



# Hazardous Location & Pneumatic Switches

## Explosion Proof Switches

Ex Range .....	16-2
Rotary Switch .....	16-4

## Galvanic Isolator ..... 16-6

## Pneumatic Switches

Lifeline 4 .....	16-8
Rotacam .....	16-8

## Explosion Proof

### Ex Range



### Description

#### Guardmaster Ex Range

The Guardmaster Ex range of safety switches are specifically designed for potentially explosive atmospheres. They retain the safety features and operating principles of the conventional Guardmaster switches. They incorporate a sealed flameproof contact block, making them suitable for use in European Zone 1 and Zone 2 environments. In the US and Canada, these products can be used in areas classified as Class 1, Division 2 in Groups A (acetylene), B (hydrogen), C (ethylene) and D (propane). All the Guardmaster Ex switches conform to the exacting standards required by the European harmonized standards. These switches carry the classification EExd IIC T6 Baseefa.

EEx equipment conforms to types of protection standardised by CENELEC (European standards), EN50014 and EN50018 respectively and BS5501 parts 1-V.

The d suffix indicates that the contact block in the switch is a flameproof enclosure and is designed to ensure that if an internal explosion occurs it will be contained within the enclosure. The designation II indicates use in surface industries and c refers to the group of gases for which the switches are suitable. The designation T represents the surface temperature classification of the switch. These switches have been tested with an ambient temperature of 60°C as opposed to the normal test limit of only 40°C, allowing them to be used in gases having a low flash point.

It should be noted that these groups refer to the explosion-proof qualities of the switches and not corrosion-resistance characteristics. Special precautions may be required to protect the vulnerable parts such as PVC-covered cables against attack by certain corrosive elements and physical damage.

### Features

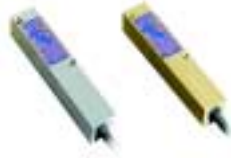

- For use in potentially explosive atmospheres
- Positive mode action, flameproof contact block
- Suitable for use in European Zone 1 and 2 environments
- US and Canada: Class 1, Division 2 in Groups A, B, C and D

### Specifications

All switches excluding Ferrogard GS2	
<b>Contact block—electrical specifications</b>	
Classification	EExd IIC T6 Class 1, Div 2, Groups A, B, C and D
Contact arrangement	1 N.C. & 1 N.O. or 2 N.C.
Protection	P66
Rated voltage	250V AC and 250V DC
Rated current	5A AC and 0.25A DC
AC ratings	250V 125V
Resistive	6A 6A
Inductive	2.5A 3A
DC ratings	250V 125V 75V 30V
Resistive	0.25A 0.5A 1A 7A
Inductive	0.1A 0.2A 1A 5A
<b>Contact block—technical specifications</b>	
Operating force	1.6N - 0.4/ - 0.2N
Release force	0.4N
Pre-travel	0.8mm
Over-travel	0.6mm
Return travel	1.1mm
Differential travel	0.5mm
Release travel	0.2mm
Positive break travel	0.4mm
Repeatability	+0.01mm
Minimum plunger operating speed	1 mm/min.
Maximum switching rate	3000/h
Mechanical life	2 x 10 <sup>6</sup>
Electrical life	Dependent on loading
Ambient temperature	-25°C to +70°C (-10°F to 284°F)
Electrical connection	Potted in leads. Flexible 4 x 0.75mm <sup>2</sup> , 2m long
<b>Ferrogard GS2</b>	
Classification	EExd IIC T6 Baseefa Not suitable for Group 1 gases
Contact arrangement	1 N & C
Protection	IP68
Rated voltage	250V AC
Rated current	2A
Max VA	100 at 50V 200 at 110V 500 at 250V
Safety contact operating distance	Make 15mm, break 26mm
Close time	3.0ms
Drop out time	2.1ms
Bounce time	0.7ms
Shock tolerance	<50G
Vibration tolerance	7-15G at 10-2000Hz
Initial resistance	0.07Ω (excluding cable)
Mechanical life	100 x 10 <sup>6</sup>
Electrical life	5 x 10 <sup>6</sup>
Ambient temperature	-10°C to +40°C (14°F to 104°F)
Housing	Brass or stainless steel
Cable	3m of Termorad

