

Mechanics : Planetary Motion

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The Wankel's Planetary Motion

Hopefully you have already checked out some of the rotary engine animations. If so, you will be familiar with the odd motion the rotor makes in the housing that somehow keeps all the apex seals on the trochoid surface at one time while each working chamber changes volume. It may seem miraculous, but really it is simple math, er...calculus and trig. Anyway, it's really not that hard to understand on a visual basis, so let's take that approach.

The seemingly complex motion of the rotor is actually the combination of two simple motions: Rotation and Orbit. The rotor rotates on its bearing, which mates to the eccentric shaft journal. The orbit is introduced by the eccentric shaft which, itself, is merely rotating, but with the journal offset from its center. Riding on the journal, the entire rotor is caused to orbit the eccentric shaft, irrespective of its own rotation. The real magic, however, is synchronizing the two motions so as to achieve the desired results, which is planetary motion (rotation and orbit).

Planetary Motion

Simple Rotation

Simple Orbit

Simple Rotation + Simple Orbit = Planetary Motion

The illustrations below demonstrates orbit and rotational motion. The image on the right represents planetary motion. Again, planetary motion is achieved by combining orbit and rotational motion together. The right image is how the rotors appear when the rotary engine is running.

