

Research of Actuators of Common Rail Injection Systems with the Use of LabVIEW on a Specially Designed Test Bench

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Abstract : Currently, the most commonly used solution to provide fuel to the diesel engines is the Common Rail system. Compared to previous designs, as a due to relatively simple construction and electronic control systems, these systems allow achieving favourable engine operation parameters with particular emphasis on low emission of toxic compounds into the atmosphere. In this system, the amount of injected fuel dose is strictly dependent on the course of parameters of the electrical impulse sent by the power amplifier power supply system injector from the engine controller. The article presents the construction of a laboratory test bench to examine the course of the injection process and the expense in storage injection systems. The test bench enables testing of injection systems with electromagnetically controlled injectors with the use of scientific engineering tools. The developed system is based on LabView software and CompactRIO family controller using FPGA systems and a real time microcontroller. The results of experimental research on electromagnetic injectors of common rail system, controlled by a dedicated National Instruments card, confirm the effectiveness of the presented approach. The results of the research described in the article present the influence of basic parameters of the electric impulse opening the electromagnetic injector on the value of the injected fuel dose. Acknowledgement: This work has been realized in the cooperation with The Construction Office of WSK 'PZL-KALISZ' S.A.' and is part of Grant Agreement No. POIR.01.02.00-00-0002/15 financed by the Polish National Centre for Research and Development.

Keywords : fuel injector, combustion engine, fuel pressure, compression ignition engine, power supply system, controller, LabVIEW

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