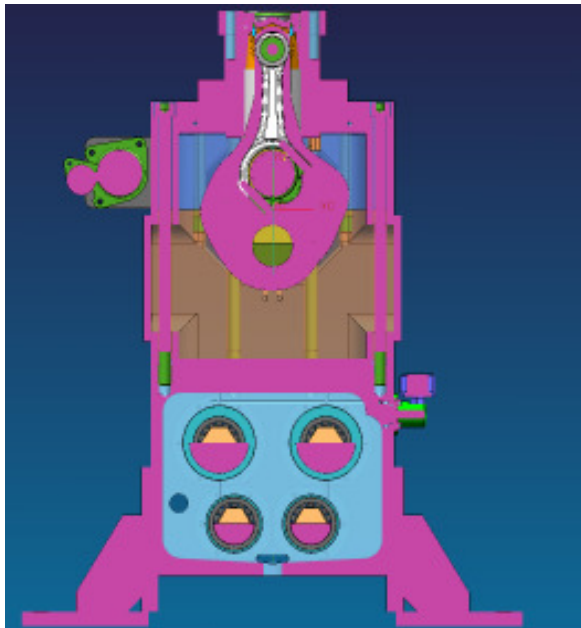


FEV HD 1-Cylinder Research Engine

FEV is offering a single cylinder engine program for basic research, test and development work in a wide range of engineering areas. It is possible to configure all engines to run on Gasoline and Diesel, as well as on various alternative fuels (CNG, H₂). All engines are characterized by a modular architecture and a very robust and flexible structure to serve as base for all kinds of engine set-ups. Main modules are:

- **base module** with crankcase, crank train, flywheel and mass balance system
- **intermediate module** with water jacket, cylinder liner and timing drive system
- **top end module** with cylinder head, valve train, valve cover, intake and exhaust system.

The consequent modular design enables customization of each engine set-up in all engine classes, even for very special investigations, including engines with optical combustion chamber access or engines utilizing production engine parts.



FEV HD Single Cylinder – Design Concept

Main technical data of FEV's HD 1-Cylinder Research Engine are:

Bore: 95 – 150 mm

Stroke: 110 – 170 mm

Rated Speed: max. 3500 rpm

Peak Pressure: up to 300 bar

Crankcase: machined steel

Cylinder head: production part or customized

Valve Train: OHV, SOHC, DOHC, alternative systems

Crankshaft: machined steel / 4 main bearings

Mass balance: Rotating mass at crankshaft

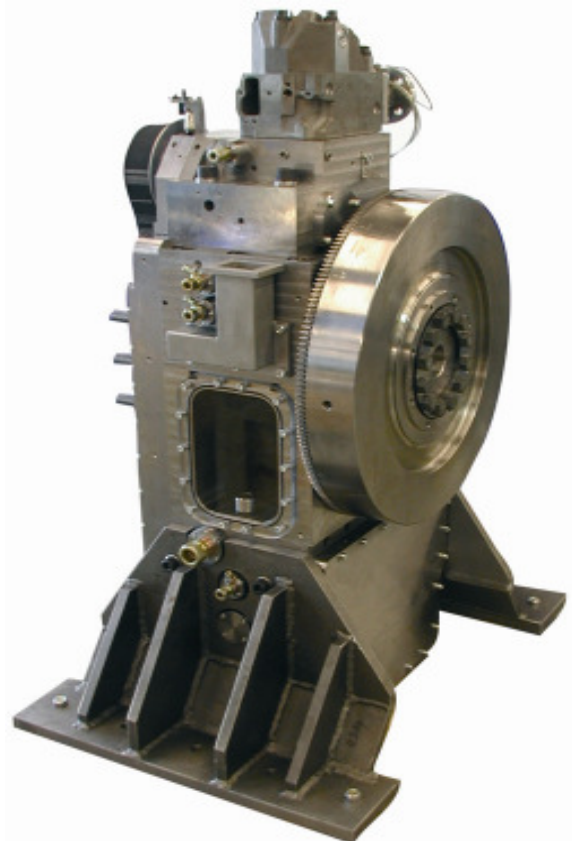
1st order oscillating mass (option)

