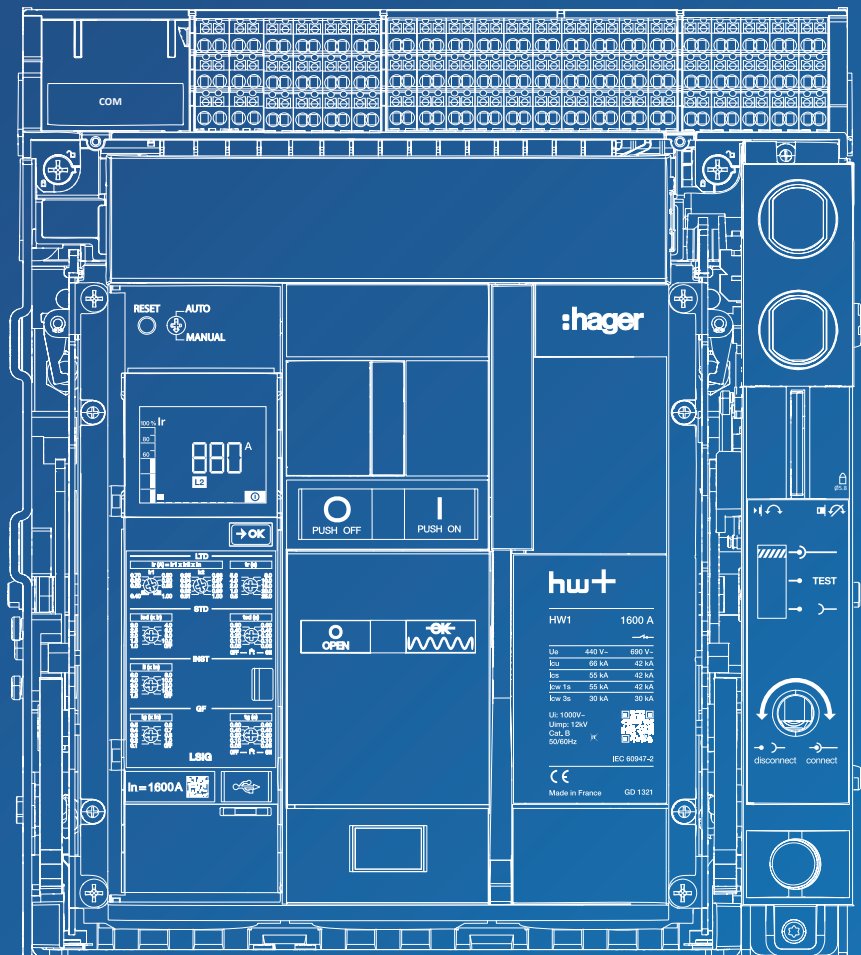


# hw+

Air circuit breakers  
up to 1600A



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



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



**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, electrical installers, panel builders and maintenance personnel with the technical information necessary for the installation and commissioning of hw+ circuit breakers with electronic trip units.

### Field of application

This document applies to hw+ circuit breakers with electronic trip units.

### Revisions

date	Date
6LE007893Ab	September 2022

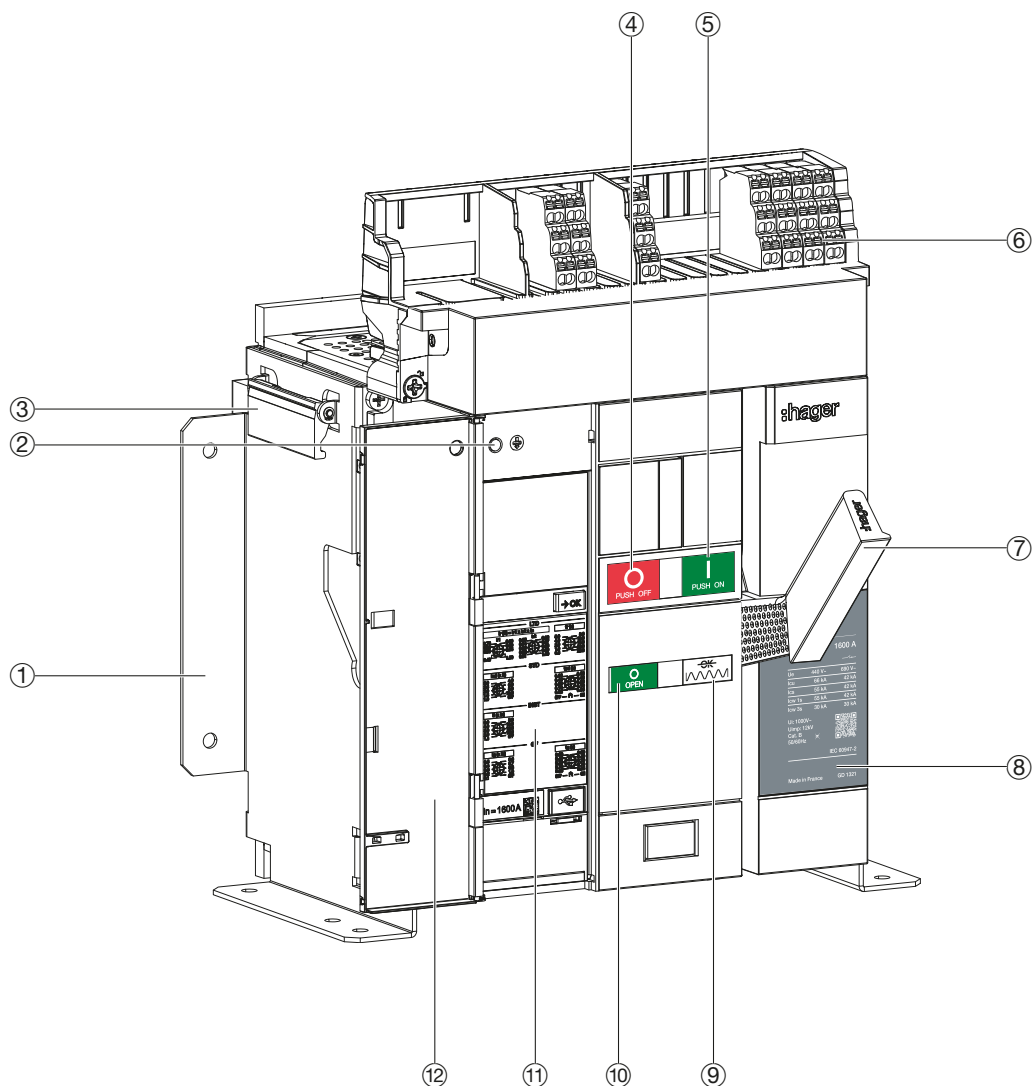
### Documents to consult

Document	Reference
User manual for hw+ sentinel electronic trip units	6LE007969A
User manual for hw+ air circuit breakers	6LE007332A
hw+ user maintenance guide	6LE007897A

You can download these publications and other technical information from our website: [www.hager.com](http://www.hager.com)

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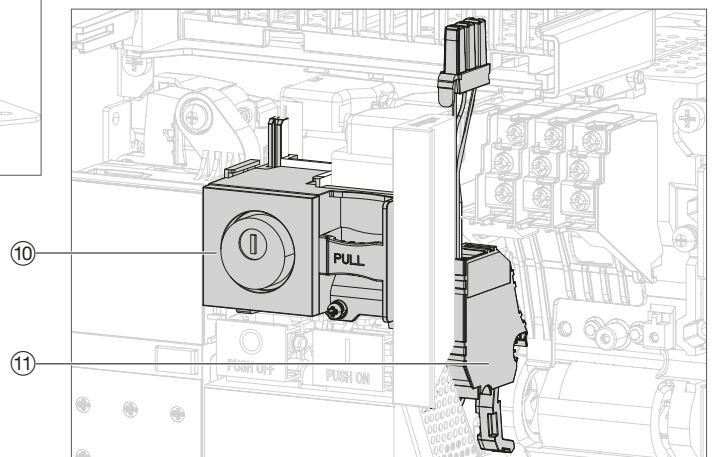
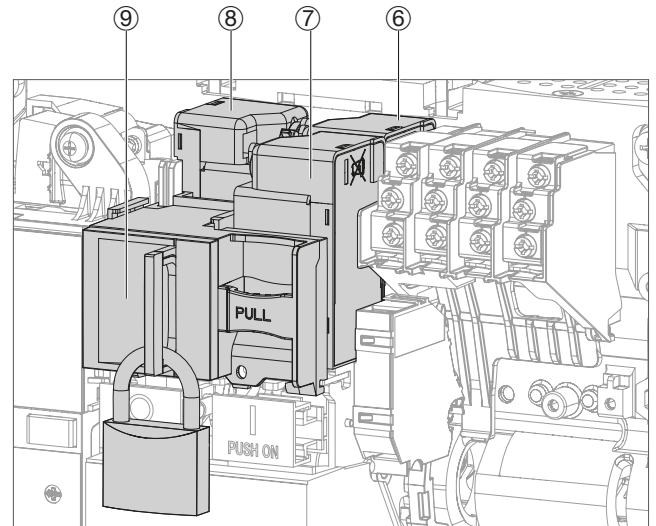
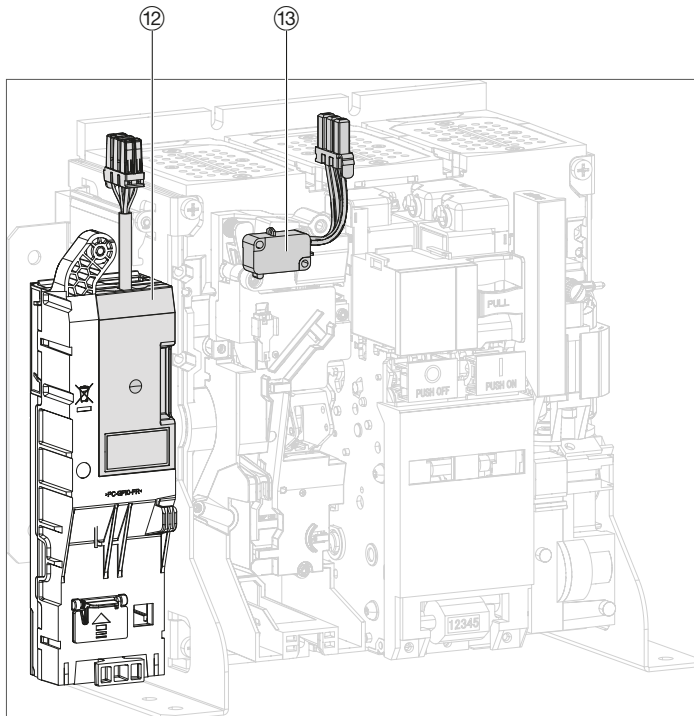
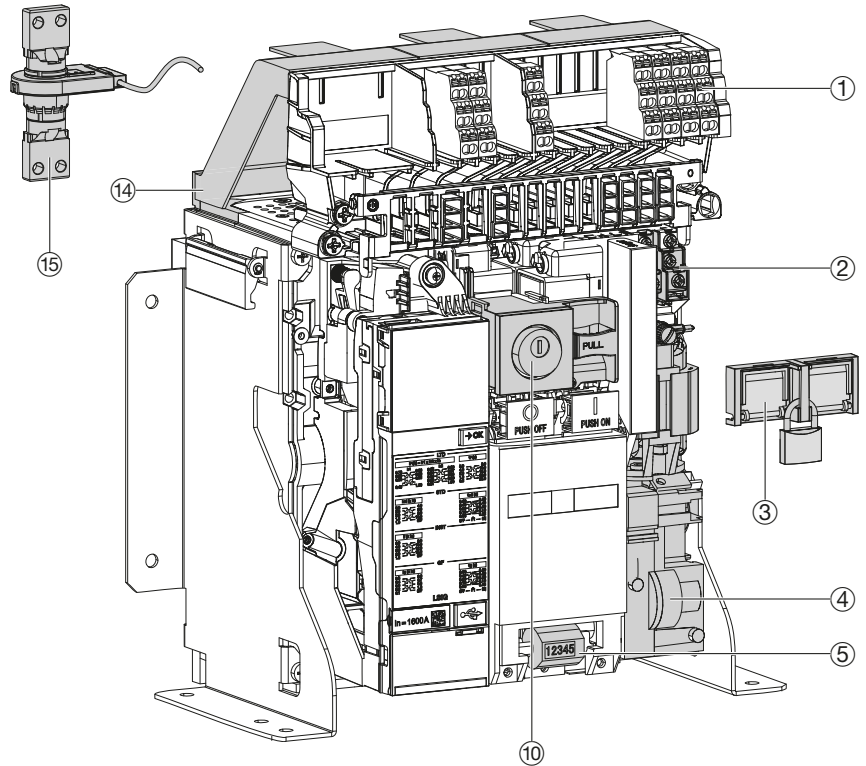


- ① Side plate for fixing
- ② RESET re-arm button
- ③ Lifting handle
- ④ Opening push button
- ⑤ Closing push button
- ⑥ Terminal blocks TB
- ⑦ Charging handle
- ⑧ Circuit breaker rating label
- ⑨ Closing spring status indicator
- ⑩ Contact opening and closing indicator
- ⑪ Electronic trip unit
- ⑫ Transparent cover of the electronic trip unit

# Fixed circuit breakers

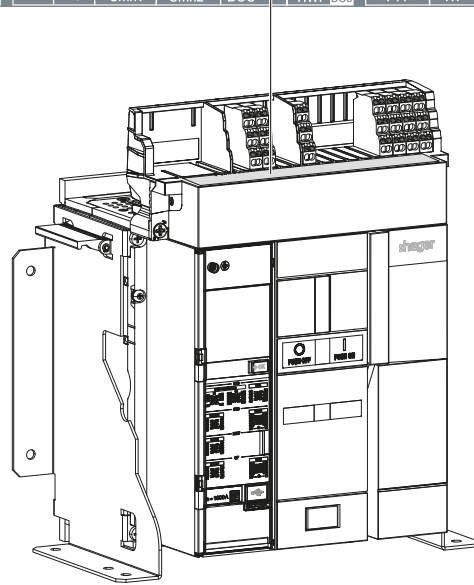
## 2.2 Description of the accessories

- ① Terminal blocks TB
- ② Auxiliary contacts AX
- ③ Opening and closing push-button locking cover PBC
- ④ MO charging Motor
- ⑤ CYC Operation Cycle Counter
- ⑥ Shunt trip coil SH or Undervoltage release coil UV
- ⑦ CC closing coil
- ⑧ Undervoltage release coil UV or Shunt trip coil SH
- ⑨ Locking the circuit breaker in open position using padlocks OLP
- ⑩ Locking the circuit breaker in open position using key locks OLK
- ⑪ Ready-to-close contact RTC
- ⑫ OAC Output Alarm Contact module
- ⑬ FS Fault trip contact
- ⑭ Cut-off chamber cover
- ⑮ External neutral sensor ENCT



hw+ circuit breakers are equipped with terminal blocks designed to connect the accessories. Some are provided as standard and always installed while others are installed according to the circuit breaker configuration.

COM/ESP		TU		ZSI		OAC		FS		RTC/FS2		UV/SH2		SH/UV2		MO		CC		AX1/vN		AX2		AX3		AX4	
	5 <sup>th</sup> S1	4 <sup>th</sup> S1	- 24V +	STD1	STD2	LTD	DO1	GF	DO3	F12	R2	F22	D12	C22	C12	D22	M2	A2	12	MN	22	32	42				
	5 <sup>th</sup> S2	4 <sup>th</sup> S2	2 CIP 1	GF1	GF2	S/I	DO2	PTA	DO4	F14	R4	F24	C24	C13		M4	A3	14	24	34	44						
			- RR/DI +	Cmn1	Cmn2	DOC		HWF	DO5	F11	R1	F21	D11	C21	C11	D21	M1	A1	11	21	31	41					



COM/ESP			
	5 <sup>th</sup> S1	4 <sup>th</sup> S1	
	5 <sup>th</sup> S2	4 <sup>th</sup> S2	

Terminal blocks	Description	Standard or as an accessory
COM/ESP	External sensors 4 <sup>th</sup> S1 and 4 <sup>th</sup> S2: connection of an external ENCT neutral current sensor for 3 pole circuit breakers	Accessory

# Fixed circuit breakers

## 2.3 Description of the terminal blocks

TU		ZSI		OAC		
- 24 V	+	STD1	STD2	LTD	DO1	GF DO3
2 CIP	1	GF1	GF2	S/I	DO2	PTA DO4
- RR/DI	+	Cmn1	Cmn2	DOC		HWF DO5

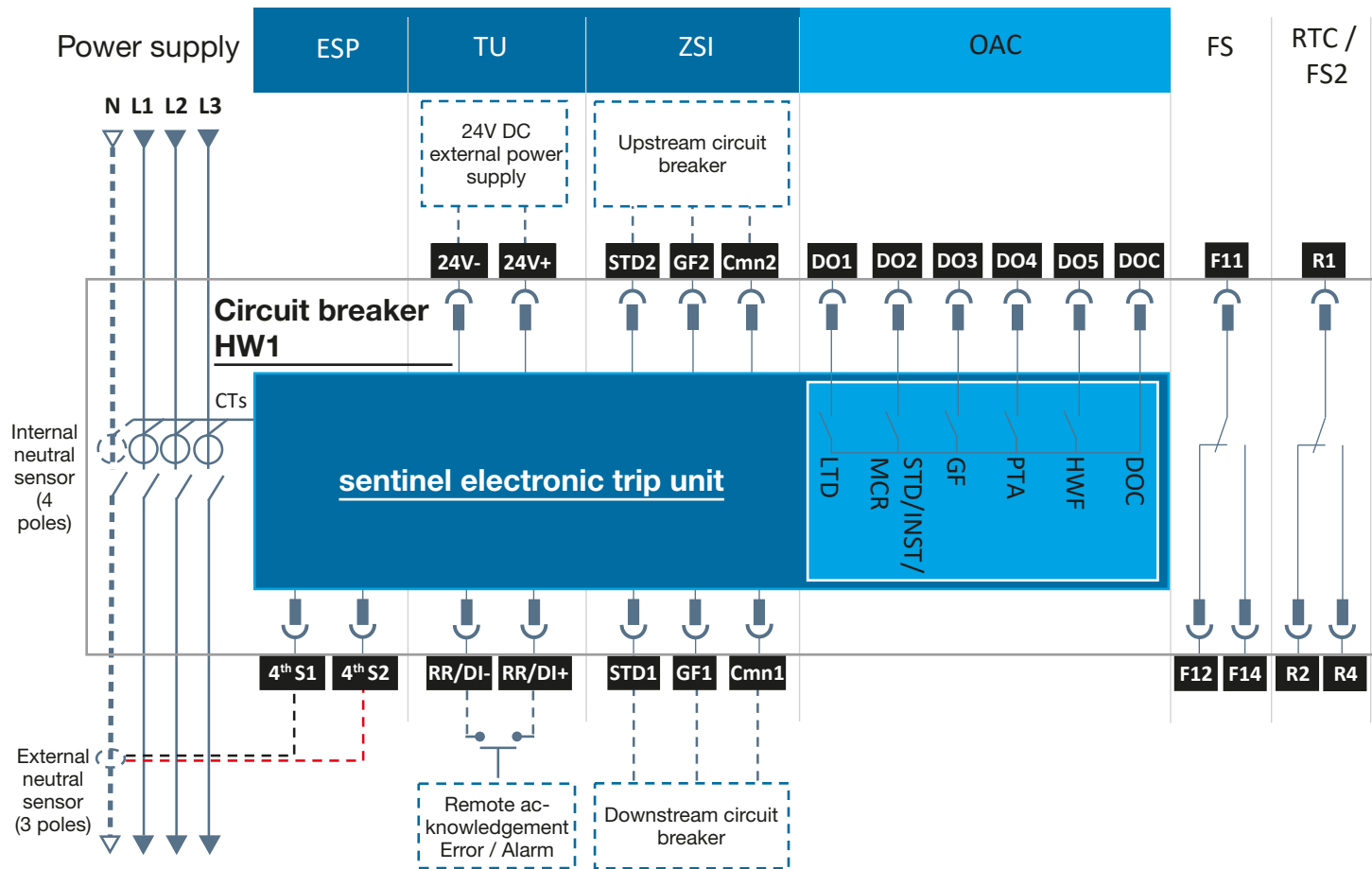
Terminal blocks	Description	Standard or as an accessory
TU	<p>Electronic trip unit</p> <p>24 V + and -: external 24V DC SELV power supply (recommended product reference Hager HTG911H) is necessary to use the OAC output alarm contacts module and/or the permanent power supply of the electronic trip unit display.</p> <p>RR/DI + and -: used to reset the display of the electronic trip unit following a trip.</p>	Standard
ZSI	<p>Zone selectivity on the STD protection and/or earth protection.</p> <p>Connection to downstream circuit breakers:</p> <p>STD1: selectivity on the Short time delay protection</p> <p>GF1: selectivity on the earth fault protection</p> <p>Cmn1: common</p> <p>Connection to the upstream circuit breaker:</p> <p>STD2: selectivity on the Short time delay protection</p> <p>GF2: selectivity on the earth fault protection</p> <p>Cmn2: common</p>	Terminal block mounted as standard but function is deactivated
OAC	<p>Output Alarm Contacts</p> <p>LTD: tripping after Long Time Delay protection</p> <p>S/I: tripping after Short Time Delay, Instantaneous or MCR protection</p> <p>DOC: common</p> <p>GF: tripping after earth fault protection</p> <p>PTA: Overload pre-alarm activation</p> <p>HWF: tripping following a critical system alarm</p>	Accessory



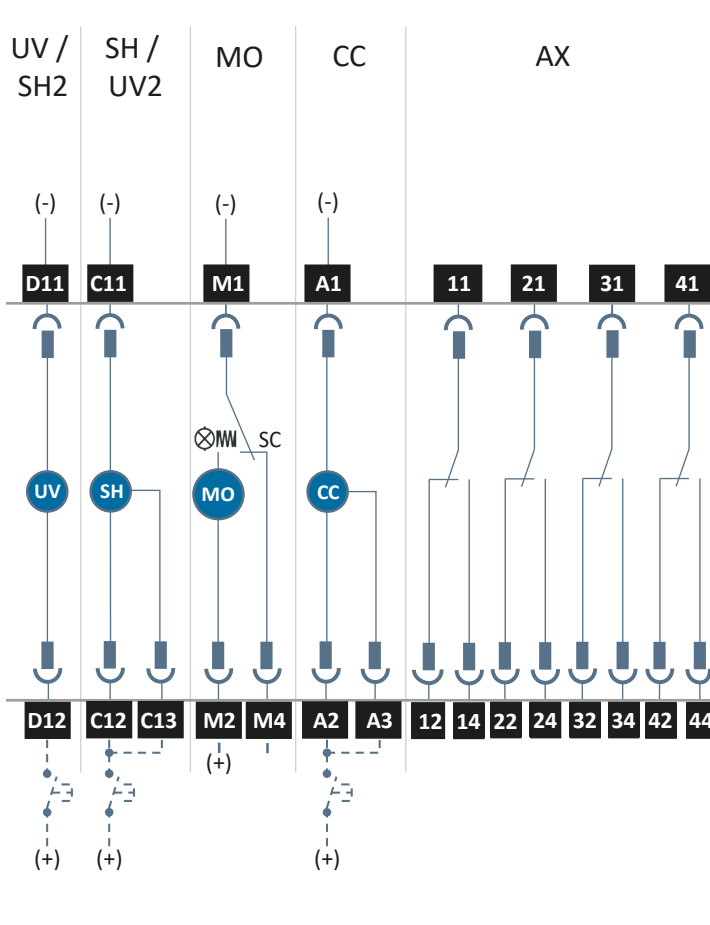
FS	RTC/FS2	UV/SH2	SH/UV2	MO	CC	AX1/vN	AX2	AX3	AX4
F12	R2 F22	D12 C22	C12 D22	M2	A2	12 vN	22	32	42
F14	R4 F24	C23	C13	M4	A3	14	24	34	44
F11	R1 F21	D11 C21	C11 D21	M1	A1	11	21	31	41

Terminal blocks	Description	Standard or as an accessory
FS	Fault trip contact Unlike OAC terminal blocks which gives precise information about the cause of the tripping, this terminal block gives general tripping information.	Standard
RTC/FS2	Contact ready to close or trip fault contact No. 2 These terminal blocks can be connected either to use an RTC ready to close contact or a 2 <sup>nd</sup> FS2 Fault trip contact.	Accessory
UV/SH2	These terminal blocks can be connected either to use a UV undervoltage release coil or an SH shunt trip coil.	Accessory
SH/UV2	These terminal blocks can be connected either to use an SH shunt trip coil or a 2 <sup>nd</sup> UV undervoltage release coil.	Accessory
MO	Power supply of the MO charging motor. Note the connection of the SC charged spring signalling contact is also done at this terminal block.	Accessory
CC	Connection of a closing coil CC	Accessory
AX1/vN	Auxiliary contact No.1- Signals the circuit breaker open/closed status	Standard
AX2	Auxiliary contact No.2 - Signals the circuit breaker open/closed status	Standard
AX3	Auxiliary contact No. 3 - Indication of the open / closed state of the circuit breaker	Standard
AX4	Auxiliary contact No. 4 - Indication of the open / closed state of the circuit breaker	Standard

Connecting diagram of the HW1 fixed circuit breakers with the sentinel electronic trip unit



Terminal blocks	Terminations
ESP	External sensors
TU	Electronic trip unit
ZSI	Zone selectivity function
OAC	Output Alarm Contacts
FS	Fault trip contact



Terminal blocks	Terminations
RTC/FS2	Ready-to-close contact
UV/SH2	UV undervoltage coil or 2 <sup>nd</sup> SH shunt trip coil
SH/UV2	SH shunt trip coil or 2 <sup>nd</sup> UV undervoltage coil
MO	MO charging motor and SC spring loaded signalling contact
CC	Closing coil CC
AX	Auxiliary contact - 4 contacts signalling the circuit breaker open/closed status

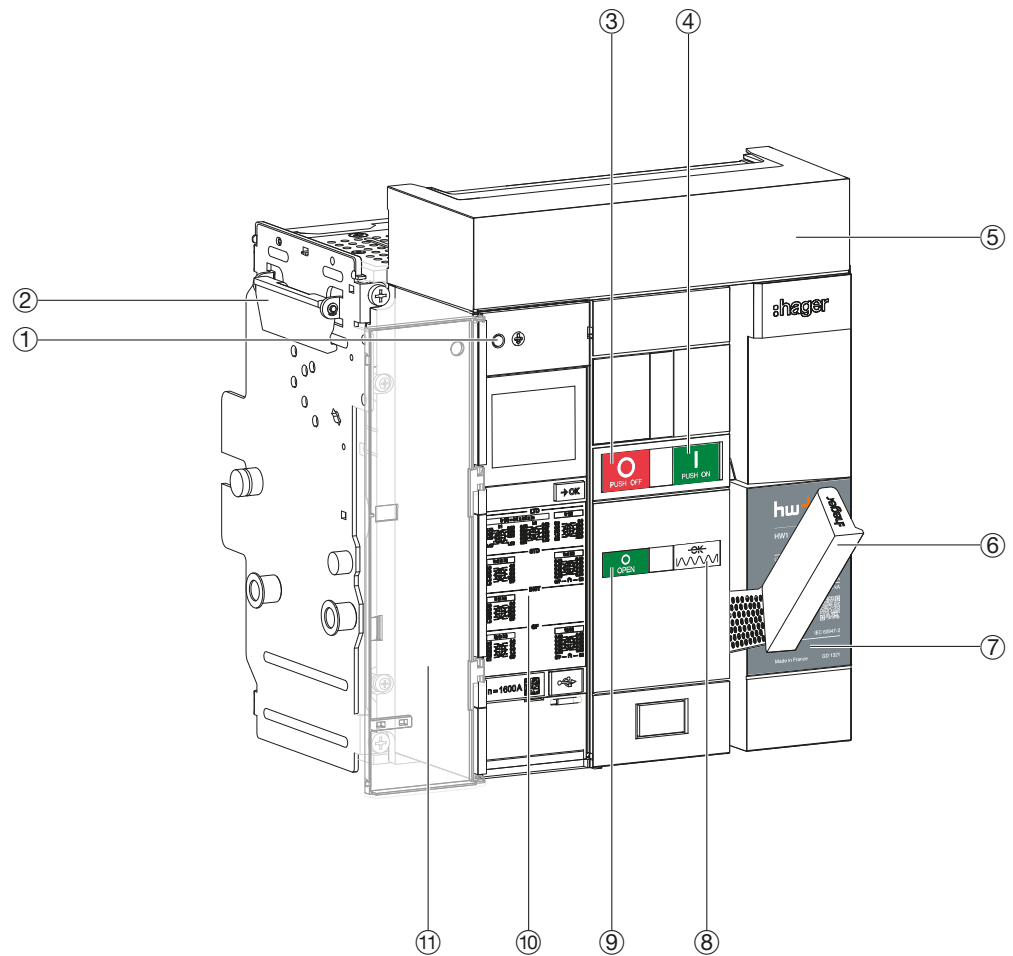
The cables used must have a cross section between 0.6 mm<sup>2</sup> and 2.5 mm<sup>2</sup>. They can be flexible or rigid.

In order to be properly held in place in the terminals, the connected cables must first be stripped form 10 to 12 mm.

Flexible cables must not be twisted. Only one cable is authorised per terminal.

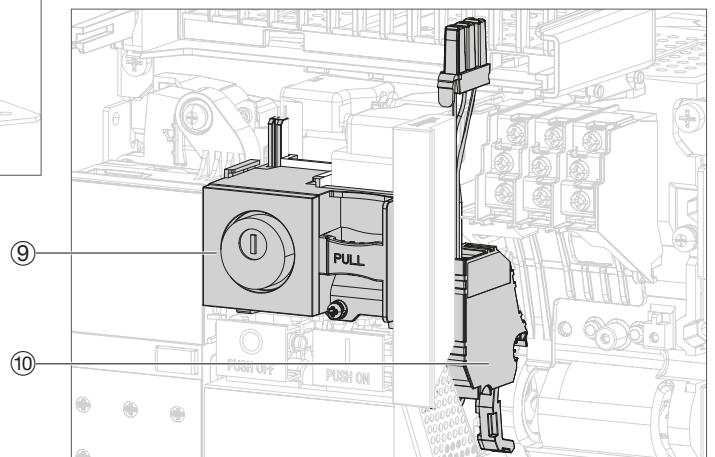
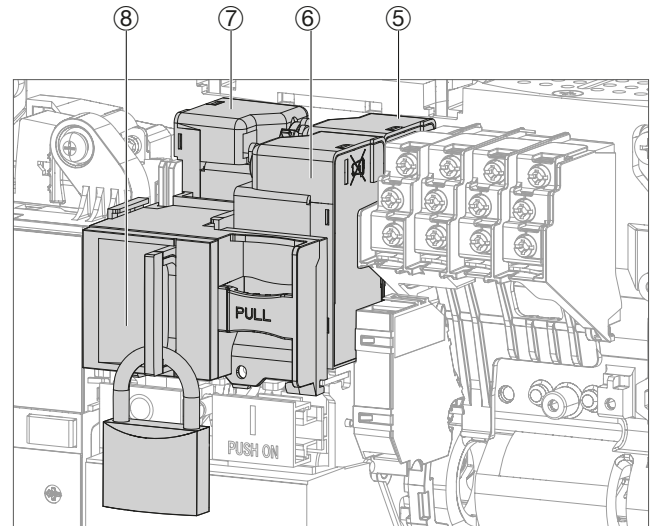
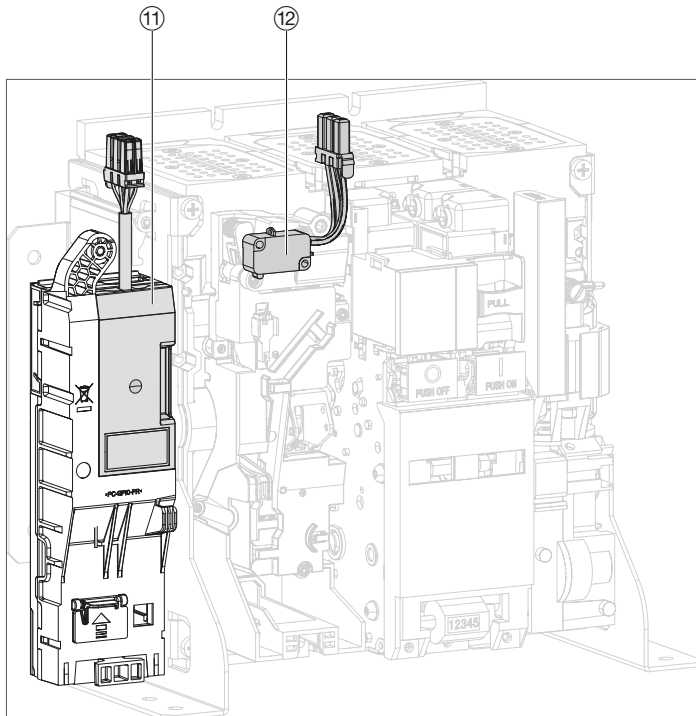
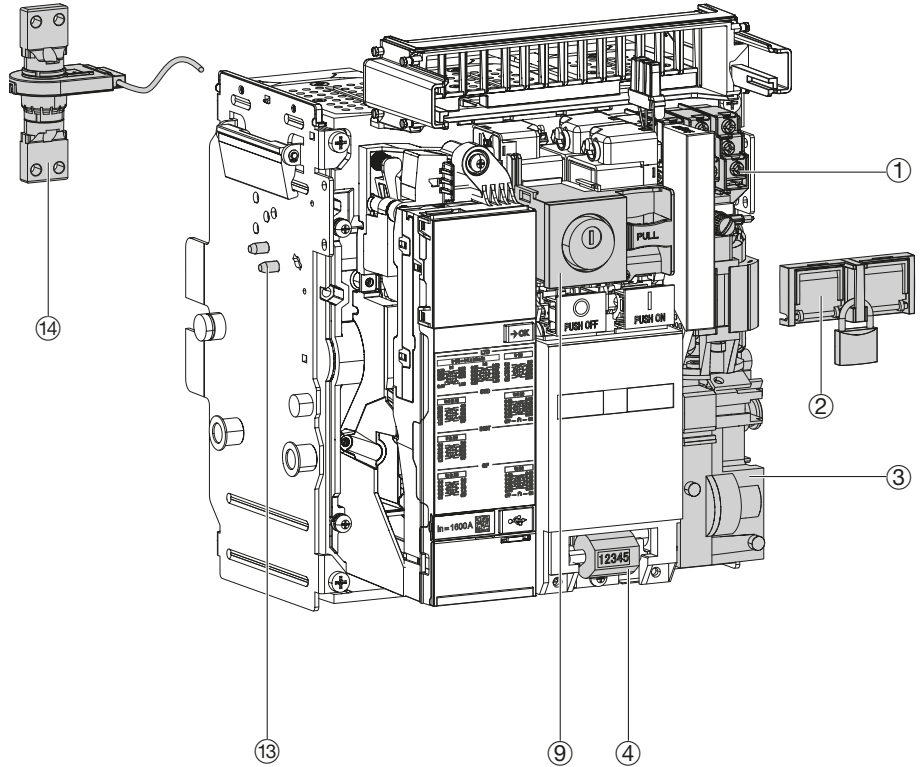
A drawout circuit breaker has two parts:

- A fixed part, the chassis.
- A mobile part, the circuit breaker itself which is inserted into the chassis.



