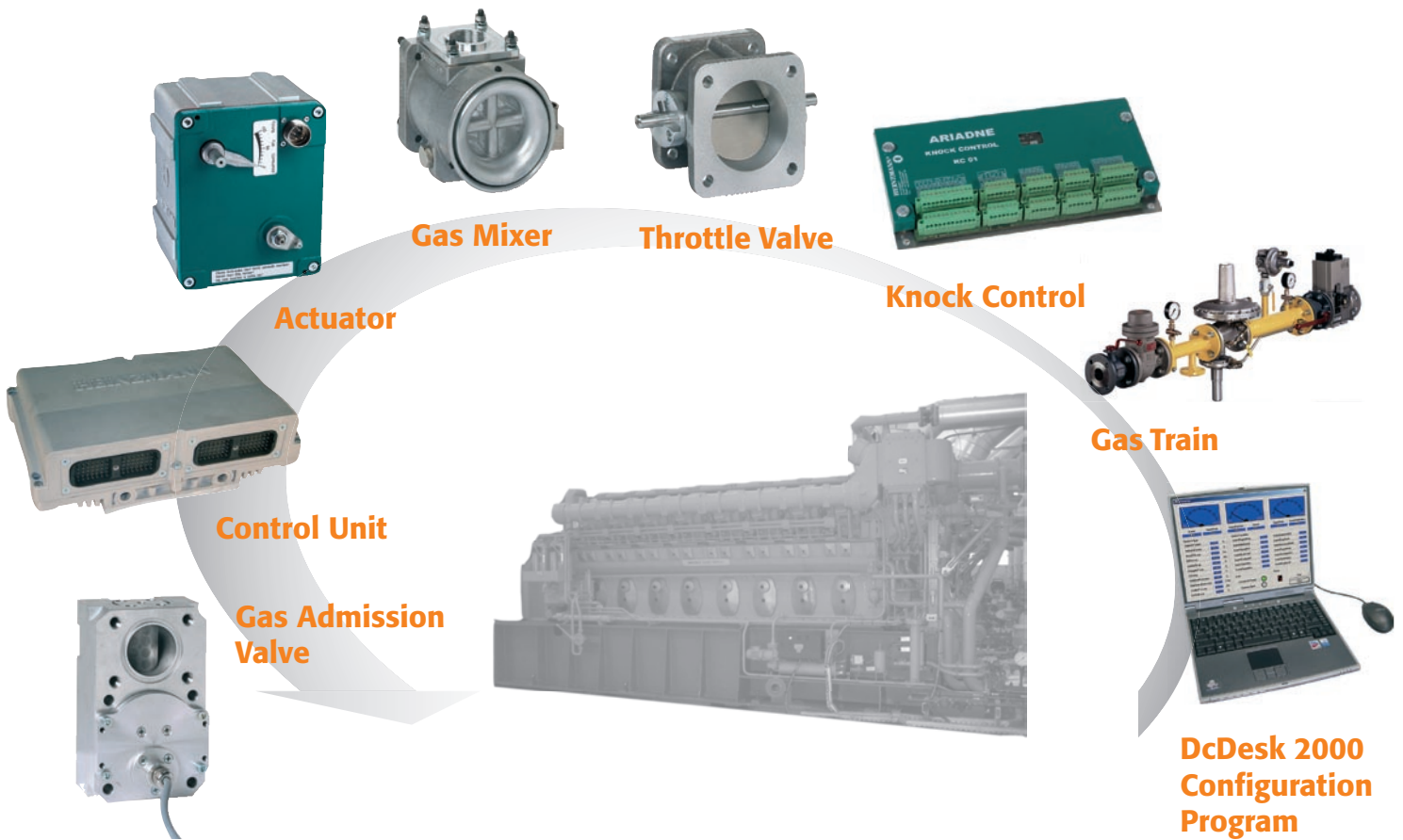


ARTEMIS

Dual Fuel Control Solutions



- ✓ For stationary genset or compressor applications and vehicles
- ✓ For different sized high- or low-speed engines
- ✓ Precise control in diesel mode as well as in gas mode



