INSTRUCTIONS for the use of the SHURE REACTANCE SLIDE RULE

Specific operating instructions are printed on the Slide Rule but the following should be kept in mind:

Front Side of the Slide Rule

Use for solution of resonant frequency equation $(2\pi f)^2 LC = 1$.

For low frequency (5 to 50,000 cycles per second) use scales a, b, c, for capacity, inductance, and frequency, respectively.

For high frequency (.05 to 500 megacycles per second) use scales d, e, f, for capacity, inductance, and frequency, respectively.

Reverse Side of the Slide Rule

Use for solution of the equations:

$X_L = 2\pi fL$ Coil $Q = \frac{2\pi fL}{R}$ X_C = capacitive reactance $\frac{1}{2\pi fC}$ Dissipation factor $D = 2\pi fCR$

Yellow frequency scale m and *yellow* D-Q scale n are to be used with *all* calculations of X_L, X_C, Q and D involving low frequency range (.1 to 1,000,000 cycles per second.)

Blue frequency scale p and *blue* D-Q scale o are to be used with *all* calculations of X_L, X_C, Q and D involving high frequency range (.001 to 10,000 megacycles per second.)

Capacity scale g (.01 to 100 microfarads) is for use *only* with Resistance-Reactance scales h and i for low and high frequency ranges respectively. Use for calculation of X_C and D.

Capacity scale l (1 to 10,000 micro-microfarads) is for use *only* with Resistance-Reactance scales k and j for low and high frequency ranges respectively. Use for calculation of X_C and D.

Inductance scale q (.01 to 100 henrys) is for use *only* with Resistance-Reactance scales r and s for low and high frequency ranges, respectively. Use for calculation of X_L and Q.

Inductance scale v (.001 to 10 millihenrys) is for use *only* with Resistance-Reactance scales u and t for low and high frequency ranges, respectively. Use for calculation of X_L and Q.

To obtain megacycles, divide cycles per second by 1,000,000. To obtain megacycles, divide kilocycles per second by 1,000.

The letter m following a number indicates that the number is to be multiplied by 1,000. For instance, on scale s (designated megohms) 50 M means 50,000 megohms.

The expression MEG following a number means that the number should be multiplied by a million. For instance, on scale r (designated ohms) 5 MEG means 5 megohms.

EXAMPLE 1

PROBLEM: In the design of a filter section it is desired to resonate a 0 .13 henry inductance at a frequency of 1500 cycles per second. Find the required capacity.

SOLUTION: Set 1500 c.p.s. on scale "c" opposite arrow; opposite .13 henry on scale "b" read capacity .087 microfarads on scale "a".
NOTE: The inductance scale "b" increases from right to left.

EXAMPLE 2

PROBLEM: In a high frequency oscillator, the tank circuit consists of a 35 micro-microfarad condenser and a 1.5 microhenry coil. Find the frequency of oscillations.

SOLUTION: 1.5 microhenrys equals .0015 millihenrys. Set .0015 millihenrys on scale "e" to 35 micro-microfarads on scale "d". Read 22 megacycles against arrow on scale "f".
NOTE: The inductance scale "e" increases from right to left.

EXAMPLE 3

PROBLEM: In the design of a grid transformer for a Microphone with 35 ohms output impedance, find primary inductance if transformer reactance is to equal microphone impedance at 50 c.p.s.

SOLUTION: X_L = 35 ohms at 50 cycles per second. Set arrow on scale "n" to 50 c.p.s. on scale "m"; opposite 35 ohms on scale "r" read .11 henrys on scale "q".

EXAMPLE 4

PROBLEM: Determine the size of a by-pass condenser for a 2500 ohm cathode resistor in an amplifier which is to have a substantially flat response down to 30 c.p.s. Assume the reactance of the condenser to be equal to 1/10 the value of the resistance.

SOLUTION: $X_C = 2500/10 = 250$ ohms. Set arrow on scale "n" to 30 c.p.s. on scale "m". Opposite 250 ohms on scale "h" read 21 microfarads on scale "g".

EXAMPLE 5

PROBLEM: In the design of .1 henry low frequency air core inductance it is desired to have a minimum Q of 30 at 1000 cycles per second. Find maximum coil resistance.

SOLUTION: Set 30 on scale "n" to 1000 on scale "m". Under .1 on scale "q", read 21 ohms on scale "r".

EXAMPLE 6

PROBLEM: Find the size of an interstage coupling condenser if grid resistance is 0.2 megohms and capacitive reactance must equal resistance at 150 cycles per second.

SOLUTION: X_C = 0.2 megohms. Set arrow on scale "n" to 150 cycles per second on scale "m". Under .2 megohms on scale "k" read 5300 micro-microfarads, or .0053 microfarads. (Use .005 microfarad condenser on scale "I".)

EXAMPLE 7

PROBLEM: In coupling tank circuit taps of a 7 megacycle transmitter to a 72 ohms transmission line, find the size condenser required, if capacitive reactance of each condenser equals 1/10 the line impedance.

SOLUTION: $X_C = \frac{72}{10} = 7.2$ ohms. Set arrow on scale "o" to 7 megacycles per second on scale "p". Under 7.2 ohms on scale "j" read 3200 micro-microfarads in scale "L".
(Use .003 microfarad condensers.)