

**SIEMENS**

Configuration Manual

**SENTRON**  
Switch Disconnectors

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## Configuration Manual

## Legal information

### Warning notice system

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<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.

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## Fuseless switch disconnectors

### 1.1 Overview of the 3LD main control and EMERGENCY STOP switches

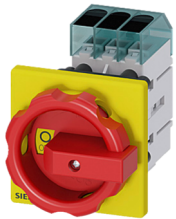

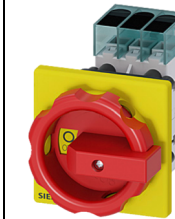
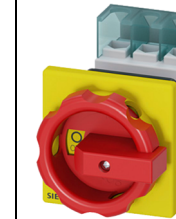



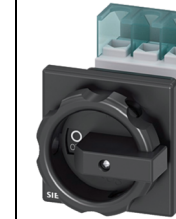
The 3LD main control and EMERGENCY STOP switches are manually operated switch disconnectors according to IEC 60947-3/VDE 0660 Part 107 (EN 60947-3) and comply with the conditions for switch disconnectors.

In EN 60204-1 (VDE 0113 Part 1), main control switches are called "disconnecter units", while EMERGENCY-STOP switches are termed "devices for emergency shutdown". The 3LD switches for 16 to 250 A are approved according to UL 508 and can be used as "Manual Motor Controllers" and "Motor Disconnects".

In addition, the 3LD switch disconnectors have CCC certification.

1.1 Overview of the 3LD main control and EMERGENCY STOP switches

Maintenance personnel can protect themselves against unauthorized startup with padlocks (up to three can be fitted). The 3LD switches can be used in any mounting position.

Rated current I <sub>n</sub>		16 A		25 A	
Type series		3LD30	3LD20	3LD31	3LD21
Operating mechanism, red/yellow					
Operating mechanism, black					
<b>Mounting type</b>					
<b>Front mounting</b>					
<input type="checkbox"/> Center-hole mounting		✓	✓	✓	✓
<input type="checkbox"/> Four-hole mounting		--	✓	--	✓
<b>Floor mounting</b>					
<input type="checkbox"/> Center-hole mounting		✓	✓	✓	✓
<input type="checkbox"/> Four-hole mounting		--	✓	--	✓
<b>Types of use</b>					
Distribution board mounting		✓	✓	✓	✓
Molded-plastic enclosure		--	✓	--	✓
DC isolator		--	--	--	--
Selector switch		--	--	--	✓
<b>Technical features</b>					
<b>Number of poles</b>					
<input type="checkbox"/> 3-pole		✓	✓	✓	✓
<input type="checkbox"/> 4-pole		✓	✓	✓	✓
<input type="checkbox"/> 6-pole		--	--	--	✓
<b>Short-circuit behavior</b>					
<input type="checkbox"/> Rated conditional short-circuit current with upstream fuses at 50/60 Hz, 690 V AC	kA rms	6	50	6	50

## 1.1 Overview of the 3LD main control and EMERGENCY STOP switches











Rated current I <sub>n</sub>		16 A		25 A	
Type series		3LD30	3LD20	3LD31	3LD21
<input type="checkbox"/> Rated short-time with-stand current (1 s current, rms value)	A	500	340	500	640
<b>Endurance</b> mechanical (operating cycles)		100000	100000	100000	100000
<b>Switching frequency</b>	1/h	50	50	50	50
<b>Conductor cross-sections for main conductors</b> <sup>1)</sup>					
<input type="checkbox"/> Solid or stranded	mm <sup>2</sup>	1 x (2.5 ... 16 mm <sup>2</sup> )	1 ... 6	1 x (2.5 ... 16 mm <sup>2</sup> )	1.5 ... 16
<input type="checkbox"/> Finely stranded with end sleeve (max.)	mm <sup>2</sup>	1 x (2.5 ... 16 mm <sup>2</sup> )	4	1 x (2.5 ... 16 mm <sup>2</sup> )	10
<input type="checkbox"/> Conductor cross-sections	AWG	14 ... 6	18 ... 10	14 ... 6	14 ... 8
<input type="checkbox"/> Torque for terminal	Nm	3	1.5 ... 2	3	2 ... 2.5
<b>Accessories</b>					
<b>Auxiliary switches</b>					
<input type="checkbox"/> 1 NO + 1 NC		✓	✓	✓	✓
<input type="checkbox"/> 2 NO		--	✓	--	✓
<b>Further accessories</b>					
<input type="checkbox"/> 4th pole		✓	--	✓	✓
<input type="checkbox"/> N or PE terminal		✓	✓	✓	✓

<sup>1)</sup> Depending on the cable infeed, only small cross-sections are possible with 3LD2 devices in molded-plastic enclosures.

✓ Available

-- Not available

1.1 Overview of the 3LD main control and EMERGENCY STOP switches

Rated current I <sub>n</sub>		32 A		40 A	63 A	
Type series		3LD32	3LD22	3LD33	3LD34	3LD25
Operating mechanism, red/yellow						
Operating mechanism, black						
<b>Mounting type</b>						
<b>Front mounting</b>						
<input type="checkbox"/> Center-hole mounting		✓	✓	✓	✓	✓
<input type="checkbox"/> Four-hole mounting		--	✓	--	--	✓
<b>Floor mounting</b>						
<input type="checkbox"/> Center-hole mounting		✓	✓	--	✓	✓
<input type="checkbox"/> Four-hole mounting		--	✓	--	--	✓
<b>Types of use</b>						
Distribution board mounting		✓	✓	✓	✓	✓
Molded-plastic enclosure		--	✓	--	--	✓
DC isolator		--	✓	--	--	--
Selector switch		--	✓	--	--	✓
<b>Technical features</b>						
<b>Number of poles</b>						
<input type="checkbox"/> 3-pole		✓	✓	✓	✓	✓
<input type="checkbox"/> 4-pole		✓	✓	✓	✓	✓
<input type="checkbox"/> 6-pole		--	✓	--	--	✓
<b>Short-circuit behavior</b>						
<input type="checkbox"/> Rated conditional short-circuit current with upstream fuses at 50/60 Hz, 690 V AC	kA rms	6	50	6	6	50
<input type="checkbox"/> Rated short-time withstand current (1 s current, rms value)	A	500	640	1000	1000	1260

## 1.1 Overview of the 3LD main control and EMERGENCY STOP switches









Rated current I <sub>n</sub>		32 A		40 A	63 A	
Type series		3LD32	3LD22	3LD33	3LD34	3LD25
Endurance mechanical (operating cycles)		100000	100000	100000	100000	100000
Switching frequency	1/h	50	50	50	50	50
<b>Conductor cross-sections for main conductors <sup>1)</sup></b>						
<input type="checkbox"/> Solid or stranded	mm <sup>2</sup>	1 x (2.5 ... 16 mm <sup>2</sup> )	1.5 ... 16	1 x (2.5 ... 16 mm <sup>2</sup> )	1 x (2.5 ... 16 mm <sup>2</sup> )	2.5 ... 35
<input type="checkbox"/> Finely stranded with end sleeve (max.)	mm <sup>2</sup>	1 x (2.5 ... 16 mm <sup>2</sup> )	10	1 x (2.5 ... 16 mm <sup>2</sup> )	1 x (2.5 ... 16 mm <sup>2</sup> )	16
<input type="checkbox"/> Conductor cross-sections	AWG	14 ... 6	14 ... 8	14 ... 6	14 ... 6	14 ... 6
<input type="checkbox"/> Torque for terminal	Nm	3	2 ... 2.5	3	3	2.5 ... 3
<b>Accessories</b>						
<b>Auxiliary switches</b>						
<input type="checkbox"/> 1 NO + 1 NC		✓	✓	✓	✓	✓
<input type="checkbox"/> 2 NO		--	✓	--	--	✓
<b>Further accessories</b>						
<input type="checkbox"/> 4th pole		✓	✓	✓	✓	✓
<input type="checkbox"/> N or PE terminal		✓	✓	✓	✓	✓

<sup>1)</sup> Depending on the cable infeed, only small cross-sections are possible with 3LD2 devices in molded-plastic enclosures.

✓ Available

-- Not available

1.1 Overview of the 3LD main control and EMERGENCY STOP switches

Rated current I <sub>n</sub>		100 A	125 A	160 A	250 A
Type series		3LD27	3LD28	3LD23	3LD24
Operating mechanism, red/yellow					
Operating mechanism, black					
<b>Mounting type</b>					
<b>Front mounting</b>					
<input type="checkbox"/> Center-hole mounting		--	--	--	--
<input type="checkbox"/> Four-hole mounting		✓	✓	✓	✓
<b>Floor mounting</b>					
<input type="checkbox"/> Center-hole mounting		--	--	--	--
<input type="checkbox"/> Four-hole mounting		✓	✓	✓	✓
<b>Types of use</b>					
Distribution board mounting		✓	✓	✓	✓
Molded-plastic enclosure		✓	✓	--	--
DC isolator		--	--	--	--
Selector switch		✓	--	✓	✓
<b>Technical features</b>					
<b>Number of poles</b>					
<input type="checkbox"/> 3-pole		✓	✓	✓	✓
<input type="checkbox"/> 4-pole		--	--	✓	✓
<input type="checkbox"/> 6-pole		--	--	✓	✓
<b>Short-circuit behavior</b>					
<input type="checkbox"/> Rated conditional short-circuit current with upstream fuses at 50/60 Hz, 690 V AC	kA rms	50	20	50	50
<input type="checkbox"/> Rated short-time withstand current (1 s current, rms value)	A	2000	2000	4000	4000

## 1.1 Overview of the 3LD main control and EMERGENCY STOP switches

Rated current I <sub>n</sub>		100 A	125 A	160 A	250 A
<b>Type series</b>		<b>3LD27</b>	<b>3LD28</b>	<b>3LD23</b>	<b>3LD24</b>
<b>Endurance</b> mechanical (operating cycles)		100000	100000	100000	100000
<b>Switching frequency</b>	1/h	50	50	50	50
<b>Conductor cross-sections for main conductors<sup>1)</sup></b>					
<input type="checkbox"/> Solid or stranded	mm <sup>2</sup>	4 ... 50	4 ... 50	4 ... 50	4 ... 50
<input type="checkbox"/> Finely stranded with end sleeve (max.)	mm <sup>2</sup>	35	35	150	150
<input type="checkbox"/> Conductor cross-sections	AWG	12 ... 1	12 ... 1	1 ... MCM400	
<input type="checkbox"/> Torque for terminal	Nm	2.5 ... 3	2.5 ... 3	9.5 ... 10	9.5 ... 10
<b>Accessories</b>					
<b>Auxiliary switches</b>					
<input type="checkbox"/> 1 NO + 1 NC		✓	✓	✓	✓
<input type="checkbox"/> 2 NO		✓	✓	✓	✓
<b>Further accessories</b>					
<input type="checkbox"/> 4th pole		✓	✓	✓	✓
<input type="checkbox"/> N or PE terminal		✓	✓	✓	✓

1) Depending on the cable infeed, only small cross-sections are possible with 3LD2 devices in molded-plastic enclosures.

✓ Available

-- Not available

## 1.2 3LD3 up to 63 A

### 1.2.1 Product description

The 3LD3 main control and EMERGENCY STOP switches are suitable for a current range from 16 to 63 A. They can be used as main control switches for small tools, as load EMERGENCY STOP switches and as load maintenance switches. The 3LD3 main control and EMERGENCY STOP switches are manually operated switch disconnectors according to IEC 60947-3/VDE 0660 Part 107 (EN 60947-3) and comply with the conditions for switch disconnectors according to EN 60204-1 (VDE 0113 Part 1).

In EN 60204-1 (VDE 0113 Part 1), these are called "disconnector units", while EMERGENCY STOP switches are termed "devices for emergency shutdown".

### Versions and accessories

- One size with box terminal in 3 and 4-pole version
- Installation via front and floor mounting or distribution board mounting
- Auxiliary switches for querying the switch positions
- Door-coupling rotary operating mechanism for operation of switch disconnector outside the control cabinet door

#### 1.2.1.1 Benefits

- Compact, narrow design saves space
- Flexibility thanks to numerous application options
- Locking capability during maintenance work
- A wide range of accessories available
- Comprehensive support through provision of CAx data

#### 1.2.1.2 Application

The 3LD3 switches are used for switching machines as well as three-phase motors and other loads in cases of maintenance and repair.

The 3LD3 switches can be used as follows:

- ON-OFF switches
- EMERGENCY STOP switches

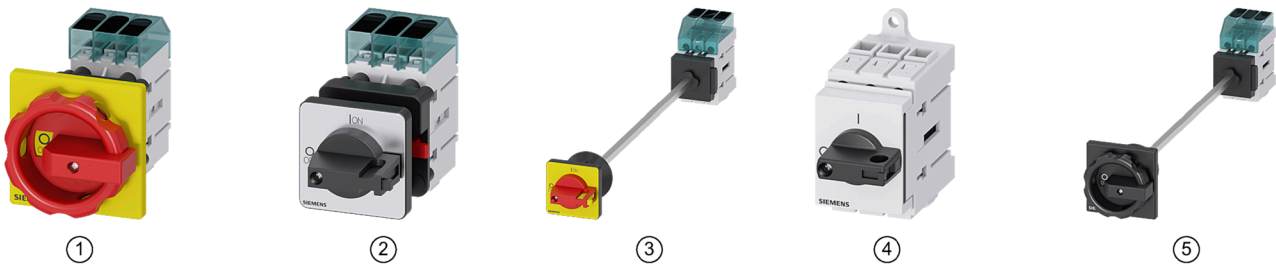


### 1.2.1.3 Design

#### Design of the contacts

Each switch has three adjacent contact elements.

A 4th leading contact for switching the N conductor, a continuous PE terminal, an auxiliary switch (1 NO + 1 NC) can be fitted to each side of the switch. The auxiliary switches operate as leading contacts on opening. On opening, the NO contact opens before the main contacts, so that a contactor carries the switching power in the circuit and the maintenance or safety switch switches at zero current. On closing, the auxiliary switch switches later than or at the same time as the main contacts.



- ① 3LD3054-0TK53 switch for front mounting with rotary operating mechanism
- ② 3LD3050-0TK11 switch for front mounting with knob
- ③ 3LD3040-0TK13 switch for floor mounting with knob and door coupling
- ④ 3LD3030-0TK11 switch for distribution board mounting with knob
- ⑤ 3LD3048-0TK51 switch for floor mounting with rotary operating mechanism and door coupling

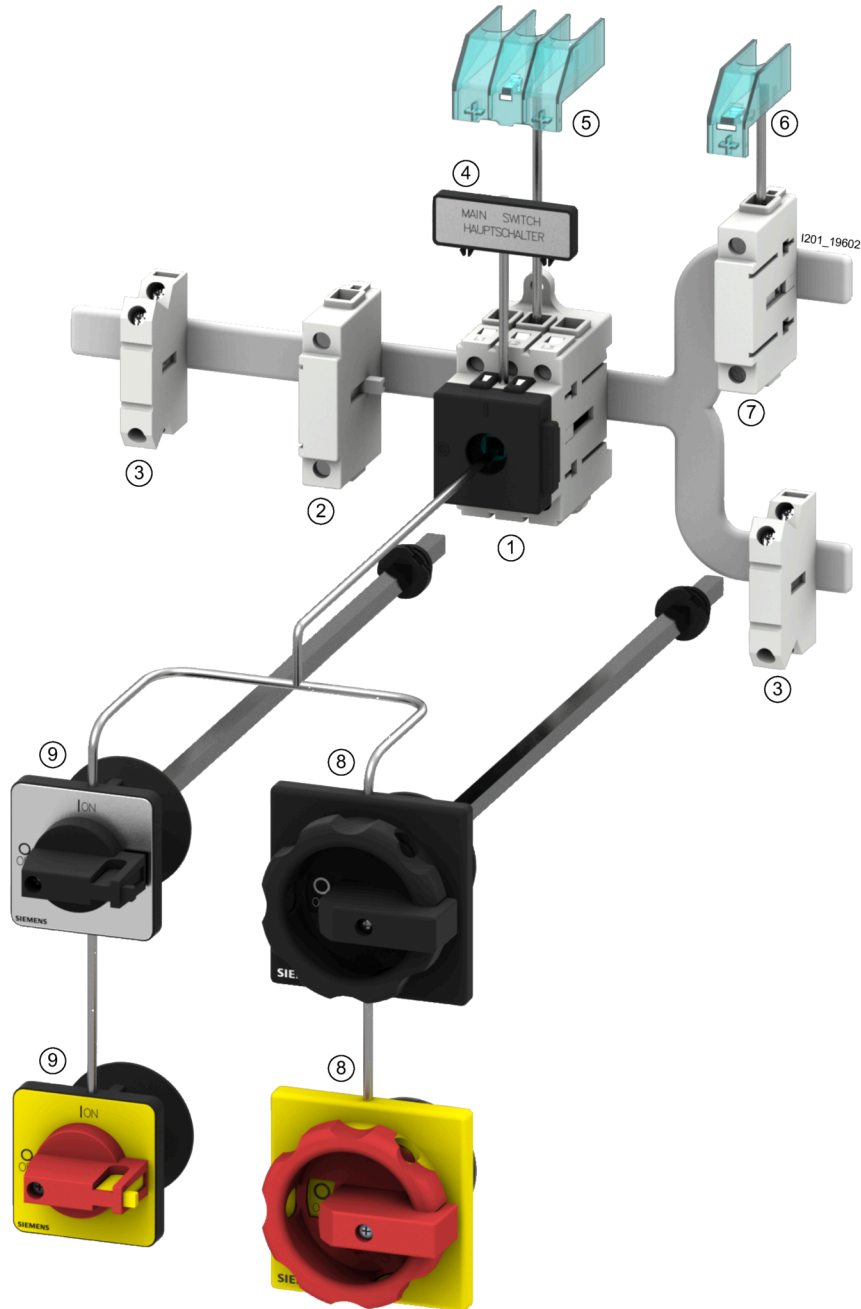
#### Design of rotary operating mechanisms

The rotary operating mechanisms of the switches for front or floor mounting are mounted on control cabinet doors, or on front or side panels via center-hole mounting with a standard diameter of 22.5 mm and are operated from the outside. In their OFF position, they can be locked with 1 to 3 padlocks with a hasp thickness of 4 to 8 mm.

- Switch position indicator: The switch position is clearly marked with direction arrows and an "O" for OFF and a "I" for ON at the front.
- Switches for front mounting: The switches for front mounting are connected directly to the rotary operating mechanism through the fixing screws or – in the case of center-hole mounting – a special-purpose coupling.
- Switches for floor mounting: The switches for floor mounting are snapped onto 35 mm standard mounting rails according to EN 60715 or screw-mounted on mounting plates. The actuators are connected to the lower section of the switch through a door coupling, which can be released in its zero position, and a 300 mm long switch shaft. When the control cabinet door is open, the switch can be protected against inadvertent operation by removing the switch shaft from the lower section of the switch. The overall depth can be adapted to individual requirements by adjusting the switch shaft length.

- Switches for distribution board mounting: The switches for distribution board mounting are suited for operation in distribution boards and for switching inside control cabinets or distribution boards. They have cap and mounting dimensions to DIN 43880 and can be fitted under the same cover together with miniature circuit breakers. The selector switches can be locked in their OFF position with no more than one padlock with a hasp thickness of 4 to 6 mm.

## 1.2.2 Overview of components



- |  |   |
|--|---|
| ① 3LD3 switch disconnector   | ⑥ Terminal cover, 1-pole  |
| ② 4th contact (N conductor)  | ⑦ N or PE terminal  |
| ③ Auxiliary switch 1 NO + 1 NC,<br>for mounting onto the left and/or right | ⑧ Door-coupling rotary operating mechanism<br>with rotary operating mechanism |
| ④ Inscription label German/English   | ⑨ Door-coupling rotary operating mechanism<br>with knob-operated mechanism    |
| ⑤ Terminal cover, 3-pole   |   |

### 1.2.3 Technical specifications 3LD3

#### General technical details

Standards		IEC 60947-3 (VDE 0660-107), EN 60204-1 (VDE 0113-1)				
Article number		3LD30...	3LD31...	3LD32...	3LD33...	3LD34...
Rated uninterrupted current	A	16	25	32	40	63
Rated insulation voltage	V	690	690	690	690	690
Rated operational voltage for AC at 50/60 Hz	V	690	690	690	690	690
Operating frequency	Hz	50 ... 60	50 ... 60	50 ... 60	50 ... 60	50 ... 60
Impulse withstand voltage, rated value	kV	6	6	6	6	6
Short-time withstand current (ICW) limited to 1 s, Rated value	kA	0.5	0.5	0.5	1	1
Design of fuse link required for short-circuit protection of the main circuit		Fuse gL/gG: 16 A	Fuse gL/gG: 25 A	Fuse gL/gG: 32 A	Fuse gL/gG: 40 A	Fuse gL/gG: 63 A
Conditional short-circuit current with line-side fuse at 690 V via gG fuse, rated value	kA	6	6	6	6	6
Let-through current with closed switch at 690 V for combination switch + gG fuse, max. permissible	kA	3	3.5	4.5	5	6
Typical power loss for each conductor	W	0.5	1.1	1.1	1.8	4.5
Typical mechanical endurance (operating cycles)		100 000				
Electrical endurance (operating cycles) at AC-23A at 690 V at 50/60 Hz		6000				

## Operational power and ambient temperature

Standards			IEC 60947-3 (VDE 0660-107), EN 60204-1 (VDE 0113-1)				
Article number			3LD30...	3LD31...	3LD32...	3LD33...	3LD34...
			<b>Rated operational power</b>				
AC-3 motor load switch	<input type="checkbox"/> At 220 ... 240 V	kW	3	4	5.5	7.5	11
Operational switching of individual motors	<input type="checkbox"/> At 380 ... 440 V	kW	5.5	7.5	9.5	11.5	18.5
	<input type="checkbox"/> At 660 ... 690 V	kW	5.5	7.5	9.5	11.5	15
AC-23A main control switches, repair switches	<input type="checkbox"/> At 220 ... 240 V	kW	3	4	6	7.5	11
Frequent, but not operational switching of individual motors	<input type="checkbox"/> At 380 ... 440 V	kW	7.5	9.5	11.5	18.5	22
	<input type="checkbox"/> At 690 V	kW	7.5	9	11.5	15	18.5
			<b>Ambient temperature</b>				
During operation		°C	-25 ... +55				
During storage		°C	-25 ... +55				

Connection and auxiliary switches

<b>Standards</b>		IEC 60947-3 (VDE 0660-107), EN 60204-1 (VDE 0113-1)				
<b>Article number</b>		3LD30...	3LD31...	3LD32...	3LD33...	3LD34...
<b>Type of connectable conductor cross-sections</b>						
<input type="checkbox"/> Solid for auxiliary contacts		2 x (0.75 ... 2.5 mm <sup>2</sup> ), 1 x 4 mm <sup>2</sup>				
<input type="checkbox"/> Finely stranded with end sleeve for auxiliary contacts		2 x (0.75 ... 1.5 mm <sup>2</sup> ), 1 x 2.5 mm <sup>2</sup>				
<input type="checkbox"/> Stranded for auxiliary contacts		2 x (0.75 ... 2.5 mm <sup>2</sup> ), 1 x 4 mm <sup>2</sup>				
<input type="checkbox"/> Solid for copper conductors		1 x (2.5 ... 16 mm <sup>2</sup> )				
<input type="checkbox"/> Stranded for copper conductors		1 x (2.5 ... 16 mm <sup>2</sup> )				
<input type="checkbox"/> Finely stranded with end sleeve for copper conductors		1 x (2.5 ... 16 mm <sup>2</sup> )				
<b>Design of electrical connection</b>						
<input type="checkbox"/> For main circuit		Box terminals				
<input type="checkbox"/> For auxiliary contacts		Terminals				
<b>Auxiliary switches</b>						
Design of fuse link required for short-circuit protection of the auxiliary switch		Fuse gL/gG: 10 A				
Insulation voltage for the auxiliary switch, rated value	V	500				

1.3 3LD2 up to 250 A

1.3.1 Product description

The 3LD2 main control and EMERGENCY STOP switches are manually operated switch disconnectors according to IEC 60947-3/VDE 0660 Part 107 (EN 60947-3) and comply with the conditions for switch disconnectors according to EN 60204-1 (VDE 0113 Part 1). In EN 60204-1 (VDE 0113 Part 1), these are called "disconnector units",

while EMERGENCY STOP switches are termed "devices for emergency shutdown". The 3LD2 switches for 16 to 250 A are approved according to UL 508 and can be used as "Manual Motor Controllers" and "Motor Disconnects". In addition, the 3LD switch disconnectors have CCC certification.

The 3LD2 main control and EMERGENCY STOP switches are suitable for a current range from 16 to 250 A. These are suitable for main control, EMERGENCY STOP, or repair switches and thus fulfill a wide range of requirements. They are approved in line with IEC, UL, EAC, CSA, and CCC, as well as for use in shipbuilding.

## Versions

- Five sizes with box terminal in 3, 4, and 6-pole version
- Front and floor mounting or distribution board mounting
- Front mounting by means of four-hole or center-hole mounting
- Switches in molded-plastic enclosure with degree of protection IP65
- DC isolators 800 V DC for PV installations
- Door-coupling rotary operating mechanism for operation of switch disconnector outside the control cabinet door
- Auxiliary switches for querying the switch positions, pre-installed or retrofittable

### 1.3.1.1 Benefits

- Compact design saves space
- High rated short-circuit currents
- Locking capability during maintenance work
- Comprehensive range of retrofittable accessories
- Comprehensive support through provision of CAx data

### 1.3.1.2 Application

The 3LD2 switches are used in almost all power distribution systems for industry and infrastructure, but particularly those in main and auxiliary power distribution systems of commercial buildings and in domestic power supplies upstream of meters (e.g. SIPRO system).

Particularly for processing machines in mechanical and conveyor system engineering and in the chemical or food and beverage industries, these switches are now an essential part of the hardware architecture as main control and EMERGENCY STOP switches.

The 3LD2 switches can be used as follows:

- ON-OFF switches
- EMERGENCY STOP switches
- Main control switches according to EN 60204-1

### 1.3.1.3 Design

#### Design of the contacts

Each switch has three adjacent contact elements<sup>1)</sup>. A 4th leading contact for switching the N conductor, a continuous PE terminal, an auxiliary switch (1 NO + 1 NC) can be fitted to each side of the switch. The auxiliary switches operate as leading contacts on opening. On opening, the NO contact opens before the main contacts, so that a contactor carries the switching power in the circuit and the maintenance or safety switch switches at zero current. On closing, the auxiliary switch switches later than or at the same time as the main contacts.

<sup>1)</sup> 16 A versions have four contact elements and six 6-pole contact elements.

#### Design of rotary operating mechanisms

The rotary operating mechanisms of the switches for front or floor mounting are mounted on control cabinet doors, or on front or side panels with four-hole or center-hole mounting with a standard diameter of 22.5 mm and are operated from the outside. In their OFF position, they can be locked with up to three padlocks with a hasp thickness of 4 to 8 mm.

Switching devices with defeatable door-coupling rotary operating mechanism are available in addition.

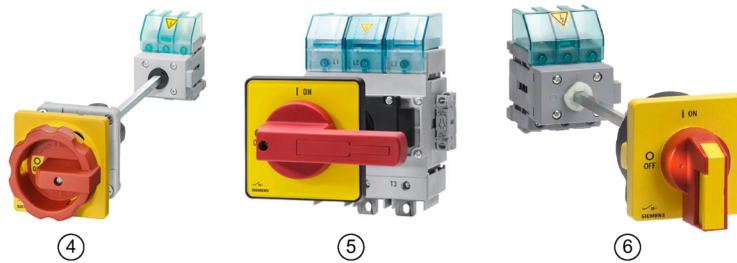
- Switch position indicator: The switch position is clearly marked with direction arrows and an "O" for OFF and a "I" for ON at the front.
- Switches for front mounting: The switches for front mounting are connected directly to the rotary operating mechanism through the fixing screws or – in the case of center-hole mounting – a special-purpose coupling.
- Switches for floor mounting: The switches for floor mounting are snapped onto 35 mm standard mounting rails according to EN 60715 or screw-mounted on mounting plates. The actuators are connected to the lower section of the switch through a door coupling, which can be released in its zero position, and a 300 mm long switch shaft. When the control cabinet door is open, the switch can be protected against inadvertent operation by removing the switch shaft from the lower section of the switch. The overall depth can be adapted to individual requirements by adjusting the switch shaft length.
- Switches for distribution board mounting: The switches for distribution board mounting are suited for operation in distribution boards and for switching inside control cabinets or distribution boards. They have cap and mounting dimensions to DIN 43880 and can be fitted under the same cover together with miniature circuit breakers. The selector switches can be locked in their OFF position with up to two padlocks with a hasp thickness of 4 to 6 mm.



- Switches in molded-plastic enclosure: For surface mounting of individual main control and EMERGENCY STOP switches, molded plastic-enclosed switches to degree of protection IP65 are used. The actuators can be locked in their OFF position with three padlocks with a hasp thickness of 4 to 8 mm. The molded-plastic enclosures each contain an N and/or a PE terminal.



- ① 3LD2704-0TK53 switch for front mounting with rotary operating mechanism
- ② 3LD2222-0TK1 switch for front mounting with knob
- ③ 3LD2103-3VK53 6-pole switch for front mounting with rotary operating mechanism

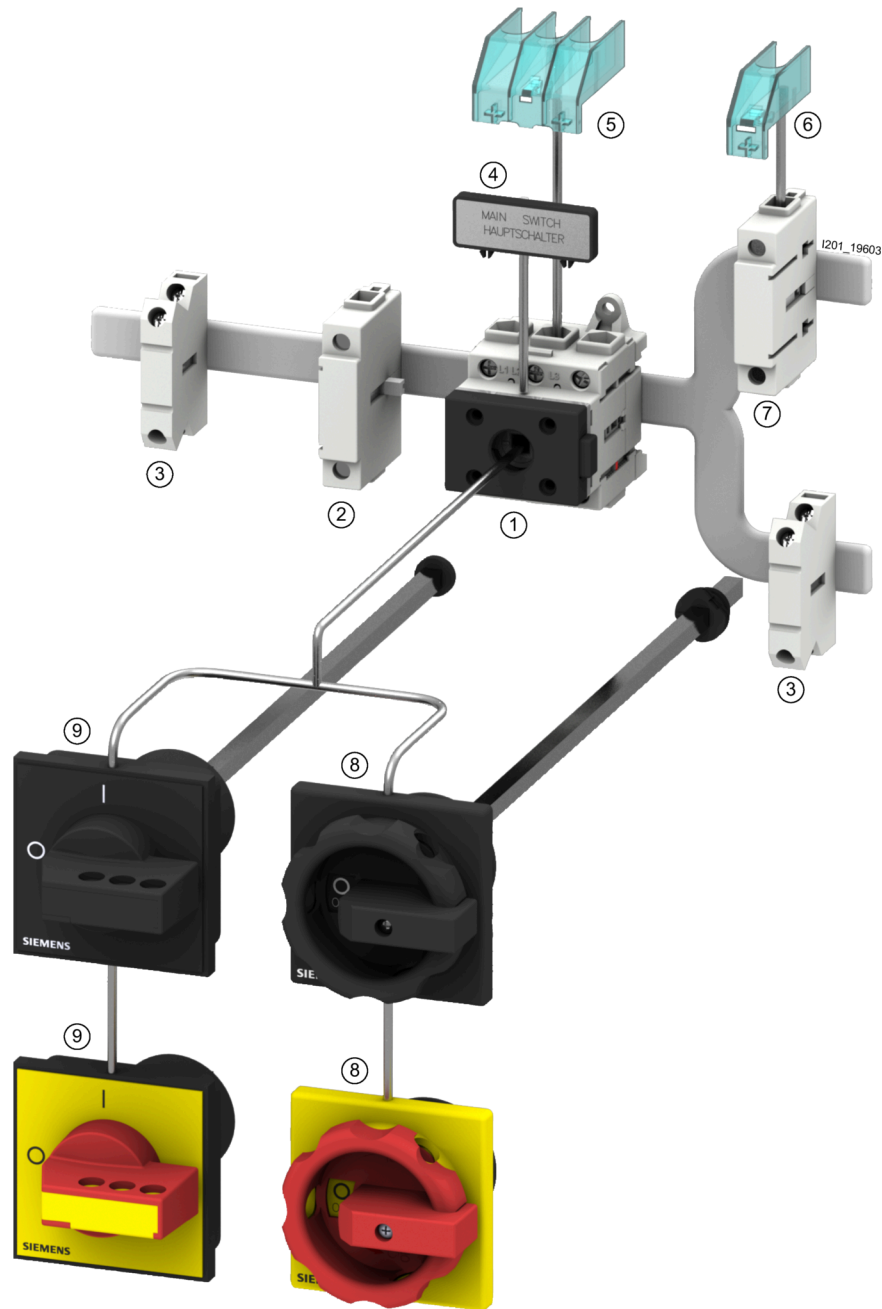


- ④ 3LD2144-0TK53 switch for floor mounting with rotary operating mechanism and door coupling
- ⑤ 3LD2418-0TK13 switch for floor mounting, 250 A, with rotary operating mechanism and door coupling
- ⑥ 3LD2217-1TL13 switch for floor mounting with rotary operating mechanism and defeatable door coupling



- ⑦ 3LD2530-0TK11 switch for distribution board mounting with knob
- ⑧ 3LD2264-0TB5 switch in molded-plastic enclosure
- ⑨ 3LD2265-8VQ51-0AF6 DC isolator

### 1.3.2 Overview of components



- |   |  |
|---|--|
| ① 3LD2 switch disconnector  | ⑥ Terminal cover, 1-pole   |
| ② 4th contact (N conductor)   | ⑦ N or PE terminal   |
| ③ Auxiliary switch 1 NO + 1 NC, for mounting onto the left and/or right | ⑧ Door-coupling rotary operating mechanism with rotary operating mechanism               |
| ④ Inscription label German/English                                      | ⑨ Door-coupling rotary operating mechanism with knob-operated mechanism, can be defeated |
| ⑤ Terminal cover, 3-pole  |  |

### 1.3.3 Technical specifications 3LD2

#### 1.3.3.1 Technical specifications 3LD2

##### General technical details

Standards		DIN VDE 0660, IEC 60947									
Circuit breaker		Type	3LD20	3LD21	3LD22	3LD25	3LD27	3LD28	3LD23	3LD24	
Rated insulation voltage $U_i$		V	690								
Rated operational voltage $U_e$		V AC	690								
Rated frequency		Hz	50 ... 60								
Rated impulse withstand voltage $U_{imp}$		kV	6	6	6	6	6	6	6	6	
Rated short-time withstand current (1 s current, rms value)		A	340	640	640	1260	2000	2000	4000	4000	
Short-circuit protection, max. back-up fuse (gL)		A	20	25	40	63	100	125	160	250	
Rated conditional short-circuit current with upstream fuses at 50/60 Hz, 690 V AC		kA	50	50	50	50	50	20	50	50	
Maximum permissible let-through $I^2t$ value		kA <sup>2</sup> s	2.5	4	9	21	64	104	185	557	
Permissible let-through current of the fuse		kA	3	3.5	4.5	6	10	10	15	15	
<b>Rated uninterrupted current <math>I_u</math></b>		A	16	25	32	63	100	125	160	250	
AC-21A load break switch	Rated operational current $I_e$	A	16	25	32	63	100	125	160	250	
AC-3 motor load switch, operational switching of individual motors	Rated operational power										
	At 220 ... 240 V	kW	3.0	4.0	5.5	11.0	18.5	22.0	35.0	55.0	
	At 380 ... 440 V	kW	5.5	7.5	9.5	18.5	30.0	37.0	50.0	110.0	
AC-23A main control switch	Rated operational power										
	Repair switch	At 220 ... 240 V	kW	4.0	5.0	6.0	11.0	18.5	22.0	45.0	75.0
	Frequent, but not operational switching of individual motors	At 380 ... 440 V	kW	7.5	9.5	11.5	22.0	37.0	45.0	75.0	132.0
AC-23A main control switch	Repair switch	At 660/690 V	kW	7.5	9.5	11.5	18.5	30.0	37.0	45.0	55.0
		Power loss per current path at $I_e$	W	0.5	1.1	1.8	4.5	7.5	12.0	36.0	36.0
Endurance Mechanical	Operating cycles		100 000								
Switching frequency		1/h	50								
Permissible ambient temperature		°C	-25 ... +55								
Isolating features	Up to max.	V	690								

Conductor cross-sections for main conductors <sup>1)</sup>

Standards		DIN VDE 0660, IEC 60947								
Circuit breaker		Type	3LD20	3LD21	3LD22	3LD25	3LD27	3LD28	3LD23	3LD24
Solid or stranded		mm <sup>2</sup>	1 ... 6	1.5 ... 16	1.5 ... 16	2.5 ... 35	4 ... 50	4 ... 50	16 ... 1 85	16 ... 1 85
Finely stranded with end sleeve (max.)		mm <sup>2</sup>	4	10	10	16	35	35	150	150
Conductor cross-sections	Copper cable	AWG	18 ... 1 0	14 ... 8	14 ... 8	14 ... 6	12 ... 1	12 ... 1	--	--
Torque for terminal		Nm	1.5 ... 2	2 ... 2. 5	2 ... 2. 5	2.5 ... 3	2.5 ... 3	2.5 ... 3	9.5 ... 10	9.5 ... 10
Touch protection according to EN 50274			Yes							

<sup>1)</sup> Depending on the cable infeed, only small cross-sections are possible with devices in molded-plastic enclosures.

## Auxiliary switches

Standards		DIN VDE 0660, IEC 60947								
Circuit breaker		Type	3LD20	3LD21	3LD22	3LD25	3LD27	3LD28	3LD23	3LD24
Rated insulation voltage U <sub>i</sub>		V	500							
Rated operational voltage U <sub>e</sub>		V AC	500							
Rated uninterrupted current I <sub>u</sub>		A	10							
Rated operational current I <sub>e</sub> , AC-15	At 120 V	A	6							
	At 220 ... 240 V	A	3							
	At 380 ... 415 V	A	1.8							
	At 500 V	A	1.4							
Short-circuit protection, auxiliary switch, max. back-up fuse (gL/gG)		A	10							

## Conductor cross-sections for auxiliary conductors

Standards		DIN VDE 0660, IEC 60947								
Circuit breaker		Type	3LD20	3LD21	3LD22	3LD25	3LD27	3LD28	3LD23	3LD24
Connection type			Screw terminals							
Solid or stranded		mm <sup>2</sup>	2 × (0.75 ... 2.5), 1 × 4							
Finely stranded with end sleeve		mm <sup>2</sup>	2 × (0.75 ... 1.5), 1 × 2.5							
Torque for terminal		Nm	0.8							

**1.3.3.2 3LD switches for UL/CSA as "Manual Motor Controllers"**

The 3LD switches for UL/CSA are approved in accordance with UL/CSA as "manual motor controllers", and they can be used as repair switches in the molded-plastic enclosure, for example. However, they do not have UL approval as main control switches.

Standards			UL / CSA							
Circuit breaker	Type		3LD20	3LD21	3LD22	3LD25	3LD27	3LD28	3LD23	3LD24
Rated operational voltage $U_e$	V AC		600	600	600	600	600	600	600	600
Rated uninterrupted current $I_u$	A		10	20	30	60	100	125	160	250
	Current rating		A 600	A 600	A 600	--	--	--	--	--
	Pilot duty		P 600	P 600	P 600	--	--	--	--	--
Conventional thermal current $I_{th}$	A		16	25	32	63	100	125	160	250
Maximum rated power (AC-3)	120 V 3 ~	HP	1	3	3	5	10	15	--	--
Alternating current motors 40 ... 60 Hz (HP = horse power)	240 V	HP	3	7.5	10 (7.5) <sup>1)</sup>	15	30	40	40	50
	480 V	HP	7.5	10	20 (15) <sup>1)</sup>	40	60	75	75	100
	600 V	HP	10	15	30 (20) <sup>1)</sup>	50	75	100	75	75
	120 V 1 ~	HP	0.5	2	2	3	--	--	--	--
	240 V	HP	1.5	3	3	10	--	--	--	--
Conductor cross-sections	Copper cable	AWG	18 ... 10	14 ... 8	14 ... 8	14 ... 6	12 ... 1	12 ... 1	1 ... MCM400	
Tightening torque		Nm	1.5 ... 2	2 ... 2.5	2 ... 2.5	2.5 ... 3	2.5 ... 3	2.5 ... 3	10	

<sup>1)</sup> Values in brackets apply to devices in molded-plastic enclosure.

## 1.4 3KD up to 1600 A

### 1.4.1 Product description

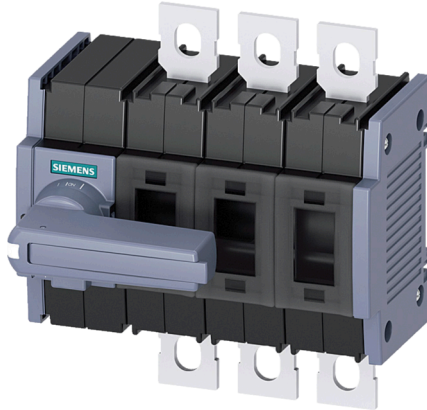


Figure 1-1 3KD switch disconnector, complete assembly, 3-pole

#### Features

- 3-pole, 4-pole, and 6-pole versions in 5 different sizes
- Supplied as a complete assembly including direct operating mechanism or as a basic unit without a handle
- Direct operating mechanism with handle on switch disconnector
- Door-coupling rotary operating mechanism for operation of switch disconnector outside the control cabinet door
- Versions with lateral operating mechanisms
- Connections in form of box terminal or flat terminal
- Floor mounting or mounting on a standard mounting rail (sizes 1 and 2)
- Additional poles can be retrofitted: 4. Contact element, N or N/PE terminals
- Auxiliary switches for querying the switch positions
- Suitable for AC applications up to 690 V + 10% (wind power)
- Suitable for DC applications up to 1200 V
- The 3KD offers high reliability thanks to the double break technology.

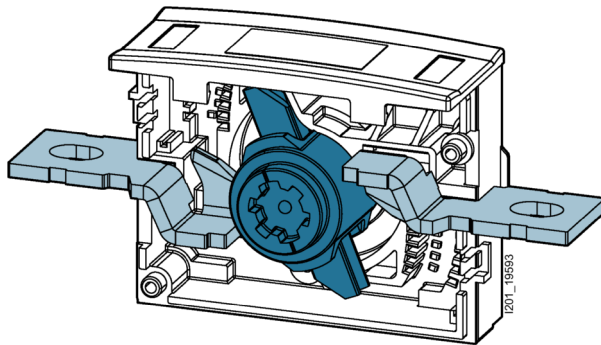


Figure 1-2 Double contact break principle

### 1.4.1.1 Benefits

- Enhanced touch protection
- Contact position is clearly visible
- Locking functions help to prevent unauthorized operation
- Enhanced protection against inter-phase arcing
- Safe use in wind farms
- Compact design saves space
- Wide variety of applications thanks to a range of different operating mechanism designs
- Supplementary functions can be retrofitted
- Various service positions are possible thanks to optimized heat dissipation
- Test function to ensure safe commissioning
- Comprehensive support through provision of CAx data

### 1.4.1.2 Application

3KD switch disconnectors are designed for applications with exacting requirements. They are deployed as main control switches, EMERGENCY OFF switches and repair switches in industrial plants, infrastructure and buildings. 3KD switch disconnectors are designed to switch the specified rated current on and off under load. At the same time, they provide a safety isolating function and isolating distance in all low-voltage circuits.

All 3KD switch disconnectors are climate-proof and meet the requirements of IEC 60947-1, IEC 60947-3 and VDE 0660-107.

### 1.4.1.3 Design

A 3KD switch disconnector consists of an operating mechanism module, three, four or six switching poles and a handle to operate the switch disconnector.



## Handles

The direct operating mechanism version of the handle is mounted directly on the switch disconnector. It can also be supplied in the form of a door-coupling rotary operating mechanism for actuation of the switch disconnector outside the control cabinet door. The handle is available in gray, or colored red/yellow for use as an EMERGENCY STOP switch. Commonly used switch disconnector variants comprising basic unit and handle are available as complete assemblies.

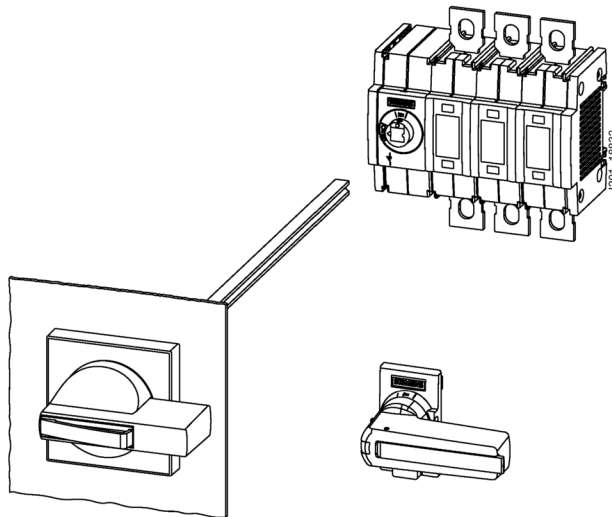


Figure 1-3 Handle either as direct operating mechanism or door-coupling rotary operating mechanism

## Position of operating mechanism modules

To allow optimum utilization of the available installation space, units with front operating mechanisms can be supplied with the operating mechanism module in various positions – mounted on the left-hand side of the 3KD switch disconnector or in the center between the switching poles.

On units with lateral operating mechanisms, the operating mechanism module is positioned on the right or left-hand side of the 3KD switch disconnector.

Number of poles/application	Front operating mechanism, side	Front operating mechanism, center	Lateral operating mechanism, left	Lateral operating mechanism, right
3-pole				
4-pole				
For 1200 V DC	--		--	--

### Additional poles

All sizes of the 3KD switch disconnectors can be retrofitted with additional poles on a modular basis. When installing additional poles, it is important to note that only a 3-pole 3KD switch disconnector may be retrofitted with an additional switching pole with contact system (4th contact element). Additional poles (4th contact element, N or N/PE terminal) must always be mounted directly adjacent to the switch disconnector on the left or right. Accordingly, an auxiliary switch module must not be mounted between the basic unit and an additional pole on sizes 1 and 2.

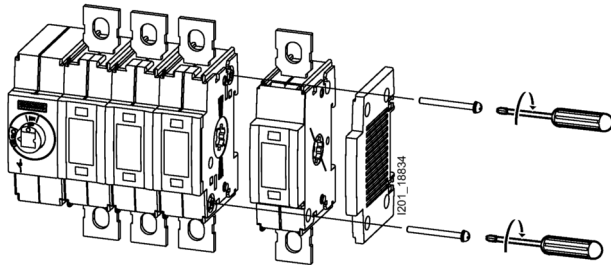


Figure 1-4 Installation of an additional pole

### Available versions

4th contact element:

The 4th contact element includes a contact system and is identical to the poles installed at the factory. It can be installed to upgrade a 3-pole switch disconnector to a disconnector with 4 poles.



Figure 1-5 4th contact element as an additional pole

N terminal (neutral conductor terminal):

The N terminal does not include a contact system. A jumper can be removed in order to interrupt the electrical connection between the two terminals. An N terminal can be installed to add a non-switching N pole to a 3-pole disconnector.

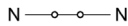


Figure 1-6 N terminal as non-switching pole

N/PE terminal:

The N/PE terminal is identical to the neutral conductor terminal. However, the electrical connection between the two terminals is permanent and cannot be interrupted by removal of a jumper. The N/PE terminal is normally deployed for applications in which it is vital to ensure that this connection can never be interrupted.



Figure 1-7 N/PE terminal with permanent connections

## Auxiliary switches

Auxiliary switches allow remote interrogation of the contact position of the switch disconnector.

