

Frequency Variable Series Resonant Test Systems For High Voltage Applications



**THE ADVANCED SOLUTION FOR
HIGH VOLTAGE AC TESTING**

agea - kull ag
Electric Apparatus, Meisenweg 1
CH-4552 **Derendingen** Switzerland

Fon: +41 32 681 54 24
Fax: +41 32 681 54 20

E-mail: info@agea-kull.ch
Web: www.agea-kull.ch

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

agea-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 0,1 Hz 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 100 Hz 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 (8 nF to 12 nF) with frequencies between 45 Hz and 65 Hz.

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

Type	Voltage kV	max. Current A	On-Duty min	Inductance H	Frequency Range Hz	Load Range nF	Diameter x Height mm	Weight kg
DSH 0W	220	6.4	10	50	110-250	8 – 42	800 x 775	420
DSH 1W	230	5.4	20	75	90-250	6 – 42	830 x 965	530
DSH 2W	230	3.0	30	200	60-250	2 – 35	880 x 1065	750
DSH 3W	200	2.5	180	200	63-250	2 – 32	940 x 1072	960
DSH 4W	250	4.0	30	200	50-250	2 - 51	930 x 1220	1200
DSH 5W	260	10.0	25	80	50-250	5 – 126	1120 x 1500	1900
DSH 6W	280	5.9	90	360	21-250	1 – 159	1350 x 1900	3300
DSH 7W	280	12.0	60	190	20-250	2 - 333	1600 x 1900	5000

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 conventional test systems (partly compensation of the load capacitance at power frequency).

Exciter Transformer

Tank type transformers with surge arrester 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 15 Hz and 250 Hz. 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:

- FUE 75 with 75 kVA power
- FUE 150 with 150 kVA 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.