

# UniSwitch Medium Voltage Switchgear

12 kV, 17.5 kV, 24 kV, 630 A



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# 1. UniSwitch Design Philosophy

## UniSwitch, need to say more?

UniSwitch, the light flexible switchgear developed as a modular, simple to apply design, with fewer components, providing a high reliable, quality and safe product for you, our Customer.



By reducing the number of components, utilising modern materials correctly, we have developed an environmentally and user friendly product. The simple design and construction of UniSwitch will stand the test of time for generations to come.

UniSwitch is an air insulated (AIS), metal enclosed, switchgear cubicle design of the next generation developed through continuous innovation and vision to meet the changing market needs.

UniSwitch provides long-term technical solutions for various applications. Safety, user friendliness and environmental concerns have been the driving force in the development of the new switchgear.

UniSwitch switchgear is a compact solution for a fully automated power distribution network. Supported by sensor technology and the latest in protection relays, it meets even the most demanding requirements in hospitals and airports.

UniSwitch is a worldwide switchgear development utilising the global experience of ABB to incorporate the needs of Customers from all over the world. UniSwitch switchgear is available from the ABB worldwide network of Companies. This universal product is manufactured in 8 ABB factories.

## UniSwitch market segment

### UniSwitch



**Switchgear for electricity distribution application such as:**

**Light compact distribution switchgear**  
**Ring Main Unit** for applications like:  
Residential suburban  
Electrical distribution  
Compact secondary substation

**Secondary substations**  
**Manufacturing industry**  
**Shopping centres**  
**Airports**  
**Metro**  
**Windmills**  
**Small/medium size power plants**  
**Hospitals**  
**Sportcenters**  
**Etc.**

**Heavy switchgear** for demanding applications including:  
Primary substations  
Power plants  
Railways  
Marine



**Ring main unit**

**Heavy switchgear**

UniSwitch product provides our Medium Voltage Customer with the best solution for heavy duty switchgear in a size only a little than a single tank Ring Main Unit while including:

- the flexibility in meeting our Customers specification and accomodating on future change and upgrading
- the options include complete control, measuring and protection systems

# 2. UniSwitch Applications



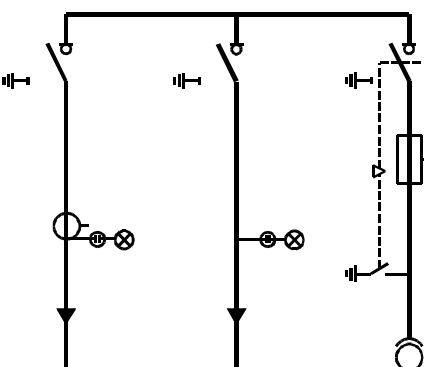
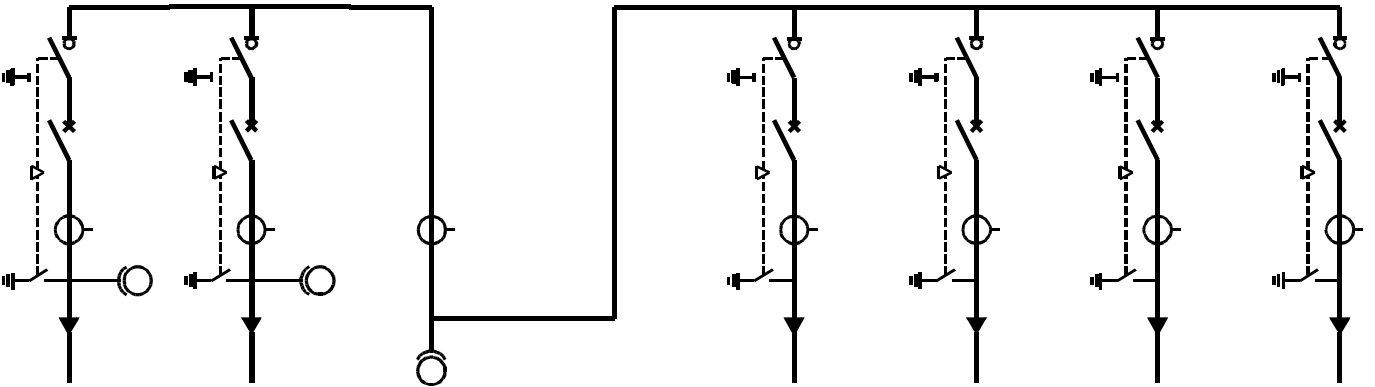
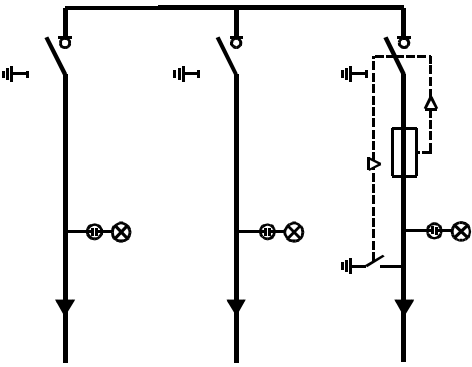
Utility



Power Plants,  
Diesel/gas engine  
(built by Wärtsilä)



Windmills



# UniSwitch

## Applications



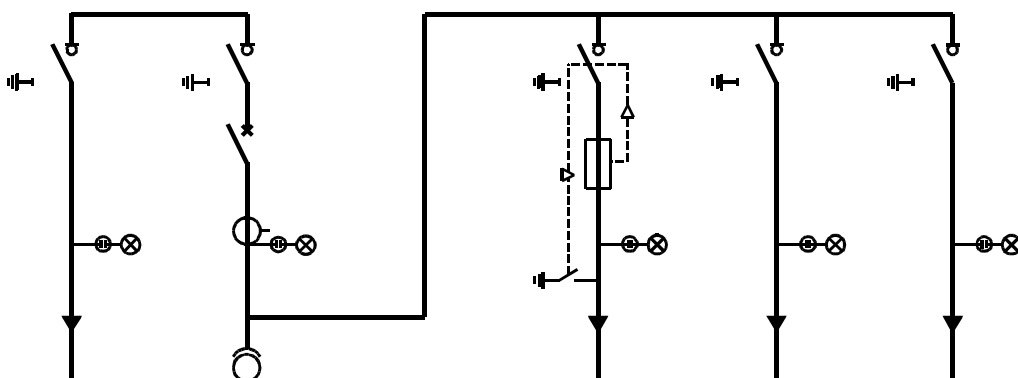
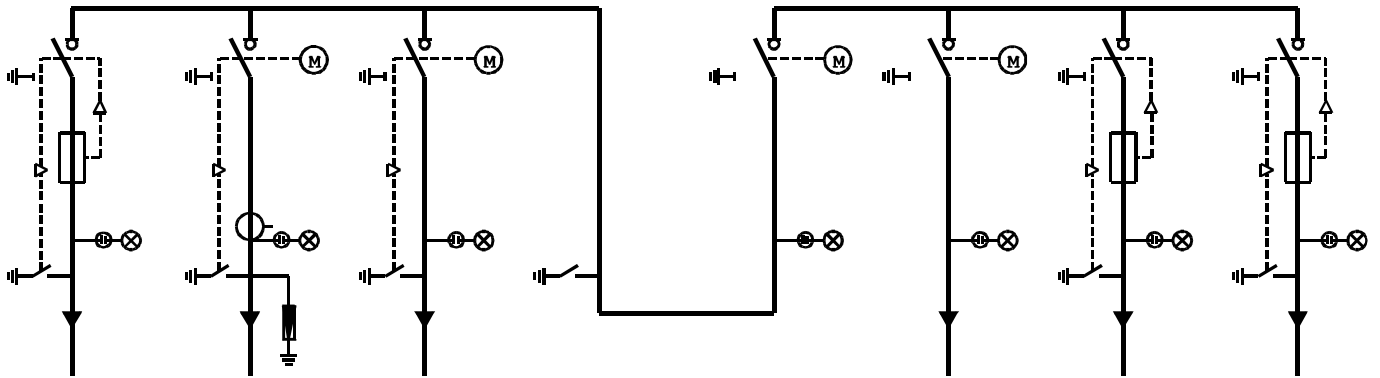
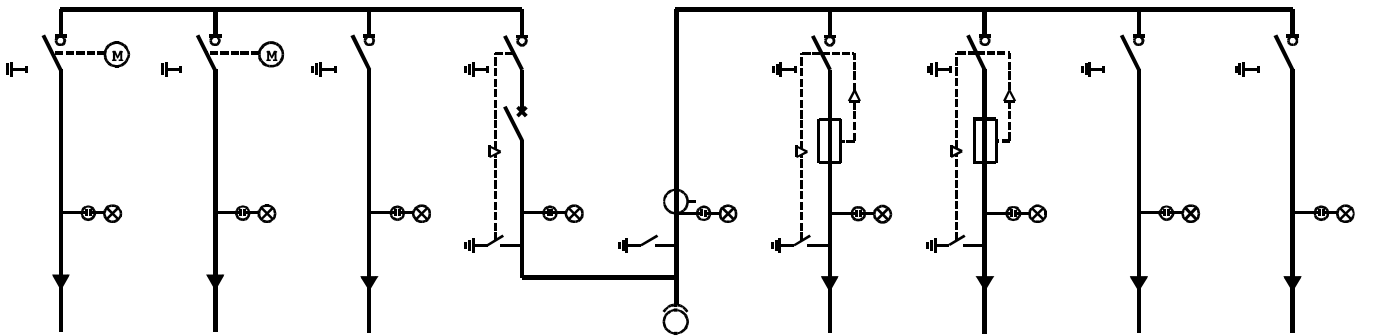
Hospital



Airport



Metro



# UniSwitch

## Applications



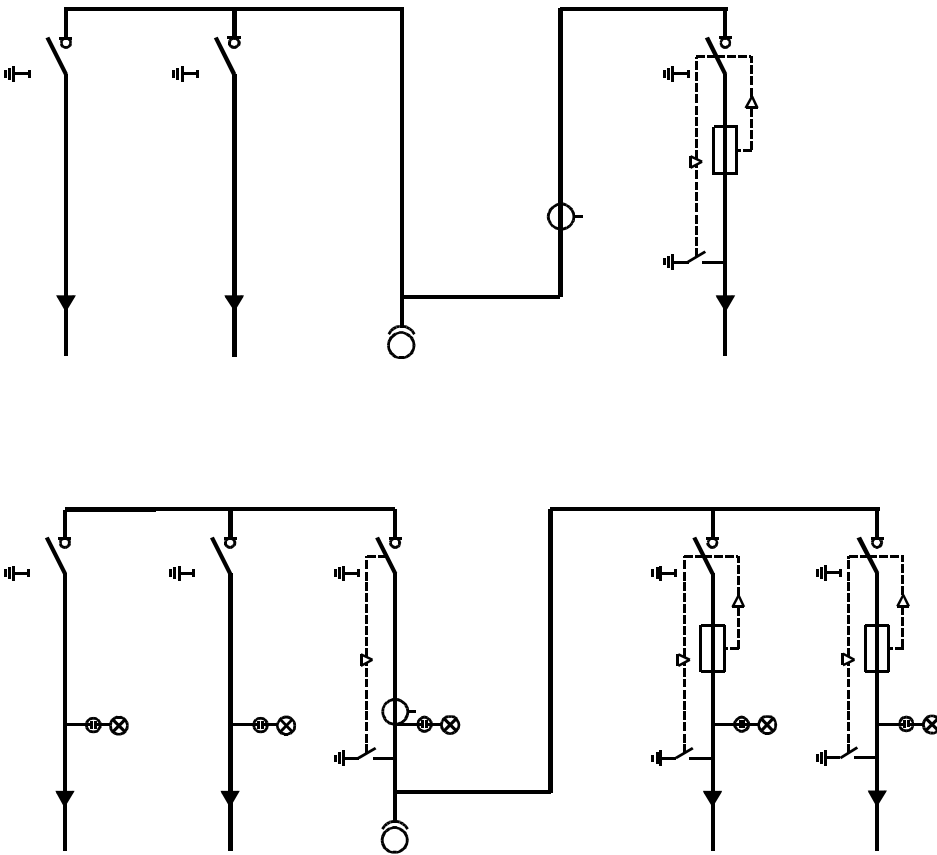
Shopping center



Sports center  
(Botnia Hall, Vaasa)



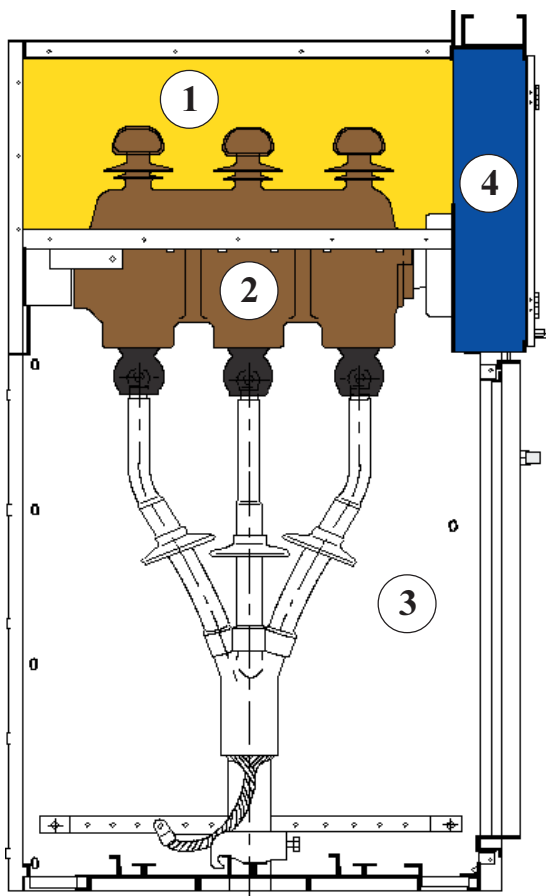
Industry



# 3. UniSwitch

## Switchgear Construction

### Metal enclosed, cubicle type switchgear



- 1 Busbar compartment
- 2 Switching compartment
- 3 Cable compartment
- 4 Mechanism, interlocking and low voltage compartment

#### 1. Busbar compartment

The busbar compartment is located on the top of the cubicle. This compartment contains the main busbars that interconnect between switchgear cubicles.

#### 2. Switching compartment

A 3-position SF6 switch-disconnector with epoxy cast resin housing is provided with inspection windows and available also with gas density indicator.

#### 3. Cable compartment

85 % of the space in the switch-disconnector cubicle is reserved for power cable connection making it possible to use both 1- and 3-phase cables with most simple unscreened terminations. Space is also adequate for cubicle accessories such as surge arresters, current transformers, second earthing switch etc. The door has an inspection window and safety interlocking as standard. For cable entry there are 3 individual cable gland plates in the bottom with support for a suitable dimensioned cable clamp. The bottom and the threshold of the cubicle can be removed for ease of cable installation.

