UniSec
Medium Voltage Air Insulated Switchgear for Secondary Distribution
Product overview
UniSec - MV Air Insulated Switchgear for Secondary Distribution

Secondary Distribution

General product positioning
UniSec - MV Air Insulated Switchgear for Secondary Distribution

Secondary Distribution

General product positioning - Applications
UniSec - MV Air Insulated Switchgear for Secondary Distribution

Product Overview

UniSec

Description
UniSec air-insulated switchgear is based on a highly flexible, modular concept with fewer parts and standardized solutions that can be readily configured to meet the specific needs of each application.

Key features
- Designed & Tested acc. to latest IEC 62271-200, GOST (RU) & GB (CN) Stds
- Internal arc proof IAC AF/AFL/AFLR with different gas exhausting variants
- Loss of Service Continuity LSC2B/ LSC2A/LSC2 solutions available
- Partition Metallic PM Classification
- Load Break Switch, Vacuum Contactor, Vacuum and SF6 Circuit Breakers
- Anti-Seismic and Marine version available

Safe conditions for all applications

<table>
<thead>
<tr>
<th>Ratings</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Voltage</td>
<td>up to 24kV</td>
</tr>
<tr>
<td>Rated Current</td>
<td>up to 1250A</td>
</tr>
<tr>
<td>Rated short-time</td>
<td>up to 25kA @ 12-17kV</td>
</tr>
<tr>
<td>withstand current &amp; IAC</td>
<td>up to 21kA @ 24kV</td>
</tr>
<tr>
<td>Rated Frequency</td>
<td>50Hz / 60Hz</td>
</tr>
</tbody>
</table>
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Values

**Productivity and Flexibility**
- Maximizing your output
- Easy to Install
- Broad portfolio
- Speed up your projects

**Reliability and Safety**
- Protecting your assets
- Safety and Protection for the operator
- Reliable in harsh environment

**Sustainability and Efficiency**
- Optimizing your investments
- Footprint reduction
- Sustainable

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Its strengths, Your benefits
UniSec - MV Air Insulated Switchgear for Secondary Distribution

Values - Productivity and Flexibility

**Easy to install**

- Modular design
- Extension and upgrades always possible on both sides
- Complete access from the front (installation against the wall)
- Frontal earthing busbar
- Bottom and Top cable entry
- Just 4 fixing point to save time
- Lifting hooks for easy handling
- Installation Videos available
UniSec - MV Air Insulated Switchgear for Secondary Distribution

Values - Productivity and Flexibility

Easy to install

Different Swg room layout to use different Internal Arc exhaust types:
(only IAC versions available)

1. IAC AF up to 16kA 1s as base proposal and pressure relief inside the room
2. IAC AFL up to 12.5kA 1s with pressure relief into arc chamber built using wall on the rear of the Swg
3. IAC AFLR up to 21kA 1s with arc gas absorbers (filters) and pressure relief inside the Swg room or downward into cable trench. (25kA 1s for LSC2B panels 12-17.5kV)
4. IAC AFLR up to 21kA 1s with arc gas duct and pressure relief outside the Swg room (25kA 1s for LSC2A W750-H2.000mm panels 12kV and LSC2B panels 12-17.5kV)
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Values - Productivity and Flexibility

Broad portfolio

Different projects line-up to be covered with more than 20 typical panels:

- Units with switch disconnectors
- Units with fused switch disconnectors
- Units with frontal withdrawable circuit breaker or contactor
- Metering units
- Units with switch disconnectors and fixed/removable/withdrawable circuit breaker

Units with switch-disconnector

<table>
<thead>
<tr>
<th>SDC</th>
<th>SDS</th>
<th>SDM</th>
<th>SDD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incoming/outgoing</td>
<td>Coupler</td>
<td>Coupler with measure</td>
<td>Double switch-disconnector</td>
</tr>
</tbody>
</table>

Units with switch-disconnector and fuses

<table>
<thead>
<tr>
<th>SFC</th>
<th>SFS</th>
<th>SFV</th>
<th>WBC</th>
<th>WBS</th>
<th>BME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outgoing</td>
<td>Coupler</td>
<td>Measure</td>
<td>Incoming/outgoing</td>
<td>Coupler</td>
<td>Distributor's metering &amp; earthing</td>
</tr>
</tbody>
</table>
UniSec - MV Air Insulated Switchgear for Secondary Distribution

