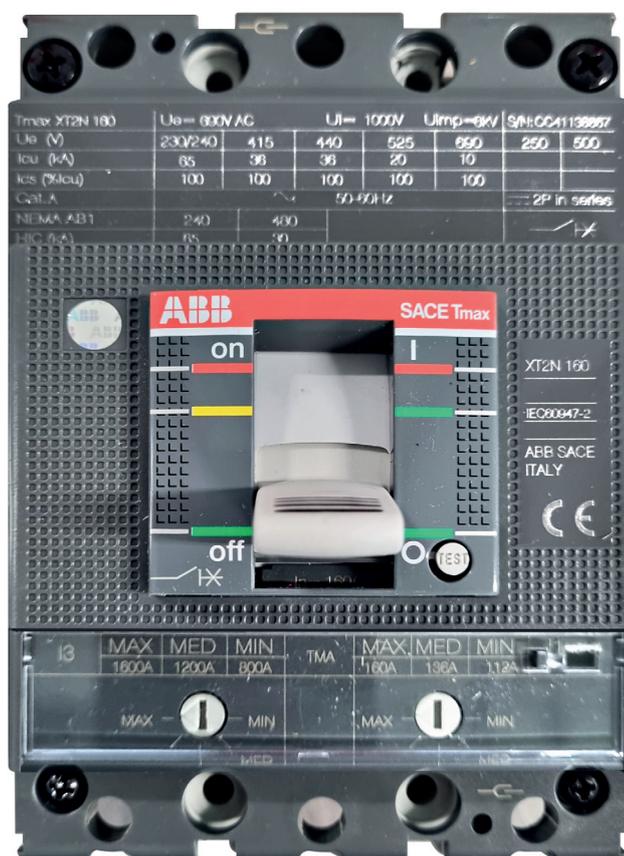


INSTRUCTION HANDBOOK
 ISDH002292A1001 - ECN000285442

TMAX XT XT2 THERMOMAGNETIC

Disassembly instructions



1. SCOPE

Scope of this document is to illustrate the step-by-step disassembly process of ABB SACE Tmax XT XT2 moulded case circuit breaker equipped with a thermomagnetic trip unit.

Document is focused on Tmax XT XT2 3p IEC version, anyway it allows to cover other versions of Tmax XT XT2 circuit breaker equipped with a thermomagnetic 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
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
Trimmers	Mounted on trip unit front	1
Lever	In the trip unit	1
Shaft	In the trip unit	1
Magnetic shaft	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 is provided:

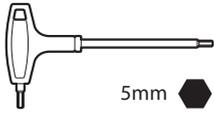
- Part/parts to be disassembled (title of the phase)
- Tools to be used
- Description of actions to be performed
- Pictures showing actions to be performed
- List, quantity and picture of disassembled parts with an indication about separate treatment (when applicable)
- In case of potential hazards signal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



6.1 PHASE 1 – CAP KITS

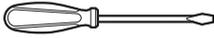
Tools

Allen key



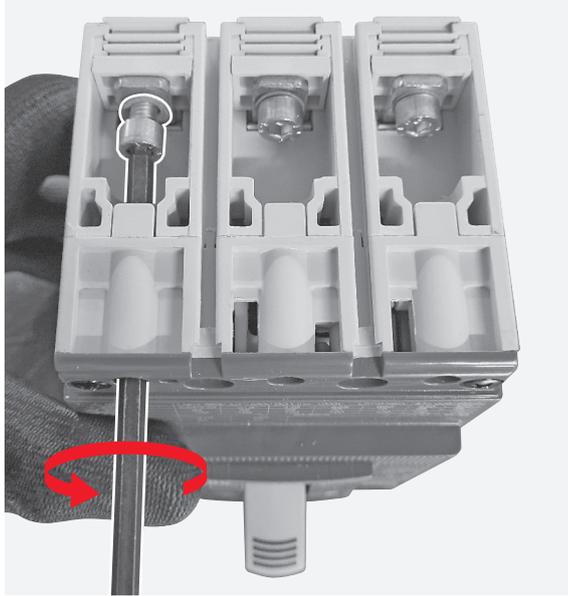
5mm

Flat screwdriver

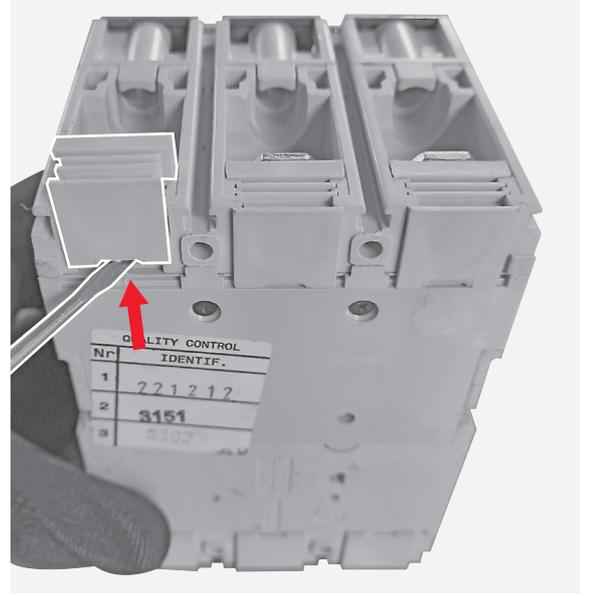


Actions to be performed

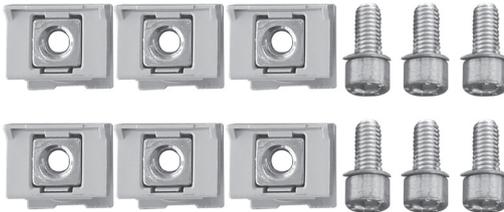
1
By means of the allen key remove the screws connected with the cap kits.



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



Disassembled parts

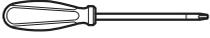


- 6 screws and related washers (Metal)
- 6 cap kits (Plastic and Metal) SEPARATE TREATMENT (Thermoplastics containing brominated flame retardants)

6.2 PHASE 2 – BREAKING PART FRONTAL

Tools

Cross screwdriver

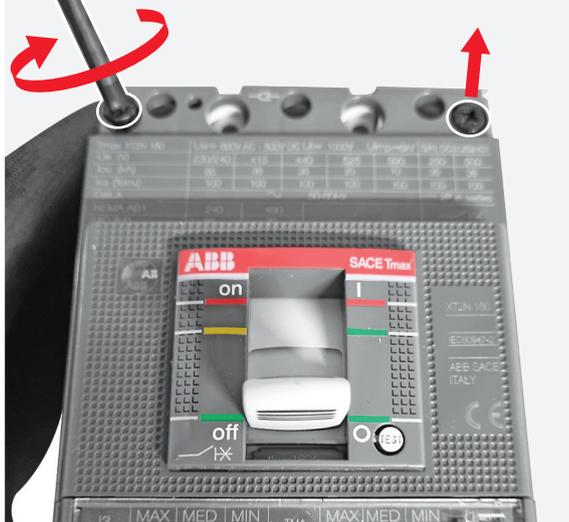


Flat screwdriver

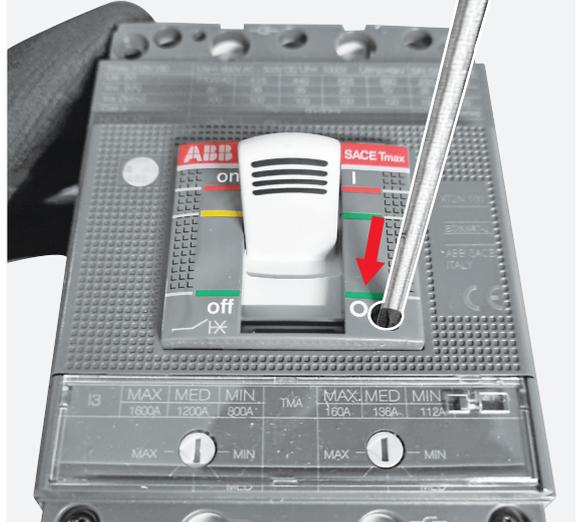


Actions to be performed

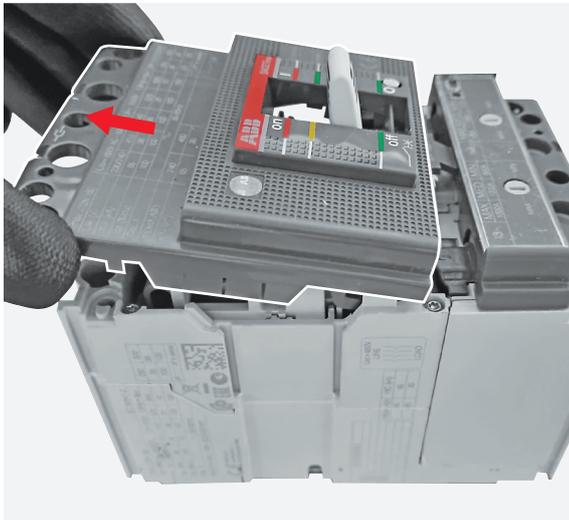
3 By means of the cross screwdriver unscrew the 2 screws fixing the braking part frontal to the circuit breaker main structure.



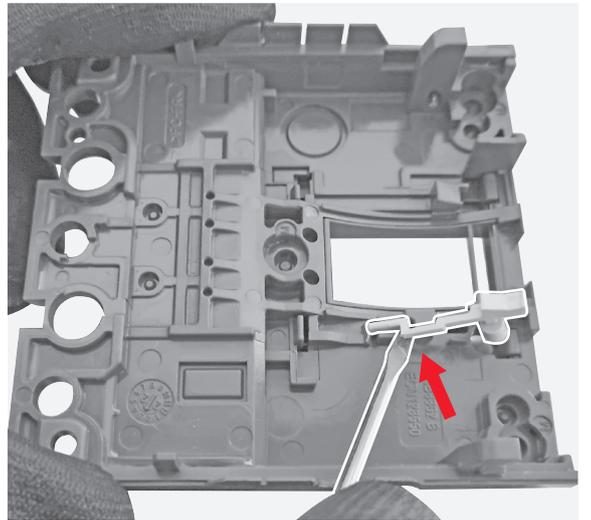
4 By means of the cross screwdriver push the trip test button.



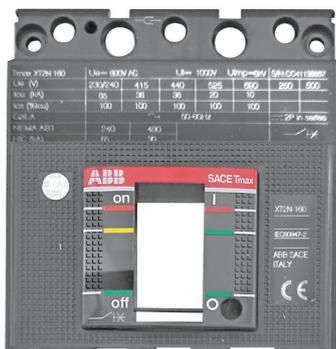
5 Manually lift a little bit the breaking part frontal and complete the removal pulling the breaking part frontal as indicated by the arrow.



