

WESTLOCK K20 ELECTRO-PNEUMATIC POSITIONERS

CERTIFIED TO NEC, CEC, ATEX, IECEx STANDARDS TO MEET INTRINSICALLY SAFE AND NON-INCENDIVE OPTIONS

The K20 is a next generation electro-pneumatic positioner that delivers improved levels of reliability and modulating position control via simple auto calibration.



GENERAL APPLICATION

The K20 represents the next phase in Westlock's mission to present a more effective and economical electro-pneumatic positioner solution. Designed to complete calibration in just minutes and independently adjust the positioner, the K20 performs position measuring by an off-set, Hall Effect Sensor.

TECHNICAL SPECIFICATION

Input current	4 – 20mA (analogue)
Voltage drop	9 volts
Supply pressure	15 to 45 psi (low), 40 to 120 psi (high)
Resolution	0.5% of span
Hysteresis	0.4% of span
Repeatability	0.4% of span
Thermal Coefficient	3% / 100 °C
Output flow rates	16.2 scfm [standard] & 40 scfm (high) @ 90 psig supply
Air consumption	0.08 scfm @ 90 psi (high) 0.03 scfm @ 20 psi (low)
Gain	Adjustable
Air connection ports	¼" BSP / NPT

FEATURES

- Simple auto calibration is completed in minutes and results are displayed on LCD display, facilitating setup and commissioning.
- Limit switch options allow for more flexibility in applications.
- Includes as standard a 4 – 20mA feedback position transmitter for verification that the valve package is tracking correctly.
- Non-contact Hall Effect sensor eliminates geared mechanical potentiometer for extended product life, reduced maintenance and improved performance under vibration.
- Every unit suitable for single acting and double acting.
- Globally certified

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TECHNICAL DATA

Agency approvals

Intrinsically Safe

ATEX and IECEX *(Engineered Resin or Stainless Steel enclosure)*
 II 1G
 Ex ia IIC T4 Ga
 Ta = -40°C to +85°C Ta = -40°C to +85°C

(Aluminum enclosure)
 II 1G
 II 2D
 Ex ia IIC T4 Ga
 Ex tb IIIC T87 Db
 Ta = -40°C to +85°C Ta = -40°C to +85°C

North America *(Stainless Steel or Resin)*
 Class I, Div. 1, Groups A, B, C & D, T4;
 Class I, Zone 0, AEx/Ex ia IIC T4 Ga;
 Type 4X, IP 65
 Class I, Div. 2, Groups A, B, C & D; T4;
 Type 4X, IP 65

(Aluminum Only)
 Class I, Div. 1, Groups A, B, C & D, T4;
 Class II, Div. 1, Groups E, F & G;
 Class III;
 Class I, Zone 0, AEx/Ex ia IIC T4 Ga;
 Class II, Zone 21, AEx/Ex tb IIIC T87 Db;
 Type 4X, IP 65

Non-Incendive Class I, Div. 2, Groups A, B, C & D, T4;
 Class II, Div. 2, Groups F & G;
 Class III;
 Type 4X, IP 65

Note: The switch options are approved for hazardous locations. (Mech. Switch option not for use in Division 2 North America).

MATERIAL OF CONSTRUCTION

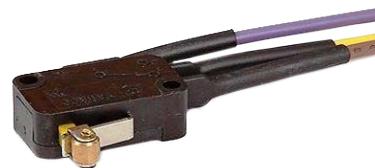
Housing / Cover	Engineered resin, aluminum & CF8M (316) stainless steel
Manifold	Anodized aluminum or stainless steel
Conduit	M20 / M25 / 3/4" NPT
Shaft	Stainless steel
Hardware	Stainless steel

SWITCH OPTIONS



Magnum XT-90 hermetically sealed proximity switch

Hermetically-sealed proximity switches with either pure tungsten or rhodium contacts for use with low power I/O's to provide longer contact life.



SPDT mechanical switch V3

A V3 (single pole double throw) mechanical switch (Form C).



