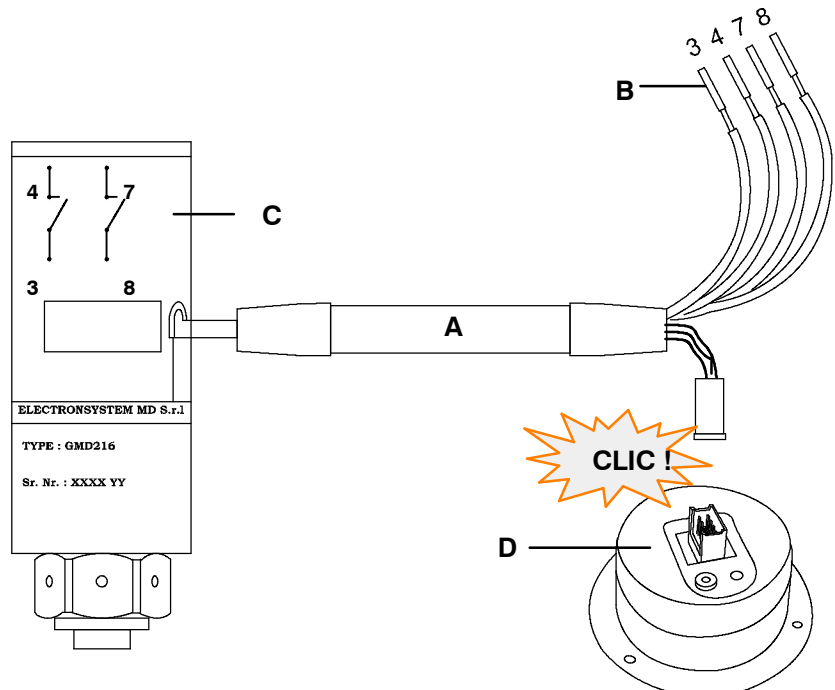
(2) see checks before energising page 13

This data is available by connection (B):

- 4 wires available under the cable trough for connection to a terminal defined by the customer for remote relay of the RM6 unit pressure status:

- wires No.3 and 4: "Level 1" auxiliary contact
- wires No.7 and 8: "Level 2" auxiliary contact

- A : heat-shrinkable sheath
 B : customer power supply (please refer to the "contacts characteristics" table)
 C : GMD 216 pressure switch
 D : pressure switch display



contact characteristics

See "Start-up instructions".

Operating voltage	Inductive load (A)
24 Vdc	2,0 L/R = 20 msec
48 Vdc	1,0 L/R = 20 msec
127 Vdc	0,5 L/R = 20 msec
220 Vdc	0,15 L/R = 20 msec
100–240 Vac	1

connecting a Sepam 10 relay

The accessories fitted to the circuit breaker must be identified before connecting the relay.

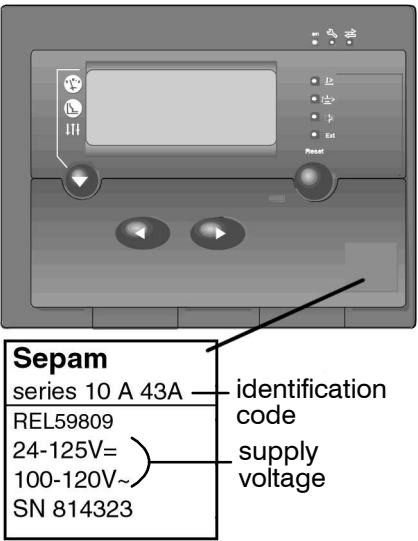
1 – Type of Sepam fitted to your **RM6** (identified by the code on the front panel of the Sepam)

2 – **RM6** circuit breaker type

D: 200 A

B: 630 A

3 – Whether the circuit breaker is fitted with a motor operating mechanism



interpreting the identification code

Note the following information:

Sepam model: A or B

Presence of a CSH200 core balance CT

Supply voltage

Sepam 10 family

Model

B: phase and earth current maximum protection settings

A: phase and earth current maximum protection settings, logic inputs and communication port

Number of current inputs

4: 3 phase current inputs + 1 earth current input

Sensitivity of earth current maximum protection

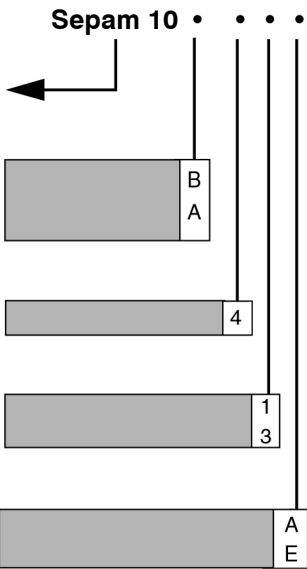
1: standard (0.1...24 In) CT

3: very sensitive (0.2...24 A and 2...240 A) CSH200

Supply voltage

A: 24...125 V DC and 100...120 V AC

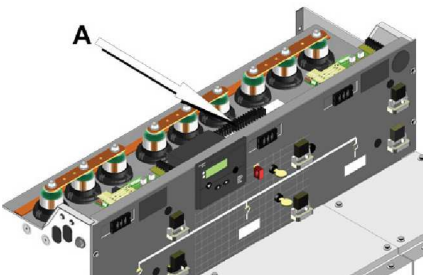
E: 110...250 V DC and 100...240 V AC



Using this information, connect the relay in accordance with the appropriate wiring diagram (below)

Connection of the inputs/outputs and the power supply to the circuit breaker are made on terminal block **A**.

The Sepam and circuit breaker accessories have a common supply.

