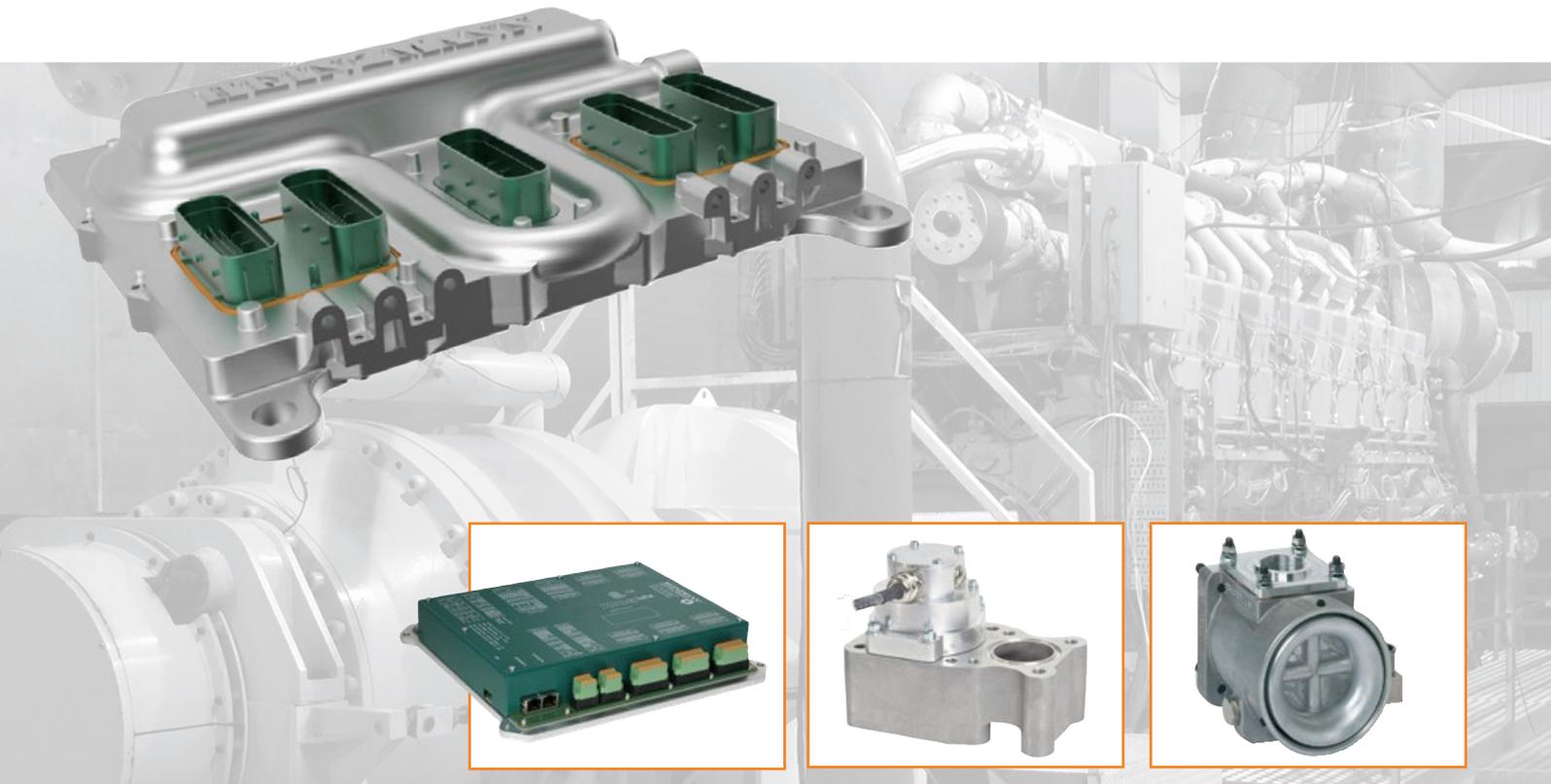


ARTEMIS



Dual-Fuel Solutions

- ▶ Reduced costs by use of gas
- ▶ Fast return on invest
- ▶ Advanced technology for high conversion rates
- ▶ Reliable components ensure high availability
- ▶ For different sized high or low-speed engines
- ▶ Precise control in diesel mode & in gas mode

