Research on Electronic Control Fuel Injection Systems of Cars GDI Engine

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Abstract

An autos GDI motor electronic control fuel infusion framework has been produced for a GDI motor in light of investigating the work standards of the control arrangement of the motor in detail in this paper. The MCU delivered by free scale was picked as the principle controller of ECU (Electronic Control System) at the starting, at that point the fuel infusion driving circuit module was outlined, and fuel infusion module program was designed. The control framework for various load and speed accomplished adaptable control, exactness, adaptable, quick response, which was demonstrated by the motor test. This control framework was ended up being guarantee ability and execution of fuel infusion requests.

Keywords: *GDI Engine; Electronic Control Fuel Injection System; Development; Experiment Research*

Introduction

With vitality sparing and discharge decrease, low carbon natural prerequisites and the inexorably stringent discharge controls, in barrel Direct Injection motor GDI Gas Direct Injection) (with its superior and fuel economy, as a delegate of the new kind the mixture formation mode think about more consideration regarding the innovation utilized generally. Mitsubishi Japan in 1996 first effectively created fuel straight turbojet. All together to accomplish thin blend stratified required shower quality, adaptable infusion timing, GDI fuel infusion framework configuration is embraced in both exactness, quick reaction of adaptable control technique. Regular rail fuel infusion framework in addition to electromagnetic drive injector guessed meet an adaptable infusion necessities in barrel infusion framework one. As of now in barrel coordinate infusion motor control infusion framework household look into seldom, accordingly, this paper GDI motor plan advancement electronic motor control infusion framework is exceptionally important.

THE ELECTRIC CONTROL INJECTION SYSTEM STRUCTURE

Electronic motor control infusion framework structure is for the most part by the sensor and flag obtaining circuit, controller, actuators and its driving circuit created. Because of the vehicle motor working conditions and nature is more complex, requiring microcontroller has higher unwavering quality, solid enemy of sticking capacity and high control exactness.

SELECTION MAIN CONTROL CHIP

Choice primary control chip ECU of electronic motor control framework is the center part, intense arrangement of directions, rich assets, fast ongoing intrude on the continuous info/yield limit. This article picks microcontroller MC9S12DP512MPVE as motor ECU principle control chip. The single-chip microcomputer is the Motorola organization M68HC12 arrangement 16-bit single chip, is one of the new age super enemy of obstruction, fast, bring down utilization MCU, can be in - 40 ć ~ 125 ć awful work

under conditions, inside framework for web based programming, streak bolster change streak, still can progressively troubleshooting. Framework has system of information sending and accepting work, chip incorporated 2 ms CAN12 module, CAN accomplish high low-speed that can organize doors hub capacities.

MASTER CONTROL SYSTEM CIRCUIT

This plan ace control framework circuit incorporates: control administration module, correspondence circuit module, a solitary chip microcomputer littlest framework module. This paper embraces high voltage change chip LM2576-5 create + 5V circuit voltage to the soundness of the power supply, appropriate to utilize electronic motor control framework. LM 2576-5, 52 kHz interior obsession oscillator, the most astounding productivity can achieve 90%, with hot shutoff and current restricting security, enhancing the framework effectiveness and unwavering quality. This paper created ECU with the PC is through standard between rs-five 232 serial correspondence way. Frameworks with MAX232 for PCS and ECU between level inconsistent changes. MAX232 chip with low utilization, single power supply, twofold rs-five 232 sends/recipient and work. The paper introduces the plan of the single chip limit framework circuit module essentially incorporates: the primary control chip MC9S12DP512MPVE, timing circuit and reset circuit, a single chip microcomputer control separating circuit and BDM troubleshooting interface. Clock circuit pick by devoted 16M gems comprise oscillator, through the pieces stage bolt circle (PLL) times the recurrence of an octave, can shape the most astounding 32M transport recurrence. Get superior, yet in addition can enhance the framework the electromagnetic similarity, ant jamming what's more, working steadiness.

THE INJECTION SYSTEM HARDWARE DESIGN DEVELOPMENT

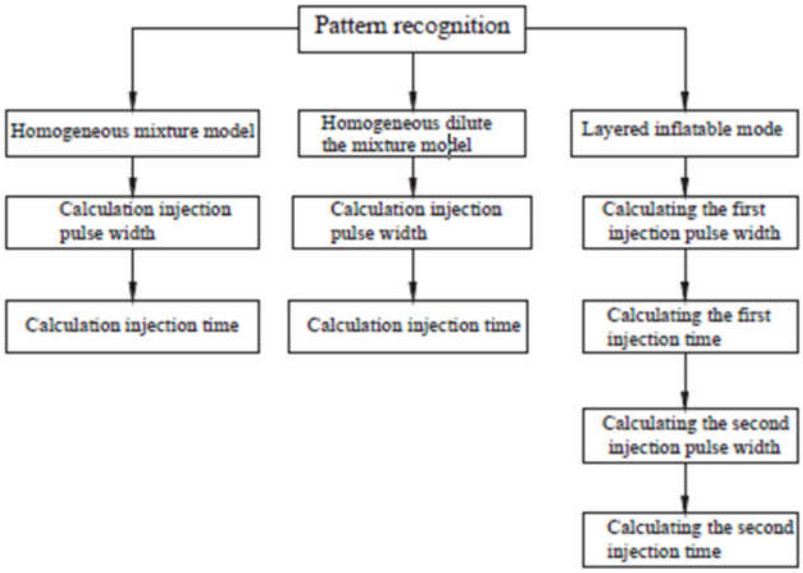
In this paper the GDI motor control infusion framework, oil spraying driver modules including four barrel of injector drive circuit and fuel estimation valve driving circuit. The fast electromagnetic injector by injector valve control, working guideline and the high weight pump on fuel metering valves comparative.

