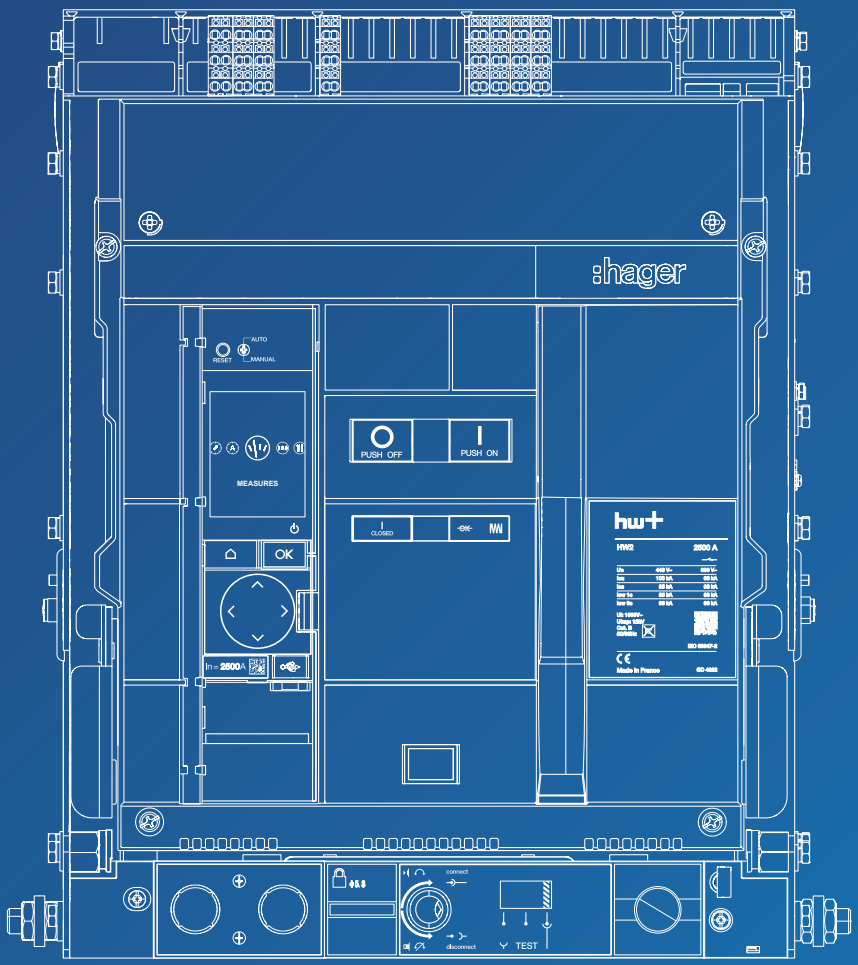
User manual

hw+

Air circuit breaker

HW2 / HW4 / HW6



:hager

Contents

Page

Warnings and instructions

This documentation contains safety advice which must be respected for your own safety and to prevent property damage.
Safety advice relating to your own safety is identified by a safety warning symbol in the documentation. Safety advice relating to damage to property is identified by "ATTENTION".
The safety warning symbols and the wording below are classified according to the risk level.

DANGER

DANGER indicates an imminent dangerous situation which, if not avoided, will result in death or serious injuries.

WARNING

WARNING indicates a potentially dangerous situation which, if not avoided, may result in serious injuries or even death.

CAUTION

CAUTION indicates a potentially dangerous situation which, if not avoided, may result in minor or moderate injuries.

ATTENTION

ATTENTION indicates a warning message relating to equipment damage.
ATTENTION also indicates important instructions for use and particularly relevant information regarding the product, which must be respected to ensure effective and safe use.

Qualified personnel

The product or the system described in this documentation must be installed, operated and maintained by qualified personnel only. Hager Electro accepts no responsibility regarding the consequences of this equipment being used by unqualified personnel.
Qualified personnel are those people who have the necessary skills and knowledge for building, operating and installing electrical equipment, and who have received training enabling them to identify and avoid the risks incurred.

Appropriate use of Hager products

Hager products are designed to be used only for the applications described in the catalogues and in the technical documentation relating to them. If products and components from other manufacturers are used, they must be recommended or approved by Hager.
Appropriate use of Hager products during transport, storage, installation, assembly, commissioning, operation and maintenance is required to guarantee problem-free operation in complete safety.
The permissible ambient conditions must be respected. The information contained in the technical documentation must be respected.

Publication liability

The contents of this documentation have been reviewed in order to ensure that the information is correct at the time of publication.
Hager cannot, however, guarantee the accuracy of all the information contained in this documentation. Hager assumes no responsibility for printing errors and any damage they may cause.
Hager reserves the right to make the necessary corrections and modifications to subsequent versions.

Purpose of the document.

This manual is designed to provide users, electricians, panel builders and maintenance personnel with the technical information required to use the HW2, HW4 and HW6 circuit breakers with electronic trip units.

Field of application

This document is applicable to the HW2, HW4 and HW6 circuit breakers of the hw+ range.

Revisions

Version	Date
6LE009210Ac	May 2024

Documents to consult

Document	Reference
Installation manual for HW2 / HW4 / HW6 air circuit breakers	6LE009206A
HW2 / HW4 / HW6 user maintenance guide	6LE009217A
User manual for sentinel hw+ electronic trip units	6LE007969A
User manual for sentinel Energy hw+ electronic trip units	6LE008147A
sentinel Energy Modbus communication guide	6LE007964A
HTD210H panel display user guide	6LE002999A

You can download these publications and other technical information from our website: www.hager.com

Contact

Address	Hager Electro SAS 132 Boulevard d'Europe 67215 Obernai France
Phone	+ 33 (0)3 88 49 50 50
Website	www.hager.com

The HW2, HW and HW6 circuit breakers have the following elements on the front.

① Charging handle

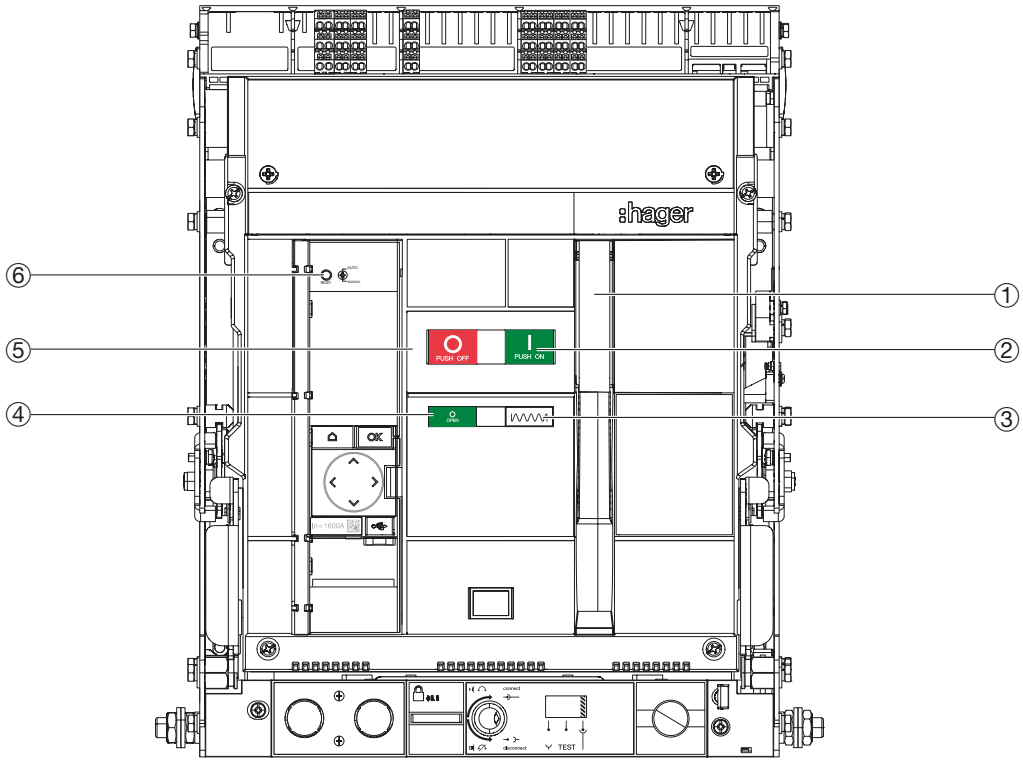
② Closing push button

③ Closing spring status indicator

④ Contact opening and closing indicator

⑤ Opening push button

⑥ RESET re-arm button



Status indicators

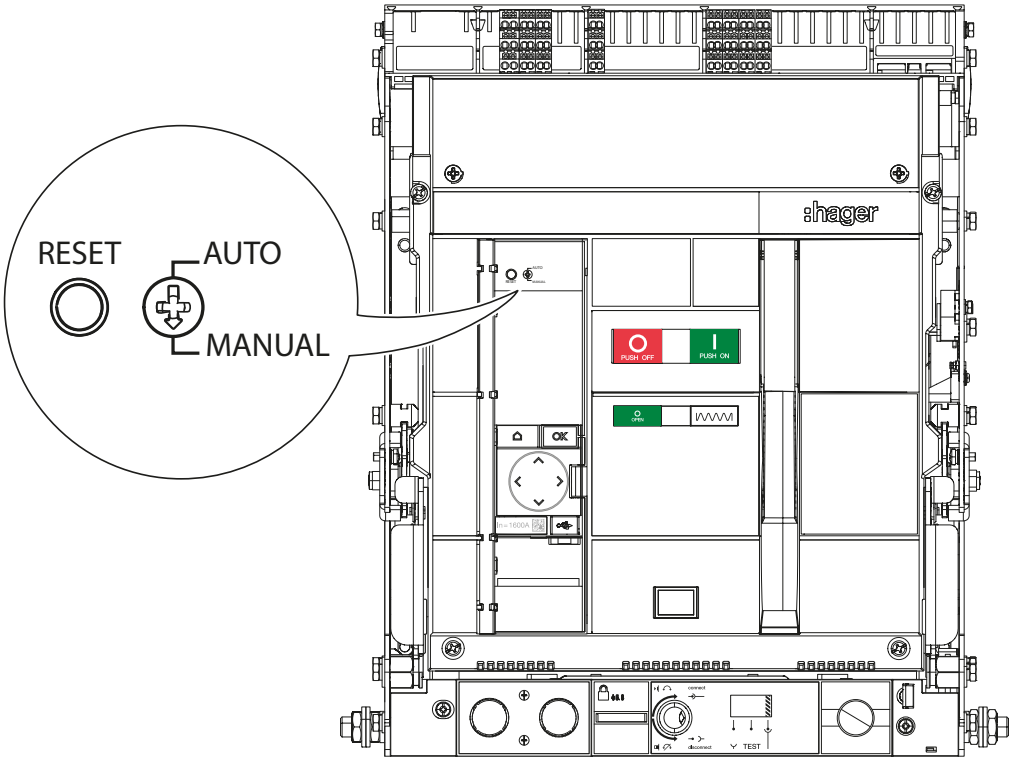
The combination of the two indicators shows the status of the circuit breaker.

Opening and closing indicator	Closing spring status indicator	Circuit breaker status
O OPEN		Circuit breaker open. Closing spring discharged.
O OPEN	~~OK~~	Circuit breaker open. Closing spring loaded but not ready to close because: • Following tripping, the circuit breaker has not been reset (see Chapter 07 Closing the circuit breaker after tripping). • The circuit breaker is mechanically locked in the open position using a lock or padlock.
O OPEN	OK	Circuit breaker open. Closing spring charged. The circuit breaker is ready to be closed.
I CLOSED		Circuit breaker closed. Closing spring discharged.
I CLOSED	~~OK~~	Circuit breaker closed. Closing spring charged.

RESET re-arm button

The RESET re-arm button is used to reset the circuit breaker after tripping (see Chapter 07 Closing the circuit breaker after tripping).

The operation of the RESET re-arm button depends on the Auto or Manual mode set using the adjustment dial on the right.



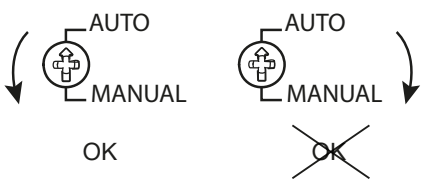
- **Auto mode**, in which it is not necessary to press the RESET re-arm button before closing the circuit breaker again after tripping.
  This mode is usually used if the circuit breaker is remotely monitored, as it can be closed without requiring a person to perform the action on-site.

- **Manual mode**, in which the RESET re-arm button must be pressed in before closing the circuit breaker again after tripping.

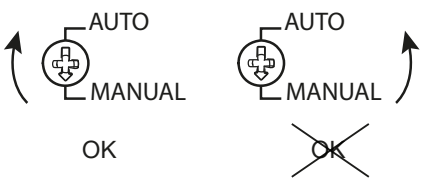
ATTENTION

Risk of property damage

To switch from Auto to Manual mode, always turn the dial **anti-clockwise**.



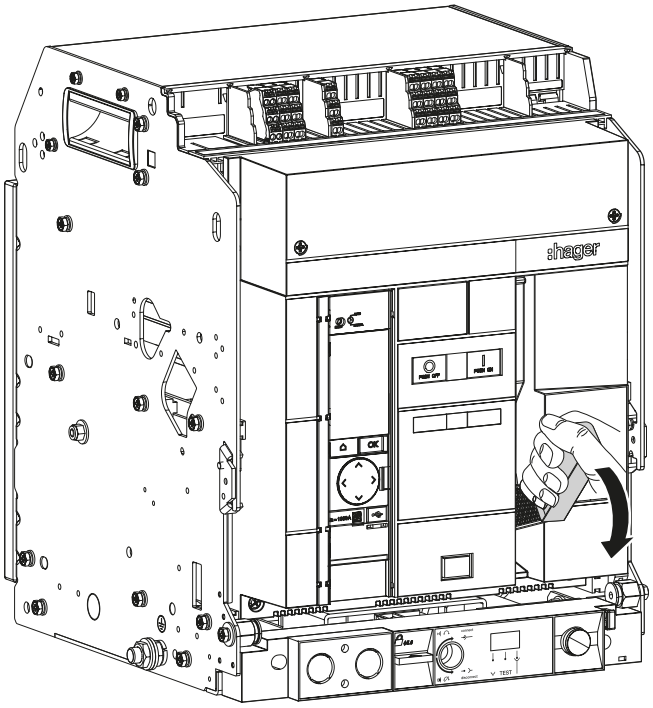
To switch from Manual to Auto mode, always turn the dial **clockwise**.



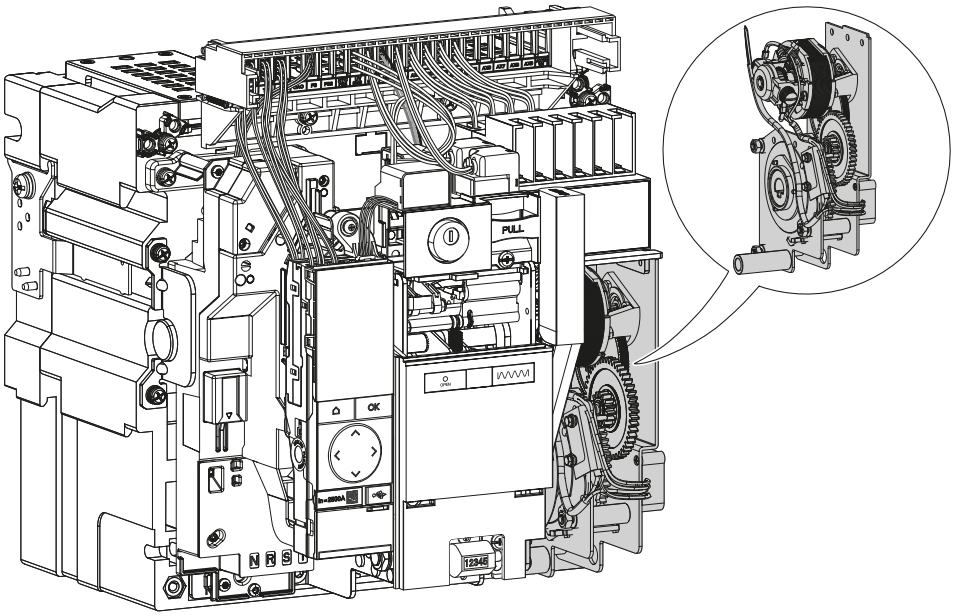
Closing spring

The closing spring is used to mechanically close the circuit breaker. It must be charged first, and there are two procedures for this:

- Manual charging
Charge the spring using the charging handle until the status of the indicator changes.



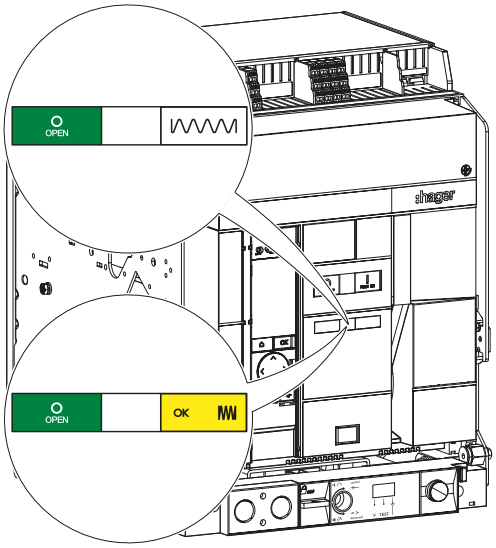
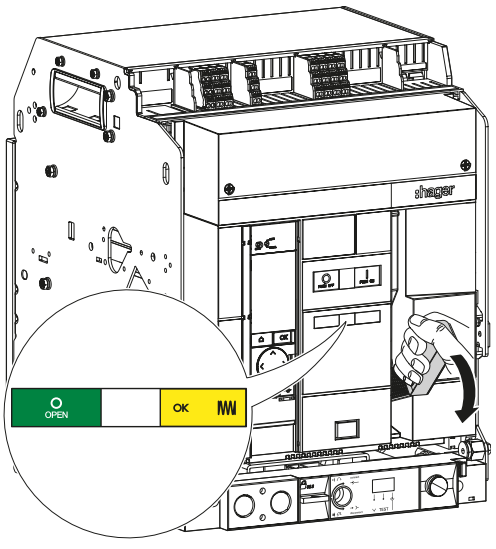
- Automatic charging
If an MO charging motor is installed and powered, the closing spring charges automatically each time the circuit breaker closes.

