

SonicFlo™ Gas Valves

Hydraulically Actuated

Applications

SonicFlo™ gas valves provide precise fuel control and shut-off capabilities for large industrial gas turbines with single or multiple combustion manifold systems. The designs feature closely integrated linear valves and actuators which are based on Woodward's extensive experience with gas fuel controls.

Robust design and component redundancy result in exceptional service life and system reliability. The assemblies may be used with electronic controllers to achieve state-of-the-art control accuracy and response characteristics.

The SonicFlo valve is available in either Standard or High Recovery configurations and in four valve sizes:

- 2" (51 mm)
- 3" (76 mm)
- 4" (102 mm)
- 6" (152 mm)

Description

The SonicFlo valve controls the flow of gas fuel to the combustion system of an industrial or utility gas turbine. The unique design yields a flow characteristic unaffected by discharge pressure up to a pressure ratio (P_2/P_1) of at least 0.80 for Standard Recovery and at least 0.91 for High Recovery, reducing the requirement for additional gas pressure boosting. The design integrates the valve and actuator into a compact assembly. This close integration allows for lower costs, smaller envelope and better accuracy.

The integral actuator is a single-acting spring-loaded design for failsafe operation. The actuator includes an on-board hydraulic filter for last-chance filtration of the fluid to ensure reliability of the servovalve and actuator. The servovalve is electrically redundant with triple coil design. Position feedback for the actuator is provided by either a dual or triple coil LVDT (linear variable differential transformer) directly coupled to the hydraulic piston. Rapid or emergency failsafe operation of the valve may be initiated by use of the solenoid-operated trip system. The trip system bypasses the servovalve-modulating control and directs the actuator to its failsafe position.



- Highly accurate fuel flow control
- High pressure recovery
- Fast dynamic response
- Electro-hydraulic actuation with fail-safe spring loading
- Flow shut-off in conformance with ANSI B16.104 Class IV
- Materials and construction in compliance with NACE MR0103
- Suitable for North American hazardous locations
- Compliant with the applicable CE Directives—ATEX, Pressure Equipment, and Machinery

SonicFlo Valve Parameters

Valve Type	Two Way–Right Angle
Type of Operation	Run—Valve Open Trip—Valve Closed
Flange Rating	ASME B16.5 Class 300 for Standard Recovery ASME B16.5 Class 600 for High Recovery
Flowing Media	Natural gas
Valve Proof Pressure Level	300 lb Flanges: 1125 psig/7757 kPa 600 lb Flanges: 1300 psig/8964 kPa
Minimum Valve Burst Pressure	300 lb Flanges: 1850 psig/12755 kPa (2.5 x 740 psig/5102 kPa max working pressure) 600 lb Flanges: 3600 psig/24821 kPa (2.5 x 1440 psig/9928 kPa max working pressure)
Gas Filtration	25 µm absolute at 75 beta requirement
Ambient Temperature	–20 to +180 °F (–29 to +82 °C)
Shut-off Classification	Class IV per ANSI B16.104/FCI 70-2
External Leakage	None
Inter-seal Vent Leakage	< 10 cm ³ /min as shipped
Position Accuracy	±1% of full scale (Over ±25 °F/±14 °C deviation from calibration)
Position Repeatability	±0.5% of point over range of 10% to 100%
Hydraulic Fluid Type	Petroleum based hydraulic fluids
Hydraulic Supply Pressure	1200 to 1800 psig/8274 to 12 411 kPa (design at 1600 psig/11 032 kPa)
Hydraulic Fluid Connections	Supply pressure—0.750-16 UNF-2B straight thread port (–8) Drain pressure—1.312-12 UN-2B straight thread port (–16)
Hydraulic Fluid Temperature	+50 to +150 °F (+10 to +66 °C)
Hydraulic Fluid Contamination Level	Per ISO 4406 code 18/16/13 max Code 16/14/11 preferred
On-board filtration	15 µm – 200 beta with DP visual indicator
Proof Test Fluid Pressure Level	2700 psig/18 616 kPa minimum per SAE J214
Minimum Burst Fluid Pressure	4500 psig/31 026 kPa minimum per SAE J214
Trip System	Solenoid operated @ 90–140 Vdc (125 Vdc nominal)
Total Valve Trip Time	Less than 0.350 s
Slew Time	Standard recovery valves: max 0.800 s (5%–95% opening and 95%–5% closing) High recovery valves: max 1.150 s (5%–95% opening and 95%–5% closing)
Servo Valve Coil	Triple Redundant
Servo Input Current Rating	–7.2 to +8.8 mA (null bias 0.8 ± 0.32 mA)
Position Transducer LVDT	Dual Coil Redundant for Standard Recovery Triple Coil Redundant for High Recovery
Materials	Woodward certifies that our SonicFlo line is designed and manufactured such that all wetted materials that experience a tensile stress are compliant with the thermo-mechanical requirements of NACE MR0103.

