



Linear Valve Position Sensors



Silver Bullet™ All Classes & Groups

In 1981, a change appeared in the National Electrical Code in the form of an exception for conduit runs of 1 1/2 inches and smaller:

"Apparatus which may produce arcs or sparks need not be sealed if the current interrupting contacts are enclosed within a chamber hermetically sealed against the entrance of gases or vapors." This exception in the Code offered large savings by the elimination of costly external seal fittings.

Environment

Careful consideration was given to the environment in which the sensor will operate. Caustics, acids, chlorides and saltwater can be a daily occurrence. The Silver Bullet, supported by UL and CSA Hazardous Location, Division 1 & 2 certification, isolates these critical interior contact areas from moisture and corrosion intrusion. Housed in a 316 stainless jacket, the highly corrosion-resistant tungsten contacts are hermetically sealed in an inert atmosphere, then encapsulated in a plastic coating to cushion the sensor in case of shock and vibration and then re-encapsulated in a premium grade polymer impervious to moisture, chemicals and solvents. Contact reliability is maintained against the adverse effects of transients through the sensors inherent capabilities of withstanding momentary surges of up to 5 amps.

Commitment

Our confidence in this product is reflected in our decision to firmly stand behind the Silver Bullet with an unconditional **five year warranty**. A warranty that confirms our commitment to excellence in the performance of your equipment.

Silver Bullet™

The utilization of Magnum Silver Bullet hermetically sealed sensors is not only cost-effective but adds circuit reliability in the form of corrosion resistance and contact integrity. By utilizing hermetically sealed sensors in lieu of potted switches, up-front costs are reduced \$300 per single installation and extend to a total savings of \$30,000 per one hundred control valves.

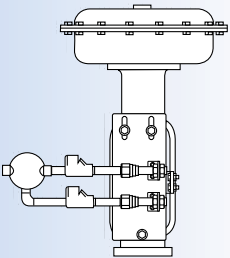
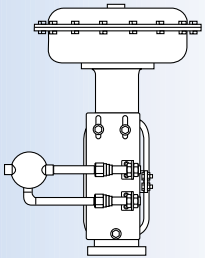


Aero O Sensor

All Magnum Silver Bullet Sensors share the same fundamental technology as the aerospace expertise found in the position verification systems of satellite antennas and space shuttle TV cameras.

Silver Bullet™

COMPARATIVE COST ANALYSIS

CONVENTIONAL METHOD Potting		MAGNUM SILVER BULLET™ Hermetic Seal	
			
2 switches	\$322	2 sensors	\$264
junction box	\$50	junction box	\$50
seal fittings	\$80	seal fittings	N/R*
wire, conduit	\$30	wire, conduit	\$15
labor	\$270	labor	\$125
TOTAL COST	\$752	TOTAL COST	\$454

* Not Required

Comparative costs were based upon list prices from major manufacturers.

National Electrical Code (1987):

Article 501-5(a) & (b). Conduit Seals, Class I, Div. 1 & 2

In each conduit run entering an enclosure for switches which may produce arcs, seals shall be placed no more than 18 inches from such enclosures.

Exception: Conduit runs 1 1/2 inches and smaller entering an explosion-proof enclosure for switches need not be sealed if the current-interrupting contacts are enclosed within a chamber hermetically sealed against the entrance of gases or vapors.

Note: For conformance to U.L. and CSA requirements, all conduit runs in Class 1, Division 1 hazardous locations must have a sealing fitting connected within 18 inches of the enclosure.

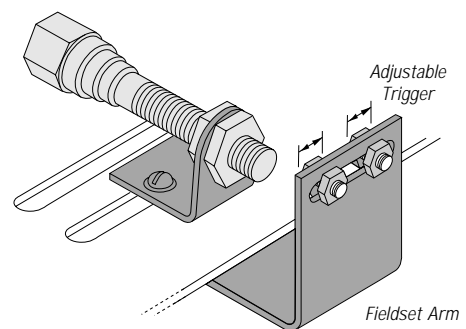
Start-Up

All of a sensors capabilities are made and broken at the contact point. Sensors that are set for position at the factory do not always remain that way after arriving in the field or being connected to pipelines and conduit systems. Final field adjustment is usually a difficult task when sensors are firmly held in place by rigid conduit. A simply engineered slide-action Fieldset™ arm takes this fact into consideration by providing a unique double upper and lower trigger for ease of final field setting.

