FRA 5311

Sweep Frequency Response Analyser

Datasheet



HAEFELY

Current and voltage – our passion

Designed by Tettex

General Description

The **FRA 5311** Sweep Frequency Response Analyser detects transformer winding movements and mechanical failures due to mechanical shock, transportation or short circuits as defined in the IEC 60076-18.

Many dielectric and mechanical failures are preceded by mechanical changes in the winding structure.

The circuit of a transformer winding is a complex R-L-C network. The measured frequency response (transfer function) of this network is unique like a fingerprint. Changes in the winding geometry generated by mechanical forces (ex. during transport or after a short circuit) will be reflected by deviations between repeated measurements. Even small winding movements or distortions will cause legible changes in the measured transfer function, which is clearly detectable.

The FRA 5311, the smallest and lightest device in the industry, is extremely easy to use. Just plug it to a USB port in the computer (for communications and power), start the windows based software and perform the test.

The clever grounding connection guarantees measurement repeatability even up to high measuring frequencies.

The additional analysis mode allows easy comparison between curves. In addition measurements from other FRA manufacturers can be loaded by using the IEC 60076 recommended XML format, or by importing them directly (most common FRA manufacturers available).

Features	Advantages
▪ Measures according the IEC 60076-18 or ANSI IEEE C57.149	☑ Measurements results **fulfill the industry standards**.
▪ **High signal-to-noise ratio** due to output voltage up to 11 Vpp at 50 Ω.	☑ **Reliable results**.
▪ **Rugged, lightweight and smallest in the industry**	☑ **Can be carried** easily on site
▪ **One single USB connection** for data and power to the computer.	☑ **Easy to setup** by connecting the USB to a computer. The specially designed clamps, twin BNC cables for generator and source, and clever ground connection system makes the connection faster than any other available device
▪ **Measures Magnitude [dB], Phase [°], Impedance [Ω] Admittance [S] and Ratio**.	☑ **Find faults easily** by using the analysis mode with curves comparison, cursors and zooming capabilities
▪ **Windows based, easy to use graphical interface**, including analysis mode for curves comparison and automatic reporting capabilities	☑ **Analyse results at the office even if no measuring device connected**, the analysis mode software runs in any windows computer. Export data to your own complete transformer test report. Data can be exported as CSV and can be opened by MS Excel or MS Word. Curves are stored as pictures
▪ **Predefined test sequences** for most common transformers	☑ **Avoid wrong measurements** by using the predefined complete transformer test sequence.
▪ **Upload tests from other devices** by using the IEC 60076 XML compatible format, as well as formats from other manufacturers	☑ **Comparison with measurements done with other devices posible** inside the FRA5311 software

Applications

Routine test and on site diagnostic of

- Power transformers
- Distribution Transformers

Scope of Supply

Type 5311 Instrument in a Cable bag including:

- FRA5311 measuring device
- 2 Measuring Clamps.
- 20m Twin BNC cable (Generator and Source)
- 20m single BNC cable with 50Ohm termination (Receiver)
- 2 Ground Tapes 10 m with 2 connecting Clamps.
- Test Certificate
- USB Memory Stick with device Software, analysis Software and instruction Manual (PDF).



Technical Data

Measurement	
Frequency Range	10 Hz .. 10 MHz, selectable
Voltage Output	max. 11 Vpp at 50 Ω
Input/output Impedance	50 Ω
Feasible accuracy(1)	± 0.1 dB from +10db to -40db, ± 0.5 dB from –40db to -80db
Dynamic range(2)	>120 dB
Measuring Points	Up to 2'000 points
Scaling	linear or logarithmic spaced

(1) Between 10 Hz and 1 MHz, ± 0.5 dB for f>100kHz and 20m meas. Cables

(2) f < 100kHz

Hardware	
Measuring Channels	2 (Source & Receiver)
Link to Controller	USB 2.0
Controller	External Computer (not included), windows 7 or 10
Grounding	Low impedance using aluminium braid, as recommended in IEC60076-18
Measuring Clamps	Flat or circular terminals up to 60 mm diameter

Software	
Measuring time	Approx 90 seconds/measurement, depending on transformer and computer speed
Data format	Proprietary
Other File formats	IEC 60076-18 Appendix E (.xml), CSV [save], Doble (.sfra) [Open], Megger (.frax) [Open]
Measuring Templates	For single and three phases transformers

Environmental, Mechanical and Power Supply	
Operating temperature	0°C +55°C
Storage temperature	-20°C +70°C
Humidity	5 .. 90% r.h. , non-condensing
Dimensions (W x D x H)	140 x 170 x 25 mm
Weight	430 g (measuring device) ; 7.5 kg (measuring cables and connections bag)
Power supply Spec.	5V DC from USB port or included power adapter
Power adapter Spec	110 VAC .. 240 V AC , 50 / 60 Hz to 5.5V DC 2000mA (Adapters for EU, US, UK and AU)

PC, Screen Resolution and Operation System Requirements	
PC min. configuration	Intel Core i3® / AMD Athlon II X2® or better, 1 GB RAM, 1 x USB 2.0 port free
Min. Screen resolution	1280 x 800 (WXGA)
Operation system	Windows 10™

Applicable Standards	
Vibration Tests	MIL-STD-810G Table 514.6C-II. Category Common carrier
CE conformity	CE mark

Global Presence

Europe
HAEFELY AG
Birsstrasse 300
4052 Basel
Switzerland

☎ + 41 61 373 4111
sales@haefely.com

China
HAEFELY AG Representative Office
8-1-602, Fortune Street, No. 67
Chaoyang Road, Beijing 100025
China

☎ + 86 10 8578 8099
sales@haefely.com.cn

This document has been drawn up with the utmost care. We cannot, however, guarantee that it is entirely complete, correct or up to date.
©Copyright HAEFELY/ Subject to change without notice

V20XX.XX

HAEFELY
Current and voltage – our passion

H HIGH VOLTAGE
I INSTRUMENTS
E EMC

precision. swiss made.