CIRCUIT BREAKERS

MV distribution circuit breaker at your service

instructions for use

SF1 fixed or in SM6 circuit–breaker

Schneider Electric

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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.

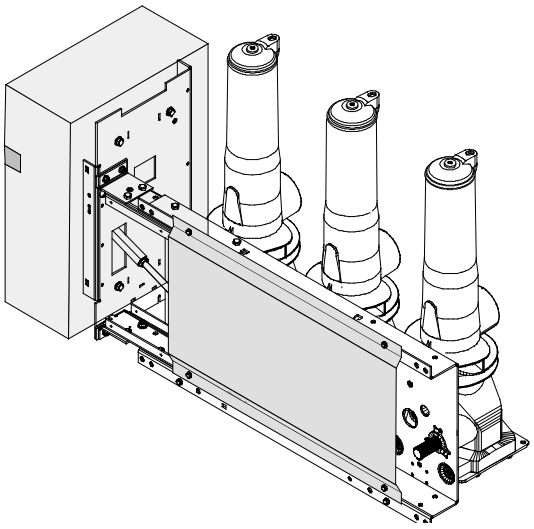
- **DO NOT carry out any dismantling operations unless authorized.**
- **DO NOT handle SF6 gas unless certified.**
- **DO NOT release SF6 gas to the atmosphere.**

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

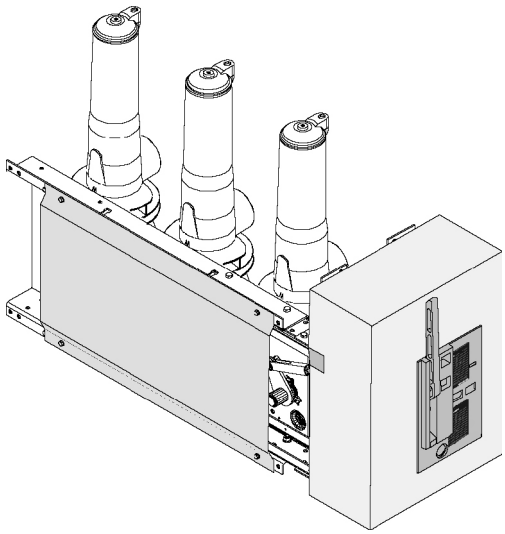
Schneider Electric offers a complete service to dismantle and recycle Medium Voltage equipment and SF6 gas at end-of-life. This service is compliant with IEC 62271-4 and conforms to local regulations.
Please contact Schneider Electric for details.

fixed circuit–breaker

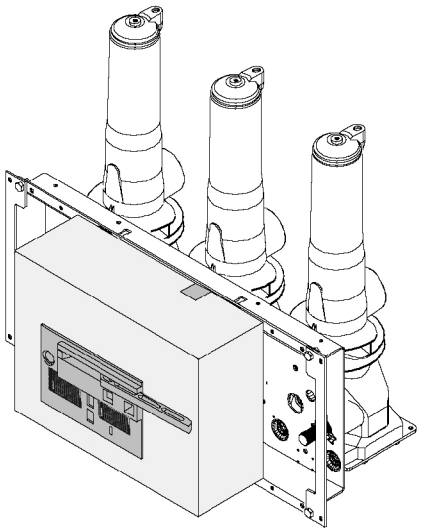
RI operating mechanism side A1 position



RI operating mechanism side B1 position

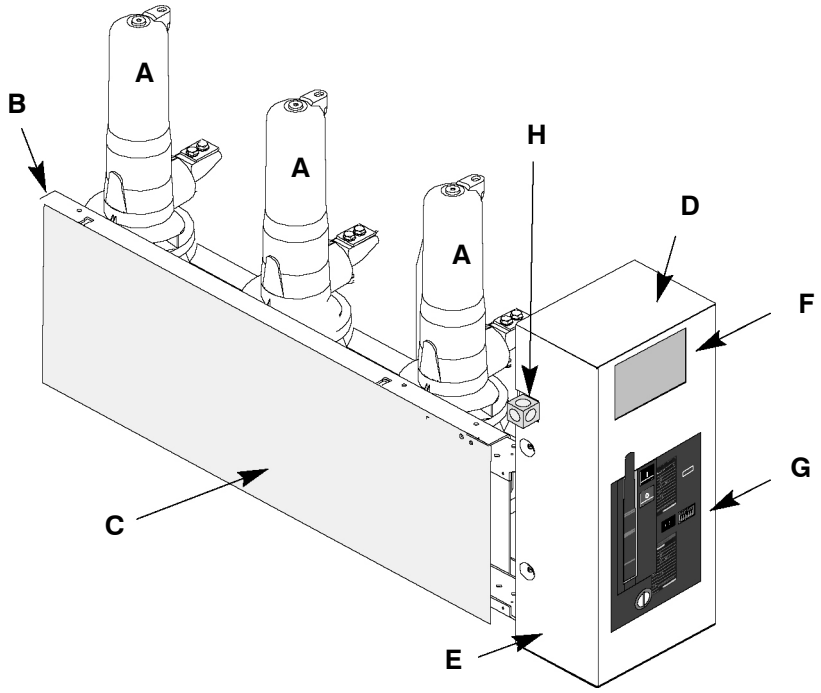


RI operating mechanism front C1 position



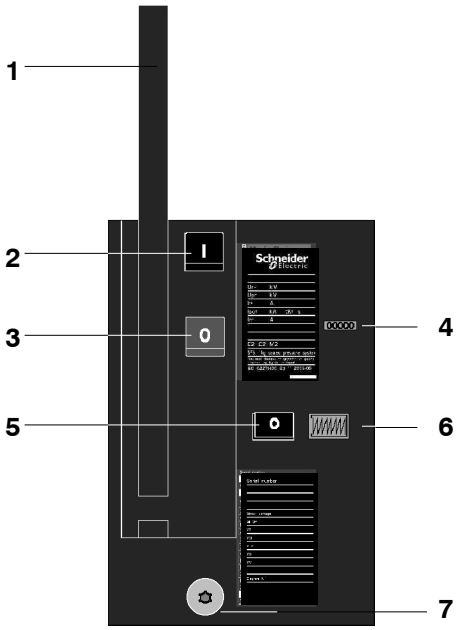
fixed circuit–breaker

A : poles.
B : supporting structure.
C : pole mechanism protective plate.
D : RI operating mechanism.
E : operating mechanism cover.
F : operating mechanism cover predrilled for adaptation of a VIP relay *(in B1 position).*
G : operating mechanism plate.
H : wiring outlet.



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

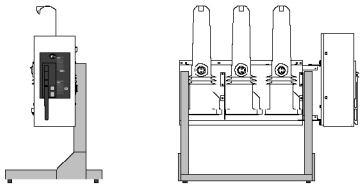
SF1 630A – 1250A

The support frame is optional and is delivered unassembled.

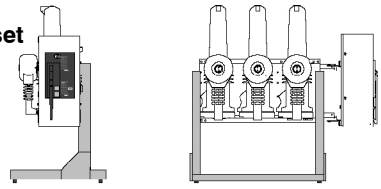
The assembly manual is found inside the packing.

righthand side operating mechanism

SF1

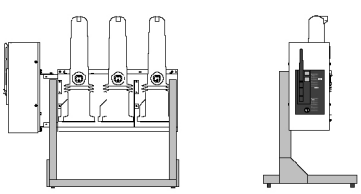


SFset

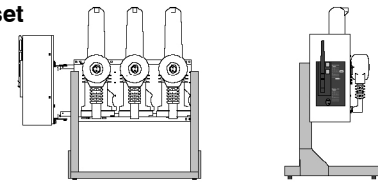


lefthand side operating mechanism

SF1

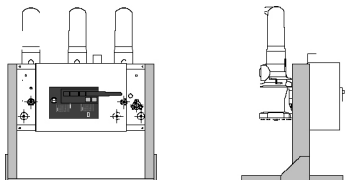


SFset

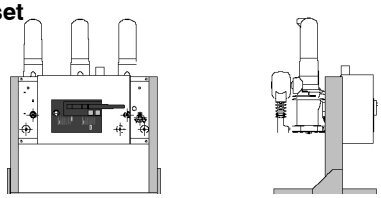


front operating mechanism

SF1



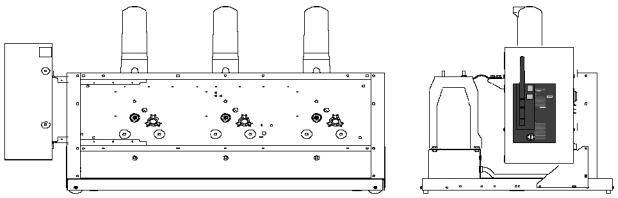
SFset



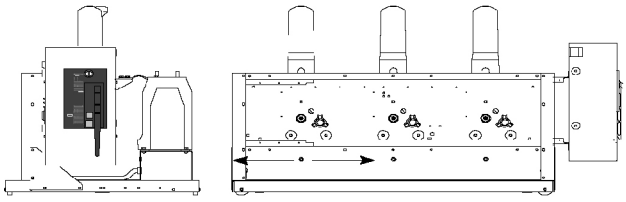
SFset 630 A 36 kV

NB: this device is delivered with the support frame without option.

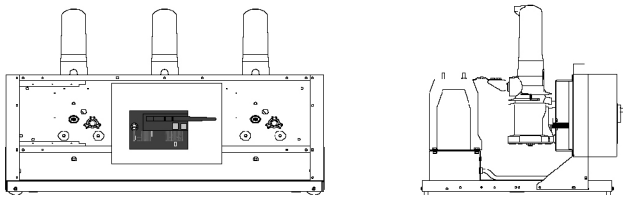
righthand side operating mechanism



lefthand side operating mechanism



front operating mechanism



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.

locating the identification plates

IEC standard

A : characteristics and auxiliaries

B : serial n° and year of manufacture

ANSI standard

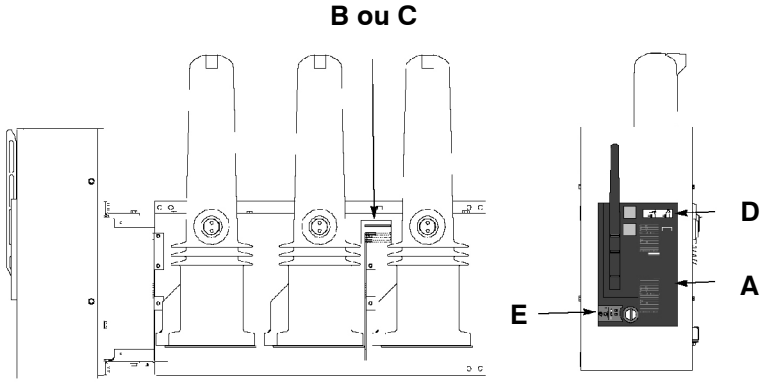
A : characteristics

C : auxiliaries

option

D : undervoltage tripping option

E : keylocking option



contactor and auxiliaries rating plates

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

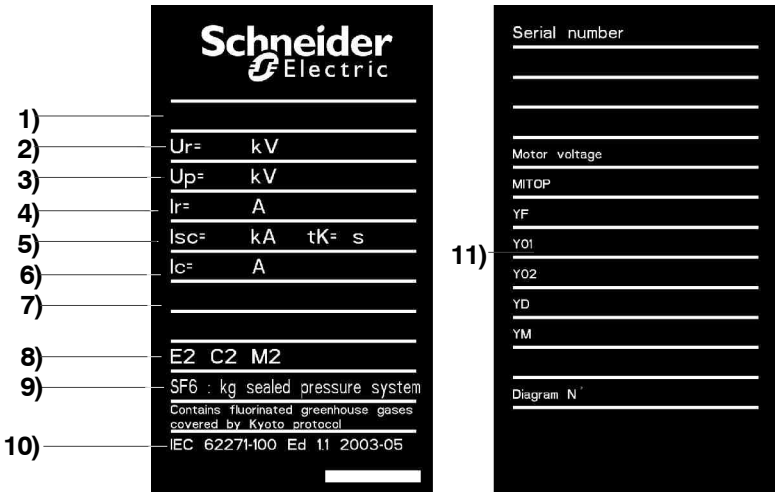
7 : rated operating sequence

8 : class

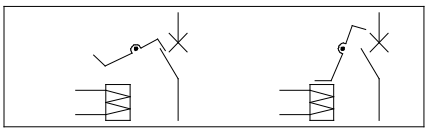
9 : SF6 mass

10 : reference standard

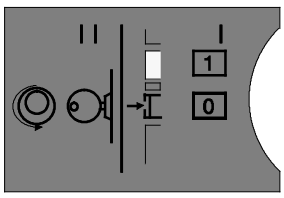
11 : characteristics information plates



voltage indication



Warning affixed to the plate for a device equipped with the undervoltage option.

