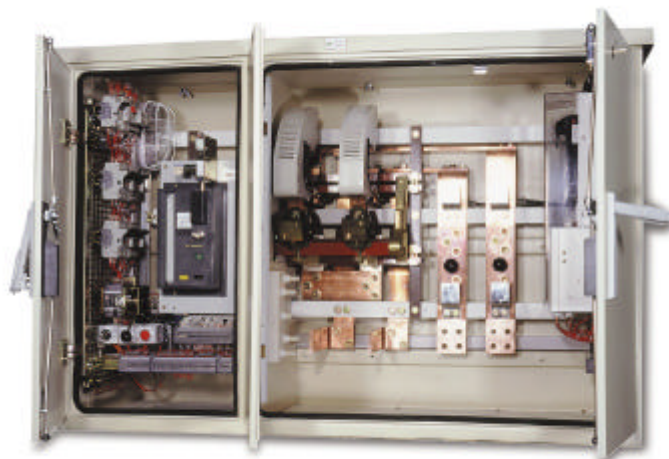


**NOTICE
OF
MAINTENANCE N° M0299/F**
Motorised accumulation contactor type CMA 98 - 1250 to 6000 A



LENOIR ELEC



GENERAL INSTRUCTIONS

1. TRANSPORT CONDITIONS

Each time the equipment is transported, it is mandatory to:

- Block the mechanisms of the accumulation control block by placing bubble cushions between the pole contacts.
- Block the equipment's locks, if any

2. PUTTING THE EQUIPMENT IN PLACE

- a) For equipment with 6 attachment points, check to ensure that the pointer of the bars at the level of the central attachment is set at + or – 0.5 mm
- b) For all type of equipment, control the position of the springs of the inner mechanism of the accumulation control block.

-View from above, left side, at the level of the nylon roller, on the inner mask next to the release coil; check to ensure the spring is well set in the cavity on the dog fixed on the mask (see page 8/13).

-View from below, right side, check to ensure the correct position of the control lever arm spring of the MV rod and of the release system (see page 8/13).

-Front plastron dismantled, at the level of the manual closing control plate; check to ensure the control pin is well positioned between the two straps (see page 10/13).

3. PUTTING THE EQUIPMENT INTO OPERATION

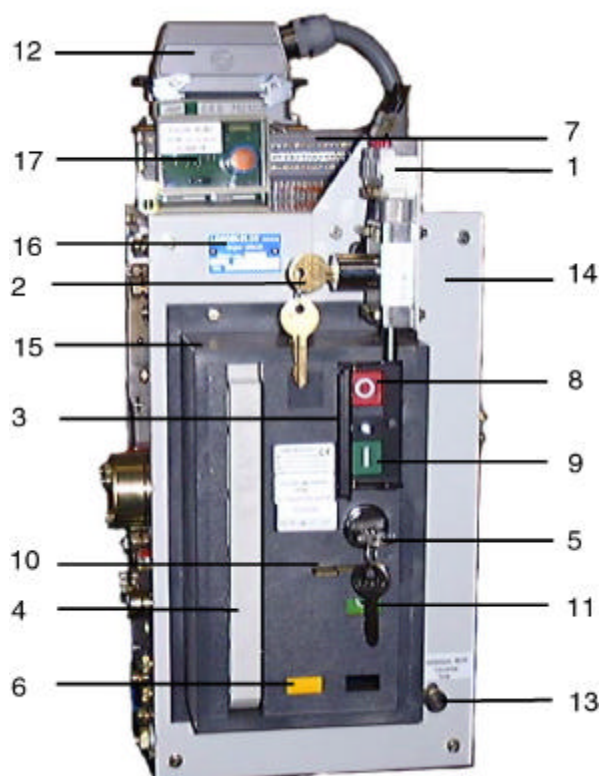
Remove the bubble cushions between the pole contacts and before putting the blow-out cages back in place, pull on the moving contacts in order to polarise correctly the mechanisms of the accumulation control block.



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DESCRIPTION OF THE BOARD PANEL OF THE ENERGY-STORING BLOCK



1. Auxiliary contacts (1 NO + 1 NC) related to the LOCAL/REMOTE lock
2. LOCAL/REMOTE lock (locking of the local controls : key is free related contacts: 1 NO + 1 NC
3. Cover prohibiting the access to the push-buttons (possible padlock facility, if no LOCAL/REMOTE lock is provided)
4. Control handle for stretching the energy-storing spring
5. Lock for locking the contactor in open position (key is free : equipment locked) related contacts: 1NO + 1 NC
6. Spring position indicator
-Yellow : not stretched spring
-Blue : stretched spring
7. Connecting box (information on the position contacts)
8. Push button for local opening
9. Push button for local closing
10. Padlocking facility in opened position
11. Status indication of equipment
-green: equipment opened
-red: equipment closed
12. Sectioning plug for the accumulation control block
13. Lever for inhibiting the lacking voltage coil (MV or MVR) in manual mode
14. Front plastron
15. Board panel
16. ID label (reference to mention in any correspondence)
17. Electronic device for delayed action of the lacking voltage coil



