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3VA27 moulded case circuit breakers

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OEZ Modeion

OEZ

3VA27 moulded case circuit breakers

- Rated current 800 ÷ 1 600 A
- Rated short-circuit ultimate breaking capacity 55 ÷ 110 kA @ AC 415 V
- $I_{cu} = I_{cs}$
- Electronic trip units ETU
- 3P, 4P design
- Storage energy operator
- Possibility of data communication
- Possibility of measuring function

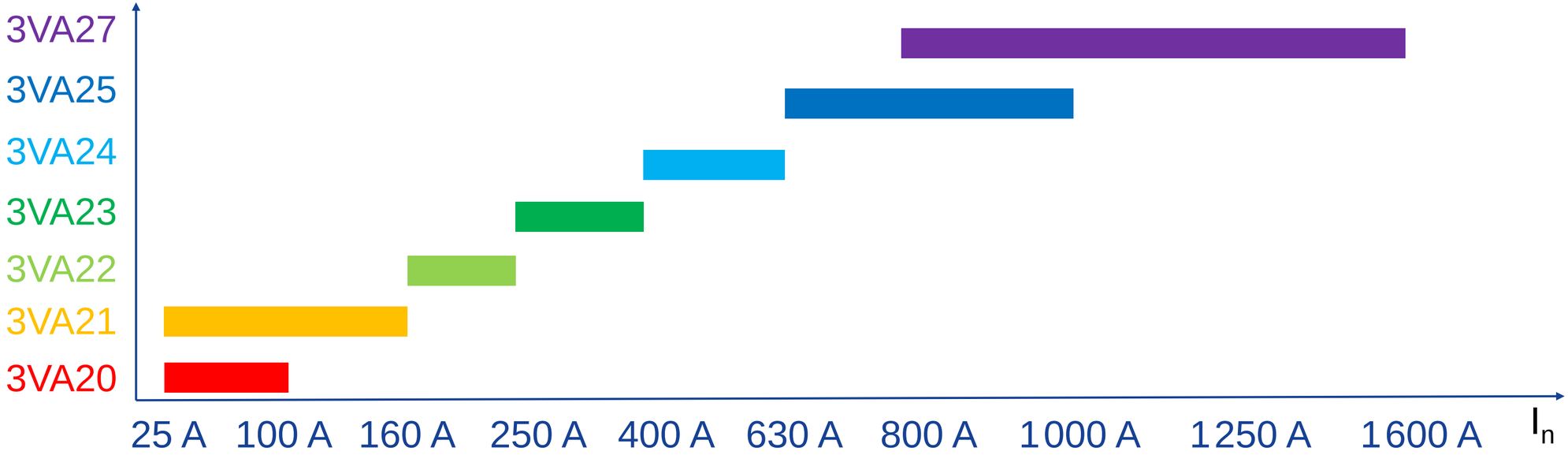
Specifications

Rated current	I_n [A]	800, 1 000, 1 250, 1 600	
Rated operating voltage	U_e [V]	690	
Number of poles		3, 4	
Max. permissible load of N-pole	[%]	100	
Design		Fixed / withdrawable	
	U_e [V] AC	415	690
Rated short-circuit ultimate breaking capacity	I_{cu} [kA]	max. 110	max. 50
Rated short-circuit service breaking capacity	I_{cs} [%]	100 %	100 % [1)]
Rated short-time withstand current	I_{cw} (1s) [kA]	20	
Endurance			
Electrical	U_e 415 V	2 000	
Mechanical		10 000	

[1)] I_{cs} = 75 % I_{cu} for breaking class C @ AC 500 V and 690 V

Specifications

I_{cu} (415 V)							
Breaking class	3VA20	3VA21	3VA22	3VA23	3VA24	3VA25	3VA27
L	150	150	150	-	-	-	-
C	110	110	110	110	110	110	110
H	85	85	85	85	85	85	85
M	55	55	55	55	55	55	55



Specifications

3VA2 AC 50/60 Hz	100 A I_{cu} / I_{cs}				160 A I_{cu} / I_{cs}				250 A I_{cu} / I_{cs}			
Breaking class	M	H	C	L	M	H	C	L	M	H	C	L
220 ÷ 240 V	85 / 85	110 / 110	150 / 150	200 / 200	85 / 85	110 / 110	150 / 150	200 / 200	85 / 85	110 / 110	150 / 150	200 / 200
380 ÷ 415 V	**55 / 55**	**85 / 85**	**110 / 110**	**150 / 150**	**55 / 55**	**85 / 85**	**110 / 110**	**150 / 150**	**55 / 55**	**85 / 85**	**110 / 110**	**150 / 150**
440 V	55 / 55	85 / 85	110 / 110	150 / 150	55 / 55	85 / 85	110 / 110	150 / 150	55 / 55	85 / 85	110 / 110	150 / 150
500 V	36 / 36	55 / 55	85 / 85	100 / 100	36 / 36	55 / 55	85 / 85	100 / 100	36 / 36	55 / 55	85 / 85	100 / 100
690 V	2 / 2	2 / 2	2 / 2	24 / 18	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	24 / 18	3 / 3	3 / 3	3 / 3	24 / 18
IT network	Up to 690 V											

3VA2 AC 50/60Hz	400 A I_{cu} / I_{cs}			630 A I_{cu} / I_{cs}			1 000 A I_{cu} / I_{cs}			1 600 A I_{cu} / I_{cs}		
Breaking class	M	H	C	M	H	C	M	H	C	M	H	C
220 ÷ 240 V	85 / 85	110 / 110	150 / 150	85 / 85	110 / 110	150 / 150	85 / 85	110 / 110	200 / 200	100 / 100	150 / 150	200 / 200
380 ÷ 415 V	**55 / 55**	**85 / 85**	**110 / 110**	**55 / 55**	**85 / 85**	**110 / 110**	**55 / 55**	**85 / 85**	**110 / 110**	**55 / 55**	**85 / 85**	**110 / 110**
440 V	55 / 55	85 / 85	110 / 110	55 / 55	85 / 85	110 / 110	On request	On request	On request	55 / 55	85 / 85	100 / 100
500 V	36 / 36	55 / 55	85 / 85	36 / 36	55 / 55	85 / 85	On request	On request	On request	36 / 36	55 / 55	85 / 63
690 V	5 / 5	5 / 5	5 / 5	6 / 6	6 / 6	6 / 6	35 / 35	35 / 35	35 / 35	25 / 25	36 / 36	50 / 36
IT network	Up to 690 V [1)]						-	-	-	Up to 690 V		

[1)] I_n 630 A IT network up to 500 V

I_{cu}: Rated short-circuit ultimate breaking capacity

I_{cs}: Rated short-circuit service breaking capacity

Maximum normal operating current

At an ambient temperature of up to 40 ° C, it is equal to the rated current I_n

- In worse thermal conditions correction is necessary
  - It also depends on the connecting sets used
    - The worst case in the table – circuit breaker in fixed design with front connections

Rated current In [A]	Minimum cross section of Cu conductor [mm²]	Maximum normal operating current						
		≤ 40 °C [A]	45 °C [A]	50 °C [A]	55 °C [A]	60 °C [A]	65 °C [A]	70 °C [A]
800	500						750	700
1 000	600				971	942	855	827
1 250	800 (Cu busbars 2x 40 x 10)				1 184	1 118	1 049	980
	1 000 (Cu busbars 2x 50 x 10)				1 240	1 182	1 122	1 057
1 600	1 000 (Cu busbars 2x 50 x 10)	1 400	1 350	1 296	1 240	1 183	1 122	1 058
	1 500 (Cu busbars 3x 50 x 10)		1 541	1 481	1 417	1 352	1 281	1 209

