

JOB ROLE – AUTOMOTIVE SERVICE TECHNICIAN

Sector: Automotive
(Qualification Pack Code : **ASC/Q01402**)



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UNIT 5 : Regular Maintenance of an Engine
Session 8: Engine Timing (Tuning)

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Session Objectives

1. The student will be Able to explain importance of timing in engine coolant.
2. Able to check the ignition, injection and valve timing

Introduction

To run the engine smoothly, it is necessary to supply fuel by opening and closing the inlet 'valve' similarly it is also needed to remove the exhaust gases at right time from the cylinder. Movements of the valves are related to the crankshaft revolution and engine (otto) cycle. It is necessary to check and set valve timing.

For the process of combustion, it is necessary to ignite the charge by using sparkplug at the right time. Plug should ignite the charge at end of compression stroke. There is a need to set the ignition system in relation to rotation of crankshaft. Thus, check and set ignition timing.

Stroboscope Lamp/Gun

Stroboscope is an instrument used to make a cyclically moving object (our flywheel) appears to be slow-moving or stationary. Stroboscopes are used in timing lights to dynamically set the ignition timing of an Otto cycle combustion engine. The timing light is connected to the ignition circuit (mostly inductively) and used to illuminate the timing marks with the engine running. The apparent position of the marks, frozen by the stroboscopic effect, indicates the current timing of the spark in relation to piston position.



Fig : Stroboscope Lamp/Gun

In new modern vehicles, we use multipoint fuel injection system. In the process of combustion of fuel injection system, it is necessary to inject the fuel by using fuel injector. The fuel injector will inject the fuel at right time at appropriate pressure at the end of compression stroke. There is a need felt to set the injection timing (FIP) system in relation to rotation of crankshaft. Thus, check and set fuel injection trimming.



Fig :Tuning

Steps for checking of valve timing

- Remove the timing cover

Check the alignment of the following :

- Turn the crankshaft pulley with transmission belt and mark on the pulley must align with crankcase mark.
- At the same time camshaft pulley mark must align with crankcase marking. This indicates proper valve timing.

Steps for checking of ignition timing

- Connect the stroboscope connection as per manual.
- Now hold stroboscope lamp near the fly wheel and run the engine at idle speed
- Check timing mark on the flywheel matches with pointer of crankcase housing at a same time lamp must glow, shows the alignment.
- This indicate proper ignition timing

Steps for checking of injector timing :

- Check the alignment the FIP timing with camshaft gears/pulley which ensures injection timing.

Summary

In this session you have learnt about, To run the engine smoothly, it is necessary to supply fuel by opening and closing the inlet 'valve' similarly it is also needed to remove the exhaust gases at right time from the cylinder. Movements of the valves are related to the crankshaft revolution and engine (otto) cycle. It is necessary to check and set valve timing. Stroboscope is an instrument used to make a cyclically moving object (our flywheel) appears to be slow-moving or stationary. Stroboscopes are used in timing lights to dynamically set the ignition timing of an Otto cycle combustion engine. These tools come in various shapes, most in gun- or torch shape. All need a power supply (230V or 12V) and they have a pickup unit (mostly an induction clamp to be putted around the HT cable for impulse pickup).

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