CIRCUIT BREAKER

MV distribution circuit breaker at your service

Anglais

instructions for use

LF and LFP fixed circuit–breakers

Schneider Electric

Important informations notice

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

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

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

DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury. The safety alert symbol shall not be used with this signal word.

INFORMATION-ADVICE

We draw your attention on this particular point.

important remarks

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

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

diffusion rules

CAUTION

safety rules

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.
- Beware of potential hazards, and carefully inspect the work area for tools and objects that may have been left inside the equipment.

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

cleaning instructions

SOLVENTS AND ALCOHOL FORBIDDEN

HIGH-PRESSURE CLEANER FORBIDDEN

disposal of the equipment at end–of–life

WARNING

This equipment contains SF6 gas. SF6 is a powerful greenhouse gas and is harmful for the environment. Prior to disposal of the equipment at end-of-life, the SF6 gas must be recovered in order for it to be recycled, reclaimed or destroyed.

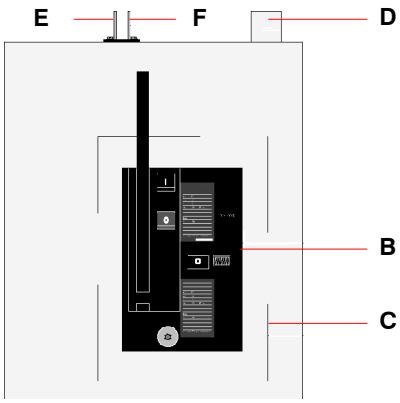
- **DO NOT carry out any dismantling operations unless authorized.**
- **DO NOT handle SF6 gas unless certified.**
- **DO NOT release SF6 gas to the atmosphere.**

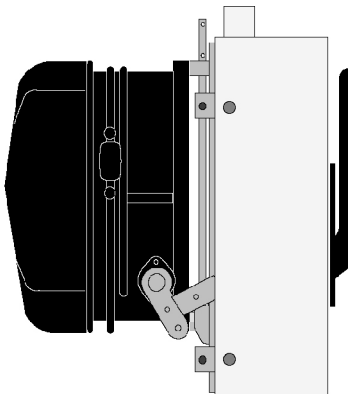
Penalties may apply according to local regulations and rules (Regulation (EU) N° 517/2014 for all European countries).

Schneider Electric offers a complete service to dismantle and recycle Medium Voltage equipment and SF6 gas at end-of-life. This service is compliant with IEC 62271-4 and conforms to local regulations.
Please contact Schneider Electric for details.

LF fixed circuit–breaker

A : enclosure
B : operating mechanism plate
C : RI operating mechanism
D : LV wiring inlet
E : mechanical opening trip device
F : energy discharging (after opening and elimination of voltage on the gear motor)

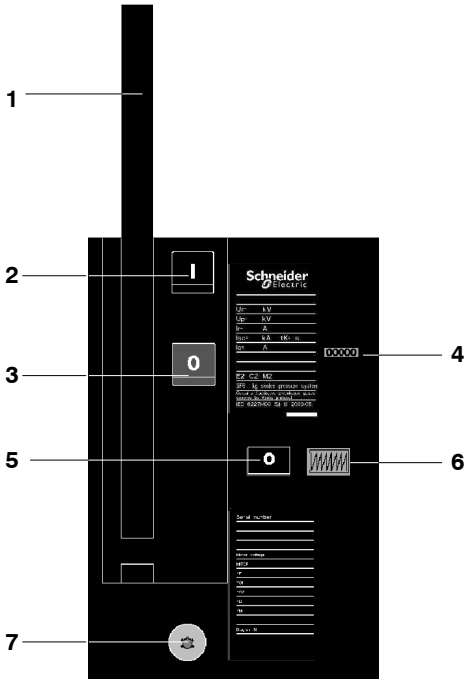




fixed equipment	IEC standard	ANSI standard
LF1	630 A et 1250 A	
LF2	630 A , 1250 A et 2000 A	1200 A et 2000 A
LF3	1250 A, 2500 A et 3150 A	1200 A, 2000 A et 3000 A
LFP	5000 A	

operating mechanism plate

1 : operating mechanism charging lever
2 : closing pushbutton
3 : opening pushbutton
4 : operation counter
5 : **"open or closed"** device status mechanical indicator
6 : **"charged or uncharged"** operating mechanism charging status mechanical indicator
7 : keylock (option)



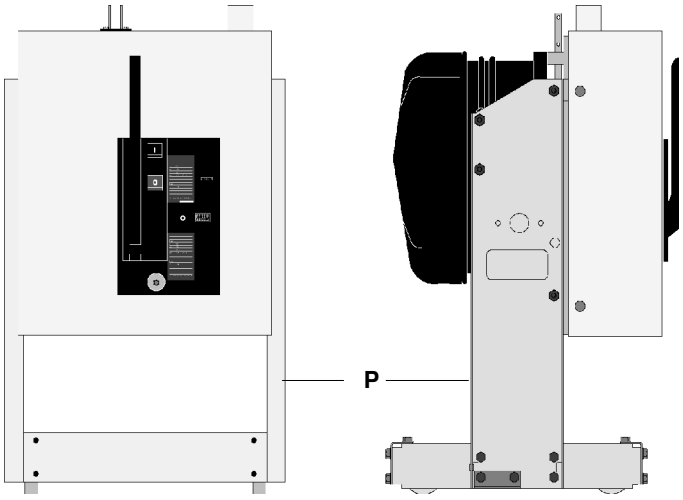
support frame

P : support frame (kit)

This frame is an option.

It is disassembled on delivery.

The assembly manual is enclosed in the packing.



identification

Check:

- that the technical data marked on the rating plates match the information given on the order form.
- that the connection diagram is enclosed with the device manual.

location of the information plates

IEC standard

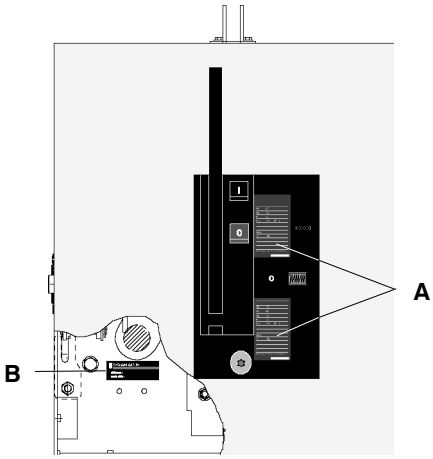
A : technical data and auxiliaries plate

B : serial number

ANSI standard

A : technical data plate

C : auxiliaries plate



IEC circuit–breaker, operating mechanism and auxiliaries information plate

1 : device type designation

2 : rated voltage

3 : rated lightning impulse withstand voltage

4 : rated continous operating current

5 : rated breaking capacity for CC 3s

6 : no–load breaking capacity

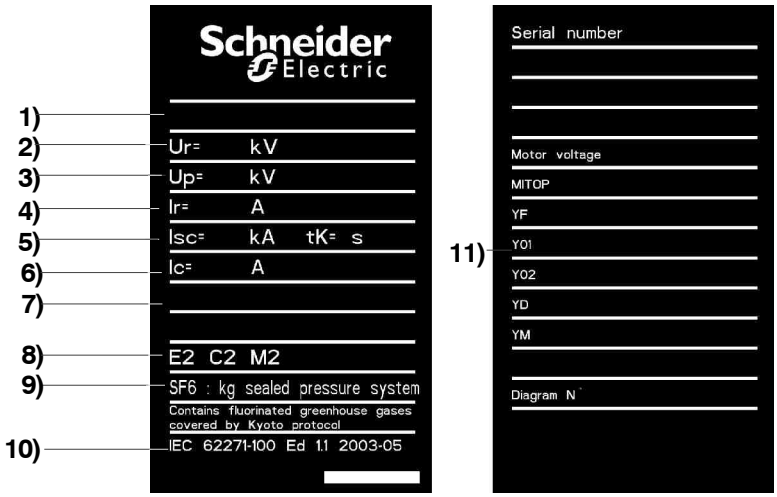
7 : rated operating sequence

8 : class

9 : SF6 mass

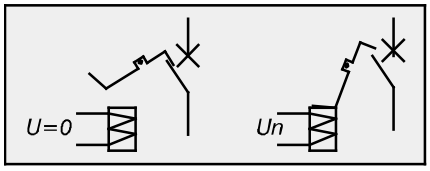
10 : reference standard

11 : characteristics information plates

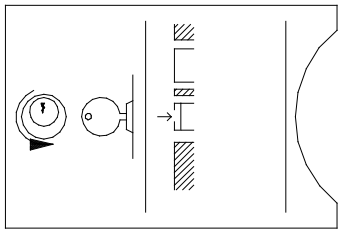


option labels

(stuck on the operating mechanism plate)



Label indicating the undervoltage trip device option.



Label indicating the key–lock option.

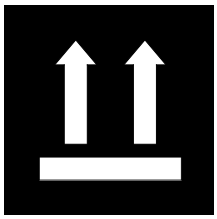
storage

The circuit–breakers are dispatched in the **open** position, with the operating mechanism **deactivated**.

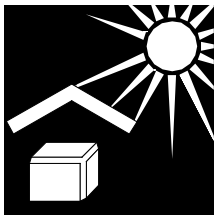
Store the devices in their original packing.

Keep away from rain

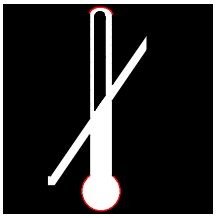
Handle with care



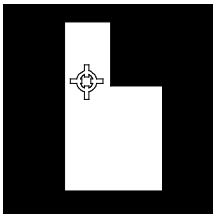
This way up



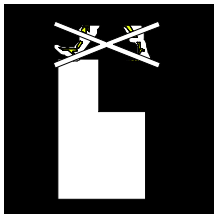
Keep away from sunlight



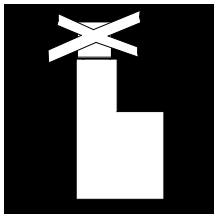
maxi 70°C
Storage Temp
mini —40°C



High gravity center



Do not walk on it



Do not stack

prolonged storage

In the case of prolonged storage, the device must remain in its original packing.

After prolonged storage, all insulating parts must be thoroughly cleaned prior to use.

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

unpacking and handling

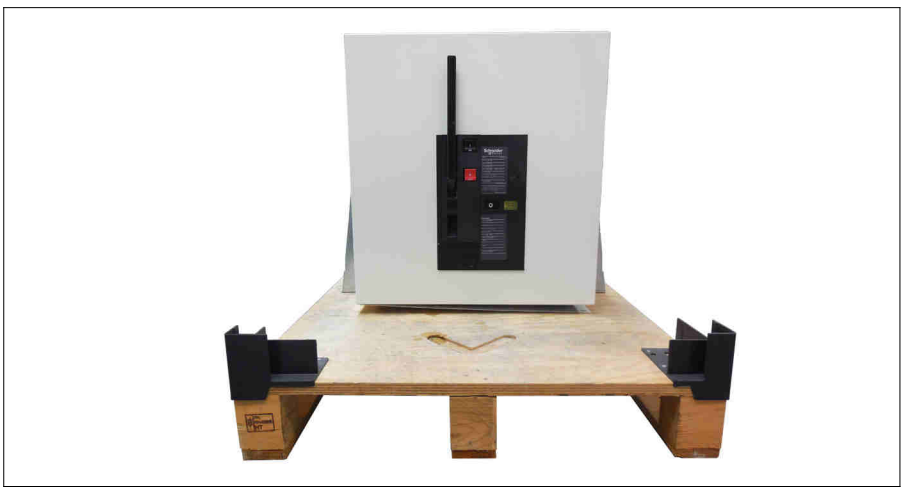
- Unpack equipment at the installation site.
- Avoid chocks.

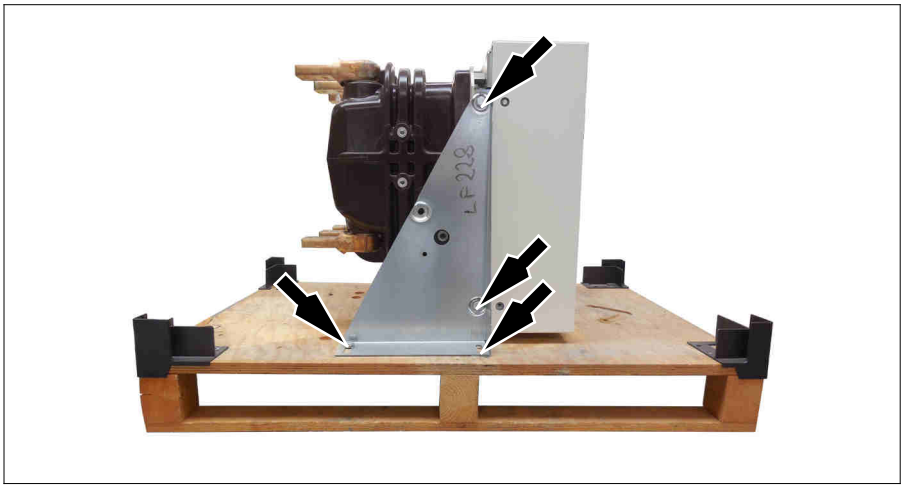
WARNING

poles are under pressure.

CAUTION

On the LF3 and LFP, the centre of gravity is shifted on the enclosure side.



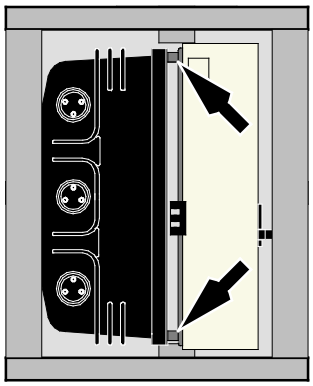


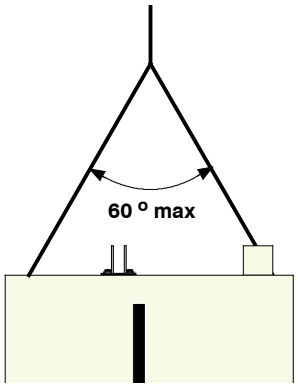
Remove 4 screws and then remove 2 transport brackets.

by lifting

removing the wooden frame

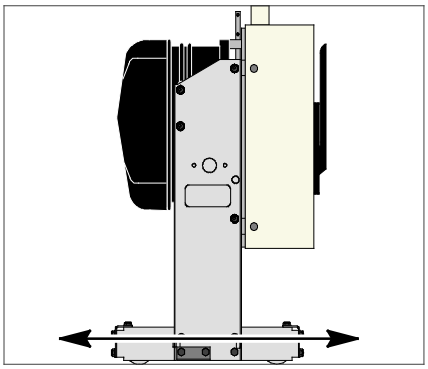
Dismantle the crate to reach the wooden frame.





