Uniswitch OEM Concept for Air Insulated MV Switchgear 12-24 kV
Uniswitch – OEM Concept
for Air Insulated Medium Voltage Switchgear

This concept offers OEMs an easy and smooth way to start local production of Medium Voltage Switchgears and run a profitable Switchgear business. This concept utilizes well-proven ABB technology used in ABB’s Uniswitch air-insulated switchgear for secondary distribution. The good image and references of ABB products makes it easy to get approval for locally manufactured Products. Technical support from ABB combined with the client’s knowledge and experience of the local market, reduced import duties, logistic and various other advantages guarantee successful co-operation. ABB is ready to commit and is looking for long-term co-operation to be able to plan and develop the business and make necessary investments for all parties.

A key element in this concept is ABB’s SFG; a reliable, compact and lightweight SF₆ insulated switch disconnector. The SFG is designed to be easily fitted or integrated into any kind of switchgear.

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References in more than 65 countries.
Terminology

- **OEM** (Original Equipment Manufacturer) a chosen ABB partner.
- **Uniswitch** is an ABB brand-name. Use of the Uniswitch brand-name is only acceptable subject to explicit approval by ABB.

Available options

The client may choose the most suitable of the four basic options to meet with the market requirements and available facilities.

1. **Top Unit Kit**
   Fully factory-tested SFG Switch, with sheet steel frame, spring mechanism and optional position indicator.

2. **Noble Parts Kit**
   The Noble Parts Kit consists of the main switchgear parts (without sheet steel parts) according to the customer's requirements. For example, an SFG switch, earthing switch, fuse base, etc.

3. **Uniswitch Basic Cubicle**
   (cubicle without protection relays, secondary wires etc.)
   The cubicle is fully assembled and tested by ABB's factory in Vaasa. The basic cubicle can easily be tailored by OEMs according to the requirements of the local market.

4. **Uniswitch Cubicle Kit SKD**
   (Semi Knock Down)
   The kit includes all parts (except standard parts such as screws, bolts, nuts and washers). The switchgear cubicle is delivered in parts (fully and/or partly disassembled). Noble parts such as Top Units and circuit breakers are delivered fully assembled.

OEM co-operation road map

- **Commitment & Revenue**
- **Time**
- **Co-operation**
- **Local Production**
- **Action**
- **Start Up**
- **Study**

ABB Power Partnership Program

More info from Local ABB Contact
**SFG**

**Gas-insulated indoor switch disconnector**

SFG is an SF₆ insulated three-position (close, open, earth on) switch disconnector. All electrically active parts, including the earthing switch, are in robust epoxy resin housings filled with SF₆ (1.45 bar).

SFG is a virtually maintenance-free, sealed-for-life (30 years) SF₆ unit. Simple and reliable mechanisms in a stainless steel enclosure offer high mechanical endurance. For the SFG, 1000 close/open and 1000 open/earth operations are guaranteed.

The switch disconnector is available with a single-spring mechanism for independent open/close operation, or alternatively with a double-spring mechanism with a tripping facility (fuse, coil or bush button).

The switches with both types of mechanism can easily be motorized and used as part of remotely controlled system.

For easy installation, the SFG is available with a corrosion-resistant sheet steel (AluZink) frame. The switch with a frame is called a "Top Unit".

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**Superior features and various advantages**

- **Compact size**
- **Non-corrosive leakproof enclosure**
- **Voltage indication contact**
- **Operating mechanism**

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**Pressures relief flaps**

**Top Unit frame**

**Gas gauge or pressure indicator**

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**Gas valve**

**Inspection windows**

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**Voltage indication display**

**Interlocking device**
Safety: user value

Safety of the SFG means safety for the operating personnel. We keep the safety aspect of our apparatus continuously in focus; we concentrate on every step in the manufacturing process to ensure quality right down to the last detail. One way of proving our dedication to safety is compliance with IEC standards.

