The stabilizer insures stability of the output voltage no worse than 0.01-0.02% per hour for a power line variation of ±10%, the effective value of the ripple components at the output does not exceed 2% on the 3-7.5-15 v ranges and 1% on the remaining ranges. Powering of the device is done from a 127/220 v line; it can operate 2-3 minutes after turning on. The stabilizer works on an ordinary table without any shock mounts. The dimensions of the apparatus are 495 × 275 × 305 mm, the weight 20 kg.

**SUMMARY**

The type U1136 photocompensated stabilized rectifier can be used instead of storage batteries of corresponding capacity and voltage (together with control rheostats) for powering permanent magnet moving coil meters in testing them with the aid of potentiometers, and also in other cases where a highly stable continuously controlled DC voltage is essential.

**LITERATURE CITED**


**CIRCUIT FOR THE MEASUREMENT OF THE VOLUME RESISTANCE OF AN ELECTRICAL INSULATOR**

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Megohmmeters and ohmmeters are used for measurements of the resistance of an insulator or the investigation of its properties; with the aid of these, ordinarily the total resistance $R_c$, including the volume $R_v$ and surface $R_s$ resistance of the insulator, is measured. In practice, it is most important to know the magnitude $R_v$, since it determines the state and properties of the insulator.

In measurement of the resistance of an insulator by the ordinary megohmmeter or ohmmeter, $R_s$ and $R_v$ are connected in parallel and, consequently, the indication of the meter corresponds to the magnitude

$$R_e = \frac{R_s R_v}{R_s + R_v}.$$

The measurement error of $R_v$ in this case is equal to

$$\Delta = \frac{R_v - R_e}{R_v} \times 100\% = \frac{R_v - \frac{R_s R_v}{R_s + R_v}}{R_v} \times 100\%.$$

Denoting $\frac{R_s}{R_v} = k$, we obtain:

$$\Delta = \frac{100}{1 + k^2} \%.$$
Fig. 1. Bridge circuit for measurement of the volume resistance of an Insulator. $R_x$ and $R_0$ arms of the bridge; 1) metal guard rings; 2) guard ring; case of the electric motor, etc.; 3, 4, 5) microammeters; 6) insulator being tested; 7) conductor; $I_s$ and $I_v$ are currents passing through the surface and volume of the Insulator.

The circuits presented in the article permit one to measure the resistance of the Insulator with significantly less error.

The following three conditions are possible in measurements of the volume resistance of an Insulator:

$$R_x > R_v, \quad R_x < R_v \text{ and } R_x < R_v.$$

In all these cases, the measurement can be made with the aid of a bridge circuit (Fig. 1).

Measurement of the volume resistance with this circuit is done in the following manner. The bridge is balanced by a change of the resistance $R_x$; when balanced, $I_w = 0$. Then for a given power supply voltage of the bridge $U$, the value of the current $I_2$ measured by meter 4 determines the volume resistance of the Insulator:

$$R_v = \frac{U - I_2 R_0}{I_v}.$$  \hspace{1cm} (2)

If $R_s << R_v$, then one can show in measuring it is necessary to diminish the resistance $R_x$ to such a value that the current $I_2$ will be excessively large. Then a measurement can be made even if the bridge is not brought to a state of complete balance. In this case the volume resistance of the Insulator is determined from the formula

$$R_v = \frac{U - I_2 R_0}{I_v}.$$  \hspace{1cm} (3)

One microammeter can be used instead of three by switching an appropriate selector switch, and doing the necessary operations successively.

Analogous measurements can be made also with the aid of the circuit shown in Fig. 2a, which is redrawn in a more convenient form in Fig. 2b.

In the measurement of the volume resistance of an Insulator with the aid of the circuit of Fig. 2, the indication is read directly from the scale of the device after balancing the bridge.

In the measurement of volume resistance of an insulator in the case where $R_s \geq R_v$, the selector switch P is put in position 1 (Fig. 2a); when this is done contacts (Fig. 2b) 1, 3, 4, 6 are closed, and contacts 2, 5, 7 remain open, that is, working coil 2 is disconnected and the complementary coil 3 is connected, resistance $R_0$, is short-circuited and resistances $r_0$, $R_{up}$, $R_{ap}$, $R_0$ and $R_x$ remain connected. The current $I_w$ in coil 3 is brought to zero by a change of the resistance $R_x$, and the bridge becomes balanced. Current $I_w$ is controlled from the scale of the instrument. At $I_w = 0$ the pointer of the instrument should stop at the "Infinity" mark, which corresponds to a current in coil 3 equal to zero (in this case only coils 1 and 3 act, since coil 2 is disconnected).

When $I_w = 0$, the selector switch P is put in position 2, when this is done 2, 3, 4, 6 will be closed and contacts 1, 5, 7 open, that is, resistance $R_0$ is disconnected and coil 2 is connected, everything else remaining as before.

Since the current $I_w = 0$ in coil 3, the same current flows through coil 2 as through resistance $R_v$. Then the pointer of the instrument stops at the mark corresponding to the resistance $R_v$.

In the case of measurement of the total resistance of the insulator, the selector switch P is put in position 3, when contacts 1, 4, 6, 7 are open and contacts 2, 3, 5 are closed, that is, binding posts $E$ and $L$ are short-