HEINZMANN®
thinking in drive and control

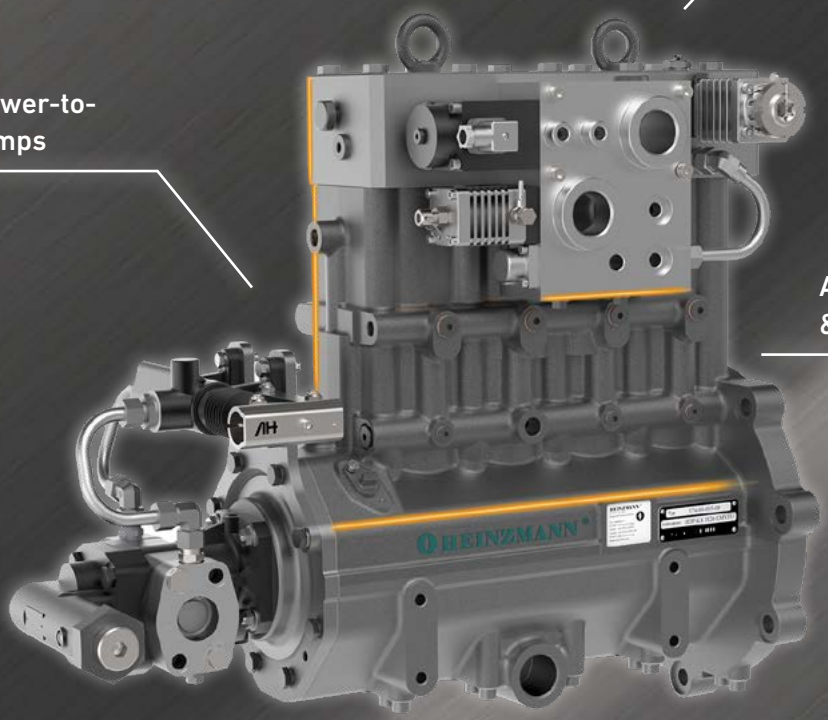
All components from one supplier

ODYSSEUS

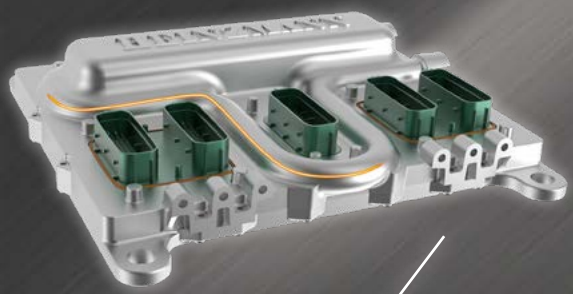
Complete Common Rail Solutions

System pressure up to 2.500 bar

Best in class power-to-weight ratio pumps



Applicable for diesel fuels & heavy fuel oil



Micro-pilot and micro-pilot capable injectors

Engine sizes from 100 up to 1.250 kW/cyl.

Engine & Turbine Management

ODYSSEUS
Common Rail (CR)

ODYSSEUS Common Rail Systems include all components for fuel injection and for pressure generation, thereby guaranteeing optimum connectivity, compatibility and safety.