Manual control

Spring stretching, closing and opening

To have access to the local manual control, you'll have to:

- unlock the interdiction cover, mark (3) if any, in order to have access to the push buttons
- Stretch the accumulation spring if this one hadn't been stretched by the pumping lever mark (4). The stretching of the spring is obtained by acting up and down on the lever.
- Once the spring is stretched, the mechanic light mark (6) turns blue (see description of the board panel).
- In order to close the equipment, acting on the green button mark (9) of the board panel is enough. Caution: If the equipment has a lacking voltage coil (MV or MVR), this one should be previously inhibited thanks to the lever mark (13) of the board panel. To do so, lifting it, pushing it then pulling it down is enough.
- In order to open the equipment, acting on the red button mark (8) of the board panel or freeing the inhibition lever of the lacking voltage coil if the equipment has any, is enough. To do so, lifting the lever mark (13) on the board panel, pushing it and pulling it down is enough.

Armement du ressort



Locking in the open position

In order to lock the contactor in open position, you'll have to:

- Unlock the interdiction door mark (1) if the equipment has any in order to have access to the push buttons.

By lock:

Push on the red button mark (8) of the board panel and quarter turn the key towards right. (key is free)
To release the equipment, quarter turn the key towards left.

By padlock:

Push on the red button mark from the board panel and pull the lever mark (10) on the board panel in order to be able to set the padlock.

To release the equipment, removing the padlock and pushing the lever mark (10) in is enough.



by lock



by padlock

Refer to the chapter: spring stretching, closing and opening.

Important note:

Never forget to set back the inhibition lever of the lacking voltage coil in its normal operating position. Should you forget to do so, no opening of the contactor would be allowed.





ENTRETIEN

The frequency of the maintenance operations essentially depends on the conditions of use.

- Operating duties
- Frequency of closings upon defect
- Frequency of openings upon defect
- Ambient conditions
 - Humidity
 - Dust
 - Corrosive atmosphere

The control block is designed to ensure 10 000 electrical or manual operations (emergency controls)

To ensure a good operation, it is recommended to process with an inspection

- -Every 2000 operations
- -Every six months (for use under the ambient conditions described above)
- -Every year, as a general rule
- The polar part is designed to ensure 50 000 operations, it is recommended to process with an inspection
- -Every year as a general rule
- -After repeated openings upon defect

Caution :

When the control is no more coupled, it is strongly recommended not to have the contactor operated in neutral.

During the maintenance operations, operating the control handle shall be avoided in order not to stretch the closing spring.



CHANGING THE CONTROL BLOCK

Preparation

Unscrew the screw mark (1) and remove the cover mark (2) of the sketch n°1

Dismantle the axis n°3 ensuring the connection between the rods of the control block and the moving shaft of the equipment after having removed its pin mark (5)

The axis is accessible by introducing the hand through the upper part of the block. Dismantle the axis mark (3) by pulling it towards left. Disconnect the sectioning plug located above the equipment, and then loosen the 4 bolts mark (4) set on the right and on the left sides of the control block.

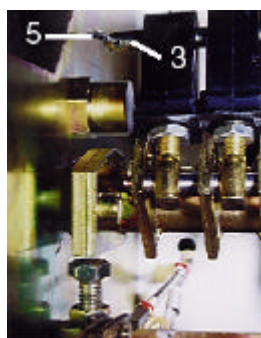
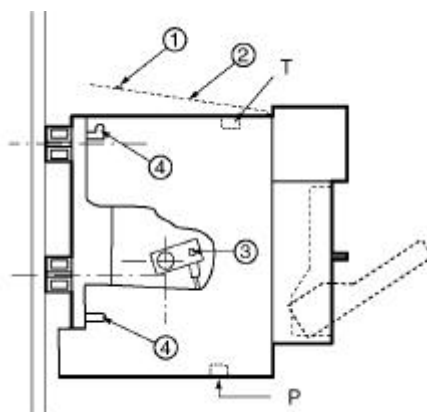
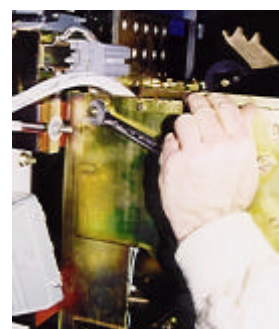


Figure N° 1



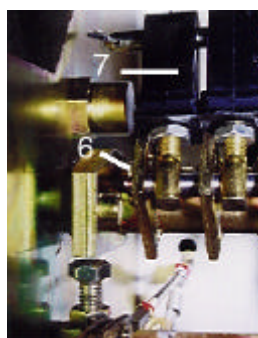
Dismantling the control block

Caution: The control block weights 27 kg

From the left hand with the inferior strut (P), incline the control block of around 30°, take the right strut from the right hand (T), lift it from a few centimetres to extract the upper pivot point and pull out.

