

POSITION
MONITORING
FOR LINEAR
VALVES

AccuTrak Linear Valve Position Monitors

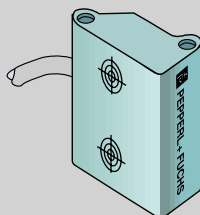
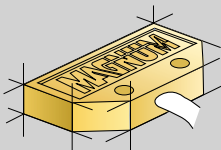
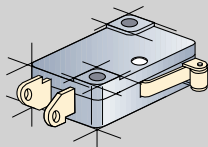
- ▶ [AccuTrak Position Monitors](#)
- ▶ [AccuTrak Position Transmitters](#)
- ▶ [Silver Bullet](#) All Classes & Groups
- ▶ [Module 3](#) Nonincendive/Explosionproof
- ▶ [Series 9900](#) General Purpose/Nonincendive
- ▶ [Series 9881](#) Explosionproof
- ▶ [EPIC 420](#) All Classes & Groups

ACCUTRAK



Rotary to Linear Convertors for AccuTrak® and Eliminator® Configurations

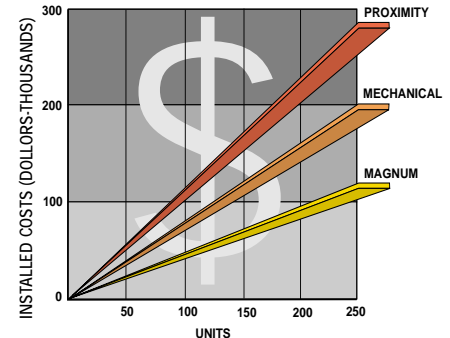
Standard Sensor Options



AccuTrak® Position Monitors All Classes & Groups

Westlock Valve Position Monitors, in both AccuTrak® and Eliminator™ configurations, are available for the monitoring of linear valves as well as rotary valves. Integration of components into one cost-effective unit is rapidly becoming the system of choice by major industrial users of process controls.

By combining sensors, solenoids, junction housings and local visual position monitors in one compact unit suitable for weatherproof and hazardous location service, Westlock offers an extremely efficient method of both monitoring and controlling linear valves. Additionally, the economic advantages offered by the National Electrical Code, through utilization



CONVENTIONAL METHOD vs WESTLOCK MAGNUM

of hermetically sealed Magnum® sensors, are reflected in major cost savings by the elimination of hazardous location seal fittings, wiring, conduit and their associated labor costs. (see comparative cost analysis)

Micro-Switch V3

SPDT (V3)			DPDT (Licon)	
AMPS	VAC	VDC	AMPS	VAC
15	125		10	125
15	250		10	250
10		24		
.50		125		
.25		250		

MAGNUM® Proximity Sensors

UL, CSA "Simple Apparatus" (Hermetically Sealed) SPDT Form C

SPDT		
AMPS	VAC	VDC
3	120	
1.5	240	
2		24

P+F Kriterion 2000

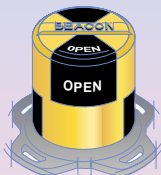
Proximity Type (Solid State), Intrinsically Safe, PTB, FM, CSA, CE

Sensing Range	3mm
Electrical Version	D.C. Voltage 2 wire in accordance with DIN19234 (NAMUR)
Hysteresis	Approx 5%
Switching Frequency	1.5 KHz
Nominal Voltage	8 VDC
Input Voltage Range	5-25 VDC
Output/Current Consumption	Cam Trigger Present: ≤1mA Cam Trigger Absent: ≥3mA (15mA max.)
Operating Temp.	-25°C to +100°C

AccuTrak® Position Monitors

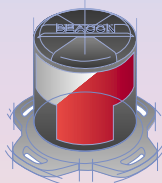
DESIGN FEATURES

- Available for on-off linear valves, modulating control valves and knife gate valves.
- Switch options include Micro-Switch®, Magnum®, GO®, P&F®, and Effector®.
- 0-100% position transmitters in either resistive or current (4-20mA) configurations.
- NEMA 4, 4X, 7, 9, UL, CSA, FM, listings for Hazardous Area applications.
- Housings in aluminum, engineered resin and stainless steel configurations.



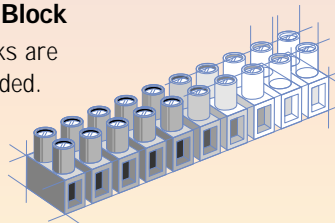
Beacon™

An impact and corrosion resistant valve position monitor capable of displaying exact valve position from any quadrant at distances of up to 150 feet.



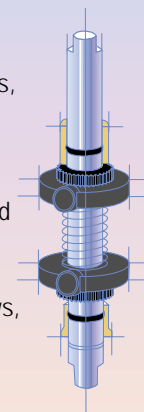
Prewired Terminal Block

Prewired terminal blocks are numbered and color-coded. Generous working space for wiring.



TouchSet™ Cams

Cams, secured by set screws, continually lose calibration due to vibration inherent in all pipelines. Self-locking TouchSet™ cams are fastened to a splined shaft and can be set by hand in seconds. Since there are no set screws, the cams will never slip out of adjustment.



COMPARATIVE COST ANALYSIS (Magnum Sensors)

NATIONAL ELECTRICAL CODE (1987):

Article 501-5(a) & (b). Conduit Seals, Class I, Division 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 explosionproof 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 UL and CSA requirements, all conduit runs in Class I, Division 1 hazardous locations must have a sealing fitting connected within 18 inches of the enclosure.

Merging Technology with Economy

UL/CSA Listed Valve Position Monitors for Nema 4, 4X, 7, 9; Class 1, Groups C & D, Class II, Groups E, F & G, Divisions 1 & 2, Class I, Groups A & B, Division 2.

LINEAR CONTROL VALVE	CONVENTIONAL METHOD		WESTLOCK
	MECHANICAL SWITCHES	PROXIMITY SWITCHES	MAGNUM SENSORS
2 switches w/ bracketry	\$550	\$630	\$403
solenoid	\$100	\$100	\$100
junction box	\$50	\$50	N/R*
seal fittings	\$40	\$80	N/R*
wire, conduit	\$20	\$30	N/R*
labor	\$170	\$270	N/R*
TOTAL COST	\$830	\$1160	\$503
TOTAL COST (250 Valves)	\$207,500	\$290,000	\$125,750

*Not Required

Comparative costs were based upon list prices from major manufacturers.

Solenoid: Asco 8320A90



Position Transmitters for AccuTrak Linear Valve Position Monitors

AccuTrak® Position Transmitters All Classes & Groups

Westlock transmitter options combine local visual display with remote electronic signaling for continuous flow device status. Point-to-point limit switch signaling is integrated with on-site visual monitoring and full range analog position transmission in one compact NEMA 4, 4x, 7 & 9 enclosure.

Available in three separate configurations (analog resistive, analog current, or digital sensing with analog current output), Westlock transmitters offer complete travel range display for continuous remote monitoring. The RS, CS, and DT options monitor control valves throughout a 0-100% range. At full open or closed, switches will additionally confirm end position limit.

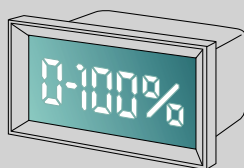


CS: A 4-20 mA or analog current output proportional to valve position. The CS current transmitter features the latest technology in solid state transmitter design and delivers one of the lowest operating voltages in the industry (5 VDC) with a maximum load resistance of 1650 ohms at 38 volts DC.



