OPERATING INSTRUCTIONS FOR DESAUTY'S BRIDGE

OBJECT:

To Compare the capabilities of two Capacitors.

APPARATUS:

Desauty's bridge has been designed on a training board New Tech Type – NTI – 113. It consists of two variable Capacitors C_1 and C_2. Each can be varied in step of 0.01μF i.e. X 0.01 μF upto 0.1 μF. Two resistances R_1 and R_2 of bridge may be varied in steps of (i) X 100 Ω upto 1 kΩ (ii) X 1kΩ upto 10 kΩ Fixed frequency oscillator and headphone or galvanometer fitted with diode are connected in between the terminals marked for this purpose.

THEORY:

When the bridge in balanced i.e. Potentials at B and D are equal i.e.

$$V_B = V_D$$

or $V_A - V_B = V_A - V_D$

If i_1 and i_2 are the alternating currents passing in arms ABC and ADC

then $R_1 i_1 = R_2 i_2$ …….. (1)

Similarly

$V_B - V_C = V_D - V_C$

or

$$\frac{i_1}{jwC_1} = \frac{i_2}{jwC_2} \quad \text{.....(2)}$$

when $W = 2\pi f = f$ is frequency of fixed frequency oscillator

Dividing (1) by (2)

$$\frac{R_1 i_1 \text{ X } jwc_1}{i_1} = \frac{R_2 i_2 \text{ X } jwc_2}{i_2}$$

or $R_1C_1 = R_2C_2$

or $$\boxed{\frac{C_1}{C_2} = \frac{R_2}{R_1}} \quad \text{.....(3)}$$

Using this formula determining the values of R_1 and R_2 the ratio between tow Capacities i.e. C_1/C_2 calculated. If one capacity is known the other can be calculated.

PROCEDURE:

COMPARISON OF TWO CAPACITIES

1. Complete the circuit as shown in Fig. 2.
2. Set C_1 and C_2 at some values.
3. Adjusting the values of R_1 and R_2 obtain null point i.e. the sound in head phone or deflection in Galvanometer should be minimum.
4. Change the values of R_1, R_2 and take different sets.
5. Note the values in O.T. and calculate the ratio C_1/C_2 using formula (3).

OBSERVATION TABLE:

C_1 = …… μF, C_2 = …….. μF

S. No.	R_1 Ω	R_2 Ω	$\frac{C_1}{C_2} = \frac{R_2}{R_1}$
1.			
2.			
3.			
4.			
5.			
6.			

Mean Value of $\frac{C_1}{C_2}$ = ...

RESULT:

Ratio of two Capacities C_1/C_2 = ————————

Correct Value of C_1/C_2 = ————————

PRECAUTIONS:

1. Initially output of fixed frequency oscillator should be kept low. Near null point it should be increased.
2. If head phone is used there must be silence in the neighboring.
3. For sensitivity of bridge the impedance in all four arms should be nearly equal.
4. Plug type resistance boxes should not be used.

