Patent being applited

CONCISE No.380

for electrical communication engineering

CIRCULAR SLIDE RULE

Surge impedance
Resonance frequency
Inductive reactance
Capacity reactance
Wave-length
Frequency
Decibel

Anyone can get
these values easily

CONCISE CO., LTD.

MERITS OF #380 "CONCISE" CIRCULAR SLIDE RULE

The "Concise" Circular Slide Rule #380 is a Pocket-type instrument to compute those relating to 7 formulas frequently appearing in electrical communication engineering. (examples follow)

1 In other slide rules, these computations will be done by two steps, namely, first getting the figures then determining the position of decimal point, while #380 slide rule can settle these steps in only one operation.

2 In these computations, it is not so easy to determine the position of decimal point, because numbers ranging from 10^{-12} to 10^{12} are used for the computations. #380 slide rule will eliminate these difficulties completely.

3. Each graduation is furnished with a mark expressing its meaning and a single-headed arrow showing the direction in order to read them easily.

4. Followi g devices have been applied for the prevention of reading incorrect answers.

   a. The answer will be given in ap erfect state, namely with correctly placed decimal point and unit.

   b If the black graduations are used for the calc ula tion, the answer will be given in black, while the user will find the answer in red when red gradu ations are used.

5. Following examples present a basic type in respective formulas, but in practice 3 calculations can be done for each formula.

   For Example :

$$\text{As to } X = \sqrt{\frac{L}{C}}$$

1) Get X from L and C (Basic example)
2) Get L from C and X
3) Get C from X and L

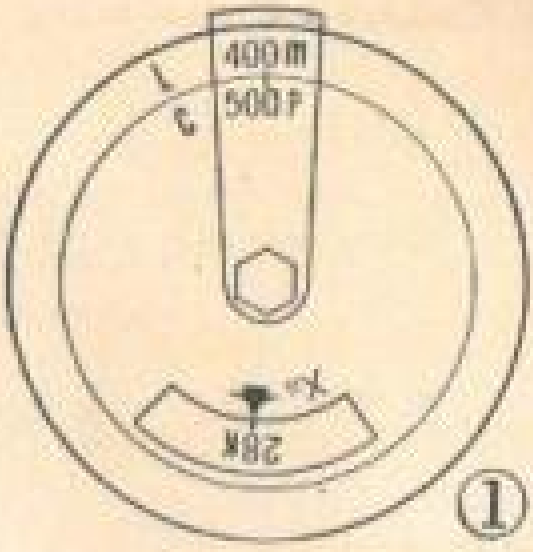
1. Surge Impedance

Example 1:

L=400mH (Milihenries)

C=500pF (Picofarads)

To find $X=\sqrt{\frac{L}{C}}$



①

Operations

1. Set hair line at 400m on L of fixed disk.
2. Move 500p on C (black) of turnable disk to hair line.
3. Read 28K (black) in the window X_Ω.

Answer: 28KΩ

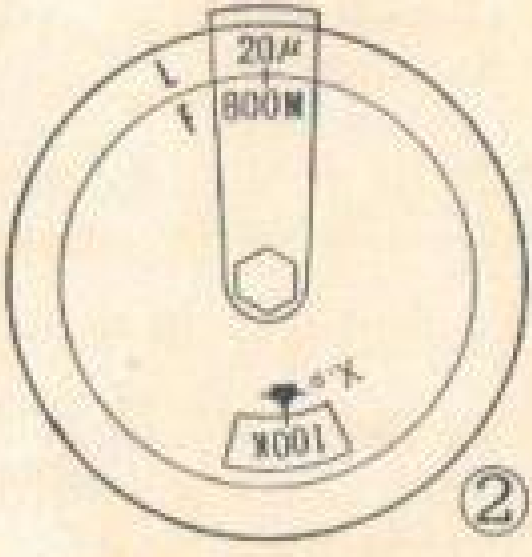
2. Inductive Reactance

Example 2:

F=800 MC/S (Megacycles per second)

L=20μH (Microhenries)

To find $X_L=2\pi FL$



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Operations

1. Set hair line at 20μ on L of fixed disk.
2. Move 800 M on F (red) of turnable disk to hair line.
3. Read 100K (red) in the window $X_L\ \Omega$.