- ① RESET re-arm button
- ② Lifting handle
- ③ Opening push button
- ④ Closing push button
- ⑤ Accessory connector cover
- ⑥ Charging handle
- ⑦ Circuit breaker rating label
- ⑧ Closing spring status indicator
- ⑨ Contact opening and closing indicator
- ⑩ Electronic trip unit
- ⑪ Transparent cover of the electronic trip unit

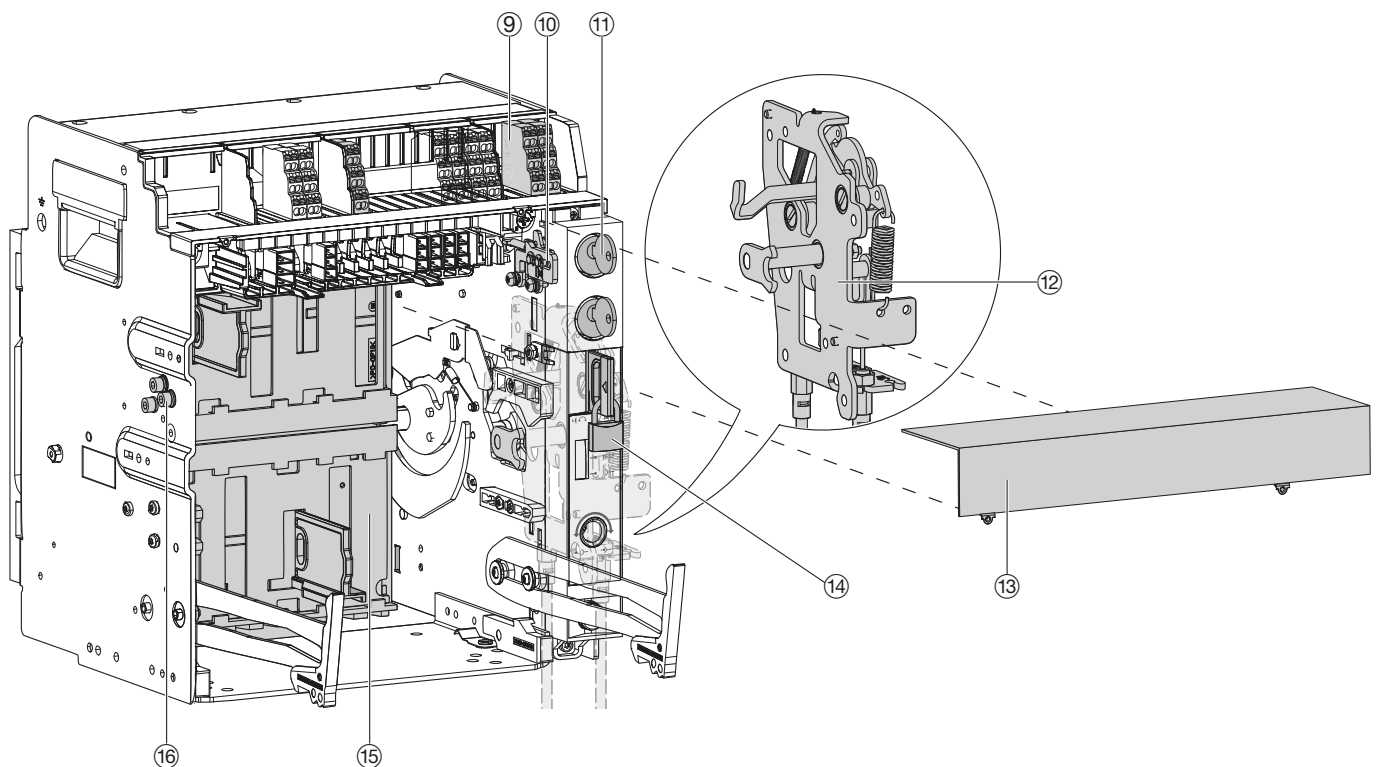
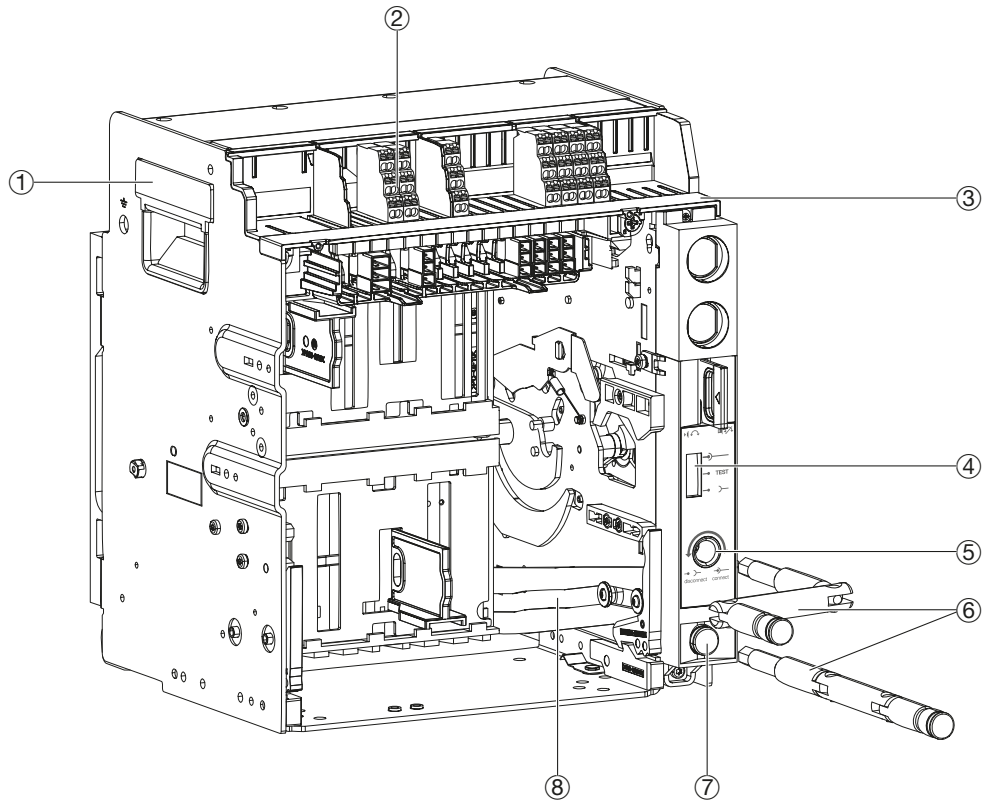
- ① Auxiliary contacts AX
- ② Opening and closing push-button locking cover PBC
- ③ MO charging Motor
- ④ CYC Operation Cycle Counter
- ⑤ SH shunt trip coil or UV undervoltage release coil
- ⑥ CC closing coil
- ⑦ UV undervoltage release coil or SH shunt trip coil
- ⑧ Locking the circuit breaker in open position using padlocks OLP
- ⑨ Locking the circuit breaker in open position using key locks OLK
- ⑩ RTC Ready-to-Close contact
- ⑪ OAC Output alarm contact module
- ⑫ FS Fault trip contact
- ⑬ WIP wrong insertion preventer chassis / circuit breaker
- ⑭ ENCT external neutral current sensor



# Drawout circuit breakers

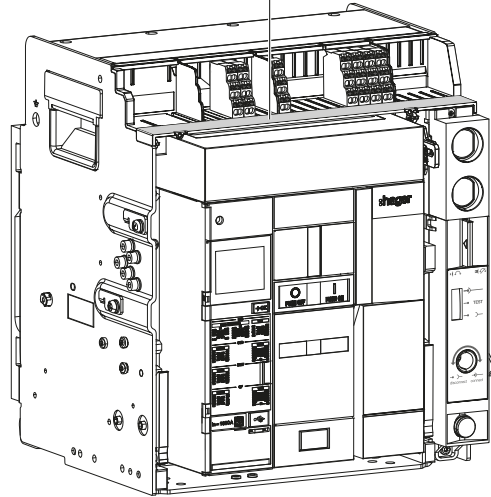
## 3.3 Description of the chassis and its accessories

- ① Lifting handle
- ② Terminal blocks TB
- ③ Terminal block label
- ④ Mechanical position indicator of the moving part
- ⑤ Place to insert the racking handle
- ⑥ Handle
- ⑦ Handle storage place
- ⑧ Guide rail
- ⑨ PS position contacts
- ⑩ RI open door racking interlock
- ⑪ Locking of the position of the moving part using CL key locks
- ⑫ MI mechanical interlock
- ⑬ Terminal block protection cover
- ⑭ Locking of the position of the moving part by means of a padlock
- ⑮ Safety shutters
- ⑯ WIP wrong insertion preventer chassis / circuit breaker



The chassis of drawout hw+ circuit breakers is equipped with terminal blocks designed to connect the accessories. Some are provided as standard and always installed while others are installed according to the circuit breaker configuration.

COM		ESP	TU	ZSI			OAC			FS	RTC/FS2	UV/SH2	SH/UV2	MO	CC	AX1/vN	AX2	AX3	AX4	D1	D2	T1	C1	C2
5 <sup>th</sup> S1	4 <sup>th</sup> S1	-	24 V	STD1	STD2	LTD	D01	GF	D03	F12	R2	D12	C12	M2	A2	12	22	32	42	D12	D22	T12	C12	C22
5 <sup>th</sup> S2	4 <sup>th</sup> S2	2	CIP	GF1	GF2	STD/INST	D02	PTA	D04	F14	R4	D24	C13	M4	A3	14	24	34	44	D14	D24	T14	C14	C24
			RR/DI	Cmn1	Cmn2	DOC	HWF	D05		F11	R1	D11	C11	M1	A1	11	21	31	41	D11	D21	T11	C11	C21



Terminal blocks	Description	Standard or as an accessory
COM	Not used	

# Drawout circuit breakers

## 3.4 Description of the chassis terminal blocks

ESP		TU		ZSI		OAC	
5 <sup>th</sup> S1	4 <sup>th</sup> S1	-	24V +	STD1	STD2	LTD DO1	GF DO3
5 <sup>th</sup> S2	4 <sup>th</sup> S2	2	CIP 1	GF1	GF2	STD/INST DO2	PTA DO4
		-	RR/DI +	Cmn1	Cmn2	DOC	HWF DO5

Terminal blocks	Description	Standard or as an accessory
ESP	External sensors 4 <sup>th</sup> S1 and 4 <sup>th</sup> S2: connection of an external ENCT neutral current sensor for 3-pole circuit breakers.	Accessory
TU	Electronic trip unit 24 V + and -: external 24V DC SELV power supply (recommended reference model Hager HTG911H) is necessary to use the OAC output alarm contacts module and/or view the protection settings on the electronic trip unit display RR/DI + and -: used to remotely reset the display of the remote electronic trip unit following a tripping operation.	Standard
ZSI	Zone Selectivity Function. For zone selectivity on the STD protection and/or earth fault protection. Connection to downstream circuit breakers: STD1: selectivity on the Short time delay protection GF1: selectivity on the earth fault protection Cmn1: common Connection to the upstream circuit breaker: STD2: selectivity on the Short time delay protection GF2: selectivity on the earth fault protection Cmn2: common	Terminal block are mounted as a standard but function is deactivated
OAC	Output Alarm Contacts LTD: tripping after Long Time Delay protection STD/INST: Short Time Delay or Instantaneous protection DOC: common GF: tripping after earth fault protection PTA: Overload pre-alarm activation HWF: following a critical system alarm	Accessory



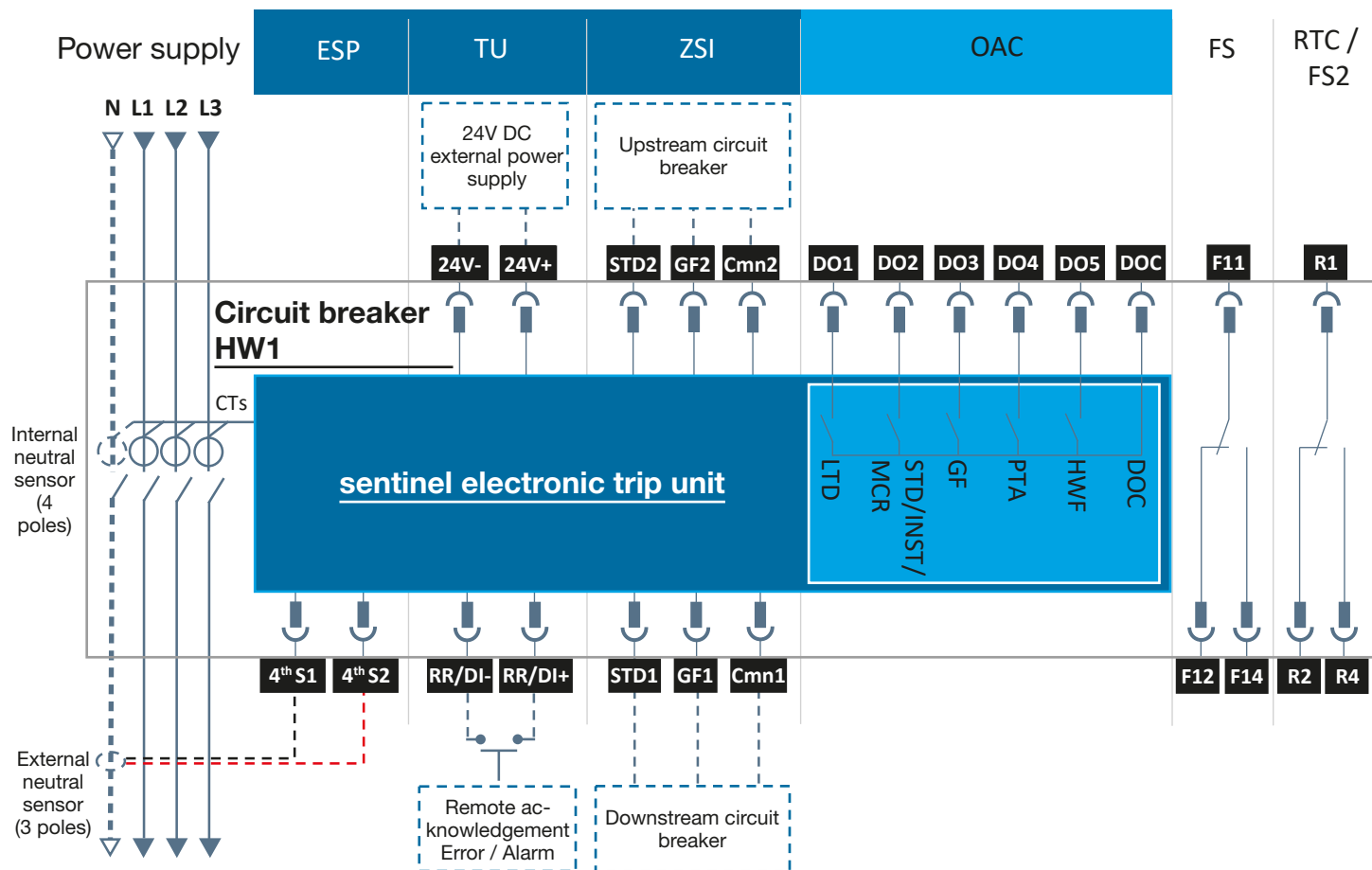
FS	RTC/FS2	UV/SH2	SH/UV2	MO	CC	AX1/vN	AX2	AX3	AX4
F12	R2 F22	D12 C22	C12 D22	M2	A2	12 vN	22	32	42
F14	R4 F24	C23	C13	M4	A3	14	24	34	44
F11	R1 F21	D11 C21	C11 D21	M1	A1	11	21	31	41

Terminal blocks	Description	Standard or as an accessory
FS	Fault trip contact Unlike OAC terminal blocks which gives precise information about the cause of the tripping, this terminal block gives general tripping information. It should be noted that this terminal block does not send information if the circuit breaker is opened manually using the OFF push-button.	Standard
RTC/FS2	RTC ready to close contact or Fault trip contact No. 2 FS2 These terminal blocks can be connected either to use an RTC ready to close contact or a 2 <sup>nd</sup> FS2 Fault trip contact.	Accessory
UV/SH2	These terminal blocks can be connected either to use a UV undervoltage release coil or an SH shunt trip coil.	Accessory
SH/UV2	These terminal blocks can be connected either to use an SH shunt trip coil or a 2 <sup>nd</sup> UV undervoltage release coil.	Accessory
MO	Power supply of the MO charging motor. Note the connection of the SC charged spring signalling contact is also done at this terminal block.	Accessory
CC	Connection of a closing coil CC	Accessory
AX1	Auxiliary contact No.1 - Signals the circuit breaker open/closed status	Standard
AX2	Auxiliary contact No. 2 - Signals the circuit breaker open/closed status	Standard
AX3	Auxiliary contact No. 3 - Signals the circuit breaker open/closed status	Standard
AX4	Auxiliary contact No.4 - Signals the circuit breaker open/closed status	Standard

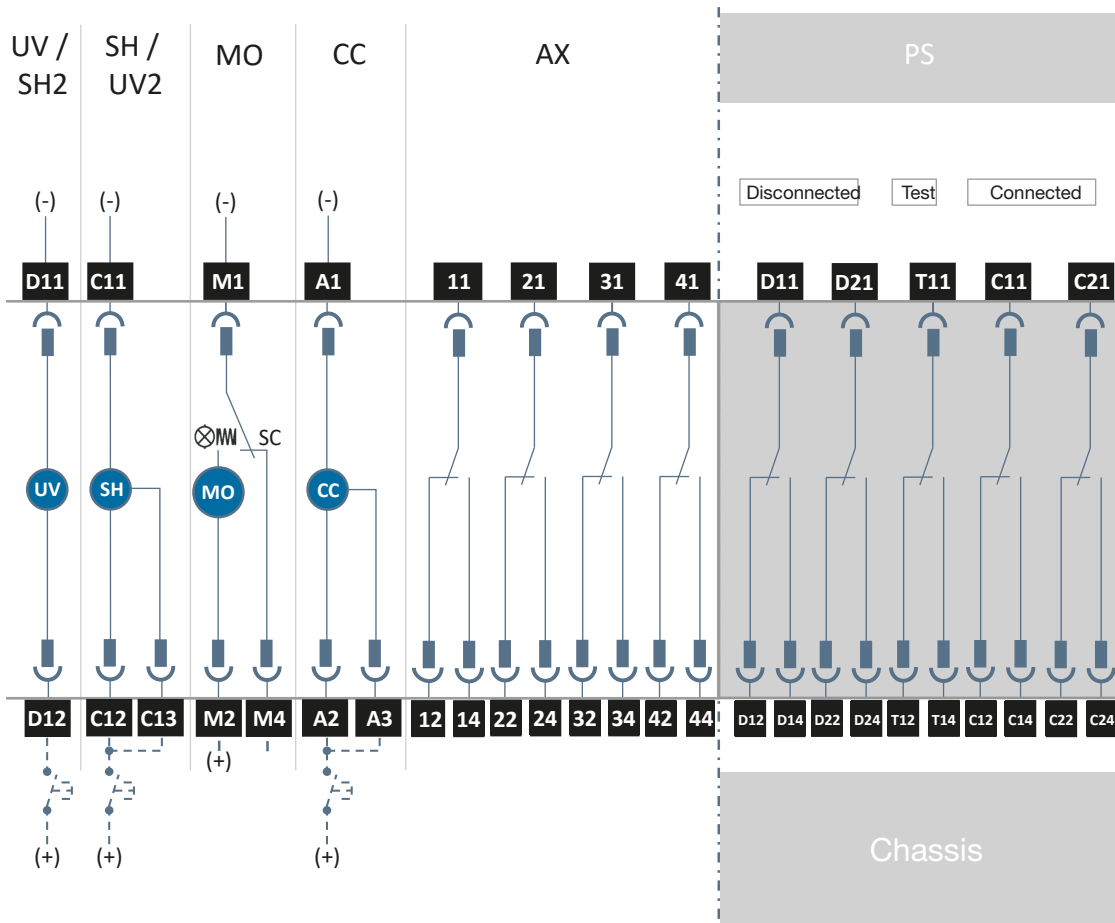
D1	D2	T1	C1	C2
D12	D22	T12	C12	C22
D14	D24	T14	C14	C24
D11	D21	T11	C11	C21

Terminal blocks	Description	Standard or as an accessory
D1 and D2	Contacts indicating the Disconnected position of the circuit breaker in the chassis	Accessory
T1	Contact indicating the test position (Test) of the circuit breaker in the chassis	
C1 and C2	Contacts indicating the Connected position of the circuit breaker in the chassis	

Connecting diagram of the drawout HW1 circuit breakers with sentinel electronic trip unit



Terminal blocks	Terminations
ESP	External sensors
TU	Electronic trip unit
ZSI	Zone selectivity function
OAC	Output Alarm Contacts
FS	Fault trip contact



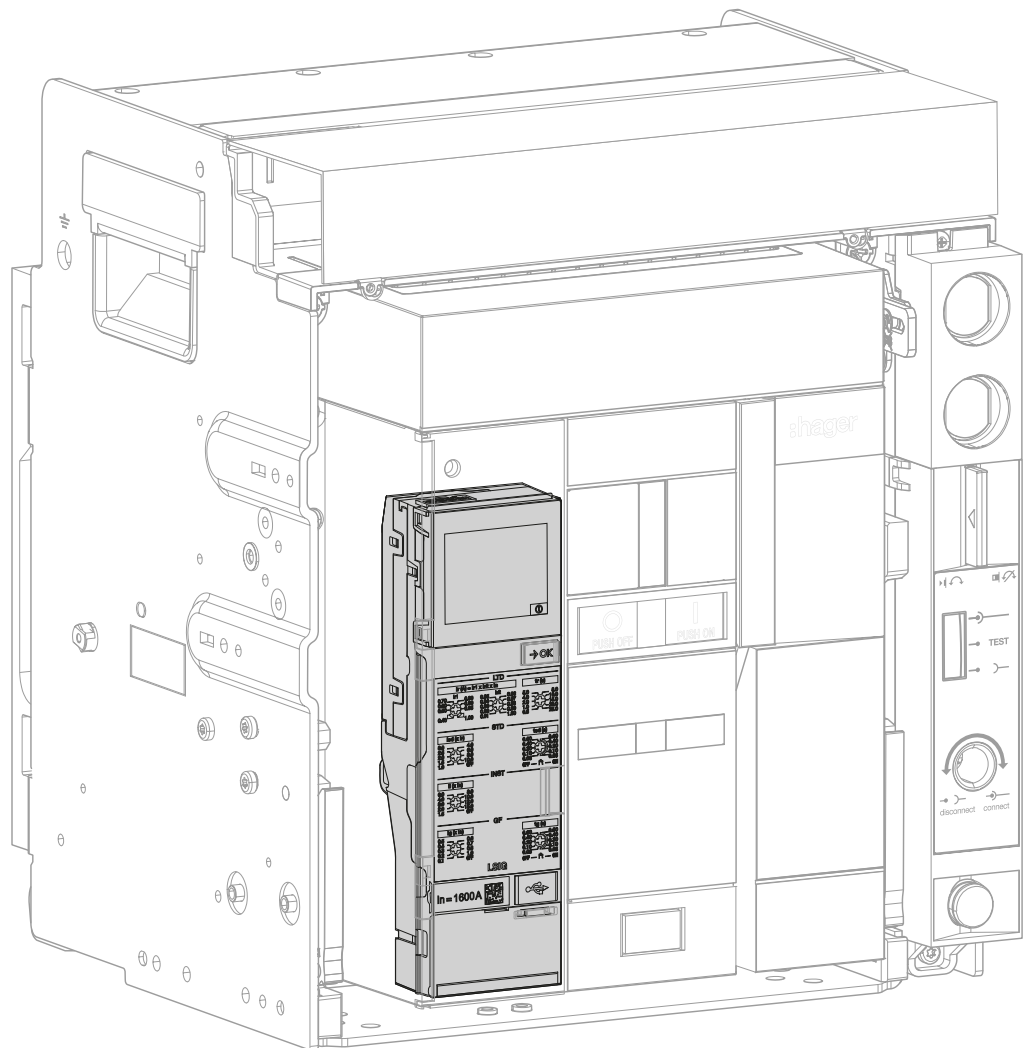
Terminal blocks	Terminations
RTC/FS2	Ready-to-close contact
UV/SH2	UV undervoltage coil or 2 <sup>nd</sup> SH shunt trip coil
SH/UV2	SH shunt trip coil or 2 <sup>nd</sup> UV undervoltage coil
MO	MO charging motor and SC spring loaded signalling contact
CC	Closing coil CC
AX	Auxiliary contact - 4 contacts signalling the circuit breaker open/closed status
PS	Position switches - 5 contacts indicating the position of the circuit breaker in the chassis: 2 contacts for the Disconnected position, 1 contact for the Test position and 2 contacts for Connected position.

The cables used must have a cross section between 0.6 mm<sup>2</sup> and 2.5 mm<sup>2</sup>. They can be flexible or rigid.

In order to be properly held in place in the terminals, the connected cables must first be stripped from 10 to 12 mm.

Flexible cables must not be twisted. Only one cable is authorised per terminal.

hw+ air circuit breakers are equipped with a sentinel electronic trip unit on the front to protect against overloads and short circuits.



The detailed description of the characteristics, functions and settings is available in the 6LE007969A user manual for hw+ sentinel electronic trip units.

**Compliance with the standards**

hw+ air circuit breakers and the related auxiliary devices comply with the following standards:

**International standards**

- IEC 60947-1: General rules
- IEC 60947-2: Circuit breakers
- IEC 60947-3: Switch-disconnectors
- IEC 60947-5-1: Control circuit devices and switching elements

**Degree of pollution**

hw+ air circuit breakers are certified for operation in pollution degree 3 environments as defined by IEC standard 60947-1.

**Temperature**

hw+ air circuit breakers can be used at temperatures between -25°C and 70 °C.

For temperatures above 65 °C, for 1600A rating, refer to the values indicated in Technical Catalogue 6LE007335A.

The acceptable storage temperature range in the original packing is from -40°C to 70°C.

**Humidity**

hw+ air circuit breakers can be used in an atmosphere with a relative humidity of 45 to 85% max.

**Altitude**

hw+ air circuit breakers can be used without reclassification up to an altitude of 2000 m. Above this, refer to the values provided in the Technical Catalogue 6LE007335A.

**Vibrations**

hw+ air circuit breakers can withstand mechanical vibrations.

They are compliant with the requirements of the standard IEC 60068-2-52:

- 2.0 to 13.2 Hz and amplitude +/-1 mm.
- 13.2 to 100 Hz acceleration +/-0.7 g.
- Resonance frequency (+/-1 mm / +/-0.7 g) for 90 min

Excessive vibration may cause nuisance (false) tripping and/or damage to connections and/or mechanical parts.

**Impacts**

hw+ air circuit breakers can withstand impacts with an acceleration of 200 m/s<sup>2</sup> (20 g) max.

**Environment**

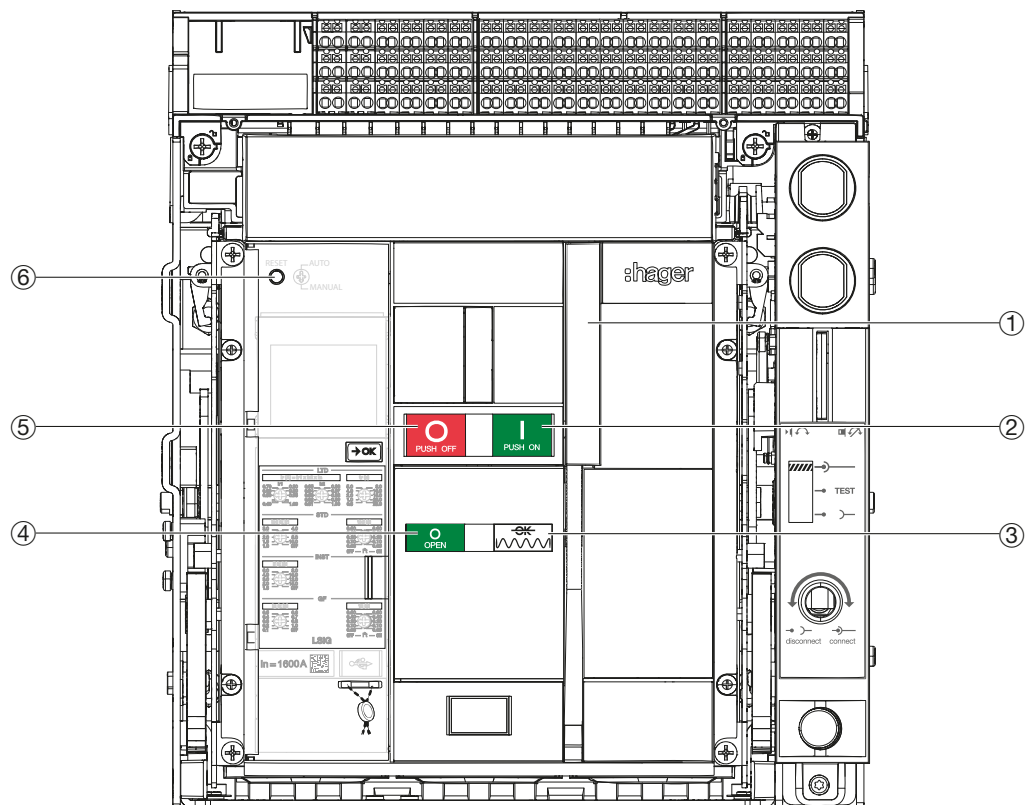
hw+ air circuit breakers must be used in an environment without excess water vapour, oil vapour, dust or corrosive gases.

Without sudden temperature fluctuations and without condensation.

With the following levels of chemical compounds: Ammonia (NH<sub>3</sub>): 0.5 ppm max. Hydrogen sulphide (H<sub>2</sub>S)/sulphur dioxide (SO<sub>2</sub>)/hydrogen chloride (HCl): 0.1 ppm max. Chlorine (Cl<sub>2</sub>): 0.05 ppm max.











The hw+ circuit breaker has 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**

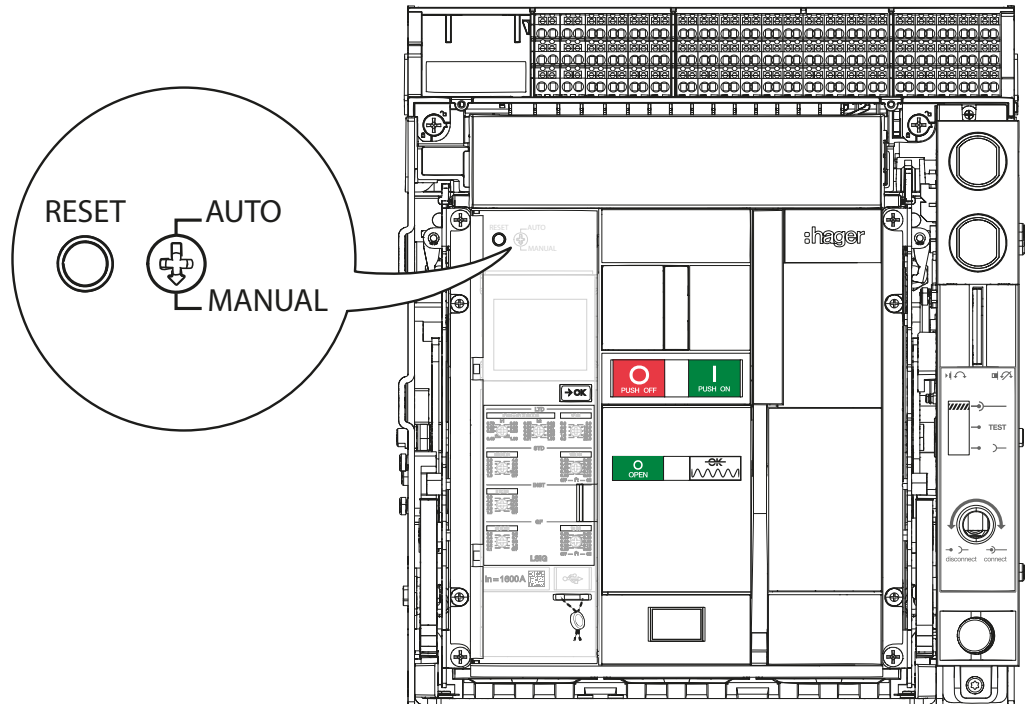
The combination of the two indicators shows the status of the circuit breaker.

Opening and closing indicator	Closing spring status indicator	Circuit breaker status
		<p>Circuit breaker open. Closing spring discharged.</p>
		<p>Air circuit breaker Closing spring charged but not ready to close. The circuit breaker is not ready to be closed because:</p> <ul style="list-style-type: none"> <li>• Following tripping, it has not been reset via the acknowledgement procedure (see 6LE007332A user manual for hw+ air circuit breakers , Chapter 07 Closing the circuit breaker after a tripping ).</li> <li>• The circuit breaker is locked in the open position using a lock or padlock.</li> </ul>
		<p>Circuit breaker open. Closing spring charged. The circuit breaker is ready to be closed.</p>
		<p>Circuit breaker closed. Closing spring discharged.</p>
		<p>Circuit breaker closed. Closing spring charged.</p>

### RESET re-arm button

The RESET re-arm button is used to reset the circuit breaker after tripping (see 6LE007332A user manual for hw+ air circuit breakers , Chapter 07 Closing the circuit breaker after a 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 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 the next closing operation.

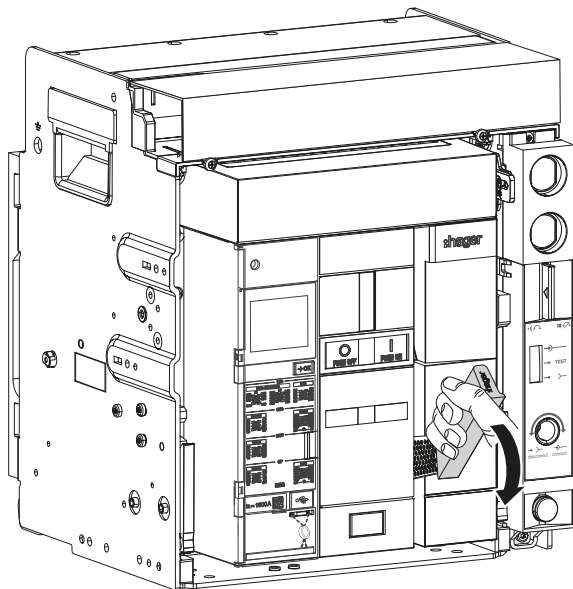


### Closing spring

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

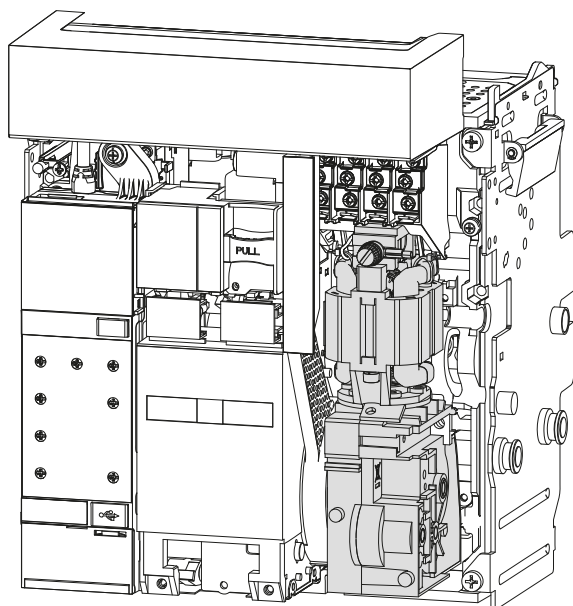
#### - Manual charging

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



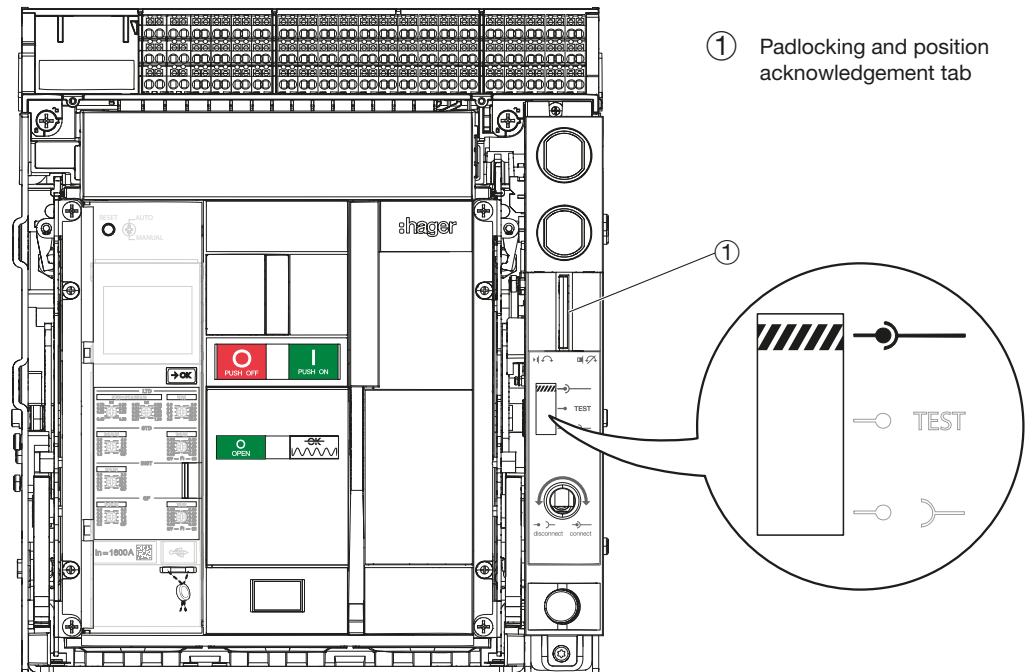
#### - Automatic charging

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



The detailed description of the circuit breaker closing and opening operations is available in the 6LE007332A user manual for hw+ air circuit breakers .

The position of the circuit breaker in the chassis is shown by the mechanical position indicator 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.



Circuit breaker position	Circuit breaker status	Mechanical position indicator
Disconnected	The circuit breaker can be removed 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 rack in clamps on the chassis. The circuit breaker is ready to operate.	




