Uniswitch Medium Voltage Switchgear

12 kV, 17.5 kV, 24 kV, 630 A

Content

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. 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:

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

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

Ring main unit

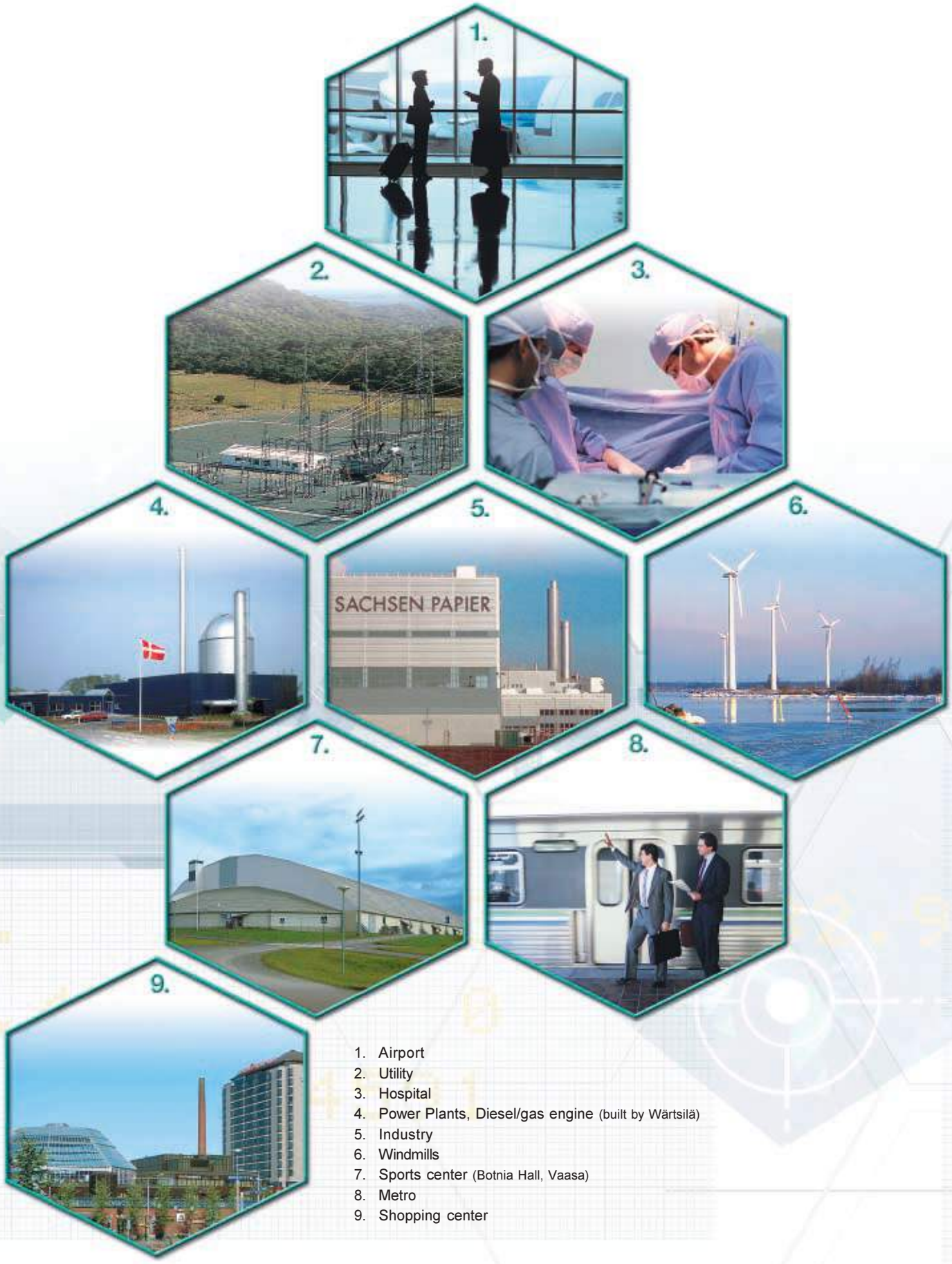
Heavy switchgear for demanding applications including:
Primary substations
Power plants
Railways
Marine

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:

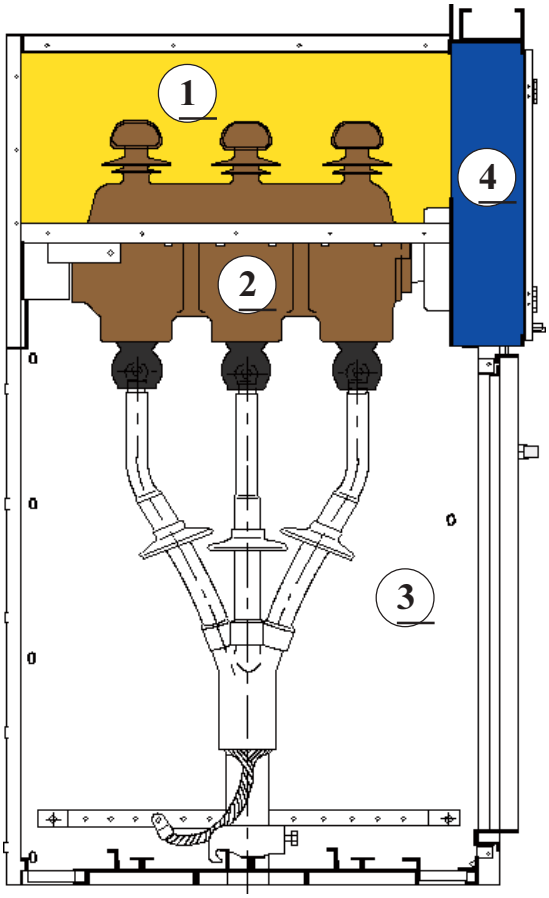
– the flexibility in meeting our Customers specification and accomodating on future change and upgrading
– the options include complete control, measuring and protection systems

2. Uniswitch
Applications



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

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 intreconnect 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

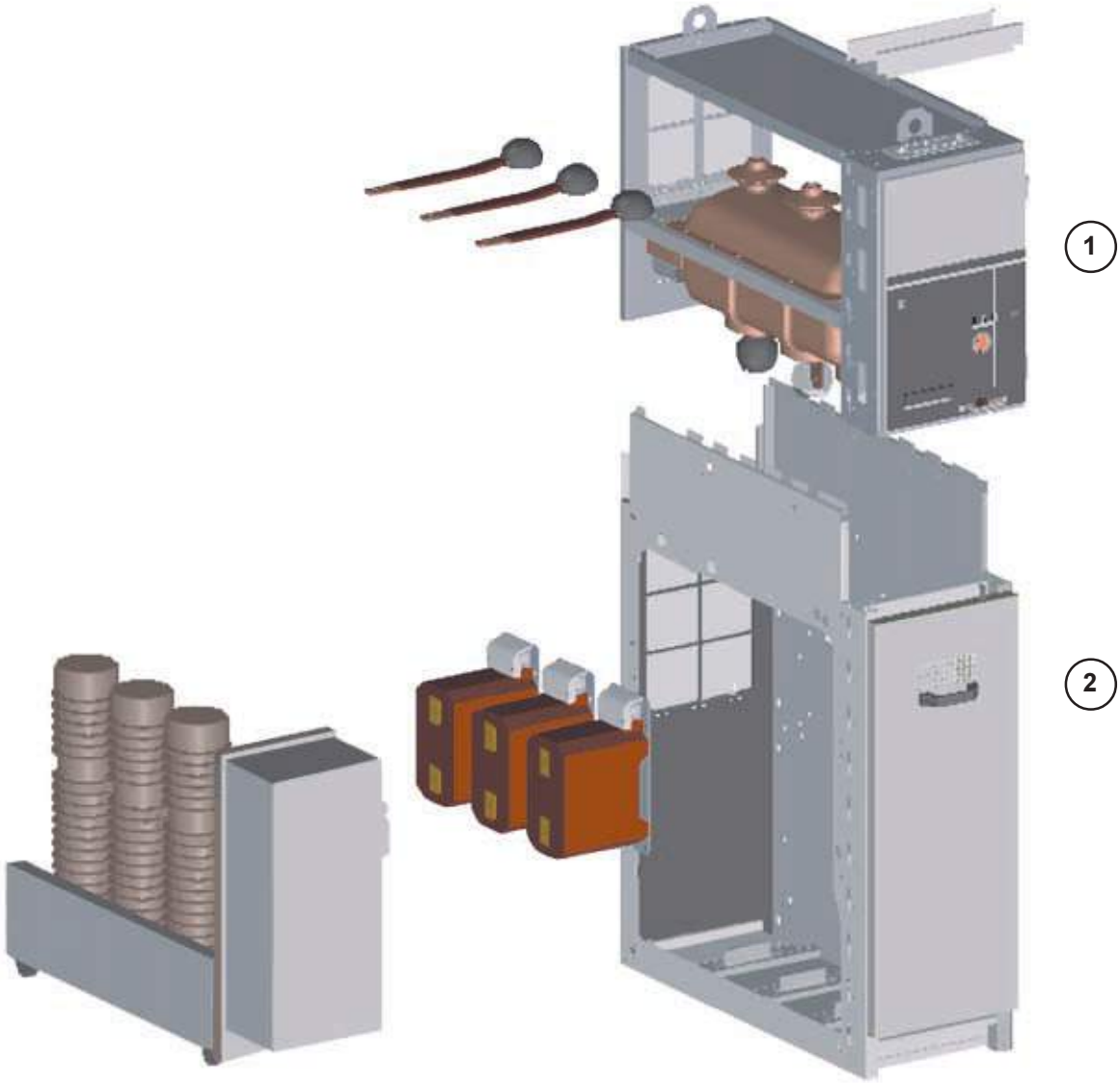
75 % of the space in the switch disconnector cubicle is reserved for power cable connection making it possible to use both 1- and 3-phase cables with most simple unscreened terminations. Space is also adequate for cubicle accessories such as surge arresters, current transformers, second earthing switch 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 indentical 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.