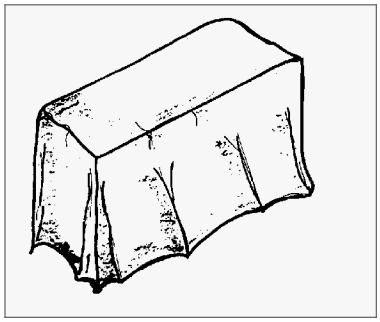


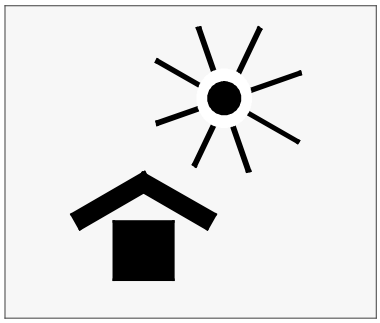
Label indicating the keylocking option.

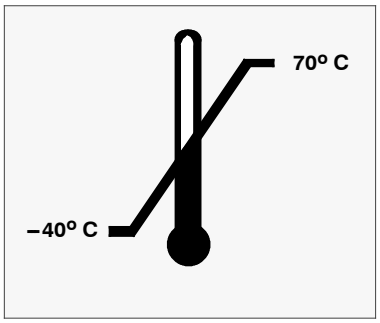
storage

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

Store the devices in their original packing.







prolonged storage

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

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

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

handling

preparation

Unpack equipment at the installation site.

Avoid chocks.

WARNING

poles are under pressure.

Once packing has been removed, hold the circuit–breaker using slings that are attached to handling elements.

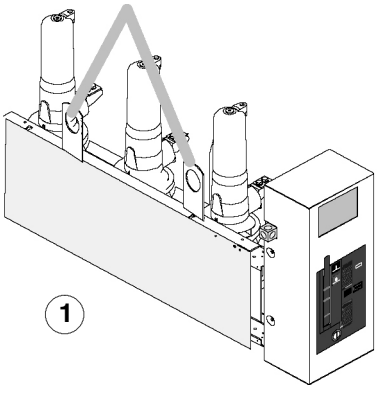
Note:

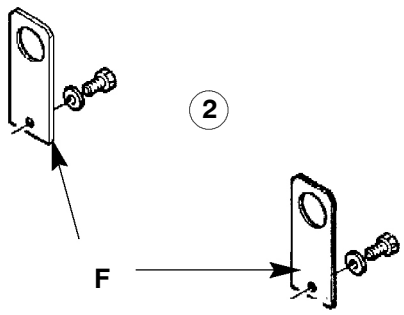
These elements should be kept for handling other equipment.

by lifting

1 : Insert the eye bolts.

2 : Remove the two eye bolts **F** using a 13 mm wrench.



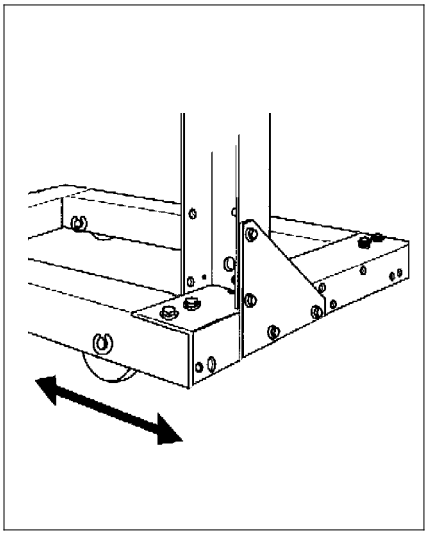


by rolling

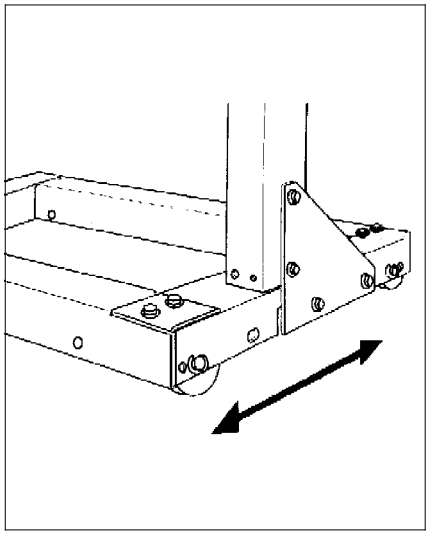
To assemble the rolling frame and assemble the **SF1** or **Sfset** on the frame,...

.... refer to the kit manual found in the frame package.

rolling direction



For the side operating mechanism in position A1 or B1.



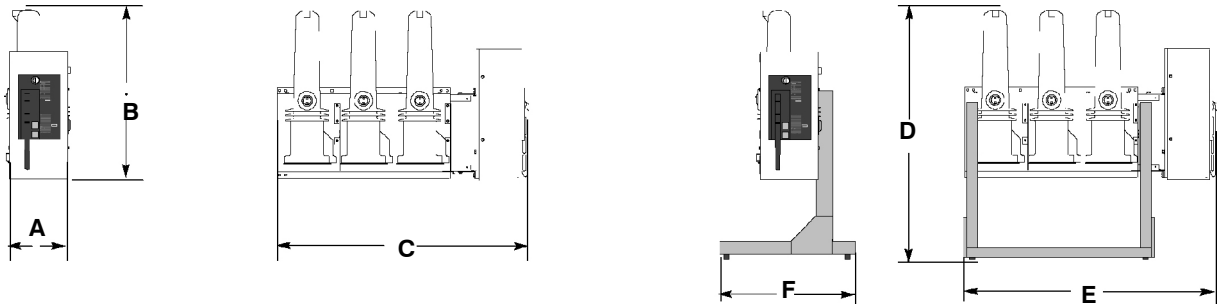
For the front operating mechanism in position C1.

overall dimensions
SF1 630A – 1250A

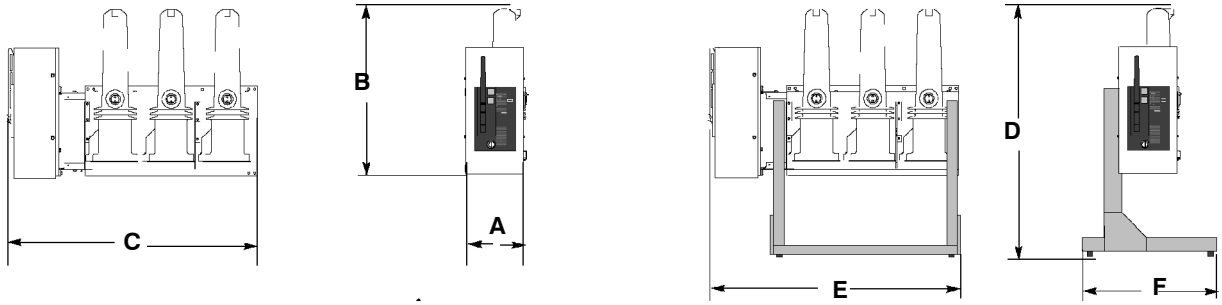
NB: the support frame (optional) shown on the figures,....

.... is mounted on all the device types included in this manual.

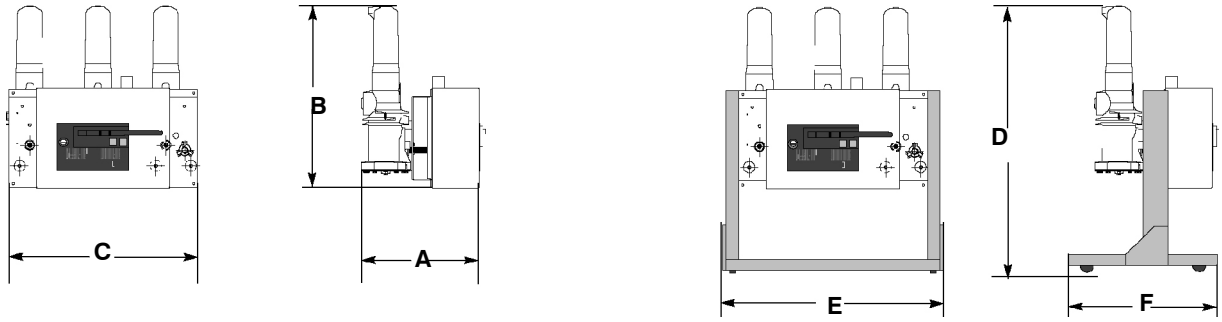
righthand side operating mechanism



lefthand side operating mechanism



front operating mechanism



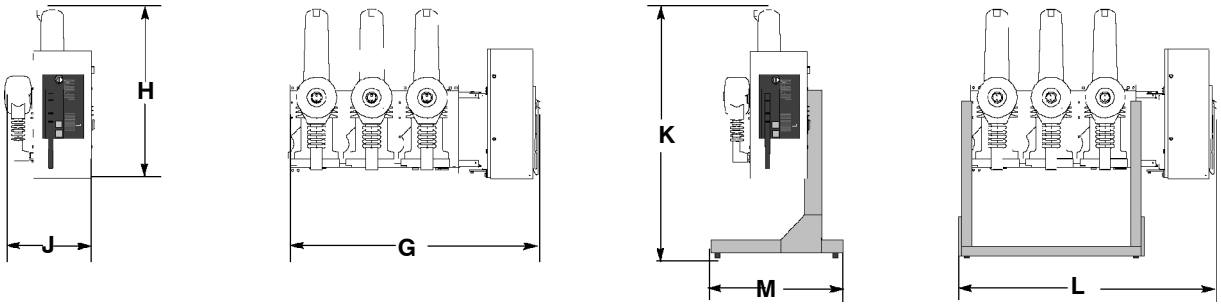
fixed SF1	phase to phase	dimensions without support frame			dimensions with support frame			weight in Kg	
SF1		A	B	C	D	E	F	SF1	Frame
righthand or lefthand side operating mechanism									
630 A and 1250 A	**220**	1008	290	750	1175	1065	600	78	25
	280	1158	290	750	1175	1215	600	80	27
	380	1575	365	750	1175	1632	600	88	27
front operating mechanism									
630 A and 1250 A	**220**	766	490	745	1175	853	600	78	25
	280	886	490	745	1175	973	600	80	27
	380	1260	429	745	1175	1317	600	88	27

SFset 630 A – 1250 A

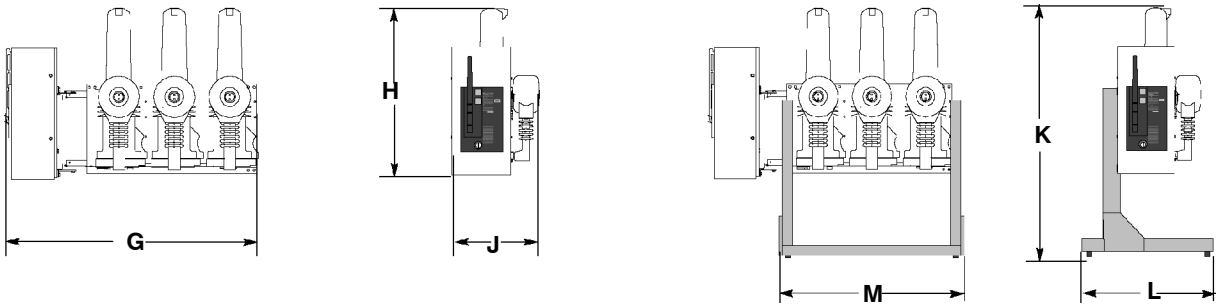
NB: the support frame (optional) shown on this figure,....

.... is mounted on all the device types included in this manual.

