VACUUM INTERRUPTERS

High ability development and outstanding vacuum technology of Meidensha Corporation (“MEIDEN”) has established high voltage vacuum interrupters. MEIDEN developed a 145kV vacuum interrupter unit for the first time in the world.

Features

1. Simplified arc quenching method
   The spiral contact assures a high arc driving efficiency.

2. Simplified construction and high quality
   Since complete degassing and hermetrical seal are processed in a vacuum furnace, vacuum degree can be maintained for a long time.

3. No evacuation tube
   Since manufacturing of vacuum interrupters using ceramics envelopes is done in a vacuum furnace, no evacuation tube is necessary.

4. Slim body
   Since new contact materials are developed, external dimensions are reduced.

Major Applications

- Vacuum circuit-breakers
- Vacuum switches
- Vacuum contactors
- Transformer tap changers
- Rail line circuit-breakers
- Autoreclousers
- Special duties, e.g. for multi-operation section switches

Outstanding vacuum-related manufacturing techniques of MEIDEN has completed high performance and high-reliability vacuum interrupters.
Vacuum Interrupters for Medium Voltage Class

IEC & ANSI Standard

GB Standard

MEIDEN is manufacturing the medium voltage class VI’s which matches to the various specifications in the world.

Vacuum Interrupters for High Voltage Class

MEIDEN developed and commercialized 72.5kV class vacuum interrupter for the first time in the world.

MEIDEN has successfully developed a 145kV/40kA rating and turn into production.

Vacuum Interrupters for Customized Arrangement

MEIDEN corresponds to size arrangement and review the specifications of VI’s based on requirement.

Production of prototype VI’s as well as test of short circuit breaking test, etc are possible.

If customer would like to have new R&D and changing for now purchases VI, MEIDEN will be possible to test at our own test laboratory for customize arrangement.

Vacuum Interrupters-Structure, Feature & Performance

Vacuum Interrupters have simple to its structure. Material of copper is used for VI’s flanges. Therefore Vacuum Interrupters have excellent on heat dissipation at load current and short circuit breaking current.

VI contacts are soft and have excellent current-breaking performance, because of their uniform-dispersion materials.

Therefore, it enable to minimize the operating energy for circuit breakers, and it helps much compact size operating mechanism.

MEIDEN produces two types of electrode (Spiral & Axial Magnetic Field) and its material is pressed powder of Cr-Cu alloy.

VI contacts are soft and have excellent current-breaking performance, because of their uniform-dispersion materials.

Therefore, it enable to minimize the operating energy for circuit breakers, and it helps much compact size operating mechanism.

Spiral electrode is normally applied for economic and standard VCB/Swichgear of midium voltage class.

MEIDEN manufactures soft electrode by using forming equipment for powder material.

AMF electrode is applied for high voltage class and capacitor bank. The electrode is hard and have excellent high voltage performance.

MEIDEN is manufacturing high voltage VCB upto rated 168kV class, and Switchgear at rated 72.5kV class.

These VCB and Switchgear are using hard material on the vacuum interrupter, its electrode is this hard material.

Vacuum Interrupters- Manufacturing & Quality & Assurance

All the Vacuum Interrupters assembly works are carried out in a clean room.

Each part is chemically cleaned, washed, dried, and then carried to the clean room. Vacuum Interrupter using ceramics envelopes has high heat-resisting characteristics.

Utilizing this advantage, degassing and hermetically sealing processes are simultaneously carried out in a vacuum furnace.

This simplified manufacturing process makes Vacuum Interrupters quality stable. After brazing under vacuum, each Vacuum Interrupter is to be given a constant mechanical load and then inspected its dimensional variations.

All data are automatically recorded under high quality control. Data recording and pass-fail judgment are automatically carried out.

Inspection of materials supplied and process control at all stage and final inspection of vacuum degree of each vacuum interrupter ensure for quality assurance and a long service life.

MEIDEN applies a delivery criterion of ultra-high vacuum less than $5 \times 10^{-7}$[Pa], thus a service life of VI is 20 years.
### Vacuum Interrupters for Circuit Breaker <50Hz to 60Hz>

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Rated lightning impulse voltage</th>
<th>Rated current</th>
<th>Short circuit breaking current with at least 30-40% DC component and Interrupter (Outdiameter-Style)</th>
</tr>
</thead>
<tbody>
<tr>
<td>kV</td>
<td>kV</td>
<td>kV</td>
<td>A</td>
</tr>
<tr>
<td>7.2</td>
<td>60</td>
<td>20</td>
<td>630</td>
</tr>
<tr>
<td>12/15</td>
<td>75</td>
<td>20</td>
<td>630</td>
</tr>
<tr>
<td>15.5/27</td>
<td>110/125</td>
<td>50/60</td>
<td>630</td>
</tr>
<tr>
<td>36/38</td>
<td>150</td>
<td>70</td>
<td>630</td>
</tr>
<tr>
<td>6.6</td>
<td>45</td>
<td>16</td>
<td>400</td>
</tr>
<tr>
<td>18/36</td>
<td>70(16.6Hz)</td>
<td>70(50/60Hz)</td>
<td>750(16.6Hz)</td>
</tr>
</tbody>
</table>