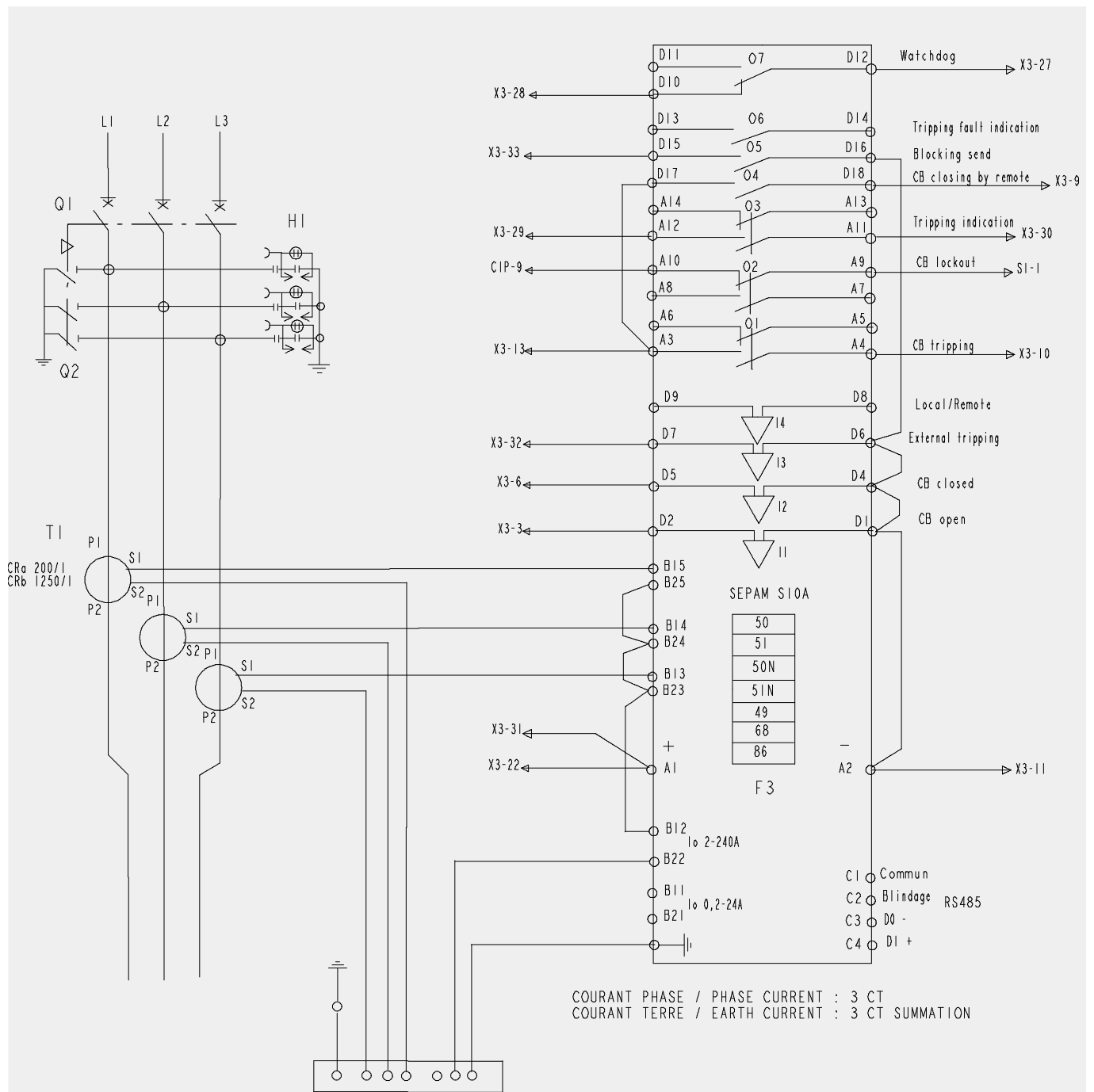


Standard sensibility

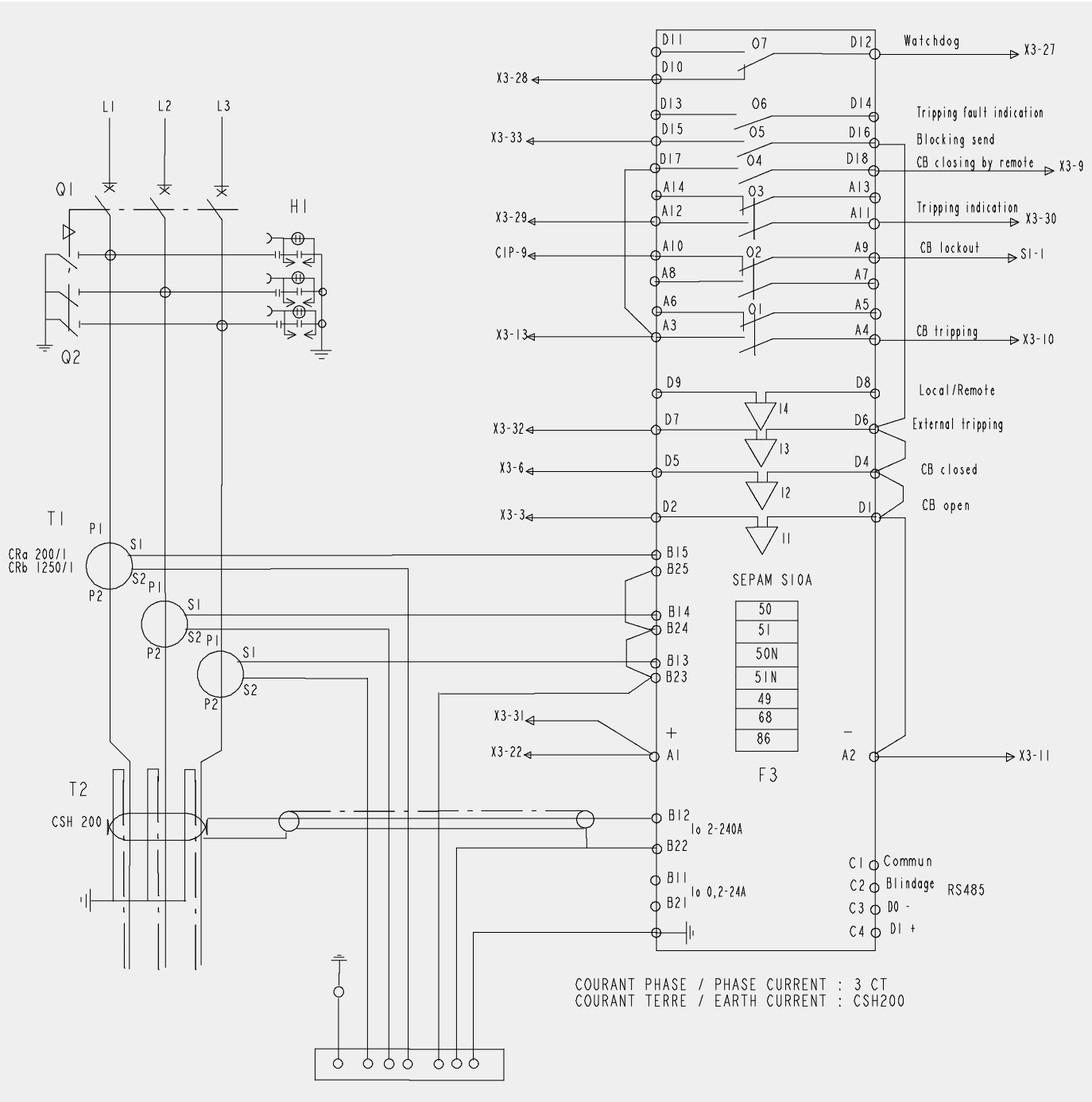


CAUTION

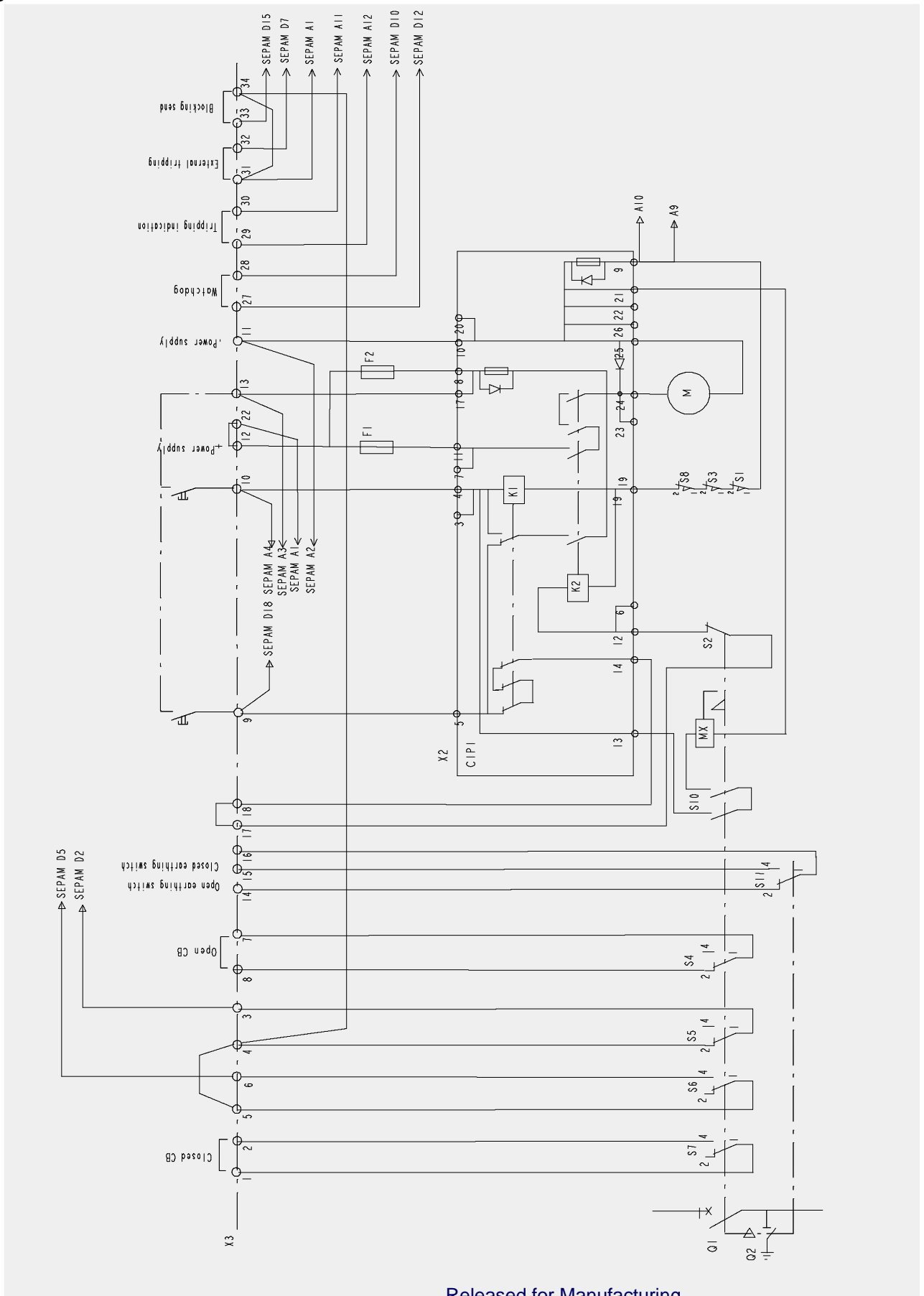
Respect voltage and polarity.



