

Rotary Control Valve (GSxE)

Applications

The GSxE is an Electrically Actuated Rotary Control Valve designed for a wide variety of applications and service conditions. The actuator design incorporates a brushless DC motor, a gearbox, and a torsional failsafe spring for precise position control and long operational life. The valve design is a segmented ball valve providing tight shutoff, high flow capacity, high ΔP capability, and elevated pressure and temperature ranges.

Optional features that can be configured at time of order are:

- Valve body sizes from 75 mm to 200 mm (3 inches to 8 inches)
- Flanged process connections—ANSI 300 lb and 600 lb class
- Carbon or stainless steel body construction
- Fail closed or fail open
- Visual indicator
- High performance actuator
- Fully integrated and tested from factory



- Electrically actuated V-notch valve
- Precise position control
- 100% duty cycle
- Positive spring failsafe
- Robust self-cleaning valve
- Certified for North American Hazardous Locations
- Compliant with applicable EU Directives
- IECEx Certified for use in explosive atmospheres
- Declared and/or Certified for use within the EAC-CU
- SIL Certified
- O&M manual—26689

Description

The GSxE is an electrically actuated fuel valve with an off-board electronic position controller. The GSxE valve family combines a highly robust Woodward self-cleaning metering valve with a high-torque actuator to ensure extended operation in all types of gaseous fuel service.

The electric actuator consists of a brushless DC motor driving a spur gear box coupled to a rotary failsafe spring. The entire drive train is designed for long life while continuously operating at the specification limits. When combined with the Woodward Digital Valve Positioner (DVP, see manual 26773), the GSxE valve provides for precise flow metering or pressure control with a high range of turn-down within a single valve body.

Highly accurate flow control is achieved by the use of a spherical fuel-metering element with a precision-machined fuel-metering port. A seal shoe is loaded against the spherical valve element to allow accurate flow-area control and positive flow shut-off. The closely integrated mechanical design eliminates backlash and provides virtually infinite valve positioning resolution.

The self-cleaning, shear-type metering action keeps the metering port free from performance-limiting deposits of gas condensates, contaminants, and system debris.

Accurate flow-versus-input-signal characteristics are achieved on each valve version by precision forming of the valve metering port, the use of extended valve travels, and a high-precision resolver for valve position feedback. The GSxE valves can achieve flow turndown ratios in excess of 100 to 1 and a positive flow shut-off rating exceeding the requirements of ANSI B16.104 Class IV.

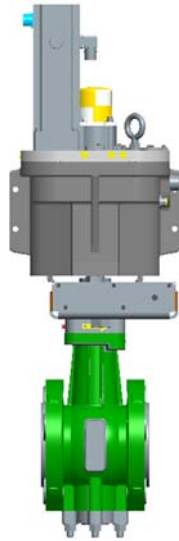
GSxE Flow Characteristics

	GS75E		GS100E		GS150E		GS200E	
Position %	Cv	Xt	Cv	Xt	Cv	Xt	Cv	Xt
100	222.94	0.242	398.96	0.28	797.40	0.29	1278.33	0.34
90	132.71	0.447	253.37	0.40	512.60	0.40	836.59	0.45
80	88.48	0.575	170.51	0.51	348.40	0.52	567.51	0.58
70	59.26	0.736	113.67	0.66	240.20	0.64	393.72	0.72
60	39.86	0.866	75.74	0.83	164.00	0.76	270.54	0.83
50	25.84	0.941	49.52	0.92	108.80	0.82	179.93	0.88
40	15.40	0.924	30.40	0.92	67.90	0.79	107.91	0.88
30	7.47	0.950	15.81	0.96	36.50	0.77	54.84	0.90
20	2.33	0.957	5.88	0.97	14.30	0.43	19.09	0.89
10	0.11	0.973	0.80	0.95	2.48	0.74	64.05	1.84