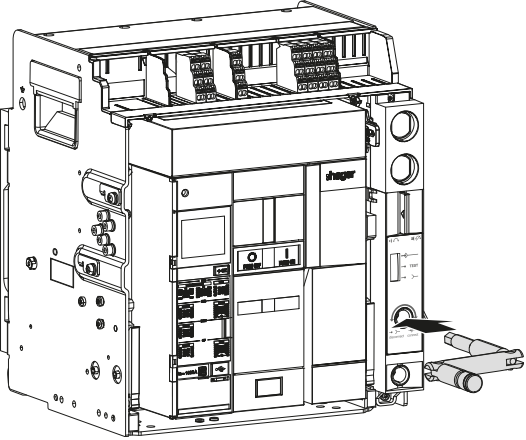
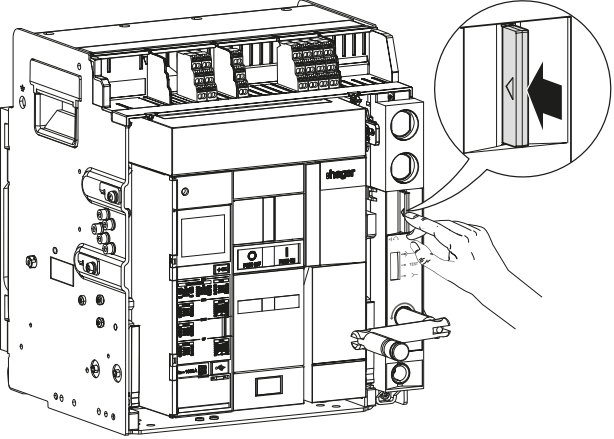
**WARNING**

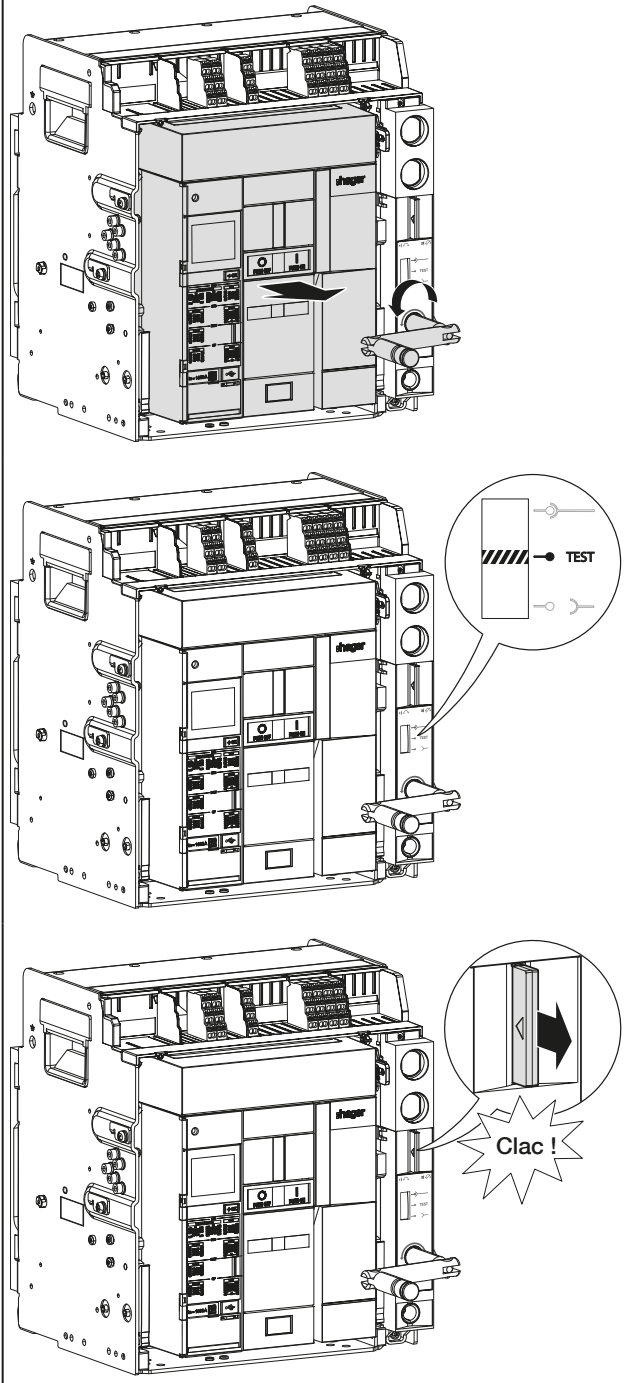
**Risk of electric shock**

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
<p>1 Verify that the circuit breaker is in the connected position and that the mechanical position indicator displays:</p>	
<p>2 Open the circuit breaker by pressing the opening</p> 	
<p>3 Remove the racking handle from its housing.</p>	

Action	Illustration
4 Insert the racking handle into the hole.	
5 Press the padlocking and position acknowledgement tab.	

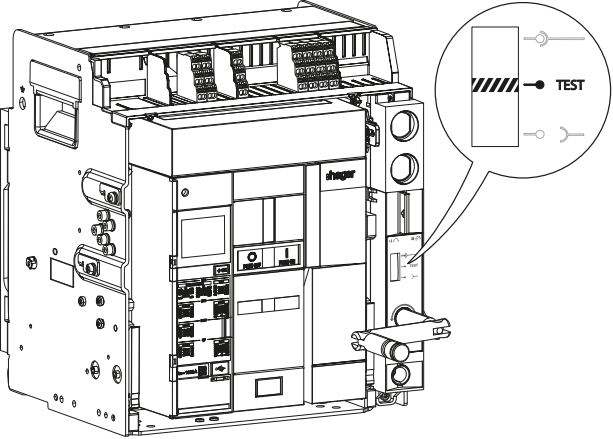
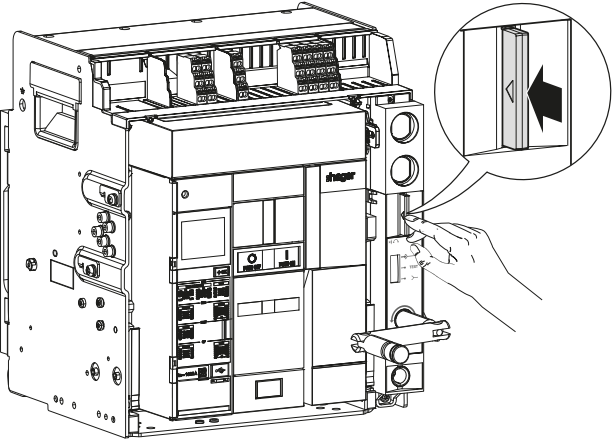
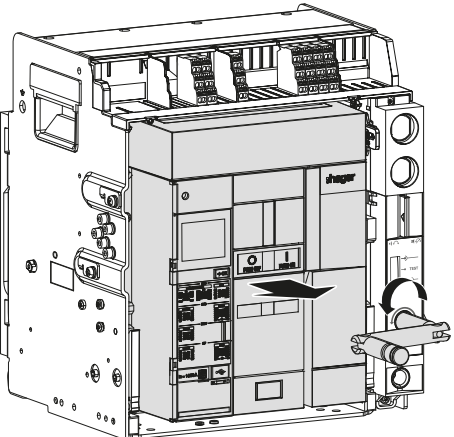
Action	Illustration
<p data-bbox="464 297 774 358"><b>6</b> Turn the racking handle anti-clockwise...</p> <p data-bbox="512 763 805 824">... until the status indicator is displayed:</p> <p data-bbox="512 1227 812 1352">and the padlocking and position acknowledgement tab comes out of its housing.</p>	 <p>The illustration consists of three sequential drawings of a drawout circuit breaker in a chassis. In the first drawing, an arrow points to the racking handle on the right side of the unit. In the second drawing, a callout bubble shows a status indicator with a hatched bar and the word 'TEST'. In the third drawing, a callout bubble shows a tab extending from a housing, with a starburst containing the text 'Clac!'.</p>

**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
<p>1 Verify that the circuit breaker is in the test position and that the mechanical position indicator displays:</p>	
<p>2 Press the padlocking and position acknowledgement tab.</p>	
<p>3 Turn the racking handle anti-clockwise...</p>	

Action	Illustration
<p><b>3</b> ... until the status indicator is displayed:</p> <p>and the padlocking and position acknowledgement tab comes out of its housing.</p>	
<p><b>4</b> Remove the racking handle.</p>	
<p><b>5</b> Place the racking handle back in its housing.</p>	





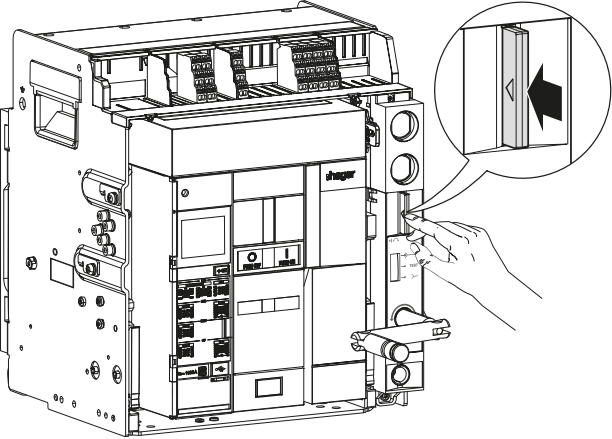
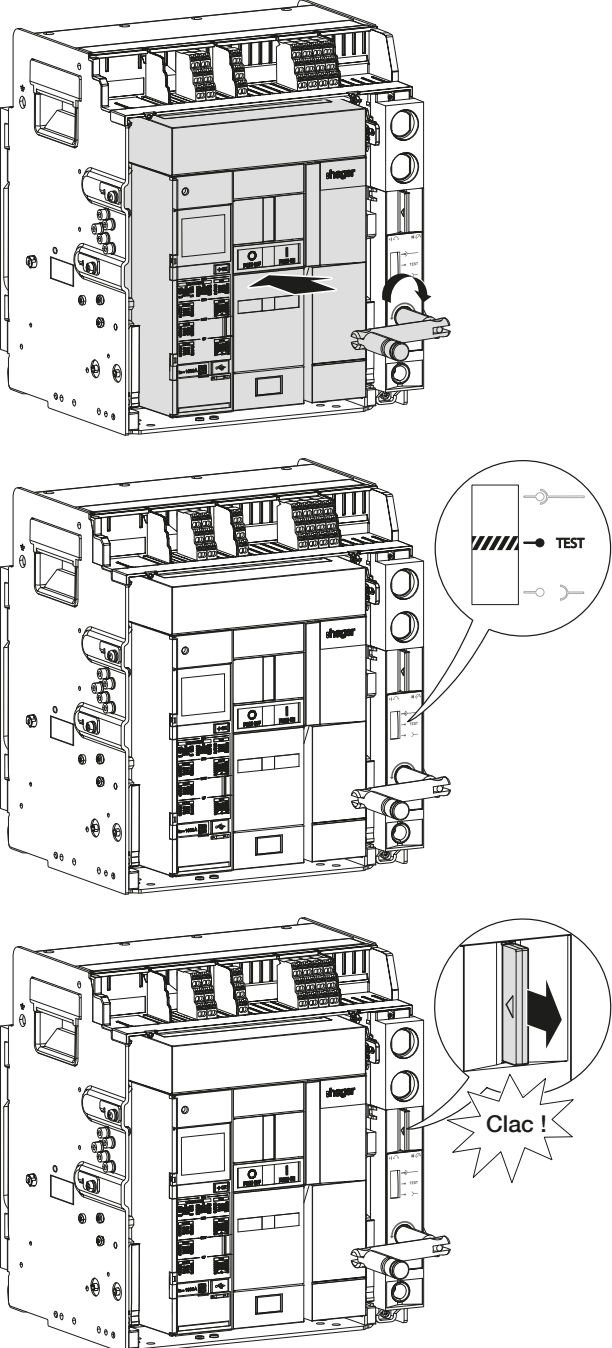
**WARNING**

**Risk of electric shock**

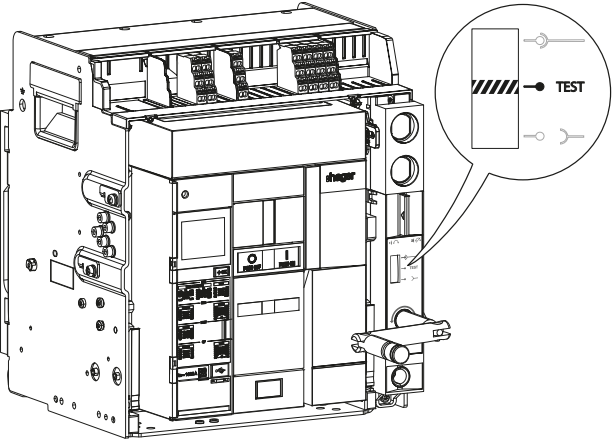
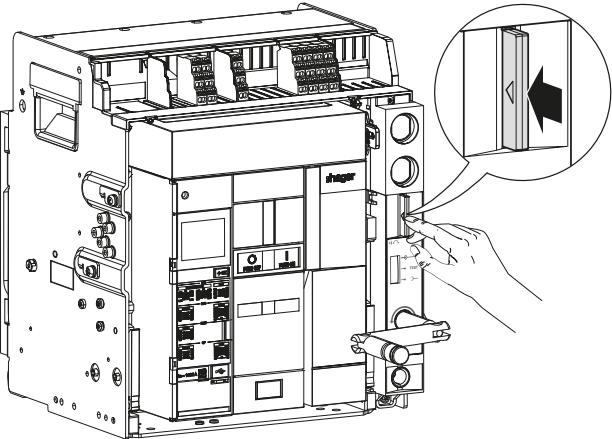
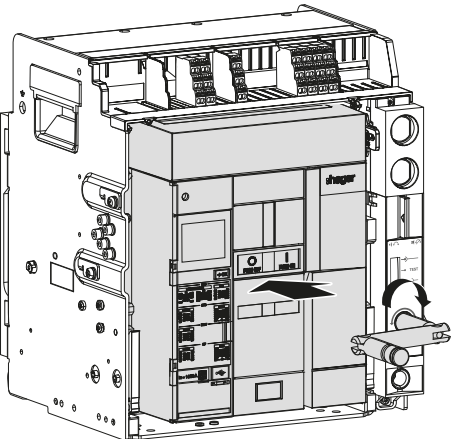
Make sure that the device is only operated by qualified personnel in accordance with to the installation standards in force in the relevant country.

To change from the disconnected position to the test position:

Action	Illustration
<p>1 Verify that the circuit breaker is in the disconnected position and that the mechanical position indicator displays:</p>	
<p>2 Remove the racking handle from its housing.</p>	
<p>3 Insert the racking handle into the hole.</p>	

Action	Illustration
<p>4 Press the padlocking and position acknowledgement tab.</p>	
<p>5 Turn the racking handle clockwise...</p> <p>... until the status indicator is displayed:</p> <p>and the padlocking and position acknowledgement tab comes out of its housing.</p>	

To change from test position to connected position:

Action	Illustration
<p>1 Verify that the circuit breaker is in the test position and that the mechanical position indicator displays:</p>	
<p>2 Press the padlocking and position acknowledgement tab</p>	
<p>3 Turn the racking handle clockwise...</p>	





**Risk of the circuit breaker falling.**  
**Risk of injury by crushing.**

Before handling the circuit breaker, ensure the chassis is fastened within the electrical panel. Ensure the device is only handled by qualified personnel equipped with lifting equipment and suitable safety equipment.

Action	Illustration
<p>1 Verify that the circuit breaker is in the disconnected position (cf. Chapters 8.1 Changing from the connected position to the test position and 8.2 Changing from the test position to the disconnected position).</p>	
<p>2 The circuit breaker remains in the chassis in the disconnected position. Pull the guide rails as far as possible while holding the upper part of the circuit breaker.</p>	
<p>3 Slide the circuit breaker from the chassis on its guide rails.</p>	

Action	Illustration
<p>4 Remove the circuit breaker from the guide rails (see Chapter 14.2 Handling drawout circuit breakers).</p>	



**Risk of the circuit breaker falling.**  
**Risk of injury by crushing.**

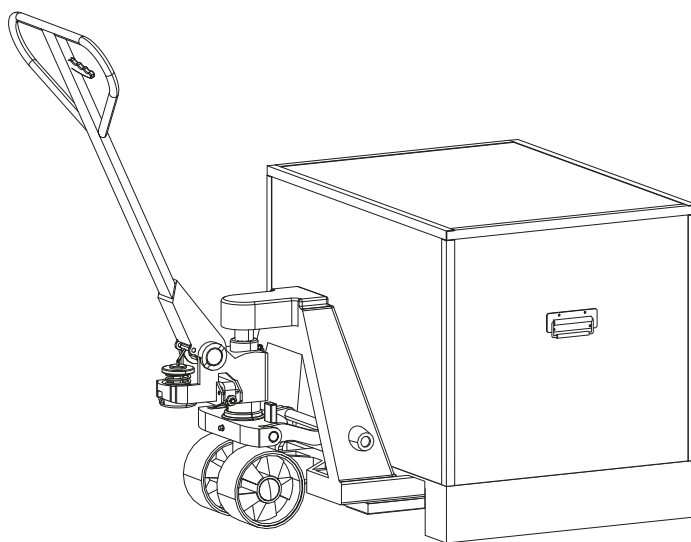
Before handling the circuit breaker, ensure the chassis is fastened within the electrical panel. Ensure the device is only handled by qualified personnel equipped with lifting equipment and suitable safety equipment.

Action	Illustration
<p>1 Verify that the chassis is in the disconnected position.</p>	
<p>2 Pull the guide rails as far as possible.</p>	
<p>3 Using suitable lifting equipment, position the circuit breaker on the guide rails.</p>	

Action	Illustration
<p>4 Remove the lifting equipment.</p>	
<p>5 Push the circuit breaker to the back of the chassis without pushing on the guide rails.</p>	
<p>6 Push the guide rails to the back of the chassis.</p>	

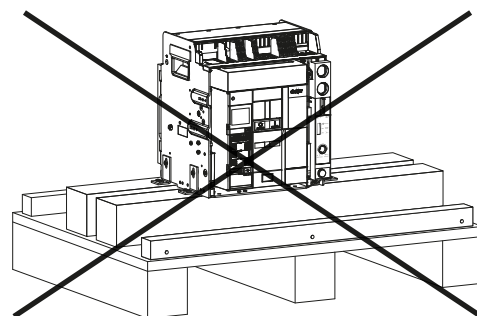
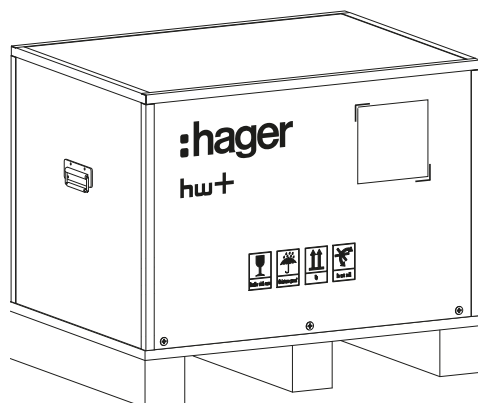


Use a pallet truck to move the hw+ transport box.

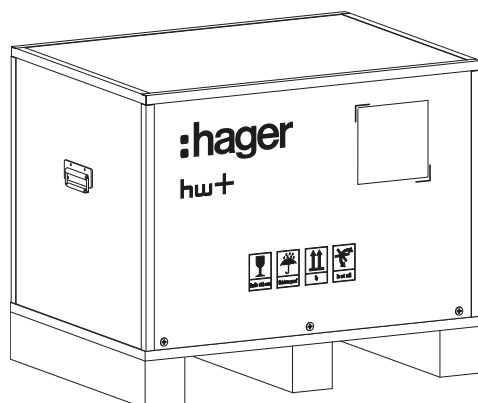
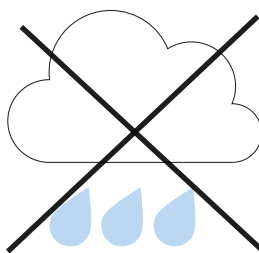


Store the circuit breaker:

- in its original transport box,

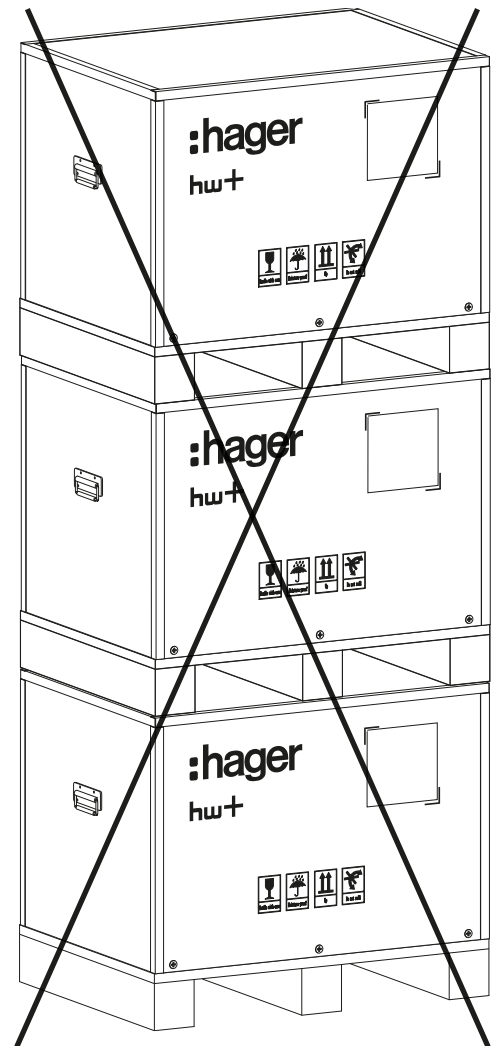
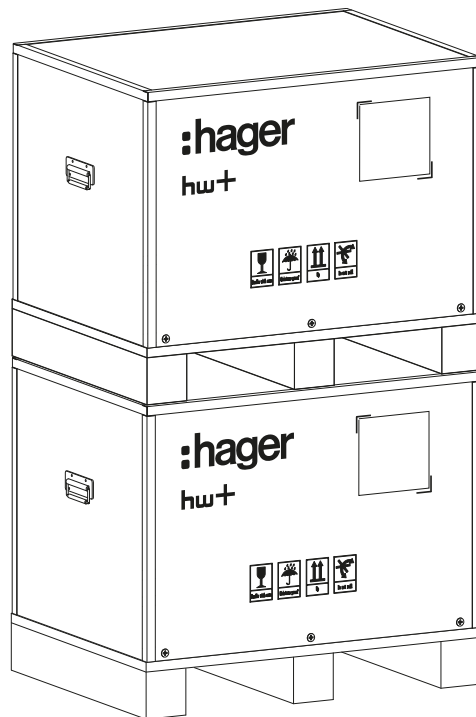


- indoors only



- At a temperature between -40 °C and 70 °C.
- In an environment as described in chapter **Circuit breaker operating conditions.**

Do not store more than two circuit breakers in their original packaging one on top of the other.



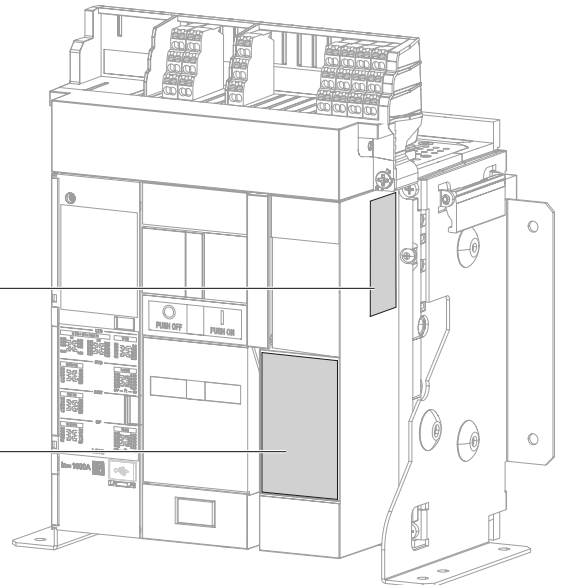
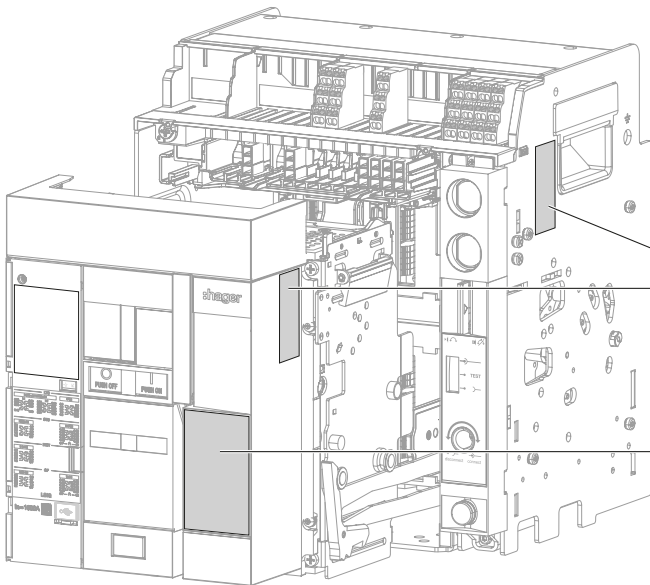
hw+ air circuit breakers can be identified by means of the various labels affixed to the product or packaging.

**ATTENTION**

For more information on the codification and the references indicated on the labels, refer to the Technical Catalogue 6LE007335A.

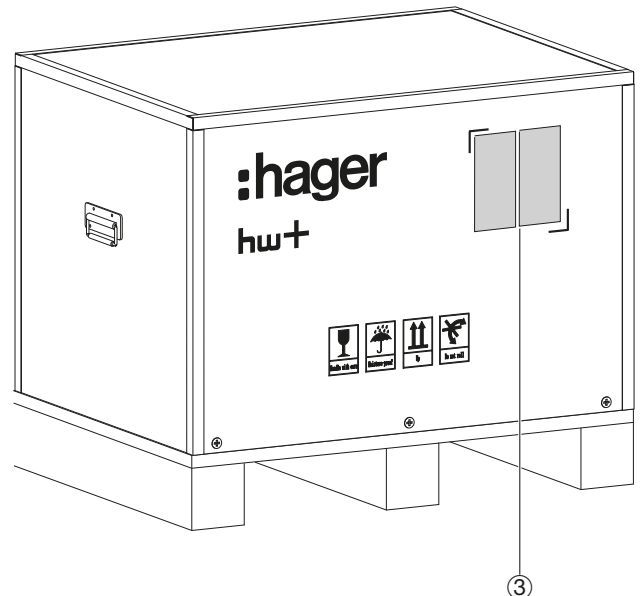
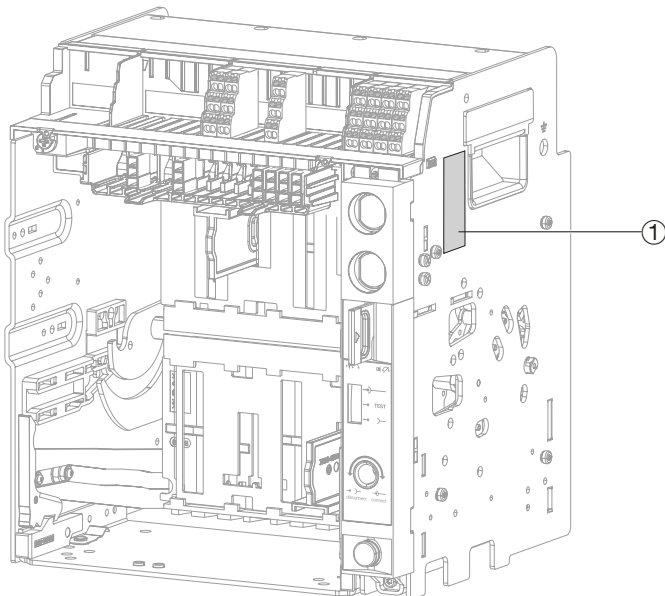
**Drawout circuit breaker**

**Fixed circuit breaker**



**Chassis only**

**Packaging**




① Identification label on the circuit breaker and the chassis

② Circuit breaker rating label

③ Identification label on the packaging

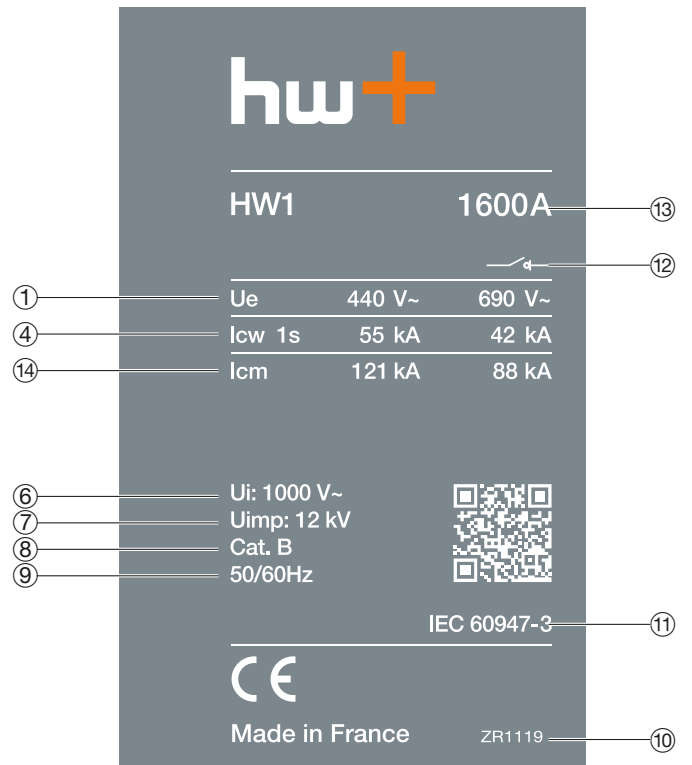
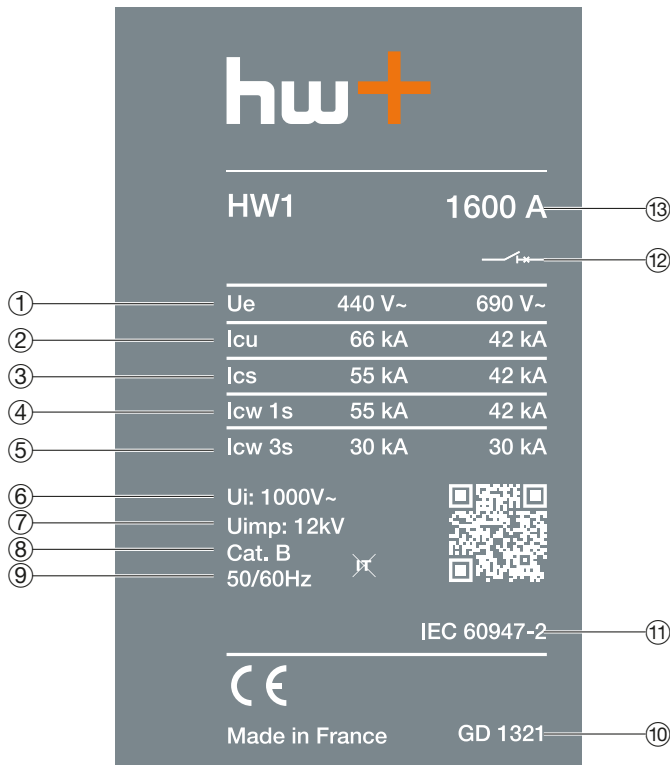
Identification label on the circuit breaker and the chassis

①	HW1M416DB		
②	ACB HW1 55kA 1600A 4P DO		
	sentinel		
③	HW1C4EH	CHA	4P
	HWY045H	FC	UP
	HWY045H	FC	DWN
	HWW452H	TU	LSIG
	HWW464H	In	1600A
	HWX004H	MO	250V AC
	HWX060H	CC	200-250V AC
	HWX023H	SH	SH1/UV2 200-250V AC
	HWX033H	UV	UV1/SH2 200-250V AC
	HWX040H	AX	
	HWX091H	RTC	
	HWX090H	OAC	
	HWX050H	FS	
④	HW1M416DB3AAAAAAAA0AAAA0AA0A00		
	SO00000025689 Hager Electro SAS		
	C0000001 BP3 - 67215 OBERNAI		
	CEDEX - FRANCE		

- ① Circuit breaker reference
- ② Circuit breaker designation
- ③ List of accessories mounted
- ④ Configuration identifier

Circuit breaker technical specification label

Switch-disconnector technical specification label



- ① Ue: Operating voltage
- ② Icu: Rated ultimate short-circuit breaking capacity at the rated operating voltage Ue
- ③ Ics: Service breaking capacity
- ④ Icw 1 s: Permissible current for 1 sec. at Ue rated operating voltage
- ⑤ Icw 3s: Permissible current for 3 sec. at Ue rated operating voltage
- ⑥ Ui: Rated insulation voltage
- ⑦ Uimp: Rated impulse withstand voltage
- ⑧ Category
- ⑨ Frequency
- ⑩ Manufacturing date code
- ⑪ Standards
- ⑫ Symbol of a circuit breaker suitable for isolation or symbol of a switch-disconnector
- ⑬ Maximum rating of the circuit breaker
- ⑭ Icm: Rated short-circuit making capacity

Identification label on the packaging

6

DISJONCTEUR OUVERT AIR CIRCUIT BREAKER OFFENER LEISTUNFSSCHALTER 1600 A	HW1 Sentinel 1600 A 4 P D/O 55/55 kA 440 VAC 50-60 Hz
---	--

Made in France

1110557286 Pos. 000001
HW1M416DB2VCAD00C1ACA111AAA

Hager Electro SAS-BP3-67215 OBERNAI CEDEX-FRANCE

HW1M416DB
1x

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6

- HW1C4EH - HWY041H TOP - HWY041H DWN - HWY241H - HWW451H - HWW468H - HWX023H SH1/UV2 - HWX033H SH2/UV1 - HWX028H - HWX040H 4x-1x - HWX090H - HWX070H - HWX091H - HWY090H - HWY238H - HWY260H - HWY701 - HWX050H 5x - ...	CHASSIS HW1 4P TERMINAL CONNECTION FC TERMINAL CONNECTION FC INTERPHASE BARRIERS HW1 4P OCR SENTINEL LSI RATING PLUG 1250A SH 200-250V AC UV 200-250V AC CLOSING COIL 200-250V AC SWITCH AX OAC ON/OFF CYCLE COUNTER READY TO CLOSE CONTACT PUSH BUTTON COVER RACKING INTERLOCK OFF LOCKING KEY ADAPTOR ... RONIS KEY LOCK TYPE 1 ... POSITION SWITCHES (PS)
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Made in France

1110557286 Pos. 000001
HW1M416DB2VCAD00C1ACA111AAA

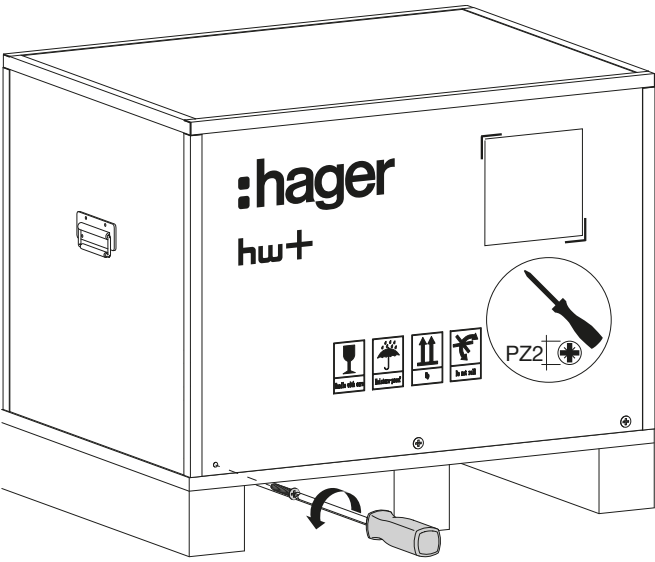
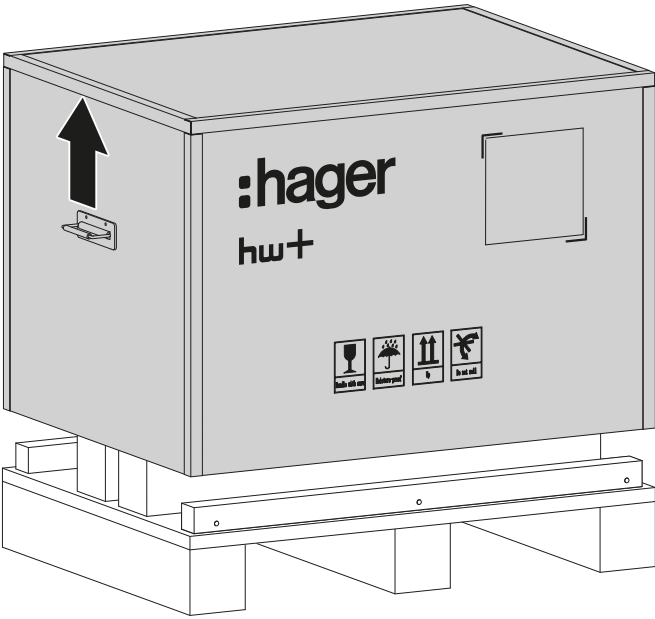
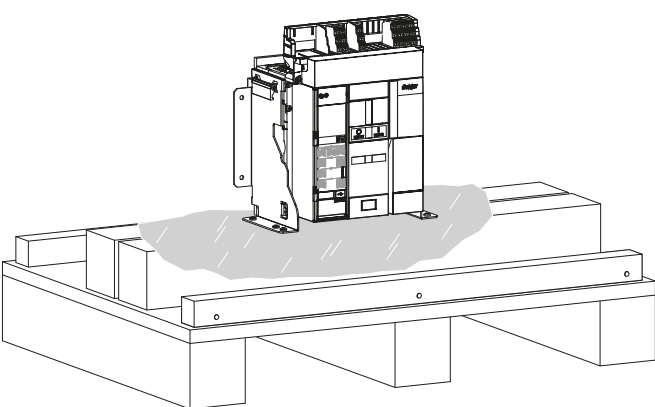
Hager Electro SAS-BP3-67215 OBERNAI CEDEX-FRANCE

HW1M416DB

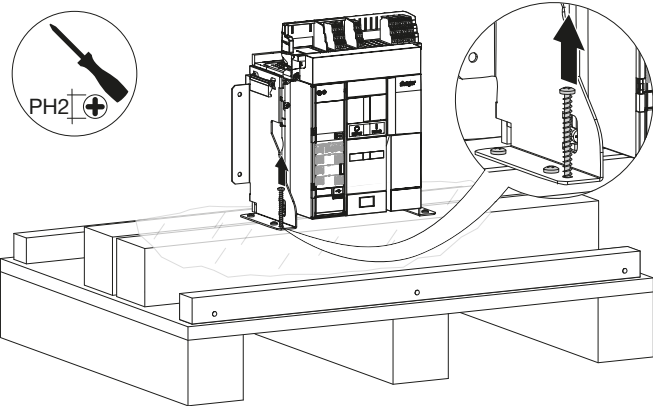
3 250613 236502

- ① Main characteristics of the circuit breaker
- ② Circuit breaker reference
- ③ List of accessories mounted
- ④ Configuration identifier

Remove the product from its crate following the procedure below:

Action	Illustration
<p>1 Remove the 6 screws (3 on each side) which hold the body on the pallet.</p>	
<p>2 Remove the case using the side handles.</p>	
<p>3 Remove the adhesive tape then open the plastic protection to gain access to the circuit breaker.</p>	

To remove a fixed circuit breaker from its pallet, proceed as follows:

Action	Illustration
1 Remove the 6 screws holding the circuit breaker in place.	 <p>The illustration shows a fixed circuit breaker mounted on a pallet. A circular inset on the left shows a PH2 screwdriver. Another circular inset on the right shows a spring being compressed, with an upward-pointing arrow indicating the direction of movement.</p>



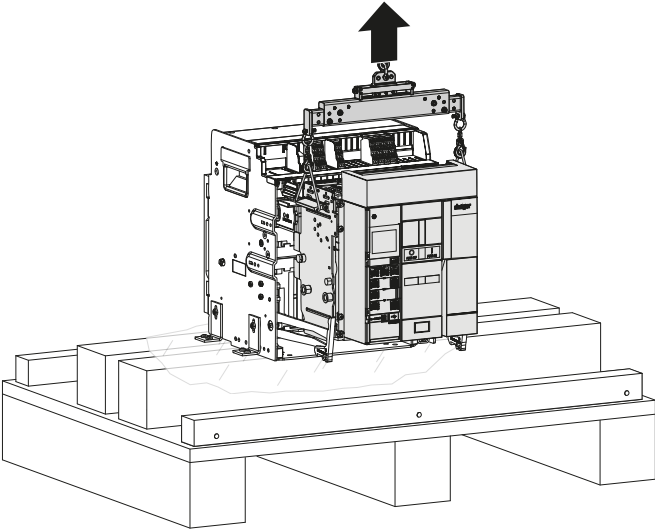
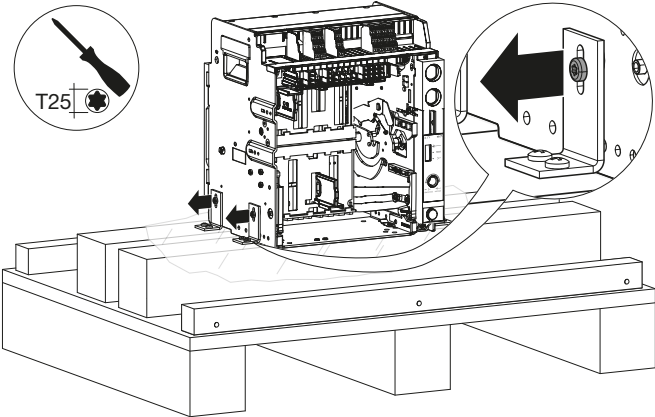
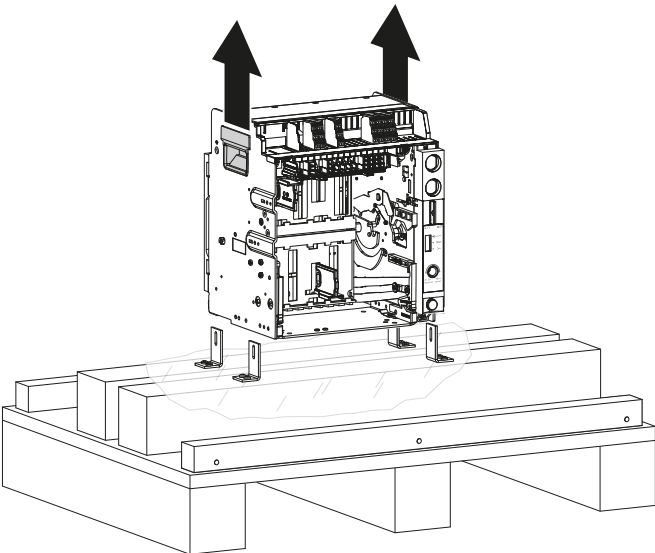


**Risk of the circuit breaker falling.**  
**Risk of injury by crushing.**

Ensure the device is only handled by qualified personnel equipped with lifting equipment and suitable safety equipment.