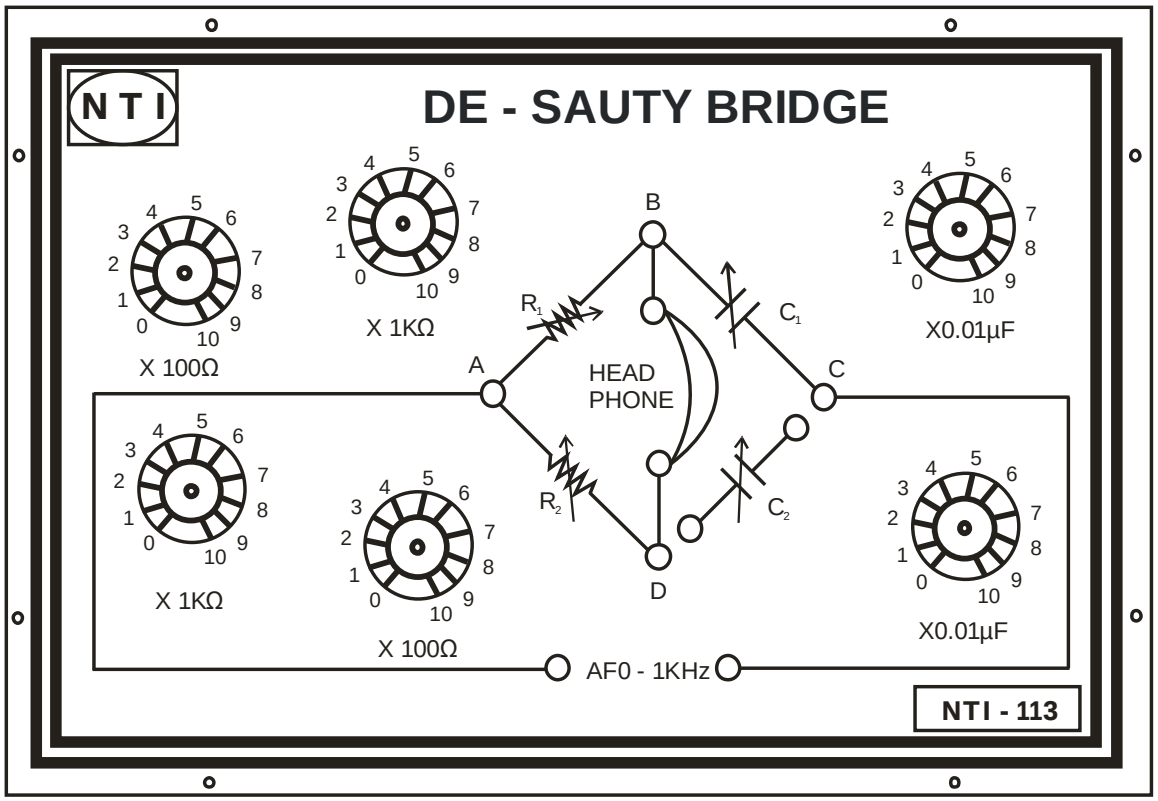

Fig. (1) Panel Diagram for DE-SAUTY BRIDGE

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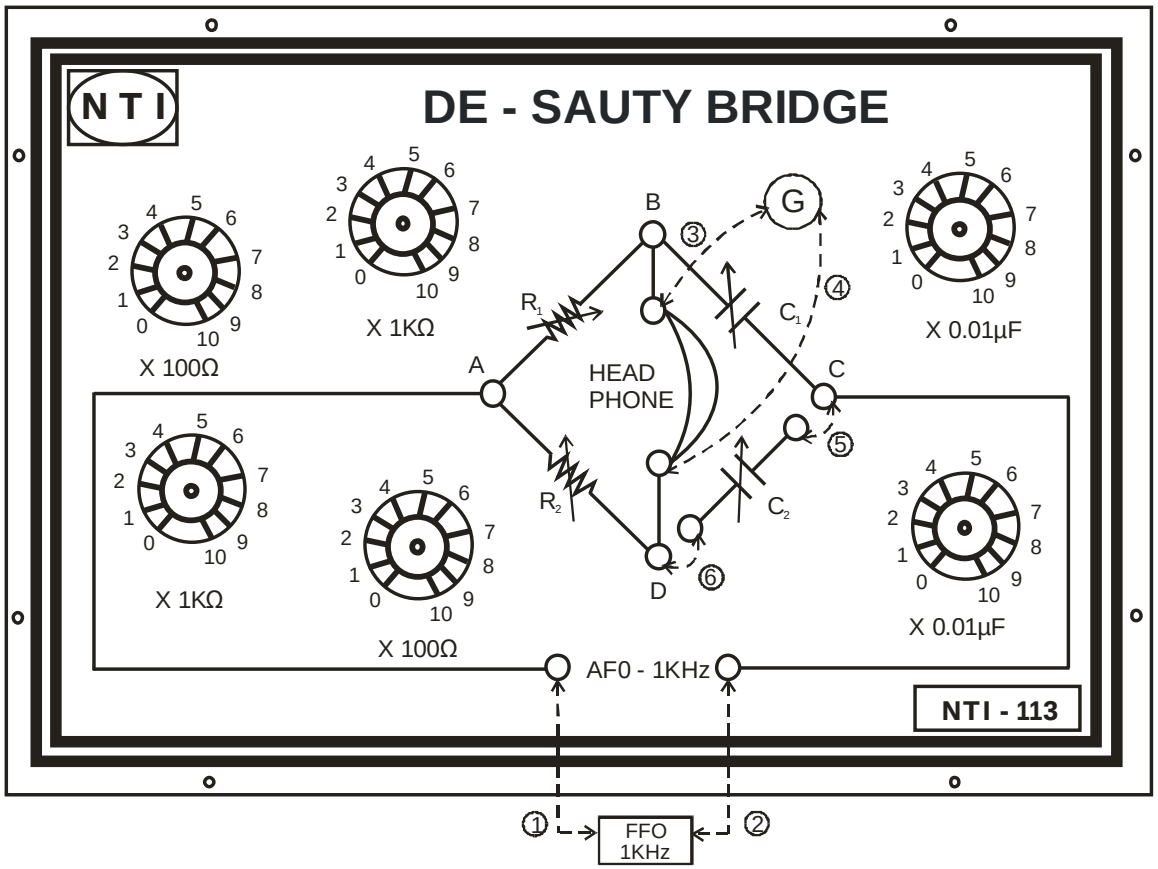

Fig. (2) Connections for DE-SAUTY BRIDGE

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