Medium voltage products

UniSec for Smart Grid
Air-insulated medium-voltage secondary distribution switchgear
Index

3  Overview
4  Standard Levels
6  Monitoring & Control
7  Measurements
8  Protection & Logic Selectivity
9  Ratings and Options
10 Dimensions and Installation information
Target markets for Smart Grid

Rising energy demand is the major challenge in today’s energy sector and the increased demand for electricity is growing faster than any other form of energy. Electric power generation is also the largest single source of CO₂ emissions, and improved energy efficiency and utilization of renewable energy sources can provide 75% of the CO₂ reduction required over the next two decades. This is possible moving from a concept of huge power generation plants into several and diffuse renewable power generation plants. This is a challenge in terms of generation, transmission and distribution where ABB’s technologies help to transform traditional power networks into smarter grids that can deliver renewable power over long distances, while maintaining reliability and efficiency.

Product highlights and Benefit

The integrated Smart Grid functionalities which increase automation allow:
- Monitor: the fault in the grid can be remotely located.
- Control: reconfiguring network the faulty part can be quickly isolated. The energy loss is minimized and achieves savings for future investments.
- Diagnostic: improved protection, maintenance, condition monitoring.

Benefits for utilities and energy consumers are:
- Improved quality of the power supply.
- Less and shorter outages and improved voltage quality.
- Improved grid efficiency, reliability and availability.
- Ensured safety for personnel.
- Enhanced operational efficiency and network stability.
- Fault analysis: density of fault, failure rate, criteria for the classification of the faults.
- Improved maintenance, also proactive, activities.
- Improved tools for the network operators and the field crews.
- Less need to travel to locations with difficult access.

Additional Benefit given by UniSec solution:
- AIS solution with UniSec portfolio.
- Wide possibilities for customization: panel portfolio and options.
- Load Break Switch panel width of 500 mm (compact solution 375 mm available).
- Circuit Breaker panel width of 500 mm.

Product positioning

This extension of the 12-24 kV UniSec portfolio is aimed at the target markets where above requirement to connect distributed renewable generation is present and AIS with Smart Grid applications in Secondary distribution networks is required.
UniSec for Smart Grid
Standard Levels

Depending on network complexity and different network’s automation degree ABB propose with UniSec four different technical solutions which are available as Preconfigured switchgears.

UniSec for Smart Grid is equipped with advanced Feeder Automation device, which in combination with additional devices (from Fault Passage Indicators up to ABB Relion multifunctional relays) provides various data to the remote control centers. Grid automation devices are located in the LV compartment giving flexibility for additional customization requirements.

Standard packages for Smart Grid applications, as described above, can provide monitoring, control, diagnostic and supervision functionalities including feeder automation devices with wired and/or wireless communication interfaces and power supply back-up. Thanks to the flexibility of UniSec portfolio (20 different typical units), grid automation solutions can also be delivered with different switchgear configurations in addition to what described.
3 ways Swb SDC-SDC-SFC
Suitable for Monitoring, Control and MV Measurements
N° 2 Load Break Switch panels
N° 1 Fused Load Break Switch panel
Width: 1.554 mm (including end covers)

3 ways Swb HBC-HBC-SFC
Suitable also for Protection and Logic Selectivity
N° 2 Circuit Breaker panels
N° 1 Fused Load Break Switch panel
Width: 1.554 mm (including end covers)
UniSec for Smart Grid
Monitoring & Control

Functions

1) Monitoring
- Indication of switch status
- Fault passage indication
- LV Measurements
- Condition monitoring in substation
2) Control
- Remote control of switches
- Remote network configuration

Customer Benefits
- Reduced outage time by means of remote fault localization
- Efficient use of manpower
- Grid topology supervision
- Fast restoration of healthy network area with remote control of the switches
- Increase of network efficiency

Devices
- UniSec Swb with n° 2 Motorized Switch disconnector panels and n° 1 is fused Switch disconnector panel
- n° 1 REC603 (RTU & Communication)
- Battery
- n° 1 Fault Passage Indicator (FPI)

REC603 Functions
- Battery charger/management
- Up to 3 controlled devices (open and close switch disconnector)
- 5/15 DI, 2/6 DO
- Hardwired status acquisition: fuse trip, switches position
- Modbus master from fault indication and measurement acquisition from FPI
- IEC 60870-5-101 gateway available for local devices
- IEC 60870-5-104 protocol for DMS communication
- Secure communication using VPN tunnelling
- Always-On GPRS Communication
- Battery charging and management

Option
- Add 2nd Fault Passage Indicator (FPI) on 2nd SDC panel to improve fault location
Measurements

