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STUDY AND ANALYSIS THE PERFORMANCE OF SPARK IGNITION ENGINE AND COMBUSTION IGNITION ENGINE USING ELECTRONIC CONTROL UNIT

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Abstract : An experimental study concerning finding the fault inside the engine with the help of ECU (Electronic Control Unit).A sensors base four cylinder spark ignition engine and combustion ignition engine improve the diagnosis system and improve the technical skill of the technical supervise . The Sensors have the capability to give the real engine performance to the ECU .A high quality microprocessor inside the engine those have the capability to take the information from the sensor as a signal. Sensors give the permission to the microprocessor to give the feedback to the ECU. Engine test is performing with the help of Intelligent Tester (IT) at on board diagnosis. This system allow to the ECU to give the sensing permission to the spark ignition engine and combustion ignition engine. The test is perform on the two segment of engine one in four cylinder spark ignition engine and second is combustion ignition engine .To measure the battery voltage at the time of crank the engine and after crank by intelligent tester.

Keywords: Electronic Control Unit; Intelligent Tester; sensors; on-board diagnostic,

Introduction: Automotive vehicles are nowadays equipped with a significant number of networked electronic systems by which advanced vehicle control, elimination of bulky wiring, and sophisticated features can be achieved. Most of the features are enabled by the use of distributed electronic systems including sensors, switches, actuators and electronic control units (ECUs). **Ortega et al. (2006).** Against this background, vehicle manufacturers are striving to reduce costs and at the same time to improve levels of customer satisfaction. Work to improve test and validation of large distributed electronic systems has been on-going for years. This has provided manufacturers with approaches to test and validation, with some degree of coverage **(Frank et al.1990).** On the screen of the PC we can see the electronic management signals graphics image. The signals are analysed and that is how the faults are diagnosed. Experience of automobile electronic management signals research is necessary for the students in their practical work of automobile diagnosis. **Rimkus et al. (2007).** Various fault taxonomies, fault hypotheses, and fault models have been proposed for use in the automobile industry. The theory provides proofs of conditions under which the system is diagnosable for a given number of faults. For example, a method by involves the transmission of diagnostic message consisting of local syndromes. Future work will further explore this fundamental trade-off. **Pravin et al.(2011).** Model Based Diagnosis of Both Sensor-Faults and Leakage in the Air-Intake System of an SI-Engine Many model based solutions to diagnosis problems in SI engines have been discussed in literature. However most presented methods are useful only for a specie class of faults.

TEST PERFORME ON SI ENGINE.

In this paper we have performed some test on s.i engine .The spark ignition engine test results are summarized in Table.

Engine speed	900 rpm
Vehicle speed	704 rpm
Coolant temp	63 C
Intake air temp	26 C
Accel position	0 %
A/C Pressure	848 kpa
Fuel temp	34 c
Injection fuel quantity	7 mm3 /st
Torque	64 (ft-lbs)

These values given by the intelligent tester of four cylinders spark ignition engine. These are the actual position of the engine inside the engine at the time of starting. spark ignition engine to show the actual value of the engine speed 900 RPM, vehicle speed 704 RPM, coolant temp 63, intake air temp 26. We got the value by intelligent tester and the actual position inside the engine at the time of start the engine and try to find out the and fault inside the vehicle. Coolant temp sensor give the value of the coolant temp in c and its value is vary during the running condition. In the internal combustion engine we need the coolant for maintain the right temperature inside the engine. The coolant temperature is change when engine is running after 5to 10 min.

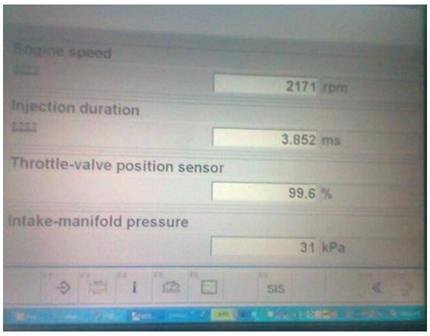
Table:-value of fuel supply in s.i engine for desired engine speed

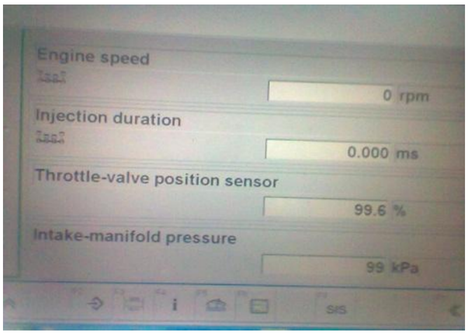
Short term fuel trim	0.00 %
Long term fuel trim	3.12 %

Total fuel trim	3.12 %
Injection pulse width	2.099 msec
Calculated load	23.52 %
Engine speed	689 rpm
Desired idle	676 rpm

The amount of fuel is drop in the engine in very less to long and the movement of the injection pulse width in engine we can also calculate on the screen by selecting the engine speed at desired idle in the meaning full amount of supply in the engine.

