





# SIEMENS

## SENTRON

### Circuit-breakers 3WT8

#### Operating Instructions

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## Legal information

### Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 <b>DANGER</b>
indicates that death or severe personal injury <b>will</b> result if proper precautions are not taken.
 <b>WARNING</b>
indicates that death or severe personal injury <b>may</b> result if proper precautions are not taken.
 <b>CAUTION</b>
indicates that minor personal injury can result if proper precautions are not taken.
<b>NOTICE</b>
indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

### Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

### Proper use of Siemens products

Note the following:

 <b>WARNING</b>
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

### Trademarks

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### Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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# Safety notes

DE		<b>GEFAHR</b>	<b>Gefährliche Spannung. Lebensgefahr oder schwere Verletzungsgefahr.</b> Vor Beginn der Arbeiten Anlage und Gerät spannungsfrei schalten. Die Installations- und Wartungsarbeiten an diesem Gerät dürfen nur von einer autorisierten Elektrofachkraft ausgeführt werden.
EN		<b>DANGER</b>	<b>Hazardous voltage. Will cause death or serious injury.</b> Turn off and lock out all power supplying this device before working on this device. Installation and maintenance work on this device may only be carried out by an authorized electrician.
FR		<b>DANGER</b>	<b>Tension électrique. Danger de mort ou risque de blessures graves.</b> Mettre hors tension avant d'intervenir sur l'appareil. Les travaux d'installation et d'entretien de cet appareil doivent uniquement être réalisés par une personne qualifiée en électricité.
ES		<b>PELIGRO</b>	<b>Tensión peligrosa. Puede causar la muerte o lesiones graves.</b> Desconectar la alimentación eléctrica antes de trabajar en el equipo. Las tareas de instalación y mantenimiento de este equipo solo puede llevarlas a cabo por un electricista autorizado.
IT		<b>PERICOLO</b>	<b>Tensione pericolosa. Può provocare morte o lesioni gravi.</b> Scollegare l'alimentazione prima di eseguire interventi sull'apparecchiatura. L'installazione e la manutenzione di questo apparecchio devono essere effettuati solo da un elettrotecnico autorizzato.
PT		<b>PERIGO</b>	<b>Tensão perigosa. Perigo de morte ou ferimentos graves.</b> Desligue a alimentação elétrica e proteja contra o religamento, antes de iniciar o trabalho no equipamento. Os trabalhos de instalação e manutenção neste equipamento somente podem ser realizados por eletricitistas autorizados.
TR		<b>TEHLİKE</b>	<b>Tehlikeli gerilim. Ölüm tehlikesi veya ağır yaralanma tehlikesi.</b> Çalışmalara başlamadan önce, sistemin ve cihazın gerilim beslemesini kapatınız. Bu cihazın montajı ve bakımı yalnız yetkili bir elektrik teknisyeni tarafından yapılmalıdır.
PY		<b>ОПАСНО</b>	<b>Опасное напряжение. Опасность для жизни или возможность тяжелых травм.</b> Перед началом работ отключить подачу питания к установке и к устройству. Работы по монтажу и техническому обслуживанию данного устройства должны производиться уполномоченным специалистом по электротехнике.
PL		<b>ZAGROŻENIE</b>	<b>Niebezpieczne napięcie. Niebezpieczeństwo poważnych obrażeń lub utraty życia.</b> Przed rozpoczęciem prac wyłączyć zasilanie instalacji i urządzenia energią elektryczną. Prace instalacyjne i konserwacyjne na tym urządzeniu może przeprowadzać wyłącznie posiadający odpowiednie kwalifikacje elektryk.
中文		<b>危险</b>	<b>危险电压。可能导致生命危险或重伤危险。</b> 操作设备时必须确保切断电源。该设备的安装和维护工作仅能由具备专业资格的电工完成。
DA		<b>FARE</b>	<b>Farlig spænding. Livsfare eller risiko for slemme kvæstelser.</b> Inden arbejdet påbegyndes skal anlægget og enheden gøres spændingsfri. Installationer og vedligeholdelser på dette apparat må kun gennemføres af en autoriseret elektriker.
FI		<b>VAARA</b>	<b>Vaarallinen jännite. Vakava loukkaantumisvaara tai hengenvaara.</b> Laite ja laitteisto on kytkettävä jännitteettömiksi ennen töiden aloittamista. Tämän laitteen asennus- ja huoltotöitä saa suorittaa ainoastaan valtuutettu sähköteknikko.
ET		<b>OHT</b>	<b>Ohtlik pinge. Oht elule või raskete vigastuste oht.</b> Enne tööde algust tuleb süsteemi ja seadme pinge välja lülitada. Seadme paigaldus- ja hooldustöid võib teha ainult atesteeritud elektrik.
BG		<b>ОПАСНОСТ</b>	<b>Опасно напрежение. Опасност за живота или опасност от тежки телесни повреди.</b> Преди започване на работа изключете захранването на инсталацията или устройството. Монтажът и техническото обслужване на това устройство се извършват единствено от оторизиран електротехник.

HR		<b>OPASNOST</b>	<b>Opasni napon. Opasnost po život ili opasnost od teških ozljeda.</b> Prije početka radova postrojenje i uređaj spojiti bez napona. Radove instalacije i održavanja na uređaju smije izvoditi samo ovlašteno stručno elektrotehničko osoblje.
EL		<b>KINΔYNOΣ</b>	<b>Επικίνδυνη τάση. Κίνδυνος για τη ζωή ή σοβαρού τραυματισμού.</b> Πριν από την έναρξη των εργασιών απομονώνετε την εγκατάσταση και τη συσκευή από την παροχή τάσης. Οι εργασίες εγκατάστασης και συντήρησης αυτής της συσκευής πρέπει να πραγματοποιούνται μόνο από εξουσιοδοτημένο ηλεκτρολόγο.
GA		<b>CONTÚIRT</b>	<b>Voltas contúirteach. Baol go bhfaighfear bás nó tromghortú.</b> Múch agus dícheangail gach foinsé cumhachta a sholáthraíonn an gaireas seo sula ndéanfar obair air. Is ag leictreoir údaraithe amháin atá cead an gléas a shuiteáil agus obair chothabhála a dhéanamh air.
LV		<b>BĪSTAMI</b>	<b>Bīstams spriegums. Letālu seku vai smagu traumu riski.</b> Pirms uzsākt darbu, atslēdziet iekārtu un ierīci no barošanas. Šīs ierīces uzstādīšanu un tehniskās apkopes darbus drīkst veikt vienīgi pilnvarots elektriķis.
LT		<b>PAVOJUS</b>	<b>Pavojinga įtampa. Pavojus gyvybei arba sunkaus susižalojimo pavojus.</b> Prieš darbų pradžią atjunkite sistemos ir prietaiso įtampą. Šio įrenginio įrengimo ir techninės priežiūros darbus leidžiama atlikti tik įgaliotam elektrikui.
MT		<b>PERIKLU</b>	<b>Vultaġġ perikoluż. Riskju ta' mewt jew korriment serju.</b> Itfi u sakkar il-provista kollha tad-dawl li tkun qed tforni d-dawl lil dan it-tagħmir qabel ma taħdem fuq dan it-tagħmir. Ix-xogħlijiet ta' installazzjoni u manutenzjoni fuq dan it-tagħmir jistgħu jitwettqu biss minn elettricista awtorizzat.
NL		<b>GEVAAR</b>	<b>Gevaarlijke spanning. Levensgevaar of gevaar voor ernstig letsel.</b> Schakel vóór aanvang van de werkzaamheden installatie en apparaat spanningsvrij. De installatie en onderhoudswerken aan dit toestel mogen enkel door een geautoriseerde electricien uitgevoerd worden.
RO		<b>PERICOL</b>	<b>Tensiune periculoasă. Pericol de moarte sau de accidentări grave.</b> Înainte de începerea lucrărilor, deconectați instalația și aparatul de la tensiune. Lucrările de instalare și întreținere pentru acest dispozitiv pot fi efectuate doar de către un electrician autorizat.
SV		<b>FARA</b>	<b>Farlig spänning. Livsfara eller risk för allvarliga personskador.</b> Koppla anläggningen och apparaten spänningsfri innan du påbörjar arbetena. Installation och underhåll av denna apparat får endast utföras av en behörig elektriker.
SK		<b>NEBEZ PEČENSTVO</b>	<b>Nebezpečné napätie. Nebezpečnosť ohrozenia života alebo vzniku ťažkých zranení.</b> Pred začatím prác zariadenie a prístroj odpojte od napätia. Inštalačné a údržbárske práce na tomto prístroji môže vykonávať výlučne autorizovaný elektrikár.
SL		<b>NEVARN OST</b>	<b>Nevarna napetost. Nevarnost za življenje ali nevarnost hudih poškodb.</b> Pred začetkom dela je treba pri napravi in aparatu odklopiti napajanje. Inštalacijska in vzdrževalna dela na tej napravi sme izvesti samo pooblaščen električar.
CS		<b>NEBEZPEČÍ</b>	<b>Nebezpečné napětí. Nebezpečí smrtelného nebo těžkého úrazu.</b> Před zahájením prací odpojte zařízení a modul od napětí. Instalační a údržbářské práce smí na tomto přístroji provádět pouze kvalifikovaný elektrikář.
HU		<b>VESZÉLY</b>	<b>Veszélyes feszültség. Életveszély vagy súlyos sérülésveszély.</b> A munkák megkezdése előtt végezze el a berendezés vagy készülék feszültségmentesítését. Ezen az eszközön a telepítéssel és a karbantartással kapcsolatos feladatokat kizárólag megfelelő felhatalmazással rendelkező villamossági szakember végezheti.

# General

## 2.1 General

### General information

The circuit-breakers are designed to be operated in enclosed rooms in which the operating conditions are not affected by dust or corrosive vapors/gases. Suitable enclosures must be used in dusty or damp conditions

#### DANGER

##### **Hazardous voltage**

During operation, certain circuit-breaker and guide frame components are subject to hazardous voltages or spring force.

Note the operating instructions and warnings.

If these are not observed, this can result in death, severe injury, or substantial material damage.

### Technical specifications

For information about technical specifications, see the Catalog LV 35 • 2011.

### Standards

GB 14048.2  
IEC 60947-2  
EN 60947-2

### Unpacking and storing the circuit-breaker

Unpack the circuit-breaker and make sure that it was not damaged during transportation. If the circuit-breaker or guide frame is not to be installed immediately, it must be stored and shipped in its original packaging only.

**Overseas packaging**

<b>Check the humidity indicator plate.</b>	
 Pink	 Blue
<ul style="list-style-type: none"> <li>• Sealed packaging ineffective.</li> <li>• Check circuit-breaker for corrosion.</li> <li>• Report any damage to transport company.</li> </ul>	Good

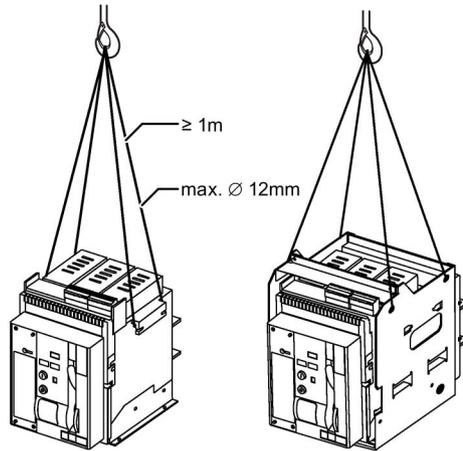
**Long-term storage**

- Replace or dry the desiccant.
- Seal the plastic film.
- Check the packaging regularly.

**Transportation with crane**

**Note**

Do not place the circuit-breaker on its back.



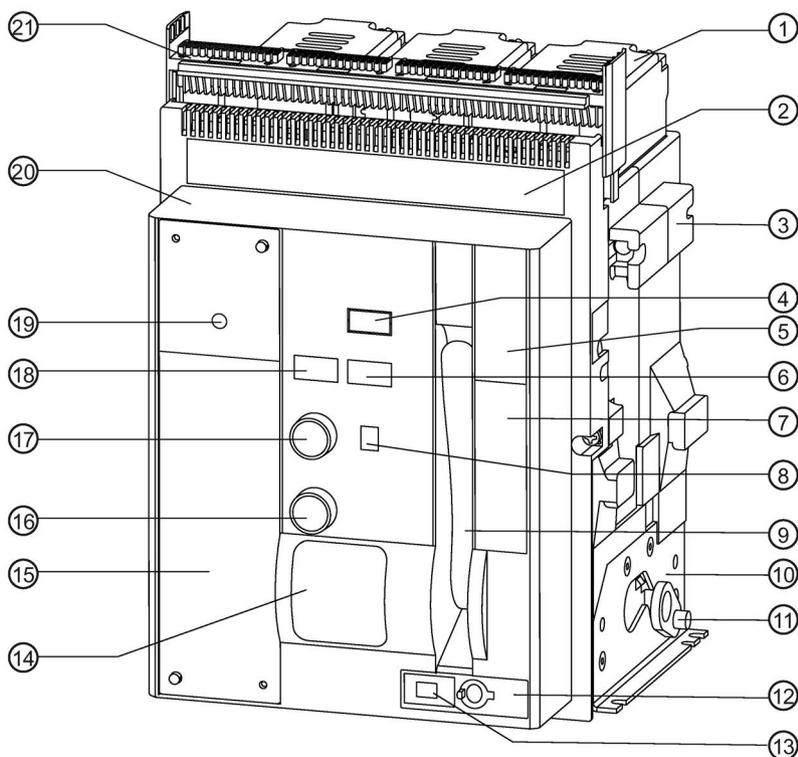
**Circuit-breaker with guide frame**

Frame size	Circuit-breaker Weight	Circuit-breaker + guide frame Weight
I/3	39 kg	59 kg
I/4	51 kg	88 kg
II/3	60 kg	87 kg
II/4	76 kg	116 kg

## Product description

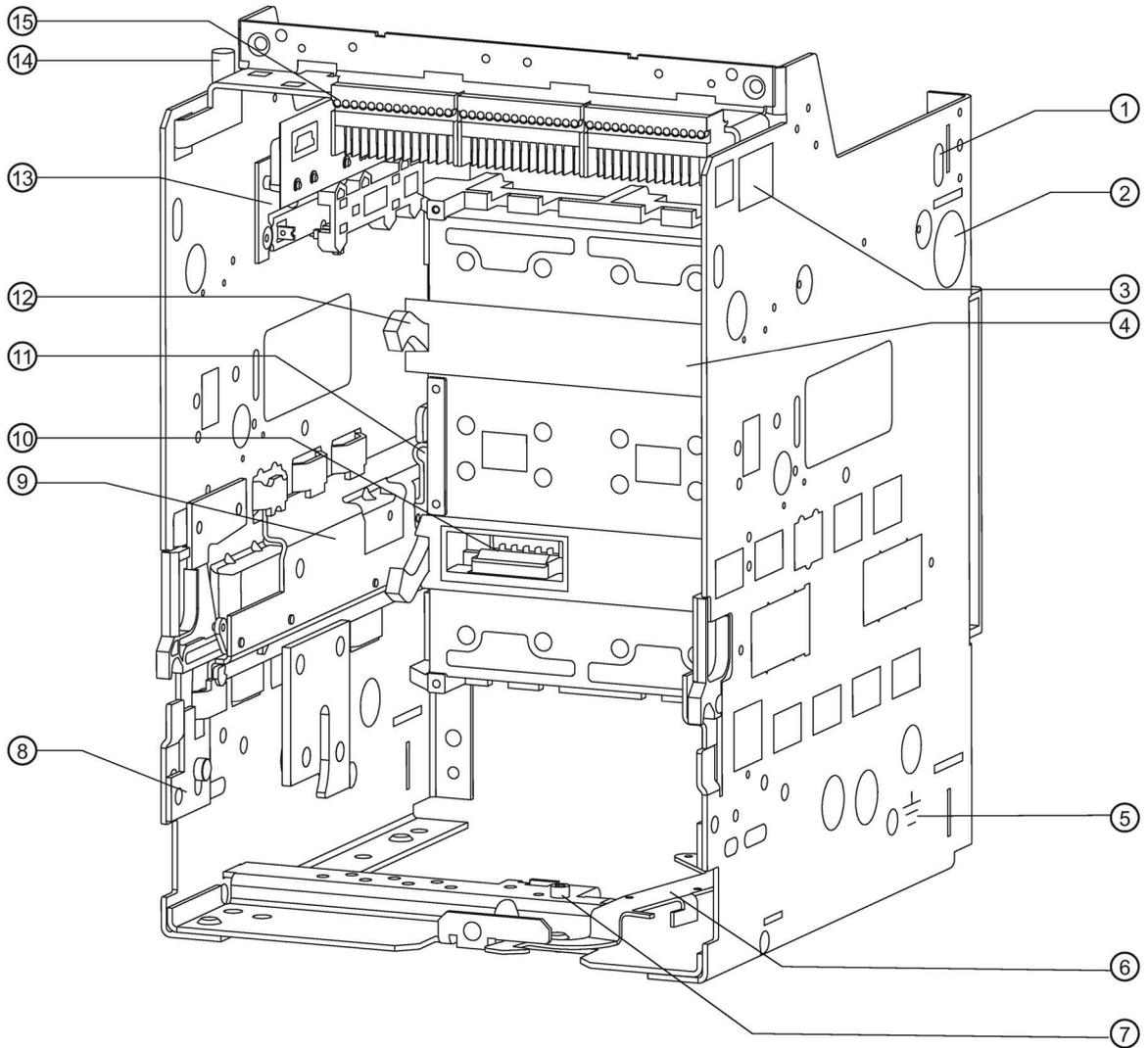
### 3.1 Design

#### 3.1.1 Circuit-breaker



- |                                 |                                     |
|---------------------------------|-------------------------------------|
| ① Arc chute                     | ⑫ Draw-out window                   |
| ② Options label                 | ⑬ Position indicator                |
| ③ Carrying handle               | ⑭ CASTELL Locking                   |
| ④ Counting indicator            | ⑮ Overcurrent release (ETU)         |
| ⑤ Type label                    | ⑯ " Mechanical OFF" button          |
| ⑥ Store-energy indicator        | ⑰ " Mechanical ON" button           |
| ⑦ Racking pictogram             | ⑱ Breaker ON/OFF indicator          |
| ⑧ Ready to close indicator      | ⑲ Reset button                      |
| ⑨ Spring charging lever         | ⑳ Front panel                       |
| ⑩ Breaker foot                  | ㉑ Receptacle for auxiliary contacts |
| ⑪ Draw-out unit transport shaft |                                     |

### 3.1.2 Guide frame



- ① Hole for crane hook
- ② Crane hook label
- ③ Type label guide rail
- ④ Shutter plate (option)
- ⑤ Grounding terminal
- ⑥ Door interlocking (option)
- ⑦ Coding screw
- ⑧ Locking device guide rail
- ⑨ Guide rail
- ⑩ Disconnecting contacts
- ⑪ Locking device shutter
- ⑫ Shutter operating device (option)
- ⑬ Position signaling switch (option)
- ⑭ Crank handle
- ⑮ Auxiliary disconnects

## 3.2 Electronic equipment

### Note

We have checked the content of this manual to ensure that it is consistent with the hardware and software described. Discrepancies cannot be wholly excluded, however, which means that we cannot assume responsibility for the correctness of the information provided here.

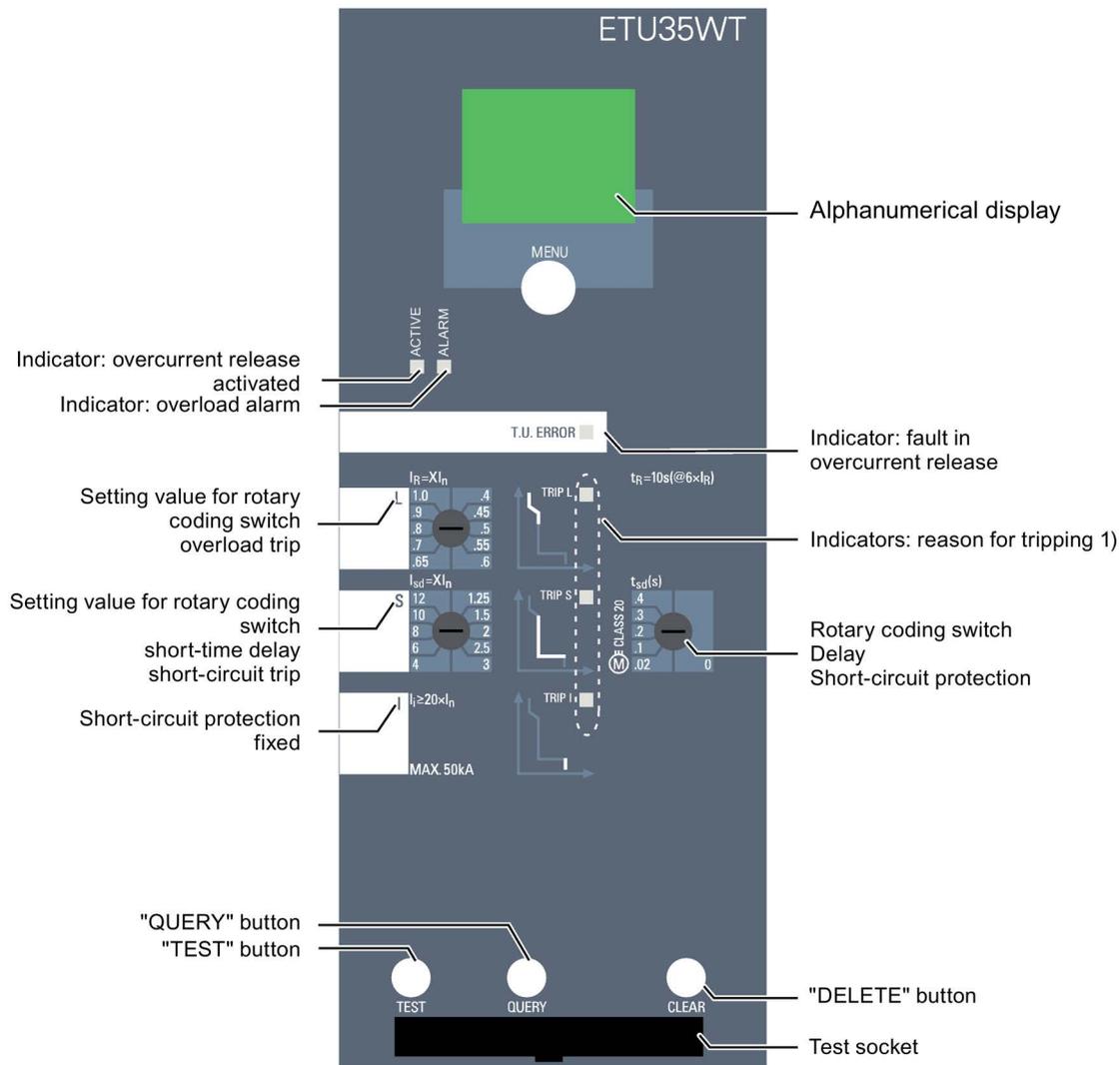
The information in this manual is reviewed on a regular basis and any necessary corrections are included in subsequent editions.

### Overcurrent release - functional overview

Functions	ETU35WT	ETU37WT	ETU45WT	ETU47WT
Overload protection (L tripping operation)	✓	✓	✓	✓
Short-time delay short-circuit protection (S tripping operation)	✓	✓	✓	✓
Instantaneous short-circuit protection (I tripping operation)	✓ <sup>1)</sup>	✓ <sup>1)</sup>	✓	✓
Neutral conductor protection (N tripping operation)	—	✓	✓	✓
Ground-fault tripping	—	✓	—	✓
Thermal memory (can be switched on/off)	—	—	✓	✓
Neutral conductor protection (can be switched on/off)	—	✓	✓	✓
Short-time delay short-circuit protection (can be switched on/off)	—	—	✓	✓
Instantaneous short-circuit protection (can be switched on/off)	—	—	✓	✓
Short-time delay short-circuit protection to I <sup>2</sup> t	—	—	✓	✓
Ground fault protection (can be switched to I <sup>2</sup> t)	—	—	—	✓
Motor protection function	✓	✓	✓	✓
Alphanumerical display	✓	✓	✓	✓

✓ Standard                      — Not available  
   <sup>1)</sup> Fixed

### 3.3 ETU35WT overcurrent release



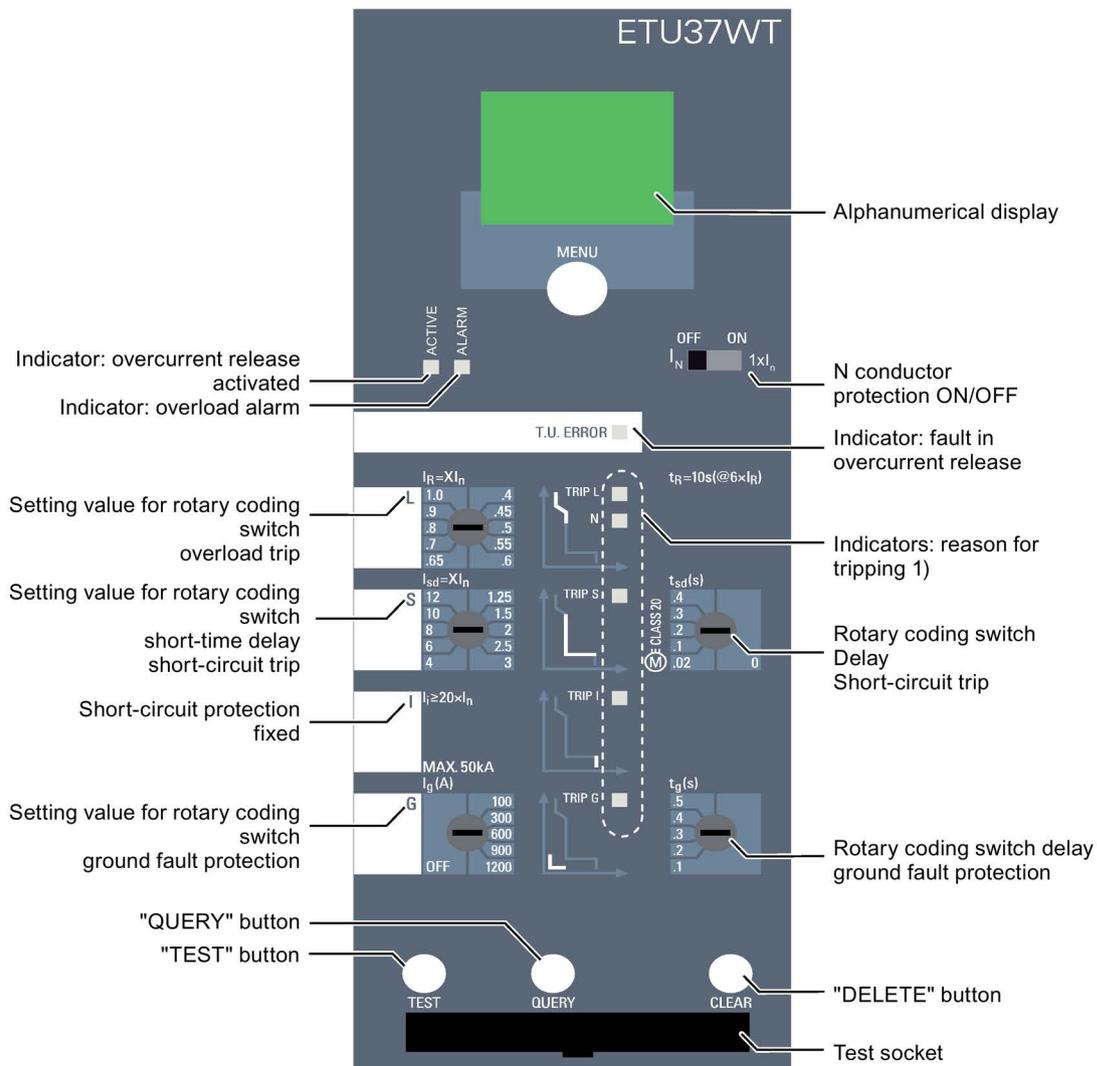
1) The reason for tripping is stored for at least two days provided that the overcurrent release was active for at least 20 minutes prior to tripping.

**NOTICE**

To protect the electrostatically-sensitive devices, the enclosed protective cap must be placed on the test socket.

Before the protective cap is removed, the breakers must be connected to ground, and the operators must have the same potential.

### 3.4 ETU37WT overcurrent release



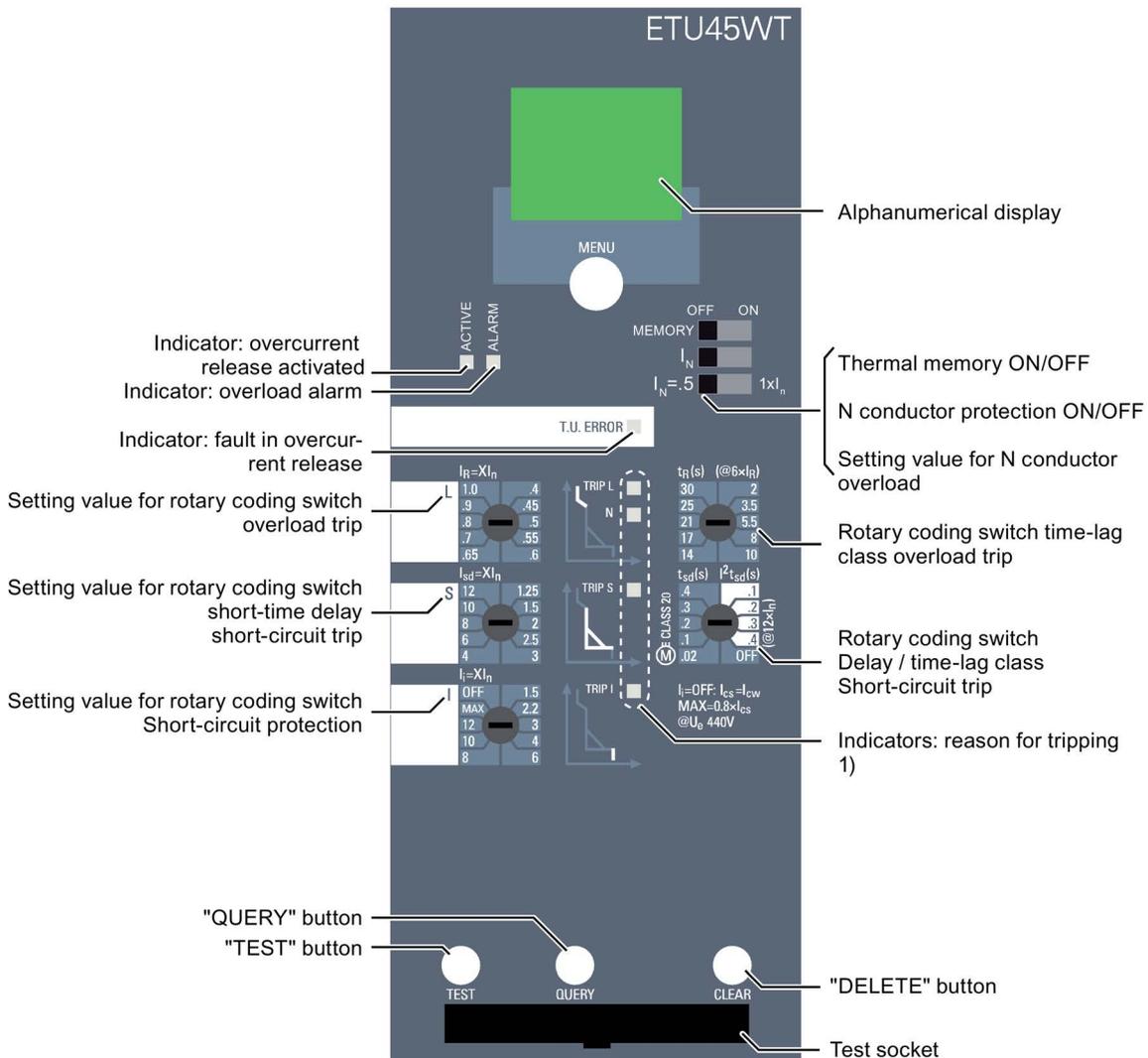
- 1) The reason for tripping is stored for at least two days provided that the overcurrent release was active for at least 20 minutes prior to tripping.

**NOTICE**

To protect the electrostatically-sensitive devices, the enclosed protective cap must be placed on the test socket.

Before the protective cap is removed, the breakers must be connected to ground, and the operators must have the same potential.

### 3.5 ETU45WT overcurrent release



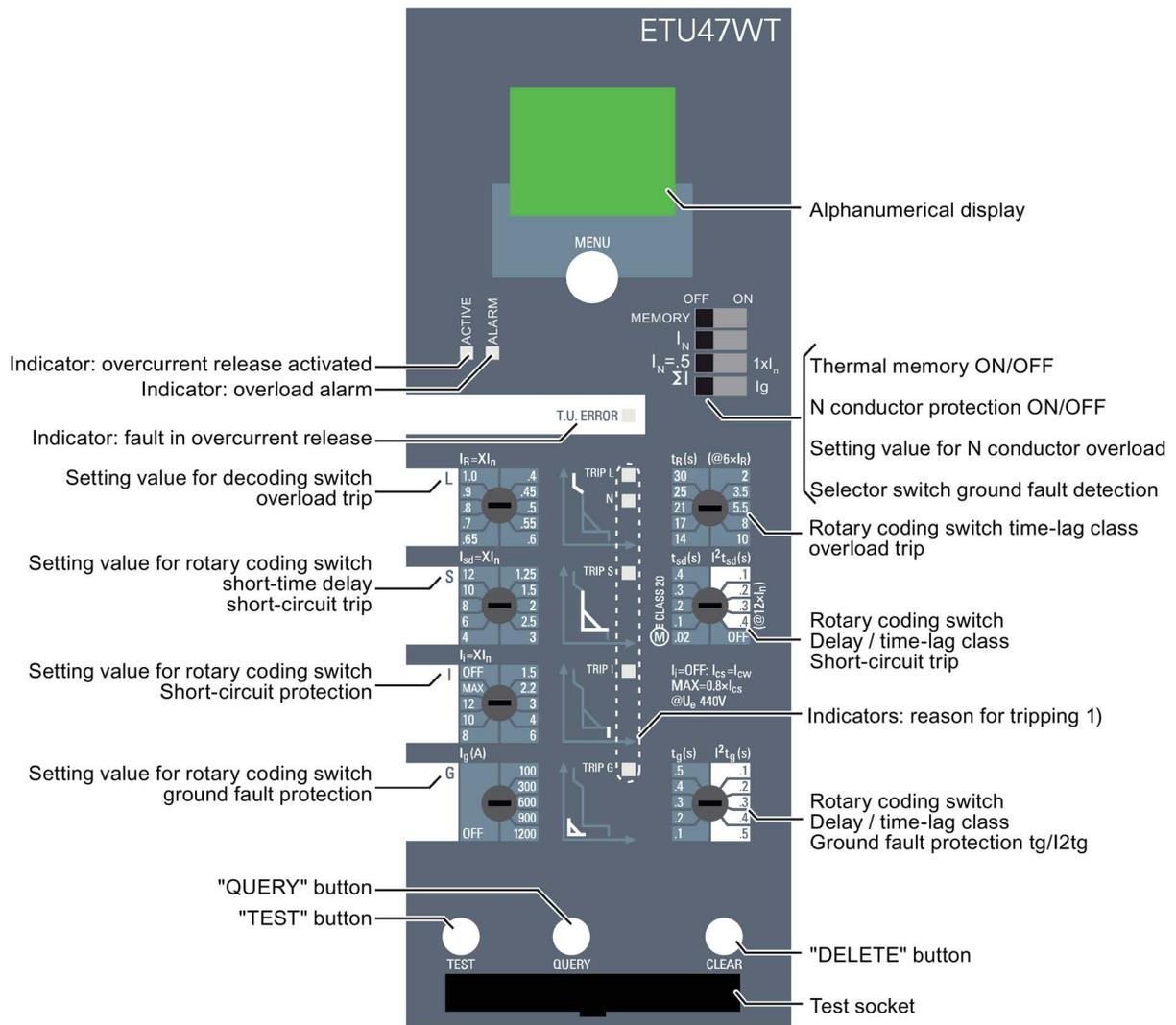
- 1) The reason for tripping is stored for at least two days provided that the overcurrent release was active for at least 20 minutes prior to tripping.

**NOTICE**

To protect the electrostatically-sensitive devices, the enclosed protective cap must be placed on the test socket.

Before the protective cap is removed, the breakers must be connected to ground, and the operators must have the same potential.

### 3.6 ETU47WT overcurrent release



- 1) The reason for tripping is stored for at least two days provided that the overcurrent release was active for at least 10 minutes prior to tripping.

#### NOTICE

To protect the electrostatically-sensitive devices, the enclosed protective cap must be placed on the test socket.

Before the protective cap is removed, the breakers must be connected to ground, and the operators must have the same potential.

*3.6 ETU47WT overcurrent release*

## Installation / mounting

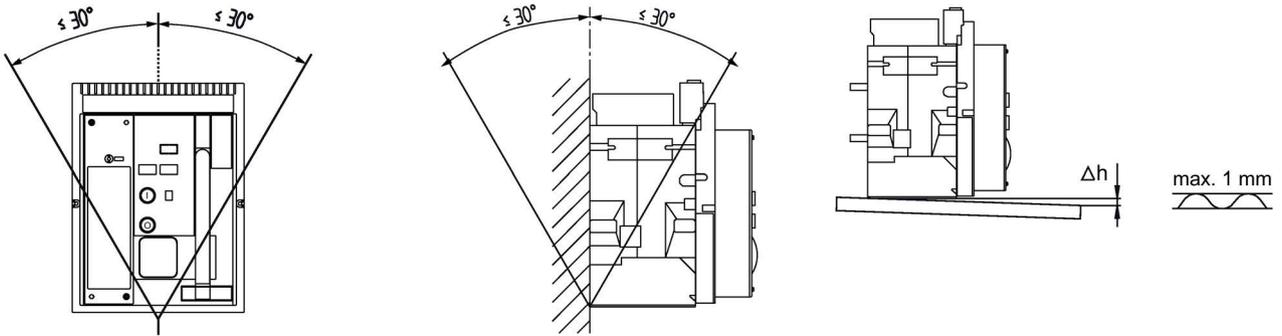
### 4.1 Installation

**⚠ WARNING**

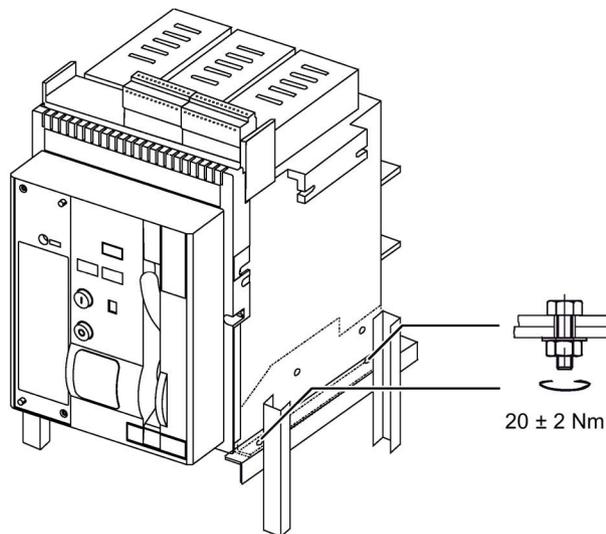
Before installing the device, make sure that the minimum distances from insulated, grounded, and live components in the switchgear are observed.

Details can be found in Catalog LV 35 • 2011.

#### Installation position



#### Installation on a horizontal surface



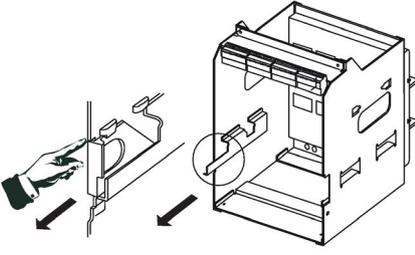
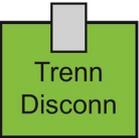
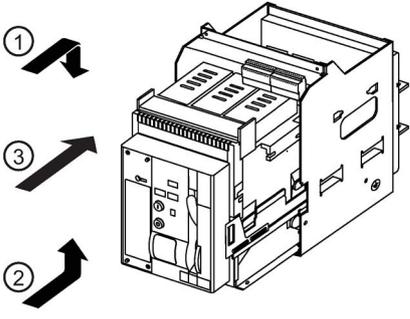
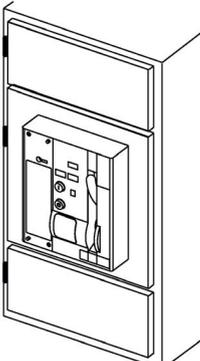
4 x M8-8.8 bolts + strain washers

## 4.2 Position of the circuit-breaker in the guide frame

Diagram	Position and display	Main and auxiliary circuit	Cubicle door	Shutter
	<p>Maintenance position</p> <p>Green</p>	<p>The auxiliary terminals of the breaker are outside of the auxiliary connector blocks of the guide frame</p>	Open	closed
	<p>Disconnected position</p> <p>Green</p>	<p>The auxiliary terminals of the breaker are inside the auxiliary connector blocks of the guide frame</p> <p>The guide rails are back in their initial position</p>	Closed	closed
	<p>Test position</p> <p>Blue</p>	<p>Main circuits disconnected</p> <p>Auxiliary circuits connected</p>	Closed	closed
	<p>Connected position</p> <p>Red</p>	<p>Main circuits connected</p> <p>Auxiliary circuits connected</p>	Closed	open

- ① Main circuit
- ② Auxiliary circuit
- ③ Shutter
- ④ Cubicle door

## 4.3 Inserting the circuit-breaker in the guide frame

			
<p>Pull out the guide rails.</p>	<p>Position indicator on the circuit-breaker</p>	<p>Insert the circuit-breaker ①, lift it up slightly ②, and push it to the end stop of the disconnected position. The correct position can be identified as the guiding rails must be again back in their initial position, and the auxiliary contacts hidden ③.</p>	<p>Close the cubicle door.</p>

## 4.4 Inserting the circuit-breaker by turning the racking handle

### Note

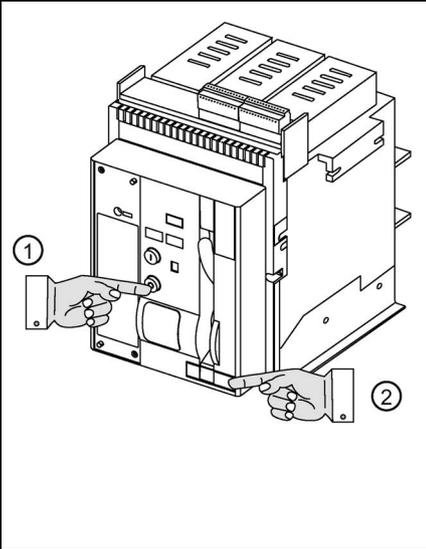
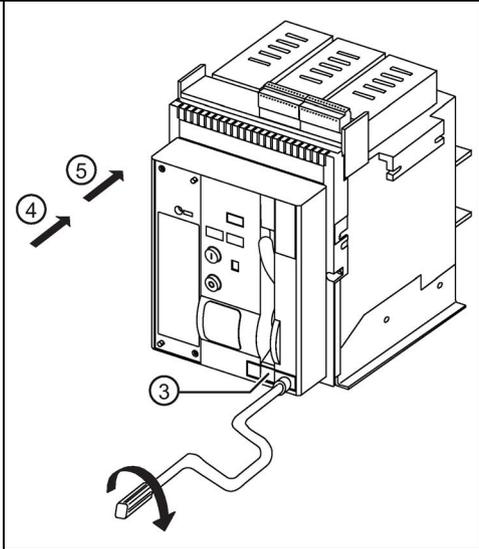
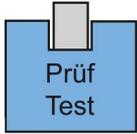
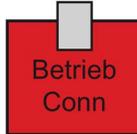
The circuit-breaker must only be racked once the operator panel has been mounted and secured.

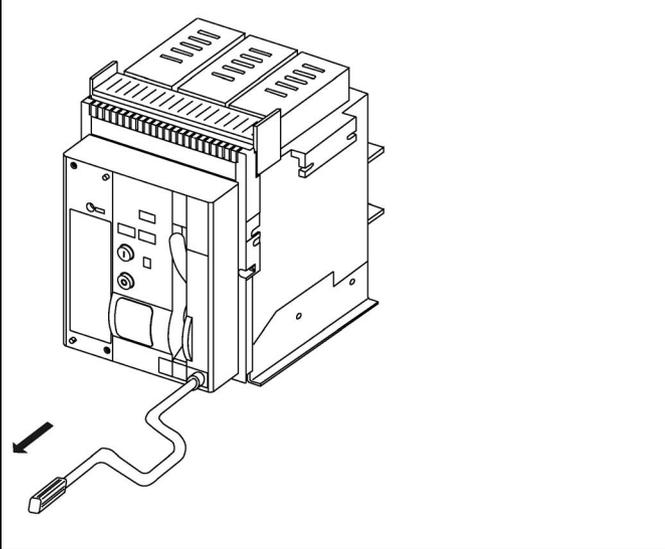
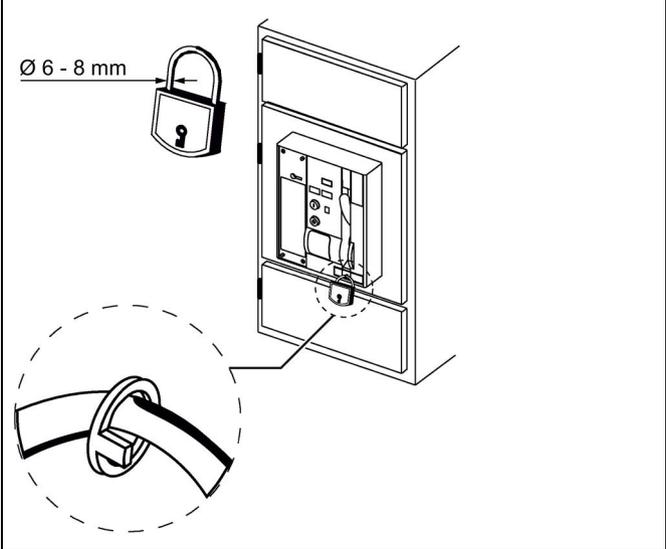
If a shutter is installed, a change of direction is not permitted while the circuit-breaker is being racked until a defined position has been reached (disconnected/test/connected position).

Note: the indicator on the circuit-breaker - position latching is not provided.

The position can only be checked via the indicator on the circuit-breaker.

4.4 Inserting the circuit-breaker by turning the racking handle

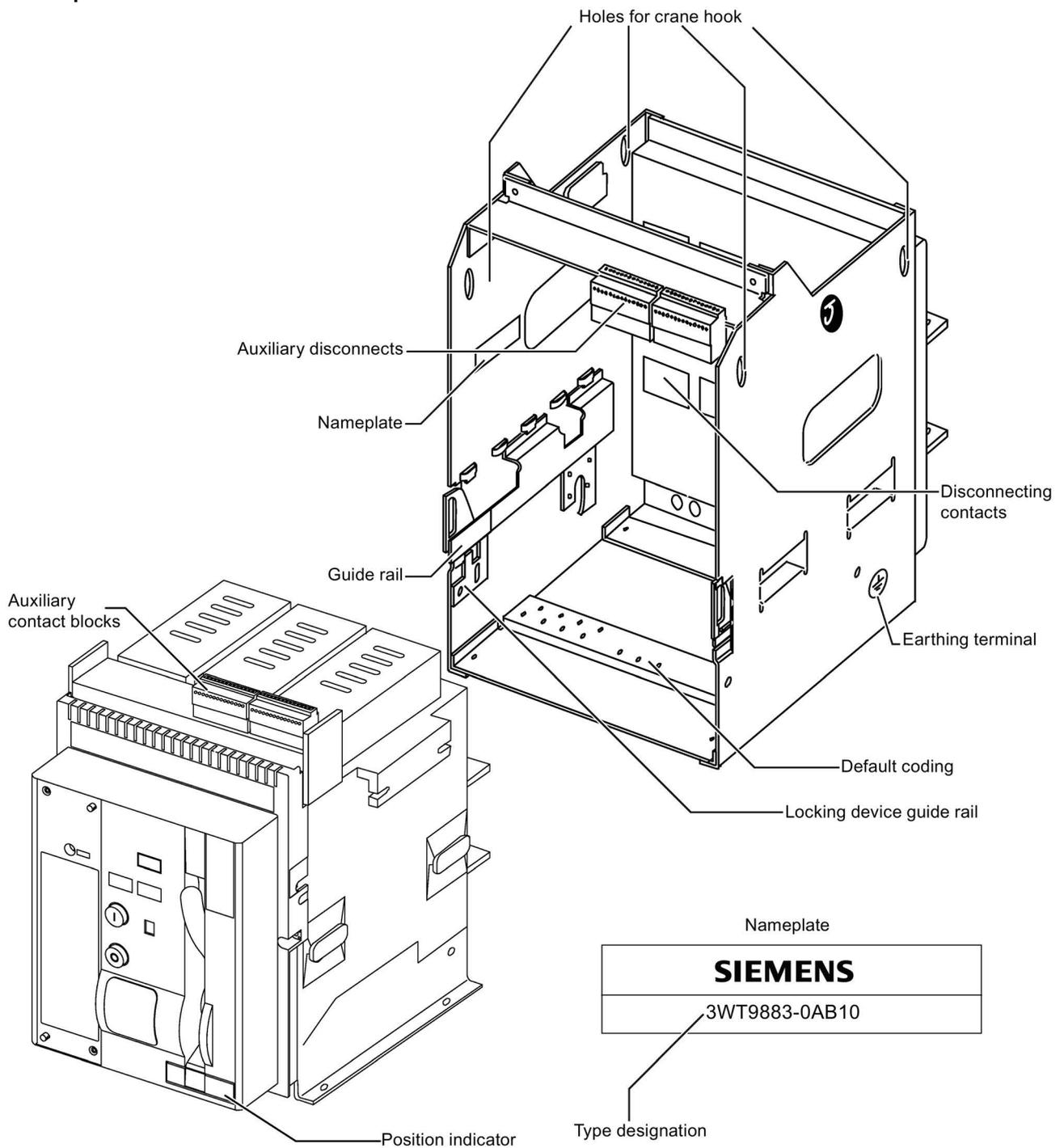
Inserting the circuit-breaker by turning the racking handle		
 <p>Diagram 1: A hand presses the OFF button (1) while another hand opens the side switch (2) of the circuit breaker.</p>	 <p>Diagram 2: The racking handle (3) is turned to the test position (4) and then to the connected position (5).</p>	<p>④ Turn to test position (position indicator: blue)</p>  <p>⑤ Turn to connected position (position indicator: red)</p> 
<p>Press the OFF button ① and open the side switch ② simultaneously.</p>	<p>③ Position indicator</p>	

 <p>Diagram 3: The racking handle is removed from the side switch, and the side switch is closed.</p>	 <p>Diagram 4: A padlock is used to lock the side switch. The hole for the padlock has a diameter of <math>\varnothing 6 - 8 \text{ mm}</math>. A detail view shows the locking mechanism.</p>
<p>Remove the racking handle and close the side switch.</p>	<p>Lockable</p>

## 4.5 Guide frame

### 4.5.1 Overview

#### Description



4.5.2 General



**! DANGER**

**Risk of death**

Do not touch the device if the voltage has been applied or the spring is charged.

Follow the instructions and note the warning information. Failure to do so can result in death, severe injury, or substantial material damage.

Transporting and setting down the device

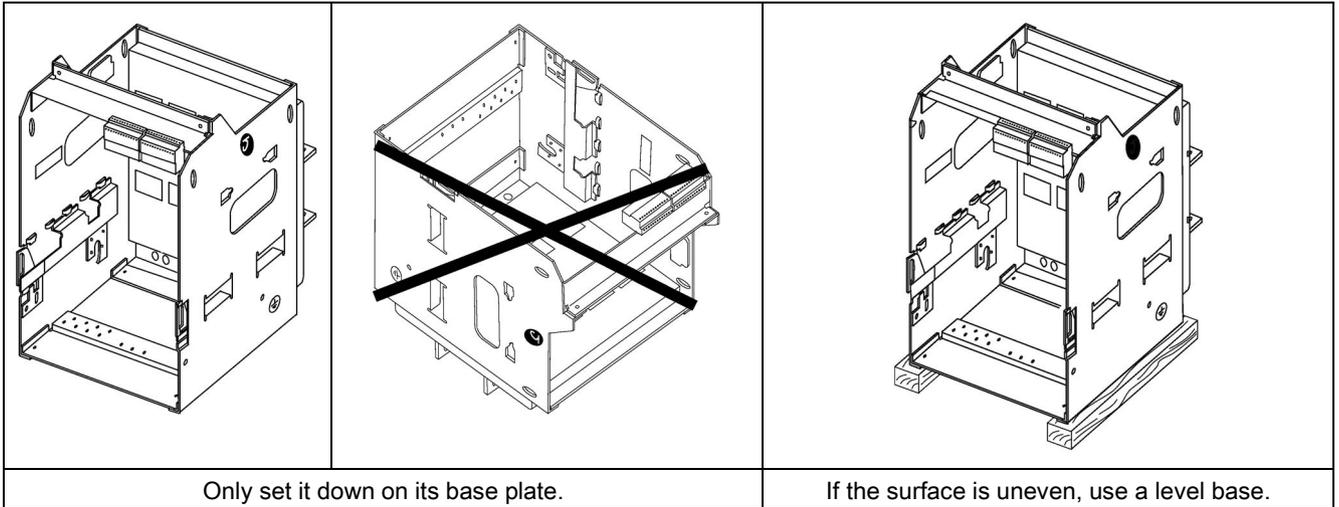
Transportation with crane

	Frame size / no. of poles	Weight
	I / 3	22
	I / 4	37
	II / 3	27
	II / 4	46

**Note**

The guide frame must not be transported with the circuit-breaker installed.

Setting down the guide frame



### 4.5.3 Installation

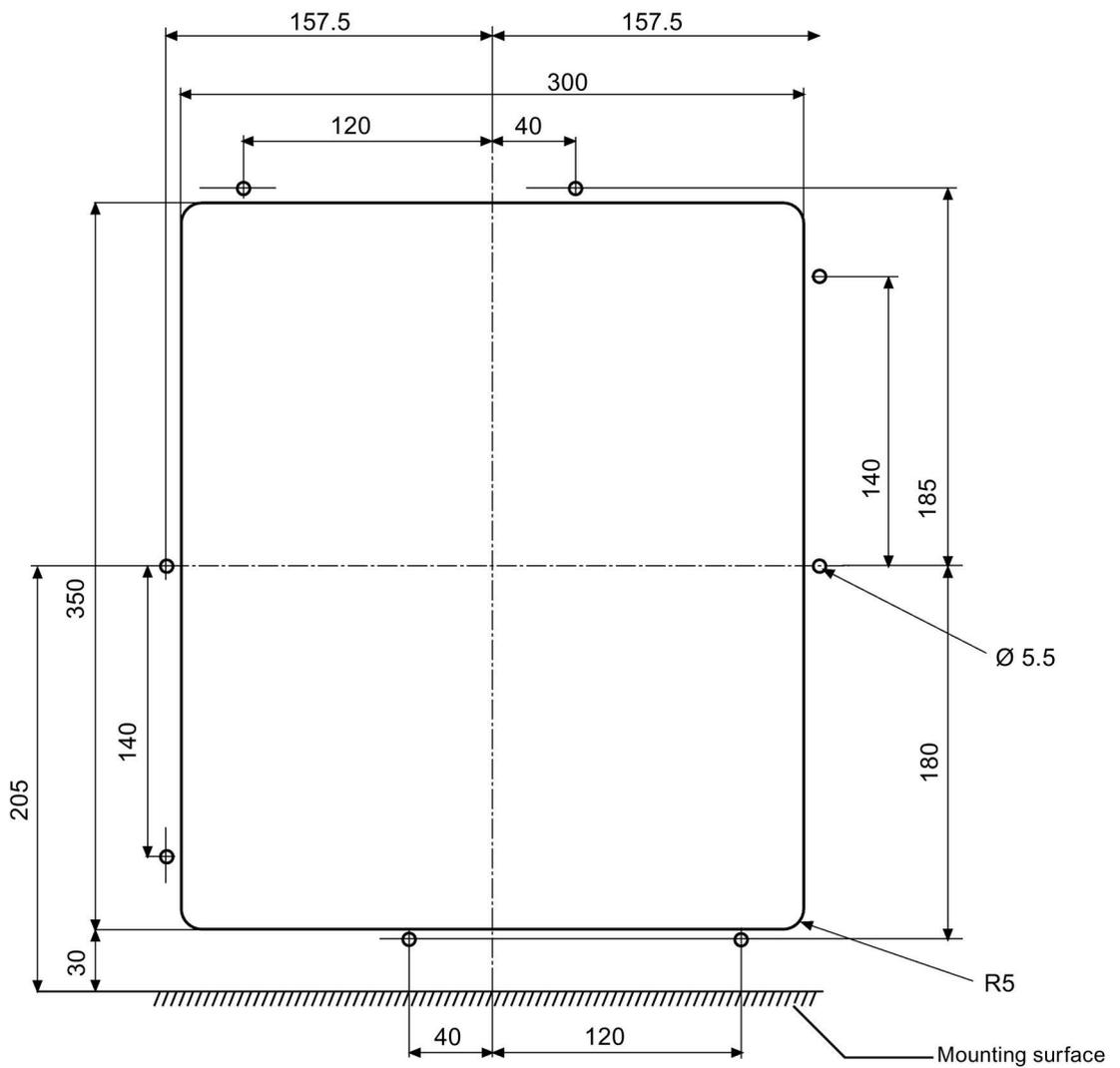


**! DANGER**

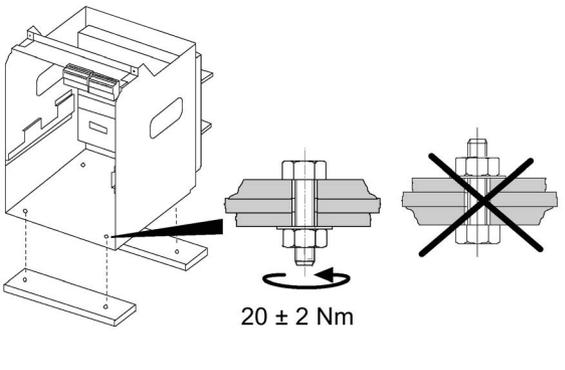
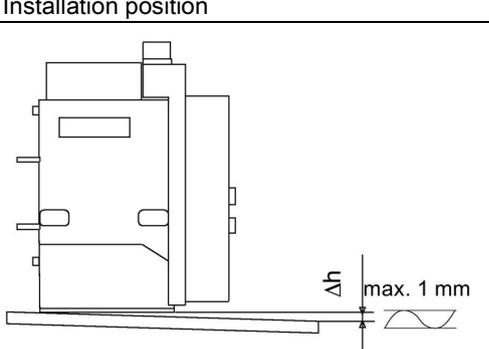
Before installing the device, make sure that the minimum distances from insulated, grounded, and live components in the switchgear are observed.

