https://doi.org/10.26160/2474-5901-2019-17-38-40

THE CONTROL DEVICE OF THE SHOCK STAND

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Keywords: control system, engine, a linear electrodynamic engine, impact stand.
Abstract. In this article we considered the relevance of the chosen topic, developed a control system for the shock stand on the basis of a linear electro-dynamic engine.

УСТРОЙСТВО УПРАВЛЕНИЯ УДАРНЫМ СТЕНДОМ

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Ключевые слова: система управления, двигатель, линейный электродинамический двигатель, ударный стенд.
Аннотация. В этой статье мы рассмотрели актуальность выбранной темы, разработали систему управления ударным стендом на основе линейного электродинамического двигателя.

Shock installations with linear electrodynamic engine [1-3] work in the pulse mode at which at the moment of impact the current density in the armature winding reaches 40-45 A/mm2. The time during which the armature with a nominal load weight passes a distance equal to the value of the working stroke is about 15-40MS. Therefore, the duration of the shock pulse in most installations is taken in the range of 0.1-0.7 seconds. The return current of the armature is taken within 10-20% of the value of the armature current in the pulse.

Shock-pulse control systems of linear electrodynamic engine are divided into contact and electronic. In the first, the shock pulse is formed by an Electromechanical device (relay, starter), and the return current is usually limited to the balance resistors.

The block diagram (Fig. 1) consists of the following units: PC, Personal computer, to control the module; MC, – microcontroller unit-designed for basic computing and for communication with a PC; K-is used to control linear electrodynamic engine hardware; RS-RS232 Controller is designed to connect to a PC; P-power supply unit of the motor; R-relay; E-Linear electro-dynamic motor.

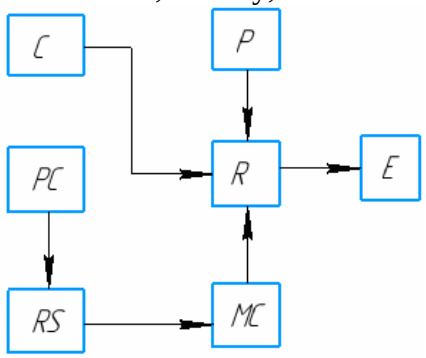

Fig. 1. Block diagram of the system

The shock stand is based on a linear electrodynamic motor, controlled directly from a personal computer (Fig. 2).

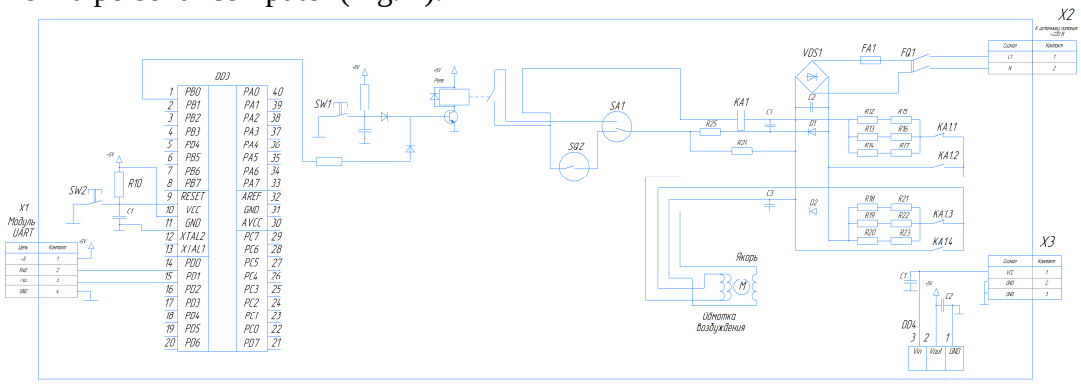

Fig. 2. Electrical diagram of the control system

Program management focused in the LabVIEW system where information is sent to the command via USART is sending the information to the microcontroller the Atmel Atmega32 model, through which we receive information submitted from the computer and then the signal at the output of the microcontroller to the relay, closing relay motor performs reciprocating movement.

The device is designed to control the linear displacement module by applying the appropriate voltage to the windings of the linear electrodynamic motor. When the module is controlled, it performs reciprocating linear movements with high speed. Control of the module is performed via a personal computer or by pressing buttons that do not have a fixation, installed directly on the module body (Fig. 3).

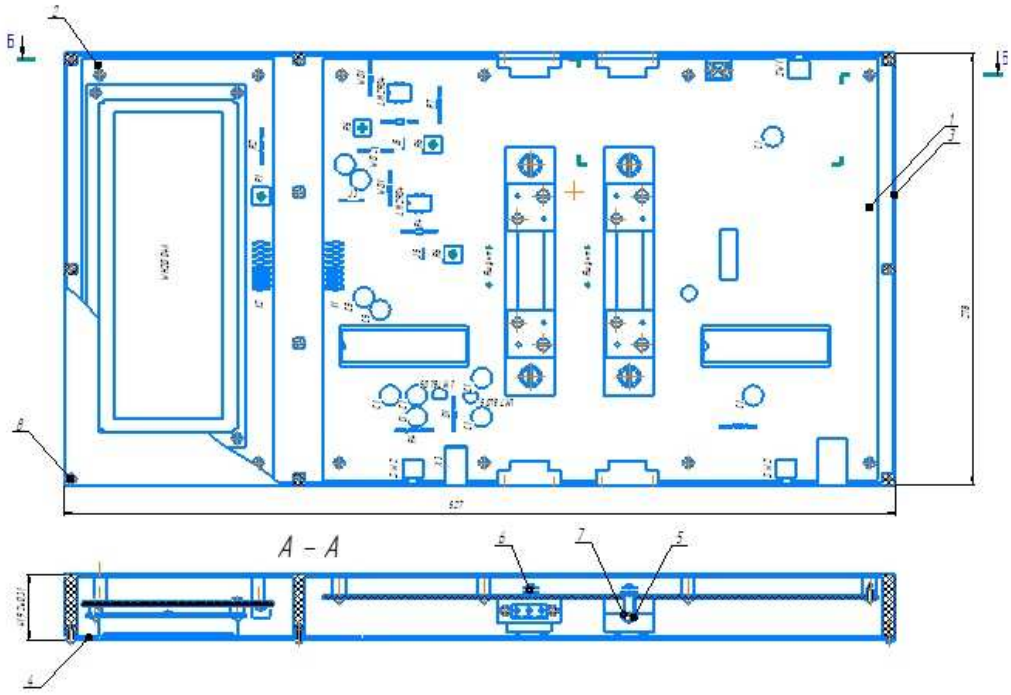

Fig. 4. Stand control device

Structurally, the module is made of a single Board, which houses electronic components and a relay designed to transmit control commands to the Executive elements by switching their electrical circuits with switching contacts.

The control module is powered by an external power supply 220V.

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Received 10.12.2019