



MEDIUM VOLTAGE CIRCUIT BREAKER CB6



PRODUCT MANUAL

Original instruction

Codice MP1800002EN

Ed.12-2020 Rev. 00 English

TECHNICAL INSPECTOR STAMP

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1 - Storage and Handling

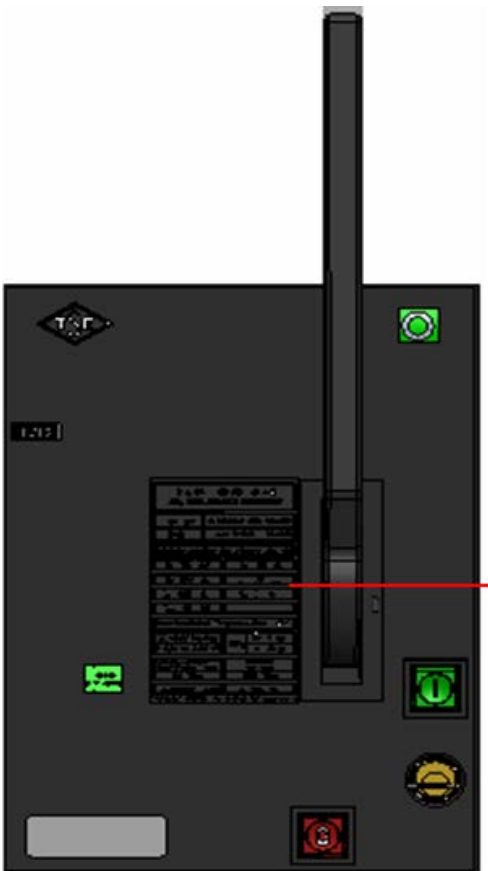
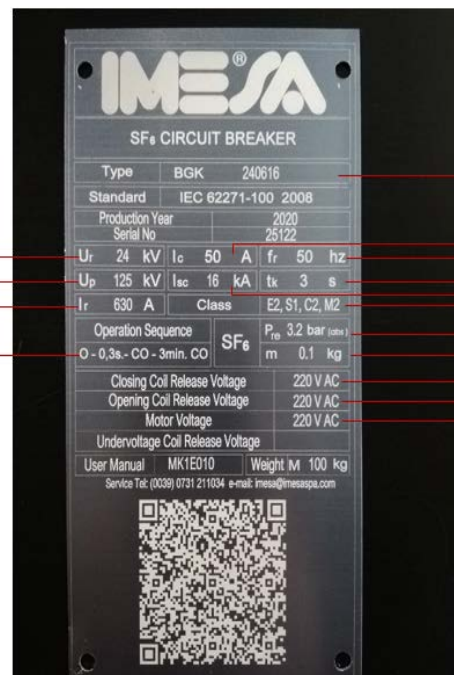
1.1 - Circuit breaker label



WHEN YOU RECEIVE THE CIRCUIT BREAKER MAKE SURE THAT OPERATING SPRINGS ARE DISCHARGED AND THE APPARATUS IS OPEN.

When you receive the product please check the label and your requests on your order. you can see electrical connection schema at the end of this rules.

Name Plate A



1. Circuit breaker type and serial number
2. Rated operating current
3. Rated voltage
4. Rated frequency
5. Rated breaking current
6. Lightning impulse voltage
7. Rated duration of short circuit
8. Capacitive breaking current
9. Series of operation
10. SF6 gas weight and filling pressure
11. Classes of circuit breaker
12. Rated opening and closing coil voltages
13. Rated motor voltage

1.2 - Storage

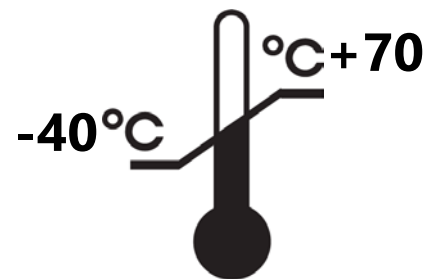
Circuit breaker must be kept in `OPEN` position and in its original packaging.

Store the circuit breaker in a place :

- protected from the weather,
- dry,
- safe from damage.



For long term storage, keep the circuit breaker in its original packaging and clean the epoxy-resin parts with dry clothes before installing .

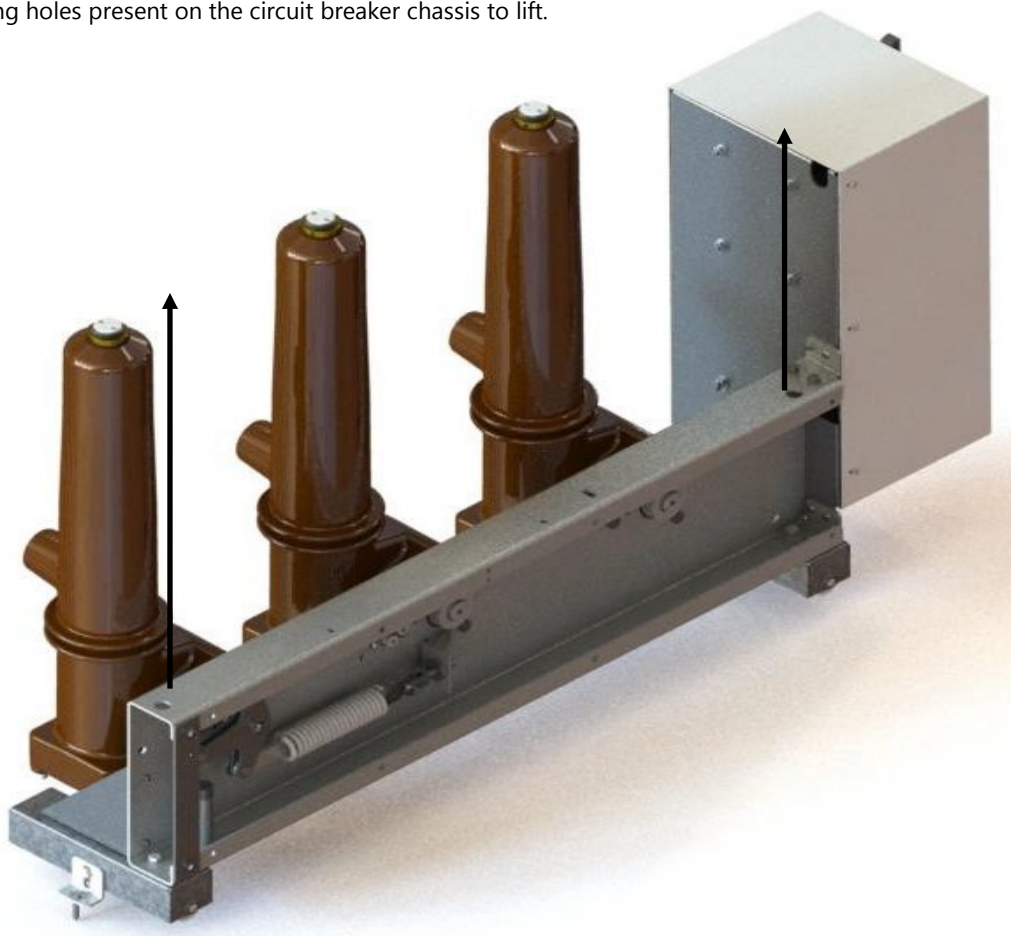


1.3 - Handling

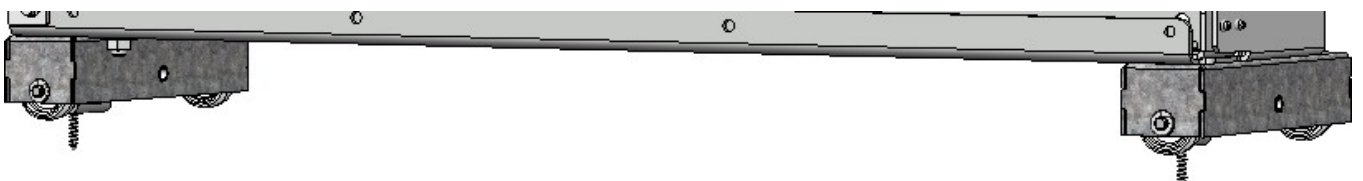


KEEP IN MIND, EPOXY-RESIN POLES ARE FILLED WITH HIGH PRESSURE SF6 GAS.
TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE TO THE POLES.

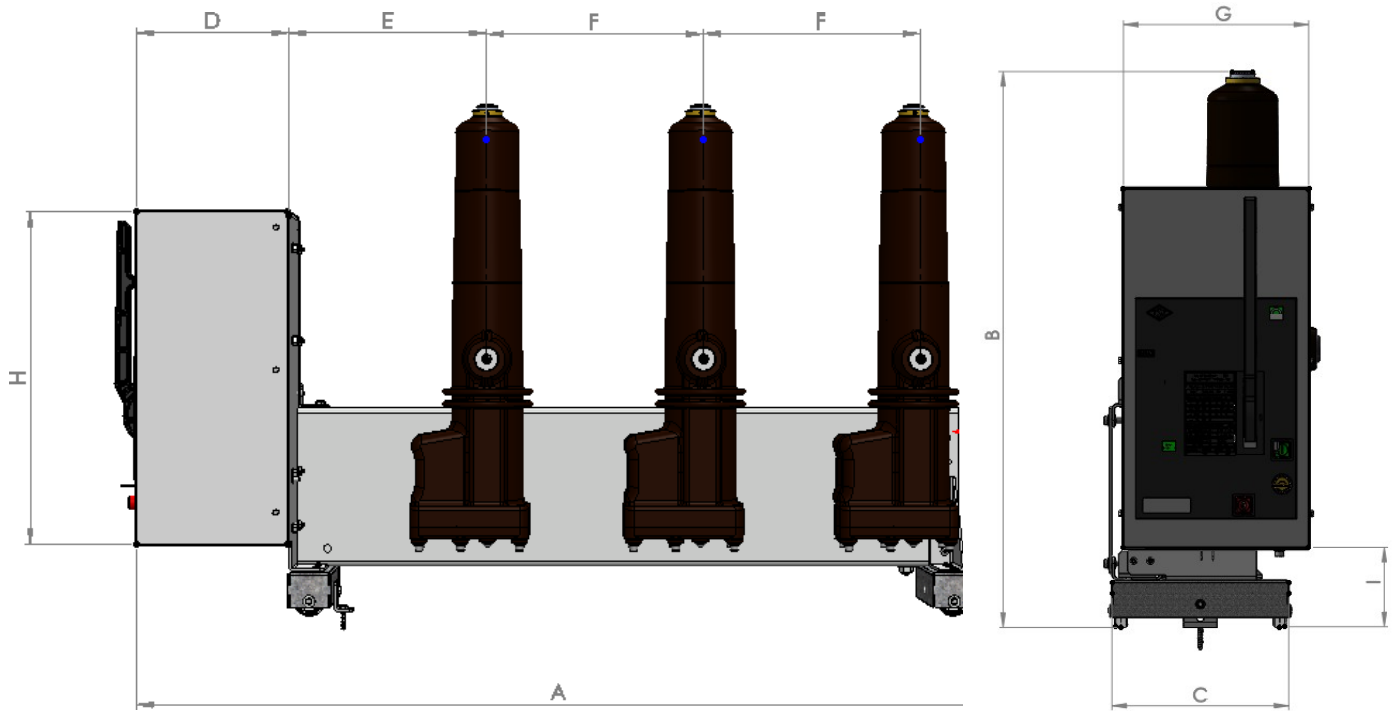
Please use the lifting holes present on the circuit breaker chassis to lift.



Circuit breaker can also be moved by the wheels on the chassis.



