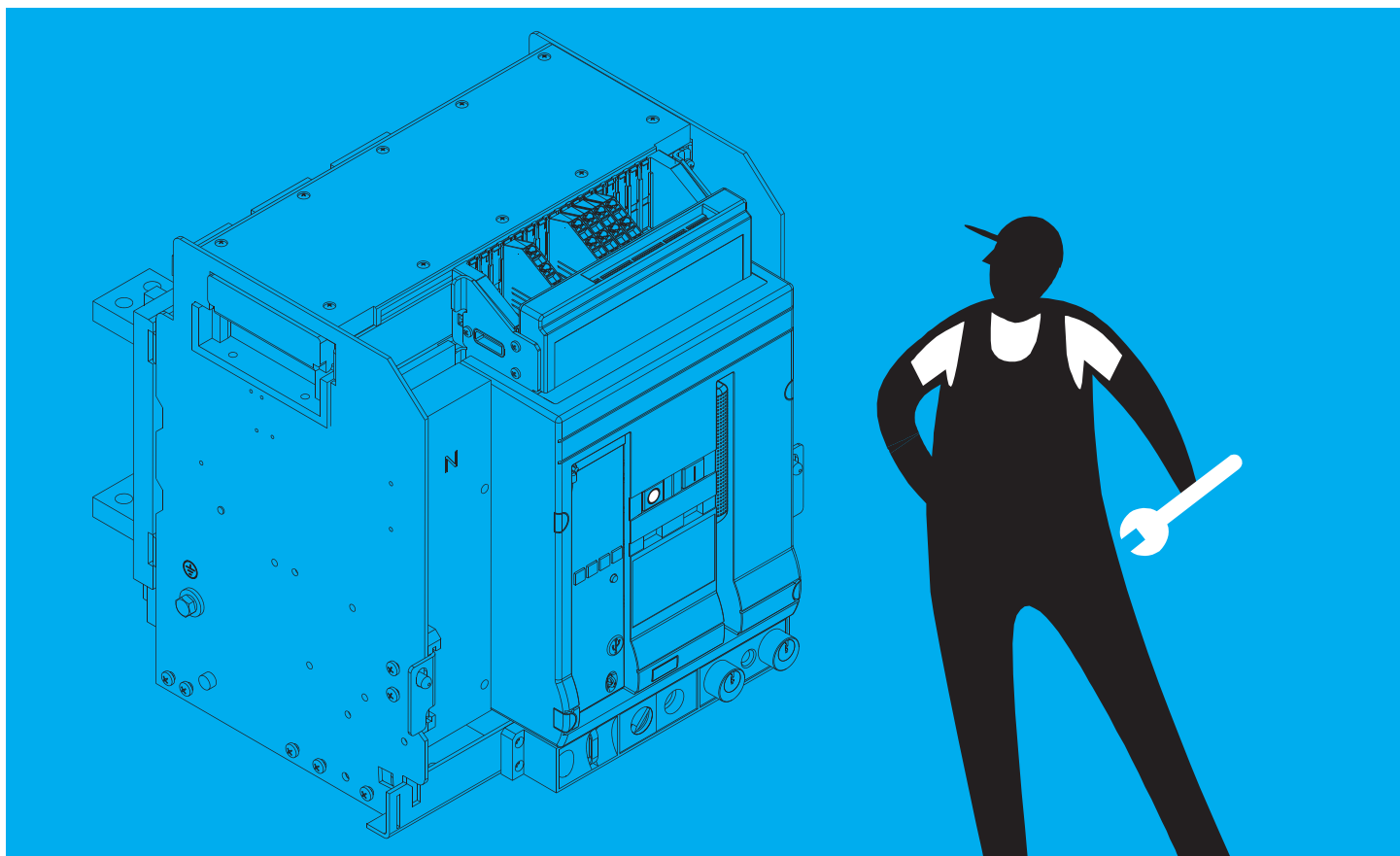


DMX3 Maintenance guide



January 18

legrand[®]
LE10707AA



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1. Warning

The use of mechanical operation counter is suggested to ease the planning and scheduling of periodical maintenance of the product.

Maintenance and periodical checks are intended to be performed by training and qualified people.

Use only original and authorized spare parts and accessories.

Before to start, please follow the safety recommendations listed below:

- Disconnect device from its supply. Any device part has to be on voltage (power or auxiliary circuitry); please verify insulation.
- Breaker must be in OPEN status, with its spring discharged (OFF- DISCHARGED).
- Be sure that the breaker has no residual heating to avoid injuries.

For correct device handling, please refer to device instruction sheets.

Injuries and serious damages to devices could arise if previous indications will not be followed.

During maintenance activities described in this manual, people in charge of the work must ensure the safety for people and devices, using every tool and procedure needed for that.

Before to start, please verify that:

- All connections are tightened with the right torque.
- All protective covers are mounted in the right way.
- The breaker is in OFF-DISCHARGED status.

Note

It' s recommended to use the original maintenance kit. It' s recommended to save and store every maintenance action done on every device.

In any circumstance, Legrand will never be considered responsible on device damages if periodical maintenance actions will be done not following indications contained in this manual.

DMX³ - Maintenance guide

2. Frequency of maintenance

Each time the product is used/installed in conditions different by IEC standards, it's recommended to plan and schedule a periodical maintenance (according to this manual), in order to:

- Verify product goodness.
- Identify damaged parts and/or accessories.
- Organize preventive actions to avoid emergencies.

It's recommended to save and store every maintenance action done on every device.

In the following tables it will be possible to find all Level 1 and Level 2 maintenance action and suggested frequency. In particular, Level 1 actions (completely explained in this manual) can be performed by trained technicians.

For Level 2 actions, please contact Legrand Service support.

Level 1 Maintenance - Explained in this maintenance guide

Check	Frequency-time		Frequency-cycles		Procedure
	1 year	2 years	at In	Without current	
Mechanism					MCH
- Correct working and lubricating	•		3000	5000	MCH-I
- Check the seals	•		3000	5000	MCH-II
Arc chutes	•		3000	-	CTS
Main contacts					MNC
- Visual	•		3000	5000	MNC-I
Draw-out system *					DWT
- Check the correct working	•		3000	5000	DWT-I
- Insulation shutter		•	3000	5000	DWT-II
- Cluster contacts		•	3000	5000	DWT-III
- Sliding aux contacts		•	3000	5000	DWT-IV
- Lubrication of draw-out chassis		•	3000	5000	DWT-V
- Draw-out mechanism		•	3000	5000	DWT-VI
Terminals	•		3000	5000	TRM
Auxiliary					AXL
- Visual check	•		3000	5000	AXL-I
- Functional Test:		•	3000	5000	AXL-II
Motor drive CC ST UVR					ECSR
- Functional test	•		3000	5000	ECSR-I
- Lubricating of motor gear		•	3000	5000	ECSR-II
Mechanical Accessories					MCSR
- Open position lock	•		-	-	MCSR-I
- Draw-out shutter lock	•		-	-	MCSR-II
Mechanical interlock		•	-	-	NTK
Trip Unit	•		-	-	PRT

Level 1 maintenance

This maintenance level is intended to be performed by trained and qualified technicians, confident with safety standard requirements for circuit breakers on

distribution systems. All these procedures are explained in this manual.

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Position of mechanism

Level 2 Maintenance

Check	Frequency		Procedure
	4 years		
Mechanism			
- Releases stroke P-NP check	•		PMP 8001 - (Confidential)
Trip Unit			
- Check the PU	•		PMP 8002- (Confidential)

Level 2 Maintenance

Maintenance intended to be used only by LEGRAND service or by certified/qualified Company. For this reason the explanation of

these second level procedures is not included in this maintenance guide.

The maintenance frequency must be intended with following operating and environment conditions:

Normal operating and environment conditions	
Load	≤ I _n
Temperature	-5°C-40°C, Average annual temperature <35°C
Dust	Low level, or with panelboard IP40
Relative humidity	<50% (40°C)
Pollution Degree	3 grade
Salt environment	None (IEC 60068-2-52)
Vibration	None (IEC 60068-2-6)

If real operating and environment condition are more severe than Normal one (described in previous table):

- The level 1 maintenance frequency must be reduced by half, but anyway never less 1 per year.
- The level 2 maintenance doesn't change its frequency.

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3. Preparatory work



Check the general condition of breaker, if there are broken parts, ageing or damaged parts for:

- front covers and IP protection
- identification labels
- Protection Unit display and enclosure
- Connections
- Chassis
- Structure of breaker

Check the compatibility between electrical accessories and the voltage used.

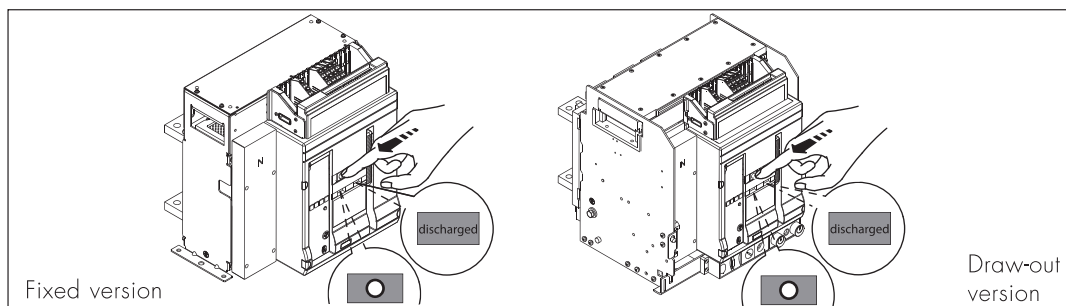
Disconnect the breaker from the supply, both the power and auxiliary circuit.

Perform a close/open cycle.

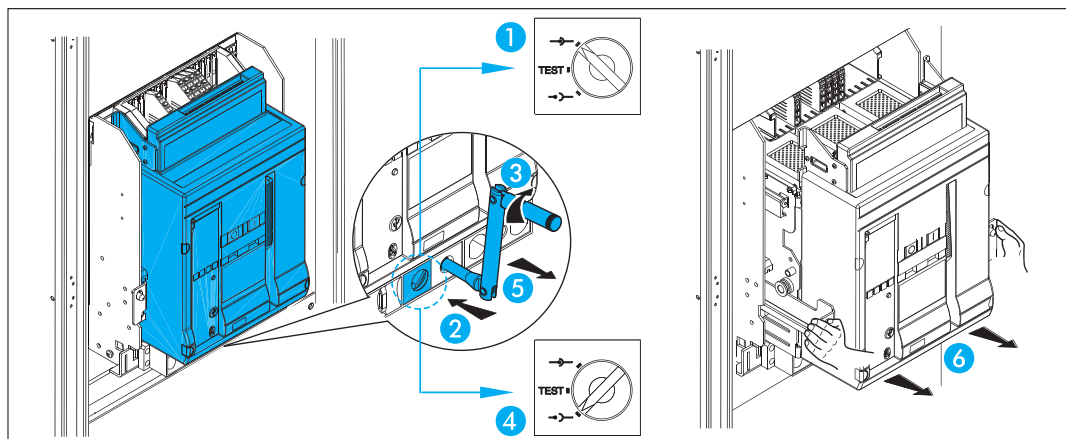
Open the breaker and discharge the springs (OFF-DISCHARGED).

Unless otherwise specified in the maintenance procedures, all operations must be carried out without supply (power and aux circuit) and with breaker in position OFF-DISCHARGED.