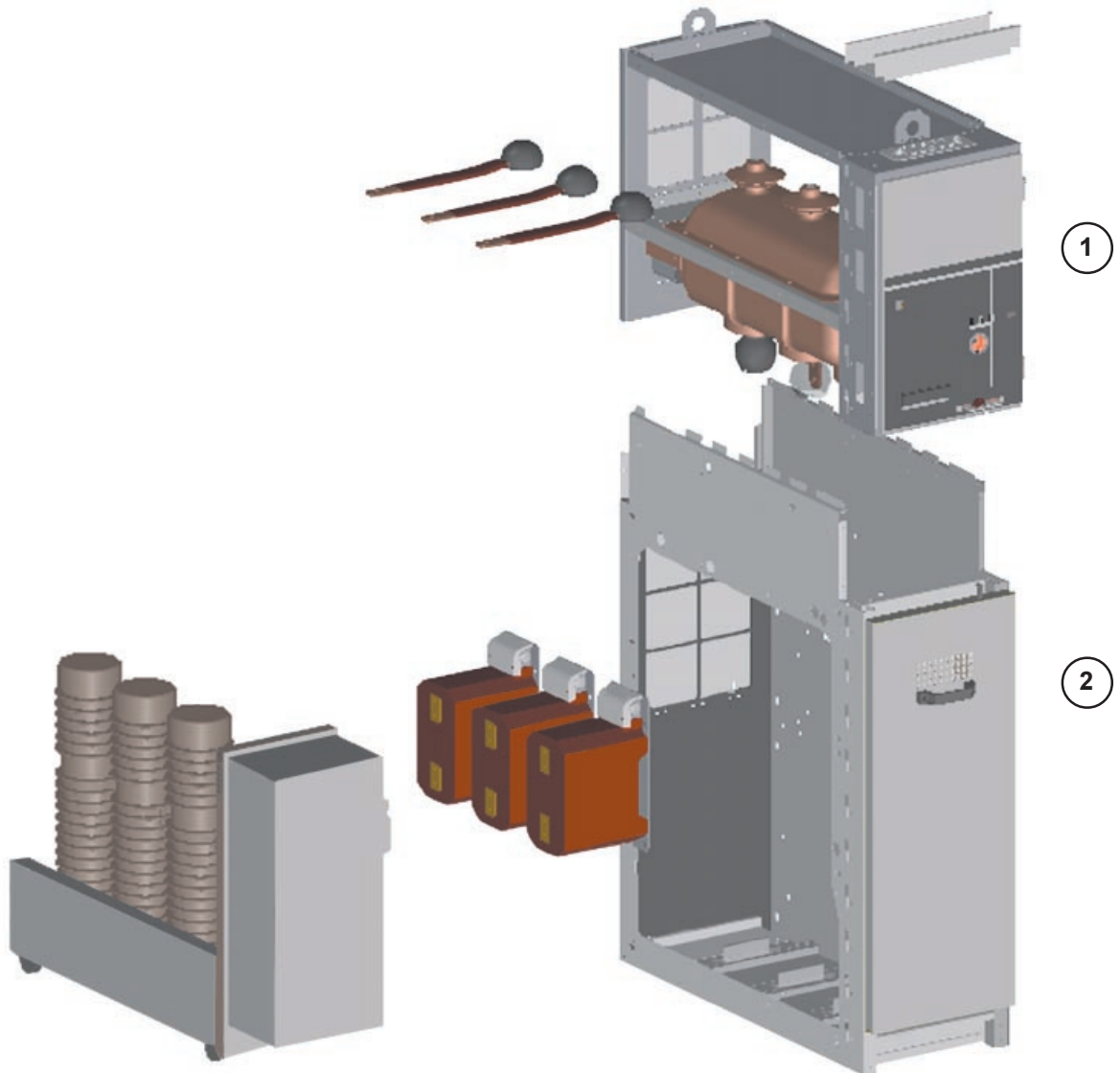
#### 4. Mechanism, Interlocking and Low Voltage compartment

Behind a hinged door (which serves as control panel) are located the spring operating mechanism with position indicator and the mechanical interlocking unit. There are also facilities for cubicle accessories such as: auxiliary contacts, tripping coil, emergency tripping mechanism, capacitive voltage indicator, key interlocks and motor operating device. Space is also provided for control circuits and measuring instruments as well as a protection relay. In the 750 wide cubicles there is also a second identical compartment for further accessories.

The upper part of the cubicle, including the busbar compartment, the switch-disconnector and the mechanism and LV compartment is separated from the lower part and the cable compartment. Because of this it is possible to carry out maintenance, repair and upgrading of the unit in the lower module while the switchgear is in service.



### Operating unit



#### 1 Top unit

- 3-position switch-disconnector SFG
- Operating mechanism with mechanical position indication
- Enclosure of busbar compartment
- Integrated low voltage compartment for secondary components
- Interlocking unit
- Busbars
- Control cable ducts

#### 2 Bottom unit

- Enclosure
- Circuit breaker
- Current transformers
- Earthing switches
- Voltage transformers
- Cable entry with cable support

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# 4. UniSwitch

## Cubicle Types

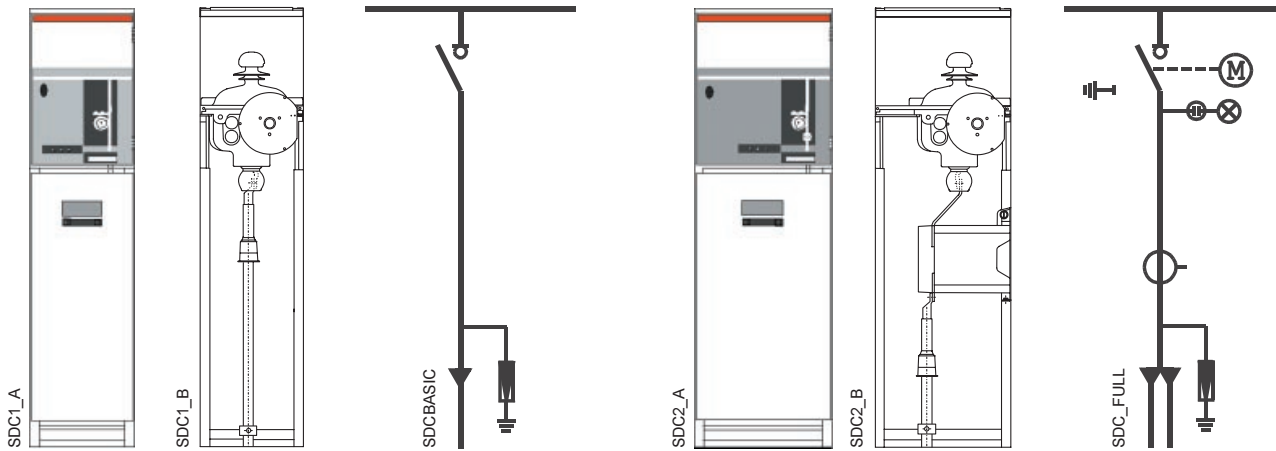
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# 4.1 UniSwitch

## Cubicle Program

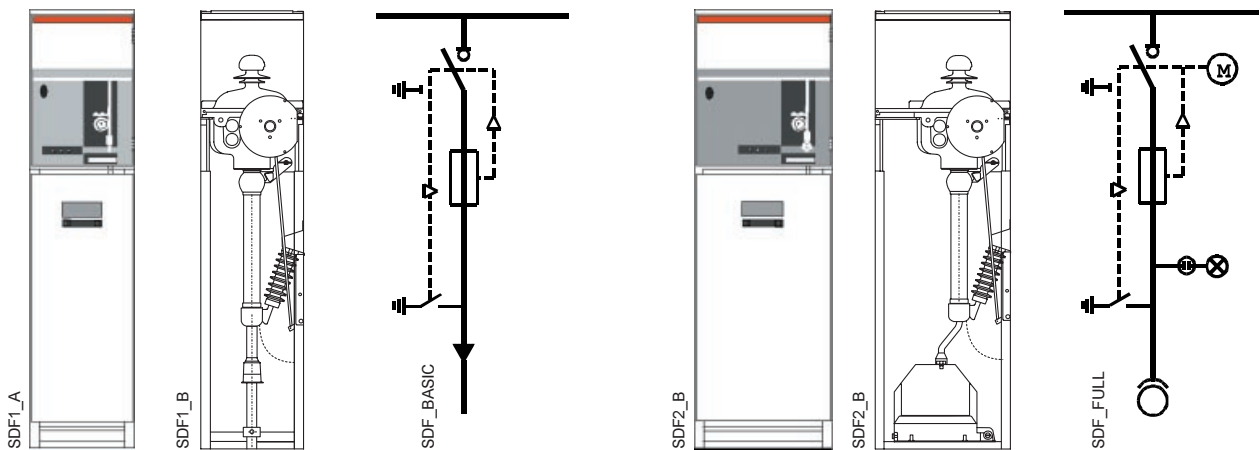
### Switch-Disconnecter Cubicle, type SDC



Width: 375 or 500 mm  
Height: 1635 or 1885 mm

Width: 500 mm  
Height: 1635 or 1885 mm

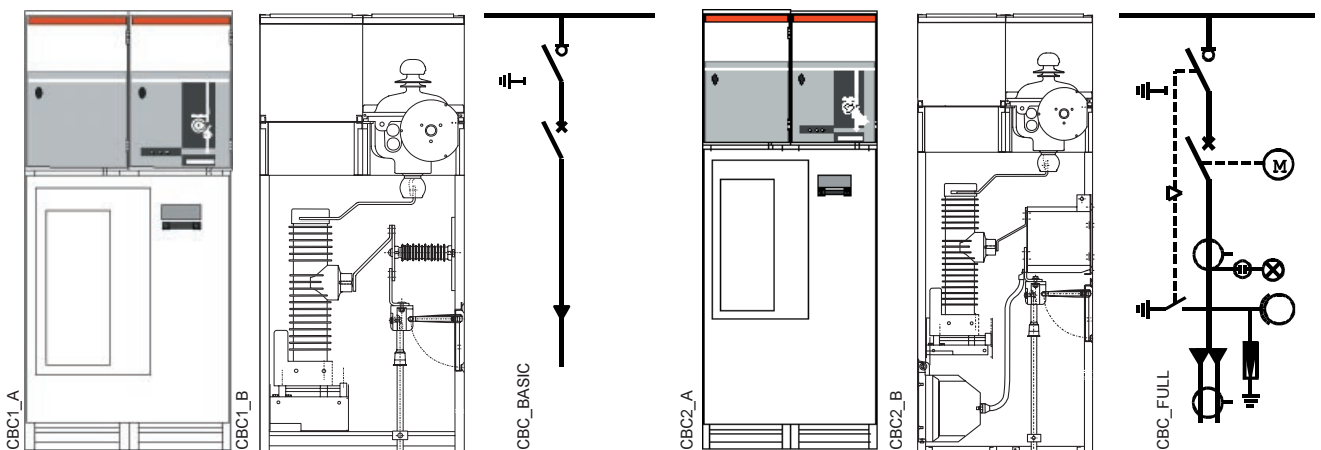
### Switch-Disconnecter with fuse Cubicle, type SDF



Width: 375 or 500 mm  
Height: 1635 or 1885 mm

Width: 500 mm  
Height: 1635 or 1885 mm

### Circuit Breaker Cubicle, type CBC



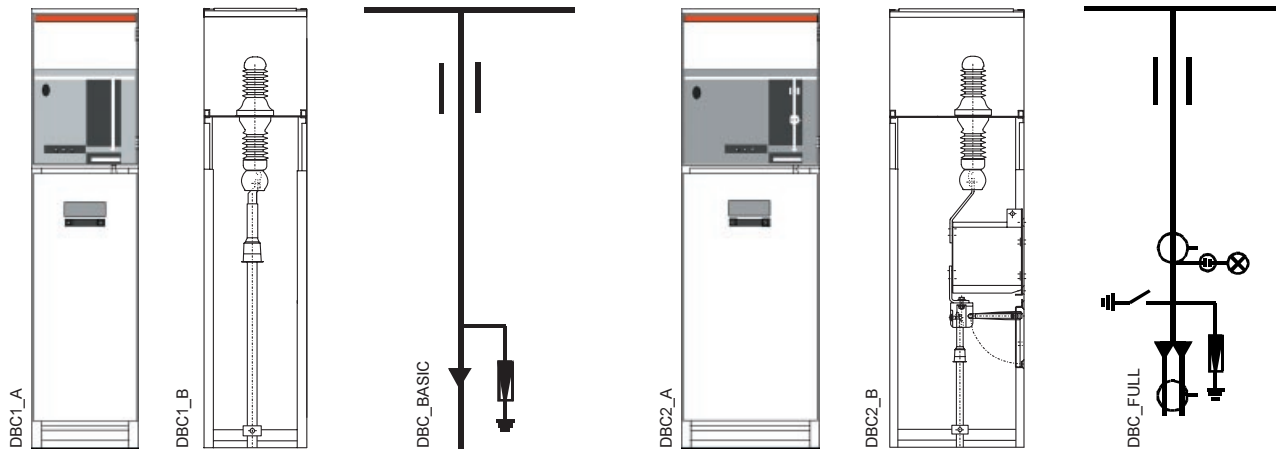
Width: 750 mm  
Height: 1635 or 1885 mm

Width: 750 mm  
Height: 1885 mm

# UniSwitch

## Cubicle Program

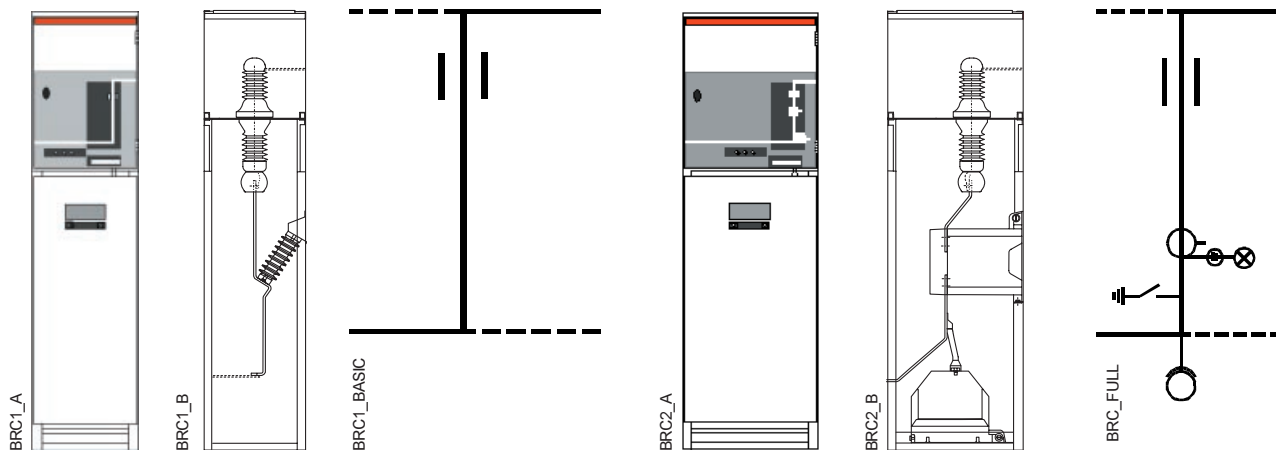
### Direct Busbar connection Cubicle, type DBC



Width: 375 or 500 mm  
Height: 1635 or 1885 mm

Width: 500 mm  
Height: 1635 or 1885 mm

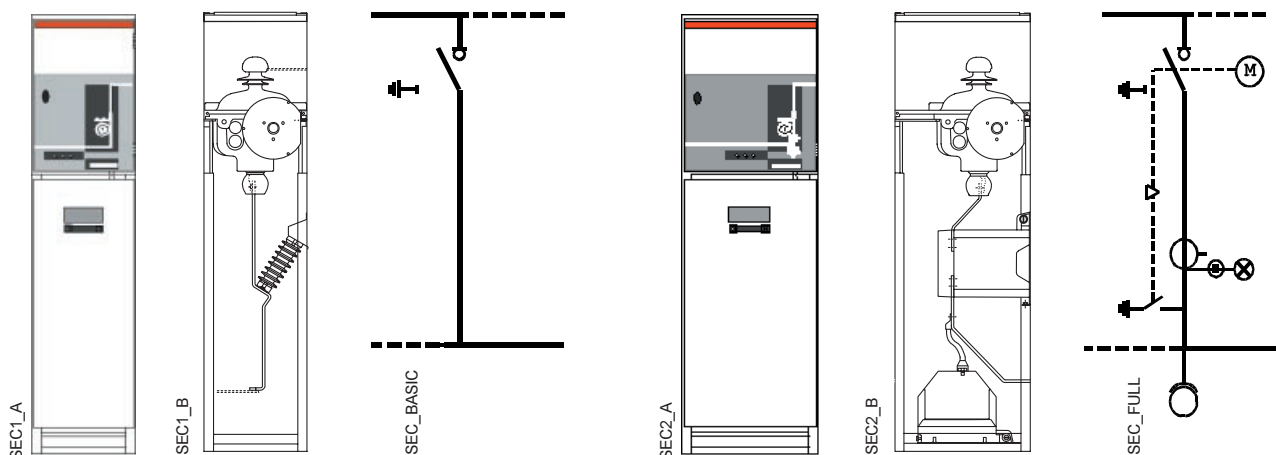
### Bus Riser Cubicle, type BRC



Width: 375 or 500 mm  
Height: 1635 or 1885 mm

Width: 500 mm  
Height: 1635 or 1885 mm

### Sectionalizing Cubicle, type SEC



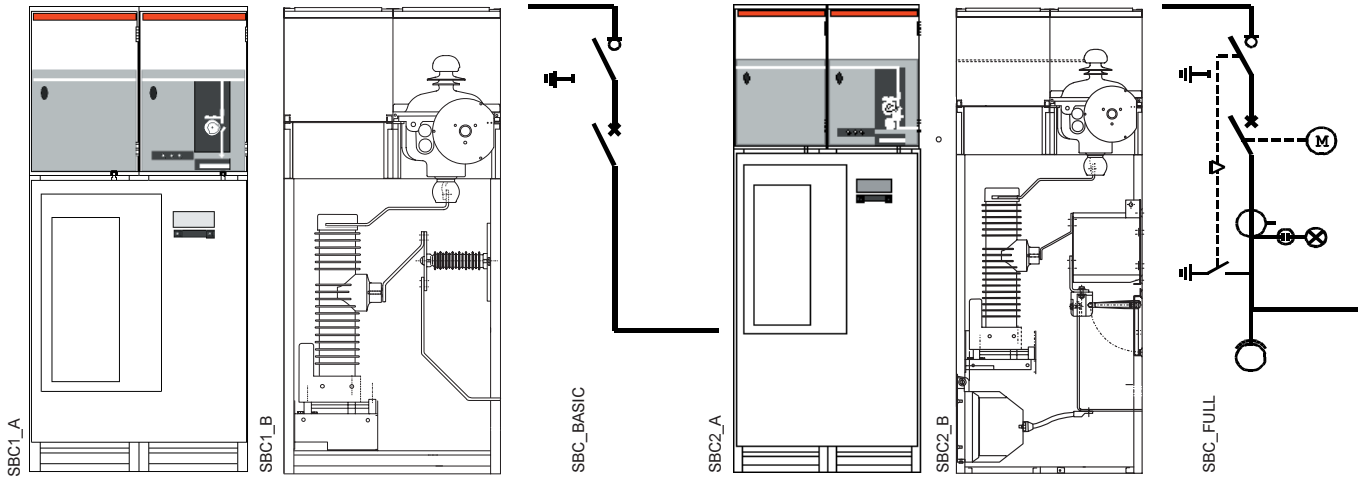
Width: 375 or 500 mm  
Height: 1635 or 1885 mm