### Installation of auxiliary switches for sizes 1 and 2

The auxiliary switches used for sizes 1 and 2 are microswitches (changeover contacts) which can be snapped into an auxiliary switch module. This auxiliary switch module is mounted on the side of the switch disconnector in the same way as an additional pole. A maximum of two microswitches can be installed in each auxiliary switch module.

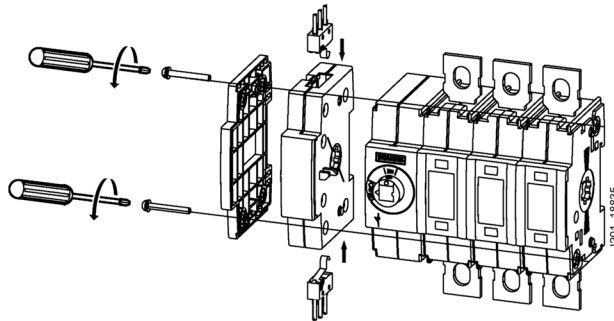


Figure 1-8 Auxiliary switches with auxiliary switch module for sizes 1 and 2

### Installation of auxiliary switches for sizes 3 to 5

With sizes 3 to 5, the auxiliary switches are directly attached to the operating mechanism module. The auxiliary switch with the leading switch function is always installed in the right-hand mounting location. The other locations are provided for simultaneously switching with the main contacts.

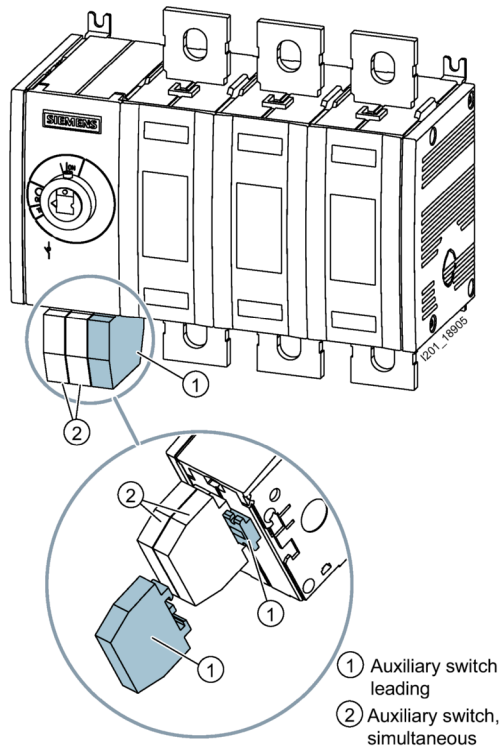
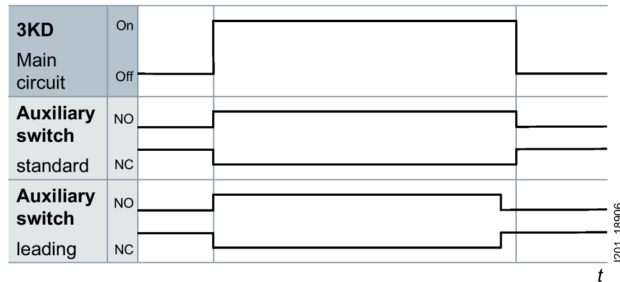


Figure 1-9 Auxiliary switches directly attached to the operating mechanism module with sizes 3 to 5. The leading auxiliary switch is highlighted in the drawing.

### Switching instants of auxiliary switches

The auxiliary switches can operate either simultaneously with the main contacts or function as leading switches with all sizes.

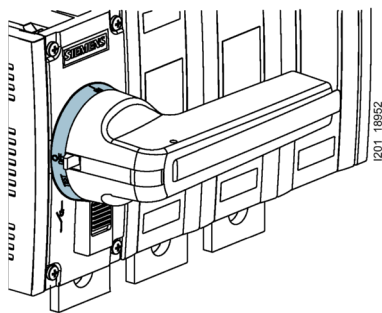


One of the possible functions of leading auxiliary switches is to disconnect the circuit with the assistance of a higher-level switching device, such as a circuit breaker, before the main contacts of the 3KD switch disconnector open. With sizes 1 and 2, the selection of the appropriate auxiliary switch module determines whether the switching instant will be leading or simultaneous. With sizes 3, 4 and 5, the switching instant is determined by the selection of the mounting location for the auxiliary switch on the operating mechanism module.

### Test function for auxiliary switches

The test function allows a wiring check to be performed on the auxiliary switches without necessitating closure of the main contacts of the 3KD switch disconnector. The test function can be used as part of the commissioning process.

The test function is activated by turning the handle of a direct operating mechanism in the OFF position by 25° in the counter-clockwise direction. The handle must be turned 90° in the clockwise direction in order to switch the main contacts.



The auxiliary switch module including test function must be used for sizes 1 and 2. With sizes 3, 4 and 5, all installed auxiliary switches are switched when the test function is activated.

### Types of mounting

All 3KD switch disconnectors are designed for floor mounting. To ensure that the switch can be flexibly adapted to the relevant installation conditions, the mounting bracket can be rotated through 90° with size 3 or larger.

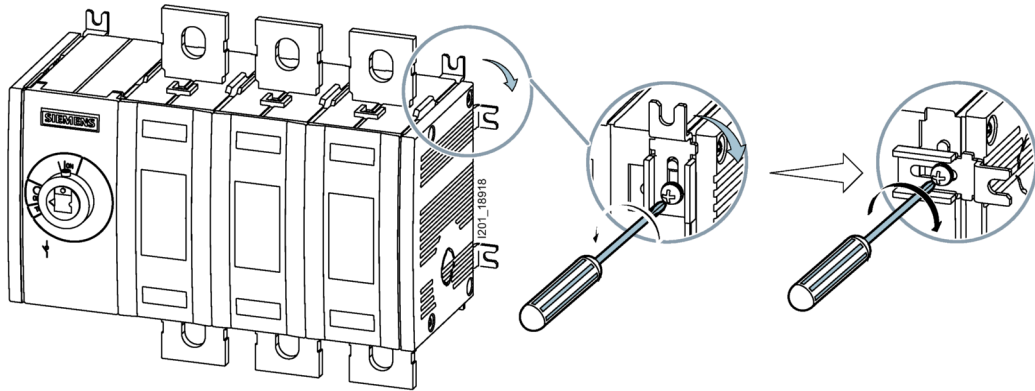


Figure 1-10 Floor mounting method

Sizes 1 and 2 can be snapped onto a standard mounting rail (TH35 according to EN 60715) as an alternative mounting method.

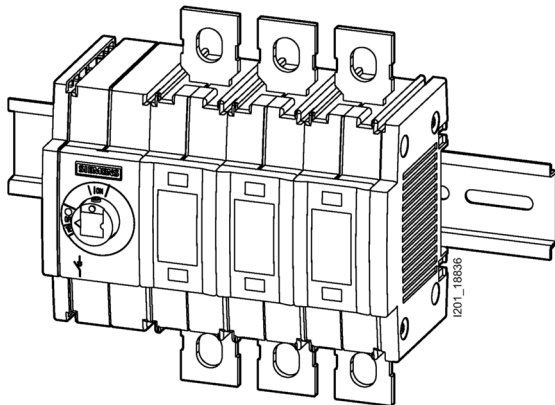


Figure 1-11 Mounting on a standard mounting rail

## Locking functions

3KD switch disconnectors can be locked by up to three padlocks in order to prevent unauthorized switch operation. A flat version of the direct operating mechanisms is available for use in confined installation spaces. This can be secured with a lock without increasing the required mounting depth.

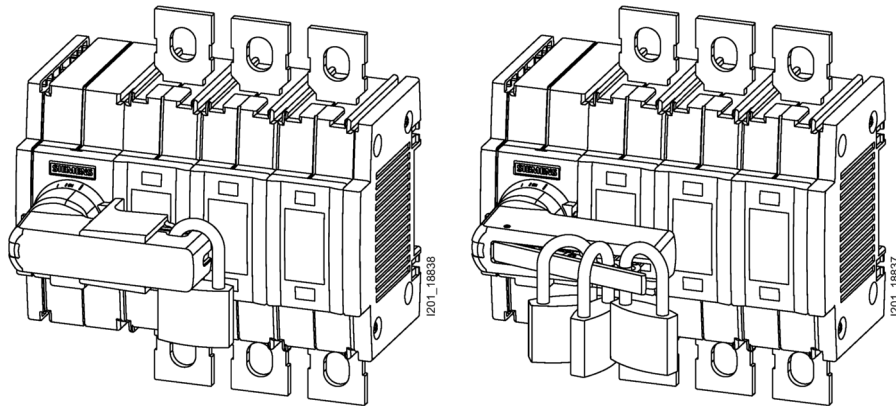


Figure 1-12 Locking functions involving one or more padlocks

### 1.4.1.4 Electrical connection

3KD switch disconnectors are available with a number of different terminal types.

### Box terminals

Box terminals for sizes 1 and 2 (rated currents 16 A to 160 A) are designed to allow the speedy connection of stripped conductors.

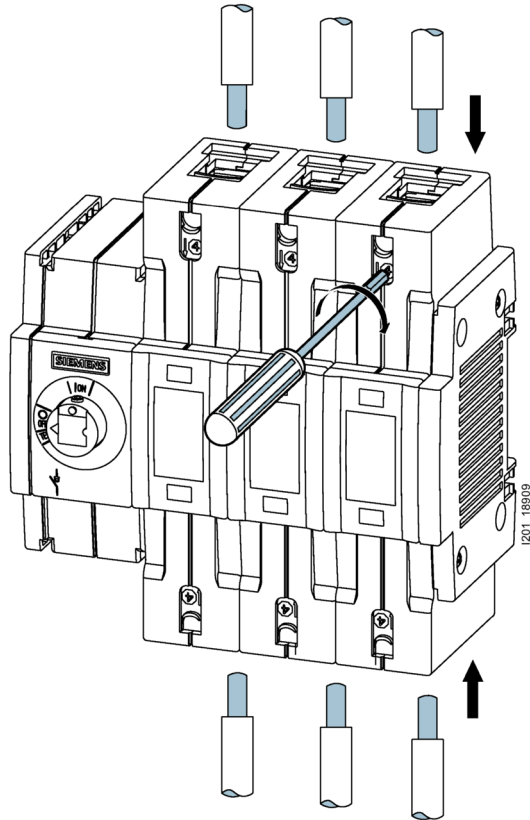


Figure 1-13 Connection via box terminals



## Flat terminals

Sizes 2 to 5 (rated currents 80 A to 1600 A) are available with flat terminals for the connection of cable lugs or busbar systems.

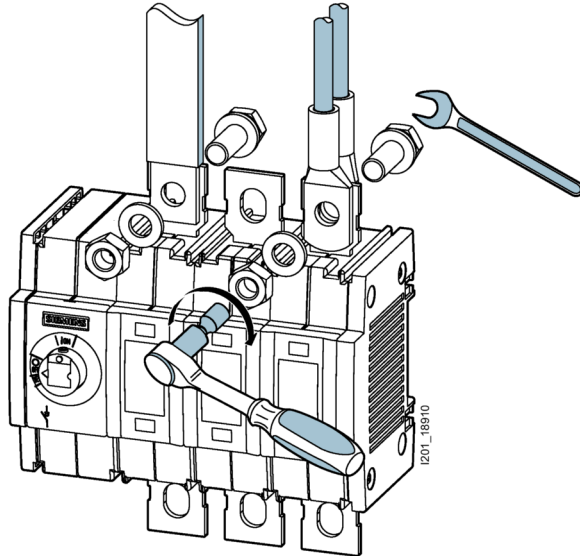


Figure 1-14 Connection via flat terminals

Terminal covers and phase barriers can be supplied for 3KD switch disconnectors with flat terminals.

## Terminal covers

Terminal covers can be installed to provide touch protection for all terminals.

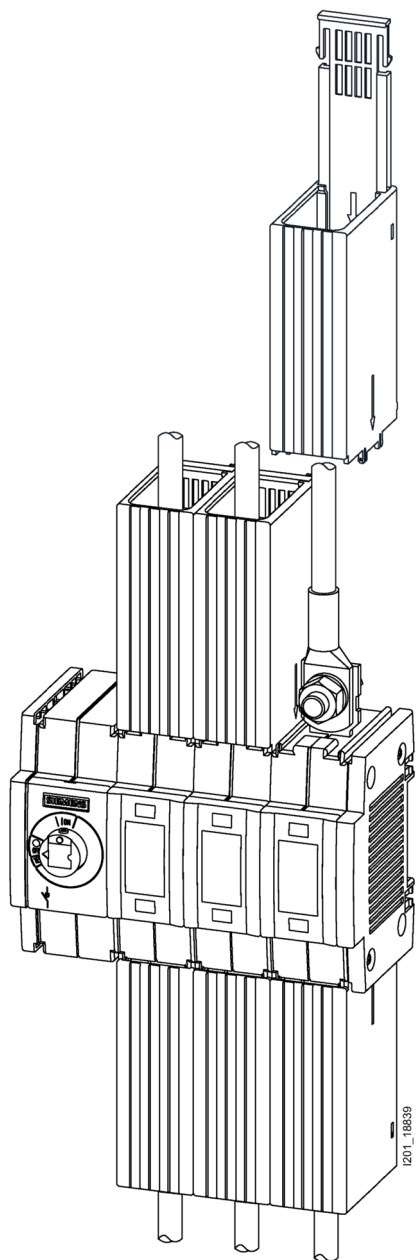


Figure 1-15 Terminal covers

## Phase barriers

When long, non-insulated cable lugs are used, phase barriers provide enhanced protection against arcing.

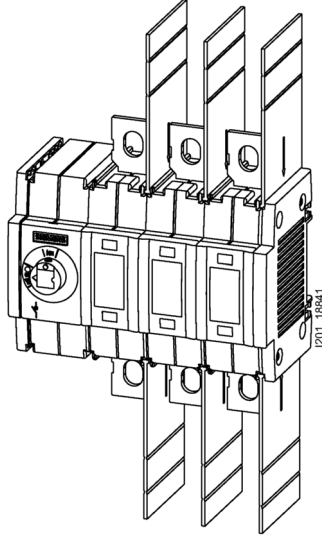




Figure 1-16 Phase barriers



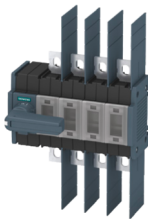
1.4.1.5 Technical features

3LD main control and EMERGENCY STOP switches									
3KD switch disconnectors: Box terminals									
3KD switch disconnectors: Flat terminals									
<b>Size</b>						1			
<b>Type</b>		3LD20	3LD21	3LD22	3LD25	3KD...-M			
		3LD main control and EMERGENCY STOP switches				3KD switch disconnectors			
<b>Rated current I<sub>n</sub></b>	A	16	25	32	63	16	32	63	
<b>Number of poles</b>									
<input type="checkbox"/> 3		✓	✓	✓	✓	✓	✓	✓	
<input type="checkbox"/> 4		✓	✓	✓	✓	✓	✓	✓	
<input type="checkbox"/> 6		✓	✓	✓	✓	✓	✓	✓	
<b>Connection</b>									
<input type="checkbox"/> Flat terminals		--	--	--	--	--	--	--	
<input type="checkbox"/> Box terminals		✓	✓	✓	✓	✓	✓	✓	
<b>Operating mechanisms</b>									
<input type="checkbox"/> Front operating mechanism		✓	✓	✓	✓	✓	✓	✓	
<input type="checkbox"/> Lateral operating mechanism		--	--	--	--	✓	✓	✓	
<b>Operating and short-circuit behavior</b>									
<input type="checkbox"/> Rated short-time withstand current I <sub>cw</sub> (1 s current, rms value)		kA	0.34	0.64	0.64	1.26	3	3	3
<input type="checkbox"/> Rated conditional short-circuit current with upstream fuses at 690 V <sup>1)</sup>		kA rms	50	50	50	50	100	100	100

1) Valid for the combination of 3KD switch disconnector and fuse type 3NA..., characteristic gG

✓ Available

-- Not available

3LD main control and EMERGENCY STOP switches									
3KD switch disconnectors: Box terminals									
3KD switch disconnectors: Flat terminals									
<b>Size</b>					2				
<b>Type</b>		3LD27	3LD28	3LD23	3KD...-N				
		3LD main control and EMERGENCY STOP switches			3KD switch disconnectors				
<b>Rated current I<sub>n</sub></b>	A	100	125	160	80	100	125	160	200
<b>Number of poles</b>									
<input type="checkbox"/> 3		✓	✓	✓	✓	✓	✓	✓	✓
<input type="checkbox"/> 4		✓	✓	✓	✓	✓	✓	✓	✓
<input type="checkbox"/> 6		✓	✓	✓	✓	✓	✓	✓	✓
<b>Connection</b>									
<input type="checkbox"/> Flat terminals		--	--	--	✓	✓	✓	✓	✓
<input type="checkbox"/> Box terminals		✓	✓	✓	✓	✓	✓	✓	--
<b>Operating mechanisms</b>									
<input type="checkbox"/> Front operating mechanism		✓	✓	✓	✓	✓	✓	✓	✓
<input type="checkbox"/> Lateral operating mechanism		--	--	--	✓	✓	✓	✓	✓

Fuseless switch disconnectors


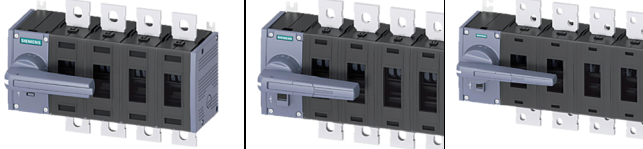
1.4 3KD up to 1600 A

Operating and short-circuit behavior									
<input type="checkbox"/> Rated short-time withstand current $I_{cw}$ (1 s current, rms value)	kA	2	2	4	4	4	4	4	4
<input type="checkbox"/> Rated conditional short-circuit current with upstream fuses at 690 V <sup>1)</sup>	kA rms	50	20	50	65	65	65	65	50

<sup>1)</sup> Valid for the combination of 3KD switch disconnector and fuse type 3NA..., characteristic gG

✓ Available

-- Not available

3LD main control and EMERGENCY STOP switches																	
3KD switch disconnectors: Box terminals																	
3KD switch disconnectors: Flat terminals																	
<b>Size</b>		<b>3</b>				<b>4</b>				<b>5</b>							
<b>Type</b>		<b>3LD24</b>				<b>3KD....-P</b>				<b>3KD....-Q</b>				<b>3KD....-R</b>			
		3LD main control and EMERGENCY STOP switches				3KD switch disconnectors											
<b>Rated current I<sub>n</sub></b>	A	250	200	250	315	400	500	630	800	1000	1250	1600					
<b>Number of poles</b>																	
<input type="checkbox"/> 3		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
<input type="checkbox"/> 4		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
<input type="checkbox"/> 6		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
<b>Connection</b>																	
<input type="checkbox"/> Flat terminals		--	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
<input type="checkbox"/> Box terminals		✓	--	✓	✓	✓	--	--	--	--	--	--	--				
<b>Operating mechanisms</b>																	
<input type="checkbox"/> Front operating mechanism		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
<input type="checkbox"/> Lateral operating mechanism		--	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
<b>Operating and short-circuit behavior</b>																	
<input type="checkbox"/> Rated short-time withstand current I <sub>cw</sub> (1 s current, rms value)		kA	4	13	13	13	13	30	30	30	50	50	50				
<input type="checkbox"/> Rated conditional short-circuit current with upstream fuses at 690 V <sup>1)</sup>		kA rms	50	65	65	35	35	65	65	50	--	--	--				

1) Valid for the combination of 3KD switch disconnector and fuse type 3NA..., characteristic gG

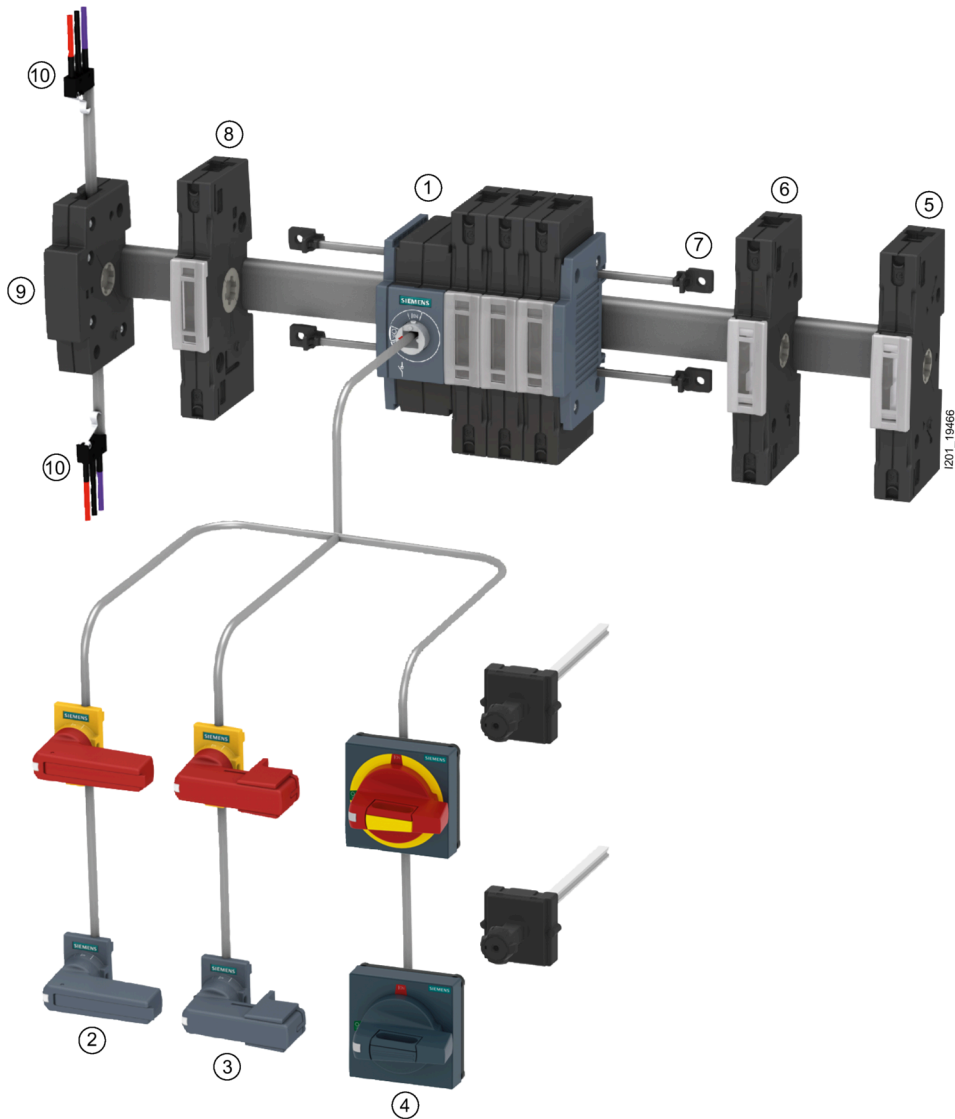
✓ Available

-- Not available

Further information on 3LD main control and EMERGENCY STOP switches is provided in Chapter Overview of 3LD main control and EMERGENCY STOP switches (Page 7).

## 1.4.2 Overview of components

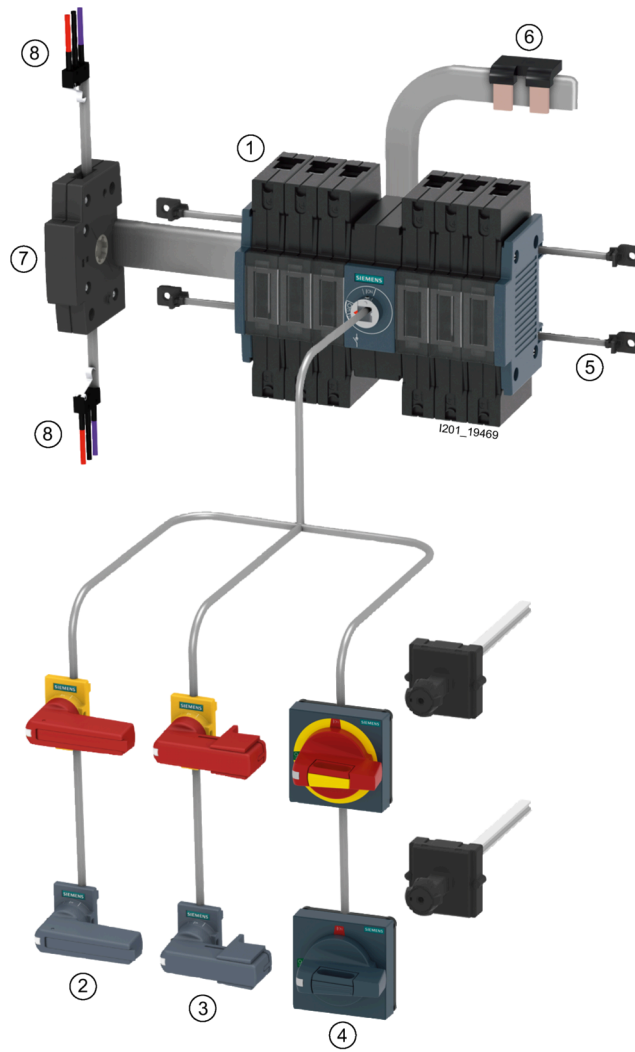
### 1.4.2.1 3/4-pole, sizes 1 and 2, box terminal



- |   |  |
|---|--|
| ① 3KD switch disconnectors                                      | ⑥ Neutral conductor terminal (with removable jumper) |
| ② Direct operating mechanism (standard version)                 | ⑦ Mounting bracket (spare part)                      |
| ③ Direct operating mechanism (suitable for distribution boards) | ⑧ 4th contact element                                |
| ④ 8UD1 door-coupling rotary operating mechanism                 | ⑨ Auxiliary switch module                            |
| ⑤ N/PE terminal (with permanent jumper)                         | ⑩ Auxiliary switch                                   |

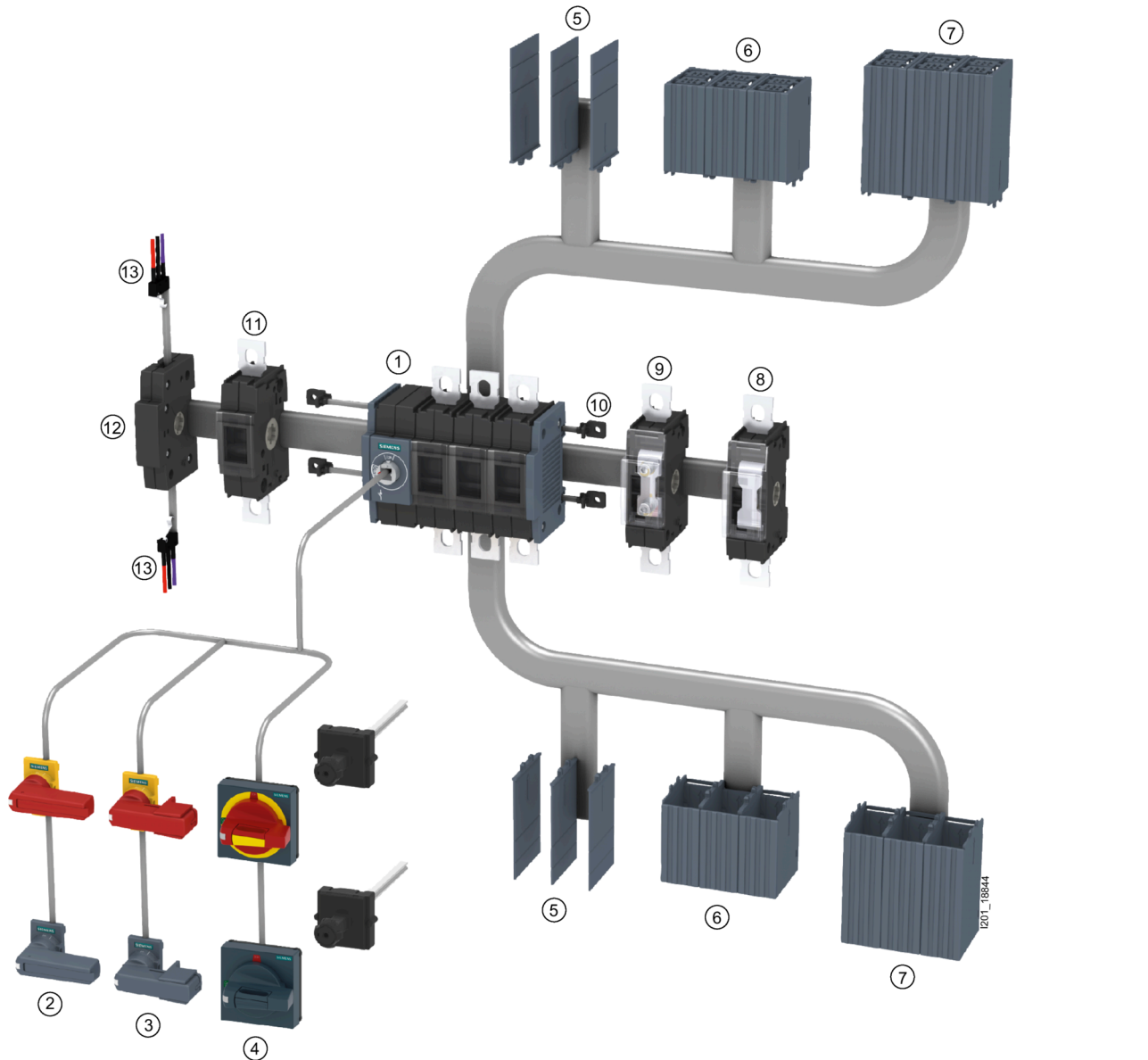


1.4.2.2 6-pole for DC applications, sizes 1 and 2



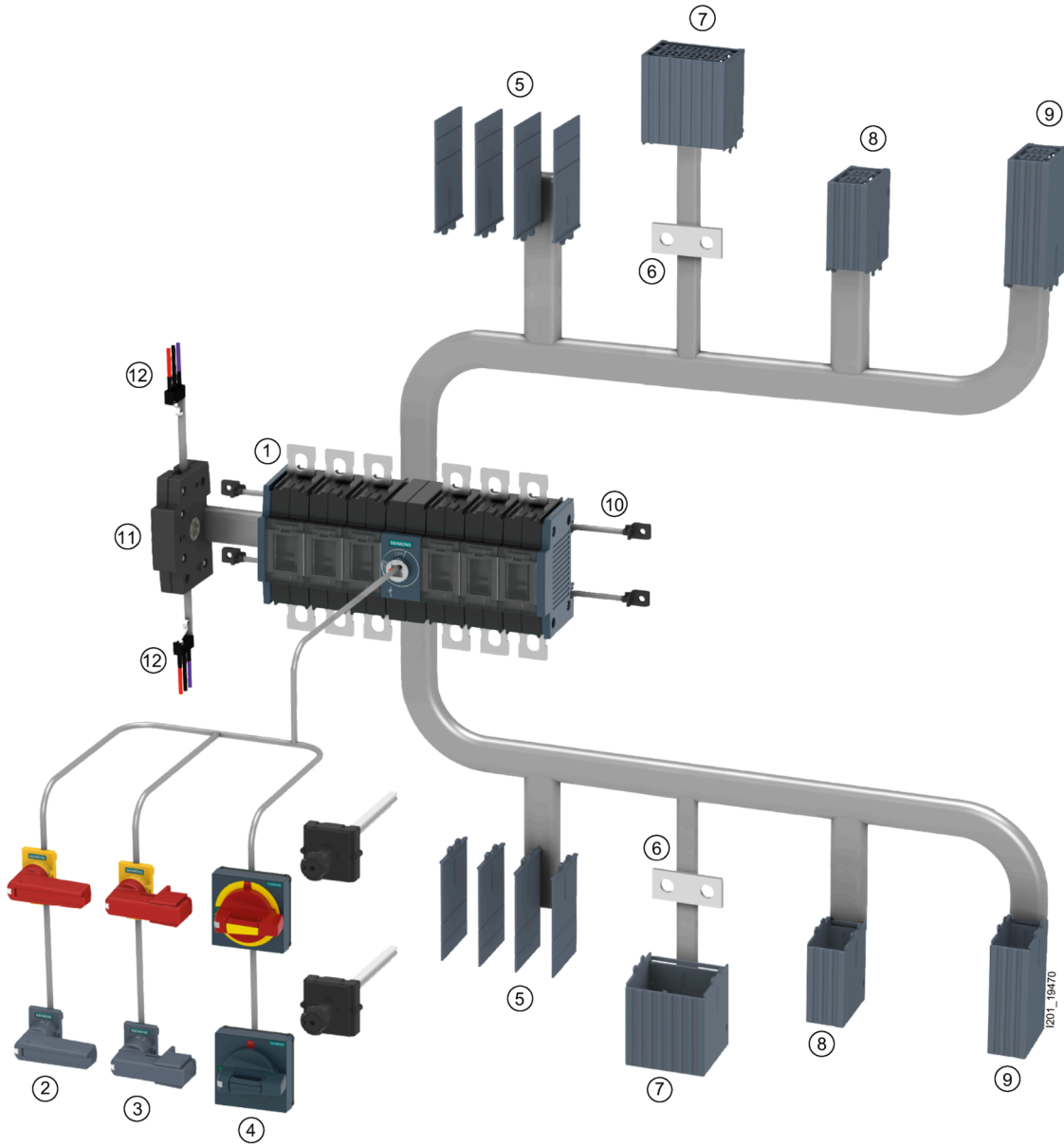
- |   |                                 |
|---|---------------------------------|
| ① 3KD switch disconnectors                                      | ⑤ Mounting bracket (spare part) |
| ② Direct operating mechanism (standard version)                 | ⑥ Bridging bar                  |
| ③ Direct operating mechanism (suitable for distribution boards) | ⑦ Auxiliary switch module       |
| ④ 8UD1 door-coupling rotary operating mechanism                 | ⑧ Auxiliary switch              |

1.4.2.3 3/4-pole, size 2, flat terminal



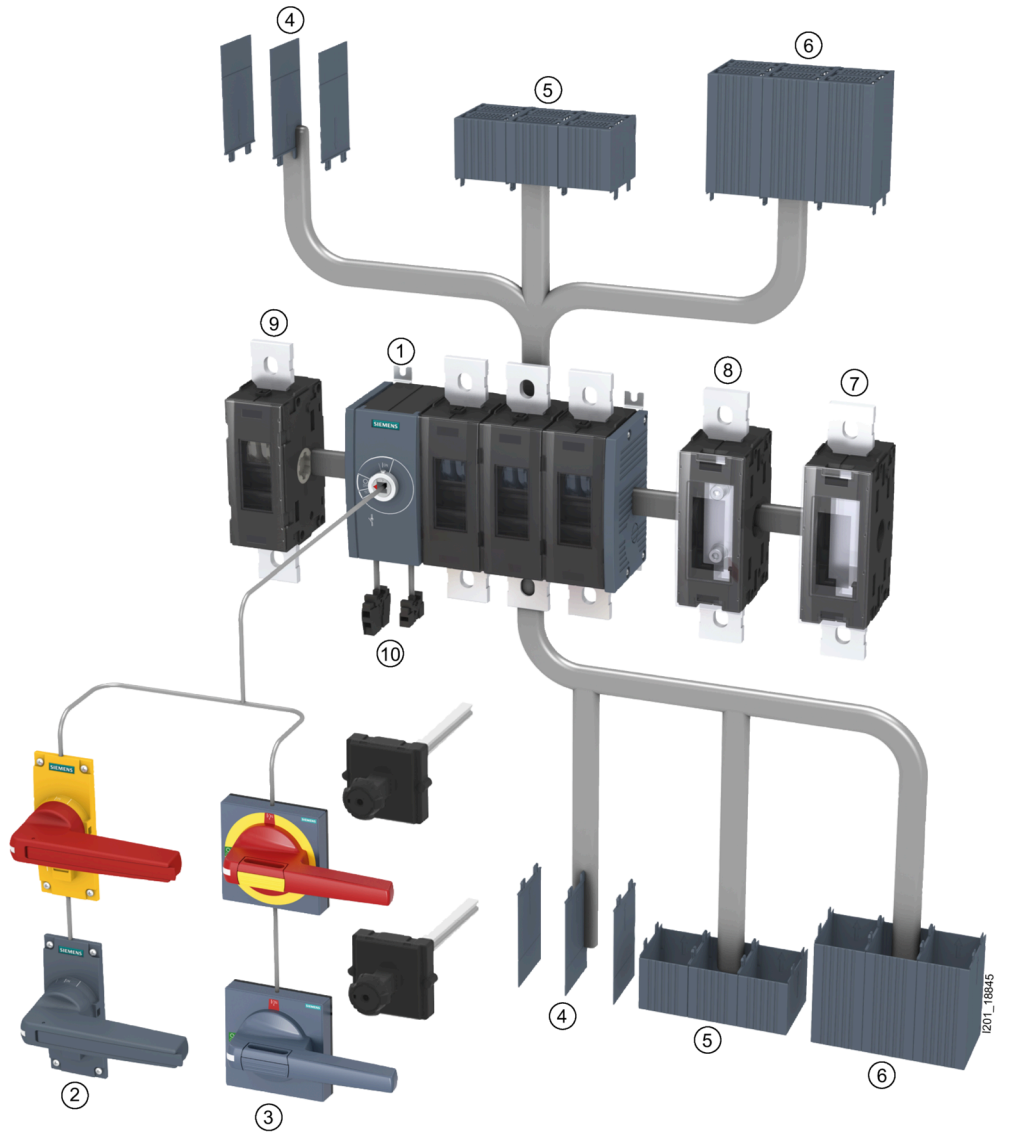
- |   |  |
|---|--|
| ① 3KD switch disconnectors                                      | ⑧ N/PE terminal (with permanent jumper)              |
| ② Direct operating mechanism (standard version)                 | ⑨ Neutral conductor terminal (with removable jumper) |
| ③ Direct operating mechanism (suitable for distribution boards) | ⑩ Mounting bracket (spare part)                      |
| ④ 8UD1 door-coupling rotary operating mechanism                 | ⑪ 4th contact element                                |
| ⑤ Phase barriers  | ⑫ Auxiliary switch module                            |
| ⑥ Cable connection cover, short                                 | ⑬ Auxiliary switch                                   |
| ⑦ Cable connection cover  |  |

1.4.2.4 6-pole, size 2, flat terminal



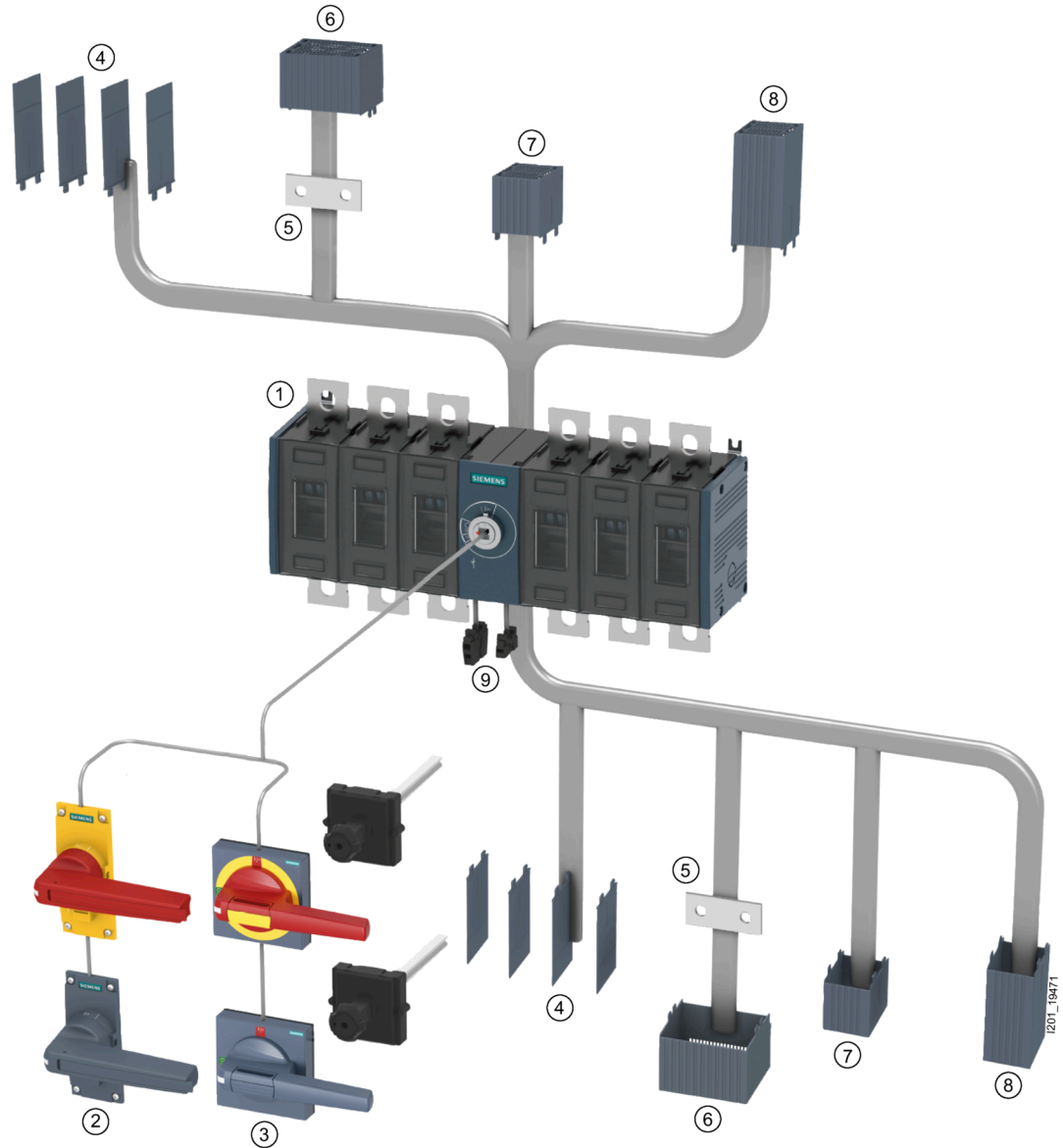
- |   |   |
|---|---|
| ① 3KD switch disconnectors                                      | ⑦ Cable connection cover for connecting bridges |
| ② Direct operating mechanism (standard version)                 | ⑧ Cable connection cover, short                 |
| ③ Direct operating mechanism (suitable for distribution boards) | ⑨ Cable connection cover                        |
| ④ 8UD1 door-coupling rotary operating mechanism                 | ⑩ Mounting bracket (spare part)                 |
| ⑤ Phase barriers  | ⑪ Auxiliary switch module                       |
| ⑥ Bridging bar  | ⑫ Auxiliary switch                              |

1.4.2.5 3/4-pole, sizes 3 to 5, flat terminal



- |   |  |
|---|--|
| ① 3KD switch disconnectors                      | ⑥ Cable connection cover                               |
| ② Direct operating mechanism                    | ⑦ N/PE terminal (with permanent jumper)                |
| ③ 8UD1 door-coupling rotary operating mechanism | ⑧ Neutral conductor terminal (with removable terminal) |
| ④ Phase barriers                                | ⑨ 4th contact element                                  |
| ⑤ Cable connection cover, short                 | ⑩ Auxiliary switch                                     |

1.4.2.6 6-pole for DC applications, sizes 3 to 5



- |   |   |
|---|---|
| ① 3KD switch disconnectors                      | ⑥ Cable connection cover for connecting bridges |
| ② Direct operating mechanism                    | ⑦ Cable connection cover, short                 |
| ③ 8UD1 door-coupling rotary operating mechanism | ⑧ Cable connection cover                        |
| ④ Phase barriers                                | ⑨ Auxiliary switch                              |
| ⑤ Bridging bar                                  |   |

### 1.4.3 Technical specifications 3KD

#### 1.4.3.1 3KD, 3/4-pole, sizes 1 and 2

#### General technical details

Standards		IEC 60947-1, IEC 60947-3							
Type		3KD16	3KD22	3KD26	3KD28	3KD30	3KD32	3KD34	3KD36 ..-N
Size		1	1	1	2	2	2	2	2
Rated uninterrupted current ( $I_U$ )	A	16	32	63	80	100	125	160	200
Conventional free-air thermal current $I_{th}^{1)}$	A	16	32	63	80	100	125	160	200
Rated operational voltage ( $U_e$ )									
<input type="checkbox"/> At 50/60 Hz AC (tolerance up to +10% permissible)	V	690							
<input type="checkbox"/> At DC – 2 conducting paths series-connected	V	220							
<input type="checkbox"/> At DC – 3 conducting paths series-connected	V	440							
Rated insulation voltage ( $U_i$ )	V	1000							
Rated impulse withstand voltage ( $U_{imp}$ )	kV	8							
Overvoltage category with pollution degree 3		III							

1) Configuring note: Max. permissible operating temperature at connections 125 °C

#### Operating and short-circuit behavior

Standards		IEC 60947-1, IEC 60947-3							
Type		3KD16	3KD22	3KD26	3KD28	3KD30	3KD32	3KD34	3KD36 ..-N
Rated operational current $I_e$									
<input type="checkbox"/> AC-21A, at AC-22A, at 400 ... 690 V	A	16	32	63	80	100	125	160	200
<input type="checkbox"/> AC-23A, at 400 V	A	16	32	63	80	100	125	160	160
<input type="checkbox"/> AC-23A, at 500 V	A	16	32	63	80	100	125	160	160
<input type="checkbox"/> AC-23A, at 690 V	A	16	32	63	80	100	125	125	125
<input type="checkbox"/> DC-21A, 220/440 V	A	16	32	63	80	100	125	160	160
<input type="checkbox"/> DC-22A, 220/440 V	A	16	32	63	80	100	125	160	160
<input type="checkbox"/> DC-23A, 220/440 V	A	16	32	63	80	100	125	160	160
Motor switching capacity AC-23A <sup>1)</sup>									
<input type="checkbox"/> At 400 V	kW	7.5	15	30	45	55	55	90	90

Standards		IEC 60947-1, IEC 60947-3							
Type		3KD16	3KD22	3KD26	3KD28	3KD30	3KD32	3KD34	3KD36 ..-N
<input type="checkbox"/> At 500 V	kW	7.5	18.5	37	55	55	75	110	110
<input type="checkbox"/> At 690 V	kW	11	30	55	75	90	110	110	110
Short-time withstand current $I_{cw}$ ( $t = 1$ s, rms value, 690 V AC/440 V DC)	kA	3	3	3	4	4	4	4	4
Short-circuit making capacity ( $I_{cm}$ )	kA	7	7	7	12	12	12	12	12
Rated current of upstream fuse <sup>2)3)</sup>	A	63	63	63	160	160	160	160	200
<b>Rated conditional short-circuit current with upstream fuses <sup>2)</sup></b>									
<input type="checkbox"/> At 400/500 V AC	kA	100	100	100	100	100	100	100	50
<input type="checkbox"/> At 690 V AC	kA	100	100	100	65	65	65	65	50
<b>Let-through current combined with upstream fuse <sup>2)</sup></b>									
<input type="checkbox"/> At 400/500 V AC	kA	7	7	7	17.9	17.9	17.9	17.9	18
<input type="checkbox"/> At 690 V AC	kA	7.5	7.5	7.5	18.7	18.7	18.7	18.7	19
<b>Let-through <math>I^2t</math> value combined with upstream fuse <sup>2)</sup></b>									
<input type="checkbox"/> At 400/500 V	kA <sup>2</sup> s	13.3	13.3	13.3	135.6	135.6	135.6	135.6	211
<input type="checkbox"/> At 690 V	kA <sup>2</sup> s	13.7	13.7	13.7	178.3	178.3	178.3	178.3	226
Power loss per pole with thermal current $I_{th}$	W	0.1	0.4	1	1.1	1.8	3.2	4.6	6.4
<b>Service life, operating cycles</b>									
Mechanical		15000	15000	15000	15000	15000	15000	15000	15000
Electrical, at AC-23 A, 690 V/50 ... 60 Hz		6000	6000	6000	1500	1500	1500	1500	1500
Electrical, at DC-23 A, 220/440 V		1500	1500	1500	1500	1500	1000	1000	1000

1) Values are provided as a guide only and may vary depending on the make of motor.