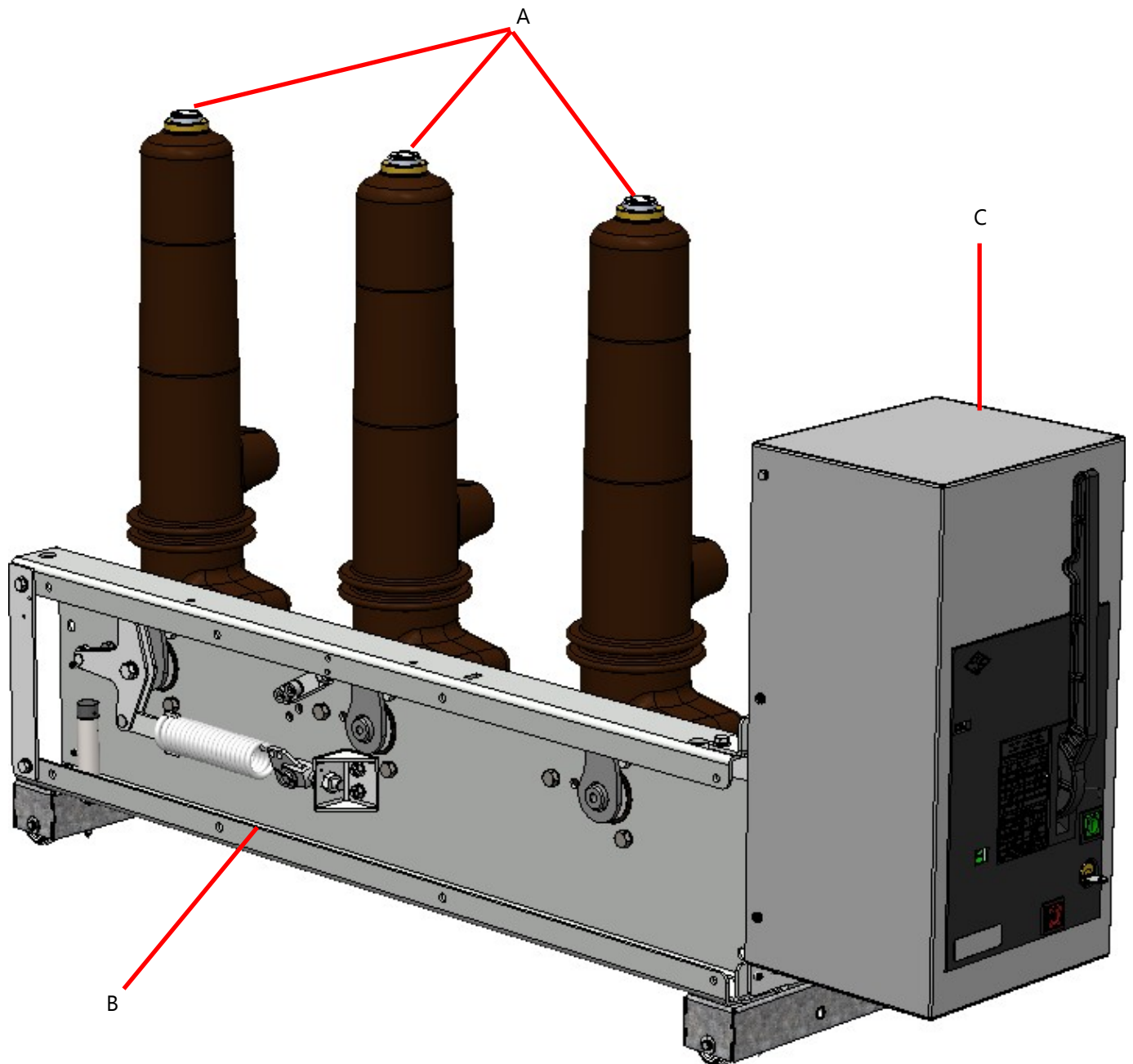
1.4 - Overall dimensions



| Rated Voltage (kV) | A | B | C | D | E | F | G | H | I |
|--------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| 12 | 1094 | 840 | 265 | 250 | 250 | 250 | 285 | 540 | 120 |
| 24 | 1094 | 840 | 265 | 250 | 250 | 250 | 285 | 540 | 120 |
| 36 | 1370 | 840 | 265 | 250 | 320 | 350 | 285 | 540 | 120 |

2 - Description

General view of BGK Type SF6 Circuit Breaker



- BGK type SF6 circuit breaker with BKM1 type operating mechanism.

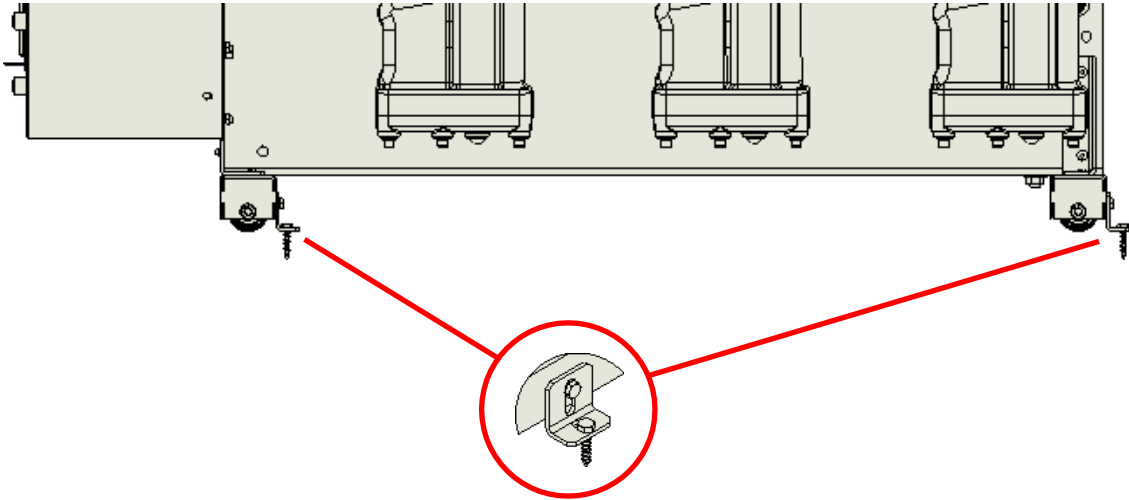
A - Poles

B - Carrying chassis

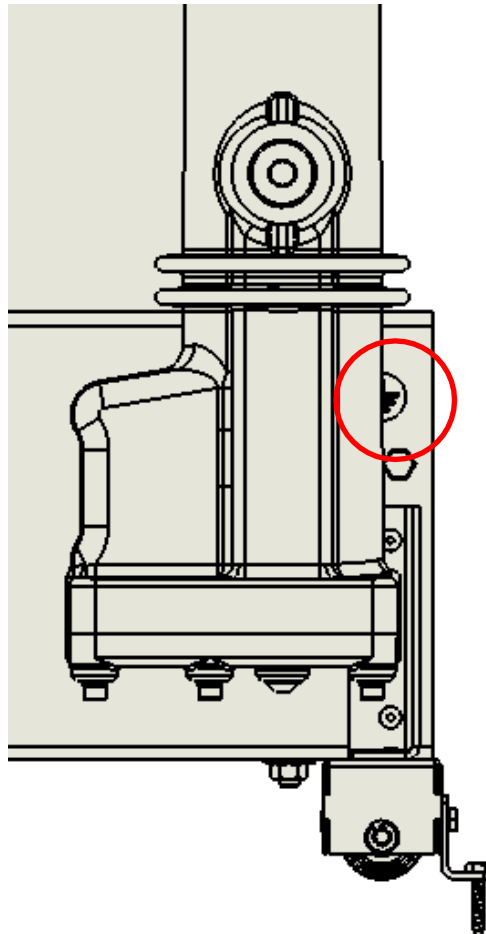
3 - Installation

3.1- Fixing and earthing the circuit breaker

- α. Circuit breaker must be fixed in position by two anchoring bolts before any high voltage connection is done.



- b) Carry out earthing by bolting the earthing conductor on the earthing point which is located on the back side of the circuit breaker.

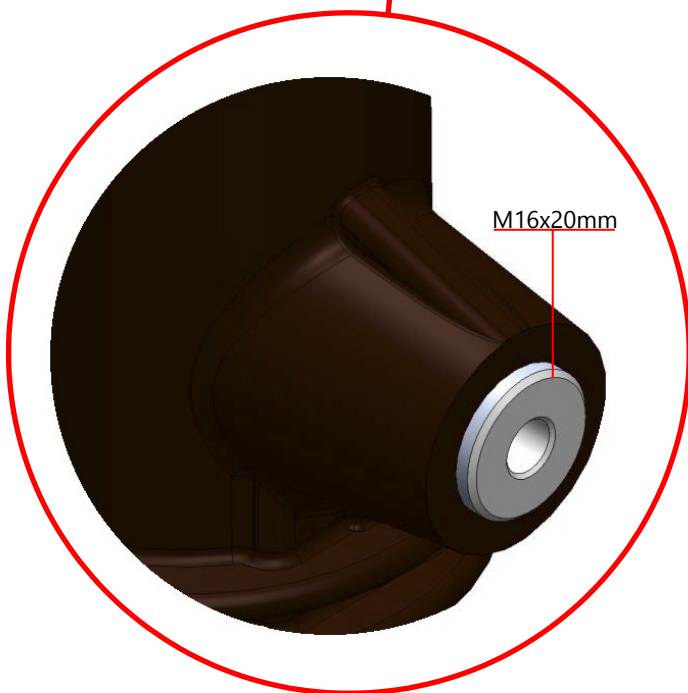
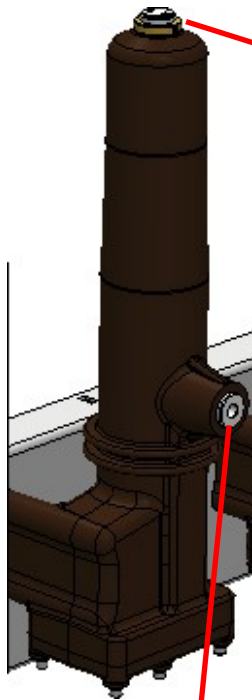


3.2 – Power circuit connections

Conductor selection should be done according to the drawings.

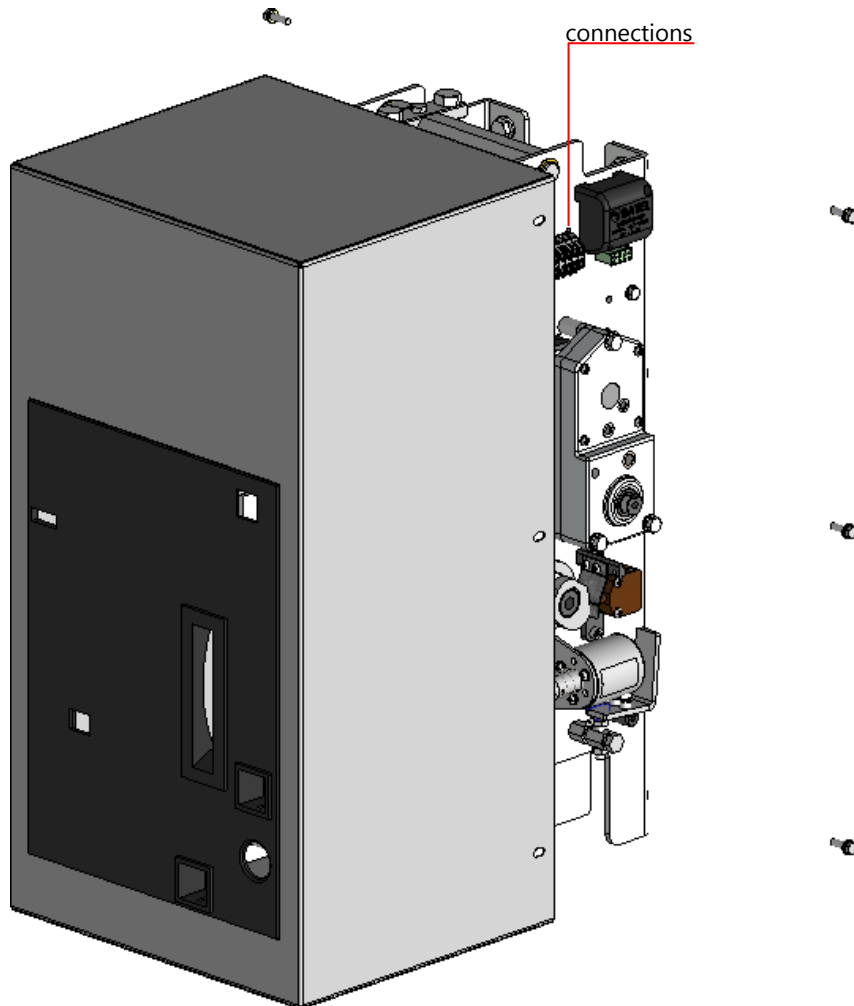


Maximum tightening torque of M8 and M16 bolts are 27Nm and 35Nm respectively. These values must not be exceeded !



