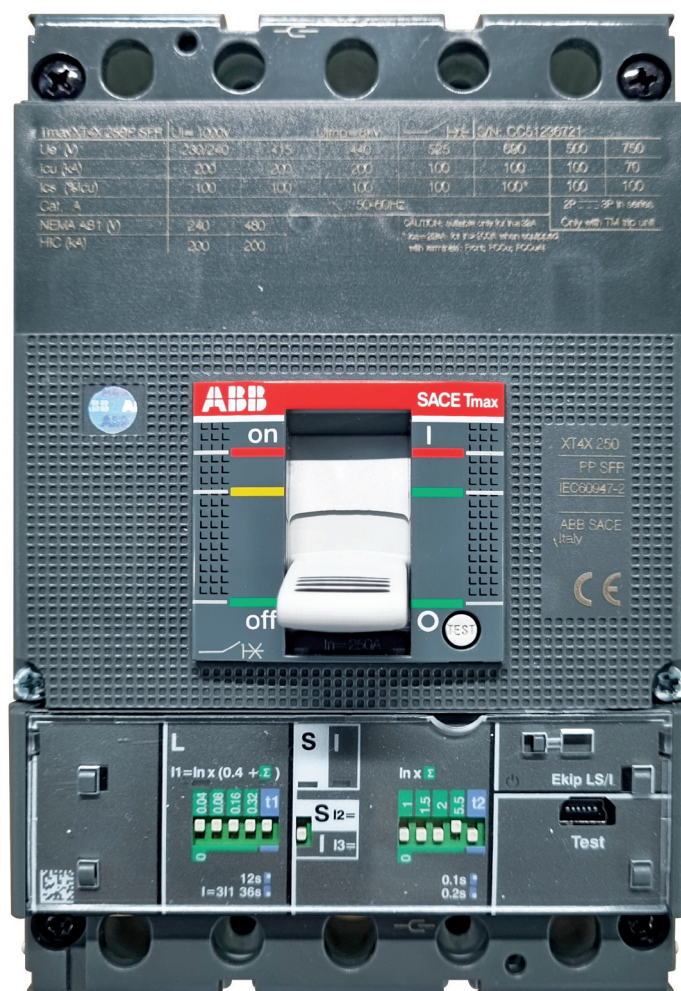


INSTRUCTION HANDBOOK

1SDH002296A1001 - ECN000285442

TMAX XT XT4 ELECTRONIC Disassembly instructions



1. SCOPE

Scope of this document is to illustrate the step-by-step disassembly process of ABB SACE Tmax XT XT4 moulded case circuit breaker equipped with an electronic trip unit (type Ekip DIP LS/I).

Document is focused on Tmax XT XT4 3p IEC version, anyway it allows to cover other versions of Tmax XT XT4 circuit breaker equipped with an electronic trip unit with just few slight differences to be taken into account.

2. SAFETY NOTES

Before proceeding with any disassembly operation, it's mandatory to put the circuit breaker in open position.

Disassembly operations of circuit breakers must be performed by qualified and skilled personnel in the electrical field (IEV 195-04-01: person with relevant education and experience to enable him or her to perceive risks and to avoid hazards which electricity can create) and having a detailed knowledge of circuit breakers.

Disassembly activities must be performed in an ergonomic workspace able to ensure protection of persons demanded to perform disassembly activities.

Applicable national legislation and international standards in force at the time of disassembly of circuit breakers must be taken into account in addition to prescriptions illustrated in this document.

ABB declines any responsibility for injury to people or damage to property resulting from a failure to comply with the instructions set out in this document and with any applicable safety standard.

3. PERSONAL PROTECTIVE EQUIPMENT (PPE)

When performing disassembly, following safety Personal Protective Equipment (PPE) must be worn:



4. TOOLS

Disassembly operations require the use of tools (e.g. screwdriver, torx key, pliers, ...); tools to be used are specified inside each phase of the disassembly process (see Chapter 6).

5. SEPARATE TREATMENT

Table below lists parts requiring a separate treatment adding information about part location inside circuit breakers and related quantity.

Description	Position inside circuit breaker	Quantity
Cap kits	In correspondence of circuit breaker connection terminals	6
Cases for microswitches	In the right hole of the circuit breaker	5
Plug	In the left hole of the circuit breaker	1
Rearming lever	Mounted on the operating mechanism	1
Tripping shaft	Mounted on the operating mechanism	1
Trip lever	In the left hole of the circuit breaker	1
Open/close lever	In the left hole of the circuit breaker	1
Case side protections	Mounted on the breaking part	2
Cover protection	In the trip unit over printed circuit board	1
Printed Circuit Board	In the trip unit	1
Sensors	In the trip unit	3
Trip coil	In the trip unit	1

If disassembled parts require a separate treatment a specific indication is provided inside each phase with reason why for the separate treatment (see Chapter 6).

6. DISASSEMBLY PROCESS

Circuit breakers disassembly process is constituted by a sequence of operations to be performed on products after their dismounting from original installation. For each phase following information are provided:

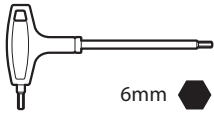
- Part/parts to be disassembled (title of the phase)
- Tools to be used
- Description of actions to be performed
- Pictures showing actions to be performed
- List, quantity and picture of disassembled parts with an indication about separate treatment (when applicable)
- In case of potential hazards signal below is reported



6.1 PHASE 1 – CAP KITS

Tools

Allen key



6mm

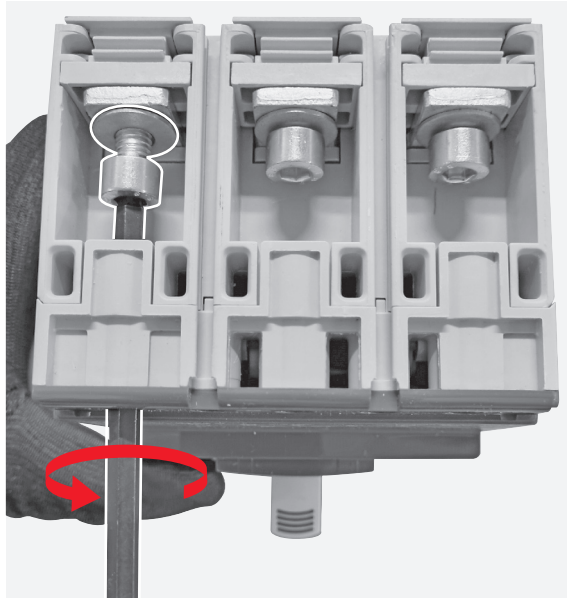
Flat screwdriver



Actions to be performed

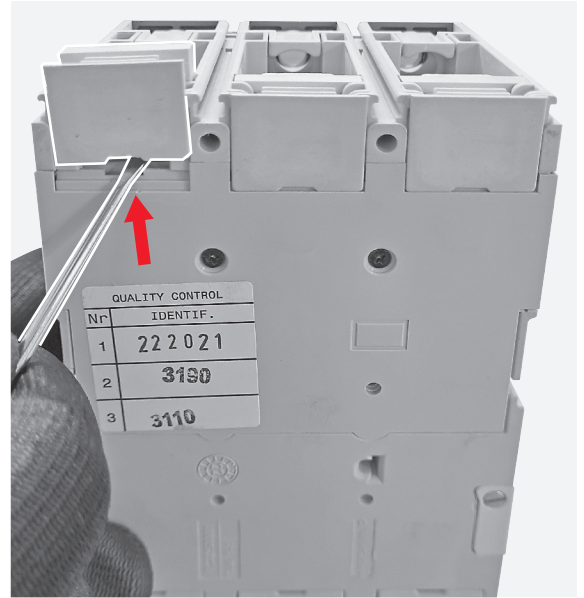
1

By means of the allen key remove the screws connected with the cap kits.

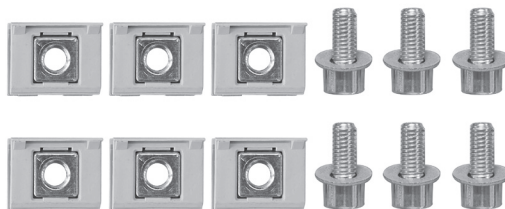


2

Insert the flat screwdriver as shown in Picture 2 and push it up in order to remove the cap kits.



Disassembled parts



- 6 screws and related washers (Metal)
- 6 cap kits (Plastic and Metal) SEPARATE TREATMENT (Thermoplastics containing brominated flame retardants)

6.2 PHASE 2 – BREAKING PART FRONTAL

Tools

Cross screwdriver



Flat screwdriver

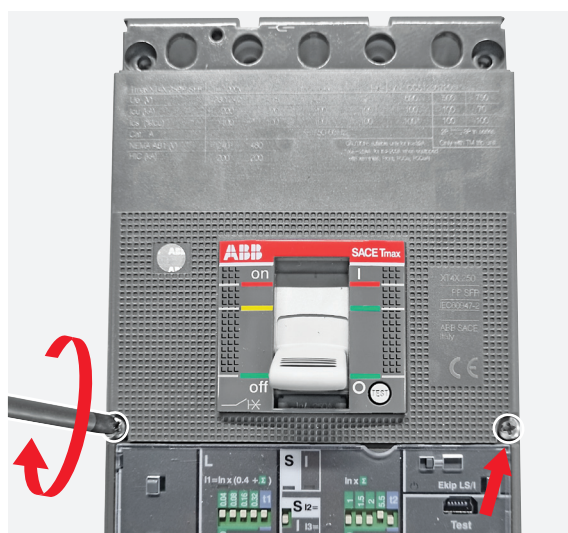


Actions to be performed

3 By means of the cross screwdriver unscrew the 2 screws located in the upper part of the breaking part frontal fixing the breaking part frontal to the circuit breaker main structure.



4 By means of the cross screwdriver unscrew the 2 screws located in the lower part of the breaking part frontal fixing the breaking part frontal to the circuit breaker main structure*.

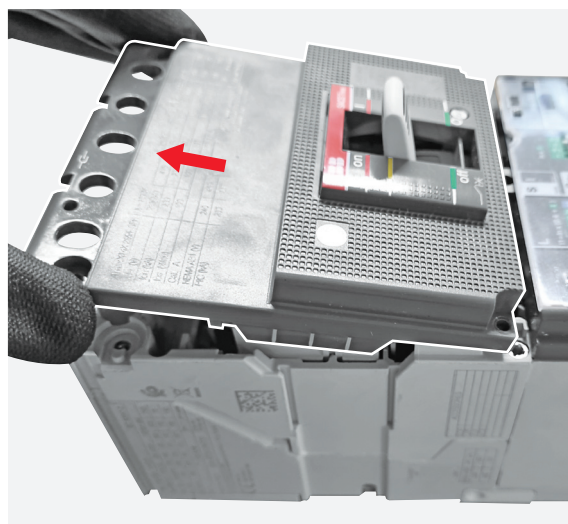


* Applicable to circuit breakers with V and X breaking capacities only.

