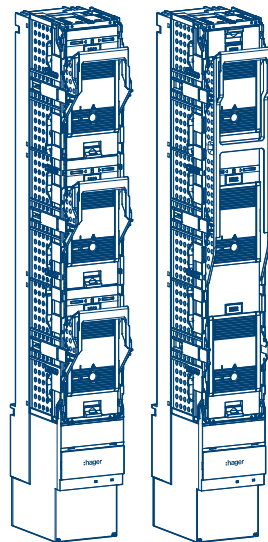


Operating and installation instructions

Switches and protective dev. NH fuse switch disconnecter



Size NH1-3 / 185 mm
LV8*

fv+ CE

:hager

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1 About these instructions

These instructions describe the safe and proper installation, commissioning and operation of the **fv+ NH1-3/185 mm** fuse switch disconnectors with product references LV8*. These instructions are part of the device. Keep the instructions for use throughout the life of the device and pass them on if necessary.

Read these instructions carefully before beginning all work and before using the fuse switch disconnectors. No warranty is accepted for damage caused by failure to follow these instructions.

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Depending on the type of fuse switch disconnector, the depictions in these instructions may differ visually. If device-specific information is required, this is indicated at the appropriate point.

1.1 Target groups

All devices may only be assembled, installed and configured by a specialist with electrical training and certification in accordance with the relevant installation standards of the country. The accident prevention regulations valid in the appropriate countries must be complied with.

In addition, these instructions are intended for operators of systems with fuse switch disconnectors.

1.2 Symbols used

Symbol	Description
●	Instruction for a single step or in any order
①	Instruction for multiple step actions. The order must be followed.
①	Identification and description of device components
-	List
▶	Reference to documents / additional information

The symbols explained below are mainly used in the Quick Guide that is included in the product packaging.

	Contents of the packaging		Product dimensions		Required tools
	Device overview		Installation		Installation
	Installation/final installation		Settings		Mandatory accessories
	Optional accessories		Dismantling accessories		Mounting orientation can be rotated by 180°
	Correct execution		Part no longer needed/to be disposed of		Not included in scope of delivery
	Labelling		Must be installed by an electrician		Two-person assembly



Protective earth (IEC 60417-5019)



Applicable in all Europe and in Switzerland



Note on disposal of waste electrical and electronic equipment (WEEE)

Danger levels in warning information

Symbol	Signal word	Consequences in the event of non-compliance
	Danger	Causes serious injury or death.
	Warning	May cause serious injuries or death.
	Caution	May cause minor injury.
	Caution	May cause serious damage to the device.
	Note	May cause damage to the device.

In addition to the general warning symbol in accordance with ISO 7010 as shown above, additional warning symbols specifically representing the danger are used in the technical documentation for the product.

Symbol	Description
	Risk of electric shock.
	Risk of damage due to mechanical overload
	Risk of damage to the equipment due to electricity
	Risk of fire damage
	Risk of heating or overheating

Other symbols used

Symbols explained below are also derived from ISO 7010 and are used in the technical documentation for the product for information that requires special attention and urgent recommendations.

Symbol	Definition
	Important note
	Information that must be read before using the product
	Disconnect all live cables to the product

2 Function

The fv+ NH fuse switch disconnectors in sizes 1 to 3 are devices designed to provide reliable protection against overloads and short circuits in low voltage systems by using NH fuse links, ensuring the safety of both people and electrical installations. In addition, they enable safe manual disconnection of circuits, even under load. They are suitable for use in main and sub distribution boards and are designed and tested according to IEC/EN 60947-3.

2.1 Intended use

NH1-3 fuse switch disconnectors with vertical design according to IEC/EN 60947-3 shall only be used as follows:

- For NH fuse links in sizes 1, 2 and 3
- For vertical mounting on busbar systems with 185 mm centre-to-centre spacing
- Use silver-plated fuse links or solid links only
- For indoor use only or in suitable outdoor enclosures



Note

For many device variants the mounting orientation can be rotated by 180°.

Permitted environmental conditions

- Do not operate in areas that are at risk of explosion or flooding
- Maximum installation altitude: 2000 m above sea level
- Operating temperature range: -25 °C to 55 °C

3 Safety

3.1 Safety instructions



The instructions belonging to this device are a component part of the product and must be available to specialist personnel at all times.

Read and comply with the instructions.



Qualified electricians

The installation and maintenance of all devices may only be carried out by a qualified electrician in accordance with the relevant installation standards, guidelines, regulations, safety and accident prevention regulations of the country.



Danger

Danger due to electric shock

Risk of death or serious injury

- 1 Disconnect the device before carrying out any work on the device (all poles and all sides).
- 2 Lock the switching devices in the disconnect position. Take into account all circuit protection devices that supply dangerous voltages to the device.



Danger

Risk of electric shock if the device is to be installed or maintained under voltage

Risk of death or serious injury

- Wear appropriate personal protective equipment (PPE).



Attention

Failure to comply with these installation instructions may result in damage to the device or system.

- Maintenance work must only be carried out by a qualified electrician in accordance with national regulations.

3.2 Requirements for operators

The operator is responsible for the correct and safe use of the fuse switch disconnectors. The operator is only deemed to be using the fuse switch disconnectors in accordance with the correct use if they meet the requirements imposed on them and comply with the conditions for operating and maintaining the fuse switch disconnector as described in these instructions.

Every person who operates a system with fuse switch disconnectors must undergo safety training. This training must be provided by qualified and accredited specialists.

All electrical work must be carried out by qualified electricians only.

Procedures requiring specific knowledge (e.g. electrical, mechanical, construction) must only be carried out by specially trained personnel with the appropriate equipment for this work.

Keep all protective devices in good condition and in good working order.

4 Scope of delivery and accessories

4.1 Scope of delivery and dimensions

Scope of delivery

- Fuse switch disconnecter
- Screws for cable connection (reference dependent)
- Quick Guide for installation

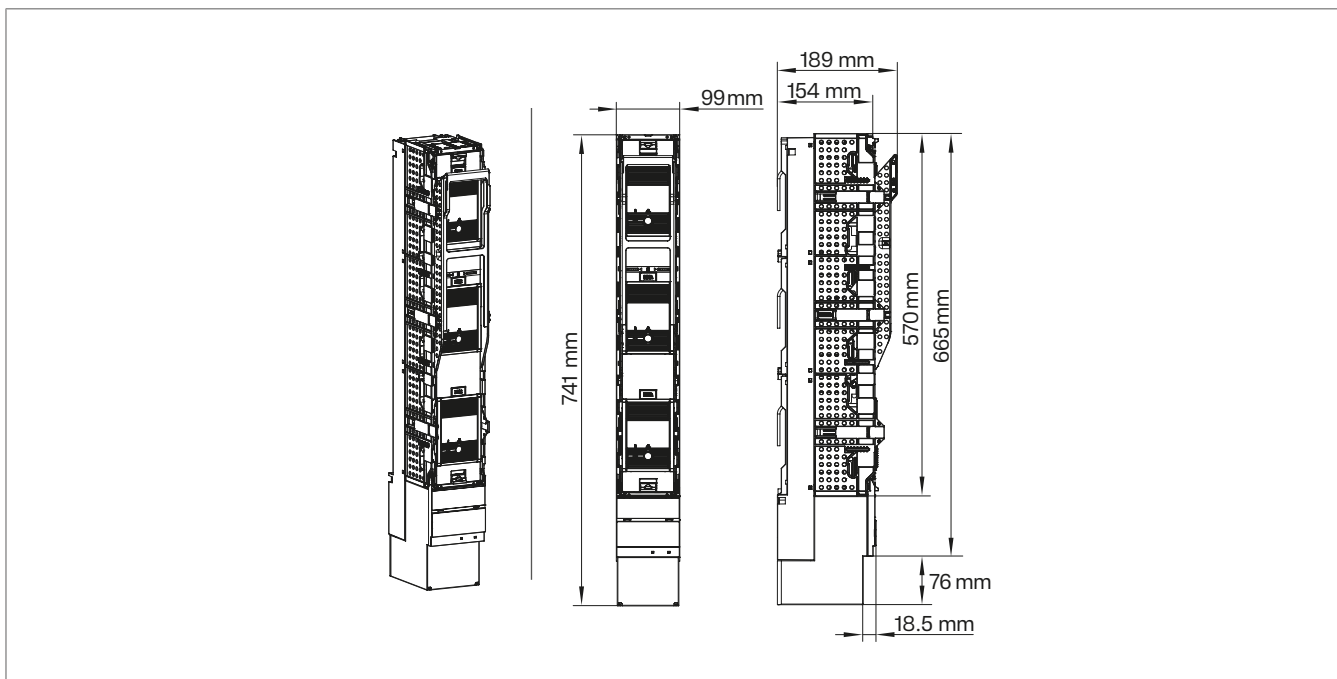


Figure: Dimensions

4.2 Accessories

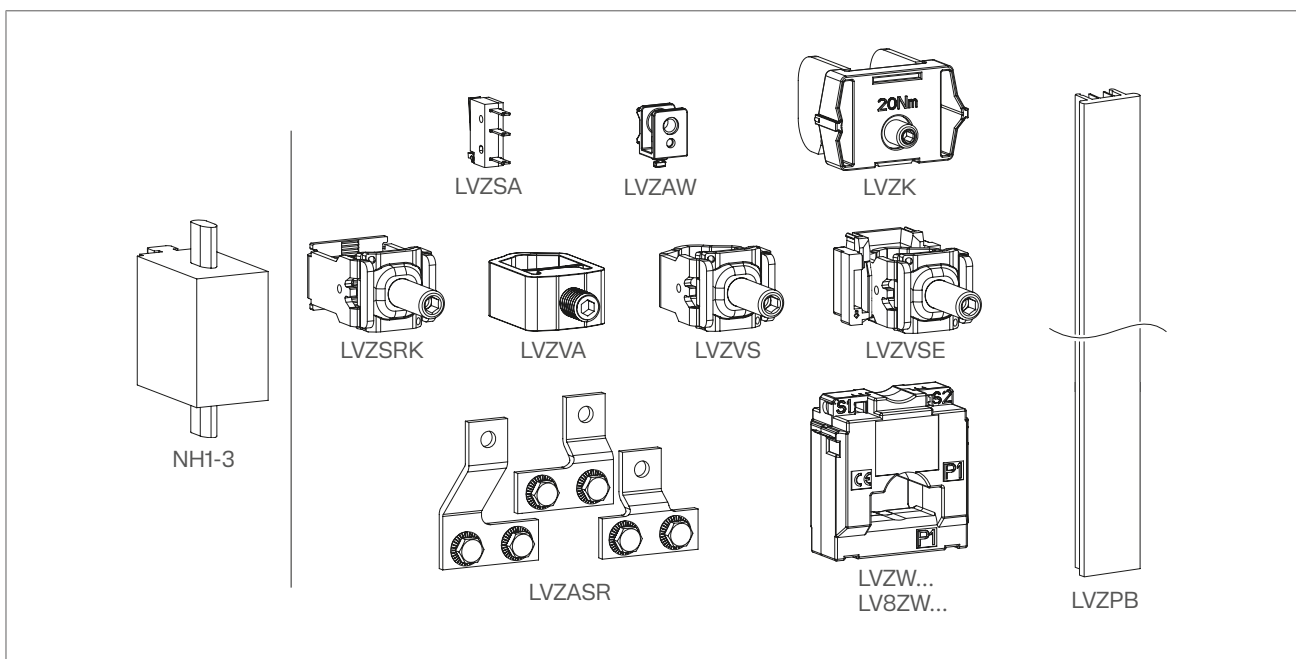


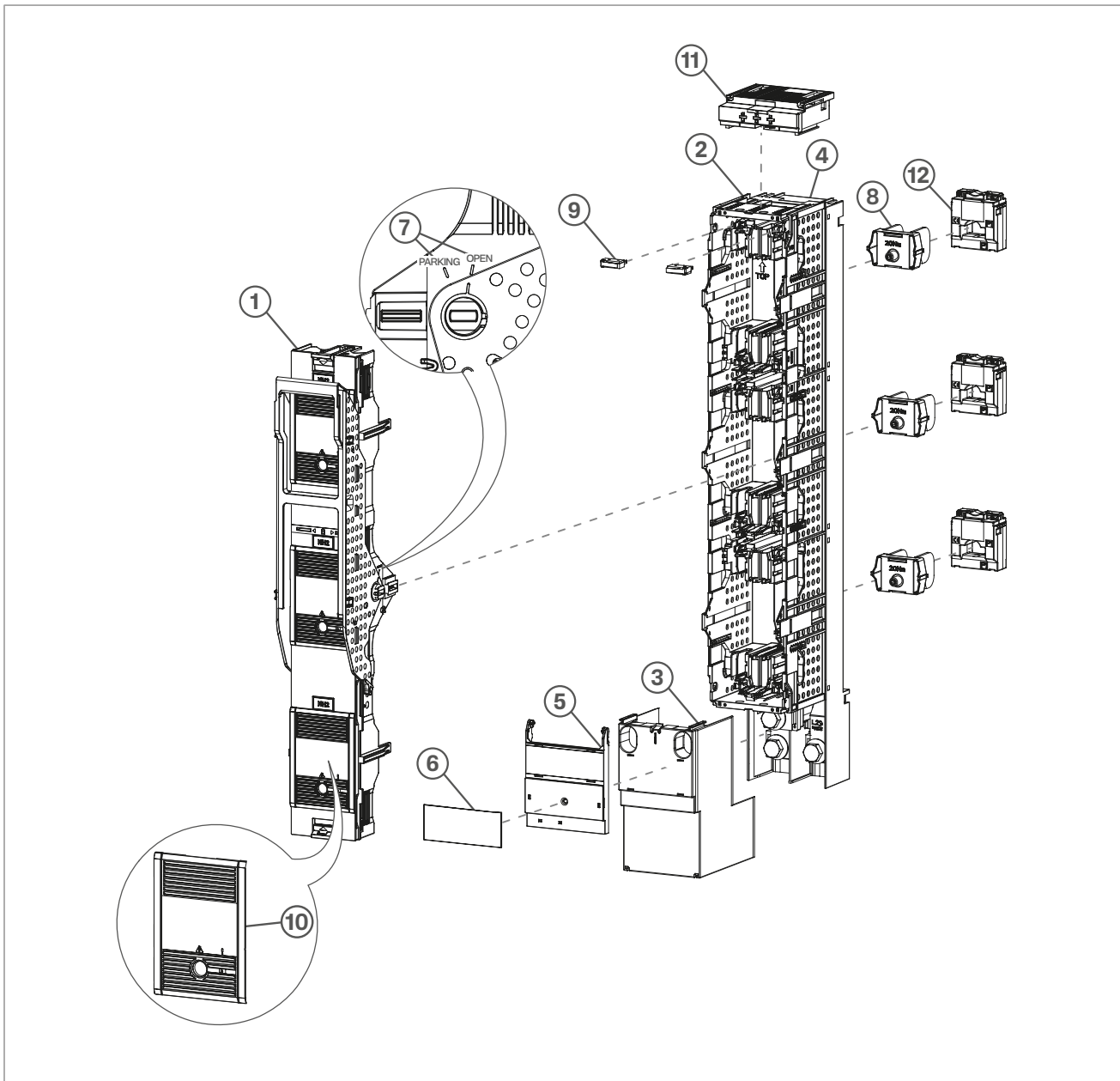
Figure: Accessories

Reference	Description
NH1-3	NH Fuse links size 1 to 3
LVZSRK	Steel captive clamp for size 1-3 185 mm, corrosion-resistant, SET
LVZSA	Switch position indicator, microswitch opener and closer
LVZVA	V-clamp aluminium for size 1-3, SET
LVZASR	Connection 2 x 300 mm ² for size 1-3, corrosion-resistant, SET
LVZAW	Angle bracket lateral for mounting the sideframes
LVZVS	V-clamp size 1-3, steel with slide-in carrier, closure not removeable, SET
LVZK	Busbar hooks for size 1-3, corrosion-resistant, for busbar thickness 5-10 mm, SET
LVZVSE	V-clamp for size 1-3, steel with slide-in carrier, closure removeable, SET
LVZW...	Current Transformer LVS* / LV8S* for size 1-3
LV8ZW...	Current Transformer LV8S* for size 3 1000 A
LVZPB	Sideframe, 850 mm long, to cover the sides

This list includes the accessories mentioned in the technical documentation for the product. Hager expressly reserves the right to make changes or additions, even if these are not referred to in these instructions.

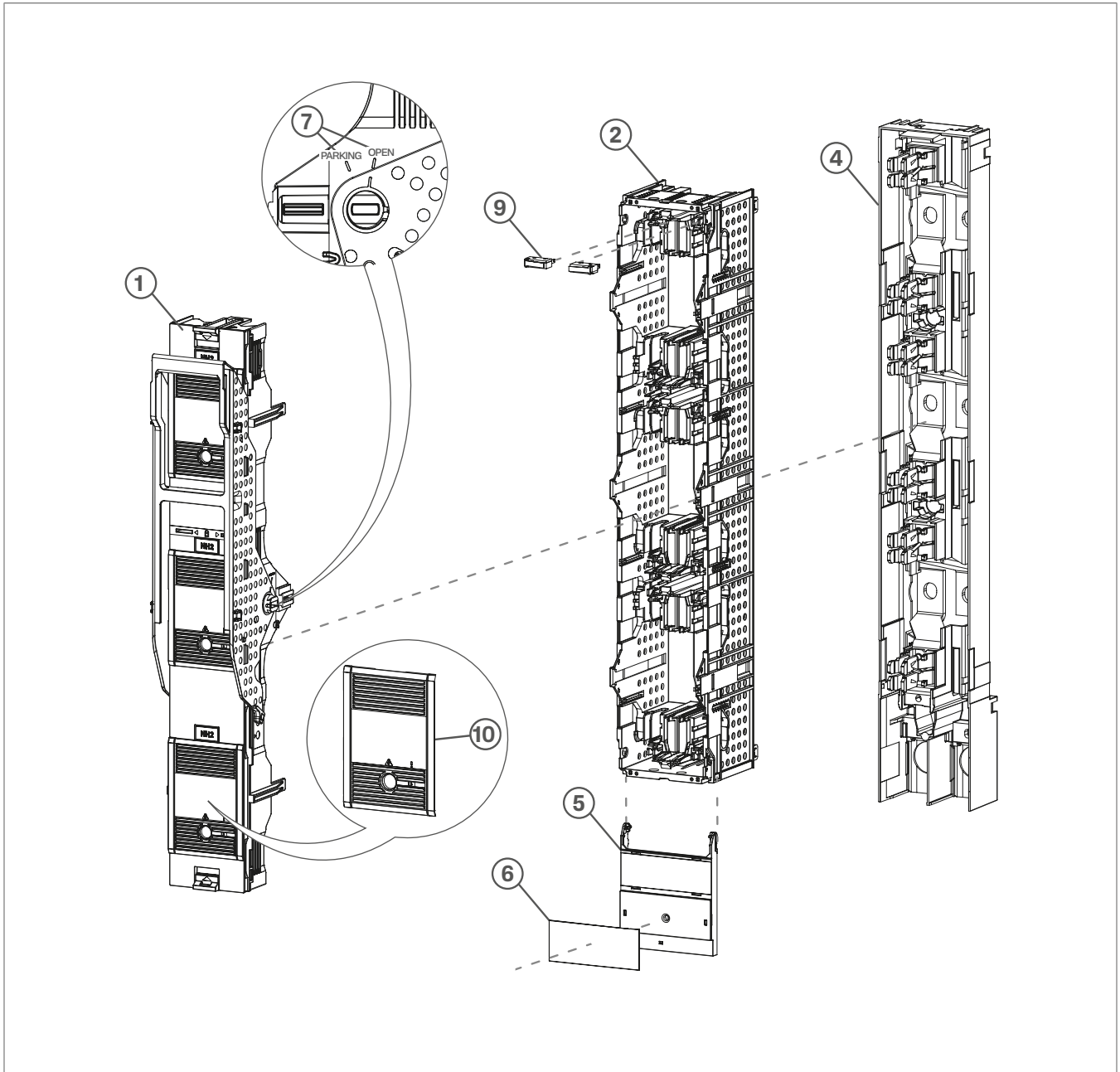
4.3 Design and layout of the device

NH1-3 fuse switch disconnecter, standard type



- ① Fuse switch lid
- ② Fuse switch cage
- ③ Terminal cover
- ④ Fuse switch base
- ⑤ Nameplate holder
- ⑥ Nameplate (rotatable)
- ⑦ Handle position indicator
- ⑧ Hooks
- ⑨ Microswitch
- ⑩ Sliding window
- ⑪ Fuse monitoring
- ⑫ Current transformer

NH1-3 fuse switch disconnecter, coupling type



- ① Fuse switch lid
- ② Fuse switch cage
- ③ (unassigned)
- ④ Fuse switch base
- ⑤ Nameplate holder
- ⑥ Nameplate (rotatable)
- ⑦ Handle position indicator
- ⑧ (unassigned)
- ⑨ Microswitch
- ⑩ Sliding window

5 Installation

5.1 Preparing installation



Danger

Electric shock when live parts are touched!

An electric shock can lead to death!

- Before working on the device, disconnect the power supply. Consider all circuits that could supply the device with dangerous voltages.
- Lock the switching devices in the disconnect position.
- Use a suitable measuring device to check that the device is volt-free.
- During maintenance work, set up safety barriers and attach a hazard sign.
- It is essential to wear appropriate personal protective equipment (PPE) when working on live equipment.

Installation is done using screw fastening (M12) or a hook system (depending on the device variant).

Most assembly steps are identical for 3-pole and 1-pole fuse switch disconnectors. The differences are highlighted below.

- 1 Pull down the handle(s) to open the fuse switch lid (1).



Notice for twin fuse switch disconnectors

Pull down both handles simultaneously.

- 2 Press down the buttons on the fuse switch lid and remove it.

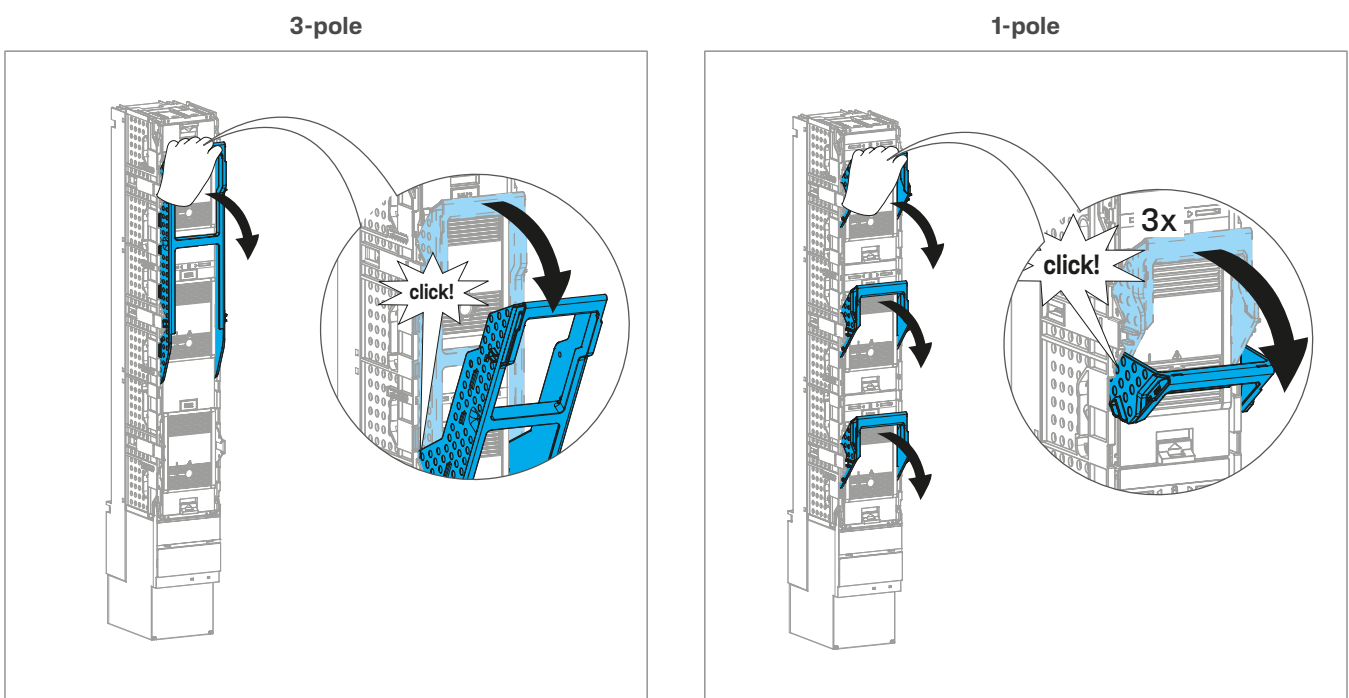


Figure: Removing the fuse switch lid

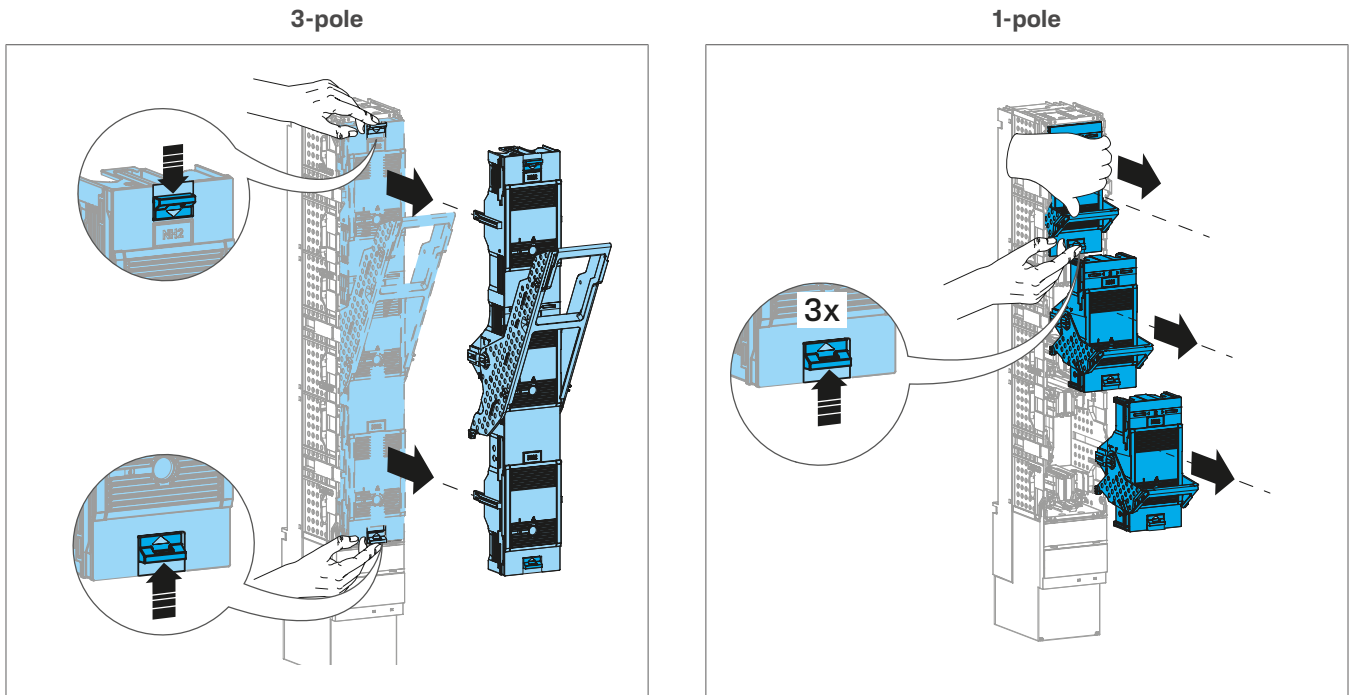


Figure: Removing the fuse switch lid

- 3 Insert a slotted screwdriver (2-6 mm) into the openings provided and carefully open the cover flaps downwards.

