

AUTOMATIC VALVE FOR WATER DRAINING

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Automatic valve is designed for installation on units which are cleaning fuel in fuel systems of tractors and cars, fuel tanks and petroleum products storage tanks.

The valve is recommended for implementation in the internal combustion engines and in organizations involved in transportation and storage of petroleum products.

The tasks associated with the timely removal of water from the drainage zone of filter housings, fuel tanks, tanks and reservoirs, are important and topical issue. This is due to the fact that currently in operation the probability of using of watered fuel is very high.

Removal of water from the drainage zone of units of fuel cleaning, fuel tanks and reservoirs is regulated by maintenance operations according to their periodicity.

However, these operations are not always effective, because the periodicity of maintenance service on draining of water is unsubstantiated; in the operating instructions are not included factual geographical and climatic conditions.

Therefore, to ensure the normal functioning of the fuel supply system on watered fuels the water needs to be operatively removed of from the drainage zone of in case of its accumulation.

The automatic valve is designed for the purpose of operational removal of the water from the drainage zone.

Automatic valve consists of a body in which the solenoid valve with a spring and drain connector are fixed. The automatic valve is attached to filter housing by using the connector that is screwed into the drain plug.

The control of solenoid valve is realized by using two electrode sensors, connection wires and a control unit.

The electrical circuit of the control unit of the solenoid valve includes: resistors, transistors, relays, electromagnet reel EM, electrodes toggle Bk and power supply.

Valve eliminates the possibility of water coming into the fuel system when the accumulation of the water to the critical top-level Btl because at this point the valve triggers and the water is drained.

The principle of operation is based on a varying dielectric constant of oil and water. Hydrocarbon fluid is dielectric, and water - conductor. The automatic valve operates as follows. In the initial state, when the water in the settling zone is absent, the coil of the electromagnet EM de-energized, the valve is closed. With the accumulation of water it reaches the lower level Nll, and in this case, an electric circuit "-" – water - R2 - R4 – "+", so the negative voltage is applied to the base of the transistor and it opens, preparing the switching circuit P. With further accumulation of water, it reaches a critical top-level (Btl), with the formation of an electrical circuit "-" – water – R1 – R3 - «+», and now the transistor V1 is switching on. In this case, the contact of P relay triggers and P1 switches on the coil of the electromagnet, EM-valve opens and the water is drained.

The water level decreases and is below the upper electrode layer (Btl), in which case V1 is turned off, but does not de-energize relay R, as is blocked by contact P2. When the water level fall below the level Nll, the transistor V2 turns off and de-energizes the relay R and EM valve is closed by the spring. Circuit comes in initial state, then the accumulation of the water cycle is repeated.

The use of automatic valve on diesel engines will improve the reliability of the fuel system and reduce the complexity of fuel cleaning units by 30-40%.

Expected annual savings amount to about 150 th. KZT. per a vehicle with a diesel engine.