Width: 500 mm  
Height: 1885 mm

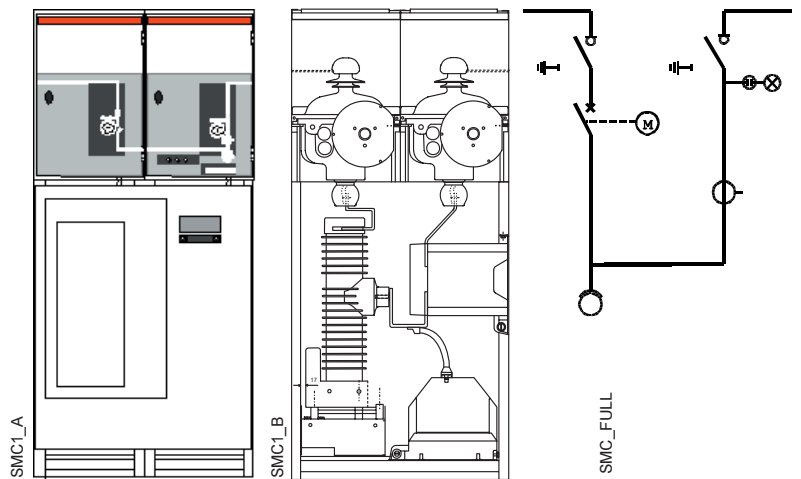
# UniSwitch

## Cubicle Program

### Sectionalizing Breaker Cubicle, type SBC



### Sectionalizing Metering Cubicle, type SMC

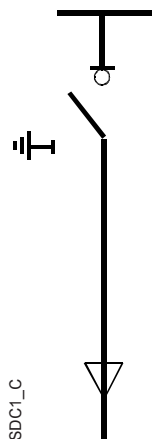
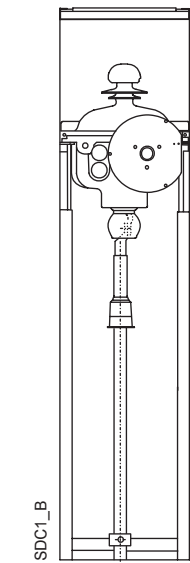
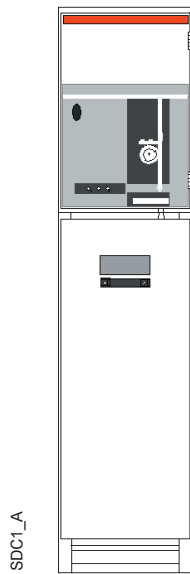


Width: 750 mm  
Height: 1635 or 1850 mm

# 4.2 UniSwitch

## Cubicle Types

### Switch-Disconnecter Cubicle type SDC



Switch-disconnector cubicle type SDC, is mainly used as an incoming, ring or branch cubicle. The basic unit is equipped with an SF6-insulated, 3-position switch-disconnector type SFG with its operation mechanism. The 3-position switch-disconnector may be in one of three positions, "closed", "open" or "earthed", therefore preventing incorrect operation. Access to the cable compartment is possible in earthed position. The position indicator of the switch-disconnector (SFG) fulfils the requirements of the standards IEC 129 A2 (1996), which determine the requirements for such an indicator. "Open" and "earthed" positions are "visible" through the inspection windows placed behind the low voltage compartment door. Inspection of cable connections and fault indicators, when used, is easily carried out through the front-door window.

For safe cable testing a unique interlocking mechanism is included as standard feature.

#### Basic equipment

- Top unit, including
- 3-position switch-disconnector
  - operating mechanism with mechanical position indication
  - enclosure of busbar compartment
  - integrated low voltage compartment
  - interlocking unit
  - busbars
  - earthing bar

- Bottom unit, including
- enclosure of cable compartment
  - cable entry with cable support

#### Cubicle Accessories

- integrated voltage indicators or socket interface for portable indicators
- auxiliary contacts for each position, 2NO+2NC
- gas density indication with alarm contact
- motor operation device
- current transformers
- arc-gas channel
- channel for control cables
- surge arresters
- anti condensation heater
- through-going earthing bar
- apparatus earthing bar

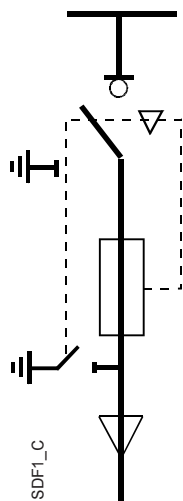
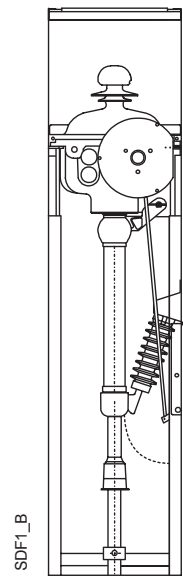
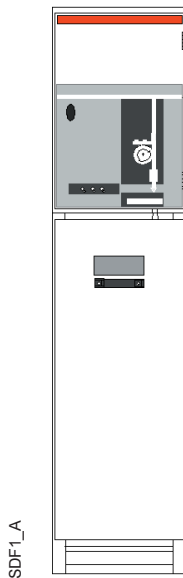
#### Data SDC

Rated voltage	[kV]	12	17,5	24
Rated current	[A]	630	630	630
Rated short-time withstand current	[kA]	25	20	20
Rated duration of short circuit	[s]	1/2	1/3	1/3
Cubicle dimensions				
- width	[mm]	375/500	375/500	375/500
- depth	[mm]	940+60	940+60	940+60
- height	[mm]	1635/1885	1635/1885	1635/1885

# 4.3 UniSwitch

## Cubicle Types

### Switch-Disconnecter Cubicle, with fuse type SDF



Fused switch-disconnector cubicle type SDF, is primarily used for transformer protection voltage metering. The cubicle is equipped with a SF6-insulated, 3-position switch-disconnector and with earthing switch. For fuse earthing, the integrated earthing switch operates on the upstream side and separate earthing switch operates on the downstream side of the fuses. The mechanism used is a double spring mechanism with automatic fuse-tripping. Access to cable compartment is possible in earthed-position. The position indicator of the switch-disconnector (SFG) fulfils the requirements of the standards IEC 129 A2 (1996), which determine the requirements for such an indicator. "Open" and "earthed" positions are "visible" through inspection windows placed behind the low voltage compartment door. Inspection of cable connections and fault indicators when used, is easily carried out through the front-door window.

#### Basic equipment

- Top unit, including
- 3-position switch-disconnector
  - operating mechanism with mechanical position indication
  - enclosure of busbar compartment
  - integrated low voltage compartment
  - interlocking unit
  - fuse tripping with indication
  - busbars
  - earthing bar
- Bottom unit, including
- earthing switch type EF
  - fuse base
  - enclosure of cable compartment
  - cable entry with cable support

#### Cubicle Accessories

- integrated voltage indicators or socket interface for portable indicators
- auxiliary contacts for each position, 2NO+2NC
- gas density indication with alarm contact
- emergency tripping
- tripping coil
- motor operation device
- voltage transformers
- arc-gas channel
- channel for control cables
- anti condensation heater
- through-going earthing bar
- apparatus earthing bar

#### Data SDF

Rated voltage	[kV]	12	17,5	24
Rated current (max fuse)	[A]	125	100	80
Rated short-time withstand current	[kA]	25	20	20
Rated duration of short circuit	[s]	1/2	1/3	1/3
Fuse length	[mm]	292/442	292/442	442
Cubicle dimensions				
- width	[mm]	375/500	375/500	375/500
- depth	[mm]	940+60	940+60	940+60
- height	[mm]	1635/1885	1635/1885	1635/1885

# 4.4

## UniSwitch Cubicle Types

### Circuit Breaker Cubicle type CBC

The circuit breaker cubicle, type CBC is designed for control and protection of distribution lines, networks, motors, transformers, capacitor banks, etc. The cubicle can be equipped with a vacuum or a SF6 circuit breaker. The breaker is rail mounted and fixed to the busbars. To achieve the disconnecting function a 3-position switch-disconnector with an earthing switch is mounted between the breaker and busbars. The door is mechanically interlocked with the switch-disconnector's earthing position to provide personal safety. The cubicle is designed to be equipped with CTs and VTs (Standard DIN size, see item 5.9).

#### Basic equipment

Top unit on right hand side, including

- 3-position switch-disconnector
- operating mechanism with mechanical position indication
- enclosure of busbar compartment
- interlocking unit
- busbars
- earthing bar

Top unit on left hand side, including

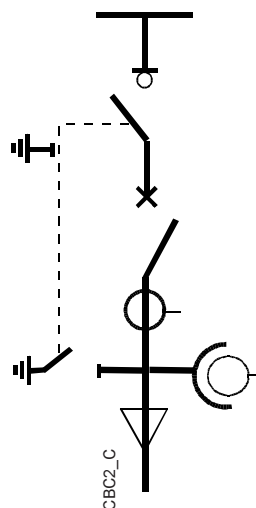
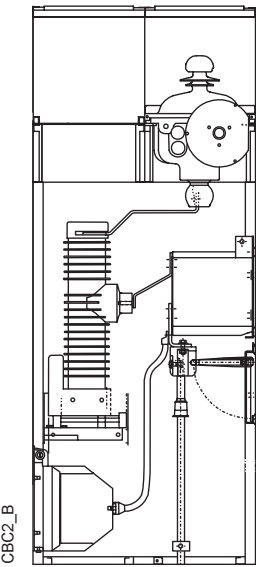
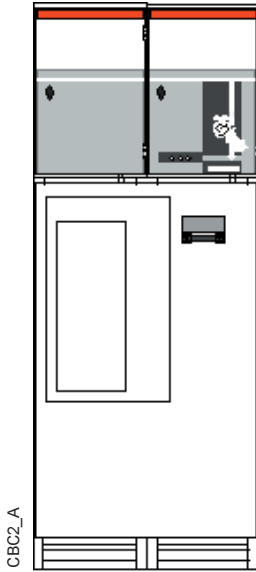
- integrated low voltage compartment for secondary components
- enclosure of busbar compartment

Bottom unit, including

- earthing switch type EM
- enclosure of cable compartment
- cable entry with cable support

#### Cubicle Accessories

- circuit breaker, vacuum- or SF6-type
- integrated voltage indicators or socket interface for portable indicators
- current transformers
- voltage transformers
- cable core transformer
- auxiliary contacts for each position, 2NO+2NC
- gas density indication with alarm contact for switch-disconnector
- motor operation device
- arc-gas channel
- channel for control cables
- anti condensation heater
- through-going earthing bar
- apparatus earthing bar



#### Data CBC

Rated voltage	[kV]	12	17,5	24
Rated current	[A]	630	630	630
Rated short-time withstand current	[kA]	25	20	20
Rated duration of short circuit	[s]	1/2	1/3	1/3
Cubicle dimensions				
- width	[mm]	750	750	750
- depth	[mm]	940+215	940+215	940+215
- height	[mm]	1635/1885	1635/1885	1635/1885



# 4.5 UniSwitch

## Cubicle Types

### Direct Busbar Cubicle type DBC

To connect cables to the busbars, a busbar connection cubicle is available. This cubicle is equipped with connection lugs for fixing the cables. CT's can be installed in the 500 mm cubicle.

The front door is fixed and can only be opened with a tool when earthing switch is not included.

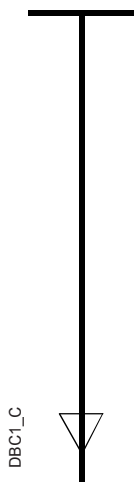
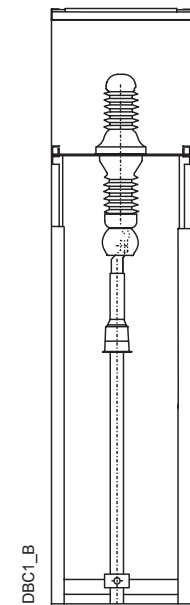
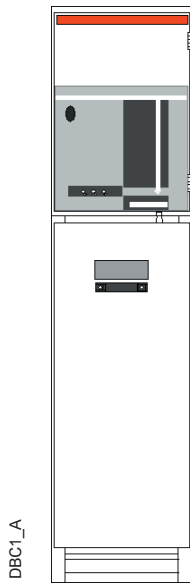
#### Basic equipment

- Top unit, including
- busbar supports
  - enclosure of busbar compartment
  - interlocking unit, but only when using earthing switch (EM)
  - integrated low voltage compartment
  - busbars
  - earthing bar

- Bottom unit, including
- enclosure of cable compartment
  - parallel cable connection possibility
  - cable entry with cable support

#### Cubicle Accessories

- integrated voltage indicators or socket interface for portable indicators
- current transformers
- earthing switch for CT's (EM)
- arc-gas channel
- channel for control cables
- surge arresters
- anti condensation heater
- through-going earthing bar



#### Data DBC

Rated voltage	[kV]	12	17,5	24
Rated current	[A]	1250	1250	630
Rated short-time withstand current	[kA]	25	20	20
Rated duration of short circuit	[s]	1/2	1/3	1/3
Cubicle dimensions				
- width	[mm]	375/500	375/500	375/500
- depth	[mm]	940+60	940+60	940+60
- height	[mm]	1635/1885	1635/1885	1635/1885

# 4.6 UniSwitch

## Cubicle Types

### Sectionalizing Cubicle type SEC

The sectionalizing cubicle is always used together with the bus riser cubicle. The standard version with 375 mm width is equipped with a SF6-insulated, 3-position switch-disconnector for sectionalizing the busbars. Earthing facility is provided always as a standard. Sectionalizing cubicle with 750 mm width can be supplied also with circuit breaker.