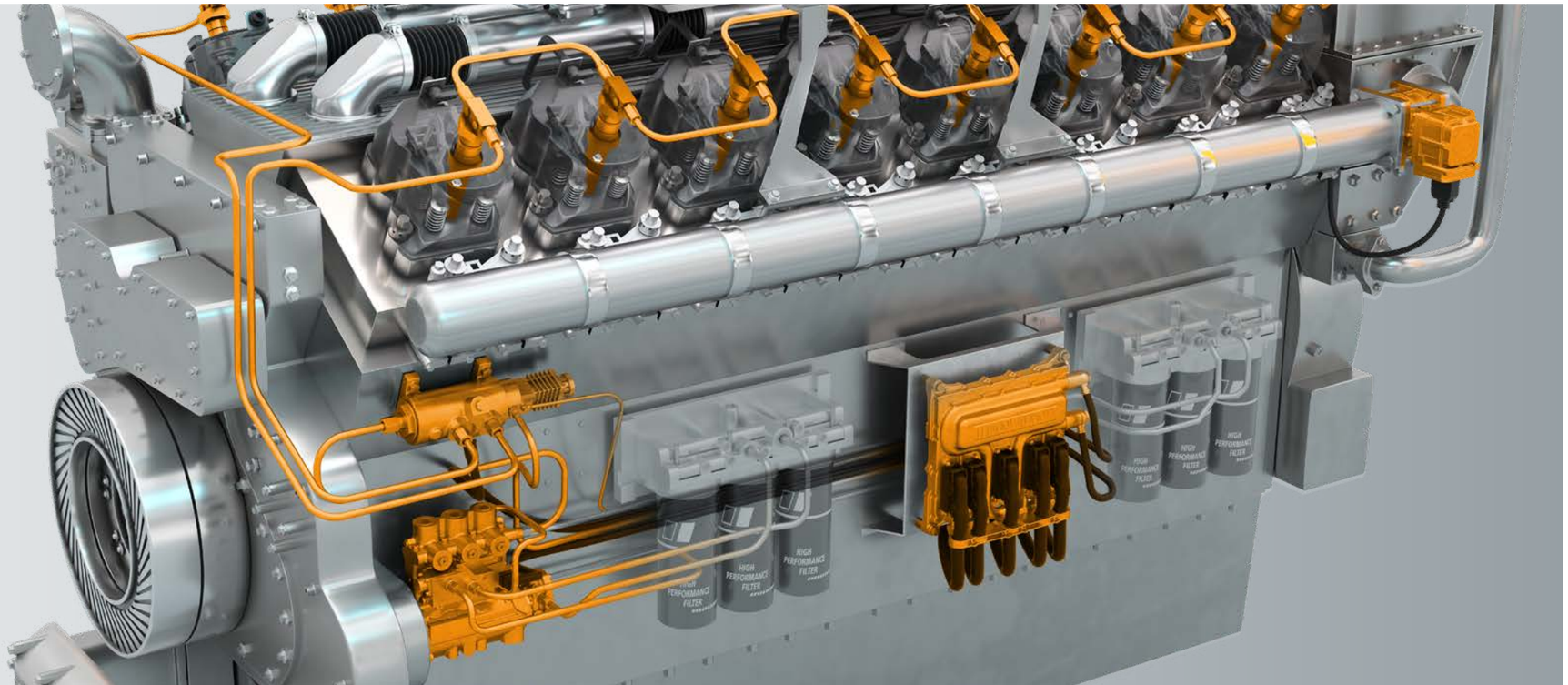
Together with the DARDANOS series control units, the highest precision hydro-mechanical components represent a holistic solution for state-of-the-art common rail fuel injection technology. The ODYSSEUS range covers engine ratings from 600 to 10,000 kW and more. The different variants of the system are not only suitable for different engine sizes, but also different applications and fuel grades. To ensure the highest performance and quality standards, all CR components are developed and manufactured in-house by HEINZMANN.

APPLICATIONS

- Diesel engines
- Dual-Fuel engines

FEATURES

- Permanently high fuel system pressures at any engine speed/load point for optimised fuel vaporisation inside the combustion chamber
- Flexibly programmable multiple injection strategy
- Engine speed/load dependent injection mapping
- Injectors can be adapted to fit various cylinder heads
- Wide range of control units: for engines up to 24 cylinders
- Safe and compact fuel rail and piping
- Complete common rail system startup, support for combustion optimisation and system training by HEINZMANN Technical Service
- Cable harness adapted to engine configuration
- Utilisation of state-of-the-art FEM and CFD software in the design process
- Hydraulic system evaluation utilising 1D and 3D professional finite elements simulation software
- Applicable for micro pilot common rail fuel injection for gas and dual fuel engines



ODYSSEUS
System Components:

- High-pressure Pumps
- Injectors
- High-pressure Accumulators
- Rail Pressure Limiting Valves
- Flow-limiting Valves
- High-pressure Pipes
- Spill Valves
- Control Units

HIGH-PRESSURE PUMPS

UNIQUE CRANK MECHANISM

HEINZMANN common rail high-pressure pumps feature the new and unique crank mechanism design. The reciprocal movement of pressure elements is driven by a solid con-rod connection with pump crank shaft. This state-of-the-art principle in the field of diesel fuel pumps is featured in all HEINZMANN pumps in various versions and sizes for different applications, delivery rates and fuel qualities (distillate and heavy fuel oils).

The HEINZMANN high-pressure pump family design excels with high delivery rates and high pump efficiencies because of relatively compact but robust design especially for the needs of industrial applications even under demanding environmental conditions (vibration, dust, offroad application, etc.).

