The Equivalent Circuit Analysis Firmware IM9000 is an optional function that enables equivalent circuit analysis using the Impedance Analyzer IM3570. Five typical equivalent circuit analysis models and the analysis results can be used to calculate the ideal frequency characteristics and check the differences from the measured values. Furthermore, Cole-Cole plot, admittance circle, and other graphs can be displayed.
### Features

- **Simple:** Automatic Selection of Equivalent Circuit Model
  The IM9000 can automatically select the equivalent circuit model from the five typical models to minimize the differences between the measured values and the ideal frequency characteristics derived from the analysis results.

- **Detailed:** Acceptance/Rejection Decision for Elements Comprising Part
  An acceptance/rejection decision can be made for the L, C, and R elements comprising a part and the resonance sharpness (mechanical quality coefficient). A detailed decision can be made on the elements using the resonance of a piezoelectric element or inductor.

### Equivalent Circuit Analysis Firmware IM9000 Specifications

#### Equivalent Circuit Model and Measurement Items

**Three-element model**

- **A**
  - Coil: Core loss is large while ESR is small
- **B**
  - Coil: ESR is relatively large
  - Resistance: Resistance is small and impact of the wire inductance is large

**Four-element model**

- **E**
  - Pizoelectric element

**Measurement items (Three-element model)**

- L1 (Inductance)
- C1 (Capacitance)
- R1 (Resistance)
- Qm (Resonance sharpness) / fa (Anti-resonance frequency)

**Function**

- FR (Resonance frequency)
- fS (Series resonance frequency)
- fP (Parallel resonance frequency)
- fA (Anti-resonance frequency)
- fR (Resonance frequency)

**Measurement items (Four-element model)**

- L1 (Inductance)
- C1 (Capacitance)
- R1 (Resistance)
- C0 (Parallel capacitance)
- Qm (Resonance sharpness or mechanical quality coefficient)

- fR (Resonance frequency)
- fa (Anti-resonance frequency)
- fS (Series resonance frequency)
- fP (Parallel resonance frequency)
- fM (Maximum admittance frequency)
- fN (Minimum admittance frequency)
- f1 (Maximum susceptance frequency)
- f2 (Minimum susceptance frequency)

**Other functions**

- **Circuit model selection**
  - AUTO (automatic selection) / HOLD (fixed)

- **Estimation execution**
  - AUTO (estimation is executed after frequency sweep ends) / MANUAL (estimation is executed by the user)

- **Sweep range using estimation**
  - Normal sweep: Analysis is performed in the sweep range from the analysis start frequency to the analysis-end frequency
  - Segment sweep: Analysis is performed in the sweep range of the set segment number

- **Simulation**
  - Enables displaying and comparing the ideal frequency characteristics graph derived from the analysis results or the values specified by the user

**Comparator**

- Runs a comparator on the analysis results and outputs the decision results to LCD, EXT. I/O, R1, L1, C1, C0, Qm, HI/IN/LO, absolute value setting

**Display position of estimation results**

- Select the display position from upper, lower, left or right

**X-Y display**

- Cole-Cole plot: Set Rs to the first measurement item, X to the third measurement item, reverse the polarity of the third measurement item, and set correction coefficient A = -1 for scaling correction
- Admittance circle display: Set G to the first measurement item and B to the third measurement item