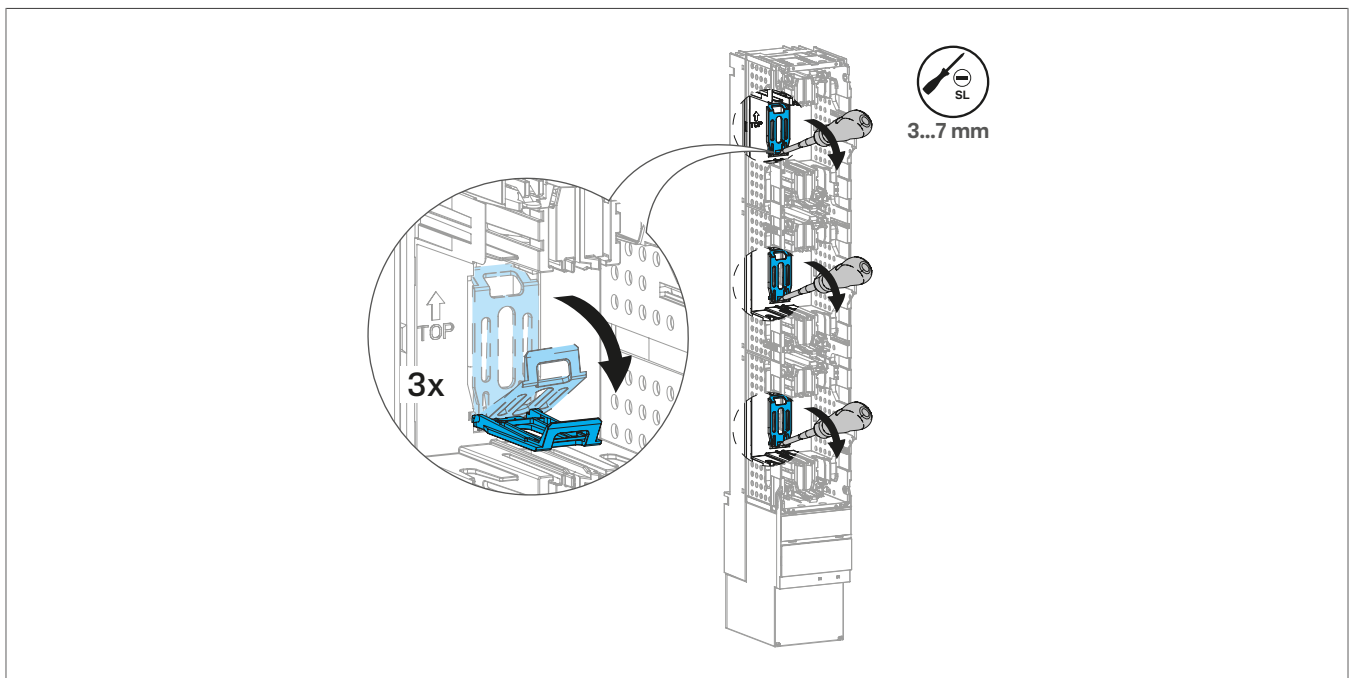


Figure: Opening the cover flaps

Installing the LVZSA microswitch option

- Connect the cables to the microswitch and insert the accessory vertically into the device until the lower stop. The levers must point outwards.

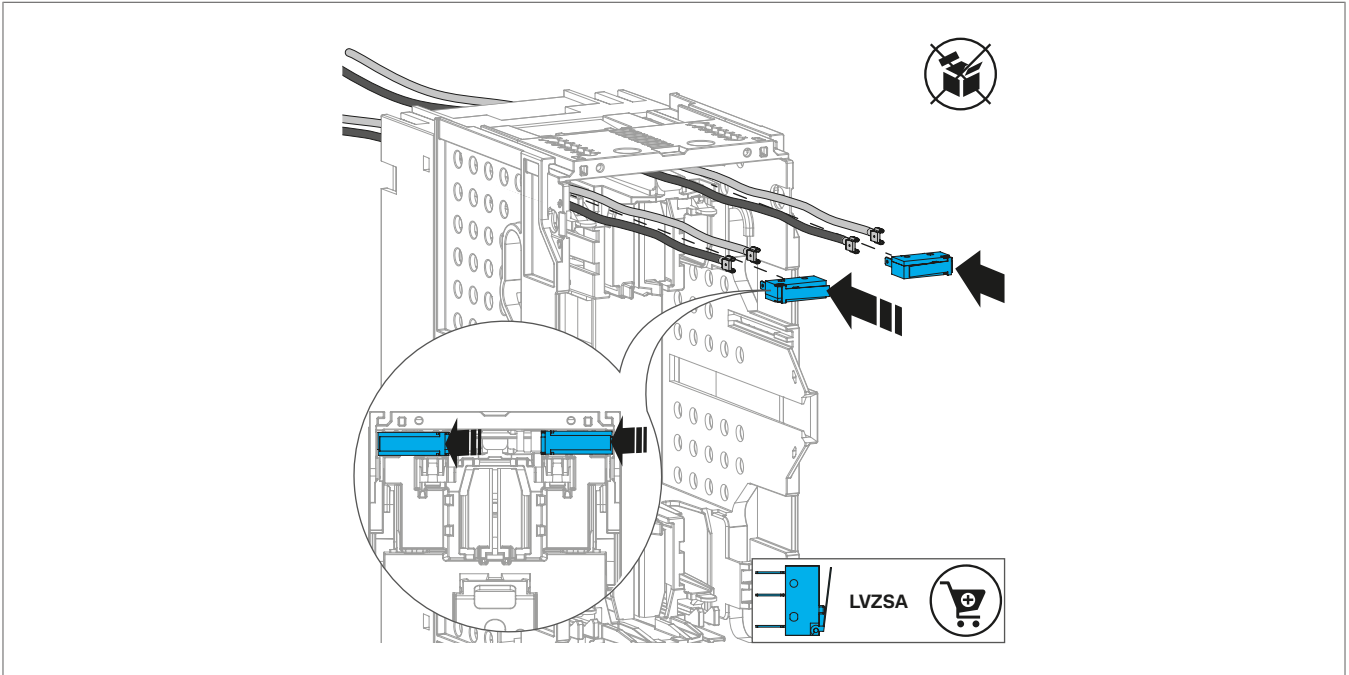


Figure: Installing the microswitch

5.2 Installation with M12 screws (standard type)

There are two installation options with M12 screws.

Option 1

- 1 Align the device with the busbars.
- 2 Insert the screws through the fuse switch cage and the holes in the fuse switch base into the dedicated screwholes of the busbars (see figure, A).
- 3 Tighten the screws evenly and completely (see figure, A).
- 4 Close the cover flaps (see figure, B).

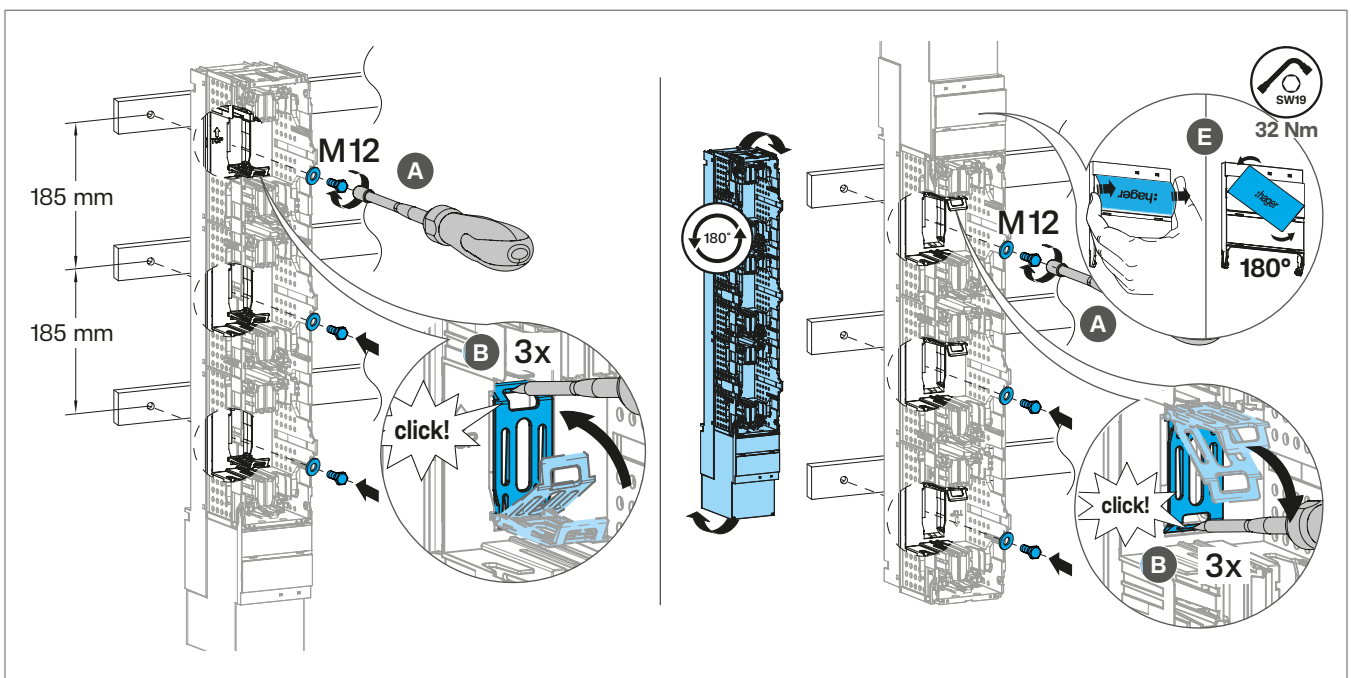


Figure: Installation with M12 screws, option 1 (right shows 180° rotated)



Mounting orientation rotated by 180°

Alternatively, the fuse switch disconnecter can be installed rotated 180°. In this case, rotate the device and follow the same steps. The nameplate can also be rotated.

Option 2

- 1 Insert a M12 screw into each of the pre-drilled holes of the upper and lower busbar and tighten slightly (see figure, left).
- 2 Position the device so that the slots in the fuse switch base (4) rest on the pre-assembled M12 screws (see figure, A).
- 3 Insert the middle M12 screw through the fuse switch cage into the dedicated screwhole of the middle busbar (see figure, B).
- 4 Tighten the screws evenly and completely (see figure, C).
- 5 Close the cover flaps.

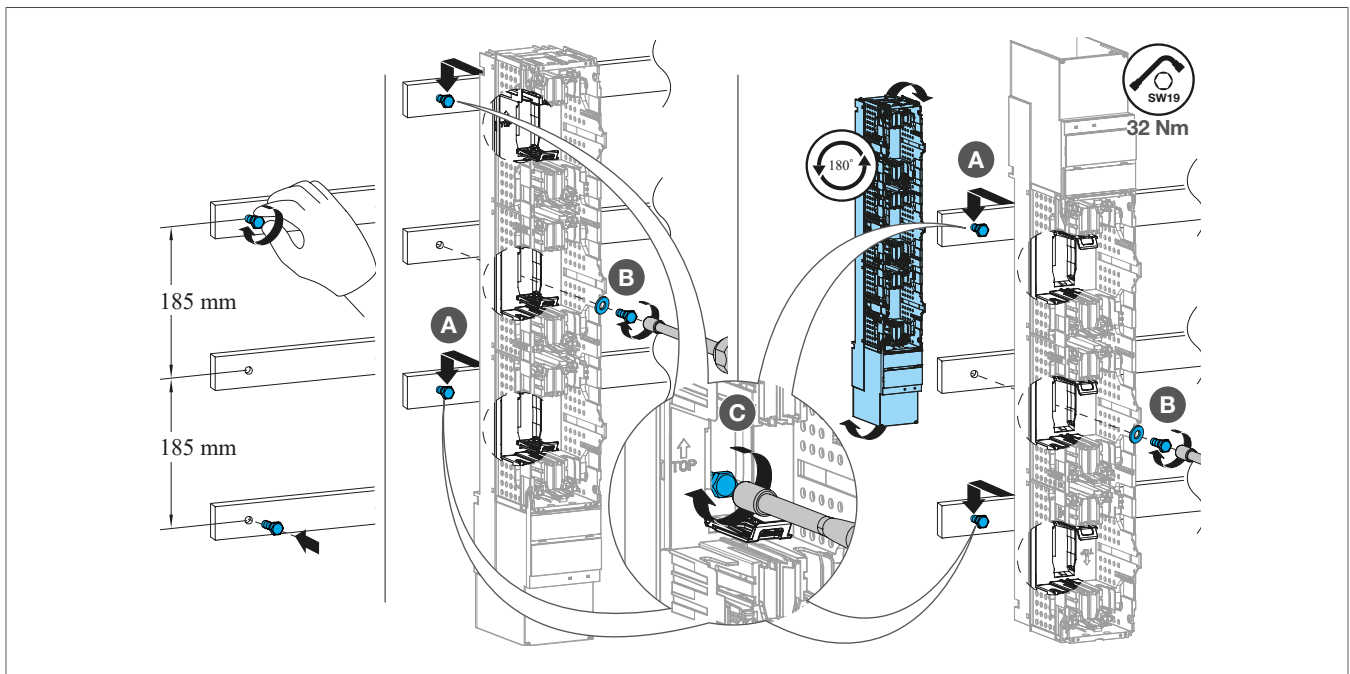


Figure: Installation with M12 screws, option 2 (right shows 180° rotated)



Mounting orientation rotated by 180°

Alternatively, the fuse switch disconnecter can be installed rotated 180°. In this case, rotate the device and follow the same steps. The nameplate can also be rotated.

5.3 Installation with M12 screws (twin type)

The twin NH1-3 fuse switch disconnectors can only be mounted with M12 screws.

- Follow the steps of chapter ([Installation with M12 screws \(standard type\)](#)) accordingly.



Pull down both handles simultaneously.
Both installation options are possible.
Rotating by 180° is possible.

5.4 Installation with M12 screws (coupling type)

Coupling fuse switch disconnectors can only be mounted with M12 screws.

- 1 Align the fuse switch base with the busbars (see figure, A).
- 2 Insert the screws through the holes in the fuse switch base into the dedicated screwholes of the busbars (see figure, B).
- 3 Tighten the screws evenly and completely.
- 4 Follow steps 1 and 2 of chapter ([Preparing installation](#)) to separate the fuse switch lid from the fuse switch cage and put the fuse switch lid aside.
- 5 Attach the fuse switch cage to the fuse switch base (see figure, C).

Inside of the fuse switch cage are two blue locking pins to secure the fuse switch cage to the fuse switch base (see figure, D).

- 6 Turn the pins with a slotted screwdriver 90° clockwise until the arrows of the pins and the cage are aligned (see figure, D).

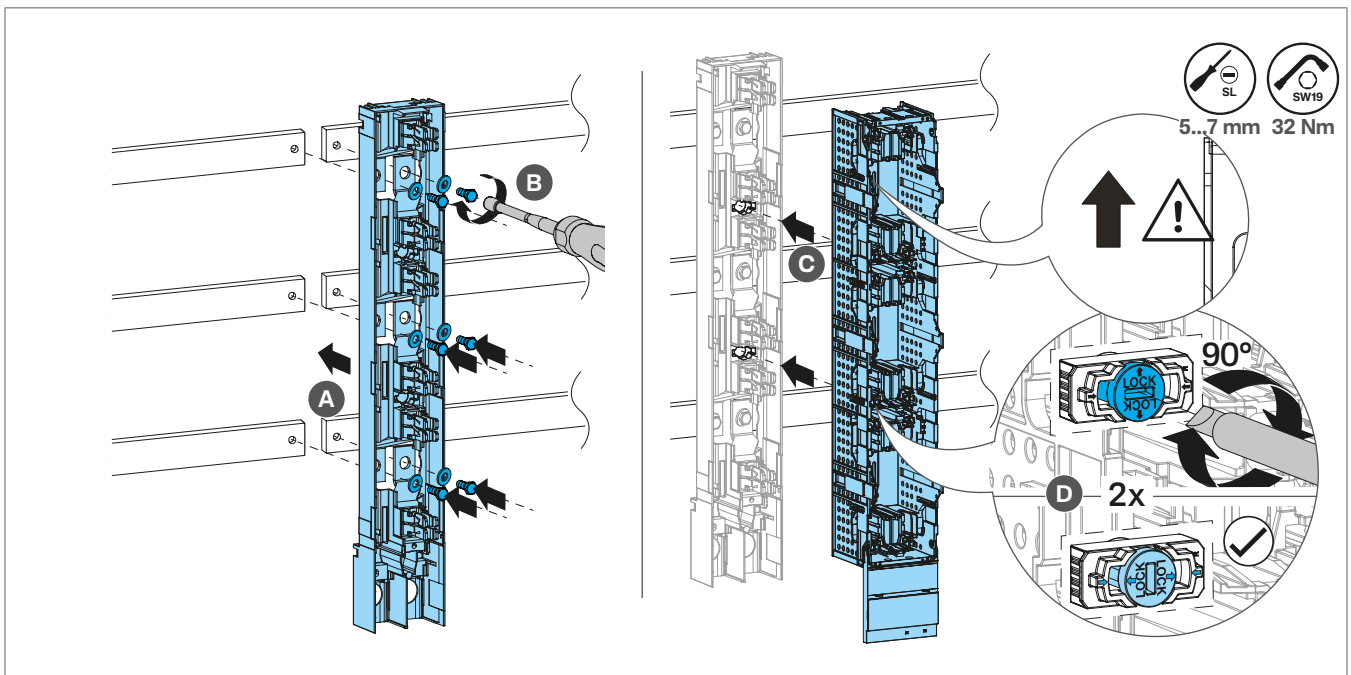


Figure: Installation of coupling fuse switch disconnecter

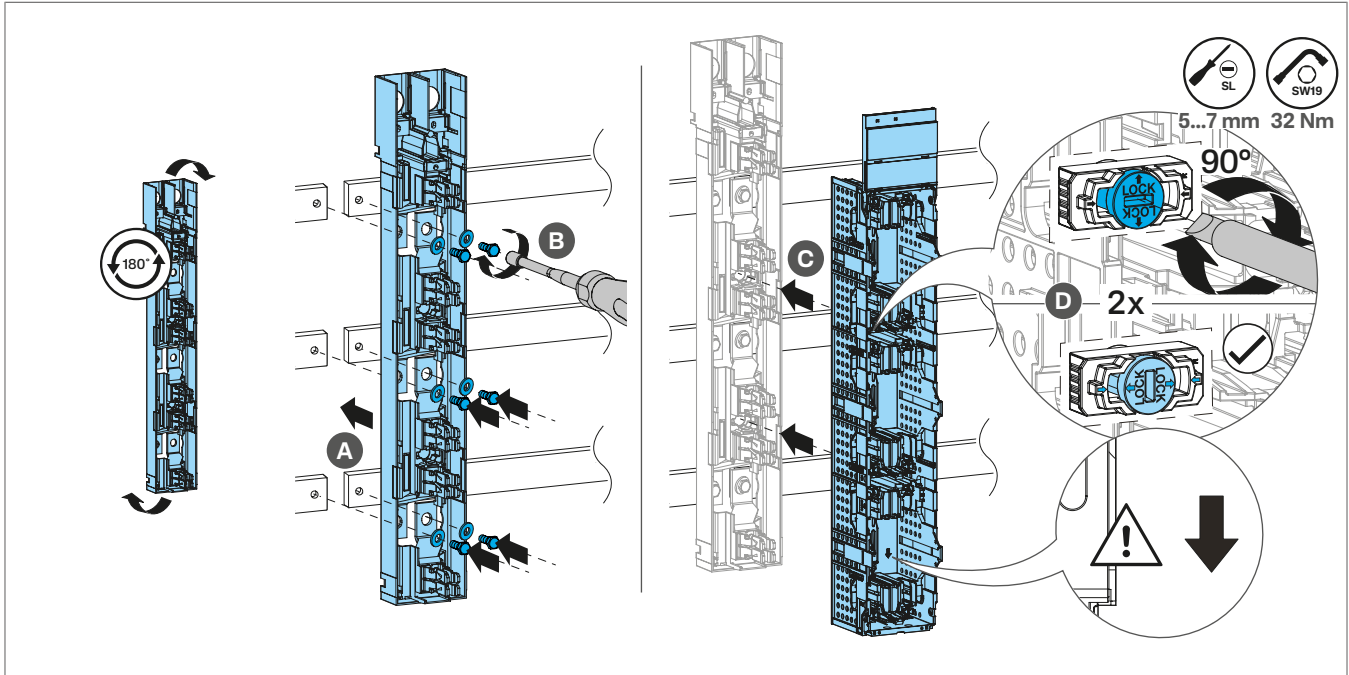


Figure: Installation of coupling fuse switch disconnecter (180° rotated)



Mounting orientation rotated by 180°

Alternatively, the coupling fuse switch disconnecter can be installed rotated 180°. In this case, rotate the fuse switch base and cage device and follow the same steps. The name-plate can also be rotated.

5.5 Installation using hooks

Use the LVZK accessory for installation using hooks.

- 1 Slide the hooks from below under the mounting brackets of the fuse switch base until they click into place (see figure, A and B).
- 2 Place the device with the hooks on the busbars (see figure, C).
- 3 Tighten the screws of the hooks (see figure, D).
- 4 Close the cover flaps.

