

Electric SonicFlo™

Gas Valves

Applications

Electric SonicFlo™ gas valves provide extremely precise fuel metering and fast response shut-off capabilities for large industrial gas turbine engines with single or multiple combustion manifold systems. The use of the SonicFlo concept minimizes system pressure losses and eliminates the need for valve discharge pressure measurement and compensation. This system simplification results in a lower system cost and improved performance. Combining the fast SonicFlo gas valve with an EM Digital Driver eliminates hydraulic and pneumatic requirements for the fuel system.

By using electric actuation, the valve has significantly better accuracy and response than conventional hydraulic valves.

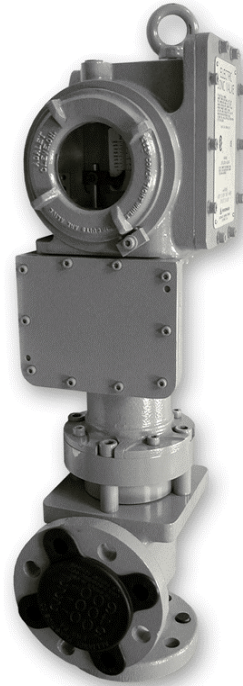
Description

The electric SonicFlo assemblies combine plug-style metering valves with electric motor driven leadscrew actuators. The integral electric actuator incorporates a brushless dc motor, speed reduction gearing, a recirculating ball-type leadscrew, and a position feedback resolver. The resolver and driver accuracy allows valve position control of $\pm 0.1\%$ (full travel) to be achieved.

High force levels ensure reliable operation with all common gaseous fuels and allow ANSI B16.104 Class IV shut-off to be achieved. The metering valve plug is loaded to the fully closed position by a helical compression spring. This spring has sufficient force to overcome the electric actuator following loss of power, trip, or position feedback signals.

Highly accurate flow control is obtained by the use of a resolver position feedback transducer and the precise contouring of the metering valve plug.

Each valve is supplied with a Woodward EM Digital Driver for actuation, position control, system protection, and fault management. The EM driver is a digital system which uses model-based control algorithms for robust operation with wide variations in friction levels and return spring loads. PC/Windows® based software facilitates driver setup. Several communication protocols are available for monitoring and control.



- Highly accurate fuel flow metering
- Fast dynamic response
- High pressure recovery
- All-electric actuation with fail-safe spring loading
- Model-based control algorithms
- Digital and/or 4–20 mA analog signal interfaces
- Discrete fault output and independent shutdown
- Gas shut-off in conformance with ANSI B16.104 Class IV
- Materials and construction in compliance with NACE MRO 175
- Certified for CSA Class I, Division 1, Groups C, D
- CE Compliant with ATEX, Pressure Equipment, Low Voltage, and Machinery directives

SonicFlo Valve Parameters

Valve type	Two way – right angle
Trim configuration	Linear flow versus stroke characteristic
Fluid ports	Inlet and discharge flanges per ANSI Class 300 Raised Face Inter-seal vent port per SAE J514-4
Flowing media	Natural gas, methane, propane, mixtures and service gas with specific gravities in the range of 0.5 to 1.05
Materials of construction	WCB steel bodies and stainless steel stem and trim NACE MR0175 compliant
Weight	2" (51 mm) valve: 45 kg (99 lb) 3" (76 mm) valve: 59 kg (130 lb)
Maximum gas inlet pressure	2" (51 mm) valve: 3450 kPa (500 psig) 3" (76 mm) valve: 2070 kPa (300 psig)
Maximum gas pressure ratio	0.795 (P_{disch}/P_{inlet})
Valve proof pressure level	7757 kPa (1125 psig) per ANSI B16.34, ANSI B16.37/ISA S75.19
Minimum valve burst pressure	25 510 kPa (3700 psig)
Inlet gas filtration	25 μ m absolute at 75 beta ratio
Gas temperature	-29 to +204 °C (-20 to +400 °F)
Valve port size	2" (51 mm) valve: Maximum Cg 125, 250, 650, 1205 3" (76 mm) valve: Maximum Cg 2000
Flow characteristics	\pm 3% Cg deviation from tabulated values
Valve ambient temperature	-29 to +83 °C (-20 to +181 °F)
Shut off classification	Class IV per ANSI B16.104/FCI 70-2 (0.01% of rated valve capacity at full travel as measured with air at 345 kPa/50 psid)
External leakage	None
Inter-seal vent leakage	1.0 cm ³ /min maximum
Positioning accuracy	with analog input signal: \pm 0.225% of full stroke with digital input signal: \pm 0.10% of full stroke
Vibration	per US MIL-STD-810D, Method 514-3, Category 1
Shock	per US MIL-STD-810D, Method 516.2, Procedure 1 (10 G Peak, 11 ms duration, sawtooth waveform)
Slew time	0.100 second maximum for 10 to 90% stroke range in either direction
Hazardous locations approvals	Class I, Division 1, Groups C, D T3 Zone I Group IIB CE Directives: Machinery, ATEX, Low Voltage, and Pressure Equipment
Sound level	110 dB at full flow conditions
Technical Manual	26177

