

instructions for use

SF1 fixed or in SM6
circuit – breaker

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symbols and conventions

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

**DANGER**

as per iso 3864–2

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

**WARNING**

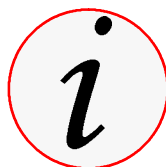
as per iso 3864–2

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

**CAUTION**

as per iso 3864–2

CAUTION: failure to follow this instruction may result in injuries.
This alert signal can also be used to indicate practices that could damage the SM6 unit.

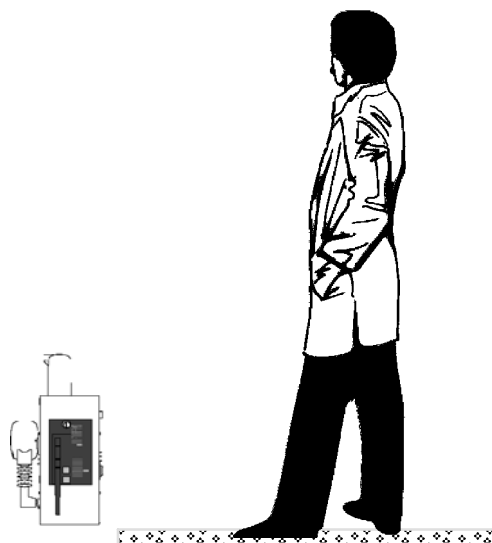
**INFORMATION-ADVICE**

We draw your attention to this specific point.

**contact the Schneider
Electric service unit for
diagnosis and advice**



Call your sales representative who
will put you in contact with
the closest
SCHNEIDER ELECTRIC
group service centre.
You can log on to:
www.schneider-electric.com



distribution rules



**The aim of this publication
is to enable the SF6 unit
to be installed correctly.**

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

safety rules



CAUTION

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



WARNING

**The contractor must be certified
and authorised to manipulate
and perform work on the SF6
unit.**



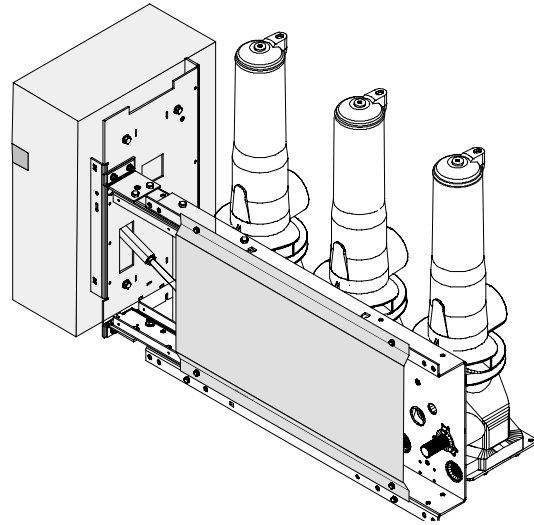
CAUTION

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

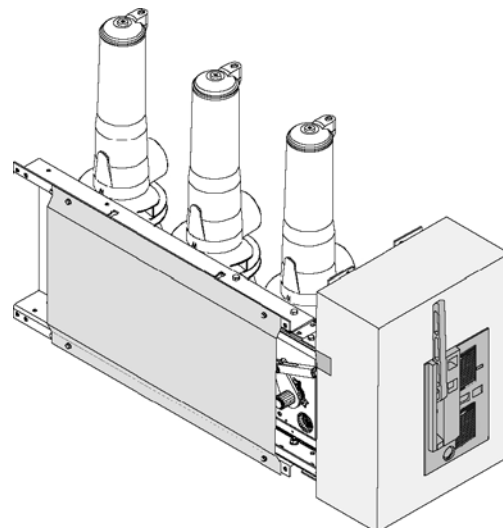
If you have any difficulty complying
with these rules, please contact
Schneider Electric.

fixed circuit-breaker

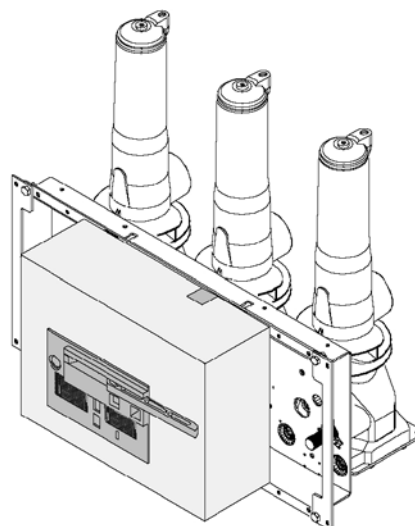
RI operating mechanism
side A1 position



RI operating mechanism
side B1 position

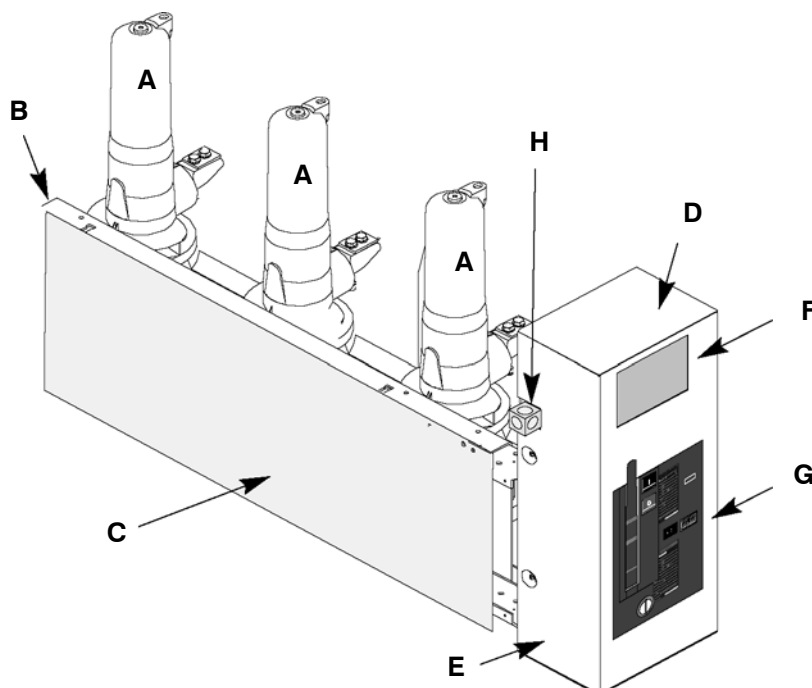


RI operating mechanism
front C1 position



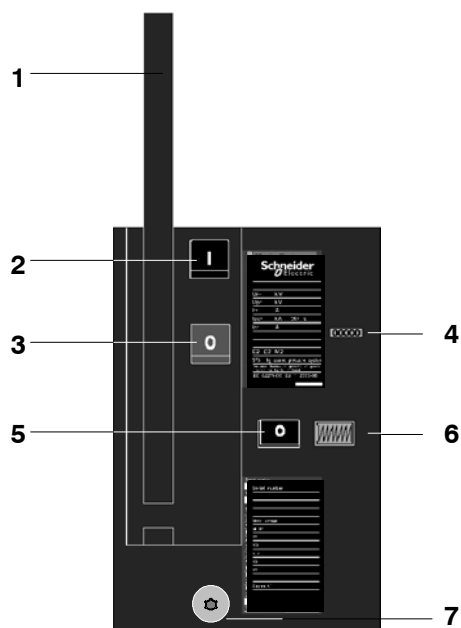
fixed circuit-breaker

- 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

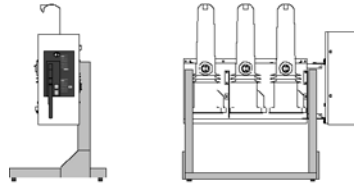
SF1 630A – 1250A

righthand side operating
mechanism

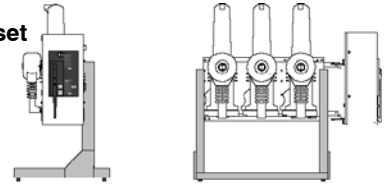
The support frame is optional
and is delivered unassembled.

The assembly manual is found
inside the packing.

SF1

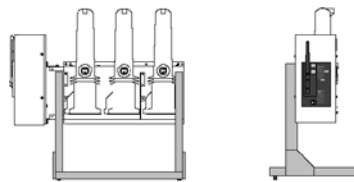


SFset

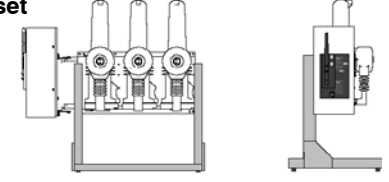


lefthand side operating
mechanism

SF1

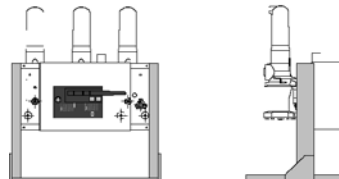


SFset

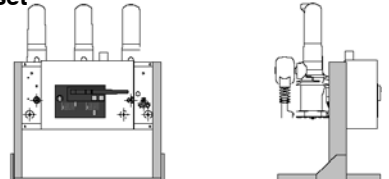


front operating mechanism

SF1



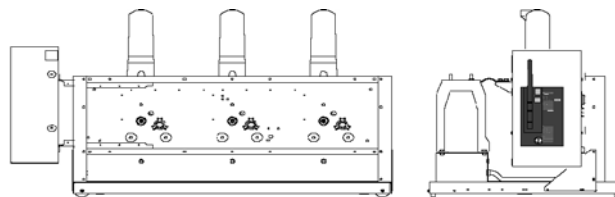
SFset



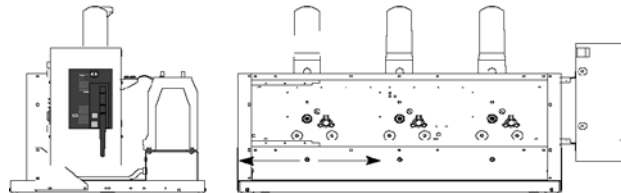
SFset 630 A 36 kV

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

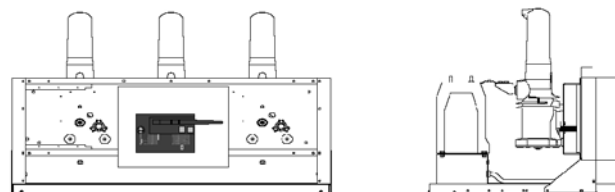
righthand side operating
mechanism



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

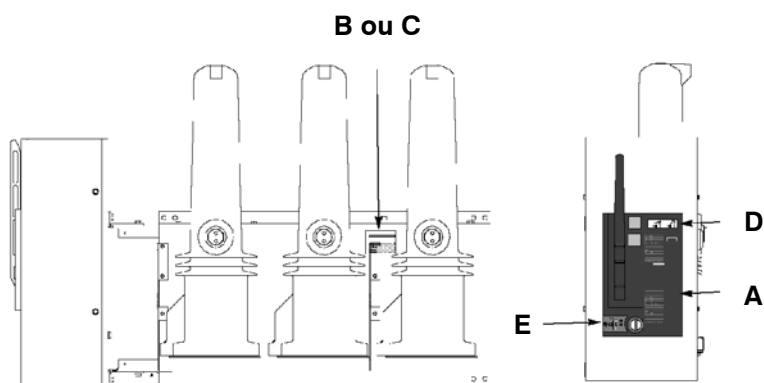
A : characteristics

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 continuous operating current

5 : rated breaking capacity for CC 3s

6 : no-load breaking capacity

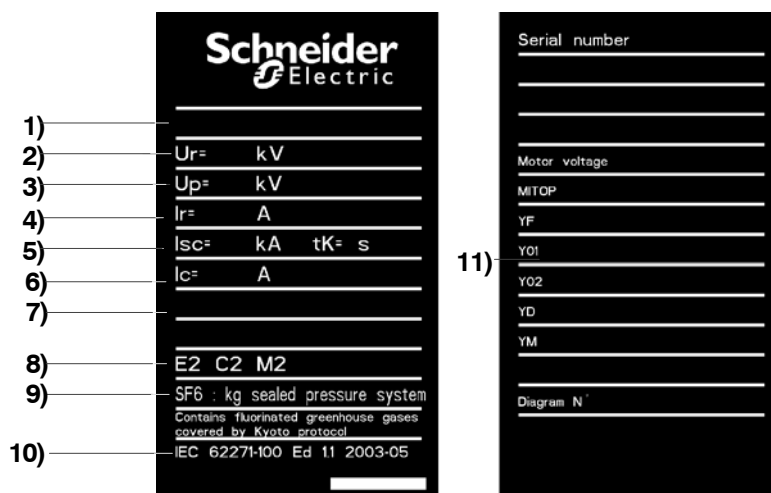
7 : rated operating sequence

8 : class

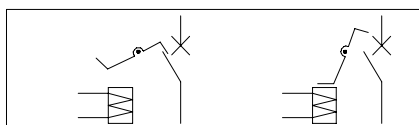
9 : SF6 mass

10 : reference standard

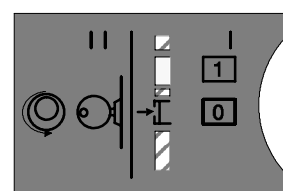
11 : characteristics information plates



voltage indication



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

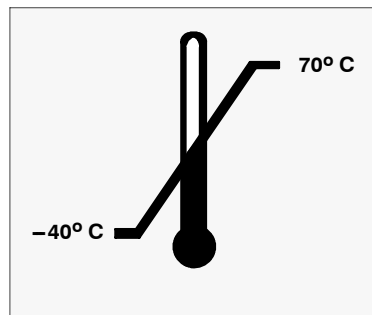
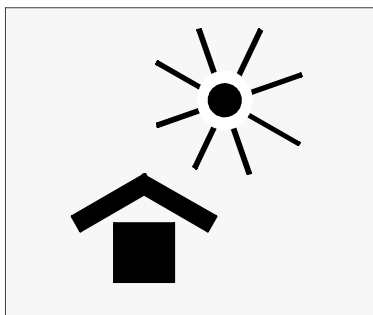
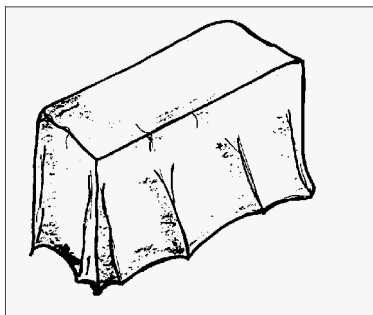


Label indicating the keylocking option.

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.