ARTEMIS

Dual Fuel management

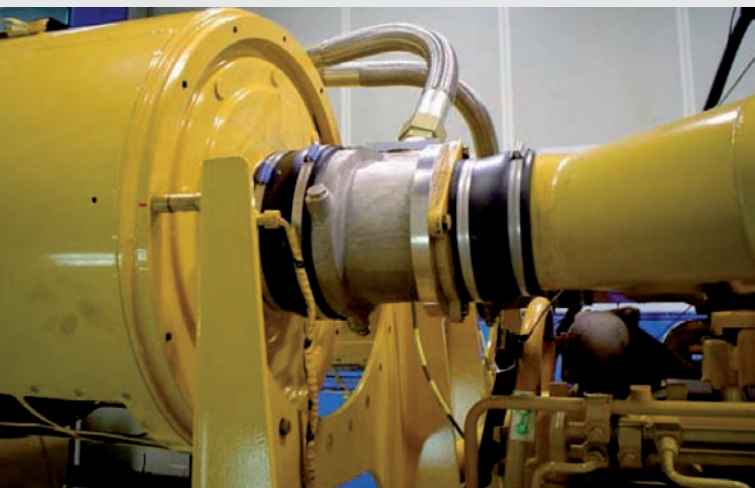
Diesel fuel has become increasingly more expensive than gas fuel, especially in countries with no oil but only gas resources.

Dual Fuel combustion allows the cheaper gaseous fuel to be used instead of diesel; in addition, Dual Fuel combustion has the advantage of clear reduction of emissions. These are the main reasons for Dual Fuel conversion.

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

Another advantage is the continuous operation of the engine, even if no gas is available. In such a case the engine is running as a pure diesel engine. The precise control of diesel and gas metering ensures an optimal performance under all operating 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 Dual Fuel mode.



Benefits ARTEMIS

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

Features

- ➔ Applicable for diesel engines to be converted into dual/pilot fuel engines
- ➔ For different gas qualities like natural gas, sewage gas and landfill gas
- ➔ Separate governor settings for diesel, gas and transfer mode
- ➔ Fixed or variable (load dependent) diesel fuel in gas mode
- ➔ Advanced diesel-gas mode transfer sequences
- ➔ Diesel assistance for load step compensation in gas mode
- ➔ Power (kW) droop for parallel operation in gas mode
- ➔ Automatic mode selection depending on current conditions
- ➔ Automatic switch to diesel mode operation if gas supply fails
- ➔ Different sized actuators
- ➔ Differently equipped ARTEMIS Dual Fuel systems

Optional features

- ➔ Misfire detection
- ➔ Knock control
- ➔ Complete gas train with pressure regulator
- ➔ Electronic foot pedal for vehicle applications
- ➔ Remote control system SATURN
- ➔ Generator management
- ➔ Fire and gas detection system

ARTEMIS SYSTEM

HEINZMANN offers a varied range of ARTEMIS systems. The users can choose from different control units and actuators, which fit their application (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 exhaust temperature via a temperature sensor for engine protection.

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

As a high end solution we offer a complete Dual Fuel system based on:

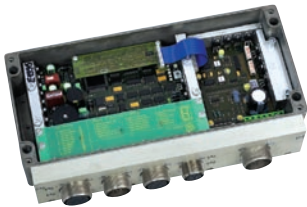
- ODYSSEUS Common Rail diesel injection system
- MEGASOL single port gas admission system

Advantages are maximum operational cost reduction and fulfillment of future emission regulation. One source solution guarantees optimum compatibility and connectivity.

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

System setup and diagnosis is made via the HEINZMANN communication program DcDesk 2000.