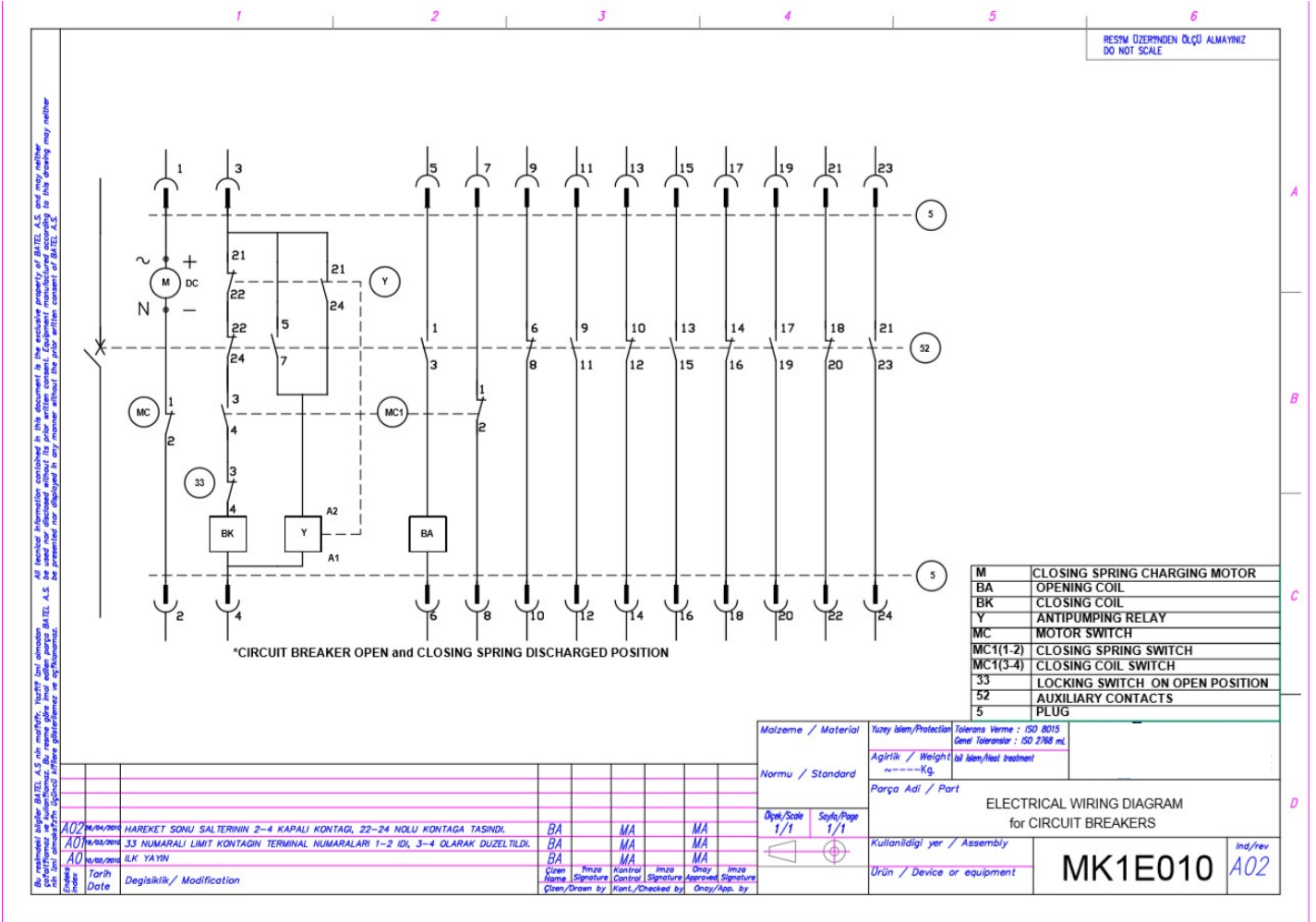
3.3 – Auxiliary circuit connections

After removing six bolts holding the mechanism protection cover in place, auxiliary circuit connections can be done.



3.4 – Circuit diagram

After removing six bolts holding the mechanism protection cover in place, auxiliary circuit connections can be done.

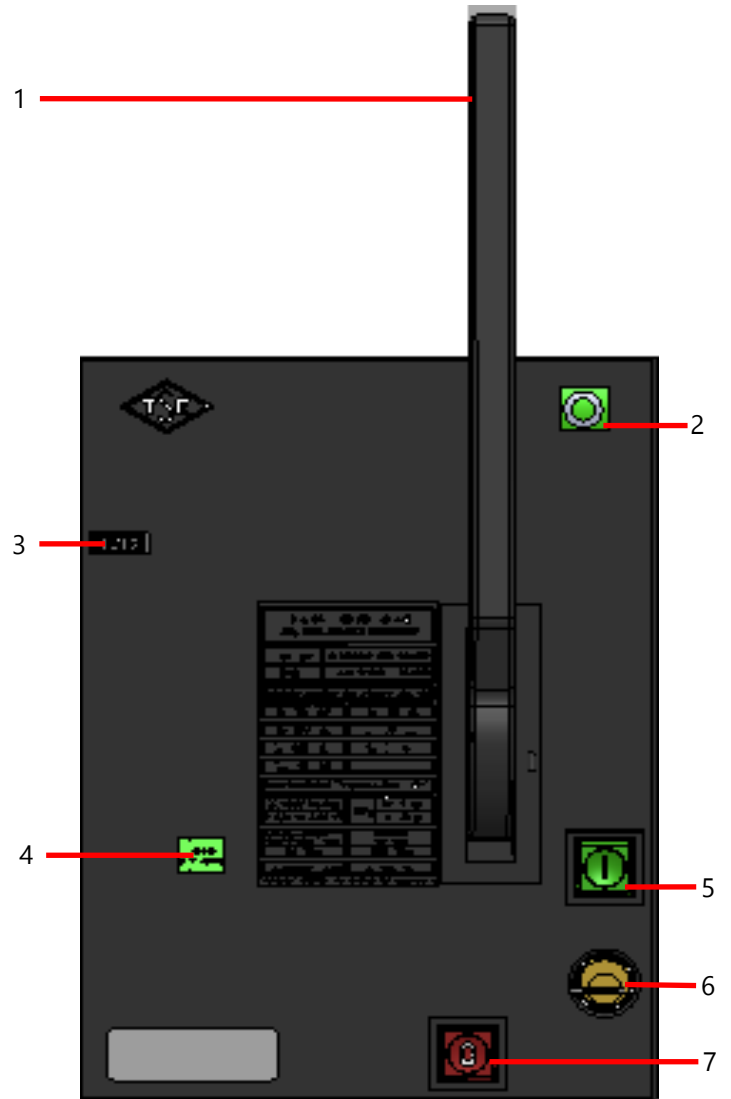


4 - Instructions for Circuit Breaker Operation

4.1 – Operating and signaling components

Caption

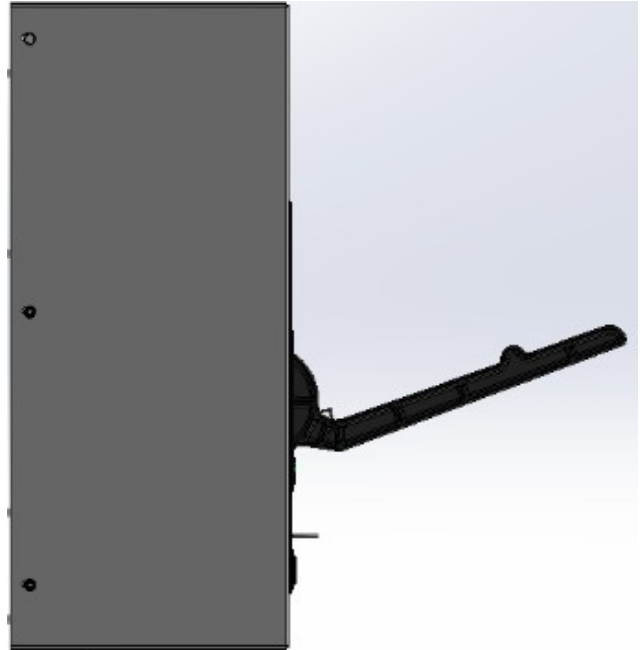
- 1 Lever for manual closing spring charging
- 2 Signaling device for circuit breaker open/closed
- 3 Operation counter
- 4 Signaling device for closing spring charged/discharged
- 5 Closing pushbutton
- 6 Mechanical lock
- 7 Opening pushbutton



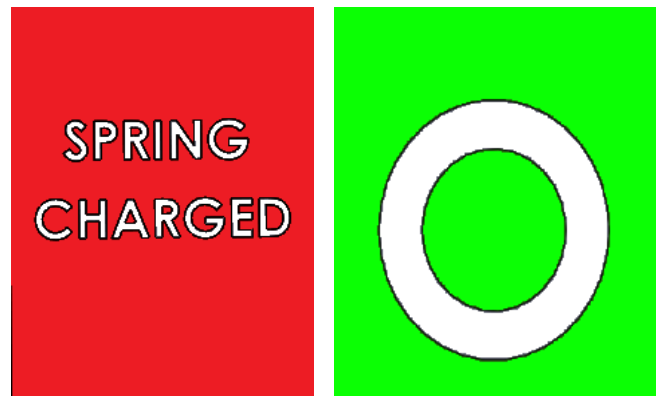
4.2 – Closing and opening operations

Spring Charging:

The closing spring can be charged by moving the handle up and down. Charging operation can be stopped when the operator hears a distinct `CLICK` sound.

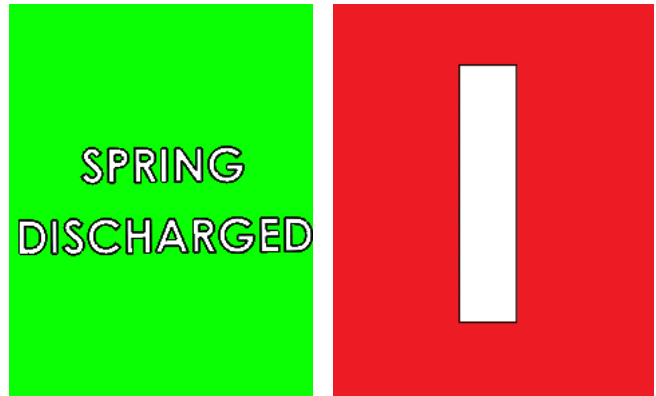


After charging the closing spring for the first time, signaling device for circuit breaker open/closed and spring charged/discharged should look like the following:



Closing:

After charging the closing spring, operator can press the green pushbutton to close the circuit breaker. Signaling device for circuit breaker open/closed and spring charged/discharged should look like the following after



Opening:

After closing the circuit breaker, operator can press the red pushbutton to open the circuit breaker. Signaling device for circuit breaker open/closed and spring charged/discharged should look like the following after



Remote operation:

Circuit breaker can be opened / closed remotely by the use of closing / opening coils. Closing spring charging mechanism will charge the spring as soon as auxiliary supply is present. It will recharge the closing spring immediately when the circuit breaker is closed.

4.3 – Locking

The circuit breaker can be locked in `OPEN` position to prevent unauthorized closing operation.

To lock the circuit breaker;

- ⇒ Make sure circuit is in `OPEN` position
- ⇒ Then simply turn the key and remove it from the mechanism.

The circuit breaker is now safely locked in `OPEN`



5 - Maintenance of Circuit Breaker

5.1 – Safety information

The following operations shall be done by authorized staff following the related safety standards.

Before doing any type of maintenance on the circuit breaker

1. Open the circuit breaker
2. Turn off the auxiliary voltage supply
3. Close then open the circuit breaker to release the energy from charged closing spring
4. Lock the mechanism with mechanical lock and remove the key from the keyhole

You may remove the mechanism cover and do maintenance on the mechanism. During the maintenance protect the poles of the circuit breaker from any type of impact.

IMESA circuit breakers are designed according to IEC 62271-1 standard for 10.000 operations.

-Circuit breakers should be opened and closed at least once a year.

5.2 – Preventive Maintenance

| Parts to be maintained | Maintenance procedure | Consumables | Equipment |
|---------------------------------|--------------------------|-------------|----------------------------|
| Poles | Remove dust from surface | | |
| Erosion of the arching contacts | Measure the erosion | | Battery, lamp and Avometer |
| Operating mechanism | General cleaning | | Dry lint-free cloth |
| | Greasing | */** | Lubricator and brush |
| Motor charging unit | Greasing | */** | Lubricator and brush |
| Pole transmission system | Remove grease by solvent | | Dry lint-free cloth |

* For bearings: MOBILUX EP2 or Shell Alvina R

** For pins : Mobilith SHC 100

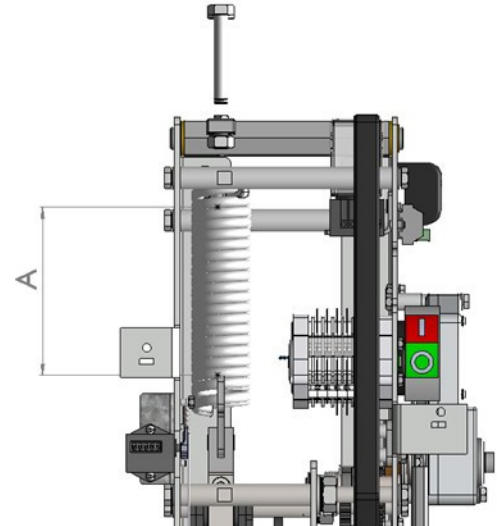
5.3 – Maintenance of poles and periodic control of 'Arc Contacts'

Poles of the circuit breaker should be changed whenever erosion of the contacts reach to the limits given by IMESA. To measure the erosion of the arc contacts please check the green/red label on the chassis. If this color label is completely red, then change the circuit breaker poles with new ones. Please contact IMESA for new poles.