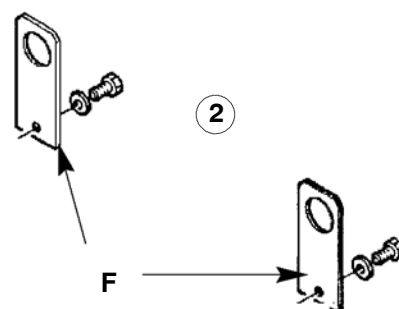
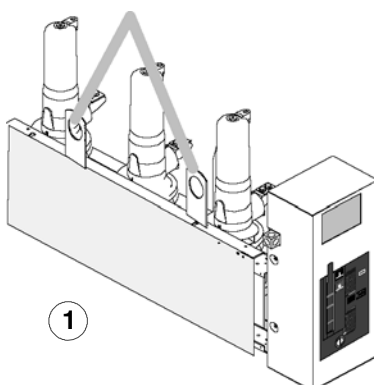
poles are under pressure. Once packing has been removed, hold the circuit-breaker using slings that are attached to handling elements.

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.

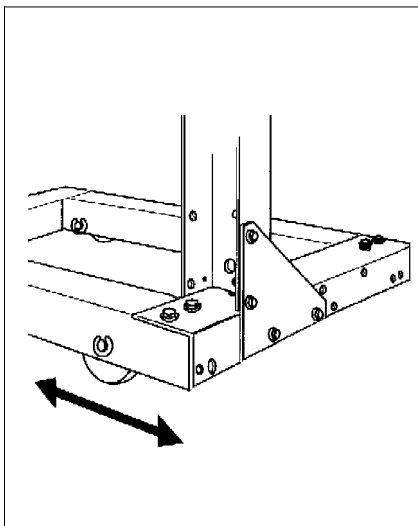


by rolling

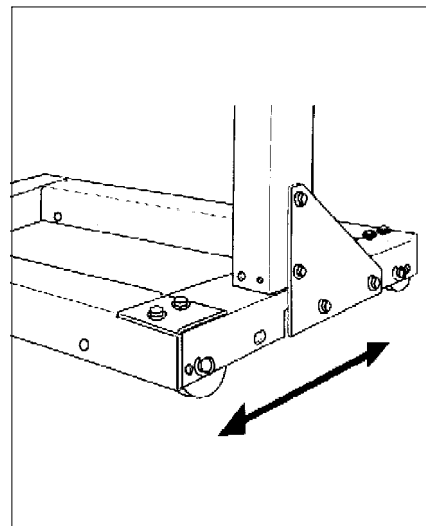
To assemble the rolling frame and assemble the **SF1** or **Sfset** on the frame,...

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

rolling direction



For the side operating mechanism in position A1 or B1.



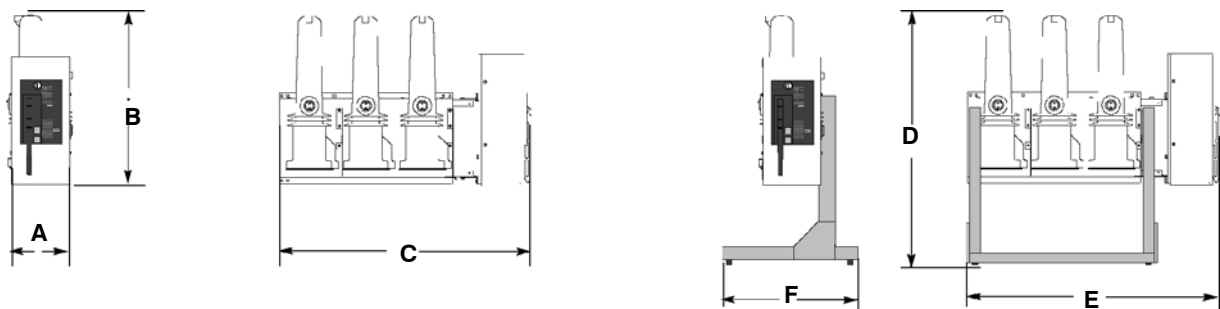
For the front operating mechanism in position C1.

overall dimensions
SF1 630A – 1250A

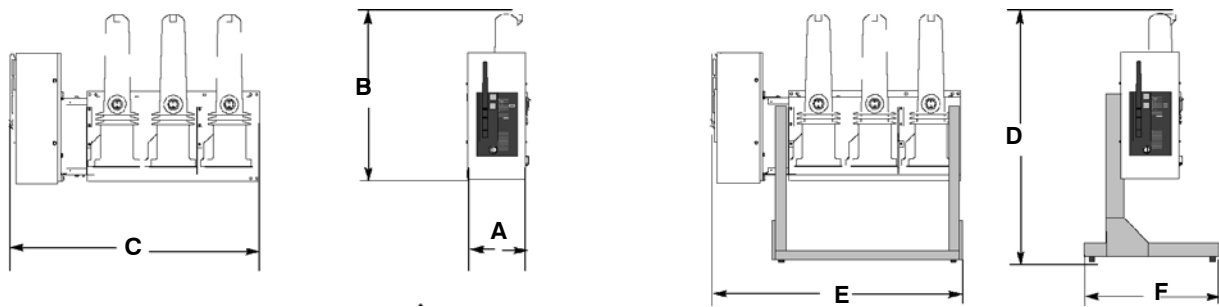
NB: the support frame (optional)
shown on the figures,....

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

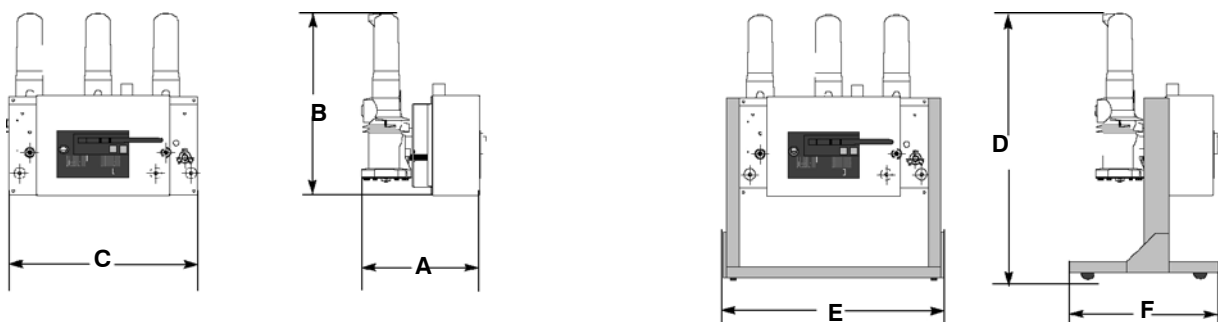
righthand side operating mechanism



lefthand side operating mechanism



front operating mechanism



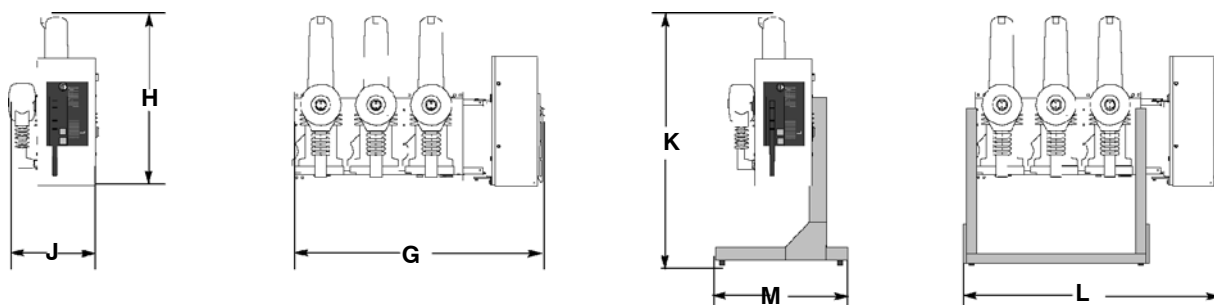
fixed SF1	phase to phase	dimensions without support frame			dimensions with support frame			weight in Kg	
SF1		A	B	C	D	E	F	SF1	Frame
righthand or lefthand side operating mechanism									
630 A and 1250 A	220	1008	290	750	1175	1065	600	78	25
	280	1158	290	750	1175	1215	600	80	27
	380	1575	365	750	1175	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

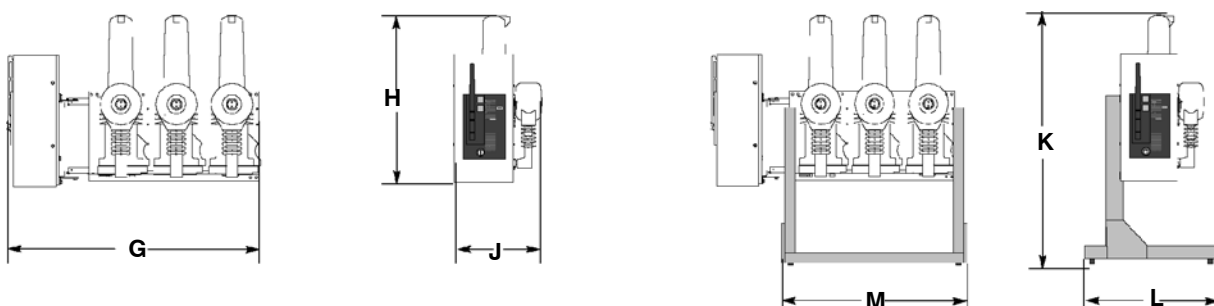
NB: the support frame (optional) shown on this figure,....

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

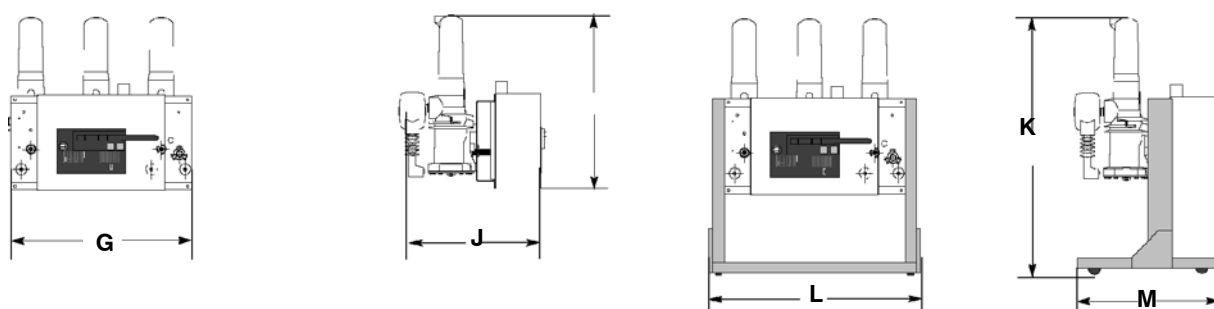
righthand side operating mechanism



lefthand side operating mechanism



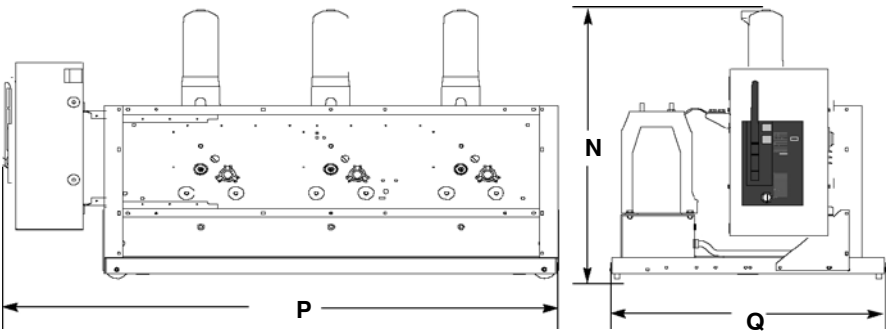
front operating mechanism



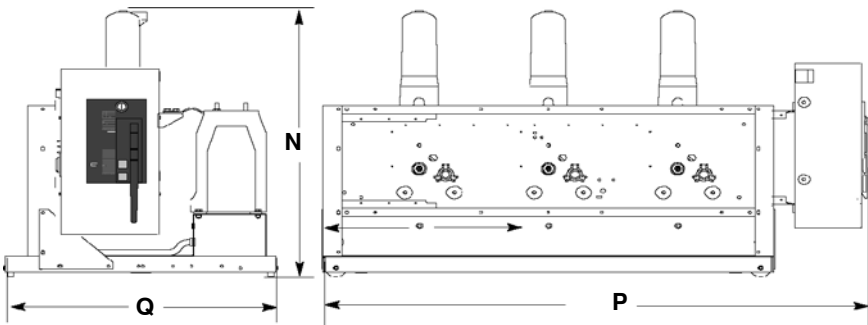
fixed SF1	phase to phase	dimensions without support frame			dimensions with support frame			weight in Kg	
		G	H I	J	K	L	M	SFset	Frame
righthand or lefthand side operating mechanism									
630 A and 1250 A	220	1008	750	420	1175	1065	600	103	25
	280	1158	750	420	1175	1215	600	105	27
front operating mechanism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

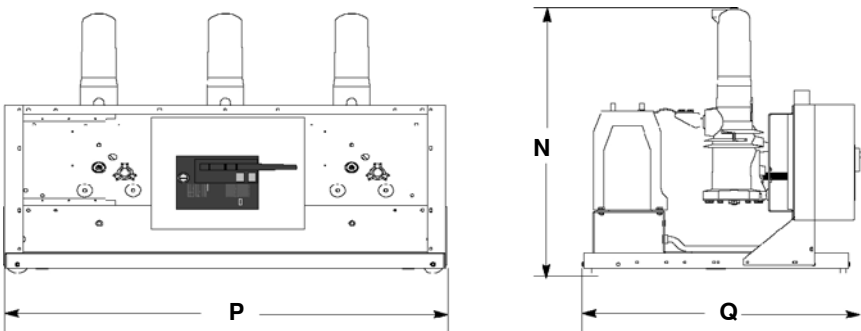
righthand side operating mechanism



lefthand side operating mechanism

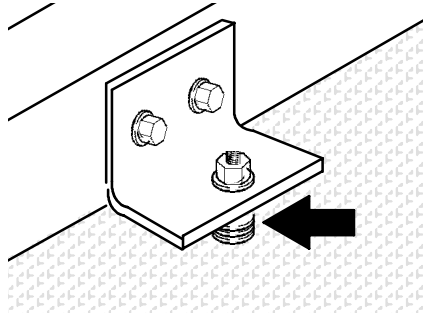


front operating mechanism



SFset	phase—to—phase	dimensions with support frame			weight in Kg	
		N	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

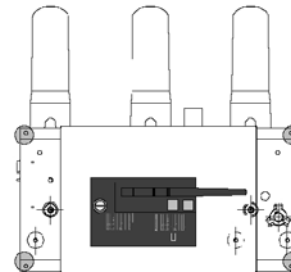
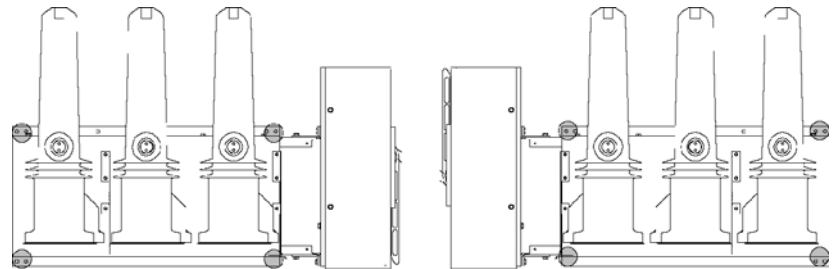
On no account must this frame be used to convert a fixed circuit-breaker into a draw-out circuit-breaker.