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



Disassembled parts



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

6.3 PHASE 3 – TOGGLE AND ITS PROTECTION

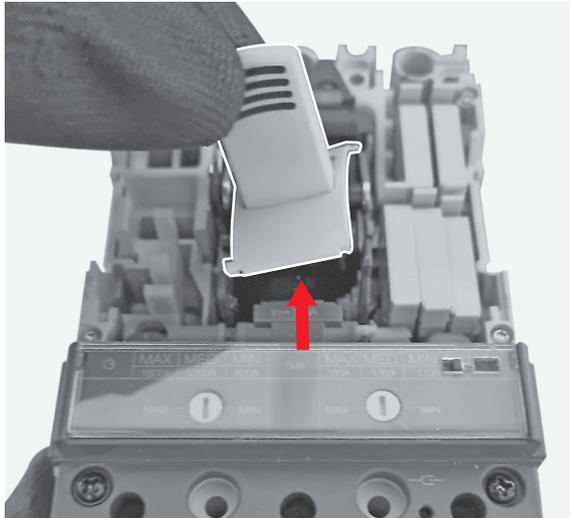
Tools

-

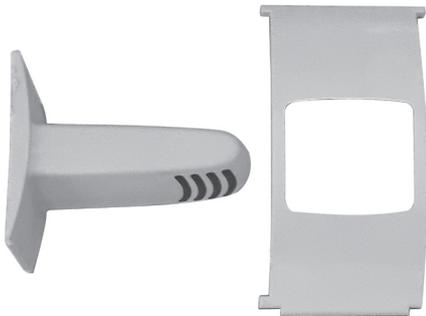
Actions to be performed

7

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



Disassembled parts



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

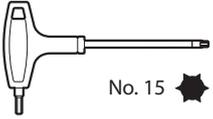
6.4 PHASE 4 – TRIP UNIT

Tools

Cross screwdriver

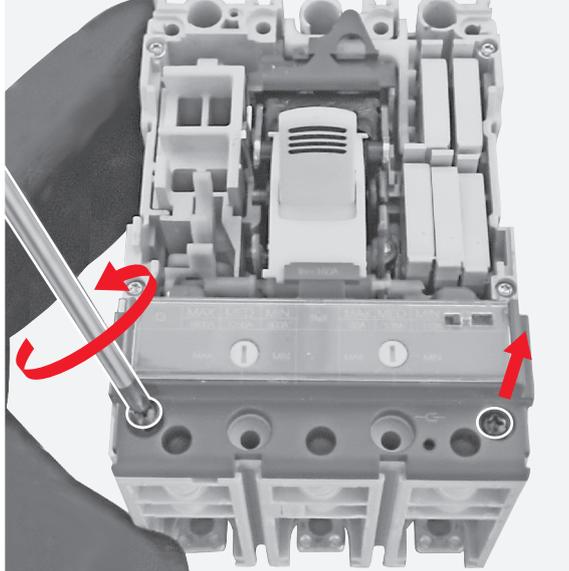


Torx key

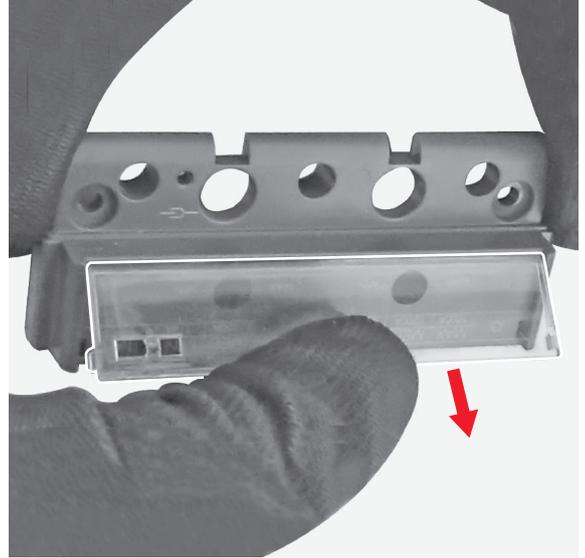


Actions to be performed

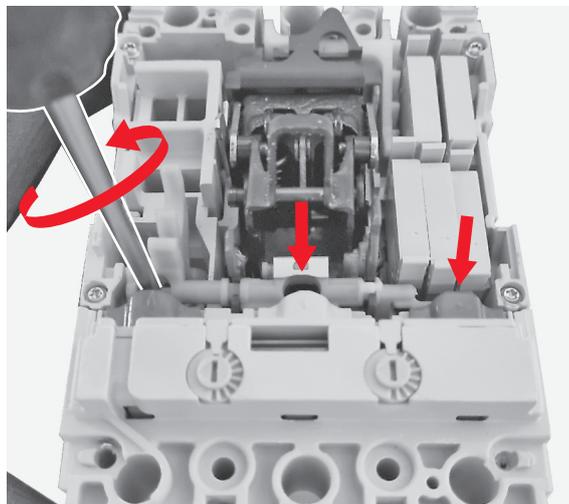
8 By means of the cross screwdriver unscrew the 2 screws fixing the trip unit frontal to the trip unit main structure.



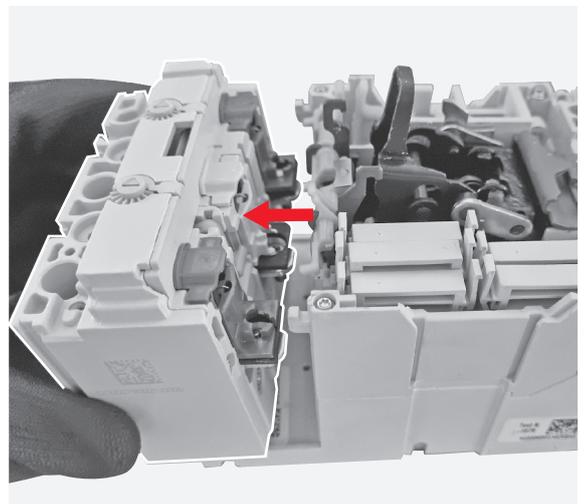
9 Manually disassemble the transparent protection from the trip unit frontal.



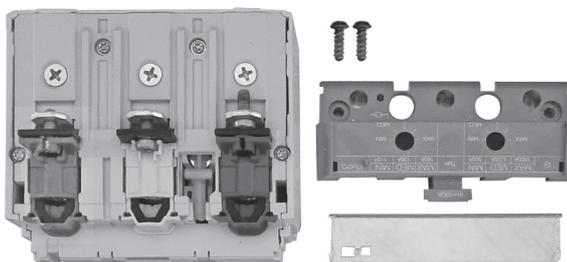
10 By means of the torx key unscrew the 3 screws fixing the trip unit to the circuit breaker breaking part.



11 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 trip unit (Plastic, Metal and Rubber) *

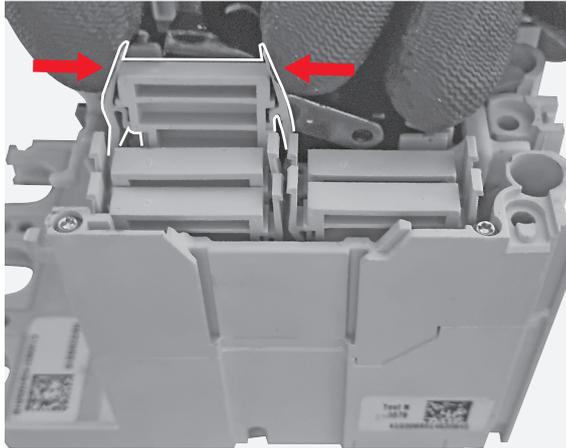
*Trip unit will be furtherly disassembled (see Phases 6.11, 6.12 and 6.13)

6.5 PHASE 5 – PLASTIC PARTS MOUNTED ON THE BREAKING PART**Tools**

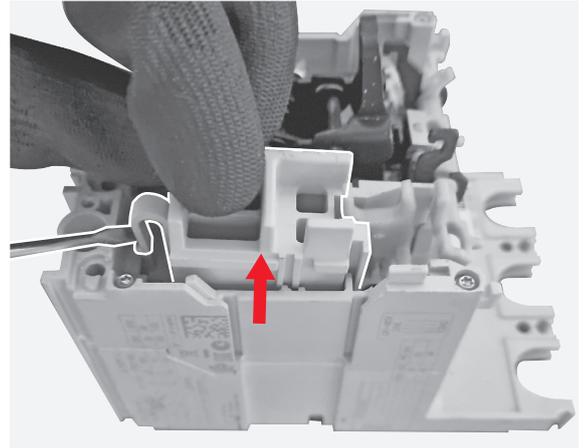
Flat screwdriver

**Actions to be performed****12**

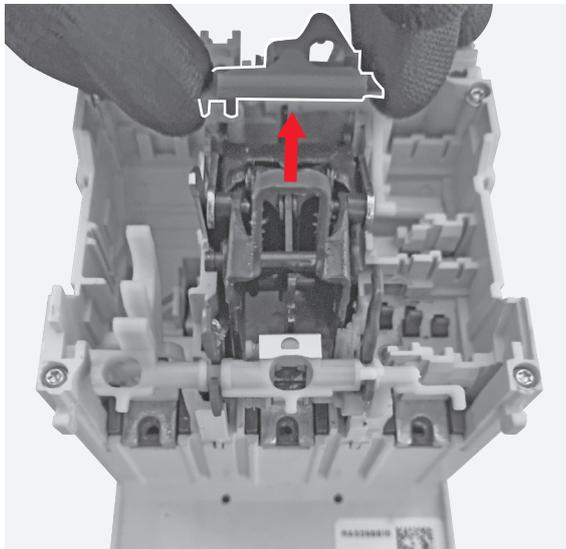
Manually slightly push the 2 flaps present on each case for microswitch located in the right hole of the breaking part as indicated by the arrows and after manually lift each case for microswitch to complete the removal.

**13**

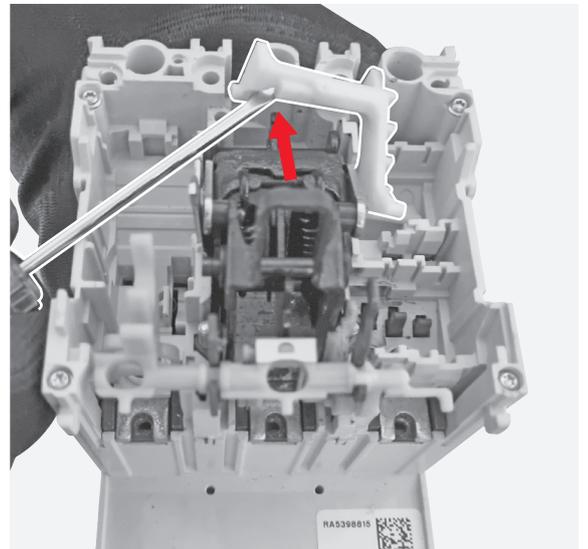
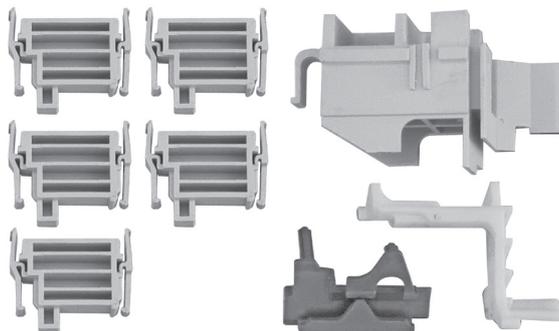
By means of the flat screwdriver lift the plug located in the left hole of the breaking part and after manually complete the removal of the plug.