For more information, refer to the catalog.

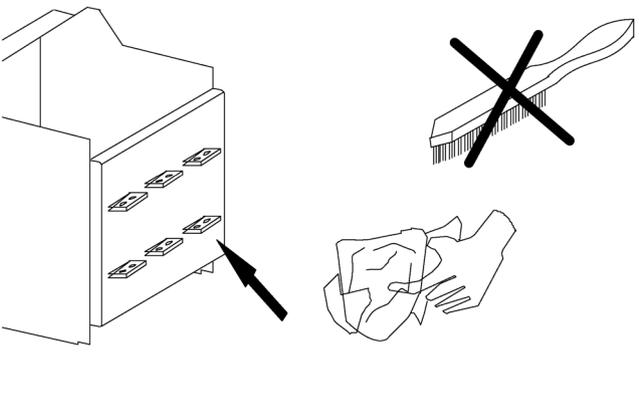
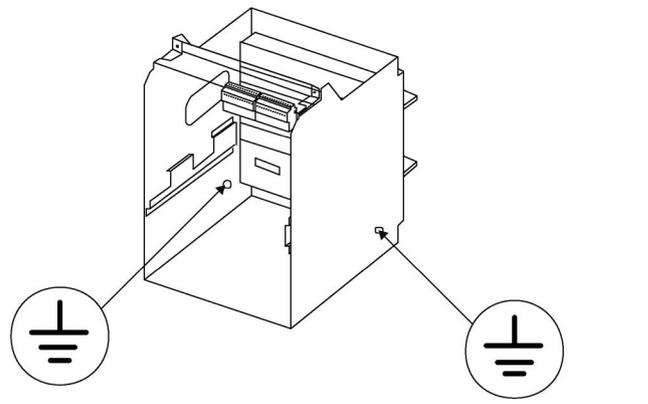
#### Preparing the switchgear door

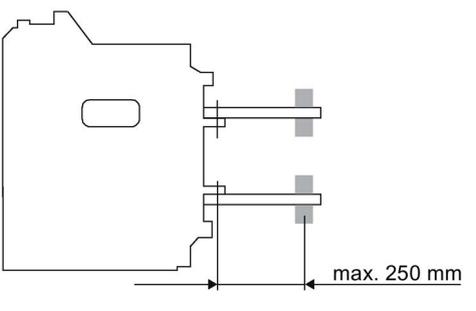
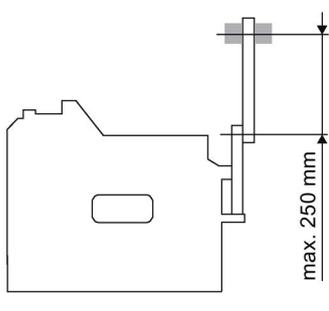
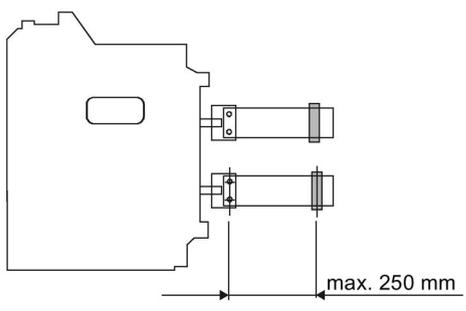


## Installation

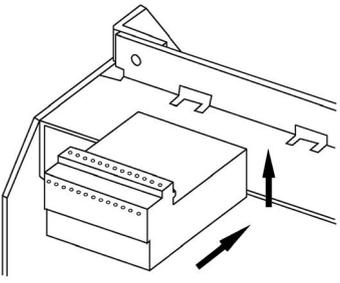
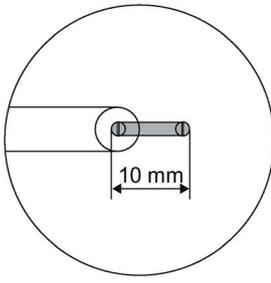
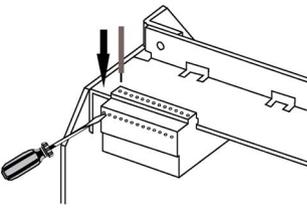
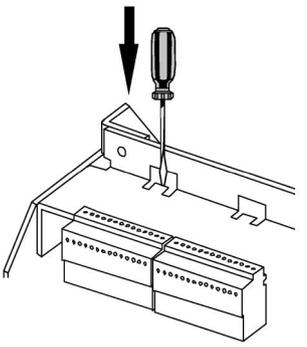
<p><b>Installation on a level surface</b></p>  <p>20 ± 2 Nm</p>	<p><b>Installation position</b></p>  <p>Δh max. 1 mm</p>
<p>Attaching the base plate: 4 x M8-8.8 bolts + nuts + washers</p>	

## Connecting the main and protective conductor

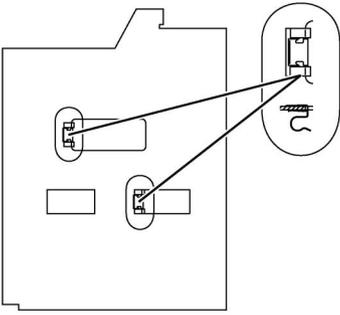
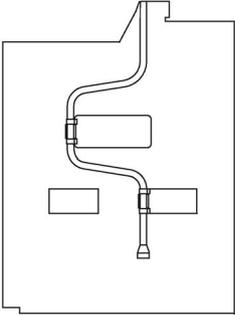
	
<p>Clean the contacts.</p>	<p>Connection for protective conductor.</p>

 <p>max. 250 mm</p>	 <p>max. 250 mm</p>	 <p>max. 250 mm</p>
<p>Reinforcing the main conductor</p>		

### Connecting the auxiliary conductors

Connection between conductor and connector			
			
Connect the connector.	Insulate the conductor.	Connect the conductor.	To remove: unscrew the click connection.

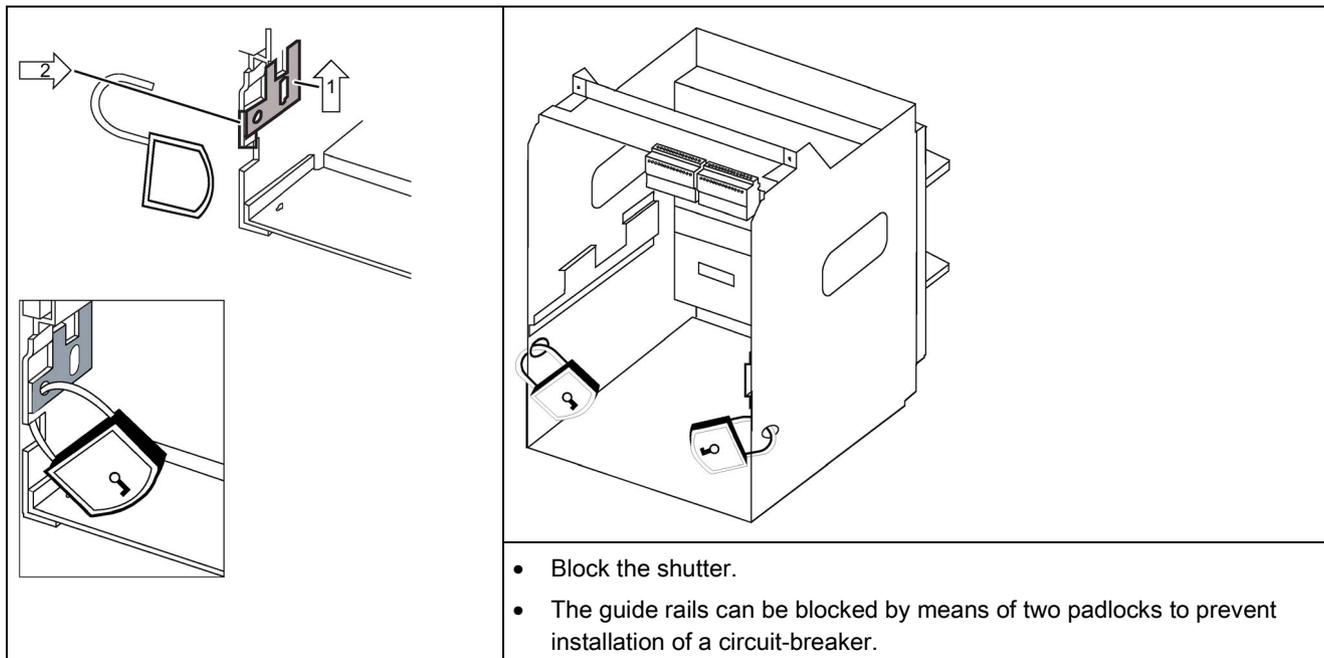
### Attaching the racking handle

	
Secure the brackets.	Attach the racking handle.

**Note**

The racking handle can also be attached on the right-hand side.

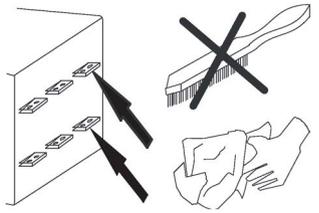
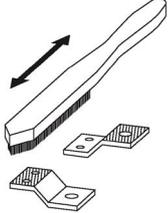
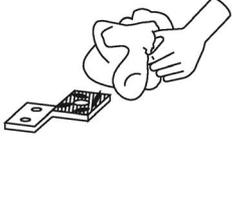
## Interlocking device





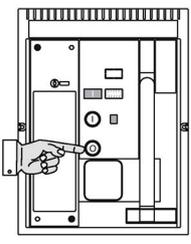
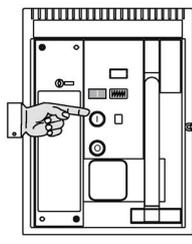
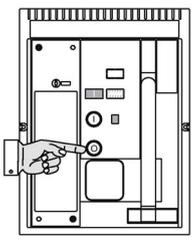
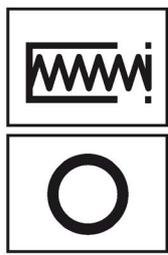
## Connection

### 5.1 Connecting the main conductor

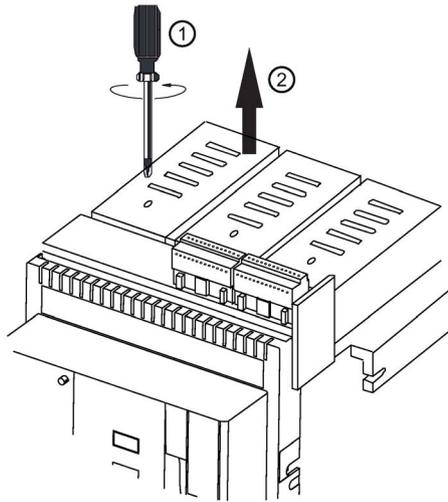
<b>Circuit-breaker</b>	<b>Clean the copper system bars</b>		
			<p>Shell Vaseline B422</p> 
Clean	Wire brush	Metal shavings	Lubricate the connections.

#### Connecting the circuit-breaker with front connections

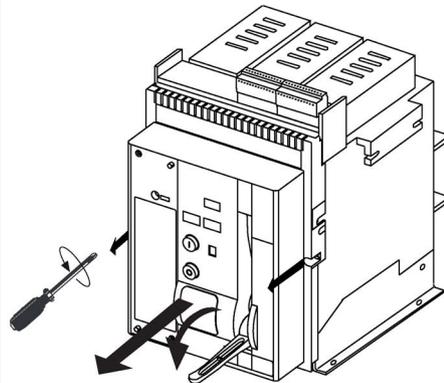
1. Disconnect the main/control circuits from the power supply and set the withdrawable circuit-breaker to the maintenance position.
2. Open the circuit-breaker mechanically (see below).

			
Open	Switch the breaker until the main spring is discharged and the breaker indicator shows "not ready to close".	Open	Indicator
			
In systems with connection points accessible from the rear		In systems with connection points not accessible from the rear	
			

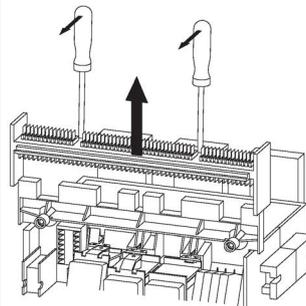
5.1 Connecting the main conductor



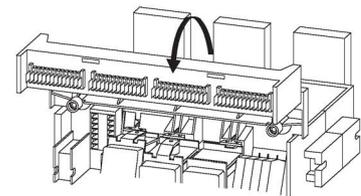
Remove the arc chutes.



Remove the screws and pull out the operator panel.

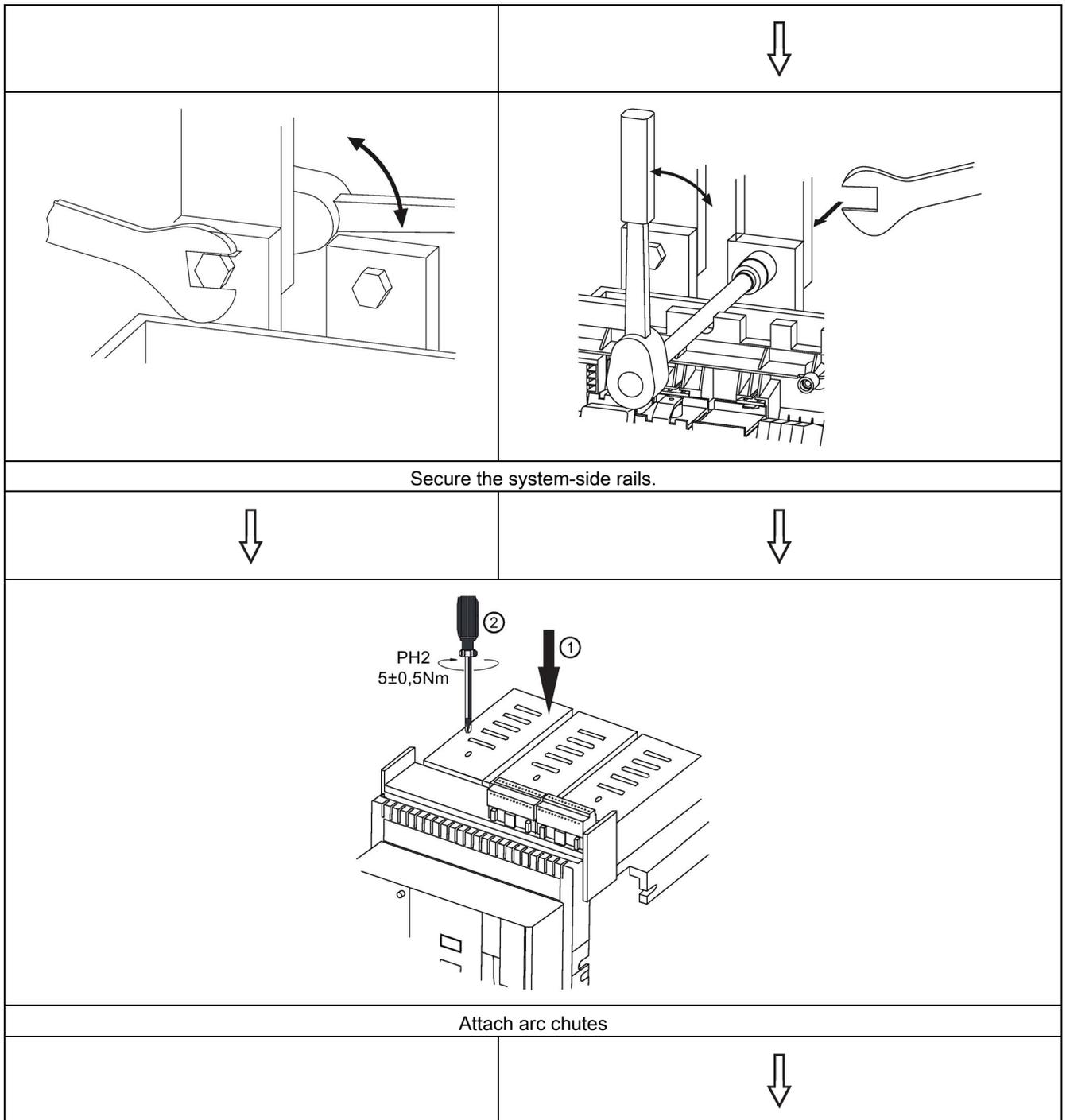


Unlock the secondary disconnect and remove it by pulling it up.

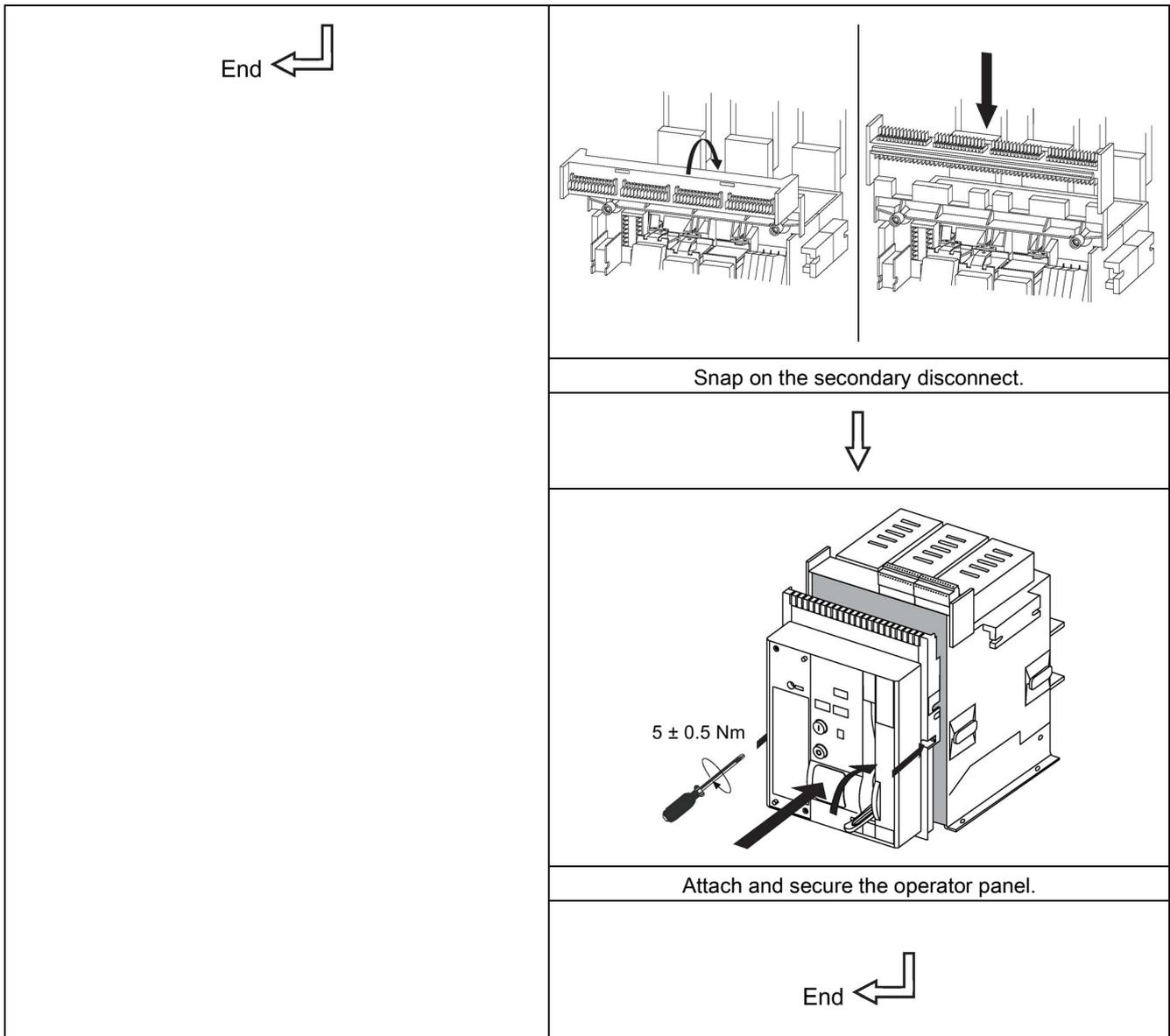


Swing the secondary disconnect forward.

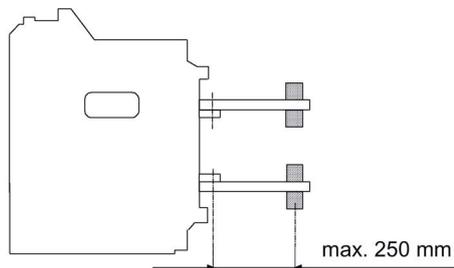




5.1 Connecting the main conductor

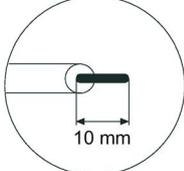
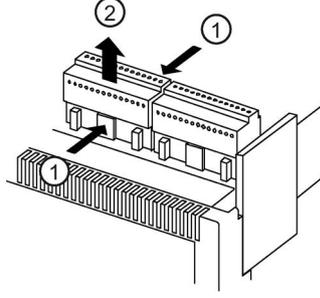
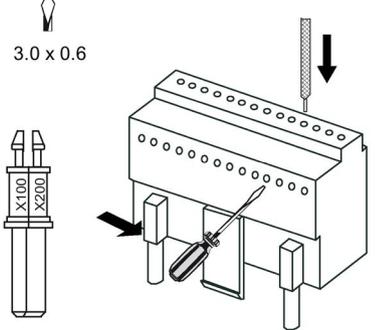
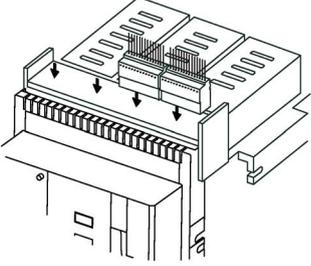


Supporting the main conductor



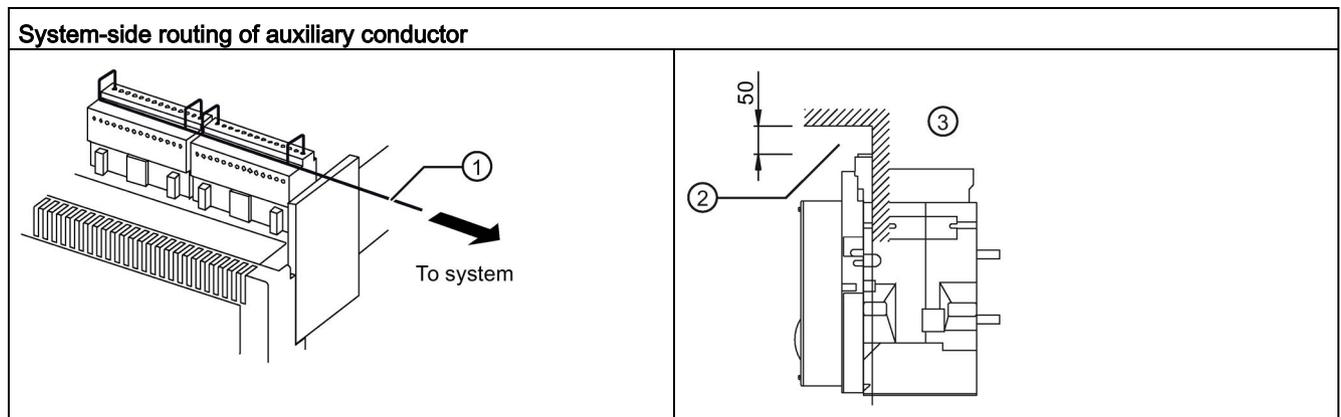
## 5.2 Connecting the auxiliary conductor

### Connecting the auxiliary conductor

Conductor connection to connector 3WT9825-1JC00			
<p>1 x 0,5 ... 2,5mm<sup>2</sup> 1 x AWG 14.</p> 		<p>3.0 x 0.6</p> 	
<p>Insulate the conductor.</p>	<p>Release latching.</p>	<p>Connect the conductor (note the coding).</p>	<p>Attach the encoded connector.</p>

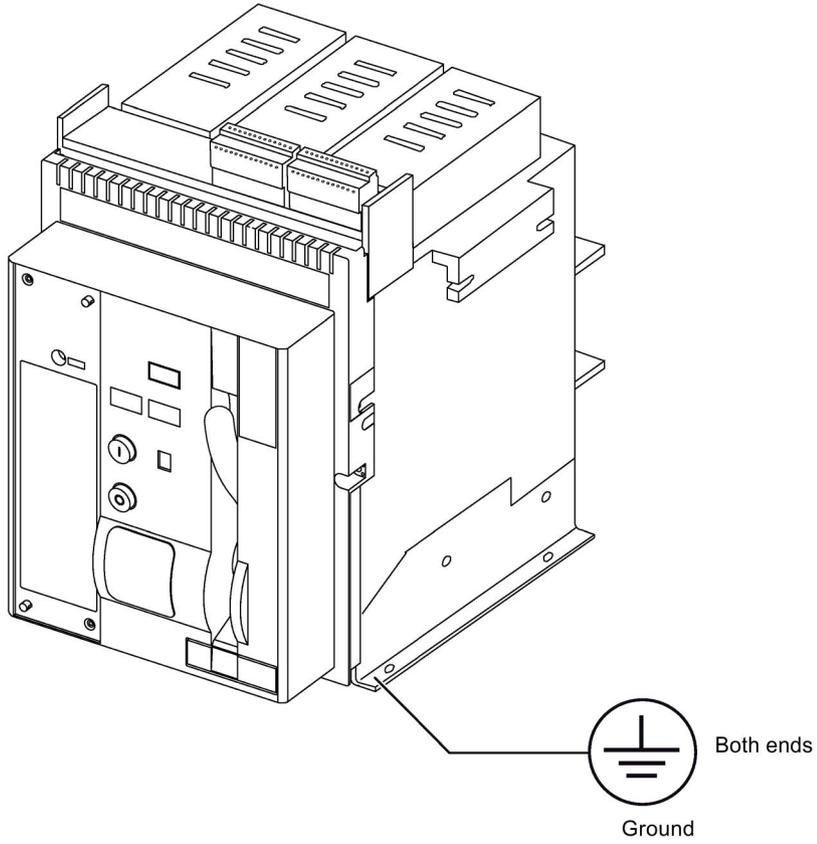
#### Note

Route the auxiliary conductor only in the front section of the circuit-breaker.



- ① Auxiliary conductor
- ② Area in which auxiliary conductor is routed
- ③ Area in which auxiliary conductor must not be routed

### 5.3 Connection for protective conductor.



## Parameterization

### 6.1 Setting the overcurrent protection

**NOTICE**

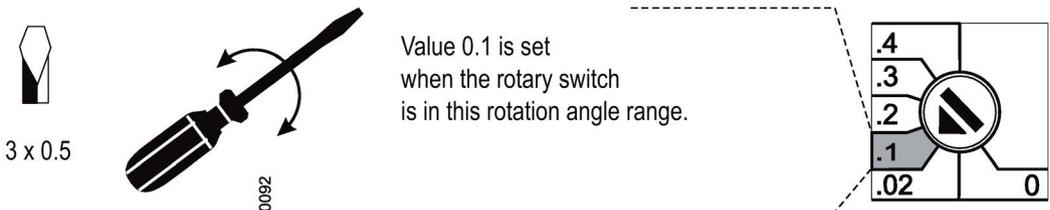
Only set parameters when the circuit-breaker is open.  
If you change them while the circuit-breaker is closed, this can cause it to trip unintentionally.

**NOTICE**

When configuring the system and performing a selectivity analysis, make sure that the circuit-breaker cannot carry any current that exceeds the circuit-breaker power values specified in the catalog.  
Higher-level protective devices must be set in such a way that equipment can be safely shut down if faults occur

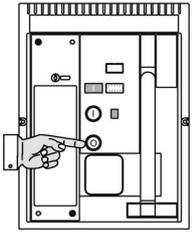
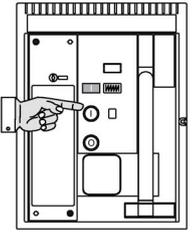
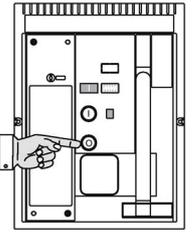
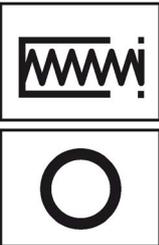
The protection functions of the overcurrent release are available without an additional auxiliary voltage. The power for the overcurrent release is supplied via the current transformers integrated in the circuit-breaker.

**All parameters are set by means of rotary coding switches**



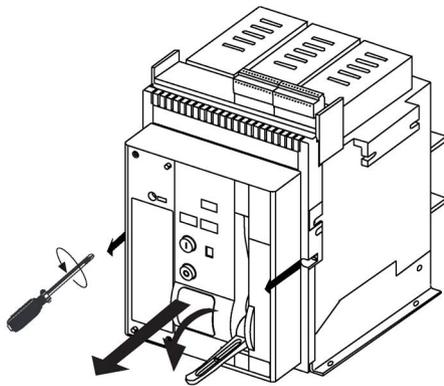
## 6.2 Setting the delay time of the undervoltage release

1. Disconnect the main/control circuits from the power supply and set the withdrawable circuit-breaker to the maintenance position.
2. Open the circuit-breaker mechanically (see table).

			
Open	Switch the breaker until the main spring is discharged and the breaker indicator shows "not ready to close".	Open	Indicator

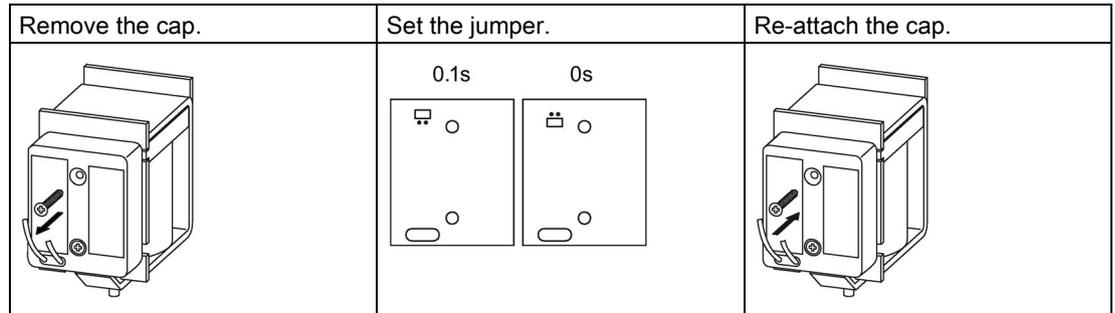
### Note

For withdrawable circuit-breakers: first close the racking hole, then remove the operator panel.

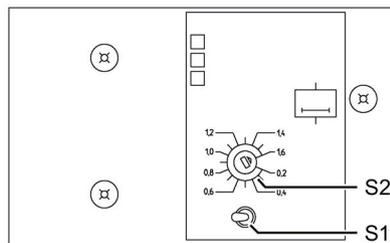


Remove the screws and pull out the operator panel.

Undervoltage release 3WT 9853 – 1J.00 td = 0...0.1 s

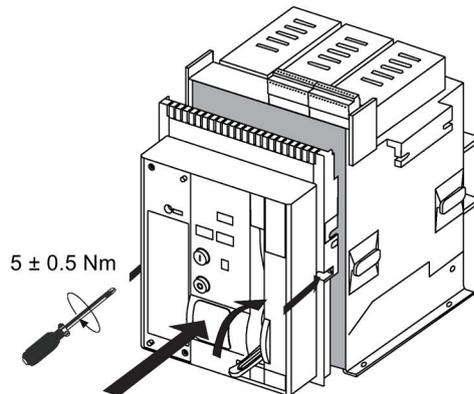


Undervoltage release 3WT 9853 - 1J.00 td = 0...0.1 s



- S1 Select the range.
- S2 Set the delay time td.

### Final steps



### Note

For withdrawable circuit-breakers: first close the racking hole, then attach the operator panel.

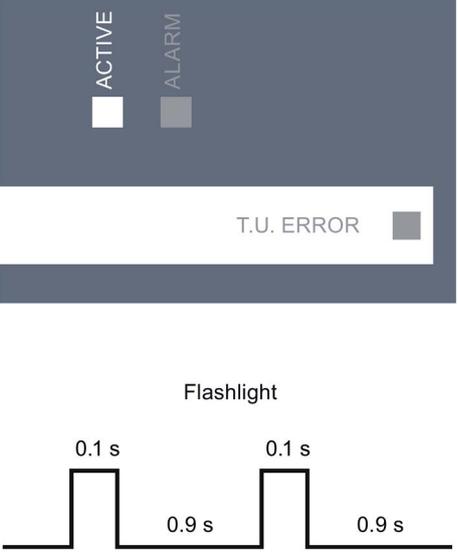
- Attach the operator panel by following the steps to remove it in reverse order.
- Fixed-mounted circuit-breaker: attach the manual connector.
- Withdrawable circuit-breaker: rack to test position.



## Function

### 7.1 Indicators on the overcurrent release

The indicators provided depend on the overcurrent release type.

<p><b>Overcurrent release is activated</b>  <math>I &gt; I_{min}</math>  <math>I_{min}</math>:          150 A for frame size I          200 A for frame size II</p>	 <p>Flashlight</p> <p>0.1 s      0.1 s</p> <p>0.9 s      0.9 s</p>
<p><b>Overcurrent alarm</b>          Continuous light, if <math>I \geq I_R</math></p>	

7.1 Indicators on the overcurrent release

<p><b>Protection function has tripped (overcurrent)</b></p> <ul style="list-style-type: none"> <li>Indicator lights up when the "QUERY" button is pressed</li> <li>Only one reason for tripping is displayed</li> <li>Only the last reason for tripping is displayed</li> </ul>	<p>The panel displays four protection functions with their respective settings and trip indicators:</p> <ul style="list-style-type: none"> <li><b>L</b> (<math>I_R = X I_n</math>): Settings 1.0, .9, .8, .7, .65, .4, .45, .5, .55, .6. Trip indicator: TRIP L.</li> <li><b>S</b> (<math>I_{sd} = X I_n</math>): Settings 12, 10, 8, 6, 4, 1.25, 1.5, 2, 2.5, 3. Trip indicator: TRIP S.</li> <li><b>I</b> (<math>I_t \geq 20 x I_n</math>): Trip indicator: TRIP I.</li> <li><b>G</b> (MAX. 50kA, <math>I_g(A)</math>): Settings 100, 300, 600, 900, 1200, OFF. Trip indicator: TRIP G.</li> </ul>
<p><b>T.U. ERROR LED</b></p> <p><b>1st T.U. Error flashes:</b> The protection function is restricted; the protection parameters are reset to the minimum values. Cause:</p> <ul style="list-style-type: none"> <li>Overcurrent release defective</li> </ul> <p><b>2nd T.U. Error lights up continuously:</b> The protection function is not ensured. Cause:</p> <ul style="list-style-type: none"> <li>Overcurrent release defective</li> </ul>	<p>The panel shows the T.U. ERROR LED indicator and status lights:</p> <ul style="list-style-type: none"> <li>ACTIVE: Status light</li> <li>ALARM: Status light</li> <li>T.U. ERROR: Error indicator light</li> </ul>

## 7.2 Protection functions and characteristic curves of ETU

### 7.2.1 ETU35WT

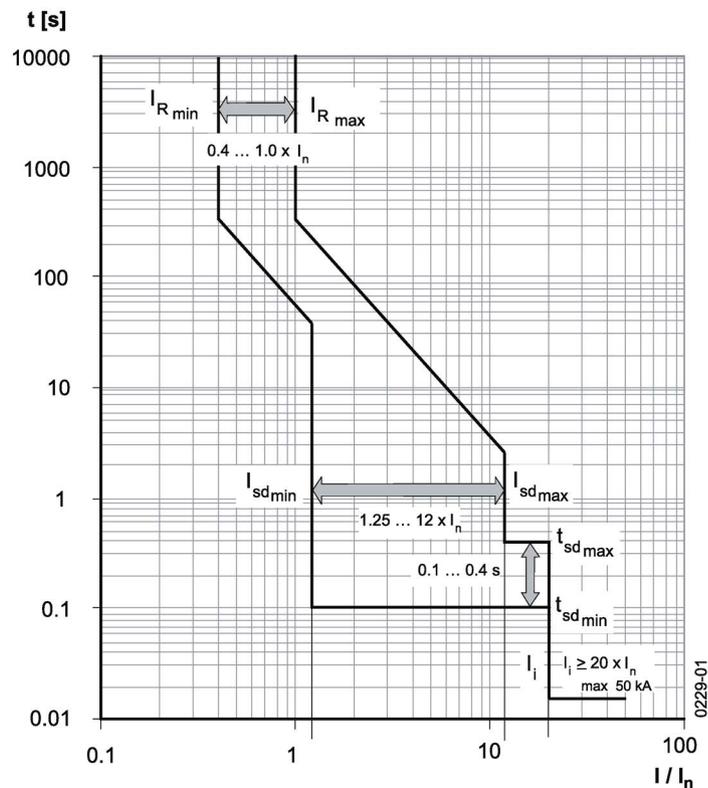
#### Protection functions

- Overload protection – L tripping operation
- Short-time delay short-circuit release – S tripping operation
- Instantaneous short-circuit release – I tripping operation

#### Characteristic curves

The diagram below only shows the setting ranges of the different parameters. Tolerance ranges are not taken into account here.

#### L, S, I tripping operation



With a one-pole load in the lowest rated current range, the response times of the short-circuit release can increase by approx. 10 % and the tripping times by approx. 15 % with respect to the characteristic curve.

### 7.2.2 ETU37WT

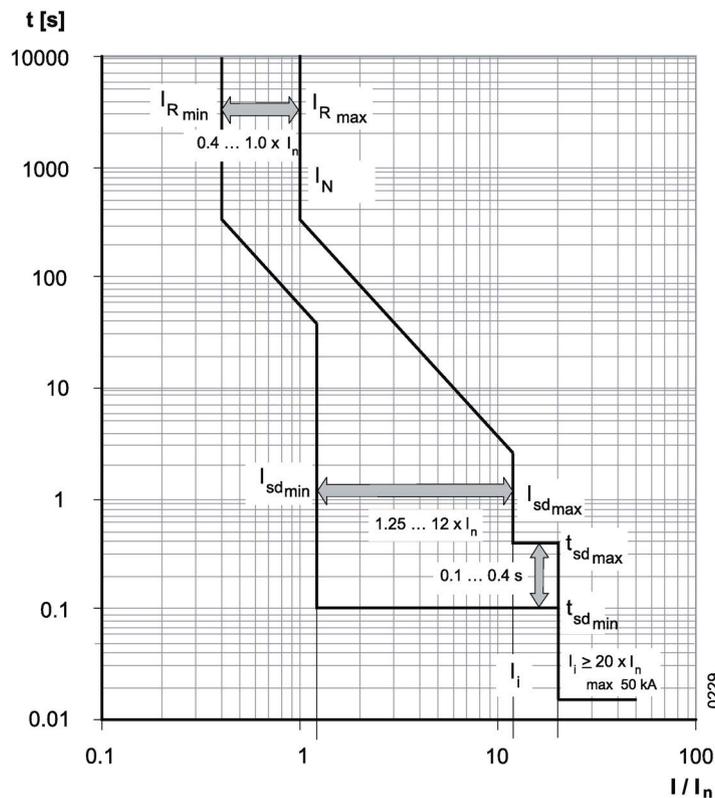
#### Protection functions

- Overload protection – L tripping operation
- Short-time delay short-circuit release – S tripping operation
- Instantaneous short-circuit release – I tripping operation
- Ground-fault tripping – G tripping operation
- Neutral conductor protection – N tripping operation

#### Characteristic curves

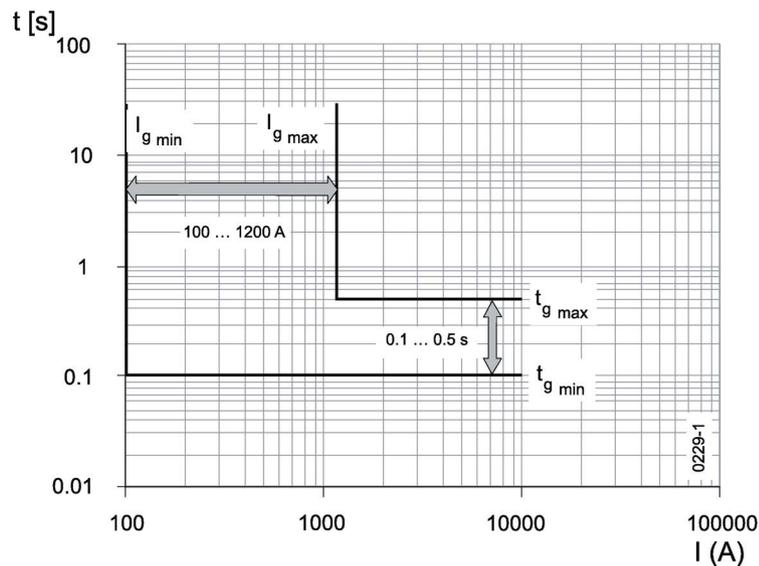
The diagram below only shows the setting ranges of the different parameters. Tolerance ranges are not taken into account here.

#### L, S, I, N tripping operation



With a one-pole load in the lowest rated current range, the response times of the short-circuit release can increase by approx. 10 % and the tripping times by approx. 15 % with respect to the characteristic curve.

## Ground-fault tripping



Due to the activation limits of 150 A (FSI) and 200 A (FSII), a ground fault response value of 100 A cannot be ensured with a one-phase load. In this case, the minimum response value is  $I_g = 300$  A.

### 7.2.3 ETU45WT

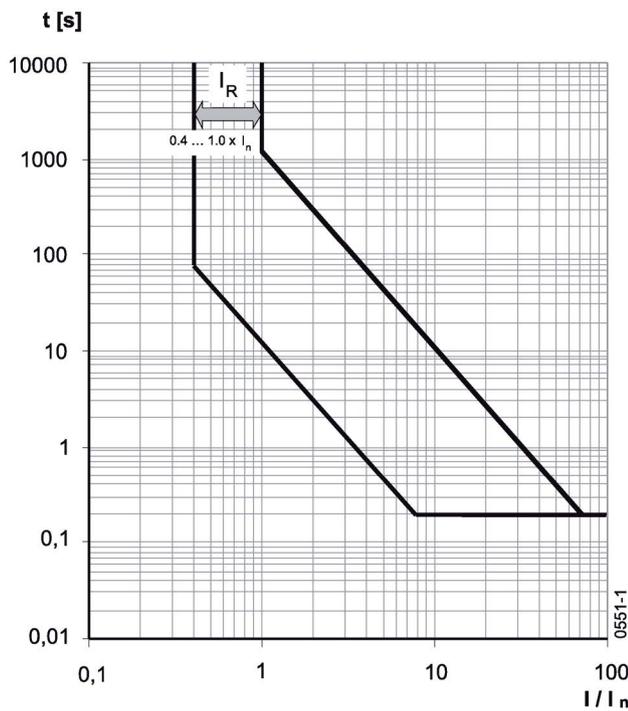
#### Protection functions

- Overload protection – L tripping operation
- Short-time delay short-circuit release – S tripping operation
- Instantaneous short-circuit release – I tripping operation
- Neutral conductor protection – N tripping operation
- Thermal memory (can be switched on/off)

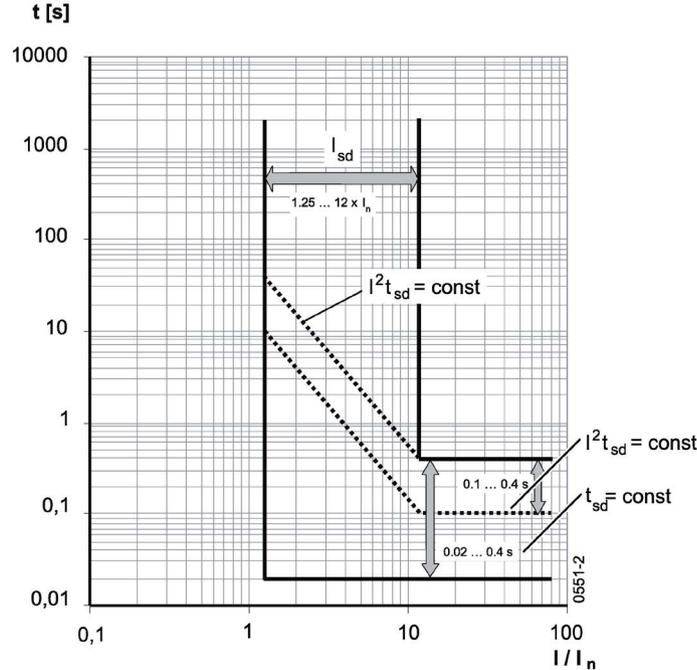
#### Characteristic curves

The diagram below only shows the setting ranges of the different parameters. Tolerance ranges are not taken into account here.

#### L tripping operation

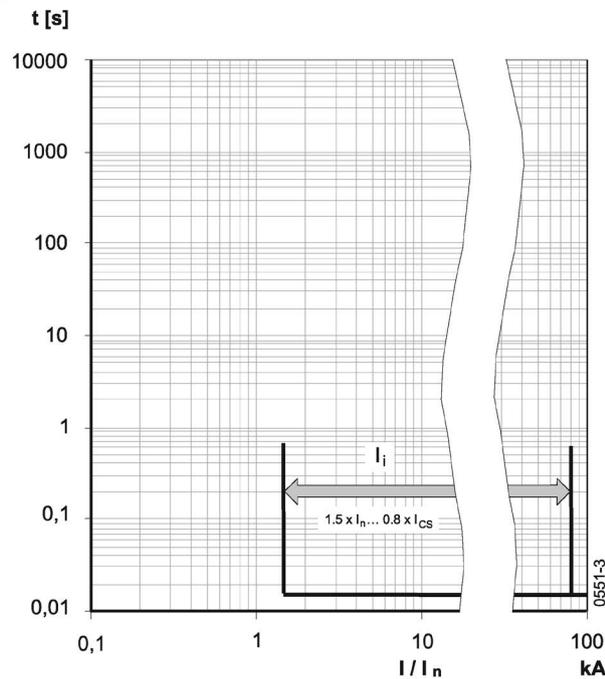


S tripping operation



With a one-pole load in the lowest rated current range, the response times of the short-circuit release can increase by approx. 10 % and the tripping times by approx. 15 % with respect to the characteristic curve.

I tripping operation



With a one-pole load in the lowest rated current range, the response times of the short-circuit release can increase by approx. 10 % and the tripping times by approx. 15 % with respect to the characteristic curve.

### 7.2.4 ETU47WT

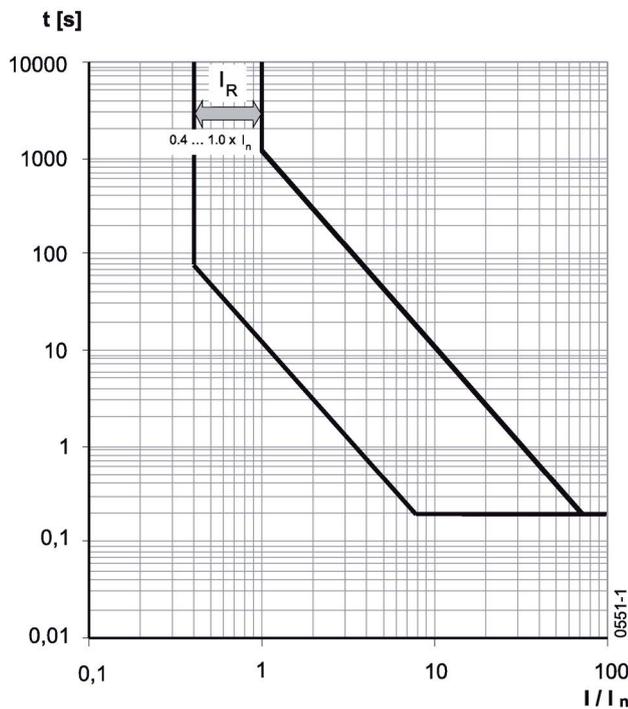
#### Protection functions

- Overload protection – L tripping operation
- Short-time delay short-circuit release– S tripping operation
- Instantaneous short-circuit release – I tripping operation
- Ground-fault tripping – G tripping operation
- Neutral conductor protection – N tripping operation
- Thermal memory (can be switched on/off)

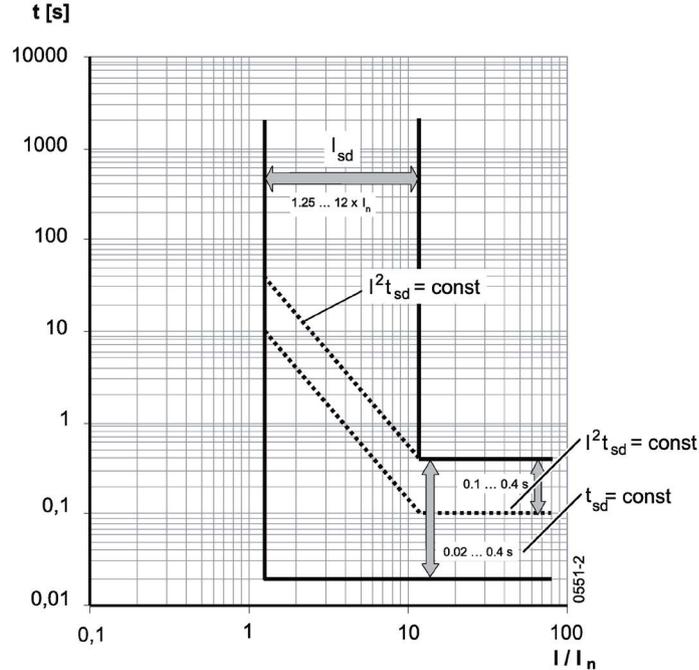
#### Characteristic curves

The diagram below only shows the setting ranges of the different parameters. Tolerance ranges are not taken into account here.

#### L tripping operation

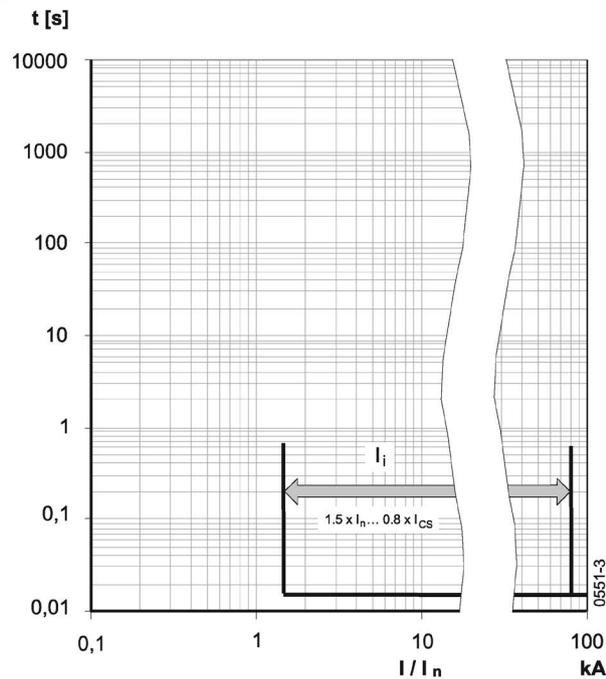


S tripping operation



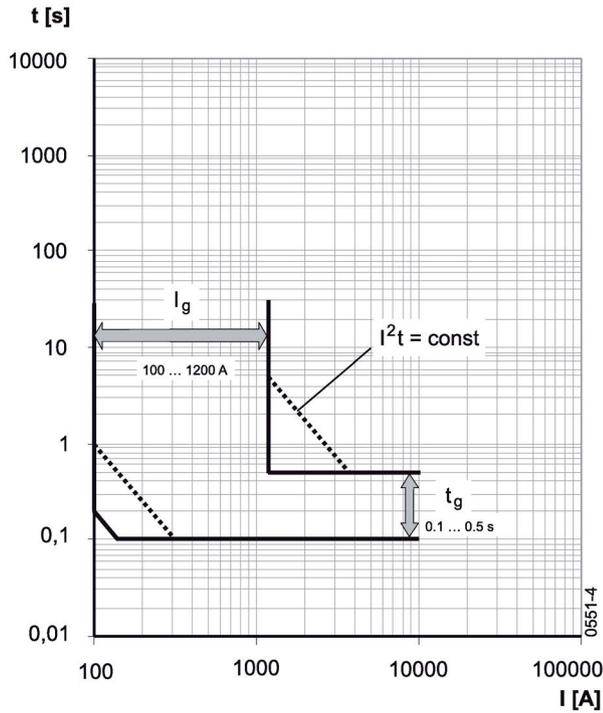
With a one-pole load in the lowest rated current range, the response times of the short-circuit release can increase by approx. 10 % and the tripping times by approx. 15 % with respect to the characteristic curve.

I tripping operation



With a one-pole load in the lowest rated current range, the response times of the short-circuit release can increase by approx. 10 % and the tripping times by approx. 15 % with respect to the characteristic curve.

### Ground-fault tripping



Due to the activation limits of 150 A (FSI) and 200 A (FSII), a ground fault response value of 100 A cannot be ensured with a one-phase load. In this case, the minimum response value is  $I_g = 300$  A.

## 7.3 Protection functions

### 7.3.1 Basic protection functions

The protection functions of the overcurrent release are available without an additional auxiliary voltage. The required energy is supplied via current transformers integrated in the circuit-breaker.

To evaluate the currents, the RMS value is calculated by the electronic components of the overcurrent release.

The individual functions are parameterized by means of rotary coding switches.

---

#### Note

##### Tolerances for the setting currents

L: tripping operations between  $1.05$  and  $1.2 \times I_R$

S:  $-0\%$ ,  $+20\%$

I:  $-0\%$ ,  $+20\%$

G:  $-0\%$ ,  $+20\%$

##### Tolerances for the tripping times

L:  $-20\%$ ,  $+0\%$  for  $I^2t$  characteristic

S:  $-0\%$ ,  $+60\text{ ms}$  or  $-0\%$ ,  $+10\%$  for characteristic with fixed delay time

I:  $<50\text{ ms}$

G:  $-0\text{ ms}$ ,  $+60\text{ ms}$  or  $-0\%$ ,  $+10\%$  for characteristic with fixed delay time

---

### 7.3.2 Overload protection - L tripping operation

The setting value  $I_R$  determines the maximum continuous current at which the circuit-breaker can operate without tripping. The time-lag class  $t_R$  determines for how long an overload can be present without causing a trip.

Setting values for $I_R$	
ETU35WT ... 47WT	$I_R = (0.4 / 0.45 / 0.5 / 0.55 / 0.6 / 0.65 / 0.7 / 0.8 / 0.9 / 1.0) \times I_n$

Setting values for $t_R$	
ETU35WT, ETU37	$t_R = 10\text{ s (at } 6 \times I_R)$
ETU45WT, ETU47WT	$t_R = 2 / 3.5 / 5.5 / 8 / 10 / 14 / 17 / 21 / 25 / 30\text{ s (at } 6 \times I_R)$

The tripping characteristic curve exhibits an  $I^2t$  characteristic.

When the motor protection function is active, a different  $t_R$  setting applies (see next page).

### 7.3.3 Short-time delay short-circuit release - S tripping operation

With the overcurrent releases, tripping caused by a short-circuit current  $I_{sd}$  can be delayed by  $t_{sd}$ .

This enables selectivity with respect to short-circuit protection in switchgear with more than one grading level.

Setting values for $I_{sd}$	
ETU35WT ... 47WT	$I_{sd} = (1.25 / 1.5 / 2 / 2.5 / 3 / 4 / 6 / 8 / 10 / 12) \times I_n$

Setting values for $t_{sd}$	
ETU35WT, ETU37WT	$t_{sd} = 0 / 0.02(M)^{1)} / 0.1 / 0.2 / 0.3 / 0.4 \text{ s}$
ETU45WT, ETU47WT	$t_{sd} = 0.02(M)^{1)} / 0.1 / 0.2 / 0.3 / 0.4 \text{ s}; \text{ OFF}$

1) The delay time 0.02 s is not a grading time.

In this setting, the motor protection function is activated.

With the setting value  $t_{sd} = 0 \text{ s}$ , the ETU35WT and ETU37WT overcurrent releases can support instantaneous short-circuit protection with a variable response value that is lower than the fixed response value  $I_i$ .

The "OFF" setting for the ETU45WT and ETU47WT overcurrent releases is used to deactivate short-time delay short-circuit protection.

The ETU45WT and ETU47WT overcurrent releases support switching to a  $I^2t$  characteristic.

### Motor protection function

A special protection function for electromotive drives is activated with the circuit-breaker setting  $t_{sd} = \textcircled{M}$  (0.02 s). This prevents the short-time delay short-circuit release from responding to the inrush peak of electric motors. At the same time, phase-failure protection is activated and the time constant for the internal, arithmetic simulation of the warming and cooling process is switched from plant protection to motor protection.

When motor protection is active, the time-lag class is also set in such a way that, regardless of the rotary coding switch setting (ETU45WT and ETU47WT) or the default setting  $t_R = 10 \text{ s}$  (ETU35WT and ETU37WT), the tripping time for overload protection is  $11.2 \text{ s} @ 7 \times I_R$ , which means that it lies within the tolerance band of class 20 ( $6 < t_p \leq 20 \text{ s}$ ).

### 7.3.4 Instantaneous short-circuit trip – I tripping operation

When the setting value  $I_i$  is exceeded, this causes the circuit-breaker to trip instantaneously.

Setting values for $I_i$	
ETU35WT, ETU37WT	$I_i \geq 20 \times I_n$ (fixed) MAX = 50 kA
ETU45WT, ETU47WT	OFF <sup>1)</sup> $I_i = (1.5 / 2.2 / 3 / 4 / 6 / 8 / 10 / 12 \times I_n)$ MAX = $0.8 \times I_{CS}$

1) When the I tripping operation is deactivated, the breaking capacity of the circuit-breaker drops to  $I_{CS} = I_{CW}$ .

With the ETU45WT and ETU47WT overcurrent releases, short-time delay (setting  $t_{sd} = \text{OFF}$ ) and instantaneous ( $I_i = \text{OFF}$ ) short-circuit protection cannot be deactivated simultaneously.

If the setting  $I_i = \text{OFF}$  is chosen when  $t_{sd} = \text{OFF}$ , the system automatically corrects itself to  $I_i = 1.5 \times I_n$ .