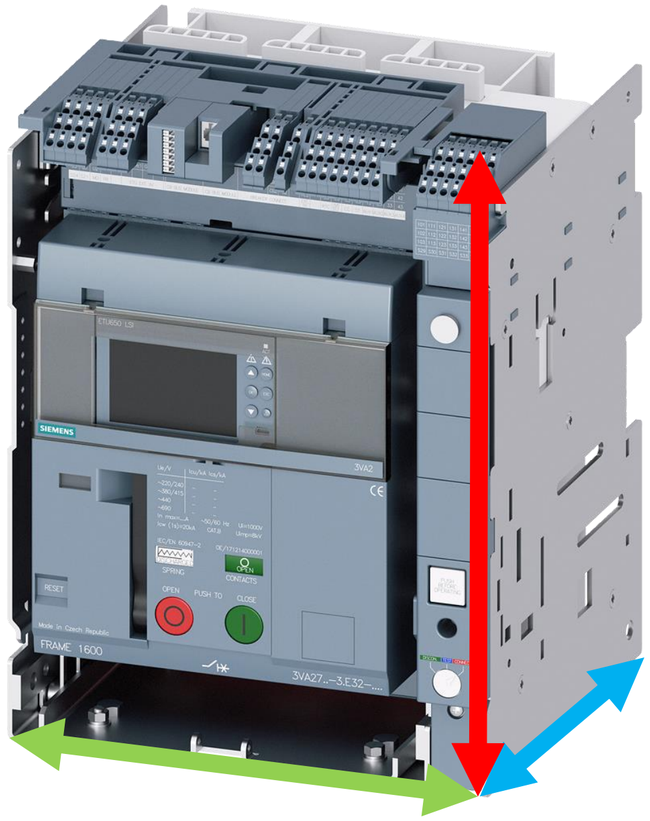
no correction

Specifications

Dimensions

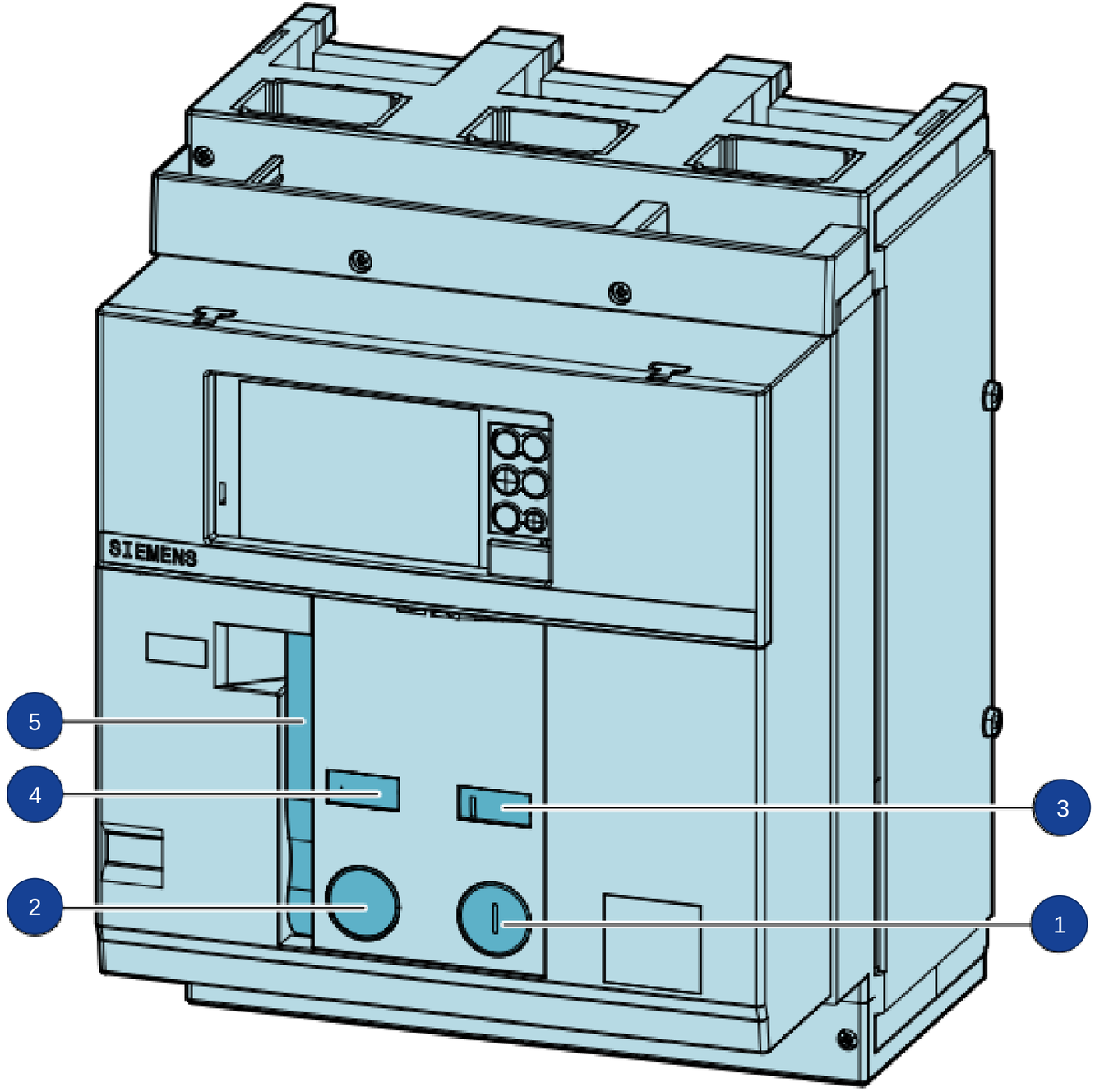
Fixed	3-pole	4-pole
Width	214 mm	284 mm
Height	291 mm	291 mm
Depth	184 mm	184 mm

Withdrawable	3-pole	4-pole
Width	278 mm	348 mm
Height	363.5 mm	363.5 mm
Depth	271 mm	271 mm



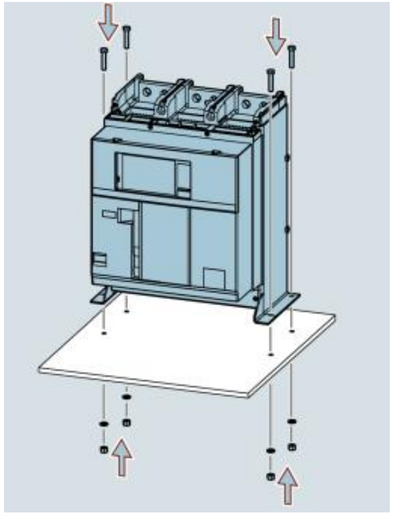
Control

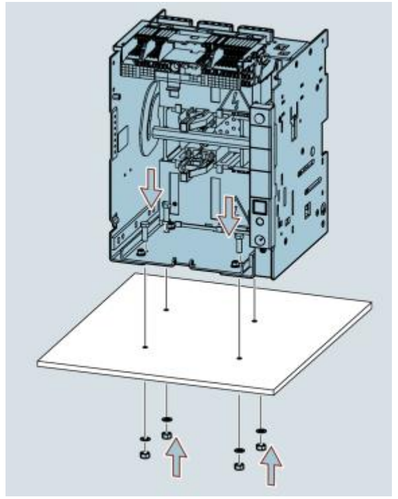
- By means of ON (1) and OFF (2) push-buttons
- The energy required to switch on or off is stored in the stored energy operator
  - As a standard, the stored energy operator can be loaded manually using the lever (5)
  - Automatically by means of motor operator
- Before the circuit breaker switching on, the following conditions must be met:
  - Circuit breaker in off position – contact status signalling is in the OPEN position (3)
  - The stored energy operator is loaded – the storage device status signalling signals CHARGED (4)



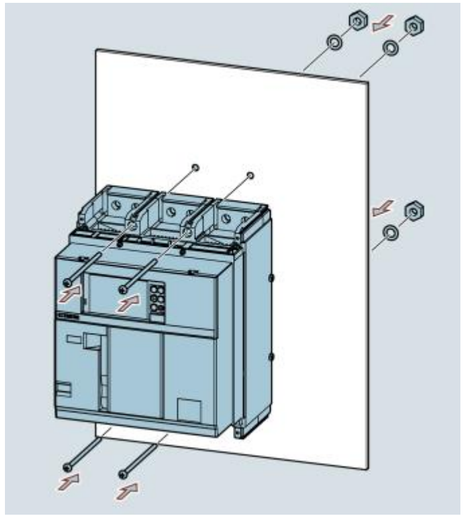
Mounting

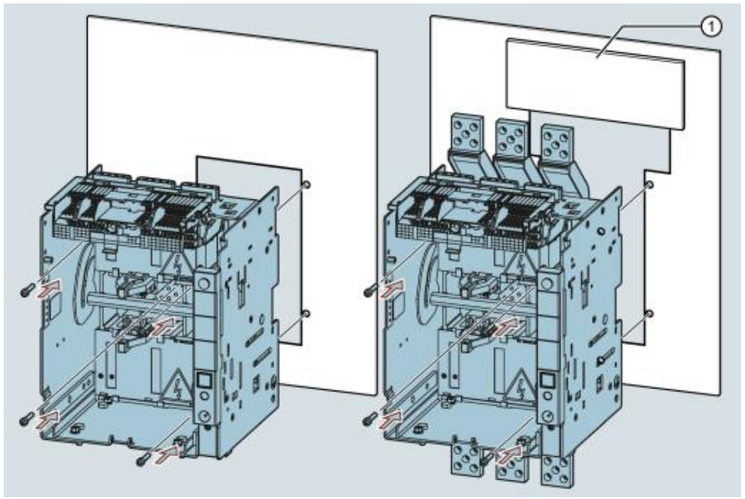
- On horizontal mounting grid
  - For fixed design it is necessary to add mounting supports



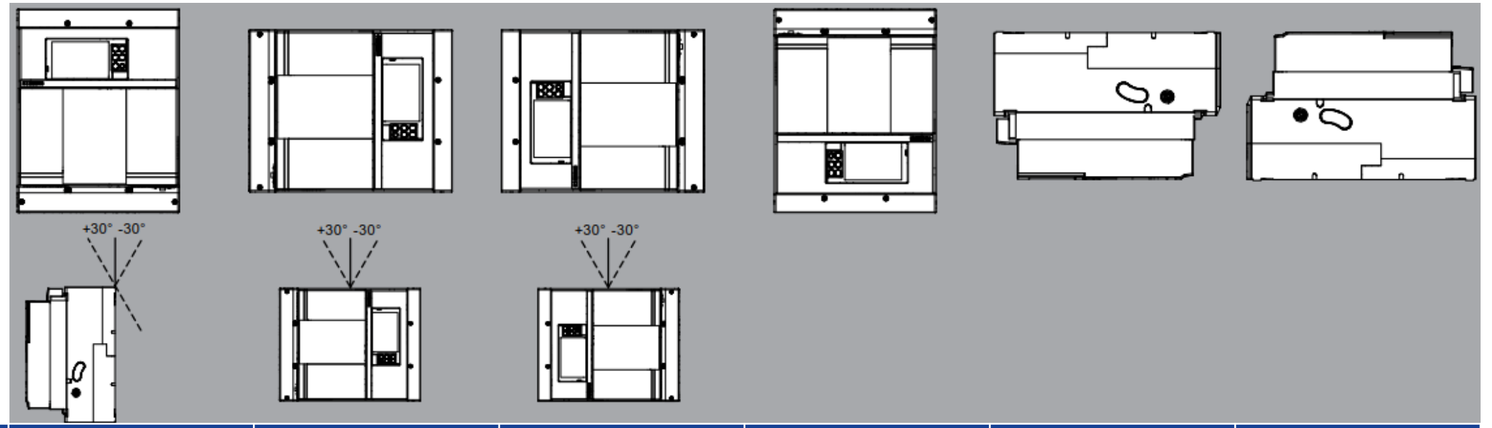


- On the mounting plate
  - For withdrawable design it is necessary to cut hole for main connections





Mounting



3VA27 circuit breakers	Vertical upright	Horizontal right	Horizontal left	Vertical rotated	Horizontal mounting with control down	Horizontal mounting with control up
Fixed design	✓	✓	✓	-	-	-
Withdrawable design	✓	✓	✓	-	-	-
Mounting on horizontal mounting grid	✓	-	-	-	-	-
Mounting on a plate	✓	✓	✓	-	-	-
Interlocking (mechanical, direct, with Bowden cable)	✓	✓	✓	-	-	-

Electronic trip units

- ETU3xx
  - Setting by means of rotary switches
  - Possibility of replacement of electronic trip unit
  - Line protection
    - ETU320 LI (replacement of DTV3)
    - ETU350 LSI (replacement of MTV8)
    - ETU360 LSIG

- ETU6xx
  - Setting by means of push-buttons and display
  - Possibility of replacement of electronic trip unit
  - Possibility to add of data communication module and measuring function
  - Line and motor protection
    - ETU650 LSI
    - ETU660 LSIG