ARTEMIS

Dual-fuel management

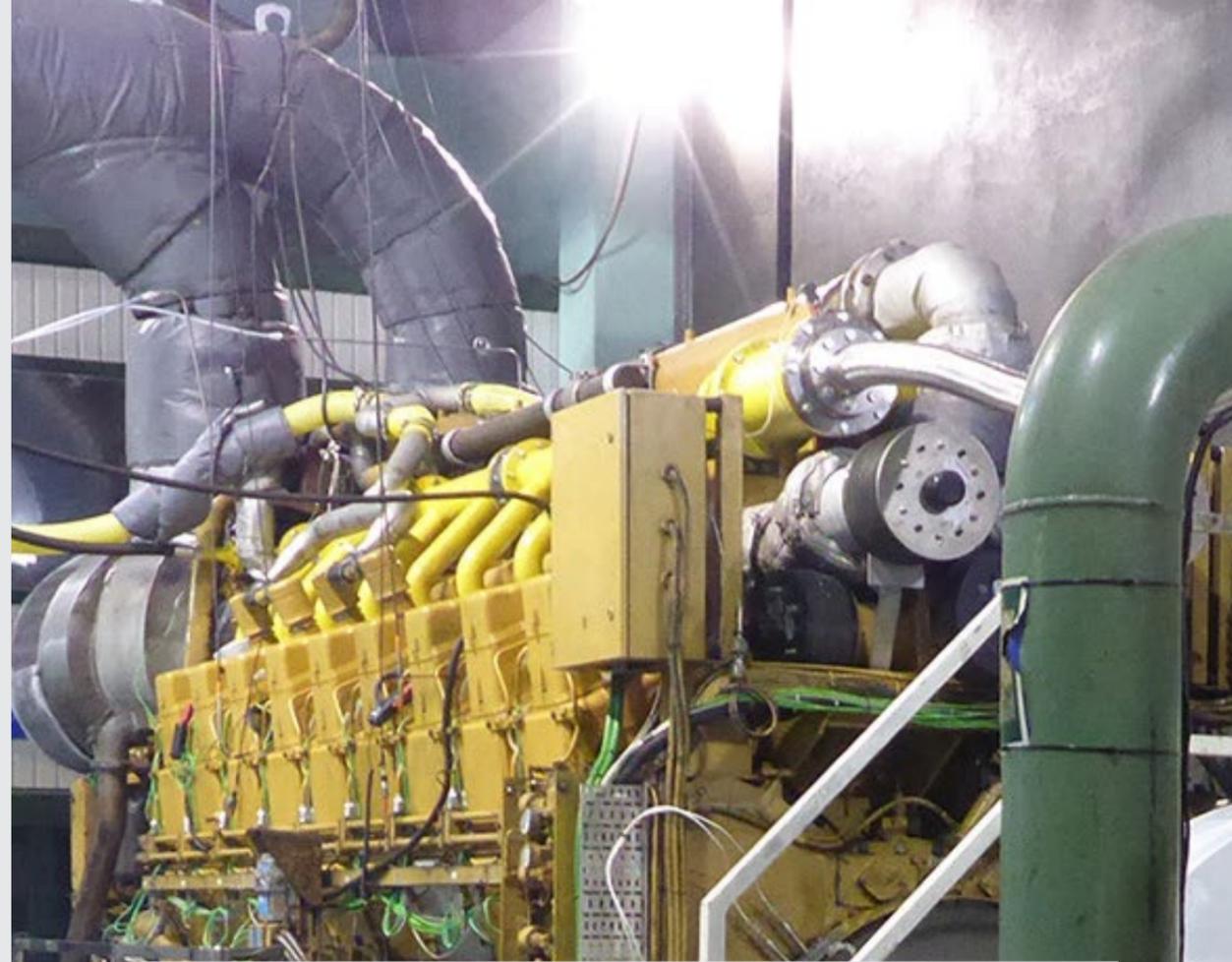
Diesel fuel has become increasingly more expensive than gas fuel, especially in countries with no oil but only gas resources. Dual-fuel combustion allows the use of cheaper gaseous fuel instead of diesel, hence delivers maximal operational cost savings. At the same time, emissions are reduced notably, ensuring the compliance with future emission regulations.

The costs of such a conversion are relatively low and are quickly compensated by remarkable fuel savings.

Dual-fuel combustion ensures the continuous operation of the engine, even if no gas is available and the engine is running on pure diesel. The result is optimum engine performance under all conditions.

The HEINZMANN dual-fuel management systems can be used for stationary genset or compressor applications, for vehicles and different sized high or low-speed engines. They ensure precise control in diesel mode as well as in gas mode.