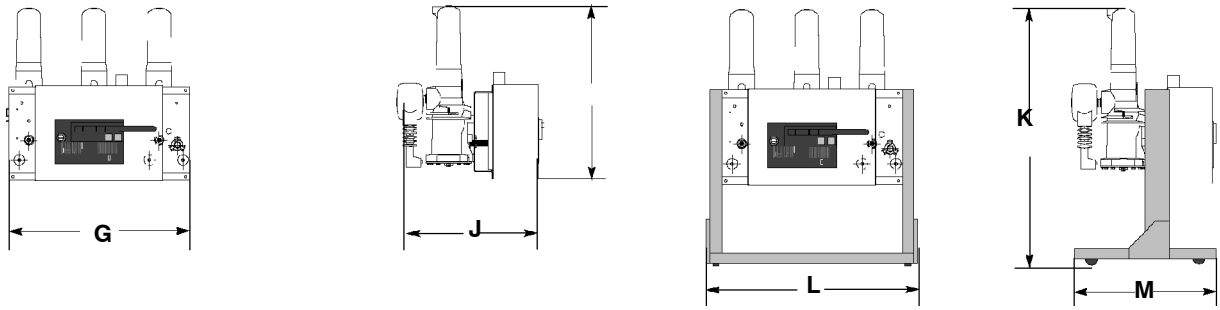
righthand side operating mechanism



lefthand side operating mechanism



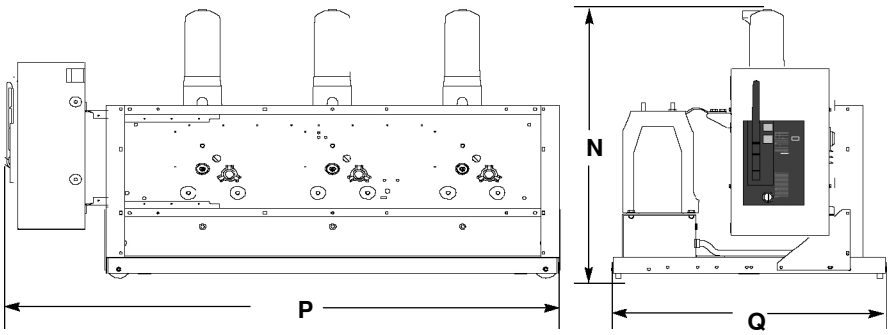
front operating mechanism



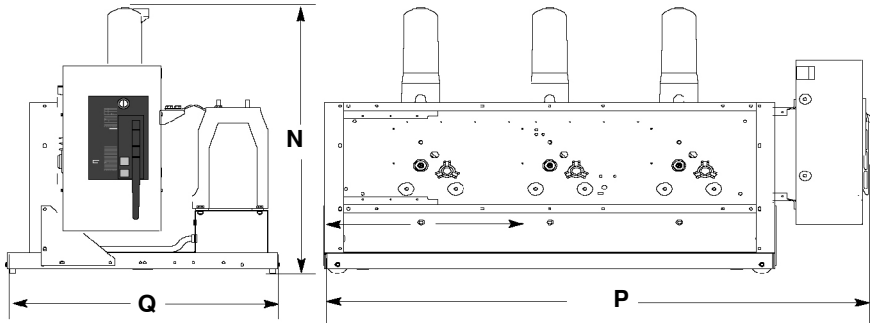
fixed SF1	phase to phase	dimensions without support frame			dimensions with support frame			weight in Kg	
		G	H	J	K	L	M	SFset	Frame
righthand or lefthand side operating mechanism									
630 A and 1250 A	**220**	1008	750	420	1175	1065	600	103	25
	280	1158	750	420	1175	1215	600	105	27
front operating mechanism									
630 A and 1250 A	**220**	766	745	635	1175	853	649	103	25
	280	886	745	635	1175	973	649	105	27

SFset 630 A 36 kV

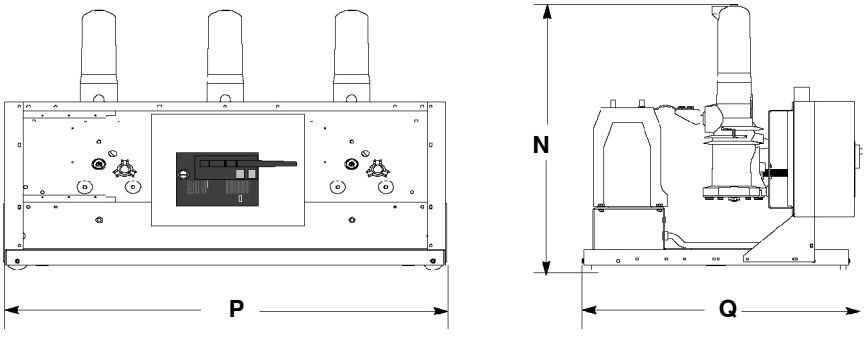
righthand side operating mechanism



lefthand side operating mechanism



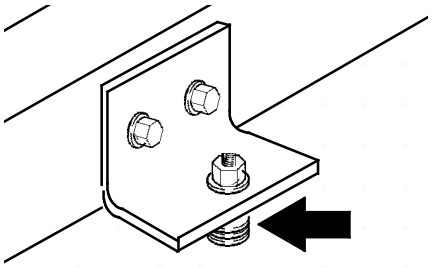
front operating mechanism



SFset	phase–to–phase	dimensions with support frame			weight in Kg	
		N O	P	Q	SFset	Frame
righthand or lefthand side operating mechanism						
630 A	**380**	960	1595	810	120	27
front operating mechanism						
630 A	**380**	960	1138	831	120	27

fitting a circuit–breaker

with support frame



CAUTION

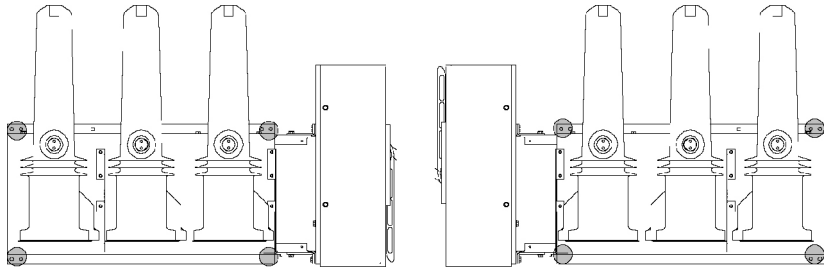
On no account must this frame be used to convert a fixed circuit–breaker into a draw–out circuit–breaker.

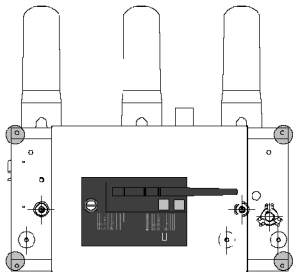
Fixed circuit–breakers with support frame are secured to the ground and attached using fastening lugs.

Insert the right number of washers to prevent deforming the lug.

without support frame

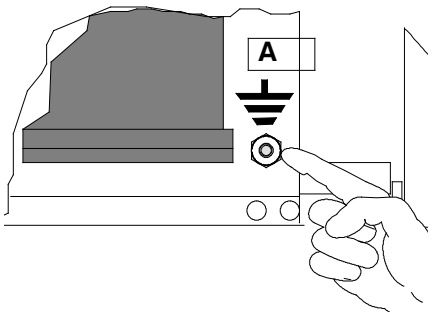
Fit the circuit–breaker and secure it using standard screws.
(○ 4 fasteners diameter 10.1)

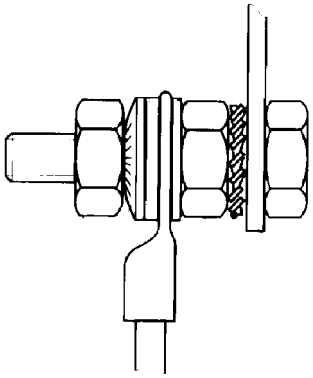




connecting the earth busbar

Connection **A** is placed to the bottom right of the poles support.



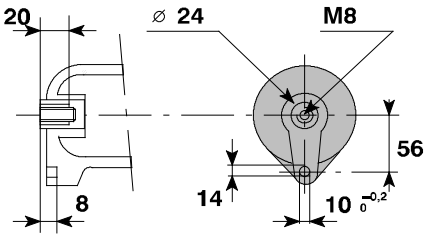


HV electrical connection

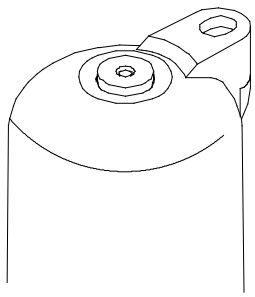
at the end of the pole

CAUTION

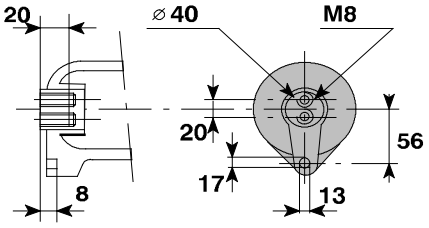
compulsory tightening torque: 28 Nm.



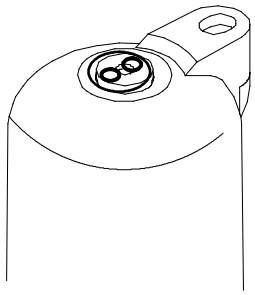
Incomer or feeder
- an M8 tap hole



Upper insert
- according to performance



Incomer or feeder
- two M8 tap holes

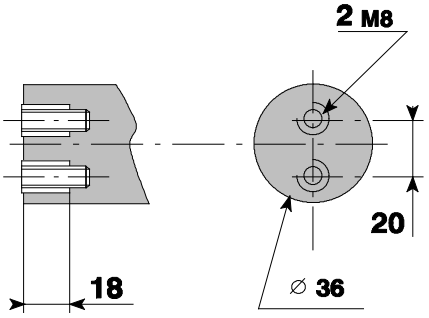


Upper insert
- according to performance

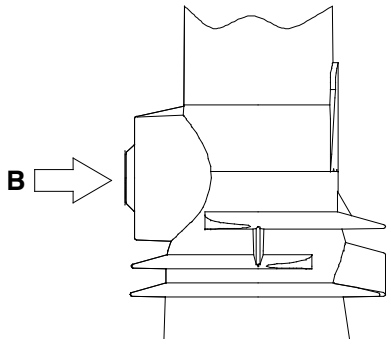
side

CAUTION

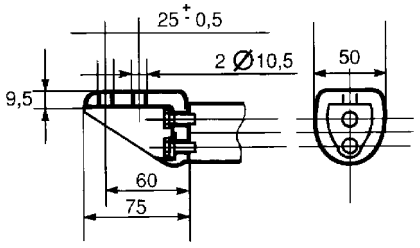
compulsory tightening torque: 28 Nm.



Incomer or feeder
- two M8 tap holes

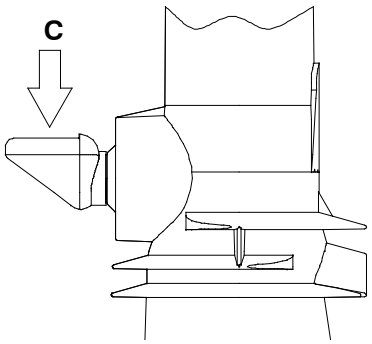


Lower insert
B : connecting holes.



Incomer or feeder
- two diameter 9 holes

for M8 screws

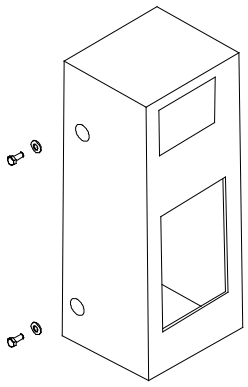


Lower insert
C : connecting holes

LV electrical connection

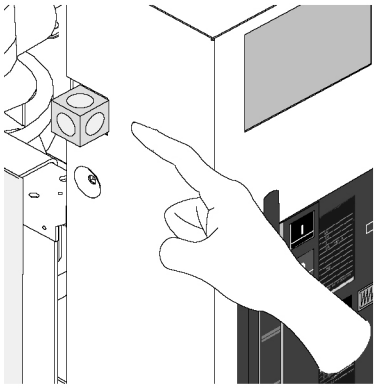
CAUTION

the **“ customer “** low voltage connection requires removal of the protective cover.



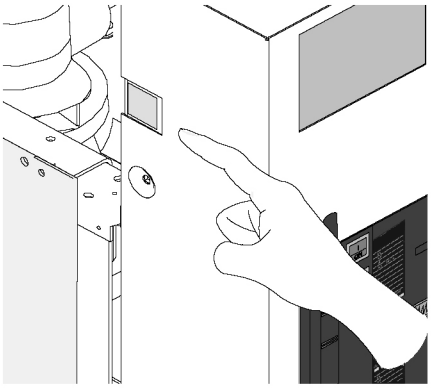
The cover is removed by withdrawing the 4 marked screws.

circuit–breaker LV wiring insertion



The wiring leaves the case through the 3 predrilled holes.