Values - Productivity and Flexibility

Broad portfolio

Units with switch-disconnector and removable or withdrawable circuit-breaker

- SBC: Incoming/outgoing
- SBC-W: Coupler
- SBS-W: Coupler
- SBS: Coupler
- SBR: Reversed feeder
- SBM: Coupler with meter

Unit with circuit-breaker and disconnector integrated

- HBC: Incoming/outgoing

Other Units

- DRC: Direct incoming/outgoing
- DRS: Busbar riser
- RLC/RRC: Cable riser
- UMP: Universal metering
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Values - Productivity and Flexibility

Broad portfolio

Different accessibility to the plant assured by:

- Different Loss of Service Continuity LSC2A/LSC2B
- Partition Metallic
- Withdrawable Circuit Breaker
- Different breaking technologies

LSC2A
for Switch Disconnector units with Fixed, Removable or Withdrawable Circuit-Breakers

2 main MV compartments (segregated by Switch Disconnector):

1. Busbars
2. Circuit-Breakers, Fuses, etc...

Accessibility to Apparatus compartment with service continuity of Busbars compartment and adjacent panels.

PM
Metallic Partition between compartments given by Apparatus (GSec or HySec)
UniSec - MV Air Insulated Switchgear for Secondary Distribution

Values - Productivity and Flexibility

Broad portfolio

Different accessibility to the plant assured by:

- Different Loss of Service Continuity LSC2A/LSC2B
- Partition Metallic
- Withdrawable Circuit Breaker
- Different breaking technologies

LSC2A panel type can fit

- Switch Disconnector type GSec (SF6)
- Removable or Withdrawable Circuit-Breaker type HD4/R-Sec (SF6)
- Removable or Withdrawable Circuit-Breaker type VD4/R-Sec* (Vacuum)
  * also VD4/L-Sec for SBS panel Coupler type
- Fixed Multifunctional apparatus type HySec (Vacuum CB & SF6 Disconnector)

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Values - Productivity and Flexibility

Broad portfolio

Different accessibility to the plant assured by:

- Different Loss of Service Continuity
  LSC2A/LSC2B
- Partition Metallic
- Withdrawable Circuit Breaker
- Different breaking technologies

1. Lever seat, line operating
2. Lever seat, earth operating with keys
3. Mimic diagram (dynamic)
4. Operating mechanism push-buttons (only 2S versions)
5. Voltage signalling device
6. Spring status indication (only 2S versions)
7. Blown fuses indicator (only fused version)
8. Lock for Padlocks

1. Relay on board
2. Closing pushbutton
3. Opening pushbutton
4. Open/closed indicator
5. Built-it charging lever
6. Spring status indication
7. Blown fuses indicator (only fused version)
8. Lock for Padlocks
9. UR mechanical override

Click for Operating sequence Video
**UniSec - MV Air Insulated Switchgear for Secondary Distribution**

Values - Productivity and Flexibility

**Broad portfolio**

Different accessibility to the plant assured by:

- Different Loss of Service Continuity LSC2A/LSC2B
- Partition Metallic
- Withdrawable Circuit Breaker
- Different breaking technologies

**LSC2B**

for frontal Withdrawable Circuit-Breakers and Contactors units.

3 main MV compartments (segregated by shutters):

1. Busbars
2. Cables
3. Circuit-Breakers

Accessibility to CB compartment with service continuity of Busbars and Cables compartments and adjacent panels where is required high service continuity and high ratings

**PM** Metallic Partition between compartments @ 12-17.5kV

**PI** Insulated Partition between compartments @ 24kV
UniSec - MV Air Insulated Switchgear for Secondary Distribution

Values - Productivity and Flexibility

**Broad portfolio**

Different accessibility to the plant assured by:

- Different Loss of Service Continuity
  - LSC2A/LSC2B
- Partition Metallic
- Withdrawable Circuit Breaker
- Different breaking technologies

**LSC2B panel type can fit**

- Withdrawable Circuit-Breaker type VD4/P 12-17.5kV and VD4/Sec 24kV
- Withdrawable Circuit-Breaker type HD4/Sec
- Withdrawable Contactor type VSC/P 7.2-12kV
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Values - Productivity and Flexibility

**Broad portfolio**

Different accessibility to the plant assured by:

- Different Loss of Service Continuity
  - LSC2A/LSC2B
- Partition Metallic
- Withdrawable Circuit Breaker
- Different breaking technologies