RS: A 1000 ohm or 10,000 ohm analog resistive output proportional to valve position.

0-100% Position Transmission



Resistive Output Signal

Standard Output Signal: 1000 ohms
Power Rating at 70°C: 1 watt
Elements: Conductive Plastic
Rotational Life (no load): 100,000 cycles

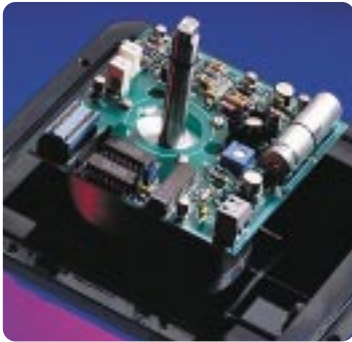
Current Output Signal

Standard Output Signal: 4-20 mA DC, 2 wire
Power Requirements: 5-38 VDC
Max. Load Resistance at 24 VDC: 950 ohms
Operating Temperature: -24°C TO 85°C

Note: For detailed transmitter specifications, see page A-41 of AccuTrak rotary section.

AccuTrak® Position Transmitters

DT: Westlock has merged absolute encoder sensing technology with loop-powered analog transmission to create the Spectrum DT full-range position monitor. Establishing a new performance standard, the communication mode continues to be the standard 4-20 mA analog signal while actual sensing is achieved by a true digital sensor.

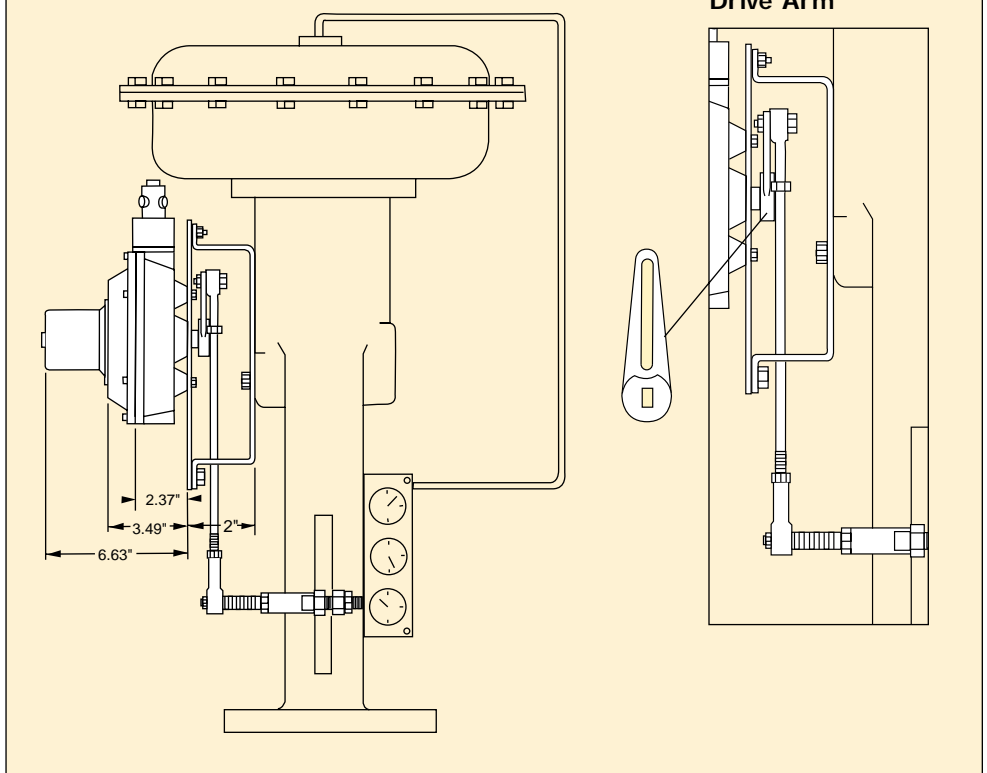


The Spectrum DT Position Transmitter derives its operating power from the 4-20mA loop itself, with no need for an external power connection. This is a high-level signal not easily affected by outside noise. In addition to the advantages of standardization, reduced field wiring costs and immunity from most electrical noise, the 4-20mA transmitter offers these benefits:

- Any number of signal receivers can be series-connected into the signal circuit without upsetting calibration.
- Multiple transmitters may share the same power supply.
- A 4-20mA signal is a "live zero" signal, which distinguishes a process condition (4mA) from an open circuit condition (0mA).
- No position loss on power down.
- Operates in electrically noisy environments.

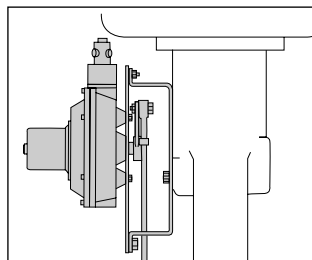
DIMENSIONS (inches/mm)

For Fisher Size 30 thru 87 Actuators



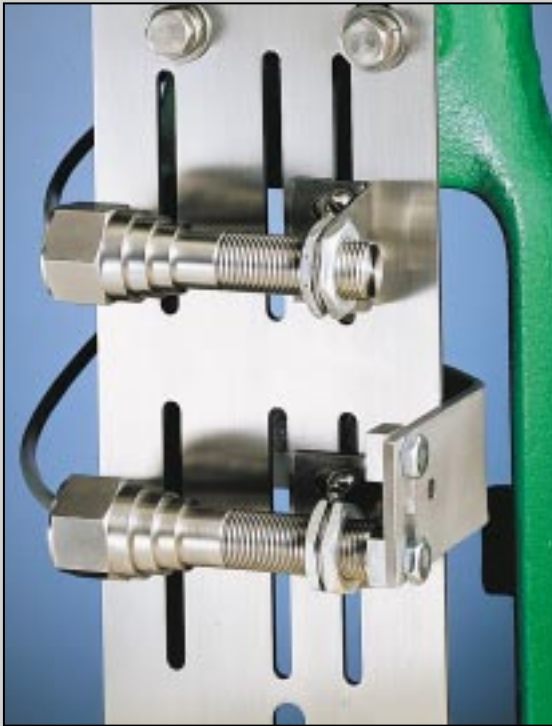
ORDERING GUIDE (Position Monitors & Transmitters)

ROTARY TO LINEAR CONVERTORS



Order standard AccuTrak/
Eliminator Models and specify
Rotary to Linear Convertor.

Also, please specify Actuator
Manufacturer and Model Number.



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.

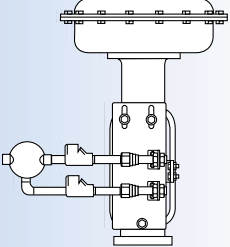
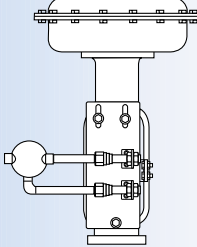


Aero O Sensor

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.