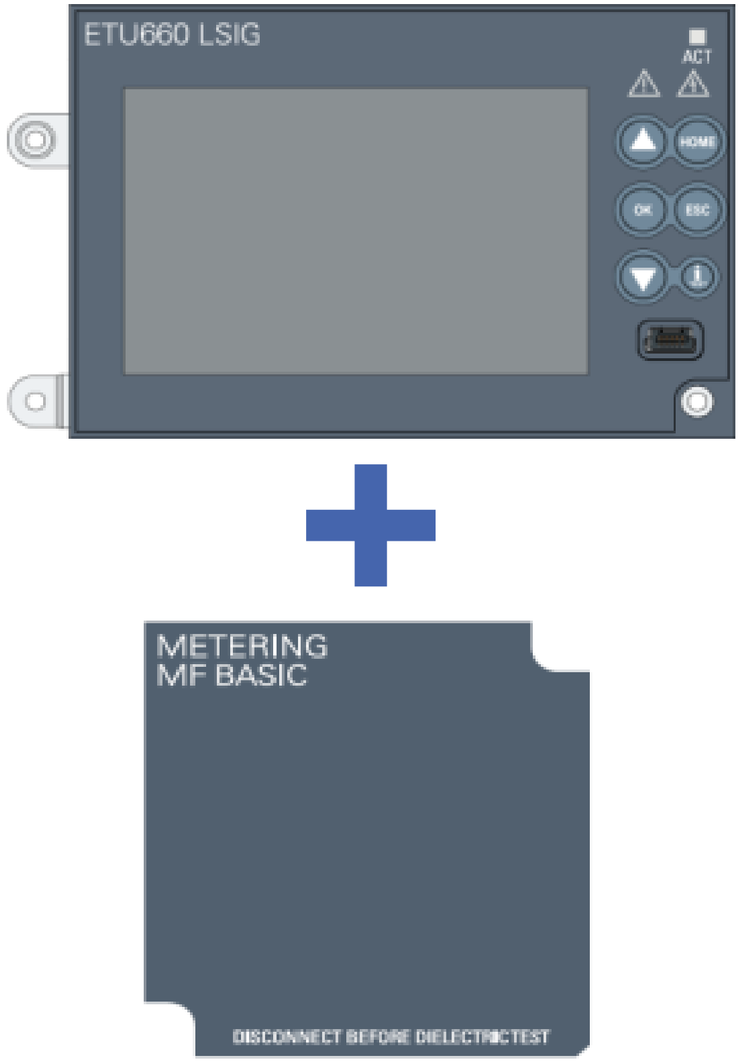
Measuring functions

- ETU3xx and ETU6xx measure current
- ETU6xx additional protection functions
- Second set of parameters (A/B)
  - Set B also for all protection functions
  - Change via display, communication, input of digital modules,…
- Direct earth fault measuring (Gret)[1) 2)]
  - Alternative to protection G (vector sum calculation)
  - Measuring via external current transformer connected to auxiliary circuit terminal
- DAS – electric arc suppression
  - Reduce value of protection I => reduce arc energy in the event of fault
  - Protection of person during maintenance work in switchboard cabinet
- Current asymmetry (I-NBA)
  - Protection from undesired unbalance of current between phases and load
- Closing on short-circuit (MCR) [1)]
  - Alternative to protection I
  - Increase of protection at the moment the circuit breaker is closed

1) Power supply module needed
2) Only available for ETU660

Measuring functions MF Basic

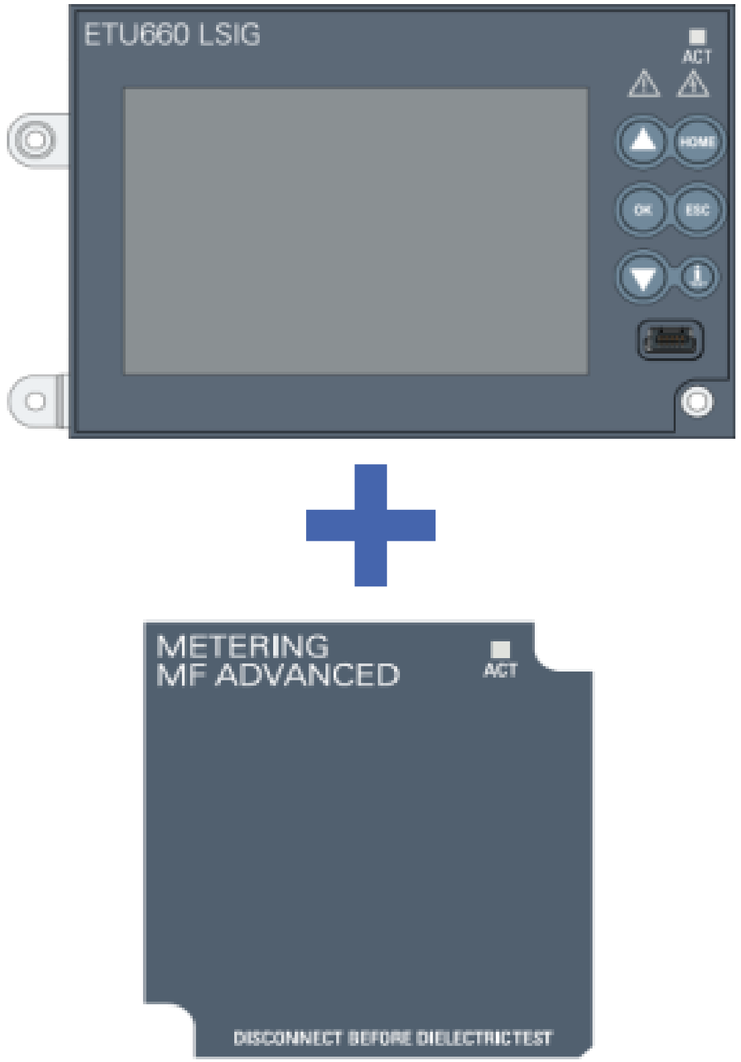
- ETU6xx measures other quantities
- Phase and line voltages
- Frequency
- Power (active, reactive, apparent)
- Energy (active, reactive, apparent)
- Power factor
- Peak value



1) Power supply module needed
2) Only available for ETU660

Measuring functions MF Advanced

- ETU6xx measures quantities like MF Basic + other protection functions
- Protection against residual currents (R_c) [1) 2)]
  - Measuring directly via external summation current transformer connected to auxiliary circuit terminal
  - $I_{\Delta n}$ 3 ÷ 30 A
- Selective protection of current direction (DST)
  - Different selective behavior depending on the direction of power flow
- Voltage asymmetry (V-NBA)
  - Protection from undesired unbalance of voltage between phases and load



[1)] Only available for ETU660

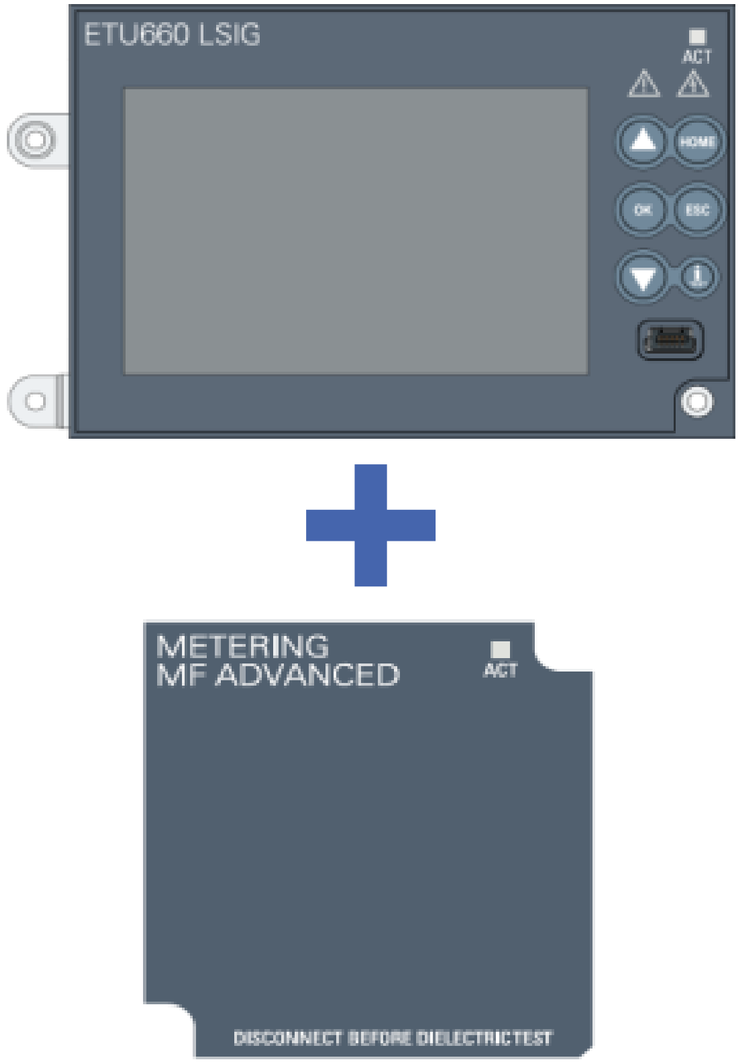
[2)] Rated current module with R_c protection is necessary to activate this function

Measuring functions MF Advanced

- Protection from impermissible deviation of
  - Undervoltage (V_u)
  - Overvoltage (V_o)
  - Frequency low limit (f_u)
  - Frequency high limit (f_o)
- Signaling limit values of currents (PAL)
  - 4 independent current settings
  - Switched via digital modules
- Phase sequence
  - L1L2L3 or L3L2L1
- Signaling cos φ
  - In case of large difference between currents and voltage => increasing reactive power
    - Need of compensation
- Protection against reverse active power (RP)

[1] Only available for ETU660

[2] Rated current module with R_c protection is necessary to activate this function



Rated current module

- It determines the rated current of the circuit breaker
- Replaceable module - only to a value ≤ $I_{n\ max}$ of the respective circuit breaker