5 By means of the cross screwdriver push the trip test button.

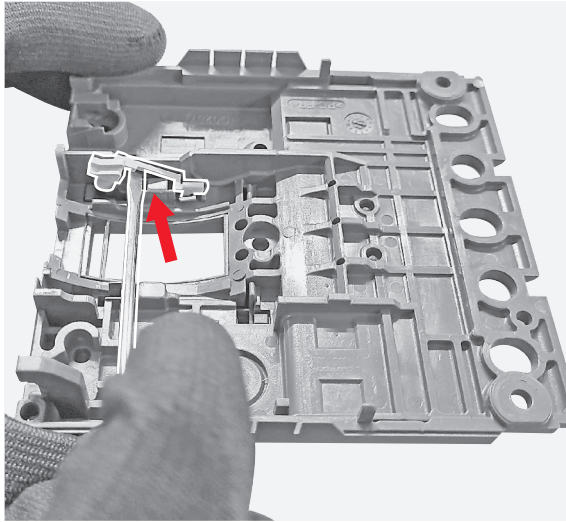


6 Manually lift a little bit the breaking part frontal and complete the removal pulling the breaking part frontal as indicated by the arrow.

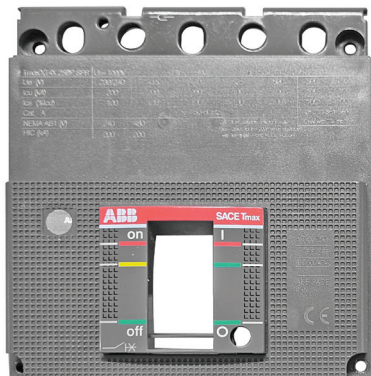


7

By means of the flat screwdriver push up the reset test rod and manually remove it.



Disassembled parts



- 2 + 2 screws (Metal)
- 1 breaking part frontal (Plastic)
- 1 reset test rod (Plastic)

6.3 PHASE 3 – TOGGLE AND ITS PROTECTION

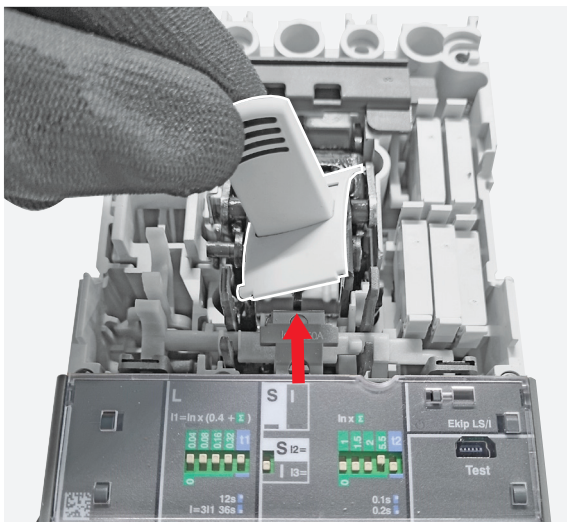
Tools

-

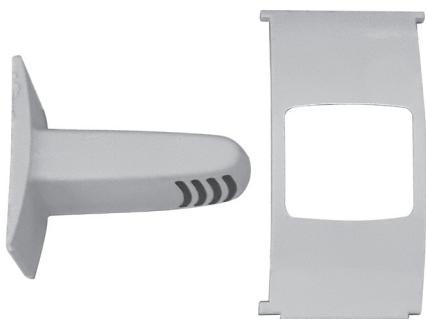
Actions to be performed

8

Manually lift the toggle and its protection and after separate the toggle from its protection.



Disassembled parts



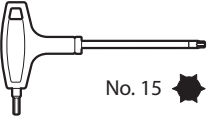
- 1 toggle (Plastic)
- 1 toggle protection (Plastic)

6.4 PHASE 4 – TRIP UNIT**Tools**

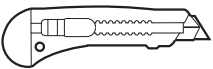
Cross screwdriver



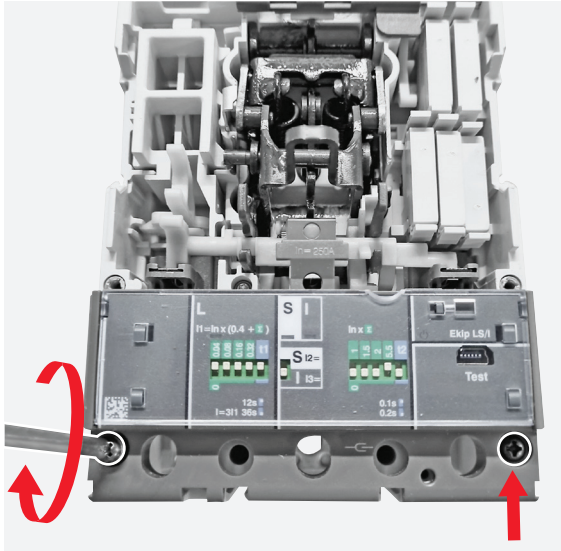
Torx key



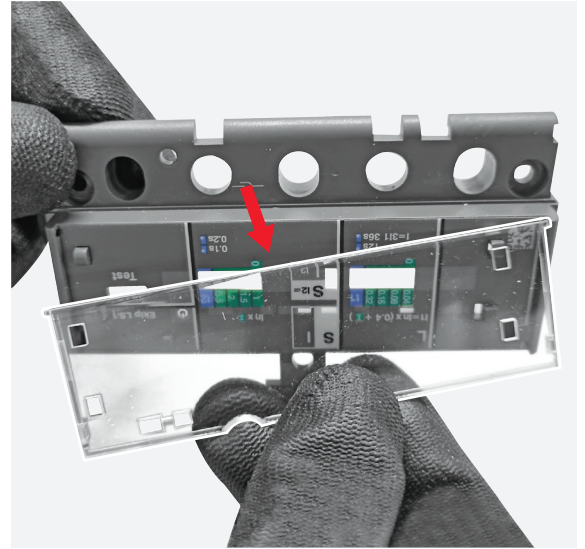
Cutter

**Actions to be performed****9**

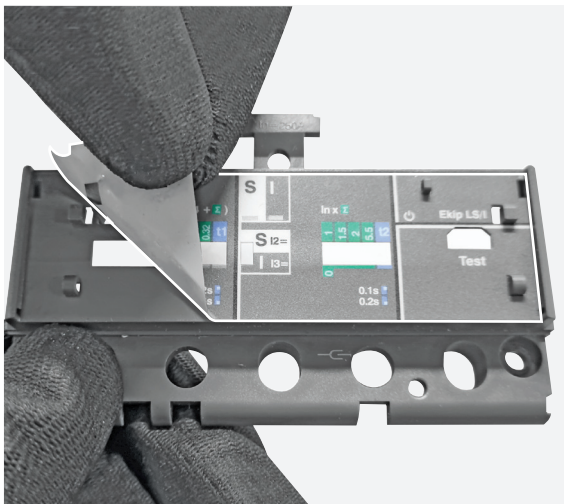
By means of the cross screwdriver unscrew the 2 screws fixing the trip unit frontal to the trip unit main structure.

**10**

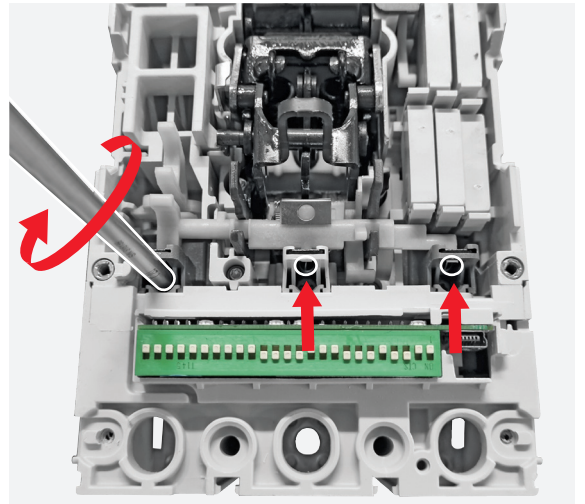
Manually disassemble the transparent protection from the trip unit frontal.

**11**

By means of the cutter start removing the label located on the trip unit frontal and manually complete the operation.

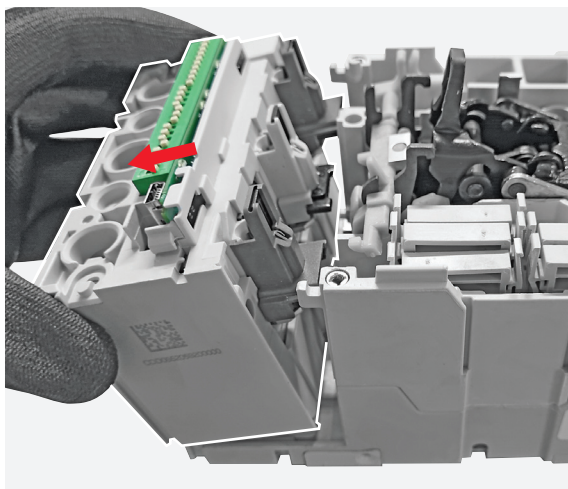
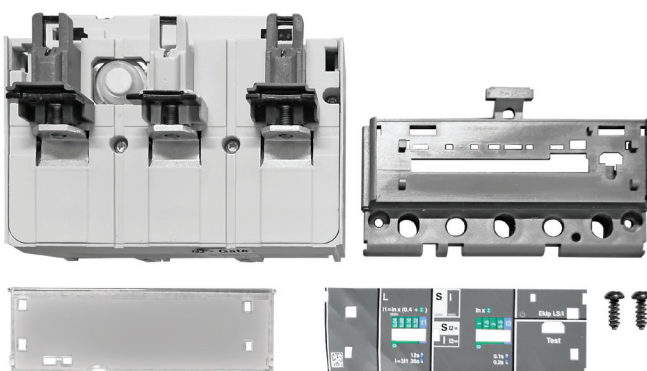
**12**

By means of the torx key unscrew the 3 screws fixing the trip unit to the breaking part.