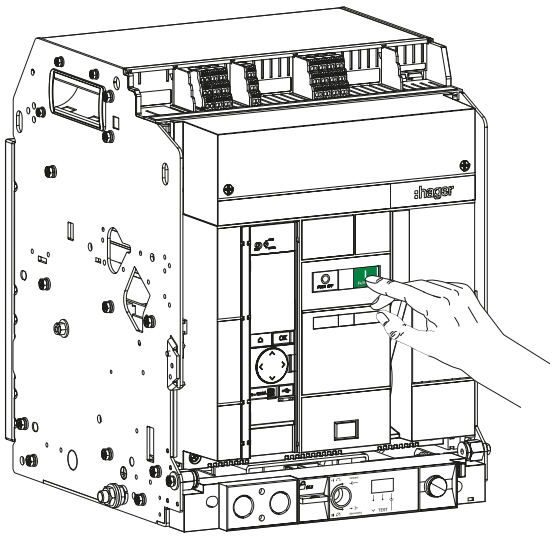
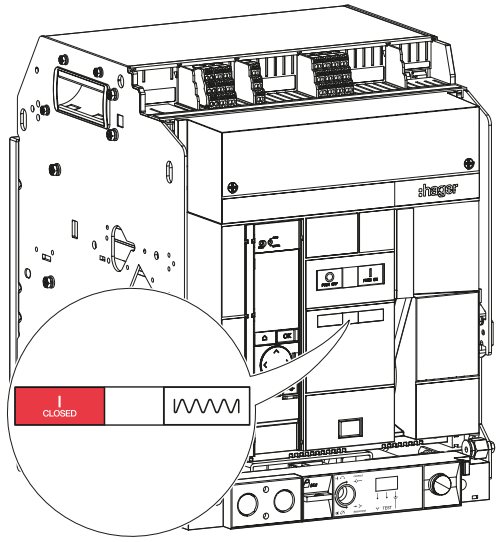
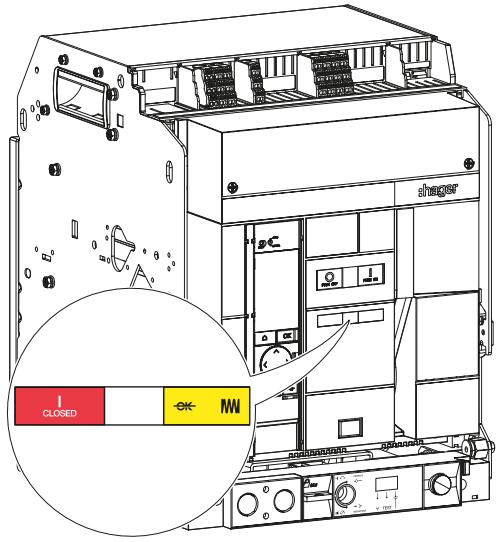


DANGER

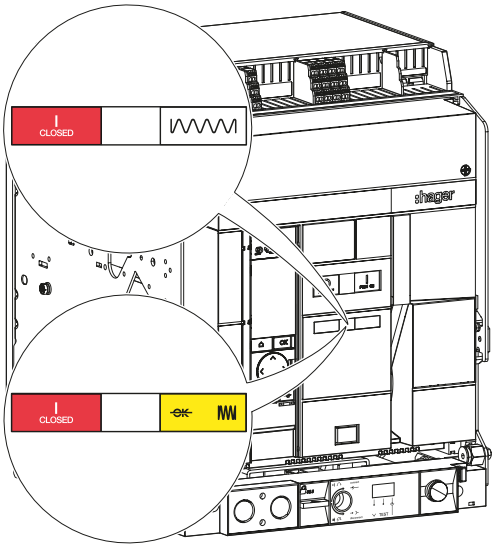
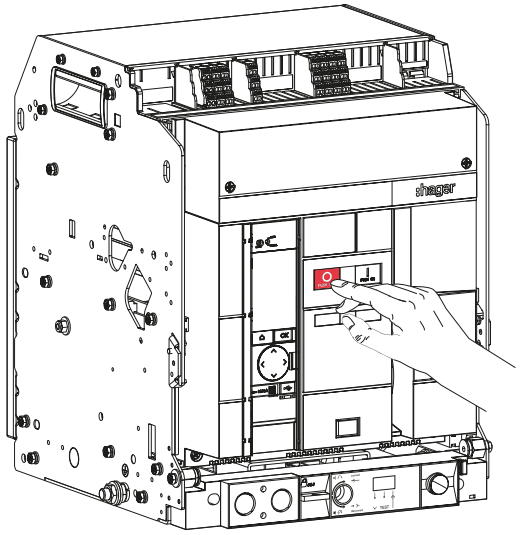
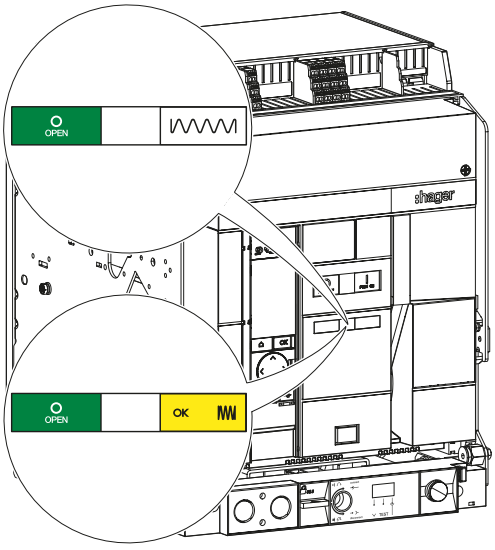
Risk of electric shock, explosion or electric arc.
Inspect the electrical installation and remove the tripping cause before closing the circuit breaker again.
Never close a circuit breaker locally or remotely without first making sure that the installation complies with the safety standards.

To close the circuit breaker:

	Action	Illustration
1	Check that the circuit breaker is open, the closing spring is discharged or charged if a charging motor is installed.	
2	If necessary, charge the closing spring using the charging handle until the following indicators appear.	

	Action	Illustration
3	Close the circuit breaker by pressing the closing push button 	
4	Check that the indicators change status.	
5	If a charging motor is installed and powered, the closing spring charges automatically.	

To open the circuit breaker:

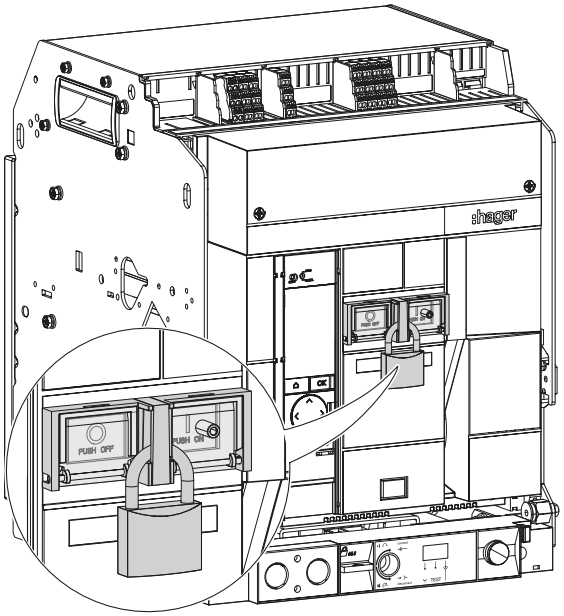
	Action	Illustration
1	Check that the following indicators appear on the circuit breaker.	
2	Open the circuit breaker by pressing the opening push button  .	
3	Check that the indicators update: - indicator OPEN, - closing spring discharged indicator (case of manual charging), - or closing spring charged indicator (automatic charging with motor).	

The closing PUSH ON and opening PUSH OFF push buttons can be locked against any operation using the PBC push button covers.
It prevents any unintended or unauthorised operation.

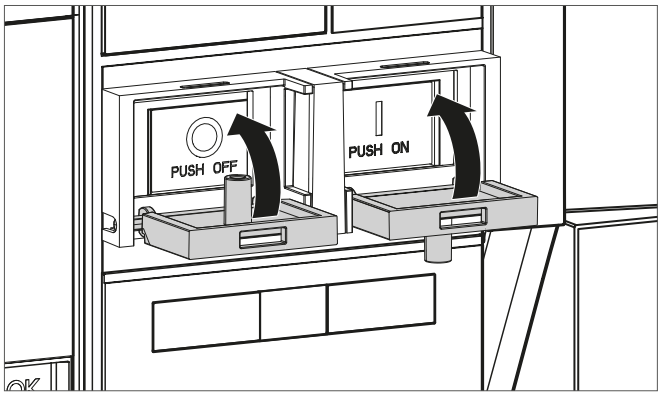
The transparent PBC push button covers have an additional function.
They can be disengaged and turned so that the opening push button PUSH OFF remains permanently and mechanically engaged. This locking function is also guaranteed if the circuit breaker is activated remotely by a CC closing coil. Even if the CC closing coil is driven, the principal contacts remain open.

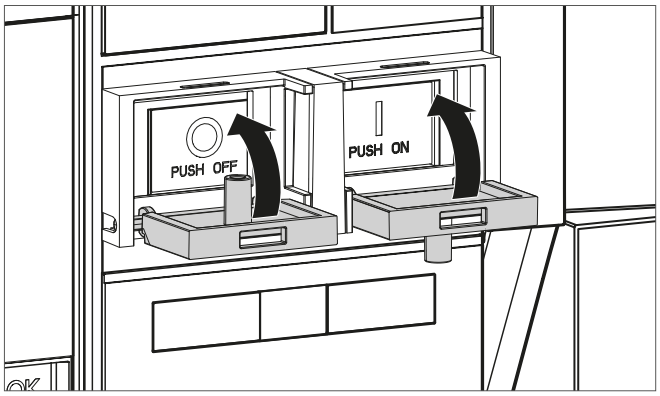
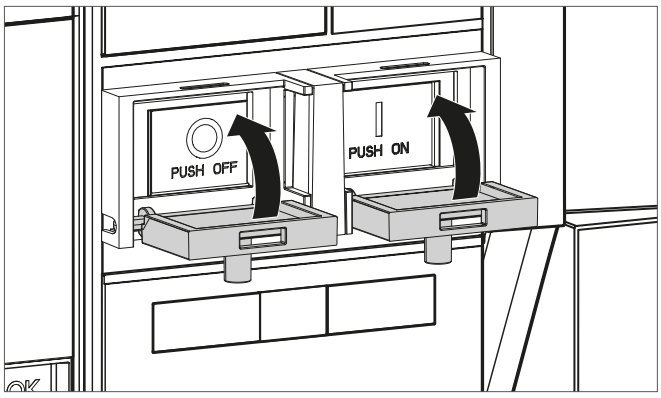
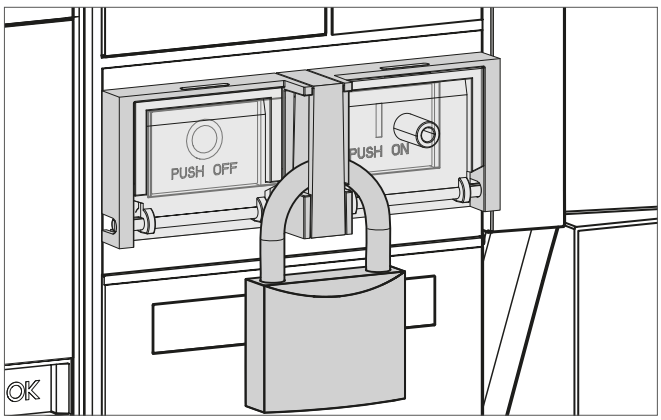
This prevents any unintentional or unauthorised operations.

The push buttons can be locked independently or jointly and up to 3 Ø5-Ø8 mm padlocks can be fitted.



To activate the locking device:

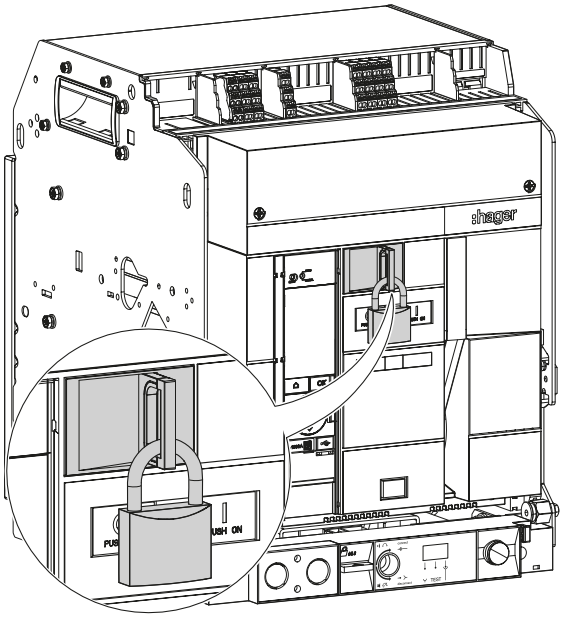
	Action	Illustration
1	Close the cover of the push button you wish to lock.	

	Action	Illustration
1	**Case 1** The opening push button PUSH OFF is pressed continuously and the closing push button PUSH ON is locked.	
	Case 2 The opening push button PUSH OFF and closing push button PUSH ON are locked.	
2	Lock it using one or more padlocks.	

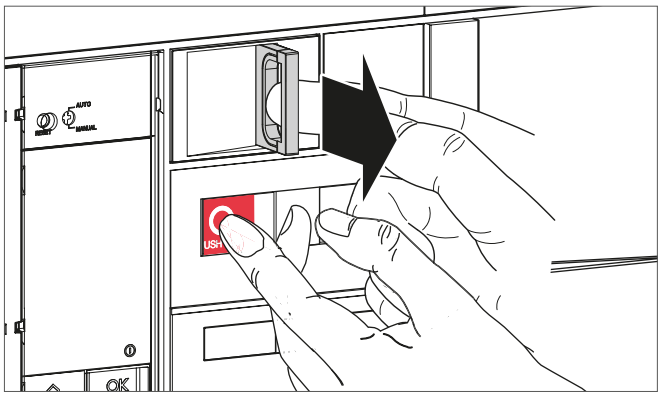
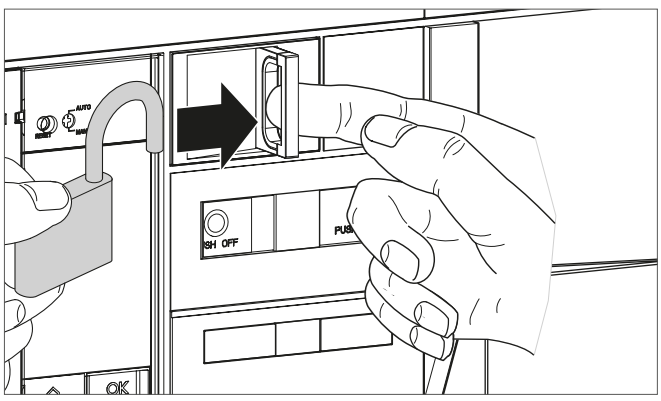
ATTENTION
It is not possible to hold down the closing push button PUSH ON with this accessory.

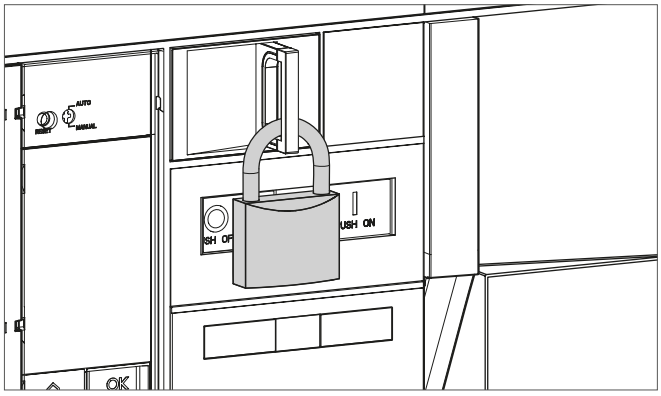
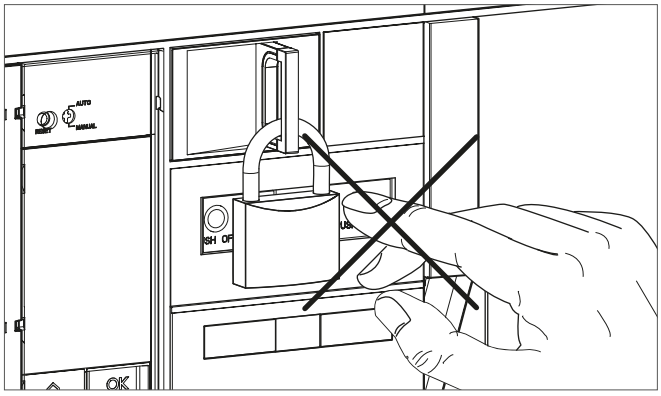
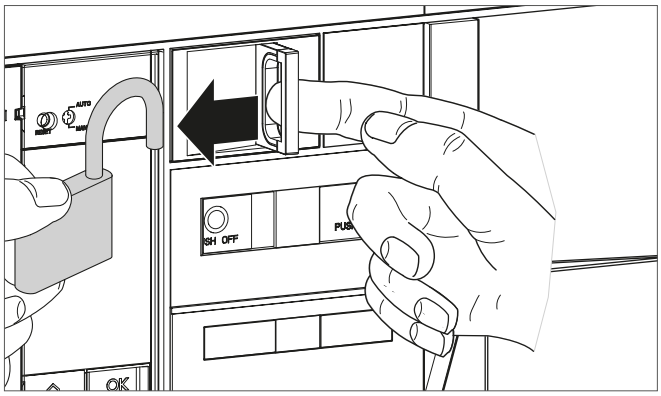
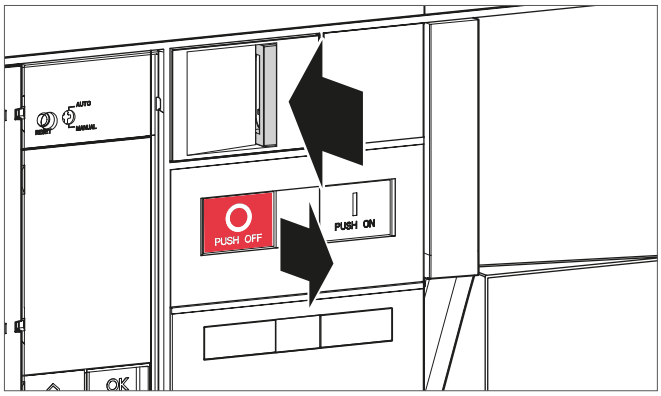
ATTENTION
Refer to manual 6LE007871A to install this locking accessory.

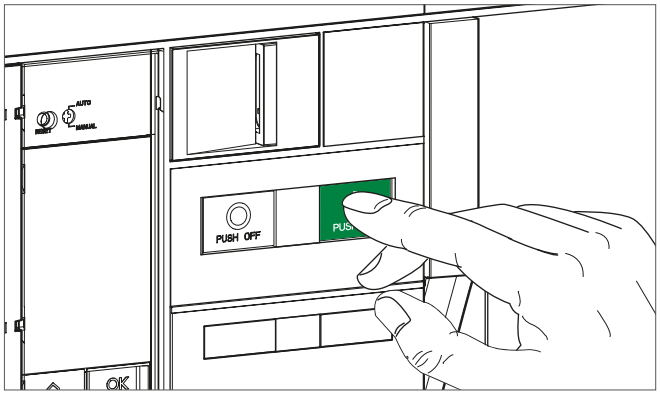
This locking device prevents the circuit breaker from closing using padlocks.
Up to 3 Ø 6-8 mm padlocks can be installed.