P+F NJ2-V3-N inductive proximity sensor

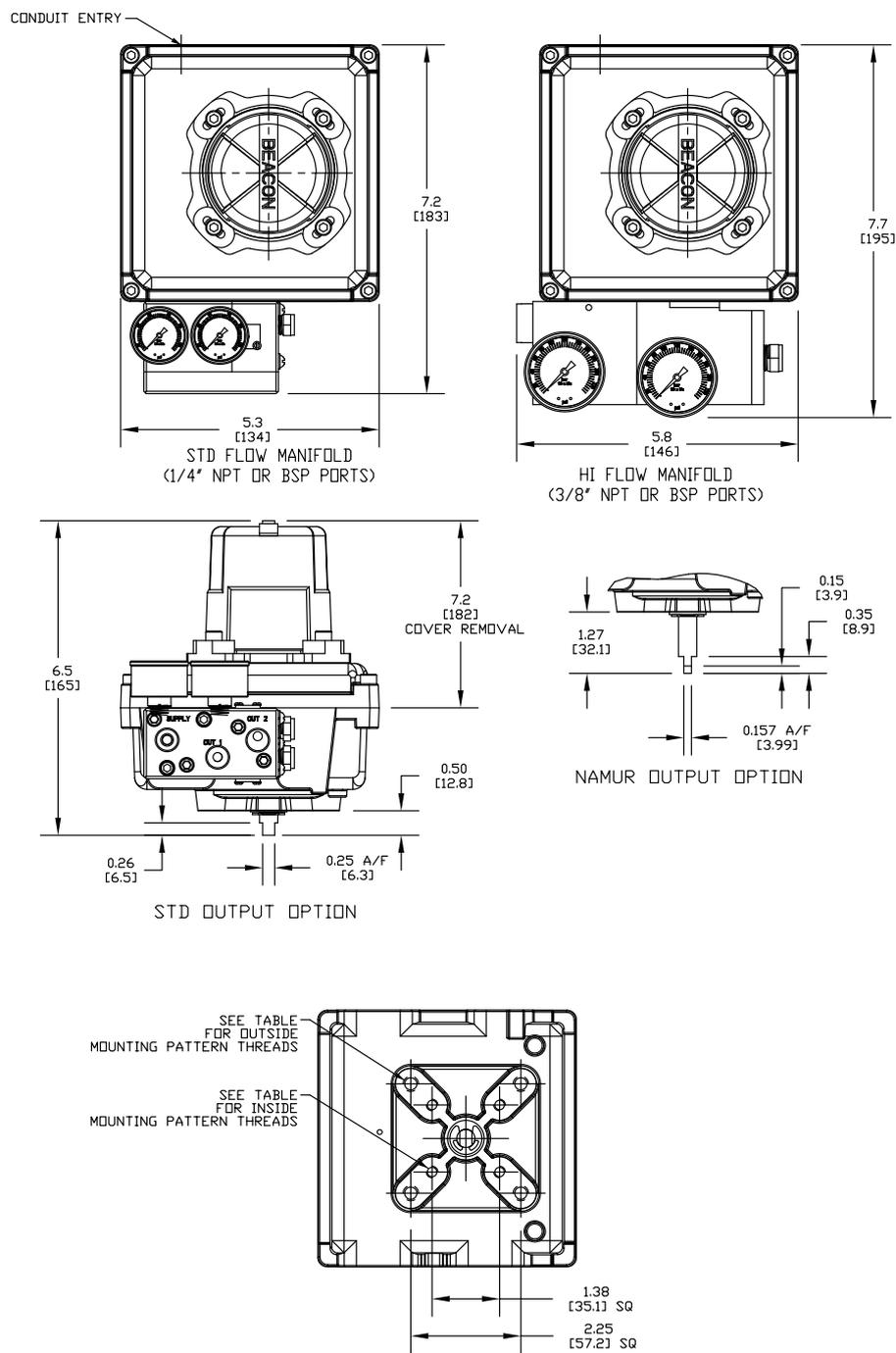
Intrinsically Safe

A solid state inductive proximity sensor which is available in NAMUR output. It is ideal for use in devices within potentially explosive atmospheres.