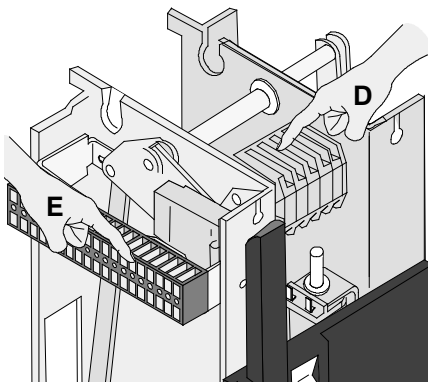
The case can be installed to the right or left of the cover.



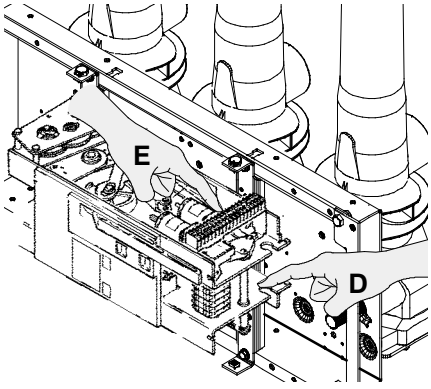
The outlet for unused wiring is blocked by a blanking plate.

LV connecting terminal

D : rotating auxiliary contacts.
E : LV terminal block and pressure indication option.



operating mechanism in the side position



operating mechanism in the front position

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.

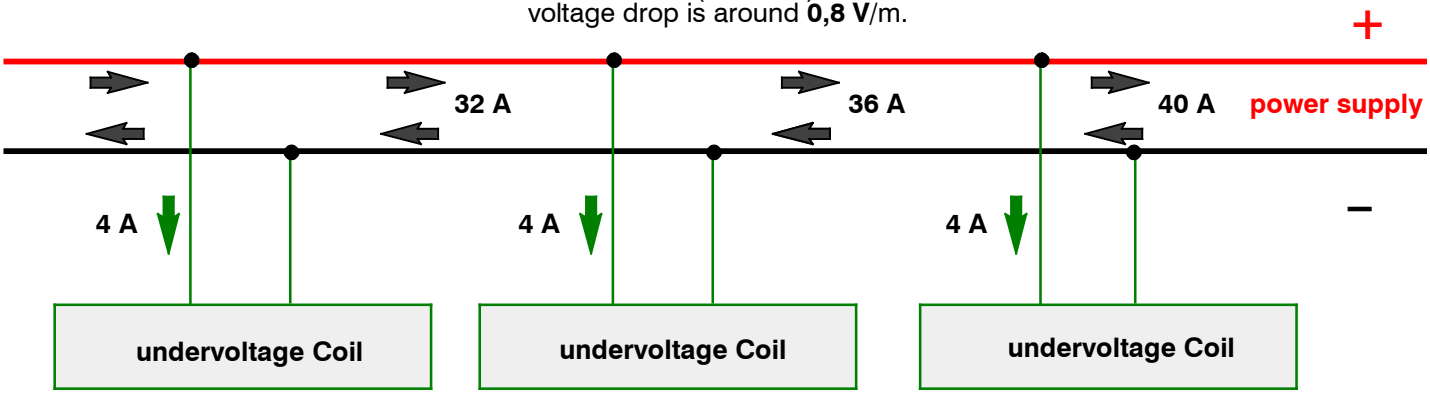
Therefore, during the installation check the following to avoid this problem:

- 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%**.

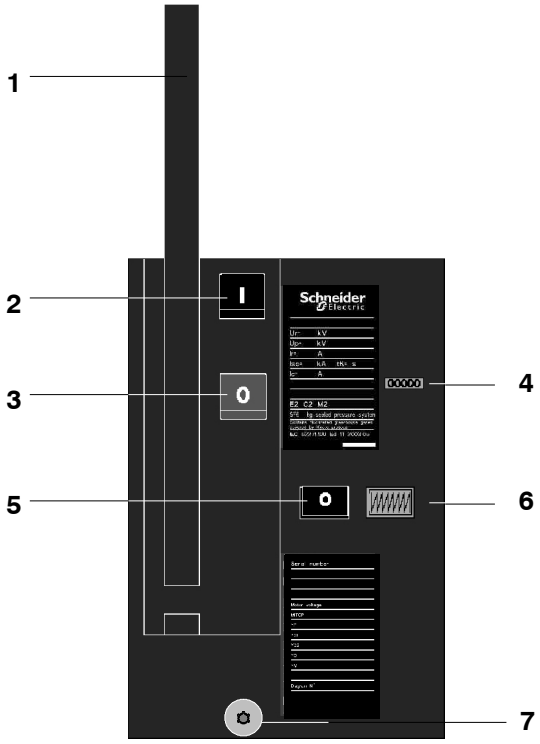


WARNING

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

operating mechanism plate

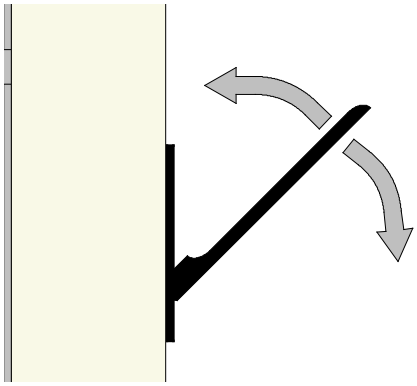
1 : operating mechanism charging lever
2 : closing pushbutton
3 : opening pushbutton
4 : operation counter
5 : **"open or closed"** device status mechanical indicator
6 : **"charged or uncharged"** operating mechanism charging status mechanical indicator
7 : keylock (option)



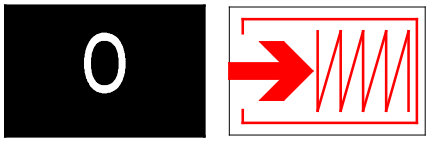
circuit–breaker manual operation

completion of Opening – Closing

charging the operating mechanism



Charge the operating mechanism by an alternating motion until it clicks in place.



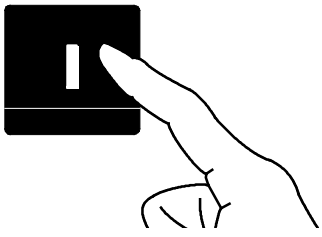
The circuit–breaker position indicator remains on **" O "** *(device **open**)*.

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

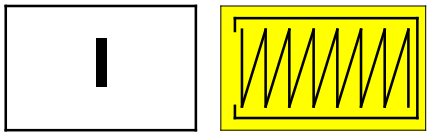
closing

CAUTION

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



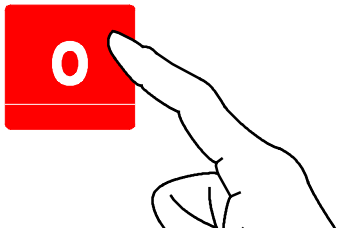
Press the push button to close the circuit–breaker



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

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

opening



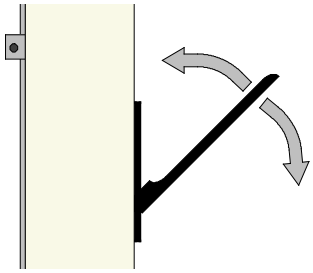
Press the push button to open the circuit–breaker.

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

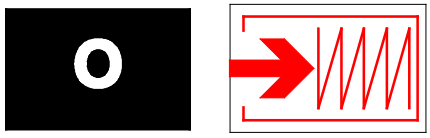
The operating mechanism indicator indicates that the mechanism is **deactivated**.

completion of Opening – Closing–Openig cycle

charging the operating mechanism



Charge the operating mechanism by an alternating motion until it clicks in place.



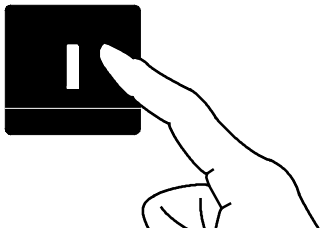
The circuit–breaker position indicator remains on “ **O** “ *(device **open**)*.

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

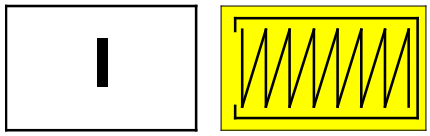
closing

CAUTION

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



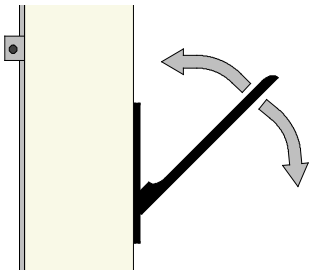
Press the push button to close the circuit–breaker



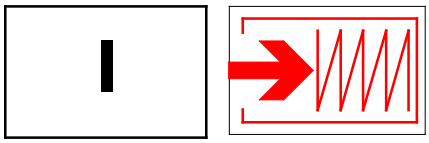
The circuit–breaker position indicator moves to “ **I** “ *(device closed)*.

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

charging the operating mechanism



Charge the operating mechanism by an alternating motion until it clicks in place.

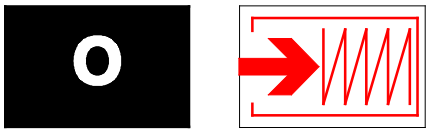


The circuit–breaker position indicator moves to “ **I** “ *(device closed)*.

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

opening

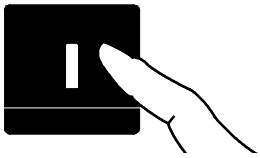
Press the push button to open the circuit–breaker.



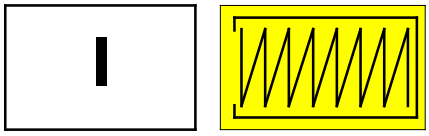
The circuit–breaker position indicator moves to “ **O** “ *(device open).*

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

closing



Press the push button to close the circuit–breaker



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

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

circuit–breaker remote operation

electrical charging of the operating mechanism *(optional).*

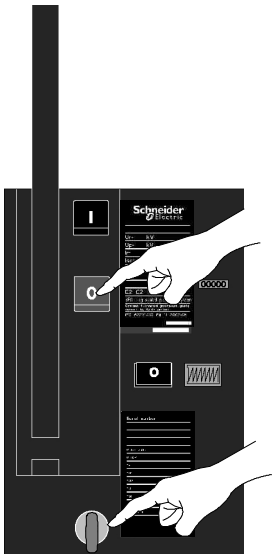
A gear motor unit automatically recharges the operating mechanism after circuit–breaker closing.

opening and closing

Release opening and closing operations are remote controlled.

interlocking the circuit–breaker

(optional)



The circuit–breaker is locked in the **open** position using the keylock.

To interlock:

- 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 carried out in accordance with applicable safety standards under the **supervision of a competent authority.**

To reach the various devices:

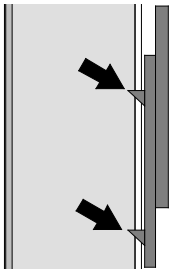
- open the circuit–breaker
- cut the supply to the auxiliary circuits and main circuit
- close and open using the push buttons in order to uncharge the operating mechanism
- avoid impacts *(pressurised enclosure)*.

general rules

Our equipment is designed to guarantee the best possible service provided that the servicing operations described in this document are complied with.

Servicing requires removal of the protective panels *(front plate and operating mechanism plate).*

Removal and fitting of the front panel plate is described in the **" installation instructions "** chapter.



The operating mechanism plate is removed by undoing the 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 **Schneider Electric service centres.**

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

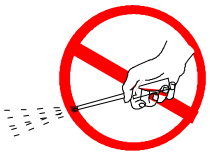
summarising table

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**



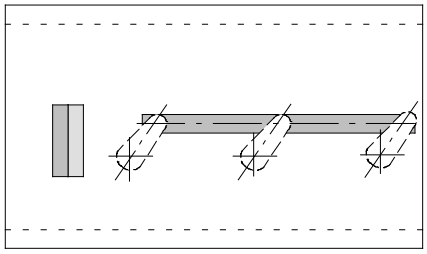
HIGH PRESSURE CLEANING PROCESS **FORBIDDEN**

The main drawbacks of such processes are.

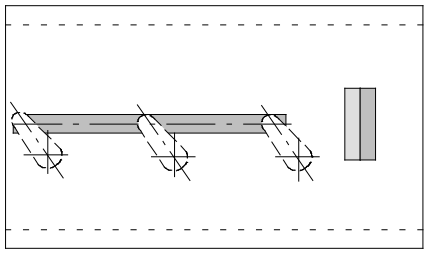
- damage due to jet pressure and impossibility of re–lubricating inaccessible fixing points.
- risk of overheating due to solvent presence on contact areas.
- elimination of special protections.

checking arcing contact wear

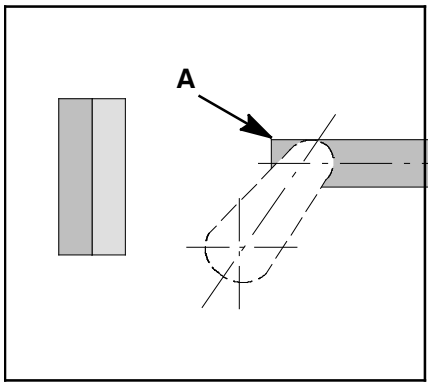
NB:
this procedure must be performed with an operating mechanism without a closing spring.



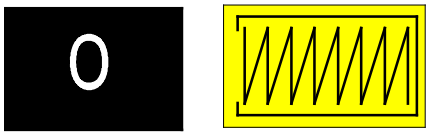
In position A1 and C1, the check is made at the linkage of the 3 poles,



... just as for the operating mechanism device in position B1.

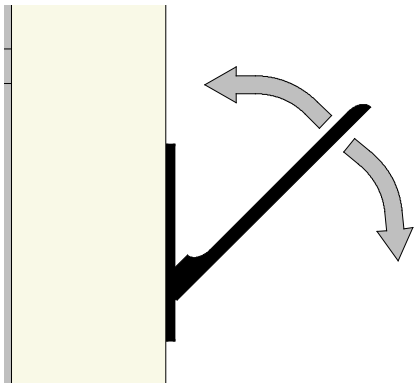


The end of link **A** acts as a reference.

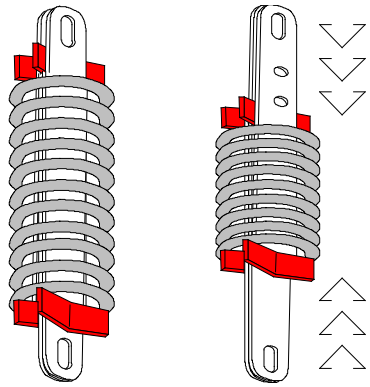


Check that the circuit–breaker is **open** and that the operating mechanism is **deactivated.**

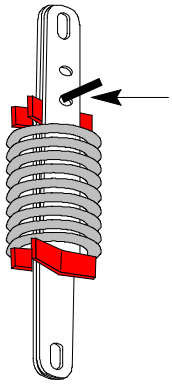
removing the closing springs



Slightly charge the operating mechanism in order to neutralise the closing springs.

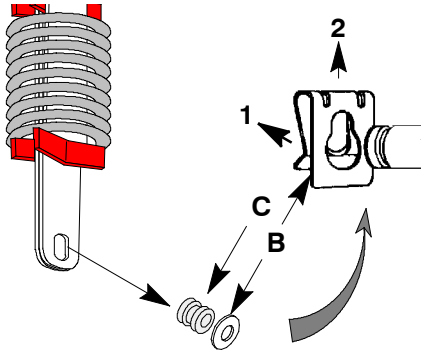


The springs will be compressed.



Insert a screw or pin, 6 mm diameter or 40 mm long min. into the hole shown above. On no account must it be free.

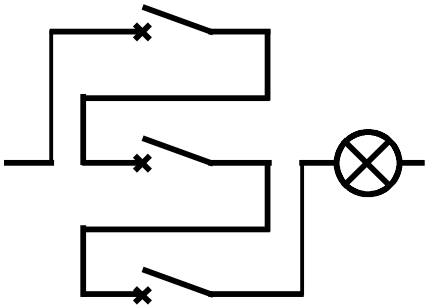
(do not exceed the first notch of the operating mechanism: otherwise carry out a full cycle and start again).



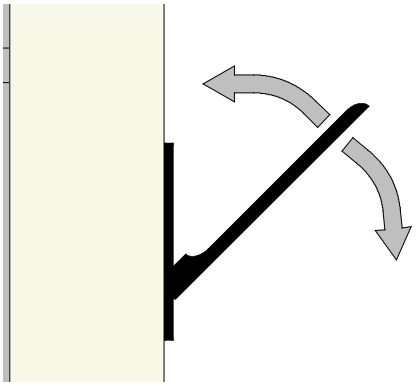
Remove the washer and the circlips **B** .

Release and withdraw the spring. Remove the ring **C** taking care not to damage it (Teflon coating).

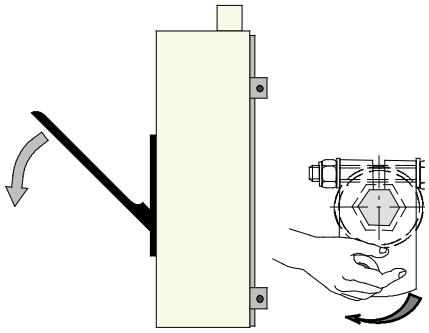
checking



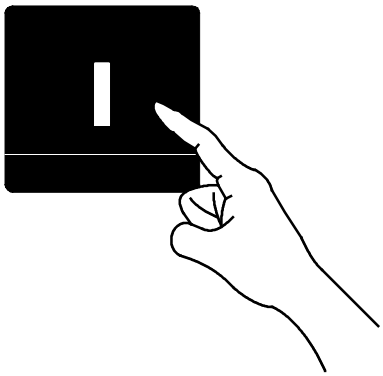
Connect in series the three phases of the device and insert a bell type indicator in the circuit.



Charge the operating mechanism until it clicks into place at the end of charging.

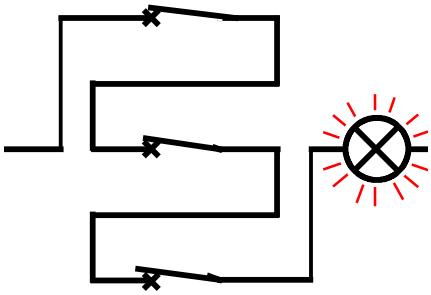


Maintain pressure on the lever and at the same time pull towards you the righthand crank handle until the ratchet wheel latches.



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

If the position is overshot, repeat the operation.

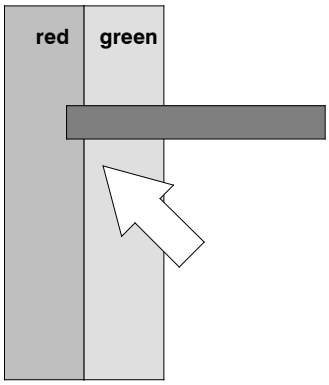


Slowly close the circuit–breaker using the lever.

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

CAUTION

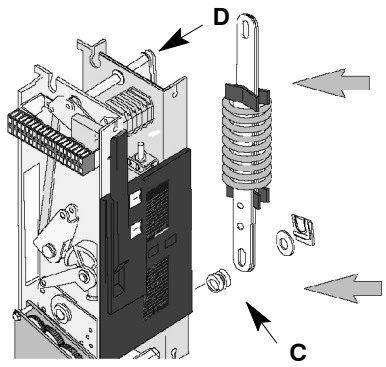
Keep the lever in this position, with the bell activated.



Proceed in the same manner for the other poles.

If one of the poles activates the bell when the indicator is in the red area, **the 3 poles** must be replaced.

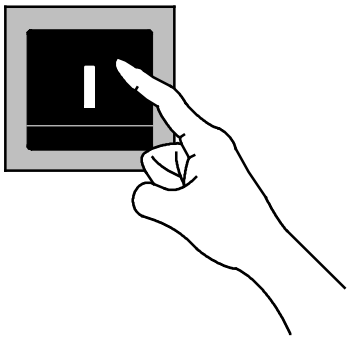
fitting the closing springs



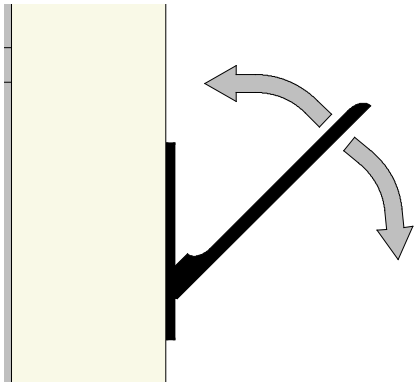
Fit the spring and the ring **C** on pin **D** of the operating mechanism.

CAUTION

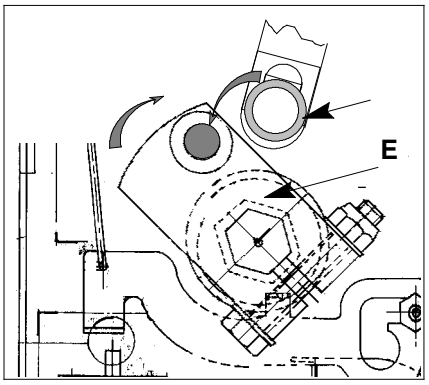
Assemble without lubricating, do not scratch the teflon ring.



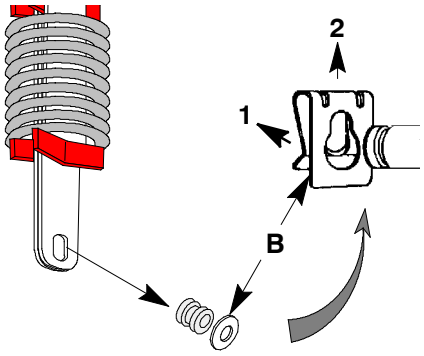
Press the closing button and at the same time...



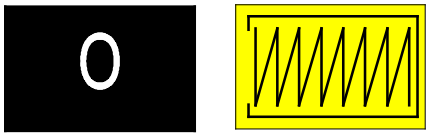
...continue charging...



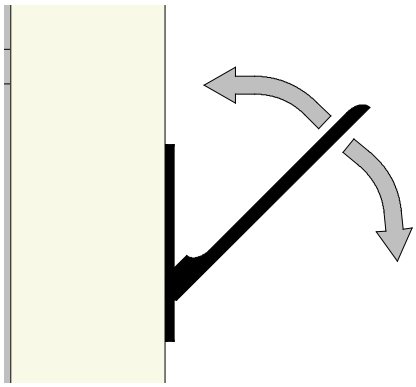
... in order to bring crank handle **E** into the axis of the lower fixing hole of the spring guide.



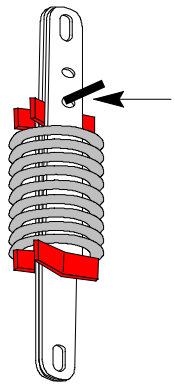
Fit the washer and the circlips **B**.



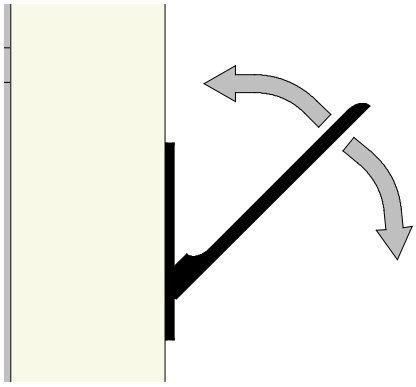
Check that the circuit–breaker is **open** and that the operating mechanism is **deactivated**.



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



Remove the locking system made on the springs with the 6 diameter screw or pin.

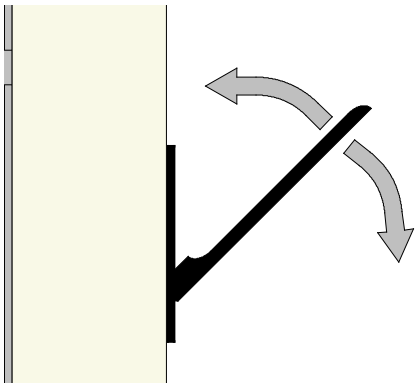


Continue charging the operating mechanism until it clicks in place.

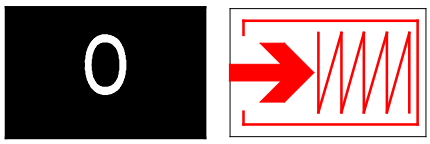
Check :
Close then open using the “**I**” and “**O**” push buttons to uncharge the operating mechanism.

lubricating the spring guides

closing spring

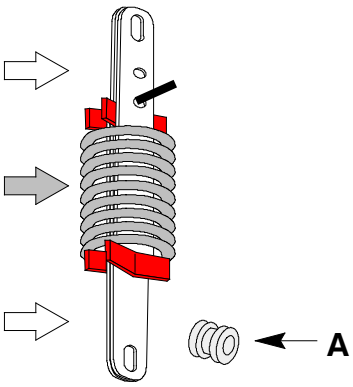


Charge the operating mechanism by an alternating motion until it clicks in place.



