Development of Fuel Injection System with Feedback Control for Single Cylinder 4-Shoke Gasline Engine

李志偉、洪振義 羅正忠

E-mail: 9607854@mail.dyu.edu.tw

ABSTRACT

The purpose of this research is to develop an electric injection control system for a single cylinder engine with active control. To the essence of HONDA 25CC four-stroke single cylinder engine, it has been converted into an electric injection engine. The intake manifold with addition of TPS sensors is replaced by the fuel injection system. We installed several sensors in the engine for the purpose of monitoring and feedback control. The closed loop control has been achieved by fed back the signal from LSU. Then the fuel injection controller was fine tuned according to the standard of vehicular pollution. The approach of this research is to use 8051chips as fuel injection system ECU. To the essence of HONDA GX-25 OHC, we modified the intake system and designed a special-purpose computer to control the fuel supply to the engine. Based on the sensed values of engine RPM, TPS Sensor and wide range O2 sensor which are the control parameters, e designed and fabricated engine ECU in order to improve and to increase horsepower and torsion of the engine. Based on a pre-planned driving schedule, we constructed an optimum fuel injection control map for the best power performance as well as the most effective air-fuel ratio.Also,we build database by optimizing injection block, fuel injection advancing angle, and ignition advancing angle. The signals of bent axle and camshaft are used to find the corresponding compression and TDC values. Finally,we program the active engine control system using C language. Based on the pre-planned driving schedule, the optimization fuel injection advancing angle, fuel injection block, and ignition advancing angle are calculated. Then fuel is injected into the engine and ignited according to intake and TDC conditions. By feedback of engine rpm and TPS, the injection block and advancing angle are determined from the database. The mechanism for air pollution control is that the LSU signal is fed back to fine turn the block of the fuel injection, and it was also the last measure to reduce air pollution. The purpose is to improve the deficiency of the commercial motorcycles of which the air-fuel ratio can not be determined. We made the special-purpose EFI computer to support fuel, and built injection control with optimization horsepower and effective air-fuel ratio. By using ECU active control and dynamical system testing machine, our experimental result can reach the environmental protection standard.

Keywords : ECU, LSU

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