To activate or deactivate the locking device:

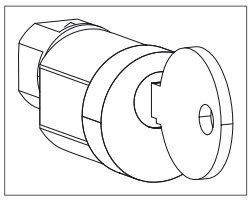
	Action	Illustration
1	Press the opening push button PUSH OFF and, while holding it down, pull the tab of the locking device.	
2	Release the pressing on the opening push button PUSH OFF while keeping the tab pressed. Position...	

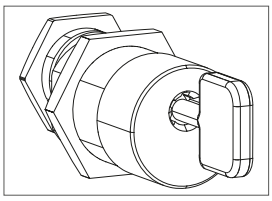
	Action	Illustration
2	*(continued)* ... Then close the padlock.	
3	Check that it is no longer possible to close the circuit breaker by pressing the closing push button 	
4	To unlock the device, remove the padlock.	
5	The tab returns to its initial position.	

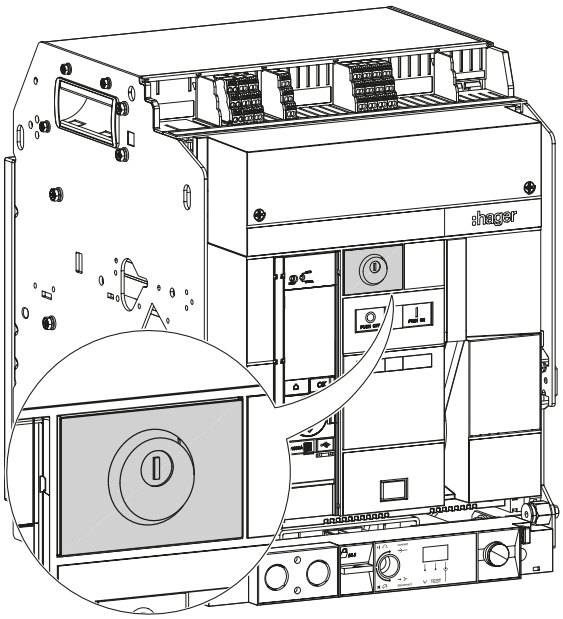
	Action	Illustration
6	Check that it is now possible to close the circuit breaker by pressing the closing push button 	

ATTENTION
Refer to manual 6LE007876A to install this locking accessory.

This locking device prevents the circuit breaker from closing using a key lock.
Several types of locks can be installed.

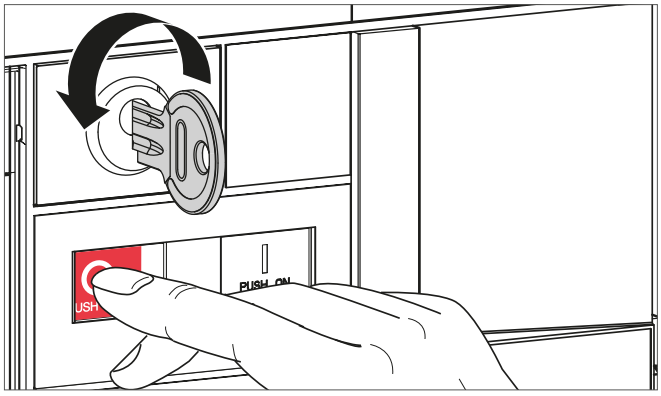
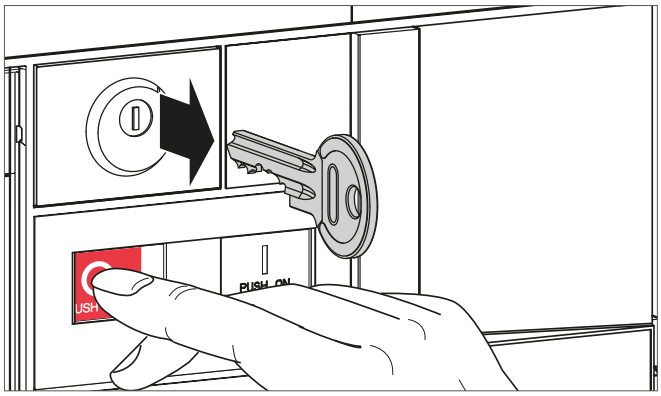

Ronis type lock

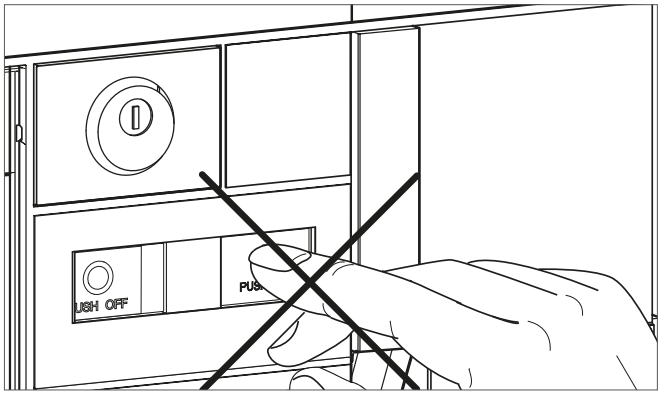
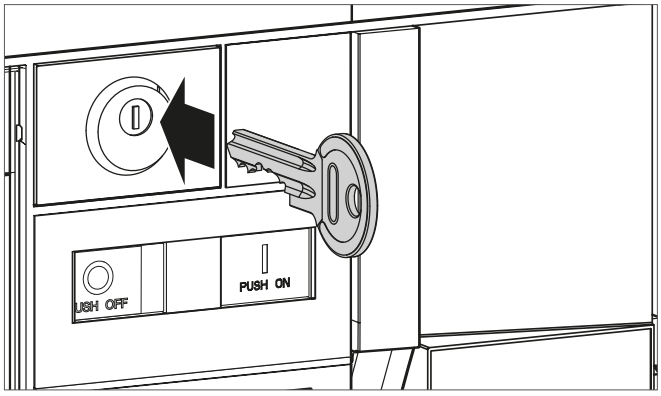

Profalux type key lock (not offered by us)



To activate or deactivate the locking device:

	Action	Illustration
1	Check that the key is in the horizontal position.	

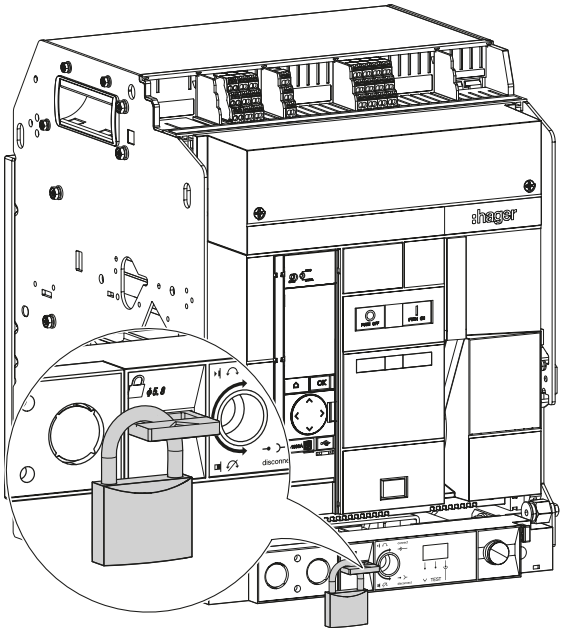
	Action	Illustration
2	Press the opening push button  .	
3	While holding down the opening push button  , put the key back into the vertical position by turning it counter-clockwise.	
4	Remove the key.	
5	Then release the opening push button  .	

	Action	Illustration
6	Check that it is no longer possible to close the circuit breaker by pressing the closing push button PUSH ON	
7	To unlock the device, insert the key into the lock.	
8	Turn the key clockwise.	
9	Check that it is now possible to close the circuit breaker by pressing the closing push button PUSH ON	

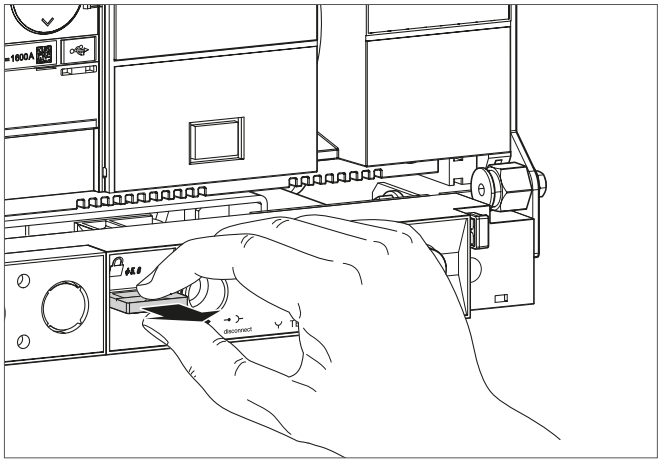
ATTENTION
The key cannot be removed in horizontal position. To remove it, follow steps 1 to 4. Refer to manual 6LE007875A to install this locking accessory.

This locking device locks the circuit breaker in the chassis and prevents the racking handle from being inserted.

Up to 3 Ø 6-8 mm padlocks can be installed.

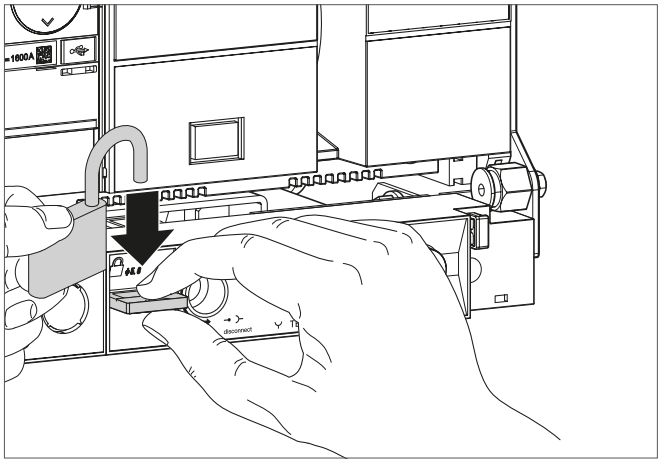
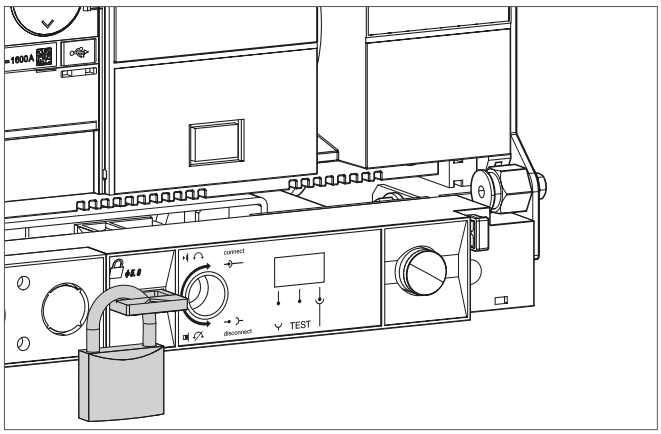
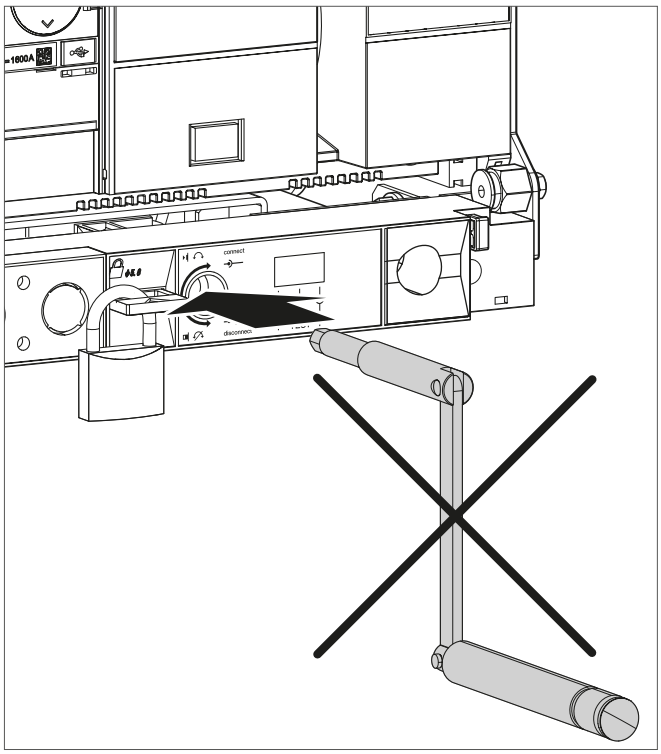


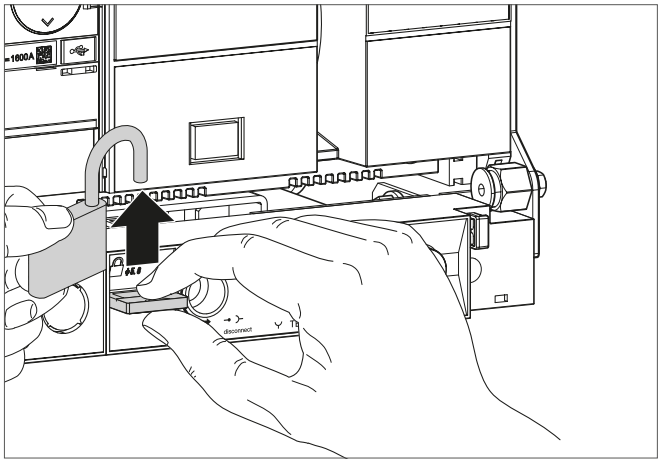
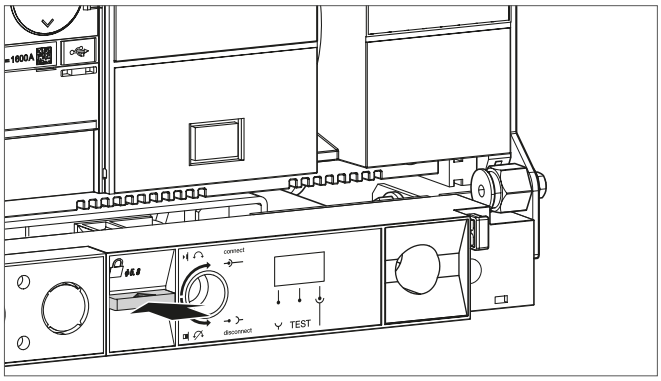
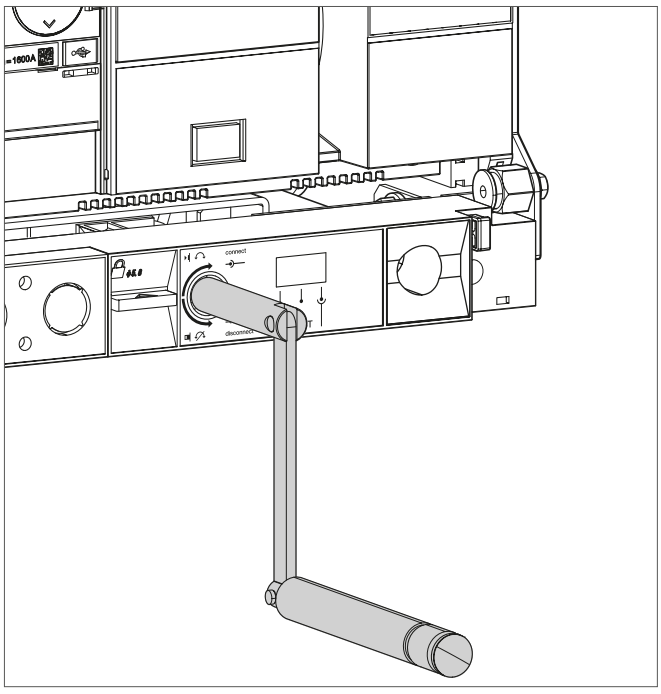
To activate or deactivate the locking device:

	Action	Illustration
1	Verify that the circuit breaker is in one of 3 stable states (Connected, Test or Disconnected) then padlocking and position acknowledgement tab.	

ATTENTION

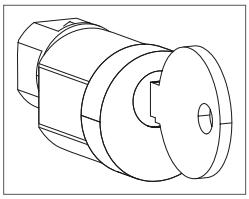
A special version of the circuit breaker is available for applications with locking in the drawout position only.

	Action	Illustration
2	Position...	
	then close the padlock.	
3	Check to ensure that it is not possible to insert the racking handle into the racking-in/racking-out hole.	

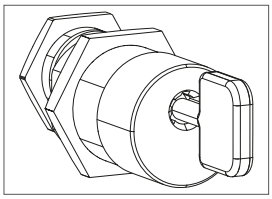
	Action	Illustration
4	To unlock the device, pull and hold the padlocking and position acknowledgement tab then remove the padlock.	
5	Check that the padlocking and position acknowledgement tab returns to its initial position.	
6	Check that it is now possible to insert the racking handle into the racking-in/racking-out hole.	

This locking device locks the circuit breaker in the chassis and prevents the racking handle from being inserted.

Several types of locks can be installed.