Primary part



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

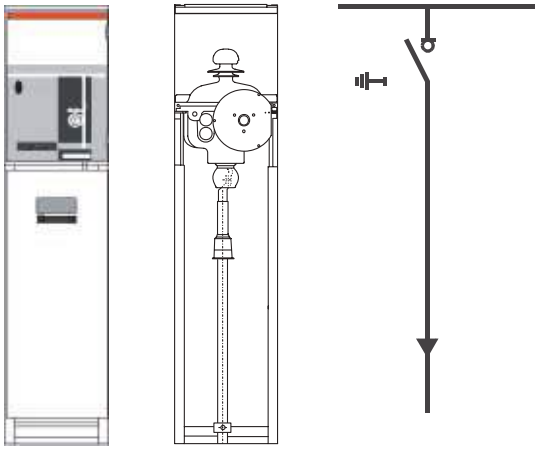
2 Bottom unit

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

4. Uniswitch
Cubicle Types

4.1 Uniswitch
Cubicle Program

Switch Disconnector Cubicle, type SDC



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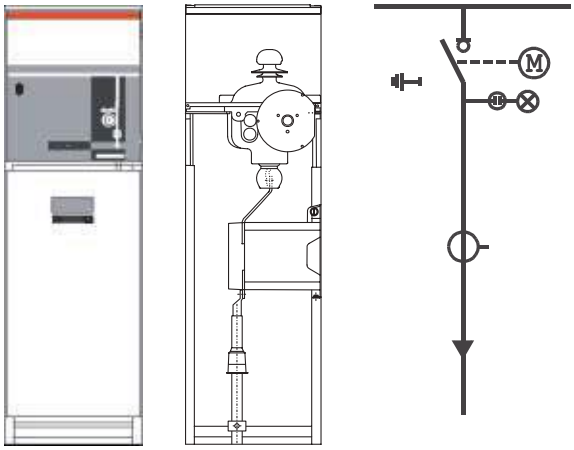
Height: 1635 or 1885 mm



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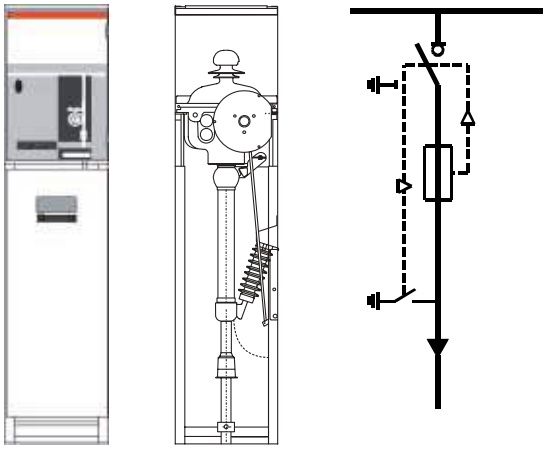
Switch Disconnector with fuse Cubicle, type SDF



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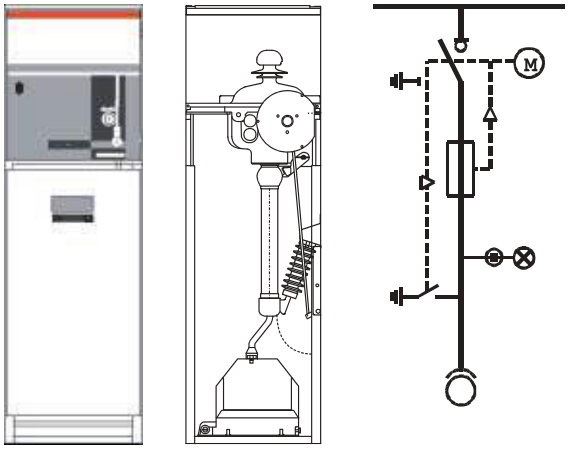

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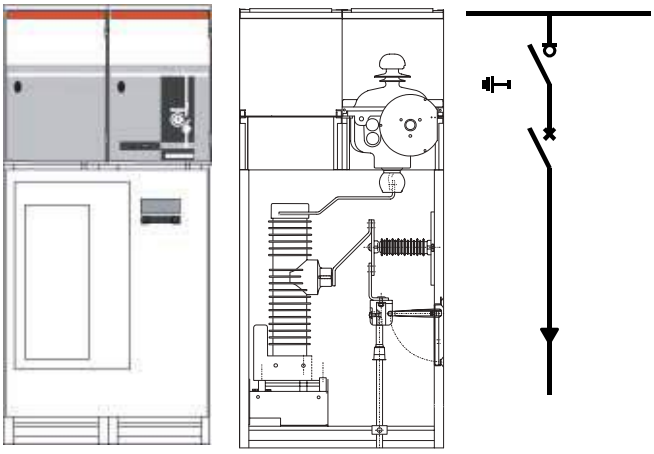
Circuit Breaker Cubicle, type CBC



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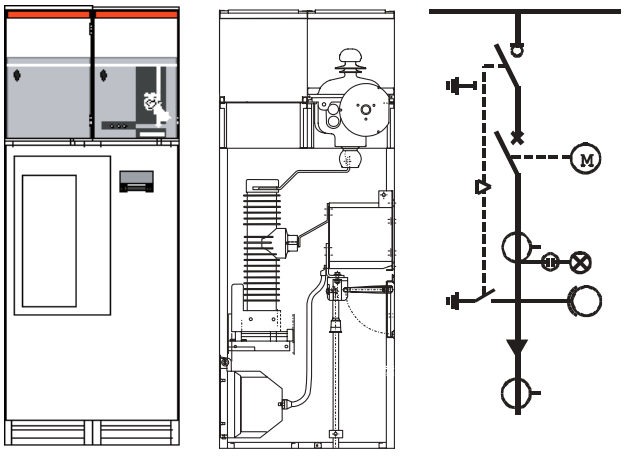
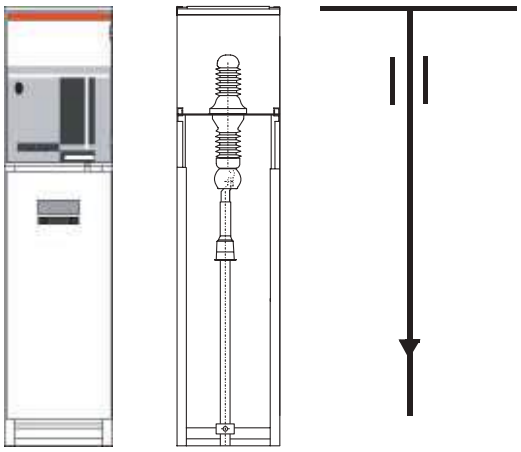


Width: 750 mm
Height: 1885 mm

Cubicle Program

Direct Busbar connection Cubicle, type DBC



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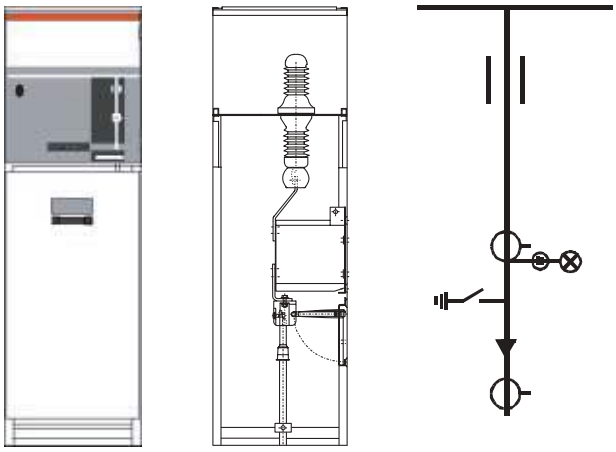
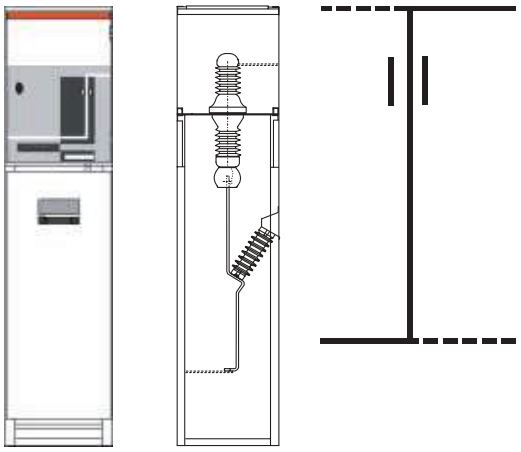


Width: 500 mm
Height: 1635 or 1885 mm

Bus Riser Cubicle, type BRC



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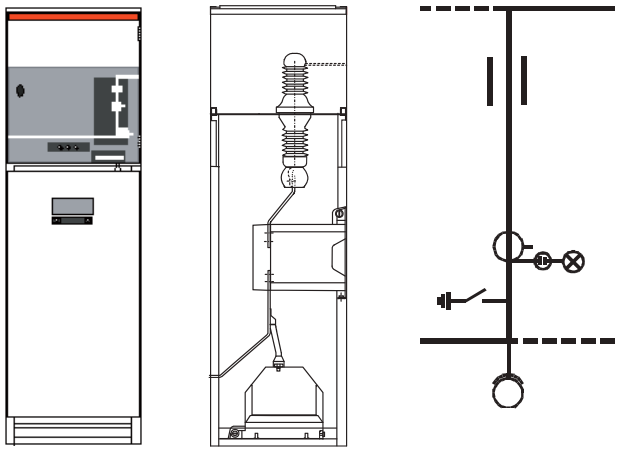

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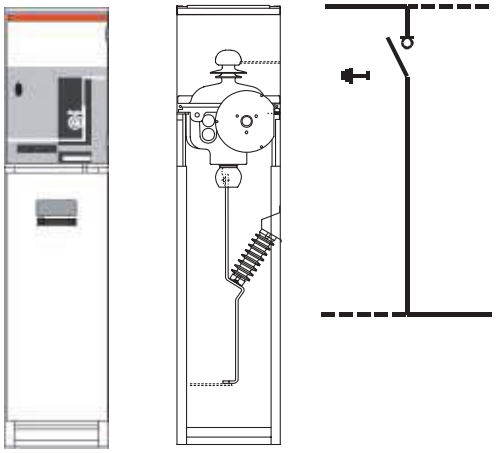
Sectionalizing Cubicle, type SEC



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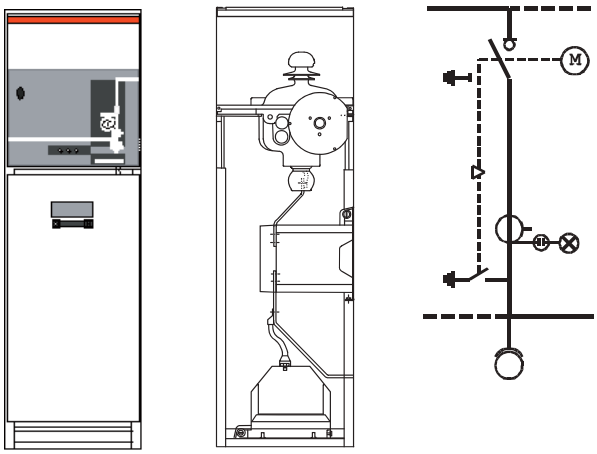