2nd order oscillating mass (option)

Starter: electric starter motor on engine

Lubrication: test cell oil conditioning system

Cooling: test cell coolant conditioning system



FEV HD Single Cylinder – Set-up with Production Cylinder Head

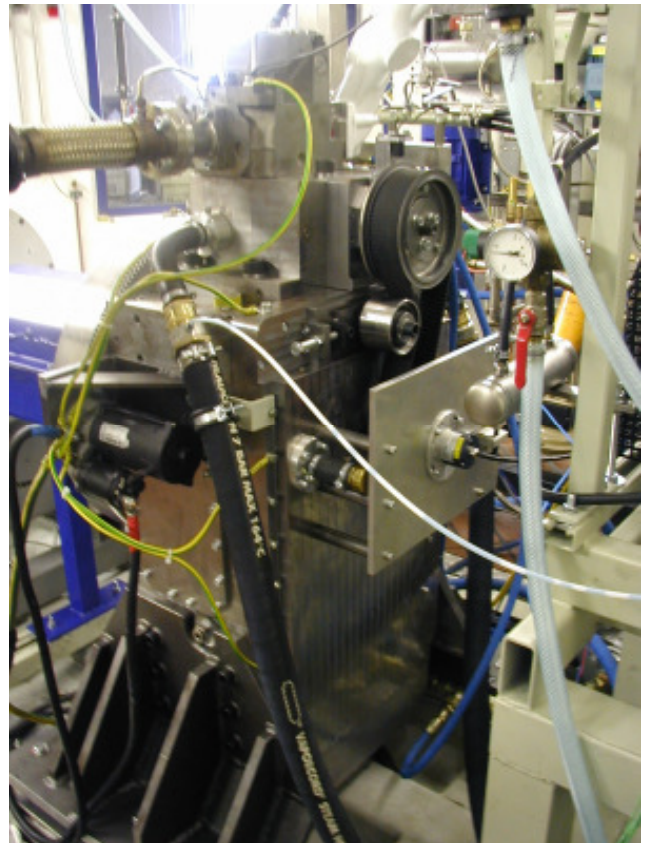
Optionally installed balancing shafts for 1st and 2nd order oscillating masses are all gear driven and equipped with roller bearings. To make the mass balancing system as robust as possible and to minimize the maintenance efforts during operation, the entire mass balance system including the drive system has a separated lubrication circuit. This circuit can be operated completely independent from the engine lubrication circuit, if requested.

The main lubrication circuit includes a central distribution unit which supplies the main bearings, camshaft bearings, cylinder head, and up to 4 piston cooling jets, depending on the engine configuration, further individual consumers.

Similar to the lubrication circuit, the cooling circuit is also designed to be flexible, and can supply cylinder head and cylinder liner individually, or, as the standard configuration, supply cylinder liner and cylinder head integrated in one circuit.

The camshaft drive is achieved by a toothed belt in the standard layout; however, gear drive configurations are also possible. Camshafts can be arranged in the intermediate module (OHV) or directly in the cylinder head (SOHC, DOHC). Alternative valve operation systems such as hydraulic actuation or electro-mechanical operation can be applied.

All established fuel injection systems for Diesel operation are possible. Typically, the high pressure fuel pump is driven by an external device and, if required, synchronized to the engine working frequency. However, a direct application of the fuel pump to the engine and operation via the engine drive train is also available.



FEV HD Single Cylinder – Test Cell Set-up

Different engine standard configurations with production engine parts are available off-the-shelf. Tailored configurations will be offered upon request.

Delivery of auxiliary devices such as conditioning units for coolant and lubrication oil, as well as other test equipment is possible.

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