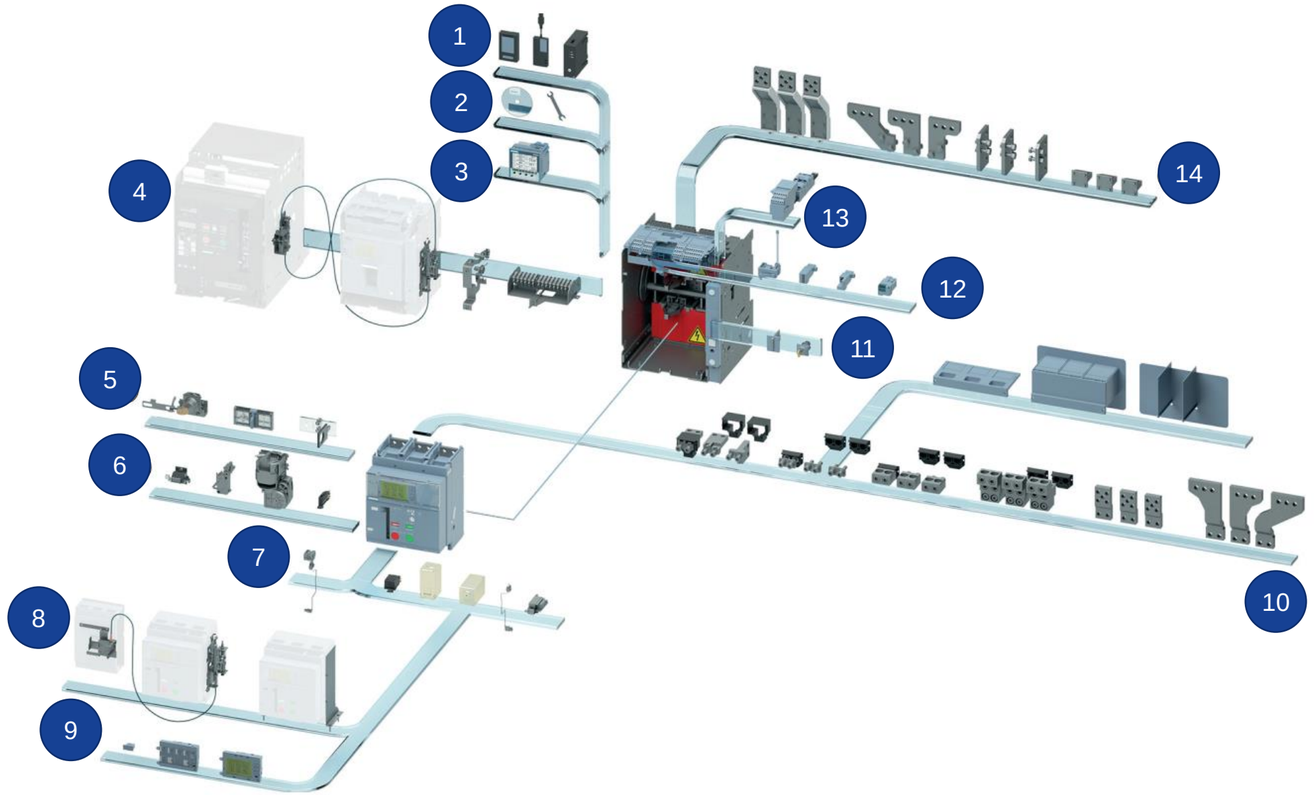
- It enables quick adaptation of the rated current I_n
  - + L = OFF with thermal release switched off
  - + R_c with protection against residual currents

Type	400	630	800	1 000	1 250	1 600
I_n/A	✓	✓	✓	✓	✓	✓
I_n/A + L = OFF	✓	✓	✓	✓	✓	✓
I_n/A + Rc	✓	✓	✓		✓	

3VA27 moulded case circuit breakers

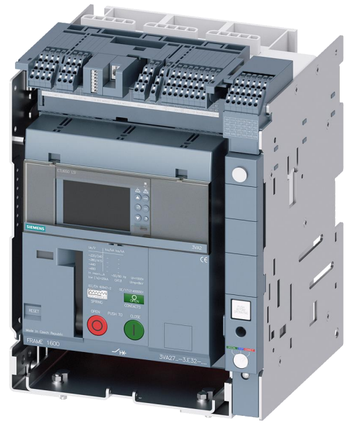
Accessories

(1) Test devices
(2) Program powerconfig
(3) External displays DSP800
(4) Mechanical interlocking for withdrawable devices
(5) Locking
(6) Motor operators and accessories
(7) Internal accessories
(8) Mechanical interlocking for fixed designs
(9) Electronic trip units ETU
(10) Connecting sets for fixed designs
(11) Locking for withdrawable devices
(12) Data communication
(13) Signalling position in the withdrawable devices
(14) Connecting sets for withdrawable devices



3VA27 moulded case circuit breakers

- Ordering
  - Similar principle as Arion
  - Make to order
  - Circuit breaker with accessories ordering in one type designation
    - Additional codes – Z for specific accessories
  - Simple setting of type designation using Online Configurator
  - Delivery time 5 working days
  - Production in Letohrad



Internal accessories

Closing coil CC

- AC/DC 24 ÷ 440 V

Shunt trip ST

- AC/DC 24 ÷ 440 V

Undervoltage release UVR

- AC/DC 24 ÷ 250 V, AC 380 ÷ 440 V

Motor operator MO

- It serves for automatic loading of the energy storage device
- AC/DC 24 ÷ 30 V
- AC/DC 48 ÷ 60 V
- AC/DC 100 ÷ 130 V
- AC/DC 220 ÷ 250 V

Mechanical operating counter MOC

- It displays the number of mechanical switching operations directly on the front side of the circuit breaker

Internal accessories

(1) Closing coil CC

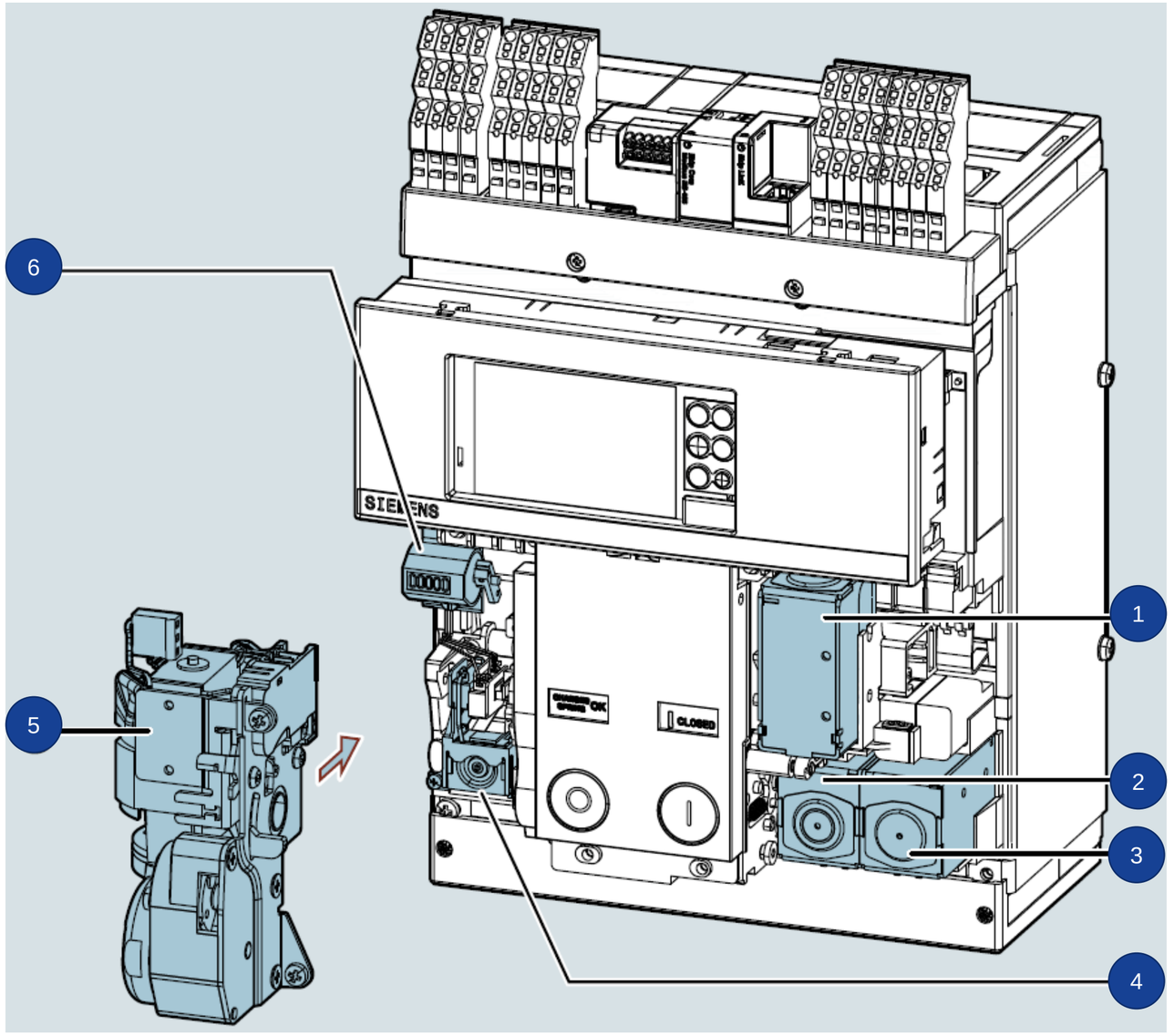
(2) Undervoltage release UVR / Shunt trip ST2

(3) Shunt trip ST1

(4) Remote reset RR

(5) Motor operator MO

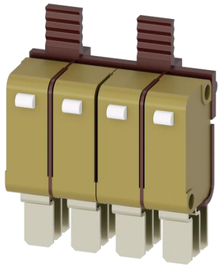
(6) Mechanical operating counter MOC



Internal accessories

Auxiliary switch AUX

- Part of the circuit breaker, 4 auxiliary contacts



Signal switch S24

- Part of the circuit breaker

Signal switch ready-to-close RTC

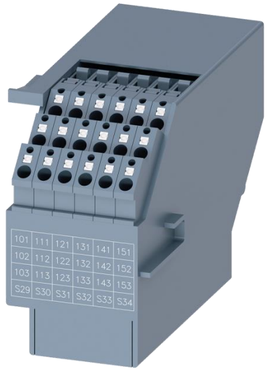
- Part of the circuit breaker

Signal switch of energy storage device state S21

- Part of the circuit breaker with motor operator or of the motor operator package