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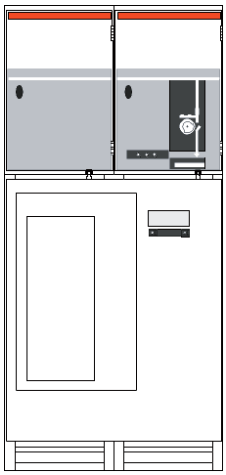
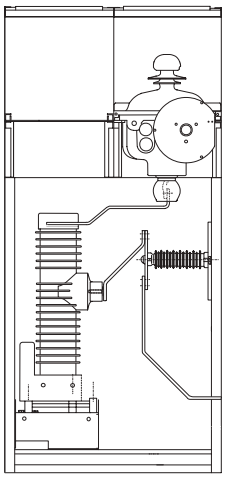
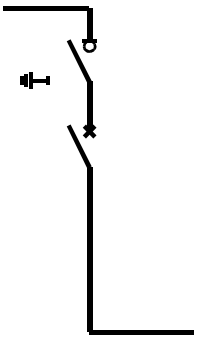
Height: 1885 mm

Cubicle Program

Sectionalizing Breaker Cubicle, type SBC







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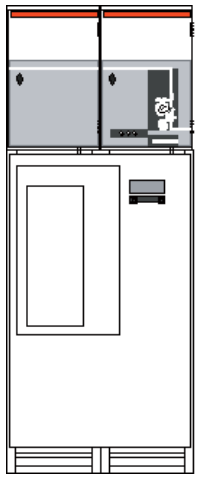

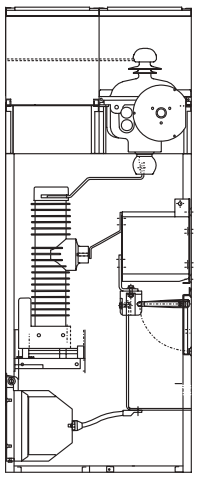

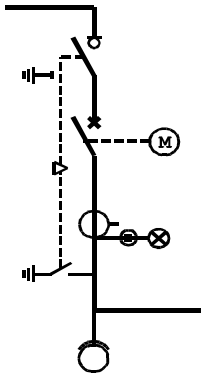

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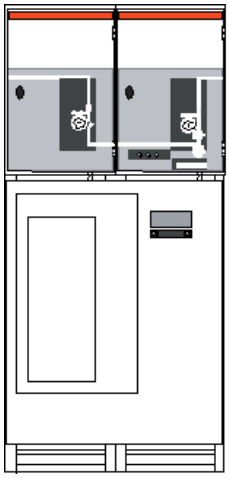
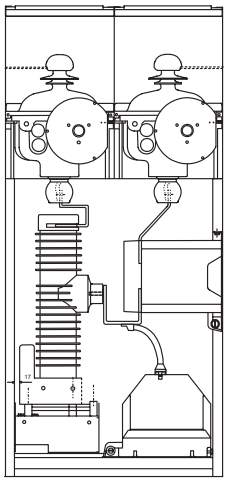
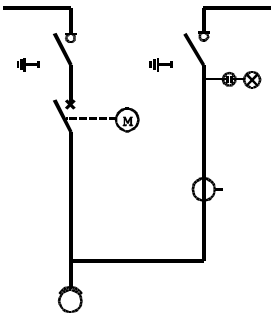
Sectionalizing Metering Cubicle, type SMC

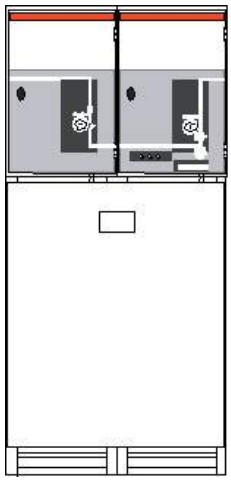


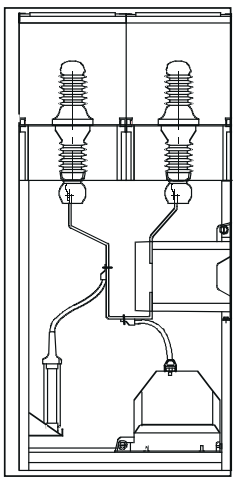


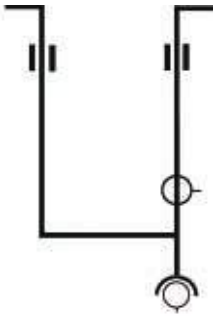


Width: 750 mm
Height: 1635 or 1885 mm

Bus Metering Cubicle, type BMC







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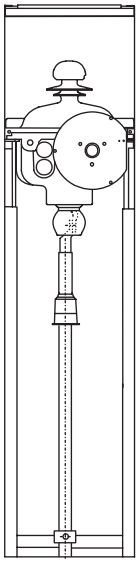
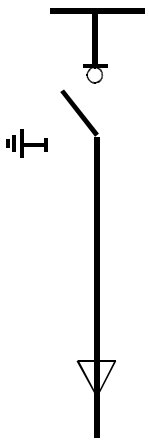




Switch Disconnector Cubicle type SDC

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

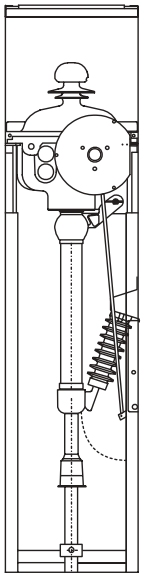
Bottom unit, including
- enclosure of cable compartment
- cable entry with cable support

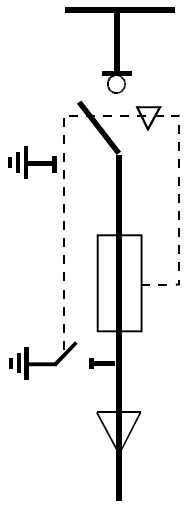
Cubicle Accessories

- 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
Max. rated duration of short circuit	[s]	2	3	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





Switch Disconnector 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

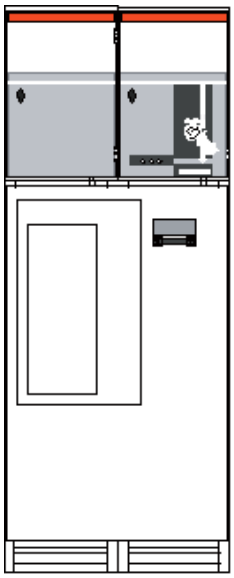
Bottom unit, including
- earthing switch type EF
- fuse base
- enclosure of cable compartment
- cable entry with cable support

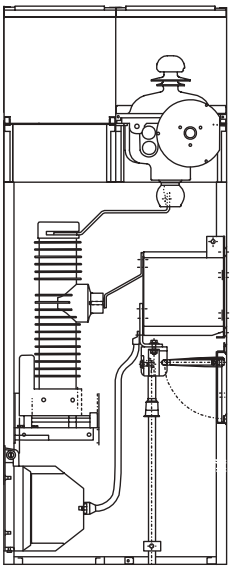
Cubicle Accessories

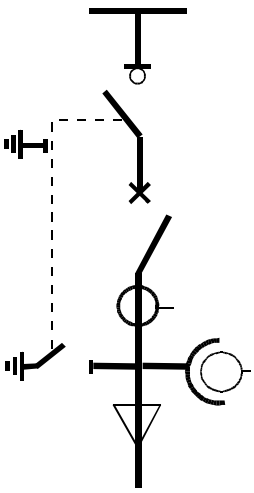
- integrated voltage indicators or socket interface for portable indicators
- auxiliary contacts for each position, 2NO+2NC
- gas density indication with alarm contact
- emergency tripping
- tripping coil
- motor operation device
- voltage transformers
- arc-gas channel
- channel for control cables
- 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
Max. rated duration of short circuit	[s]	2	3	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







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

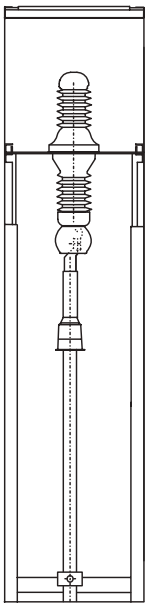
Bottom unit, including
- earthing switch type EM
- enclosure of cable compartment
- cable entry with cable support

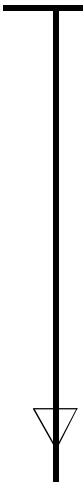
Cubicle Accessories

- 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
Max. rated duration of short circuit	[s]	2	3	3
Cubicle dimensions				
- width	[mm]	750	750	750
- depth	[mm]	940+215	940+215	940+215
- height	[mm]	1635/1885	1635/1885	1635/1885





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

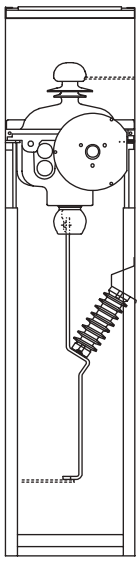
Bottom unit, including
- enclosure of cable compartment
- parallel cable connection possibility
- cable entry with cable support

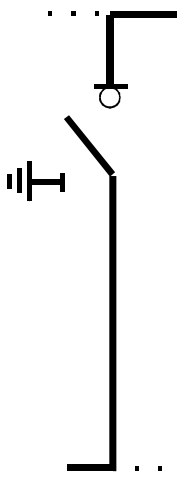
Cubicle Accessories

- 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
Max. rated duration of short circuit	[s]	2	3	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





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.