LOW WEAR

In operation, HEINZMANN high-pressure pumps are practically wear-free when inspected after operation for the normal service lifespan of conventional diesel fuel common rail pumps. This is because commonly available cam-roller pumps suffer wear due to line contact of the cam and roller. In contrast the connecting rod bearings of HEINZMANN's HDP-K pumps are designed to run hydrodynamically on a film of lubricant.

HEINZMANN HDP-K pumps use a mechanical con-rod mechanism instead of a spring return like in conventional pumps to return the pistons on non-pressure stroke. Thus, there is no risk of accelerated wear due to rollerjumping at maximum operating speeds as in cam-roller pumps.

The connecting rod bearings decouple side forces (typical stress effects on pump plungers and elements within cam-roller solutions) which are generated by rotation of pump shaft. A cross-head piston with special plunger connection design transmits virtually no side-force effects on the HDP-K plungers. This results in very low wear effects on pump elements and coated plungers as well as correspondingly long TBO periods.

The above mentioned plunger connection mechanism has a fail-safe function. The mechanism disconnects non-destructively plunger from cross-head piston and crank shaft in case of mal-function and keeps the pumps working.

ODYSSEUS HDP-K series

The HEINZMANN HDP-K high-pressure pump family consists of two basic sizes: HDP-K3 and HDP-K4. They both stand out due to:

- Robust design
- Long service life
- Available with or without pre-feed pump
- Lubrication provided by the engine oil circuit
- Unique crank mechanism
- Simple to maintain

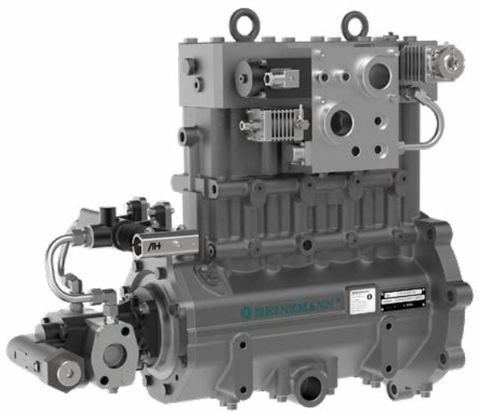
HDP-K3

- 3 pressure elements
- Suitable for system pressures of up to 2,400 bar
- Versions with 12 and 16 mm stroke
- Plunger diameter: Ø 12 mm, Ø 14 mm
- Pump speed of up to 3,000 rpm (12 mm stroke)
- Delivery rates of up to 15 l/min with one pump; redundant concept: up to 30 l/min with two pumps
- Easy to adapt (installed using flanges or on a base)

HDP-K3 HFO

- 3 pressure elements
- Suitable for system pressures of up to 2,200 bar
- Designed for operation with heavy oil
- Delivery rates of up to 15 l/min with one pump; redundant concept: up to 30 l/min with two pumps
- Special two-way heavy oil/lubricating oil sealing concept
- Mixed-oil drain
- Special design for operation at high temperatures (heavy oil)

HDP-K4 HFO



- 4 pressure elements
- Suitable for system pressures of up to 2,500 bar
- Designed for operation with heavy oil; suitable for delivery rates of up to 65 l/min with one pump; redundant concept: up to 130 l/min with two pumps
- Special two-way heavy oil/lubricating oil sealing concept
- Mixed-oil drain
- Special design for operation at high temperatures (heavy oil)

INJECTORS

HEINZMANN has developed a completely new injector generation with sophisticated features:

STATIC LEAK FREE DESIGN

The new ICR-DS injector generation features a static leak free design. Only a small amount of control volume returns to fuel backflow. HEINZMANN has achieved a considerable reduction of fuel backflow by 75 % (compared to conventional leakage afflicted common rail injector designs) and of fuel return temperatures.

The pressurised fuel enters ICR-DS injectors through the high-pressure fuel port directly into the injector integrated accumulation volume. The integrated accumulation volume (rail volume) has a beneficial effect on damping peak pressures within the hydraulic system and especially within highly stressed inner parts of injectors. HEINZMANN has achieved reduction of peak pressures inside ICR-DS injectors by 25 % by means of integration of accumulation volume. The achieved good fuel flow within the accumulator is of highest importance especially for HFO operation.

HEINZMANN fuel injection nozzles have only one single central bore-hole which acts as needle guide and fuel feed at the same time. Injectors and nozzles for HFO operation feature less susceptibility to cat-fines and lacquering effects.