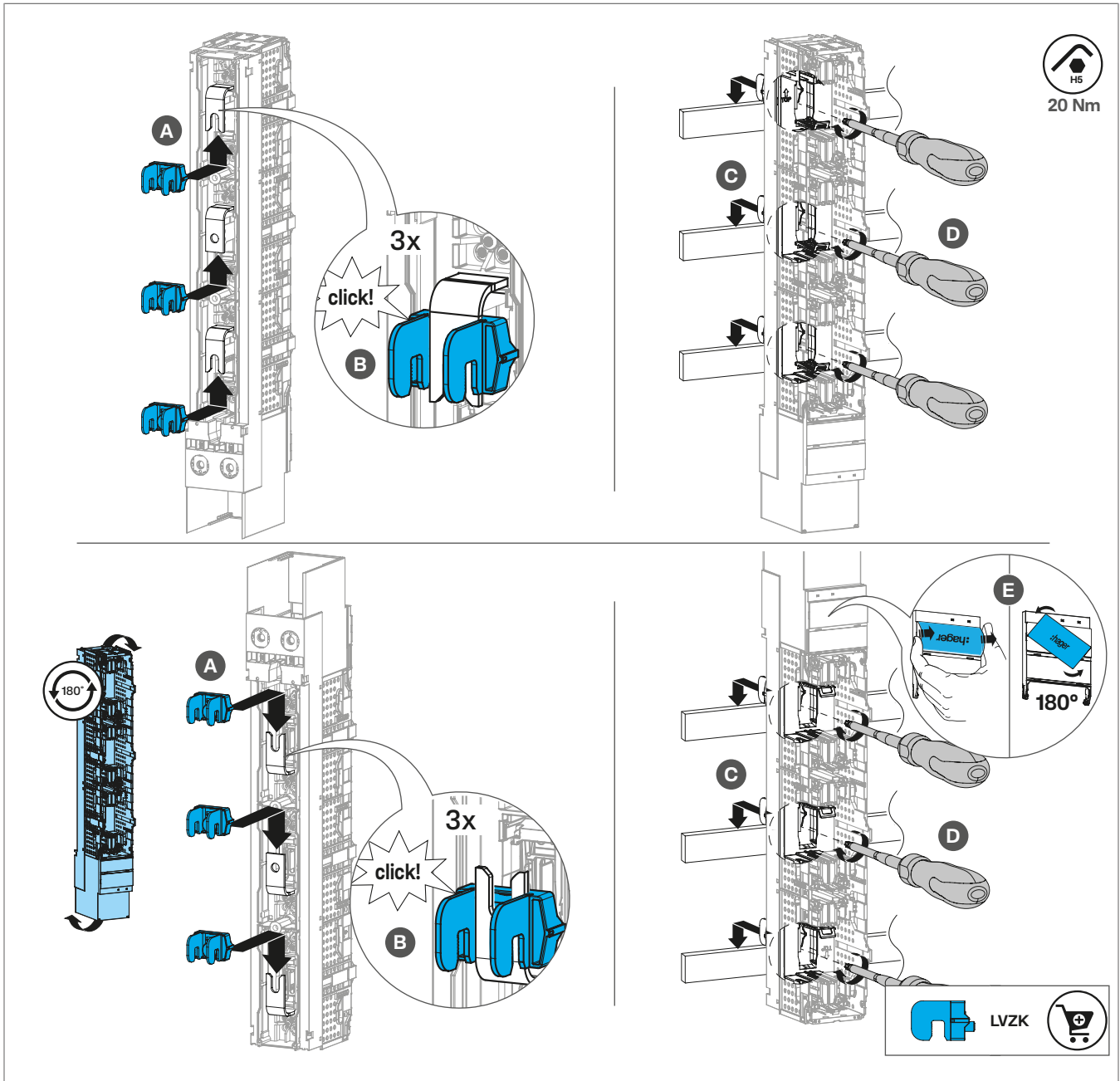


Figure: Installation using hooks (row 2 shows 180° rotated)



Mounting orientation rotated by 180°

The hooks are sledged in from above under the mounting brackets. Place the device with the hooks on the busbar and tighten. The nameplate orientation can be changed.

5.6 Installation of the IP2X-system devices

The devices LV8S..PSTE and LV8S..PSTP can only be mounted with hooks.

- Follow the steps of chapter ([Installation using hooks](#)) accordingly.



Rotating by 180° is not possible.

5.7 Installation of current transformers (CT)

Mounting of current transformers type LVZW..

These current transformers are available for sizes NH1-3.

- 1 When using current transformers type LVZW.. (12), slide them onto the mounting brackets of the fuse switch base until they click into place (see figure, A).
- 2 Then:
 - For installation with M12 screws follow the steps of chapter [\(Installation with M12 screws \(standard type\)\)](#) accordingly (rotation by 180° is possible).
 - For installation with hooks follow the steps of chapter [\(Installation using hooks\)](#) accordingly (rotation by 180° is possible).

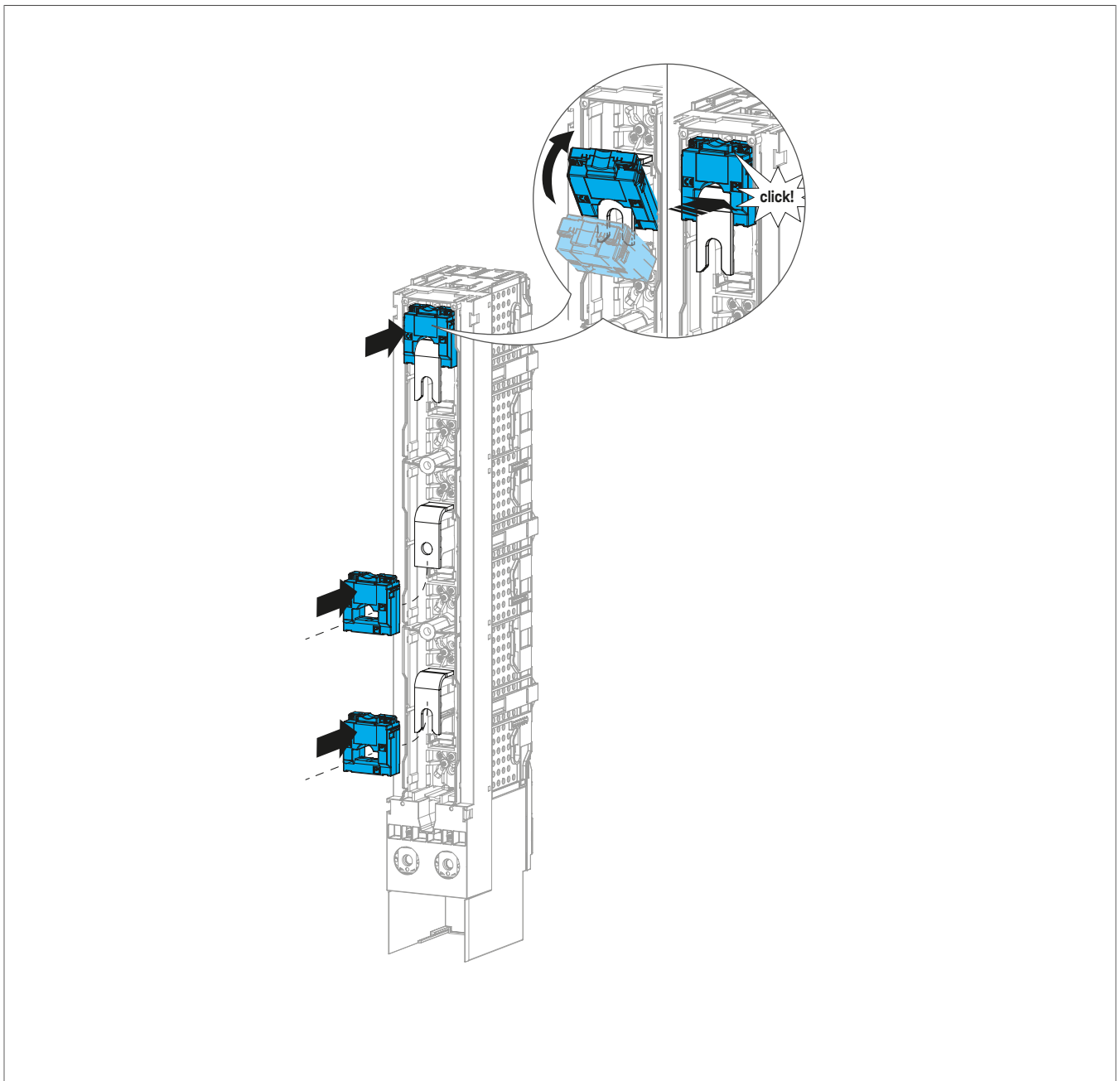


Figure: Installing current transformers type LVZW..

Mounting of current transformers type LV8ZW1000.. (CT 1000)

These current transformers are designed for size NH3 1000 A.

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Installation is only possible with M12 screws.

- 1 When using current transformers type LV8ZW1000.. (12), slide them parallel onto the mounting brackets of the fuse switch base until they click into place (see figure, A and B).
- 2 Follow the steps of chapter [Installation with M12 screws \(standard type\)](#) accordingly (rotation by 180° is possible).

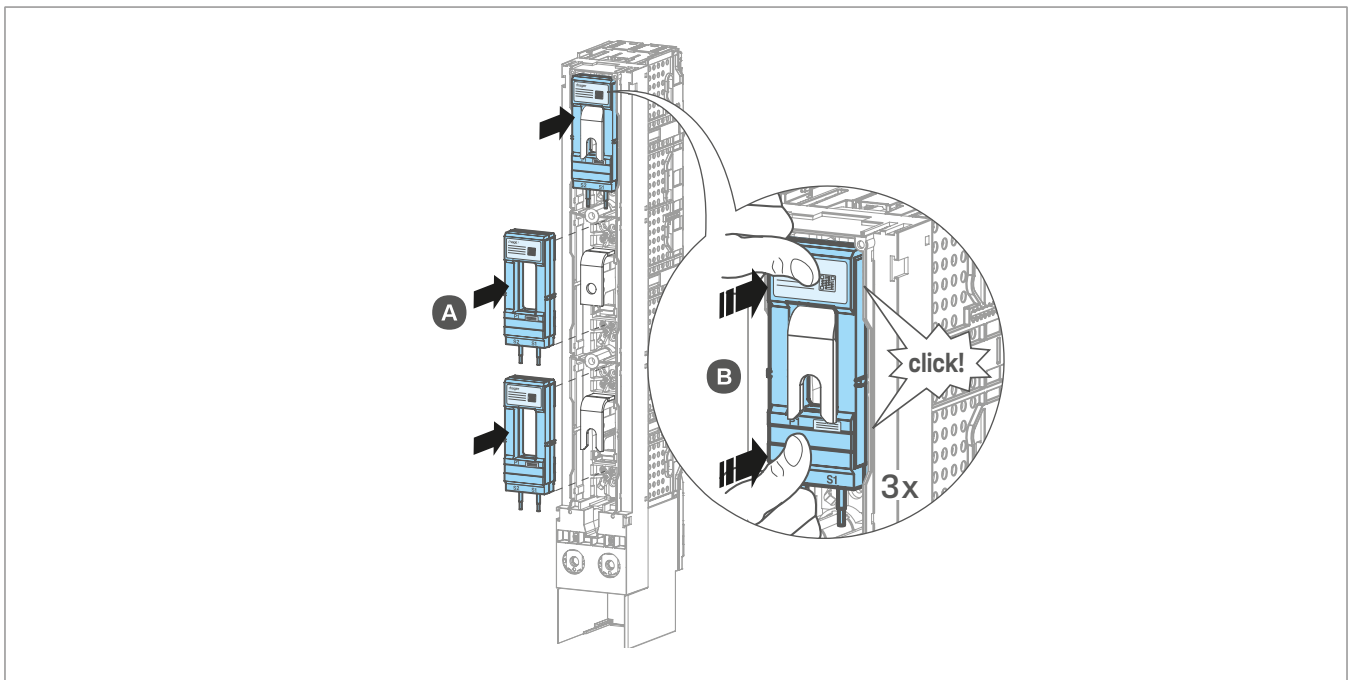


Figure: Installing current transformers type LV8ZW1000..

Establishing a cable connection

Each fuse switch disconnecter can have up to three current transformers (CT) (12).

Use the LVZKH accessory (CT cable holder clickable) for routing the cables.

- 1 After mounting the CTs (see chapter before), route their connecting cables through cable holders LVZKH.
 - Option 1: All cables on one side.
 - Option 2: Cables split between left and right.
- 2 Click the cable holders into place.
- 3 Connect the cables to the communication module, respecting the cable colours for proper connection (S1 is black, S2 is brown).

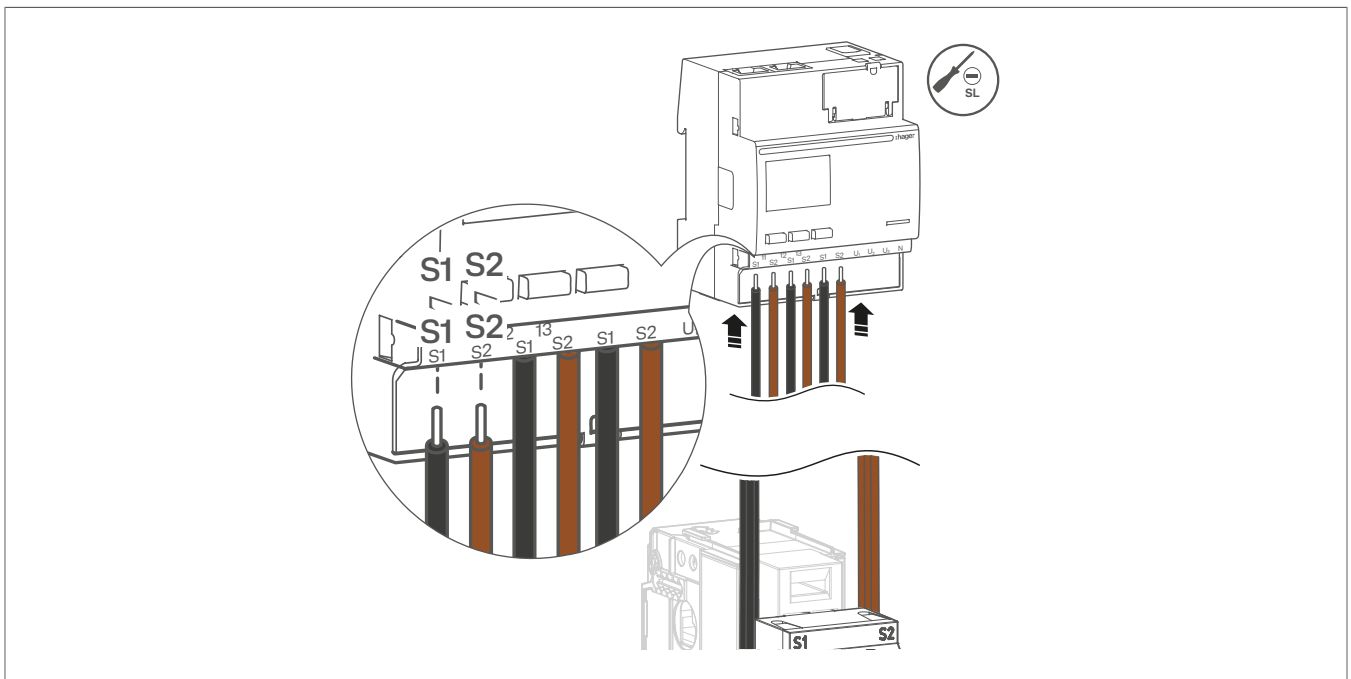
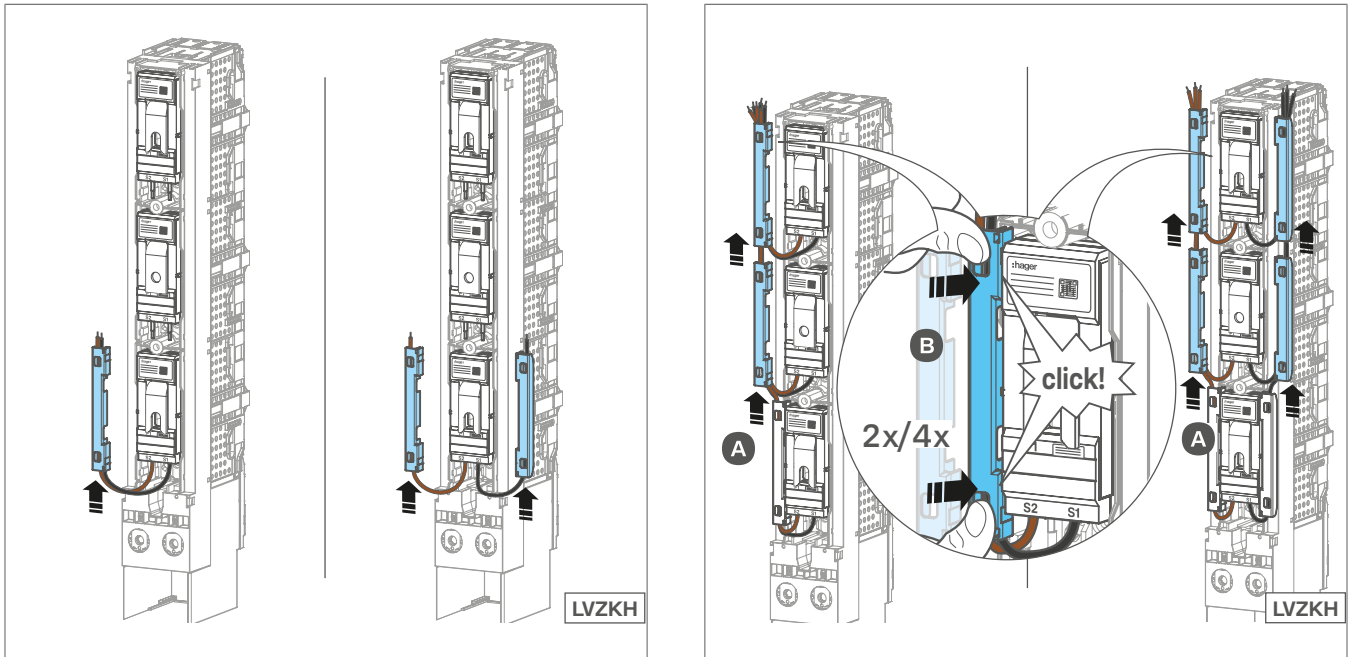


Figure: Establishing a cable connection

5.8 Completing installation

- Secure the window by fastening with 3 mm self-tapping screws (one piece per window).

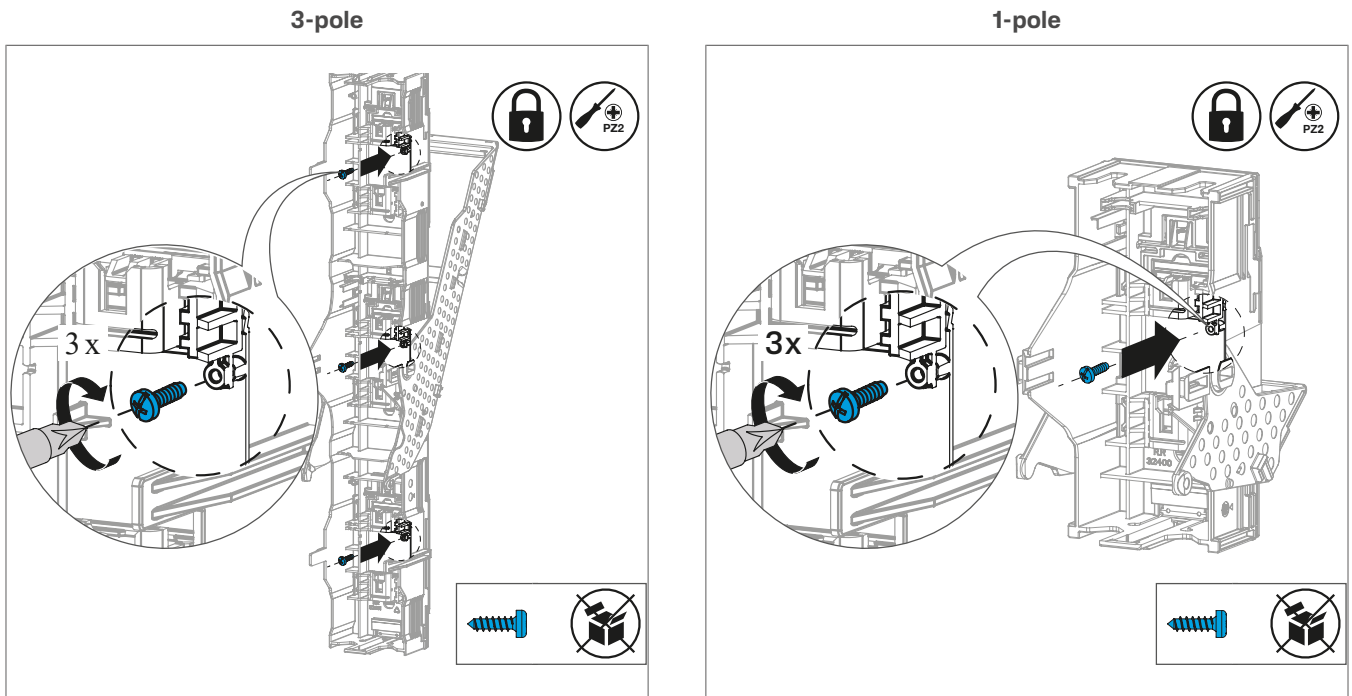
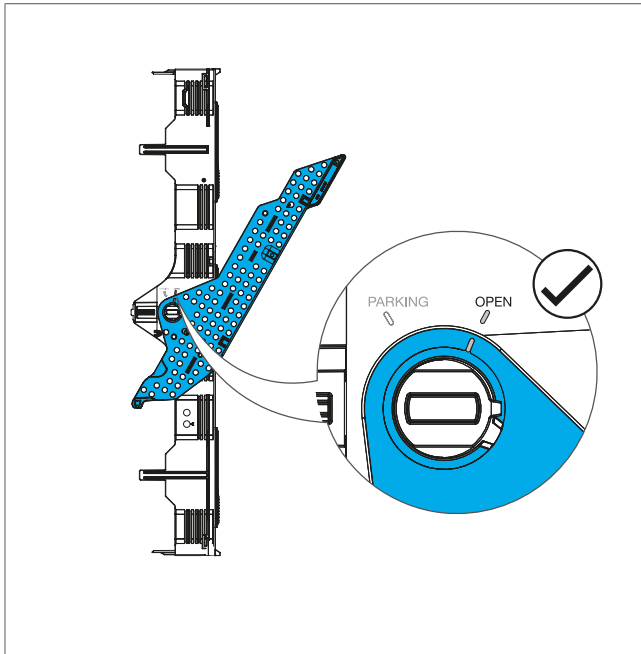


Figure: Securing the window

Inserting and closing the fuse switch lid

- With the handle in **open** position, Insert the fuse switch lid (1) at the appropriate mounting slots of the fuse switch cage.
A clicking sound and noticeable locking confirm the correct seating.
- Close the lid by folding back the handle until it clicks into place.

3-pole



1-pole

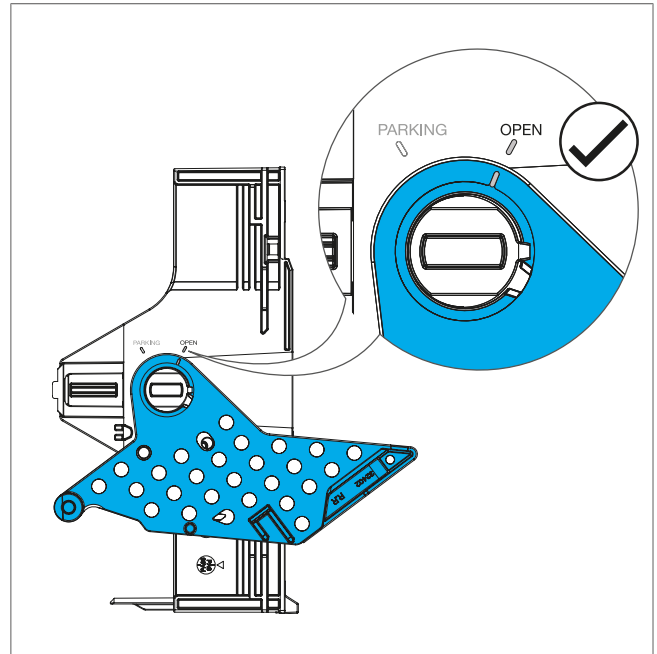
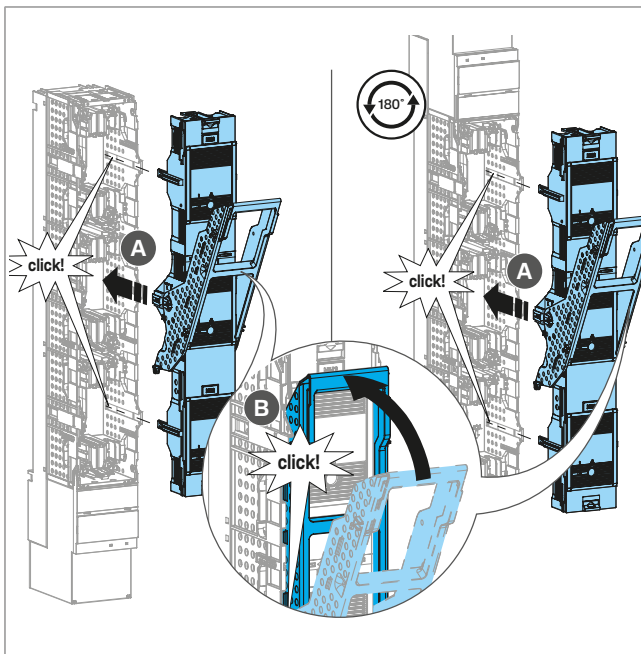


Figure: Inserting and closing the fuse switch lid

3-pole



1-pole

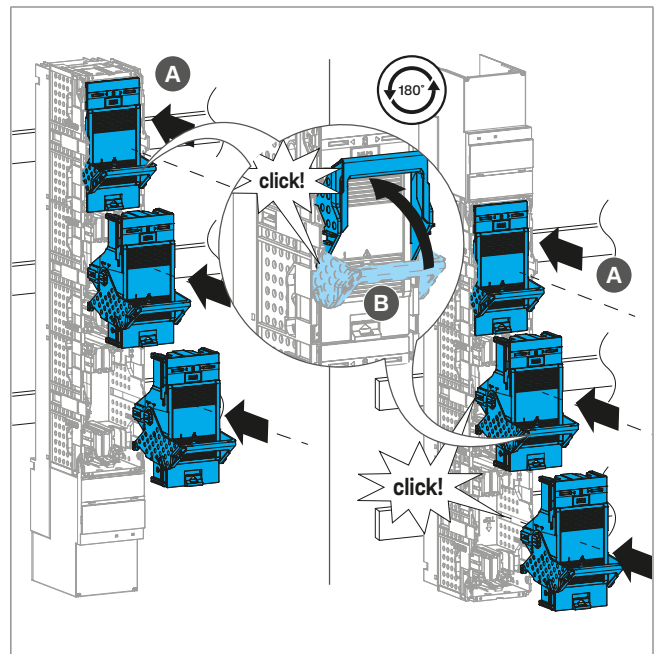


Figure: Inserting and closing the fuse switch lid



Mounting orientation rotated by 180°

The fuse switch lid always fits in in the upright position.

