



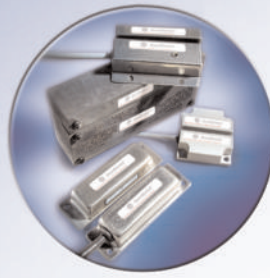
**GE Interlogix**  
**Industrial**

*The World's #1 Non-Contact Safety Switch Manufacturer*



*Product Catalog*





# *Product Catalog*

*Introduction*

*Standards*

*Risk Assessment*

## *Safety Interlock Systems*

*300-BT Series GuardSwitches™*

*INT Series Safety Monitor Relays*

*Mechanical Safety Switches*

*200 Series FailSafe GuardSwitches™*

## *Industrial Interlock Systems*

*100 Series Interlocks*

*300-CT/DT Series Interlocks*

## *Position Sensors*

## *Magnets & Accessories*

## *Appendix*

## *Warnings/Warranty*

## *Index*



**GE Interlogix**  
**Industrial**

# Introduction

## ***The Safer Switch for Safety Interlocks***

GE Interlogix Industrial is a market leader in the development and manufacture of safety interlock switches and position sensors for industrial applications. Whether it's a new machine design or a retrofit to increase operator safety on an existing machine, GE Interlogix Industrial GuardSwitches™ and mechanical safety interlocks provide the best fit for your application.

All GE Interlogix Industrial GuardSwitches™ are non-contact, magnetic devices consisting of a switch and a magnet actuator. They are extremely tolerant of misalignment and the build-up of dirt, grease and other contaminants. The typical air gap between actuator and switch is 0.5" to 1.0". This allows easy installation and a margin for the usual "settling out" shift that occurs in machine guard doors and gates.

GE Interlogix Industrial GuardSwitches™ actuate through wood, aluminum, stainless steel or any other nonferrous material. This allows the interlock switches to be concealed in the machine for added protection against tampering. In addition, all switching elements are hermetically sealed, so they can be installed in dirty or corrosive environments.

The 300-BT Series non-contact GuardSwitches™ offer superior defeat resistance, ease of installation and are "CE" and **Semi S2** compliant when used with our INT Safety Monitor Relays.

GE Interlogix Industrial also has a complete line of mechanical safety interlock switches which include key-operated, solenoid release, rope pulls, hinged and slotted. All mechanical switches are positive opening and "CE" compliant.

GE Interlogix Industrial has safety switches to meet all applications and they comply with published standards.

GE Interlogix Industrial position sensors have earned their reputation for quality. They are built for durability and dependability. Most are conservatively rated at 100,000 cycles under full load and 10,000,000 cycles under dry circuit. Every reed connection is hand soldered and the reeds in all modes are environmentally sealed.

### ***A tradition of excellence***

Our reputation for durability and dependability is based on meticulous manufacturing standards and stringent testing procedures. Our world-class manufacturing has earned **ISO 9001** certification for quality. GE Interlogix Industrial manufacturing standards and attention to detail virtually eliminate out-of-box failures. **All switches are tested before they leave the factory—100% of the time.**

For the best protection from danger in the workplace and the highest level of defeat resistance, GE Interlogix Industrial sets the standard.

## ***A Safer Workplace***

Automation continues to create hazards for employees in the workplace, making their safety a major concern for manufacturers worldwide. This concern has led to the creation of OSHA guidelines, ANSI standards, semiconductor and robotics standards and the European Machinery Safety Directive.

### ***OSHA Guidelines***

Section 1910.12 states:

(a) **Machine guarding** — (1) Types of guarding. One or more methods of machine guarding shall be provided to protect the operator and other employees in the machine area from hazards such as those created by point of operation, ingoing nip points, rotating parts, flying chips and sparks. Examples of guarding methods are — barrier guards, two-hand tripping devices, electronic safety devices, etc.

(2) General requirements for machine guards. Guards shall be affixed to the machine where possible and secured elsewhere if for any reason attachment to the machine is not possible. The guard shall be such that it does not offer an accident hazard in itself.

### ***ANSI Standards***

ANSI (the American National Standard) B11.19-1990 Section 5.5, E5.5, and E5.51 reads:

**5.5.1** When required by the performance requirements of the safeguarding, the device, system or interface shall be designed, constructed and installed such that a single component failure within the device, interface or system shall not prevent normal stopping action from taking place but shall prevent a successive machine cycle. This requirement does not apply to those components whose function does not affect the safe operation of the machine tool.