ODYSSEUS ICR-DS series

The electronically controlled injectors are actuated by HEINZMANN solenoid technology with strong magnetic force, fast response time and compact size.

ICR-DS-200

For engines with cylinder power up to 200 kW.

- Medium-sized common rail injector for injection pressures up to 2,500 bar and injection quantities in a range of 50 ... 2,500 mm^3/shot
- Designed for distillate diesel fuels
- With integrated accumulator, flow limiter and fuel filter

ICR-DS-300

For engines with cylinder power up to 300 kW.

- Large-sized common rail injector for injection pressures up to 2,200 bar and injection quantities in a range of 50 ... 4,000 mm^3/shot
- Designed for distillate diesel fuels and heavy fuel oil (HFO)
- Cooled nozzle

ICR-DS-500

For engines with cylinder power up to 500 kW.

- Large-sized common rail injector for injection pressures up to 2,200 bar and injection quantities in a range of 70 ... 9,000 mm^3/shot
- Designed for distillate diesel fuels and heavy fuel oil (HFO)
- Cooled nozzle

COMPLEMENTARY COMPONENTS

HIGH-PRESSURE ACCUMULATORS

HEINZMANN's compact and modular high-pressure accumulators are designed for easy adaptation to various volumes. All accumulators can be customized to meet specific customer connection geometries. The engineering focus lies on compensating for pressure oscillations within the fuel system.

RAIL PRESSURE LIMITING VALVES

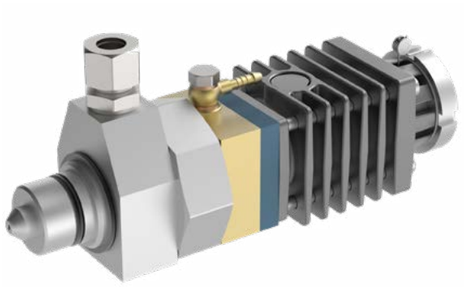
Pressure-limiting valves for protecting common rail systems against excess pressure; with fast-switching action for rapidly reducing the pressure.

RPLV-2S-CAR

With RPLV-2S-CAR pressure is limited, then reduced to the holding pressure ("limp home"); triggered upon reaching the configured excess-pressure value or, alternatively, forced opening when venting compressed air.

RPLV-2S

With the Rail Pressure Limiting Valve RPLV-2S pressure is limited, then reduced to the holding pressure ("limp home").



RPLV-1S

With the Rail Pressure Limiting Valve RPLV-1S pressure is limited; only a temporary safety function is provided. The engine must be stopped.

High-pressure pipes

HIGH-PRESSURE PIPES

The high-pressure pipes of the HEINZMANN subsidiary GIRO ENGINEERING are ideal for common rail engines.

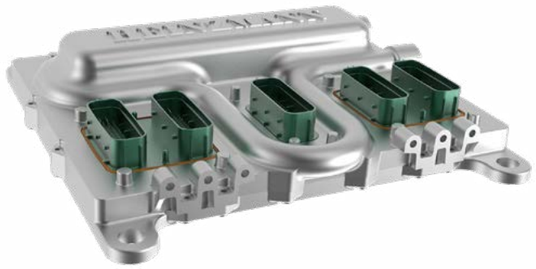
For more information please refer to the „Fuel Injection Pipes" leaflet or go to www.giroeng.com.

CONTROL UNITS

The HEINZMANN control units are based on an outstanding experience and technological background in EFI control systems. They feature proven control strategies aimed at optimizing engines performance and efficiency, as well as reducing environmentally harmful emissions under all operating conditions across various applications.

DARDANOS MVC series

The DARDANOS series is designed as universal full-authority controllers for engines with electronically controlled injection systems for diesel, gas, and dual-fuel engines. Beyond their primary role of controlling speed and power output, these controllers offer additional features for engine monitoring and combustion control.