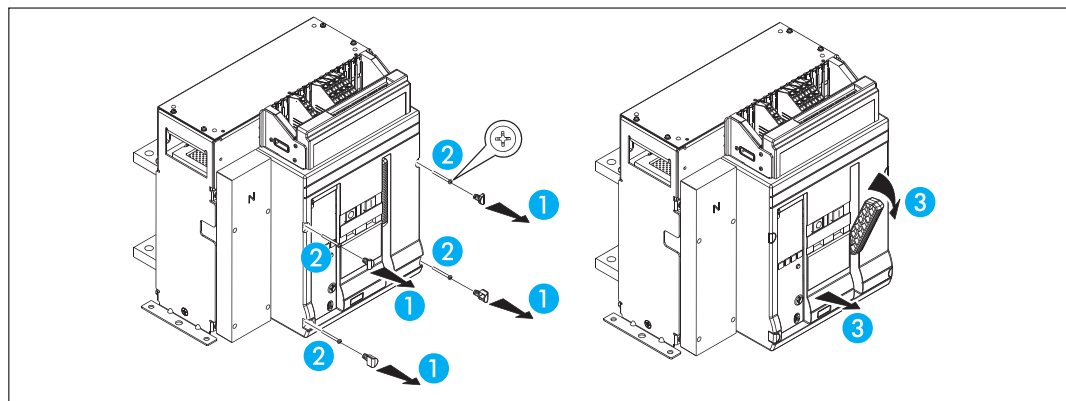
If in procedure there are different indications, at the end of procedure the breaker must anyway be in the safe condition: no supply in power and aux circuit and OFF-DISCHARGED



In case of draw-out breaker, remove the breaker from chassis



Remove the front cover.





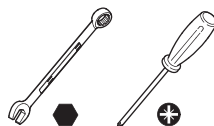
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4. Maintenance procedures

4.1 MCH - Mechanism

Necessary tools:

- Cross screw drivers
- Spanner
- Lubricant



4.1.1 MCH-I - Correct working and Lubricating

• Check the correct working

Do at least n°1 charge/close/open Cycle

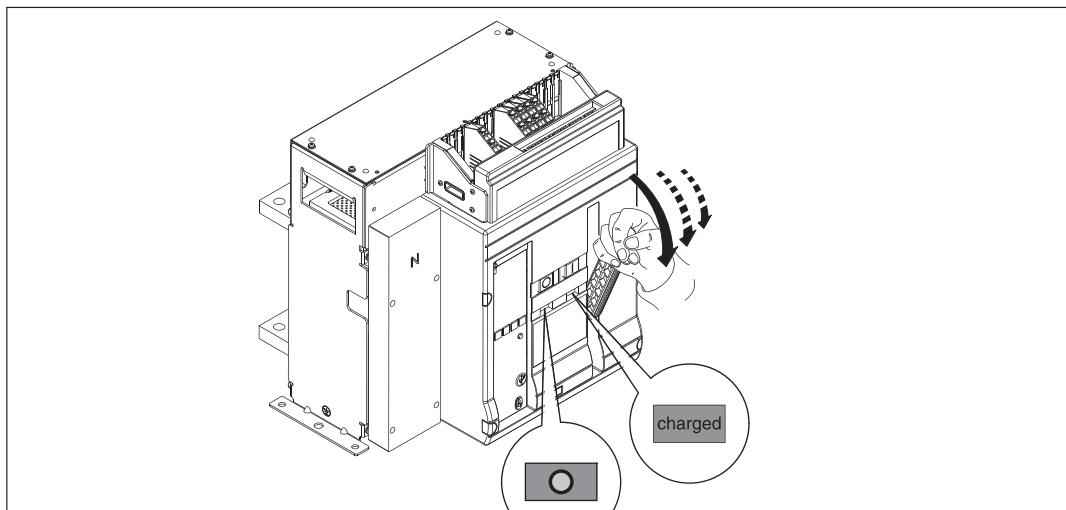


The main contacts must remain in closed position. If breaker open (see the ON-OFF indication) → it is necessary to perform procedure "PMP 8004" *

** procedure "PMP 8004" can be used only By Legrand service or certified/qualified service companies*

Close the breaker and charge the spring manually.

At the end get the breaker in open position with springs discharged.



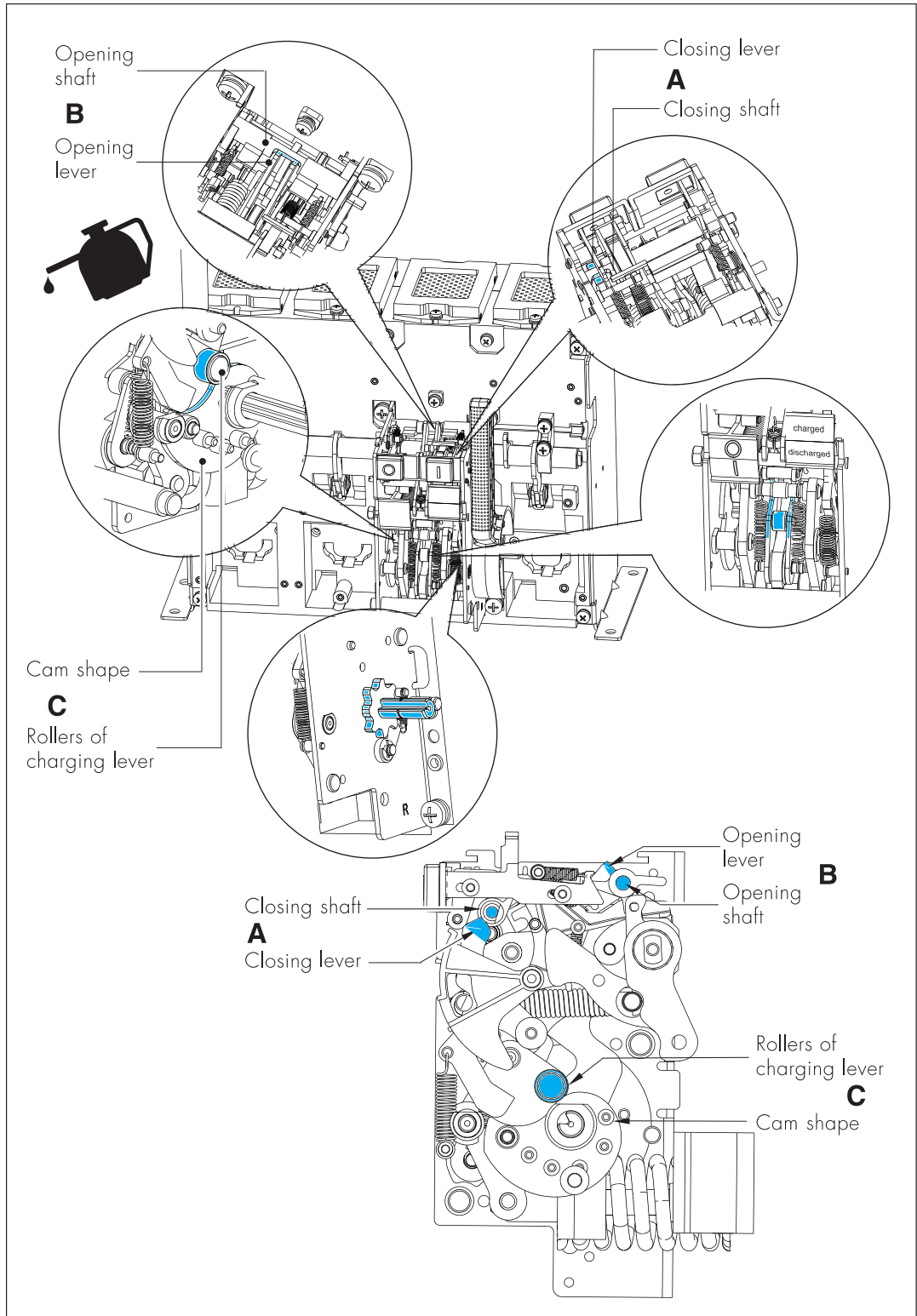
• Lubricating

Clean the mechanism with dry air compressed lubricate(Rheolube 361 F) the parts as shown in pictures. After lubricating do a cycle charge/close/open .





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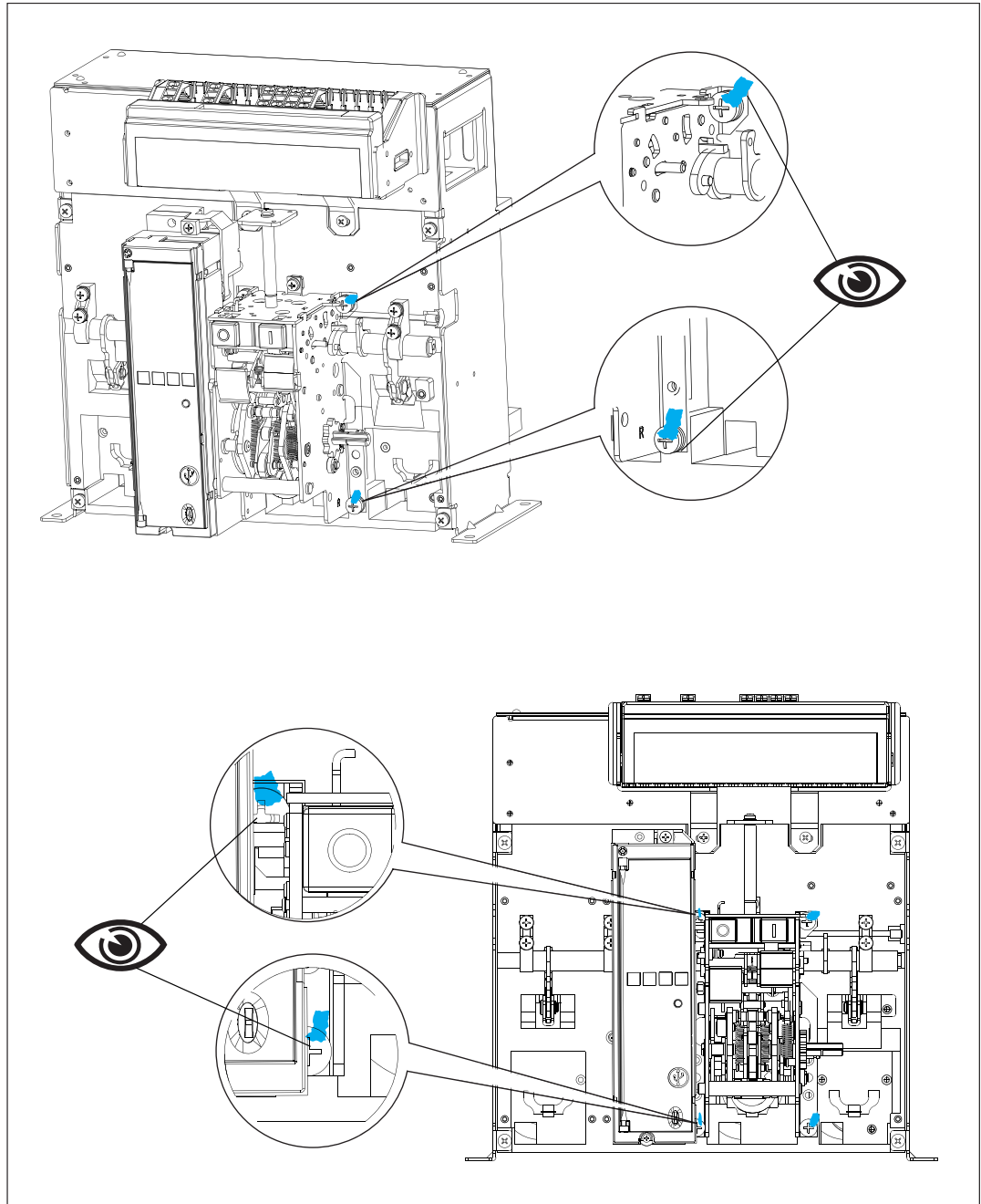


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4.1.2 MCH-II - The seals

- **Visual check**

Check the integrity of seals as shown in pictures.