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.

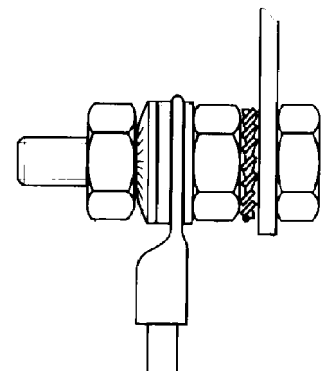
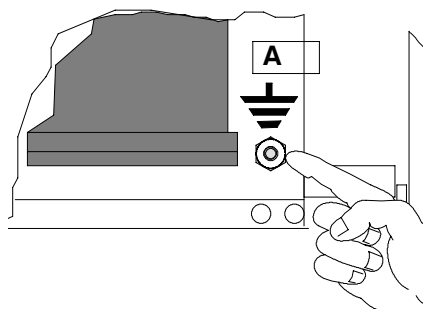
without support frame

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



connecting the earth busbar

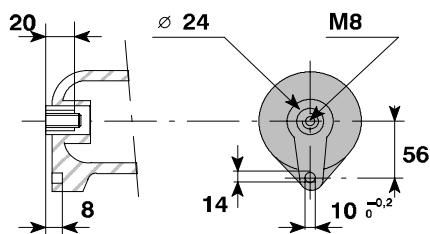
Connection **A** is placed to the bottom right of the poles support.



HV electrical connection **at the end of the pole**

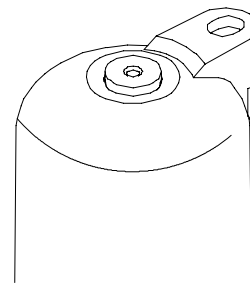


compulsory tightening torque:
28 Nm.



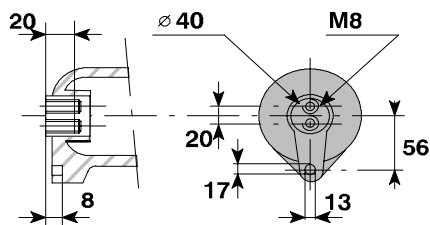
Incomer or feeder

- an M8 tap hole



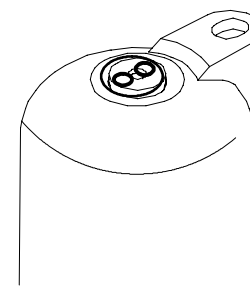
Upper insert

- according to performance



Incomer or feeder

- two M8 tap holes



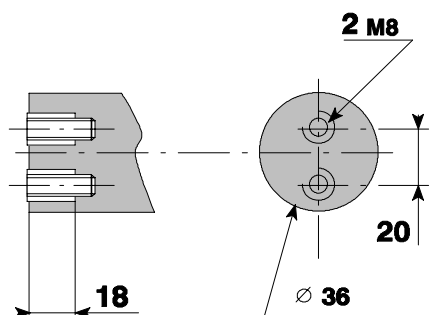
Upper insert

- according to performance

side

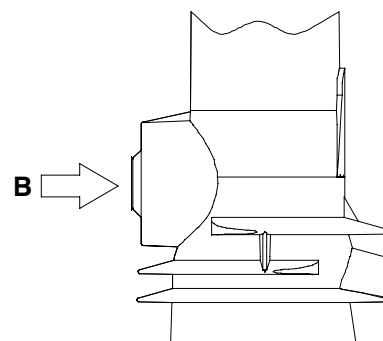


compulsory tightening torque:
28 Nm.



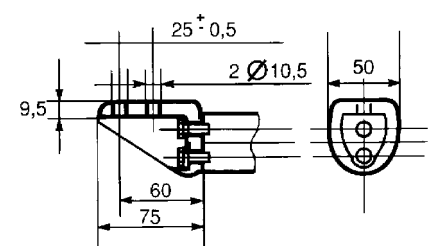
Incomer or feeder

- two M8 tap holes



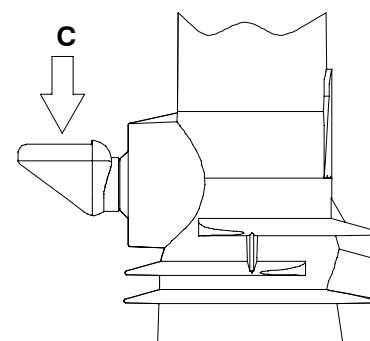
Lower insert

- B** : connecting holes.



Incomer or feeder

- two diameter 9 holes
for M8 screws



Lower insert

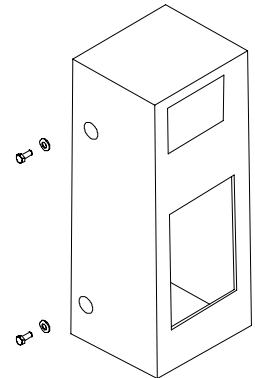
- C** : connecting holes

LV electrical connection



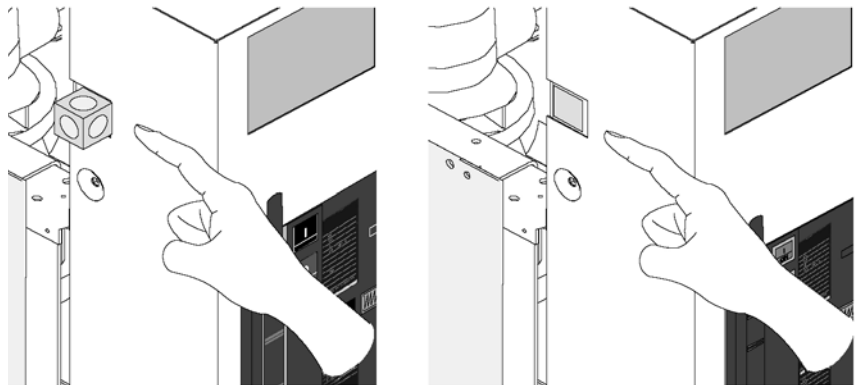
CAUTION

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

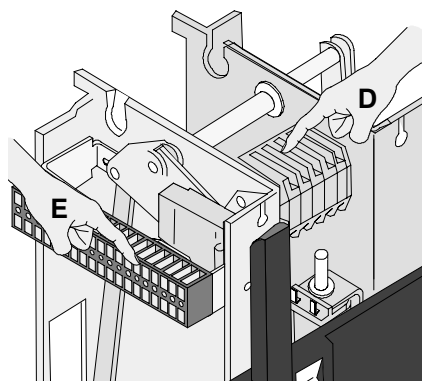


The wiring leaves the case through the 3 predrilled holes.
The case can be installed to the right or left of the cover.

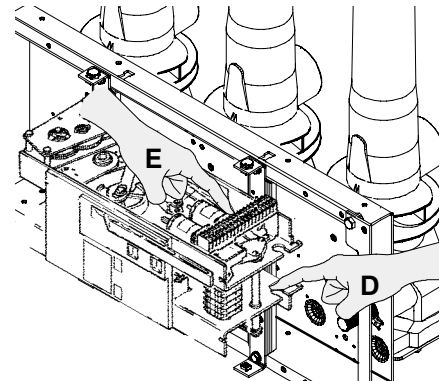
The outlet for unused wiring is blocked by a blanking plate.

LV connecting terminal

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

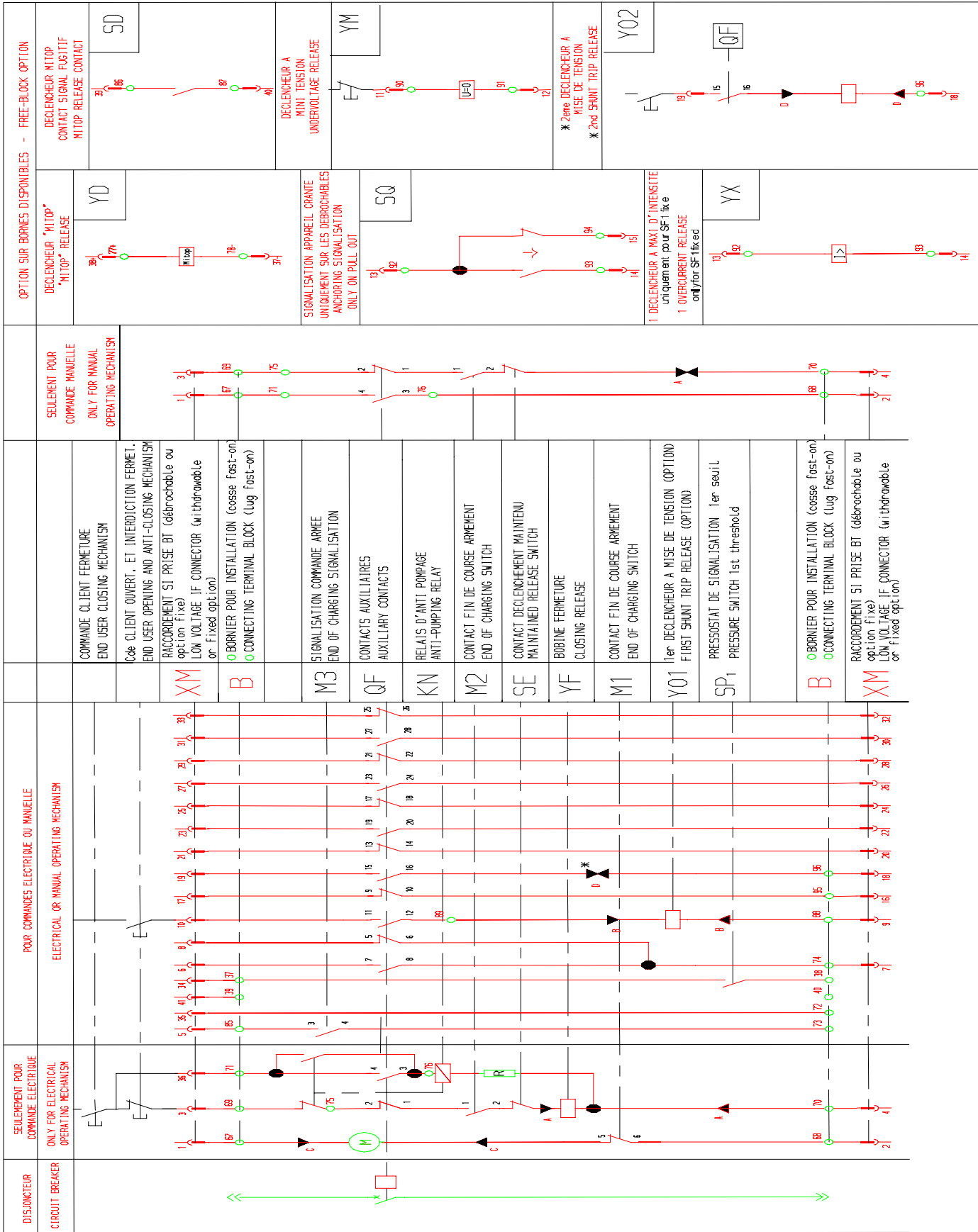


operating mechanism in the side position



operating mechanism in the front position

electrical diagram n° 889461

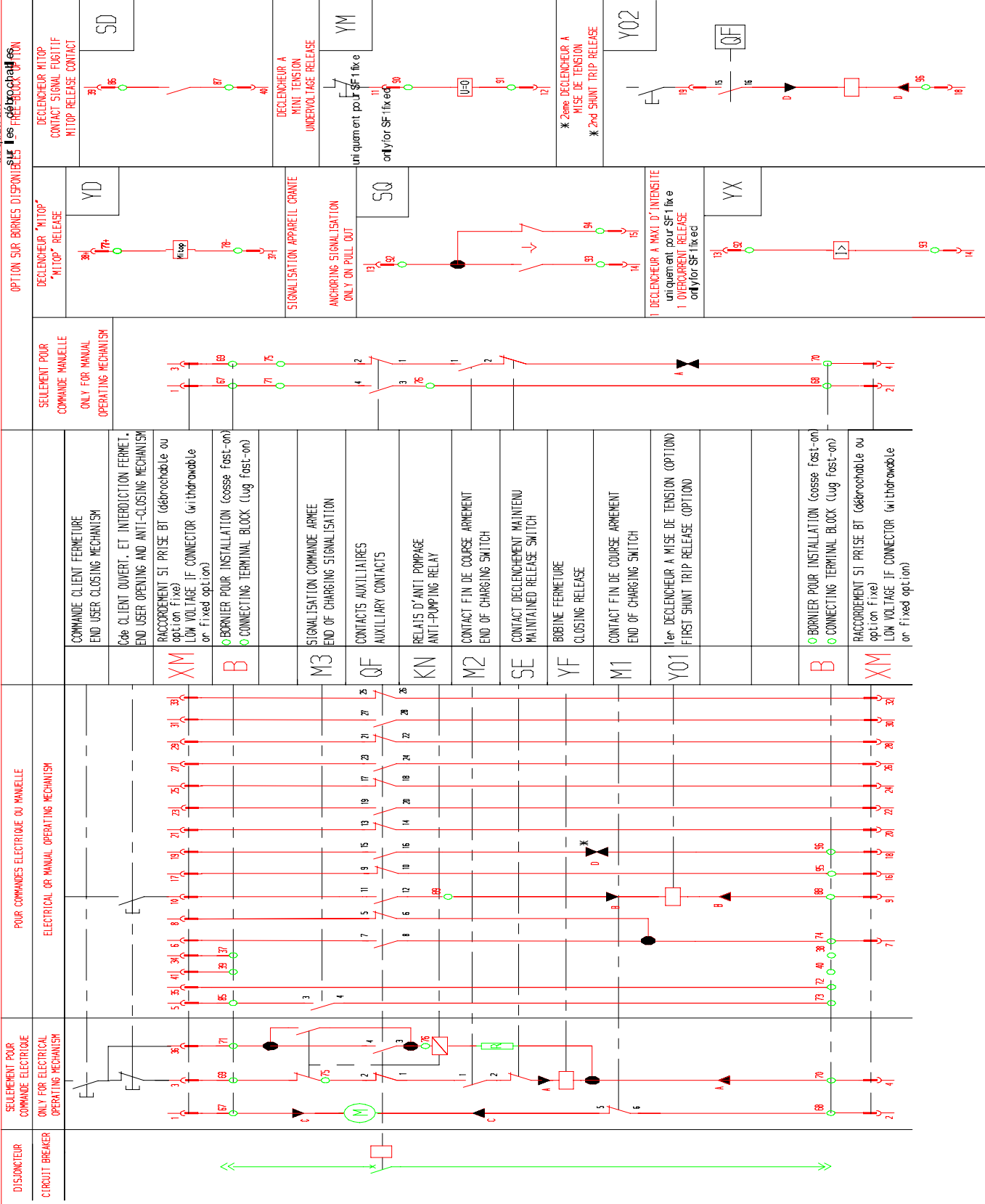


- A** : SF6 pressure signalisation/ common source of power supply for end of charging signalisation and opened or closed CB signalisation/common point for release interlock and anti-pumping relay
- B** : common point for end of charging signalisation/SF6 pressure signalisation/ opened or closed CB signalisation supervision of continuity release circuit
- C** : common point for end of charging signalisation/SF6 pressure signalisation/ opened or closed CB signalisation
- D** : common point for end of charging signalisation/SF6 pressure signalisation supervision of continuity release circuit
- E** : common point for end of charging signalisation/SF6 pressure signalisation
- F** : end of charging signal / supervision of continuity release circuit / common point for SF6 pressure and opened or closed CB signalisation
- G** : end of charging signalisation / common point for SF6 pressure and opened or closed CB signalisation
- H** : SF6 pressure signalisation / common point for end of charging signalisation and opened or closed CB signalisation supervision of continuity release circuit
- J** : SF6 pressure signalisation / common point for end of charging signalisation and opened or closed CB signalisation
- P** : end of charging signalisation /supervision of continuity of release circuit

