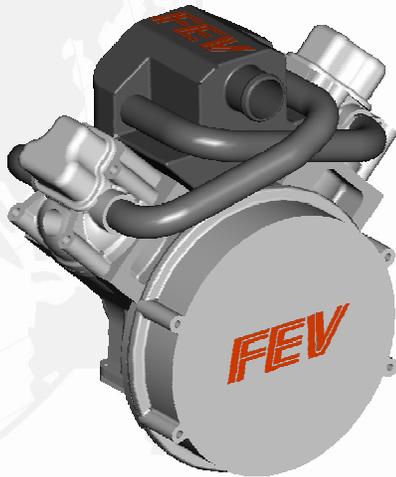


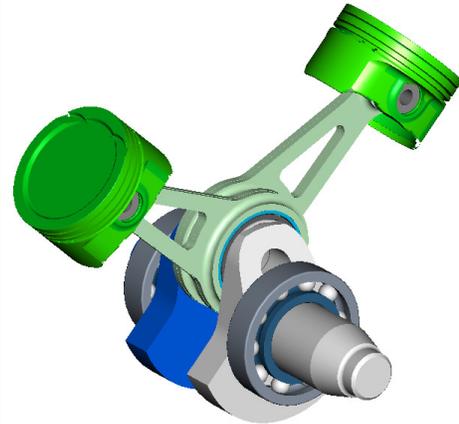


FEV – V2 Range Extender Concept

The V-arranged two cylinder engine shows some interesting possibilities particularly with regard to range extender applications. Using a 90 degree bank angle, first order mass forces can be fully compensated by crankshaft-mounted counter-weights. A balancer shaft, commonly used with two cylinder in-line engines causing additional parasitic losses, is therefore not necessary. Regarding its space requirements, a V2 concept with a disc-shaped generator directly flanged to the crankshaft is also attractive, assuming a valve train with in-block camshaft and pushrods. Length and height of the unit are smaller than those of a two cylinder in-line engine with the same displacement. The “antiquated” push rod technology bears no restrictions to the functionality of the engine as high engine speeds are not desired due to NVH considerations. FEV’s proposed V2 concept consists on a one-piece high pressure die cast aluminium crank case in conjunction with a cracked crankshaft.



This design allows to support the complete crank train by low friction roller bearings using one-piece standard industrial bearings. The oil pump can be significantly scaled down or be omitted completely, causing an extremely low friction level. An additional advantage of the cracked crankshaft is the fact that the conrods do not have to be split and can thus be manufactured as low-cost sheet-metal formed parts.



Roller bearing supported V2 crank train with cracked crankshaft

In the present concept, the crack is placed on the crankpin opposite to the power transmitting crank web and is therefore well controllable with regard to the structural strength. Due to its one-piece bearing pedestal (tunnel housing), the crank case requires a minimum of machining and significantly contributes to a low unit price.

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