#### Basic equipment

Top unit, including

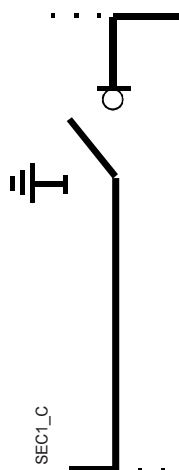
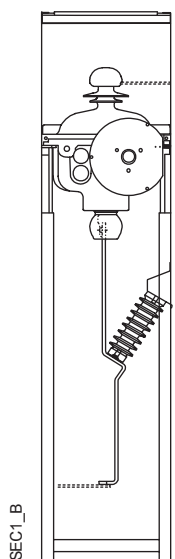
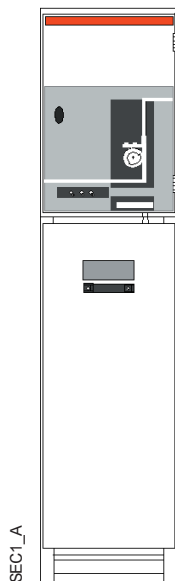
- 3-position switch-disconnector
- operating mechanism with mechanical position indication
- enclosure of busbar compartment
- integrated low voltage compartment
- interlocking unit
- earthing bar

Bottom unit, including

- enclosure with sectionalizing busbars

#### Cubicle Accessories

- circuit breaker, vacuum- or SF6-type
- integrated voltage indicators or socket interface for portable indicators
- auxiliary contacts for each position, 2NO+2NC
- gas density indication with alarm contact
- motor operation device
- current transformers
- arc-gas channel
- channel for control cables
- anti condensation heater
- through-going earthing bar
- apparatus earthing bar



#### Data SEC

Rated voltage	[kV]	12	17,5	24
Rated current	[A]	630	630	630
Rated short-time withstand current	[kA]	25	20	20
Rated duration of short circuit	[s]	1/2	1/3	1/3
Cubicle dimensions				
- width	[mm]	375/500	375/500	375/500
- depth	[mm]	940+60	940+60	940+60
- height	[mm]	1635/1885	1635/1885	1635/1885

# 4.7 UniSwitch

## Cubicle Types

### Bus Riser Cubicle type BRC

Bus riser cubicle, type BRC, connects the busbar to the bottom of a sectionalizing cubicle with circuit breaker or switch-disconnector. This 500 mm width cubicle can be used as a metering cubicle with space for 3 CTs and 3 VTs. The front cover is fixed to the cubicle and has to be released with a tool. The front door has a window for inspection.

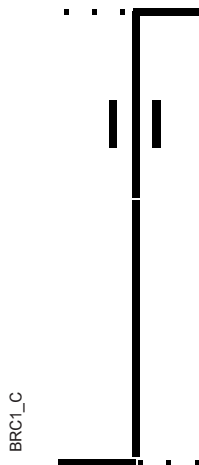
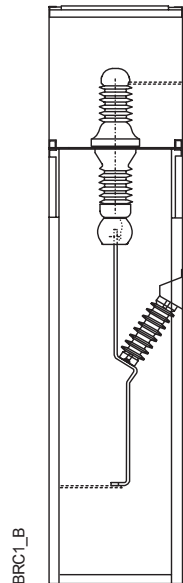
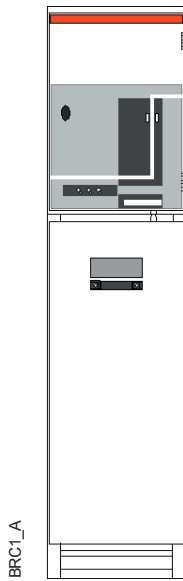
#### Basic equipment

- Top unit, including
- switch substitute
  - enclosure of busbar compartment
  - integrated low voltage compartment
  - earthing bar

- Bottom unit, including
- enclosure with bus riser bars
  - bottom cover

#### Cubicle Accessories

- current transformers
- voltage transformers
- earthing switch with position indication
- auxiliary contacts for earthing switch, 2NO+2NC
- arc-gas channel
- channel for control cables
- anti condensation heater
- through-going earthing bar



#### Data BRC

Rated voltage	[kV]	12	17,5	24
Rated current	[A]	630/1250	630/1250	630/1250
Rated short-time withstand current	[kA]	25	20	20
Rated duration of short circuit	[s]	1/2	1/3	1/3
Cubicle dimensions				
- width	[mm]	375/500	375/500	375/500
- depth	[mm]	940+60	940+60	940+60
- height	[mm]	1635/1885	1635/1885	1635/1885

# 4.8 UniSwitch

## Cubicle Types

### Sectionalizing Breaker Cubicle type SBC

Sectionalizing breaker cubicle is always used together with the bus riser cubicle. The standard cubicles are equipped with a SF6 insulated 3-position switch-disconnector in series with a circuit breaker for sectionalizing the busbar. The cubicle is equipped with a vacuum or a SF6 circuit breaker. The breaker is rail mounted and fixed to the busbars. Earthing facility on the switch-disconnector is always included. The door is mechanically interlocked with the switch-disconnector's earthing position to give personal safety. The cubicle is designed to be equipped with CTs and VTs (Standard DIN size, see item 5.9).

#### Basic equipment

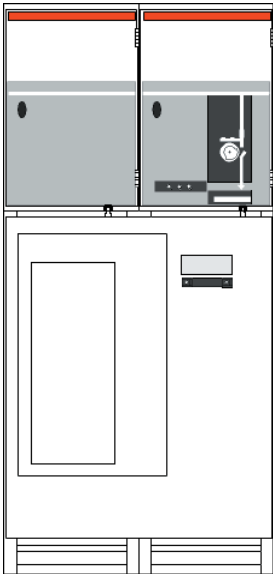
- Top unit on right hand side, including
- 3-position switch-disconnector
  - operation mechanism with mechanical position indication
  - enclosure of busbar compartment
  - interlocking unit
  - busbars
  - earthing bar

- Top unit on left hand side, including
- integrated low voltage compartment for secondary components
  - enclosure of busbar compartment

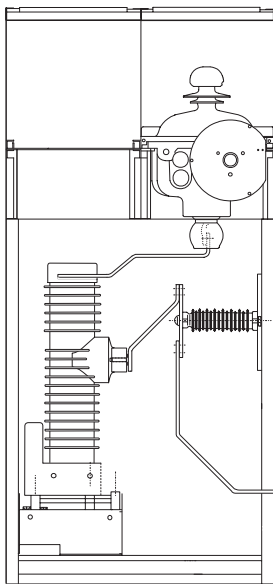
#### Cubicle Accessories

- circuit breaker, vacuum- or SF6-type
- integrated voltage indicators or socket interface for portable indicators
- current transformers
- voltage transformers
- auxiliary contacts for each position, 2NO+2NC
- gas density indication with alarm contact for switch-disconnector
- motor operation device
- arc-gas channel
- channel for control cables
- earthing switch type EM
- anti condensation heater
- through-going earthing bar
- apparatus earthing bar

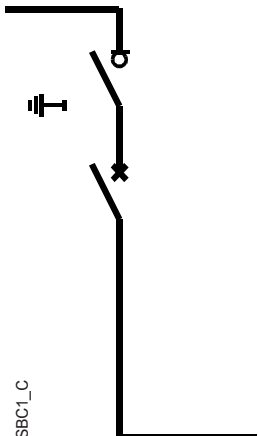
SBC1\_A



SBC1\_B



SBC1\_C



#### Data SBC

Rated voltage	[kV]	12	17,5	24
Rated current	[A]	630	630	630
Rated short-time withstand current	[kA]	25	20	20
Rated duration of short circuit	[s]	1/2	1/3	1/3
Cubicle dimensions				
- width	[mm]	750	750	750
- depth	[mm]	940+215	940+215	940+215
- height	[mm]	1635/1885	1635/1885	1635/1885

# 4.9 UniSwitch

## Cubicle Types

### Sectionalizing Metering Cubicle type SMC

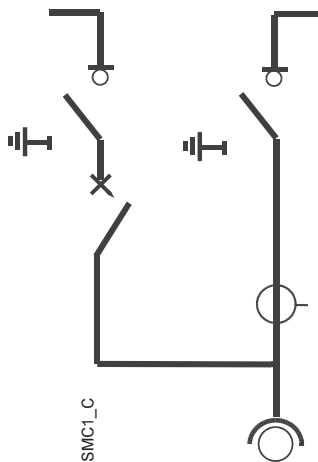
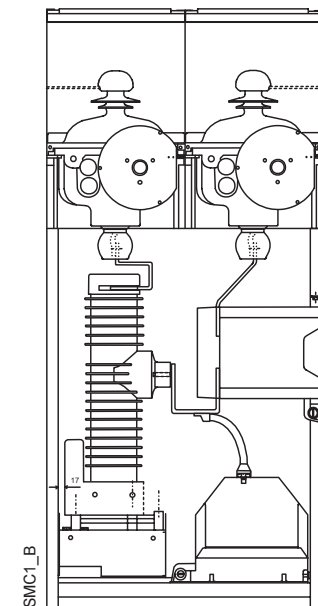
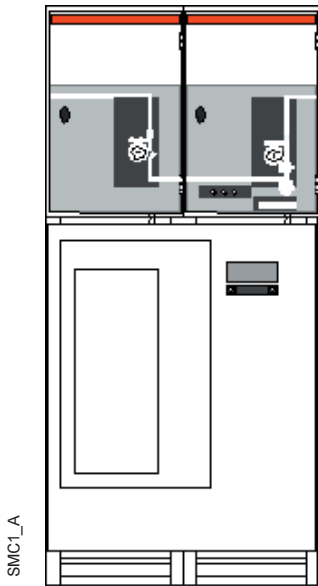
Sectionalizing metering cubicle, type SMC, is mainly used when medium voltage metering is required. Cubicle is based on operation of one rail mounted circuit breaker and two separately operated 3-position, SFG type switch-disconnectors. Switch-disconnectors are located at both ends of the sectionalized busbar with the circuit breaker in between, after left hand side switch-disconnector. DIN size VT's and CT's are available on right hand side of circuit breaker, in previously mentioned order. 3-position switch-disconnectors are interlocked with cubicle front door and access into cable compartment is possible only when both switch-disconnectors are in earthed-position.

#### Basic equipment

- Top unit on left hand side, including
- 3-position switch-disconnector
  - operation mechanism with mechanical position indication
  - integrated low voltage compartment
  - interlocking unit
  - busbars
  - earthing bar
- Top unit on right hand side, including
- 3-position switch-disconnector
  - operation mechanism with mechanical position indication
  - integrated low voltage compartment
  - interlocking unit
  - busbars
- Bottom unit, including
- enclosure of busbar compartment

#### Cubicle Accessories

- circuit breaker, vacuum- or SF6-type
- integrated voltage indicators or socket interface for portable indicators
- auxiliary contacts for each position, 2NO+2NC
- gas density indication with alarm contact for switch-disconnector
- current transformers
- voltage transformers
- channel for control cables
- arc channels
- anti condensation heater
- through-going earthing bar
- apparatus earthing bar



#### Data SMC

Rated voltage	[kV]	12	17,5	24
Rated current	[A]	630	630	630
Rated short-time withstand current	[kA]	25	20	20
Rated duration of short circuit	[s]	1/2	1/3	1/3
Cubicle dimensions				
- width	[mm]	750	750	750
- depth	[mm]	940+215	940+215	940+215
- height	[mm]	1635/1885	1635/1885	1635/1885

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# 5. UniSwitch

## 5. Components & Accessories

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# 5.1

## UniSwitch

### Components & Accessories

#### Mechanism

##### UES-K3/2 single spring operating mechanism

The UES-K3/2 is used together with the switch-disconnector type SFG and the cubicles of

- SDC
- CBC
- SEC
- SEB
- SCC

The same mechanism is used to operate the switch positions between OPEN – CLOSE and OPEN – EARTH. There has to be always the central interlocking module 1VFJ220001R2 fully assembled in the front of the UES-K3/2 during the operation.

The UES-K3/2 uses the energy stored in a flat spring to close and open the switch-disconnector. The total operation angle is about 180° (90° + 90°). The switch-disconnector is closed by a clockwise operation and the earthing switch is closed by an anti-clockwise operation.

The mechanism is maintenance free during whole lifetime (i.e. 30 years) in normal conditions. Mechanical endurance is 5000 C/O and 1000 O/Earth.

The UES-K3/2 can be equipped with motor operating device UEMC40K8-U/1.

The opening time from the impulse is about 40 ms.

##### UES-A3/2 double spring operating device

The UES-A3/2 is used together with the switch-disconnector type SFG and the cubicles of SDF.

The same mechanism is used to operate the switch positions between OPEN – CLOSE and OPEN – EARTH. The UES-A3/2 is also used to operate the earthing switch EF. There has to be always the central interlocking module 1VFJ220001R2 fully assembled in the front of the UES-A3/2 during the operation.

The UES-A3/2 uses the energy stored in 2 flat springs. One (K-spring) to close and open the switch-disconnector and another (A-spring) to rapidly open the switch-disconnector. The A-spring charges the K-spring. The A-spring is charged during the manual or motor operation from the open to the close position only once. During the operation the A-spring will be locked and not released before the impulse from the fuse, shunt trip-coil or mechanical push button. Before that the UES-A3/2 can be used similarly to UES-K3/2. The operation shaft has to be returned to the open position after the tripping.

The total manual operation angle is approximately 180° (90° + 90°). The switch-disconnector is closed by a clockwise operation and the earthing switch is closed by an anti-clockwise operation.

The mechanism is maintenance free during the whole lifetime (i.e. 30 years) in normal conditions. Mechanical endurance is 2000 C/O (5000 C/O in a motor use only) and 1000 O/Earth.

The UES-A3(M)/2 can be equipped with

- Shunt trip-coil type
  - 24VDC = 1VFJ120007R2 -24VDC
  - 48VDC = 1VFJ120007R2 -48VDC
  - 60VDC = 1VFJ120007R2 -60VDC
  - 110VDC = 1VFJ120007R2 -110VDC
  - 220VDC = 1VFJ120007R2 -220VDC
  - 110VAC = 1VFJ120007R2 -110VAC
  - 230VAC = 1VFJ120007R2 -230VAC
- Mechanical push button for a rapid opening, type 1VFJ120006R2
- For motor operation device UES-A3M/2

##### Central interlocking module

There is a new central interlocking module type 1VFJ220001R2 used in UniSwitch. The module is used to avoid any incorrect operations and to give more alternatives to interlock. Padlocks can be used to interlock. Can be equipped with a fast lock.

##### Position indication and operator interface module

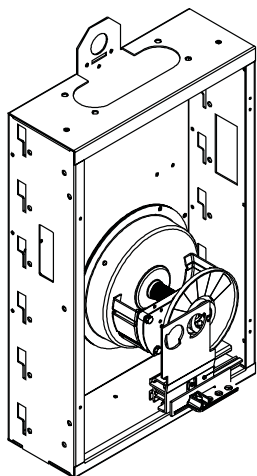
Different colors of position indication labels are available.

As a standard white color has been used in the module type 1VFJ120005R2.

##### Manual operation handle

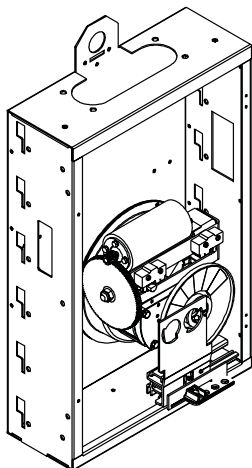
To avoid any incorrect operations use the manual control handle type 1VFJ220002R2 only.

UESK3



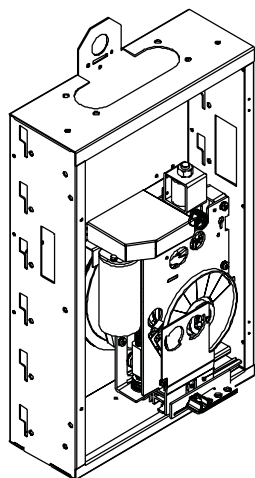
Single spring mechanism

UESK3MOTOR



Single spring mechanism with motor

UESKA3MOTOR

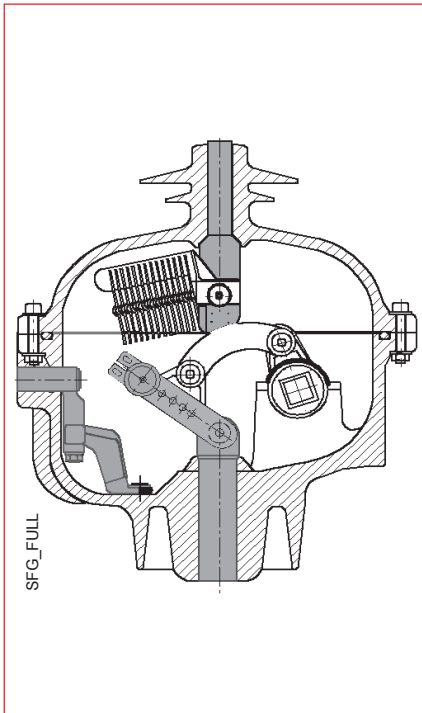


Double spring mechanism with motor

# 5.2

## UniSwitch

### Components & Accessories



## Switch-disconnector, type SFG

The switch-disconnector, type SFG, has the following 3 positions:

- CLOSE
- OPEN
- EARTHING

The switch-disconnector is using SF6 as extinguishing and insulation medium. The switch housing is equipped with two thermo plastic windows to allow visual inspection.