2) Valid for the combination of 3KD and fuse type 3NA38 for  $I_U=16...160$  A; 3NA31 for  $I_U = 200$  A, characteristic gG

3) Maximum rated current of the upstream fuse; a fuse with a lower rated current can also be used.

## Main conductor connection

Standards		IEC 60947-1, IEC 60947-3							
Type		3KD16	3KD22	3KD26	3KD28	3KD30	3KD32	3KD34	3KD36 ..-N
Conductor cross-section, max.	mm <sup>2</sup>	35	35	35	70 (95) <sup>1)</sup>	70 (95) <sup>1)</sup>	70 (95) <sup>1)</sup>	70 (95) <sup>1)</sup>	95
<b>Busbar systems, max. dimensions (number x width x thickness)</b>									
<input type="checkbox"/> Flat terminals	mm	--			1 x 20 x 3 <sup>2)</sup>				
<input type="checkbox"/> Box terminals	mm	1 x 9 x 2			1 x 14 x 3				
<b>Tightening torque</b>									
<input type="checkbox"/> Flat terminals	Nm	--			15 ... 22				

1.4 3KD up to 1600 A

<b>Standards</b>		IEC 60947-1, IEC 60947-3							
<b>Type</b>		3KD16	3KD22	3KD26	3KD28	3KD30	3KD32	3KD34	3KD36 ..-N
<input type="checkbox"/> Box terminals	Nm	5 ... 6.5			6.5 ... 8				

- 1) 95 mm<sup>2</sup> valid for versions with flat terminals
- 2) When using busbars that are 20 mm wide, these must be insulated

Other properties

<b>Standards</b>		IEC 60947-1, IEC 60947-3							
<b>Type</b>		3KD16	3KD22	3KD26	3KD28	3KD30	3KD32	3KD34	3KD36 ..-N
<b>Degree of protection</b>									
<input type="checkbox"/> With masking plate without cable connection cover		IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
<input type="checkbox"/> Without masking plate or terminal cover		IP20	IP20	IP20	IP00 <sup>1)</sup> / IP20				IP00
<b>Ambient conditions</b>									
<input type="checkbox"/> During operation		°C	-25 ... +70 (no derating of I <sub>th</sub> at -5 to +55 °C)						
<input type="checkbox"/> During storage		°C	-50 ... +80						
<input type="checkbox"/> Mounting position <sup>2)</sup>		Any							

- 1) Relevant only for devices with flat terminals
- 2) For mounting positions other than the vertical, please contact Technical Support.

1.4.3.2 3KD, 3/4-pole, sizes 3 to 5

General technical details

<b>Standards</b>		IEC 60947-1, IEC 60947-3										
<b>Type</b>		3KD 36..- .P	3KD 38	3KD 40	3KD 42	3KD 44	3KD 46	3KD 48	3KD 50	3KD 52	3KD 54	
Size		3	3	3	3	4	4	4	5	5	5	
Rated uninterrupted current (I <sub>u</sub> )		A	200	250	315	400	500	630	800	1000	1250	1600
Conventional free-air thermal current I <sub>th</sub> <sup>1)</sup>		A	200	250	315	400	500	630	800	1000	1250	1600
<b>Rated operational voltage (U<sub>e</sub>)</b>												
<input type="checkbox"/> At 50/60 Hz AC (tolerance up to +10% permissible)		V	690									
<input type="checkbox"/> At DC – 2 conducting paths series-connected		V	220									



Standards		IEC 60947-1, IEC 60947-3									
Type		3KD 36.- .P	3KD 38	3KD 40	3KD 42	3KD 44	3KD 46	3KD 48	3KD 50	3KD 52	3KD 54
<input type="checkbox"/> At DC – 3 conducting paths series-connected	V	440									
Rated insulation voltage (U <sub>i</sub> )	V	1000									
Rated impulse withstand voltage (U <sub>imp</sub> )	kV	12									
Overvoltage category with pollution degree 3		IV									

1) Configuring note: Max. permissible operating temperature at connections 125 °C

### Operating and short-circuit behavior

Standards		IEC 60947-1, IEC 60947-3									
Type		3KD 36.- .P	3KD 38	3KD 40	3KD 42	3KD 44	3KD 46	3KD 48	3KD 50	3KD 52	3KD 54
<b>Rated operating current I<sub>e</sub> 1)2)</b>											
<input type="checkbox"/> AC-21A, at AC-22A, at 400 ... 690 V	A	200	250	315	400	500	630	800	1000	1250	1600
<input type="checkbox"/> AC-23A, at 400 V	A	200	250	315	400	500	630	800	1000	1250	1600
<input type="checkbox"/> AC-23A, at 500 V	A	200	250	315	350	500	630	800	1000	1250	1600
<input type="checkbox"/> AC-23A, at 690 V	A	200	250	315	315	500	630	800	1000	1250	1600
<input type="checkbox"/> DC-21A, 220/440 V	A	200	250	315	400	500	630	800	1000	1250	1600
<input type="checkbox"/> DC-22A, 220/440 V	A	200	250	315	400	500	630	800	--	--	--
<input type="checkbox"/> DC-23A, 220/440 V	A	200	250	315	400	500	630	800	--	--	--
<b>Motor switching capacity AC-23A<sup>3)</sup></b>											
<input type="checkbox"/> At 400 V	kW	110	132	160	200	250	355	400	560	710	900
<input type="checkbox"/> At 500 V	kW	132	160	200	250	355	400	560	710	900	1000
<input type="checkbox"/> At 690 V	kW	185	220	315	315	500	630	800	1000	1000	1000
Short-time withstand current I <sub>cw</sub> (t = 1 s, rms value, 690 V AC/440 V DC)	kA	13	13	13	13	30	30	30	50	50	50
Short-circuit making capacity (I <sub>cm</sub> )	kA	26	26	26	26	63	63	63	105	105	105
Rated current of upstream fuse 4)5)	A	250	250	400	400	630	630	800	1000	1250	1600
<b>Rated conditional short-circuit current with upstream fuses<sup>4)</sup></b>											
<input type="checkbox"/> At 400/500 V AC	kA	100	100	65	65	100	100	100	100	80	80
<input type="checkbox"/> At 690 V AC	kA	65	65	35	35	65	65	50	--	--	--
<b>Let-through current combined with upstream fuse 4)</b>											
<input type="checkbox"/> At 400/500 V AC	kA	25.1	25.1	35.2	35.2	61.6	61.6	63.7	95.9	103. 4	110

Standards		IEC 60947-1, IEC 60947-3									
Type		3KD 36..- .P	3KD 38	3KD 40	3KD 42	3KD 44	3KD 46	3KD 48	3KD 50	3KD 52	3KD 54
<input type="checkbox"/> At 690 V AC	kA	22.7	22.7	27.9 6	27.9 6	54.5	54.5	70.4	--	--	--
<b>Let-through I<sup>2</sup>t combined with upstream fuse <sup>4)</sup></b>											
<input type="checkbox"/> At 400/500 V	kA <sup>2</sup> s	427	427	1165	1165	3687	3687	7471	1540 0	2596 0	3090 0
<input type="checkbox"/> At 690 V	kA <sup>2</sup> s	348	348	1157	1157	4450	4450	1030 0	--	--	--
Power loss per pole with thermal current I <sub>th</sub>	W	4	6	10	14	12	17	25	20	32	57
<b>Service life, operating cycles</b>											
Mechanical		1000 0	1000 0	1000 0	1000 0	8000	8000	8000	6000	6000	6000
Electrical, at AC-23 A, 690 V/50 ... 60 Hz		1000	1000	1000	1000	1000	1000	500	500	500	500
Electrical, at DC-23 A, 220/440 V		1000	1000	1000	1000	1000	1000	500	500	500	500

- 1) For size 3, phase barriers or contact connection covers (accessories) are required for busbar systems (AC-21A, AC-22A, and U<sub>e</sub>>400 V, AC-23A) and when connecting cable lugs.
- 2) With size 4 at AC-23A, terminal covers must be installed (accessories).
- 3) Values are provided as a guide only and may vary depending on the make of motor.
- 4) Valid for the combination of 3KD and fuse type 3NA..., characteristic gG
- 5) Maximum rated current of the upstream fuse; a fuse with a lower rated current can also be used.

### Main conductor connection

Standards		IEC 60947-1, IEC 60947-3										
Type		3KD 36..- .P	3KD 38	3KD 40	3KD 42	3KD 44	3KD 46	3KD 48	3KD 50	3KD 52	3KD 54	
Conductor cross-section, max.	mm <sup>2</sup>	240				2 x 240			2 x 240			
<b>Busbar systems, max. dimensions (number x width x thickness)</b>												
<input type="checkbox"/> Flat terminals	mm	1 x 30 x 10				2 x 40 x 5			2 x 60 x 10			
<input type="checkbox"/> Box terminals	mm	1 x 30 x 10				2 x 40 x 5			2 x 60 x 10			
<b>Tightening torque</b>												
<input type="checkbox"/> Flat terminals	Nm	30 ... 44				50 ... 75			50 ... 75			
<input type="checkbox"/> Box terminals	Nm	--				--			--			

## Other properties

Standards		IEC 60947-1, IEC 60947-3									
Type		3KD 36..- .P	3KD 38	3KD 40	3KD 42	3KD 44	3KD 46	3KD 48	3KD 50	3KD 52	3KD 54
<b>Degree of protection</b>											
<input type="checkbox"/> With masking plate without cable connection cover		IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
<input type="checkbox"/> Without masking plate or terminal cover		IP00	IP00	IP00	IP00	IP00	IP00	IP00	IP00	IP00	IP00
<b>Ambient conditions</b>											
<input type="checkbox"/> During operation	°C	-25 ... +70 (no derating of $I_{th}$ at -5 to +55 °C)									
<input type="checkbox"/> During storage	°C	-50 ... +80									
<input type="checkbox"/> Mounting position <sup>1)</sup>		Any									

1) With mounting positions other than the vertical, please contact Technical Support.

## 1.4.3.3 3KD, 6-pole for DC applications up to 1200 V, sizes 1 and 2

## General technical details

Standards		IEC 60947-1, IEC 60947-3						
Type		3KD16	3KD22	3KD26	3KD28	3KD30	3KD32	3KD34
Size		1	1	1	2	2	2	2
Rated uninterrupted current ( $I_U$ )	A	16	32	63	80	100	125	160
Conventional free-air thermal current $I_{th}$ <sup>1)</sup>	A	16	32	63	80	100	125	160
<b>Rated operational voltage (<math>U_e</math>)</b>								
<input type="checkbox"/> At DC – with pollution degree 2	V	1200	1200	1200	1200	1200	1200	1200
<input type="checkbox"/> At DC – with pollution degree 3	V	1000	1000	1000	1000 <sup>2)</sup>	1000 <sup>2)</sup>	1000 <sup>2)</sup>	1000 <sup>2)</sup>
<b>Rated insulation voltage (<math>U_i</math>)</b>								
<input type="checkbox"/> At DC – with pollution degree 2	V	1250	1250	1250	1250	1250	1250	1250
<input type="checkbox"/> At DC – with pollution degree 3	V	1000	1000	1000	1000 <sup>3)</sup>	1000 <sup>3)</sup>	1000 <sup>3)</sup>	1000 <sup>3)</sup>
Rated impulse withstand voltage ( $U_{imp}$ )	kV	8	8	8	8	8	8	8
Overvoltage category		III						

1) Configuring note: Max. permissible operating temperature at connections 110 °C

2) Valid for version with box terminal, version with flat terminal max. 1200 V

3) Valid for version with box terminal, version with flat terminal max. 1250 V

### Operating and short-circuit behavior

Standards		IEC 60947-1, IEC 60947-3						
Type		3KD16	3KD22	3KD26	3KD28	3KD30	3KD32	3KD34
<b>Rated operational current I<sub>e</sub></b>								
<input type="checkbox"/> DC-21A, 1200 V	A	16	32	63	80	100	125	160
<input type="checkbox"/> DC-21B, 1200 V	A	16	32	63	80	100	125	160
Short-time withstand current I <sub>cw</sub> (t=1s, rms value, 1200 V DC)	kA	3	3	3	4	4	4	4
Short-circuit making capacity (I <sub>cm</sub> )	kA	4.3	4.3	4.3	5.7	5.7	5.7	5.7
Power loss per pole with thermal current I <sub>th</sub>	W	0.1	0.4	1	1.1	1.8	3.2	4.6
<b>Service life, operating cycles</b>								
<input type="checkbox"/> Mechanical		15000	15000	15000	15000	15000	15000	15000
<input type="checkbox"/> Electrical, at DC-21, 1200 V		1500	1500	1500	1500	1500	1500	1500

### Main conductor connection

Standards		IEC 60947-1, IEC 60947-3						
Type		3KD16	3KD22	3KD26	3KD28	3KD30	3KD32	3KD34
Conductor cross-section, max.	mm <sup>2</sup>	35	35	35	70	70	70	70
<b>Busbar systems, max. dimensions (number x width x thickness)</b>								
<input type="checkbox"/> Flat terminals	mm	--			1 x 20 x 3 <sup>1)</sup>			
<input type="checkbox"/> Box terminals	mm	1 x 9 x 2			1 x 14 x 3			
<b>Tightening torque</b>								
<input type="checkbox"/> Flat terminals	Nm	--			15 ... 22			
<input type="checkbox"/> Box terminals	Nm	5 ... 6.5			6.5 ... 8			

1) When using busbars that are 20 mm wide, these must be insulated.

## Other properties

Standards		IEC 60947-1, IEC 60947-3						
Type		3KD16	3KD22	3KD26	3KD28	3KD30	3KD32	3KD34
<b>Degree of protection</b>								
<input type="checkbox"/> With masking plate without cable connection cover		IP20	IP20	IP20	IP20	IP20	IP20	IP20
<input type="checkbox"/> Without masking plate or terminal cover		IP20	IP20	IP20	IP00 <sup>2)</sup> / IP20			
<b>Ambient conditions</b>								
<input type="checkbox"/> During operation	°C	-25 ... +70 (no derating of $I_{th}$ at -5 to +40 °C)						
<input type="checkbox"/> During storage	°C	-50 ... +80						
<input type="checkbox"/> Mounting position <sup>1)</sup>		Any						

1) With mounting positions other than the vertical, please contact Technical Support.

2) Relevant only for devices with flat terminals

## 1.4.3.4 3KD, 6-pole for DC applications up to 1200 V, sizes 3 to 5

## General technical details

Standards		IEC 60947-1, IEC 60947-3									
Type		3KD 36	3KD 38	3KD 40	3KD 42	3KD 44	3KD 46	3KD 48	3KD 50	3KD 52	3KD 54
Size		3	3	3	3	4	4	4	5	5	5
Rated uninterrupted current ( $I_U$ )	A	200	250	315	400	500	630	800	1000	1250	1600
Conventional free-air thermal current $I_{th}$ <sup>1)</sup>	A	200	250	315	400	500	630	800	1000	1250	1600
<b>Rated operational voltage (<math>U_e</math>)</b>											
<input type="checkbox"/> At DC – pollution degree 2	V	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
<input type="checkbox"/> At DC – pollution degree 3	V	1200	1200	1200	1200	1000	1000	1000	1200	1200	1200
<b>Rated insulation voltage (<math>U_i</math>)</b>											
<input type="checkbox"/> At DC – pollution degree 2	V	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
<input type="checkbox"/> At DC – pollution degree 3	V	1250	1250	1250	1250	1000	1000	1000	1250	1250	1250
Rated impulse withstand voltage ( $U_{imp}$ )	kV	12									
Overvoltage category		IV									

1) Configuring note: Max. permissible operating temperature at connections 110 °C

**Operating and short-circuit behavior**

Standards		IEC 60947-1, IEC 60947-3									
Type		3KD 36	3KD 38	3KD 40	3KD 42	3KD 44	3KD 46	3KD 48	3KD 50	3KD 52	3KD 54
<b>Rated operational current <math>I_e</math> <sup>1)</sup></b>											
<input type="checkbox"/> DC-21A, 1200 V	A	--	--	--	--	--	--	--	--	--	--
<input type="checkbox"/> DC-21B, 1200 V	A	200	250	315	400	500	630	800	1000	1250	1600
Short-time withstand current $I_{cw}$ ( $t=1s$ , rms value, 1200 V DC)	kA	10	10	10	10	20	20	20	20	20	20
Short-circuit making capacity ( $I_{cm}$ )	kA	14.2	14.2	14.2	14.2	28.4	28.4	28.4	28.4	28.4	28.4
Power loss per pole with thermal current $I_{th}$	W	4	6	10	14	12	17	25	20	32	57
<b>Service life, operating cycles</b>											
Mechanical		1000 0	1000 0	1000 0	1000 0	8000	8000	8000	6000	6000	6000
Electrical, at DC-21A, 1200 V		200	200	200	200	100	100	100	100	100	100

1) For sizes 3 and 4, phase barriers or contact connection covers (accessories) are required when connecting cable lugs.

**Main conductor connection**

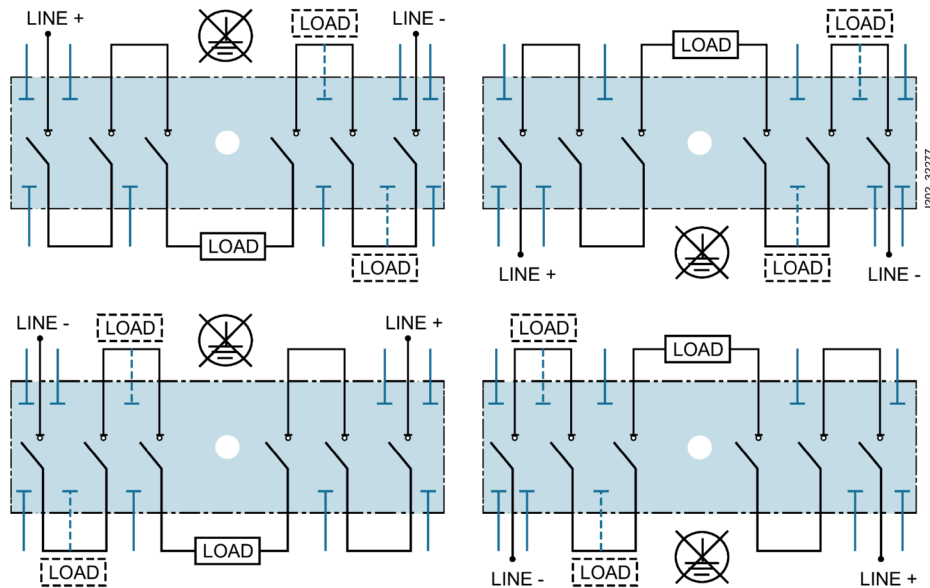
Standards		IEC 60947-1, IEC 60947-3										
Type		3KD 36	3KD 38	3KD 40	3KD 42	3KD 44	3KD 46	3KD 48	3KD 50	3KD 52	3KD 54	
Conductor cross-section, max.	mm <sup>2</sup>	240				2 x 240			2 x 240			
<b>Busbar systems, max. dimensions (number x width x thickness)</b>												
<input type="checkbox"/> Flat terminals	mm	1 x 30 x 10				2 x 40 x 5			2 x 60 x 10			
<input type="checkbox"/> Box terminals	mm	--				--			--			
<b>Tightening torque</b>												
<input type="checkbox"/> Flat terminals	Nm	30 ... 44				50 ... 75			50 ... 75			
<input type="checkbox"/> Box terminals	Nm	--				--			--			

Other properties

Standards		IEC 60947-1, IEC 60947-3									
Type		3KD 36	3KD 38	3KD 40	3KD 42	3KD 44	3KD 46	3KD 48	3KD 50	3KD 52	3KD 54
<b>Degree of protection</b>											
<input type="checkbox"/> With masking plate without cable connection cover		IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
<input type="checkbox"/> Without masking plate or terminal cover		IP00	IP00	IP00	IP00	IP00	IP00	IP00	IP00	IP00	IP00
<b>Ambient conditions</b>											
<input type="checkbox"/> During operation	°C	-25 ... +70 (no derating of $I_{th}$ at -5 to +40 °C)									
<input type="checkbox"/> During storage	°C	-50 ... +80									
<input type="checkbox"/> Mounting position		Any									

1.4.4 Circuit diagrams

3KD switch disconnectors, 6-pole for DC applications up to 1200 V, all sizes



Typical circuit diagrams for 3KD 6-pole for DC applications up to 1200 V, all sizes in which 3 of the 6 poles in each case are to be connected in series using the connecting bridges.

## 1.5 5TE1 up to 200 A

### 1.5.1 Product description

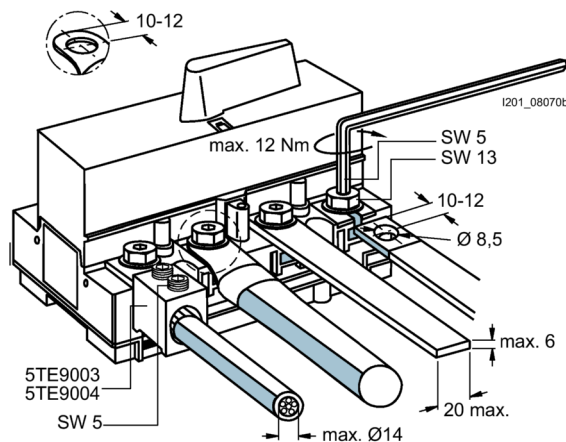
The 5TE1 switch disconnectors are available from 100 A to 200 A in 3 and 4-pole versions and can be used as main control switches, repair switches, outgoing feeder switches and emergency mains switching off device. The series corresponds to the requirements of IEC/EN 60947-3 and its key features are its compact and robust design, high short-circuit strength, high DC breaking capacity and comprehensive accessories. Its small footprint means it is easy to install in all types of enclosures, distribution boards and control cabinets. The devices are approved to UL 508 and KEMA certified.

#### 1.5.1.1 Benefits

- Transparent enclosures ensure that the contact position is always visible
- Contacts with double breaks ensure reliable insulation characteristics
- Can be locked in the OFF position to allow for maintenance work
- With red knob and yellow cap, can be used as emergency mains switching off device

#### 1.5.1.2 Design

Connection of 5TE1.3 and 5TE1.4 switches, 160 A and 200 A



- From 160 A: Supplied with one terminal cover
- 160 A and 200 A: Version for connection with cable lug
- Screw fixing on base plate
- Installation on standard mounting rail to EN 60715, which is raised at least 5 mm from the base plate.



## 1.5.2 Technical specifications 5TE1

### General technical details

<b>Standards</b>		IEC/EN 60947-3, UL 508 (for the following types: 5TE1320, 5TE1330, 5TE1340, 5TE1420, 5TE1430, 5TE1440) UL File No. E302554			
<b>Type</b>		<b>5TE1.1</b>	<b>5TE1.2</b>	<b>5TE1.3</b>	<b>5TE1.4</b>
Thermal rated current $I_{th}$ , at 40, 50, 60 °C	A	100	125	160	200
Rated operational voltage ( $U_e$ )	V AC	According to UL: 480, acc. to IEC: 690			
Rated insulation voltage ( $U_i$ )	V AC	690			
Rated impulse withstand voltage ( $U_{imp}$ ) – 2000 m	kV	8			
Impulse test voltage – at sea level	kV	12.3			
Frequency	Hz	50/60			

### Operating and short-circuit behavior

<b>Standards</b>		IEC/EN 60947-3, UL 508 (for the following types: 5TE1320, 5TE1330, 5TE1340, 5TE1420, 5TE1430, 5TE1440) UL File No. E302554			
<b>Type</b>		<b>5TE1.1</b>	<b>5TE1.2</b>	<b>5TE1.3</b>	<b>5TE1.4</b>
<b>Rated operational current <math>I_e</math> (per current path)</b>					
<input type="checkbox"/> AC-21A, at 400 V / 415 V / 500 V / 690 V	A	100	125	160	200
<input type="checkbox"/> AC-22A, at 400 V / 415 V	A	100	125	160	200
<input type="checkbox"/> AC-22A, at 500 V	A	100	100	160	200
<input type="checkbox"/> AC-22A, at 690 V	A	63	63	160	200
<input type="checkbox"/> AC-23A, at 400 V / 415 V	A	80	80	125	160
<input type="checkbox"/> AC-23A, at 500 V	A	50	50	125	125
<input type="checkbox"/> AC-23A, at 690 V	A	40	40	63	80
<input type="checkbox"/> DC-23A, at 110 V – 2 poles in series	A	100	100	160	160
<input type="checkbox"/> DC-23A, at 220 V – 2 poles in series	A	--	--	100	100
<input type="checkbox"/> DC-23A, at 220 V – 4 poles in series	A	100	100	160	160
<b>Max. rated operational power</b>					
<input type="checkbox"/> AC-23A, at 400 V	kW	44	44	69	88
<input type="checkbox"/> AC-23A, at 415 V	kW	46	46	72	92
<input type="checkbox"/> AC-23A, at 500 V	kW	35	35	86	86
<input type="checkbox"/> AC-23A, at 690 V	kW	36	36	60	76
Rated making capacity AC-23A, at 415 V	A	1875	1875	3200	4000

<b>Standards</b>		IEC/EN 60947-3, UL 508 (for the following types: 5TE1320, 5TE1330, 5TE1340, 5TE1420, 5TE1430, 5TE1440) UL File No. E302554			
<b>Type</b>		<b>5TE1.1</b>	<b>5TE1.2</b>	<b>5TE1.3</b>	<b>5TE1.4</b>
Rated breaking capacity AC-23A, at 415 V	A	1000	1000	1920	2400
<b>Rated conditional short-circuit current</b> for back-up protection with back-up fuse with identical current rating					
<input type="checkbox"/> At 400 V / 415 V / 500 V	kA	50			
<input type="checkbox"/> At 690 V	kA	33	33	20	18
<b>Short-time withstand current <math>I_{cw}</math> (peak value)</b>					
<input type="checkbox"/> 0.25 s (per current path)	kA	5	5	6	6
<input type="checkbox"/> 1 s (per current path)	kA	2.5	2.5	3	3
<b>Short-circuit making capacity (<math>I_{cm}</math>)</b>					
<input type="checkbox"/> 400 V / 415 V	kA	10			
<input type="checkbox"/> 500 V / 690 V	kA	6.7			
Capacitive load at 400 V	kVar	50	60	77	97
Number of poles		2 / 3 / 4			
Rated power loss $P_v$ per pole	VA	2.9	4.5	6.5	10
<b>Service life, operating cycles</b>					
<input type="checkbox"/> Mechanical		20000	20000	10000	10000
<input type="checkbox"/> Electrical		1500	1500	1000	1000

**Main conductor connection**

<b>Standards</b>		IEC/EN 60947-3, UL 508 (for the following types: 5TE1320, 5TE1330, 5TE1340, 5TE1420, 5TE1430, 5TE1440) UL File No. E302554			
<b>Type</b>		<b>5TE1.1</b>	<b>5TE1.2</b>	<b>5TE1.3</b>	<b>5TE1.4</b>
<b>Conductor cross-sections</b>					
<input type="checkbox"/> Solid and stranded	mm <sup>2</sup>	6 ... 50	6 ... 50	--	--
<input type="checkbox"/> AWG cables	AWG	10 ... 1/0	10 ... 1/0	8	8
<input type="checkbox"/> Copper busbars	mm <sup>2</sup>	--	--	max. 20 x 6	max. 20 x 6

Acc. to UL 508

<b>Standards</b>		IEC/EN 60947-3, UL 508 (for the following types: 5TE1320, 5TE1330, 5TE1340, 5TE1420, 5TE1430, 5TE1440) UL File No. E302554			
<b>Type</b>		<b>5TE1.1</b>	<b>5TE1.2</b>	<b>5TE1.3</b>	<b>5TE1.4</b>
$I_n$	A	--	80	100	125
General Use 480 V	A	--	28	34	40
Manual Motor Controller 230 V	hp	--	10	25	30
Manual Motor Controller 480 V	hp	--	20	15	15
Short circuit at 480 V with Class H or K5 fuses	kA	--	10	10	10
Short circuit at 480 V with J fuses	kA	--	50	50	50

1.5.3 Circuit diagrams

Graphical symbols



- 5TE1210 5TE1310 5TE1410 5TE1610 5TE1315 5TE1415
- 5TE1220 5TE1320 5TE1420 5TE1620 5TE1325 5TE1425
- 5TE1230 5TE1330 5TE1430 5TE1630 5TE1335 5TE1435
- 5TE1240 5TE1340 5TE1440 5TE1640 5TE1345 5TE1445

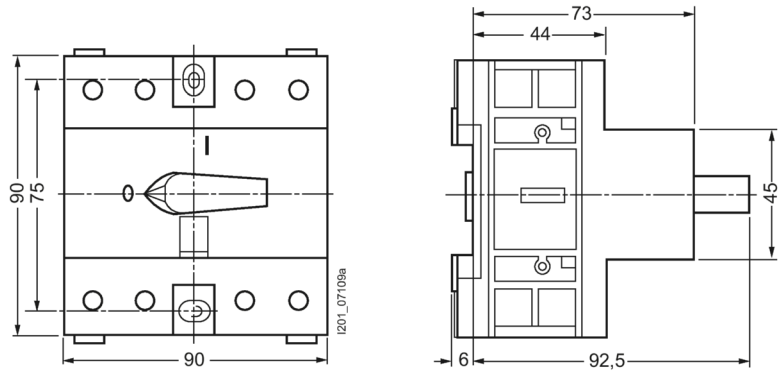
5TE9 auxiliary switches



- 5TE9005 5TE9006

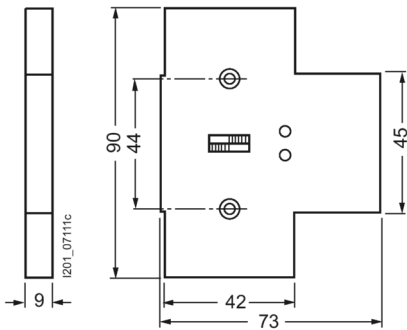
1.5.4 Dimensional drawings

1.5.4.1 5TE1 switch disconnectors, 100 A and 125 A



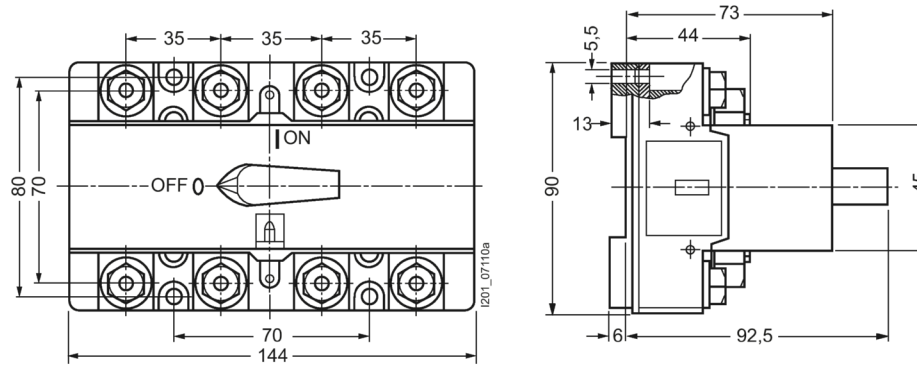
- 5TE1210 5TE1310 5TE1410 5TE1610
- 5TE1220 5TE1315 5TE1415 5TE1620
- 5TE1320 5TE1420
- 5TE1325 5TE1425

1.5.4.2 5TE9 auxiliary switches



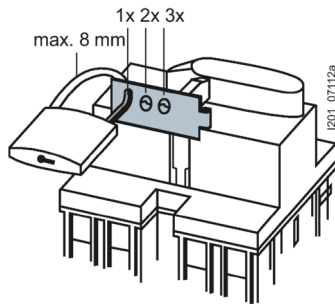
- 5TE9005
- 5TE9006

1.5.4.3 5TE1 switch disconnectors, 160 A and 200 A

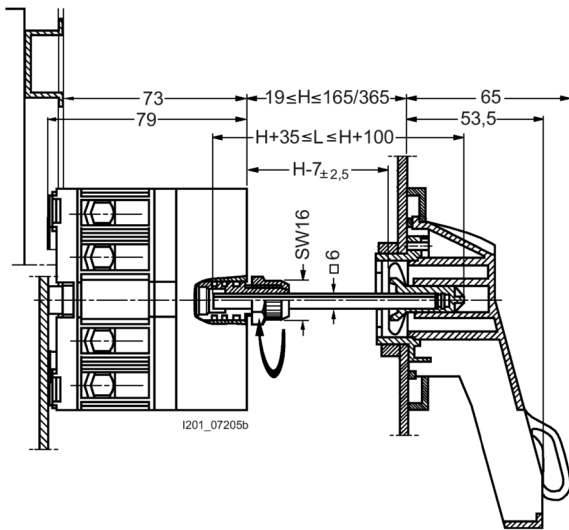


- 5TE1230 5TE1330 5TE1430 5TE1630
- 5TE1240 5TE1335 5TE1435 5TE1640
- 5TE1340 5TE1440
- 5TE1345 5TE1445

1.5.4.4 5TE9014 locking units

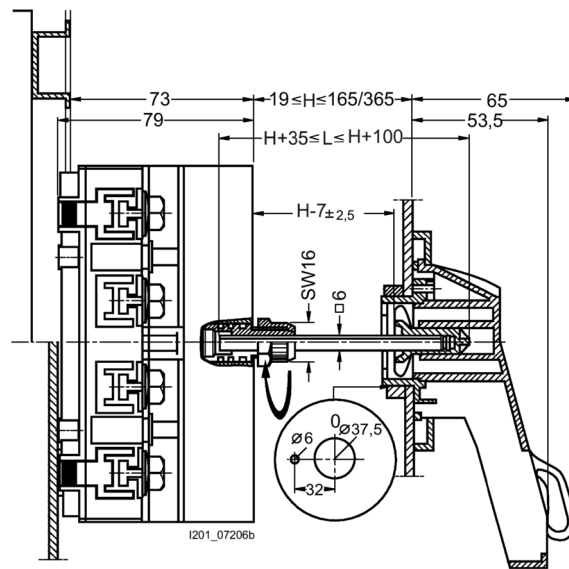


1.5.4.5 5TE9 rotary actuators with extension shaft



With 100 A and 125 A switch disconnectors  
5TE9010, 5TE9011, 5TE9012, 5TE9013

It is possible to open the door in a disconnected state.



With 160 A and 200 A switch disconnectors  
5TE9010, 5TE9011, 5TE9012, 5TE9013

It is possible to open the door in a disconnected state.

## Fuse switch disconnectors

### 2.1 3NP1 up to 630 A

#### 2.1.1 Product description

##### 2.1.1.1 Features



Figure 2-1 3NP1 fuse switch disconnectors, supplemented with 4-pole and 1-pole versions

- Five sizes available for LV HRC fuses sizes NH000 to NH3
- 1-pole, 3-pole and 4-pole devices
- Switch disconnectors can be mechanically coupled using accessories to create any type of 2 or 4-pole versions
- Connections in form of box terminal or flat terminal
- Electrical connection can be adapted to suit the application thanks to a wide variety of terminal types
- Floor mounting, standard rail mounting, or mounting on busbar systems
- Busbar supports can be built over

- Conversion of 5/10 mm thick busbars without parts which can be lost or broken off
- Convertibility of cable feeder at top/bottom for 3-pole devices for busbar
- 1-pole devices can be mounted on a busbar with free selection of the infeed busbar
- Auxiliary switches for querying the switch positions
- Fuse monitoring possible throughout
- All units can be sealed and locked

### 2.1.1.2 Benefits

- Enhanced touch protection
- Locking and sealing function helps to prevent unauthorized operation
- Small space requirement through compact devices and busbar supports which can be built over.
- Modular design
- One device version with very high short-circuit values dispenses with having to order and install arc splitter chutes to increase the electrical values.
- All devices feature all-round touch protection.
- Box terminals are available for all sizes and shorten the mounting time appreciably.
- Snapping the sizes 000 and 00 onto a busbar shortens the mounting time greatly compared to fixing with screws.
- Devices for busbar mounting can be converted to 5 mm or 10 mm thick busbars without parts which can be lost or broken off.

### 2.1.1.3 Application

Fuse switch disconnectors are used for occasional load switching and provide reliable isolation from the infeed. The ability to use fuses with LV HRC design means the system can be protected against short circuit and overload. In practice, they are generally used as main control switches or repair switches.

### Standards and guidelines

The 3NP1 fuse switch disconnectors meet the requirements of the standards IEC 60947-1, IEC 60947-3 and VDE 0660-107 and are climate-proof.

### Certificates

3NP1 has been awarded a large number of international certificates for global use.

For information about currently available certifications, e.g. CE, CCC, UL, shipbuilding, see [www.siemens.com/lowvoltage/certificates](http://www.siemens.com/lowvoltage/certificates)

(<https://support.industry.siemens.com/cs/ww/en/ps/19409/cert>).

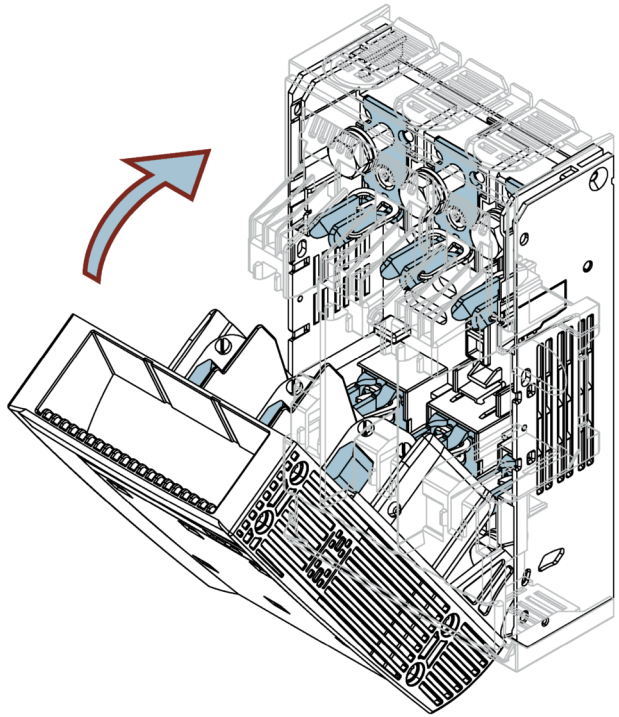
In the Entry list, you can filter the view according to product and certificate type.



### 2.1.1.4 Design

A 3NP1 fuse switch disconnector comprises a handle into which the fuses are inserted and the base with the contacts for fuses and terminals.

When the handle is closed, the blades of the LV HRC fuses are forced into the contacts and close the circuit.



### Suitable fuses

The 3NP1 fuse switch disconnector is suitable for all fuses with LV HRC design in sizes 000 to 3 which comply with IEC 60269-2.

This standard describes the technical constraints on fuses for the protection of cables and motor feeders, including the maximum permitted power loss of the fuses.

Conventional fuse switching devices are designed in accordance with the maximum values permitted according to this fuse standard with respect to possible heat dissipation.

Fuses for semiconductor protection (SIEMENS trade name SITOR) must disconnect much faster than standard fuses to protect the semiconductor load as reliably as possible and by virtue of their design have power loss values that in some cases significantly exceed the limit values permitted in IEC 60269-2.

To permit simple installation, not only are many application-specific special designs available but also very many fuses for semiconductor protection in the standard-compliant designs, such as the LV HRC design. If a fuse of this kind is used in a conventional fuse switching device for standard-compliant fuses for semiconductor protection, the maximum permissible fuse power loss defined by the switching device must be complied with. If the rated power loss of the fuse for semiconductor protection is above that permitted by the switching device, the fuse can only be operated in the partial load range, i.e. the load current must be reduced until the actual power loss is within the limit values defined by the switching device. The fuse manufacturer provides the data required for this (power loss as a function of the load current). If the maximum power losses of the fuse defined by the switching device are not complied with, the switching device may overheat or, in the worst case, even cause a fire in the switchgear.

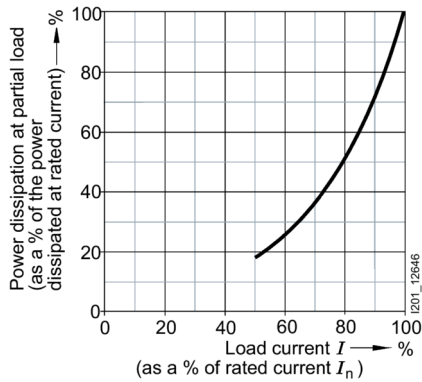


Figure 2-2 Power losses depending on the operational current for SIEMENS fuses for semiconductor protection

For use of SIEMENS fuses for semiconductor protection (SITOR) in 3NP1, the possible load values are available for each possible combination of a fuse and circuit breaker type (see chapter Derating values of 3NP1 fuse switch disconnectors when using SITOR fuses (Page 100))

Fuses from third-party manufacturers can also be used, in which case the possible load values must be determined based on the technical data of the fuse.

## Replacing the fuses

Fuse links can reach very high temperatures on melting. Removing them manually immediately after melting is almost impossible. The 3NP1 fuse switch disconnector offers contact-free removal of tripped fuses, thus minimizing downtimes after a trip. By operating the release shaft and tilting sideways, the fuse links drop out contactlessly.

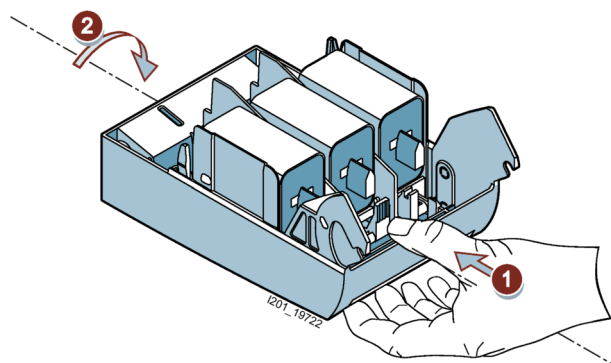


Figure 2-3 Removing the fuses

## Number of poles

3NP1 fuse switch disconnectors are available in 1, 3 and 4-pole device versions.

Preassembled 4-pole types in commonly used versions (without fuse monitoring, N pole on the right) are available from the factory ready for installation.

The connection kits can be used to fabricate 2-pole types and application-specific 4-pole versions (e.g. N pole on the left, with fuse monitoring).

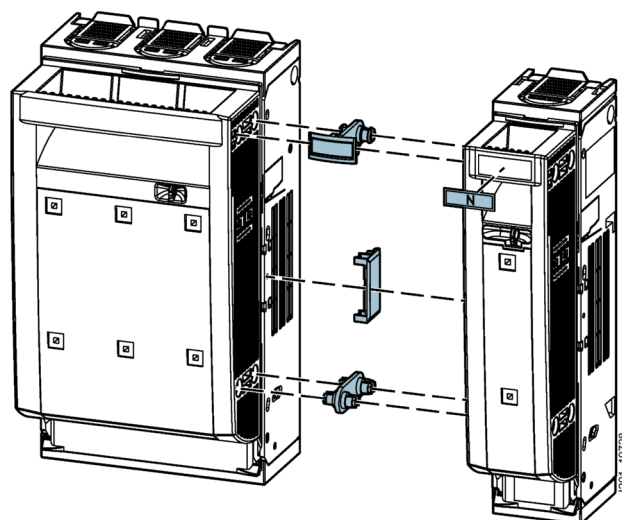


Figure 2-4 Assembly kit for mechanical connection of two 3NP1 devices, size NH00

**Switching instant of N pole in 4-pole 3NP1 devices**

4-pole 3NP1 devices are used in 3-phase AC networks with a switched neutral conductor. They are supplied without an isolating blade for the N pole.

The switching instant is selected by the installed isolating blade:

- Simultaneous switching – the N pole switches at the same time as the main contacts
- Leading switching – the N pole switches early when the circuit breaker closes (switch-on) and late when it opens (switch-off)



Figure 2-5 Isolating blade for leading switching of the neutral conductor

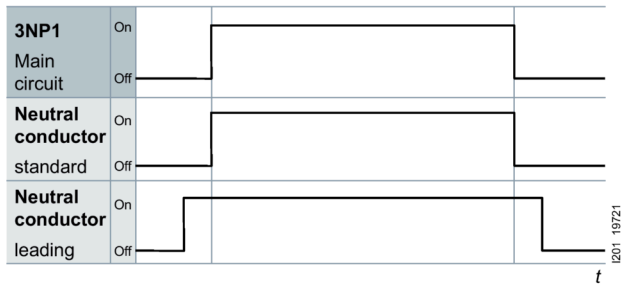


Figure 2-6 Possible switching instants of the neutral conductor

## Types of mounting

### Floor mounting

All sizes of the 3NP1 fuse switch disconnectors are available in floor mounting versions.

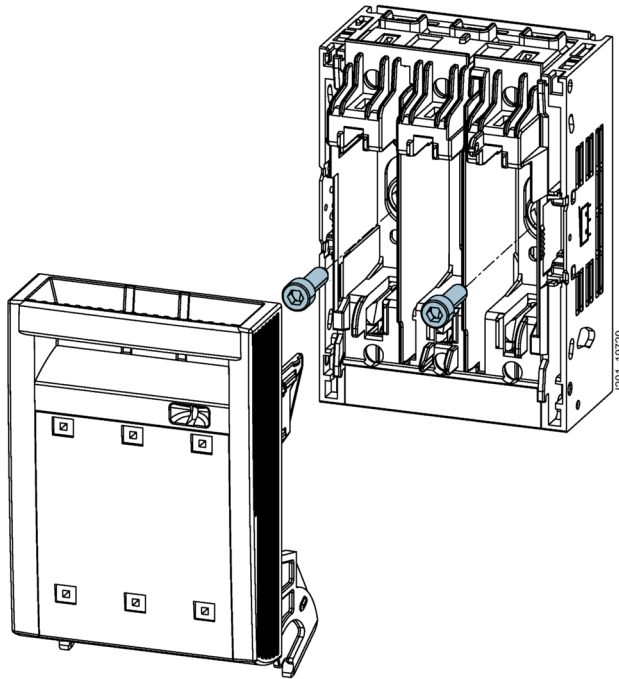


Figure 2-7 Floor mounting method

### Mounting on a standard mounting rail

Sizes 000, 00 and 1 can also be snapped onto a standard mounting rail (TH35 according to EN 60715) using an accessory.

Whereas size 000 is mounted on a standard mounting rail, sizes 00 and 1 are mounted on two standard mounting rails with a spacing of 125 or 150 mm.

The spacing of the standard mounting rails can be freely selected when installing the standard mounting rail assembly kit.

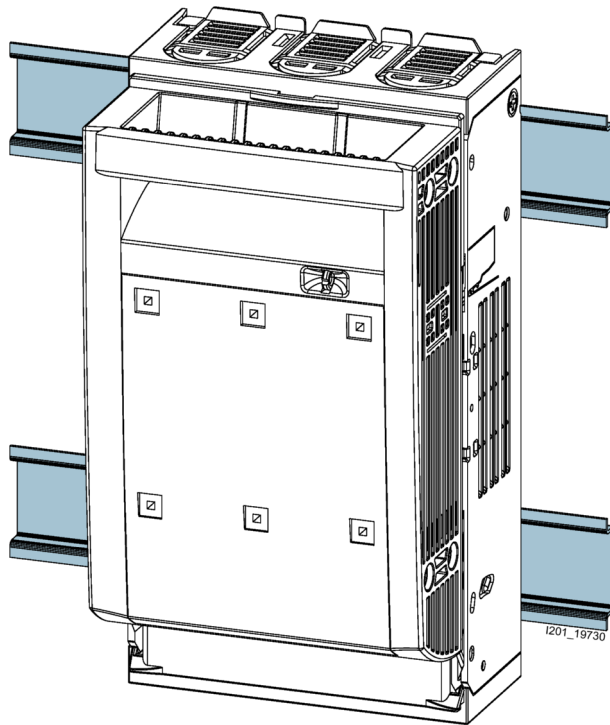


Figure 2-8 Mounting on a standard mounting rail

### Mounting on busbar systems

3NP1 fuse switch disconnectors are available for mounting on Siemens and Rittal busbar systems with 60 mm (all sizes) or 40 mm spacing (sizes 000 to 00). The difference between the versions for the various busbar systems lies in the reach-around protection which is specially adapted to the system in order to provide optimum touch protection.

