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skills for the motor industry

Electronic Ignition Systems

Course Aims

To provide the delegate with the ability to service and repair electronic automotive ignition systems, using circuit diagrams, as per instructions and in accordance with procedures, in a safe and aware manner.

Duration

10 Evening Sessions
(2 to 3 hours per session) **or**
3 consecutive days

Course Contents / Criteria

- **Read and interpret automotive electronic ignition system circuit diagrams and symbols**

  Electronic ignition circuits — including breakerless ignition and direct ignition.

  Electronic ignition symbols — including breakerless distributor (inductive, hall-effect and optical sensor type pulse generation), electronic control unit (igniter), distributor assembly (distributor cap, distributor rotor, signal rotor / stator), ignition coil, HT leads and spark plugs.

  Direct ignition symbols — including power transistors, ignition coil (direct), HT leads, spark plugs, electronic control unit and sensors.

- **Select, explain and discuss various components used in automobile electronic ignition systems**

  Electronic ignition components — includes breakerless distributor (inductive, hall-effect and optical sensor type pulse generation), electronic control unit (igniter/module), ignition coil, HT leads and spark plugs.

  Direct ignition components — includes power transistors, ignition coil (direct) HT leads, spark plugs, electronic control unit & sensors.

- **Remove and fit ignition systems components using the correct tools in a safe and aware manner according to procedures**

  Electronic ignition procedures.

  Direct ignition components.

- **Service and test electronic ignition system and components**

  Test equipment — includes ohm-meter, continuity tester, test lamp, feeler gauge, timing light, oscilloscope and digital code tester.

  Service — includes spark plug service, distributor service, checking vacuum advance and centrifugal advance.

  Testing — includes ignition coil testing, distributor testing, HT lead testing, rotor testing, inductive (pick-up coil), electronic ignition unit.

  Distributor cap inspection.

- **Diagnose electronic ignition system problems**

  Problems include loss of energy in primary circuit, loss of energy in secondary circuit, faulty timing and faulty components.

- **Complete diagnostic reports**

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Pre-requisites

- An understanding of electricity, magnetism and electromagnetism
- Ability to apply standard electrical formulae to practical situations
- Can set-up and use automotive multimeters and oscilloscopes

Qualification Outcome

The course outcome will provide evidence for Technical Certificate level 3 Diploma and could be incorporated as a part of an NVQ programme, towards an APL process or a CPD

Course Theory & Practical Work

Names and functions

Electronic ignition system components, direct ignition components & fuel systems.

The Purpose of

Servicing

Using removal and fitting procedures.

Ignition system components.

Secondary and primary circuits.

Ignition systems.

Relevant documentation.

Attributes, descriptions, characteristics and properties

Ignition coil tower; electronic ignition distributor assembly; electronic ignition system; direct ignition system; electronic control unit; fuel; Four stroke engine.

Sensory cues

Use of sight to visually inspect all ignition system components.

Cause and effects, implications

Implications of not using personal protection.

Implications of not applying vehicle protection.

Implications of not following procedures.

Procedures and techniques

Safety procedures; testing procedures; removal and fitting procedures; vacuum advance setting; setting spark gap; setting timing; firing order.

Theory: rules, principles & laws

Inductive pulse generation; Hall effect pulse generation; optical sensor pulse generation; operation of electronic control units.

Relationships between systems

Relationship of the battery to that of the electronic ignition system as the power source when starting.

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