Each switch is sealed for life (i.e. 30 years) and maintenance free. SF6 gas pressure is 1.4 bar and the SFG switch incorporates a capacitive divider for voltage indication. Mechanical endurance is 5000 C/O and 1000 O/Earth.

The switch and operation mechanism are installed in a removable top unit, making it easy to convert SDF to a SDC cubicle, or vice versa.

### Switch types

- SFG with UES-K3 operating mechanism
- SFG with UES-A3 operating mechanism

### Optional equipment

Auxiliary contacts:

- closed position 2NO-2NC
- open position 2NO-2NC
- earth position 2NO-2NC

Shunt trip coil:

For SFG with UES-A3 operating mechanism.

Push-button for mechanical tripping of SFG with UES-A3 operating mechanism.

Motor operation: See item 5.4.

<b>Rated voltage Ur</b>	[kV]	<b>12</b>	<b>17,5</b>	<b>24</b>
Rated lightning impulse withstand voltage $U_p$				
Common value	[kV]	75	95	125
Across the isolating distance	[kV]	85	110	145
Rated short-duration power-frequency withstand voltage $U_d$				
Common value	[kV]	28 (1)	38 (1)	50
Across the isolating distance	[kV]	32 (1)	45 (1)	60
Rated frequency	[Hz]	50/60	50/60	50/60
Rated current Ir	[A]	630	630	630
Rated short-time withstand current	[kA]	25	20	20
Rated duration of short circuit	[s]	1/2	1/3	1/3
Rated peak withstand current	[kA]	62,5	50	50
Breaking capacity (IEC 60265-1)				
Mainly active load	[A]	630	630	630
Closed-loop distribution circuit current	[A]	630	630	630
Cable-charging current	[A]	50/10	50/10	50/10
Line-charging current	[A]	20	20	20
Cable and line charging current under earth faults	[A]	87	87	87
Making capacity (IEC 60265-1)	[kA]	62,5	50	50
Making and breaking capacity (IEC 60420)				
Withstanding and making the cut-off current of the fuse	[kA]	25	20	20
Breaking test with long prearcing time of fuse		ok	ok	ok
Breaking capacity at rated transfer current	[A]	1530	1260	800
Mechanical endurance of switch c/o		5000	5000	5000
Mechanical endurance of earthing switch c/o		1000	1000	1000
Ambient temperature	[°C]			
Maximum value		+ 40	+ 40	+ 40
Maximum value of 24 h-mean		+ 35	+ 35	+ 35
Minimum value		- 5	- 5	- 5 (3)
Altitude above sea level	[m]	≤1000 (2)	≤1000 (2)	≤1000 (2)

(1) Highest values in accordance with national standards.  
 (2) Adjustment is necessary for greater altitudes.  
 (3) Lower ambient temperature on request.

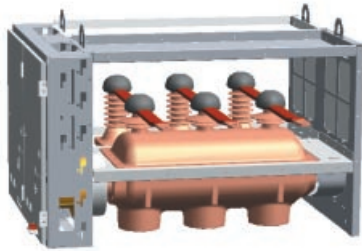


# 5.3

## UniSwitch

### Components & Accessories

#### Busbar arrangement



The copper busbars are located in the Top Units in their own compartment. The busbars are provided in sections and connect the cubicles together. This arrangement makes it easy to extend the switchgear.

#### Busbar set 12/17.5 kV, 630/1250 A

Panel width 375 mm  
Panel width 500 mm  
Panel width 750 mm

#### Busbar set 24 kV, 630 A

(Insulated with heat shrink sleeve)  
Panel width 375 mm  
Panel width 500 mm  
Panel width 750 mm

#### Field control caps for 24 kV

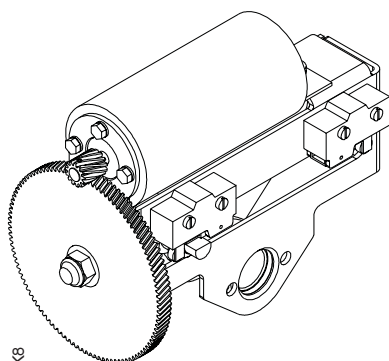
#### Data busbar

Rated voltage	[kV]	12	17,5	24
Rated current	[A]	630/1250	630/1250	630
Rated short-time withstand current	[kA]	25	20	20
Rated duration of short circuit	[s]	1/2	1/3	1/3
Material		Cu	Cu	Cu
Insulation		no	no	yes
Dimension	[mm]	40x8	40x8	40x8

# 5.4

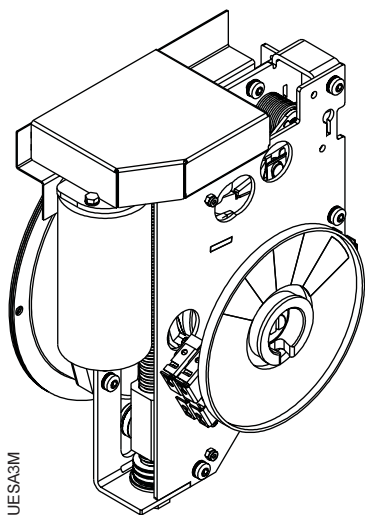
## UniSwitch

### Components & Accessories



UEMC40K8

For single spring mechanism



UESA3M

For double spring mechanism

### Motor operation of switch-disconnector

For electrical or remote operation of the switch-disconnector type SFG a motor operation device and a control unit are available for all cubicles.

The motor operation device types when mechanism UES-K3/2 is used

Type	Circuit diagram
UEMC 40 K8-12 VDC/1	31 UEMC 207
UEMC 40 K8-24 VDC/1	"
UEMC 40 K8-48 VDC/1	"
UEMC 40 K8-60 VDC/1	"
UEMC 40 K8-110 VDC/1	"
UEMC 40 K8-125 VDC/1	"
UEMC 40 K8-220 VDC/1	"

Includes:

- Motor
- Position limit switches

The operating device type UES-A3M/2 has to be chosen instead of type UES-A3/2 when a double spring device is needed.

Type	Circuit diagram
UES-A3M/2-12 VDC/1	31 UEMC 207
UES-A3M/2-24 VDC/1	"
UES-A3M/2-48 VDC/1	"
UES-A3M/2-60 VDC/1	"
UES-A3M/2-110 VDC/1	"
UES-A3M/2-125 VDC/1	"
UES-A3M/2-220 VDC/1	"

Includes:

- Motor + double spring device
- Position limit switches

The operation shaft has to be returned to the open position after the motorized open operation if a manual closing is to be executed.

### Control unit

Type	Circuit diagram
UEZJ 1 -12VDC/4	31 UEMC 230
UEZJ 1 -24VDC/4	"
UEZJ 1 -48VDC/4	31 UEMC 231
UEZJ 1 -60VDC/4	"
UEZJ 1 -110VDC/4	"
UEZJ 1 -125VDC/4	"
UEZJ 1 -220VDC/4	"
UEZJ 1 -110VAC/4	"
UEZJ 1 -230VAC/4	"

### Control push buttons

Type UEZJ 3

Includes:

- I-button with text CLOSE
- O-button with text OPEN
- On/Off selector switch with text REMOTE ON/OFF

### Rectifier

Type -REC 36 MB 160A

Used for AC supplies

Circuit diagram 31 UEMC 281

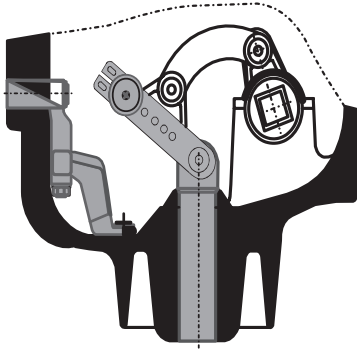
The motor operating devices and the control unit are mounted in the low voltage compartment. They can be mounted without any additional parts.

The motor operating devices are DC operated and a rectifier is necessary when AC supply. For control of motor operating device 2NO+ 2NC aux. contacts on switch-disconnector are required.

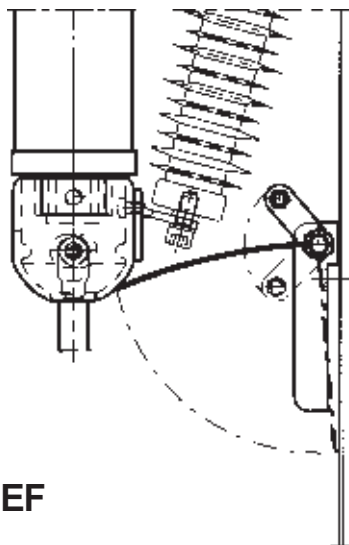
# 5.5

## UniSwitch

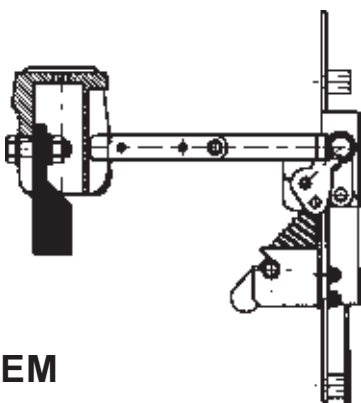
### Components & Accessories



SFG



EF



EM

### Earthing Switches

The main earthing switch is incorporated in the switch-disconnector SFG. The earthing switch has 3 double bladed moving knives. The fixed contacts are connected together to a common earthing bar inside the switch housing.

The earthing switch, type EF, has reduced making capacity due to the fact that no full short circuit current can occur (Fuse down-stream).

Earthing switch, type EM, is used for earthing current transformers and circuit breaker.

All earthing switches have true position indicators through the front door and are operated by the main operating shaft in the front of the panel.

#### For fuse base (down-stream)

EF 12/17.5 - 210

EF 24 - 210

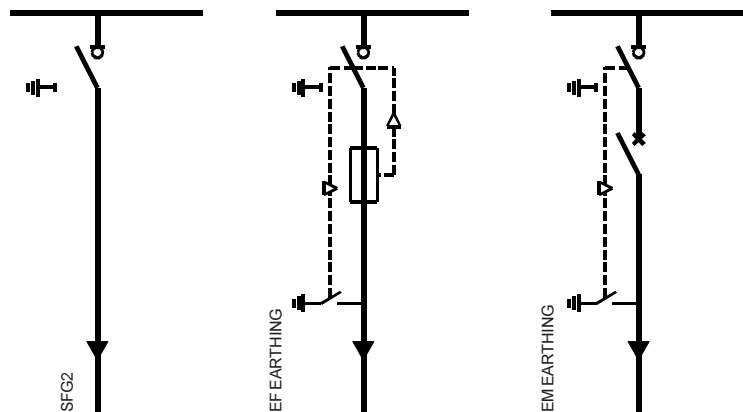
#### For current transformers (down-stream)

EM - 210

#### Optional equipment

- auxiliary contacts            2NO-2NC
- + extension                    2NO-2NC

### Different configurations



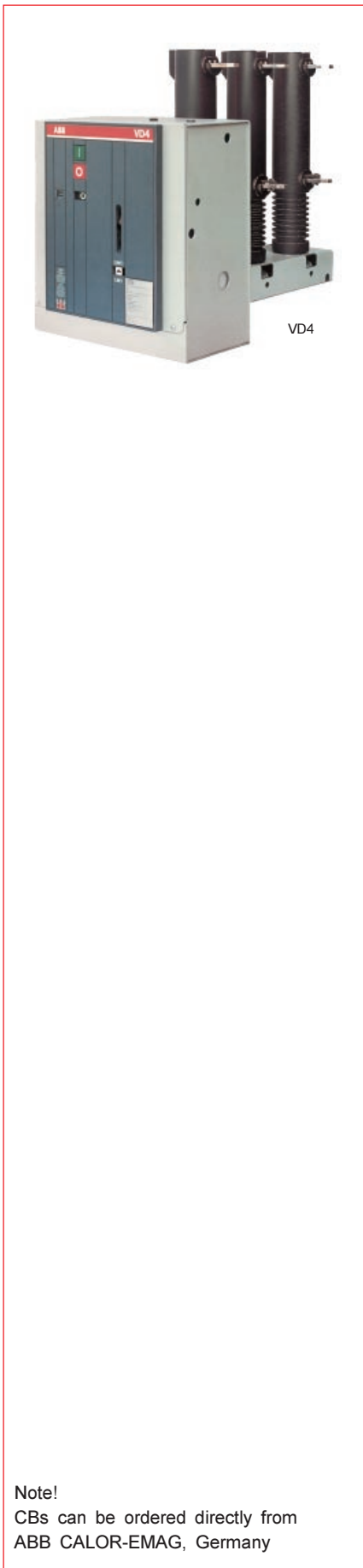
### Technical Data IEC 129/265-1

Rated voltage	12 kV	17.5 kV	24 kV
---------------	-------	---------	-------

Making and peak withstand current  $I_{ma}$ ,  $I_p$

EF 12 - 210	[kA]	4	4	4
EF 24 - 210	[kA]	4	4	4
EM - 210	[kA]	62,5	50	50

# 5.6 UniSwitch Components & Accessories



## Vacuum Circuit Breaker VD4-S

The vacuum circuit breaker VD4-S has been specially designed for UniSwitch switchgear. The switching capacity is sufficient for any conditions arising from switching of the equipment as well as from system components under normal operating and fault conditions.

Vacuum circuit breakers have particular advantages for use in power systems where frequently switching with normal operating currents is required. VD4-S vacuum circuit breakers are equipped with a stored-energy spring mechanism suitable for normal operating sequence, and also for autoreclosing sequence (O-0.3s-CO-3min-CO). They have exceptionally high operating reliability and long life.

The breaker poles, designed in column form, include vacuum interrupters installed in tubular epoxy resin insulators.

The current-breaking process in a vacuum circuit breaker differs from all other CBs which use an arc quenching medium like oil or gas. After separation of the current-carrying contacts, the contact material has to generate the charge carriers by itself which are required to pass the current through the vacuum to the natural current zero. For normal currents up to about 10 kA this effect is characterized as "diffuse vacuum arc". Without special measures contraction of the diffuse vacuum arc occurs at higher levels, which is resulting in overheating and overall erosion of the contacts. These effects will be avoided by magnetically forced motion of the plasma arc due to spiral contacts.

Due to the small contact gap and the conductivity of the vacuum arc the arc-drop voltage, and additionally due to the short

arcing time, the associated arc energy is extremely low. This results in a long life of the the vacuum interrupters and the vacuum circuit breakers.

Another positive effect of vacuum is its high dielectric strength already with small contact gaps. The low vacuum reached with the production process and the tight sealing guarantees, in conjunction with the pressure measuring methode after manufacturing, that the effective leakage rate is smaller than the tolerable value for life.

### Basic equipment

- manually charged mechanism
- shunt release + auxiliary switch
- auxiliary contacts, 1NO + 3NC
- auxiliary switch for fault annunciation

### Optional equipment

- blocking magnet
- charging motor + auxiliary switch
- shunt release + auxiliary switch
- 2nd shunt release
- auxiliary switch (5 contacts)
- undervoltage release
- indirect overcurrent release

### Circuit breaker types

- VD4 1206-12 S
- VD4 1206-16 S
- VD4 1206-20 S
- VD4 1206-25 S
- VD4 1706-12 S
- VD4 1206-16 S
- VD4 1706-20 S
- VD4 2406-12 S
- VD4 2406-16 S

## Technical Data VD4 S

Rated voltage		12 kV	17.5 kV	24 kV
Rated frequency	[Hz]	50/60	50/60	50/60
Rated lighting impulse withstand voltage	[kV]	75	95	125
Rated power frequency withstand voltage	[kV]	28	38	50
Rated current	[A]	630	630	630
Rated short-circuit breaking current	[kA]	12/16/20/25	12/16/20	12/16
Rated short-circuit making current	[kA]	30/40/50/63	30/40/50	30/40
Rated short-circuit duration	[s]	3/3/3/1	3/3/1	3/3
Pole centres	[mm]	210	210	210

Note!  
CBs can be ordered directly from  
ABB CALOR-EMAG, Germany

# 5.7

## UniSwitch

### Components & Accessories



HAD-US



HAD-US with PR521 overcurrent release

**Note!**

CBs can be ordered directly from ABB SACE, Italy

## SF6-Circuit Breaker, HAD-US

HAD-US <sup>(1)</sup> SF6 Medium voltage circuit breakers, specially designed for installation in UniSwitch cubicles, are equipped with right-hand operating mechanism.