5.9 Installation of the touch protection cover and the blanking cover

Securing the touch protection cover using angle brackets

- 1 Insert the LVZAW (angle bracket) accessory and turn it 90° **anti-clockwise**.
- 2 Secure the touch protection cover with M6 screws.

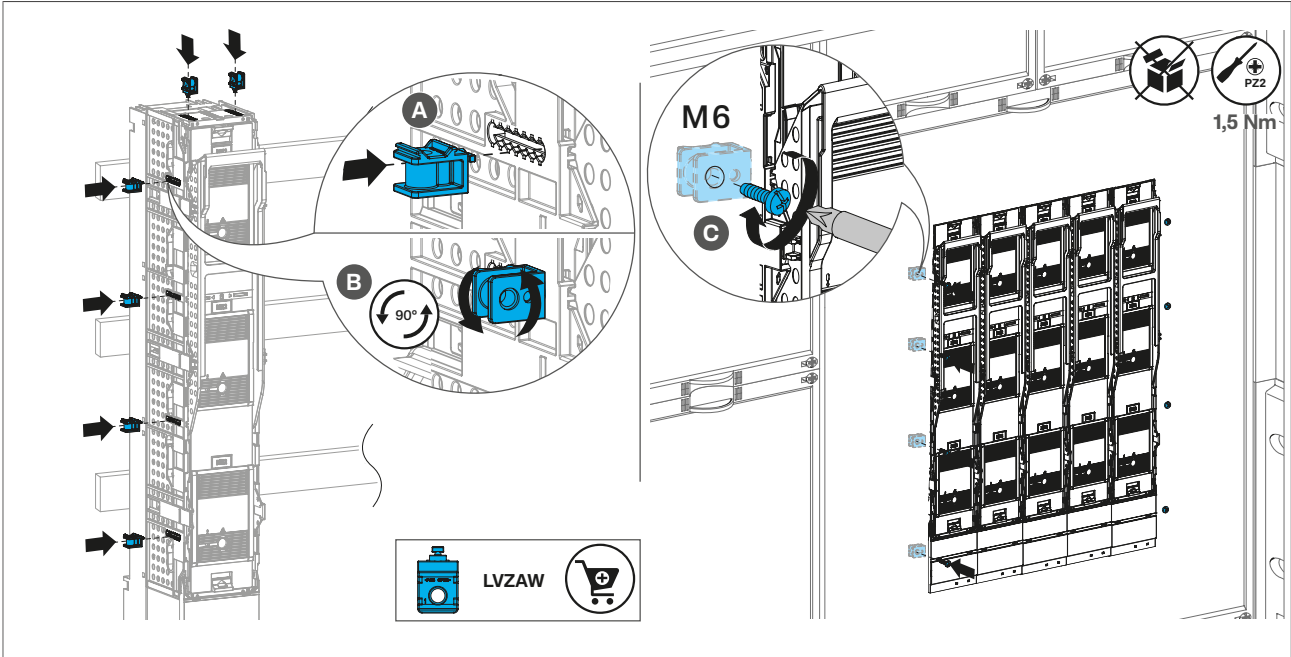


Figure: Securing the cover using angle brackets

Mounting the sideframe

- 1 Insert the LVZAW (angle bracket) accessory and turn it 90° **clockwise**.
- 2 Clip on the LVZPB (sideframe) accessory.

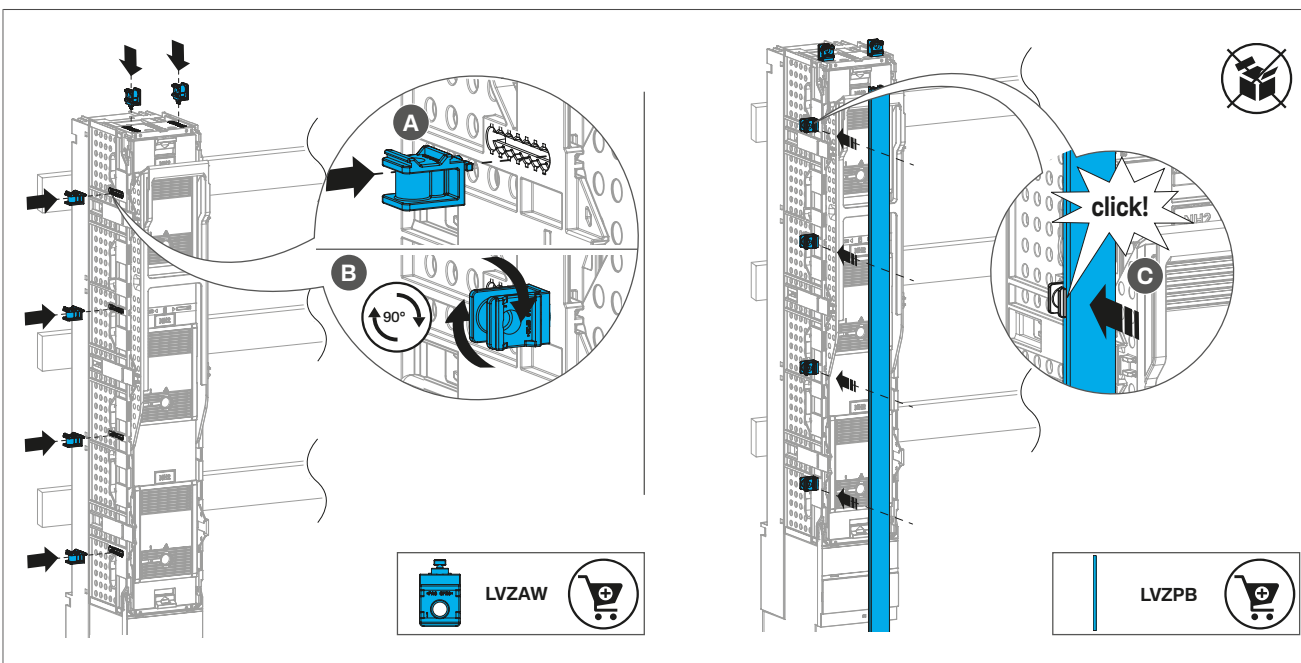


Figure: Mounting the sideframe

6 Electrical connection



Danger

Electric shock when live parts are touched!

An electric shock can lead to death!

- Before working on the device, disconnect the power supply. Consider all circuits that could supply the device with dangerous voltages.
- Lock the switching devices in the disconnect position.
- Use a suitable measuring device to check that the device is volt-free.
- During maintenance work, set up safety barriers and attach a hazard sign.
- It is essential to wear appropriate personal protective equipment (PPE) when working on live equipment.



Danger

Risk of fire due to loose cables

Cables that are not sufficiently secured can heat up during operation and cause arcing

- Use only permitted cable types with the corresponding cross section
- Strip the conductor ends to the specified length and screw them to the specified tightening torque.

The terminal connections and permissible conductor cross-sections are specified on the terminal marking and in the technical documentation.

The specified tightening torques and conductor types (solid, flexible, with conductor sleeves) must be observed.

					re 	rm 	se 	sm
M12 screws	M12	32 Nm	Cu/Al	1 x max 300 mm ² 2 x max. 240 mm ²				
LVZSRK	M12	25 Nm	Cu/Al		35 ... 300 mm ²		50 ... 300 mm ²	50 ... 240 mm ²
LVZVA	M12	30 Nm	Cu/Al		25 ... 300 mm ²			35 ... 240 mm ²
LVZVS	M12	25 Nm	Cu/Al		35 ... 300 mm ²	35 ... 240 mm ²	50 ... 300 mm ²	50 ... 240 mm ²
LVZASR	M12	32 Nm	Cu/Al	2 x max 300 mm ²				

Table 1: Conductor cross-sections and tightening torques

Connecting the cables

- Using a slotted screwdriver, take out the terminal cover (3) and pull it off the side guides. Do not tilt while doing so.

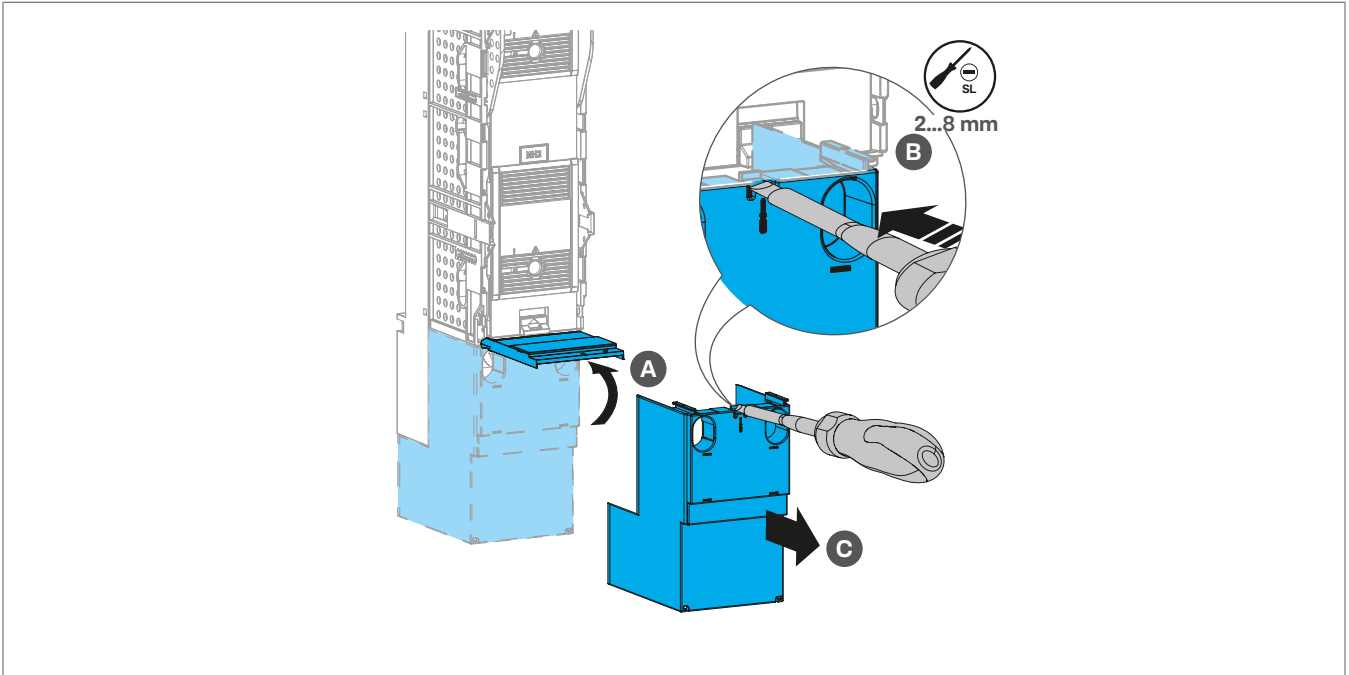
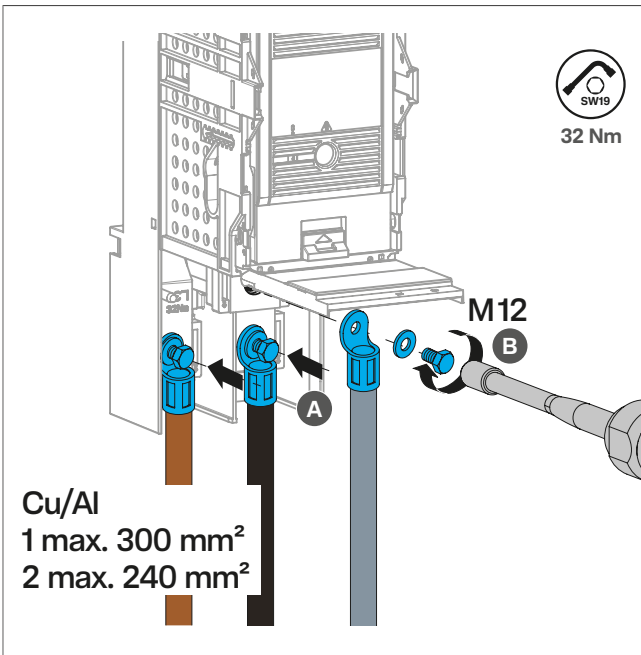
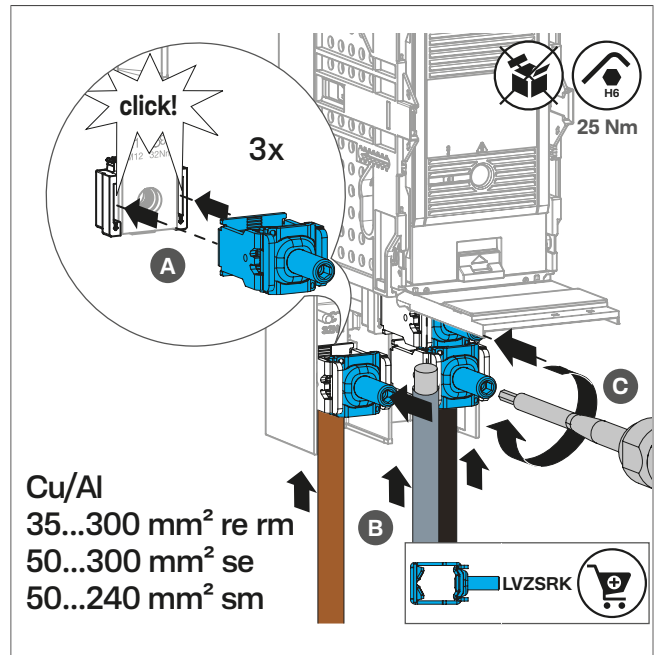


Figure: Open the connection compartment

Following scenarios are possible for connecting the cables to the fuse switch disconnecter.

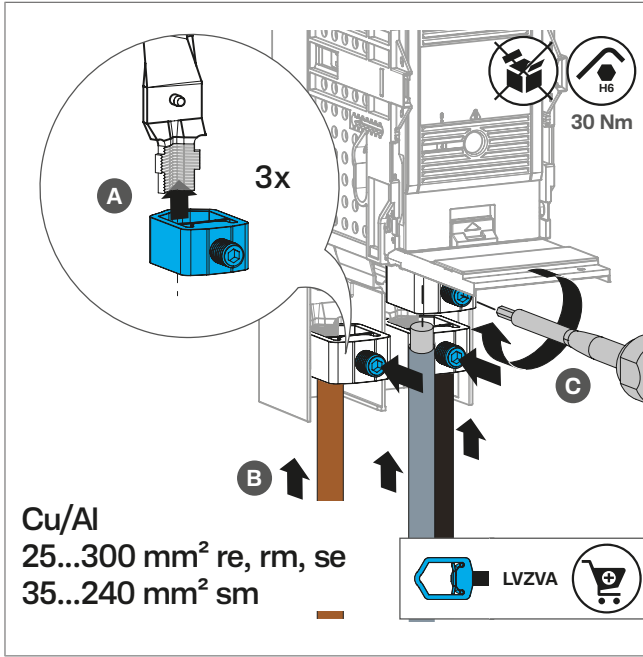


Connection with standard M12 screws and cable lugs

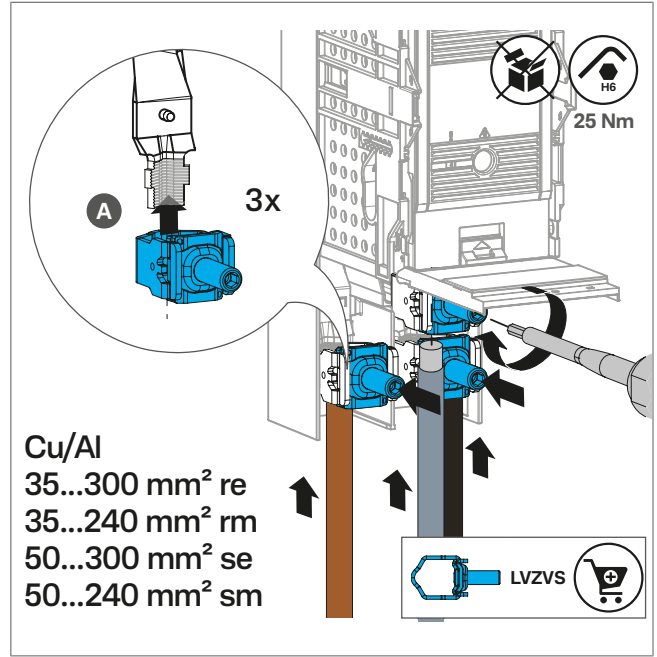


Connection with LVZSRK terminal adapter

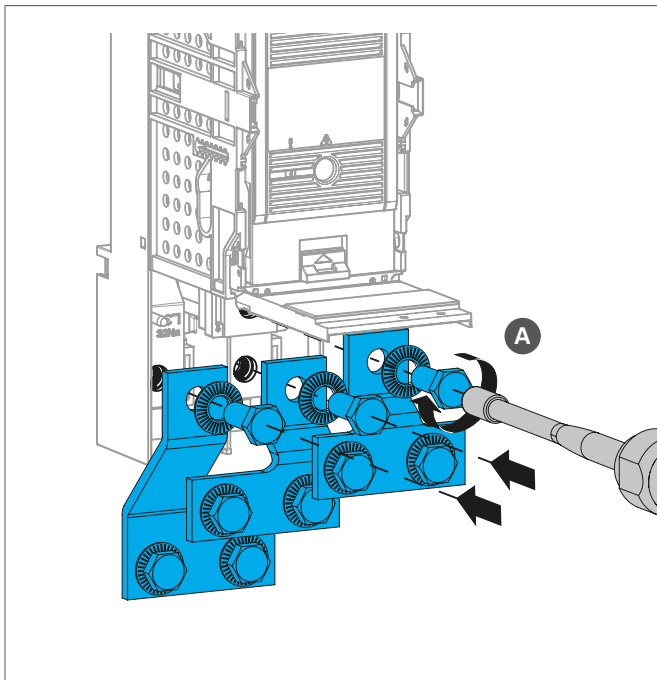
Electrical connection



Connection with LVZVA terminal adapter (accessory)



Connection with LVZVS terminal adapter (accessory)



Connection with LVZASR terminal adapter (accessory)

7 Fuse links

7.1 Inserting and removing fuse links



Danger

Electric shock when live parts are touched!

An electric shock can lead to death!

- Before working on the device, disconnect the power supply. Consider all circuits that could supply the device with dangerous voltages.
- Lock the switching devices in the disconnect position.
- Use a suitable measuring device to check that the device is volt-free.
- During maintenance work, set up safety barriers and attach a hazard sign.
- It is essential to wear appropriate personal protective equipment (PPE) when working on live equipment.

Inserting the fuse links

- Insert the fuse links into the fuse link holders until they click into place.

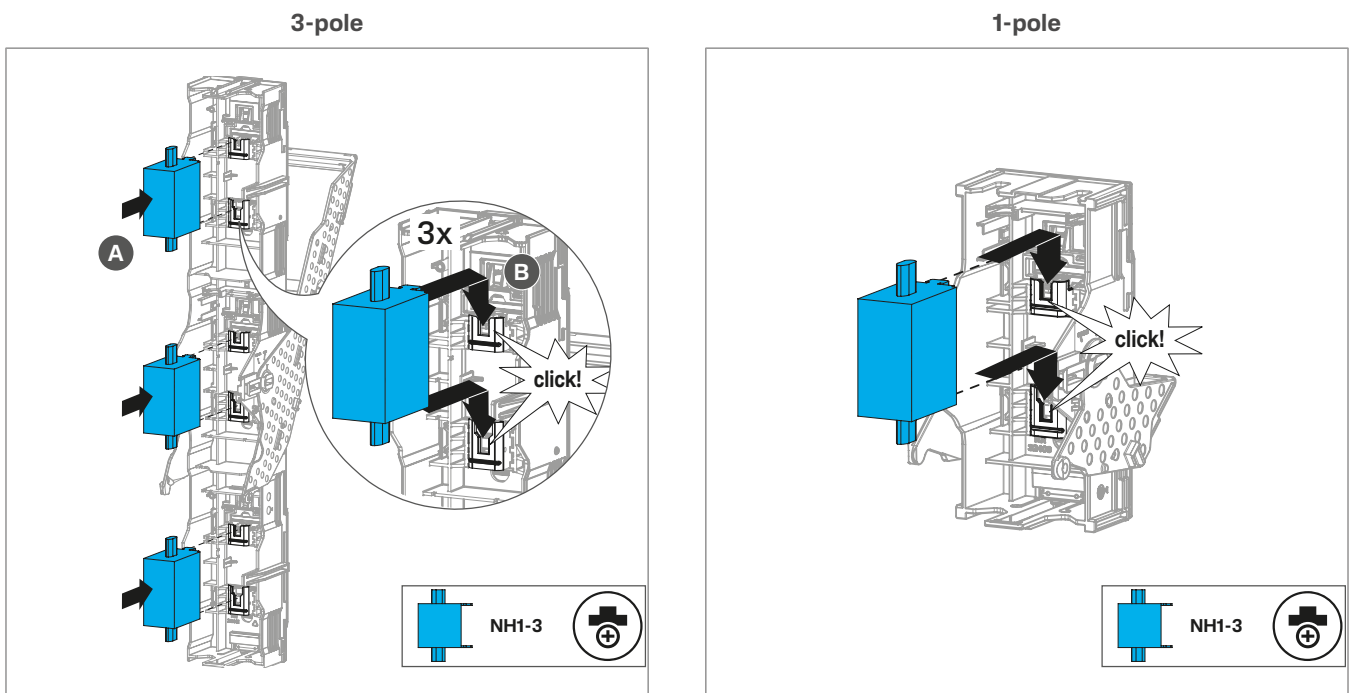


Figure: Inserting fuse links

Removing the fuse links



Caution

Burns caused by heated fuse links!

During operation of the device, the fuse links can heat up significantly and cause burns.

- After removing the fuse links don't touch them until they have cooled down.

- Release and remove the fuse links by pressing the blue fuse link release button.

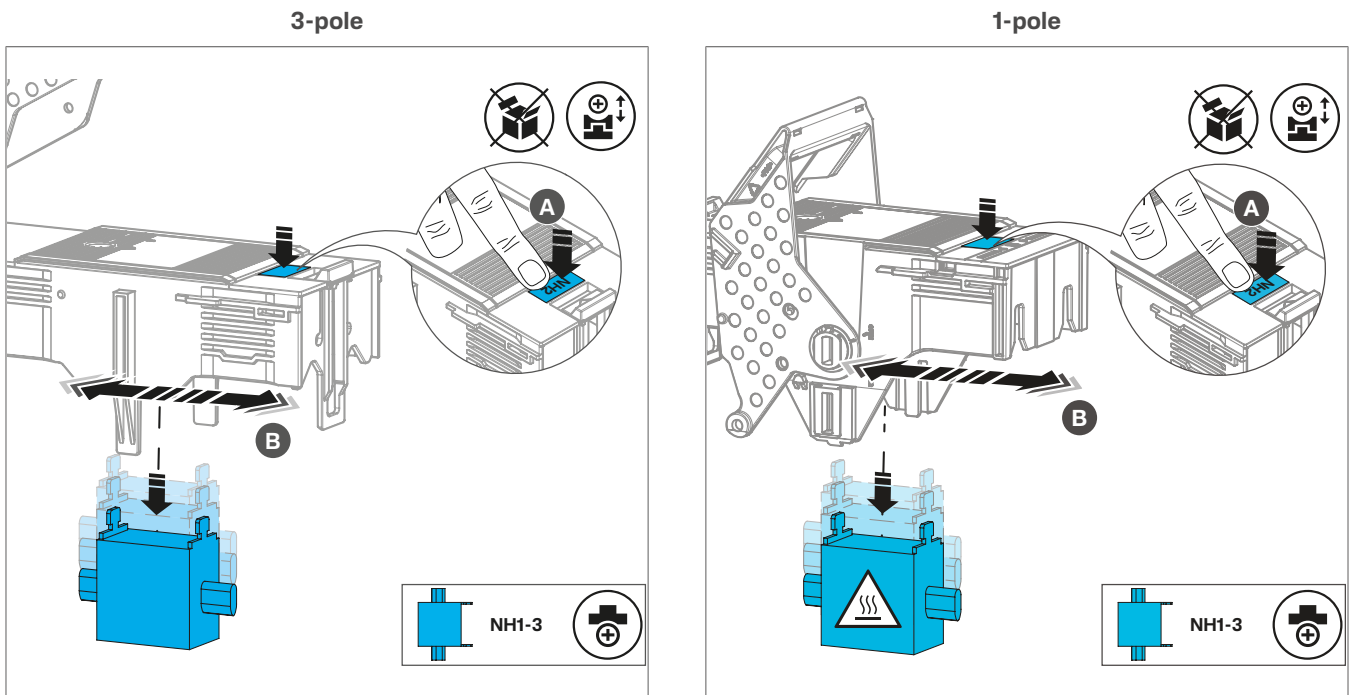


Figure: Removing fuse links

7.2 Fuse monitoring and testing

Testing fuse monitoring (FM test)

This function is only applicable for the product variant with integrated fuse monitoring (11).