the bridges are only possible on the circuit breaker with low voltage connectors

type of connection (1 th letter of diagram)		A	B	C	D	E	F	G	H	J	P
bridge between terminals -- / --	72 / 73	—	×	×	×	×	×	×	—	—	×
	72 / 38	×	×	×	×	×	—	—	×	×	—
	73 / 74	×	×	×	—	—	—	—	×	×	—
H bridge standard and level C	89 / 95	—	×	—	×	—	×	—	×	—	×
	69 / 71	—	—	—	—	—	—	—	—	—	—
A bridge only to be used in retrofit cases	74 / 38	—	—	—	—	—	×	×	—	—	—
	-- / --	—	—	—	—	—	—	—	—	—	—
	-- / --	—	—	—	—	—	—	—	—	—	—
	-- / --	—	—	—	—	—	—	—	—	—	—
	-- / --	—	—	—	—	—	—	—	—	—	—

electrical diagram n° 889460

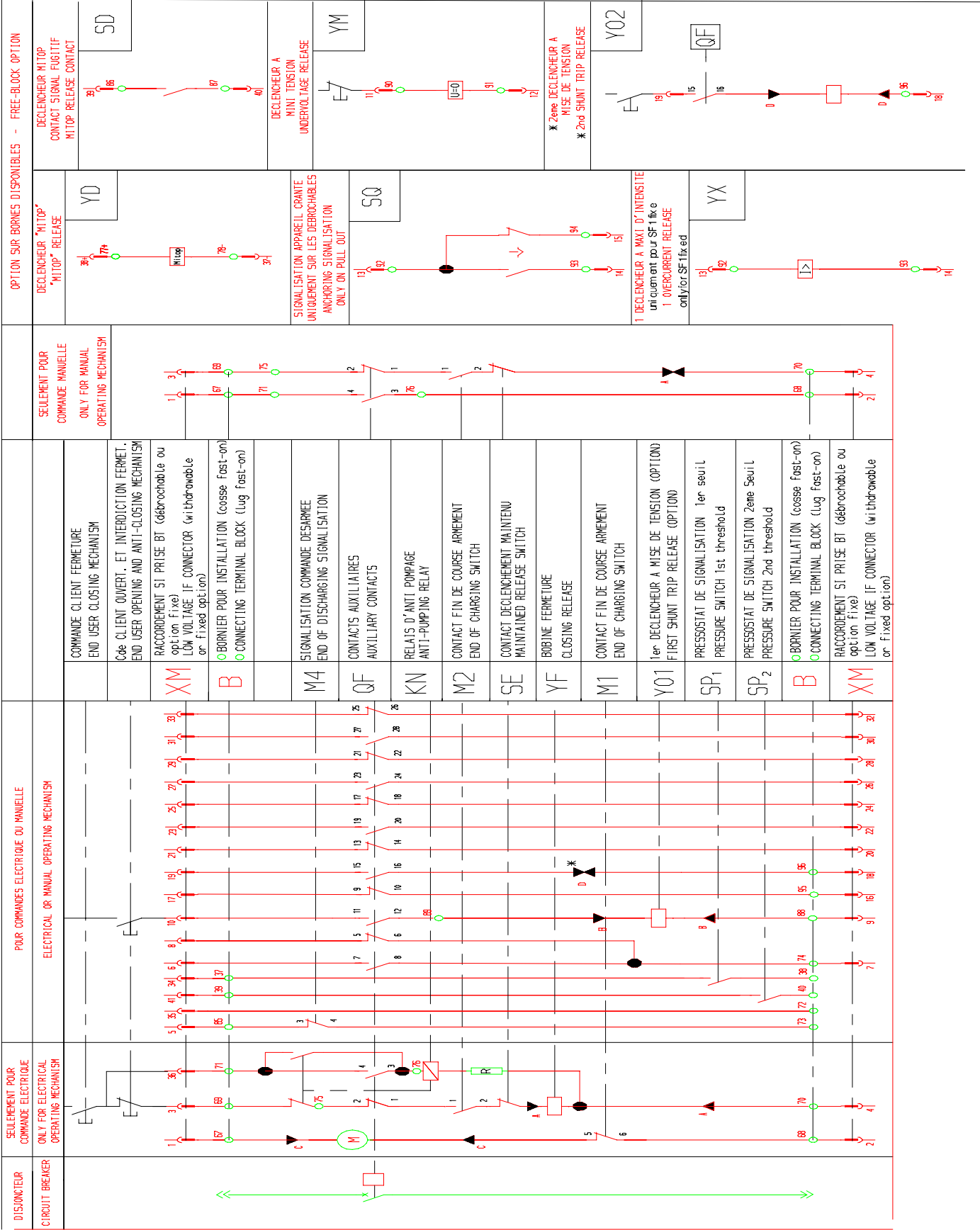


- A** : common point for release interlock and anti-pumping relay common source of power supply for end of charging signalisation and opened or closed CB signalisation
- B** : common point for end of charging signalisation/ opened or closed CB signalisation supervision of continuity release circuit
- C** : common point for end of charging signalisation/ opened or closed CB signalisation
- D** : common point for end of charging signalisation supervision of continuity release circuit
- E** : common point for end of charging signalisation
- F** : end of charging signalisation / supervision of continuity release circuit
- G** : end of charging signalisation
- H** : common point for end of charging signalisation and opened or closed CB signalisation supervision of continuity release circuit
- J** : common point for end of charging signalisation and opened or closed CB signalisation
- P** : end of charging signalisation supervision of continuity of release circuit

the bridges are only possible on the circuit breaker with low voltage connectors

type of connection (1 th letter of diagram)		A	B	C	D	E	F	G	H	J	P
bridge between terminals -- / --	72 / 73	—	×	×	×	×	×	×	—	—	×
	69 / 71	×	—	—	—	—	—	—	—	—	—
	73 / 74	×	×	×	—	—	—	—	×	×	—
H bridge standard and level C	89 / 95	—	×	—	×	—	×	—	×	—	×
		—	—	—	—	—	—	—	—	—	—
A bridge only to be used in retrofit cases		—	—	—	—	—	—	—	—	—	—
	-- / --	—	—	—	—	—	—	—	—	—	—
	-- / --	—	—	—	—	—	—	—	—	—	—
	-- / --	—	—	—	—	—	—	—	—	—	—
	-- / --	—	—	—	—	—	—	—	—	—	—

electrical diagram n° 890212



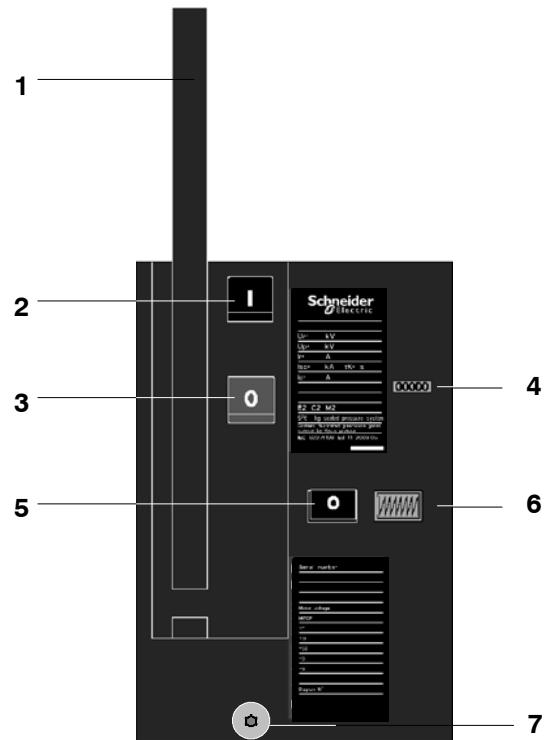
- A** : SF6 pressure signalisation/ common source of power supply for end of charging signalisation and opened or closed CB signalisation/common point for release interlock and anti-pumping relay SF6 pressure signalisation
- B** : common point for end of charging signalisation/SF6 pressure signalisation/ opened or closed CB signalisation supervision of continuity release circuit SF6 pressure signalisation
- C** : common point for end of charging signalisation/SF6 pressure signalisation/ opened or closed CB signalisation SF6 pressure signalisation
- D** : common point for end of charging signalisation/SF6 pressure signalisation supervision of continuity release circuit SF6 pressure signalisation
- E** : common point for end of charging signalisation/SF6 pressure signalisation SF6 pressure signalisation
- F** : end of charging signal / supervision of continuity release circuit / common point for SF6 pressure and opened or closed CB signalisation common point for SF6 pressure and opened or closed CB signalisation
- G** : end of charging signalisation / common point for SF6 pressure and opened or closed CB signalisation common point for SF6 pressure and opened or closed CB signalisation
- H** : SF6 pressure signalisation / common point for end of charging signalisation and opened or closed CB signalisation supervision of continuity release circuit SF6 pressure signalisation
- J** : SF6 pressure signalisation / common point for end of charging signalisation and opened or closed CB signalisation SF6 pressure signalisation
- P** : end of charging signalisation /supervision of continuity of release circuit SF6 pressure signalisation

the bridges are only possible on the circuit breaker with low voltage connectors

type of connection (1 th letter of diagram)		A	B	C	D	E	F	G	H	J	P
bridge between terminals -- / --	72 / 73	—	×	×	×	×	×	×	—	—	×
	72 / 38	×	×	×	×	×	—	—	×	×	—
H bridge standard and level C	73 / 74	×	×	×	—	—	—	—	×	×	—
	89 / 95	—	×	—	×	—	×	—	×	—	×
A bridge only to be used in retrofit cases	69 / 71	—	—	—	—	—	—	—	—	—	—
	74 / 38	—	—	—	—	—	×	×	—	—	—
	38/39	—	—	—	—	—	—	—	—	—	×
	74/40	—	—	—	—	—	×	×	—	—	—
	72/40	×	×	×	×	×	—	—	×	×	—

operating mechanism plate

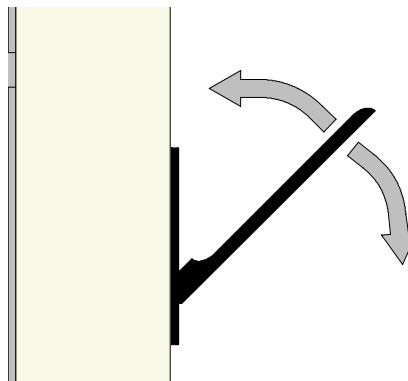
- 1 : operating mechanism charging lever
- 2 : closing pushbutton
- 3 : opening pushbutton
- 4 : operation counter
- 5 : "open or closed" device status mechanical indicator
- 6 : "charged or uncharged" operating mechanism charging status mechanical indicator
- 7 : keylock (option)



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.

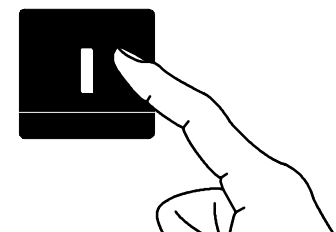


The circuit-breaker position indicator remains on "O" (device **open**). The operating mechanism indicator moves to the **charged** position.

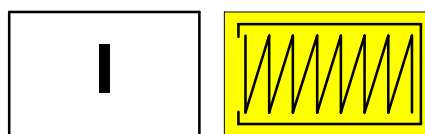
closing



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



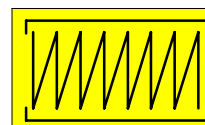
The circuit-breaker position indicator moves to “I” (*device closed*).

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

opening



Press the push button to open the circuit-breaker.

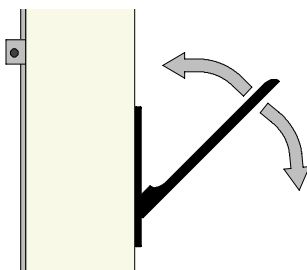


The circuit-breaker position indicator moves to “O” (*device open*).

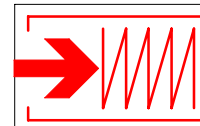
The operating mechanism indicator indicates that the mechanism is **deactivated**.

completion of Opening – Closing – Opening cycle

charging the operating mechanism



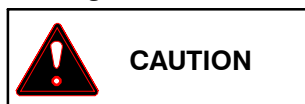
Charge the operating mechanism by an alternating motion until it clicks in place.



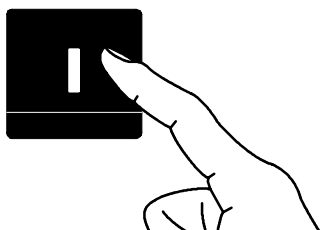
The circuit-breaker position indicator remains on “O” (*device open*).

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

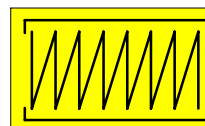
closing



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*).



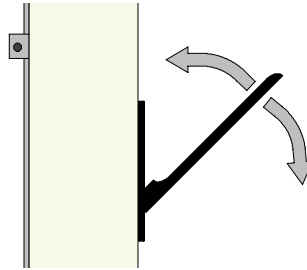
Press the push button to close the circuit-breaker



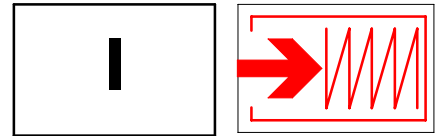
The circuit-breaker position indicator moves to “I” (*device closed*).