They use SF6 gas to extinguish the electric arc and as the insulating means. They are constructed using the separate pole technique.

The operating mechanism is the ES type with stored energy, free release, and with closing and opening independent of operator action. By adding electrical accessories, remote control is possible. Construction is compact, sturdy and of limited weight.

The HAD-US are systems with lifelong sealed pressure (IEC 56 and CEI 17-6 Standards).

### Breaking technique

SF6 is an inert gas with excellent insulating properties. Thanks to its special thermal and chemical stability, SF6 maintains its characteristics over the long term, ensuring a high level of reliability of the circuit breakers.

The blasting and cooling effect of SF6 and the special shape of the contacts, gradually quenches the electric arc and rapidly restores the dielectric properties, without re-ignition.

This process results in very low overvoltage values and short arc duration.

These characteristics make HAD-US the ideal circuit breaker in M.V. distribution substations.

### Ranges of application

The HAD-US circuit breakers are used in all secondary MV distribution applications and in MV/LV substations, in factories, industrial workshops, buildings (bank, shopping center, airport, metro, etc.).

Thanks to the application (on request) of the self-supplied PR521 overcurrent release, the HAD-US circuit breakers are suitable for use in MV/LV unmanned substations without auxiliary power supply <sup>(2)</sup>.

### Basic equipment <sup>(3)</sup>

- Connection terminals
- Manual operating mechanism
- Mechanical indicator for closing and opening springs (charged/discharged)
- Mechanical indicator for circuit breaker open/closed
- Closing handle and opening handle
- Connector (plug) for auxiliary circuits
- Key lock
- Spring charging lever
- Shunt opening release
- Group of 5 auxiliary open/closed contacts.

### Main characteristics

No maintenance, high number of operations, long electrical and mechanical life, remote control, complete range of accessories and many possibilities of personalization, gas control device (on request), self-supplied overcurrent releases (on request), autoreclosing sequence O-0,3s-CO-15s-CO.

### Optional equipment

- Shunt closing release
- Spring charging geared motor
- Undervoltage release
- Locks on operating knobs
- Operation counter
- PR521 + 2/3 current sensors built in the circuit breaker.

**Notes**

- (1) The circuit breakers can be ordered directly from ABB SACE T.M.S. - Italy.
- (2) Installation of PR521 release and relative current sensors is not possible for circuit breaker with 24 kV rated voltage.
- (3) Although the basic equipment is supplied as standard, it must always be specified when ordering (see the section Compulsory accessories in the Esafluor HAD technical catalogue) for customization.

### Circuit breakers types

U [kV]	In [A]	Isc [kA]	Icm [kA]	Description	Without pressure switch UXAB <sup>(4)</sup>	With pressure switch UXAB <sup>(5)</sup>
12	630	12,5	31,5	HAD-US 12.06.12	376161110	376161111
		16	40	HAD-US 12.06.16	376161120	376161121
		20	50	HAD-US 12.06.20	376161130	376161131
		25	63	HAD-US 12.06.25	376161140	376161141
17,5	630	12,5	31,5	HAD-US 17.06.12	376162110	376162111
		16	40	HAD-US 17.06.16	376162120	376162121
		20	50	HAD-US 17.06.20	376162130	376162131
24	630	12,5	31,5	HAD-US 24.06.12	376163110	376163111
		16	40	HAD-US 24.06.16	376163120	376163121
		20	50	HAD-US 24.06.20	376163130	376163131

(4) With this type of circuit breaker, later addition of the pressure switch is not possible.

(5) The pressure switch is always provided with two intervention thresholds.

# 5.8

## UniSwitch

### Components & Accessories



Note!  
Fuses can be ordered directly from  
ABB KRAFT AS, Skien Norway

### Fuse link type CEF

The UniSwitch system is designed for HRC-fuses according to IEC Publication 282-1. The dimensions are in accordance to DIN 43625 with length «e» 292 mm for 12 kV and 442 mm for 24 kV. To select and order fuse for the transformer protection see table below.

The lower fuse contacts are mounted on the insulators. These insulators can be selected with or without capacitive voltage transmitters.

The upper fuse contact with fuse tripping release is fixed directly on the switch-disconnector.

### Medium voltage - HRC fuse links

Type	Rated voltage KV	Rated current A	e/d mm	Ident. No.		
CEF	12	6	292/65	NHPL052721R1		
		10	292/65	NHPL052723R1		
		16	292/65	NHPL052724R1		
		25	292/65	NHPL052725R1		
		40	292/65	NHPL052726R1		
		50	292/65	NHP241036R12		
		63	292/65	NHPL052727R1		
		80	292/87	NHPL052703R1		
		100	292/87	NHPL052728R1		
		125	442/87	NHPL052704R1		
		CEF	17,5	6	292/65	NHPL052731R1
				10	292/65	NHPL052733R1
16	292/65			NHPL052734R1		
25	292/65			NHPL052735R1		
40	292/87			NHPL052736R1		
50	292/87			NHP241037R11		
63	292/87			NHPL052737R1		
80	442/87			NHPL052705R1		
100	442/87			NHPL052738R1		
CEF	24			6	442/65	NHPL052741R1
				10	442/65	NHPL052743R1
				16	442/65	NHPL052744R1
		25	442/65	NHPL052745R1		
		40	442/65	NHPL052746R1		
		50	442/87	NHP241038R6		
		63	442/87	NHPL052747R1		
		80	442/87	NHP200473R2		

### Selection of fuses: According to IEC 420

Operating voltage kV	Transformer rating [kVA]																	
	57	75	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	
	Fuse selection (ratings in Amps)																	
3	25	25	40	40	63	63	63	80	100	100								
5	16	25	25	25	40	40	63	63	63	80	100	100						
6	16	16	25	25	25	40	40	63	63	63	80	100	100					
10	10	16	16	16	25	25	25	40	40	63	63	80	100	100				
12	10	16	26	26	26	25	25	25	40	40	63	63	80	100	100	125		
15	10	10	16	16	16	16	25	25	25	40	40	63	63	63	100	100		
20	10	10	10	16	16	16	16	25	25	25	40	40	63	63	63	80	100	
24	10	10	10	10	16	16	16	16	25	25	25	40	40	63	63	63	80	(1)

(1) Unique ratings on request

# 5.9

## UniSwitch

### Components & Accessories

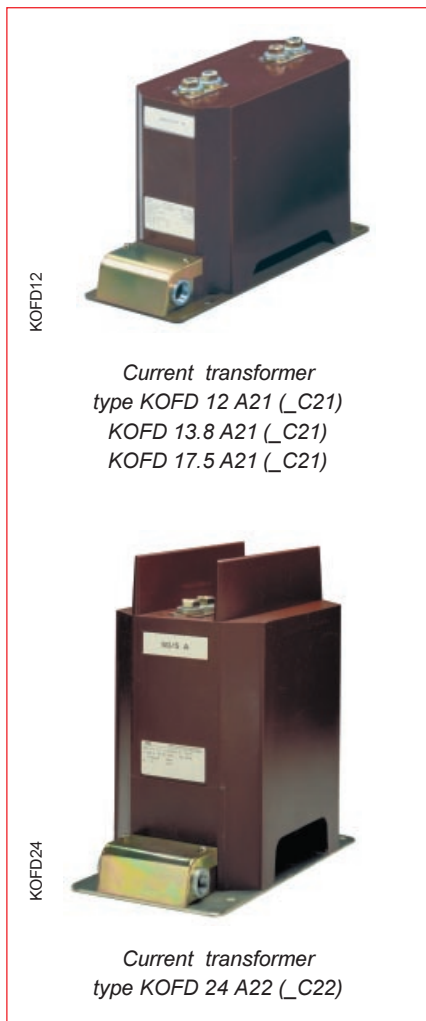
#### Current transformers

Taking into account the operating voltage and required BIL – level the use of current transformers can be optimized.

Un kV	BIL kV	1-core CT Type	2-core CT Type
12	75	KOFD 12A21	KOFD 12C21
13.8	95	KOFD 13.8A21	KOFD 13.8C21
17.5	95	KOFD 17.5A21	KOFD 17.5C21
24	125	KOFD 24A22	KOFD 24C22

For use together with the electronic relays in this catalogue, the above current transformers can be used with the classes and burdens below, with appropriate limitations to the short circuit levels. These data are examples only. Other data available upon request.

When a capacitive voltage indication device is to be installed the operating voltage shall be specified.



#### 1-core current transformers, 12 – 24 kV, 50 Hz (60 Hz)

Single ratio with secondary current 1 A or 5 A

Extended primary current value: 120 %

Alternative classes:       0.5 , 10 VA  
                                  5P10 , 10 VA  
                                  5P20 , 10 VA

$I_p$ (A)	50	75	100	150	200	300	500	600
$I_{th}$ (kA 1s)	25	25	25	25	25	25	25	25
$I_{th}$ (kA 3s)	6.3	16	20	25	25	25	25	25

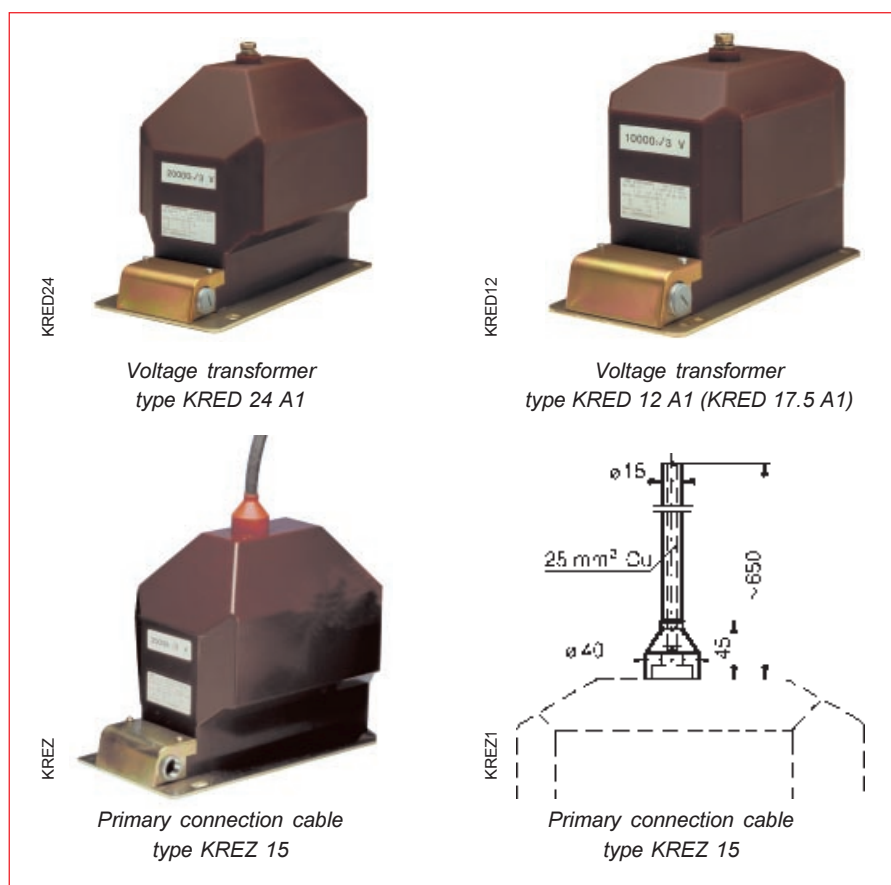
#### 2-core current transformers , 12 – 24 kV , 50 Hz (60 Hz)

Single ratio with secondary current 1 A or 5 A

Extended primary current value: 120 %

Core 1: class       0.5 , 10 VA  
Core 2: class       5P10 , 10 VA  
Alternatively:       5P20 , 10 VA

$I_p$ (A)	100	150	200	300	500	600
$I_{th}$ (kA 1s)	25	25	25	25	25	25
$I_{th}$ (kA 3s)	16	20	25	25	25	25



### Voltage transformers

Single pole insulated (phase-to-earth) voltage transformers are available in three sizes: 12 kV, 17.5 kV and 24 kV. They can be built for most primary voltages between  $1:\sqrt{3}$  kV and  $22:\sqrt{3}$  kV and for all normal secondary voltages; e.g.  $100:\sqrt{3}$  V,  $110:\sqrt{3}$  V,  $115:\sqrt{3}$  V and  $120:\sqrt{3}$  V.

The voltage transformers type KRED 24A1 must be connected to the primary using the HV connecting cable KREZ 15.

When using single pole insulated voltage transformers, the earth fault windings shall be connected in open delta with a damping resistor  $27 \Omega$ , 450 W (for  $110:\sqrt{3}$  V) or  $22 \Omega$ , 450 W (for  $100:\sqrt{3}$  V) to avoid ferro-resonance.

### Guaranteed max. data for voltage transformers 50 Hz ( 60 Hz )

Type	KRED 12 A1, A2 KRED 17.5 A1, A2		KRED 24 A1	
Primary voltage	1000: $\sqrt{3}$ ...12000: $\sqrt{3}$ V, 12000: $\sqrt{3}$ ...17500: $\sqrt{3}$ V		1000: $\sqrt{3}$ ...24000: $\sqrt{3}$ V	
Terminal marking	A-N		A-N	
Maximum number of secondary windings	3		3	
Winding	Measuring winding	Earth-fault winding	Measuring winding	Earth-fault winding
Secondary voltage	$100:\sqrt{3}$ V $110:\sqrt{3}$ V	100:3 V 110:3 V	$100:\sqrt{3}$ V $110:\sqrt{3}$ V	100: 3V 110: 3V
Terminal marking	a-n	da-dn	a-n	da-dn
Accuracy class	0.2 0.5 1 3 3P 6P	3P 6P	0.2 0.5 1 3 3P 6P	3P 6P
Rated burden max. VA <sup>(1)</sup> when earth fault winding fitted	25 60 100 100 100 200	100 200	30 75 150 150 150 300	100 200
Secondary thermal limiting current $U = 1.2 \times U_n$ $U = 1.9 \times U_n$	7 A 6 A	- 6 A	7 A 5 A	- 6 A

(1) Valid for single measuring winding only.  
Available outputs for double measuring windings are calculated on request.



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## UniSwitch

# Components & Accessories

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System and test voltages

Primary winding

Type	Highest voltage kV	Alternating test voltage kV	Impulse test voltage 1.2/50 $\mu$ s, kV
KRED 12_	3.6	10	40
	7.2	20	60
	12	28	75
KRED 17.5_	13.8	34	95
	17.5	38	95
KRED 24_	24	50	125

# 5.10

## UniSwitch

### Components & Accessories

#### Low Voltage Compartment

The UniSwitch system contains an integrated low voltage compartment which is segregated from the high voltage side by a metal partition.

For 750 mm wide cubicles the LV compartment consists of two 375 mm compartments. In 750 mm cubicles the left compartment is reserved for meters, switches & push buttons (front door) and terminal blocks, mcb's & auxiliary relays (rear plate). The right side compartment's upper side is reserved for protection relays (SPACOM 100 or 300 series) and the lower side for the SFG switch-disconnector's operating device.

For 375 mm and 500 mm wide cubicles the LV compartments upper side is reserved for terminals. The lower side for the SFG switch-disconnector's operating device.

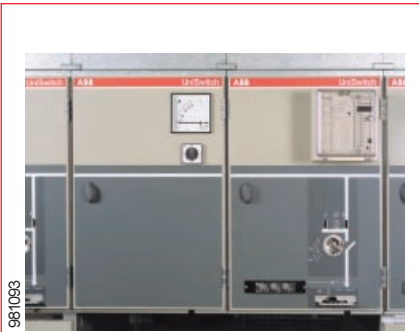
Cable inlet from cable channel, panel and between different panels are shown in item 5.13.

The pictures on the left show examples of how the components can be arranged in the low voltage compartment.

Other arrangements and special applications are available on request.