Accel position	0.00 %
Throttle position	4.70 %
Target throttle position	4.70 %
Battery voltage	14.412 V
A/C Pressure	160 kpa





To measure the speed of the engine and injection duration, throttle valve position sensors and intake manifold pressure.

TEST PERFORM ON COMBUSTION IGNITION ENGINE

The spark ignition engine test results are summarized in Table 5.2. A typical doughnut is presented in Fig. 5.2. Spark ignition engine 1st qtr. indicates the engine speed of 1000 RPM, 2nd indicates the vehicle speed at 800 RPM, 3rd indicate the coolant temp is 65 C and 4th indicate the air intake temp is 28. The doughnut diagram has separated into four parts during at the s.i engine start as indicated by doughnut diagram.

Table:- Results of combustion ignition test

Engine speed	1000 RPM

Vehicle speed	800RPM
Coolant temp	65 C
Intake air temp	28 C
Accel position	0 %
A/C Pressure	845 kpa
Fuel temp	36 c
Injection fuel quantity	8 mm3 /s
Torque	68 (ft-lbs)

When the driver press the accelerator pedal then the large quantity of fuel flow inside the combustion ignition engine. With the help of doughnut diagram of spark ignition engine to show the actual value of the engine speed 1000 RPM,

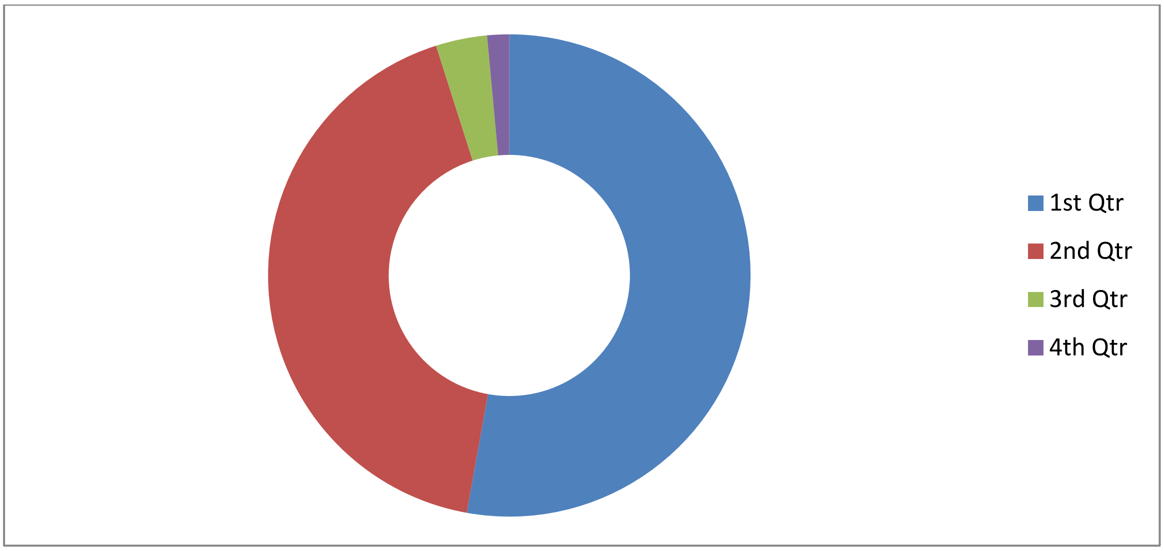


Figure Doughnut diagram show the Engine speed, Vehicle speed, Coolant temp, Intake air temp

Table :-Results of combustion ignition test

Short term fuel trim	0.00 %
Long term fuel trim	3.12 %
Total fuel trim	3.12 %
Injection pulse width	2.924 msec
Calculated load	29.41 %
Engine speed	697 rpm
Desired idle	698 rpm

The amount of fuel is drop in the engine in very less to long and the movement of the injection pulse width in engine we can also calculate on the screen by selecting the engine speed at desired idle in the meaning full amount of supply in the engine.

Table :-Results of combustion ignition test

Accel position	0.00 %
Throttle position	3.52 %
Target throttle position	3.52 %
Battery voltage	14.506 V
A/C Pressure	160 kpa

By this table you will see that accel position sensor open at 0 % but throttle position open in 3.52 % in this duration the engine in running position the battery voltage is 14.5.