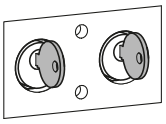


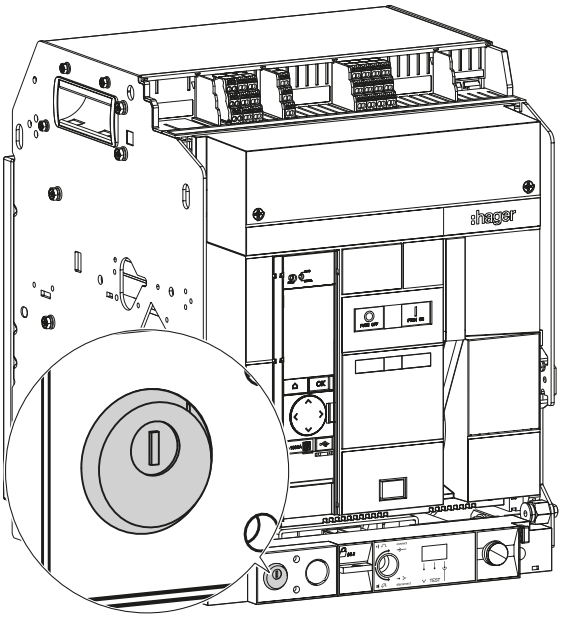
Ronis type lock



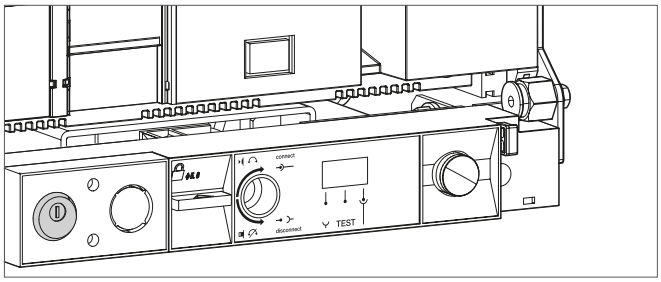
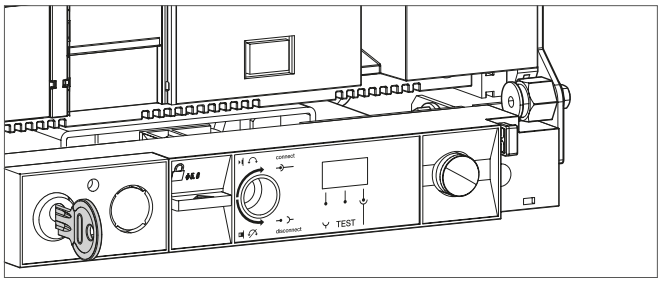
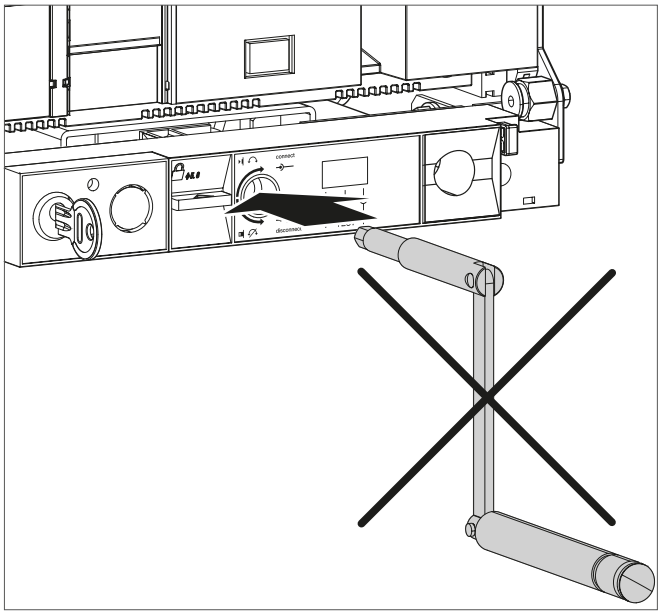
Profalux type key lock (not offered by us)

Up to 2 locks can be installed in the housing.



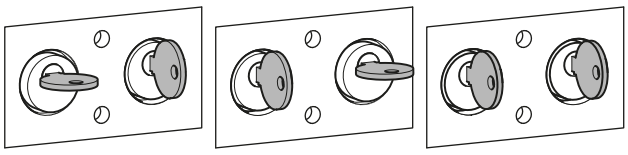


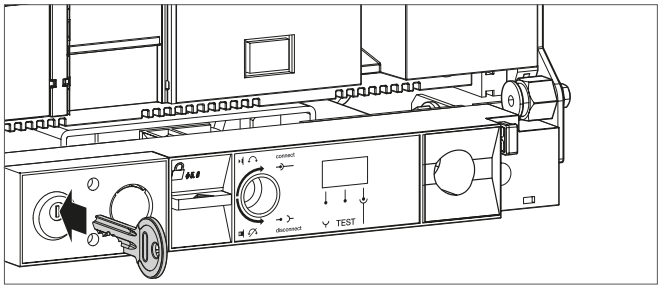
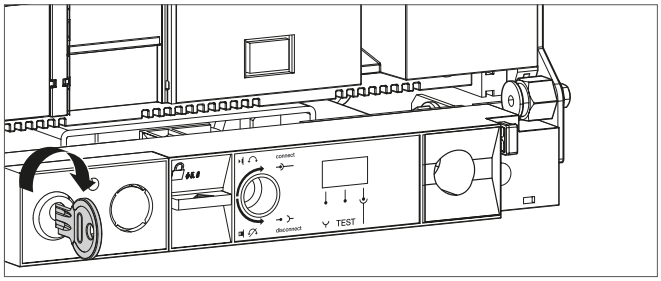
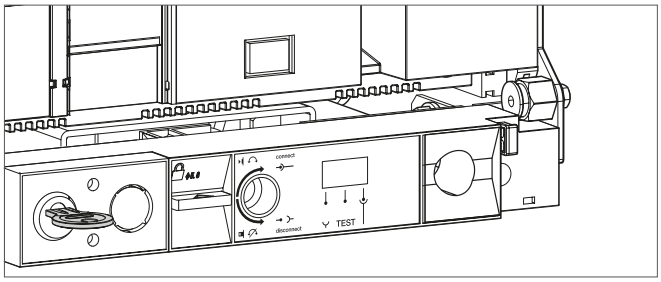
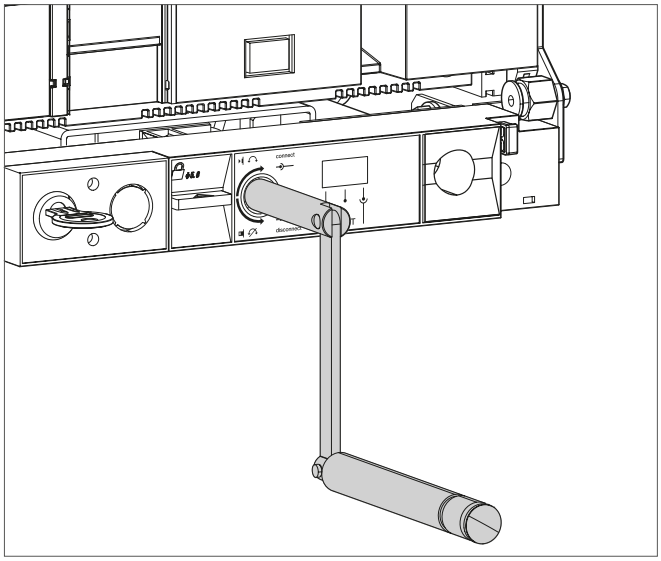
To activate or deactivate the locking device:

	Action	Illustration
1	Check that the keylock is in the vertical position...	
	or that the key is inserted in the vertical position.	
2	Check to ensure that it is not possible to insert the racking handle into the racking-in/racking-out hole.	

ATTENTION

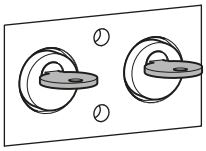
If 2 locks are installed, only one key in the vertical position prevents the introduction of the racking handle into the place to insert the racking handle.

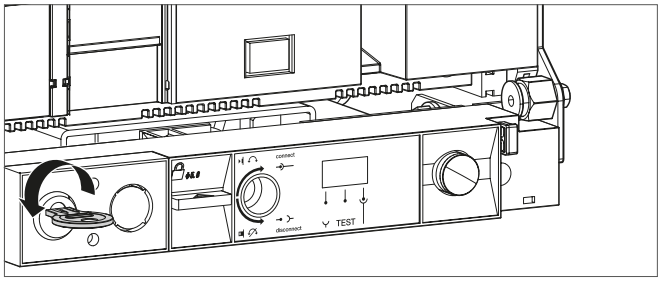
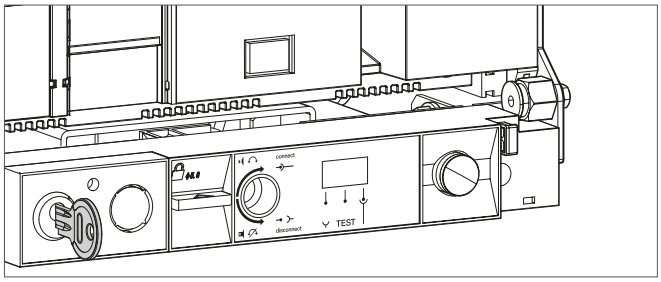
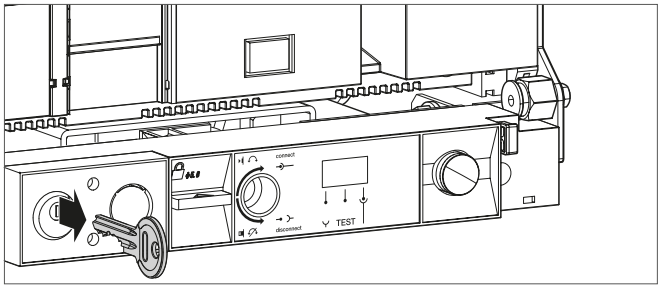


	Action	Illustration
3	To unlock the device, insert the key into the lock.	
4	Turn the locking device key clockwise.	
	to put it in the horizontal position.	
5	Check that it is now possible to insert the racking handle into the racking-in/racking-out hole.	

ATTENTION

If 2 locks are installed, both keys must be in the horizontal position to allow the introduction of the racking handle into the place to insert the racking handle.



	Action	Illustration
6	The key cannot be removed in horizontal position. To remote it, turn the key anti-clockwise...	
	to put it in the vertical position	
		

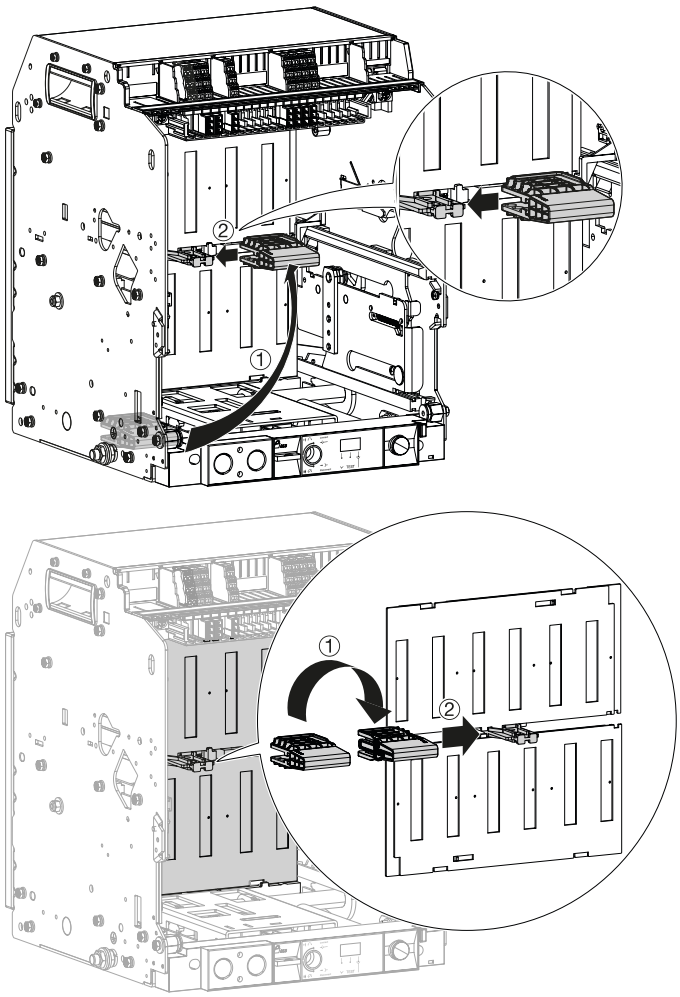
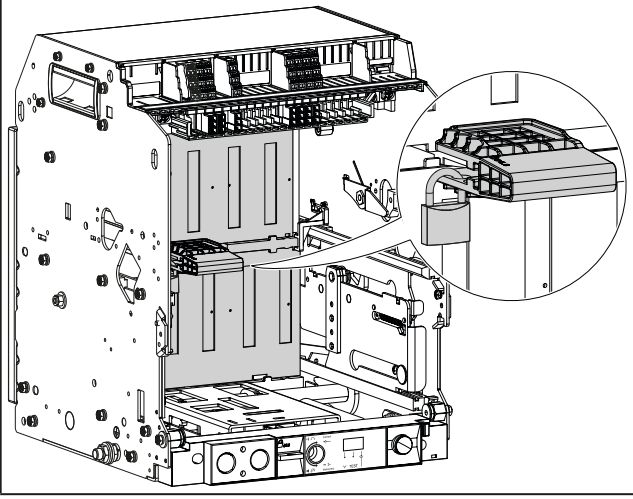
ATTENTION
Refer to manual 6LE007877A to install this locking accessory.

The safety shutters cover the contacts of the main circuit in the chassis when the circuit breaker is in the disconnected or test position.

In this way they preclude accidental access to the connections.

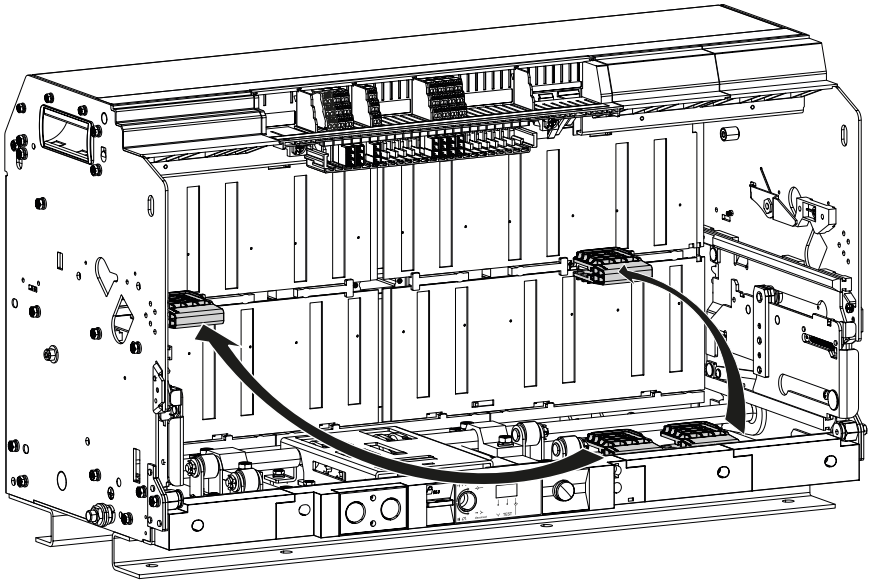
The upper and lower shutters can be locked to prevent their opening or the insertion of the circuit breaker in the connected position.

• Locking using the accessory in the chassis.

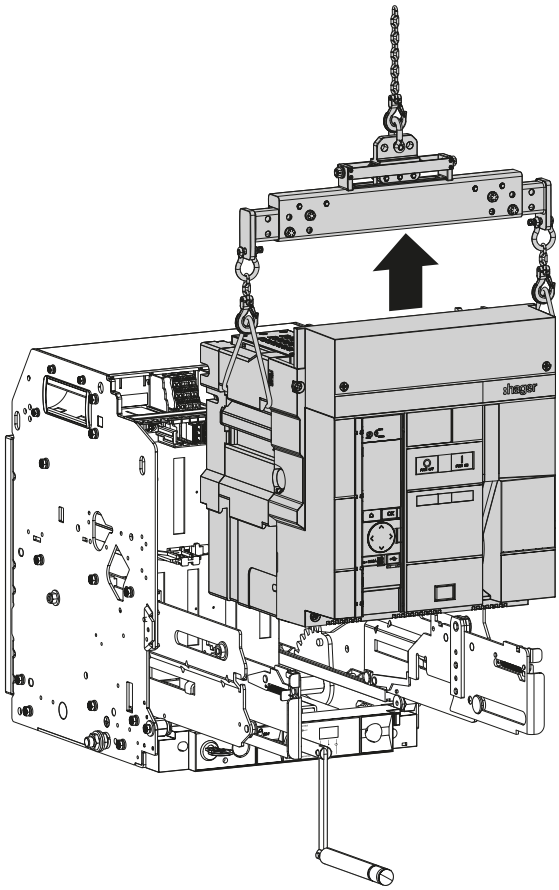
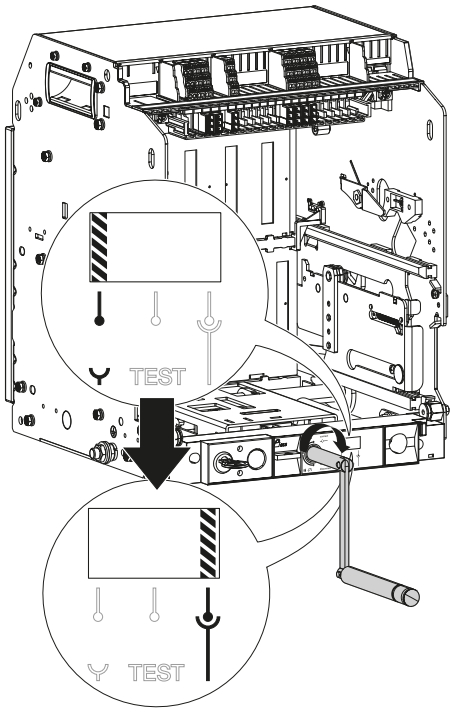
	Action	Illustration
1	Remove the locking accessory from the chassis and place it on the insulated safety shutter. Note that the accessory can be inserted from 2 sides by turning it through 180°.	
2	Lock the shutter with a padlock. Up to three Ø5-Ø8 mm padlocks can be installed.	