Functions

1) Same as Monitoring & Control
2) High Accuracy MV Measurements

Customer Benefits

- Same as Monitoring & Control
- Power flow management
- Measurement monitoring for voltage stability even for intermitted distributed generation

Devices

- UniSec Swb with n° 2 Motorized Switch disconnector panels and n° 1 is fused Switch disconnector panel
- n° 1 RER601 (Communication)
- n° 1 REC615 (Control, Advantage FPI)
- n° 1 set of Combisensors Type KEVCR
- Battery
- Battery charger
- RIO600

RER601 Functions

- IEC 60870-5-101 gateway available for local devices
- IEC 60870-5-104 protocol for DMS communication
- Secure communication using VPN tunneling
- Always-On GPRS Communication

REC615 Functions

- Protections functions as FPI
- Local logics available
- Accurate MV measurement from current and voltage sensors

Option

- Add 2nd Set of Combisensors and 2nd REC615 on 2nd SDC panel to improve fault location
UniSec for Smart Grid
Protection & Logic Selectivity

Functions
1) Same as Monitoring & Control
2) Same as High Accuracy MV Measurements
3) Protection & Logic Selectivity

Customer Benefits
- Same as Monitoring & Control
- Same as Measurements
- Reduced number of outages

Devices
- UniSec Swb with n° 2 Circuit Breaker panels and n° 1 Fused Switch disconnector panel
- n° 1 RER601 (Communication)
- n° 2 REC615 (Control, Protections)
- Battery
- Battery charger

RER601 Functions
- IEC 60870-5-101 gateway available for local devices
- IEC 60870-5-104 protocol for DMS communication
- Secure communication using VPN tunneling
- Always-On GPRS Communication
- Data acquisition from REC615

REC615 Functions
- Full protections functions
- Local logics available
- Accurate MV measurement from current and voltage sensors
- Possibility to use logic selectivity trough GOOSE (require an high speed network)
### Ratings and Options

#### Switchgear electrical characteristics

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>kV</th>
<th>12</th>
<th>17.5</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test voltage (50-60 Hz x 1 min)</td>
<td>kV</td>
<td>28</td>
<td>38</td>
<td>50</td>
</tr>
<tr>
<td>Impulse withstand voltage</td>
<td>kV</td>
<td>75</td>
<td>95</td>
<td>125</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 main busbar current</td>
<td>A</td>
<td>630/800</td>
<td>630/800</td>
<td>630</td>
</tr>
<tr>
<td>Rated current of apparatus:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– HySec multi-function apparatus</td>
<td>A</td>
<td>630</td>
<td>630</td>
<td>630</td>
</tr>
<tr>
<td>– GSec gas switch-disconnector</td>
<td>A</td>
<td>630/800</td>
<td>630/800</td>
<td>630</td>
</tr>
<tr>
<td>Rated short time withstand current</td>
<td>kA (3s)</td>
<td>16 (3)/20 (2)/25 (1)</td>
<td>16 (2)/20 (2)</td>
<td>16 (2)/20 (2)</td>
</tr>
<tr>
<td>Peak current</td>
<td>kA</td>
<td>40 (3)/50/62.5</td>
<td>40 (3)/50</td>
<td>40 (3)/50</td>
</tr>
<tr>
<td>Internal arc withstand current (up to IAC AFLR)</td>
<td>kA (1s)</td>
<td>12.5/16 (3)/21/25 (4)</td>
<td>12.5/16 (3)/21</td>
<td>12.5/16 (3)/21</td>
</tr>
</tbody>
</table>

(1) 25 kA 2s
(2) Contact ABB for 21 kA/52.5 kAp
(3) For HySec 16 kA(1s)/40 kAp
(4) Only units at 12 kV, height 2000 mm and width 750 mm (excluding units SBC-W, SBS-W, SDD, UMP and SBR)

In case Std solution proposed cannot satisfy a special requirement the complete UniSec panel portfolio can be proposed up to 1.250 A @ 25 KA.

Additional information available in UniSec product catalogue 1VFM200003.