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

charging the operating mechanism

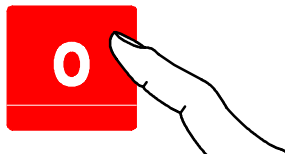


Charge the operating mechanism by an alternating motion until it clicks in place.



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.

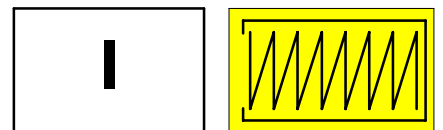


The circuit-breaker position indicator moves to "O" (*device open*).
The operating mechanism indicator moves to the **charged** position.

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.

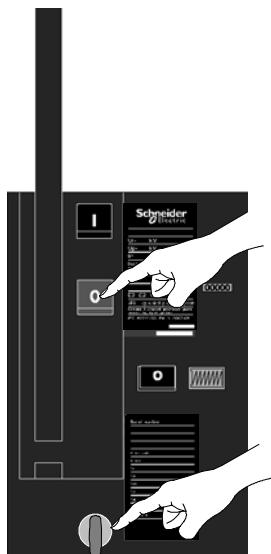
circuit-breaker remote operation

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.

introduction 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:

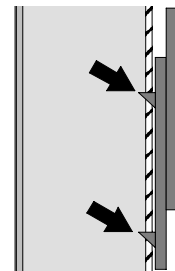
- open the circuit–breaker
- cut the supply to the auxiliary circuits and main circuit
- close and open using the push buttons in order to uncharge the operating mechanism
- avoid impacts (*pressurised enclosure*).

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 servicing operations

This device is designed to operate for 10 years or 10,000 operations under normal operating conditions in accordance with the IEC 694 standard.

The following are recommended:

- an O/I operation every year at least
- a visual inspection every 5 years at least to be determined with the **Groupe Schneider service centres**.

summarising table

description	operations	supplies	tools
pole enclosure	dust the enclosure		cloth
arcing contact wear degrees	measure degree of wear		lamp
operating mechanism			
spring guide	clean using a degreasing agent	unchlorinated solvent degreasing agent	cloth
	lubricate, oil	oils 133 vacuoline oil Isoflex Topas L152 grease	brush, oiler
operating mechanism unit	overall cleaning		cloth
	lubricate, oil	oils 133 vacuoline oil Isoflex Topas L152 grease	brush, oiler
latching mechanism and linkage	clean using a degreasing agent	unchlorinated solvent degreasing agent	cloth
	lubricate, oil	oils 133 vacuoline oil Isoflex Topas L152 grease	brush, oiler
gear motor	lubricate	Isoflex Topas L152 grease	brush
pole mechanism			
	clean using a degreasing agent	unchlorinated solvent degreasing agent	cloth
	lubricate, oil	oils 133 vacuoline oil Isoflex Topas L152 grease	brush, oiler

preventive maintenance and cleaning instructions

The pressurised **SF₆** gas inside the pole retains all its dielectric properties after breaking. Electrical durability is limited by contact wear.

This wear depends on device use. We draw your attention to the risk of cleaning processes, consisting of spraying solvents at high pressure.

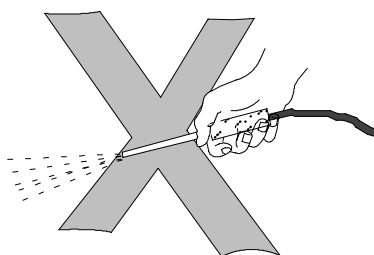
The main drawbacks of such processes are.

- 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.



CAUTION

Never use solvents and alcohol.

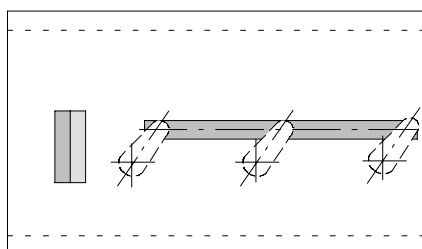


If the insulating parts are dusty, it is recommended that **you remove the dust using a dry cloth.**

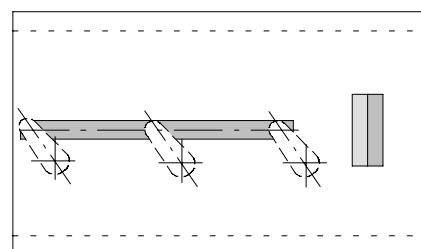
checking arcing contact wear

NB:

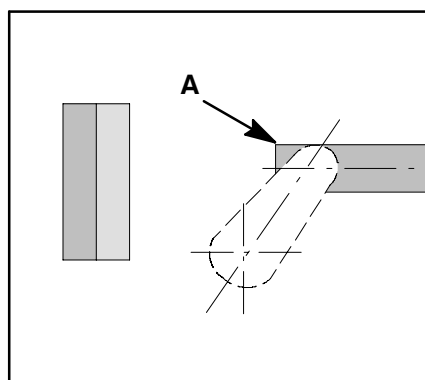
this procedure must be performed with an operating mechanism without a closing spring.



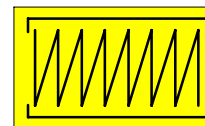
In position A1 and C1, the check is made at the linkage of the 3 poles,



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

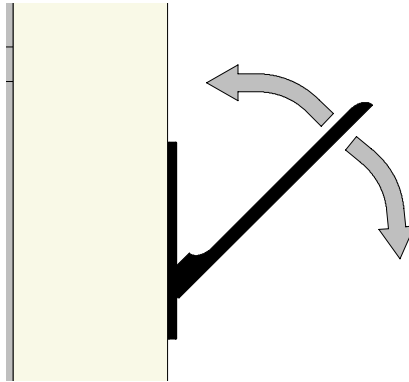


The end of link **A** acts as a reference.

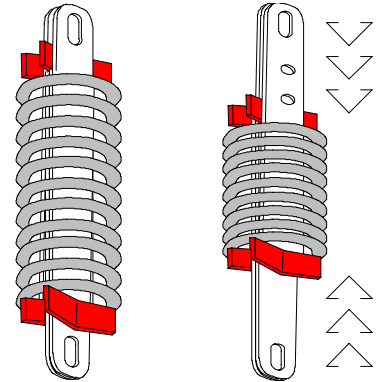


Check that the circuit-breaker is **open** and that the operating mechanism is **deactivated**.

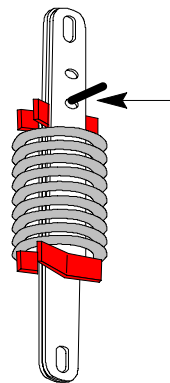
removing the closing springs



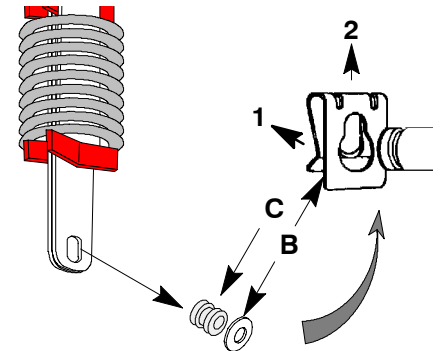
Slightly charge the operating mechanism in order to neutralise the closing springs.



The springs will be compressed.

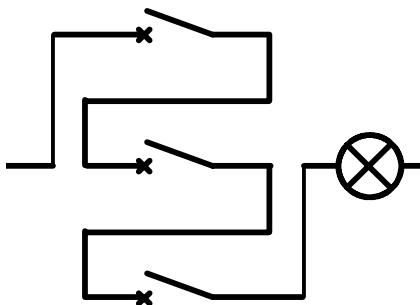


Insert a screw or pin, 6 mm diameter or 40 mm long min. into the hole shown above. On no account must it be free.
(do not exceed the first notch of the operating mechanism: otherwise carry out a full cycle and start again).

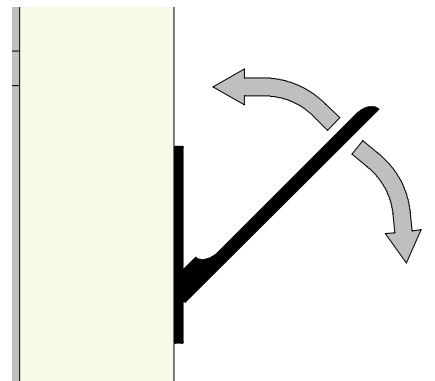


Remove the washer and the circlips **B**.
Release and withdraw the spring.
Remove the ring **C** taking care not to damage it (Teflon coating).

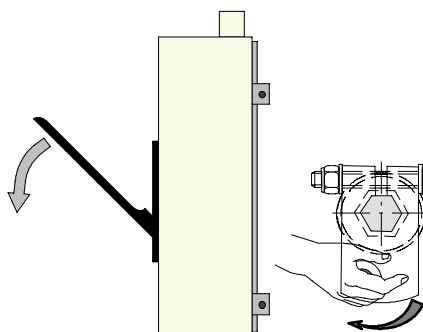
checking



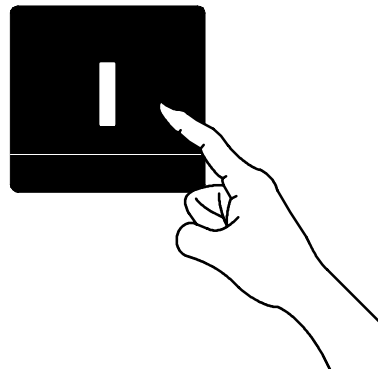
Connect in series the three phases of the device and insert a bell type indicator in the circuit.



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

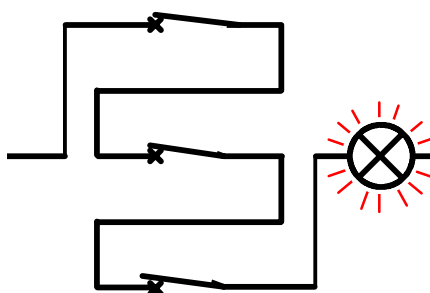


Maintain pressure on the lever and at the same time pull towards you the righthand crank handle until the ratchet wheel latches.



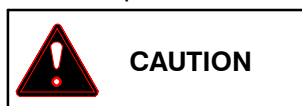
At the same time press closing button **I** and the charging lever in order to release the latching mechanism.

If the position is overshoot, repeat the operation.

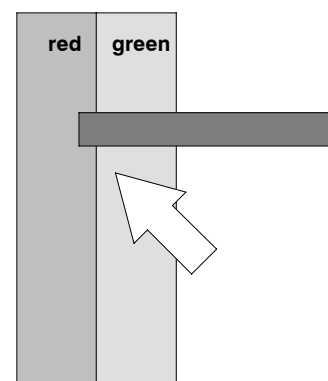


Slowly close the circuit-breaker using the lever.

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



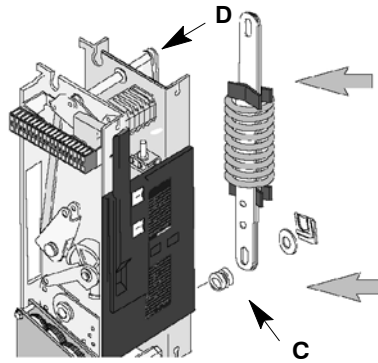
Keep the lever in this position, with the bell activated.



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

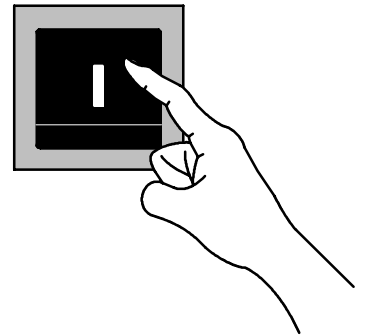


Fit the spring and the ring **C** on pin **D** of the operating mechanism.

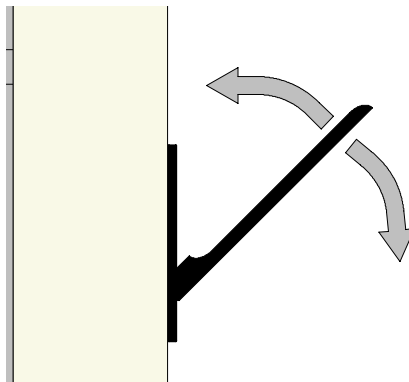


CAUTION

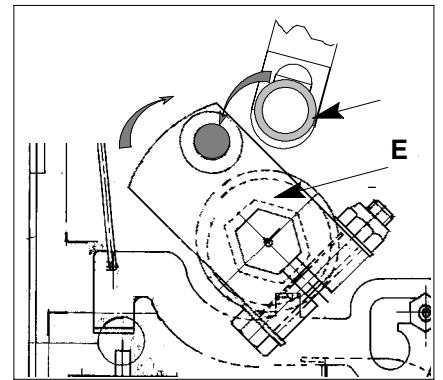
Assemble without lubricating, do not scratch the teflon ring.



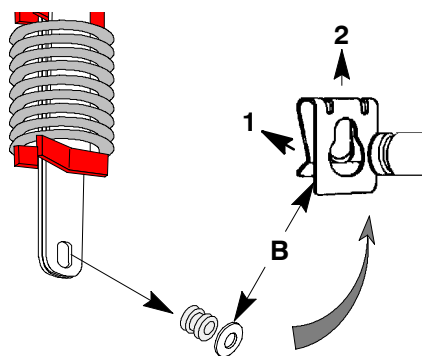
Press the closing button and at the same time...



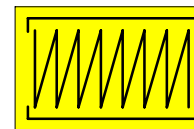
...continue charging...



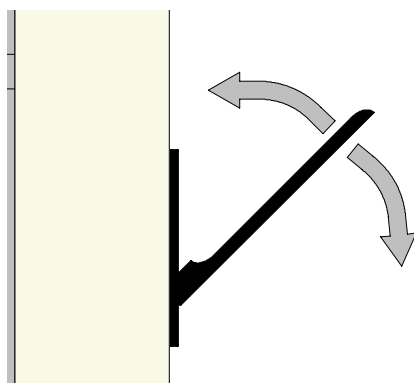
... in order to bring crank handle **E** into the axis of the lower fixing hole of the spring guide.



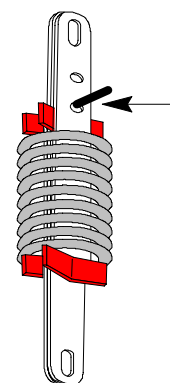
Fit the washer and the circlips **B**.



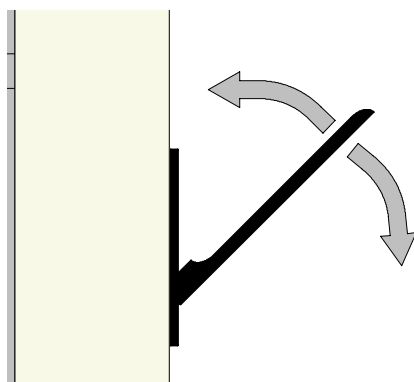
Check that the circuit-breaker is **open** and that the operating mechanism is **deactivated**.