Highlights of safety aspects:
- Integrated voltage indicator
- Interlocking device
- Gas gauge, pressure indicator
- Inspection windows
- Non-corrosive leakproof enclosure
- Pressure relief channel

Economy: financial value

In all our solutions and applications we pay attention to economic aspects and cost optimisation during the total lifecycle of the product. The SFG is virtually maintenance free and the lifespan is a guaranteed minimum of 30 years.

Highlights of economy aspects:
- Long lifecycle
- High mechanical endurance
- Low maintenance costs
- Low environmental impact

Reliability: performance value

ABB’s long experience in switching and isolating technology is an advantage when it comes to ensuring the highest reliability of the SFG. The highest technical values and the low number of moving parts guarantee reliable operation throughout the entire lifespan of the product. The epoxy resin enclosure prevents negative effects from external disturbances and stresses.

Highlights of reliability aspects:
- Each unit is stringently tested
- Used worldwide in the Uniswitch
- Extremely durable and reliable operating mechanism
- Local ABB support globally

Smart integration: process value

We believe that our customers rate smart integration as one of the most important features. The SFG concept is based on modular construction, which offers many flexible opportunities for you to decide on the best solution. To meet your requirements and fulfill your needs, the SFG concept includes a full range of operating mechanisms and accessories.

Highlights of smart integration:
- Compact size
- One switch – many applications
- Easy installation
- Part of the ABB solution

ABB support for OEMs

- Full and broad portfolio of Products and Systems
- Technology developed to fit with OEM demands
- Products tested according to IEC standards and complying with other main standards (ANSI, GOST, GB)
- Experienced project handling from S to XXL
- Products accepted by all end customers
- Service with worldwide access
- Tools available to support OEM businesses (e.g. configurators)
- Power Partnership Program
SFG switch disconnector 1VFS110006R2 and single spring device UES-K3/10

SFG switch disconnector 1VFS110006R2 and double spring device UES-A3/10

SFG Top Unit 375 with single-spring device 1VFM111056R2

SFG Top Unit 500 with single-spring device 1VFM111057R2

Bushing Unit 375 1VFM111072R2

Bushing Unit 500 1VFM111073R2

SFG Top Unit 375 with double-spring device 1VFM111063R2

SFG Top Unit 500 with double-spring device 1VFM111064R2

SFG switch disconnector 1VFS110006R2 and single spring device UES-K3/10

Bushing/EM Top Unit 1VFM111071R2

Bushing Unit 500 1VFM111073R2
**Accessories**

**Doors**
- Top Unit door 375: 1VFM111010R3
- Top Unit door 500: 1VFM111011R3
- Top Unit door 375 for fuse indication: 1VFM111017R3
- Top Unit door 500 for fuse indication: 1VFM111018R3

**Single line diagrams**
- Single line diagram SDC 375: 1VFM187001P1
- Single line diagram SDC 500: 1VFM187021P1
- Single line diagram SDF 375: 1VFM187006P1
- Single line diagram SDF 500: 1VFM187026P1

**Operating and interlocking devices**
- Central locking system: 1VFJ 220030R2
- Position indicator: 1VFJ 120037R2
- Operating handle: 1VFJ 220020R2

**Motor operating device for single-spring device**
- Motor operating device: 1VFU110001R2-24VDC
- Motor operating device: 1VFU110001R2-48VDC
- Motor operating device: 1VFU110001R2-60VDC
- Motor operating device: 1VFU110001R2-110VDC
- Motor operating device: 1VFU110001R2-125VDC
- Motor operating device: 1VFU110001R2-220VDC

**Motor operating device for double spring device**
- Motor operating device: 1VFU110002R3-24VDC
- Motor operating device: 1VFU110002R3-48VDC
- Motor operating device: 1VFU110002R3-60VDC
- Motor operating device: 1VFU110002R3-110VDC
- Motor operating device: 1VFU110002R3-125VDC
- Motor operating device: 1VFU110002R3-220VDC