► For more information, see [\(Electronic fuse monitoring system\)](#).

☑ The fuse switch disconnecter is mounted and connected.

- Test correct functioning of the fuse monitoring by pressing the test button located on the front top of the module.

During the test phase all LEDs will blink in red and the NO/NC state are switched.

After some seconds the LEDs return to steady green and the NO/NC return to normal state.

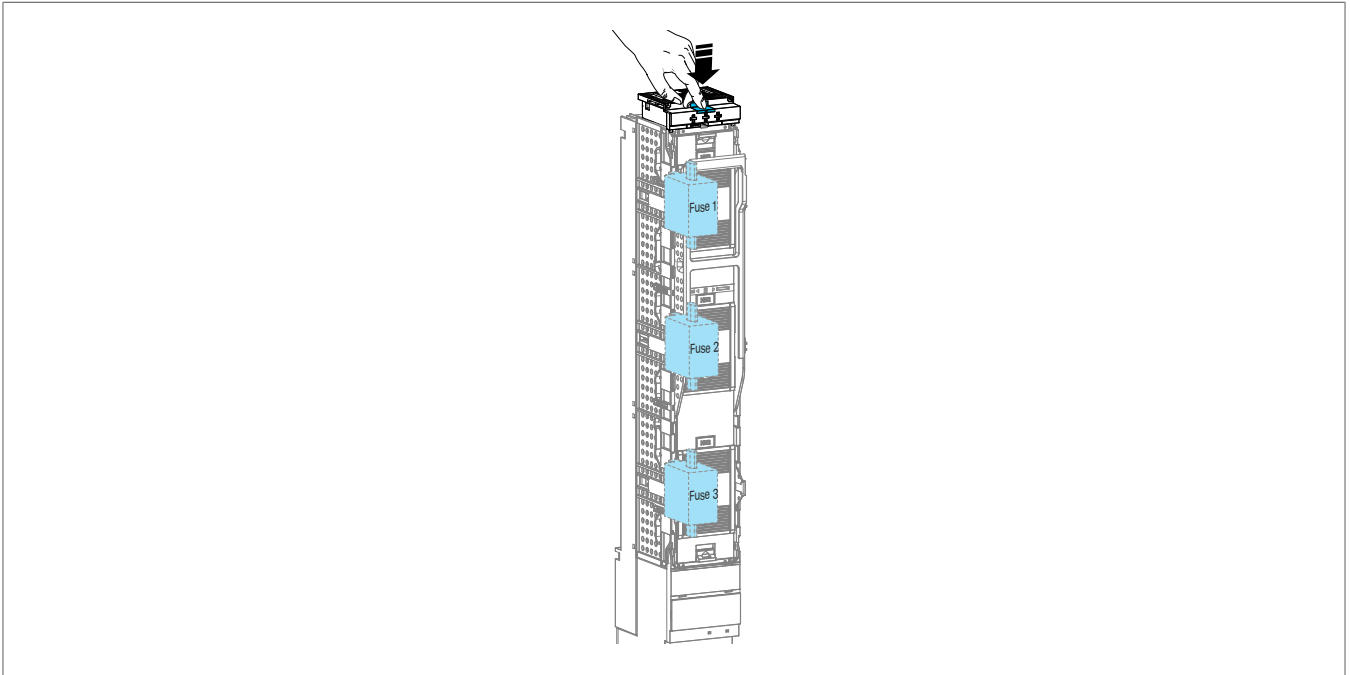


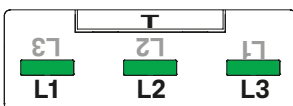
Figure: Fuse monitoring test button

Checking the control LED

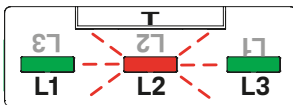
The fuse monitoring provides information about the condition of each fuse link by the status of its control LED:

- A steady green light indicates that the fuse link is OK.
- Red blinking indicates that the associated fuse link has tripped or no fuse link is installed in the respective phase.
- If the LED is off there is an error. Refer to chapter [\(Electronic fuse monitoring system\)](#).

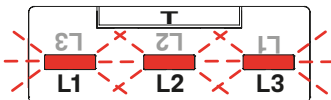
Examples



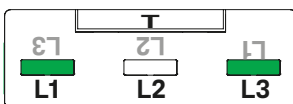
All fuse links are ok.



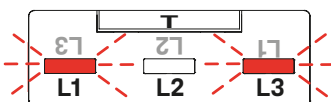
Fuse links of L1 and L3 are ok.
Fuse link of L2 has tripped.



All three fuse links have tripped.



Fuse links in L1 and L3 are ok.
Error on fuse link for L2 (refer to chapter 10).



Fuse links for L1 and L3 have tripped.
Error on fuse link for L2 (refer to chapter 10).

8 Completing the installation

8.1 Sealing

- 1 Insert the sealing wire through the corresponding openings on the handle (three times for the 1-pole).
- 2 Fasten the seal using an approved sealing tool.
- 3 Document the seal number for future traceability.

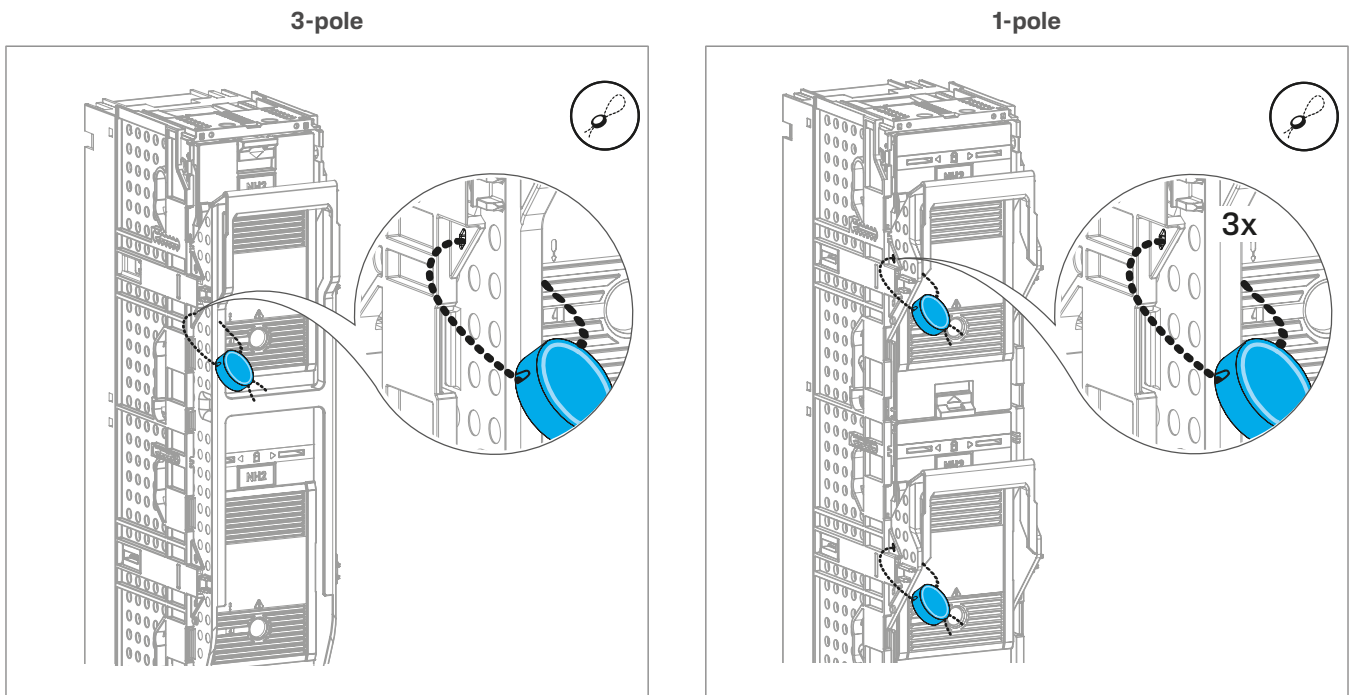


Figure: Sealing

8.2 Labelling

Labelling the nameplate

- 1 Fold up the nameplate holder (5).
- 2 Pull out the identification paper to the right.
- 3 Add information to the identification paper.
- 4 Reinsert the identification paper.
- 5 If necessary, an additional label can be clipped on the nameplate holder.

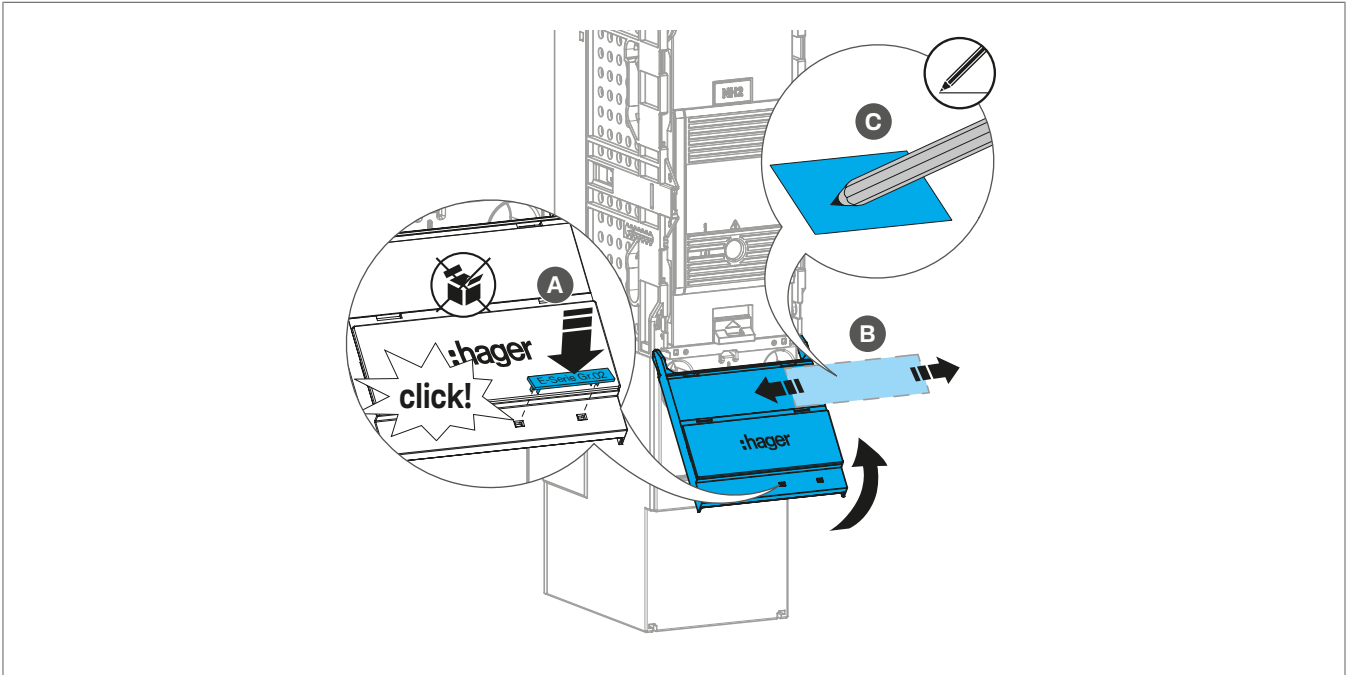


Figure: Labelling the nameplate

Customizing the position of the nameplate holder

The nameplate holder can also be placed on the top of the device.

- 1 Fold up the nameplate holder (5) by 45°.
- 2 Carefully spread both retaining lugs.
- 3 Pull out the nameplate holder.
- 4 Place the nameplate holder on the top of the device by aligning its retaining lugs with the dedicated slots.
- 5 Click the retaining lugs into place.
- 6 Turn the nameplate (6) 180° so that Hager is again legible.

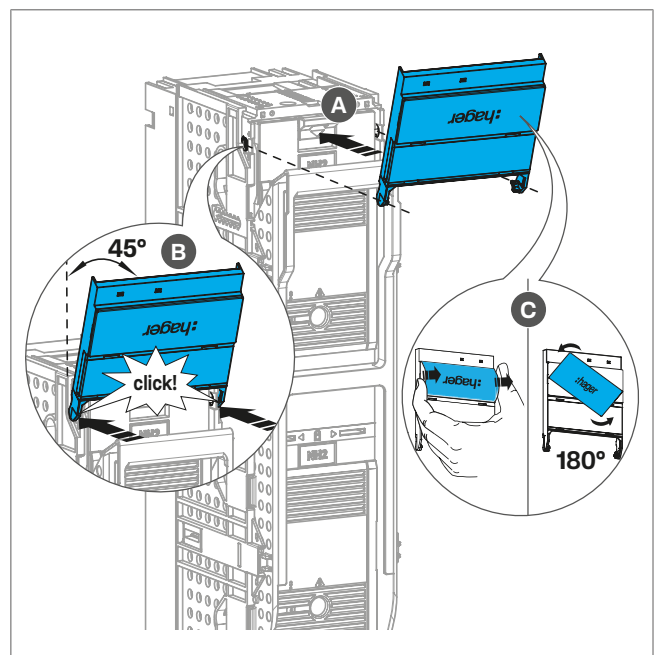
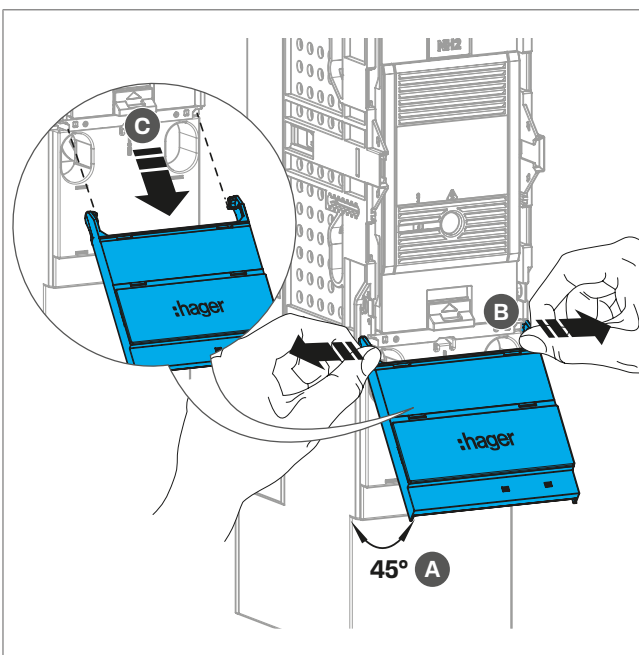


Figure: Customizing the position of the nameplate holder

9 Operation

9.1 Voltage absence test (VAT)

- 1 Use a flat-head screwdriver to gently lift open the sliding window (10) (see figure left, A and B).
- 2 Perform the voltage test through the dedicated opening (see figure right, A).
- 3 Then close the sliding window again (see figure right, B) to ensure the IP3X degree of protection on the front of the device.

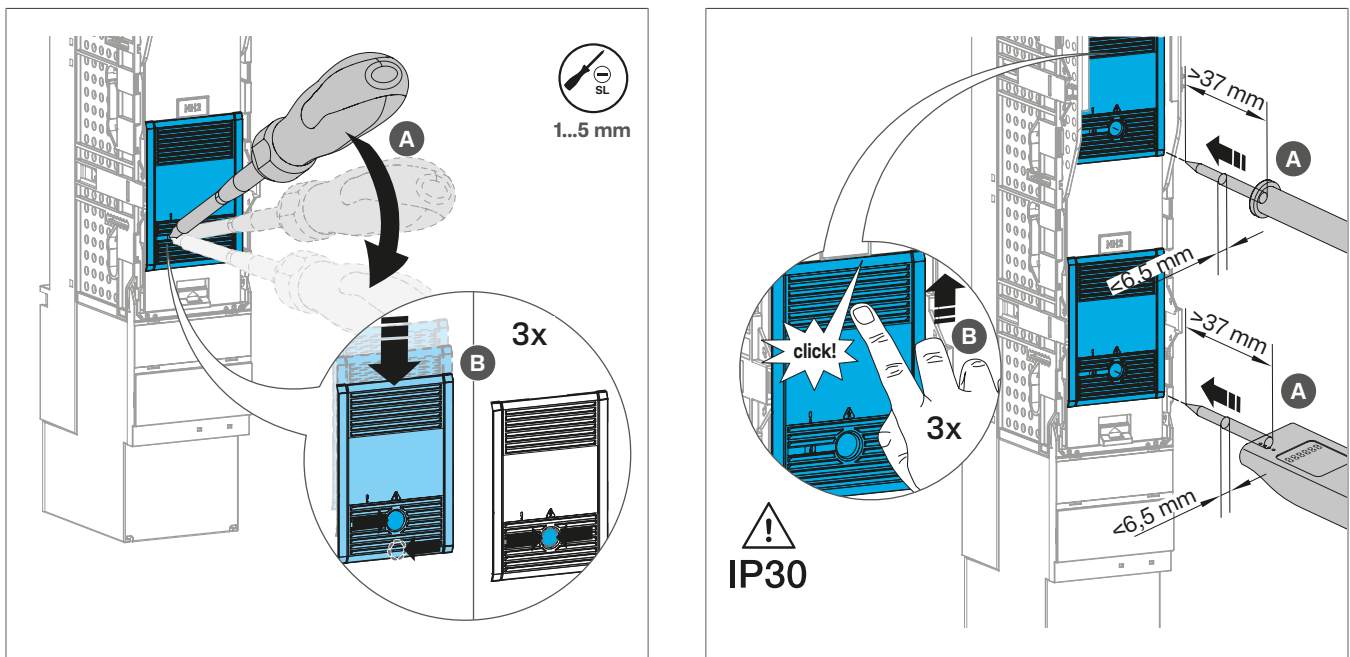


Figure: Voltage absence test (VAT)

9.2 Securing the device in closed position using padlocks

- The fuse switch lid (1) is in the closed position.

Each fuse switch lid can be secured with one or two locking pieces.

- 1 Insert the locking pieces LV8ZLP into the dedicated slots of each fuse switch lid until they click into place.
The **Closed** mark is visible.
- 2 Insert padlocks of maximum 8 mm shackle thickness (accessory) into each **Closed** opening of the locking pieces.
- 3 Close the padlocks.

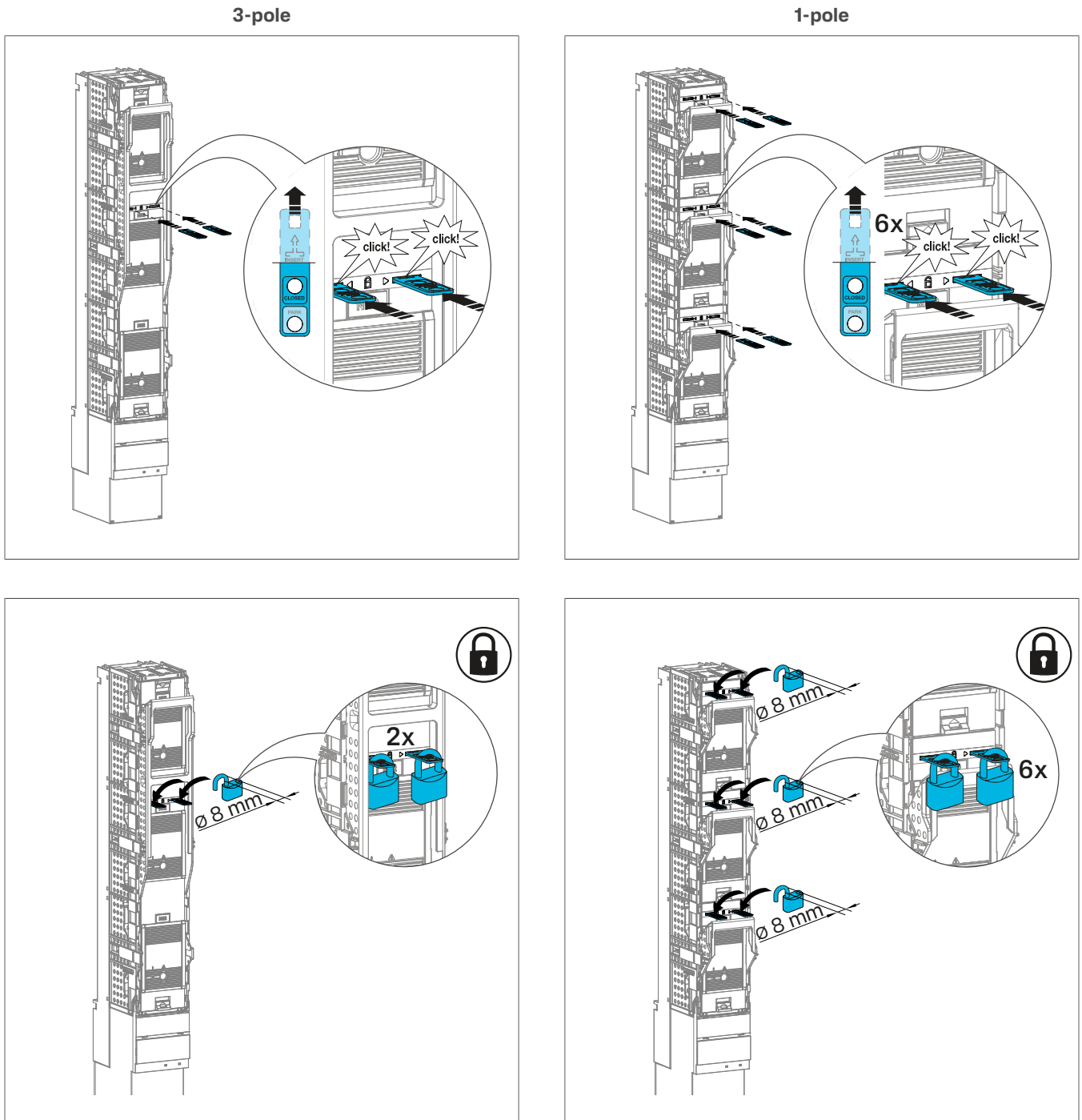
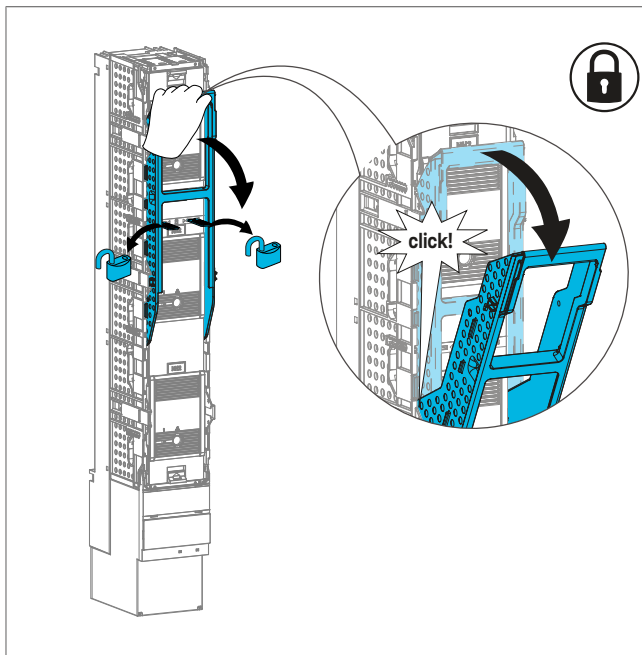


Figure: Securing the device in closed position using padlocks

9.3 Unlocking the device in closed position

- 1 Open and remove the padlocks.
- 2 Pull down the handle to open the fuse switch lid (1).
- 3 Press down the buttons on the fuse switch lid and remove it.
- 4 Pull out the locking pieces.

