

Sweep Frequency Response Analyser (SFRA)

SYSTEM DESCRIPTION

SFRA should be Stand-alone sweep response analyser for the high accuracy transformer analysis. The SFRA offered should have both high precision and portability in a single package, providing all the accessories required for fast, easy to use, reliable and repeatable measurements, without the need for a PC to compare transformer fingerprints, enabling to complete testing in a much shorter period of time. The SFRA shall have the ability to utilise existing plots saved to internal memory or USB memory stick and use them as a reference during a live measurement. If a problem is detected the test can be interrupted without wasting any time by comparing the plots real time, point by point.

The software

SFRA shall be provided with its own embedded software, giving the possibility to the engineer to zoom into a portion of the sweep in order to inspect any differences in the plot in more detail during or after a sweep. This enables diagnosis of transformer faults early on in a transformer sweep, without the need for a PC. In fact, the SFRA does not run on a generic operation system, it is based upon embedded software which is more reliable in the field, especially when used as a standalone instrument.

SFRA Software shall be provided with excellent fault diagnosis assistance, ranging from a sophisticated database including multiple search options to automatic fault diagnosis algorithms in accordance with DLT - 911/2004 and also provided with excellent graphing functionality for the more experienced user.

SFRA shall be provided with simple, swift and user intuitive diagnosis of transformer sweeps. The user is able to filter out unwanted sweeps from the built-in database and select up to 9 sweeps to be plotted on one graph.

IEC60076-18 Compliance

The SFRA and accompanying accessories and software should have been developed alongside the IEC60076-18 international standard for sweep frequency analysis of power transformers.

Connecting cables

The SFRA measurement system shall be included with colour coded interconnecting leads and cable storage reel. This facilitates quick setup times for testing. The SFRA and cable reel are to be designed so that they can be used in site in the rugged field case, ensuring the test equipment remains clean when operating in the sometimes challenging field environment.

Features

- Stand-alone high accuracy transformer analysis
- Leading wideband accuracy: basic 0.02dB with class leading high frequency performance
- Leading phase accuracy: 0.05 degrees basic
- Wide frequency range: 5Hz to 45MHz
- Full colour VGA display enabling engineer to perform and store measurement in the field without a PC
- USB, RS232 and LAN interfaces
- PC software included: remote control, tables, graphs and database management of results
- Fully functional LCR meter to measure transformer LCR parameters
- Various measurement modes: FRA, RMS, LCR, Scope
- Compliant to IEC60076-18 standard
- Light and easy to carry

TECHNICAL SPECIFICATIONS

MEASUREMENT SPECIFICATION

| Frequency Response Analyser | |
|-----------------------------|---|
| Measurement | Magnitude, Gain (CH1/CH2, CH2/CH1), Gain (dB), Offset Gain (dB), Phase (°) |
| Frequency Range | 5Hz to 45MHz |
| Gain Accuracy | 0.02dB < 50kHz; 0.02dB + 0.05dB/MHz < 5MHz; 0.1dB + 0.04dB/MHz < 45MHz |
| Phase Accuracy | 0.05° < 10kHz; 0.07° + 0.0009°/kHz < 5MHz; 5.05° + 0.0001°/kHz < 45MHz |
| Frequency Source | Generator |
| Measurement | Real Time DFT, no missing data |
| Speed | Up to 100 readings per second |
| Filter | Selectable from 0.2 seconds |
| Resolution | 5 or 6 digits |
| Input Impedance | 50 Ohm or 1M Ohm High Impedance (Selectable) |
| Dynamic Range | 120dB. |
| LCR Meter | |
| Functions | L, C, R (AC), Q, Tan Delta, Impedance, Phase - Series or Parallel Circuit |
| Frequency Range | 5Hz to 5MHz |
| Current Shunt | 50R Internal or External |
| Ranges | Inductance, Capacitance, Resistance |
| Basic Accuracy | 0.5% + 2%/MHz |
| Sweep Capability | All AC functions |
| Impedance Range | 100mOhm to 100kOhm. |
| True RMS Voltmeter | |
| Channel | 2 (Ground Referenced) |
| Frequency Range | 5Hz to 5MHz |
| Measurement | AC RMS, Peak, CF, Surge, dBm |
| Basic Accuracy (AC) | 0.05% range + 0.05% reading + 0.1mV < 1kHz; 0.15% range + 0.15% reading + 0.1mV < 10kHz; 0.5% range + 0.5% reading + 0.025%/kHz + 0.4mV < 5MHz; |
| Signal Generator | |
| Type | Direct Digital Synthesis, Single Frequency or Sweep |
| Frequency | 5Hz to 45MHz |
| Waveforms | Sine, Square, Triangle, Ramp, White Noise |
| Accuracy | Frequency 5ppm over all temperature range Amplitude ±5% < 10MHz, Amplitude ±10% < 45MHz |
| Impedance | 50 Ohm ± 2% |
| Scaling | 1x10 ⁻⁹ to 1x10 ⁹ |
| Output Level | 50mVpk to 10Vpk. |
| Input Ranges | |
| Inputs | 2 x 10Vpk |
| Connectors | Ground referenced BNC |

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|---|---|
| Coupling | AC |
| Input | 10Vpk from earth |
| Input Ranges | Peak Ranging 3mV, 10mV, 30mV, 100mV, 300mV, 1V, 3V, 10V |
| Scaling | 1x10 ⁻⁹ to 1x10 ⁹ |
| Ranging | Full auto, Up only or Manual |
| Input Impedance | 50 Ohm or 1M Ohm High Impedance Selectable |
| ACCESSORIES AND PORTS | |
| Instrument Accessories | |
| Probes | 2x Probes |
| Leads | 3x BNC to BNC (Output, CH1, CH2), RS232, Power |
| Software | CommView, SFRAComm |
| Documentation | Calibration Certificate, User Manual. |
| SFRA Transformer Connection System | |
| Bushing Clamps | 2x Bushing Connection Clamps |
| BNC Cable Reel | N4L 18m Cable reel (Signal, CH1, CH2) |
| Earth Braid | 2x 5 metre Earthing Braid |
| Earth Clamps | 2x |
| Spare Earth Braid | 2x 500mm |
| USB Stick | 2 GB. |
| Ports | |
| RS232 | Baud Rate to 19200, RTS/CTS flow Control |
| USB | USB Port |
| LAN | 10/100 base-T Ethernet auto sensing RJ45. |
| SYSTEM SPECIFICATION | |
| Functions | FRA, Impedance |
| Steps | Up to 2000 Steps |
| Window | From 50ms with no gap between each log |
| Memory | 1 GB Internal or External USB. |
| Display | 5.7" ¼VGA colour high brightness backlit |
| Program Stores | 100, Location 1 loaded on power up |
| Sweep Stores | 2000, all parameters in any sweep function |
| Remote Operation | Full Capability, Control and Data |
| Power Supply | 9 – 18V @ 3A, AC adapter or 12V dc from car or external batteries |
| Electromagnetic Compatibility | Directive no. 89/336/EEC |
| Applicable Standard | IEC60076-18 / EN 61326:1997 Class A |
| IP Protection of Inputs and Outputs | IP30 |
| Storage Temperature | -10 ° to +50° C |
| Relative humidity | 20-90%, non-condensing |
| Max Altitude | 2.000 m |