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GA DRAWING



SIMPLE CALIBRATION

- Easy to use auto-calibration via button assumes Low is 4mA and High is 20mA
- Manual Low/High Calibration - with 'value' options for closed and open positions
- Full Manual Calibration accommodating:
 - o Forward Gain/Reverse Gain
 - o Drop Off
 - o Zero Adjust
 - o Span Adjust
 - o Forward or Reverse Acting
 - o Long Cal - For larger actuators to avoid timeout of calibration
 - o Split Range Applications

MOUNTING OPTIONS

CONDUIT ENTRY	OUTSIDE MOUNTING PATTERN	INSIDE MOUNTING PATTERN	HOUSING MATERIAL
3/4"-14 NPT	5/16"-18	N/A	Resin
3/4"-14 NPT	5/16"-18	M6 x 1	Metal
M25 x 1.5	M8 x 1.25	M6 x 1	All
M20 x 1.5	M8 x 1.25	M6 x 1	All

WESTLOCK K20 ELECTRO-PNEUMATIC POSITIONERS

POSITIONER SELECTION GUIDE

K Series Positioner Base Model

K20 Electro-Pneumatic Positioner (4-20 mA Input)

Shaft Output

- S Standard (Double-D with 1/4" Flats)
- D Direct mount to Keystone 79U or MRP Actuators
- N NAMUR

Hazardous Area Certification

- IS Intrinsically Safe and Non-Incendive

Housing Material

- E Engineered Resin Enclosure (Clear Cover w/ Visible LCD)
- S Stainless steel CF8M (316) Enclosure
- A Aluminum Enclosure

Supply Pressure

- H STD flow High Pressure (40 - 120 psi)
- L STD flow Low Pressure (15 - 45 psi)
- V High Flow (40 - 120 psi, for larger actuators)

Manifold Material

- 0 Anodized Aluminium
- 1 Stainless Steel (required for SS enclosure)

Conduit Entry*

- B (1) M20 x 1.5 **
- C (1) 3/4-14 NPT *** (Recommended with switch options)
- D (1) M25 x 1.5 ** (Recommended with switch options)

Limit Switch Options

- 0 None
- B 2 x SPDT Mechanical Switches with Gold Plated Contacts
- I 2 x Inductive Sensors P&F Model NJ2-V3-N
- T 2 x SPDT Magnum Proximity switches with Tungsten Contacts
- R 2 x SPDT Magnum Proximity switches with Rhodium contacts

Position Transmitter Output

- B 4-20mA Transmitter

Pneumatic Connections

- N 1/4" NPT (3/8" NPT with high flow option)
- B 1/4" BSP (3/8" BSP with high flow option)
- F 1/4" NPT w/Aluminum Filter-Regulator Assembly (3/8" NPT with High Flow option)
- S 1/4" NPT w/ Stainless Steel Filter-Regulator Assembly (3/8" NPT with High Flow option)

K20 N IS E H 0 C R B F = Model number **K20NISEH0CRBF**

Magnum Proximity Switch Application Note:

For **24 VDC service below 1 watt**, **R** (Rhodium Magnum switches) is recommended

For **24 VDC service below 1 watt**, **T** (Tungsten Magnum switches) is recommended

* Consult sales for multiple conduit offerings

** Mounting pattern (M8 x 1.25 outer pattern) (M6 x 1 inner pattern)

*** Mounting pattern (5/16-18 outer pattern) (M6 x 1 inner pattern - metal housings only)

FALCON® V INTEGRAL SOLENOID VALVES

The Falcon V solenoid valve is an integral part of Westlock Quantum control monitors and is engineered specifically to address low power valve actuation requirements. It is available for single-acting or dual acting actuators