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

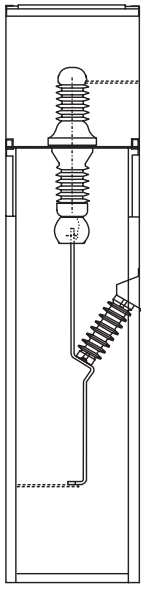
Bottom unit, including
- enclosure with sectionalizing busbars
- bottom cover

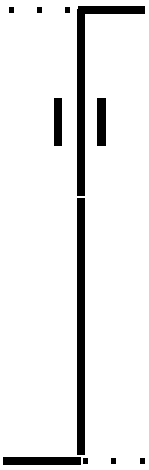
Cubicle Accessories

- 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
- anti condensation heater
- through-going earthing bar
- apparatus earthing bar
- voltage transformers

Data SEC

Rated voltage	[kV]	12	17,5	24
Rated current	[A]	630	630	630
Rated short-time withstand current	[kA]	25	20	20
Max. rated duration of short circuit	[s]	2	3	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





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

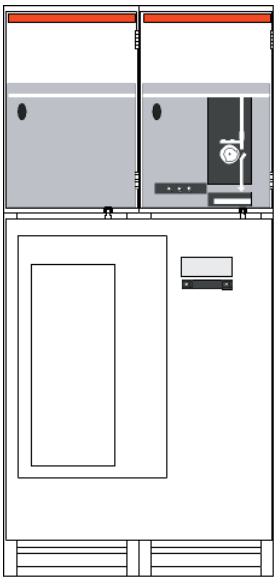
Bottom unit, including
- enclosure with bus riser bars
- bottom cover

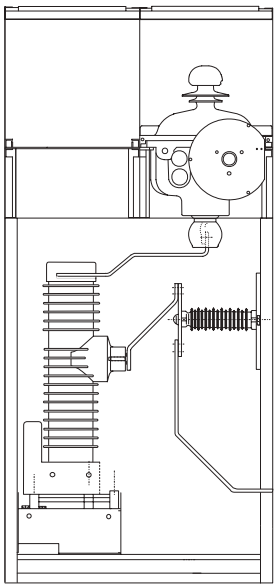
Cubicle Accessories

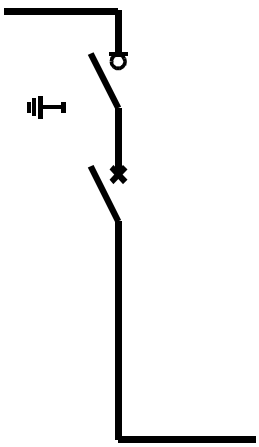
- current transformers
- voltage transformers
- earthing switch with position indication
- auxiliary contacts for earthing switch, 2NO+2NC
- arc-gas channel
- channel for control cables
- anti condensation heater
- through-going earthing bar
- integrated voltage indicators

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]	2	3	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







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

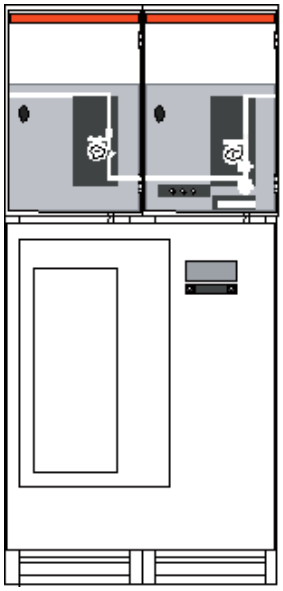
Top unit on left hand side, including
- integrated low voltage compartment for secondary components
- enclosure of busbar compartment

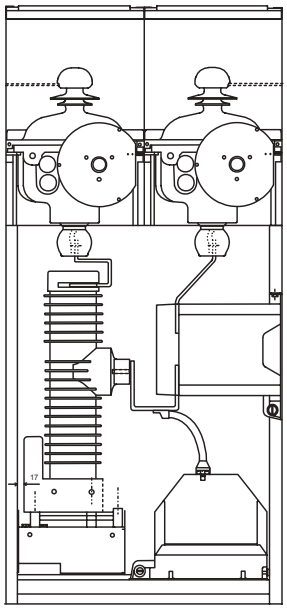
Cubicle Accessories

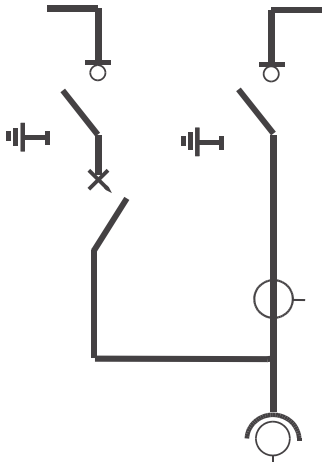
- circuit breaker, vacuum- or SF6-type
- integrated voltage indicators or socket interface for portable indicators
- current transformers
- voltage transformers
- auxiliary contacts for each position, 2NO+2NC
- gas density indication with alarm contact for switch disconnector
- motor operation device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

Data SBC

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







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 separetly operated 3-position, SFG type switch disconnectors. Switch disconnectors are located at both ends of the secitonalized 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

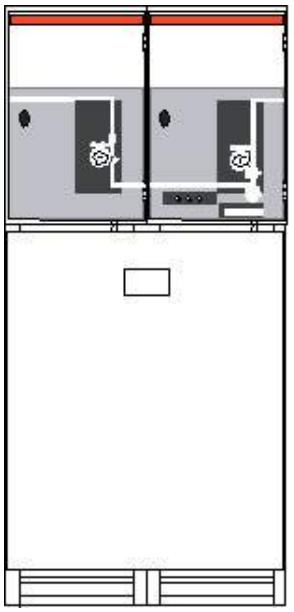
Bottom unit, including
- enclosure of busbar compartment

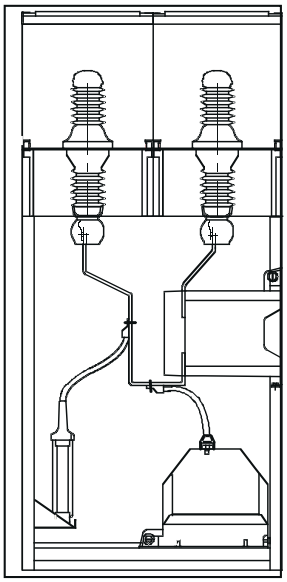
Cubicle Accessories

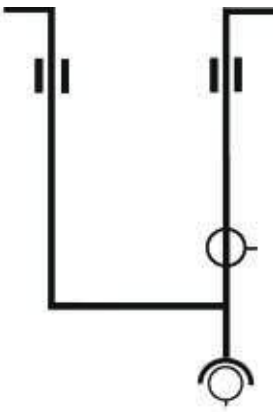
- circuit breaker, vacuum- or SF6-type
- integrated voltage indicators or socket interface for portable indicators
- auxiliary contacts for each position, 2NO+2NC
- gas density indication with alarm contact for switch disconnector
- current transformers
- voltage transformers
- channel for control cables
- arc-gas channel
- 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
Max. rated duration of short circuit	[s]	2	3	3
Cubicle dimensions				
- width	[mm]	750	750	750
- depth	[mm]	940+215	940+215	940+215
- height	[mm]	1635/1885	1635/1885	1635/1885







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

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

Bottom unit, including
- enclosure of busbar compartment

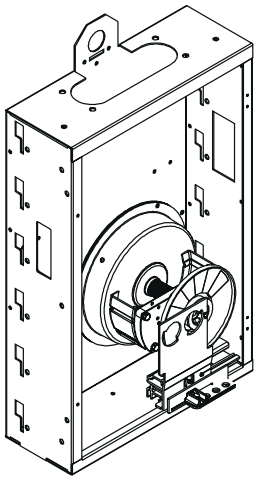
Cubicle Accessories

- 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

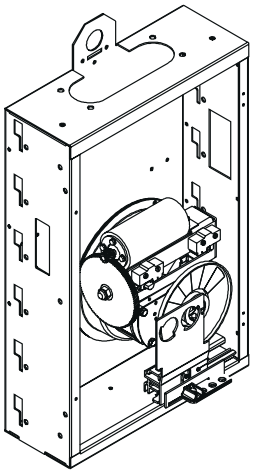
Data BMC

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

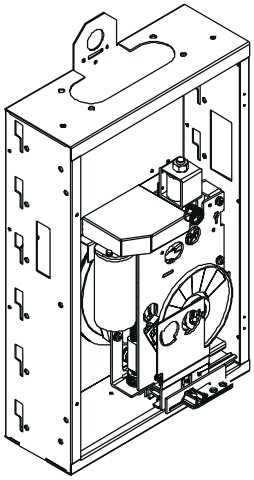
5. Uniswitch
Components & Accessories



Single spring mechanism



Single spring mechanism with motor



Double spring mechanism with motor

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
- SBC
- SMC

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.

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.

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.

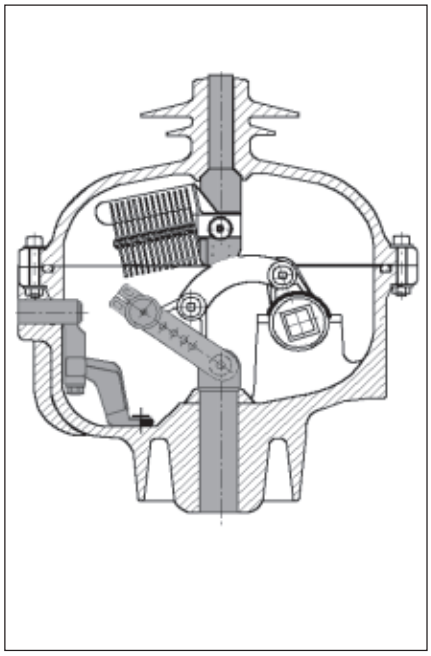
The same mechanism is used to operate the switch positions between OPEN – CLOSE and OPEN – EARTH. The UES-A3/2 is also used to operate the earthing switch EF. There has to be always the central interlocking module 1VFJ220001R2 fully assembled in the front of the UES-A3/2 during the operation.

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 isconnector 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



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
- earth position 2NO-2NC

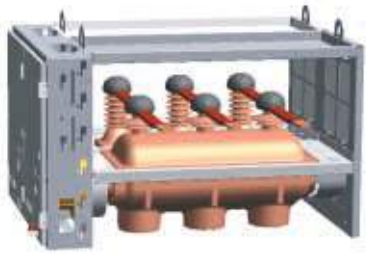
Shunt trip coil:
For SFG with UES-A3 operating mechanism.

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

Motor operation: See item 5.4.

Rated voltage Ur	**[kV]**	**12**	**17,5**	**24**
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]	800	800	630
Rated short-time withstand current	[kA]	25	20	20
Max. rated duration of short circuit	[s]	2	3	3
Rated peak withstand current	[kA]	62,5	50	50
Breaking capacity (IEC 60265-1)				
Mainly active load	[A]	630/800	630/800	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	920
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 3)	- 5 3)	- 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.



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

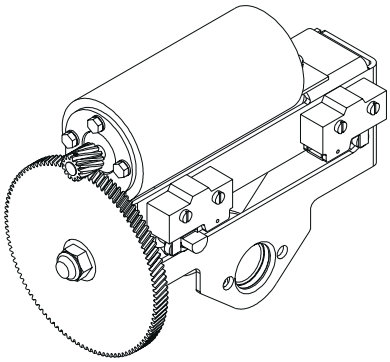
(Insulated with heat shrink sleeve)

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

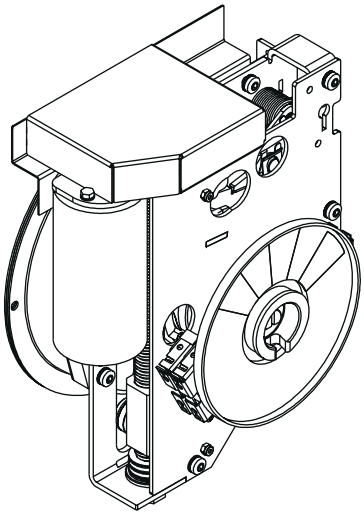
Field control caps for 24 kV

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
Max. rated duration of short circuit	[s]	2	3	3
Material		Cu	Cu	Cu
Insulation		no	no	yes
Dimension	[mm]	40x8	40x8	40x8



For single spring mechanism



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 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 aux. contacts on switch disconnector are required.