Hook the eye bolts on the small columns.

by rolling

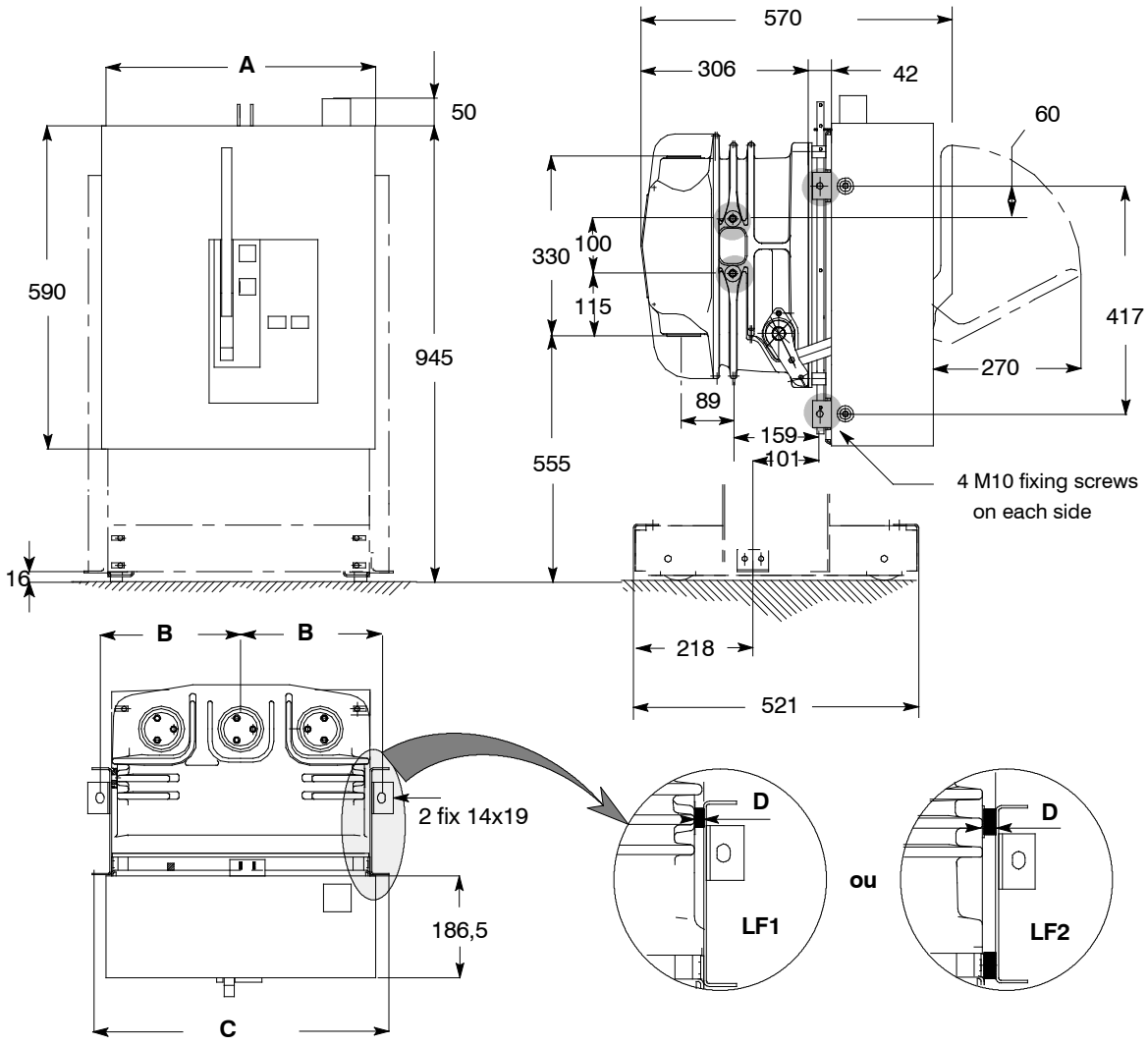


rolling direction

To assemble the rolling frame and the **LF** on the frame, refer to the kit manual found in the frame parcel.

overall dimensions

LF1, LF2, LF3 circuit breakers

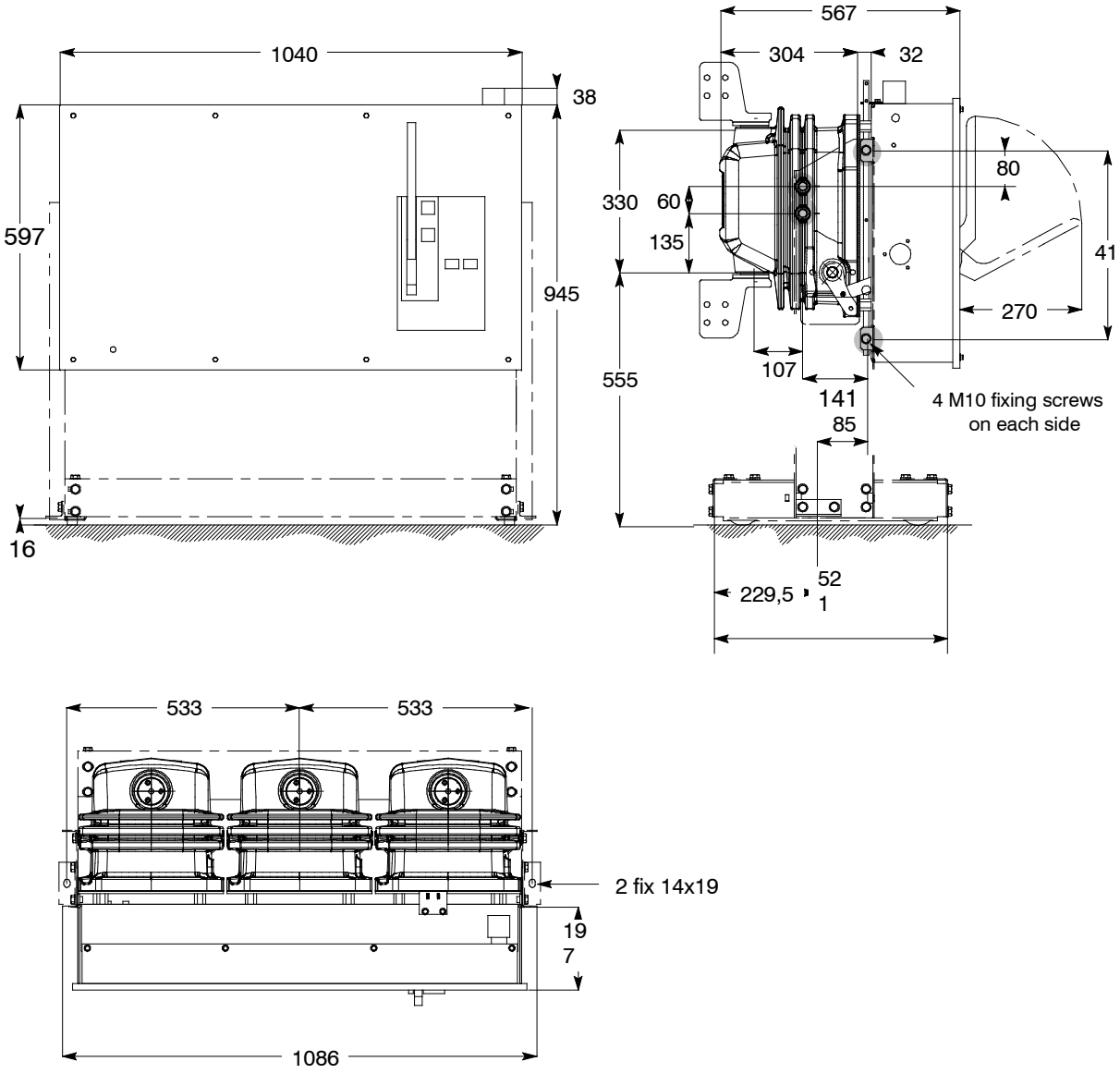


fixed circuit breakers	A	B	C	D
LF1	493	261	542	9
LF2	553	304	628	13
LF3	728	378	776	0

Dimension **D** represents the space to be filled between the front and the rear fixing points of **LF1**, and between the front and rear fixing points of **LF2**.

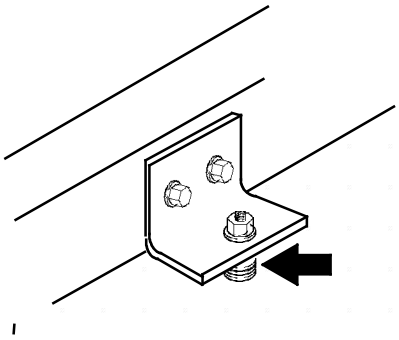
- with a rolling frame, use the spacers supplied in the bag of screws and bolts.

LFP circuit breakers



fitting a circuit–breaker

with a support frame

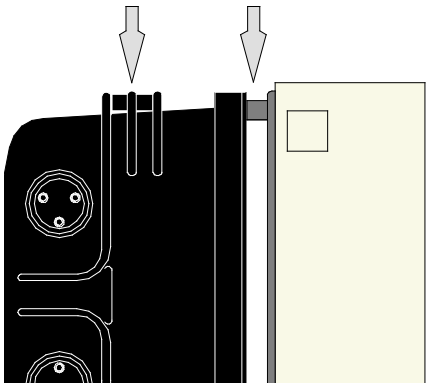


CAUTION

On no account must the support frame be used to convert a fixed circuit–breaker into a draw–out one.

Once the support frame has been fitted, fix it to the ground using the 2 fixing lugs.
If necessary, insert washers between the fixing lug and the ground in order to prevent deformation of the lug.

without a support frame



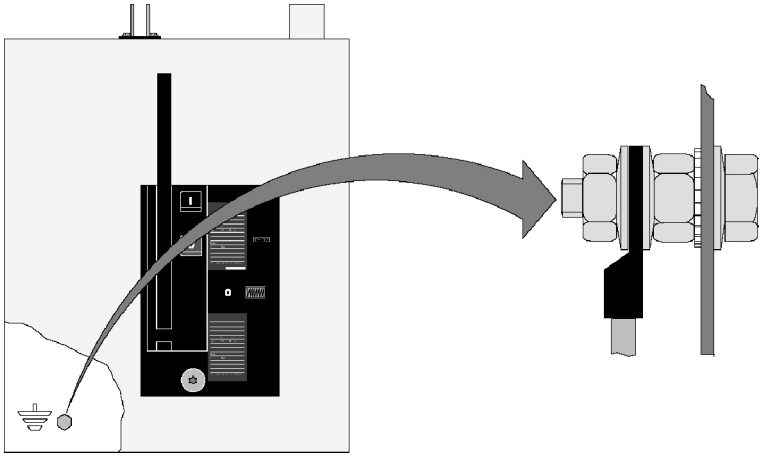
Fit the circuit–breaker and fix it using standard screws and bolts.
(8 fixing points)

CAUTION

The useful depth of internal screw threads for fitting the screws and bolts is 18 mm.

Tightening torque: 45 N.m.

connecting the earth bar

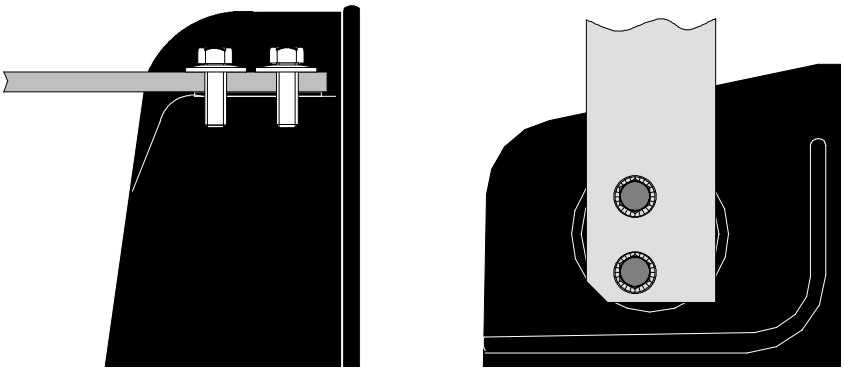


HV connections

busbar connection principle

Tightening torque: 50 N.m.

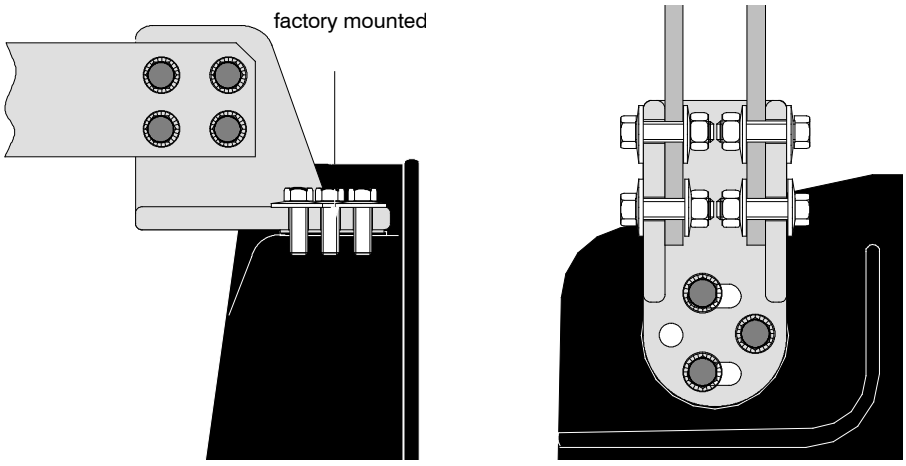
Use class 8.8 hexagonal head screws as well as contact washers.



busbar and connector connection principle

Tightening torque: 50 N.m.

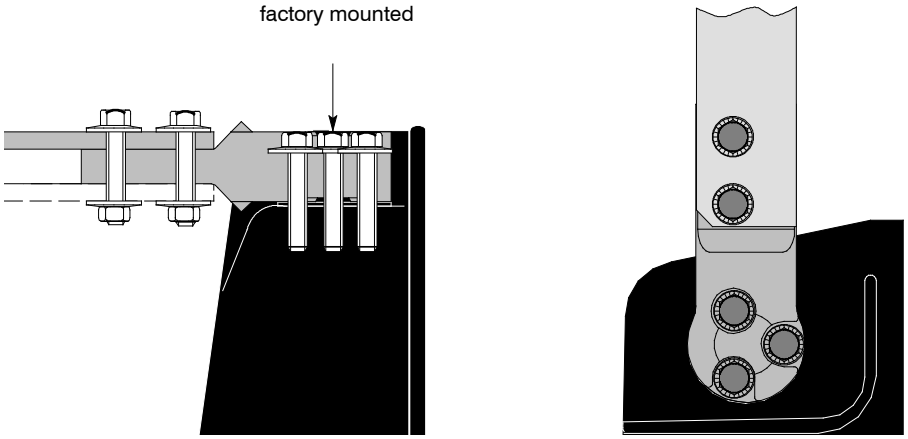
Use class 8.8 hexagonal head screws as well as contact washers.



busbar and arm connection principle

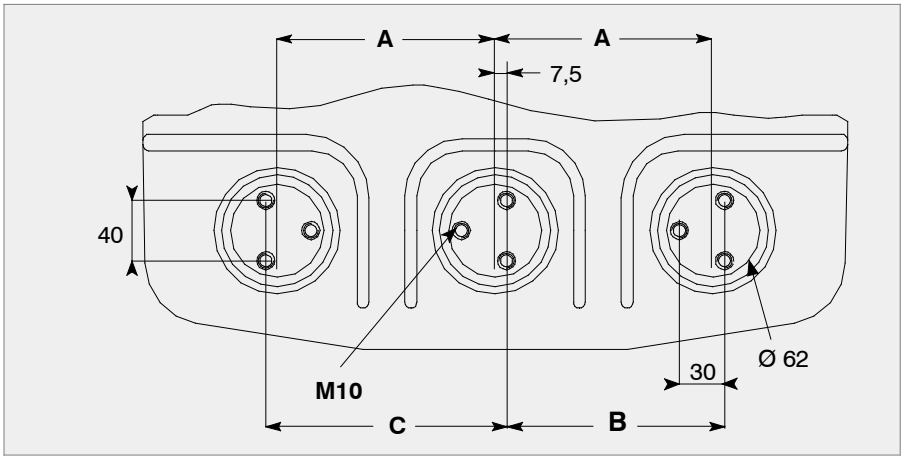
Tightening torque: 50 N.m.

Use class 8.8 hexagonal head screws as well as contact washers.



dimension of LF1, LF2 and LF3 connections

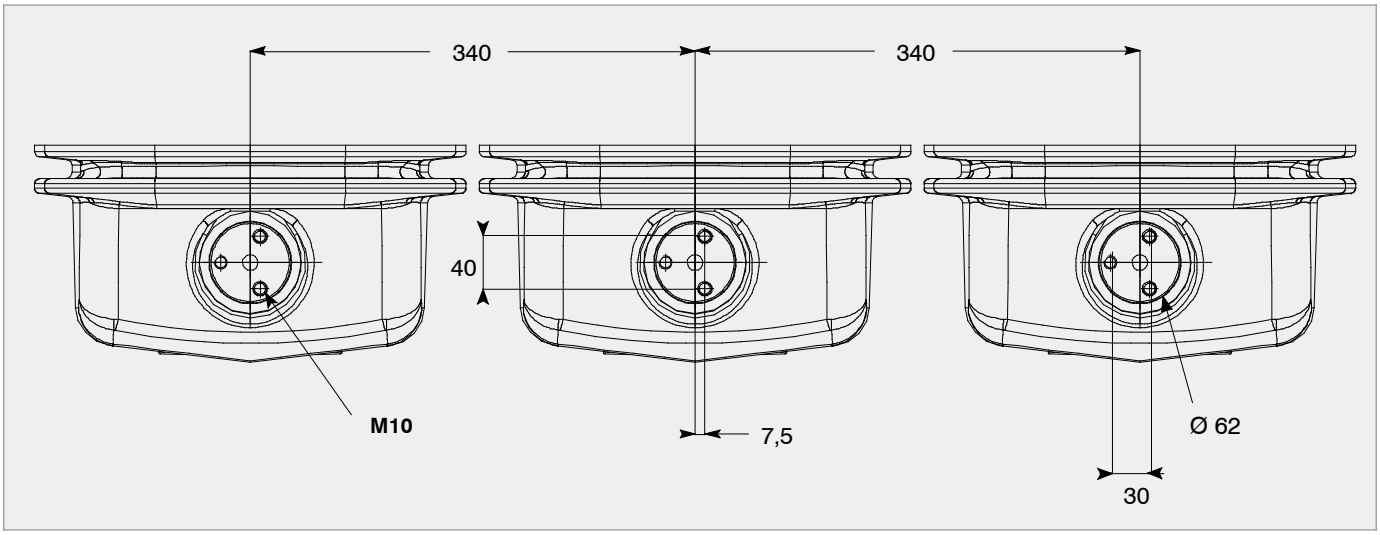
Internal screw thread useful depth is 26 mm.