FEATURES

- Available in anodized aluminum (all wetted parts), nickel-plated brass with stainless steel internals and 316 SS (all wetted parts) material options.
- Valve body temperature range -4°F to +200°F (-20°C to 94°C) standard.
- Solenoid coil temperature range [-40°C to +75°C) standard for general purpose and non-incendive coils and [-40°C to +85°C) standard for intrinsically safe applications.
- Viton seals standard.
- Internal venting design standard.
- Increased C_v of the standard valve body (1.4 C_v standard) allows for automation of a wider range of actuators and reduces the need for increased stock.
- Reduced pilot pressure coil allows use on low supply pressure without external pilot.
- Anti-extrusion seal design.
- Common global porting system and location across all Westlock brands for ease of automation.
- New protected spool indicator design prevents incidental contact damage.
- Less than or equal to 5 cc air leakage at steady state reduces losses.
- Extended low temp [-50° degrees Celsius) seal optional.
- Suitable for use in a SIL 3 area for SIS system.
- Single and dual coils, with fail center option available for fail freeze applications.
- Stand-alone versions available for all materials.
- Suitable for high cycle applications.

TECHNICAL DATA

Operating pressure	30 - 120 psi (2.1 - 8.3 bar) - single coil 15 - 120 psi (1.0 - 8.3 bar) - dual coil
Operating temperature	-4°F to +166°F (-20°C to + 75°C) - standard -40°F to +166°F (-40°C to + 75°C) - low temperature -4°F to +185°F (-20°C to + 85°C) - IS only -40°F to +185°F (-40°C to + 85°C) - IS low temperature only Filtered air to 20 microns
Operating media	
Standard specification	
Materials	Anodized aluminum, nickel plated brass, stainless steel
Valve flow rates	
Falcon V	1.4 C_v
Standard coil voltages	
Falcon V	24 V DC, 24 V AC, 120 V AC, 125 V DC, 220 V AC
Valve port tapping	
Falcon V	¼" NPT air ports for inlet, outlet and exhaust

Note: the new Falcon V is reverse compatible with all existing Falcon installations with the use of a standard retrofit kit and slight modification to the actuator tubing.



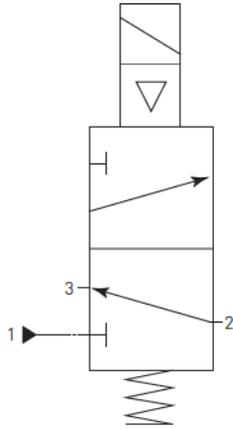
FALCON® V INTEGRAL SOLENOID VALVES

PNEUMATIC OPERATION

Air line designation

¼" NPT air ports for inlet, outlet and exhaust.

FIGURE 1 - SPRING RETURN VALVE 3-WAY

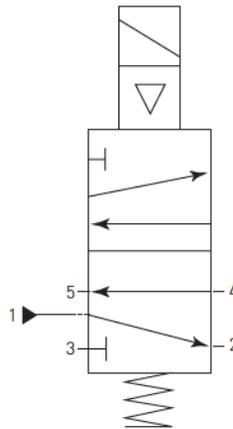


Operation

Solenoid de-energized - air flows from outlet port 2 to exhaust port 3.

Solenoid energized - air flows from inlet port 1 to outlet port 2.

FIGURE 2 - SPRING RETURN VALVE 4-WAY

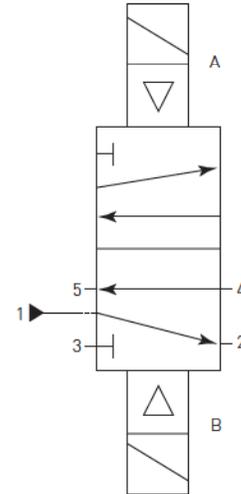


Operation

Solenoid de-energized - air flows from inlet port 1 to outlet port 2 and exhausts from port 4 to port 3.

Solenoid energized - air flows from inlet port 1 to outlet port 4 and exhausts from port 2 to port 3.