### 7.3.5 Ground-fault tripping – G tripping operation

If the overcurrent release is equipped with a ground fault protection function, this can protect consumers against excessive ground fault currents.

Ground fault detection can be implemented in two ways:

- By means of vectorial summation of the currents of the external conductors and N conductor
- For ETU47WT: direct measurement of the ground fault current with a separate transformer 1200 A : 1 A

In conjunction with the delay time setting  $t_g$ , the response value  $I_g$  defines the disconnection of ground faults.

Setting values for $I_g$	
ETU37WT, ETU47WT	$I_g = 100 / 300 / 600 / 900 / 1200 \text{ A}$

Setting values for $t_g$	
ETU37WT, ETU47WT	$t_g = 0.1 / 0.2 / 0.3 / 0.4 / 0.5 \text{ s}$

The ETU47WT overcurrent release supports switching to a  $I^2t$  characteristic.

### 7.3.6 Neutral conductor protection – N tripping operation

The ETU37WT ... 47WT overcurrent releases allow the neutral conductor to be protected against overload. A current transformer for the neutral conductor (which can be retrofitted if necessary) is required for this purpose.

With respect to tripping, the same time-lag class  $t_R$  as that for the overload trip applies.

Setting values for $I_N$	
ETU37WT	$I_N = I_n$ ; OFF
ETU45WT, 47WT	$I_N = (0.5 / 1.0) \times I_n$ ; OFF

## 7.4 Additional functions

### 7.4.1 Phase-failure protection

When the circuit-breaker setting is  $t_{sd} = \textcircled{M}$  (0.02s), phase-failure protection is activated.

If the operational current on the phase with the lowest load is 50% less than the operational current of the phase with the highest load when phase-failure protection is active, the setting value  $I_R$  is automatically reduced to 80%. If the three phase currents do not differ by more than 50% with respect to each other, the setting value  $I_R$  applies.

### 7.4.2 Thermal memory (can be switched on/off)

The ETU45WT and ETU47WT overcurrent releases enable the internal, arithmetic simulation of the thermal processes in downstream plants and consumers to continue even when the circuit-breaker is open. This helps ensure effective protection against thermal overload even with frequent closing/opening operations and fluctuating loads.

#### Response in overload range:

- Above  $1.125 \times I_R$ : the system heats up strictly in accordance with the characteristic curve.

#### Response in the rated current range:

- Below  $1.125 \times I_R$ : no heating.
- The system cools down in accordance with the exponential function with a time constant of  $18 \times t_R$  for plant protection or  $10 \times t_R$  for motor protection.

#### Response when `_ParaSwitchTherm = ON`:

When the thermal memory is switched on, the thermal history is taken into account:

- After a tripping operation, the thermal memories of the phases are defaulted with the equivalent of heat of the warmest phase reduced to 90% (enables reactivation).
- The system cools down in accordance with the exponential function with a time constant of  $18 \times t_R$  for plant protection or  $10 \times t_R$  for motor protection.

Upon reactivation, the cooling during the deactivation phase is simulated by the software over max. 60 minutes.

#### Response when `_ParaSwitchTherm = OFF`:

When the thermal memory is switched off, the thermal history is not taken into account:

- Upon activation, the release always starts with heat memory ZERO.
- After a tripping operation, the thermal memories of the phases are set to ZERO.

The thermal memory can be activated by means of a slide switch (ETU45WT, ETU47WT).



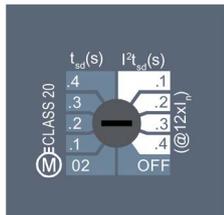
### 7.4.3 Short-time delay short-circuit protection can be switched to I<sup>2</sup>t

The ETU45WT and ETU47WT overcurrent releases support switching from a constant delay time to an I<sup>2</sup>t characteristic. The delay time thus becomes dependent on the short-circuit current when the I<sup>2</sup>t<sub>sd</sub> value is constant, thereby improving selectivity with downstream fuses.

In this case, the setting options for the time-lag class change as follows:

Setting values for t <sub>sd</sub>	
ETU45WT, ETU47WT	t <sub>sd</sub> = 0.1 / 0.2 / 0.3 / 0.4 s (at 12 x I <sub>n</sub> )

You can switch to the I<sup>2</sup>t<sub>sd</sub>-dependent characteristic using the t<sub>sd</sub> rotary coding switch by setting it to one of the white values.



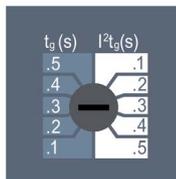
### 7.4.4 Ground fault protection can be switched to I<sup>2</sup>t characteristic

Ground fault protection for the ETU47WT overcurrent release supports switching from a constant delay time to an I<sup>2</sup>t characteristic.

This results in a tripping characteristic with a current-dependent delay time when the I<sup>2</sup>t<sub>g</sub> value is constant and, in switchgear with more than one grading level, improves selectivity with respect to ground fault protection.

Setting values for t <sub>g</sub>	
ETU47WT	t <sub>g</sub> = 0.1 / 0.2 / 0.3 / 0.4 / 0.5 (at 3 x I <sub>g</sub> )

You can switch to the I<sup>2</sup>t<sub>g</sub>-dependent characteristic using the t<sub>g</sub> rotary coding switch (ETU47WT) by setting it to one of the white values.



## 7.5 Menus on the ETU display

When you press the menu button briefly (< 1 s), you can switch from one menu to another. The following consecutive menu displays can be selected:

I1  
... A

Current in phase L1

I2  
... A

Current in phase L2

I3  
... A

Current in phase L3

IN  
... A

Current in neutral conductor  
(for ETU37WT to ETU47WT only)

IG  
... A

Ground fault current  
(for ETU37WT and ETU47WT only)

I<sub>max</sub>  
... A

Current of phase with highest load of L1, L2, L3, and N

The reason for tripping is displayed during a tripping operation.



LT tripping operation



ST tripping operation



INST tripping operation



N tripping operation  
(for ETU37WT to ETU47WT only)



Ground-fault tripping  
(for ETU37WT and ETU47WT only)

## Commissioning

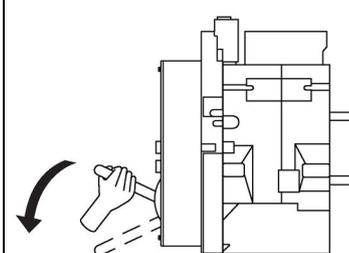
### 8.1 Charging the stored-energy spring mechanism

**⚠ WARNING**

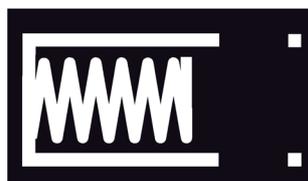
**Can cause injury.**

When the circuit-breaker has been removed from the system with an unloaded stored-energy spring mechanism, it must be placed on a stable surface (e.g. on a workbench during maintenance).

#### Manual charging



Pump movements 5x

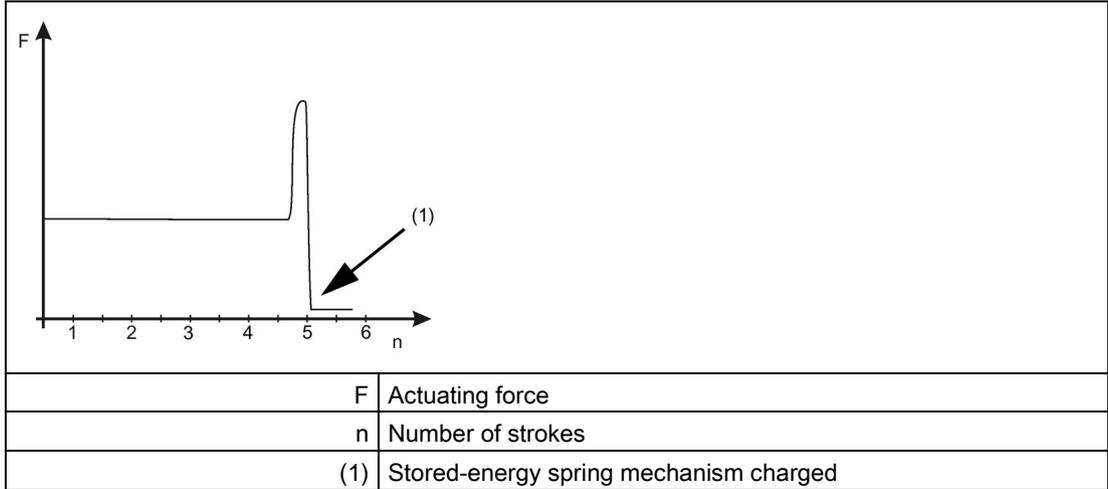


Stored-energy spring mechanism charged

#### Note

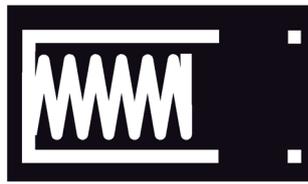
To charge the stored-energy spring mechanism, grasp the charging lever securely and move it as far as it will go. Make sure that each movement is as smooth as possible. The fifth stroke must be made as far and as smoothly as the previous four strokes, even though the force required to actuate the lever increases considerably. Once the stored-energy spring mechanism has been fully charged, the charging lever can be moved without resistance.

8.1 Charging the stored-energy spring mechanism



**By means of motorized operating mechanism**

This occurs automatically once the control voltage has been applied (the motorized operating mechanism is shut down as soon as charging is complete).



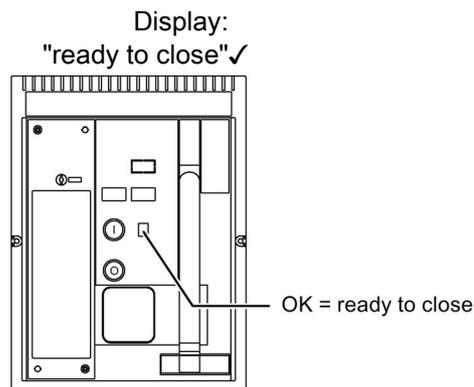
Stored-energy spring mechanism charged

## 8.2 Preparing for operation

### Preparing for operation

Commissioning checklist	
Arc chutes attached	✓
Circuit-breaker is OFF	✓
Overcurrent release is installed and RESET pressed	✓
Operating values on the overcurrent release are set	✓
Auxiliary and control voltages are applied (for rated values, see the rating plate)	✓
The main conducting paths are de-energized	✓
Cabinet door is closed	✓
Stored-energy spring mechanism is charged	✓
Withdrawable circuit-breaker in connected position	✓

Conditions (depending on version)		
Undervoltage release	Excited	✓
Shunt release	Not excited	✓
Electrical closing lockout	Not excited	✓
Mechanical reclosing lockout	Set to RESET	✓
Electrical interlocking for closing solenoid	Canceled	✓
Interlock	Not active	✓

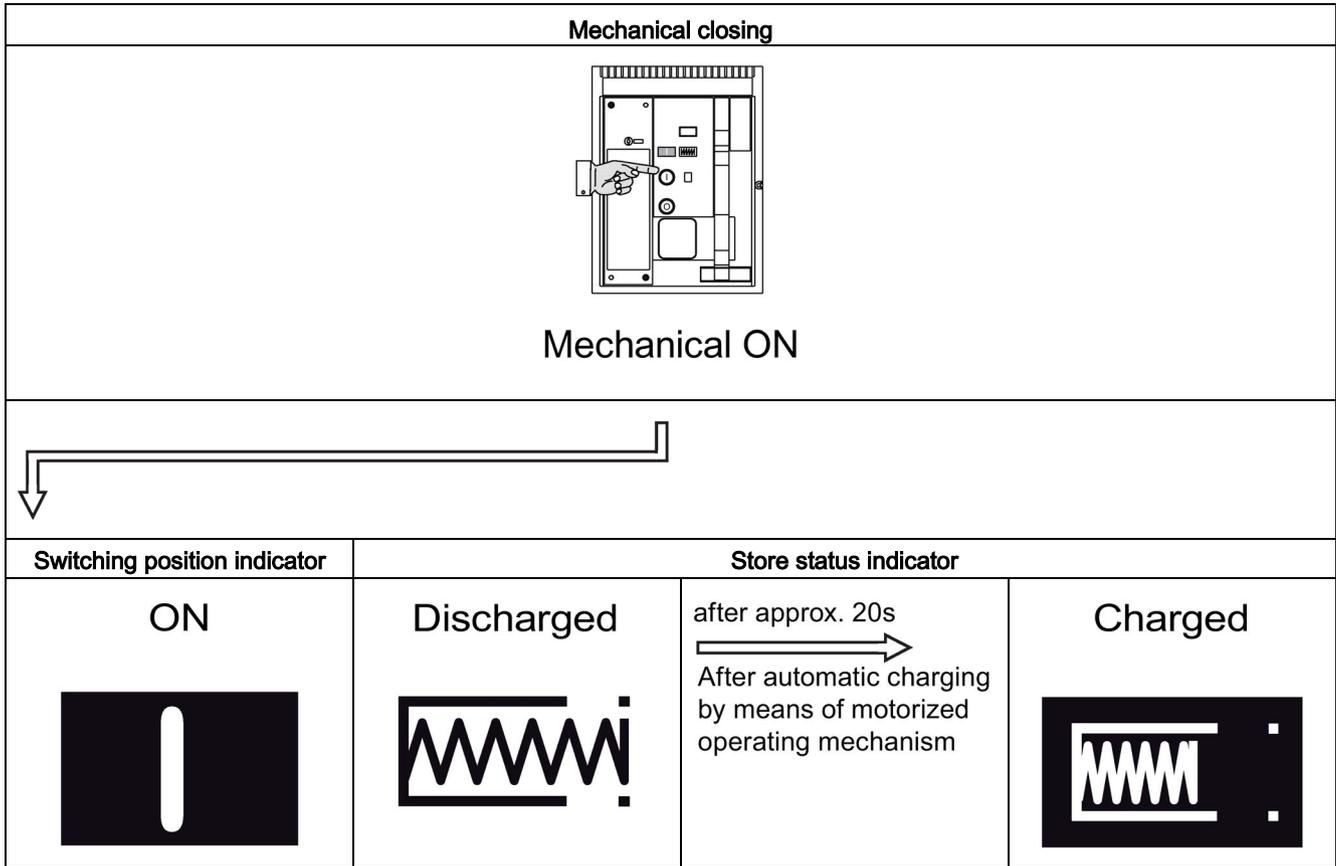


#### Note

1. The circuit-breaker must only be closed when the overcurrent release has been installed (with the exception of non-automatic circuit-breakers).
2. Never remove overcurrent releases under load since this can damage the overcurrent release / current transformer.

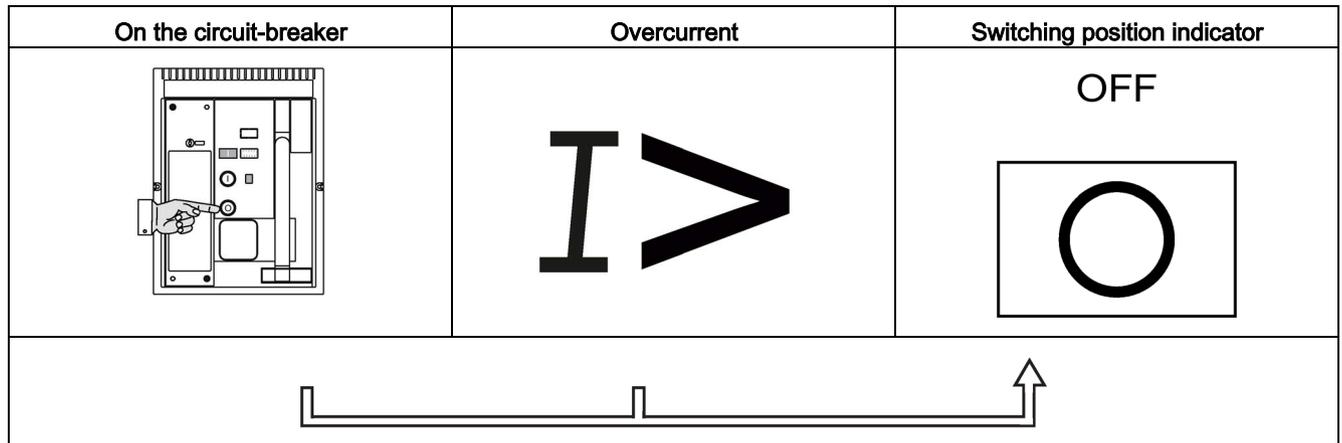
### 8.3 Closing operation

#### Closing operation

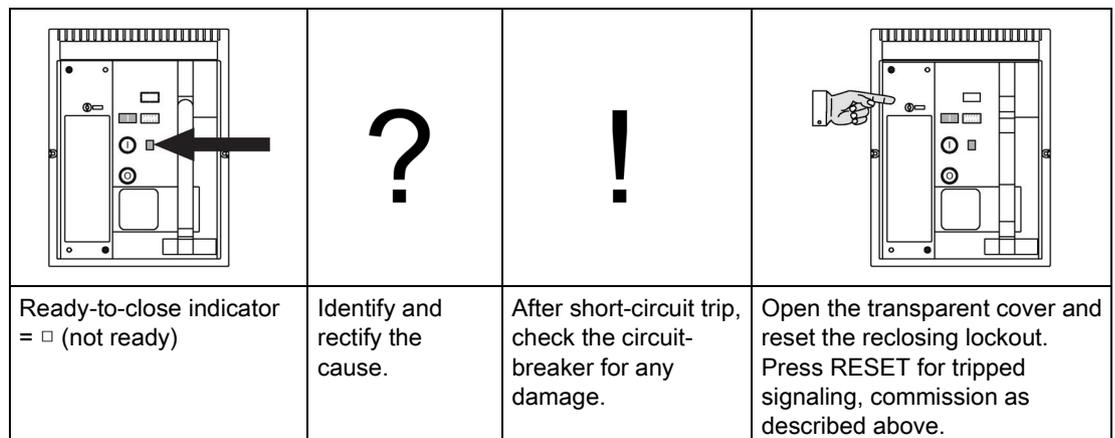


## 8.4 Opening operation

### Opening operation



## 8.5 Recommissioning after opening operation by means of overcurrent release







**! DANGER**

**Hazardous voltage**

During operation, certain circuit-breaker components are subject to hazardous voltages or spring force. If you come into contact with live components, this can result in death or serious injury.

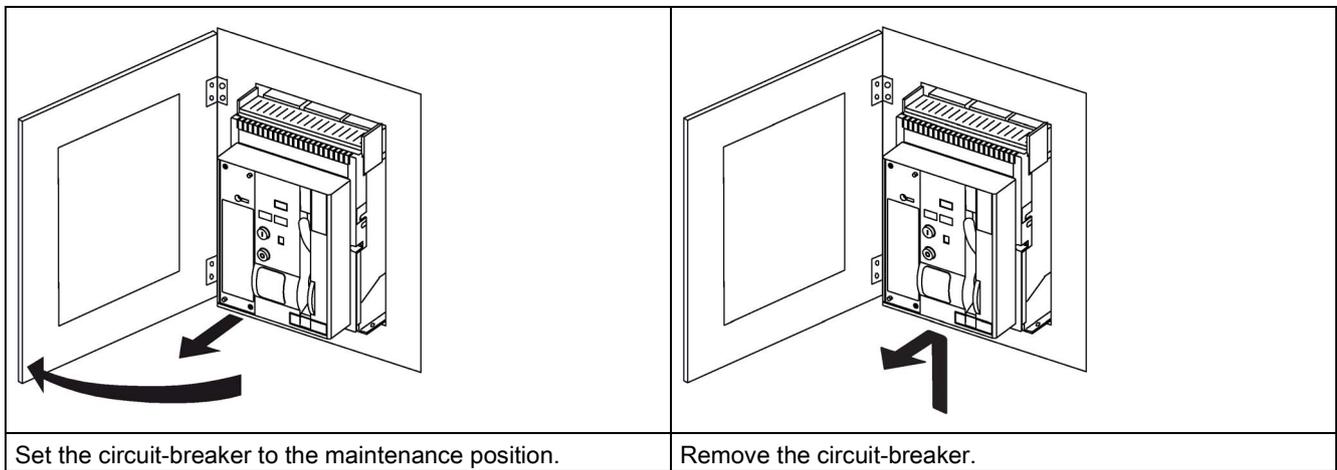
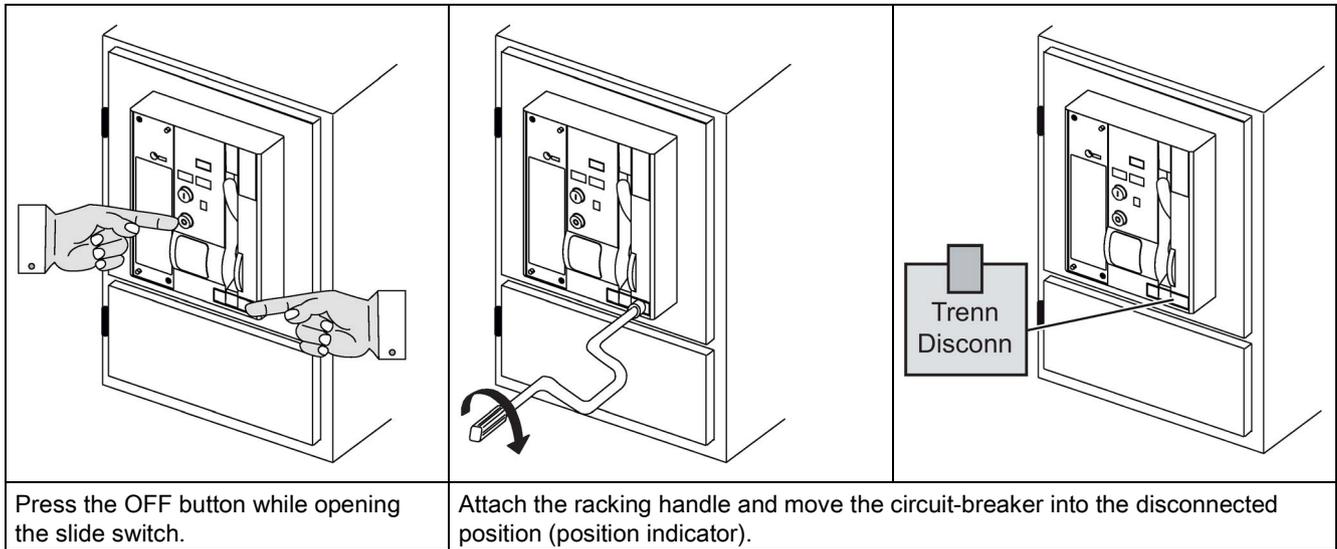
Maintenance must only be carried out by authorized personnel.

## Preparation

1. Disconnect the main/control circuits from the power supply and set the withdrawable circuit-breaker to the maintenance position.
2. Open the circuit-breaker mechanically (see table).

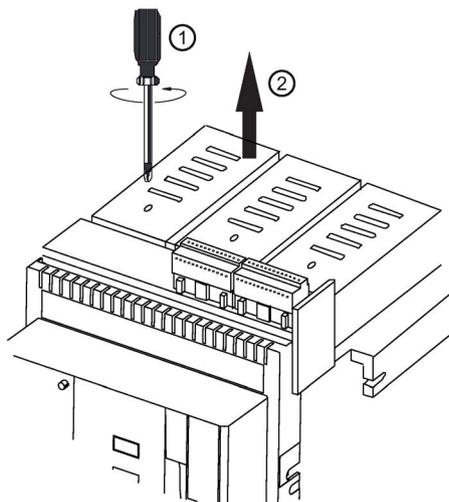
<p>Opening operation</p>	<p>Switch the breaker until the main spring status indicator shows "discharged" and the breaker status indicator shows "not ready to close".</p>	<p>Opening operation</p>	<p>Indicator</p>

### 9.1 Removing the withdrawable circuit-breaker



## 9.2 Checking the arc chutes

- Every 12 months or after 1000 switching operations
- After serious shutdowns

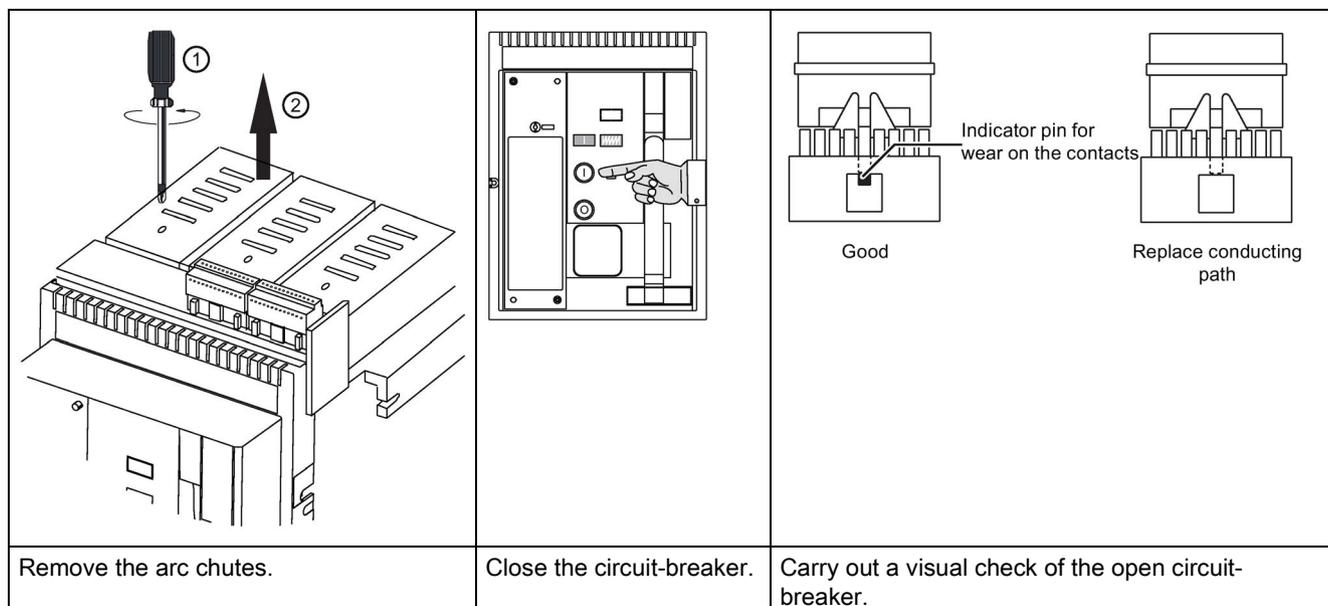


Remove the arc chutes.

If severe wear and tear is present (e.g. burns on the arc splitters), replace the arc chutes.

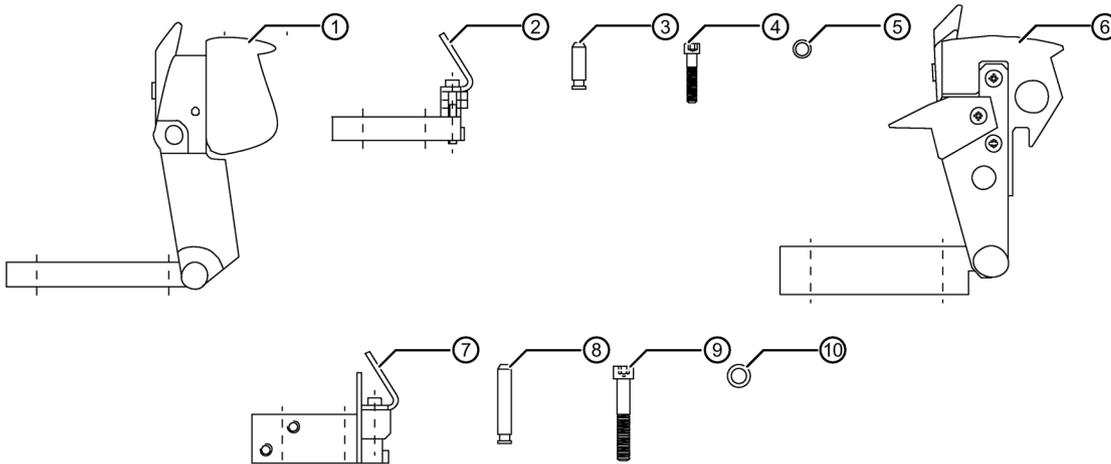
## 9.3 Checking the wear on the contacts

- Every 12 months or after 1000 switching operations
- After serious shutdowns



## 9.4 Replacing the conducting paths

Check the contents of the packaging



Frame size I

①	Contact carrier, cpl.	1x
②	Conducting path, fixed	1x
③	Coupling bolt	1x
④	Cylinder-head screw M6 x 30 DIN 912	4x
⑤	Strain washer 6 DIN 6796	4x

Frame size II

⑥	Contact carrier, cpl.	1x
⑦	Conducting path, fixed	1x
⑧	Coupling bolt	1x
⑨	Cylinder-head screw M8 x 50 DIN 912	4x
⑩	Strain washer 8 DIN 6796	4x

**⚠ DANGER**

**Hazardous voltage!  
Hazardous stored-energy spring mechanism**

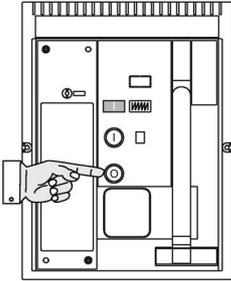
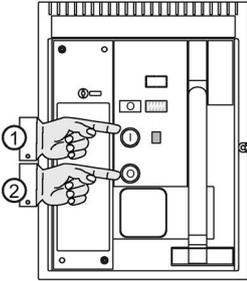
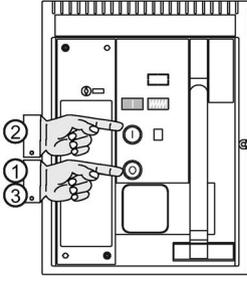
Before starting work, disconnect the device from the supply and ensure that it cannot be switched on. Only carry out work on the device when the circuit-breaker is open and the stored-energy spring mechanism is discharged (see page 3). Failure to do so can result in death, severe injury, or substantial material damage.

The devices must be installed and mounted by authorized personnel only.

**Note:**

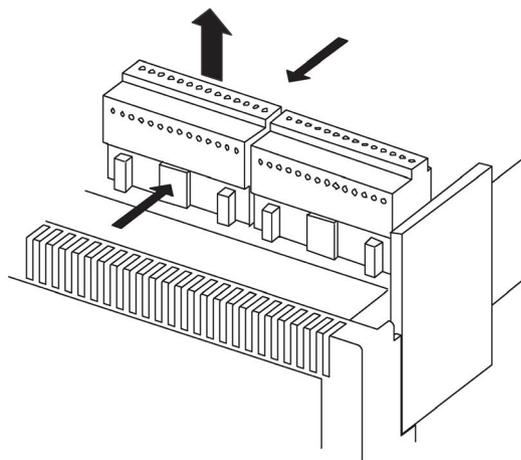
The shape of the connection bars on the contact carriers ① and ⑥ and on the conducting paths ② and ⑦ varies depending on the version you have ordered. The installation/mounting procedure is the same for all versions.

Opening the circuit-breaker / discharging the stored-energy spring mechanism

Possible status:	Circuit-breaker CLOSED	Open circuit-breaker	Circuit-breaker CLOSED
	Stored-energy spring mechanism discharged	Stored-energy spring mechanism charged	Stored-energy spring mechanism charged
Actuating sequence:	OPEN	CLOSED - OPEN	OPEN - CLOSED - OPEN
			

Preparatory work

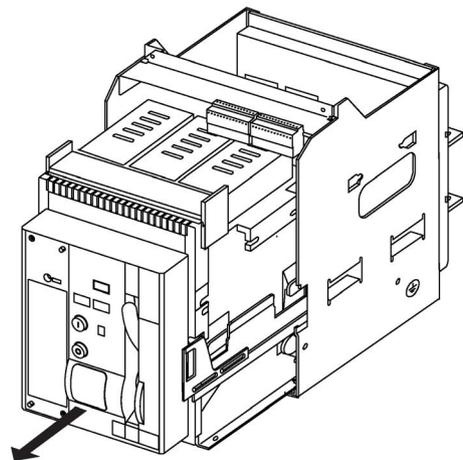
Fixed-mounted circuit-breaker



Remove the manual connector and take out the circuit-breaker.

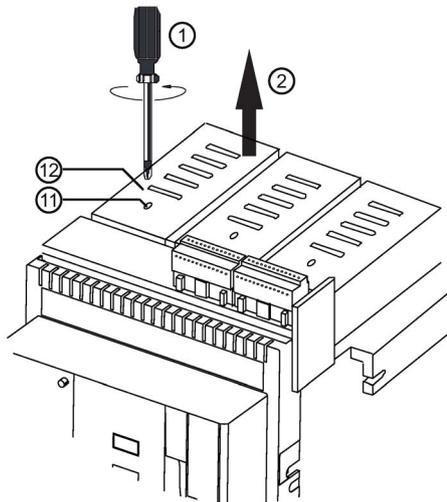
To remove the manual connector(s), push them up. Make sure that the connected cables are not bent.

Withdrawable circuit-breaker

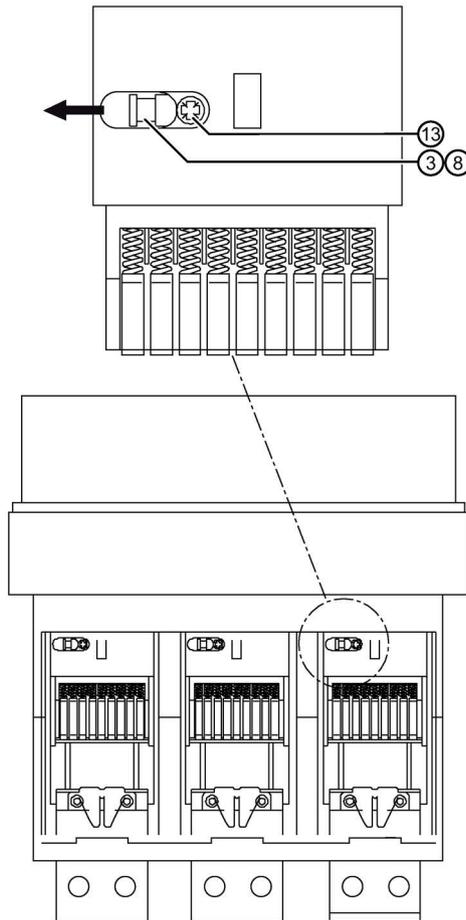


Set the circuit-breaker to the maintenance position and remove from the system.

### Unscrew arc chutes



- Remove the fixing screws ⑪ for the arc chutes ⑫.
- Lift off the arc chutes.

**Disconnecting the contact carriers (frame sizes I and II)**

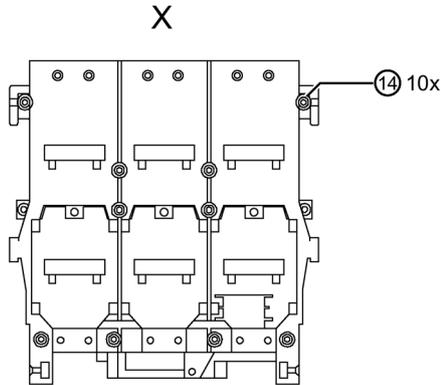
- Loosen the locking bolt ⑬ (do not remove completely).
- Press out the coupling bolt ③ or ⑧ by means of a screwdriver (as shown).

**Note:**

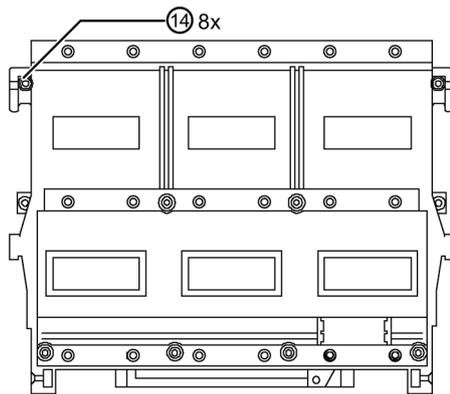
With frame size II, the locking bolt ⑬ with cover must be removed completely.

### Removing the rear housing panel

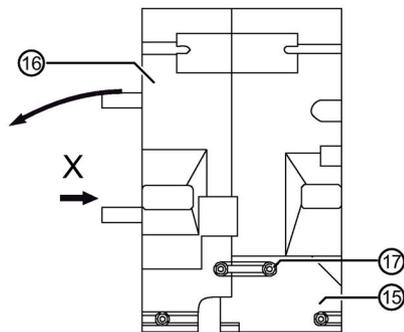
#### Frame size I



#### Frame size II

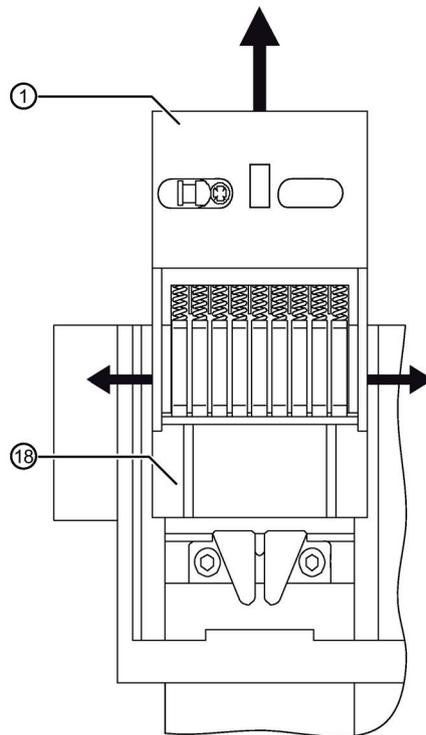


#### Frame sizes I and II



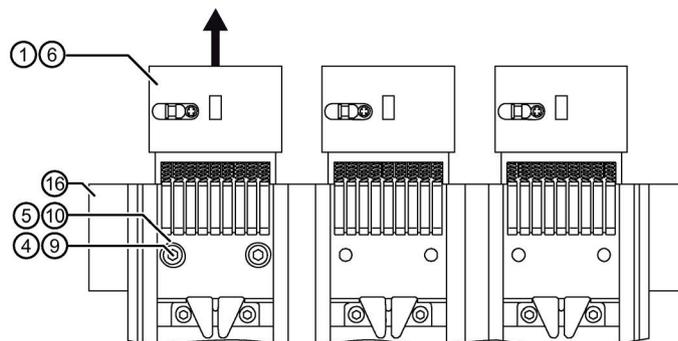
- Remove the cylinder-head screws 14.
- Unscrew the countersunk head screws 17 on the support bracket 15 of the rear panel 16.
- Loosen the countersunk head screws 17 of the support bracket 15 (do not remove completely).
- Open the rear panel of the circuit-breaker 16 (as shown).

### Removing the insulation (frame size I)



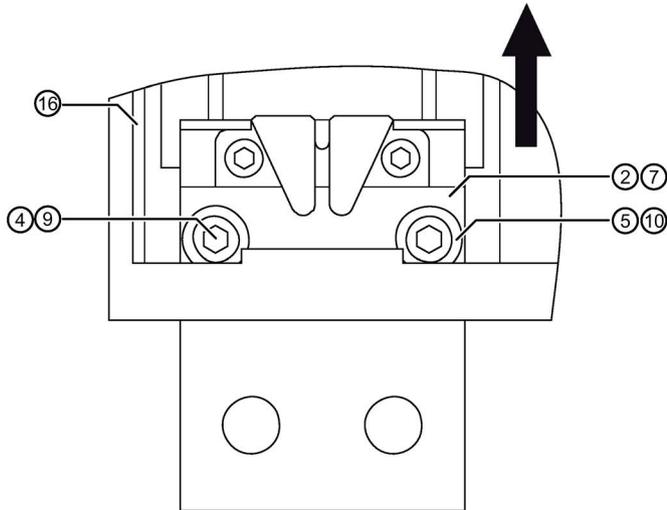
- Lift the contact carrier ① up.
- Pull the insulation ⑱ forward (push the side walls of the insulation ⑱ outward slightly).

### Removing the contact carriers (frame sizes I and II)



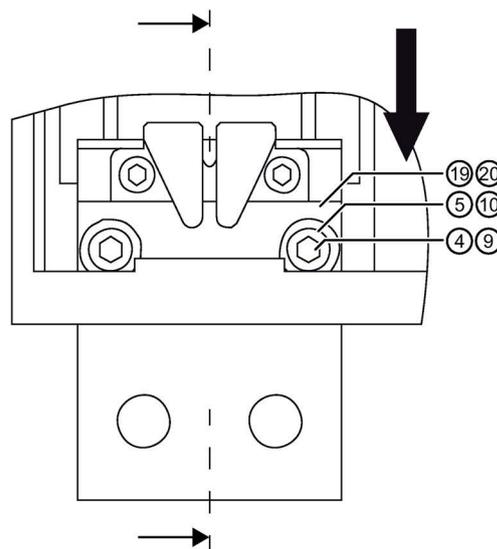
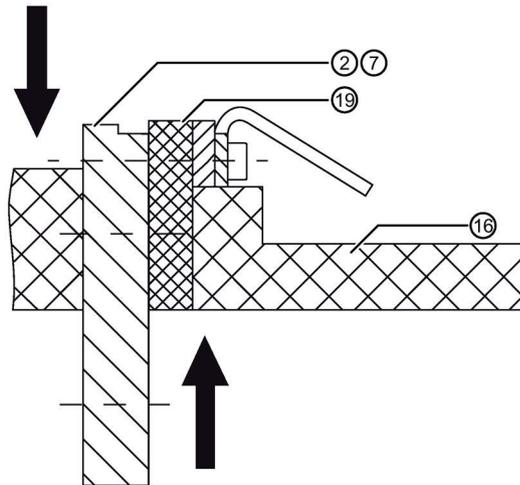
- Lift the contact carrier ① or ⑥ up.
- Unscrew the cylinder-head screw ④ or ⑨ with strain washer ⑤ or ⑩.
- Remove the contact carrier ① or ⑥ from the rear housing panel ⑯ (as shown).

Removing the conducting paths (frame sizes I and II)



- Unscrew the cylinder-head screws ④ or ⑨ with strain washers ⑤ or ⑩.
- Remove the conducting path ② or ⑦ from the rear housing panel ⑯ (as shown).

## Installing the conducting path (frame sizes I and II)

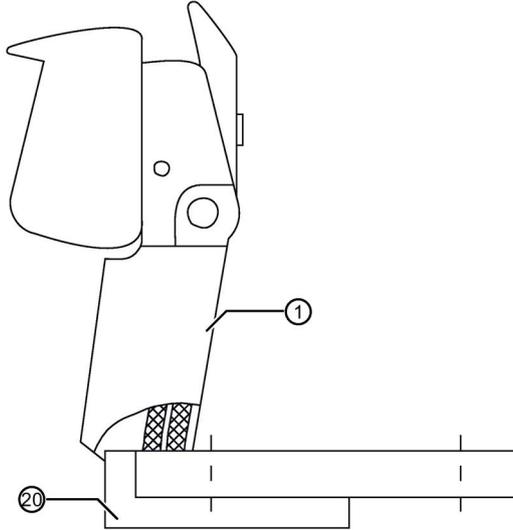


- Push the conducting path ② or ⑦ into the rear housing panel ⑯ from above.
- Push the spacer ⑲ or ⑳ into the rear housing panel ⑯ from below as far as it will go.
- Secure the conducting path ② or ⑦ and spacer ⑲ or ⑳ with cylinder-head screws ④ or ⑨ and strain washers ⑤ or ⑩ to the rear housing panel ⑯ (tighten by hand only).

**Note:**

The spacer (19 or 20) is not required for versions other than 3WT9821-0AA00.

Attaching the spacer (frame size I)

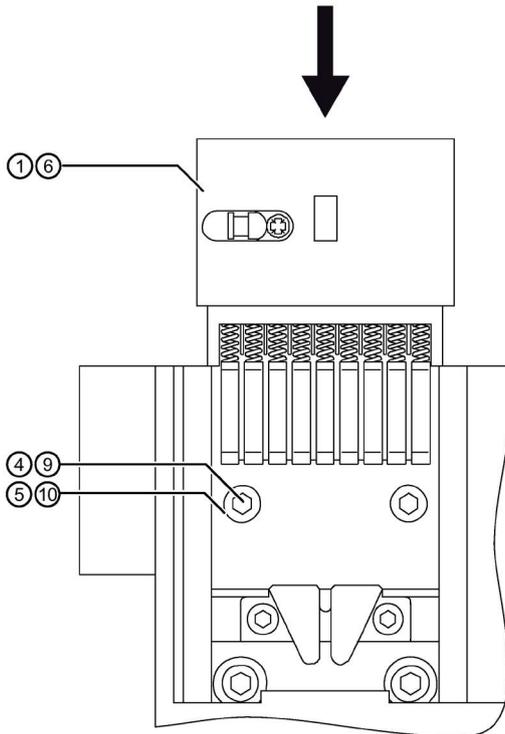


- Attach the spacer ⑳ to the contact carrier ① (as shown).

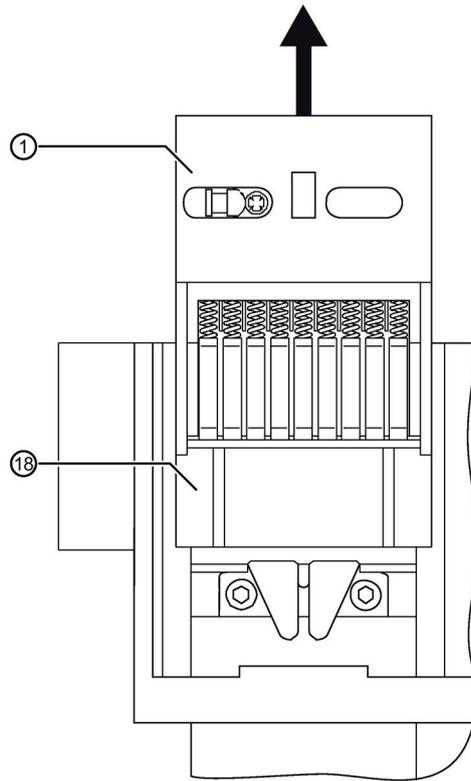
**Note:**

The spacer ⑳ is not required for versions other than 3WT9821-0AA00.

Installing the contact carriers (frame sizes I and II)



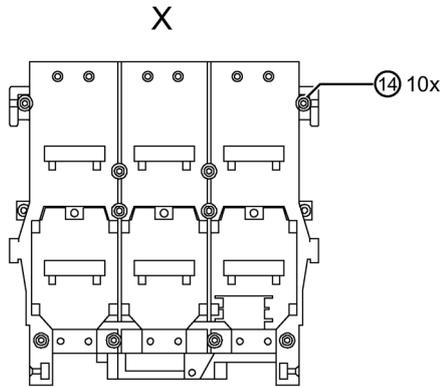
- Insert the contact carrier ① or ⑥ (if necessary, with spacer ⑳) into the rear housing panel ⑯ and secure with cylinder-head screws ④ or ⑨ and strain washers ⑤ or ⑩ (tightening torque:  $8 \pm 1$  Nm ④;  $12 \pm 1$  Nm ⑨)

**Installing the insulation (frame size I)**

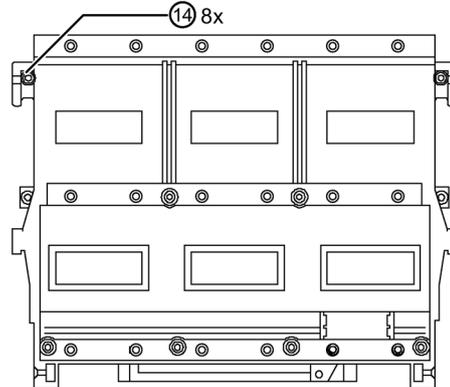
- Lift the contact carrier ① up.
- Attach the insulation ⑱ to the contact carrier ① (must audibly engage).

### Removing the rear housing panel

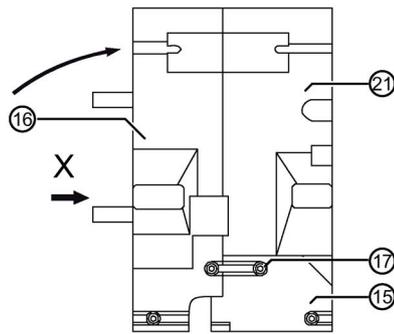
Frame size I



Frame size II

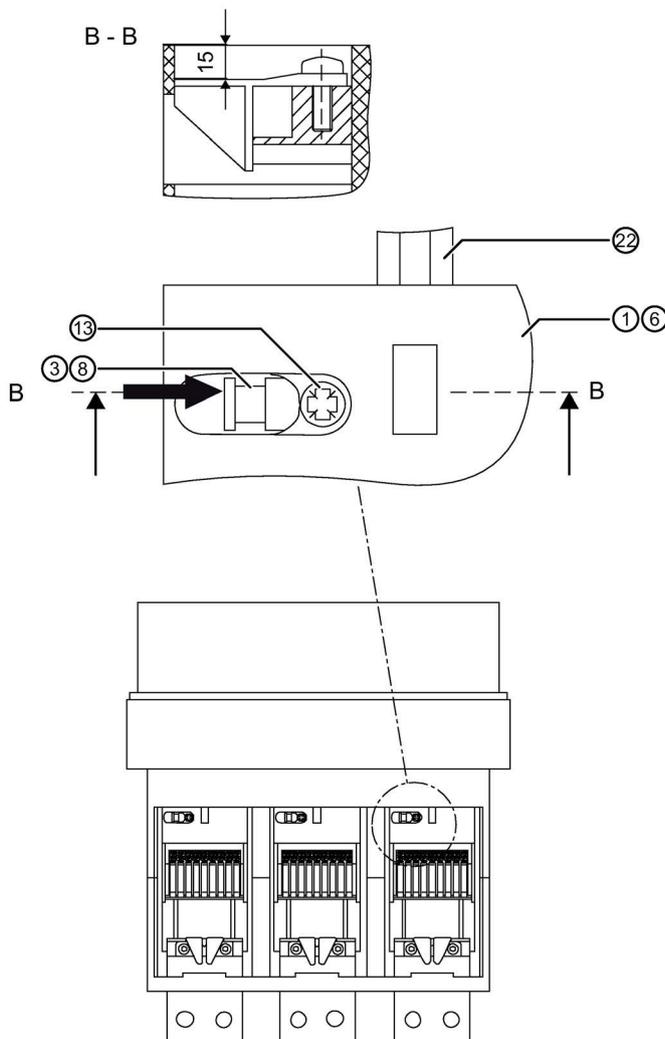


Rear housing panel: frame sizes I and II



- Place the rear housing panel ⑯ up against the housing ⑳. When doing so, make sure that you do not trap any cables.
- Secure the support bracket ⑮ and housing ㉑ or rear housing panel ⑯ by means of countersunk head screws ⑰ (tightening torque:  $6 \pm 1$  Nm).
- Secure the cylinder-head screws ⑭ (tightening torque:  $10 \pm 1$  Nm).

## Connecting the contact carriers (frame sizes I and II)

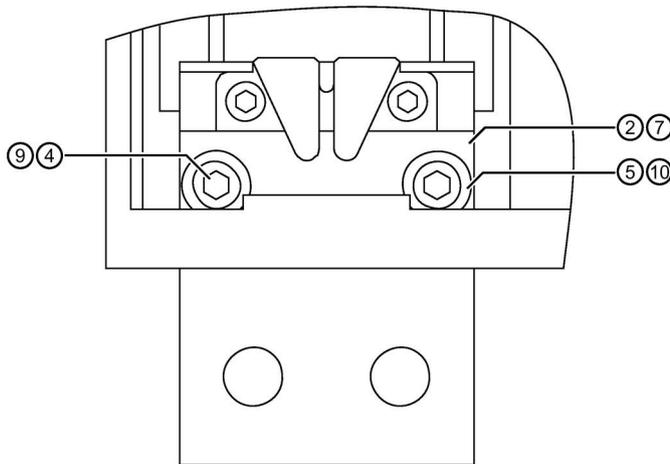


- Press the contact carrier ① or ⑥ toward the coupling clips ②② (as shown). When doing so, make sure that the coupling clips ②② fully accommodate the contact carrier ① or ⑥.
- Insert the coupling bolt as shown (③ or ⑧) by means of a screwdriver (to the right).
- Secure the coupling bolt ③ or ⑧ by means of a locking bolt ⑬ (tightening torque:  $2 \pm 0.3 \text{ Nm}$ ).

**Note:**

With frame size II as of 09/95, the locking bolt ⑬ (with cover) must be screwed in again (tightening torque:  $2 \pm 0.3 \text{ Nm}$ ).

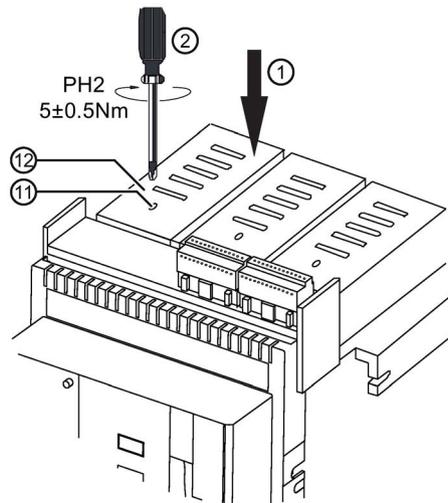
Final installation of the conducting path (frame sizes I and II)



 <b>CAUTION</b>
<b>Hazardous stored-energy spring mechanism</b>

- Charge the stored-energy spring mechanism and close the circuit-breaker.
- Close the circuit-breaker, making sure that you take the necessary precautions.
- Secure the cylinder-head screws ④ or ⑨ with strain washers ⑤ or ⑩ (tightening torque: frame size I  $8 \pm 1$  Nm, frame size II  $12 \pm 1$  Nm)

## Attaching the arc chutes



- Attach the arc chutes ⑫.
- Secure the arc chutes ⑫ by means of fixing screws ⑪.

## Functional test

### Mechanical functional test

- Charge the stored-energy spring mechanism manually.
- Close.
- Open.
- Check the indicator for wear on the contacts again.

## 9.5 Internal self-test of the overcurrent release function

For commissioning and checking the function of the device.

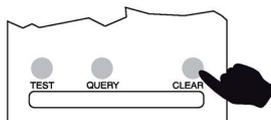
### Requirements

- The release is activated by means of:  
operational current
- The current is not in the overload range  
→ for indicators, see (Indicators on the overcurrent release (Page 43))

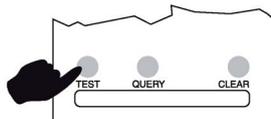
### Internal self-test of circuit-breaker without tripping operation

Normal operation of the circuit-breaker is not affected.

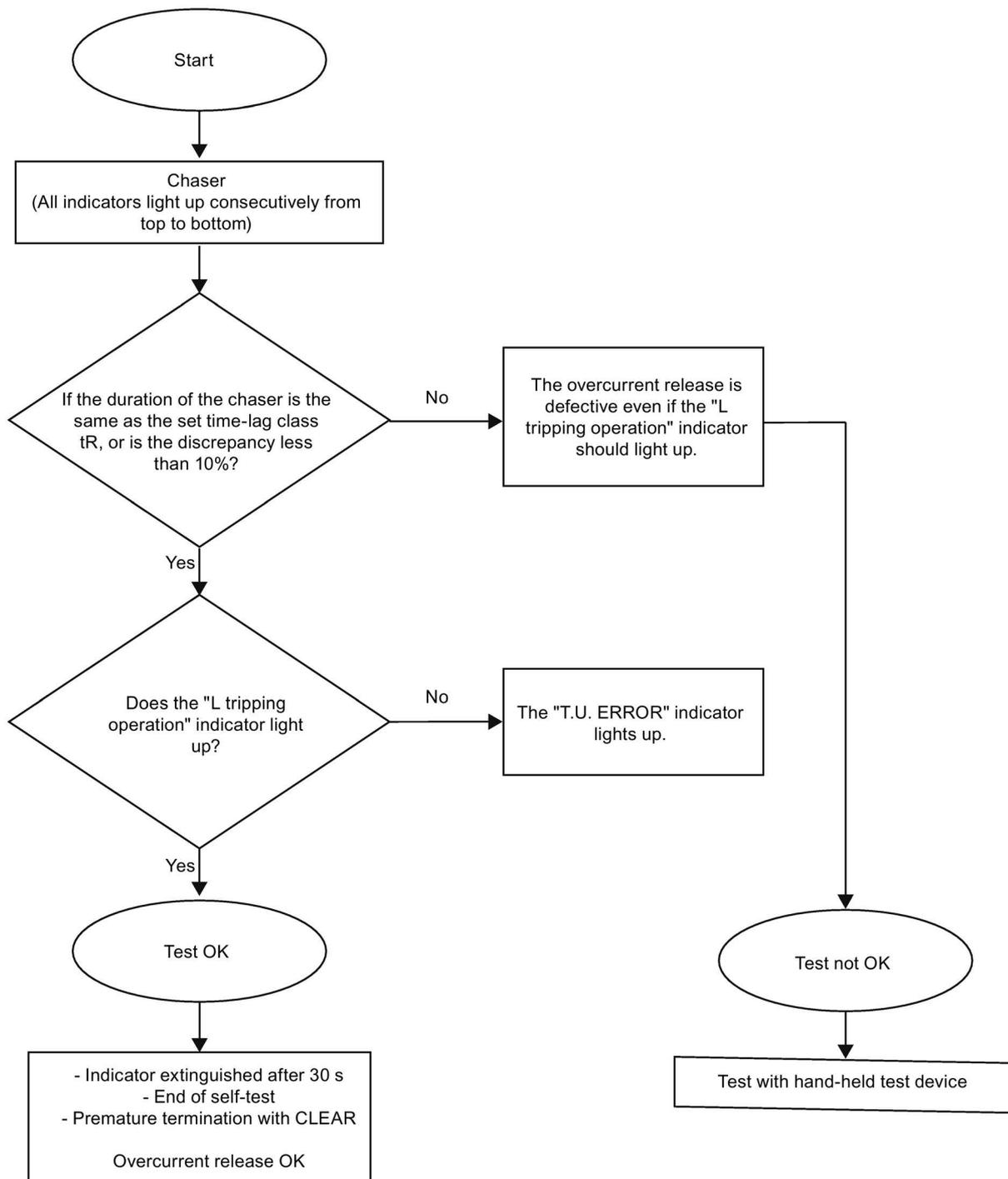
The test can be terminated at any point with "CLEAR".



Start the self-test.