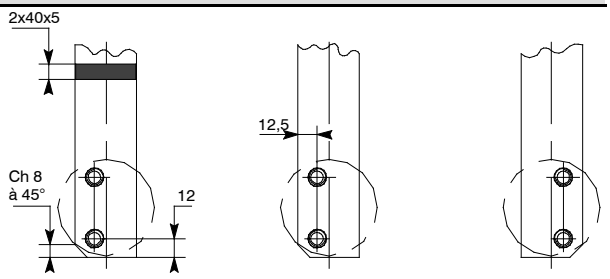
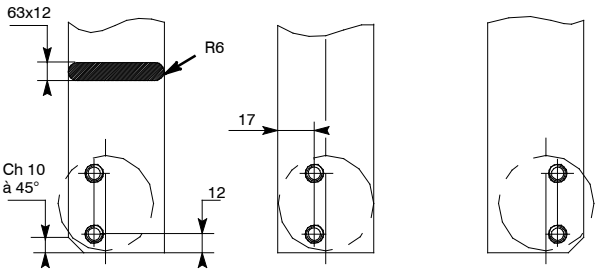
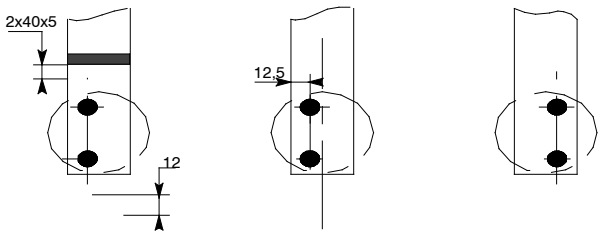
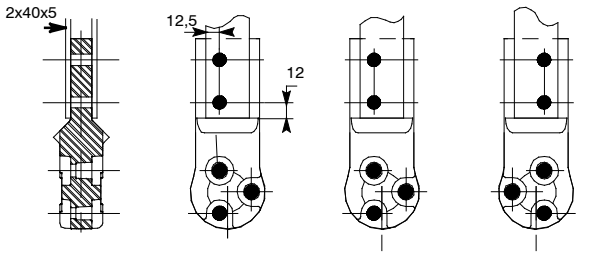
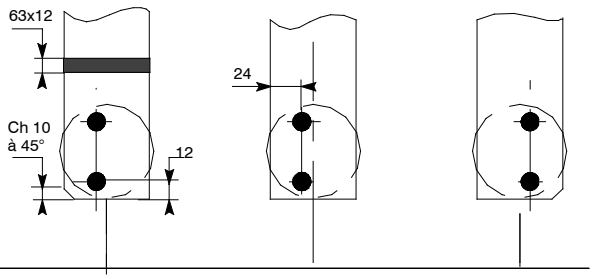
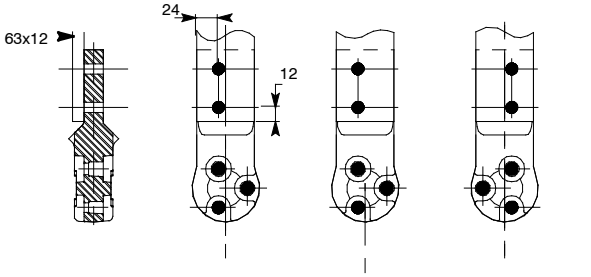
equipment	A	B	C
LF1	145	145	160
LF2	165	165	180
LF3	225	225	240

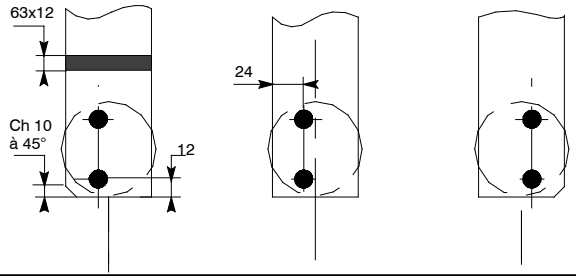
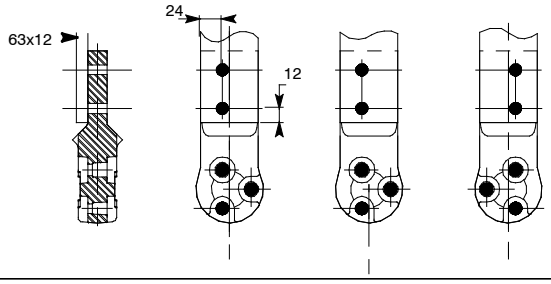
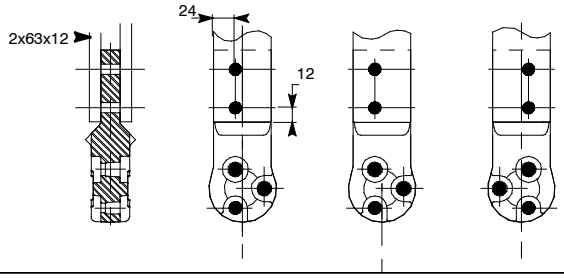
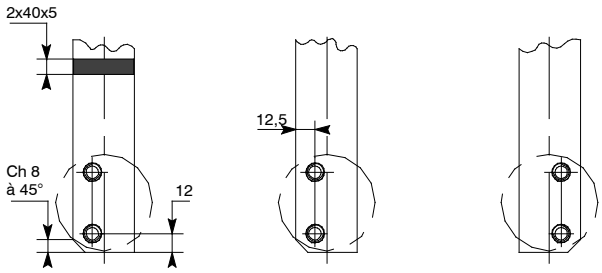
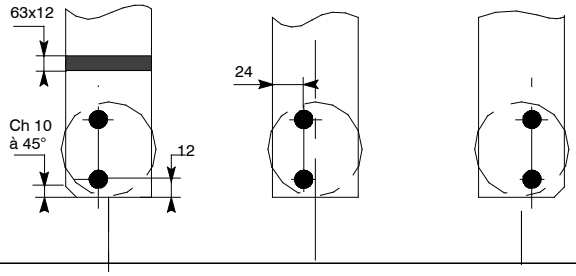
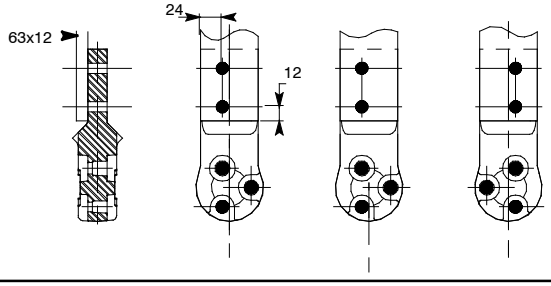
dimension of LFP connections

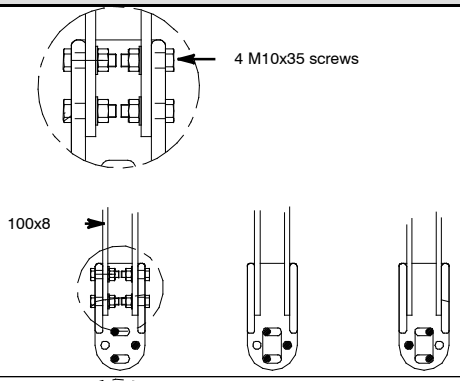
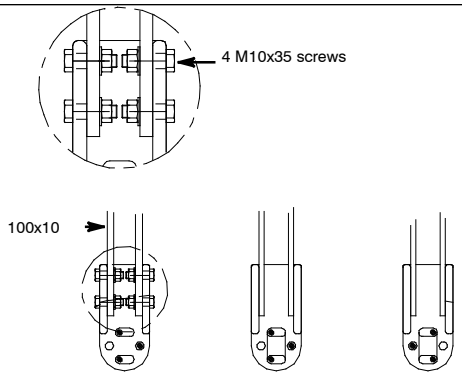
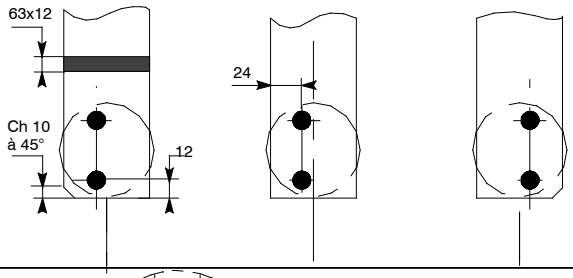
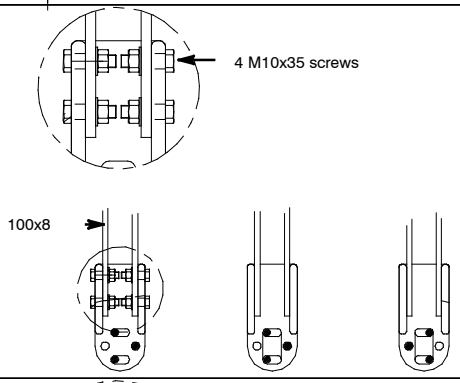
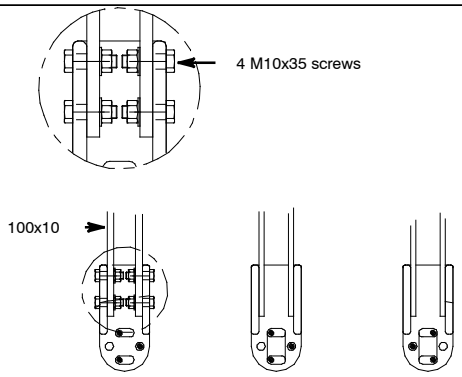
Internal screw thread useful depth is 26 mm.



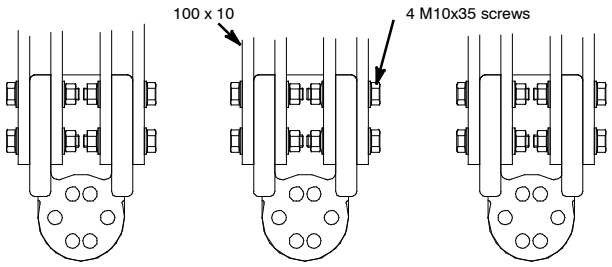
indicative connection table

equipment	type of connection	
LF1 630 A 75 kV impulse	2 40x5 mm busbars	
LF1 1250 A 75 kV impulse	1 63x12 mm busbar	
LF2 630 A 75 kV impulse	2 40x5 mm busbars	
LF2 630 A 95 kV impulse	2 40x5 mm busbars+ arm	
LF2 1250 A 75 kV impulse	1 63x12 mm busbar	
LF2 1250 A 95 kV impulse	1 63x12 mm busbar + arm	

equipment	type of connection	
LF2 1200 A ANSI 60 kV impulse	1 63x12 mm busbar	
LF2 1200 A ANSI 95 kV impulse	1 63x12 mm busbar + arm	
LF2 2000 A ANSI 95 kV impulse	2 63x12 mm busbars + arm	
LF3 630 A IEC 75 kV impulse	2 40x5 mm busbars	
LF3 1250 A IEC 75 kV impulse	1 63x12 mm busbar	
LF3 1250 A IEC 95 kV impulse	1 63x12 mm busbar + arm	

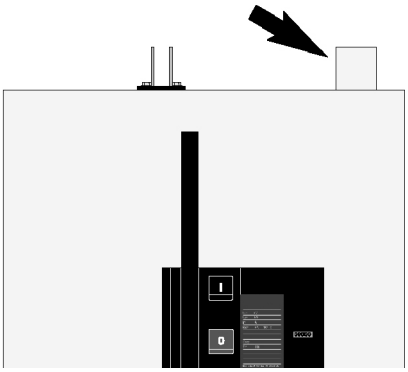
equipment	type of connection	
LF3 2500 A IEC 95 kV impulse	2 100x8 busbars+ connector	
LF3 3150 A IEC 95 kV impulse	2 100x10 busbars + connector	
LF3 1200 A ANSI 60 kV impulse or LF3 1200 A ANSI 95 kV impulse	1 63x12 mm busbar	
LF3 2000 A ANSI 95 kV impulse	2 100x8 busbars + connector	
LF3 3000 A ANSI 95 kV impulse	2 100x10 busbars+ connector	

equipment	type of connection
LFP	4 100x10 mm busbars



LV connection

wiring insertion



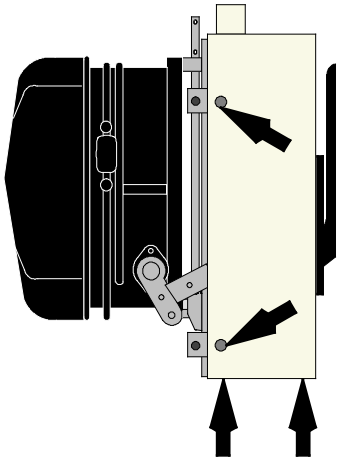
Wiring is inserted through one of the 3 cut–out capsules.

access to the LV connection terminal block

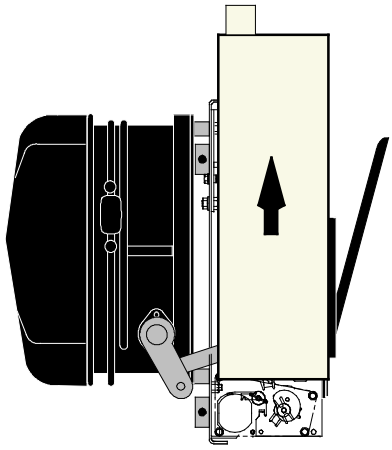
LF1, LF2 and LF3 circuit–breakers

CAUTION

Check that the device is **open**, with the operating mechanism deactivated.



Unscrew and remove the fixing screws on both sides of the cover and under the lower closing plate.

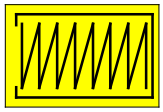


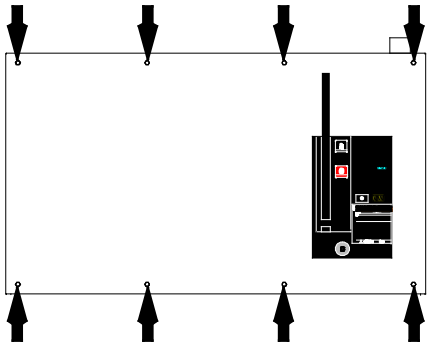
Remove the cover by pulling it upwards.

LFP

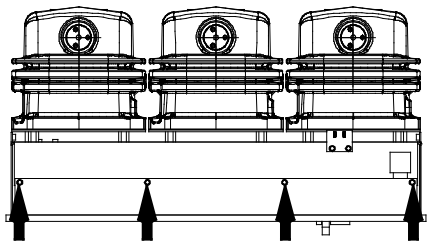
CAUTION

Check that the device is **open**, with the operating mechanism deactivated.





Remove the front panel cover by withdrawing the 8 fixing screws.



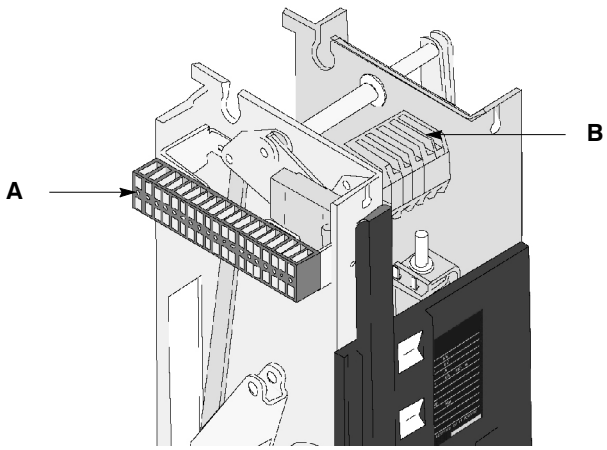
Remove the top and bottom covers by withdrawing the 4 fixing screws on each cover.