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

Type	Circuit diagram
UEMC 40 K8-12 VDC/3	31 UEMC 366
UEMC 40 K8-24 VDC/3	"
UEMC 40 K8-48 VDC/3	"
UEMC 40 K8-60 VDC/3	"
UEMC 40 K8-110 VDC/3	"
UEMC 40 K8-125 VDC/3	"
UEMC 40 K8-220 VDC/3	"

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
1VFU 120003R2-12VDC	31 UEMC 368
1VFU 120003R2-24VDC	"
1VFU 120003R2-48VDC	"
1VFU 120003R2-60VDC	"
1VFU 120003R2-110VDC	"
1VFU 120003R2-125VDC	"
1VFU 120003R2-220VDC	"

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.

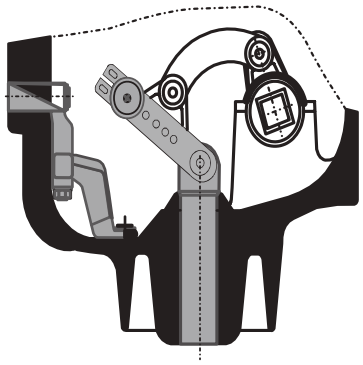
Control unit

Type	Circuit diagram
UEZJ 1 -12VDC/7	31 UEMC 364
UEZJ 1 -24VDC/7	"
UEZJ 1 -48VDC/7	31 UEMC 365
UEZJ 1 -60VDC/7	"
UEZJ 1 -110VDC/7	"
UEZJ 1 -125VDC/7	"
UEZJ 1 -220VDC/7	"
UEZJ 1 -110VAC/7	"
UEZJ 1 -230VAC/7	"

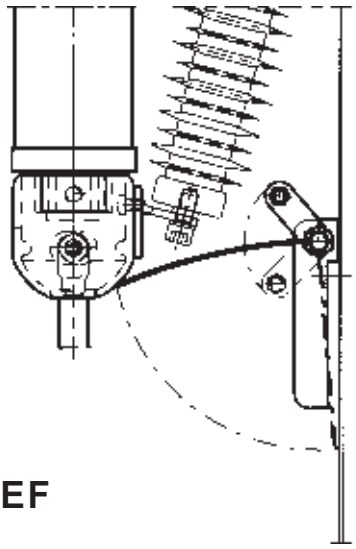
Control push buttons

Type UEZJ 3

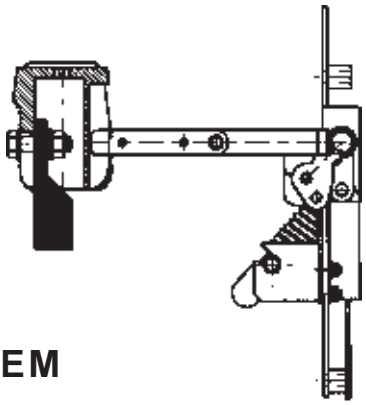
Includes:
- I-button with text CLOSE
- O-button with text OPEN
- On/Off selector switch with text REMOTE ON/OFF



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.

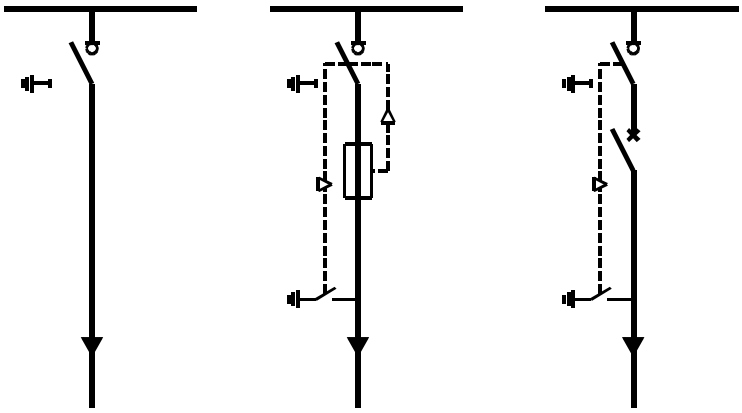
For fuse base (down-stream)
EF - 210

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 capacity				
EF - 210	[kA]	5	5	5
EM - 210	[kA]	62,5	50	50

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

HD4/S with PR521 overcurrent release

SF6-Circuit Breaker, HD4/S

HD4/S[(1)] 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).

Ranges of application

The HD4/S 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 HD4/S circuit breakers are suitable for use in MV/LV unmanned substations without auxiliary power supply 1).

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.

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 HD4/S the ideal circuit breaker in M.V. distribution substations.

Basic equipment 2)

- 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
- 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
- Operation counter
- PR521 + 2/3 current sensors built in the circuit breaker.

Notes

1) Installation of PR521 release and relative current sensors is not possible for circuit breaker with 24 kV rated voltage.

2) Although the basic equipment is supplied as standard, it must always be specified when ordering (see the section Compulsory accessories in the Esafluor HD4/S technical catalogue) for customization.

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

4) The pressure switch is always provided with two intervention thresholds. The first threshold intervenes for low pressure and intervention is signalled by contact B63 changing over (see electrical diagram 401738, fig. 11). The second threshold intervenes for insufficient pressure and intervention is signalled by the second contact B63 closing (see electrical diagram 401738, fig. 11). The control circuit is made by the customer. Circuit-breaker ordering codes
   - The circuit-breaker selected must be completed with the accessories specified in the standard fittings (see Kits B and C on page 12 of the HD4/R circuit-breaker catalogue; the optional accessories are indicated on page 14 of the HD4/R catalogue).
   - Should the pressure switch accessory be required, specify the request at the time of ordering the circuit-breaker as subsequent application is not possible by the customer.

Circuit breaker types

U [kV]	In [A]		Description	Without pressure switch 4) UXAB 3)
12	**630**	**12,5**	HD4/S 12.06.12	**348121111**
		16	HD4/S 12.06.16	**348121121**
		20	HD4/S 12.06.20	**348121131**
		25	HD4/S 12.06.25	**348121141**
17,5	**630**	**12,5**	HD4/S 17.06.12	**348123111**
		16	HD4/S 17.06.16	**348123121**
		20	HD4/S 17.06.20	**348123131**
24	**630**	**12,5**	HD4/S 24.06.12	**348124111**
		16	HD4/S 24.06.16	**348124121**
		20	HD4/S 24.06.20	**348124131**

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

1) Unique ratings on request

TPU 43.13

TPU 63.13

Current transformers

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)

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

/p	(A)	50	75	100	150	200	300	500	600
/th	(kA 1s)	25	25	25	25	25	25	25	25
/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

/p	(A)	100	150	200	300	500	600
/th	(kA 1s)	25	25	25	25	25	25
/th	(kA 3s)	16	20	25	25	25	25

Voltage transformers

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:√3 kV and 22:√3 kV and for all normal secondary voltages; e.g. 100: √3 V, 110: √3 V, 115: √3 V and 120: √3 V.

The voltage transformers type UMZ 24-1 must be connected to the primary using the HV connecting cable KREZ 15, when using single pole insulated voltage transformers.

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 of 100 ohm (for 100:3 V and 110: 3 V).

UMZ 12-1
UMZ 17-1
UMZ 24-1

Type	**UMZ 12-1**						**UMZ 17-1**						**UMZ 24-1**					
Primary voltage	1000:√3....12000:√3						1000:√3....17500:√3						1000:√3....24000:√3					
Terminal marking	A-N						A-N						A-N					
Max. number of sec. windings	3						3						3					
Winding	Measuring winding				Earth fault winding		Measuring winding				Earth fault winding		Measuring winding				Earth fault 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	10	25	50	75	75	125	7,5	25	50	125	75	125	10	25	50	75	100	150
Secondary thermal limiting current U = 1.2 x Un U = 1.9 x Un	7 6				- 6		7 6				- 6		7 6				- 6	

1) Valid for single measuring winding only.

Available outputs for double measuring windings are calculated on request.

If higher burdens are required, the following voltage transformers can be used, but the risk for ferroresonance is increased. The earth fault windings shall be connected in open delta with a damping resistor 27 Ω, 450 W (for 110:3 V) or 22 Ω, 450 W (for 100:3 V).

Type	UMZ 12-1						UMZ 17-1						UMZ 24-1					
Primary voltage	1000:√3....12000:√3						1000:√3....17500:√3						1000:√3....24000:√3					
Terminal marking	A-N						A-N						A-N					
Max. number of sec. windings	3						3						3					
Winding	Measuring winding				Earth fault winding		Measuring winding				Earth fault winding		Measuring winding				Earth fault 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 = 1,9 x Un	20	50	100	150	50	100	20	50	100	150	50	100	25	50	100	200	50	100
Secondary thermal limiting current U = 1.2 x Un U = 1.9 x Un	7 6				- 6		7 6				- 6		7 6				- 6	

1) Valid for single measuring winding only.

Available outputs for double measuring windings are calculated on request.

Combi / Current sensor KEVCD

*REF 54_*

Sensor Technology

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 technogoly 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 specifially 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.

REF 54_

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

Low Voltage Compartment

Front view
750 mm (CBC) cubicle

750 mm (CBC) cubicle
(one part)

375 mm (SDF) cubicle

The Uniswitch system contains an integrated low voltage compartment whitch 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.

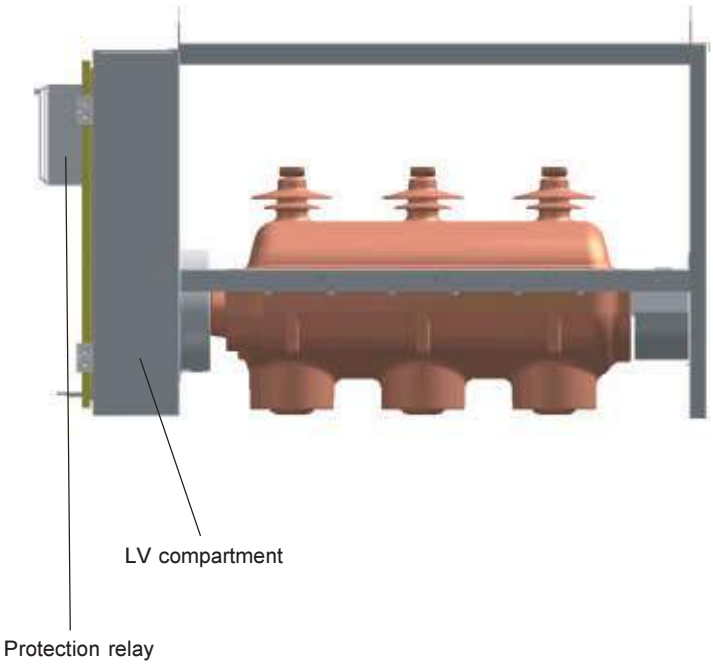
Cable inlet from cable channel, panel and between different panels are shown in item 5.13.