Changing the connecting rod (s)

After having dismantled the control block, remove the pin mark (6) then remove the axis and replace the connecting rod after having checked the distance B on sketch n° 2 on next page. Put back in place in the inverse order.



Position of the inferior axis of the connecting rods

Position (A)

CMA 98 1250/1600/2000 2.0

1 connecting rod

CMA 98 2560/3000/3200 1.0

2 connecting rods

CMA 98 5000/5500/6000 1.0

2 connecting rods

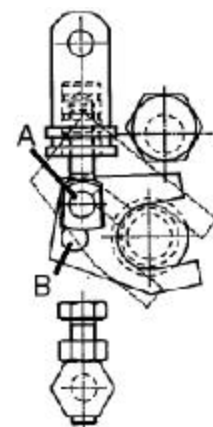
Position (B)

CMA 98 2560/3000/3200 2.0

3 connecting rods

CMA 98 1250/1600/2000 6.0

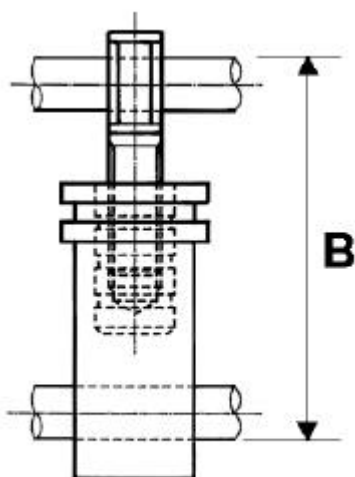
3 connecting rods



**Adjusting the insulating connecting rods**

During the replacement of the control block or of the connecting rods, always make sure, according to the type of equipment:

- of the number of connecting rods
- of their positions compared with the hole A or B
- of the distance B below mentioned (sketch n°2 and table)



sketch nr. 2

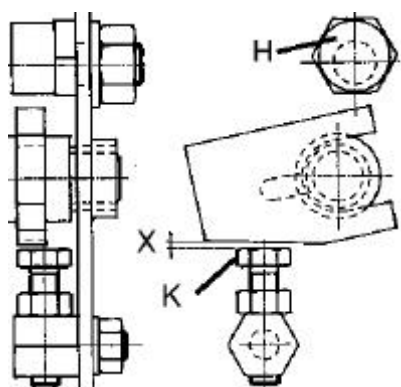
Calibre	Number of poles	Distance B	Number of rods
1250/1600/2000	2	59,5 ^{+/- 0,6}	1
1250/1600/2000	2 x 3	61,5 ^{+/- 0,6}	3
2560/3200	1 = (2 + 1)	61,5 ^{+/- 0,6}	2
4800/6000	1 = (3 + 1)	61,5 ^{+/- 0,6}	2

Putting the control block back in place

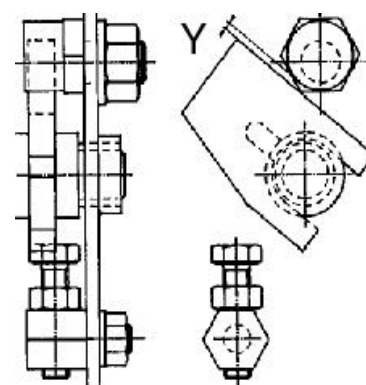
Put it back in place by doing the operations in the inverse order, previously ensuring there is no mechanical core in the polar part and that the shaft rotates freely. Do not forget to check previously the status of the connecting rod (s) (replace it (them), if necessary) and its (their) gap, distance B on sketch n°2.

Adjust the lower stop plate mark (H).
This stop plate is factory-adjusted.

Adjust the upper stop plate mark (H)
-Remove the upper stop plate mark (H) of the sketch n°2
-Stretch the energy-storing spring manually.
-Close the contactor (this one has to be mechanically latched in closed position)
-Put the upper stop plate mark (H) back in place ensuring that Y=0.5 mm minimum (see drawing n°4) then block the nut.



sketch nr. 3



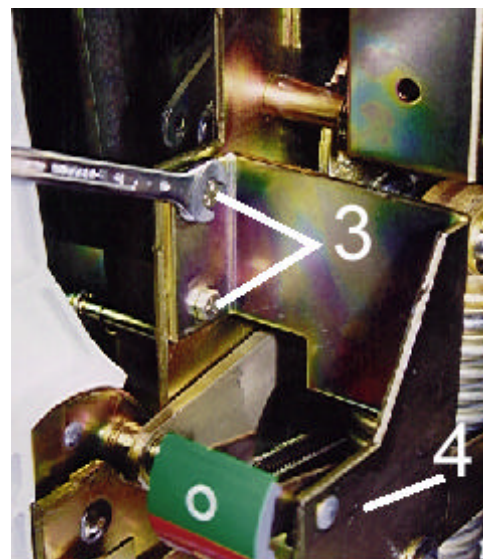
sketch nr.4



CHANGING THE ENERGY-STORING SPRING

Preparation

- Equipment in open position and spring not stretched
- Remove the board panel mark (15) and the plastron mark (14) see sketch from chapter 'description of the board panel'
- Remove the clips mark (2)
- Unscrew the 2 screws mark (3) and remove the part mark (4)
- Extract the spring mark (R)