**E5.5 Control reliability** is also known as control component failure and is not merely component redundancy. Control reliability implies “fail-safe”. However, failsafe is an order of reliability which includes any and all possible component failure combinations including multiple and simultaneous. Thus, a true fail-safe condition and this magnitude of reliability are not practically achievable.

In its section B11.19-1990, ANSI states:

“A component may fail open, closed or to the point that its intended function is no longer viable. All failures should be considered in the evaluation of the system.

Some electromechanical systems utilize relays that have contacts that can fail closed while the other contacts on the same relay continue to function. Other relays have contacts that can fail open while the other contacts on the same relay continue to function. Because of this fact, only relay types that prevent this occurrence from happening should be used.

Electromechanical systems that require redundancy and checking of relay contacts should use relays that are designed with mechanical linkages to provide a positive relation between normally open and normally closed contacts to check the contact operation. Solid-state devices do not have a mutually exclusive normally open - normally closed contact arrangement. Other methods must be used to monitor the performance of these devices.”

### ***Risk Categories: European Standard EN-954-1***

Requirement of the safety related control circuit to meet the various categories are listed in section 7 of EN 954-1, but in general their requirements are as follows:

**Category B:** Safety devices and control systems at a minimum must be designed, selected and assembled to meet the operational requirements of design limits and influence of the processed materials and other external influences. Most domestic appliances fall into this category, and providing the components are correctly specified (load, switching frequency, etc.), then no other special features are required.

**Category 1:** All conditions of B apply, but the safety related system must use “well tried” principles and components, see 7.2.2 EN (TC114/JWG 6).

**Category 2:** All conditions of B apply, but in addition the machine shall be prevented from starting if a fault is detected on power up. This suggests the use of an interface relay with redundancy and self checking on energization. Single channel operation is permitted providing that the input devices (E Stop buttons, gate switches) are tested for operation on a regular basis.

**Category 3:** All conditions of B apply, but the complete safety control system shall be designed so that any single fault shall not lead to the loss of the safety function and where practical, the single fault shall be detected. This now calls for not only redundancy in the interface relay but also in the input devices, pointing to dual channel systems.

**Category 4:** All conditions of B apply, but now single fault detection is imperative and calls for not only redundancy in the input and output devices, but also for self-checking and cross monitoring. Again dual channel controls are called for.

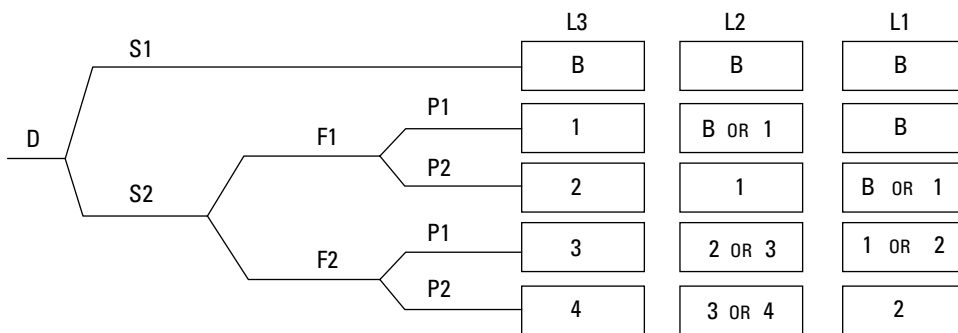
# Risk Assessment

The primary purpose of risk assessment is to reduce the level of risk associated with a particular piece of machinery. The end result is to increase worker safety. Though risk assessment does rely on judgmental decisions, quantitative models have proven useful in assessing alternative safety measures and to determine which gives better protection.

Structured risk assessment involves evaluating:

- Severity of the potential risk,
- Frequency of exposure to the potential hazard,
- Possibility of avoiding the hazard if it occurs, and
- Likelihood of occurrence if a safety interlock fails.

To assist industries with evaluating potential risk, the European Machinery Directive provides quantitative guidelines based upon five defined levels of risk. These levels range from the lowest risk category in which the severity of injury is slight and/or there is relatively little likelihood of occurrence, to the highest risk category in which the likelihood of a severe injury is relatively high.