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
(width x hight x depth)



CL-497

CL-498

Voltage Presence Indicating System (VPIS)

Capacitive voltage presence indicating system for Uniswitch ≥ 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

Connecting cables

Operating voltage [kV]	Type
6...7,2	1VMF170039P1
10...12	1VMF170040P1
13,8...17,5	1VMF170041P1
20...24	1VMF170042P1

Relays

Type of faults	IEEE device No.	IEC Symbols	Protection function	SPAA C 121	SPAA C 341	SPAJ C 140 (C 141)	SPAU 130	SPAM C150	PR 512 5)
Short circuits	51	3 I >	Three-phase non-directional overcurrent low-set stage		X	X (X)			X
	50 / 51 / 51B	3 I >>	Three-phase non-directional overcurrent high-set stage		X	X (X)		X	X
	50 / 51B	3 I >>>	Three-phase non-directional overcurrent high-set stage		X				
	51	2 I >	Two-phase non-directional overcurrent, low-set stage	X					
	50 / 51	2 I >>	Two-phase non-directional overcurrent, high-set stage	X					
Earth fault	51N	Io >	Non-directional earth-fault, low-set stage, coarse, In= 1 A and 5 A		X	X		X	X
	51N	Io > / SEF	Non-directional earth-fault, low-set stage, sensitive, In=0,2 A and 1 A			(X)			
	50N / 51N	Io >>/Io-o >	Non-directional earth-fault, high-set stage		X	X (X)			X
	67N	Io > →/ SEF	Directional earth-fault, low-set stage, sensitive, In=0,2 A and 5 A	X	X				
	67N	Io >> →	Directional earth-fault, high-set stage	X	X				
	59N	Uo >	Residual overvoltage, low-set stage	X 1)	X				
	59N	Uo >>	Residual overvoltage, high-set stage		X 1)				
	59N	Uo >>>	Residual overvoltage, instantaneous stage		X 1)				
Overload	49M	3	Three-phase therman overload (motors)					X 3)	
Over-/under-voltage	59	3U >	Three-phase overvoltage, low-set stage				X 2)		
	27	3U <	Three-phase undervoltage, low-set stage				X 2)		
Additional functions	79	O → I	Auto-recloser		X				
	46	ΔI >	Phase discontinuity		X			X	
	62BF	CBFP	Circuit breaker failure	X	X	X (X)			
	48 / 51	I_s>/I_s^2t	Start-up supervision (locked rotor, multiple starts)					X 4)	
	14	n <	Start-up supervision using speed device					X	
	37	3I <	Loss of load / under current					X	

Type of measurement

Current		3I / 2I	Three-phase / two-phase current	X	X	X (X)		X	
		Io	Neutral current	X	X	X (X)		X	
		ΔI	Degree of unbalance		X			X	
Voltage		3U	Three-phase voltage				X		
		Uo	Residual voltage	X	X				

1) Can be used instead of directional earth-fault current stage
2) Single-phase operation selectable
3) Also applicable for small distribution transformers and small and medium sized generators and feeders
4) Can be used as additional overcurrent stage, if start-up supervision not needed
5) Only available with SF6 circuit breaker, equipped with additional opening solenoid and two or three current sensors

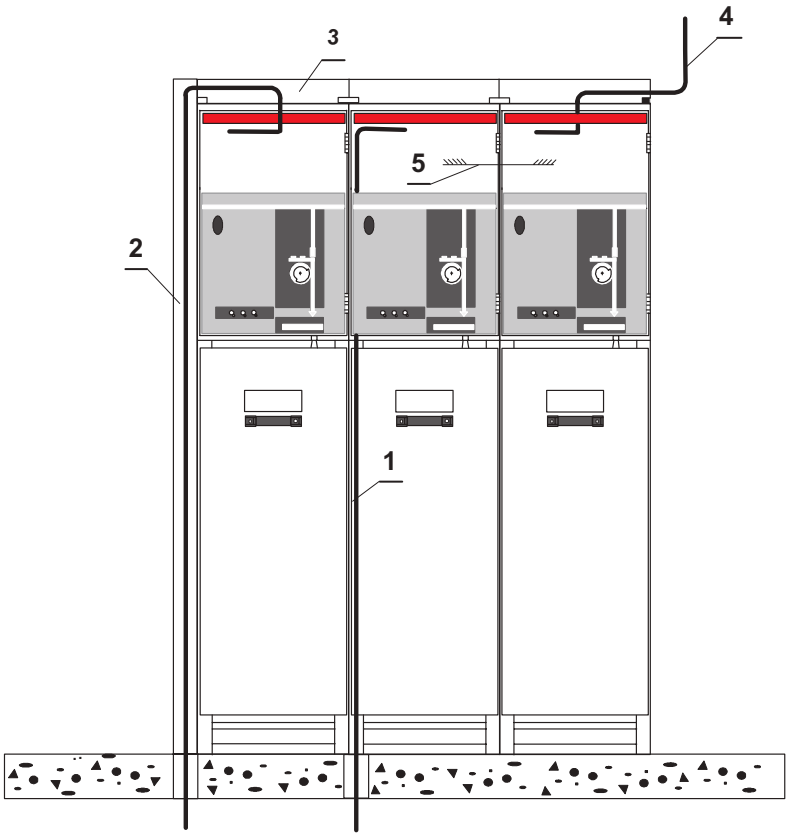
Control cable entries

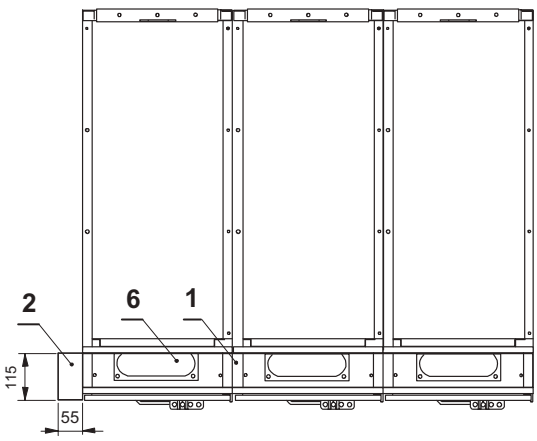
In the basic cubicle the control cable entry is in the bottom (1). An internal cable duct 30 x 60 mm is supporting the cable from the bottom up to the upper part (TopUnit). Internal wiring between cubicles (5) is easily done through openings in side walls.

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

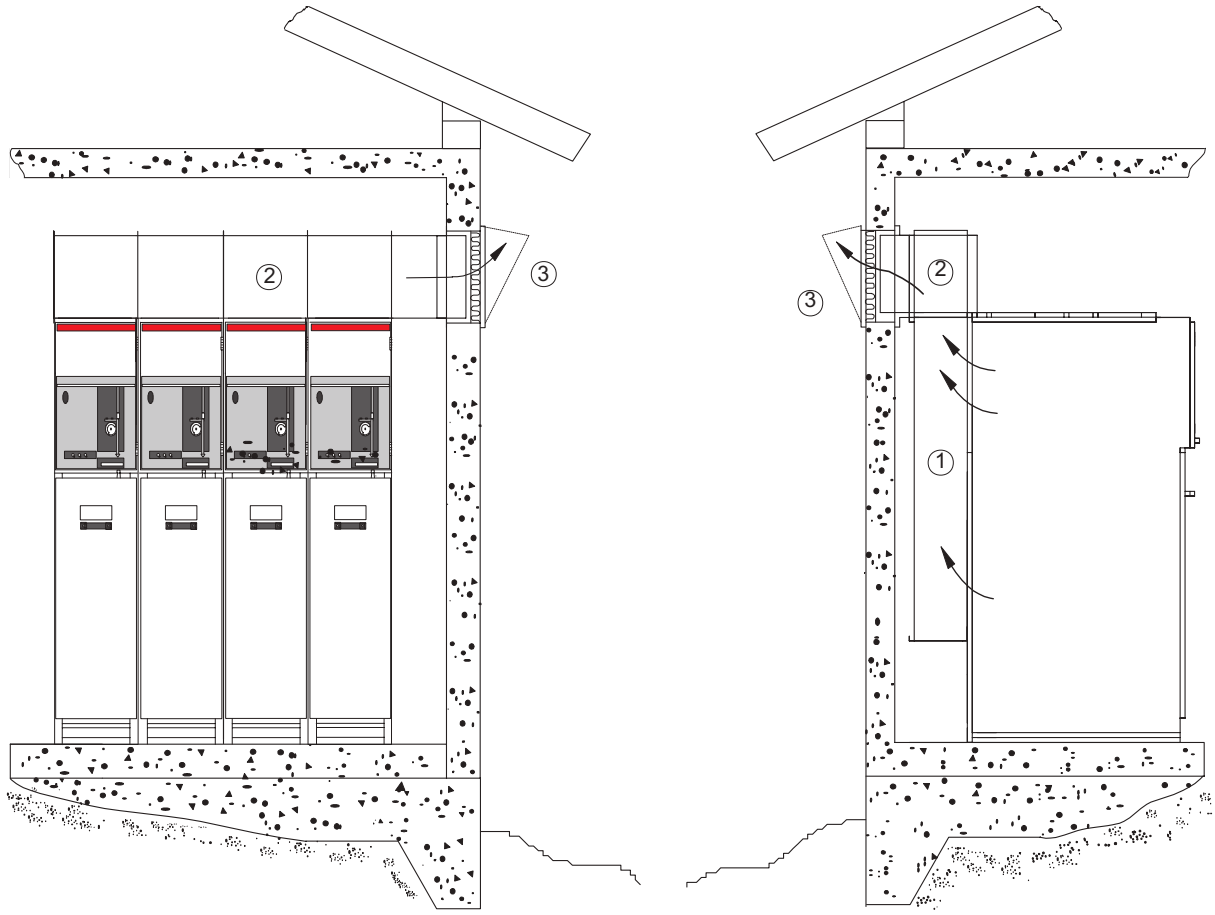
(2) At both ends of the switchgear, it is possible to have side ducts mounted.