**Note:** For all other specifications and dimensions see relevant standard switch.

**Product Selection**

Switch	Description	Type	Contacts	Cable m (ft)	Catalogue Number
	Ex Trojan 5 Explosion proof tongue operated safety interlock switch.	Trojan 5-EX	2 N.C.	2 (6.5)	440K-H11145
				6 (19.7)	440K-H11160
				15 (39.2)	440K-H11161
	Ex Ferrogard GS2 Explosion proof magnetically actuated, noncontact safety interlock switches.	Ferrogard GS2-EX (stainless steel)	1 N.C.	3 (9.8)	440N-H02047
		Ferrogard GS2-EX (brass)			440N-H02046
		Ferrogard GS2-EX (stainless steel)		5 (32.8)	440N-H02086
				10 (32.8)	440N-H02087
	Ex Lifeline 4 Explosion proof, cable and push button actuated Emergency Stop switch.	Lifeline 4-EX	1 N.C. & 1 N.O.	2 (6.5)	440E-H13046
			2 N.C.		440E-H13069
	Ex Rotacam Explosion proof, hinge actuated safety interlock switch.	Rotacam-HS-2-EX	1 N.C. & 1 N.O.	2 (6.5)	440H-H03077
			2 N.C.		440H-H03100
	Ex Centurion Explosion proof, manually operated time delay, bolt interlock switch.	Centurion-EX (left hand version)	1 N.C. & 1 N.O.	2 (6.5)	440K-H04035
		Centurion-EX (right hand version)	2 N.C.		440K-H04037
			1 N.C. & 1 N.O.		440K-H04036
		2 N.C.	440K-H04038		
	Ex Telescopic Explosion proof telescopic (antenna) safety trip switch.	Telescopic CP15-EX	1 N.C. & 1 N.O.	2 (6.5)	440E-H05004
			2 N.C.		440E-H05019

## Explosion-Proof Rotary Switch



### Description

The explosion proof rotary switches are used for electrical isolation of machinery to enable safe access. This switch can be mounted within the hazardous location.


### Features

- Conforms to EExd IIB T6
- Zone 1 and 2 hazardous locations
- 4 N.O. or 2 N.C. + 2 N.O.
- Direct opening operation

### Specifications

Standards	EN50014 – 018
Approvals	CE marked for all applicable directives
No & Type of Conduit Entries	4 x M20 (2 Plugged)
Rtd. Insulation Voltage (Ui)	690
Rtd. Impulse withstand Voltage (Uimp)	6kv
Rtd Uninterrupted Current (Iu) IEC/EN/VDE/UL/CSA	40A
Rtd. Operational Voltage (Ue) IEC/EN/SEV/VDE/UL/CSA	600V
Main Switch Isol. Voltage	690V
Rtd. Operational Current (Ie) AC-21A IEC/EN/VDE AC-1 SEV	40A
Rtd. Op.Power at 50/ 60 Hz AC-23A IEC/EN/VDE	
3 phase 220-240V	7.5kw
3 pole 380-440V	15kw
500-690V	15kw
AC-3A IEC/EN/VDE	
3 phase 220-240V	7.5kw
3 pole 380-440V	11kw
500-690V	11kw
DOL-Rating UL/CSA	
3 phase 140V	3kw
3 pole 240V	7.5kw
480V	15kw
600V	15kw
Rated Breaking Capacity	
AC-23/AC-3 220-240V	7.5kw
Motor Switch 380-440V	15kw
500-690V	15kw
Maximum Fuse Size (G)	50A
Rated fuse Short Circuit Current	500A
Terminal Cross Section Single/Multiple Wire	
Minimum mm <sup>2</sup>	1
Maximum mm <sup>2</sup>	16
Fine Strand Wire with Sleeve	
Minimum mm <sup>2</sup>	1
Maximum mm <sup>2</sup>	16
American Wire Gauge (AWG)	6
Enclosure IP Rating	IP66
Weight	10.5kg (23.2lbs)
Electrical Operations	100,000
Operating Temperature	-20°C to +40°C (-4°F to 104°F)
Mechanical Operations	100,000
Humidity	25% – 95%