LV connection terminal block

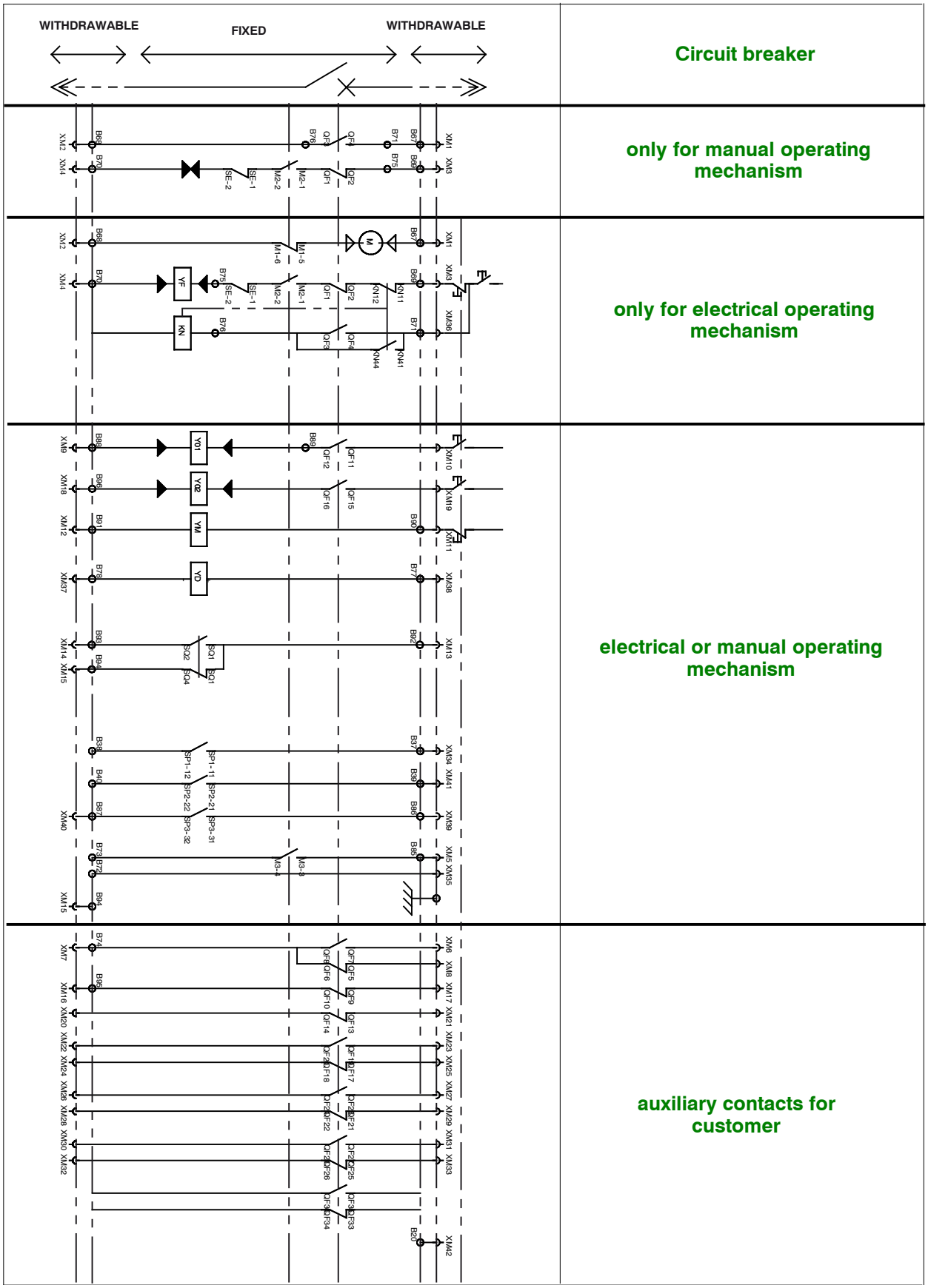
Connection is possible on the **connection terminal block** or on the **auxiliary contact terminal block** (refer to the wiring diagram).

A : connection terminal block

B : auxilary contacts



00890903F002 – Circuit breaker opened, rack–out, in test position, and mechanism discharged

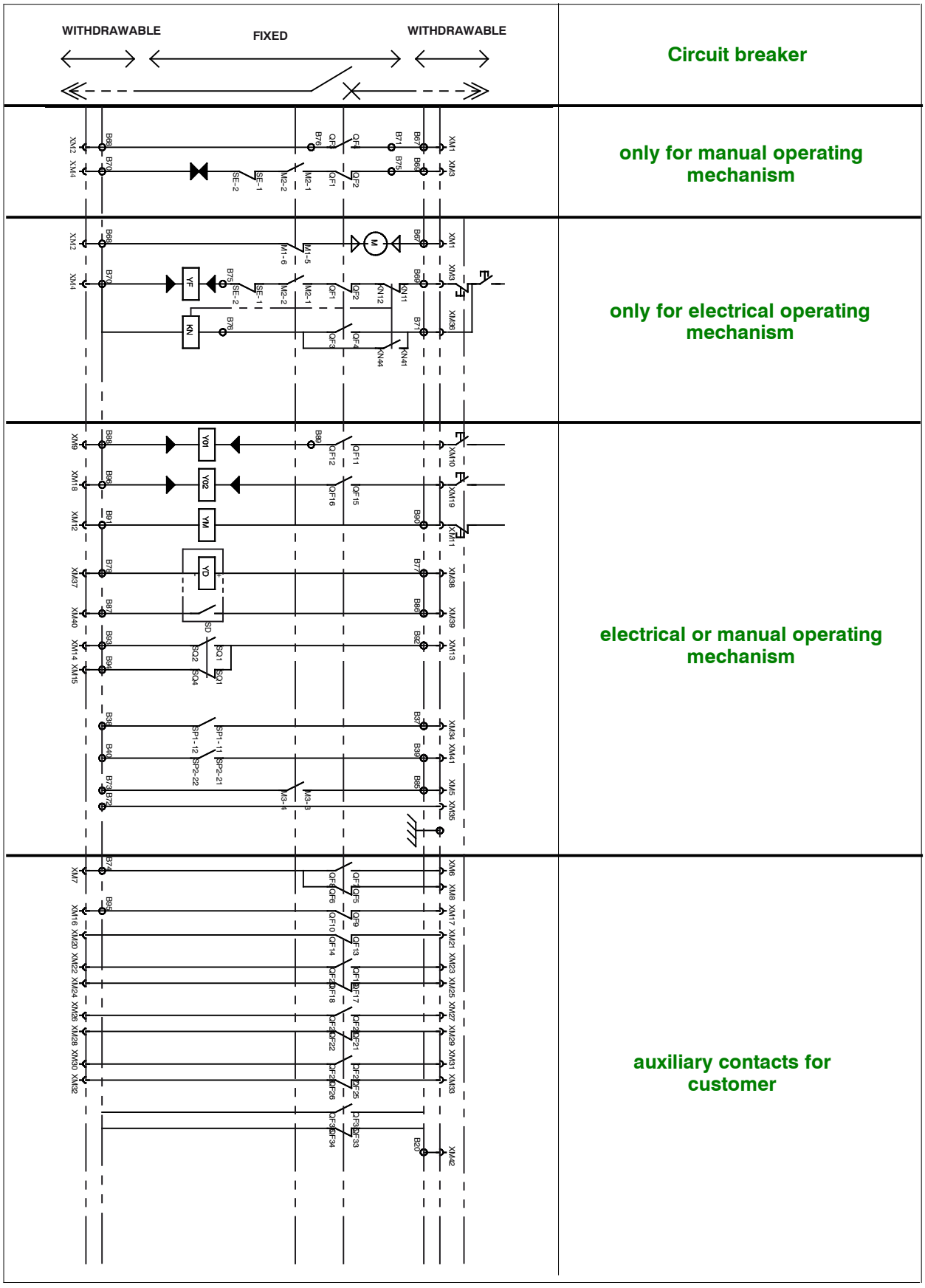


legend

XM	Low voltage plug connections (withdrawable or fixed option)
B	Connecting terminal block (lug fast−on)
M1	End of charging switch
M2	End of charging switch
M3	End of charging switch
QF	Auxiliary contacts
SE	Maintened release switch
YF	Closing release
Y01	First shunt trip release
Y02	2nd shunt trip release
YM	Undervoltage release
YD	MITOP release
SD	MITOP release contact
SQ	Latch signalisation only on rack out
KN	Anti−pumping relay
SP1	Pressure switch 1st threshold
SP2	Pressure switch 2nd threshold
SP3	Pressure switch 3rd threshold

The bridges are only possible on the circuit breaker with low voltage connectors	
Bridge 02 (supervision)	**Bridge 01 (standard)**
B73/**B74**: End of charging signalisation and CB position signalisation	**B73**/**B74** : End of charging signalisation and CB position signalisation
B38/**B72**: SF6 pressure switch signalisation 1st threshold	**B38**/**B72 :** SF6 pressure switch signalisation 1st threshold
B40/**B72**: SF6 pressure switch signalisation 2nd threshold	**B40**/**B72** : SF6 pressure switch signalisation 2nd threshold
B89/**B95**: Y01 supervision	**B89**/**B95 : Y01** supervision
QF14/**QF16**: Y02 supervision	
B75/**B20**: YF supervision	
Note: Equivalent bridge 01 with YF and Y02 supervision	Note: Equivalent bridge H

88946202 – Circuit breaker opened, rack–out, in test position, and mechanism discharged



legend

XM	Low voltage plug connections (withdrawable or fixed option)
B	Connecting terminal block (lug fast−on)
M1	End of charging switch
M2	End of charging switch
M3	End of charging switch
QF	Auxiliary contacts
SE	Maintened release switch
YF	Closing release
Y01	First shunt trip release
Y02	2nd shunt trip release
YM	Undervoltage release
YD	MITOP release
SD	MITOP release contact
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KN	Anti−pumping relay
SP1	Pressure switch 1st threshold
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The bridges are only possible on the circuit breaker with low voltage connectors	
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B89/**B95**: **Y01** supervision	**B89**/**B95 : Y01** supervision
QF14/**QF16: Y02** supervision	
B75/**B20**: **YF** supervision	
Note: Equivalent bridge 01 with YF and Y02 supervision	Note: Equivalent pontage H / Equivalent bridge H

recommendations and precautions

Warning : opening coil supervision

	Voltage (V)	Maximun current allowable permanently (mA)
Direct Current	24	105
	48	55
	110	24
	125	13
	220	12
Alternative Current	48	200
	110	100
	120	78
	220	45
	240	45

Warning : closing coil supervision

	Voltage (V)	Maximun current allowable permanently (mA)
Direct Current	24	100
	48	45
	110	13
	125	13
	220	10
Alternative Current	48	200
	110	85
	125	85
	220	45
	240	45

Anti–pumping relay installation recommandations

In case of a length of wire greater than 6 meters, between power supply and anti–pumping relay, we request you to order the following commercial references of RC circuit or diode for compensation.

circuit RC

diode

AC	24–60 V	RXM041BN7
	110–240 V	RXM041FU7
DC	6–250 V	RXM040W

Undervoltage release installation recommendations

During come back to initial position of undervoltage release, the inrush currents are important and can lead to the destruction of the coil.

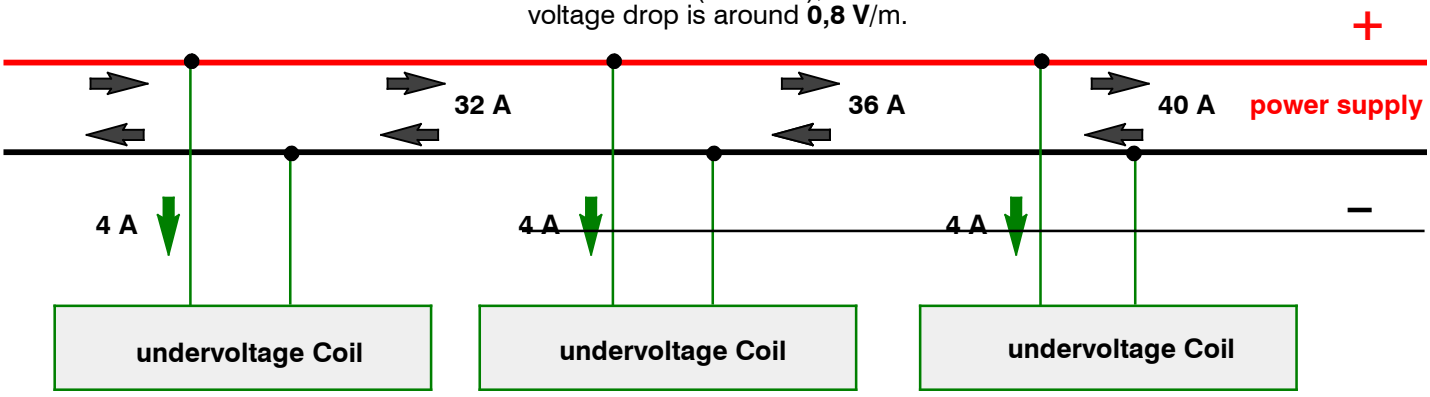
Therefore, during the installation check the following to avoid this problem:

- wire cross section
- wire length
- power supply voltage drop

information

Consider a network with 10 coils in series with the distance 1 m between them. For **24 VDC** power supply, the consumption is **4 A** per coil. Therefore **40 A** if there are 10 release in series. With 1 mm^2 wire cross section (20 m^2/m), the voltage drop is around **0,8 V**/m.

Hence the voltage becomes 16 V instead of 24 V seen by the 10th coil at 10 meters length. In this case, the voltage at the terminal of the coils is **16 V** instead of **24**: so below **85%**.

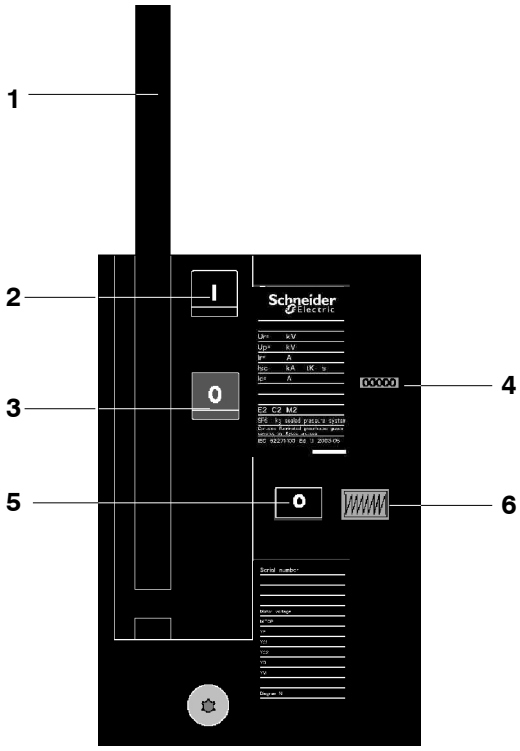


Warning pressure switch

Pressure switch is a safety device. It must be connected to an adapted alarm system.

operating mechanism plate

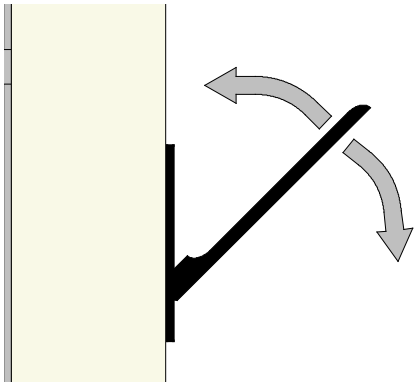
1 : operating mechanism charging lever
2 : closing pushbutton
3 : opening pushbutton
4 : operation counter
5 : **"open or closed"** device status mechanical indicator
6 : **"charged or uncharged"** operating mechanism charging status mechanical indicator



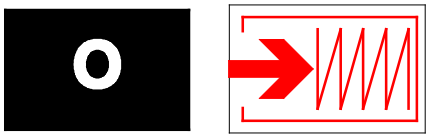
circuit–breaker manual operation

carrying out a Closing – Opening cycle

charging the operating mechanism



Charge the operating mechanism by an up and down motion until you hear a click.