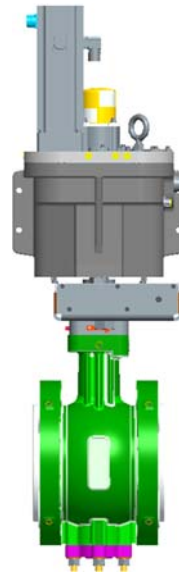
GSxE Valve Family of sizes:



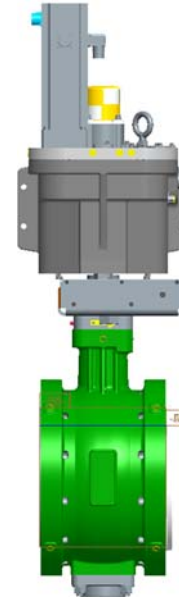
GS75E
3" Valve Body



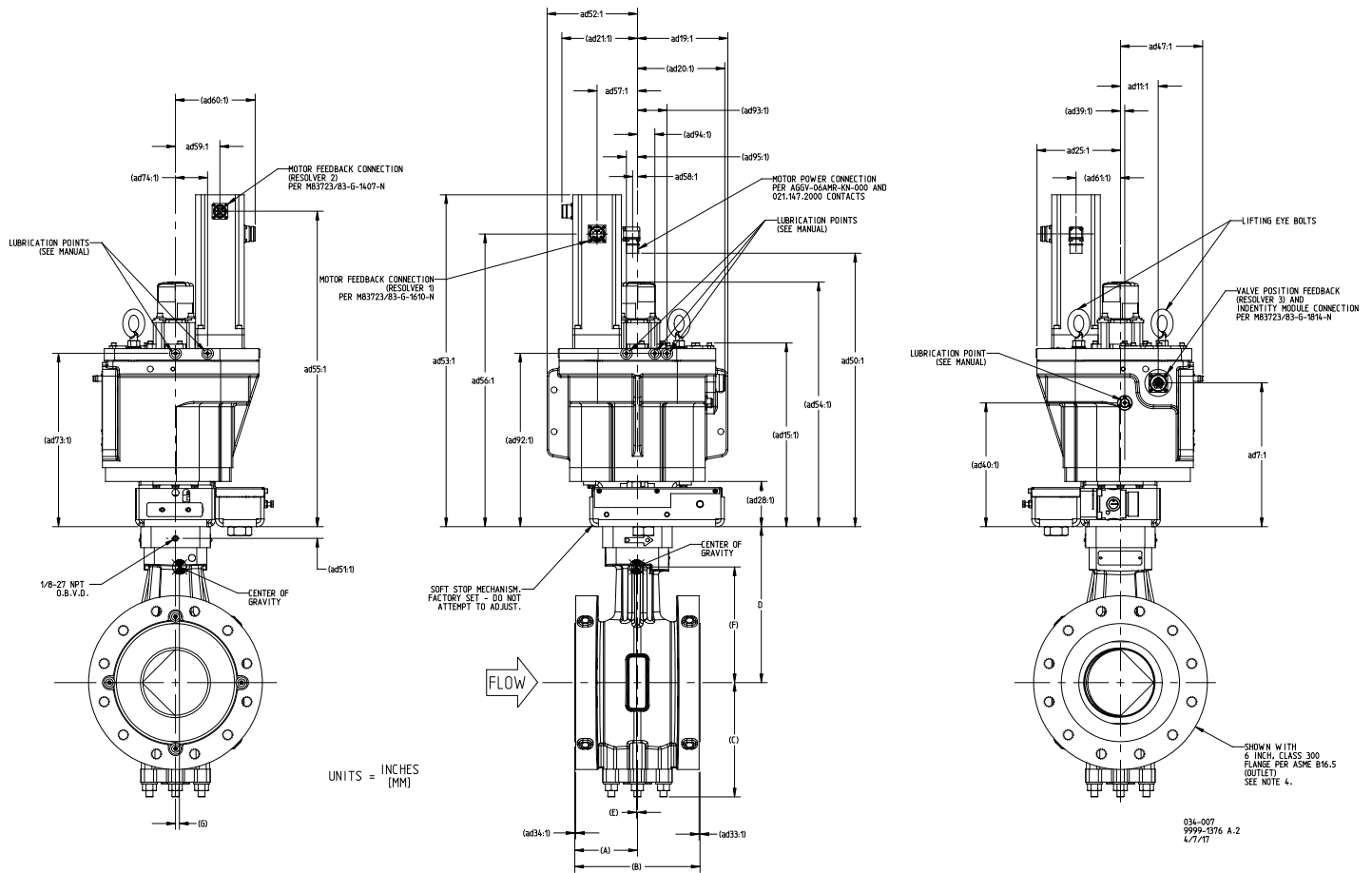
GS100E
4" Valve Body



GS150E
6" Valve Body



GS200E
8" Valve Body



DIMENSION TABLE											
		CENTER OF GRAVITY									
SIZE	CLASS	WEIGHT	DIM "A"	DIM "B"	DIM "C"	DIM "D"	DIM "E"	DIM "F"	DIM "G"	DIM "H"	
3 INCH	300	198.1 LBS [89.9 KG]	(3.25) [82.5]	(6.50) [165.1]	(6.42) [163.2]	(9.45) [240.0]	(.04) [1.0]	(11.43) [290.3]	(.45) [11.4]		
4 INCH	300	229.4 LBS [104.1 KG]	(3.81) [96.7]	(7.62) [193.5]	(7.00) [177.8]	(10.00) [254.1]	(.04) [1.0]	(10.23) [259.7]	(.39) [9.9]		
6 INCH	300	299.2 LBS [135.7 KG]	(4.50) [114.3]	(9.00) [228.6]	(8.22) [208.8]	(11.23) [285.1]	(.06) [1.5]	(8.45) [214.5]	(.29) [7.4]		
8 INCH	300	437.5 LBS [198.4 KG]	(4.78) [121.4]	(9.56) [242.8]	(9.08) [230.6]	(12.83) [325.7]	(.08) [2.0]	(6.50) [165.1]	(.19) [4.8]		
3 INCH	600	202.6 LBS [91.9 KG]	(3.25) [82.5]	(6.50) [165.1]	(6.42) [163.0]	(9.45) [240.0]	(.04) [1.0]	(11.19) [284.3]	(.44) [11.1]		
4 INCH	600	249.3 LBS [113.1 KG]	(3.81) [96.7]	(7.62) [193.5]	(7.00) [177.8]	(10.00) [254.1]	(.04) [1.0]	(9.36) [237.8]	(.35) [8.9]		
6 INCH	600	352.7 LBS [159.9 KG]	(4.50) [114.3]	(9.00) [228.6]	(8.22) [208.8]	(11.23) [285.1]	(.06) [1.5]	(7.14) [181.3]	(.24) [9.1]		