To remove a drawout circuit breaker with chassis from its pallet, proceed as follows:

Action	Illustration
<p>1 Put the circuit breaker in the disconnected position (see Chapters 8.1 Changing from the connected position to the test position and 8.2 Changing from the test position to the disconnected position).</p>	
<p>2 Pull the guide rails as far as possible.</p>	
<p>3 Slide the circuit breaker from the chassis on its guide rails.</p>	

Action	Illustration
4 Remove the circuit breaker from the chassis.	
5 Remove the 4 screws attaching the chassis to the brackets.	
6 Remove the chassis from the pallet using the lifting handles and placing it in an appropriate place.	



**Risk of the circuit breaker falling.**

**Risk of injury by crushing.**

Ensure the device is only handled by qualified personnel equipped with lifting equipment and suitable safety equipment.

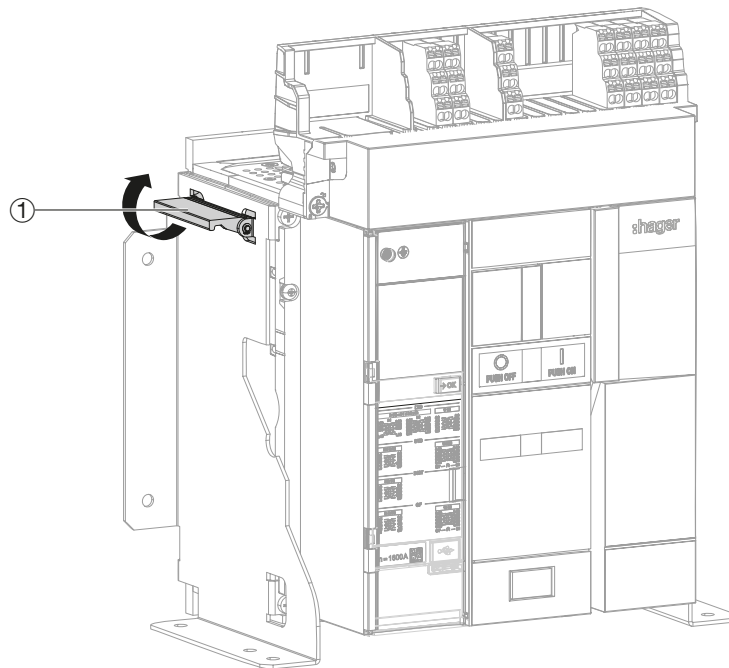
The fixed circuit breaker, drawout circuit breaker and chassis have lifting handles to be used for handling.

Ensure you have a lifting system corresponding to the weight of the circuit breaker or chassis to be moved.

**Weight of the HW1 circuit breakers (without accessories)**

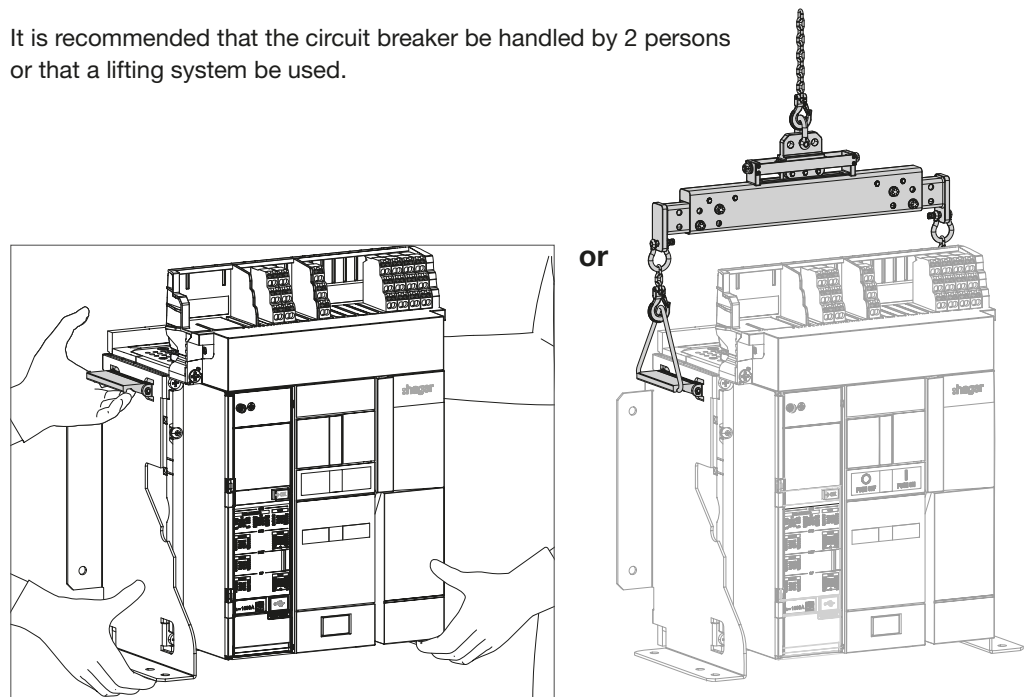
Product	Number of poles	Weight
Fixed circuit breaker	3 poles	14 kg
Drawout circuit breaker (without chassis)		15 kg
Chassis		13 kg
Fixed circuit breaker	4 poles	18 kg
Drawout circuit breaker (without chassis)		19 kg
Chassis		15 kg

Use the lifting handles on the side of the circuit breaker.



① Lifting handle

It is recommended that the circuit breaker be handled by 2 persons or that a lifting system be used.



**ATTENTION**

**Risk of property damage**

Never move a drawout circuit breaker in its chassis. Always move the two elements separately.

**ATTENTION**

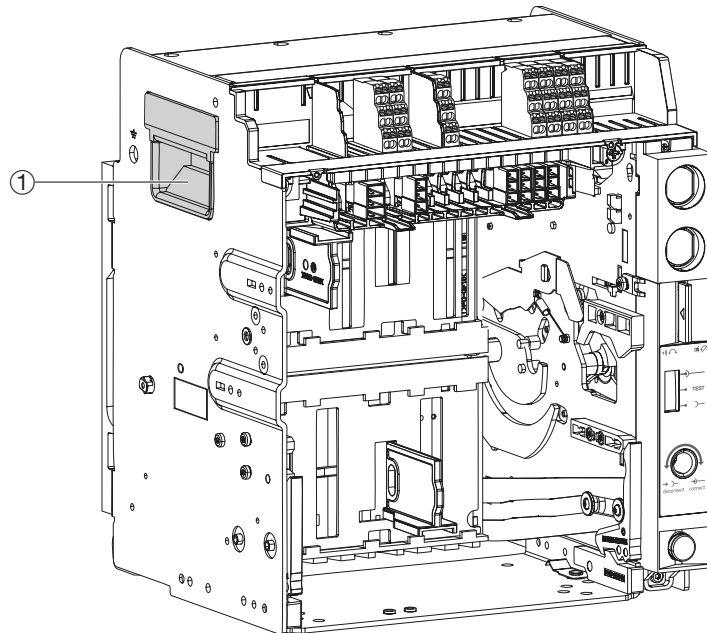
**Risk of the circuit breaker falling.**

**Risk of injury by crushing.**

To handle circuit breakers, wear suitable personal protective equipment (PPE).

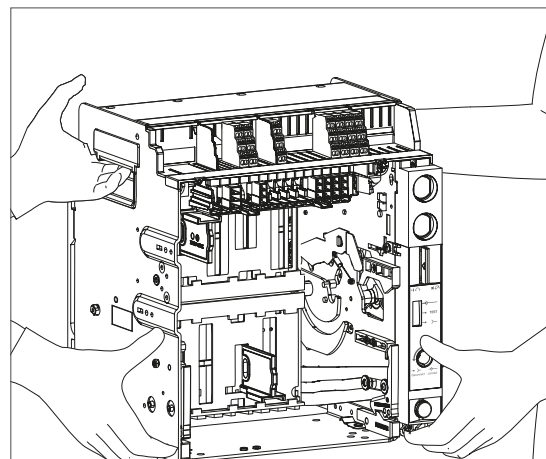
**Handling the chassis**

Use the lifting handles on the side of the circuit breaker.

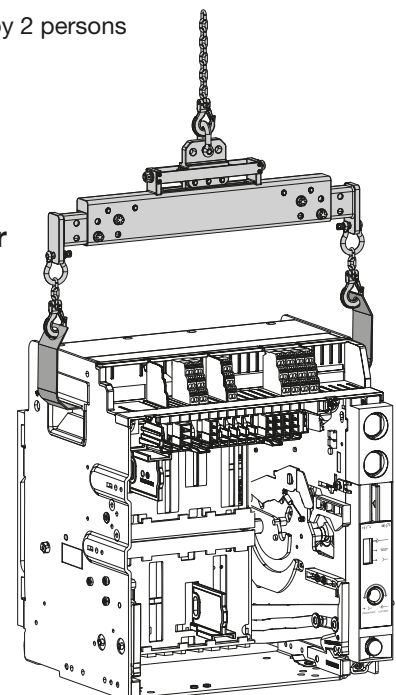


It is recommended that the circuit breaker be handled by 2 persons or that a lifting system be used.

① Lifting handle

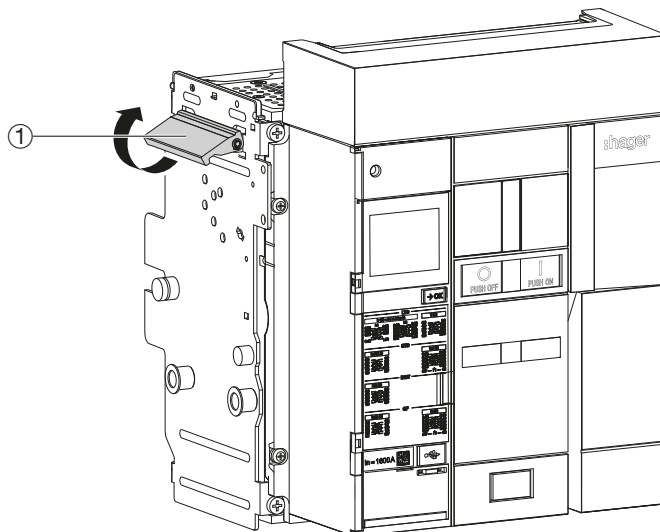


or



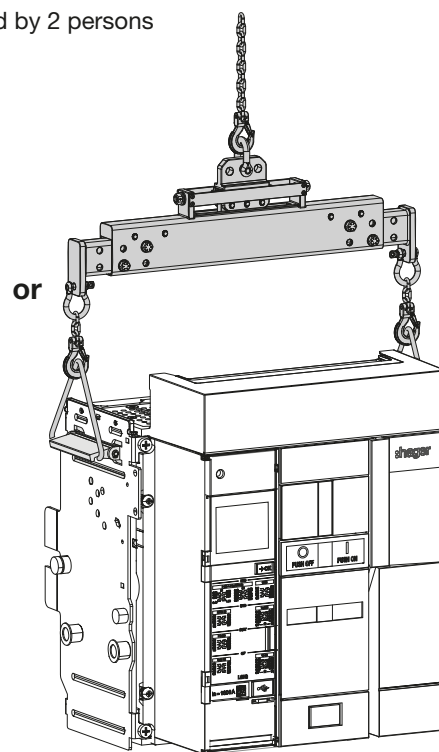
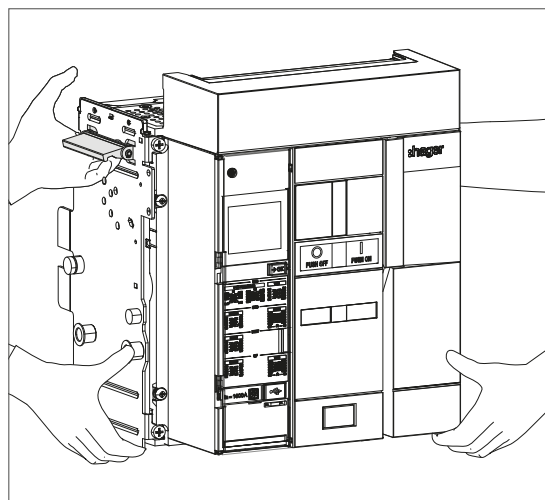
### Handling the circuit breaker

Use the lifting handles on the side of the circuit breaker.



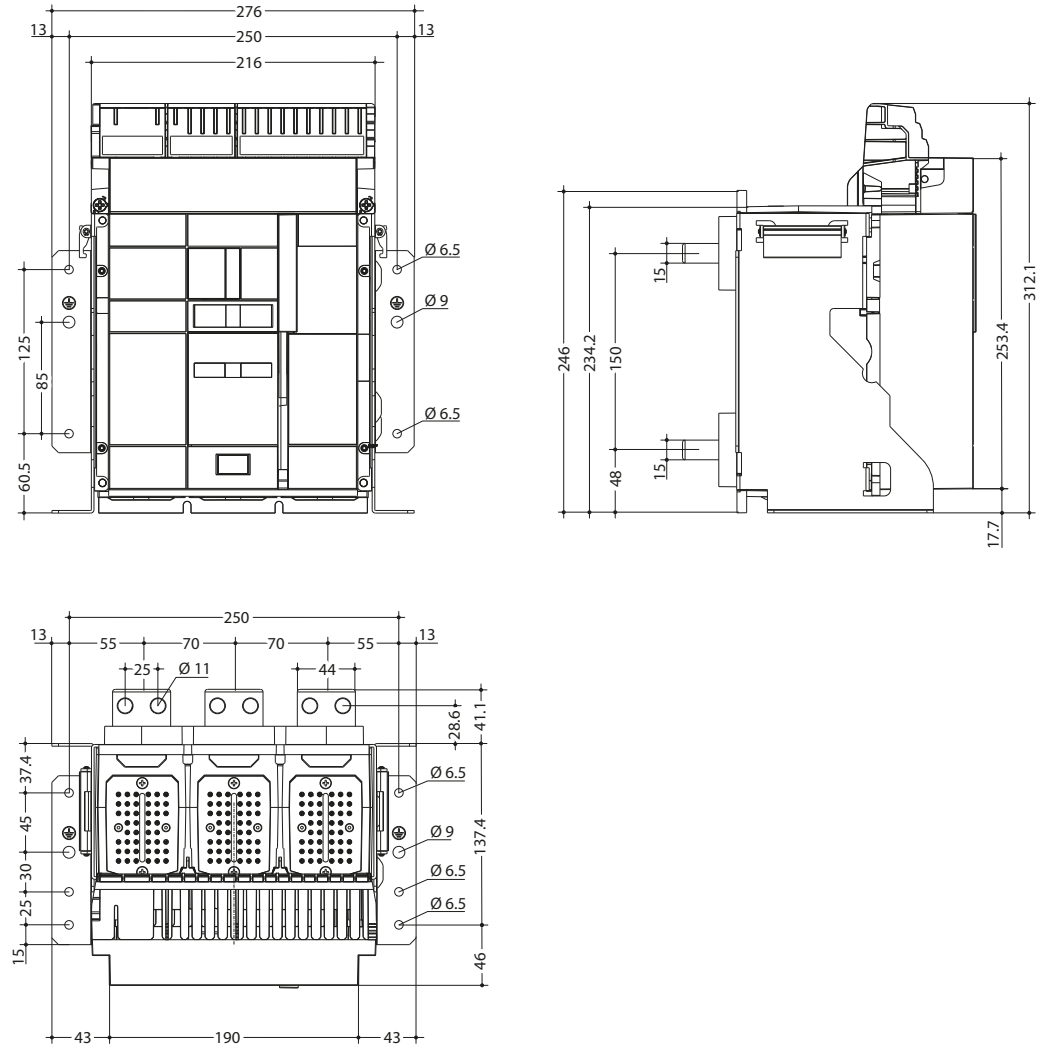
① Lifting handle

It is recommended that the circuit breaker be handled by 2 persons or that a lifting system be used.

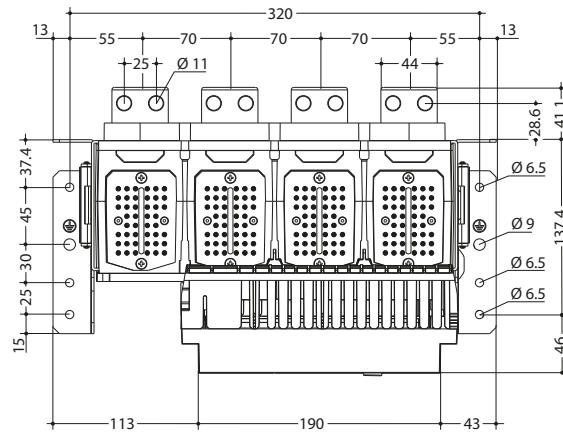
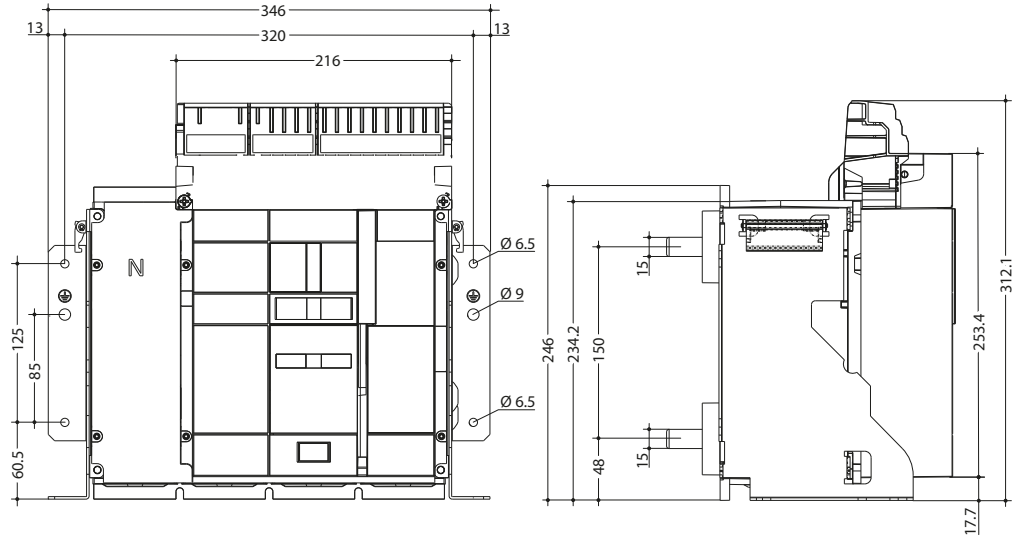


To install an HW1 circuit breaker, comply with the following dimensions for mounting:

**3 pole - Fixed version**

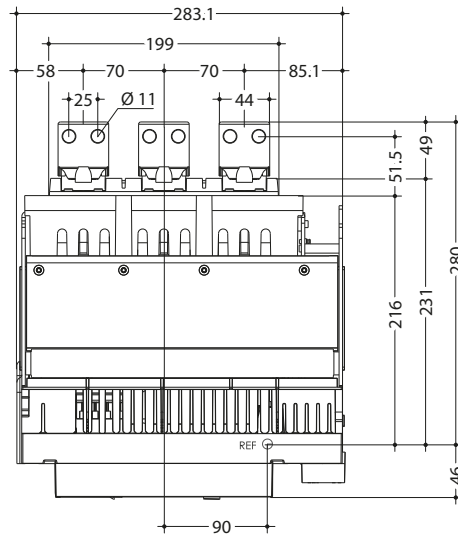
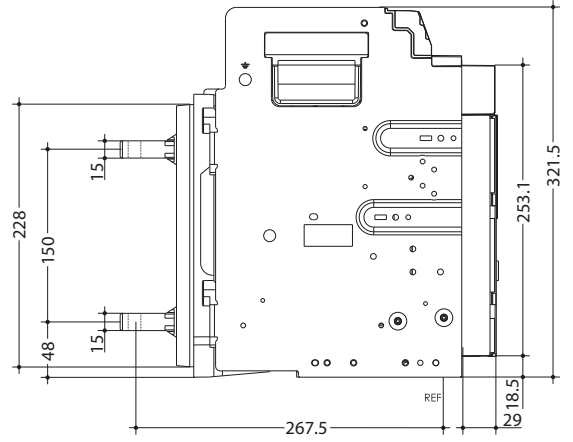
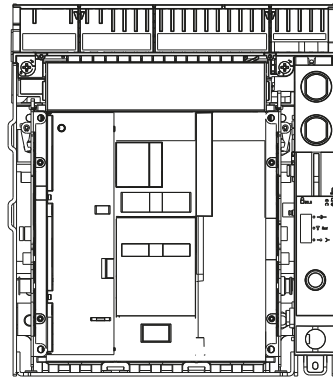


4 pole - Fixed version

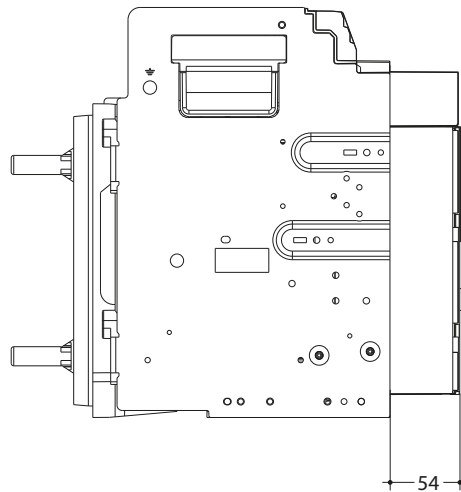




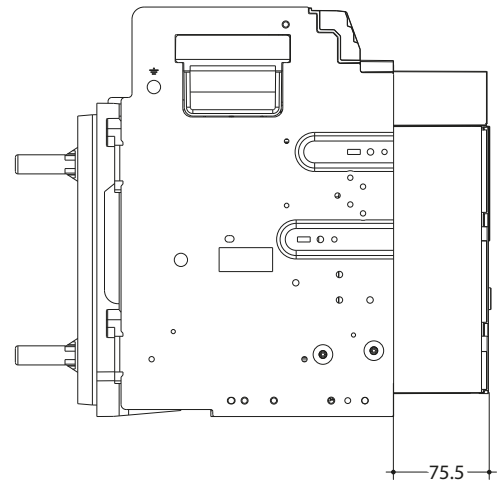
3 pole - Drawout version



Test position

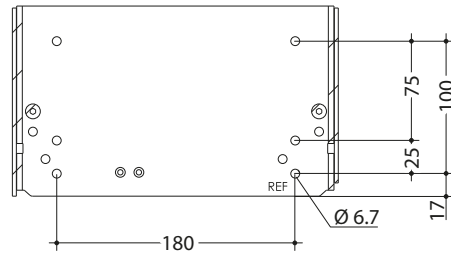


Disconnected position

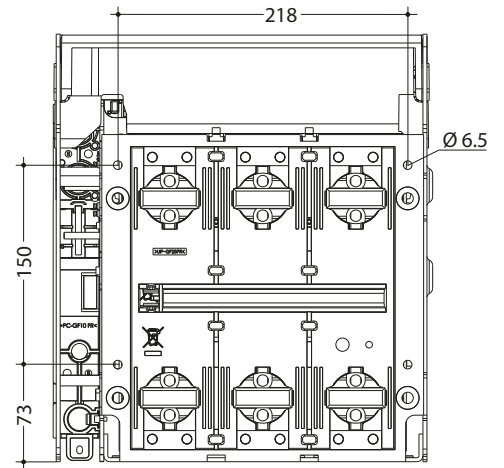


Chassis mounting

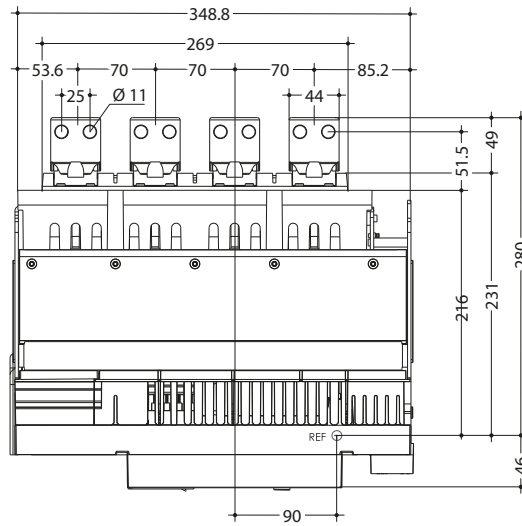
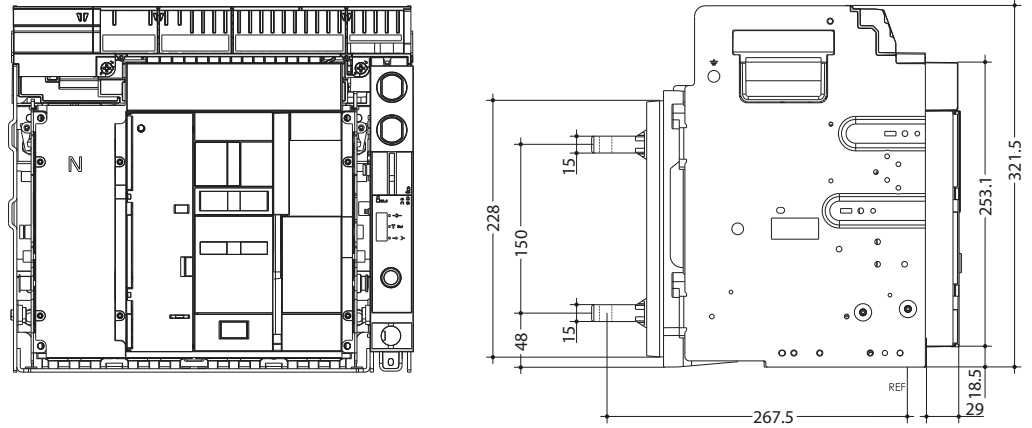
Bottom view



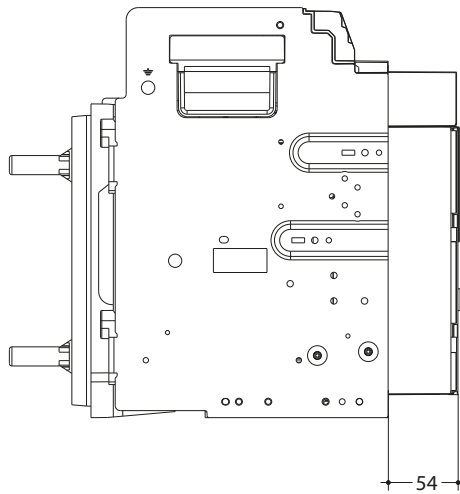
Rear view



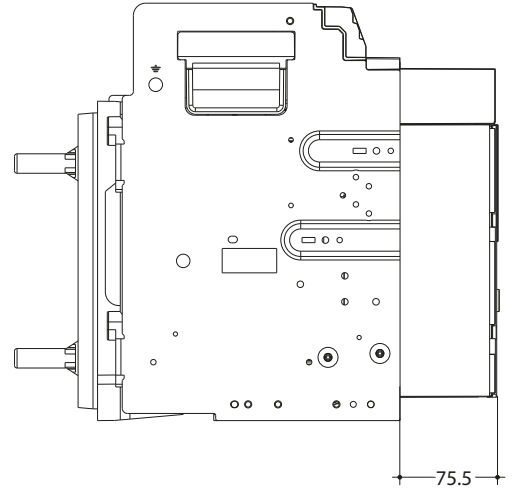
4 pole - Drawout version



Test position

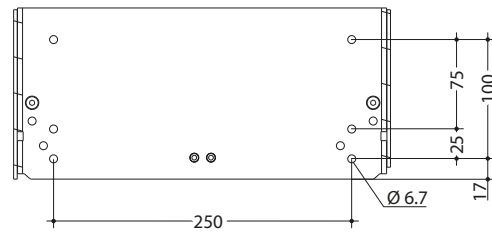


Disconnected position

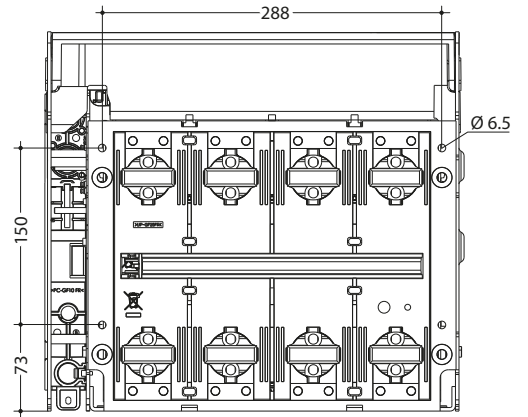


Chassis mounting

Bottom view



Rear view

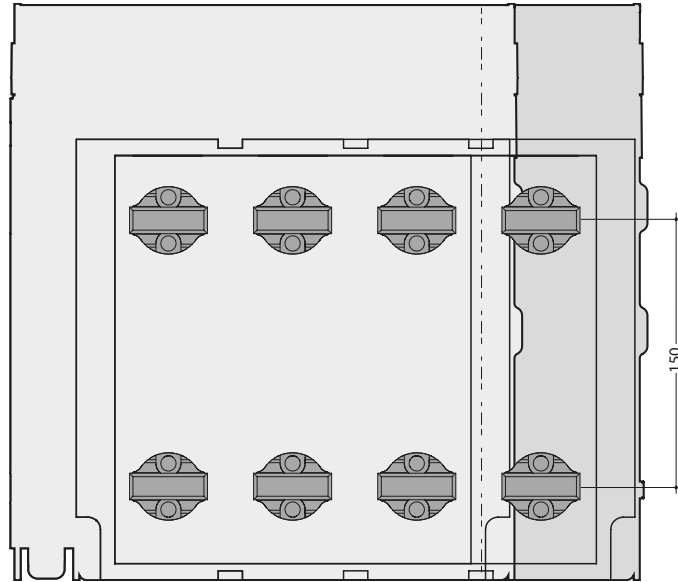


To connect an HW1 circuit breaker, comply with the following socket dimensions:

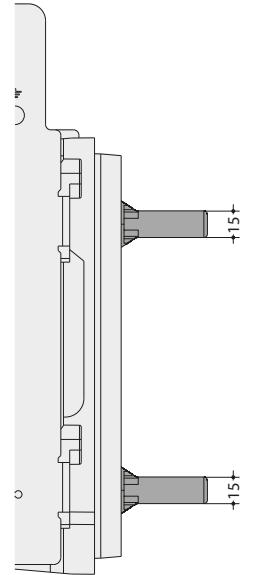
**Rear horizontal RC sockets**

For fixed or drawout 3- or 4-pole version

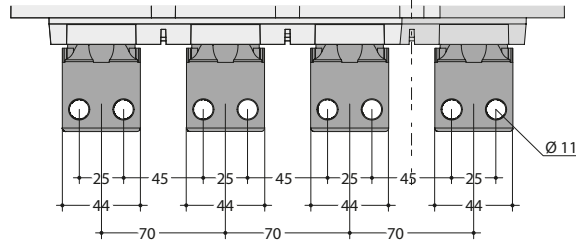
Rear view



Side view



Top view

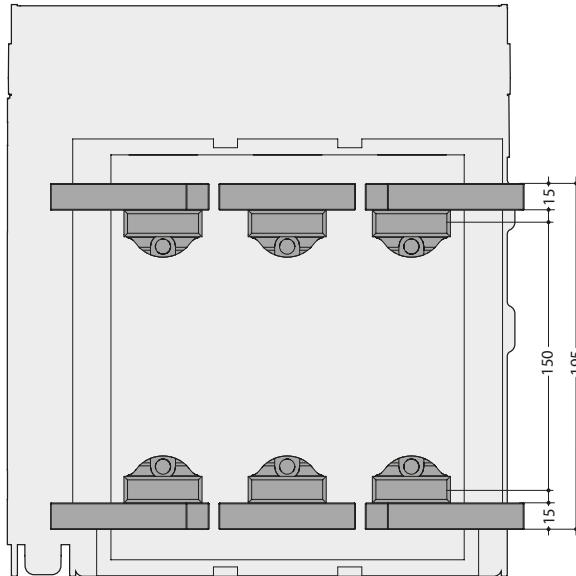


The dimensions given are valid for the fixed and drawout versions.