Position (A)

Spring N°

CMA 98 1250/1600/2000 2.0 _____ 753229

1 connecting rod

CMA 98 2560/3000/3200 1.0 _____ 753230

2 connecting rods

CMA 98 5000/5500/6000 1.0 _____ 753230

2 connecting rods

Position (B)

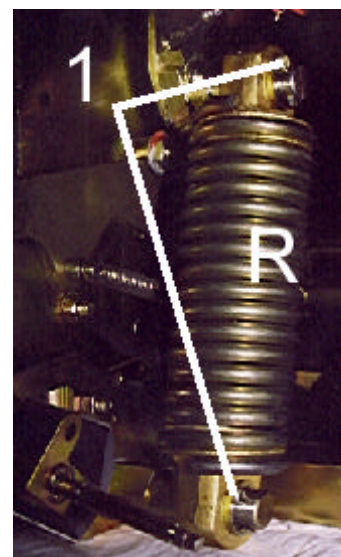
CMA 98 2560/3000/3200 2.0 _____ 753231

3 connecting rods

CBA 98 1250/1600/2000 6.0 _____ 753231

3 connecting rods

See chapter: CHANGING A CONTROL BLOCK



- Replace it and put it back in place in the inverse order and check the adjustment of the upper stop plate



AUXILIARY CONTACTS

The auxiliary contacts are accessible after having dismantled the cover mark (2) of the sketch n°1 (CHANGING THE CONTROL BLOCK)

Check the contacts with a warning light by acting on the black drivers of the contact blocks (should they do not work, replace the contact blocks)

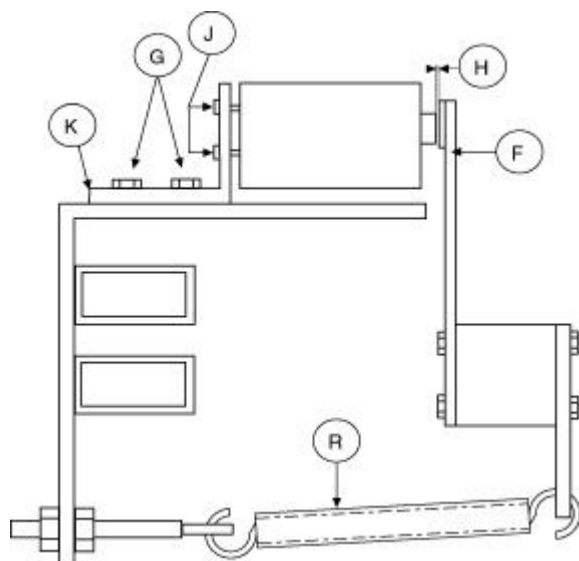
- Disconnect the blocks
- Unscrew the screws mark (G) of sketch n°5 to have access to all the blocks and support.
- Unscrew the screws mark (J) of sketch n°5 to replace the defective block.
- Replace the defective contact block
- Put everything back in place in the inverse order, when the contactor is closed, ensure that there is a gap $H = 1$ to 1.5 mm between the drivers of the D type auxiliary contact blocks and the 'beater' mark (F). That gap is obtained by adjusting the support (K) of auxiliary blocks.

RETURN SPRING

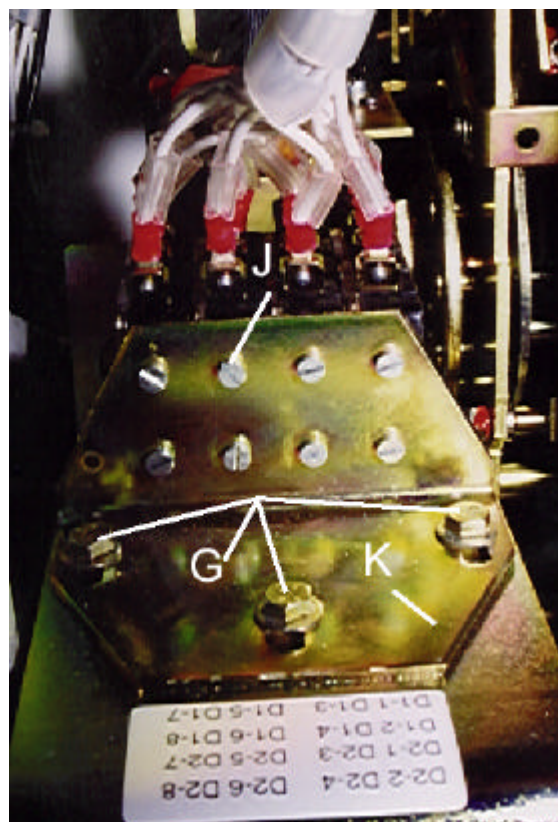
The springs mark (R) of the sketch n°7 allow holding the moving part of poles opened.