Answer: 100KΩ

3. Decibel

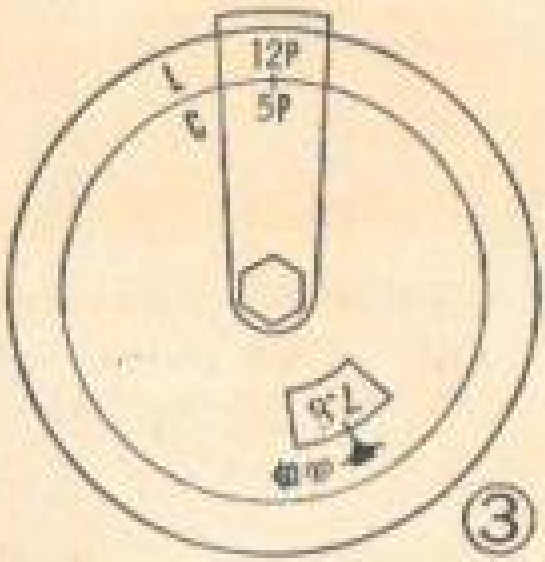
Example 3:

(a) $V_2 = 12$Volts $V_1 = 5$Volts

To find d.b $= 20 \log_{10} \frac{V_2}{V_1}$

(b) $I_2 = 12$ amperes $I_1 = 5$amperes

To find d.b $= 20 \log_{10} \frac{I_2}{I_1}$



Operations

1. Set hair line at 12p on L of fixed disk
2. Move 5p on C of turnable disk to hair line.
3. Read 7.6 in the window d. b(V. I).

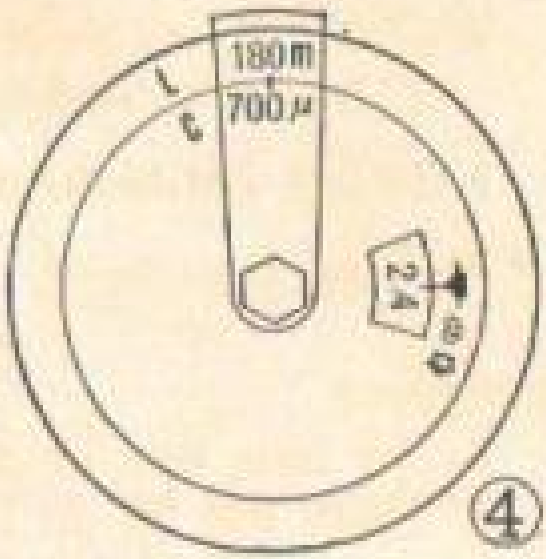
You can get the answer by using 12μ (or 12m) on L and 5μ (or 5m) on C instead of 12p and 5p. By the same procedure you can get answer of (b) 7.6 d. b

Answers: (a) 7.6 d. b (b) 7.6 d. b

Example 4:

$W_2 = 180$mW $W_1 = 700\mu$W

To find d.b $= 10 \log_{10} \frac{W_2}{W_1}$



Operations

1. Set hair line at 180m on L of fixed disk.
2. Move 700μ on C of turnable disk to hair line.
3. Read 24.1 in the window d. b (W).

Answer: 24.1 d.b

Example 5: (a) $\frac{V_2}{V_1}=5.7$ To finb d.b$=20 \log_{10} 5.7$

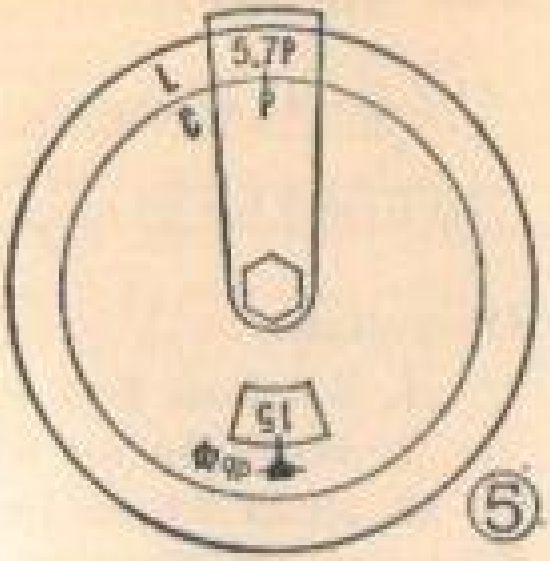
(b) $\frac{P_2}{P_1}=22$ To find d.b$=10 \log_{10} 22$

Operations

(a) 1. Set index (p) of C of turnable disk to 5.7p on L of fixed disk.

