Vacuum Circuit Breaker & Vacuum Interrupter

LSIS Pro-MEC VCB is user-friendly to give more convenience and safety by providing high speed interrupting time (3cycles), adopting the rapid auto-reclosing method, and having wide range of accessories.

7.2kV Draw-out (F class)

24kV Draw-out (F class)
Vacuum Circuit Breaker

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Control circuit diagram
7.2kV dimension
12kV dimension
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Vacuum Interrupter

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VI internal structure
Basic functions and interrupting action
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Dimensions
Technical data
LSIS Pro-MEC VCB is user-friendly to give more convenience and safety by providing high speed interrupting time (3cycles), adopting the rapid auto-reclosing method, and having wide range of accessories.

**Wide range of accessories (optional)**

- Key Lock
- Padlock of earthing switch
- Button padlock
- Position switch of the earthing switch
- Button cover
- Locking coil of earthing switch
- Position switch (Cell switch)
- Shutter padlock
- Preparatory trip coil (Secondary trip coil)
- MOC (Mechanically operated cell switch)
- Latch checking switch
- TOC (Truck operated cell switch)
- Charge indicator
- Code plate (Miss insertion prevention)
- Position padlock
- Capacitor trip device
- Earthing switch  
  Note 1)
- Rectifier

Note 1) The earthing switch is not available for 17.5kV VCB.
High reliability of the operating mechanism
- Separate design of the main circuit from the operating mechanism.
- Adopt the toggle link method.
- Improved the reliability of electric circuit.
- Adopt the rapid auto-reclosing method as a standard option. (O-0.3sec.-CO-3min.-CO)

High interrupting performance
- Make short of the interrupting time. (3cycles)
- Increase the rated short-circuit withstand characteristics. (1sec. to 3sec.)

Great operational safety
- Reinforce the insulation in the conduct, by adopting the molded housing in each phase.
- Built in the device making the contacts open first when draw in and out.
- Adopt the tulip-shape connection between the cradle and the VCB.
## Vacuum Circuit Breaker

### Ratings

<table>
<thead>
<tr>
<th>Type</th>
<th>LVB-06(□)-32D</th>
<th>LVB-06(□)-40D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage (kV)</td>
<td>7.2</td>
<td>7.2</td>
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<tr>
<td>Rated normal current (A)</td>
<td>1250</td>
<td>2000</td>
</tr>
<tr>
<td>Rated frequency (Hz)</td>
<td>50/60</td>
<td>50/60</td>
</tr>
<tr>
<td>Rated short-circuit breaking current (kA)</td>
<td>31.5</td>
<td>40</td>
</tr>
<tr>
<td>Rated short-circuit breaking capacity (MVA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated short-time withstand current (kA/3sec)</td>
<td>31.5</td>
<td>40</td>
</tr>
<tr>
<td>Rated short-circuit making current (kA)</td>
<td>82</td>
<td>104</td>
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<td>Rated breaking time (Cycle)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Rated opening time (sec)</td>
<td>≤ 0.04</td>
<td>≤ 0.04</td>
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<tr>
<td>No-load closing time (sec)</td>
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<tr>
<td>Withstand voltage Power frequency (kV/min)</td>
<td>20</td>
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<tr>
<td>Impulse (kV/1.2 (\times) 50㎲)</td>
<td>60</td>
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<tr>
<td>Rated operating sequence</td>
<td>O-0.3s-CO-3min-CO</td>
<td>O-0.3s-CO-3min-CO</td>
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<tr>
<td>Type test</td>
<td>Mechanical</td>
<td>M2 (10,000 times)</td>
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<td></td>
<td>Electrical</td>
<td>E2 (List1)</td>
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<td>Capacitive current switching</td>
<td>C2</td>
<td>C2</td>
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<tr>
<td>Lifetime Mechanical</td>
<td>Without maintenance (Time)</td>
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<td>20000</td>
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<td>Maintenance (Time)</td>
<td>30000</td>
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<td>Auxiliary switch</td>
<td>4a4b, 10a10b</td>
<td>4a4b, 10a10b</td>
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<td>Installing method</td>
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<td>Visible, Fixed</td>
</tr>
<tr>
<td></td>
<td>Draw-out type</td>
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<tr>
<td></td>
<td>G-type</td>
<td>Visible, Tulip</td>
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<td></td>
<td>T</td>
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<td></td>
<td>M-type</td>
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<tr>
<td>Weight</td>
<td>VCB</td>
<td>E-type (kg)</td>
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<td>F-type (kg)</td>
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<td>Cradle</td>
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<td>IEC 62271-100</td>
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<tr>
<td>Test laboratory</td>
<td>KERI</td>
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</table>

Note 1) Applied cable-charging current switching test
Note 2) In the event of ordering Enclosed Tulip type for G class VCB, please add “T” in the end of type name. (Ex: LVB-06G-32D/06-1A2B-T)
Note 3) (        )* indicates the weight of Enclosed Tulip installing method VCB.
Note 4) KERI: Korea Electrotechnology Research Institute
<table>
<thead>
<tr>
<th>Type</th>
<th>LVB-12□-32D/12, 20-T, 30</th>
<th>LVB-12□-40D/12, 20, 30</th>
<th>LVB-17□-40D/12, 20, 30</th>
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<tr>
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<td>Rated normal current (A)</td>
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<td>1250 2000 3150</td>
<td>1250 2000 3150</td>
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<td>Rated frequency (Hz)</td>
<td>60(E1,E2,C2: PT &amp; T) 50(E1.C2:KEMA), 60(M2,E2,C2: PT &amp; T)</td>
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<td>Rated short-circuit breaking current (kA)</td>
<td>31.5 40</td>
<td>31.5 40</td>
<td>31.5 40</td>
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<tr>
<td>Rated short-circuit breaking capacity (MVA)</td>
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<td>650 831</td>
<td>650 831</td>
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<td>Rated short-time withstand current (kA/3sec)</td>
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<td>31.5 40</td>
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<td>Rated short-circuit making current (kA)</td>
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<td>81.9 104</td>
<td>81.9 104</td>
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<td>Impulse (kV/1.2×50㎲)</td>
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<td>75</td>
<td>95</td>
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<td>M2 (10,000 times)</td>
<td>M2 (10,000 times)</td>
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<td>E2 (List 1)</td>
<td>E2 (List 1)</td>
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<td>C2</td>
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<td>20,000</td>
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<td>30,000</td>
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<tr>
<td>Without maintenance (Time)</td>
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<td>4a4b, 10a10b</td>
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<td>-</td>
<td>-</td>
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<td>Draw-out type Mechanical</td>
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<td>C2</td>
<td>C2</td>
</tr>
<tr>
<td>E-TYPE</td>
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<td>Enclosed, Tulip</td>
</tr>
<tr>
<td>F-TYPE</td>
<td>Enclosed, Tulip</td>
<td>Visible, Tulip</td>
<td>Visible, Tulip</td>
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<tr>
<td>G-TYPE</td>
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<td>Visible, Tulip</td>
<td>Visible, Tulip</td>
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<tr>
<td>M-TYPE</td>
<td>Enclosed, Tulip</td>
<td>Visible, Tulip</td>
<td>Visible, Tulip</td>
</tr>
<tr>
<td>VCB Mechanical</td>
<td>E-TYPE</td>
<td>F-TYPE</td>
<td>M-TYPE</td>
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<td>E-TYPE (kg)</td>
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<td>160</td>
<td>162</td>
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<td>F-TYPE (kg)</td>
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<td>163</td>
<td>220</td>
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<td>G, M-TYPE (kg)</td>
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<td>162 163 220</td>
<td>200 205 260</td>
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<td>Cradle Mechanical</td>
<td>E-TYPE</td>
<td>F-TYPE</td>
<td>M-TYPE</td>
</tr>
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<td>E-TYPE (kg)</td>
<td>110</td>
<td>117</td>
<td>155</td>
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<td>F-TYPE (kg)</td>
<td>110</td>
<td>117</td>
<td>155</td>
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<tr>
<td>G, M-TYPE (kg)</td>
<td>110 117 155</td>
<td>110 117 155</td>
<td>175 175 200</td>
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<td>Applied standard</td>
<td>IEC 62271-100</td>
<td>IEC 62271-100</td>
<td>IEC 62271-100</td>
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<tr>
<td>Test laboratory</td>
<td>PT &amp; T, E1, E2, C2, M2</td>
<td>KEMA, PT &amp; T</td>
<td>KEMA, PT &amp; T</td>
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</table>

