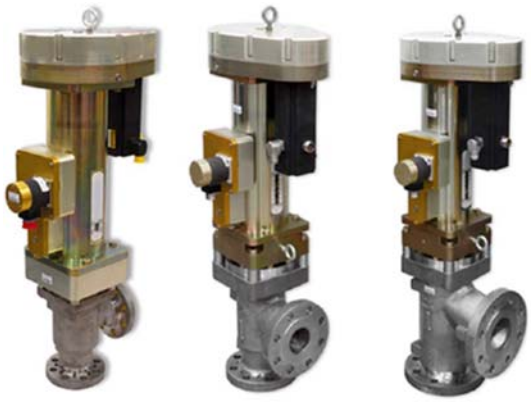
WOODWARD

Product Specification **03439**
(Revision -, 5/2017)

LESV

Large Electric SonicFlo Valve

Applications



The Large Electric SonicFlo Valve family (LESV) controls the flow of gas fuel to the combustion system of an industrial or utility gas turbine. The highly robust and patented valve technology combined with a proven electric actuator provides exceptional performance over a broad range of applications.

The integral electric actuator consists of a brushless DC motor, resolver(s) for motor commutation and position sensing, valve stem resolver for motor resolver verification, fail-safe spring for fail-safe operation, and a soft stop system to increase reliability. The LESV utilizes an integral ID Module (Identification Module) containing all the configuration and calibration information that is read by the off-board valve positioner (Digital Valve Positioner (DVP)) when the valve/actuator is connected and powered up. The DVP is a proprietary valve positioner only used with other Woodward electrically actuated products. See Woodward DVP Documentation for details.

The integrated control valve includes Woodward's long history of SonicFlo technology. With over 10,000 valves shipped, this technology continues to exceed expectations providing both high performance and reliability. The SonicFlo valve technology provides a highly efficient valve that operates in the choked flow region under all conditions. This enables a simplified control algorithm to be used and minimal pressure measurement (P1 only), saving installation costs and maximizing reliability.

The SonicFlo valve technology has been used for many years with multiple levels of performance based upon the allowable system gas pressure for the application.

- The High Recovery valve series is capable of sonic operation up to a .92 (P2/P1) pressure ratio.
- The latest valve series, Ultra High Recovery, is capable of sonic operation up to .94 (P2/P1) pressure ratio.

- 2", 3", 4" and 6" Valve Sizes
- B16.5 300# & 600# RF Flanges
- Carbon Steel or Stainless Steel Valve Bodies
- Stainless Steel Trim Components
- Multiple Flow Trims per valve size
- Single or Dual Motor Feedback Devices
- Compatible with Woodward DVP
- SIL Certified Safety Shutdown

Description

The LESV family is available in four ANSI flange sizes (2-inch, 3-inch, 4-inch, and 6-inch) with twelve different flow trim sets spread across the sizes. Combined with two ANSI pressure classes, two valve body materials and three levels of Pressure Recovery, the LESV family can cover a vast range of applications. A common electric actuator Large Electric Linear Actuator (LELA) for all sizes with the option of single or dual motor resolver enables a common platform with ease of interchangeability. The off-board driver (DVP) used with each LESV remains common and interchangeable with any of the valves.

Valve Characteristic Data

Flow testing is conducted on every valve before shipment. Results from this flow testing produce Cg versus position characteristics of the valve. Each valve must demonstrate predetermined Cg characteristics before it can be shipped.

Calibration

When the DVP is activated, it performs an automatic rigging procedure that checks system health and verifies the valve is in the proper position. No additional steps are required from the operator.

Valve/Actuator Configuration Settings

The LESV utilizes a device (ID Module) containing all the configuration and calibration information that is read by the Digital Valve Positioner (DVP) when the valve/actuator is connected and powered up. Initial configuration settings for the valve/actuator do not need to be entered into the DVP due to the ID Module communicating directly with the positioner. However, in an unlikely event the configuration settings must be entered manually.

These configuration settings are broken up into three groups: User Configuration Parameters, Valve Part Number Specific Parameters, and Valve Serial Number Specific Parameters. Some of the configuration settings include factory calibration information. Please contact Woodward with the valve part number and serial number for the data containing the specific calibration and configuration settings if the need arises.

Many of these parameters are accessible via the Woodward Service Tool.

User Configuration Parameters

The User Configuration Parameters are used in the DVP to define the interface between the DVP and the turbine control system. Examples of these include the demand type selection, analog input scaling, discrete input and output configurations, etc. For a complete description of all the options for the User Configuration Parameters, please see the DVP product manual.

Valve Part Number Specific Parameters

These parameters define the settings based on a particular valve type (part number). Every valve of the same type, regardless of serial number, will have the same settings. Please refer to the table below for a definition of these settings.