In the case of 4-pole devices, the infeed for the fourth pole is supplied via a bar and terminal (included in the scope of supply) from the neutral conductor bar located above the 3 phases.

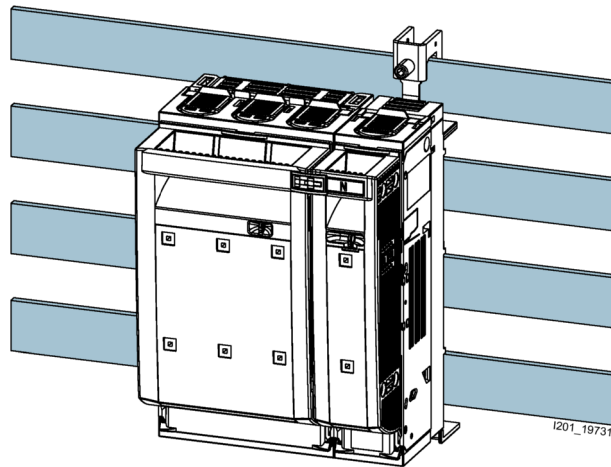


Figure 2-9 Mounting on Siemens 8US 4-pole busbar

All devices for mounting on the busbar are supplied from the factory with the cable feeder at the bottom. The 3-pole versions can be converted to cable feeder at the top. As all 3 phases are converted in a single sequence, the possibility of installation errors (e.g. one phase not converted) is almost totally excluded.

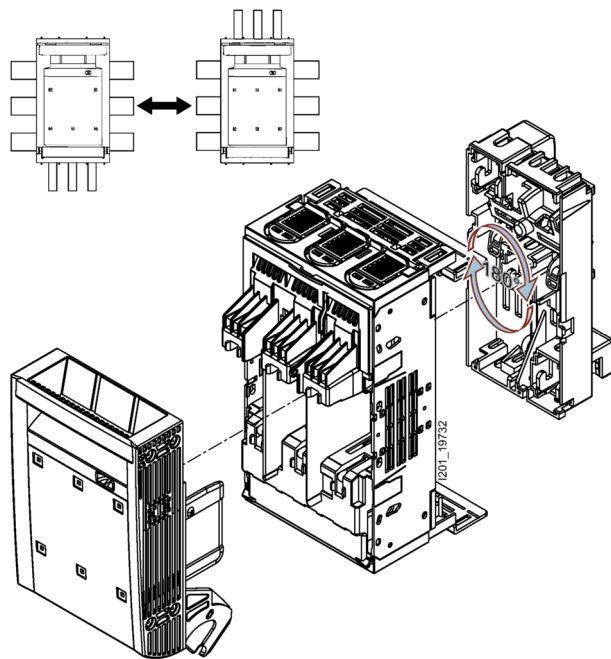


Figure 2-10 Conversion of cable feeder in devices for busbar mounting

**1 and 2-pole busbar mounting**

1-pole 3NP1 devices for wall mounting in sizes 000 and 00 can be adapted to the 8US 60 mm busbar system using the assembly kit for busbar mounting.

The modular design of the mounting hooks for the busbar makes it possible to freely select whether the infeed for the 3NP1 comes from L1, L2 or L3.

If two 1-pole 3NP1 devices with busbar adapters are combined using the connecting kit, 2-pole disconnectors for busbar mounting can also be fabricated.

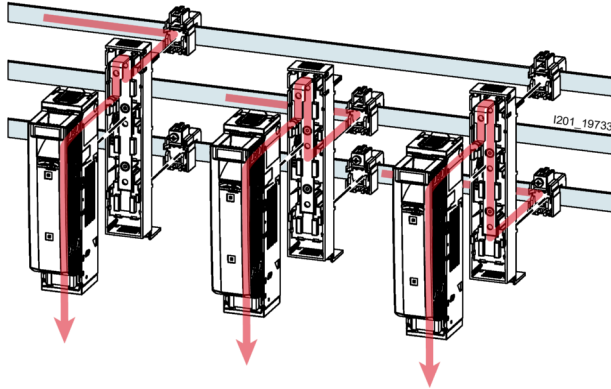


Figure 2-11 1/2-pole busbar mounting  
Red lines: Current flow

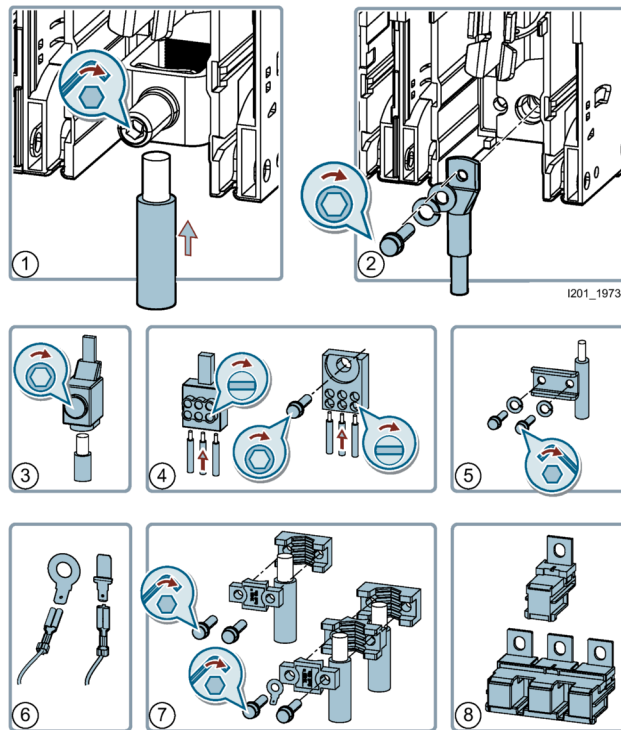
The table below shows which version of the 3NP1 fuse switch disconnector can be mounted on busbars:

Size	000			00			1			2			3		
	1/2	3	4	1/2	3	4	1/2	3	4	1/2	3	4	1/2	3	4
Mounting on 40 mm busbar system	--	✓	--	--	✓	--	--	--	--	--	--	--	--	--	--
Mounting on 60 mm busbar system	✓	✓	✓	✓	✓	✓	--	✓	✓	--	✓	✓	--	✓	✓
Cable feeder at the bottom	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cable feeder at the top	--	✓	--	--	✓	--	--	✓	--	--	✓	--	--	✓	--



## Electrical connection

The 3NP1 fuse switch disconnectors feature various connection options. Versions with box terminals and flat terminals are available. Further terminal types can be retrofitted as accessories so that the device can be flexibly adapted to suit any application.



- ① Box terminals
- ② Flat terminals
- ③ Feeder terminals
- ④ Three-tier terminals
- ⑤ Saddle terminals
- ⑥ Auxiliary conductor connections
- ⑦ Prism terminals
- ⑧ Connection module

Figure 2-12 Overview of connection technology

### Box terminals

All sizes of the 3NP1 device are available with box terminals, which are designed to allow the speedy connection of stripped conductors.

### Flat terminals

Sizes 00 to 3 are available with flat terminals for the connection of cable lugs or busbar systems.

### **Saddle terminals**

Saddle terminals can be mounted on 3NP1 devices with flat terminals – these allow the connection of stripped circular conductors (without cable lug) or of rectangular conductors (copper bars or Flexibars) without a drill hole.

### **Prism terminals**

Prism terminals are available in versions for the connection of one or two stripped circular conductors. They can be retrofitted on 3NP1 devices with flat terminals.

Prism terminals were specially developed for the connection of aluminum conductors. Copper conductors can also be used however.

### **Three-tier terminals**

Three-tier terminals are available in versions for mounting on 3NP1 devices with flat terminals or box terminals in sizes 000 and 00. They make it possible to branch to three smaller feeders directly at the 3NP1 outgoing feeder.

### **Feeder terminals**

The feeder terminal is required for 3NP1 devices in size 000 if these are to be operated with load currents above 100 A (max. permissible 160 A). It expands the connection to the cross-sections required for this purpose.

### **Connection module**

The connection module is used for devices in size 00 for busbar mounting. A masking plate can be mounted at the 32 mm or 70 mm level in the case of devices in size 00 for busbar mounting. The output terminals of the 3NP1 are located above the 32 mm masking plate level – the connection module moves the connection level to below the 32 mm masking plate level.

### **Auxiliary conductor connections**

The auxiliary conductor connections are connected in the output terminals of the 3NP1 together with the main conductor.

They allow smaller loads in the control cabinet to be directly supplied using commercially available flat tab sleeves 6.4 x 0.8 mm.

### Three-phase busbar

The 3-phase busbar is used for the infeed-side bridge connection of several 3NP1 devices for floor mounting in size 000.

Busbars are available for the connection of 2, 3 or 4 3NP1 devices. A connection bar can be used to connect two blocks of this kind. The infeed is supplied via the feeder terminals.

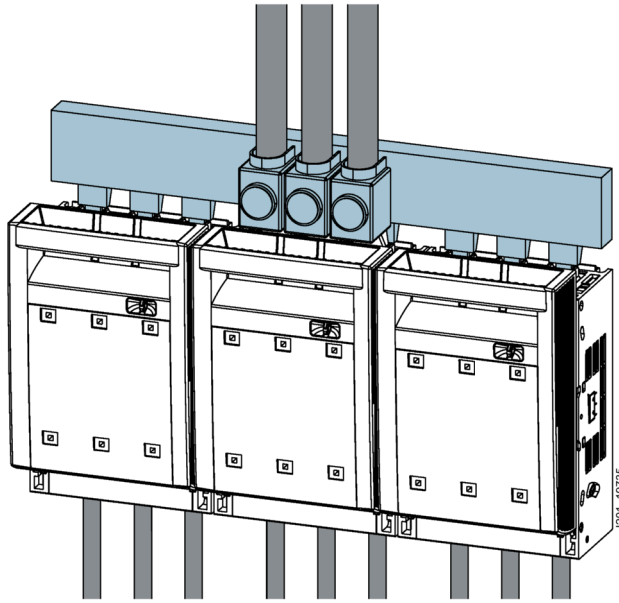


Figure 2-13 Three-phase busbar

### Terminal covers

Terminal covers are fitted on all 3NP1 devices at the factory. However, if long, non-insulated cable lugs are used which project outside these covers, these covers can also be extended using the terminal covers that are available as accessories.

The terminal covers are also available with optional rear reach-around protection so that a high degree of protection is also provided in switchboards where access from the rear is possible.

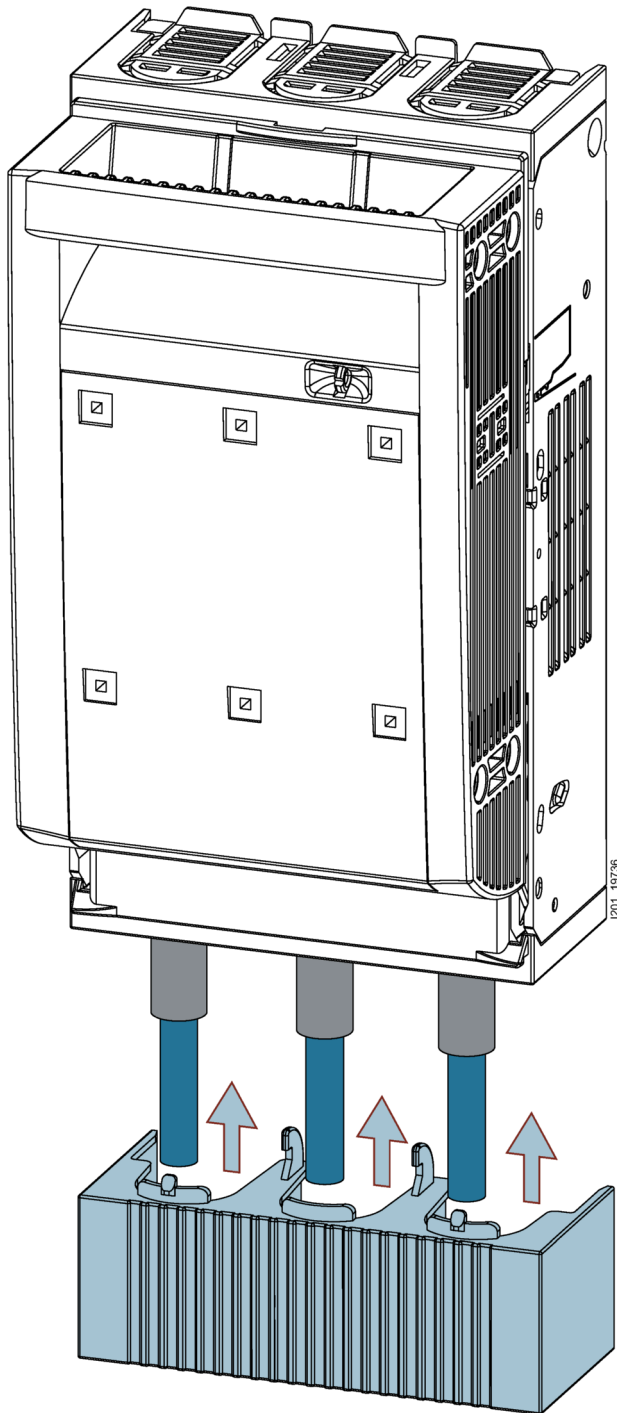


Figure 2-14 Terminal covers

## Fuse monitoring

Fuse monitoring is used to detect, indicate and report faults. All the commonly used 3NP1 versions are available with factory-fitted fuse monitoring. This can also be easily retrofitted by replacing the fuse carrier if required.

Various fuse monitoring versions are available for the 3NP1 fuse switch disconnectors. These can be selected according to application-specific requirements.

All versions are equipped with floating contacts for remote signaling. With all fuse monitoring devices, the physical principle for the detection of tripped fuses is based on voltage measurement upstream and downstream of the fuse. The voltage drop across the fuse is just a few volts due to the low internal resistance of the fuse. If the fuse trips, the full line voltage is applied. Fuse monitoring picks off the voltage at the grip lugs of the fuse – fuses with insulated grip lugs cannot be used for this reason.

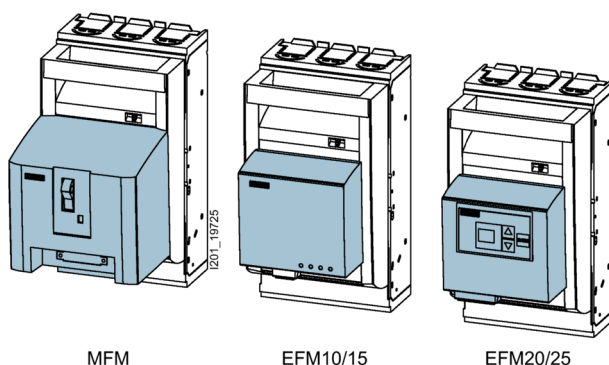


Figure 2-15 Fuse monitoring versions

### MFM – electromechanical fuse monitoring

MFM monitors fuses by means of an installed SIRIUS circuit breaker

External power supply	Not required (self-powered)
Output	1 NO contact + 1 NC contact
Local indication	Toggle switch position
Versions	3-pole for <ul style="list-style-type: none"> <li><input type="checkbox"/> Max. 690 V AC</li> <li><input type="checkbox"/> Max. 440 V DC</li> </ul>

### EFM10/15 – electronic fuse monitoring

The EFM10 and EFM15 monitor fuses by means of an evaluation electronics circuit. Unlike the EFM10, the EFM15 is not self-powered. It requires infeed from a 24 V DC supply.

The absence of the built-in power supply unit makes it a cost-optimized alternative to the EFM10.

External power supply	EFM10: Not required EFM15: 24 V DC
Output	EFM10: 1 CO contact EFM15: 1 NO contact
Local indication	Indication via LEDs for each phase
EFM10 versions	3-pole for 230 ... 690 V AC
EFM15 versions	1-pole for 110 ... 690 V AC 1-pole for 24 ... 240 V AC / 24 ... 250 V DC 1-pole for 120 ... 440 V DC 3-pole for 190 ... 690 V AC 3-pole for 220 ... 440 V DC

### EFM20/25 – electronic fuse monitoring with line monitoring

The EFM20 and EFM25 monitor fuses by means of an evaluation electronics circuit (EFM20 – version for AC / EFM25 – version for DC). In addition to fuse tripping, they can also detect line faults, such as a phase failure (EFM20 only) and overvoltage/undervoltage.

The limit values for overvoltage/undervoltage can be set.

External power supply	Not required (self-powered)
Output	2 CO contacts: 1 CO contact for fuse tripping, 1 CO contact for line fault
Local indication	Indication via display for each phase
EFM20 versions	3-pole for 230 ... 690 V AC
EFM25 versions	3-pole for 220 ... 440 V DC

## Auxiliary switch

Auxiliary switches allow remote interrogation of the contact position of the 3NP1 fuse switch disconnector. Up to two auxiliary switches can be installed in each 3NP1.

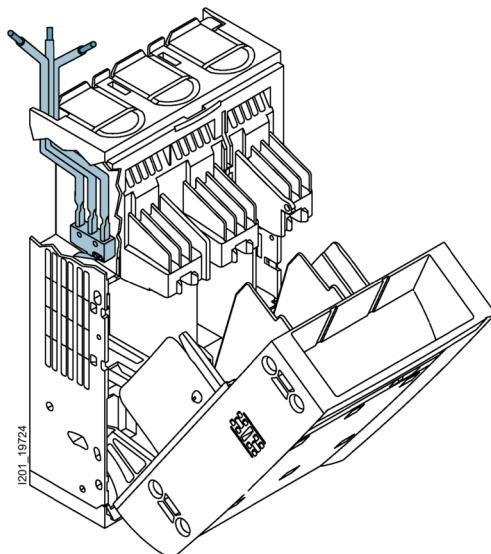


Figure 2-16 Auxiliary switches for remote interrogation of the contact position of the 3NP1

## Switching instants of auxiliary switches

With size 00 and larger, the switching instants of the auxiliary switches can be selected during installation – simultaneously with the main circuit or lagging switch-on/leading switch-off.

One of the possible functions of leading auxiliary switches is to disconnect the circuit with the assistance of a higher-level switching device, such as a circuit breaker, before the main contacts of the 3NP1 fuse switch disconnector open.

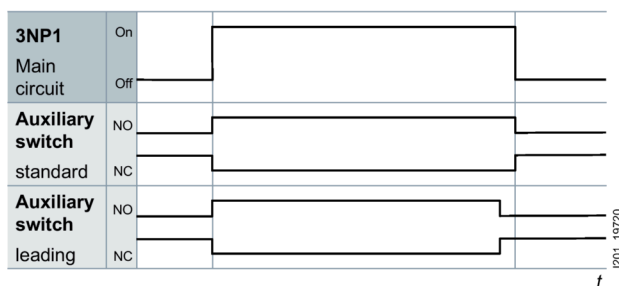


Figure 2-17 Switching instants of auxiliary switches

### Locking and sealing

The 3NP1 fuse switch disconnectors can be sealed and locked with padlocks in order to prevent unauthorized access or operation.

The sealing function is integrated in all versions. The locking function can be retrofitted in 3-pole switch disconnectors as an accessory (the locking function is already included in 1-pole 3NP1 disconnectors).

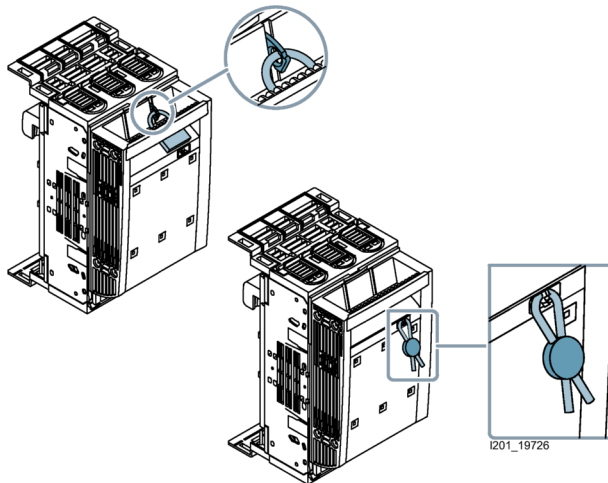


Figure 2-18 Locking and sealing of 3NP1

### Protection against power theft

A frequently occurring requirement for fuse switch disconnectors in infrastructure applications is protection against power theft. This is provided when no unauthorized access to the live parts of a locked or sealed device is possible without causing visible damage to the switch disconnector.

This function can be retrofitted with 3NP1 fuse switch disconnectors – the holes for voltage testing in the front window are closed off and the window itself is protected against disassembly.

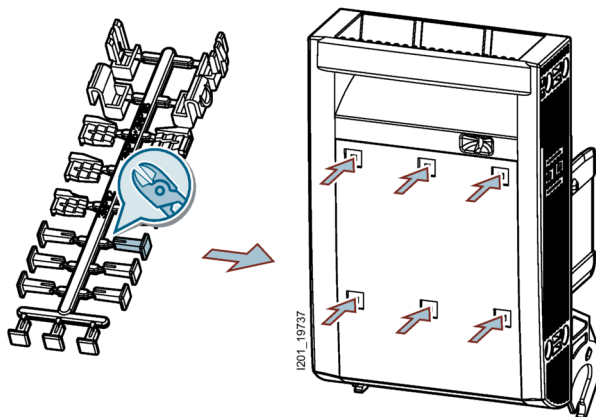
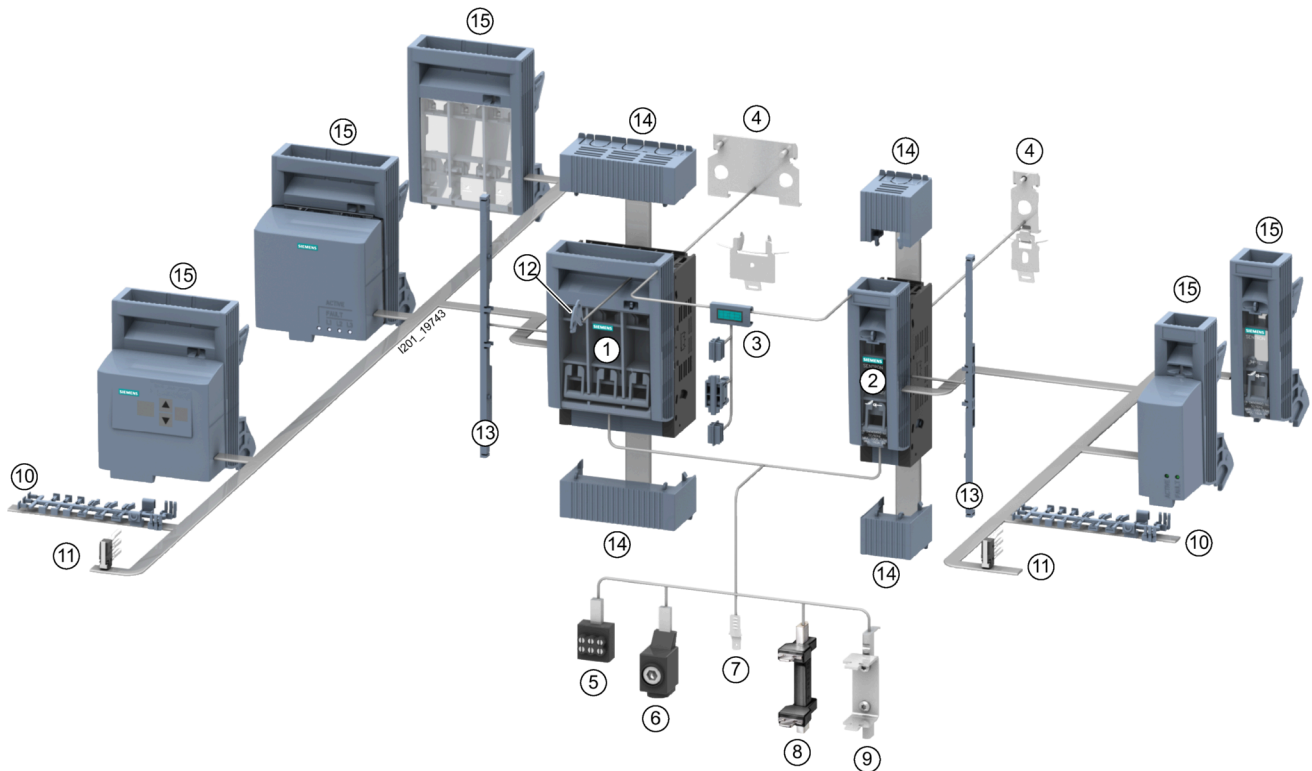


Figure 2-19 Protection against power theft



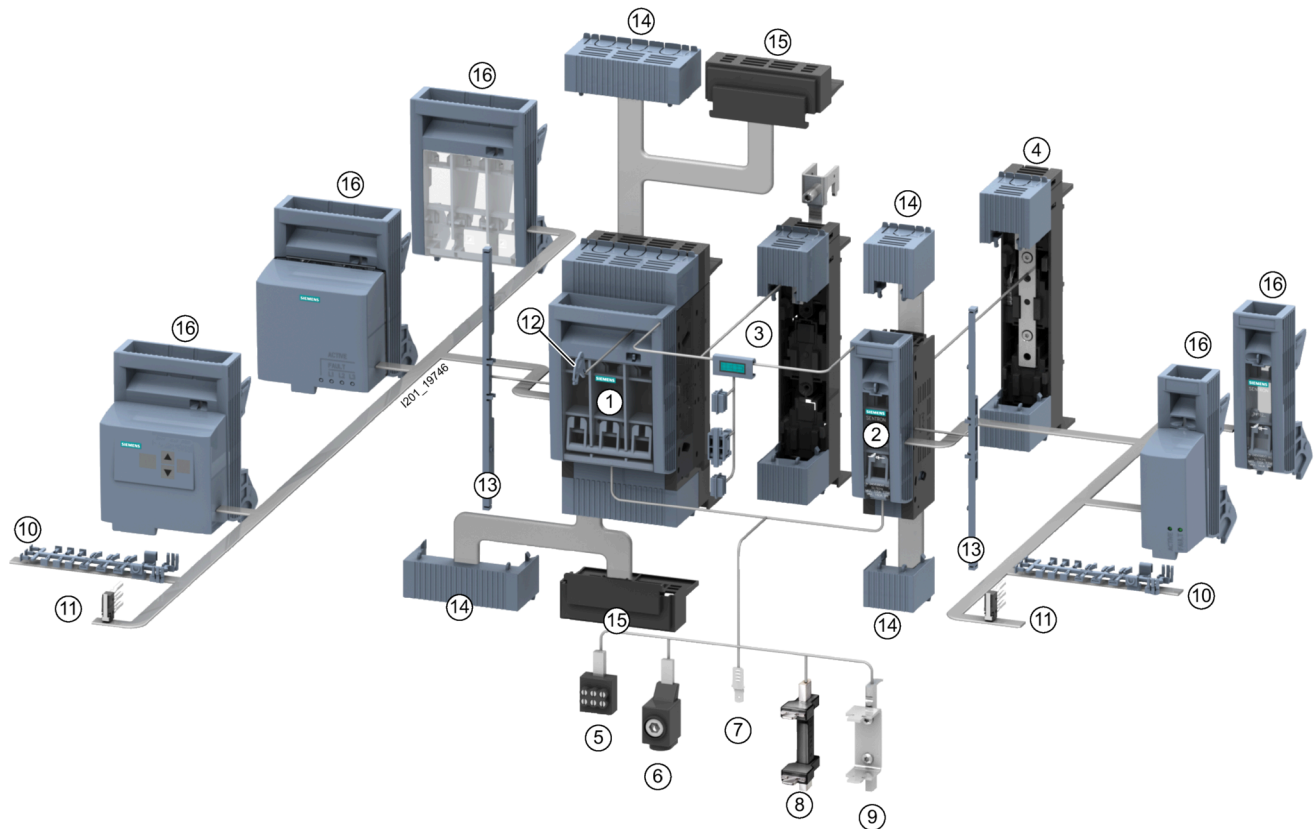
## 2.1.2 Overview of components

### 2.1.2.1 3NP1 for floor mounting, size 000



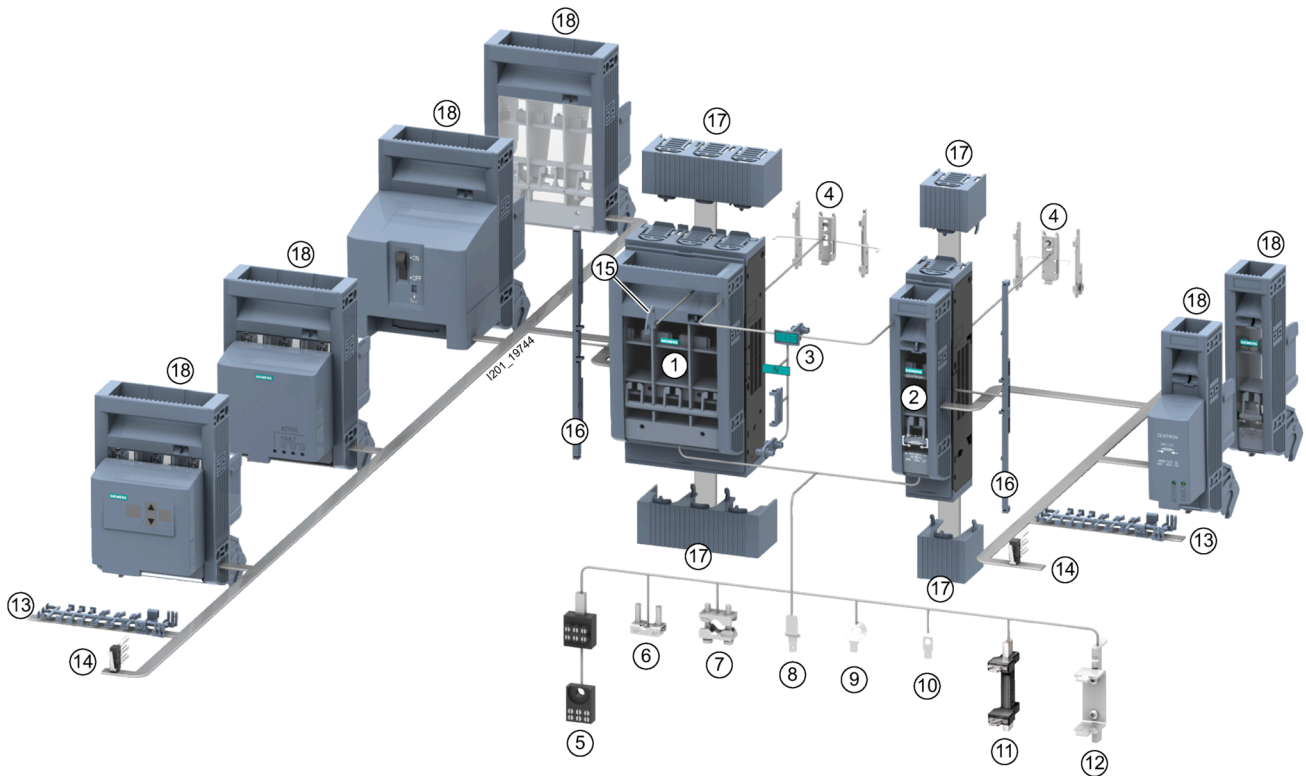
- |  |   |
|--|---|
| ① 3NP1 fuse switch disconnector, 3-pole, for wall mounting | ⑨ Isolating blade, leading switch-on / lagging switch-off |
| ② 3NP1 fuse switch disconnector, 1-pole, for wall mounting | ⑩ Assembly kit for protection against electricity theft   |
| ③ Assembly kit for mechanical connection of two 3NP1       | ⑪ Auxiliary switch  |
| ④ Assembly kit for standard rail mounting                  | ⑫ Locking device  |
| ⑤ Three-tier terminals                                     | ⑬ Masking frame supports                                  |
| ⑥ Feeder terminals   | ⑭ Cable connection covers                                 |
| ⑦ Auxiliary conductor terminal for box terminal            | ⑮ Fuse carriers with and without fuse monitoring          |
| ⑧ Isolating blade, simultaneously switching                |   |

2.1.2.2 3NP1 for mounting on busbar systems, size 000



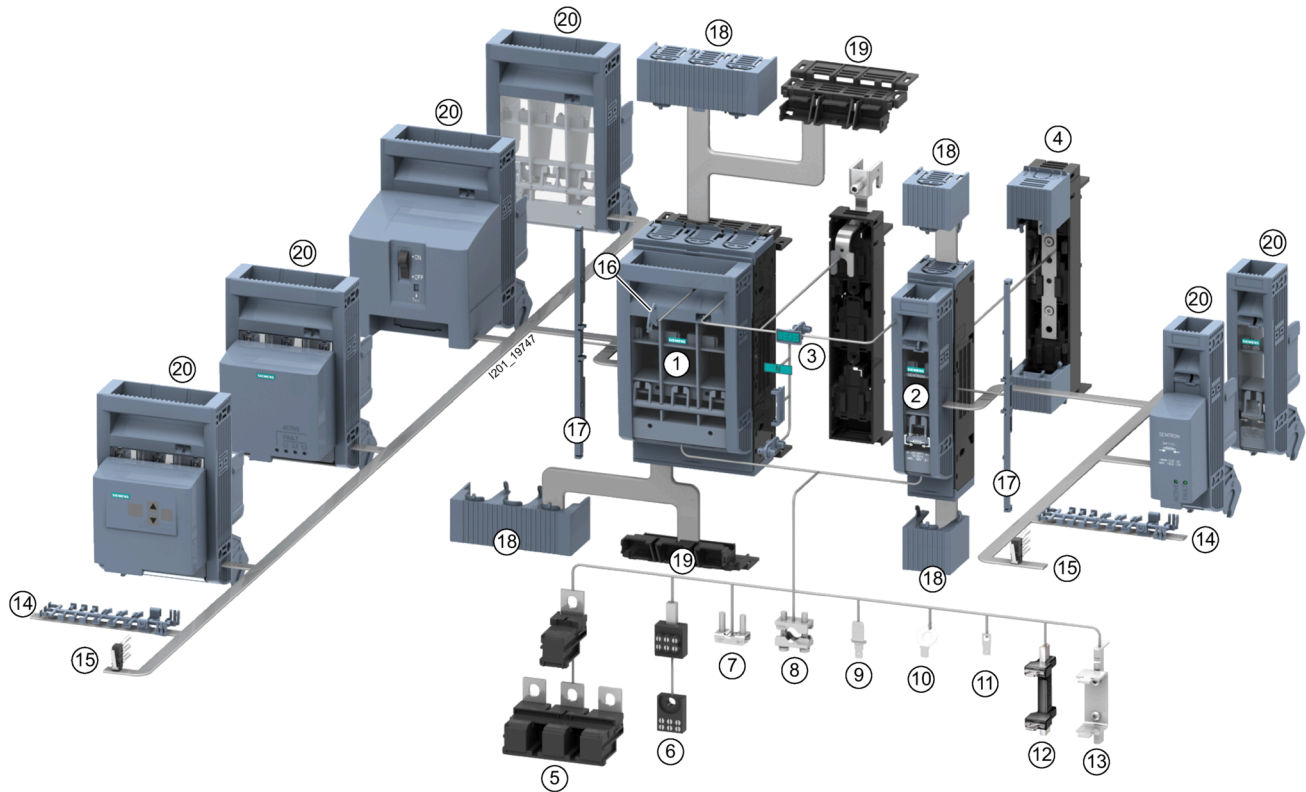
- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>① 3NP1 fuse switch disconnector, 3-pole, for wall mounting</li> <li>② 3NP1 fuse switch disconnector, 1-pole, for wall mounting</li> <li>③ Assembly kit for 4-pole busbar mounting</li> <li>④ Assembly kit for 1-pole busbar mounting</li> <li>⑤ Three-tier terminals</li> <li>⑥ Feeder terminals</li> <li>⑦ Auxiliary conductor terminal for box terminal</li> <li>⑧ Isolating blade, simultaneously switching</li> </ul> | <ul style="list-style-type: none"> <li>⑨ Isolating blade, leading switch-on / lagging switch-off</li> <li>⑩ Assembly kit for protection against electricity theft</li> <li>⑪ Auxiliary switch</li> <li>⑫ Locking device</li> <li>⑬ Masking frame supports</li> <li>⑭ Cable connection covers</li> <li>⑮ Reach-around protection for busbar</li> <li>⑯ Fuse carriers with and without fuse monitoring</li> </ul> |
|--|---|

2.1.2.3 3NP1 for floor mounting, size 00



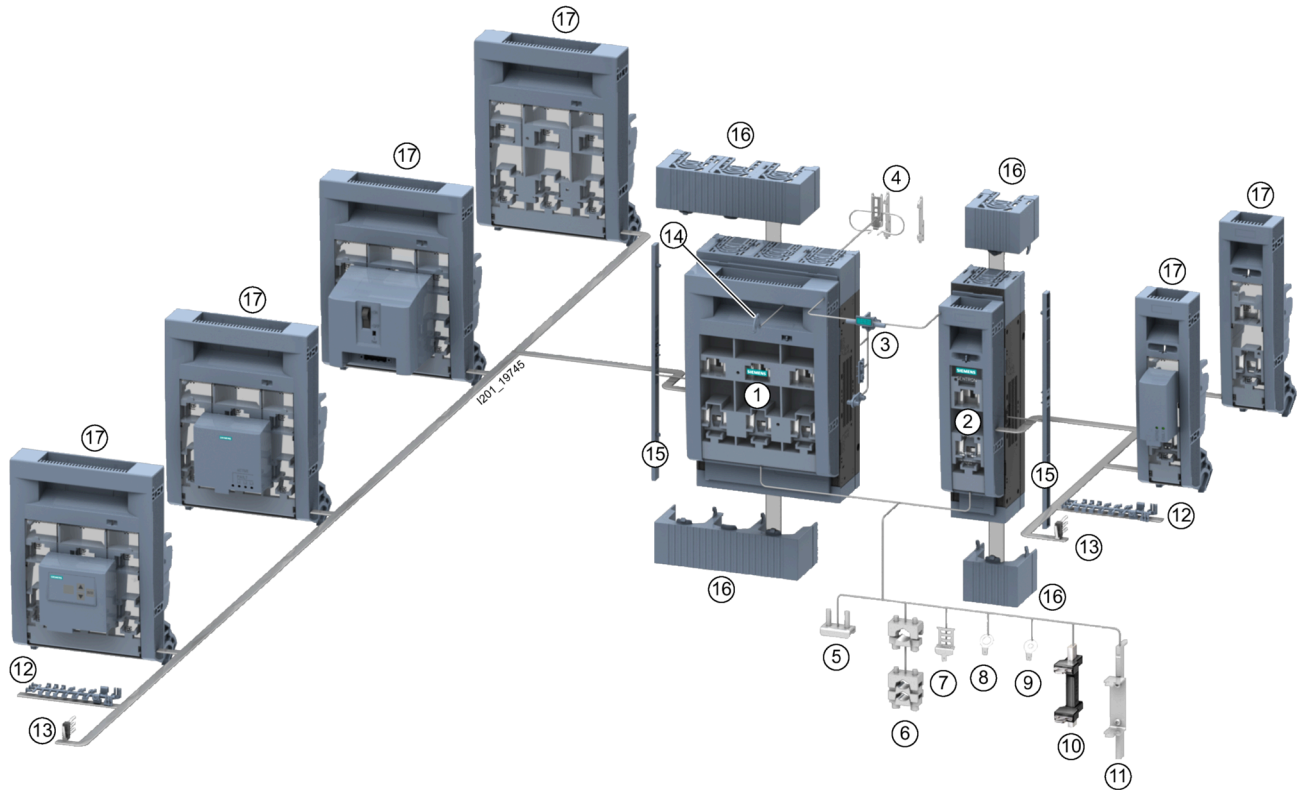
- |  |   |
|--|---|
| ① 3NP1 fuse switch disconnector, 3-pole, for wall mounting | ⑩ Auxiliary conductor terminal for saddle and prism terminals |
| ② 3NP1 fuse switch disconnector, 1-pole, for wall mounting | ⑪ Isolating blade, simultaneously switching                   |
| ③ Assembly kit for mechanical connection of two 3NP1       | ⑫ Isolating blade, leading switch-on / lagging switch-off     |
| ④ Assembly kit for standard rail mounting                  | ⑬ Assembly kit for protection against electricity theft       |
| ⑤ Three-tier terminals                                     | ⑭ Auxiliary switch  |
| ⑥ Feeder terminals   | ⑮ Locking device  |
| ⑦ Prism terminals  | ⑯ Masking frame supports                                      |
| ⑧ Auxiliary conductor terminal for box terminal            | ⑰ Cable connection covers                                     |
| ⑨ Isolating blade, simultaneously switching                | ⑱ Fuse carriers with and without fuse monitoring              |

2.1.2.4 3NP1 for mounting onto busbar systems, size 00



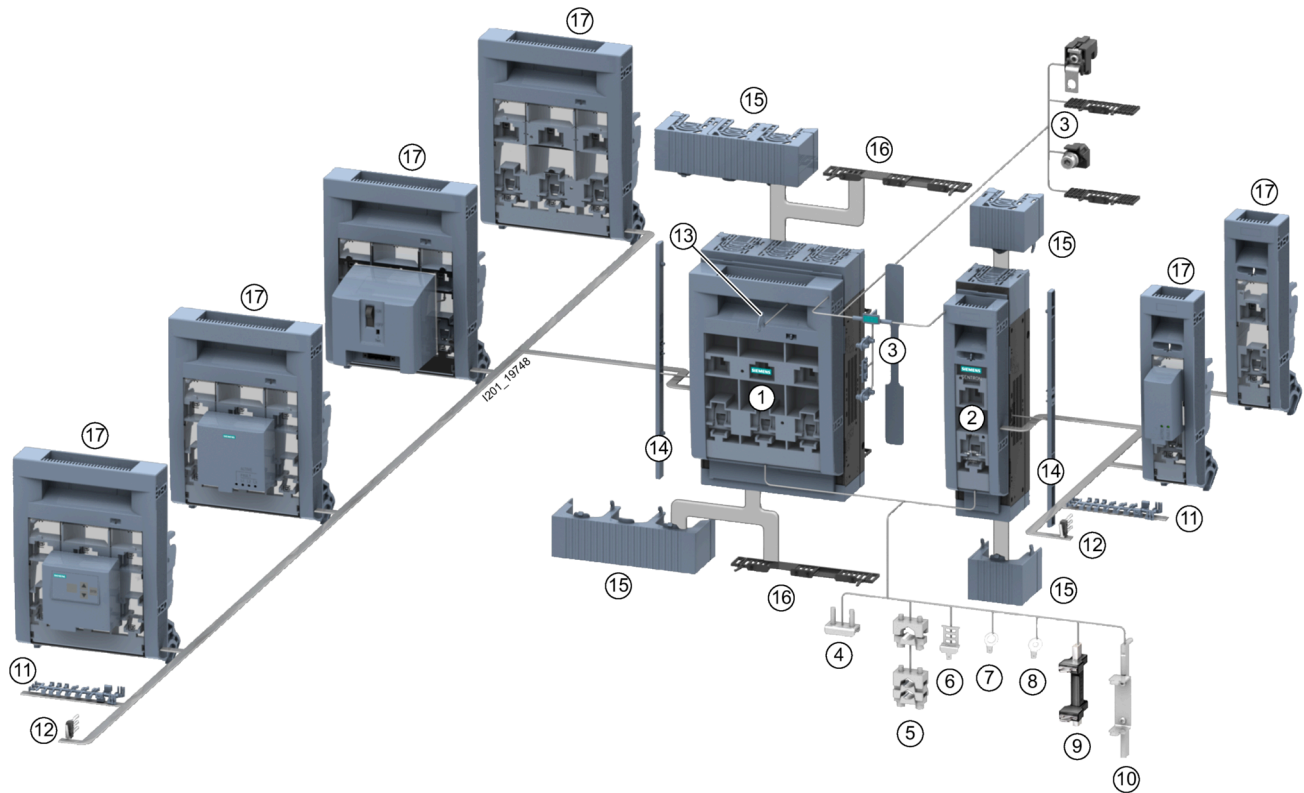
- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>① 3NP1 fuse switch disconnector, 3-pole, for mounting on busbars</li> <li>② 3NP1 fuse switch disconnector, 1-pole, for wall mounting</li> <li>③ Assembly kit for 4-pole busbar mounting</li> <li>④ Assembly kit for 1-pole busbar mounting</li> <li>⑤ Terminal module for installation of terminals underneath 32-mm cover level</li> <li>⑥ Three-tier terminals</li> <li>⑦ Feeder terminals</li> <li>⑧ Prism terminals</li> <li>⑨ Auxiliary conductor terminal for box terminal</li> <li>⑩ Auxiliary conductor terminal for flat terminal</li> </ul> | <ul style="list-style-type: none"> <li>⑪ Auxiliary conductor terminal for saddle and prism terminals</li> <li>⑫ Isolating blade, simultaneously switching</li> <li>⑬ Isolating blade, leading switch-on / lagging switch-off</li> <li>⑭ Assembly kit for protection against electricity theft</li> <li>⑮ Auxiliary switch</li> <li>⑯ Locking device</li> <li>⑰ Masking frame supports</li> <li>⑱ Cable connection covers</li> <li>⑲ Reach-around protection for busbar</li> <li>⑳ Fuse carriers with and without fuse monitoring</li> </ul> |
|--|---|

2.1.2.5 3NP1 for floor mounting, sizes 1 to 3



- ① 3NP1 fuse switch disconnector, 3-pole, for wall mounting
- ② 3NP1 fuse switch disconnector, 1-pole, for wall mounting
- ③ Assembly kit for mechanical connection of two 3NP1
- ④ Assembly kit for standard rail mounting
- ⑤ Saddle terminals
- ⑥ Prism terminals
- ⑦ Auxiliary conductor terminal for box terminal
- ⑧ Auxiliary conductor terminal for flat terminal
- ⑨ Auxiliary conductor terminal for saddle and prism terminals
- ⑩ Isolating blade, simultaneously switching
- ⑪ Isolating blade, leading switch-on / lagging switch-off
- ⑫ Assembly kit for protection against electricity theft
- ⑬ Auxiliary switch
- ⑭ Locking device
- ⑮ Masking frame supports
- ⑯ Cable connection covers
- ⑰ Fuse carriers with and without fuse monitoring

2.1.2.6 3NP1 for mounting on busbar systems, sizes 1 to 3



- ① 3NP1 fuse switch disconnector, 3-pole, for mounting on busbars
- ② 3NP1 fuse switch disconnector, 1-pole, for wall mounting
- ③ Assembly kit for 4-pole busbar mounting
- ④ Saddle terminals
- ⑤ Prism terminals
- ⑥ Auxiliary conductor terminal for box terminal
- ⑦ Auxiliary conductor terminal for flat terminal
- ⑧ Auxiliary conductor terminal for saddle and prism terminals
- ⑨ Isolating blade, simultaneously switching
- ⑩ Isolating blade, leading switch-on / lagging switch-off
- ⑪ Assembly kit for protection against electricity theft
- ⑫ Auxiliary switch
- ⑬ Locking device
- ⑭ Masking frame supports
- ⑮ Cable connection covers
- ⑯ Reach-around protection for busbar
- ⑰ Fuse carriers with and without fuse monitoring

## 2.1.3 Technical specifications

### 2.1.3.1 3/4-pole

#### General technical details

Standards		IEC / EN 60947-1, IEC / EN 60947-3, VDE 0660 Part 7				
Size		000	00	1	2	3
Rated uninterrupted current ( $I_u$ )	A	160 <sup>1)</sup>	160	250	400	630
<input type="checkbox"/> For fuse links acc. to IEC 60269-2	Size	000	00/000	1 / 0	2 / 1	3 / 2
Conventional free-air thermal current $I_{th}$	A	160 <sup>1)</sup>	160	250	400	630
Rated operational voltage ( $U_e$ ) <sup>2)</sup>						
<input type="checkbox"/> At 50/60 Hz AC	V	690				
<input type="checkbox"/> At DC – 3 conducting paths series-connected	V	440				
<input type="checkbox"/> At DC – 2 conducting paths series-connected	V	240				
<input type="checkbox"/> For utilization category AC-20B or DC-20B <sup>3)</sup>	V	1000				
Rated insulation voltage ( $U_i$ ) <sup>3)</sup>	V	1000				
Rated impulse withstand voltage ( $U_{imp}$ )	kV	8				

1) 160 A available in combination with feeder terminal 3NP1923-1BD00, otherwise max. 100 A

2) The permissible operational voltage range is restricted for versions with fuse monitoring

3) Up to pollution degree 2, above this 690 V

See Technical specifications for fuse monitoring (Page 99)

#### Operating and short-circuit behavior

Standards		IEC / EN 60947-1, IEC / EN 60947-3, VDE 0660 Part 7				
Size		000	00	1	2	3
Rated operational current $I_e$						
<input type="checkbox"/> AC-21B, AC-22B, 23B at 400 V AC	A	160	160	250	400	630
<input type="checkbox"/> AC-21B, at 500 V	A	160	160	250	400	630
<input type="checkbox"/> AC-22B, at 500 V	A	125	160	250	400	630
<input type="checkbox"/> AC-23B, at 500 V	A	40	63	200	315	500
<input type="checkbox"/> AC-21B, at 690 V	A	160	160	250	400	630
<input type="checkbox"/> AC-22B, at 690 V	A	50	125	250	400	500
<input type="checkbox"/> AC-23B, at 690 V	A	25	35	100	125	200

Standards		IEC / EN 60947-1, IEC / EN 60947-3, VDE 0660 Part 7				
Size		000	00	1	2	3
<input type="checkbox"/> DC-21B, 240 V – 2 conducting paths series-connected	A	160	160	250	400	630
<input type="checkbox"/> DC-22B, 240 V – 2 conducting paths series-connected	A	100	160	250	400	630
<input type="checkbox"/> DC-23B, 240 V – 2 conducting paths series-connected	A	80	100	200	250	400
<input type="checkbox"/> DC-21B, 440 V – 3 conducting paths series-connected	A	100	160	250	400	630
<input type="checkbox"/> DC-22B, 440 V – 3 conducting paths series-connected	A	50	125	200	315	500
<input type="checkbox"/> DC-23B, 440 V – 3 conducting paths series-connected	A	25	63	100	160	250
Rated making capacity with isolating blades at 500 V AC	kA	2	6	17	17	17
<b>Rated conditional short-circuit current with fuses (by fast switch on)</b>						
<input type="checkbox"/> Rated current at 500 / 690 V	kA	80/80	80/80	80/50	80/50	50/50
<input type="checkbox"/> Permissible let-through current of the fuses, peak value	kA	10	15	25	40	50
<b>Short-circuit strength with fuses (with closed disconnector)</b>						
<input type="checkbox"/> Rated current at 500 / 690 V	kA	120/100	120/100	120/100	100/100	100/100
<input type="checkbox"/> Let-through $I^2t$ value combined with up-stream fuse	kA <sup>2</sup> s	223	223	780	2150	5400
<input type="checkbox"/> Permissible let-through current of the fuses, peak value	kA	15	23	32	40	60
Power loss per pole with thermal current $I_{th}$ (without fuses)	W	5	5	8	14	30
Maximum power loss of the usable fuses (per fuse <sup>1)</sup> )	W	7.5 <sup>2)</sup>	12	23	34	48
Mechanical endurance, operating cycles		2000	2000	1600	1000	1000

1) Values are valid when using LV HRC fuses according to IEC 60269-1 (characteristics gG, gL, aM). If using fuses for semiconductor protection, please refer to the Derating table.