Keeping in mind the end goal to diminish the winding loop warm in the solenoid bit suction and after must be decreased through loop of current, no longer with bigger suction to keep up suction close state. This
article USES the control infusion electromagnetic valve opening and shutting the path for: first standard with a time of open heartbeat, open heartbeat embrace PWM waves will 390v set to 0- 100% of the approaches to figure it out. At the point when the electromagnetic valve what's more, after assimilation, and afterward utilizing PWM waves lessen its current keep near keep up the degree of assimilation, in this way diminishing electromagnetic valve loop calorific esteem. This paper injector electromagnetic valve blend drive level .Injector drive circuit rule is: the current to L298N yield driver electromagnetic injector valve, maintaining a strategic distance from electromagnetic valve shutoff, curl create turn around emf will L298N chip wore out, in of the injector top of the line C1 + and low-end C1 - between to invert, and succeeded stream diode furthermore, vitality obstruction. In circuit outline and creation process, this paper receives EMC outline strategy, the arrangement of hostile to sticking, oppose radiation, battle oscillatory and so forth embraced the fundamental measures.

HIGH PRESSURE INJECTION SYSTEM STRUCTURE

This paper tests utilizing GDI motor high weight infusion framework as figure1 appears. Framework for the most part comprises of high-pressure pump, high-weight pump controller, fuel rail, high weight sensor, injector fuel and high-weight fuel weight restrict valve, high-weight tube and so on. Electric fuel pump (low weight pump) to high weight pump pre oil-provided prestressing, the oil supply weight around 0.6 MPa. Whenever the framework needs infusion, high-weight pump will direct into the
fuel rail inside. High-weight pump structure fig.2 appears, pump oil, fuel weight control valves will suck and cut oil supply, high weight pumps freely in the draw assembly of direct into the fuel rail. High-weight pump by a camshaft driven by mechanical methodology, high-weight pump created 15 MPa weight, fuel weight by introducing in pump weight controller modifying, as indicated by the motor needs to change in

accordance with 5-15 MPa between. High-weight pump create fuel rail inside required weight, the weight cradles can ingest high-pressure inside the framework weight vacillations. High-weight fuel weight constrain valve open weight 20 MPa.



Pattern recognition injection flow chart

CONCLUSION

Going for the electric vehicle gas straight turbojet infusion framework, the choice of free scale single chip microcomputer as the primary control chip motor ECU, plan infusion driving circuit module, and the infusion and start timing control system. Through the motor execution test demonstrated that the adaptable flexible control infusion framework, the diverse load and speed control infusion parameters required, the framework control doff high, empowers it to accomplish and cases to adjust to the ideal esteem, high control exactness, solid enemy of sticking capacity, withstand the trial of electromagnetic similarity.

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REFERENCES

[1] Cole R, Poola R, Sekar R, Exhaust emissions of a vehicle with a gasoline direct injection engine. SAE paper, 982605.
[2] Iwamato Y, Noma K, Yamauchi T, et al. Development of gasoline direct injection engine. SAE paper, 970541.
[3] Kume T, Iwamato Y, Iida K, et al. Combustion control technologies for direct injection SI engine. SAE paper, 960600.
[4] Kuwahara K, Ueda K, Ando H Mixing control strategy for engine performance improvement in a gasoline direct injection engine. SAEpaper, 980158.
[5] Yamaguchi J. Mitsubishi DI gasoline engine prototype. Automotive Engineering, 1995,Sep.:25-29.

[6]Cai shaoli, Cylinder electronic injection gasoline engine of progress, Jinan University journal, 2000□10□5□□1□4.
[7]Pontoppidan Me, et al. Experimental and numerical approach to□ injection and ignition optimization of lean GDI combustion behavior □SAE 199920120173, 1999.
[8]Yang shichun, Based on model of LPG single fueled engine control systems research, Changchun, Jilin University, 2004.
[9]Jiang jian, Fuel injection engine electronic-control fuel injection system and closed-loop control algorithm of research, Dalian, Dalian University of Technology, 2006.
[10]Zhou ji, Electronic Fuel Injection Control System Design and Experimental Study on Lean Burn, Changchun, Jilin University, 2009