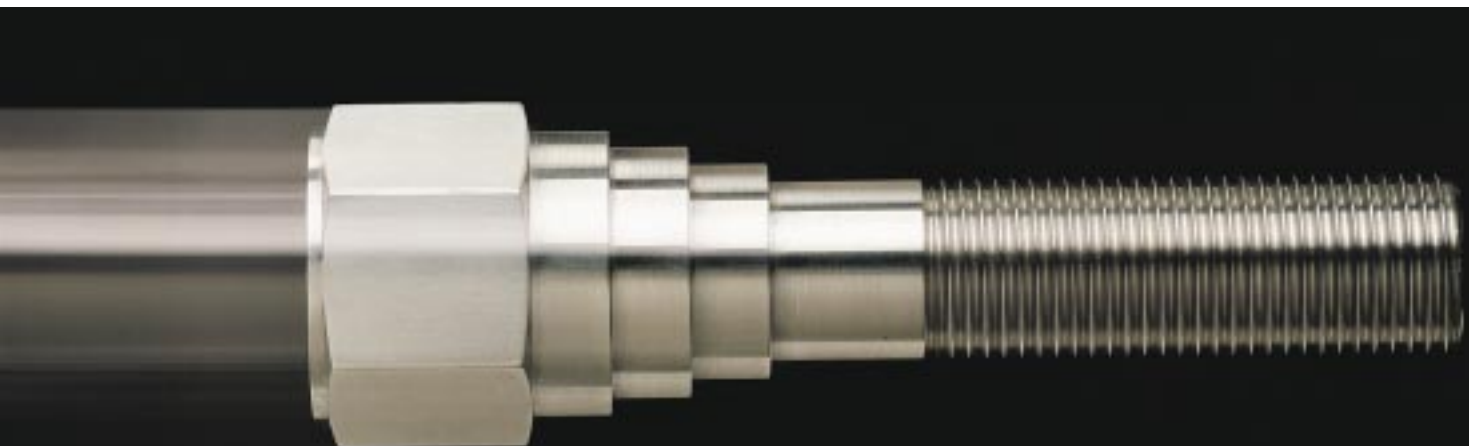
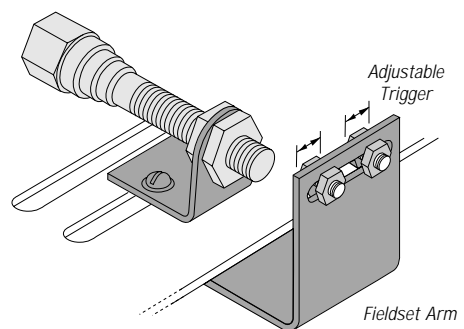
Start-Up

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

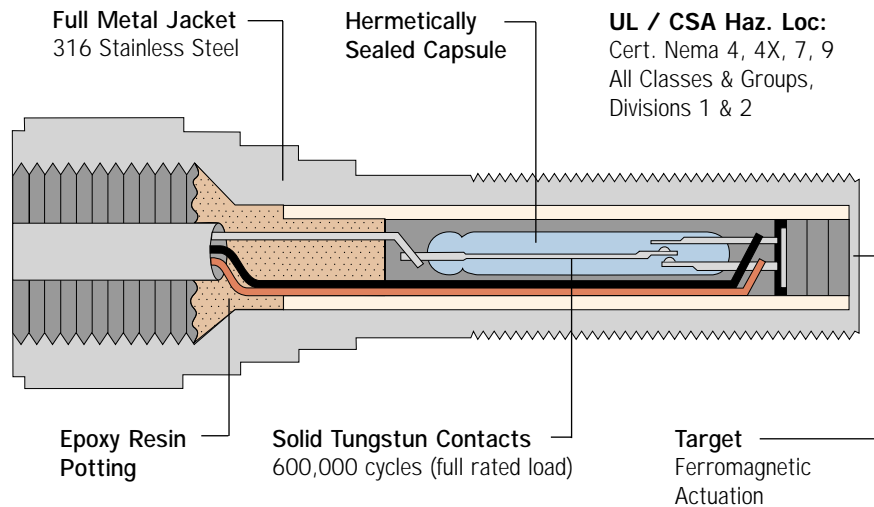
All Silver Bullets are bolted to heavyduty stainless steel brackets. Sensor triggering is accomplished by stainless steel encapsulated ferromagnetic actuators. Eventually, as valve seats wear, a slight readjustment of position sensors becomes necessary. The Fieldset™ triggering system allows fast resetting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

Fieldset™ Triggering System

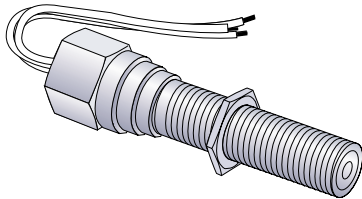


Silver Bullet™

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)

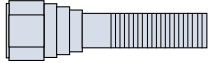


Silver Bullet™

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.

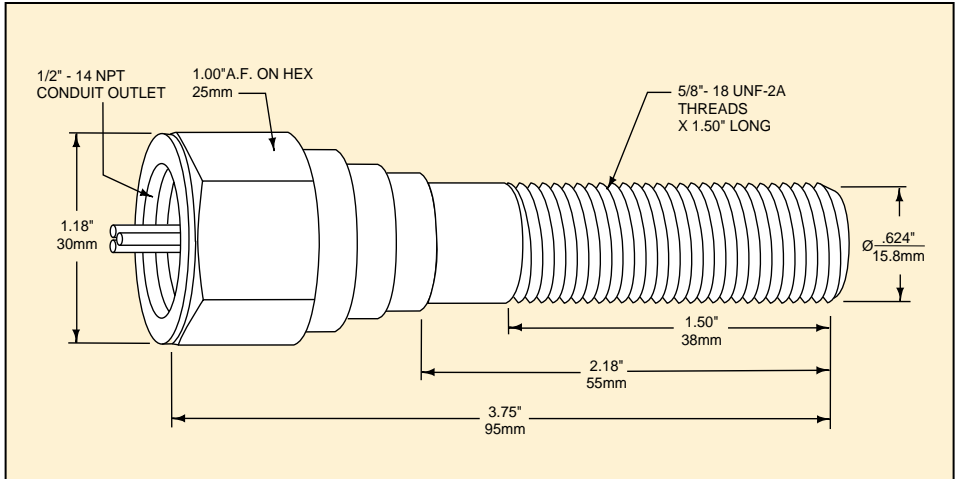
Testing

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

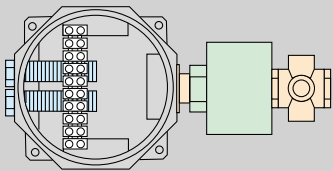
Contact Arrangement:	SPDT, Form C (normally open), DPDT Form CC (normally open)
Contacts:	Solid Tungsten
Current Rating:	3 Amps / 120 VAC, 2 Amps / 24 VDC
Agency Certification:	Underwriters Labs, Canadian Standards, NEMA 4, 4X, 7, 9 Class I, Groups A, B, C & D. Class II, Groups E, F & G, Division 1 & 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



Integrated Linear Valve Monitoring



A cost effective, integrated system that both monitors and controls valve position.

Module³ Nonincendive / Explosionproof

Designed with a clear-sighted concept of true monitoring proficiency, each component is engineered to safely interact with every other control element. The high-current hermetically sealed sensors are manufactured of 316 stainless steel. The NEMA 4, 4X, 7, 9 Hazardous Location enclosure is supported by UL and CSA certification. The optional ASCO[®] solenoid is an integral part of the unit and has been tested as such by UL and CSA under explosive conditions.