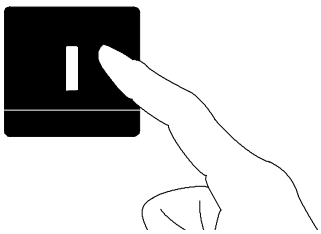
The circuit–breaker position indicator remains on " **O** " *(device **open**)*.

The operating mechanism indicator moves to the **charged** position.

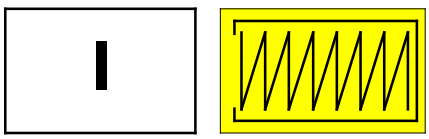
closing

CAUTION

if the circuit–breaker is equipped with an undervoltage release *(optional)*, the latter must be energised in order to close the circuit–breaker *(except in the case of downstream supply)*.



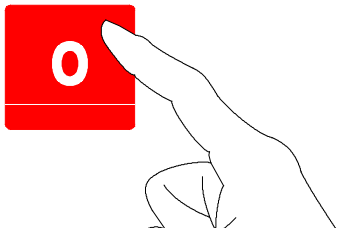
Press the pushbutton to close the circuit–breaker.



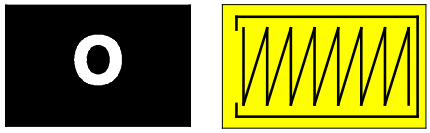
The circuit–breaker position indicator moves to " **I** " *(device **closed**)*.

The operating mechanism indicator moves to the **deactivated** position.

opening



Press the pushbutton to open the circuit–breaker.

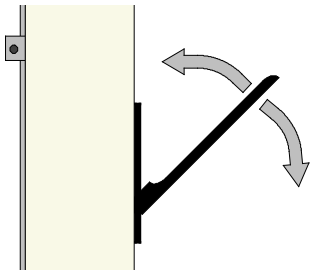


The circuit–breaker position indicator remains on " **O** " *(device **open**).*

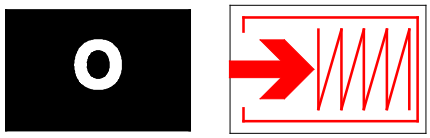
The operating mechanism indicator moves to the **deactivated** position.

carrying out an Opening – Closing – Opening cycle

charging the operating mechanism



Charge the operating mechanism by an up and down motion until you hear a click.



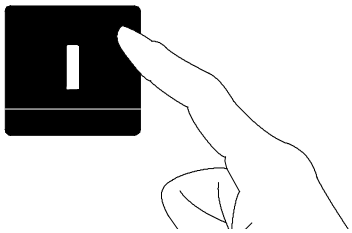
The circuit–breaker position indicator remains on " **O** " *(device **open**).*

The operating mechanism indicator moves to the **charged** position.

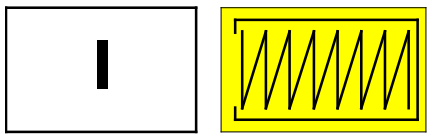
closing

CAUTION

if the circuit–breaker is equipped with an undervoltage release *(optional)*, the latter must be energised in order to close the circuit–breaker *(except in the case of downstream supply).*



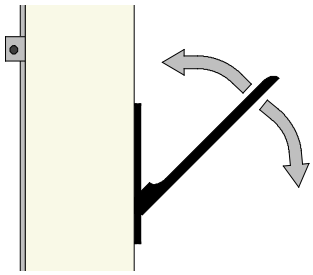
Press the pushbutton to close the circuit–breaker.



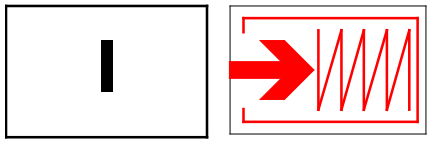
The circuit–breaker position indicator moves to " **I** " *(device **closed**).*

The operating mechanism indicator moves to the **deactivated** position.

charging the operating mechanism



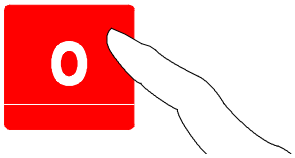
Charge the operating mechanism by an up and down motion until you hear a click.



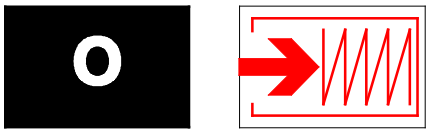
The circuit–breaker position indicator remains on " **I** " *(device **closed**).*

The operating mechanism indicator moves to the **charged** position.

opening



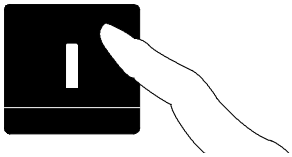
Press the pushbutton to open the circuit–breaker.



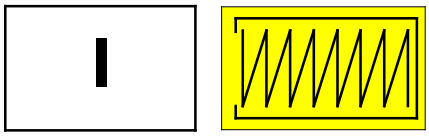
The circuit–breaker position indicator remains on " **O** " *(device **open**).*

The operating mechanism indicator moves to the **charged** position.

closing



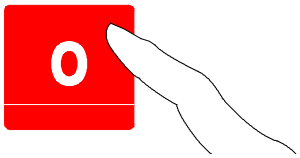
Press the pushbutton to close the circuit–breaker



The circuit–breaker position indicator moves to " **I** " *(device **closed**).*

The operating mechanism indicator moves to the **deactivated** position.

opening



Press the pushbutton to open the circuit–breaker

The circuit–breaker position indicator moves to " **O** " *(device **open**).*

The operating mechanism indicator moves to the **deactivated** position.

circuit–breaker remote operation

electrical charging of the operating mechanism

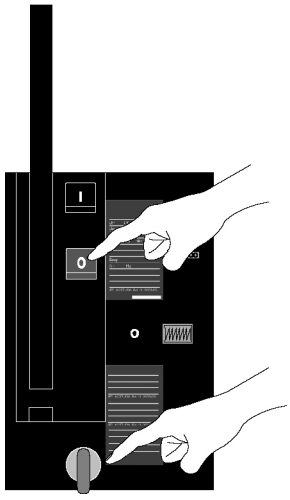
A gear motor unit automatically recharges the operating mechanism after a circuit–breaker closing.

opening and closing

The release opening and closing operations are remote controlled.

circuit–breaker interlocking

(optional)



The circuit–breaker is locked in the **open** position with the key–lock.

To lock:

- press the opening button
- keep the " O " opening button depressed
- turn and remove the key

foreword

Description	Levels
Operations recommended in the instructions manual "installation – operation – maintenance", carried out by suitably qualified personnel having received training allowing them to intervene whilst respecting the safety rules	1
Complex operations, requiring specific expertise and the implementation of support equipment in accordance with Schneider–Electric's procedures. These are carried out by Schneider–Electric or by a specialised technician, trained by Schneider–Electric (see § 1.2) in the implementation of procedures, and who is equipped with specific equipment.	2
All preventive and corrective maintenance, all renovation and reconstruction work is carried out by Schneider Electric.	3

safety instructions

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

To access the various parts:

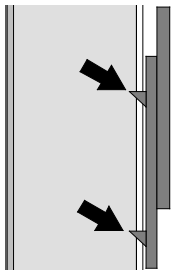
- open the circuit–breaker
- cut the supply to the auxiliary circuits and the main circuit
- close then open the circuit–breaker by means of the push buttons in order to deactivate the operating mechanism
- avoid impacts *(pressurised enclosure)*

general rules

Our equipment is designed to guarantee optimum service provided that the maintenance operations described in this document are complied with.

These operations require removal of the protective covers (front plate and operating mechanism plate).

Removal and replacement of the covers is described in the chapter **" Installation instructions "**.



The front plate is removed by removing clips.

cycle and maintenance operations

This device is designed to operate for 30 years or 10 000 cycles in normal conditions of use according to the **IEC 62271–100** standard.

The following are recommended:

– an O/I cycle at least once a year

– a maintenance at least once every 2 years to be determined with the **group Schneider Electric service centres.**

For any other maintenance operations (not listed below), please contact your nearest group Schneider Electric service centre.

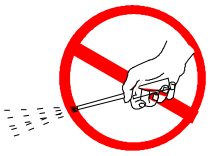
summarising table

Description of maintenance operations	Frequency	Levels		
Recommended operations	**5 years**	**1**	**2**	**3**
Verification of the presence and condition of accessories (levers, etc.)	■	■	■	■
Visual inspection of the exterior (cleanliness, absence of oxidation, etc.)	■	■	■	■
Cleaning of external elements, with a clean, dry cloth.	■	■	■	■
Checking the tightening torque (covers, wiring ducts, connections, etc.)	■	■	■	■
Checking the mechanical controls by carrying out a number of operations	■	■	■	■
Checking the positioning of the status indicators (armed, open and closed)	■	■	■	■
Control of the status and functioning of locking by key locks	■	■	■	■
Dusting and cleaning the internal mechanical elements and poles (without solvent)	■		■	■
Inspection of the tightening of the threaded fasteners and presence of internal stop elements	■			■
Checking arcing contact wear	■			■
General cleaning of the control block Lubrication and greasing of the control block (vacuoline oil 133; grease Isoflex Topas L152)	■			■
Cleaning the spring guides (with unchlorinated grease remover) Lubrication and greasing of spring guides (vacuoline oil 133; grease Isoflex Topas L152)	■			■
Greasing of motor gear (grease Isoflex Topas L152)	■			■
Cleaning the control mechanism of the pole (with unchlorinated grease remover) Lubrication and greasing of control mechanism of the pole (vacuoline oil 133; grease Isoflex Topas L152)	■			■
Cleaning the motor gear	10000 cycles		■	■
Replacing the operation counter	10000 cycles			■

Corrective Maintenance (on fault)	Levels	
Recommended operations	**2**	**3**
Replacing the keylocking	■	■
Replacing the closing springs	■	■
Replacing the enclosure		■
Replacing the RI operating mechanism		■
Replacing the single closing release coil	■	■
Replacing the shunt release coil or simple overcurrent trip devices	■	■
Replacing the release coil undervoltage trip devices withort lifting system	■	■
Replacing the release coil undervoltage trip devices without lifting system with a time delay unit	■	■
Replacing the release coil undervoltage trip devices with lifting system	■	■
Replacing the release coil shunt releases or double overcurrent trip devices	■	■
Replacing the motor gear box	■	■
Replacing the micro–contact (SE)	■	■
Replacing the end of charging contact	■	■
Replacing the anti–pumping relay	■	■
Replacing the auxiliary contact unit	■	■
Replacing the MITOP release mechanism		■
Replacing the operation counter		■
Procedure in case of pressure switch alarm		■

foreword

CHEMICAL SOLVENT AND ALCOHOL **FORBIDDEN**



HIGH PRESSURE CLEANING PROCESS **FORBIDDEN**

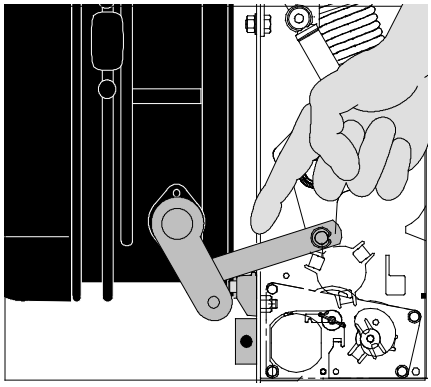
The main drawbacks of such processes are.

- damage due to jet pressure and impossibility of re–lubricating inaccessible fixing points.
- risk of overheating due to solvent presence on contact areas.
- elimination of special protections.

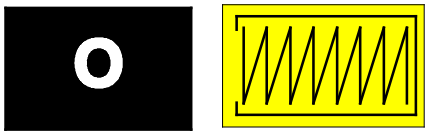
If the insulating parts are dusty, it is recommended that **you remove the dust using a dry cloth lintless.**

monitoring arcing contact wear

This operation requires removal of the springs.

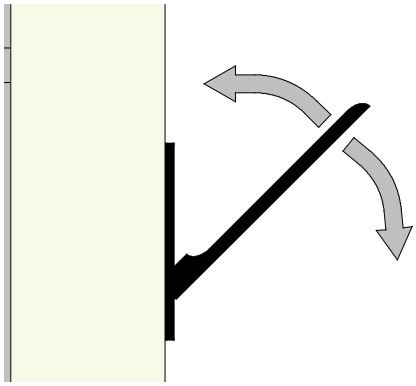


Arcing contact wear is monitored on the operating mechanism/ circuit–breaker pole link.

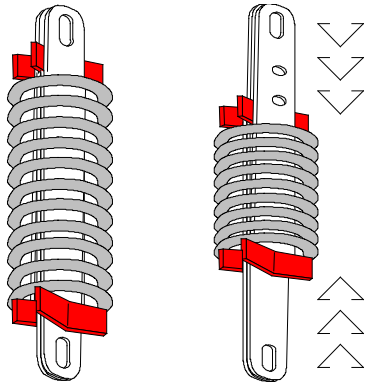


Check that the circuit–breaker is open, with its operating mechanism deactivated.

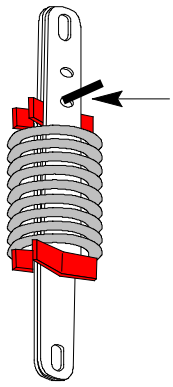
removing the closing springs



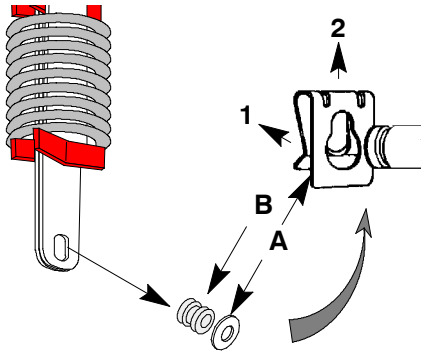
Slightly charge the operating mechanism using the charging lever...



... the springs will be compressed...

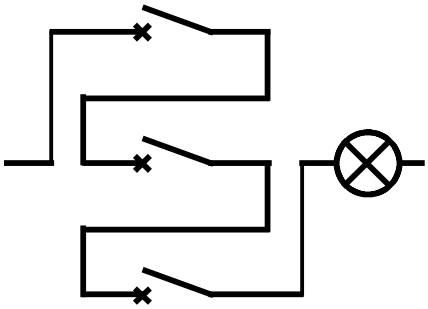


..... as soon as possible insert a 6 dia. 40 mm long min. screw or pin into the hole shown above. Release the lever. The springs will exert a force on the pin. On no account must the pin be free. *(do not exceed the first notch on the operating mechanism, or perform a complete cycle and start again).*

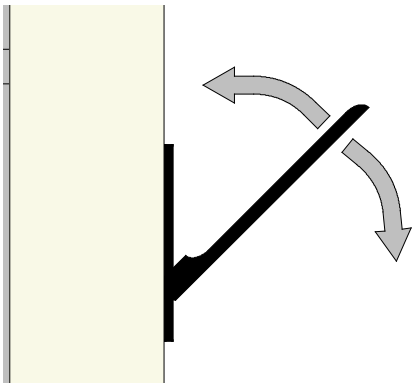


Remove the washer and circlips **A**. Release and withdraw the spring. Remove ring **B** taking care not to damage it (Teflon coating).

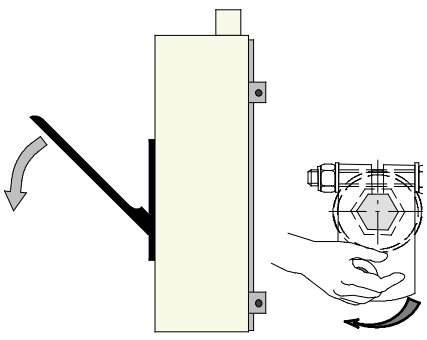
checking



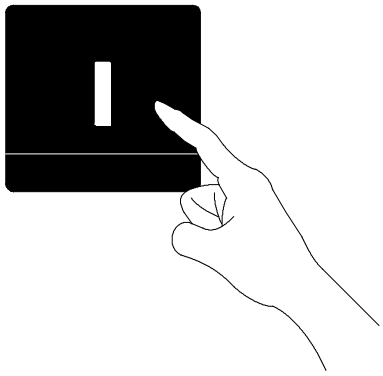
Serial connect the three phases of the device and insert a bell type indicator in the circuit.



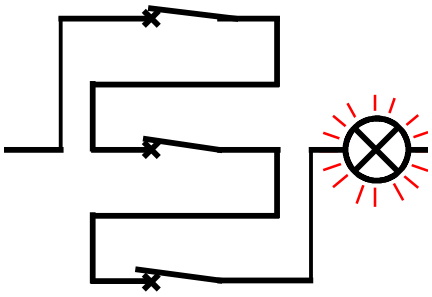
Charge the operating mechanism until you hear a click indicating charging is complete.