MVC 01-24 for up to 24 cylinders

TECHNICAL DATA

EFI control system	MVC 01-24
Supply voltage	15 ... 33 VDC (nom. 24 VDC)
Max. inj. boost / hold current	30 / 18 A
Ambient temperature	-40 ... +80 °C -40 ... +125 °C with cooling
Permissible humidity	up to 95 % at 55 °C
Degree of protection	IP6K9K
Vibration	max. ±2 mm at 10 ... 24 Hz max. 0.24 m/s at 24 ... 64 Hz max. 9 g at 64 ... 2000 Hz
Shock level	30 g, 11 ms – half sine wave

HIGH-PRECISION MANUFACTURING

Production takes place at HEINZMANN under optimum conditions and features production processes that are sustainable, environmentally friendly and conserve energy. The state-of-the-art machinery enables ultramodern production processes. An outstanding example is the high-precision manufacturing of common rail components at our site in Schönau.

HIGH-PRECISION MACHINERY

- High-precision external grinding machines (Studer)
- High-precision internal grinding machines (Studer)
- Centreless grinding machine (Tschudin)
- High-precision coordinate grinding machine (SIP Hauser)
- Precision CNC-lathes (Mazak, Spinner, Schaublin)
- Precision CNC-milling machines (Heller, Hermle)
- Highest quality lapping machines (Stähli)
- Honing machines (Gehring, Pemamo)
- EDM drilling machines (Posalux)
- Hydro-erosive rounding and calibrating machines (Sonplas)
- ECM machines (Kennametal)
- Demagnetizer (Maurer Magnetic)
- Ultrasonic cleaning equipment

CLEANROOM ASSEMBLY

All ODYSSEUS high-precision components like plungers, valves or nozzles manufactured and cleaned in our production areas, are assembled in special cleanrooms.

The cleanrooms are separated from the production area by two-gate air locks. This ensures the elimination of dust particles in the ambient air.

ODYSSEUS components are mounted under optimal conditions to ensure their high quality and reliability.

HIGH-PRECISION MEASUREMENT AND QUALITY ASSURANCE

HEINZMANN products are synonymous with reliability and precision. Product quality is a top priority, which is why every product undergoes rigorous checks before, during, and after manufacturing using advanced techniques. Maximum precision is ensured through the use of state-of-the-art measuring and testing equipment.

ENDURANCE TEST BENCHES

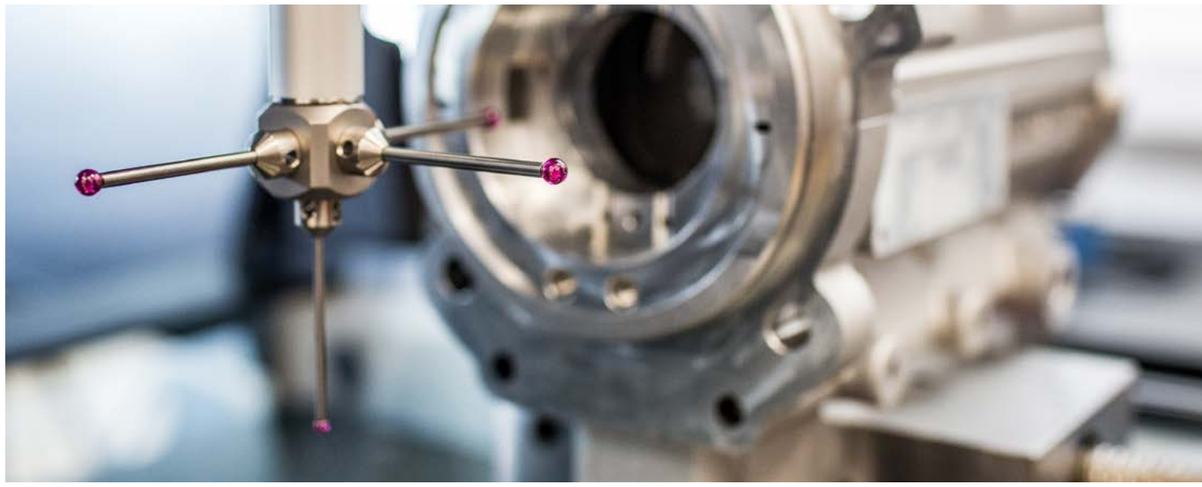
Once our products have been manufactured, their loadbearing capacity is examined using high-tech endurance test benches. The durability of HEINZMANN ODYSSEUS high-pressure parts and complete systems are tested in non-stop operation 24 hours a day, 7 days a week to ensure that all components satisfy the highest quality standards.

QUALITY CONTROL EQUIPMENT

HEINZMANN carries out analyses for quality control of prototypes and serial parts in their own modern equipped laboratories. All test results are documented and stored in secured internal and external data bases.