2) For operation up to 160 A, max. 9 W

Derating values of 3NP1 fuse switch disconnectors when using SITOR fuses (Page 100)



## Main conductor connection

Standards		IEC / EN 60947-1, IEC / EN 60947-3, VDE 0660 Part 7				
Size		000	00	1	2	3
Conductor cross-section max. for circular conductors (box terminal)	mm <sup>2</sup>	50	70	185	300	300
<b>Busbar systems or cable lugs, max. dimensions</b> (number x width x thickness)						
<input type="checkbox"/> Flat terminals	mm	--	24 x 12	25 x 18	34 x 18	40 x 18
<input type="checkbox"/> Box terminals	mm	8 x 8	9 x 12	20 x 10	32 x 10	32 x 20
<b>Tightening torque</b>						
<input type="checkbox"/> Flat terminals	Nm	--	10 ... 12	10 ... 12	10 ... 12	10 ... 12
<input type="checkbox"/> Box terminals	Nm	3.5 ... 4	10	10	25	25

## Other properties

Standards		IEC / EN 60947-1, IEC / EN 60947-3, VDE 0660 Part 7				
Size		000	00	1	2	3
<b>Degree of protection</b>						
<input type="checkbox"/> With molded-plastic masking frame/cable lug cover		IP40 (switch closed) / IP20 (switch open)				
<input type="checkbox"/> W/o molded-plastic masking frame/cable lug cover		IP30 (switch closed) / IP20 (switch open)				
<b>Ambient conditions</b>						
<input type="checkbox"/> Ambient temperature during operation <sup>1)</sup>	°C	-25 ... +55				
<input type="checkbox"/> Ambient temperature during storage <sup>1)</sup>	°C	-50 ... +80				
<input type="checkbox"/> Mounting position		Vertical and horizontal (no derating)				
Pollution degree, max.		3 (2 for versions with fuse monitoring)				

<sup>1)</sup> Temperature range may be restricted by the fuses to be used – please note the technical specifications of the fuses

2.1.3.2 1/2-pole

General technical details

Standards		IEC / EN 60947-1, IEC / EN 60947-3, VDE 0660 Part 7				
Size		000	00	1	2	3
Rated uninterrupted current ( $I_U$ )	A	160 <sup>1)</sup>	160	250	400	630
<input type="checkbox"/> For fuse links acc. to IEC 60269-2	Size	000	00/000	1 / 0	2 / 1	3 / 2
Conventional free-air thermal current $I_{th}$	A	160 <sup>1)</sup>	160	250	400	630
<b>Rated operational voltage (<math>U_e</math>) <sup>2)</sup></b>						
<input type="checkbox"/> At 50/60 Hz AC, 2-pole	V	240				
<input type="checkbox"/> At 50/60 Hz AC, 2-pole	V	400				
<input type="checkbox"/> At DC, 1-pole	V	120				
<input type="checkbox"/> At DC, 2-pole	V	240				
<input type="checkbox"/> For utilization category AC-20B or DC-20B <sup>3)</sup>	V	1000				
Rated insulation voltage ( $U_i$ ) <sup>3)</sup>	V	1000				
Rated impulse withstand voltage ( $U_{imp}$ )	kV	8				

<sup>1)</sup> 160 A available in combination with feeder terminal 3NP1923-1BD00, otherwise max. 100 A

<sup>2)</sup> The permissible operational voltage range is restricted for versions with fuse monitoring

<sup>3)</sup> Up to pollution degree 2, above this 690 V

See Technical specifications for fuse monitoring (Page 99)

Operating and short-circuit behavior

Standards		IEC / EN 60947-1, IEC / EN 60947-3, VDE 0660 Part 7				
Size		000	00	1	2	3
<b>Rated operational current <math>I_e</math></b>						
<input type="checkbox"/> AC-21B, AC-22B, 23B, 240 V, 1-pole	A	160	160	250	400	630
<input type="checkbox"/> AC-21B, AC-22B, 23B, 400 V, 2-pole	A	160	160	250	400	630
<input type="checkbox"/> DC-21B, 120 V, 1-pole	A	160	160	250	400	630
<input type="checkbox"/> DC-22B, 120 V, 1-pole	A	100	160	250	400	630
<input type="checkbox"/> DC-23B, 120 V, 1-pole	A	80	100	200	250	400
<input type="checkbox"/> DC-21B, 240 V, 2-pole	A	160	160	250	400	630
<input type="checkbox"/> DC-22B, 240 V, 2-pole	A	100	160	250	400	630
<input type="checkbox"/> DC-23B, 240 V, 2-pole	A	80	100	200	250	400
Rated making capacity with isolating blades at 400 V AC	kA	2	6	17	17	17

Standards		IEC / EN 60947-1, IEC / EN 60947-3, VDE 0660 Part 7				
Size		000	00	1	2	3
<b>Rated conditional short-circuit current with fuses (by fast switch on)</b>						
<input type="checkbox"/> Rated current at 240 V (1-pole) / 400 V (2-pole)	kA	80/80	80/80	80/50	80/50	50/50
<input type="checkbox"/> Permissible let-through current of the fuses, peak value	kA	10	15	25	40	50
<b>Short-circuit strength with fuses (with closed disconnector)</b>						
<input type="checkbox"/> Rated current at 240 V (1-pole) / 400 V (2-pole)	kA	120/120	120/120	120/120	100/100	100/100
<input type="checkbox"/> Let-through I <sup>2</sup> t value of the 240 V fuse (1-pole)	kA <sup>2</sup> s	137	120	420	1155	3630
<input type="checkbox"/> Let-through I <sup>2</sup> t value of the 400 V fuse (2-pole)	kA <sup>2</sup> s	166	158	551	1515	4340
<input type="checkbox"/> Permissible let-through current of the fuses, peak value	kA	15	23	32	40	60
Power loss per pole with thermal current I <sub>th</sub> (without fuses)	W	5	5	8	14	30
Maximum power loss of the usable fuses (per fuse <sup>1)</sup> )	W	7.5 <sup>2)</sup>	12	23	34	48
Mechanical endurance, operating cycles		2000	2000	1600	1000	1000

1) Values are valid when using LV HRC fuses according to IEC 60269-1 (characteristics gG, gL, aM). If using fuses for semiconductor protection, please refer to the Derating table.

2) For operation up to 160 A, max. 9 W

Derating values of 3NP1 fuse switch disconnectors when using SITOR fuses (Page 100)

## Main conductor connection

Standards		IEC / EN 60947-1, IEC / EN 60947-3, VDE 0660 Part 7				
Size		000	00	1	2	3
Conductor cross-section max. for circular conductors (box terminal)	mm <sup>2</sup>	50	70	185	300	300
<b>Busbar systems or cable lugs, max. dimensions (number x width x thickness)</b>						
<input type="checkbox"/> Flat terminals	mm	--	24 x 12	25 x 18	34 x 18	40 x 18
<input type="checkbox"/> Box terminals	mm	8 x 8	9 x 12	20 x 10	32 x 10	32 x 20
<b>Tightening torque</b>						
<input type="checkbox"/> Flat terminals	Nm	--	10 ... 12	10 ... 12	10 ... 12	10 ... 12
<input type="checkbox"/> Box terminals	Nm	3.5 ... 4	10	10	25	25

### Other properties

Standards		IEC / EN 60947-1, IEC / EN 60947-3, VDE 0660 Part 7				
Size		000	00	1	2	3
<b>Degree of protection</b>						
<input type="checkbox"/> With molded-plastic masking frame/cable lug cover		IP40 (switch closed) / IP20 (switch open)				
<input type="checkbox"/> W/o molded-plastic masking frame/cable lug cover		IP30 (switch closed) / IP20 (switch open)				
<b>Ambient conditions</b>						
<input type="checkbox"/> Ambient temperature during operation <sup>1)</sup>	°C	-25 ... +55				
<input type="checkbox"/> Ambient temperature during storage <sup>1)</sup>	°C	-50 ... +80				
<input type="checkbox"/> Mounting position		Vertical and horizontal (no derating)				
Pollution degree, max.		3 (2 for versions with fuse monitoring)				

<sup>1)</sup> Temperature range may be restricted by the fuses to be used – please note the technical specifications of the fuses

### 2.1.3.3 Auxiliary switches

#### Electrical values and connection

Type		3NP19..-1FA00	3NP19..-1FB00 (solid-state compatible)
Conventional free-air thermal current $I_{th}$	A	5	0.1
<b>Rated operational voltage (<math>U_e</math>)</b>			
<input type="checkbox"/> At 50/60 Hz AC	V	230	230
<input type="checkbox"/> At DC	V	230	--
Rated insulation voltage ( $U_i$ )	V	250	250
<b>Rated operational current <math>I_e</math></b>			
At AC-12, at 230 V	A	5	--
At AC-13, at 230 V	A	--	0.1
At AC-15, at 230 V	A	2	--
At DC-13, at 230 V	A	0.2	--
At DC-14, at 24 V	A	0.45	--
Conductor cross-section, max.	mm <sup>2</sup>	1	1
Connection type		Flat tab sleeve 2.8 x 0.5 mm	

### 2.1.3.4 Fuse monitoring

#### Electrical values and connection

Type		MFM	EFM 10	EFM15				EFM 20	EFM 25	
				3-pole		1-pole				
Version		AC/DC	AC	AC	DC	AC	DC	AC/DC	AC	DC
<b>Rated operational voltage (U<sub>e</sub>) of 3NP11 <sup>1)</sup></b>										
<input type="checkbox"/> At 50/60 Hz AC	V	24 ... 690	230 .. . 690	190 .. . 690	--	110 .. . 690	--	24 ... 240	230 .. . 690	--
<input type="checkbox"/> At DC	V	24 ... 240	--	--	220 .. . 440	--	120 .. . 440	24 ... 250	--	220 .. . 440
Conductor cross-section, max.	mm <sup>2</sup>	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Tightening torque		2.5 ... 1.2	0.5 ... 1.2	0.5 ... 1.2	0.5 ... 1.2	0.5 ... 1.2	0.5 ... 1.2	0.5 ... 1.2	0.5 ... 1.2	0.5 ... 1.2

1) Please note: The permissible voltage range for the main circuit of a fuse switch disconnector is restricted in versions with fuse monitoring. If the upper or lower threshold of the permissible operational voltage range for fuse monitoring is crossed, there is a risk of irreparable damage to the fuse monitoring device or fuse monitoring may malfunction.

#### Signaling contacts

Type		MFM	EFM 10	EFM15				EFM 20	EFM 25	
				3-pole		1-pole				
Version		AC/DC	AC	AC	DC	AC	DC	AC/DC	AC	DC
Type and number of signaling contacts		1 NO + 1 NC	1 CO	1 NO	1 NO	1 NO	1 NO	1 NO	2 CO <sup>1)</sup>	2 CO <sup>1)</sup>
<b>Rated operational voltage U<sub>e</sub></b>										
<input type="checkbox"/> At 50/60 Hz AC	V	230	24	24	24	24	24	24	24	24
<input type="checkbox"/> At DC	V	230	24	24	24	24	24	24	24	24
<b>Rated operational current I<sub>e</sub></b>										
<input type="checkbox"/> At AC-15, at 24 V	A	6	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
<input type="checkbox"/> At AC-15, at 230 V	A	6	--	--	--	--	--	--	--	--
<input type="checkbox"/> At DC-13, at 24 V	A	2	1	1	1	1	1	1	1	1
<input type="checkbox"/> At DC-13, at 230 V	A	0.5	--	--	--	--	--	--	--	--

1) One changeover contact to signal fuse failure and one changeover contact to signal line faults (overvoltage/undervoltage and phase failure).

### 2.1.3.5 Derating values of 3NP1 fuse switch disconnectors when using SITOR fuses

The 3NP1 fuse switch disconnectors are suitable for all fuses in LV HRC design. SITOR semiconductor fuses in LV HRC design can also be used. Although it must be noted that, compared to cable and line protection fuses, these get much hotter during operation. For this reason, the fuse must be operated below the rated current  $I_n$  of the device (derating) when installed in a closed switching device.

The following tables show the permissible load currents of the SITOR semiconductor fuses for installation in 3NP1. The values were determined using the conductor cross-sections specified in the table.

#### Note

If using smaller cross-sections, a considerably higher derating is required due to the lower heat dissipation.

## 3NC

SITOR semiconductor fuse data						Permissible load currents <sup>4)</sup> of the fuse in 3NP1			
Type <sup>1)2)</sup>	Size	Rated current $I_n$	Rated voltage <sup>3)</sup>	Operational class	Required conductor cross-section Cu	Type	Size	Floor mounting	Busbar mounting <sup>5)</sup>
		A	V AC		mm <sup>2</sup>			A	A
3NC23..	3	150	500	gR	70	3NP1163	3	140	150
3NC2425..	3	200	500	gR	95	3NP1163	3	175	190
3NC2427..	3	250	500	gR	120	3NP1163	3	220	237
3NC2428..	3	300	500	gR	185	3NP1163	3	250	285
3NC2431..	3	350	500	gR	240	3NP1163	3	320	332
3NC2432..	3	400	500	aR	240	3NP1163	3	370	380
3NC3336-1	3	630	1000	aR	2 x (40 x 5)	3NP1163	3	500	500
3NC3430-1	3	315	1250	aR	2 x 95	3NP1163	3	280	285
3NC3432-1	3	400	1250	aR	2 x 120	3NP1163	3	340	340
3NC3434-1	3	500	1250	aR	2 x 150	3NP1163	3	400	425
3NC3436-1	3	630	1250	aR	2 x (40 x 5)	3NP1163	3	460	535
3NC8423..	3	150	660	gR	70	3NP1163	3	120	140
3NC8425..	3	200	660	gR	95	3NP1163	3	160	190
3NC8427..	3	250	660	gR	120	3NP1163	3	200	240

SITOR semiconductor fuse data						Permissible load currents <sup>4)</sup> of the fuse in 3NP1			
Type <sup>1)2)</sup>	Size	Rated current I <sub>n</sub>	Rated voltage <sup>3)</sup>	Operational class	Required conductor cross-section Cu	Type	Size	Floor mounting	Busbar mounting <sup>5)</sup>
		A	V AC		mm <sup>2</sup>			A	A
3NC8431..	3	350	660	gR	240	3NP1163	3	270	300
3NC8434..	3	500	660	gR	2 x 150	3NP1163	3	385	385

- 1) Due to the mechanical stress on the relatively long fuse blades, SITOR 3NE41 semiconductor fuses should only be switched occasionally and only at zero current.
- 2) Permissible load currents for 3NE8...-0MK
- 3) 3NP1 fuse switch disconnectors may be operated at up to 1000 V AC/DC with the following restrictions: Degree of pollution 2 (instead of 3) / AC20 or DC20 – i.e. switching only without load
- 4) In the case of cyclic loads, the currents may have to be further reduced (precise values on request).
- 5) Values apply if used with 30 x 10 mm rails; for size 00: 12 x 5 mm and top busbar connection – values for other configurations available on request.

### 3NE1..

SITOR semiconductor fuse data						Permissible load currents <sup>4)</sup> of the fuse in 3NP1					
Type <sup>1)2)</sup>	Size	Rated current I <sub>n</sub>	Rated voltage <sup>3)</sup>	Operational class	Required conductor cross-section Cu	Type	Size	Floor mounting	Type	Size	Busbar mounting <sup>5)</sup>
		A	V AC		mm <sup>2</sup>			A			A
3NE1020-2	00	80	690	gR	25	3NP1133	00	80	3NP1133	00	80
3NE1021-0	00	100	690	gS	35	3NP1133	00	100	3NP1133	00	100
3NE1021-2	00	100	690	gR	35	3NP1133	00	95	3NP1133	00	95
3NE1022-0	00	125	690	gS	50	3NP1133	00	120	3NP1133	00	120
3NE1022-2	00	125	690	gR	50	3NP1133	00	115	3NP1133	00	115
3NE1224-0	1	160	690	gS	70	3NP1143 3NP1153	1 2	160 160	3NP1143 3NP1153	1 2	160 160
3NE1224-2/3	1	160	690	gR	70	3NP1143 3NP1153	1 2	150 160	3NP1143 3NP1153	1 2	152 160
3NE1225-2/3	1	200	690	gR	95	3NP1143 3NP1153	1 2	180 190	3NP1143 3NP1153	1 2	180 190
3NE1227-0	1	250	690	gS	120	3NP1143 3NP1153	1 2	235 250	3NP1143 3NP1153	1 2	238 250

SITOR semiconductor fuse data						Permissible load currents <sup>4)</sup> of the fuse in 3NP1					
Type <sup>1)2)</sup>	Size	Rated current I <sub>n</sub>	Rated voltage <sup>3)</sup>	Operational class	Required conductor cross-section Cu	Type	Size	Floor mounting	Type	Size	Busbar mounting <sup>5)</sup>
		A	V AC		mm <sup>2</sup>			A			A
3NE1227-2/3	1	250	690	gR	120	3NP1143 3NP1153	1 2	220 235	3NP1143 3NP1153	1 2	213 235
3NE1230-0	1	315	690	gS	2 x 70	3NP1153	2	290	3NP1153	2	315
3NE1230-2/3	1	315	690	gR	2 x 70	3NP1153 3NP1163	2 3	278 380	3NP1153 3NP1163	2 3	315 400
3NE1331-0	2	350	690	gS	2 x 95	3NP1153 3NP1163	2 3	315 340	3NP1153 3NP1163	2 3	350 350
3NE1331-2/3	2	350	690	gR	2 x 95	3NP1153 3NP1163	2 3	300 330	3NP1153 3NP1163	2 3	330 350
3NE1332-0	2	400	690	gS	2 x 95	3NP1153	2	340	3NP1153	2	380
3NE1332-2/3	2	400	690	gR	2 x 95	3NP1153 3NP1163	2 3	328 370	3NP1153 3NP1163	2 3	360 400
3NE1333-0	2	450	690	gS	2 x 120	3NP1163	3	450	3NP1163	3	430
3NE1333-2/3	2	450	690	gR	2 x 120	3NP1163	3	430	3NP1163	3	420
3NE1334-0	2	500	690	gS	2 x 120	3NP1163	3	500	3NP1163	3	450
3NE1334-2/3	2	500	690	gR	2 x 120	3NP1163	3	475	3NP1163	3	450
3NE1435-0	3	560	690	gS	2 x 150	3NP1163	3	560	3NP1163	3	520
3NE1435-2/3	3	560	690	gR	2 x 150	3NP1163	3	555	3NP1163	3	510
3NE1436-0	3	630	690	gS	2 x 185	3NP1163	3	630	3NP1163	3	585
3NE1436-2/3	3	630	690	gR	2 x 185	3NP1163	3	620	3NP1163	3	570
3NE1437-0	3	710	690	gS	2 x (40 x 5)	--	--	--	3NP1163	3	605
3NE1437-1	3	710	600	gR	2 x (40 x 5)	--	--	--	3NP1163	3	590
3NE1437-2/3	3	710	690	gR	2 x (40 x 5)	--	--	--	3NP1163	3	580
3NE1438-0	3	800	690	gS	2 x (50 x 5)	--	--	--	3NP1163	3	630
3NE1438-1	3	800	600	gR	2 x (50 x 5)	--	--	--	3NP1163	3	610



SITOR semiconductor fuse data						Permissible load currents <sup>4)</sup> of the fuse in 3NP1					
Type <sup>1)2)</sup>	Size	Rated current I <sub>n</sub>	Rated voltage <sup>3)</sup>	Operational class	Required conductor cross-section Cu	Type	Size	Floor mounting	Type	Size	Busbar mounting <sup>5)</sup>
		A	V AC		mm <sup>2</sup>			A			A
3NE1438-2/3	3	800	690	gR	2 x (50 x 5)	--	--	--	3NP1163	3	600
3NE1447-2/3	3	670	690	gR	2 x (40 x 5)	--	--	--	3NP1163	3	575
3NE1448-2/3	3	850	690	gR	2 x (40 x 8)	--	--	--	3NP1163	3	630
3NE1802-0	00	40	690	gS	10	3NP1123 3NP1133	00 00	40 40	3NP1123 3NP1133	00 00	40 40
3NE1803-0	00	35	690	gS	6	3NP1123 3NP1133	00 00	35 35	3NP1123 3NP1133	00 00	35 35
3NE1813-0	00	16	690	gS	1.5	3NP1123 3NP1133	00 00	16 16	3NP1123 3NP1133	00 00	16 16
3NE1814-0	00	20	690	gS	2.5	3NP1123 3NP1133	00 00	20 20	3NP1123 3NP1133	00 00	20 20
3NE1815-0	00	25	690	gS	4	3NP1123 3NP1133	00 00	25 25	3NP1123 3NP1133	00 00	25 25
3NE1817-0	00	50	690	gS	10	3NP1123 3NP1133	00 00	50 50	3NP1123 3NP1133	00 00	50 50
3NE1818-0	00	63	690	gS	16	3NP1123 3NP1133	00 00	63 63	3NP1123 3NP1133	00 00	63 63
3NE1820-0	00	80	690	gS	25	3NP1123 3NP1133	00 00	80 80	3NP1123 3NP1133	00 00	80 80

1) Due to the mechanical stress on the relatively long fuse blades, SITOR 3NE41 semiconductor fuses should only be switched occasionally and only at zero current.

2) Permissible load currents for 3NE8...-0MK

3) 3NP1 fuse switch disconnectors may be operated at up to 1000 V AC/DC with the following restrictions: Degree of pollution 2 (instead of 3) / AC20 or DC20 – i.e. switching only without load

4) In the case of cyclic loads, the currents may have to be further reduced (precise values on request).

5) Values apply if used with 30 x 10 mm rails; for size 00: 12 x 5 mm and top busbar connection – values for other configurations available on request.

3NE3..

SITOR semiconductor fuse data						Permissible load currents <sup>4)</sup> of the fuse in 3NP1					
Type <sup>12)</sup>	Size	Rated current I <sub>n</sub>	Rated voltage <sup>3)</sup>	Operational class	Required conductor cross-section Cu	Type	Size	Floor mounting	Type	Size	Busbar mounting <sup>5)</sup>
		A	V AC		mm <sup>2</sup>			A			A
3NE3221	1	100	1000	aR	35	3NP1143 3NP1153	1 2	88 95	3NP1143 3NP1153	1 2	95 100
3NE3222	1	125	1000	aR	50	3NP1143 3NP1153	1 2	102 110	3NP1143 3NP1153	1 2	113 125
3NE3224	1	160	1000	aR	70	3NP1143 3NP1153	1 2	130 140	3NP1143 3NP1153	1 2	140 150
3NE3225	1	200	1000	aR	95	3NP1143 3NP1153	1 2	163 175	3NP1143 3NP1153	1 2	170 180
3NE3227	1	250	1000	aR	120	3NP1143 3NP1153	1 2	195 210	3NP1143 3NP1153	1 2	200 215
3NE3230-0B	1	315	1000	aR	185	3NP1153	2	270	3NP1153	2	265
3NE3231	1	350	1000	aR	240	3NP1153	2	290	3NP1153	2	280
3NE3232-0B	1	400	1000	aR	240	3NP1153	2	320	3NP1153	2	310
3NE3233	1	450	1000	aR	2 x 150	3NP1153	2	360	3NP1153	2	330
3NE3332-0B	2	400	1000	aR	240	3NP1153 3NP1163	2 3	330 360	3NP1163 --	3 --	360 --
3NE3333	2	450	1000	aR	2 x 150	3NP1163	3	375	3NP1163	3	390
3NE3334-0B	2	500	1000	aR	2 x 150	3NP1163	3	420	3NP1163	3	415
3NE3335	2	560	1000	aR	2 x 185	3NP1163	3	475	3NP1163	3	460
3NE3336	2	630	1000	aR	2 x 185	3NP1163	3	540	3NP1163	3	500
3NE3337-8	2	710	900	aR	2 x (40 x 5)	3NP1163	3	580	3NP1163	3	500
3NE3338-8	2	800	800	aR	2 x 240	3NP1163	3	605	3NP1163	3	500
3NE3340-8	2	900	690	aR	2 x (40 x 8)	3NP1163	3	630	3NP1163	3	500

1) Due to the mechanical stress on the relatively long fuse blades, SITOR 3NE41 semiconductor fuses should only be switched occasionally and only at zero current.

2) Permissible load currents for 3NE8...-0MK

3) 3NP1 fuse switch disconnectors may be operated at up to 1000 V AC/DC with the following restrictions: Degree of pollution 2 (instead of 3) / AC20 or DC20 – i.e. switching only without load

4) In the case of cyclic loads, the currents may have to be further reduced (precise values on request).

5) Values apply if used with 30 x 10 mm rails; for size 00: 12 x 5 mm and top busbar connection – values for other configurations available on request.

## 3NE4..

SITOR semiconductor fuse data						Permissible load currents <sup>4)</sup> of the fuse in 3NP1					
Type <sup>1)2)</sup>	Size	Rated current I <sub>n</sub>	Rated voltage <sup>3)</sup>	Operational class	Required conductor cross-section Cu	Type	Size	Floor mounting	Type	Size	Busbar mounting <sup>5)</sup>
		A	V AC		mm <sup>2</sup>			A			A
3NE4101	0	32	1000	gR	6	3NP1143	1	30	3NP1143	1	32
3NE4102	0	40	1000	gR	10	3NP1143	1	35	3NP1143	1	40
3NE4117	0	50	1000	gR	10	3NP1143	1	42	3NP1143	1	50
3NE4118	0	63	1000	aR	16	3NP1143	1	55	3NP1143	1	60
3NE4120	0	80	1000	aR	25	3NP1143	1	71	3NP1143	1	76
3NE4121	0	100	1000	aR	35	3NP1143	1	84	3NP1143	1	93
3NE4122	0	125	1000	aR	50	3NP1143	1	107	3NP1143	1	115
3NE4124	0	160	1000	aR	70	3NP1143	1	134	3NP1143	1	144
3NE4327-0B	2	250	800	aR	150	3NP1153	2	195	3NP1153	2	220
						3NP1163	3	215	3NP1163	3	220
3NE4330-0B	2	315	800	aR	240	3NP1153	2	240	3NP1163	3	255
						3NP1163	3	270	--	--	--
3NE4333-0B	2	450	800	aR	2 x (30 x 5)	3NP1163	3	370	3NP1163	3	355
3NE4334-0B	2	500	800	aR	2 x (30 x 5)	3NP1163	3	410	3NP1163	3	390
3NE4337	2	710	800	aR	2 x (50 x 5)	3NP1163	3	540	3NP1163	3	500

- 1) Due to the mechanical stress on the relatively long fuse blades, SITOR 3NE41 semiconductor fuses should only be switched occasionally and only at zero current.
- 2) Permissible load currents for 3NE8...-0MK
- 3) 3NP1 fuse switch disconnectors may be operated at up to 1000 V AC/DC with the following restrictions: Degree of pollution 2 (instead of 3) / AC20 or DC20 – i.e. switching only without load
- 4) In the case of cyclic loads, the currents may have to be further reduced (precise values on request).
- 5) Values apply if used with 30 x 10 mm rails; for size 00: 12 x 5 mm and top busbar connection – values for other configurations available on request.

3NE8..

SITOR semiconductor fuse data						Permissible load currents <sup>4)</sup> of the fuse in 3NP1			
Type <sup>1)2)</sup>	Size	Rated current I <sub>n</sub>	Rated voltage <sup>3)</sup>	Operational class	Required conductor cross-section Cu	Type	Size	Floor mounting	Busbar mounting <sup>5)</sup>
		A	V AC		mm <sup>2</sup>			A	A
3NE8015-1	00	25	690	gR	4	3NP1133	00	25	25
3NE8003-1	00	35	690	gR	6	3NP1133	00	32	35
3NE8017-1	00	50	690	gR	10	3NP1133	00	43	50
3NE8018-1	00	63	690	gR	16	3NP1133	00	52	60
3NE8020-1	00	80	690	aR	25	3NP1133	00	65	72
3NE8021-1	00	100	690	aR	35	3NP1133	00	85	85
3NE8022-1	00	125	690	aR	50	3NP1133	00	100	100
3NE8024-1	00	160	690	aR	70	3NP1133	00	120	115

- 1) Due to the mechanical stress on the relatively long fuse blades, SITOR 3NE41 semiconductor fuses should only be switched occasionally and only at zero current.
- 2) Permissible load currents for 3NE8...-0MK
- 3) 3NP1 fuse switch disconnectors may be operated at up to 1000 V AC/DC with the following restrictions: Degree of pollution 2 (instead of 3) / AC20 or DC20 – i.e. switching only without load
- 4) In the case of cyclic loads, the currents may have to be further reduced (precise values on request).
- 5) Values apply if used with 30 x 10 mm rails; for size 00: 12 x 5 mm and top busbar connection – values for other configurations available on request.

## 2.2 3NP5 up to 630 A

### 2.2.1 Product description

#### 2.2.1.1 Overview



Figure 2-20 3NP5 fuse switch disconnector range

3NP5 fuse switch disconnectors are controls for the occasional manual switching/isolating of loads and distribution boards. They are able to switch on, control and switch off the specified rated current (including a specific overload).

With the 3NP5 fuse switch disconnectors, all poles of downstream electric loads can be safely disconnected from the system under load.

#### 2.2.1.2 Application

The 3NP5 fuse switch disconnectors are ideally suited for surface mounting and installation in the ALPHA distribution boards and SIVACON 8MF1 system cubicles.

The ability to mount them on a range of different busbar systems allows their very diverse implementation in switchboard cabinet and control engineering.

The 3NP5 fuse switch disconnectors are ideal for operation in combination with other switching devices, for example in capacitor modules for reactive-power compensation.

In conjunction with semiconductor protection fuses (e.g. SITOR), these are used for the effective protection of frequency converters and soft starters.

The 3NP5 fuse switch disconnectors are climate-proof and meet the requirements of IEC 60947-1, IEC 60947-3 and DIN VDE 0660 Part 107.

In addition, the 3NP5 series of fuse switch disconnectors complies with the requirements of BS 5419 and is also approved for operation in marine applications.

All 3NP5 fuse switch disconnectors can be sealed as standard (or can be sealed through accessories).

## 2.2.2 Technical specifications

### General technical specifications

Standards		IEC 60947-1, IEC 60947-3, VDE 0660 Part 7			
Type		3NP50	3NP52	3NP53	3NP54
Rated uninterrupted current (I <sub>u</sub> )	A	160	250	400	630
<input type="checkbox"/> For fuse links acc. to IEC 60269-2	Size	00	1 and 0	2 and 1	3 and 2
Conventional free-air thermal current I <sub>th</sub>	A	160	250	400	630
<b>Rated operational voltage (U<sub>e</sub>)</b>					
<input type="checkbox"/> At 50/60 Hz AC	V	690			
<input type="checkbox"/> At DC (3 conducting paths series-connected)	V	440			
<input type="checkbox"/> At DC (2 conducting paths series-connected, fuse monitoring by 3RV)	V	220			
Rated insulation voltage (U <sub>i</sub> )	V	690 <sup>1)</sup>			
Rated impulse withstand voltage (U <sub>imp</sub> )	kV	6			

### Operating and short-circuit behavior

Standards		IEC 60947-1, IEC 60947-3, VDE 0660 Part 7						
Type		3NP50	3NP52	3NP53	3NP54			
<b>Rated conditional short-circuit current with fuses (by fast switch on)</b>								
<input type="checkbox"/> Rated current	Size/ A	00/160	1/250	2/400	3/630			
<input type="checkbox"/> At 500 V AC	kA	50	50	50	50			
<input type="checkbox"/> Permissible let-through current of the fuses (peak value)	kA	15	25	40	50			
<b>Short-circuit strength with fuses (with closed disconnector)</b>								
<input type="checkbox"/> Rated current	Size/ A	00/160	1/250	2/400	3/630			
<input type="checkbox"/> At 500 V AC	kA	100	100	50	50			
<input type="checkbox"/> Maximum permissible let-through I <sup>2</sup> t value	kA <sup>2</sup> s	223	780	2150	5400			
<input type="checkbox"/> Permissible let-through current of the fuses (peak value)	kA	23	32	40	60			
<b>Rated short-circuit making capacity with isolating blades <sup>2)</sup></b>	Size	00	1	2	3			
<input type="checkbox"/> At 500 V AC (peak value)	kA	6	17	17	17			
<b>Rated making and breaking capacity <sup>2)</sup> (in-feed from top or bottom) <sup>3)</sup></b>	Size	00	1	0	2	1	3	2

Standards		IEC 60947-1, IEC 60947-3, VDE 0660 Part 7								
Type		3NP50	3NP52	3NP53	3NP54					
Breaking current $I_c$										
<input type="checkbox"/>	At p.f. = 0.35, rms value at 500 V	A	1300	2500	1600	4000	2500	5040	4000	
<input type="checkbox"/>	At p.f. = 0.35, rms value at 690 V	A	800	1280	100	2520	1600	3200	2520	
<input type="checkbox"/>	At p.f. = 0.35 and 400 V AC, with fuse links, rms value	A	1600	2500	1600	4000	2500	5040	4000	
Rated operational current $I_e$										
<input type="checkbox"/>	At AC-21B, AC-22B, AC-23B at 400 V AC, with fuse links	A	160	250	160	400	250	630	400	
<input type="checkbox"/>	At AC-21B, AC-22B, AC-23B at 500 V AC, with fuse links	A	160	250	160	400	250	630	400	
<input type="checkbox"/>	At AC-21B, AC-22B at AC 690 V	A	160	250	160	400	250	630	400	
<input type="checkbox"/>	At AC-23B at 690 V AC	A	100	160	125	315	200	400	315	
At 220 (440) V DC, with 2 (3) conducting paths series-connected and fuse links:										
<input type="checkbox"/>	Breaking current $I_c$ (L/R = 15 ms)	A	640	1000	640	1600	1600	2520	1600	
<input type="checkbox"/>	Rated operational current $I_e$ at DC-23B	A	160	250	160	400	250	630	400	
Capacitor switching capacity										
<input type="checkbox"/>	Capacitor rating at 400 V AC	kvar	80	90		150		250		
<input type="checkbox"/>	Rated current $I_n$ at 525 V AC	A	116	130		216		361		
<input type="checkbox"/>	Capacitor rating	kvar	100	125		200		300		
<input type="checkbox"/>	Rated current $I_n$	A	110	137		220		330		
Power loss of the switch at $I_{th}$ (without power loss of the fuse links)										
<input type="checkbox"/>	Without busbar adapter	W	7.8 (16.3) <sup>4)</sup>	7.5		15		39		
	Maximum power loss of the usable fuses (per fuse) <sup>5)</sup>	W	12	23		37		50		
Mechanical endurance, operating cycles			1600							

1) When observing degree of pollution 2 (instead of 3) operation is also possible up to  $U_i=1000$  V.

2) Rated making and breaking current according to IEC 60947-3:

ON:  $I = 10 \times I_e$  (AC-23);  $3 \times I_e$  (AC-22);  $1.5 \times I_e$  (AC-21)

OFF:  $I_e = 8 \times I_e$  (AC-23);  $3 \times I_e$  (AC-22);  $1.5 \times I_e$  (AC-21)

3) When electronic fuse monitoring devices are used, infeed must be from the top.

4) With busbar adapter.

5) Values are valid when using LV HRC fuse systems with characteristic gG. If using fuses for semiconductor protection, refer to chapter Derating values of 3NP5 fuse switch disconnectors when using SITOR fuses.

### Main conductor connection

Standards		IEC 60947-1, IEC 60947-3, VDE 0660 Part 7			
Type		3NP50	3NP52	3NP53	3NP54
Flat terminal for connection of					
<input type="checkbox"/> Crimped cable lugs acc. to DIN 46234 (conductor cross-section, stranded)	mm <sup>2</sup>	2.5 ... 120	6 ... 150	16 ... 240	16 ... 2 x 240
<input type="checkbox"/> Pressed cable lugs acc. to DIN 46235 (conductor cross-section, stranded)	mm <sup>2</sup>	16 ... 70	16 ... 150	16 ... 240	16 ... 2 x 240
<input type="checkbox"/> Busbars (usable busbar width)	mm <sup>2</sup>	16 ... 22	22 ... 30	22 ... 30	22 ... 30
<input type="checkbox"/> Clamp terminals	Nm	2.5 ... 50 <sup>1)</sup>	35 ... 120	--	--

1) When connecting one conductor. For 2 conductors max. 1 x 50 mm<sup>2</sup> and 1 x 35 mm<sup>2</sup>

### Signaling contacts

Type		IEC 60947-1, IEC 60947-3, VDE 0660 Part 7			
Version		3NP50	3NP52	3NP53	3NP54
Auxiliary switch 2 NO + 1 NC (accessories)		The same voltage potential must be applied to the NO and NC contacts			
<input type="checkbox"/> At 50/60 Hz to 400 V AC, rated operational current I <sub>e</sub> at AC-12/AC-15	V	16/6			
<input type="checkbox"/> Flat plug-in terminals (DIN 46244)	V	A 6.3 ... 0.8			
<b>Signaling contact for electronic fuse monitoring</b>		1 NO + 1 NC			
Rated operational current I <sub>e</sub>					
<input type="checkbox"/> At DC-13, at 250 V	A	0.27			
<input type="checkbox"/> At AC-15, at 240 V	A	1.5			
<input type="checkbox"/> Thermal free-air rated current I <sub>th</sub>	A	5			



## Other properties

<b>Standards</b>		IEC 60947-1, IEC 60947-3, VDE 0660 Part 7			
<b>Type</b>		<b>3NP50</b>	<b>3NP52</b>	<b>3NP53</b>	<b>3NP54</b>
<b>Degree of protection</b>					
<input type="checkbox"/> Without molded-plastic masking frame		IP00, for 3NP52 with terminal clamp connection, IP10			
<input type="checkbox"/> With molded-plastic masking frame with closed fuse carrier on the operator side		IP30			
<input type="checkbox"/> With molded-plastic masking frame with open fuse carrier		IP10			
<b>Ambient conditions</b> <sup>1)</sup>					
<input type="checkbox"/> Ambient temperature during operation <sup>2)</sup>		°C	-25 ... +55		
<input type="checkbox"/> Ambient temperature during storage		°C	-50 ... +80		
<input type="checkbox"/> Mounting position		Vertical or horizontal installation (switching capacity may be reduced with horizontal installation)			

1) When using isolating blades. If using fuse links, please observe specifications of fuse manufacturer.

2) With busbar adapter

### 2.2.2.1 Derating values of 3NP5 fuse switch disconnectors when using SITOR fuses

#### 3NC (derating values)

3NP5 fuse switch disconnectors are suitable for all fuses in LV HRC design.

SITOR semiconductor fuses in LV HRC design can also be used. Although it must be noted that, compared to cable and line protection fuses, these get much hotter during operation. For this reason, the fuse must be operated below the rated current  $I_n$  of the device (derating) when installed in a closed switching device.

The following table shows the permissible load currents of the SITOR semiconductor fuses for installation in 3NP5. The values were determined using the conductor cross-sections specified in the table.

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#### Note

If using smaller cross-sections, a considerably higher derating is required due to the lower heat dissipation.

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SITOR semiconductor fuse data						Permissible load currents of fuse when installed in 3NP5 for floor mounting					
Type <sup>1)2)</sup>	Size	Rated current I <sub>n</sub>	Rated voltage <sup>3)</sup>	Operational class	Required conductor cross-section Cu	Type 3NP5			Alternative type 3NP5		
						Type	Size	Perm. load current <sup>4)</sup>	Alternative type	Size	Perm. load current <sup>5)</sup>
		A	V AC		mm <sup>2</sup>						
3NC242 3	3	250	500	gR	70	3NP54	3	145	--	--	--
3NC242 5..	3	200	500	gR	95	3NP54	3	180	--	--	--
3NC242 7..	3	250	500	gR	120	3NP54	3	225	--	--	--
3NC242 8..	3	300	500	gR	185	3NP54	3	255	--	--	--
3NC243 1..	3	350	500	gR	240	3NP54	3	330	--	--	--
3NC243 2..	3	400	500	aR	240	3NP54	3	400	--	--	--
3NC333 6-1	3	630	1000	aR	2 x (40 x 5)	3NP54	3	530	--	--	--
3NC333 7-1	3	710	1000	aR	2 x (50 x 5)	3NP54	3	570	--	--	--
3NC333 8-1	3	800	1000	aR	2 x (40 x 8)	3NP54	3	630	--	--	--
3NC334 0-1	3	900	1000	aR	2 x (40 x 8)	3NP54	3	700 <sup>5)</sup>	--	--	--
3NC334 1-1	3	100	1000	aR	2 x (50 x 8)	3NP54	3	770 <sup>5)</sup>	--	--	--
3NC334 2-1	3	110	800	aR	2 x (50 x 8)	3NP54	3	800 <sup>5)</sup>	--	--	--
3NC334 3-1	3	1250	800	aR	2 x (50 x 8)	3NP54	3	850 <sup>5)</sup>	--	--	--
3NC343 0-1	3	315	1250	aR	2 x 95	3NP54	3	295	--	--	--
3NC343 2-1	3	400	1250	aR	2 x 120	3NP54	3	355	--	--	--
3NC343 4-1	3	500	1250	aR	2 x 150	3NP54	3	440	--	--	--
3NC343 6-1	3	630	1250	aR	2 x (40 x 5)	3NP54	3	520	--	--	--
3NC343 8-1	3	800	1100	aR	2 x (40 x 8)	3NP54	3	625	--	--	--
3NC842 3..	3	150	660	gR	70	3NP54	3	135	--	--	--

SITOR semiconductor fuse data						Permissible load currents of fuse when installed in 3NP5 for floor mounting					
						Type 3NP5			Alternative type 3NP5		
Type <sup>1)2)</sup>	Size	Rated current I <sub>n</sub>	Rated voltage <sup>3)</sup>	Operational class	Required conductor cross-section Cu	Type	Size	Perm. load current <sup>4)</sup>	Alternative type	Size	Perm. load current <sup>5)</sup>
		A	V AC		mm <sup>2</sup>						
3NC842 5..	3	200	660	gR	95	3NP54	3	180	--	--	--
3NC842 7..	3	250	660	gR	120	3NP54	3	225	--	--	--
3NC843 1..	3	350	660	gR	240	3NP54	3	300	--	--	--
3NC843 4..	3	500	660	gR	2 x 150	3NP54	3	425	--	--	--
3NC844 4-3C	3	1000	600	aR	2 x (69 x 6)	3NP54	3	850 <sup>5)</sup>	--	--	--

- 1) Due to the mechanical stress on the relatively long fuse blades, SITOR 3NE41 semiconductor fuses should only be switched occasionally and only at zero current.
- 2) Permissible load currents for 3NE8...-0MK, see chapter Technical specifications 3NE8 (derating values)
- 3) 3NP1 fuse switch disconnectors may be operated at up to 1000 V AC/DC with the following restrictions: Degree of pollution 2 (instead of 3) / AC20 or DC20 – i.e. switching only without load
- 4) In the case of cyclic loads, the currents may have to be further reduced (precise values on request).
- 5) The fuse can also be operated at a higher rated uninterrupted current than the 630 A current of the 3NP54. However, in this case, the 3NP54 must not be switched under load (utilization category AC-20).