Exert pressure on the lever and at the same time pull the right–hand crank handle towards you until the ratchet wheel is latched.



At the same time press the closing " **I** " pushbutton and the charging lever in order to release the latching mechanism.



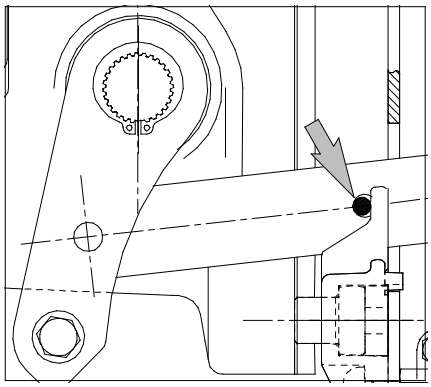
Very slowly close the circuit–breaker using the lever.

Stop charging as soon as **the lamp comes on**: the arcing contacts of the three phases are in contact.

CAUTION

Keep the lever in this position, with the bell activated.

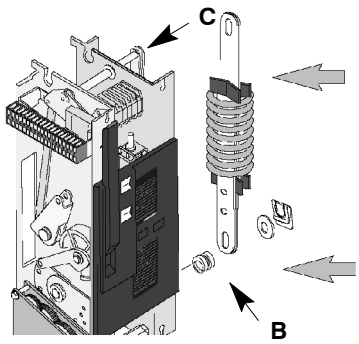
If the position is overshot, repeat the operation.



When the lamp is on, a rod with **a diameter less than or equal to 5 mm** can be inserted in the hole shown above.

For larger diameters, absence of signal means the device must be replaced.

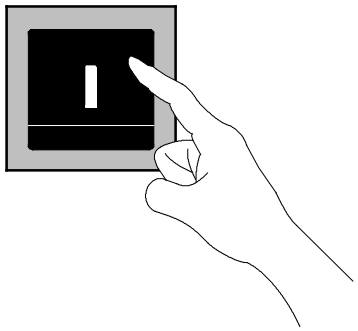
fitting the closing springs



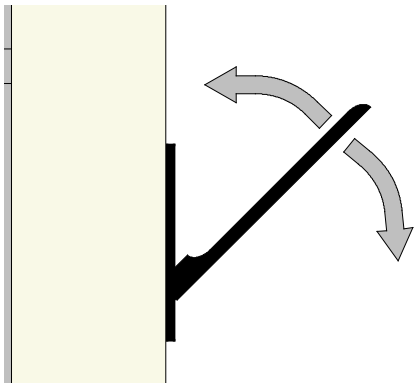
Fit the spring on pin **C** and ring **B** of the operating mechanism**.**

CAUTION

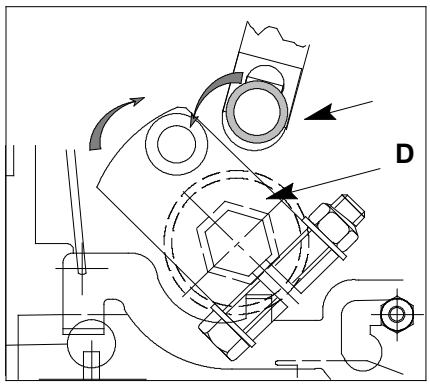
Do not lubricate when mounting and do not scratch the teflonised ring.



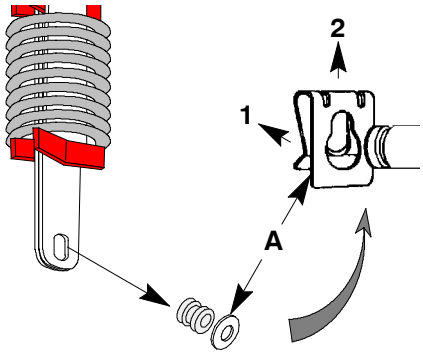
Press the closing button and at the same time....



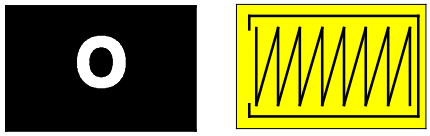
... continue charging....



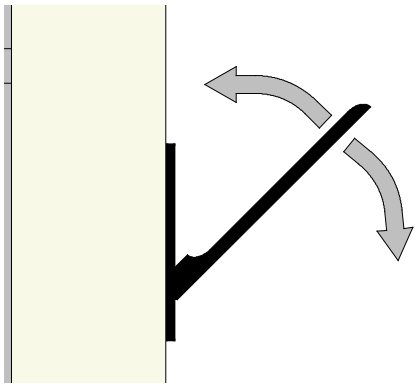
... in order to bring the crank handle **D** into the axis of the lower fixing hole of the spring guide.



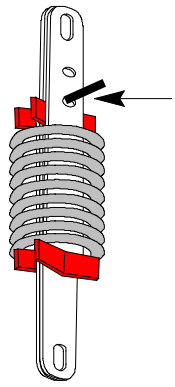
Fit the washer and the circlips **A**.



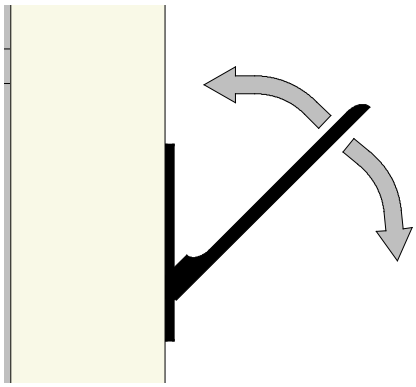
Check that the circuit–breaker is open and that the operating mechanism is deactivated.



Slightly charge the operating mechanism in order to unflange the springs.



Remove the locking created on the springs with the 6 dia. screw or pin.

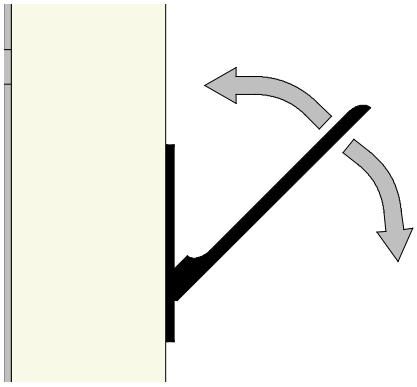


Continue charging until you hear a click.

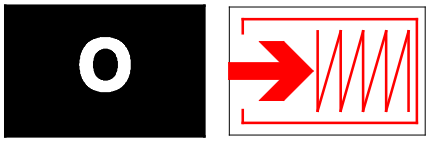
Check: Close then open using the " **I** " and " **O** " pushbuttons in order to deactivate the operating mechanism.

lubricating the spring guides

closing spring

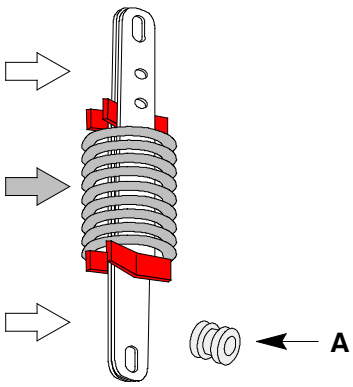


Charge the operating mechanism by an up and down motion until you hear a click.



The circuit–breaker position indicator remains on " **O** " *(device **open**)*.

The operating mechanism indicator moves to the **charged** position.



- lubricate the guides
- oil the phosphatised springs

CAUTION

Do not lubricate the teflonised ring **A**.

WARNING

A brush must be used to lubricate. Do not dismantle the spring to perform this operation.

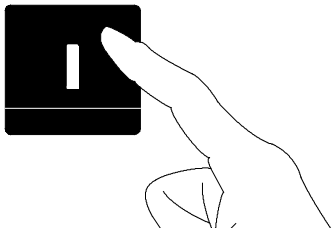
The springs will be compressed.

opening spring

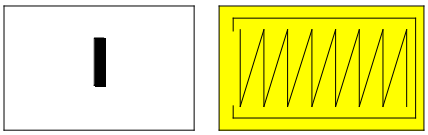
manual closing of the circuit–breaker

CAUTION

If the circuit–breaker is equipped with an undervoltage release *(optional)*, the latter must be energised in order to close the circuit–breaker *(except in the case of downstream supply)*.

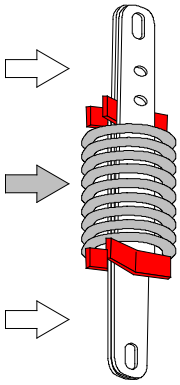


Press the push button " **I** " to close the circuit–breaker.



The circuit–breaker position indicator moves to " **I** " *(device **closed**)*.

The operating mechanism indicator moves to the **deactivated** position.



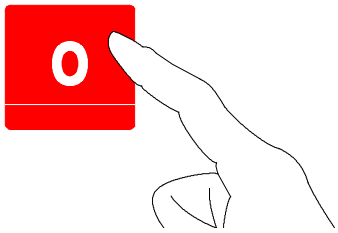
The springs will be compressed:

- lubricate the guides
- oil the phosphatised springs

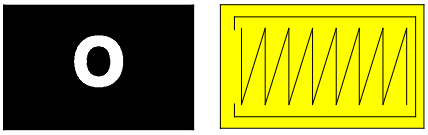
WARNING

A brush must be used to lubricate. Do not dismantle the spring to perform this operation.

manual opening of the circuit–breaker



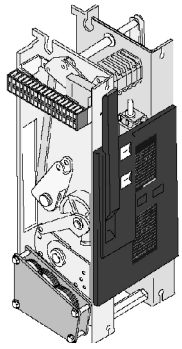
Press the push button " **O** " to open the circuit–breaker.



The circuit–breaker position indicator moves to " **O** " *(device **open**)*.

The operating mechanism indicator indicates that the mechanism is **deactivated**.

cleaning the operating mechanism unit



Clean the entire subassembly.

Oil all the phosphatised parts.

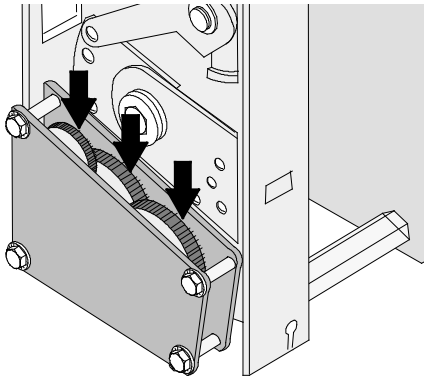
Check that the locking eye bolts are fitted.

Lubricate the pins and hinges.

WARNING

A brush must be used to lubricate. Do not dismantle the operating mechanism to perform this operation.

cleaning the gear motor



Clean the entire subassembly.
Lubricate the gears.

WARNING

A brush must be used to lubricate. Do not dismantle the gear motor to perform this operation.

SEPAM diagnosis

This function supplies the total number of breakings and the cumulated total of broken kA2.

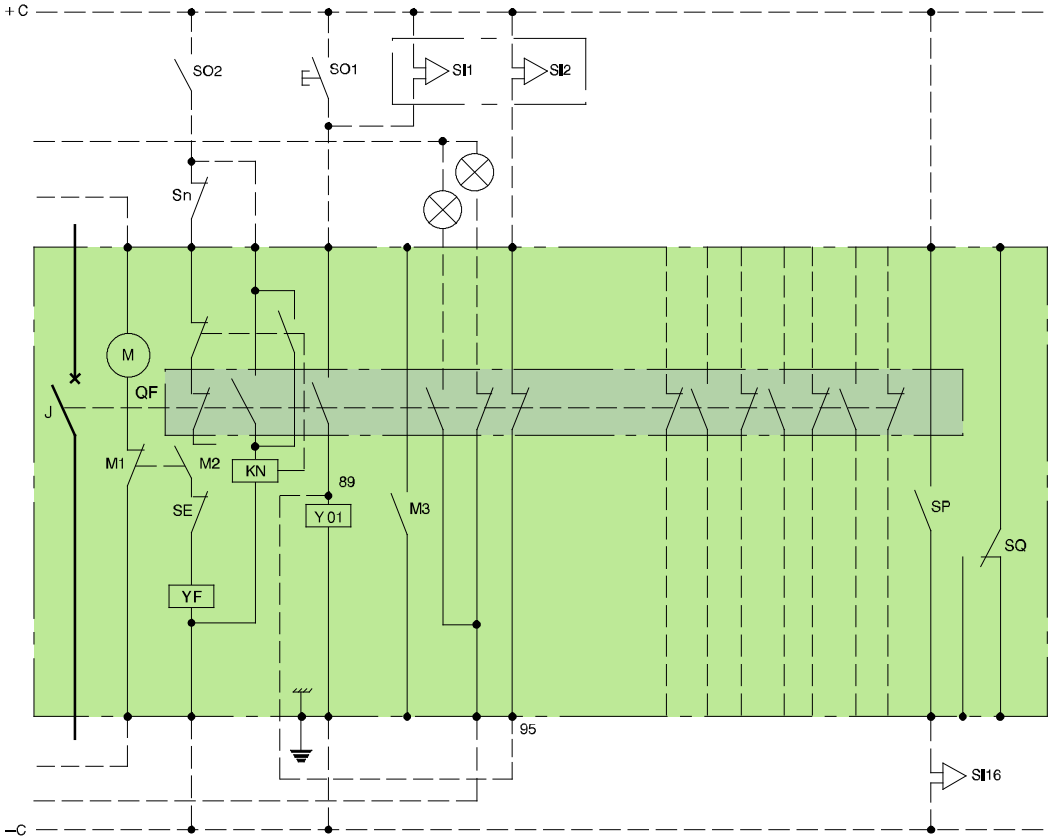
The cumulated total of broken amps reflects the degree of wear of the breaking part.

This information is used to manage arcing contact wear and to generate monitoring.

Maximum levels of broken amp cumulated totals:

LF1, 2 or 3:
cumulated 30 000 kA^2.

SEPAM connection schematic diagram



J	: circuit–breaker
KN	: antipumping relay
M	: charging motor
M1–M2	: end of charging contacts
M3	: operating mechanism charged contact
QF	: circuit–breaker auxiliary contacts
SE	: tripping contact depressed
SO1	: SEPAM output: tripping
SO2	: SEPAM output: activation
SI1	: SEPAM input: monitoring the tripping circuit with device closed
SI2	: SEPAM input: monitoring the tripping circuit with device open
SI16	: SEPAM input: monitoring pole pressure
Sn	: closing disabling contact (external)
SP	: pressure switch contact
SQ	: device ready to operate contact
YF	: closing release
Y01	: shunt release

foreword

Corrective maintenance operations are designed to replace faulty subassemblies.

After each operation carry out the electrical tests in accordance with current standards.

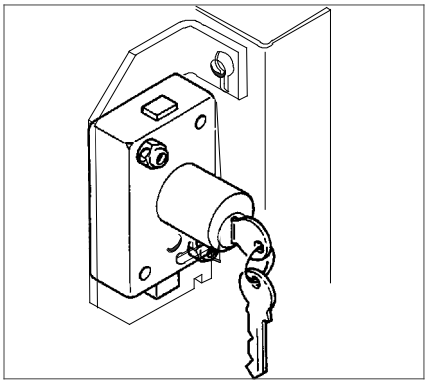
CAUTION

when replacing equipment, the following accessories must all be replaced by new devices.

- **self–locking nut**
- **contact washer**
- **locking eye bolts**
- **mechanical pin**

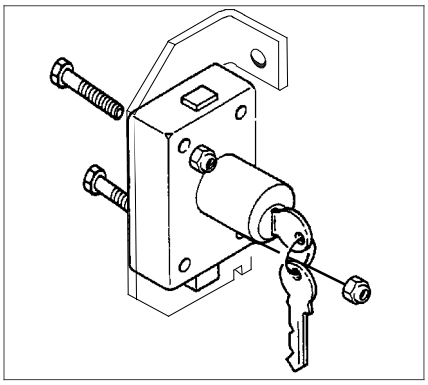
replacing a key–lock

removal

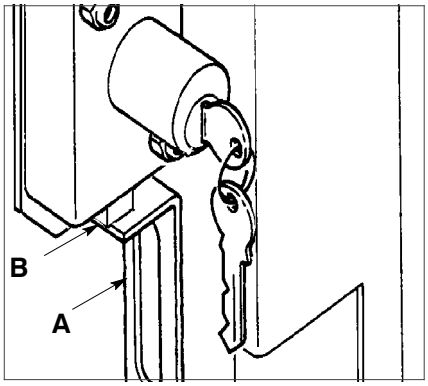


Remove the 2 screws fixing the lock. Separate the lock from its support.

fitting and checking



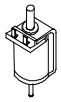
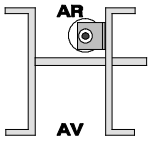
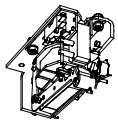
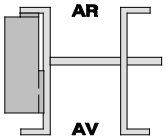
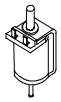
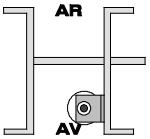
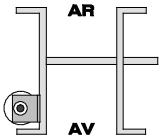
Fit the lock on its support. Fit and tighten the lock fixing screws.