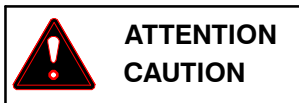
Sensitive earth default



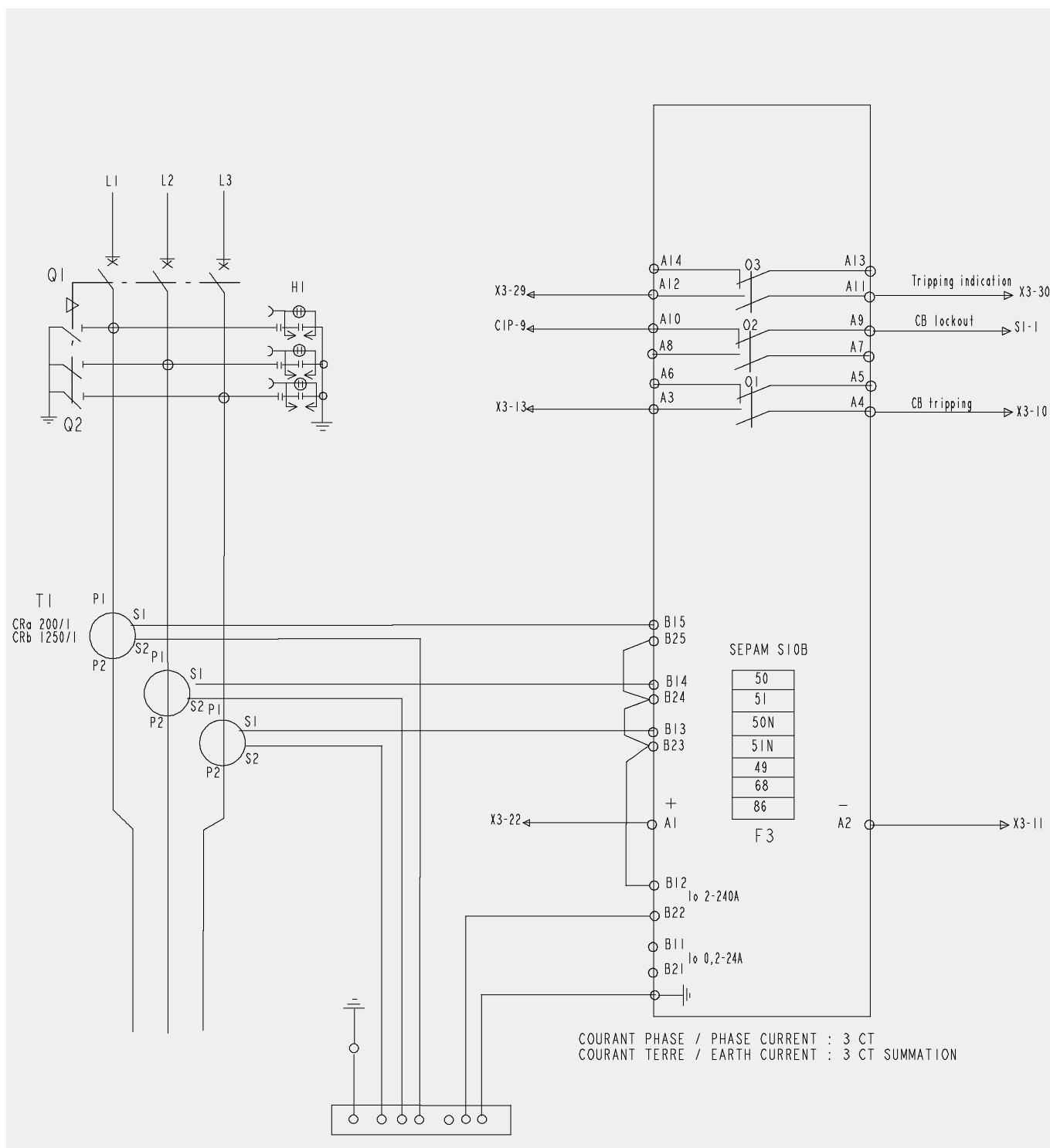
Connecting customer terminal bloc



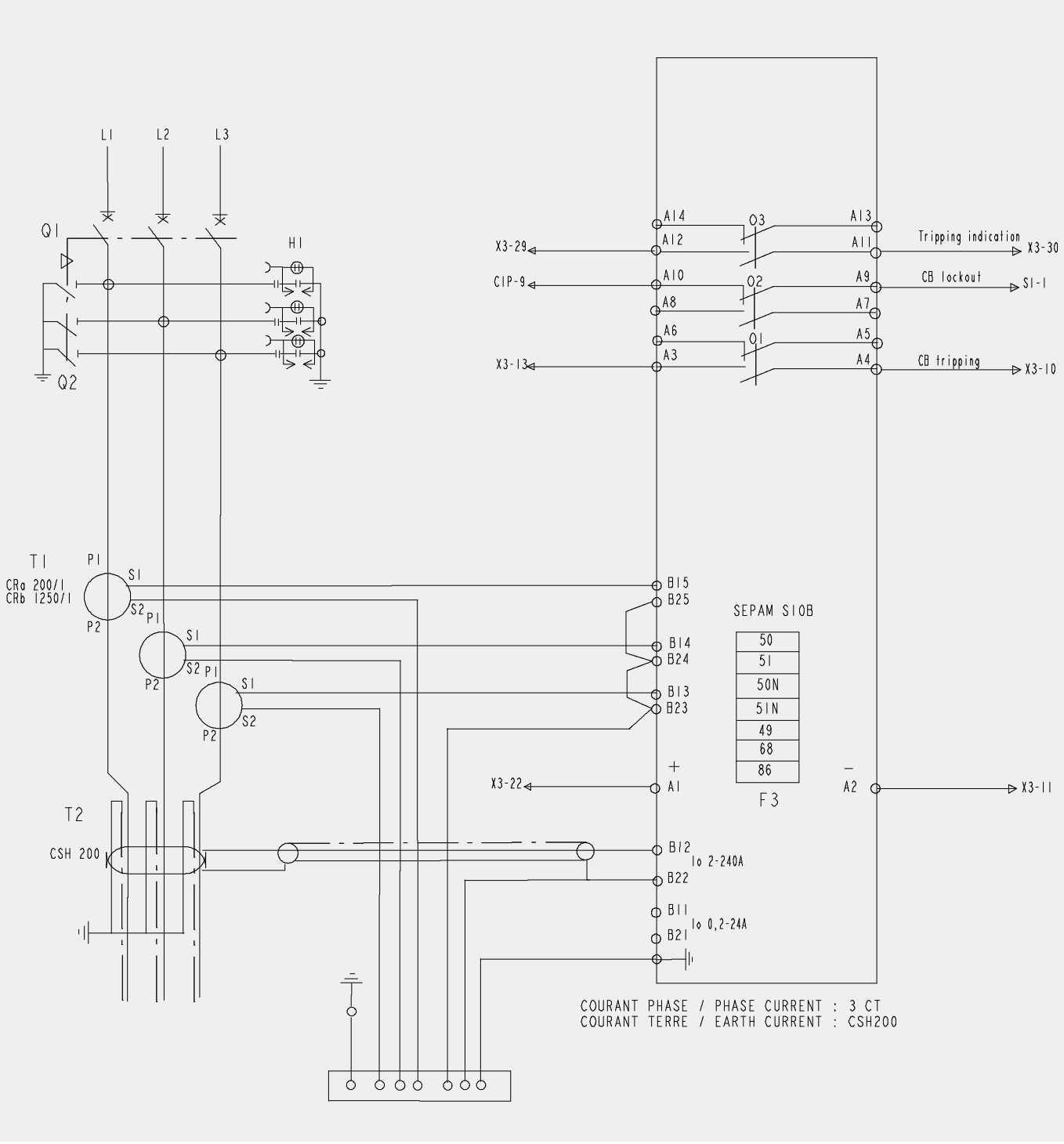
Standard sensibility



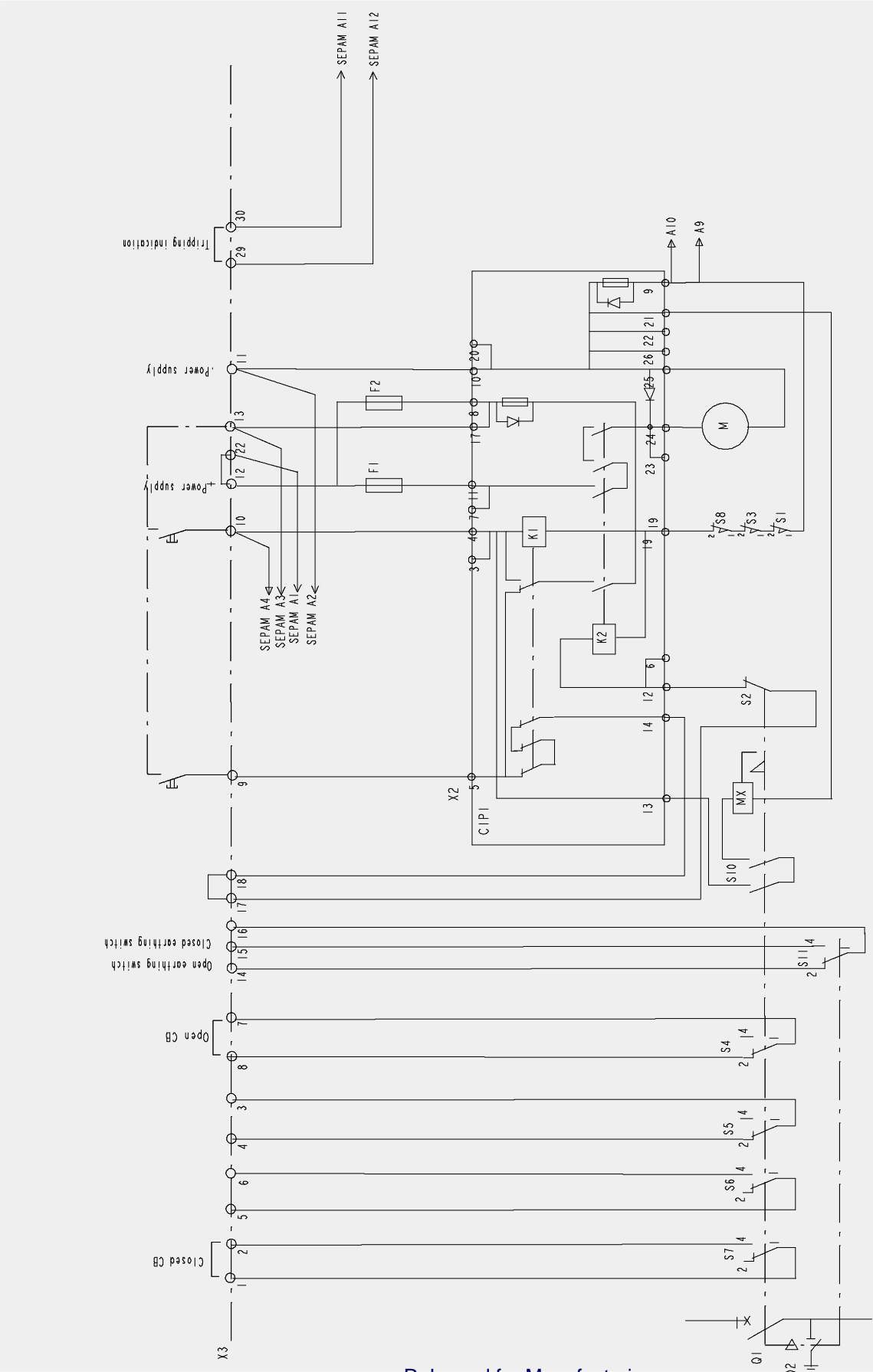
Respect voltage and polarity.