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





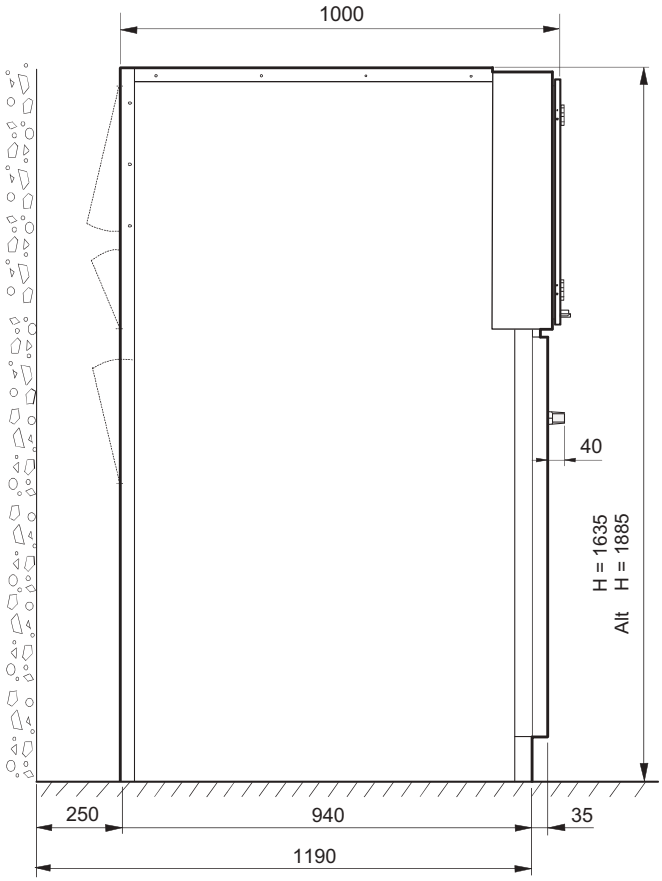
Arc gas channel



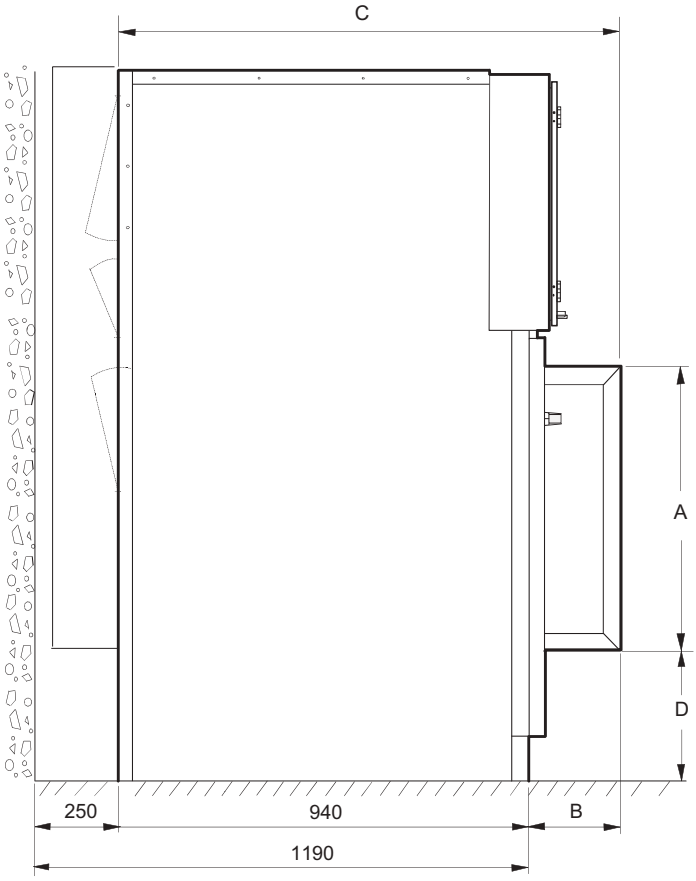
To ventilate the arc-gas out in a certain direction, arc-gas channels are available for the Uniswitch system. Vertical channel (1) on the rear of each cubicle has been connected to a common horizontal channel (2) on the top of the switchgear. The horizontal channel has been connected to an opening (3)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

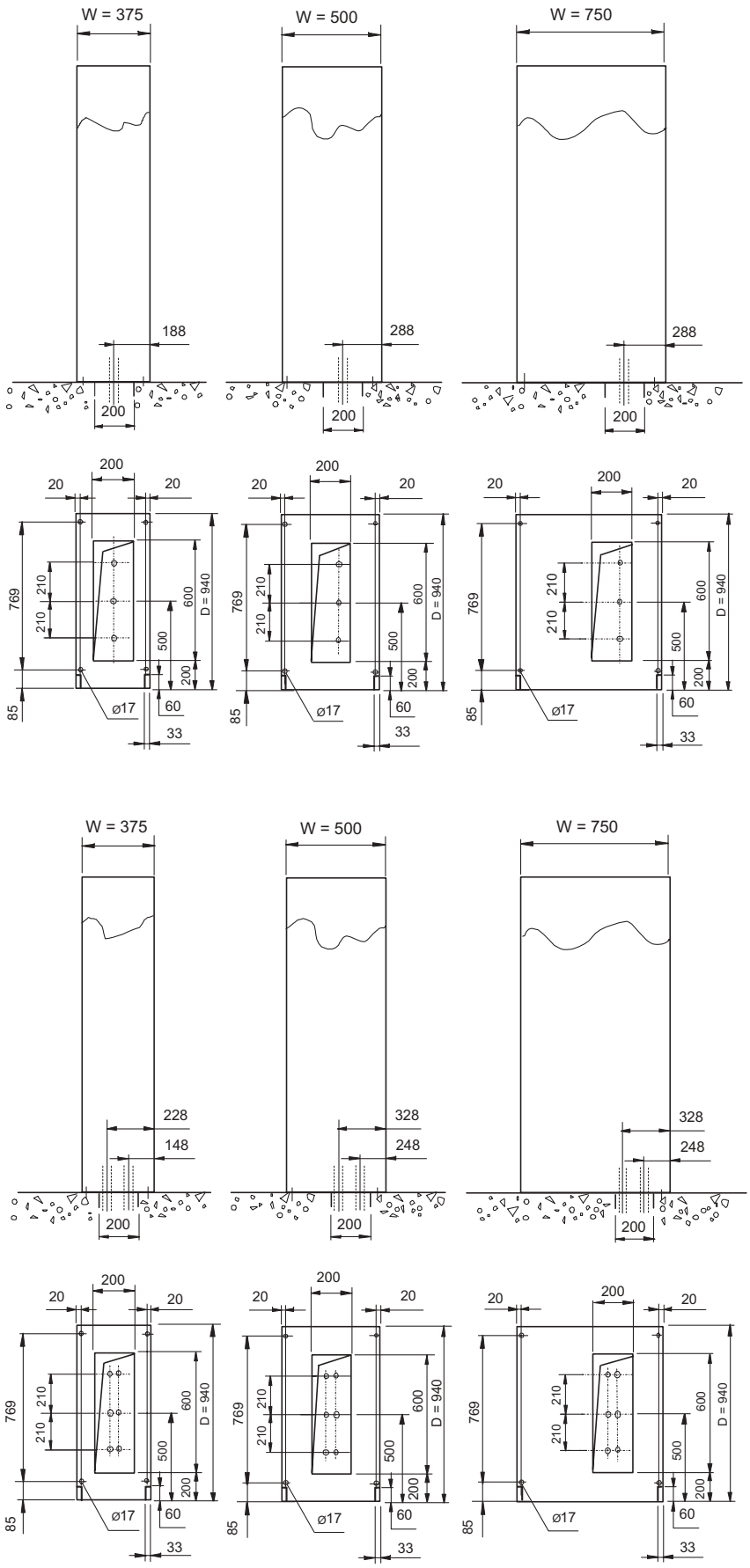
SDC
SDF
DBC
BRC
SEC
BMC

Cubicle types:

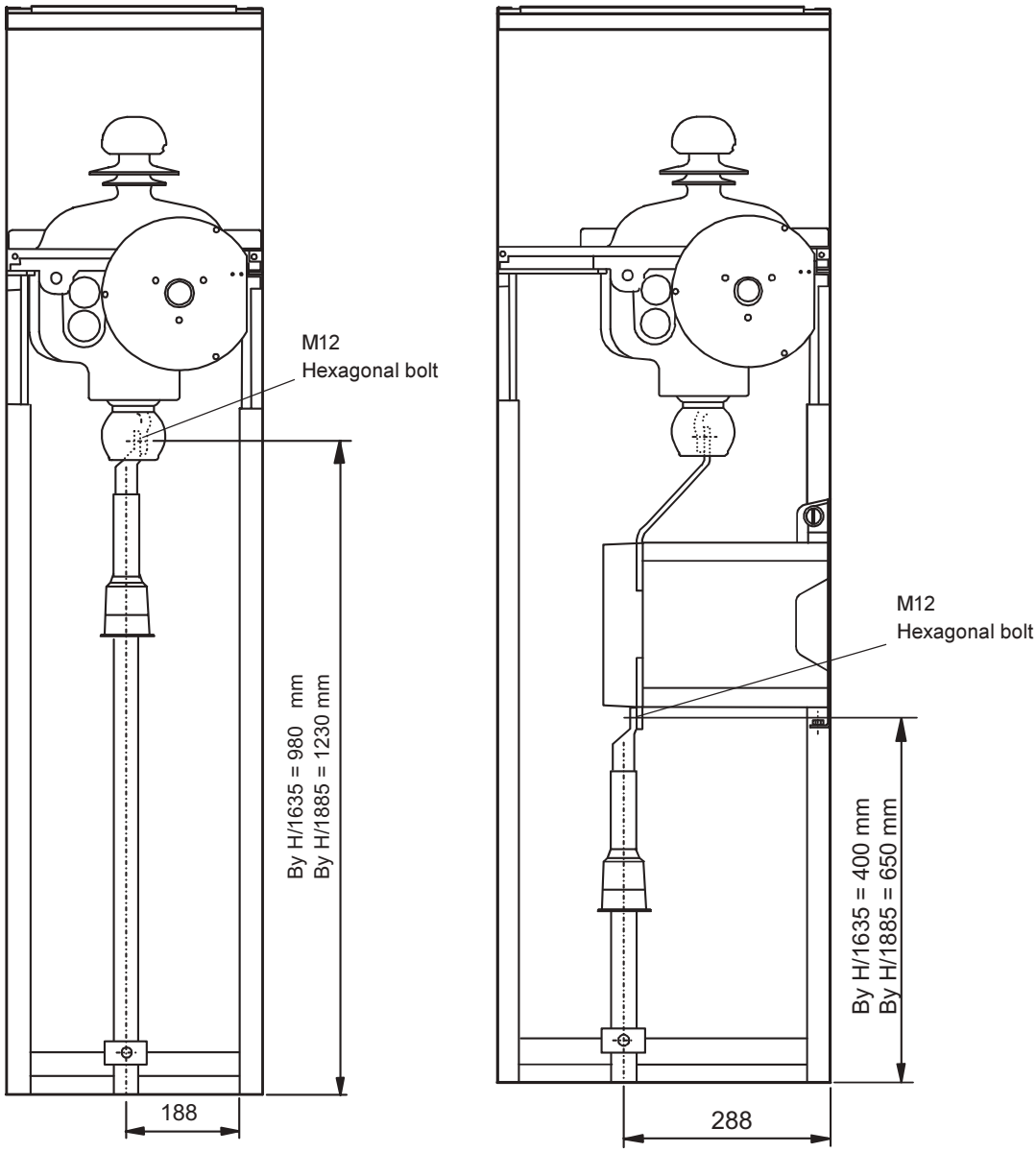
CBC
SMC
SBC

Circuit Breaker	A	B	C	D
HD4/S	652 mm	215 mm	1155 mm	230 mm by H=1635 480 mm by H=1885
VD4-S	652 mm	195 mm	1135 mm	130 mm by H=1635 380 mm by H=1885