A. Aux. contacts
B. Motor charging
C. Built-in charging lever
D. Open/closed indicator
E. Operation counter
F. Plug-socket connectors
G. Spring status indication
H. Service release
I. Closing pushbutton
L. Opening pushbutton

1. Key free with ES open
2. Key free with truck in service
3. Key free with ES closed
4. ES position indicator
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Values - Productivity and Flexibility

**Broad portfolio**

LSC2B and LSC2A panels can be mixed in the same Swg line-up
- All panel types (LSC2A and LSC2B) in the same Swg line-up
- Adaptor panel (H2.000mm) needed to adjust busbars height
- Adaptor panels can be used as Incoming/Outgoing
- Both Filters and Gas Duct are available when mixing different LSC panel type
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Values - Productivity and Flexibility

Broad CB panel portfolio

HBC
630A LSC2A PM
Fixed Apparatus HySec

SBC (SBS)
630/800A LSC2A PM
Removable CB VD4/HD4, GSec

SBC-W (SBS-W)
630A LSC2A PM
Single Insulation Withdrawable CB
VD4/HD4, GSec

WBC (WBS)
1.250A LSC2B PM-PI
Double Insulation Withdrawable CB
VD4/HD4/VSC, ES
HBC details

Only 500mm wide
Direct Earthing of the cables with HySec
Flexible, used as Incoming and Outgoing
600mm Cables connection height:
- 1 cable 630mm²
- 2 cables 300mm²

Upper part
Vacuum poles for CB function
Epoxy resin

1. Vacuum pole
2. Fixed contact of Line Switch
3. Moving part in isolated position
4. Fixed contact of Earthing Switch

Lower part
SF6 3 positions Disconnector
Stainless steel

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Values - Productivity and Flexibility

SBC-W details

Single cover without screws and mechanically interlocked with GSec Earth position

From bolt connection to n°6 sliding contacts
Safety truck lock/unlock with a lever

Fast CB withdraw in 1 minute:
- where technical specification asks for withdrawn feature
- to quickly replace CB in case of need
- to have a complete access to the cables compartment for quick and easy cables connections

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Click to play video
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Values - Productivity and Flexibility

Scalable LV compartments

According to requests and different engineering content are available scalable LV compartments.

Can be integrated in standard design, IEC61850 communication with GOOSE messaging and Interlocks.
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Values - Productivity and Flexibility

**ITs for measuring**

Measuring request satisfied with CTs and VTs available in every panel type and position including busbars compartment.

Current Transformer basic proposal must be with Ring CTs fitted in the bottom of the unit.

Other proposal/combinations with DIN CTs are possible.

* According to cable dimension; alternative with mounting in cable trench is available.
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Values - Productivity and Flexibility

**Speed up your projects**

**Filters**
NO civil works required with gas evacuation inside the switchgear room

**Skid**
Reduce drastically the commissioning activity with a complete Switchgear delivery thanks to the Skid
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Values - Productivity and Flexibility

Digital to Speed up your projects

Reduced Engineering activity and component lead time with Digital version:

IEC61850 communication and GOOSE messaging (ie. ATS)
Reduce hard wiring improving reliability and decreasing engineering and on-site activities

Sensors
wide dynamic operating field, shorting engineering activities and always with linear response

Toroidal current transformer
perfectly working with ABB Relion IEDs; few type to cover the range shorting engineering activities

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Values - Productivity and Flexibility

**Speed up your projects**

**Smart Grid**

Requests are:
- Manage faults reducing duration and frequency
- Improve power quality
- Manage power flow due to distributed generation (DG)

Solution is:
- Introduce automation and communication concept into MV Switchgear
- UniSec gives flexibility, measurement, compactness

UniSec Smart Grid concept provides preconfig. packages depending on network complexity and different network’s automation degree
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Values - Productivity and Flexibility

**Speed up your projects**

Smart Grid

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UniSec Smart Grid concept provides preconfig. packages depending on network complexity and different network’s automation degree

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Values - Reliability and Safety

**Safety and Protection for the operator**

Higher level to avoid blackouts and injuries UniSec is «Native» acc. to latest IEC62271-200

From Constructive criteria/ Maker point of view Metal Clad/ Metal Enclosed (Old 60298)

To Operator related criteria/ User point of view

Loss of Service Continuity

... with higher safety given by more sever Type Tests rules
UniSec - MV Air Insulated Switchgear for Secondary Distribution
Values - Reliability and Safety

Safety and Protection for the operator

Higher level to avoid blackouts and injuries
UniSec is «Native» acc. to latest IEC62271-200

Internal Arc Test must be repeated
some acceptance criteria have been aggravated:
arrangement of indicators, position of the ignition wire,
FLR classification, allowed deformations, etc...