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.

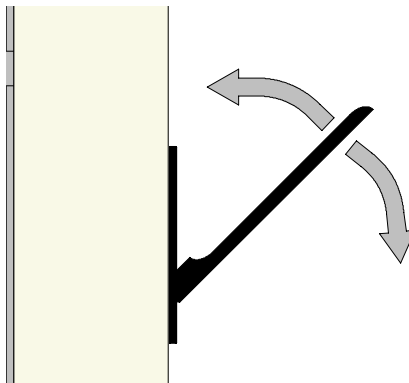


Continue charging the operating mechanism until it clicks in place.

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

lubricating the spring guides

closing spring

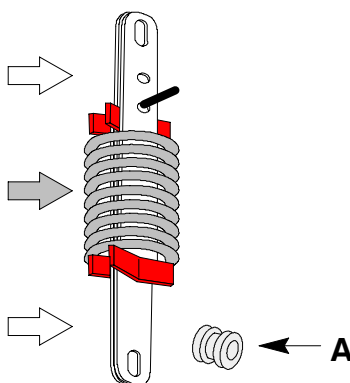


Charge the operating mechanism by an alternating motion until it clicks in place.



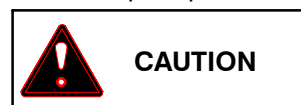
The circuit-breaker position indicator remains on “O” (*device open*).

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.

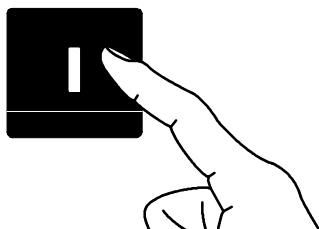
opening spring

local manual closing of the circuit-breaker

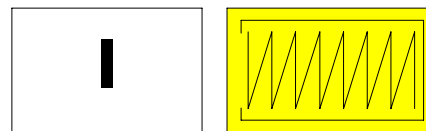


CAUTION

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*).

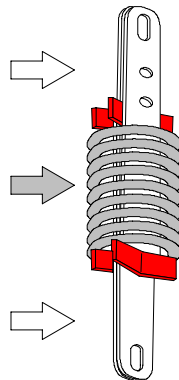


Press the “I” push button to close the circuit-breaker.



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

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



The springs will be compressed.

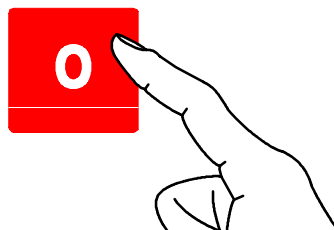
- lubricate the guides
- oil the phosphatised springs



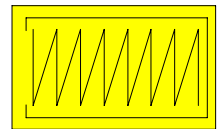
WARNING

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

local manual opening of the circuit-breaker



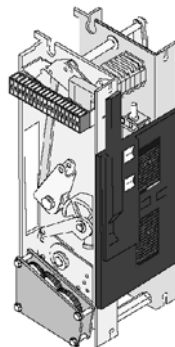
Press the push button to open the circuit-breaker.



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

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

operating mechanism unit

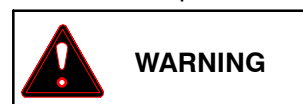


Clean the entire subassembly.

Oil all the phosphatised parts.

Check that “bauman” type hoops are fitted.

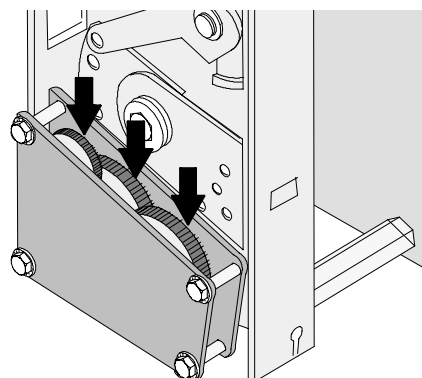
Lubricate the pins and hinges.



WARNING

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

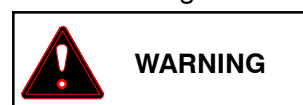
gear motor



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.

The operations listed in the summarising table below can be performed either by the customer or by the **Groupe Schneider** After – Sales representatives.

For any other operations contact your nearest Groupe Schneider centre.

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



CAUTION

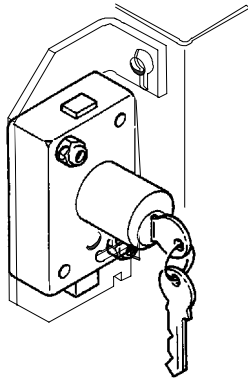
when replacing parts, the accessories listed below **MUST** be replaced by new equipment:

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

summarising table

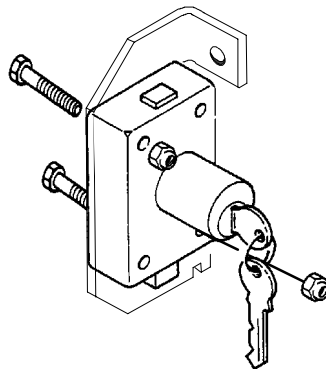
description	performed by	comments
replacing poles	=S=	for withdrawable SM6
replacing the RI operating mechanism	=S=	
replacing key interlocking	=S= or Customer	
replacing the closing spring	=S= or Customer	
replacing the trip devices		
simple closing releases	=S= or Customer	
shunt releases and simple overcurrent trip devices	=S= or Customer	
undervoltage trip devices without lifting system	=S= or Customer	
undervoltage trip devices without lifting system with time delay relay	=S= or Customer	
undervoltage trip devices with lifting system	=S=	
shunt releases or double overcurrent trip devices	=S= or Customer	
replacing the MITOP relay	=S=	
replacing the gear motor	=S= or Customer	every 10000 operations
replacing the microswitch (SE)	=S= or Customer	
replacing the end of charging contacts M1, M2 and M3	=S= or Customer	
replacing the antipumping relays	=S= or Customer	
replacing the auxiliary contact unit	=S= or Customer	
replacing the operation counter	=S=	every 10000 operations
what to do in the event of a pressure switch alarm	=S=	

replacing a keylock removal

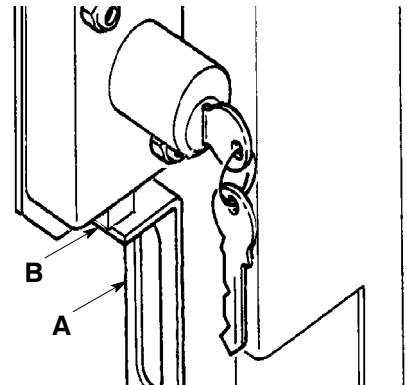


Remove the 2 keylock fixing screws and separate the keylock from its support.

fitting and checking

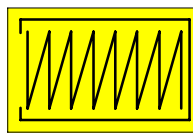


Fit the keylock on its support.
Fit and tighten the keylock fixing screws.



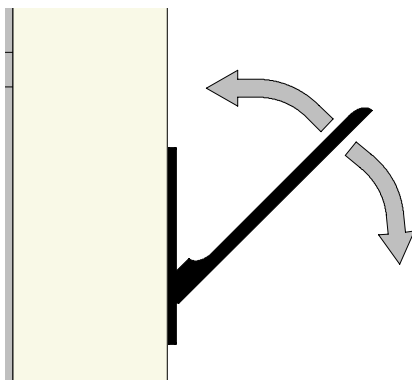
Part **A** must not be flanged by the bolt of keylock **B**.

replacing the closing springs

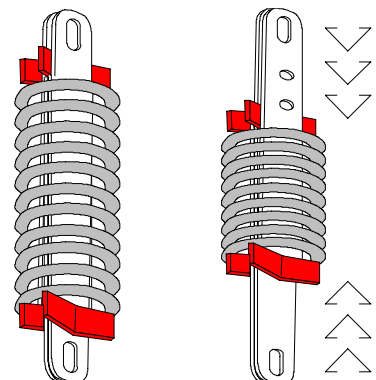


Check that the circuit-breaker is **open** and that the operating mechanism is **deactivated**.

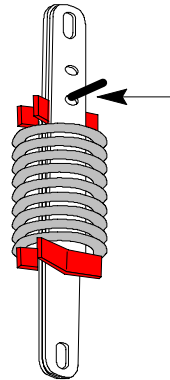
removal



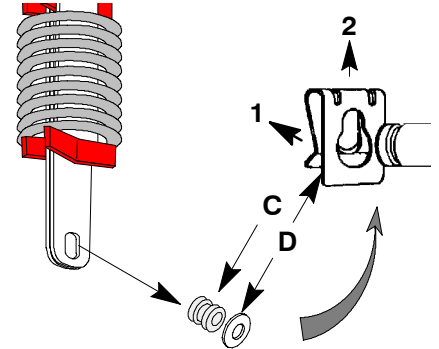
Charge the operating mechanism by an alternating motion until it clicks in place.



The springs will be compressed.

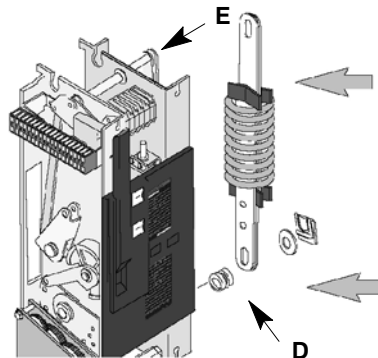


Insert a screw or pin, 6 mm diameter or 40 mm long min. into the hole shown above. On no account must it be free.
(do not exceed the first notch of the operating mechanism: otherwise carry out a full cycle and start again).



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

fitting

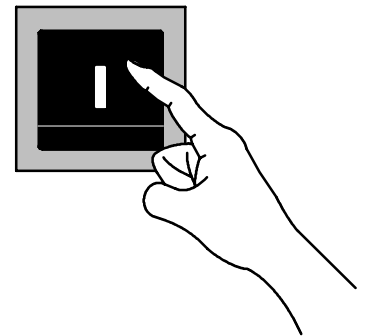


Fit the spring and the ring **E** on pin **D** of the operating mechanism..

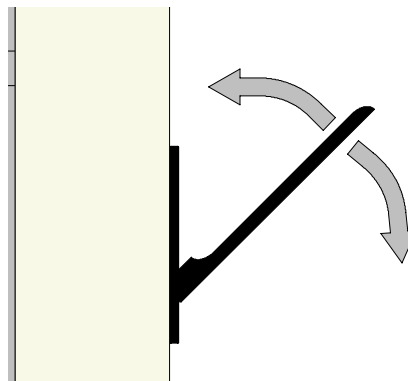


CAUTION

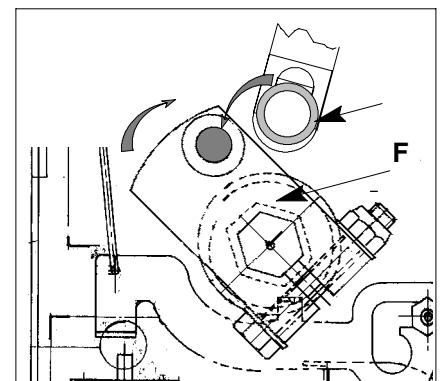
assemble without lubricating: do not scratch the teflon ring.



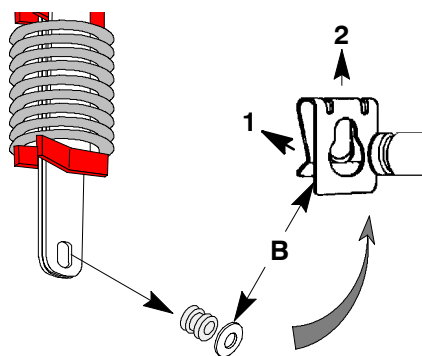
Press the closing button and at the same time....



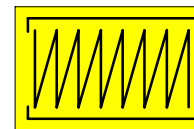
... continue charging...



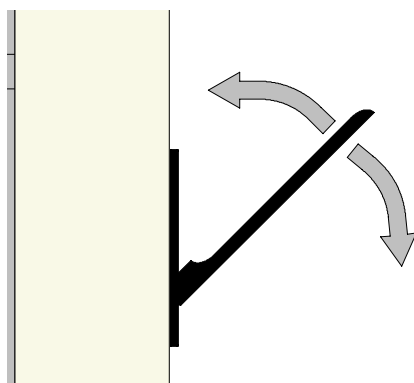
.... in order to bring the crank handle **F** into the axis of the lower fixing hole of the spring guide.



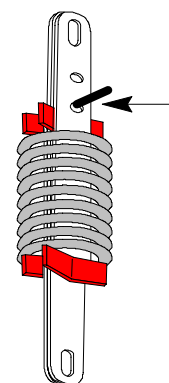
Fit the washer and the circlips **B**.



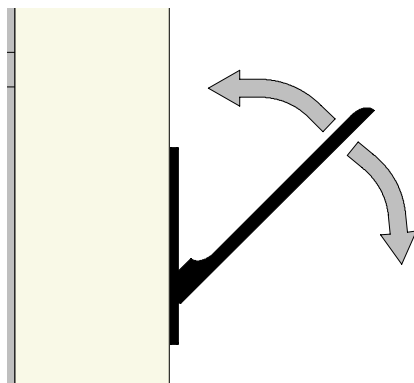
Check that the circuit-breaker is **open** and that the operating mechanism is **deactivated**.



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



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

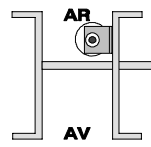
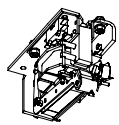
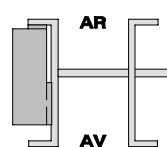
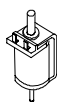
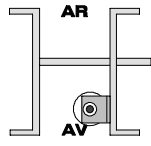
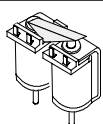
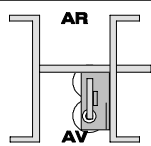
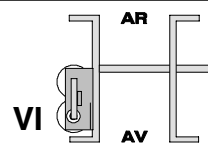


Continue charging the operating mechanism until it clicks in place.

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

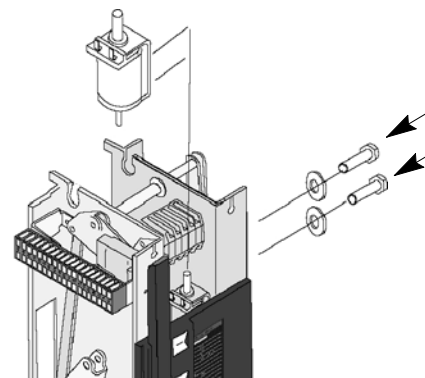
replacing a release

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	
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.