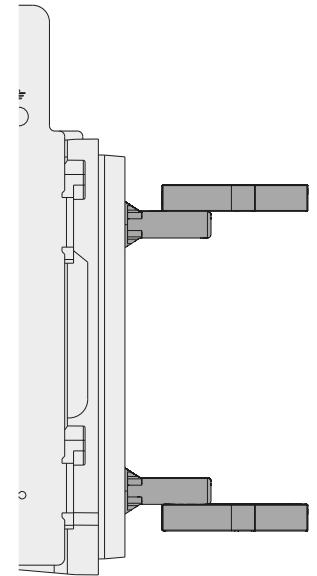
### Rear horizontal RC sockets

With SP spreaders for fixed or drawout 3-pole circuit breakers

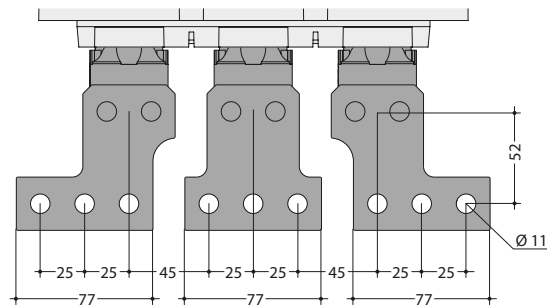
Rear view



Side view



Top view



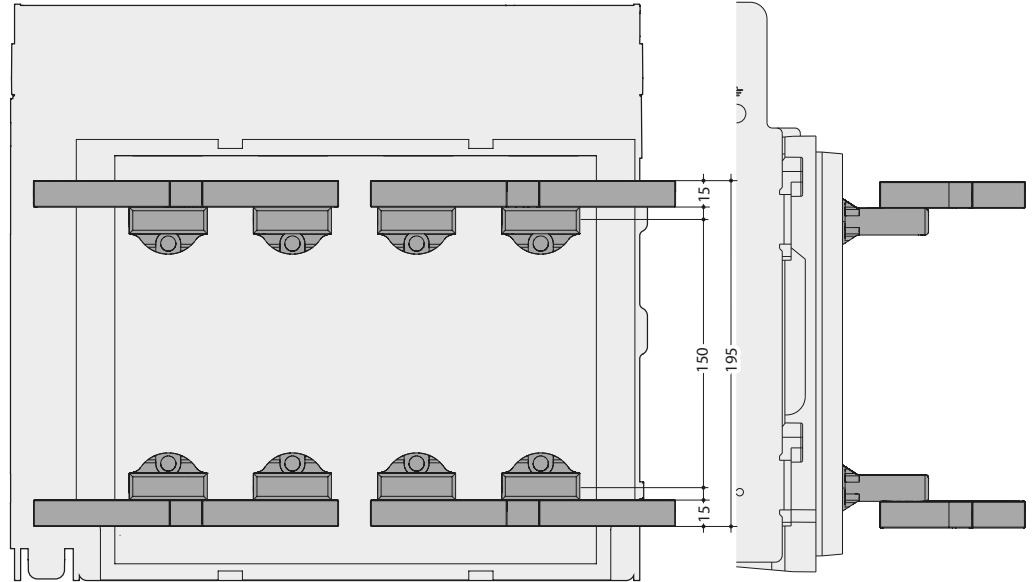
The dimensions given are valid for the fixed and drawout versions.

**Rear horizontal RC sockets**

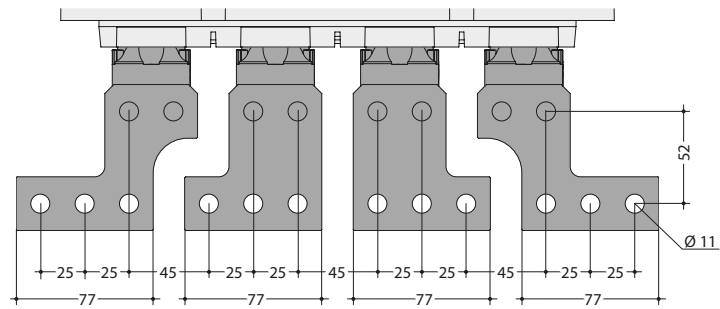
With SP spreaders for fixed or drawout 4-pole circuit breakers

Rear view

Side view



Top view



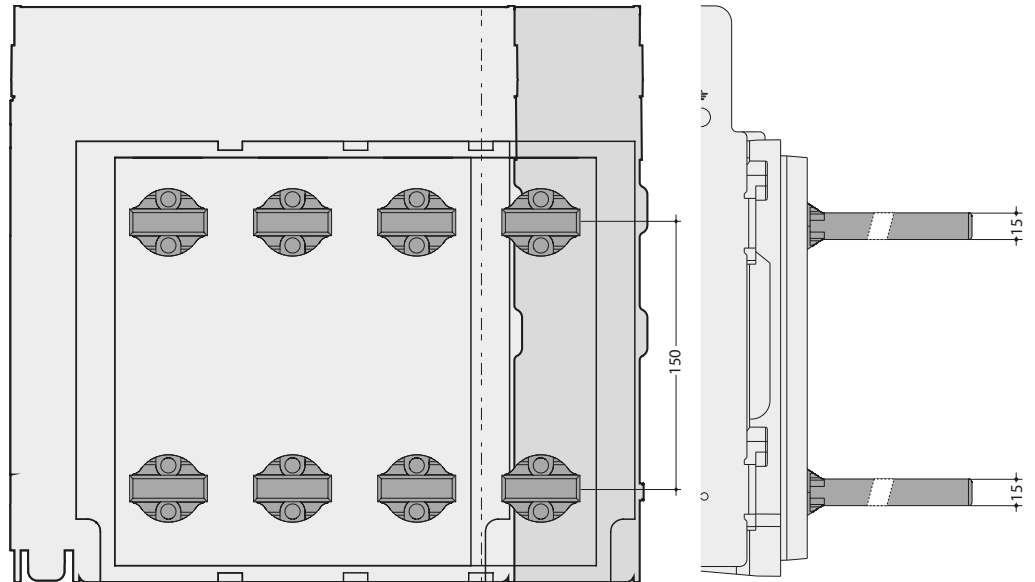
The illustration above shows a drawout version.  
The dimensions given are valid for the fixed and drawout versions.

### Rear horizontal RC sockets

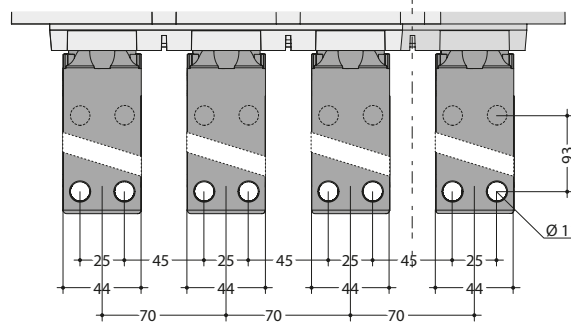
Long for vertical UNIMES type distribution board for fixed or drawout 3- or 4-pole circuit breaker

Rear view

Side view



Top view



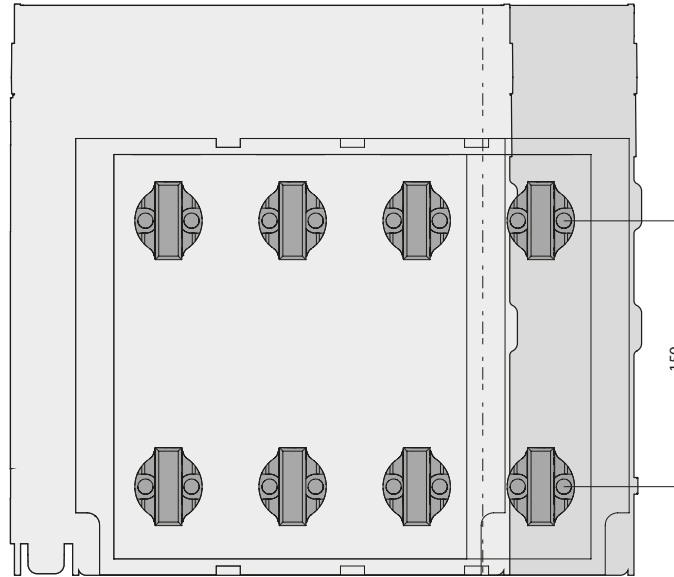
The illustration above shows a drawout version.  
The dimensions given are valid for the fixed and drawout versions.



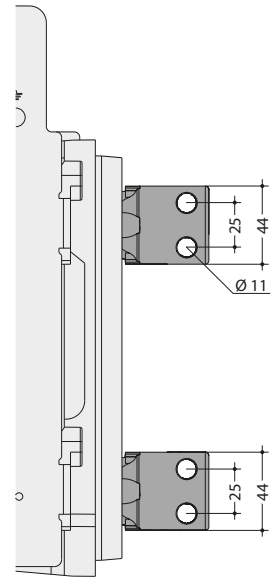
**Rear vertical RC sockets**

For fixed or drawout 3- or 4-pole version

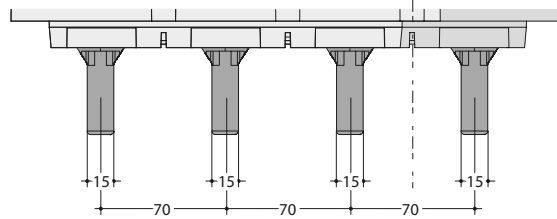
Rear view



Side view



Top view



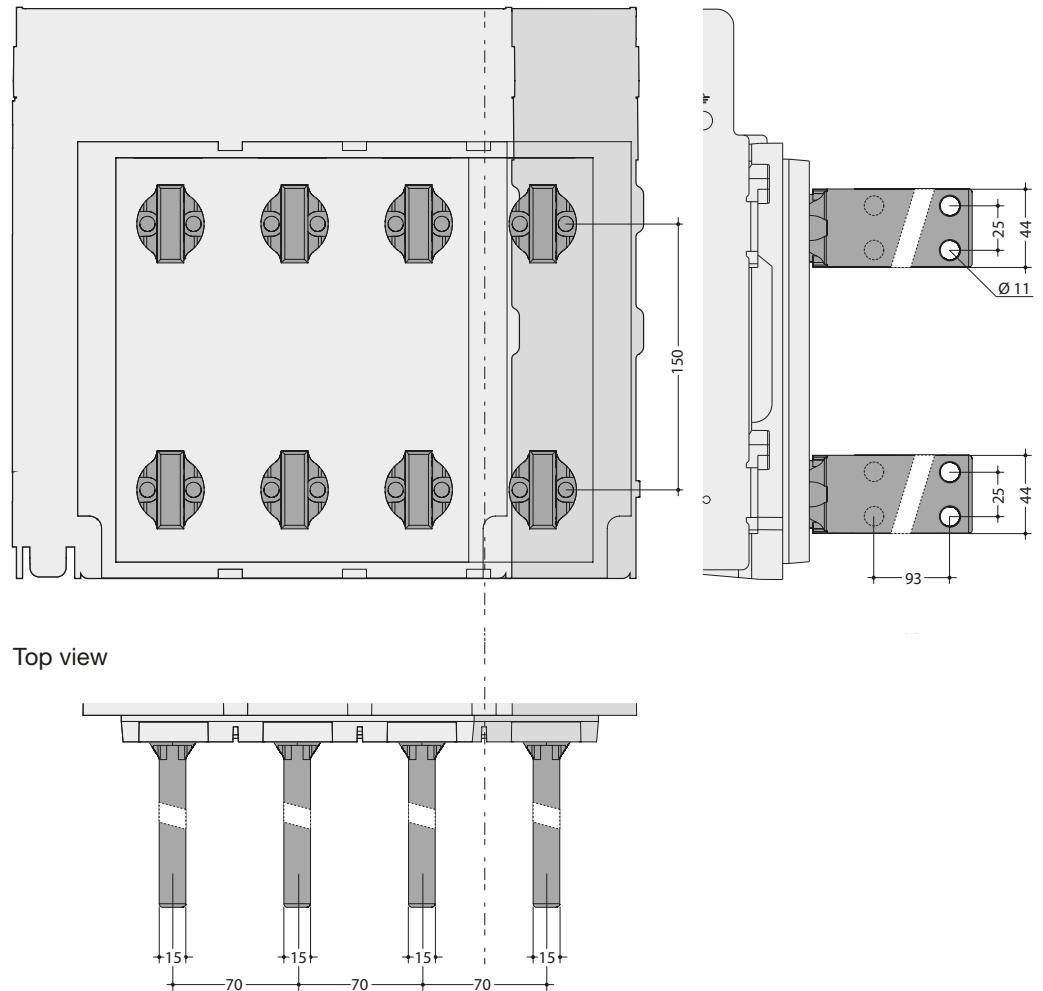
The dimensions given are valid for the fixed and drawout versions.

### Rear vertical RC sockets

Long for vertical UNIMES type distribution board for fixed or drawout 3- or 4-pole circuit breaker

Rear view

Side view

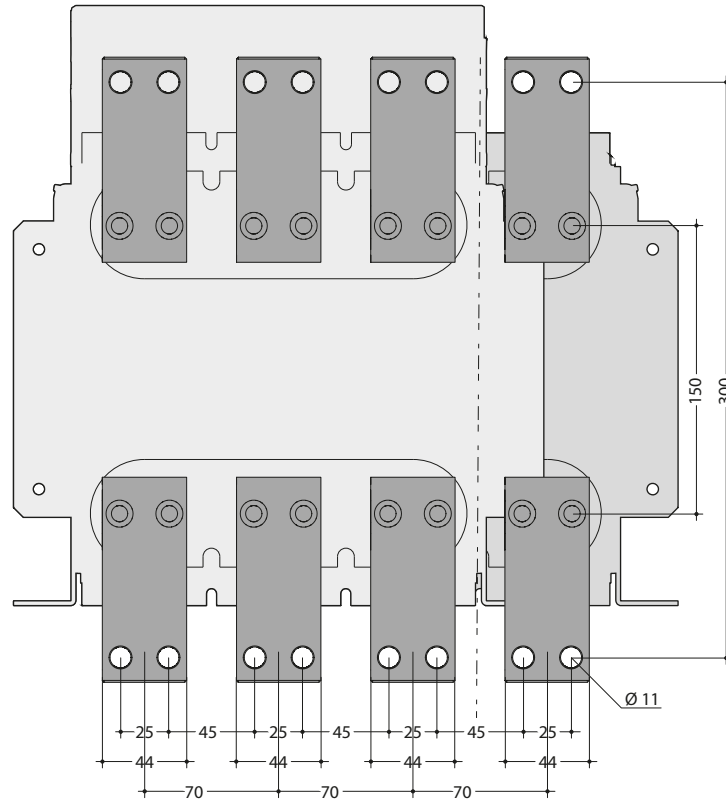


The dimensions given are valid for the fixed and drawout versions.

**FC front sockets**

For fixed 3- or 4-pole circuit breaker

Rear view



Side view



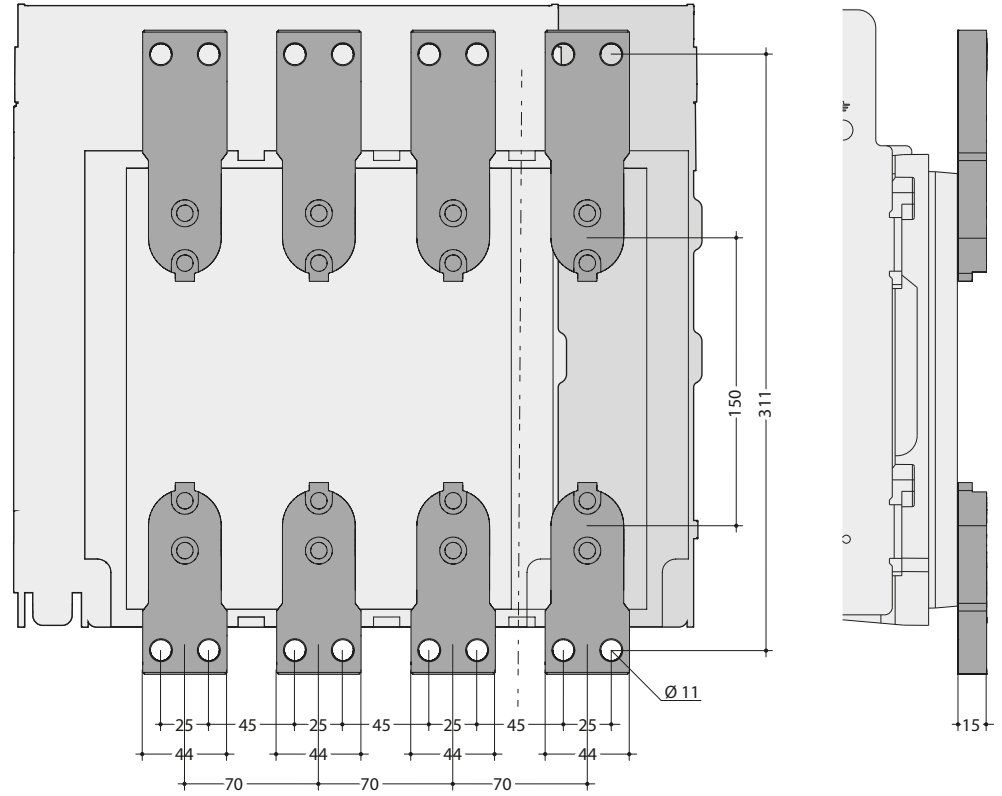


**FC front sockets**

For drawout 3- or 4- pole circuit breaker with short terminal extensions in bottom position

Rear view

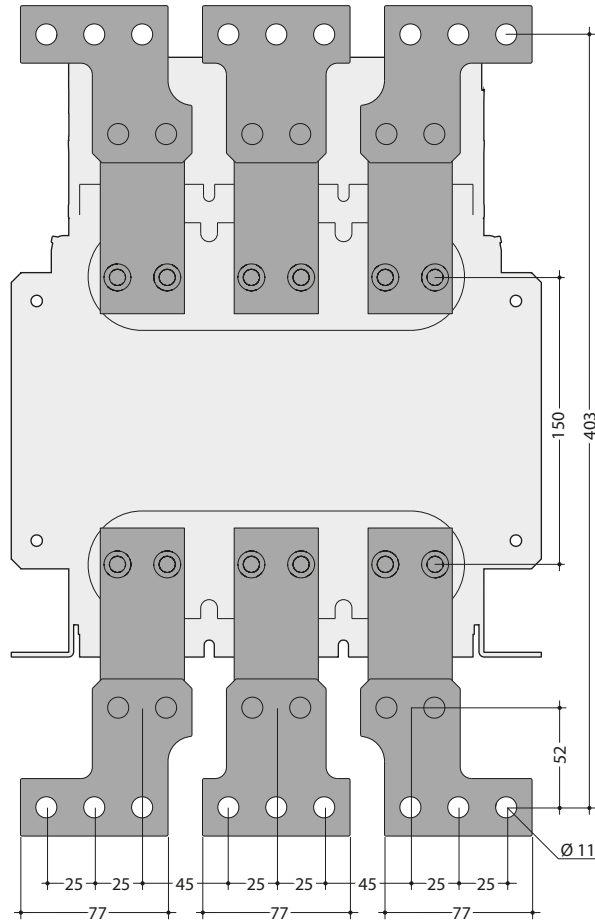
Side view



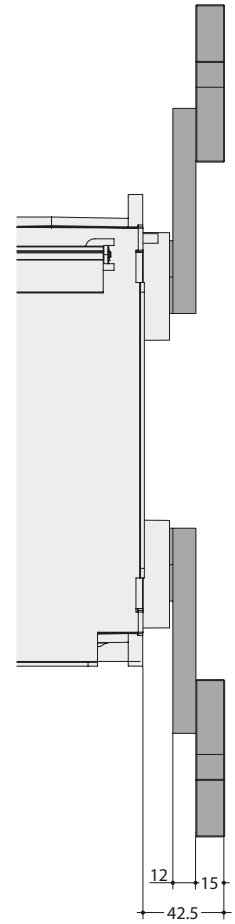
**FC front sockets with SP spreaders**

For fixed 3-pole circuit breaker

Rear view



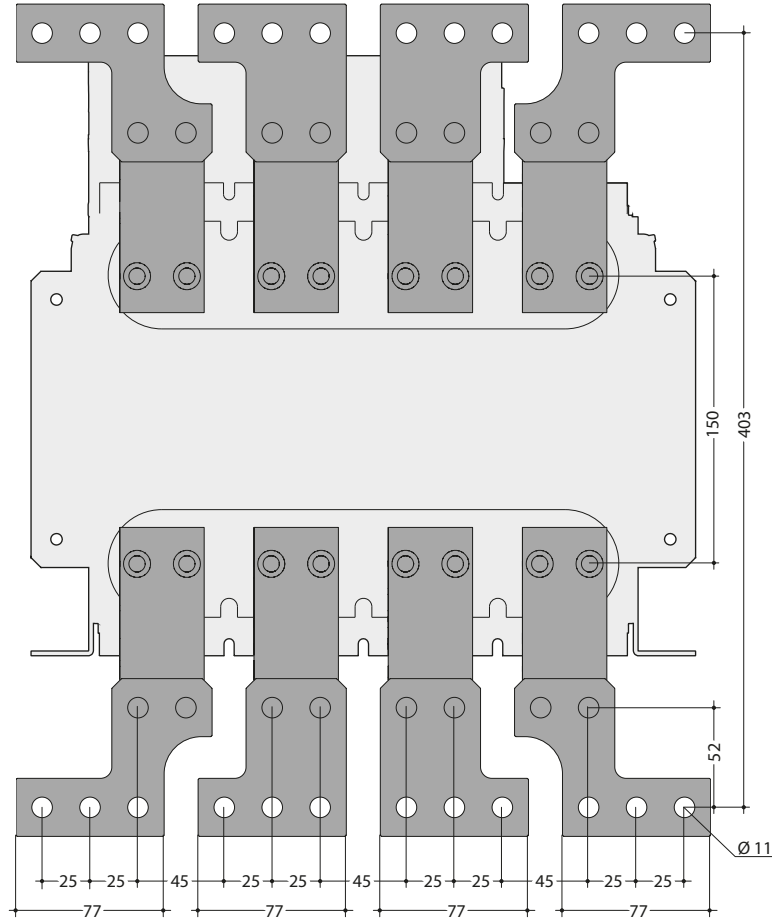
Side view



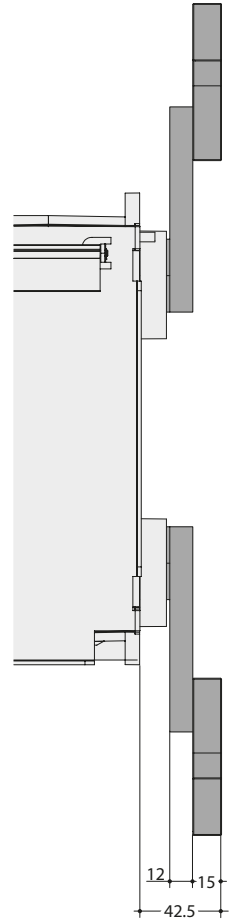
**FC front sockets with SP spreaders**

For fixed 4-pole circuit breaker

Rear view



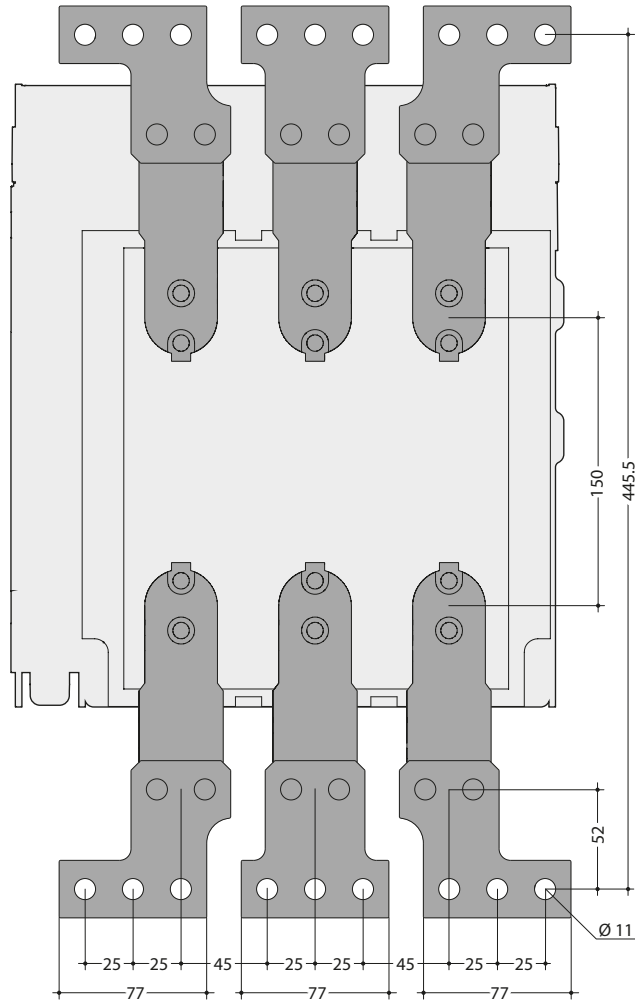
Side view



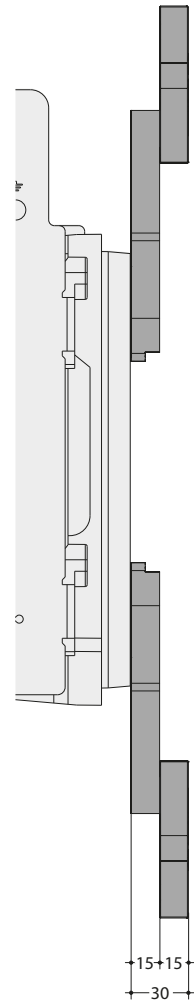
**FC front sockets with SP spreaders**

For drawout 3-pole circuit breaker

Rear view



Side view

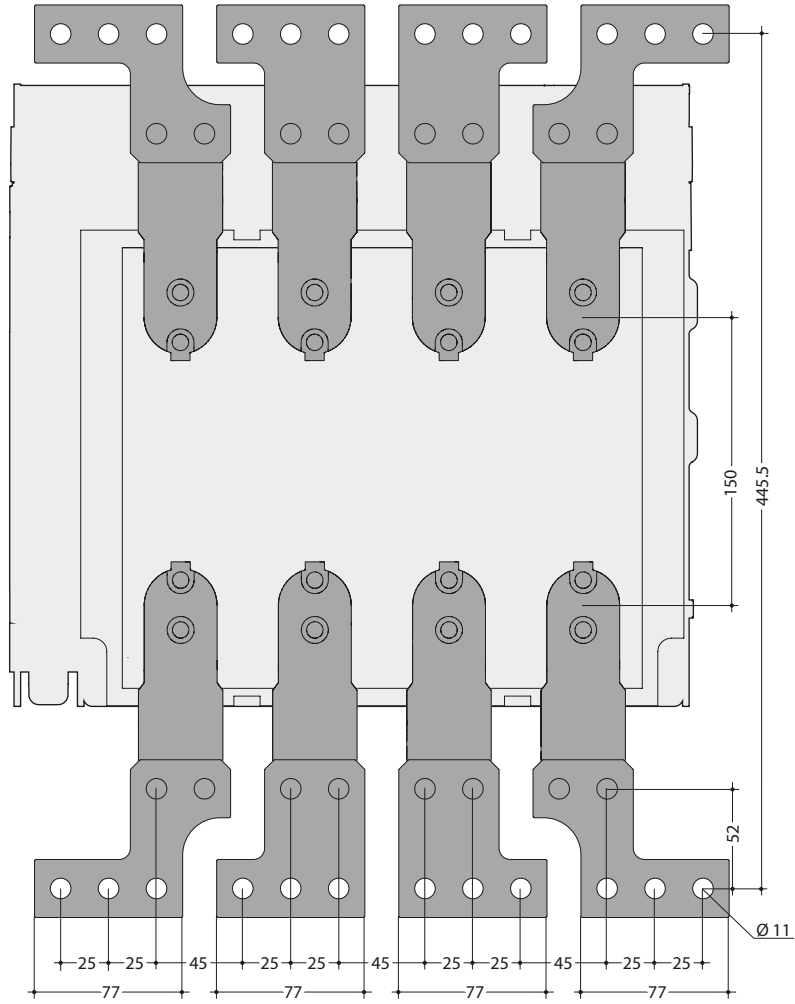




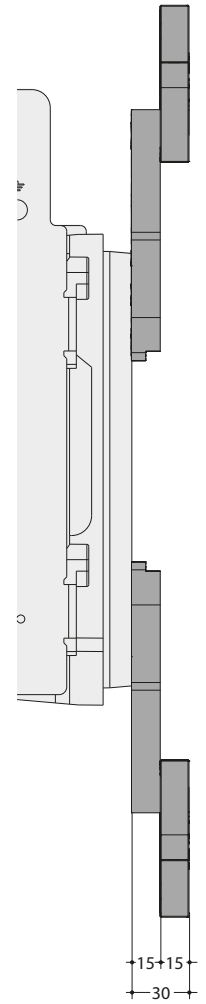
**FC front sockets with SP spreaders**

For drawout 4-pole circuit breaker

Rear view



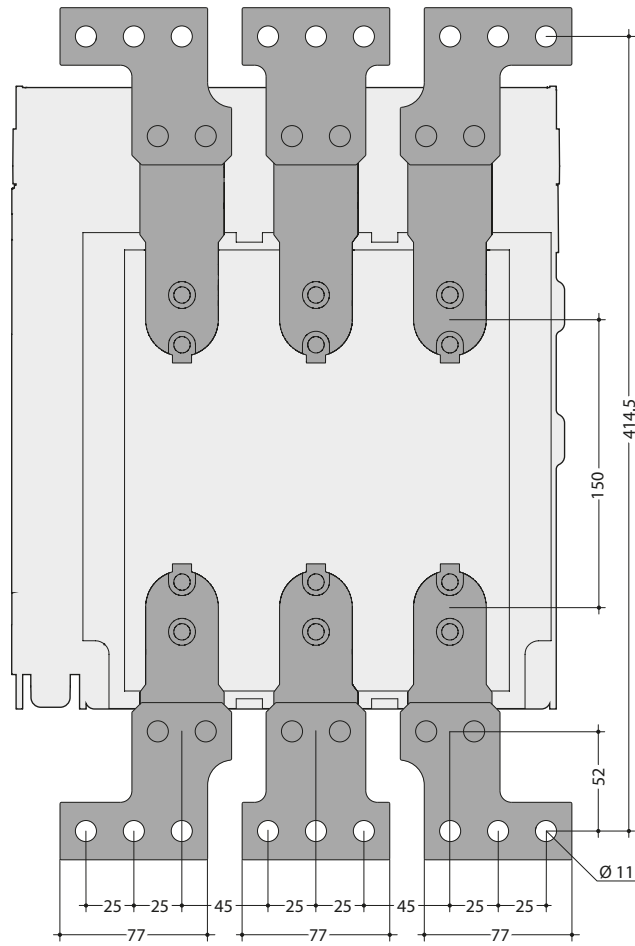
Side view



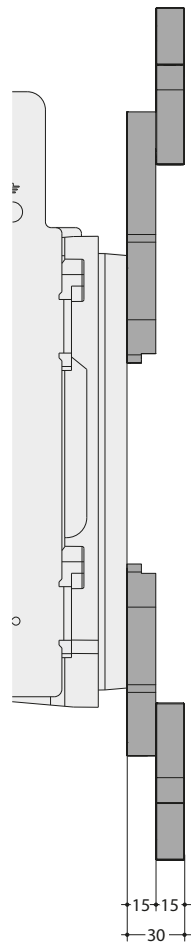
**FC front sockets with SP spreaders**

For drawout 3-pole circuit breaker with short terminal extensions in bottom position

Rear view



Side view

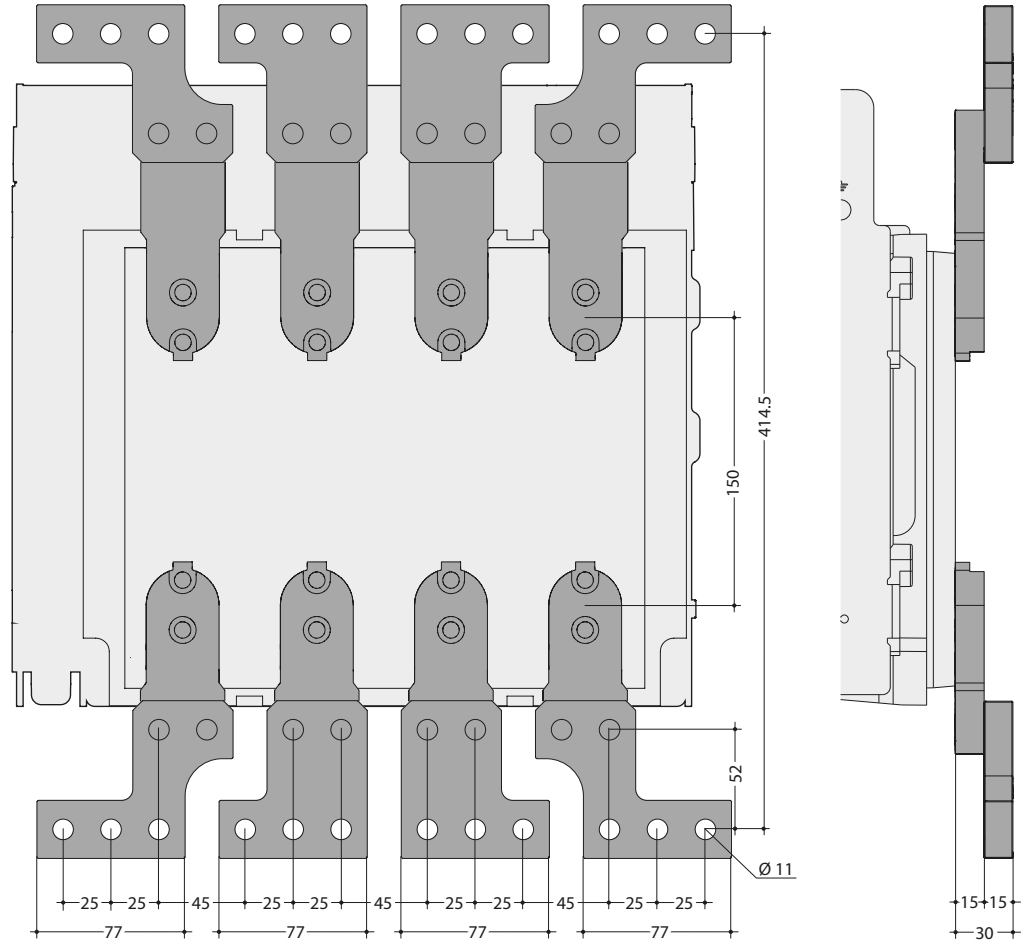


**FC front sockets with SP spreaders**

For drawout 4-pole circuit breaker with short terminal extensions in bottom position

Rear view

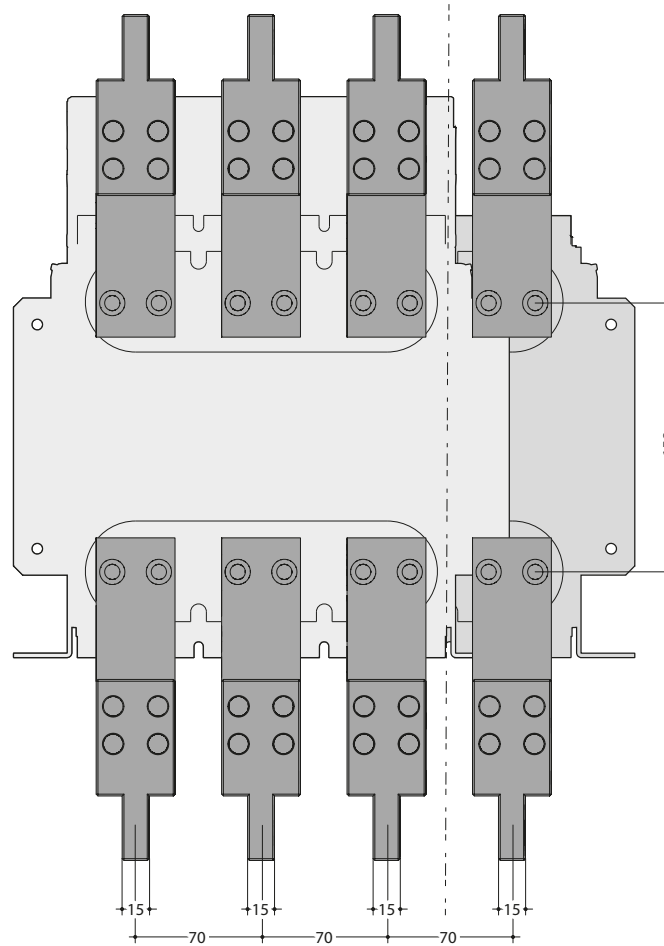
Side view



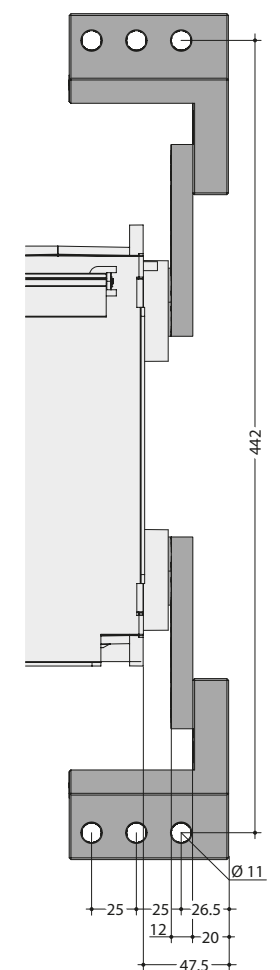
**FC front sockets with VCA vertical connectors**