ARTEMIS system components



Dual Fuel control



Gas admission valve



Gas injection control



Gas train



Knock control



Actuator



Gas mixer



Throttle valve



Load measuring unit



Rail with injectors



High-pressure pump

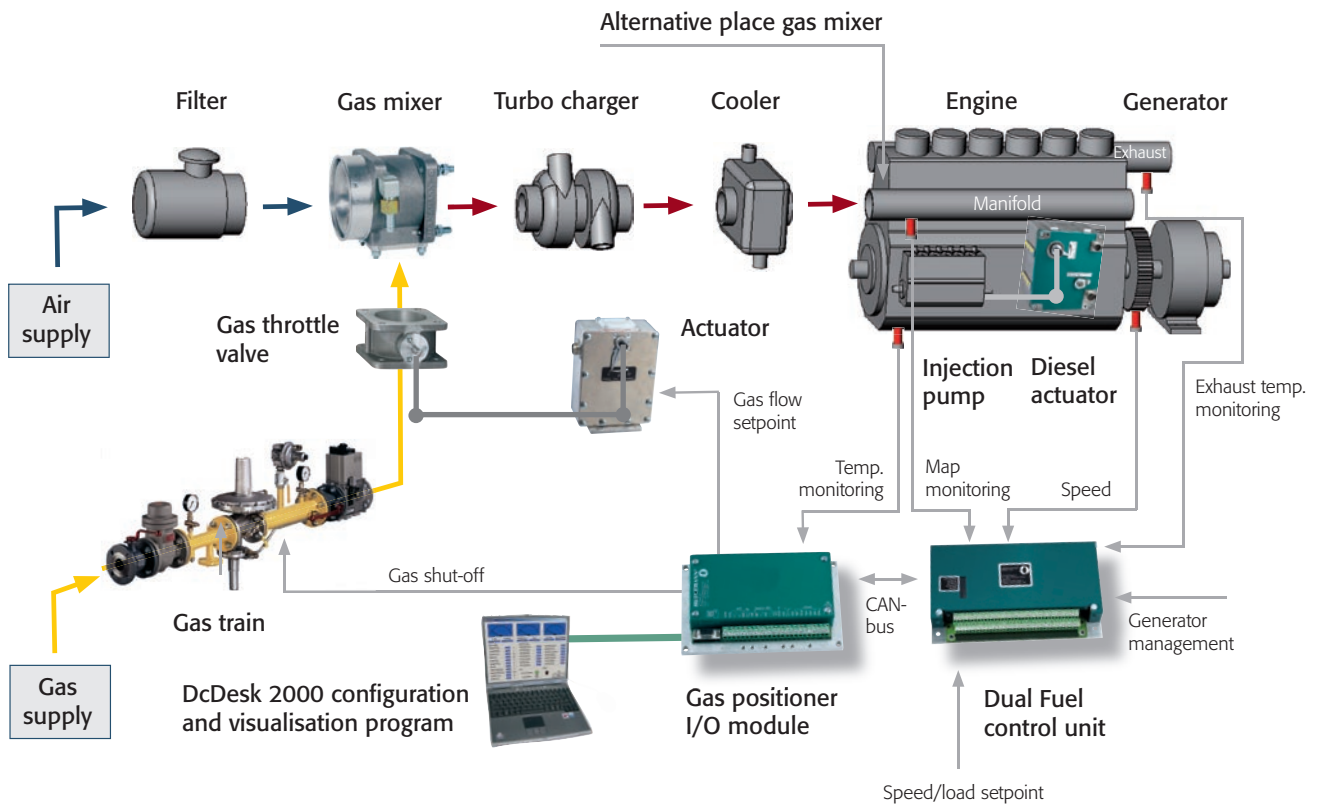


Diesel injection control

GAS CONTROLLED AND GAS MIXER BASED ARTEMIS SYSTEMS

Gas controlled and mixer based ARTEMIS systems are offered for various engine power ranges (100 – 6000 kW). As such, these Dual Fuel solutions are suitable for a wide range of engine sizes. Our customers can choose from custom configurations consisting of

a broad spectrum of control devices and actuators of various sizes. They can be used for stationary applications as well as for vehicles. The systems differ in the number of actuators and the use of a foot pedal or of a speed/load set point signal.



Features

- All electric actuators up to 90 Nm
- Diesel and gas governor control
- Flexible system configuration tailored for the respective power output range and for the kind of application (scope of functions and components, control unit, size of actuator)
- Gas mixer in air inlet or after intercooler
- Exhaust temperature monitor
- Diesel operation in case gas supply fails
- Engine response as with diesel engine
- Gas fuel map adjustable for maximum gas/diesel ratio
- For V-engines 2 gas actuators
- Diesel governors with electronic foot pedal unit (vehicle applications)
- Idle/max. or all speed control