**Self-test procedure**



## 9.6 Internal self-test of circuit-breaker with tripping operation

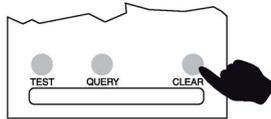
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### Note

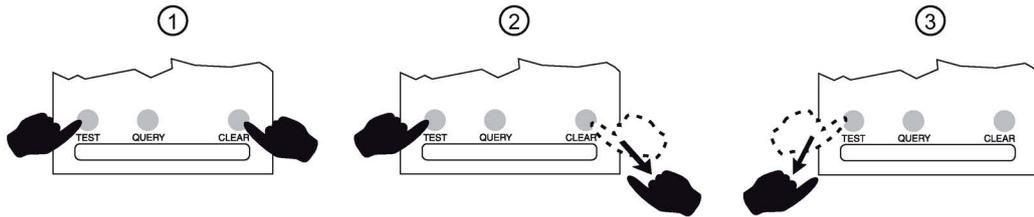
The internal self-test with tripping operation must only be carried out when the downstream circuits have been shut down.

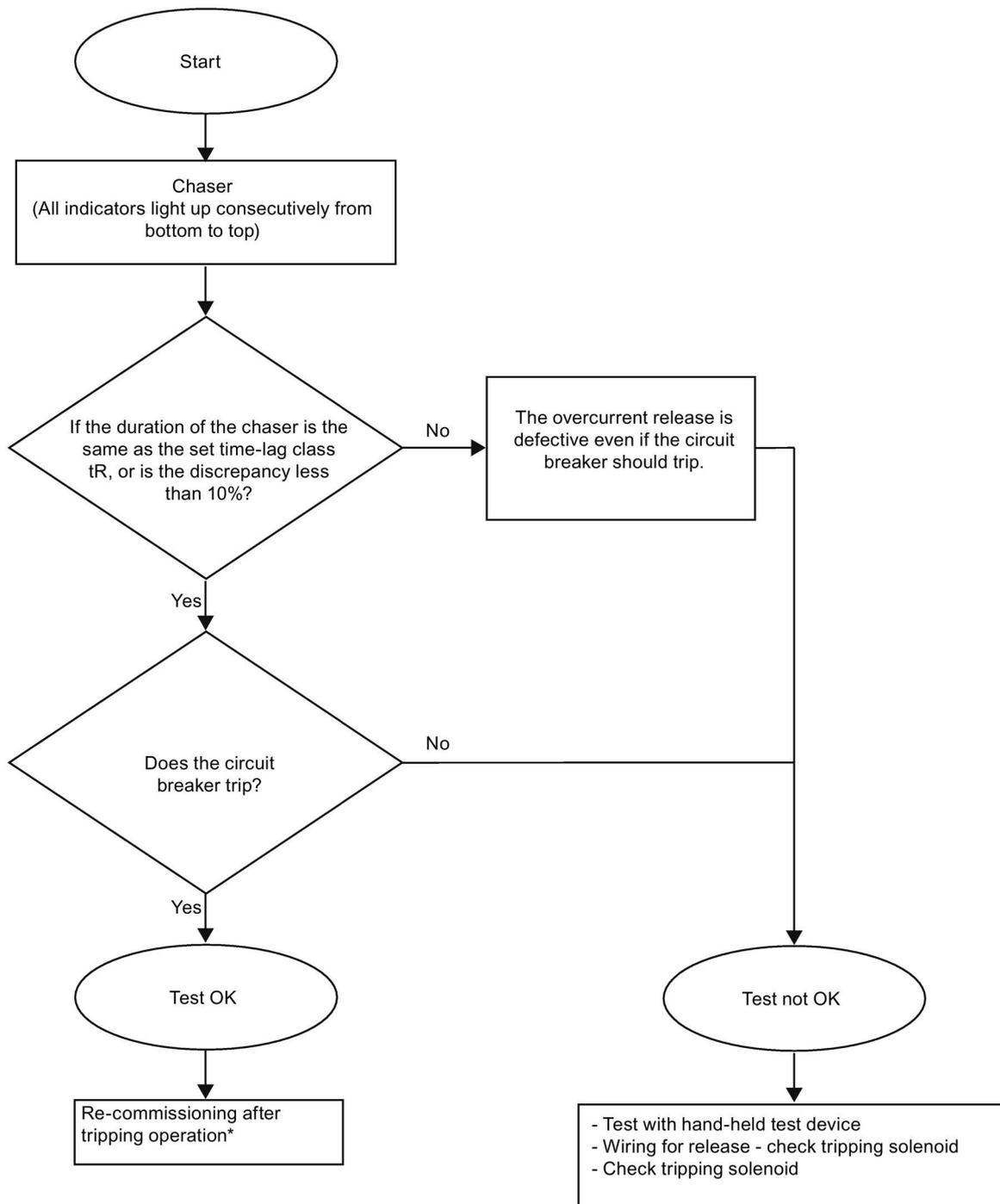
---

The test can be terminated at any point with "CLEAR".



Start the self-test.



**Self-test procedure****See also**

Recommissioning after opening operation by means of overcurrent release (Page 65)

## 9.7 Replacing the overcurrent release

### Removal

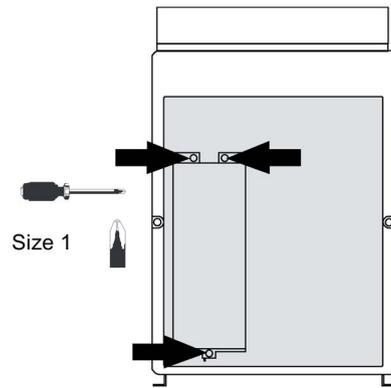
See Removing the operating device (Page 93)

### Removal

Note the current overcurrent release settings.



Remove the nuts and washers.



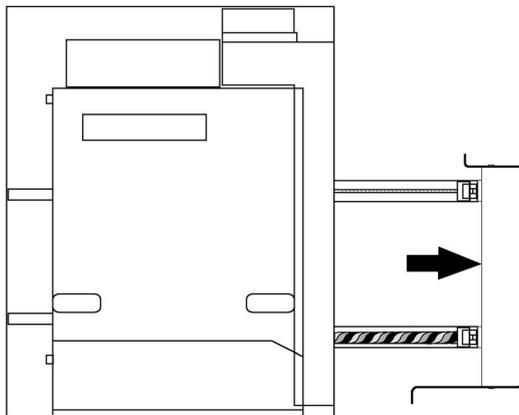
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### Note

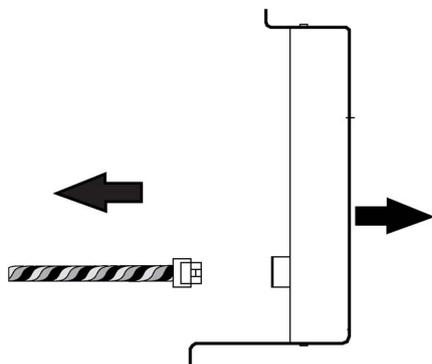
Carefully pull the release forward.

Make sure that you do not damage the cable harness.

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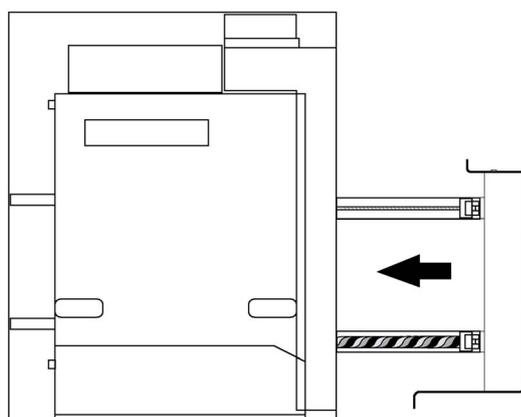


Remove the connector (press the release buttons).

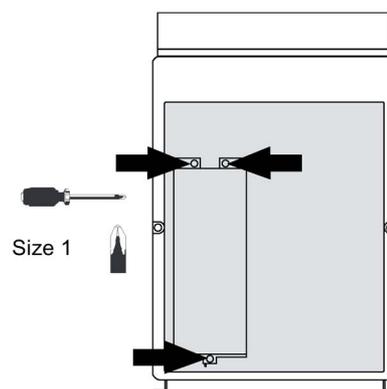


### Installation

Remove the connector.



Secure the release.



### Installation

See Installing the operating device (Page 95)

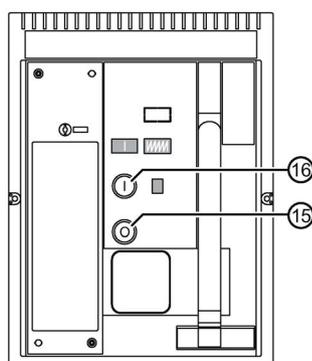


## Accessories

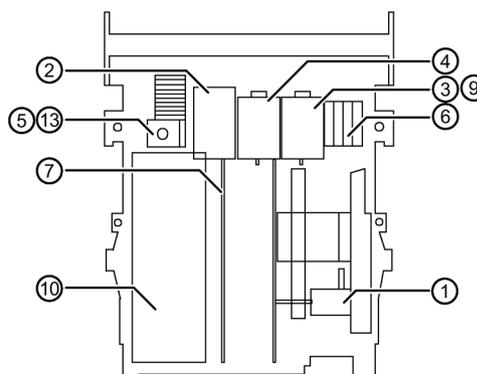
### 10.1 Accessories

#### Version specific

Operator panel



Circuit-breaker, operator panel removed



#### For closing operation

①	Motorized operating mechanism -M
②	Closing solenoid -Y1

#### For opening operation

③	Shunt release -F1
④	Shunt release -F2
⑤	Tripping solenoid -F5

#### For monitoring

⑥	Auxiliary switch for switching position indication -S1...-S6
⑦	Ready-to-close signaling switch -S7
⑨	Undervoltage release -F3
⑨	Undervoltage release with delay -F8
⑩	Overcurrent release -A1

#### For interlocking

⑬	Reclosing lockout -F5 with tripped signaling contact -S11
⑮	Key-operated pushbutton "OFF"
⑯	Key-operated pushbutton "ON" (mechanical)

## 10.2 Accessories - general

The following sections describe the accessories available for 3WT8. In some cases, the front cover and manual connector may have to be removed. If a withdrawable circuit-breaker is used, it must be set to the maintenance position. The different activities are described in the following sections.

 **DANGER**

**Hazardous voltage**

**Hazardous stored-energy spring mechanism**

Before starting work, the device must be disconnected from the supply and protected against reactivation.

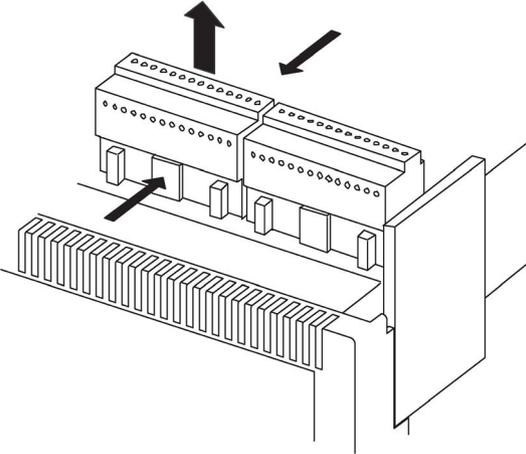
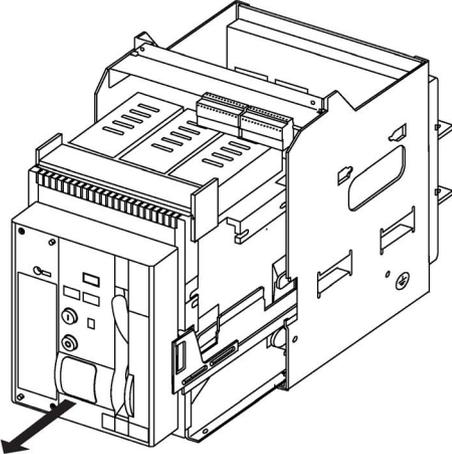
Only carry out work on the device when the circuit-breaker is shut down and the stored-energy spring mechanism is discharged.

Failure to do so can result in death, severe injury, or substantial material damage.

The devices must be installed and mounted by qualified, authorized personnel only.

## 10.2.1 Removing the operating device

### Preparatory work

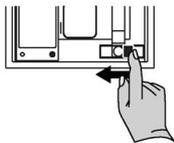
Fixed-mounted circuit-breaker	Withdrawable circuit-breaker
	
Remove the manual connector.	Set the circuit-breaker to the maintenance position or remove it from the system.

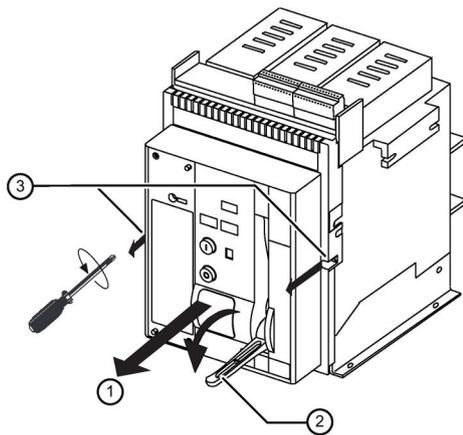
To remove the manual connector(s), push them up. Make sure that the connected cables are not bent.

### Removing the operator panel

#### Note

For withdrawable circuit-breakers: first close the racking hole, then remove the operator panel.





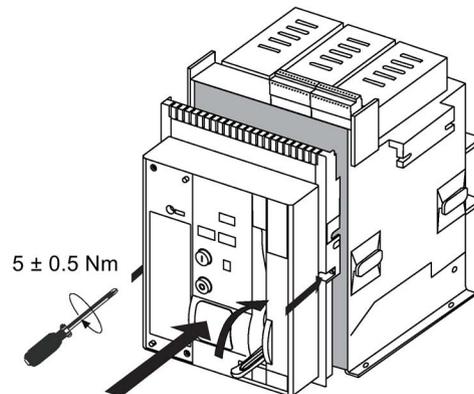
- Remove the fixing screws ③ (2 x).
- Tool: cross-tip screwdriver (size 3)
- Move the charging lever ② until you feel resistance.
- Remove the front cover ① by lifting it up and forward.
- Set down the front cover so that its inside is facing down.

## 10.2.2 Installing the operating device

### Note

For withdrawable circuit-breakers: first close the racking hole, then attach the operator panel.

### Attaching the operator panel



- Attach the front cover (operator panel) by following the above steps in reverse order. When doing so, push the clamping lever forward until you feel resistance and attach the front cover from above. The fixing screws are tightened to 5 Nm.

### Final steps

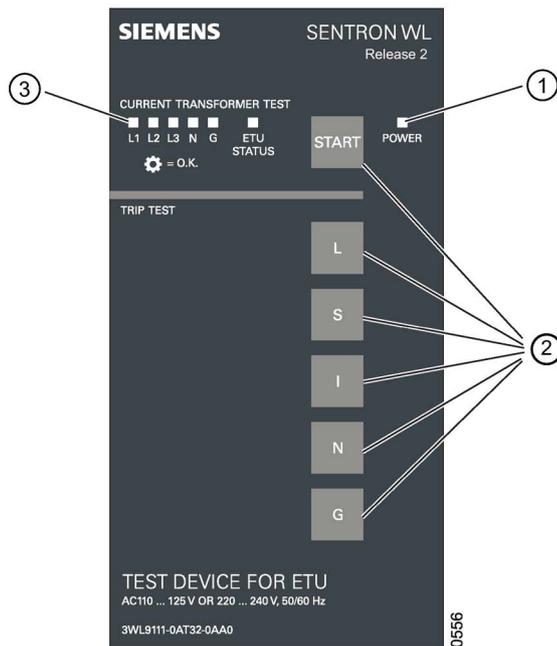
- Fixed-mounted circuit-breaker: connect the manual connector. When doing so, make sure that you do not trap any cables.
- Withdrawable circuit-breaker: rack to the test position (from disconnected position to test position: approx. 22 rotations of the racking handle).

## 10.3 Hand-held test device

The hand-held test device is used to check that the following devices function properly:

- Overcurrent release
- Energy and current transformer
- Tripping solenoid F5
- Measured value display

### View



- ① LED for indicating the operating voltage
- ② Control keys
- ③ 6 LEDs for indicating the test results

## Preparatory work

- Open and disconnect the circuit-breaker.
- Note the setting values of the overcurrent release.
- Deactivate ground fault protection (if available) on the overcurrent release ( $I_g = \text{OFF}$ ).
- Setting value  $I_R = 1.0 I_n$
- Remove the cover cap from test socket X25 on the ETU.



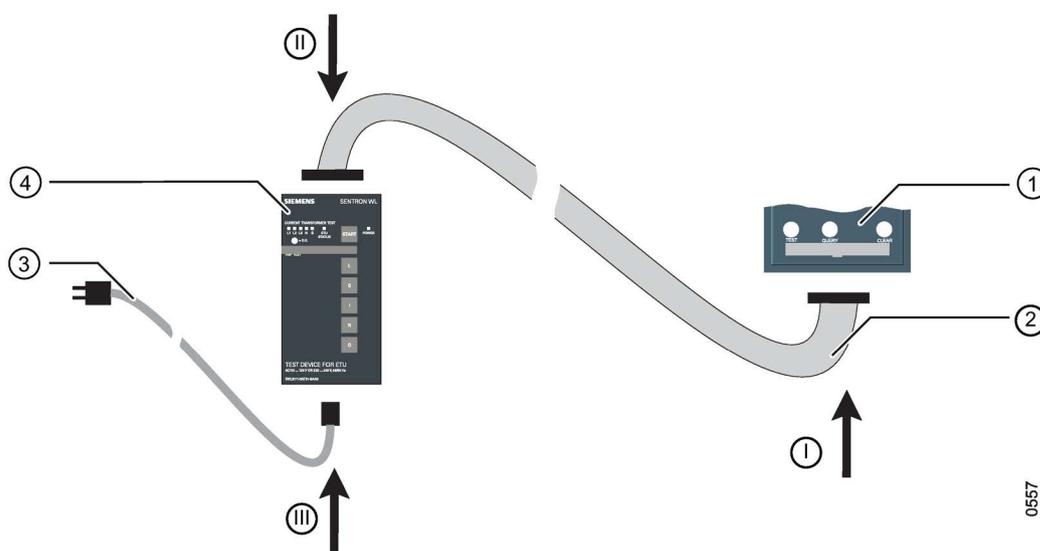
### ⚠ CAUTION

If the hand-held test device is used while the circuit-breaker is closed, this can cause false tripping and destroy the hand-held test device.

## Connection

### Note

Malfunctions and incorrect test results can occur if the connection sequence is not followed.



0557

- ① Test socket on the overcurrent release
- ② Cable with SUB D (40 pole) (hand-held test device) to plug connector (40 pole)
- ③ Power supply
- ④ Hand-held test device

**Power supply**

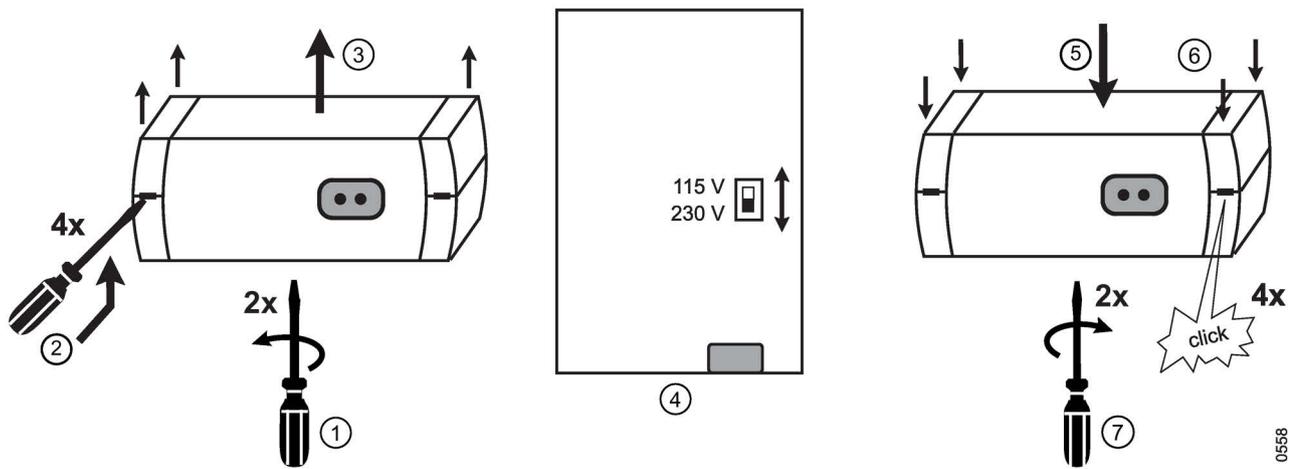
The hand-held test device is supplied from an AC voltage network:

- 220 ... 240 V 50/60 Hz
- 110 ... 125 V 50/60 Hz

Factory setting: 220 ... 240 V

The selector switch is located on the circuit board within the hand-held test device.

**Switching the line voltage**



**Operation**

When the power supply is connected, the status test starts automatically with the querying of different overcurrent release components and parameters. If the status test is successful, the "ETU STATUS" LED lights up (continuous light). If the test is not successful, this means that the overcurrent release or one of its components is either defective or has not been installed.

Indicator	Meaning
1 x short, pause	Test device defective
2 x short, pause	Overcurrent release defective
4 x short, pause	<ul style="list-style-type: none"> <li>• Parameters set incorrectly</li> <li>• Current transformer incorrectly terminated</li> </ul>
5 x short, pause	<ul style="list-style-type: none"> <li>• Tripping solenoid F5 incorrectly connected or defective</li> <li>• Overcurrent release defective</li> </ul>

The status test can be repeated at any time by means of the "START" button (press for at least 3 s). The status test can also be carried out on overcurrent releases that have already been activated. In this case, note that the "ETU STATUS" LED may flash twice briefly when the result of the status test is signaled even if no fault is present. To be on the safe side, the overcurrent release should be deactivated and the status test repeated.

## Testing the transformers

To test the energy and current transformers, press the "START" button (for less than 2 s).



If the LED lights up, this means that the transformer is functioning properly. If the LED flashes, the transformer is either not installed, incorrectly connected, or defective.

## Result of the N transformer test

If the LED flashes (1 s ON, 1 s OFF), this signals a fault with the measuring transformer of the neutral conductor. This might be because a measuring transformer has not been installed (e.g. no external neutral conductor transformer connected), or it has been connected incorrectly, or is defective.

If the LED starts flashing quickly (0.5 s ON, 0.5 s OFF), this signals a fault with the energy transformer of the neutral conductor. This might be because an energy transformer has not been installed (e.g. when an external neutral conductor transformer is connected), or it has been connected incorrectly, or is defective.

## Testing the tripping function

- Charge the stored-energy spring mechanism manually.
- Close the circuit-breaker

To test the tripping function, press either "L", "S", "I", "N", or "G".



The circuit-breaker trips after the set delay time plus 2 seconds. The reason for tripping can be queried via the "QUERY" button on the overcurrent release. To do so, the overcurrent release must have been active for at least 20 minutes. If the circuit-breaker does not trip, the overcurrent release is either not equipped with the relevant protection function or is defective.

## Testing the measured value display

After the tripping test, the capability of the system to store the reasons for tripping must be tested via the "QUERY" button when the ETU is deactivated.

To test the measured value display, press "I" and "N" simultaneously.



Over a period of 30 s, a current is simulated in L1, L2, L3, N, and G consecutively via the measuring transformer. The LEDs of the corresponding transformers flash. The test is considered successful when current is displayed at the relevant point.

### Activating the overcurrent release

To activate the overcurrent release, press "N" and "G" simultaneously.



The overcurrent release remains active until you press a different button.

This function can be used, for example, to test the signaling of the "T.U. Error" LED if the status test ended with the fault "Overcurrent release defective".

### Subsequent steps

- Restore the setting values you noted down.
- Place the cover cap on test socket X25.

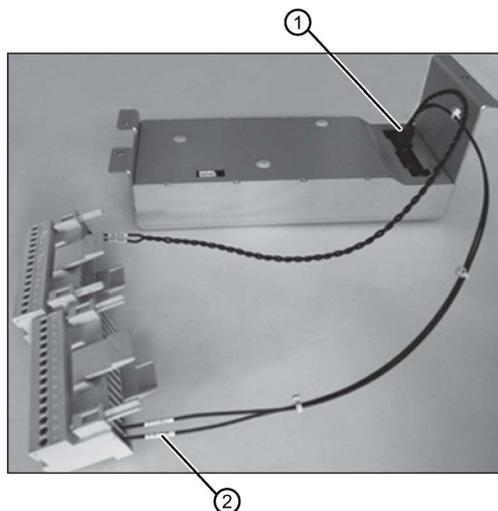
### Article numbers

	Article number
Hand-held test device	3WL9111-0TA32-0AA0

## 10.4 Retrofitting the internal N transformer

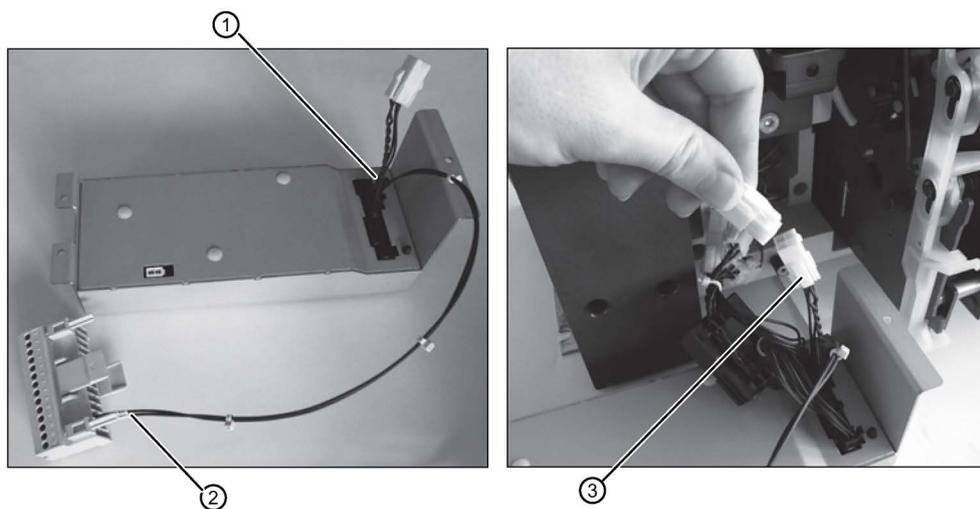
- Remove the overcurrent release (for details, see Replacing the overcurrent release (Page 88)).

### Removing the cable harness from the overcurrent release



- ① Unplug the connector from X24.
- ② Remove the cable from terminals 1 and 2 of secondary disconnect X300 as well as from terminals 13 and 14 of male connector X400.

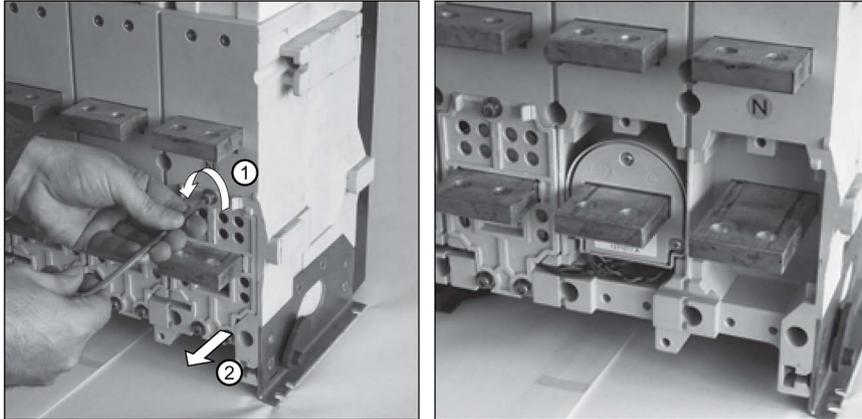
### Attaching a new cable harness to the overcurrent release



- ① Attach cores X400.13 and X400.14 to terminals 13 and 14 of secondary disconnect X400.
- ② Plug the connector into X24.
- ③ Connect the connector to the N transformer in the circuit-breaker.

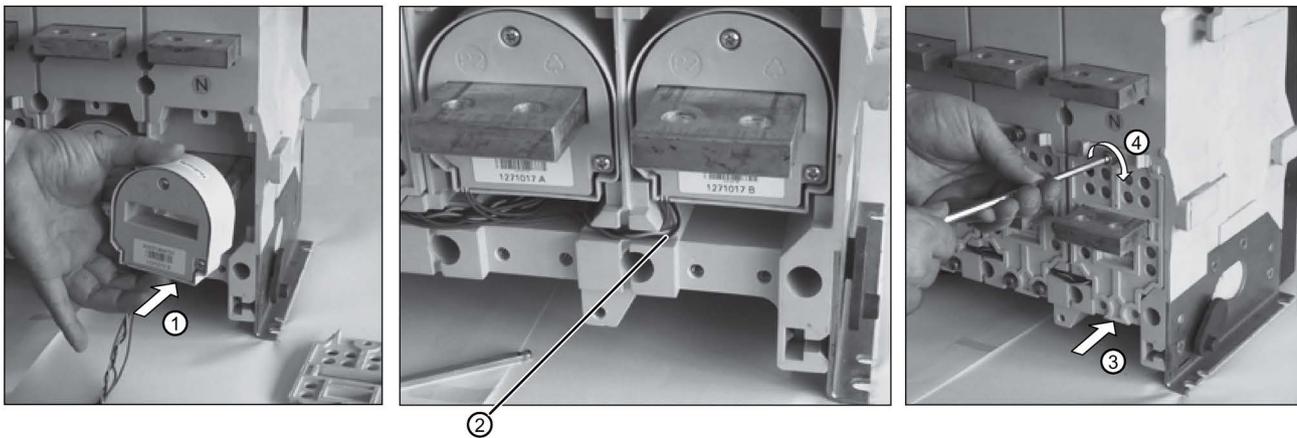
10.4 Retrofitting the internal N transformer

Remove the transformer covers on the N conductor connection and phase L3

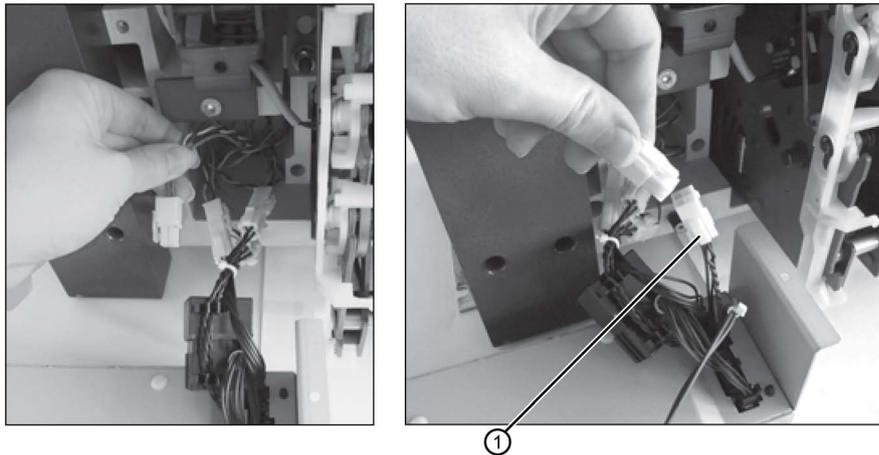


- ① Remove the screws.
- ② Remove the transformer cover.

Installing the N transformer

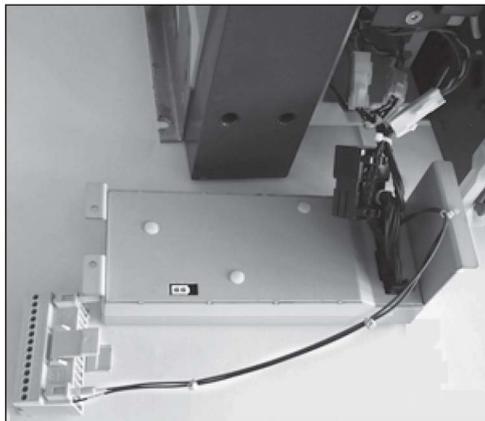


- ① Install the transformer.
- ② Insert the connector from the transformer connection into the cable compartment.
- ③ Attach the transformer cover.
- ④ Secure with screws (tightening torque:  $8 \pm 1$  Nm).



- ① Plug the connector for the cable harness into the connector for the N transformer and place them in the cable duct.

#### Connecting the terminals on the overcurrent release



- ① Place the overcurrent release down in front of the circuit-breaker.
- ② Connect the connectors to X20 and X21.

#### Subsequent steps

- Install the overcurrent release (for details, see Replacing the overcurrent release (Page 88)).

## 10.5 External transformer for neutral conductors

### 10.5.1 External transformer for neutral conductors (for ETU37WT...ETU47WT)

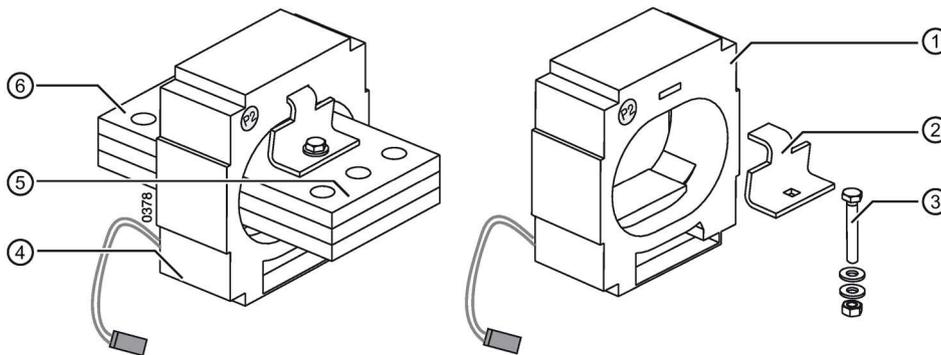
---

**Note**

The secondary connection cables from the neutral conductor transformer to the 3WT8 circuit-breaker must be twisted.

---

#### External transformer for neutral conductors



- ① Version for plant-side copper bar
- ② Mounting bracket
- ③ M6 bolt with washers and nut
- ④ Version with copper connection elements
- ⑤ Connection P2
- ⑥ Connection P1

#### Assignment of connections

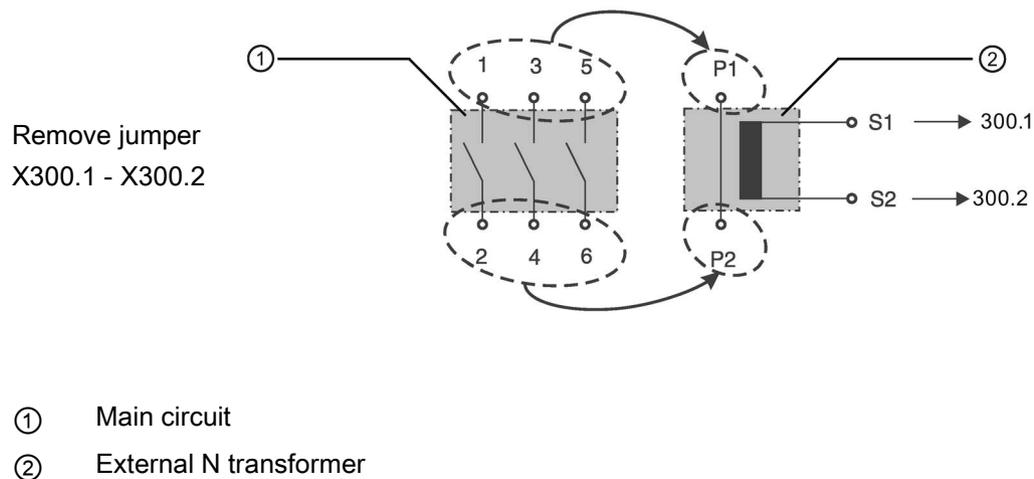
This assignment ensures that the current in the circuit-breaker and external N transformer flows in the same direction.

---

**Note**

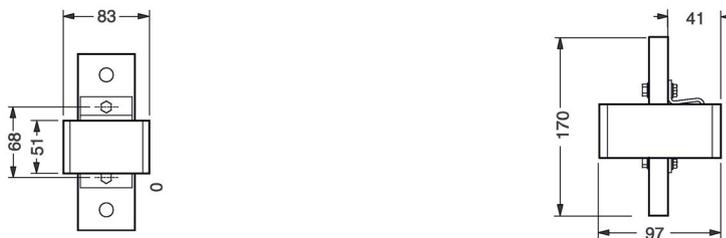
Any missing auxiliary current connections (secondary disconnect, auxiliary supply connector, sliding contact module for guide frame) can be retrofitted if required.

---



External transformer for neutral conductors - dimension drawings

Frame size I



Frame size II

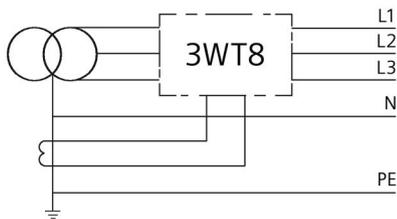


## 10.5.2 External ground fault current transformer (only for ETU47WT)

The ground fault protection can use an external current transformer with the following properties:

- Primary current: 1200A
- Secondary current: 1A
- Accuracy: Class 1
- Breaker internal burden: 0.11 Ohm

### Examples



3 pole circuit-breaker with current transformers "Y" connected with the star point of the transformer grounded.

### Connection

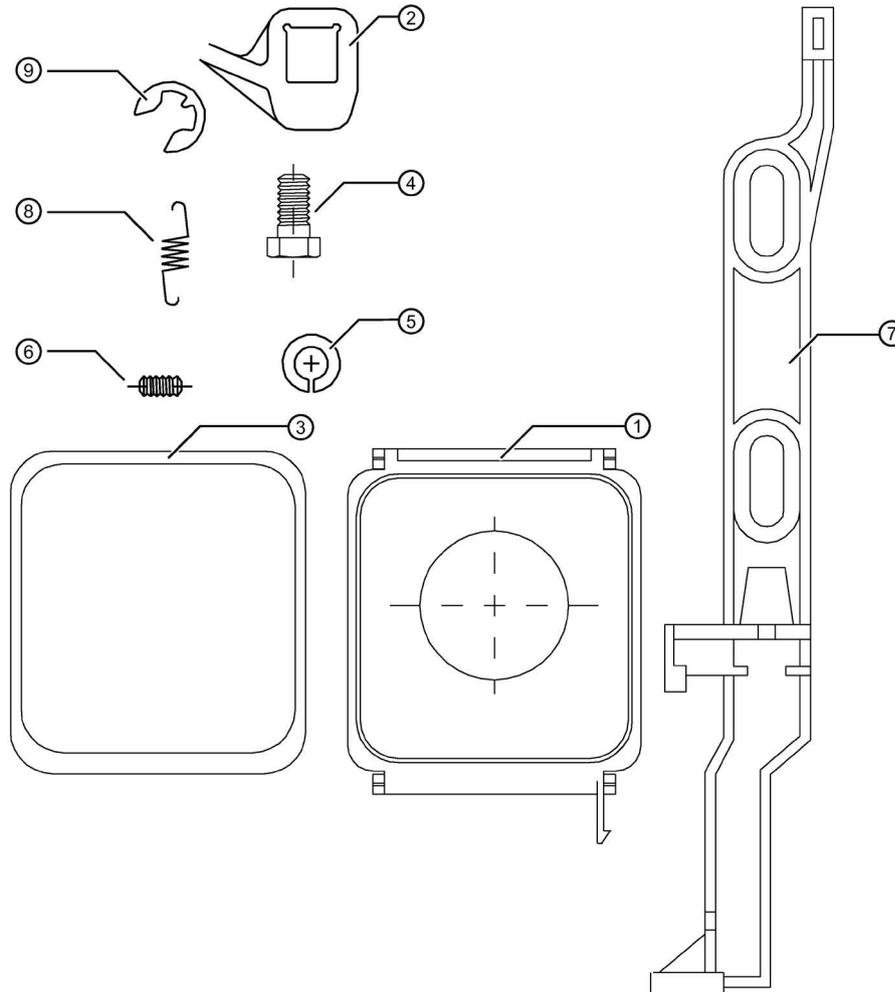
The external ground fault current transformer has to be connected to **X300.13** and **X300.14**.

#### Note

Any missing auxiliary current connections (secondary disconnect, auxiliary supply connector, sliding contact module for guide frame) can be retrofitted if required)

## 10.6 Castell lock

Check the contents of the packaging



①	Housing	1x
②	Latch	1x
③	Seal	1x
④	Hexagon socket-head screw M 6x10 ISO 4017	1x
⑤	Spring washer A6 DIN 128	2x
⑥	Threaded pin M 4x8 ISO 7435	1x
⑦	Door slider	1x
⑧	Door slider spring	1x
⑨	Lock washer	2x

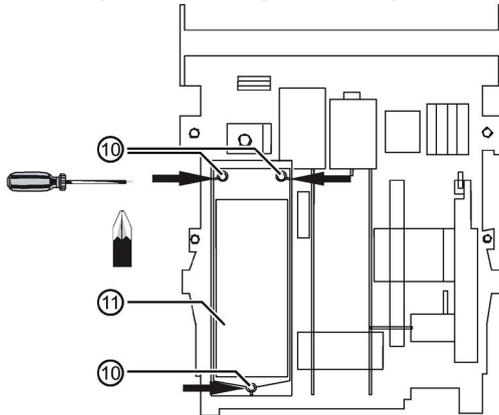
### Note

The following components must be ordered from the relevant manufacturer: Castell lock interlock, version FS2.

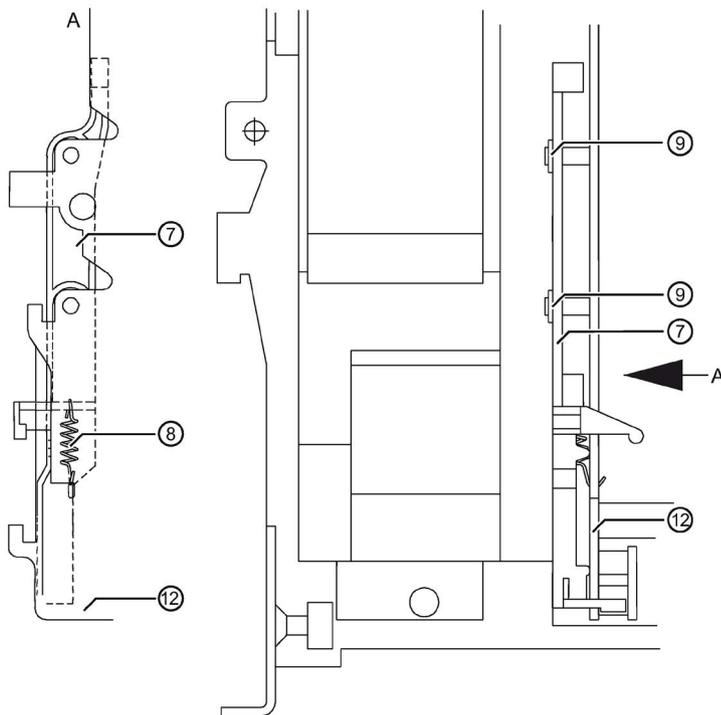
## Removing the operating device

Removing the operating device (Page 93)

## Installing the door slider (if not already installed)

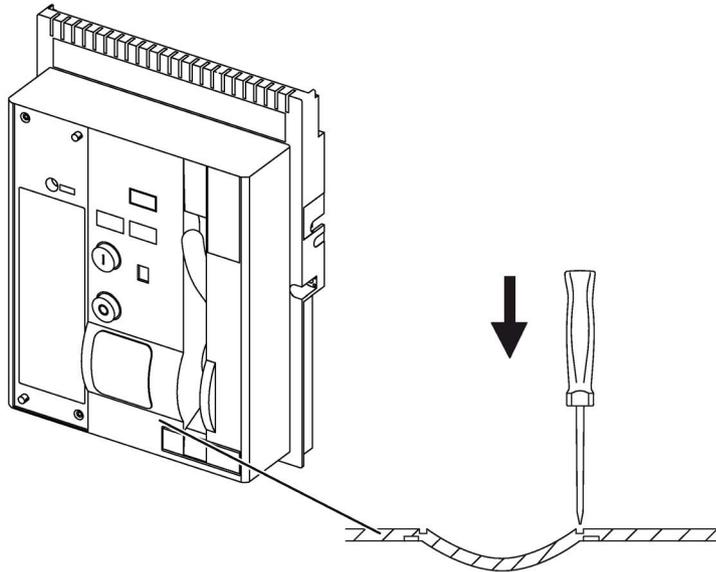


- Remove the screws ⑩ for the electronic overcurrent release ⑪.
- Remove the electronic overcurrent release ⑪.



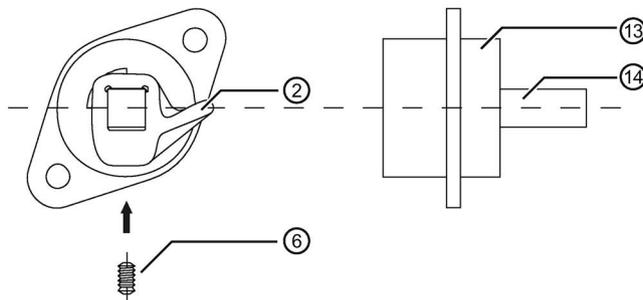
- Place the door slider spring ⑧ with the off-center eye in the side panel of the drive ⑫.
- Place the door slider spring ⑧ with the center eye in the door slider ⑦ using a small screwdriver (see diagram).
- Place the door slider ⑦ with the door slider spring ⑧ on the side panel of the drive ⑫ and secure it by means of the lock washers ⑨.
- Install the electronic overcurrent release ⑪. When doing so, make sure that you do not trap any cables.

### Preparing the operator panel



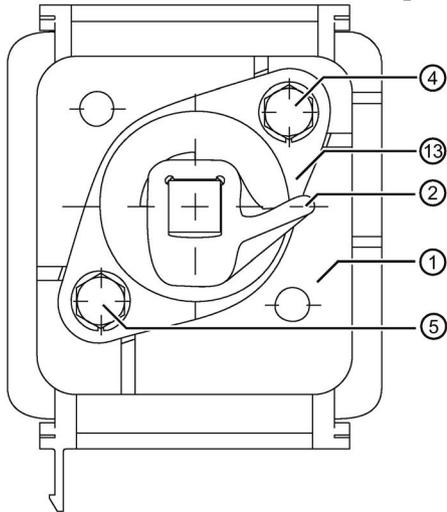
- Place the operator panel on a stable surface near the outline to be cut out.
- Use a hammer and screwdriver to cut out the groove base from the pre-pressed groove.
- File the edges of the cutout.

### Preparing the Castell / fortress lock



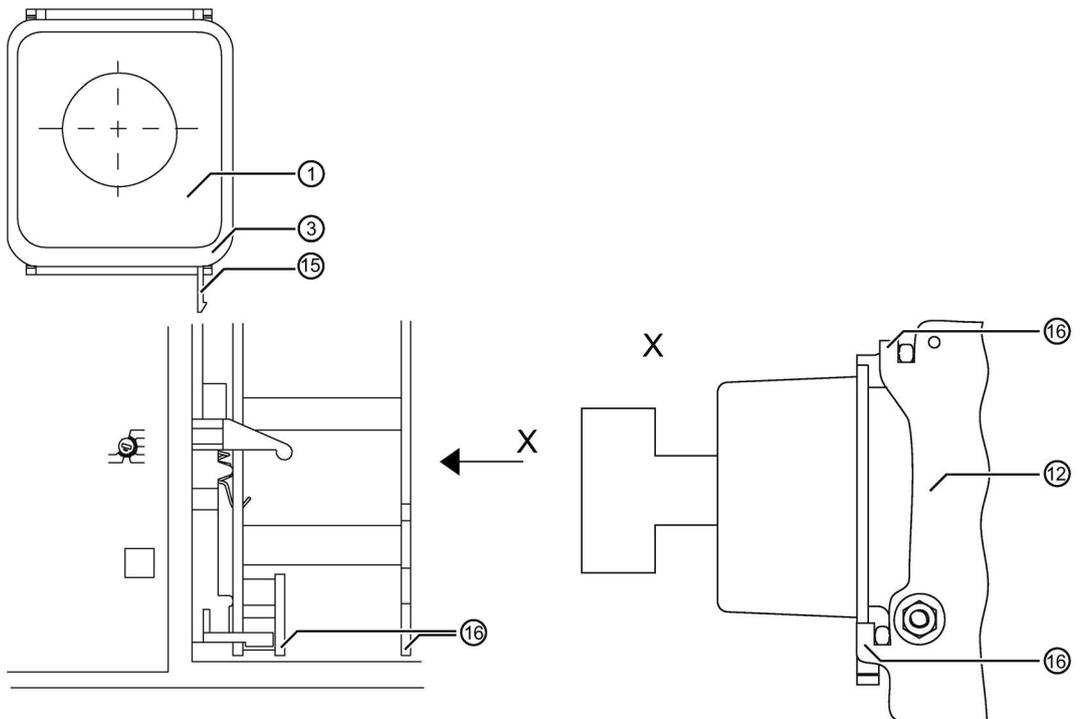
- Remove the key.
- Attach the latch (2) as far as it will go onto the square section (14) of the lock (13).
- Secure the latch (2) by means of a threaded pin (6).

### Installing the Castell / fortress lock in the housing



- Attach the lock 13 with latch 2 to the housing 1.
- Screw the lock 13 onto the housing 1 by means of a hexagon socket-head screw 4 and spring washer 5.

### Installing the housing

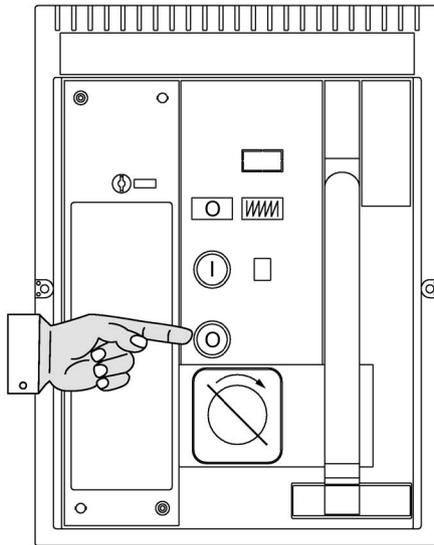


- Push the seal 3 over the housing 1. When doing so, make sure that the wide edge of the seal is on the lower part of the housing.
- Place the housing 1 with lock 13 into the clips 16 on the side panel of the drive 12. The locking pin 15 must audibly engage.

## Installing the operating device

Installing the operating device (Page 95)

## Functional check

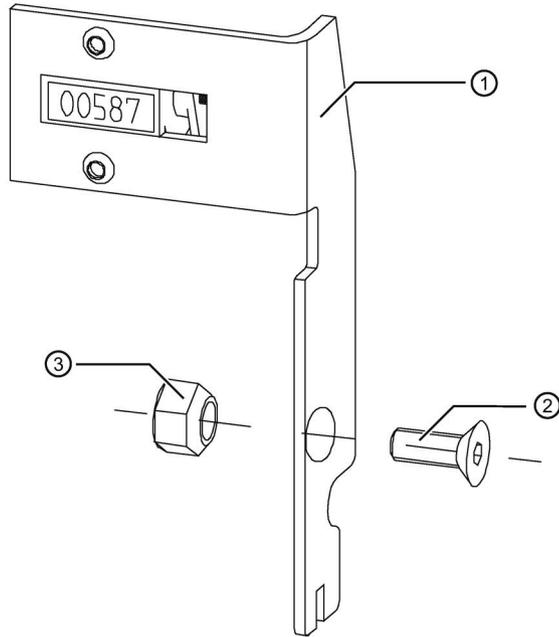


While pressing the OFF button, turn the key clockwise to the locking position.

- Remove the key.
- The circuit-breaker cannot close when in this position.

## 10.7 Counting mechanism

Check the contents of the packaging

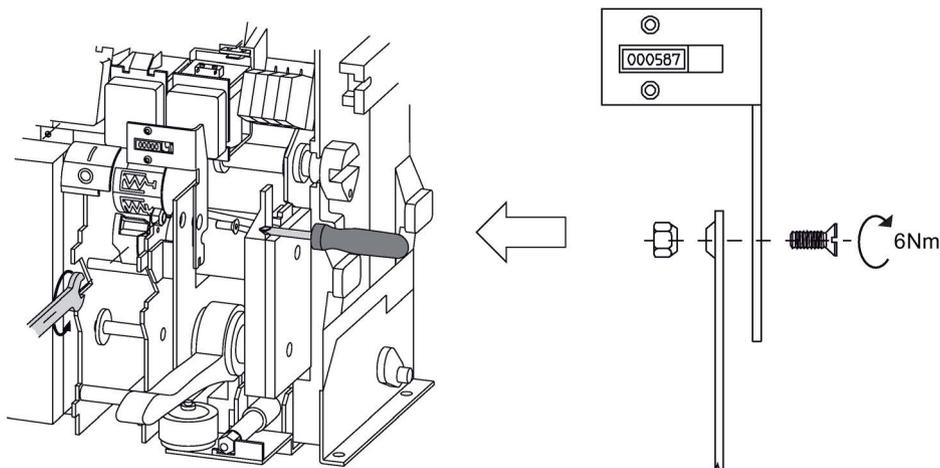


- |   |  |    |
|---|--|----|
| ① | Counting mechanism, complete           | 1x |
| ② | DIN 7991 countersunk screw M6 x 16 - 8 | 1x |
| ③ | Conical nut                            | 1x |

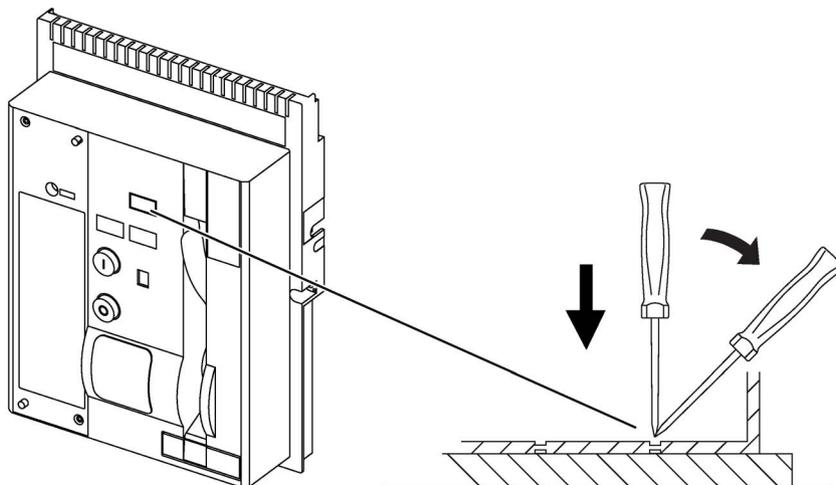
### Removing the operating device

Removing the operating device (Page 93)

### Installing the counting mechanism



### Installing the display window



- Place the operator panel onto a wooden board (make sure that it is in full contact with the surface) near the outline to be cut out.
- Use a screwdriver to cut out the groove base from the pre-pressed groove.

### Functional check

Charge the stored-energy spring mechanism and watch the counting mechanism. Once the charging process is complete, the counting mechanism is incremented by one.

#### CAUTION

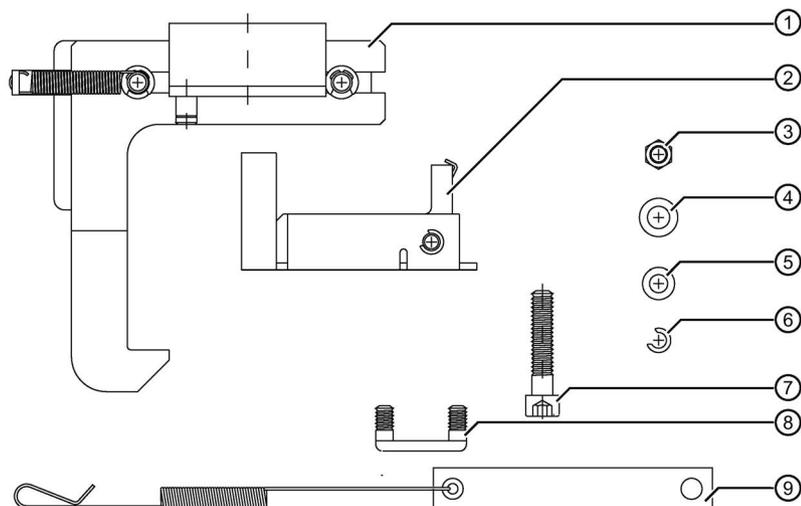
Taking the necessary precautions, close and open the circuit-breaker to discharge the stored-energy spring mechanism.