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

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



The springs will be compressed.

- lubricate the guides
- oil the phosphatised springs

CAUTION

do not lubricate teflon ring **A**.

WARNING

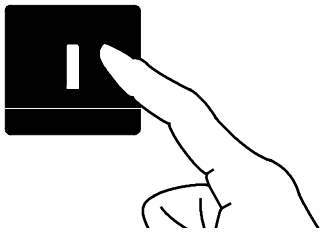
A brush must be used to lubricate.
Do not dismantle the spring to perform this operation.

opening spring

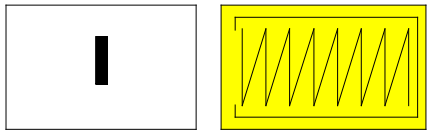
local manual closing of the circuit–breaker

CAUTION

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

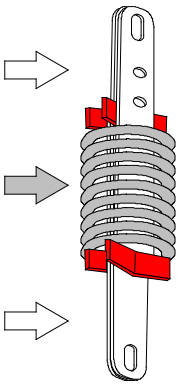


Press the **“ I “** push button to close the circuit–breaker.



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

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



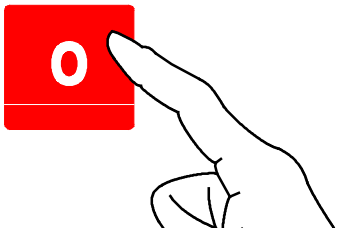
The springs will be compressed.

- lubricate the guides
- oil the phosphatised springs

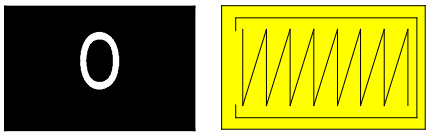
WARNING

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

local manual opening of the circuit–breaker



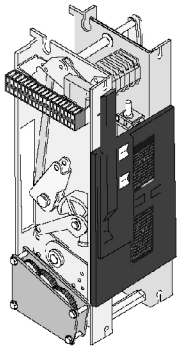
Press the push button to open the circuit–breaker.



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

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

operating mechanism unit



Clean the entire subassembly.

Oil all the phosphatised parts.

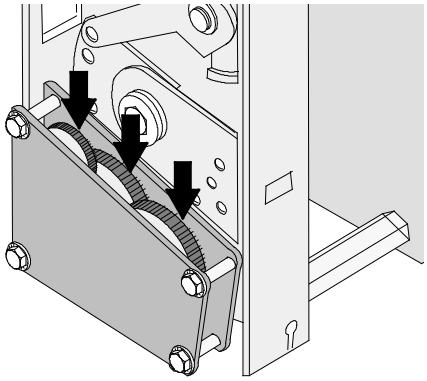
Check that " bauman " type hoops are fitted.

Lubricate the pins and hinges.

WARNING

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

gear motor



Clean the entire subassembly.

Oil all the phosphatised parts.

Lubricate the gears

WARNING

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

introduction

The corrective maintenance operations are designed to replace faulty subassemblies.

For any other operations contact your nearest Schneider Electric centre.

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

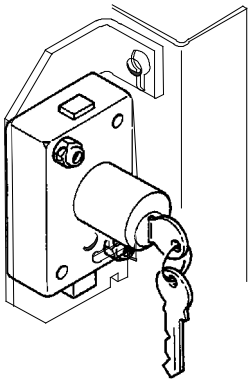
CAUTION

when replacing parts, the accessories listed below MUST be replaced by new equipment:

- **Nylstop**
- **Contact washer**
- **Hoop**
- **Circlips**
- **Clips**
- **Mechanical pin**

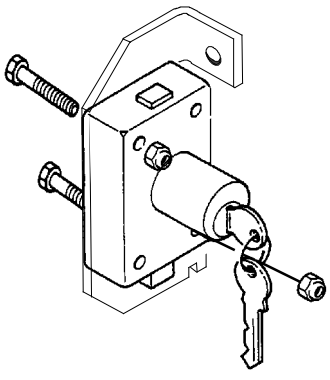
replacing a keylock

removal



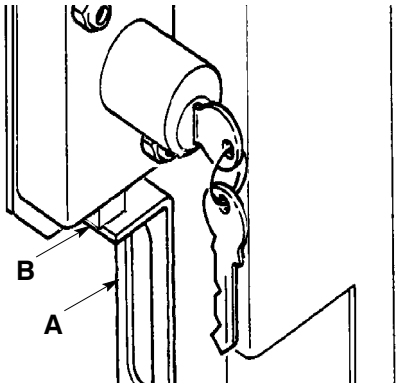
Remove the 2 keylock fixing screws and separate the keylock from its support.

fitting and checking



Fit the keylock on its support.

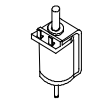
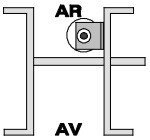
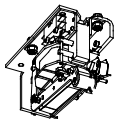
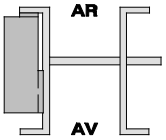
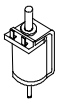
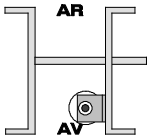
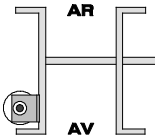
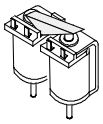
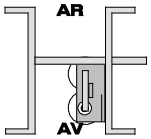
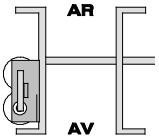
Fit and tighten the keylock fixing screws.



Part **A** must not be flanged by the bolt of keylock **B**.

replacing a release

the various positions of the releases in the operating mechanism

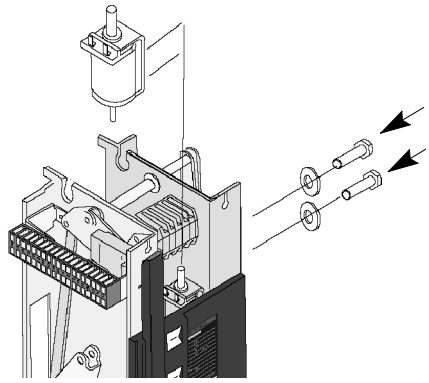
release	undervoltag	shunt	overcurrent	assembly position top view
simple closing 		❑		I 
undervoltage trip 	❑			II 
simple opening 		❑	❑	III  IV 
double opening 		❑	❑	V  VI 

simple closing

according to position I

removal

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



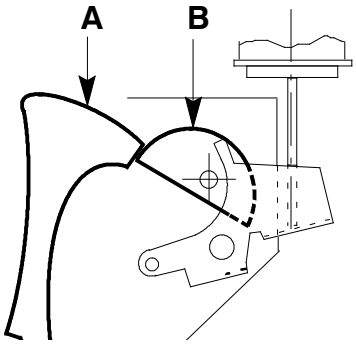
fitting and checking

Assemble in reverse order to disassembly.

Tightening torque: 13 N.m.

Position the release with the cylindrical rod directed towards the latching crank handle.

Check that the coil rod does not flange the crank handle in the tripped position and ensures transfer of the closing latch **A** onto the half–moon **B**.

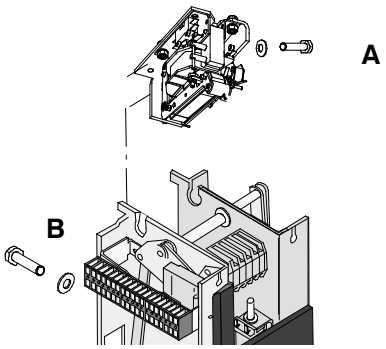


undervoltage trip

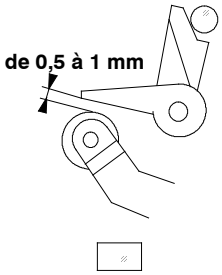
according to position II

removal

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



fitting and checking

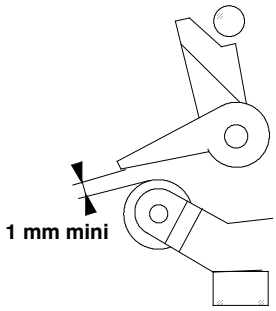


Position the trip device in the tripped position.

Position 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 device.

Place M6 fixing screw **A** on the trip unit.
Install the trip unit
Place M6 fixing screw **B**.

Tightening torque: 13 N.m.



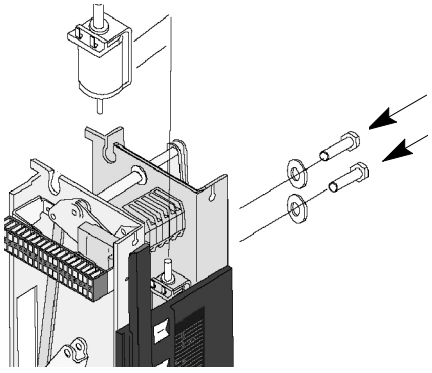
Check that when the magnetic circuit is closed there is a clearance of at least **1 mm** between the idle crank handle and the trip device.

shunt release or overcurrent trip device

according to position III

removal

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



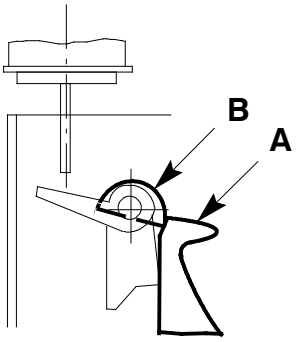
fitting and checking

Assemble in reverse order to disassembly.

Tightening torque: 13 N.m.

Position the release with the cylindrical rod directed towards the latching crank handle.

Check that the coil rod does not flange the crank handle in the tripped position and ensures transfer of the closing latch **A** onto the half−moon **B**.



according to position IV

removal

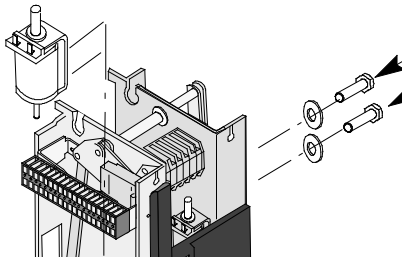
NB: the coil is mounted to the left or right of the operating mechanism according to the protection type.

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.



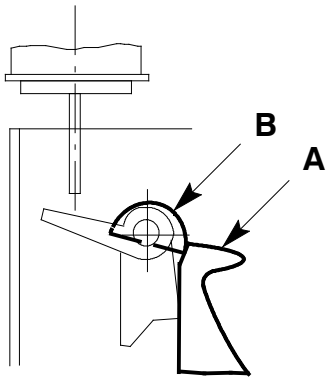
fitting and checking

Assemble in reverse order to disassembly.

Tightening torque: 13 N.m.

Position the release with the cylindrical rod directed towards the latching crank handle.

Check that the coil rod does not flange the crank handle in the tripped position and ensures transfer of the closing latch **A** onto the half–moon **B**.



shunt release or overcurrent trip device (two coils)

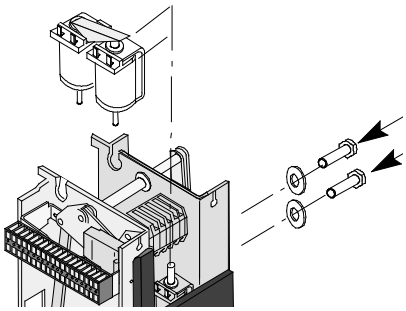
according to position V

removal

Mark and disconnect the wires.

Remove the two M6 fixing screws.

Remove the release.



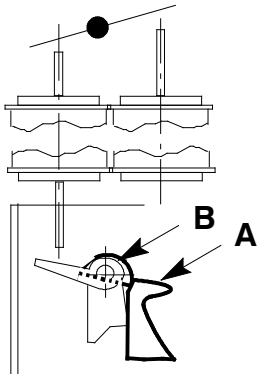
fitting and checking

Assemble in reverse order to disassembly.

Tightening torque: 13 N.m.

Position the release with the cylindrical rod directed towards the latching crank handle.

Check that the coil rod does not flange the crank handle in the tripped position and ensures transfer of the closing latch **A** onto the half−moon **B**.



