

## MEMS-SENSOR SATELLITE MONITORING SYSTEMS OF TRANSPORT

Nikonova G.V., Yessimhanova A.M.

Proposed modernization of the accounting system of fuel of the movable devices with the use of sensor technology micro-Electromechanical systems (MEMS) in the measurement control system fuel level mobile devices in the monitoring system of transport. The used algorithm for the calculation of correction coefficients, which are accounted for by program control of the microcontroller and amend the resulting readings of the account of consumption of fuel in real time. Investigated MEMS sensor to extend the temperature range of the measurements, the more linear dependence of the output characteristics, while increasing accuracy and reliability to control the level of fuel in the satellite systems of transport monitoring.

Key words: MEMS technology, satellite system, monitoring, sensor, temperature compensation, measurement process.

### *Problem Definition:*

In the organization of work of transport is very important account for, and optimize all related costs. The use of modern technologies of satellite monitoring of transport allows you to keep all processes under control, to respond quickly to emergency situations, to minimize the influence of random factors. The possibility of a monitoring system for any type of equipment: track vehicle in online mode; monitoring movement history; interactive reports; notification of violations; the ability to integrate with information systems. In particular, the monitoring system of transportations will allow to provide control of the route on the whole route: Parking/traffic, gas stations/plum, mileage, speed etc. extra fuel sensor will provide a significant reduction of vehicle downtime, increase the security of cargo on the whole route, reduce accidents – increase safety of drivers, reduction of fuel costs and fuel. Replacement gauges used in modern satellite systems of transport monitoring and fuel monitoring (ultrasonic, float, capacitive, optical, etc.) on MEMS sensors as the most satisfying in terms of accuracy, reliability, and size [1].

### *Research:*

The fuel level sensors in MEMS technology (microelectromechanical systems) device, which combines microelectronic and micromechanical components. MEMS devices are usually made on a silicon substrate using micromachining technology. Silicon also has significant advantages over other materials due to its physical properties. Single crystal silicon is almost perfectly obeys Hooke's law. This means that during the deformation it is not subject to hysteresis and therefore, the deformation energy is practically not dissipated [2]. A scheme of the measuring unit in the monitoring system of transport, where as a Converter we use Converter of hydrostatic pressure flange mounting [3].

Pressure transmitters for flange mounting are installed on the side wall near the bottom of the tank or at the bottom of the tank. Reference pressure — the pressure above the liquid. Their advantage is the possibility of level measurement in closed tanks with pressure different from atmospheric. Problematic link in the existing sensor is a temperature instability in the dynamic range [4]. Proposed software implementation method of temperature compensation based on the valuation estimates of sensor values by averaging data in the temperature range, and dynamic range with the introduction of correction factors [5]. Linear compensation of pressure variations on temperature is implemented in the controller by means of data from 3 calibration points by the method of piecewise linear approximation (PWL).

### *Relevance:*

In satellite systems of transport monitoring additional fuel level sensor with independent power supply and the protective case provides a continuous and accurate determination of the amount of fuel in the tank in real time. The system of temperature compensation with the introduction of correction factors in the measurement process in real time in a wide temperature measurement range ensures reliable data transmission to control room monitoring.

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