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GENERAL INFORMATION ABOUT ELECTROMECHANICAL ANALOG DEVICES

Abstract: direct indication electrical measuring devices (in particular electromechanical devices) can be considered as consisting of two main parts: a measuring circuit and a measuring mechanism. The measuring circuit converts the measured electrical quantity (voltage, power, frequency, etc.) into a value proportional to it and affecting the measurement mechanism. The measuring mechanism converts the electrical energy supplied to it into the mechanical energy of the moving part and the associated movement of the pointer. Electromechanical measuring mechanisms will consist of magnetoelectric, electromagnetic, electrodynamic, induction and electrostatic mechanisms.

Keywords: measuring device, metrological properties, electromechanical, measuring circuit, measuring mechanism, dynamic mode, rest time

It is said that a measuring instrument is a technical instrument that is applied to the measurement and has Metrological properties that are normalized [1,2]. Analog measuring instruments or indirect pointing instruments are considered to be instruments that have a wide place in electrical measurements and measurement techniques in general. In this type of instrument, the display record will be in relation to the size being measured continuously (functionally) [3]. The structure scheme of this type of instrument is shown in Figure 1.

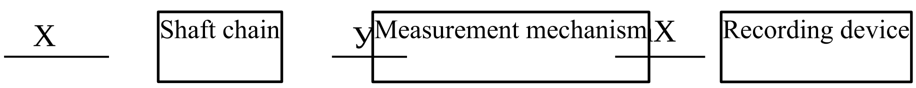


Figure 1. Structure scheme of an analog measuring

Indirect-pointing electrical measuring instruments, (specifically electromechanical instruments), can be viewed as consisting of two main parts, a measuring chain and a measuring mechanism.

The measurement loop converts the measured electrical magnitude (voltage, power, frequency, and hokazoni) to the magnitude proportional to it and affecting the measurement mechanism.

The measuring mechanism gives the electrical energy supplied to it by converting it into the mechanical energy of the excitable qicm and The Associated indicator movement. Electromechanical measurement mechanisms will consist of magnetoelectric, electromagnetic, electrodynamic, induction and electrostatic mechanisms [4,5].

Regardless of which system the measuring instruments consist of a matching mechanism, the haracitation of the excitable part of the instrument depends on the change in the energy of the electromagnetic field.

Formed under the influence of the measured magnitude, the moment that rotates the instrument indicator to the incremental side is called the rotating moment, which in general is expressed as:

$M=dW_{ye}/d\alpha,$ (1)

where We is the angle at which the electromagnetic field energy is deflected, the moment - the angle at which the instrument is excited.

The above expression (8.1) can be written in a different way:

$M=F(X_{1\alpha}),$

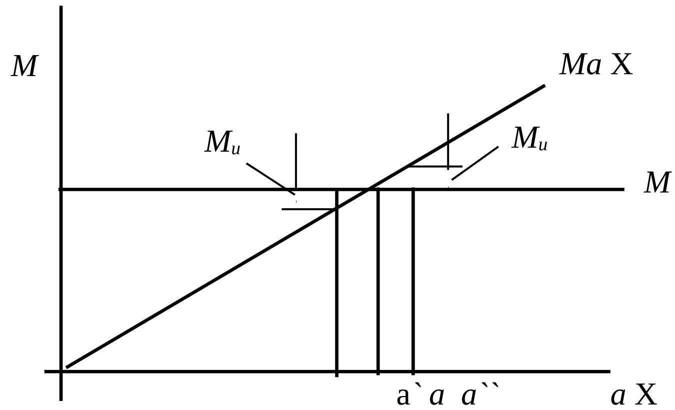
that is, the rotating moment can be viewed as a function of the measured magnitude and the angle of inclination of the instrument drive. In addition to the torque converting it to the excitable part of the measuring instrument, the moment acting on the reflection (reverse) should also be affected. The reflection would have deviated from the scale of the instrument's arrow if there was no acting moment. The moment of reflection is in the opposite direction to the moment of rotation, and the angle of inclination of the excitable part should increase with an increase in magnitude. The excitable part is deflected by the rotating moment until the axial moment m equates to the rotating moment M

(M=Mα) In many electrical measuring instruments, the torque acting on the reflection is generated by the torsion of the spring and suspension. In such a device, the moment of reflection is exactly proportional to the angle of inclination of the excitable part, i.e., M is called the moment of reflection, where W is the torque or the constant magnitude that depends on the material of the spring and its dimensions, which is the moment corresponding to one angle of Origin (1° or 1 radians).

The stationary deflection state of the excitable part of the instrument is found from the equality of the rotating and counter-acting moments M=M of the moment and it is expressed in general as:

$$\alpha = \frac{1}{W} \cdot F(X, \alpha) \qquad (2)$$

this can also be observed from the graph shown in Figure 2.



2 picture. M=Mα count

When the instrument is operating in Dynamic mode, in other words when the instrument pointer (in drag) is excited from the position, moments other than the rotating and counter-acting moments mentioned above are also generated. These moments arise from the moment of inertia of the excitable part, the resistance of the external environment, and from the grinding current, etc., which is formed with metal elements [6].

The moment that occurs when the excitable part of the instrument moves and seeks to calm its movement is called the calming moment.

$M_T = R(d\alpha/dt)$ (3)

This moment is proportional to the calming coefficient R and to the angular velocity of the excitable Part $d\alpha/dt$. The calming moment to some extent determines one of the important operational parameters of the instrument - the time of calming [3].

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