OSHA Acceptable Triggering System

Designed with safety intelligence, the Module³, OSHA Acceptable triggering system meets all of the requirements for conformance to the Code of Federal Regulations Section 1910.219. Noting the necessity to increase safety within the process industry, Westlock has redesigned the conventional method of tripping switches (the utilization of exposed metal arms) into a unique system; a system having no component project beyond the largest periphery of the shaft collar. All outside edges are smoothly rounded and all screws are countersunk so that nothing protrudes beyond any moving surface. Double recessed upper and lower triggers offer fingertip control for ease of sensor setting.



Magnum Sensors

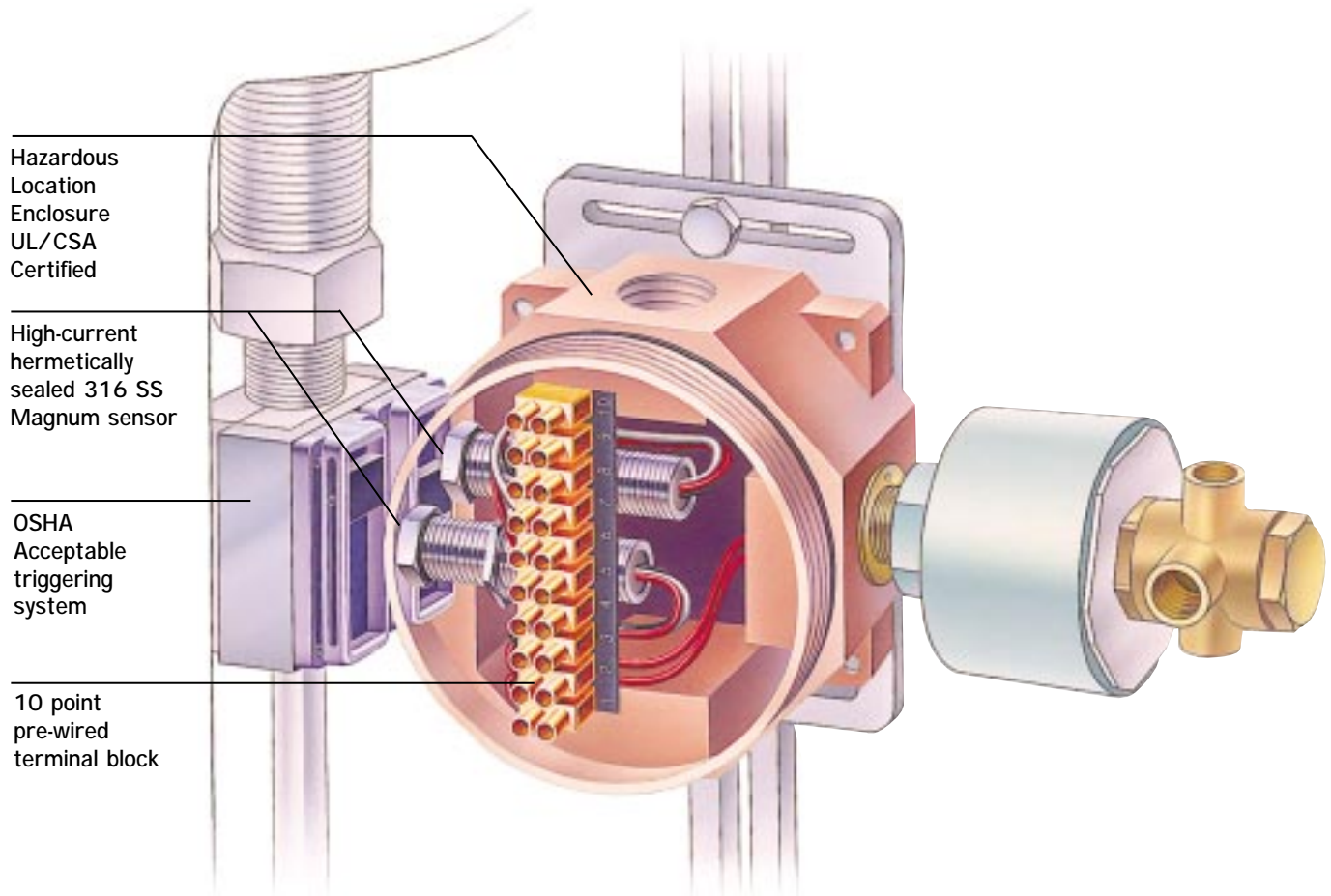
The Silver Bullet supported by UL and CSA Hazardous Location, Division 1 and 2 certification offers the process industry the kind of corrosion resistance and high-current capacity required in the industrial environment. Rated at 3 Amps, 120 VAC and 2 Amps, 24 VDC, the Magnum Silver Bullet is first hermetically sealed and then safely encased in a 316 stainless steel housing.

Knife Gate Valves

The MOD³ has been expanded to include the monitoring and control of knife gate valves. Combined with the Magnum Silver Bullet, the MOD³/Silver Bullet combination offers the process industry a versatile range of optional configurations for position sensing and solenoid actuator control. Each assembly is UL and CSA certified and suitable for use in NEMA 4, 4x, 7, 9, Class I, Groups B, C & D, Class II, Groups E, F & G, Division 1 & 2 and Class I, Group A, Division 2 hazardous areas.



Module³ Technical Specifications



OSHA
Acceptable



Comparative Cost Analysis

The Module³ applies the economic advantages offered by the National Electrical Code, which states, "In hazardous locations, apparatus which may produce sparks need not be sealed if the current interrupting contacts are enclosed within a hermetically sealed chamber." Through the utilization of hermetically sealed Magnum sensors, substantial savings are realized by the elimination of costly seal fittings. Integration of all components into a single housing provides additional savings through the elimination of junction boxes, wiring and labor.

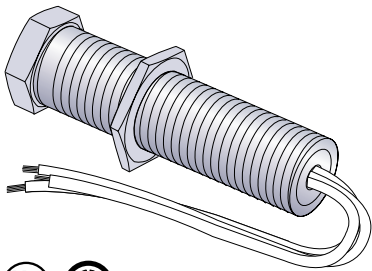
CONVENTIONAL METHOD Potted Switches		MODULE ³ Hermetically Sealed Sensors	
2 switches	\$322	MODULE ³ w/bracket	\$442
junction box	\$65	junction box	N/R*
solenoid valve	\$100	solenoid valve	\$100
seal fittings	\$80	seal fittings	N/R*
wire, conduit	\$70	wire, conduit	N/R*
field labor	\$340	field labor	N/R*
TOTAL COST	\$977	TOTAL COST	\$542

*Not Required

Comparative costs were based upon list prices from major manufacturers.
(Solenoid: Asco 8320A90)

Module³

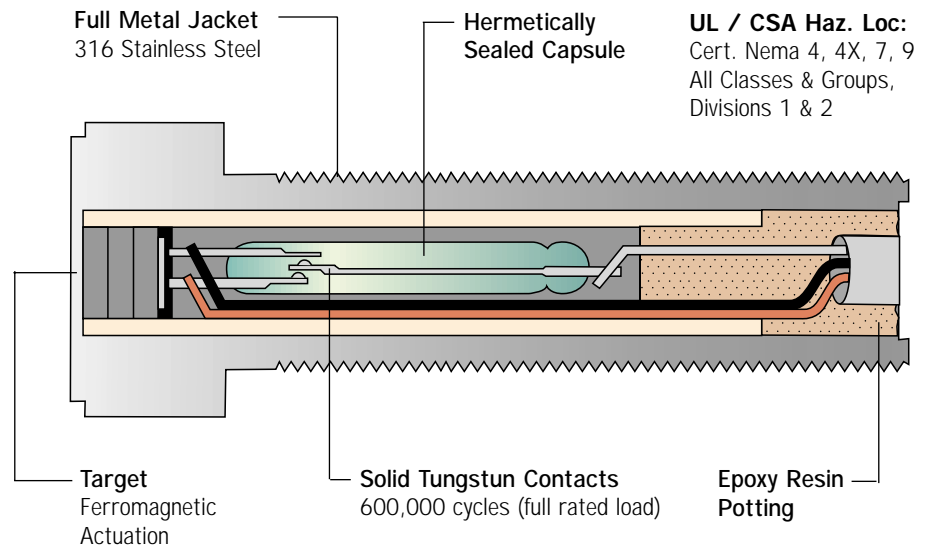
MAGNUM SENSOR



Certified for hazardous and highly corrosive areas.