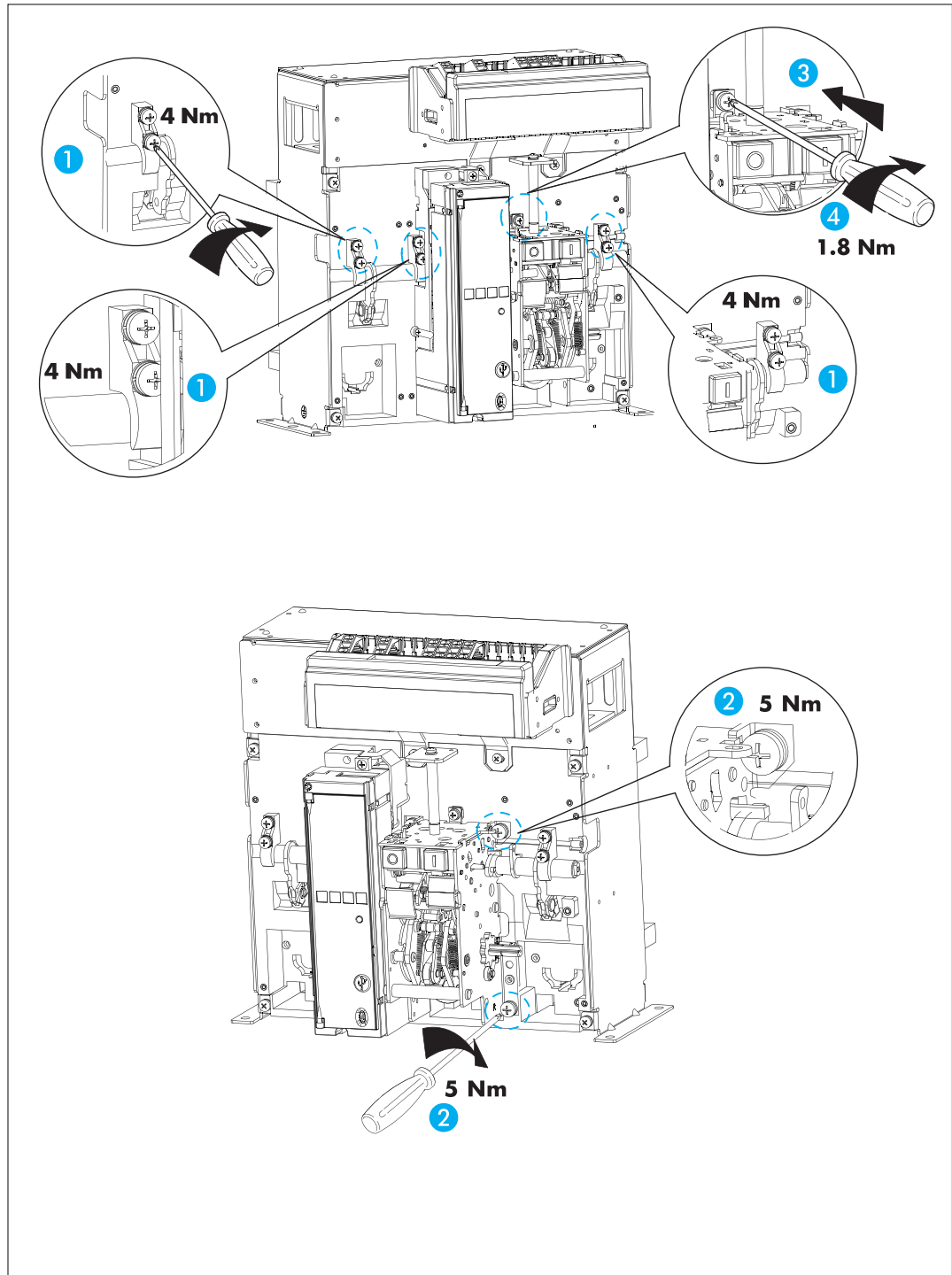


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• **Screws tightening**

In case on breaking seals:
- tight the screws as shown in pictures

- Jump to procedure "MCH-III".
- At the end Jump to procedure "MNC-II".



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4.2 CTS - Arc Chutes

Necessary tools:

- Cross screw drivers
- Ohmmeter



• Visual and cleaning

Remove the arc chutes.

Check presence of broken or damaged parts.
In case of broken parts → replace the arc chute (spare part).

Check the presence of copper dust or traces of melted copper. Clean with dry compressed air.
If necessary replace the arc chute (spare part).

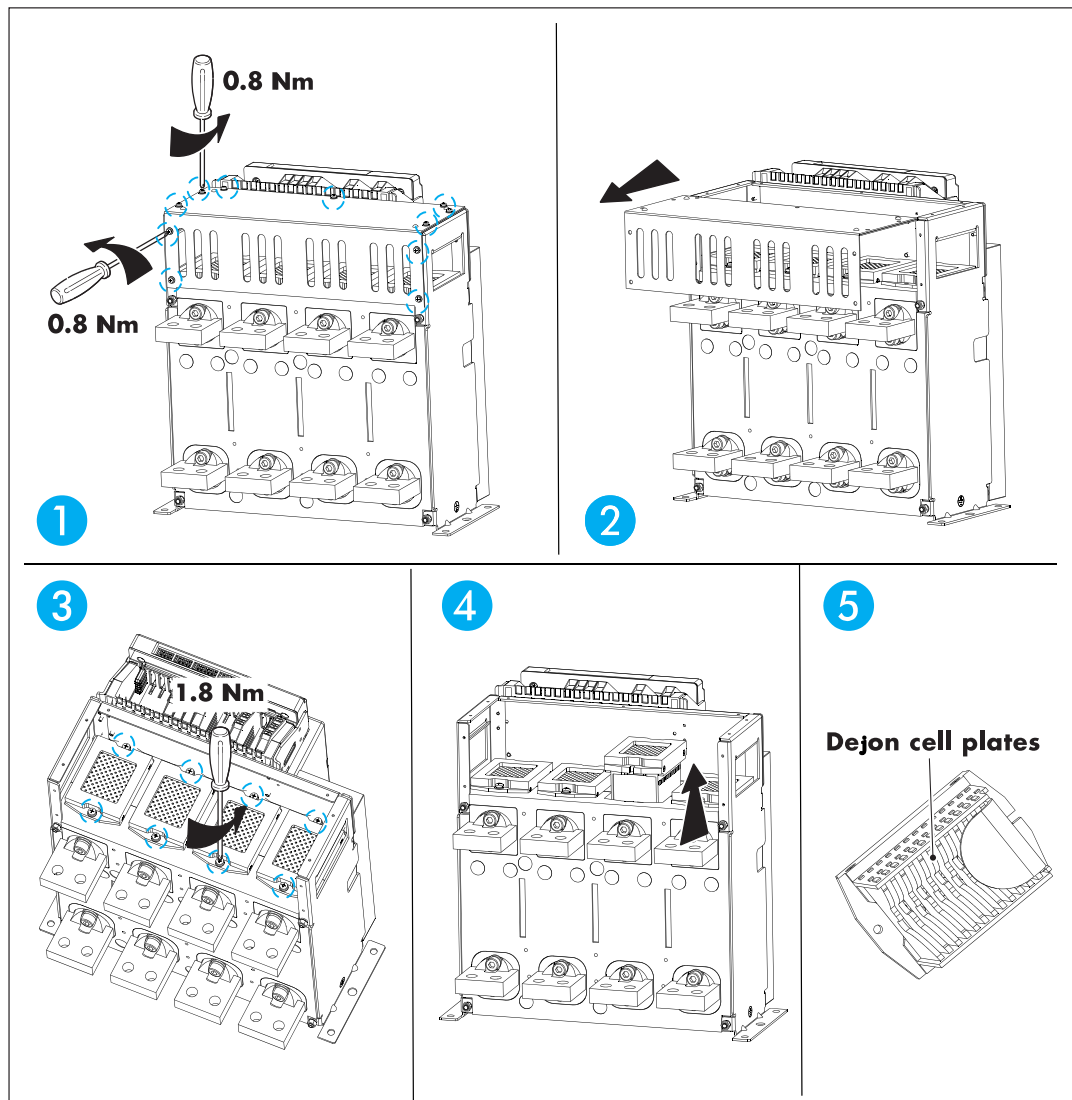
• Check the insulating between arc chute plates

Clean with dry compressed air.

By using an ohmmeter check the insulating between arc chutes plates.

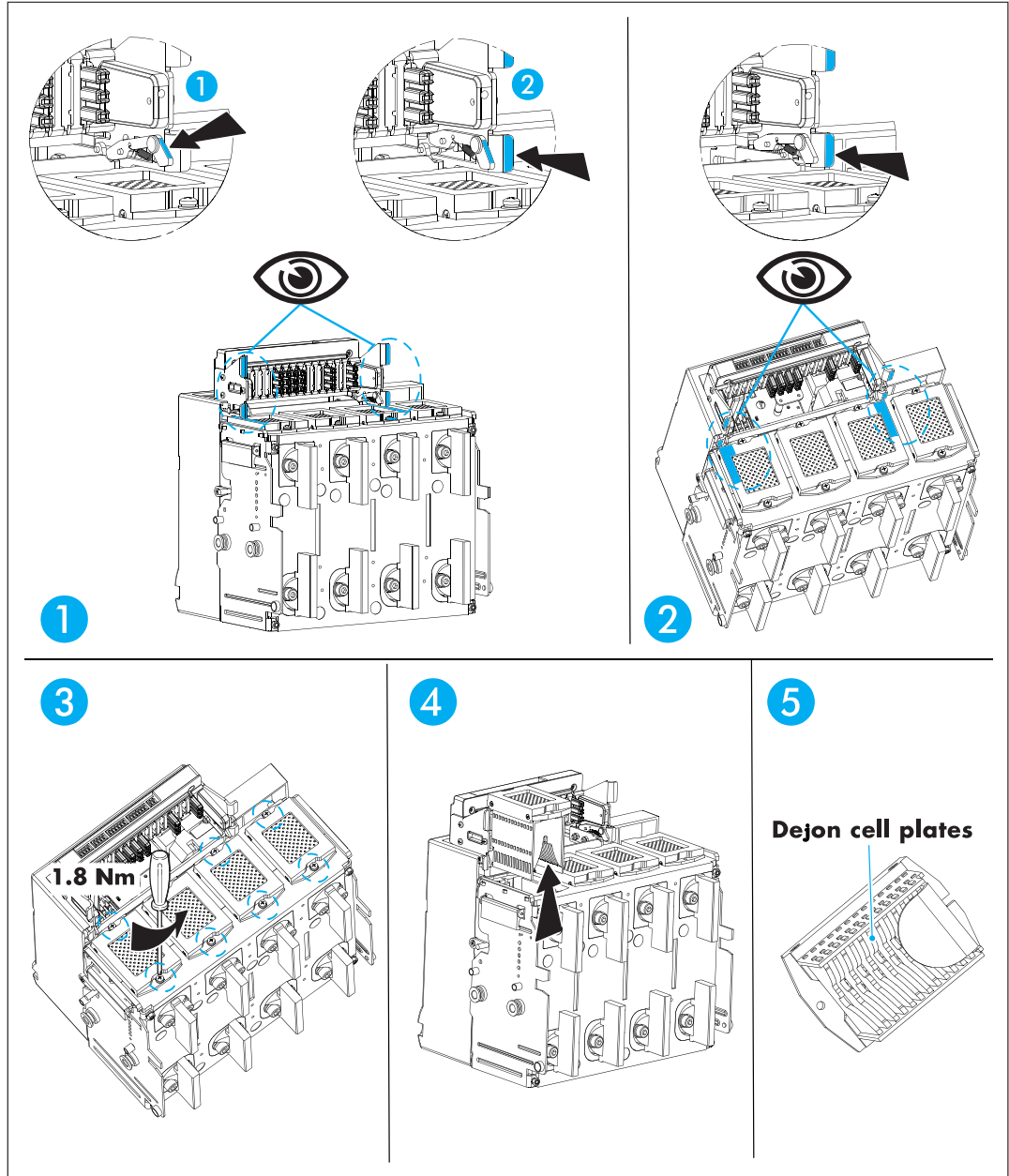
If necessary replace the arc chute (spare part).