### 3NE1 (derating values)

SITOR semiconductor fuse data						Permissible load currents of fuse when installed in 3NP5 for floor mounting					
						Type 3NP5			Alternative type 3NP5		
Type <sup>1)2)</sup>	Size	Rated current I <sub>n</sub>	Rated voltage <sup>3)</sup>	Operational class	Required conductor cross-section Cu	Type	Size	Perm. load current <sup>4)</sup>	Alternative type	Size	Perm. load current <sup>5)</sup>
		A	V AC		mm <sup>2</sup>						
3NE102 0-2	00	80	690	gR	25	3NP50	00	80	--	--	--
3NE102 1-0	00	100	690	gS	35	3NP50	00	100	--	--	--

SITOR semiconductor fuse data						Permissible load currents of fuse when installed in 3NP5 for floor mounting					
Type <sup>1)2)</sup>	Size	Rated current I <sub>n</sub>	Rated voltage <sup>3)</sup>	Operational class	Required conductor cross-section Cu	Type 3NP5			Alternative type 3NP5		
						Type	Size	Perm. load current <sup>4)</sup>	Alternative type	Size	Perm. load current <sup>5)</sup>
		A	V AC		mm <sup>2</sup>						
3NE102 1-2	00	100	690	gR	35	3NP50	00	100	--	--	--
3NE102 2-0	00	125	690	gS	50	3NP50	00	125	--	--	--
3NE102 2-2	00	125	690	gR	50	3NP50	00	125	--	--	--
3NE122 4-0	1	160	690	gS	70	3NP52	1	160	3NP53	2	160
3NE122 4-2/3	1	160	690	gR	70	3NP52	1	160	3NP53	2	160
3NE122 5-0	1	200	690	gS	95	3NP52	1	200	3NP53	2	200
3NE122 5-2	1	200	690	gR	95	3NP52	1	200	3NP53	2	200
3NE122 5-3	1	200	690	gR	95	3NP52	1	190	3NP53	2	200
3NE122 7-0	1	250	690	gS	120	3NP52	1	250	3NP53	2	250
3NE122 7-2	1	250	690	gR	120	3NP52	1	250	3NP53	2	250
3NE122 7-3	1	250	690	gR	120	3NP52	1	235	3NP53	2	250
3NE123 0-0	1	315	690	gS	2 x 70	3NP53	2	315	--	--	--
3NE123 0-2/3	1	315	690	gR	2 x 70	3NP53	2	315	--	--	--
3NE133 1-0	2	350	690	gS	2 x 95	3NP53	2	350	3NP54	3	350
3NE133 1-2/3	2	350	690	gR	2 x 95	3NP53	2	350	3NP54	3	350
3NE133 2-0	2	400	690	gS	2 x 95	3NP53	2	400	3NP54	3	400
3NE133 2-2/3	2	400	690	gR	2 x 95	3NP53	2	400	3NP54	3	400
3NE133 3-0	2	450	690	gS	2 x 120	3NP54	3	450	--	--	--
3NE133 3-2/3	2	450	690	gR	2 x 120	3NP54	3	450	--	--	--

SITOR semiconductor fuse data						Permissible load currents of fuse when installed in 3NP5 for floor mounting					
						Type 3NP5			Alternative type 3NP5		
Type <sup>1)2)</sup>	Size	Rated current I <sub>n</sub>	Rated voltage <sup>3)</sup>	Operational class	Required conductor cross-section Cu	Type	Size	Perm. load current <sup>4)</sup>	Alternative type	Size	Perm. load current <sup>5)</sup>
		A	V AC		mm <sup>2</sup>						
3NE133 4-0	2	500	690	gS	2 x 120	3NP54	3	500	--	--	--
3NE133 4-2/3	2	500	690	gR	2 x 120	3NP54	3	500	--	--	--
3NE143 5-0	3	560	690	gS	2 x 150	3NP54	3	560	--	--	--
3NE143 5-2/3	3	560	690	gR	2 x 150	3NP54	3	560	--	--	--
3NE143 6-0	3	630	690	gS	2 x 185	3NP54	3	630	--	--	--
3NE143 6-2/3	3	630	690	gR	2 x 185	3NP54	3	625	--	--	--
3NE143 7-0	3	710	690	gS	2 x (40 x 5)	3NP54	3	710 <sup>5)</sup>	--	--	--
3NE143 7-1	3	710	600	gR	2 x (4 x 5)	3NP54	3	690 <sup>5)</sup>	-	--	--
3NE143 7-2/3	3	710	690	gR	2 x (40 x 5)	3NP54	3	685 <sup>5)</sup>	-	--	--
3NE143 8-0	3	800	690	gS	2 x (50 x 5)	3NP54	3	800 <sup>5)</sup>	--	--	--
3NE143 8-1	3	800	600	gR	2 x (50 x 5)	3NP54	3	750 <sup>5)</sup>	--	--	--
3NE143 8-2/3	3	800	690	gR	2 x (50 x 5)	3NP54	3	770 <sup>5)</sup>	--	--	--
3NE144 7-2/3	3	670	690	gR	2 x (40 x 5)	3NP54	3	655 <sup>5)</sup>	--	--	--
3NE144 8-2/3	3	850	690	gR	2 x (40 x 8)	3NP54	3	820 <sup>5)</sup>	--	--	--
3NE180 2-0	000	40	690	gS	10	3NP50	00	40	--	--	--
3NE180 3-0	000	35	690	gS	6	3NP50	00	35	--	--	--
3NE181 3-0	000	16	690	gS	1.5	3NP50	00	16	--	--	--
3NE181 4-0	000	20	690	gS	2.5	3NP50	00	20	--	--	--

SITOR semiconductor fuse data						Permissible load currents of fuse when installed in 3NP5 for floor mounting					
Type <sup>1)2)</sup>	Size	Rated current I <sub>n</sub>	Rated voltage <sup>3)</sup>	Operational class	Required conductor cross-section Cu	Type 3NP5			Alternative type 3NP5		
						Type	Size	Perm. load current <sup>4)</sup>	Alternative type	Size	Perm. load current <sup>5)</sup>
		A	V AC		mm <sup>2</sup>						
3NE181 5-0	000	25	690	gS	4	3NP50	00	25	--	--	--
3NE181 7-0	000	50	690	gS	10	3NP50	00	50	--	--	--
3NE181 8-0	000	63	690	gS	16	3NP50	00	63	--	--	--
3NE182 0-0	000	80	690	gS	25	3NP50	00	80	--	--	--

- 1) Due to the mechanical stress on the relatively long fuse blades, SITOR 3NE41 semiconductor fuses should only be switched occasionally and only at zero current.
- 2) Permissible load currents for 3NE8...-0MK, see chapter Technical specifications 3NE8 (derating values)
- 3) 3NP1 fuse switch disconnectors may be operated at up to 1000 V AC/DC with the following restrictions: Degree of pollution 2 (instead of 3) / AC20 or DC20 – i.e. switching only without load
- 4) In the case of cyclic loads, the currents may have to be further reduced (precise values on request).
- 5) The fuse can also be operated at a higher rated uninterrupted current than the 630 A current of the 3NP54. However, in this case, the 3NP54 must not be switched under load (utilization category AC-20).

**3NE3 (derating values)**

SITOR semiconductor fuse data						Permissible load currents of fuse when installed in 3NP5 for floor mounting					
Type <sup>1)2)</sup>	Size	Rated current I <sub>n</sub>	Rated voltage <sup>3)</sup>	Operational class	Required conductor cross-section Cu	Type 3NP5			Alternative type 3NP5		
						Type	Size	Perm. load current <sup>4)</sup>	Alternative type	Size	Perm. load current <sup>5)</sup>
		A	V AC		mm <sup>2</sup>						
3NE322 1	1	100	1000	aR	35	3NP52	1	95	3NP53	2	100
3NE322 2	1	125	1000	aR	50	3NP52	1	110	3NP53	2	120
3NE322 4	1	160	1000	aR	70	3NP52	1	140	3NP53	2	150

SITOR semiconductor fuse data						Permissible load currents of fuse when installed in 3NP5 for floor mounting					
Type <sup>1)2)</sup>	Size	Rated current I <sub>n</sub>	Rated voltage <sup>3)</sup>	Operational class	Required conductor cross-section Cu	Type 3NP5			Alternative type 3NP5		
						Type	Size	Perm. load current <sup>4)</sup>	Alternative type	Size	Perm. load current <sup>5)</sup>
		A	V AC		mm <sup>2</sup>						
3NE322 5	1	200	1000	aR	95	3NP52	1	175	3NP53	2	190
3NE322 7	1	250	1000	aR	120	3NP52	1	210	3NP53	2	230
3NE323 0-0B	1	315	1000	aR	185	3NP53	2	285	--	--	--
3NE323 1	1	350	1000	aR	240	3NP53	2	310	--	--	--
3NE323 2-0B	1	400	1000	aR	240	3NP53	2	330	--	--	--
3NE323 3	1	450	1000	aR	2 x 150	3NP53	2	360	--	--	--
3NE333 2-0B	2	400	1000	aR	240	3NP54	3	360	--	--	--
3NE333 3	2	450	1000	aR	2 x 150	3NP54	3	400	--	--	--
3NE333 4-0B	2	500	1000	aR	2 x 150	3NP54	3	450	--	--	--
3NE333 5	2	560	1000	aR	2 x 185	3NP54	3	510	--	--	--
3NE333 6	2	630	1000	aR	2 x 185	3NP54	3	580	--	--	--
3NE333 7-8	2	710	900	aR	2 x (40 x 5)	3NP54	3	630	--	--	--
3NE333 8-8	2	800	800	aR	2 x 240	3NP54	3	630	--	--	--
3NE334 0-8	2	900	690	aR	2 x (40 x 8)	3NP54	3	630	--	--	--

- 1) Due to the mechanical stress on the relatively long fuse blades, SITOR 3NE41 semiconductor fuses should only be switched occasionally and only at zero current.
- 2) Permissible load currents for 3NE8...-0MK
- 3) 3NP1 fuse switch disconnectors may be operated at up to 1000 V AC/DC with the following restrictions: Degree of pollution 2 (instead of 3) / AC20 or DC20 – i.e. switching only without load
- 4) In the case of cyclic loads, the currents may have to be further reduced (precise values on request).
- 5) The fuse can also be operated at a higher rated uninterrupted current than the 630 A current of the 3NP54. However, in this case, the 3NP54 must not be switched under load (utilization category AC-20).

## 3NE4 (derating values)

SITOR semiconductor fuse data						Permissible load currents of fuse when installed in 3NP5 for floor mounting					
Type <sup>1)2)</sup>	Size	Rated current I <sub>n</sub>	Rated voltage <sup>3)</sup>	Operational class	Required conductor cross-section Cu	Type 3NP5			Alternative type 3NP5		
						Type	Size	Perm. load current <sup>4)</sup>	Alternative type	Size	Perm. load current <sup>5)</sup>
		A	V AC		mm <sup>2</sup>						
3NE410 1	0	32	1000	gR	6	3NP52	1	32	--	--	--
3NE410 2	0	40	1000	gR	10	3NP52	1	40	--	--	--
3NE411 7	0	50	1000	gR	10	3NP52	1	50	--	--	--
3NE411 8	0	63	1000	aR	16	3NP52	1	63	--	--	--
3NE412 0	0	80	1000	aR	25	3NP52	1	80	--	--	--
3NE412 1	0	100	1000	aR	35	3NP52	1	95	--	--	--
3NE412 2	0	125	1000	aR	50	3NP52	1	120	--	--	--
3NE412 4	0	160	1000	aR	70	3NP52	1	150	--	--	--
3NE432 7-0B	2	250	800	aR	150	3NP53	2	210	3NP54	3	220
3NE433 0-0B	2	315	800	aR	240	3NP53	2	270	3NP54	3	285
3NE433 3-0B	2	450	800	aR	2 x (30 x 5)	3NP53	2	400	3NP54	3	420
3NE433 4-0B	2	500	800	aR	2 x (30 x 5)	3NP53	2	450	--	--	--
3NE433 7	2	710	800	aR	2 x (50 x 5)	3NP53	2	600	--	--	--

- 1) Due to the mechanical stress on the relatively long fuse blades, SITOR 3NE41 semiconductor fuses should only be switched occasionally and only at zero current.
- 2) Permissible load currents for 3NE8...-0MK
- 3) 3NP1 fuse switch disconnectors may be operated at up to 1000 V AC/DC with the following restrictions: Degree of pollution 2 (instead of 3) / AC20 or DC20 – i.e. switching only without load
- 4) In the case of cyclic loads, the currents may have to be further reduced (precise values on request).
- 5) The fuse can also be operated at a higher rated uninterrupted current than the 630 A current of the 3NP54. However, in this case, the 3NP54 must not be switched under load (utilization category AC-20).



## 3NE8 (derating values)

SITOR semiconductor fuse data						Permissible load currents of fuse when installed in 3NP5 for floor mounting					
						Type 3NP5			Alternative type 3NP5		
Type <sup>1)2)</sup>	Size	Rated current I <sub>n</sub>	Rated voltage <sup>3)</sup>	Operational class	Required conductor cross-section Cu	Type	Size	Perm. load current <sup>4)</sup>	Alternative type	Size	Perm. load current <sup>5)</sup>
		A	V AC		mm <sup>2</sup>						
3NE801 5-1	00	25	690	gR	4	3NP50	00		--	--	--
3NE800 3-1	00	35	690	gR	6	3NP50	00		--	--	--
3NE801 7-1	00	50	690	gR	10	3NP50	00		--	--	--
3NE801 8-1	00	63	690	gR	16	3NP50	00		--	--	--
3NE802 0-1	00	80	690	aR	25	3NP50	00		--	--	--
3NE802 1-1	00	100	690	aR	35	3NP50	00		--	--	--
3NE802 2-1	00	125	690	aR	50	3NP50	00		--	--	--
3NE802 4-1	00	160	690	aR	70	3NP50	00		--	--	--

- 1) Due to the mechanical stress on the relatively long fuse blades, SITOR 3NE41 semiconductor fuses should only be switched occasionally and only at zero current.
- 2) Permissible load currents for 3NE8...-0MK
- 3) 3NP1 fuse switch disconnectors may be operated at up to 1000 V AC/DC with the following restrictions: Degree of pollution 2 (instead of 3) / AC20 or DC20 – i.e. switching only without load
- 4) In the case of cyclic loads, the currents may have to be further reduced (precise values on request).
- 5) The fuse can also be operated at a higher rated uninterrupted current than the 630 A current of the 3NP54. However, in this case, the 3NP54 must not be switched under load (utilization category AC-20).

## 2.3 3NJ4, 3NJ5 up to 2000 A

### 2.3.1 Product description

#### 2.3.1.1 All key product features at a glance



Figure 2-21 3NJ4/3NJ5 fuse switch disconnectors

- meet the requirements of IEC / EN 60439-1, IEC / EN 60947-3
- Voltage levels up to 690 V AC
- Rated operational current from 160 A to 2000 A
- Fuse links according to IEC 60269 Part 1 can be used – nickel-plated fuse blades are not permissible due to the high transfer resistance
- In open position safe from touch by the back of the hand (exception 3NJ56: IP00)
- Parking position for maintenance
- 1-pole or 3-pole switchable
- Vertical and horizontal mounting position
- Climate-proof
- Degree of protection IP30 with closed fuse carriers, IP10 with open fuse carriers (exception 3NJ56: IP00)

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#### Note

Instead of fuse links, some 3NJ4 fuse switch disconnectors can be equipped with isolating blades. They can then be switched as "Fuseless switch disconnectors", but only under AC-20 conditions "Switching without load".

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### **2.3.1.2 Parking position**

For maintenance, e.g. of 1-pole switchable in-line fuse switch disconnectors – sizes 1 to 3 – and for 3-pole switchable in-line fuse switch disconnectors – size 00 – the fuse carriers can be mounted after being turned by 180° (fuse facing outwards).

This results in the following advantages:

- Visible disconnection point
- Depot for fuse links (parking position)
- No opportunity for mistakes when replacing the fuse links
- Additional touch protection in the vicinity of the lyre-shaped contacts

### **2.3.1.3 Application**

3NJ41/3NJ56 1-pole and 3-pole in-line fuse switch disconnectors can be installed in low-voltage distribution boards, substations and cable distribution cubicles.

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#### **Note**

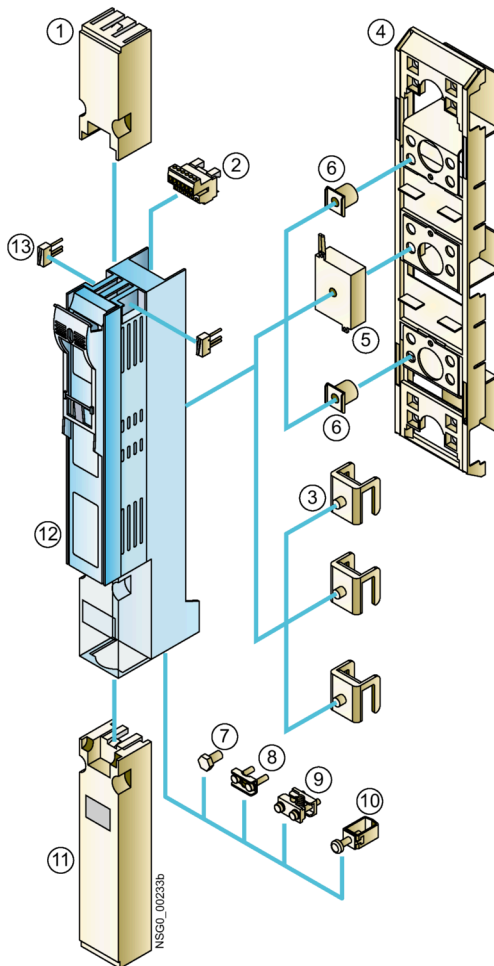
For 1-pole switchable fuse switch disconnectors the following applies acc. to EC/EN 60947-3:

These devices are intended for power distribution systems that may require the switching and/or disconnection of individual outer conductors. They should not be used for switching the primary circuits of three-phase equipment.

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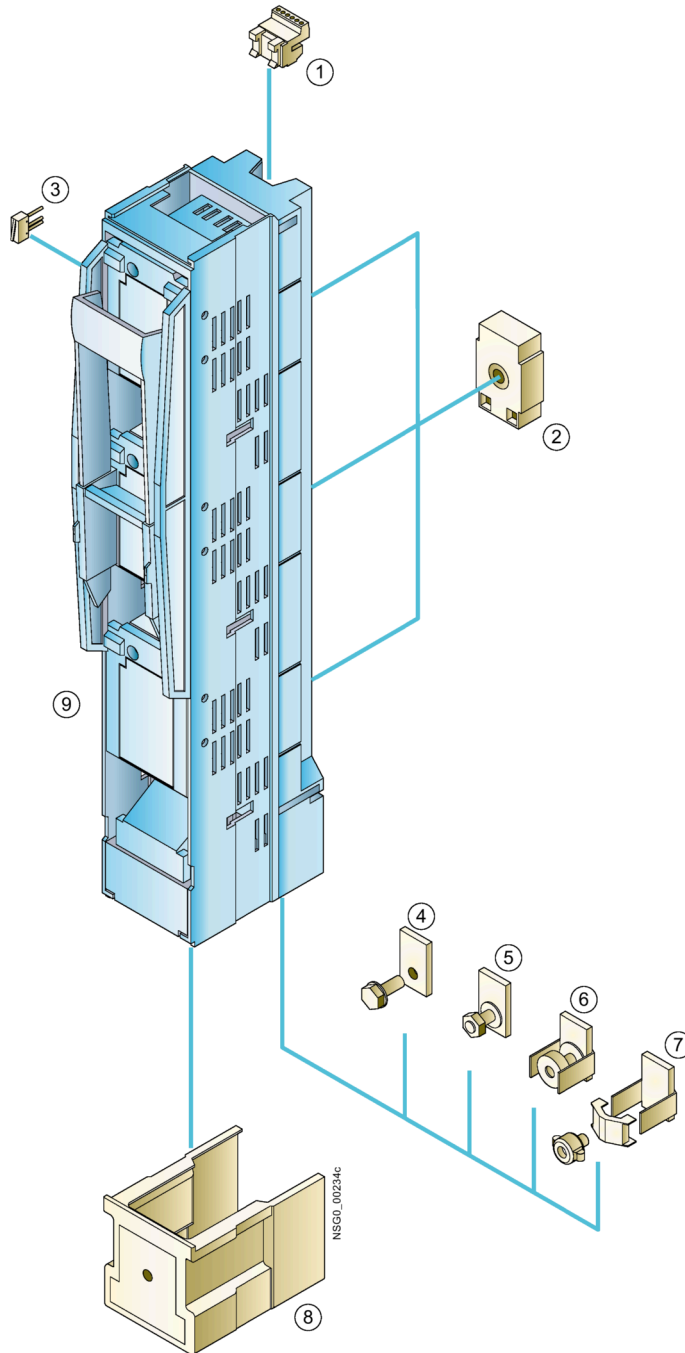
## 2.3.2 Overview of components

### 2.3.2.1 3NJ4/3NJ5 in size 00



- |  |   |
|--|---|
| ① Cover                                      | ⑧ Saddle terminals                                |
| ② Terminal strip                             | ⑨ Prism terminals                                 |
| ③ Busbar terminal                            | ⑩ Box terminals                                   |
| ④ Adapter for screw fixing on busbar systems | ⑪ Cover   |
| ⑤ Current transformer                        | ⑫ 3NJ4/5 switch disconnector, basic unit, size 00 |
| ⑥ Distance compensation                      | ⑬ Auxiliary switch – mounting kit                 |
| ⑦ Flat terminals                             |   |

2.3.2.2 3NJ4/3NJ5 in sizes 1 to 3



- |   |   |
|---|---|
| ① Terminal strip                                | ⑥ V terminal  |
| ② Distance compensation or current transformers | ⑦ Box terminals                                       |
| ③ Auxiliary switch                              | ⑧ Cover   |
| ④ Flat terminals                                | ⑨ 3NJ4/5 switch disconnector, basic unit, sizes 1/2/3 |
| ⑤ Stud terminal                                 |   |

### 2.3.3 Technical specifications

#### General technical details

Standards	IEC 60947-1, IEC 60947-3, VDE 0660 Part 107									
Type	3NJ41 0	3NJ41 2	3NJ41 3	3NJ41 4	3NJ56	3NJ41 5	3NJ41 8	3NJ41 6	3NJ41 7	
<b>Conventional thermal current</b>										
Free-air with gG fuses, $I_{th}$	A	160	250	400	630	1250	630	800	1260	1600
Free-air with isolating blade, $I_{th}$	A	--	--	--	800	--	1000	1250	1600	2000
Free-air with gTr fuses, $I_{th}$	A	--	--	--	--	1154	722	910	1154	1444
Rated apparent power of the transformer, $S_n$	kVA	--	--	--	--	800	500	630	800	1000
<b>For fuse links and isolating blades</b>										
Size		00	1	2	3	4a	3	3	2 x 3	2 x 3
gG according to IEC 60269, $I_n$	A	160	250	400	630	1250	630	800	2 x 630	2 x 800
Free-air with isolating blade, $I_n$	A	--	--	--	--	--	1000	1250	2 x 800	2 x 1000
gTr according to VDE 0636-2011, $I_{rat}$	A	--	--	--	--	1154	722	909	2 x 577	2 x 722
gTr according to VDE 0636-2011, $S_n$	kVA	--	--	--	--	800	500	630	2 x 400	2 x 500
<b>Rated operational voltage (<math>U_e</math>)</b>										
<input type="checkbox"/> At 40 Hz ... 60 Hz AC	V	690	690	690	690	690	690	400	690	400
<b>Rated insulation voltage (<math>U_i</math>)</b>										
	V	800	1000	1000	1000	1000	1000	690	1000	690
<b>Rated impulse withstand voltage (<math>U_{imp}</math>)</b>										
	kV	8	12	12	12	12	12	8	12	8
<b>Rated conditional short-circuit current with fuses, at 500 V AC</b>										
With gG fuse (rms value)	kA	80 / 120	120	120	120	80	120	50	80	50
With gTr fuse (rms value)	kA	--	--	--	--	--	--	50	--	--
<b>Max. permissible power loss per fuse link</b>										
	W	12	32	45	48	110	51	61	48	51
<b>Rated short-time withstand current <math>I_{cw}</math> when using isolating blades</b>										
in interlocking position and when using isolating blades instead of fuse links ("Fuseless switch disconnector"), 3-pole switchable version (exception: 3NJ414: 1-pole without interlocking position and 3-pole switchable), rms values	kA	--	--	--	10 / 15	--	15	15	25	25

Standards			IEC 60947-1, IEC 60947-3, VDE 0660 Part 107								
Type			3NJ41 0	3NJ41 2	3NJ41 3	3NJ41 4	3NJ56	3NJ41 5	3NJ41 8	3NJ41 6	3NJ41 7
<b>Rated making and breaking capacity</b>											
Rated operational current $I_e$ for gG fuses at											
AC-21B	400 V AC	A	160	250	400	630	1250	630	800	2 x 630	2 x 800
AC-22B	400 V AC	A	160	250	400	630	1250	630	800	2 x 630	2 x 800
AC-23B	400 V AC	A	--	250	400	--	--	--	--	--	--
AC-21B	500 V AC	A	160	250	400	630	1250	--	--	--	--
AC-22B	500 V AC	A	160	250	400	630	1250	--	--	--	--
AC-23B	500 V AC	A	--	--	--	--	--	--	--	--	--
AC-21B	690 V AC	A	100	250	400	630	1250	--	--	--	--
AC-22B	690 V AC	A	100	250	--	--	--	--	--	--	--
AC-23B	690 V AC	A	--	--	--	--	--	--	--	--	--
Rated operational current $I_e$ for gTr fuses at											
AC-22B	400 V AC	A	--	--	--	--	--	722	910	2 x 577	2 x 722
Rated operational current $I_e$ for isolating blades											
AC-22B	400 V AC	A	--	--	--	--	--	1000	1250	2 x 800	2 x 1000
<b>Permissible ambient temperature</b>		°C	-25 ... +55, > 35 °C with derating factors								
<b>Mechanical endurance</b> , operating cycles			1400	1400	800	800	500	800	500	500	500
<b>Electrical endurance</b> , operating cycles			200	200	200	200	100	100	100	100	100
<b>Degree of protection</b>											
With closed fuse carrier, with terminal cover and peripheral cover			IP30	IP30	IP30	IP30	IP30	IP30	IP30	IP30	IP30
With open fuse carrier			IP10	IP10	IP10	IP10	IP10	IP10	IP10	IP10	IP10
<b>Power loss of the main conducting paths at <math>I_{th}</math></b>		W	18	23	54	115	190	275	155	350	375
<b>Main conductor connection</b>											
<b>Terminal screws</b>			M8	M10	M12	M12	M16	2 x M12	2 x M12	3 x M12	4 x M12
Flat bars		mm	20	30	30	30	80	80 x 10	80 x 10	--	--
Cable lug, max. conductor cross-section (stranded)		mm <sup>2</sup>	95	240	240	240	2 x 300	2 x 300	2 x 300	3 x 300	4 x 300
Tightening torque		Nm	12 ... 1 5	30 ... 3 5	35 ... 4 0	35 ... 4 0	50 ... 6 0	35 ... 4 0	35 ... 4 0	35 ... 4 0	35 ... 4 0
<b>Clamp/V terminals</b>		mm <sup>2</sup>	1.5 ... 70	25 ... 3 00	25 ... 3 00	25 ... 3 00	--	--	--	--	--
<b>Fixing screws</b>			M8	M12	M12	M12	M16	M12	M12	M12	M12
Required tightening torque for mounting on busbars		Nm	16 ... 1 8	35 ... 4 0	35 ... 4 0	35 ... 4 0	35 ... 4 0	50 ... 6 0	35 ... 4 0	35 ... 4 0	35 ... 4 0

## **2.4 5SG fuse switch disconnectors and switch disconnectors with fuses up to 63 A**

### **2.4.1 Product description**

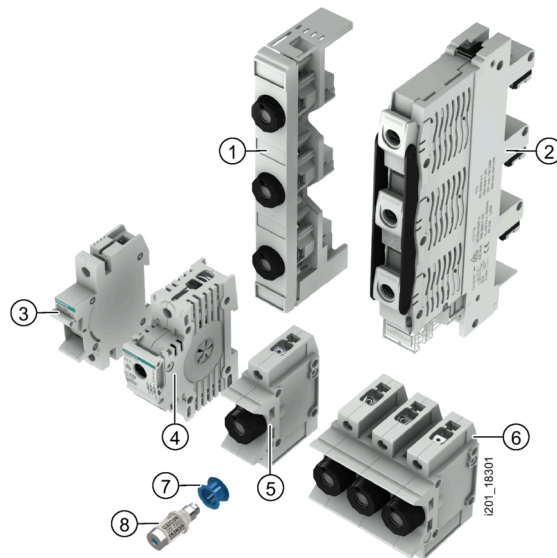
The NEOZED fuse system is primarily used in distribution technology and industrial switchboard assemblies. The system is easy to use and is also approved for domestic installation.

The MINIZED switch disconnectors are primarily used in switchboard assemblies and control engineering. They are approved for switching loads as well as for safe switching in the event of short circuits. The MINIZED D02 is also suitable for use upstream of the meter in household applications in compliance with the recommendations of the VDEW according to TAB.

Due to its compact design, the MINIZED D01 fuse switch disconnector is primarily used in control engineering. The NEOZED fuse bases are the most cost-effective solution for using NEOZED fuses. All NEOZED bases must be fed from the bottom to ensure that the threaded ring is insulated during removal of the fuse link. The terminals of the NEOZED bases are available in different versions and designs to support the various installation methods.



### 2.4.1.1 Benefits



- ① NEOZED D02 bus-mounting base for 60 mm busbar system, with NEOZED screw cap
- ② NEOZED D02 bus-mounting switch disconnector for 60 mm busbar system
- ③ MINIZED D01 fuse switch disconnectors
- ④ MINIZED D02 switch disconnectors
- ⑤ NEOZED comfort bases, 1-pole (fuse base with touch protection BGV A3), with NEOZED screw cap
- ⑥ NEOZED comfort bases, 3-pole (fuse base with touch protection BGV A3), with NEOZED screw cap
- ⑦ NEOZED adapter sleeve
- ⑧ NEOZED fuse link

Compared to the older DIAZED fuse system, the NEOZED fuse system is significantly more modern:

- Much more compact design, which saves space in the distribution board
- Modern devices, such as the MINIZED switching devices, which combine the functions of a switch disconnector and a fuse base
- Wide range of accessories, such as busbars for one, two, or three-phase wiring
- Modern terminals for MINIZED D02 and NEOZED comfort bases: visible, clear and controllable connection simplifies cable entry

Double terminal chambers permit connection of two wires of different cross-sections

- Lower power loss of the fuse links

Even when compared to the internationally prevalent cylindrical fuse system, the NEOZED fuse system has considerable advantages:

- Non-interchangeability thanks to use of adapter sleeves (i.e. it is not possible to insert a fuse for larger currents). This is a requirement of numerous wiring regulations in Germany and other European countries.
- Switching devices with load switching characteristics allow the safe switching of load currents up to 63 A.

### 2.4.2 Technical specifications

<b>Standards</b>		<b>NEOZED fuse links, 5SE2</b>	
<b>Standards</b>		IEC 60269-3; DIN VDE 0636-3	
<b>Operational class</b>		gG	
<b>Rated voltage (U<sub>n</sub>)</b>	V AC	400	
	V DC	250	
<b>Rated current (I<sub>n</sub>)</b>	A	2 ... 100	
<b>Rated breaking capacity</b>	kA AC	50	
	kA DC	8	
<b>Non-interchangeability</b>		Using adapter sleeves	
<b>Resistance to climate</b>	°C	Up to 45 at 95% rel. humidity	
<b>Ambient temperature</b>	°C	-5 ... +40°C, humidity 90% at 20°C	

	MINIZED switch disconnectors	MINIZED fuse switch disconnectors	Fuse bases, made of ceramic			Comfort bases	Fuse bases
	D02	D01	D01	D02	D03	D01 / 02	D01 / 02
	5SG71	5SG76	5SG15 5SG55	5SG16 5SG56	5SG18	5SG130 1 5SG170 1 5SG530 1 5SG570 1	5SG1302 5SG1702 5SG5302 5SG5702
<b>Standards</b>	DIN VDE 0638; EN 60947-3 (VDE 0660-107) IEC / EN 60947-3		IEC 60269-3; DIN VDE 0636-3				
<b>Main switch characteristic</b> EN 60204-1	Yes	--	--				

## 2.4 5SG fuse switch disconnectors and switch disconnectors with fuses up to 63 A

		MINIZED switch discon- nectors	MINIZED fuse switch disconnect- ors	Fuse bases, made of ceramic			Comfort bases	Fuse bases
		D02	D01	D01	D02	D03	D01 / 02	D01 / 02
		5SG71	5SG76	5SG15 5SG55	5SG16 5SG56	5SG18	5SG130 1 5SG170 1 5SG530 1 5SG570 1	5SG13 02 5SG17 02 5SG53 02 5SG57 02
<b>Insulation characteristic</b> EN 60664-1		Yes	--	--				
<b>Rated voltage <math>U_n</math></b>	V AC	230 / 400, 240 / 415			400			
<input type="checkbox"/> 1P	V DC	65	48	400				
<input type="checkbox"/> 2P in series	V DC	130	110	250				
<b>Rated current <math>I_n</math></b>	A	63	16	16	63	100	16 / 63	16 / 63
<b>Rated conditional short-circuit current</b>	kA	50						
<b>Rated insulation voltage</b>	V AC	500	690	--				
<b>Rated impulse withstand voltage</b>	kV AC	6	6	--				
<b>Overvoltage category</b>		IV	IV	--				
<b>Utilization category</b> acc. to VDE 0638								
<input type="checkbox"/> AC-22	A	63	16	--				
<b>Utilization category</b> acc. to EN 60947-3								
<input type="checkbox"/> AC-22A	A	--	16	--				
<input type="checkbox"/> AC-22B	A	63	--	--				
<input type="checkbox"/> AC-23B	A	35	--	--				
<input type="checkbox"/> AC-22B	A	63	--	--				
<b>Sealable</b> when switched on		Yes			Yes, with sealable screw caps			
<b>Mounting position</b>		Any, preferably vertical						
<b>Reduction factor</b> of $I_n$ with 18 poles								
<input type="checkbox"/> Side-by-side mounting		0.9	--					
<input type="checkbox"/> On top of one another, with vertical standard mounting rail		0.87	--					
<b>Degree of protection</b> acc. to IEC 60529		IP20, with connected conductors <sup>1)</sup>						
<b>Terminals</b> With touch protection acc. to BGV A3		Yes			No		Yes	
<b>Ambient temperature</b>		°C -5 ... +40°C, humidity 90% at 20°C						

		MINIZED switch discon- nectors	MINIZED fuse switch disconnect- ors	Fuse bases, made of ceramic			Comfort bases	Fuse bases
		D02	D01	D01	D02	D03	D01 / 02	D01 / 02
		5SG71	5SG76	5SG15 5SG55	5SG16 5SG56	5SG18	5SG130 1 5SG170 1 5SG530 1 5SG570 1	5SG13 02 5SG17 02 5SG53 02 5SG57 02
<b>Terminal versions</b>		Box ter- minals	Box termi- nals	B	K, S	K / S	Box termi- nals	Box termi- nals
<b>Conductor cross-sections</b>	mm <sup>2</sup>							
<input type="checkbox"/> Solid								Input 1 ... 35 , out- put 1 ... 25
<input type="checkbox"/> Solid and stranded	mm <sup>2</sup>	1.5 ... 35	1.5 ... 16	1.5 ... 4	2.5 ... 25	10 ... 5 0	0.75 ... 3 5	Input 1.5 ... 25, output 1 ... 25
<input type="checkbox"/> Flexible								Input 1.5 ... 25, output 1 ... 25
<input type="checkbox"/> Flexible, with end sleeve	mm <sup>2</sup>	1.5 ... 35	1.5 ... 10	1.5 ... 4	1.5 ... 16	10 ... 3 5	--	Input 0.75 ... 35, output 1 ... 25
<b>Tightening torque</b>	Nm	2.5 ... 3	2	1.2	2	3.5 / 2. 5	3.5	3

1) Degree of protection IP20 is tested according to regulations using a straight test finger (from the front), with the device mounted and equipped with a cover, housing or some other enclosure.





## Switch disconnectors with fuses

### 3.1 3KF up to 800 A

#### 3.1.1 Product description

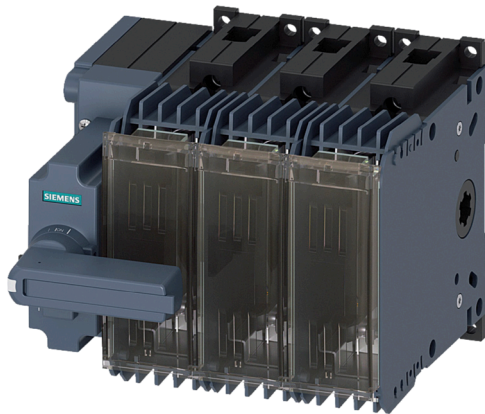


Figure 3-1 3KF LV HRC switch disconnector with fuse, complete assemblies, 3-pole

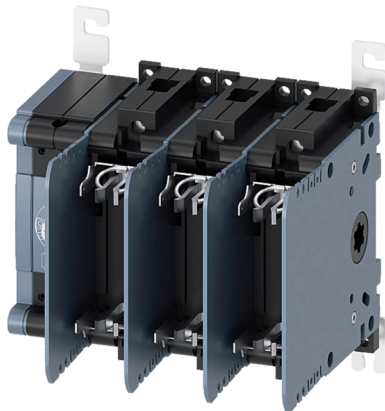


Figure 3-2 3KF SITOR switch disconnector with fuse, basic unit, 3-pole, front operating mechanism, operating mechanism on right, size 1, box terminals



Figure 3-3 3KF SITOR switch disconnector with fuse, basic unit, 3-pole, front operating mechanism, operating mechanism in center, size 2, flat terminals

## Features

- 3KF LV HRC series for standard applications and 3KF SITOR for protection of semiconductors
- 3-pole and 4-pole versions in 5 different sizes (4-pole versions for 3KF LV HRC series only)
- Supplied as a complete assembly including direct operating mechanism or as a basic unit without a handle
- Direct operating mechanism with handle on switch disconnector
- Door-coupling rotary operating mechanism for operation of switch disconnector outside the control cabinet door
- Versions with lateral operating mechanism left and right
- Connections in form of box terminal or flat terminal
- Floor mounting or mounting on a standard mounting rail (size 1)
- Additional poles can be retrofitted: 4. Contact element, N or N/PE terminals
- Auxiliary switches for querying the switch positions
- Suitable for AC applications up to 690 V + 10% (wind power)
- Suitable for DC applications up to 440 V
- Suitable LV HRC fuse links up to 800 A
- Double contact interruption



### 3.1.1.1 Benefits

- Enhanced touch protection
- Locking function helps to prevent unauthorized operation
- Enhanced protection against inter-phase arcing
- Safe use in wind farms
- Compact design saves space
- Wide variety of applications thanks to a range of different operating mechanism designs
- Supplementary functions can be retrofitted
- Various service positions are possible thanks to optimized heat dissipation
- Test function to ensure safe commissioning
- Comprehensive support through provision of CAx data
- Protection against short circuit and overload

### 3.1.1.2 Application

3KF switch disconnectors with fuses protect against overload and short circuit as main control and EMERGENCY OFF switches of switchboards, power distribution boards, power supply and motor outgoing feeders. 3KF switch disconnectors with fuses are designed to switch the specified rated current on and off under load. At the same time, they provide a safety isolating function and isolating distance in all low-voltage circuits. All 3KF switch disconnectors with fuses are climate-proof and meet the requirements of IEC 60947-1, IEC 60947-3 and VDE 0660-107.

### 3.1.1.3 Semiconductor protection with 3KF SITOR

Switch disconnectors with fuses protect the load from overload and short-circuit by means of the fuses and are used to switch the specified rated current on and off under load. At the same time, they provide a safety isolating function and isolating distance in all low-voltage circuits.

Conventional fuse switching devices, such as 3KF, 3NP1 are designed to use LV HRC fuses that comply with the fuse standard IEC 60269-2. This standard describes the technical constraints on fuses for the protection of cables and motor feeders, including the maximum permitted power loss of the fuses.

Conventional fuse switching devices are designed in accordance with the maximum values permitted according to this fuse standard with respect to possible heat dissipation. Fuses for semiconductor protection (SIEMENS trade name SITOR) must disconnect much faster than standard fuses to protect the semiconductor load as reliably as possible and by virtue of their design have power loss values that in some cases significantly exceed the limit values permitted in IEC 60269-2.

To permit simple installation, not only are many application-specific special designs available but also very many fuses for semiconductor protection in the standard-compliant designs, such as the LV HRC design.

3.1 3KF up to 800 A

If a fuse of this kind is used in a conventional fuse switching device for standard-compliant fuses for semiconductor protection, the maximum permissible fuse power loss defined by the switching device must be complied with. If the rated power loss of the fuse for semiconductor protection is above that permitted by the switching device, the fuse can only be operated in the partial load range, i.e. the load current must be reduced until the actual power loss is within the limit values defined by the switching device. The fuse manufacturer provides the data required for this (power loss as a function of the load current).

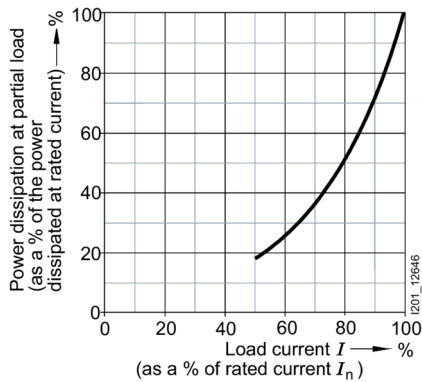


Figure 3-4 Power losses depending on the operational current for SIEMENS fuses for semiconductor protection

If the maximum power losses of the fuse defined by the switching device are not complied with, the switching device may overheat or, in the worst case, even cause a fire in the switchgear.

3KF SITOR is a variation of the proven 3KF LV HRC fuse switch disconnector, provides optimized heat dissipation and permits the use of fuses with substantially higher power losses. In this way, fuses for semiconductor protection can be loaded with higher currents than conventional fuse switching devices.

For use of SIEMENS fuses for semiconductor protection in 3KF SITOR and 3KF LV HRC, the possible load values are available for each possible combination of a fuse and circuit breaker type (see chapter Derating values of 3KF fuse switch disconnectors when using SITOR fuses according to IEC constraints (Page 155))

Fuses from third-party manufacturers can also be used, in which case the possible load values must be determined based on the technical data of the fuse.

### 3.1.1.4 Design

A 3KF switch disconnector with fuses consists of an operating mechanism module, three or four switching poles and a handle to operate the switch disconnector.

#### Handles

The direct operating mechanism version of the handle is mounted directly on the switch disconnector. It can also be supplied in the form of a door-coupling rotary operating mechanism for actuation of the switch disconnector outside the control cabinet door. The handle is available in gray, or colored red/yellow for use as an EMERGENCY STOP switch.

Commonly used switch disconnector variants comprising basic unit and handle are available as complete assemblies.

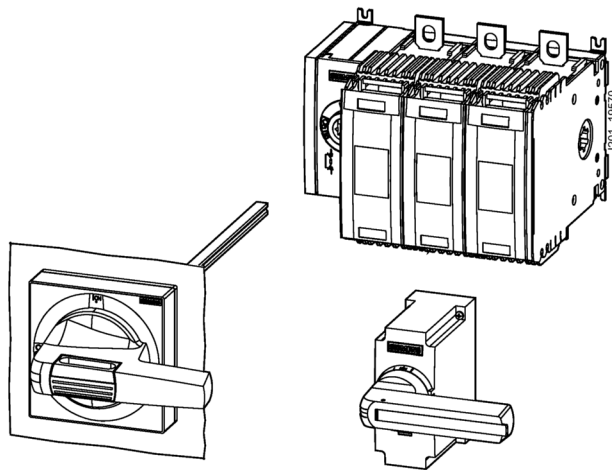


Figure 3-5 Handle either as direct operating mechanism or door-coupling rotary operating mechanism

### Position of operating mechanism modules

To allow optimum utilization of the available installation space, units with front operating mechanisms can be supplied with the operating mechanism module in various positions – mounted on the left-hand side of the 3KF switch disconnector with fuses or in the center between the switching poles.

On units with lateral operating mechanisms, the operating mechanism module is positioned on the right or left-hand side of the 3KF switch disconnector with fuses.

Number of poles/application	Front operating mechanism, side	Front operating mechanism, center	Lateral operating mechanism, left	Lateral operating mechanism, right
3-pole				
4-pole				

### Additional poles

All sizes of the 3KF switch disconnectors with fuses can be retrofitted with additional poles on a modular basis.

When installing additional poles, it is important to note that only a 3-pole 3KF switch disconnector with fuses may be retrofitted with an additional switching pole with contact system (4th contact element).

Additional poles (4th contact element, N or N/PE terminal) must always be mounted directly adjacent to the switch disconnector on the left or right, therefore, it is not permissible to install an auxiliary switch module between the basic unit and an additional pole for size 1.

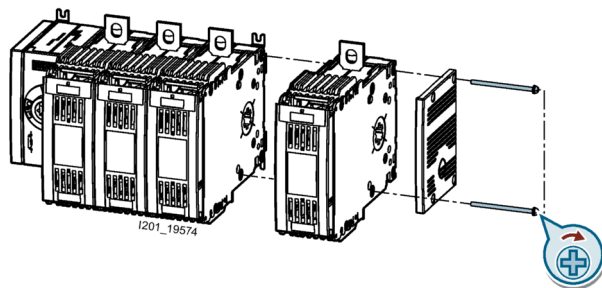


Figure 3-6 Installation of an additional pole

## Available versions

4th contact element:

The 4th contact element includes a contact system and is identical to the poles installed at the factory. It can be installed to upgrade a 3-pole switch disconnector to a disconnector with 4 poles.



Figure 3-7 4th contact element as an additional pole

N terminal (neutral conductor terminal):

The N terminal does not include a contact system. A jumper can be removed in order to interrupt the electrical connection between the two terminals. An N terminal can be installed to add a non-switching N pole to a 3-pole disconnector.

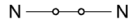


Figure 3-8 N terminal as non-switching pole

N/PE terminal:

The N/PE terminal is identical to the neutral conductor terminal. However, the electrical connection between the two terminals is permanent and cannot be interrupted by removal of a jumper. The N/PE terminal is normally deployed for applications in which it is vital to ensure that this connection can never be interrupted.



Figure 3-9 N/PE terminal with permanent connections

## Auxiliary switches

Auxiliary switches allow remote interrogation of the contact position of the 3KF switch disconnector with fuses.

### Installation of auxiliary switches for size 1

The auxiliary switches used for size 1 are microswitches (changeover contacts), which can be snapped into an auxiliary switch module. This auxiliary switch module is mounted on the side of the switch disconnector with fuses in the same way as an additional pole. A maximum of two microswitches can be installed in each auxiliary switch module.

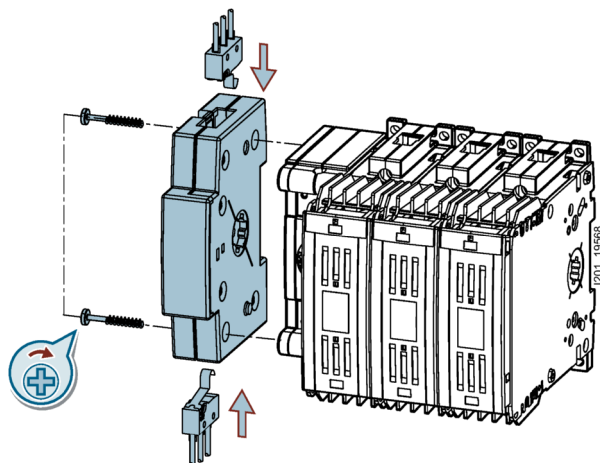
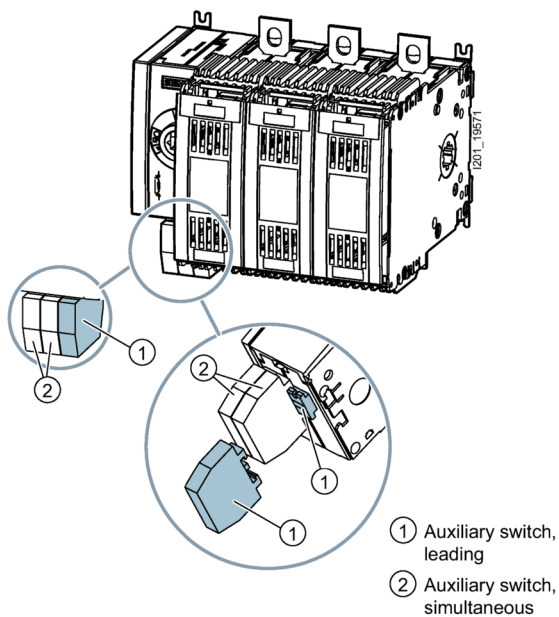


Figure 3-10 Auxiliary switch with auxiliary switch module for size 1

### Installation of auxiliary switches for sizes 2 to 5

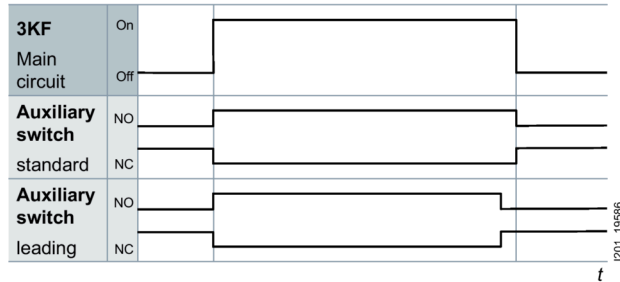
With sizes 2 to 5, the auxiliary switches are directly attached to the operating mechanism module. The auxiliary switch with the leading switch function is always installed in the right-hand mounting location. The other locations are provided for simultaneously switching with the main contacts.