**14**

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

**15**

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**

- 5 cases for microswitches (Plastic) SEPARATE TREATMENT (Thermoplastics containing brominated flame retardants)
- 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

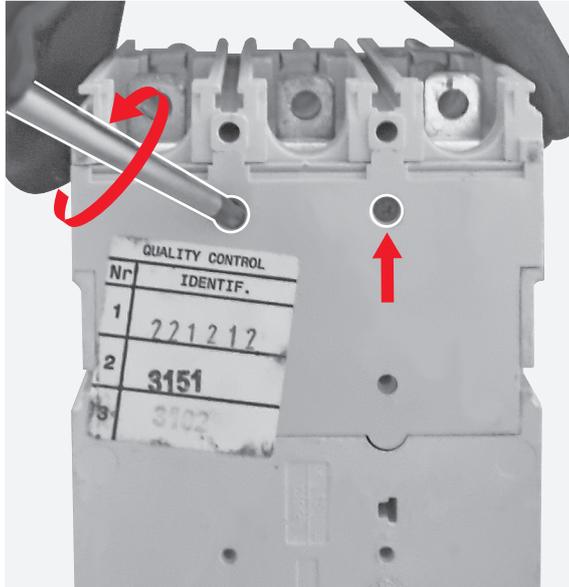
Cross screwdriver



Actions to be performed

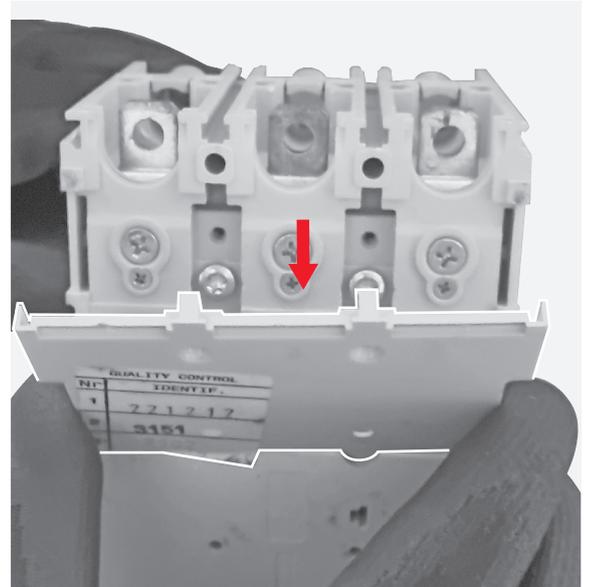
16

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



17

Manually remove the rear cover.



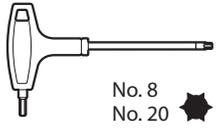
Disassembled parts



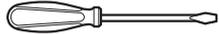
- 2 screws (Metal)
- 1 rear cover (Plastic)

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

Torx key



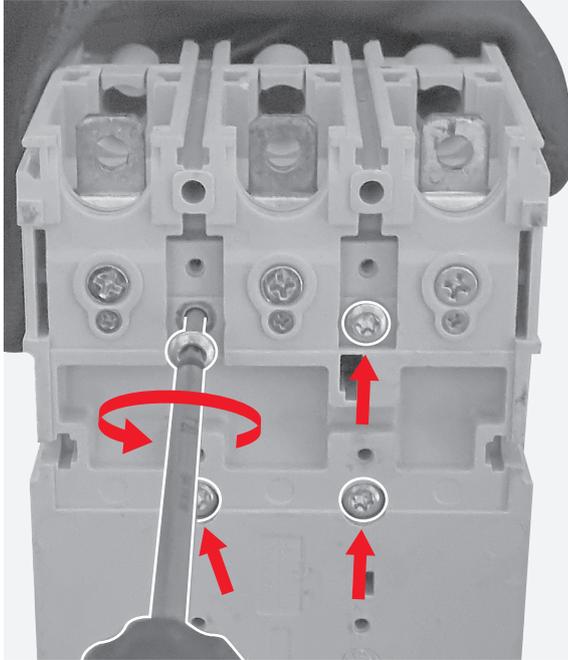
Flat screwdriver



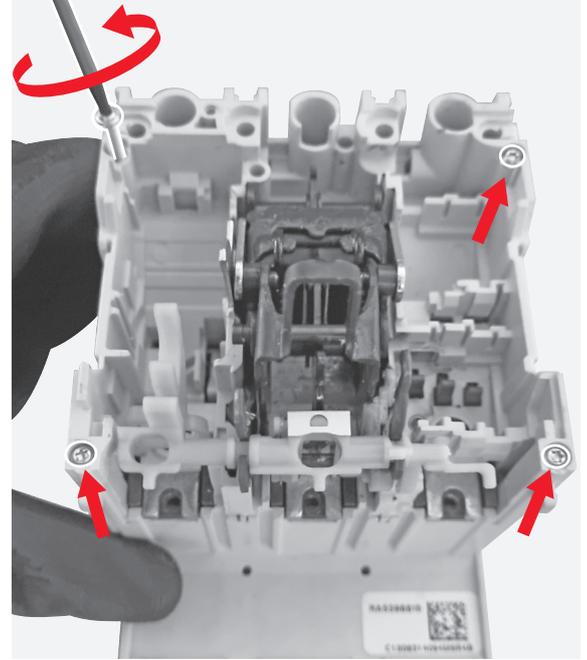
Pliers

**Actions to be performed****18**

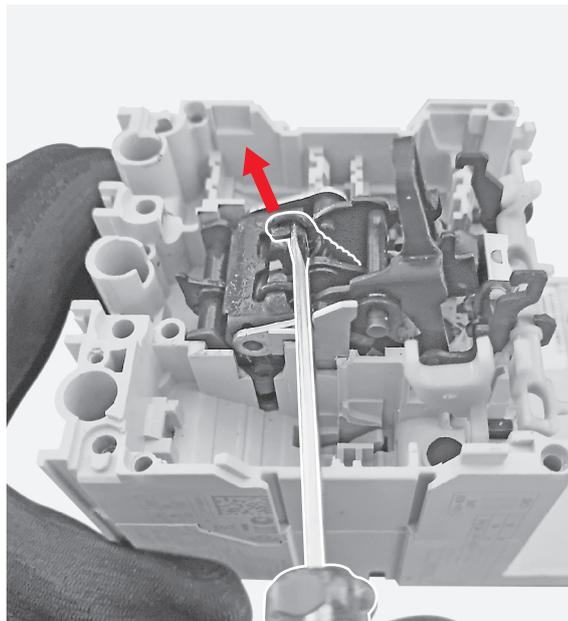
By means of the torx key (size 20) unscrew the 4 screws located in the back part of the breaking part.

**19**

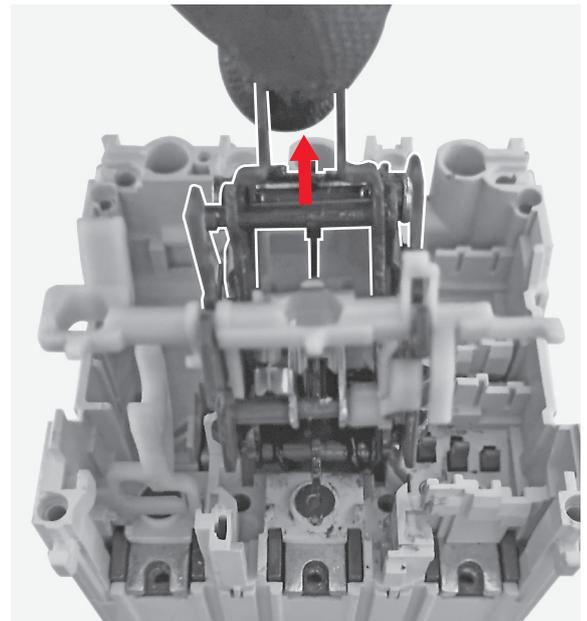
By means of the torx key (size 8) unscrew the 4 screws located at the corners of the breaking part cover.

**20**

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

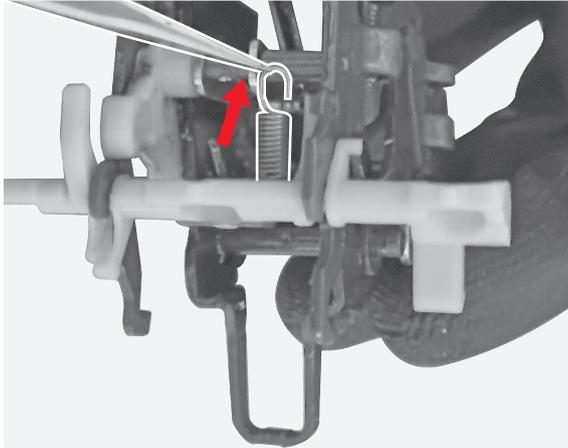
**21**

Manually lift the operating mechanism and after manually complete removal operation.

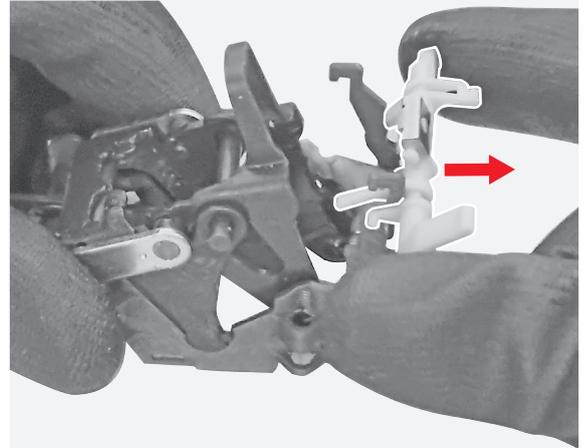


22

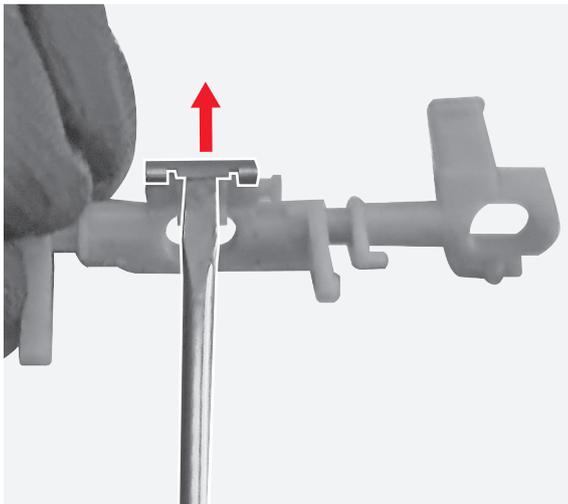
By means of the pliers remove the spring mounted in the middle of the operating mechanism.