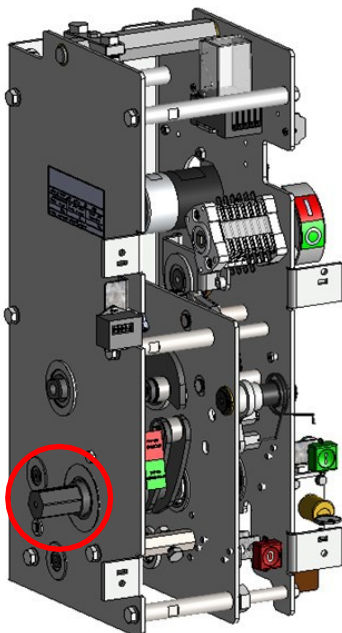
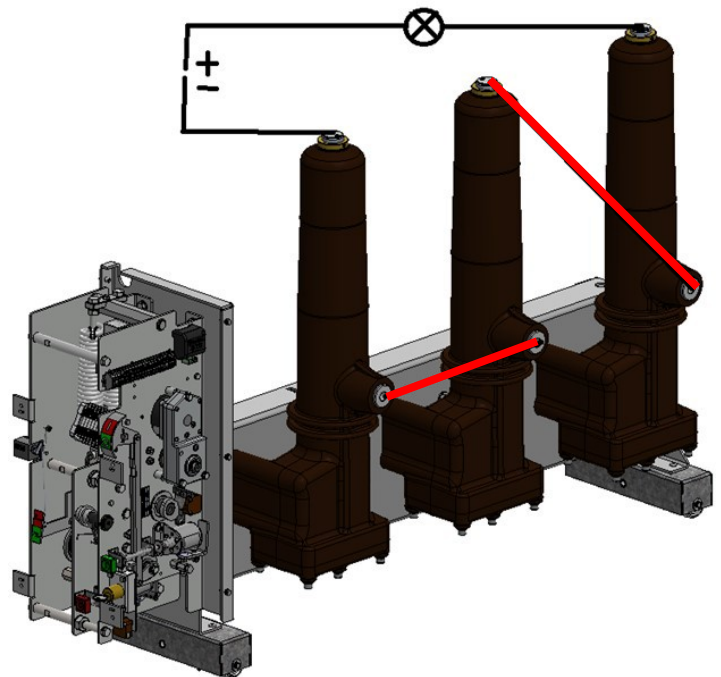
Controlling the erosion of the arcing contacts

To perform this control, do the following first;

1. Open the circuit breaker
2. Turn off the auxiliary voltage supply
3. Close then open the circuit breaker to release the energy from charged closing spring
4. Measure the distance "A" as shown and record the measurement
5. Remove the bolt and remove the closing spring from the mechanism



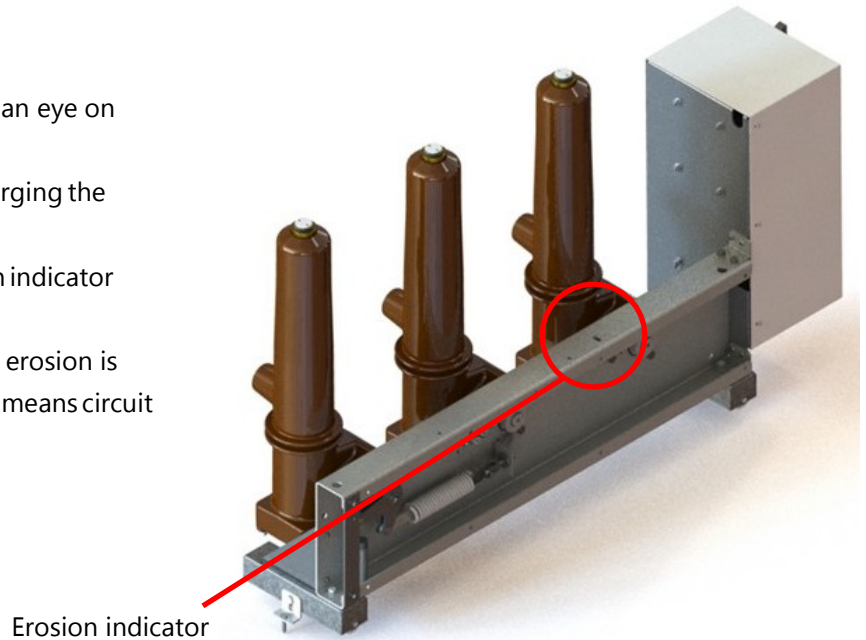
6. Use a 9V battery, a lamp, and cables to connect the poles in series. (Shown right)



7. Move the shaft (shown left) clockwise by using a 17AA spanner until the movement ends.
8. When the movement ends press the closing button and rotate the shaft more. In the mean time use the charging lever to charge the mechanism.

Poles of the circuit breaker should be changed whenever erosion of the contacts reach to the limits given by IMESA. To measure the erosion of the arc contacts please check the green/red label on the chassis. If this color label is completely red, then change the circuit breaker poles with new ones. Please contact IMESA for new poles.


9. During this charging operation keep an eye on the lamp.
10. The moment lamp lights up stop charging the mechanism and hold steady.
11. At this steady state check the erosion indicator located on the chassis.
12. If the indicator is green, it means the erosion is within limits. If the indicator is red, it means circuit breaker poles should be replaced.

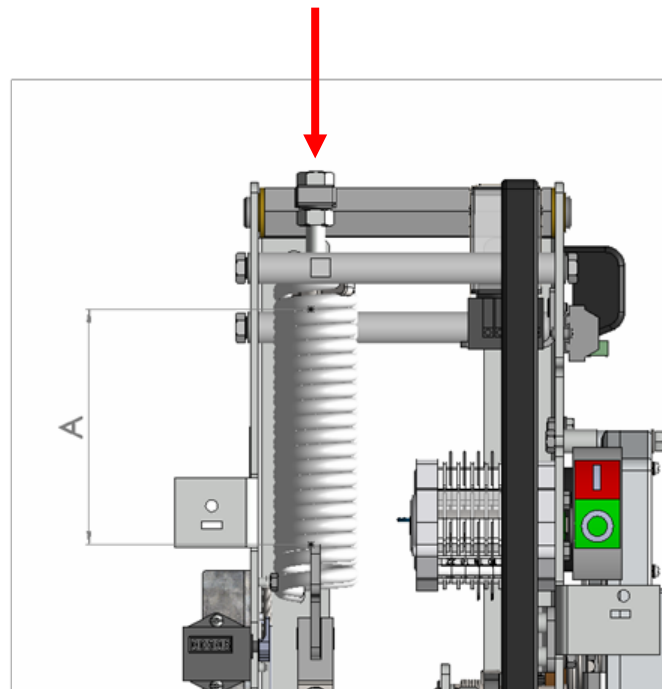


Installing closing spring

After checking the erosion levels of arcing contacts, closing spring must be installed back.

Keep charging the mechanism by the lever until the shaft, which closing spring is connected, is able to move freely. Use that free position and install closing spring. Fasten the bolt until distance "A" is equal to measurement recorded before removing the closing spring.

 Keep in mind this charging of the mechanism will close the circuit breaker and cause opening spring to be charged. After installing the closing spring use the opening button to discharge the opening spring.

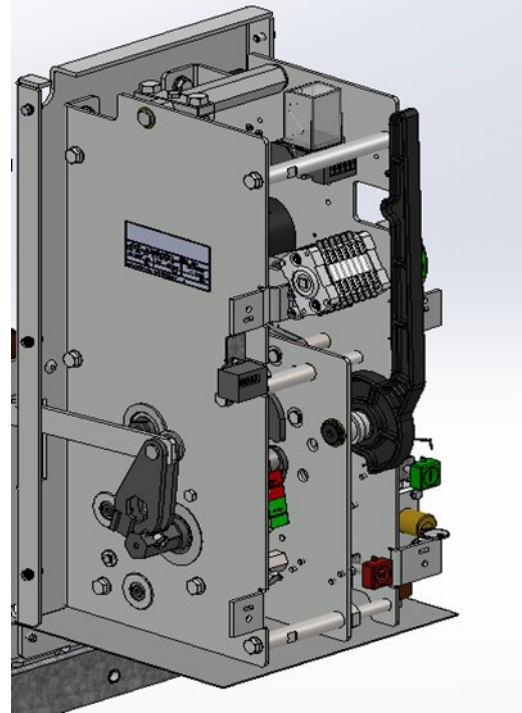


5.4 – Operating Mechanism

Operating mechanism must be kept clean. Operating parts should be greased.

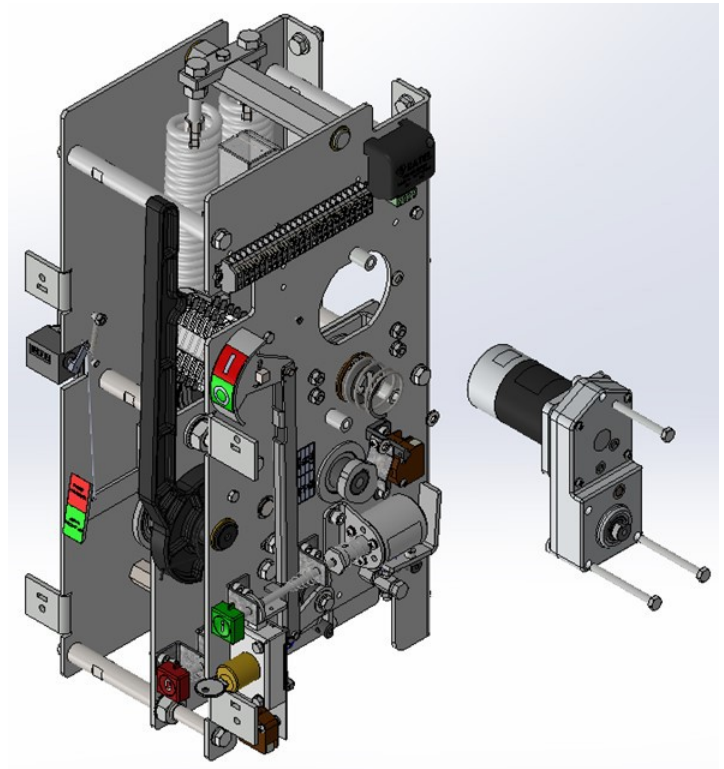
Before greasing the mechanism make sure circuit breaker is in open position and the closing spring is discharged.

Use a brush for greasing the mechanism.



5.5 – Motor Gearbox

Motor gearbox is designed to be maintenance free and does not require any greasing.

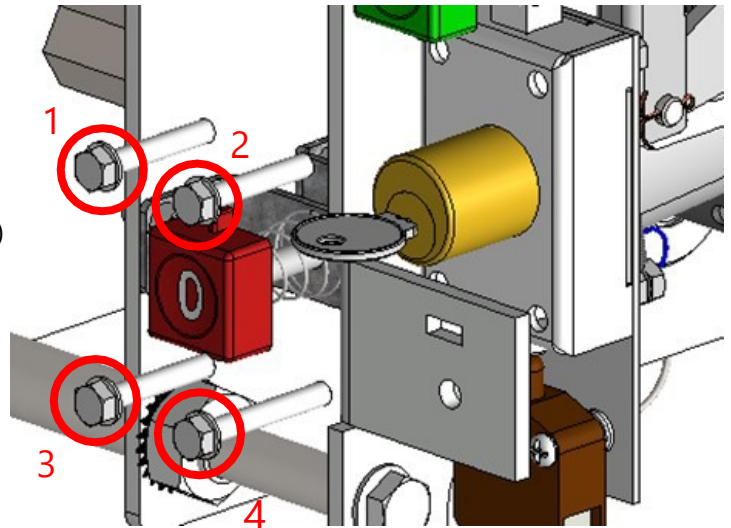


5.6 – Table of replaceable parts

| Part to be replaced | Replaceable by | Replacement period |
|---------------------------|-------------------|---------------------------------|
| Circuit breaker poles | IMESA | After checking erosion contacts |
| Circuit breaker mechanism | IMESA | After 10000 operations |
| Mechanical lock | IMESA or Customer | After faults |
| Closing spring | IMESA or Customer | After faults |
| Opening and closing coils | IMESA or Customer | After faults |
| Spring charging motor | IMESA or Customer | After faults |
| Limit switches | IMESA or Customer | After faults |
| Anti-pumping relay | IMESA or Customer | After faults |
| Rotary switch | IMESA or Customer | After faults |
| Mechanical counter | IMESA or Customer | After 10000 operations |

5.7 – Replacing mechanical lock

To remove mechanical lock make sure closing spring is discharged and circuit breaker is in open position, then remove 4 bolts (M5x30) (shown right) fixing the mechanical lock to the mechanism. While installing the bolts back, make sure to connect the spring back to its original place on bolt number 4.

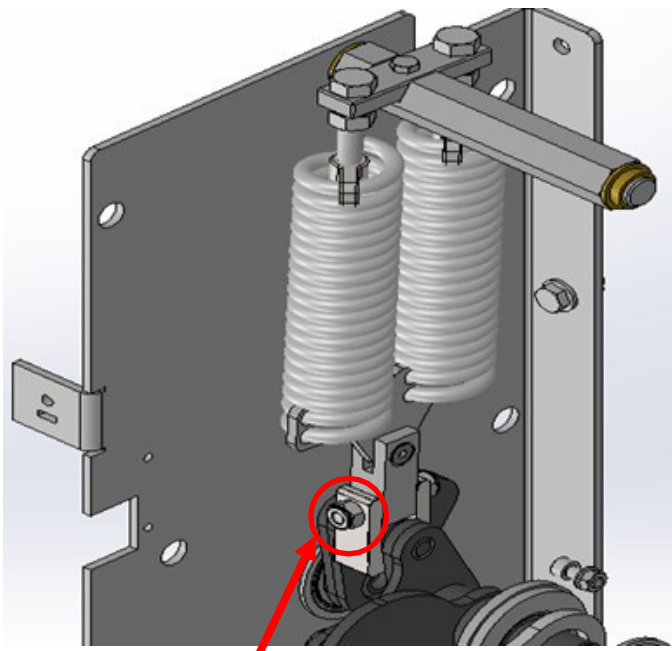
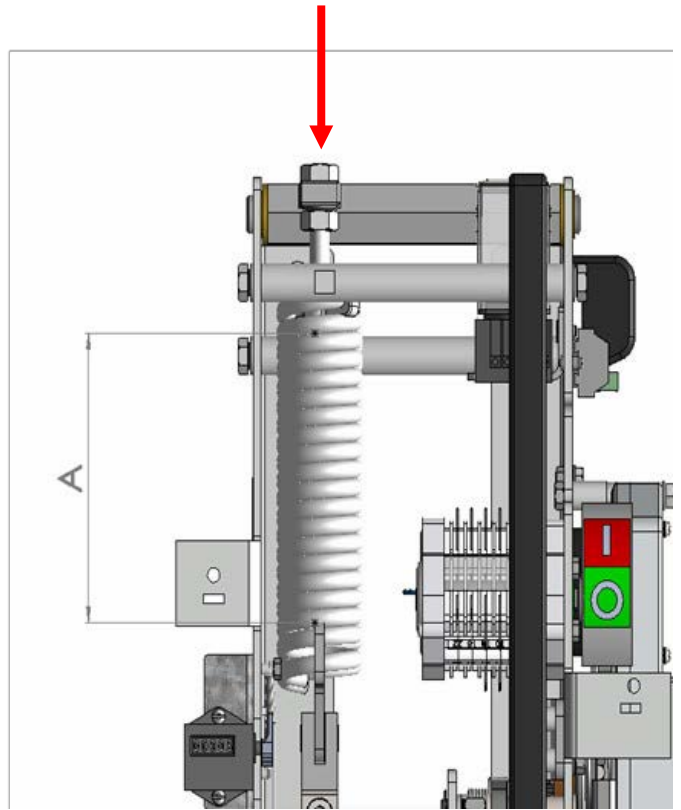


5.8 – Replacing closing spring

Before replacing closing spring make sure circuit breaker is in open position and the closing spring is discharged.

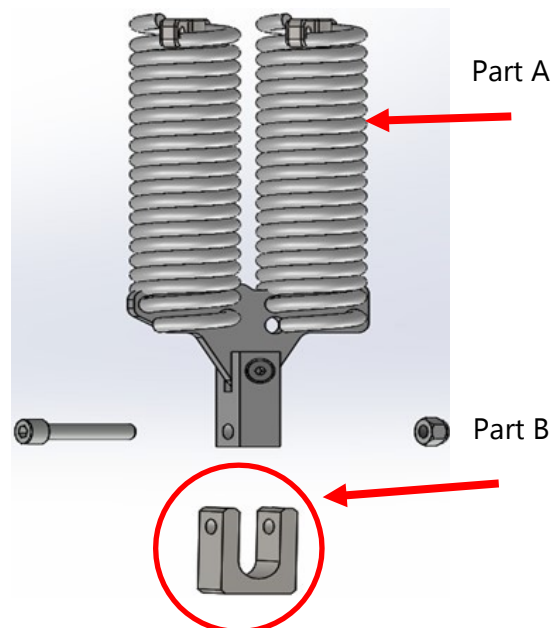
Measure the distance "A" before removing the closing spring and record it.

Remove the bolts (shown right) and release the closing spring.



M8x40 Bolt

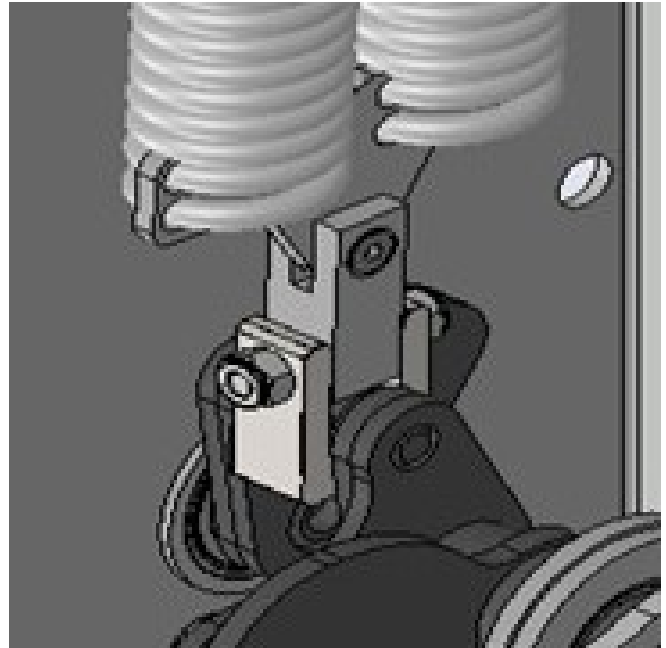
Remove the M8x40 bolt securing the spring assembly to the shaft.. (Shown left)



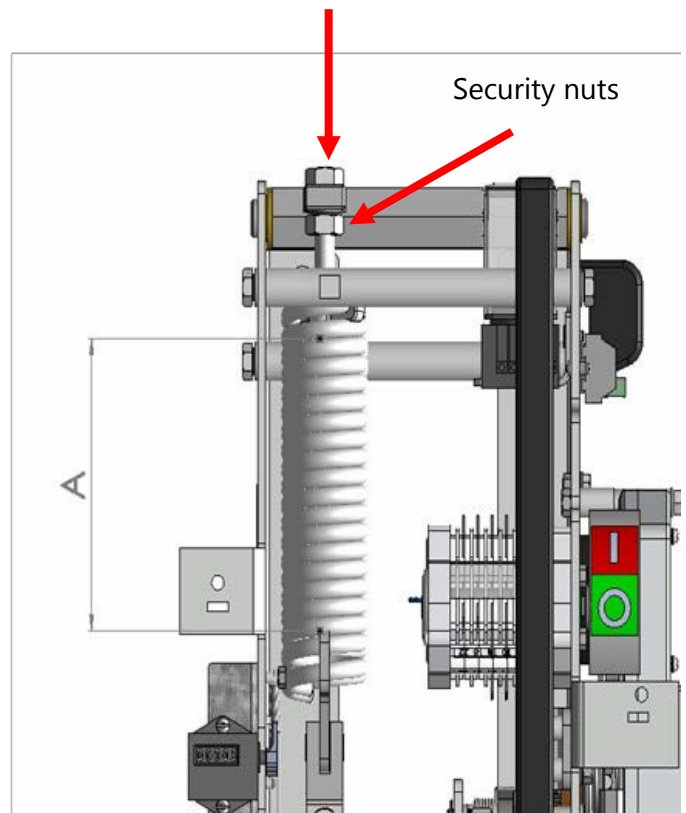
Replace the part A with a new one and reuse part B.

Connect part B and part A on to the shaft then tighten the M8x40 bolt.

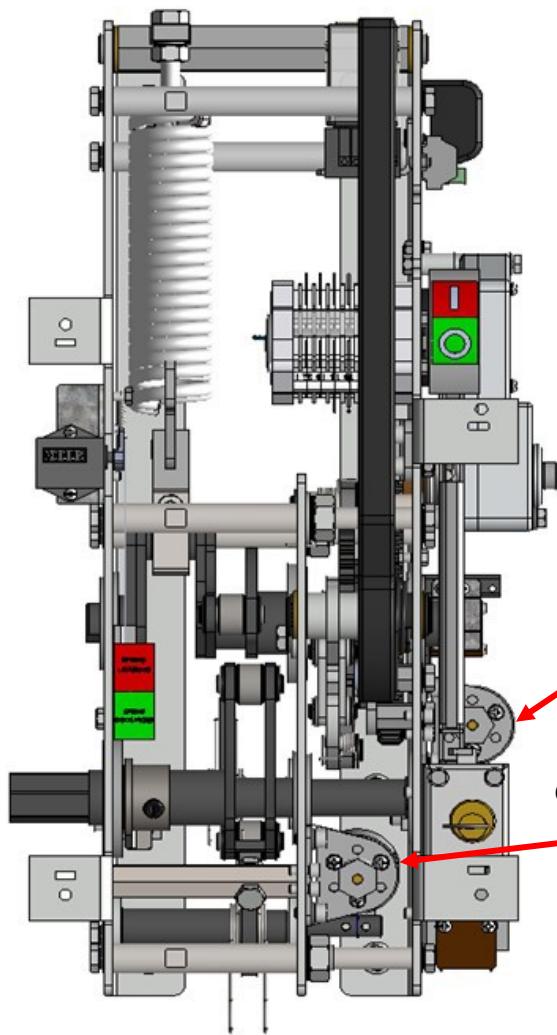
During this or while tightening the bolts on the top of the closing spring, shaft may lock in position. To release the shaft simply press the closing button and move the shaft then release the closing button.



Connect the bolts (shown right) to the closing spring and tighten them until distance "A" is equal to the measurement done before changing the closing spring and secure the bolts in place by tightening the nuts.



5.9 – Replacing opening and closing coils



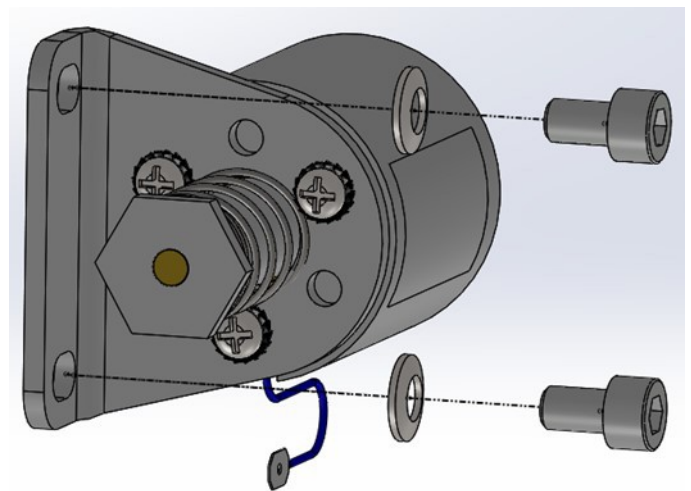
There is one opening and one closing coil on the circuit breaker mechanism.

