

Intelligent systems for fuel control

GAS TURBINE FUEL CONTROLS

Reliable, highly responsive & stable

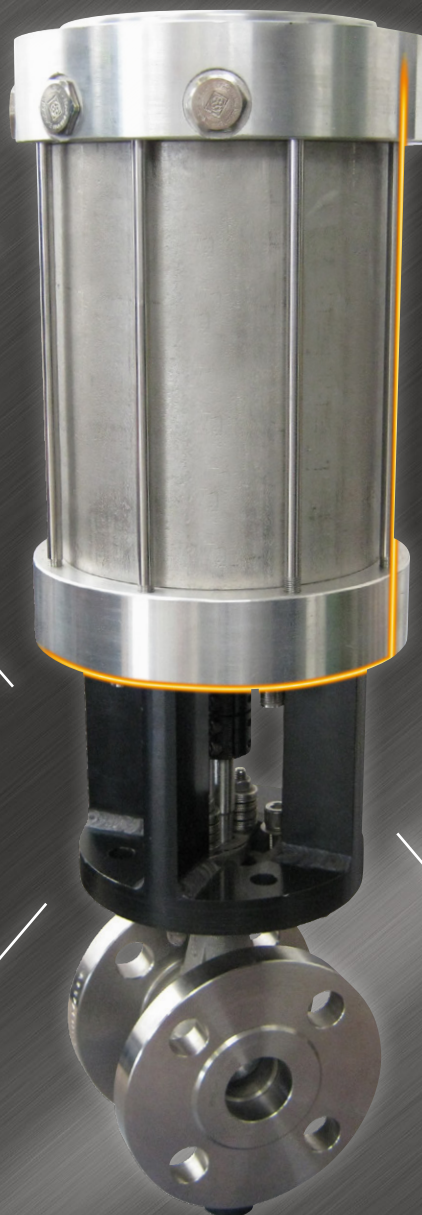
Design and build
of complete fuel systems

Single and volume prices
available

Simplifies system design
with common parts

Accurate multi-stream
DLE systems supplied

Compatible with all control
systems



FUEL CONTROLS

LIQUID AND GAS FUEL CONTROL SYSTEMS FOR GAS TURBINES

HEINZMANN UK has supplied many hundreds of fuel control products to gas turbine OEM's and operators since 1993 for machines ranging from fractional through over 100 MW shaft power. These may be supplied loose or as complete fuel systems or as part of total gas turbine controls packages including air, lubricating oil and electronic control systems. Single gas or liquid through dual fuel DLE fuel systems may be supplied.

HEINZMANN fuel controls are based on electric motor, digital electronic and safety technologies and experience developed in the HEINZMANN Group since the 1980's and products feature many innovations not found in competitor products. These features deliver ease and flexibility of application, quality of control and reliability for customers.

PRODUCT OVERVIEW

Evolution Systems

- ▶ EVOLUTION II-HT G Gas Fuel Control
- ▶ EVOLUTION II-HT L Liquid Fuel Control
- ▶ EVOLUTION III Gas Fuel Control
- ▶ EVOLUTION Lite 2120 Gas and Liquid Fuel Control Applications

Optiflow Systems

- ▶ OPTIFLOW Electrical Liquid Fuel Control System

- ▶ Less maintenance
- ▶ Ease of installation
- ▶ Remote reporting
- ▶ Fully configurable

EVOLUTION II-HT G

GAS FUEL CONTROL

The EVOLUTION II-HT G Gas Fuel Throttle Valve (EVO II-HT G) is a mechatronic assembly consisting of a valve, position servo and digital flow controller with associated redundant pressure instrumentation. In application, the assembly is usually mounted between pipe reducers as part of a complete fuel system. An optional temperature sensor can be fitted in the upstream pipe section to permit the flow controller to compensate for changes in gas fuel temperature.

FLEXIBILITY AND PERFORMANCE

EVOLUTION II-HT G valves are usually sized according to the maximum flow steady state flow requirement plus 20 % at full load valve and pressure drop of between 1 and 2 bar across the valve. The EVO II-HT G servo will satisfactorily position valves of 1 through 3 inches (25 – 80 mm) and 1 inch valves with several sizes of reduced trim are available to suit small gas turbines. Line sizes of 1.5 times valve size is usually specified.

CERTIFICATION & SAFETY

All EVOLUTION II-HT G valve assemblies operate from 24 VDC nominal battery supplies which are in common use on most gas turbines. EVO II-HT G valves are certified for use in hazardous areas to ATEX and CSA standards permitting their use in almost every gas turbine application. EVO II-HT G gas throttle valves have been independently assessed as suitable for use in SIL 2 applications when used as a low demand risk reduction system and in SIL 1 applications when used as a high demand safety related instrument.