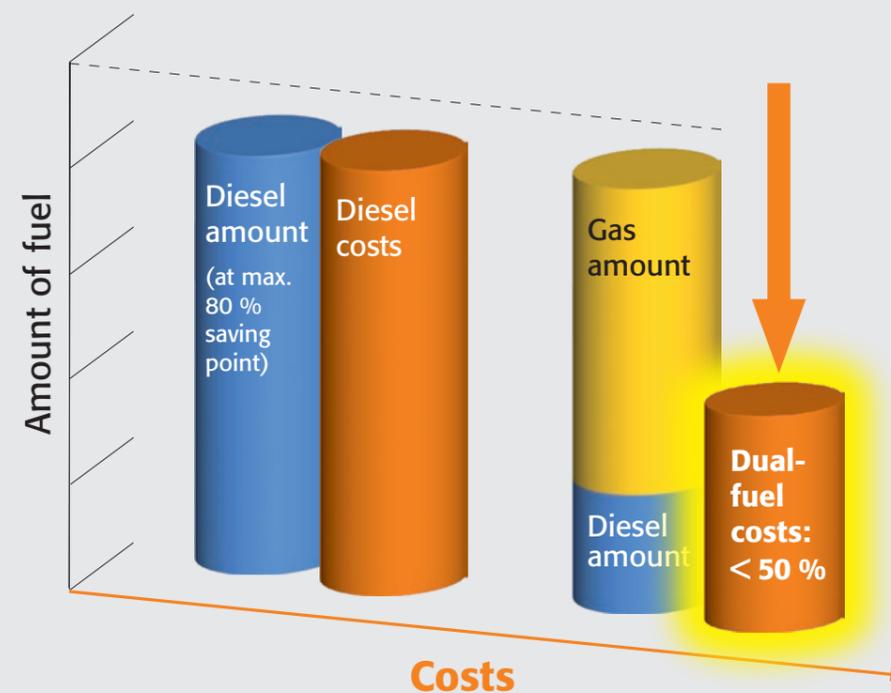
Convert your diesel engine to natural gas operation



Cost Savings on Fuel

Cost reduction with dual-fuel conversion: **> 50 %** possible savings

Assumption: gas price 40 % of diesel fuel price



Much more than Fuel Cost Savings

Halve your fuel costs

- Benefit from low natural gas prices
- High conversion ratio up to 95 %
- Optimised system efficiency in gas operation

Be flexible

- Choose your fuel at any time according to availability

Go green

- Lower pollution to meet latest emission standards

Feel safe

- Comprehensive monitoring and protection functionalities
- Reliable and proven operating concept
- Automatic system operation including fallback to diesel

Lean back

- Easy and extensible integration of modular components
- Full engine performance, full lifetime service
- Maintenance-free system components

ARTEMIS SYSTEMS

HEINZMANNs ARTEMIS systems offer a wide range of application which consequently fit customer requirements (stationary or vehicle) and engine sizes.

We offer both, full authority and gas control systems. Besides control of gas flow, all ARTEMIS systems limit the maximum exhaust temperature via a temperature sensor for engine protection.