Position signal switch in the withdrawable device PSS

- Part of the circuit breaker of withdrawable design



Internal accessories

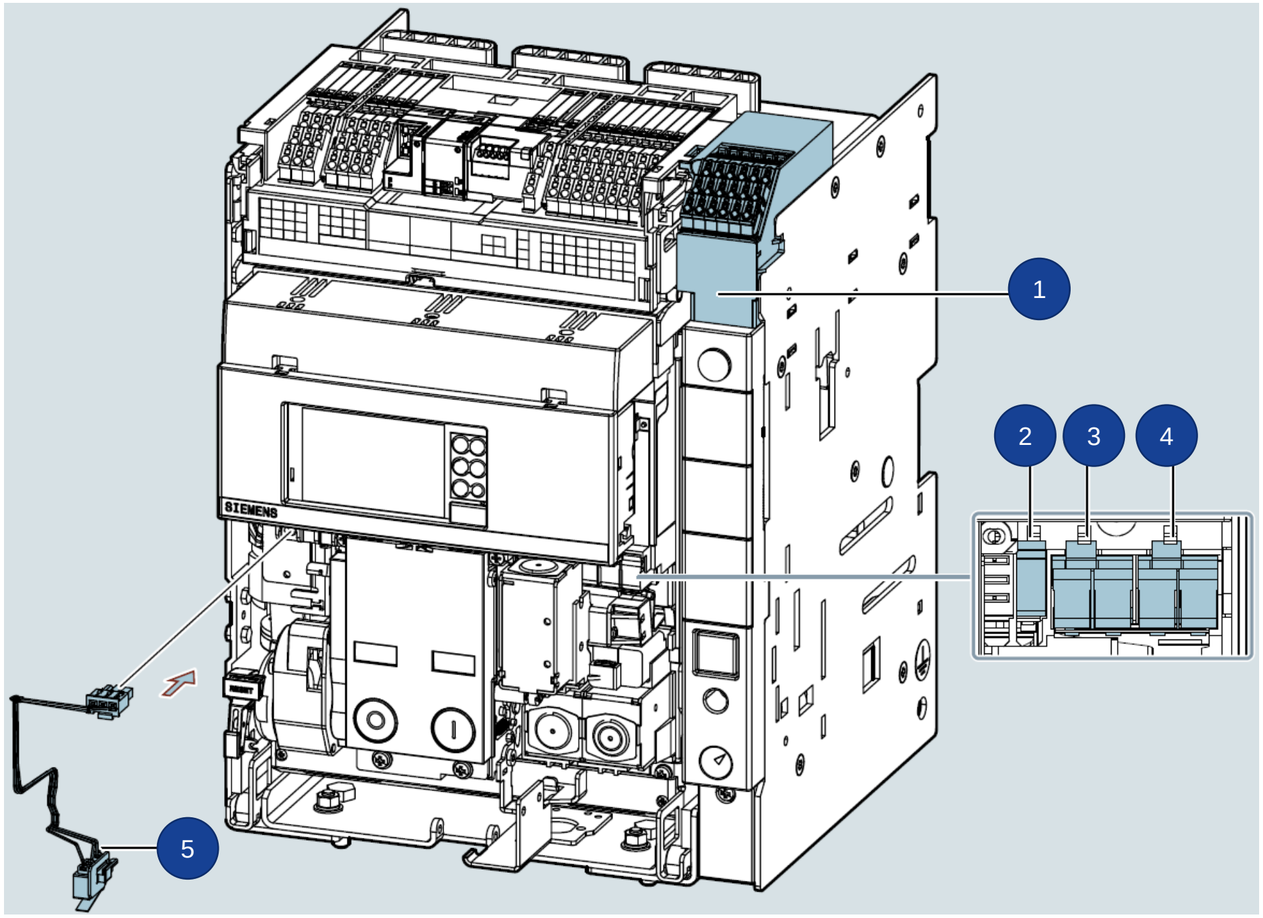
(1) Position signal switch in the withdrawable device PSS

(2) Signal switch ready-to-close RTC

(3) Auxiliary switch AUX1 - AUX2

(4) Auxiliary switch AUX3 - AUX4

(5) Signal switch S24



Data communication and remote control

Position signal switch in the withdrawable device COM PSS

- Part of the circuit breaker with communication function
- Connected to the communication module
- It signals 2 states
  - Inserted position (CONNECT)
  - Withdrawn position (TEST or DISCONNECT)

Signal switch ready-to-close COM RTC

- Part of the circuit breaker with communication function

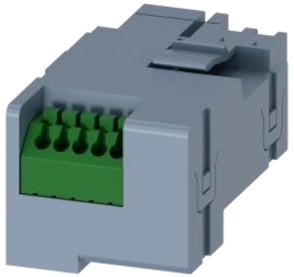
Control module COM ACT

- Part of the circuit breaker with communication function
- Remote control of the closing coil CC and shunt trip ST via powerconfig

Data communication and remote control

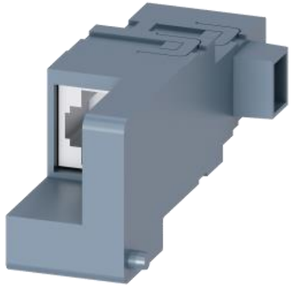
Power supply module

- External power supply DC 24 V



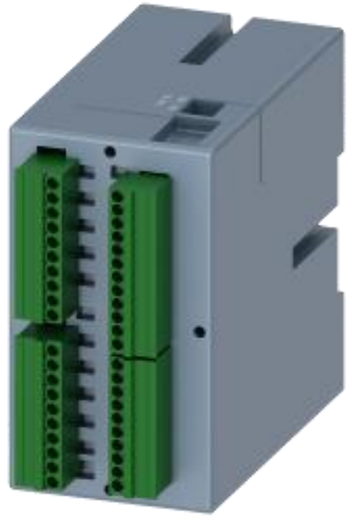
Communication module

- Modbus TCP
- Modbus RTU
- Direct communication without external gateway
- Both protocols can be selected at the same time
- Setting the circuit breaker from PC via powerconfig program
- Connection to DSP800 via Modbus TCP
  - Displaying up to three 3VA27 circuit breakers



Digital I/O module

- IOM040 – 2 input and 2 output contacts
- IOM300 – external, 11 input and 10 output contacts