Fixed version:



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Draw-out version:



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4.3 MNC - Main contacts

Necessary tools:
- Cross screw drivers



4.3.1 - MNC-I - Visual

- **Presence of dust, etc**

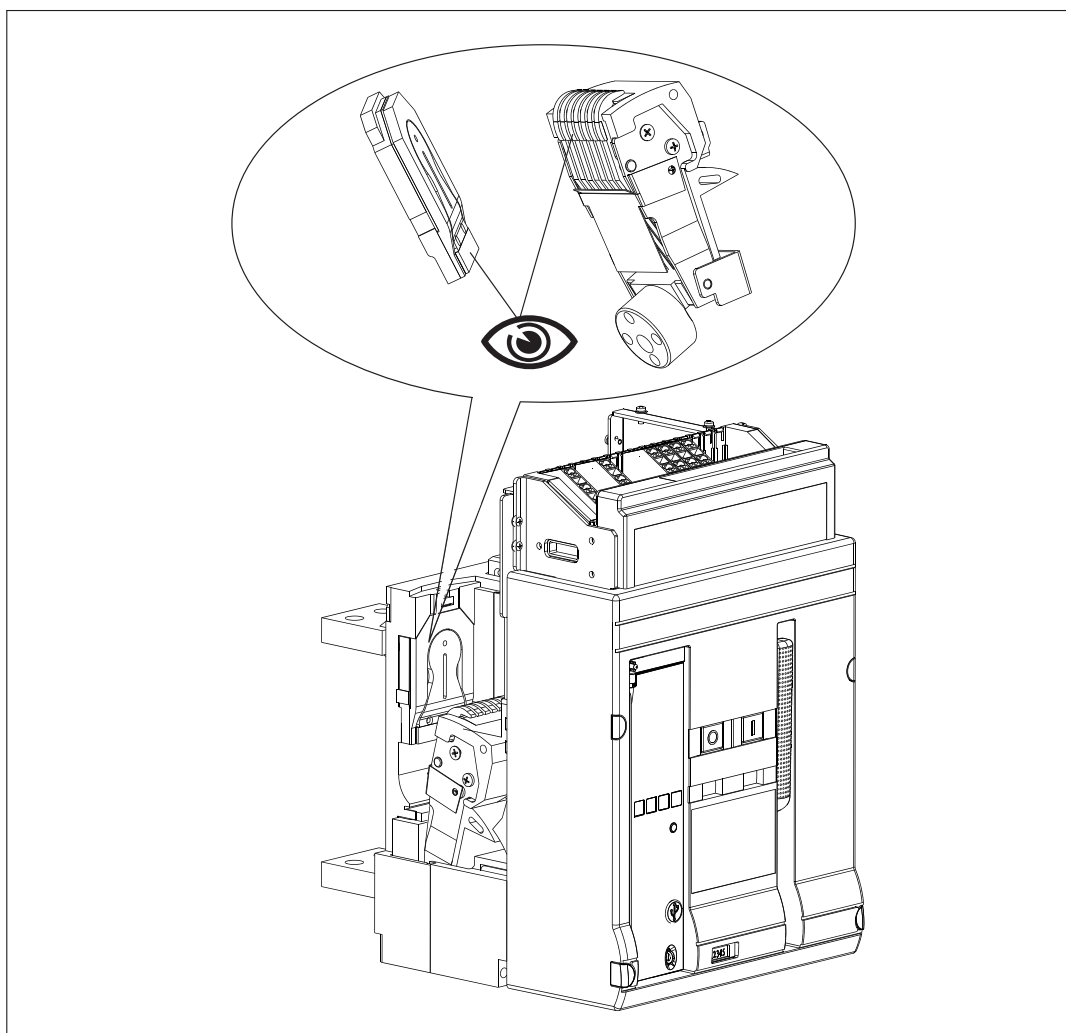
If necessary clean with dry cloth and alcohol.

- **Condition of main contacts surface**

In case of damaging surface treat it with glass-paper (n°320).

Clean with dry compressed air.

If the main contacts are too damaged please contact LEGRAND.



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4.4 DWT - Draw-out system

Necessary tools:

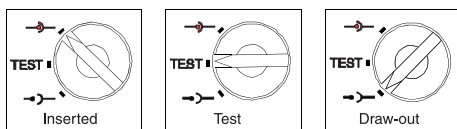
- Cross screw drivers
- Lubricant



4.4.1 DWT-I - Right working of draw-out system

• Check the correct working of draw-out system

- Insert the breaker in the draw-out chassis
- Get the breaker in inserted position – test position – drawout position



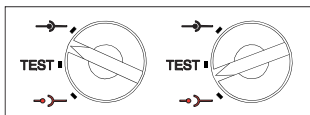
- For each position verify

If it is possible to operate the breaker (close and open).

If it is possible close and lock the shutter with padlock (drawout position).

Check key lock if present (see MCSR-II).

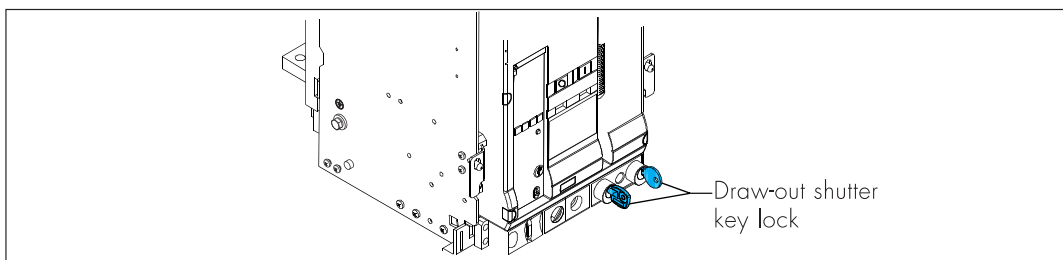
- Get the breaker in middle (not definite) position and verify



If it is NOT possible to close the breaker.

If it is NOT possible close and lock the shutter with padlock.

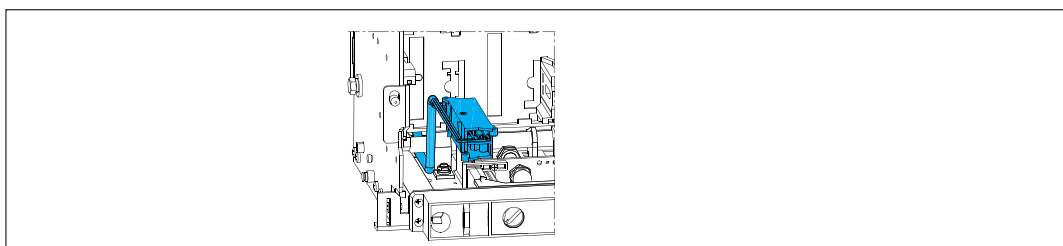
Check key lock if present (see MCSR-II).



At the end get again the breaker in open position with springs discharged.



In case of Inserted/test/draw-out contacts see the procedure "AXL".



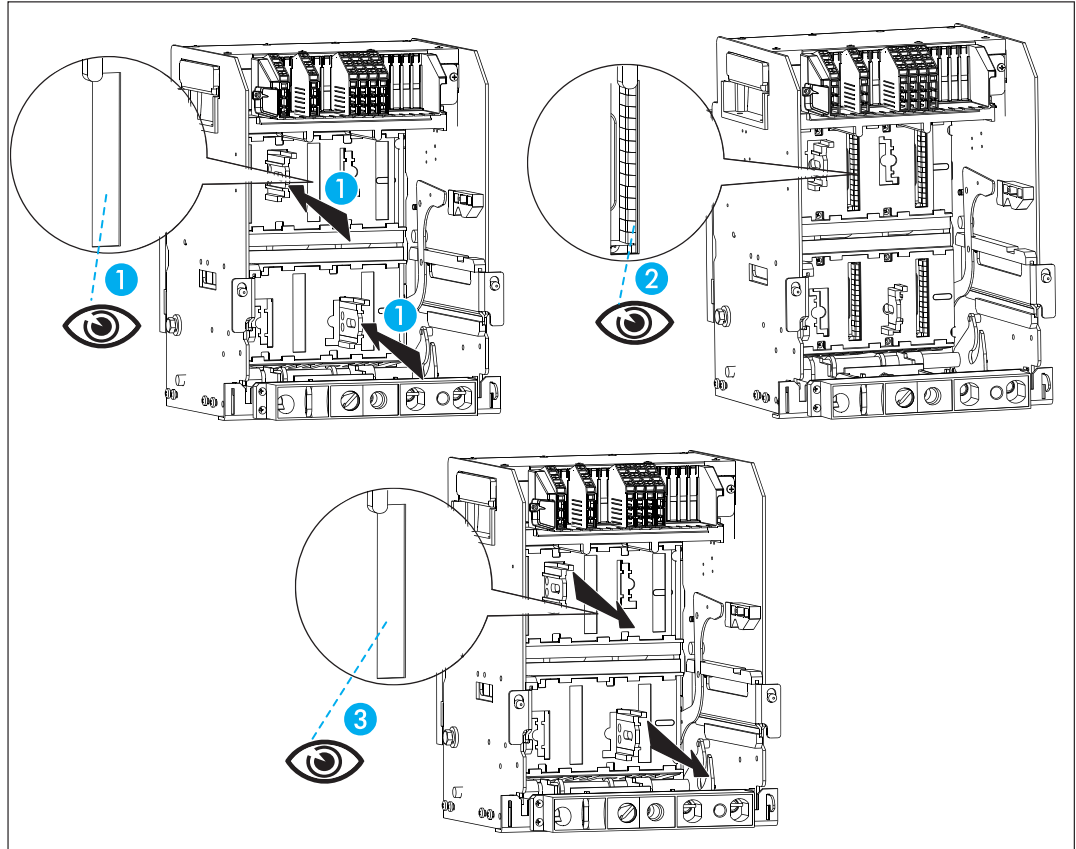


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4.4.2 DWT-II - Insulation shutter

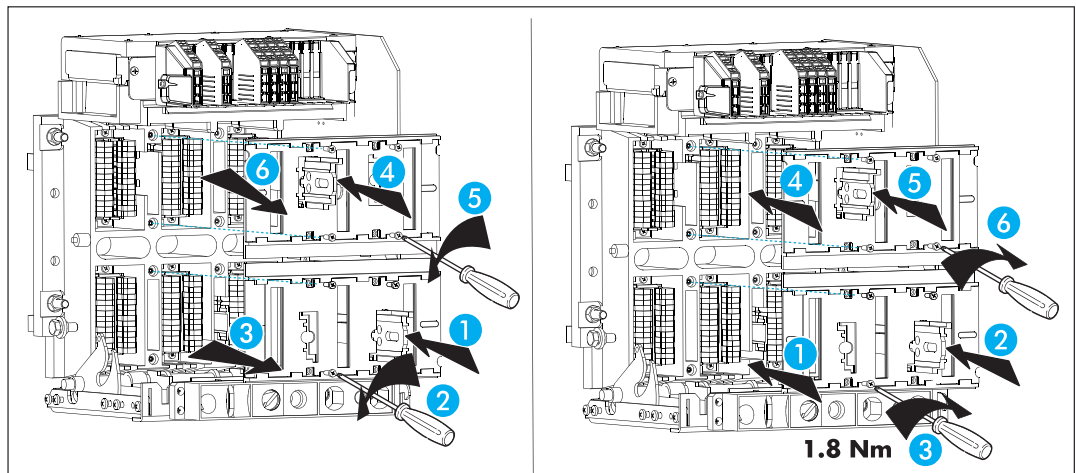
- **Check the correct working of insulation shutter**

Cluster contacts inspection remove space, simulate the insertion: the shutters must get completely up.