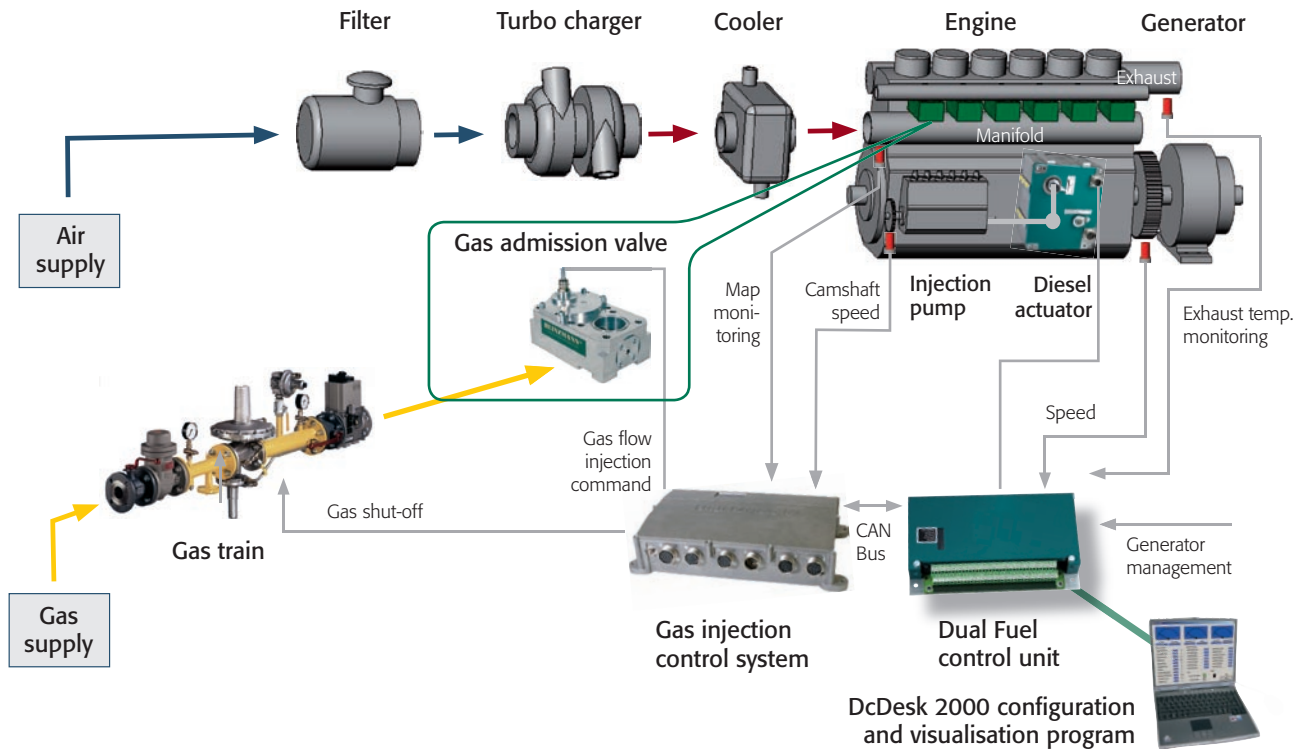
Configuration

- HEINZMANN standard digital controllers
- Diesel and gas actuators in different sizes covering a wide torque range
- Magnetic speed pickup
- CAN bus interface between the controllers
- Pressure and temperature sensors (gas, air, cooling water, exhaust)
- Gas mixer, gas throttle valve
- Knock control device (optional)
- LMG loadshare unit or DGM digital generator management (optional)
- Power supply (optional)

GAS CONTROLLED AND GAS ADMISSION VALVE BASED ARTEMIS SYSTEMS

This ARTEMIS solution is based on multi-point gas admission and is suitable for retrofitting on large diesel engines. Proven HEINZMANN technology in the form of a selection of EFI control units comes into play here.

The system prevents gas loss at valve overlaps and avoids the risk of backfiring. The single port injection provides best possible load response.



Features

- All electric actuators up to 90 Nm
- Diesel and gas governor control
- High-pressure gas injection
- System based on proven HEINZMANN EFI technology
- Precise fuel injection metering
- Misfire detection
- Improved engine dynamics
- Exhaust temperature monitor
- Diesel operation in case gas supply fails
- Gas fuel map adjustable for maximum gas/diesel ratio