### Installing the operating device

Installing the operating device (Page 95)

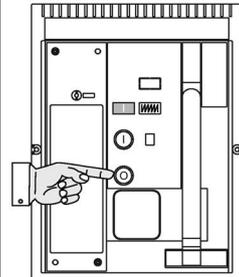
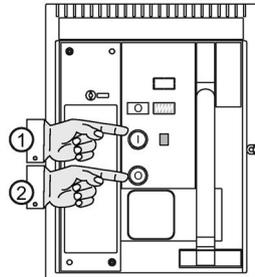
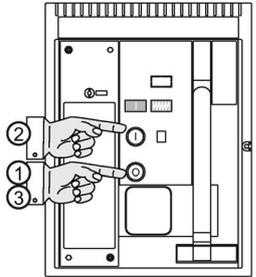
## 10.8 Door interlock for fixed-mounted circuit-breaker

Check the contents of the packaging



①	Interlocking module	(1x)
②	Catch	(1x)
③	Hexagon nut M5, DIN 934	(2x)
④	Strain washer 6, DIN 6796	(1x)
⑤	Washer 5.3, DIN 125	(2x)
⑥	Lock washer 5, DIN 6799	(1x)
⑦	Hexagon socket-head screw M6x30, DIN 912	(1x)
⑧	Clip	(1x)
⑨	Tension spring with lug	(1x)

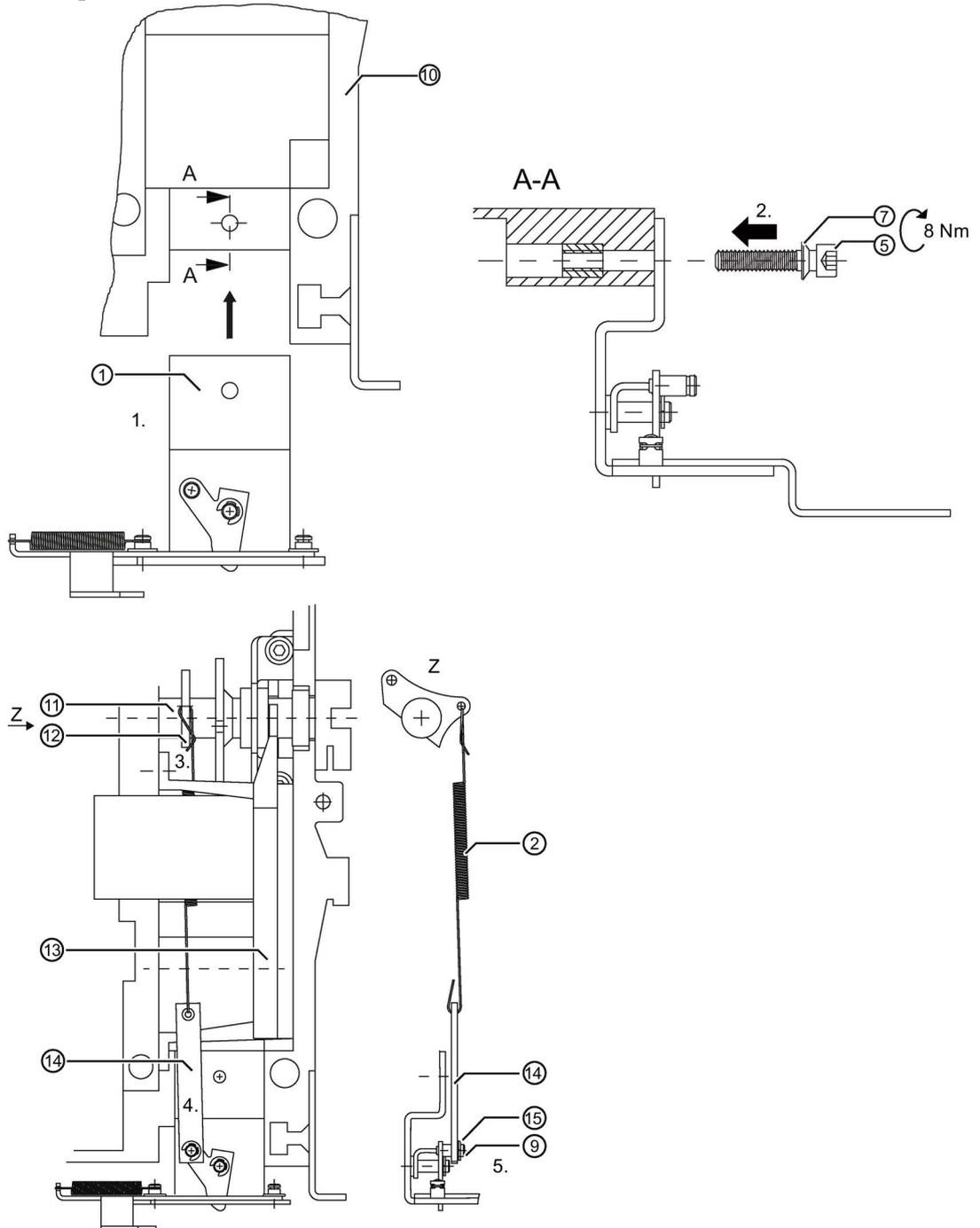
**Opening the circuit-breaker / discharging the stored-energy spring mechanism**

Possible status:	Circuit-breaker CLOSED	Switch of circuit- breaker	Circuit-breaker CLOSED
	Stored-energy spring mechanism discharged	Stored-energy spring mechanism charged	Stored-energy spring mechanism charged
Actuating sequence:	OPEN	CLOSED - OPEN	OPEN - CLOSED - OPEN
			

**Removing the operating device**

Removing the operating device (Page 93)

Installing the interlocking module

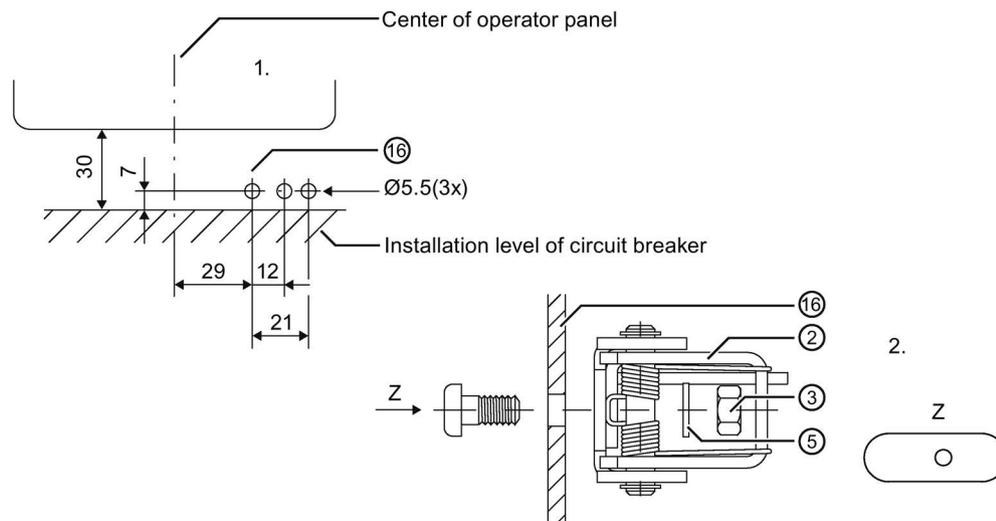


1. Push the interlocking module ① in front of the plastic front panel ⑩ of the circuit-breaker.
2. Secure the module ( $8 \pm 1$  Nm). Note the position of the strain washer ⑦.
3. Insert the tension spring ② with lug ⑭ behind the geared motor ⑬.  
Place the tension spring ② in the lever ⑫ of the breaker shaft ⑪.
4. Place the lug ⑭ on the pin ⑮.
5. Secure the lug ⑭ by means of the lock washer ⑨.

## Installing the operating device

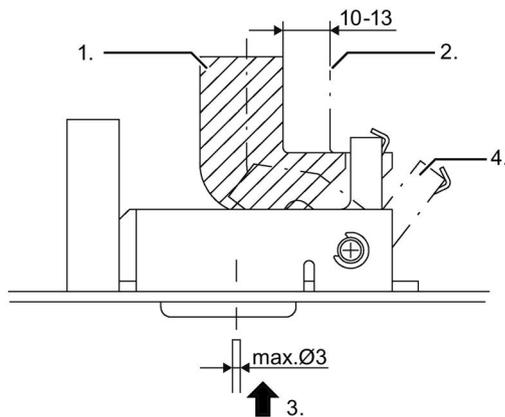
Installing the operating device (Page 95)

## Install the catch in the cabinet door



1. Drill holes with a diameter of 5.5 mm in the cabinet door ⑯.
2. Screw on the catch ② (tightening torque for component ③: 0.4 Nm).

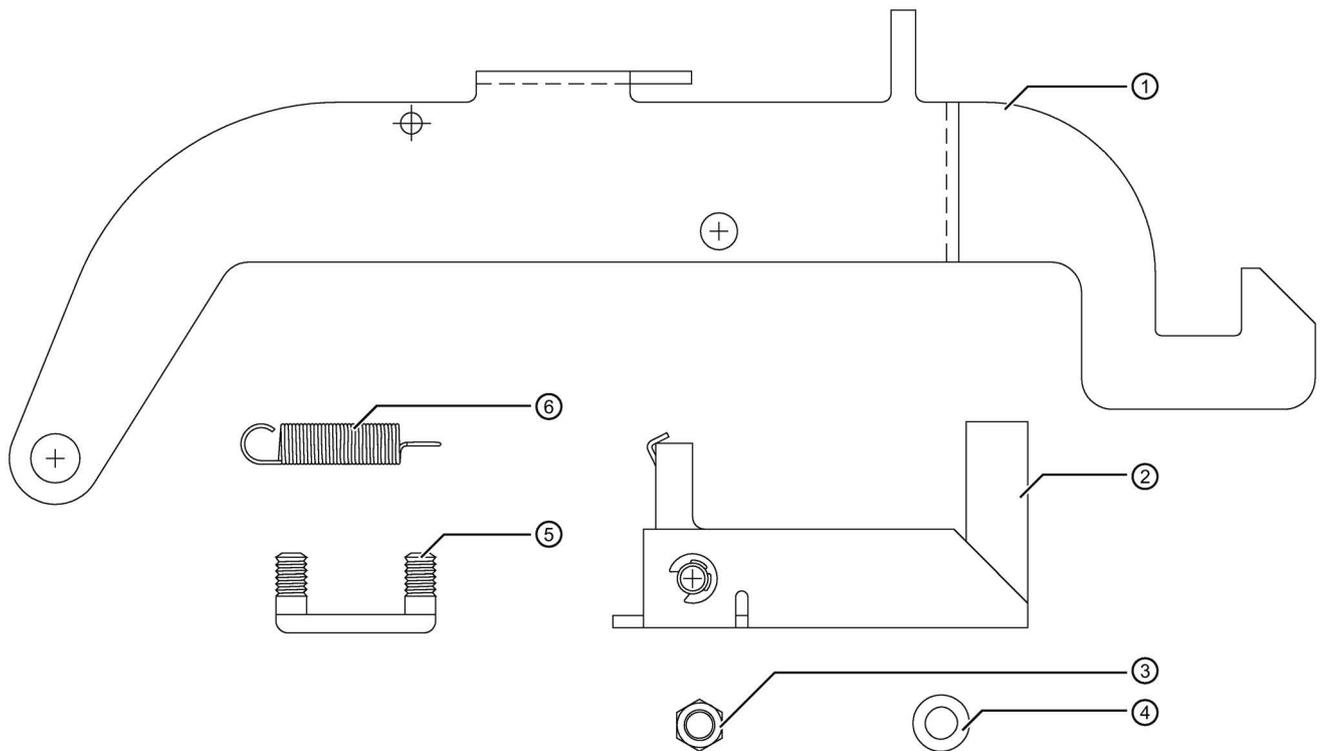
## Functional check



1. Position with circuit-breaker OPEN
2. Position with circuit-breaker CLOSED
3. Overrule
4. Position in overruled condition

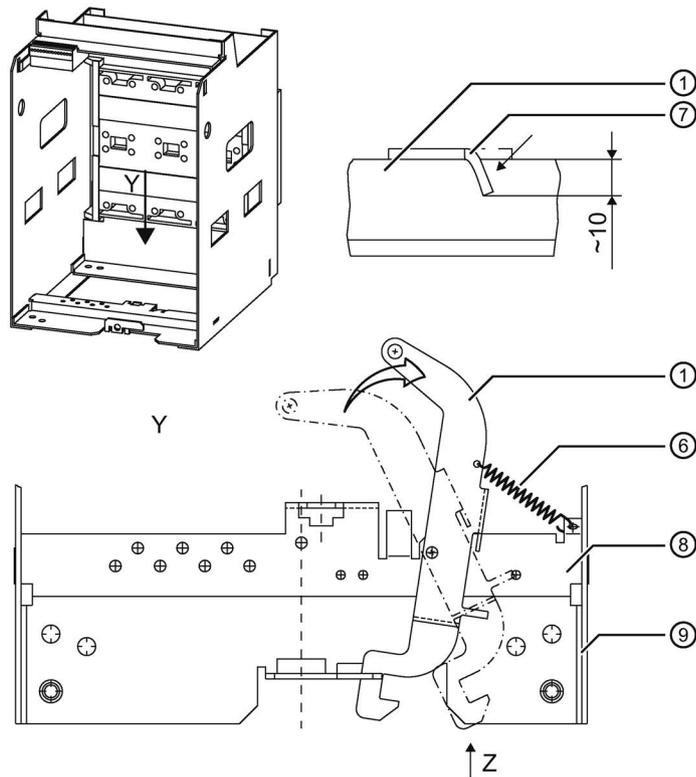
## 10.9 Door interlock for guide frame

Check the contents of the packaging



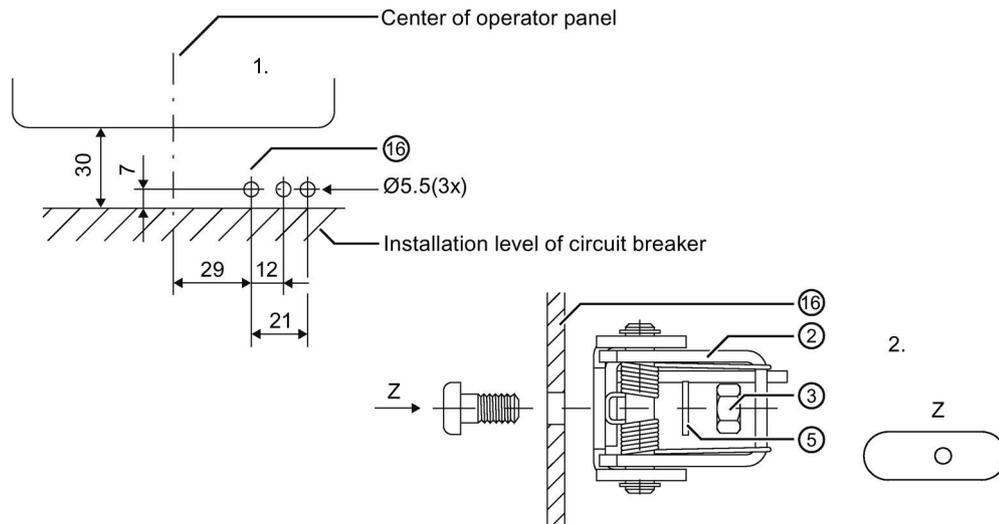
- |   |                         |      |
|---|-------------------------|------|
| ① | Bolt                    | (1x) |
| ② | Catch                   | (1x) |
| ③ | Hexagon nut M5, DIN 934 | (2x) |
| ④ | Washer 5.3, DIN 125     | (2x) |
| ⑤ | Clip                    | (1x) |
| ⑥ | Tension spring          | (1x) |

## Installing the bolt in the guide frame



- Place the bolt 1 on the crossmember ⑧ of the guide frame ⑨.
- Position the bolt approx. 90° to the crossmember.
- Bend down the metal lugs ⑦ on the bolt.
- Place the tension spring ⑥ in the bolt ① and crossmember ⑧.

**Install the catch in the cabinet door**



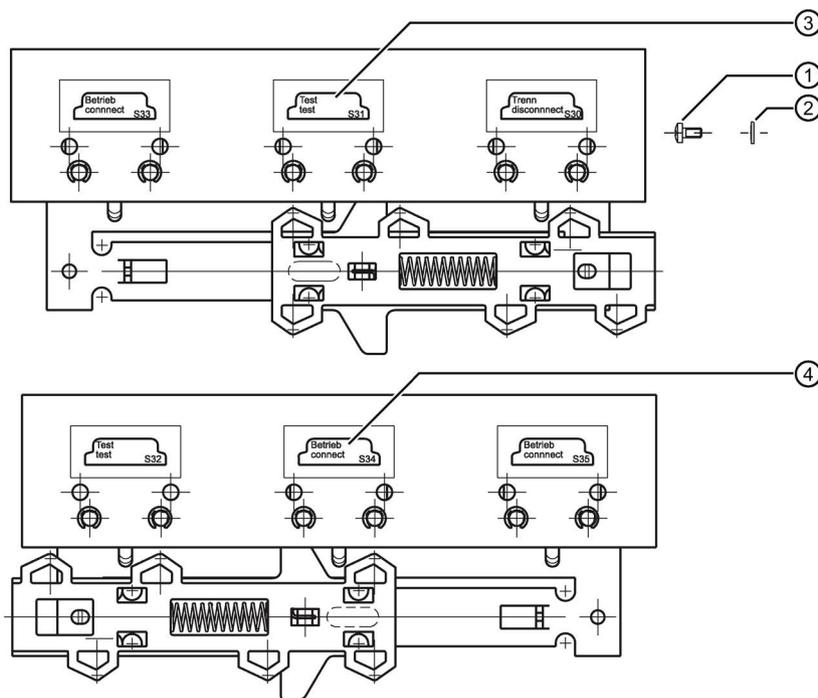
1. Drill holes with a diameter of 5.5 mm in the cabinet door ⑯.
2. Screw on the catch ② (tightening torque for component ③: 0.4 Nm).

**Functional check**

This can only be carried out once the circuit-breaker has been installed.  
 The switchgear door is interlocked after approx. 4 rotations of the racking handle from the test position toward the connected position.

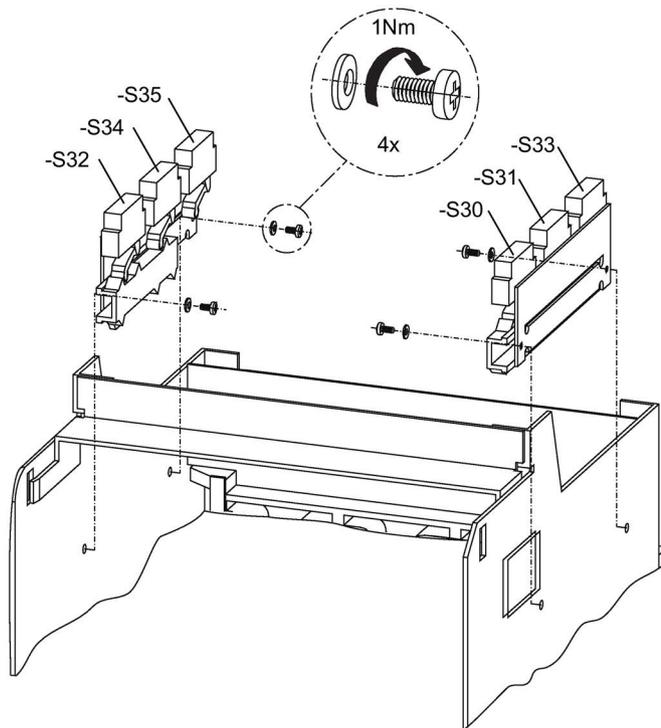
## 10.10 Position signaling switch for guide frame

Check the contents of the packaging (position signaling switch without intermediate terminal)



Quantity of parts	
Article number of packing unit	Part no.
	1 2 3 4
3WT9884--1JC10	4 4 1 1

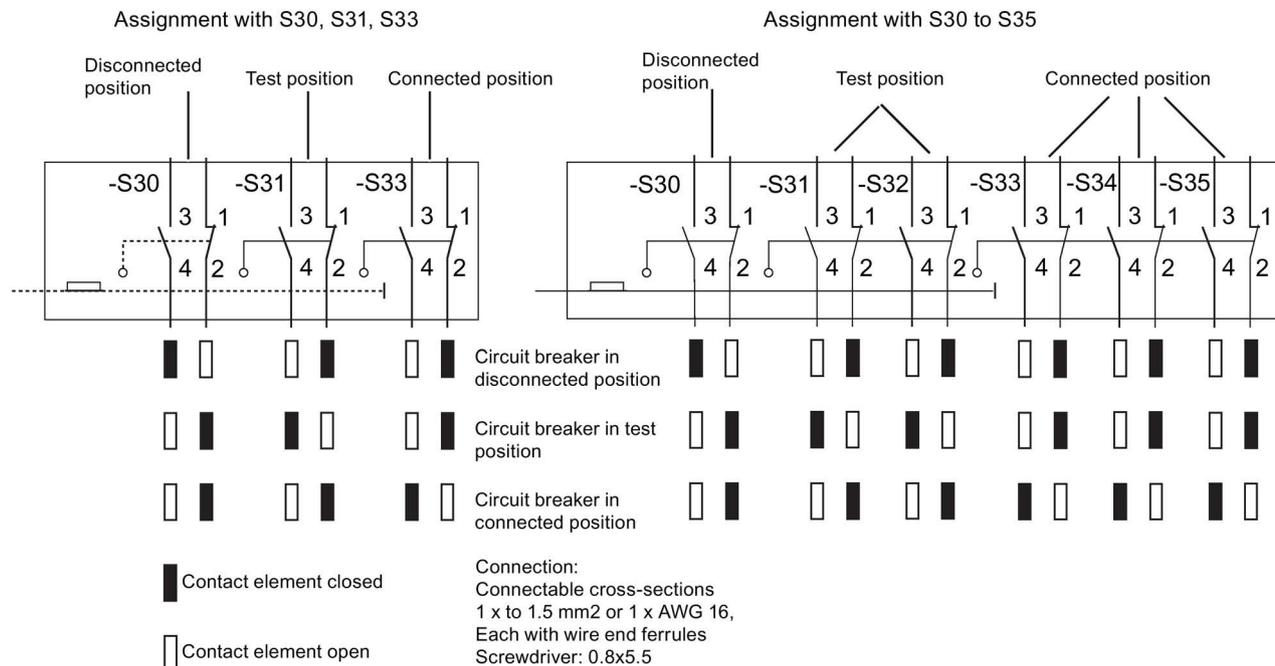
Installing the position signaling switch without intermediate terminal



Cross-tip screwdriver (size 2)

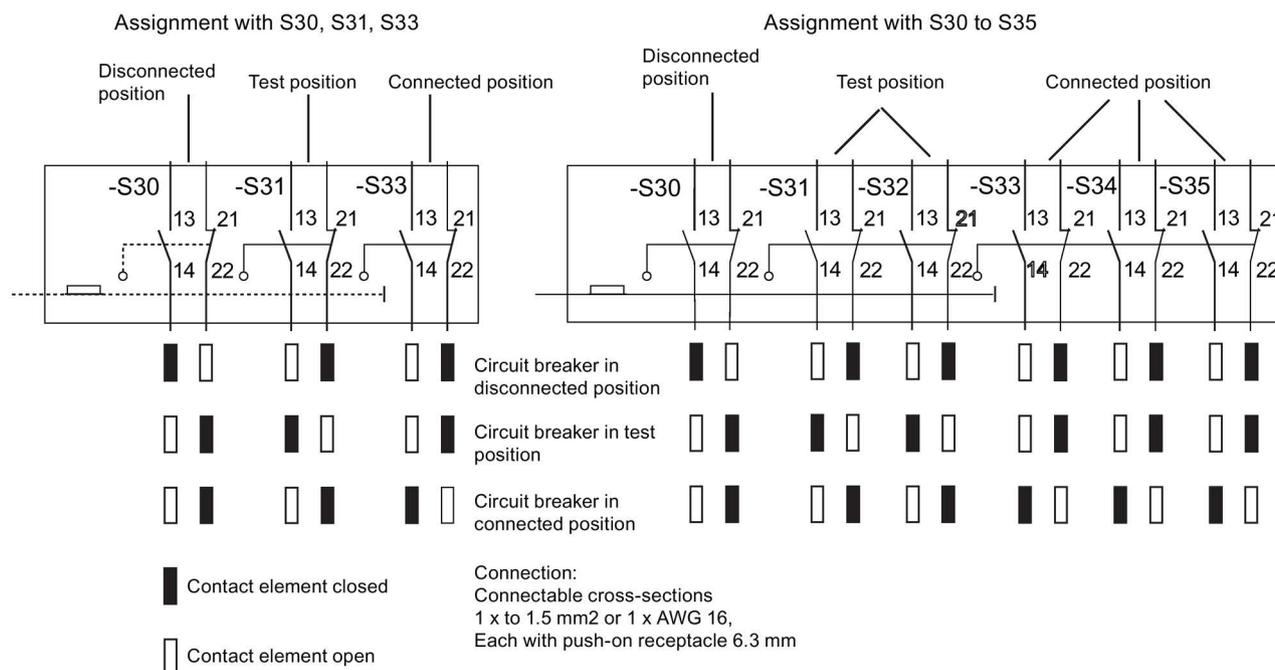
### Connecting the position signaling switch without intermediate terminal

#### Circuit diagrams



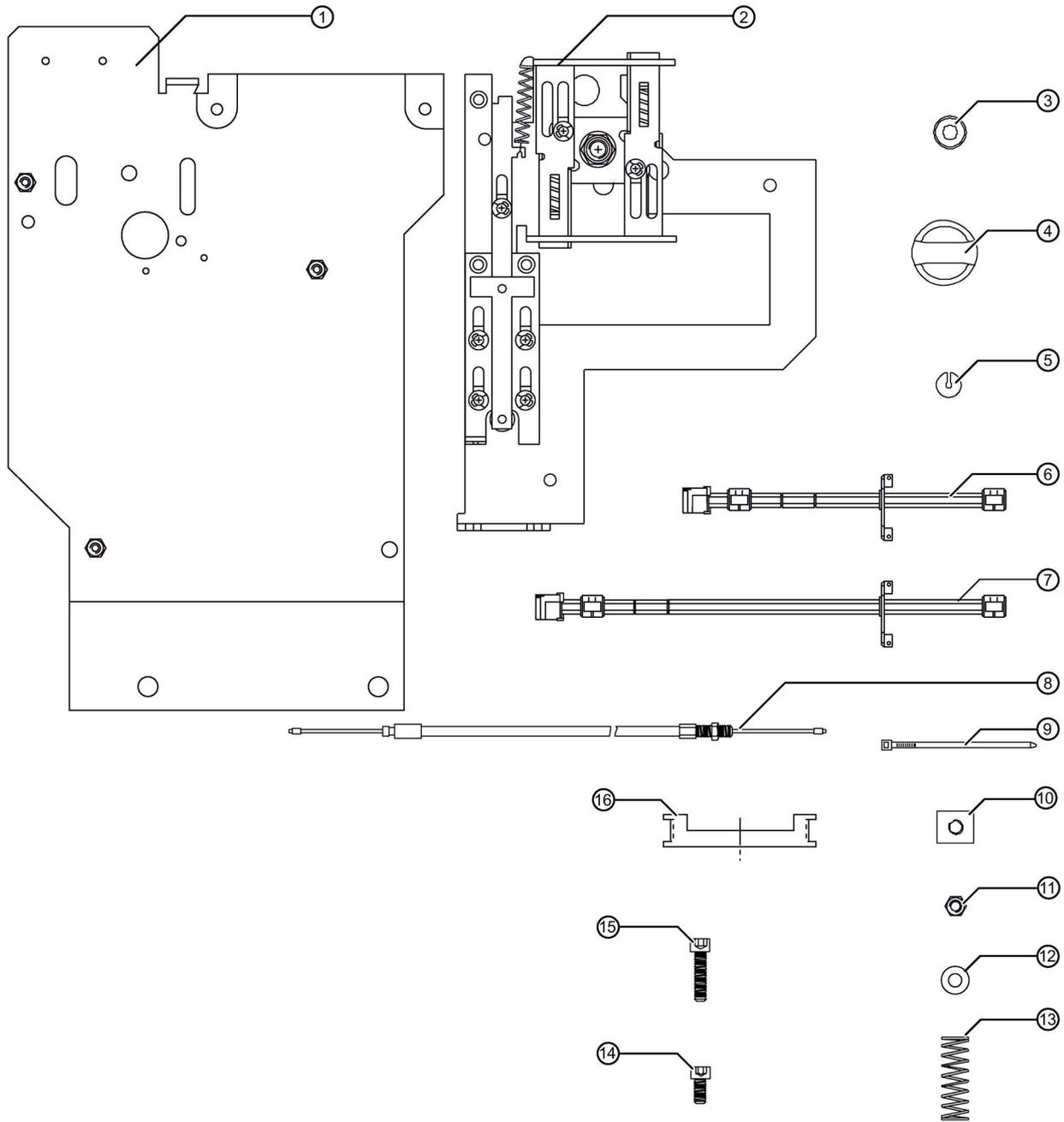
### Connecting the position signaling switch (article number 3WT9884-1JC10)

#### Circuit diagrams



### 10.11 Mechanical interlock of fixed-mounted circuit-breakers

Check the contents of the packaging

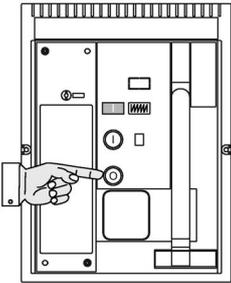
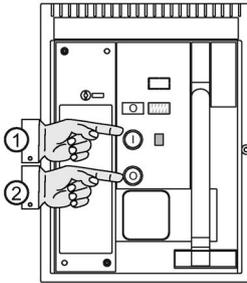
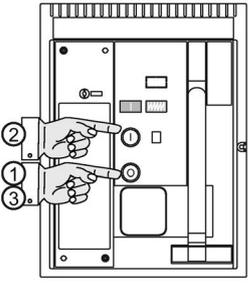


## 10.11 Mechanical interlock of fixed-mounted circuit-breakers

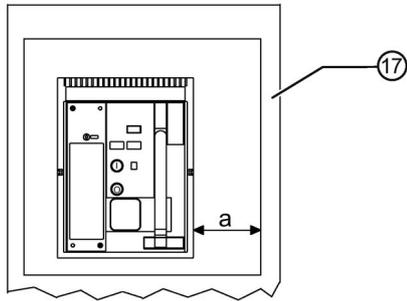
## Parts list

①	Fixed mounting plate	1x
②	Interlocking module	1x
③	Spring bush	1x
④	Control unit	1x
⑤	Slotted washer	1x
⑥	Auxiliary shaft, cpl. frame size 1	1x
⑦	Auxiliary shaft, cpl. frame size 2	1x
⑧	Bowden wire	1x
⑨	Cable tie	1x
⑩	Insertable nut M6	1x
⑪	Setnut M6	1x
⑫	Compression spring	1x
⑬	Strain washer 6 DIN 6796	2x
⑭	Cylinder-head screw M6 x 12 DIN 912	2x
⑮	Cylinder-head screw M6 x 25 DIN 912	2x
⑯	Part cover	9x

## Opening the circuit-breaker / discharging the stored-energy spring mechanism

Possible status:	Circuit-breaker CLOSED	Switch of circuit- breaker	Circuit-breaker CLOSED
	Stored-energy spring mechanism discharged	Stored-energy spring mechanism charged	Stored-energy spring mechanism charged
Actuating sequence:	OPEN	CLOSED - OPEN	OPEN - CLOSED - OPEN
			

## Preparatory work



The minimum distance (a) required between the circuit-breaker and cabinet unit ⑰ is as follows:

- For frame size 1 : a = 150 mm
- For frame size 2 : a = 200 mm

If necessary, remove the circuit-breaker.

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### Note

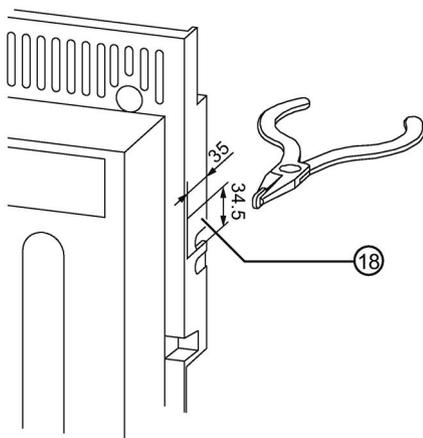
If the module is already installed, continue with "Information about mechanical interlock".

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## Removing the operating device

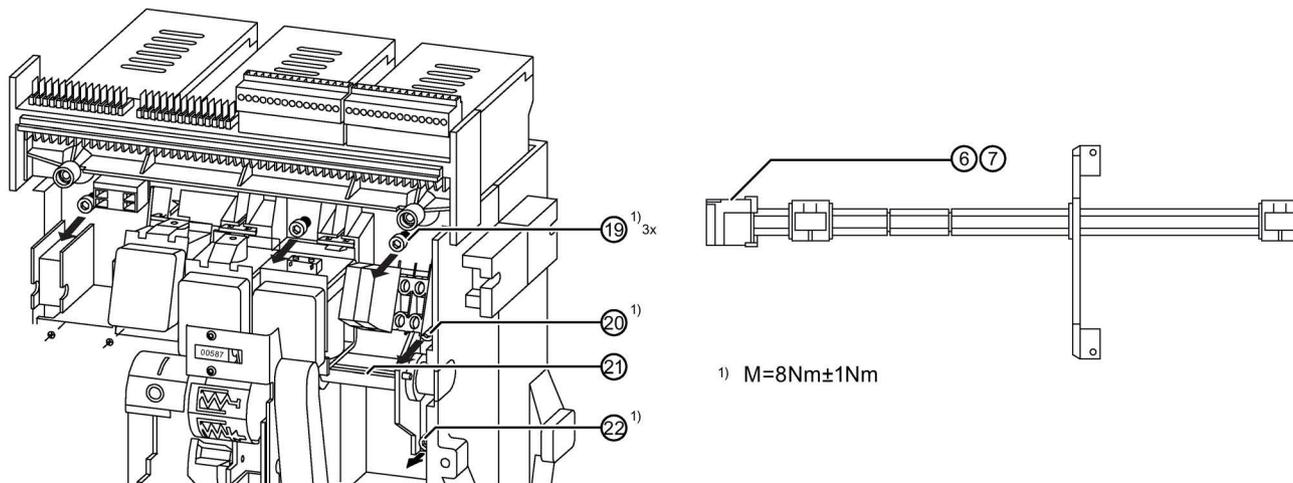
Removing the operating device (Page 93)

## Preparing the operator panel



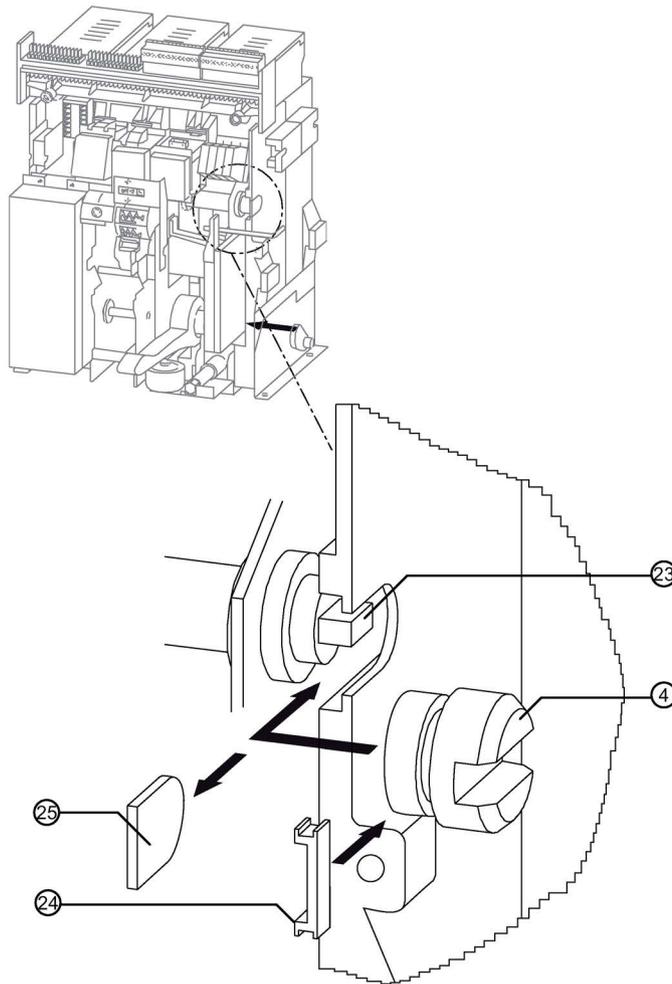
- Cut out a sub-shaft hole outline ⑱ using snipe-nose pliers.
- With frame size 2, the sub-shaft hole outline ⑱ must also be cut out of the cover.
- File the cutout edges to fit the sub-shaft hole outline ⑱.

## Installing the auxiliary shaft in the circuit-breaker



- Remove the motorized operating mechanism (if installed).
- 2. Remove the second auxiliary switch (if installed).
- Unscrew and remove the fixing screw ②② from the underside of the bearing plate.
- Unscrew the cylinder-head screws ①⑨ (turn three or four times only) and loosen the mounting plate (for frame size 1 only).
- Unscrew and remove ②① the fixing screw from the top of the bearing plate.
- Remove the bearing plate with auxiliary shaft. ②①
- Attach the control unit (see page 7).
- Install the auxiliary shaft, cpl. (6, 7) in the same position as the old one.
- Complete the circuit-breaker by carrying out the above steps in reverse order.

### Attaching the control unit

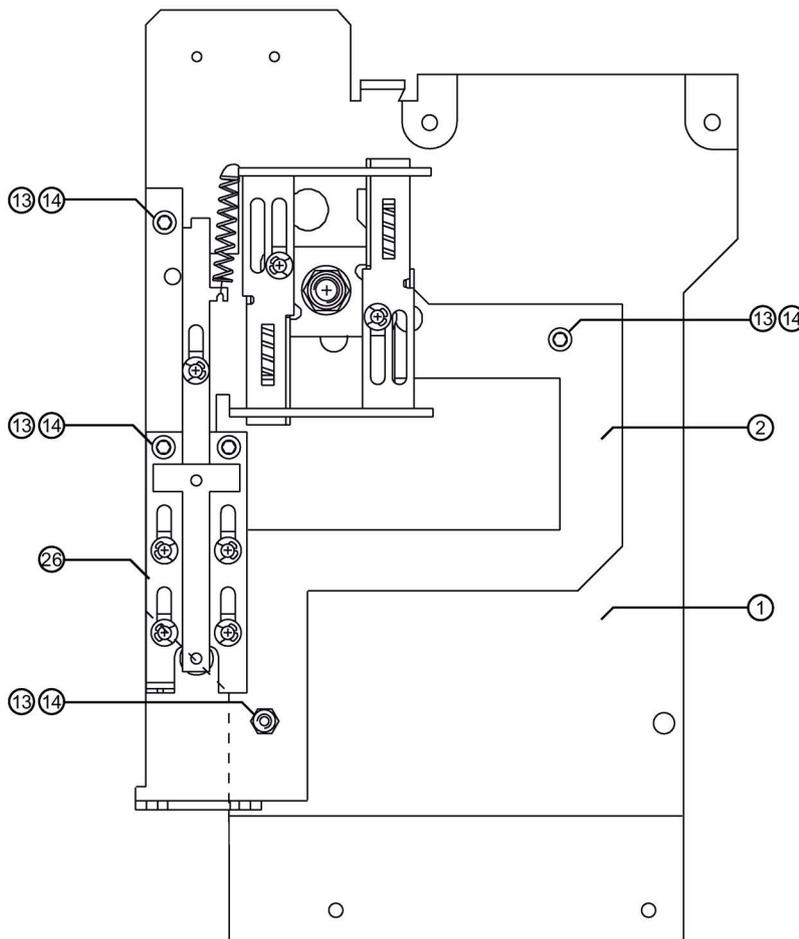


- Remove the cover ②⑤ and attach the control unit ④ to the breaker shaft ②③ (must audibly engage).
- Attach the part cover ②④ to the operator panel.

### Installing the operating device

Installing the operating device (Page 95)

## Installing the interlocking module



- Place the interlocking module ② against the fixed mounting plate ①.
- Secure the interlocking module ② and fixed mounting plate ① by means of cylinder-head screws ⑭ and strain washers ⑬ (tightening torque:  $8 \pm 1$  Nm).
- Depending on the configuration, screw the cylinder-head screw ⑭ with strain washer ⑬ into the index clip ⑳ (tightening torque:  $8 \pm 1$  Nm).

## Installing the fixed mounting plate

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### Note

Shown here without interlocking module

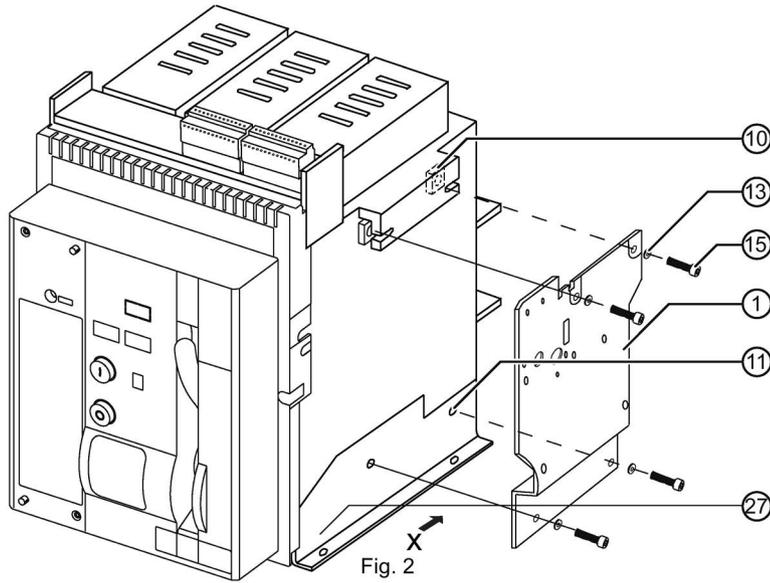
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### Note

Before screwing the fixed mounting plate onto the circuit-breaker, push the lever ⑳ from a to b (e.g. by means of a screwdriver) so that lever ⑨ and ⑳ do not overlap.

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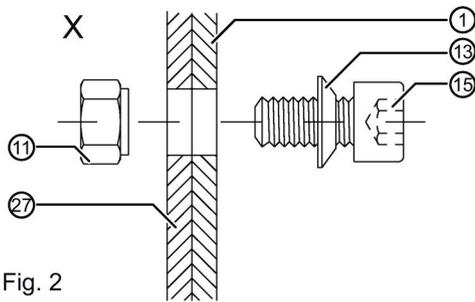
10.11 Mechanical interlock of fixed-mounted circuit-breakers



- Push the insertable nuts ⑬ into the openings provided.
- Insert the setnuts ⑪ with cylinder-head screw ⑮ into the support bracket ⑳ (without fixed mounting plate ①).
- Remove the cylinder-head screws ⑮ again.
- Place the fixed mounting plate ① onto the circuit-breaker and secure by means of cylinder-head screws ⑮ and strain washers ⑬ (tightening torque:  $8 \pm 1$  Nm).

**Note**

Position the strain washers only as shown.



## Information about mechanical interlock

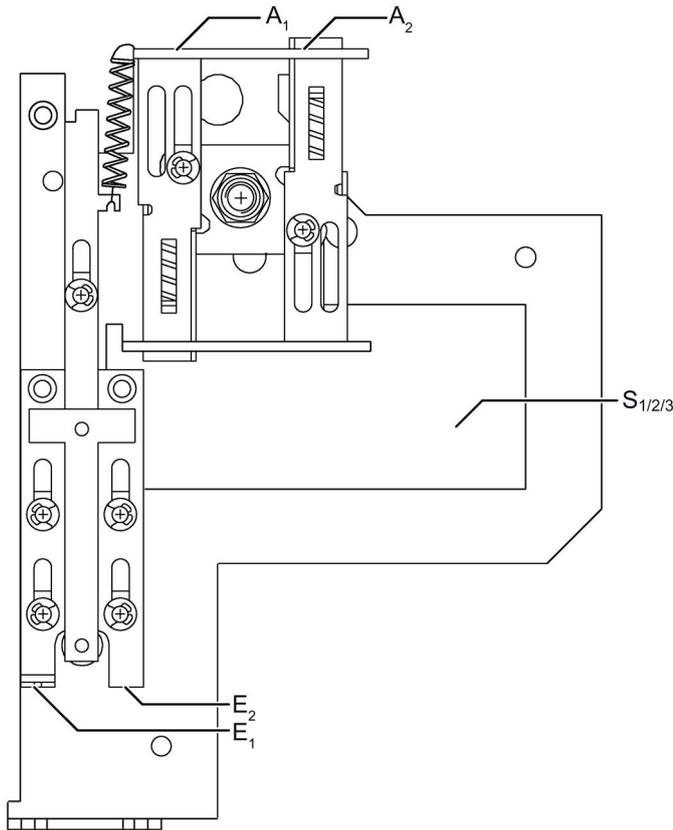
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### Note

To ensure that the interlock functions properly, the following minimum switchgear requirements must be fulfilled:

1. Bowden wires must be laid so that they are as straight as possible.
  2. The bending radii of the Bowden wire must be > 500 mm.
  3. The total bending angle across the length of the Bowden wire must not exceed 540°.
  4. If the circuit-breakers to be interlocked are arranged vertically, the interlock mechanisms must be aligned.
  5. Circuit-breakers to be interlocked must be arranged in such a way that 2 m or 4.5 m Bowden wires can be properly laid in accordance with the conditions specified in points 1. - 4.
  6. The Bowden wires must be secured before the interlock is adjusted (e.g. cable ties).
  7. When choosing the switchgear compartment, make sure that it provides sufficient room for adjusting the interlock.
  8. Openings and cutout sections in system elements must be designed in such a way that the direction of the Bowden wires is not changed and that the wires are not obstructed when they are routed.
-

10.11 Mechanical interlock of fixed-mounted circuit-breakers



The mechanical interlock module can be used for two or three circuit-breakers. The following designations apply in the configuration instructions below:

- O<sub>1/2</sub> : Output information <sub>1/2</sub>
- I<sub>1/2</sub> : Input information <sub>1/2</sub>
- C<sub>1/2/3</sub>: circuit-breaker <sub>1/2/3</sub>

If the output information 1 of circuit-breaker 1 is interconnected with the input information 2 of circuit-breaker 2, for example, the following abbreviations are used: C<sub>1</sub> O<sub>1</sub> - C<sub>2</sub> I<sub>2</sub>

	The statuses of the circuit-breakers are indicated on the operator panel as follows:
	Circuit-breaker CLOSED
	Circuit-breaker OPEN and not ready to CLOSE (interlocked)
	Circuit-breaker OPEN and ready to CLOSE (not interlocked)

**Configuration: Two circuit-breakers back to back****Description:**

A circuit-breaker can only be closed when the other is open.

**Required equipment:**

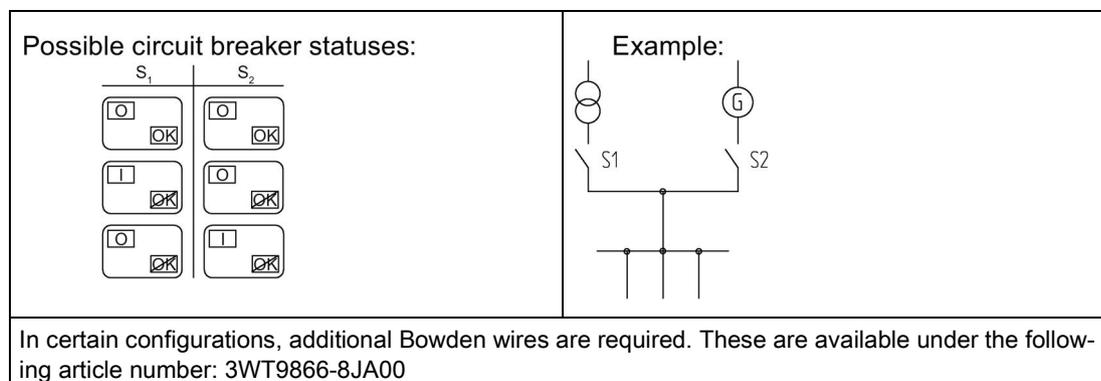
Each circuit-breaker is equipped with an interlocking module and a Bowden wire.

**Terminals for the Bowden wires:**

1. Bowden wire: C<sub>1</sub> O<sub>1</sub> - C<sub>2</sub> I<sub>1</sub>
2. Bowden wire: C<sub>1</sub> I<sub>1</sub> - C<sub>2</sub> O<sub>1</sub>

**Note:**

The cylinder-head screws ⑭ with strain washers ⑬ must be screwed into the index clip ⑯ at the following terminals: C<sub>1</sub> I<sub>1</sub>; C<sub>2</sub> I<sub>1</sub>.



**Configuration: Three circuit-breakers stacked**

**Description:**

Any two circuit-breakers can be closed at any time, with the third interlocked.

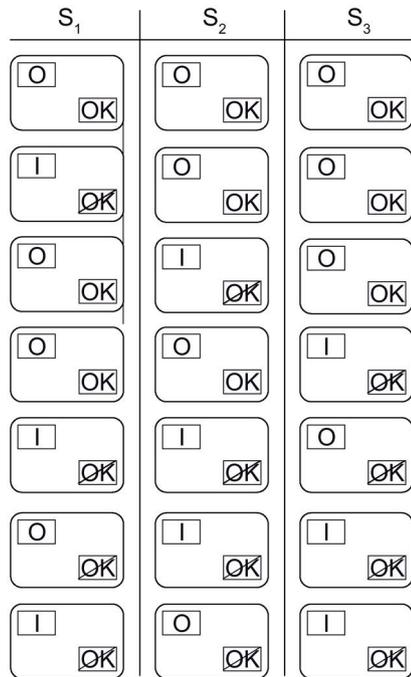
**Required equipment:**

Each circuit-breaker is equipped with an interlocking module and a Bowden wire. Three additional Bowden wires must be ordered separately.

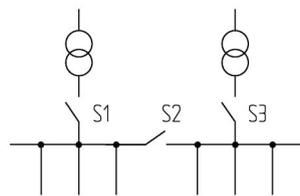
**Terminals for the Bowden wires:**

1. Bowden wire: C<sub>1</sub> O<sub>1</sub> - C<sub>2</sub> I<sub>1</sub>
2. Bowden wire: C<sub>1</sub> O<sub>2</sub> - C<sub>3</sub> I<sub>1</sub>
3. Bowden wire: C<sub>2</sub> O<sub>1</sub> - C<sub>1</sub> I<sub>2</sub>
4. Bowden wire: C<sub>2</sub> O<sub>2</sub> - C<sub>3</sub> I<sub>2</sub>
5. Bowden wire: C<sub>3</sub> O<sub>1</sub> - C<sub>1</sub> I<sub>2</sub>
6. Bowden wire: C<sub>3</sub> O<sub>2</sub> - C<sub>2</sub> I<sub>2</sub>

**Possible circuit-breaker statuses**



**Example**



### Configuration: Three circuit-breakers stacked

#### Description:

When one circuit-breaker is closed, the other two cannot be closed.

#### Required equipment:

Each circuit-breaker is equipped with an interlocking module and a Bowden wire. Three additional Bowden wires must be ordered separately.

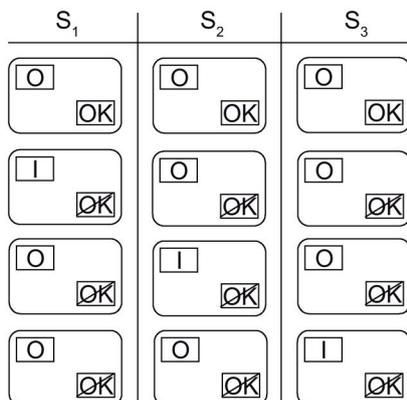
#### Terminals for the Bowden wires:

1. Bowden wire: C<sub>1</sub> O<sub>1</sub> - C<sub>2</sub> I<sub>1</sub>
2. Bowden wire: C<sub>1</sub> O<sub>2</sub> - C<sub>3</sub> I<sub>1</sub>
3. Bowden wire: C<sub>2</sub> O<sub>1</sub> - C<sub>1</sub> I<sub>1</sub>
4. Bowden wire: C<sub>2</sub> O<sub>2</sub> - C<sub>3</sub> I<sub>2</sub>
5. Bowden wire: C<sub>3</sub> O<sub>1</sub> - C<sub>1</sub> I<sub>2</sub>
6. Bowden wire: C<sub>3</sub> O<sub>2</sub> - C<sub>2</sub> I<sub>2</sub>

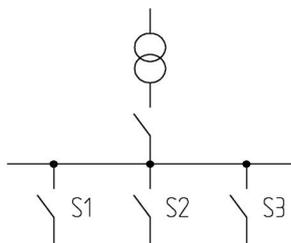
#### Note:

The cylinder-head screws ⑭ with strain washer ⑬ must be screwed into the index clip ⑳ at the following terminals: C<sub>2</sub> I<sub>1</sub>, C<sub>3</sub> I<sub>1</sub>, C<sub>1</sub> I<sub>1</sub>, C<sub>3</sub> I<sub>2</sub>, C<sub>1</sub> I<sub>2</sub>, C<sub>2</sub> I<sub>2</sub>.

#### Possible circuit-breaker statuses



#### Example



**Configuration: Three circuit-breakers back to back**

**Description:**

Two circuit-breakers can be closed/opened independently of each other, with the third only ready to be closed when the other two are open. If the third circuit-breaker is closed, the other two cannot be closed.

**Required equipment:**

Each circuit-breaker is equipped with an interlocking module and a Bowden wire. The Bowden wire must be ordered separately.

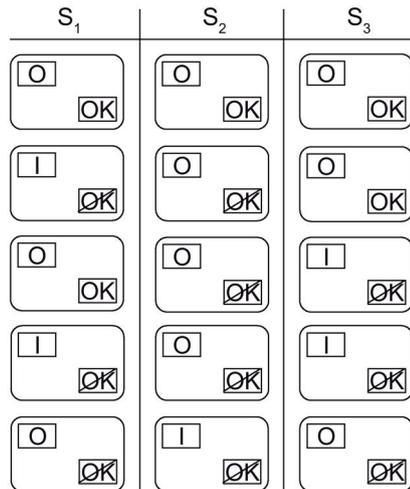
**Terminals for the Bowden wires:**

1. Bowden wire: C<sub>1</sub> O<sub>1</sub> - C<sub>2</sub> I<sub>1</sub>
2. Bowden wire: C<sub>2</sub> O<sub>1</sub> - C<sub>1</sub> I<sub>1</sub>
3. Bowden wire: C<sub>2</sub> O<sub>2</sub> - C<sub>3</sub> I<sub>1</sub>
4. Bowden wire: C<sub>3</sub> O<sub>1</sub> - C<sub>2</sub> I<sub>2</sub>

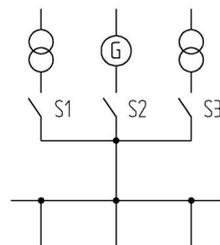
**Note:**

The cylinder-head screws ⑭ with strain washer ⑬ must be screwed into the index clip ⑯ at the following terminals: C<sub>2</sub> I<sub>1</sub>, C<sub>1</sub> I<sub>1</sub>, C<sub>3</sub> I<sub>1</sub>, C<sub>2</sub> I<sub>2</sub>.

**Possible circuit-breaker statuses**



**Example**



**Configuration: Three circuit-breakers, of which two are back to back****Description:**

One circuit-breaker can be closed/opened independently of the other two. The two other circuit-breakers are mutually exclusive, that is, one can only be closed when the other is open.

**Required equipment:**

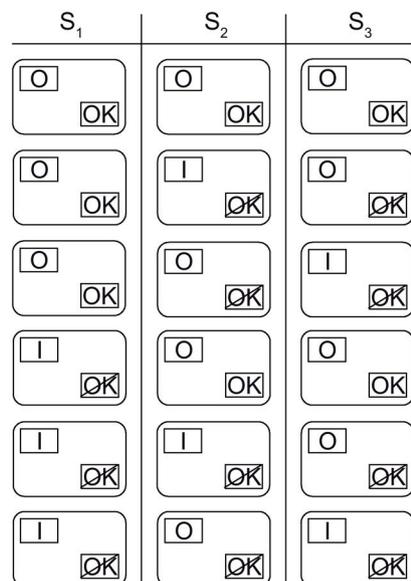
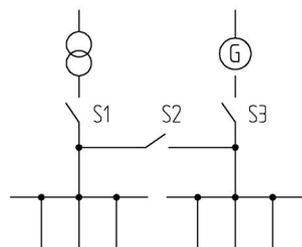
Two of the three circuit-breakers are each equipped with an interlocking module and a Bowden wire.

**Terminals for the Bowden wires:**

1. Bowden wire: C<sub>2</sub> O<sub>1</sub> - C<sub>3</sub> I<sub>1</sub>
2. Bowden wire: C<sub>3</sub> O<sub>1</sub> - C<sub>2</sub> I<sub>1</sub>

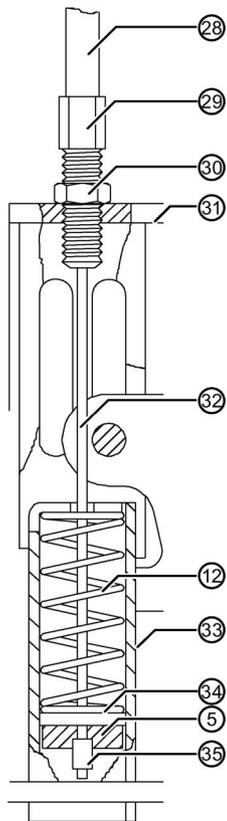
**Note:**

The cylinder-head screws ⑭ with strain washers ⑬ must be screwed into the index clip ⑳ at the following terminals: C<sub>3</sub> I<sub>1</sub>, C<sub>2</sub> I<sub>1</sub>.

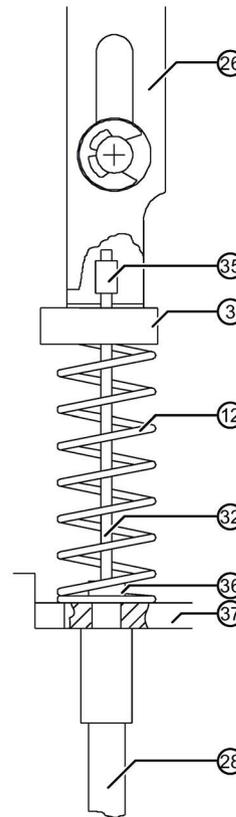
**Possible circuit-breaker statuses****Example**

Inserting and adjusting the Bowden wire

Terminal O1 ; O2



Terminal I1 ; I2

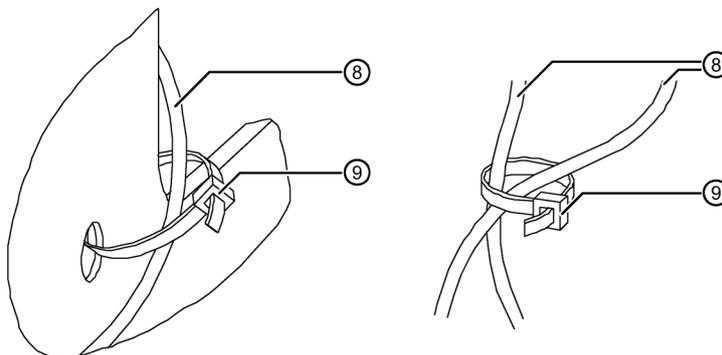


- Push Bowden wire ⑫ with nipple ⑮ through angle plate ⑬, compression spring ⑰, and insertable plate. ⑭
- Secure Bowden wire ⑫ and nipple ⑮ by means of slotted washer ⑤.
- Screw adjusting screw ⑲ with lock nut ⑳ into plate. ㉑
- When Bowden wire is attached on both sides, the sheath must have ㉒ approx. 1 mm clearance. If necessary, adjust with adjusting screw. ⑲
- Fix setting by means of lock nut. ㉓

- Push compression spring ⑫ and spring bush ③ over tube holder ⑮ and sheath. ㉒
- Place Bowden wire ⑫ with nipple ⑮ into index clip. ㉒
- Place spring bush ③ onto index clip. ㉒
- Press compression spring ⑫ between spring bush ③ and plate. ㉓
- Push tube holder ⑮ into plate. ㉓

### Installing the Bowden wire

- Bowden wires ⑧ must be installed in such a way that they are not bent excessively (large bending radii).
- Secure Bowden wires ⑧ by means of cable ties ⑪.
- Minimum permissible bending radius:  $R = 50 \text{ mm}$ . This bending radius is only permitted a maximum of six times for each Bowden wire. The remaining bending radii should be as large as possible.