B, 1, 2, 3, 4: Risk Category

S: Severity of potential injury

S1: Slight injury (bruise)

S2: Severe injury (amputation or death)

F: Frequency of exposure to potential hazard

F1: Infrequent exposure

F2: Frequent to continuous exposure

P: Possibility of avoiding the hazard if it occurs (generally related to the speed/frequency of movement of hazard point and distance to hazard point)

P1: Possible

P2: Less possible

L: Likelihood of occurrence (if an interlock fails)

L1: Very unlikely

L2: Unlikely

L3: Highly likely

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# Safety Interlock Systems

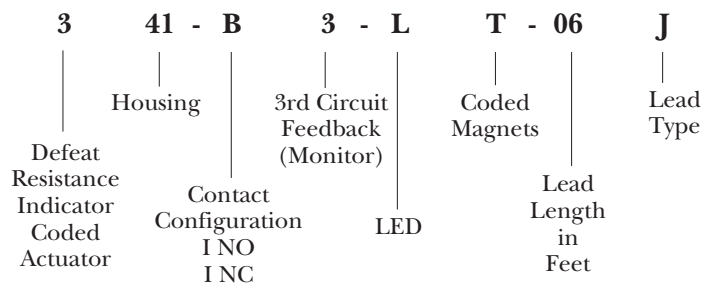
## A Tradition of Excellence

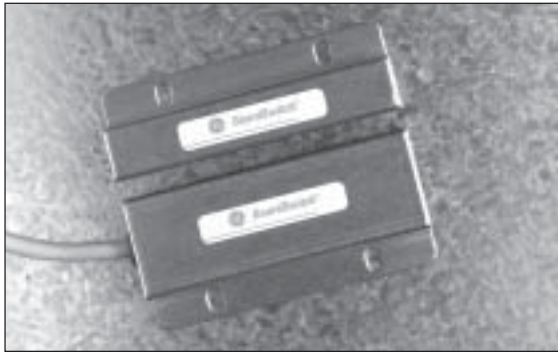
The industry's most complete line of contact and non-contact products. GE Interlogix Industrial safety interlock switches are used to detect the opening of guards—including doors, gates and/or removable covers—that prevent access to dangerous parts of a machine, and to help deter tampering with the guards or the internal machine controls. As with all GE Interlogix Industrial products, the safety interlock switches are in full compliance with the most current and required standards. These include IMQ, CE, VDE, UL, CSA, IEC, EN and Semi S2 standards. Class of protection is IP65 to IP67 (Type 12 to Type 4).

## Reading GE Interlogix Industrial Part Numbers

### Part Number Matrix

Typical part number — 341-B3LT-06J





# Safety Switch

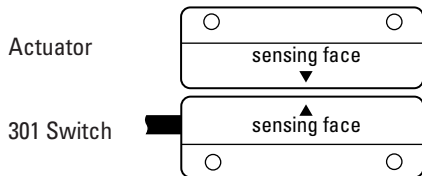
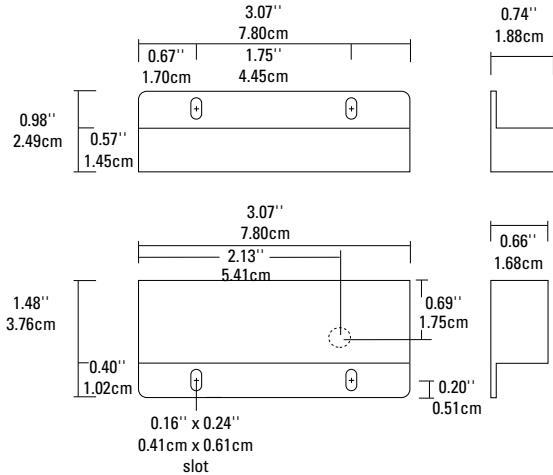
## 301-BT GuardSwitch

### Applications

- Requiring Highly Defeat Resistant Switches
- Meets ANSI, Semi S2 & European Safety Standard for the Highest Machine Risk Category 4 when used with the INT Safety Relay
- Packaging Machinery
- Pharmaceutical Equipment
- Semiconductor Equipment
- Machine Tool Equipment
- Food Processing Machinery