Part **A** must not be flanged by the latch on lock **B**.

replacing a release

different positions of releases in the operating mechanism

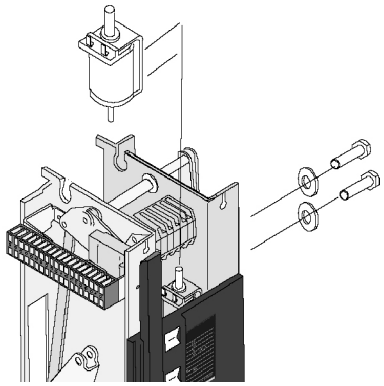
release	undervoltage release	shunt release	overcurrent trip unit	top view of assembly position
single closing release + seismic survey 		❑		I 
undervoltage release 	❑			II 
single opening release + seismic survey 		❑	❑	III  IV 

single closing release

according to position I

removal

Mark and disconnect the wires.
Remove the two M6 fixing screws.
Remove the release.



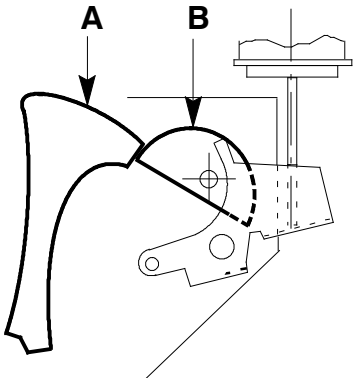
fitting and checking

Fit in reverse order to removal.

Tightening torque: 13 N.m.

Position the release with its cylindrical rod pointing towards the latching crank handle.

Check that the coil rod does not flange the crank handle in the tripped position and ensures passage of the closing lock **A** on the eccentric catch **B**.

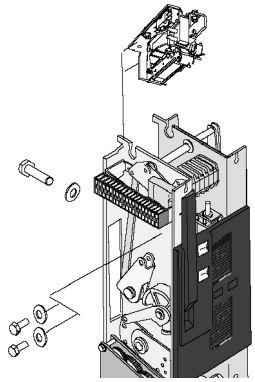


undervoltage release

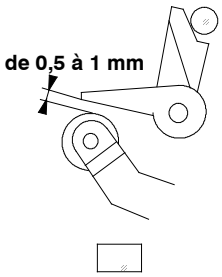
according to position II

removal

Mark and disconnect the wires.
Remove the two M6 fixing screws.
Remove the trip unit.



fitting and checking

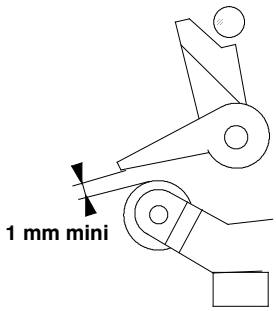


Place the trip unit in the tripped position. Place the crank handle in the limit stop position.

There must be a clearance of **0.5 to 1 mm** between the crank handle and the trip unit.

Fit the two M6 fixing screws.

Tightening torque: 13 N.m.



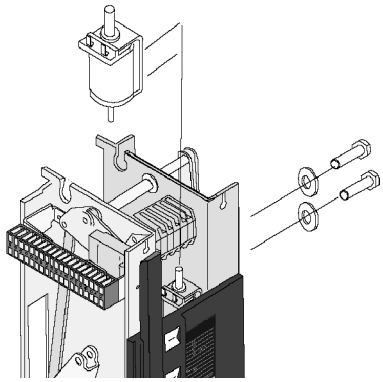
When the magnetic circuit is closed, check that there is at least **1 mm** clearance between the idle crank handle and the trip unit.

shunt release or overcurrent trip unit

according to position III

removal

Mark and disconnect the wires.
Remove the two M6 fixing screws.
Remove the release.



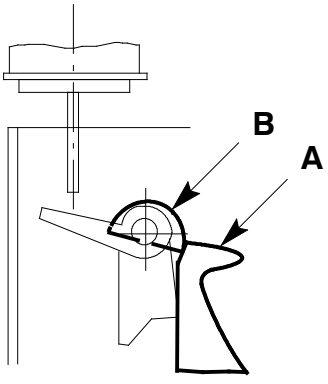
fitting and checking

Fit in reverse order to removal.

Tightening torque: 13 N.m.

Position the release with its cylindrical rod pointing towards the latching crank handle.

Check that the coil rod does not flange the crank handle in the tripped position and ensures passage of the closing lock **A** on the eccentric catch **B**.



according to position IV

removal

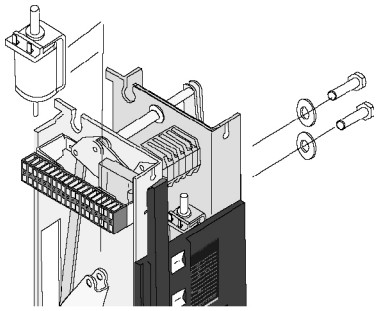
NB: the coil is mounted to the left or right of the operating mechanism according to the protection type.

Mark and disconnect the wires.

Remove the two M6 fixing screws.

This assembly is **compatible** with the presence of an undervoltage release

Remove the release.



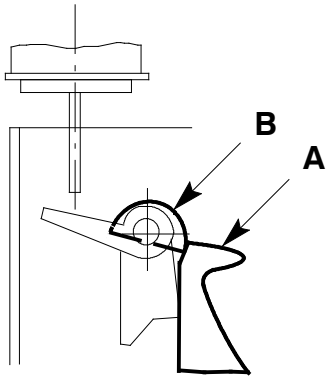
fitting and checking

Fit in reverse order to removal.

Tightening torque: 13 N.m.

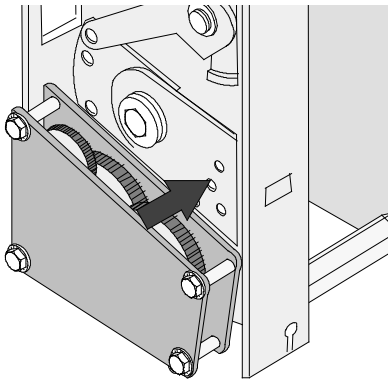
Position the release with its cylindrical rod pointing towards the latching crank handle.

Check that the coil rod does not flange the crank handle in the tripped position and ensures passage of the closing lock **A** on the eccentric catch **B**.

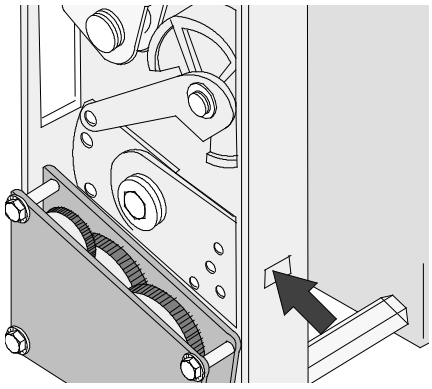


replacement gear motor and roller on the ratchet holder

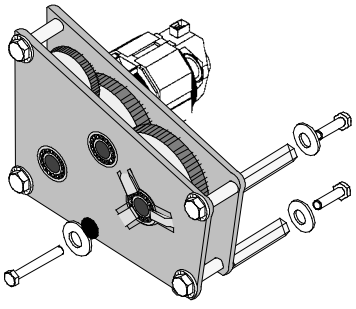
removing the gear motor



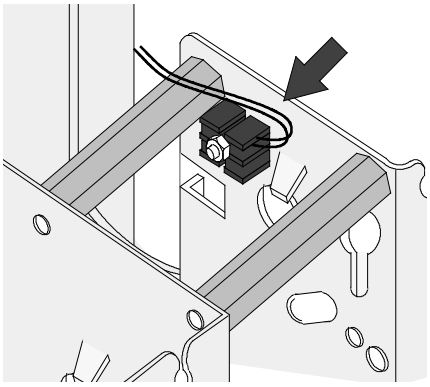
Unhook the ratchet holder return spring and lift the gear latching ratchet by means of a screwdriver.



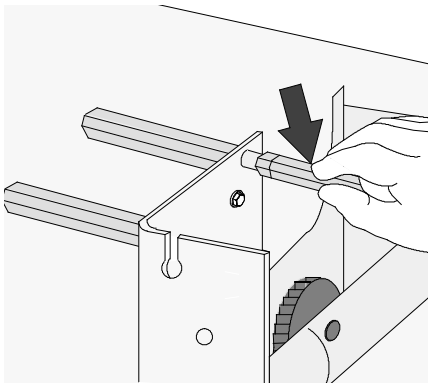
Raise the motor ratchet holder as high as possible and lock it in place with the screwdriver.



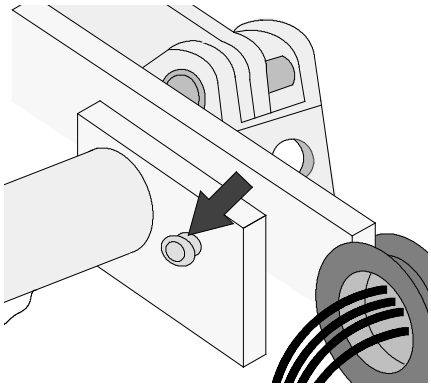
Remove the gear motor (3 screws).



Disconnect the 2 motor supply wires.



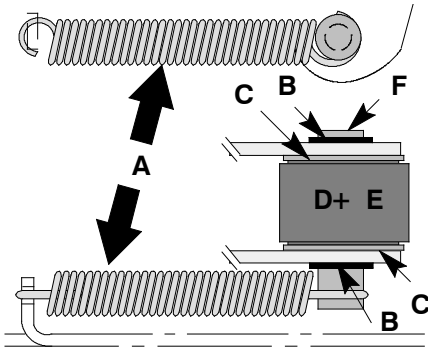
Remove the small column.



Take out this rivet.

Replace it with an M4 screw combined with washers and lock nut.

removing the roller on the ratchet holder

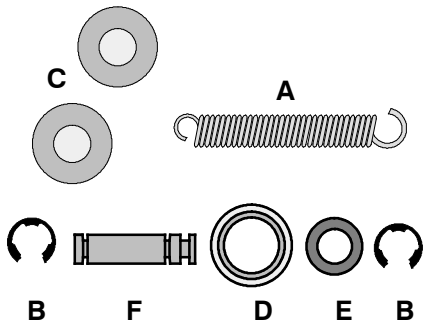


Remove spring **A**.

Remove the roller.

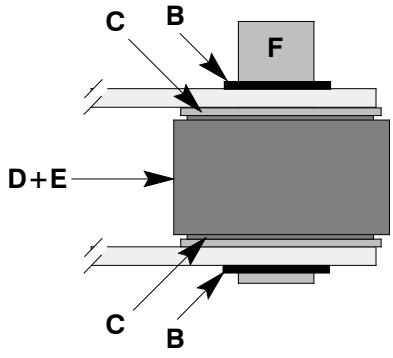
- Truarc **B**.
- washers **C**.
- bearing **D.**
- internal bearing ring **E**.
- pin **F**.

placing the roller on the ratchet holder

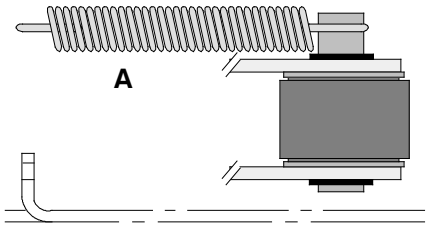


Prepare and lubricate the parts:

- bearing **D.**
- internal bearing ring **E**.
- pin **F**.
- washers **C**.
- Truarc **B**.
- spring **A**.

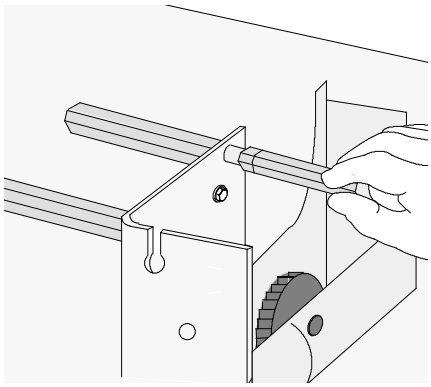


Assemble the roller, with the part of the pin used to hook the spring turned towards the gear motor.



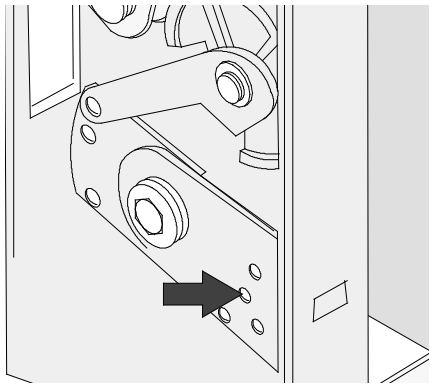
Place the spring on the ratchet holder.

fitting the gear motor



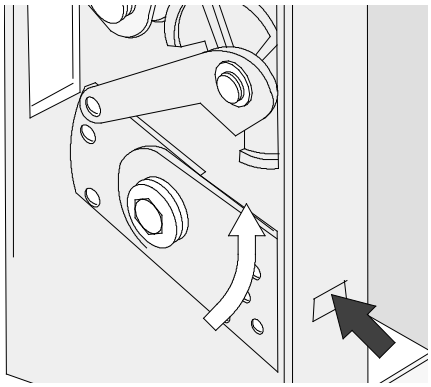
Stick (SR 270 strong loctite) and screw the HM6 length 12, **class 12.9** stud in the yellow column on the tool mark side .

Stick (SR 270 strong loctite) and screw the new column equipped with the stud into the operating mechanism column.

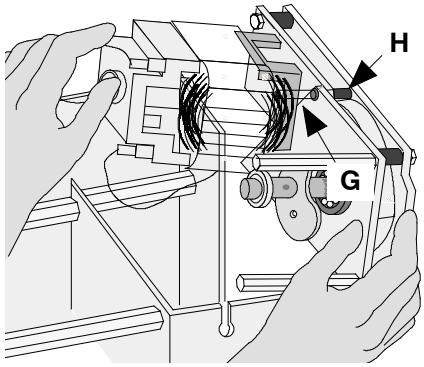


To fit the gear motor, raise the ratchet wheel as far as it will go and lock it using the screwdriver.

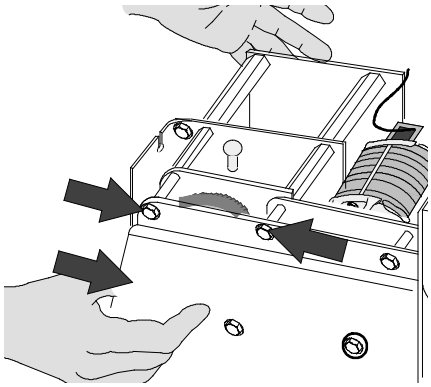
Should a ratchet catch in the ratchet wheel, it will prevent this operation.



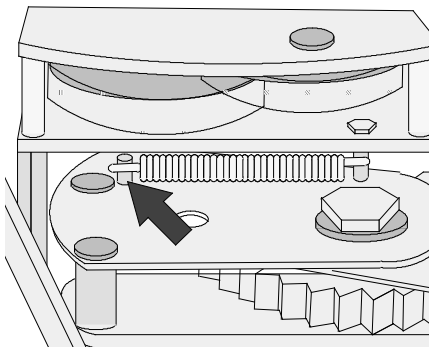
Raise the motor ratchet wheel as far as it will go and lock it using the screwdriver.



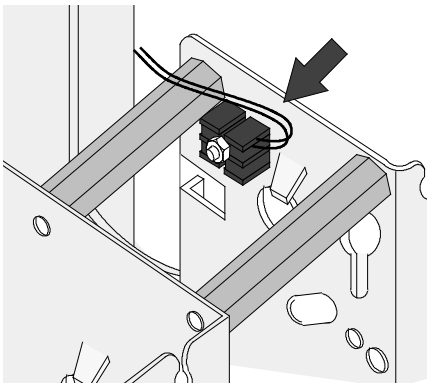
Insert the gear motor, taking care not to remove screw **G** so as not to lose spacer **H** placed between the two flanges.