**23**

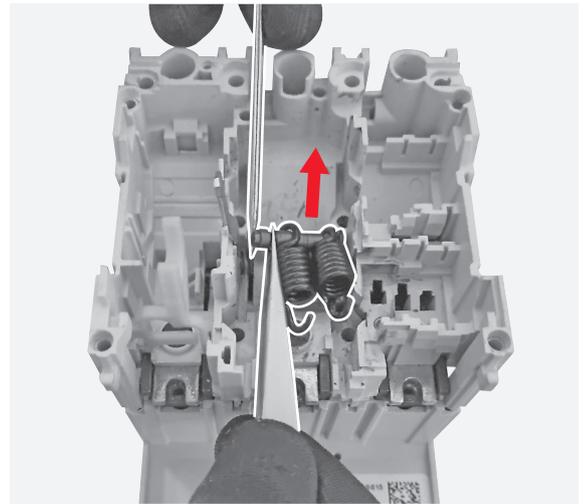
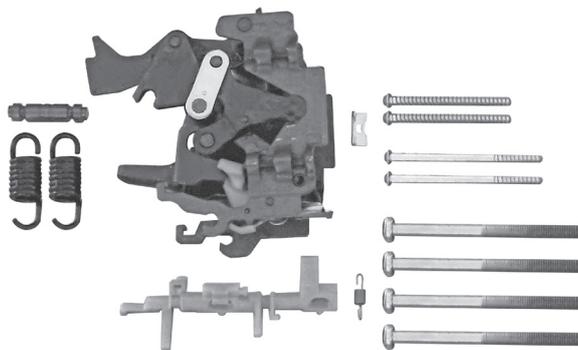
Manually remove the tripping shaft from the operating mechanism pulling it as indicated by the arrow.

**24**

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

**25**

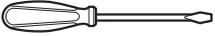
By means of the flat screwdriver and by means of the pliers dismantle the pin and remove the pin and the 2 springs mounted on the pin itself.

**Disassembled parts**

- 4 + 4 screws (Metal)
- 1 operating mechanism (Plastic and Metal)
- 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**

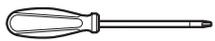
Flat screwdriver



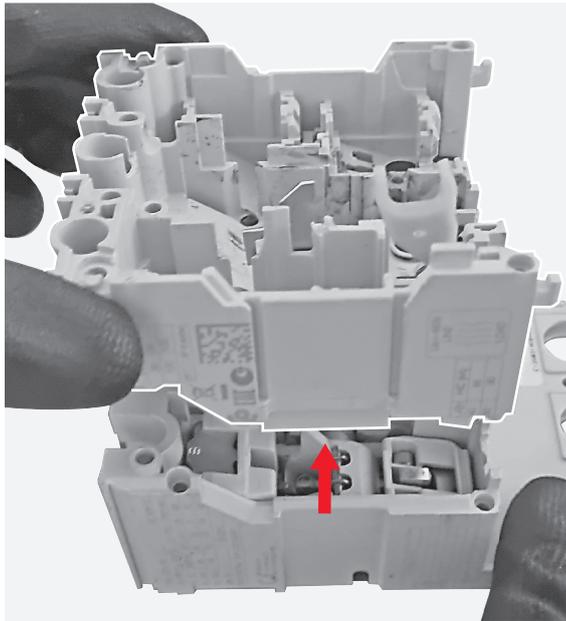
Pliers



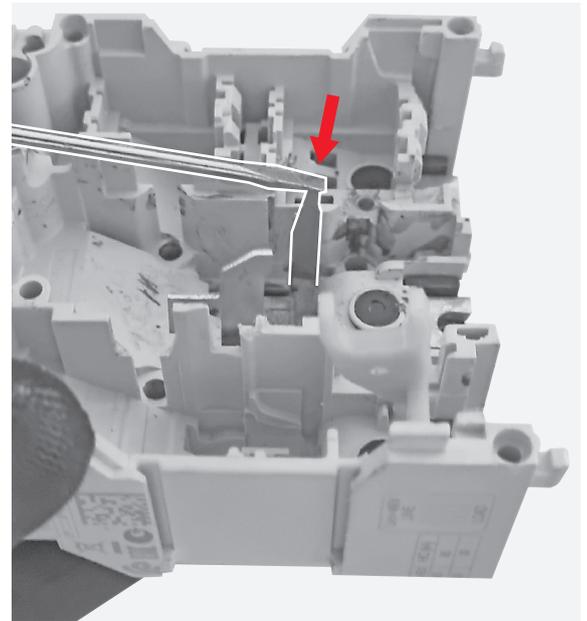
Cross screwdriver

**Actions to be performed****26**

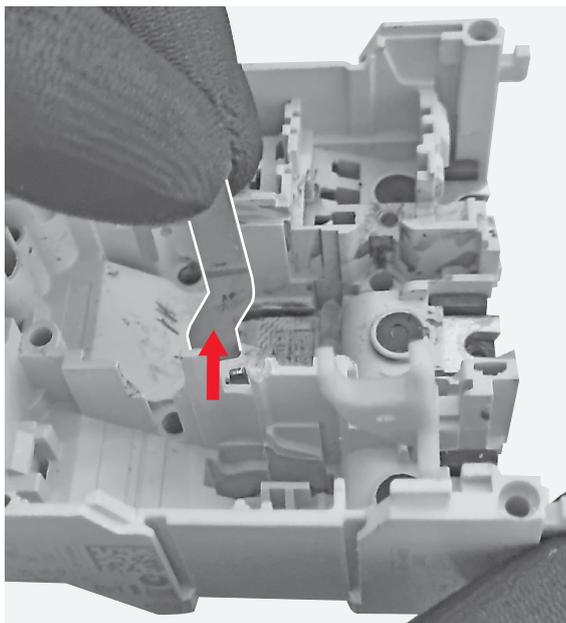
Manually lift the breaking part cover.

**27**

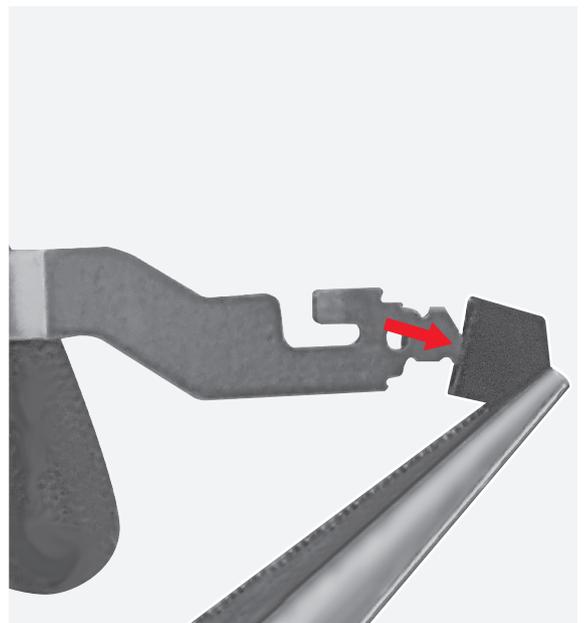
By means of the flat screwdriver push down the block lever located between the hole previously hosting the operating mechanism and the right hole and after manually remove the block lever.

**28**

Manually lift the motor operator lever located between the hole previously hosting the operating mechanism and the left hole and after manually remove the motor operator lever.

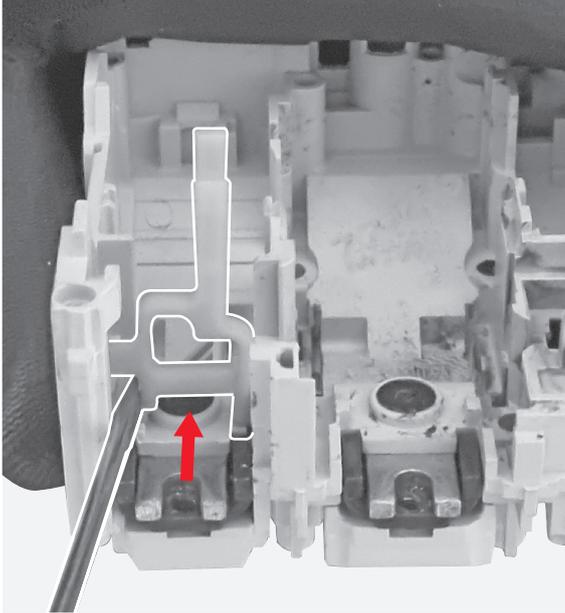
**29**

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

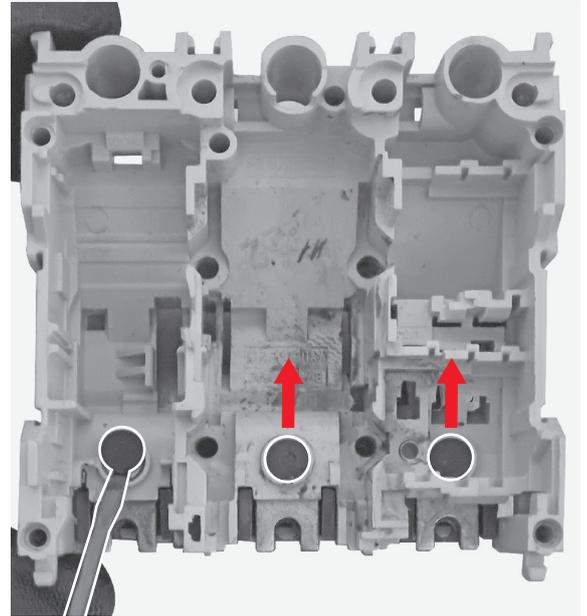


30

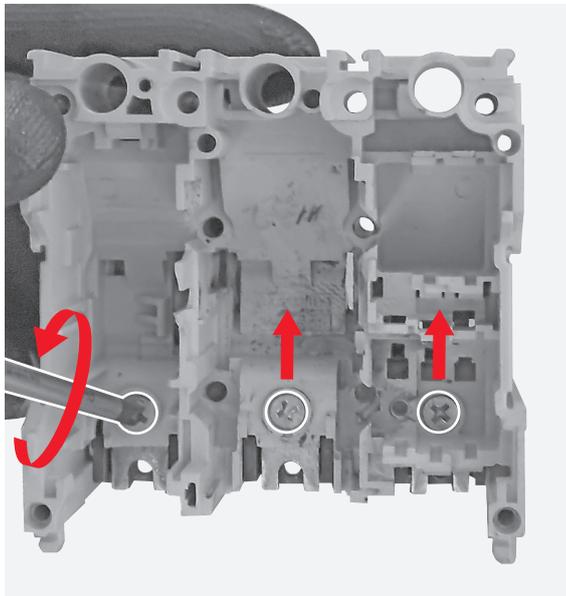
By means of the flat screwdriver slightly push on the right the trip lever mounted in the bottom part of the breaking part and then lift the lever in order to complete the removal.