3-pole



1-pole

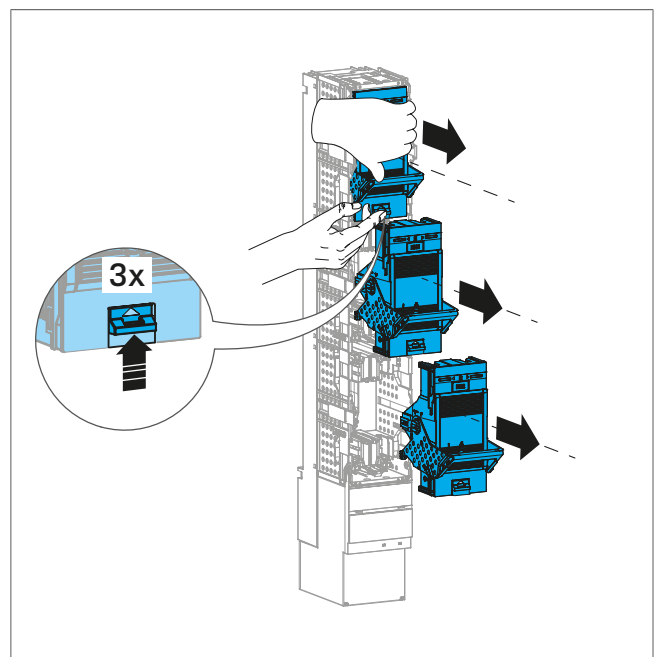
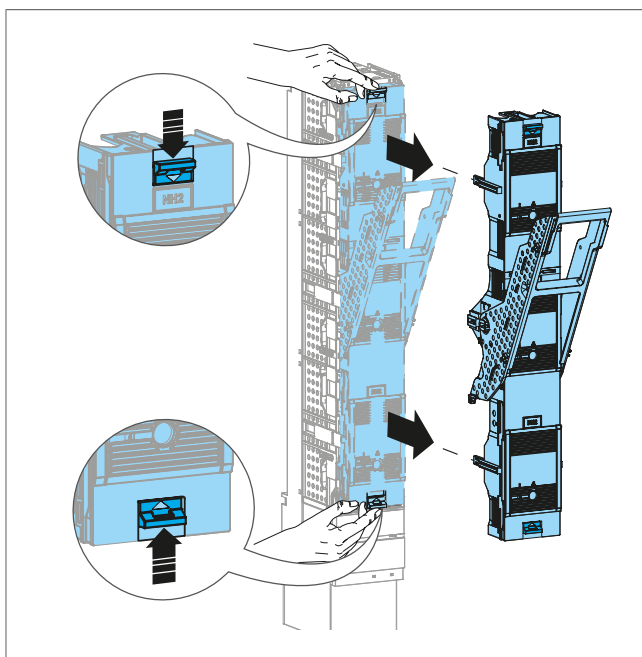
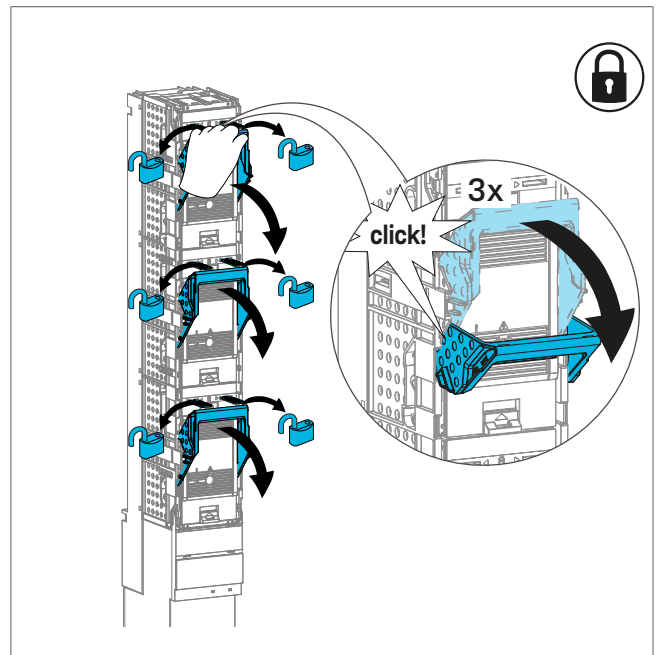


Figure: Unlocking the device in the closed position

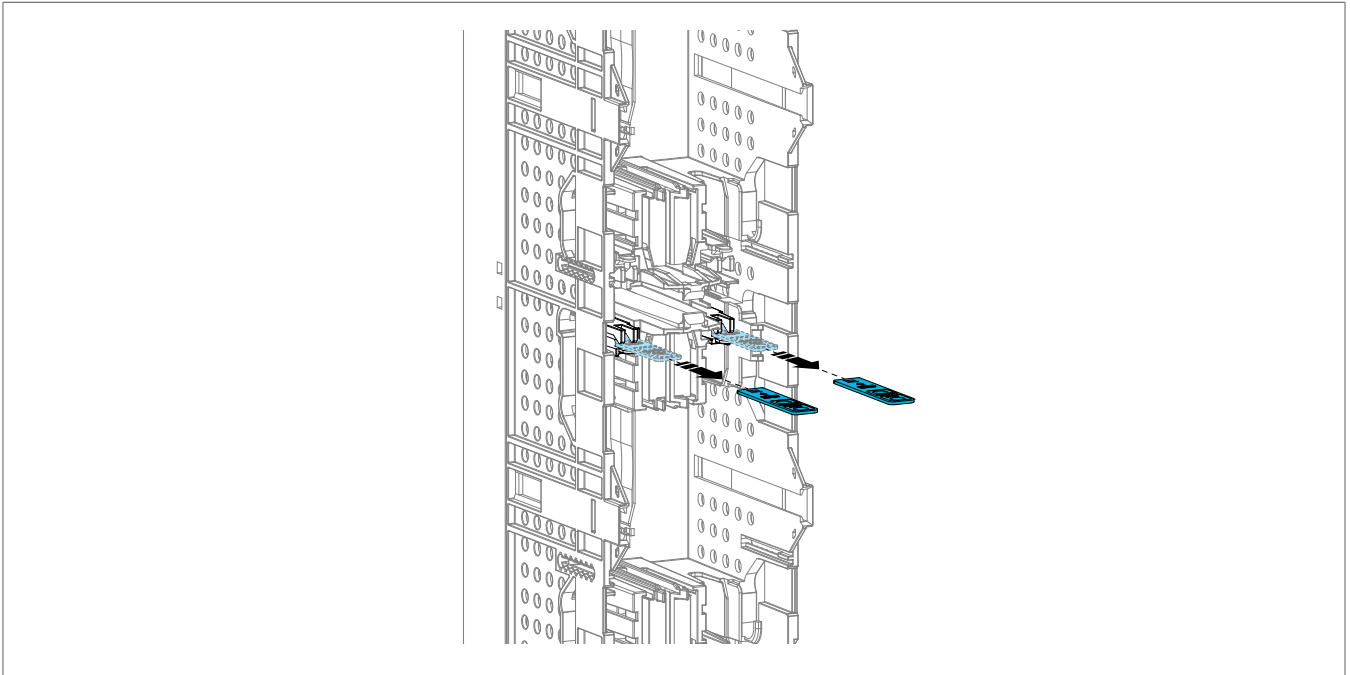


Figure: Pulling out the locking pieces

9.4 Securing a twin device in closed position using padlocks

☑ The double fuse switch lid is in the closed position.

Each double fuse switch lid can be secured with one or two **standard locking pieces LV8ZLP**.

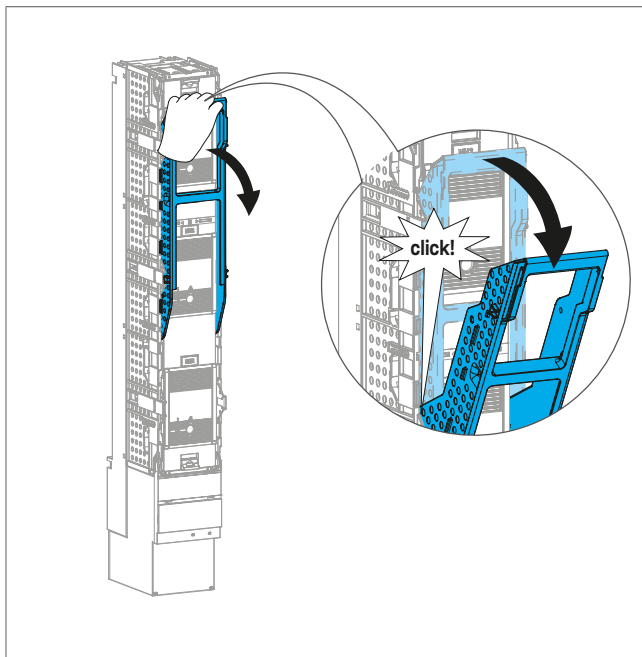
The twin locking pieces LV8ZTP must only be used for the park position.

- Follow the steps of chapter [\(Securing the device in closed position using padlocks\)](#) accordingly.
- For unlocking refer to chapter [\(Unlocking the device in closed position\)](#).

9.5 Positioning the device in park position

- 1 Pull down the handle to open the fuse switch lid (1).
- 2 Press down the buttons on the fuse switch lid and remove it.
- 3 Push the handle up to engage the park position until it clicks into place (see figure, indicator **Parking** in the handle)
- 4 Rotate the fuse switch lid (front side facing inwards) and insert it into the fuse switch cage.
The device is in park position.

3-pole



1-pole

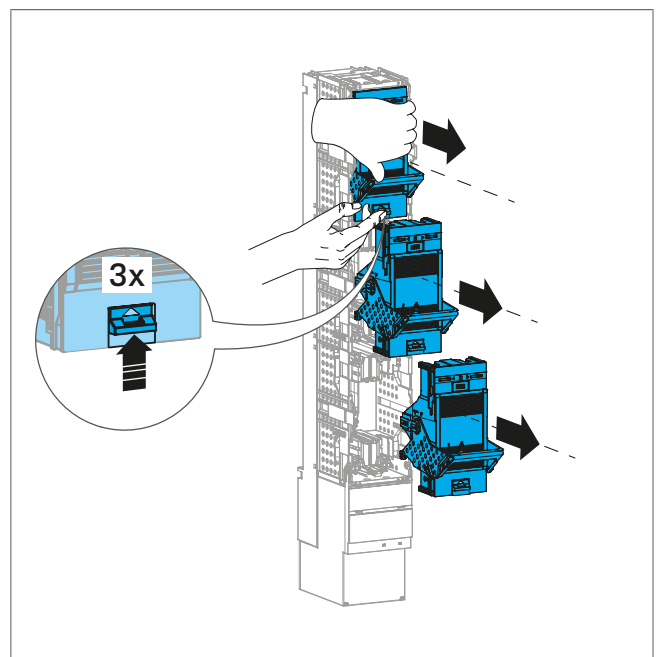
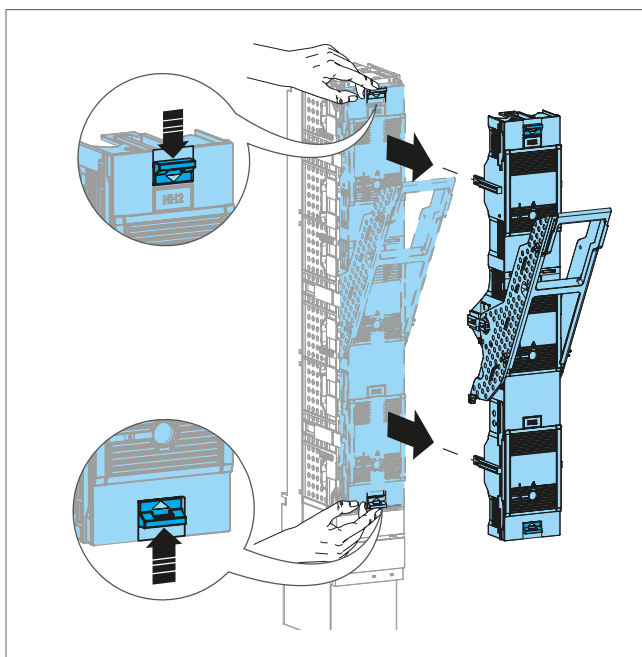
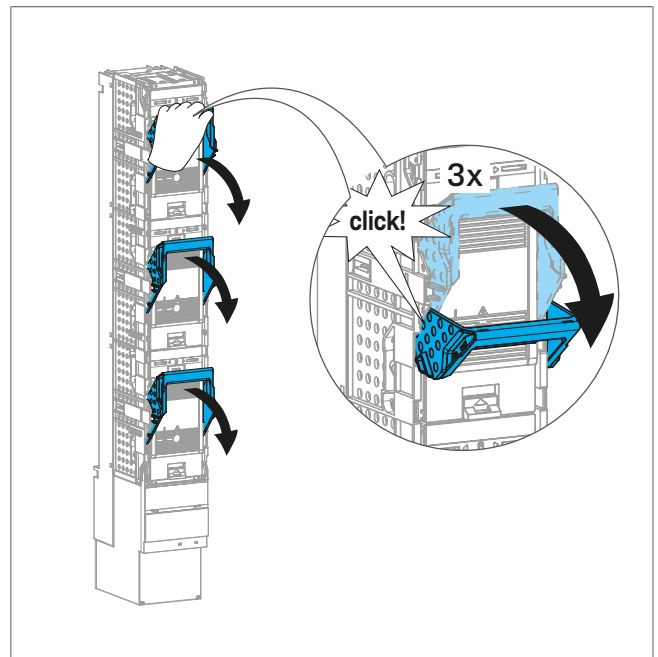


Figure: Positioning the device in park position

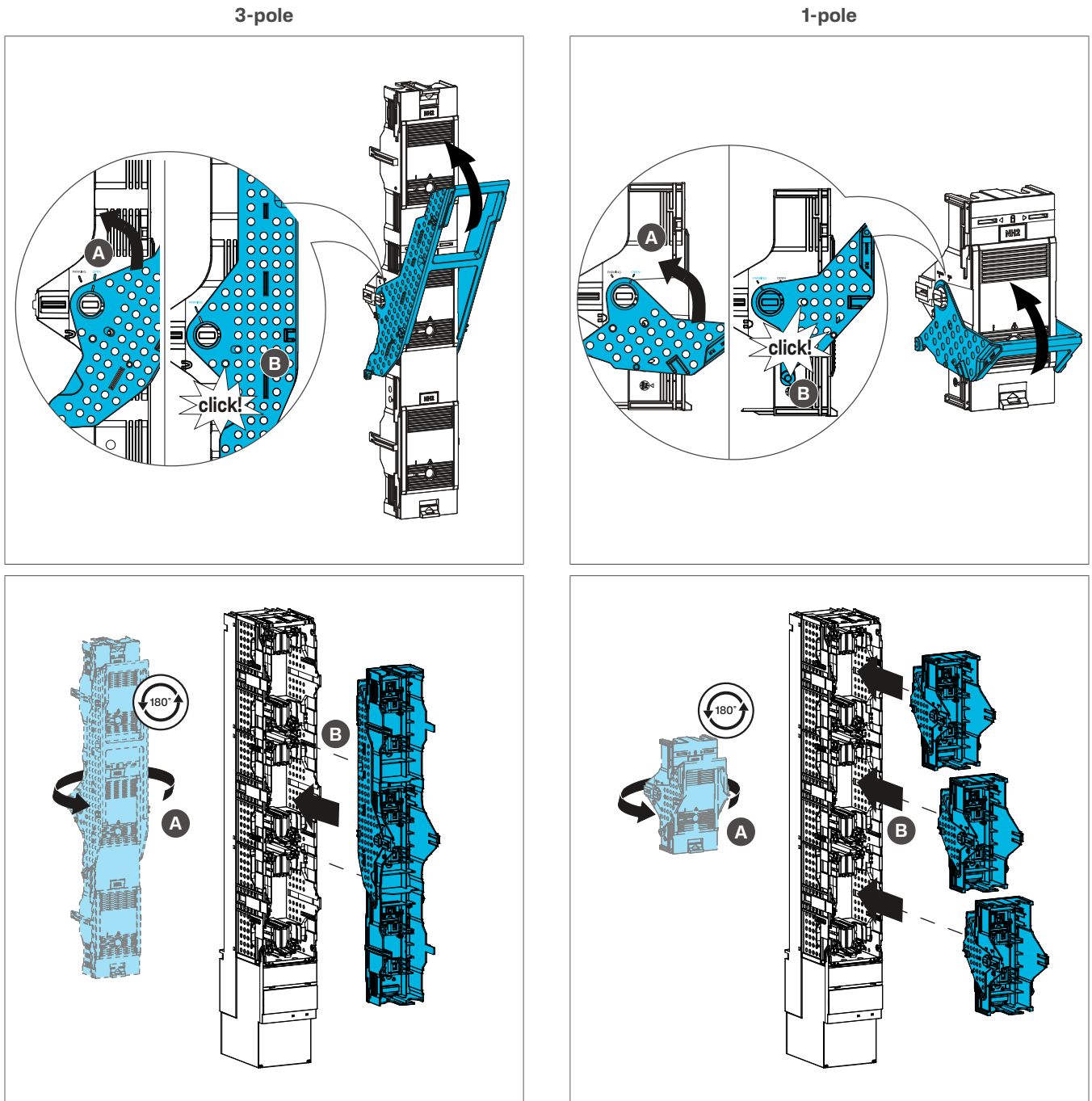


Figure: Positioning the device in park position

9.6 Securing the device in park position using padlocks

☑ The fuse switch lid (1) is in park position. Each fuse switch lid can be secured with one or two locking pieces.

Each fuse switch lid can be secured with one or two locking pieces.

- 1 Fully insert the locking pieces LV8ZLP into the dedicated slots of the fuse switch lids until they click into place.

The **Park** mark is visible.

- 2 Insert padlocks of maximum 8 mm shackle thickness (accessory) into each **Park** opening of the locking pieces.
- 3 Close the padlocks. The device is locked in
The device is locked in park position.

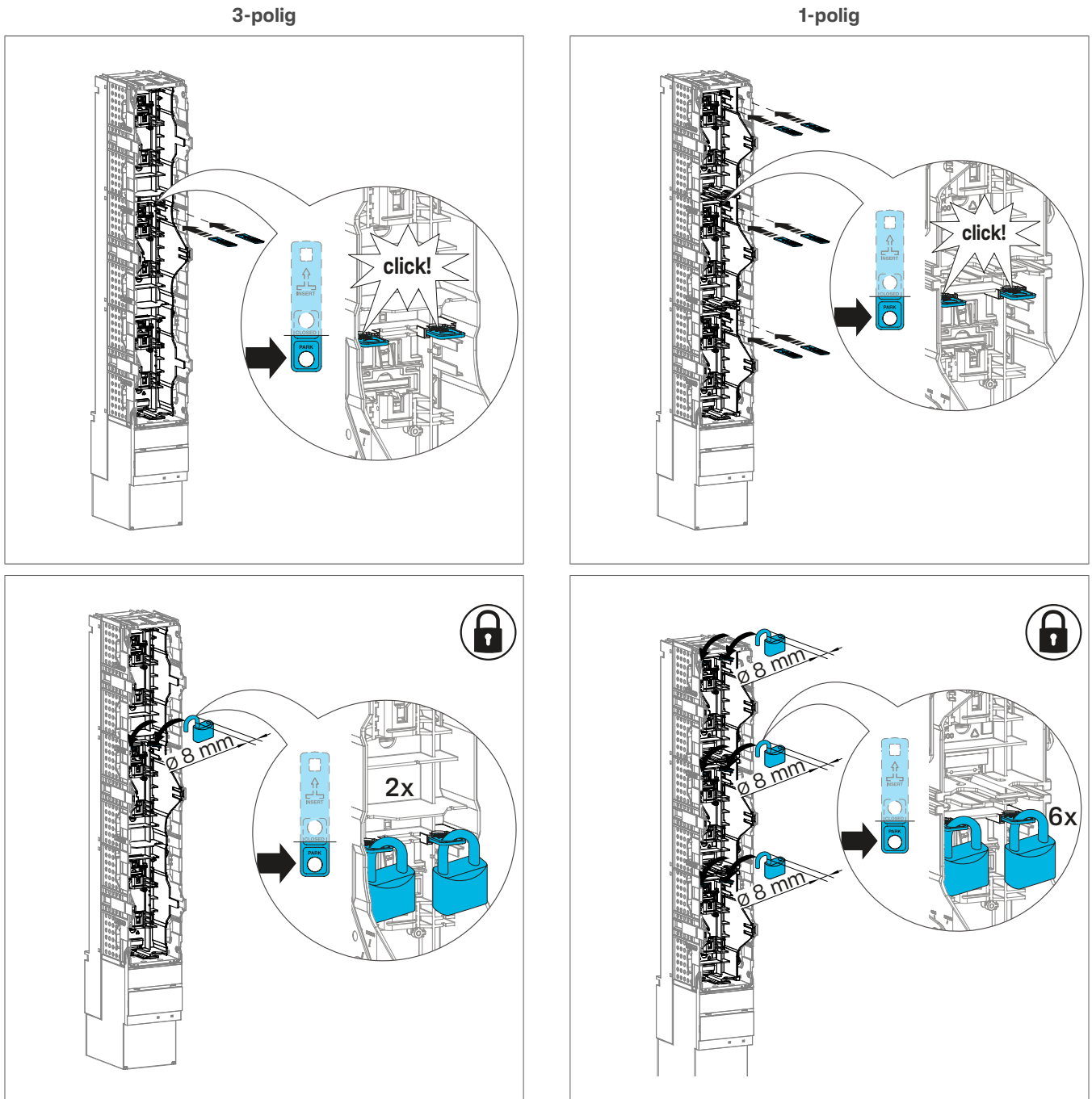


Bild: Gerät in der Park-Position mit Vorhängeschloss sichern

9.7 Unlocking the device in park position

- 1 Open and remove the padlocks.
- 2 Remove the fuse switch lid (1) from the fuse switch cage (2).
- 3 Pull the locking pieces LV8ZLP out.

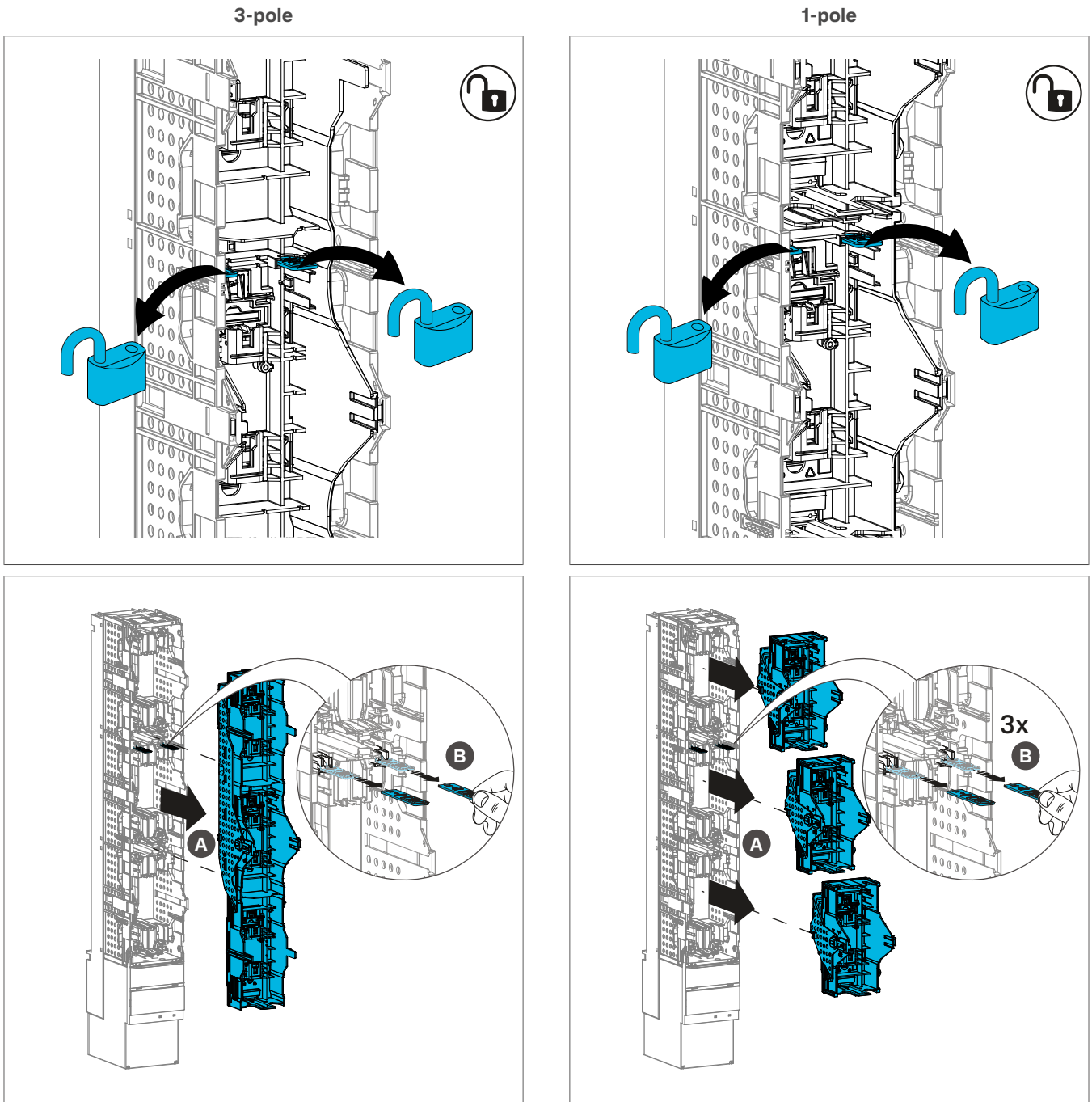


Figure: Unlocking the device in the park position

9.8 Locking piece storage

The locking pieces LV8ZLP can be kept in dedicated storage slots inside the fuse switch lid.

- Insert the locking pieces into the dedicated slots until they click into place.