Housing	316 Stainless Steel
Hermetic Seal	Glass (vacuum)
Temp. Range	-40°F to 220° F
Operational Life	600,000 Cycles (full rated load)
Sensor Actuation	Ferromagnetic (stainless steel encapsulated)
Sensing Distance	0.100" End Sensing
Agency Certification	UL, CSA
Operating Time	3.0 m Sec.
Initial Contact Resistance	.50 Ohms (max.)
Repeatability	.005 in.
Hysteresis	.030 in.
Contact Ratings	SPDT Form C (Normally Open) 3 Amps / 120 VAC, 2 Amps / 24 VDC
Warranty	5 Year Unconditional

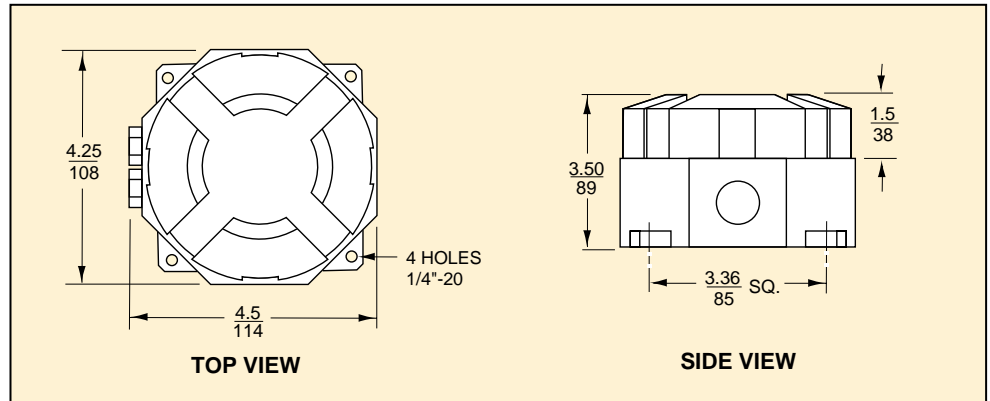
MATERIALS OF CONSTRUCTION



Module³

AREA CLASSIFICATIONS
Nema 4, 4x, 7, 9
Class I, Groups B, C, D
Class II, Groups E, F, G, Divisions 1 & 2
Class I, Group A, Division 2

DIMENSIONS (inches/mm)



Suggested Specification MODULE³

Valve position monitor shall be Westlock Controls Module³ Model _____.

Sensors shall be Magnum, Hermetically sealed (UL & CSA Recognized) and rated at 3 amps/120 VAC, 2 amps/24 VDC with OSHA acceptable triggering system. Complete assembly shall be UL & CSA certified for Class I, Groups B, C & D, Class II, Groups E, F & G, Divisions 1 & 2.

MATERIALS OF CONSTRUCTION	
Housing	Aluminum
Coating	Double Polyurethane
Conduit Entries	2-3/4" (3-3/4" optional)
Terminal Strip	10 contacts

APPROVALS / CERTIFICATION	
UL	(Underwriters Laboratories, Inc.)
CSA	(Canadian Standards Association)

CONDUIT ENTRY OPTIONS

Model 3479: A & B Standard (3/4" NPT)

Model E3479: A (solenoid) & B Standard (A: 1/2" NPT Male, B: 3/4" NPT)

Solenoid Transition Coupling
(1/2" NPT) Model E3479 Only

Please specify if optional conduit entries are required. (C)

ORDERING GUIDE

MODULE ³ 2-SPDT Sensors*	MODULE ³ for Knifegate Valves 2-SPDT Sensors*	ASCO Solenoid**	Triggering System (OSHA Acceptable)
<p>Nema 4, 4x, 7 & 9 Class I, Groups B, C & D Class II, Groups E, F & G, Div. 1 & 2 Class I, Group A, Div. 2</p> <p>3479</p>	<p>Nema 4, 4x, 7 & 9 Class I, Groups B, C & D Class II, Groups E, F & G, Div. 1 & 2 Class I, Group A, Div. 2</p> <p>3479 + 316</p>	<p>To Be Specified by Customer</p>	<p>Please specify Actuator and Model Number</p>
<p>E3479 2-SPDT Sensors w/ Solenoid</p> <p>Nema 4, 4x, 7 & 9 Class I, Groups B, C & D Class II, Groups E, F & G, Divisions 1 & 2 Class I, Group A, Div. 2</p>	<p>E3479 + 316 2-SPDT Sensors w/ Solenoid</p> <p>Nema 4, 4x, 7 & 9 Class I, Groups B, C & D Class II, Groups E, F & G, Divisions 1 & 2 Class I, Group A, Div. 2</p>	<p>Stainless Steel</p>	<p>Stainless Steel</p>

*The Mod³ is also available with solid-state sensors rated for Intrinsically-safe applications. Please contact factory for IS Options.
 **Hazardous area ratings of solenoid must meet Classes and Groups for intended use.



Engineered For The Monitoring And Control Of Sanitary Diaphragm Valves

AccuTrak® 9900 General Purpose / Nonincendive

The 9900 Series offers an extremely compact, efficient and economical means of monitoring and controlling sanitary diaphragm valves. By combining three separate products into one pre-integrated unit; junction housing, position sensors and solenoid valve, the high cost of wiring, seal fittings and field labor is totally eliminated.



Designed for NEMA 4, 4x; Class I, Group A, B, C, D; Class II, Group F, G; Division 2 hazardous area applications, the 9900 enclosure is of a high integrity nylon resin for protection against caustic, alcohol or detergent washdowns.

Engineered Resin Enclosure

An FM approved nylon enclosure with local visual indicator assures both strength and corrosion resistance. Extra conduit entrances allow for integration of solenoid valves.

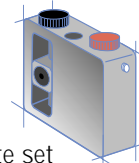
Magnum® Proximity Sensors

Hermetically sealed against explosive gasses and liquids, Magnum sensors provide maximum resistance against moisture and corrosion. Each sensor is rated at 3A/120 VAC, 2A/24 VDC.



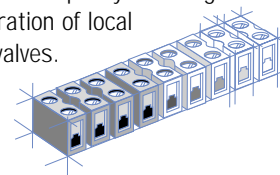
Touchset™ Triggers

Thumbscrew trigger adjustments eliminate set screws and provide instantaneous hand setting of position sensors.

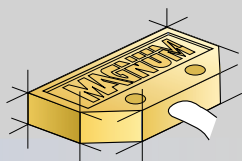
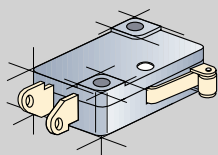


9 Point Terminal Block

9 pt. slide-out terminal block provides for simplicity of wiring and integration of local solenoid valves.