FIGURE 3 - DUAL COIL VALVE



Operation

Coil B de-energized - air flows from inlet port 1 to outlet port 2 and exhausts from port 4 to port 3.

Coil A energized - air flows from inlet port 1 to outlet port 4 and exhausts from port 2 to port 3.

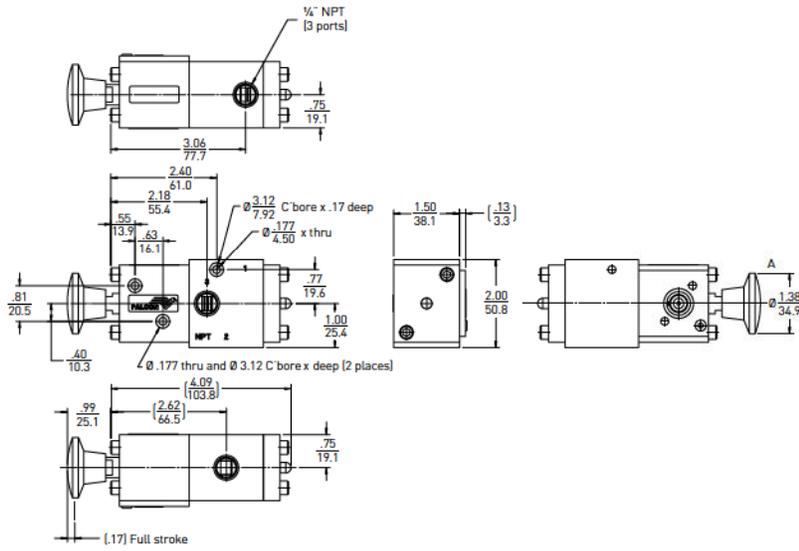
FALCON MATERIAL SPECIFICATIONS

Components	Aluminum valve body	316 stainless steel valve body	Ni-plated brass valve body
Valve body	Black anodized aluminum	Passivated 316 SS	Ni-plated brass
Pilot piston end cap	Black anodized aluminum	Passivated 316 SS	Ni-plated brass
Spring end cap	Black anodized aluminum	Passivated 316 SS	Ni-plated brass
Spool	PTFE impregnated hard anodized aluminum	303 SS	PTFE impregnated hard anodized aluminum
Seals (std. operating temp.)	Nitrile	Nitrile	Nitrile
Bushes	Brass	Brass	Brass
Spring	Stainless steel	Stainless steel	Stainless steel