- **Visual check of insulation shutter**

If there are some parts damaged, replace those damaged parts (Spare parts).

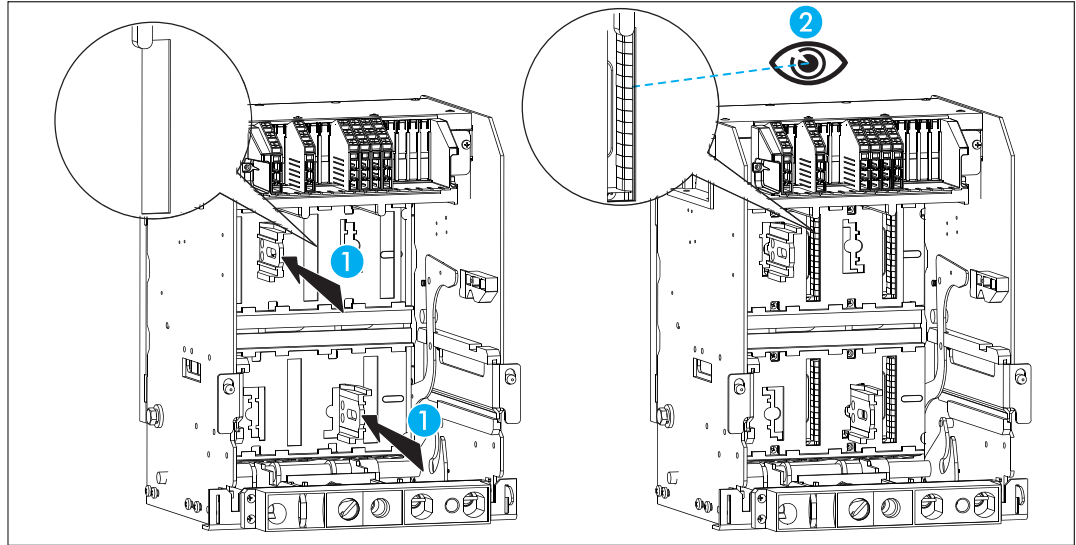


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4.4.3 DWT-III - Cluster contacts

- **Visual check and cleaning**

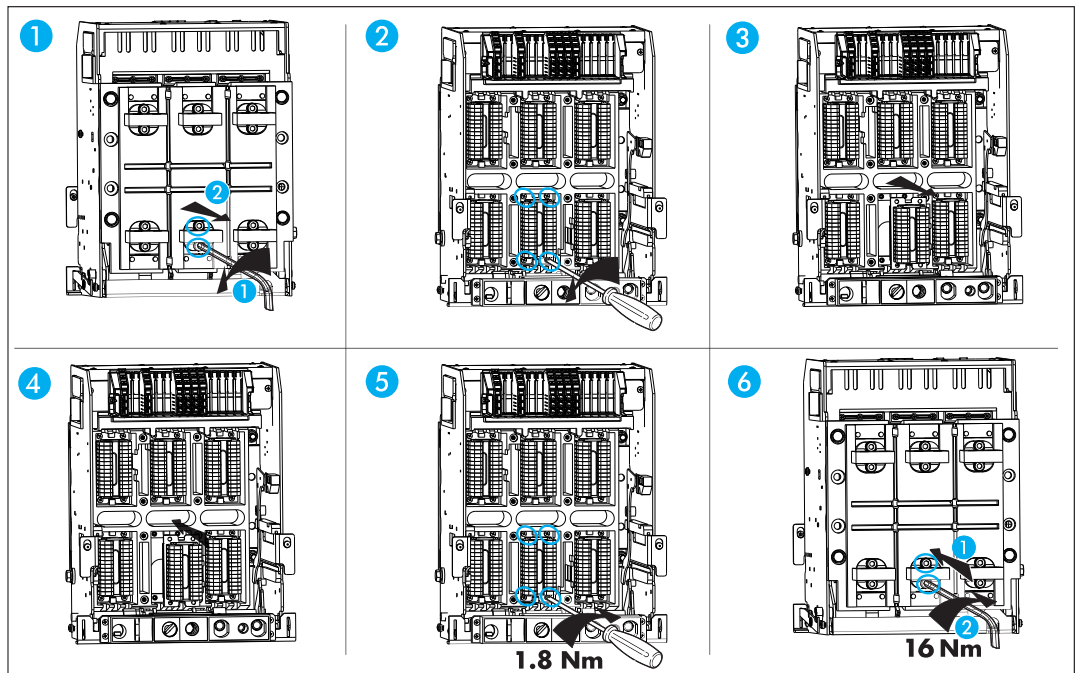
Open insulation shutter for cluster contact



If necessary (dust, oxidation, blackened, etc.) clean the cluster contacts with dry clothe. If necessary remove the cluster contacts.

- **Check the presence of damaging and replacement**

If replacement of cluster contacts is expected, please detail also the demounting operations and tightening torque for re-assemblying.

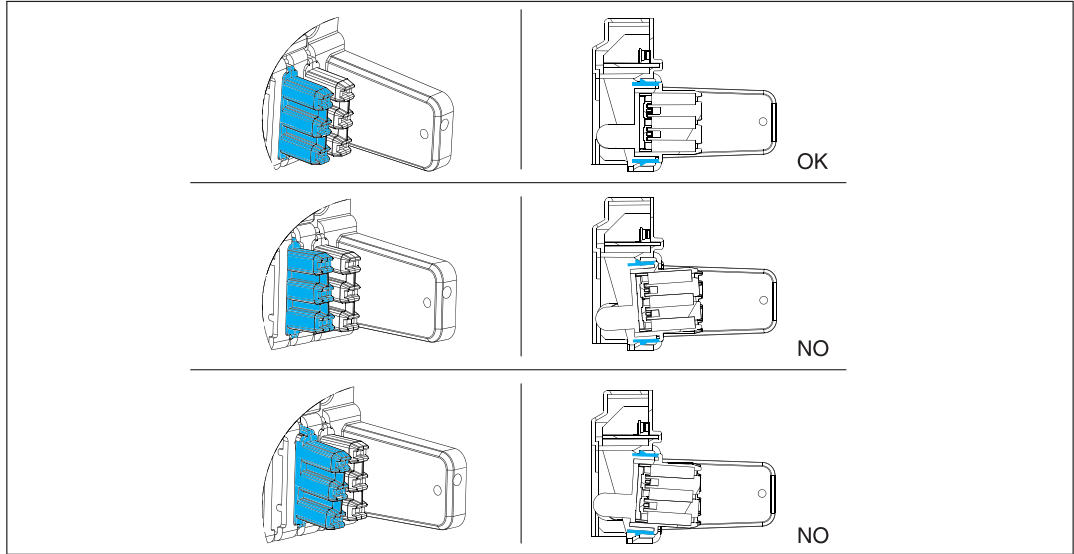


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4.4.4 DWT-IV - Sliding Aux contact

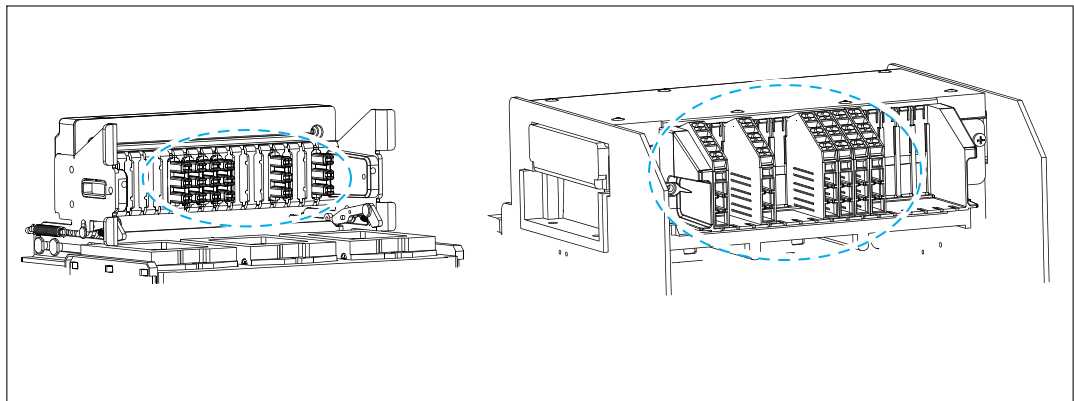
• Visual

Check the right position of sliding contacts.
Check damaged parts.

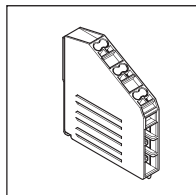


• Clean and lubricate

In presence of dust clean with dry cloth the parts highlighted in pictures.
Lubricate (Nyogel 760G) the parts as shown in pictures.



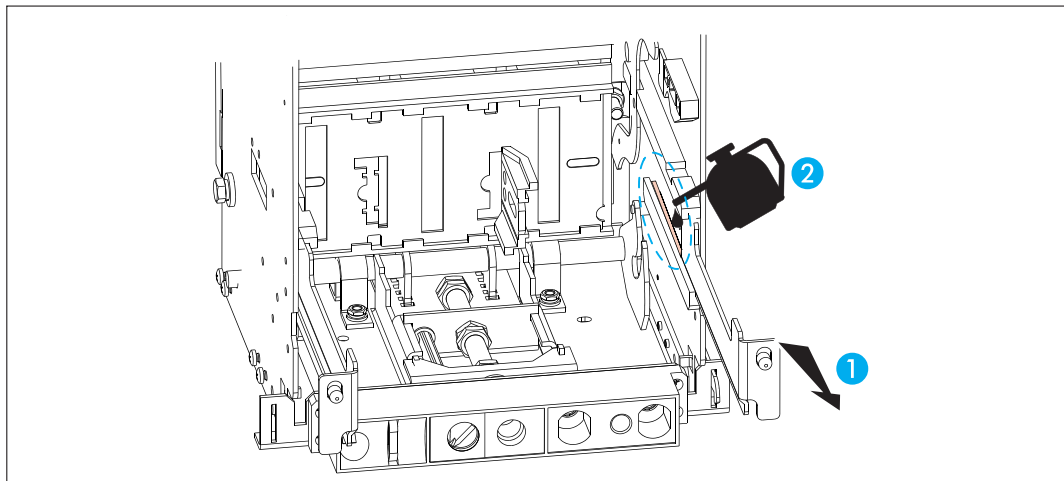
In presence of damaged aux terminals , replace them (spare parts).