Note) Applied cable-charging current switching test
## Vacuum Circuit Breaker

### Ratings

<table>
<thead>
<tr>
<th>Type</th>
<th>LVB-20□-13D</th>
<th>LVB-20□-13D/T</th>
<th>LVB-20□-16D</th>
<th>LVB-20□-16D/T</th>
<th>LVB-20□-25D</th>
<th>LVB-20□-25D/T</th>
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</thead>
<tbody>
<tr>
<td>Rated voltage (kV)</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
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<tr>
<td>Rated normal current (A)</td>
<td>630</td>
<td>630</td>
<td>630</td>
<td>630</td>
<td>1250</td>
<td>1250</td>
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<tr>
<td>Rated frequency (Hz)</td>
<td>50/60</td>
<td>50/60</td>
<td>50/60</td>
<td>50/60</td>
<td>50/60</td>
<td>50/60</td>
</tr>
<tr>
<td>Rated short-circuit breaking current (kA)</td>
<td>12.5</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Rated short-circuit breaking capacity (MVA)</td>
<td>520</td>
<td>665</td>
<td>665</td>
<td>665</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>Rated short-time withstand current (kA/3sec)</td>
<td>12.5</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>25</td>
<td>25</td>
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<tr>
<td>Rated short-circuit making current (kAp)</td>
<td>32.5</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>65</td>
<td>65</td>
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<tr>
<td>Rated breaking time (Cycle)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated opening time (sec)</td>
<td>≤ 0.04</td>
<td>≤ 0.04</td>
<td>≤ 0.04</td>
<td>≤ 0.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No-load closing time (sec)</td>
<td>≤ 0.06</td>
<td>≤ 0.06</td>
<td>≤ 0.06</td>
<td>≤ 0.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Withstand voltage</td>
<td>Power frequency (kV/min)</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impulse (kV/1.2 × 50㎲)</td>
<td>125</td>
<td>125</td>
<td>125</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated operating sequence</td>
<td>O-0.3s-CO-3min-CO</td>
<td>O-0.3s-CO-3min-CO</td>
<td>O-0.3s-CO-3min-CO</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Type of test

- **Mechanical**: M2(10,000 times)
- **Electrical**: E2 (List1)
- **Capacitive current switching**: C2

### Lifetime

- **Mechanical**: Without maintenance (Time) 20000
- **Maintenance**: (Time) 30000
- **Electrical**: Without maintenance (Time) 20000
- **Maintenance**: (Time) 30000

### Auxiliary switch

- **Fixed**: 4a8b, 10a10b
- **Draw-out type**: E-type Enclosed, Tulip
- **G-type (Note 2)**: Enclosed, Tulip
- **M-type**: Enclosed, Tulip

### Weight

- **VCB**: E-type 145 kg
- **F-type**: 145 kg
- **G, M-type**: 155 kg
- **Cradle**: E-type 80 kg
- **F-type**: 82 kg
- **G-type**: 110 kg

### Applied standard

- **IEC 62271-100**: KERI
- **IEC 62271-100**: KEMA

### Note

1) Applied cable-charging breaking current
2) In the event of ordering Enclosed Tulip type for G class VCB, please add “T” in the end of type name. (Ex: LVB-06G-20D/06-1A2B-T)
Motor

When the closing spring is charged, the control power of motor is turned off by the built-in limit s/w.

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>The peak value of the inrush current (A)</th>
<th>Rated current (A)</th>
<th>Consumption power (W)</th>
<th>Charging time (Sec.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 48V</td>
<td>21</td>
<td>4</td>
<td>350</td>
<td>13</td>
</tr>
<tr>
<td>DC 110V</td>
<td>20</td>
<td>3</td>
<td>330</td>
<td>12</td>
</tr>
<tr>
<td>DC 125V</td>
<td>20</td>
<td>3</td>
<td>330</td>
<td>12</td>
</tr>
<tr>
<td>DC 220V</td>
<td>17</td>
<td>2.6</td>
<td>374</td>
<td>12</td>
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</tbody>
</table>

Note 1) Range of the normal operating voltage: 85~110%
2) DC 24V is the underdeveloped rating.

Closing Coil (C)

The coil operated only when the power is applied continuously over 45ms. It has built-in electrically anti-pumping circuit.

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>Rated current (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 48V</td>
<td>6</td>
</tr>
<tr>
<td>DC 110V</td>
<td>3</td>
</tr>
<tr>
<td>DC 125V</td>
<td>3</td>
</tr>
<tr>
<td>DC 220V</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Note 1) Range of the normal operating voltage: 85~110%
2) DC 24V is the underdeveloped rating.

Shunt coil (TC)

When the VCB is ‘ON’ position, even though the control power of a shunt coil is ‘OFF’, the VCB maintains the ‘ON’ position.

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>Rated current (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 48V</td>
<td>6</td>
</tr>
<tr>
<td>DC 110V</td>
<td>3</td>
</tr>
<tr>
<td>DC 125V</td>
<td>3</td>
</tr>
<tr>
<td>DC 220V</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Note 1) Range of the normal operating voltage: 70~110%
2) DC 24V is the underdeveloped rating.

Auxiliary switch

Standard 4a4b / Optional 10a10b

<table>
<thead>
<tr>
<th>Classification</th>
<th>General load (A)</th>
<th>Inductive load (A)</th>
<th>Contact configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 250V 10</td>
<td>5</td>
<td></td>
<td>4a4b</td>
</tr>
<tr>
<td>125V 10</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC 250V 10</td>
<td>10</td>
<td>5</td>
<td>10a10b</td>
</tr>
<tr>
<td>DC 125V 10</td>
<td>10</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>30V 10</td>
<td>5</td>
<td></td>
<td></td>
</tr>
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</table>

Note) The contact capacity of the following accessories are the same with that of the Aux. switch. Position switch, Closing sp. ring contact, Charging complete indicating contact, Position switch of the earthing switch, Mechanically operated cell switch, Truck operated cell switch.

Charge indicator of the closing spring

Indicating the condition of the closing spring.

Position indicator of the main contacts

Indicating the ‘Close’ or the ‘Open’ of the main contacts.
Close position: ‘ON’  Open position: ‘OFF’

Counter

Mechanically counts the switching of the VCB by 5digits analog type counter (Standard option)
Vacuum Circuit Breaker

Constructional and operating characteristics

**Manual charge**
Insert the charge handle into the manual charge hole in the front of a VCB, and rotate it to clockwise over 40 times and the charge complete with a metal sound.

**Motor charge**
If you apply the control power to a VCB, the closing spring will be charged automatically by a motor and then the control power will be turned off by the built-in limit s/w. Please use the same control voltage for motor, Closing coil, Trip coil.

**Sequence of the switching mechanism**

![Sequence diagram]

- **Charge Indicator of the closing spring**
- **Close button**
- **Key lock (Optional)**
- **Trip button**
- **Manual charge hole**
- **Position indicator of the main contacts**
- **Counter**
- **Screw hole for draw-in and draw-out**
- **Nameplate**
- **Mounting hole**
- **Safety cover**
Control circuit diagram

- External terminal of VCB
- Vacuum circuit breaker
- Spring charging motor
- Trip coil
- Closing coil
- Anti-pump relay
- Auxiliary switch (NO)
- Auxiliary switch (NC)
- Closing interlock limit switch (only withdrawable type)
- Motor stopping, closing spring charged indication
- Anti-closing, anti-pumping limit switch
- Opening latch checking switch (preventing closing unless the trip latch is properly reset)
- Position switch: 4a (Terminal No.: 1, 2, 3, 4, 5, 6, 7, 8)
- Secondary trip coil (Preparatory trip coil Terminal No.: 82, 83)

Note 1) LCS1: Latch checking switch
2) Trip coil supervision (Trip coil monitoring contact)
3) Position switch 4a (Terminal No.: 1, 2, 3, 4, 5, 6, 7, 8)
4) TC1: Secondary trip coil (Preparatory trip coil Terminal No.: 82, 83)
5) In fixed type VCB, LS1 (Closing-coil limit switch) is not available.

※ Above circuit diagram is based on 'OFF' status of VCB, and closing spring is charged.
Vacuum Circuit Breaker

7.2kV dimension (VCB)

**LVB-06P-32D, 40D (Visible, Fixed) - (1250/2000A)**

- **Top**
  - Wiring connector
  - *125.5 applied to all 7.2kV VCB.

- **Front**

- **Side**

- **Terminal conductor**

<table>
<thead>
<tr>
<th></th>
<th>31.5/40kA 1250A</th>
<th>31.5/40kA 2000A</th>
</tr>
</thead>
<tbody>
<tr>
<td>d</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>d</td>
<td>4 x 14</td>
<td>4 x 14</td>
</tr>
<tr>
<td>d</td>
<td>150</td>
<td>150</td>
</tr>
</tbody>
</table>

**LVB-06P-32D, 40D (Visible, Fixed) - (3150A)**

- **Front**
- **Side**
- **Top**

<table>
<thead>
<tr>
<th></th>
<th>31.5/40kA 3150A</th>
</tr>
</thead>
<tbody>
<tr>
<td>d</td>
<td>665</td>
</tr>
<tr>
<td>d</td>
<td>729</td>
</tr>
<tr>
<td>d</td>
<td>569</td>
</tr>
</tbody>
</table>
LVB-06E, F, G-32D, 40D  E, F, G class - (1250/2000A)

- Top

- Front

- Side

<Terminal conductor>

LVB-06G- 32D/T, 40D/T  G class (Enclosed, Tulip contact) - (1250/2000A)

- Front

- Side

31.5/40kA 1250/2000A  E, F, G class
(Enclosed, Tulip contact)
Vacuum Circuit Breaker

7.2kV dimension (VCB)

LVB-06E-32D, 40D  E class (Visible, Tulip contact) - (3150A)

- Front
- Side
- Top

LVB-06F-32D, 40D  F class (Visible, Tulip contact) - (3150A)

- Front
- Side
- Top
LVB-06G-32D, 40D  G class (Visible, Tulip contact) - (3150A)

- Front

- Side

- Top

31.5/40kA 3150A  G class
Vacuum Circuit Breaker

7.2kV dimension (Cradle)

LCL-06E-32D, 40D  E class (Visible, Tulip contact)

- Front

- Side

<table>
<thead>
<tr>
<th>Rating</th>
<th>1250A</th>
<th>2000A</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10</td>
<td>20</td>
</tr>
</tbody>
</table>