**Product Selection**

Type	Current	Contacts	Catalogue Number
	24 A	4 N.O.	440T-MERSE10 ①
		2 N.O. & 2 N.C.	440T-MERSE12 ①

① Substitute the desired primary code for this symbol (key not included). See page 5-7 for code selection.

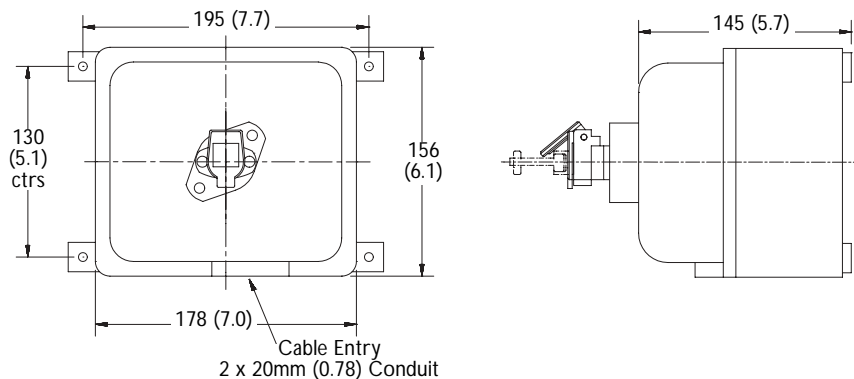
**Accessories**

Description	Page Number	Catalogue Number
Key	5-33	440T-AKEYE10⊗
Code Barrel	5-33	440T-ASCBE11 ①
Dust Cap	5-33	440T-ASFC10⊗

① Substitute the desired primary code for this symbol (key not included). See page 5-7 for code selection.

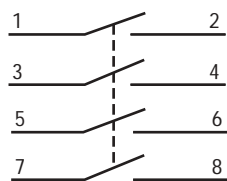
⊗ Substitute the desired code for this symbol. See page 5-7 for code selection.

**Approximate Dimensions—mm (inches)**

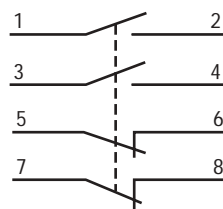


**Typical Wiring Diagrams**

Diagrams shown are key free



440T-MERSE10



440T-MERSE10

# Hazardous Location & Pneumatic Switches

## Galvanic Isolator



### Description

The galvanic isolators are active protective interface assemblies to isolate intrinsically safe circuits from non intrinsically safe circuits to worldwide standards. Galvanic isolators offer economical solutions for instrumentation and control systems in hazardous locations. Unlike zener diode barriers, galvanic isolators do not require grounding.

Allen-Bradley's galvanic isolators provide 1500 volt isolation between hazardous area and non hazardous area terminals and 500 volt isolation between input/output and external power terminals. DIP switches provide convenient programming for output or diagnostic functions. Multiple LEDs allow easy visual indication of module and circuit status.

Wiring for intrinsically safe systems must be identified as such through the use of light blue jacketing and/or through appropriate labels. Such labels are required by NEC Article 504 and ANSI/ISA RP-12.6 to be placed at no more than 25 foot intervals. When installing intrinsically safe equipment the user should refer to all relevant national standards and/or those standards set forth by the "authority having jurisdiction" at the installation site.