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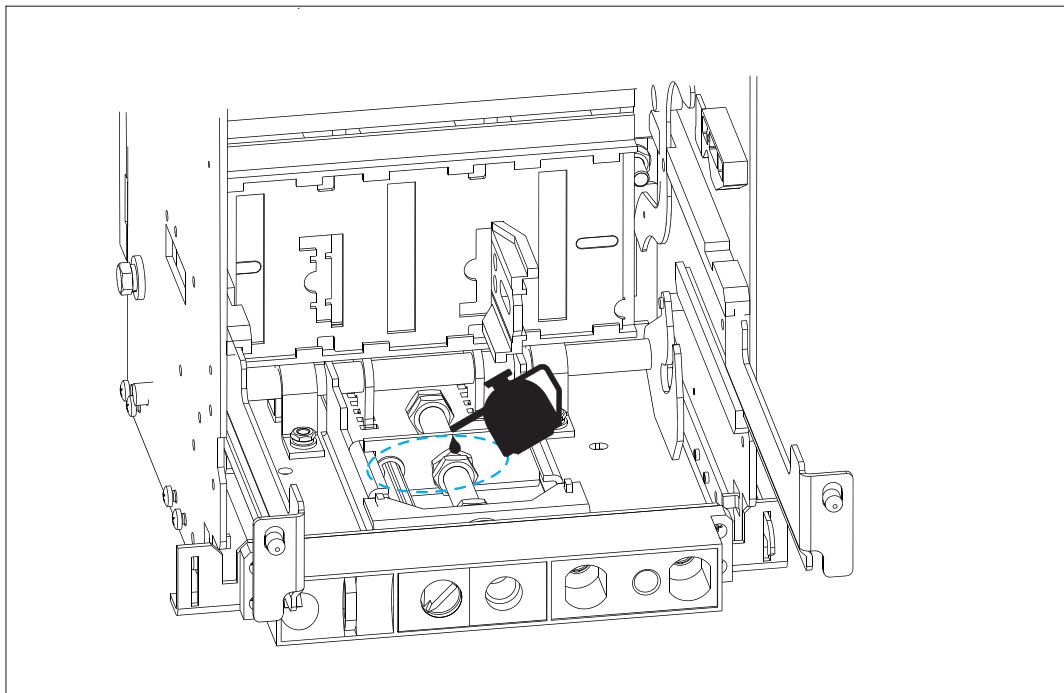
4.4.5 DWT-V - Clean and Lubricant draw-out chassis

Vacuum the dust on bottom of draw-out chassis.
Clean the parts indicate in picture with dry cloth.
Lubricate (Rheolube 361 F) the parts as shown in pictures: guide rail.



4.4.6 DWT-VI - Draw-out mechanism

Clean with dry cloth the worm screw of mechanism.
Lubricate (Rheolube 361 F) the worm screw of mechanism.



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4.5 TRM - Power Terminals

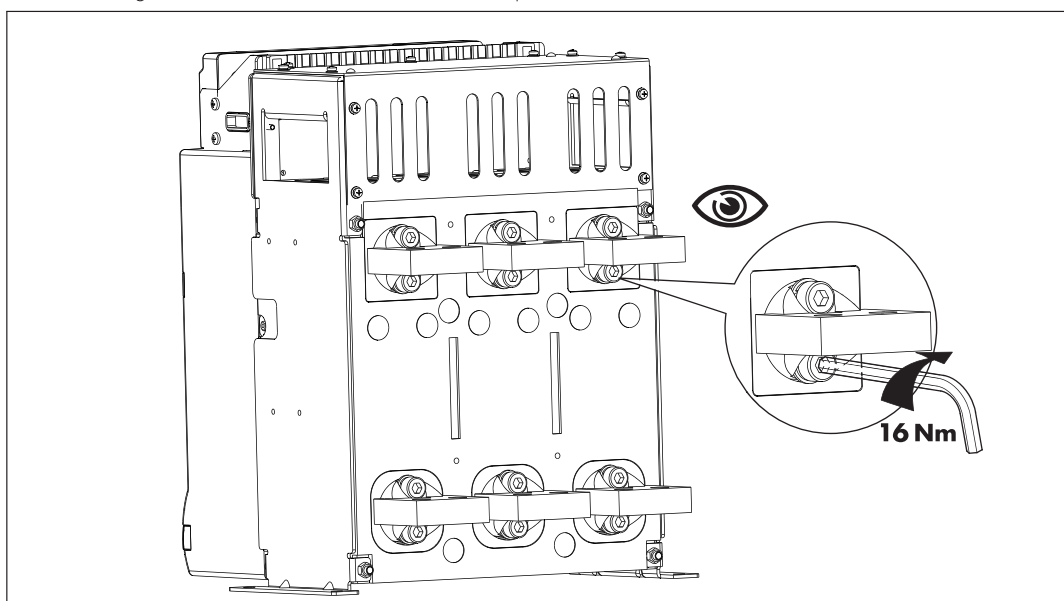
Necessary tools:

- Allen key (hexagonal wrench) T5



• **Visual / Screws tightening**

Check and tight the screws with 16 Nm as shown in pictures.



If is not possible to tight the screw please contact LEGRAND.

• **Status**

Check the status and color of power terminals.

If there is a change in color (which indicates an abnormal temperature rise) → check the seals and tightening of power terminals (Check the connection bars tightening too).

If there is oxidation → clean the power terminal (if necessary clean the connection bars too).

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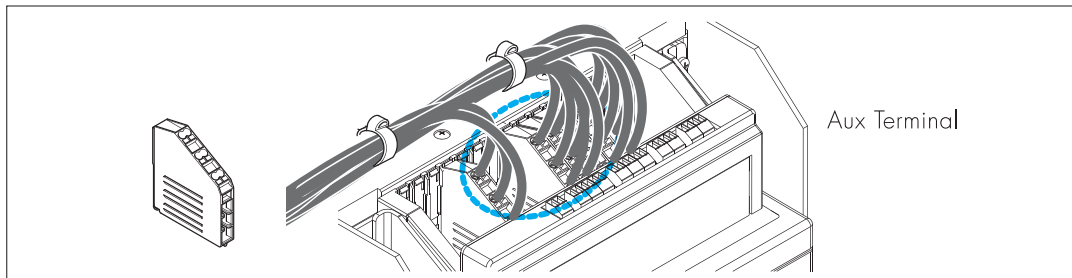
4.6 AXL - Auxiliary

Necessary tools:
- Ohmmeter

4.6.1 - AXL-I - Visual and wiring check

• **Auxiliary terminal block**

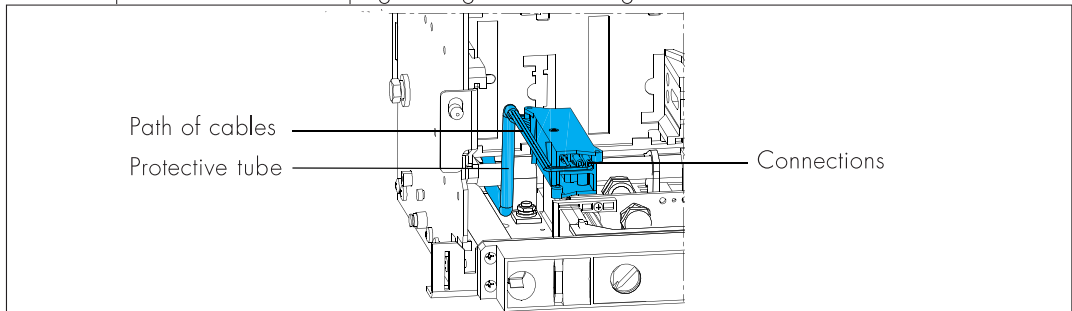
Check presence of broken parts.
Check the good connection of cables in terminals.
Check the presence of cables warping or signs of overheating.



If necessary, replace the Aux terminal (spare parts).

• **Inserted/test/drawout contacts**

Check presence of broken parts.
Check the good connection of cables.
Check the right path of cables and the presence of protective tube.
Check the presence of cables warping or signs of overheating.

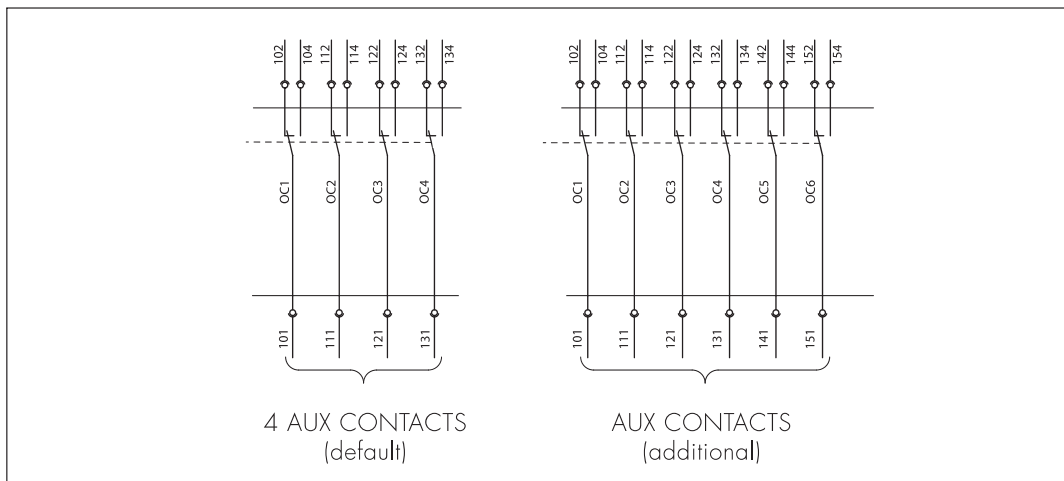


If necessary, replace the cables and inserted/test/drawout contacts.

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4.6.2 - AXL-II - Functional test

• O/C contacts



With breaker closed:

check continuity between terminals: (101 – 104); (111-114); (121-124); (131-134)

With breaker open:

check continuity between terminals: (101 – 102); (111-112); (121-122); (131-132)

If additional O/C contact are present, they must be checked as well.
In case of wrong working replace O/C contacts.

At the end get again the breaker in open position with springs discharged.



discharged

• RC-SC contacts

Get the breaker in open position with springs charged



charged

Check the continuity between (241-244); (231-234)

Close the breaker and charge the springs



charged

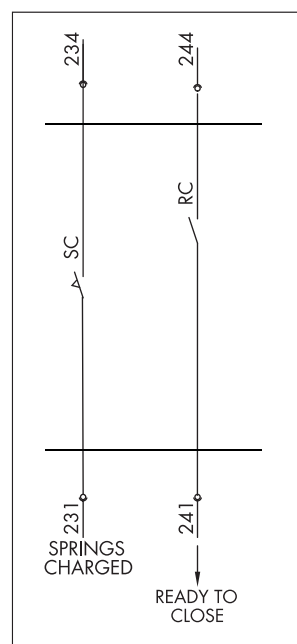
Check the continuity between (231-234)

At the end get again the breaker in open position with springs discharged



discharged

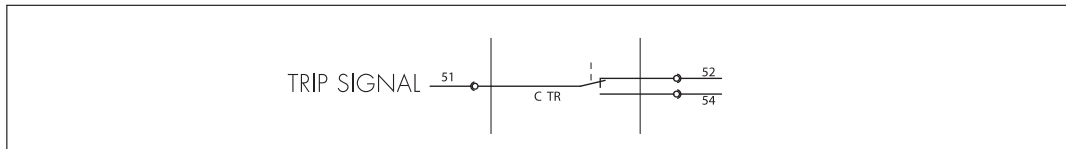
If necessary replace RC-SC contacts



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• Trip Contact

Perform procedure PRT (trip Unit) and within trip test, check the continuity between (51-54).



If trip contacts doesn't work, replace it by using procedure PMP 8006*.

*procedure "PMP 8006" can be used only by Legrand service or certified/qualified service companies.