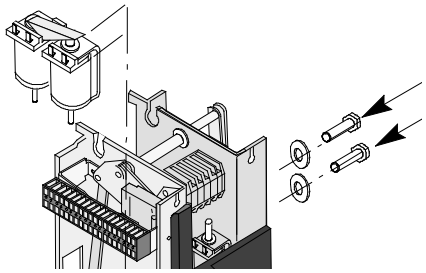
according to position VI

removal

Mark and disconnect the wires.

Remove the two M6 fixing screws.

Remove the release.



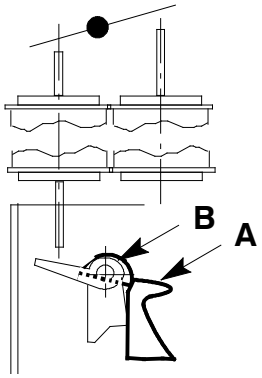
fitting and checking

Assemble in reverse order to disassembly.

Tightening torque: 13 N.m.

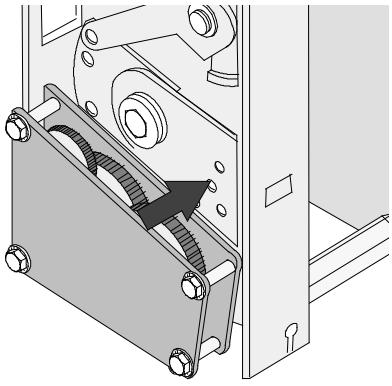
Position the release with the cylindrical rod directed towards the latching crank handle.

Check that the coil rod does not flange the crank handle in the tripped position and ensures transfer of the closing latch **A** onto the half−moon **B**.

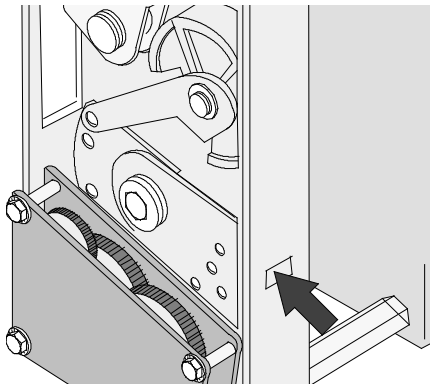


replacement gear motor and roller on the ratchet holder

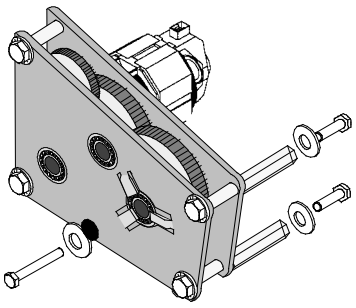
removing the gear motor



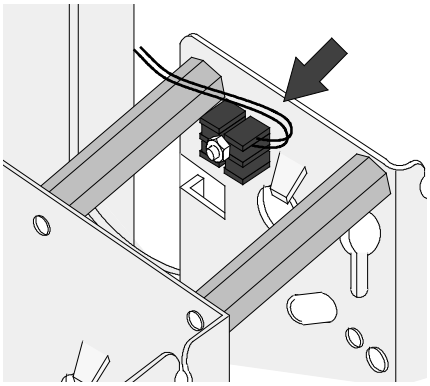
Unhook the ratchet holder return spring and lift the gear latching ratchet by means of a screwdriver.



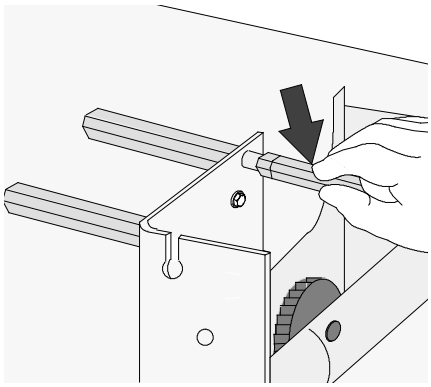
Raise the motor ratchet holder as high as possible and lock it in place with the screwdriver.



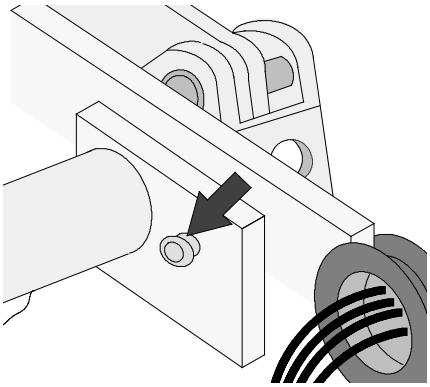
Remove the gear motor (3 screws).



Disconnect the 2 motor supply wires.



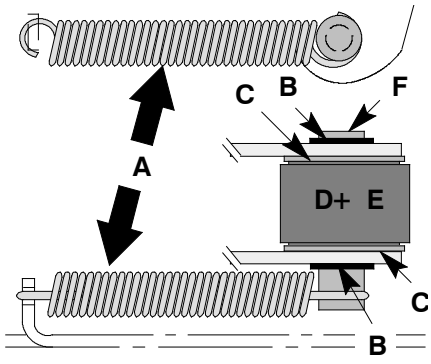
Remove the small column.



Take out this rivet.

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

removing the roller on the ratchet holder

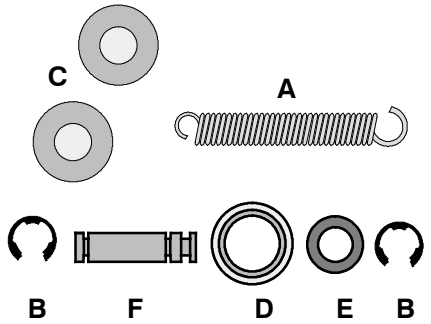


Remove spring **A**.

Remove the roller.

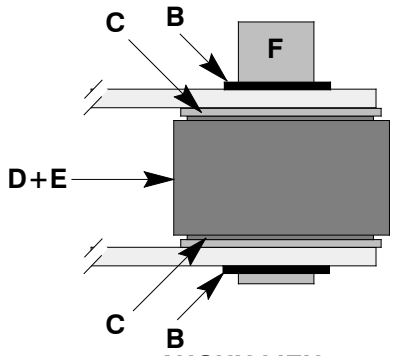
- Truarc **B**.
- washers **C**.
- bearing **D.**
- internal bearing ring **E**.
- pin **F**.

placing the roller on the ratchet holder

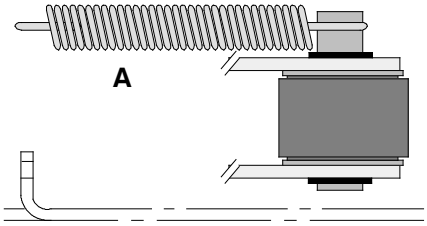


Prepare and lubricate the parts:

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

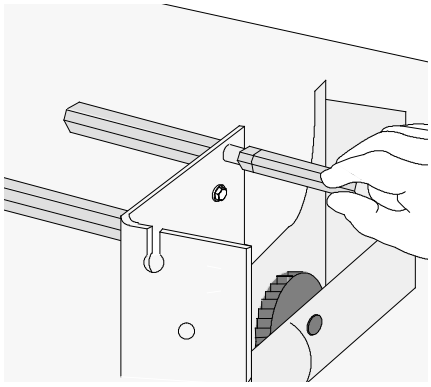


Assemble the roller, with the part of the pin used to hook the spring turned towards the gear motor.



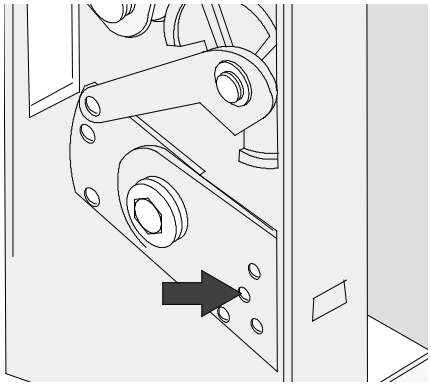
Place the spring on the ratchet holder.

fitting the gear motor



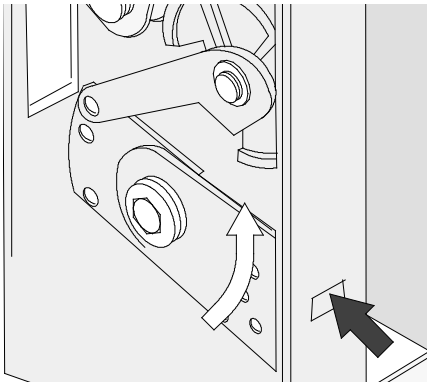
Stick (SR 270 strong loctite) and screw the HM6 length 12, **class 12.9** stud in the yellow column on the tool mark side .

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

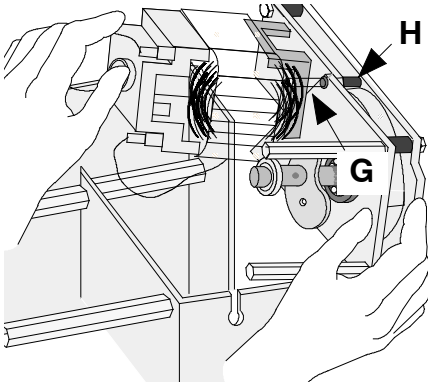


To fit the gear motor, raise the ratchet wheel as far as it will go and lock it using the screwdriver.

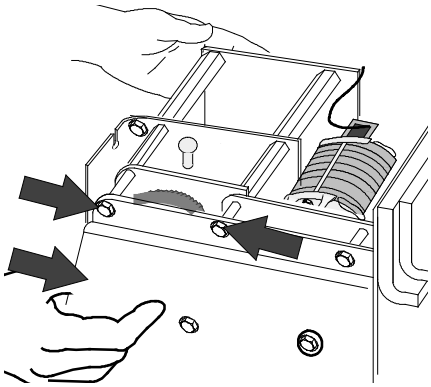
Should a ratchet catch in the ratchet wheel, it will prevent this operation.



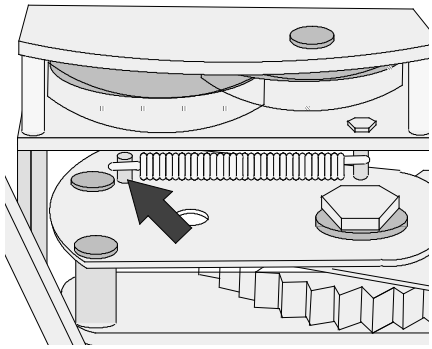
Raise the motor ratchet wheel as far as it will go and lock it using the screwdriver.



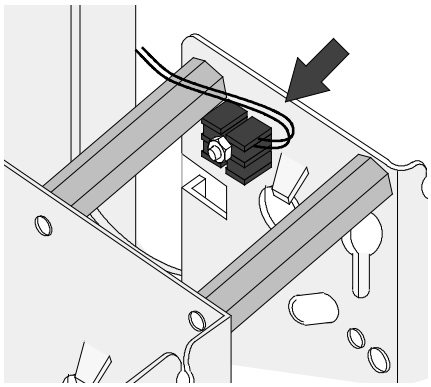
Insert the gear motor, taking care not to remove screw **G** so as not to lose spacer **H** placed between the two flanges.



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**.



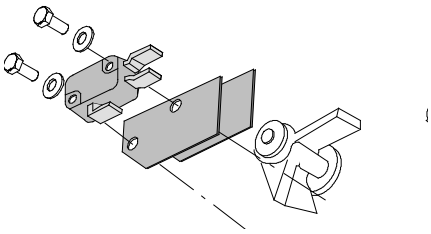
Hook the spring onto the gear motor pin.



- 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.

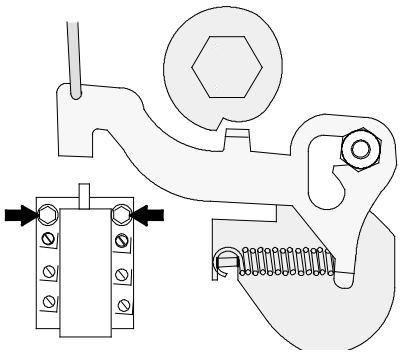
fitting and checking

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)

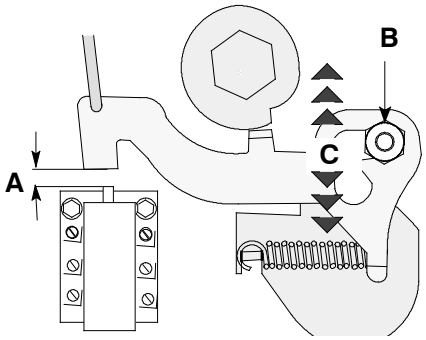
removal



Mark and disconnect the wires.