Making and Breaking Test must be repeated
Circuit Breaker, load switching and earthing devices must
be tested into the panel in which they will be installed

Dielectric Test must be verified/ repeated
2 breakdowns out of 15 impulses are allowed but not
during the last 5
UniSec - MV Air Insulated Switchgear for Secondary Distribution

Values - Reliability and Safety

Safety and Protection for the operator

Higher level to avoid blackouts and injuries

Protection Against Internal Arc:

Passive safety
1. Thanks to Internal Arc resistant switchgear

Active safety
2. Possible with systems to reduce Internal Arc duration and damages
3. TruckMaster CS available for remote raking in/out

Preventive Maintenance by using:
4. My Site Care
   - Predictive CBs monitoring system with Central unit, RFID identification sensor and current sensor
5. InfraRed inspection window

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Values - Reliability and Safety

Safety and Protection for the operator

Higher level to avoid blackouts and injuries

Safe access grant:
- Voltage check
  Voltage Presence Indication as compulsory equipment
- Earth applied
  Earthing Switch always with Making Capacity
- Safe Operations
  Mechanical Interlocks to avoid wrong operations (standard)
- Correct Operations
  Padlocks, Keys, Electrical look available to apply the right procedures (optional)
Reliable in harsh environment

Additional tests

Anti-Seismic according to IEEE 693

Based on the seismic test performed according to the IEEE 693 Standard UniSec panels are in compliance with the requirements of UBC Zone 4 up to 1g of acceleration.
UniSec - MV Air Insulated Switchgear for Secondary Distribution
Values - Reliability and Safety

Reliable in harsh environment

Additional tests
Ageing according to IEC 62271-304

Based on the ageing test performed according to the IEC 62271-304 Standard (49 days in climatic chamber) UniSec panels is declared Level 2.
UniSec - MV Air Insulated Switchgear for Secondary Distribution

Values - Reliability and Safety

Reliable in harsh environment

- Additional tests
- GOST certified

At -25°C operation and -40°C storage for Vacuum CBs and GSec

At -5°C operation and -5°C storage for SF6 CBs and Contactors
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Values - Reliability and Safety

Reliable in harsh environment

Additional tests

Type tested Protection class increase
- Standard IP2X internal and IP3X external (excluded GSec operating seats)
- Available options for external protection up to IP42

Installation altitude up to 3.000m

Tested both 50Hz and 60Hz without de-rating

Minimum life of 30 years according to IEC 62271-1
UniSec - MV Air Insulated Switchgear for Secondary Distribution

Values - Reliability and Safety

**Reliable in harsh environment**

Additional tests
Vibration for Marine version

3 frequencies scanned for every axis
Total vibration test time 15 hours

No structural problem to the frame
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Values - Reliability and Safety

**Reliable in harsh environment**

High mechanical and electrical performances

- Housing made of two materials:
  - bottom part in stainless steel to guarantee PM
  - top part in epoxy resin to guarantee compactness
- 3 positions Load Break Switch (making capacity)
- Internal arc test performed inside the housing of GSec
- Motorized in both directions: Line and Earth (if 1S)
- High performance: Line M2/ E3 and Earth M0/ E2
- Line M2 (5000 operations) E3 (5 makings)
- Earth M0 (1000 operations) E2 (5 makings)
- Min. temperature up to -25°C operating -40°C storage
- Maximum Altitude of 3000 m
- Mechanical indication directly from the main shaft
- Blocking magnets on both Line and Earth position
- Modular solution of accessories with front access
- Operating mechanisms independent from operator:
  - Single Spring: Line closing/ opening takes place by charging the spring until dead centre is exceeded
  - Double Spring: Line closing/ opening takes place, when springs charged, with buttons or coils

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Footprint reduction

Panels variant/options for Swg line-up reduction:

1. CB panel type HBC/SBR with direct cable earthing (example with -1.250mm saving)
2. Lateral cable riser of 190mm for compact In/Out solution
3. CB panel type HBC only 500mm wide. Switch Disconnector panel type SDC/SFC only 375mm wide
4. Metering Coupler and Riser integrated in 1 panel with SBM/SDM panel type
UniSec - MV Air Insulated Switchgear for Secondary Distribution
Values - Sustainability and Efficiency

**Footprint reduction**

Panels variant/option for line-up reduction:

Equipment fitted in busbars compartment to save 1 panel each Swg:
1. Busbars Voltage transformer
2. Busbars Earthing switch
3. Busbars Current transformer
4. Direct cable connection to busbars

Height 2.000mm panel variant needed; busbars chamber is increased while bottom unit is unchanged.
(UniSec Std is H1700mm and both Height can be mixed in the same Swg line-up)
UniSec - MV Air Insulated Switchgear for Secondary Distribution
Values - Sustainability and Efficiency

**Footprint reduction**

Suitable for containerization

IAC according to IEC 62271-202 ed. 2
Downwards gas evacuation Tested

UniSec provides a tested level of safety inside a walk-in ABB UniPack CSS increasing the safety for operators and the general public. Two tests:

- **Accessibility A**
  Protection of the operating personnel in the substation. CSS doors are open and indicators are placed on Swg front

- **Accessibility B**
  Protection of the general public to all sides of the substation. CSS doors are closed and indicators are placed all around

Generally a container installation is always possible with all types of gas evacuation acc. to IEC 62271-200 respecting installation distances

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Medium Voltage Air Insulated Switchgear for Secondary Distribution

Interlocks details
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Interlocks details

Interlocks for LSC2A panels

Standard safety interlocks

Prevent cable door opening in case Switch Disconnector is not in Earth position

**Door - ES**

Mechanical interlock between Switch Disconnector, earthing switch downstream fuses

**ES - LBS**

Prevent motor operation when the lever is in Switch Disconnector line seat (by means of microswitch)

**Motor - Lever**

No mechanical interlock is present (keys or padlocks as option) between CB and LBS. This is an Advantage

Except Interlock in HBC since HySec has a Disconnector

**CB - LBS**
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Interlocks details

Interlocks for LSC2A panels

Optional Interlocks to apply a procedure

- Key interlocks: Giussani (Std), Ronis or Profalux (alternative)
- Padlocks facility always present
  Padlocks as option at customer care
- Procedure can be applied also using blocking magnet
  Available on switch disconnector position both Line and Earth

Keys

N° 1 or 2 keys on both Line or Earth operating mechanism lever seats

Padlocks

N° 3 Padlocks on both Line and Earth operating mechanism lever seats
## UniSec - MV Air Insulated Switchgear for Secondary Distribution

### Interlocks details

<table>
<thead>
<tr>
<th>Interlocks for LSC2B panels</th>
<th>Standard safety interlocks</th>
</tr>
</thead>
</table>
| Prevent CB racking-in in case of door open | | Prevent CB racking-in in case of multi pole connector disconnected.  
Prevent the disconnection of multi-pole connector in case CB truck in service or intermediate position |
| Prevent door opening in case of truck in service or intermediate position | |  

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Interlocks details

Interlocks for LSC2B panels

Standard safety interlocks

- Prevent cable compartment door opening in case of ES open.
- Prevent ES opening in case of cable compartment door open.

Status of Earthing Switch
- Open position
- Earth position

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Interlocks details

Interlocks for LSC2B panels

Optional Interlocks to apply a procedure

Key interlocks (Arel, Ronis, Profalux) for
- Open Earthing Switch lock
- CB racking-in lock
- Closed Earthing Switch lock

Metallic shutters between CB, busbars and cables compartments can be locked by means of padlocks in both the open and closed positions:
N° 2 padlocks for panel @ 12-17.5kV

Insulated shutters between CB, busbars and cables compartments can be locked by means of padlocks in both the open and closed positions:
N° 1 padlock for panel @ 24kV
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Interlocks details

**Interlocks for LSC2B panels**

**Optional Interlocks to apply a procedure**

- The operations for apparatus racking-in/out can be prevented by applying a padlock to the operating lever seat.
- Fails Safe interlock (Std for ABB increasing safety)
  Device that lock the shutters when the apparatus is removed from the compartment.
- Electromechanical interlocks
  To enable automatic interlocking logic without human intervention:
  - Opening of CB compartment door
  - Earthing Switch position