equal to its nominal value. In order to provide a voltage drop of 50 v across the terminals of the NTN-2 box (with a nominal value of 57.7 v), the value marked on it has been raised by a factor of 1.333 according to the ratio of the squares of the nominal and actual voltages (57.7²/50²).

According to GOST (All-Union State Standard) 9032-59 voltage transformers type I510 should be checked at a voltage up to 120% of the nominal. The loading boxes NTN-1 and NTN-2 are designed to operate at a voltage 110% of the nominal. Check testing of boxes NTN-1 and NTN-2 produced in 1956 and 1950 have shown that the raising of the voltage across their terminals to 120% of the nominal produces a change in conductivity not exceeding 0.5 % which can be neglected considering that the loading of transformers must be provided with an error not exceeding 4%.

LITERATURE CITED


METHOD FOR MEASURING PULSATING MAGNETIC FIELDS

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Pulsating magnetic fields which may arise, for instance, in discharging a capacitor through a coil, can be measured by various methods based on the use of a pulse oscillograph [1]. A direct measurement of the current, measurements by means of a Hall probe or a bismuth spiral cannot be carried out without this instrument. If the voltage U₁ induced in a measuring coil and proportional to dH/dt (in Fig. 1 the pulse is represented for the sake of simplicity as a triangle) serves as a measure of the pulsating magnetic field, it is necessary to integrate graphically its oscillogram, or to connect between the measuring coil and the oscillograph an RC network.

The peak value of the pulsating magnetic field

$$\Delta H \approx \int_{t_A}^{t_E} U_1 dt + \int_{t_A}^{t_S} U_1 dt = 0$$

can be measured by means of a ballistic galvanometer of a fluxmeter providing a rectifier is connected into the measuring instrument’s circuit.

Ballistic sensitivity can be greatly increased in the galvanometer circuit by using semiconductor rectifiers. If the polarity of the pulse coincides with that of the rectifier, the damping voltage which operates in the opposite direction and retards the galvanometer system is blocked by the rectifier. In order to obtain reliable measurements, the measured and damping voltages must not coincide in time. This condition is met if the duration of the pulse is small compared with the period of the instrument’s oscillations, which, of course, is required for the operation of any ballistic galvanometer.

The angular velocity of the galvanometer mirror immediately following the pulse can be expressed by the following equations [2]:
where $T_0$ is the oscillation period of an undamped galvanometer; $S_i$ is its current sensitivity; $R_M$ is the resistance of the galvanometer circuit.

For the first ballistic throw we have:

$$\Phi_{\text{max}} = \frac{T_0}{2n\beta} \frac{d\Phi_0}{dt};$$

$$\Phi_{\text{max}} = \frac{\pi S_i}{T_0} \frac{U dt}{R_M \beta};$$

where $\beta$ is a value representing the galvanometer damping.

We obtain $\beta = 1$ for $R_M = 0$ (without accounting for air damping). For critical damping of the galvanometer $\beta = e$, and for $R_M = 0$, which is only possible theoretically, $\beta = \frac{1}{2}$. It will thus be seen that a small value of $R_M$ on the one hand increases the swing, and on the other again retards it through $\beta$. The effect of the first factor is slightly stronger than that of the second. The two effects do not coincide in time.

The value of $R_M$ in (1a) and (2a) is determined by the forward resistance of the rectifier, whereas for calculating it is necessary to use its reverse resistance, therefore in (2a) it is possible to consider that $\beta = 1$. Thus, the sensitivity of galvanometers with a small internal resistance and a large critical resistance of the external circuit can be greatly increased, especially when the resistance of the measuring coil can be neglected, for instance, when working at low temperatures. The voltage pulse of a pulsating magnetic fields is, as a rule, so large that it is possible to use for measuring purposes fluxmeters or pointer galvanometers. In this case an appropriate damping should be provided by means of a shunting resistor, taking into consideration the very high resistance of the semiconductor rectifier for $U_1 = 0$. The damping voltage which arises in the galvanometer moving coil cannot, as a rule, change appreciably the resistance of the barrier layer, even in the conducting direction. Without any damping or the restoring torque of a suspension, the swing of a pointer galvanometer should, theoretically, be infinitely large without a shunting resistor, since in such a case the moving coil would be deflected without retardation at a given speed.