SecoVac VB2
Vacuum Circuit Breaker
GE – Global

GE is “Imagination at Work” – a diversified technology, media and financial services company focused on solving some of the world’s toughest problems. “Imagination at Work”, is a spirit that is driven by relentless passion and commitment. It is cognizant to needs, and has the power to transform ideas into innovative technological breakthroughs. It is a spirit that strives to serve people in a manner that reflects our values. With products and services ranging from aircraft engines, power generation, industrial solutions, water processing and security technology to medical imaging, business and consumer financing, media content and advanced materials. GE serves customers in more than 100 countries and employs more than 300,000 people worldwide.

Innovation has always been the foundation of our past and the key to our future contributions. GE plays a vital role in our modern world by making extraordinary ideas, a natural part of everybody’s life. We are committed to anticipate and meet changing needs and represent imagination in a manner that reflects our principles. We take pride in delivering quality and value to our customers day after day.

GE Energy – Industrial Solutions, India

GE Energy – Industrial Solutions, India offers innovative solutions to meet customer needs in Power & Protection. The company has a pan India presence, with 4 regional offices, 13 sales offices and manufacturing plant at Bangalore.

GE Energy – Industrial Solutions, offers solutions and products to customers in several segments that include power sector, core infrastructure like marine establishments, airports, highways, heavy and light Industries, IT & ITES infrastructure, healthcare, commercial and residential segments.

The India Innovation Center

The India Innovation Center (IIC) is a dedicated engineering research & design IT development center for the global GE Energy – Industrial Solutions business. Established in 1999, IIC today is amongst the largest design and development centers for GE Energy – Industrial Solutions business. IIC employs more than 1000 engineers and IT professionals working with teams across the globe.

About the Technology Team

The Technology teams at IIC develop new products and solutions for the global market in the areas of Circuit Breakers, Motors, Power Quality and Protection, Electrical Machines, Industrial Automation, Sensing Systems.
Introduction

GE Energy – Industrial Solutions, has launched a new series of vacuum circuit breakers called SecoVac VB2. SecoVac vacuum circuit breakers are withdrawable type circuit breakers rated for a voltage of 12kV and a maximum current of up to 4000A for application in Indoor Switchgear Panels. The product conforms to IEC62271-100 standard and becomes the optimal choice for control and protection in MV Transmission and Distribution System.

Product Type

SecoVac VB2

- SMSR for SecoVac System Integrator Kit
- Power Supply for Shunt Release - N for 220V, J for 110V, D for 24V
- Power Supply for Shunt Release – A for AC, D for DC
- Power Supply for Closing Coil - N for 220V, J for 110V, D for 24V
- Power Supply for Closing Coil – A for AC, D for DC
- Power Supply for Energy Storing Motor - Closing Coil - N for 220V, J for 110V
- Power Supply for Energy Storing Motor – A for AC, D for DC
- Pole Pitch (mm) – 170, 210, 275
- Rated Breaking Current for short-circuit – 263 for 26.3kA, 315 for 31.5kA, 400 for 40kA
- Rated Current – 0800 for 800A, 1250 for 1250A

Environmental data

- The ambient air temperature does not exceed 40°C and its average value, measured over a period of 24 h, does not exceed 35°C.
- The minimum ambient air temperature is -25°C (storage and transport is allow at 30°C).
- The altitude does not exceed 1000m.
- The conditions of humidity are as follow:
  - the average value of the relative humidity, measured over a period of 24 h, does not exceed 95%;
  - the average value of the water vapour pressure, over a period of 24 h, does not exceed 2.2 kPa;
  - the average value of the relative humidity, measured over a period of one month, does not exceed 90%;
  - the average value of the water vapour pressure, over a period of one month, does not exceed 1.8 kPa.
- Earthquake intensity is no more than 8 degree.
- The ambient air is not significantly polluted by dust, smoke, corrosive and/or flammable gases, vapours or salt.
- Storing place shall be free from fire, explosion, chemical corrosion and heavy shakes.
Characteristics and Advantages

• Use of high-end 3D computer aided design (Pro-Engineer) and dynamic simulation optimal design (Pro-Mechanica)
• Reduced partial distribution and local overheating limited by optimizing electromagnetic field distribution
• World leading-edge miniature interrupter chamber applying axial rotating magnetic field vacuum interrupting principle, with the extremely stable breaking performance
• Perfect insulation material with higher creepage distance and electrical clearance greater than requirements of IEC standards and successful clearance of the condensation test which is applicable for operation under harsh environment
• With reliable grounding mode, which ensures earth continuity of breaker from service position to test position

