



TYPE 107 VARIABLE INDUCTOR

USES: The TYPE 107 Variable Inductors find their greatest uses in the laboratory as standards of moderate accuracy for measurements of self- and mutual inductance, and as components of bridges, oscillators, and similar equipment where a variable inductor is needed as a circuit element.

DESCRIPTION: Two coils, a rotor and a stator, are mounted concentrically. As the position of the rotor is changed the coupling between the two coils changes, and the inductance is varied.

In most models stranded wire is used, in which the separate strands are insulated from one another. The coils are impregnated and baked in a high-melting-point material before being securely mounted to the bakelite panel.

FEATURES: The TYPE 107 Variable Inductor is direct reading in inductance for both series

and parallel connections of the coils. The inductances of the rotor and stator have been carefully equalized, and the coils are so mounted that the inductance for the parallel connection is exactly one-fourth the value shown by the dial for the series connection. This equalization of the two coils also eliminates losses from circulating currents when the parallel connection is used.

Separate terminals are brought out for both rotor and stator so that they may be quickly connected in either series or parallel as a self-inductor, or used separately as a mutual inductor. The formula for the mutual inductance is given on the nameplate together with the value of d-c resistance and maximum current.

Other features of these inductors are their permanence of construction, low losses, and high current-carrying capacity.

SPECIFICATIONS

Self-Inductance Range: Five sizes are available in stock covering a total range of approximately 1.7 microhenrys to 500 millihenrys by the use of both the series and parallel connections. Maximum and minimum values for both connections are shown in the price list.

Mutual Inductance: Either positive or negative values of mutual inductance can be obtained. The exact formula for the mutual inductance is engraved on each individual instrument. The approximate ranges are given in Table I.

Calibration: The inductance for the series connection, measured at 1000 cycles and accurate within 1% of full-scale reading, is engraved on the dial. The inductance for the parallel connection is within 0.1% of one-fourth of the series inductance.

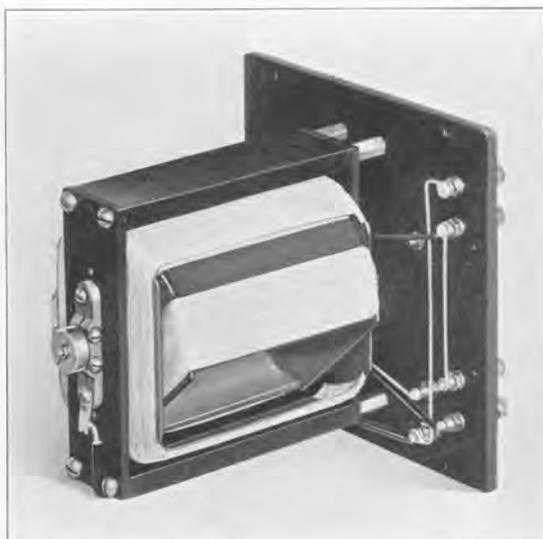
Frequency Error: Disregarding errors due to skin effect, the fractional change in inductance with frequency will be f^2/f_0^2 where f is the operating frequency and f_0 the natural frequency. Accordingly, at one-tenth the natural frequency, the frequency error is but 1%. At higher frequencies skin effect errors, which are different for the different units, may become appreciable. Table I gives the natural frequencies for the different standard units, for full setting with series connection.

Losses: The maximum value of the storage factor $Q = \frac{X}{R}$ for full-scale setting with the series connection is given in Table I for each inductor together with the frequency at which this value of Q is obtained.

Maximum Power and Current: The total amount of power which each inductor is capable of dissipating is 15 watts. This amount causes a temperature rise of 40° Centigrade.

The maximum allowable current, for the series connection, is given below in Table I and is engraved on each nameplate.

Direct-Current Resistance: The approximate values of d-c resistance for the different units are given in Table I and are also engraved on the nameplates of the instruments.



Terminals: Standard 3/4-inch spacing, jack-top binding posts are provided which allow separate connections to rotor and stator. Connecting links are supplied so that either a series or parallel connection of the rotor and stator can be made available at a third pair of binding posts.

Mounting: All units are mounted on bakelite panels and enclosed in walnut cabinets.

Dimensions: 6 1/2 x 6 1/2 x 3 3/4 inches, over-all.

Net Weight: 5 pounds, all ranges.

TABLE I

| Type | Mutual Inductance | D-C Resistance | Maximum Current | Maximum Q* | Frequency for Maximum Q* | Natural Frequency* |
|-------|-------------------|----------------|-----------------|------------|--------------------------|--------------------|
| 107-J | 0-10.8 μh | 0.17 Ω | 8.5 a | 110 | 400 kc | 5000 kc |
| 107-K | 0-110 μh | 0.7 Ω | 4.0 a | 140 | 200 kc | 1500 kc |
| 107-L | 0-1.1 mh | 4.8 Ω | 1.7 a | 125 | 60 kc | 500 kc |
| 107-M | 0-11 mh | 40 Ω | 0.60 a | 65 | 20 kc | 150 kc |
| 107-N | 0-110 mh | 660 Ω | 0.14 a | 20 | 7 kc | 30 kc |

*For full-scale setting, series connection.

Self-Inductance

| Type | Series | Parallel | Code Word | Price |
|-------|-----------|--------------|-----------|---------|
| 107-J | 7- 50 μh | 1.7-12.5 μh | HAREM | \$35.00 |
| 107-K | 60-500 μh | 15-125 μh | HARPY | 35.00 |
| 107-L | 0.6- 5 mh | 0.15-1.25 mh | HARRY | 35.00 |
| 107-M | 6- 50 mh | 1.5-12.5 mh | HOTEL | 40.00 |
| 107-N | 60-500 mh | 15-125 mh | HOVER | 40.00 |

PATENT NOTICE. See Note 17, page v.

OTHER INDUCTORS

TYPE 119 R-F Chokes are described on page 191. Because of their low capacitances, high inductance, and high Q , these chokes are useful as inductance elements in filters and tuned circuits.