Floor plan

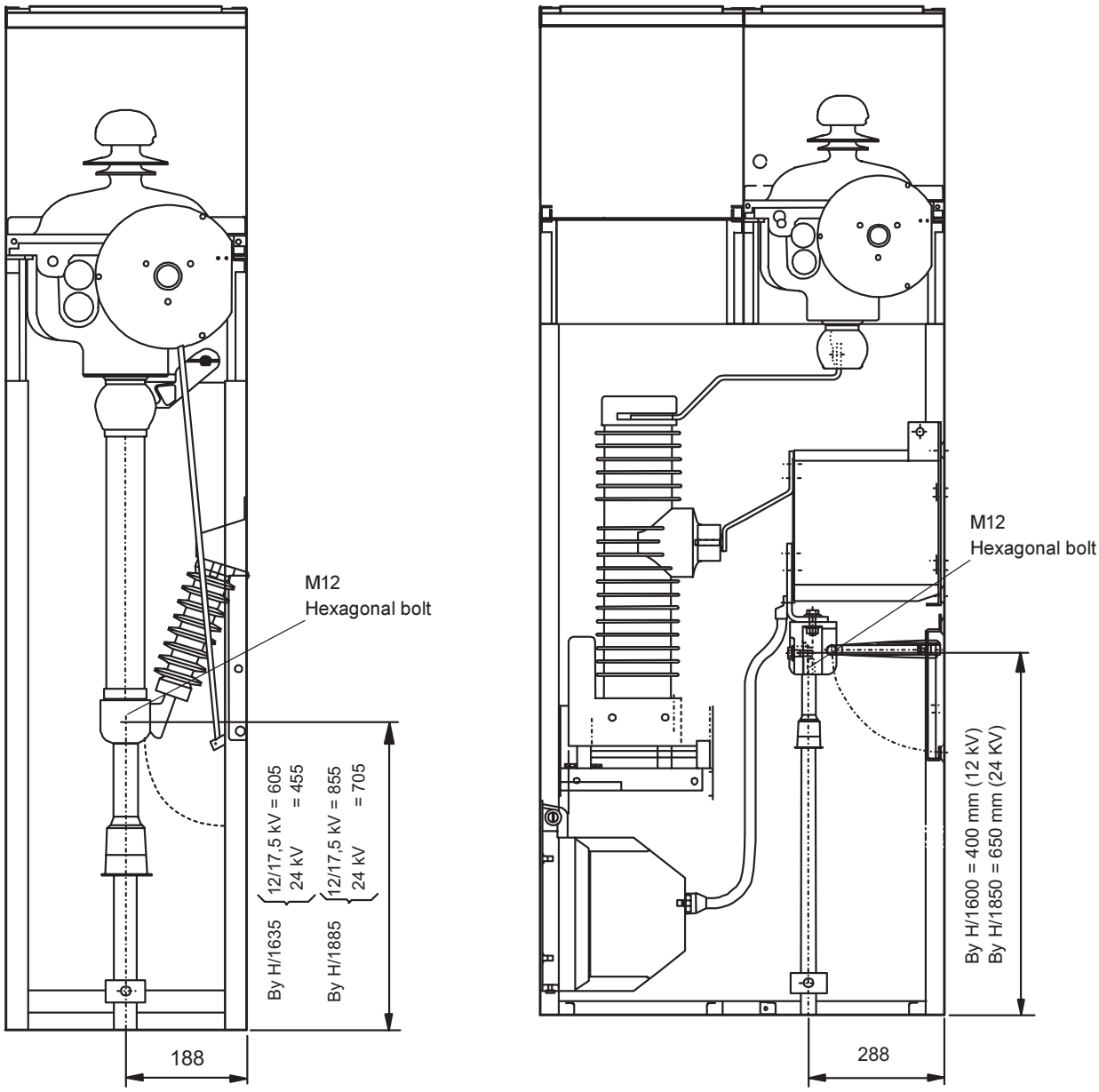

W = 375
W = 500
W = 750
188
288
288
200
200
200
200
20
20
769
210
210
600
D = 940
500
200
85
ø17
60
33
W = 375
W = 500
W = 750
228
148
328
248
328
248
200
200
200

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

Rated voltage Ur	[kV]	12	17.5	24
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
Rated current Ir				
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
Max. rated duration of short circuit	[s]	2	3	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		IP2XC	IP2XC	IP2XC
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 3)	-5 3)	-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

Rated voltage Ur	[kV]	12	17.5	24
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)	BMC 4)
- 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	420
- 750 x 1885	[kg]	-	-	440	-	-	440	-	460	440

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

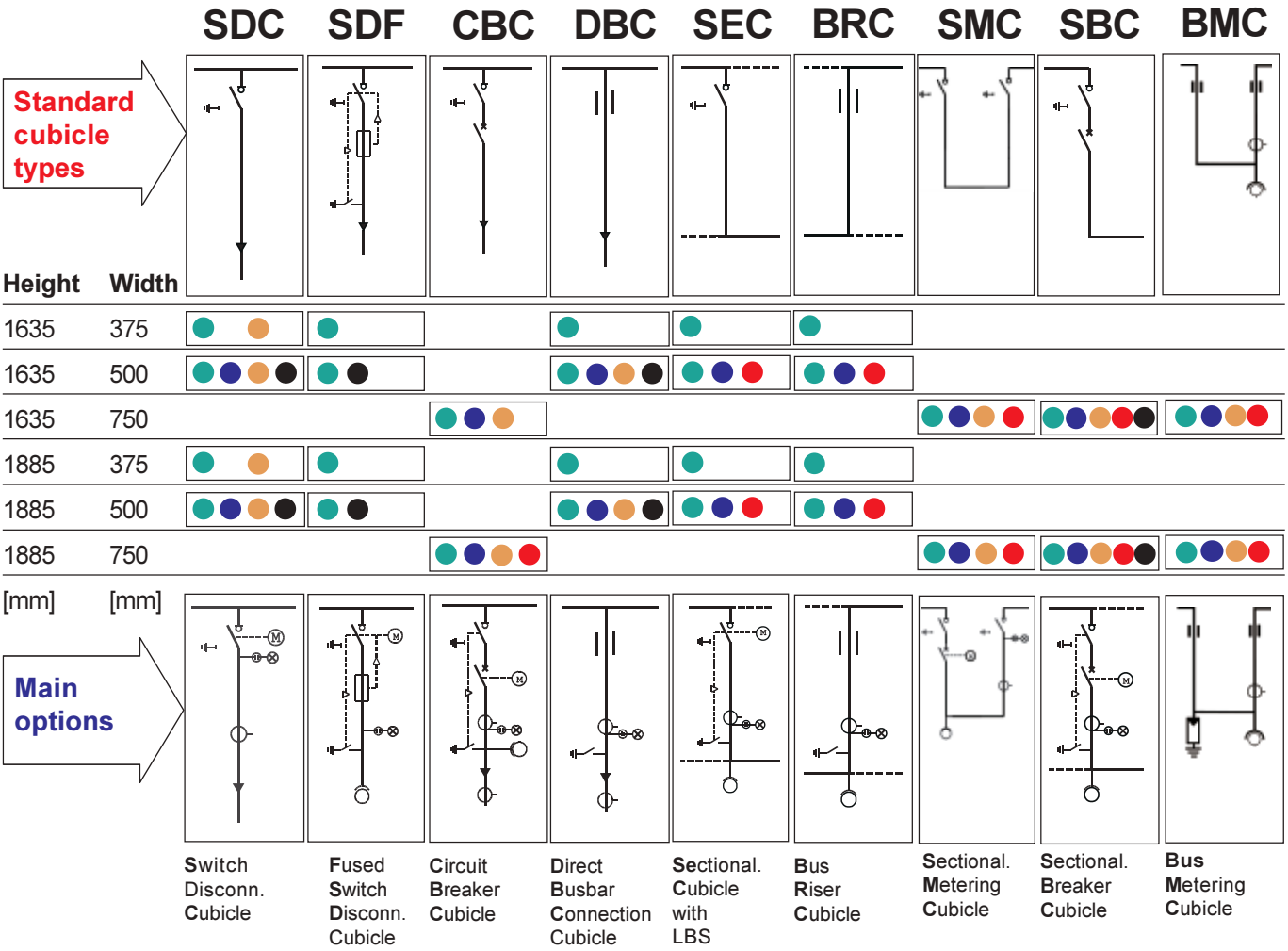
1) without CT's and VT's
2) without fuses
3) without circuit breaker
4) including CT's and VT's

Circuit breakers:
– VD4-S 74 kg
– HD4/S 103 kg

Transformers:
– 12/17,5 kV approx. 25 kg
– 24 kV approx. 30 kg

7. Uniswitch
Ordering example

The standard range of cubicles and the main options



- Voltage indicators
- Current transformers
- Surge arresters
- Voltage transformers
- VT's instead of cable connection

Waasa Graphics Oy, 1500

ABB Oy
Medium Voltage Technology
P.O. Box 613, FIN-65101 Vaasa, Finland
Phone: +358 10 22 11
Fax: +358 10 22 44661
www.abb.com

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