1. Vacuum arc-extinguish chamber
2. Radiator (for 2500A and above)
3. Insulating hood
4. Switching-in spring
5. Switching-out spring
6. Contactor spring
7. Main driveshaft
8. Insulating rod

• Operating mechanism is made of modular design with main sub-assemblies/components arranged in such way that it will improve the reliability and stability of the breaker
• The whole mechanism consist of three modules: energy-charging module, closing module and tripping module. Each module can be assembled respectively and mounted on to the mechanism together with bolts
• The energy-charging module is composed of two-level worm gears, super clutch and closing spring
• Besides power operating energy-charging device, the manual operating device is provided. Auto-reclosing can be realized for all VB2 breakers
## Technical data for breaker

<table>
<thead>
<tr>
<th>Product type</th>
<th>VB20800263</th>
<th>VB20800315</th>
<th>VB21250263</th>
<th>VB21250315</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>kV</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Rated normal current</td>
<td>A</td>
<td>800</td>
<td>1250</td>
<td>800</td>
</tr>
<tr>
<td>Rated frequency</td>
<td>Hz</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Rated power-frequency withstand voltage (1 minute)</td>
<td>kV</td>
<td>42</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td>Rated lightning impulse withstand voltage (peak)</td>
<td>kV</td>
<td>75</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>Rated short-circuit breaking current</td>
<td>kA</td>
<td>26.3</td>
<td>31.5</td>
<td>26.3</td>
</tr>
<tr>
<td>Rated short-circuit making current (peak)</td>
<td>kA</td>
<td>66</td>
<td>80</td>
<td>66</td>
</tr>
<tr>
<td>Rated short-time withstand-current (3 sec.)</td>
<td>kA</td>
<td>26.3</td>
<td>31.5</td>
<td>26.3</td>
</tr>
<tr>
<td>Rated peak withstand-current</td>
<td>kA</td>
<td>66</td>
<td>80</td>
<td>66</td>
</tr>
<tr>
<td>Rated short-circuit current breaking</td>
<td>times</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Short circuit/breaking endurance</td>
<td>times</td>
<td>274</td>
<td>274</td>
<td>274</td>
</tr>
<tr>
<td>Operating sequence</td>
<td>O-0.3s-CO-180s-CO</td>
<td>O-0.3s-CO-180s-CO</td>
<td>O-0.3s-CO-180s-CO</td>
<td>O-0.3s-CO-180s-CO</td>
</tr>
<tr>
<td>Mechanical life</td>
<td>times</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
</tr>
<tr>
<td>Clearance between contact</td>
<td>mm</td>
<td>9±1</td>
<td>9±1</td>
<td>9±1</td>
</tr>
<tr>
<td>Overtravel</td>
<td>mm</td>
<td>5±1</td>
<td>5±1</td>
<td>5±1</td>
</tr>
<tr>
<td>Average closing speed</td>
<td>m/s</td>
<td>0.5~1</td>
<td>0.5~1</td>
<td>0.5~1</td>
</tr>
<tr>
<td>Average opening speed</td>
<td>m/s</td>
<td>1~1.3</td>
<td>1~1.3</td>
<td>1~1.3</td>
</tr>
<tr>
<td>Contact closing tripping time</td>
<td>ms</td>
<td>≤2</td>
<td>≤2</td>
<td>≤2</td>
</tr>
<tr>
<td>Synchronization of 3-phase contact closing and opening</td>
<td>ms</td>
<td>≤2</td>
<td>≤2</td>
<td>≤2</td>
</tr>
<tr>
<td>Pole center distance</td>
<td>mm</td>
<td>170</td>
<td>210</td>
<td>170</td>
</tr>
<tr>
<td>Allowable maximum contact erosion</td>
<td>mm</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>VB21600400</td>
<td>VB22000400</td>
<td>VB22500400</td>
<td>VB23150400</td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>------------</td>
<td>------------</td>
<td>------------</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>1600</td>
<td>2000</td>
<td>2500</td>
<td>3150 (Self-cooled) 4000 (Fan-cooling)</td>
</tr>
<tr>
<td>50</td>
<td>42</td>
<td>75</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>40</td>
<td>100</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>274</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15000</td>
<td>8±1</td>
<td>5±1</td>
<td>0.5~1</td>
<td></td>
</tr>
<tr>
<td>1~1.3</td>
<td>≤2</td>
<td>≤2</td>
<td>275</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Truck Rocking handle of chassis Energy-storing handle
## Technical data for spring-operating mechanism