31.5/40kA 1250/2000A  E class

- Top

LCL-06E-32D, 40D  E class (Visible, Tulip contact) - (3150A)

- Front

- Side

- Top
LCL-06F-32D, 40D  F class (Visible, Tulip contact) - (1250/2000A)

- Front

- Side

<table>
<thead>
<tr>
<th>Rating</th>
<th>1250A</th>
<th>2000A</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10</td>
<td>20</td>
</tr>
</tbody>
</table>

- Top

31.5/40kA 1250/2000A F class

LCL-06F-32D, 40D  F class (Visible, Tulip contact) - (3150A)

- Front

- Side

- Top

31.5/40kA 3150A F class
Vacuum Circuit Breaker

7.2kV dimension (Cradle)

LCL-06G-32D, 40D  G class(Visible, Tulip contact) - (31.5/40kA 1250/2000A)

<table>
<thead>
<tr>
<th>Rating</th>
<th>1250A</th>
<th>2000A</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10</td>
<td>20</td>
</tr>
</tbody>
</table>

**<Terminal conductor>**

<table>
<thead>
<tr>
<th>31.5/40kA 1250A G class</th>
</tr>
</thead>
<tbody>
<tr>
<td>2# 14 (Mounting hole)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>20–40kA 2000A G class</th>
</tr>
</thead>
<tbody>
<tr>
<td>4# 16 (Mounting hole)</td>
</tr>
</tbody>
</table>
LCL-06G-20D/T, 25D/T, 32D/T, 40D/T  G class (Enclosed, Tulip contact) - (630/1250/2000A)

- Front
- Side
- Top

<Terminal conductor>

Rating  | 31.5/40kA  | 1250A | 2000A |
-------|-----------|-------|-------|
A      | 12        | 25    |       |
B      |           |       | 48    |

Section S-S

View "C"
LCL-06G-32D, 40D  G class (Visible, Tulip contact) - (3150A)

**Side**

![Side Diagram]

31.5/40kA 3150A  G class

**Top**

![Top Diagram]

<User busbar requirement>

*To connect with VCB’s bushing terminals user busbar should have below dimensions and two holes.*
12kV dimension (VCB)

LVB-12G-32D/T  G class (Enclosed, Tulip contact) - (1250/2000A)

- Front

- Side

![Diagram of LVB-12G-32D/T]

(Unit: mm)

LVB-12G-40D  G class (Enclosed, Tulip contact) - (1250/2000A)

- Front

- Side

- Top

![Diagram of LVB-12G-40D]

40kA 1250/2000A  G class

31.5kA 1250/2000A  G class
LVB-12G-40D  G class (Enclosed, Tulip contact) - (3150A)

• Front

• Side

• Top

40kA 3150A  G class

(Unit: mm)
12kV dimension (Cradle)

LCL-12G-25D/T, 32D/T  
G class (Enclosed, Tulip contact) - (630/1250/2000A)

- Front
- Side
- Top

<Terminal conductor>

<table>
<thead>
<tr>
<th>Rating</th>
<th>25kA</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>12</td>
</tr>
<tr>
<td>B</td>
<td>⊙48</td>
</tr>
</tbody>
</table>

(Unit: mm)

31.5kA 1250/2000A  G class
LCL-12G-40D  G class (Enclosed, Tulip contact) - (1250/2000A)

- Front
- Side

40kA 1250/2000A  G class

- Top

<Terminal conductor>

(Unit: mm)
LCL-12G-32D/LCL-12G-40D  G class (Enclosed, Tulip contact) - (3150A)

40kA 3150A  G class

• Front

• Side

• Top

<Terminal conductor>
Vacuum Circuit Breaker

17.5kV dimension (Cradle)

LVB-17G-40D  G class (Visible, Tulip contact) - (1250/2000A)

- Front
- Side
- Top

LVB-17G-40D  G class (Visible, Tulip contact) - (3150A)

- Front
- Side
- Top
LCL-17G-40D  G class (Visible, Tulip contact) - (1250/2000A)

- Side

- Top

<Terminal conductor>

1250A

2000A
Vacuum Circuit Breaker
17kV dimension (VCB)

LCL-17G-40D  G class (Visible, Tulip contact) - (3150A)

- Side

- Top

<Terminal conductor>
24kV dimension (VCB)

LVB-20P-13D, 16D, 25D (Visible, Fixed) - (630/1250/2000A)
- Front
- Side

LVB-20E, F-13D/(T), 16D/(T), 25D/(T)  E, F class - (630/1250/2000A)
- Front
- Side

Note ) In case of 12.5kA & 16kA 630A, the dimension shown in parenthesis should be applied.
Vacuum Circuit Breaker

24kV dimension (VCB)

**LVB-20G-13D, 16D, 25D**  
G class (Visible, Tulip contact) - (630/1250A)

- Front
- Side

**LVB-20G-13D/T, 16D/T, 25D/T**  
G class (Enclosed, Tulip contact) - (630/1250/2000A)

- Front
- Side

---

Note 1) (     ): The dimension shown in parenthesis should be applied to LVB-20G-13E/T or LVB-20G-16E/T, LVB-20G-25E/T for 630A and 1250A in case that distance between phase & phase is 210mm.

2) IP Cover applied both sides in case of 265mm phase distance.
LCL-20E-13D, 16D, 25D  E class (Visible, Clip contact) - (630/1250/2000A)

**Front**

<table>
<thead>
<tr>
<th>Rating</th>
<th>A</th>
<th>B</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>630, 1250A</td>
<td>768</td>
<td>190.5</td>
<td>10</td>
</tr>
<tr>
<td>2000A</td>
<td>778</td>
<td>185.5</td>
<td>20</td>
</tr>
</tbody>
</table>

**Side**

Note) Insulation barrier is not used for rating 12.5kA 630A and 16kA 630A.
Vacuum Circuit Breaker
24kV dimension (Cradle)

LCL-20E-13D/T, 16D/T, 25D/T  E class (Enclosed, Tulip contact) - (630/1250/2000A)

<table>
<thead>
<tr>
<th>Rating</th>
<th>A</th>
<th>B</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>630, 1250A</td>
<td>768</td>
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<td>10</td>
</tr>
<tr>
<td>2000A</td>
<td>778</td>
<td>185.5</td>
<td>20</td>
</tr>
</tbody>
</table>

Note) Insulation barrier is not used for rating 12.5kA 630A and 16kA 630A
LCL-20F-13D, 16D, 25D  F class (Visible, Clip contact) - (630/1250/2000A)

- Front
- Side

<table>
<thead>
<tr>
<th>Rating</th>
<th>A</th>
<th>B</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>630, 1250A</td>
<td>768</td>
<td>190.5</td>
<td>10</td>
</tr>
<tr>
<td>2000A</td>
<td>778</td>
<td>185.5</td>
<td>20</td>
</tr>
</tbody>
</table>

Note) Insulation barrier is not used for rating 12.5kA 630A and 16kA 630A
Vacuum Circuit Breaker

24kV dimension (Cradle)

LCL-20F-13D/T, 16D/T, 25D/T  F class(Enclosed, Tulip contact) - (630/1250/2000A)

- Front
- Side

<table>
<thead>
<tr>
<th>Rating</th>
<th>A</th>
<th>B</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>630, 1250A</td>
<td>768</td>
<td>190.5</td>
<td>10</td>
</tr>
<tr>
<td>2000A</td>
<td>778</td>
<td>185.5</td>
<td>20</td>
</tr>
</tbody>
</table>

<Terminal conductor>

Note) Insulation barrier is not used for rating 12.5kA 630A and 16kA 630A
LCL-20G-13D, 16D, 25D  G class (Visible, Tulip contact) - (630/1250A)

- **Front**
- **Side**

- **Top**

<Terminal conductor>

(Unit: mm)
Vacuum Circuit Breaker

24kV dimension (Cradle)

LCL-20G-13D/T, 16D/T, 25D/T  G class (Enclosed, Tulip contact) - (630/1250/2000A)

- Front
- Side
- Top
- Earthing Switch

<br>

<Terminal conductor>

Note) ( ) The dimension shown in parenthesis should be applied to LVB-20G-13E/T or LVB-20G-16E/T, LVB-20G-25E/T for 630A and 1250A in case that distance between phase & phase is 210mm.

View "A" 210mm

View "B"
**Accessories for VCB**

**Key lock**
When it is locked by a key, the closing operation is not available (electrically and mechanically) without a Key.

**Button padlock**
Button padlock protects ‘ON’ or ‘OFF’ button when accident is occurred by operation at discretion. It is available to operate after release button padlock.

**Button cover**
Button cover protects ‘ON’ or ‘OFF’ button when accident is occurred by operation at discretion. It is available to operate by push bar.

**Position switch (Cell switch)**
Indicating the position (Run or Test) of a VCB, by mechanically pressing the switch when a VCB change the position.
- RUN: 2a
- TEST: 2a

*Note* In case that position of VCB changed to “Run” or “Test” position, “a” contact will be closed.
Accessories for VCB

Secondary coil (Preparatory trip coil)
The main coil and the preparatory coil is connected in parallel. So even though there happens a fault in the trip coil, the VCB can be tripped by one of the two trip coils.

Latch checking switch
When the Latch is in abnormal position, the Latch checking switch prevents the closing operation even though there is the 'Closing' signal.