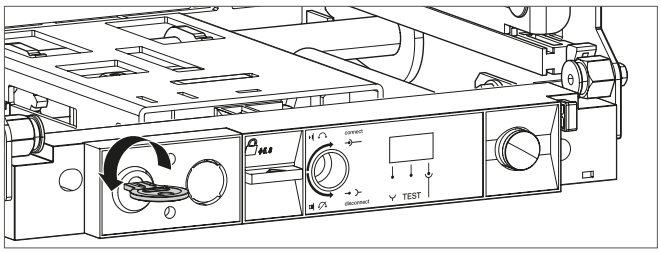
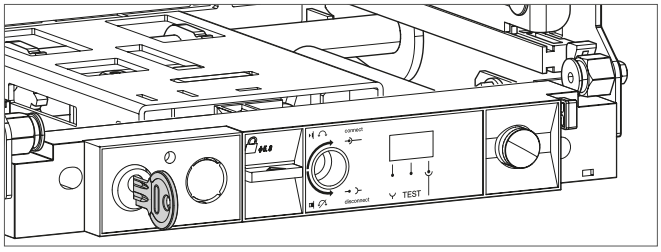
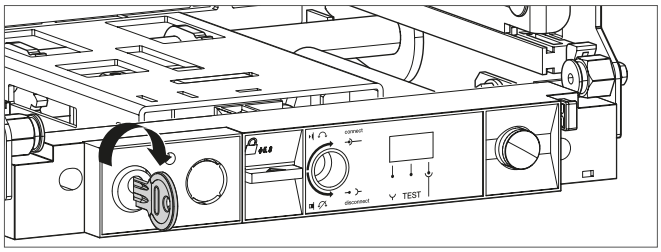
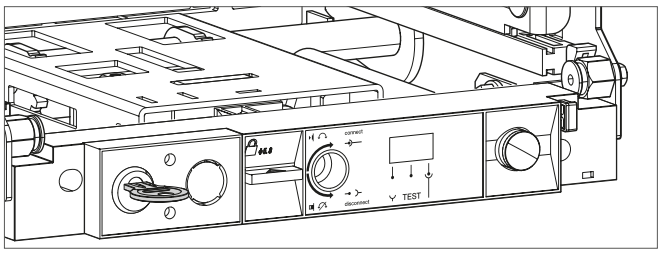
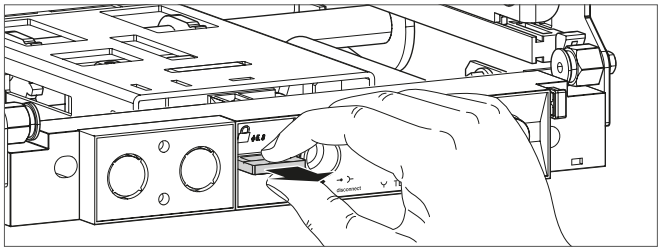
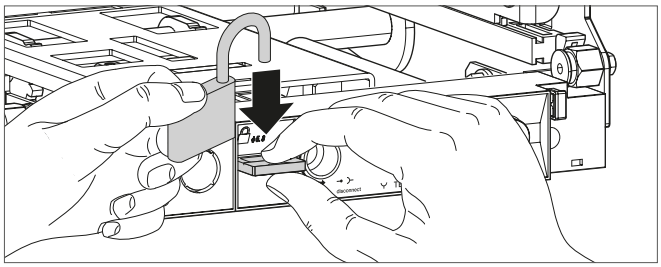
ATTENTION

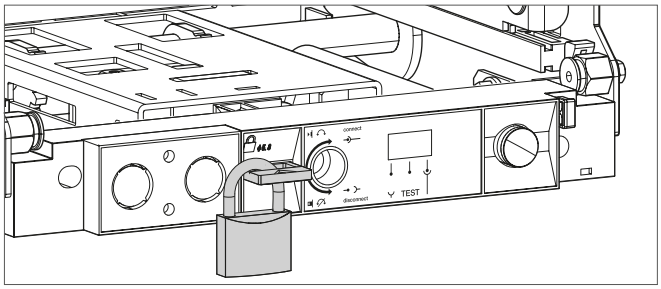
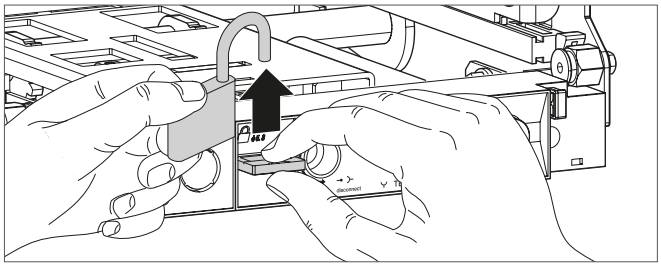
The HW6 circuit breakers have 2 accessories to independently lock the left and right safety isolating shutters.



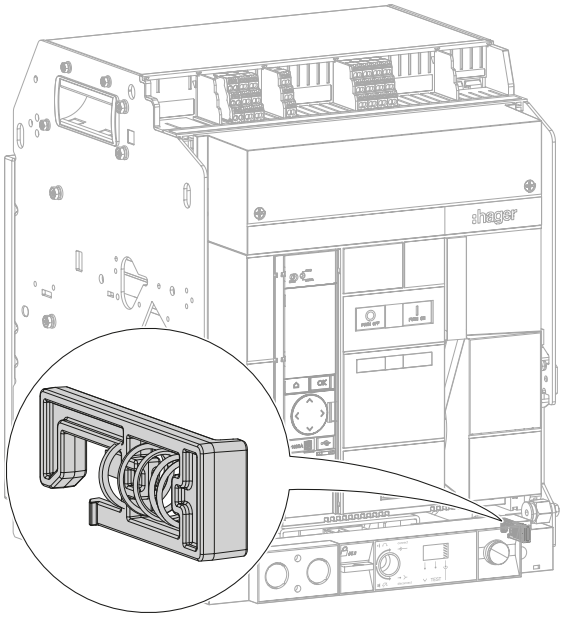
• Locking using the CL key locks or padlocking and position acknowledgement tab.

	Action	Illustration
1	Remove the circuit breaker from the chassis (see Chapter 05 Extracting the drawout circuit breaker).	
2	Put the circuit breaker in the connected position (see Chapters 4.3 Changing from the disconnected position to the test position and 4.4 Changing from the test position to the connected position).	

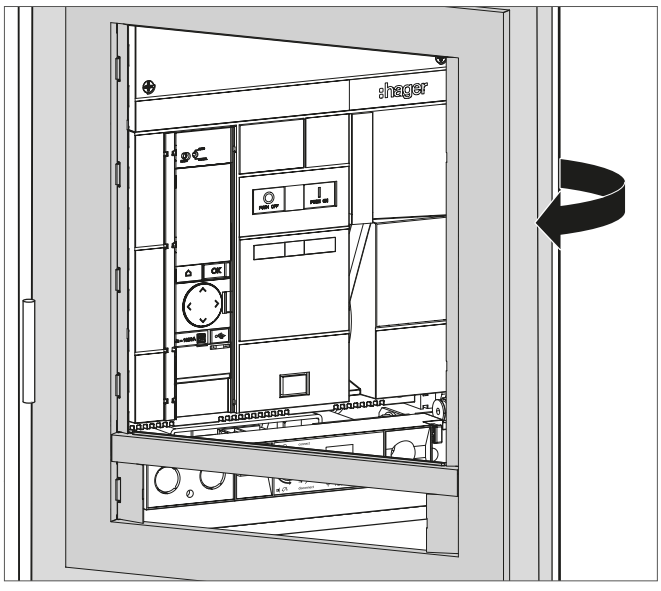
	Action	Illustration
3	Remove and stow away the racking handle.	
	Using the key lock, turn the key in the locking device in an anti-clockwise direction...	
	until it is in the vertical position.	
	To unlock the insulated safety shutters, turn the key clockwise...	
	to put it in the horizontal position.	
4	The insulating safety shutters can also be locked using the padlocking and position acknowledgement tab.	
	Pull on the tab...	
	position...	

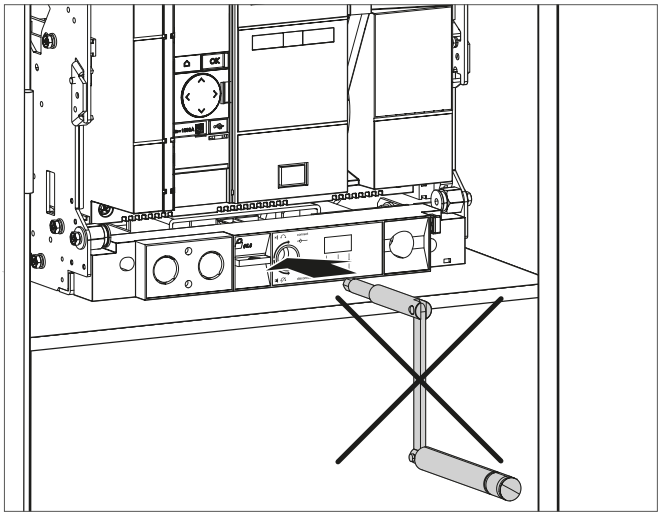
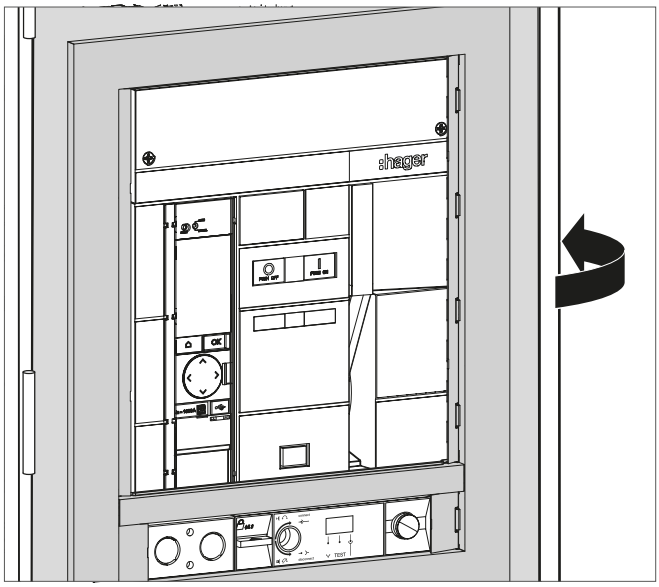
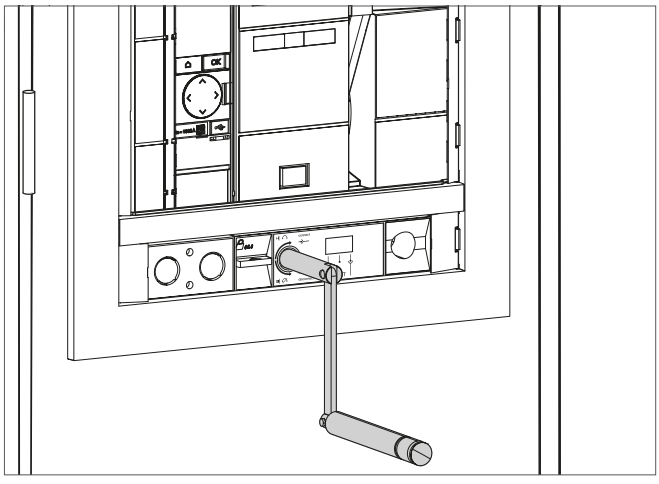
	Action	Illustration
4	*(continued)* then close the padlock.	
	To unlock the insulated safety shutters, pull the tab and remove the padlock.	

This device prevents the racking handle being inserted into the circuit breaker rack in/rack out mechanism when the door of the electrical distribution board is open.



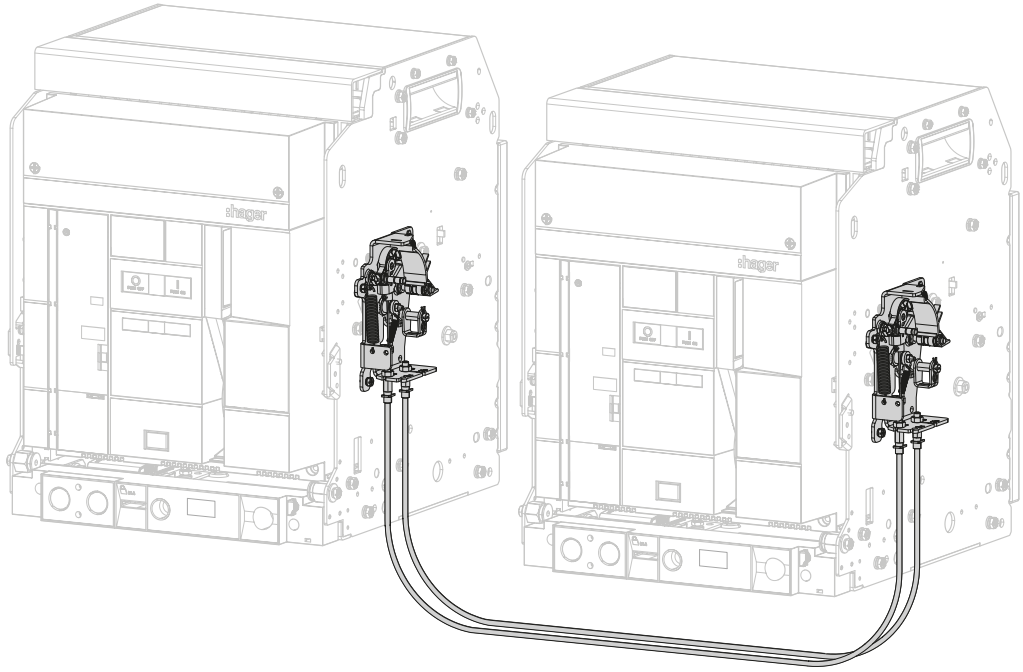
To test the locking device:

	Action	Illustration
1	Open the electrical cabinet door.	

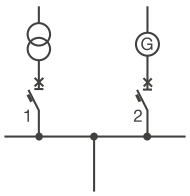
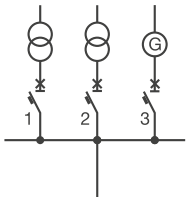
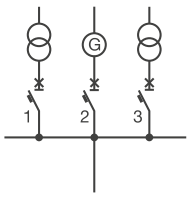
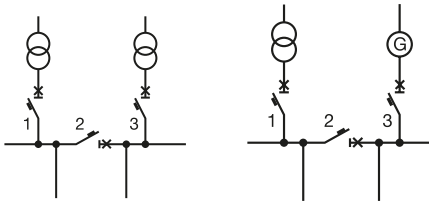
	Action	Illustration
2	Check to ensure that it is not possible to insert the racking handle into the racking-in/racking-out hole.	
3	Close the electrical cabinet door.	
4	Check that it is now possible to insert the racking handle into the racking-in/racking-out hole.	

ATTENTION
Refer to manual 6LE007874A to install this locking accessory.

The mechanical interlocking kit is used to interlock 2 to 3 circuit breakers installed vertically or horizontally in the electrical distribution board.

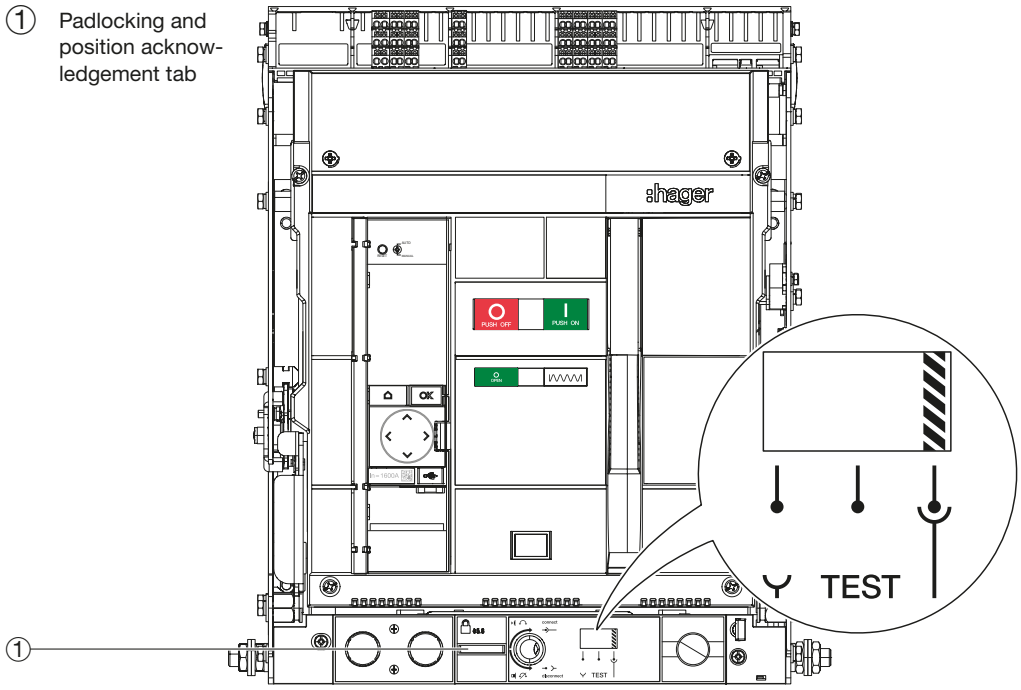


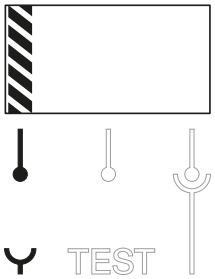
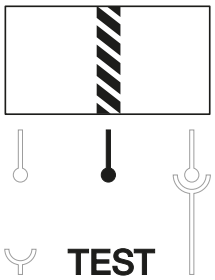
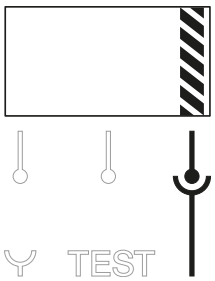
In this way it prevents interlocked circuit breakers closing at the same time according to the types of application described below:

Diagram	Type	Locking logic	Description
	2S	ACB 1 / ACB 2 0 / 0 1 / 0 0 / 1	Only one device out of two can be closed.
	3S	ACB 1 / ACB 2 / ACB 3 0 / 0 / 0 1 / 0 / 0 0 / 1 / 0 0 / 0 / 1	Only one device out of three can be closed.
	3SX	ACB 1 / ACB 2 / ACB 3 0 / 0 / 0 1 / 0 / 0 0 / 0 / 1 1 / 0 / 1 0 / 1 / 0	Allows two devices to be closed if the third is open. The latter can only be closed if the other two are open.
	3C	ACB 1 / ACB 2 / ACB 3 0 / 0 / 0 1 / 0 / 0 0 / 1 / 0 0 / 0 / 1 0 / 1 / 1 1 / 1 / 0 1 / 0 / 1	Two devices out of three can be closed at the same time.

The position of the circuit breaker in the chassis is shown by the mechanical position indicator of the moving part on the front. There are three different positions, connected, test and disconnected.
Changing from one position to another is done using a racking handle.
Before changing from one position to another, the padlocking and position acknowledgement tab must be pressed.

