KONČAR
Electrical Engineering
INSTITUTE

tradition. knowledge. responsibility.

UNIQUE MAGNETIC PATH DESIGN

FASTER RESPONSE TIME

HIGHER ELECTROMAGNETIC FORCE

REDUCED DIMENSIONS

SOLENOID ELECTROMAGNETIC ACTUATORS

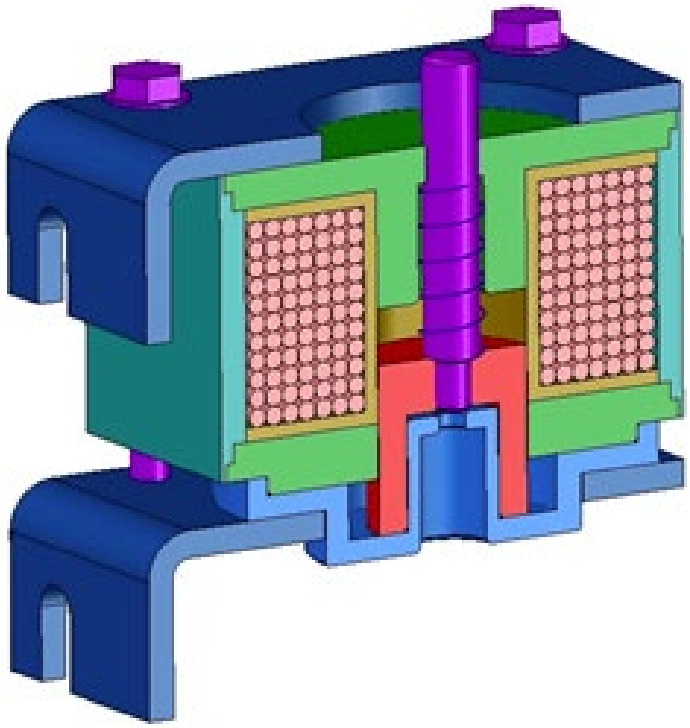
www.koncar-institut.com

Overview

Solenoid electromagnetic actuators (EMA-s) are electromechanical devices that convert electrical energy to mechanical energy related to linear motion. They are characterized by their compact size, simple structure, reliability, and simple activation. They are widely used in many components that accompany our daily lives. KONČAR - Electrical Engineering Institute Inc. has over 35 years of experience in the development of EMA-s. Recently, the new series of solenoid EMA-s has been developed. These new EMA-s are characterized by the unique magnetic path, faster response time, higher electromagnetic force, and reduced dimensions.

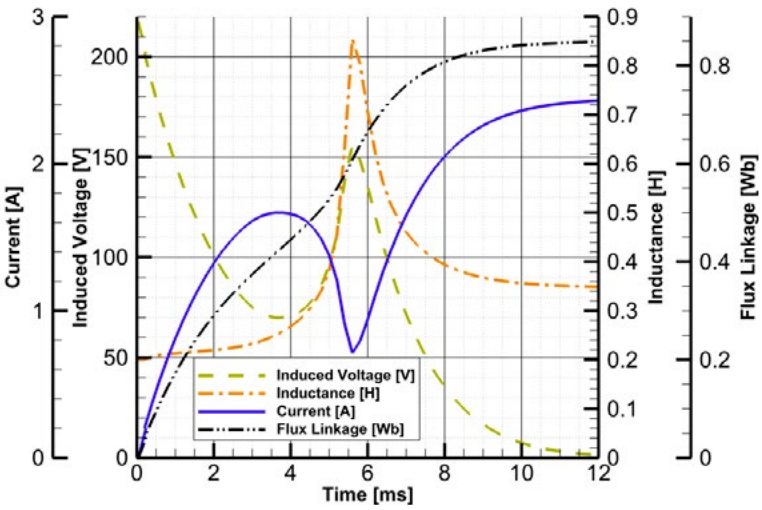
Electromagnetic actuators design

The design of EMA-s starts with the operating conditions of the device. The development of every EMA aims to meet the constraints on the force and time response while maintaining dimensions as small as possible. EMA-s usually do not have a linear static characteristic, but it can be achieved by optimizing the magnetic path shape.



The calculations of time-dependent partial differential equations of the magnetic, electrical and mechanical subsystem of EMA are solved simultaneously. The electrical and mechanical subsystems are modeled separately and then mutually coupled with the magnetic subsystem which is analyzed in 2D and 3D by FEM. Transient numerical simulation of solenoid EMA is performed using a commercial software package.

Temperature rise calculation for EMA-s is performed using an in-house analytical method and validated by numerical calculation of the 3D model using FEM and laboratory testing.



Laboratory testing

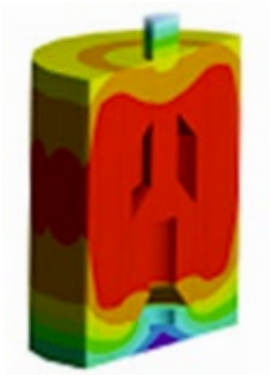
KONČAR – Electrical Engineering Institute, in its Laboratory Center (LC), measures EMA's response time, plunger displacement, and electromagnetic force. The transient recorder with the sample rate of 20 MS/s and its acquisition unit is used to precisely measure the response time. The plunger displacement is measured using the linear displacement sensor attached directly to the actuator's shaft, while the attraction electromagnetic force acting on the plunger is measured using the universal machine with the associated force sensor.

EMA-s characteristics

The range of EMA-s which we produce, with their technical specifications, is shown in the table.