### General Specifications

Enclosure	Folded 304 Stainless Steel
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 4, 4X, 5, 12, 12K
Protection Class	IP 66
Response Time (individual circuits)	1 msec The two circuits do not switch simultaneously and depend on the speed of the guard closure. A delay less than 50 msec is typical.
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Lead Types/O.D.	18/4 SJTOW (K) / 0.34" (0.86cm) 22/4 PVC Jacketed (J) / 0.19" (0.48cm) 22/6 PVC Jacketed (J) / 0.21" (0.53cm)
UL/CSA/TUV	All Models



### Electrical Specifications (Applies to all models)

Circuit	Circuit	Contact	Load	MAX Switching	MAX Switching
1	Switch	N.O.	40W/VA	48VAC/VDC	1.0ADC, 0.7AC
2	Tamper	N.C.	10W/VA	48VAC/VDC	0.3A
2	w/optional LED	N.C.	0.1-1.4W	48VDC(3V drop)	30mA
3	Monitor	N.O.	10W/VA	48VAC/VDC	0.3ADC, 0.3AC



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When used with INT  
Safety Monitor Relay



### Order Information

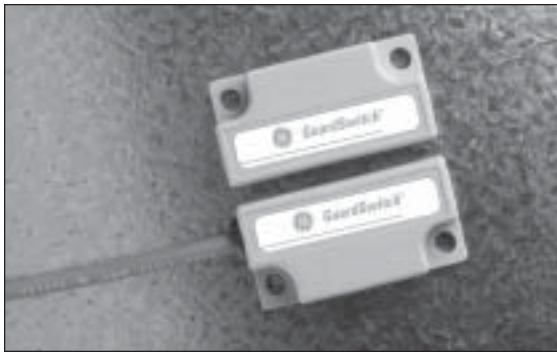
Part Number	Contact <sup>2</sup> Configuration	Sense Range <sup>3</sup> Minimum	Sense Range <sup>3</sup> Maximum	Break Range	Lead Length
301-BT-12(J)or(K)	DPST: 1 N.O., 1 N.C.	0.3"(0.8cm)	0.6"(1.5cm)	1.2"(3.0cm)	12' (3.6m)
301-BT-12(J)-NH <sup>1</sup>	DPST: 1 N.O., 1 N.C.		0.6"(1.5cm)	1.2"(3.0cm)	12' (3.6m)
301-BLT-12(J)or(K)	DPST: 1 N.O., 1 N.C. w/ LED	0.3"(0.8cm)	0.6"(1.5cm)	1.2"(3.0cm)	12' (3.6m)
301-B3T-12(J)	TPST:2 N.O., 1 N.C.	0.3"(0.8cm)	0.6"(1.5cm)	1.2"(3.0cm)	12'(3.6m)
301-B3LT-12(J)	TPST:2 N.O., 1 N.C. w/LED	0.3"(0.8cm)	0.6"(1.5cm)	1.2"(3.0cm)	12'(3.6m)

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> NH—no minimum sense range

<sup>2</sup> Configuration with actuator away from the switch

<sup>3</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.



# Safety Switch

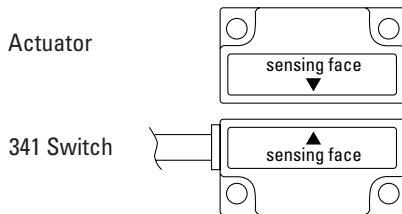
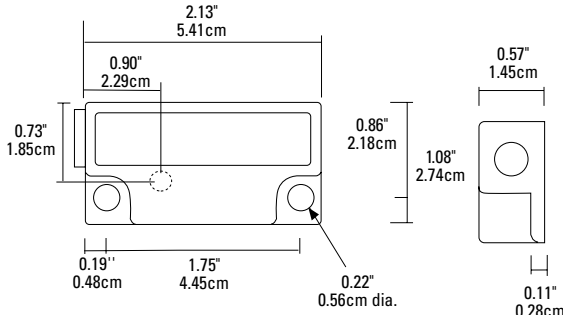
## 341-BT GuardSwitch

### Applications

- Requiring Highly Defeat Resistant Switches
- Meets ANSI, Semi S2 & European Safety Standard for the Highest Machine Risk Category 4 when used with the INT Safety Relay
- Washdown Environments
- Packaging Machinery
- Pharmaceutical Equipment
- Semiconductor Equipment
- Food Processing Machinery