Data communication and remote control

(1) Position signal switch in the withdrawable device COM PSS

(2) Power supply module

(3) Digital I/O module IOM040

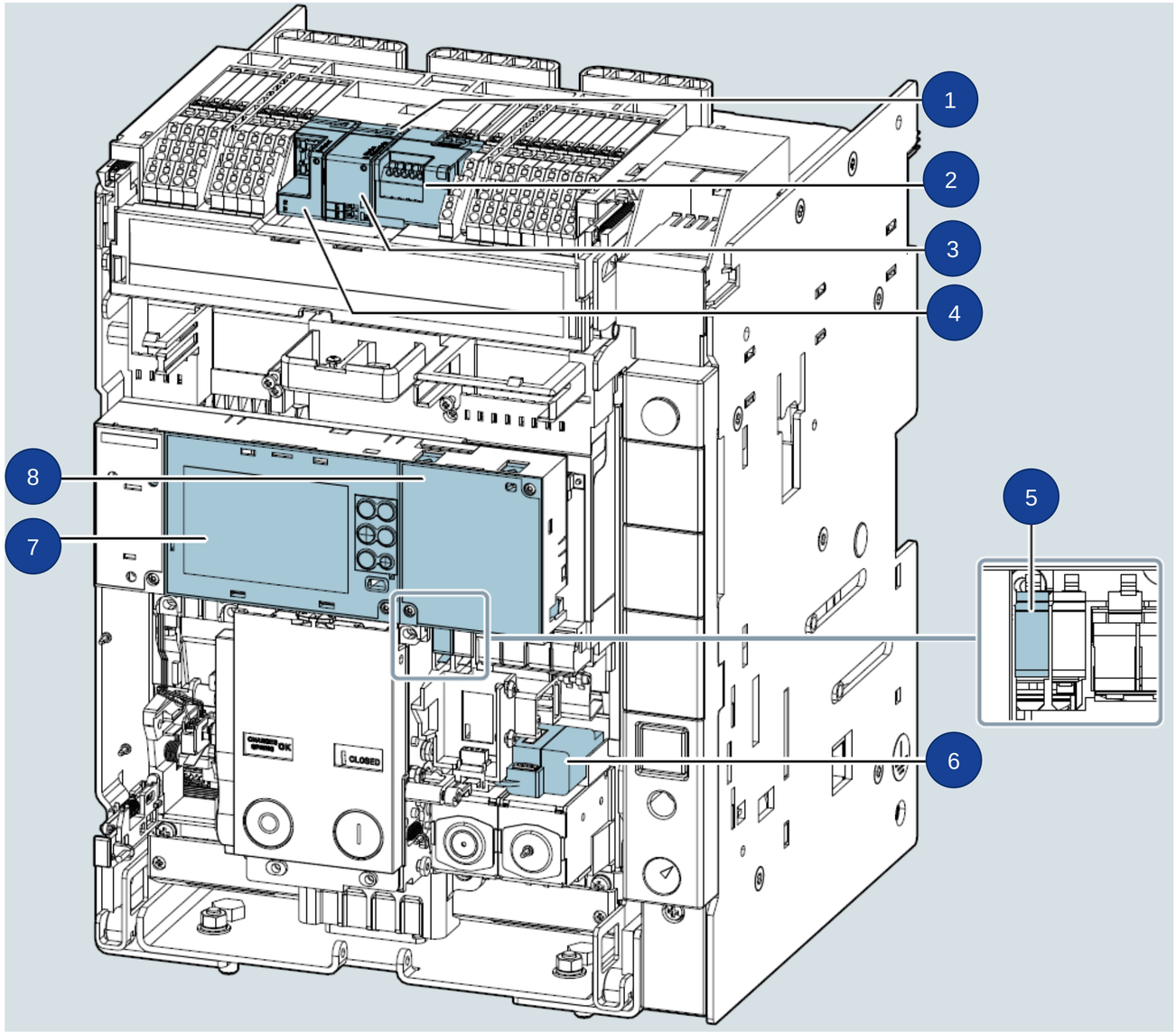
(4) Communication module

(5) Signal switch ready-to-close COM RTC

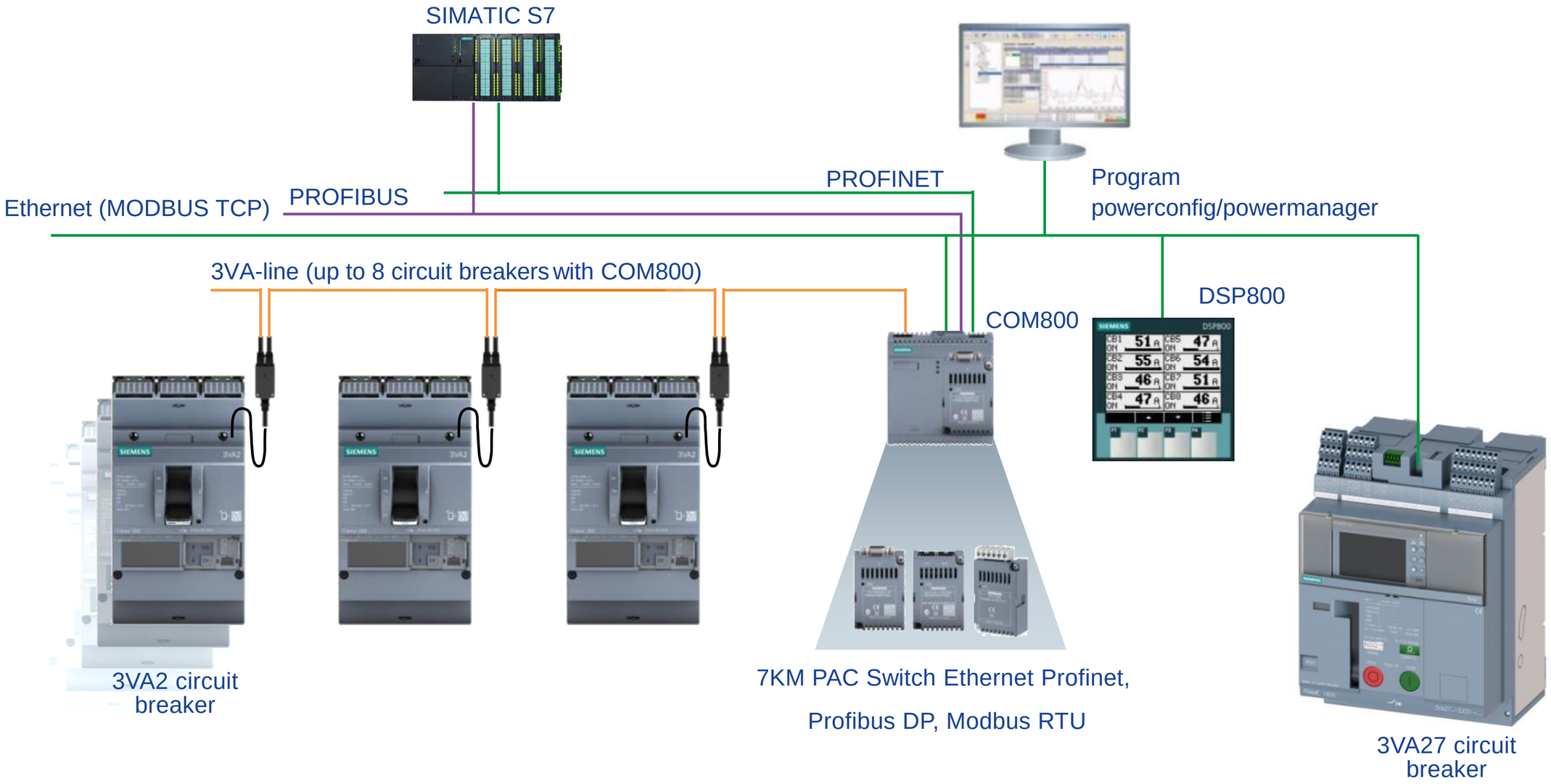
(6) Control module COM ACT

(7) Electronic trip unit ETU6xx

(8) Measuring functions



Data communication and remote control



Fixed design

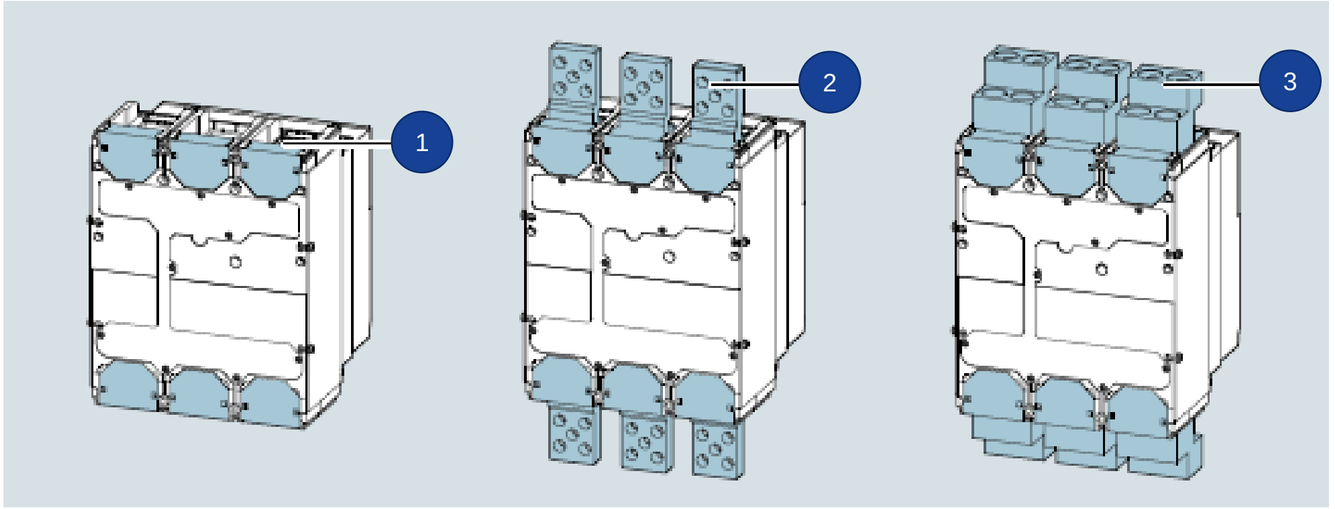
(1) Front connection

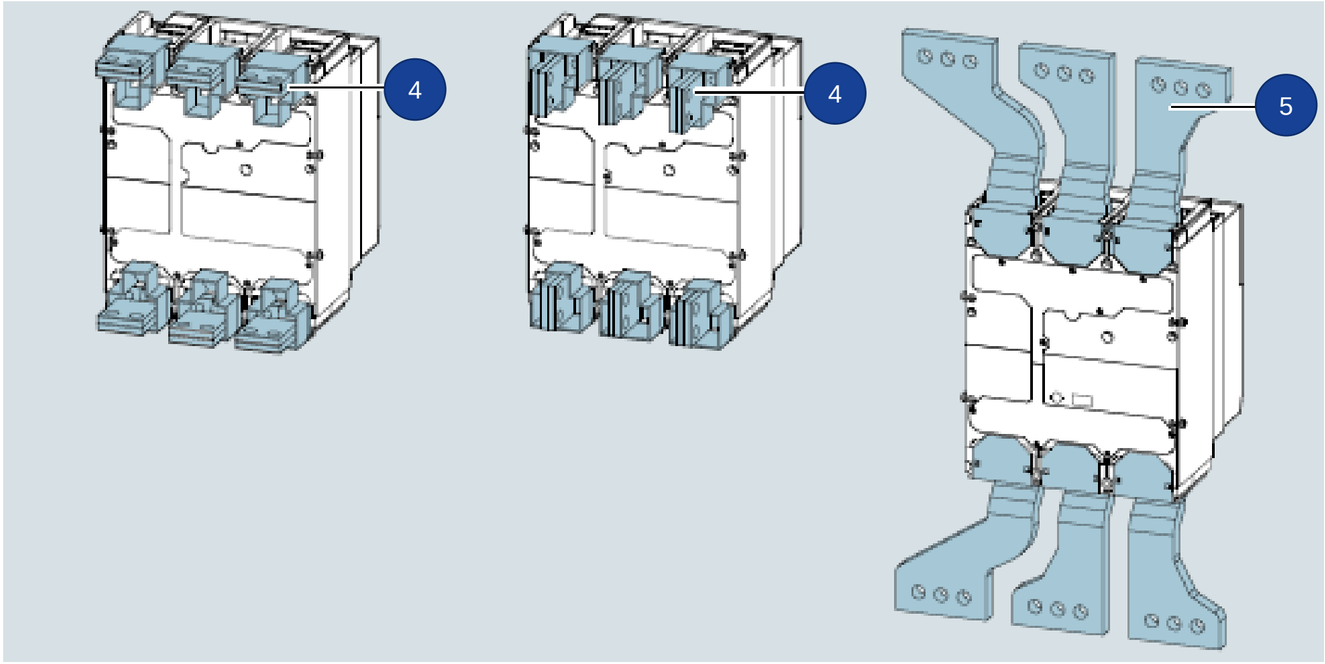
(2) Front connection, extended

(3) Block terminal for Cu/Al cable

(4) Rear connection, horizontal/vertical

(5) Front connection, broadened





Insulating accessories

- Designed for fixed design
- Part of delivery of connecting sets

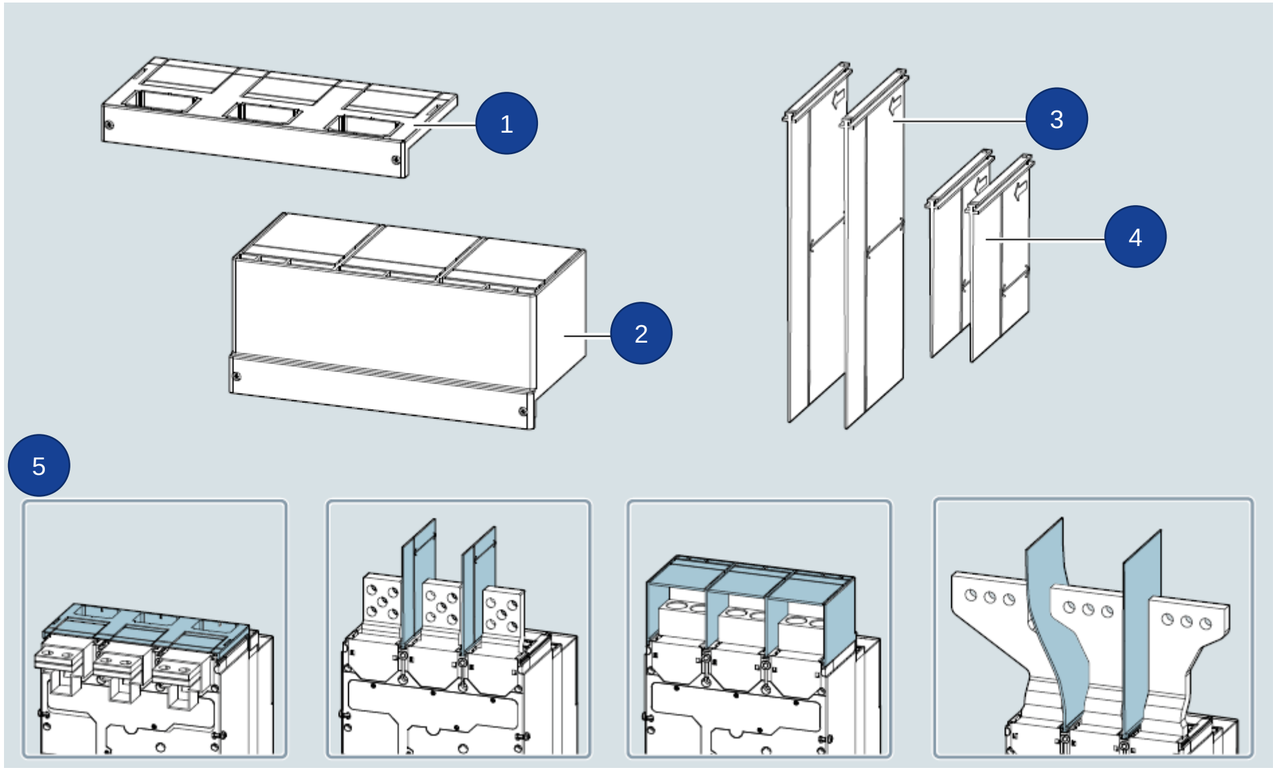
(1) Terminal cover

(2) Extended terminal cover

(3) Insulating barrier 200 mm

(4) Insulating barrier 100 mm

(5) Examples of application