① Padlocking and position acknowledgement tab

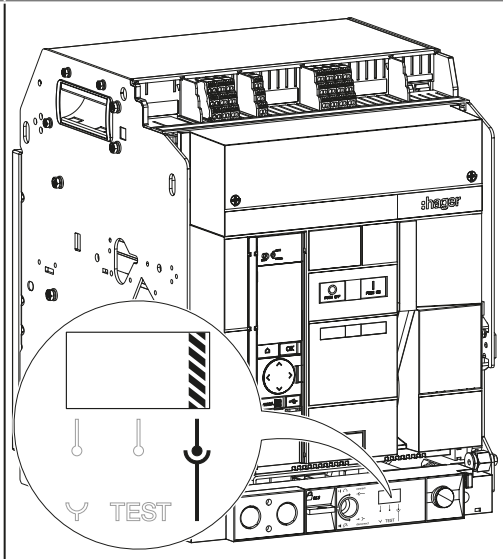
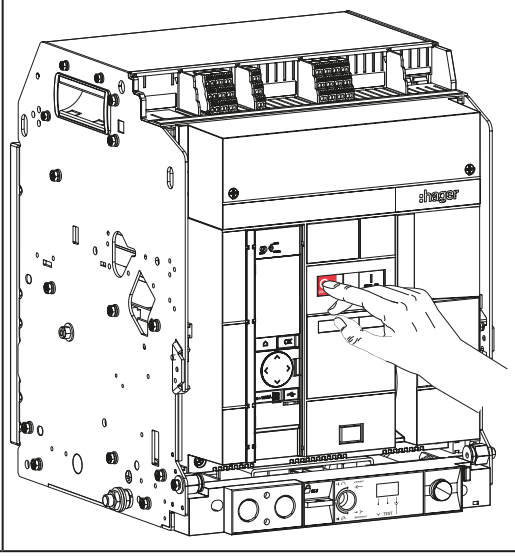


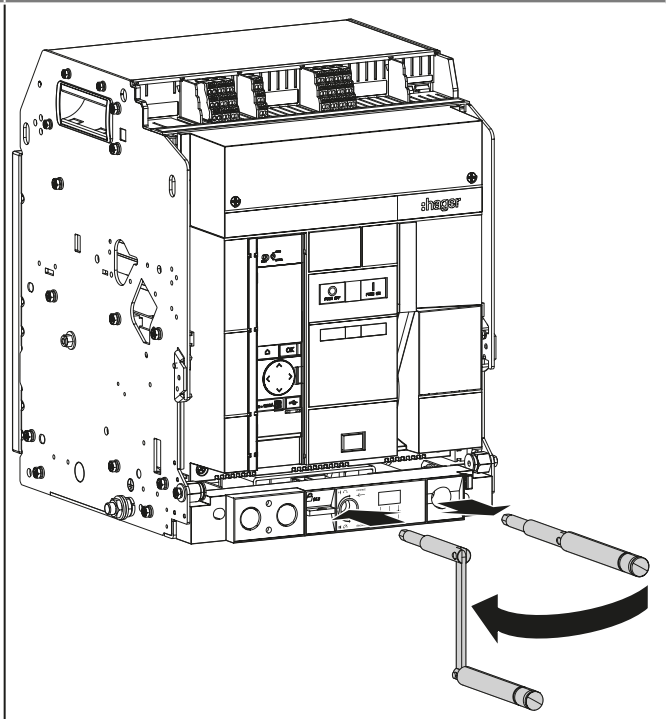
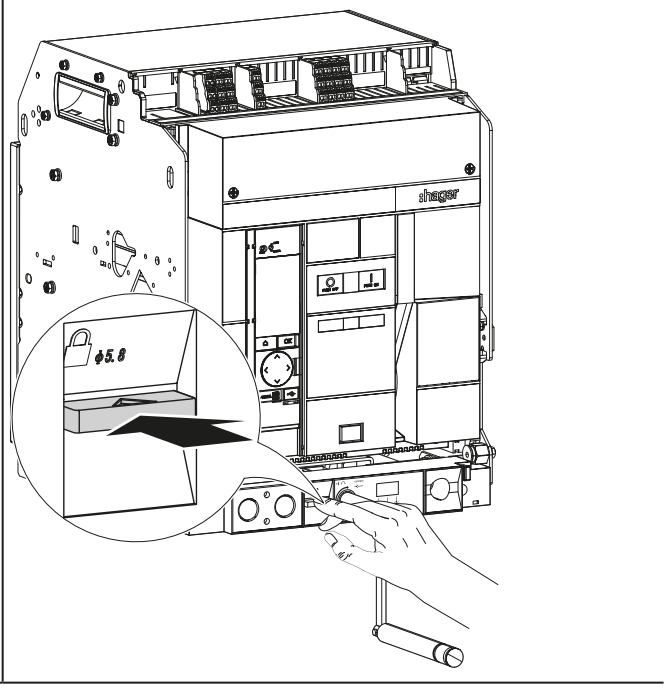
Circuit breaker position	Circuit breaker status	Mechanical position indicator of the moving part
Disconnected	The circuit breaker can be withdrawn from or inserted into the chassis.	
Test	The circuit breaker's power contacts are isolated. All of the auxiliaries remain electrically connected so that they remain functional.	
Connected	The connections on the circuit breaker are connected to the jaw contacts on the chassis. The circuit breaker is ready for operation.	

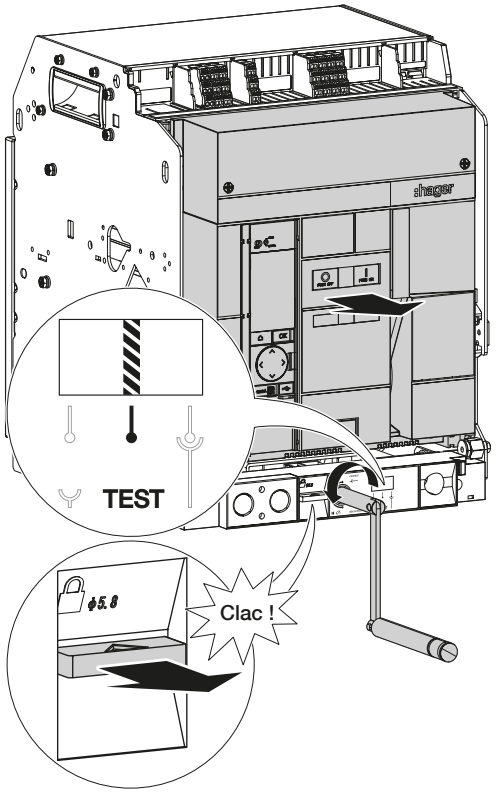
⚠ WARNING

Risk of electric shock
Make sure that the device is only operated by qualified personnel in accordance with to the installation standards in force in the relevant country.

To change from connected position to test position:

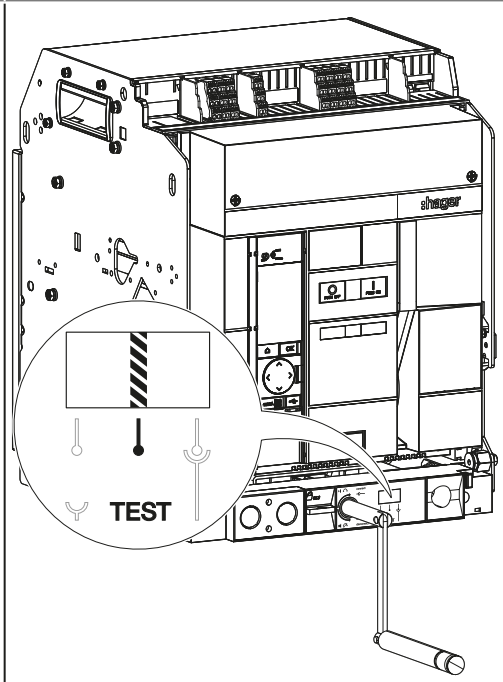
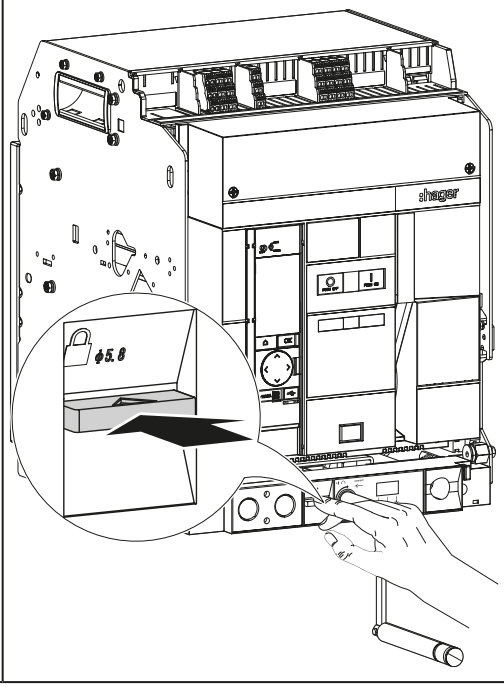
	Action	Illustration
1	Check that the circuit breaker is in the connected position and the mechanical position indicator displays:	
2	Open the circuit breaker by pressing the opening push button  .	

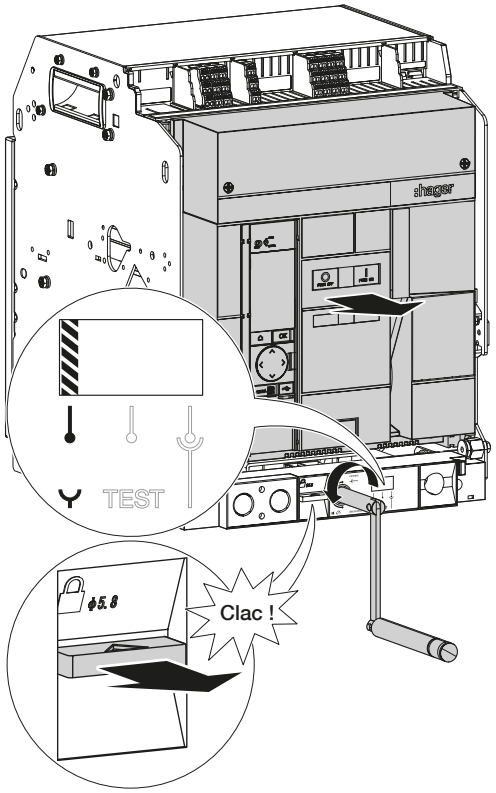
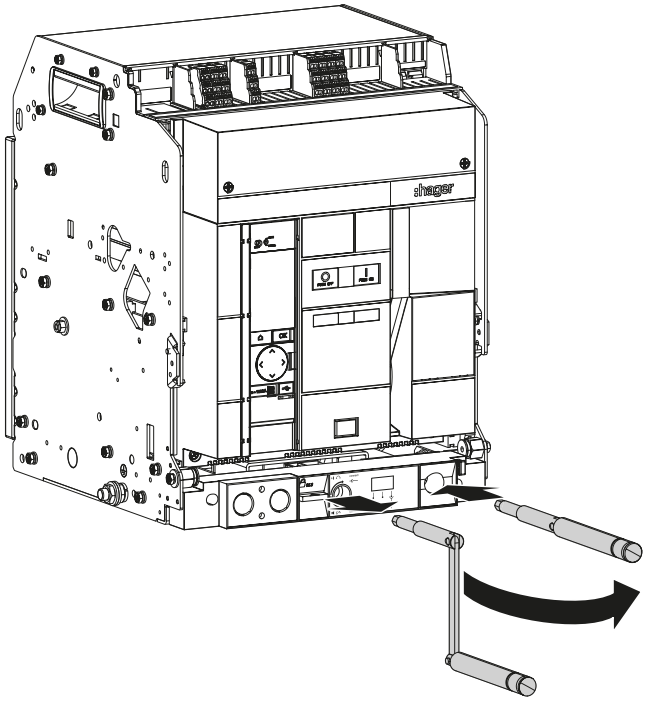
	Action	Illustration
3	Take the racking handle out of its housing and insert it in the racking-in/ racking-out hole.	
4	Press the padlocking and position acknowledgement tab.	

	Action	Illustration
5	Turn the racking handle anti-clockwise until: - the mechanical position indicator displays the Test position, - the padlock latch and position acknowledgement tab comes out of its housing.	

ATTENTION
Risk of property damage If the chassis is not fitted in an electrical panel, ensure it is correctly fastened before changing position.

To change from test position to disconnected position:

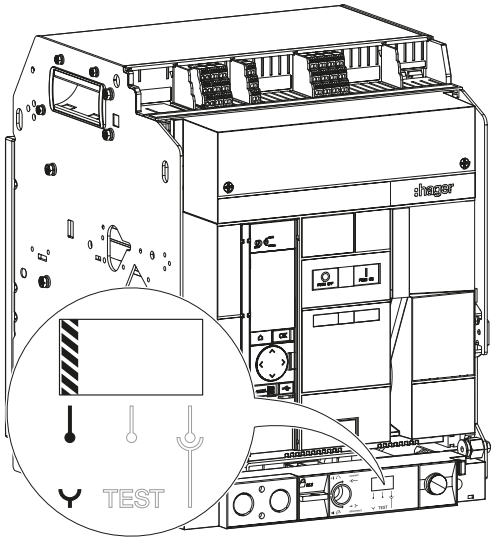
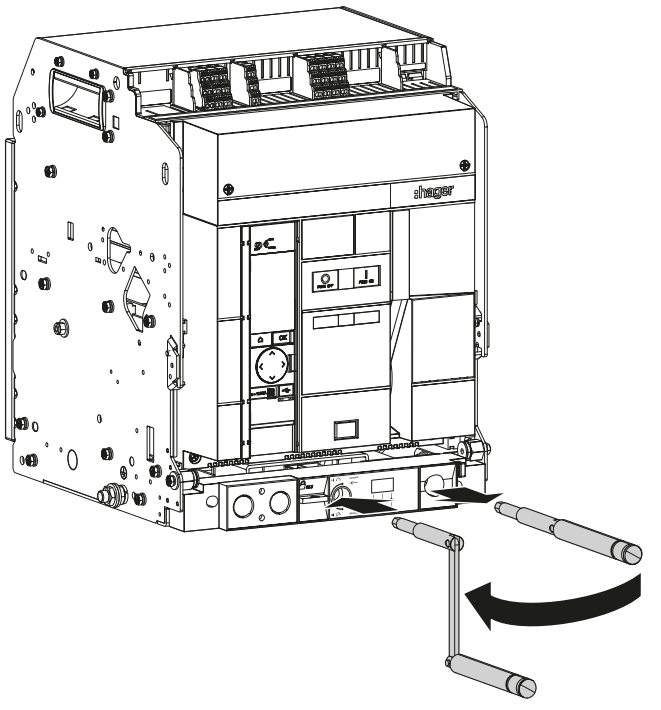
	Action	Illustration
1	Check that the circuit breaker is in the test position and the mechanical position indicator displays:	
2	Press the padlocking and position acknowledgement tab.	

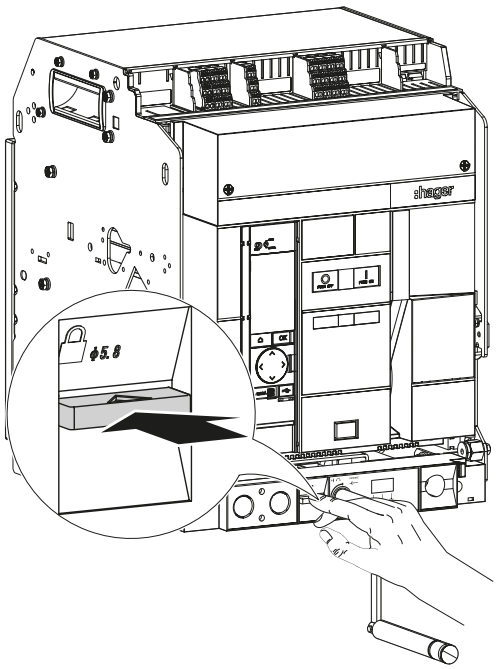
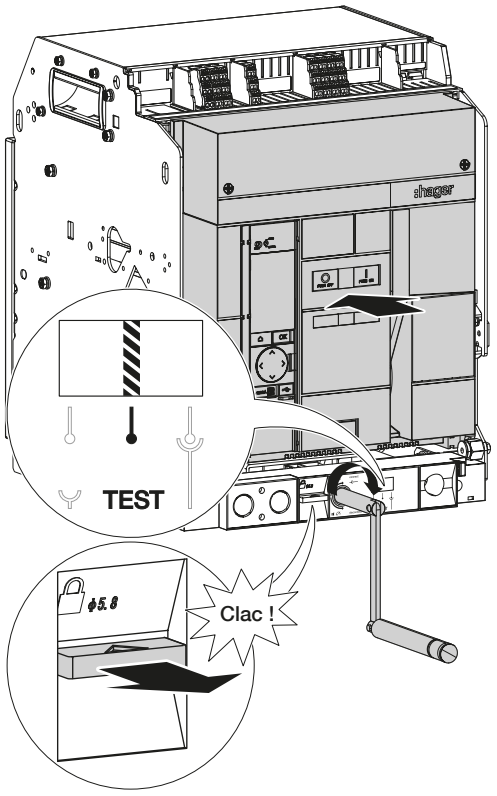
	Action	Illustration
3	Turn the racking handle anti-clockwise until: - the mechanical position indicator displays the Disconnected position, - the padlock latch and position acknowledgement tab comes out of its housing.	
4	Remove, then store the racking handle in its housing.	

⚠ WARNING

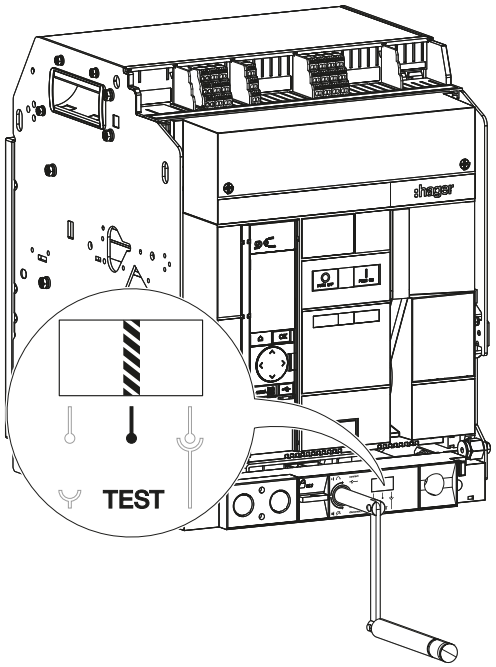
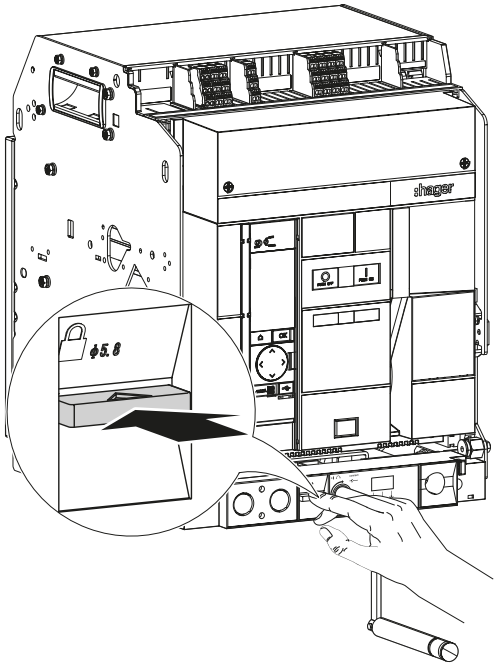
Risk of electric shock
Make sure that the device is only operated by qualified personnel in accordance with to the installation standards in force in the relevant country.