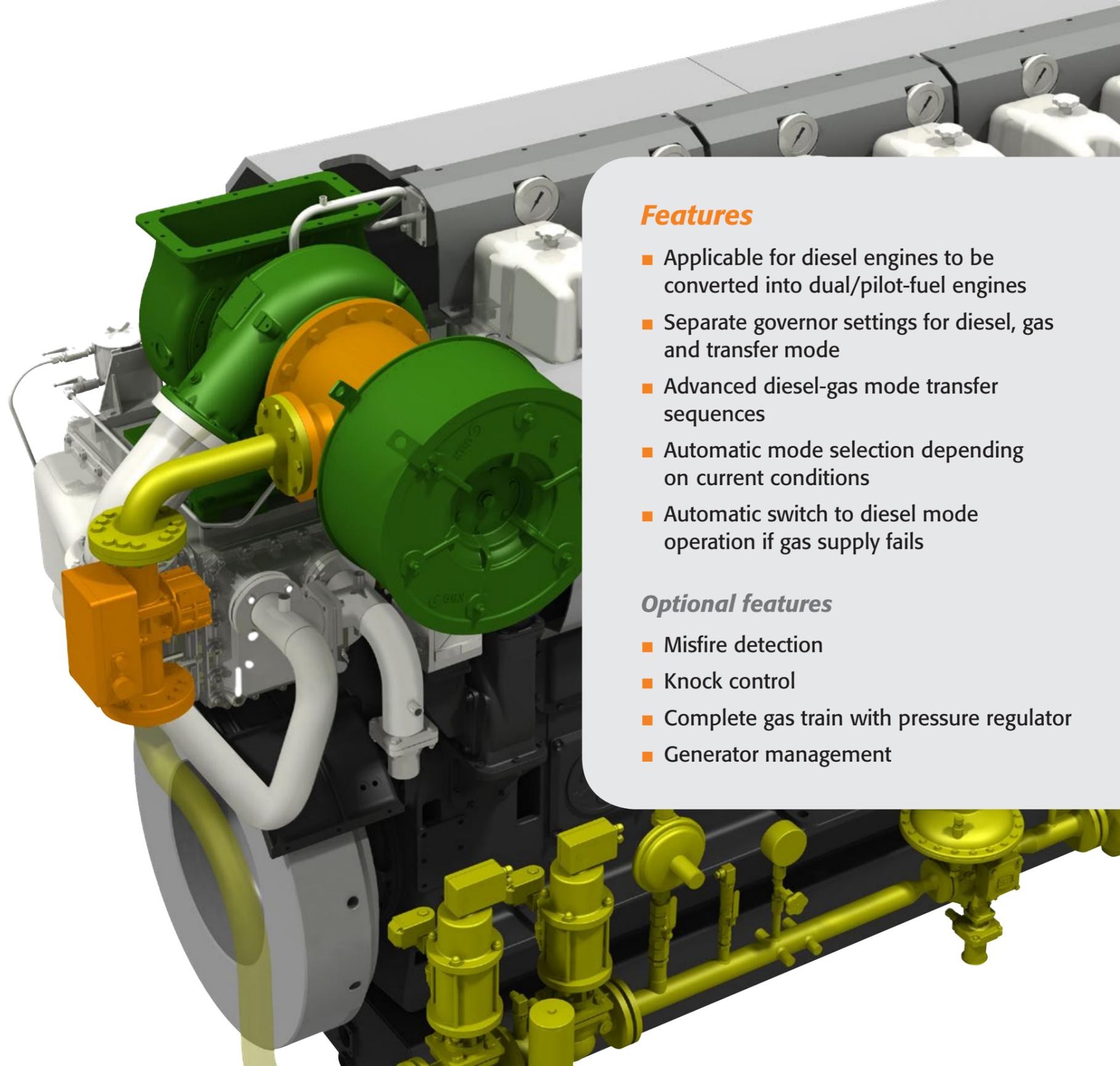
The systems differ in being based on gas mixer or gas admission valve technology (single-point or multi-point). Speed/load control is either realised by a diesel or gas regulation.

The HEINZMANN team will help the customer to find a tailor-made solution to fit individual needs.

ARTEMIS Benefits

- **Remarkable fuel cost savings by using gaseous fuel instead of diesel**
- **Reduction of emissions**
- **Easy installation and commissioning**
- **High reliability based on proven components**
- **Tailored for customers' needs**
- **Technical support and service worldwide**

ARTEMIS SYSTEM COMPONENTS



Features

- Applicable for diesel engines to be converted into dual/pilot-fuel engines
- Separate governor settings for diesel, gas and transfer mode
- Advanced diesel-gas mode transfer sequences
- Automatic mode selection depending on current conditions
- Automatic switch to diesel mode operation if gas supply fails

Optional features

- Misfire detection
- Knock control
- Complete gas train with pressure regulator
- Generator management