Standard Sensor Options



Micro-Switch V3

SPDT Form C, UL, CSA

Electrical Version	SPDT Form C
Electrical Characteristics	15A, 125/250 VAC • 10A, 24 VDC • .5A, 125 VDC .25A, 250 VDC
Operating Temp.	-25°C to +148°C

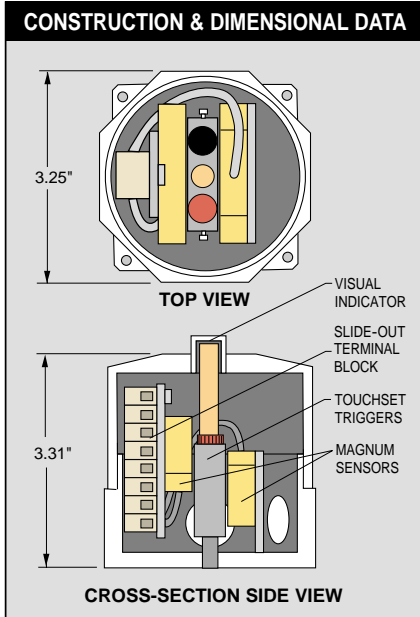
Gold plated contact available ("Simple Apparatus" - I.S. applications)

MAGNUM® Proximity Sensors

High Current Proximity Sensor, SPDT Form C
UL, CSA (Hermetically Sealed)

	SPDT	
AMPS	VAC	VDC
3	120	
1.5	240	
2		24

AccuTrak® 9900



AREA CLASSIFICATIONS

Nema 4, 4x Nonincendive
Class I, Groups A, B, C, D, Div. 2
Class II, Groups F, G, Div. 2

ENCLOSURE

Conduit Entries 2- 3/4 NPT
Terminal Points 9 Points standard

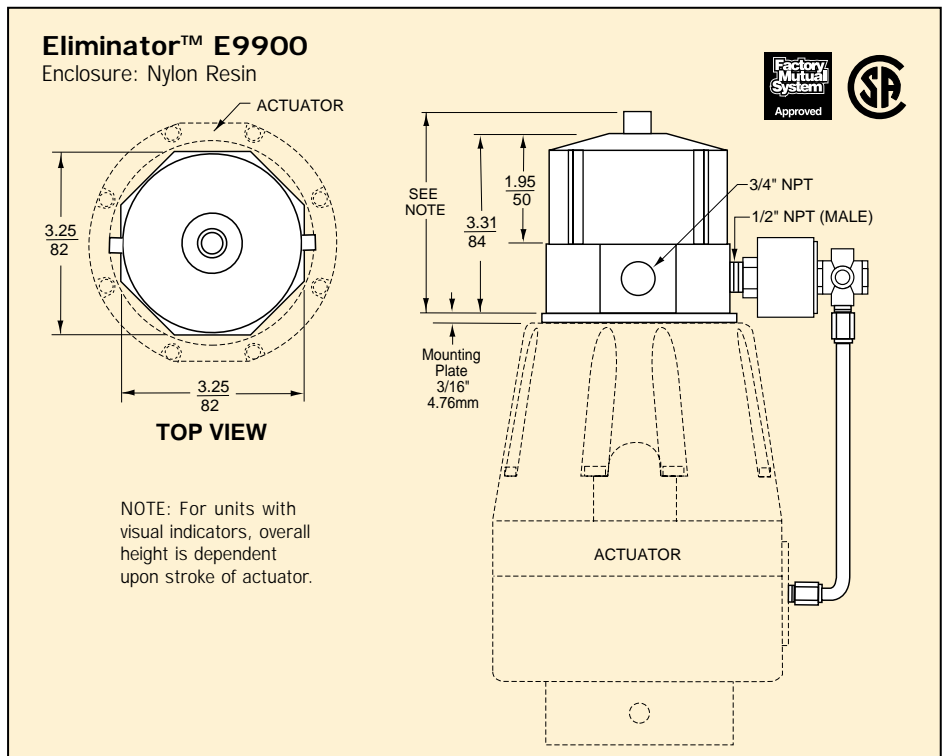
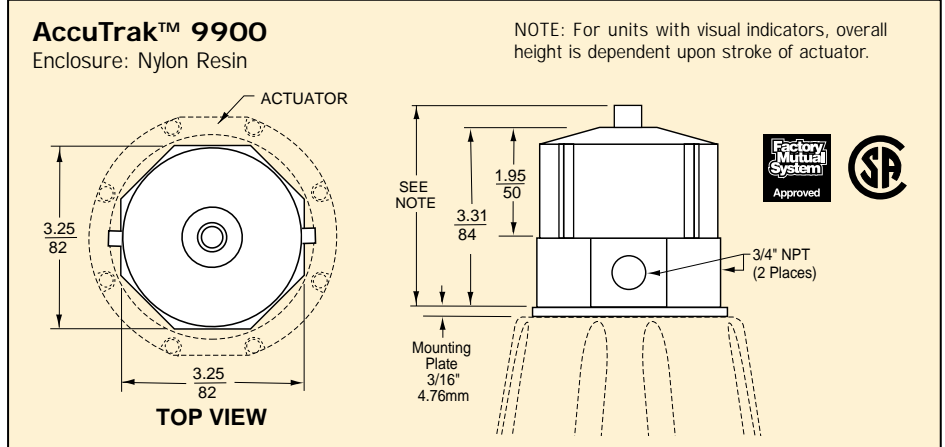
MATERIALS OF CONSTRUCTION

Enclosure Nylon Resin

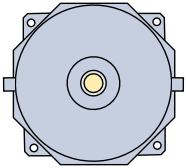
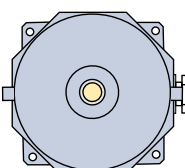
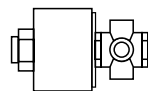
APPROVALS / CERTIFICATION

FM (Factory Mutual Research)
CSA (Canadian Standards Association)

DIMENSIONS (inches/mm)



ORDERING GUIDE

ACCUTRAK™	ELIMINATOR™ with Solenoid*	Solenoid Valve
<p>9918 2 Mechanical SPDT Switches NEMA 4, 4X</p> 	<p>E9918 2 Mechanical SPDT Switches NEMA 4, 4X</p> 	<p>To Be Specified by Customer*</p> 
<p>9920 2 Magnum SPDT Sensors NEMA 4, 4X, Nonincendive Class I, Grps. A, B, C, D, Div. 2 Class II, Grps. F, G, Div. 2</p> <p>Factory Mutual System Approved</p> <p>CSA</p>	<p>E9920 2 Magnum SPDT Sensors NEMA 4, 4X, Nonincendive Class I, Grps. A, B, C, D, Div. 2 Class II, Grps. F, G, Div. 2</p> <p>Factory Mutual System Approved</p> <p>CSA</p>	

*Hazardous area ratings of solenoid must meet Classes and Groups for intended use.



Engineered for the Monitoring and Control of Sanitary Diaphragm Valves in Explosionproof Areas

AccuTrak® 9881 Explosionproof

The Westlock Accutrak / Eliminator 9881 is specifically engineered for the monitoring and control of sanitary diaphragm valves. Certified to UL and CSA, the 9881 series utilizes high current, hermetically sealed Magnum® proximity sensors that eliminate the costly requirements of installing seal fittings in Division 2 hazardous areas while additionally providing the high level of corrosion resistance required by today's process industries.

