GAS-POWERED VEHICLE DELIVERY SYSTEM

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Abstract. The continuous evolution and development of the world in which we live in vis-à-vis the entire transport industry is constantly demanding endless and rapid advancement in vehicle performance and efficiency. This crucial and imperative need in our transportation system is not only important but also extremely essential for the present and future of road network, vehicle and user sustenance. Improvement in road and vehicle transport technology has continued to redefine the current expectations and subsequently future prospects of sustainable transport and traffic management. In this paper, the current trends and applications of Intelligent Transport System (ITS) on cars and infrastructure is discussed and reviewed.

Key words: Repair, vehicle diagnostics system, electronic engine, intelligent transport system(ITS), dealership-service center (DSC), car, technology.

Аннотация. Непрерывная эволюция и развитие мира, в котором мы живем, по отношению ко всей транспортной отрасли постоянно требует бесконечного и быстрого улучшения характеристик и эффективности транспортных средств. Эта важнейшая и настоятельная потребность в нашей транспортной системе не только важна, но и чрезвычайно важна для настоящего и будущего дорожной сети, транспортных средств и жизнеобеспечения пользователей. Совершенствование технологий дорожного и автотранспортного транспорта продолжает пересматривать нынешние ожидания, а затем и будущие перспективы устойчивого транспорта и управления дорожным движением

Ключевые слова: ремонт, система диагностики транспортного средства, электронный двигатель, интеллектуальная транспортная система (ИТС), дилерско-сервисный центр (ДСЦ), автомобиль, технология.

Annotatsiy. Biz yashayotgan dunyoning uzluksiz evolyutsiyasi va rivojlanishi, ya'ni butun transport sohasi doimiy ravishda transport vositalarining ishlashi va samaradorligini cheksiz va tezkor rivojlantirishni talab qilmoqda. Bizning transport tizimimizdagi ushbu muhim va majburiy ehtiyoj nafaqat muhim, balki yo'l tarmog'i, transport vositasi va foydalanuvchi ta'minotining hozirgi va kelajagi uchun juda muhimdir. Yo'l va transport vositalarini tashish texnologiyasini takomillashtirish barqaror transport va transportni boshqarishning hozirgi taxminlarini va keyinchalik kelajakdagi istiqbollarini qayta aniqlashda davom etdi.

Kalit so'zlar: ta'mirlash, transport vositalarini diagnostika qilish tizimi, elektron dvigatel, aqlli transport tizimi(ATT), dilerlik-xizmat ko'rsatish markazi (DXKM), avtomobil, texnologiya.

Introduction. Gas-powered vehicles are usually built on the basis of mass-produced engines that run on liquid fuel-gas-powered engines. When the engine

produced in this series is replaced with a gas-fueled engine, its main parts and sleeves remain unchanged. The main difference between modifications of gas-powered engines is its transmission system, the method of ignition of the fuel mixture and adjustment. Even when adapting gas-fueled diesel engines, this is done in two unique ways. The first method is to convert the diesel engine into a gas engine with spark ignition (the engine runs on gasoline fuel) and adapt it to ignition through the spark plug. Compression in the cylinders for this purpose, the level is lowered to 8-9, the ignition system and gas cylinder installations are installed. The second method involves running the engine on diesel fuel and gas at the same time. For the transfer of gaseous fuel, the engine is equipped with a gas cylinder device. The gas is fed through a mixer to the inlet pipe and, mixing with air, is sucked into each of the cylinders. At the end of the compression cycle in the cylinder block, diesel fuel is sprayed into the cylinders, which acts as an ignition spark. Its amount is about 25 percent of the amount consumed in a conventional diesel fuel process. This method does not require drastic changes to the engine design. Currently, the gas-diesel method for automobile engines is widely used. Both methods are applicable for most stationary engines. The working cycle of a gasoline engine is practically no different from the working cycle of a gasoline engine [1-11].

A set of equipment that is installed on a car to run the engine on gaseous fuel is called gas cylinder installations. Gas cylinder installations are mainly divided into two types, which are divided into: for compressed and liquefied petroleum gas. The peculiarity of the gas cylinder device is that in any case, gas will flow in cylinders under high pressure. Therefore, a gearbox is included in the system to reduce the gas pressure. In the figure above, you can see a schematic diagram of gas cylinder equipment running on compressed gas