13

Manually slightly pull the trip unit as indicated by the arrow and after lift the trip unit in order to complete the removal

**Disassembled parts**

- 2 screws (Metal)
- 1 trip unit frontal (Plastic)
- 1 trip unit transparent protection (Plastic)
- 1 label (Adhesive paper)
- 1 trip unit (Plastic and Metal) *

*Trip unit will be furtherly disassembled (see Phases 6.11 and 6.12)

6.5 PHASE 5 – PLASTIC PARTS MOUNTED ON THE BREAKING PART

Tools

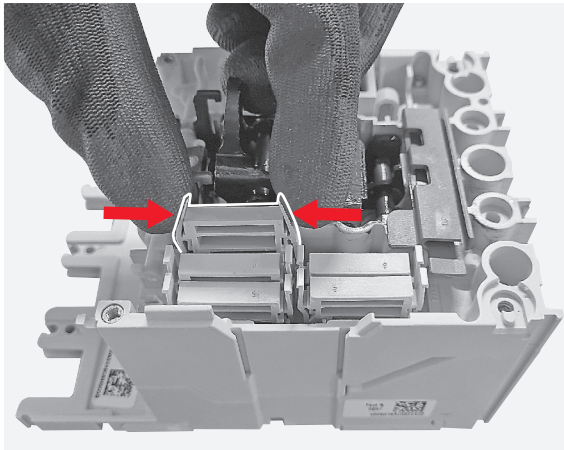
Flat screwdriver



Actions to be performed

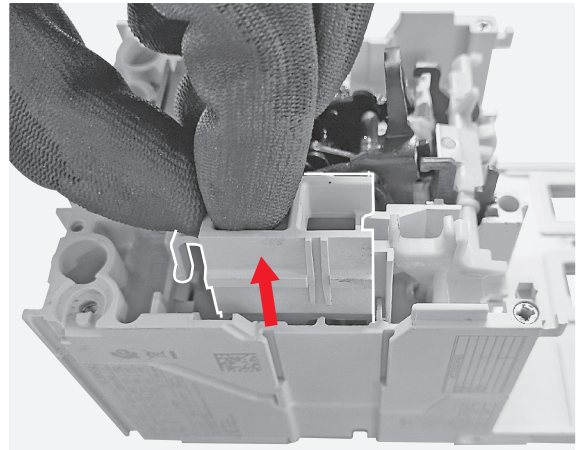
14

Manually slightly push the 2 flaps present on each case for microswitch located in the right hole of the breaking part as indicated by the arrows and after manually lift each case for microswitch to complete the removal.



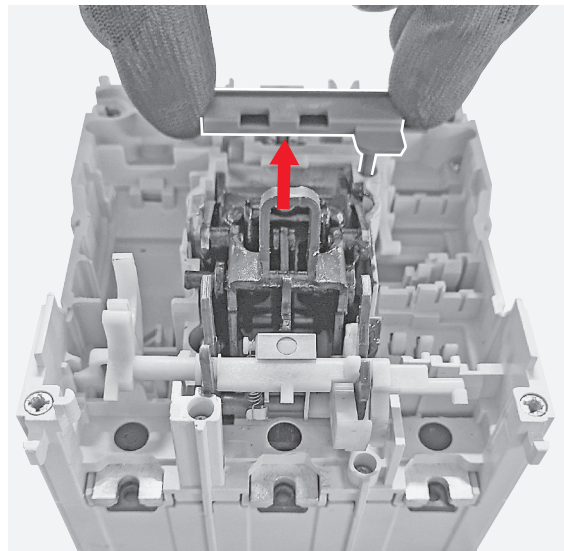
15

By means of the flat screwdriver lift the plug located in the left hole of the breaking part and after manually complete the removal of the plug.



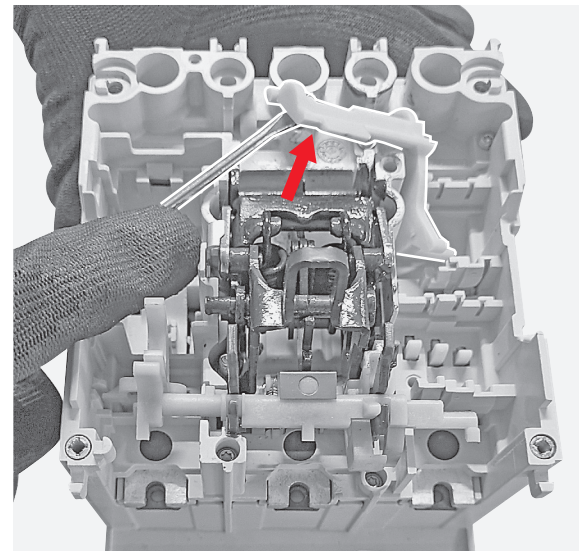
16

Manually lift cable crossing cover located in the upper part of the breaking part.

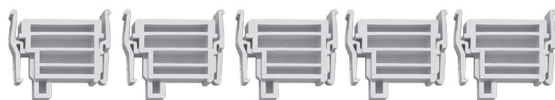


17

By means of the flat screwdriver lift the white plastic lever located in the upper part of the breaking part and after manually complete the removal of the white plastic lever.



Disassembled parts



- 1 plug (Plastic) SEPARATE TREATMENT
(Thermoplastics containing brominated flame retardants)
- 1 cable crossing cover (Plastic)
- 1 lever (Plastic)

6.6 PHASE 6 – REAR COVER

Tools

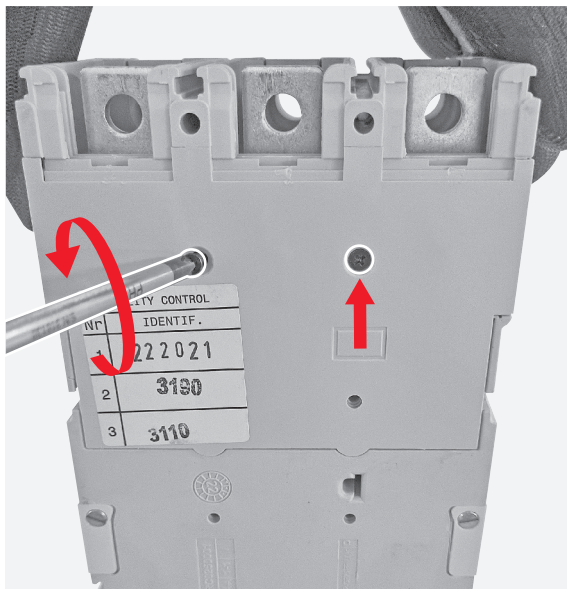
Cross screwdriver



Actions to be performed

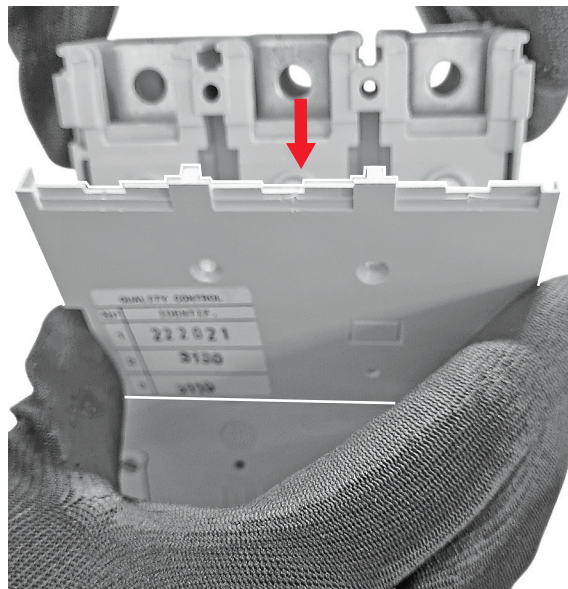
18

By means of the cross screwdriver unscrew the 2 screws fixing the rear cover to the breaking part.

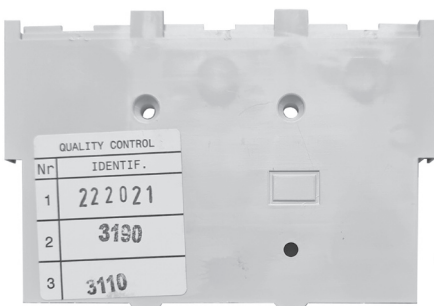


19

Manually remove the rear cover.



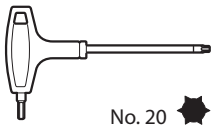
Disassembled parts



- 2 screws (Metal)
- 1 rear cover (Plastic)

6.7 PHASE 7 – OPERATING MECHANISM AND TRIPPING SHAFT**Tools**

Torx key



No. 20

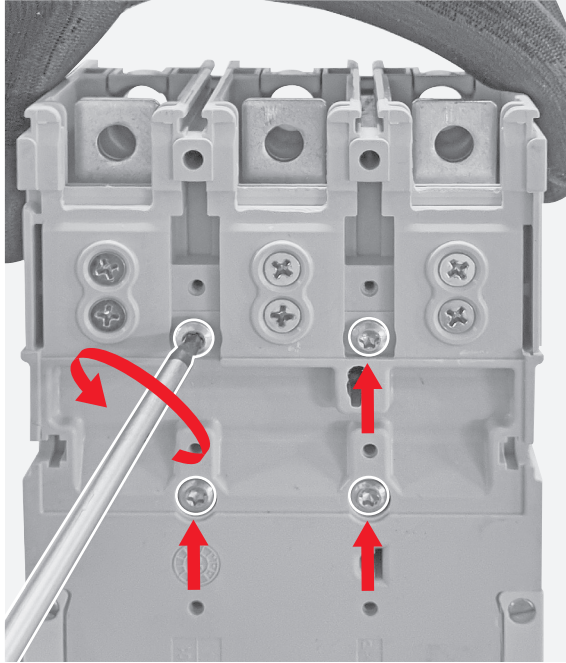
Flat screwdriver



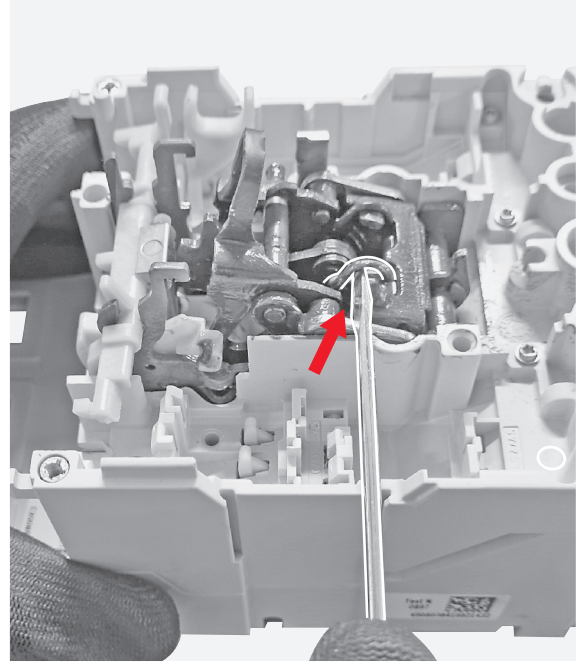
Pliers

**Actions to be performed****20**

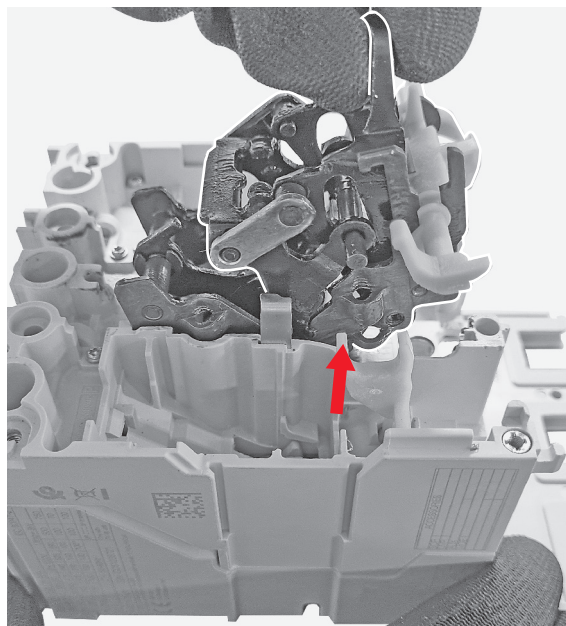
By means of the torx key (size 20) unscrew the 4 screws located in the back part of the breaking part.