### Technical data for energy storing motor

<table>
<thead>
<tr>
<th>Name</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated operation voltage (V)</td>
<td>AC, DC110</td>
</tr>
<tr>
<td>Rated input power for motor (W)</td>
<td>300</td>
</tr>
<tr>
<td>Normal operation voltage scope</td>
<td>85%–110% rated operation voltage</td>
</tr>
<tr>
<td>Energy storing period under rated operation voltage (s)</td>
<td>≤10</td>
</tr>
</tbody>
</table>

### Technical data for opening and closing electromagnetic coils

<table>
<thead>
<tr>
<th>Name</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated operation voltage (V) AC/DC</td>
<td>24* 110 220</td>
</tr>
<tr>
<td>Scope of normal operation voltage</td>
<td>Closing: 85%–110% rated voltage</td>
</tr>
<tr>
<td></td>
<td>Opening: 85%–120% rated voltage, in case the voltage is lower than 30% rated voltage, opening operation is not allowed.</td>
</tr>
</tbody>
</table>

*DC only - on request

### Overall size

#### Installation dimensions of breaker body bottom

<table>
<thead>
<tr>
<th>Specifications</th>
<th>A (mm)</th>
<th>B (mm)</th>
<th>C (mm)</th>
<th>D (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>800–1250A</td>
<td>460</td>
<td>325</td>
<td>50</td>
<td>520</td>
</tr>
<tr>
<td>Pole centre distance 170mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>800–1250A</td>
<td>515</td>
<td>325</td>
<td>50</td>
<td>600</td>
</tr>
<tr>
<td>Pole centre distance 210mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1600–4000A</td>
<td>700</td>
<td>325</td>
<td>85</td>
<td>760</td>
</tr>
<tr>
<td>Pole centre distance 275mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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4-M12

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*DC only - on request
Overall dimensions

26.3kA/Pole centre distance 170mm, withdrawable

31.5kA/Pole centre distance 210mm, withdrawable

40kA/Pole centre distance 275mm, withdrawable

Truck size and track for withdrawable type circuit breaker

<table>
<thead>
<tr>
<th>Pole centre distance</th>
<th>A (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>170mm (800-1250A)</td>
<td>530</td>
</tr>
<tr>
<td>210mm (800-1250A)</td>
<td>620</td>
</tr>
<tr>
<td>275mm (1600-4000A)</td>
<td>820</td>
</tr>
</tbody>
</table>
Electric circuit diagram

Secondary components of breaker
- HK: Servicing position
- X02: Testing position

Secondary components of the truck
- HK 58-pin aviation plug S8 Limit switch (Testing position)
- M: Energy storage motor S9 Limit switch (Working position)
- S10, S11, S12: Energy storage position switch X02 Terminals of the truck
- S21, S22: Energy storage position switch
- S41, S42: Energy storage position switch
- HQ: Closing coil
- TQ: Opening coil
- GT1: Over current trip coil
- GT2: Over current trip coil
- GT3: Over current trip coil
- D1: Appliance switch

Electric circuit diagram
## Weight

<table>
<thead>
<tr>
<th>Specifications</th>
<th>26.3kA-31.5kA withdrawable</th>
<th>40kA/1600–2000 pole centre distance 275 withdrawable</th>
<th>40kA/2500–4000 pole centre distance 275 withdrawable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (Kg)</td>
<td>196</td>
<td>295</td>
<td>315</td>
</tr>
</tbody>
</table>

## Order Sheet Format

1. **Purchaser**
   - Project Name
   - Quantity Ordered
   - Unit

2. **Product type**

3. **Rated current (A):**
   - 800
   - 1250
   - 1600
   - 2000
   - 2500
   - 3150
   - 4000

4. **Breaking current (kA):**
   - 26.3
   - 31.5
   - 40

5. **Pole centre distance (mm):**
   - 170
   - 210
   - 275

4. **Technical data for spring-operated mechanism**

   - **Opening power supply:**
     - DC110V
     - DC220V
     - AC110V
     - AC220V
     - DC24V*

   - **Closing power supply:**
     - DC110V
     - DC220V
     - AC110V
     - AC220V
     - DC24V*

   - **Power supply for energy-storing motor:**
     - DC110V
     - DC220V
     - AC110V
     - AC220V

5. **Accessories**
   - energy-storing handle
   - racking handle of truck

6. **Remark:**
   - SecoVac system integrator kit
   - (consisting of shutter, male contact, spout & rails)
   - with panel (enclosure)

*on request
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