**31**

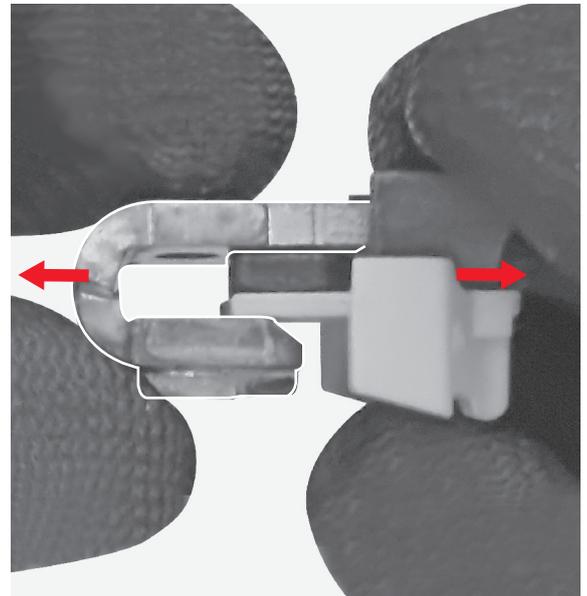
By means of the flat screwdriver remove the 3 plugs located in the bottom part of the breaking part.

**32**

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.

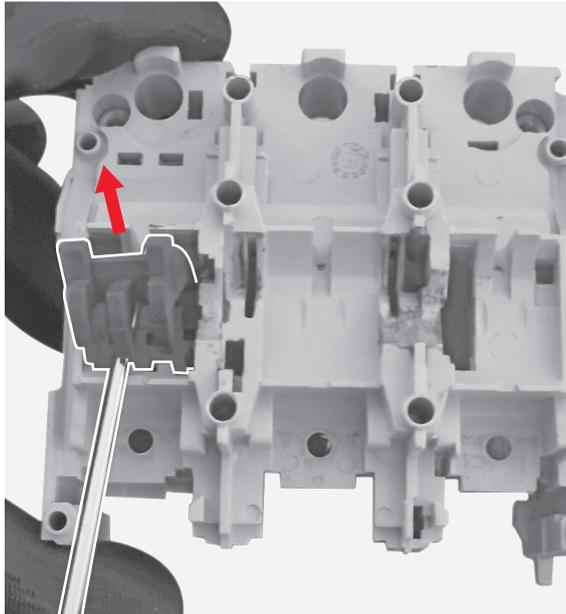
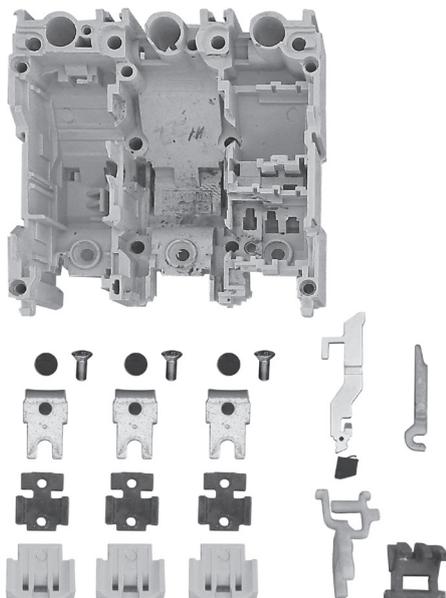
**33**

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



34

By means of the flat screwdriver lift the open/close lever and after manually complete the removal of the open/close lever.

**Disassembled parts**

- 1 breaking part cover (Plastic)
- 1 block lever (Metal)
- 1 motor operator lever (Metal)
- 1 hood (Rubber)
- 1 trip lever (Plastic) SEPARATE TREATMENT (Thermoplastics containing brominated flame retardants)
- 3 plugs (Rubber)
- 3 screws (Metal)
- 3 plastic parts constituting terminals connections (Plastic)
- 3 + 3 metal parts constituting terminals connections (Metal)
- 1 open/close lever (Plastic) SEPARATE TREATMENT (Thermoplastics containing brominated flame retardants)

6.9 PHASE 9 – MOVING CONTACTS AND ARCHING CHAMBERS

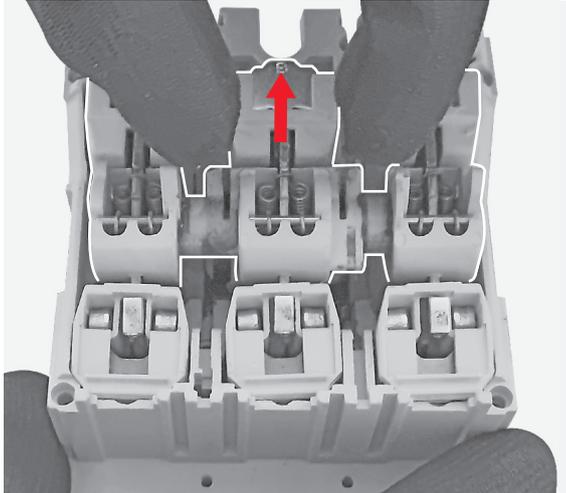
Tools

Flat screwdriver

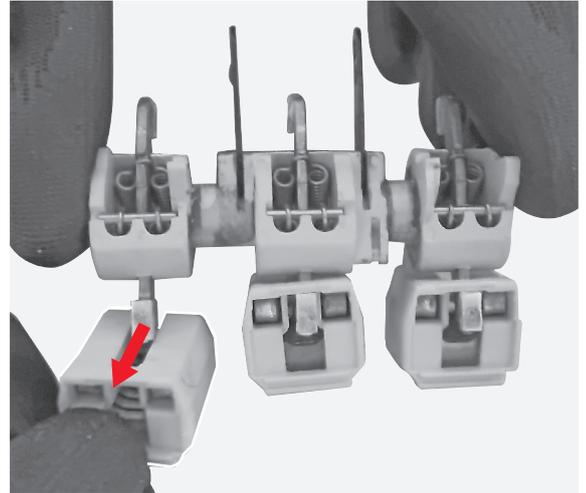


Actions to be performed

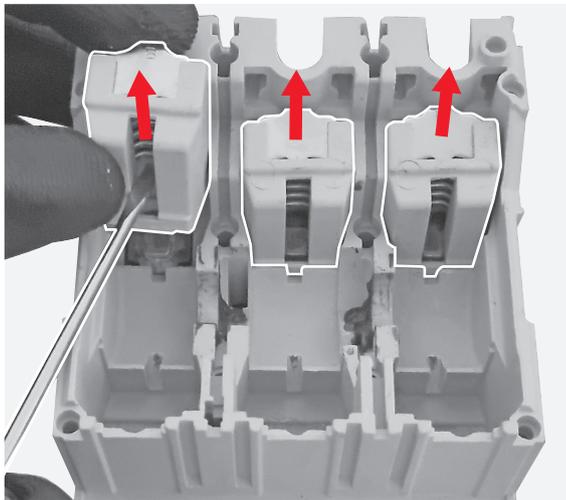
35 Manually lift the moving contacts assembly together with the arching chambers connected with the lower part of the moving contacts assembly.



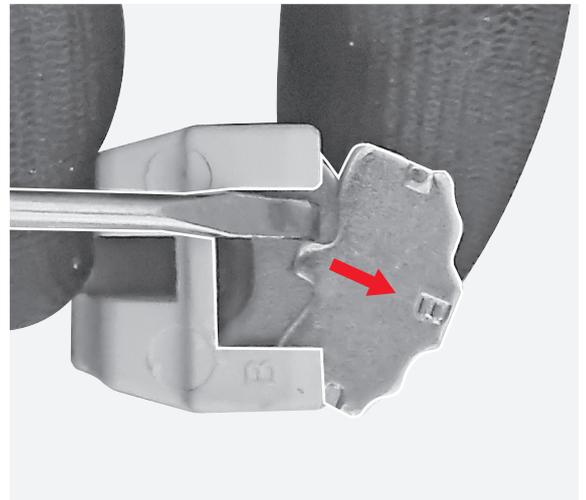
36 Manually remove the arching chambers from the lower moving contacts.



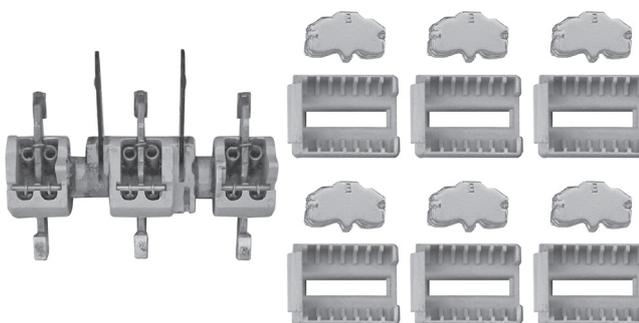
37 By means of the flat screwdriver lift the arching chambers still present in the breaking part base and after manually complete the removal of the arching chambers.



38 By means of the flat screwdriver push the plates mounted inside the arching chambers out of the arching chambers.



Disassembled parts



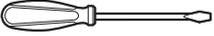
- 1 moving contacts assembly (Plastic and Metal)
- 6 arching chambers cases (Plastic and Metal)
- 42 arching chambers plates (Metal)

6.10 PHASE 10 – FIXED CONTACTS**Tools**

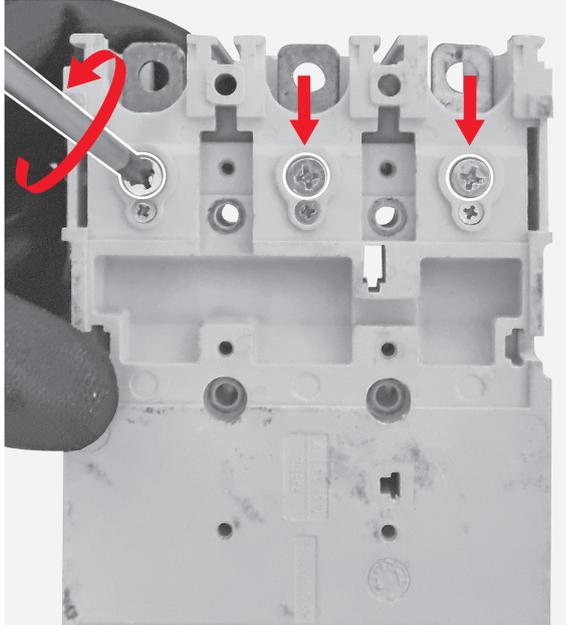
Cross screwdriver



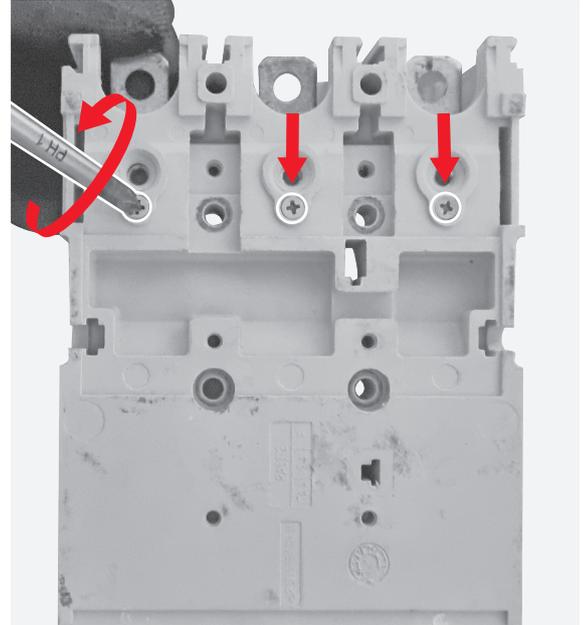
Flat screwdriver

**Actions to be performed****39**

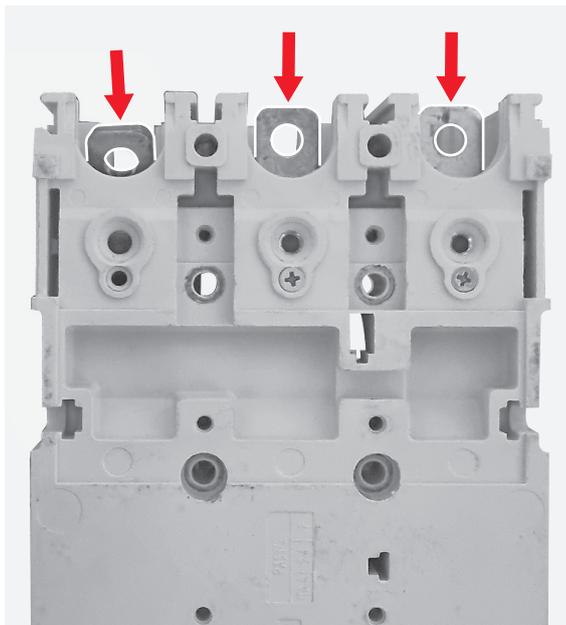
By means of the cross screwdriver unscrew the 3 screws located in the back part of the breaking part base.

