Product brochure

Generator circuit-breaker HVS-63S
System type GCB with innovative built-in monitoring
ABB is a leader in power and automation technologies that enable utility and industry customers to improve their performance while lowering environmental impact.
HVS-63S with increased functionality and built-in monitoring features

ABB is a leader in the design and manufacturing of generator circuit-breakers (GCBs) since 1954 with more than 8,000 deliveries in over 100 countries. We offer the widest and most modern portfolio of GCBs in SF$_6$ and vacuum technology with a range of short-circuit ratings from 50 kA to 300 kA and nominal currents from 3,150 A to over 50,000 A to meet the demand of all types of power plants around the globe.

Key benefits

HVS-63S is a complete three phase system
- Capable to interrupt short-circuit currents up to 63 kA with rated continuous current up to 7,150 A
- Type tested exceeding the mandatory requirements of the latest GCB standard and IEEE C37.013
- Capability to interrupt fault currents with high degree of asymmetry up to 130 percent
- Type tested for out-of-phase fault with full phase opposition (180 degree) exceeding the standards’ minimum requirements

Built-in mechanical erosion monitoring with direct measurement of the arcing contact length for the highest safety and reliability and for cost-effective planning of service activities

Low SF$_6$ content of only 5.1 kg for 3 poles and lowest leakage rate < 0.1 percent per year

Pressure relief device installed as a standard feature for higher safety

Well-proven hydro-mechanical spring drive operating mechanism type HMB-1* for higher reliability

Greatly improved system-type functionality for simpler and more economic power plant layouts

* Most reliable drive as per paper A3-206 presented at CIIGRE 2012.
The most reliable system solution with a contact erosion indicator

- Circuit-breaker
- Erosion monitoring device
- Pressure relief device
- Current transformer
- Line disconnector
- Surge arrester
- Earthing switch
- Capacitor
- HMB-1 drive
Earthing switch
Voltage transformer
Current transformer
Disconnected for SFC (static frequency converter)
SFC (static frequency converter) connection
Key locks system for interlocking
Innovative breaking chamber
The breaking chamber of HVS-63S is based on the highly reliable technology of open-type GCB HVR-63. The breaking chamber includes the double main contacts for double current commutation for higher stability of resistance to ensure the maintenance span of 20 years or 10,000 close-open operations. Featuring the advantage of a hydraulic spring operating mechanism, HMB-1, it uses 50 percent less energy compared to mid-sized GCBs for a more compact design and lower lifecycle costs.

Pressure relief device
Standard feature in the breaking chamber to improve safety and availability.

Erosion monitoring system
The breakthrough application of head-to-head contact system in HVS-63S enables an innovative built-in mechanical solution for a direct measurement and indication of arcing contact erosion. This real-time indication of the remaining time to service enables a timely planning of maintenance and increases the availability and reliability of the plant.

The most reliable spring drive HMB-1
CIGRE study (conducted in 2012) on high-voltage circuit breaker failures and defects in service revealed that the availability of the circuit breakers depends primarily on the reliability of the operating mechanism. These results from the study have endorsed the hydro mechanical spring drive as the most reliable operating mechanism for GCB applications. The hydraulic spring operating mechanism combines the advantages of a hydraulic operating mechanism with those of spring energy storage system with higher stability in the full range of the GCB operating temperatures and high consistency of timing during the entire lifespan for a safe performance.

Combined disconnector-earthling switch and earthing switch-starting switch
Combination of line disconnector with earthing switch and earthing switch with starting switch by three-positions disconnector allows the use of only one drive per disconnector for the lowest lifecycle cost, simplification of the switchgear and leaner management of the spare parts.

Low environmental impact
Only 5.1 kg of SF₆ in three poles and a leakage rate lower than 0.1 percent per year. The advanced functions of GMS600 monitoring system, such as SF₆ and temperature monitoring and trending (available on request), facilitates the control of such parameters.

Compact design and easy handling
HVS-63S is fully assembled and tested at the factory for substantial cost and time saving in installation and commissioning process. Its compact design fits into a standard 20-feet container for easy transportation, handling and storage. Combined with its plug-in system it leads to a simpler and quicker installation on-site.
**Additional safety features**

By using an advanced Geneva mechanism and key locks system, the design of the disconnector drives ensures full flexibility in implementation of the interlocking needs of the power plant. Special care in the encapsulation of the pole frame assures protection from unintentional access to moving parts between operating mechanism and switching components for the highest safety of operators & maintenance engineers. The breaking chamber technology from HVR-63 with very fast opening time assures the clearance of potential harmful faults in tens of milliseconds for higher protection of power plant assets.

**Type-tested according to latest standards**

HVS-63S is type-tested according to the latest standards for GCB, including switching with full-phase opposition fault current (180° out-of-phase). Moreover, it is type-tested to interrupt current exhibiting delayed current zeros up to 130 percent degree of asymmetry, which are typical for turbo generators. The above capabilities exceed the mandatory requirements of the latest GCB standard and IEEE C37.013.

**Equipment Options**

1. Generator circuit-breaker
2. Line disconnector switch
3. Earthing switch
4. Starting switch for SFC connection
5. Manual short-circuiting connection
6. Surge capacitor
7. Current transformers
8. Voltage transformers
9. Surge arrester

**HVS-63S system type circuit breaker ratings**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated maximum voltage</td>
<td>24 kV</td>
</tr>
<tr>
<td>Rated frequency</td>
<td>50 / 60 Hz</td>
</tr>
<tr>
<td>Rated continuous current 50 Hz / 60 Hz</td>
<td>up to 7150 / up to 6900 A rms</td>
</tr>
<tr>
<td><strong>Rated insulation level</strong></td>
<td></td>
</tr>
<tr>
<td>Rated power frequency withstand voltage breaker / line disconnector</td>
<td>60 / 70 kV rms</td>
</tr>
<tr>
<td>Rated lightning impulse withstand voltage breaker / line disconnector</td>
<td>125 / 145 kV peak</td>
</tr>
<tr>
<td>Rated peak withstand current</td>
<td>190 kA peak</td>
</tr>
<tr>
<td>Rated short-time withstand current</td>
<td>63 kA, 3s</td>
</tr>
<tr>
<td>Rated interrupting time</td>
<td>49 ms</td>
</tr>
<tr>
<td>Mechanical endurance life</td>
<td>10000</td>
</tr>
</tbody>
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