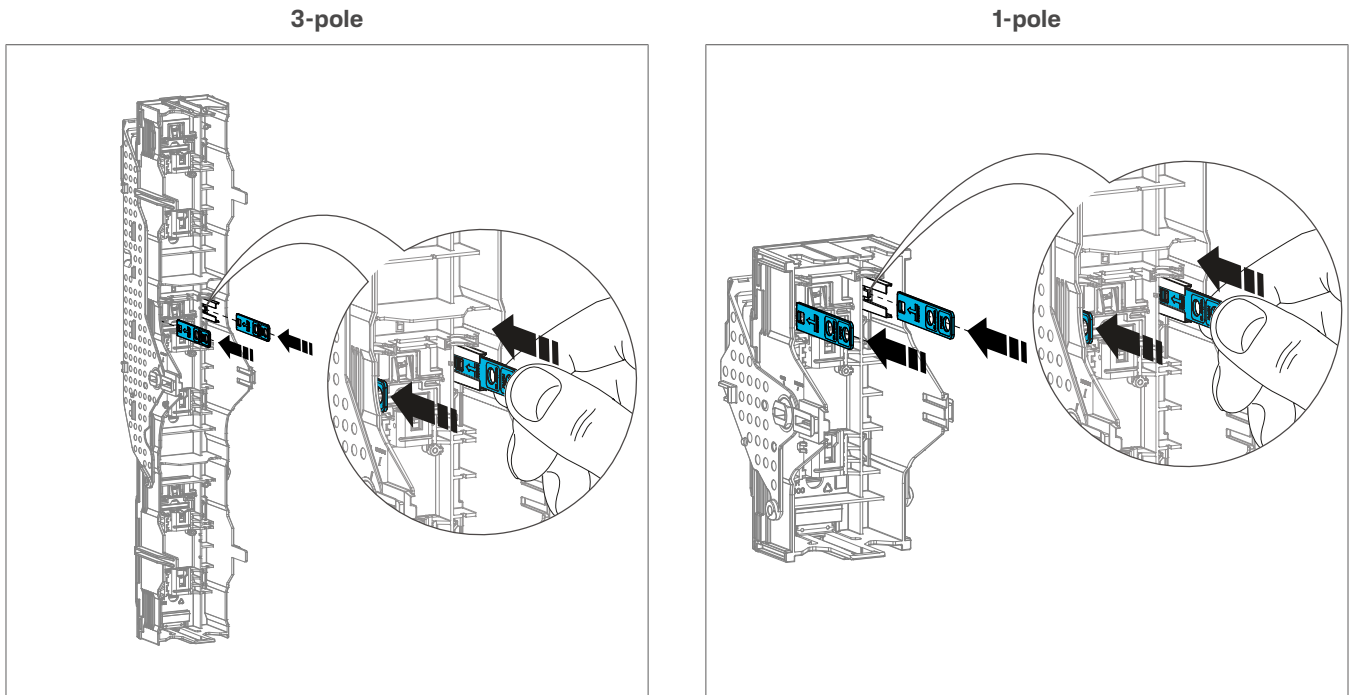


Figure: Locking piece storage

9.9 Positioning and locking a twin device in park position

Each fuse switch lid can be secured with one or two locking pieces.

- ① Pull down the handles simultaneously with both hands to open the fuse switch double lid.
- ② Press down the 4 buttons on the double lid and remove it from the fuse switch cage.
- ③ Push the handles up to engage the park position until they click into place (see figure, indicator **Parking** in the handles).

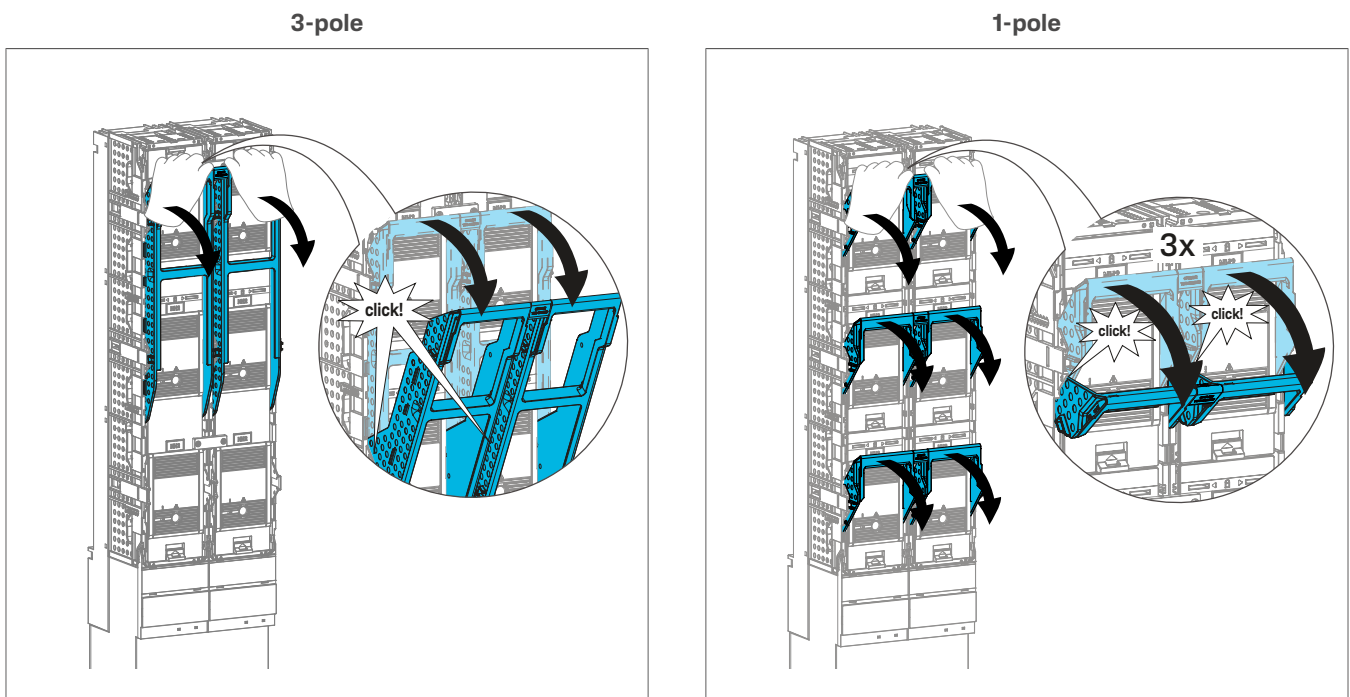


Figure: Positioning a twin device in park position

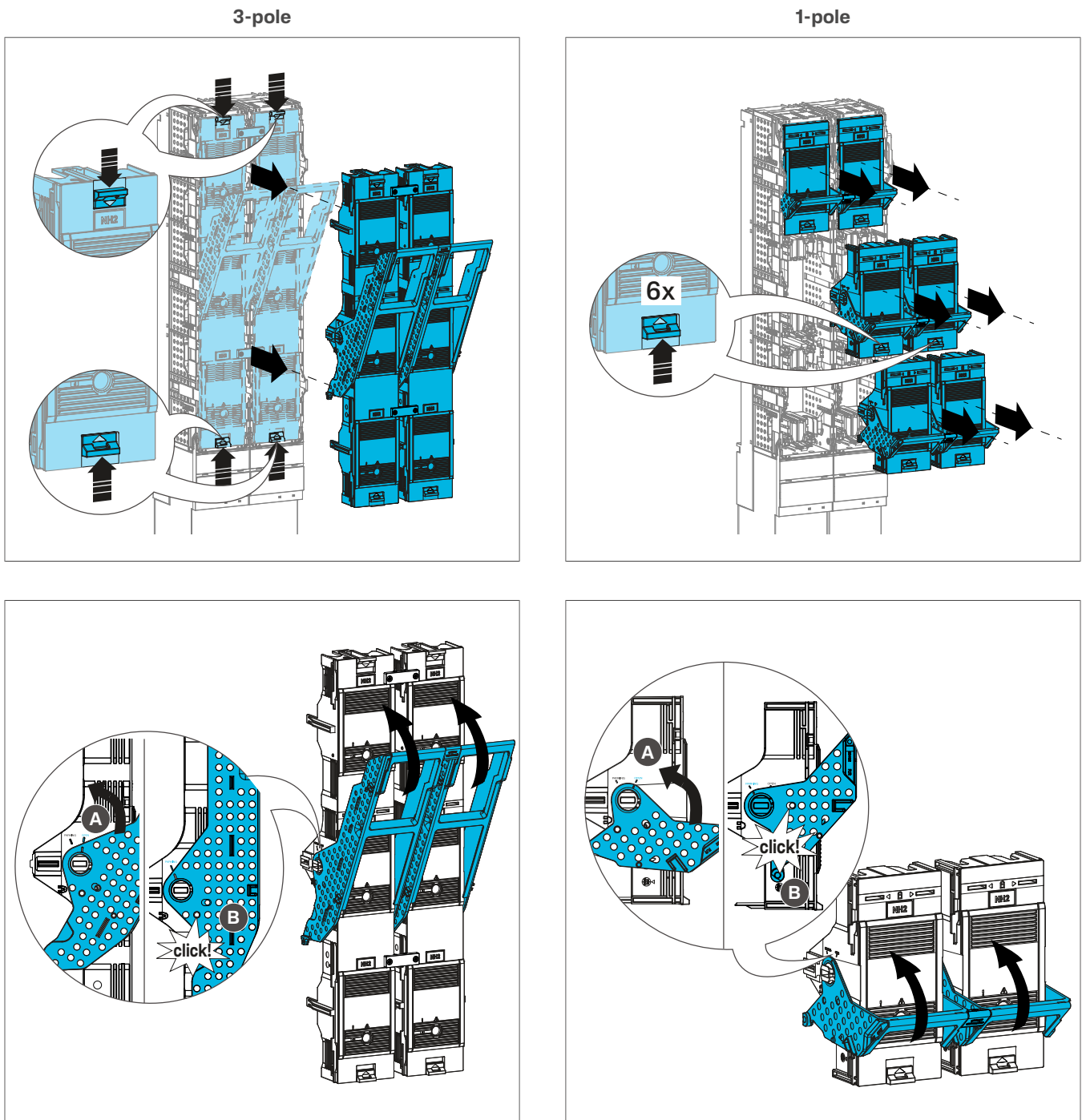
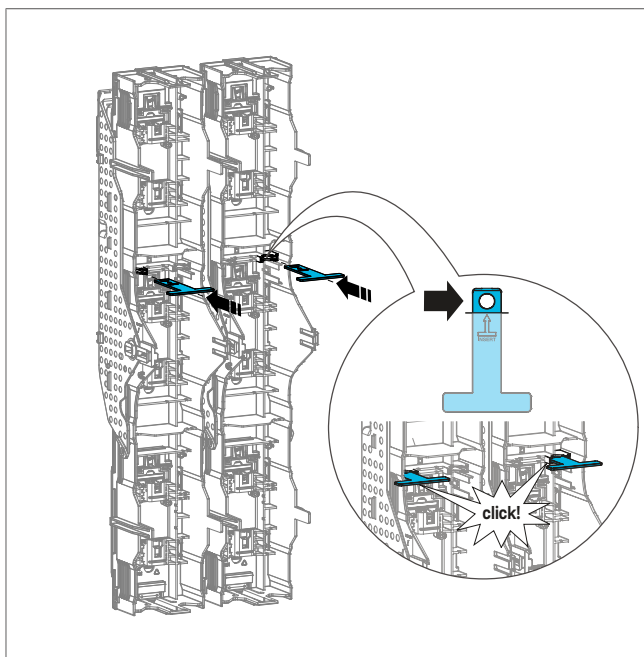


Figure: Positioning a twin device in park position

- 4 Insert the locking pieces LV8ZTP from the inside of the double switch lid into the dedicated slots.
- 5 Reattach the double lid to the fuse switch cage.
- 6 Insert padlocks of maximum 8 mm shackle thickness (accessory) in each of the locking pieces.
- 7 Lock the padlocks.

The device is in park position and locked.

3-pole



1-pole

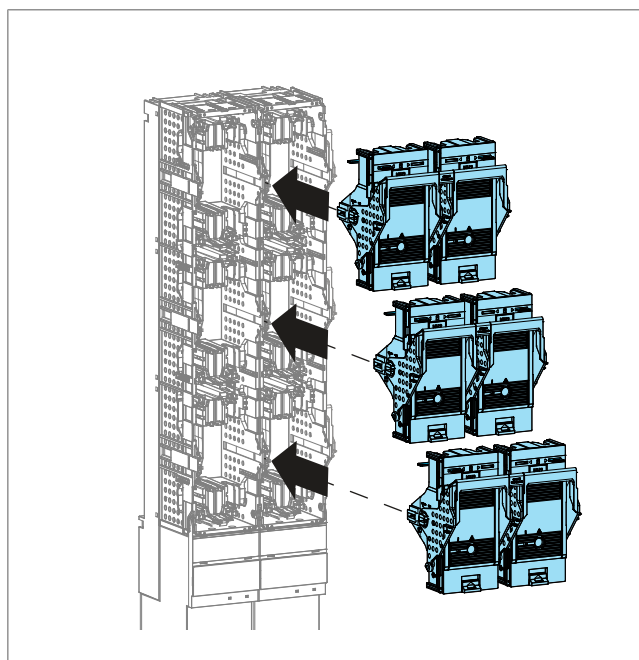
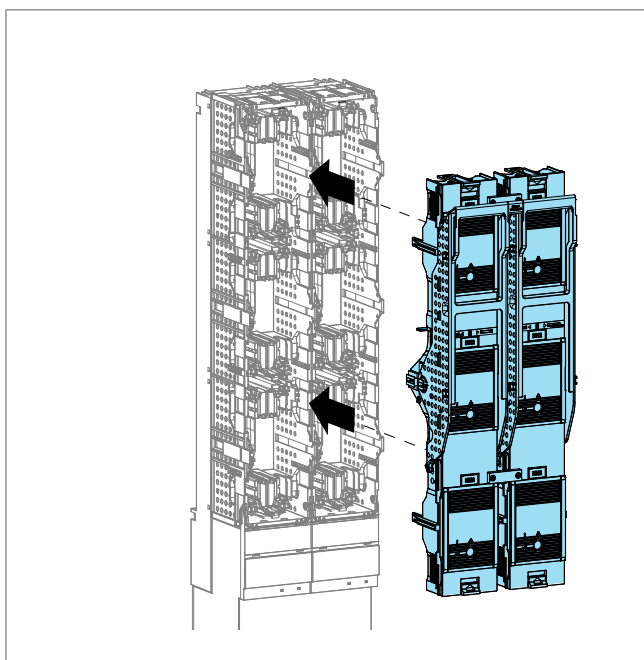
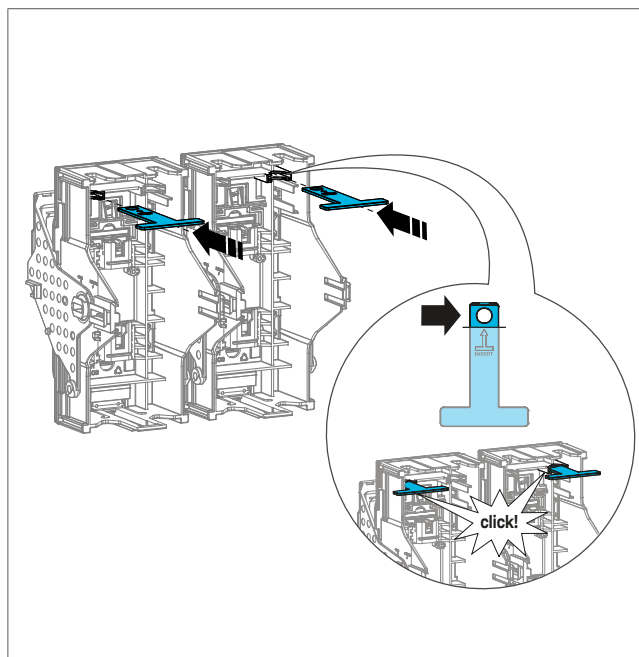


Figure: Locking a twin device in park position

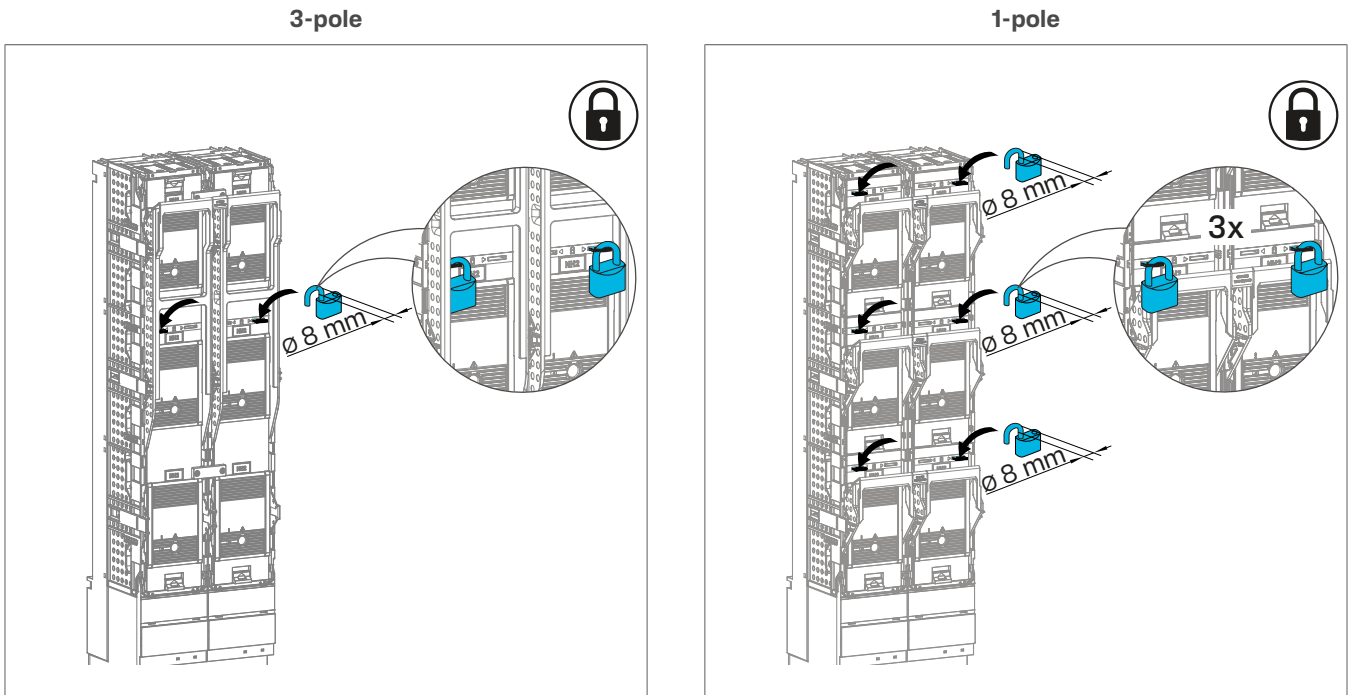


Figure: Locking a twin device in park position

9.10 Unlocking a twin device in park position

- 1 Open and remove the padlocks.
- 2 Press down the 4 buttons on the fuse switch double lid and remove it from the fuse switch cage.
- 3 Pull the locking pieces LV8ZTP out.

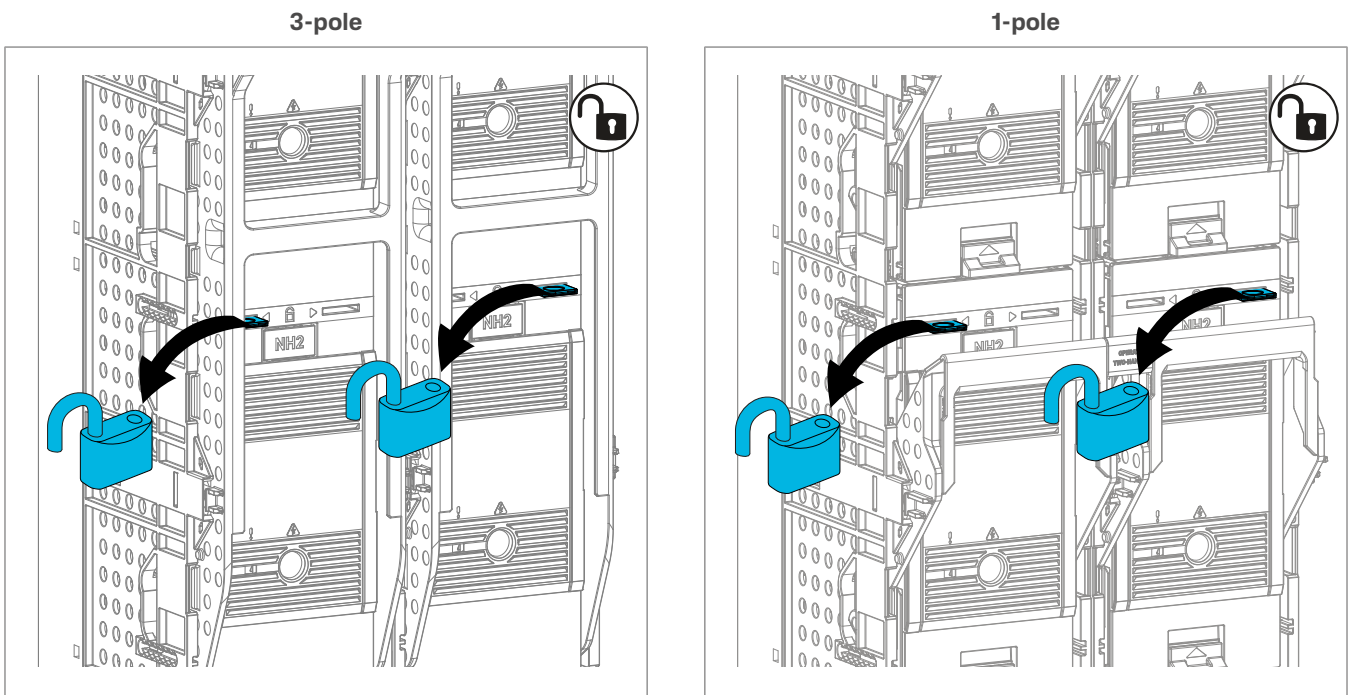


Figure: Unlocking a twin device in the park position

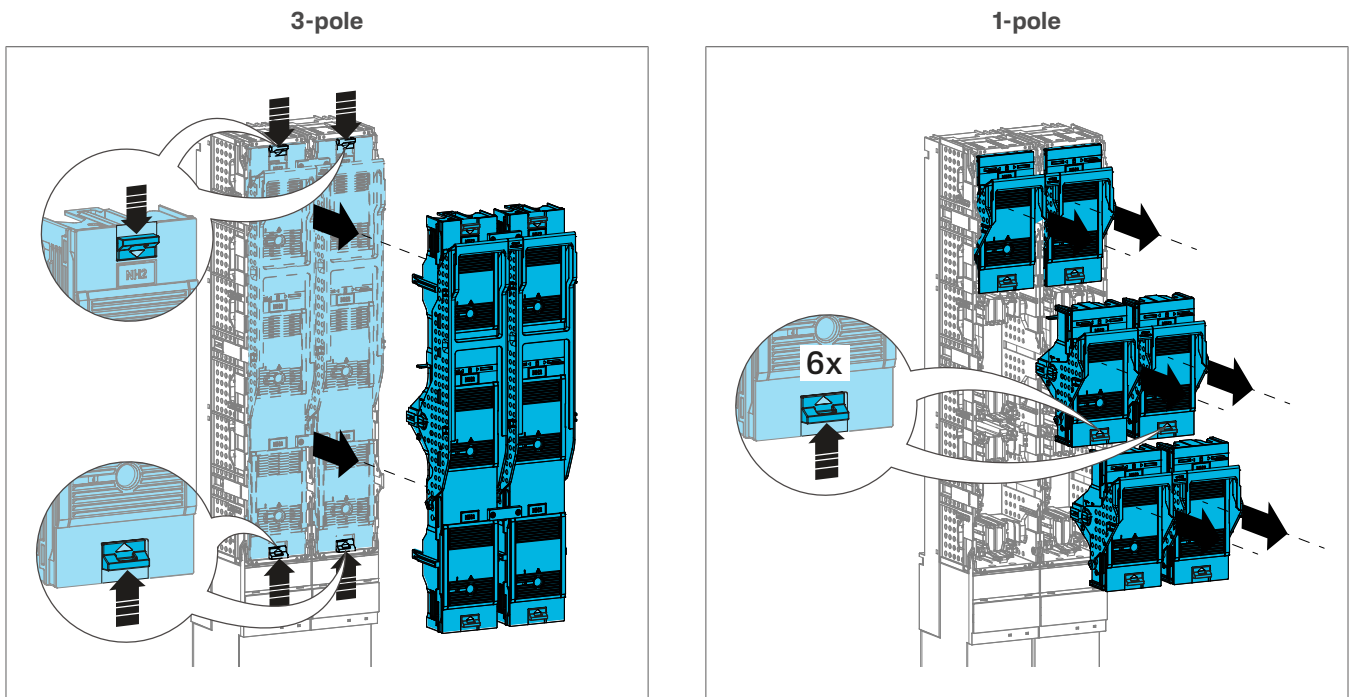


Figure: Unlocking a twin device in the park position

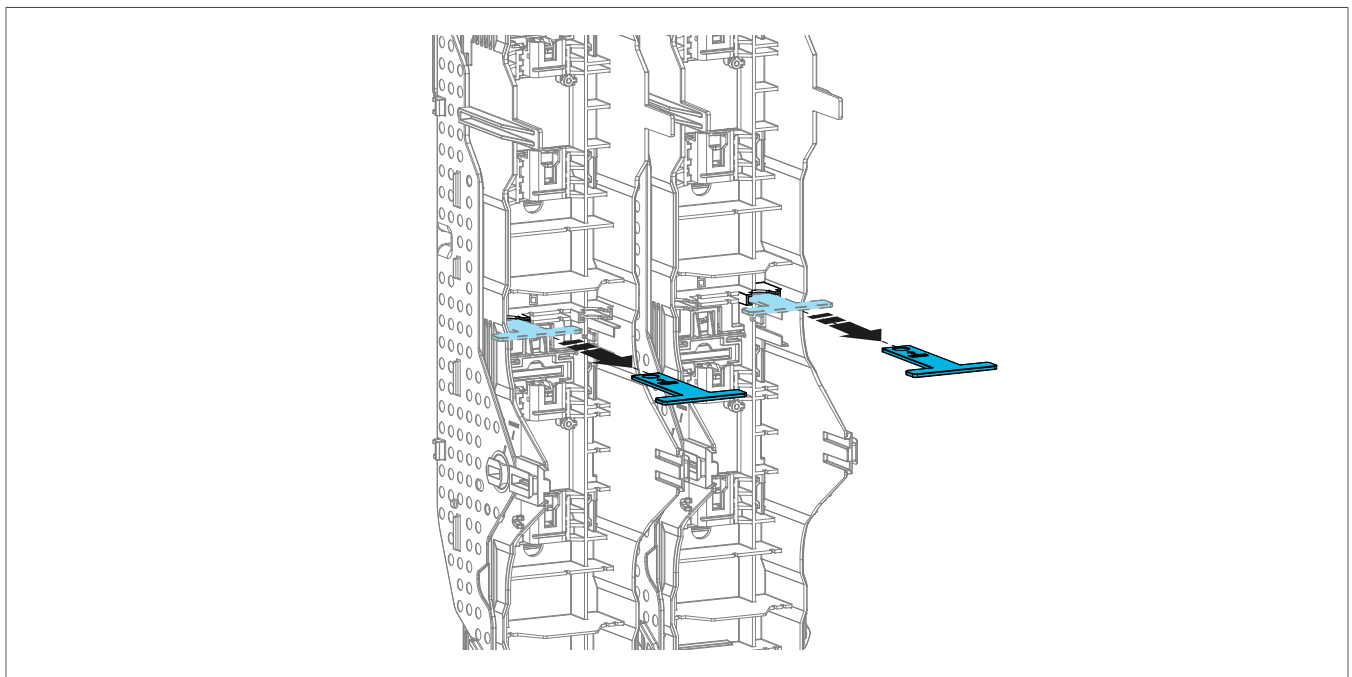


Figure: Pulling the locking pieces LV8ZTP out

10 Electronic fuse monitoring system

Operation Conditions

- ☑ Correct switching state of auxiliary contacts only after commissioning, under voltage and with inserted fuse links.