Our own material laboratory is able to prepare probes for metallurgical, structural and hardness analyses within minutes. With high end optical instruments, internal structures such as rounding of spray holes, galleries, bore crossings, etc., surfaces are inspected and documented.

- Dimensional control: 3D coordinate measurement
- Contour measuring: roundness, parallelism, cylindricity, straightness
- Surface measuring: roughness
- Shape testing: measurement of shape and position tolerances



COMISSIONING AND AFTER SALES SERVICE

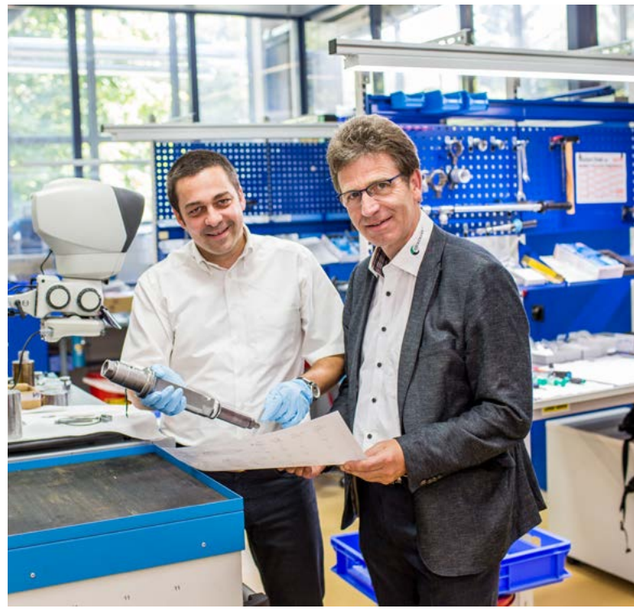
One of our key strengths is the comprehensive on-site service we offer to our customers. Our service team is dedicated to providing optimal support during installation, commissioning, and system calibration. We travel to our customers, no matter where they are located, ensuring prompt assistance. Quick response times are standard practice. HEINZMANN also has a vast network of authorized service providers worldwide.

As experts in handling HEINZMANN products, our team of experienced service engineers manages installation, order processing, repair, and maintenance tasks. In addition to overhauling components, they also deliver and install spare parts that are stored on-site.

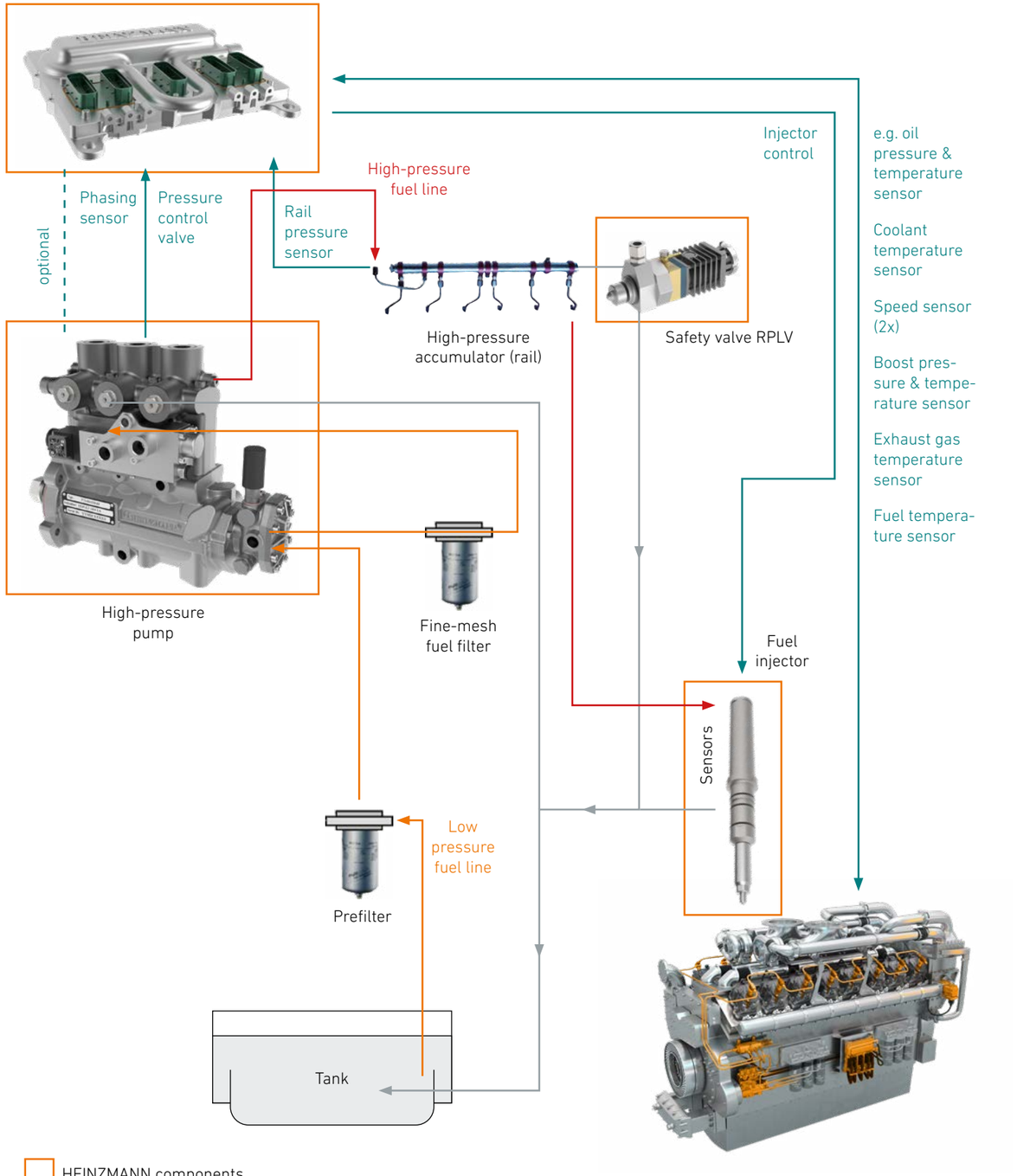
HEINZMANN offers expertise and state-of-the-art testing facilities, enabling us to support customers in the optimisation of their engines equipped with HEINZMANN common rail systems.

