

# Single-Cylinder Engine

## Modular Series for Test-Bench Trials

### Combustion Process Testing ...

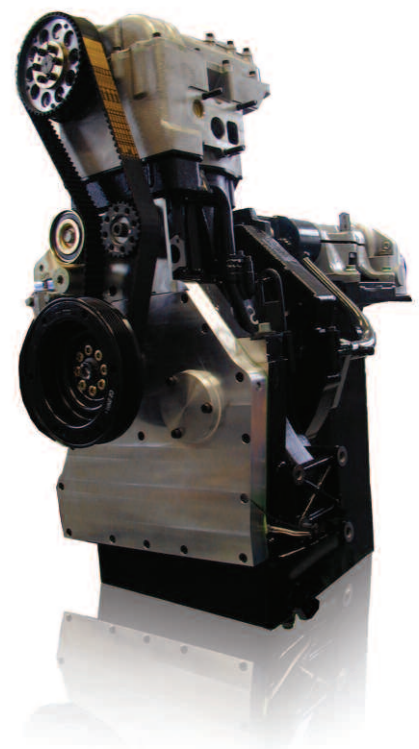
... has prompted IAV to design an engine series for application in conjunction with state-of-the-art measuring equipment. The basic concept permits application on many of the main spark-ignition and diesel-engine specifications. In developing this new series, particular attention has been given to designing and rating all of the functional engine systems with a level of robustness that ensures reliable, continuous operation on the test bench. Yet rapid availability of engines and components is still provided at an attractive price. This is achieved by integrating the development processes available in-house with tool-assisted layout, fully parameterized design and comprehensive simulation of all function-relevant engine systems.

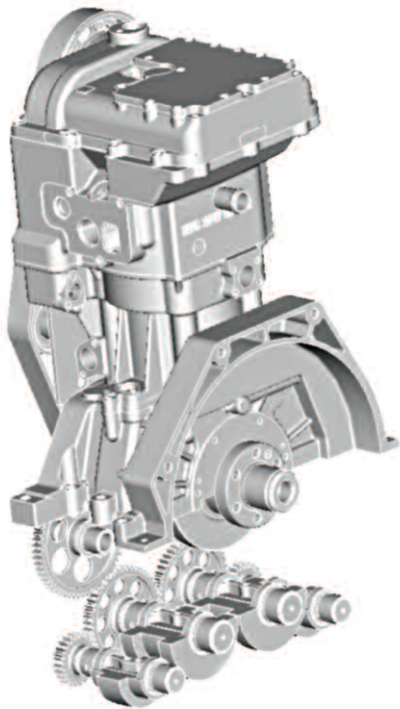
Crankcase, cylinder liner as well as cranktrain and balancer shaft are modular in design and can be adapted to the application conditions in a very short time. Cylinder head and valvetrain are designed using tried and tested modeling strategies so that changes to combustion-relevant components can be rapidly implemented.

### Features:

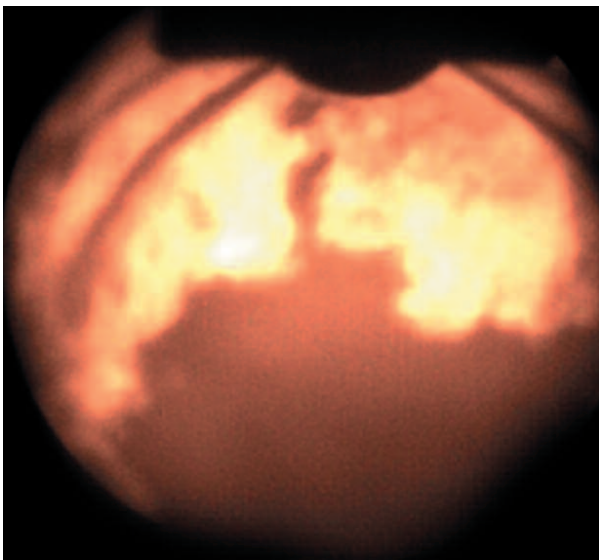
- Full 1<sup>st</sup> and 2<sup>nd</sup> order mass balancing through modular balancer-shaft concept with exchangeable balancing weights
- Basic dimensions of engine rated for high cylinder pressures
- Two-piece cast-iron crankcase to accommodate the cranktrain and the balancer shafts
- Separate modular cast-iron cylinder liner and aluminum cylinder head connected to the crankcase by continuous tension bolts; high-pressure resistant cylinder head sealing concept
- Flywheel inertia moment optimized through design measures and heavy-metal inserts
- Cylinder head and valve train concept to customer specifications
- Flexible timing gear with toothed belt
- Adapter for connecting water and oil pump as well as high-pressure fuel pump; external media supply optional
- Can be configured with full set of sensors and actuators for test-bench operation and use with special measuring equipment
- Ready for operation on engine test bench with IAV FI<sup>2</sup>RE ignition and injection control unit within very short time
- Casing components and mechanical engine parts in modular system (refer to table overleaf for technical specifications), application spectrum can be extended in terms of the main specifications on request

*Employing over 4,000 staff across the globe, IAV is one of the leading providers of engineering services to the automotive industry. Our core competency lies in providing our clients with perfected, production-ready solutions in all areas of powertrain, electronics and vehicle development. As a company that drives innovations, IAV engages in its own primary research, performs its own advanced development activities and works on an interdisciplinary basis. Our clients include all major automobile manufacturers and component suppliers.*





Full mass balancing for low-vibration operation, also suitable for sensitive measuring equipment



Combustion process in a diesel engine

### Application Range

- Concept verification at early development phase in optimizing combustion processes (spark-ignition/diesel/gaseous fuel) and in developing new combustion processes (e.g. HCCI, CAI)
- Design of injection system, valve train, intake port, combustion chamber geometry
- Influence of alternative fuels
- Designing new closed-loop control concepts
- Supply of data for rapid-engineering process (simulation – design – flow measurement – engine test bed)

### Development Environment

- External supercharging
- Hydraulic supply unit
- Good optical sensor accessibility for diagnosing combustion (including laser measuring equipment)
- User-programmable, real-time capable engine control unit
- User-parameterizable FI<sup>2RE</sup> development control unit for ignition and injection hardware control

### Technical Specifications

<b>Stroke</b>	≤ 100 mm
<b>Bore</b>	≤ 95 mm
<b>Block height</b>	(depending on design)
<b>Main bearing dimensions</b>	∅ 70 mm x 22,5 mm
<b>Max. ignition pressure</b>	≤ 220 bar (depending on design)
<b>Max. engine speed</b>	≤ 9000 1/min (depending on design)
<b>Max. osc. total mass for 100% balance</b>	1200 g
<b>Max. flywheel moment of inertia</b>	≤ 0,35 kgm <sup>2</sup>