Auxiliary switches directly attached to the operating mechanism module with sizes 2 to 5. The leading auxiliary switch is highlighted in the drawing.

### Switching instants of auxiliary switches

The auxiliary switches can operate either simultaneously with the main contacts or function as leading switches with all sizes.



One of the possible functions of leading auxiliary switches is to disconnect the circuit with the assistance of a higher-level switching device, such as a circuit breaker, before the main contacts of the 3KF switch disconnector with fuses open.

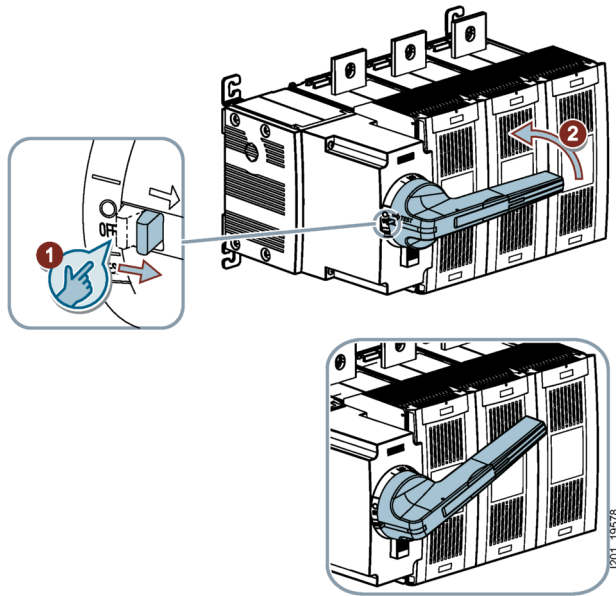
With size 1, the selection of the appropriate auxiliary switch module determines whether the switching instant will be leading or simultaneous.

With sizes 2 to 5, the switching instant is determined by the selection of the mounting location for the auxiliary switch on the operating mechanism module.

### Test function for auxiliary switches

The test function allows a wiring check to be performed on the auxiliary switches without necessitating closure of the main contacts of the 3KF switch disconnector with fuses. The test function can be used as part of the commissioning process.

The test function is activated by turning the handle of a direct operating mechanism in the OFF position by 25° in the counter-clockwise direction. The handle must be turned 90° in the clockwise direction in order to switch the main contacts.



The auxiliary switch module including test function must be used for size 1. With sizes 2 to 5, all installed auxiliary switches are switched when the test function is activated.

### Types of mounting

All 3KF switch disconnectors with fuses are designed for floor mounting. To ensure that the switch can be flexibly adapted to the relevant installation conditions, the mounting bracket can be rotated through 90° with size 2 or larger.

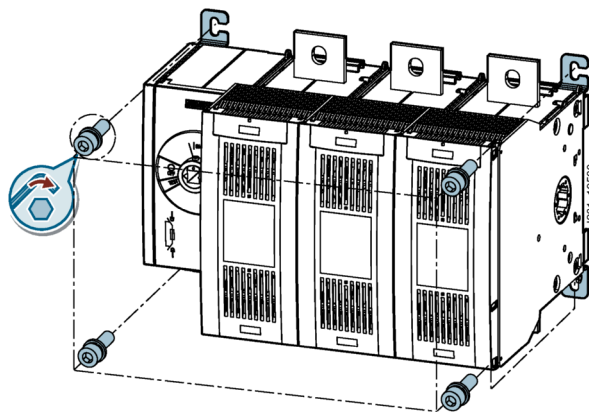


Figure 3-11 Floor mounting method



Size 1 can be snapped onto a standard mounting rail (TH35 according to EN 60715) as an alternative mounting method.

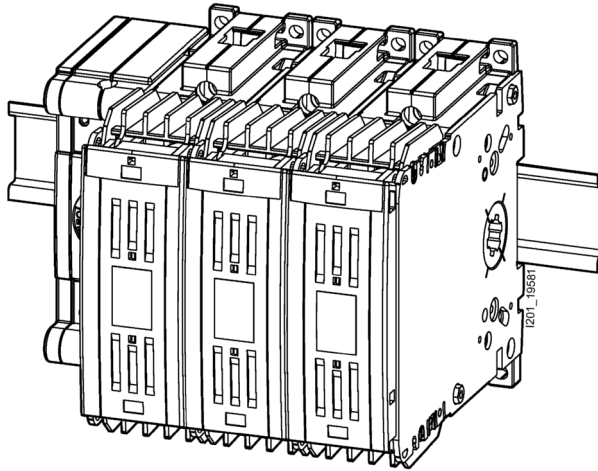


Figure 3-12 Mounting on a standard mounting rail

### Locking functions

3KF switch disconnectors with fuses can be locked by up to three padlocks to prevent unauthorized switch operation.

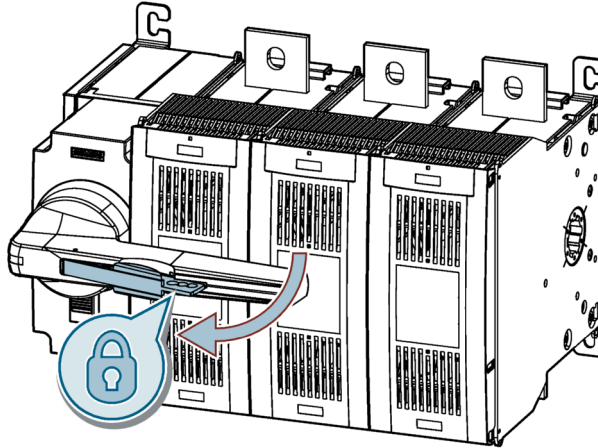


Figure 3-13 Locking functions involving one or more padlocks

### Electrical connection

3KF switch disconnectors with fuses feature different connection options.

### Box terminals

Box terminals for size 1 (rated currents 32 A to 80 A) are designed to allow the speedy connection of stripped conductors.

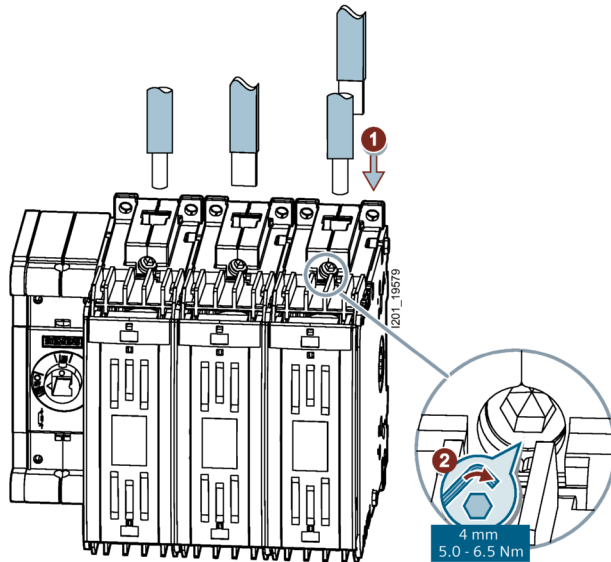


Figure 3-14 Connection via box terminals

### Flat terminals

Sizes 2 to 5 (rated currents 125 to 800 A) are available with flat terminals for the connection of cable lugs or busbar systems.

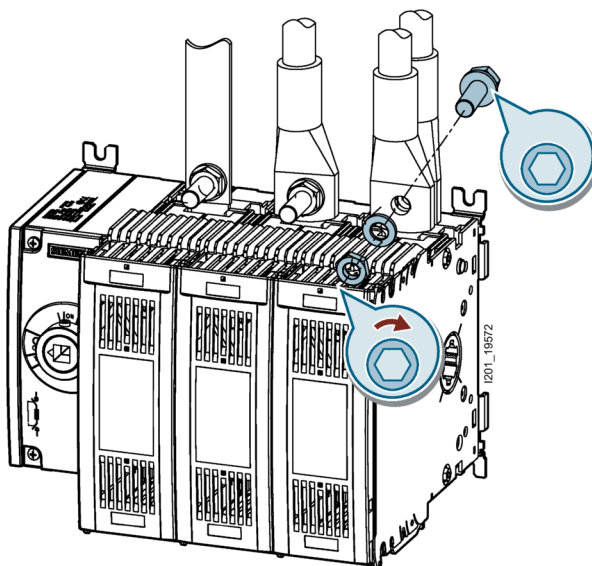


Figure 3-15 Connection via flat terminals

### Flat terminals at rear

Sizes 1 to 2 (rated currents up to 125 A) are available with rear flat terminals for the connection of cable lugs or busbar systems.

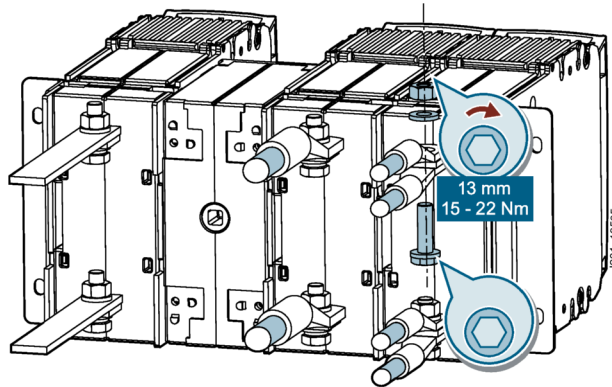


Figure 3-16 Connection via rear flat terminals

### Terminal covers and phase barriers

Terminal covers and phase barriers can be supplied for 3KF switch disconnectors with fuses with flat terminals.

### Terminal covers

Terminal covers can be installed to provide touch protection for all terminals.

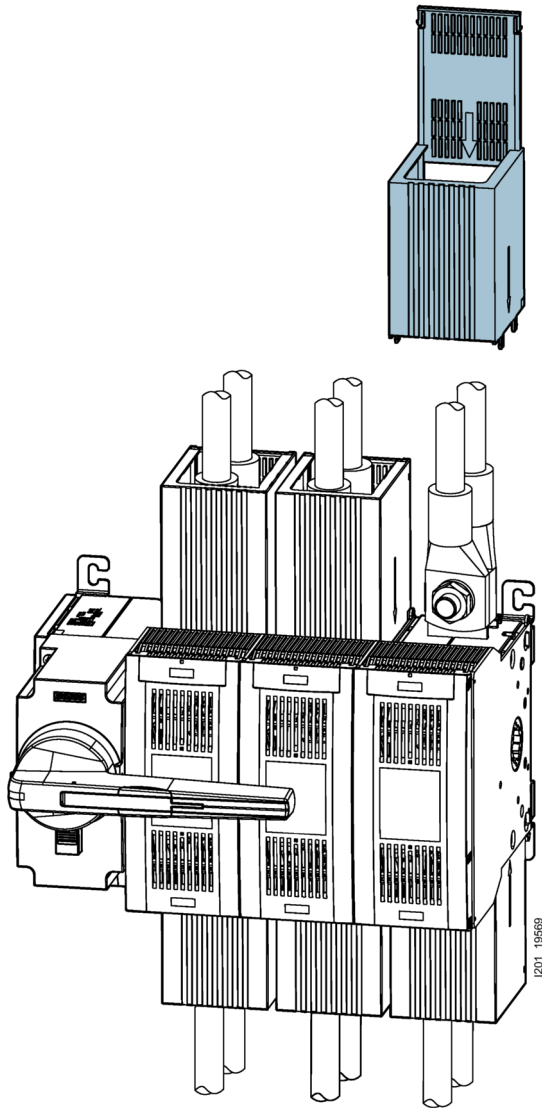


Figure 3-17 Terminal covers

## Phase barriers

When long, non-insulated cable lugs are used, phase barriers provide enhanced protection against arcing.

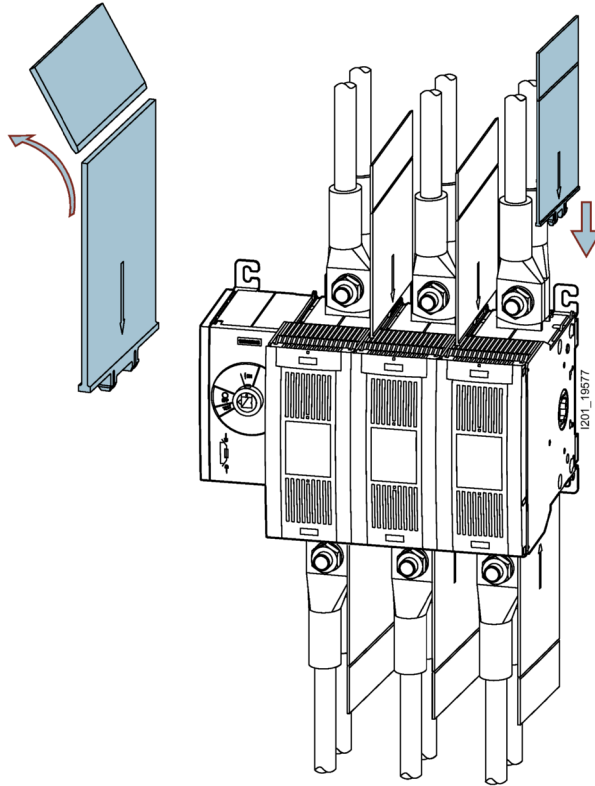


Figure 3-18 Phase barriers

## Fuse monitoring

Fuse monitoring is used to detect, indicate and report faults. The fuse monitoring can be mounted on the side of each 3KF switch disconnector with fuse and away from the 3KF on a standard mounting rail or mounting plate.

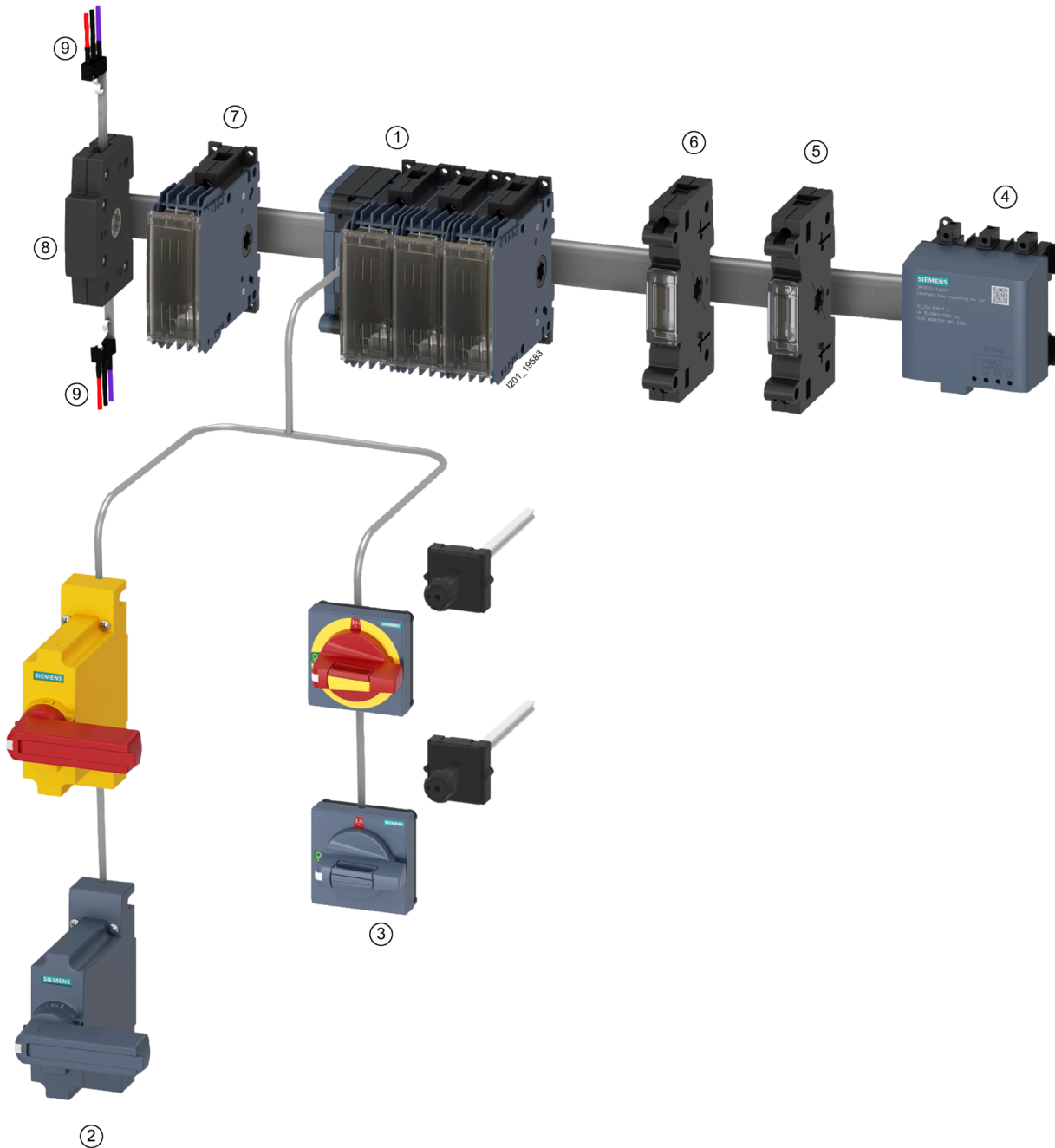
The fuse monitoring is equipped with a floating changeover contact for remote signaling of tripped fuses. Locally, the tripped fuse is displayed for each phase by LEDs.



Figure 3-19 Fuse monitoring on the 3KF

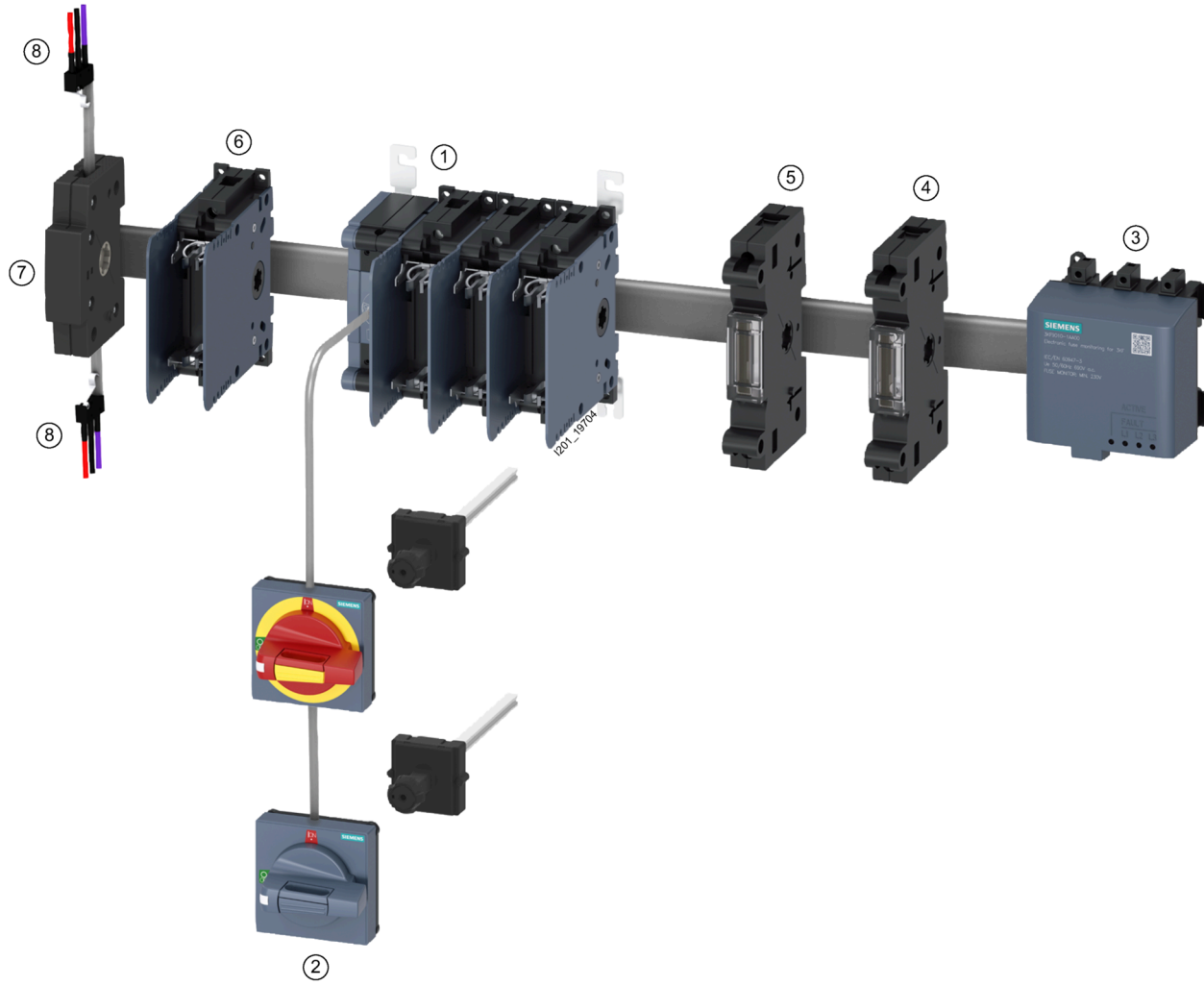
### 3.1.2 Overview of components

#### 3.1.2.1 3KF LV HRC switch disconnectors with fuses in size 1



- ① 3KF switch disconnector with fuses
- ② Direct operating mechanism
- ③ 8UD door-coupling rotary operating mechanism
- ④ Electronic fuse monitoring
- ⑤ Neutral conductor terminal with removable jumper
- ⑥ N/PE terminal with permanent jumper
- ⑦ Fourth pole
- ⑧ Auxiliary switch module
- ⑨ Auxiliary switch

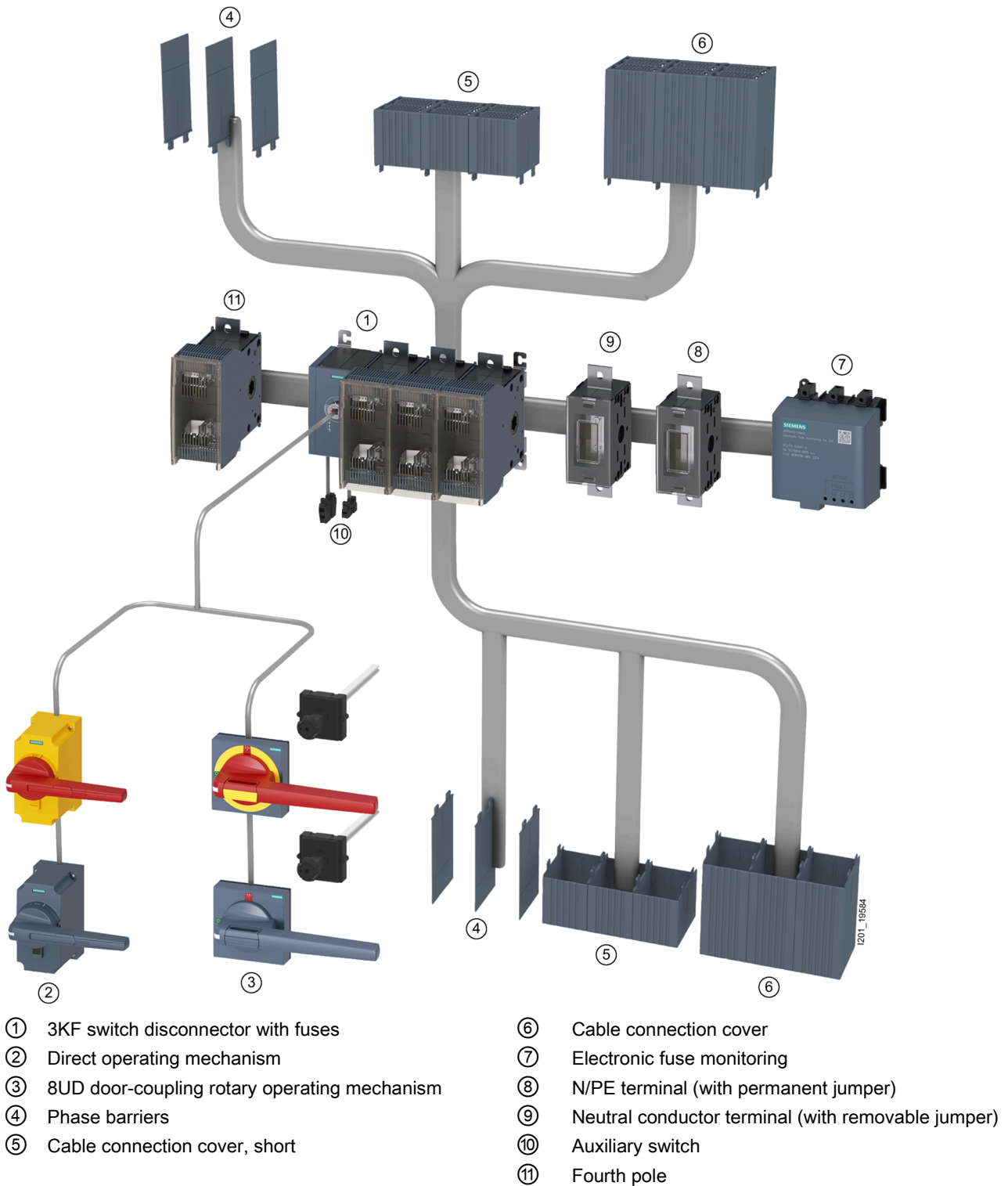
3.1.2.2 3KF SITOR switch disconnectors with fuses in size 1



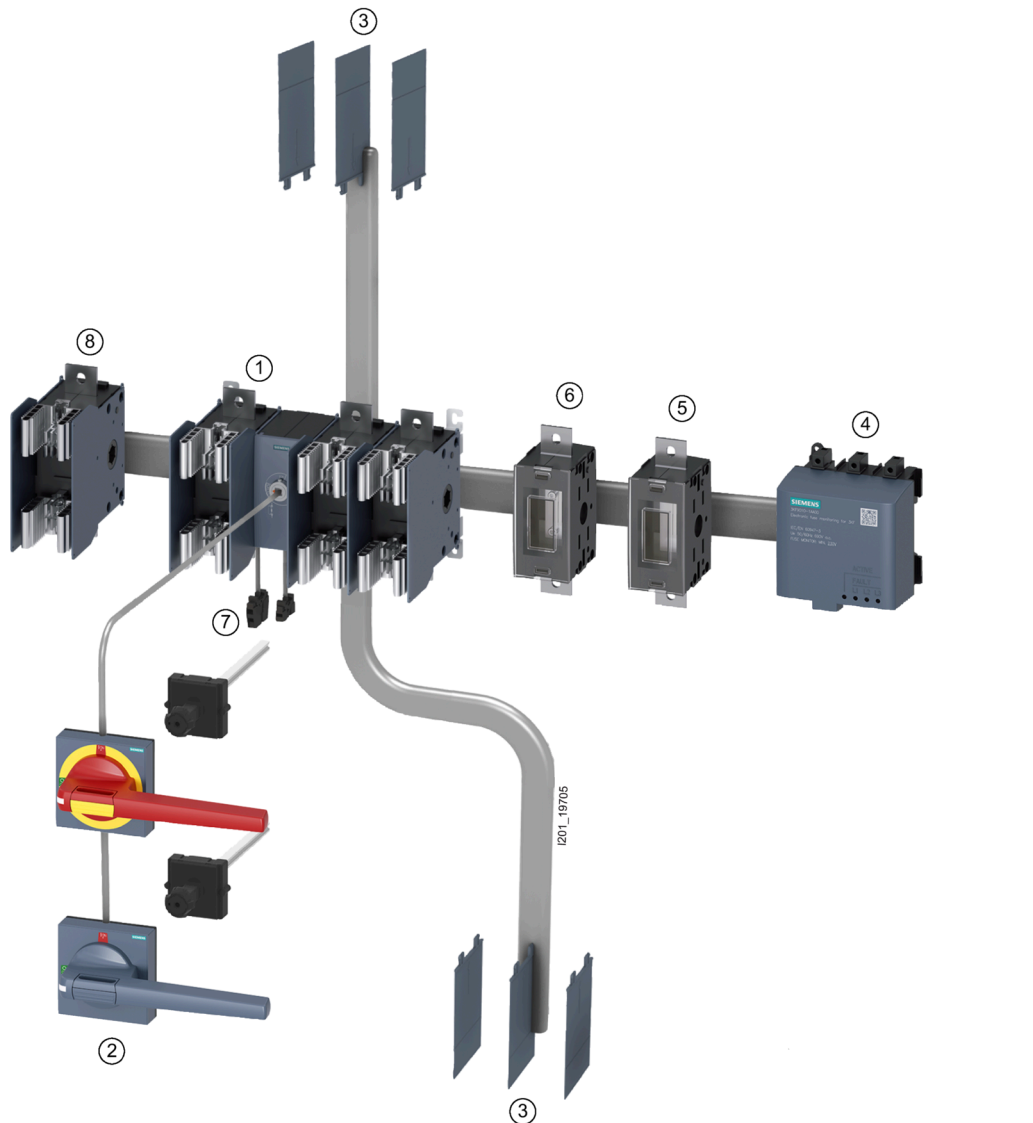
- |  |                                       |
|--|---------------------------------------|
| ① 3KF switch disconnector with SITOR fuses         | ⑤ N/PE terminal with permanent jumper |
| ② 8UD door-coupling rotary operating mechanism     | ⑥ Fourth pole                         |
| ③ Electronic fuse monitoring                       | ⑦ Auxiliary switch module             |
| ④ Neutral conductor terminal with removable jumper | ⑧ Auxiliary switch                    |



3.1.2.3 3KF LV HRC switch disconnectors with fuses in sizes 2 to 5



3.1.2.4 3KF SITOR switch disconnectors with fuses in sizes 2 to 5



- ① 3KF switch disconnector with SITOR fuses
- ② 8UD door-coupling rotary operating mechanism
- ③ Phase barriers
- ④ Electronic fuse monitoring
- ⑤ N/PE terminal (with permanent jumper)
- ⑥ Neutral conductor terminal (with removable jumper)
- ⑦ Auxiliary switch
- ⑧ Fourth pole

### 3.1.3 Technical specifications

#### General technical details

Some values do not apply to 3KF with rear flat terminals – you will find further information in the Equipment Manual 3KF Switch Disconnectors with Fuses (<https://support.industry.siemens.com/cs/ww/en/view/109743189>).

Standards		IEC 60947-1, IEC 60947-3, VCE 0660 Part 107								
Size		1			2		3	4	5	
Rated uninterrupted current $I_u$	A	32	63	80	125	160	250	400	630	800
Conventional free-air thermal current $I_{th}^{1)}$	A	32	63	80	125	160	250	400	630	800
For fuse links acc. to IEC 60269-2		00 and 000					1 and 0	2 and 1	3 and 2	
Rated operational voltage $U_e$										
<input type="checkbox"/> At 50 Hz/60 Hz AC (tolerance up to +10% permissible)	V	690								
<input type="checkbox"/> At DC (3 conducting paths series-connected)	V	440								
<input type="checkbox"/> At DC (2 conducting paths series-connected)	V	220								
Rated insulation voltage $U_i$	V	1000								
Rated impulse withstand voltage $U_{imp}$	kV	12								
Overvoltage category		IV								

1) Max. permissible operating temperature at connections 125 °C

#### Operating and short-circuit behavior

Standards		IEC 60947-1, IEC 60947-3, VCE 0660 Part 107								
Size		1			2		3	4	5	
Rated operational current $I_e^{1)}$										
<input type="checkbox"/> At AC-21A, AC-22A, AC-23A, 400 ... 690 V	A	32	63	80	125	160	250	400	630	800
<input type="checkbox"/> At DC-21A, DC-22A, DC-23A, 220 ... 440 V	A	32	63	80	125	160	250	400	630	800
Motor switching capacity AC-23A <sup>2)</sup>										
<input type="checkbox"/> At 400 V	kW	15	30	37	55	90	132	220	355	400
<input type="checkbox"/> At 500 V	kW	18.5	37	55	75	110	160	280	400	560
<input type="checkbox"/> At 690 V	kW	30	55	75	110	132	250	400	630	800

Switch disconnectors with fuses

3.1 3KF up to 800 A

Standards		IEC 60947-1, IEC 60947-3, VCE 0660 Part 107									
Size		1		2		3		4		5	
<b>Rated short-time withstand current <math>I_{cw}</math></b>											
(with $t = 1$ s, rms value, 690 V AC/440 V DC)	kA	2.5		5		8		12		22	
<b>Rated short-circuit making capacity <math>I_{cm}</math></b>											
(At 690 V AC/440 V DC)	kA	3.5		7.65		13.6		24		44	
<b>Rated conditional short-circuit current with fuse<sup>3)</sup></b>											
<input type="checkbox"/> At 400/500 V AC	kA	100									
<input type="checkbox"/> At 690 V AC	kA	100								80	
<b>Let-through current <math>I_c</math> combined with fuse<sup>3)</sup></b>											
<input type="checkbox"/> At 400/500 V AC	kA	10.4		18.2		28.7		39.4		58.5	
<input type="checkbox"/> At 690 V AC	kA	11.2		16.87		30.31		41.14		49.95	
<b>Let-through <math>I^2t</math> value combined with fuse<sup>3)</sup></b>											
<input type="checkbox"/> At 400/500 V AC	kA <sup>2</sup> s	33.2		150.6		437.0		1205		4100	
<input type="checkbox"/> At 690 V AC	kA <sup>2</sup> s	40.7		89.64		490.1		1300		2050	
<b>Let-through current <math>I_c</math> of usable fuses, max.</b>											
<input type="checkbox"/> At 400/500 V AC	kA	11.8		18		33.7		37.1		77.4	
<input type="checkbox"/> At 690 V AC	kA	11.5		25.5		37.7		47		65	
<b>Let-through <math>I^2t</math> value of usable fuses, max.</b>											
<input type="checkbox"/> At 400/500 V AC	kA <sup>2</sup> s	34		223		1500		2150		10400	
<input type="checkbox"/> At 690 V AC	kA <sup>2</sup> s	55		360		940		2600		7000	
<b>Power loss per pole with thermal current <math>I_{th}</math> (plus fuses)</b>		W	0.4	1.7	2.8	4.2	7.2	15	26	40	50
<b>Maximum power loss of the usable fuses (per fuse)</b>											
<input type="checkbox"/> For 3KF LV HRC	W	6.5	7.5	8.5	11	12	25.5	34	48	60	
<input type="checkbox"/> For 3KF SITOR	W	7	8	12	20	26	36	55	68	85	
<b>Service life, operating cycles</b>											
<input type="checkbox"/> Mechanical		15000		12000		10000		8000		6000	
<input type="checkbox"/> Electrical, at AC-23A, 690 V / 50 ... 60 Hz		6000		5000		4000		2000		1000	
<input type="checkbox"/> Electrical, at AC-23A, 440 V / 50 ... 60 Hz		10000		8000		5000		3000		1500	
<input type="checkbox"/> Electrical, at DC-23A, 440 V		1500		1000						500	

1) Values valid even at +10% line voltage tolerance in case of AC

2) Values are provided as a guide only and may vary depending on the make of motor

3) Valid for combination of 3KF and fuse type 3NA/3ND, characteristic gG/aM

**Degree of protection (operator side)**

Standards		IEC 60947-1, IEC 60947-3, VCE 0660 Part 107				
Size		1	2	3	4	5
<b>Degree of protection for 3KF LV HRC</b>						
<input type="checkbox"/> With masking plate or cable connection cover		IP20				
<input type="checkbox"/> Without masking plate or terminal cover		IP20	IP00			
<b>Degree of protection for 3KF SITOR</b>						
<input type="checkbox"/> With masking plate or cable connection cover		IP00				

**Ambient conditions**

Standards		IEC 60947-1, IEC 60947-3, VCE 0660 Part 107				
Size		1	2	3	4	5
<input type="checkbox"/> Ambient temperature during operation	°C	-25 ... +70				
<input type="checkbox"/> Ambient temperature during storage	°C	-50 ... +80				
<input type="checkbox"/> Mounting position		Any				

**Main conductor connection**

Standards		IEC 60947-1, IEC 60947-3, VCE 0660 Part 107				
Size		1	2	3	4	5
Conductor cross-section, max.	mm <sup>2</sup>	25	95	240	2 x 150	2 x 300
Busbar systems, max. dimensions (number x width x thickness)	mm	1 x 9 x 2	1 x 20 x 3	1 x 25 x 3	1 x 30 x 10	1 x 50 x 10
Tightening torque	Nm	5 ... 6.5	15 ... 22	30 ... 44	30 ... 44	50 ... 75

**3.1.3.1 Derating values of 3KF fuse switch disconnectors when using SITOR fuses according to IEC constraints**

The 3KF switch disconnectors with fuses are suitable for all fuses in LV HRC design. When using fuses for semiconductor protection (SITOR) in LV HRC design, it must be noted that they have a higher power loss and can become considerably hotter during operation than fuses for cable protection. For this reason, the fuse must be operated below the rated current  $I_n$  of the device (derating) when installed in a closed switching device.

3.1 3KF up to 800 A

The 3KF SITOR series is optimized for high heat dissipation and can usually be loaded with higher current values when fuses for semiconductor protection are used.

The following table shows the permissible load currents of the SITOR semiconductor fuses for installation in 3KF LV HRC and 3KF SITOR according to IEC constraints. The specified values apply to a 3KF mounted in accordance with the test conditions of IEC 60947-1 (open installation, length of the incoming and outgoing cables 1 m) installed vertically and with insulated cables, cross section corresponding to the rated operational current of the 3KF switch disconnector (acc. to Table 9 and 10 of the IEC 60947-1).

Further derating is necessary if a combination of 3KF and SITOR fuses is used under different conditions that impair heat dissipation.

3.1.3.2 Derating table for use of SITOR fuses IEC from 32 to 160 A

Derating table for use of SITOR fuses IEC from 32 to 160 A

SITOR semiconductor fuse data						Permissible load currents of fuse when installed in									
Type	Size	Rated current I <sub>n</sub>	Rated voltage	Operational class	Power loss P <sub>v</sub>	Type 3KF LV HRC					Type 3KF SITOR				
						32	63	80	125	160	32	63	80	125	160
		A	V AC		mm <sup>2</sup>	A	A	A	A	A	A	A	A	A	A
3NE1802-0	000	40	690	gS	3	32.0	40.0	40.0	40.0	40.0	32.0	40.0	40.0	40.0	40.0
3NE1803-0	000	35	690	gS	3.5	32.0	35.0	35.0	35.0	35.0	32.0	35.0	35.0	35.0	35.0
3NE1813-0	000	16	690	gS	4	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
3NE1814-0	000	20	690	gS	5	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
3NE1815-0	000	25	690	gS	5	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
3NE1817-0	000	50	690	gS	6	32.0	50.0	50.0	50.0	50.0	32.0	50.0	50.0	50.0	50.0
3NE1818-0	000	63	690	gS	7	32.0	63.0	63.0	63.0	63.0	32.0	63.0	63.0	63.0	63.0
3NE1820-0	000	80	690	gS	8	32.0	63.0	80.0	80.0	80.0	32.0	63.0	80.0	80.0	80.0
3NE1020-2	00	80	690	gR	10	32.0	63.0	76.0	80.0	80.0	32.0	63.0	80.0	80.0	80.0
3NE1021-0	00	100	690	gS	10	32.0	63.0	80.0	100.0	100.0	32.0	63.0	80.0	100.0	100.0
3NE1021-2	00	100	690	gR	12	32.0	63.0	80.0	96.0	100.0	32.0	63.0	80.0	100.0	100.0
3NE1022-0	00	125	690	gS	11	32.0	63.0	80.0	125.0	125.0	32.0	63.0	80.0	125.0	125.0
3NE1022-2	00	125	690	gR	13	32.0	63.0	80.0	118.8	120.0	32.0	63.0	80.0	125.0	125.0

SITOR semiconductor fuse data						Permissible load currents of fuse when installed in									
						Type 3KF LV HRC					Type 3KF SITOR				
Type	Size	Rated current I <sub>n</sub>	Rated voltage	Operational class	Power loss P <sub>v</sub>	32	63	80	125	160	32	63	80	125	160
		A	V AC		mm <sup>2</sup>	A	A	A	A	A	A	A	A	A	A
3NE8015-1	00	25	690	gR	7	24.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
3NE8003-1	00	35	690	gR	9	32.0	34.0	34.0	35.0	35.0	32.0	35.0	35.0	35.0	35.0
3NE8017-1	00	50	690	gR	14	32.0	40.0	42.5	46.0	47.5	32.0	50.0	50.0	50.0	50.0
3NE8018-1	00	63	690	gR	16	32.0	48.5	50.4	55.4	57.3	32.0	60.0	60.0	63.0	63.0
3NE8020-1	00	80	690	aR	19	32.0	57.6	60.8	66.4	68.8	32.0	63.0	68.0	80.0	80.0
3NE8021-1	00	100	690	aR	22	32.0	60.0	60.0	79.0	82.0	32.0	63.0	68.0	100.0	100.0
3NE8022-1	00	125	690	aR	28	32.0	63.0	70.0	90.0	92.5	32.0	63.0	75.0	125.0	125.0
3NE8024-1	00	160	690	aR	38	---	63.0	80.0	100.8	104.0	32.0	63.0	80.0	125.0	140.0

### 3.1.3.3 Derating table for use of SITOR fuses IEC from 250 to 800 A

#### Derating table for use of SITOR fuses IEC from 250 to 800 A

SITOR semiconductor fuse data						Permissible load currents of fuse when installed in							
						Type 3KF LV HRC				Alternative type 3KF SITOR			
Type	Size	Rated current I <sub>n</sub>	Rated voltage	Operational class	Power loss P <sub>v</sub>	250	400	630	800	250	400	630	800
		A	V AC		W	A	A	A	A	A	A	A	A
3NE4101	0	32	1000	gR	12	32.0	---	---	---	32.0	---	---	---
3NE4102	0	40	1000	gR	13	40.0	---	---	---	40.0	---	---	---
3NE4117	0	50	1000	gR	16	50.0	---	---	---	50.0	---	---	---
3NE4118	0	63	1000	aR	20	63.0	---	---	---	63.0	---	---	---
3NE4120	0	80	1000	aR	22	80.0	---	---	---	80.0	---	---	---
3NE4121	0	100	1000	aR	24	100.0	---	---	---	100.0	---	---	---
3NE4122	0	125	1000	aR	30	118.8	---	---	---	125.0	---	---	---
3NE4124	0	160	1000	aR	35	144.0	---	---	---	160.0	---	---	---

3.1 3KF up to 800 A

SITOR semiconductor fuse data						Permissible load currents of fuse when installed in							
						Type 3KF LV HRC				Alternative type 3KF SITOR			
Type	Size	Rated current I <sub>n</sub>	Rated voltage	Operational class	Power loss P <sub>v</sub>	250	400	630	800	250	400	630	800
		A	V AC		W	A	A	A	A	A	A	A	A
3NE1224-0	1	160	690	gS	24	160.0	160.0	---	---	160.0	160.0	---	---
3NE1224-2/-3	1	160	690	gR	32	148.8	160.0	---	---	160.0	160.0	---	---
3NE1225-0	1	200	690	gS	27	194.0	200.0	---	---	200.0	200.0	---	---
3NE1225-2/-3	1	200	690	gR	35	180.0	196.0	---	---	200.0	200.0	---	---
3NE1227-0	1	250	690	gS	30	237.5	250.0	---	---	250.0	250.0	---	---
3NE1227-2/-3	1	250	690	gR	37	220.0	240.0	---	---	240.0	250.0	---	---
3NE1230-0	1	315	690	gS	38	250.0	299.3	---	---	250.0	315.0	---	---
3NE1230-2/-3	1	315	690	gR	40	250.0	290.4	---	---	250.0	315.0	---	---
3NE3221	1	100	1000	aR	28	96.0	100.0	---	---	100.0	100.0	---	---
3NE3222	1	125	1000	aR	36	111.3	121.3	---	---	125.0	125.0	---	---
3NE3224	1	160	1000	aR	42	136.0	148.8	---	---	160.0	160.0	---	---
3NE3225	1	200	1000	aR	42	170.0	186.0	---	---	190.0	200.0	---	---
3NE3227	1	250	1000	aR	50	197.5	220.0	---	---	210.0	250.0	---	---
3NE3230-0B	1	315	1000	aR	60	185.0	261.5	---	---	225.0	315.0	---	---
3NE3231	1	350	1000	aR	75	190.0	266.0	---	---	220.0	350.0	---	---
3NE3232-0B	1	400	1000	aR	85	200.0	292.0	---	---	235.0	370.0	---	---
3NE3233	1	450	1000	aR	95	250.0	306.0	---	---	250.0	385.0	---	---
3NE1331-0	2	350	690	gS	42	---	325.5	350.0	350.0	---	350.0	350.0	350.0
3NE1331-2/-3	2	350	690	gR	43	---	322.0	350.0	350.0	---	350.0	350.0	350.0
3NE1332-0	2	400	690	gS	45	---	364.0	400.0	400.0	---	400.0	400.0	400.0



SITOR semiconductor fuse data						Permissible load currents of fuse when installed in							
						Type 3KF LV HRC				Alternative type 3KF SITOR			
Type	Size	Rated current I <sub>n</sub>	Rated voltage	Operational class	Power loss P <sub>v</sub>	250	400	630	800	250	400	630	800
		A	V AC		W	A	A	A	A	A	A	A	A
3NE1332-2/-3	2	400	690	gR	50	---	352.0	392.0	400.0	---	400.0	400.0	400.0
3NE1333-0	2	450	690	gS	53	---	387.0	432.0	450.0	---	400.0	450.0	450.0
3NE1333-2/-3	2	450	690	gR	58	---	351.0	423.0	450.0	---	400.0	450.0	450.0
3NE1334-0	2	500	690	gS	56	---	400.0	475.0	500.0	---	400.0	500.0	500.0
3NE1334-2/-3	2	500	690	gR	64	---	400.0	455.0	485.0	---	400.0	500.0	500.0
3NE3332-0B	2	400	1000	aR	80	---	296.0	340.0	364.0	---	385.0	400.0	400.0
3NE3333	2	450	1000	aR	90	---	315.0	360.0	391.5	---	350.0	450.0	450.0
3NE3334-0B	2	500	1000	aR	90	---	350.0	400.0	435.0	---	375.0	500.0	500.0
3NE3335	2	560	1000	aR	95	---	380.8	442.4	418.6	---	400.0	560.0	560.0
3NE3336	2	630	1000	aR	100	---	400.0	485.1	535.5	---	400.0	630.0	630.0
3NE3337-8	2	710	900	aR	105	---	400.0	539.6	589.3	---	400.0	630.0	710.0
3NE3338-8	2	800	800	aR	130	---	400.0	552.0	616.0	---	400.0	630.0	720.0
3NE3340-8	2	900	690	aR	165	---	---	558.0	621.0	---	400.0	630.0	760.0
3NE4327-0B	2	250	800	aR	105	---	162.5	190.0	207.5	---	200.0	250.0	250.0
3NE4330-0B	2	315	800	aR	120	---	192.2	230.0	248.9	---	285.0	315.0	315.0
3NE4333-0B	2	450	800	aR	140	---	256.5	297.0	333.0	---	285.0	370.0	370.0
3NE4334-0B	2	500	800	aR	155	---	265.0	320.0	360.0	---	300.0	450.0	450.0
3NE4337	2	710	800	aR	155	---	376.3	454.4	511.2	---	400.0	630.0	630.0
3NC2423-0C/3C	3	150	500	gR	35	---	---	150.0	150.0	---	---	150.0	150.0
3NC2425-0C/3C	3	200	500	gR	40	---	---	200.0	200.0	---	---	200.0	200.0

Switch disconnectors with fuses

3.1 3KF up to 800 A

SITOR semiconductor fuse data						Permissible load currents of fuse when installed in							
						Type 3KF LV HRC				Alternative type 3KF SITOR			
Type	Size	Rated current I <sub>n</sub>	Rated voltage	Operational class	Power loss P <sub>v</sub>	250	400	630	800	250	400	630	800
		A	V AC		W	A	A	A	A	A	A	A	A
3NC2427-0C/3C	3	250	500	gR	50	---	---	245.0	250.0	---	---	250.0	250.0
3NC2428-0C/3C	3	300	500	gR	65	---	---	270.0	288.0	---	---	300.0	300.0
3NC2431-0C/3C	3	350	500	gR	60	---	---	325.5	350.0	---	---	350.0	350.0
3NC2432-0C/3C	3	400	500	aR	50	---	---	392.0	400.0	---	---	400.0	400.0
3NC3336-1U	3	630	1000	aR	145	---	---	409.5	466.2	---	---	570.0	570.0
3NC3337-1U	3	710	1000	aR	150	---	---	461.5	518.3	---	---	630.0	630.0
3NC3338-1U	3	800	1000	aR	155	---	---	512.0	576.0	---	---	630.0	700.0
3NC3340-1U	3	900	1000	aR	165	---	---	558.0	621.0	---	---	630.0	750.0
3NC3341-1U	3	1000	1000	aR	170	---	---	600.0	680.0	---	---	630.0	780.0
3NC3342-1U	3	1100	800	aR	185	---	---	630.0	715.0	---	---	630.0	800.0
3NC3343-1U	3	1250	800	aR	210	---	---	630.0	725.0	---	---	630.0	800.0
3NC3430-1U	3	315	1250	aR	80	---	---	267.8	286.7	---	---	315.0	315.0
3NC3432-1U	3	400	1250	aR	95	---	---	316.0	344.0	---	---	400.0	400.0
3NC3434-1U	3	500	1250	aR	115	---	---	370.0	400.0	---	---	450.0	450.0
3NC3436-1U	3	630	1250	aR	120	---	---	459.9	497.7	---	---	530.0	30.0
3NC3438-1U	3	800	1100	aR	145	---	---	520.0	592.0	---	---	630.0	715.0
3NC8423-0C/-3C	3	150	690	gR	40	---	---	150.0	150.0	---	---	150.0	150.0
3NC8425-0C/-3C	3	200	690	gR	55	---	---	190.0	200.0	---	---	200.0	200.0
3NC8427-0C/-3C	3	250	690	gR	72	---	---	217.5	235.0	---	---	250.0	250.0
3NC8431-0C/-3C	3	350	690	gR	95	---	---	276.5	301.0	---	---	350.0	350.0

SITOR semiconductor fuse data						Permissible load currents of fuse when installed in							
						Type 3KF LV HRC				Alternative type 3KF SITOR			
Type	Size	Rated current I <sub>n</sub>	Rated voltage	Operational class	Power loss P <sub>v</sub>	250	400	630	800	250	400	630	800
		A	V AC		W	A	A	A	A	A	A	A	A
3NC8434-0C/-3C	3	500	690	gR	130	---	---	345.0	380.0	---	---	450.0	450.0
3NC8444-3C	3	1000	600	aR	140	---	---	630.0	740.0	---	---	630.0	800.0
3NE1435-0	3	560	690	gS	50	---	---	548.8	560.0	---	---	560.0	560.0
3NE1435-2/-3	3	560	690	gR	60	---	---	520.8	560.0	---	---	560.0	560.0
3NC1436-0	3	630	690	gS	55	---	---	598.5	630.0	---	---	630.0	630.0
3NC1436-2/-3	3	630	690	gR	60	---	---	585.9	630.0	---	---	630.0	630.0
3NE1437-0	3	710	690	gS	58	---	---	630.0	710.0	---	---	630.0	710.0
3NE1437-1	3	710	600	gR	65	---	---	630.0	681.6	---	---	630.0	710.0
3NE1437-2/-3	3	710	690	gR	72	---	---	617.7	667.4	---	---	630.0	710.0
3NE1438-0	3	800	690	gS	58	---	---	630.0	800.0	---	---	630.0	800.0
3NE1438-1	3	800	600	gR	72	---	---	630.0	752.0	---	---	630.0	800.0
3NE1438-2/-3	3	800	690	gR	84	---	---	630.0	712.0	---	---	630.0	800.0
3NE1447-2/-3	3	670	690	gR	64	---	---	609.7	649.9	---	---	630.0	670.0
3NE1448-2/-3	3	850	690	gR	76	---	---	630.0	782.0	---	---	630.0	850.0

### 3.1.3.4 Derating values when using SITOR fuses according to UL constraints

The following table shows the permissible load currents of SITOR semiconductor fuses for installation in 3KF SITOR according to UL constraints. The specified values apply to a 3KF mounted in accordance with the test conditions of UL 508 / UL 60947-4-1 (installation in an enclosure) and with connected insulated cables, cross section corresponding to the rated operational current of the 3KF switch disconnector. The specified values apply to use in enclosures that are larger or equal in size to the specified enclosures.