Sensitive earth default



Connecting customer terminal
bloc



Standard sensibility

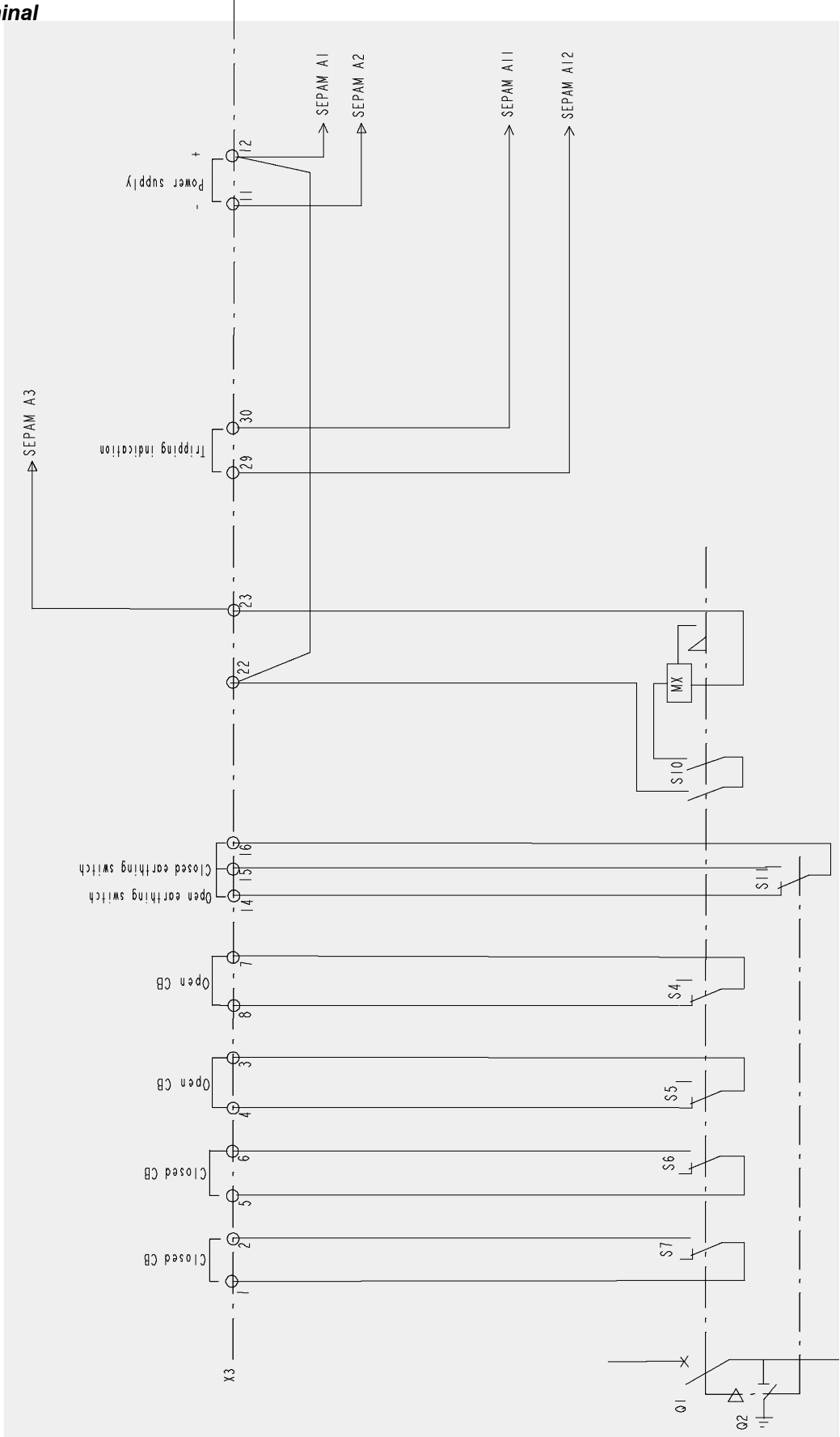


Respect voltage and polarity.



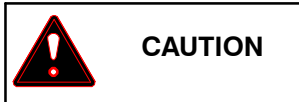


**Connecting customer terminal
bloc**



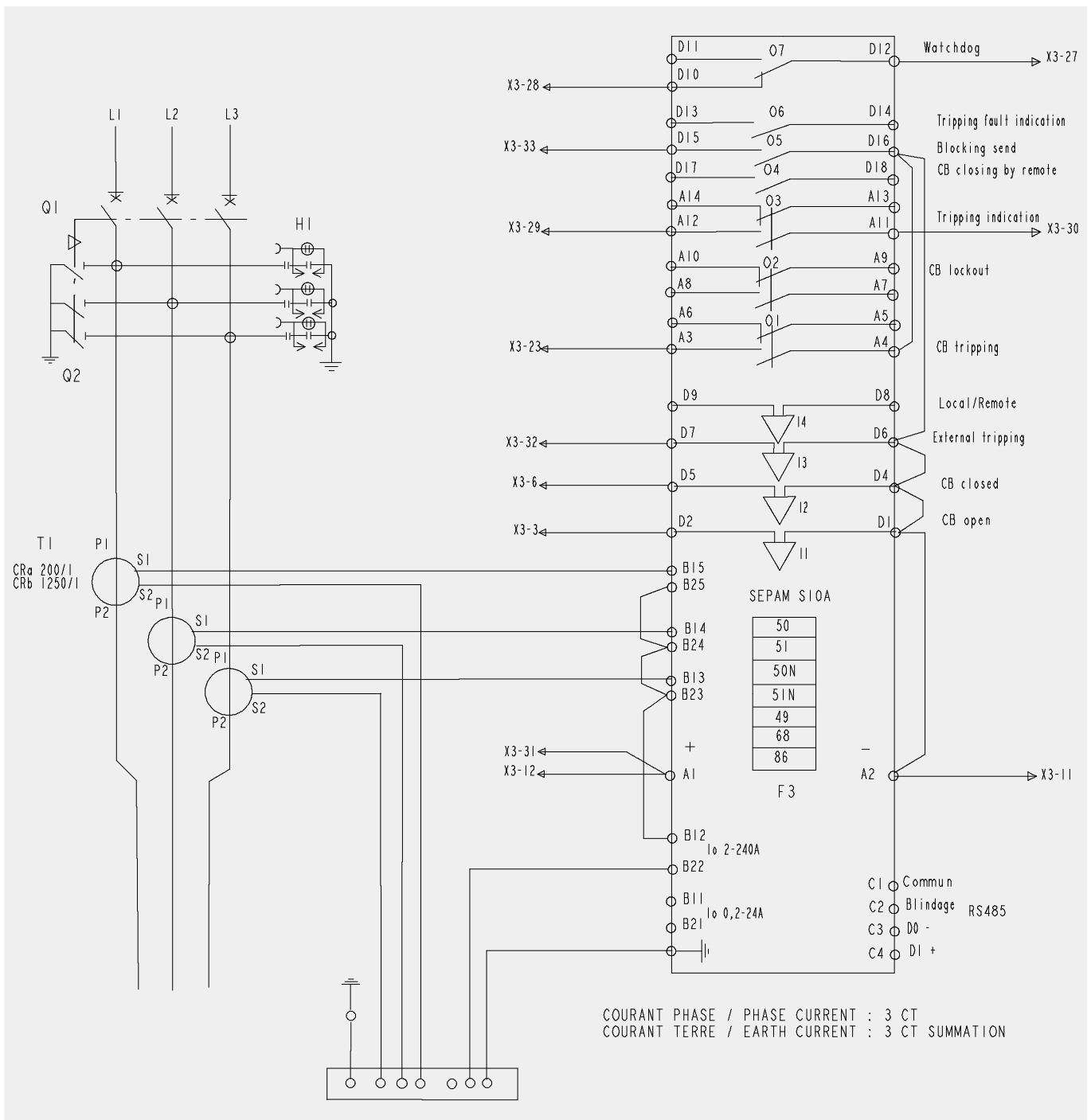
**circuit breaker type B or D
with Sepam 10A + MX**