Operating Specifications

General Product Information		
Description	2, 3, 4, & 6” (51, 76, 102, 152 mm) electrically actuated SonicFlo gas fuel metering valve.	
Mean Time Between Failure (MTBF)	149 000 hrs. operation of combined Metering Valve system Metering Valve system includes valve/actuator/DVP/cable subsystems	
Ambient Temperature Range	–40 to +93 °C (–40 to +200 °F)	
Approximate Weights	Class 300 LESV 2” - 113 kg / 250 lb. 3” - 161 kg / 356 lb. 4” - 195 kg / 430 lb. 6” - 256 kg / 565 lb.	Class 600 LESV 2” – 113 kg / 250 lb. 3” – 167 kg / 368 lb. 4” – 207 kg / 456 lb. 6” – 278 kg / 613 lb.
Actuator		
Description	Brushless dc motor with dual position feedback sensors.	
Coil Insulation	Class H insulation	
Failure Mode	Spring type to drive valve to safe position with loss of signal (Fail Close).	
Visual Indicator	Yes	
Ingress Protection	IP55	

Performance Characteristic	High Recovery (.92 P2/P1)	Ultra-High Recovery (.94 P2/P1)
Full Stroke Slew Rate	2”—200 ms 3”—350 ms 4”—700 ms 6”—700 ms	2”—400 ms 3”—700 ms 4”—700 ms 6”—700 ms
DVP Input Voltage Range (Typical)	90-300 VDC (125 VDC or 220 VDC)	
DVP Minimum Input Voltage for full dynamic performance	112.5 VDC	
Valve		
Operating Fluid	Natural Gas or similar	
Gas Filtration	25 µm absolute at 75 beta requirement	
Valve Flange Connection	ANSI B16.5 300# and 600# RF Flanges	
Process Fluid Temperature Range	–29 °C (–20 °F) to 232 °C (450 °F) High Recovery Valves –29 °C (–20 °F) to 260 °C (500 °F) Ultra High Recovery Valves –29 °C (–20 °F) to 370 °C (700 °F) Ultra High Recovery Valves	
Max Process Fluid Pressure	4171 kPa at 260 °C (605 psig at 500 °F)	
Proof Test Pressure/ Production	9480 kPa / 1375 psig	
Minimum Burst Pressure	> 5x maximum operating pressure	
Overboard Leakage	< 20 cm³/min as shipped (see Fuel Overboard Vent Port section).	
Trim Sizes	Contact Woodward for available trim sizes.	

Regulatory Compliance

European Compliance for CE Marking:
These listings are limited only to those units bearing the CE Marking.

EMC Directive: Directive 2017/30/EU

Pressure Equipment Directive: 2014/68/EU (Category II and III)

ATEX Directive: 2014/34/EU
Zone 2, Category 3, Group II G, Ex nA IIC T3 X Gc IP55

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

Machinery Directive: Compliant as partly completed machinery per 2006/42/EC.

Other International Compliance:

IECEx (LELA Actuator) Certified for use in explosive atmospheres per Certificate IECEx CSA 14.0013X Ex nA IIC T3 Gc IP55

EAC Customs Union:
These listings are limited only to those units with labels, marking, and manuals in Russian language to comply with their certificates and declaration.

EAC Customs Union (Marked): Certified to Technical Regulation CU 012/2011 for use in potentially explosive atmospheres per Certificate RU C-US.ГБ08.B.01076 as 2Ex nA IIC T3 Gc X for electrical and II Gc TX for non-electrical portions of the valve.

EAC Customs Union (Marked): Certified to Technical Regulation CU 032/2013 On the safety of equipment operating under excessive pressure. Certificate RU C-US.МЮ62.B.02208 for 6 inch valves.

EAC Customs Union: Declared to Technical Regulation CU 032/2013 On the safety of equipment operating under excessive pressure. Declaration of Conformity Registration No: RU Д-US.МЮ62.B.02150 for 2, 3, and 4 inch valves.

EAC Customs Union: Declared to Technical Regulation CU 010/2011 on Electromagnetic Compatibility of Technical Equipment. Declaration of Conformity Registration No: RU Д-US.AY14.B.25099.

North American Compliance:
These listings are limited only to those units bearing the CSA Marking.

CSA (Actuator): CSA Certified for Class I, Division 2, Groups A, B, C, & D, T3 at 93 °C Ambient for use in Canada and the United States. Certificate 1635932. Actuator is certified for North America as on-engine systems component connected to the certified Digital Valve Positioner.

SIL Compliance:
LESV – Certified SIL 3 Capable for safe position fuel shutoff function in safety instrumented systems. Evaluated to IEC 61508 Parts 1-7. Refer to the instructions of this Installation and Operation Manual, B26419, Chapter 6 – Safety Management – Safe Position Fuel Shutoff Function.
SIL Certificate WOO 1405126 C001

See Product Manual(s) for valve dimensions.

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Woodward has company-owned plants, subsidiaries, and branches, as well as authorized distributors and other authorized service and sales facilities throughout the world. Complete address / phone / fax / email information for all locations is available on our website.

For more information contact: