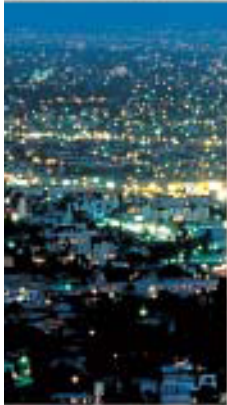


# Uniswitch Medium Voltage Switchgear

12, 17.5 and 24 kV  
630 and 1250 A



**ABB**

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# 1. Uniswitch Design Philosophy

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## 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. The standard cubicle is powder pointed light gray (RAL 7035) on visible parts.

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 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.

# 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  
Marine**

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



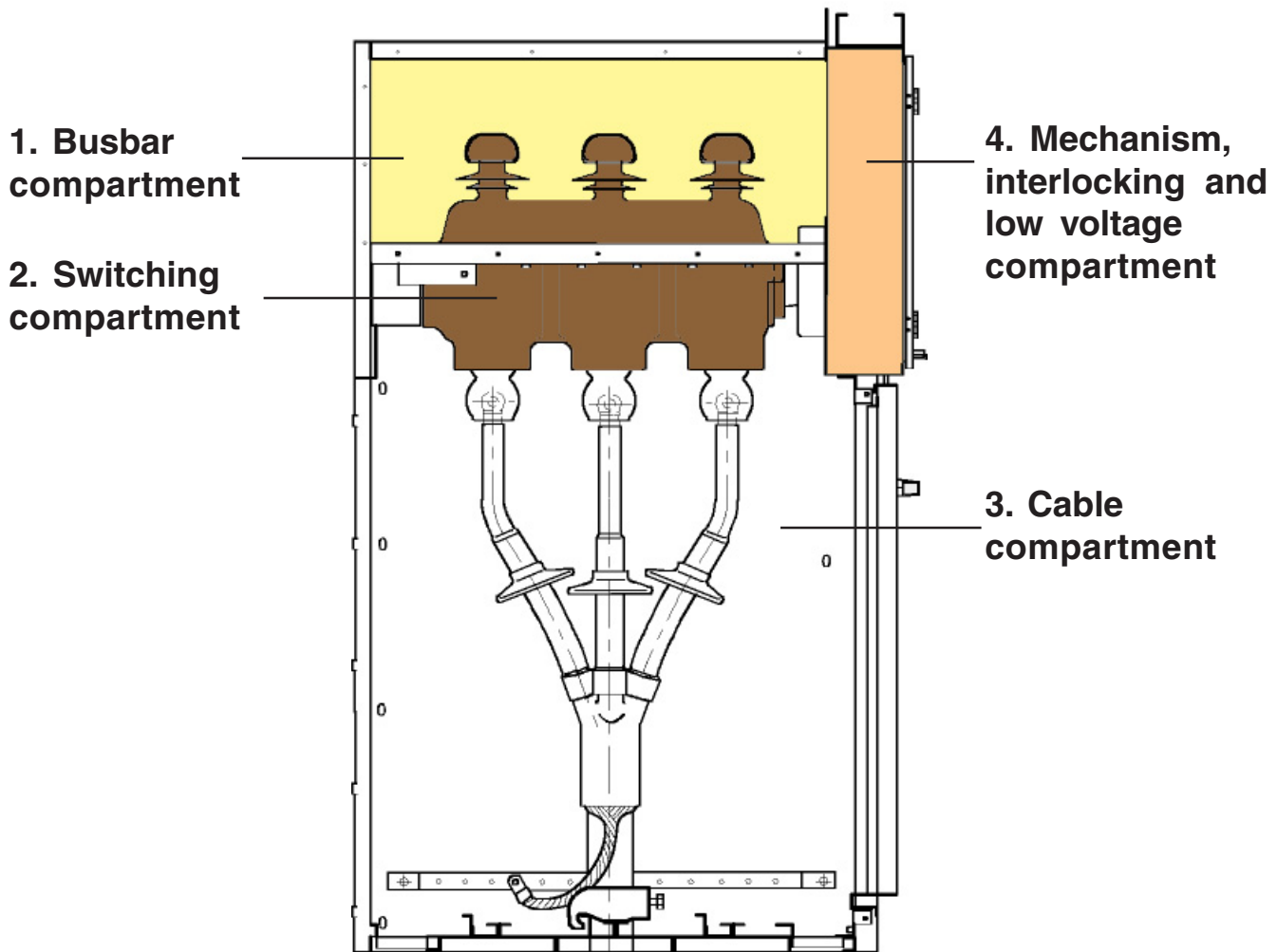
# 2. Applications

1. Airport
2. Utility
3. Hospital
4. Power Plants, Diesel/gas engine (built by Wärtsilä)
5. Industry
6. Windmills
7. Sports center (Botnia Hall, Vaasa)
8. Metro
9. Shopping center

# 3. Uniswitch

## Switchgear Construction

### Metal enclosed switchgear



#### 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 disconnecter with epoxy cast resin housing is provided with inspection windows and available also with gas density indicator.

#### 3. Cable compartment

75 % 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

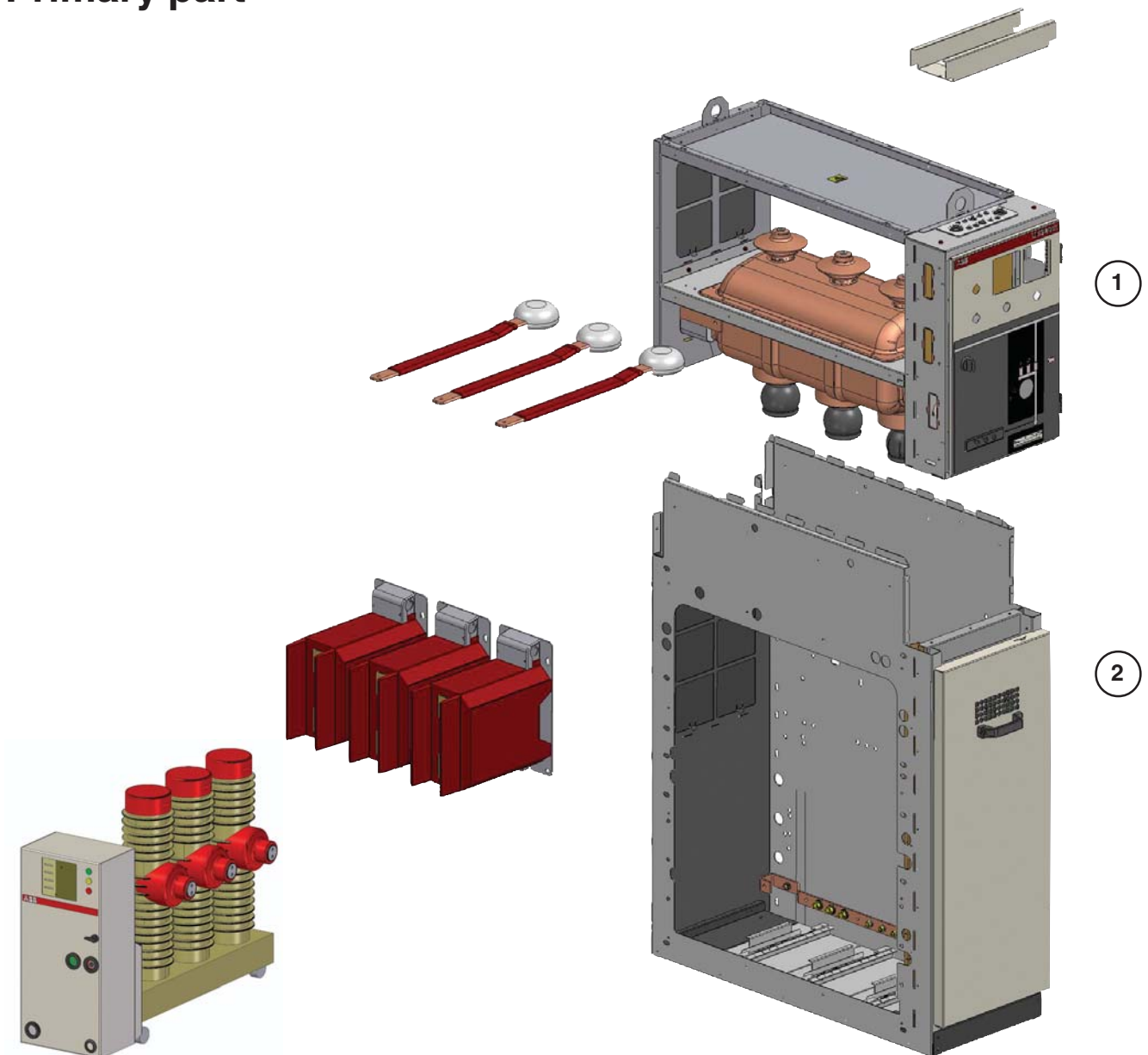
Behind a hinged door (which serves as control panel) are located the spring operating mechanism with position indicator and the mechanical interlocking unit. There are also facilities for cubicle accessories such as: auxiliary contacts, tripping coil, emergency tripping mechanism, capacitive voltage presence indicating system, 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 low voltage 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.

# Uniswitch

## Switchgear Construction

### Primary part



#### 1 Top unit

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

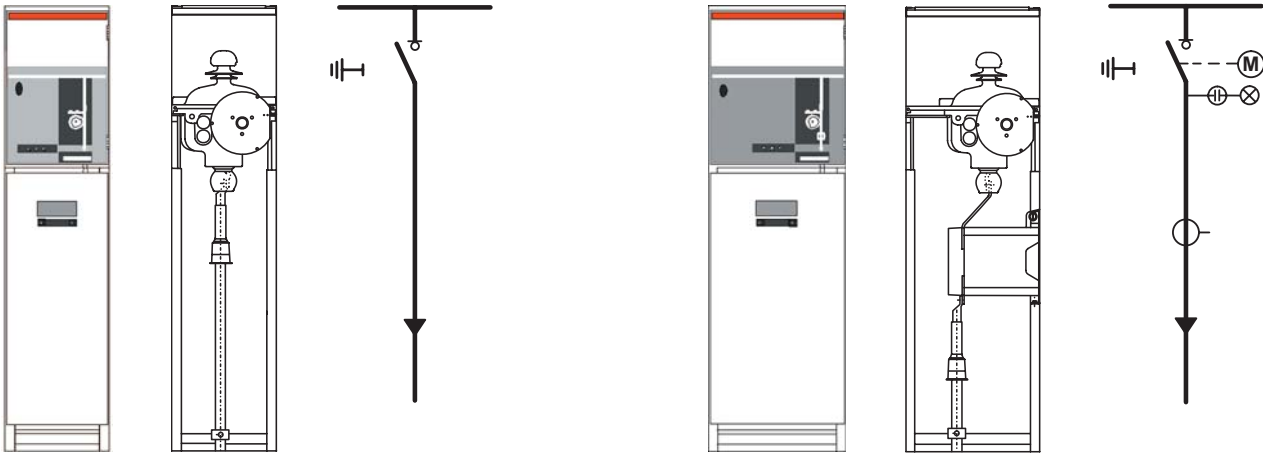
#### 2 Bottom unit

- Enclosure
- Circuit breaker (fixed version)
- Current transformers
- Earthing switches
- Voltage transformers
- Cable entry with cable support

# 4 Uniswitch

## Cubicle Types / Cubicle Program

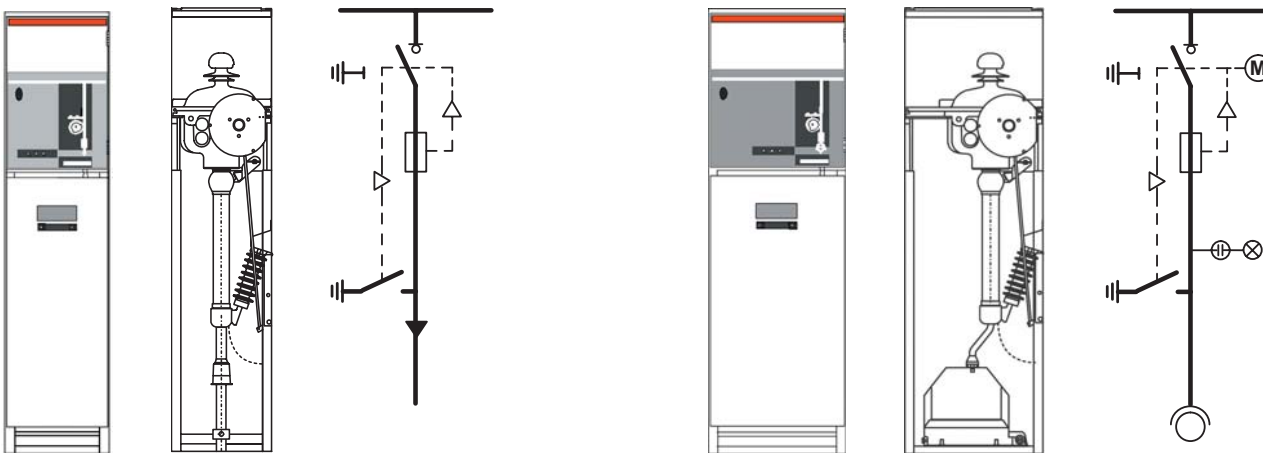
### Switch Disconnecter Cubicle, type SDC



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

Example: equipped with motor, current transformer, voltage indication

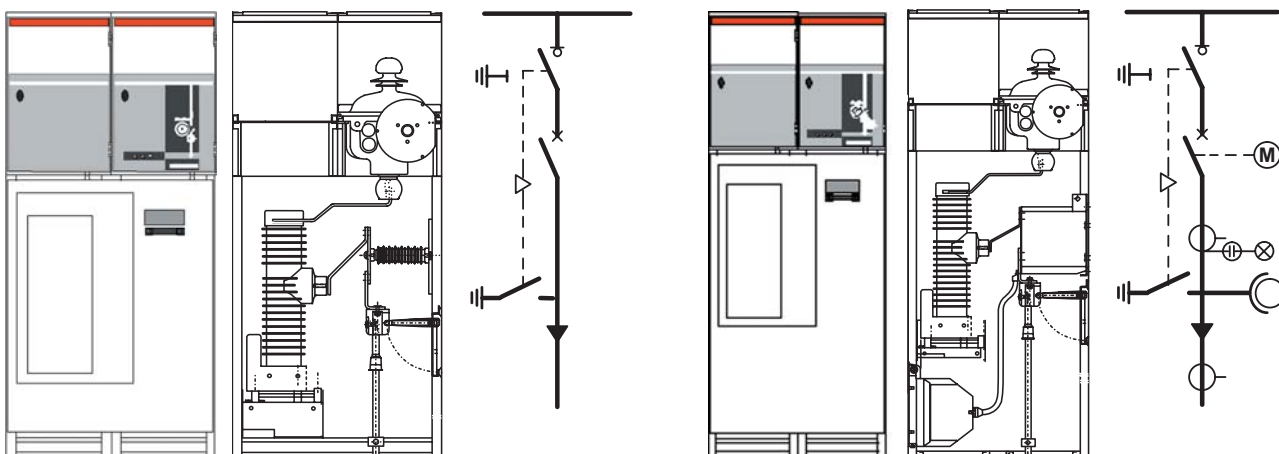
### Switch Disconnecter with Fuse, type SDF