#### Measurements

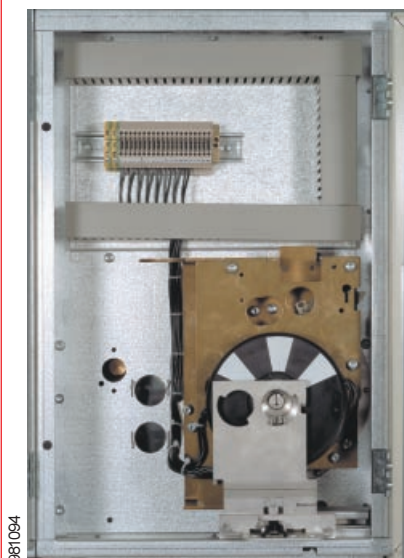
375/500 x 580 x 120 mm  
(length x height x depth)



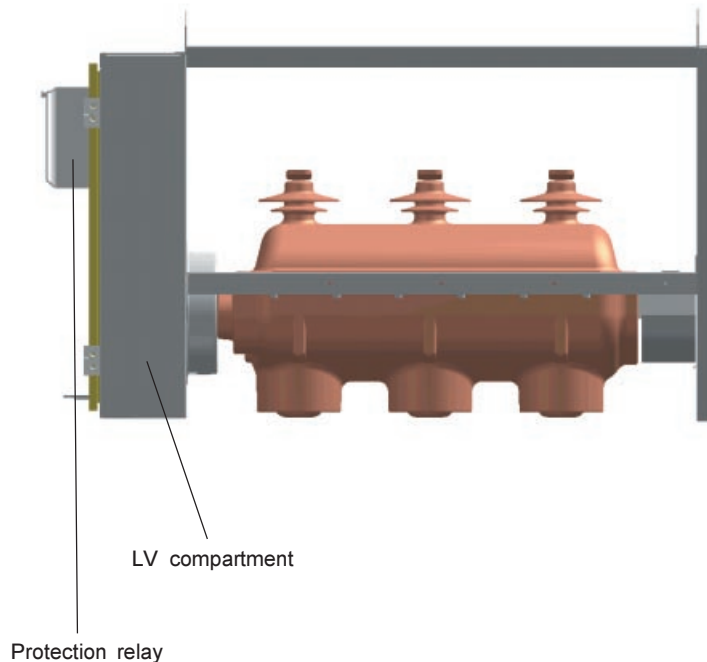
981003  
Front view  
750 mm (CBC) cubicle



981002  
750 mm (CBC) cubicle  
(one part)



981004  
375 mm (SDF) cubicle



# 5.11

## UniSwitch

### Components & Accessories

#### Capacitive voltage indicators

High resistance capacitive voltage indicating systems (VIS) for medium voltage switchgear  $\geq 6$  kV in accordance with IEC1243-5.

Systems available:

- VIS with integrated indicator
- VIS with portable indicator

A complete system consists of:

- 3 capacitive voltage dividers (switch-disconnector/substitutes, post-insulators or CT's)
- 3 connecting leads including measuring circuit components and surge arresters
- 1 integrated voltage indicator or 1 interface with sockets and portable indicator



981095

*VIS with integrated indicator*



981096

*For with portable indicator*

##### VIS with Integrated Indicator for SFG

Operating voltage [kV]	Type
6...7,2	1VMF170001P1
10...12	1VMF170002P1
13,8...17,5	1VMF170003P1
20...24	1VMF170004P1

##### VIS with Integrated Indicator for Post Insulators

Operating voltage [kV]	Type
6...7,2	1VMF170005P1
10...12	1VMF170006P1
13,8...17,5	1VMF170007P1
20...24	1VMF170008P1

##### VIS with Integrated Indicator for Current Transformers

Operating voltage [kV]	Type
6...7,2	1VMF170009P1
10...12	1VMF170010P1
13,8...17,5	1VMF170011P1
20...24	1VMF170012P1

##### VIS with Separable Indicator for SFG

Operating voltage [kV]	Type
6...7,2	1VMF170013P1
10...12	1VMF170014P1
13,8...17,5	1VMF170015P1
20...24	1VMF170016P1

##### VIS with Separable Indicator for Post Insulators

Operating voltage [kV]	Type
6...7,2	1VMF170017P1
10...12	1VMF170018P1
13,8...17,5	1VMF170019P1
20...24	1VMF170020P1

##### VIS with Separable Indicator for Current Transformers

Operating voltage [kV]	Type
6...7,2	1VMF170021P1
10...12	1VMF170022P1
13,8...17,5	1VMF170023P1
20...24	1VMF170024P1

# 5.12 UniSwitch

## Components & Accessories

### Relays

Protection and measurement				Relay				
Type of faults	IEEE device No.	IEC Symbol	Protection function	SPAJ 131	SPAJ 140	SPAJ 141	SPAJ 144	PR 512
Short circuits	51	3 I >	Non-directional overcurrent, low-set stage	X	X	X	X	X
	50/51/51B	3 I >>	Non-directional overcurrent, high-set stage	X	X	X	X	X
	50/51B		Non-directional overcurrent, instantaneous stage/blockable overcurrent <sup>(1)</sup>				X	
Earth fault	51N	lo / SEF	Non-directional earth-fault, low-set stage, coarse, I <sub>n</sub> = 1A and 5A		X		X	X
	51N	lo / SEF	Non-directional earth-fault, low-set stage, sensitive, I <sub>n</sub> = 0.2A and 1A (only DT operation)			X		
	50N / 51N	lo >> / lo-o >	Non-directional earth-fault, high-set stage		X	X	X	X
Additional functions	46	Δ I >	Phase discontinuity				X	
	62BF	CBFP	Circuit-breaker failure		X	X	X	
Type of measurement, current		3I / 2I	Three-phase / two-phase current	X	X	X	X	
		lo	Neutral current		X	X	X	
		Δ I	Degree of unbalance				X	

(1) e.g. busbar protection, protection of transformer LV-terminals

# 5.13

## UniSwitch

### Components & Accessories

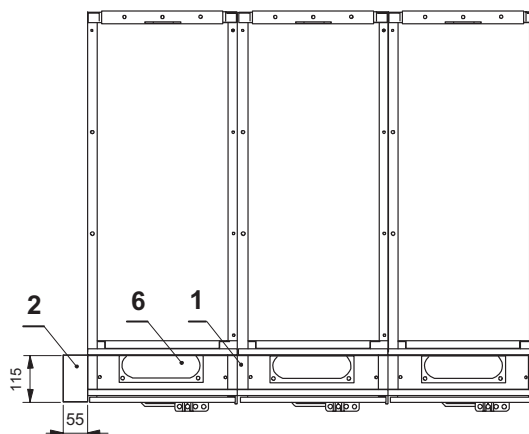
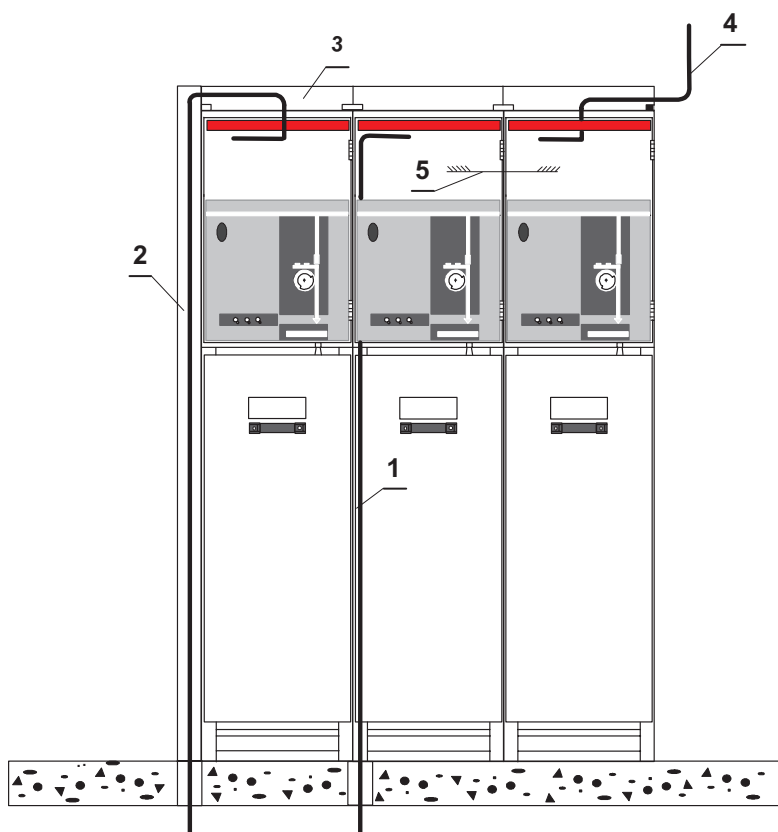
#### Control cable entries

In the basic cubicle the control cable entry is in the bottom (1). An internal cable duct 30 x 60 mm is supporting the cable from the bottom up to the upper part (TopUnit). Internal wiring between cubicles (5) is easily done through openings in side walls.

Several options are available (2, 3, 4, 6) for control cable inlet.

(2) At both ends of the switchgear, it is possible to have side ducts mounted.

(3) A duct can also be placed on top of the switchgear supporting cables coming from e.g. overhead cable ladder (s. 4).

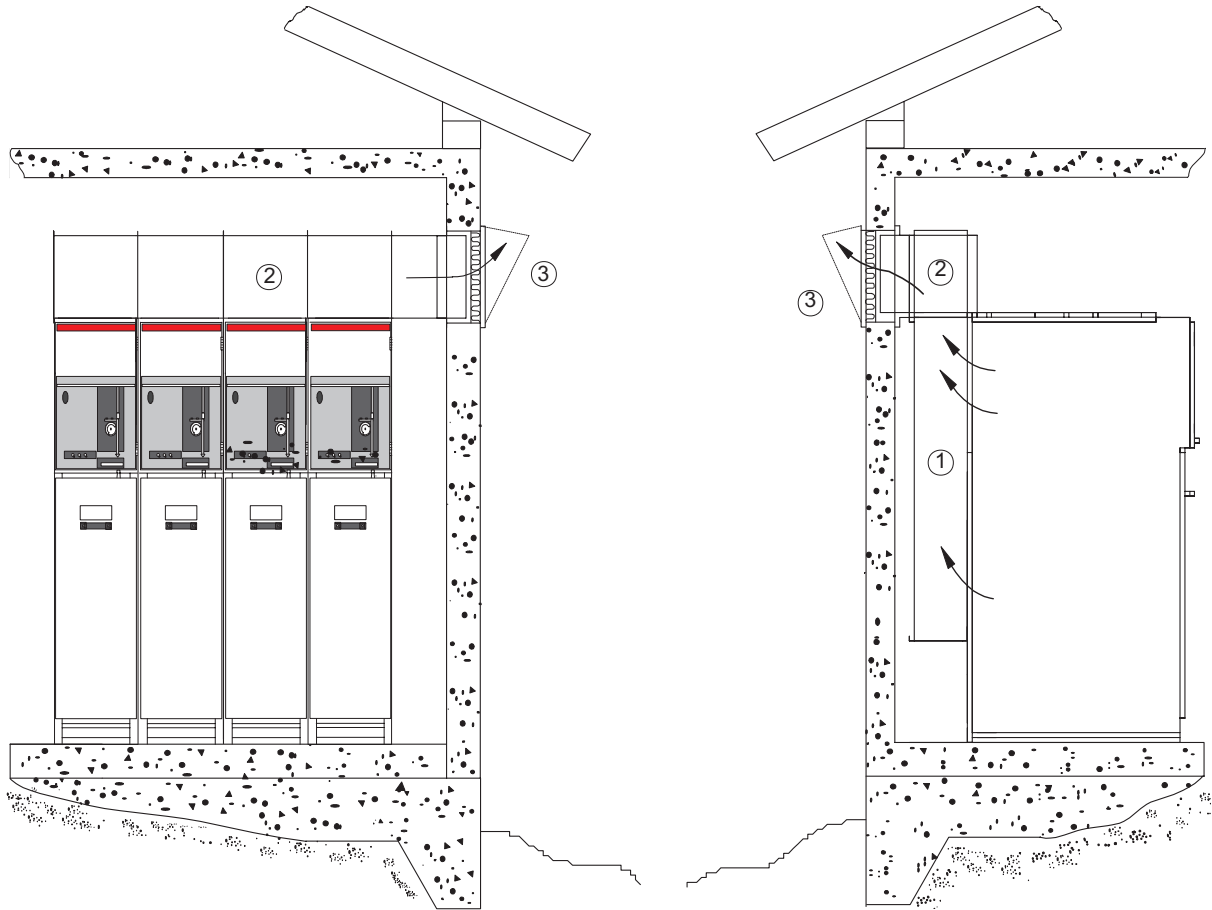


# 5.14

## UniSwitch

### Components & Accessories

#### Arc gas channel



To ventilate the arc-gas out in a certain direction, arc-gas channels are available for the UniSwitch system. Vertical channel (1) on the rear of each cubicle has been connected to a common horizontal channel (2) on the top of the switchgear. The horizontal channel has been connected to an opening (3) in the wall

of the switchgear room. The connecting point from channel (2) to the opening will be located in the rear or in the end of the top channel (2). The opening (3) has been equipped with in pressure relief flap.

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# 6. UniSwitch

## 6. Technical data / Dimensions

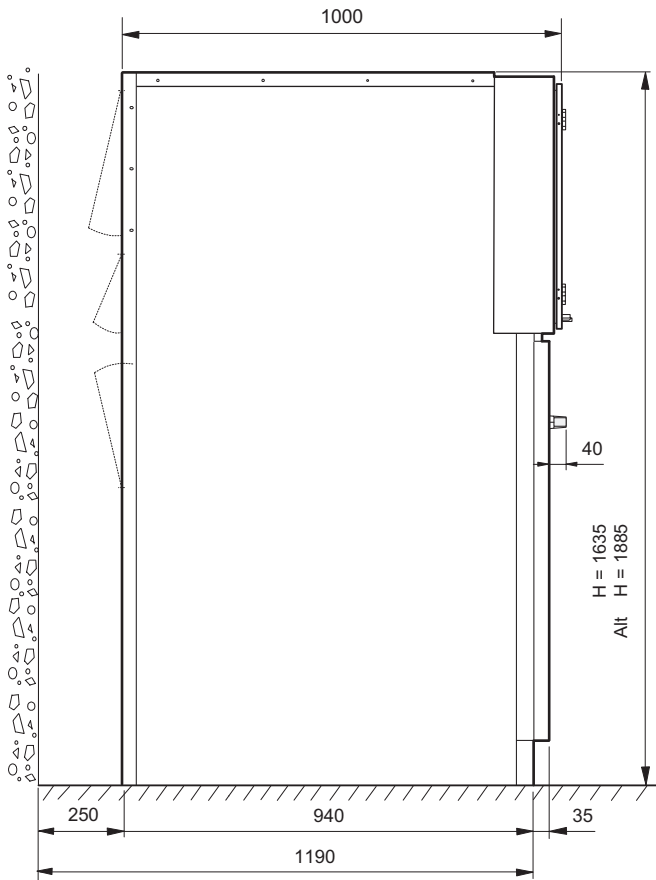
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6.1	Cubicle dimensions .....	40
6.2	Floor plan.....	41
6.3	Cable arrangement .....	42
6.4	Technical data / Dimensions.....	44

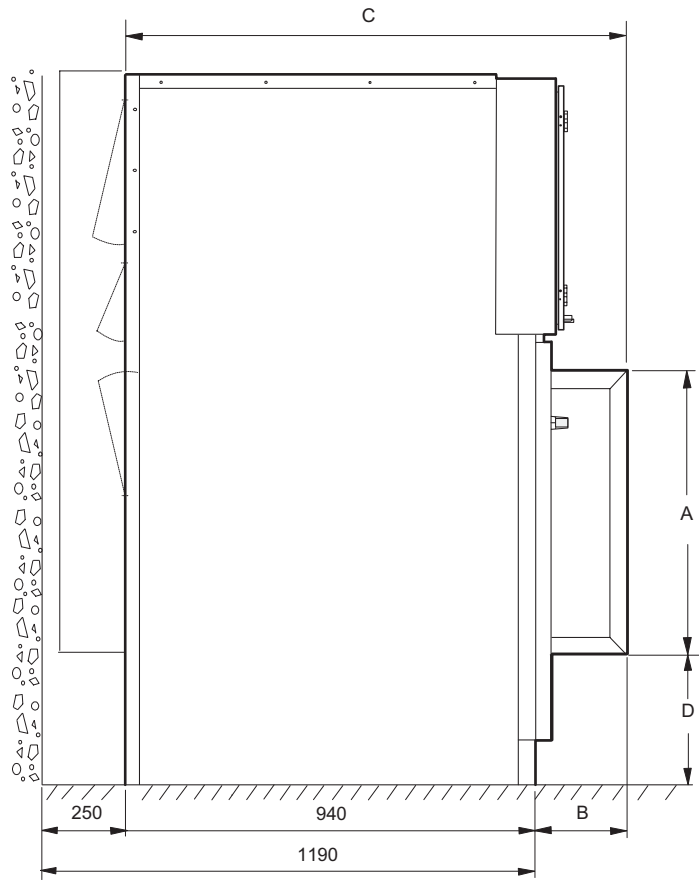
# 6.1 UniSwitch

## Technical data / Dimensions

### Cubicle dimensions



Main dimensions and the need of space of cubicles without circuit breaker and with arc gas channel