*Additional external insulation necessary
**Capacitor bank switching

### Vacuum Interrupters for Load Break Switch

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Rated lightning impulse voltage</th>
<th>Rated current</th>
<th>Short circuit making current</th>
</tr>
</thead>
<tbody>
<tr>
<td>kV</td>
<td>kV</td>
<td>kV</td>
<td>A</td>
</tr>
<tr>
<td>12/15.5</td>
<td>95</td>
<td>35</td>
<td>630</td>
</tr>
<tr>
<td>15.5/27</td>
<td>110/125</td>
<td>50/60</td>
<td>630</td>
</tr>
<tr>
<td>36/38</td>
<td>150</td>
<td>70</td>
<td>630</td>
</tr>
<tr>
<td>6.6</td>
<td>45</td>
<td>16</td>
<td>400</td>
</tr>
<tr>
<td>18/36</td>
<td>70(16.6Hz)</td>
<td>70(50/60Hz)</td>
<td>750(16.6Hz)</td>
</tr>
</tbody>
</table>

### Vacuum Interrupters for Auto-Recloser & Fault Interrupter Switch

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Rated lightning impulse voltage</th>
<th>Rated current</th>
<th>Short circuit breaking current</th>
</tr>
</thead>
<tbody>
<tr>
<td>kV</td>
<td>kV</td>
<td>kV</td>
<td>A</td>
</tr>
<tr>
<td>15.5/27</td>
<td>110/125</td>
<td>50/60</td>
<td>800</td>
</tr>
<tr>
<td>38</td>
<td>150</td>
<td>70</td>
<td>630</td>
</tr>
<tr>
<td>6.6</td>
<td>45</td>
<td>16</td>
<td>400</td>
</tr>
<tr>
<td>18/36</td>
<td>70(16.6Hz)</td>
<td>70(50/60Hz)</td>
<td>750(16.6Hz)</td>
</tr>
</tbody>
</table>

### Vacuum Interrupters for Contactor Switch

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Rated lightning impulse voltage</th>
<th>Rated current</th>
<th>Short circuit breaking current</th>
</tr>
</thead>
<tbody>
<tr>
<td>kV</td>
<td>kV</td>
<td>kV</td>
<td>A</td>
</tr>
<tr>
<td>6.6</td>
<td>45</td>
<td>16</td>
<td>400</td>
</tr>
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<td>6.6</td>
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<td>16</td>
<td>400</td>
</tr>
<tr>
<td>6.6</td>
<td>45</td>
<td>16</td>
<td>400</td>
</tr>
<tr>
<td>18/36</td>
<td>70(16.6Hz)</td>
<td>70(50/60Hz)</td>
<td>750(16.6Hz)</td>
</tr>
</tbody>
</table>

### Vacuum Interrupters for Mobile Railway Interrupter Switch

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>Rated lightning impulse voltage</th>
<th>Rated current</th>
<th>Short circuit breaking current</th>
<th>Short circuit making current</th>
<th>Vi Type (Dia.-Style)</th>
</tr>
</thead>
<tbody>
<tr>
<td>kV</td>
<td>kV</td>
<td>kV</td>
<td>A</td>
<td>kA</td>
<td></td>
</tr>
<tr>
<td>18/36</td>
<td>170</td>
<td>70(16.6Hz)</td>
<td>70(50/60Hz)</td>
<td>450(50/60Hz)</td>
<td>25(16.6Hz) at 36kV</td>
</tr>
</tbody>
</table>

### Diameter

Interrupter types and diameters are shown in the tables.
Overseas Offices & Group Companies

**China**
- DONGGUAN MEIDEN PACIFIC ELECTRICAL ENGINEERING CO., LTD.
- MEIDEN ZHENGZHOU ELECTRIC CO., LTD.
- MEIDENSHA (SHANGHAI) CORPORATE MANAGEMENT CO., LTD.
- MEIDEN HANGZHOU DRIVE SYSTEMS CO., LTD.
- SHANGHAI MEIDENSHA CHANGCHENG SWITCHGEAR CO., LTD.
- MEIDEN PACIFIC (CHINA) LTD.
- MEIDEN INDIA PVT. LTD.
- PRIME MEIDEN LTD.
- P.T. MEIDEN ENGINEERING INDONESIA
- MEIDEN KOREA CO., LTD.
- MEIDEN MALAYSIA SDN. BHD.
- MEIDEN METAL ENGINEERING SDN. BHD.

**Singapore**
- MEIDEN ASIA PTE. LTD.
- MEIDEN SINGAPORE PTE. LTD.

**Thailand**
- THAI MEIDENSHA CO., LTD.
- MEIDEN ELECTRIC (THAILAND) LTD.

**United Arab Emirates**
- MEIDEN ASIA PTE. LTD. DUBAI BRANCH

**Germany**
- MEIDEN EUROPE GmbH
- TRIDELTA MEIDENSHA GmbH

**The United States**
- MEIDEN AMERICA, INC.
- MEIDEN TECHNICAL CENTER NORTH AMERICA LLC