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

Example: equipped with motor, voltage metering and indication

### Circuit Breaker Cubicle, type CBC



Width: 750 mm  
Height: 1635 or 1885 mm

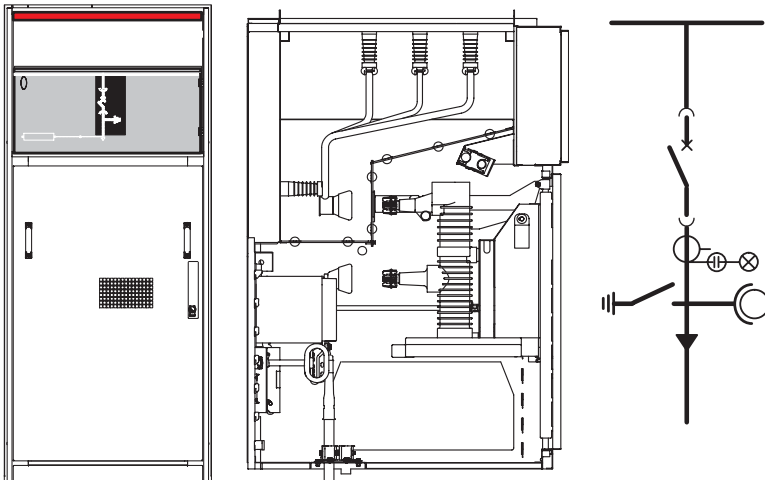
Example: equipped with motor, current and voltage transformers, voltage indication



# Uniswitch

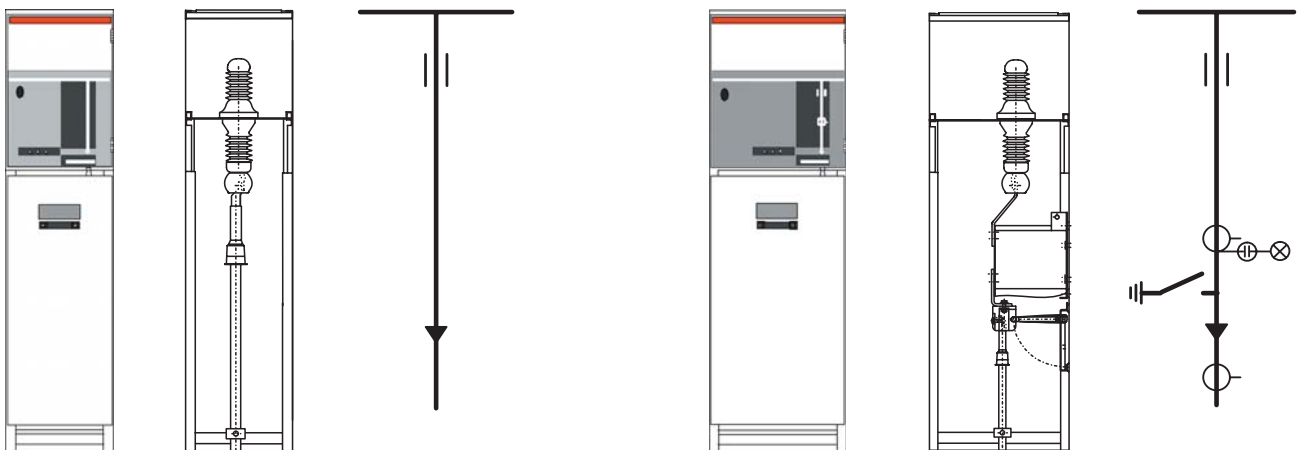
## Cubicle Types / Cubicle Program

### Withdrawable Circuit Breaker cubicle, type CBW



Width: 800 mm  
Height: 1885 mm

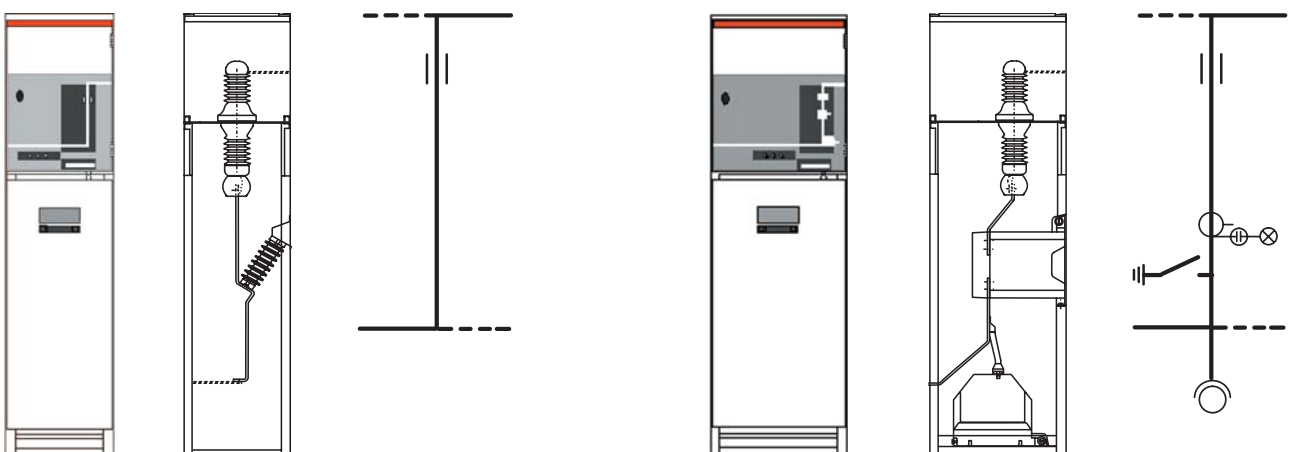
### Direct Busbar connection Cubicle, type DBC



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

Example: equipped with earthing switch, current transformers and voltage indication

### Bus Riser Cubicle, type BRC



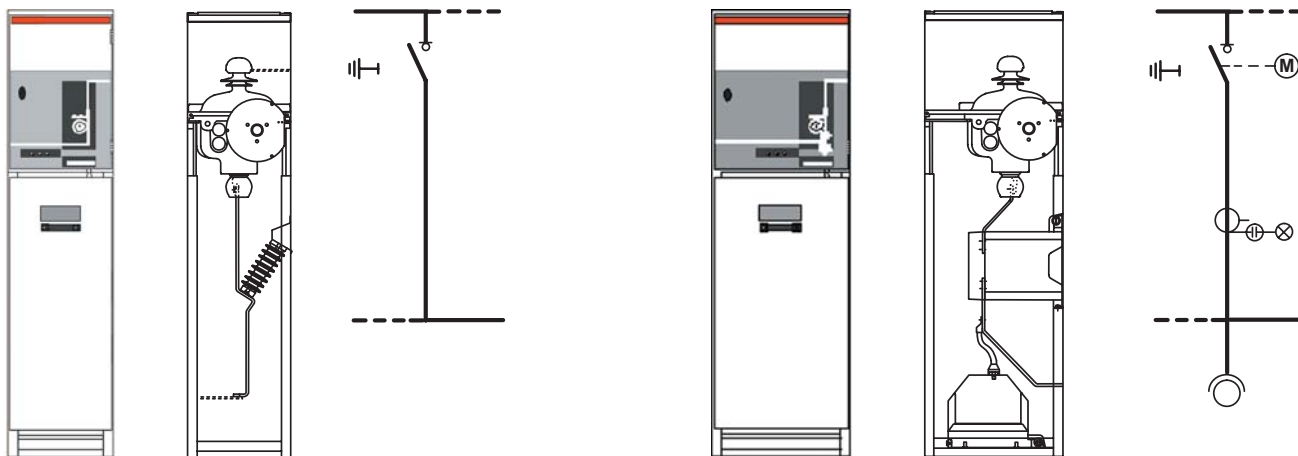
Width: 375 or 500 mm  
Height: 1635 or 1885 mm

Example: equipped with earthing switch, current and voltage transformers, voltage indication

# Uniswitch

## Cubicle Types / Cubicle Program

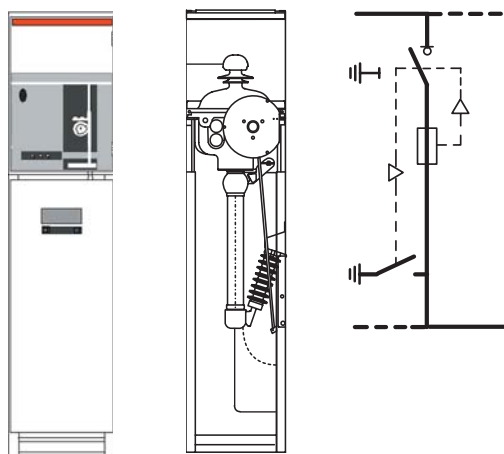
### Sectionalising Cubicle, type SEC



Width: 375, 500 or 750 mm  
Height: 1635 or 1885 mm

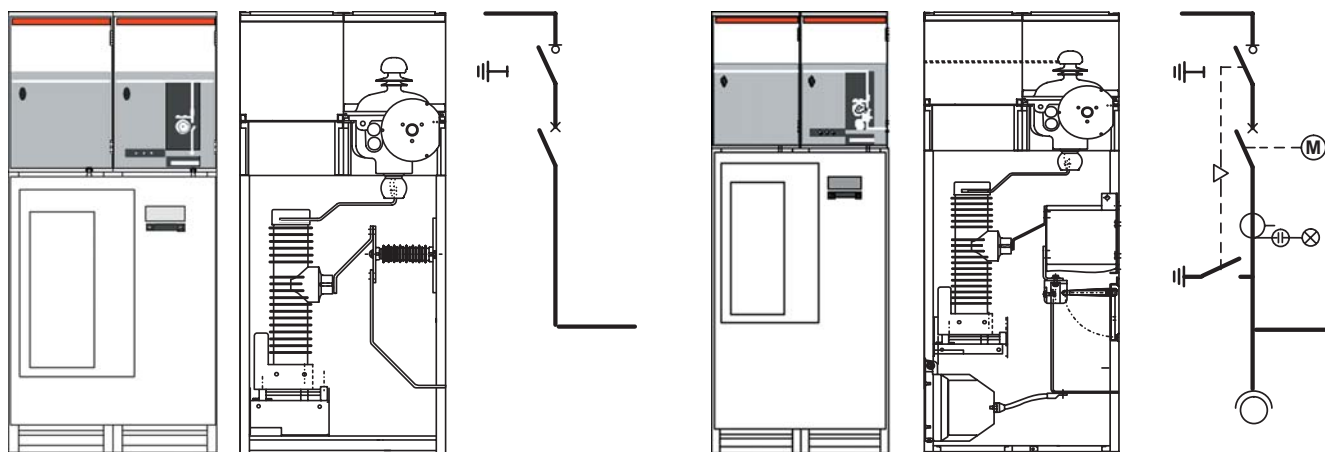
Example: equipped with motor operation, current and voltage transformers, voltage indication

### Sectionalising cubicle with Fuse, type SEF



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

### Sectionalising Breaker Cubicle, type SBC



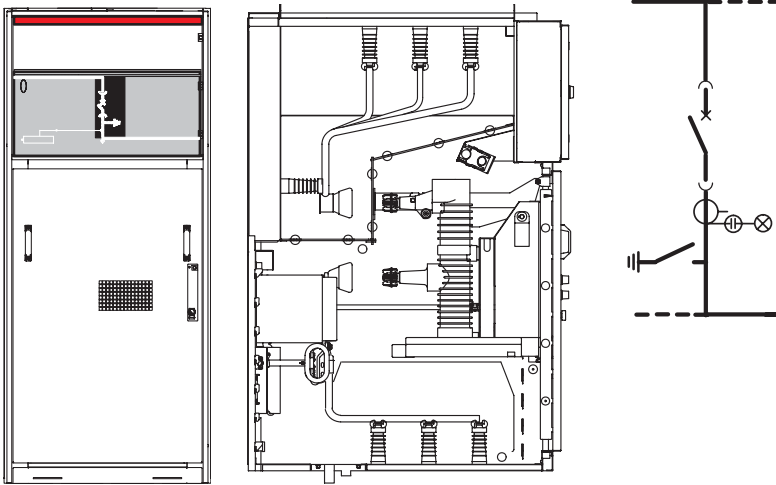
Width: 750 mm  
Height: 1635 or 1885 mm

Example: equipped with motor operated CB, current and voltage transformers, second earthing switch, voltage metering