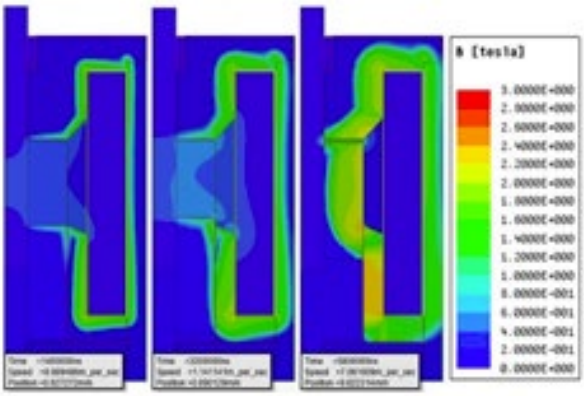
Technical specifications:

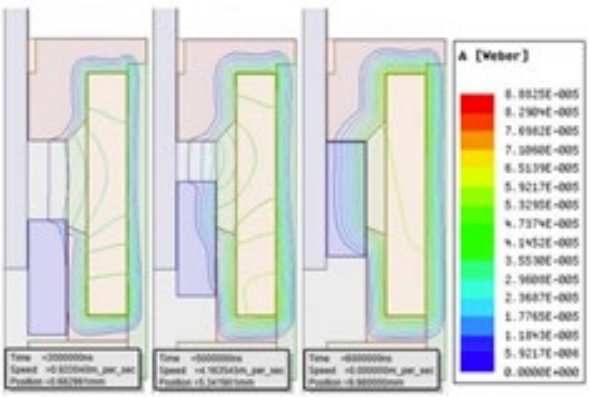
Rated power [W]	50 - 1000
Rated voltage [V]	12 - 220 AC/DC
Response time [ms]	1 - 12
Force [N]	20 – 1000
Plunger displacement [mm]	1 - 20



Tailor-made design

Our R&D team can develop all types of electromagnetic actuators according to the customer requirements and related to the required parameters of response time and electromagnetic force.





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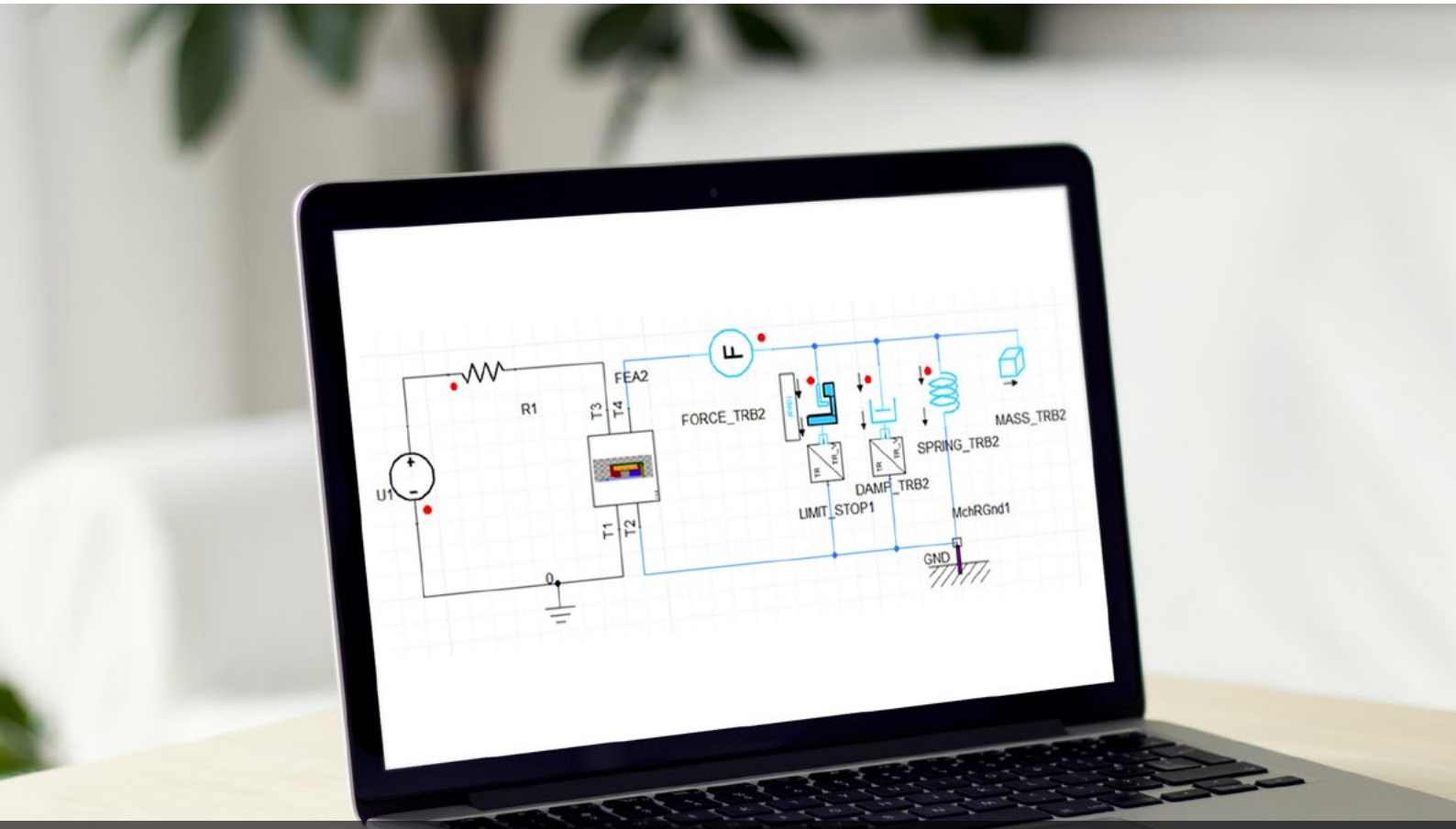

Contact us for more information!

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