Frequency Variable
Series Resonant Test Systems
For High Voltage Applications

THE ADVANCED SOLUTION FOR
HIGH VOLTAGE AC TESTING
Frequency Variable Series Resonant Test Systems

Application

Frequency variable series resonant test systems are mainly used for on-site dielectric and diagnosis tests of capacitive line equipment as:
- GIS/GIL/Switchgear Arrangements
- Power Cables
- Power Transformers

*aega-kull* series resonant test systems are of modular design with low weight components, especially designed for the requirements of on-site testing. Easy to handle and robust reactors with the possibility of series and parallel connection of more units allows an optimised adaptation of the system to the load capacitance and enables testing of different kind of test objects with the same system.

No special equipment for transportation or erection is required, a small lorry and a low weight crane is enough.

Cable Testing

In difference to other on-site test techniques as 0,1Hz or DC, resonant test sets generate a voltage stress for the insulation similar to the service condition. This gives the test result more evidence and is nowadays the preferred on-site test method.

GIS/GIL/Switchgear-Testing

The systems cover a wide load range and test frequencies above 100Hz prevent saturation of the instrument transformer cores. Therefore testing with installed instrument transformers and cable connections is possible.

Transformer Testing

The modular series resonant test systems can be used for applied voltage testing in the factory or on-site. A suitable selection of the system inductance allows testing of typical winding capacitances (8nF to 12nF) with frequencies between 45Hz and 65Hz.

Partial Discharge Measurements

Different kinds of partial discharge measurements like conventional method, non-conventional method with integrated sensors or UHF-method can be applied with frequency variable test systems.

Typical High Voltage Reactor Coils

<table>
<thead>
<tr>
<th>Type</th>
<th>Voltage kV</th>
<th>max. Current A</th>
<th>On-Duty H</th>
<th>Inductance H</th>
<th>Frequency Range Hz</th>
<th>Load Range nF</th>
<th>Diameter x Height mm</th>
<th>Weight kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSH 0W</td>
<td>220</td>
<td>6.4</td>
<td>10</td>
<td>50</td>
<td>110-250</td>
<td>8 – 42</td>
<td>800 x 775</td>
<td>420</td>
</tr>
<tr>
<td>DSH 1W</td>
<td>230</td>
<td>5.4</td>
<td>20</td>
<td>75</td>
<td>90-250</td>
<td>6 – 42</td>
<td>830 x 965</td>
<td>530</td>
</tr>
<tr>
<td>DSH 2W</td>
<td>230</td>
<td>3.0</td>
<td>30</td>
<td>200</td>
<td>60-250</td>
<td>2 – 35</td>
<td>880 x 1065</td>
<td>750</td>
</tr>
<tr>
<td>DSH 3W</td>
<td>200</td>
<td>2.5</td>
<td>180</td>
<td>200</td>
<td>63-250</td>
<td>2 – 32</td>
<td>940 x 1072</td>
<td>960</td>
</tr>
<tr>
<td>DSH 4W</td>
<td>250</td>
<td>4.0</td>
<td>30</td>
<td>200</td>
<td>50-250</td>
<td>2 - 51</td>
<td>930 x 1220</td>
<td>1200</td>
</tr>
<tr>
<td>DSH 5W</td>
<td>260</td>
<td>10.0</td>
<td>25</td>
<td>80</td>
<td>50-250</td>
<td>5 – 126</td>
<td>1120 x 1500</td>
<td>1900</td>
</tr>
<tr>
<td>DSH 6W</td>
<td>280</td>
<td>5.9</td>
<td>90</td>
<td>360</td>
<td>21-250</td>
<td>1 – 159</td>
<td>1350 x 1900</td>
<td>3300</td>
</tr>
</tbody>
</table>

Other voltages, currents, duties and inductance on request!

Design of Components

Reactor Coils

The bar core reactors are oil impregnated and built in a hermetical closed resin cylinder. Up to four units can be stacked to increase the output voltage of the system.

Besides the application as reactors for variable frequency series resonant test systems, they can be used to increase the load range of test transformer systems (partly compensation of the load capacitance at power frequency).

Exciter Transformer

Tank type transformers with surge arrestor protection and automatic grounding are used to excite the resonant circuit. Voltage and power are adapted to the requirements of the system.

Frequency Converter

The converter works with an intermediate direct voltage circuit. The line voltage is rectified and stabilised. A following IGBT-bridge generates a square wave voltage of adjustable frequency between 15Hz and 250Hz. The converter generates only four switching impulses per cycle which do not disturb the PD-pattern or can be suppressed by gating.

Two types of frequency converters are available:
- FUE75 with 75kVA power
- FUE150 with 150kVA power

Control Unit / Voltage Measurement

The control unit is integrated in the frequency converter housing and enables automatic and manual operation of the system. An operator panel displays pre-selected and measured parameters.

The high voltage is measured by a built-in peak voltmeter in collaboration with a high voltage divider which is at the same time used as a base load and coupling capacitor.

Transport Frames

Transport frames for easy and safe transportation of one or two reactor coils are available. The upper part of the frame is removable and the lower part can be used as a testing console.