# Uniswitch

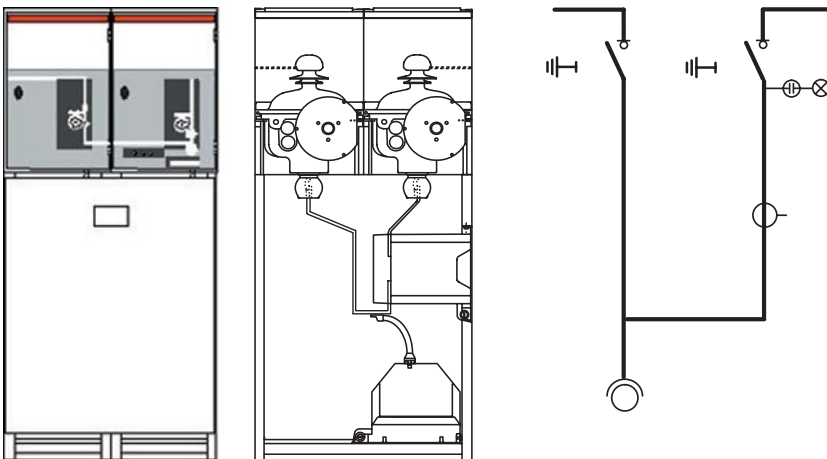
## Cubicle Types / Cubicle Program

### Sectionalising Withdrawable Breaker cubicle, type SBW



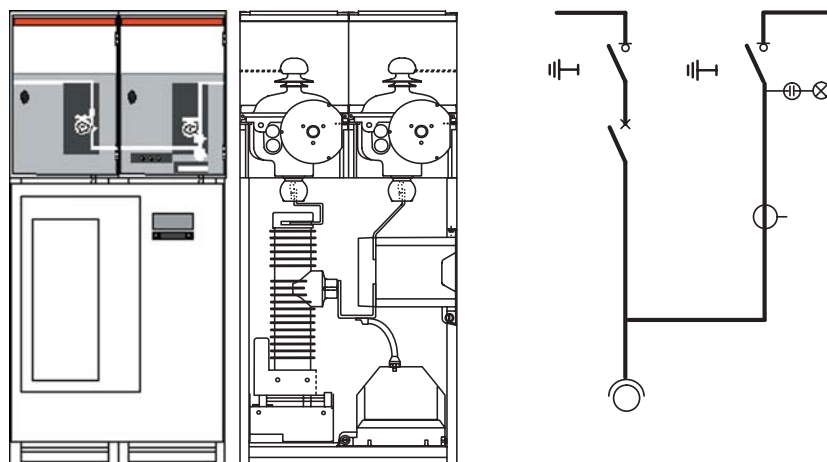
Width: 800 mm  
Height: 1885 mm

### Sectionalising Metering cubicle with Disconnecter, type SMD



Width: 750 mm  
Height: 1635 or 1885 mm

### Sectionalising Metering Cubicle, type SMC

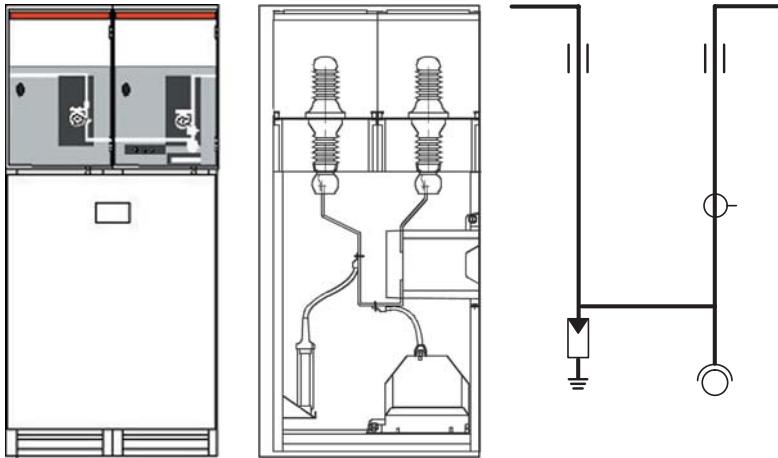


Width: 750 mm  
Height: 1635 or 1885 mm

## Uniswitch

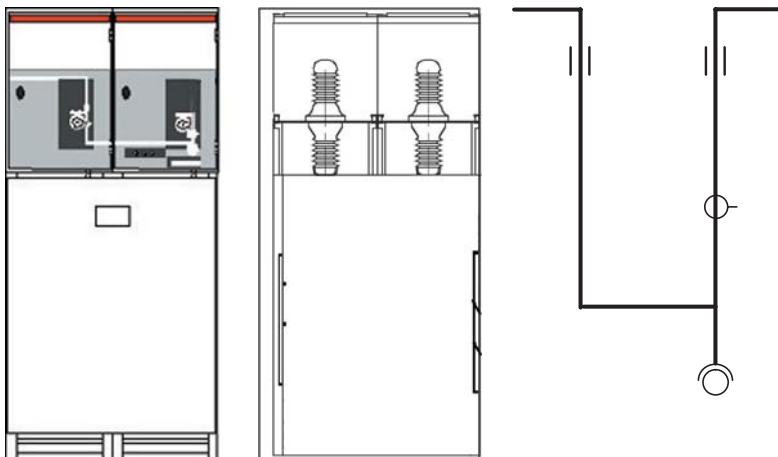
# Cubicle Types / Cubicle Program

### Bus Metering Cubicle, type BMC



Width: 750 mm  
Height: 1635 or 1885 mm

### Universal Metering Cubicle, type UMC



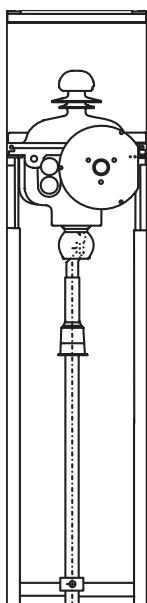
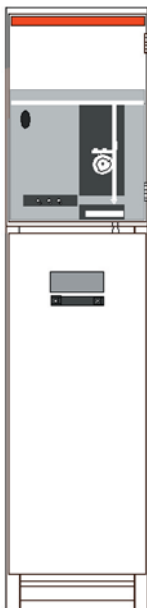
Width: 750 mm  
Height: 1635 or 1885 mm

Prepared for mounting of universal instrument transformers,  
busbars on request



# 4.1 Uniswitch

## Cubicle Types



### Switch Disconnecter Cubicle, type SDC

Switch disconnecter 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 disconnecter type SFG with its operation mechanism. The 3-position switch disconnecter 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. "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 disconnecter
  - 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

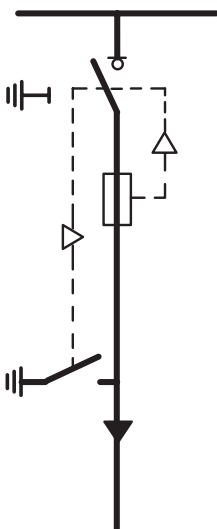
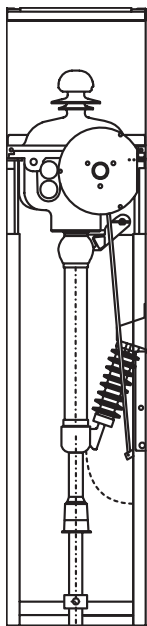
- integrated voltage indicators or socket interface for portable indicators
- auxiliary contacts for close (2NO+2NC) and earth (2NO+2NC) position
- gas density indication with alarm contact
- motor operation device
- current transformers
- arc-gas channel
- channel for control cables
- surge arresters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

#### Technical Data SDC

Rated voltage	[kV]	12	17,5	24
Rated current	[A]	630/800	630/800	630
Rated short-time withstand current	[kA]	25	20	20
Max. rated duration of short circuit	[s]	1	1	1
Cubicle dimensions				
- width	[mm]	375/500	375/500	375/500
- depth	[mm]	1000	1000	1000
- height	[mm]	1635/1885	1635/1885	1635/1885

# 4.2 Uniswitch Cubicle Types

## Switch Disconnecter cubicle with Fuse, type SDF



Fused switch disconnecter cubicle type SDF, is primarily used for transformer protection voltage metering. The cubicle is equipped with a SF6-insulated, 3-position switch disconnecter 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. "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

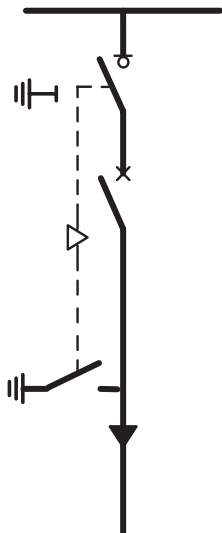
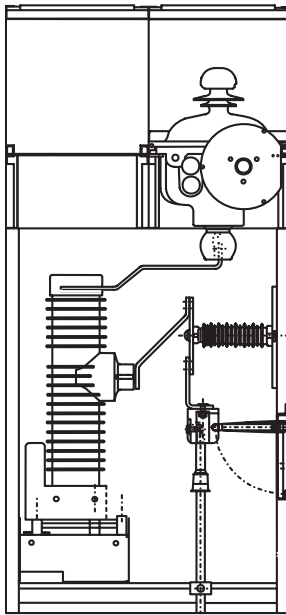
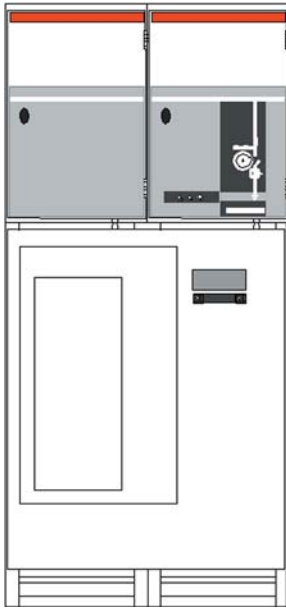
### Cubicle Accessories

- integrated voltage indicators or socket interface for portable indicators
- auxiliary contacts for close (2NO+2NC) and earth (2NO+2NC) position
- auxiliary contacts for fuse tripped, 1NO+1NC
- 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

### Technical 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
Max. rated duration of short circuit	[s]	1	1	1
Fuse length	[mm]	292/442	292/442	442
Cubicle dimensions				
- width	[mm]	375/500	375/500	375/500
- depth	[mm]	1000	1000	1000
- height	[mm]	1635/1885	1635/1885	1635/1885
Cable shoe, max. width	[mm]	30	30	30

# 4.3 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-gas circuit breaker. The breaker is rail mounted and fixed to the busbars. To achieve the disconnecting function a 3-position switch disconnecter with an earthing switch is mounted between the breaker and busbars.

The door is mechanically interlocked with the switch disconnecter's earthing position to provide personal safety. The cubicle is designed to be equipped with CTs and VTs (Standard DIN size, see item 5.10).

### Basic equipment

- Top unit on right hand side, including
- 3-position switch disconnecter
  - 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

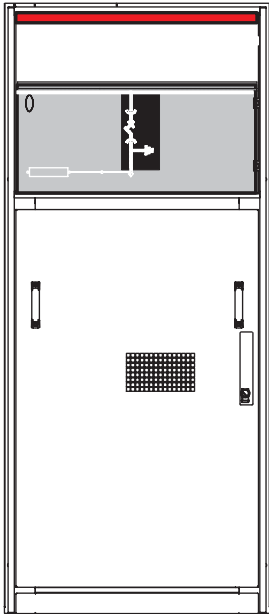
- circuit breaker, vacuum- or SF6-type
- integrated voltage indicators or socket interface for portable indicators
- current transformers
- voltage transformers
- cable core transformer
- auxiliary contacts for close (2NO+2NC) and earth (2NO+2NC) position
- gas density indication with alarm contact for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

### Technical Data CBC

Rated voltage	[kV]	12	17,5	24
Rated current	[A]	630/800	630/800	630
Rated short-time withstand current	[kA]	25	20	20
Max. rated duration of short circuit	[s]	1	1	1
Cubicle dimensions				
- width	[mm]	750	750	750
- depth	[mm]	940+215	940+215	940+215
- height	[mm]	1635/1885	1635/1885	1635/1885

# 4.4 Uniswitch

## Cubicle Types

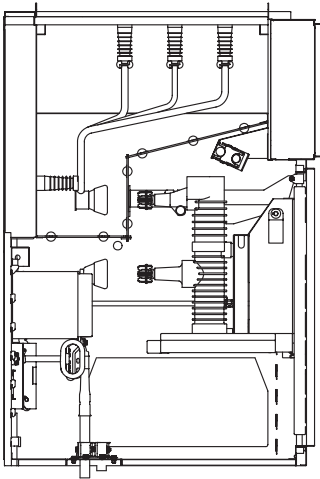


### Withdrawable Circuit Breaker cubicle, type CBW

The CBW panel is a circuit breaker panel with a withdrawable circuit breaker. The circuit breaker cubicle is designed for control and protection of distribution lines, networks, motors, transformers, capacitor banks, etc. The cubicle is available with either vacuum or SF6-gas circuit breaker. The CB truck handles the disconnecting function of the circuit breaker. A separate earthing switch enables earthing of the cables.

The door is mechanically interlocked with the circuit breaker and the earthing switch to provide personnel safety.

A wide range of secondary control & protection equipment is available for the cubicle, from the simplest self-powered protection relays to complicated protection, monitoring and controlling devices.

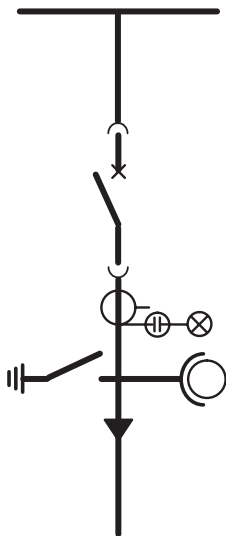


#### Basic equipment

- Basic cubicle, including
- metal enclosed Alu-zinc steel cubicle enclosure with integrated rear-mounted arc gas channel
  - busbars
  - non-metallic partitioning and shutter
  - low voltage compartment for secondary components
  - withdrawable circuit breaker, vacuum- or SF6-type, including interlocked LV cable plug
  - earthing switch, including interlocked operation device
  - cable entry with cable support

#### Cubicle Accessories

- integrated voltage indicators or socket interface for portable indicators
- current transformers
- voltage transformers or surge arresters
- cable core transformer
- additional auxiliary contacts
- channel for control cables
- anti condensation heater
- through-going earthing bar
- apparatus earthing bar
- electrical position indication
- electrical interlocking of earthing switch
- electrical interlocking of truck

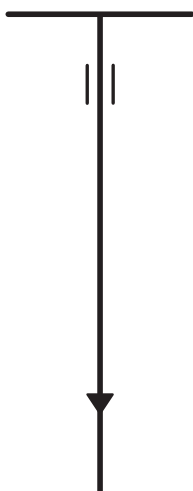
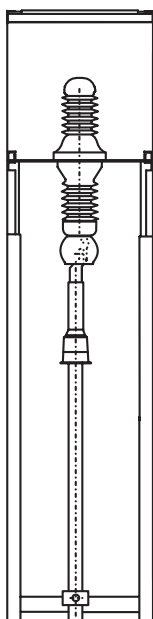
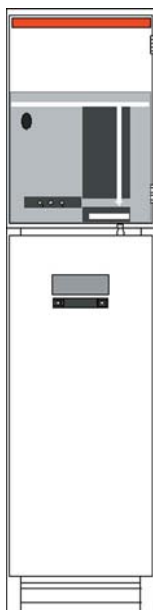


#### Technical Data CBW

Rated voltage	[kV]	12	17,5	24
Rated current, busbars	[A]	1250	1250	1250
Rated current, circuit breaker	[A]	630 / 1250	630 / 1250	630 / 1250
Rated short-time withstand current	[kA]	25	20	20
Max. rated duration of short circuit	[s]	1	1	1
Cubicle dimensions				
- width	[mm]	800	800	800
- depth	[mm]	1335	1335	1335
- height	[mm]	1885	1885	1885



# 4.5 Uniswitch Cubicle Types



## Direct Busbar connection 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 lower front door is fixed and can only be opened with a tool when earthing switch is not included. The door has a window for inspection.

### Basic equipment

- Top unit, including
- bushings
  - 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 or VT mounting bracket

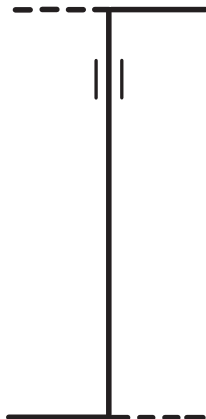
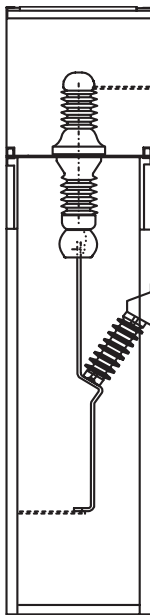
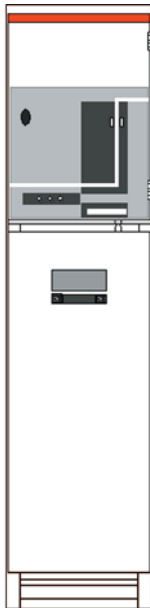
### Cubicle Accessories

- 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

### Technical Data DBC

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
Max. rated duration of short circuit	[s]	1	1	1
Cubicle dimensions				
- width	[mm]	375/500	375/500	375/500
- depth	[mm]	1000	1000	1000
- height	[mm]	1635/1885	1635/1885	1635/1885

# 4.6 Uniswitch Cubicle Types



## Bus Riser Cubicle, type BRC

Bus riser cubicle, type BRC, connects the busbar to the bottom of a sectionalising 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 lower front door is fixed to the cubicle and has to be released with a tool. The door has a window for inspection.