Charge indicator
Remotely indicates the charging is completed.
(Standard Feature)
- Terminal No.: 9, 10

Position padlock
The hole to prevent the draw-in and out of a VCB from the present position. ('Run' or 'Test')
Standard option in the interlock lever of the E, F class draw-out type VCB. (Hole size = $\varnothing$ 8)
Accessories for Cradle

Earthing switch (for G class draw-out type only)
For the safety during the maintenance of a VCB panel, discharge the charging current in the load side of a VCB with this earthing switch.

Padlock of earthing switch
(for G class draw-out type only)
The hole to prevent the accident through carelessness earthing switch operation, the locking of the earthing switch is available when the switch is in 'OFF' position.
(Hole size = Ø 8)

Position switch of the earthing switch
(for G class draw-out type only)
Indicates the 'ON' or 'OFF' status of the earthing switch. (5a5b)

Locking coil of earthing switch
(for G class draw-out type only)
To prevent the accident through carelessness earthing switch operation, the earthing switch can be changed to 'ON' position after releasing the lock by magnetizing the coils.
**Accessories for Cradle**

**Shutter padlock**
The hole to lock the shutters (load and line side) in close position, to increase the safety during the maintenance of a VCB draw-out position.
(Hole size = $\phi 8$)

**Mechanically operated cell switch (MOC) -for G class draw-out type only**
The auxiliary switch (3a4b), which indicate the 'ON' or 'OFF' condition of a VCB, but operated only when the VCB is in 'Run' state. (Installed in the bottom of a cradle)

**Truck operated cell switch (TOC) -for G class draw-out type only**
The auxiliary switch (3a4b), which indicate the 'Run' state of a VCB and is operated by the movement of a VCB frame. (Installed in the bottom of a cradle)

**Code plate (Miss insertion prevention) -for E, F class draw-out type only**
To prevent the insert a VCB to a cradle, when the ratings of VCB and cradle are different.

**Padlock**
To prevent the insert draw-in/out handle to a screw hole by operating G class VCB temporarily

*Note*) #11, 21 are Early 'b' contact
Optional accessories

Capacitor trip device (CTD)
When the control power is off, the CTD supply the power for tripping a VCB.

<table>
<thead>
<tr>
<th>Ratings</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type CB-T1</td>
<td>CB-T2</td>
</tr>
<tr>
<td>Rated input voltage</td>
<td>AC100/110V</td>
</tr>
<tr>
<td>Frequency (Hz)</td>
<td>50/60</td>
</tr>
<tr>
<td>Charging volta(V)</td>
<td>140/155</td>
</tr>
<tr>
<td>Charging time</td>
<td>Within 10 Sec. after the AC power off</td>
</tr>
<tr>
<td>Tripping time</td>
<td>Within 30 Sec. after the AC power off</td>
</tr>
<tr>
<td>Allowable Input voltage range</td>
<td>85% ~ 100%</td>
</tr>
<tr>
<td>Capacitor rating(μF)</td>
<td>1000</td>
</tr>
</tbody>
</table>

Rectifier
When the DC power is not available, rectify the AC power and get the DC power for closing coil.

<table>
<thead>
<tr>
<th>Type</th>
<th>AC Input voltage</th>
<th>Output current</th>
<th>Rating time</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCB-X</td>
<td>1Ø 100/110V</td>
<td>40A DC</td>
<td>10 sec.</td>
</tr>
<tr>
<td>1Ø 200/220V</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Standard tool

Handle for draw-in and out
Handle for draw-in and out the VCB
(Standard feature in the draw-out type)

Manual charging handle
Handle for charging the spring manually.
(Standard feature)
Vacuum Circuit Breaker

Types and ordering information

**12kV**

- **LS VCB**
  - **Cradle**
  - **Installation method**
    - G: G class draw-out type
    - M: G class draw-out type + Bushing
  - **Rated voltage**
    - 12: 12kV
  - **Revision No.**
    - D: Pro-MEC
  - **Control voltage**
    - 1A: DC110V
    - 1B: DC220V
    - 1C: DC48V
    - 1E: DC125V
  - **Breaking current**
    - 32: 31.5kA
    - 40: 40kA
  - **Rated current**
    - 12: 1250A
    - 20: 2000A
    - 30: 3150A
  - **Auxiliary switch**
    - 2B: 4x4b (A type connector)
    - 2E: 10x10b (A type connector)
    - 2G: 4x4b (B type connector)
    - 2H: 10x10b (B type connector)
  - **Accessories**
    - B: Position Switch (RUN/TEST:2a2a)
    - C1: Button Padlock (ON)
    - C2: Button Padlock (OFF)
    - C3: Button Padlock (ON/OFF)
    - D1: Button Cover (ON)
    - D2: Button Cover (OFF)
    - D3: Button Cover (ON/OFF)
    - E: Button padlock (ON)+ Button cover (OFF)
    - F: Button padlock (OFF)+ Button cover (ON)
    - G: Key Lock
    - H: Secondary Trip Coil (Preparatory trip coil)
    - J: Fire-extendable wiring cable ass'y
    - K: Opening Latch Checking Switch
    - S: Pad Lock (G class)
    - T: Enclosed type, Tulip contact

- **LS Cradle**

- **Cradle**
  - **Installation method**
    - G: G class draw-out type
  - **Rated voltage**
    - 12: 12kV
  - **Revision No.**
    - D: Pro-MEC
  - **Rated current**
    - 12: 1250A
    - 20: 2000A
    - 30: 3000A
  - **Accessories**
    - T: Enclosed type, Tulip contact
17.5kV

**LS VCB**
- **Rated voltage**: 17.5kV

**Installation method**
- **P**: Fixed type
- **E**: E class draw-out type
- **F**: F class draw-out type
- **G**: G class draw-out type

<table>
<thead>
<tr>
<th><strong>Breaking current</strong></th>
<th><strong>Rated current</strong></th>
<th><strong>Control voltage</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>40</strong></td>
<td><strong>40kA</strong></td>
<td><strong>1A</strong>: DC110V</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>1B</strong>: DC220V</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>1C</strong>: DC48V</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>1E</strong>: DC125V</td>
</tr>
</tbody>
</table>

**Revision No.**
- **D**: Pro-MEC

<table>
<thead>
<tr>
<th><strong>Auxiliary switch</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2B</strong>: 4a4b(A type connector)</td>
</tr>
<tr>
<td><strong>2E</strong>: 10a10b(A type connector)</td>
</tr>
<tr>
<td><strong>2G</strong>: 4a4b(B type connector)</td>
</tr>
<tr>
<td><strong>2H</strong>: 10a10b(B type connector)</td>
</tr>
</tbody>
</table>

**Accessories**
- **B**: Position Switch (RUN/TEST, 2a2b)
- **C1**: Button Padlock (ON)
- **C2**: Button Padlock (OFF)
- **C3**: Button Padlock (ON/OFF)
- **D1**: Button Cover (ON)
- **D2**: Button Cover (OFF)
- **D3**: Button Cover (ON/OFF)
- **E**: Button padlock (ON) + Button cover (OFF)
- **F**: Button padlock (OFF) + Button cover (ON)
- **G**: Key Lock
- **H**: Secondary Trip Coil/Preparatory trip coil
- **K**: Opening Latch Checking Switch
- **S**: Pad Lock (G class)
- **J**: Fire-endurable wiring cable ass'y

**Cradle**

**LS Cradle**
- **Rated voltage**: 17.5kV

**Installation method**
- **E**: E class draw-out type
- **F**: F class draw-out type
- **G**: G class draw-out type

<table>
<thead>
<tr>
<th><strong>Breaking current</strong></th>
<th><strong>Rated current</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>1250A</strong></td>
</tr>
<tr>
<td></td>
<td><strong>2000A</strong></td>
</tr>
<tr>
<td></td>
<td><strong>3150A</strong></td>
</tr>
</tbody>
</table>

**Revision No.**
- **D**: Pro-MEC

<table>
<thead>
<tr>
<th><strong>Rated current</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>12</strong>: 1250A</td>
</tr>
<tr>
<td><strong>20</strong>: 2000A</td>
</tr>
<tr>
<td><strong>30</strong>: 3150A</td>
</tr>
</tbody>
</table>

**Accessories**
- **A**: MOC (3a4b) + TOC (3a4b)

*Note: 'A' is for 'G' class only.*
**Vacuum Circuit Breaker**

**Types and ordering information**

### 24kV

#### LS VCB

- **Rated voltage**: 24kV
- **Installation method**
  - P: Fixed type
  - E: G class draw-out type
  - G: G class draw-out type
- **Revision No.**
  - D: Pro-MEC
  - E: Pro-MEC (Minimized type)
- **Control voltage**
  - 00: -
  - 1A: DC110V
  - 1B: DC220V
  - 1C: DC48V
  - 1D: DC125V
  - 1E: AC220(M), DC110(TC)
  - 1F: AC220(M), DC220(TC)
  - 1G: AC110(M), DC110(TC)
- **Breaking current**
  - 13: 630A
  - 16: 1250A
  - 25: 2000A
- **Rated current**
  - 13: 630A
  - 16: 1250A
  - 25: 2000A
- **Auxiliary switch**
  - 00: -
  - 1E: 4a4b (A type connector)
  - 1F: 10a10b (A type connector)
  - 1G: 4a4b (B type connector)
  - 1H: 10a10b (B type connector)

#### Accessories

- **B**: Position Switch (RUN/TEST:2a2a)
- **C**: Button Padlock (ON)
- **D**: Button Padlock (OFF)
- **E**: Button Padlock (ON/OFF)
- **F**: Button Cover (ON)
- **G**: Button Cover (OFF)
- **H**: Button Cover (ON/OFF)
- **I**: Button padlock (ON)
- **J**: Button cover (OFF)
- **K**: Button cover (ON)
- **L**: Key Lock
- **M**: Secondary Trip Coil (Preparatory trip coil)
- **N**: Fire-endurable wire ass'y
- **O**: Opening Latch Checking Switch
- **P**: Dummy VCB (AMP Jack)
- **Q**: Dummy VCB (Phoenix Jack)
- **R**: Earthing Truck (Lower terminal earthing)
- **S**: Earthing Truck (Upper terminal earthing)
- **T**: Pad Lock (G class)
- **U**: Enclosed type, Tulip contact

#### Accessory only for versions D and E

1. Version E is available only at 24kV G class and its distance between phases is 210mm.
2. "00" is used for ordering Earthing Truck and Dummy VCB.
3. Accessory only for versions D and E.