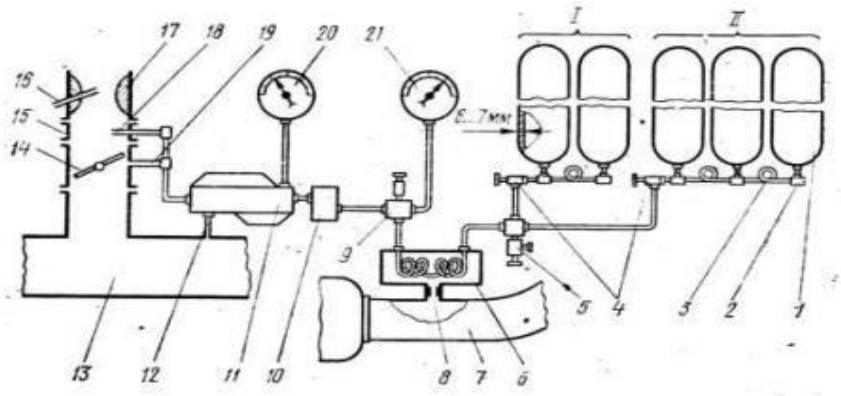
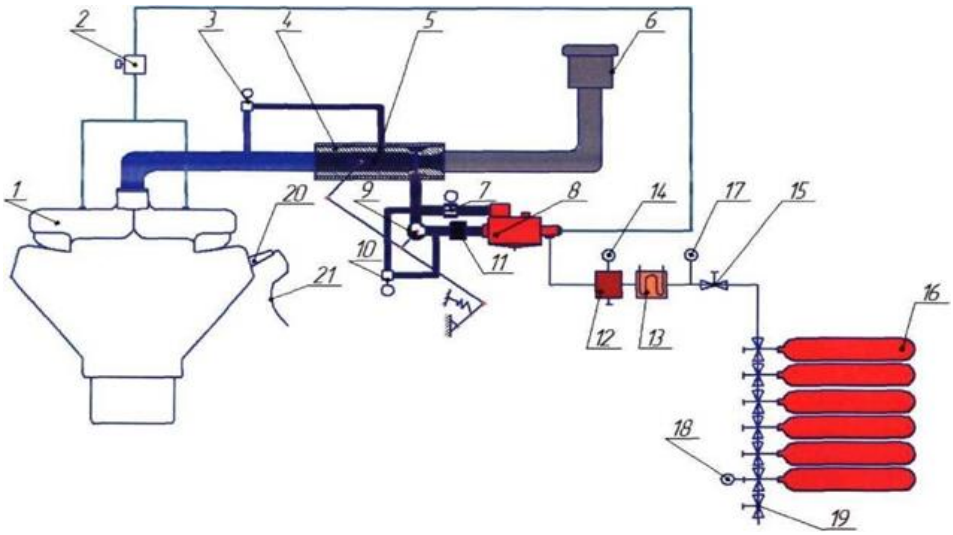


Figure 1. Schematic diagram of gas cylinder equipment
1-cylinders; 2-connecting fittings; 3-steel pipes; 4-flow tap;5-filling tap; 6-heater; 7 - exhaust gas system pipeline;8 - metering washer; 9-main tap; 10-filter; 11-gearbox; 12-connecting tube with pipe;13 - inlet pipe; 14-throttle valve; 15-pan; 16-spray gun; 17-diesel mixer; 18-nozzle; 19-stuffing box working tube; 20-low pressure gauge; 21-high pressure gauge.