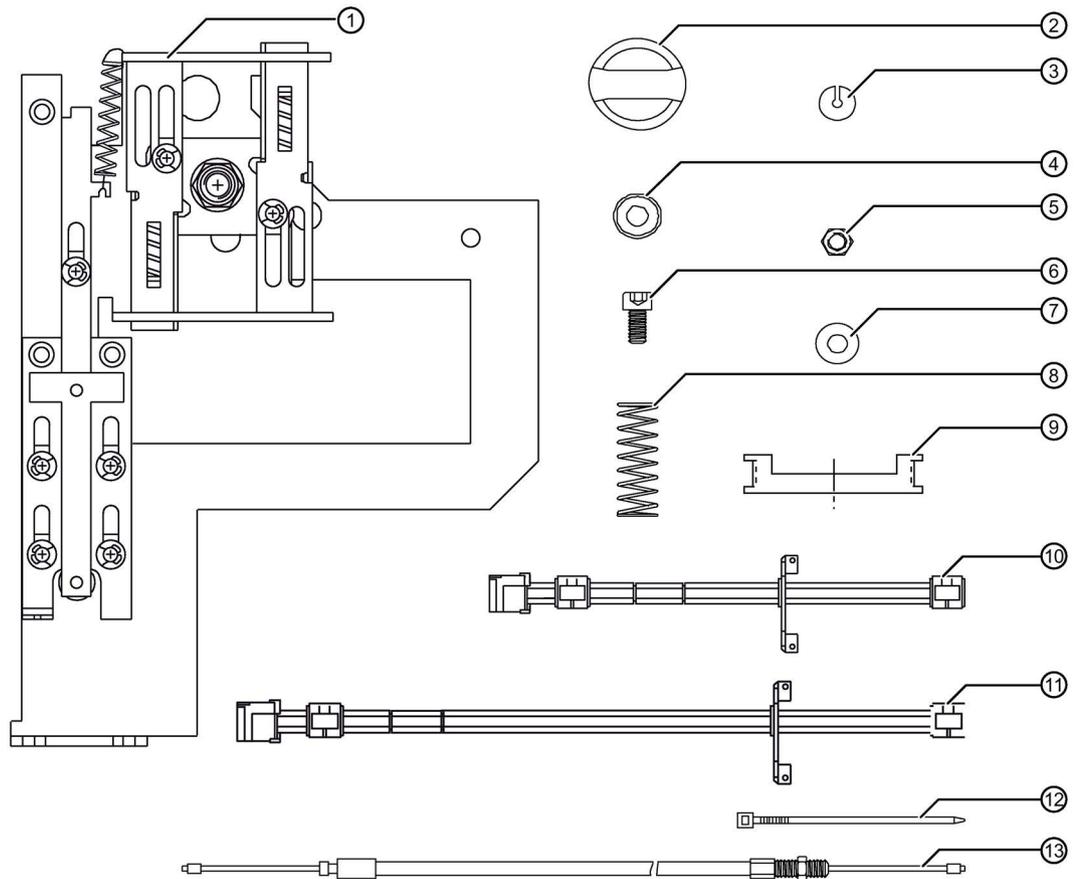
**⚠ WARNING**

If a mechanical circuit-breaker interlock is installed, two or more circuit-breakers **must not be closed simultaneously** by electrical or mechanical means.

The delay between the close commands must be at least 100 ms.

## 10.12 Mechanical interlock of withdrawable circuit-breakers

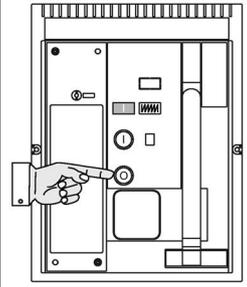
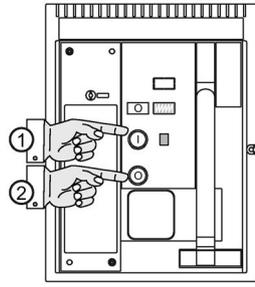
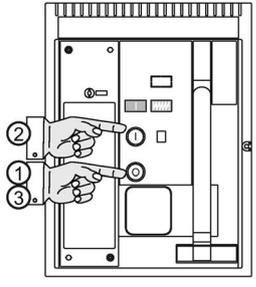
Check the contents of the packaging



### Parts list

①	Interlocking module	1x
②	Control unit	1x
③	Slotted washer	1x
④	Spring bush	1x
⑤	Setnut M6	3x
⑥	Cylinder-head screw M6 x 12 DIN 912	5x
⑦	Strain washer 6 DIN 6796	5x
⑧	Compression spring 1 x 12.5 x 55.5 DIN 2098	1x
⑨	Part cover	1x
⑩	Auxiliary shaft, cpl. frame size 1	1x
⑪	Auxiliary shaft, cpl. frame size 2	1x
⑫	Bowden wire	1x
⑬	Cable tie	1x

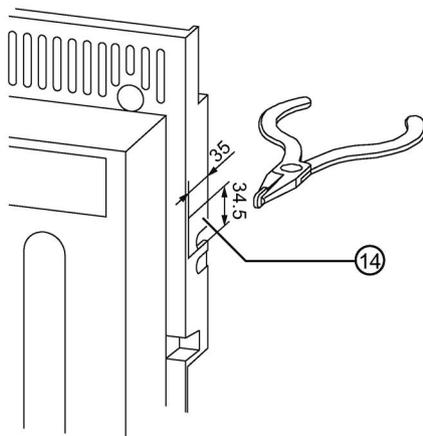
### Opening the circuit-breaker / discharging the stored-energy spring mechanism

Possible status:	Circuit-breaker CLOSED	Switch of circuit- breaker	Circuit-breaker CLOSED
	Stored-energy spring mechanism discharged	Stored-energy spring mechanism charged	Stored-energy spring mechanism charged
Actuating sequence:	OPEN	CLOSED - OPEN	OPEN - CLOSED - OPEN
			

### Removing the operating device

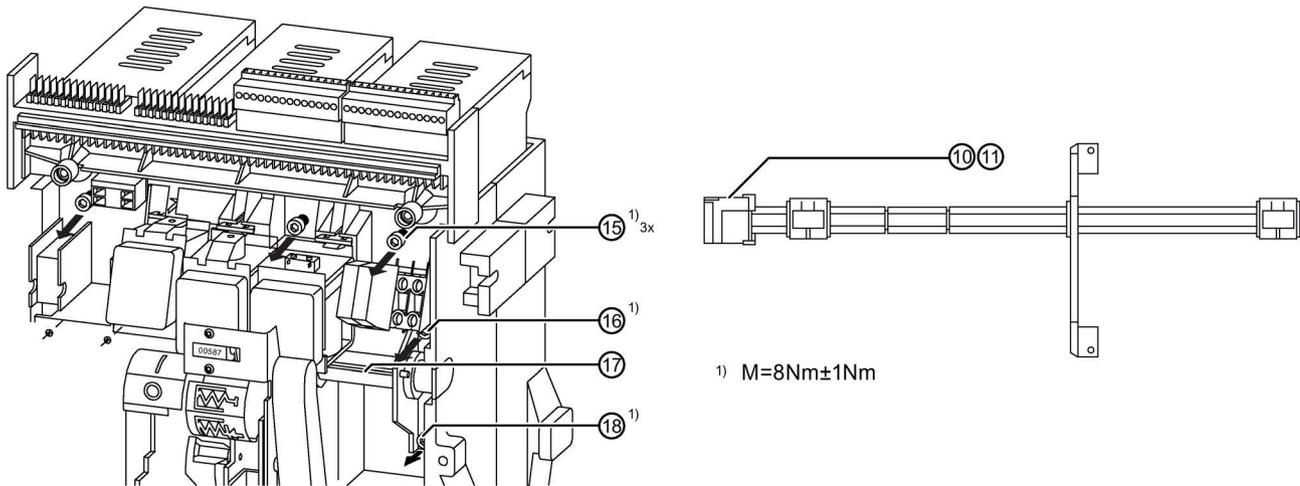
Removing the operating device (Page 93)

### Preparing the operator panel



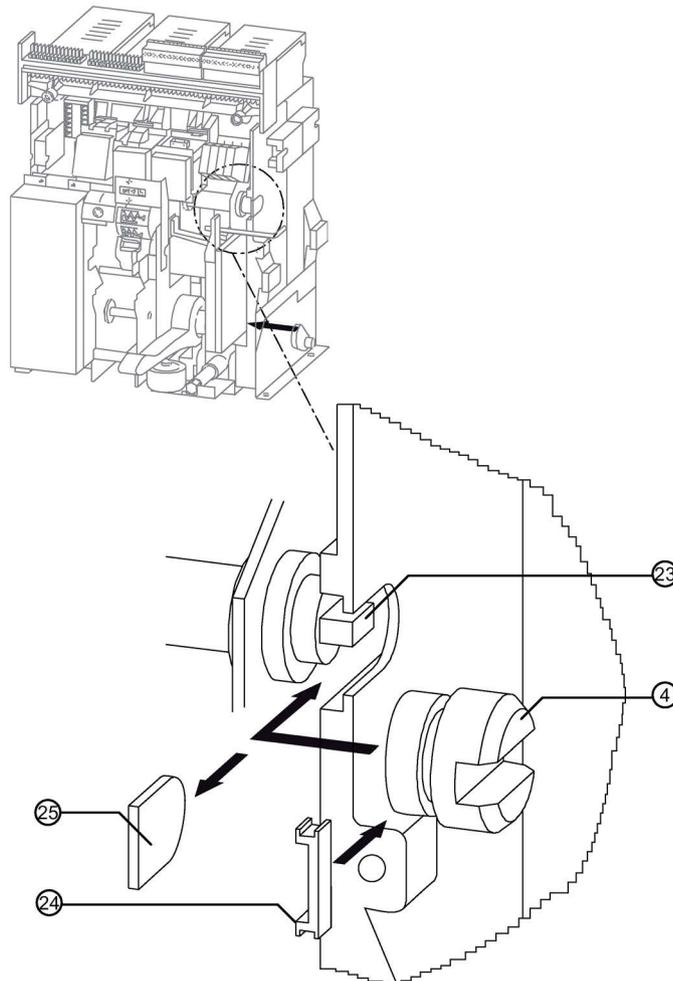
- Cut out a sub-shaft hole outline (14) using snipe-nose pliers.
- With frame size 2, the sub-shaft hole outline (14) must also be cut out of the cover.
- File the cutout edges to fit the sub-shaft hole outline (14).

### Install auxiliary shaft in circuit-breaker



- Remove the motorized operating mechanism (if installed).
- Remove the auxiliary switches (if installed).
- Unscrew and remove the fixing screw ⑱ from the underside of the bearing plate.
- Unscrew the cylinder-head screws ⑮ (turn three or four times only) and loosen the mounting plate (for frame size 1 only).
- Unscrew and remove the fixing screw ⑯ from the top of the bearing plate.
- Remove the bearing plate with auxiliary shaft ⑰.
- Attach the control unit
- Install the auxiliary shaft, cpl. ⑩ ⑪ in the same position as the old one.
- Complete the circuit-breaker by carrying out the above steps in reverse order.

## Attaching the control unit



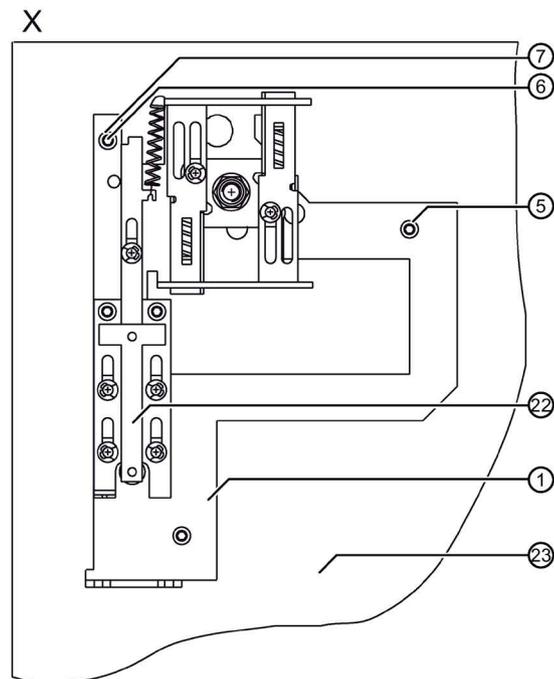
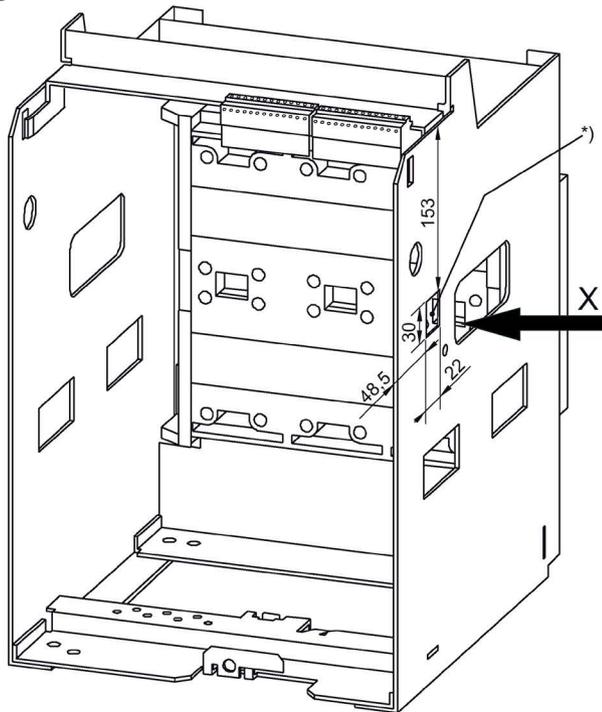
Remove ②① the cover and attach the control unit ② to the breaker shaft ①⑨ (must audibly engage).

- Attach the part cover ②① to the operator panel.

## Installing the operating device

Installing the operating device (Page 95)

Install interlocking module



Place the interlocking module ① against the guide frame ⑳.

- Secure the interlocking module ① and guide frame ㉓ by means of cylinder-head screws ⑥, strain washers ⑦, and setnuts ⑤ (tightening torque:  $8 \pm 1$  Nm).
- Depending on the configuration, screw the cylinder-head screw ⑥ with strain washer ⑦ into the index clip ㉒ (tightening torque:  $8 \pm 1$  Nm).

\*) If a 30 x 22 mm cutout is not provided, you must create it yourself.

## Information about mechanical interlock

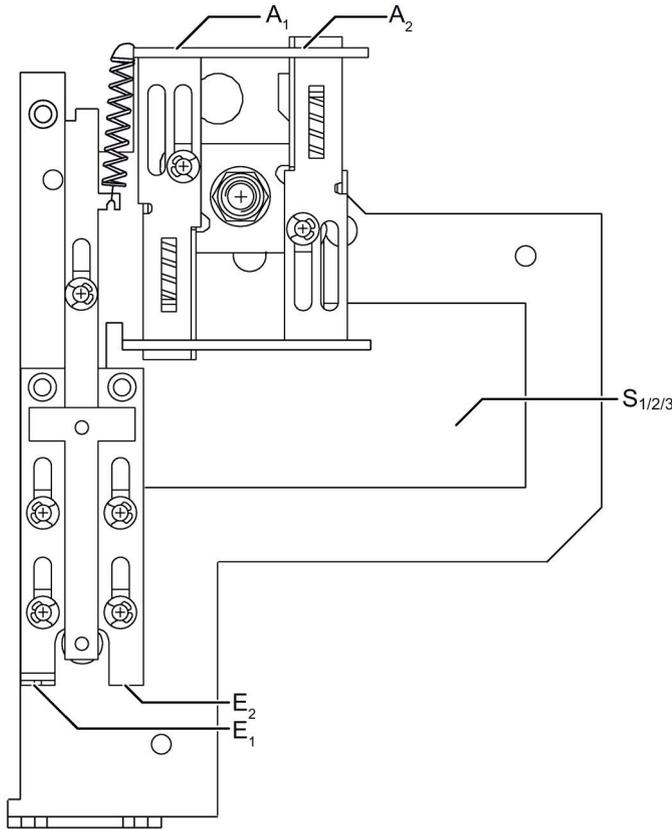
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### Note

To ensure that the interlock functions properly, the following minimum switchgear requirements must be fulfilled:

1. Bowden wires must be laid so that they are as straight as possible.
  2. The bending radii of the Bowden wire must be > 500 mm.
  3. The total bending angle across the length of the Bowden wire must not exceed 540°.
  4. If the circuit-breakers to be interlocked are arranged vertically, the interlock mechanisms must be aligned.
  5. Circuit-breakers to be interlocked must be arranged in such a way that 2 m or 4.5 m Bowden wires can be properly laid in accordance with the conditions specified in points 1. - 4.
  6. The Bowden wires must be secured before the interlock is adjusted (e.g. cable ties).
  7. When choosing the switchgear compartment, make sure that it provides sufficient room for adjusting the interlock.
  8. Openings and cutout sections in system elements must be designed in such a way that the direction of the Bowden wires is not changed and that the wires are not obstructed when they are routed.
-

10.12 Mechanical interlock of withdrawable circuit-breakers



The mechanical interlock module can be used for two or three circuit-breakers. The following designations apply in the configuration instructions below:

- $O_{1/2}$  : Output information  $_{1/2}$
- $I_{1/2}$  : Input information  $_{1/2}$
- $C_{1/2/3}$ : circuit-breaker  $_{1/2/3}$

If the output information 1 of circuit-breaker 1 is interconnected with the input information 2 of circuit-breaker 2, for example, the following abbreviations are used:  $C_1 O_1 - C_2 I_2$

	The statuses of the circuit-breakers are indicated on the operator panel as follows:
	Circuit-breaker CLOSED
	Circuit-breaker OPEN and not ready to CLOSE (interlocked)
	Circuit-breaker OPEN and ready to CLOSE (not interlocked)

**Configuration: Two circuit-breakers back to back****Description:**

A circuit-breaker can only be closed when the other is open.

**Required equipment:**

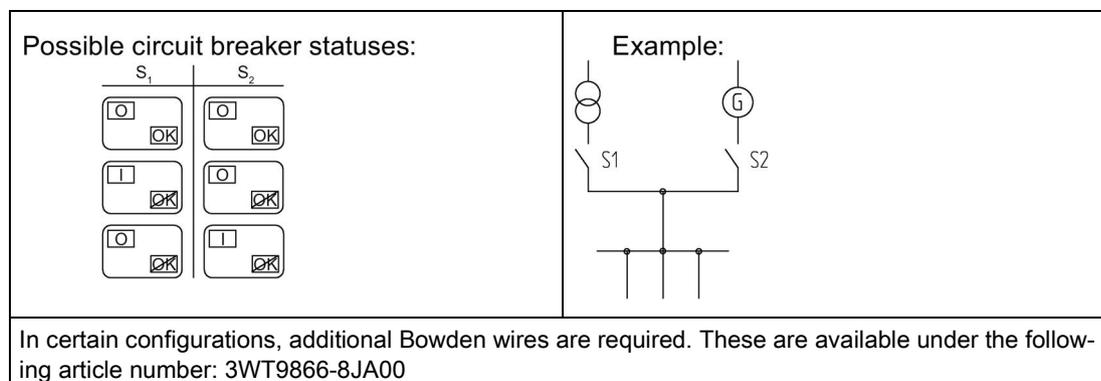
Each circuit-breaker is equipped with an interlocking module and a Bowden wire.

**Terminals for the Bowden wires:**

1. Bowden wire: C<sub>1</sub> O<sub>1</sub> - C<sub>2</sub> I<sub>1</sub>
2. Bowden wire: C<sub>1</sub> I<sub>1</sub> - C<sub>2</sub> O<sub>1</sub>

**Note:**

The cylinder-head screws ⑥ with strain washers ⑦ must be screwed into the index clip at the following terminals: C<sub>1</sub> I<sub>1</sub>, C<sub>2</sub> I<sub>1</sub> .②



**Configuration: Three circuit-breakers stacked**

**Description:**

Any two circuit-breakers can be closed at any time, with the third interlocked.

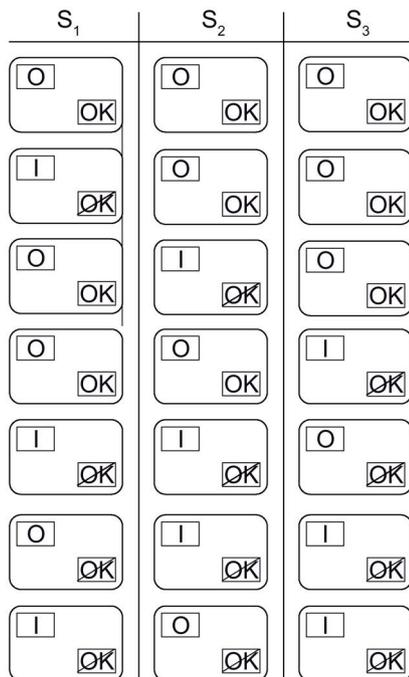
**Required equipment:**

Each circuit-breaker is equipped with an interlocking module and a Bowden wire. Three additional Bowden wires must be ordered separately.

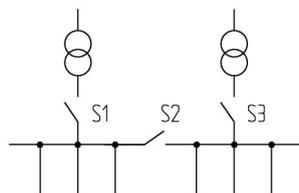
**Terminals for the Bowden wires:**

1. Bowden wire: C<sub>1</sub> O<sub>1</sub> - C<sub>2</sub> I<sub>1</sub>
2. Bowden wire: C<sub>1</sub> O<sub>2</sub> - C<sub>3</sub> I<sub>1</sub>
3. Bowden wire: C<sub>2</sub> O<sub>1</sub> - C<sub>1</sub> I<sub>1</sub>
4. Bowden wire: C<sub>2</sub> O<sub>2</sub> - C<sub>3</sub> I<sub>2</sub>
5. Bowden wire: C<sub>3</sub> O<sub>1</sub> - C<sub>1</sub> I<sub>2</sub>
6. Bowden wire: C<sub>3</sub> O<sub>2</sub> - C<sub>2</sub> I<sub>2</sub>

**Possible circuit-breaker statuses**



**Example**



### Configuration: Three circuit-breakers stacked

#### Description:

When one circuit-breaker is closed, the other two cannot be closed.

#### Required equipment:

Each circuit-breaker is equipped with an interlocking module and a Bowden wire. Three additional Bowden wires must be ordered separately.

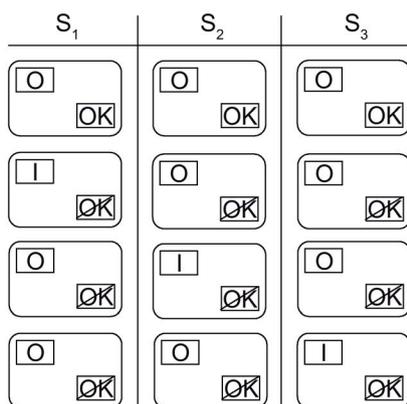
#### Terminals for the Bowden wires:

1. Bowden wire: C<sub>1</sub> O<sub>1</sub> - C<sub>2</sub> I<sub>1</sub>
2. Bowden wire: C<sub>1</sub> O<sub>2</sub> - C<sub>3</sub> I<sub>1</sub>
3. Bowden wire: C<sub>2</sub> O<sub>1</sub> - C<sub>1</sub> I<sub>1</sub>
4. Bowden wire: C<sub>2</sub> O<sub>2</sub> - C<sub>3</sub> I<sub>2</sub>
5. Bowden wire: C<sub>3</sub> O<sub>1</sub> - C<sub>1</sub> I<sub>2</sub>
6. Bowden wire: C<sub>3</sub> O<sub>2</sub> - C<sub>2</sub> I<sub>2</sub>

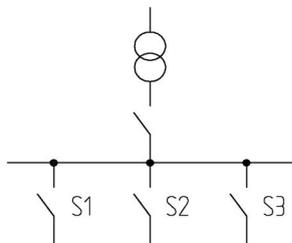
#### Note:

The cylinder-head screws ⑭ with strain washer ⑬ must be screwed into the index clip at the following terminals: C<sub>2</sub> I<sub>1</sub>, C<sub>3</sub> I<sub>1</sub>, C<sub>1</sub> I<sub>1</sub>, C<sub>3</sub> I<sub>2</sub>, C<sub>1</sub> I<sub>2</sub>, C<sub>2</sub> I<sub>2</sub>. ⑳

#### Possible circuit-breaker statuses



#### Example



**Configuration: Three circuit-breakers back to back**

**Description:**

Two circuit-breakers can be closed/opened independently of each other, with the third only ready to be closed when the other two are open. If the third circuit-breaker is closed, the other two cannot be closed.

**Required equipment:**

Each circuit-breaker is equipped with an interlocking module and a Bowden wire. The Bowden wire must be ordered separately.

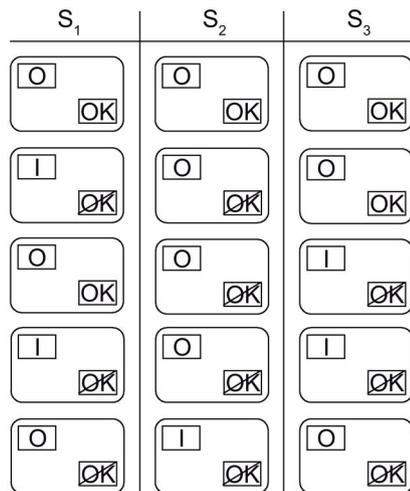
**Terminals for the Bowden wires:**

1. Bowden wire: C<sub>1</sub> O<sub>1</sub> - C<sub>2</sub> I<sub>1</sub>
2. Bowden wire: C<sub>2</sub> O<sub>1</sub> - C<sub>1</sub> I<sub>1</sub>
3. Bowden wire: C<sub>2</sub> O<sub>2</sub> - C<sub>3</sub> I<sub>1</sub>
4. Bowden wire: C<sub>3</sub> O<sub>1</sub> - C<sub>2</sub> I<sub>2</sub>

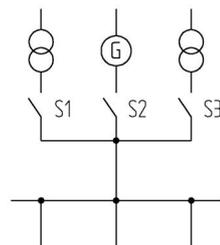
**Note:**

The cylinder-head screws ⑥ with strain washer ⑦ must be screwed into the index clip at the following terminals: C<sub>2</sub> I<sub>1</sub>, C<sub>1</sub> I<sub>1</sub>, C<sub>3</sub> I<sub>1</sub>, C<sub>2</sub> I<sub>2</sub>. ②

**Possible circuit-breaker statuses**



**Example**



**Configuration: Three circuit-breakers, of which two are back to back****Description:**

One circuit-breaker can be closed/opened independently of the other two. The two other circuit-breakers are mutually exclusive, that is, one can only be switched on when the other is switched off.

**Required equipment:**

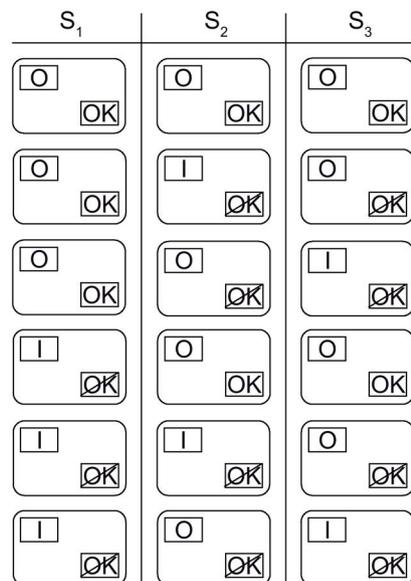
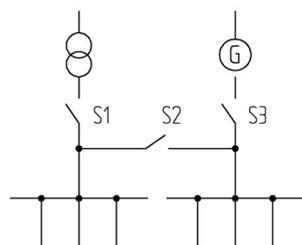
Two of the three circuit-breakers are each equipped with an interlocking module and a Bowden wire.

**Terminals for the Bowden wires:**

1. Bowden wire: C<sub>2</sub> O<sub>1</sub> - C<sub>3</sub> I<sub>1</sub>
2. Bowden wire: C<sub>3</sub> O<sub>1</sub> - C<sub>2</sub> I<sub>1</sub>

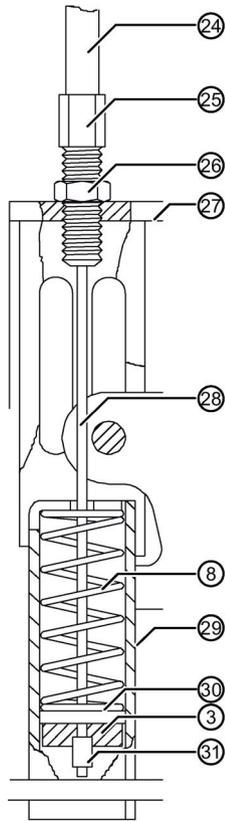
**Note:**

The cylinder-head screws ⑥ with strain washers ⑦ must be screwed into the index clip at the following terminals: C<sub>3</sub> I<sub>1</sub>, C<sub>2</sub> I<sub>1</sub>. ②

**Possible circuit-breaker statuses****Example**

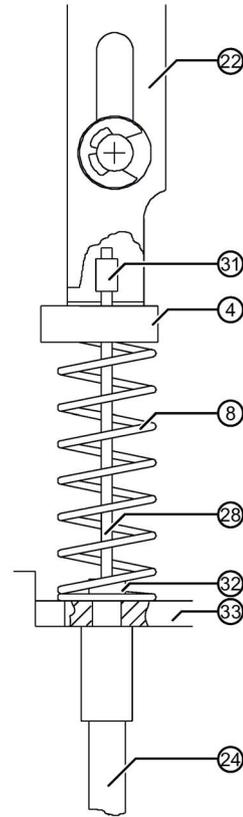
Inserting and adjusting the Bowden wire

Terminal O1 ; O2



- Push Bowden wire ②⑧ with nipple ③① through angle plate ②⑨, compression spring ⑧, and insertable plate ③⑩
- Secure Bowden wire ②⑧ and nipple ③① by means of slotted washer ③.
- Screw adjusting screw ②⑤ with lock nut ②⑥ into plate. ②⑦
- When Bowden wire is attached on both sides, the sheath must have ②④ approx. 1 mm clearance. If necessary, adjust with adjusting screw. ②⑤
- Fix setting by means of lock nut. ②⑥

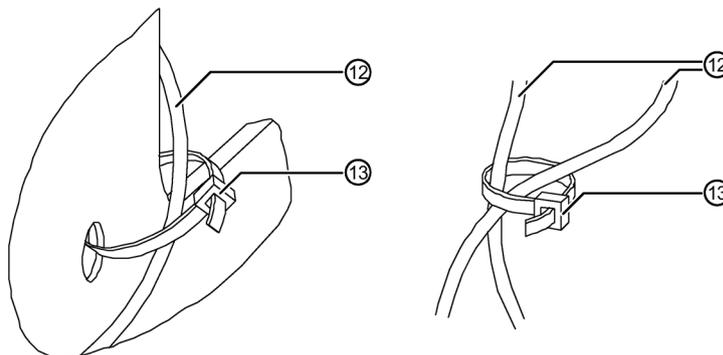
Terminal I1 ; I2



- Push the compression spring ⑧ and spring bush ④ over the tube holder ③② and sheath. ②④
- Place Bowden wire ②⑧ with nipple ③① into index clip. ②②
- Place the spring bush ④ onto the index clip. ②②
- Press the compression spring ⑧ between the spring bush ④ and plate. ③③
- Push tube holder ③② into plate. ③③

### Installing the Bowden wire

- Bowden wires ⑩ must be installed in such a way that they are not bent excessively (large bending radii).
- Secure Bowden wires ⑩ by means of cable ties ⑪.
- Minimum permissible bending radius:  $R = 50 \text{ mm}$ . This bending radius is only permitted a maximum of six times for each Bowden wire. The remaining bending radii should be as large as possible.



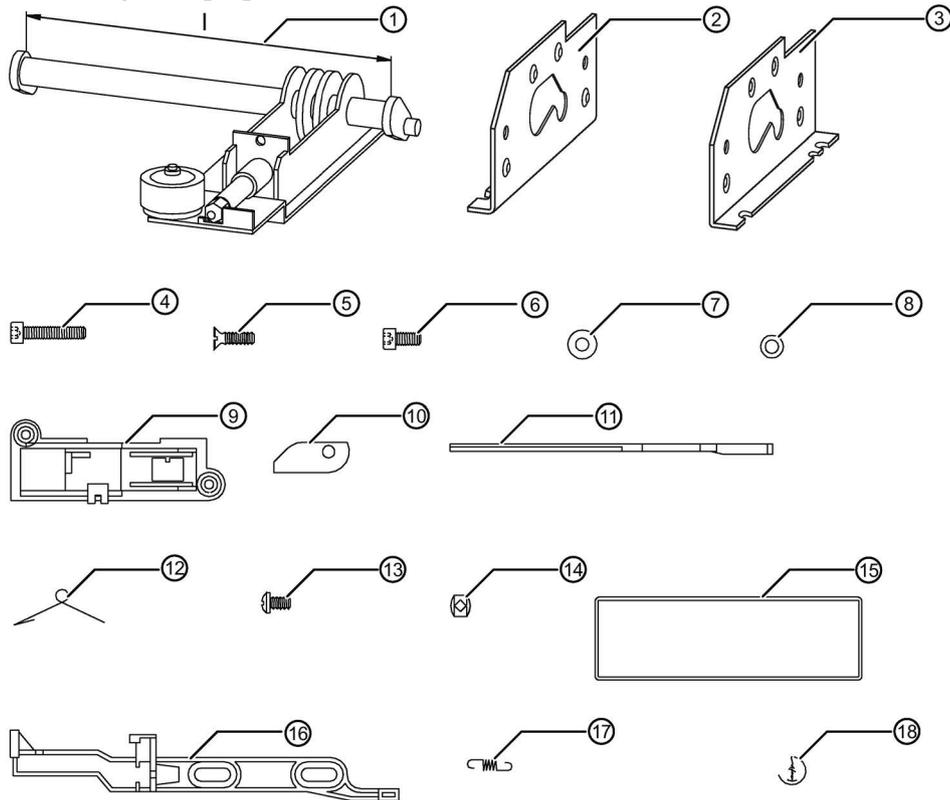
**⚠ WARNING**

If a mechanical circuit-breaker interlock is installed, two or more circuit-breakers must not be switched on simultaneously by electrical or mechanical means.

The delay between the close commands must be at least 100 ms.

## 10.13 Switching from fixed-mounted circuit-breakers to withdrawable circuit-breakers

Check the contents of the packaging



①	Positioning actuator	1x
②	Angle bracket (left)	1x
③	Angle bracket (right)	1x
④	Hexagon socket-head screw M6x30 DIN 912	1x
⑤	Countersunk screw M6x20 DIN 7991	8x
⑥	Hexagon socket-head screw M6x12 or similar, DIN 912	FS I 2x, FS II 3x
⑦	Strain washer 6 DIN 6796	1x
⑧	Washer 6,4 DIN 433	FS I 1x, FS II 2x
⑨	Insert	1x
⑩	Lever	1x
⑪	Slide switch	1x
⑫	Leg spring	1x
⑬	Plastite screw 6. 19x10	2x
⑭	DUOCLIPS 4SXN 10	1x
⑮	Adhesive label	1x
⑯	Door slider	1x
⑰	Door slider spring	1x
⑱	Lock washer DIN 6799-5	2x

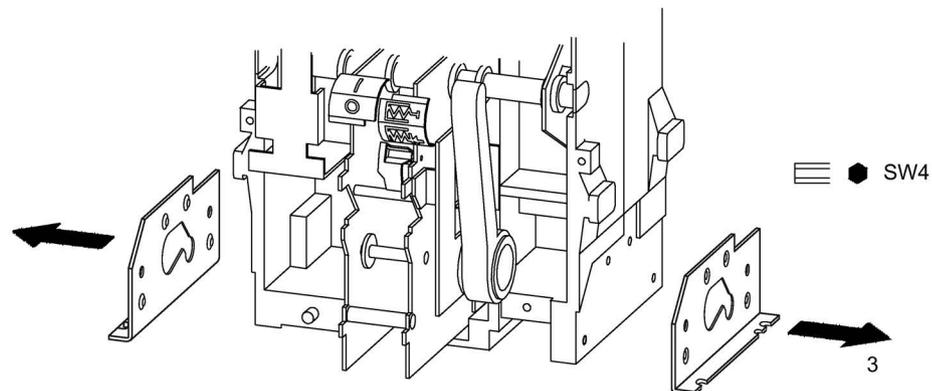
**Note**

The components are shown in simplified form.

Article number	Frame size	Number of poles	Dimension "I" (Part 1)
3WT9888-0GA00	I	3	281
3WT9888-0KA00	II	3	381
3WT9888-0HA00	I	4	371
3WT9888-0LA00	II	4	501

**Removing the operating device**

Removing the operating device (Page 93)

**Unscrewing the angle bracket**

### Attaching the positioning actuator

- Place the circuit-breaker on its back.  
**Important:** place it on a soft surface.  
The underside of the circuit-breaker should ideally point to the installation engineer.
- Insert the positioning actuator ① in the circuit-breaker ⑳ and secure by means of the screw ⑤ and strain washer ⑧ (tighten by hand only).
- Push the angle bracket ② and ③ over the shaft ends ㉒ and ㉔ of the positioning actuator and position up against the circuit-breaker housing.
- Secure the angle brackets ② and ③ by means of the screws ⑥ (tightening torque:  $8 \pm 1$  Nm).
- Fix the positioning actuator securely by means of the screw ⑤ (tightening torque:  $8 \pm 1$  Nm).
- Screw the coding screws ⑦ for the rated current coding into the base plate ㉓ of the positioning actuator ①.

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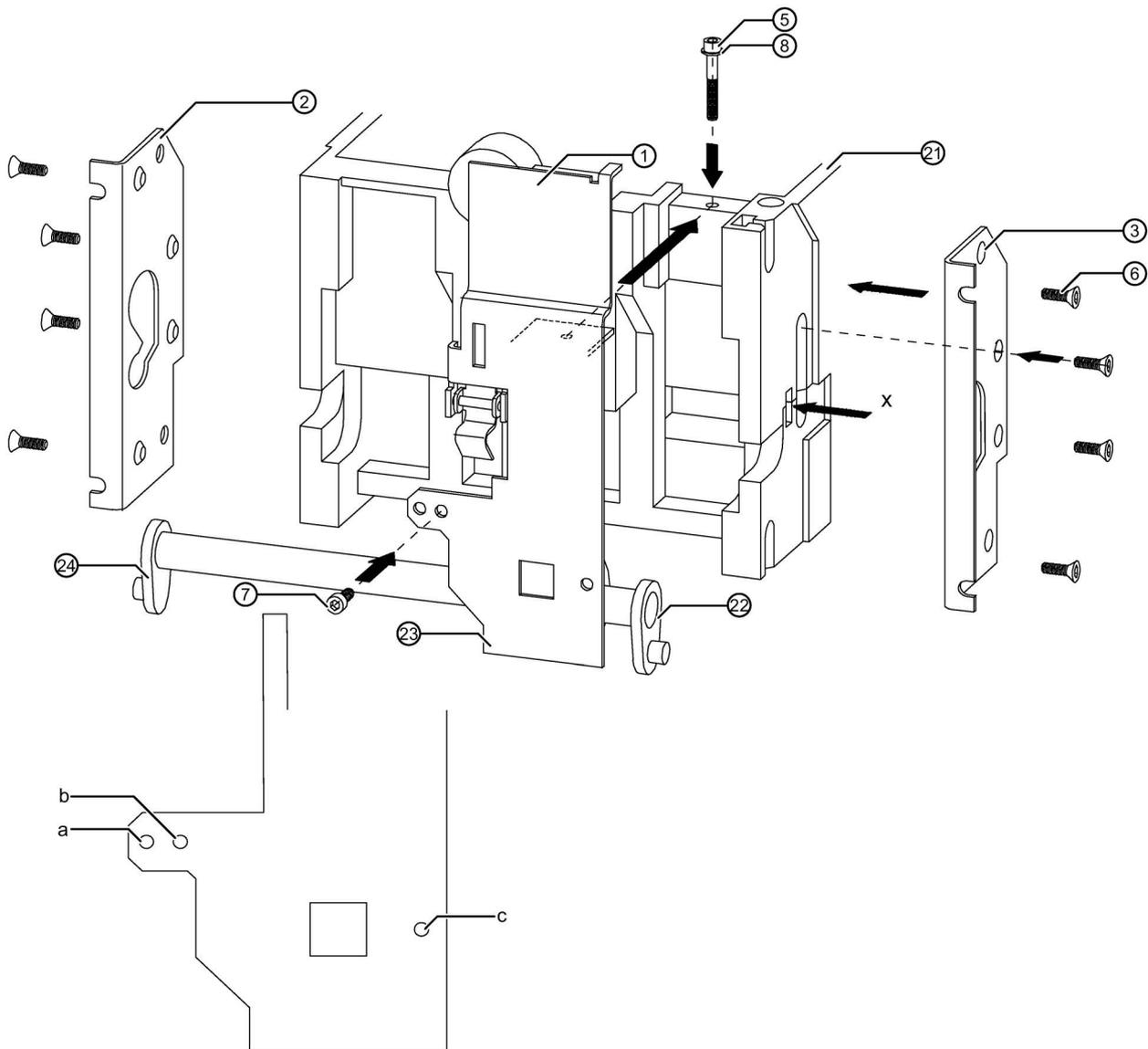
#### Note

The coding screws are thread-shaped screws, which means that they require a higher tightening torque. For the arrangement of the coding screws, see the diagram below.  
Tightening torque:  $8 \pm 1$  Nm

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- Place the circuit-breaker in an upright position again.

10.13 Switching from fixed-mounted circuit-breakers to withdrawable circuit-breakers

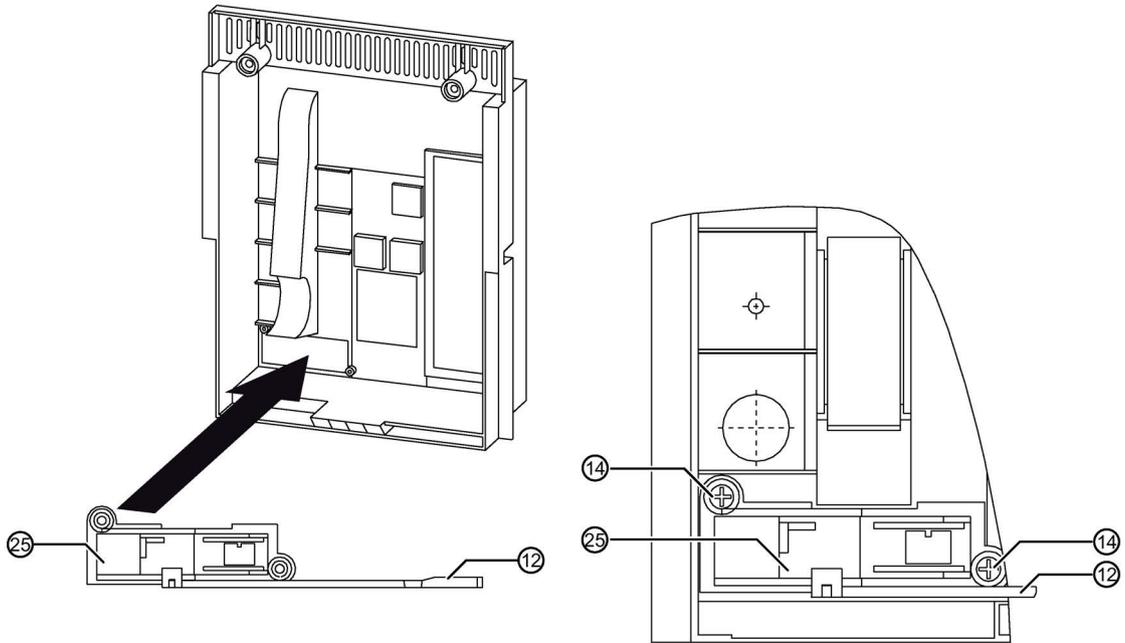


Coding scheme

Rated current	Frame size	Coding screw in hole
1250 A	I	a
1600 A	I	b
2500 A	II	a
3200 A	II	c
3800 A	II	b

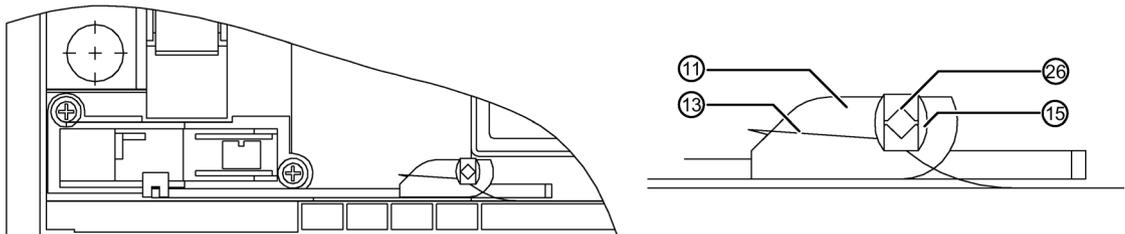
10.13 Switching from fixed-mounted circuit-breakers to withdrawable circuit-breakers

- Insert the shutter ⑳ and slide switch ㉒ into the cutout of the operator panel together from inside and secure by means of screws ㉔.



- Make sure that the shutter ㉑ can move without hindrance and leave it closed.
- Place the lever ㉑ and leg spring ㉓ onto the pins ㉖ of the operator panel.
- Place the bent leg 13 over lever ㉑ so that leg 13 can be moved by lever ㉑.
- Secure both parts by means of DUOCLIPS ㉕.

**Important:** The lever ㉑ must rotate without hindrance.

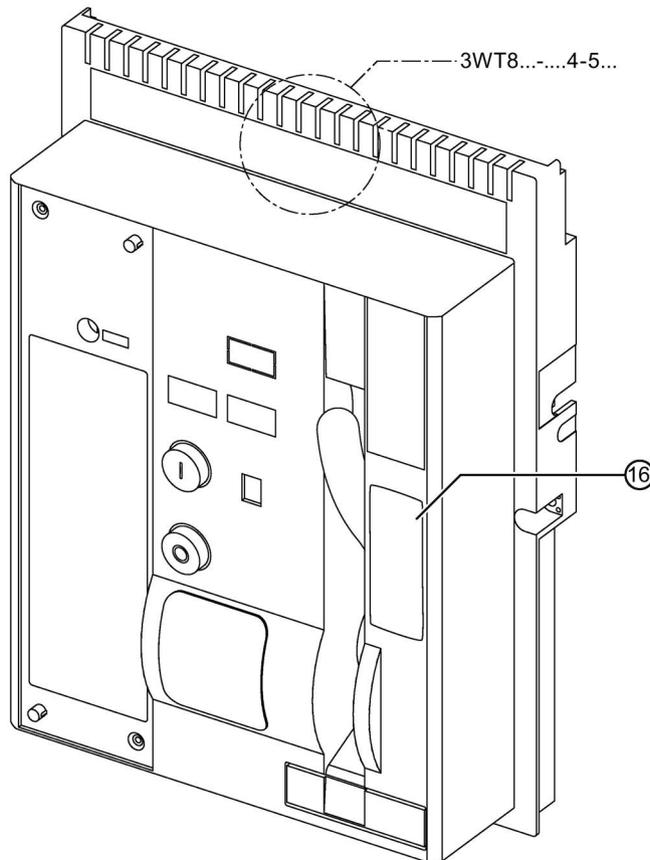


**Attaching the adhesive label and changing the rating plate.**

Stick the label ⑩ onto the front of the operator panel.

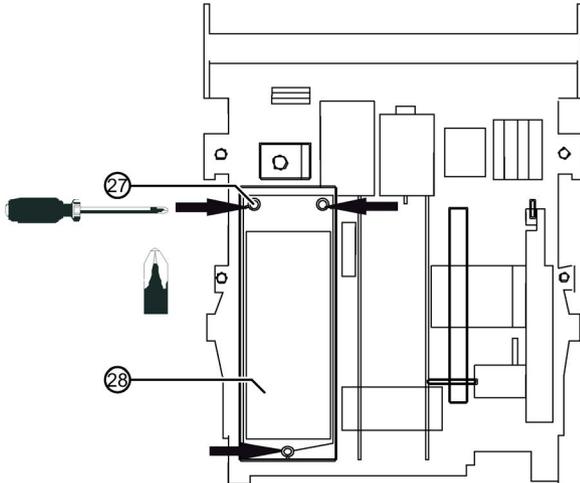
**Changing the rating plate:**

12. Change the 12th digit of the MLFB to "4" and the 13th to "5"  
(use an indelible marker).

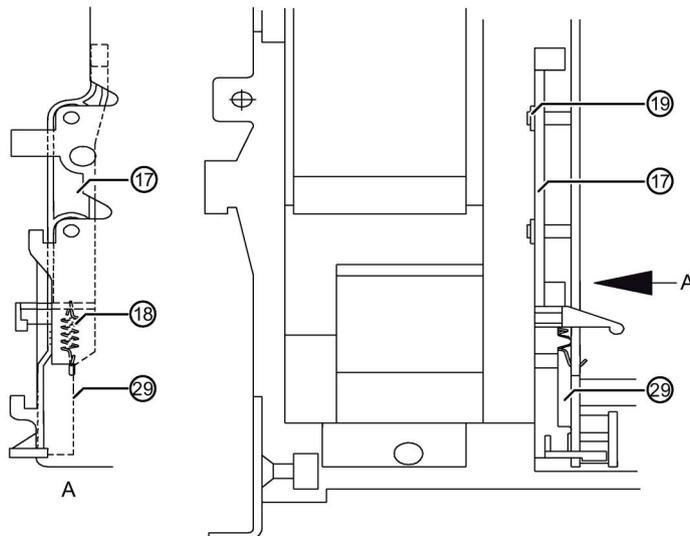


### Installing the door slider (if not already installed)

- Remove the screws ⑳ for the electronic overcurrent release. ㉑
- Remove the electronic overcurrent release. ㉒



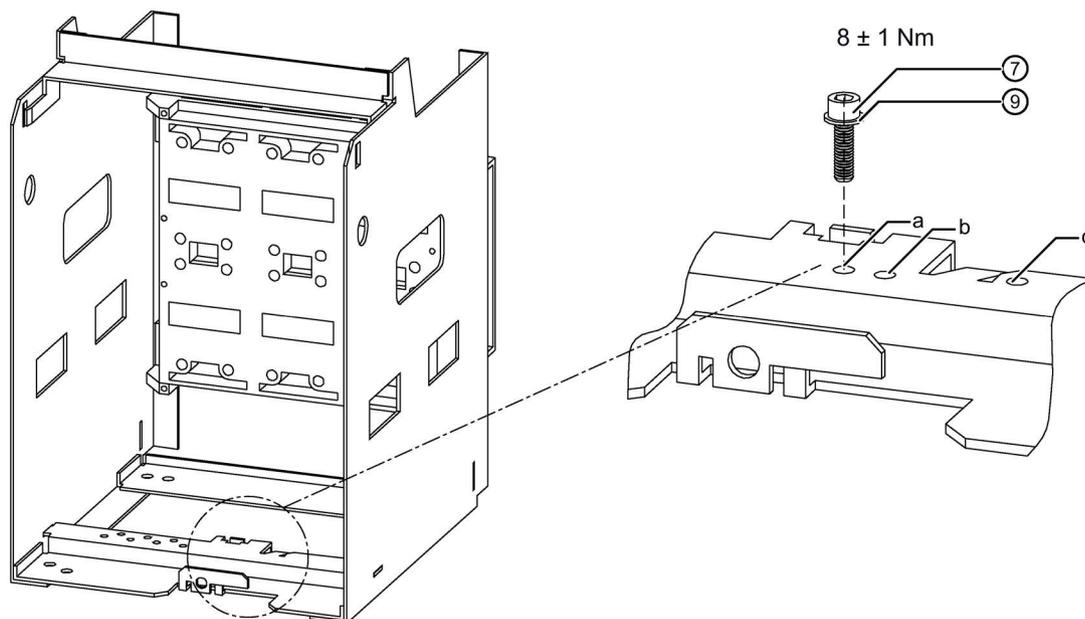
- Place the door slider spring ㉓ with the off-center eye in the side panel of the drive. ㉔
- Place the door slider spring ㉓ with the center eye in the door slider ㉕ using a small screwdriver (see diagram).
- Place the door slider ㉕ with the door slider spring ㉓ on the side panel of the drive ㉔ and secure it by means of the lock washers ㉖.
- Attach the electronic overcurrent release ㉒. When doing so, make sure that ㉔ you do not trap any cables.



## Installing the operating device

Installing the operating device (Page 95)

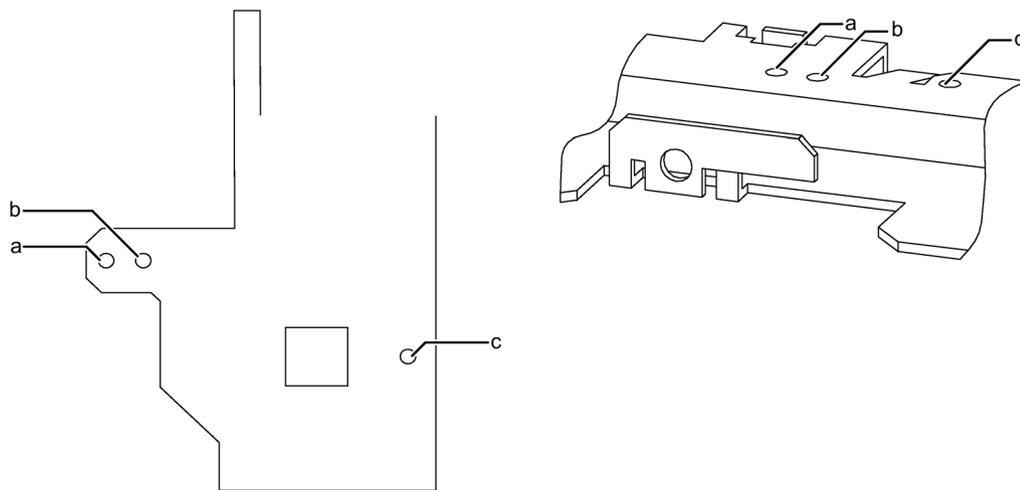
## Encoding in the guide frame



### Coding scheme

Rated current	Frame size	Coding screws in hole
1250 A	I	b
1600 A	I	a
2500 A	II	b + c
3200 A	II	a + b
3800 A	II	a + c

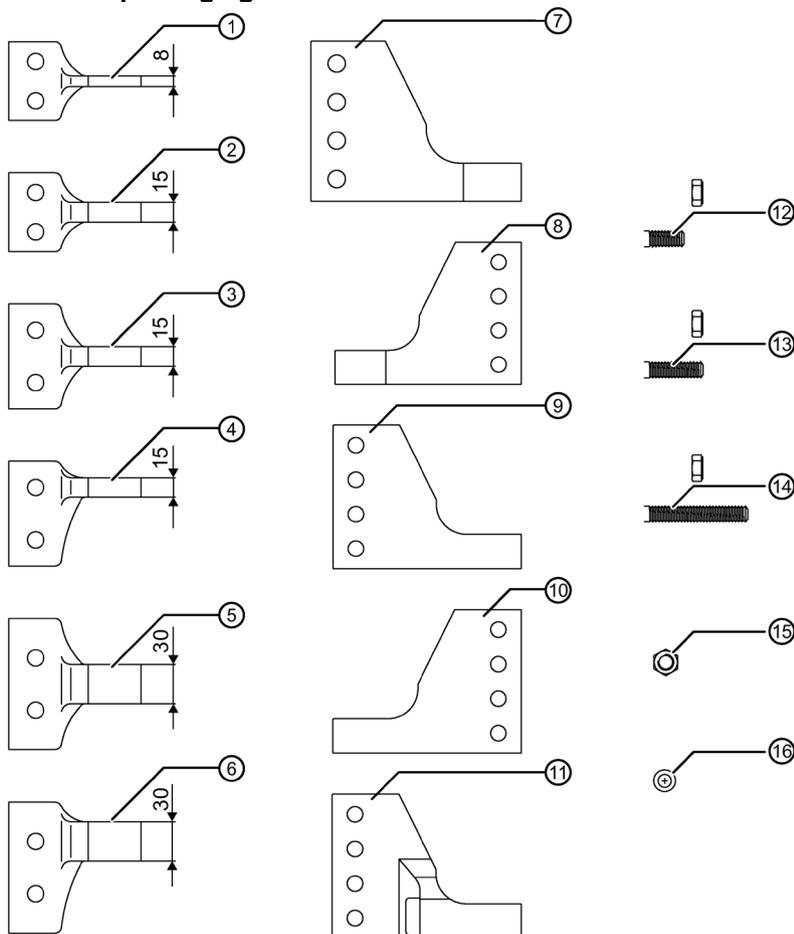
Summary of coding for circuit-breaker and guide frame



FS	Rated current	Coding							
		Circuit-breaker				Withdrawable part			
		a	b		c	a	b		c
I	1250 A	●	○			○	●		
	1600 A	○	●			●	○		
II	2500 A	●	○		○	○	●		●
	3200 A	○	○		●	●	●		○
	3800 A	○	●		○	●	○		●

## 10.14 Vertical connections for fixed-mounted circuit-breaker

Check the contents of the packaging



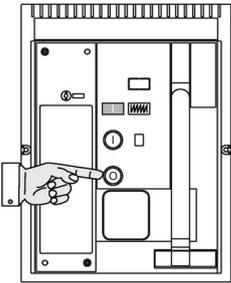
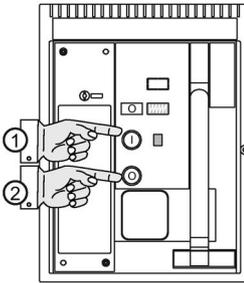
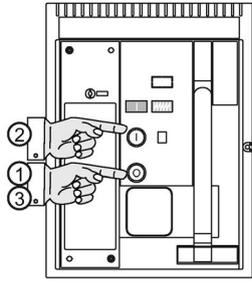
- ① Connection piece
- ② Connection piece
- ③ Connection piece
- ④ Connection piece
- ⑤ Connection piece
- ⑥ Connection piece
- ⑦ Connection piece
- ⑧ Connection piece
- ⑨ Connection piece
- ⑩ Connection piece
- ⑪ Connection piece
- ⑫ Hexagon-head screw M12 x 30 DIN933
- ⑬ Hexagon-head screw M12 x 45 DIN931
- ⑭ Hexagon-head screw M12 x 80 DIN931
- ⑮ Hexagon nut M12 DIN934
- ⑯ Strain washer 12 DIN6796

10.14 Vertical connections for fixed-mounted circuit-breaker

Article number	Frame size / no. of poles	Rated current A	Number of items															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
3WT9821 - 7AC00	I / 3 I / 4	≤ 1250	3 4											6 8			6 8	6 8
3WT9821 - 7BC00	I / 3 I / 4	1600		3 4											6 8		6 8	6 8
3WT9821 - 7DA00 3WT9821 - 7DB00	II / 3 II / 4	2000-2500			1 1	2 3									6 8		6 8	6 8
3WT9821 - 7FA00 3WT9821 - 7FB00	II / 3 II / 4	3200					1 1	2 3									6 8	6 8
3WT9821-7FC00 3WT9821-7FD00	II / 3 II/4	4000								1 1	1 1			1			6 8	6 8

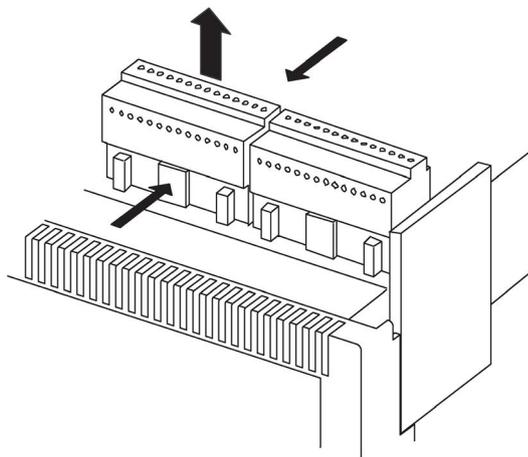
Preparatory work

Opening the circuit-breaker / discharging the stored-energy spring mechanism

Possible status:	Circuit-breaker CLOSED	Switch of circuit-breaker	Circuit-breaker CLOSED
	Stored-energy spring mechanism discharged	Stored-energy spring mechanism charged	Stored-energy spring mechanism charged
Actuating sequence:	OPEN	CLOSED - OPEN	OPEN - CLOSED - OPEN
			

## 10.14 Vertical connections for fixed-mounted circuit-breaker

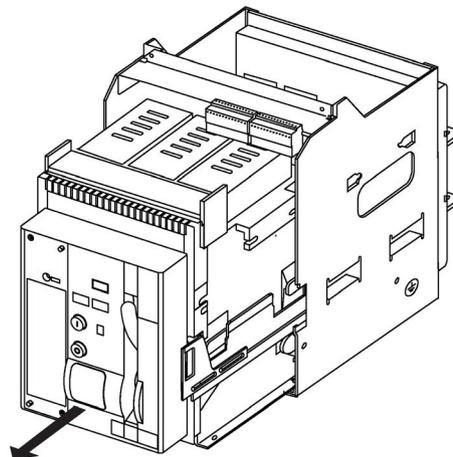
Fixed-mounted circuit-breaker



Remove the manual connector.