### Cradle

#### LS Cradle

- **Rated voltage**: 24kV
- **Installation method**
  - E: G class draw-out type
  - F: F class draw-out type
  - G: G class draw-out type
- **Revision No.**
  - A: Conventional
  - D: Pro-MEC
  - E: Pro-MEC (Minimized type)
- **Control voltage**
  - 06: -
  - 1A: DC110V
  - 1B: DC220V
  - 1C: DC48V
  - 1D: DC125V
  - 1E: AC220(M), DC110(TC)
  - 1F: AC220(M), DC220(TC)
  - 1G: AC110(M), DC110(TC)
- **Breaking current**
  - 13: 630A
  - 16: 1250A
  - 25: 2000A
- **Rated current**
  - 06: 630A
  - 12: 1250A
  - 20: 2000A
- **Auxiliary switch**
  - 00: -
  - 1E: 4a4b (A type connector)
  - 1F: 10a10b (A type connector)
  - 1G: 4a4b (B type connector)
  - 1H: 10a10b (B type connector)

#### Accessories

- **A**: MOS (3a4b)+ TOC (3a4b)
- **B**: Earthing Switch
- **C**: Earthing Switch Position Switch + Earthing Switch Locking coil
- **T**: Enclosed type, Tulip contact
- **PS**: Position SW Block (24kV E/F class only)

Note 1: Version E is available only at 24kV G class and its distance between phases is 210mm.
Note 2: Versions A, B and C are available only at G class VCB.
Features

Accumulation of more than 20 years of vacuum-related technologies

Simplified arc extinguishing system
Spiral contact structure with Radial magnetic field provides effective dispersing of the arc energy.

Simple structure and high quality
Sealing after complete removal of gas in the vacuum chamber in order to secure a long vacuum confidentiality

Small size and light weight
The new contact material used to enhance the competitiveness of the size

Wide rated coverages
Wide interrupting range from 6kV up to 40.5kV 40kA

High reliability and electrical life
Certification by KERI and KEMA according to the latest standard IEC62271-100 (2008) E2, LIST3, M2

Modeling system

<table>
<thead>
<tr>
<th>Basic type</th>
<th>Revision No</th>
<th>ETC.</th>
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<tbody>
<tr>
<td>L</td>
<td>LS</td>
<td>-</td>
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<tr>
<td>V</td>
<td>Vacuum</td>
<td>P</td>
</tr>
<tr>
<td>7</td>
<td>Series No.</td>
<td>Null</td>
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<tr>
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<td>Straight type</td>
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<td></td>
<td>P</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Potting type</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
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<td>Wave type</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Embedded type</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gas Insulation type</td>
</tr>
</tbody>
</table>
Largely movable and fixed electrodes and main shield compose the Susol VI. The main components are shown in the following.

The vacuum rate within the VI is very high (approximately 5x10^-5 Torr) and the spacing between fixed contact and movable contact is about 6 ~ 20mm, depending on the voltage. The contacts are in a structure that arc can easily be extinguished and the surfaces of the contacts are made of special alloy (copper - chromium) and the interior is completely sealed to prevent loss of vacuum. Therefore the wearing of the contacts can be minimized in the event of short-circuit and the arc energy by overvoltage or switching can be reduced effectively.
Basic functions and interrupting action

Interrupting action by VI

Spiral contact structure (Radial magnetic field), using the force \( F = j \times B \) generated by the interaction of the radial magnetic field caused by the current flowing through the arc between two contacts, disperse the arc energy evenly on the surface of contact by rotating the arc that is contracted by the pinch effect so as to minimize contact damage.

The images show arc behavior during the arcing time of about 8ms by shooting with high-speed camera capable of shooting 10,000 frames per sec. (0.1ms/frame) by focusing on parts of the arcing time on the above graph and simultaneously measured arc voltage also represented to show arc state by section.

In case of using the flat contact any of the designs do not reflect on when contacts are opening the arc with high temperature is contracted and fixed in the center of the contacts, which is called pinch effect. To prevent the effect two kinds of contact shapes are designed. One is Axial magnetic field which spreads the arc before its contraction, and the other is Radial magnetic field which permits the contraction of the arc but makes it rotated to disperse the energy. Because contracted arc is shaped like a cylinder it is called Contracted arc or columnar arc.
Vacuum Interrupter

VI endurance by interrupting current

<table>
<thead>
<tr>
<th>Vacuum Interrupter Model</th>
<th>Voltage</th>
<th>Operation Numbers</th>
<th>Interrupting Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>VI model LV2 at 7.2kV</td>
<td></td>
<td>N : Operation numbers</td>
<td>I : Interrupting current</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI model LV3 at 7.2kV</td>
<td></td>
<td>N : Operation numbers</td>
<td>I : Interrupting current</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI model LV4 at 24kV</td>
<td></td>
<td>N : Operation numbers</td>
<td>I : Interrupting current</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI model LV5 at 17.5kV</td>
<td></td>
<td>N : Operation numbers</td>
<td>I : Interrupting current</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Note) 1. Above graphs represent the characteristics of the electrical life of LS Susol VCB.
2. Life characteristics of each model in each rating represents the LOG-LOG graphs.

VI model LV8 at 17.5kV

- N: Operation numbers
- I: Interrupting current

VI model LV7-P1 at 24kV

- N: Operation numbers
- I: Interrupting current

VI model LV8 at 36kV

- N: Operation numbers
- I: Interrupting current

Note) 1. Above graphs represent the characteristics of the electrical life of LS Susol VCB.
2. Life characteristics of each model in each rating represents the LOG-LOG graphs.
<table>
<thead>
<tr>
<th>LV7-P1 / LV8-P</th>
<th>LV7-C</th>
<th>LV10404</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Diagram" /></td>
<td><img src="image2.png" alt="Diagram" /></td>
<td><img src="image3.png" alt="Diagram" /></td>
</tr>
</tbody>
</table>

- **LV7-P1 / LV8-P**
  - Diagram showing various components and dimensions.

- **LV7-C**
  - Diagram showing various components and dimensions.

- **LV10404**
  - Diagram showing various components and dimensions.

**Dimensions and Notes**

- **LV7-P1 / LV8-P**
  - Dimensions and tolerances are indicated for each component.

- **LV7-C**
  - Dimensions and tolerances are indicated for each component.

- **LV10404**
  - Dimensions and tolerances are indicated for each component.

---

**Additional Information**

- **LV7-P1 / LV8-P**
  - Specific notes on assembly and usage.

- **LV7-C**
  - Specific notes on assembly and usage.

- **LV10404**
  - Specific notes on assembly and usage.

---

**Contact Information**

- **Susol**
  - Contact details for further inquiries and support.

---

**Specifications**

- **LV7-P1 / LV8-P**
  - Specifications for material, dimensions, and usage.

- **LV7-C**
  - Specifications for material, dimensions, and usage.

- **LV10404**
  - Specifications for material, dimensions, and usage.

---

**Technical Details**

- **LV7-P1 / LV8-P**
  - Technical details for mounting and installation.

- **LV7-C**
  - Technical details for mounting and installation.

- **LV10404**
  - Technical details for mounting and installation.
## Vacuum Interrupter