**40**

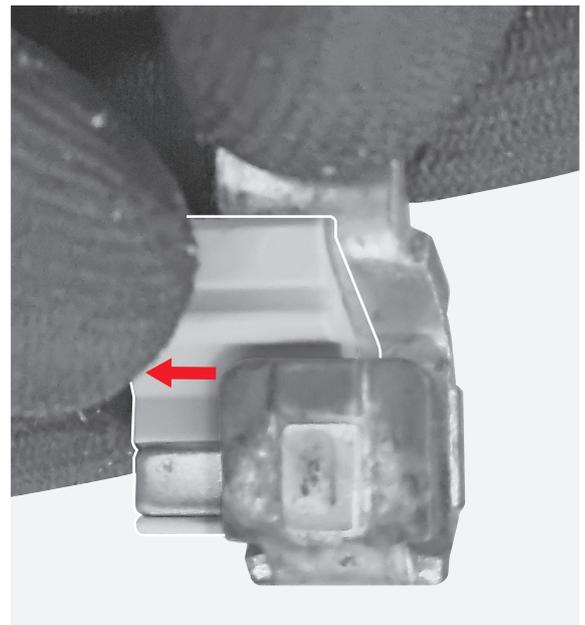
By means of the cross screwdriver unscrew the other 3 screws located in the back part of the breaking part base.

**41**

Manually push the fixed contacts as indicated by the arrow.

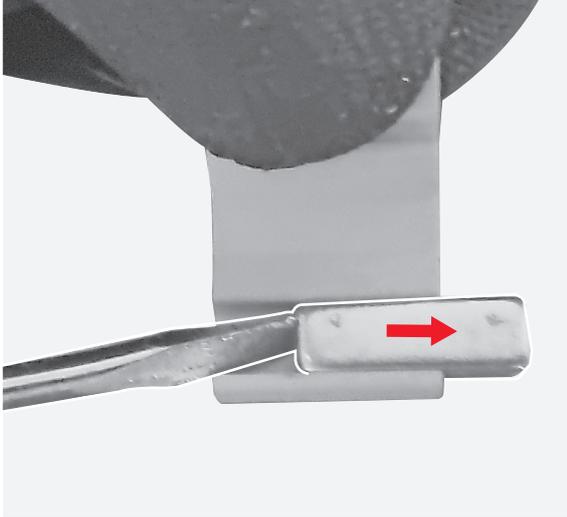
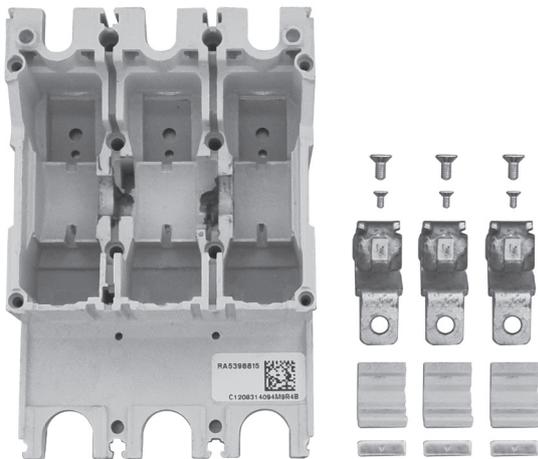
**42**

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



43

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

**Disassembled parts**

- 1 breaking part base (Plastic)
- 3 + 3 screws (Metal)
- 3 plastic parts constituting fixed contacts (Plastic)
- 3 metal parts constituting fixed contacts (Metal)
- 3 plates (Metal)

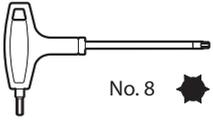
6.11 PHASE 11 – TRIP UNIT COVER AND I3 ASSEMBLY

Tools

Cross screwdriver



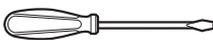
Torx key



Pliers

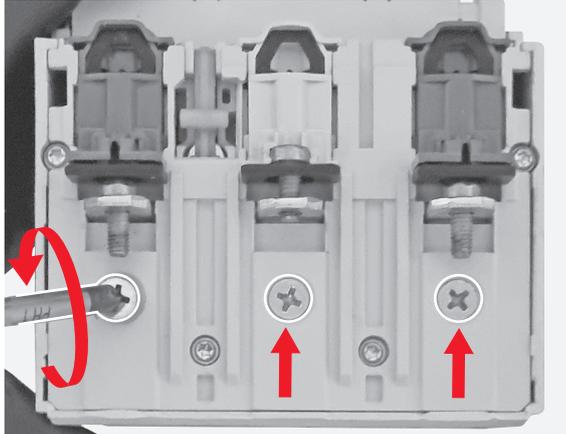


Flat screwdriver

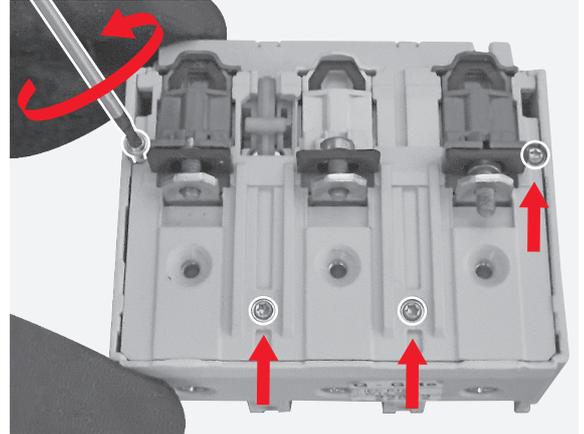


Actions to be performed

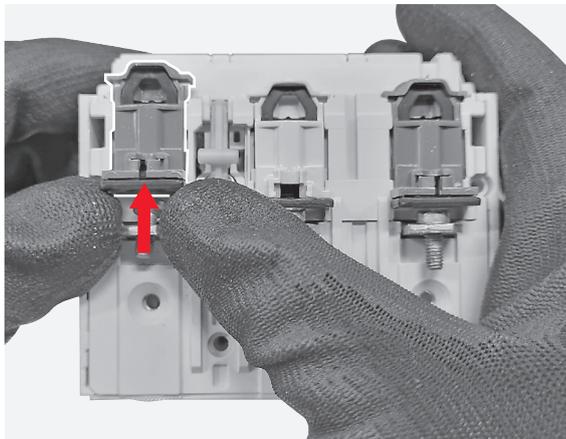
44
By means of the cross screwdriver unscrew the 3 screws fixing the trip unit cover to the trip unit.



45
By means of the torx key unscrew the 4 screws fixing the trip unit cover to the trip unit.



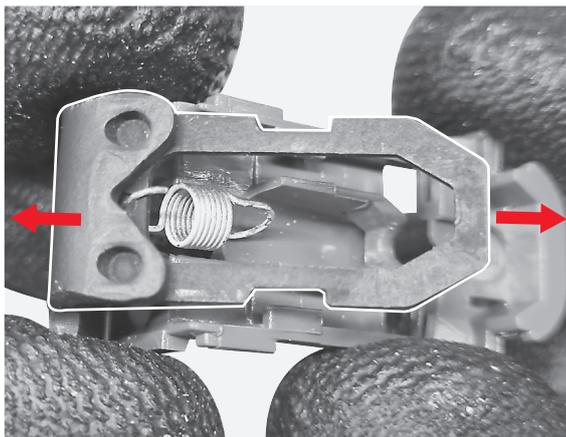
46
Manually push the 3 I3 assemblies as indicated by the arrow.



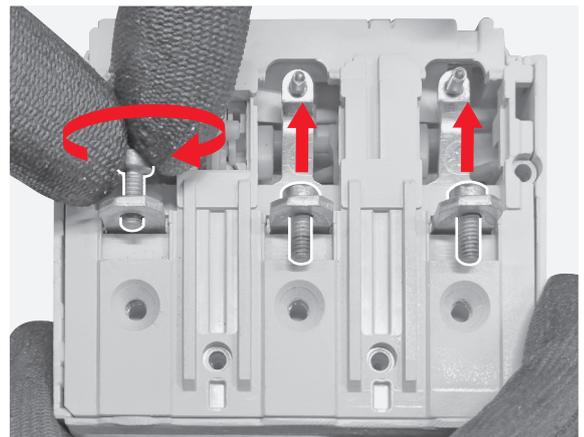
47
By means of the pliers remove the spring mounted on the I3 assembly.



48
Manually separate the I3 support and the I3 group.

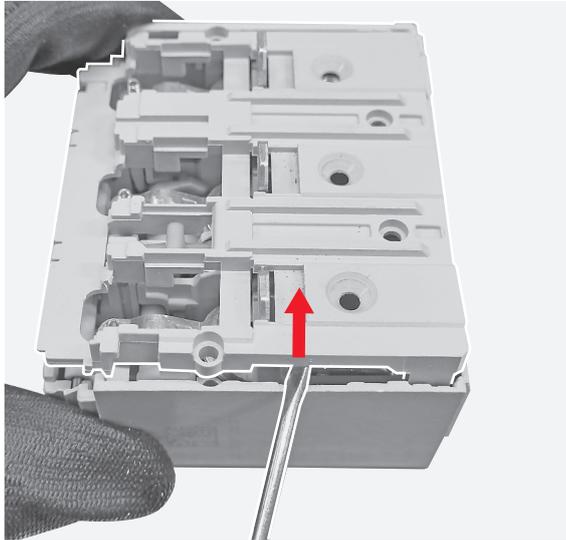
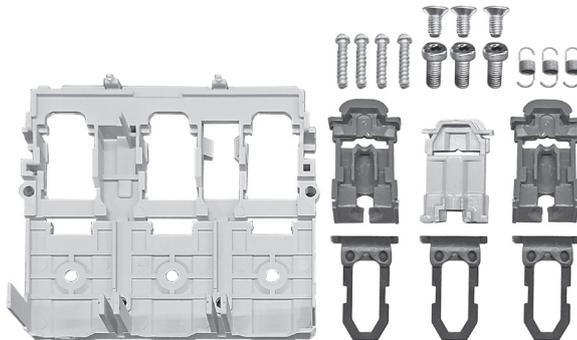


49
Manually remove the 3 screws located on the top of the trip unit.



50

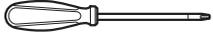
By means of the flat screwdriver lift the top cover of the trip unit and manually complete the removal.