**Control units for motor operating device**
- Control unit: UEZJ 1-24 VDC/7
- Control unit: UEZJ 1-48 VDC/7
- Control unit: UEZJ 1-60 VDC/7
- Control unit: UEZJ 1-110 VDC/7
- Control unit: UEZJ 1-125 VDC/7
- Control unit: UEZJ 1-220 VDC/7
- Control unit: UEZJ 1-110 VAC/7
- Control unit: UEZJ 1-230 VAC/7

**Auxiliary contacts**
- Auxiliary contacts, switch disconnector: 1VFJ 120008R3
- Auxiliary contacts, earthing switch: 1VFJ 120010R3

**Voltage indication system (VIS) fixed mode**
- Bracket for VIS: 1VFM115055R2
- Indicator (CATU CL497) 12...24 kV: 1VF170037P1
- Cable 1.7 m (3-phase) 12 kV: 1VFM170040P1
- Cable 1.7 m (3-phase) 17.5 kV: 1VFM170041P1
- Cable 1.7 m (3-phase) 24 kV: 1VFM170042P1

**Bottom units**
- Bottom unit 16-375: 1VFM112001R3
- Bottom unit 16-500: 1VFM112003R3
- Bottom unit 18-375: 1VFM112002R3
- Bottom unit 18-500: 1VFM112004R3
- Locking lug for cable compartment door: 1VFM132002R3

**Fuse tripping and indicating system**
- Fuse tripping device with blown fuse indicator: 1VFM113039R2
- Blown Fuse indicator: 1VFM113040R2

**Tripping coils**
- Tripping coil: 1VFJ 120007R2-24VDC
- Tripping coil: 1VFJ 120007R2-48VDC
- Tripping coil: 1VFJ 120007R2-60VDC
- Tripping coil: 1VFJ 120007R2-110VDC
- Tripping coil: 1VFJ 120007R2-125VDC
- Tripping coil: 1VFJ 120007R2-220VDC

**Pressure indication**
- Gas density alarm contact: 1VFS120008R3
- Pressure gauge: 1VFS120008R2

**Connection parts for SFG/cable side**
- Connection bars (3-phase) 12...17.5 kV: 1VFM114023R3
- Connection bars (3-phase) 24 kV: 1VFM114024R3

**Fuse bases**
- Fuse base with EF (w/o capacitor) 12...24 kV: 1VFM113048R2
- Fuse base with EF & C1 (w/o capacitor) 12 kV: 1VFM113068R2
- Fuse base with EF & C1 (w/o capacitor) 17.5 kV: 1VFM113055R2
- Fuse base with EF & C1 (w/o capacitor) 24 kV: 1VFM113069R2

**Primary connection cable for VT**
- Primary connection cable VT, 12...24 kV: KREZ 15

**Busbars (3 phase sets)**
- Busbar 630 A, 375, 12...17.5 kV: 1VFM114001R2
- Busbar 630 A, 500, 12...17.5 kV: 1VFM114002R2
- Busbar 630 A, 375, 24 kV: 1VFM114007R2
- Busbar 630 A, 500, 24 kV: 1VFM114008R2

**Connection parts for SFG/busbar side**
- Mid panel 12...17.5 kV, 630 A: 1VFM114013R2
- Mid panel 12...17.5 kV, 1250 A: 1VFM114028R2
- Right or left panel 12...17.5 kV, 630 A: 1VFM114027R2
- Right or left panel 12...17.5 kV, 1250 A: 1VFM114029R2
- Mid panel 24 kV, 630 A: 1VFM114014R3
- Right panel 24 kV, 630 A: 1VFM114015R3
- Left panel 24 kV, 630 A: 1VFM114063R3
Technical data

Compliance with GOST and IEC standards: IEC 62271-200, IEC 60694, IEC 62271-100, IEC 60265-1, IEC 62271-102 and IEC 62271-105.

