TYPE 740-B CAPACITANCE TEST BRIDGE

The Type 740-B Capacitance Test Bridge is a 60-cycle bridge for the measurement of capacitance and power factor. The circuit, shown schematically below, is that of the conventional capacitance bridge. The null indicator consists of a tuned amplifier and an electron-ray tube.

RANGE AND ACCURACY

Capacitance Range: 5 μμf to 1100 μf.

Capacitance Accuracy: Within ±1% over main decade of CRL dial (1 to 11) for all multipliers except .0001.

Within ±1.5% or ±3 micromicrofarads, whichever is the larger, on the .0001 multiplier on the main decade of the CAP. dial. Below 100 micromicrofarads the error gradually increases to ±5 micromicrofarads as zero is approached.

Corrections for bridge zero capacitance are unnecessary because the zero capacitance value is negligible.

Dissipation Factor Range: 0 to 50%.

Dissipation Factor Accuracy: Calibration within ±3/4 of the smallest division for all capacitance multipliers except .0001.

On the .0001 capacitance multiplier a correction of 0.3% should be subtracted from the dial reading. When this correction is made the calibration is within ±2 divisions on the X1 multiplier and within ±1 division on the X10 multiplier.

On the lowest and highest capacitance ranges, where the sensitivity of balance is lower, this accuracy can be obtained by interpolation.

Note that the bridge reads in dissipation factor (RωC), which is related to power factor as the cotangent of the loss angle is to the cosine. The difference is negligible for power factors less than 10%.

INSTALLATION

1. Connect bridge to 100-130 volt, 60-cycle, a-c line by means of the cord and plug supplied. The input power is about 15 watts.
2. Ground the bridge at panel terminal G.
3. Turn on power (ON-OFF) switch.

OPERATION

1. Connect the condenser under test to the UNKNOWN terminals, making sure that the low terminal (if any) is connected to the bridge terminal engraved LOW.
2. If the approximate capacitance is known, set the MULTIPLY BY and CAPACITANCE dials to this value. If the approximate value is not known, set the SENSITIVITY control at about 5 and adjust the MULTIPLY BY switch until the pattern on the electron-ray tube opens.
3. Adjust the CAPACITANCE and POWER FACTOR dials until a null is reached, i.e., until the pattern on the electron-ray tube is at maximum deflection when the sensitivity is at maximum.

PRECAUTIONS

1. Keep supply line away from the UNKNOWN terminals and samples being measured. This is extremely important when measuring on .0001 capacitance multiplier.
2. Do not use CRL dial below 1 except for measurements less than 100 micromicrofarads.
3. Sensitivity is best when power supply has good waveform.

POLARIZING VOLTAGE

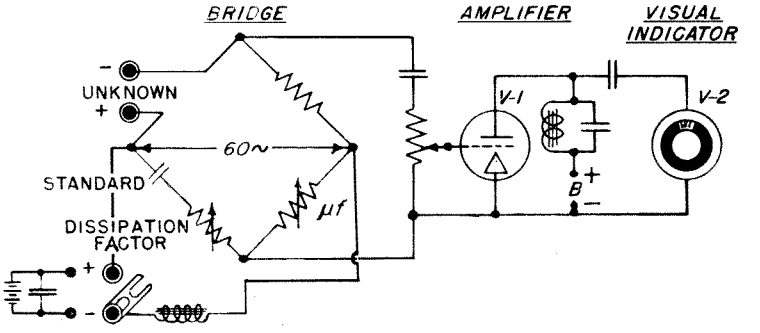
A d-c polarizing voltage (not over 500 volts) can be introduced at the DC and COND. terminals. Batteries are recommended as the source of polarizing voltage rather than an a-c rectifier filter system. The smallest available battery that will give the desired voltage is satisfactory because the only current drain is that caused by leakage in the condenser under test.

Connect a condenser (10 μf or larger) across the d-c supply in order to avoid a drop in the 60-cycle bridge voltage caused by the internal impedance of the d-c supply.

If an a-c operated power supply is used, its capacitance to ground must be low, because this capacitance is shunted across the standard condenser. The presence of a-c ripple may reduce the sensitivity of balance

Make sure that the polarity of the voltage is correct for the condenser under test. A simple convention to follow is to connect the negative terminal of the electrolytic condenser under test to the LOW terminal of the bridge and the negative side of the d-c source to the right-hand DC and COND. terminals.

When no polarizing voltage is used, the DC and COND. terminals should be shorted with the link provided.



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