**21**

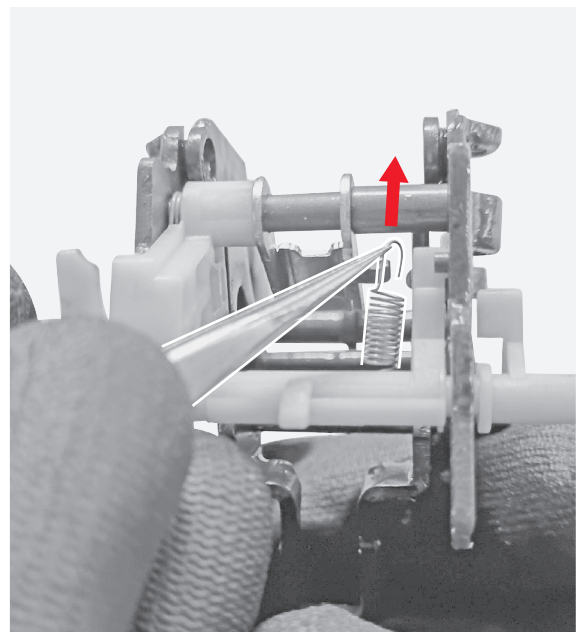
By means of the flat screwdriver unhook the 2 springs mounted on the operating mechanism.

**22**

Manually lift the operating mechanism and remove it.

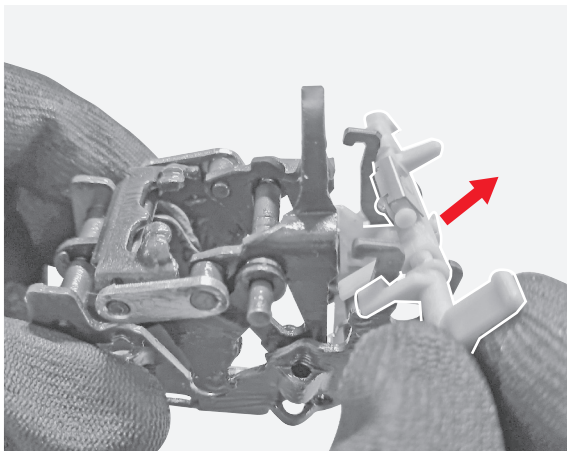
**23**

By means of the pliers remove the spring mounted in the middle of the operating mechanism.

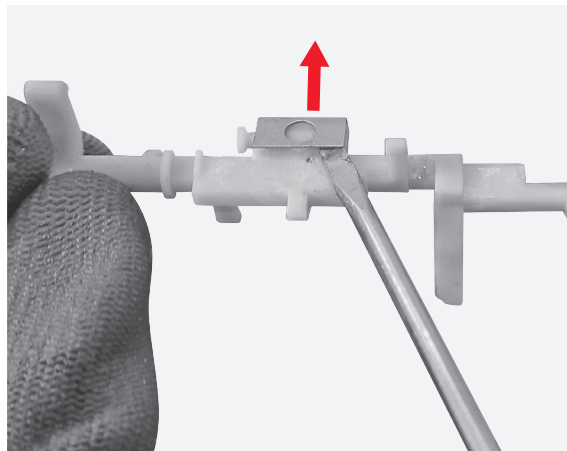


24

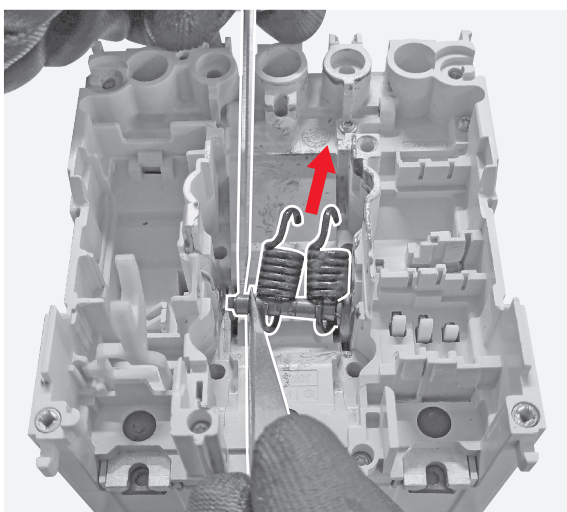
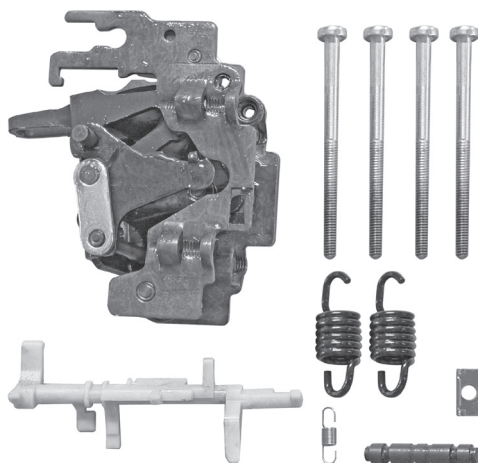
Manually remove the tripping shaft from the operating mechanism pulling it as indicated by the arrow.

**25**

By means of the flat screwdriver remove the metal plate mounted on the tripping shaft.

**26**

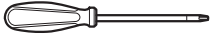
By means of the flat screwdriver and by means of the pliers dismount the pin and remove the pin and the 2 springs mounted on the pin.

**Disassembled parts**

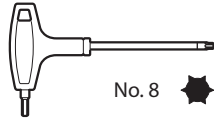
- 4 screws (Metal)
- 1 operating mechanism (Plastic and Metal) SEPARATE TREATMENT (Thermoplastics containing brominated flame retardants)
- 1 + 2 springs (Metal)
- 1 tripping shaft (Plastic) SEPARATE TREATMENT (Thermoplastics containing brominated flame retardants)
- 1 plate (Metal)
- 1 pin (Metal)

6.8 PHASE 8 – BREAKING PART COVER AND CONNECTED PARTS**Tools**

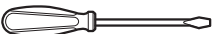
Cross screwdriver



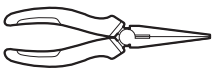
Torx key



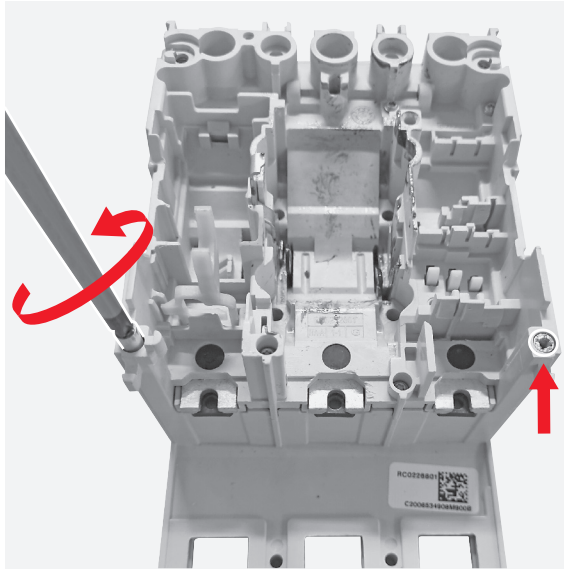
Flat screwdriver



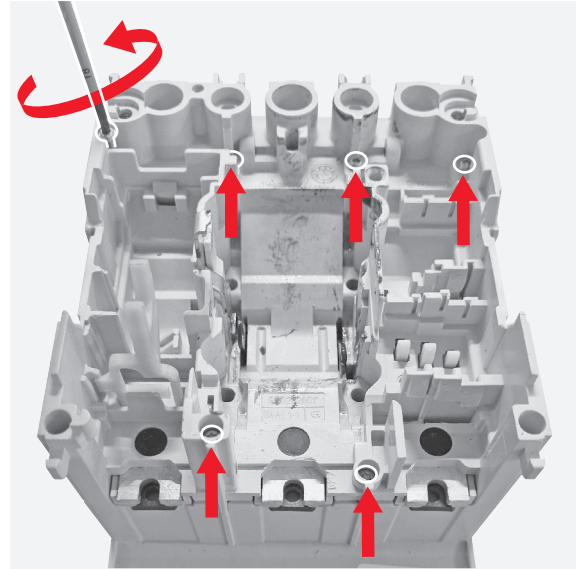
Pliers

**Actions to be performed****27**

By means of the cross screwdriver unscrew the 2 screws located at the bottom corners of the breaking part cover.*

**28**

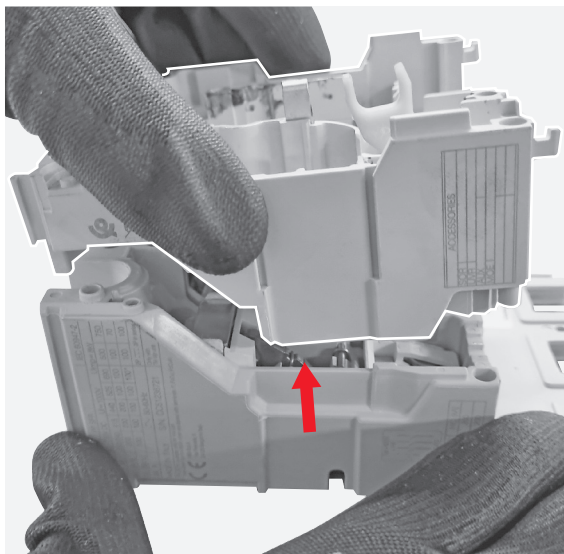
By means of the cross screwdriver uncrew the 6 screws fixing the breaking part cover to the breaking part base.