Compressed gas with a load up to a pressure of 20 MPa is stored in five steel cylinders of 50 liters each, installed under the cargo platform 1, divided into two groups (I and II). The cylinders are connected to each other by connecting fittings 2 and tubes 3. In order that the bushing 3 does not break as a result of the differential of the car frame, they are equipped with expansion joints[12-19]. Gas flows from the cylinders 1 through the flow valve 4 of the heater 6 to the main valve 9, then it is cleaned in the filter 10 and enters the gearbox 11. In the gearbox 11, the gas pressure is reduced to atmospheric. Layout of gas equipment in the car 1-ventilation pipe; 2-sealed box; 3-fittings; 4, 11-flanges; 5-mixer; 6-dispenser; 7-control unit; 8-electromagnetic gas valve with filter;9-gearbox 21-connecting rod; 10-electromagnetic gasoline valve; 12-interior heater; 13-heater tap; 14-high-pressure pipeline; 15-duralumin cylinder; 16-collectors;17-through pipeline; 18-casting device. Due to a sharp decrease (expansion) of the gas pressure, if moisture is present in its composition, freezing can lead to disruption of the normal operation of the system. Therefore, the gas is transmitted through the heater 6. For gas heating, the heat of the exhaust gases is used 7,8. When the engine is not running, the gearbox blocks the gas line. And in a running engine, the gas разряженияpasses through the nozzle 18 into the Diesel mixer 17 due to the resulting dilution and, mixing with the air, a gas-air mixture is prepared. In the salt mode of operation, gas is supplied directly to the lower part of the throttle valve through the branch pipe 19. With the help of a high-pressure pressure gauge 21, the gas pressure in the cylinders and the amount proportional to it are monitored. And with the help of a low pressure gauge 20, the operation of the gearbox is monitored. Both pressure gauges are installed on the dashboard in the car interior. The cylinders are filled with gas through a valve (tap) 5. The device shown in the figure is universal, thanks to the backup gasoline fuel system, it ensures normal operation even on gasoline, if you are careful. In installations running on liquefied gas, the transition of gas to the vapor state occurs in a special heat exchanger, that is, an evaporator. The peculiarity of the liquefied gas device is not that the operating pressure in it depends on the amount of gas in the cylinder, but that the gas, unlike the liquefied gas device, depends on the component composition of the mixture and the ambient temperature to determine the amount of liquefied gas in the cylinder. A special level indicator must be installed in the LPG device. The liquefied gas is stored in cylinders of 225 liters 20 installed under the platform and fixed on the left spar of the frame. Flow valves are installed on the front wall of the cylinder, through which gas passes from the cylinder pressure gauge (tee) 19 to the high-speed valve 18. Gas is taken from the liquid phase using the flow fan installed above.

Diagram of the liquefied natural gas supply system in cars: 1-intake manifold; 2 - mixer of the salt operating system from the gearbox; 3-tube between the gearbox and the mixer; 4-hose between the intake pipeline from the gearbox; 5 - tube from the gearbox between the solenoid valve of the starting system; 6 - tube from the evaporator between the gearbox; 7-gas mixer; 8-gas reducer; 9-gas

reducer filter; 10-start-up system solenoid valve; 11-tube between the mixer from the start-up system valve; 12-high-pressure hose between the evaporator from the solenoid valve; 13-evaporator; 14-backup system; 15-solenoid valve; 16,17-tubes; 18-speed valve; 19-cylinder tee (tee). From the tee (flange) 19, gas passes through the pipes 16, 17 to the solenoid valve 15. When the ignition is connected, gas is supplied via a high-pressure hose 12 to the intake manifold of the engine 1 to the built-in evaporator 13. From the evaporator 13, gas enters the two-stage gearbox 8 and reduces its pressure. Before the first stage of the gearbox, a filter 9 is installed, gas from the cavity of the second stage of the gearbox goes to the dispenser-economizer, and from it the required amount of gas is supplied to the mixer 7 in accordance with the engine operation mode.



Drawing 2. Gaz-cabriolet.
1-engine; 2-solenoid valve; 3,10-electric control valves; 4-mixer; 5-gas-air damper; 6-gas-air damper with intake filter; 7-gas damper; 8-low-pressure reducer; 9-distributor; 11-filter cleaner; 12-high-pressure gas reducer; 13-liquid heating; 14,17,18-pressure gauges; 15-main tap; 16 - part of the cylinder; 19-filling tap

The engine start system includes an electromagnetic start valve 10 with a metering joystick, injectors and valve switches. After connecting the start valve during ignition of a cold engine, GAS under pressure from the first stage of the gearbox through pipe 2 enters the salt mixing system. 23 the operation of the feed system is controlled by a pressure gauge installed in the driver's cab. After the first step of the gearbox, the gas pressure should be 0.15 MPa. The function of the gas reducer is to reduce the pressure of gas entering (passing) from the cylinder into the engine, automatically adjust (change) the amount of gas supplied to the mixer in accordance with the operating modes of the engine, as well as to instantly turn off the gas line when the engine stops[20-25].

Negative and positive properties of gas and diesel fuel.

Gas fuel has a number of advantages over liquid fuel. Therefore, they are promising and are the optimal fuel for wide application in automobile engines. In

most cases, these are local fuels, which are much cheaper than liquid fuels. With spark, the use of combustible gases in internal combustion engines improves and facilitates the mixing process, as well as the distribution of the mixture over the cylinders under operating conditions, since gases are much easier to mix with air in various proportions. Most gases have a much wider concentration range of flame propagation compared to liquid fuels, which means that they burn quickly and completely even with a significant amount of air in the mixture. All this makes it possible to simplify the device used to produce a combustible mixture, and use the ratio of fuel and air in it, at which toxic substances are released into the atmosphere in small quantities. When using gaseous fuel, it is not difficult to start the engine in a cold state and vaporize the fuel when working in a heated state, and at high ambient temperatures, cases of steam jams in the supply system disappear by themselves[26-29].