### General Specifications

Enclosure	Kynar <sup>®</sup> Polyvinylidene Flouride with sonic welded lid
Temperature Range	14°F to 150°F (-10°C to 65°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 4, 4X, 5, 12, 12K, 13
Protection Class	IP 67
Response Time (individual circuits)	1 msec The two circuits do not switch simultaneously and depend on the speed of the guard closure. A delay less than 50 msec is typical.
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Lead Types/O.D.	18/4 SJTOW (K) / 0.34" (0.86cm) 22/4 PVC Jacketed (J) / 0.19" (0.48cm) 22/6 PVC Jacketed (J) / 0.21" (0.53cm)
UL/CSA/TUV	All Models



U9880128199005  
When used with INT  
Safety Monitor Relay



### Electrical Specifications (Applies to all models)

Circuit No.	Circuit Type	Contact Configuration	Load Rating	MAX Switching Voltage	MAX Switching Current
1	Switch	N.O.	10W/VA	48VAC/VDC	0.2A
2	Tamper	N.C.	10W/VA	48VAC/VDC	0.2A
2	w/optional LED	N.C.	0.1-1.4W	48VDC(3V drop)	30mA
3	Monitor	N.O.	10W/VA	48VAC/VDC	0.2A

### Order Information

Part Number	Contact <sup>1</sup> Configuration	Sense Range <sup>2</sup> Minimum	Sense Range <sup>2</sup> Maximum	Break <sup>2</sup> Range	Lead Length
341-BT-06(K)	DPST: 1 N.O., 1 N.C.	0.12"(0.3cm)	0.38"(1.0cm)	0.75"(1.9cm)	6' (1.8m)
341-BT-12(J)OR(K)	DPST: 1 N.O., 1 N.C.	0.12"(0.3cm)	0.38"(1.0cm)	0.75"(1.9cm)	12' (3.6m)
341-BLT-12(K)	DPST: 1 N.O., 1 N.C. w/ LED	0.12"(0.3cm)	0.38"(1.0cm)	0.75"(1.9cm)	12' (3.6m)
341-B3T-12(J)	TPST: 2 N.O., 1 N.C.	0.12"(0.3cm)	0.38"(1.0cm)	0.75"(1.9cm)	12' (3.6m)
341-B3LT-12(J)	TPST: 2 N.O., 1 N.C. w/LED	0.12"(0.3cm)	0.38"(1.0cm)	0.75"(1.9cm)	12' (3.6m)

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.

# Safety Switch

## 371-BT GuardSwitch Explosion Proof

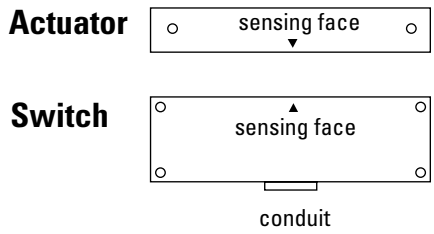
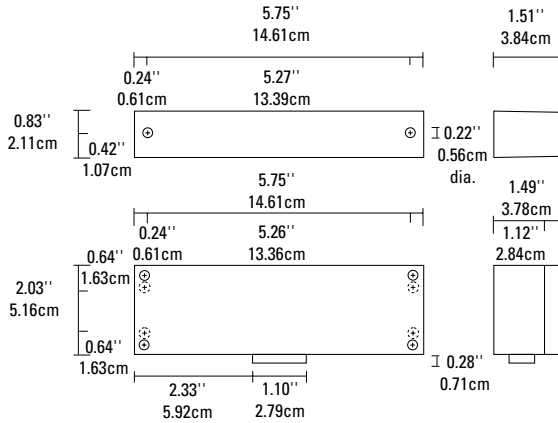


### Applications

- Requiring Explosion-Proof Enclosure for Hazardous Locations
- Meets ANSI, Semi S2 & European Safety Standard for the Highest Machine Risk Category 4 when used with the INT Safety Relay
- UL Enclosure Classified for Use in Hazardous Locations: Class I, Group B, C, D Class II, Group E, F, G Class III, Divisions 1 & 2

### General Specifications

Enclosure	UL Explosion Proof Black Anodized, Die Cast Aluminum
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 5
Protection Class	IP 64
Response Time (individual circuits)	1 msec The two circuits do not switch simultaneously and depend on the speed of the guard closure. A delay less than 50 msec is typical.
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Conduit Connection	1/2" Threaded NPT
UL/CSA/TUV	All Models