VALVE FEATURES

Neles type REGUALTEURS EUROPA (RE) or Fisher V300 V ball valves are usually specified in EVOLUTION IIG throttle systems. These valves are available worldwide in a range of sizes and materials to suit any application.

FIELD BUS COMPATIBILITY

EVOLUTION II-HT G may be specified with any one of Profibus or DeviceNet field bus network types at the time of ordering. EVO II-HT G measurements, calculated values and valve status is available on the network to assist in the integration of the system.



KEY FEATURES

- ▶ High accuracy, flow fully compensated for fuel pressure and temperature
- ▶ Absolute repeatability
- ▶ Highly responsive and stable
- ▶ Reliable, does not require any flow sensor, self-cleaning valve surfaces
- ▶ User configurable and maintainable using free PC application
- ▶ Network enabled for Profibus, DeviceNet, field busses
- ▶ 24 VDC power source only required
- ▶ Competitive for wide range of turbine sizes
- ▶ Lifetime self-adjusting seals protect against leakage
- ▶ Independently SIL rated and certified for use in hazardous areas ATEX and CSA



EVOLUTION II-HT L

LIQUID FUEL CONTROL

The EVOLUTION II-HT L Liquid Fuel Throttle Valve is a mechatronic valve assembly similar in form and function to the EVOLUTION II-HT G Gas Fuel Throttle Valve but for liquid fuels. The description is the same as the EVO II-HT G gas fuel throttle except for the following features.



VALVE FEATURES

The EVOLUTION II-HT L uses a wafer type Fisher V200 V ball valve fitted between an ANSI class 600 flange and a special block containing a recycle pressure regulator block. The recycle regulator valve acts to maintain reasonably constant pressure drop across the throttle valve by 'spilling' unrequired fuel back to the tank or high-pressure pump inlet by means of a third connection on the block. Fisher V200 valves are available in 1 inch reduced and 1 inch sizes to support flow requirements for gas turbines up to over 100 MW shaft power.

The EVO II-HT L may be supplied with or may accept a process signal from a transmitter connected to instrument tapings on the block to measure the valve differential pressure. The EVOLUTION II-HT L flow controller can use this measurement to compensate for the natural pressure droop of the mechanical regulator thus improving the flow accuracy of the system. The measurement also provides increased protection by allowing the flow controller to monitor the correct operation of the recycle regulator valve. The differential pressure sensor is therefore recommended for larger turbines.

HEINZMANN will supply EVOLUTION II-HT L liquid valves ready for use with configuration set for the appropriate valve and fuel characteristics but EVO II-HT L is fully user configurable using a PC software application according to instructions which we provide in the installation and operations manual.

KEY FEATURES

- ▶ Integrated recycle regulator block ready to use
- ▶ Absolute repeatability
- ▶ BSPP ports to accept standard fittings for pump, manifold and tank connections
- ▶ ANSI class 600 pressure rating for pressure atomised burner systems
- ▶ Cartridge type recycle regulator valve for easy inspection/ replacement

EVOLUTION III

GAS FUEL CONTROL

The EVOLUTION III Fuel throttle valve is a mechatronic assembly consisting of a valve, position servo and digital flow controller with associated redundant pressure instrumentation. The big brother of the EVO II-HT G system.



KEY FEATURES

- ▶ High accuracy, flow fully compensated for fuel pressure and temperature, suitable for DLE systems
- ▶ Absolute repeatability
- ▶ Highly responsive and stable
- ▶ Reliable and tolerant to dirty fuel supplies, does not use flow sensor, self-cleaning valve
- ▶ User configurable and maintainable using free PC application
- ▶ Network enabled for Profibus, DeviceNet, field busses
- ▶ 24 VDC power source only required
- ▶ Competitive for wide range of turbine sizes
- ▶ Lifetime self-adjusting seals protect against leakage

Offering up to 100 Nm of torque. Designed to operate large valves that require high break torque and high accuracy. Complete with the HEINZMANN flow calculation and dual redundant pressure sensors built in.

EVOLUTION LITE

PRECISE CONTROL POSITIONER

EVO lite is a pure positioner using the same principal of operation as EVO II-HT G but without the flow control algorithm. Designed to operate on 4–20 mA or PWM signal and to return a similar feedback. It can be adapted for almost any rotary actuator application, from fuel valves, through to air and swashplate control.



KEY FEATURES

- ▶ High Accuracy, suitable for DLE systems
 - ▶ No flow control, positioner*
 - ▶ Economic
 - ▶ User configurable and maintainable using free PC application
 - ▶ 24 VDC power source only required
- *4-20 mA or PWM linear positioner. Equal percentage is available for gas flow control applications including DLE

OPTIFLOW

METERING PUMP FOR LIQUID FUEL CONTROL

This metering pump is a recent concept for liquid fuel systems. It offers unbeatable cost effectiveness for medium-sized gas turbine applications.