Main dimensions and the need of space of circuit breaker cubicle without arc channel

### Cubicle types:

SDC  
SDF  
DBC  
BRC  
SEC

### Cubicle types:

CBC  
SMC  
SEB

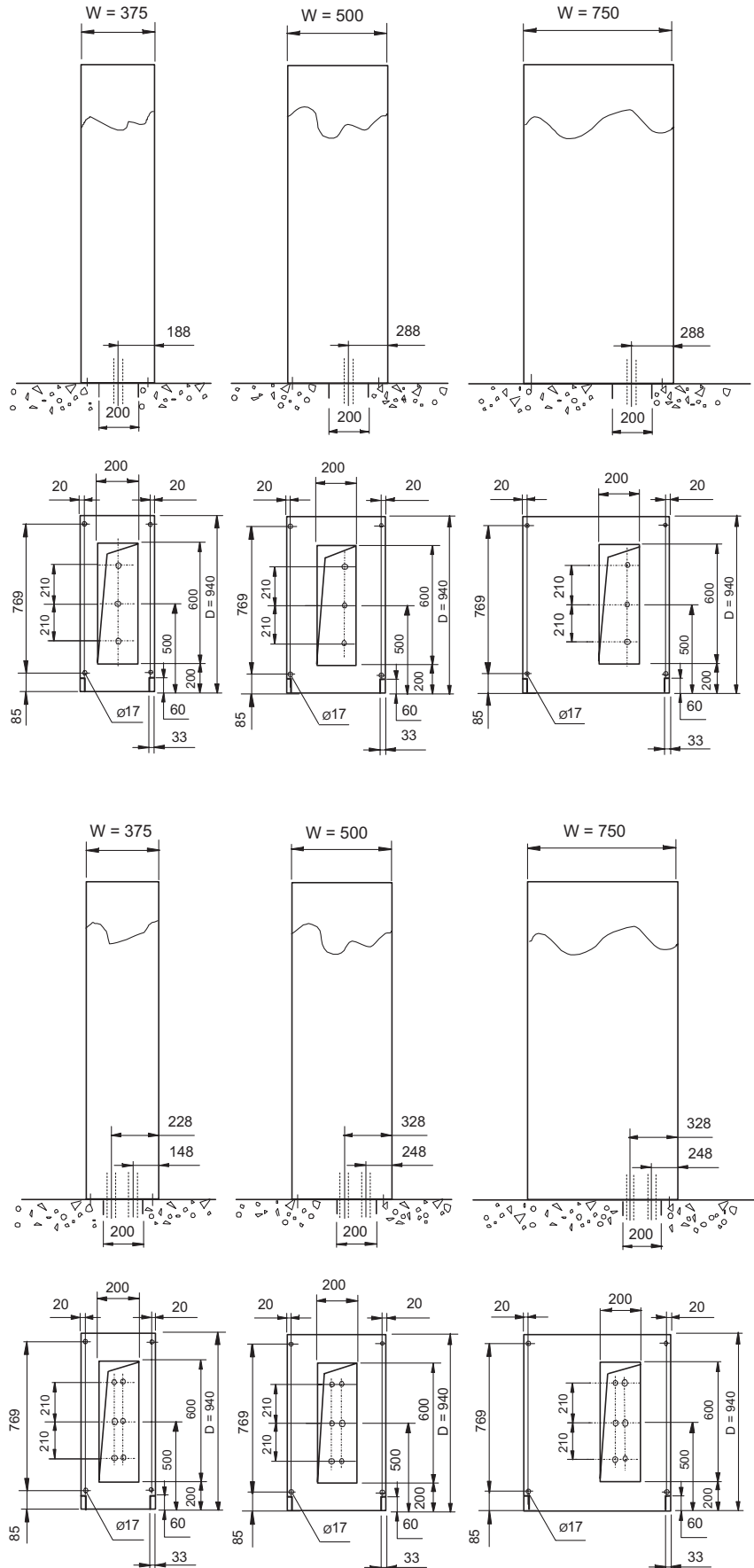
Circuit Breaker	A	B	C	D
HAD-US	652 mm	215 mm	1155 mm	230 mm by H=1635 480 mm by H=1885
VD4S	652 mm	195 mm	1135 mm	130 mm by H=1635 380 mm by H=1885



# 6.2 UniSwitch

## Technical data / Dimensions

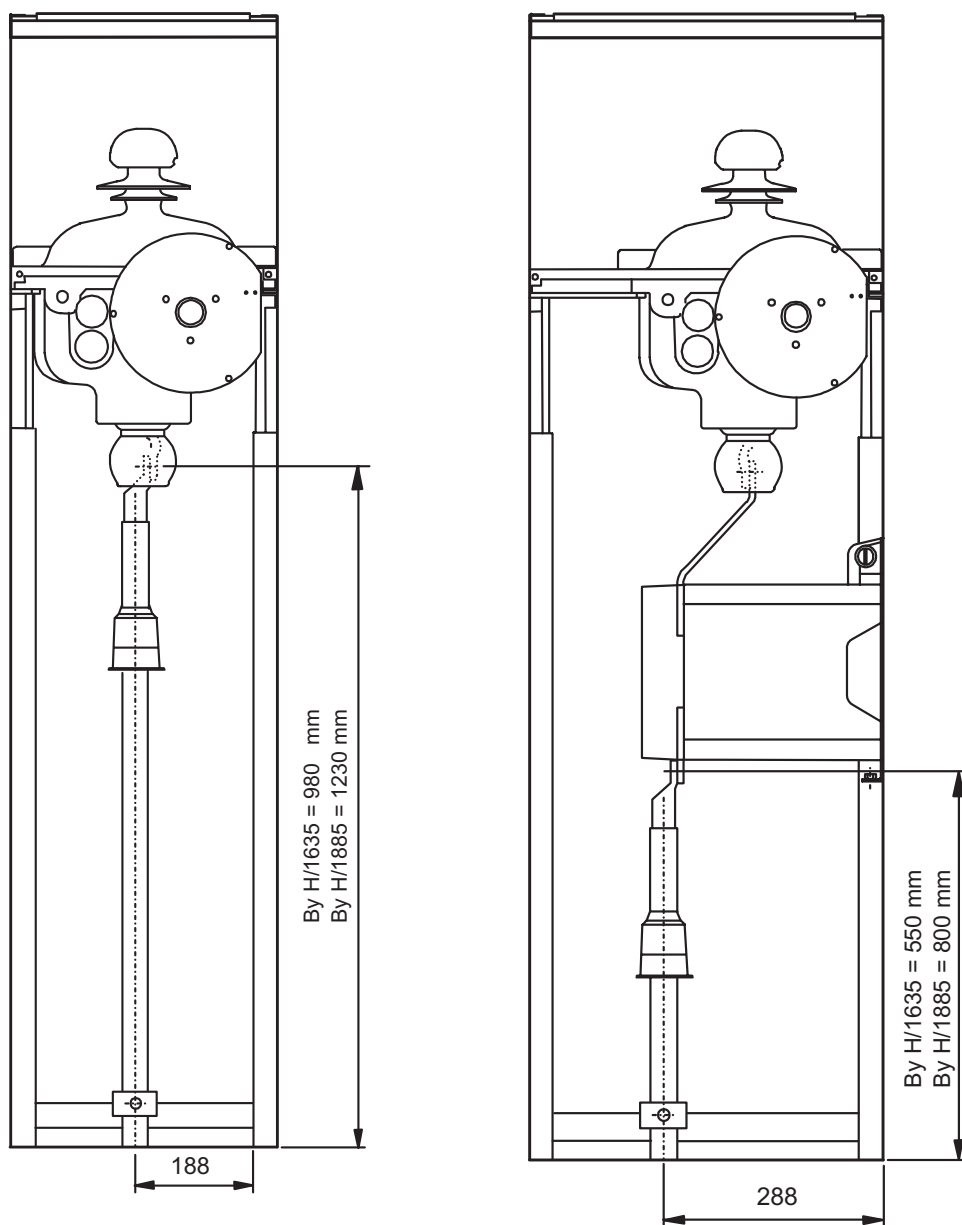
### Floor plan



# 6.3 UniSwitch

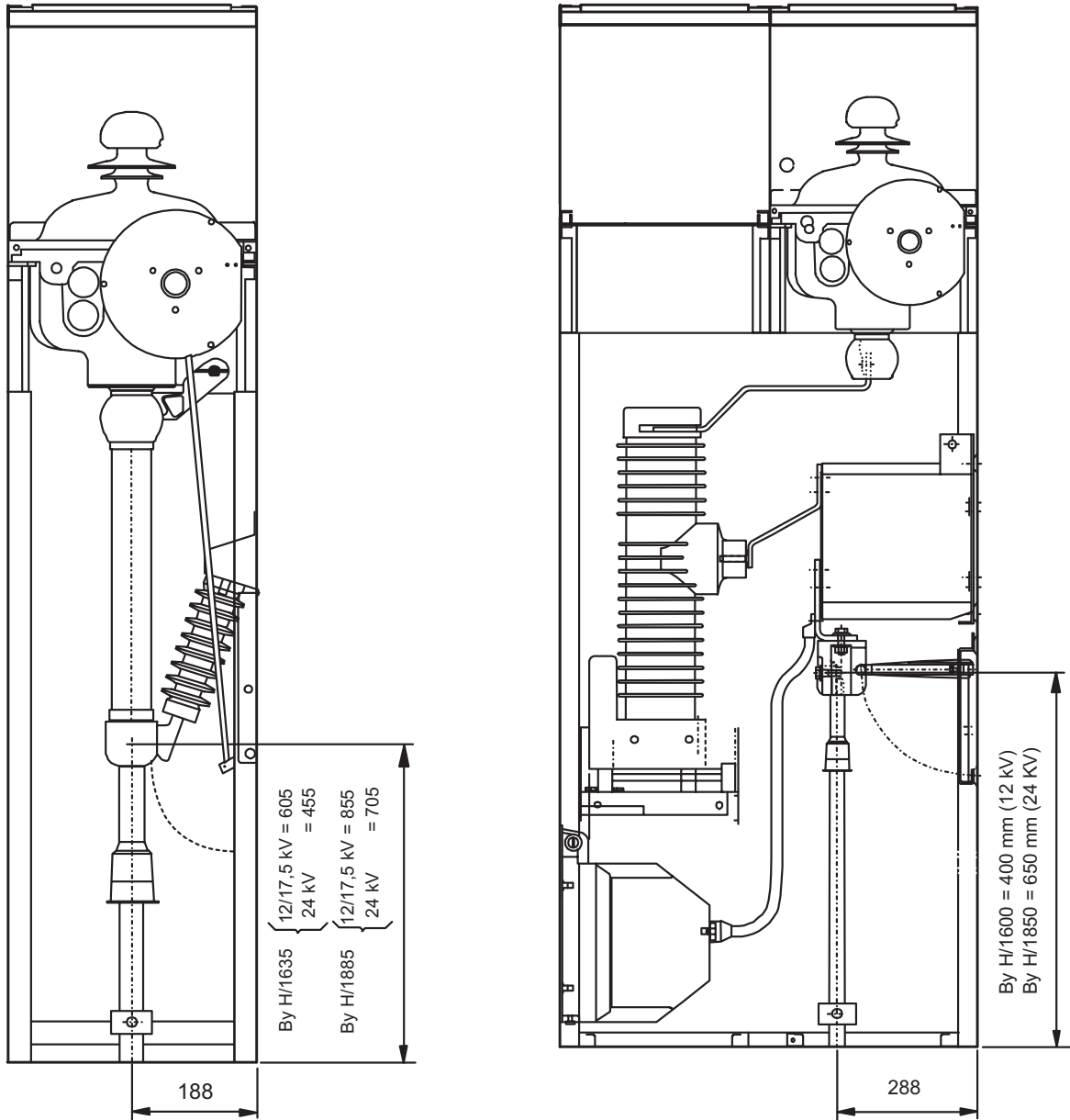
## Technical data / Dimensions

### Cable arrangement



Further information regarding cable arrangement is available in installation manual.

Cable arrangement



Further information regarding cable arrangement is available in installation manual.

# 6.4

## UniSwitch

### Technical data / Dimensions

#### Technical data

<b>Rated voltage <math>U_r</math></b>	<b>[kV]</b>	<b>12</b>	<b>17.5</b>	<b>24</b>
Rated lightning impulse withstand voltage $U_p$				
Common value	[kV]	75	95	125
Across the isolating distance		85	110	145
Rated short-duration power-frequency withstand voltage $U_d$				
Common value	[kV]	28 (1)	38 (1)	50
Across the isolating distance		32 (1)	45 (1)	60
Rated frequency	[Hz]	50/60	50/60	50/60
<b>Rated current <math>I_r</math></b>				
Busbar	[A]	630/1250	630/1250	630
Feeder		630	630	630
Rated short-time withstand current				
Main circuit	[kA]	25	20	20
Earthing circuit	[kA]	25	20	20
Rated duration of short circuit	[s]	1/2	1/3	1/3
Rated peak withstand current	[kA]	62,5	50	50
Arc-fault current, 1s	[kA]	20	20	20
Degree of protection (IP-code)				
For the enclosure		IP 3X	IP 3X	IP 3X
For the partitions		IP 2X	IP 2X	IP 2X
Mechanical endurance of switch c/o		5000	5000	5000
Mechanical endurance of earthing switch c/o		1000	1000	1000
Ambient temperature				
Maximum value	[°C]	+40	+40	+40
Maximum value of 24 h-mean		+35	+35	+35
Minimum value		-5	-5	-5 (3)
Altitude above sea level	[m]	≤1000 (2)	≤1000 (2)	≤1000 (2)

(1) Higher values in accordance with national standards on request

(2) Adjustment is necessary for greater altitudes

(3) Lower ambient temperature on request.

#### Dimensions

<b>Rated voltage <math>U_r</math></b>	<b>[kV]</b>	<b>12</b>	<b>17.5</b>	<b>24</b>
Width / circuit breaker cubicle	[mm]	750	750	750
Width / other cubicles	[mm]	375/500	375/500	375/500
Height	[mm]	1635/1885	1635/1885	1635/1885
Depth	[mm]	940+60	940+60	940+60
Height / LV-compartment	[mm]	450	450	450

### Tests and Certificates

Type test according to IEC 60298 and certificated by SATS

Routine test IEC 60298

Quality certificate ISO 9001

Environmental certificate ISO 14001.

### Weights (without packing)

Dimensions: (W x H mm)		SDC (1)	SDF (2)	CBC (3)	DBC (1)	SEC (1)	SEB (3)	BRC (1)	SMC (3)
- 375 x 1635	[kg]	130	140	-	110	140	-	140	-
- 375 x 1885	[kg]	140	150	-	120	150	-	150	-
- 500 x 1635	[kg]	140	150	-	120	150	-	150	-
- 500 x 1885	[kg]	150	160	-	130	160	-	160	-
- 750 x 1635	[kg]	-	-	420	-	-	420	-	440
- 750 x 1885	[kg]	-	-	440	-	-	440	-	460

Note: Circuit breaker belonging to breaker cubicle is delivered in a separate packing.

(1) without CT's and VT's

(2) without fuses

(3) without circuit breaker

Circuit breakers:

- VD4S 74 kg
- HAD-US 103 kg

Transformers:

- 12/17,5 kV approx. 25 kg
- 24 kV approx. 30 kg





# The UniSwitch production facilities in Vaasa, Finland



You are always welcome to visit us



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Information given in this publication is generally applicable to equipment described. Changes may be made in future without notice.