

# SILVER BULLET SERIES MODELS 316, 316DB & 316SB INSTALLATION AND OPERATIONS MANUAL

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|--|---------------|---------------------------|---------------|--|
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## WESTLOCK CONTROLS CORPORATION

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## **Revision History**

**Revision** Initial release 5/27/98 • Rev.A 11/1/05 • Rev.B 1/11/11• Rev.C 10/16/14

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## 1. Introduction

## 1.1 Product Certification

ITS 10ATEX16970X Ex II 2GD Ex d IIC T\* Gb Ex tb IIIC T\* Db IP6X

IECEx ITS 10.0020X Ex d IIC T\* Gb Ex tb IIIC T\* Db IP6X Ta =  $-20^{\circ}$ C TO 84°C T5 and  $-20^{\circ}$ C TO +69°C T6



Class I, Division 1, Groups A, B, C & D Class II, Division 1, Groups E, F & G -50°C to 85°C T6

# 1.2 Warnings

- Never remove enclosure cover or make/break electrical connections with power connected to the unit.
- Perform all wiring in accordance with site and local codes and the National Electric Code ANSI-NFPA-70 (US) or the Canadian Electric Code Part I (Canada) for the appropriate area classifications.
- Confirm that the AccuTrak model being installed is approved for the hazardous area (see Product Certification section above or unit ID label).
- Confirm that supply power to switches is within rated specifications listed on the unit identification label.
- Protect the unit from exposure to aggressive substances or atmospheres to ensure that hazard rating is not compromised.

## 1.3 Description

The Westlock Silver Bullet series products are hermetically sealed, dry contact, single pole double throw or double pole double throw reed switch element encapsulated in a 316 stainless steel casing with epoxy resin and shock absorbent polymer. The Silver Bullet 316DB features an integral, 7-conductor cable, and the Silver Bullet 316 features an integral, 4-conductor cable. conduit entry and externally threaded casing for ease of mounting and position adjustment. It is also supplied with threaded, encapsulated magnetic triggering bolts that facilitate adjustment of the gap between Silver Bullet and the triggering mechanism.

## 1.4 Principles of Operation

The Silver Bullet Series 316 operates on the principle of magnetic attraction, reacting to ferromagnetic actuators as they come within the switch's sensing range.



All sensors, when actuated by the presence of a ferromagnetic trigger, change the state of electrical contacts from Normally Closed (N/C) to Normally Open (N/O).

## 1.5 Special Features

IECEX/ATEX CONDITIONS OF SAFE USE:

- 1. Encapsulating compound must be protected from UV radiation
- 2. Cable entry thread is either M20X1.5 or 1/2-14NPT
- 3. Only suitably approved cable glands may be used.
- 4. When conduit is used, a suitably approved stopping box must be installed within 1/2 inch (12.7mm) of conduit opening.
- 5. Metal casing of product must be suitably grounded or equipotentially bonded unless using grounded metal conduit.
- 6. WARNING: DO NOT OPEN PRODUCT WHEN ENERGIZED OR WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT.

All Magnum Silver Bullets are Hermetically sealed. For installation in hazardous locations, check local electrical codes. Seal fitting not required.

## 2. Order Guide

See applicable catalog literature for ordering guide.

#### 3. Definitions

Not applicable

#### 4. Installation

#### 4.1 Mounting

•Determine the actuator(s) and trigger(s) desired operating point.

•Locate switch and/or actuator to assure that actuator comes within switch's sensing area.

-Use ferromagnetic trigger furnished with each sensor.

-Avoid contact between switch and actuator, which may damage switch.

Switches must be mounted as follows:
The blue arrow on the DPDT switch must be oriented in the

The blue arrow on the DPDT switch must be oriented in the same direction as the travel of the trigger.

-When mounting switches side-by-side, sensing areas must face the same direction.

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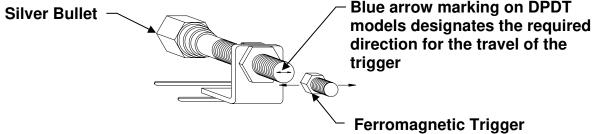
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-When mounting switches with sensing areas facing each other, install them at least 3 inches apart.

•For best results, utilize the ferromagnetic trigger supplied with each sensor.

-Keep all magnetic materials at least 1 inch away from switch.

-Steel placed inside the switch's differential area will not affect functioning.