	Standard Recovery Configuration	High Recovery Configuration
Trim Configuration	Linear	Linear
Maximum Gas Pressure	3103 kPa (450 psig)	3965 kPa (580 psig)
Gas Temperature	–18 to +177 °C (0 to 350 °F)	–18 to +232 °C (0 to 450 °F)
Valve Port Sizes	<u>2" (50 mm)</u> Cv=72; Kv=62.3 <u>3" (75 mm)</u> Cv=171; Kv=147.9 <u>4" (100 mm)</u> Cv=253; Kv=218.8 <u>6" (150 mm)</u> Cv=365; Kv=315.7	<u>2" (50 mm)</u> Cv=109; Kv=94.3 <u>3" (75 mm)</u> Cv=252; Kv=218.0 <u>4" (100 mm)</u> Cv=370; Kv=320.1 <u>6" (150 mm)</u> Cv=540; Kv=467.1
Flow Characteristics	±3% of point from 10% to 100% stroke	±3% of point from 10% to 100% stroke
Operating Pressure Ratio (P2/P1)	Up To 0.80	Up To 0.91

Regulatory Compliance

European Compliance for CE Marking:

These listings are limited only to those units bearing the CE Marking.

Pressure Equipment Directive: Certified to Pressure Equipment Directive 97/23/EC of 29 May 1997 on the approximation of the laws of the Member States concerning pressure equipment, Category II and III

ATEX – Potentially Explosive Atmospheres Directive: Declared to 94/9/EC COUNCIL DIRECTIVE of 23 March 1994 on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres.
Zone 2, Category 3, Group II G, EEx nA IIC T3X

Note: T3 represents surface temperature without process fluid. It is the user's responsibility to assure that the process fluid temperature is below the ignition temperature of surrounding hazardous gases.

Other European Compliance:

Compliance with the following European Directives or standards does not qualify this product for application of the CE Marking:

EMC Directive: 2004/108/EC COUNCIL DIRECTIVE of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and all applicable amendments is met by evaluation of the physical nature to the EMC protection requirement. Electromagnetically passive or "benign" devices are excluded from the scope of the Directive 2004/108/EC, however they also meet the protection requirement and intent of the directive.

Machinery Directive: Compliant as partly completed machinery with Directive 2006/42/EC of the European Parliament and the Council of 17 May 2006 on machinery.

North American Compliance:

Suitability for use in North American Hazardous Locations is the result of compliance of the individual components:

LVDT (triple coil): ETL Certified for North American Class I, Division 2, Groups A, B, C, D, T3, per ETL J98036083-003.

LVDT (dual coil): CSA Certified for Class I, Divisions 1 and 2, Groups C & D, T4 for use in the United States and Canada per CSA 151336-1090811.

Servo Valve: Certified for Class I, Division 2, Groups A, B, C, D for the United States per FM 4B9A6.AX and for Canada per CSA 1072373.

Junction Box: UL Certified for Class I, Zone 1, Gas Group II, for use in North America per UL E203312.

Electric Trip Solenoid: CSA certified for North American Class I, Division 1, Groups C and D, and Class I, Division 2, Groups A, B, C, D per CSA 1260548.



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