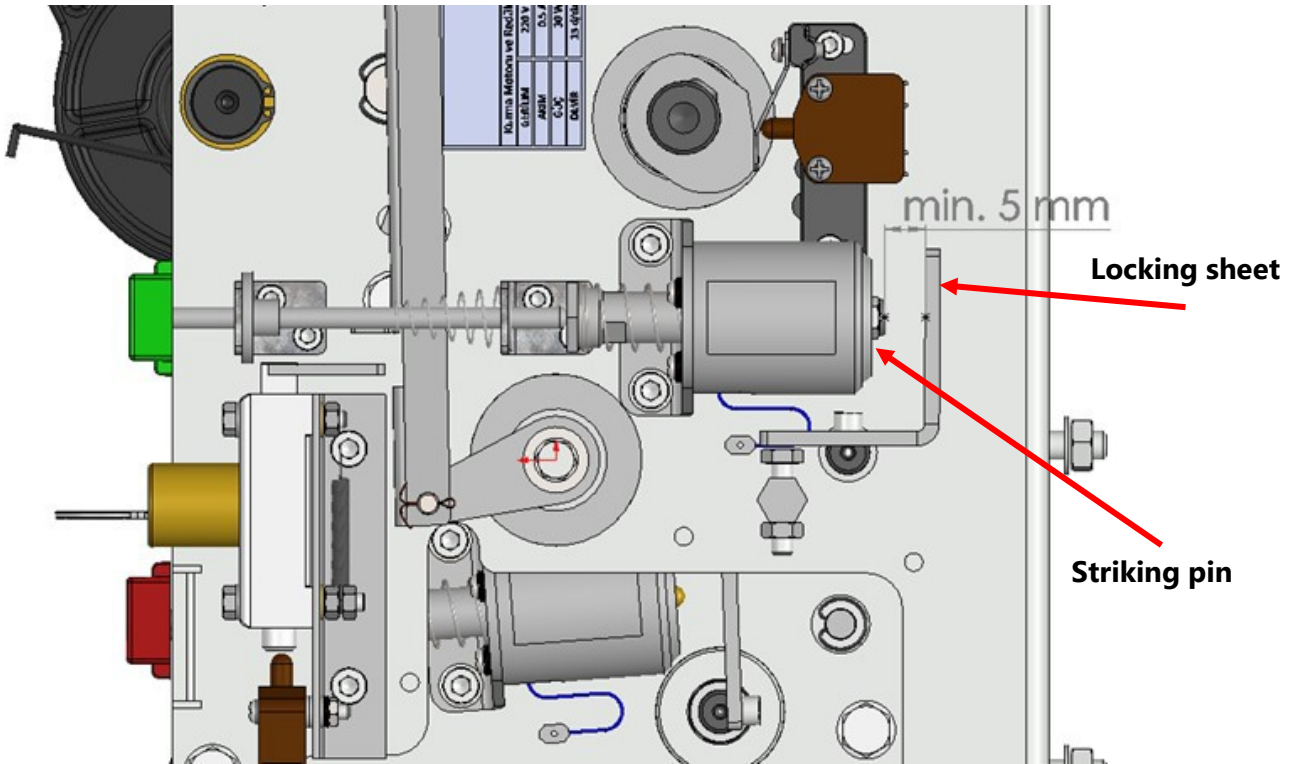
Closing coil

Opening coil

To replace the coils,

- 1) Mark the cables connected to coils and disconnect them
- 2) Remove 2 M6 bolts securing the coils to mechanism.
- 3)



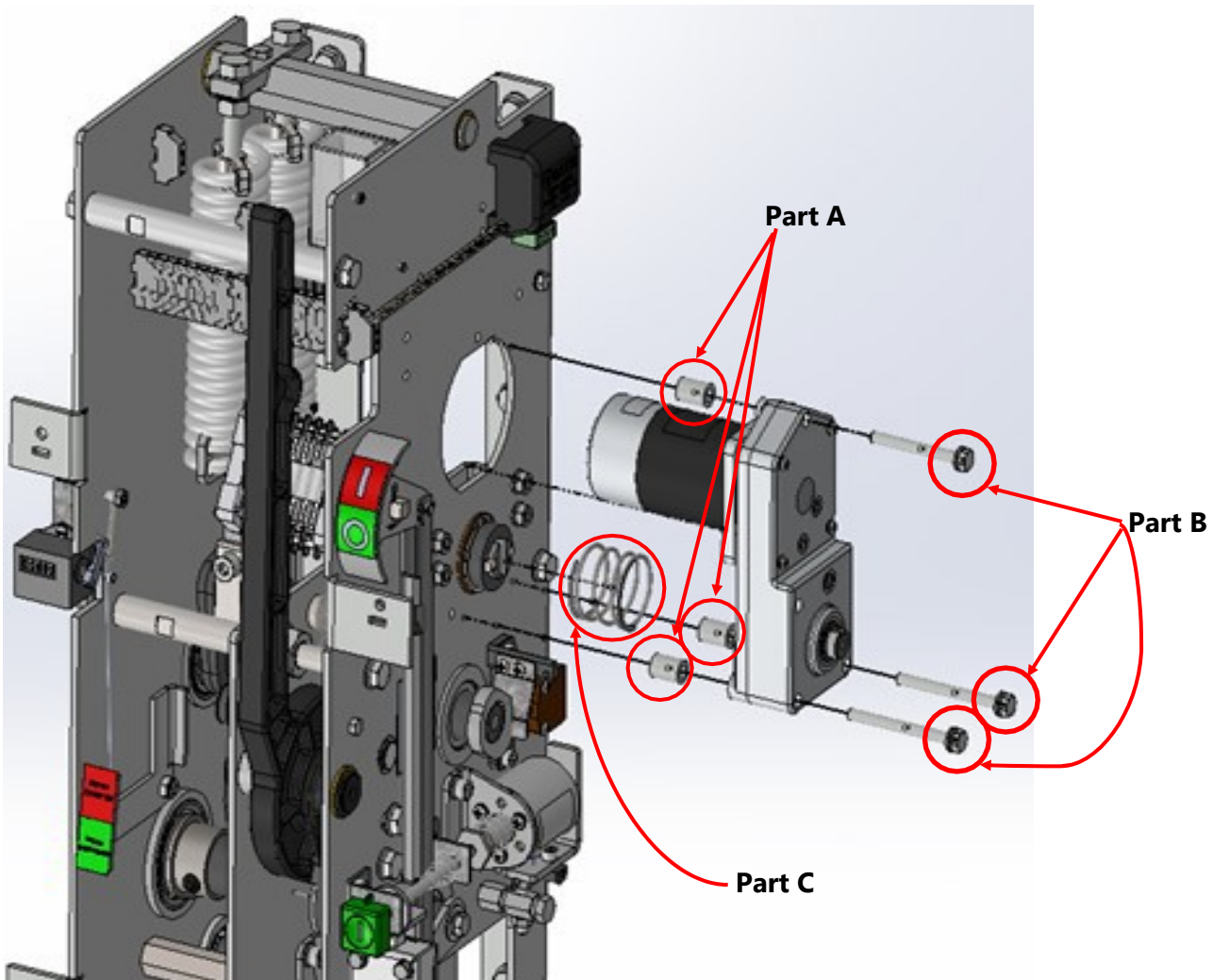


While installing the new coils to mechanism make sure there is minimum 5mm distance between the striking pin of the coil and locking sheet.

Use the removed M6 bolts to secure the coils back into the mechanism.

5.10 – Replacing charging motor

Before replacing the charging motor make sure auxiliary voltage is disconnected, closing spring is discharged, and circuit breaker is in open position.

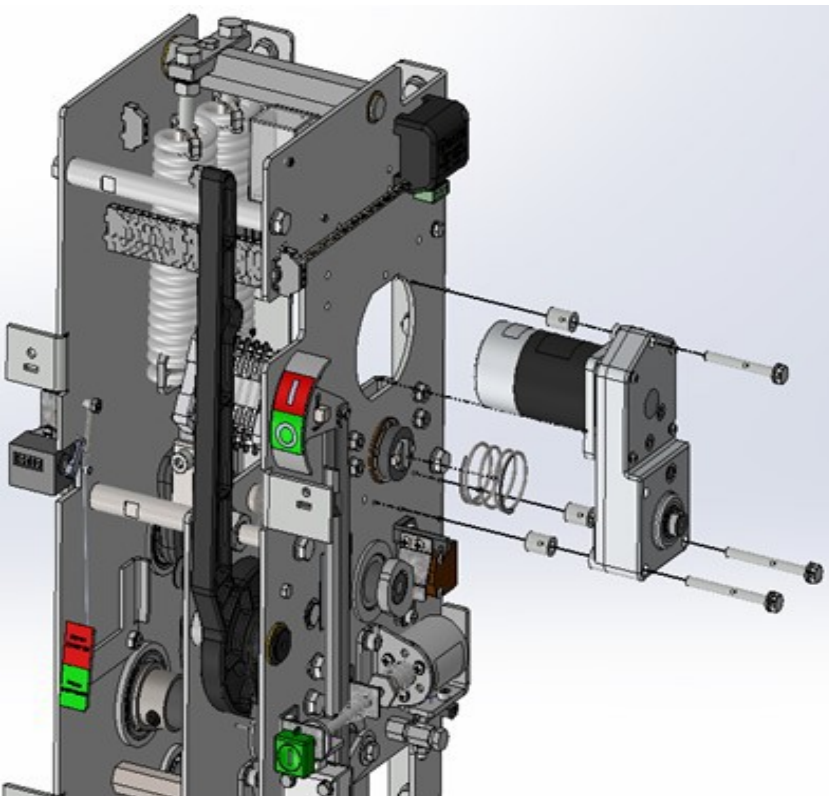
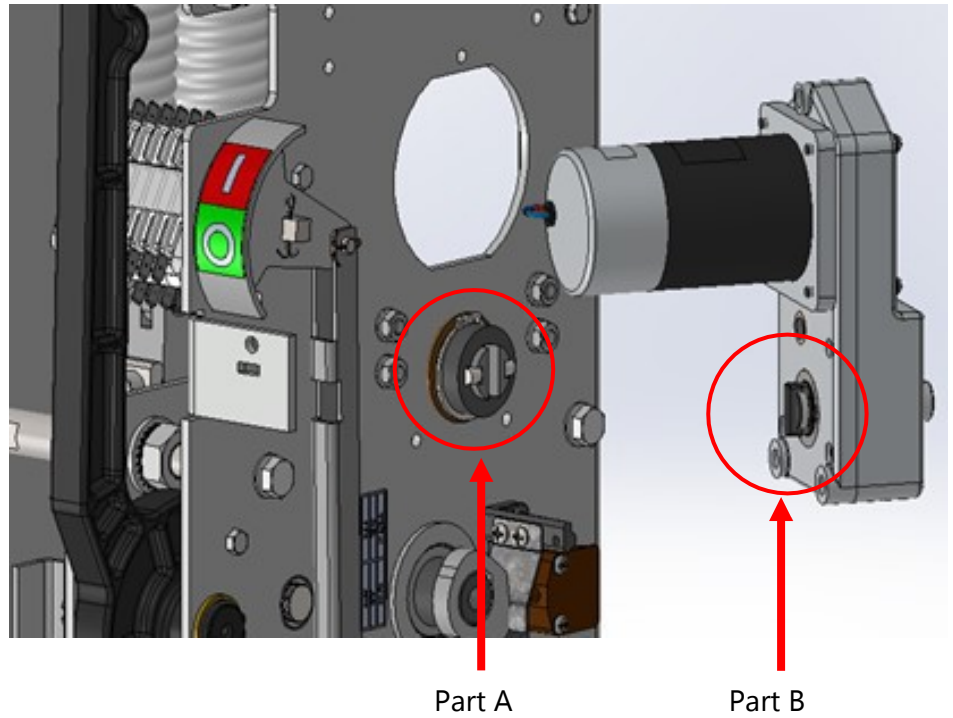


To replace the motor,

- 1) Mark the cables connected to motor and disconnect them
- 2) Remove 3 pieces of M6 bolts (part B) securing the motor to mechanism Be careful not to lose any bushes (part A) while removing the bolts.
- 3) Remove the motor from mechanism completely and make sure spring (part C) is not lost.

Before installing the new motor make sure wedged transmission shaft (part A) and Part B are parallel to each other. (Shown right)

If they are not parallel to each other use the charging lever to rotate the transmission shaft.



To install the motor,

- 1) Install the spring back on the wedged transmission shaft.
- 2) Use the bushes and M6 bolts to secure the motor to mechanism
- 3) Connect the marked cables to new motor

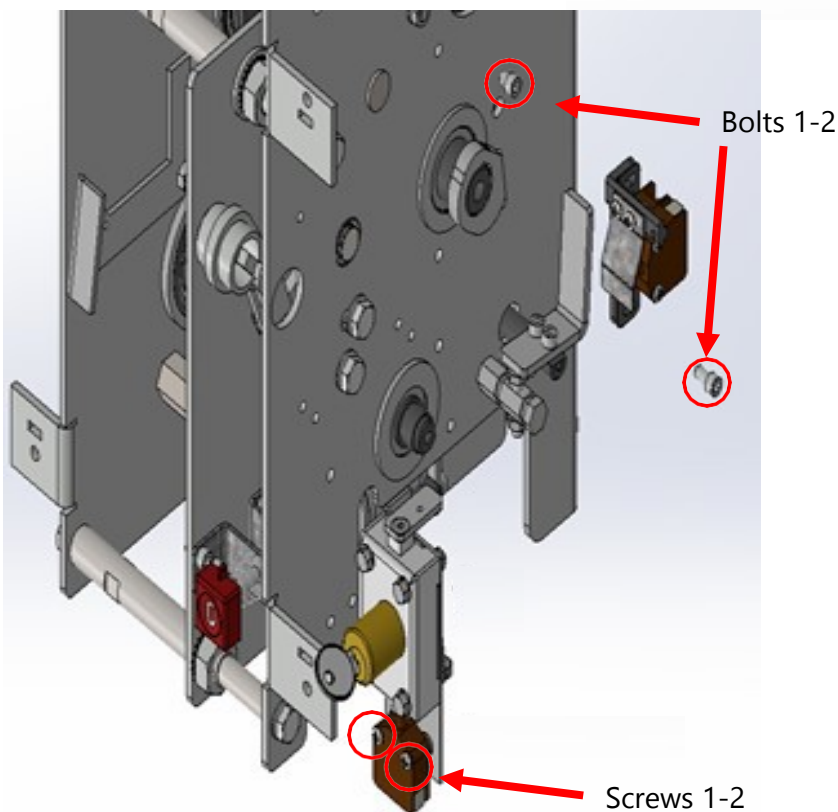
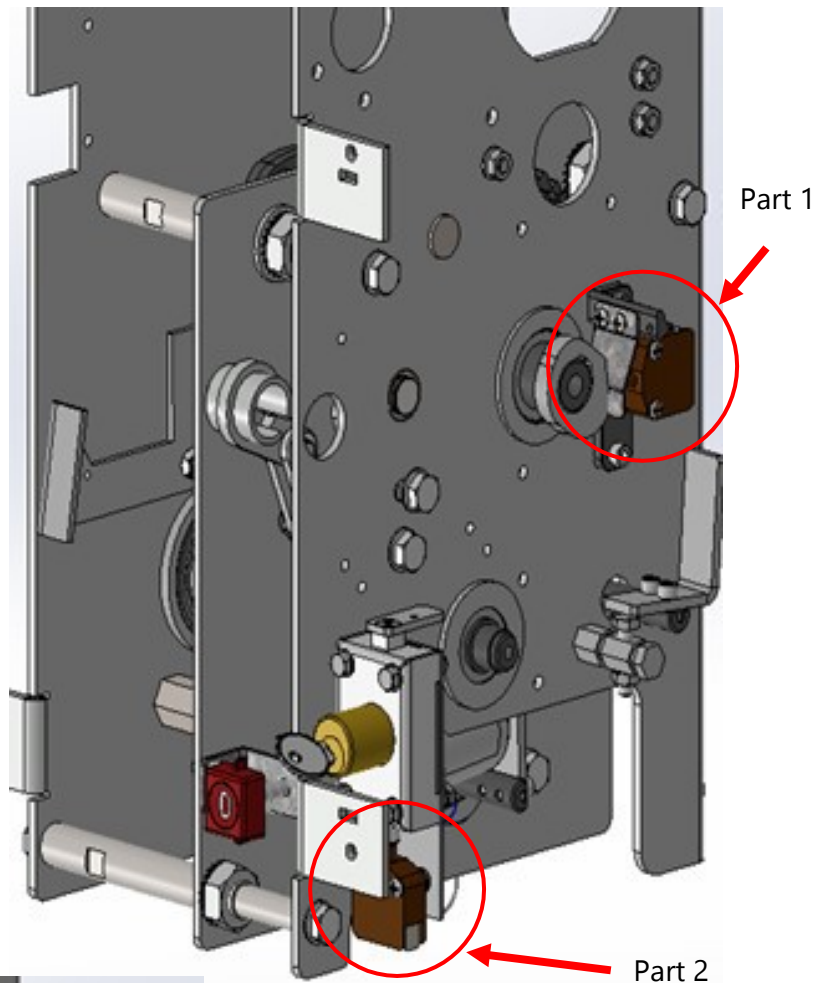
5.11 – Replacing limit switches

There is a total of 3 limit switches on the mechanism, two located on the charging mechanism (Part 1) and one in mechanical lock (Part 2).

Before changing the switches makes sure to mark every cable and remove them.

Limit switch on the mechanical lock (Part 2) can be replaced by removing the screws securing it to the mechanical lock (Screws 1-2)..

To replace charging system limit switches closing coil must be removed. After removing closing coil remove bolts 1-2 and replace the limit switch assembly.



5.12 – Replacing anti-pumping relay

Anti-pumping relay assembly consists of three pieces;

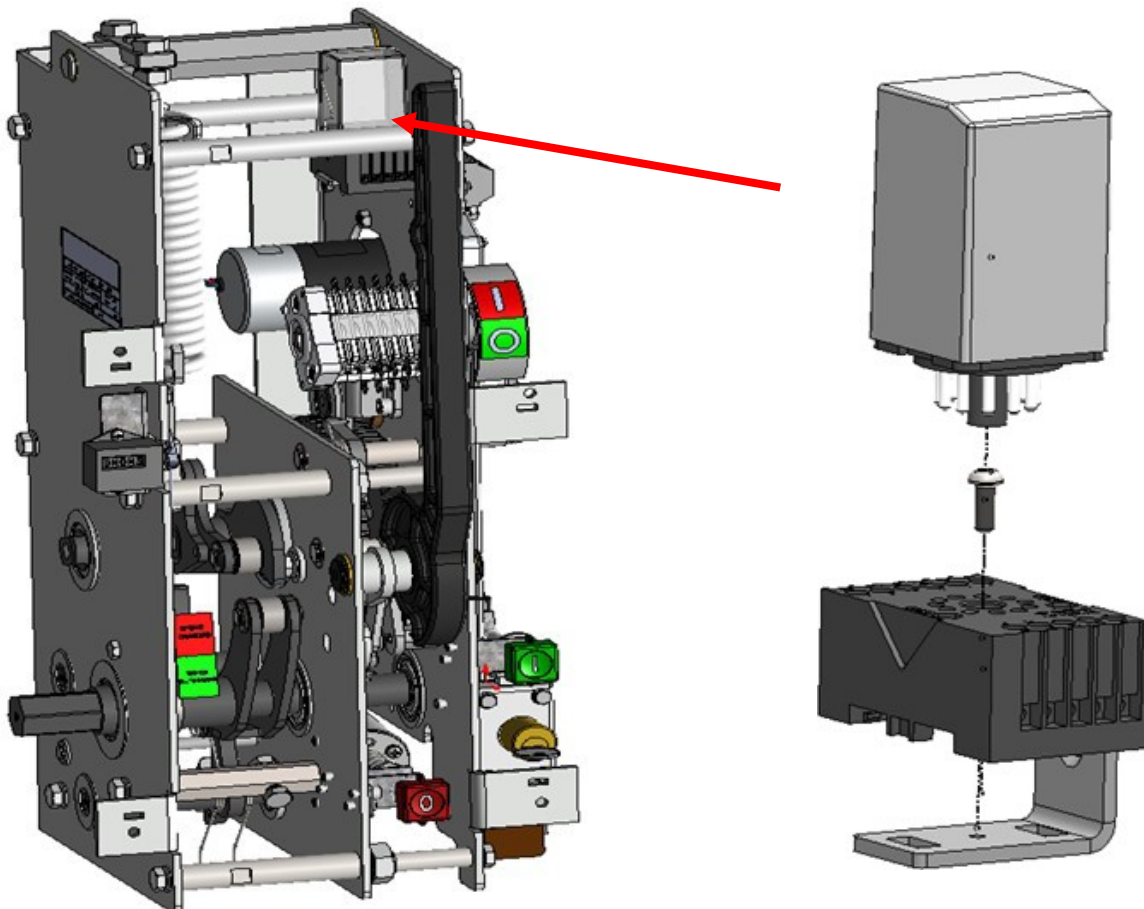
- 1) Relay
- 2) Relay Socket
- 3) Relay Hold-Down Spring

To replace the relay,

- 1) Remove relay hold-down spring
- 2) Remove relay from socket
- 3) Place the new relay into the socket

To replace the relay,

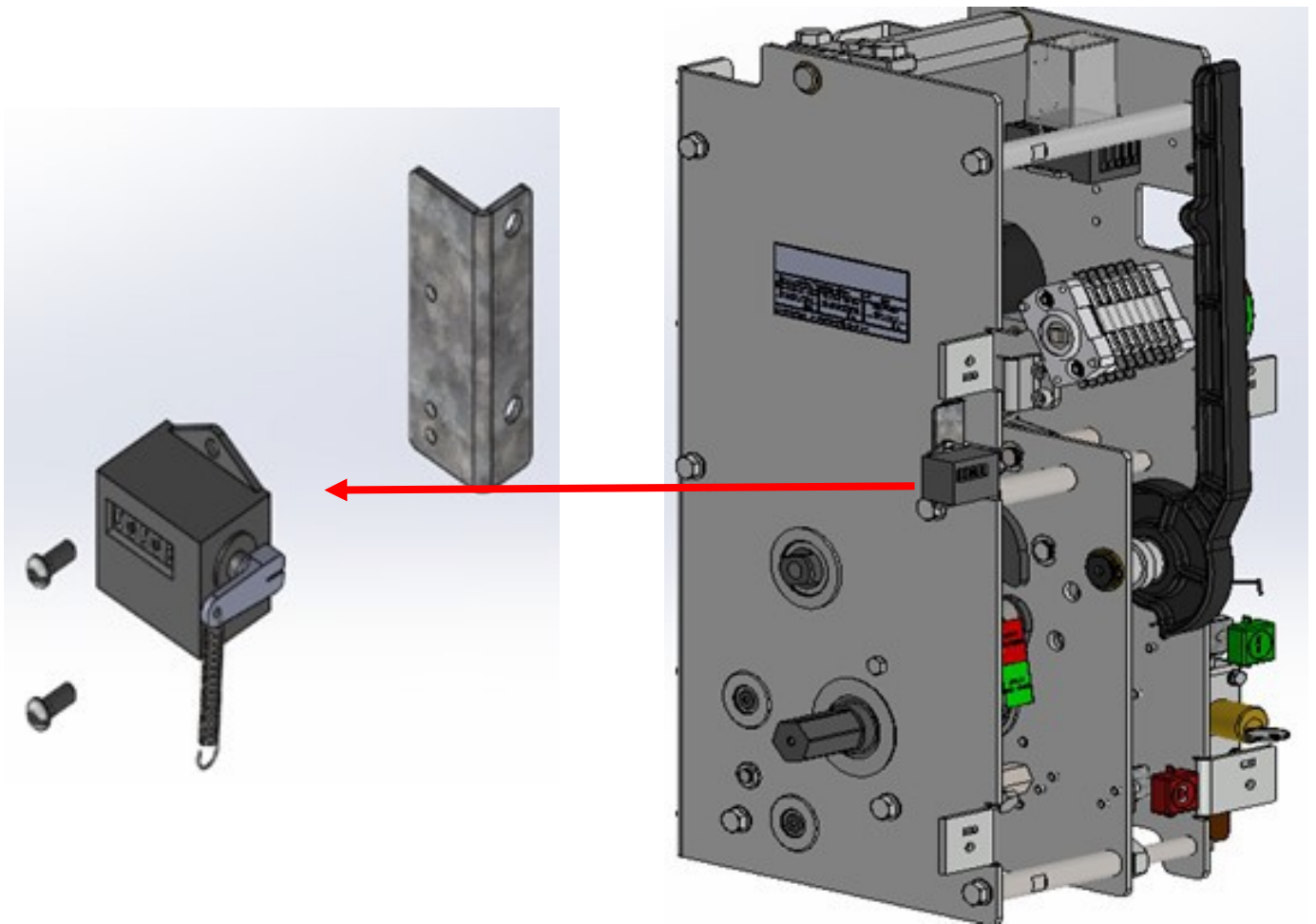
- 1) Remove relay hold-down spring
- 2) Remove relay from socket
- 3) Remove cables from socket
- 4) Remove the bolt located in the middle of the socket
- 5) Install new socket and connect cables back to correct addresses.
- 6) Install relay then hold-down spring.