Solicit the moving part upon closing and check while loosening that the distances between fixed and moving contacts (Break) are at least equal to the values mentioned in the tables (chapter: Adjusting the power poles). Should that condition be not respected, check that the main shaft rotates freely and replace the return springs if necessary.

Note: These springs have to be changed systematically every 10000 operations.



Sketch nr. 5





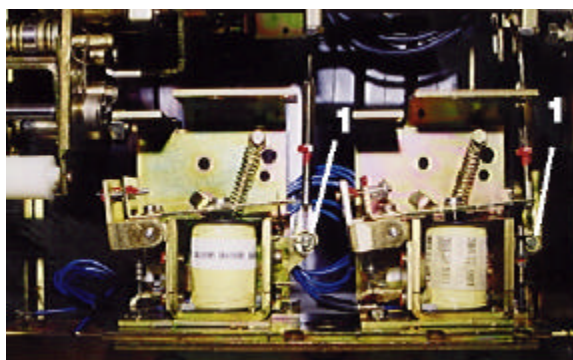
Voltage-triggered releaser

Replacement

1 Disconnect the wires

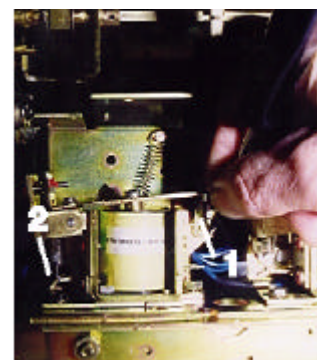
2 Remove the ferrule (1)
to uncouple the rod

3 Remove the 2 screws (2)
and remove the releaser



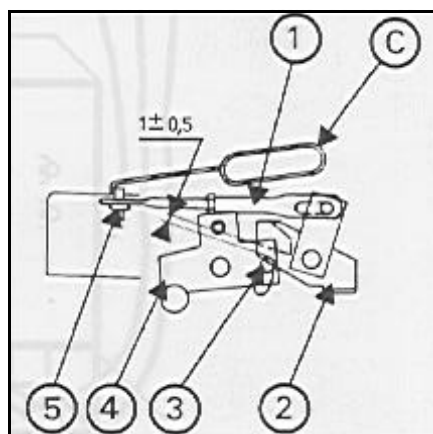
EA

MV



4 Put everything back in place in the inverse order

5 Control
Release : equipment in open position
-Adjusting screw for re-stretching (7) unscrewed at max.



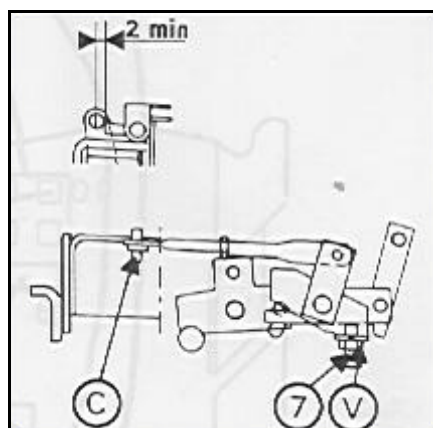
6 Releaser latched, adjust the rod (1), to obtain the gap ± 0.5 mm between the lever (2) and the stud (3) of the lock (4) position 'not working'

WEAR LIMIT: 0.1 mm

-equipment in CLOSED position

-maintain the percutor (6) with a crochet (C) not to prevent the releaser from stretching again at the time of opening the equipment and free the latching of the releaser.

Check by loosening slowly that the equipment opens.



7 Re-stretched

Equipment open position

Adjust the screw (7) to bring the percutor (6) at the stop plate level

Unscrew $\frac{1}{2}$ turn

Check that there is a safety device.

8 : Minimum re-stretching of 2 mm

WEAR LIMIT: no re-stretching

Note: In case the equipment has 2 current-triggered releasers, check the operation of both releasers after adjustment

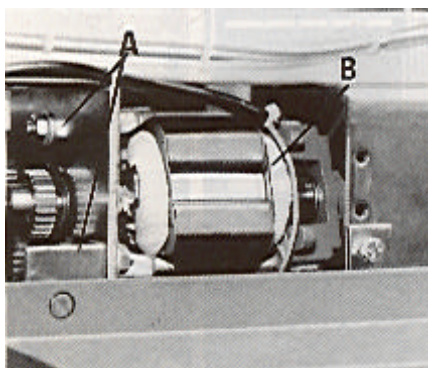


ELECTRICAL CONTROL MOTOR

Replacement

1. After having dismantled the upper plastron of the control
 - disconnect the wires of the terminals
 - unscrew the 2 nuts A
 - dismantle and remove the motor B