EM Driver Characteristics

Power Supply

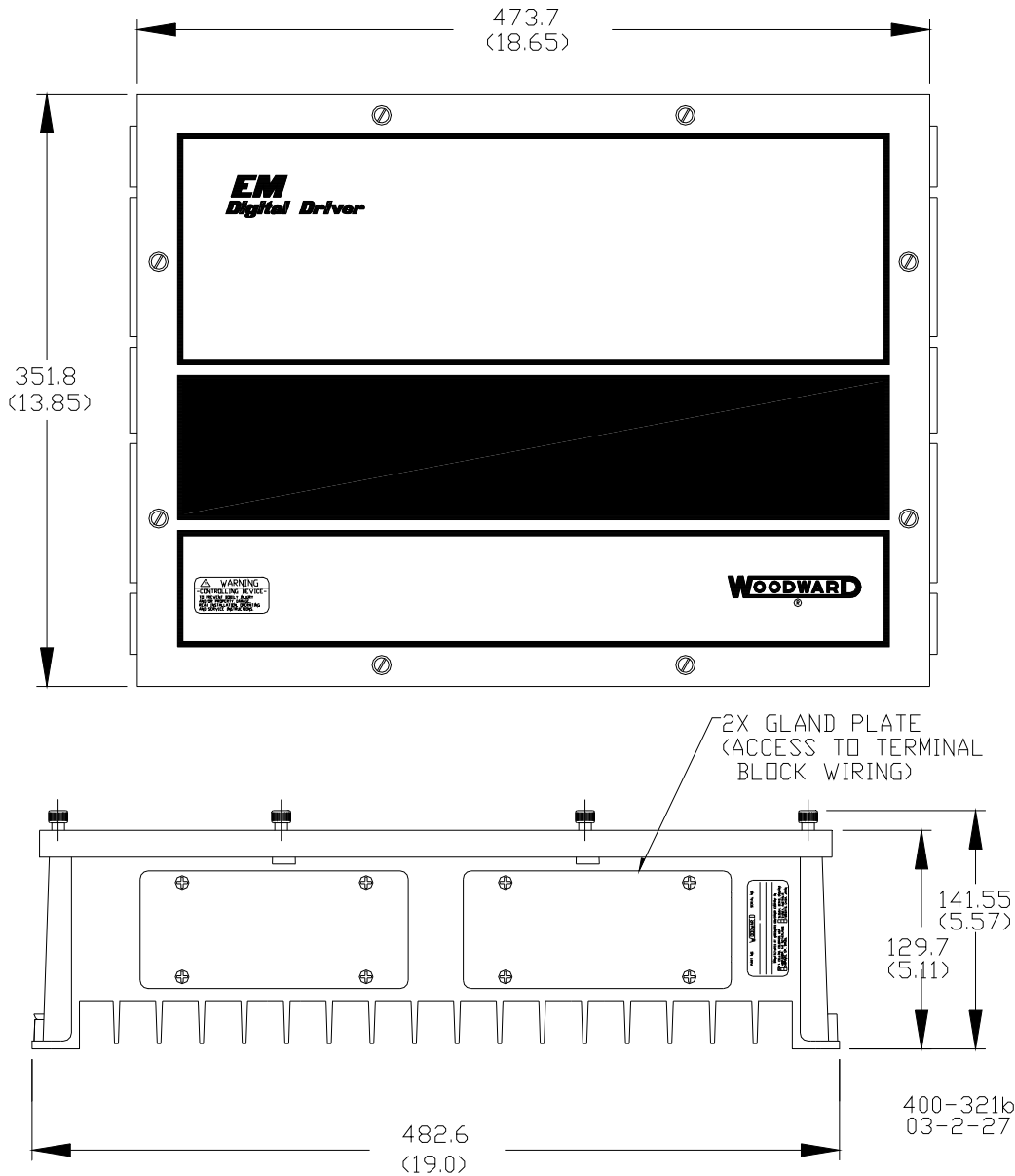
Voltage to driver terminals:	125 Vdc (90–152 Vdc)
Maximum current draw:	1.1 A continuous 20 A transient (1.8 s max)

Environmental Specifications

Ambient Temperature Range:	-20 to +68 °C (-4 to +154 °F)
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Agency Approvals

North American:	Class I, Division 2, Groups A, B, C, D
CE:	Compliant with EMC Directive, ATEX Directive, and Low Voltage Directive
European:	Zone 2, Group IIC
Dynamic Response:	The actuator provides a minimum positioning control bandwidth 10 Hz at \pm 0.5 mm (\pm 0.02") of displacement as defined by the point where the normalized dc position gain is equal to -4.0 dB. The actuator position control provides a 120° nominal and 140° maximum phase lag at a frequency of not less than 10 Hz.



EM Digital Driver
(Do not use for construction)



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