8 INCH	600	470.0 LBS [213.2 KG]	(4.78) [121.4]	(9.56) [242.8]	(9.08) [230.6]	(12.83) [325.7]	(.08) [2.0]	(5.99) [152.3]	(.17) [4.3]		

Specifications

Valve Performance Characteristics

- V-Notch Rotary Control Valve
 - Process Fluid: Compressible fluids
 - Valve Body Materials: ASTM A351 (CF8M) or ASTM A216 (WCC)
 - Trim Component Materials: Stainless Steel Per NACE MRO103
 - Process Fluid Temperature: -28°C to $+260^{\circ}\text{C}$ (-20°F to $+500^{\circ}\text{F}$)
 - Maximum Process Fluid Pressure: 5.1 MPa (740 psig)
 - Max. (Fwd) Differential Pressure: 3.4 MPa (500 psid) [3", 4", & 6" valves]
4.0 MPa (580 psid) [8" valves]
 - Valve Flange-Flange: Per ISA S75.08
 - Valve Flanges: Per ANSI B16.5 Class 300# and 600#
 - Hydrostatic Pressure Rating: Class 300 (WCC) flanges: See ASME B16.34, Table 2-1.2 (VII-2-1.2)
Class 300 (CF8M) flanges: See ASME B16.34, Table 2-2.2 (VII-2-2.2)
Class 600 (WCC) flanges: See ASME B16.34, Table 2-1.2 (VII-2-1.2) 3", 4" & 6" valves follow Class 300 limits; 8" valve follow Class 600 limits
Class 600 (CF8M) flanges: See ASME B16.34, Table 2-2.2 (VII-2-2.2) 3", 4" & 6" valves follow Class 300 limits; 8" valve follow Class 600 limits
 - Seat Leakage Class: ANSI Class IV Forward and Reverse
 - OBVD Leakage: $<20\text{ cm}^3/\text{min}$ maximum
 - Mean Time Before Overhaul: 24 000 hours recommended (not to exceed 48 000 hours)

Actuator Performance Characteristics

- Electrically Powered Rotary Actuator with Failsafe Spring
 - Ambient Temperature: -29°C to $+82^{\circ}\text{C}$ (-20°F to $+180^{\circ}\text{F}$)
 - Position Accuracy: $\pm 0.1\%$ of full scale
 - Position Repeatability: Within $\pm 0.5\%$ of point
 - Position Hysteresis: less than 0.15% full scale
 - Bandwidth: 30 rad/s with no more than 3 dB attenuation and less than 180° phase loss at $\pm 2\%$ magnitude and minimum supply voltage at DVP
 - Fail Position: Closed (standard); may also be configured for Fail Open
 - Input Voltage (DVP): 90–300 Vdc
 - Steady State Current (DVP): 12 A max
 - Transient Current (DVP): 40 A for $< 200\text{ ms}$
 - Slew Times: 350 ms (measured from 90% to 10% during a 100% to 0% step)
650 ms (measured from 10% to 90% during a 0% to 100% step)
 - Failsafe Trip Times: 350 ms (unpowered, measured from 100% to 0%, above $16^{\circ}\text{C}/60^{\circ}\text{F}$) [3", 4", & 6" valves]
600 ms (unpowered, measured from 100% to 0%, above $16^{\circ}\text{C}/60^{\circ}\text{F}$) [8" valves]

Regulatory Compliance

European Compliance for CE Marking:

Pressure Equipment Directive: 2014/68/EU Category II, GS75E, GS100E
Category III, GS150E, GS200E

LERA Actuator

ATEX Directive: 2014/34/EU, Zone 2, Category 3, Group II G, Ex nA IIC T3 Gc IP65 X

EMC Directive: Directive 2014/30/EU

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 a partly completed machinery per 2006/42/EC

Other International Compliance:

IECEX LERA Actuator: Certified for use in hazardous locations
IECEX CSA 14.0019X Ex nA IIC T3 Gc IP65

EAC Customs Union: Certified to Technical Regulation CU 012/2011 for use in potentially explosive atmospheres.
Certificate RU C-US.MIO62.B.02104 as Ex nA IIC T3 Gc

EAC Customs Union: Certified to Technical Regulation CU 032/2013 on the safety of equipment operating under excessive pressure.
Certificate RU C-US.MIO62.B.02129 – GS150E, GS200E

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. MIO62.B.02098 – GS75E, GS100E

EAC Customs Union: Declared to Technical Regulation CU 020/2011 on the safety of machinery and equipment.
Declared to Technical Regulation CU 04/2011 on the safety of low voltage equipment.
Declared to Technical Regulation CU 020/2011 On Electromagnetic Compatibility of Technical Equipment Declaration of Conformity, Registration No: RU Д-US. AП32.B.04567

North American Compliance:

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

LERA Actuator: LERA = Large Electric Rotary Actuator
CSA Certified for Class I, Division 2, Groups A, B, C, & D, T3 at 82 °C Ambient. For use in Canada and the United States.
Certificate 160584-2558716

SIL Certification

Certified SIL 3 Capable for safe position fuel shut off in safety instrumented systems.

Evaluated to IEC 61508 Parts 1-7. Refer to the Instructions of the Installation and Operation Manual, Chapter 6 Safety Management. SIL Certificate WOO 1503119 C001



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