Connecting sets

Withdrawable design

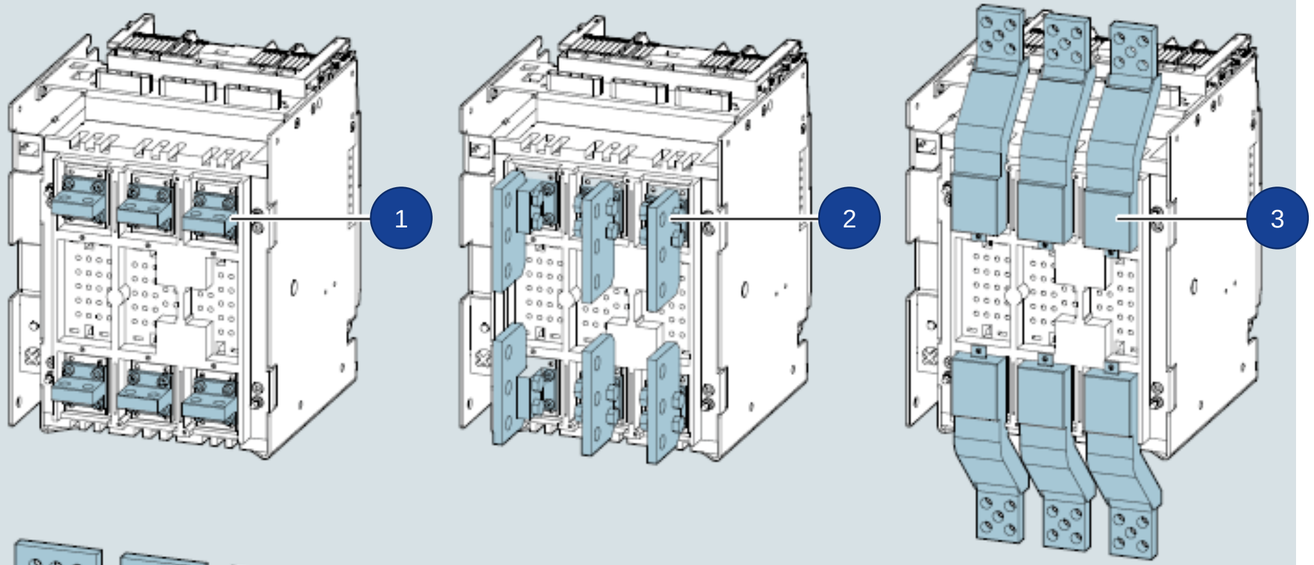
(1) Rear connection, horizontal/vertical

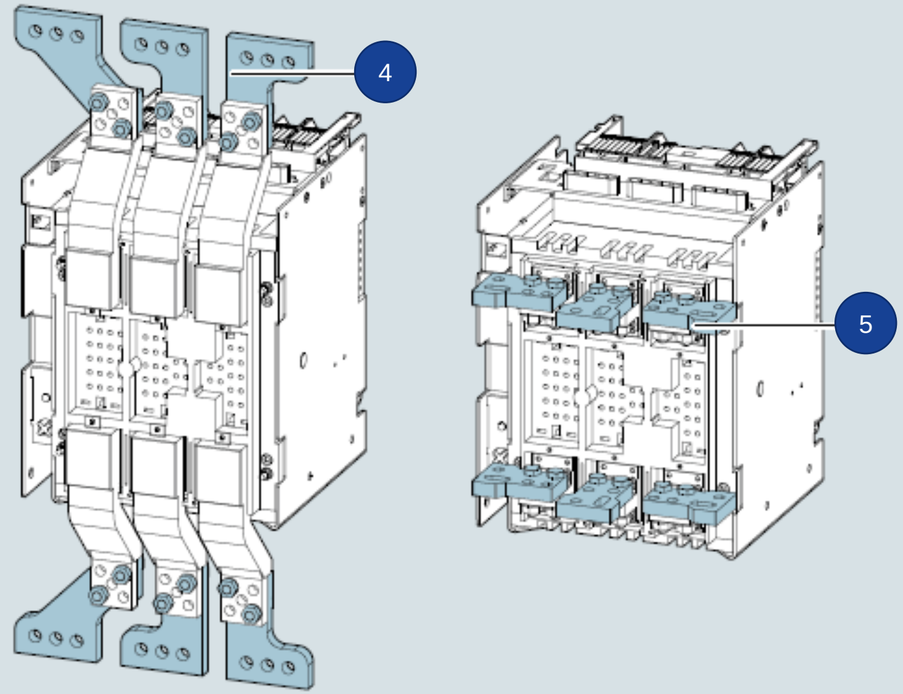
(2) Rear connection, vertical,
for Cu/Al cables

(3) Front connection, extended

(4) Front connection, broadened

(5) Rear connection, broadened





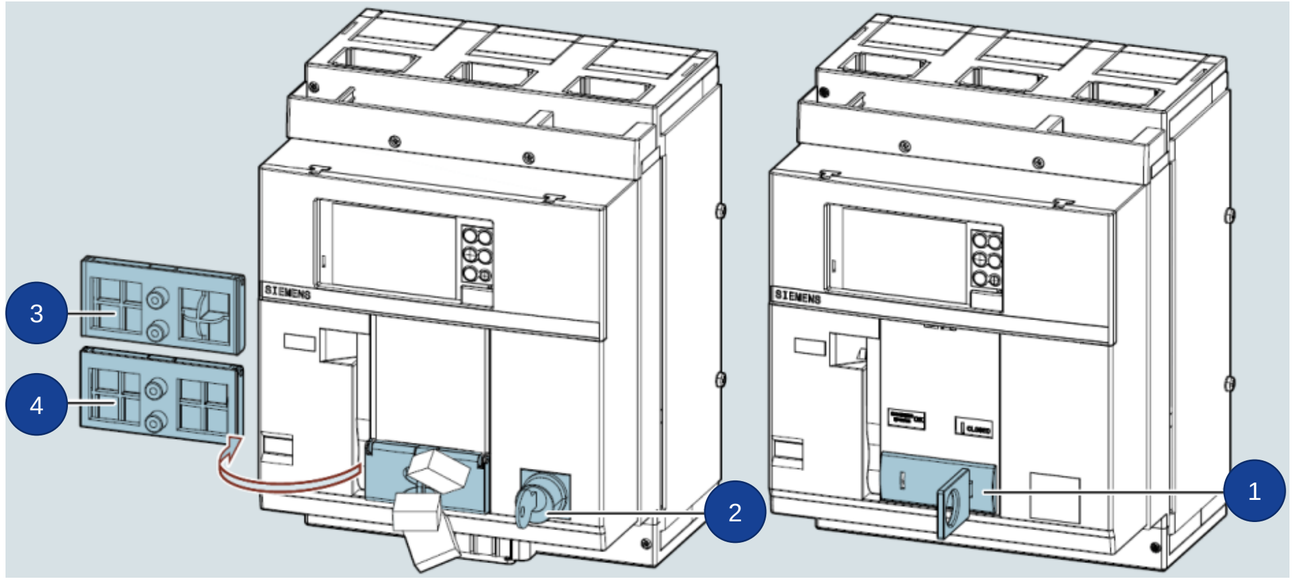
Circuit breaker

(1) Protective cover to prevent unintentional mechanical ON/OFF operation

(2) Locking in the OFF position by Ronis cylinder lock

(3) Locking in the OFF position by padlocks

(4) Lockable protective covers to prevent unintentional switch ON and/or OFF (up to 3 padlocks)



Withdrawable device

(1) Locking against circuit breaker shifing by Ronis cylinder lock

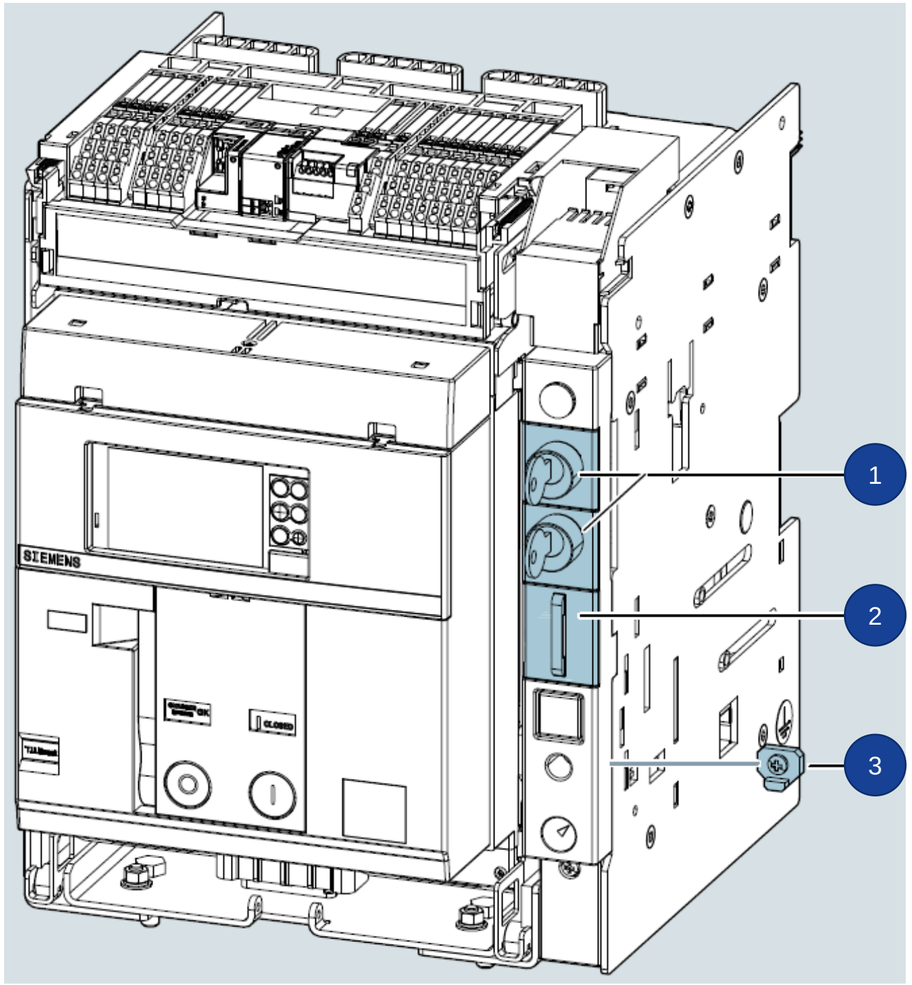
- In position: connected, test and disconnected

(2) Locking against shifing by padlocks

- In position: connected, test and disconnected

(3) Accessory for locking (1) or (2)