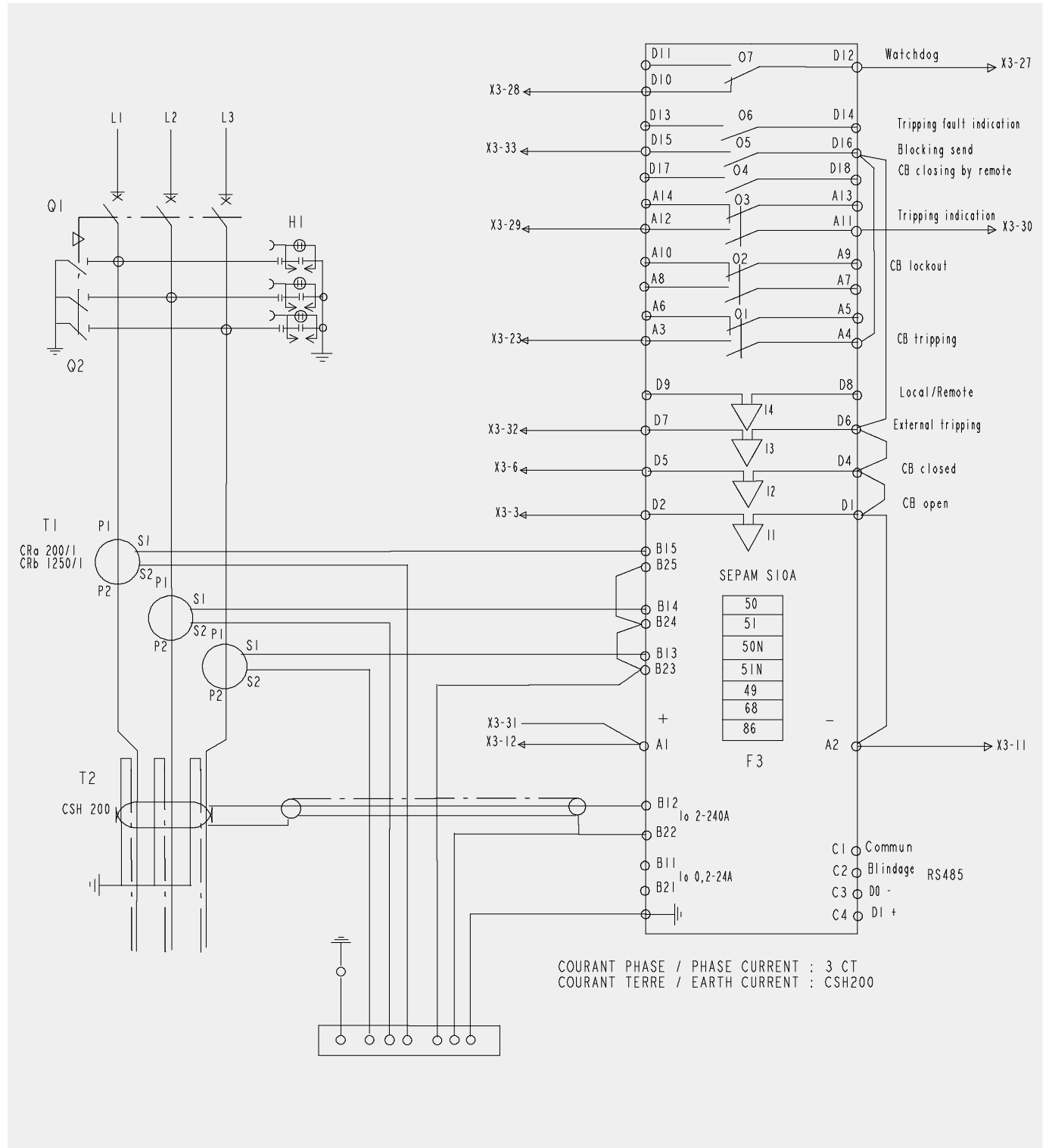
Standard sensibility



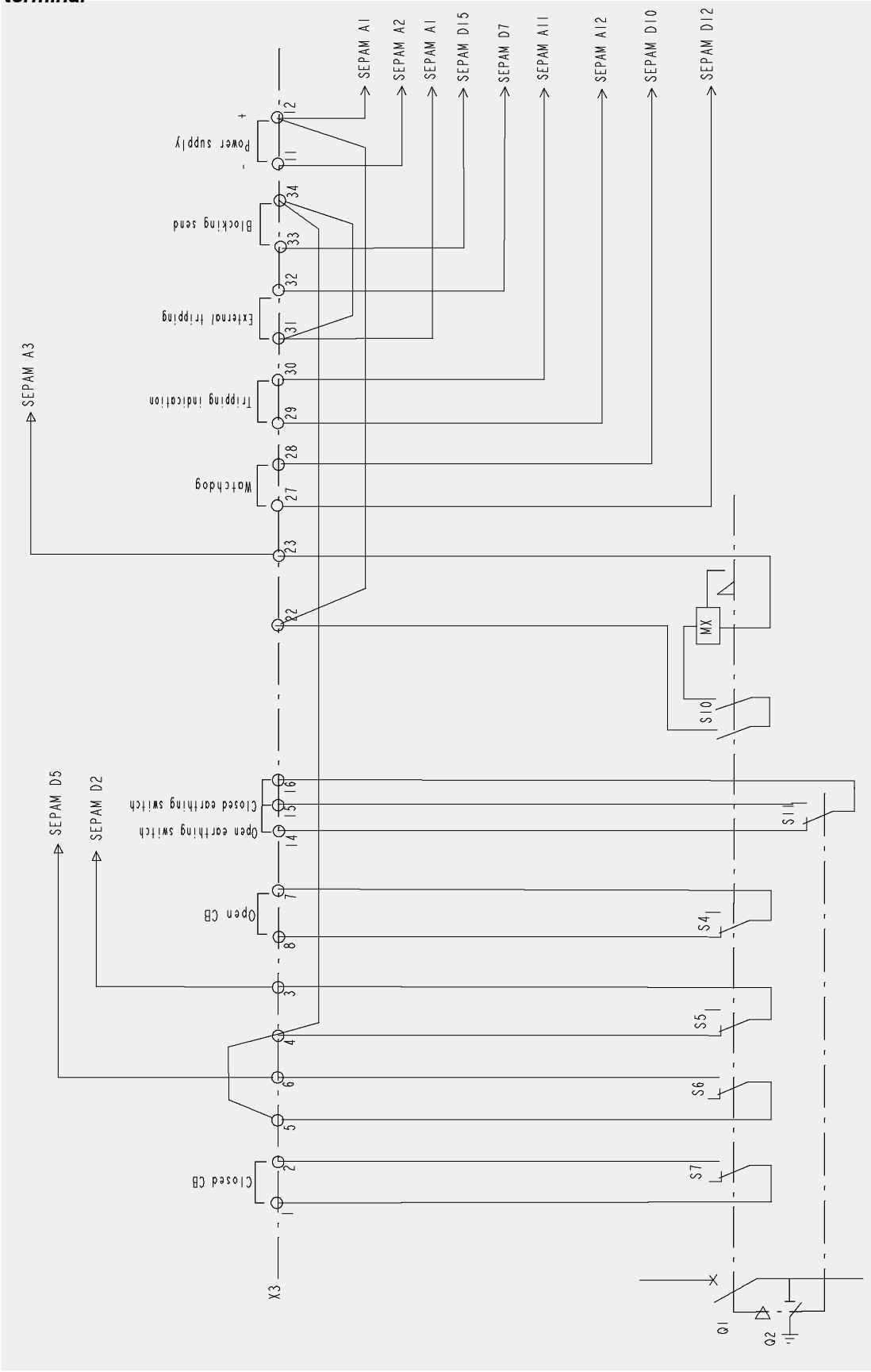
CAUTION

Respect voltage and polarity.





Connecting customer terminal
bloc



connecting the communication port

The **Sepam 10A** is able to communicate via a 2-wire EIA RS 485 communication port.

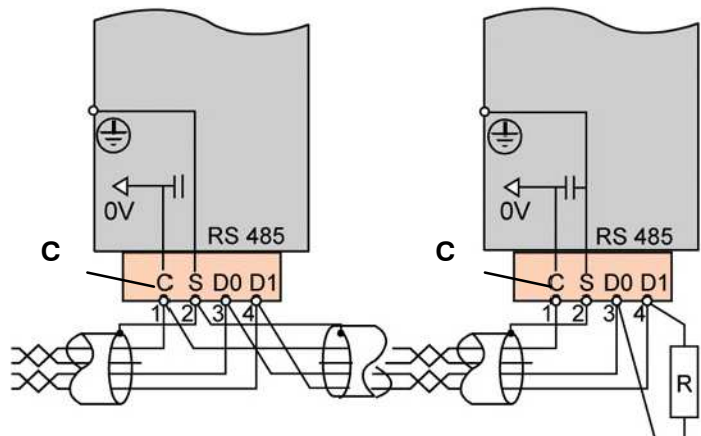
Connection to bus connector **C** is made directly without accessories.

A daisy chain connection is used which requires a 150 Ω end-of-line resistor

Resistor ref: VW3A8306DR

Terminals	Connected Information	Description
1	C : common.	Terminal connected to 0V of the communication interface
2	S : shielding	Terminal connected to the Sepam earthing terminal
3	D0	Terminal to be connected to terminal A (or L-) of the supervisor port
4	D1	Terminal to be connected to terminal B (or L+) of the supervisor port

Connection is made directly to the Sepam connector **C**.



connecting a CSH200 core balance CT



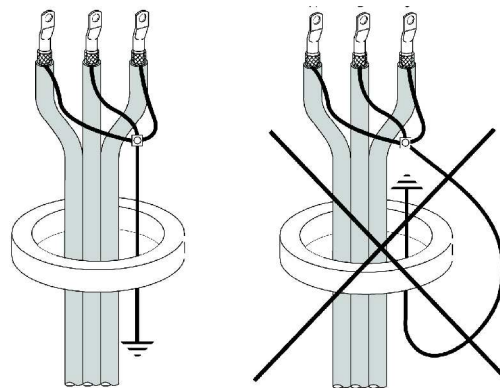
ATTENTION

The CSH200 is not MV insulated. It should be fitted to the part of the cable with the earthed screen.