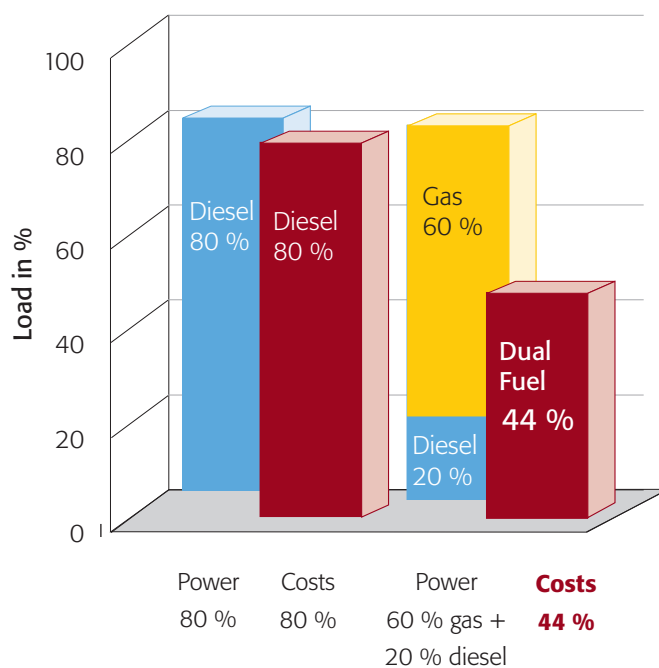
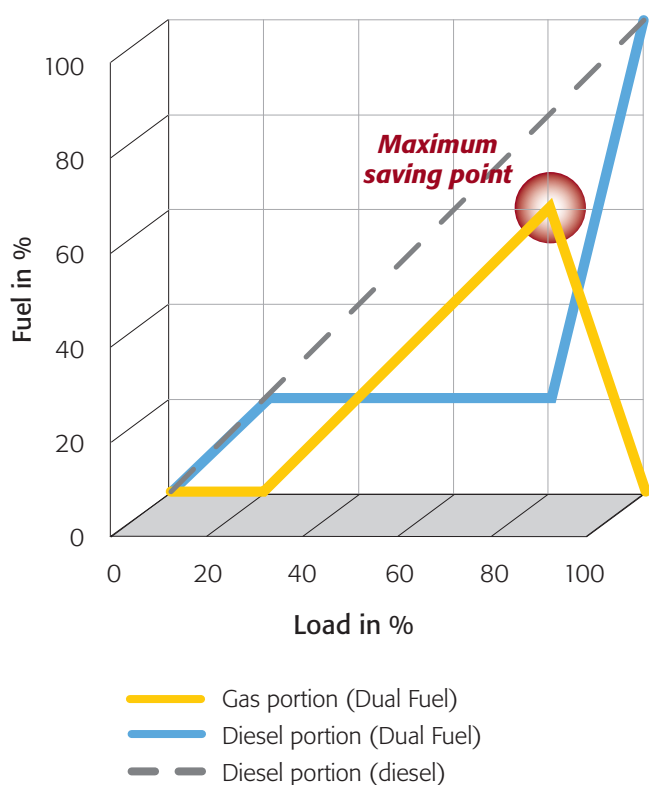
Configuration

- Different HEINZMANN controllers
- Magnetic valve control unit for gas valves
- Various HEINZMANN gas admission valves (electrically controlled)
- Hall speed and magnetic pickups
- Pressure and temperature sensors (gas, air, cooling water, exhaust)
- Knock control device (optional)
- Loadshare unit or DGM digital generator management (optional)
- Power supply (optional)

SELECTION OF DUAL FUEL INSTALLATIONS

Country	Engines	Power	Commissioned
Germany	MBH VDG 48/42	2500 ... 6000 kW	1995-1999
Germany	MAN B&W 32/40	6000 ... 9000 kW	1995-2000
Belgium	ABC 6DXD, 8DZD 550	750 kW	1995
Egypt	Wärtsilä 16V CR 26GD	2300 kW	2000
France	Wärtsilä 16V CR 26GD	2300 kW	2000
India	Wärtsilä 16V CR 26GD	2300 kW	2000
Germany	MAN B&W 32/40	3000 ... 4500 kW	2001-2005
Ukraine	various	200 ... 630 kW	2001
Brazil	Mirrlees K8 and K9 Major	6000 kW	2002-2005
Ukraine	Pervomajsk 6GZhChN26/34	800 kW	2002
Brazil	Cummins 6CT	240 kW	2004
The Netherlands	CAT 3512	1000 kW	2005
Ukraine	Raba	150 kW	2005
Uzbekistan	CAT 3512B	1300 kW	2005
China	Shengli 12V190	700 kW	2006
Germany	Volvo Penta TAD1232GE	220 kW	2006
Austria	BMW 3.0d	160 kW	2007
Germany	Scania DSI 1162A	280 kW	2007
Iran	Mirrlees K9 Major	2000 kW	2007

COST SAVINGS ON FUEL



Costs situation at maximum saving point.
Assumption: gas price 40 % of diesel fuel price



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Selection of HEINZMANN products

Wide range of digital and analogue control units



Different sizes of electrical actuators for 1 Nm up to 500 Nm



Electronic Fuel Injection control system (EFI) - control units from 4-cyl. up to 20-cyl. engines



Range of analogue and digital generator management units



Gas engine management



Common Rail systems



Sensors & solenoids



Digital control systems for gas turbines



Hydraulic governors & actuators



Electric components of hybrid drive systems



Quality & Precision since 1897



www.heinzmann.com