### Technical data

<table>
<thead>
<tr>
<th>Type</th>
<th>LV2</th>
<th>LV3</th>
<th>LV4-E</th>
<th>LV5-P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Rating</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage (kV)</td>
<td>7.2</td>
<td>7.2</td>
<td>24/25.8</td>
<td>12/17.5</td>
</tr>
<tr>
<td>Rated power frequency withstand voltage (kV, rms)</td>
<td>20 20</td>
<td>50</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Rated impulse withstand voltage (kV, crest)</td>
<td>60 60</td>
<td>135</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>Rated frequency (Hz)</td>
<td>50/60 50/60</td>
<td>50/60</td>
<td>50/60</td>
<td></td>
</tr>
<tr>
<td>Rated normal current (Amp)</td>
<td>400/630 630/1250</td>
<td>630</td>
<td>630/1250</td>
<td></td>
</tr>
<tr>
<td>Rated short circuit current (Sym.) (kA)</td>
<td>8</td>
<td>12.5 20</td>
<td>25</td>
<td>16</td>
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<tr>
<td>Rated short circuit making current (kA, peak)</td>
<td>20.8</td>
<td>32.5</td>
<td>52</td>
<td>65 41.6</td>
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<tr>
<td>Rated duration of short-circuit (sec)</td>
<td>3 3</td>
<td>3 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interrupter weight (kg)</td>
<td>0.8</td>
<td>1.4 1.2</td>
<td>2.4</td>
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</tr>
<tr>
<td>Moving part weight (kg)</td>
<td>0.3 0.7</td>
<td>0.5</td>
<td>0.7</td>
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<tr>
<td>Outline dimension (mm)</td>
<td>a 132 158</td>
<td>b 91 105</td>
<td>159</td>
<td>163</td>
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<tr>
<td></td>
<td>c 62 80</td>
<td>62</td>
<td>90</td>
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</tr>
<tr>
<td>Mechanical data</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Contact stroke (mm)</td>
<td>6 ± 1.10 1 12 ± 1</td>
<td>± 1</td>
<td>10 ± 1</td>
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</tr>
<tr>
<td>Opening speed, average 0 to 75% of full stroke (m/s)</td>
<td>0.7~1.0</td>
<td>0.7~1.0</td>
<td>1.3~1.5</td>
<td>0.7~1.0</td>
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<td>Overslew during opening, Max. (mm)</td>
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<td>2</td>
<td>2</td>
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<tr>
<td>Closing speed, average last 33% of full stroke (m/s)</td>
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<td>0.7~1.0</td>
<td>0.7~1.0</td>
<td>0.7~1.0</td>
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<td>Contact bounce duration, Max. (sec)</td>
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<tr>
<td>Added force from atmospheric pressure (kg - ft)</td>
<td>80 154</td>
<td>227</td>
<td>120</td>
<td>154</td>
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<tr>
<td>Contact force from atmospheric pressure (kg - ft)</td>
<td>8.5 12.6</td>
<td>9</td>
<td>12.6</td>
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<tr>
<td>Contact erosion limit (mm)</td>
<td>3 3</td>
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<td>Mechanical life (× 10⁴, Operations)</td>
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<td>LV5A</td>
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<td>LV7-C</td>
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<td>------</td>
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<td>-----</td>
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<tr>
<td>12/17.5 24/25.8</td>
<td>40.5 17.5</td>
<td>36</td>
<td>7.2/12</td>
<td>25.8</td>
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<tr>
<td>42 65</td>
<td>95 38</td>
<td>70</td>
<td>20/28</td>
<td>70</td>
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<td>95 125</td>
<td>185 95</td>
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<td>2000</td>
<td>2500</td>
<td>~3150</td>
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<td>~3150</td>
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<td>20</td>
<td>25</td>
<td>25 31.5 40</td>
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<tr>
<td>52</td>
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<td>65 81.9 104</td>
<td>65</td>
<td>81.9 104</td>
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<td>3.4</td>
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<td>4</td>
<td>3</td>
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<td>3.0</td>
<td>7.3</td>
<td>9.8 6.6</td>
<td>7.3</td>
<td>8.7</td>
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<td>1.0</td>
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<td>2.6 2.2</td>
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<td>220 272</td>
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<td>320 210</td>
<td>216</td>
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<td>80</td>
<td>145</td>
<td>145 135</td>
<td>145</td>
<td>135</td>
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<td>10 ± 1 12</td>
<td>± 1</td>
<td>17~19 12</td>
<td>±1 17~19</td>
<td>10 ± 1 17</td>
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<td>0.7~1.0</td>
<td>1.0~1.3</td>
<td>1.3<del>1.5 1.0</del>1.3</td>
<td>1.3~1.5</td>
<td>1.0~1.3</td>
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<tr>
<td>2 2</td>
<td>2.2</td>
<td>2</td>
<td>2</td>
<td>1.5</td>
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<tr>
<td>0.7<del>1.0 0.7</del>1.0</td>
<td>0.7<del>1.0 0.7</del>1.0</td>
<td>0.7~1.0</td>
<td>0.7~1.0</td>
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<tr>
<td>2 2</td>
<td>2.2</td>
<td>2</td>
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<td>12.6 25.5</td>
<td>25.1 25.8</td>
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<td>3 3</td>
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</tr>
<tr>
<td>M2 M2</td>
<td>M2 M2</td>
<td>M2</td>
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</table>
Contents:

Vacuum Circuit Breaker for MCSG
Features and Structure  H2-2
Control circuit diagram  H2-4
Dimensions  H2-5
Vacuum Circuit Breaker for MCSG

Features and Structure

Features

- **Module type VCB**
- **Convenient especially for fabricating MCSG**
  - Housing is designed like VCB compartment style
  - MCSG panel can be easily constructed if combined with Low voltage compartment, Busbar compartment and Cable compartment.
- **Convenient for maintenance and offering high safety**
  - Earthing switch can be operated from outside of the panel, and which makes earthing of 3 phases at the same time.
  - Without opening the compartment panel door, breaker can be drawn in or out electrically or manually
- **Main functions**
  - Breaker: draw-in or out electrically or manually
  - Compartment: 3-positions
- **Standard**
  - IEC 62271-100

![Diagram of Vacuum Circuit Breaker for MCSG]

- Name plate
- Manual closing button
- Keylock
- Manual trip button
- Manual charging hole
- Contact position indicator
- Closing spring charge indicator
- Operation counter
- Insertion & Draw-out screw
- Geared Mechanism

![Images of Vacuum Circuit Breaker for MCSG]

- Compartment
- Earthing switch
- Bushings
- Shutter
### Ratings

<table>
<thead>
<tr>
<th>Type</th>
<th>LVB – 25□-25□/06</th>
<th>LVB – 25□-25□/20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage (kV)</td>
<td>25.8</td>
<td>25.8</td>
</tr>
<tr>
<td>Rated normal current (A)</td>
<td>630 2000</td>
<td></td>
</tr>
<tr>
<td>Rated frequency (Hz)</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Rated short-circuit breaking current (kA)</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Rated short-circuit breaking capacity (MVA)</td>
<td>1100</td>
<td></td>
</tr>
<tr>
<td>Rated short-time withstand current (kA)</td>
<td>25/3s</td>
<td></td>
</tr>
<tr>
<td>Rated short-circuit making current (kA)</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Rated breaking time (Cycles)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Withstand Power frequency (kV)</td>
<td>50/1min</td>
<td></td>
</tr>
<tr>
<td>voltage Impulse (KV/1.2×50㎲)</td>
<td>125</td>
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<tr>
<td>TRV rising rate (kV/㎲)</td>
<td>0.47</td>
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<td>TRV max. (kV)</td>
<td>41</td>
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<tr>
<td>Rated operating sequence</td>
<td>O-0.3s-CO-3min-CO</td>
<td></td>
</tr>
<tr>
<td>Mechanical lifetime</td>
<td>10,000 operations</td>
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<tr>
<td>Electrical lifetime</td>
<td>10,000 operations</td>
<td></td>
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<tr>
<td>Rated control voltage (V)</td>
<td>DC 110V</td>
<td></td>
</tr>
<tr>
<td>Rated trip voltage (V)</td>
<td>DC 110V</td>
<td></td>
</tr>
<tr>
<td>Standard auxiliary switch</td>
<td>4a4b, 8a8b</td>
<td></td>
</tr>
<tr>
<td>Rated opening time (s)</td>
<td>≤ 0.04</td>
<td></td>
</tr>
<tr>
<td>No-load closing time (s)</td>
<td>≤ 0.06</td>
<td></td>
</tr>
<tr>
<td>Rated charging motor current (A)</td>
<td>≤ 7</td>
<td></td>
</tr>
<tr>
<td>Rated closing coil current (A)</td>
<td>≤ 5</td>
<td></td>
</tr>
<tr>
<td>Rated trip coil current (A)</td>
<td>≤ 5</td>
<td></td>
</tr>
<tr>
<td>Closing spring charging time (s)</td>
<td>≤ 12</td>
<td></td>
</tr>
<tr>
<td>Draw-in/out motor voltage (V)</td>
<td>DC 110V</td>
<td></td>
</tr>
<tr>
<td>Draw-in/out motor current (A)</td>
<td>≤ 5</td>
<td></td>
</tr>
<tr>
<td>Distance between phases (mm)</td>
<td>265</td>
<td></td>
</tr>
<tr>
<td>Weight (kg) breaker</td>
<td>205</td>
<td>236.5</td>
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<tr>
<td>Weight (kg) compartment</td>
<td>281 293</td>
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<tr>
<td>Installing</td>
<td>G</td>
<td></td>
</tr>
<tr>
<td>Applied standard</td>
<td>IEC 62271-100</td>
<td></td>
</tr>
</tbody>
</table>

#### Breaker

- **LS VCB**
  - **Installation method**: G, Class draw-out
  - **Rated voltage**: 25, 25.8kV
  - **Breaking current**: 25, 25kA

#### Auxiliary switch

- **Control voltage**: 1A, DC110V
  - **Version**: 06, 1A
- **Breaking current**: 25, 25kA
- **Accessories**: B, Position Switch
  - **Rated current**: 06, 630A
  - **Rated trip voltage**: DC 2000A

#### Cradle (Compartment)

- **LS VCB**
  - **Rated voltage**: 25, 25.8kV
  - **Installation method**: C, Bushing
  - **Breaking current**: 25, 25kA

#### Accessories

- **Version**: 06, 1A
- **Rated current**: 06, 630A
  - **Rated trip voltage**: DC 2000A
- **Accessories**: A, B, C
  - **Rated current**: 06, 630A
  - **Rated trip voltage**: DC 2000A

---

H2-3
Note. Diagram shows the circuit breaker in position "OFF" with closing spring "Charged".
Cradle(Compartment) - w/o Earthing Switch

• Front

(A-A Section View)

• Rear

(B-B Section View)

(C-View(Cover 2 Cutting))

• Top

(G type breaker + track(electric draw-in/out))
Vacuum Circuit Breaker for MCSG

Cradle(Compartment) - w/ Earthing Switch

Dimensions

• Front

• Side

• Rear

• Top

<Terminal conductor>
Vacuum Circuit Breaker for Power Plants

- Ratings: H3-4
- Ratings of Accessories: H3-5
- Accessories: H3-6
- Control circuit diagram: H3-8
- Dimensions: H3-9
- Types and ordering information: H3-14
A product developed for water and thermal power plants due to the revision and application of Kepco’s standard (ES150) followed by the IEC standard revision. It has completed the high capacity (40~50kA) VCB series for power plants by securing higher breaking capacity, safety and reliability.