A metering pump is a high-pressure pump with a positive displacement characteristic which can be varied by a control mechanism to provide both pumping and throttle functionality in essentially one unit. Because only the turbines' fuel flow

requirements are delivered by the metering pump, there is no need for a recycle regulator as in the case of a conventional liquid fuel throttle valve system.

The HEINZMANN metering pump is based on an axial piston pump where the piston stroke is adjusted by means of a swash plate whose angle is controlled by a HEINZMANN positioning actuator. The pump delivery is approximately $C \times n \times \alpha$ where C is the pump size constant, n is the pump speed and α is the swash plate angle.

METERING PUMP APPLICATIONS

Simple systems are run at fixed speed with electric motor drive and in these systems the pump delivery is directly proportional to swash plate angle irrespective of discharge pressure. It is possible to drive the pump mechanically from the auxiliary gearbox of a gas turbine whereby a more sophisticated controller can be used to compensate the delivery for pump speed changes. This type of system is very cost effective for black start applications.

Because the metering pump only delivers the fuel demanded by the turbine to meet the load, no recycling of fuel is required so that the pump consumes a minimum amount of power and thus imparts no heat energy to the fuel supply. The pump therefore runs cool so maintaining the lubricity of the fuel which extends the wear life of the pump and fuel system.

HEINZMANN actuators used in metering pump systems are independently certified for application in hazardous areas to ATEX and CSA standards permitting their use in almost all turbine applications. Metering pumps are available in a large range of sizes to suit most medium sized gas turbines.

Metering pumps are tolerant to typical contaminants present in liquid fuel supplies which might interfere with sensitive components in traditional fuel systems.

KEY FEATURES

- Cost effective - replaces the high-pressure pump, throttle valve and regulator of traditional system with one component
- Electric or mechanically driven available. Mechanically driven pumps are particularly useful for black start generator applications.
- Tolerant to typical fuel contaminants
- Certified for use in hazardous areas (ATEX and CSA)
- Optimally efficient, no heat energy recycled into fuel supply
- Accurate and responsive
- Configurable for any size of gas turbine

COMPLETE FUEL SYSTEMS

HEINZMANN offers custom designed fuel systems based on HEINZMANN products for any gas turbine application, including single gas or liquid, dual or multi-fuel, simple or dry low emissions. All fuel systems feature safety shut-off system and may also optionally include fuel treatment such as filtration, pressure reduction or boosting and pressure relief, liquid knock out (for gas systems), degassing, water extraction and additive injection (for liquid systems) and heating.

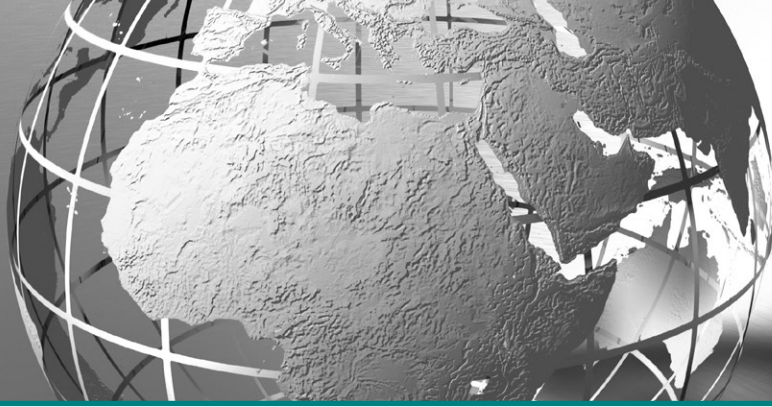
HEINZMANN fuel shut-off systems exceed current safety standards with over-travel valve position monitoring and may be supplied with pneumatic (air or fuel gas) or hydraulic (fuel oil or lubricating oil) actuation. Vent-free designs are offered to eliminate emission of fuel to the atmosphere.

We also supply low or high energy ignition systems and liquid fuel purge systems.

KEY FEATURES

- Upgrading the original fuel controls with replacement systems built into the space occupied by the original system
- Replacement of original hydraulically actuated fuel assemblies with electrically actuated systems designed one replacement of the original system
- No limits on size we build fuel system frames for all types of turbines
- HEINZMANN delivers a tailor-made solution for any type, size or make of gas turbine





HEINZMANN GROUP - THINKING IN DRIVE AND CONTROL

HEINZMANN is a globally active family business founded in 1897 with its headquarters in Schöna (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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