### Basic equipment

- Top unit, including
- bushings
  - enclosure of busbar compartment
  - integrated low voltage compartment
  - busbars
  - earthing bar

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

### Cubicle Accessories

- integrated voltage indicators or socket interface for portable indicators
- 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

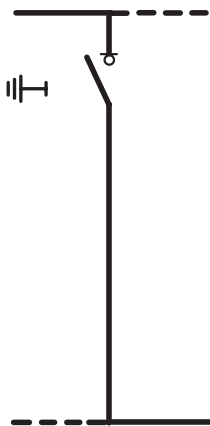
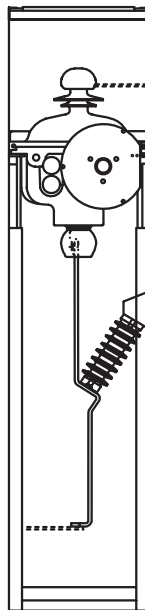
### Technical Data BRC

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
Max. rated duration of short circuit	[s]	1	1	1
Cubicle dimensions				
- width	[mm]	375/500	375/500	375/500
- depth	[mm]	1000	1000	1000
- height	[mm]	1635/1885	1635/1885	1635/1885

# 4.7 Uniswitch Cubicle Types

## Sectionalising Cubicle, type SEC

The sectionalising 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 disconnecter for sectionalising the busbars. Earthing facility is provided always as a standard.



### Basic equipment

Top unit, including

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

Bottom unit, including

- enclosure with sectionalising busbars
- bottom cover

### Cubicle Accessories

- integrated voltage indicators or socket interface for portable indicators
- auxiliary contacts for close (2NO+2NC) and earth (2NO+2NC) position
- 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
- voltage transformers

### Technical Data SEC

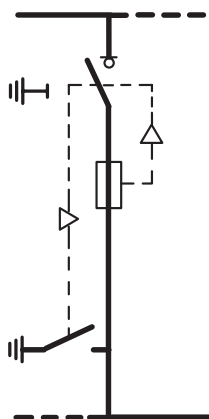
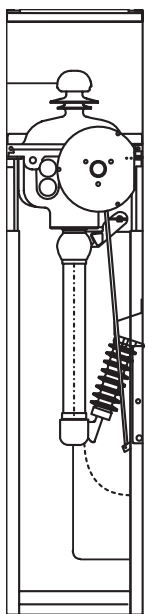
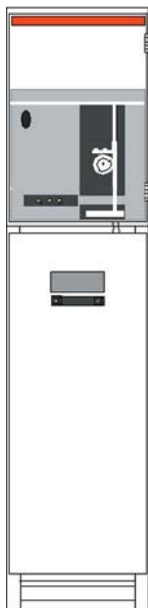
Rated voltage	[kV]	12	17,5	24
Rated current	[A]	630/800	630/800	630
Rated short-time withstand current	[kA]	25	20	20
Max. rated duration of short circuit	[s]	1	1	1
Cubicle dimensions				
- width	[mm]	375/500/750	375/500/750	375/500/750
- depth	[mm]	1000	1000	1000
- height	[mm]	1635/1885	1635/1885	1635/1885

# 4.8 Uniswitch Cubicle Types

## Sectionalising cubicle with Fuse, type SEF

The cubicle type SEF is used when a sectionalising cubicle with fuse protection is needed, or if there is a requirement for measuring on the transformer feeder. 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 only possible in earthed-position. A visible check of the "open" and "earthed" positions is available through inspection windows placed in the low voltage compartment. Busbar connections to both left and right are possible.



### Basic equipment

Top unit, including

- 3-position switch disconnecter
- 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

### Cubicle Accessories

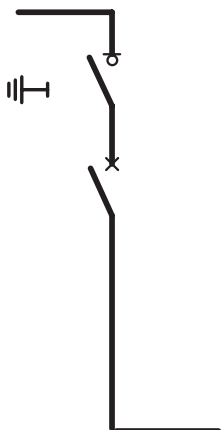
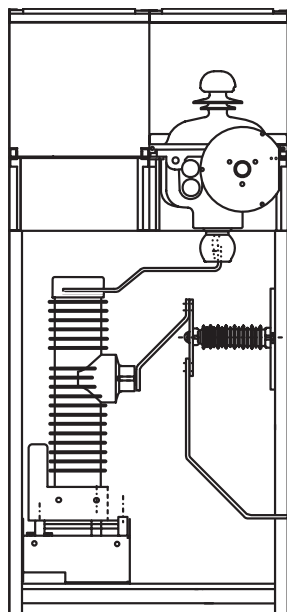
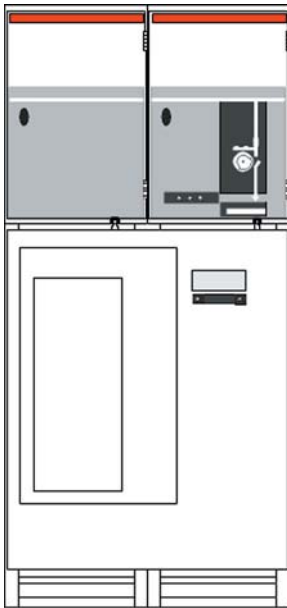
- integrated voltage indicators or socket interface for portable indicators
- auxiliary contacts for close (2NO+2NC) and earth (2NO+2NC) position
- auxiliary contacts for fuse tripped, 1NO+1NC
- gas density indication with alarm contact
- emergency tripping
- tripping coil
- motor operation device
- arc-gas channel
- channel for control cables
- anti condensation heater
- through-going earthing bar
- apparatus earthing bar

### Technical Data SEF

Rated voltage	[kV]	12	17,5	24
Rated current (max. fuse)	[A]	125	100	80
Rated short-time withstand current	[kA]	25	20	20
Max. rated duration of short circuit	[s]	1	1	1
Fuse length	[mm]	292/442	292/442	442
Cubicle dimensions				
- width	[mm]	375/500	375/500	375/500
- depth	[mm]	1000	1000	1000
- height	[mm]	1635/1885	1635/1885	1635/1885



# 4.9 Uniswitch Cubicle Types



## Sectionalising Breaker Cubicle, type SBC

Sectionalising breaker cubicle is 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 sectionalising the busbar. The cubicle is equipped with a vacuum or a SF6-gas 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

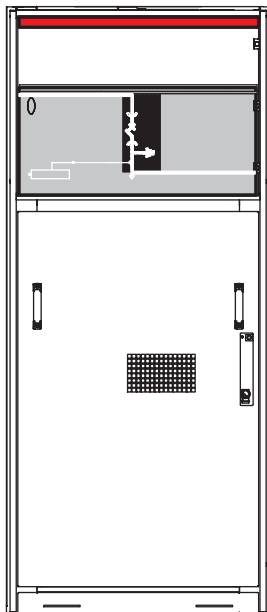
- circuit breaker, vacuum- or SF6-type
- integrated voltage indicators or socket interface for portable indicators
- current transformers
- voltage transformers
- auxiliary contacts for close (2NO+2NC) and earth (2NO+2NC) position
- gas density indication with alarm contact for switch disconnector
-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

### Technical Data SBC

Rated voltage	[kV]	12	17,5	24
Rated current	[A]	630/800	630/800	630
Rated short-time withstand current	[kA]	25	20	20
Max. rated duration of short circuit	[s]	1	1	1
Cubicle dimensions				
- width	[mm]	750	750	750
- depth	[mm]	1155	1155	1155
- height	[mm]	1635/1885	1635/1885	1635/1885

# 4.10 Uniswitch

## Cubicle Types

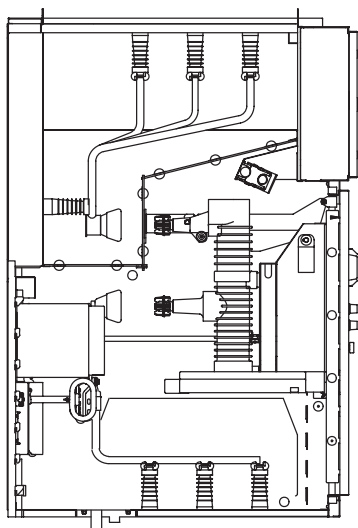


### Sectionalising Withdrawable Breaker cubicle, type SBW

The SBW panel is a sectionalising circuit breaker panel with a withdrawable circuit breaker. The SBW is used together with the bus riser cubicle (BRC). The cubicle is designed for sectionalising the busbar in the switchgear. It is available with either vacuum or SF6-gas circuit breaker. The CB truck handles the disconnecting function of the circuit breaker. A separate earthing switch enables earthing of the busbar.

The door is mechanically interlocked with the circuit breaker and the earthing switch to provide personnel safety.

A wide range of secondary control & protection equipment is available for the cubicle, from the simplest self-powered protection relays to complicated protection, monitoring and controlling devices.

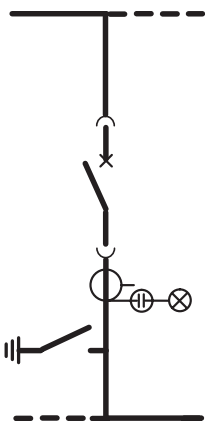


#### Basic equipment

- Basic cubicle, including
- metal enclosed Alu-zinc steel cubicle enclosure with integrated rear-mounted arc gas channel
  - busbars
  - non-metallic partitioning and shutter
  - low voltage compartment for secondary components
  - withdrawable circuit breaker, vacuum- or SF6-type, including interlocked LV cable plug
  - earthing switch, including interlocked operation device

#### Cubicle Accessories

- integrated voltage indicators or socket interface for portable indicators
- current transformers
- additional auxiliary contacts
- channel for control cables
- anti condensation heater
- through-going earthing bar
- apparatus earthing bar



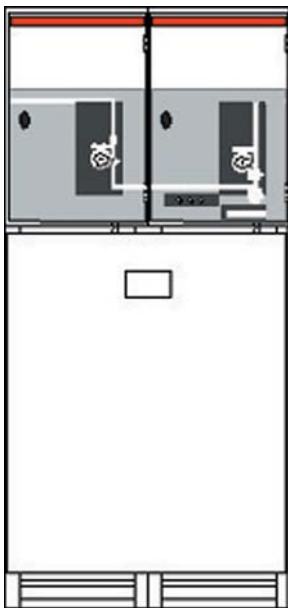
#### Technical Data SBW

Rated voltage	[kV]	12	17,5	24
Rated current, busbars	[A]	1250	1250	1250
Rated current, circuit breaker	[A]	630 / 1250	630 / 1250	630 / 1250
Rated short-time withstand current	[kA]	25	20	20
Max. rated duration of short circuit	[s]	1	1	1
Cubicle dimensions				
- width	[mm]	800	800	800
- depth	[mm]	1335	1335	1335
- height	[mm]	1885 1)	1885 1)	1885 1)

1) 1905 with cable channel

# 4.11 Uniswitch

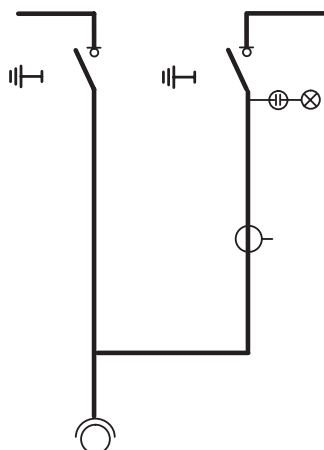
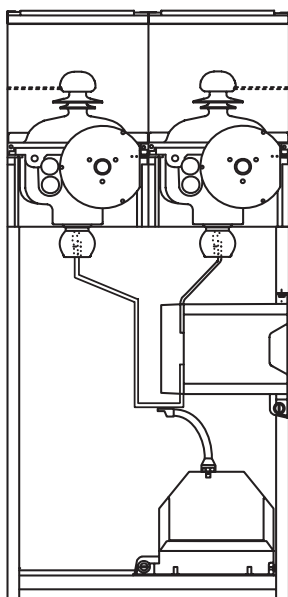
## Cubicle Types



### Sectionalising Metering cubicle with Disconnector, type SMD

Sectionalising metering cubicle, type SMD, is mainly used when medium voltage metering is required and/or when there is a requirement to sectionalise the switchgear. Cubicle is based on operation of two separately operated 3-position, SFG type switch disconnectors. Switch disconnectors are located at both ends of the sectionalised busbar. DIN size VT's and CT's are available on right hand side of the switchgear.