**VCB Full Option**
To prevent fatal error, property and life loss caused from operator during operation, it is equipped with safety mechanisms such as shutter padlock.

**Bushing applied for Window CT adaptation**
The bushing provides sufficient strength to collaborate with the internal insulation and is adaptable with CT offering safety mechanically and electrically when applying large current.
It is recognized for reliability by acquiring new IEC 62271-100 and ES150 (KEPCO standard specification on AC breakers)
# Vacuum Circuit Breaker for Power Plants

## Ratings

<table>
<thead>
<tr>
<th>Type</th>
<th>LVB-06G-40H</th>
<th>LVB-06G-40J</th>
<th>LVB-06G-50J</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage (kV)</td>
<td>7.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated normal current (A)</td>
<td>1200</td>
<td>2000</td>
<td>3000</td>
</tr>
<tr>
<td>Rated frequency (Hz)</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated short-circuit breaking current (kA)</td>
<td>40</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Rated short-circuit breaking capacity (MVA)</td>
<td>500</td>
<td>624</td>
<td></td>
</tr>
<tr>
<td>Rated short-time withstand current (kA/3sec)</td>
<td>40</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Rated short-circuit making current (kA)</td>
<td>104</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>Rated breaking time (Cycle)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated opening time (sec)</td>
<td>≤ 0.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No-load closing time (sec)</td>
<td>≤ 0.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Withstand Power frequency (kV/min)</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>voltage Impulse (kV/1.2 × 50µs)</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated operating sequence</td>
<td>CO-15s-CO</td>
<td>O-0.3s-CO-3min-CO</td>
<td></td>
</tr>
<tr>
<td>Rated charging motor current (A)</td>
<td>5 (at DC125V)</td>
<td>5 (at DC110V)</td>
<td></td>
</tr>
<tr>
<td>Rated closing coil current (A)</td>
<td>3 (at DC125V)</td>
<td>3 (at DC110V)</td>
<td></td>
</tr>
<tr>
<td>Rated shunt coil current (A)</td>
<td>3 (at DC125V)</td>
<td>3 (at DC110V)</td>
<td></td>
</tr>
</tbody>
</table>

**Type**
- Mechanical
- Electrical

**Test**
- E2 (Maintenance free)
- E2 (List1)
- Capacitive current switching C2

**Lifetime**
- Mechanical
  - Without maintenance: 10000 operations
  - Maintenance: 20000 operations
- Electrical
  - Without maintenance: 10000 operations
  - Maintenance: 20000 operations

**Auxiliary switch**
- 3a3b

**Installing**
- Draw-out G-type: Visible, Tulip

**Weight Breaker**
- G-type (kg): 200 260 200 260 200 260
- Cradle G-type (kg): 190 230 190 230 190 230

**Applied standard**
- ES150
- IEC 62271-100

**Type test laboratory**
- KERI

---

**Note:** ES150: KEPCO's standard in which IEC62271-100 is applied.
- KERI: Korea Electrotechnology Research Institute
Ratings and auxiliary devices

Motor
When the closing spring is charged, the control power of motor is turned off by the built-in limit s/w.

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>The peak value of the inrush current (A)</th>
<th>Rated current (A)</th>
<th>Consumption power (W)</th>
<th>Charging time (Sec.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 110V</td>
<td>20</td>
<td>3</td>
<td>330</td>
<td>12</td>
</tr>
<tr>
<td>DC 125V</td>
<td>20</td>
<td>3</td>
<td>330</td>
<td>12</td>
</tr>
</tbody>
</table>

Note) Range of the normal operating voltage: 85~110% of rated voltage

Closing Coil (C)
When the rated volt is applied to the coil the breaker is closed. The electrical anti-pumping circuit is built-in it.

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>Rated current (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 110V</td>
<td>3</td>
</tr>
<tr>
<td>DC 125V</td>
<td>3</td>
</tr>
</tbody>
</table>

Note) Range of the normal operating voltage: 75~125% of rated voltage

Shunt coil (TC)
When the rated volt is applied to the coil the breaker is opened.

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>Rated current (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 110V</td>
<td>3</td>
</tr>
<tr>
<td>DC 125V</td>
<td>3</td>
</tr>
</tbody>
</table>

Note) Range of the normal operating voltage: 60~125% of rated voltage

Auxiliary switch
Standard configuration: 3a3b1b of early-b contact function exists inside

Charge indicator of the closing spring
Indicating the condition of the closing spring.

Counter
Mechanically counts the operation of the VCB by 5 digits

Position indicator of the main contacts
Indicating the ‘Close’ or the ‘Open’ of the main contacts.
Close position: 「ON」 Open position: 「OFF」
## Accessories for breakers

- **Position padlock**
  It is located at the screw hole to prevent the draw-in and out of a breaker from the present position (Disconnected, Test or Connected).

- **Mechanical position indicator**
  It is located in the lower part of a breaker to check the present position - Disconnected, Test or Connected - easily.

- **Position interlock**
  The breaker is locked in each position - Disconnected, Test or Connected, thus it is necessary to release the lock before draw-in or out of a breaker from the present position.

- **Auto connection**
  When the breaker is moved to Test position from Disconnected position the connector for control powers is automatically connected. In case of reverse moving of the breaker the connector is automatically disconnected.

- **Code plate**
  When the breaker is inserted to the cradle, if the ratings does not match with the cradle, it mechanically prevents the breaker from being inserted into the cradle.
Accessories for breakers

- **Mechanically operated cell switch (MOC)**
  It is auxiliary switch (6a6b), which indicates the ‘ON’ or ‘OFF’ condition of a VCB, and operated when the VCB is in ‘Run’ state.

- **Truck operated cell switch (TOC)**
  It is auxiliary switch (6a6b), which indicates the ‘Run’ state of a VCB and is operated by the movement of a VCB frame.
Vacuum Circuit Breaker for Power Plants

Control circuit diagram

Note: Diagram shows the circuit breaker in position "OFF" with closing spring "Charged".

Ø : External terminal of VCB
52 : Vacuum circuit breaker
M : Spring charging motor
TC : Trip coil
C : Closing coil
Y : Anti-pump relay
52a : Auxiliary switch NO
52b : Auxiliary switch NC
LS1 : Closing interlock limit switch
LS2 : Motor stopping
LS3 : Anti-closing, Anti-pumping limit switch
LS4 : Motor charging interlock limit switch

SECONDARY DISCONNECT WIRING
(FRONT VIEW OF RECEPTACLE PLUG)
Dimensions - Breakers

LVB-06G-40H, 40J  G class (Visible, Tulip contact)-(1200, 1250, 2000A)

• Front

• Side

• Top

<Conductor>

1200/1250/2000A
LVB-06G-40H, 40J G class (Visible, Tulip contact)-(2500, 3000, 3150A) (unit : mm)

- Front
- Side
- Top

<Conductor>
LVB-06G-50J G class (Visible, Tulip contact)-(1250, 2000A)

- Front
- Side
- Top
LVB-06G-50J G class (Visible, Tulip contact)-(3150A)

- Front
- Side
- Top
### Vacuum Circuit Breaker for Power Plants

#### Types and ordering information

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>MOC active only at RUN position</td>
</tr>
<tr>
<td>A2</td>
<td>MOC active only at TEST and RUN position</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Control voltage</th>
<th>DC110V</th>
<th>DC220V</th>
<th>DC125V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>H</td>
<td>J</td>
<td>E</td>
</tr>
<tr>
<td>ESB150</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IEC</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Auxiliary switch</th>
<th>3a3b(Autocon)</th>
</tr>
</thead>
</table>

#### Breaker

- **LS VCB**
  - **Rated voltage**: 06 (7.2kV)
  - **Breaking current**: 40 (40kA), 50 (50kA)
  - **Rated current**: 12 (1200/1250A), 20 (2000A), 25 (2500A), 30 (3000/3150A)
  - **Control voltage**: 1A (DC110V), 1B (DC220V), 1E (DC125V)
  - **Installation method**: G (G class draw-out)

#### Cradle

- **LS Cradle**
  - **Rated voltage**: 06 (7.2kV)
  - **Breaking current**: 40 (40kV), 50 (50kV)
  - **Rated current**: 12 (1200/1250A), 20 (2000A), 25 (2500A), 30 (3000/3150A)
  - **Control voltage**: 1A (DC110V), 1B (DC220V), 1E (DC125V)
  - **Installation method**: G (G class draw-out)

Note 1: Rated current 2500A is available only at 7.2kV 40kA, IEC version(J)

Note 2: Control voltage and Auxiliary switch are not applied to Dummy VCB and Earthing Truck

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H3-14
Vacuum Circuit Breaker for Nuclear Power Plants

Ratings
Ratings of Accessories
Accessories
Control circuit diagram
Dimensions
Types and ordering information

H4-4
H4-5
H4-6
H4-8
H4-9
H4-11
It was developed for KEPCO nuclear power stations. This breaker satisfies quality, safety measures (secure from earthquake and other environments), and surge protection class complies with “1E-CLASS” provisions. It is featured with high breaking technologies, safety, and reliability by applying our own vacuum interrupters (50KA) approved by ANSI standard tests.
VCB Full Option

To prevent fatal error, property and life loss caused from operator during operation, it is equipped with safety mechanisms such as shutter padlock.