2. Read 15 in the winbow d. b (V I).

(b) Similarly you can get 13.4 in the window d. b(W).



Answers: (a) 15 d. b (b) 13.4 d. b

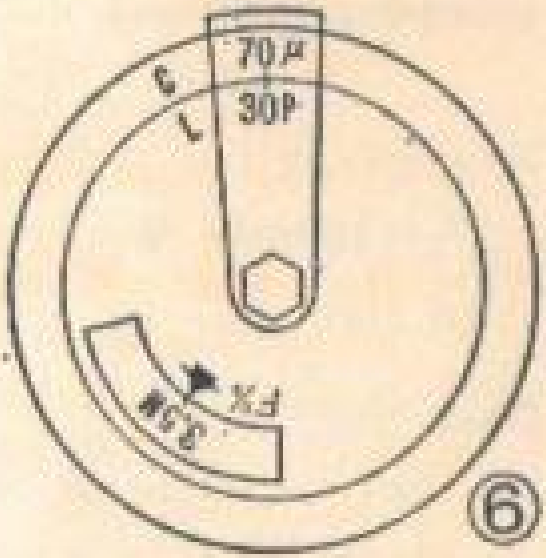
4. Reasonance Frequency

Example 6:

L=30 pH (Picohenries)

C=70 μF (Microfarads)

To find $F=\frac{1}{2\pi\sqrt{LC}}$



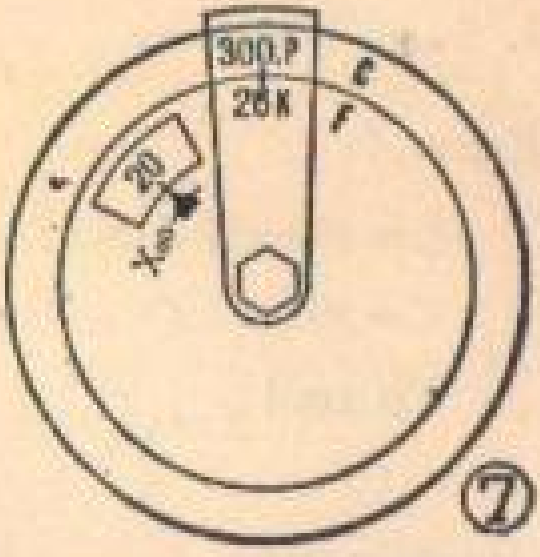
Operations 1. Set hair line at 70 μon C of fixed disk.

2. Move 30p (black) on L of turnable disk.

3. Read 3.5M in the window F C/S.

Answer: 3.5 MC/S

5. Condensive Reactance



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Example 7:

C=300,000 pF (Picofarads)

F=26KC/S (Kilocycles per second)

To find $X_C = \frac{1}{2\pi FC}$

Operations

1. Set hair line at 300,p on C of fixed diek.
2. Move 26k on F(red) of turnable diisk to hair line.
3. Read 20(red) in the window $X_C\Omega$.

Answer: 20Ω

6. Wave-length and Frequency

$\lambda F = 3 \times 10^5 Km$

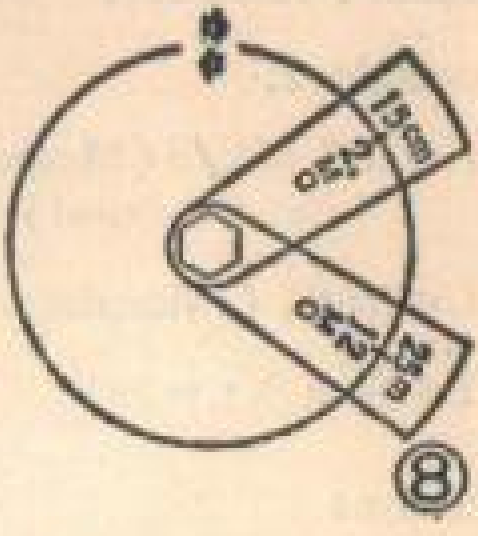
Example 8:

(a) $\lambda = 15cm$

To find $F = \frac{3 \times 10^5 Km}{15cm}$

(b) $\lambda = 25m$

To find $F = \frac{3 \times 10^5 Km}{25m}$



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Operations

(a) 1. Set hair line at 15cm on λ.
2. Pead 2, MC on F.

(b) 1. Set hair line at 25m on λ.
2. Read 12 MC on F.

Answer: 2,000MC 12MC