

RLC Measurement Package

Resistance, Inductance and Capacitance (RLC) measurement is one of the many uses of the Venable Frequency Response Analysis Systems. This function can be greatly enhanced by adding the RLC Measurement Package to provide an accurate, easily used instrument for measuring values of resistors, inductors, and capacitors, and values of one or two additional parasitic elements. For example, the user can simultaneously measure the capacitance, ESR, and ESL of a capacitor.

The RLC Measurement Package includes the RLC Adapter, the Axial Lead Adapter, and the Venable RLC software and documentation.

The figure below shows how the Analyzer is connected to the RLC Adapter. The Oscillator Output jack connects to the oscillator output connector of the frequency response analyzer. CH1 and CH2 jacks mate directly with the analyzer input connectors. These inputs, used to calculate impedance, represent current and voltage in the circuit under test.

Specifications

Measurement Frequency

1 Hz to 40 MHz, user-selectable models for a single component or for a multiple-component circuit.

Accuracy

1 Hz to 1 kHz	0.1%
1 kHz to 100 kHz	0.2%
100 kHz to 1 MHz	0.5%
1 MHz to 10 MHz	1.0%
10 MHz to 40 MHz	4.0%

Optimum Measurement Range

Resistance	10 milliOhms to 1 MegaOhm
Inductance	1 microHenry to 10,000 Henries
Capacitance	100 picoFarads to 1 Farad

Extended Measurement Range*

Resistance	100 microOhms to 100 MegaOhms
Inductance	10 nanoHenries to 1 MegaHenries
Capacitance	1 picoFarad to 100 Farads

*Extended range loses least-significant digit of accuracy for each decade of measured valued outside the optimum measure or frequency range.

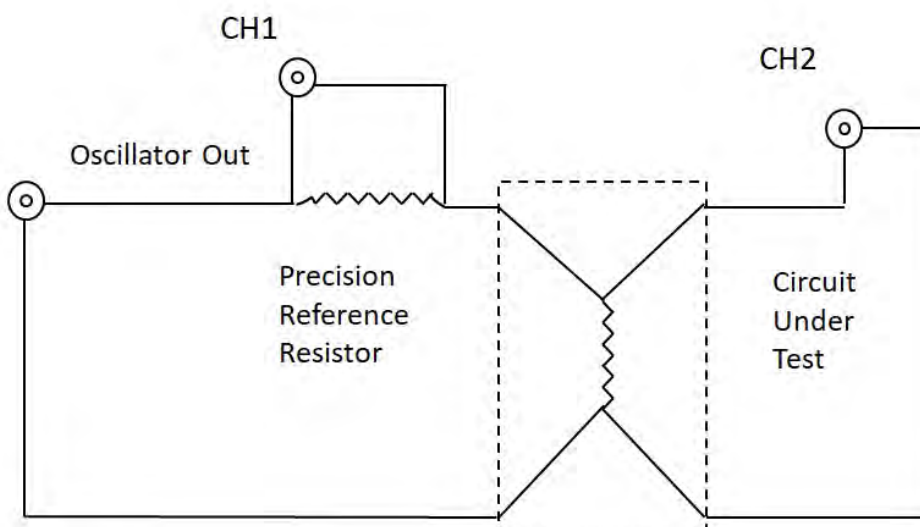
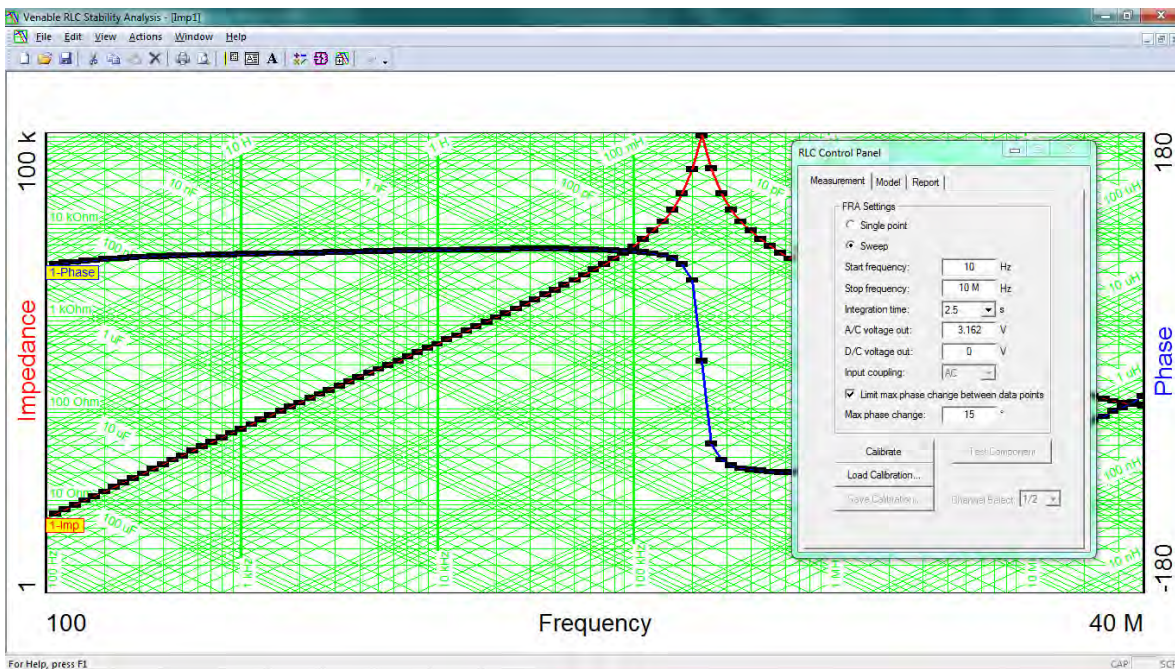


Figure 1. RLC connected to FRA

Venable RLC Software

The RCL Measurement is compatible with all current Venable Instrument Frequency Response Analyzers (FRAs).

Before measuring a component, using the RLC Control Panel in the RLC software, the open and closed circuit calibration data is measured with the adapter attached to the analyzer. This data is stored and used to correct errors associated with instrument and test circuit parasitics. After calibration, components can be placed in the calibration fixture and measured. Measured values of components of the circuit under test are displayed on the plot and can be examined with the slide bar. Errors will be automatically removed after the measurement sweep is complete. All data is saved including the uncorrected measurement. Uncorrected measurements are hidden on the plot but can be unhidden and displayed if needed.



Plot of a Transformer Primary Magnetizing Inductance

In the modeling tab of the RLC Control Panel, the user selects a component type, or an equivalent circuit, and the data set they wish to model. The software then calculates the values for the equivalent circuit model for the data. The user has the option to create a plot of the model to compare with the actual measurement.

The Report tab data of the RLC Control Panel saves the plot data in an Excel xml file. It gives the user options to save the circuit values of the model, the calibration data, and the channel voltage data for each data set in the plot.