Further derating is necessary if a combination of 3KF and SITOR fuses is used under different conditions that impair heat dissipation.

3.1 3KF up to 800 A

3.1.3.5 Derating table for use of SITOR fuses UL from 32 to 160 A

Minimum housing sizes:

- 3KF 32 A: 278 x 500 x 196 mm
- 3KF 63 A: 278 x 500 x 196 mm
- 3KF 80 A: 278 x 500 x 196 mm
- 3KF 125 A: 459 x 500 x 242 mm
- 3KF 160 A: 459 x 500 x 242 mm

SITOR semiconductor fuse data						Permissible load currents of fuse when installed in type 3KF SITOR				
Type	Size	Rated current I <sub>n</sub>	Rated voltage	Operational class	Power loss P <sub>v</sub>	32	63	80	125	160
		A	V AC		W	A	A	A	A	A
3NE1802-0	000	40	690	gS	3	32.0	40.0	40.0	40.0	40.0
3NE1803-0	000	35	690	gS	3.5	32.0	35.0	35.0	35.0	35.0
3NE1813-0	000	16	690	gS	4	16.0	16.0	16.0	16.0	16.0
3NE1814-0	000	20	690	gS	5	20.0	20.0	20.0	20.0	20.0
3NE1815-0	000	25	690	gS	5	25.0	25.0	25.0	25.0	25.0
3NE1817-0	000	50	690	gS	6	32.0	50.0	50.0	50.0	50.0
3NE1818-0	000	63	690	gS	7	32.0	60.0	60.0	63.0	63.0
3NE1820-0	000	80	690	gS	8	32.0	60.0	60.0	80.0	80.0
3NE1020-2	00	80	690	gR	10	32.0	60.0	60.0	80.0	80.0
3NE1021-0	00	100	690	gS	10	32.0	60.0	60.0	100.0	100.0
3NE1021-2	00	100	690	gR	12	32.0	60.0	60.0	100.0	100.0
3NE1022-0	00	125	690	gS	11	32.0	60.0	60.0	125.0	125.0
3NE1022-2	00	125	690	gR	13	32.0	60.0	60.0	120.0	120.0
3NE8015-1	00	25	690	gR	7	25.0	25.0	25.0	25.0	25.0
3NE8003-1	00	35	690	gR	9	29.0	29.0	29.0	35.0	35.0
3NE8017-1	00	50	690	gR	14	32.0	35.0	35.0	50.0	50.0
3NE8018-1	00	63	690	gR	16	32.0	45.0	45.0	60.0	60.0
3NE8020-1	00	80	690	aR	19	32.0	50.0	50.0	63.0	63.0
3NE8021-1	00	100	690	aR	22	32.0	60.0	60.0	90.0	90.0
3NE8022-1	00	125	690	aR	28	32.0	60.0	60.0	100.0	100.0
3NE8024-1	00	160	690	aR	38	32.0	60.0	60.0	110.0	110.0

3.1.3.6 Derating table for use of SITOR fuses UL from 250 to 800 A

Minimum housing sizes:

- 3KF 250 A - 506 x 600 x 283 mm
- 3KF 400 A - 581 x 600 x 309 mm
- 3KF 630 A - 746 x 700 x 396 mm
- 3KF 800 A - 746 x 700 x 396 mm

SITOR semiconductor fuse data						Permissible load currents of fuse when installed in type 3KF SITOR			
Type	Size	Rated current I <sub>n</sub>	Rated voltage	Operational class	Power loss P <sub>v</sub>	250	400	630	800
		A	V AC		W	A	A	A	A
3NE4101	0	32	1000	gR	12	32.0	--	--	--
3NE4102	0	40	1000	gR	13	40.0	--	--	--
3NE4117	0	50	1000	gR	16	50.0	--	--	--
3NE4118	0	63	1000	aR	20	63.0	--	--	--
3NE4120	0	80	1000	aR	22	80.0	--	--	--
3NE4121	0	100	1000	aR	24	100.0	--	--	--
3NE4122	0	125	1000	aR	30	110.0	--	--	--
3NE4124	0	160	1000	aR	35	130.0	--	--	-
3NE1224-0	1	160	690	gS	24	140.0	160.0	--	--
3NE1224-2/-3	1	160	690	gR	32	125.0	160.0	--	--
3NE1225-0	1	200	690	gS	27	170.0	200.0	--	--
3NE1225-2/-3	1	200	690	gR	35	160.0	200.0	--	--
3NE1227-0	1	250	690	gS	30	205.0	250.0	--	--
3NE1227-2/-3	1	250	690	gR	37	190.0	250.0	--	--
3NE1230-0	1	315	690	gS	38	205.0	280.0	--	--
3NE1230-2/-3	1	315	690	gR	40	205.0	275.0	--	--
3NE3221	1	100	1000	aR	28	90.0	100.0	--	--
3NE3222	1	125	1000	aR	36	95.0	125.0	--	--
3NE3224	1	160	1000	aR	42	115.0	160.0	--	--
3NE3225	1	200	1000	aR	42	140.0	200.0	--	--
3NE3227	1	250	1000	aR	50	165.0	200.0	--	--
3NE3230-0B	1	315	1000	aR	60	190.0	225.0	--	--
3NE3231	1	350	1000	aR	75	195.0	220.0	--	--
3NE3232-0B	1	400	1000	aR	85	205.0	230.0	--	--
3NE3233	1	450	1000	aR	95	205.0	250.0	--	--
3NE1331-0	2	350	690	gS	42	--	315.0	350.0	350.0
3NE1331-2/-3	2	350	690	gR	43	--	300.0	350.0	350.0
3NE1332-0	2	400	690	gS	45	--	320.0	400.0	400.0
3NE1332-2/-3	2	400	690	gR	50	--	310.0	400.0	400.0
3NE1333-0	2	450	690	gS	53	--	320.0	450.0	450.0
3NE1333-2/-3	2	450	690	gR	58	--	320.0	440.0	440.0

3.1 3KF up to 800 A

SITOR semiconductor fuse data						Permissible load currents of fuse when installed in type 3KF SITOR			
Type	Size	Rated current I <sub>n</sub>	Rated voltage	Operational class	Power loss P <sub>v</sub>	250	400	630	800
		A	V AC		W	A	A	A	A
3NE1334-0	2	500	690	gS	56	--	320.0	500.0	500.0
3NE1334-2/-3	2	500	690	gR	64	--	320.0	470.0	470.0
3NE3332-0B	2	400	1000	aR	80	--	260.0	350.0	350.0
3NE3333	2	450	1000	aR	90	--	285.0	380.0	380.0
3NE3334-0B	2	500	1000	aR	90	--	300.0	415.0	415.0
3NE3335	2	560	1000	aR	95	--	320.0	440.0	440.0
3NE3336	2	630	1000	aR	100	--	320.0	480.0	480.0
3NE3337-8	2	710	900	aR	105	--	320.0	515.0	515.0
3NE3338-8	2	800	800	aR	130	--	320.0	500.0	500.0
3NE3340-8	2	900	690	aR	165	--	347.0	520.0	520.0
3NE4327-0B	2	250	800	aR	105	--	160.0	205.0	205.0
3NE4330-0B	2	315	800	aR	120	--	205.0	240.0	240.0
3NE4333-0B	2	450	800	aR	140	--	225.0	310.0	310.0
3NE4334-0B	2	500	800	aR	155	--	240.0	320.0	320.0
3NE4337	2	710	800	aR	155	--	320.0	440.0	440.0
3NC2423-0C/3C	3	150	500	gR	35	--	--	150.0	150.0
3NC2425-0C/3C	3	200	500	gR	40	--	--	200.0	200.0
3NC2427-0C/3C	3	250	500	gR	50	--	--	250.0	250.0
3NC2428-0C/3C	3	300	500	gR	65	--	--	300.0	300.0
3NC2431-0C/3C	3	350	500	gR	60	--	--	350.0	350.0
3NC2432-0C/3C	3	400	500	aR	50	--	--	400.0	400.0
3NC3336-1U	3	630	1000	aR	145	--	--	400.0	400.0
3NC3337-1U	3	710	1000	aR	150	--	--	440.0	440.0
3NC3338-1U	3	800	1000	aR	155	--	--	480.0	480.0
3NC3340-1U	3	900	1000	aR	165	--	--	510.0	510.0
3NC3341-1U	3	1000	1000	aR	170	--	--	530.0	530.0
3NC3342-1U	3	1100	800	aR	185	--	--	530.0	530.0
3NC3343-1U	3	1250	800	aR	210	--	--	530.0	530.0
3NC3430-1U	3	315	1250	aR	80	--	--	290.0	290.0
3NC3432-1U	3	400	1250	aR	95	--	--	330.0	330.0
3NC3434-1U	3	500	1250	aR	115	--	--	370.0	370.0
3NC3436-1U	3	630	1250	aR	120	--	--	440.0	440.0
3NC3438-1U	3	800	1100	aR	145	--	--	450.0	450.0

SITOR semiconductor fuse data						Permissible load currents of fuse when installed in type 3KF SITOR			
Type	Size	Rated current I <sub>n</sub>	Rated voltage	Operational class	Power loss P <sub>v</sub>	250	400	630	800
		A	V AC		W	A	A	A	A
3NC8423-0C/-3C	3	150	690	gR	40	--	--	150.0	150.0
3NC8425-0C/-3C	3	200	690	gR	55	--	--	200.0	200.0
3NC8427-0C/-3C	3	250	690	gR	72	--	--	245.0	245.0
3NC8431-0C/-3C	3	350	690	gR	95	--	--	290.0	290.0
3NC8434-0C/-3C	3	500	690	gR	130	--	--	250.0	250.0
3NC8444-3C	3	1000	600	aR	140	--	--	530.0	530.0
3NE1435-0	3	560	690	gS	50	--	--	530.0	530.0
3NE1435-2/-3	3	560	690	gR	60	--	--	520.0	520.0
3NE1436-0	3	630	690	gS	55	--	--	530.0	530.0
3NE1436-2/-3	3	630	690	gR	60	--	--	530.0	530.0
3NE1437-0	3	710	690	gS	58	--	--	530.0	530.0
3NE1437-1	3	710	600	gR	65	--	--	530.0	530.0
3NE1437-2/-3	3	710	690	gR	72	--	--	530.0	530.0
3NE1438-0	3	800	690	gS	58	--	--	530.0	530.0
3NE1438-1	3	800	600	gR	72	--	--	530.0	530.0
3NE1438-2/-3	3	800	690	gR	84	--	--	530.0	530.0
3NE1447-2/-3	3	670	690	gR	64	--	--	530.0	530.0
3NE1448-2/-3	3	850	690	gR	76	--	--	530.0	530.0

## 3.2 3NJ62 up to 630 A

### 3.2.1 Product description

#### 3.2.1.1 All key product features at a glance



Figure 3-20 3NJ62 switch disconnectors with fuses

- In-line design
- Type-tested according to IEC EN 60947-3
- Voltage levels up to 690 V AC and 440 V DC
- 160 A to 630 A for LV HRC and BS 88 fuse links, according to IEC 60269-1/EN 60269-1
- 2/3/4-pole versions available
- 185 mm center-to-center spacing of plug-in contacts
- Manually operated or with motorized operating mechanism
- Electronic fuse monitoring (EFM)
- Developed for switchboard in plug-in design
- Horizontal or vertical mounting position
- Front panel locked in ON position
- Degree of protection IP41



### 3.2.1.2 Benefits

#### Key advantages for switchboard manufacturers thanks to the following:

- Compact, modular design
- Simple and efficient mounting due to incoming plug-in contact
- High packing density in the field
- Cable connection with cable clamps or cable lugs
- Can be mounted in different control cabinet depths
- Comprehensive range of accessories

#### The advantages for users are:

- Conversion, retrofitting and replacement without switching off the switchboard
- Dead-state fuse replacement
- Maintenance-free
- High personal safety
- Operating handle can be locked in OFF position
- Clear and unambiguous switch position indicator

### 3.2.1.3 Application

The plug-in 3NJ62 switch disconnectors with fuses are installed in low-voltage distribution boards where a minimum amount of space is available for a maximum number of cable ducts to the power distribution. They can be easily fitted in all common control cabinets (minimum depth: 400 mm).

The plug-in 3NJ62 switch disconnectors with fuses are available for rated uninterrupted currents from 160 A to 630 A.

LV HRC fuse links according to IEC 60269-1/EN 60269-1 (sizes NH 00 to NH 3) or BS fuse links according to BS 88 provide overload and short-circuit protection up to 690 V AC.

The switch disconnectors can be retrofitted at any time with auxiliary switches, an ammeter (48 mm x 48 mm) and current transformers, with no extra space required. For installation in control cabinets with a depth > 400 mm, the mounting depth of the disconnectors can be increased by 200 mm using a contact extension. Further installation accessories, such as guide rails and blanking covers, complete the product range.

### 3.2.1.4 Function

#### Fuse monitoring

Fuse monitoring is used to detect, indicate and report faults. The electronic fuse monitoring devices are available in 2 versions.

EFM10 electronic fuse monitoring devices:

- For use up to 690 V AC
- Operational voltage < 20 V
- Display: Ready-to-run
- Individual fault display per phase
- 1 CO contact as centralized fault signaling unit

EFM20/25 electronic fuse monitoring and line monitoring devices:

- EFM20 for use up to 690 V AC, EFM25 for use up to 440 V DC
- Operational voltage < 13 V (EFM20) < 20 V (EFM25)
- Test function
- Closed-circuit principle or open-circuit principle
- 2 CO contacts as centralized fault signaling unit incl. line monitoring functions with phase failure detection (EFM20), undervoltage/overvoltage detection

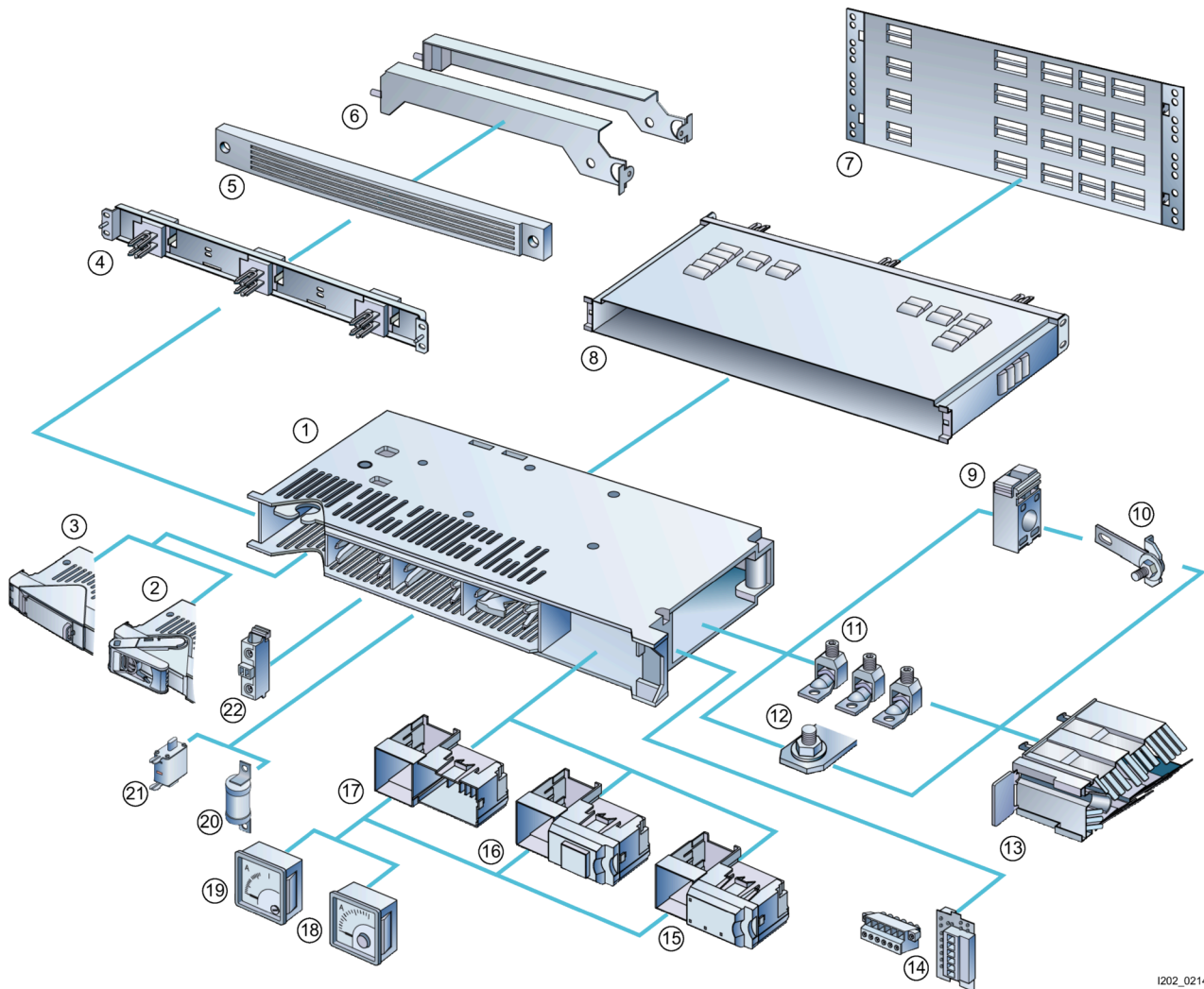


Figure 3-21 EFM10 electronic fuse monitoring devices



Figure 3-22 EFM20/25 electronic fuse monitoring device

### 3.2.2 Overview of components



I202\_02142

- |  |  |
|--|--|
| ① 3NJ62 switch disconnector basic unit, here in size 00, open, without front cover | ⑫ Stud terminal  |
| ② Manual operating mechanism   | ⑬ Terminal cover   |
| ③ Motorized operating mechanism  | ⑭ Multifunction plug   |
| ④ Connection modules   | ⑮ Holder for measuring device with electronic fuse monitoring (EFM10)    |
| ⑤ Blanking cover   | ⑯ Holder for measuring device with electronic fuse monitoring (EFM20/25) |
| ⑥ Guide rails  | ⑰ Holder for measuring device without EFM                                |
| ⑦ Busbar cover   | ⑱ Bimetal current measuring device                                       |
| ⑧ Contact extension  | ⑲ Moving-iron current measuring device                                   |
| ⑨ Current transformer  | ⑳ BS fuse  |
| ⑩ Current transformer bar  | Ⓐ LV HRC fuse  |
| ⑪ Terminals  | Ⓑ Auxiliary switch   |

### 3.2.3 Technical specifications

#### 3.2.3.1 Main devices of sizes 00 and 1

Size		00								1			
Switch disconnector with fuse Type 3NJ62...	LV HRC			...02-3 ...02-4		...03-1 ...04-1 ...04-2		...03-3 ...03-4		...12-3 ...12-4	...13-1 ...14-1 ...14-2	...13-3 ...13-4	
	BS	...43-3	...53-3	...62-3 ...62-4				...63-3 ...63-4		...72-3 ...72-4	...74-1 ...72-4	...73-3 ...73-4	
<b>Breaking capacity</b>		H	H	H		S		H		H		S	H
<b>Rated insulation voltage <math>U_i</math></b>	V	1000											
<b>Rated impulse voltage <math>U_{imp}</math></b>	V	8000											
<b>Rated operational current <math>I_e</math></b>	A	63	100	160	--	160	125	160	125	250			
<b>For LV HRC fuse links acc. to IEC 60269</b>		--	--	For 00 and 000						1			
<b>For BS fuse links acc. to BS 88</b>		A3	A3	00T <sup>1)</sup>						B2			
<b>Rated operational voltage <math>U_e</math></b>													
<input type="checkbox"/> At 50/60 Hz rated frequency	V	690		--	--	500	690	500	690	690			
<input type="checkbox"/> At DC	V	--	--	230	440	--	--	--	--	230	440	--	--
<b>Utilization category</b>		AC-23B		DC-23B	DC-21B	AC-22B		AC-23B		DC-23B	DC-21B	AC-22B	AC-23B
<b>Rated conditional short-circuit current</b>													
<input type="checkbox"/> Short-circuit strength (rms value)	kA	100		60		100		100		60		100	
<input type="checkbox"/> Short-circuit making capacity (rms value)	kA	66		60		55		66		60		55	66
<b>Rated making capacity</b>													
<input type="checkbox"/> $\cos \varphi = 0.65$	A	--	--	--	--	480	375	--	--	--	--	750	--
<input type="checkbox"/> $\cos \varphi = 0.45$	A	630	1000	--	--	--	--	--	--	--	--	--	--

Size		00						1						
Switch disconnector with fuse Type 3NJ62...	LV HR C			...02- 3 ...02- 4		...03-1 ...04-1 ...04-2	...03-3 ...03-4	...12-3 ...12-4	...13- 1 ...14- 1 ...14- 2	...13- 3 ...13- 4				
	BS	...43- 3	...53- 3	...62- 3 ...62- 4			...63-3 ...63-4	...72-3 ...72-4	...74- 1 ...72- 4	...73- 3 ...73- 4				
<input type="checkbox"/> $\cos \varphi = 0.35$	A	--	--	--	--	--	--	1600	1250	--	--	--	--	2500
<b>Rated breaking capacity</b>														
<input type="checkbox"/> $\cos \varphi = 0.65$	A	--	--	--	--	480	375	--	--	--	--	750	--	--
<input type="checkbox"/> $\cos \varphi = 0.45$	A	504	800	--	--	--	--	--	--	--	--	--	--	--
<input type="checkbox"/> $\cos \varphi = 0.35$	A	--	--	--	--	--	--	1280	1000	--	--	--	--	2000
<b>Endurance</b>														
<b>Operating cycles total</b>		2000			1600			1600						
Electrical (690 V, $\cos \varphi = 0.65$ )		300			200			200						
<b>Power loss</b> (without fuse links)	W	7	17	43			78							
<b>Permissible ambient temperature</b>	°C	-5 ... +55												
<b>Permissible mounting position</b>	Horizontal and vertical with bottom connection													
<b>Degree of protection (in operating state)</b>	IP41													
<b>Connection type</b>	Main conductor connection													
<b>Cable lug connection</b>														
<input type="checkbox"/> Conductor cross-section (Al/Cu, solid or stranded) according to DIN 46235 (Cu) and DIN 46239 (Al)	mm <sup>2</sup>	1x 10-95 2x 16-70						1x 25-240 2x 25-70						
<input type="checkbox"/> Screw size	M8													
<input type="checkbox"/> Tightening torque	Nm	15						30						
<b>Clamp connection</b>														
<input type="checkbox"/> Conductor cross-section (Al/Cu), mm	mm <sup>2</sup>	1x 10-50						1x 16-185						

3.2 3NJ62 up to 630 A

Size		00					1			
Switch disconnector with fuse Type 3NJ62...	LV HR C			...02-3 ...02-4		...03-1 ...04-1 ...04-2	...03-3 ...03-4	...12-3 ...12-4	...13-1 ...14-1 ...14-2	...13-3 ...13-4
	BS	...43-3	...53-3	...62-3 ...62-4			...63-3 ...63-4	...72-3 ...72-4	...74-1 ...72-4	...73-3 ...73-4
<input type="checkbox"/> Conductor cross-section (Al/Cu), re	mm <sup>2</sup>	1x 10-50					1x 16-150			
<input type="checkbox"/> Conductor cross-section (Al/Cu), sm	mm <sup>2</sup>	1x 16-95					1x 35-240			
<input type="checkbox"/> Conductor cross-section (Al/Cu), se	mm <sup>2</sup>	1x 16-95					1x 35-300			
<input type="checkbox"/> Required torque	Nm	15					25			

1) The fuse is available from Lawson Fuses (UK) and does not correspond to BS 88.

3.2.3.2 Main devices of sizes 2 and 3

Size		2				3			
Switch disconnector with fuse Type 3NJ62...	LV HR C	...22-3 ...22-4		...23-1 ...24-1 ...24-2	...23-3 ...23-4	...32-3 ...32-4	...33-1 ...34-1 ...34-2	...33-3 ...33-4	
	BS	...82-3 ...82-4			...83-3 ...83-4	...92-3 ...92-4	...94-1 ...94-2	...93-3 ...93-4 ...33-3 ...33-4	
<b>Breaking capacity</b>		H		S	H	H	S	H	
<b>Rated insulation voltage</b> U <sub>i</sub>	V	1000							
<b>Rated impulse voltage</b> U <sub>imp</sub>	V	8000							
<b>Rated operational current</b> I <sub>e</sub> <input type="checkbox"/> For fuse links acc. to IEC 60269/BS 88	A	400			630		500	630	500

Size		2				3					
Switch disconnector with fuse Type 3NJ62...	LV	...22-3		...23-1	...23-3	...32-3	...33-1			...33-3	
	HR	...22-4		...24-1	...23-4	...32-4	...34-1			...33-4	
	C			...24-2			...34-2				
	BS	...82-3			...83-3	...92-3	...94-1			...93-3	
		...82-4			...83-4	...92-4	...94-2			...93-4	
										...33-3	
										...33-4	
For fuse links acc. to IEC 60269		2 and 1				3 and 2					
For BS fuse links acc. to BS 88		B4				3T <sup>1)</sup>					
Rated operational voltage $U_e$											
<input type="checkbox"/> At 50/60 Hz rated frequency	V	--	--	690		230	440	500	690	500	690
<input type="checkbox"/> At DC	V	230	440	--	--	--	--	--	--	--	--
Utilization category		DC-23B	DC-21B	AC-22B	AC-23B	DC-23B	DC-21B	AC-22B		AC-23B	
Rated conditional short-circuit current											
<input type="checkbox"/> Short-circuit strength (rms value)	kA	60		100		60		100			
<input type="checkbox"/> Short-circuit making capacity (rms value)	kA	60		55	66	60		55		66	
Rated making capacity											
<input type="checkbox"/> $\cos \varphi = 0.65$	A	--	--	1200	--	--	--	1890	1500	--	--
<input type="checkbox"/> $\cos \varphi = 0.45$	A	--	--	--	--	--	--	--	--	--	--
<input type="checkbox"/> $\cos \varphi = 0.35$	A	--	--	--	4000	--	--	--	--	6300	5000
Rated breaking capacity											
<input type="checkbox"/> $\cos \varphi = 0.65$	A	--	--	1200	--	--	--	1890	1500	--	--
<input type="checkbox"/> $\cos \varphi = 0.45$	A	--	--	--	--	--	--	--	--	--	--
<input type="checkbox"/> $\cos \varphi = 0.35$	A	--	--	--	3200	--	--	--	--	5040	4000
Endurance											
Operating cycles total		1000				1000					
Electrical (690 V, $\cos \varphi = 0.65$ )		200				200					
Power loss (without fuse links)		158				357					
Permissible ambient temperature		-5 ... +55									
Permissible mounting position		Horizontal and vertical with bottom connection									

Size		2				3			
Switch disconnector with fuse Type 3NJ62...	LV HR C	...22-3		...23-1	...23-3	...32-3	...33-1	...33-3	
		...22-4		...24-1	...23-4	...32-4	...34-1	...33-4	
				...24-2			...34-2		
	BS	...82-3			...83-3	...92-3	...94-1	...93-3	
		...82-4			...83-4	...92-4	...94-2	...93-4	
								...33-3 ...33-4	
Degree of protection (in operating state)		IP41							
Connection type		Main conductor connection							
<b>Cable lug connection</b>									
<input type="checkbox"/> Conductor cross-section (Al/Cu, solid or stranded) according to DIN 46235 (Cu) and DIN 46239 (Al)	mm <sup>2</sup>	1x 25-300 2x 25-240				1x 25-300 2x 25-240			
<input type="checkbox"/> Screw size		2 x M12				2 x M12			
<input type="checkbox"/> Tightening torque	Nm	30				30			
<b>Clamp connection</b>									
<input type="checkbox"/> Conductor cross-section (Al/Cu), rm	mm <sup>2</sup>	2x 16-185				2x 16-185			
<input type="checkbox"/> Conductor cross-section (Al/Cu), re	mm <sup>2</sup>	2x 16-150				2x 16-150			
<input type="checkbox"/> Conductor cross-section (Al/Cu), sm	mm <sup>2</sup>	2x 35-240				2x 35-240			
<input type="checkbox"/> Conductor cross-section (Al/Cu), se	mm <sup>2</sup>	2x 35-300				2x 35-300			
<input type="checkbox"/> Required torque	Nm	25				25			

1) The fuse is available from Lawson Fuses (UK) and does not correspond to BS 88.



## Auxiliary switch

<b>Acc. to IEC 60947-5-1</b>		
<b>Rated insulation voltage <math>U_i</math></b>	V	690
<b>Rated impulse voltage <math>U_{imp}</math></b>	V	8000
<b>Rated operational current <math>I_e</math></b>		
<input type="checkbox"/> At AC 15, $U_e = 120$ V	A	8
<input type="checkbox"/> At AC 15, $U_e = 230$ V	A	6
<input type="checkbox"/> At AC 15, $U_e = 400$ V	A	4
<input type="checkbox"/> At AC 15, $U_e = 690$ V	A	2

## Electronic fuse monitoring devices, AC version (EFM10)

<b>Size</b>		00	1	2/3
<b>Apparent power consumption S</b>	VA	Approx. 2.5		
<b>Internal resist. of measurement circuit</b>	M $\Omega$	$R_{in} > 6$		
<b>Storage temperature</b>	$^{\circ}\text{C}$	-20 ... +80		
<b>Operating temperature</b>	$^{\circ}\text{C}$	5 ... +55		
<b>Operating temperature (500 V or 500 A)</b>	$^{\circ}\text{C}$	5 ... +35		
<b>Degree of protection in closed disconnector</b>		IP40		
<b>Rated operational voltage of the main control switching devices</b>	V A	230 ... 690		
	C			
	Hz	50/60		
<b>Voltage limits</b>	%	$\pm 15$		
<b>Signaling relay acc. to IEC 60947-5-1</b>	A	$I_{th} = 1.5$		
	kV	$U_{imp} = 4$		
	V	$U_i = 250$		
<b>Load capacity of the signaling relay</b>				
<input type="checkbox"/> $U_e$	V	24	125	240
<input type="checkbox"/> DC-13; $I_e$	A	1	0.2	0.1
<input type="checkbox"/> AC -15; $I_e$	A	1.5		
<b>Short-circuit protection</b>		Max. fuse protection DIAZED 2 A gLgG		

Electronic fuse monitoring devices, AC version (EFM20)

<b>Size</b>		00	1	2/3
<b>Apparent power consumption S</b>	VA	Approx. 2.5		
<b>Internal resist. of measurement circuit</b>	MΩ	R <sub>in</sub> > 6		
<b>Storage temperature</b>	°C	-20 ... +80		
<b>Operating temperature</b>	°C	5 ... +55		
<b>Operating temperature (500 V or 500 A)</b>	°C	5 ... +35		
<b>Degree of protection in closed disconnector</b>		IP40		
<b>Rated operational voltage of the main control switching devices</b>	V A C	230 ... 690		
	Hz	50/60		
<b>Voltage limits</b>	%	± 15		
<b>Undervoltage</b>	V	375		
<b>Overvoltage</b>	V	425		
<b>Voltage drop for faulty fuses</b>	V	>13		
<b>Delay time</b>	s	0.1		
<b>Relay 2</b>		As relay 1 (fuse monitoring)		
<b>Storage function</b>		Off		
<b>Open/closed-circuit principle</b>		Closed-circuit principle		
<b>Mode</b>		Run mode		
<b>Menu option</b>		Display of voltage values / signals		
<b>Signaling relay acc. to IEC 60947-5-1</b>	A	I <sub>th</sub> = 1.5		
	kV	U <sub>imp</sub> = 4		
	V	U <sub>i</sub> = 250		
<b>Signaling relay 1</b>		1 changeover contact for fuse monitoring only		
<b>Signaling relay 2</b>		1 changeover contact as output for central fault OR as signaling relay 1 (presetting)		
<b>Load capacity of the signaling relay</b>				
<input type="checkbox"/> U <sub>e</sub>	V	24	125	240
<input type="checkbox"/> DC-13; I <sub>e</sub>	A	1	0.2	0.1
<input type="checkbox"/> AC -15; I <sub>e</sub>	A	1.5		
<b>Short-circuit protection</b>		Max. fuse protection DIAZED 2 A gLgG		

## Electronic fuse monitoring devices, DC version (EFM25)

Size		00	1	2/3
Apparent power consumption S	VA	Approx. 2.5		
Internal resist. of measurement circuit	MΩ	R <sub>in</sub> > 6		
Storage temperature	°C	-20 ... +80		
Operating temperature	°C	5 ... +55		
Operating temperature (500 V or 500 A)	°C	5 ... +35		
Degree of protection in closed disconnector		IP40		
Rated operational voltage of the main control switching devices	V A C	220 ... 440		
Voltage limits	%	± 15		
Undervoltage	V	200		
Overvoltage	V	240		
Voltage drop for faulty fuses	V	>20		
Delay time	s	0.1		
Relay 2		As relay 1 (fuse monitoring)		
Storage function		Off		
Open/closed-circuit principle		Closed-circuit principle		
Mode		Run mode		
Menu option		Display of voltage values / signals		
Signaling relay acc. to IEC 60947-5-1	A	I <sub>th</sub> = 1.5		
	kV	U <sub>imp</sub> = 4		
	V	U <sub>i</sub> = 250		
Signaling relay 1		1 changeover contact for fuse monitoring only		
Signaling relay 2		1 changeover contact as output for central fault OR as signaling relay 1 (presetting)		
<b>Load capacity of the signaling relay</b>				
<input type="checkbox"/> U <sub>e</sub>	V	24	125	240
<input type="checkbox"/> DC-13; I <sub>e</sub>	A	1	0.2	0.1
<input type="checkbox"/> AC -15; I <sub>e</sub>	A	1.5		
Short-circuit protection		Max. fuse protection DIAZED 2 A gLgG		

**Ammeters**

<b>Input</b>		x /1 A or x /5 A	
<b>Overload</b>			
<input type="checkbox"/> Moving-iron measuring instruments	1.2 times		
<input type="checkbox"/> Bi-metal measuring instruments	Double		
<b>Slave pointer</b>			
<input type="checkbox"/> Moving-iron measuring instruments	min	---	
<input type="checkbox"/> Bi-metal measuring instruments	min	15	
<b>Power consumption</b>			
<input type="checkbox"/> Moving-iron measuring instruments	VA	0.6	
<input type="checkbox"/> Bi-metal measuring instruments	VA	1	

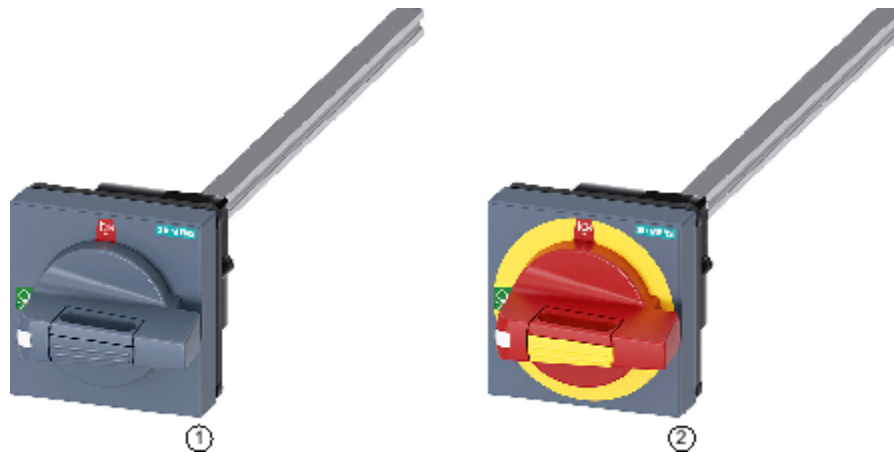
**Motorized operating mechanism**

Size		00	1	2/3
Supply voltage	V D C	24 ± 2		
Current consumption	A	1.1	1.3	2.8
<b>Service life (no limitation of switch disconnector according to IEC 60947-3)</b>				
Operating cycles total	1600			
Operating cycles under load	200			
Signal duration	s	Min. 0.5 or continuous signal		

## 8UD1 door-coupling rotary operating mechanisms

### 4.1 Product description

#### 4.1.1 Overview



- ① 8UD1 rotary operating mechanisms in STANDARD version in gray (ti-gray)
- ② 8UD1 rotary operating mechanisms in EMERGENCY STOP version in red/yellow

With door-coupling rotary operating mechanisms it is also possible to operate switch disconnectors from the outside with the control cabinet doors closed. The 8UD1 door-coupling rotary operating mechanisms can be used for

- 3KD and 3KF switch disconnectors
- 3KC0 manual transfer switching equipment (MTSE)

The rotary operating mechanisms are available in "STANDARD" and "EMERGENCY STOP" versions with the following differences:

- **STANDARD version:** Masking plate and handle in gray (ti-gray)
- **EMERGENCY STOP version:** Masking plate in gray and yellow, handle in red and yellow

#### Degree of protection

Degree of protection when installed is IP65.

4.1 Product description

**Standards**

8UD1 door-coupling rotary operating mechanisms are in line with the following standards, for example:

Standard	Title
IEC 60204-1, EN 60204-1 (VDE 0113 Part 1)	Safety of machinery; electrical equipment of machines
IEC 60439-1, EN 60439-1 (VDE 0660 Part 500)	Low-voltage switchgear and controlgear assemblies
IEC 60947-3, EN 60947-3 (VDE 0660 Part 107)	Low-voltage switchgear and controlgear; Switches, disconnectors, switch disconnectors and fuse-combination units

**4.1.2 Benefits**

**Can be locked**

The retractable locking device integrated in the handles is suitable for padlocks with shackle diameters of 4.5 mm to 9.5 mm (locks according to DIN 7465).

Up to three padlocks with a shackle diameter of 9.5 mm can be fitted simultaneously.

**Non-interchangeability**

In order to ensure that, when installing switches and door-coupling operating mechanisms, all components are assembled in the correct position with respect to one another, the components are provided with non-interchangeability features (rivet and lug).

**Stops**

Stops are used to prevent damage occurring as the result of excessive torque. These stops are supplied loose with the rotary operating mechanisms and can be fitted as required. Stops are fitted at the factory to size 1 and 2 rotary operating mechanisms with a 90° operating angle (exception: 3RV motor starter protectors/circuit breakers).

## Tolerance compensation

8UD1 rotary operating mechanisms are capable of taking up a radial eccentricity of max. 8 mm between the actuating shaft of the switching device and the door-coupling rotary operating mechanism. Supporting the extension shaft is recommended with greater tolerances.

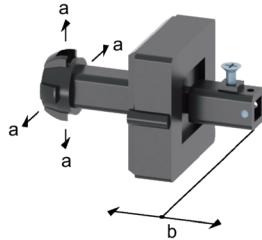


Figure 4-1 Permissible radial eccentricity and axial tolerance compensation in mm

Coupling drivers	a	b	Shaft length
With tolerance compensation	$\pm 8$	$\pm 5$	x
Without tolerance compensation	+ 1.5	$\pm 2.5$	x + 23.5

## Pull-out strength

The pull-out strength of interlocked operating mechanisms, e.g. pulling off the shaft or destruction of the operating mechanism, amounts to 800 N when the pulling force acts directly onto the operating mechanism in the direction of the shaft.

### 4.1.3 Application

8UD1 door-coupling rotary operating mechanisms can be used in electrical controls, distribution boards and switchboards in cases where switches have to be mounted behind covers, end plates and doors that must be opened and where they are to be operated manually from outside.

#### 4.1 Product description

##### Interlocking conditions

The basic versions of the rotary operating mechanisms comply with the following interlocking conditions:

- **Operating mechanism and switch in "0" (OFF) position:**  
The control cabinet door can be opened. With padlocks fitted, the control cabinet door remains locked however.
- **Operating mechanism and switch in "I" (ON) position:**  
The control cabinet door cannot be opened in this position. However, the lock can be overridden and the control cabinet door opened by trained personnel for performing checks. No padlocks can be fitted in "I" position.

Other interlocking conditions:

- If no door interlock is desired, it can be deactivated.

##### Operating conditions and ambient conditions

The temperature range for operation of the rotary operating mechanisms is between -25 °C and +60 °C.

Thanks to the use of glass fiber-reinforced molded plastic for handles and masking plates as well as metal components with surface protection, the rotary operating mechanisms are suitable for rough conditions, high air humidity and aggressive atmospheres.

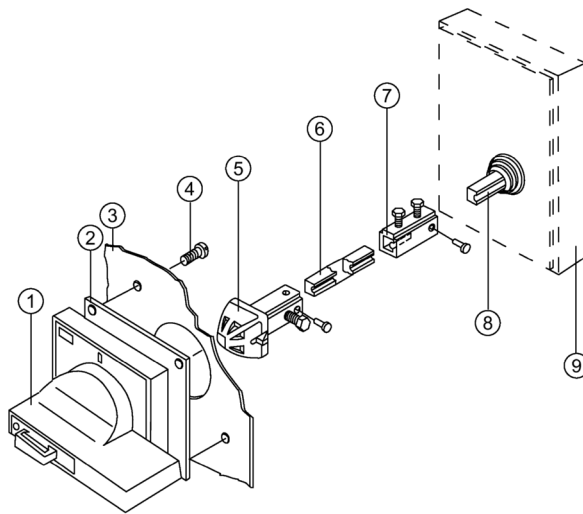


## 4.1.4 Design

### Components

The rotary operating mechanisms consist of a masking plate with handle, including seal and fixing screws for door installation, an extension shaft (300 mm) and a coupling driver to be mounted onto the switch shaft.

The shaft coupling is only required if the 300 mm shaft needs to be extended by an additional shaft. Shafts with a length of 600 mm are also available as an alternative.



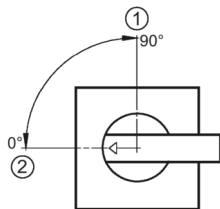
- ① Handle with masking plate
- ② Seal
- ③ Door
- ④ Fixing screws
- ⑤ Coupling drivers
- ⑥ Extension shaft
- ⑦ Adapter
- ⑧ Operating shaft of switching device
- ⑨ Switching device

Figure 4-2 Design, schematic representation

4.1 Product description

**Switch position**

In order to ensure compliance with locking and interlocking conditions, the controls and operating mechanisms must be installed such that, with two-position switches the "0" position lies at 9 o'clock and the "I" position at 12 o'clock.



- ① 12 o'clock position
- ② 9 o'clock position

Figure 4-3 Positions for two-position switches with 90° operating angle

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## Further Information

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