Serious injury may result if this instruction is not followed.

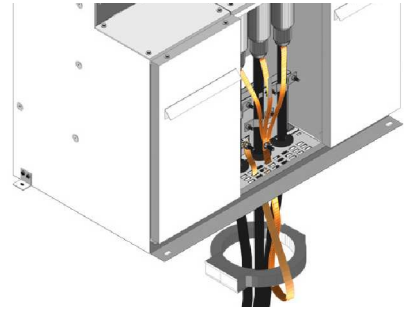
The core balance CT must only measure the sum of the phase currents. The currents circulating in the screens of the 3 HV cables must be excluded.

Pass the screens' earthing braid through the CT. Check the direction the braid passes through the CT.



connection

Position the CSH200 under the **RM6**, in the duct, or if this is not possible, in the raising block. Use the pre-mounted shielded cable that is inside the **RM6** HV connection compartment.



installing an ATS (Automatic Transfer System)

This unit automatically manages the power sources for the distribution network upstream of T200 to ensure the availability of...

...the power supply downstream in case of failure of one of the sources.

ACO function

ACO (Auto Change Over) is an automatic power source switching function with two incoming lines (**SW1** and **SW2**).

- **Network ATS** : changeover between two MV network sources (**SW1** and **SW2**)
- **Generator ATS** between a distribution system line and a generator (**SW1** and **SW2**)

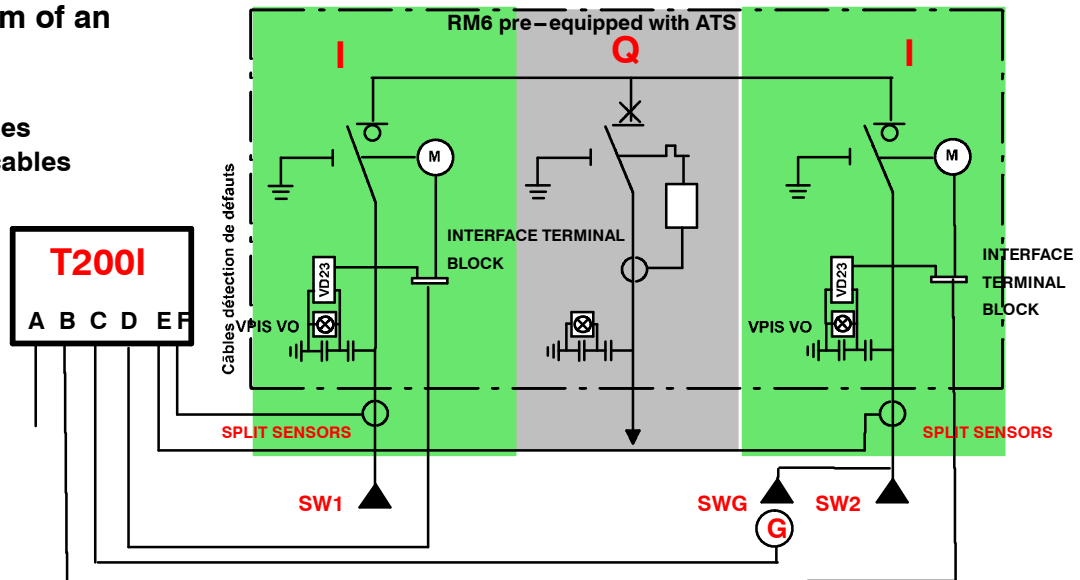
Operating mode

When the power is lost on the line in service, switch-over to the other line is automatic.

One line can be given priority over the other, with return or not to the priority line if necessary.

single line diagram of an AOC function

A : power supply
B,C,D : controle cables
E,F : fault detection cables



other Functions

ATS in ON/OFF mode :

The **ATS** system can be switched ON or OFF from the local control panel (**T200I**) or remotely (**SCADA system**).

ATS in parallel mode upon Auto return:

Enables paralleling of the channels during the phase of automatic return to the priority channel.
(allows return to the main line without any power interruption)

Generator ON override command:

Activation of the ATS and transfer on Generator can be activated upon an order.

allows periodic maintenance tests of the ATS/Generator system for example.

BTA function

BTA (**B**us **T**ie **A**utomatism) is an automatic power source switching function with 2 incoming lines (**SW1** and **SW2**) and a coupler switch (**SW3**).

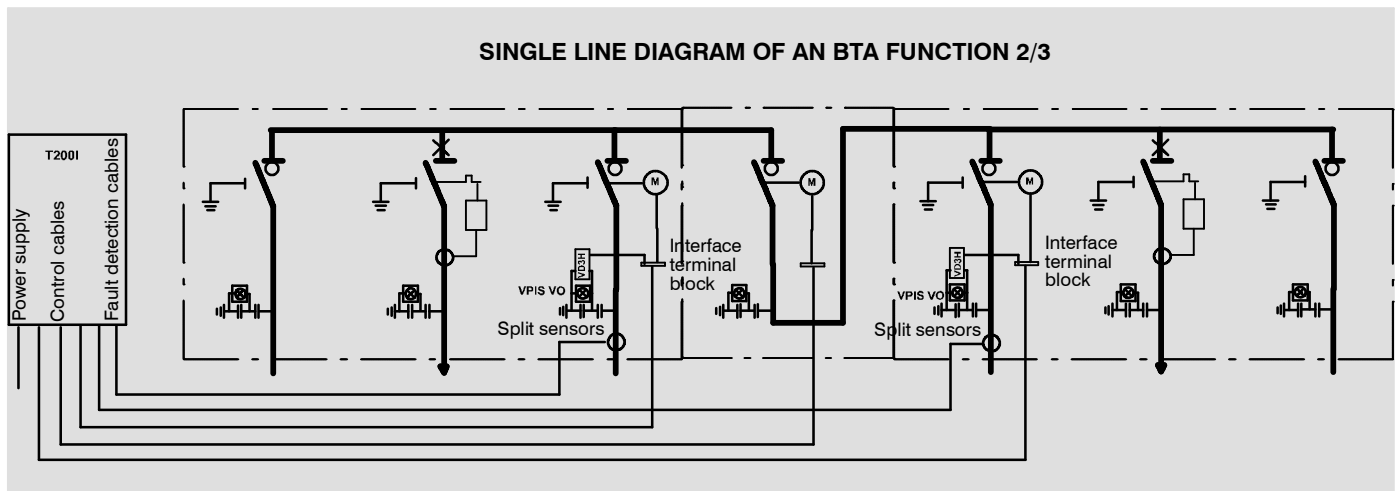
Operating mode

Standard mode:

When the power is lost on one line, the automatic function opens the line in question and closes the coupler switch. The coupler switch is conditioned by the absence of fault current on the main power source.

Locking mode after loss of power following switch-over:

After automatic switch-over in standard mode, the power supply is checked over a configurable period. If the power is lost during this period, the **SW3** coupler switch is opened and the automatic function is locked.

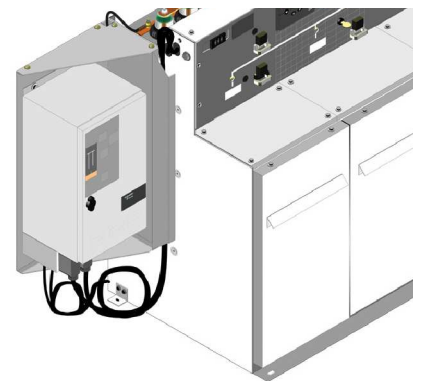


The switching function will not work with faulty batteries. Remember to check the T200I batteries regularly (**see T200I manual**).

installing an ATS/ACO

The following equipment is required in order to install an **ATS** with **ACO** (**A**uto **C**hange **O**ver).

- **RM6** pre-equipped for the **ATS** function
- 1 **T200I** support kit
- 1 **T200I (TI04M – – – ABBM22)**
- 2 pilot wires
- 2 CTs (optional split sensors or pre-equipped)
- 2 wires for CTs



fitting the T200I support kit

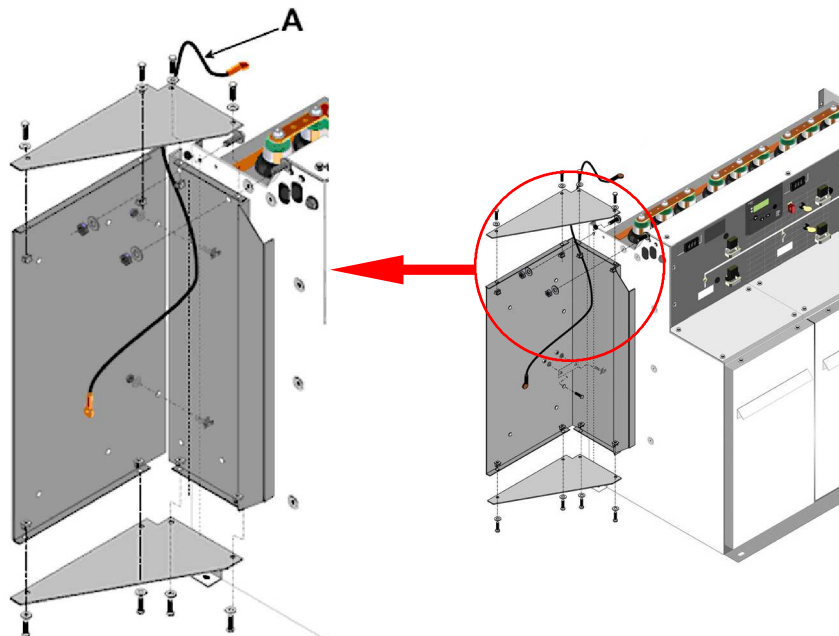


CAUTION

Do not transport the RM6 + T200I once assembled.