In front for fixed 3- or 4-pole circuit breaker

Rear view



Side view

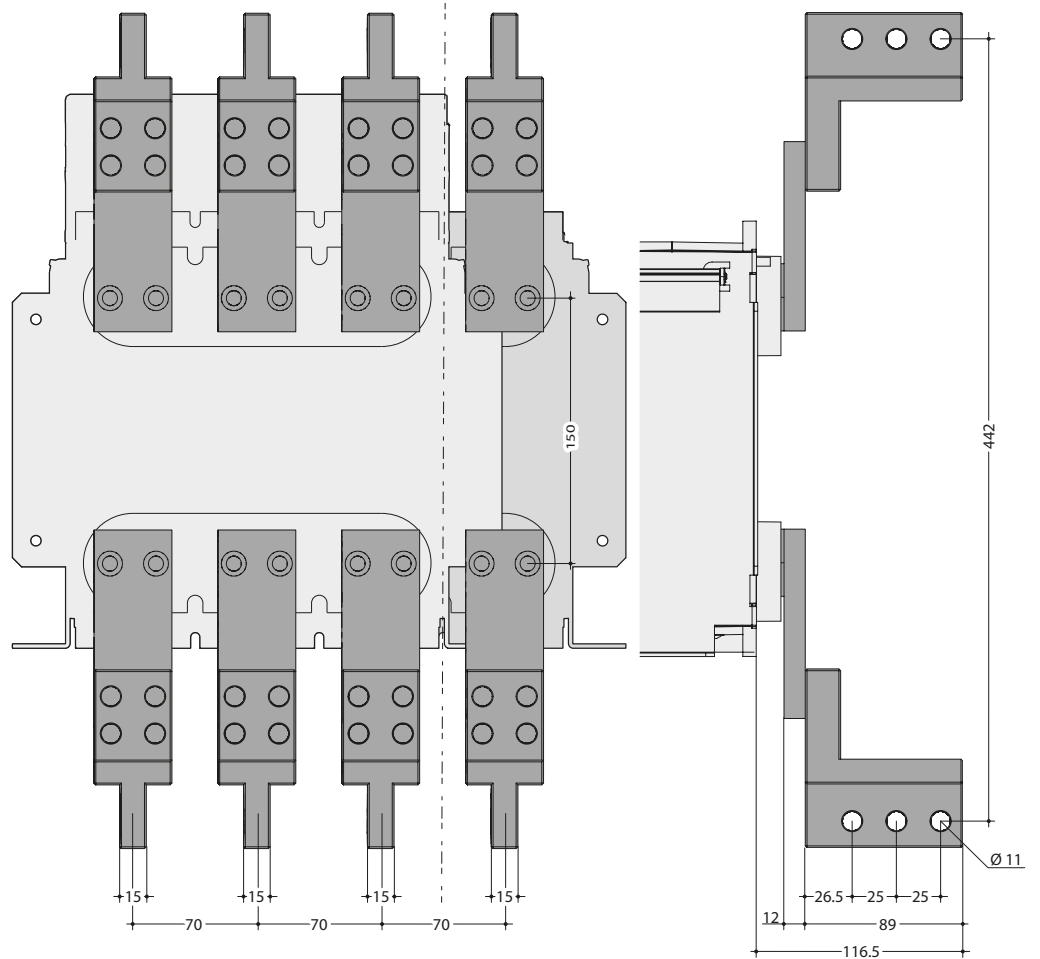


**FC front sockets with VCA vertical connectors**

At rear for fixed 3- or 4-pole circuit breaker

Rear view

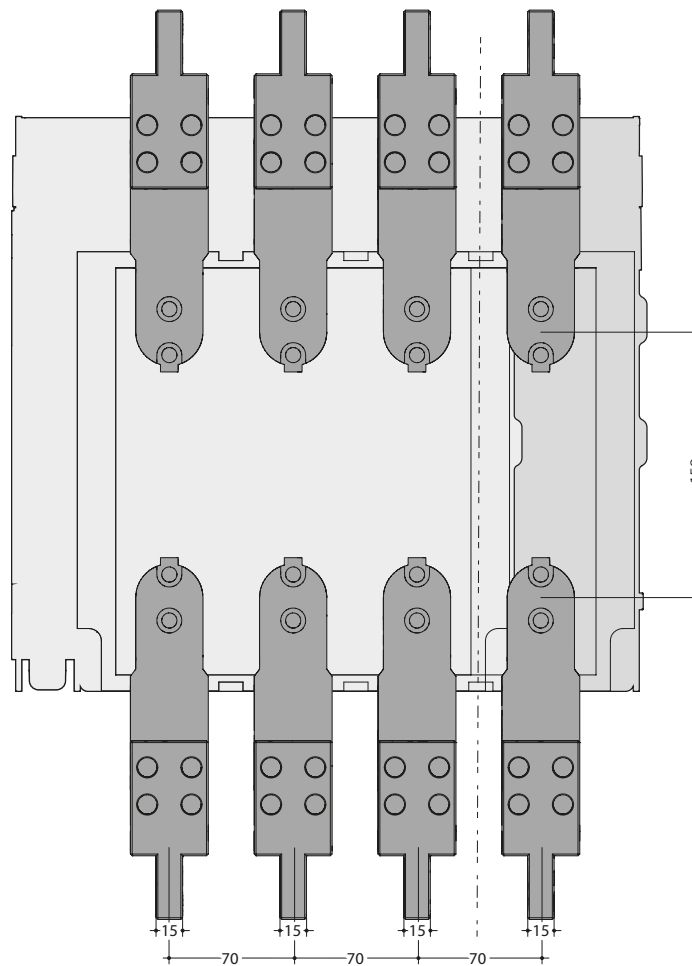
Side view



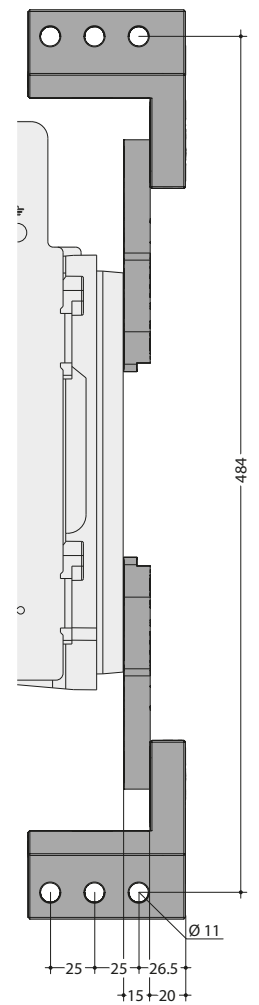
**FC front sockets with VCA vertical connectors**

In front for drawout 3- or 4-pole circuit breaker

Rear view



Side view

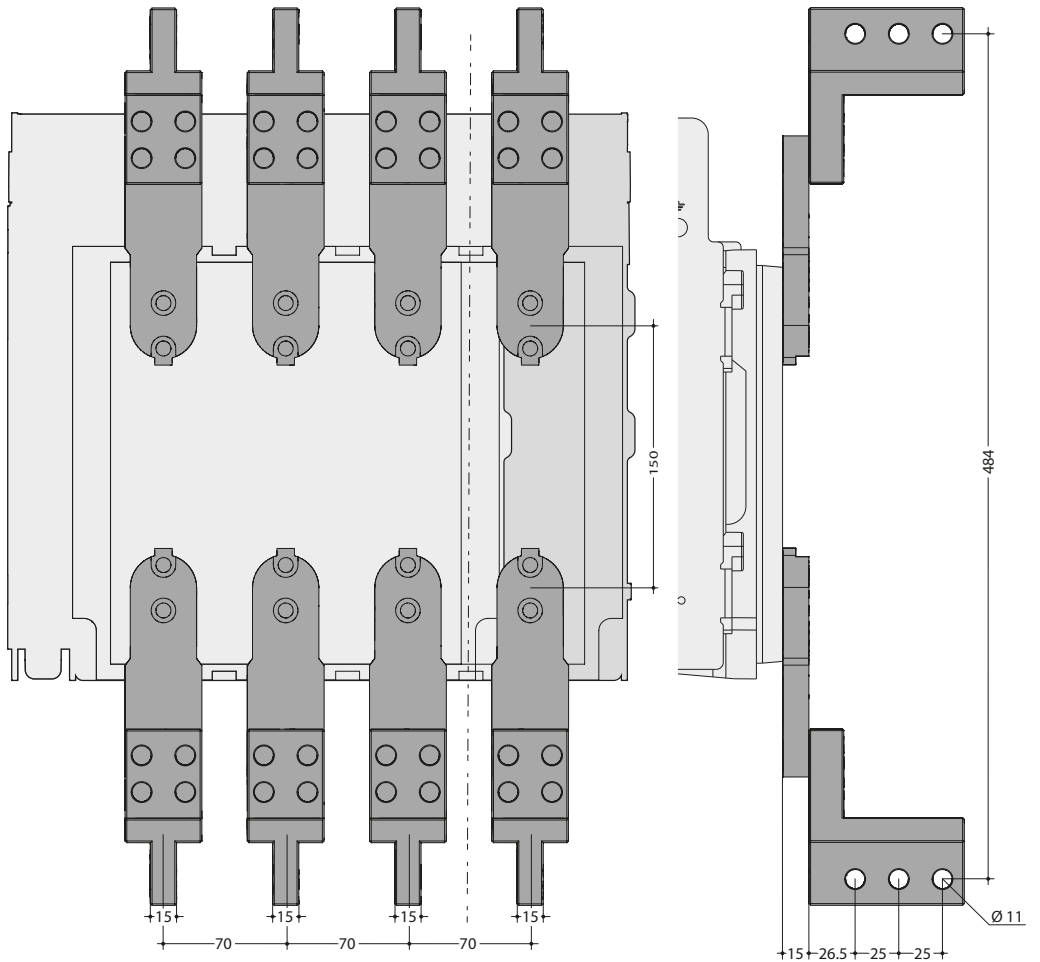


**FC front sockets with VCA vertical connectors**

At rear for drawout 3- or 4-pole circuit breaker

Rear view

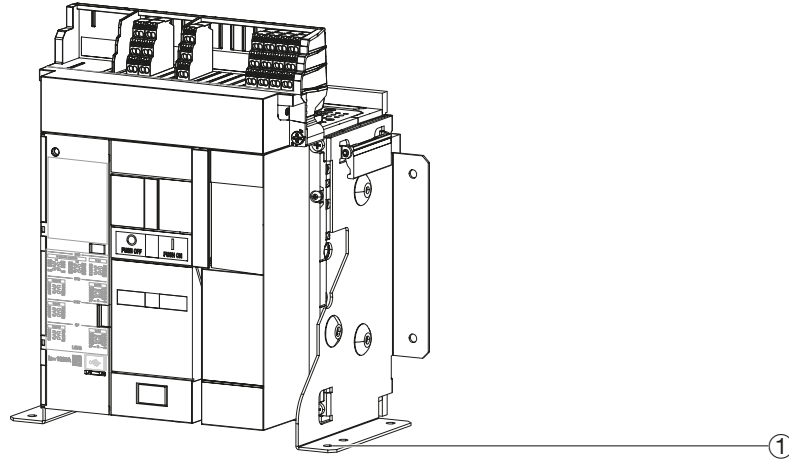
Side view



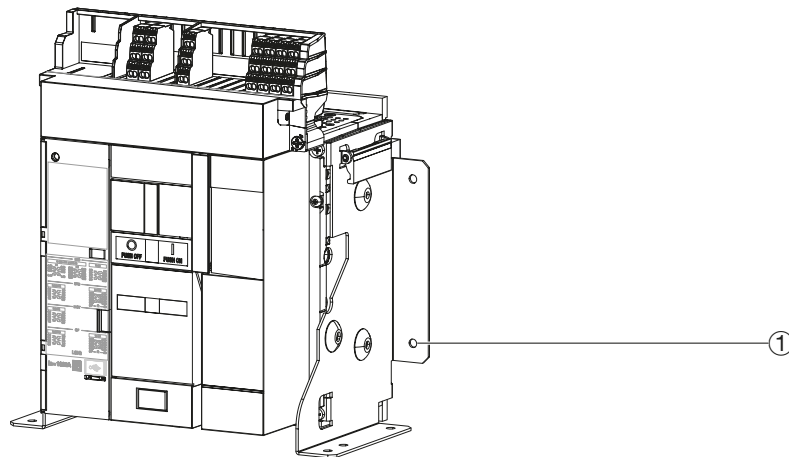
The door frame must be positioned in relation to the **reference point** between the circuit breaker and the distribution board door.

The **reference point** is one of the product's fastening holes.

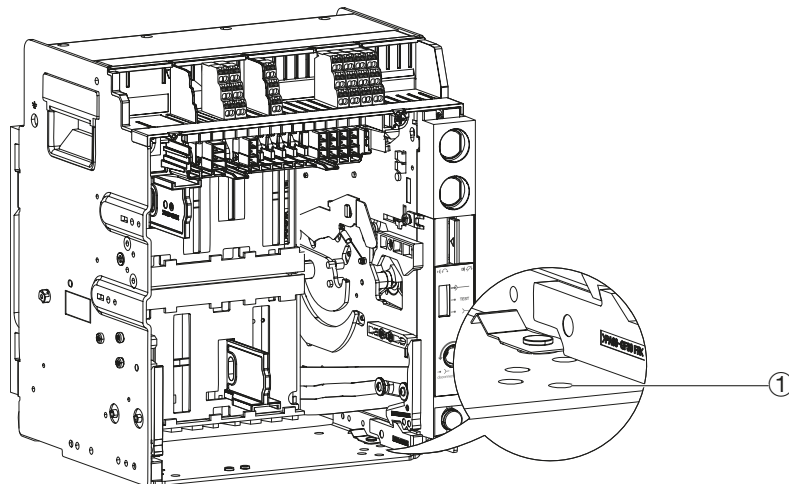
**Fixed 3 and 4 pole circuit breaker, fastening on a plate or mounting rails.**



**Fixed 3 and 4 pole circuit breaker, mounting on a panel at the rear of the product.**



**Drawout 3 and 4 pole circuit breaker, fastening on a plate or mounting rails.**

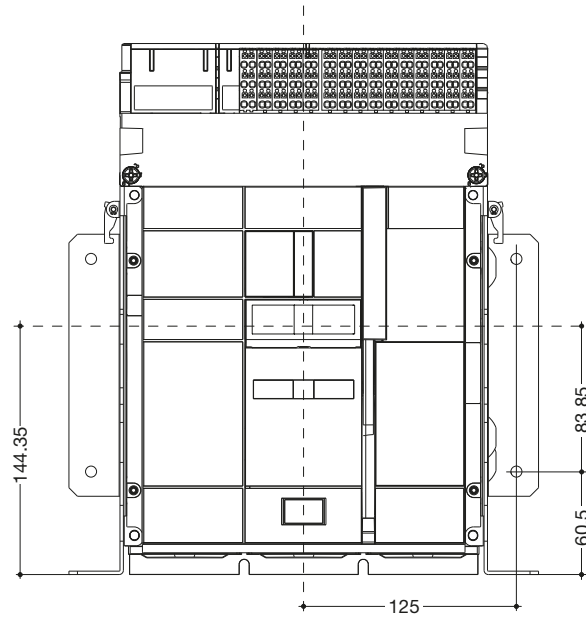


① Reference point

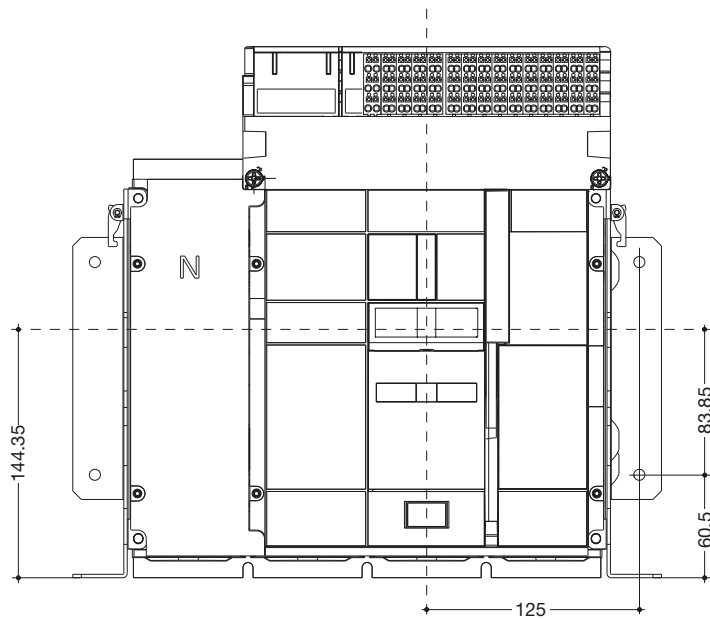


Comply with the following dimensions to install a door frame:

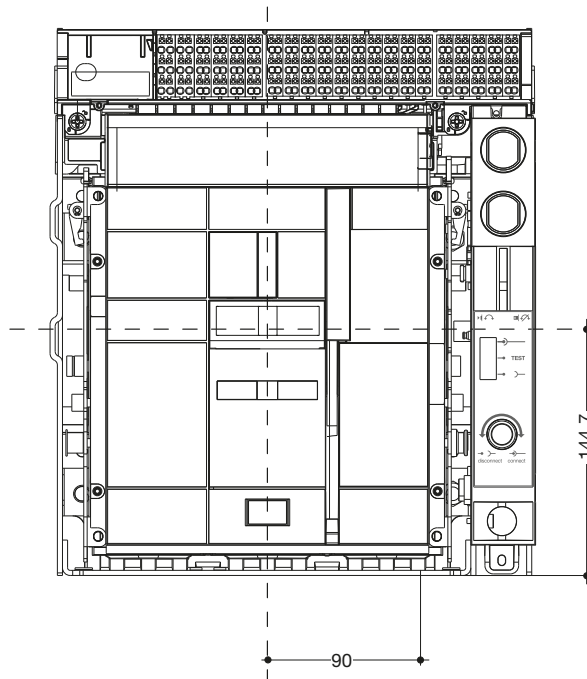
**Fixed 3 pole circuit breaker**



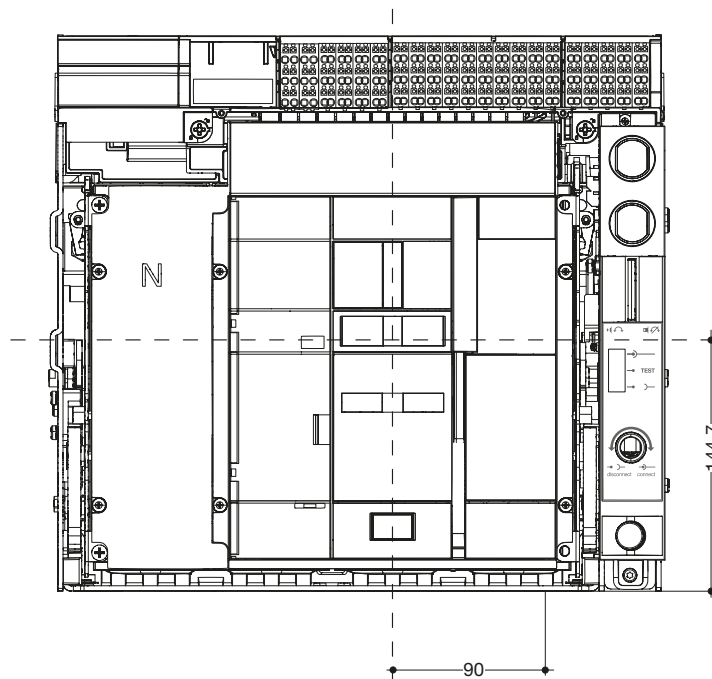
**Fixed 4 pole circuit breaker**



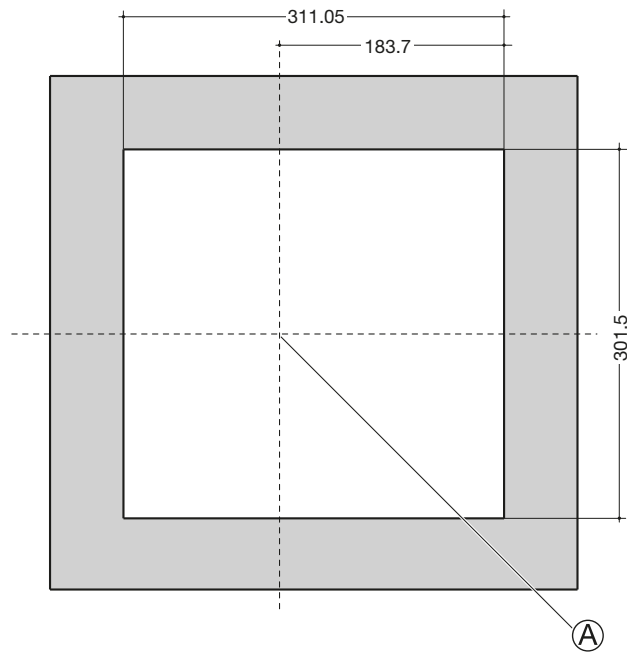
Drawout 3 pole circuit breaker



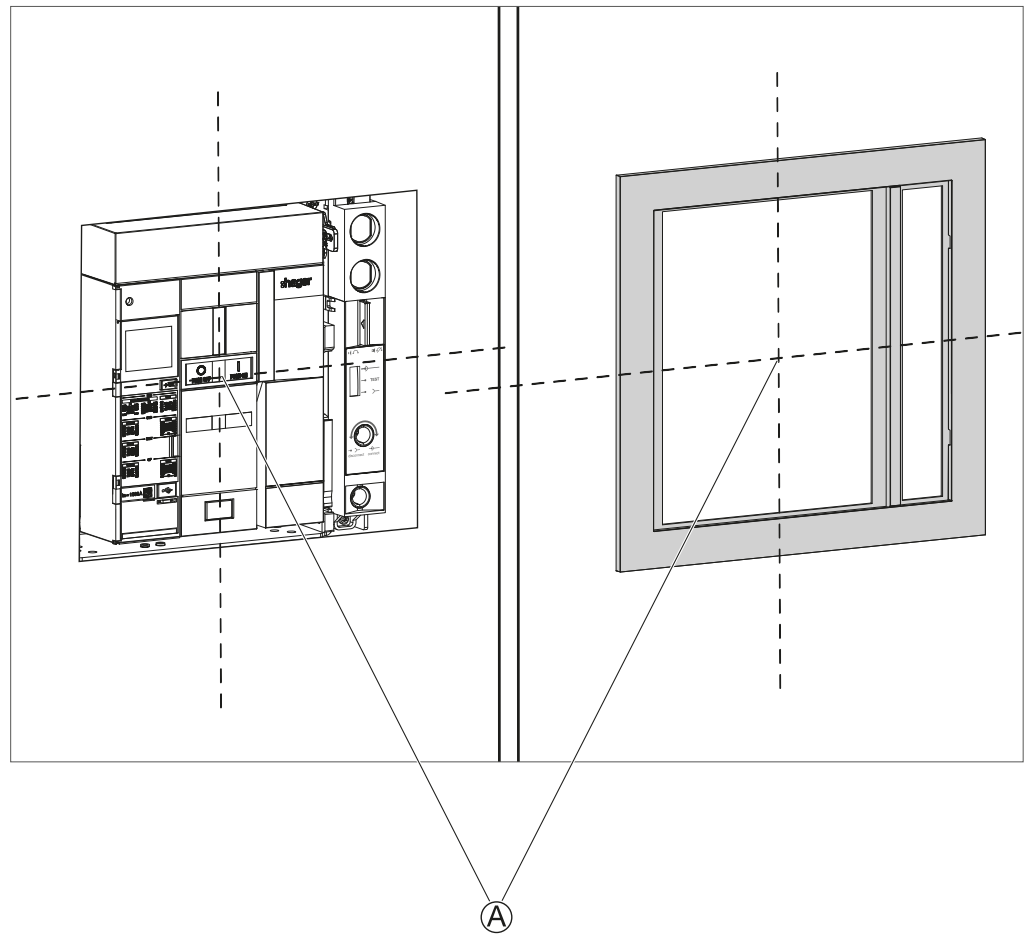
Drawout 4 pole circuit breaker



DF Door Frame



Align the centre **A** of the circuit breaker with the centre **A** of the door frame.





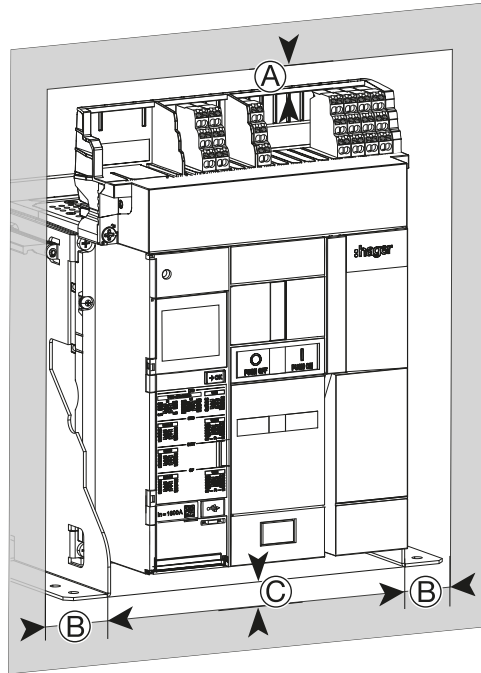
**WARNING**

**Risk of electric shock.**

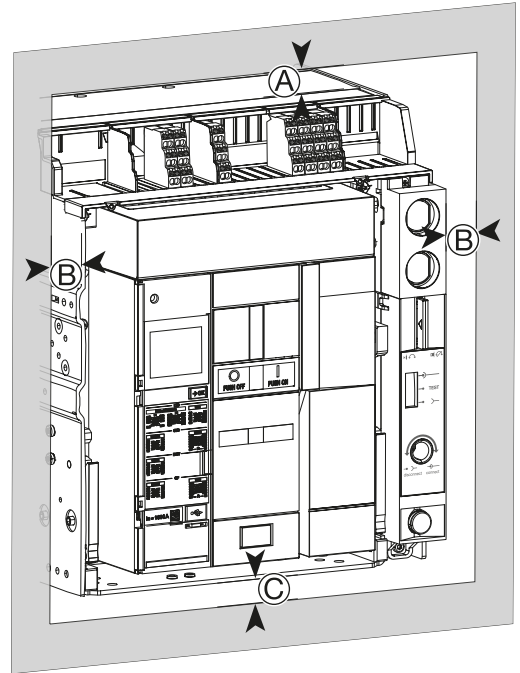
**Danger to life, risk of injury due to electric shock, or risk of serious injury.**

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 ensure the safety of people and the installation, comply with the following safety clearances:



Fixed circuit breaker



Drawout circuit breaker

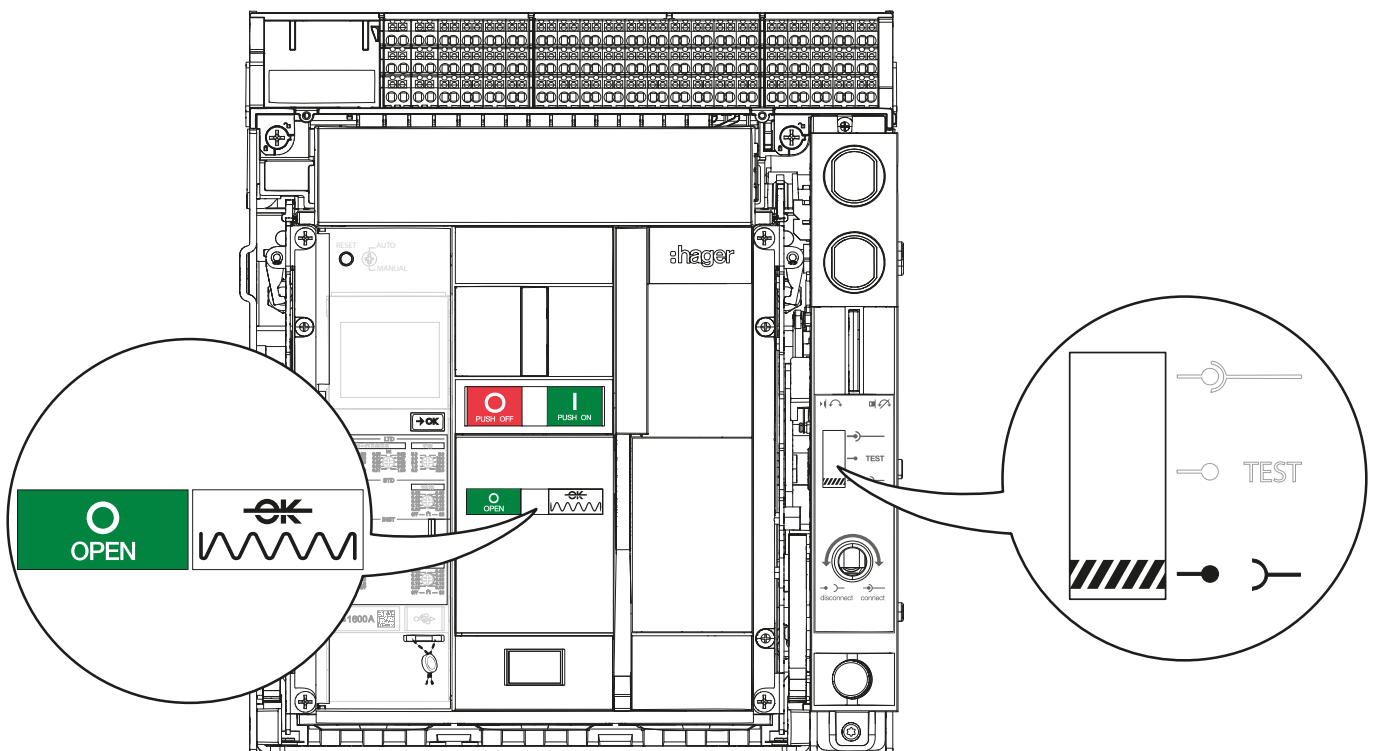
Circuit breaker	Distance	Insulating material	Metallic material	Live parts (mm)
Fixed	Ⓐ	0	0	150
	Ⓑ	0	0	60
	Ⓒ	0	0	0
Drawout	Ⓐ	0	0	0
	Ⓑ	0	0	60
	Ⓒ	0	0	0



**Risk of electric shock, electrocution or electric arc.**  
**Danger to life, risk of injury due to electric shock, or risk of serious injury.**  
 Ensure that the device is only installed by qualified personnel in accordance with the installation standards in force in the relevant country and that they are equipped with personal protective equipment (PPE).

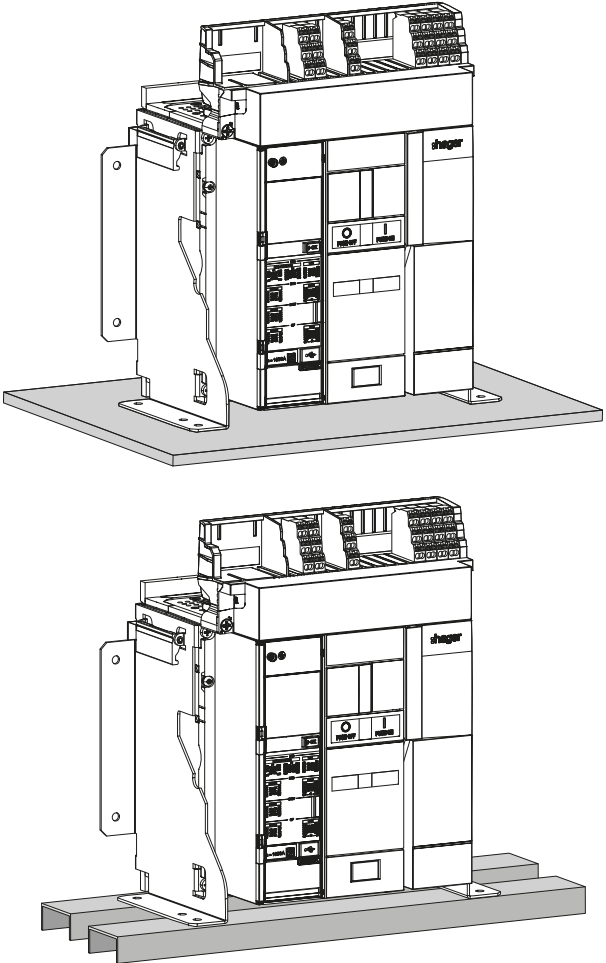
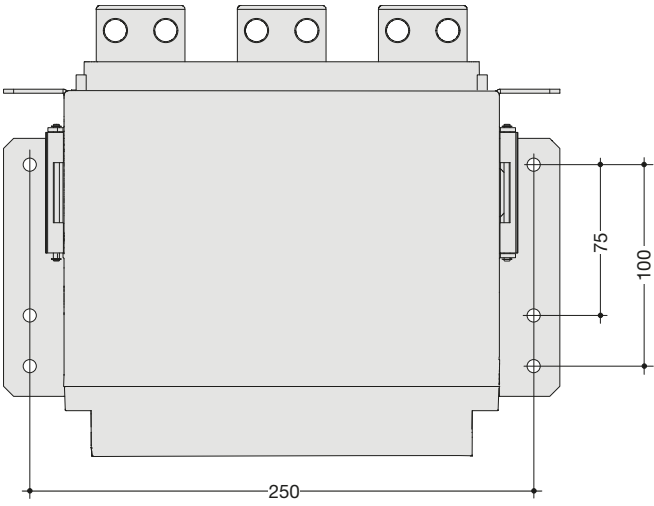
**Before installing, ensure that:**

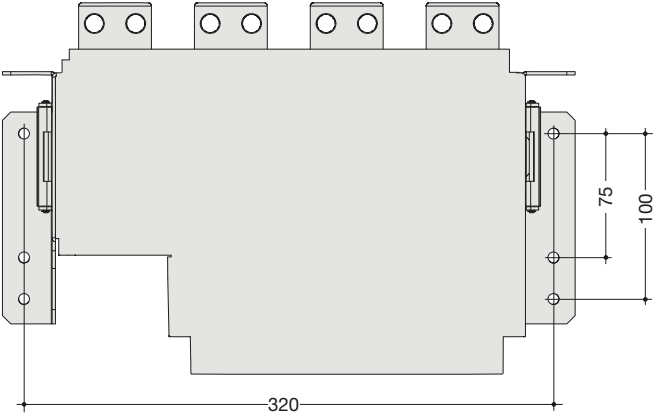
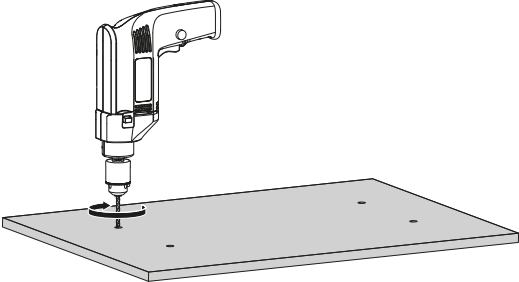
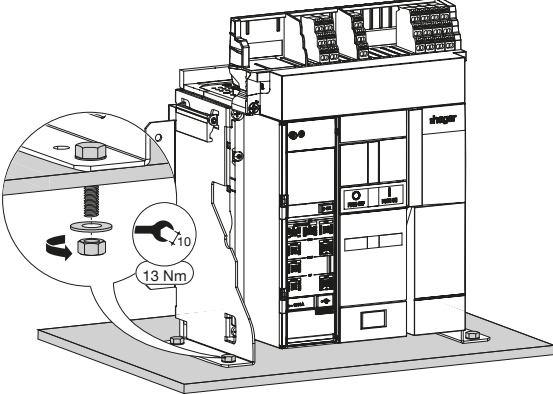
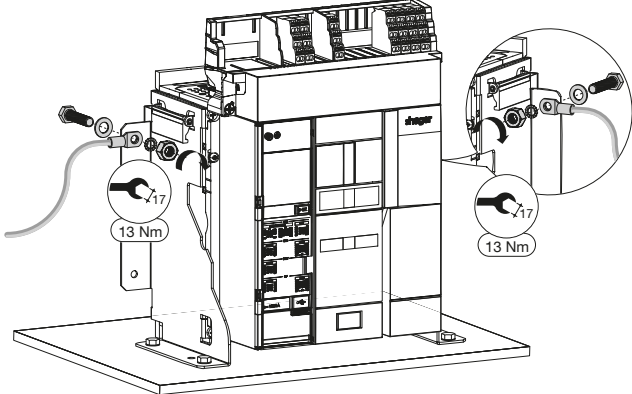
All of the circuit breaker's power sources are shut off, the circuit breaker is open, closing spring discharged and in the disconnected position.