Designed for NEMA 4, 4x, 7, 9 applications, the 9881 enclosure is a high integrity aluminum housing with a polyurethane enamel coating for protection against caustic, alcohol or detergent washdowns. As an option, an aluminum housing encapsulated in nylon is available for full compliance with the safety clearances issued by the FDA for use in food processing applications.

The 9881 Series offers an extremely efficient and economical means of monitoring and controlling sanitary diaphragm valves. By combining three separate products into one pre-integrated unit; junction housing, position sensors and solenoid valve, the high cost of termination enclosures, wiring, seal fittings and field labor is totally eliminated.

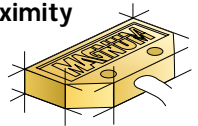


High Integrity Enclosure

Aluminum housing, with polyurethane enamel coating, assures both strength and corrosion resistance. Extra conduit entrances allow for integration of solenoid valves.

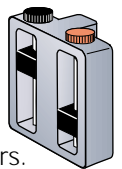
Magnum® Proximity Sensors

Hermetically sealed against explosive gasses and liquids, Magnum sensors provide maximum resistance against moisture and corrosion. Each sensor is rated at 3A/120 VAC, 2A/24 VDC.



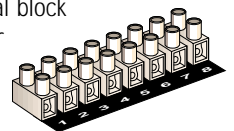
Touchset™ Triggers

Thumbscrew trigger adjustments eliminate set screws and provide instantaneous hand setting of position sensors.

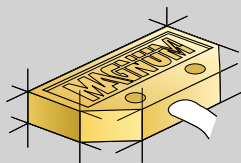


Terminal Block

An easily accessible 8-point prewired, numbered and color-coded terminal block is provided for simplification of wiring.



Magnum Sensors



Contact Arrangement	SPDT, Form C (Normally Open)
Contact Ratings	3 Amps/120 VAC, 2 Amps/24 VDC
Initial Contact Resistance	.50 ohms (Max)
Seal	Hermetic
Approvals	UL, CSA
Temperature Range	-40°F to +185°F
Operational Life	600,000 Cycles (full rated load)
Repeatability	.005 inches
Warranty	5 Year Unconditional

AccuTrak® 9881

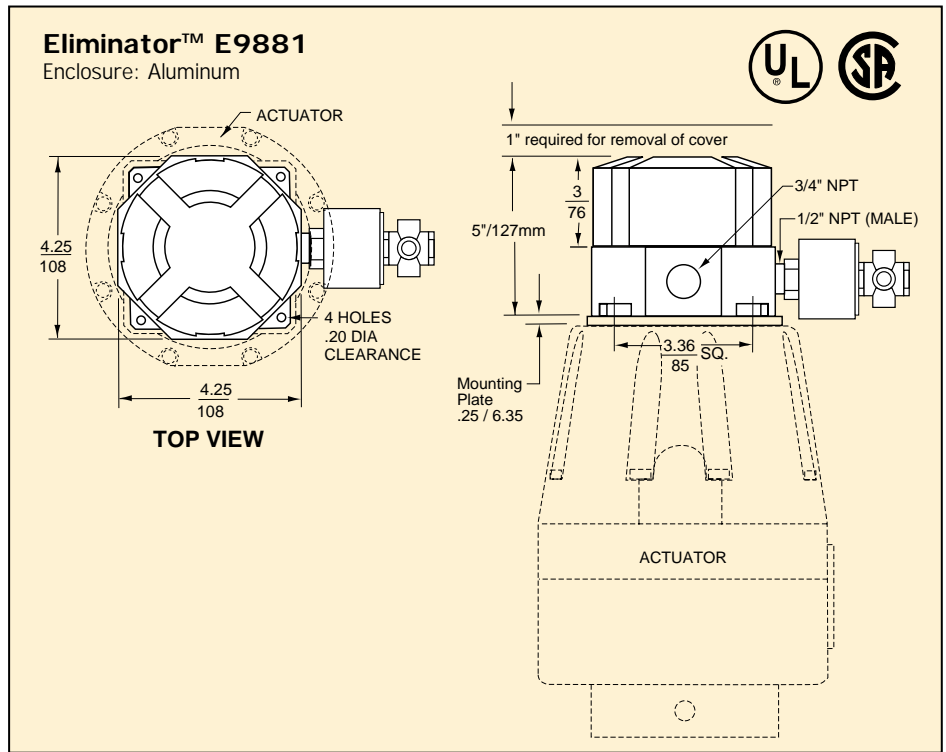
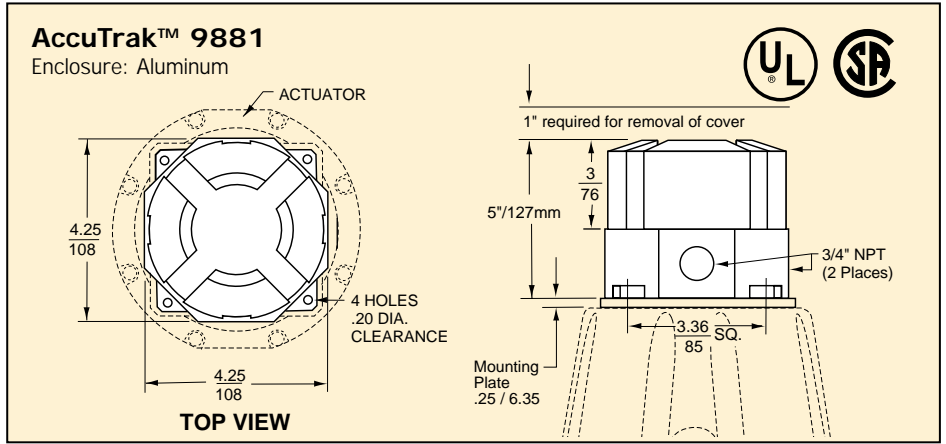
AREA CLASSIFICATIONS
Nema 4, 4x, 7, 9
Class I, Groups B, C, D,
Class II, Groups E, F, G, Div. 1 & 2
Class I, Group A, Div. 2

ENCLOSURE
Conduit Entries 2 - 3/4"
Terminal Strip 8 contacts standard


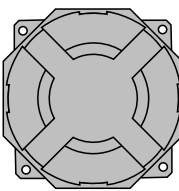

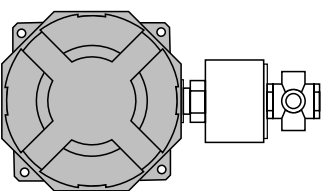
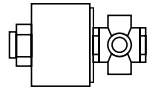
MATERIALS OF CONSTRUCTION
Housing Aluminum
Cover Aluminum
Coating Polyurethane Optional: Nylon Encapsulated
Shaft Stainless Steel

APPROVALS / CERTIFICATION
UL (Underwriters Laboratories Inc.)
CSA (Canadian Standards Association)

DIMENSIONS (inches/mm)



ORDERING GUIDE

ACCUTRAK™ 2-SPDT Sensors	ELIMINATOR™ 2-SPDT Sensors with Solenoid*	Solenoid Valve
<p>9881</p> <p>Class I, Groups B, C & D Class II, Groups E, F & G, Divisions 1 & 2 Class I, Group A, Div. 2</p>  	<p>E9881</p> <p>Class I, Groups B, C & D Class II, Groups E, F & G, Divisions 1 & 2 Class I, Group A, Div. 2</p>  	<p>To Be Specified by Customer*</p> 

*Hazardous area ratings of solenoid must meet Classes and Groups for intended use.