Maintenance

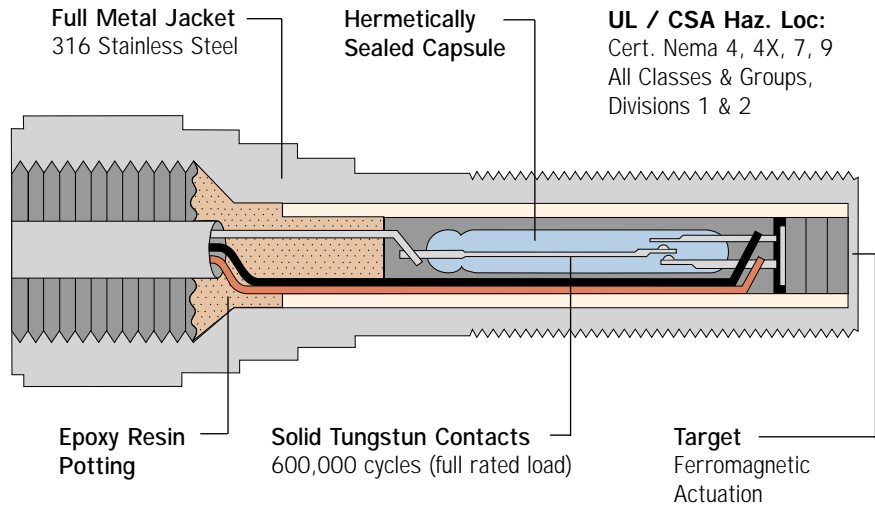
All Silver Bullets are bolted to heavyduty stainless steel brackets. Sensor triggering is accomplished by stainless steel encapsulated ferromagnetic actuators. Eventually, as valve seats wear, a slight readjustment of position sensors becomes necessary. The Fieldset™ triggering system allows fast resetting by the simple turning of a bolt rather than the disconnecting of rigid conduit systems.

Fieldset™ Triggering System

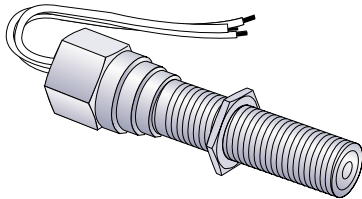


Silver Bullet™

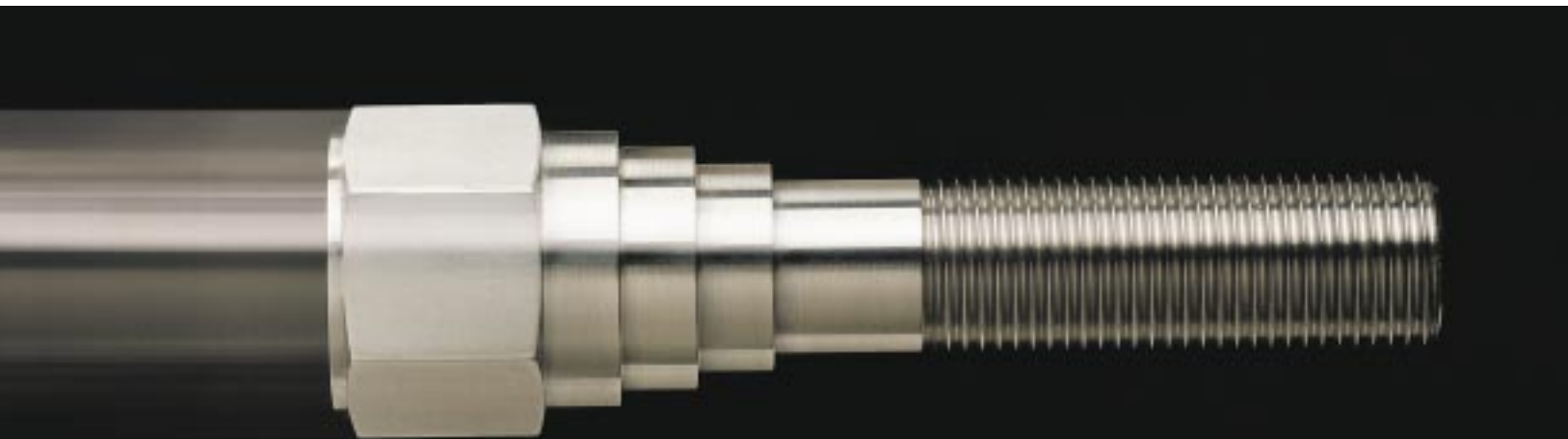
MATERIALS OF CONSTRUCTION



TECHNICAL SPECIFICATIONS

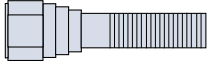



Hermetically Sealed:	corrosion-resistant / cost-effective
High Current:	3 amps / 120VAC; 2amps / 24VDC
Full Metal Jacket:	316 stainless steel
Agency Certification:	UL, CSA, NEMA 4, 4X, 7, 9 Class I, Groups A, B, C, D; Class II, Groups E, F, G; Div. 1 & 2
Repeatability:	.005 in.
Hysteresis:	.040 in.
Trigger:	Ferromagnetic (stainless steel encapsulated)
Operational Life:	600,000 cycles (full rated load)