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 or bushing
  - 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 or bushing
  - operation mechanism with mechanical position indication
  - integrated low voltage compartment
  - interlocking unit
  - busbars
  - earthing bar

- Bottom unit, including
- enclosure of busbar compartment

#### Cubicle Accessories

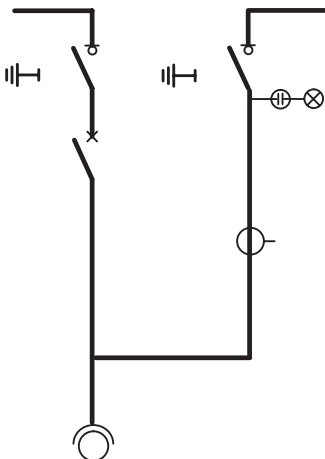
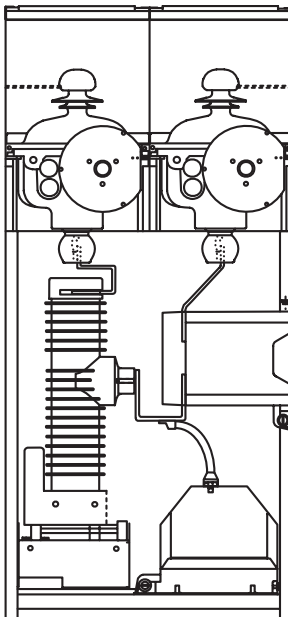
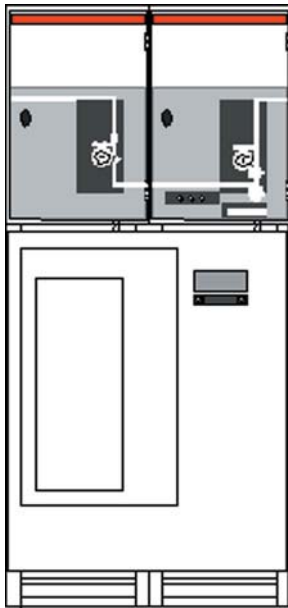
- integrated voltage indicators or socket interface for portable indicators
- auxiliary contacts for close (2NO-2NC) and earth (2NO+2NC) position
- gas density indication with alarm contact for switch disconnector
- current transformers
- voltage transformers
- channel for control cables
- anti-gas channel
- anti condensation heater
- through-going earthing bar
- apparatus earthing bar

#### Technical Data SMD

Rated voltage	[kV]	12	17,5	24
Rated current	[A]	630/800	630/800	630
Rated short-time withstand current	[kA]	25	20	20
Max. rated duration of short circuit	[s]	1	1	1
Cubicle dimensions				
- width	[mm]	750	750	750
- depth	[mm]	940+60	940+60	940+60
- height	[mm]	1635/1885	1635/1885	1635/1885

# 4.12 Uniswitch

## Cubicle Types



### Sectionalising Metering Cubicle, type SMC

Sectionalising metering cubicle, type SMC, is mainly used when medium voltage metering is required and/or when there is a requirement to sectionalise the switchgear. 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 sectionalised 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 or bushing
  - 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 or bushing
  - operation mechanism with mechanical position indication
  - integrated low voltage compartment
  - interlocking unit
  - busbars
  - earthing bar

- Bottom unit, including
- enclosure of busbar compartment

#### Cubicle Accessories

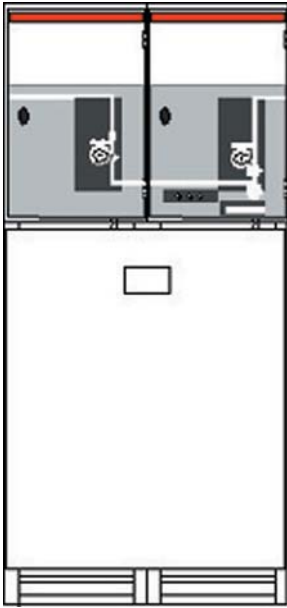
- circuit breaker, vacuum- or SF6-type
- integrated voltage indicators or socket interface for portable indicators
- auxiliary contacts for close (2NO-2NC) and earth (2NO+2NC) position
- gas density indication with alarm contact for switch disconnector
- current transformers
- voltage transformers
-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

#### Technical Data SMC

Rated voltage	[kV]	12	17,5	24
Rated current	[A]	630/800	630/800	630
Rated short-time withstand current	[kA]	25	20	20
Max. rated duration of short circuit	[s]	1	1	1
Cubicle dimensions				
- width	[mm]	750	750	750
- depth	[mm]	940+215	940+215	940+215
- height	[mm]	1635/1885	1635/1885	1635/1885



# 4.13 Uniswitch Cubicle Types



## Bus Metering Cubicle, type BMC

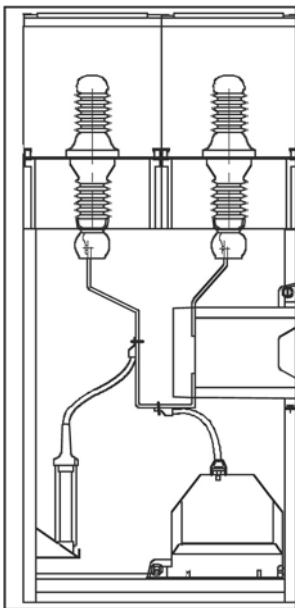
Metering cubicle, type BMC, is mainly used when medium voltage metering is required. DIN size VT's and CT's are available on right hand side of cubicle. Access into cable compartment is possible only when the interlocking unit is in the door open position.

### Basic equipment

- Top unit on left hand side, including
- integrated low voltage compartment
  - interlocking unit
  - busbars
  - earthing bar
  - bushings

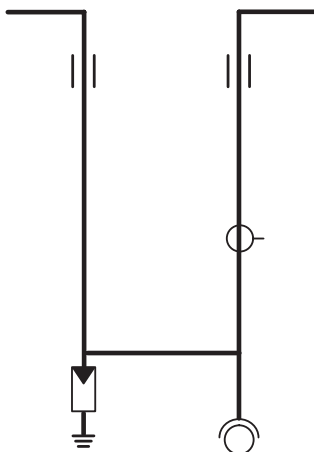
- Top unit on right hand side, including
- integrated low voltage compartment
  - interlocking unit
  - busbars
  - bushings

- Bottom unit, including
- enclosure of busbar compartment



### Cubicle Accessories

- integrated voltage indicators or socket interface for portable indicators
- current transformers
- voltage transformers
- channel for control cables
- arc-gas channel
- anti condensation heater
- through-going earthing bar

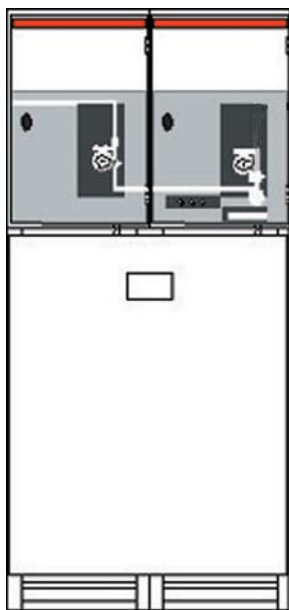


### Technical Data BMC

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
Max. rated duration of short circuit	[s]	1	1	1
Cubicle dimensions				
- width	[mm]	750	750	750
- depth	[mm]	1000	1000	1000
- height	[mm]	1635/1885	1635/1885	1635/1885

# 4.14 Uniswitch

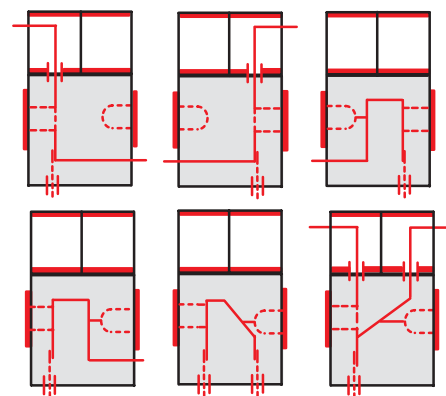
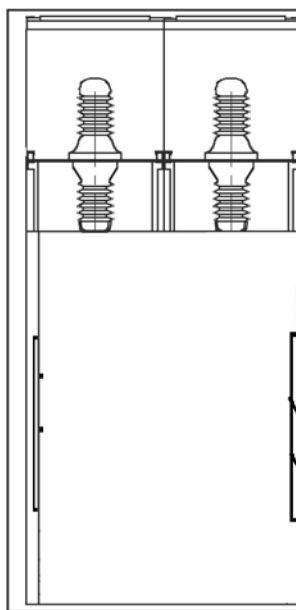
## Cubicle Types



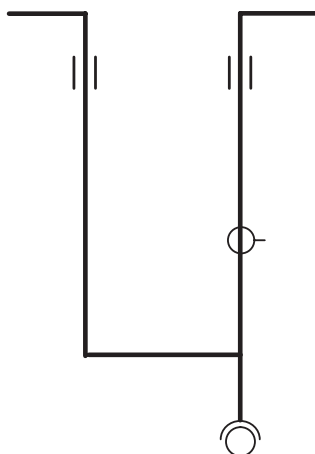
### Universal Metering Cubicle, type UMC

The Universal metering cubicle, type UMC, is used when special arrangements with medium voltage metering are required. The cubicle is very flexible and fulfils most customer requirements of metering and cable arrangements. Please see the available busbar configurations in the sketch below.

Thanks to a universal instrument transformer assembly device, different types of VT's and CT's are possible to install in the cubicle. To provide full flexibility, the busbars in the cubicle will be made to order, or by the customer. Access into the cable compartment is only possible when the interlocking unit is in the door open position.



6 main configurations



#### Basic equipment

- Top unit on left hand side, including
- integrated low voltage compartment
  - interlocking unit
  - earthing bar
  - bushings

- Top unit on right hand side, including
- integrated low voltage compartment
  - interlocking unit
  - bushings

- Bottom unit, including
- enclosure of busbar compartment
  - instrument transformer assembly device

#### Cubicle Accessories

- integrated voltage indicators or socket interface for portable indicators
- current transformers
- voltage transformers
- channel for control cables
- arc-gas channel
- anti condensation heater
- through-going earthing bar

#### Technical Data UMC

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
Max. rated duration of short circuit	[s]	1	1	1
Cubicle dimensions				
- width	[mm]	750	750	750
- depth	[mm]	1000	1000	1000
- height	[mm]	1885	1885	1885

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# 5. Uniswitch Components & Accessories

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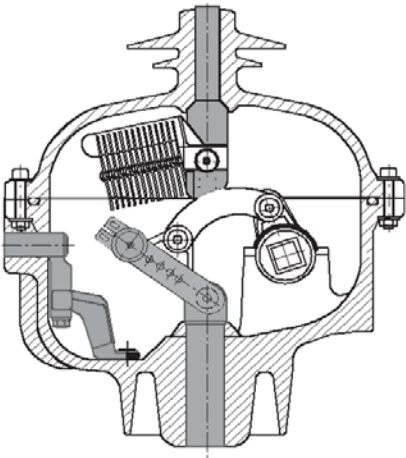
5.1	Switch disconnecter, type SFG .....	28
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# 5.1

## Uniswitch

# Components & Accessories

### Switch disconnecter, type SFG



The switch disconnecter, type SFG, has the following 3 positions:

- CLOSE
- OPEN
- EARTHING

The switch disconnecter 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. The SFG switch incorporates a capacitive divider for voltage indication.

#### Switch types

- SFG with UES-K3 single spring operating mechanism
- SFG with UES-A3 double spring operating mechanism

#### Optional equipment

Auxiliary contacts:

- close position 2NO+2NC
- earth position 2NO+2NC

Shunt trip coil:

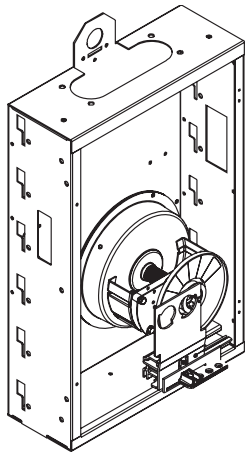
For SFG with UES-A3 operating mechanism.

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

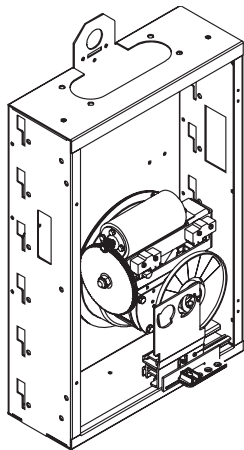
Motor operation: See item 5.3.

# 5.2 Uniswitch Components & Accessories

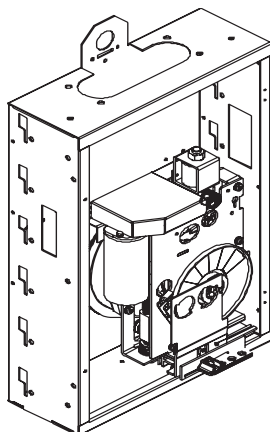
## Operating mechanism



Single spring mechanism



Single spring mechanism with motor



Double spring mechanism with motor

### UES-K3/10 single spring operating mechanism

The UES-K3/10 is used together with the switch disconnecter type SFG and the cubicles of

- SDC
- CBC
- SEC
- SBC
- SMC
- SMD

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 1VFJ220030R2 fully assembled in the front of the UES-K3/10 during the operation.

The UES-K3/10 uses the energy stored in a flat spring to close and open the switch disconnecter. The total operation angle is about 180° (90° + 90°). The switch disconnecter 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 1000 C/O and 1000 O/Earth.

The UES-K3/10 can be equipped with motor operating device 1VFU110002R2. The opening time from the impulse is about 40 ms.

### Central interlocking module

There is a new central interlocking module type 1VFJ220030R2 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.

### UES-A3/10 double spring operating mechanism

The UES-A3/10 is used together with the switch disconnecter 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-A10/2 is also used to operate the earthing switch EF. There has to be always the central interlocking module 1VFJ220030R2 fully assembled in the front of the UES-A3/10 during the operation.

The UES-A3/10 uses the energy stored in 2 flat springs. One (K-spring) to close and open the switch disconnecter and another (A-spring) to rapidly open the switch disconnecter.

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-A3/10 can be used similarly to UES-K3/10. 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 disconnecter 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 1000 C/O and 1000 O/Earth.

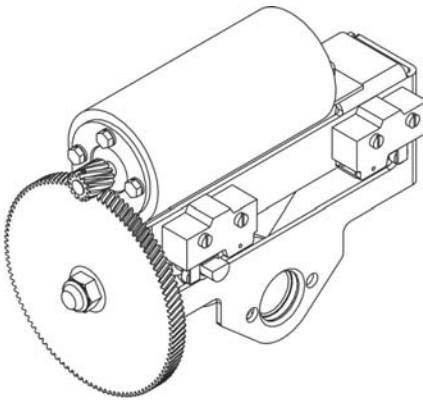


# 5.3

## Uniswitch

# Components & Accessories

### Motor operation of switch disconnecter



*For single spring mechanism*

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

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

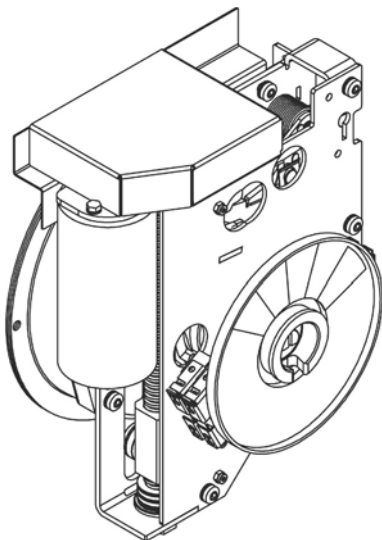
The motor operating devices are DC operated and a rectifier is used when AC supply. For control of motor operating device 2NO+2NC auxiliary contacts on switch disconnecter and earthing switch are required.