5.13 – Replacing mechanical counter

To replace the mechanical counter,

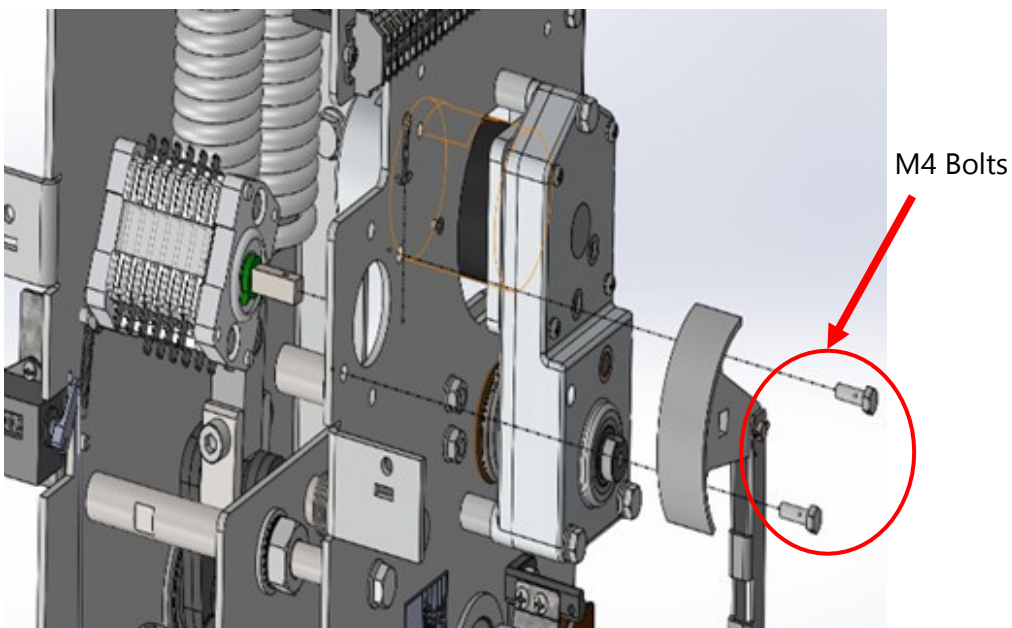
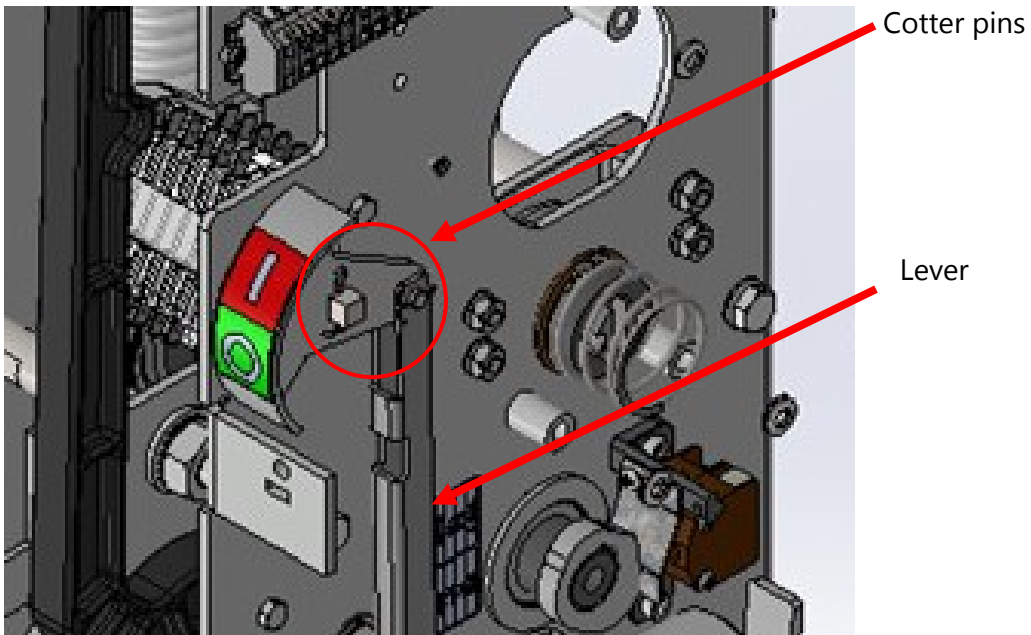
- 1) Remove the metal wire that is connected to the spring on the counter
- 2) Remove 2 M4 bolts that are securing the counter to metal support
- 3) Install new counter to the same support and secure it by using 2 M4 bolts.
- 4) Connect the metal wire to the spring on the spring on the counter.



5.14 – Replacing auxiliary switch

To replace the auxiliary switch,

- 1) Disconnect all the cables from auxiliary switch.
- 2) Remove the cotter pins (split pins) from both lever and indicator.
- 3) Push the pin on the lever and remove indicator.
- 4) Remove 2 M4 bolts securing the auxiliary switch to mechanism.
- 5) To reinstall the auxiliary switch follow these steps in reverse.

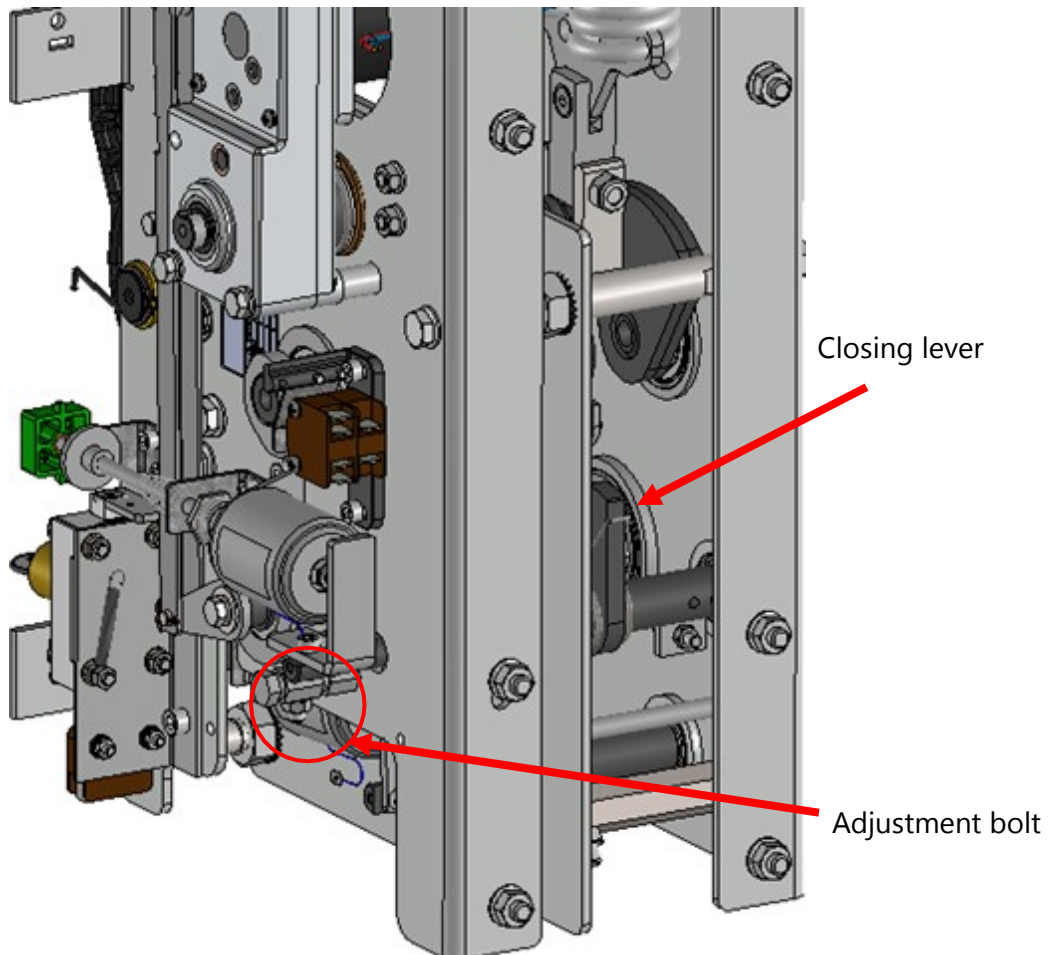


5.15 – Adjustments for closing lever

Normally during charging, when the closing spring reaches to dead point, cam follower on the cam sits on the closing lever. If it's not the case closing lever requires some adjustments.

To make this adjustment, bolt below the locking sheet should be loosened or fastened according to cam follower's position.

After this adjustment charge the closing coil and check whether the cam follower sits on the closing lever. If the position is correct use the security nut to fix the position of the closing lever.

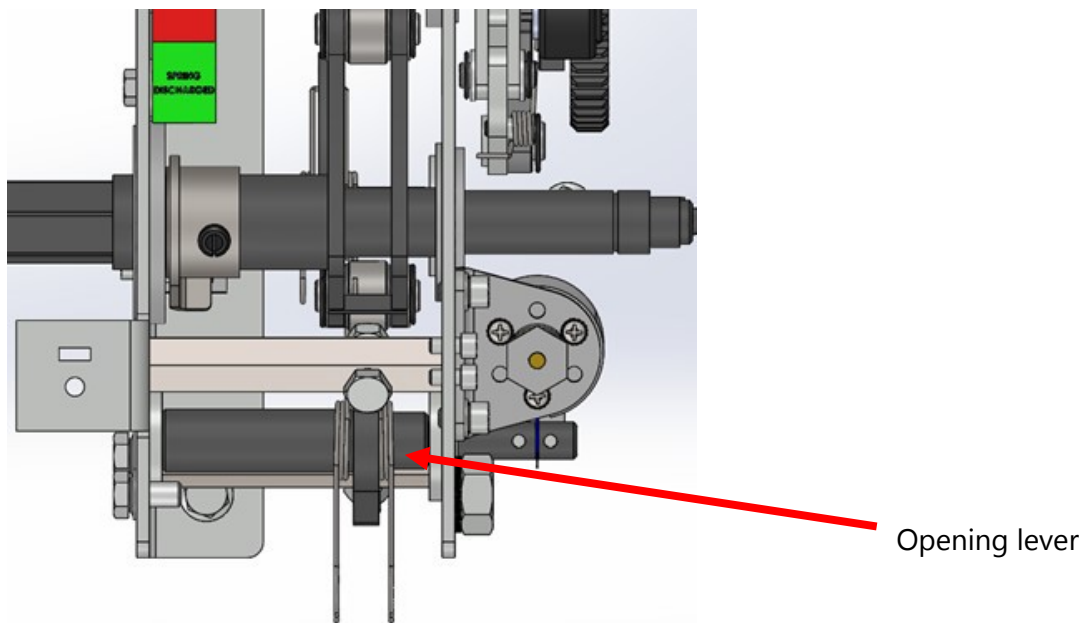
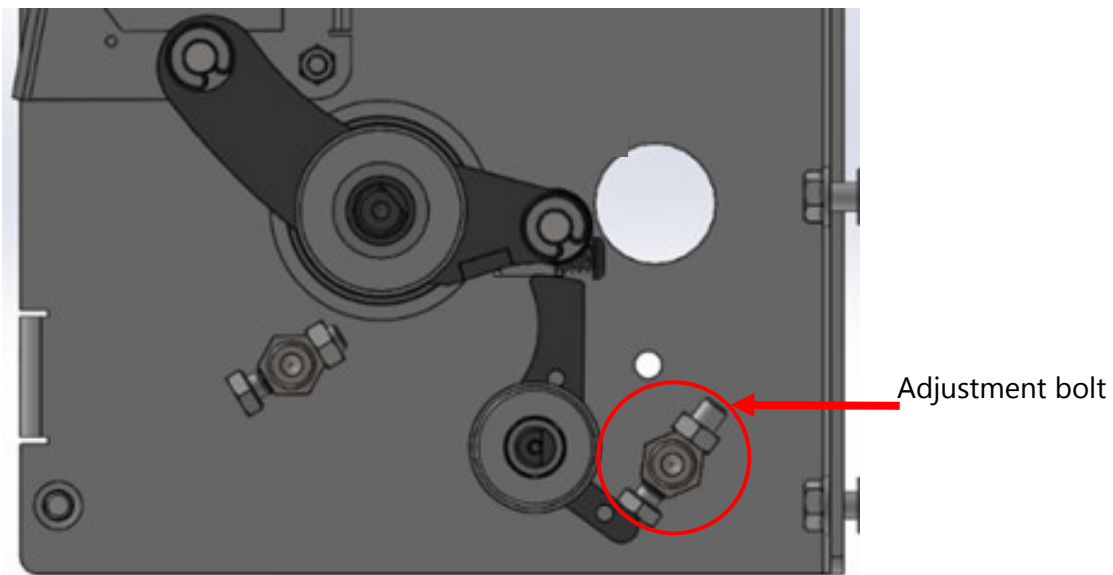


5.16 – Adjustments for opening lever

After closing operation cam follower on the transmission shaft should sit on tripping lever. During opening operation, tripping lever moves and cam follower is freed from lever and circuit breaker is opened. If the cam follower does not sit on the lever, opening lever should be adjusted.

To make this adjustment, adjustment bolt on the opening lever should be loosened or fastened according to cam follower's position.

After this adjustment charge the closing coil and check whether the cam follower sits on the closing lever. If the posi-



GENERAL WARRANTY TERMS AND CONDITIONS

1. This Warranty covers the defects resulting from defective parts, materials or manufacturing, if such defects are revealed during the period of 24 months since the date of purchase.
2. If the goods malfunctioned while still covered by the warranty period, time spent in service center is added to warranty period.
3. In the following situations,
 - The goods showed same defect twice or more times or showed different defects four or more times in one year under warranty period
 - Maximum time for repairs is exceeded
 - The service center is not available and/or repairs are not possible
 - The goods will be replaced by new ones.
4. The warranty does not cover damages due to the user's fault or lack of knowledge



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