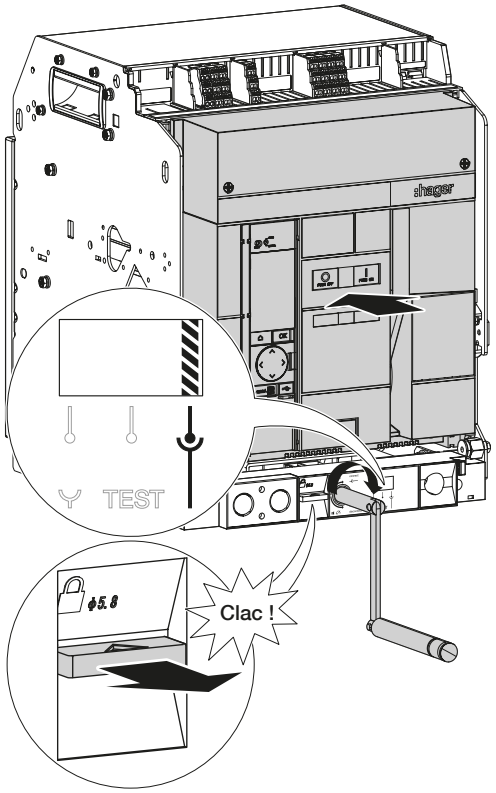
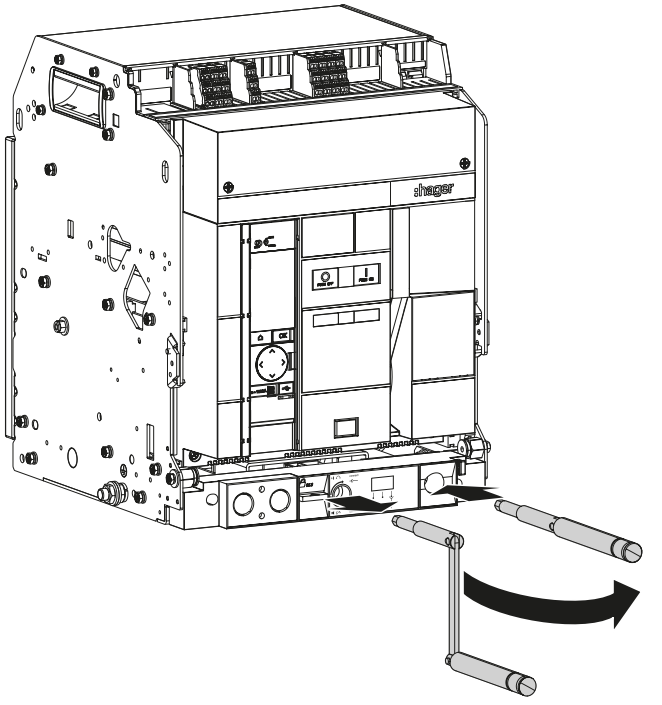
To change from disconnected position to test position:

	Action	Illustration
1	Check that the circuit breaker is in the disconnected position and that the mechanical position indicator displays:	
2	Take the racking handle out of its housing and insert it in the racking-in/ racking-out hole.	

	Action	Illustration
3	Press the padlocking and position acknowledgement tab.	
4	Turn the racking handle clockwise until: - the mechanical position indicator displays the Test position, - the padlock latch and position acknowledgement tab comes out of its housing.	

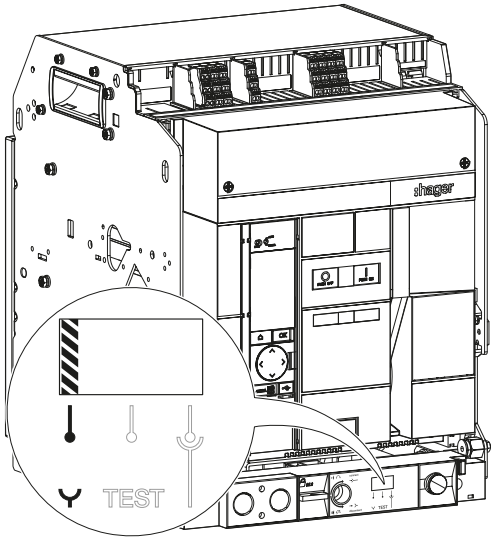
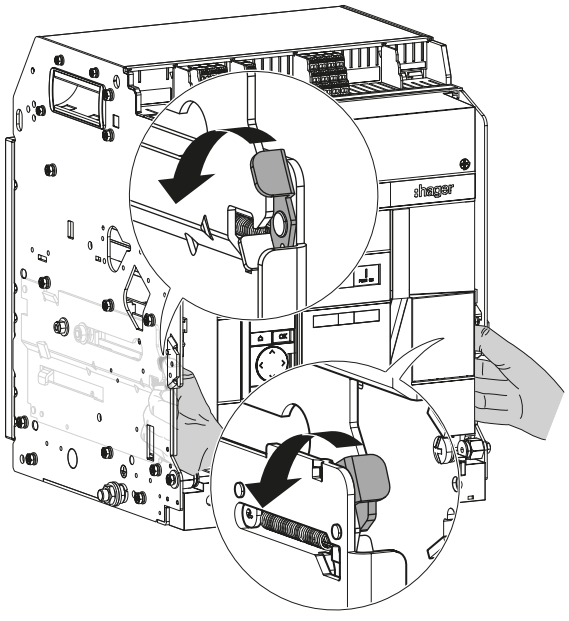
To change from test position to connected position:

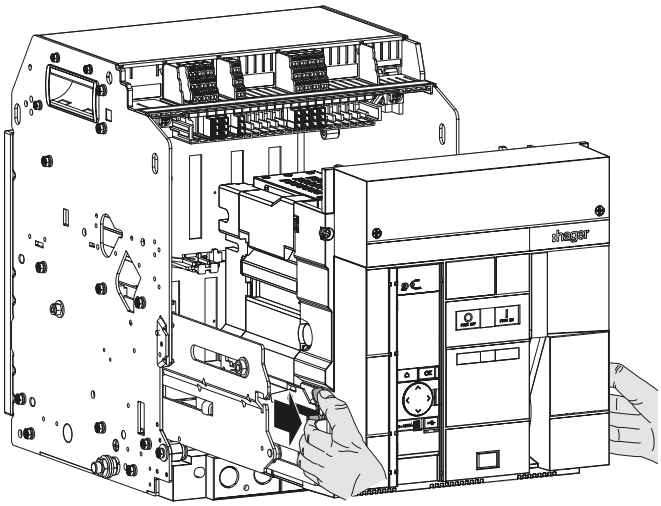
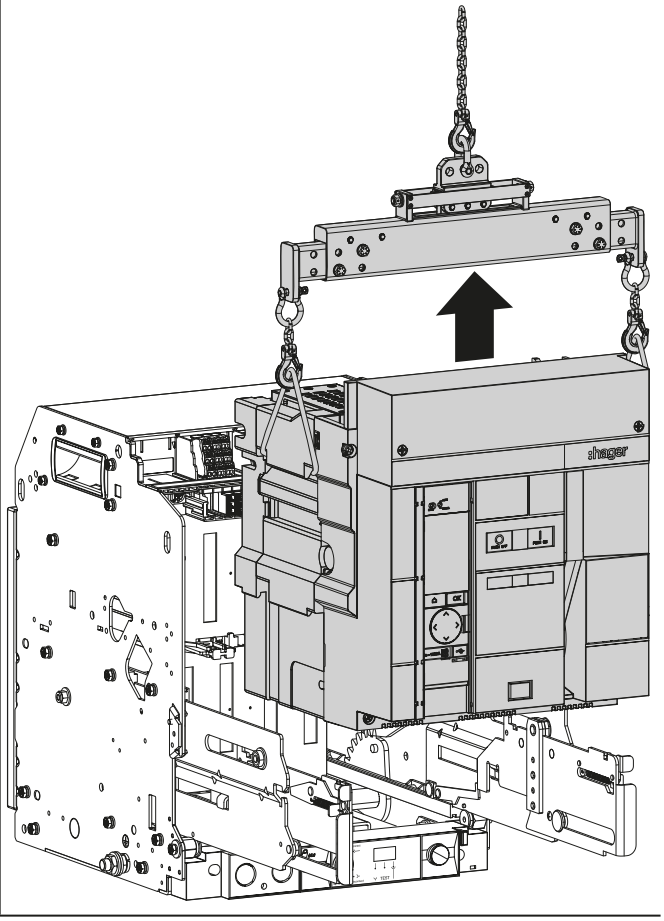
	Action	Illustration
1	Check that the circuit breaker is in the test position and the mechanical position indicator displays:	
2	Press the padlocking and position acknowledgement tab.	

	Action	Illustration
3	Turn the racking handle clockwise until: - the mechanical position indicator displays the Connected position, - the padlock latch and position acknowledgement tab comes out of its housing.	
4	Remove, then store the racking handle in its housing.	

⚠ CAUTION

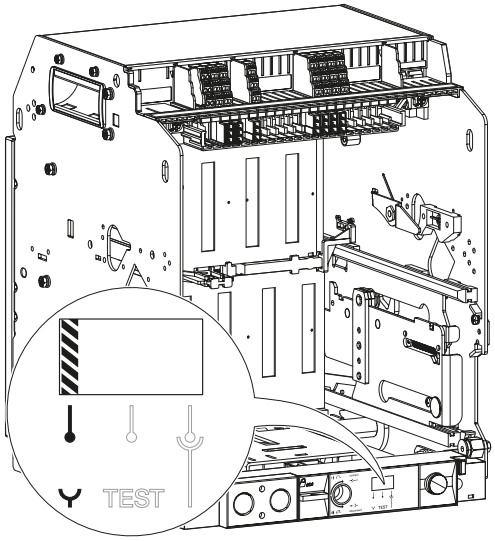
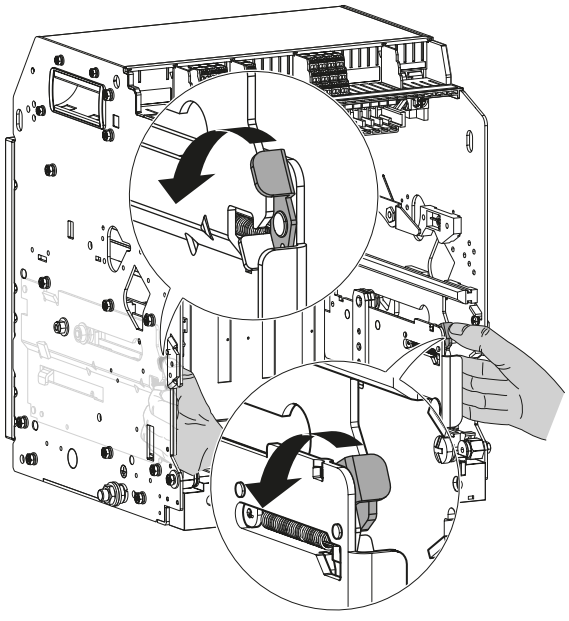
Risk of the circuit breaker falling out
Risk of injury by crushing.
Before handling the circuit breaker, ensure the chassis is fastened within the electrical distribution board. Ensure the device is only handled by qualified personnel equipped with lifting equipment and suitable safety equipment.

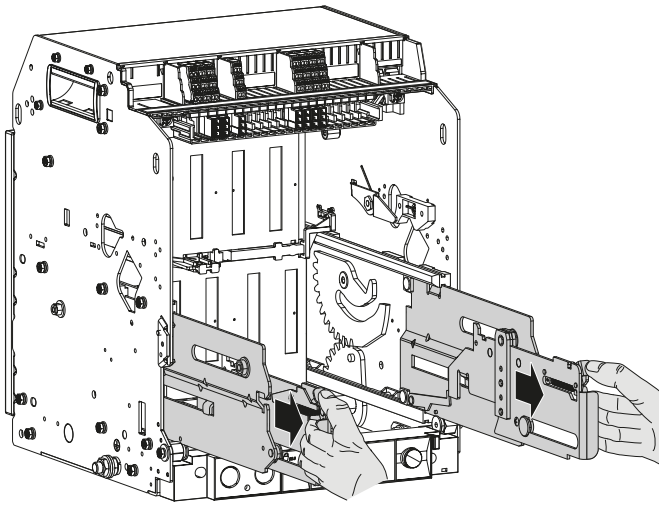
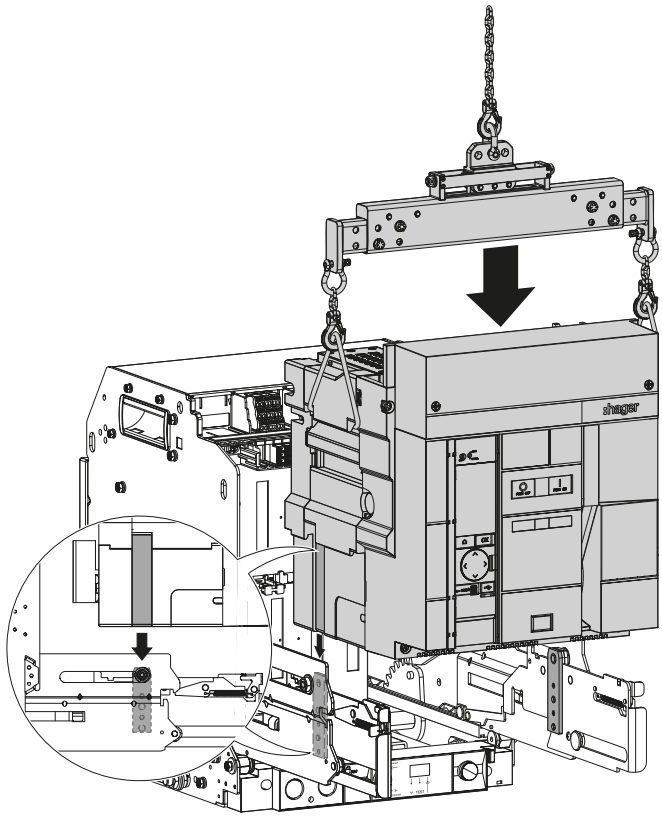
	Action	Illustration
1	Check that the circuit breaker is in the disconnected position (cf. Chapters 4.1 Changing from the connected position to the test position and 4.2 Changing from the test position to the disconnected position).	
2	The circuit breaker remains in the chassis in the disconnected position. While pressing the push buttons...	

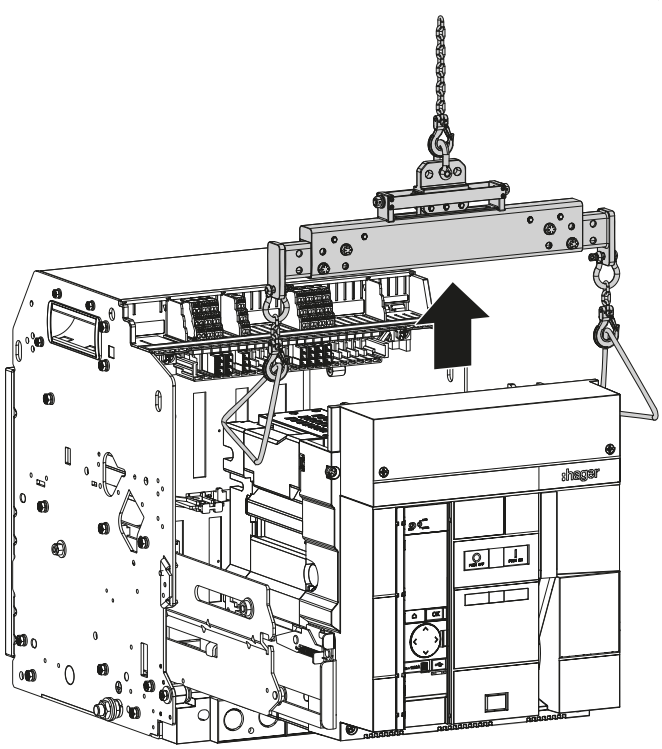
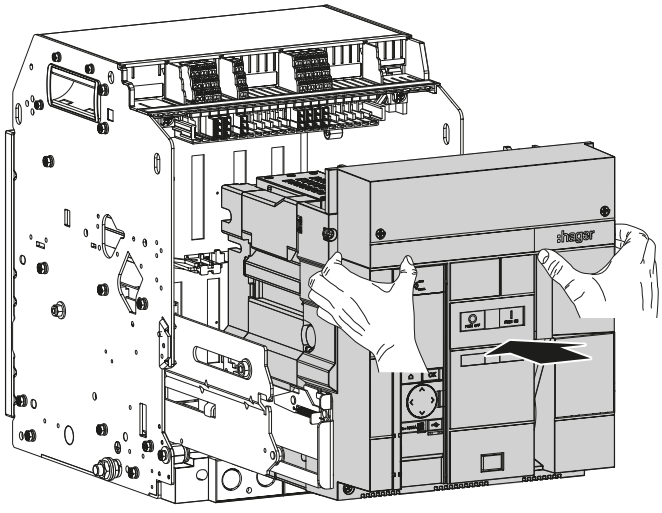
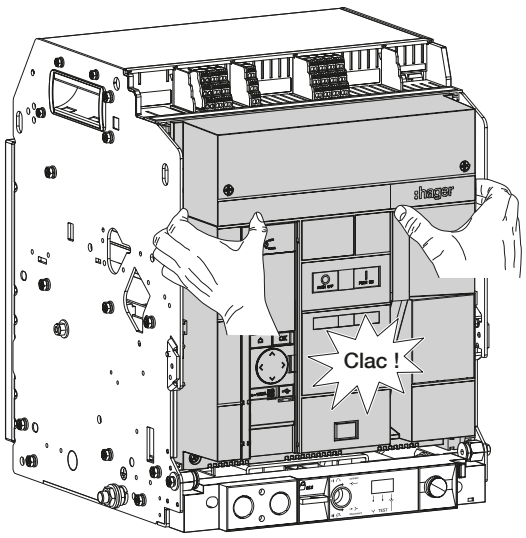
	Action	Illustration
2	*(continued)* pull the racking handles to take the circuit breaker out of its housing.	
3	Remove the circuit breaker from the guide rails using an appropriate lifting device.	

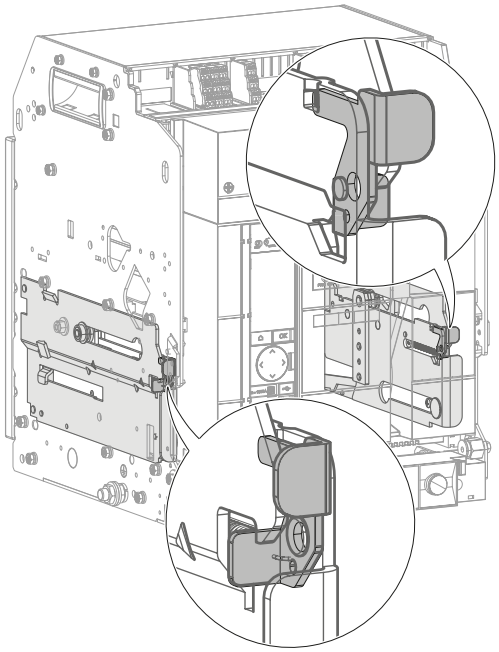
⚠ CAUTION

Risk of the circuit breaker falling out
Risk of injury by crushing.
Before handling the circuit breaker, ensure the chassis is fastened within the electrical distribution board. Ensure the device is only handled by qualified personnel equipped with lifting equipment and suitable safety equipment.