Dual-Fuel ECU



Gas Mixer



Gas Throttle Valve



Gas Throttle Valve



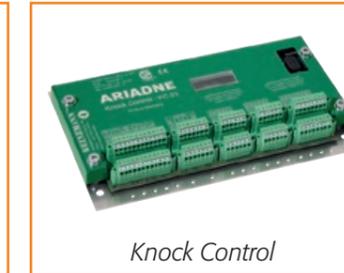
Gas Admission Valve



Gas Admission Valve



EFI Controller

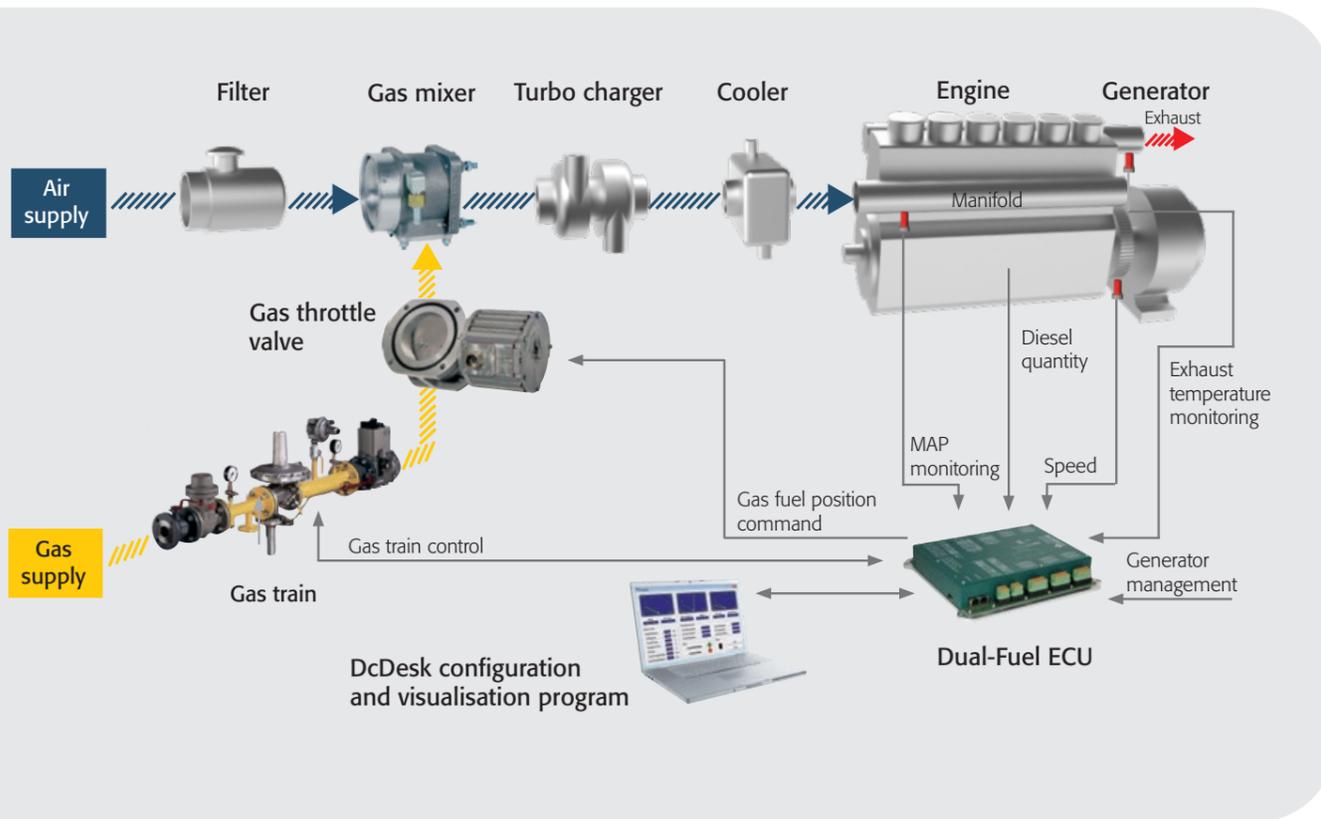


Knock Control

Gas mixer based dual-fuel system ARTEMIS

ARTEMIS Dual-Fuel Systems are based on HEINZMANN's proven gas engine components, its powerful actuation and governing units. They assure perfect gas-air mixture quality and achieve the optimal diesel substitution rate.

Operating dual-fuel engines up to 6,000 kW output, the gas controlled and gas mixer based systems are suitable for stationary applications as well as heavy-duty vehicles.