The kit can be fitted to the left or right of the **RM6**.

The T200I earthing cable (**A**) should be connected to the **RM6** earth bar.



installing the T200I and connecting it to the RM6

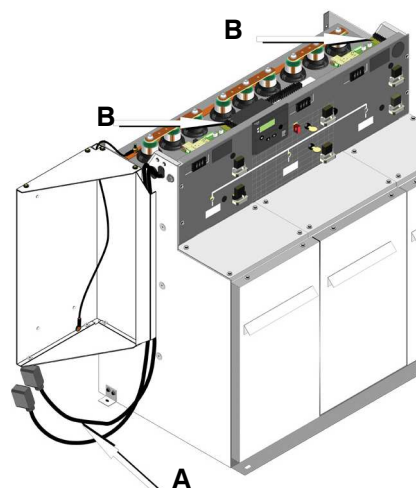
Fit the **RM6** connection cables (**A**) and connect them to the interface terminals (**B**) in the **RM6** LV compartment.



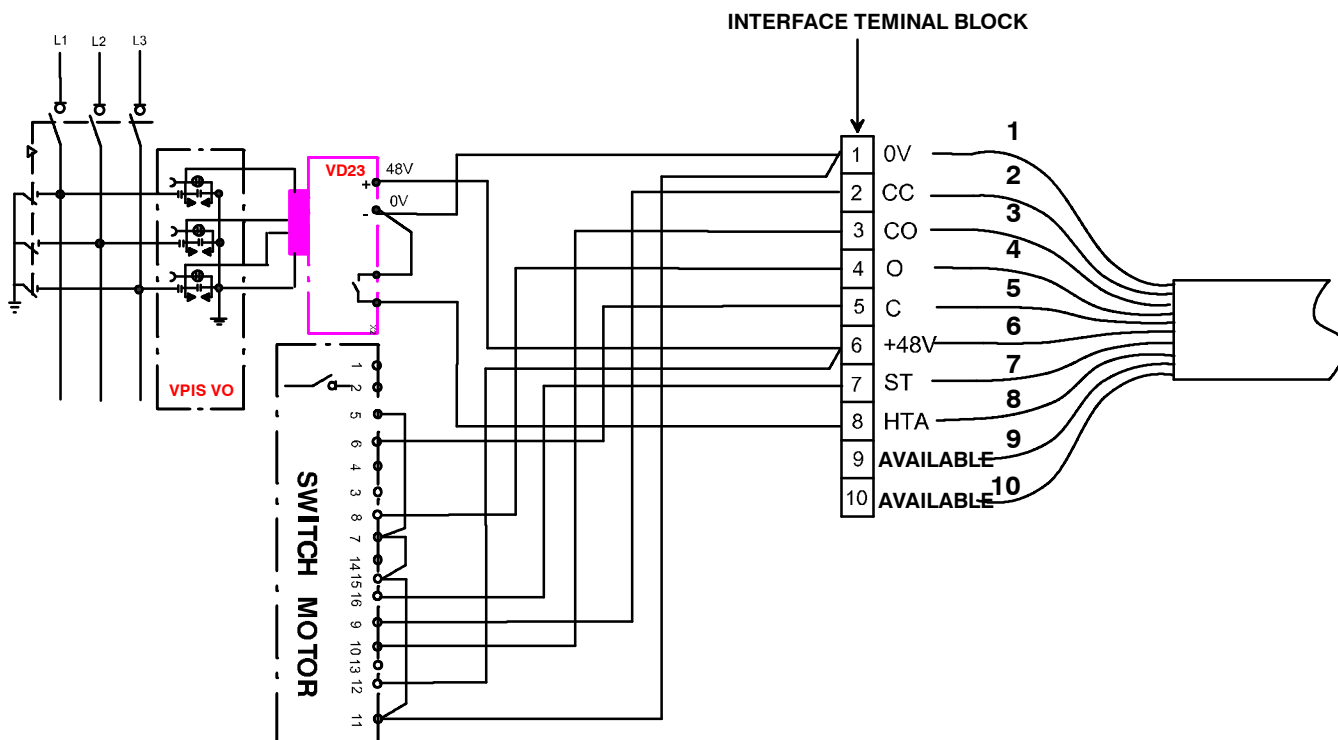
CAUTION

Take care with channel markings and mismatch.

The **ACO** unit is only available on channels 1 and 2 of the **T200I**.



switch wiring diagram

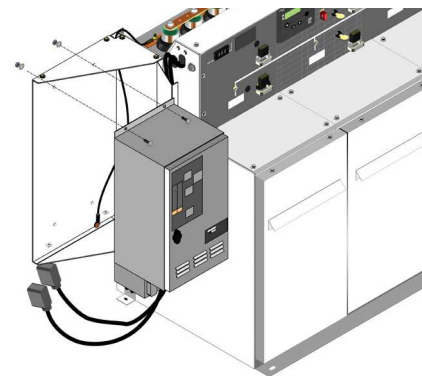


fitting the T200I enclosure

Fit the **T200I** and earth the enclosure (diameter 8 earth stud).

Use the instructions on the CD supplied with the **T200I** to:

- fit and connect the core balance CTs
- fit and connect the battery
- connect the AC supply



locking the source transfer

This input makes it possible to forbid commands from:

- the local control panel
- the automatic switching function
- the supervisor

To be wired to terminal J1 of the T200I, terminals 1–2.

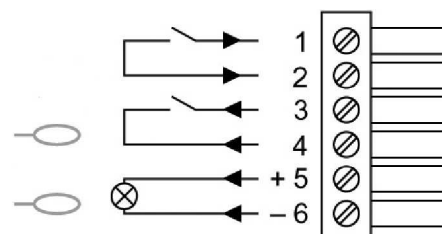
RM6 circuit breaker complete with a Sepam 10 relay, terminals 29–30.

RM6 circuit breaker complete with a VIP relay, terminals 20–21.

locking the source transfer

Channels 1 to 4
fault reset output

Channels 1 to 4
external indicator lamp



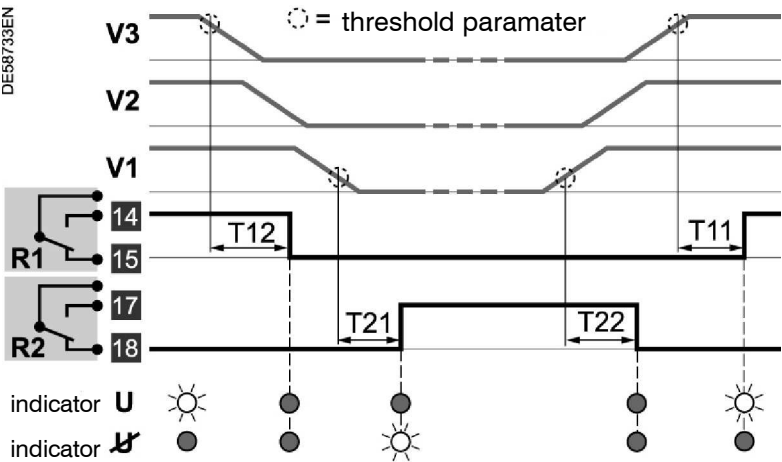
detection sequence (ATS/VD23)

Configuration: voltages V1,V2,V3, direct mode

R1: terminal 15 = relay rest position: voltage loss on at least one of the phases

R2: terminal 18 = relay rest position: voltage presence on at least one of the phases

A configurable time delay is applied for control of R1 and R2:
T12 = time delay for R1 changeover upon voltage loss
T11 = time delay for R1 changeover upon voltage recovery
T21 = time delay for R2 changeover upon voltage loss
T22 = time delay for R2 changeover upon voltage recovery



suggested choice for VD23 settings

VOLTAGE DETECTOR		EARTHED OR IMPEDANT GROUNDING	ISOLATED NEUTRAL	COMPENSATED NEUTRAL
VD23	SW 1			
	SW 2			
	SW 1			
	SW 2			

recommended settings thresholds

Phase voltage detection	50%
Voltage detection– residual earth fault voltage	54%

T200I specific settings

For each channel, set the control and automation parameters

Access ' Control & Automation configuration'

RM6 control settings

Standard control	Standard
Await return of switch command position time delay	5000 ms
Await return of circuit–breaker command position time delay	14000 ms
Non–complementarity filtering time delay	3000 ms
Operating time delay	500 ms