Remove the hexagon socket screws and the fixing nuts.

fitting and checking



Proceed in reverse order.

Lock the contact fixing screws.

Tightening torque: 0.7 N.m.

Adjustment

- do not flange the contact,

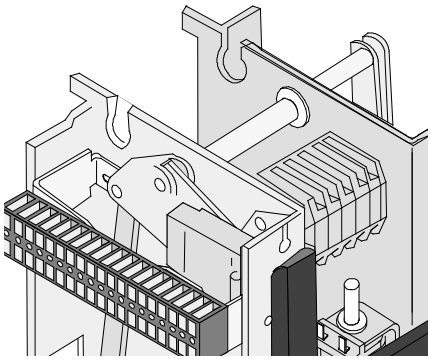
adjust travel **A** 0,7 $^{+0,1}_{-0,2}$ mm.

NB: to adjust **A,**

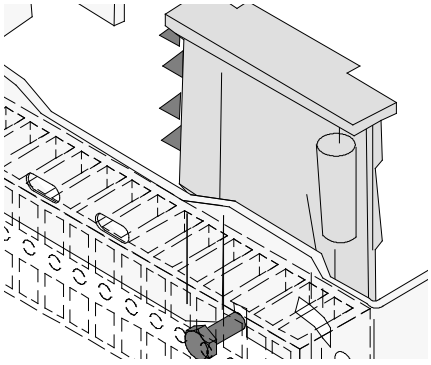
- loosen nut **B**
- move the part along **C**

replacing the antipumping relay

removal



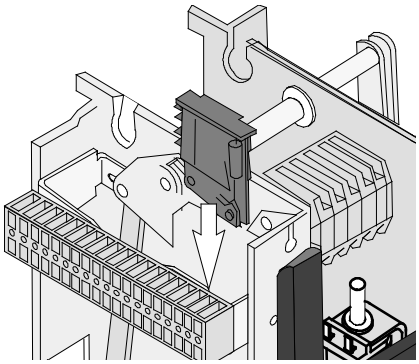
Mark and disconnect the wires.



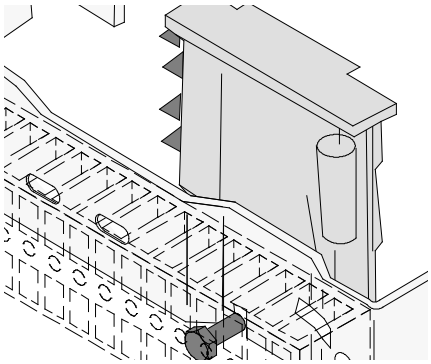
Loosen the fixing screw and slide the relay so that the screw passes through the opening.

Use a 7 mm wrench.

fitting



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



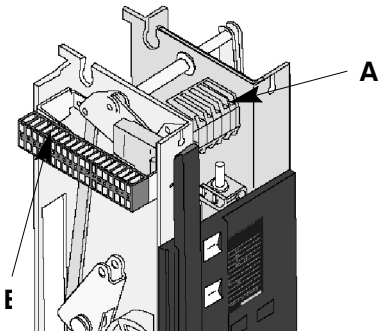
Lock the fixing screw in place.

Tightening torque: 0.7 N.m.

Connect the wires according to the diagram and bind them.

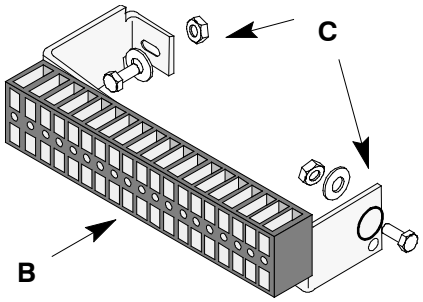
replacing the auxiliary contact unit

removal



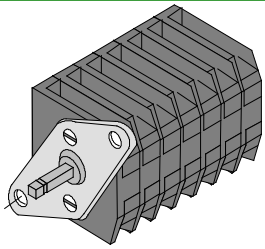
Remove the operating mechanism cover

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



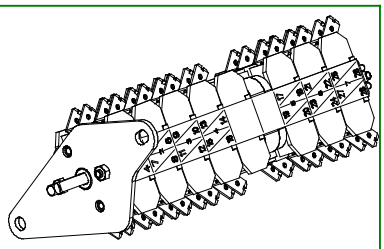
Remove the terminal block assembly **B**, secured by screws, washers and nuts **C**.

replacement of the rotating contacts



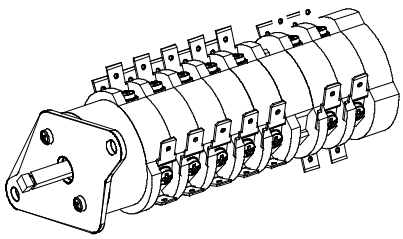
ENTRELEC> 732797

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



MAFELEC> 51307608F0

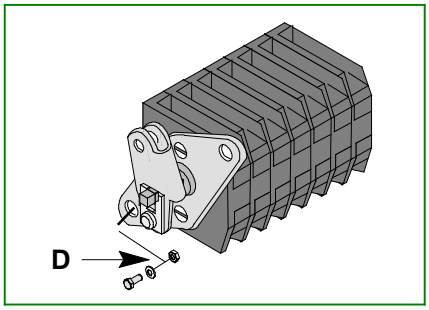
OLD rotating contacts **MAFELEC until 2010/23/02**



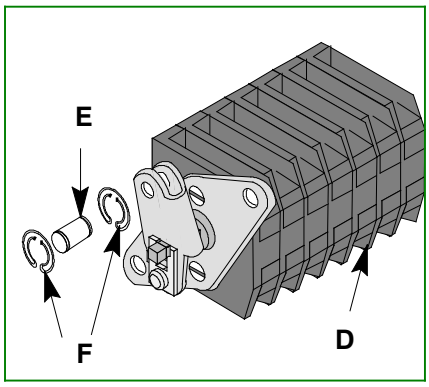
BREMAS> AAV85914

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

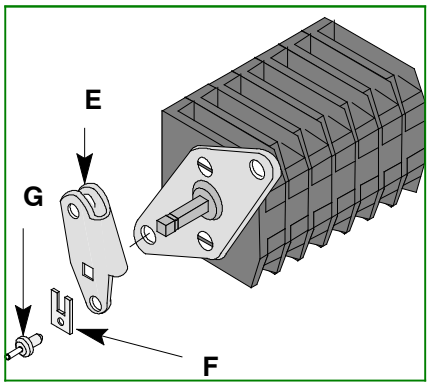
dismantling the OLD rotating contacts ENTRELEC



Remove the 2 nylstop nuts **D.**



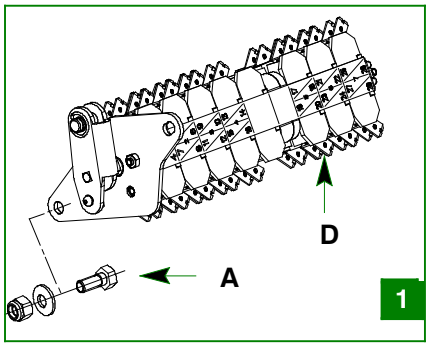
- remove pin **E** and colar **F**
- remove rotating contacts **D**



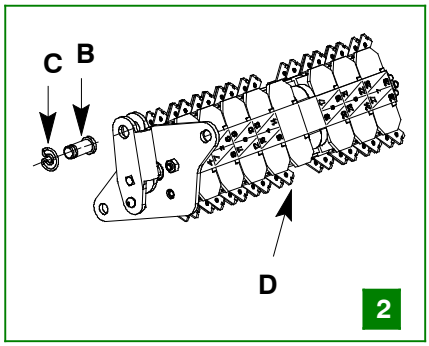
- remove rivet **G** which locks small plate **F**
- remove crank **E** and small plate **F**

dismantling the OLD rotating contacts MAFELEC

D : rotating contacts



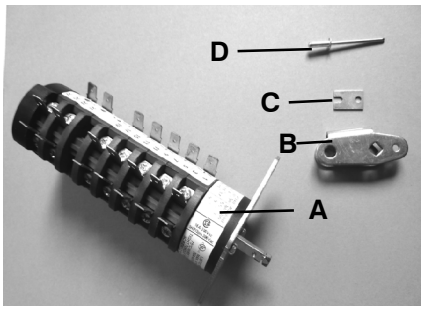
Remove the 2 nylstop nuts **(A).**



Remove pin **B** and colar **C,** remove rotating contacts **D**

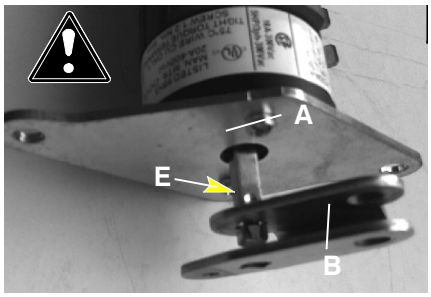
NEW

installation of rotating contacts BREMAS



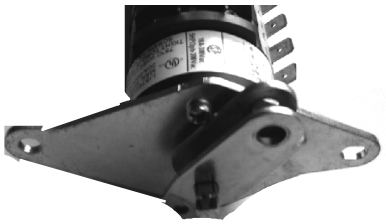
Kit reference : **MV261239**

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



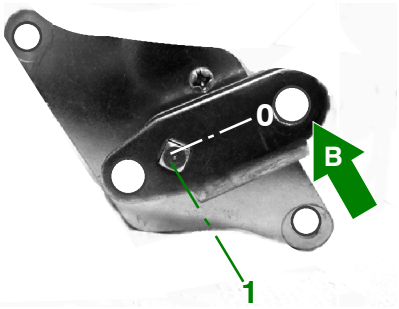
Correctly position the crank (B) on the pin of the contact (A), using the punch (E) as a position market.

correct configuration before to continue intervention

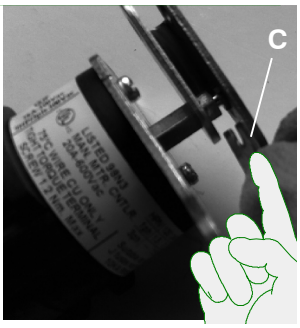


Correct assembly.

You can continue the intervention.



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



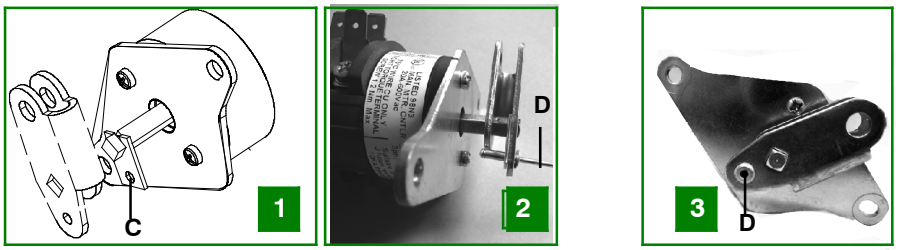
Install the plate **C**.

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 downtimes to a minimum.

However if the solutions proposed are not effective, you must contact the **Schneider Electric service centre**.

symptoms	faulty devices	problable causes and solutions
Charging not possible	Electrical operating mechanism: motor	Voltage too low at motor terminals: ▪ restore voltage ▪ replace motor if required
	End of charging contact	▪ check contact status ▪ replace contact if required
	Wiring	▪ check connections of the auxiliary circuits
Impossible to close the circuit--breaker the indicator remains green	Undervoltage release	The coil is not powered ▪ supply the release or keep it artificially in the closed circuit position.
	Closing release	The release is incorrectly connected ▪ check the circuit The winding is broken ▪ replace the release

	Charging device	The operating mechanism is not charged
The circuit−breaker closes and opensimmediately and remains openalthough the closing order is maintained.	All opening releases *(direct or indirect)*	There is a fault on the main HV circuit, or adjustment of the protection circuits is incorrect ▪ remove the fault ▪ adjust the protection circuits
The circuit−breaker opens and closesin turn.	Antipumping relay or direct releases	▪ replace the relay ▪ readjust
The circuit−breaker does not open manuallyor by remote control*(circuit−breaker without electrical operating mechanism).*	Operating mechanism or circuit−breaker *(incomplete closing)*	Hard spot on the operating mechanism or circuit−breaker ▪ finish charging the operating mechanism with the manual charging handle **Alert the Schneider Electric service centre.**
	Opening release	The release is incorrectly connected ▪ check the circuit The winding is broken ▪ replace the release ▪ check the protection circuit.