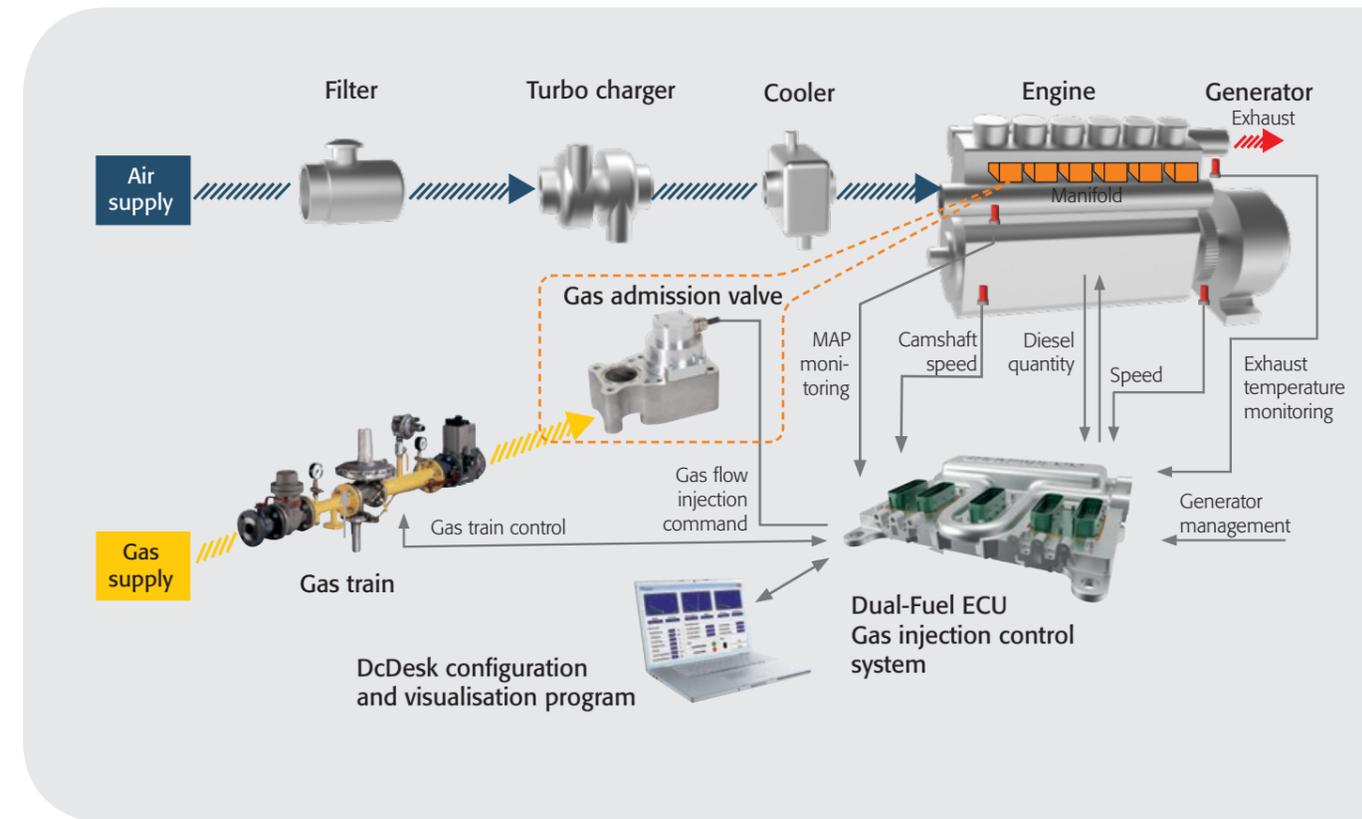


- **High conversion ratio**
- **Low investment costs**
- **Control strategies for diesel and gas**
- **Unlimited diesel operation at any time**
- **Sophisticated safety and engine monitoring strategies**
- **Throttle valve with integrated positioner for soft switching to dual-fuel mode and for precise control of gas flow**

Gas admission valve based dual-fuel system ARTEMIS

The multi-point gas admission version of the ARTEMIS Dual-Fuel System incorporates a dual-fuel ECU, gas admission valves and an adjustable valve timing EFI controller. Like all ARTEMIS systems it is based on HEINZMANN's proven gas engine components, its powerful actuation and governing units. Its single port

injection achieves best possible load response while the risk of gas loss or backfiring due to valve overlapping is avoided due to precise gas admission timing. Operating dual-fuel engines of up to 20 MW, these ARTEMIS systems are suitable for retrofitting large diesel engine applications.



- **Maximum conversion ratio**
- **Improved engine response**
- **Cylinder to cylinder gas balancing**
- **Reduced risk of backfire**
- **Separate governor settings for diesel, gas and transfer mode**
- **Automatic mode selection, automatic switch if gas supply fails**

HEINZMANN Group

Quality & Precision
since 1897

The Group started in 1897 with
Heinzmann GmbH & Co. KG,
and now includes
HEINZMANN UK,
HEINZMANN China,
HEINZMANN Korea,
HEINZMANN India,
HEINZMANN Australia,
HEINZMANN AUTOMATION,
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and CPK Automotive as
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network.

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solutions, as well as exhaust
gas aftertreatment solutions,
for industrial combustion
engines and turbines. It also
encompasses automation
systems, primarily for the
shipping industry.



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