17.2.1  
Fastening on a plate  
or mounting rails

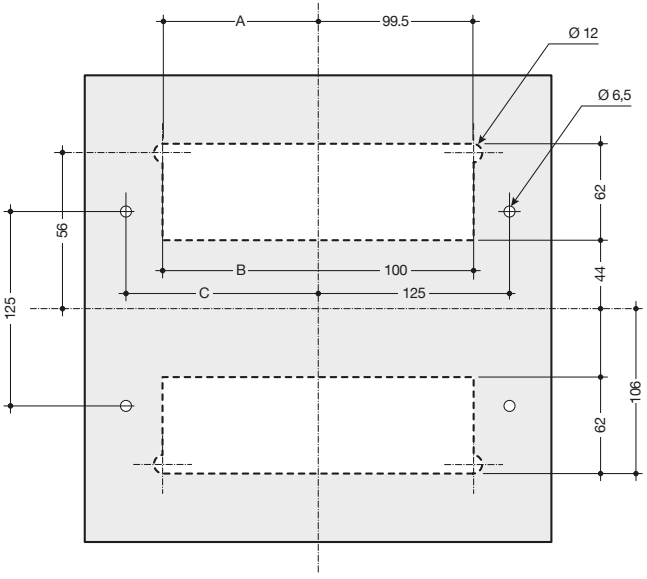
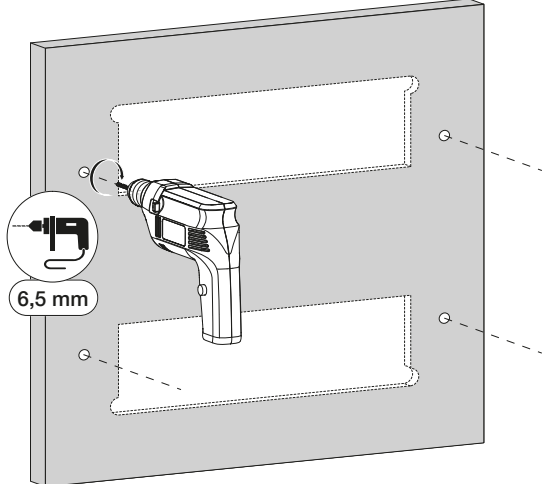
To fasten a fixed circuit breaker on a horizontal support, proceed as follows:

Action	Illustration
<p>1 Be sure to mount the circuit breaker on a plate with sufficient resistance</p> <p>or on mounting supports that are stable enough.</p>	
<p>2 Identify at least 4 mounting holes (2 on each side) complying with the following dimensions.</p> <p><b>3 poles</b></p>	

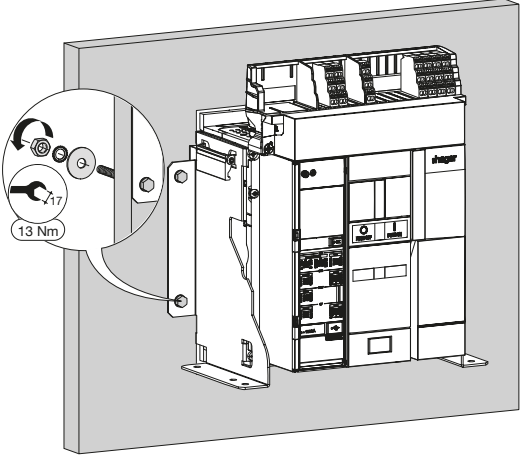
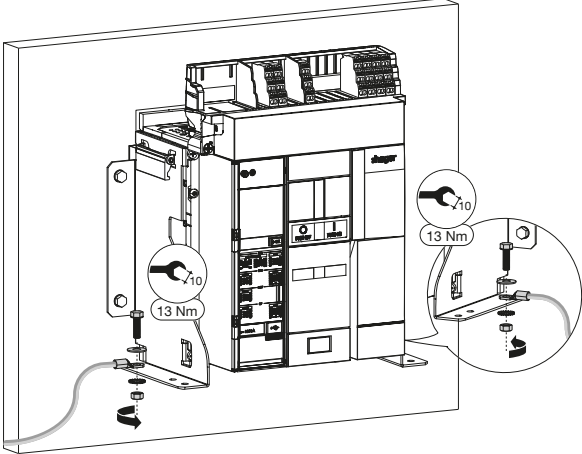
Action	Illustration
<p>2 (continued)</p> <p><b>4 poles</b></p>	
<p>3 Drill the 4 fixing holes (Ø mini 6.5 mm).</p>	
<p>4 Mount the circuit breaker using M6 screws.</p>	
<p>5 If the mounting plate is not connected to the earth, connect an earthing conductor to each side of the mounting plate using an M6 screw and an unused drilled hole. It is recommended that an earthing conductor with a cross-section of 16 mm<sup>2</sup> be used.</p>	

**17.2.1**  
**Fastening on a panel**  
**at the rear of the product**

To mount a fixed circuit breaker on a panel at the rear of the product, proceed as follows:

Action	Illustration												
<p><b>1</b> To allow access to the rear connections, provide 2 cut-outs in the panel, then identify at least 4 mounting holes complying with the following dimensions. The circuit breaker must always be fastened by at least four screws.</p>	 <table border="1" data-bbox="906 965 1289 1151"> <thead> <tr> <th></th> <th>3P</th> <th>4P</th> </tr> </thead> <tbody> <tr> <td>A (mm)</td> <td>99,5</td> <td>169,5</td> </tr> <tr> <td>B (mm)</td> <td>100</td> <td>170</td> </tr> <tr> <td>C (mm)</td> <td>125</td> <td>195</td> </tr> </tbody> </table>		3P	4P	A (mm)	99,5	169,5	B (mm)	100	170	C (mm)	125	195
	3P	4P											
A (mm)	99,5	169,5											
B (mm)	100	170											
C (mm)	125	195											
<p><b>2</b> Drill the 4 fixing holes (Ø mini 6.5 mm).</p>													

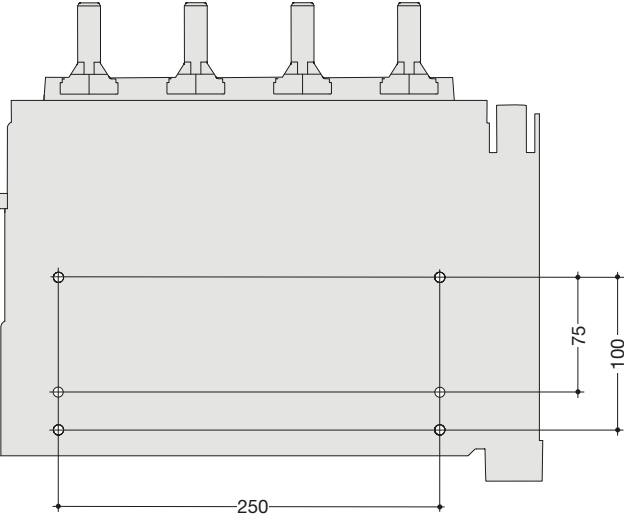
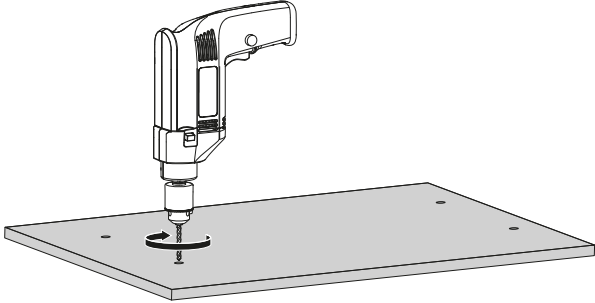
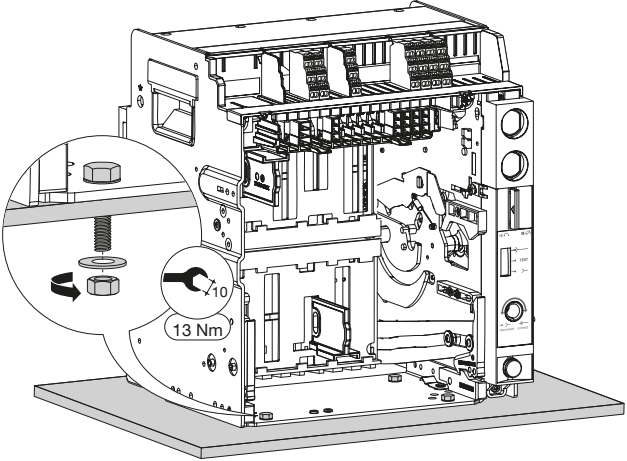
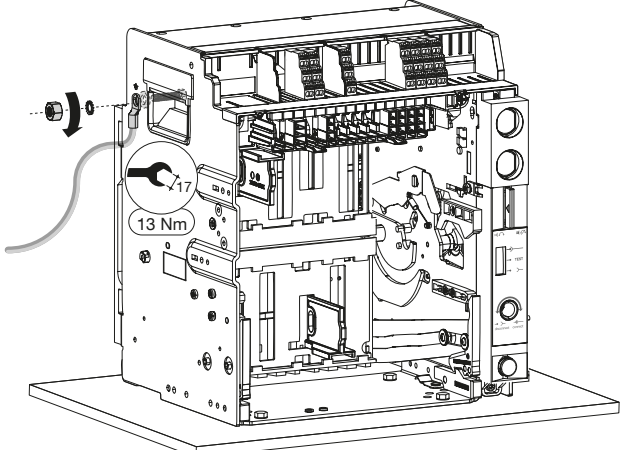


Action	Illustration
<p>3 Mount the circuit breaker using M6 screws.</p>	
<p>4 If the panel is not earthed, connect an earthing cable to each side mounting plate using an M6 screw and an unused hole. It is recommended that an earthing conductor with a cross-section of 16 mm<sup>2</sup> be used.</p>	

<b>ATTENTION</b>	
<b>Risk of property damage</b>	
Always mount the chassis before inserting or extracting the circuit breaker.	

To mount the chassis of a drawout circuit breaker, proceed as follows:

	<b>Action</b>	<b>Illustration</b>
<b>1</b>	<p>The circuit breaker must first be removed from the chassis.</p> <p>Be sure to mount the circuit breaker on a plate with sufficient resistance</p> <p>or on mounting supports that are stable enough.</p>	
<b>2</b>	<p>Identify at least 4 mounting holes (2 on each side) complying with the following dimensions.</p> <p><b>3 poles</b></p>	

Action	Illustration
<p>2 (continued)</p> <p><b>4 poles</b></p>	
<p>3 Drill the 4 fixing holes (Ø mini 6.5 mm).</p>	
<p>4 Mount the chassis using M6 screws.</p>	
<p>5 If the plate is not earthed, connect an earthing conductor directly to the chassis using an M10 screw. It is recommended that an earthing conductor with a cross-section of 16 mm<sup>2</sup> be used.</p>	

**ATTENTION**

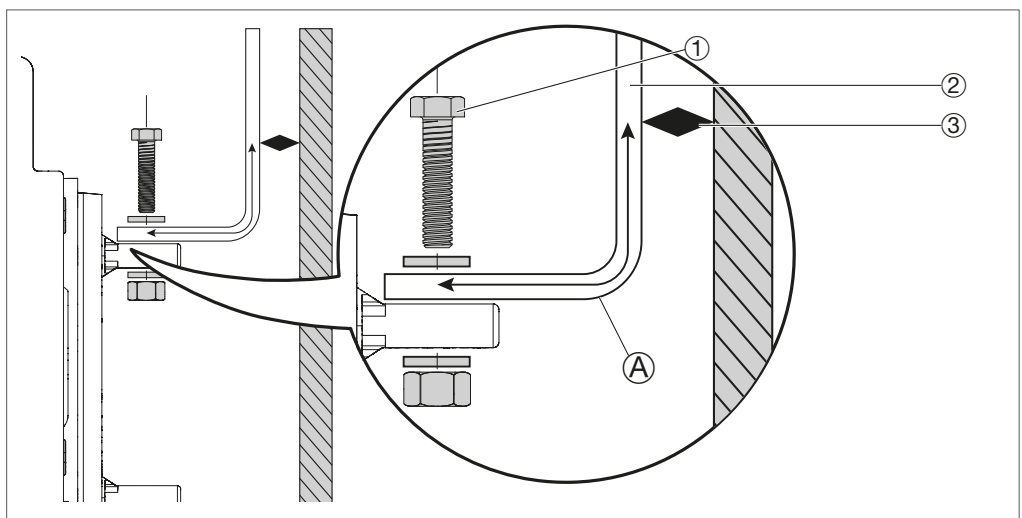
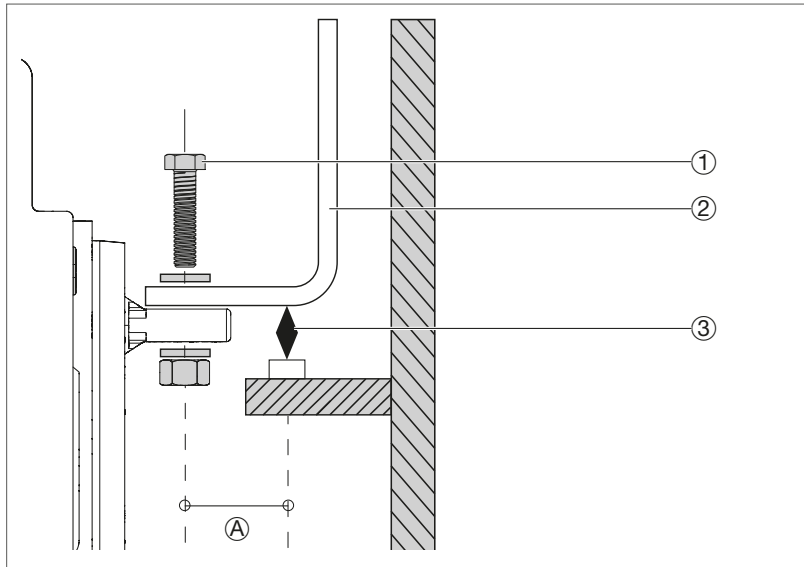
**Risk of property damage**

The connecting bars must be shaped and positioned so that they are perfectly adapted to the rear connections before tightening using bolts.

The connecting bars must be resting on a support attached to the electrical distribution board, not directly on the rear sockets.

If a short circuit occurs, the deformation of the connecting bars must not damage the fastening of the rear connections. To guarantee this, one of the connecting bar supports should be used at maximum distance, according to the short-circuit currents as indicated below:

Presumed short circuit current (kA)	Distance $\text{\textcircled{A}}$ (mm)
42	350
55	300
66	250

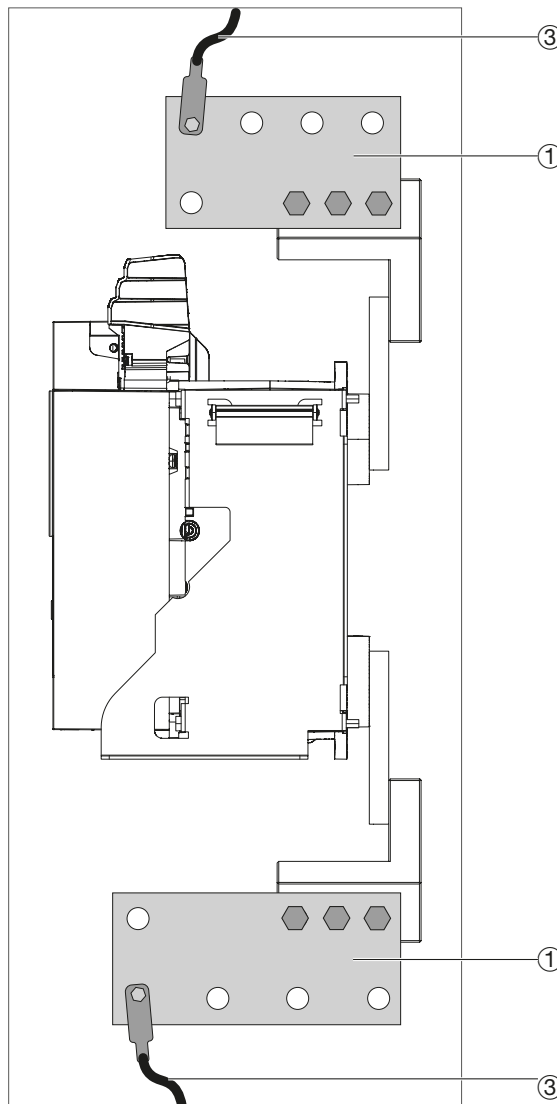
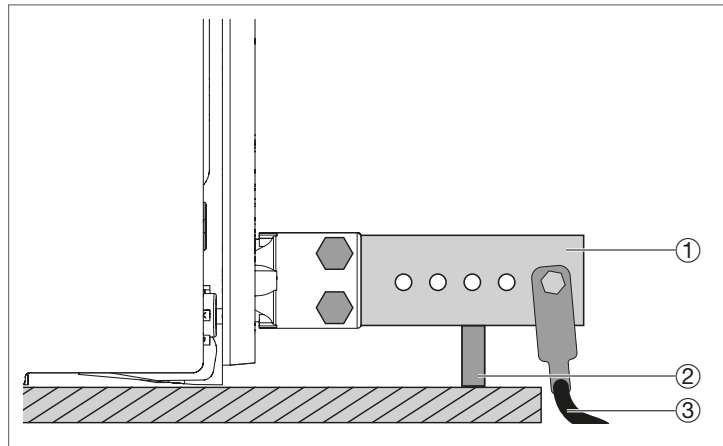


- ① Tightening bolt
- ② Connecting bar
- ③ Connecting bars support

**ATTENTION**

**Risk of property damage**

The connecting cables must be fastened to the electrical distribution board to avoid dragging on the rear connections. Cable retaining bars are indicated for this. If necessary, extend the rear connection using terminal extensions for cables, then connect them to the connection cables.



**ATTENTION**

Hager does not provide either the terminal extensions for cables or the cable retaining bars. To create these parts, refer to chapter 15 Fastening dimensions.

- ① Terminal extensions for cables
- ② Connection cable support
- ③ Connection cable

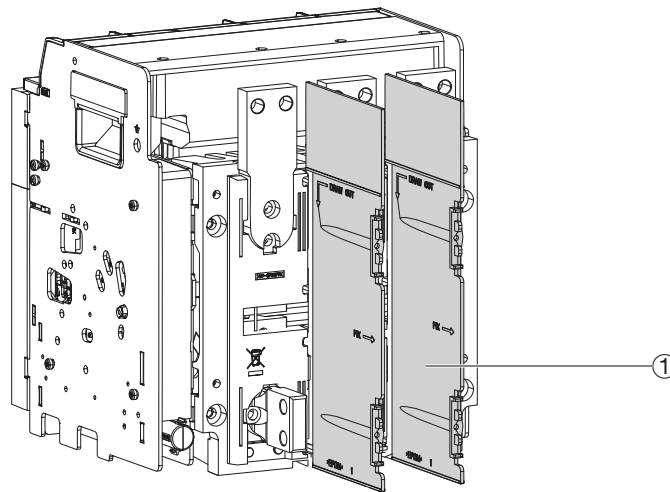
For the installation of protection accessories, refer to the following manuals:

Accessories	Instructions
IB interphase barrier	6LE007544A
Cut-off chamber cover	6LE007513A
DF Door Frame	6LE007512A
Terminal block protection cover	-

### IB interphase barrier

The interphase barriers are safety accessories designed to strengthen the isolation between the phases at the rear connections.

ATTENTION
<ul style="list-style-type: none"> <li>• The use of interphase barriers is mandatory for supply voltages over 500 V AC.</li> <li>• The use of interphase barriers is incompatible with the SP spreaders.</li> </ul>

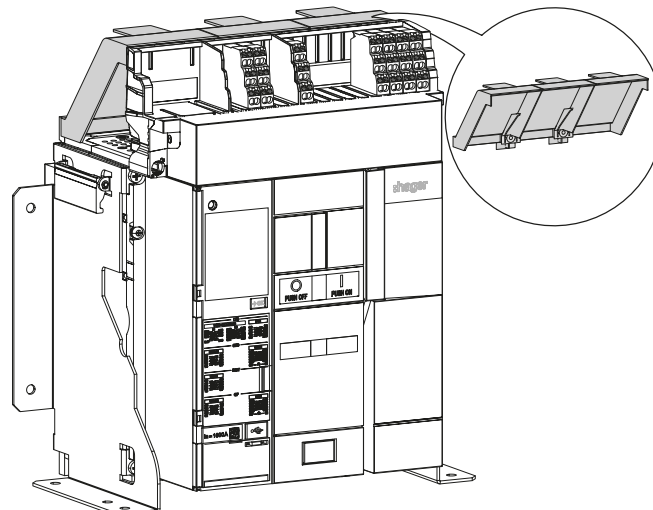


① IB interphase barrier

### Cut-off chamber cover

The cut-off chamber cover is an accessory mounted on fixed circuit breakers connected with front connections.

This cover prevents the ionized gases produced during trip operations from reaching the connections and thus avoids electric arcing between the connections.

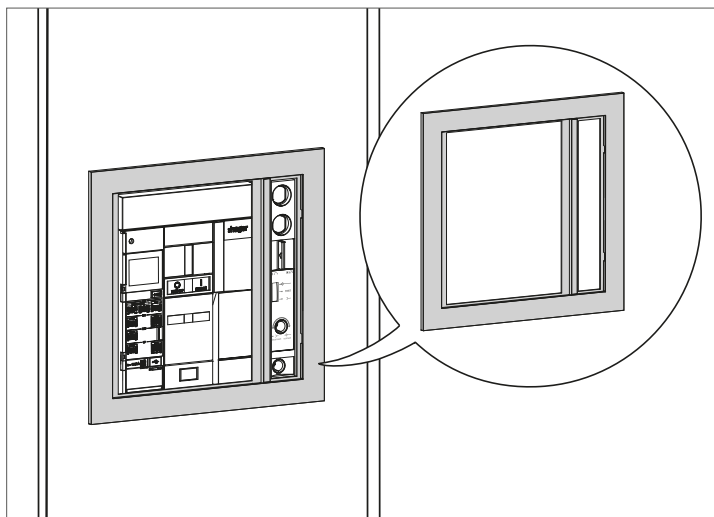


### DF Door Frame

The door frame is fitted on the cut-out in the electrical distribution board door and raised the protection class to IP30.

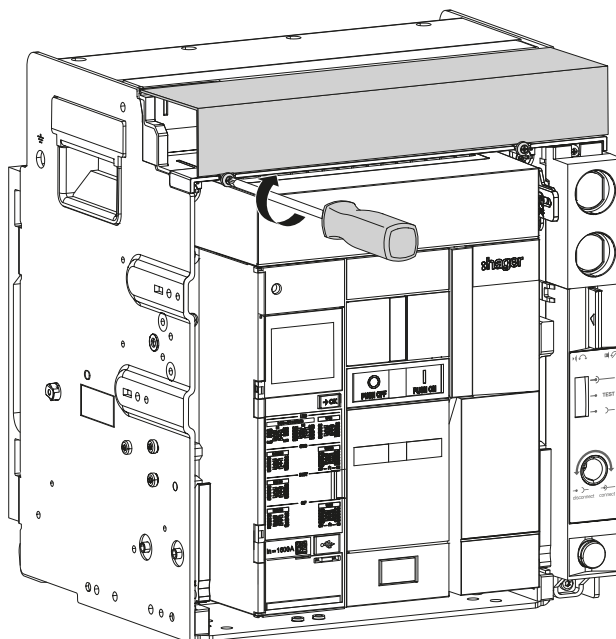
It is used for a fixed or drawout circuit breaker.

For a drawout circuit breaker, the IP30 protection level is guaranteed in the connected position and in the test position.



### Terminal block protection cover

The cover offers protection and prevents accidental access to the terminal blocks. Fasten the cover using the two screws supplied.



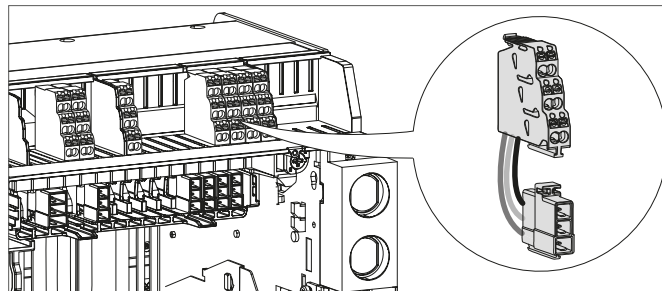
For the installation of accessories and auxiliaries, refer to the following instructions:

<b>Accessories</b>	<b>Instructions</b>
Terminal blocks TB	6LE007543A

### **Terminal blocks TB**

The terminal blocks TB are used to connect to the various circuit breaker accessories and auxiliary devices. For a pre-configured circuit breaker, all the accessories, including terminal blocks TB, are delivered pre-fitted. If the accessories are installed later, the terminal blocks TB must be purchased separately.

Care must then be taken to ensure they are fitted in the right place.

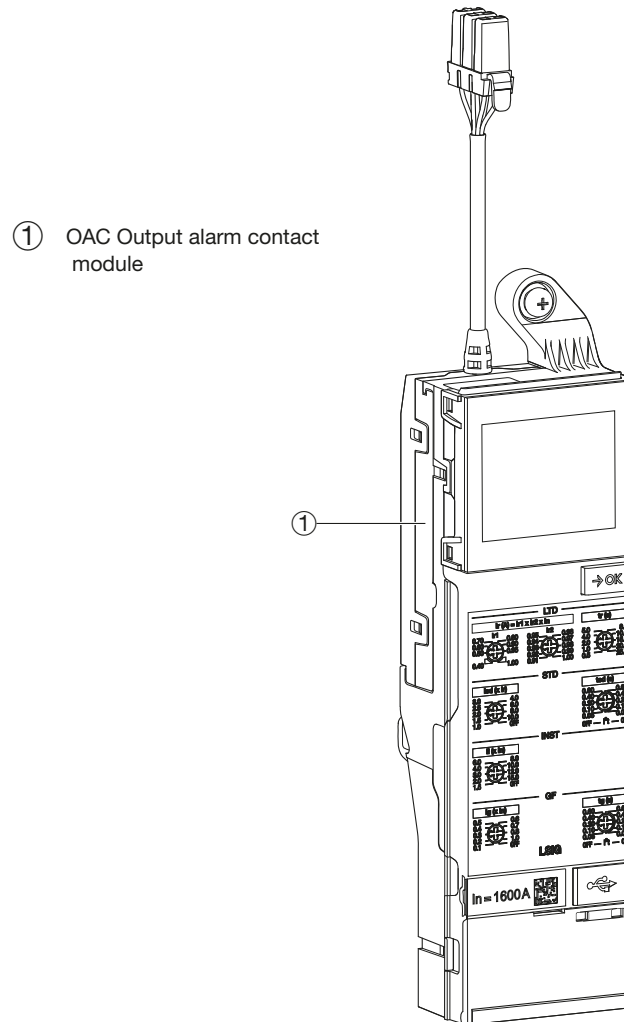




The OAC output alarm contacts module has 5 digital output contacts. It is fitted behind the electronic trip unit.

It allows the following alarms to be signalled:

- LTD tripping operations on one output, STD/INST/MCR on one output and GF on one output,
- overload pre-alarm,
- tripping due to a critical system alarm.



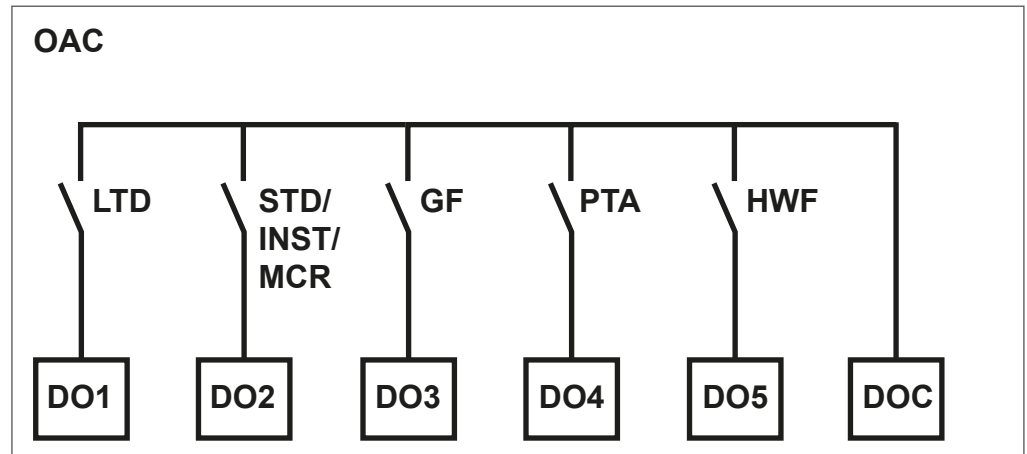
**ATTENTION**

An external 24 V DC SELV power supply (recommended reference Hager HTG911H) connected on the TU terminal blocks of the circuit breaker is necessary to use the OAC output alarm contacts module (see Chapter 17.9 Connecting the inputs).

**ATTENTION**

For installation of the OAC output alarm contacts module , refer to the 6LE007430A manual.

OAC Output alarm contact wiring diagram



Characteristics of the OAC output alarm contacts: 2 A/230 V AC and 2 A/24 V DC

<b>ATTENTION</b>
The OAC output alarm contacts retain their state even when the circuit breaker opens thanks to the external 24V DC power supply.

• LSIG trippings

	No. of the output	Rest	Trip
LTD output contact	DO1	open	closed
STD/INST/MCR output contact	DO2	open	closed
GF output contact	DO3	open	closed

• Overload pre-alarm

	No. of the output	Rest	Current level > 90 x I <sub>r</sub>
PTA output contact	DO4	open	closed

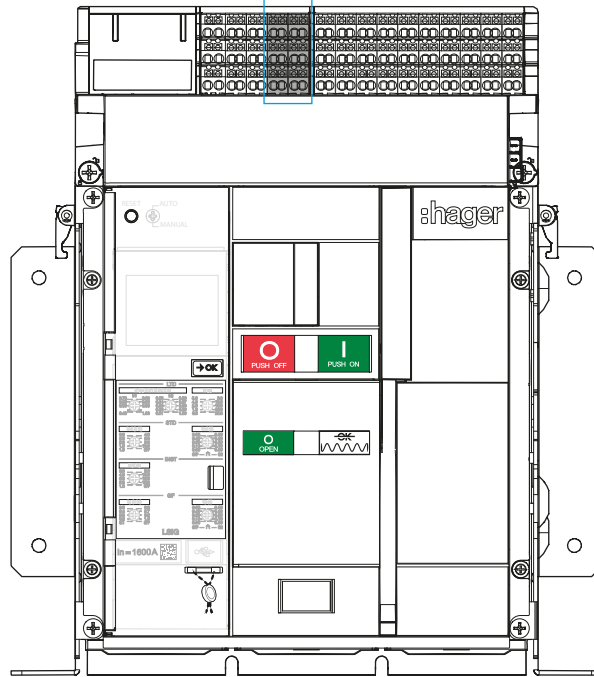
• Tripping due to a critical system alarm

	No. of the output	Rest	Pre-trip warning zone
HWF output contact	DO5	open	closed

<b>ATTENTION</b>
The LTD, STD/INST/MCR, GF and HWF output contacts are acknowledged when the tripping screens on the circuit breaker are acknowledged or when the RR/DI input is activated (see Chapter 17.9 Inputs connection).

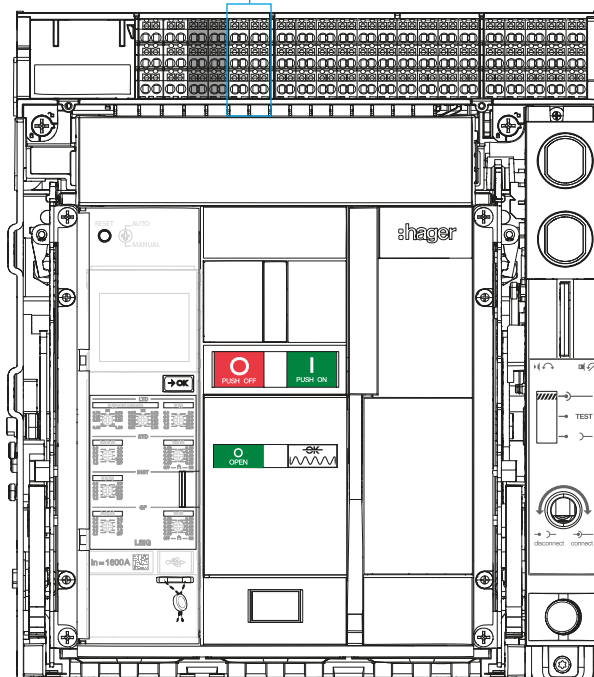
Fixed circuit breaker

ZSI		OAC			F	
D1	STD2	LTD	DO1	GF	DO3	F
F1	GF2	S/I	DO2	PTA	DO4	F
nn1	Cmn2	DOC	HWF	DO5		F



Drawout circuit breaker

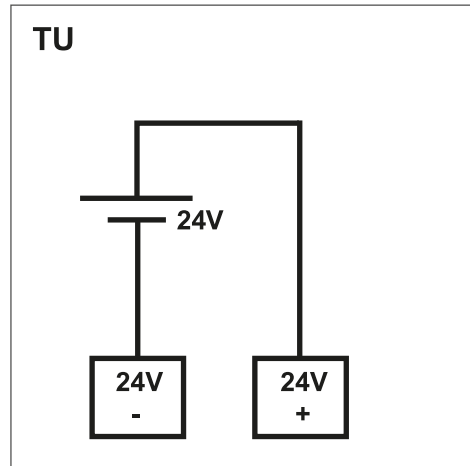
ZSI		OAC			FS	
D1	STD2	LTD	DO1	GF	DO3	F12
F1	GF2	STD/INST	DO2	PTA	DO4	F14
nn1	Cmn2	DOC	HWF	DO5		F11



Several inputs can be connected by cable to the circuit breaker:

### Wiring diagram of the 24 V DC external power supply

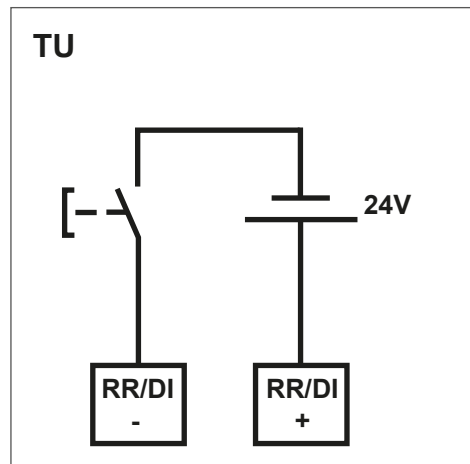
Wire an external 24V DC SELV power supply (recommended reference Hager HGT911H) to the 24V + and - terminals.



### Wiring diagram of the RR/DI input

The RR/DI digital input allows the electronic trip unit to be reset remotely and the STD/INST/MCR, GF and HWF output contacts to be acknowledged after tripping caused by an electrical fault.

The digital input must be powered with 24V DC in accordance with the following diagram.



The Zone Selective Interlocking (ZSI) function is designed to limit the electro-dynamic constraints on the installation (devices, conductors and busbars) in case of a short circuit fault or earth fault.

The installed circuit breakers are linked together by cable to determine which circuit breaker should trip first. If an electrical fault appears between two linked circuit breakers, the downstream circuit breaker is unable to eliminate it. Thanks to zone selectivity, the circuit breaker upstream of the fault trips without waiting till the end of its time delay.

hw+ circuit breakers can be linked with h3+ Energy circuit breakers.

For zone selectivity to work correctly, the ZSI hw+ circuit breakers and the ZSI1/ZSI2 sockets of the Energy h3+ circuit breakers must be wired together.

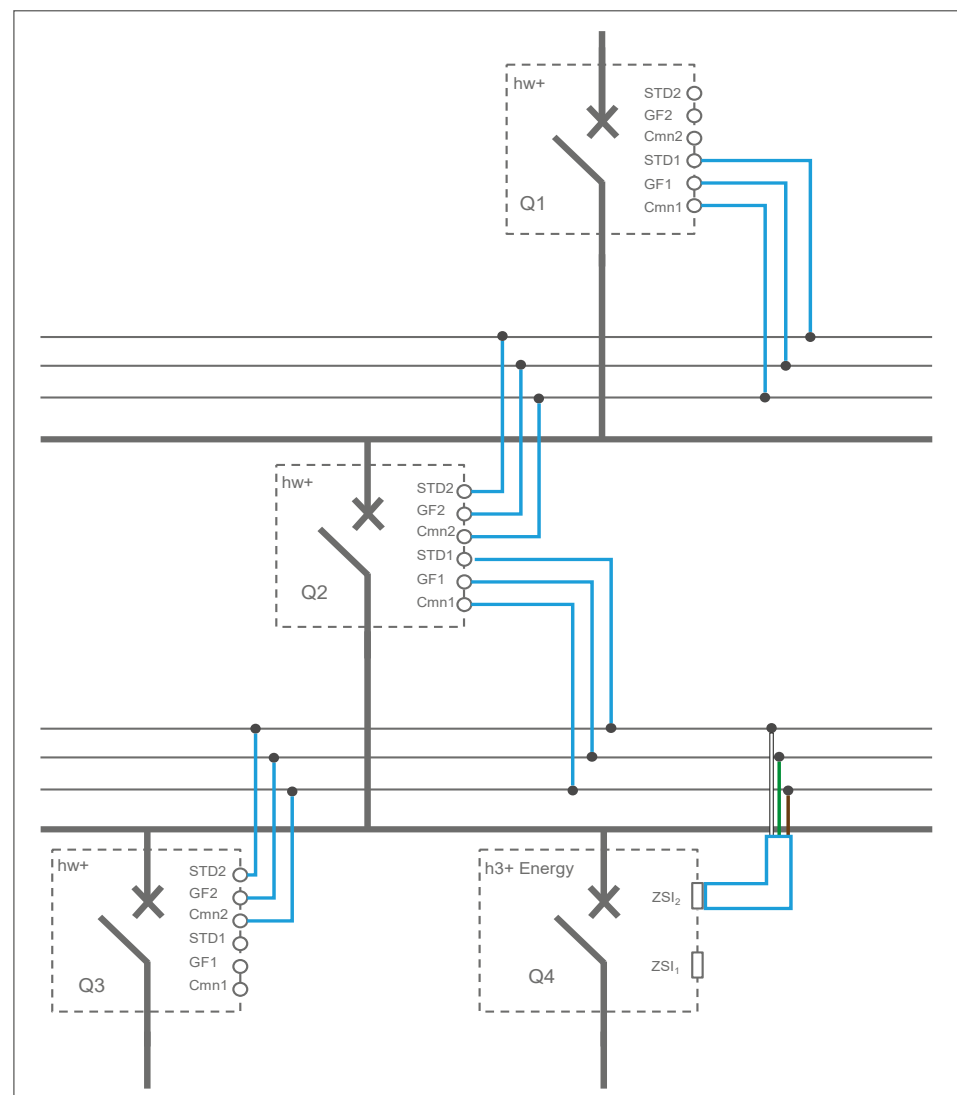
The installation plan should also include one or more link terminals inside the electrical distribution board to allow:

- the linkage between several circuit breakers connected to a single upstream circuit breaker,
- the linkage between an hw+ circuit breaker and an Energy h3+ circuit breaker.

**ATTENTION**

Refer to the h3+ communication system manual for the connection of ZSI1/ZSI2 sockets and the use of associated accessories.