• Inserted/test/drawout contacts

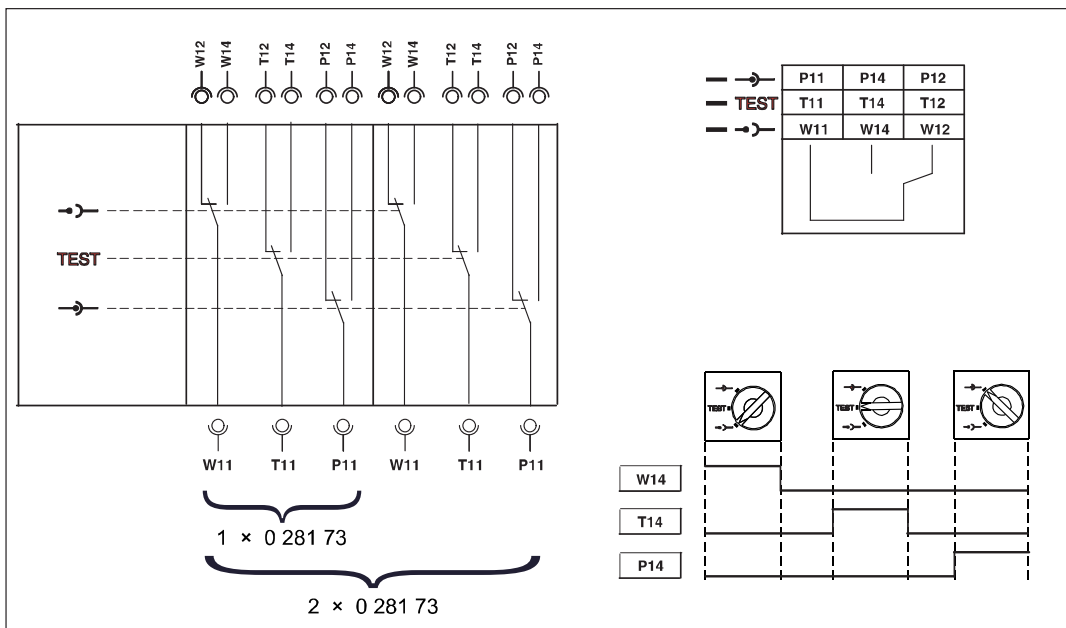
Check the correct working of the contacts. Check the continuity with ohmmeter:

test position: continuity between T11-T12;

Inserted position: continuity between P11-P12;

Draw-out position: continuity between W11-W12;

If necessary, replace the contacts.



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4.7 ECSR - Motor, UVR, CC, ST

Necessary tools:
- Cross screwdriver



4.7.1 - ECRS-I - Functional tests

• Motor

Supply the motor at Vn (terminals M1-M2).
The motor operator charge the springs and stop automatically.
If motor doesn't work:
- check the connectors
- check the supply voltage
- check the fuse
If the problem is still present → replace the motor drive.
At the end get again
the breaker in open position with springs discharged.



discharged

• CC

Charge the springs



charged

Supply the CC (C3-C4) and verify the breaker is closed.
At the end get again
the breaker in open position with springs discharged.



discharged

• ST

Close the breaker



discharged

Supply the ST (C1-C2) and verify the breaker is opened.

• UVR

Supply UVR (D1-D2): Close the breaker.

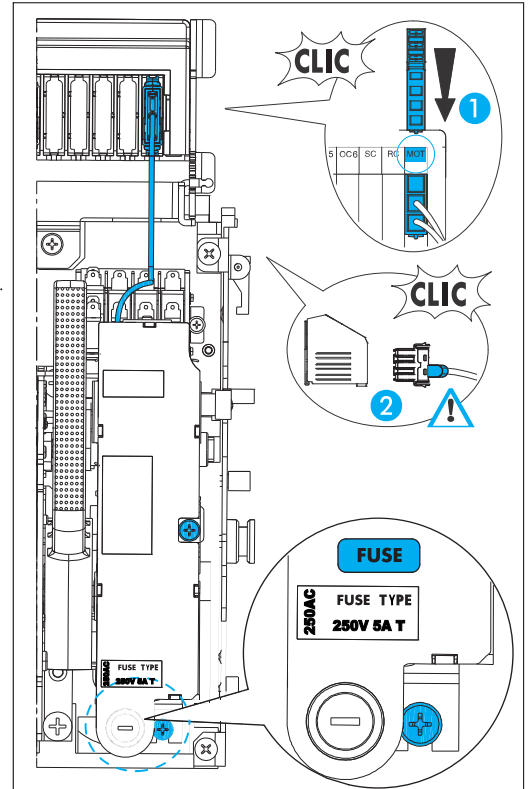


discharged

Cut off the supply of UVR and verify the breaker is opened. Let UVR without supply and verify it is not possible to close the breaker. At the end get again the breaker in open position with springs discharged.



discharged



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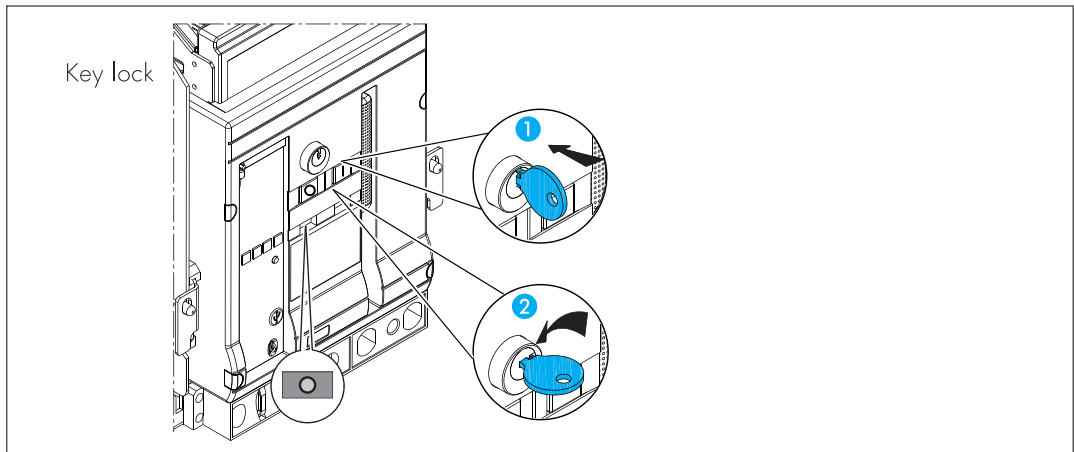
4.8 MCSR - Mechanical accessories

Necessary tools:
- None

4.8.1 - MCSR-I - Open position lock

• **Functional**

- Open the breaker
- Push the open push button and activate the "open position lock"
- Verify it is not possible activate "open position lock" without open the breaker and keeping pushed the open pushbutton

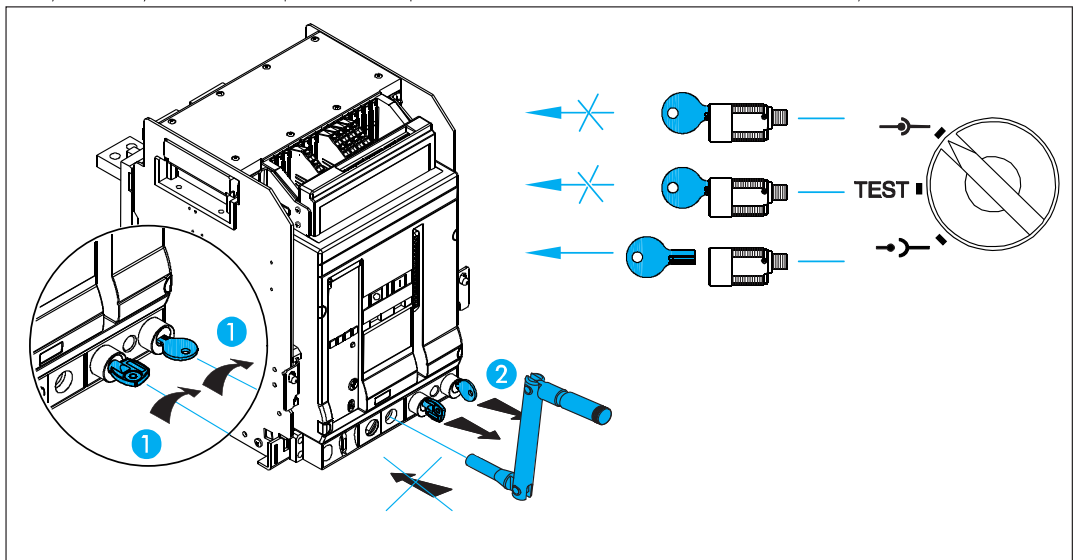


4.8.2 - MCSR-II - Draw-out shutter key lock

• **Functional**

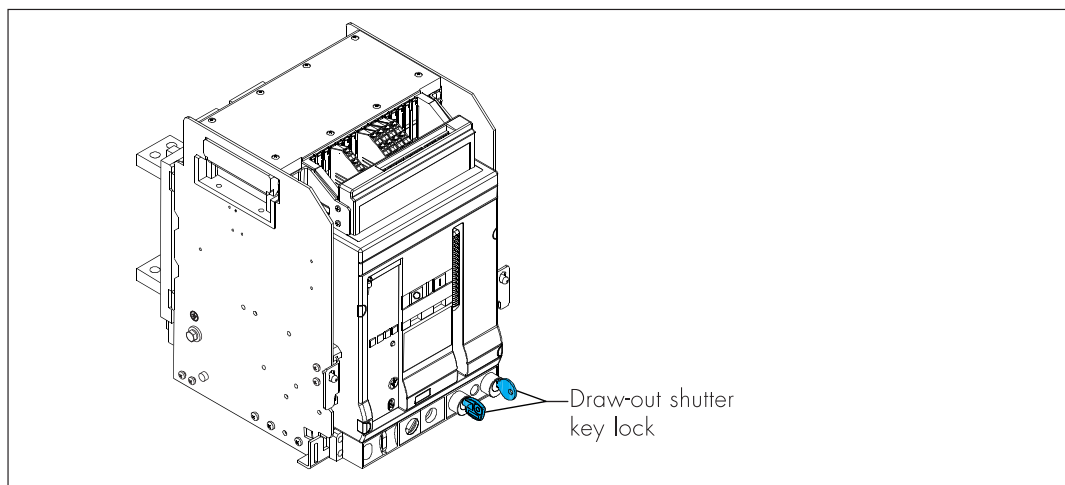
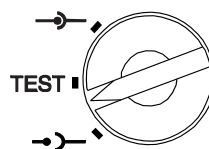
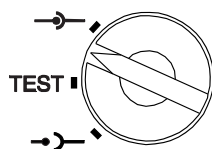
- Get the breaker in inserted position – test position – drawout position

Verify that only in Draw out position it is possible to lock the shutter and extract the key.