We deliver turnkey solutions tailored for OEM and retrofit applications, with a development program focused on optimizing the combustion process in diesel engines. Whether the requirement is power, fuel efficiency, acoustic performance, or compliance with upcoming international emission standards,

HEINZMANN has the ideal solution. Future enhancements aim to reduce engine exhaust emissions (e.g., NOx, HC, CO, and particulates), combustion noise, and fuel consumption. The increasing demands of our customers are the driving force at HEINZMANN.



SYSTEM OVERVIEW



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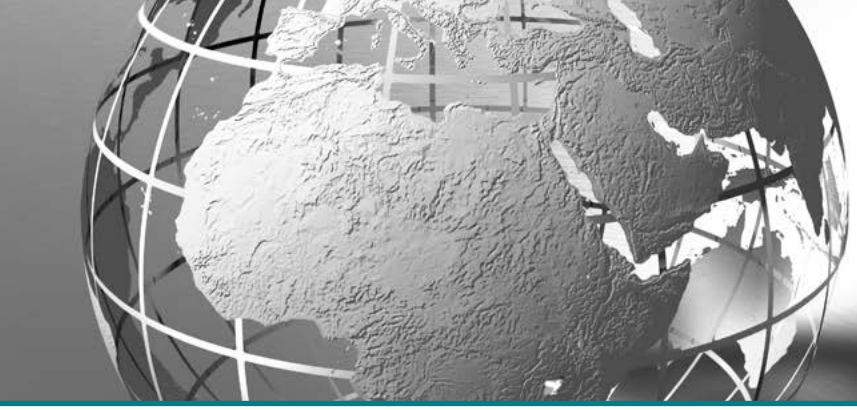

HEINZMANN®
thinking in drive and control

HEINZMANN GROUP – THINKING IN DRIVE AND CONTROL

HEINZMANN is a globally active family business founded in 1897 with its headquarters in Schönau (Germany), in the Black Forest.

Today, in the field of engine management HEINZMANN is one of the leading suppliers of components and systems for industrial combustion engines, generators and turbines. As a specialist and development partner, HEINZMANN is committed to developing exactly the right solution for increasing efficiency and reducing emissions.

In the Electric Drives division, HEINZMANN also demonstrates innovative strength and development expertise in engine technologies of the future. The company has established itself as a reliable partner and system provider for electric drive systems.

Our collaborative interaction with more than 40 globally active subsidiaries and sales companies characterizes the spirit within the HEINZMANN group of companies and makes us a reliable partner.

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