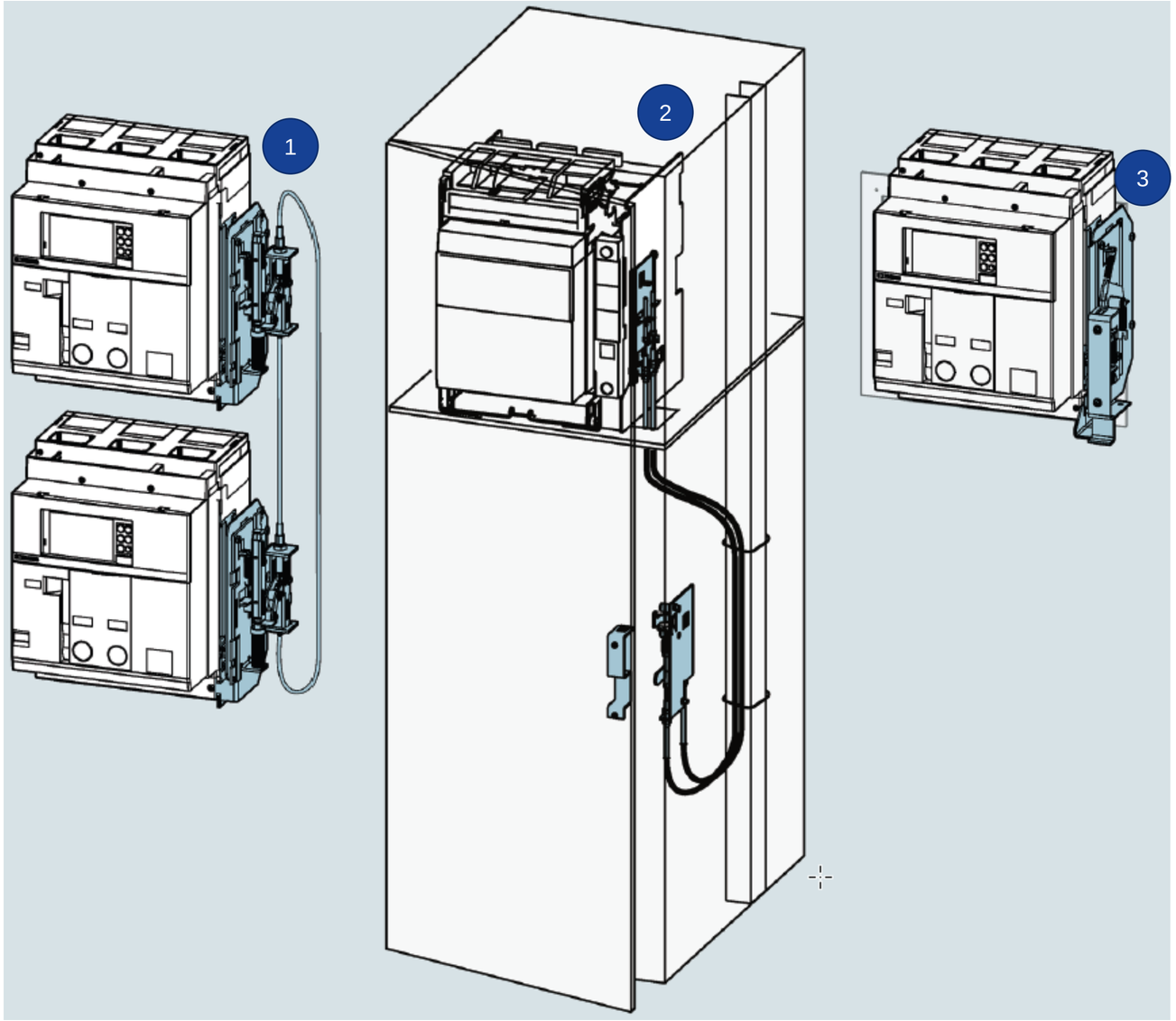
- It enables locking only in the disconnected position (3)



Mechanical interlocking (1)

- Bowden cables
- Max. 2 circuit breakers
  - At a moment it is possible to switch on only one circuit breaker
  - 3VA27 – fixed and withdrawable design
    - fixed design must be completed by extended mounting support or set
  - 3VA27 – 3VA25 (3VA15)
  - 3VA27 – Arion WL air circuit breaker

- Blocking of the switchboard door
  - Bowden cables (2)
  - Direct (3)
  - It prevents door opening with the circuit breaker switched on
  - It prevents circuit breaker switching on with the door open



Withdrawable device

(1) Connection point of main connections

(2) Push/pull crank

(3) Blocking push-button (press before changing circuit breaker position)

(4) Crank hole

(5) Circuit breaker position signalling

(6) Sliding rails

(7) Bottom insulation covers

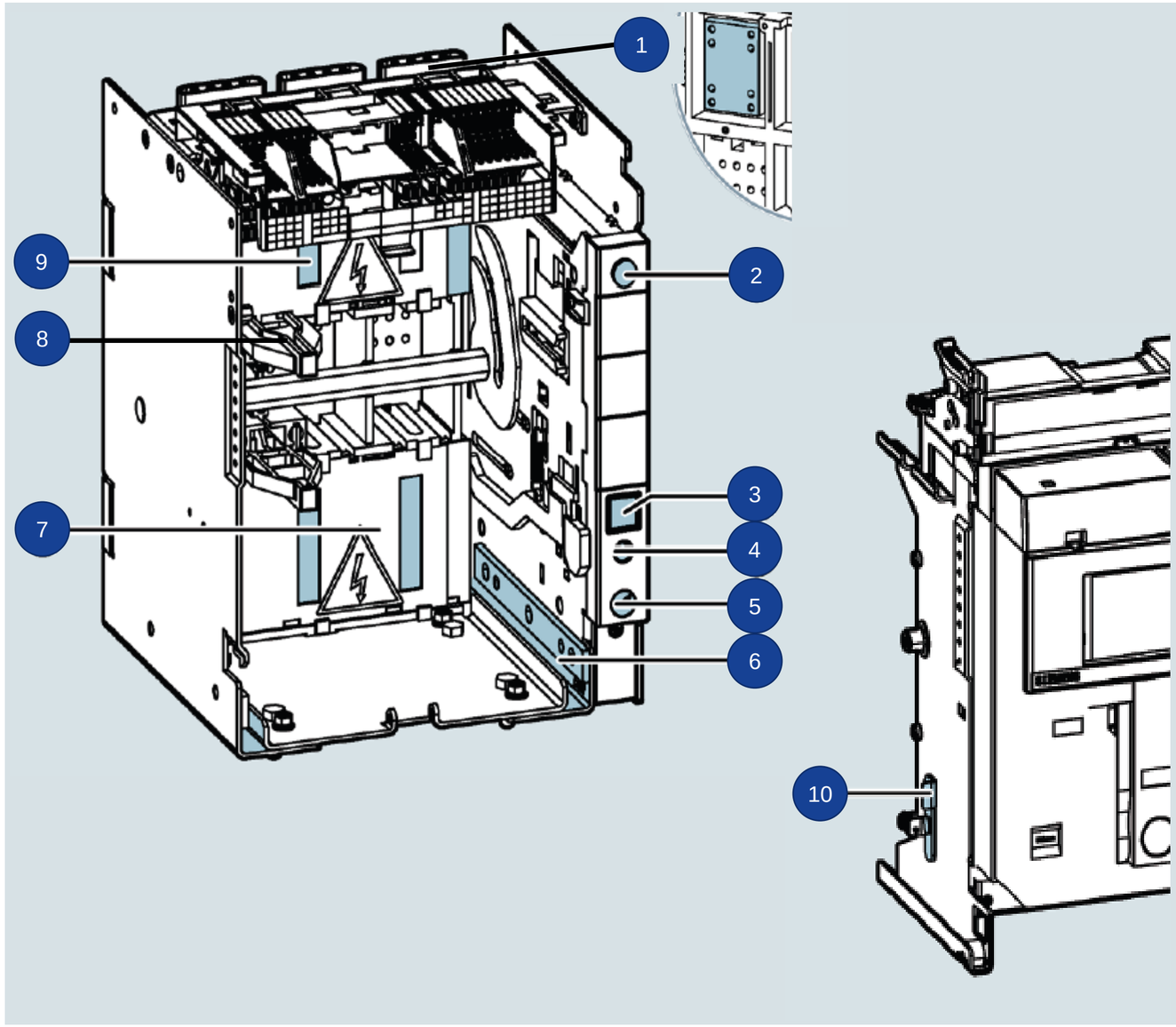
(part of delivery)

(8) Locking for insulation covers by padlocks

(9) Top insulation covers

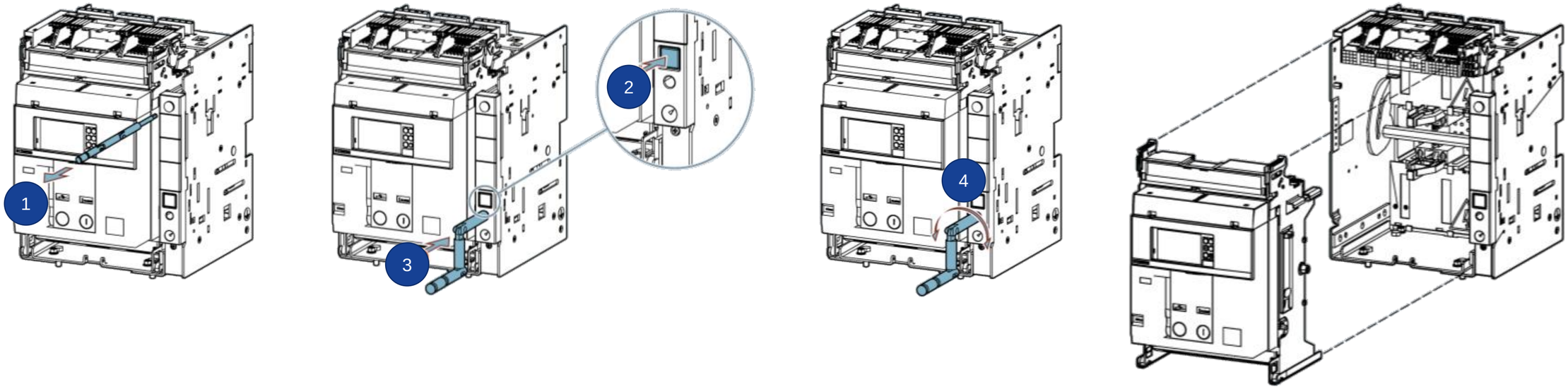
(part of delivery)

(10) Fixing lever on the circuit breaker



Withdrawable device

It enables quick and safe installation/replacement of circuit breakers



3 positions of the circuit breaker in the withdrawable device

Circuit breaker position	Main circuit	Auxiliary circuit
Connected position (CONNECT)	Closed	Closed
Inspection position (TEST)	Open	Closed
Disconnected position (DISCONNECT)	Open	Open

Testers

TD310

- Hardware (HW) test of switching off by means of control push-button "i / Test" on ETU
- Power supply for ETU6xx setting

TD410

- Hardware (HW) test of switching off by means of control push-button "i / Test" on ETU
- Power supply for ETU6xx setting
- Gateway to PC – software (SW) test of switching off
- Setting via powerconfig
- Diagnostic reports and documentation

TD420

- The same functions as TD410 plus
  - Extended test functions
  - Reading data records, network and error analysis

Thank you for your attention

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