



SIVA INSTRUMENTS

An ISO 9001:2000 Company



Sweep Frequency Response Analyzer



Sweep Frequency Response Analyzer (SFRA) detects potential mechanical and electrical problems that other methods are unable to detect. Major utilities and service companies have used the SFRA method for more than a decade. The actual measurement is compared to a reference and gives a direct answer if the mechanical parts of the transformer are unchanged or not. Deviations indicate geometrical and/or electrical changes within the transformer. This technique is a major advance in transformer health analysis.

What can the equipment detect?

- ◆ Winding deformations and displacements
- ◆ Shorted turns and open windings
- ◆ Loose or broken clamping structures
- ◆ Core displacements
- ◆ Faulty core grounds
- ◆ Hoop Buckling
- ◆ Partial Winding collapse

Utilizations of SFRA

- ◆ To obtain initial signature of healthy transformer for future comparisons.
- ◆ Periodic checks as part of regular maintenance.
- ◆ Immediately after a major external event like short circuit.
- ◆ Transportation or relocation of transformer.
- ◆ Earthquakes.
- ◆ Pre-commissioning check.

Compact and rugged Sweep Frequency Response Analyzer (SFRA) instrument in the industry.

Highest possible repeatability by using reliable cable practice and high-performance instrumentation.

Fulfills all international standards for SFRA measurements.

Highest dynamic range and accuracy in the industry.

Advanced analysis and decision support built into the software .

Imports data from previously performed SFRA tests.



Sweep Frequency Responce Analyzer

How does SFRA work?

Transformers consist of multiple complex networks of capacitances and resistors that can generate a unique signature when tested at discrete frequencies and plotted as a curve. The distance between conductors of the transformer forms a capacitance. Any movement of the conductors or windings will change this capacitance. This capacitance being a part of complex L(Inductance), R(Resistance) and C(Capacitance) network, any change in this capacitance will be reflected in the curve or signature. The SFRA test is carried out to obtain initial signature of the transformer sweep frequency response by injecting various discrete frequencies, which is then used as reference for future comparisons. Any fault giving rise to change in winding movement etc. will result in change in capacitance or inductance thereby affecting the measured curves. Tests are carried out periodically or during major external events like short circuits and results compared against the initial signature to test for any problems.

The basic functionality of SFRA supports following measuring modes.
Voltage transfer function $U_o/U_i (f)$

SFRA test reveals if the transformers mechanical or electrical integrity has been compromised.

Features Provided By Software

- Unlimited number of tests
- Graphical representation and analysis of data.
- Display/Hide individual sweeps on the graph
- Compare specific subset of data (within defined frequency band).
- Automatic Go/No-Go analysis using custom algorithm to compare actual data with reference.*
- Data download to Microsoft Excel for custom analysis by expert analysts.
- Controlling instrument, executing tests and analyzing results from remote location (IP based).*
- Load any historical data in the application for comparison purposes.
- Standard and Customized reports. Auto report generation feature to generate test report in seconds.
- Use of high end database (Microsoft SQL Server) and data warehousing techniques to ensure high reliability and efficiency by eliminating most of the issues posed by storage of data in files.
- WiFi enabled (Optional).

Technical Specifications:

General

Method	Sweep Frequency Response Analysis(SFRA)Frequency Range 10 Hz to 2 MHz, Selectable
Waveform	Sine Wave
Number of points	1800 default (user selectable Max 32000)
Measurement Time	Less than 32 seconds (20Hz to 2MHz)
Points Spacing	Log/Linear/Custom (to reduce testtime)
IF bandwidth	10% of active frequency
Plotting	Frequency vs. Amplitude/Phase
Weight	5kg (approx)

Analog Output

Channels	1
Compliance Voltage	Settable 0.2V to 20V pk-pk
Measurement Voltage	0.1V to 10V pk-pk into 50 Ohms
Output Impedance	50 Ohms
Protection	Short Circuit Protection.

Analog Input

Channels	2
Sampling	Simultaneously
Input Impedance	50 Ohms
Sampling Rate	20 MS/s
Accuracy	+/- 1db to 80db

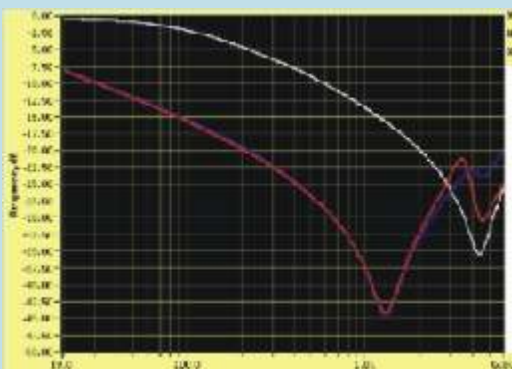
Accessories

PC Software
Measuring Cables 3 (15m) Coaxial measuring cables 50 ohm with BNC connectors.
Connection Clamps 2 Connection clamps for bushing terminals with Copper strips for low impedance to ground.

Optional Accessories

Wi-Fi
Battery Pack for flexibility when testing on top of transformers.
Active probes for specific requirements

Note : Requires user PC /laptop



To keep pace with the latest technology Sivananda Electronics reserves the right to update it's system. Hence, information in this brochure is likely to change without notice.



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