HMB Spring Hydraulic Mechanism
Most compact and reliable

HMB is the most compact and reliable operating mechanism for the proper operation of gas insulated high voltage circuit breakers.

HMB operating mechanisms are designed for reliable switching of high voltage circuit breakers from 72.5 kV to 800 kV.

Circuit breakers are a critical component providing switching and short circuit protection across the electrical network. The operating mechanism ensures proper operability of the breaker for its particular application.

How does the HMB spring hydraulic mechanism compare to other styles?

<table>
<thead>
<tr>
<th></th>
<th>Pneumatic operating mechanism</th>
<th>Hydraulic operating mechanism</th>
<th>Spring operating mechanism</th>
<th>Spring hydraulic operating mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of moving parts</strong></td>
<td>✓ Minimum</td>
<td>✓ Minimum</td>
<td>Higher</td>
<td>✓ Minimum</td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td>Extensive</td>
<td>Extensive</td>
<td>Medium</td>
<td>✓ Very compact</td>
</tr>
<tr>
<td><strong>Maintenance</strong></td>
<td>Intensive</td>
<td>Minimum</td>
<td>✓ None</td>
<td>✓ None</td>
</tr>
</tbody>
</table>

HMB operating mechanisms adapt easily to varying breaker types and ratings. Compact size and unique installation principles facilitate shipping with the mechanism installed on the breaker for most ratings lowering installation and commissioning time and cost.

**Applications**
- AIS Dead Tank Breaker 72.5-800 kV
Ease of use

- Limited number of moving parts, modular design
- Quick and easy field replacement or upgrade (if necessary)
- Minimizes overall footprint of the assembly with less complex installation and timing
- Breaker ships with mechanism installed on breaker (except 245 kV, 50-90 kA)
- Less control power required than comparable mechanism with similar energy (only 5 ampere)
- No parts requiring lubrication
- Minimum scheduled maintenance for 10,000 CO operations

Reliability

- Spring assemblies do not relax over time
- No external dampening system to wear or that requires adjustment
- Smooth deceleration of the breaker
- No adjustments required during commissioning of the breaker
- No overcharging due to built-in bypass valve protection
- Point-on-Wave switching for critical applications (e.g. capacitor bank switching)
- Temperature independent energy storage ensuring proper operation in all ambient conditions

Safety

- Modular and service-friendly design with easily accessible modules
- Spring assemblies will not fail catastrophically
- No latches or gears limiting pinch points (one)
- Operates under abnormal conditions, as long as it is charged
Modular design

Auxiliary switch assembly and control circuit
- For signaling of the switching state

Charging module
- Hydraulic pump with motor for charging the storage module

Control module
- Main valve operating the working module
- Includes the coils for initiating the switching operation
- Individual adjustable switching speed and timing

Monitoring module
- Spring travel switch for monitoring the status of the stored energy
- Spring limit switch to govern the charging of the springs

Working module
- Main cylinder with piston rod operating the circuit breaker
- Integrated end position damping

Storage module
- Spring assembly and storage cylinders
- Storing the energy for the switching operation

Disc spring column