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EFFECT OF ELECTRIC CONDUCTING ELEMENT ON INDICATORS OF LINEAR PULSE ELECTROMECHANICAL CONVERTER INDUCTION TYPE

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Abstract

The purpose of the article is to study the influence of geometric parameters and the location of a coaxially located electrically conductive element (ECE), made in the form of a thin-walled disk, ring or hollow cylinder, on the characteristics and performance of an induction-type linear pulse electromechanical converter (LPEC). A mathematical model has been developed that describes the electromechanical and thermal processes in an induction-type LPEC using the concentrated parameters of active elements. It is shown that the ECE, coaxially mounted near the inductor winding, has a negative effect on the performance of the LPEC. The smallest value of the converter efficiency of 6.1% occurs when ECE is used in the form of a thin copper disk 0.5 mm high, in which the radial dimensions are similar to the sizes of the windings of the inductor and the armature installed at a minimum distance from the inductor. Moreover, the temperature rise of the electrically conductive element is maximum and equal to 51 ° C. With an increase in the thickness of the ECE and with its removal from the inductor, the efficiency of the LPEC increases, and the excess of the temperature of the ECE decreases. When removing a disk ECE with a height of 1.0 mm at a distance of 10 mm from the inductor, the efficiency of the LPEC is 12.6%, and the excess of the ECE temperature is 6 ° C. References 14, figures 6.

Key words: linear pulse electromechanical converter of induction type, electrically conductive element, mathematical model, electromechanical and thermal processes and indicators.

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