2. Put everything back in place in the inverse order ensuring that there is an operating gap between the pinion and the engaged wheel.
Connect again the wires

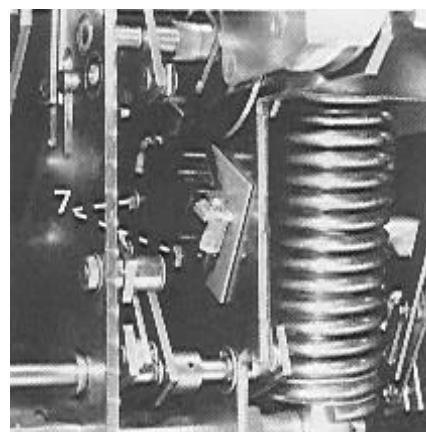
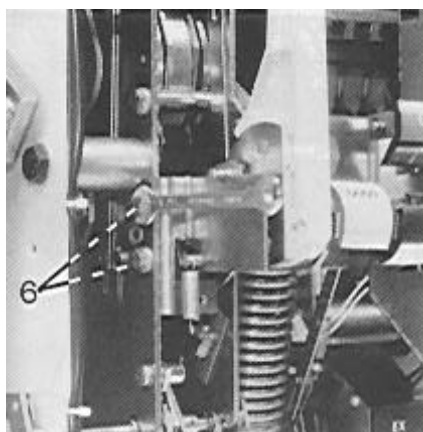


STRETCHING LIMIT SWITCH

Replacement

1. After having dismantled the board panel and the front plastron:
Unscrew the 2 nuts mark (6) – key n°10 and dismantle the handle support plate.

2. Unscrew the 2 nuts mark (7) – key n°8
Dismantle the contact
Disconnect the wires



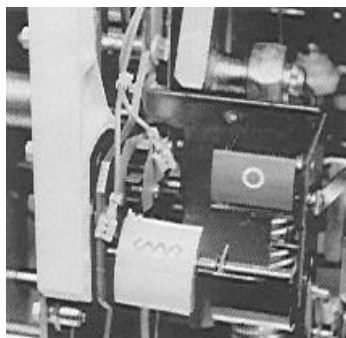
3. Connect again the wires on the new contact
Assemble in inverse order, ensuring that the struts are still in place on the attachment screws.



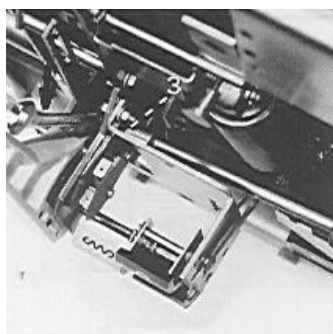
STRETCHED SPRING CONTACT

Replacement

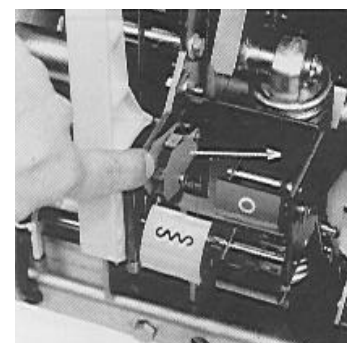
1. After having dismantled the board panel and the front plastron, disconnect the wires, duly marking the position of the wires



2. Unscrew the screw, mark (3)



3. Remove the contact – support assembly.



4. Connect again the wires on the new contact – support assembly and reassemble in the inverse order.

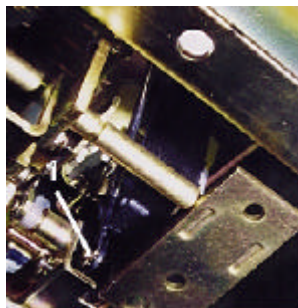
Note: The parts delivered and not used are to be thrown away.

CLOSING ELECTROMAGNET

Replacement

1 After having dismantled the board panel and the front plastron:

- disconnect the wires
- remove the axis, mark (1)



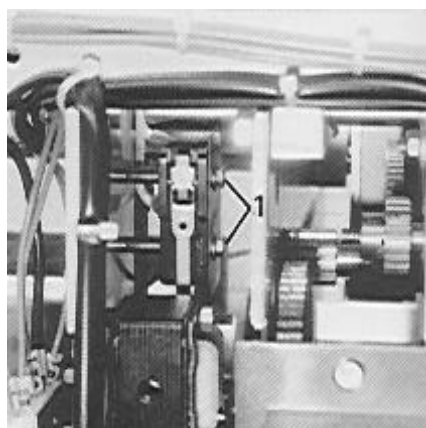
2. Remove the 2 screws mark (2)
- Remove the closing electromagnet
 - reassemble in the inverse order



INSERTION CONTACT

Replacement (DC current only)