#### Standard voltages

- 12 VDC
- 24 VDC
- 48 VDC
- 60 VDC
- 110 VDC
- 125 VDC
- 220 VDC

#### Control

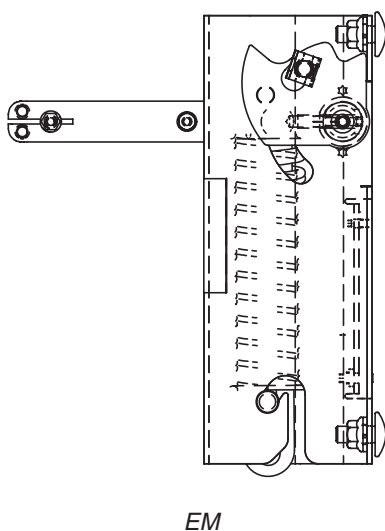
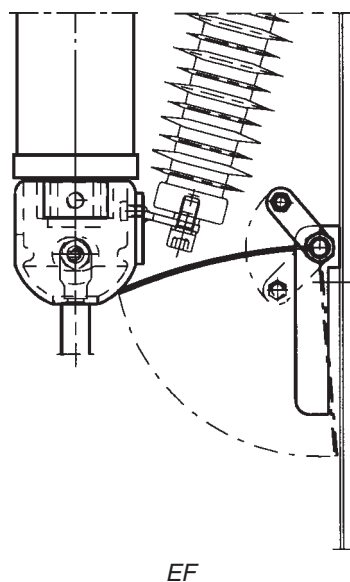
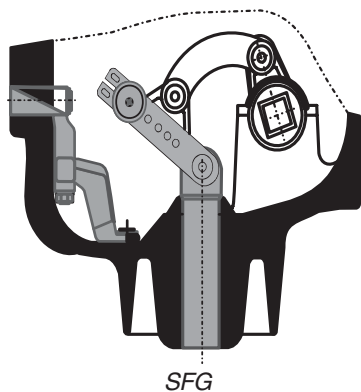
- Includes:
- open/close push buttons
  - local/remote switch



*For double spring mechanism*

# 5.4 Uniswitch Components & Accessories

## Earthing Switches



The earthing switch for earthing parts of main circuits is incorporated in the switch disconnecter SFG-three position switch. The earthing switch has double bladed moving knives. The fixed contacts are connected together (short-circuited) to a common earthing bar inside the switch housing. Outside the housing is an earthing terminal for connection to an earthing conductor.

The main earthing switch is incorporated in the switch disconnecter 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.

Fused switch disconnecter cubicles are equipped with two earthing switches. Because the both ends of fuse links are earthed, the fuse links can be replaced by hands without any special tools.

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 of cable terminations in circuit breaker cubicles and when the main busbar earthing is needed.

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 210

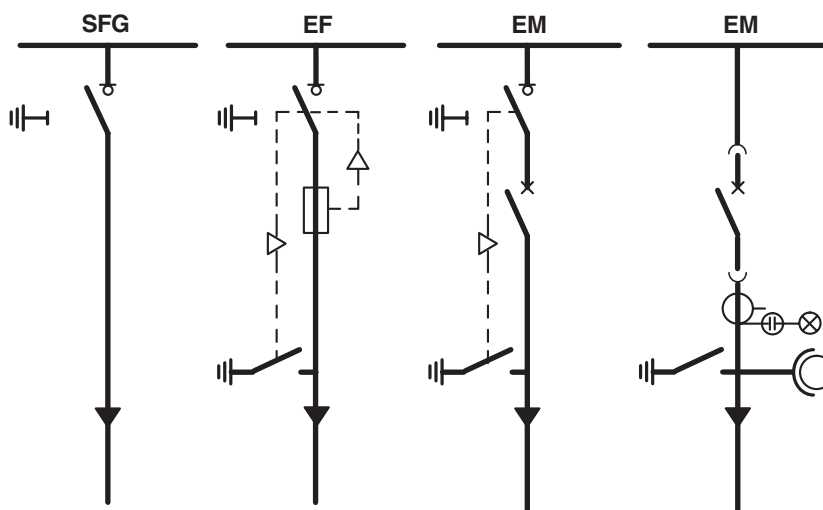
### Earthing of cable terminations and busbar

EM 210

### Optional equipment

- auxiliary contacts 2NO+2NC

### Different configurations



### Technical Data IEC 62271-102

Rated voltage		12 kV	17.5 kV	24 kV
Making capacity				
EF 210	[kA]	5	5	5
EM 210	[kA]	62,5	50	50

# 5.5 Uniswitch Components & Accessories



VD4/S

## Vacuum Circuit Breaker, VD4/S Fixed version

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.

### 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
- PR521 + 2/3 current sensors built

## Technical Data VD4/S

Rated voltage		12 kV	17.5 kV	24 kV
Rated frequency	[Hz]	50/60	50/60	50/60
Rated lightning impulse withstand voltage	[kV]	75	95	125
Rated power frequency withstand voltage	[kV]	28	38	50
Rated current	[A]	630/800	630/800	630
Rated short-circuit breaking current	[kA]	12/16/20/25	12/16/20	12/16/20
Rated short-circuit making current	[kA]	30/40/50/63	30/40/50	30/40/50
Rated short-circuit duration	[s]	3	3	3
Pole centres	[mm]	210	210	210

# 5.6

## Uniswitch

# Components & Accessories

## Vacuum Circuit Breaker, VD4/US Withdrawable version



VD4/US

The new VD4/US are a synthesis of the renowned technology in designing and constructing vacuum interrupters embedded in resin poles, and of excellence in design, engineering and production of circuit breakers. The VD4/US medium voltage circuit breakers use vacuum interrupters embedded in resin poles. Embedding the interrupter in resin makes the circuit breaker poles particularly sturdy and protects the interrupter against shocks, accumulation of dust and humidity. The vacuum interrupter houses the contacts and makes up the interrupting chamber.

### Basic equipment

- EL type manual operating mechanism
- Mechanical signalling device for closing springs charged/discharged
- Mechanical signalling device for circuit breaker open/closed
- Closing/Opening pushbutton
- Operation counter
- Set of ten circuit breaker open/closed auxiliary contacts
- Lever for manually charging the closing springs
- Isolating contacts
- Cord with connector (plug only) for auxiliary circuits
- Racking-in/out lever (the quantity must be defined according to the number of pieces of apparatus ordered).

### Optional equipment

- Shunt opening release
- Additional shunt opening release
- Opening solenoid
- Shunt closing release
- Undervoltage release with power supply branched on the supply side
- Undervoltage release with electronic time delay device (0.5 - 1 - 1.5 - 2 - 3 s) (power supply branched on the supply side)
- Undervoltage release mechanical override
- Contact for signalling undervoltage energised/de-energised
- Set of 15 circuit breaker open/closed auxiliary contacts (alternative to the set of 10 contacts)
- Transient contact
- Position contact
- Spring-charging geared motor
- Contact for signalling closing springs charged/discharged
- Opening and closing pushbutton protection
- Opening and closing pushbutton padlocks
- Key lock in open position
- Locking magnet on the operating mechanism
- Locking magnet on truck.

## Technical Data VD4/US

Rated voltage / Rated insulation voltage	[kV]	12	24
Withstand voltage at 50 Hz	[kV]	50	50
Impulse withstand voltage	[kV]	125	125
Rated frequency	[Hz]	50-60	50-60
Rated normal current	[A]	630/1250	630/1250
Rated breaking capacity	[kA]	25	20
Rated short time withstand current (3s)	[kA]	25	20
Making capacity	[kA]	62,5	50
Pole centres	[mm]	210	210

# 5.7 Uniswitch Components & Accessories

## SF6-Circuit Breaker, HD4/S, Fixed version



HD4/S with PR521 overcurrent release

### Description

HD4/S 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 ESH 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 HD4/S are systems with lifelong sealed pressure (IEC 60056 Standards).

### 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-0,3min-CO-3min-CO.

### 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 over-voltage values and short arc duration. These characteristics make HD4/S the ideal circuit breaker in M.V. distribution substations.

### Basic equipment

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

### Optional equipment

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

### Two Level pressure switch

#### First level - intervention for low pressure

The indication is given when the gas pressure drops from 380 kPa absolute to a value under 310 kPa absolute.

#### Second level - intervention for insufficient pressure

The indication is given when the gas pressure drops to below 280 kPa absolute.

#### Circuit-breaker locking device (with/without lamps) for insufficient SF6 gas pressure

This device can only be supplied for circuit breakers provided with a pressure switch. The locking circuit is an optional application and can only be installed by ABB.

#### The following configurations are available:

**A** - Circuit for automatic circuit breaker opening and lock in the open position; version **without signalling lamps**.

**B** - Circuit for locking the circuit breaker in the position it is found in; version **without signalling lamps**.

**C** - Circuit for automatic circuit breaker opening; version **with three signalling lamps**.

**D** - Circuit for locking the circuit breaker in the position it is found in; version **with three signalling lamps**.

### Technical Data HD4/S

Rated voltage		12 kV	17.5 kV	24 kV
Rated frequency	[Hz]	50/60	50/60	50/60
Rated lightning impulse withstand voltage	[kV]	75	95	125
Rated power frequency withstand voltage	[kV]	28	38	50
Rated current	[A]	630/800	630/800	630
Rated short-circuit breaking current	[kA]	12/16/20/25	12/16/20	12/16/20
Rated short-circuit making current	[kA]	30/40/50/63	30/40/50	30/40/50
Rated short-circuit duration	[s]	3	3	3
Pole centres	[mm]	210	210	210



# 5.8

## Uniswitch

# Components & Accessories



HD4/US

## SF6 Circuit Breaker, HD4/US Withdrawable version

HD4/US medium voltage circuit breakers use sulphur hexafluoride gas (SF6) to extinguish the electric arc and as the insulating medium. Breaking in SF6 gas takes place without any arc chopping and without generation of overvoltages. These characteristics ensure long electrical life of the circuit breaker and limited dynamic, dielectric and thermal stresses on the installation.

The circuit breaker poles are systems with lifelong sealed pressure (IEC 62271-100 Standards) and are maintenance-free.

### Basic equipment

- Manual operating mechanism
- Mechanical signalling device for closing springs charged/discharged
- Mechanical signalling device for circuit breaker open/closed
- Closing / Opening pushbutton
- Operation counter
- Set of ten open/closed circuit breaker auxiliary contacts (four opening (NC) and three closing (NO) available)
- Lever for manually charging the closing springs (quantity to be define)
- Isolating contacts
- Cord with connector (plug only) for auxiliary circuits
- Racking-in/out lever

### Optional equipment

- Shunt opening release
- Additional shunt opening release
- Opening solenoid with demagnetisation
- Shunt closing release
- Undervoltage release
- Undervoltage release with electronic delay device (0.5 – 1 – 1.5 – 2 – 3 s)
- Mechanical override of undervoltage release trip with electrical signalling.
- Undervoltage release electric signalling
- Alternative set of 15 circuit-breaker open/closed auxiliary contacts (alternative to the set of 10 contacts)
- Transient contact
- Position contact
- Spring-charging geared motor
- Thermomagnetic protection of the motor
- Electrical signalling of operating mechanism springs charged/discharged.
- Opening pushbutton lock
- Closing pushbutton lock
- Key lock for circuit breaker open
- Operating mechanism locking magnet
- Truck locking magnet
- Two-level pressure switch gas control device
- Two-level pressure switch gas control device with three LEDs and additional shunt opening release: circuit breaker opening and lock on closing
- Two-level pressure switch gas control device with three LEDs: circuit breaker locking in the position it is found in.

## Technical Data HD4/US

Rated voltage / Rated insulation voltage	[kV]	12	24
Withstand voltage at 50 Hz	[kV]	50	50
Impulse withstand voltage	[kV]	125	125
Rated frequency	[Hz]	50-60	50-60
Rated normal current	[A]	630/1250	630/1250
Rated breaking capacity	[kA]	25	20
Rated short time withstand current (3s)	[kA]	25	20
Making capacity	[kA]	62,5	50
Pole centres	[mm]	210	210



# 5.9 Uniswitch Components & Accessories

## 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 disconnecter.

### Medium voltage - HRC fuse links

Type	Rated voltage kV	Rated current A	e/d mm
CEF	12	6	292/65
		10	292/65
		16	292/65
		25	292/65
		40	292/65
		50	292/65
		63	292/65
		80	292/87
		100	292/87
		125	442/87
CEF	17.5	6	292/65
		10	292/65
		16	292/65
		25	292/65
		40	292/87
		50	292/87
		63	292/87
		80	442/87
		100	442/87
		CEF	24
10	442/65		
16	442/65		
25	442/65		
40	442/65		
50	442/87		
63	442/87		
80	442/87		

### Selection of fuses: According to IEC 60420

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) 1)																	
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	63	80	100	100			
12	10	16	16	16	16	25	25	25	40	40	63	63	63	80	100			
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		
24	10	10	10	10	16	16	16	16	25	25	25	40	40	63	63	63	80	

1) Unique ratings on request

# 5.10 Uniswitch Components & Accessories

## Current transformers



TPU 40.13

Un kV	BIL kV	Basic dimensions	Transformer type	Drawing number
12	75	DIN 42600 T8 (DIN 42600 - SSB 12) With ribs	TPU 4x.xx	1VL 44614040 1)
				1VL 44614050 2)
17.5	95	DIN 42600 T8 (DIN 42600 - SSB 12) With ribs	TPU 5x.xx	1VL 44614590 1)
				1VL 44614600 2)
24	125	DIN 42600 T8 (DIN 42600 - SSB 24)	TPU 6x.xx	1VL 44615040 1)
				1VL 44615050 2)

- 1) Primary terminal P1 near the secondary terminal box (normal polarity)  
2) Primary terminal P2 near the secondary terminal box (inverted polarity)



TPU 60.13

### 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)

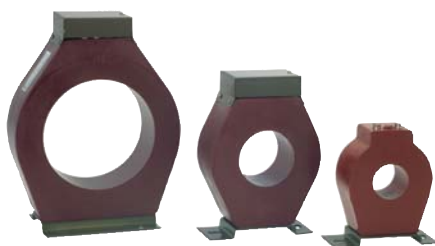
Single ratio with secondary current 1 A or 5 A  
Extended primary current value: 120 %  
Core 1: class 0.5, 10 VA  
Core 2: class 5P10, 10 VA  
Alternatively: 5P20, 5 VA

$I_p$ (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

### KOLMA

Transformer KOLMA is suitable for the measurement of the sum of three-phase current in a 3-phase cable. Under normal operating conditions this sum is zero. In the event of an earth-fault the sum of the currents are equal to the earth-fault current and a corresponding current flows in the secondary.

This transformer is used together with static earth-fault relays. The cable current transformer can generally be used when measuring the residual current e.g. to prevent, or locate an earth-fault.



Window diameter	180 mm
Construction	Ring core, multi-cap secondary
Secondaries	100/1A 2.0 VA 10P10 150/1A 4.0 VA 10P10

# 5.11 Uniswitch Components & Accessories

## Voltage transformers



TJC 4  
TJC 5  
TJC 6

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

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 presented below represent a design for decreased risk for ferroresonance. However, to increase safety, earth fault windings shall be connected in open delta with a damping resistor.

The voltage transformers type TJC must be connected to the primary using the HV connecting cable KREZ 15, when using single pole insulated voltage transformers.