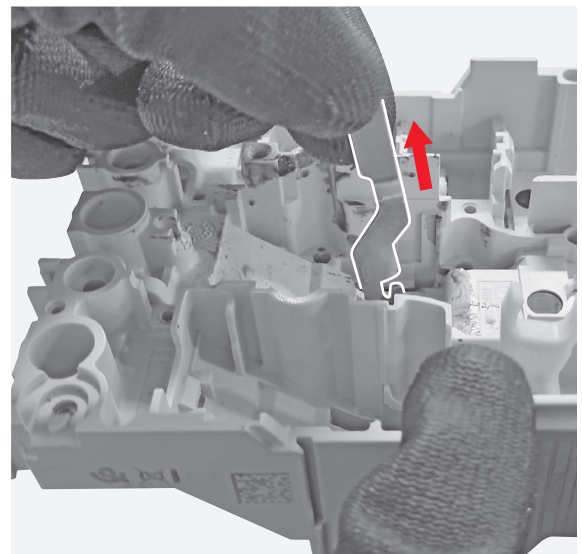
* For circuit breakers with N, S, H and L breaking capacities, torx key must be used to unscrew the 2 screws.

29

Manually lift the breaking part cover.

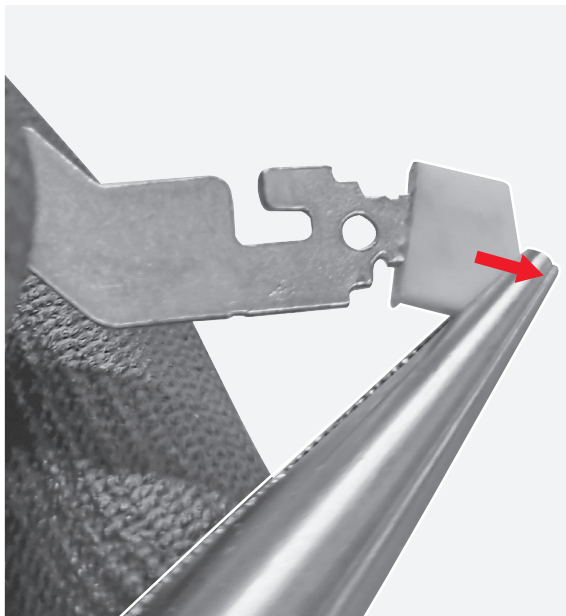
**30**

Manually lift the motor operator lever located between the hole previously hosting the operating mechanism and after complete removal operation.

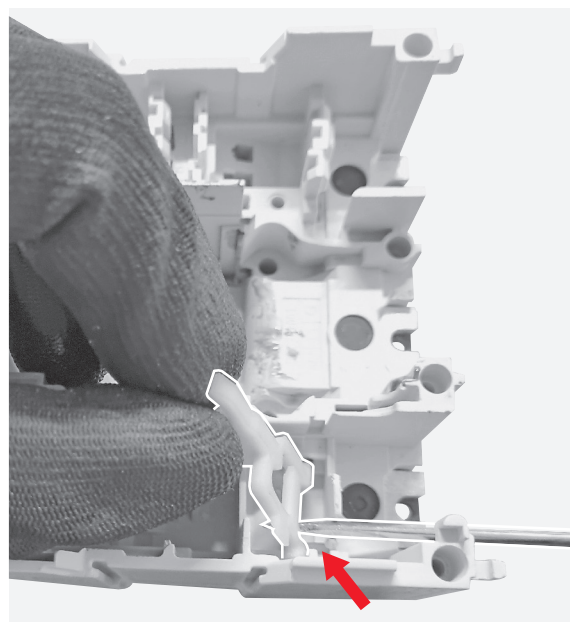


31

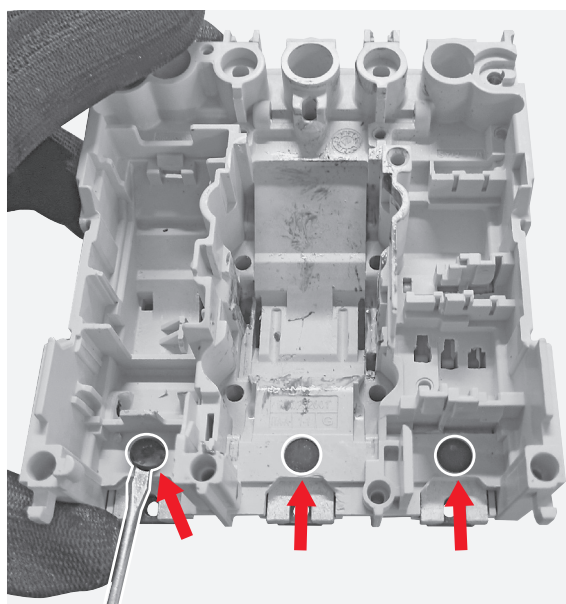
By means of the pliers remove the hood mounted on the motor operator lever removed at previous step.

**32**

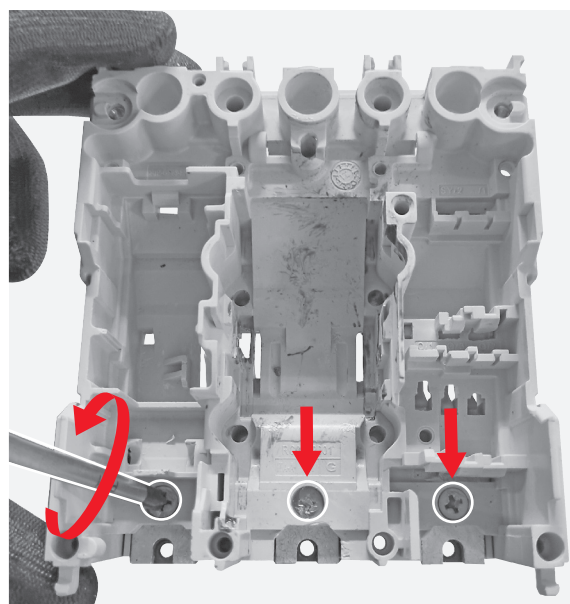
By means of the flat screwdriver slightly push on the right the the trip lever mounted in the bottom part of the breaking part and then lift the lever in order to complete the removal.

**33**

By means of the flat screwdriver remove the 3 plugs located in the bottom part of the breaking part.

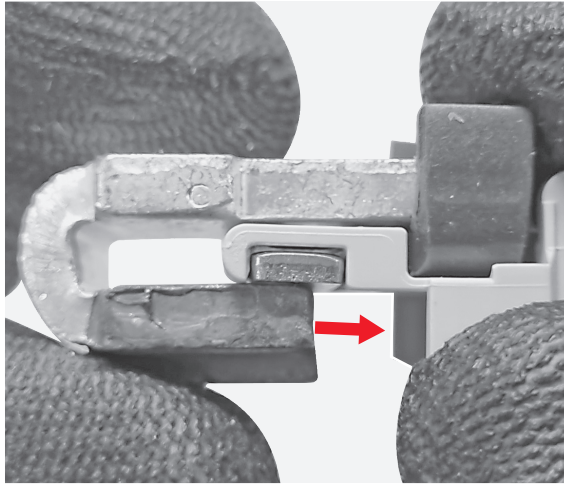
**34**

By means of the cross screwdriver unscrew the 3 screws located in the bottom part of the breaking part; the terminals connections between the breaking part and the trip unit will fall from the breaking part by gravity.

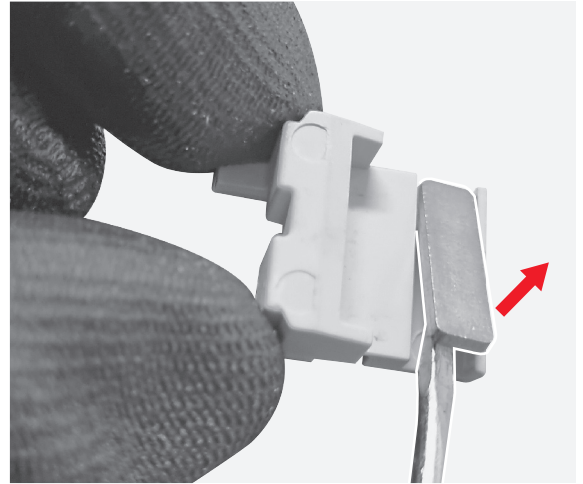


35

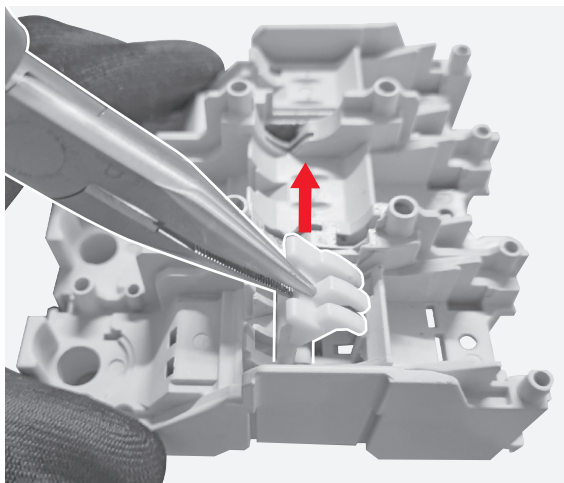
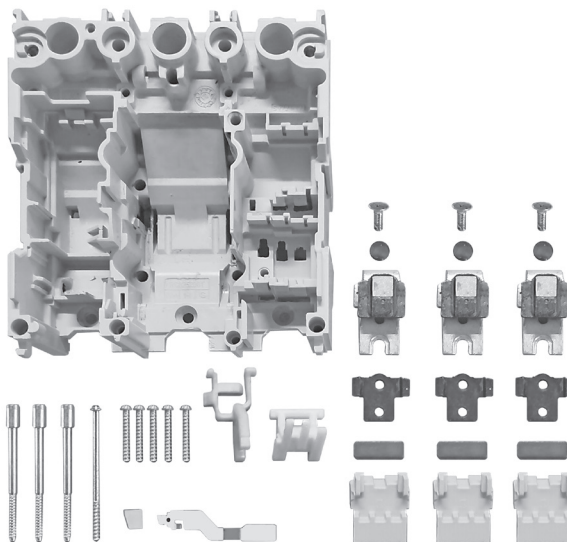
Manually separate the plastic part from the metals parts constituting the terminals connections removed at previous step.

**36**

By means of the flat screwdriver remove the metal plate from the plastic part constituting terminals connections.

**37**

By means of the pliers remove the open/close lever.