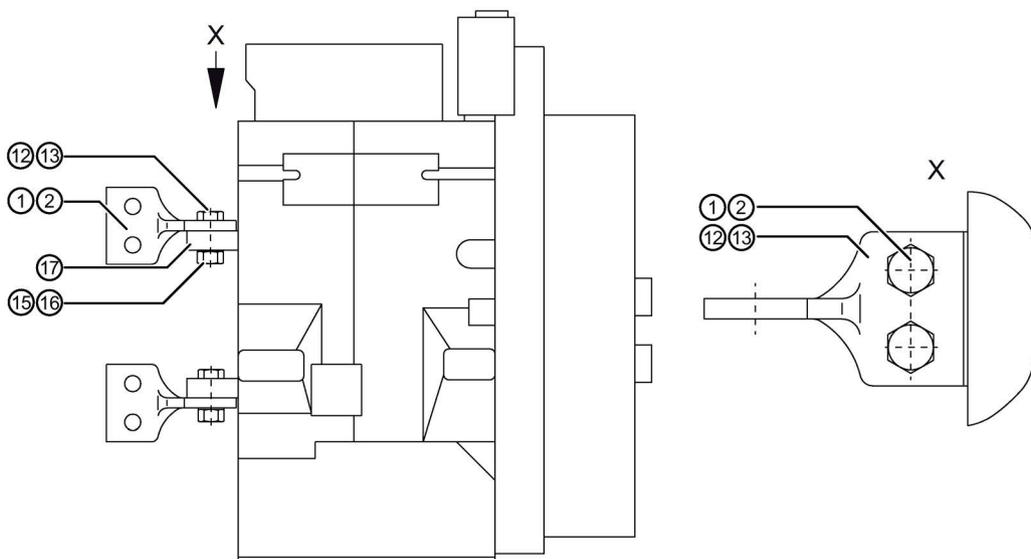
To remove the manual connector(s), push them up. Make sure that the connected cables are not bent.

Withdrawable circuit-breaker



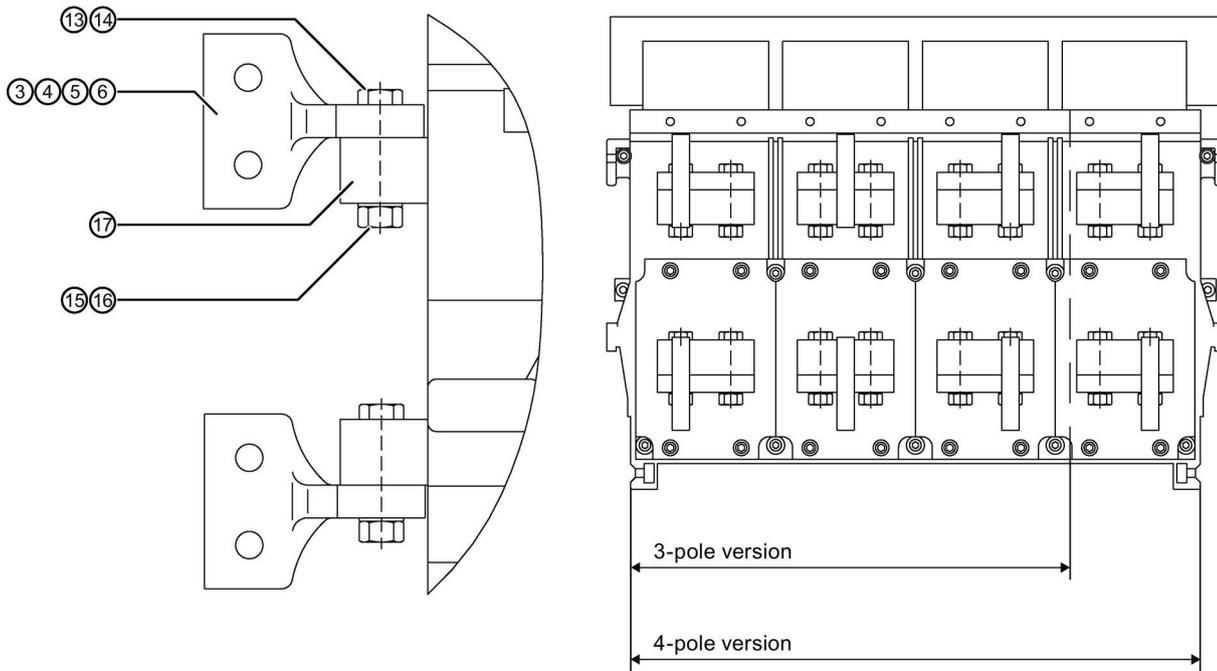
Set the circuit-breaker to the maintenance position or remove it from the system.

## Installing the connection pieces (frame size I)



Place the connection piece ① or ② on the connection bar ⑰ as shown and secure by means of a hexagon socket-head screw ⑫ or ⑬, strain washer ⑯ and hexagon nut ⑮ (tightening torque:  $70 \pm 7$  Nm).

Installing the connection pieces (frame size II)



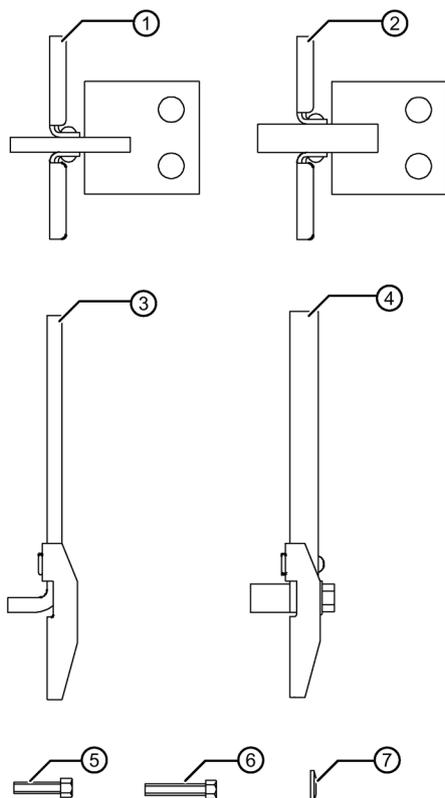
Place the connection pieces ③ and ④ or ⑤ and ⑥ on the connection bar ⑰ as shown and secure by means of a hexagon socket-head screw ⑬ or ⑭, strain washer ⑱ and hexagon nut ⑮ (tightening torque:  $70 \pm 7$  Nm).

**Note**

Make sure that connection pieces ③ and ④ or ⑤ and ⑥ (symmetrical and asymmetrical) are mounted in the correct position. The 3-pole version does not have the outer connections on the right.

## 10.15 Connection bars for guide frame (frame size I)

Check the contents of the packaging



- ① Vertical connection 1250 A
- ② Vertical connection 1600 A
- ③ Front connection with DIN hole pattern 1250 A
- ④ Front connection with DIN hole pattern 1600 A
- ⑤ Hexagon-head screw M6 x 25 - 8.8 DIN 933
- ⑥ Hexagon-head screw M6 x 35 - 8.8 DIN 933
- ⑦ Strain washer 6 DIN 6796

### Parts list

Article number	Rated current	Connection type	Quantity						
			1	2	3	4	5	6	7
3WT9823-3AA00	1250	Vertical connection	1				4		4
3WT9823-3BA00	1600	Vertical connection		1			4		4
3WT9823-1AA01	1250	DIN front connection			1		2	2	4
3WT9823-1BA01	1600	DIN front connection				1	2	2	4

### Installing the connection bars

Unscrew any connection pieces. To do so, unscrew the fixing screws ⑨ or ⑩ and remove the connection pieces from the finger clusters ⑫. When doing so, make sure that you do not pull the finger clusters out of the rear panel ⑬.

---

#### Note

If necessary, only insert finger clusters that have been removed in the position shown in Fig. 2, that is, the stop pin ⑭ must point toward the connection pieces.

---

Insert the new connection pieces as shown in Fig. 1 and Fig. 2 and secure them by means of the enclosed screws and strain washers (tightening torque:  $8 \pm 1$  Nm). See Fig. 1 for the fixing screw assignments; see Fig. 2 for the position of the strain washers.

**All diagrams are simplified.**

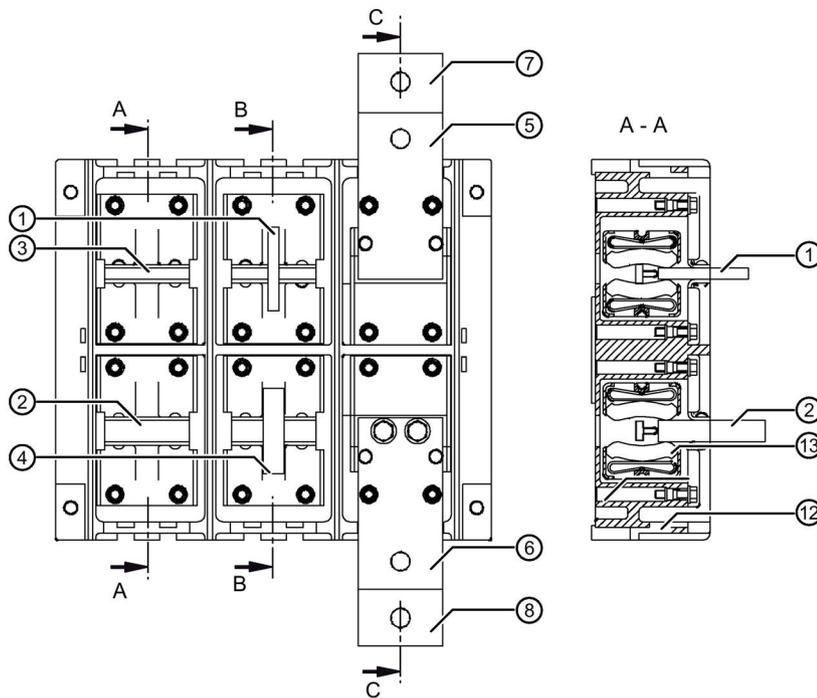


Fig. 1: Rear panel of guide frame, rear view, possible connection types

10.15 Connection bars for guide frame (frame size I)

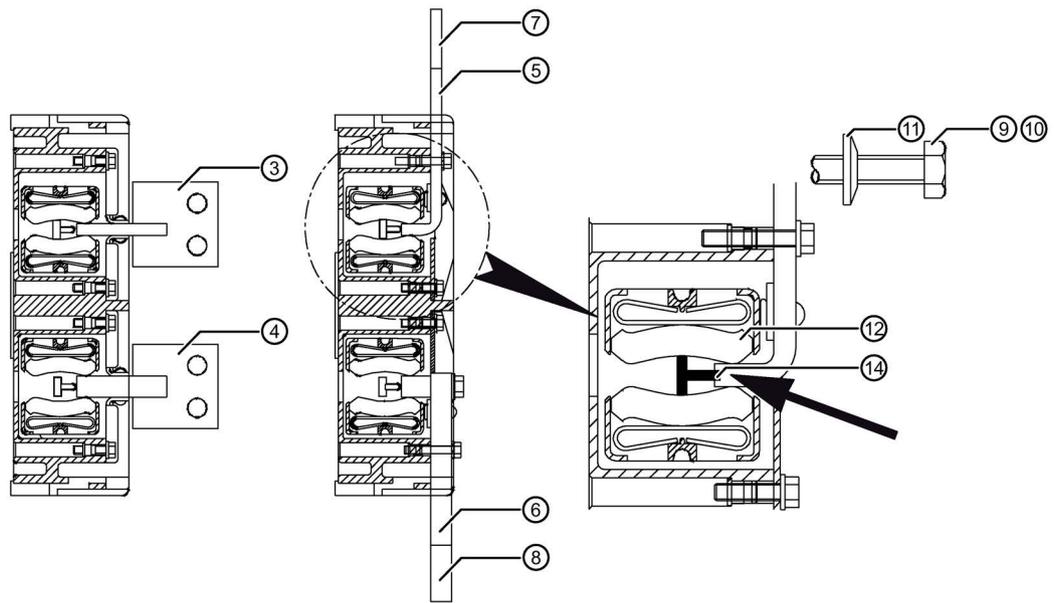
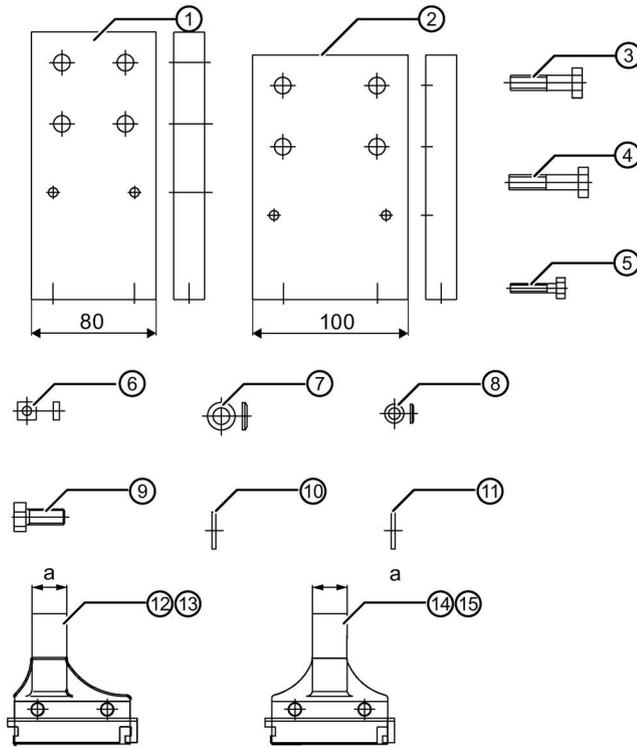


Fig. 2: Position of the finger clusters

## 10.16 Connection bars / connection pieces for guide frame version FS II

Check the contents of the packaging



- ① Connection bar  $\leq 2500$  A, DIN hole pattern
- ② Connection bar 3200 A, DIN hole pattern
- ③ Hexagon-head screw DIN 931 - M 10 x 40 - 8
- ④ Hexagon-head screw DIN 931 - M 10 x 55 - 8
- ⑤ Cylinder-head screw DIN 933 - M 6 x 40 - 8
- ⑥ Square nut M 6
- ⑦ Strain washer DIN 6796 - 10 - St
- ⑧ Strain washer DIN 6796 - 6 - St
- ⑨ Connection piece  $\leq 2500$ A
- ⑩ Connection piece 3200A
- ⑪ ⑬ Hexagon-head screw DIN 933 - M6 x 16 - 8.8
- ⑫ ⑭ Strain washer DIN 6796 - 6 - Fst
- ⑮ Washer DIN 9021 - 6,4

## Quantity of parts

Article number of packing unit	Circuit-breaker frame size	a (mm)	Rated current (A)	Hole pattern
3WT9823 - 1DA01	II		≤ 2500	DIN / double-hole row
3WT9823 - 1EA01	II		3200	DIN / double-hole row
3WT9823 - 4AB00 3WT9823 - 4AC00	II	15	≤ 2500	
3WT9823 - 4BB00 3WT9823 - 4BC00	II	30	3200	

Article number of packing unit	Part no.														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
3WT9823 - 1DA01	1		2		2	2	2	2							
3WT9823 - 1EA01		1		2	2	2	2	2							
3WT9823 - 4AB00 3WT9823 - 4AC00									12 16	12 16	6 8	2 3		1 1	
3WT9823 - 4BB00 3WT9823 - 4BC00									12 16	12 16			2 3		1 1

 **DANGER**
**Hazardous voltage!**  
**Hazardous stored-energy spring mechanism**

Before starting work, disconnect the device from the supply and ensure that it cannot be switched on.

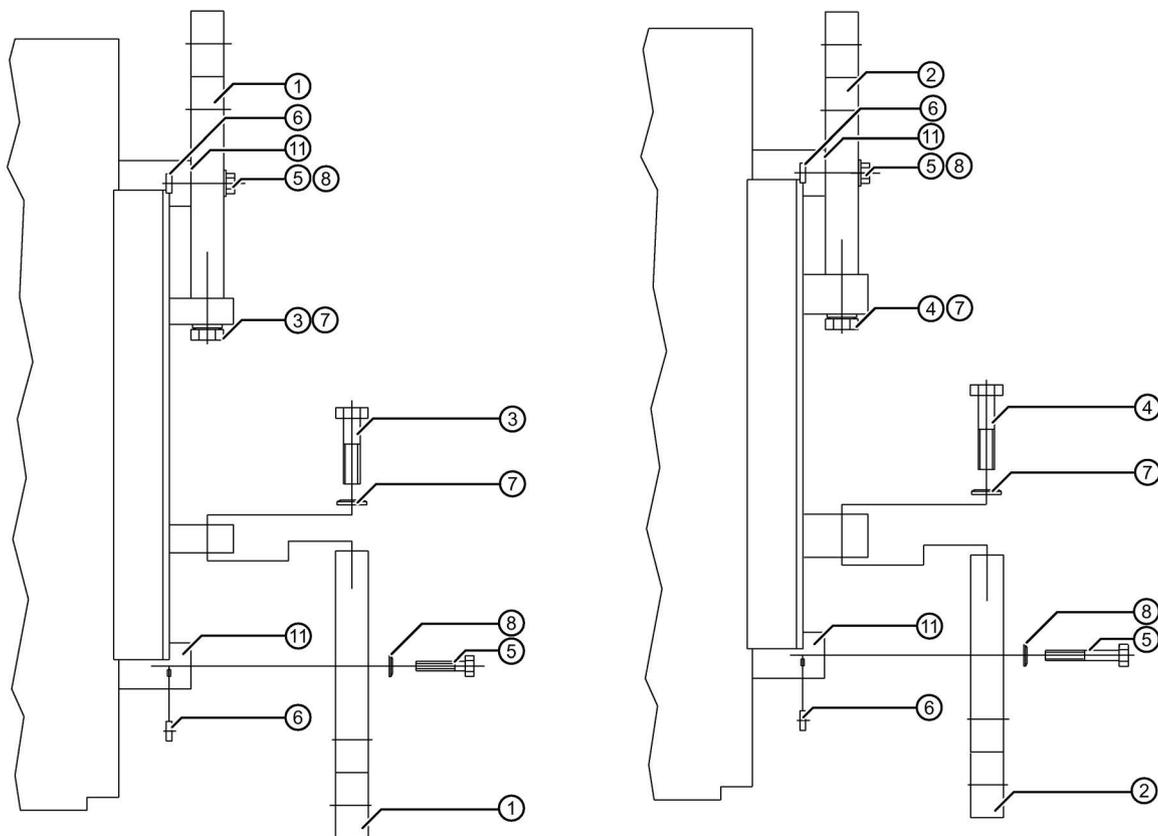
Failure to observe this warning can result in death, severe injury, or substantial material damage.

The devices must be installed and mounted by authorized personnel only.

### Installing the connection bars

**Installation sequence:**

1. Press the connection bars in parallel onto the screw-on points ⑪ and tighten the screws ⑦ (tighten by hand only).
2. Tighten the screws ③ and ④ to  $40 \pm 4$  Nm.
3. Tighten the screws ⑤ with ⑥ to  $\pm 1$  Nm.



**Note**

Note the position of the strain washers.

### Installing the connection pieces

1. Unscrew any connection pieces. To do so, unscrew the fixing screw ⑮ and remove the connection pieces with the finger clusters (X) (Fig. 1).
2. Insert the new connection pieces (Fig. 2) and secure them by means of the enclosed screws and strain washers (Fig. 3) (tightening torque:  $8 \pm 1$  Nm).

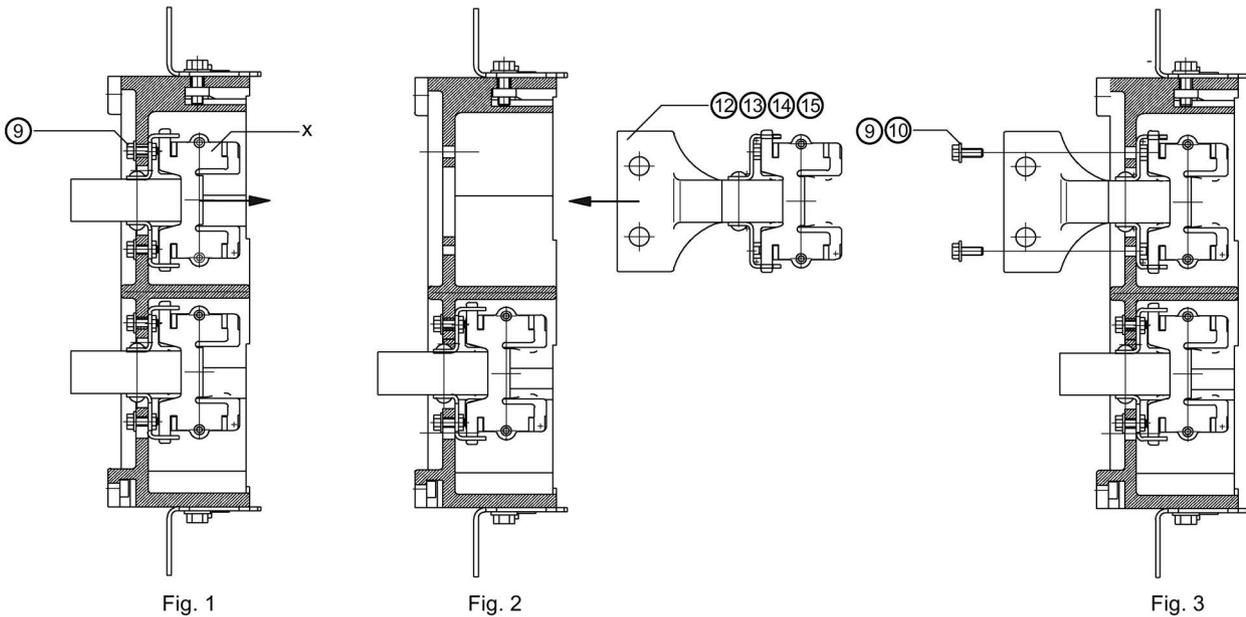
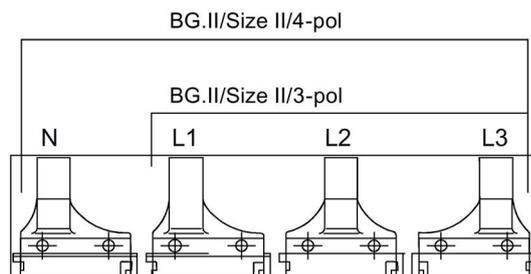


Fig. 1

Fig. 2

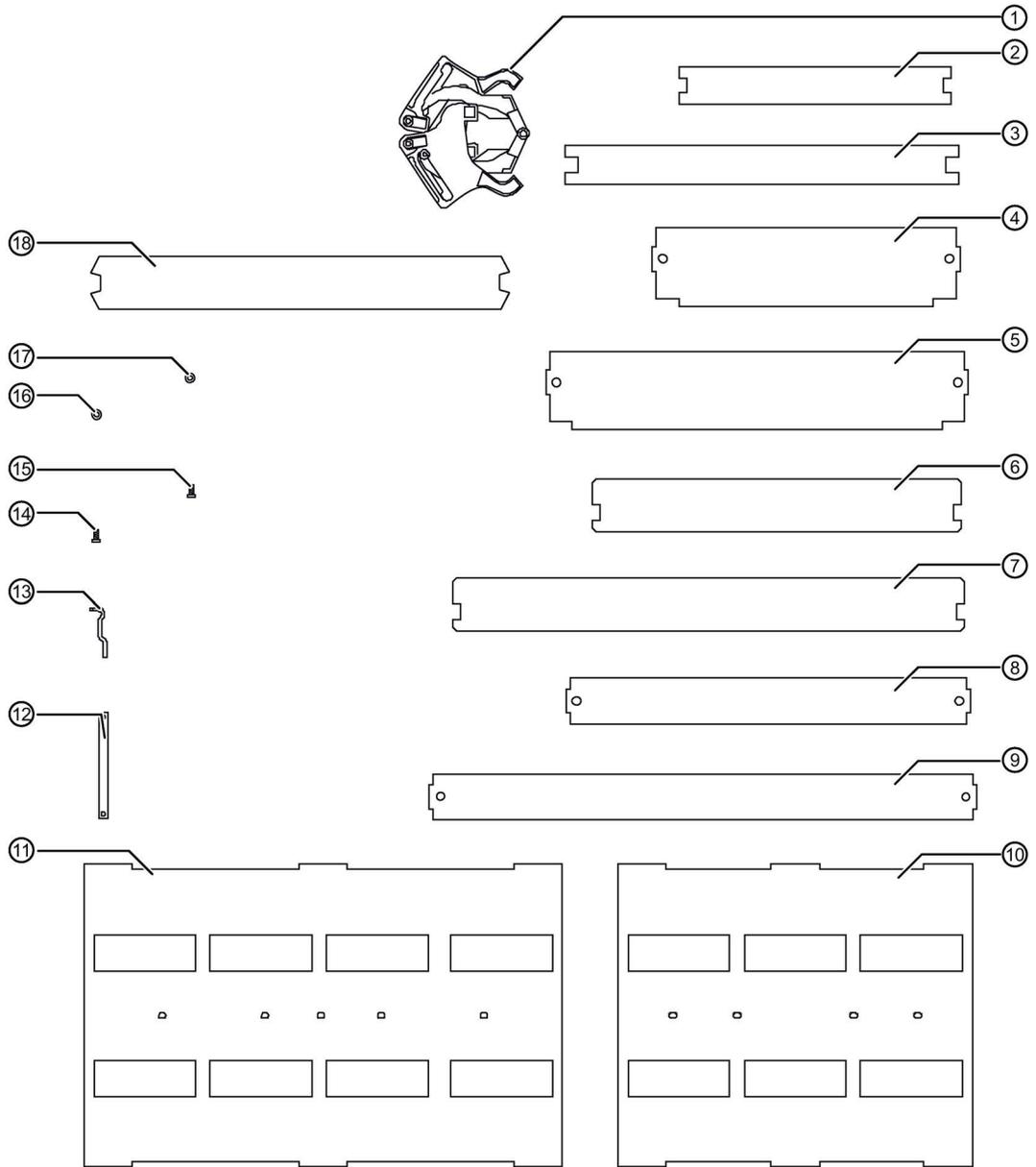
Fig. 3

### Arrangement of the connection pieces



# 10.17 Shutters

Check the contents of the packaging for frame sizes I and II

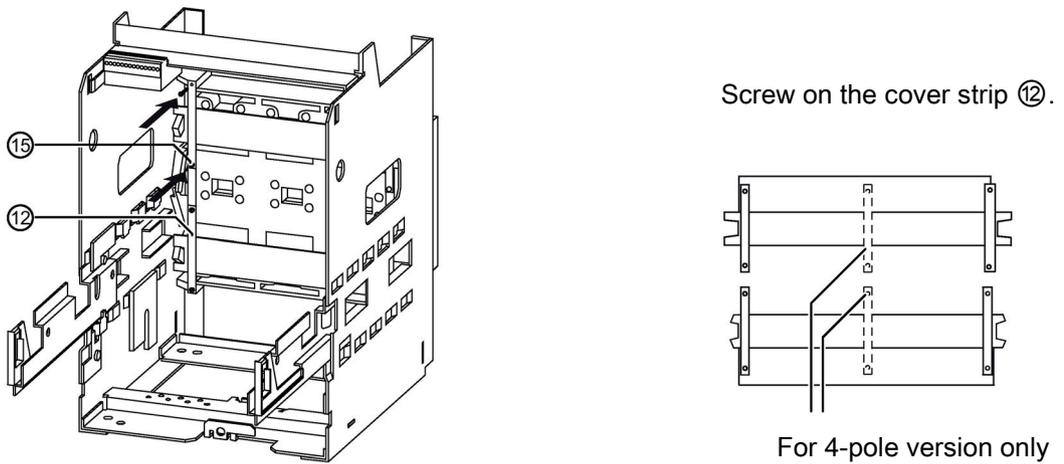
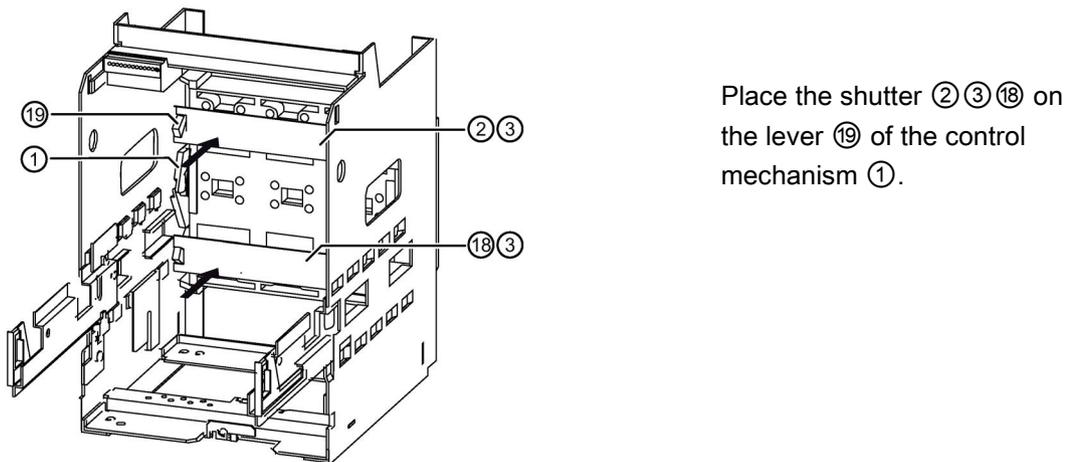
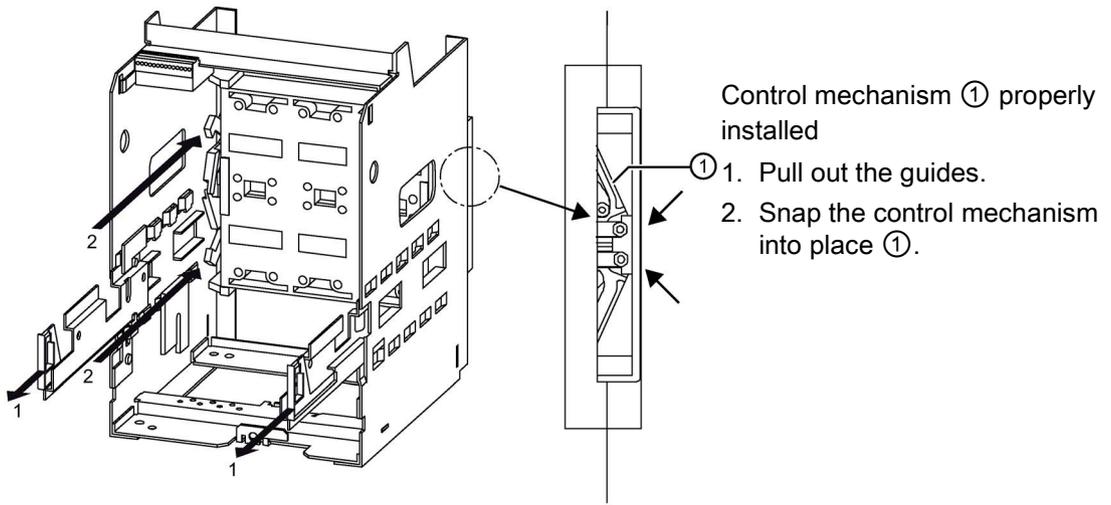


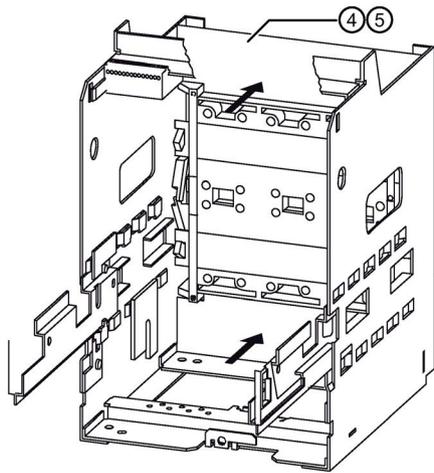
	Frame size	I	I	II	II
	Number of poles	3	4	3	4
	Article number	3CA00	3CB00	3DA00	3DB00
	3WT 9884				
①	Control mechanism	2	2	2	2
②	Shutters	1			
③	Shutters		2		
④	Cover	2			
⑤	Cover		2		
⑥	Shutters			2	
⑦	Shutters				2
⑧	Cover			2	
⑨	Cover				2
⑩	Insulating plate			1	
⑪	Insulating plate				1
⑫	Cover strip	3	5		
⑬	Hook	2	2	2	2
⑭	Pan-head screw M 4 x 8 ISO 7045	2	2	2	2
⑮	Plastite screw 6- 19 x 10	8	8	4	5
⑯	Washer 4,3 DIN 125			4	5
⑰	Strain washer 4 DIN 6796	2	2	2	2
⑱	Shutters	1			

**Note**

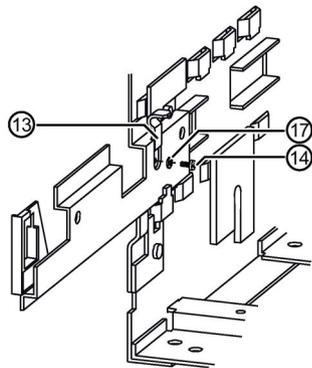
These operating instructions apply to 3 and 4-pole guide frames.

Installing the shutter - work sequence for frame size I



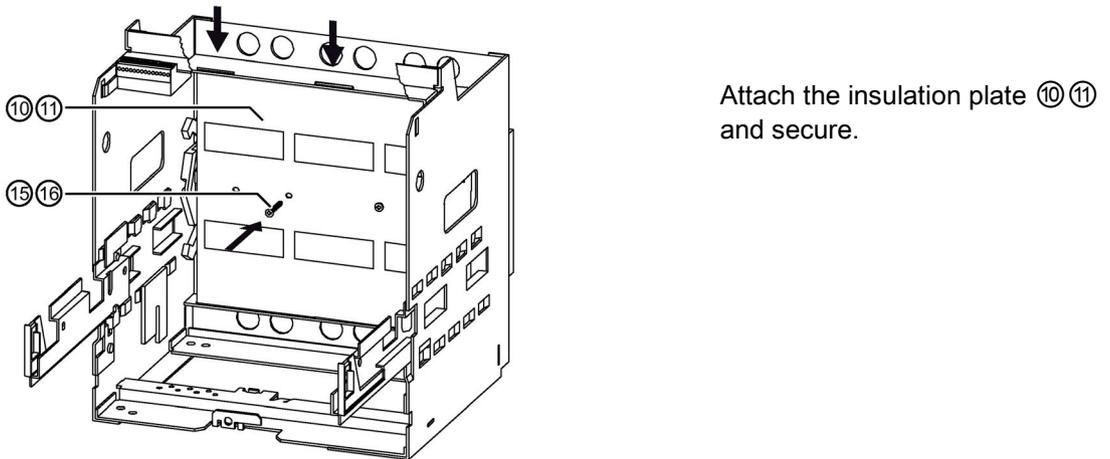
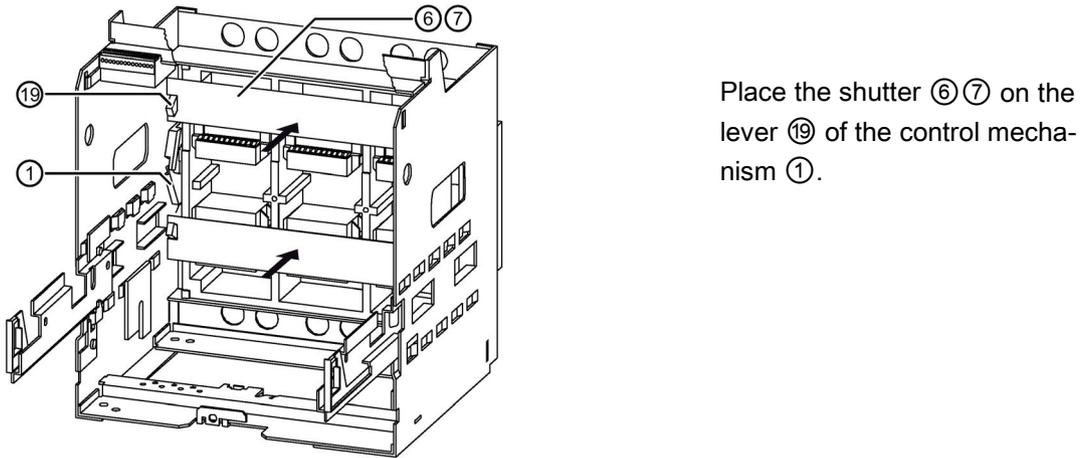
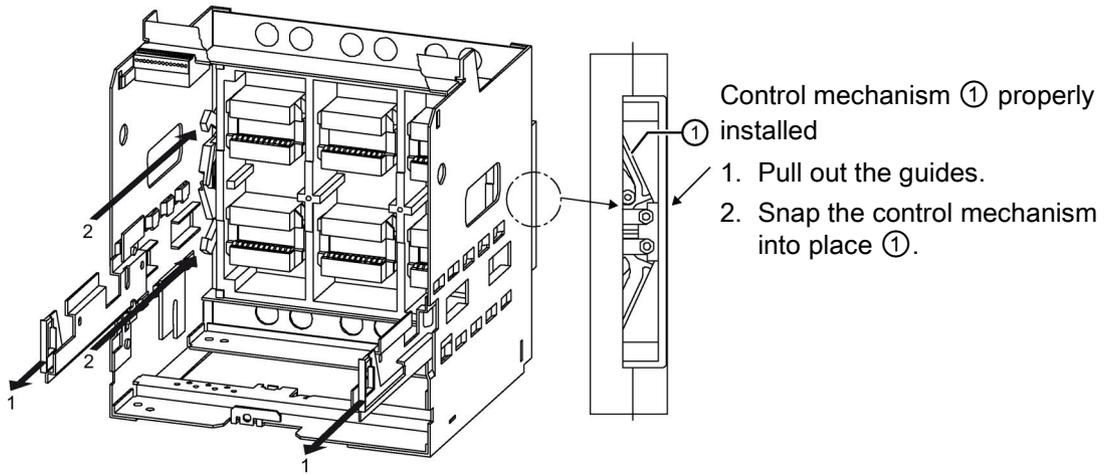


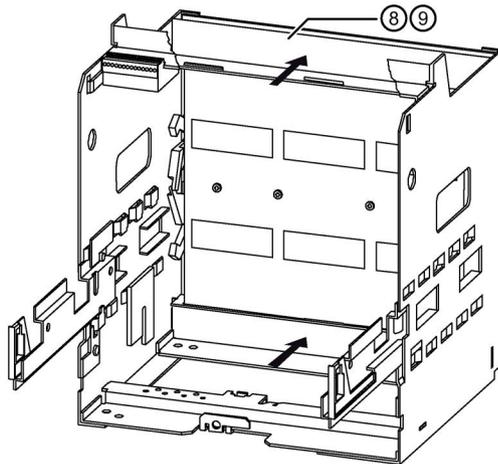
Attach the upper and lower covers ④ ⑤.



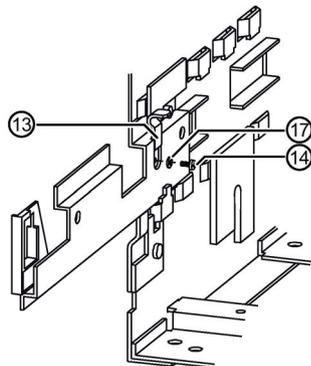
Screw the hook ⑬ onto the guides.

### Installing the shutter - work sequence for frame size II



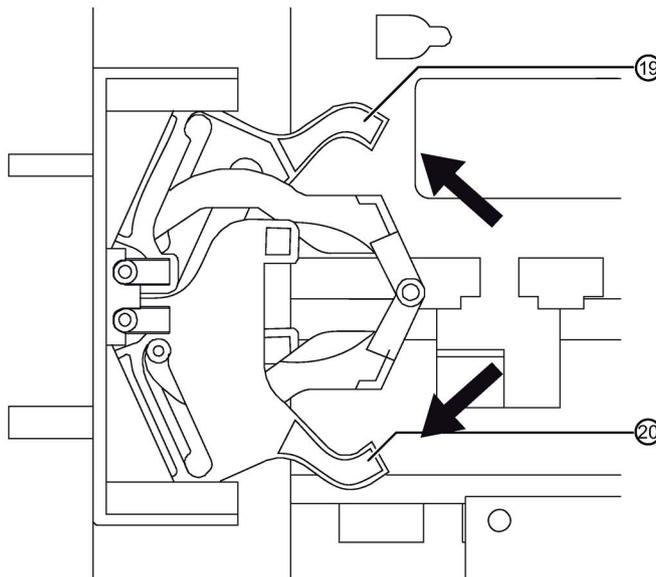


Attach the upper and lower cover ⑧ ⑨.



Screw the hook ⑬ onto the guides.

### Functional check: frame sizes I and II



Move the upper and lower lever ⑲ and ⑳ in the direction of the arrow until the shutter is open fully. When you let go of the levers, the shutters should close automatically.

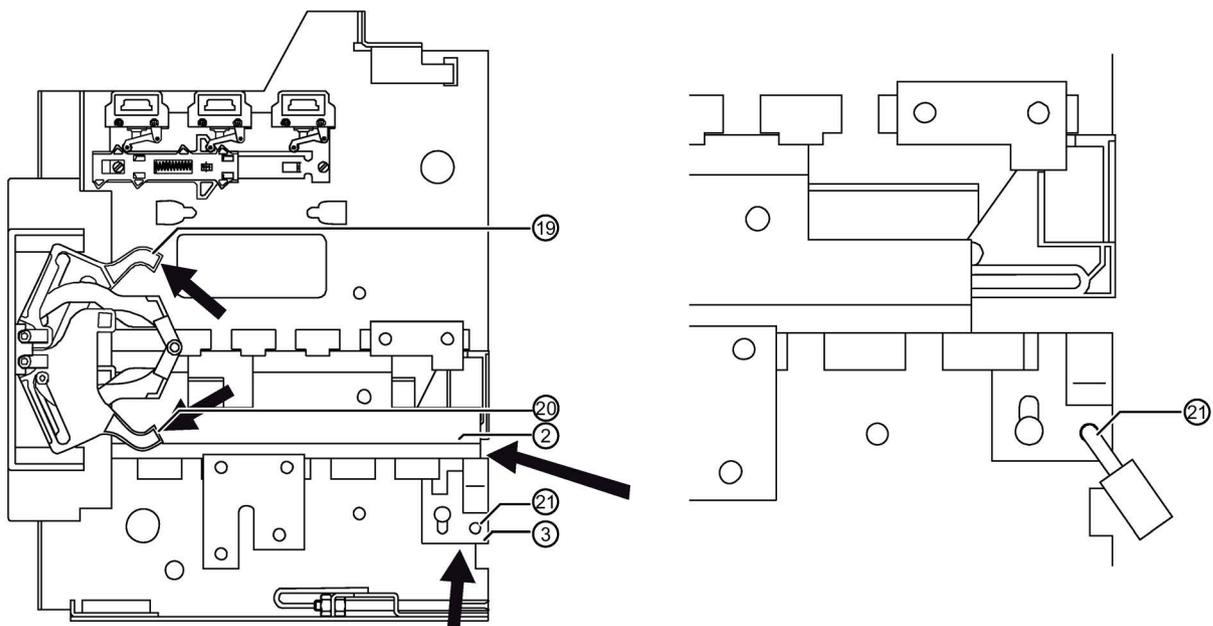
## Locking the shutter: frame sizes I and II

### Note

The following options are available:

- Both shutters closed
- The top shutter open
- The lower shutter open
- Both shutters open

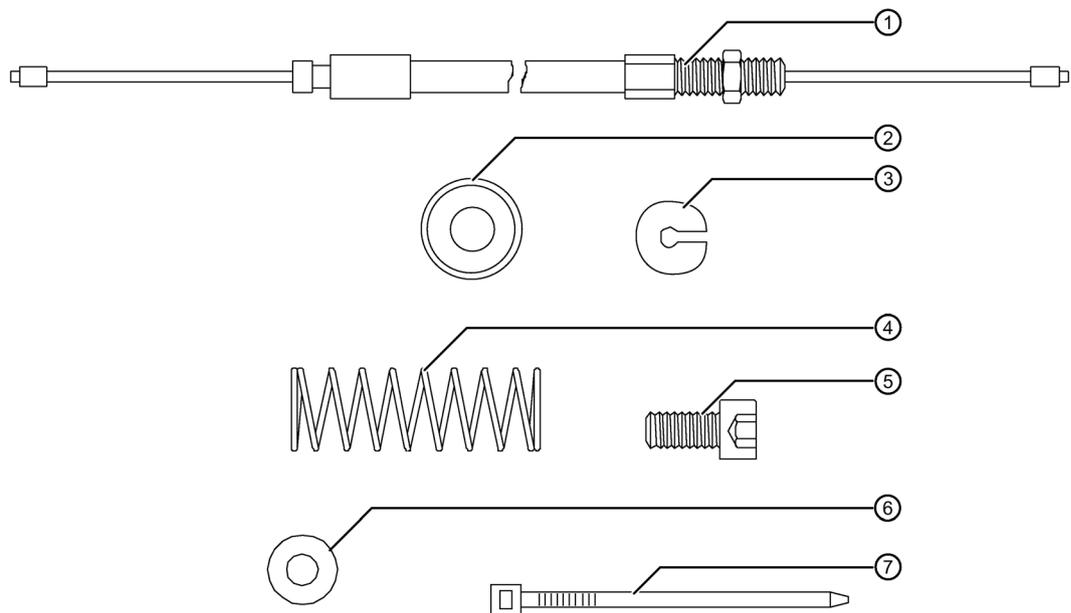
Two padlocks are required here for each shutter.  
These must be provided by the customer.



1. Both shutters closed:
  - Insert the guides ② as far as they will go.
  - Push the bolt ③ up as far as it will go.
  - Place the padlocks ② in the holes and lock.
2. Upper shutter open:
  - Push the upper lever ①9 up in the direction of the arrow.
  - Continue as described above (1).
3. Lower shutter open:
  - work sequence as described above (2).
4. Both shutters open:
  - Move the upper ①9 and lower ②0 lever in the direction of the arrow.
  - Continue as described above (1).

## 10.18 Bowden wire for interlock

Check the contents of the packaging

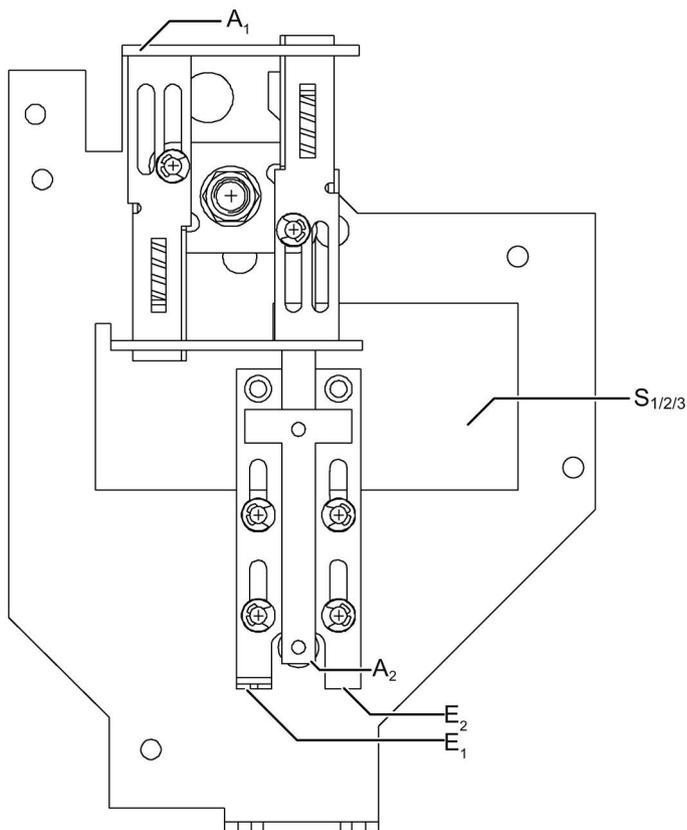


①	Bowden wire	1x
②	Spring bush	1x
③	Slotted washer	1x
④	Compression spring 1 x 12.5 x 55.5 DIN 2098	1x
⑤	Cylinder-head screw M6 x 12 DIN 912	1x
⑥	Strain washer 6 DIN 6796	1x
⑦	Cable tie	1x

Opening the circuit-breaker / discharging the stored-energy spring mechanism

Possible status:	Circuit-breaker CLOSED	Switch of circuit- breaker	Circuit-breaker CLOSED
	Stored-energy spring mechanism discharged	Stored-energy spring mechanism charged	Stored-energy spring mechanism charged
Actuating sequence:	OPEN	CLOSED - OPEN	OPEN - CLOSED - OPEN

## Information about mechanical interlock



The mechanical interlock module can be used for two or three circuit-breakers. The following designations apply in the configuration instructions below:

- $O_{1/2}$  : Output information  $_{1/2}$
- $I_{1/2}$  : Input information  $_{1/2}$
- $C_{1/2/3}$ : circuit-breaker  $_{1/2/3}$

If the output information 1 of circuit-breaker 1 is interconnected with the input information 2 of circuit-breaker 2, for example, the following abbreviations are used:  $C_1 O_1 - C_2 I_2$

	The statuses of the circuit-breakers are indicated on the operator panel as follows:
	Circuit-breaker CLOSED
	Circuit-breaker OPEN and not ready to CLOSE (interlocked)
	Circuit-breaker OPEN and ready to CLOSE (not interlocked)

**Configuration: Two circuit-breakers back to back**

**Description:**

A circuit-breaker can only be closed when the other is open.

**Required equipment:**

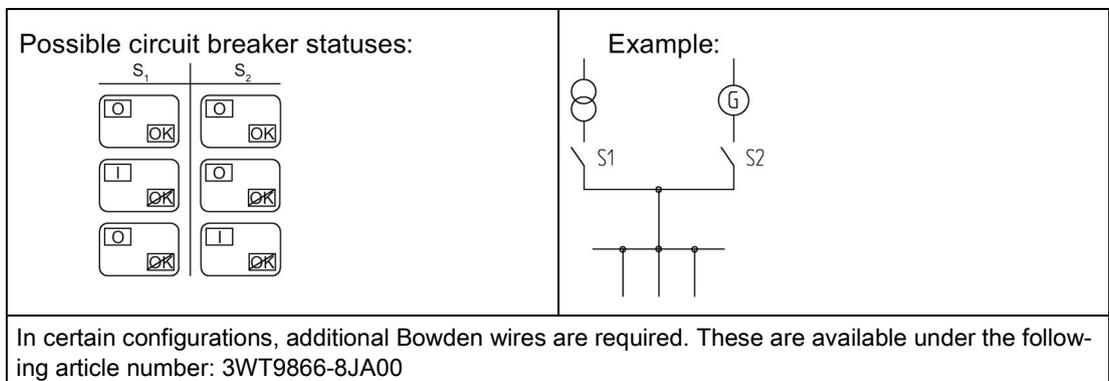
Each circuit-breaker is equipped with an interlocking module and a Bowden wire.

**Terminals for the Bowden wires:**

- 1. Bowden wire: C<sub>1</sub> O<sub>1</sub> - C<sub>2</sub> I<sub>1</sub>
- 2. Bowden wire: C<sub>1</sub> I<sub>1</sub> - C<sub>2</sub> O<sub>1</sub>

**Note:**

The cylinder-head screws with strain washers must be screwed into the index clip at the following terminals: C<sub>1</sub> I<sub>1</sub>; C<sub>2</sub> I<sub>1</sub>.



### Configuration: Three circuit-breakers stacked

#### Description:

Any two circuit-breakers can be closed at any time, whereby the third is interlocked.

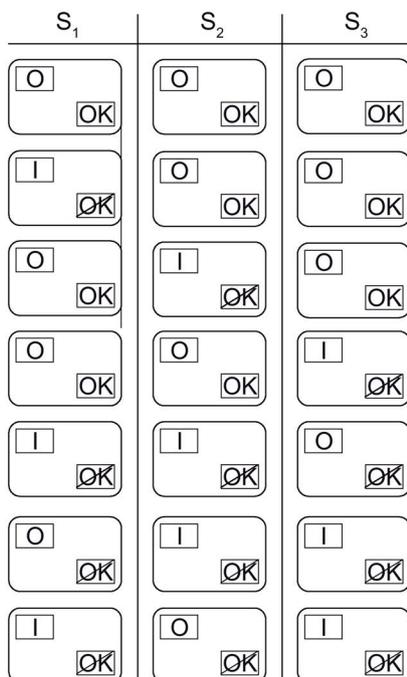
#### Required equipment:

Each circuit-breaker is equipped with an interlocking module and a Bowden wire. Three additional Bowden wires must be ordered separately.

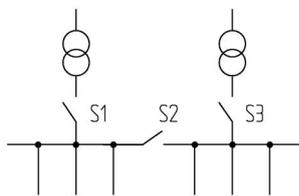
#### Terminals for the Bowden wires:

1. Bowden wire: C<sub>1</sub> O<sub>1</sub> - C<sub>2</sub> I<sub>1</sub>
2. Bowden wire: C<sub>1</sub> O<sub>2</sub> - C<sub>3</sub> I<sub>1</sub>
3. Bowden wire: C<sub>2</sub> O<sub>1</sub> - C<sub>1</sub> I<sub>2</sub>
4. Bowden wire: C<sub>2</sub> O<sub>2</sub> - C<sub>3</sub> I<sub>2</sub>
5. Bowden wire: C<sub>3</sub> O<sub>1</sub> - C<sub>1</sub> I<sub>2</sub>
6. Bowden wire: C<sub>3</sub> O<sub>2</sub> - C<sub>2</sub> I<sub>2</sub>

#### Possible circuit-breaker statuses



#### Example



**Configuration: Three circuit-breakers stacked**

**Description:**

When one circuit-breaker is closed, the other two cannot be closed.

**Required equipment:**

Each circuit-breaker is equipped with an interlocking module and a Bowden wire. Three additional Bowden wires must be ordered separately.

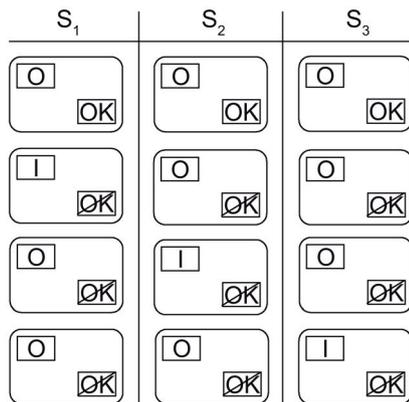
**Terminals for the Bowden wires:**

1. Bowden wire: C<sub>1</sub> O<sub>1</sub> - C<sub>2</sub> I<sub>1</sub>
2. Bowden wire: C<sub>1</sub> O<sub>2</sub> - C<sub>3</sub> I<sub>1</sub>
3. Bowden wire: C<sub>2</sub> O<sub>1</sub> - C<sub>1</sub> I<sub>1</sub>
4. Bowden wire: C<sub>2</sub> O<sub>2</sub> - C<sub>3</sub> I<sub>2</sub>
5. Bowden wire: C<sub>3</sub> O<sub>1</sub> - C<sub>1</sub> I<sub>2</sub>
6. Bowden wire: C<sub>3</sub> O<sub>2</sub> - C<sub>2</sub> I<sub>2</sub>

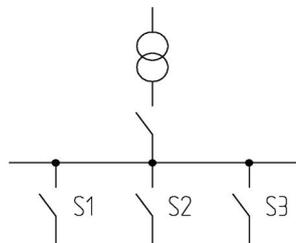
**Note:**

The cylinder-head screws with strain washer must be screwed into the index clip at the following terminals: C<sub>2</sub> I<sub>1</sub>, C<sub>3</sub> I<sub>1</sub>, C<sub>1</sub> I<sub>1</sub>, C<sub>3</sub> I<sub>2</sub>, C<sub>1</sub> I<sub>2</sub>, C<sub>2</sub> I<sub>2</sub>.

**Possible circuit-breaker statuses**



**Example**



## Configuration: Three circuit-breakers stacked

### Description:

Two circuit-breakers can be closed/opened independently of each other, with the third only ready to be closed when the other two are open. If the third circuit-breaker is closed, the other two cannot be closed.