### Features

- Galvanic isolation input-to-output
- Reverse polarity protected
- 500V isolation between input and output
- No separate intrinsically safe grounding required
- 18mm (0.71in) wide housing
- 35mm Din rail mount

### Specifications

Standards	EN50020-EN50039, FM3610, CSA22.2 No.157, UL913
Approvals	FM, CSA, UL, CENELEC (PTB) approved and CE marked for all applicable directives
Power Supply	32mA @ 18-35V DC
Number of Inputs	2
Signal Range	8V @ 8.2mA
Input Switching Current	On > 2.1mA Off < 1.2mA
Input Resistance	1000 ohms
Isolation Protection	1500V
Output	2 x SPST
Output Contact Rating	2A/250V AC, 2A/120V AC, 2A/24V DC
Switching Frequency	15Hz
Switch Delay	On to Off 15ms Off to On 15ms
Indication LEDs	Green = Power Yellow = Output Closed Red = Wire Break/Short
Operating Temperature	-20°C to +65°C (-4°F to +149°F)
Humidity	95% RH
Housing Material	Polyamide 6GF
Enclosure Protection	IP30
Mounting	35mm Din rail
Conductor Size	0.2-2.5mm <sup>2</sup> (24-14AWG)
Weight	120g (0.26lbs)
Mechanical Contact Life	20,000,000 cycles

