Retrofit of medium voltage switchgears

- Increased reliability and safety
- Significantly reduced maintenance costs
- Increased remaining life time with minimum 20 years
- Cost effective
Concept of retrofit

The concept of retrofit comprises wide range of activities for upgrading of existing systems and equipment by using modern parts and components. With these activities the technical, reliability and profitability aspects of the system are optimized. It is assumed that such partial modernization of the system is profitable if it amounts at 60 - 70% of the value of completely new switchgear.

Preconditions

Medium voltage switchgear consists of components with different duration of life in operation. On this criterion three main groups can be separated:

- Stationary parts: panels, current and voltage transformers, insulators, busbars etc. which aging is very slow;
- Movable parts: switching devices. The circuit breakers and load break switches are subject to the effects of the arcing, in their spring motor operating mechanisms the mechanically loaded and rubbing parts are subject to wearing. The switching devices undergo fast moral aging beside the physical. New types of circuit breakers are developed and introduced, which have smaller dimensions and weight and higher operational features: increased mechanical and breaking capacity, higher breaking current, lack of thrown out gases and oil in the process of the commutation, maintenance free components, high reliability and safety in service. The vacuum and SF6 circuit breakers correspond to these features.
- Secondary commutation: protection relays, control, measurement, signalling. The devices used for secondary commutation undergo moral aging much faster than physical.
Our offer

ABB Avangard offers upgrading of medium voltage switchgears from 6kV to 44 kV. The upgrading includes replacement of the old circuit breaker with new one - vacuum or SF6 depending on the customer’s request, replacement of the disconnector, replacement of the instrument transformers to handle increases in rated current, renewal of the phase insulation, renewal of the busbar system, fitting protection devices against fault arcing etc. Modernization in plant guarantees to the customer meeting the requirements of national and international standards with testing in an authorized laboratory, if required.

Retrofit solutions of ABB Avangard

ABB Avangard takes in account all specific requirements of the customer. We make the design changes on the truck, so you can use a spare one and do not stop the operation. We send our specialists on site for technical consideration.
Cassettes for circuit breakers

With the help of a cassette the circuit breakers can be easily fitted in old switchgears. The cassettes are characterized with limited dimensions and weight, including mechanical and electromechanical interlocks and high reliability. For the circuit breakers we use we can offer several types of cassettes: CBF, CBE and Powerblock.

1. Segregation shutters
2. Socket connection
3. Inspection window
4. Earthing switch operating mechanism
5. Sliding earthing contact
6. Earthing switch release lever
7. Bush for passage of connected/insulated operating lever
8. Internal arc-proof door
9. Insulating monoblocks
10. Main circuit contacts

Secondary commutation

The use of sensor technology with switching equipment and local fitting of the most up-to-date protection and process control technology at bay level allows you to increase the functionality and ease of operation of your system.

ABB Avangard offers following services:

- Replacing
  - conventional protection and control equipment with digital protection and process control technology
  - conventional control cables with optical waveguides
  - analog with digital measuring
- visualisation of the state of the network in the control room
- alarm and event monitoring in real-time
Circuit breakers

ABB Avangard offers vacuum as well as SF6 breakers (on customer’s choice) for modernization and retrofit of switchgears.

We use three main types of circuit breakers:
- **VD4** – vacuum circuit breaker with motor operating mechanism
- **VM1** – vacuum circuit breaker with magnetic actuator
- **HD4** – SF6 circuit breaker with motor operating mechanism

<table>
<thead>
<tr>
<th>RATED DATA</th>
<th>VM1</th>
<th>VD4</th>
<th>HD4</th>
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<tbody>
<tr>
<td>Rated current</td>
<td>kV</td>
<td>12/17.5</td>
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<tr>
<td>Rated power frequency</td>
<td>kV</td>
<td>28/38</td>
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<td>Rated impulse withstand voltage</td>
<td>kV</td>
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<td>...200</td>
<td>...4000</td>
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<td>Rated short-circuit breaking</td>
<td>k A</td>
<td>...50/31,5</td>
<td>...25</td>
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<tr>
<td>Rated short-time current, 3s</td>
<td>k A</td>
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<td>Weight</td>
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</tbody>
</table>

**SF6 circuit breaker type HD4**

**Vacuum circuit breaker type VD4**

**Vacuum circuit breaker type VM1**