**Disassembled parts**

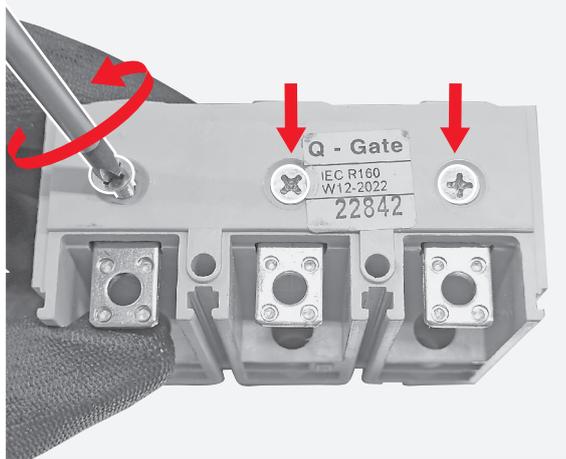
- 3 + 4 + 3 screws (Metal)
- 3 springs (Metal)
- 3 I3 groups (Metal)
- 3 I3 supports (Plastic)
- 1 trip unit cover (Plastic and Metal)

6.12 PHASE 12 – THERMAL/MAGNETIC GROUPS**Tools**

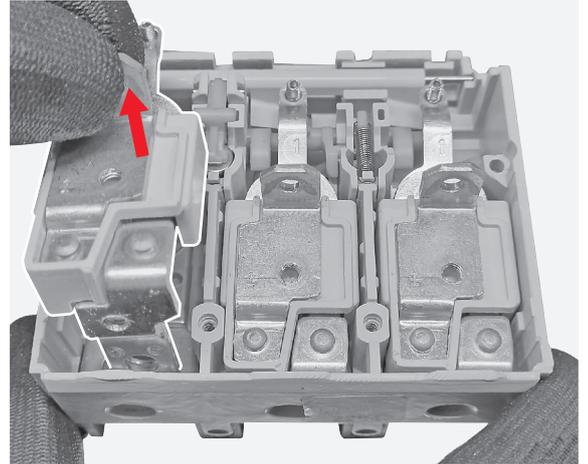
Cross screwdriver

**Actions to be performed****51**

By means of the cross screwdriver unscrew the 3 screws located in the back part of the trip unit.

**52**

Manually lift the thermal/magnetic groups.

**Disassembled parts**

- 3 screws (Metal)
- 3 thermal/magnetic groups (Plastic and Metal)

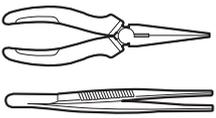
6.13 PHASE 13 – TRIP UNIT

Tools

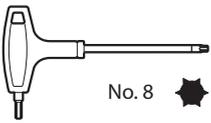
Flat screwdriver



Pliers

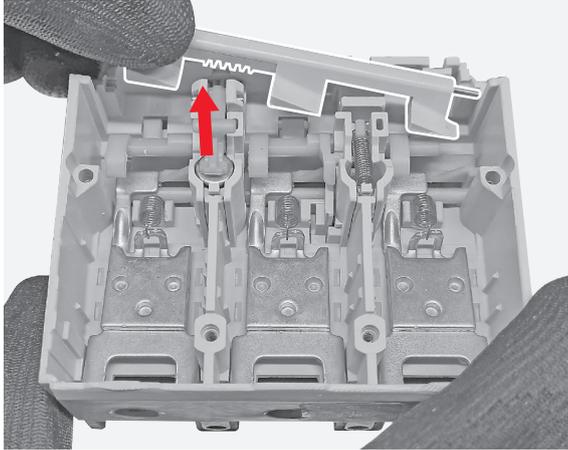


Torx key

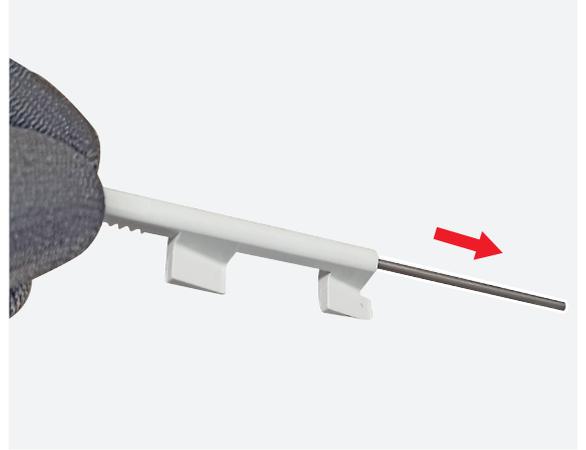


Actions to be performed

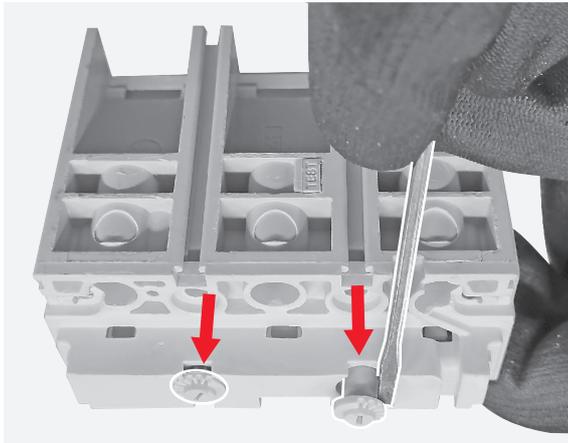
53
Manually lift the thermal shaft.



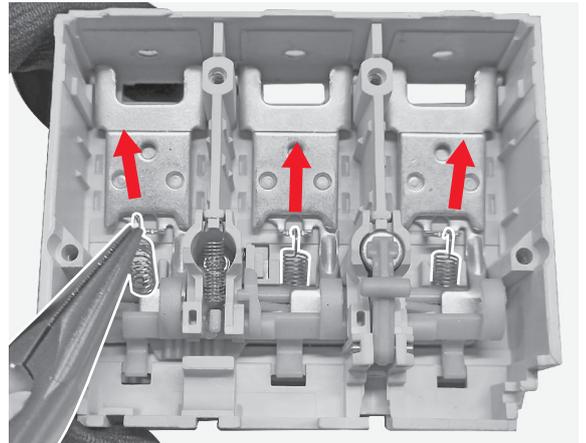
54
By gravity let the rod present in the thermal shaft come out.



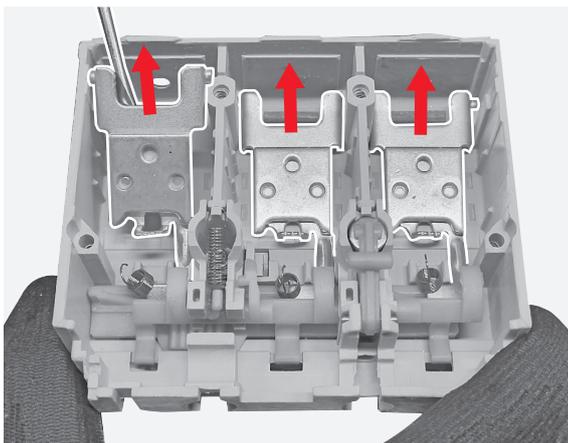
55
By means of the flat screwdriver remove the 2 trimmers located on the trip unit front.



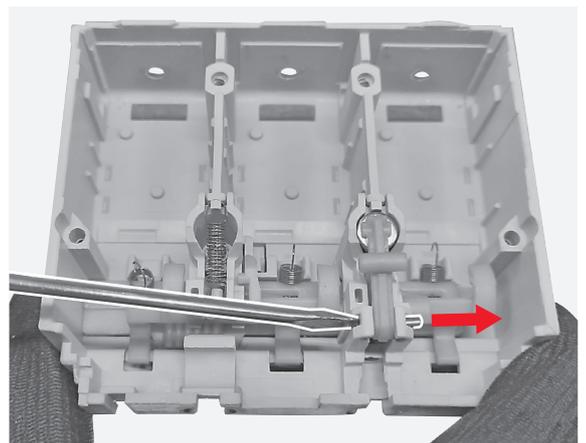
56
By means of the pliers unhook the 3 springs located in the poles.



57
By means of the flat screwdriver lift the moving armatures located in each pole and after manually complete the removal of the moving armatures.

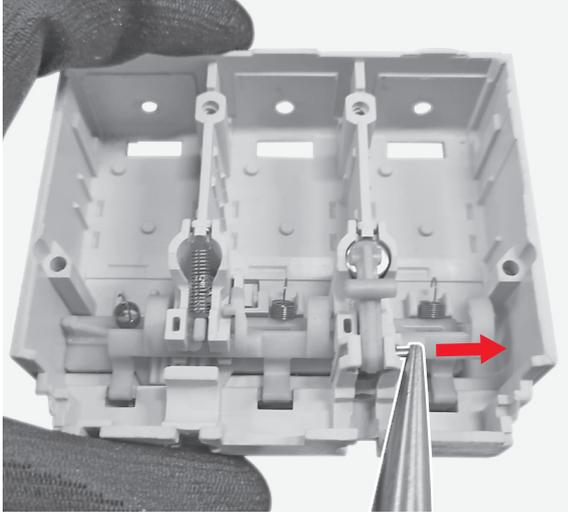


58
By means of the flat screw driver push the pin mounted in the side between the central and the right pole as indicated by the arrow.

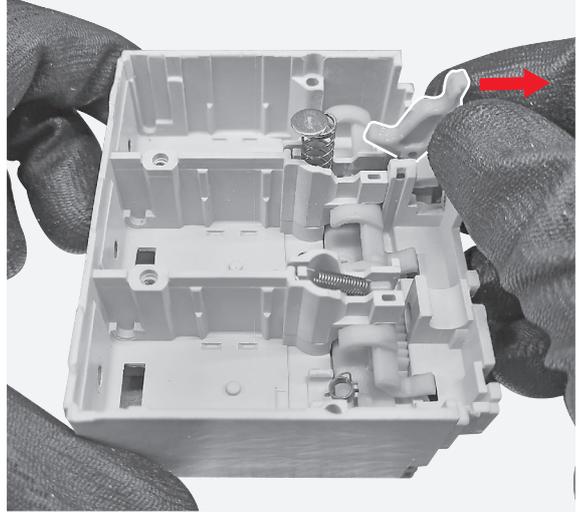


59

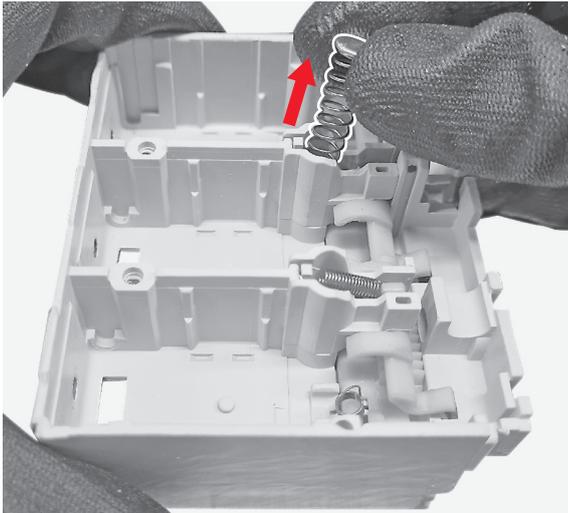
by means of the pliers complete the removal of the pin.