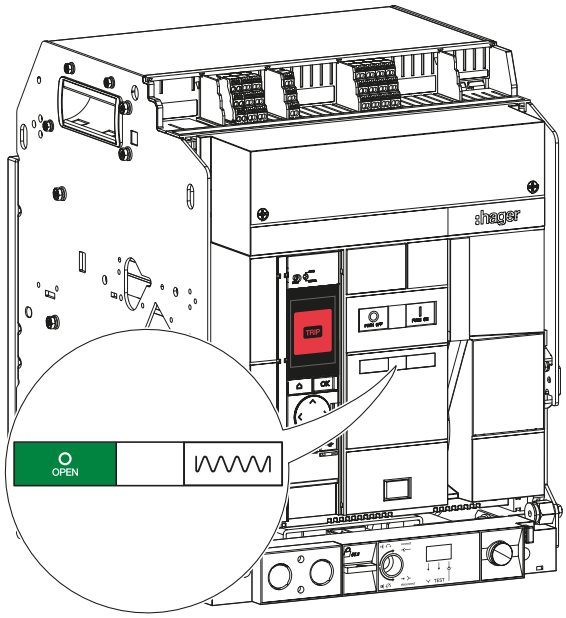
	Action	Illustration
1	Check that the chassis is in the disconnected position.	
2	While pressing the push buttons...	

	Action	Illustration
2	*(continued)* pull the racking handles to take out the guide rails.	
3	Using an appropriate lifting device, position the circuit breaker on the guide rails, having previously aligned the guides with the slots on the circuit breaker.	

	Action	Illustration
4	Remove the lifting equipment.	
5	Push the circuit breaker to the back of the chassis without pushing on the guide rails.	 

	Action	Illustration
6	Verify that the guide rails are correctly positioned.	

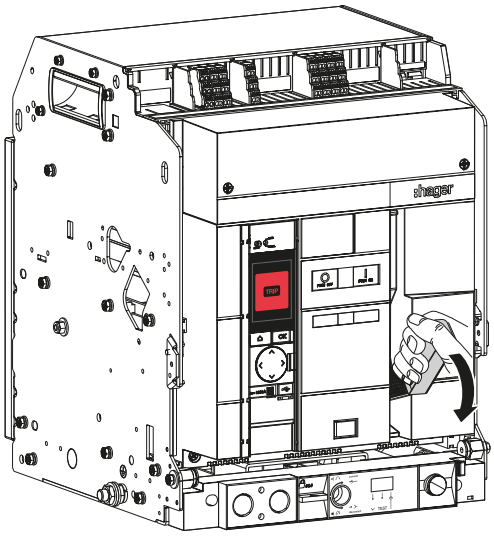
After tripping, the circuit breaker is open, the closing spring discharged if a charging motor is not installed. The circuit breaker is open, the spring charged if a charging motor is installed. The electronic trip unit display flashes.
To understand the cause of the tripping, refer to the 6LE007969A user manual for hw+ sentinel electronic trip units and the 6LE008147A user manual for hw+ sentinel Energy electronic trip units.

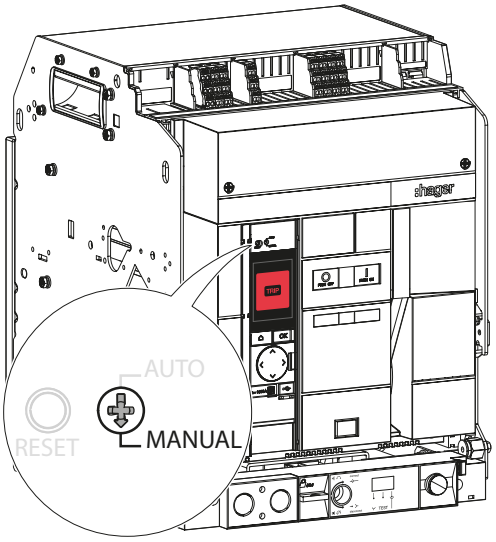
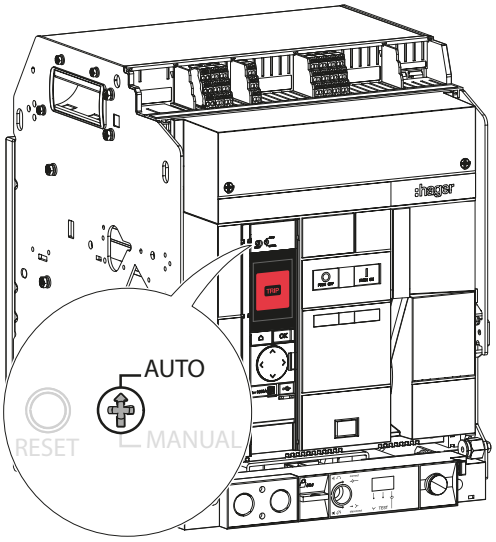
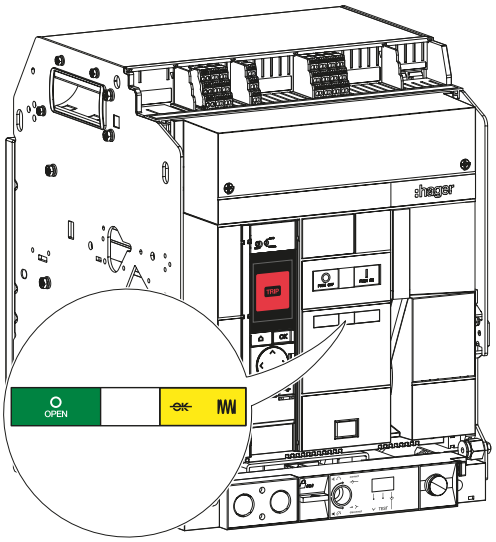


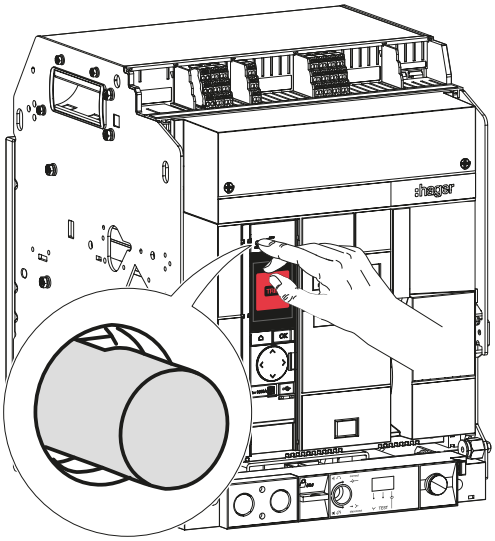
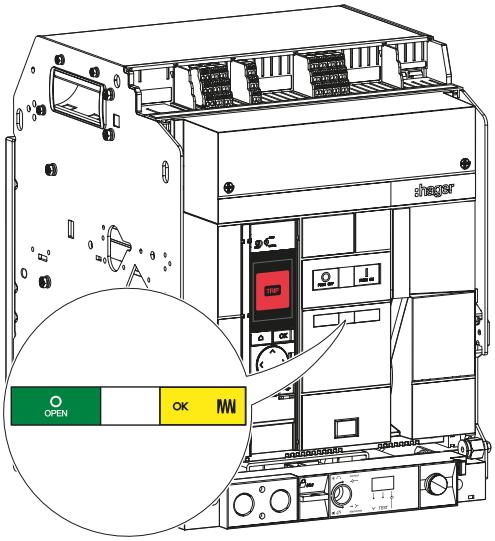
DANGER

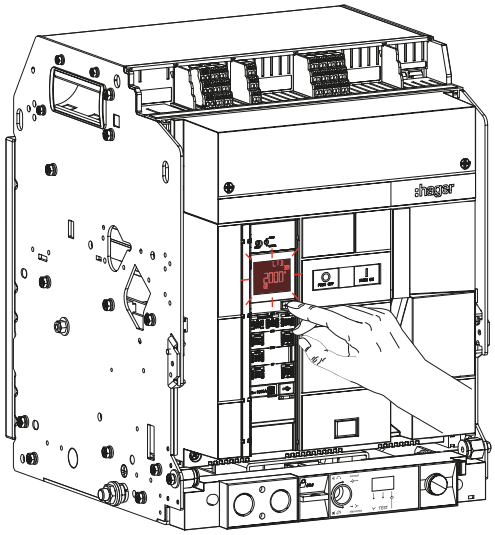
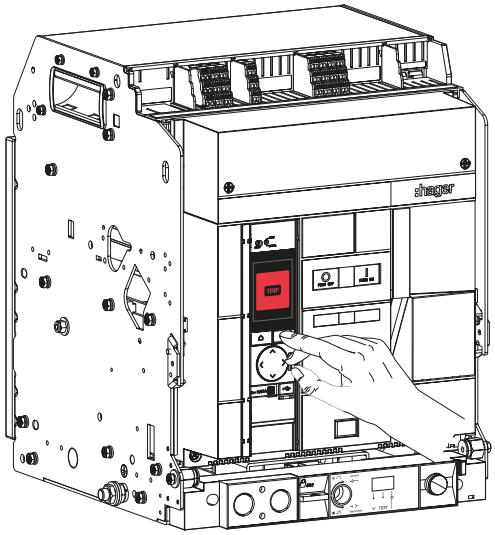
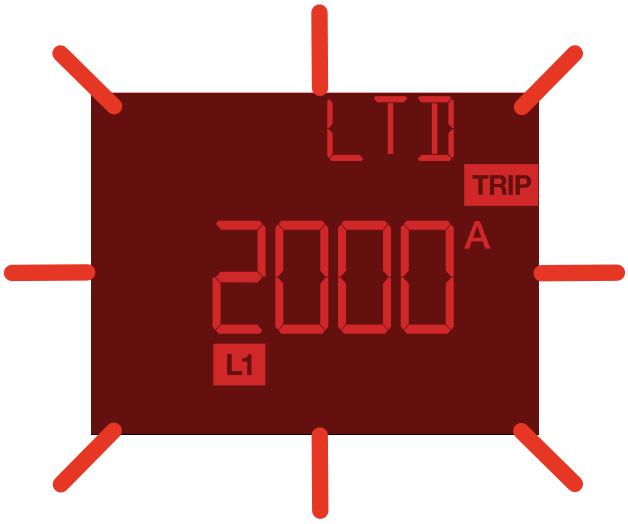
Risk of electric shock, explosion or electric arc.
Inspect the electrical installation and remove the tripping cause before closing the circuit breaker again.
Never close a circuit breaker locally or remotely without first making sure that the installation complies with the safety standards.

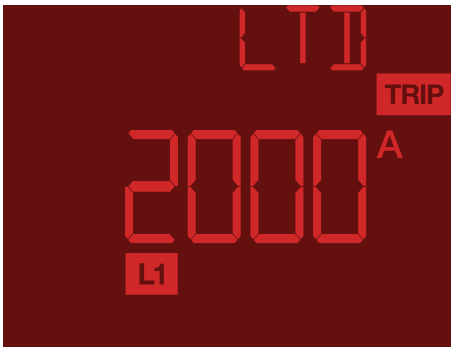
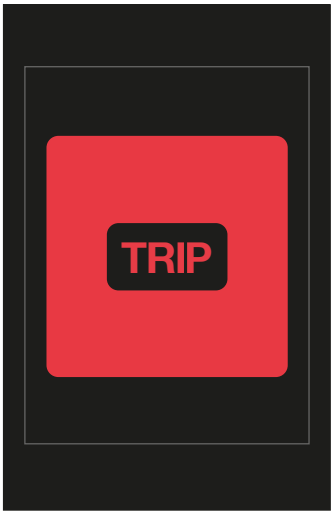
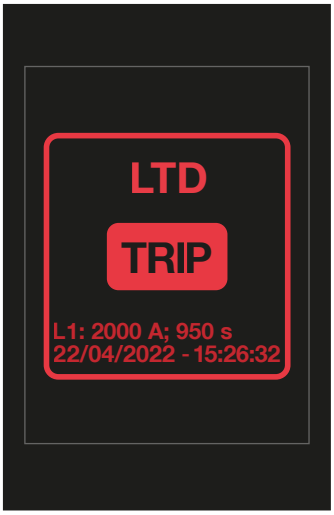
To close the circuit breaker:

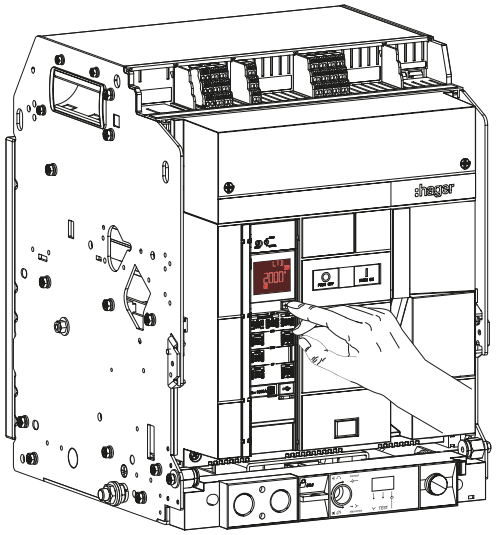
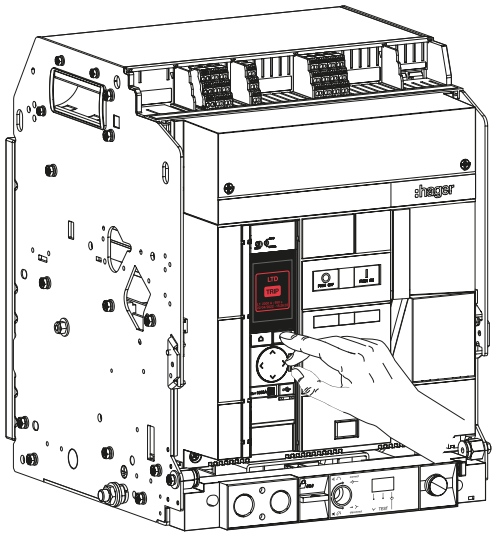
	Action	Illustration
1	Charge the spring using the charging handle until the status of the indicator changes. If a spring charging motor is installed, move on to step 2.	

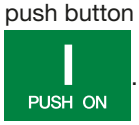
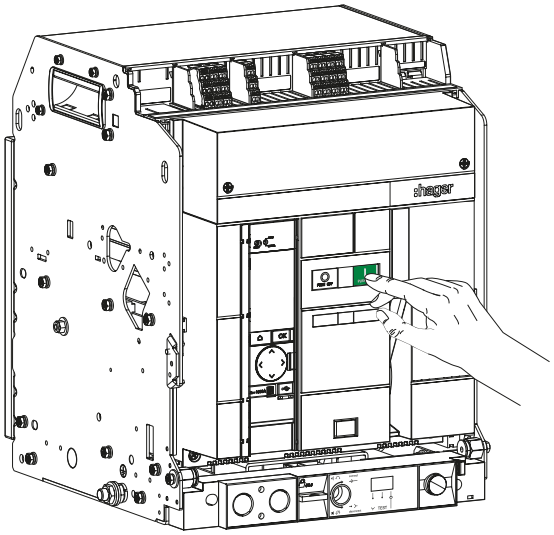
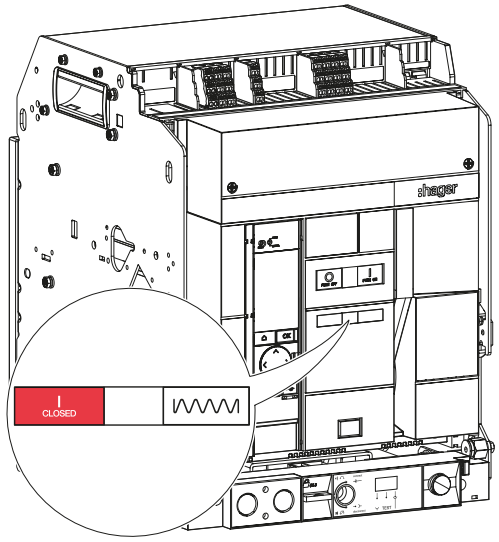
	Action	Illustration
2	If the circuit breaker reset is configured to **MANUAL**, move on to step 3.	
	If the circuit breaker reset type is set to **AUTO**, go directly to step 5.	
3	Check that the indicators display: The closing spring is charged, but the circuit breaker is not ready to be closed.	

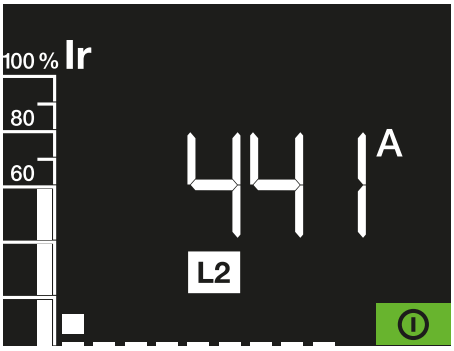
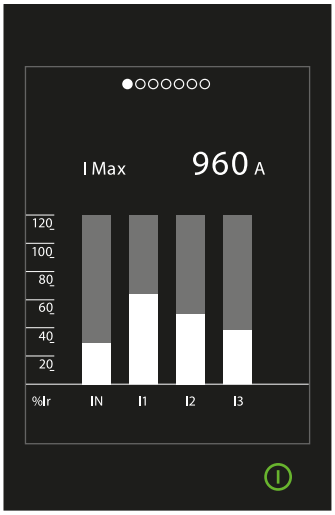
	Action	Illustration
4	Press the circuit breaker RESET re-arm button.	
5	Check that the closing spring is charged. The circuit breaker is now ready to be closed.	

	Action	Illustration
6	Then reset the trip unit display. **Briefly press** the button →OK for a sentinel trip unit	
	and the button OK for a sentinel Energy trip unit.	
	The sentinel trip unit display stops flashing:	

	Action	Illustration
6	*(continued)* and becomes steady:	
	The sentinel Energy trip unit display switches from this flashing message:	
	To this flashing message.	

	Action	Illustration
7	Press the →OK button **for more than 3 s** for a sentinel trip unit	
	and the OK button for a sentinel Energy trip unit.	
8	Check that the fault is cleared and that the display switches off.	

	Action	Illustration
9	Close the circuit breaker by pressing the closing push button  .	
10	Check that the indicators change status.	

	Action	Illustration
11	Verify that the ReadyToProtect indicator flashes on the sentinel trip unit display or that the ReadyToProtect indication light is lit on the sentinel Energy trip unit. If the display remains off, connect an external battery to the USB-C socket to perform this check.	sentinel trip unit  sentinel Energy trip unit 

ATTENTION

The trip unit must be powered in order for it to perform its protection functions. It is powered as long as a minimum current of 20% of the nominal current In passes through the circuit breaker.

Nevertheless, it is strongly recommended that an external 24 V DC SELV power supply (recommended reference model Hager HTG911H) be connected to terminal block TU to guarantee optimal operation of the trip unit and prevent malfunctions in the electrical installation associated with a breach in the continuity of the trip unit operation.

Hager Electro SAS
132 Boulevard d'Europe
BP3
67210 OBERNAI CEDEX

hager.com

2024-10

6LE009210Ac