**Disassembled parts**

- 2 + 6 + 3 screws (Metal)
- 1 breaking part cover (Plastic)
- 1 motor operator lever (Metal)
- 1 hood (Rubber)
- 1 trip lever (Plastic) SEPARATE TREATMENT (Thermoplastics containing brominated flame retardants)
- 3 plugs (Rubber)
- 3 terminals connections (Plastic and Metal)
- 1 open/close lever (Plastic) SEPARATE TREATMENT (Thermoplastics containing brominated flame retardants)

6.9 PHASE 9 – MOVING CONTACTS AND ARCHING CHAMBERS

Tools

Flat screwdriver



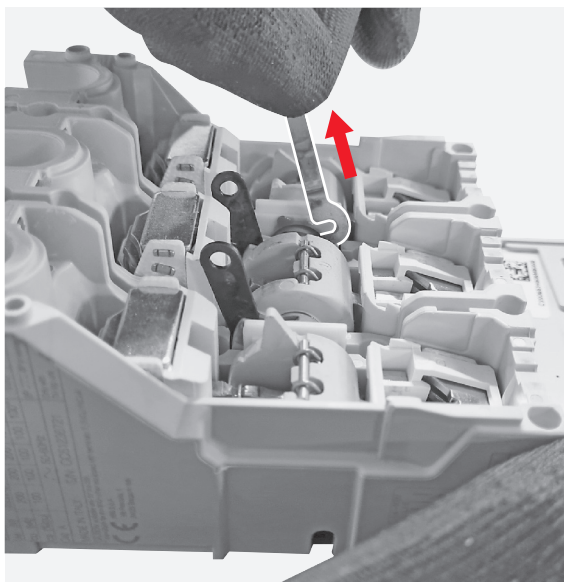
Pliers



Actions to be performed

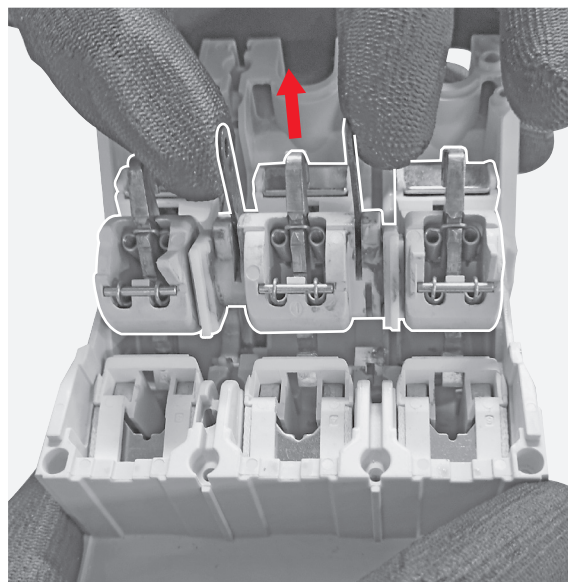
38

Manually remove the block lever.



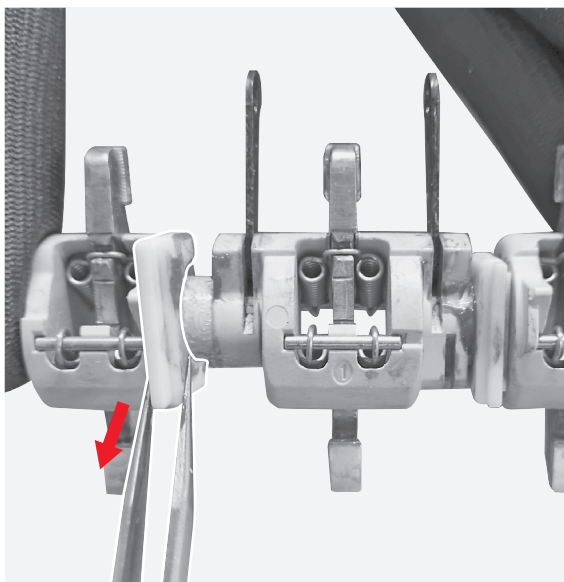
39

Manually lift the moving contacts assembly.



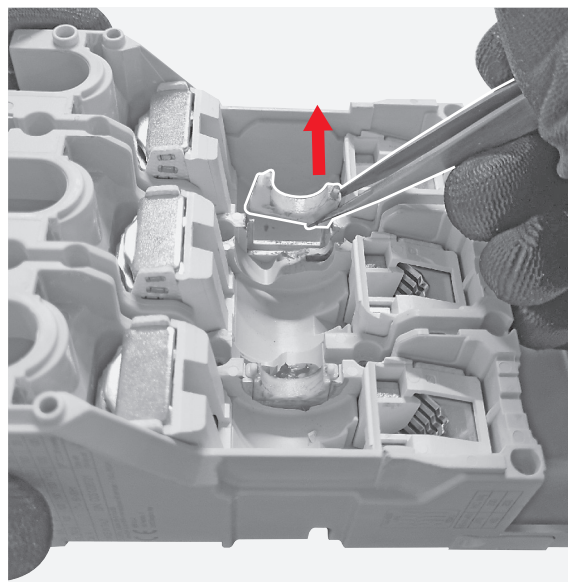
40

By means of the pliers remove the 2 plugs mounted on the moving contacts assembly*.



41

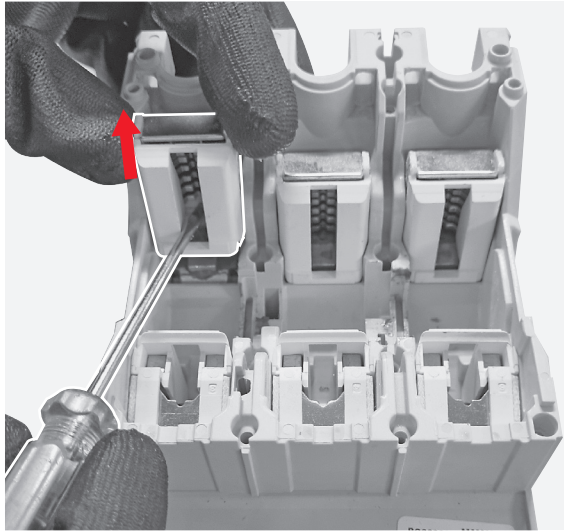
By means of the pliers remove the 2 plugs mounted on the breaking part base.



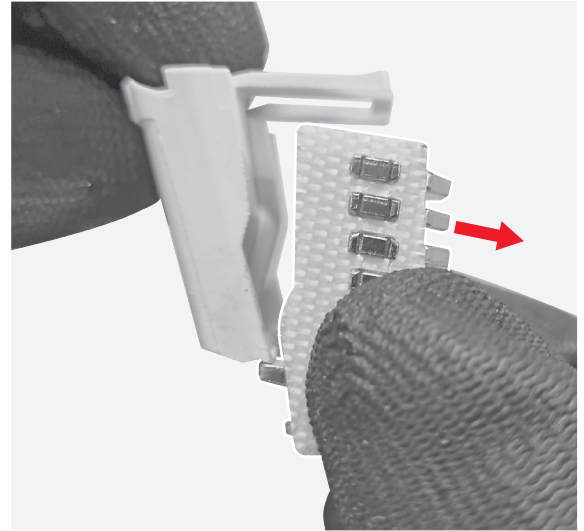
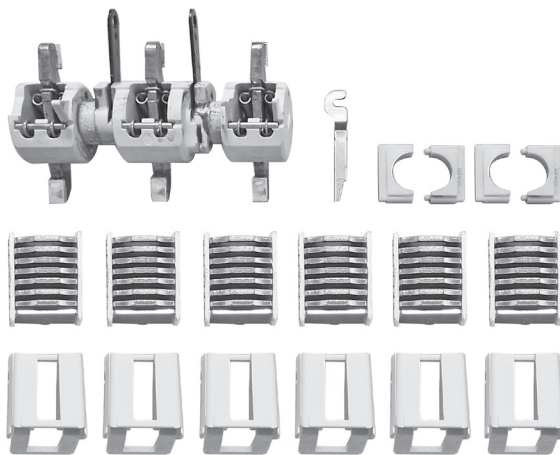
* Applicable to circuit breakers with V and X breaking capacities only.

42

By means of the flat screw driver lift the arching chambers and after manually complete the removal operation.

**43**

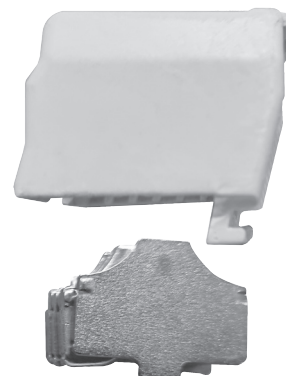
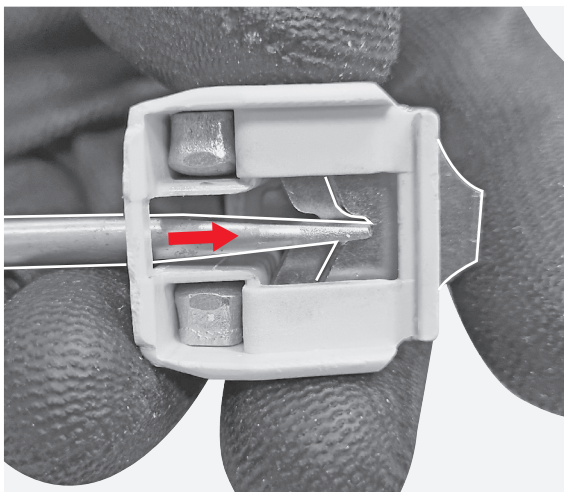
Manually separate the arching chambers from their supports.

**Disassembled parts**

- 1 block lever (Metal)
- 1 moving contacts assembly (Plastic and Metal)
- 4 plugs (Plastic)
- 6 arching chambers (Plastic and Metal)
- 6 arching chambers supports (Plastic and Metal)

Note:

Arching chambers of circuit breakers with N, S, H and L breaking capacities are made by an unique assembly and by means of a flat screwdriver plates can be removed from the arching chamber case.