NO 13-14	Open	Closed
NC 21-22	Closed	Open



Only use fuse links with live gripping lugs and ensure continuity between both gripping lugs. Check specifications of the fuse link manufacturer.

Testing fuse monitoring (FM test)

- ☑ The device is in operational mode.
- Test correct functioning of the fuse monitoring by pressing the test button located on the front top of the module.

During the test phase all LEDs will blink in red and the NO/NC state are switched.

After some seconds the LEDs return to steady green and the NO/NC return to normal state.



Do not remove any fuse links for testing.
 Generator operation is not possible.
 Device can be used regardless of the direction of current flow.

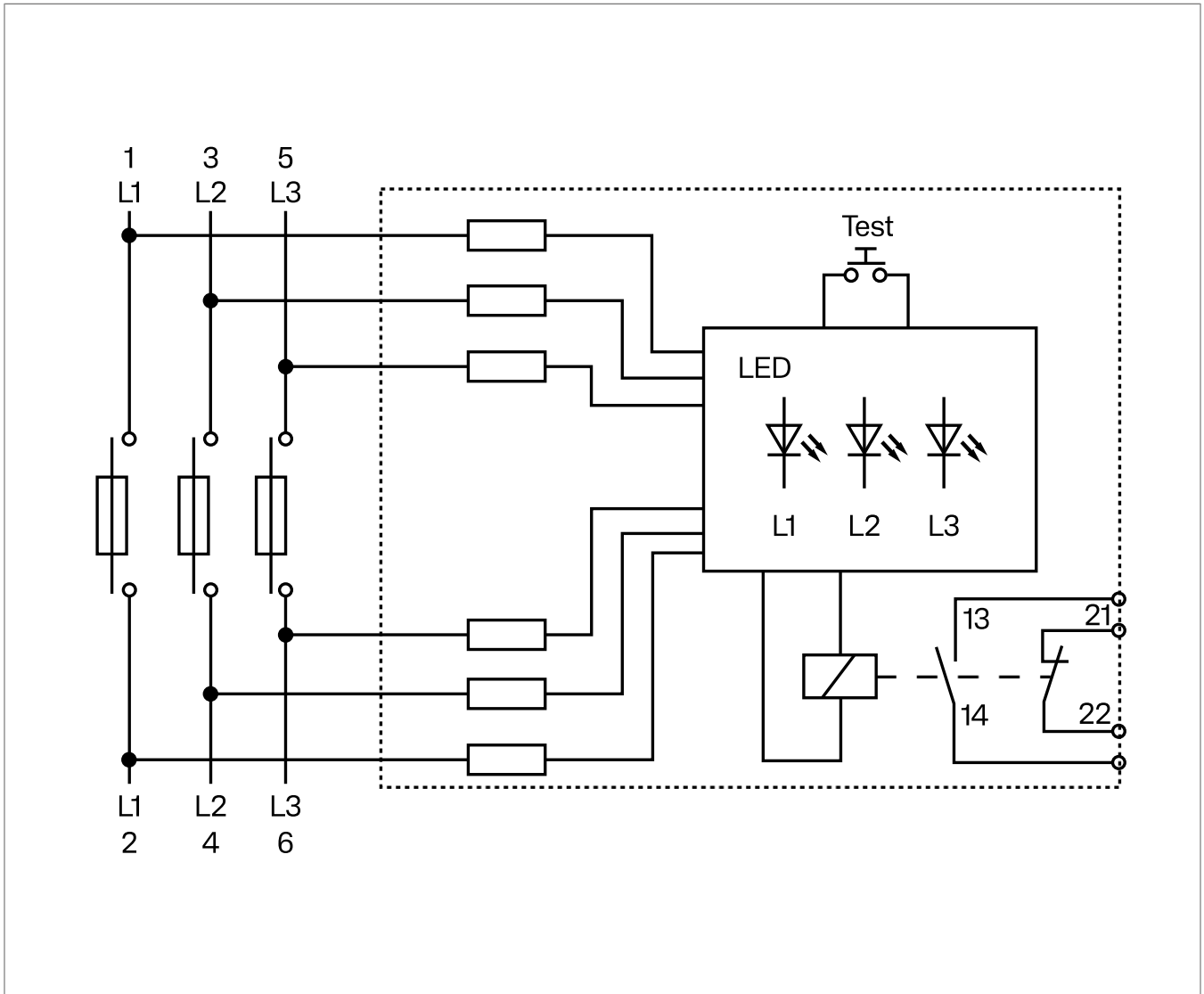




Figure: Terminal Diagram

Functional description

- Each phase (L1, L2, L3) has its own LED indicator, which indicates the status of the respective fuse link:

 LED steady green: The fuse link for the phase is intact (normal operation).

 LED blinking red: The fuse link for the phase has tripped.

- NO/NC output contacts switch if at least one fuse link has tripped.
- If one or more LEDs are off:
 - The power supply is interrupted on the relevant phase.
 - The device has failed or has a malfunction.
 - The fuse link status cannot be determined.



Dielectric tests (electrical insulation tests) with 2200 V AC and 500 V DC for housing according to IEC 61439-1 can be performed without disconnecting the fuse monitoring.

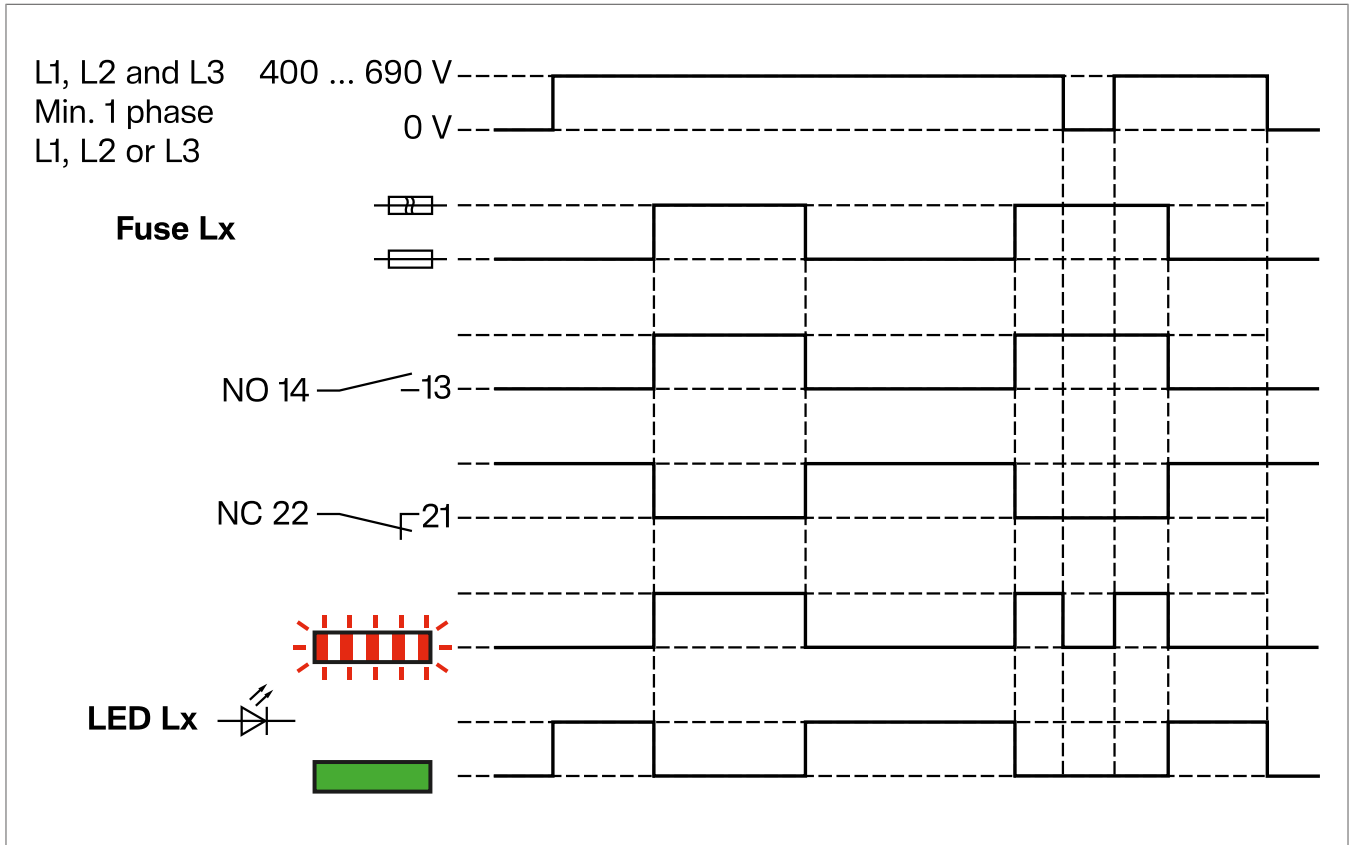


Figure: Functional diagram

Electronic fuse monitoring system

Designation	Value	
Rated operating voltage U_e of the main switching device	AC 400 ... 690 V	
Rated insulation voltage U_i	AC 1000 V	
Nominal voltage of the supply system	AC 277 V/480 V	AC 400 V/690 V
Overtoltage category of the supply system	IV	IV
Rated impulse withstand voltage U_{imp} of the main switching device and electronic fuse monitoring system	6 kV	8 kV
Rated conditional short circuit current (with protection by NH fuse links)	Restriction specified by switching device.	
Permissible ambient temperature	-25 to +85 °C	
Function	Differential voltage > 30 V, independent of the incoming side.	
Signal output / Level of protection of secondary system	Relay with NO contact and NC contact. Output with reinforced insulation according to IEC 60947-1 (SELV).	
Rated voltage/current signal output	AC 250 V max. 5 A	
Rated frequency	50/60 Hz Combination with frequency converter operation is not permitted.	

Table 2: Technical data electronic fuse monitoring

11 Appendix

11.1 Technical data

Fuse switch disconnectors fv+ (LV8*) size NH1 250 A

Without or with fuse monitoring (FM).

Description	NH1	NH1 + FM
Rated operating voltage U_e	690 V / 800 V ^[1] AC	690 V AC
Rated operating current I_e		
- 400 V	250 A	250 A
- 500 V	250 A	250 A
- 690 V	250 A	250 A
- 800 V	200 A	-
Frequency	50 Hz / 60 Hz	50 Hz / 60 Hz
Power dissipation of device without fuse-links	26 W	26 W
Power dissipation of device at full load	95 W	95 W
Max. power dissipation of fuse-links P_n	23 W	23 W
Operating temperature	-25 °C ... +55 °C	-25 °C ... +55 °C
Storage / transport temperature	-40 °C ... +70 °C	-40 °C ... +70 °C
Temperature Conventional free air thermal current I_{th} with fuse-links / with solid links	250 A / 320 A	250 A / 320 A
Utilization Category		
- 400 V	AC23-B / 250 A	AC23-B / 250 A
- 500 V	AC22-B / 250 A	AC22-B / 250 A
- 690 V	AC21-B / 250 A	AC21-B / 250 A
- 800 V	AC21-B / 200 A	-
Rated conditioned short-circuit current		
- 400 V	120 kA	120 kA
- 500 V	120 kA	120 kA
- 690 V	100 kA	100 kA
- 800 V	50 kA	-
Rated short-time withstand current I_{cw} 1 s without / with locking system	10 kA / 15 kA	10 kA / 15 kA
Rated insulation Voltage U_i	1000 V	1000 V
Rated impulse withstand voltage U_{imp}	12000 V	8000 V
Overload category	IV	IV
Degree Pollution according IEC 60664	3	3
IP Protection		
- Front with closed cover	IP3X	IP3X
- Front with opened cover	IP2X	IP2X
- Lateral Side	IP2X	IP2X
- Front without cover	IP1X	IP1X
Electric endurance in number of cycles	200	200
Number of mechanical operations	1400	1400

^[1] No restrictions to switch off the handle under load at 800 V AC. Use appropriate personal protective equipment.

Fuse switch disconnectors fv+ (LV8*) size NH2 400 A

Without or with fuse monitoring (FM).

Description	NH2	NH2 + FM
Rated operating voltage U_e	690 V / 800 V ^[1] AC	690 V AC
Rated operating current I_e		
- 400 V	400 A	400 A
- 500 V	400 A	400 A
- 690 V	400 A	400 A
- 800 V	250 A	-
Frequency	50 Hz / 60 Hz	50 Hz / 60 Hz
Power dissipation of device without fuse-links	54 W	54 W
Power dissipation of device at full load	156 W	156 W
Max. power dissipation of fuse-links P_n	34 W	34 W
Operating temperature	-25 °C ... +55 °C	-25 °C ... +55 °C
Storage / transport temperature	-40 °C ... +70 °C	-40 °C ... +70 °C
Temperature Conventional free air thermal current I_{th} with fuse-links / with solid links	400 A / 480 A	400 A / 480 A
Utilization Category		
- 400 V	AC23-B / 400 A	AC23-B / 400 A
- 500 V	AC22-B / 400 A	AC22-B / 400 A
- 690 V	AC21-B / 400 A	AC21-B / 400 A
- 800 V	AC21-B / 250 A	-
Rated conditioned short-circuit current		
- 400 V	120 kA	120 kA
- 500 V	120 kA	120 kA
- 690 V	100 kA	100 kA
- 800 V	50 kA	-
Rated short-time withstand current I_{cw} 1 s without / with locking system	10 kA / 15 kA	10 kA / 15 kA
Rated insulation Voltage U_i	1000 V	1000 V
Rated impulse withstand voltage U_{imp}	12000 V	8000 V
Overload category	IV	IV
Degree Pollution according IEC 60664	3	3
IP Protection		
- Front with closed cover	IP3X	IP3X
- Front with opened cover	IP2X	IP2X
- Lateral Side	IP2X	IP2X
- Front without cover	IP1X	IP1X
Electric endurance in number of cycles	200	200
Number of mechanical operations	800	800

^[1] No restrictions to switch off the handle under load at 800 V AC. Use appropriate personal protective equipment.

Fuse switch disconnectors fv+ (LV8*) size NH3 630 A

Without or with fuse monitoring (FM).

Description	NH3	NH3 + FM
Rated operating voltage U_e	690 V / 800 V ^[1] AC	690 V AC
Rated operating current I_e		
- 400 V	630 A	630 A
- 500 V	630 A	630 A
- 690 V	630 A	630 A
- 800 V	400 A	-
Frequency	50 Hz / 60 Hz	50 Hz / 60 Hz
Power dissipation of device without fuse-links	111 W	111 W
Power dissipation of device at full load	255 W	255 W
Max. power dissipation of fuse-links P_n	48 W	48 W
Operating temperature	-25 °C ... +55 °C	-25 °C ... +55 °C
Storage / transport temperature	-40 °C ... +70 °C	-40 °C ... +70 °C
Temperature Conventional free air thermal current I_{th} with fuse-links / with solid links	630 A / 680 A	630 A / 680 A
Utilization Category		
- 400 V	AC23-B / 630 A	AC23-B / 630 A
- 500 V	AC22-B / 630 A	AC22-B / 630 A
- 690 V	AC21-B / 630 A	AC21-B / 630 A
- 800 V	AC21-B / 400 A	-
Rated conditioned short-circuit current		
- 400 V	120 kA	120 kA
- 500 V	120 kA	120 kA
- 690 V	100 kA	100 kA
- 800 V	50 kA	-
Rated short-time withstand current I_{cw} 1 s without / with locking system	15 kA / 25 kA	15 kA / 25 kA
Rated insulation Voltage U_i	1000 V	1000 V
Rated impulse withstand voltage U_{imp}	12000 V	8000 V
Overload category	IV	IV
Degree Pollution according IEC 60664	3	3
IP Protection		
- Front with closed cover	IP3X	IP3X
- Front with opened cover	IP2X	IP2X
- Lateral Side	IP2X	IP2X
- Front without cover	IP1X	IP1X
Electric endurance in number of cycles	200	200
Number of mechanical operations	800	800

^[1] No restrictions to switch off the handle under load at 800 V AC. Use appropriate personal protective equipment.

Fuse switch disconnectors fv+ (LV8*) Twin NH2 (2 x 400 A) 800 A and Twin NH3 (2 x 630 A) 1260 A

Description	Twin NH2 800 A	Twin NH3 1260 A
Rated operating voltage U_e	690 V AC	690 V AC
Rated operating current I_e		
- 400 V	800 A	1260 A
- 500 V	800 A	1260 A
- 690 V	800 A	1260 A
- 800 V	-	-
Frequency	50 Hz / 60 Hz	50 Hz / 60 Hz
Power dissipation of device without fuse-links	112 W	222 W
Power dissipation of device at full load	214 W	366 W
Max. power dissipation of fuse-links P_n	34 W	48 W
Operating temperature	-25 °C ... +55 °C	-25 °C ... +55 °C
Storage / transport temperature	-40 °C ... +70 °C	-40 °C ... +70 °C
Temperature Conventional free air thermal current I_{th} with fuse-links / with solid links	800 A / 960 A	1260 A / -
Utilization Category		
- 400 V	AC22-B / 800 A	AC22-B / 1260 A
- 500 V	AC22-B / 800 A	AC22-B / 1260 A
- 690 V	AC21-B / 800 A	AC21-B / 1260 A
- 800 V	-	-
Rated conditioned short-circuit current		
- 400 V	80 kA	80 kA
- 500 V	80 kA	80 kA
- 690 V	50 kA	50 kA
- 800 V	-	-
Rated short-time withstand current I_{cw} 1 s without / with locking system	20 kA / -	22 kA / -
Rated insulation Voltage U_i	1000 V	1000 V
Rated impulse withstand voltage U_{imp}	12000 V	12000 V
Overload category	IV	IV
Degree Pollution according IEC 60664	3	3
IP Protection		
- Front with closed cover	IP3X	IP3X
- Front with opened cover	IP2X	IP2X
- Lateral Side	IP2X	IP2X
- Front without cover	IP1X	IP1X
Electric endurance in number of cycles	100	100
Number of mechanical operations	500	500

Fuse switch disconnectors fv+ (LV8*) size NH3 910 A and Twin NH3 (2 x 910 A) 1820 A

Description	NH3 910 A	Twin NH3 1820 A
Rated operating voltage U_e	400 V AC	400 V AC
Rated operating current I_e		
- 400 V	910 A	1820 A
- 500 V	-	-
- 690 V	-	-
- 800 V	-	-
Frequency	50 Hz / 60 Hz	50 Hz / 60 Hz
Power dissipation of device without fuse-links	148 W	328 W
Power dissipation of device at full load	358 W	538 W
Max. power dissipation of fuse-links P_n	70 W	70 W
Operating temperature	-25 °C ... +55 °C	-25 °C ... +55 °C
Storage / transport temperature	-40 °C ... +70 °C	-40 °C ... +70 °C
Temperature Conventional free air thermal current I_{th} with fuse-links / with solid links	910 A / 1250 A	1820 A / 2400 A
Utilization Category		
- 400 V	AC23-B / 910 A	AC23-B / 1820 A
- 500 V	-	-
- 690 V	-	-
- 800 V	-	-
Rated conditioned short-circuit current		
- 400 V	50 kA	50 kA
- 500 V	-	-
- 690 V	-	-
- 800 V	-	-
Rated short-time withstand current I_{cw} 1 s without / with locking system	15 kA / 25 kA	25 kA / 40 kA
Rated insulation Voltage U_i	1000 V	1000 V
Rated impulse withstand voltage U_{imp}	12000 V	12000 V
Overload category	IV	IV
Degree Pollution according IEC 60664	3	3
IP Protection		
- Front with closed cover	IP3X	IP3X
- Front with opened cover	IP2X	IP2X
- Lateral Side	IP2X	IP2X
- Front without cover	IP1X	IP1X
Electric endurance in number of cycles	100	100
Number of mechanical operations	500	500

Switch disconnectors fv+ (LV8*) size NH3 1000 A and Twin NH3 (2 x 1000 A) 2000 A

Description	NH3 1000 A	Twin NH3 2000 A
Rated operating voltage U_e	690 V AC	690 V AC
Rated operating current I_e		
- 400 V	1000 A	2000 A
- 500 V	1000 A	2000 A
- 690 V	1000 A	2000 A
- 800 V	-	-
Frequency	50 Hz / 60 Hz	50 Hz / 60 Hz
Power dissipation of device without fuse-links	262 W	582 W
Power dissipation of device at full load	262 W	582 W
Max. power dissipation of fuse-links P_n	-	-
Operating temperature	-25 °C ... +55 °C	-25 °C ... +55 °C
Storage / transport temperature	-40 °C ... +70 °C	-40 °C ... +70 °C
Temperature Conventional free air thermal current I_{th} with solid links	1000 A	2000 A
Utilization Category		
- 400 V	AC22-B / 1000 A	AC22-B / 2000 A
- 500 V	AC21-B / 1000 A	AC22-B / 2000 A
- 690 V	AC21-B / 1000 A	AC21-B / 2000 A
- 800 V	-	-
Rated conditioned short-circuit current		
- 400 V	-	-
- 500 V	-	-
- 690 V	-	-
- 800 V	-	-
Rated short-time withstand current I_{cw} 1 s without / with locking system	15 kA / 25 kA	22 kA / 40 kA
Rated insulation Voltage U_i	1000 V	1000 V
Rated impulse withstand voltage U_{imp}	12000 V	12000 V
Overload category	IV	IV
Degree Pollution according IEC 60664	3	3
IP Protection		
- Front with closed cover	IP3X	IP3X
- Front with opened cover	IP2X	IP2X
- Lateral Side	IP2X	IP2X
- Front without cover	IP1X	IP1X
Electric endurance in number of cycles	100	100
Number of mechanical operations	500	500

11.2 Disposal note

Disposal note



Correct disposal of this product (electrical waste).

(Applicable in the European Union and other European countries with separate collection systems)

This marking shown on the product or its documentation indicates that it should not be disposed of with other household waste at the end of its working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate this device from other types of waste. Recycle the device responsibly to promote the sustainable reuse of material resources.

Household users should contact either the dealer where they purchased this product, or their local government office, for details of where and how they can take this device for environmentally safe disposal.

Commercial users should contact their supplier and check the terms and conditions of the purchase contract. This product should not be mixed with other commercial waste for disposal.



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