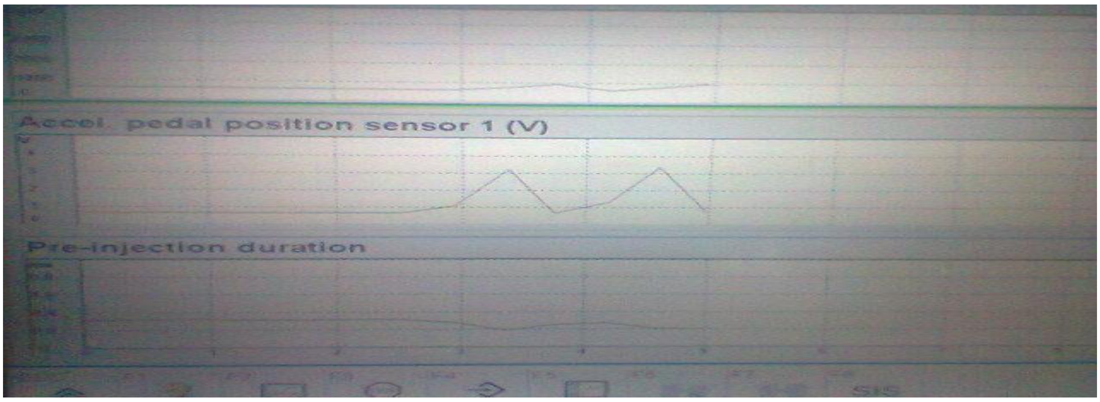


Figure plot the graph between crank angle and intake manifold pressure, and throttle valve sensor, injection duration

TEST PERFORM ON THE BATTERY

To see the actual value of the battery and can be maintain this value of the regular interval. When the engine need crank at the starting position and after that to be calculated.

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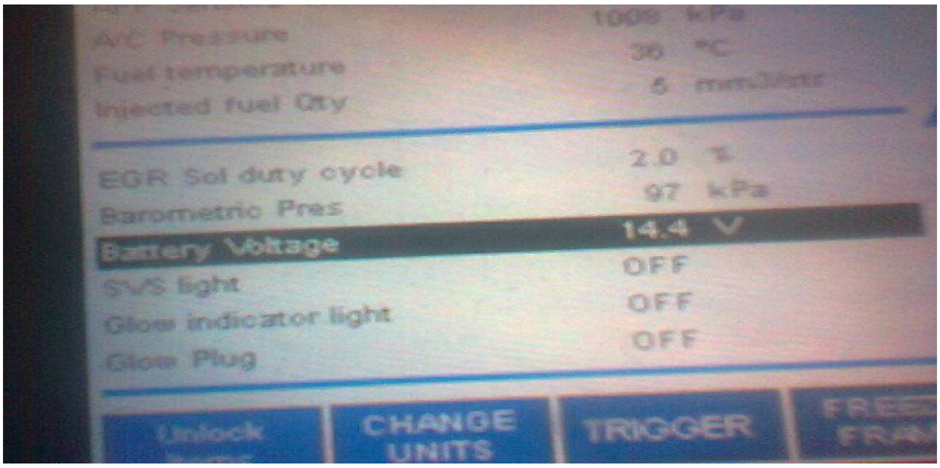

Figure5.3.1 measure the value of the battery.

CONCLUTION: - Connect the intelligent tester in the ECU (electronic control unit) by connector. Switch on the IT in the back side.IT take the power from the battery and give the green signal on the front side on the desktop of the IT. Than give the command on the IT by select to battery option and note the value of the battery on the screen of the Intelligent Tester. A Direct Detonation System is used in engine. The ignition timing accuracy, reduces high-voltage loss, and enhances the overall reliability of the ignition system by eliminating the distributor. The ignition system which gives help to ignites one cylinder with one ignition coil at time. Only one cable is connected to the one cylinder passing by the distributor and Reach to the spark plague to the end of the secondary winding. High voltage generated in the secondary winding is applied directly to the spark plug. The spark of the spark plug passes from the centre electrode to the ground electrode. The engine ECU determines ignition timing and outputs of the ignition signals for each cylinder. Based on signals, the power transistors in the ignite cut off the current to the primary coil in the ignition coil, which is supplied to the spark plugs that are connected to the end of the secondary coil. At the same time, the igniter also sends an ignition confirmation signal as a fail-safe measure to the engine ECU. A knocking control system is used in order to constantly realize optimal ignition timing. Direct ignition system. A signal comes into the ignition coil from ECU. We can compare petrol injection moment with ignition moment. Signals in petrol injector and in ignition coil with ignite.

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