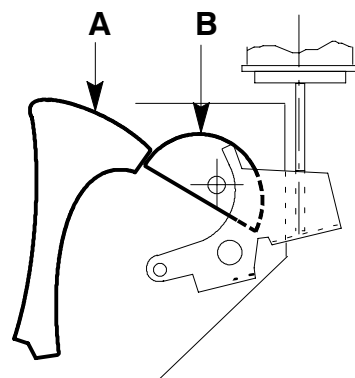
fitting and checking

Assemble in reverse order to disassembly.

Tightening torque: 13 Nm.

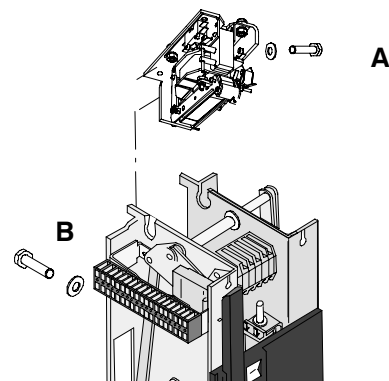
Position the release with the cylindrical rod directed towards the latching crank handle.

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**.

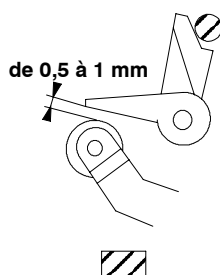


undervoltage trip according to position II removal

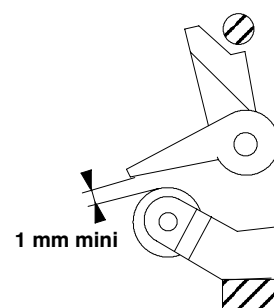
Mark and disconnect the wires.
Remove the two M6 fixing screws.
Remove the trip device.



fitting and checking



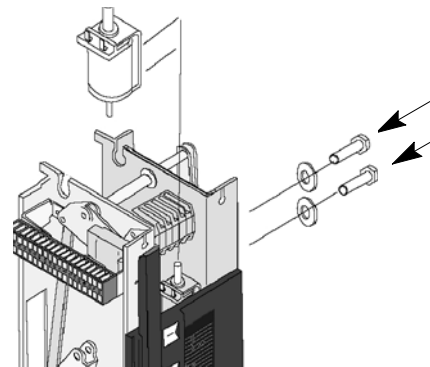
Position the trip device in the tripped position.
Position the crank handle in the limit stop position.
There must be a clearance of **0.5 to 1 mm** between the crank handle and the trip device.
Place M6 fixing screw **A** on the trip unit.
Install the trip unit
Place M6 fixing screw **B**.
Tightening torque: 13 Nm.



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.

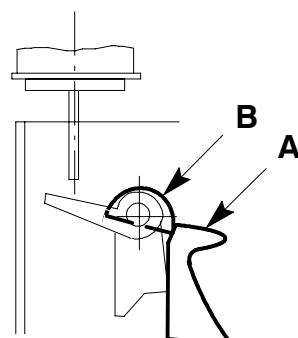
shunt release or overcurrent trip device according to position III removal

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



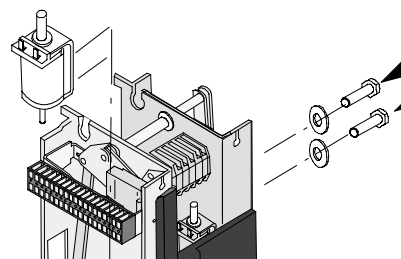
fitting and checking

Assemble in reverse order to disassembly.
Tightening torque: 13 Nm.
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**.



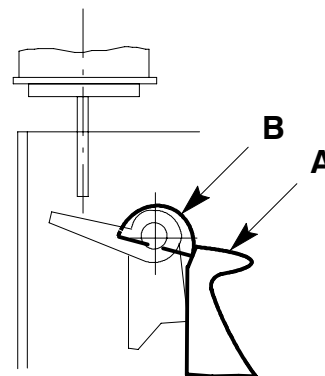
according to position IV
removal

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.



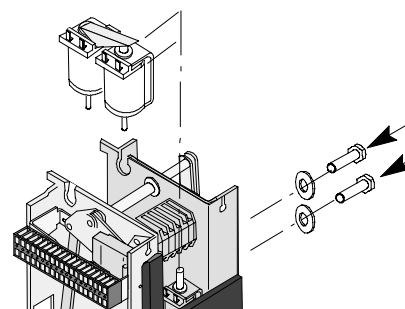
fitting and checking

Assemble in reverse order to disassembly.
Tightening torque: 13 Nm.
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**.



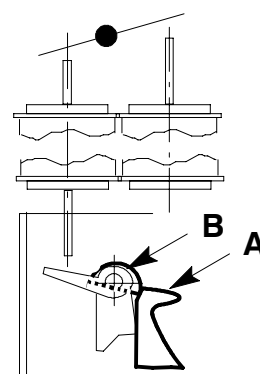
shunt release or overcurrent trip device (two coils)
according to position V
removal

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



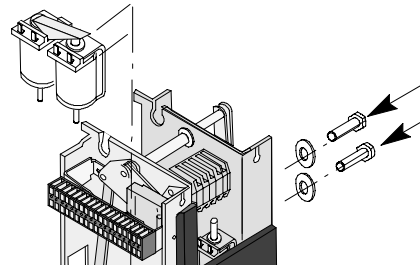
fitting and checking

Assemble in reverse order to disassembly.
Tightening torque: 13 Nm.
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.



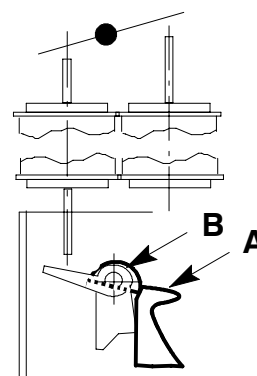
fitting and checking

Assemble in reverse order to disassembly.

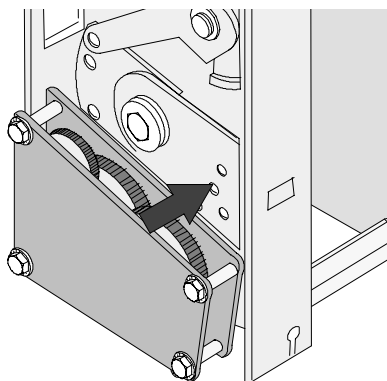
Tightening torque: 13 Nm.

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

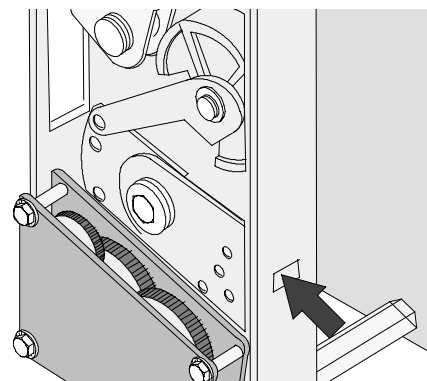
Check that the coil rod does not flange the crank handle in the tripped position and ensures transfer of the closing latch **A** onto the half-moon **B**.



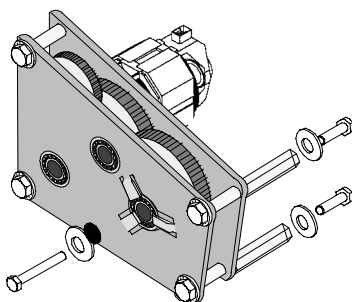
replacement gear motor and roller on the ratchet holder removing the gear motor



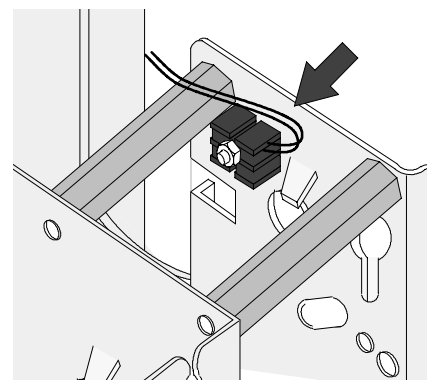
Unhook the ratchet holder return spring and lift the gear latching ratchet by means of a screwdriver.



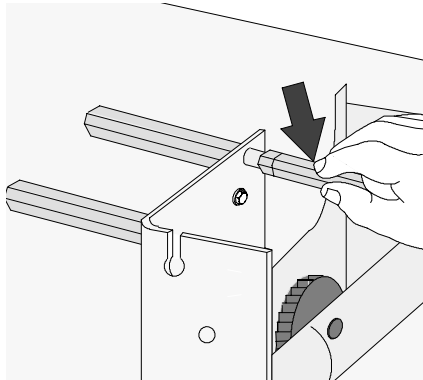
Raise the motor ratchet holder as high as possible and lock it in place with the screwdriver.



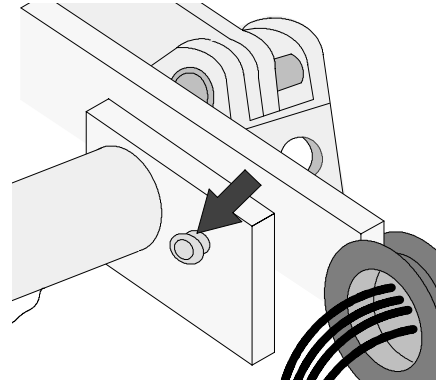
Remove the gear motor (3 screws).



Disconnect the 2 motor supply wires.



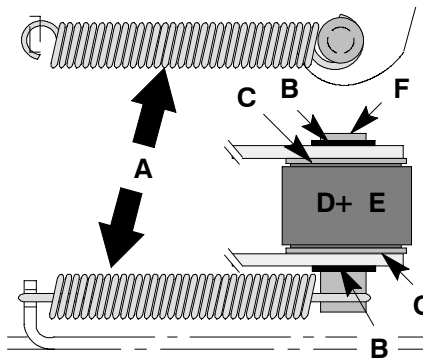
Remove the small column.



Take out this rivet.

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

removing the roller on the ratchet holder

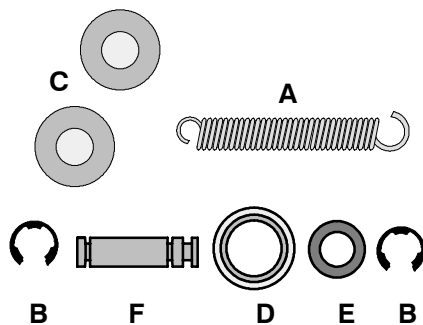


Remove spring A.

Remove the roller.

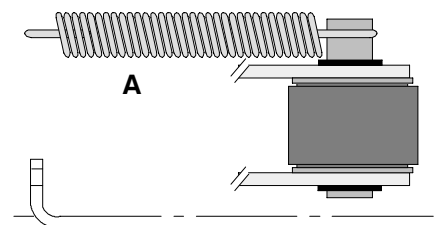
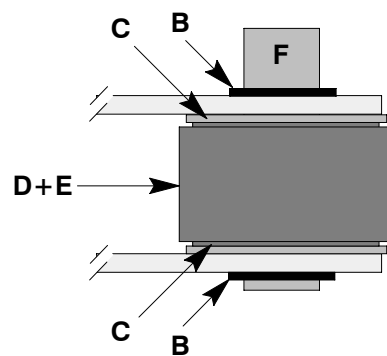
- Truarc B.
- washers C.
- bearing D.
- internal bearing ring E.
- pin F.

placing the roller on the ratchet holder



Prepare and lubricate the parts:

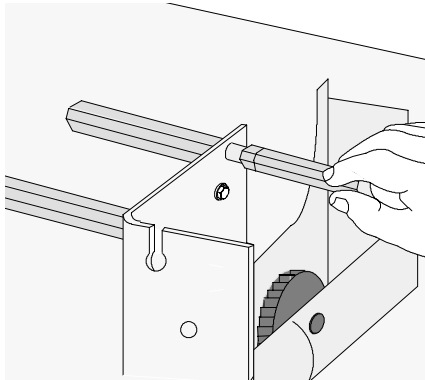
- bearing D.
- internal bearing ring E.
- pin F.
- washers C.
- Truarc B.
- spring A.



Place the spring on the ratchet holder.

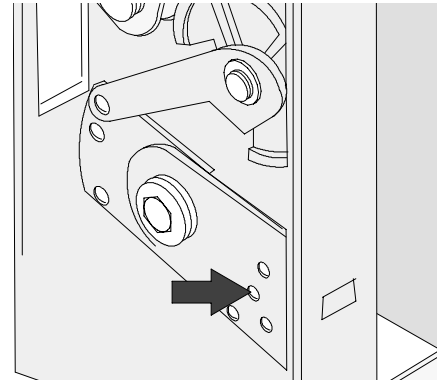
Assemble the roller, with the part of the pin used to hook the spring turned towards the gear motor.

fitting the gear motor



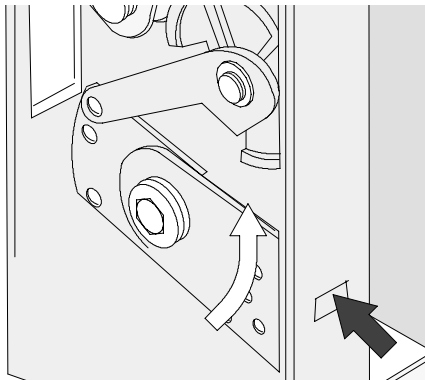
Stick (SR 270 strong loctite) and screw the HM6 length 12, **class 12.9** stud in the yellow column on the tool mark side .

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

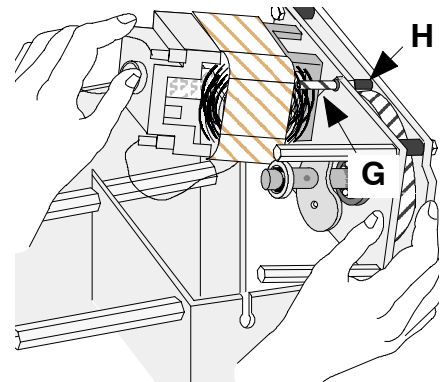


To fit the gear motor, raise the ratchet wheel as far as it will go and lock it using the screwdriver.

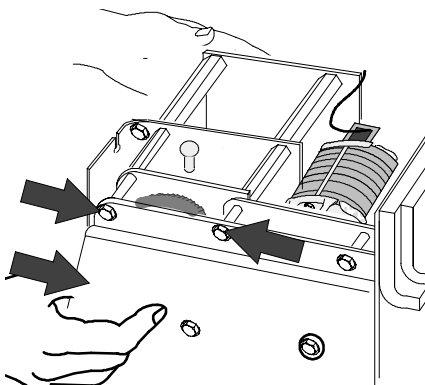
Should a ratchet catch in the ratchet wheel, it will prevent this operation.