Mode selection

Test mode

Configuration mode

Parameters defined by micro switches

Parameters setup mode

To set the parameter values, see the section below

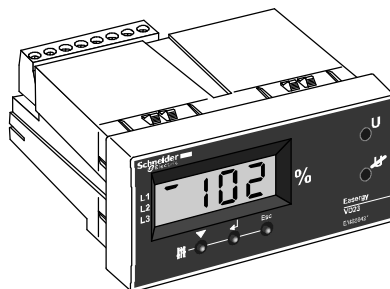
Calibration mode

Measuring mode

Product name	Software version	Network frequency		Digits test	
vd23 3s	v1.00 3s	Fr.50 or	Fr.60 3s	8888 3s	
Type of measurement	Relay output	Phase 1	Phase 2	Phase 3	Residual voltage
line-to-line	inverted	measured	measured	measured	measured
line-to-neutral	direct	not measured	not measured	not measured	not measured
Phase voltage threshold	Residual voltage threshold	Activation time delay R1 (direct)	Release time delay R1 (direct)	Phase voltage threshold	Activation time delay R2 (direct)
40 to 90 % of nominal voltage (10% increments)	30 to 60 % of nominal voltage (10% increments)	0 to 3 0 to 1 s (0.1s increments) 1 to 21 s (2s increments)	0 to 3 0 to 1 s (0.1s increments) 1 to 3 s (0.5s increments)	10 to 30 % of nominal voltage (10% increments)	0 to 21 0 to 1 s (0.1s increments) 1 to 21 s (2s increments)
Voltage presence	Voltage absence	Activation time delay R2 (direct)	Release time delay R2 (direct)	Activation time delay R2 (direct)	Release time delay R2 (direct)
5-V	5-A	0 to 21 0 to 1 s (0.1s increments) 1 to 21 s (2s increments)	0 to 21 0 to 1 s (0.1s increments) 1 to 3 s (0.5s increments)	0 to 21 0 to 1 s (0.1s increments) 1 to 21 s (2s increments)	0 to 21 0 to 1 s (0.1s increments) 1 to 3 s (0.5s increments)
Automatic calibration	Forced calibration	Set to OFF to retain the last calibration performed			
Auto	d0	OFF or On	Calibration performed normally		
			Error in calibration: voltage levels too low		

parameter display (ATS/VD23)

The ▼ and ↵ buttons allow navigation in the parameter tree structure in accordance with the following diagram. At any time, a press on the “Esc” key (Return) allows you to return to the preceding stage.



Configuration of thresholds and time delays(ATS/VD23)

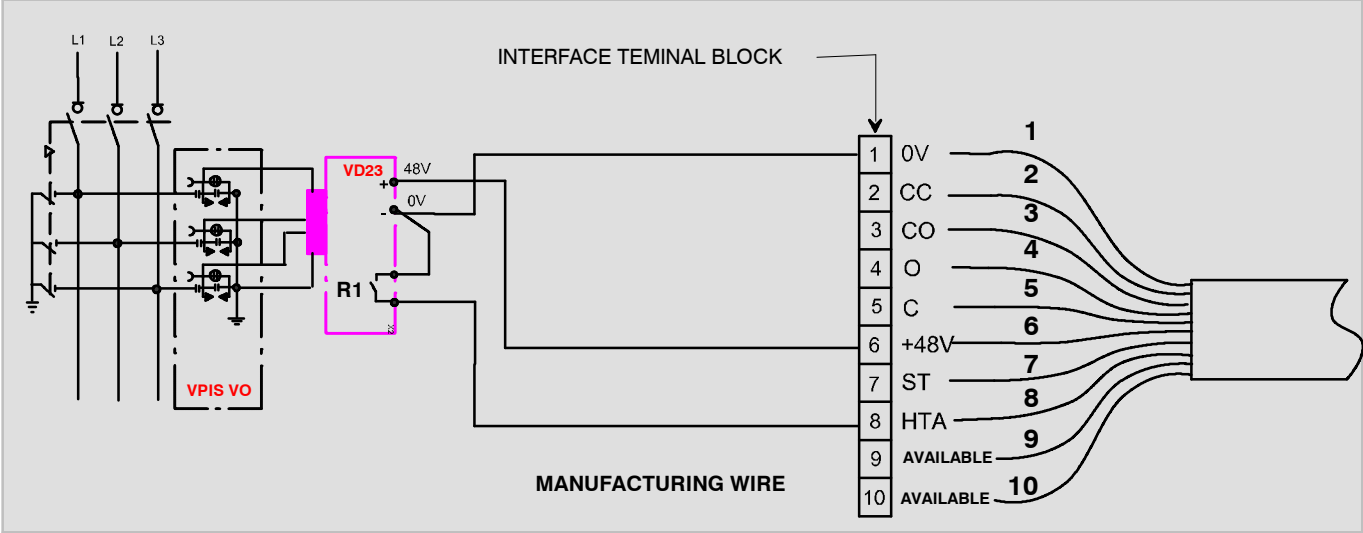
The parameter values (white screen in the above diagram) can be modified as follows:

- When the value of the parameter is displayed, a press on the ↵ key causes the display to flash for 5 s
- During flashing, press successively ▼ to display the desired value

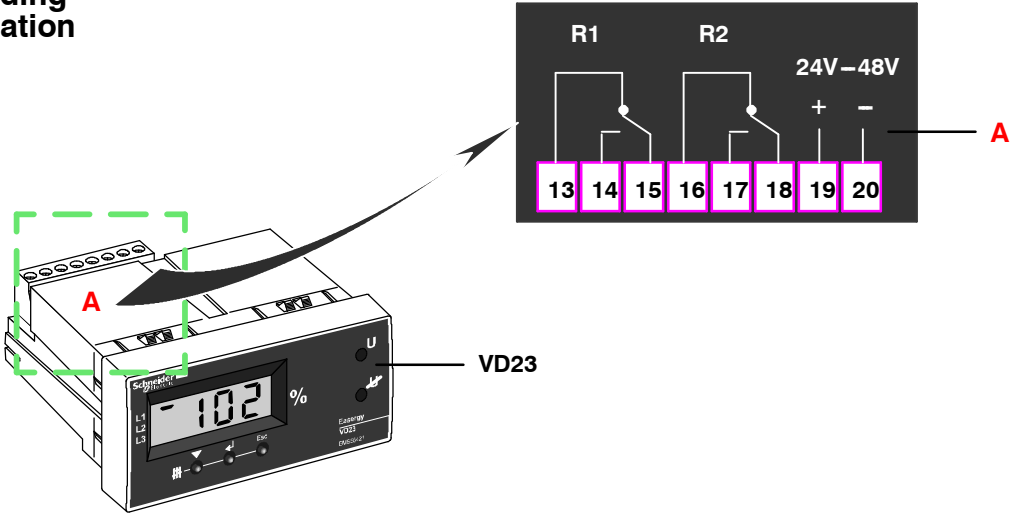
Confirm this value by pressing the ↵ button; without confirmation within a period of 15 s, return to display of the parameters without change in the value. **Each press on the “Esc” button takes you back to the preceding stage.**

VD23 relay only

Wiring of VD23 when there is no 48V DC motor



wiring reference according configuration or installation type



fault current detector selectivity

The I_{max} and I_o thresholds must be configured corresponding to those configured on the protection of the upstream system circuit breaker.

The thresholds and time delays to be configured on the T200I must be slightly lower than those of the upstream circuit breaker protection

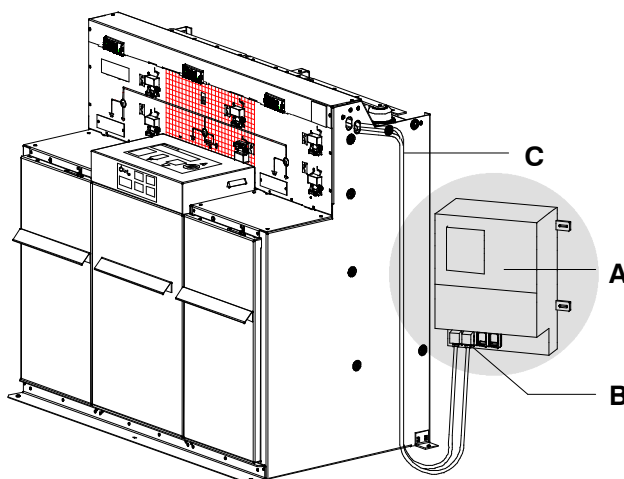
in order to allow the T200I to detect the presence of the fault current before the upstream circuit breaker opens.

For the other parameters, use the instruction manual on the CD supplied with the T200I

remote control

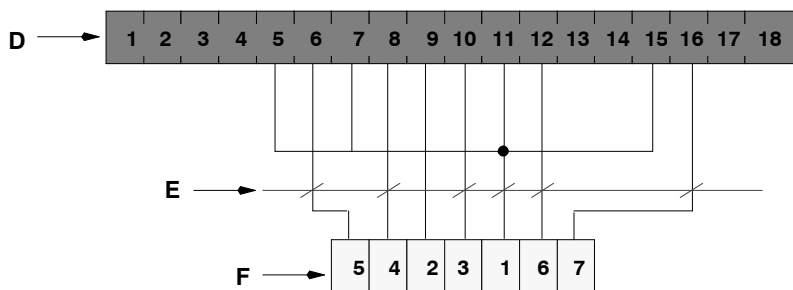
Connecting the RM6 to the Talus 200 remote control interface.

- A : TALUS 200 remote control interface
- B : connectors (of the Harting type)
- C : connecting leads



cabling a connecting lead

- D : RM6 terminal block
- E : connection lead
- F : harting contact pin



polarisation of the HARTING connectors

Trunnion positions.
pin side views

PLUG CONNECTORS

SOCKET CONNECTORS

- polarisation is archived by screw-on trunnions

