Dealing with an OAP

Steve Carolan of INA & FAG explains the purpose, testing and replacement of Overrunning Alternator Pulleys (OAPs) and their cousins, the Overrunning Alternator Decoupler(OADs)

The function of the Overrunning Alternator Pulley (OAP) and the Overrunning Alternator Decoupler (OAD) is to decouple the alternator from the rotational irregularities of the crankshaft in an internal combustion engine, since the alternator has the highest amount of inertia in the accessory belt drive. In this way, the alternator is driven using only the acceleration portion of the crankshaft and reduces the rotational vibrations and irregularities

Advantages
The positive influences on the accessory belt drive result in:

- damping of belt vibrations
- reduced load in the belt drive
- reduced tensioner movement
- increased belt life
- improved noise behaviour of the belt drive
- increased alternator speed in the idling speed range
- reduced belt slip and noise on the alternator pulley during gear changes

Decoupling function
The OAP and OAD decouples the alternator from the rotational irregularities of the crankshaft up to an engine speed of approx. 2000 revolutions per minute. The decoupling function of the overrunning pulley unit is dependent on the load condition of the engine (amplitude of torsional oscillation), the inertia and the load condition of the alternator. Furthermore the overrunning pulley decouples the alternator inertia during significant decreases in engine speed, such as gear changes.

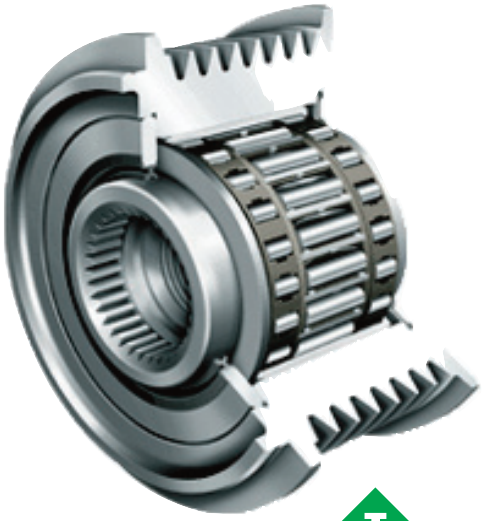
Applications in which the OAP provide benefit include:

- Diesel or petrol engines with severe periodic crankshaft vibrations
- Very low engine running speeds
- V-engines with valve cut-out (cylinder or block cut-out)
- Sudden contacts in automatic transmissions
- Sudden contacts caused by Aircon compressors
- Extremely high performance alternators (high inertia)

Design
Outwardly, the Overrunning Alternator Pulley resembles the fixed drive wheel. In fact, it consists of the following components all fitted into an integral, compact unit:

- Drive wheel with profile for poly V-belt
- Overrunning clutch / mounting unit with outer and inner rings plus clamping ramps
- Roller bearing for overrunning function and freewheeling support
- Inner ring, threaded, for fitting alternator shaft
- Serrations for assembly tool
- Seals
- Protective cap.

For protection against heavy water impacts and other dirt contamination, a cover snap is fitted on the front side. To ensure that the OAP has a long service life, the protective cap must re- fitted when the OAP is replaced or tested, and must remain in place at all times.



Characteristics to look out for when testing an OAP

It is recommended you use a suitable tool to make testing the OAP/OAD easier. As these pulleys become more common, the tool manufacturers have kept pace with the need for the specialty tools.

Grasp the outer ring of the OAP with one hand. With your other hand, twist the tool in the directions shown.

The tool jams immediately and cannot be turned when moved in an anti-clockwise direction.

The tool can be continuously turned in a clockwise direction with slight resistance

Characteristics to look out for when testing an OAD

Use a suitable tool, as explained above.

You will notice an increasing spring force when moved in an anti-clockwise direction.

The tool can be continuously turned in a clockwise direction with slight resistance.

Note: A small number of overrunning pulleys have a left-handed thread instead of a right-handed thread. The functions of the left-handed thread are exactly the same as those for the right-handed thread, but reversed.