**ZSI inputs and outputs wiring diagram**



For zone selectivity on the STD protection and/or the earth fault protection:

Connection to downstream circuit breakers:

STD1: selectivity on the Short time delay protection

GF1: selectivity on the earth fault protection

Cmn1: common

Connection to the upstream circuit breaker:

STD2: selectivity on the Short time delay protection

GF2: selectivity on the earth fault protection

Cmn2: common

hw+ air circuit breakers have 6 ZSI terminal blocks enabling the upstream or downstream circuit breakers to be connected to deploy zone selective interlocking (ZSI).

Type of connection	Total number of circuit breakers	Max. distance between 2 circuit breakers
Upstream	3	300 m
Downstream	7	300 m

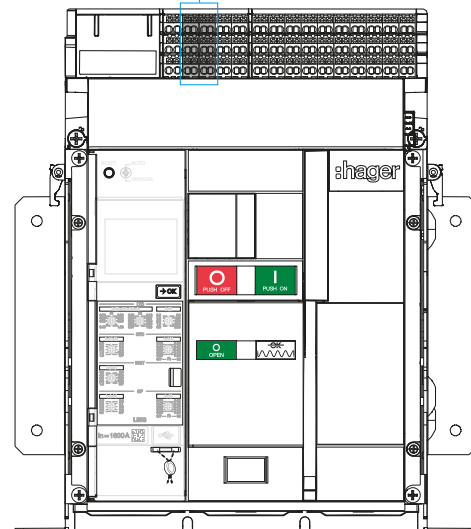
Recommended connection cable: 1 to 1.5 mm<sup>2</sup> twisted pair.

**ATTENTION**

It is recommended that the Hager Power setup software be used to verify the wiring between the circuit breakers.

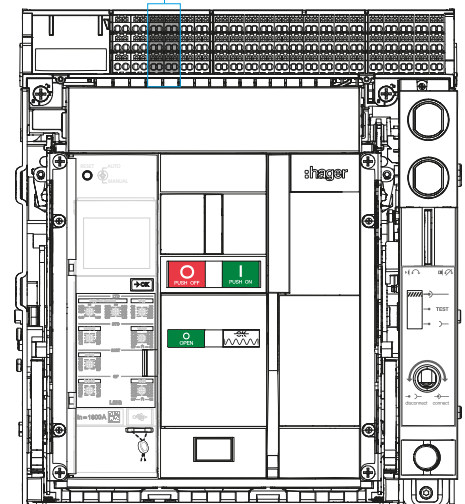
Fixed circuit breaker

TU		ZSI		
S1	- 24 V +	STD1	STD2	LTD
S2	2 CIP 1	GF1	GF2	S/I
	- RR/DI +	Cmn1	Cmn2	DOC



Drawout circuit breaker

TU		ZSI		
S1	- 24 V +	STD1	STD2	LTD DC
S2	2 CIP 1	GF1	GF2	STD/INST DC
	- RR/DI +	Cmn1	Cmn2	DOC



For the installation of control accessories, refer to the following manuals:

Accessories	Instructions
Coils	6LE007405A
MO charging motor	6LE007406A

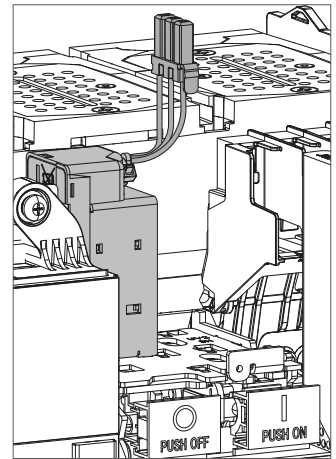
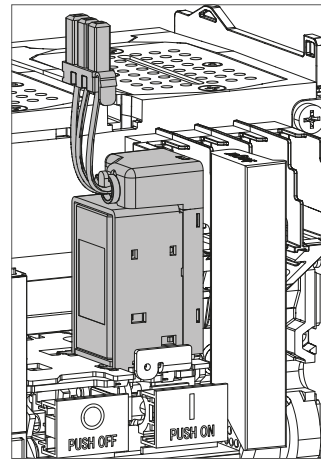
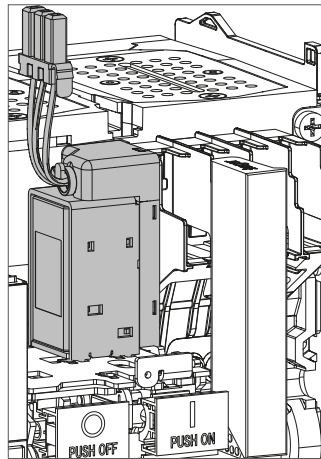
**Coils**

Three types of coils can be installed in the dedicated positions behind the front cover of the circuit breaker:

Shunt trip coil SH or  
Undervoltage release coil UV

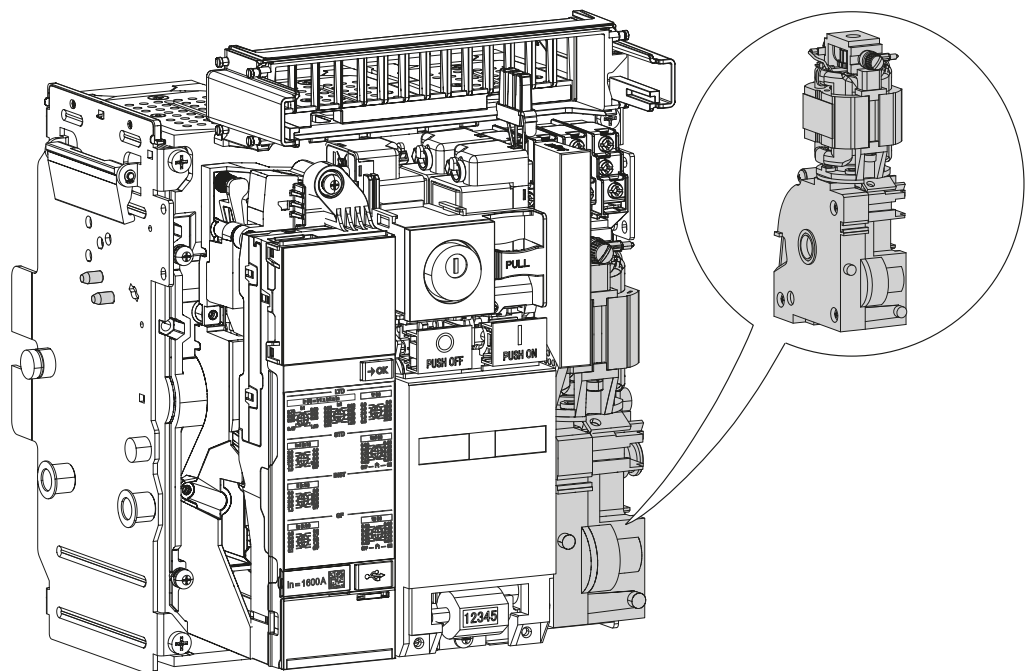
Closing coil CC

Undervoltage release coil UV  
or Shunt trip coil SH



**MO charging motor**

The MO charging motor is positioned on the right side of the reset handle and automatically charges the spring after each time the circuit breaker closes.

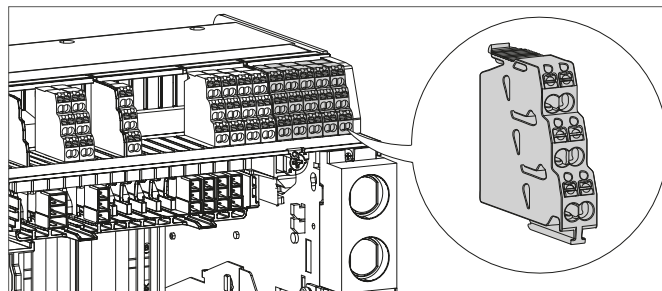


For the installation of signalling accessories, refer to the following manuals:

Accessories	Instructions
PS Position contact	6LE007542A
AX Auxiliary contact	6LE007407A
RTC Ready-to-Close contact	6LE007623A
CYC Operation Cycle Counter	6LE007487A
OAC Output Alarm Contact module	6LE007430A
FS Fault trip contact	6LE007676A

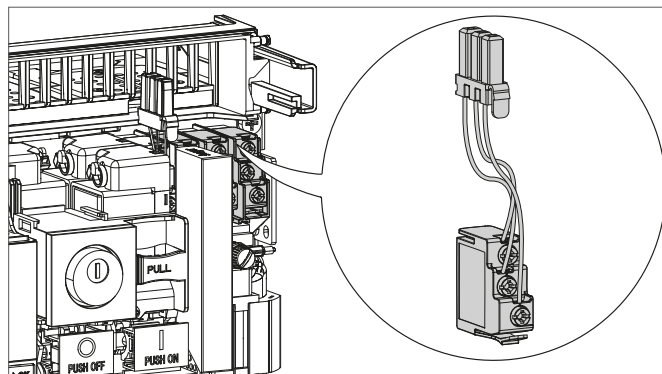
### PS Position contact

This contact indicates the connected, test or disconnected position of the circuit breaker in its chassis.



### AX Auxiliary contact

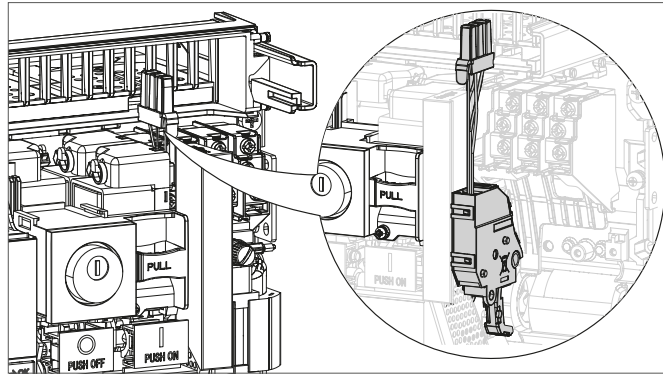
The auxiliary contacts indicate the open or closed position of the circuit breaker power contacts.





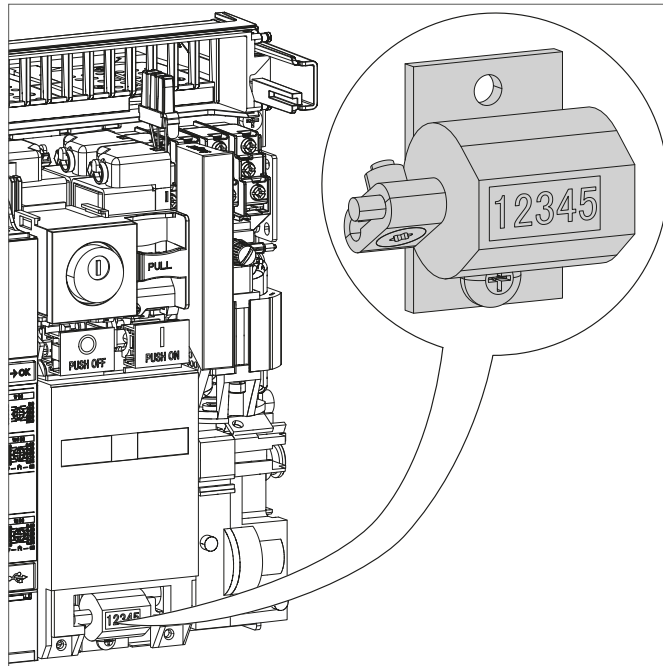
### RTC Ready-to-Close contact

The ready-to-close contact gives the information that the circuit breaker is ready to be closed.



### CYC Operation Cycle Counter

The cycle counter shows the number of opening operations completed by the circuit breaker

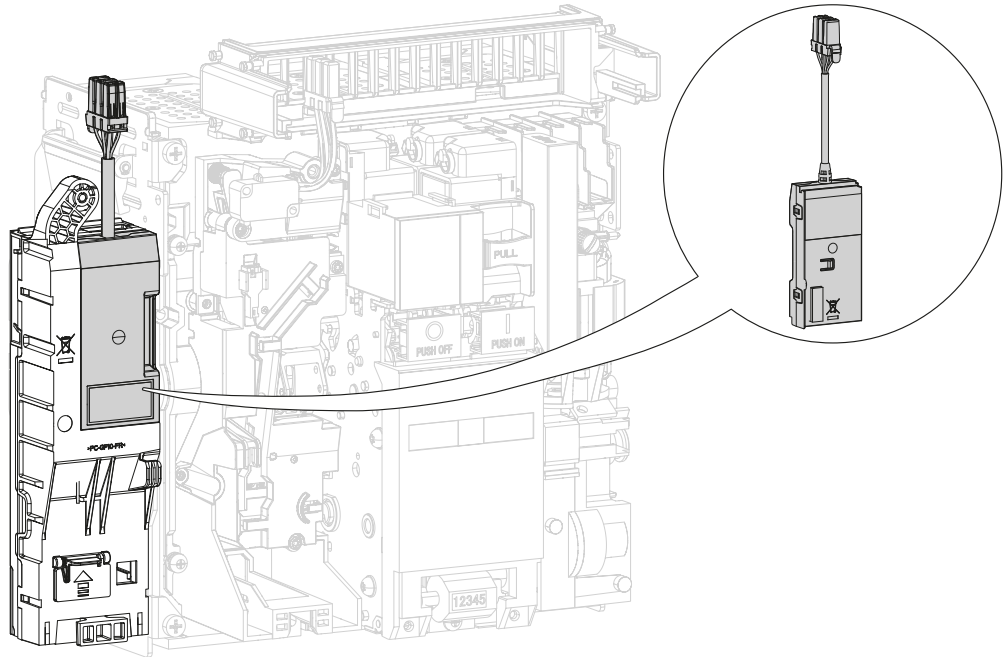


### OAC Output Alarm Contact module

The OAC output alarm contacts module has 5 digital output contacts allowing the following alarms to be signalled:

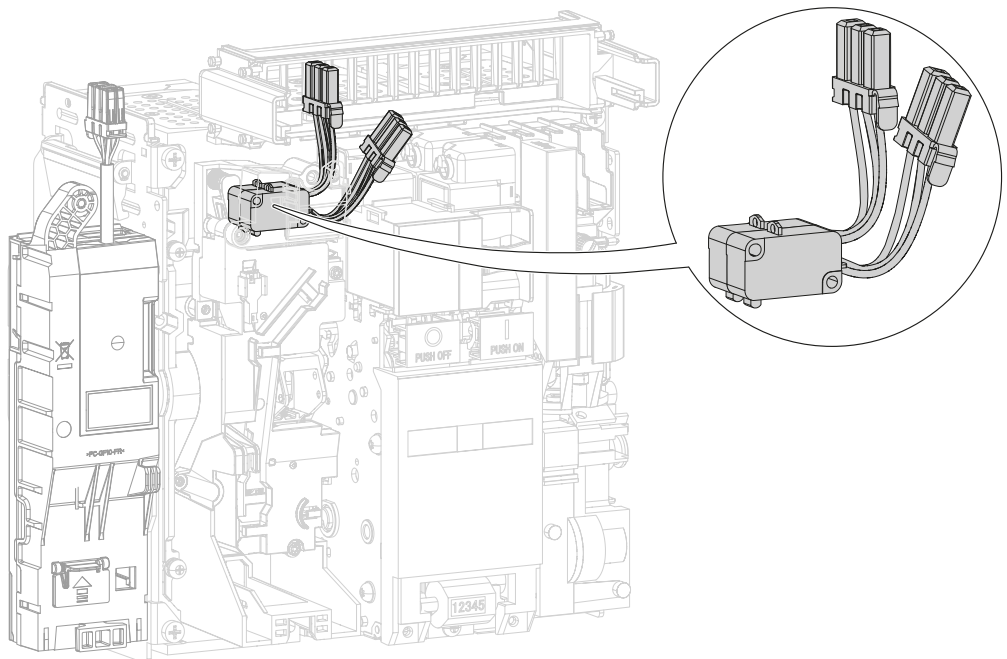
- LTD trippings on one output, STD/INST/MCR on one output and GF on one output,
- overload pre-alarm,
- tripping due to a critical system alarm.

For more information, see chapter 17.8 Connecting the output contacts.



### FS Fault trip contact

The FS fault trip contact is used to signal the tripped status of the circuit breaker due to faults detected by the electronic trip unit. A second FS2 contact can be fitted.



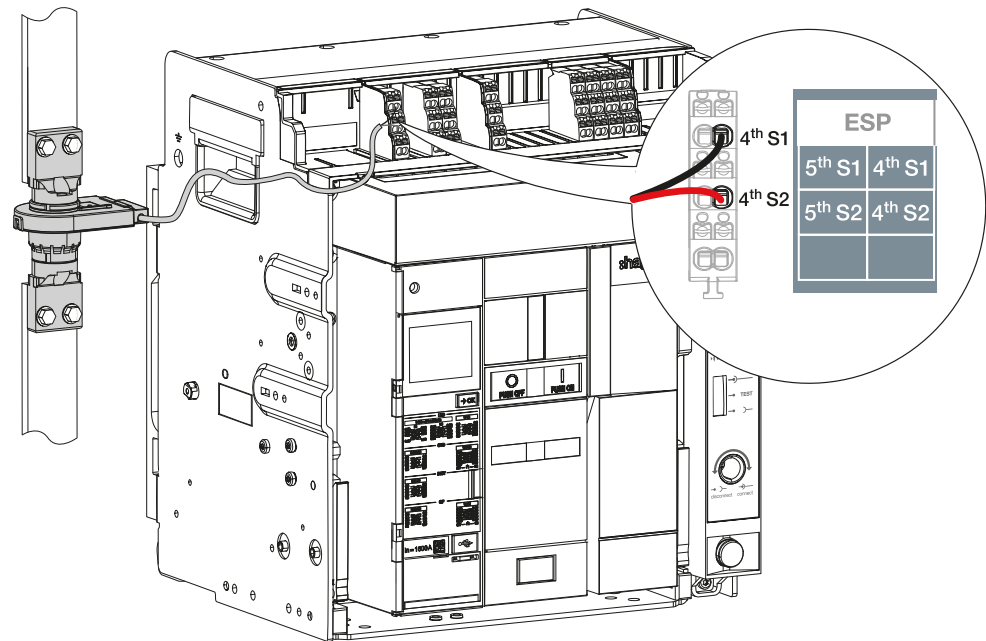
For the installation of neutral protection accessories, refer to the following manuals:

Accessory	Manual
ENCT external neutral current sensor	6LE007514A

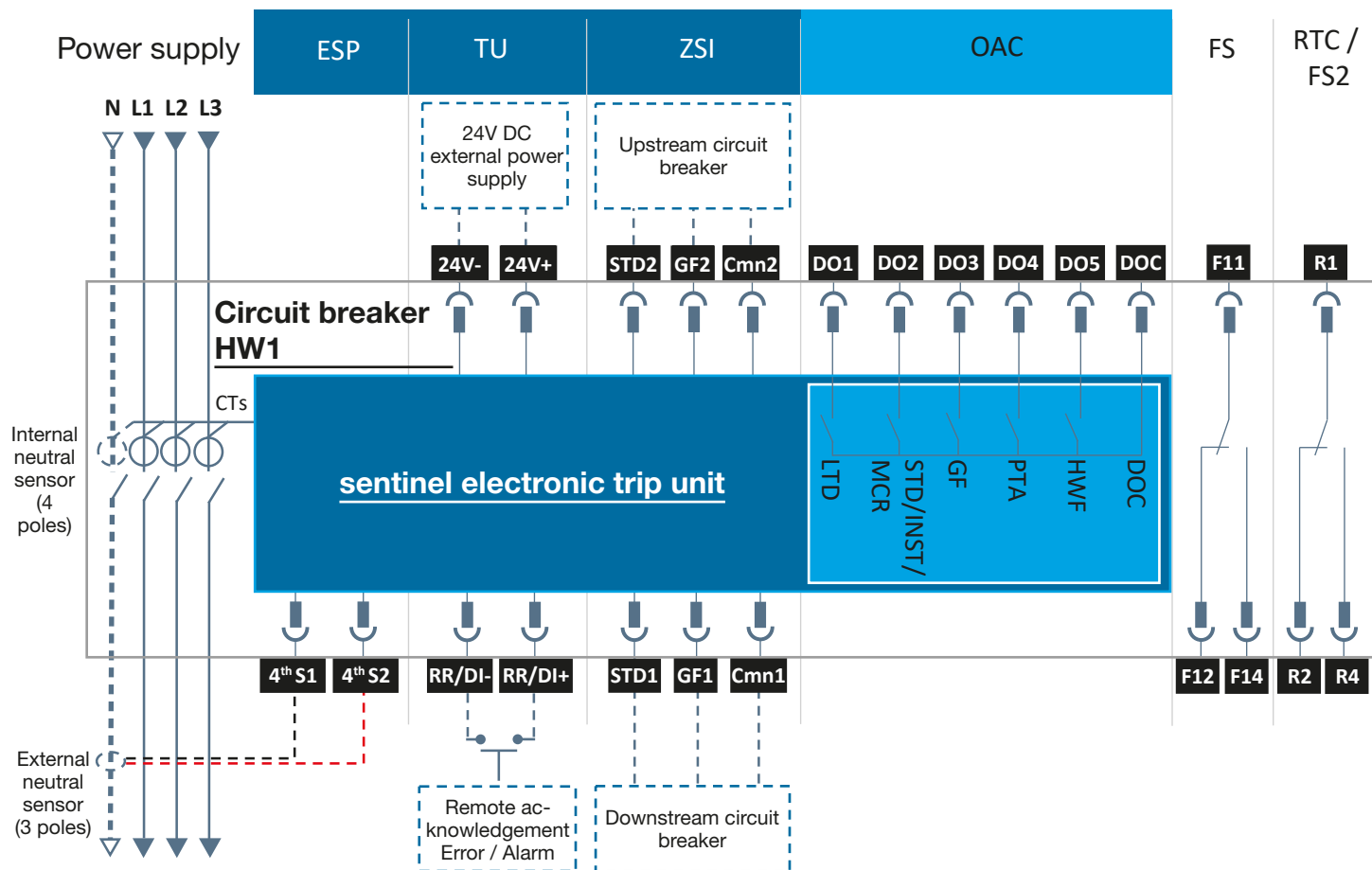
### ENCT external neutral current sensor

The ENCT external neutral current sensor allows the circuit breaker to provide neutral protection on a 3-pole circuit breaker in a TN earthing system.

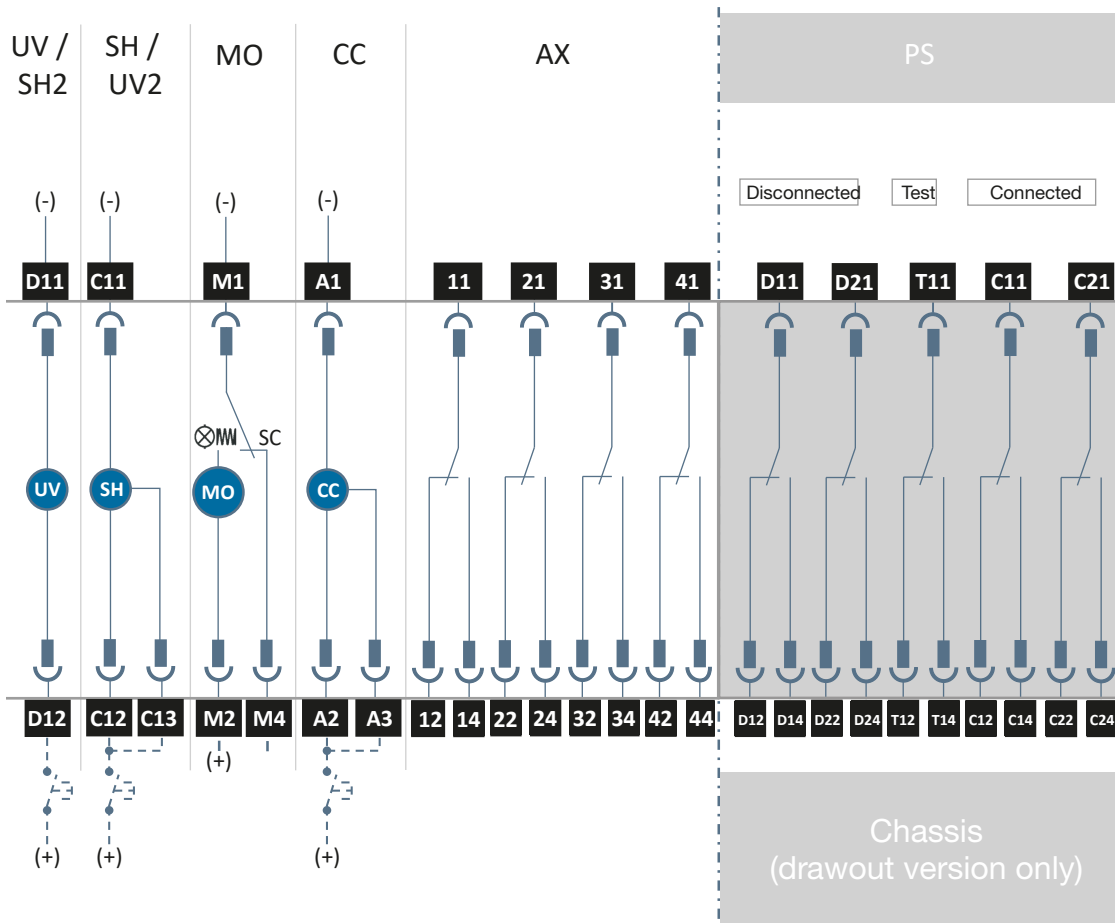
It is installed on the neutral distribution bar generally located on the left of the circuit breaker. It must be connected to the terminals marked ESP 4<sup>th</sup> S1 (black wire) and 4<sup>th</sup> S2 (red wire).



Connecting diagram of the fixed and drawout HW1 circuit breakers with the sentinel electronic trip unit



Terminal blocks	Terminations
ESP	External sensors
TU	Electronic trip unit
ZSI	Zone selectivity function
OAC	Output Alarm Contacts
FS	Fault trip contact



Terminal blocks	Terminations
RTC/FS2	Ready-to-close contact
UV/SH2	UV undervoltage coil or 2 <sup>nd</sup> SH shunt trip coil
SH/UV2	SH shunt trip coil or 2 <sup>nd</sup> UV undervoltage coil
MO	MO charging motor and SC spring-loaded signal contact
CC	Closing coil CC
AX	Auxiliary contact - 4 contacts signalling the circuit breaker open/closed status
PS	Position switches - 5 contacts indicating the position of the circuit breaker in the chassis: 2 contacts for the Disconnected position, 1 contact for the Test position and 2 contacts for Connected position.

The cables used must have a cross section between 0.6 mm<sup>2</sup> and 2.5 mm<sup>2</sup>. They can be flexible or rigid.

In order to be properly held in place in the terminals, the connected cables must first be stripped from 10 to 12 mm.

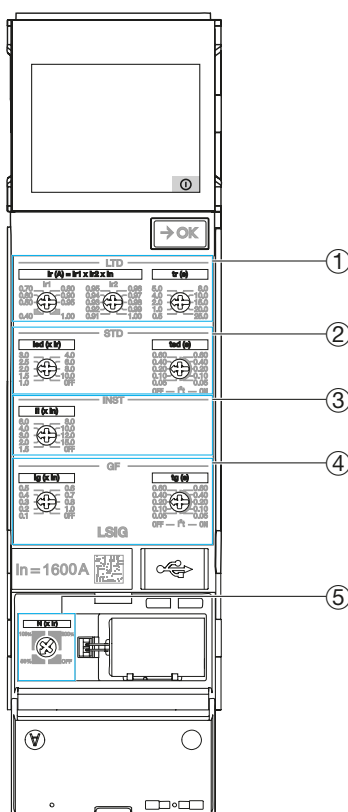
Flexible cables must not be twisted. Only one cable is authorised per terminal.

The protection settings are adjusted using adjustment dials on the sentinel electronic trip unit. A detailed description of the functions and settings is available in the 6LE007969A user manual for hw+ sentinel electronic trip units.

**WARNING**

**Risk of inappropriate settings.**  
 For safety reasons, the circuit breaker's factory default settings are for the lowest level of protection.  
 Adjust the protection settings in accordance with the short circuit and selectivity calculation performed by the electrical designer.

sentinel electronic trip unit



- ① LTD Long time delay protection setting
- ② STD Short Time Delay protection setting
- ③ INST Instantaneous protection setting
- ④ GF earth fault protection setting
- ⑤ N neutral protection setting adjustment



**Risk of electric shock, electrocution or electric arc**

**Danger to life, risk of injury due to electric shock, or risk of serious injury.**

Ensure that the device is only commissioned by qualified personnel who are equipped with adequate safety equipment.

For commissioning, refer to the operations described in standard IEC 61439-1 and -2.

**ATTENTION**

For any further information about commissioning the circuit breaker, contact Hager Technical Support.

**ATTENTION**

The Hager Power setup tool is recommended in order to carry out the protection settings when commissioning the electronic trip unit.

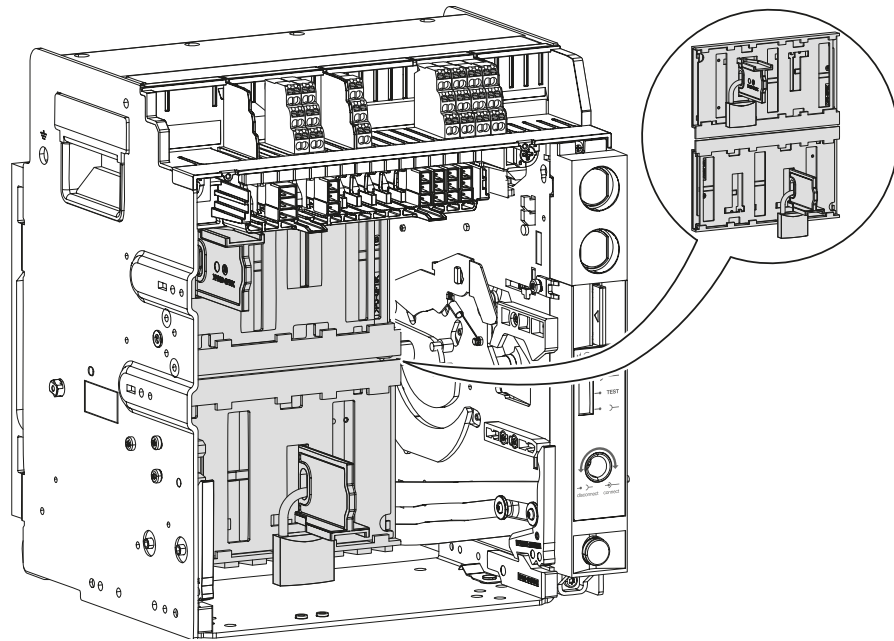
Refer to 6LE007545A manual to install this locking accessory.

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 it precludes accidental access to the sockets.

The high and low shutters work independently. They can be padlocked separately to prevent them being opened or prevent the circuit breaker being racked in in the connected position.

Up to three Ø5–Ø8 mm padlocks can be installed.





To install this accessory, refer to 6LE007489A manual.

The WIP wrong insertion preventer is used when several circuit breakers of the same model are installed in an electrical panel and are configured differently. To prevent any confusion, all the circuit breakers and their chassis must be coded in such a way that each circuit breaker can be racked in in its corresponding chassis.

It is composed of screws and pins which must be installed on the chassis and circuit breaker in one of the following 10 combinations:

Chassis	Circuit breaker	Chassis	Circuit breaker
123	DE	145	BC
124	CE	234	AE
125	CD	235	AD
134	BE	245	AC
135	BD	345	AB

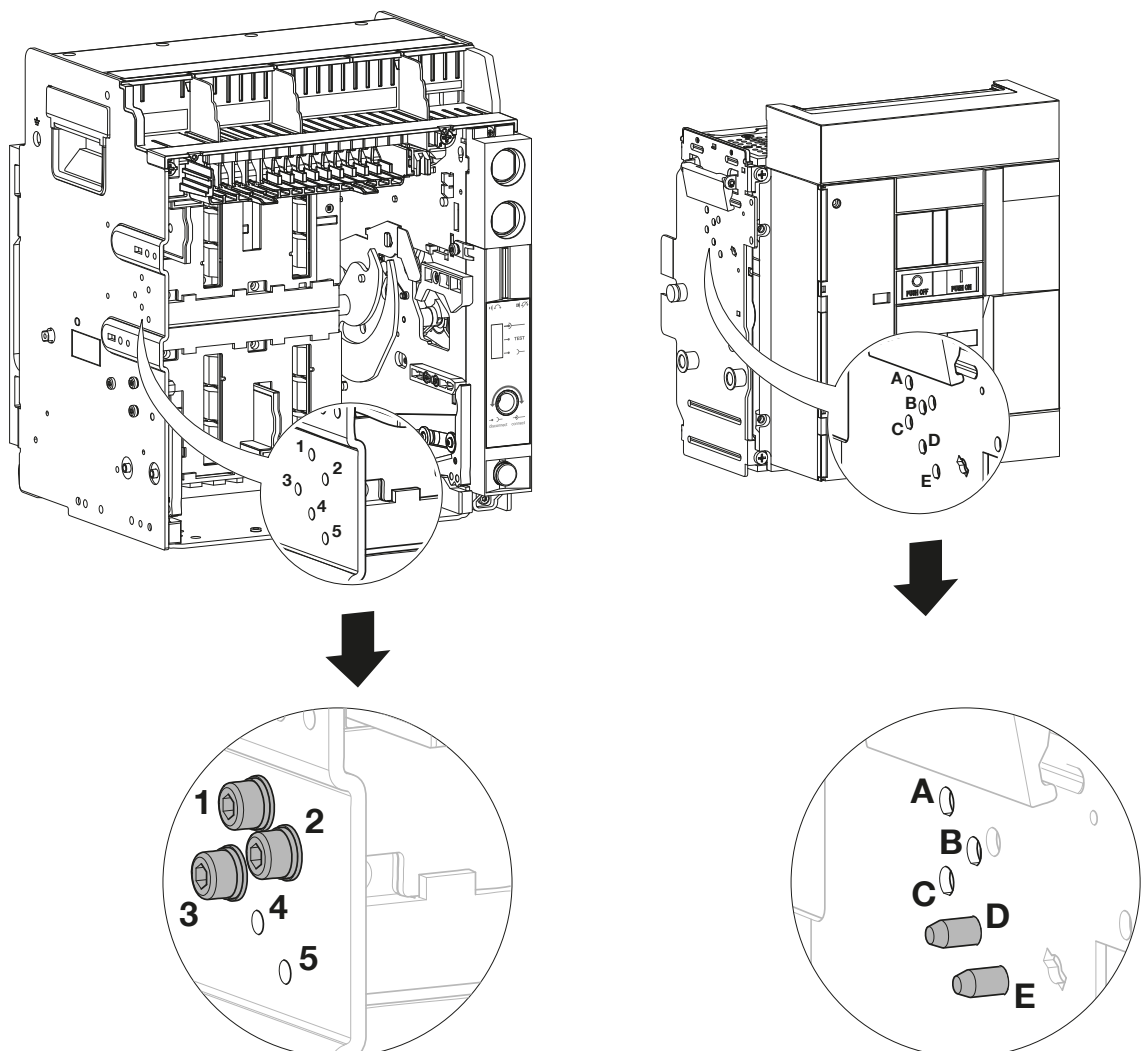
The combination chosen on the chassis must correspond to the combination of the circuit breaker in order for the 2 parts to be compatible.

On the chassis side, the wrong insertion preventer is numbered 1 to 5.

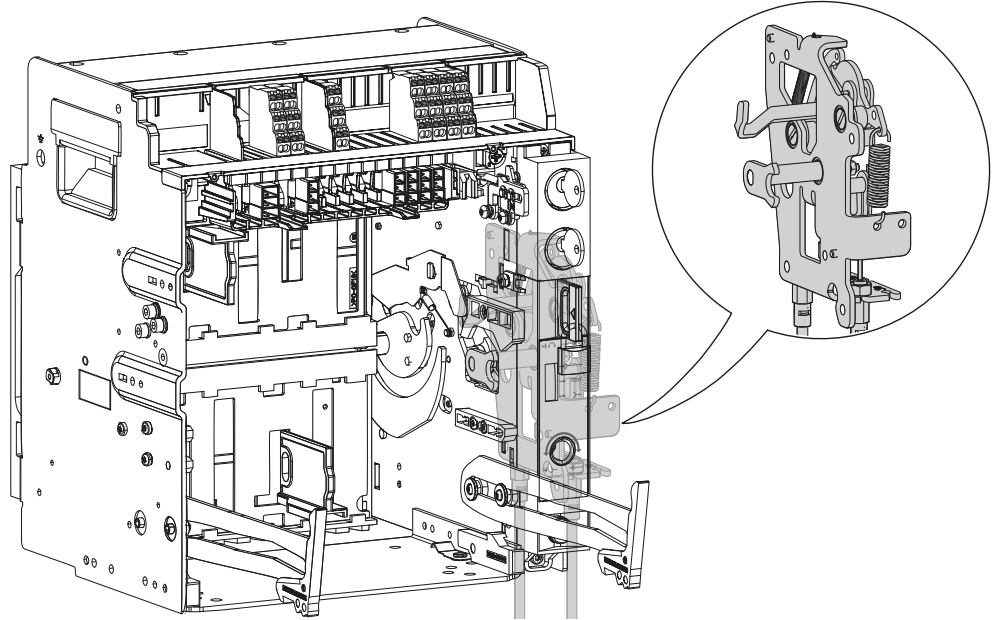
On the circuit breaker side, the wrong insertion preventers are marked A to D.

Example of installation with the combinations 123 and DE:

Chassis	Circuit breaker
123	DE



Refer to 6LE007624A and 6LE008138A manual for installation of this locking accessory.  
The interlocking kit is used to interlock 2 circuit breakers installed vertically or horizontally in the electrical distribution board.











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