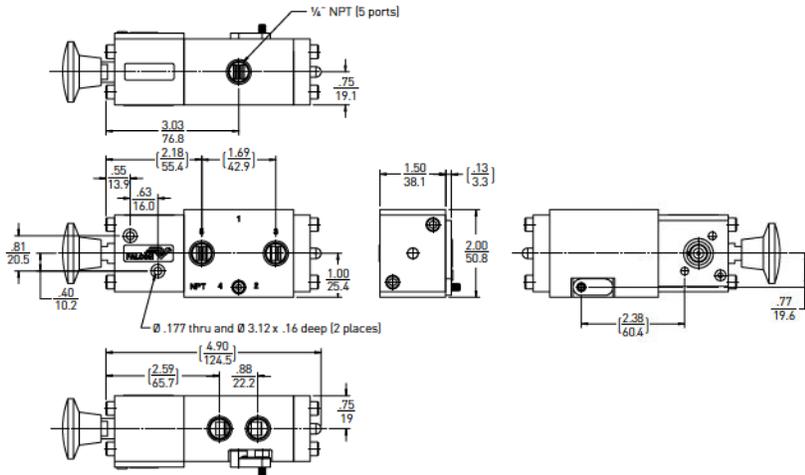
FALCON® V INTEGRAL SOLENOID VALVES

DIMENSIONS

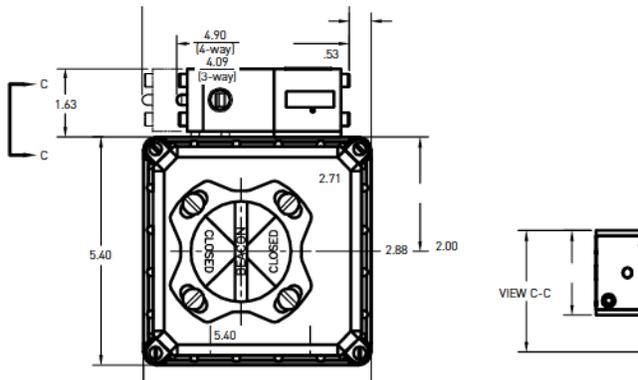
DIMENSIONS - 3 WAY VALVE



DIMENSIONS - 4 WAY VALVE



DIMENSIONS - MOUNTED TO SWITCH BOX



FALCON® V INTEGRAL SOLENOID VALVES

FALCON V VALVE BODY OPTIONS

The standard range of Falcon V valve options is shown below. Please consult individual control monitor product datasheets for availability as applicable.

Code	C _v	Mode	Material	Code	C _v	Mode	Material	Code	C _v	Mode	Material
2V3	1.4	3-way	Brass	2VY	1.4	Dual coil	Brass	2V7	1.4	4-way	Brass
3V3	1.4	3-way	Aluminum	3VY	1.4	Dual coil	Aluminum	3V7	1.4	4-way	Aluminum
5V3	1.4	3-way	316 SS	5VY	1.4	Dual coil	316 SS	5V7	1.4	4-way	316 SS
3V4	3.5	3-way	Aluminum	3VZ	3.5	Dual coil	Aluminum	3V8	3.5	4-way	Aluminum
5V4	3.5	3-way	316 SS					5V8	3.5	4-way	316 SS

VALVE OPTIONS

0 - None

N - Manual reset with latch

With the coil first energized, the palm button is pushed in and latched. The inward movement of the palm button causes the valve to shift. When the coil is de-energized, the palm button and latching mechanism are tripped automatically, allowing the valve to return to its original position.

M - Momentary override

Spring return momentary push type. Must be held in to actuate.

R - No-voltage release (non-latching)

With the coil first energized, the palm button is pushed in. The inward movement of the palm button causes the valve to shift. When the coil is de-energized, the valve automatically returns to its original position.

L - Manual locking override

The palm button is pushed in and rotated clockwise to lock in position. It must be disengaged manually to return to its original position.

E - External pilot

The 1/8" NPT external pilot connection requires a separate auxiliary pressure line to the valve. This feature should be used when the controlled pressure is below the minimum 45 psi (3.1 bar) operating pressure.

FALCON / FALCON V CODE COMPARISON

The new Falcon V is reverse compatible with all existing Falcon installations with the use of a standard retrofit kit and slight modification to the actuator tubing. The tables below show the original Falcon code and the new Falcon V equivalent.

3-WAY VALVES

Falcon code	Falcon V equivalent
22	2V3
23	2V3
32	3V3
33	3V3
34	3V4
52	5V3
53	5V3

DUAL COIL VALVES

Falcon code	Falcon V equivalent
20	2VY
2Y	2VY
30	3VY
3Y	3VY
3Z	3VZ
50	5VY
5Y	5VY

4-WAY VALVES

Falcon code	Falcon V equivalent
26	2V7
27	2V7
36	3V7
37	3V7
56	5V7
57	5V7
58	5V8



The manufacturer may use the mark:



Valid until December 1, 2017
Revision 2.1 December 19, 2014



ANSI Accredited Program
PRODUCT CERTIFICATION
#1004

Certificate / Certificat Zertifikat / 合格証

WES 1102068 C001

exida hereby confirms that the:

**AccuTrak Position Monitor Series
2200, 2600, 3000, 3200, 3300, 3400,
3500, 8300, 8400 and 8500**

**Westlock Controls Ltd.
Tunbridge Wells, Kent - UK**

Has been assessed per the relevant requirements of:

IEC 61508 : 2010 Parts 1-7

and meets requirements providing a level of integrity to:

Systematic Capability: SC 2 (SIL 2 Capable)

Random Capability: Type A, Route 2_H Device

**PFD_{AVG} and Architecture Constraints
must be verified for each application**

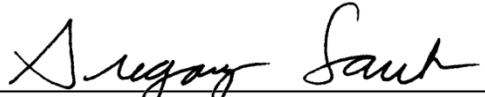
Safety Function:

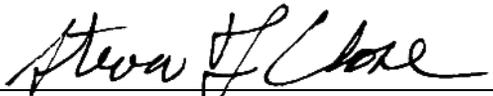
The Position Monitor switch(es) will change it's output when the attached Valve moves to the configured position.

Application Restrictions:

The unit must be properly designed into a Safety Instrumented Function per the Safety Manual requirements.




Evaluating Assessor


Certifying Assessor

WES 1102068 C001

Systematic Capability: SC 2 (SIL 2 Capable)

Random Capability: Type A, Route 2_H Device

PFD_{AVG} and Architecture Constraints must be verified for each application

Systematic Capability :

The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 2. These are intended to achieve sufficient integrity against systematic errors of design by the manufacturer.

A Safety Instrumented Function (SIF) designed with this product must not be used at a SIL level higher than stated.

Random Capability:

The SIL limit imposed by the Architectural Constraints must be met for each element.

Versions:

Series	Switch Quantity and Type (Option Code)
AccuTrak 2200	1 to 6 SPDT Microswitches (5) 1 to 4 DPDT Microswitches (6) 1 to 6 P&F Inductive Sensor (7) 1 to 6 Magnum Switches (9)
AccuTrak 2600	
AccuTrak 3000	
AccuTrak 3200	
AccuTrak 3300	
AccuTrak 3400	
AccuTrak 3500	
AccuTrak 8300	
AccuTrak 8400	
AccuTrak 8500	

IEC 61508 Failure Rates¹ in FIT²

AccuTrak Series Switch Circuit Qty (Option Code)	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}
1 Switch Circuit (5, 6, 7 or 9)	0	11	0	94
2 Switch Circuits (5, 6, 7 or 9)	0	23	0	119
3 Switch Circuits (5, 6, 7 or 9)	0	34	0	149
4 Switch Circuits (5, 6, 7 or 9)	0	45	0	174
6 Switch Circuits (5, 6, 7 or 9)	0	68	0	229
8 Switch Circuits (6)	0	80	0	239
1 Switch Circuit (5, 6, 7 or 9) w/PVST ³	11	0	86	8
2 Switch Circuits (5, 6, 7 or 9) w/PVST	23	0	110	9
3 Switch Circuits (5, 6, 7 or 9) w/PVST	34	0	139	10
4 Switch Circuits (5, 6, 7 or 9) w/PVST	45	0	163	11
6 Switch Circuits (5, 6, 7 or 9) w/PVST	68	0	216	13
8 Switch Circuits (6) w/PVST	80	0	225	14

¹ Failure Rates listed are only applicable if the switch contacts current is limited to 60% of the switches rated capacity and the end user has added external transient protection if being used with non-resistive loads.

² FIT = 1 failure / 10⁹ hours

³ PVST = Partial Valve Stroke Test of a final element Device

SIL Verification:

The Safety Integrity Level (SIL) of an entire Safety Instrumented Function (SIF) must be verified via a calculation of PFD_{avg} considering redundant architectures, proof test interval, proof test effectiveness, any automatic diagnostics, average repair time and the specific failure rates of all products included in the SIF. Each element must be checked to assure compliance with minimum hardware fault tolerance (HFT) requirements.

The following documents are a mandatory part of certification:

Assessment Report: WES 11/02-068 R002 V1 R3

Safety Manual: TECHUK-78

AccuTrak Position
Monitor Series 2200,
2600, 3000, 3200, 3300,
3400, 3500, 8300, 8400
and 8500



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Sellersville, PA 18960