### Entity Table

Groups	Voc	Isc	Ca	La
A, B	10.6V	29.7mA	2.5uF	40mH
C, D, E, F, G			15uF	150mH

# Hazardous Location & Pneumatic Switches Galvanic Isolator

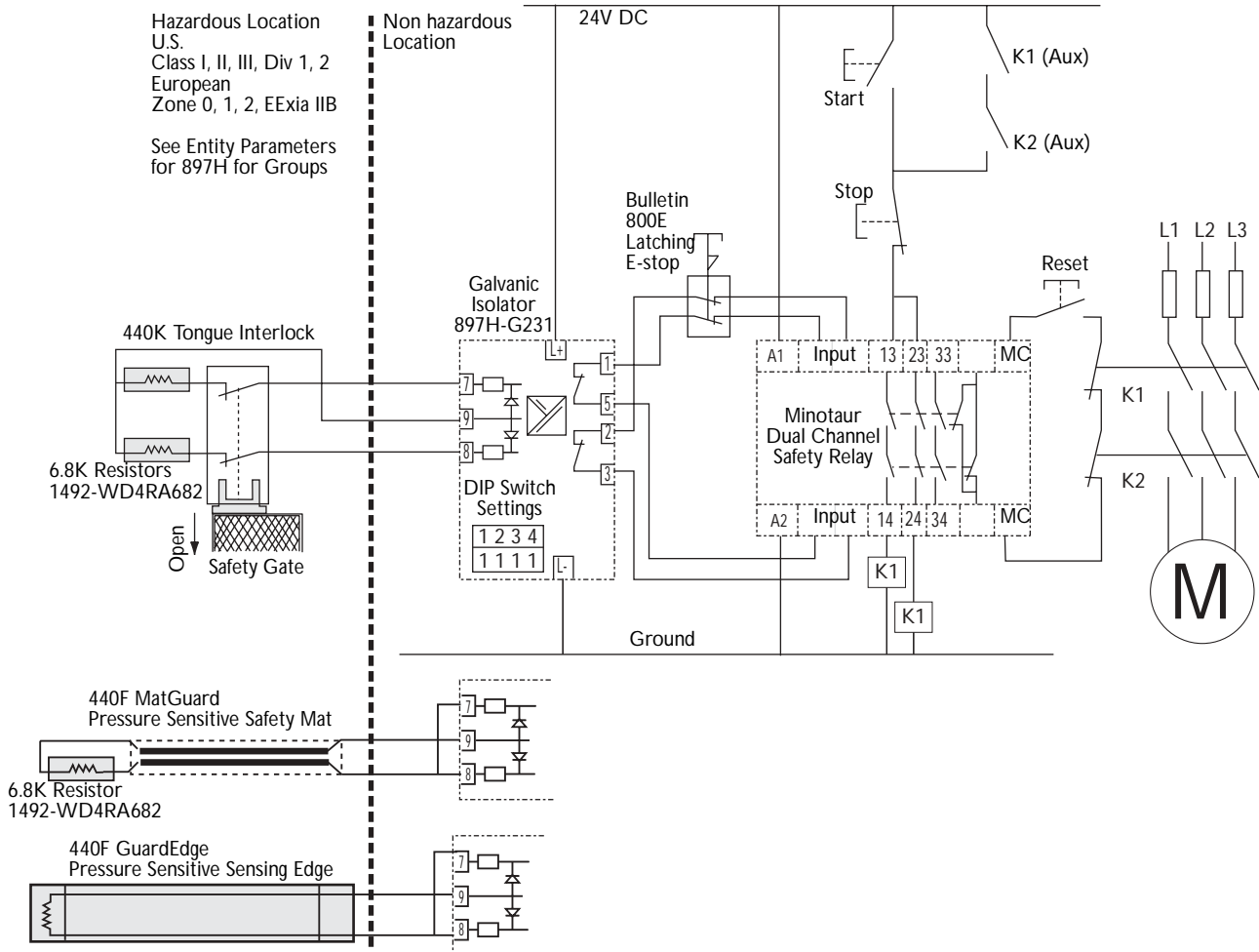
## Product Selection

Product	External Power	Output type	Catalog Number
Galvanic Isolator	32mA @ 18-35VDC	SPST 2A @ 250V AC	897H-G231

## Approximate Dimensions—mm (inches) Block Diagram



## Typical Wiring Diagrams



## Pneumatic

### Lifeline 4 and Rotacam



#### Description

##### Pneumatic Rotacam

Based on the highly successful conventional Rotacam the Pneumatic Rotacam has the same design features except that it gives positive acting isolation of a machine's compressed air supply instead of an electrical power source.

The switch is mounted at the hinge point of the guard door. The bored stainless steel operating shaft is mounted in a sealed bearing which is so robust that it enables the switch itself to be used as the hinge pin if necessary.

The pneumatic valve specifications are shown below. The external switch dimensions and operating shaft specifications are the same as the conventional Rotacam.

**Note:** The Pneumatic Rotacam does not have the adjustable cam used with the standard Rotacam.

##### Pneumatic Lifeline 4

Based on the conventional Lifeline 4 this rope operated pneumatic safety switch can be used for guarding exposed pneumatic machinery and conveyor equipment.

The Pneumatic Lifeline 4 is immune to machine vibration thus overcoming the problem of nuisance tripping.

The pneumatic valve specifications are shown below. The external switch dimensions are the same as the conventional Lifeline 4.

#### Features

##### Pneumatic Rotacam

- Can be used as a hinge pin with light and medium weight guard doors on pneumatic machinery
- Isolates pneumatic power within 5° of guard movement

##### Pneumatic Lifeline 4

- Switches pneumatic power with up to 75 meter span
- Lid mounted emergency stop button, designed to EN418
- Switch lockout with indication of rope pulled and rope slack

#### Specifications

Standards	
Pneumatic Rotacam	IEC 60947-5-1, ISO 14119, ISOTR 12100,
Pneumatic Lifeline 4	IEC 60204-1 IEC 60947-5-1, ISO 14119, ISOTR 12100, IEC 60204-1, ISO 13850
Fluid used	Compressed air or neutral gas
Pressure range	2 to 8 bars
Passage diameter	2.7mm
Connection	Push in fittings for standard 4mm Ø nylon tube, internal Ø 2.5mm
Flow	138 NL/min. (ie., number of liters of air at normal atmospheric pressure obtained with the output open to atmosphere and the supply pressure at 4 bars).
Mechanical endurance	>1 x 10 <sup>6</sup>
Temperature	10°C to +60°C (+50°F to 140°C)

**Note:** For other specifications and dimensions see relevant specifications on standard product

#### Product Selection

Type	Catalog Number
Rotacam	440H-P03035
Lifeline 4	440E-P13045

**Note:** See standard Lifeline 4 for installation kits, etc.