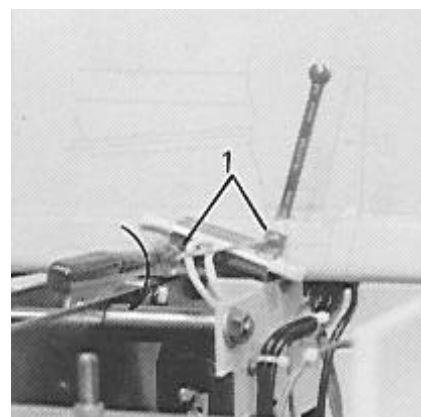
1. Dismantle the board panel and the front plastron
2. Unscrew the 2 screws mark (1)
- disconnect the wires
 - remove the contact
 - reassemble in the inverse order



ECONOMY RESISTOR

Replacement (DC current only)

1. Dismantle the board panel and the front plastron
- disconnect the wires
 - unscrew the 2 screws mark (1)
 - remove the resistor
 - reassemble in the inverse order





POLE MAINTENANCE

Remove the blow-out cage, if any. Lift it of about 30 mm in order to release studs A & B and pull out. Holding the contactor closed, check the distance X (operation to be done with energy-storing control in place and previously inspected if necessary)

When due to the contact pin wear the thickness of the silver pads is inferior to 0.5mm or when that thickness is inferior to the minimum values in the table (see chapter: **Adjusting the power poles**), contact(s) has(ve) to be replaced.

Make sure that no metal has been deposited on the arc chute inner walls due to the electric arc. Should a significant coat of metal be noticed, remove it by brushing softly the walls with a scraper and clean the inner walls with a soft cloth and blow the arc chute. Check the metallic plates inside the arc chute. In case, they are seriously damaged, the arc chute has to be replaced. After inspection, put the arc chute back in place by tilting it backwards and engaging stud A in the V-shaped seat at the fixed arc-chute tip. Then, return it to vertical position by swinging and push to engage stud B. Finally, make sure that the moving contact moves freely without rubbing against the arc chute inner walls.

Contacts practically don't need any maintenance unless slight beading occurs. Should it occurs, remove it always using a smooth file, never abrasive cloth or paper.

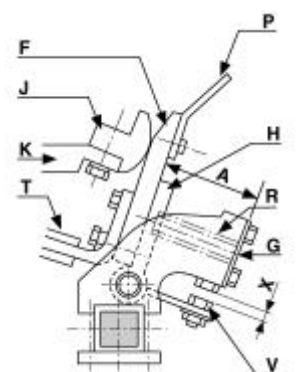
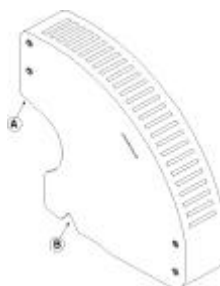


Figure N° 6

REPLACING THE CONTACTS

Remove the arc chute, if any.

To remove the moving contacts F:

Loosen alternately the 2 screws holding stop plate G of spring R

Remove the spring plate

Dismantle the bolt and the screw holding the contact on the hinged link H and remove the contact

To remove the fixed contacts J:

Remove the screw holding the contact on the top member K

Clean all the surfaces of electric connections with a clean dry cloth and assemble in inverse order. Before tightening, align the moving contact in relation to the fixed contact.

Set the moving contact Wippe with the screw V, the distances X must be superior to the minimum values indicated on the table of chapter 'adjusting the power poles'.

As for poles combining thermal poles with blow-out poles, another inspection has to be done in order to ensure that blow-out contacts duly open after the thermal contacts. This operation can be done with an electronic chronometer or with an analogic analyser or with a memorising oscilloscope or visually (in that last case, the accumulation control has to be uncouple in order to operate manually the power poles)

CONTACT PRESSURE SPRING mark R sketch 6

The effort measured at F, sketch n°9 (equipment closed) must be between the values indicated in the table, in the normal WIPPE adjusting conditions (distance X of the table of chapter 'adjusting the power poles')

In case the springs are defective, replace them. Loosen alternately the 2 screws holding the plate G. Put the new springs back in place. In order to obtain the effort required, eventually insert flat washers of dia.8 between the plate G and its support to obtain the distance $A=70\pm 1$, (for 2 x 3 poles, distance A should be of 76 ± 1). Check the effort at F.

SUPPLE CONNECTION mark T sketch n°6

Check if there are small cracks (worsening of the fibres at the end of the tips)

MOVING BLOWOUT HORN

In case of significant erosion, replace the horn.

CLEANING THE INSULATING BARS

Blow or remove with a soft brush, not to scratch the varnish, the dust deposits between energised parts. Such an operation is very important when dust deposits are conductive and must be frequently repeated.