6.10 PHASE 10 – FIXED CONTACTS

Tools

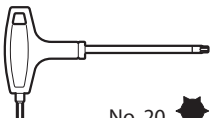
Cross screwdriver



Flat screwdriver



Torx key

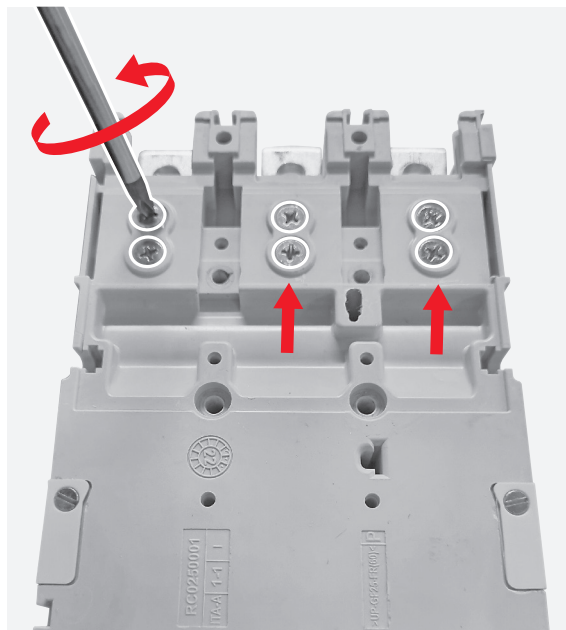


No. 20 

Actions to be performed

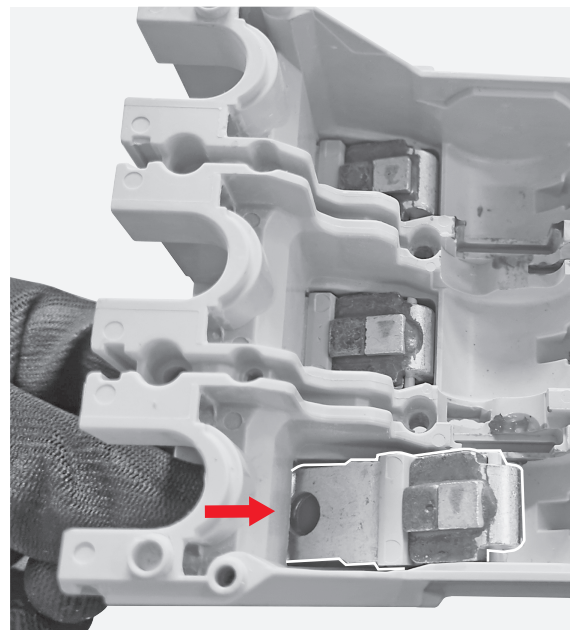
44

By means of the cross screw driver unscrew the 6 screws located in the back part of the breaking part base*.



45

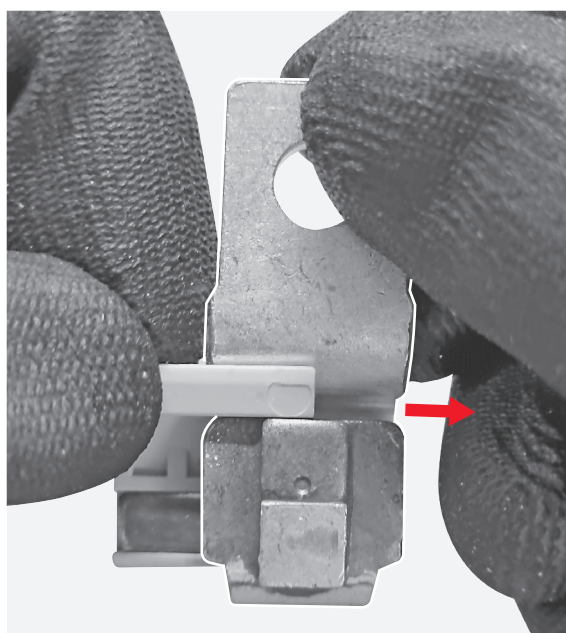
Manually push the fixed contacts as indicated by the arrow.



* To unscrew the 3 bottom screws mounted on circuit breakers with breaking capacities N, S, H and L a torx key must be used.

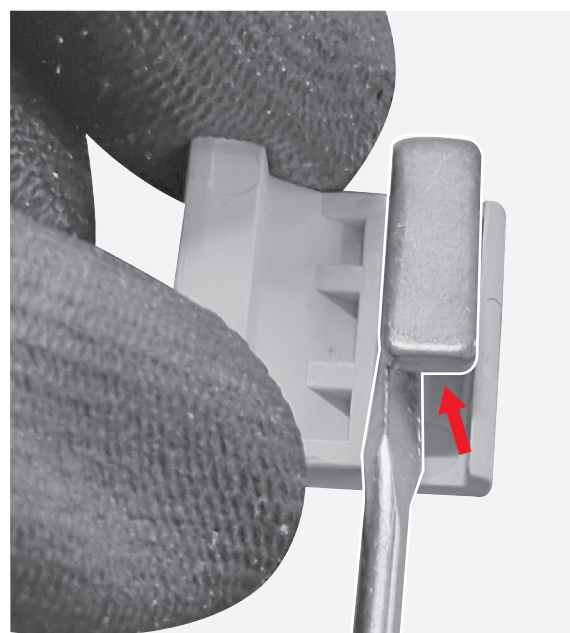
46

Manually separate the plastic part from the metal part constituting the fixed contacts.



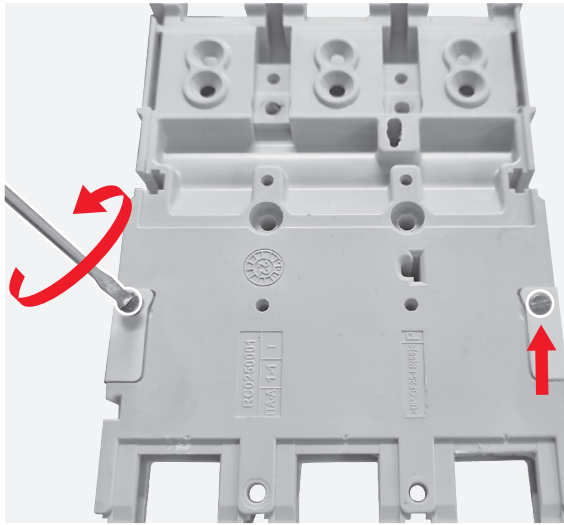
47

By means of the flat screwdriver remove the metal plate mounted on the the plastic part constituting the fixed contacts.



48

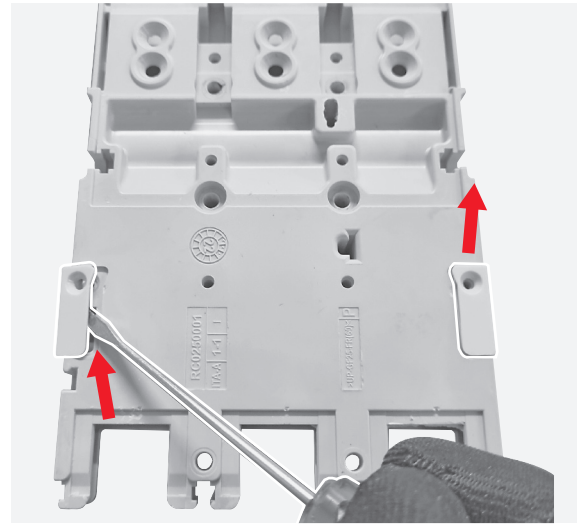
By means of the flat screwdriver unscrew the screw fixing the case side protection to the breaking part base.



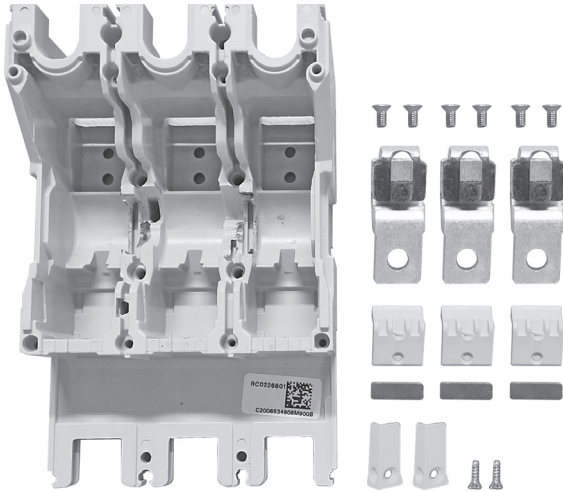
* Applicable to circuit breakers with V and X breaking capacities only.

49

By means of the flat screwdriver complete the removal of the case side protections.



* Applicable to circuit breakers with V and X breaking capacities only.

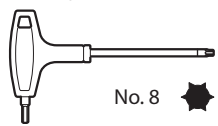
Disassembled parts

- 1 breaking part base (Plastic)
- 6 + 2 screws (Metal)
- 3 fixed contacts (Plastic and Metal)
- 3 plates (Metal)
- 2 case side protections (Plastic) **SEPARATE TREATMENT** (Thermoplastics containing brominated flame retardants)

6.11 PHASE 11 – TRIP UNIT COVER AND I3 ASSEMBLY

Tools

Torx key



Pliers



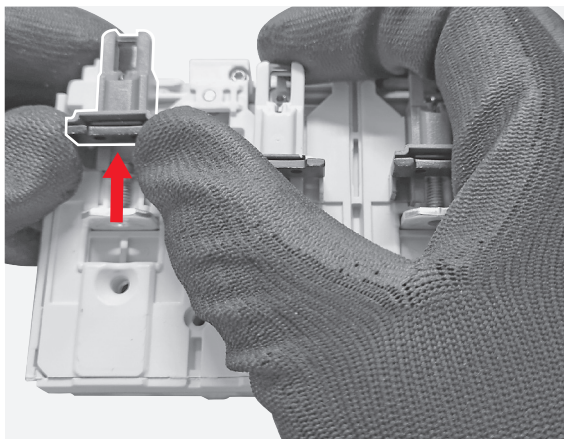
Flat screwdriver



Actions to be performed

50

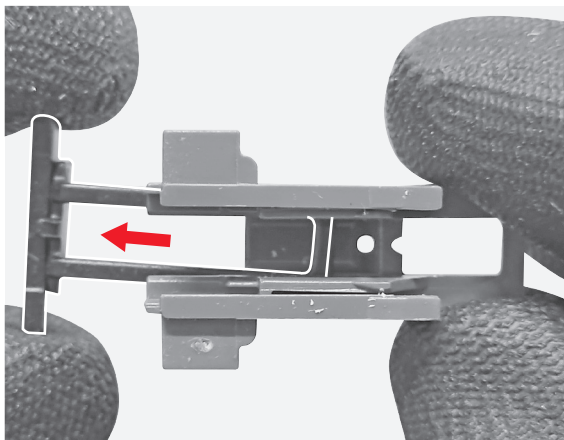
Manually push the 3 I3 assemblies as indicated by the arrow.

**51**

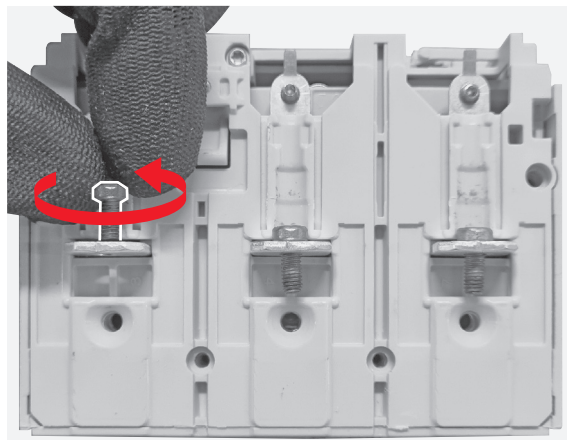
By means of the pliers remove the spring mounted on the I3 assembly.