Non-Contact Position Monitoring for Linear Control Valves

EPIC® 420

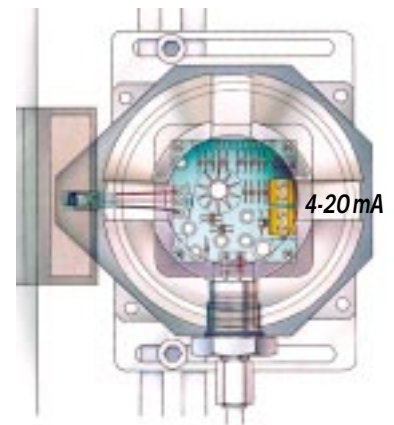
Nonincendive / Explosionproof

Non-Contact Position Transmitter

The EPIC® non-contact position transmitter represents a significant departure from previous attempts to reliably measure stem position of linear control valves. As opposed to conventional devices, no linkages, levers, rotary or linear seals are utilized. A static slide-by actuation assembly, attached to the valve stem, is the only "moving" part in the entire transmitter. Sensing is performed totally by non-contacting means, based upon characterization of flux strength as a function of axial position.

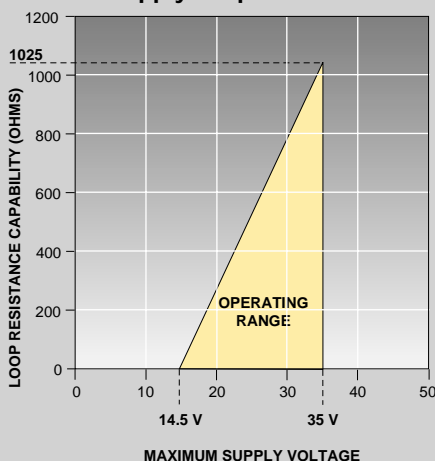
A solid state sensor is employed, whose output is a function of both flux density and excitation voltage. That property allows the use of an internal bridge circuit for highly accurate zero adjustment, where one arm of the bridge is comprised of the sensor, and the other comprised of a resistive divider for zero reference.

Transmitter output is 4-20 mA, 2 wire, with compliance voltage ranging from 14.5 to 35 volts. Output updating takes place 20 times per second, allowing use of the transmitter for applications heretofore not possible with transmitters of other types. The inherent reliability of the transmitter permits use of advanced control strategies, where knowledge of valve position can be used in predictive and other algorithms.



Technical Specifications

Power Supply Requirements



Output	4 to 20 mA nominal, proportional to stem position.
Terminal Voltage Req.	14.5 to 35 Volts DC, Reverse polarity protected.
Linearity	± 1% maximum deviation from straight line.
Span Adjustment	0.5" to 1.25" stroke, continuously adjustable. Longer strokes available upon request.
Zero Adjustment	± 30% of calibration span, considered centered when magnet travel range is centered on valve stroke range. Continuously adjustable.
Resolution	Infinite.
Hysteresis	Negligible.
Temperature Range	-20°F to 185°F.
Temperature Effect	Less than .01% / °F, combined zero and span effect, at full span.
Humidity	10% to 90%, non-condensing.
Voltage Effect	Less than 0.1% for any voltage within the range of 14.5 to 35 volts.
Reverse Polarity	Protected from damage by internal diode.
Mounting Attitude	Any position.
Output Update Rate	Nominally 20 times per second.
Startup Stabilization	Within 4 seconds of power application.

*NOTE: For linear graphs displaying deviation from straight line (0.4" to 20") see technical manual #374

EPIC® 420



Predictive Diagnostics

EPIC® provides operating personnel the capability of bringing a higher degree of intelligence to the final control element. On-board electronics allow remote monitoring and diagnostics that continuously monitor control valve positioning performance, allowing comparison with the ideal. Reporting of deviations affords plant personnel the ability to detect problems before they become serious enough to trigger an alarm or shutdown.

Need For Diagnostic Capability

In terms of diagnostics, one of the most common problems in control valves is a form of "stickiness" developing in the packing or guide bushings.

In addition, most pneumatic actuators do not provide infinite positioning "stiffness". That is, a sudden decrease of force required to stroke the valve will cause the actuator to stroke further than intended with the actuator air signal held constant.

In practice, the mass of actuator and valve moving parts is low enough that a rapid "jump" in position will occur due to the fall in friction at the onset of stroking. The "jump" is rapid enough that the positioner cannot correct quickly enough to prevent the resulting overshoot.

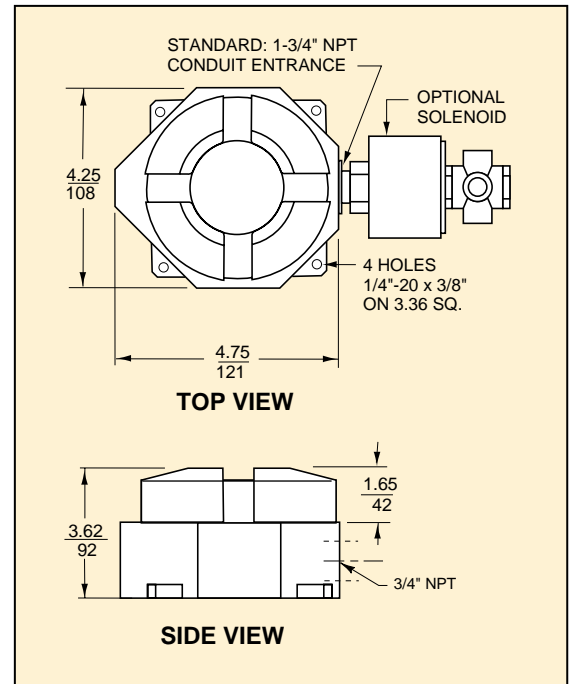
As age, wear, and other factors take their toll, the "jump" effect often becomes more pronounced. The resulting overshoot may become severe enough that the positioner continually tries to correct the situation, resulting in a constant "hunting" condition.

Early Detection and Diagnostics

With proper signal processing, the EPIC transmitter is ideal for detecting the onset of such effects. Early diagnosis allows maintenance or other corrective action to be scheduled; therefore avoiding a severe problem. The key in detection lies in determination of maximum rate of position change, or alternatively, in a comparison between rate of change of position signal and the actual position change of the valve.

Rate of valve position change may be determined by taking EPIC transmitter readings at finite intervals, perhaps once per second. The change in position during each interval may be compared with a maximum allowable value. In essence, the technique described here amounts to taking a first time derivative of position by numerical means.

DIMENSIONS (inches/mm)



MATERIALS OF CONSTRUCTION

Housing	Aluminium
Cover	Aluminium

APPROVALS / CERTIFICATION

UL (Underwriters Laboratories, Inc.)
CSA (Canadian Standards Association)

AREA CLASSIFICATIONS

Nema 4, 4x, 7, 9
Class I, Groups B, C, D
Class II, Groups E, F, G, Divisions 1 & 2
Class I, Group A, Division 2

ORDERING GUIDE

EPIC®

420

Aluminum:

Class I, Groups B, C & D

Class II, Groups E, F & G, Div. 1 & 2

Class I, Group A, Div. 2