### List of available units

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDC</td>
<td>Unit with switch-disconnector</td>
<td>190 mm</td>
</tr>
<tr>
<td>SDS</td>
<td>Unit with switch-disconnector – isolation</td>
<td></td>
</tr>
<tr>
<td>SDM</td>
<td>Isolating unit with measurement with switch-disconnector</td>
<td></td>
</tr>
<tr>
<td>SDD</td>
<td>Unit with double switch-disconnector</td>
<td></td>
</tr>
<tr>
<td>UMP</td>
<td>Universal Metering Unit</td>
<td></td>
</tr>
<tr>
<td>SFC</td>
<td>Switch-disconnector with fuses</td>
<td></td>
</tr>
<tr>
<td>SFS</td>
<td>Switch-disconnector with fuses – isolation</td>
<td></td>
</tr>
<tr>
<td>SBC</td>
<td>Unit with removable circuit-breaker with switch-disconnector</td>
<td></td>
</tr>
<tr>
<td>SBC-W</td>
<td>Circuit-breaker-Withdrawable with switch-disconnector</td>
<td></td>
</tr>
<tr>
<td>SBS</td>
<td>Unit with removable circuit-breaker with switch-disconnector – isolation</td>
<td></td>
</tr>
<tr>
<td>SBS-W</td>
<td>Circuit-breaker-Withdrawable with switch-disconnector – isolation</td>
<td></td>
</tr>
<tr>
<td>SBM</td>
<td>Isolating unit with measurements, circuit-breaker and double switch-disconnector</td>
<td></td>
</tr>
<tr>
<td>SBR</td>
<td>Reversed circuit-breaker unit</td>
<td></td>
</tr>
<tr>
<td>HBC</td>
<td>Unit with circuit-breaker and disconnector integrated</td>
<td></td>
</tr>
<tr>
<td>SFV</td>
<td>Switch-disconnector with fuses – measurement</td>
<td></td>
</tr>
<tr>
<td>DRC</td>
<td>Direct incoming unit with measurement and busbar earthing</td>
<td></td>
</tr>
<tr>
<td>DRS</td>
<td>Riser unit – measurement</td>
<td></td>
</tr>
<tr>
<td>RLC/RRC</td>
<td>Lateral, left and right-hand cable riser</td>
<td></td>
</tr>
<tr>
<td>WBC</td>
<td>Unit with withdrawable circuit-breaker</td>
<td></td>
</tr>
<tr>
<td>WBS</td>
<td>Unit with withdrawable circuit-breaker – isolation</td>
<td></td>
</tr>
<tr>
<td>BME</td>
<td>Busbar measuring and earthing unit</td>
<td></td>
</tr>
</tbody>
</table>

(*) 12-17,5 kV
(**) 24 kV
UniSec for Smart Grid
Dimensions and Installation information

The installation room must be prepared according to the switchgear dimensions and version. Observance of the distances indicated guarantees correct and safe operation of the equipments.

For installation conditions other than those indicated, please consult ABB.

<table>
<thead>
<tr>
<th>Descriptions</th>
<th>Monitoring &amp; Control</th>
<th>Measurement</th>
<th>Protection &amp; Logic Selectivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel Type</td>
<td>SDC-SDC-SFC</td>
<td>SDC-SDC-SFC</td>
<td>HBC-HBC-SFC</td>
</tr>
<tr>
<td>LV Compartment Type</td>
<td>Big-Std-Std</td>
<td>Big-Std-Std</td>
<td>Big-Wide-Std</td>
</tr>
<tr>
<td>Swb. Width [mm]</td>
<td>1.554</td>
<td>1.554</td>
<td>1.554</td>
</tr>
<tr>
<td>Swb. Depth [mm]</td>
<td>Base panel with Filters IAC AFLR up to 16KA 1.170</td>
<td>1.170</td>
<td>1.170</td>
</tr>
<tr>
<td></td>
<td>Base panel with Gas Duct IAC AFLR up to 21KA 1.190</td>
<td>1.190</td>
<td>1.190</td>
</tr>
<tr>
<td>Swb. Height [mm]</td>
<td>Base panel with Filters / Including LV compartment 1.700 / 2.000</td>
<td>1.700 / 2.000</td>
<td>1.700 / 2.000</td>
</tr>
<tr>
<td></td>
<td>Base panel with Gas Duct / Including LV compartment 2.020 / 2.000</td>
<td>2.020 / 2.000</td>
<td>2.020 / 2.000</td>
</tr>
<tr>
<td>Minimum Swbroom Height [mm]</td>
<td>2.100</td>
<td>2.100</td>
<td>2.100</td>
</tr>
</tbody>
</table>

A = Standard
B = Wide
C = Big

HBC panel with Filter and REC615 fit on Wide LV Compartment
Minimum distances from the walls of the installation room, solution IAC A-FLR 16 kA 1s with filters installed on each unit.

Minimum distances from the walls of the installation room, solution IAC A-FLR 211/252 kA 1s with gas exhaust ducts.

- 16 kA if with HBC panel
- For a shorter distance, please contact ABB
- Only units at 12 kV, height 2000 mm and width 750 mm (excluding units SBC-W, SBS-W, SDO, UMP and SBR)
‘The data and illustrations are not binding. We reserve the right to make changes in the course of technical development of the product.

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