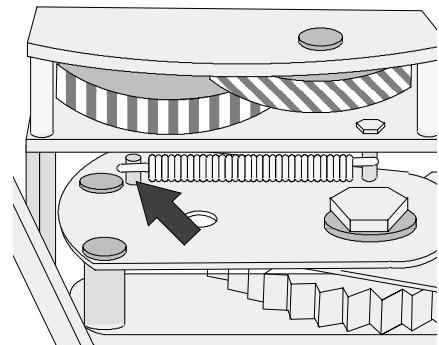
Raise the motor ratchet wheel as far as it will go and lock it using the screwdriver.



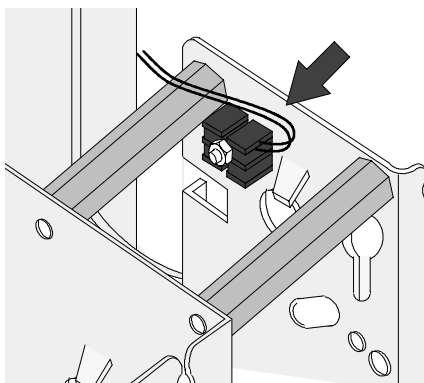
Insert the gear motor, taking care not to remove screw **G** so as not to lose spacer **H** placed between the two flanges.



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

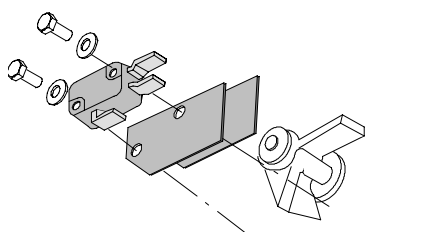


Hook the spring onto the gear motor pin.



- connect the wiring to the terminal block

replacing an SE microswitch removal



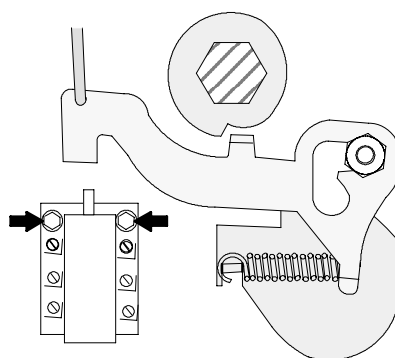
Remove the two fixing screws.
Remove the microswitch without
withdrawing the insulating plates.

fitting and checking

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

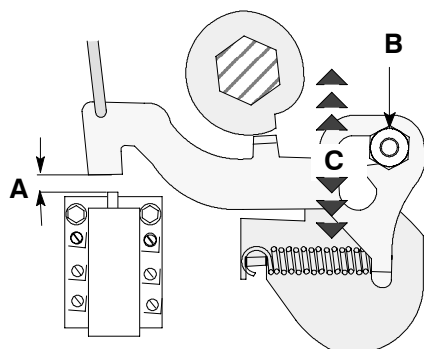
Tightening torque: 0.7 Nm.

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

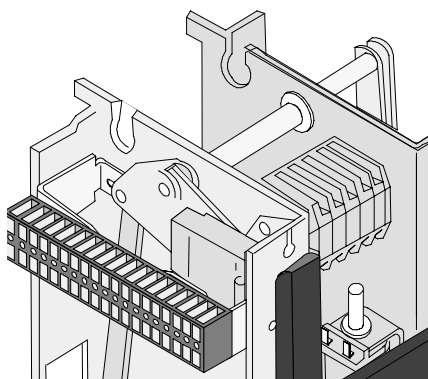


Proceed in reverse order.
Lock the contact fixing screws.
Tightening torque: 0.7 Nm.

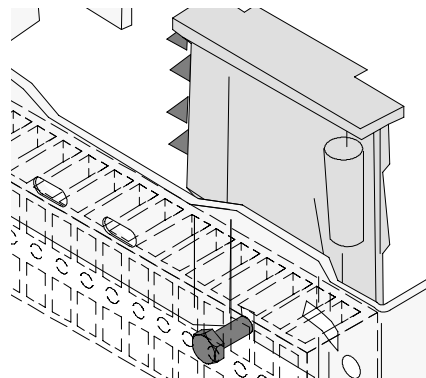
Adjustment

- 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

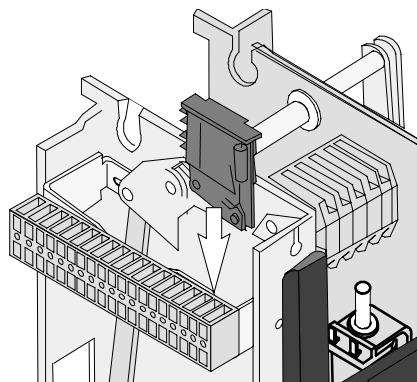


Mark and disconnect the wires.

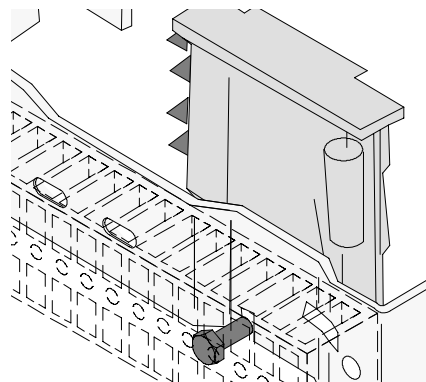


Loosen the fixing screw and slide the relay so that the screw passes through the opening.
Use a 7 mm wrench.

fitting

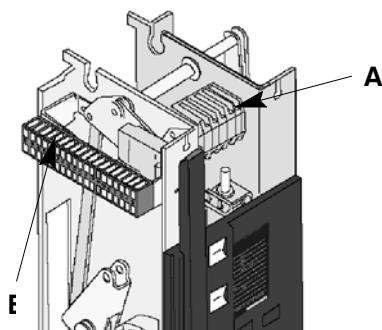


Fit the fixing screw on the relay and position the relay.



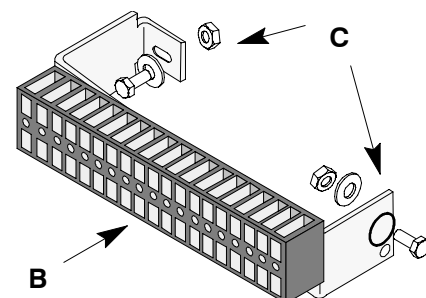
Lock the fixing screw in place.
Tightening torque: 0.7 Nm.
Connect the wires according to the diagram and bind them.

replacing the auxiliary contact unit removal



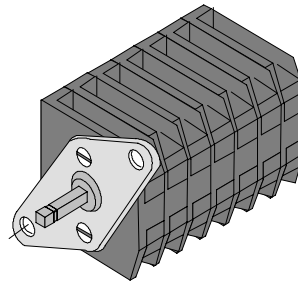
Remove the operating mechanism cover

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

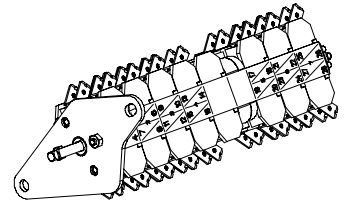


Remove the terminal block assembly **B**, secured by screws, washers and nuts **C**.

presentation

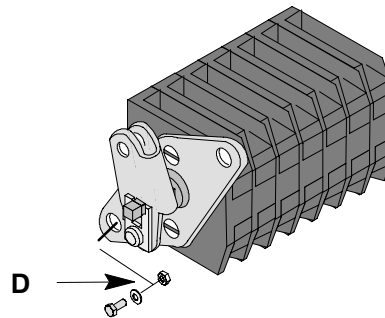


OLD rotary switch **ENTRELEC**.

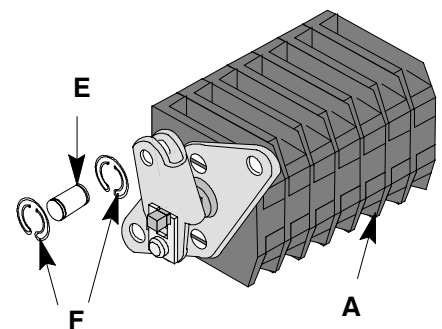


NEW rotary switch **MAFELEC**.

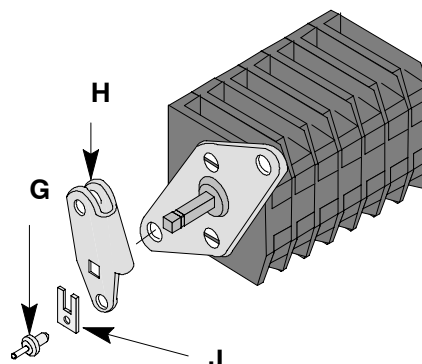
dismantling the OLD rotary switch



Remove the 2 nylostop nuts **D**.

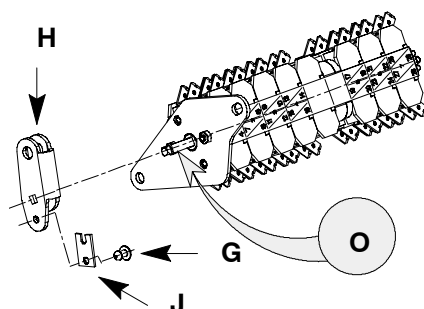


- remove pin **E** and collar **F**
- remove rotary switch **A**



- remove rivet **G** which locks small plate **J**
- remove crank **H** and small plate **J**

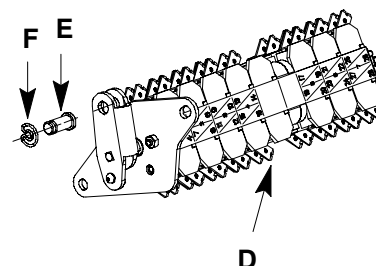
fitting of new rotary switch



Assemble on the new unit, crank **H** according to the assembly direction shown above :

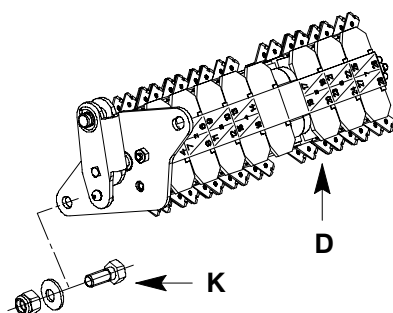
- reference "O" (engraved on the pin) in front of the hole of rivet **G**

Fit plate **J** and fix it by a rivet **G** (or a diameter 3 screw).



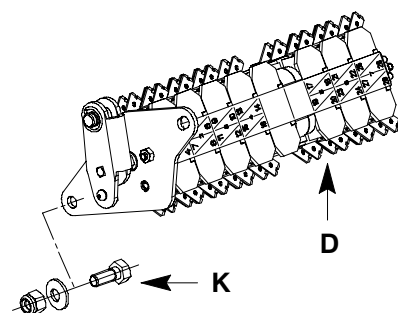
To end the assembly, the operation is the reverse to the dismantling.

- fix rotary switch **D** on the operating mechanism
- fix pin **E** and collar **F**

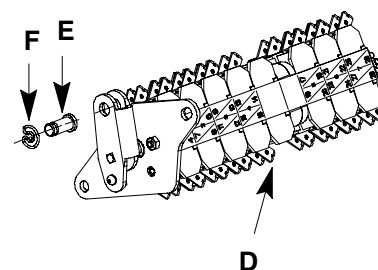


- fix and lock the 2 nylostop nuts **K**
- fix the assembly terminal block **D**, fix by screws, washers, nuts

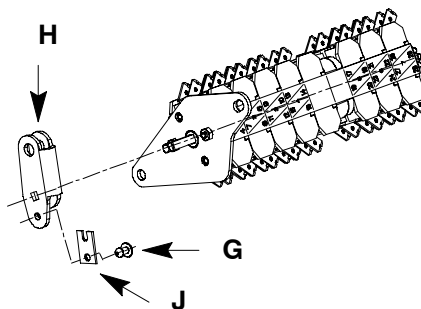
dismantling of the new rotary switch



Remove the 2 nylostop nuts **K**.



Remove pin **E** and collar **F**, remove rotary switch **D**.

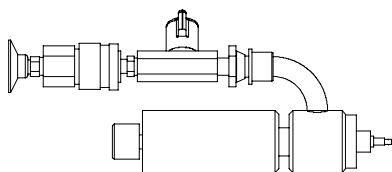


Remove rivet **G** which locks small plate **J**. Remove crank **H** and small plate **J**

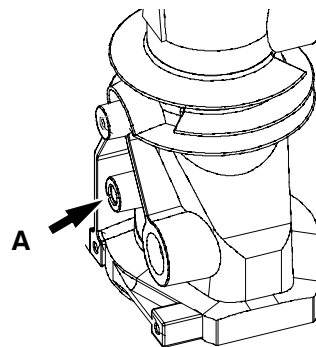
SF6 gas recovery conformity rules

The SF6 must be removed before any dismantling operation can be carried out in compliance with the procedures described in IEC-61634 and according to the following instructions. The gas must be treated in compliance with IEC-60480.

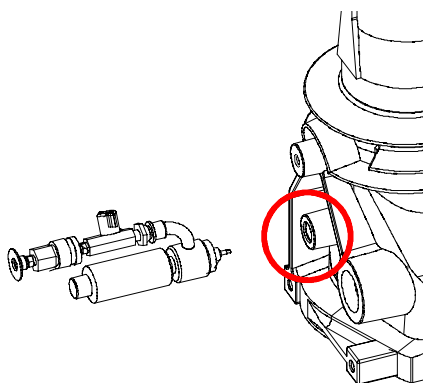
intervention method



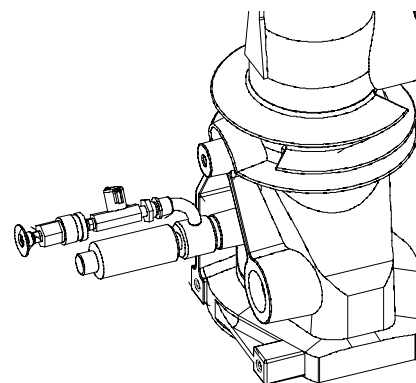
Tool necessary for the operation



Plug (A).



Connect the vacuum/filling device.



Wait until the pressure gauge shows 0 (15 min to empty the tank) before removing the connection.

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 **Groupe Schneider service centre**.

symptoms	faulty devices	probable 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 opens immediately and remains open although the closing order is maintained.	All opening releases (<i>direct or indirect</i>)	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 closes in turn.	Antipumping relay or direct releases	■ replace the relay ■ readjust
The circuit-breaker does not open manually or by remote control (<i>circuit-breaker without electrical operating mechanism</i>).	Operating mechanism or circuit-breaker (<i>incomplete closing</i>)	Hard spot on the operating mechanism or circuit-breaker ■ finish charging the operating mechanism with the manual charging handle Alert the Groupe Schneider service centre.
	Opening release	The release is incorrectly connected ■ check the circuit The winding is broken ■ replace the release ■ check the protection circuit.

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centers are there for:**

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

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to time, please ask for confirmation of the information given
in this publication.

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