**60**

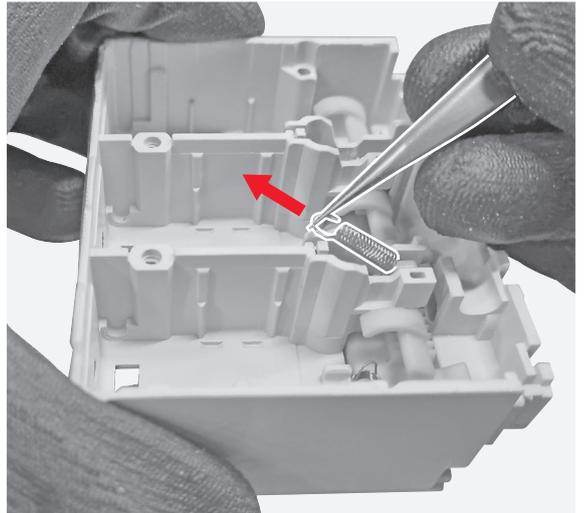
Manually remove the plastic lever located between the central and the right pole.

**61**

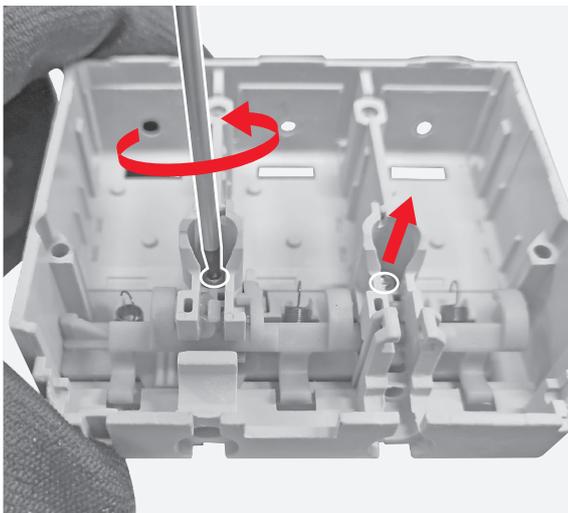
Manually remove the spring located between the central and the right pole and its plug.

**62**

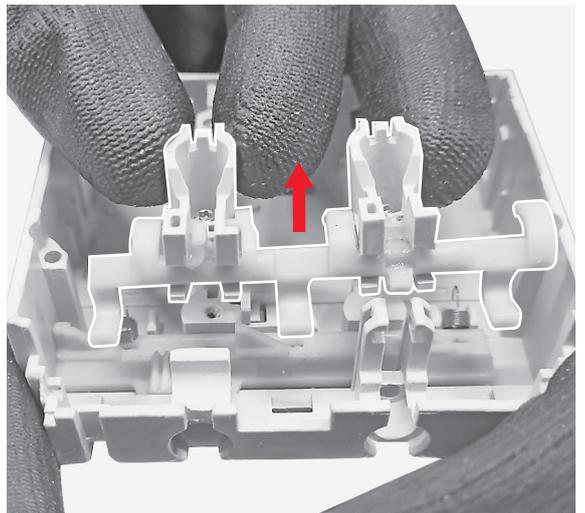
By means of the pliers remove the spring located between the left and the central pole.

**63**

By means of the torx key unscrew the 2 screws fixing the plastic supports and the shaft to the trip unit base.

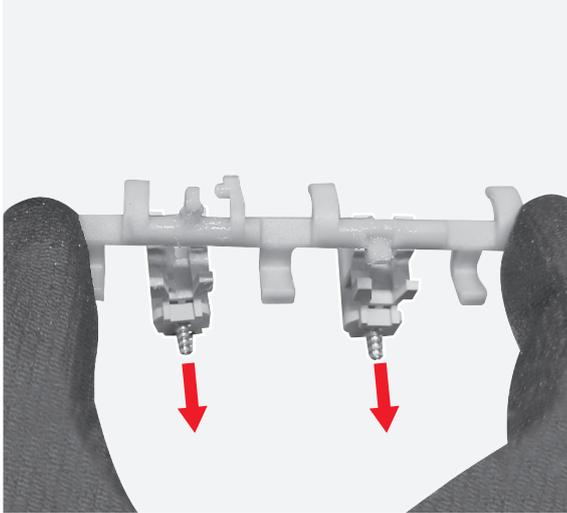
**64**

Manually lift the plastic supports and the shaft.



65

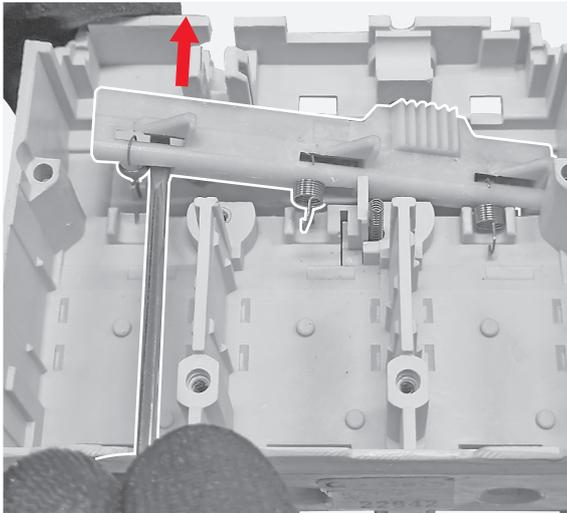
Manually lift the shaft in order to disassemble the plastic supports.

**66**

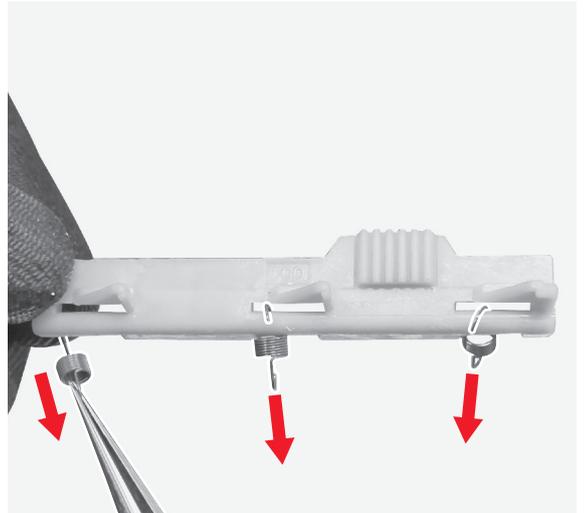
By gravity let the screws fall from the plastic supports.

**67**

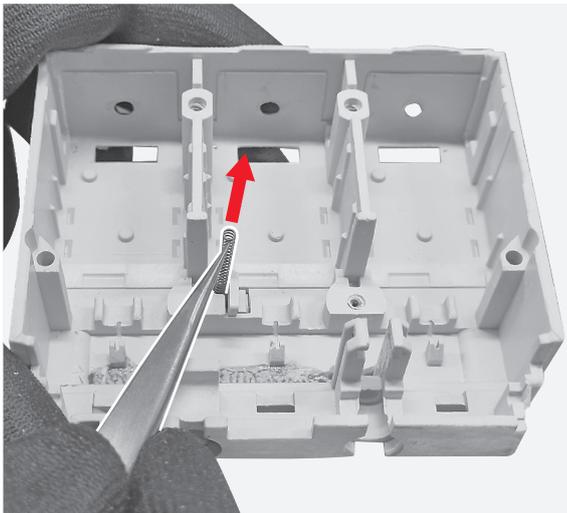
By means of the flat screw driver lift the magnetic shaft.

**68**

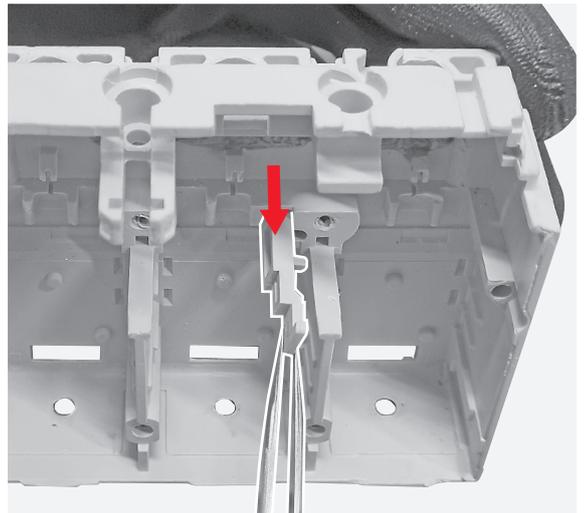
By means of the pliers remove the 3 springs.

**69**

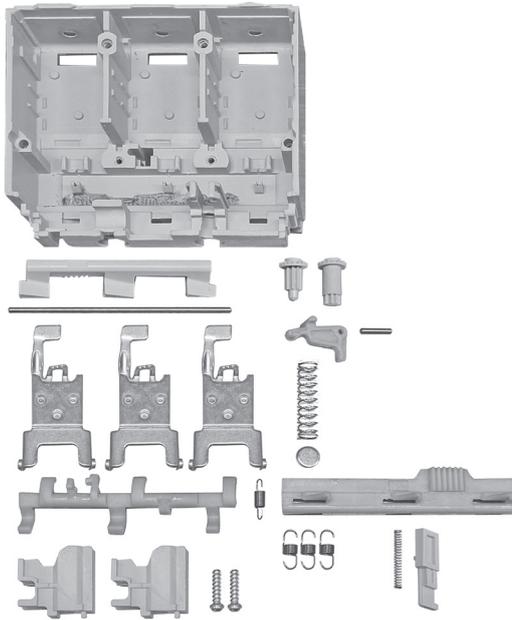
By means of the pliers remove the spring mounted on the trip unit base.

**70**

By means of the pliers remove the test button mounted on the trip unit base.



Disassembled parts



- 1 thermal shaft (Plastic)
- 1 rod (Metal)
- 2 trimmers (Plastic) SEPARATE TREATMENT (Thermoplastics containing brominated flame retardants)
- 3 + 1 + 1 + 1 springs (Metal)
- 3 moving armatures (Metal)
- 1 pin (Metal)
- 1 plug (Metal)
- 1 lever (Plastic) SEPARATE TREATMENT (Thermoplastics containing brominated flame retardants)
- 1 shaft (Plastic) SEPARATE TREATMENT (Thermoplastics containing brominated flame retardants)
- 2 supports (Plastic)
- 2 screws (Metal)
- 1 magnetic shaft (Plastic) SEPARATE TREATMENT (Thermoplastics containing brominated flame retardants)
- 1 test button (Plastic)
- 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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