#### Notes:

Frequency: 50 Hz  
Ambient temperature: 40 °C  
Standard IEC 60044-2

Type	TJC 4						TJC5						TJC6					
Primary voltage	3000....12000:√3						3000:√3....15000:√3						3000:√3....24000:√3					
Terminal marking	A-N						A-N						A-N					
Max.number of sec. windings	3						3						3					
Winding	Measuring winding		Residual winding				Measuring winding		Residual winding				Measuring winding		Residual winding			
Secondary voltage	100:√3 or 110:√3		100:3 or 110:3				100:√3 or 110:√3		100:3 or 110:3				100:√3 or 110:√3		100:3 or 110:3			
Terminal marking	a-n		da-dn				a-n		da-dn				a-n		da-dn			
Accuracy class	0,2	0,5	1	3	3P	6P	0,2	0,5	1	3	3P	6P	0,2	0,5	1	3	3P	6P
Rated burden max. VA 1) when earth fault winding fitted Fv = 3 x Un	25	50	100	150	50	100	25	50	100	150	50	100	35	75	150	200	50	100
Secondary thermal limiting current U = 1,2 x Un U = 1,9 x Un	4 6		-				4 6		-				4 6		-			

1) Valid for single measuring winding only.

Available outputs for double measuring windings are calculated on request.

# 5.12 Uniswitch Components & Accessories

## Sensor Technology



Combi / Current sensor KEVCD

The protection and monitoring in switchgear today, is many times based on equipment with digital technologies with a very low power consumption on the input.

This enables the use of sensor technology in Uniswitch instead of conventional current transformers and voltage transformers.

The current sensors are based on the Rogowski coil – a magnetic current transducer – in which the iron core has been replaced by non-magnetic material.

The measuring principle for voltage measurement is based on a resistive or capacitive voltage divider, which results in a wide dynamic range and high linearity.

The signal produced by the sensors can easily be verified by an off-the-shelf multimeter. As a result, the sensors ensure high protection performance throughout the whole range without saturation.

The sensor technology also makes it possible to integrate both the current and the voltage sensors in the same compact cast resin part, as a combi sensor.

With their remarkably low measuring signals (between 0 to 10 VAC), the sensors reduce the risk of component break-downs and grid shutdowns. They are also resistant to secondary short circuits and open windings, and are not prone to ferroresonance.

Another positive feature of the sensor is the limited number of types, basically only a few types for all applications. This feature will reduce delivery times, as the sensors do not need to be produced especially for each switchgear.

### Combi / current sensor KEVCD

Highest voltage for equipment 12 - 17.5 - 24 kV  
Max. continuous thermal current 1250 A

### Current measurement

Rated primary current 80 - 240 - 640 A  
Rated output voltage 0.150 V

### Voltage measurement

Rated division ratio 10 000 / 1 (can be excluded)

**Coupling electrode for voltage indication is always included.**

# 5.13 Uniswitch Components & Accessories



REX 521



SPAJ 140



PR 512



SEG WIC 1



REF 541



REF 610



REF 543

## Protection relays and feeder terminals

A wide range of secondary control & protection equipment is available for the Uniswitch switchgear range, from the simplest self-powered protection relays to advanced protection, monitoring and controlling devices.

### Protection relays

ABB offers a wide range of protection schemes from simple protection relays to more versatile feeder protection. The ABB relays have worldwide references and have been used for a long time. The reputation for reliability and secure operation is excellent. The use of sensors is possible in this range (REX type). The relays in this range require auxiliary power.

### Selfpowered protection relays

The most economical protection solution is achieved through the use of self-powered relays. As the current transformers power the protection relay there is no need for external power supply. The self-powered relays are excellent for use in rough conditions and places without auxiliary supply. The adjustment of protection parameters is simple and quick. Both the ABB range as well as other manufacturer's relays can be supplied.

### Feeder terminals

The most comprehensive protection, monitoring and control functions are offered with the ABB feeder terminals. The feeder terminals offer configurable protection and control schemes and a possibility to use sensors, if so requested. The relays in this range require auxiliary power.

### Sensor technology

For protection, control, measurement and supervision with sensor technology we can offer the Feeder Terminal serie REX 521, REF 541, REF 542+, REF 543 and REF 545 of ABB.

# 5.14 Uniswitch Components & Accessories

## Relays, indicative table

Type of faults	IEEE device No.	IEC Symbols	Protection function	SPAA C 121	SPAJ C 140-C 142	SPAU 130	SPAM C150	PR 512 4)	REF 610	REM 610
Short circuits	51	3I >	Three-phase non-directional overcurrent low-set stage		X			X	X	
	50 / 51	3I >>	Three-phase non-directional overcurrent high-set stage		X		X	X	X	X
	50 / 51B	3I >>>	Three-phase non-directional overcurrent instantaneous stage						X	
	51	2I >	Two-phase non-directional overcurrent, low-set stage	X						
	50 / 51	2I >>	Two-phase non-directional overcurrent, high-set stage	X						
Earth fault	51N	Io >	Non-directional earth-fault, low-set stage		X		X	X	X	X
	50N / 51N	Io >>	Non-directional earth-fault, high-set stage		X			X	X	X
	67N	Io > →	Directional earth-fault, low-set stage	X						
	67N / 51N	Io >> →	Directional earth-fault, high-set stage	X						
	59N	Uo >	Residual overvoltage, low-set stage							
	59N	Uo >>	Residual overvoltage, high-set stage							
	59N	Uo >>>	Residual overvoltage, instantaneous stage							
Overload	49M	3θ >	Three-phase thermal overload (motor)				X 2)			X
	49/38	ThA>, ThB>	Thermal protection by RTDs or thermistors							X
	49F	3θ >	Three-phase thermal overload (cables)						X	
Over-/under-voltage	59	3U >	Three-phase overvoltage, low-set stage			X 1)				
	27	3U <	Three-phase undervoltage, low-set stage			X 1)				
Additional functions	79	O → I	Auto-recloser						X	
	46	ΔI >	Phase discontinuity				X		X	
	46R	3I()	Phase reversal							X
	46	I2>	Negative phase sequence							X
	62BF	CBFP	Circuit breaker failure						X	X
	48/51	$I_s^2 t_s$	Start-up supervision (locked rotor, multiple starts)				X 3)			X 3)
			Arc-protection, 2 lens						X	
	14	n	Start-up supervision using speed device				X			X
	37	3I <	Loss of load / under current				X			X
DR	DR	Disturbance recorder						X		

## Type of measurement

Current		3I/2I	Three-phase/two phase current	X	X		X	X	X 5)	X 5)
		Io	Neutral current	X	X		X		X 5)	X 5)
Voltage		3U	Three-phase voltage			X				
		Uo	Residual voltage	X						

1) Single-phase operation selectable.

2) Also applicable for small distribution transformers and small and medium sized generators and feeders.

3) Can be used as additional overcurrent stage, if start-up supervision not needed.

4) Only available with circuit breaker, equipped with additional opening solenoid and two or three current sensors.

5) Display of primary values.



# 5.15

## Uniswitch

# Components & Accessories

### Low Voltage Compartment



Low voltage compartment



Low voltage compartment, 375 mm



CBW low voltage compartment,  
800 mm



Additional low voltage  
compartment, 750 mm



Additional low voltage  
compartment, 750 mm

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. The left side is reserved for relays, meters, switches and push buttons.

The right side compartment's lower side is reserved for the SFG switch disconnecting device'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 disconnecting device's operating device.

The withdrawable CB cubicles, CBW & SBW have an 800 mm wide low voltage compartment, with more space for secondary apparatus.

An additional low voltage compartment placed on top of the cubicle is also available for all cubicle types.

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

#### Measurements

CBW, SBW (W x H x D)  
800 x 580 x 180 mm

Other (W x H x D)  
375/500 x 580 x 120 mm

Additional LV-box  
375/500/750/800 x 390 x 390 mm

# 5.16

## Uniswitch

### Components & Accessories

#### Voltage Presence Indicating System (VPIS)

Capacitive voltage presence indicating system for Uniswitch  $\geq 6$  kV in accordance with IEC 61958.

A complete system consists of:

- 1 integrated voltage indicator (CL-497) or 1 interface with sockets (CL-498) and portable indicator
- 3 connecting cables including measuring circuit components and voltage limiting devices



CL-497



CL-498

# 5.17 Uniswitch Components & Accessories

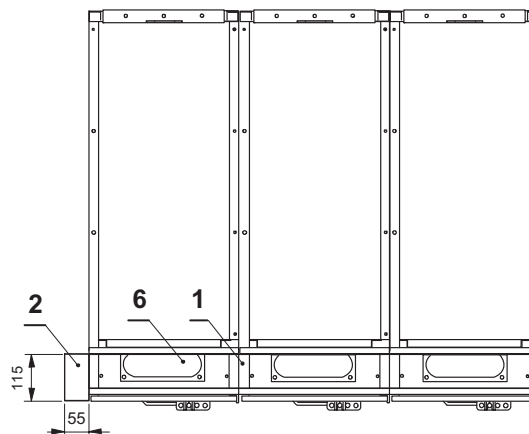
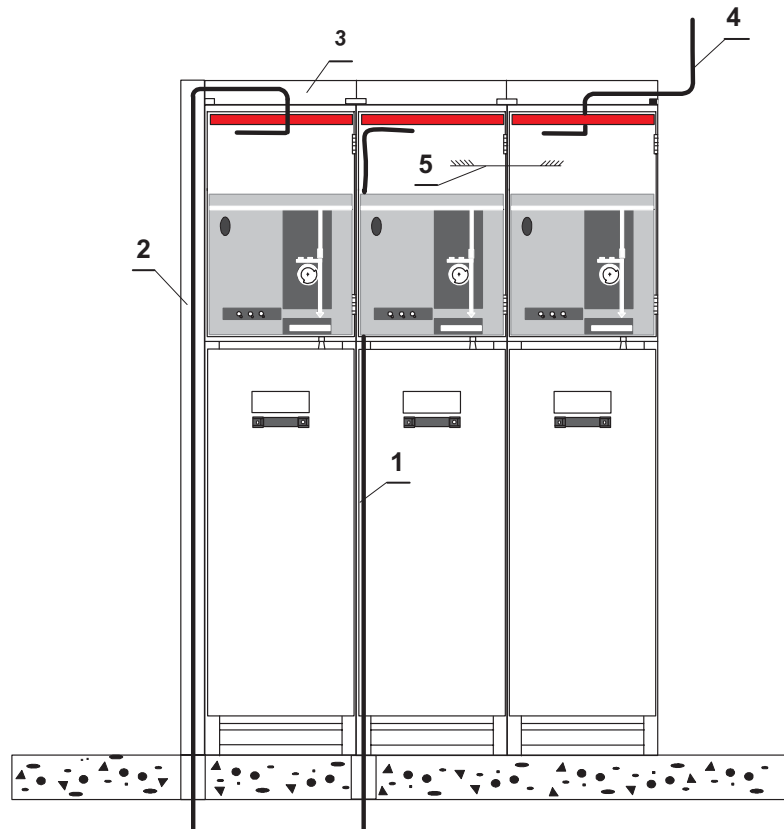
## Control cable entries

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.

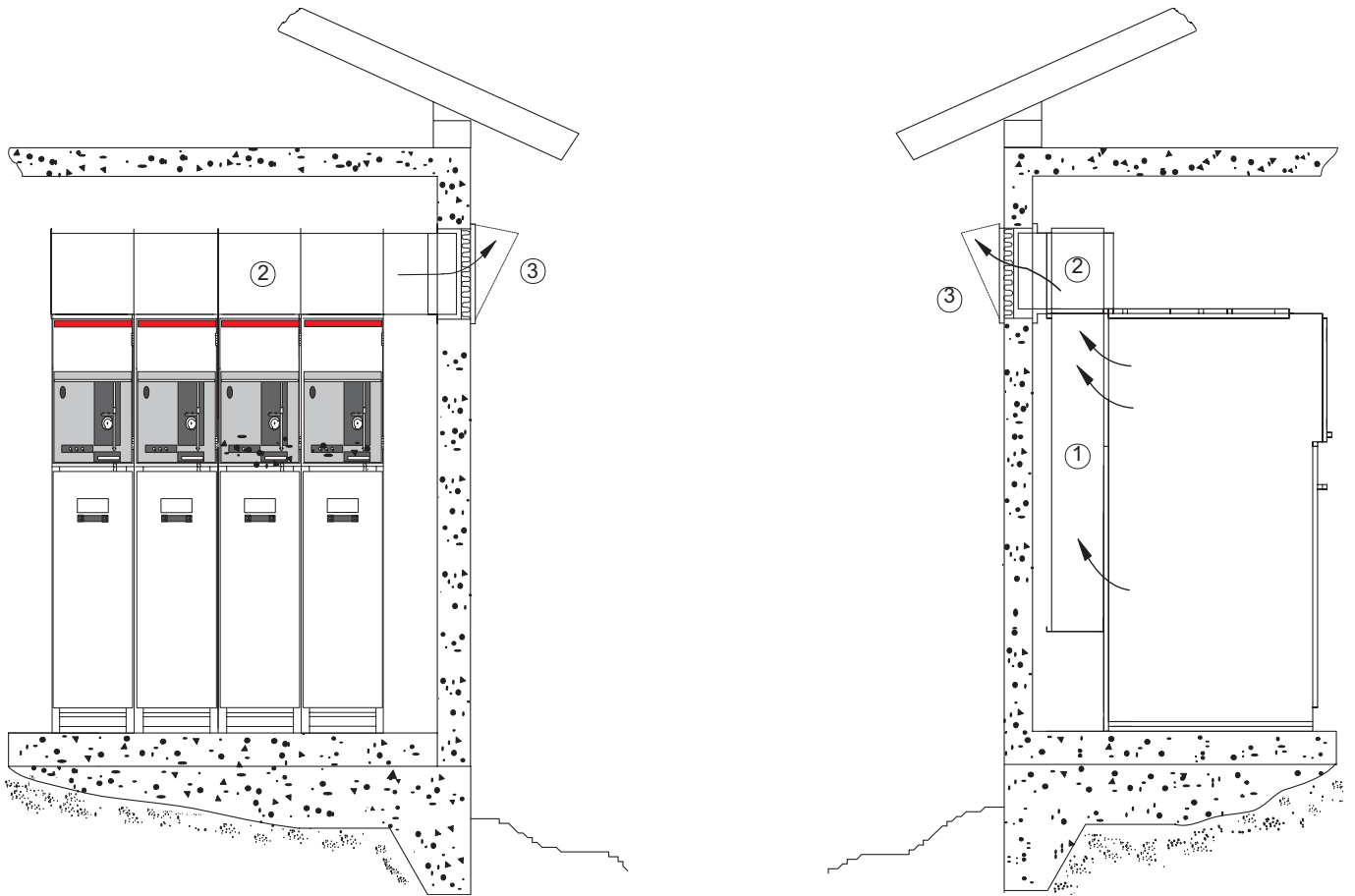
(3) A duct can also be placed on top of the switchgear supporting cables coming from e.g. overhead cable ladder (4).