## 4.2 Calibration

-Align magnetic trigger axially with the sensing end of the Silver Bullet. Adjust gap between magnetic trigger bolt to approximately 0.100 inch from the Silver Bullet.

Note: Be sure to abide by orientation instructions provided in the mounting section with regards to the direction of travel of the trigger to ensure best switch performance.

-Connect leads of a suitable continuity tester to the black (normally open contact) and white (common contact) wires of the Silver Bullet (refer to wiring diagram).

- Verify continuity between black and white wires in the presence of the trigger. Repeat continuity test between the brown and blue wires in the presence of the trigger for DPDT models.

Note: If an open circuit is required when the Silver Bullet is triggered, connect continuity tester to the red (normally closed contact) and white (common contact) wires and to orange (normally closed contact) and blue (common contact) wires for DPDT models, and follow the above continuity verification in the presence of the trigger.

## 4. Field Wiring

Attach conduit or cable correctly

-When using long runs of conduit or cable, place supports close to the switch to avoid pulling switch out of position.

-For installation in hazardous locations, check local electrical codes.

## 5. Maintenance and Repair

No maintenance is required for 316 series products.

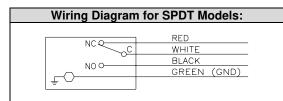
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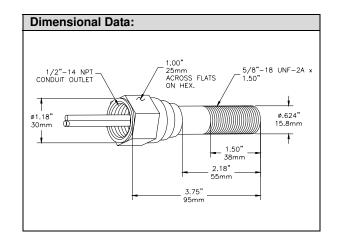
## 6. Appendix

| Mechanical                  |   |
|-----------------------------|---|
| Full Metal Outer Jacket:    | 316 Stainless Steel                     |
| Hermetic Seal:              | Glass (Inert gas)                       |
| Potting:                    | Epoxy Resin                             |
| Contacts:                   | Tungsten or Rhodium (specify model No.) |
| Type Rating:                | N/A                                     |
| IP Rating:                  | 65, 67                                  |
| Std. Temp. Range (°F) (°C): | -40°F to 220°F, -40°C to 104°C          |
| Low Temp. Range (°F) (°C):  | -58°F to 185°F, -50°C to 85°C           |
| Operational Life:           | 600,000 cycles (full rated load)        |
| Sensor Actuation:           | Ferromagnetic                           |
| Sensing Distance:           | 0.100" (2.54mm) end sensing             |

| Electrical                     |   |  |
|--------------------------------|---|--|
| Contact Arrangement:           | DPDT, Form CC (normally open) or SPDT, Form C (normally open) as specified by model number                            |  |
| Contacts:                      | Solid Tungsten or rhodium as specified by model number  |  |
| Current Rating:                | Tungsten: 3 Amps/120 VAC, 2 Amps/ 24 VDC; Rhodium: 1 Amp/24 VDC   |  |
| Operating time:                | 3.0 m Sec.  |  |
| Initial Contact<br>Resistance: | .50 ohms (Max.)   |  |
| Repeatability:                 | .005 in.  |  |
| Hysteresis:                    | .040 in   |  |
| Conduit Connection:            | 1/2"-14 NPT or M20 X 1.5  |  |
| Leads (Std):                   | Factory Sealed with 48" min. length, 7 Conductor (DPDT) or 4 Conductor (SPDT) PVC Insulation, rated for 105°C at 600V |  |
| Leads (Low Temp                | Factory Sealed with 48" min. length, 7 Conductor (DPDT) or 4 Conductor (SPDT) XL PE/TPE Insulation,                   |  |
| Option):                       | rated for 125°C at 300V   |  |
|                                | DPDT, Form CC (Normally Open) 3 Amps/120 VAC, 2 AMPS/ 24 VDC wire: 7 Conductor, 18 AWG, Ground                        |  |
| Contact Ratings:               | SPDT, Form C (Normally Open) 3 Amps/120 VAC, 2 AMPS/ 24 VDC wire: 4 Conductor, 18 AWG, Ground:                        |  |
|                                | Green , NC: Red, NO: Black, Common: White   |  |



| Wiring Diagram for DPDT Models: |                      |  |  |  |
|---------------------------------|----------------------|--|--|--|
| NC QC                           | RED<br>WHITE         |  |  |  |
| NO 0                            | BLACK                |  |  |  |
| NC QC                           | ORANGE<br>BLUE       |  |  |  |
| N0 0                            | BROWN<br>GREEN (GND) |  |  |  |
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