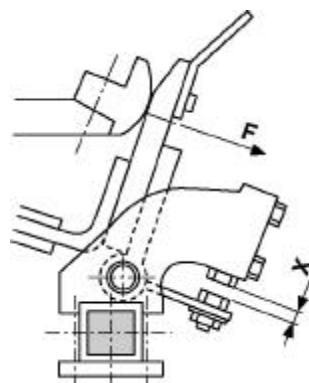
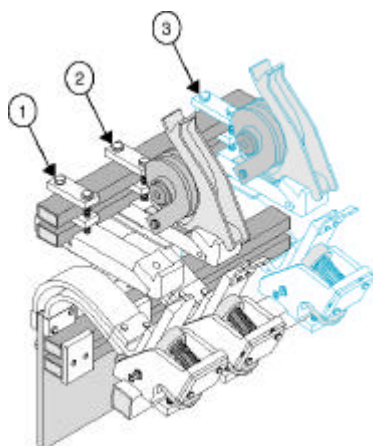


ADJUSTING THE POWER POLES

CMA 98 1250 1600 2000 Number of poles: 6 (2 x 3)

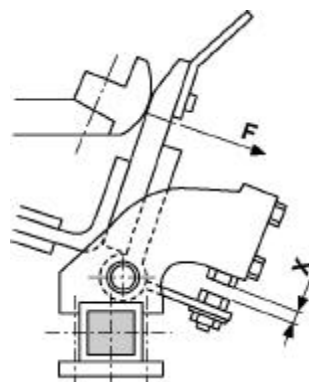
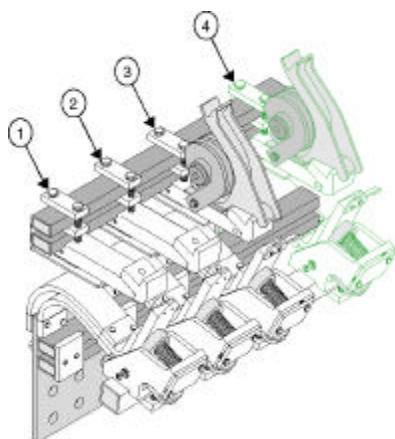
	Wippe X	Break *	(F) Contact spring pressure
Mini	2.7	30	24
Maxi	3.7	36	32

CMA 98 2500 3000 3200 Single pole (voltage 1200 Vdc/2+1 poles)



		Pôle N° 1	Pôle N° 2	Pôle N° 3
Wippe X	Mini	2.8	4.8	5.3
	Maxi	3.5	5.5	6.0
Break *	Mini	33	32	31
	Maxi	38	37	36
(F) contact spring pressure	Mini	26	27	28
	Maxi	35	36	37

CMA 98 4000 5500 6000 Single pole (voltage 1200 Vdc/3+1 poles).



		Pôle N° 1	Pôle N° 2	Pôle N° 3	Pôle N° 4
Wippe X	Mini	1.5	2.0	4.0	4.5
	Maxi	2.5	3.0	5.5	6.0
Break *	Mini	36	35	31	30
	Maxi	42	41	40	39
(F) contact spring pressure	Mini	26	27	28	29
	Maxi	38	39	39	39

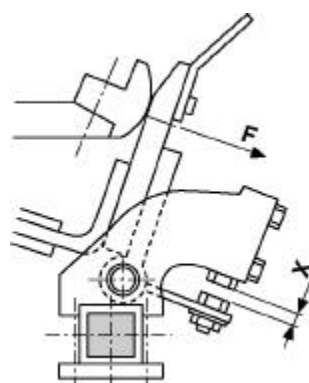
*Break: distance between fixed and moving contact (equipment opened)



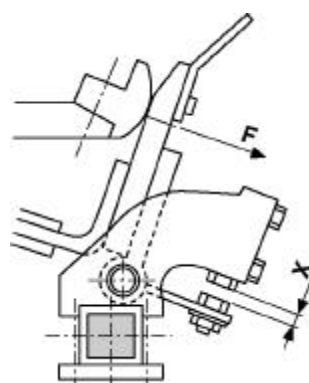
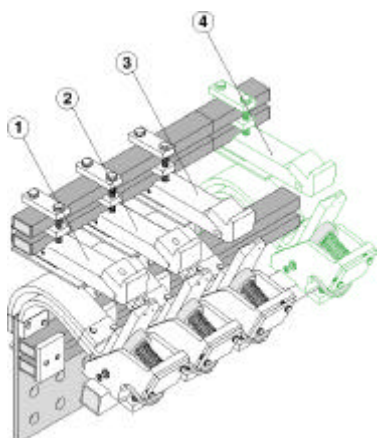
ADJUSTING THE POWER POLES

CMA 98 1250 1600 2000 BIPOLAR

	Wippe X	Break *	(F) contact spring pressure
Mini	2.8	35	23.5
Maxi	3.5	41	28.7



CMA 98 6000 Without blow-out (used as a short-circuiting equipment)



		Pôle N° 1	Pôle N° 2	Pôle N° 3	Pôle N° 4
Wippe X	Mini	4	4.5	5	5.5
	Maxi	5	5.5	6	6.5

*Break: distance between fixed and moving contact (equipment opened)