Fit the screws **class 10.9** (stick using SR 270 strong loctite) and secure the gear motor assembly to a **torque of 13 N.m.**



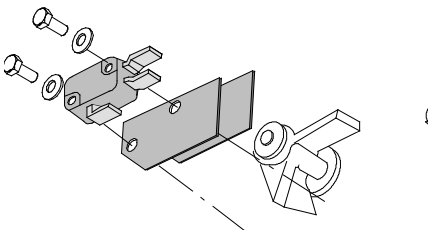
Hook the spring onto the gear motor pin.



- connect the wiring to the terminal block

replacing an SE microswitch

removal



Remove the two fixing screws.

Remove the microswitch without withdrawing the insulating plates.

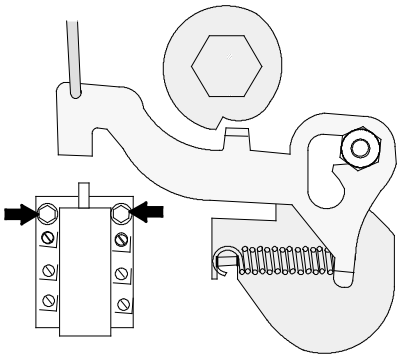
fitting and checking

Perform reverse operation to disassembly having first compensated clearance in an anticlockwise direction and pushed the contacct in the direction of the auxiliary contacts.

Tightening torque: 0.7 N.m.

replacing an end of charging contact (M1/M2/M3)

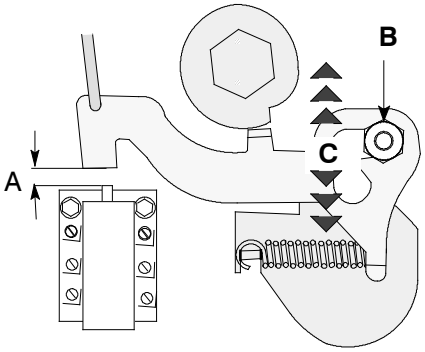
removal



Mark and disconnect the wires.

Remove the 6 hexagon socket screws and fixing nuts.

fitting and adjustment



Proceed in reverse order.

Lock the contact fixing screws.

Tightening torque : 0.7 N.m.

Adjustment:

- do not flange the contact,

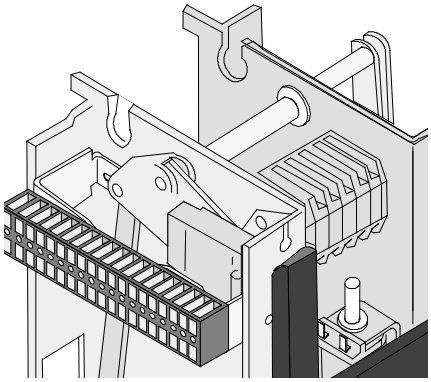
adjust travel **A** 0,7 $^{+0,1}_{-0,2}$ mm.

NB: to adjust **A,**

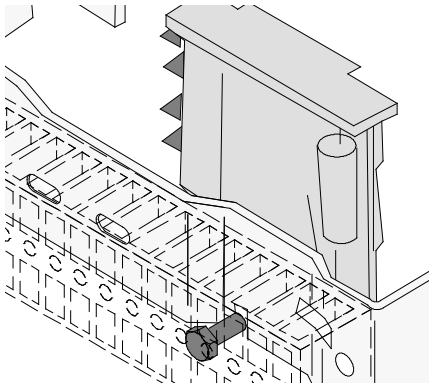
- loosen nut **B**
- move the part along **C**

replacing the antipumping relay

removal

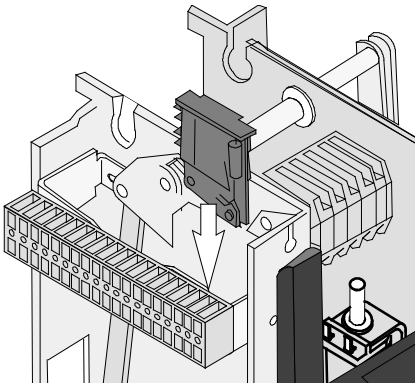


Mark and disconnect the wires.

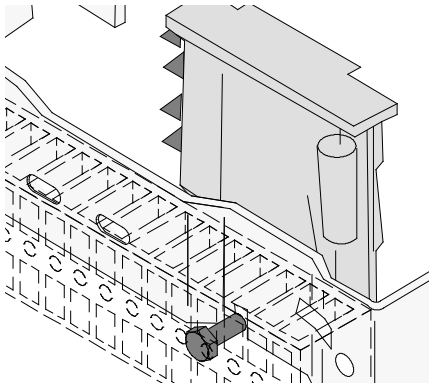


Loosen the fixing screw and slide the relay so that the screw leaves the slot.
Use a 7 wrench.

fitting



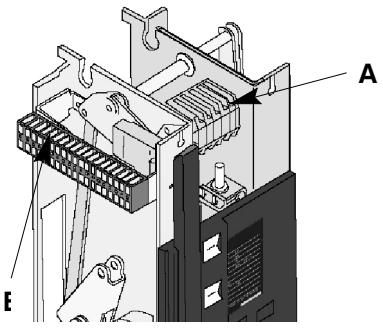
Fit the fixing screw on the relay and position the relay.



Lock the fixing screw in place.
Tightening torque : 0.7 N.m.
Connect the wires as in the wiring diagram and bind.

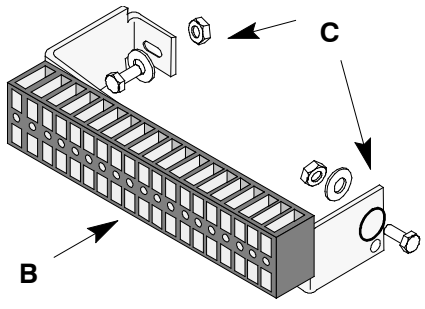
replacing the auxiliary contact unit

removal



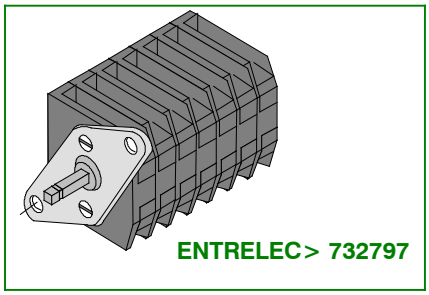
Remove the operating mechanism cover.

- locate the contact unit **A.**
- mark and disconnect the wires.

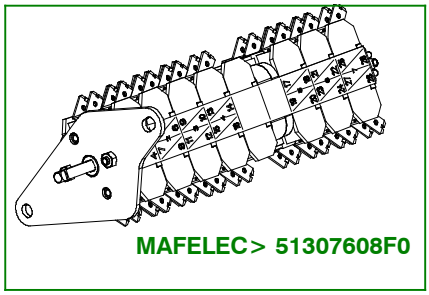


Remove the terminal block assembly **B**, fixed by screws, washers and nuts **C**.

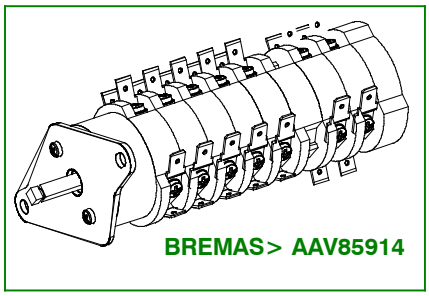
replacement of the rotating contacts



OLD rotating contacts **ENTRELEC until 2005/14/12**

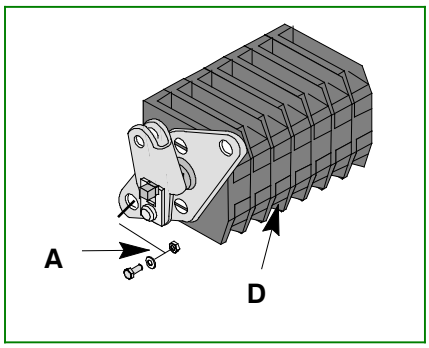


OLD rotating contacts **MAFELEC until 2010/23/02**

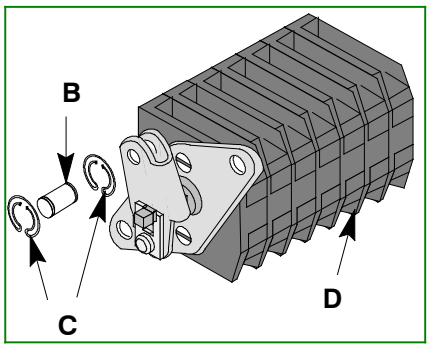


New rotating contacts **BREMAS** from 2010/23/02

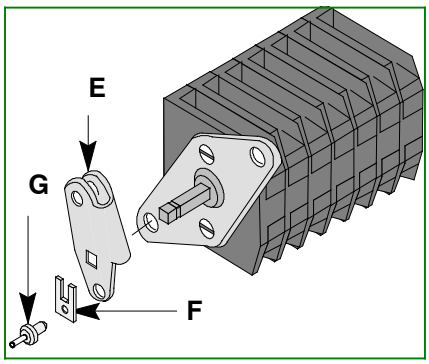
dismantling the OLD rotating contacts ENTRELEC



Remove the 2 nylstop nuts **D.**



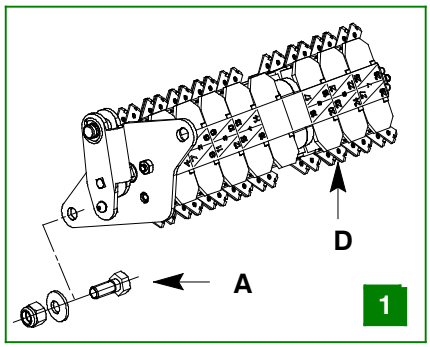
- remove pin **B** and colar **C**
- remove rotating contacts **D**



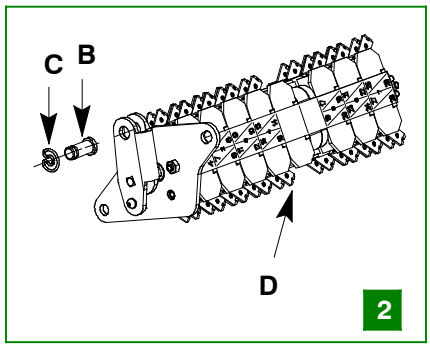
- remove rivet **G** which locks small plate **F**
- remove crank **E** and small plate **F**

dismantling the OLD rotating contacts MAFELEC

D : rotating contacts



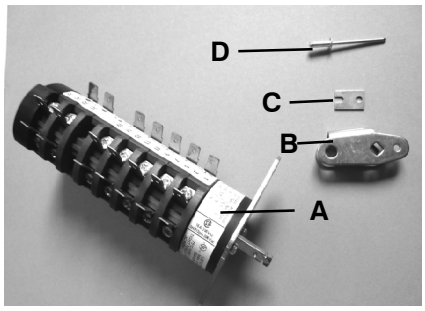
Remove the 2 nylstop nuts **A.**



- remove pin **B** and colar **C**
- remove rotating contacts **D**

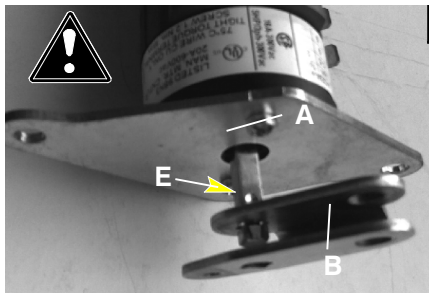
NEW

installation of rotating contacts BREMAS



Kit reference : **MV261239**

- **A** : rotating contacts
- **B** :crank
- **C** :plate
- **D** :rivet

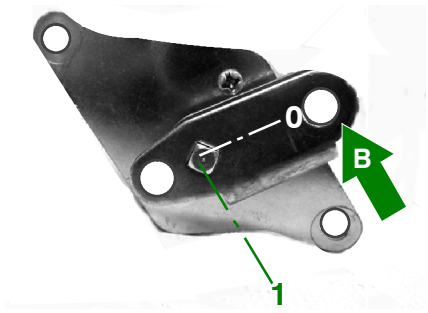


Correctly position the crank B on the pin of the contact A, using the punch E as a position market.

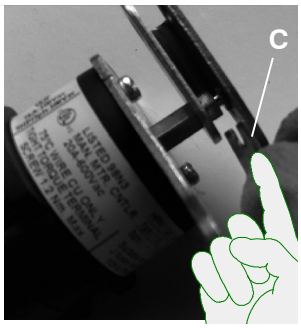
correct configuration before to continue intervention

Correct assembly.

You can continue the intervention.



The crank **B** must move freely from the position **0** to **1**



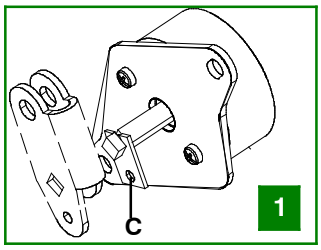
Install the plate **C**.

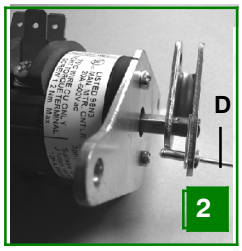
1 :The notch of the plate **C** must be positionned in the axis of the contact

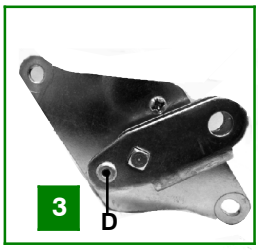
2 : put in place the rivet **D**

3 : rivet all

the new rotating contacts can be installed in the circuit breaker







dismantling the new rotating contacts BREMAS

- **refer to the removal of old rotating contacts**.

SF6 gas recovery

conformity rules (reminder)

WARNING

This equipment contains SF6 gas. SF6 is a powerful greenhouse gas and is harmful for the environment. Prior to disposal of the equipment at end-of-life, the SF6 gas must be recovered in order for it to be recycled, reclaimed or destroyed.

- **DO NOT carry out any dismantling operations unless authorized.**
- **DO NOT handle SF6 gas unless certified.**
- **DO NOT release SF6 gas to the atmosphere.**

Penalties may apply according to local regulations and rules (Regulation (EU) N° 517/2014 for all European countries).

Schneider Electric offers a complete service to dismantle and recycle Medium Voltage equipment and SF6 gas at end-of-life. This service is compliant with IEC 62271-4 and conforms to local regulations.
Please contact Schneider Electric for details.

problems, probable causes and solutions

The information given below reduces operating downtimes to a minimum.

If the solutions proposed are not effective, we suggest you contact the **group Schneider Electric service centre.**

symptoms	faulty devices	probable causes and solutions
Charging impossible.	Electrical operating mechanism: motor	Insufficient voltage at motor terminals ▪ restore voltage ▪ replace motor if required
	End of charging contact	▪ check contact state ▪ replace it if required
	Wiring	▪ check auxiliary circuit connections
Circuit−breaker closing impossible. the indicator remains open	Undervoltage release	The coil is not energised ▪ energise the release or keep it artificially in the « closed circuit » position
	Closing release	The release is badly connected ▪ check the circuit The winding is cut ▪ replace the release
	Charging device	The operating mechanism is not charged ▪ charge the operating mechanism
The circuit−breaker closes and opens immediately and remains open although the closing order is maintained.	All opening trip units *(direct or indirect)*	There is a fault on the main HV circuit, or protection circuits are incorrectly adjusted ▪ remove the fault ▪ adjust the protection circuits
The circuit−breaker opens and closes in turn.	Antipumping relay or direct releases	▪ replace the relay ▪ readjust
The circuit−breaker does not open manually or remotely. *(circuit−breaker without electricaloperating mechanism)*.	Operating mechanism or circuit−breaker *(incomplete closing)*	Hard spot on the operating mechanism or circuit−breaker ▪ finish charging the mechanism with the manual charging handle. **Warn the group Schneider service centre.**
	Trip unit	The trip unit is badly connected ▪ check the circuit The winding is cut ▪ replace the trip unit ▪ check the protection circuit

group Schneider Electric service centers are there for:

engineering and technical
assistance
start-up
training
preventive and corrective
maintenance
adaptation work
spare parts

Call your sales representative who will put you in touch with your nearest group Schneider Electric service centers.

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