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AUTOMATED MEASURING SYSTEM OF EXPRESS DIAGNOSTICS OF MOTOR VEHICLE PARAMETERS

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The work presents the research results of the developing the automated measuring system of controlling the express diagnostics motor vehicle parameters. There are the express-diagnostics' results of the vibrational parameters, the work of the ignition system and the onboard network.

Keywords: Measuring system, control parameters, engine, motor vehicle.

The creation and modernization of periodic express control parameters of the mechanisms and aggregates is one of the most important tasks in the field of diagnosing vehicles. Permanent technical perfection of motor vehicles requires the change of approach from creation of the dedicated measuring systems to creation and enhancement of the universal multibrand measuring systems. This creates a demand in development of forming, creation and implementation of the express-diagnostics auto-measuring systems for motor vehicle (MV) parameters.

Now attention is focused on not previously investigated diagnostic parameters, so the research of vibration and acoustic parameters of the MV mechanisms work showed highly informative and sensitivity to the technical condition changing of the diagnostic object.

Measuring systems, consisting of input units — sensor network, primary signal processing block, out devices, information storage and transfer and specialized software [1] — have found application in the new generation of the diagnostic equipment.

Such aggregates of motor vehicle as engine consist of a few disrepair systems, which lead to mutual influence on each other, which complicates the choice of the controlled parameters. This must be taken into account when choosing the algorithm and control methods.

Known measuring equipment for each of the diagnosed parameters provides the necessary accuracy, but makes it impossible to perform a control in all the necessary parameters simultaneously. There are no studies on the use of automated measuring systems to decide the task of the improving the quality control of diagnostic parameters of MV. Similarly the lack of the known decisions is absence of the unified approach to the use of the automated systems for express-diagnostics of the motor vehicle parameters. The aim of the work is to develop an automated measuring system of express-diagnostics parameters of internal combustion engine. Block diagram of the system proposed in Fig. 1.

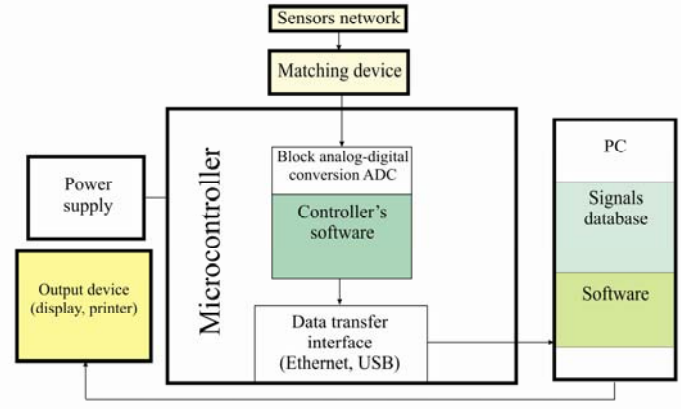

Fig. 1. Structural diagram of the express-diagnostics system for motor vehicle parameters

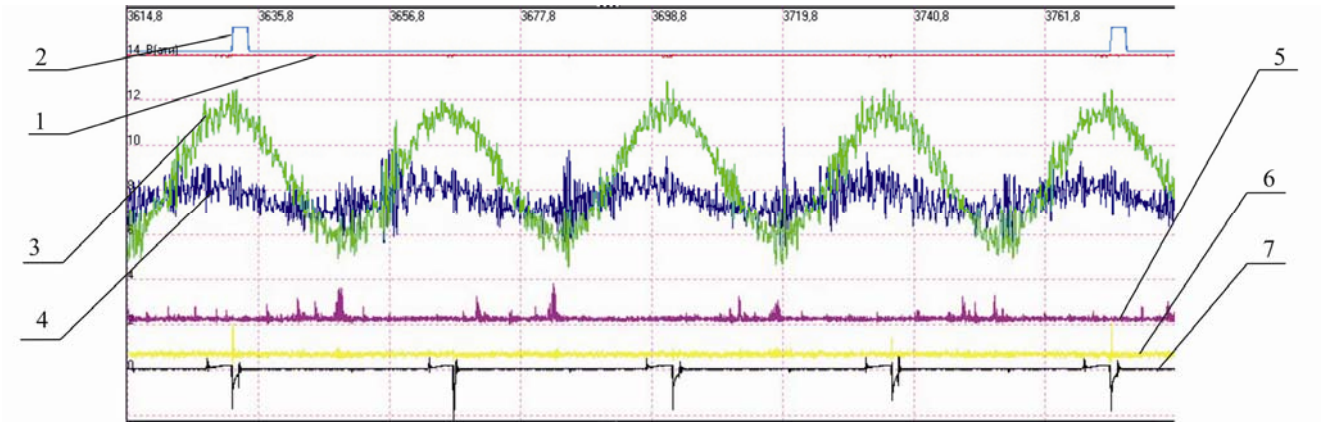

Fig. 2. The results of Nissan Primera engine measurements, duty cycle 720º:
1 — system voltage B; *2* — TDC synchronization pulse of the 1st cylinder; *3* — low-frequency oscillations engine block, m^2/s; *4* — high-frequency vibrations of the engine cylinder, m^2/s; *5* — ultrasonic vibration of the cylinder head, m^2/s; *6* — ultrasonic vibration cylinder, m^2/s; *7* — oscillogram of the ignition system, kV

The prototype system is a well-known information-measuring system Dolphin-1M [2]. The main differences of the offered system are the presence of the proposed system adapted to the needs of the express-diagnostics DVS software as well as a set of sensors to form a network for monitoring selected diagnostic parameters.

Diagnostic parameters were selected by expert evaluation of the survey results and 10 experts' data processing from leading experts and researchers in the field of operation of internal combustion engines.

Fig. 2 shows a typical example of results of express-diagnostics of Nissan Primera's petrol engine, performed using the automated system.

Conducted researches, the application of the developed system showed the possibility of the internal combustion engine's (ICE) express-diagnostics parameters with the help of developed automated system. The time available for measurement and processing of the results by extending the number of functions performed reduces when using the proposed system for automated control of the cumulative diagnostic motor vehicle parameters, and also the efficiency measurements increase, the impact of human factors on the measurement results reduces.

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Автоматизированная измерительная система экспресс-диагностики параметров двигателя автомобиля.

Представлены результаты исследований по созданию автоматизированной измерительной системы контроля параметров экспресс-диагностики двигателя автомобильного транспортного средства. Приведены результаты экспресс-диагностики по параметрам вибрации, работы системы зажигания и бортовой сети.

Ключевые слова: *измерительная система, параметры контроля, двигатель, транспортное средство.*