# 5.18 Uniswitch

## Components & Accessories

### Arc gas channel



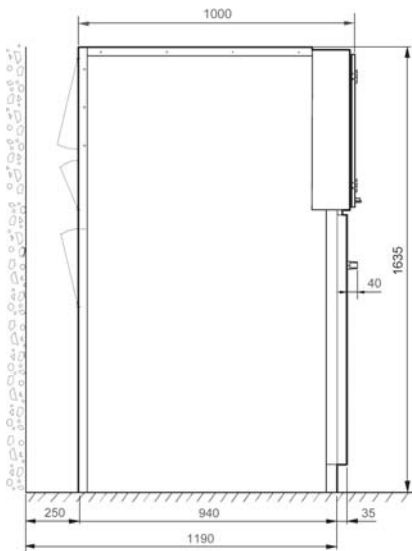
To ventilate the arc-gas out in a certain direction, arc-gas channels are available for the Uniswitch system. Vertical channel (1) on the rear of each cubicle has been connected to a common horizontal channel (2) on the top of the switchgear. The horizontal channel has been connected to an opening (3)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

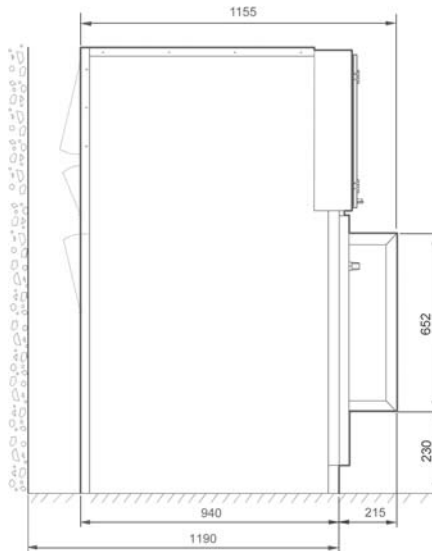
# 6. Uniswitch

## Technical data / Cubicle Dimensions

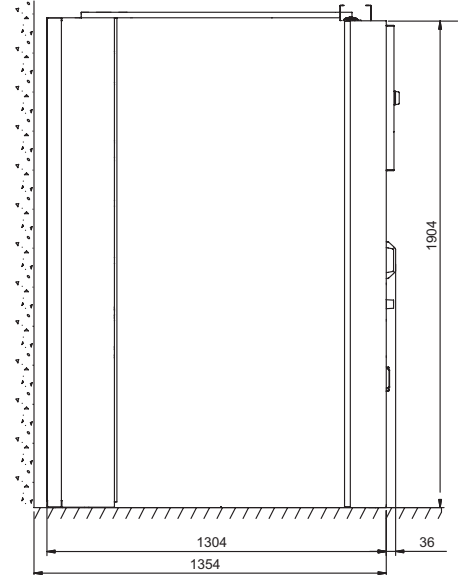
### Cubicle dimensions



Main dimensions and the need of space of cubicles.



Main dimensions and the need of space of circuit breaker cubicle.



Main dimensions and the need of space of withdrawable circuit breaker cubicle.

### Cubicle types:

SDC  
SDF  
DBC  
BRC  
SEC  
BMC  
SMD  
SEF  
UMC

### Cubicle types:

CBC  
SMC  
SBC

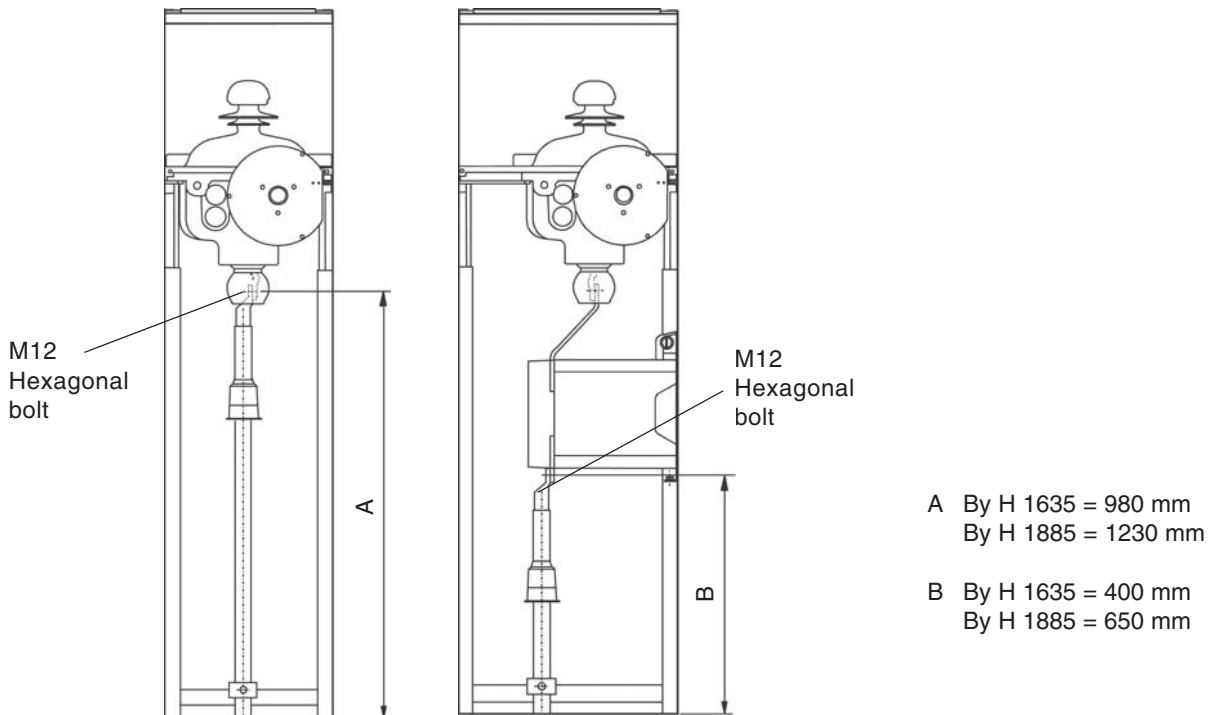
### Cubicle types:

CBW  
SBW

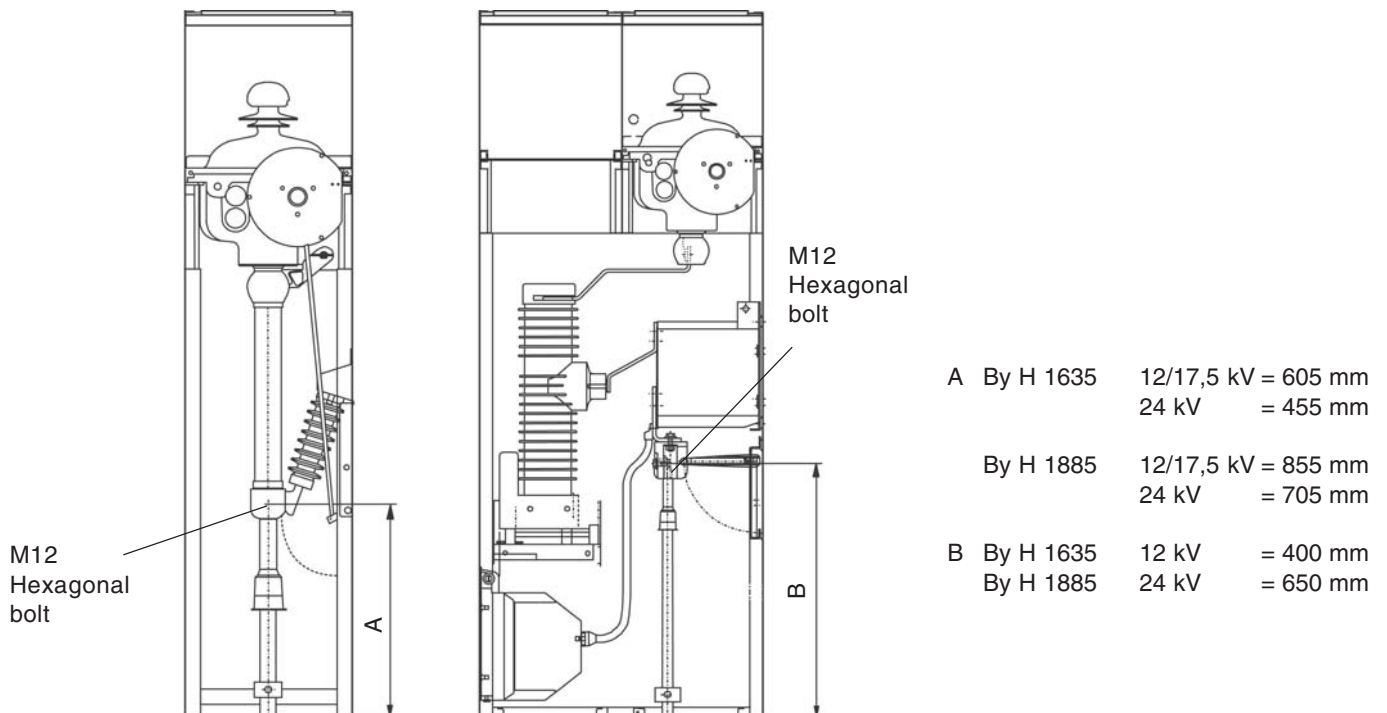
# 6.1 Uniswitch

## Technical data

### Cable arrangement



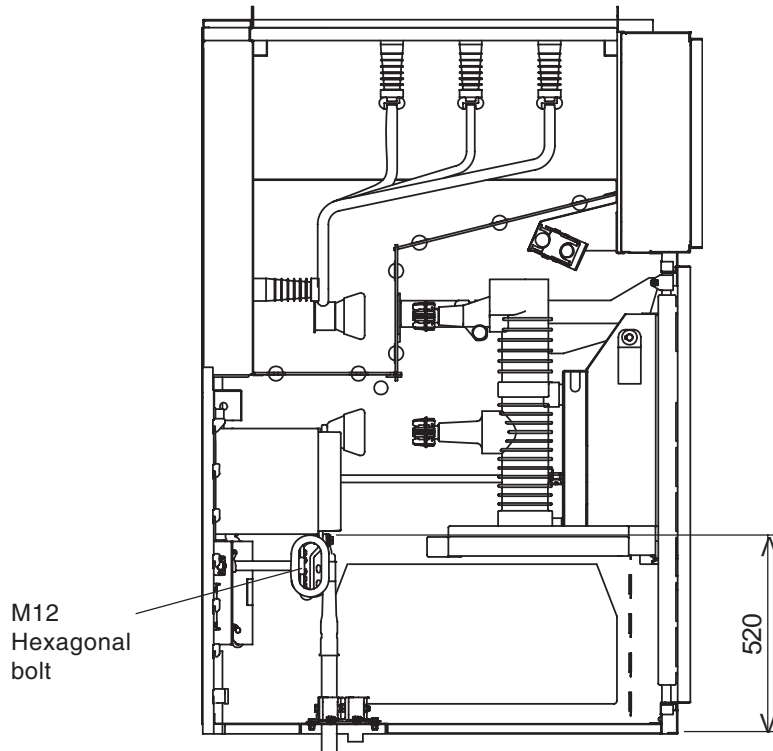
Information regarding cable arrangement is available in installation manual.



Information regarding cable arrangement is available in installation manual.



## Cable arrangement



Information regarding cable arrangement is available in installation manual.

# 6.2 Uniswitch

## Technical data

### Technical data

Rated voltage Ur	kV	12	17.5	24
<b>BIL</b>				
- common value	kV	75	95	125
- across the isolating distance		85	110	145
<b>AC withstand voltage</b>				
- common value	kV	28 <sup>1)</sup>	38 <sup>1)</sup>	50
- across the isolating distance		32 <sup>1)</sup>	45 <sup>1)</sup>	60
<b>Rated frequency</b>	Hz	50/60	50/60	50/60
<b>Rated current</b>				
- busbar	A	630/1250	630/1250	630/1250
- feeder	A	630/800/1250 <sup>4)</sup>	630/800/1250 <sup>4)</sup>	630/1250 <sup>4)</sup>
<b>Rated short-time withstand current</b>				
- main circuit	kA	25	20	20
- earthing circuit	kA	25	20	20
<b>Rated peak withstand current</b>	kA	65	50	50
<b>Rated duration of short circuit</b>	s	1	1	1
<b>Arc-fault current, 1s</b>	kA	20	20	20
<b>Degree of protection, enclosure</b>		IP2XC	IP2XC	IP2XC
<b>Degree of protection, partitions</b>		IP2X	IP2X	IP2X
<b>Ambient temperature</b>				
- maximum value	[°C]	+40	+40	+40
- maximum value of 24 h-mean		+35	+35	+35
- minimum value		-5 <sup>3)</sup>	-5 <sup>3)</sup>	-5 <sup>3)</sup>
<b>Altitude above sea level</b>	[m]	≤1000 <sup>2)</sup>	≤1000 <sup>2)</sup>	≤1000 <sup>2)</sup>

1) Higher values in accordance with national standards on request

2) Adjustment is necessary for greater altitudes

3) Lower ambient temperature on request.

4) 1250 A = CBW, SBW, BRC, DBC

# 6.3 Uniswitch

## Technical data / Dimensions

### Tests and Certificates

Type test according to IEC 62271-200 and certified by SATS.

Routine test IEC 62271-200.

Quality certificate ISO 9001.

Environmental certificate ISO 14001.

### Weights (without packing)

Dimensions: (W x H mm)		SDC 1)	SDF 2)	CBC 1) 3)	CBW 4)	DBC 1)	BRC1)	SEC1)	SEF 2)	SBC 1) 3)
– 375 x 1635	[kg]	130	140	–	–	110	140	140	150	–
– 375 x 1885	[kg]	140	150	–	–	120	150	150	160	–
– 500 x 1635	[kg]	140	150	–	–	120	150	150	160	–
– 500 x 1885	[kg]	150	160	–	–	130	160	160	170	–
– 750 x 1635	[kg]	–	–	420	–	–	–	–	250	280
– 750 x 1885	[kg]	–	–	440	–	–	–	–	270	300
– 800 x 1885	[kg]	–	–	–	650	–	–	–	–	–

Dimensions: (W x H mm)		SBW 4)	SMD 1)	SMC 1) 3)	BMC1)	UMC 1)				
– 375 x 1635	[kg]	–	–	–	–	–				
– 375 x 1885	[kg]	–	–	–	–	–				
– 500 x 1635	[kg]	–	–	–	–	–				
– 500 x 1885	[kg]	–	–	–	–	–				
– 750 x 1635	[kg]	–	270	290	220	220				
– 750 x 1885	[kg]	–	290	310	240	240				
– 800 x 1885	[kg]	680	–	–	–	–				

1) without CT's and VT's

2) without fuses

3) without circuit breaker

4) with circuit breaker and CT's

#### Circuit breakers:

– VD4/S	103 kg
– VD4/US	115 kg
– HD4/S	103 kg
– HD4/US	125 kg

#### Transformers:

– 12/17.5 kV	25 kg
– 24 kV	30 kg





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