**52**

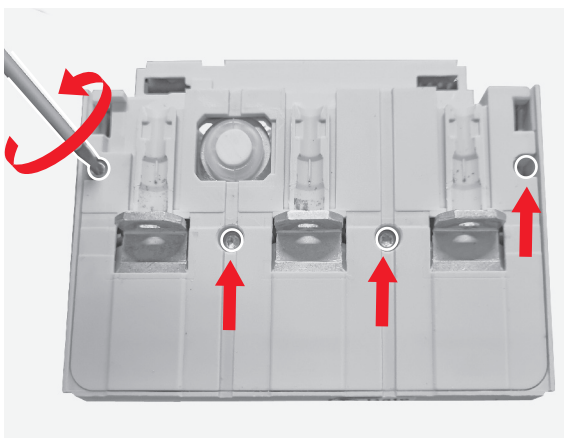
Manually separate the I3 support and the I3 group.

**53**

Manually remove the 3 screws located on the top of the trip unit.

**54**

By means of the torx key unscrew the 4 screws fixing the trip unit cover to the trip unit.

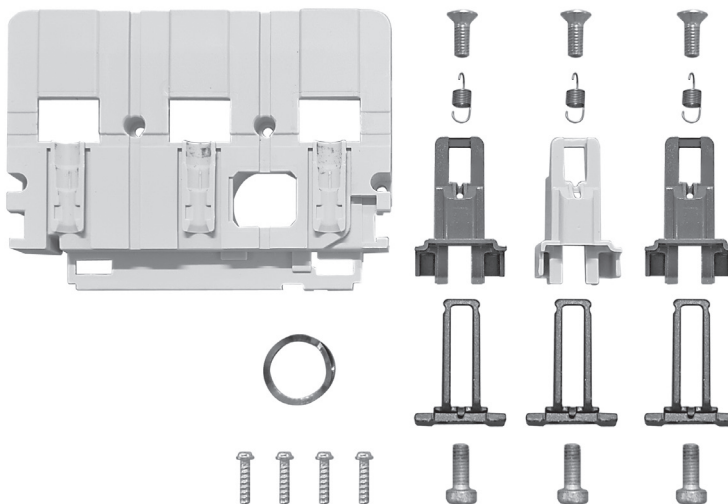
**55**

By means of the flat screwdriver lift the top cover of the trip unit and manually complete the removal.



56

Manually remove the wave spring located over the trip coil.

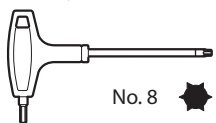
**Disassembled parts**

- 3 + 4 screws (Metal)
- 3 springs (Metal)
- 3 I3 groups (Metal)
- 3 I3 supports (Plastic)
- 1 trip unit cover (Plastic and Metal)
- 1 wave spring (Metal)

6.12 PHASE 12 – PRINTED CIRCUIT BOARD, CURRENT SENSORS, TRIP COIL AND TRIP UNIT

Tools

Torx key



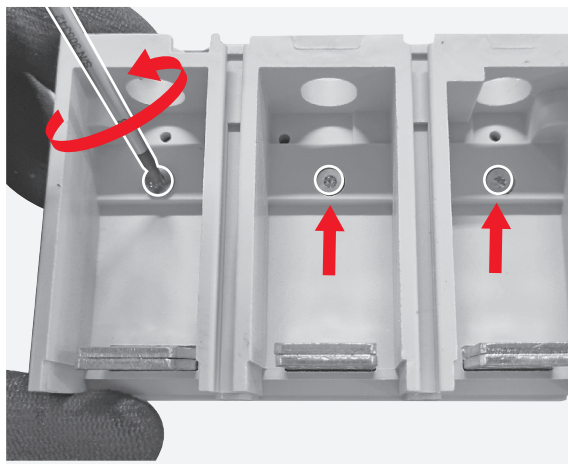
No. 8



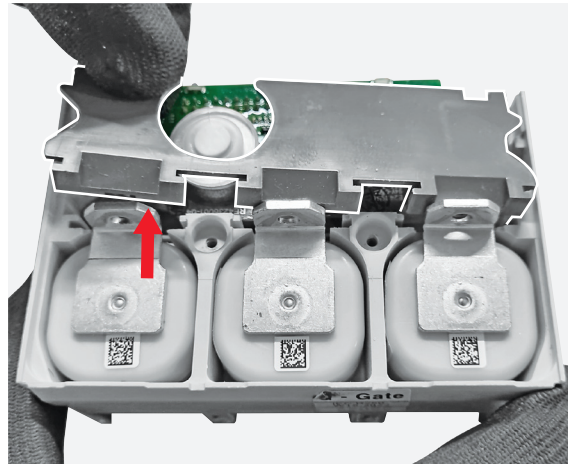
Actions to be performed

57

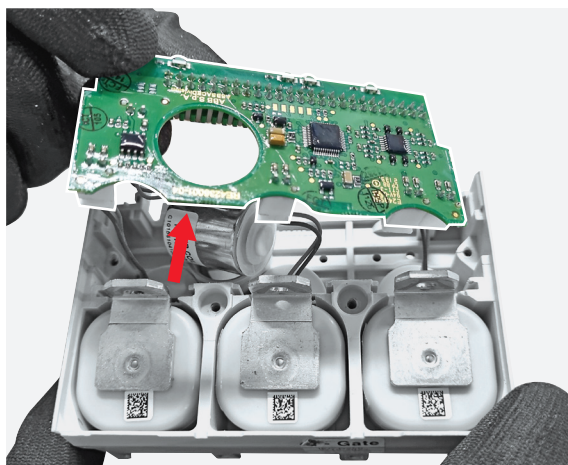
By means of the torx key unscrew the 3 screws located in the bottom part of the trip unit.

**58**

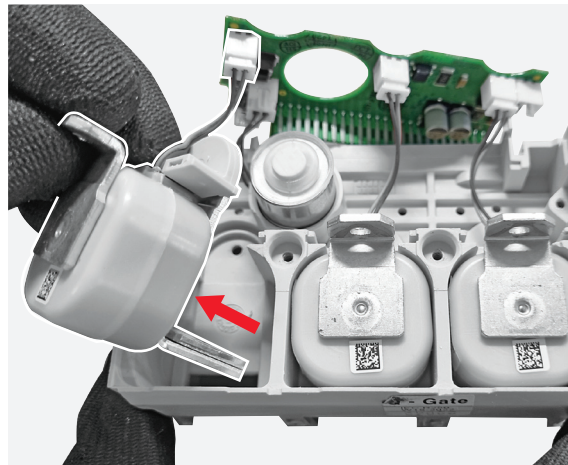
Manually lift the protection cover over the printed circuit board.

**59**

Manually lift the printed circuit board.

**60**

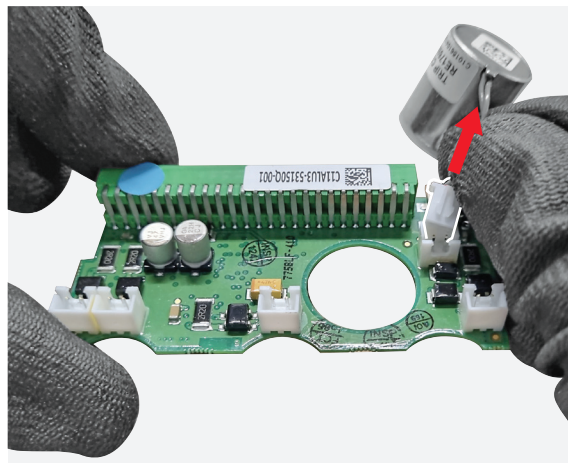
Manually lift the current sensors and after complete the removal of the printed circuit board and of the 3 current sensors together with their plastic supports and the trip coil.

**61**

Manually separate the 3 current sensors from the printed circuit board.

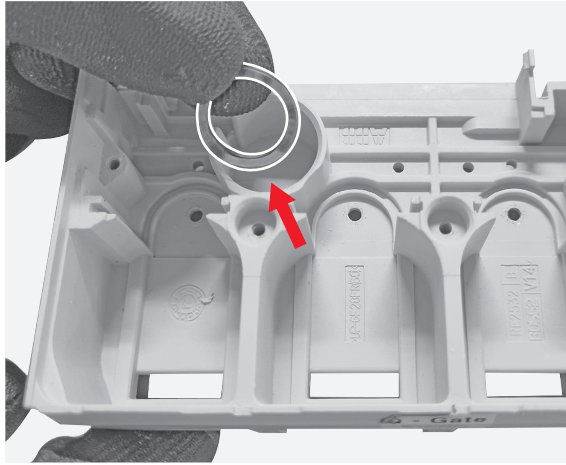
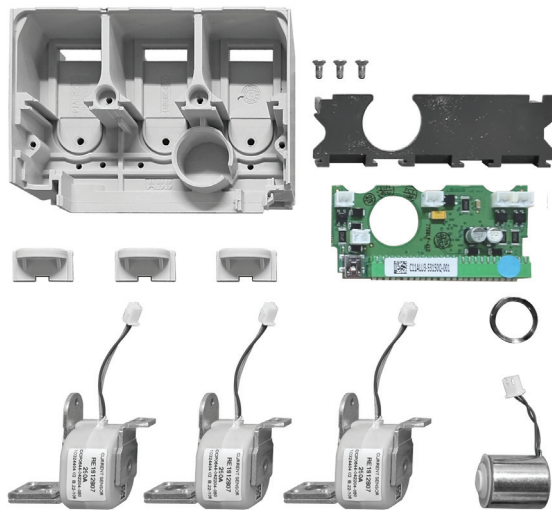
**62**

Manually separate the trip coil from the printed circuit board.



63

Manually remove the wave spring located in the hole previously hosting the trip coil.

**Disassembled parts**

- 3 screws (Metal)
- 1 protective cover (Plastic) SEPARATE TREATMENT (Thermoplastics containing brominated flame retardants)
- 1 printed circuit board (Plastic, Metal and Electronic components) SEPARATE TREATMENT (Printed circuit board)
- 3 sensors (Plastic, Metal and Mixture) SEPARATE TREATMENT (Thermoplastics containing brominated flame retardants)
- 3 supports (plastic)
- 1 trip coil (Plastic, Metal and Magnets) SEPARATE TREATMENT (Magnets)
- 1 wave spring (Metal)
- 1 trip unit base (Plastic)

7. ENERGY CONSUMPTION FOR CIRCUIT BREAKERS DISASSEMBLY

Since all disassembly operations illustrated in this document are manual, the CO₂ equivalent emissions can be considered null/negligible.



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