### Required equipment:

Each circuit-breaker is equipped with an interlocking module and a Bowden wire. The Bowden wire must be ordered separately.

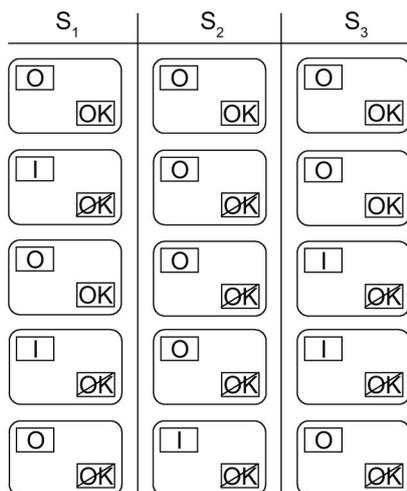
### Terminals for the Bowden wires:

1. Bowden wire: C<sub>1</sub> O<sub>1</sub> - C<sub>2</sub> I<sub>1</sub>
2. Bowden wire: C<sub>2</sub> O<sub>1</sub> - C<sub>1</sub> I<sub>1</sub>
3. Bowden wire: C<sub>2</sub> O<sub>2</sub> - C<sub>3</sub> I<sub>1</sub>
4. Bowden wire: C<sub>3</sub> O<sub>1</sub> - C<sub>2</sub> I<sub>2</sub>

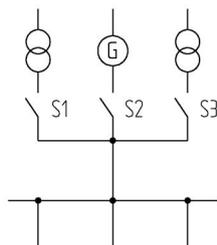
### Note:

The cylinder-head screws with strain washer must be screwed into the index clip at the following terminals: C<sub>2</sub> I<sub>1</sub>, C<sub>1</sub> I<sub>1</sub>, C<sub>3</sub> I<sub>1</sub>, C<sub>2</sub> I<sub>2</sub>.

### Possible circuit-breaker statuses



### Example



**Configuration: Three circuit-breakers, of which two are back to back**

**Description:**

One circuit-breaker can be closed/opened independently of the other two. The two other circuit-breakers are mutually exclusive, that is, one can only be closed when the other is open.

**Required equipment:**

Two of the three circuit-breakers are each equipped with an interlocking module and a Bowden wire.

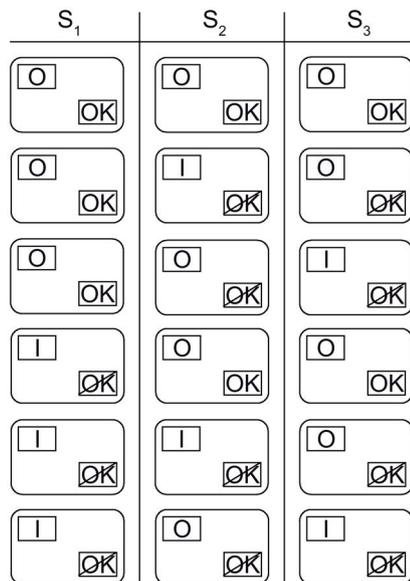
**Terminals for the Bowden wires:**

1. Bowden wire: C<sub>2</sub> O<sub>1</sub> - C<sub>3</sub> I<sub>1</sub>
2. Bowden wire: C<sub>3</sub> O<sub>1</sub> - C<sub>2</sub> I<sub>1</sub>

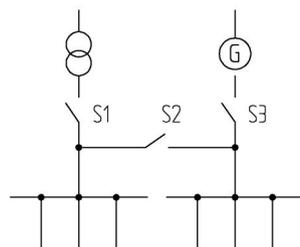
**Note:**

The cylinder-head screws with strain washers must be screwed into the index clip at the following terminals: C<sub>3</sub> I<sub>1</sub>, C<sub>2</sub> I<sub>1</sub>.

**Possible circuit-breaker statuses**

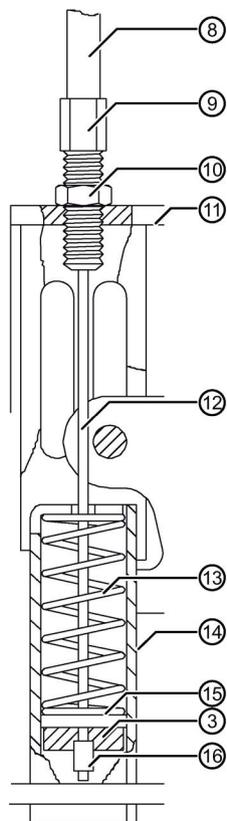


**Example**



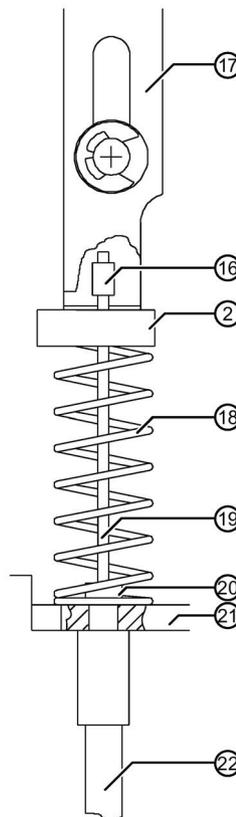
## Inserting and adjusting the Bowden wire

### Terminal O1 ; O2



- Push Bowden wire ⑫ with nipple ⑯ through angle plate ⑭, compression spring ⑬, and insertable plate ⑮.
- Secure Bowden wire ⑫ and nipple ⑯ by means of slotted washer ③.
- Screw adjusting screw ⑨ with lock nut ⑩ into plate ⑪.
- When the Bowden wire is attached on both sides, the sheath ⑧ must have approx. 1 mm clearance. If necessary, adjust with adjusting screw ⑨.
- Fix the setting by means of the lock nut ⑩.

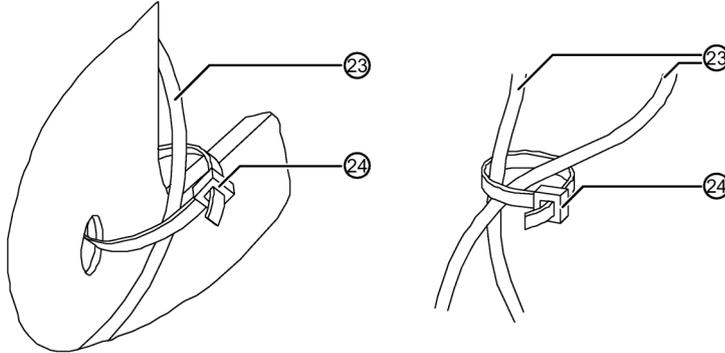
### Terminal I1 ; I2



- Push the compression spring ⑱ and spring bush ② over the tube holder ⑳ and sheath. ㉔
- Place the Bowden wire ⑲ with nipple ⑯ into the index clip ⑰.
- Place the spring bush ② onto the index clip ⑰.
- Press the compression spring ⑱ between the spring bush ② and plate. ㉔
- Push the tube holder ⑳ into the plate. ㉔

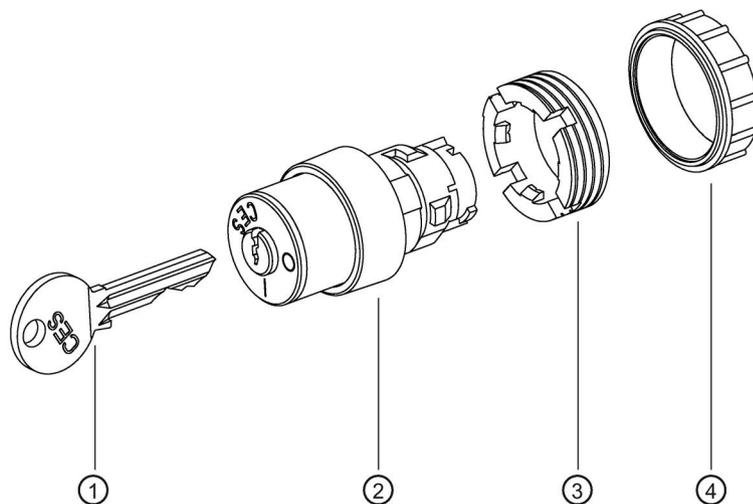
### Installing the Bowden wire

- Bowden wires ⑳ must be installed in such a way that they are not bent excessively (large bending radii).
- Secure Bowden wires ⑳ by means of cable ties.㉔
- Minimum permissible bending radius:  $R = 50 \text{ mm}$ . This bending radius is only permitted a maximum of six times for each Bowden wire. The remaining bending radii should be as large as possible.



## 10.19 CES lock (set), 3 locks and 2 keys

Check the contents of the packaging

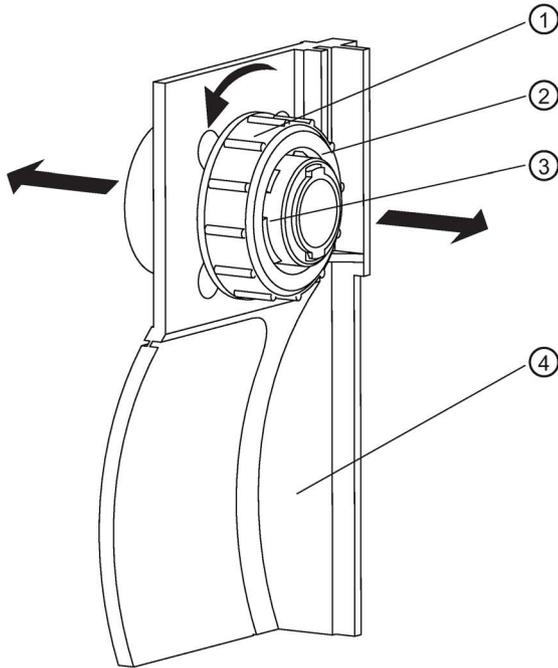


①	Key	2x
②	Lock	3x
③	Sleeve Pg21	3x
④	Ring nut Pg21	3x

## Removing the operating device

Removing the operating device (Page 93)

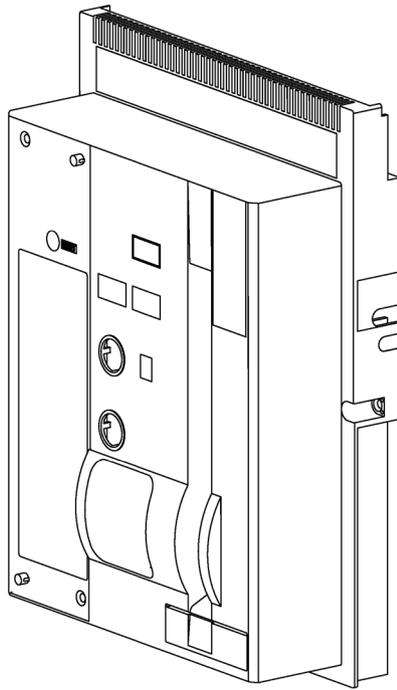
### Removing "Mechanical OFF" button



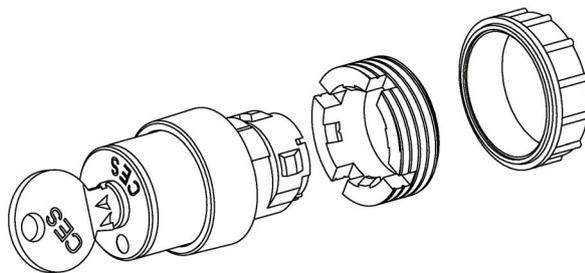
### Removing pushbutton concerned

- Unscrew ring nut ① and take it away
- Remove sleeve ②
- Remove pushbutton concerned ③ from front panel ④

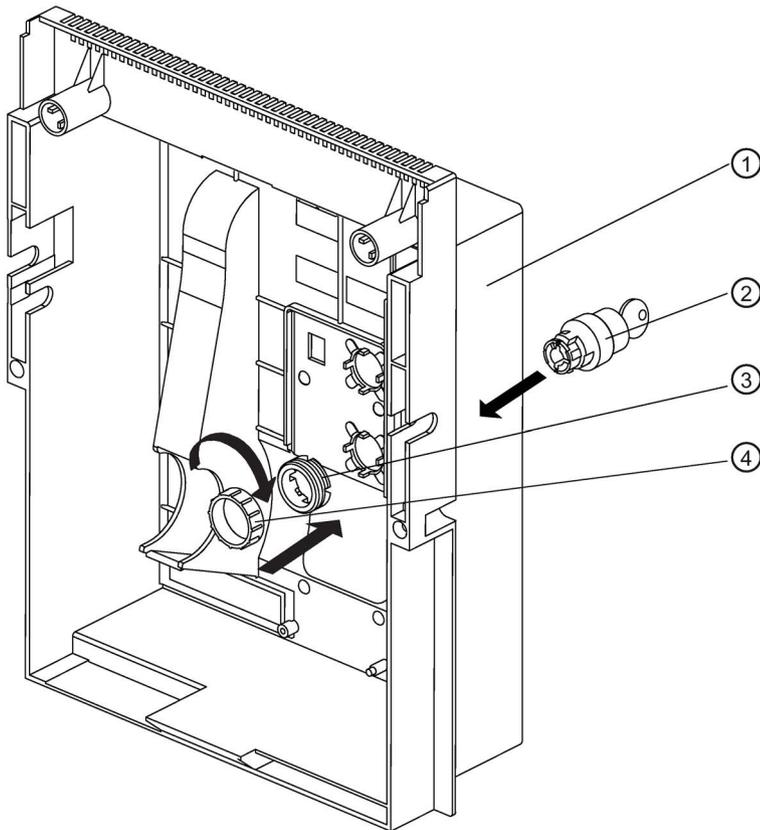
Preparing the operator panel



Preparing CES lock (Set), ring nut pg21 and sleeve pa21 for one breaker



**Installing CES lock (Set), ring nut pg21 and sleeve pa21 on front panel**



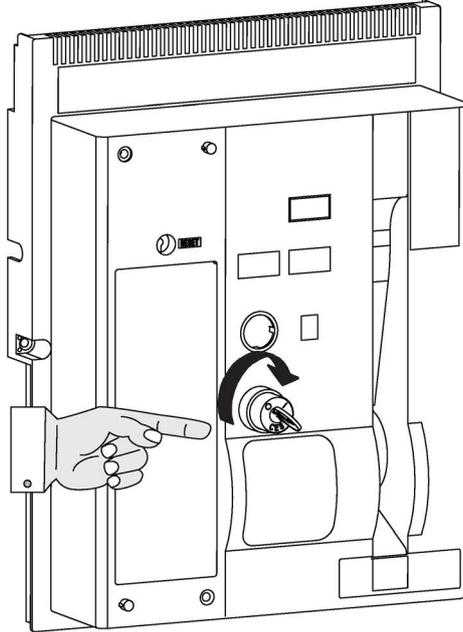
Installing CES lock (Set), ring nut pg21 and sleeve pa21:

- Insert CES lock (Set) ② into front panel ① from the front
- Place sleeve ③ on CES lock(set) ②, and align the slots with front panel ①
- Place ring nut pg21 ④ on sleeve ③, then finger-tighten ring nut pg21 ④

## Installing the operating device

Installing the operating device (Page 95)

### Functional check

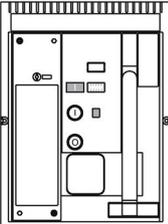
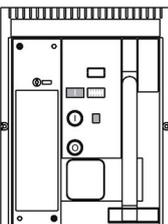


- Turn the key clockwise to the locking position.
- Remove the key
- The circuit-breaker cannot be closed when in this position



## Troubleshooting

### Troubleshooting

Fixed-mounted circuit-breaker	Withdrawable circuit-breakers	Fault	Cause	Remedy
✓	✓	<p>The circuit-breaker cannot be closed mechanically and/or electrically.</p> <p>(The circuit-breaker is not ready to close, ready-to-close indicator )</p> 	The stored-energy spring mechanism has not been charged.	Charge the stored-energy spring mechanism.
✓	✓		The undervoltage release is not excited.	Connect the undervoltage release to the power supply.
✓	✓		Mechanical reclosing lockout active.	Rectify cause of overcurrent tripping and press RESET.
✓	✓		Electrical closing lockout active.	Remove the control voltage of the closing lockout. *)
✓	✓		Mechanical OFF pushbutton locked.	Enable the pushbutton. <sup>2</sup>
✓	✓		Block against closing. <sup>1</sup>	Close the cabinet door.
✓	✓		Mechanical circuit-breaker interlock active (accessories).	Open the interlocking circuit-breaker or rack it to disconnected position. <sup>2</sup>
✓	✓		Electronic overcurrent release not installed or installed incorrectly.	Install the electronic overcurrent release properly.
	✓		The circuit-breaker is set to an intermediate position in the guide frame (note the position indicator).	Rack the circuit-breaker to the disconnected, test, or operating position.
	✓		Shutter for racking handle opening not closed.	Close the shutter (to disconnected, test, or operating position).
✓	✓	<p>The circuit-breaker cannot be closed by electrical means.</p> <p>(The circuit-breaker is ready to close, ready-to-close indicator OK)</p> 	The operating voltage of the closing solenoid is incorrect or has not been applied.	Check that the voltage is correct or apply the voltage.
	✓		The circuit-breaker is in the disconnected position in the guide frame.	Rack the circuit-breaker to the test or operating position.
✓			The auxiliary supply connector has been unplugged.	Plug in the auxiliary supply connector.

Fixed-mounted circuit-breaker	Withdrawable circuit-breakers	Fault	Cause	Remedy
	✓	The guide rails cannot be pulled out to install the circuit-breaker.	The shutter is locked with one or two padlocks.	Remove the padlocks.
	✓	The circuit-breaker cannot be switched from the maintenance position to the disconnected position.	The positioning mechanism of the circuit-breaker is not in the disconnected position (note the position indicator).	Rack the positioning mechanism to the disconnected position.
	✓		You have attempted to insert the circuit-breaker in a guide frame with a different rated current.	Only use circuit-breakers with the same rated current as the guide frame.
	✓		The circuit-breaker and guide frame are encoded differently.	
	✓	When the circuit-breaker is racked from the disconnected position to the test position, you encounter a high level of resistance as soon as you pass the disconnected position.	The circuit-breaker was not inserted as far as it will go and the side latches are not yet engaged (warning: danger of destroying the device).	Push the circuit-breaker to the disconnected position as far as it will go. The side latches must engage.
	✓	When you rack the circuit-breaker from the disconnected position to the test position, it does not move for the first eight rotations.	No fault, due to the function	Continue racking
	✓	The racking handle cannot be inserted.	The OFF button has not been pressed.	Press the OFF button and, at the same time, move the slide switch to the right.
	✓		The cabinet door is not completely shut.	Close the cabinet door.
	✓		Racking handle opening locked with padlock(s).	Remove the padlock(s). <sup>1</sup>
✓		The cabinet door cannot be opened (door interlock as accessory).	When the circuit-breaker is closed, this interlocks the cabinet door.	Open circuit-breaker
	✓		The circuit-breaker is in the operating position.	Rack the circuit-breaker to the test position or disconnected position.
<sup>1</sup>	Effective when the cabinet door is open (accessory).			
<sup>2</sup>	Note the following safety information:			

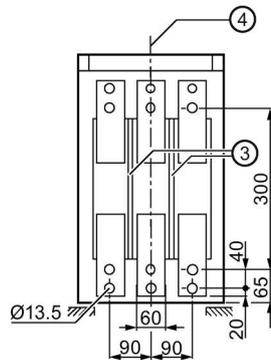
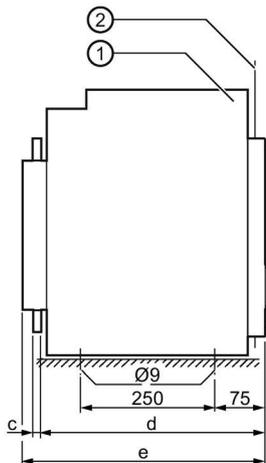
**Note**

**Protective device**

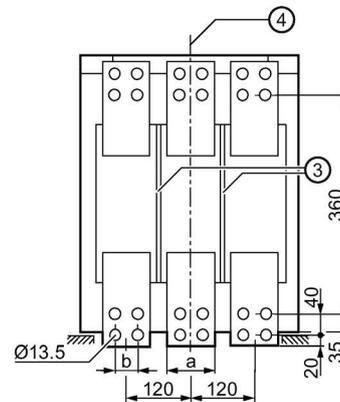
Override only if permissible under normal operating conditions.

## Dimension drawings

### 12.1 Withdrawable circuit-breaker, 3 pole, front connections



Double hole, 400 to 1600 A  
Holes in bars to DIN 43673

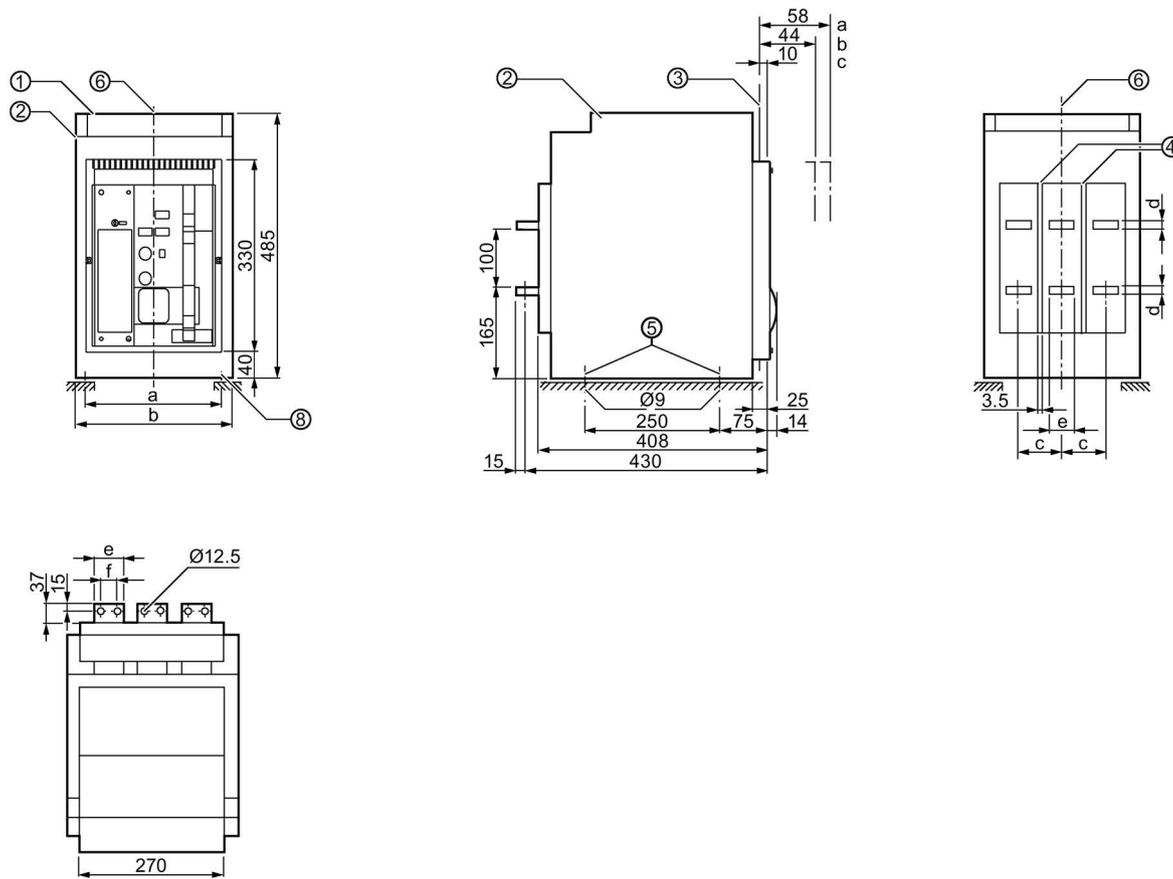


Double hole, 2000 to 3200 A  
Holes in bars to DIN 43673

- ① Guide frame
- ② Cabinet door
- ③ Slot (6 mm deep) for phase barriers
- ④ Center line of circuit-breaker

Rated current A	a	b	c	d	e
400 to 1250	60	-	8	390	408
1600	60	-	15	390	408
2000 to 2500	80	40	20	420	445
3200	100	50	20	420	445

## 12.2 Withdrawable circuit-breaker, 3 pole, horizontal connections



- a Disconnected position
- b Test position
- c Operating position
- ① Auxiliary conductor connection system
- ② Guide frame
- ③ Cabinet door
- ④ Slot (6 mm deep) for phase barriers
- ⑤ Holes for securing the guide frame
- ⑥ Center line of circuit-breaker

## Safety distances

No additional safety distance from adjacent, grounded components is required above the circuit-breaker (on fixed-mounted circuit-breakers marked with "3").

The distance between the connection point and bar support must not exceed 250 mm.

Rated current A	a	b	c	d	e	f
400 to 1250	280	320	90	8	60	30
1600	280	320	90	15	60	30
2000 to 2500	380	420	120	15	80	40
3200	380	420	120	30	100	50

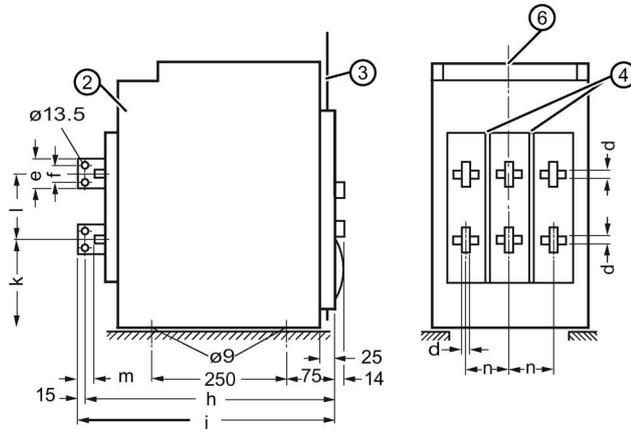
Main conductor connection	
Terminal screws with strain washers (internal diameter = 12 mm to DIN 6769-Fst)	M12
Recommended tightening torque	70
Required screw strength	8.8 to DIN 267

Up to a rated operating voltage of 440 V AC, the vertical bars (e.g. with front connection) must not be shielded if the busbar system is not located above the circuit-breaker.

On the other hand, live, bare conductors and bars with voltages in excess of 440 V AC (if they are located above the circuit-breaker and if the current is supplied from above) must be protected against flashover by means of phase barriers, bar covers, or arc chute covers (only use accessories for horizontal or vertical connections).

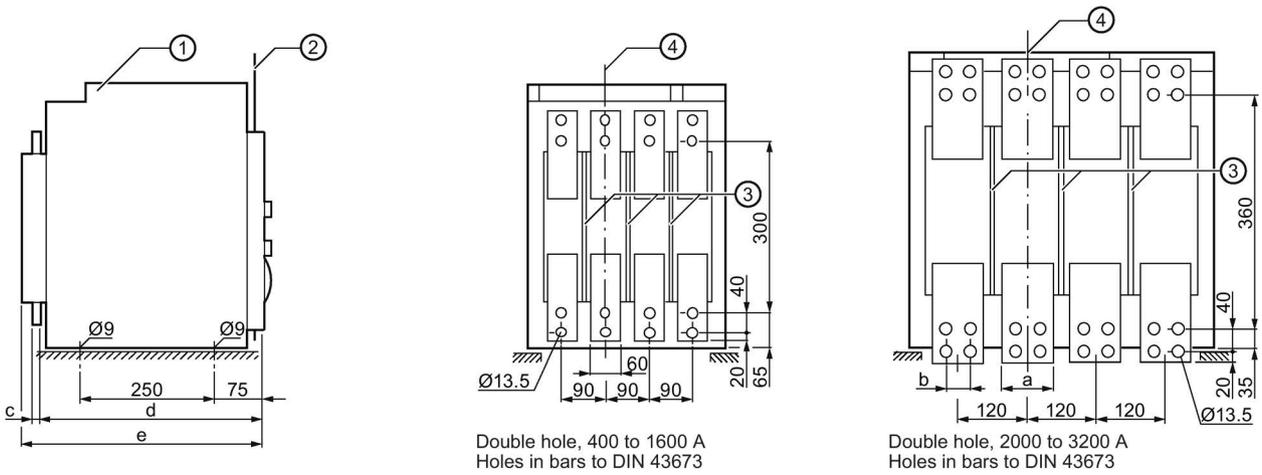
Optional electrical equipment directly above the circuit breaker (if arc chutes are not used) or next to the circuit-breaker should be protected with a cover. Once you have installed additional phase barriers or covers, you must ensure that heat dissipation from the circuit-breaker is not impeded.

### 12.3 Withdrawable circuit-breaker, 3 pole, vertical connections up to 3200 A



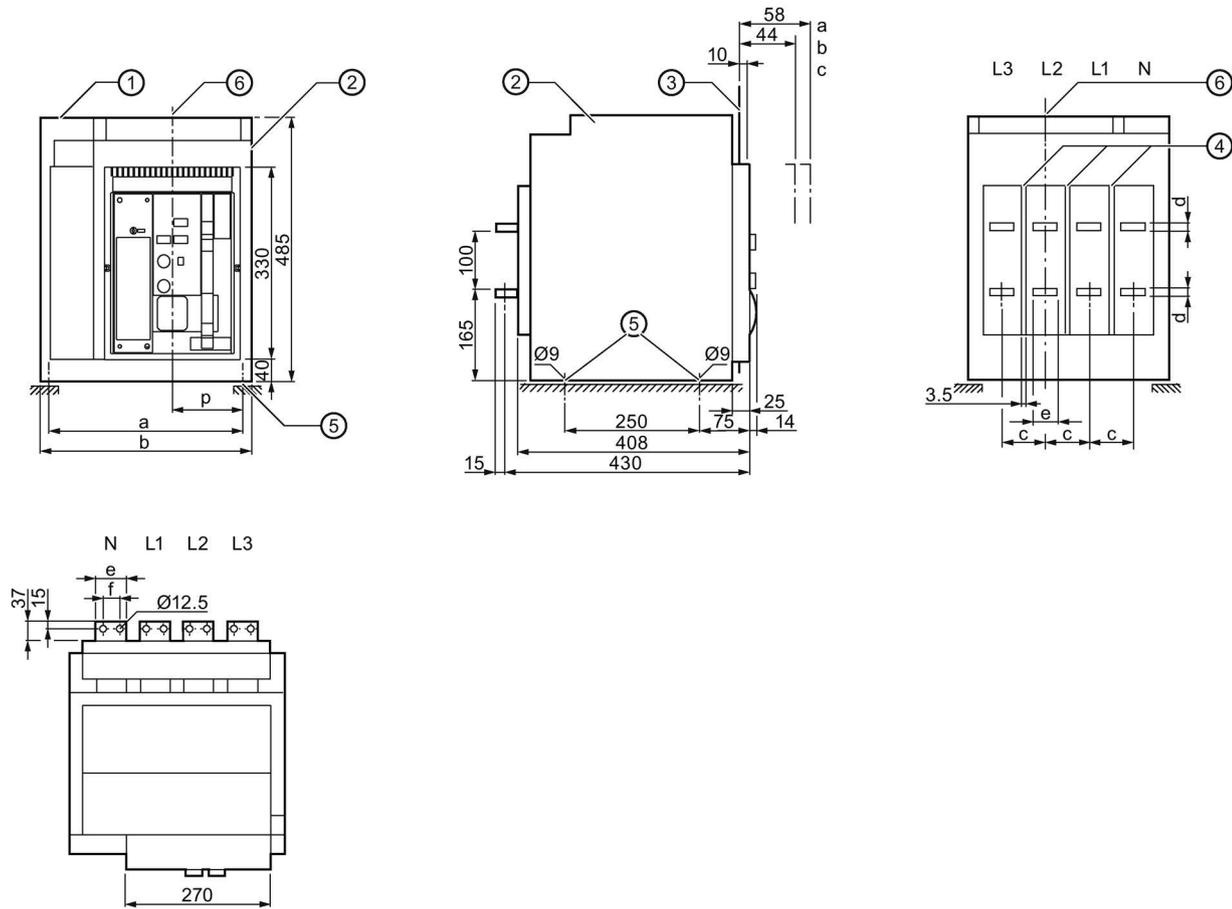
Rated current A	a	b	c	d	e	f	h	i	k	l	m	n
400 to 1250	280	320	90	8	60	30	455	470	157,5	115	37	90
1600	280	320	90	15	60	30	455	470	157,5	115	37	90
2000 to 2500	380	420	120	15	80	40	465	480	157,5	115	37	140
3200	380	420	120	30	100	50	465	480	150	130	37	140

## 12.4 Withdrawable circuit-breaker, 4 pole, front connections



Rated current A	a	b	c	d	e
400 to 1250	60	-	8	390	408
1600	60	-	15	390	408
2000 to 2500	80	40	20	420	445
3200	100	50	20	420	445

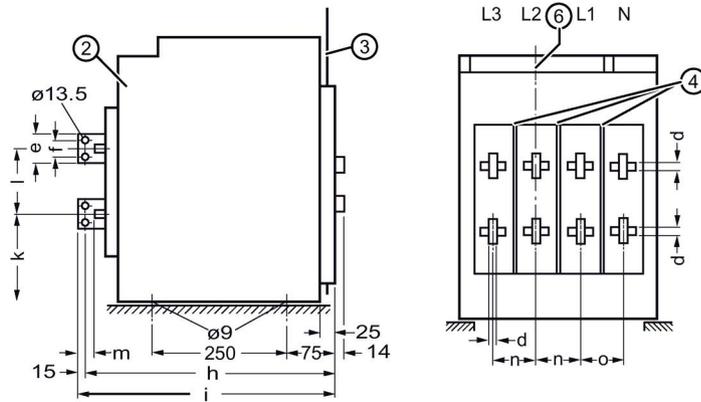
## 12.5 Withdrawable circuit-breaker, 4 pole, horizontal connections



- a Disconnected position
- b Test position
- c Operating position
- ① Auxiliary conductor connection system
- ② Guide frame
- ③ Cabinet door
- ④ Slot (6 mm deep) for phase barriers
- ⑤ Holes for securing the guide frame
- ⑥ Center line of operator panel

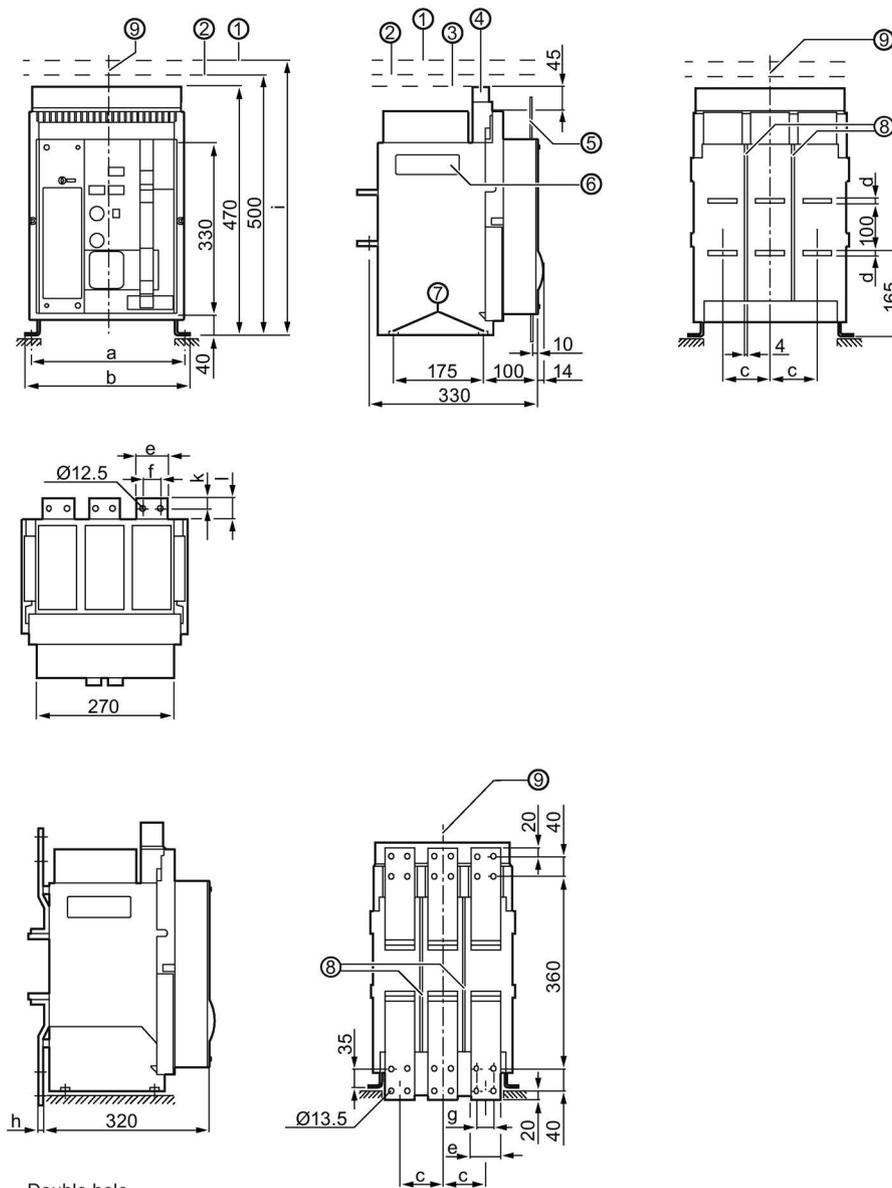
Rated current A	a	b	c	d	e	f	p
400 to 1250	370	410	90	8	60	30	140
1600	370	410	90	15	60	30	140
2000 to 2500	500	540	120	15	80	40	190
3200	500	540	120	30	100	50	190

## 12.6 Withdrawable circuit-breaker, 4 pole, vertical connections up to 3200 A



Rated current A	a	b	c	d	e	f	h	i	k	l	m	n	o	p
400 to 1250	370	410	90	8	60	30	455	470	157,5	115	37	90	90	140
1600	370	410	90	15	60	30	455	470	157,5	115	37	90	90	140
2000 to 2500	500	540	120	15	80	40	465	480	157,5	115	37	140	120	190
3200	500	540	120	30	100	50	465	480	150	130	37	140	120	190

## 12.7 Fixed-mounted circuit-breaker, 3 pole, horizontal connections

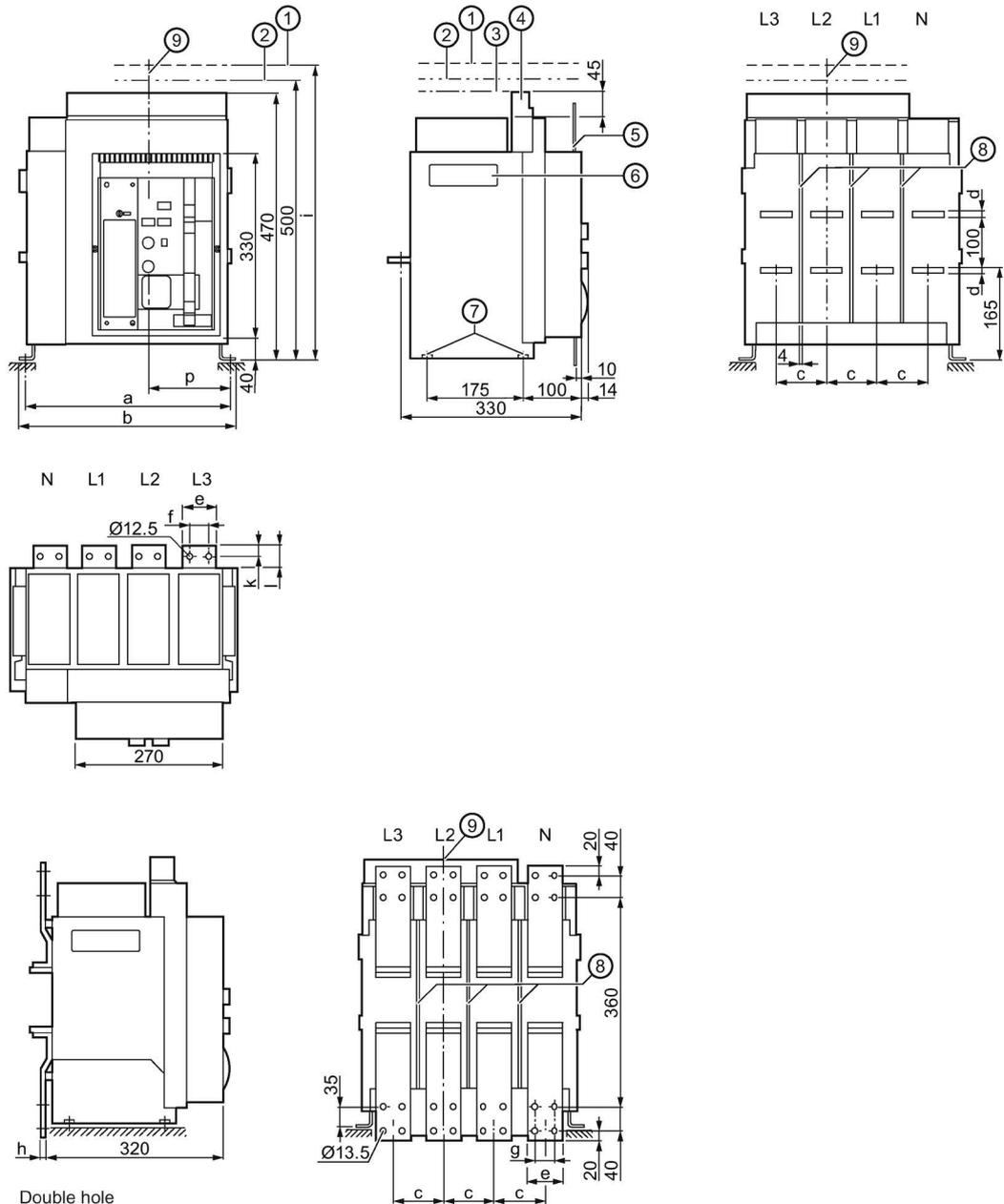


Double hole  
Holes in bars to DIN 43673

- ① Clearance for lifting out the arc chutes
- ② Space for auxiliary supply connector
- ③ Space above arc chutes
- ④ Auxiliary supply connector
- ⑤ Cabinet door
- ⑥ Countersunk handle
- ⑦ Nut M 8
- ⑧ Slot (4 mm deep) for phase barriers
- ⑨ Center line of circuit-breaker

Rated current A	a	b	c	d	e	f	g	h	i	k	l
400 to 1250	300	320	90	8	60	30	-	8	530	18	40
1600	300	320	90	15	60	30	-	20	530	18	40
2000 to 2500	400	420	120	15	80	40	40	20	560	22	44
3200	400	420	120	30	80	40	40	20	560	22	44

## 12.8 Fixed-mounted circuit-breaker, 4 pole, horizontal connections



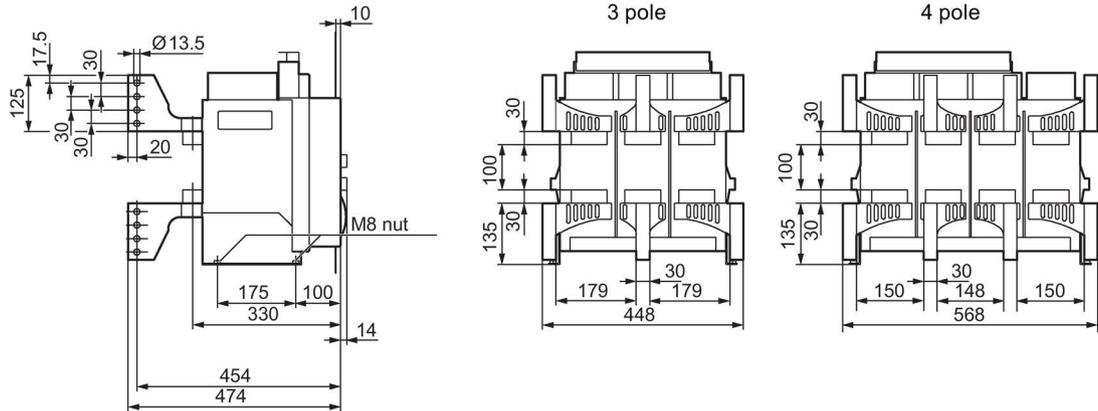
Double hole  
Holes in busbars to DIN 43673

- ① Clearance for lifting out the arc chutes
- ② Space for auxiliary supply connector
- ③ Space above arc chutes
- ④ Auxiliary supply connector
- ⑤ Cabinet door
- ⑥ Countersunk handle
- ⑦ Nut M 8
- ⑧ Slot (4 mm deep) for phase barriers
- ⑨ Center line of operator panel

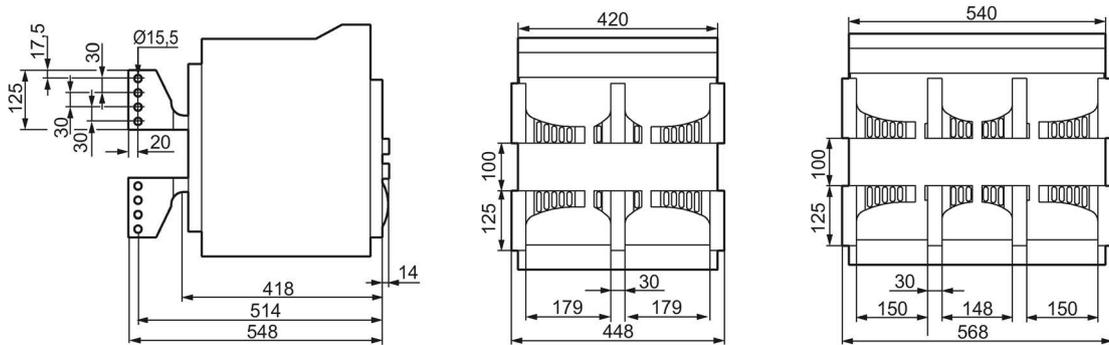
Rated current A	a	b	c	d	e	f	g	h	i	k	l	p
400 to 1250	390	410	90	8	60	30	-	8	530	18	40	150
1600	390	410	90	15	60	30	-	15	530	18	40	150
2000 to 2500	520	540	120	15	80	40	40	20	560	22	44	200
3200	520	540	120	30	80	40	40	20	560	22	44	200

## 12.9 Withdrawable/fixed-mounted circuit-breaker, 3 / 4 pole, vertical connections (3800 A / 4000 A only)

### Fixed-mounted circuit-breaker 4000 A



### Withdrawable circuit-breaker 3800 A



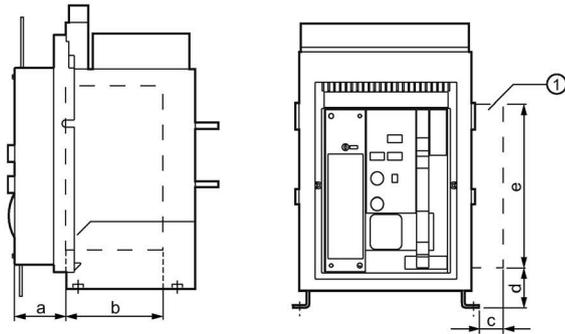
## 12.10 Accessories 3 pole / 4 pole

Mechanical interlock (1)

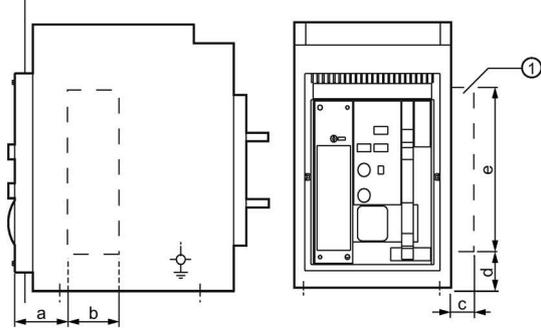
Interlocking device that prevents closing (2).

Comprising an interlock in the cabinet and an interlocking module with Bowden wire.

For fixed-mounted circuit breakers



For withdrawable circuit-breakers



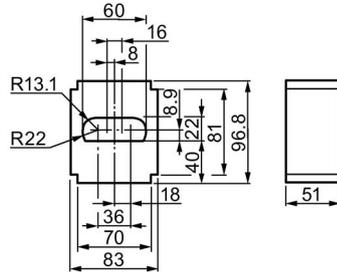
① Distance for interlocking module  
(without Bowden wire)

Distance for	a	b	c	d	e
(1)	90	90	50	65	270
(2)	58	215	10	250	115

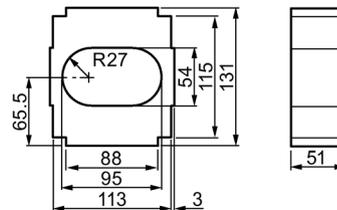


## 12.12 Current transformer for N conductor

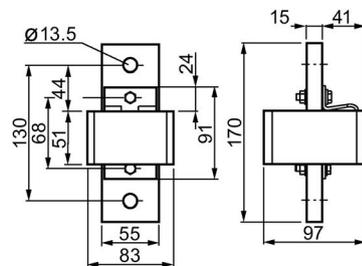
Frame size I, 3WL9 111-0AA21-0AA0



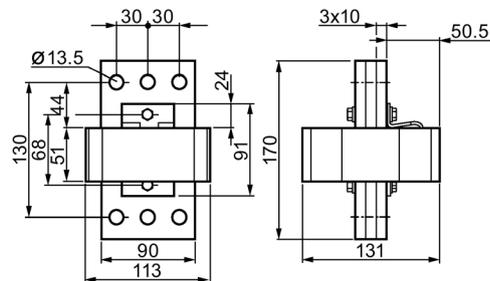
Frame size II, 3WL9 111-0AA22-0AA0



Frame size I, 3WL9 111-0AA31-0AA0



Frame size II, 3WL9 111-0AA32-0AA0



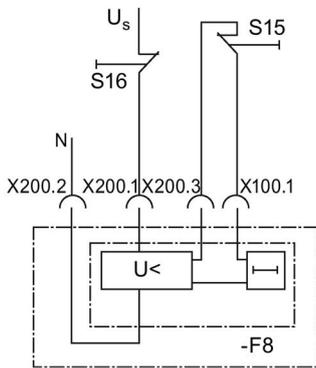




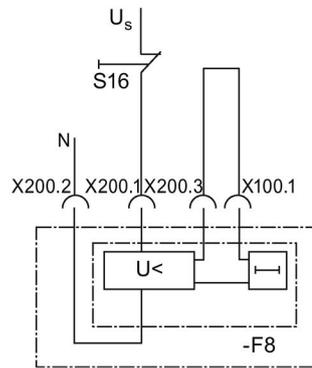
13.2 Circuit diagram for undervoltage release with delay

Accessories in overall circuit diagram	
F8	Undervoltage release with delay
F5	Tripping solenoid
M1	Motor for charging stored-energy spring mechanism
P	Stored-energy spring mechanism
R	Display and reset plunger for overcurrent tripping
Q01	Spring charging lever for spring energy store
Q1	Main contacts
T1 / T2 / T3	Current transformers
X100 / X200 / X300	Connecting terminals
Y1	Closing solenoid

13.2 Circuit diagram for undervoltage release with delay



Circuit for EMERGENCY OFF function  
(instant OFF when S15 is open)



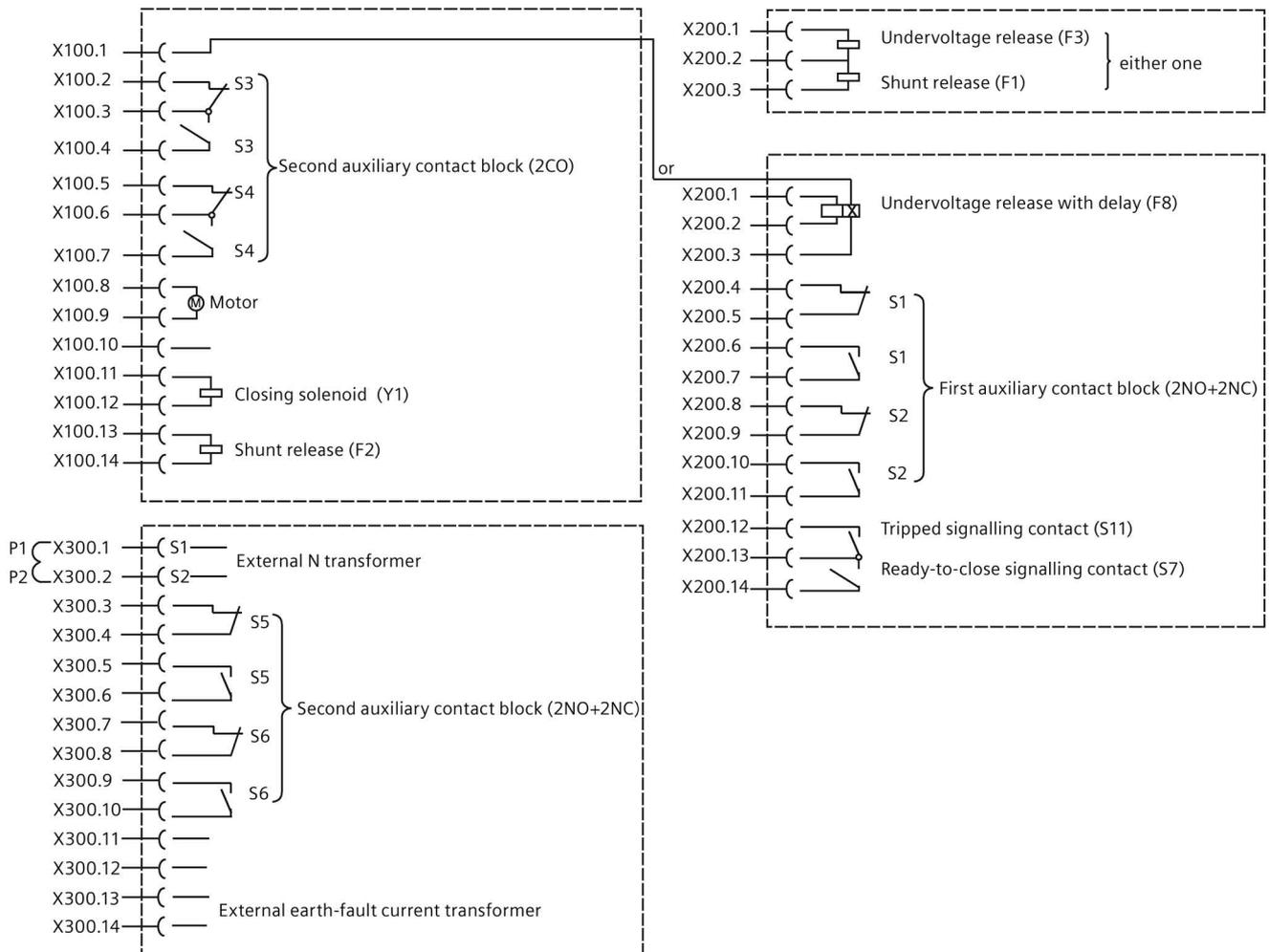
Circuit without EMERGENCY OFF function

S15 = external instant OFF  
S16 = external delayed OFF

## 13.3 Terminal diagrams

### Terminal diagrams

The following overview shows which part of the internal equipment is connected to which part of the contact blocks, i.e. this is a complete auxiliary wiring diagram of the circuit-breaker.





# Glossary

## Auxiliary trip unit

Undervoltage releases and shunt releases are available.

## Closing solenoid

Electrical closing of the energy in the spring energy store.

## Electrical closing lockout

This function is designed to electrically interlock two or more circuit-breakers (closing lockout). The electrical closing lockout prevents the circuit-breaker from closing with a continuous signal.

## Energy transformer

Generates energy (power supply) for the internal supply of the overcurrent release.

## Finger contacts

These connect the main terminals on the circuit-breaker to the main terminals on the guide frame.

## Manual connector coding

The manual connectors can be coded to prevent the auxiliary conductor connectors from being connected incorrectly.

## Mechanical interlock

This function supports different types of mechanical interlocking for circuit-breakers.

## Mechanical reclosing lockout

After overcurrent tripping, the circuit-breaker is locked against reclosing until the mechanical reclosing lockout function has been manually reset.

## Motorized operating mechanism

A geared motor automatically charges the stored-energy spring mechanism as soon as voltage has been applied to the auxiliary supply connections. After one closing operation, the stored-energy spring mechanism is automatically charged for the next closing operation.

### **Position indicator**

This indicates the position of the circuit-breaker (disconnected/test/operating position) in the guide frame.

### **Position signaling switch**

This is used for remotely displaying the circuit-breaker position in the guide frame.

### **Racking rail**

Accommodates the circuit-breaker in the guide frame.

### **Rated current coding**

The rated current is coded in the factory, that is, each circuit-breaker can only be used in a guide frame with the same rated current.

### **Safe OFF**

This additional function prevents the circuit-breaker from closing and fulfills the isolation condition in the OFF position to IEC 60947-2:

- "Mechanical OFF" button pressed
- Main contacts open
- Withdrawable circuit-breakers: racking handle removed
- The various interlocking conditions are fulfilled

### **Shunt release (F1, F2)**

For remotely opening the circuit-breaker and blocking it against closing.

### **Shutters**

Shutters are molded-plastic plates for covering live main conducting paths in the guide frame (shock-hazard protection). If the circuit-breaker is racked to the disconnected position, the shutters are moved over the uncovered contact gaps.

### **Spring charging lever**

The stored-energy spring mechanism is charged by means of a series of pump movements (five actuations of charging lever).

### **Stored-energy spring mechanism**

Unit with spring energy store (mechanical energy). The spring is charged by means of the spring charging lever or motorized operating mechanism and maintained in a charged state

by means of latches. When these latches are released, the stored energy is routed to the switching contact and the circuit-breaker closes.

### **Switching position signaling switch**

This auxiliary switch is actuated depending on the switching status of the circuit-breaker.

### **Tripped signaling switch**

Group signal for overload, short-circuit, and ground-fault tripping by means of microswitch.

### **Undervoltage release (delayed)**

For remotely opening and interlocking the circuit-breaker. Voltage dips must not cause the circuit-breaker to open.

### **Undervoltage release (instantaneous/short-time delay)**

For remotely opening and interlocking the circuit-breaker as well as for using the circuit-breaker in EMERGENCY OFF circuits (to EN 60204-1 / DIN VDE 0113 Part 1) in conjunction with a separate EMERGENCY OFF device. Brief voltage dips ( $t_d < 80$  ms for instantaneous undervoltage release,  $t_d < 200$  ms for short-time delay undervoltage release) must not cause the circuit-breaker to open.

### **Use of tools**

Buttons located under a cover and that can be accessed through a hole (diameter 6.35 mm) can only be actuated by means of a suitable rod.





Siemens AG  
Siemensstr. 10  
D-93055 Regensburg

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