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- Get the breaker in middle (not definite) position
- Verify is NOT possible close and extract the key

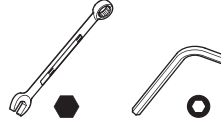


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4.9 NTK - Mechanical interlock

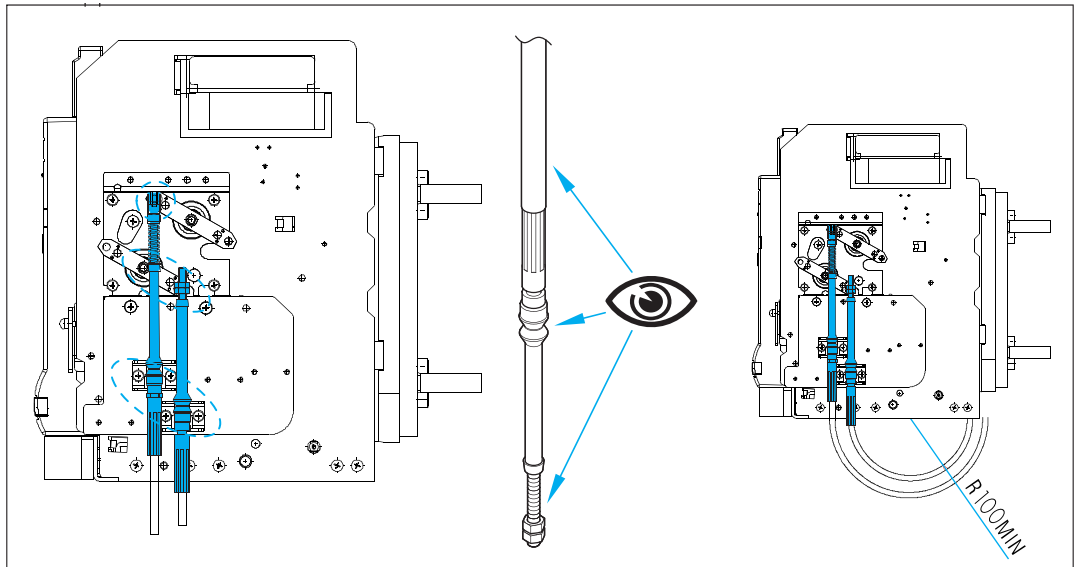
Necessary tools:

- Standard spanner n°8
- Allen key (hexagonal wrench) T3; T4
- Lubricant



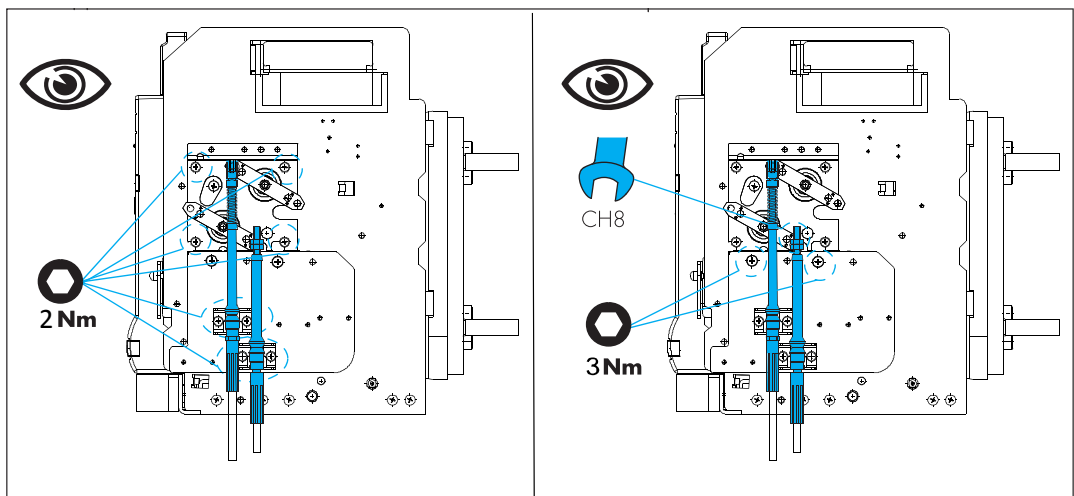
• Visual

Check the right path, correct fixing and minimum radius of cables.
Check the integrity of cables and their sheath.



• Tightening check

Check the tightening concerning fixing of mechanical interlock plate to breaker.
Check the tightening of fixing of cables to mechanical interlock plate.
If necessary regenerate the correct tightening torque.



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• **Functional test**

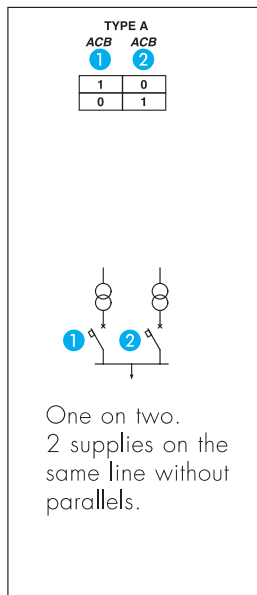
Check the adjustment of mechanical interlock on the base on truth-table in pictures below.

Example of interlock type A:

If one breaker is closed, the second one cannot be closed.

If necessary readjust the mechanical interlock (see the mechanical interlock instruction sheet).

At the end get again the breaker in open position with springs discharged.



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4.10 PRT - Trip Unit

Necessary tools:
- None

• Adjustments

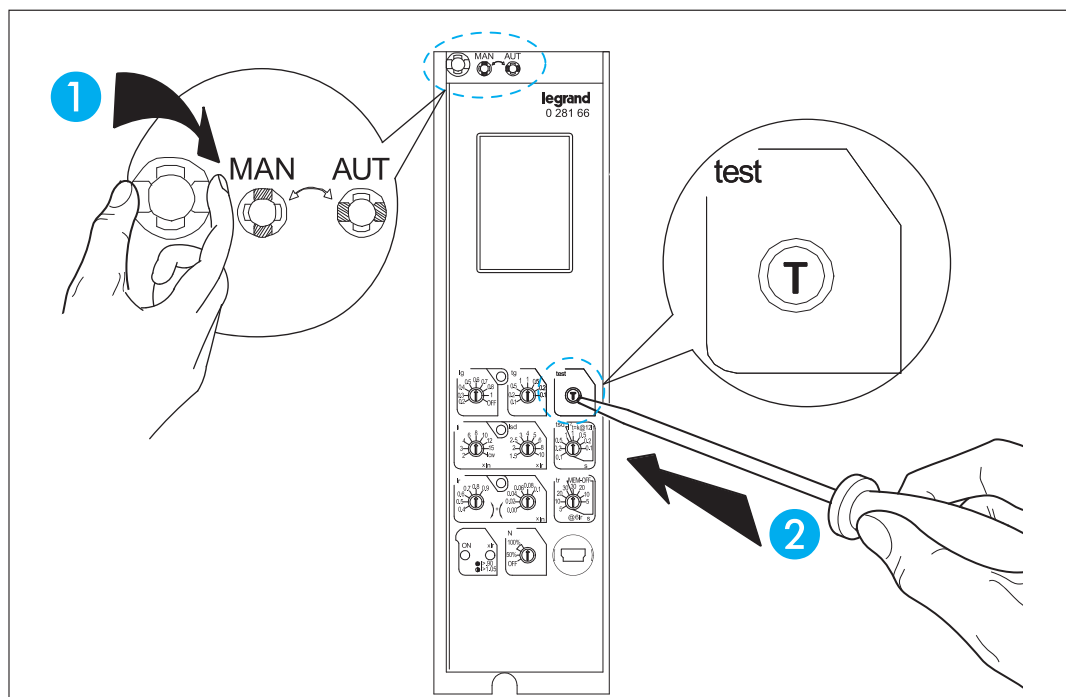
Check the adjustment of Protection Unit: see Protection Unit manual in order to navigate inside menu.
Check that on display appear "state" if the breaker is opened.

• Test button

Turn on the trip Unit (push one of push buttons)

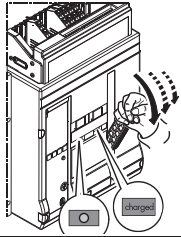
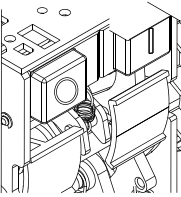
Get the reset button in position MAN

- Push the test button for more than 2 seconds
- Verify the breaker trip and appear on display "Trip Test"
- Verify the "reset button" is came out
- Verify is not possible to switch on the breaker
- Check the trip contact: check continuity between terminals (51-54) (procedure AUX-II)
- Push the "reset button"
- Close the breaker
- Verify disappear the indication "Trip Test"

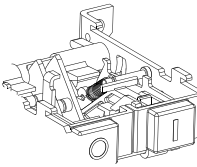
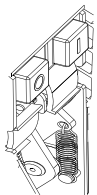


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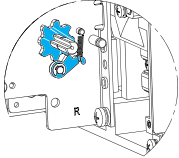
5. Troubleshooting

Problem	Possible causes	Checkup & resolution	Notes
It's not possible to close the breaker	Reset button is not reset	Push the reset button	
	The mechanism is not charged	Charge the springs	
	UVR not supplied	Check its power supply circuit. If the problem persists, replace the UVR	
	Electrical interlock	Check the electrical interlock	
	Shunt trip remains energized	Check its power supply circuit	
	Closing coils remains energized	Check its power supply circuit	
	Closing coil doesn't work	Check its power supply circuit. Check the fitting on breaker seat. If the problem persists, replace the closing coil	
	Wrong fitting of contact RC-SC	Fit the accessory properly	
	The breaker is not completely inserted inside the chassis	Insert properly the breaker inside the chassis	
	OPEN position Key lock is enabled	Disable the key lock	
	Mechanical interlock enabled	Check the logic of interlock	
	The spring of opening pushbutton (O) is out of seat	Get the spring on correct position	

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Problem	Possible causes	Checkup & resolution	Notes
It's not possible to close the breaker	The spring of closing pushbutton (I) is out of seat	Get the spring on correct position	
	The spring of "springs charging indicator" is out of seat	Get the spring in correct position	
	Mechanism jammed	Follow the mechanism maintenance procedures MCH. If the problem persists, contact LEGRAND	
It's not possible to open the breaker	Shunt trip doesn't work	Check its power supply circuit. Check the fitting on breaker seat. If the problem persists, replace the shunt trip	
	UVR doesn't work	Check its power supply circuit. Check the fitting on breaker seat. If the problem persists, replace the UVR	
	Mechanism jammed	Follow the mechanism maintenance procedures MCH. If the problem persists, contact LEGRAND	
It's not possible to electrically charge the springs	Motor operator doesn't work	Check its power supply circuit	
	The supply voltage on motor operator terminals is correct but the motor doesn't work	Check the integrity of motor operator and its protection fuse. If necessary, replace the fuse. If the problem persists, replace the motor	
It's not possible to charge manually the springs	Check the springs are not charged yet	Try to close the breaker and check the correct indication on springs charged	

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Problem	Possible causes	Checkup & resolution	Notes
It's not possible to charge manually the springs	The springs charging gear is damaged	Check the integrity of the lever and the mechanism. If necessary replace it (spare parts). If the problem persists, contact LEGRAND	
	Mechanism jammed	Follow the mechanism maintenance procedures MCH. If the problem persists, contact LEGRAND	
Unexpected trips	Trip for real overcurrent	Check the type of trip event by consulting the display of Protection Unit	
	Trip by UVR or Shunt Trip	Check their power supply circuit. Check UVR is supplied with $U > 0,85U_n$	
	Wrong settings of protection unit	Set correctly the protection values of PU	
	Malfunctioning of protection unit	Contact LEGRAND	
The breaker doesn't trip in case of over-current	Disconnection between CT and trip Unit	The breaker must be able to trip by test button. Check that PU shows correct current on display. Check the CT integrity and if necessary replace them (spare parts)	
	Defect of electronic Trip Unit	Check if PU can be turned on with correct supply. Check trip unit with test device box. If the problem persists contact LEGRAND	

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Problem	Possible causes	Checkup & resolution	Notes
It's not possible to insert the draw-out crank	Keylock of draw-out is enabled	Disable the Keylock of draw-out	
The draw-out crank doesn't rotate: it's not possible to extract the breaker	Draw-out mechanism faulty or damaged	Check the integrity of the draw-out mechanism following the mechanism maintenance procedure DWT-VI. If necessary, change draw-out kit.	
Keylock in OPEN position doesn't work: it's possible to close the breaker even if the lock is enabled	The keylock is not fitted properly	Fit the accessory properly as showed on instruction sheet	
	The keylock has some part broken or damaged	Replace the keylock	
The draw-out shutter keylock/padlock doesn't work: it's possible to open the shutter even if the lock is enabled	In case of padlock, check the minimum cross section permitted (refer to instruction sheet)	Use a proper padlock	
	The keylock is not fitted properly	Fit the accessory properly as showed on instruction sheet	
	The keylock has some part broken or damaged	Replace the keylock	
The breaker doesn't trip by pushing of trip test button "T"	The breaker is already opened	Close the breaker.	
	Defect of electronic trip unit	Check the power up of the protection unit. Check trip unit with test device box. If the problem persists contact LEGRAND	

If problem cannot be solved with indications in troubleshooting table, contact LEGRAND.



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