## Ratings

<table>
<thead>
<tr>
<th>Rating</th>
<th>Unit</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>kV</td>
<td>12</td>
<td>17.5</td>
<td>24</td>
</tr>
<tr>
<td>Rated lighting impulse withstand voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common value</td>
<td>kV</td>
<td>75</td>
<td>95</td>
<td>125</td>
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<tr>
<td>Across the isolating distance</td>
<td>kV</td>
<td>85</td>
<td>110</td>
<td>145</td>
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<tr>
<td>Rated short duration power frequency withstand voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common value</td>
<td>kV</td>
<td>28.1</td>
<td>38.1</td>
<td>50</td>
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<tr>
<td>Across the isolating distance</td>
<td>kV</td>
<td>32.1</td>
<td>45.1</td>
<td>60</td>
</tr>
<tr>
<td>Rated frequency</td>
<td>Hz</td>
<td>50 / 60</td>
<td>50 / 60</td>
<td>50 / 60</td>
</tr>
<tr>
<td>Rated current I</td>
<td>A</td>
<td>800</td>
<td>800</td>
<td>630</td>
</tr>
<tr>
<td>Rated short time withstand current</td>
<td>kA</td>
<td>25</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Rated duration of short circuit</td>
<td>s</td>
<td>2</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Rated peak withstand current</td>
<td>kA</td>
<td>62.5</td>
<td>50</td>
<td>50</td>
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### Making and breaking tests (IEC 60265-1, Class E3)

#### for the SFG switch

<table>
<thead>
<tr>
<th>Operation</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mainly active load current</td>
<td></td>
<td>800</td>
<td>800</td>
<td>630</td>
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<tr>
<td>Closed-loop distribution circuit current</td>
<td></td>
<td>800</td>
<td>800</td>
<td>630</td>
</tr>
<tr>
<td>Cable charging current</td>
<td></td>
<td>50 and 10</td>
<td>50 and 10</td>
<td>50 and 10</td>
</tr>
<tr>
<td>Line charging current</td>
<td></td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Cable and line charging current under earth faults</td>
<td></td>
<td>87</td>
<td>87</td>
<td>87</td>
</tr>
<tr>
<td>Short circuit making current</td>
<td>kA</td>
<td>62.5</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

### Making and breaking tests (IEC 60420)

#### for the SFG switch - fuse combination

<table>
<thead>
<tr>
<th>Operation</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated cut-off current of the fuse-switch combination</td>
<td>kA</td>
<td>25</td>
<td>20</td>
<td>20</td>
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<tr>
<td>Breaking test with long pre-arcing time of fuse</td>
<td></td>
<td>ok</td>
<td>ok</td>
<td>ok</td>
</tr>
<tr>
<td>Breaking capacity at rated transfer current</td>
<td>A</td>
<td>1530</td>
<td>1260</td>
<td>920</td>
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</tbody>
</table>

### Mechanical performance

<table>
<thead>
<tr>
<th>Operation</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical endurance of switch close / open</td>
<td></td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>Mechanical endurance of switch open / earth</td>
<td></td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum value</td>
<td>ºC</td>
<td>+40</td>
<td>+40</td>
<td>+40</td>
</tr>
<tr>
<td>Maximum value of 24 h mean</td>
<td>ºC</td>
<td>+35</td>
<td>+35</td>
<td>+35</td>
</tr>
<tr>
<td>Minimum value</td>
<td>ºC</td>
<td>-5 2)</td>
<td>-5 2)</td>
<td>-5 2)</td>
</tr>
<tr>
<td>Altitude above sea level</td>
<td>m</td>
<td>&lt; 1000 3)</td>
<td>&lt; 1000 3)</td>
<td>&lt; 1000 3)</td>
</tr>
</tbody>
</table>

1) Higher values in accordance with national standards on request.
2) Lower ambient temperature on request.
3) Higher altitudes on request.