Gaseous fuel has anti-knock properties compared to gasoline, which allows you to increase the compression ratio of the engine and increase fuel efficiency. At the same time, gaseous fuel has a number of other advantages:

-widely distributed, affordable, and has large inventory.

-during combustion, black moth and tar are not released, ash is not formed, and the combustion products do not contain substances harmful to the environment;

- easily transmitted through pipes to consumers and maintained centrally;

-when using gaseous fuel, the wear process of engine oil slows down, and the replacement time increases by 2-4 times compared to the use of liquid fuel. The main reason for this is that when using gaseous fuel, fuel vapors do not condense on the cylinder wall, which, in turn, leads to dilution of engine oil with liquid or non-flammable fuel; the service life of the engine before repair also increases by 1.5-2 times, as dryness and sediment accumulate on the walls of its chamber. relatively rare, reduces wear of the cylinder-piston group;

-also used in compressed or liquefied form.

- resistant to detonation.

As can be seen from the above points, gaseous fuel by its complex properties is much more suitable for engines in which a combustible mixture is formed outside the cylinder and ignited by a spark, and can also be used in diesel engines. High explosion hazard is the main disadvantage of most gaseous fuels (natural gas, hydrogen, methane). The release of combustible gases from even the smallest crevices requires careful use. Gas appliances can be operated reliably and safely if they comply with safety regulations and fire safety regulations, as well as when performing the recommended measures. Also, when using gaseous fuel, a low cylinder filling coefficient leads to a decrease in engine power compared to liquid fuel, while the fuel remaining non-flammable, like liquid fuel, belongs to the cylinder-piston group and combustion

Low-calorie, with a calorific value of up to 10000 kJ / m3 (generator, blast furnace, ore gases, etc.) - moderately calorific, with a calorific value of up to

10000-20000 KJ / m3 (coke oven, lighting gases, etc.) high-calorie, with a calorific value of more than 20000 KJ/m3 these gases include various natural gases extracted from gas fields, oil gases extracted together with oil from oil wells, or associated gases generated when various cracking gases and other gases that are obtained during oil refining are also included. Cracking, in turn, is divided into two types: Tchemical and chemical cracking. Catalytic. Gaseous fuels can be either natural or artificial. Natural gas fuels include light gaseous hydrocarbons produced during oil production and natural gas produced from clean gas fields. Natural gases from different deposits differ little from each other in composition and heat transfer. Artificial combustible gases are obtained by processing solid and liquid fuels (dry distillation, semi-coking, etc.). Artificial gases can be low-calorie or high-calorie in terms of heat transfer. They are used as fuel. To reduce the risk of explosion, natural gases are added to them. Mixing is carried out at special stations, while the finished gas is supplied to consumers. However, it is important to remember that the gas supplied to the consumer is explosive, often toxic, and should be used with caution. Vehicles that run on gaseous fuels use compressed and liquefied gases. Hydrocarbons whose critical temperature is higher than the air temperature change from a gaseous state to a liquid state at low pressure. Such gases are called liquefied gases. Gas liquefaction requires a certain temperature and a certain pressure. For example, a pressure of 0.85 MPa is required to convert propane to a liquid state at 20° C, and a pressure of 0.2 MPa is required to convert Butane to a liquid state. Gases whose critical temperature is lower than the operating temperature are called compressed (at a pressure of 20 MPa) and are called compressed gases[30].

Compressed gas retains its gaseous state at normal temperature and desired high pressure, unlike liquefied gas. The gas turns into a liquid only after super cooling (below -62°C). In cars, compressed natural gas up to 20 MPa is used as fuel. Natural gas is obtained from gas fields, the main component of which is methane. When compressed gas is burned, 49,800 kJ/kg of heat is released per unit of large mass, but at very low density (0°C and atmospheric pressure 0.0007 g/cm3), even when compressed natural gas burns up to 20 MPa, its volume heat does not exceed 7000 kJ / kg. kJ / m3, i.e. not less than 3 times less than the volume heat of the liquefied gas. The small amount of volumetric heat released during combustion does not allow you to store a sufficient amount of gas in the car, even at high pressure. That is why the power reserve in cars with gas cylinders running on compressed natural gas is two times less than in cars running on gasoline or liquefied gas. The octane number of methane determined by the study is about 110. Since the amount of compressed natural gas in the reserve is large and it is cheap, it is advisable to use this gas instead of diesel fuel (especially in urban and suburban transportation).

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