Silver Bullet™

ORDERING GUIDE

SILVER BULLET	
MODEL 316 SPDT	
MODEL 316DB DPDT	
316 Stainless Steel NEMA 1, 3, 4, 4X, 6, 7, 9, 12, 13 UL Listed, CSA certified 4, 4X, 7, 9 Hazardous Location Class I, Groups A, B, C, D; Class II, Groups E, F, & G; Divisions 1 & 2	
	

Suggested Specification

SILVER BULLET™

Valve position sensors shall be Westlock Controls Silver Bullet Model _____. Sensor shall be Hermetically sealed (UL & CSA Recognized) and rated at 3 amps/120 VAC, 2 amps/24 VDC, with Fieldset™ triggering mechanism. 316 Stainless Steel housing shall meet all NEMA 4, 4X, 7, 9 requirements having as standard one 1/2" conduit entrance.

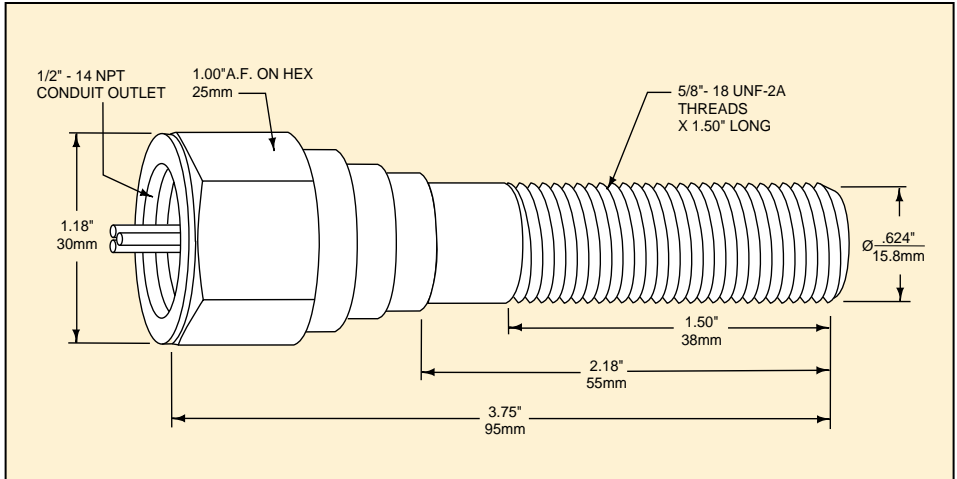
Testing

Every electrical component in every Silver Bullet is 100% tested at incoming inspection and every unit then receives a final, complete functional test.

Warranty

5 year unconditional warranty

DIMENSIONS (inches/mm)



MECHANICAL

Full Metal Outer Jacket:	316 Stainless Steel
Hermetic Seal:	Glass (vacuum)
Coating:	Acid / Alkali Resistant
Potting:	Epoxy Resin
Contacts:	Tungsten
NEMA Rating:	1, 3, 4, 4X, 6, 7, 9, 12, 13
IP Rating:	65, 67
Temp. Range (°F):	-40°F to 220°F
Operational Life:	600,000 cycles (full rated load)
Sensor Actuation:	Ferromagnetic (stainless steel encapsulated)
Sensing Distance:	0.100" (2.54mm) end sensing

ELECTRICAL

Contact Arrangement:	SPDT, Form C (normally open), DPDT Form CC (normally open)
Contacts:	Solid Tungsten
Current Rating:	3 Amps / 120 VAC, 2 Amps / 24 VDC
Agency Certification:	Underwriters Labs, Canadian Standards, NEMA 4, 4X, 7, 9 Class I, Groups A, B, C & D. Class II, Groups E, F & G, Division 1 & 2
Operating Time:	3.0 m Sec.
Initial Contact Resistance:	.50 ohms (Max)
Repeatability:	.005 in.
Hysteresis:	.040 in.
Conduit Connection:	1/2" - 14 NPT
Leads:	Factory Sealed with 18" minimum, 4 conductor PVC insulated
Contact Ratings:	SPDT. Form C (Normally Open) 3 amps/120 VAC, 2 amps/24 VDC Wire: 4 conductor, 18AWG. DPDT. Form CC (Normally Open) 3 amps/120 VAC, 2 amps/24 VDC Wire: 7 conductor, 18AWG.

ADAPTION

Bracket:	Stainless Steel
Hardware:	Stainless steel
Actuation Trigger:	Ferromagnetic (stainless steel encapsulated)
Sensing Distance:	.100" (2.54 mm) end sensing
Trigger Arm:	Dual Fieldset™ Adjustment