Bushing applied for Window CT adaptation

The bushing provides sufficient strength to collaborate with the internal insulation and is adaptable with CT offering safety mechanically and electrically when applying large current.

Satisfies earthquake and other internal environment specifications

During the lifespan of power stations (40yrs), it is designed to operate its fundamental breaking functions even under the most severe conditions like earthquake, which is critical from safety perspectives. These technologies proven through tests that comply with KEPIC standard and relevant specifications are to guarantee nuclear reactor safety.
## Vacuum Circuit Breaker for Nuclear Power Plants

### Ratings

<table>
<thead>
<tr>
<th>Type</th>
<th>LVB-05G-50B</th>
<th>LVB-15G-40B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage (kV)</td>
<td>4.76</td>
<td>15</td>
</tr>
<tr>
<td>Rated normal current (A)</td>
<td>1200</td>
<td>1200</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>2000</td>
</tr>
<tr>
<td></td>
<td>3000</td>
<td>-</td>
</tr>
<tr>
<td>Rated frequency (Hz)</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Rated short-circuit breaking current (kA)</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>Rated short-circuit breaking capacity (MVA)</td>
<td>410</td>
<td>1040</td>
</tr>
<tr>
<td>Rated short-time withstand current (kA/3sec)</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>Rated short-circuit making current (kA)</td>
<td>130</td>
<td>104</td>
</tr>
<tr>
<td>Rated breaking time (Cycle)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Rated opening time (sec)</td>
<td>≤ 0.04</td>
<td>≤ 0.04</td>
</tr>
<tr>
<td>No-load closing time (sec)</td>
<td>≤ 0.06</td>
<td>≤ 0.06</td>
</tr>
<tr>
<td>Withstand Power frequency (kV/1min)</td>
<td>19</td>
<td>36</td>
</tr>
<tr>
<td>voltage Impulse (kV/1.2 × 50㎲)</td>
<td>60</td>
<td>95</td>
</tr>
<tr>
<td>Rated operating sequence</td>
<td>0-0.3s-CO-3min-CO</td>
<td></td>
</tr>
<tr>
<td>Rated charging motor current DC 125V (A)</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Rated closing coil current DC 125V (A)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Rated shunt coil current DC 125V (A)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Lifetime Mechanical(w/o maintenance)</td>
<td>10000 operations</td>
<td>10000</td>
</tr>
<tr>
<td>Electrical(w/o maintenance)</td>
<td>10000 operations</td>
<td>10000</td>
</tr>
<tr>
<td>Auxiliary switch</td>
<td>5a3b</td>
<td>5a3b</td>
</tr>
<tr>
<td>Installing G-type</td>
<td>G-type</td>
<td></td>
</tr>
<tr>
<td>Weight 1200A (kg)</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>3000A (kg)</td>
<td>350</td>
<td>-</td>
</tr>
<tr>
<td>Applied standard</td>
<td>ANSI C37</td>
<td>ANSI C37</td>
</tr>
<tr>
<td>Type test laboratory</td>
<td>KERI</td>
<td>KERI</td>
</tr>
</tbody>
</table>
Ratings of Accessories

Motor
When the closing spring is charged, the control power of motor is turned off by the built-in limit s/w.

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>The peak value of the inrush current (A)</th>
<th>Rated current(A)</th>
<th>Range of the normal operating voltage</th>
<th>Consumption power (W)</th>
<th>Charging time (sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.76kV, 15kV</td>
<td>4.76kV, 15kV</td>
<td>50kA, 40kA</td>
<td>90~140</td>
<td>360</td>
<td>8</td>
</tr>
</tbody>
</table>

DC 125V

Closing Coil (C)
When the rated volt is applied to the coil the breaker is closed. The electrical anti-pumping circuit is built-in it.

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>The peak value of the inrush current (A)</th>
<th>Range of the normal operating voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.76kV, 15kV</td>
<td>50kA, 40kA</td>
<td>90~140</td>
</tr>
</tbody>
</table>

DC 125V

Shunt Coil (TC)
When the rated volt is applied to the coil the breaker is opened.

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>The peak value of the inrush current (A)</th>
<th>Range of the normal operating voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.76kV, 15kV</td>
<td>50kA, 40kA</td>
<td>70~140</td>
</tr>
</tbody>
</table>

DC 125V

Auxiliary switch
Standard configuration : Reversible 8C(5a3b) and 2c(2b) with early-b contact function

<table>
<thead>
<tr>
<th>Classification</th>
<th>Resistive load(A)</th>
<th>Inductive load(A)</th>
<th>Contact configuration</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 250V</td>
<td>10</td>
<td>5</td>
<td>8c</td>
<td></td>
</tr>
<tr>
<td>DC 125V</td>
<td>10</td>
<td>5</td>
<td>8c</td>
<td></td>
</tr>
<tr>
<td>DC 30V</td>
<td>10</td>
<td>5</td>
<td>8c</td>
<td></td>
</tr>
</tbody>
</table>

Position of the Auxiliary switch

Charge indicator of the closing spring
Indicating the condition of the closing spring.

Discharged

Charged

Position indicator of the main contacts
Indicating the ‘Close’ or the ‘Open’ of the main contacts.
Close position: ‘ON’  Open position: ‘OFF’

Counter
Mechanically counts the operation of the VCB by 5 digits

Note: The contact ratings of Mechanical Operated Cell Switch(MOC) are the same with that of the Aux. switch.
Vacuum Circuit Breaker for Nuclear Power Plants

Accessories

Accessories for breakers

• **Position padlock**
  It is located at the screw hole to prevent the draw-in and out of a breaker from the present position (Disconnected, Test or Connected).

• **Mechanical position indicator**
  It is located in the lower part of a breaker to check the present position - Disconnected, Test or Connected - easily.

• **Auto connection**
  When the breaker is moved to Test position from Disconnected position the connector for control powers is automatically connected. In case of reverse moving of the breaker the connector is automatically disconnected.

• **Reversible contact**
  10 auxiliary switches are provided. 8 of them consist of reversible 8c which can be changed from a(b) to b(a). Factory composition is 5a3b. And the other 2 switches are supplied as 2b with early-b contact function.

• **Code plate**
  When the breaker is inserted to the cradle, if the ratings does not match with the cradle, it mechanically prevents the breaker from being inserted into the cradle.

• **Auto discharge**
  In case the breaker is drawn-out when the closing spring is charged in the position-Disconnected, Test or Connected, or the breaker is moved to Disconnected position from Test position the closing spring shall be automatically released.
Accessories for cradles

- **Mechanically operated cell switch (MOC)**
  This 6a6b switch indicates the 'ON' or 'OFF' condition of a VCB and is operated in the positions of ‘Run’ and ‘Test’.

- **Truck operated cell switch (TOC)**
  This 6a6b switch indicates the 'Run' state of a VCB and is operated by the movement of a VCB frame.
Vacuum Circuit Breaker for Nuclear Power Plants

Control circuit diagram

- Ø: External terminal of VCB
- 52: Vacuum circuit breaker
- M: Spring charging motor
- TC: Trip coil
- C: Closing coil
- Y: Anti-pump relay
- 52a: Auxiliary switch (NO)
- 52b: Auxiliary switch (NC)
- LS1: Closing interlock limit switch (only withdrawable type)
- LS2: Motor stopping, closing spring charged indication
- LS3: Anti-closing, Anti-pumping limit switch

Note: Diagram shows the circuit breaker in position "OFF" with closing spring "Charged"
Breaker

<Front view>

<Side view>

1200/2000A

3000A
Vacuum Circuit Breaker for Nuclear Power Plants

Dimensions

Cradle

Front view

Side view
Types and ordering information

Breaker

**LS VCB**

- **LVB**
- **05**
- **G**
- **40**
- **B** / **20**
- **1A**
- **2K**
- **1**

**Installation method**
- **G** - G class draw-out

**Version**
- **B** - Pro-MEC

**Rated voltage**
- **05** - 4.76kV
- **15** - 15kV

**Breaking current**
- **40** - 40kA
- **50** - 50kA

**Rated current**
- **12** - 1200A
- **20** - 2000A
- **30** - 3000A

**Control voltage**
- **1A** - DC110V
- **1B** - DC220V
- **1C** - DC48V
- **1E** - DC125V

**Auxiliary switch**
- **2K** - 8c 접점

**Nuclear class**
- **1** - 1E class
- **2** - Non 1E class

---

Cradle

**LS Cradle**

- **LCL**
- **05**
- **G**
- **40**
- **B** / **20**
- **1**

**Installation method**
- **G** - G class draw-out

**Version**
- **B** - Pro-MEC

**Rated voltage**
- **05** - 4.76kV
- **15** - 15kV

**Breaking current**
- **40** - 40kA
- **50** - 50kA

**Rated current**
- **12** - 1200A
- **20** - 2000A
- **30** - 3000A

**Nuclear class**
- **1** - 1E class
- **2** - Non 1E class

---

**Note:** 1A, 1B, 1C are only available at 15kV class