### Electrical Specifications

Circuit No.	Circuit Type	Contact Configuration	Load Rating	MAX Switching Voltage	MAX Switching Current
1	Switch	N.O.	40W/VA	48VAC/VDC	1.0ADC, 0.7AC
2	Tamper	N.C.	10W/VA	48VAC/VDC	0.3A



### Order Information

Part Number	Contact <sup>1</sup> Configuration	Sense Range <sup>2</sup> Minimum	Sense Range <sup>2</sup> Maximum	Break Range	Terminal Type
371-BT	DPST: 1 N.O., 1 N.C.	0.3"(0.8cm)	0.6"(1.5cm)	1.2"(3.0cm)	#6 screws

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch  
<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.



# Safety Switch

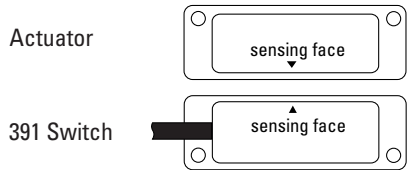
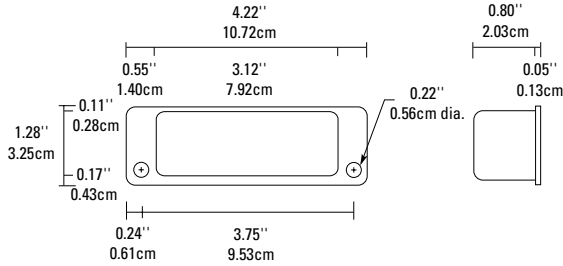
## 391-BT GuardSwitch

### Applications

- Machine Tool Machinery
- Withstands Corrosive and Extreme Washdown Environments
- Packaging Machinery
- Food Processing Machinery
- Presses
- Meets ANSI, Semi S2 & European Safety Standard for the Highest Machine Risk Category 4 when used with the INT Safety Relay

### General Specifications

Enclosure	Seamless 304 Stainless Steel
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 4, 4X, 5, 12, 12K
Protection Class	IP 67
Response Time	1 msec
(individual circuits)	The two circuits do not switch simultaneously and depend on the speed of the guard closure. A delay less than 50 msec is typical.
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Lead Types/O.D.	18/4 SJTOW (K) / 0.34" (0.86cm) 22/4 PVC Jacketed (J) / 0.19" (0.48cm)
UL/CSA/TUV	All Models



### Electrical Specifications

Circuit No.	Circuit Type	Contact Config.	Load Rating	MAX Switching Voltage	MAX Switching Current
1	Switch	N.O.	40W/VA	48VAC/VDC	1.0ADC, 0.7AC
2	Tamper	N.C.	10W/VA	48VAC/VDC	0.3A
2	w/optional LED	N.C.	0.1-1.4W	48VDC(3V drop)	30mA



### Order Information

Part Number	Contact <sup>1</sup> Configuration	Sense Range <sup>2</sup> Minimum	Sense Range <sup>2</sup> Maximum	Break Range	Lead Length
391-BT-06(K)	DPST: 1 N.O., 1 N.C.	0.3"(0.8cm)	0.6"(1.5cm)	1.2"(3.0cm)	6' (1.8m)
391-BLT-12(J)	DPST: 1 N.O., 1 N.C. w/ LED	0.3"(0.8cm)	0.6"(1.5cm)	1.2"(3.0cm)	12' (3.6m)

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.

# Series 300-BT Safety Switches

## Installation Instructions

### Mounting Configurations

The interlock switch and actuator should be mounted in only three configurations for actuation:

Figure 1

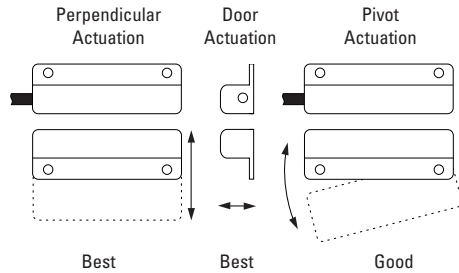
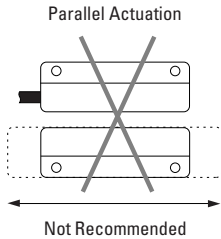
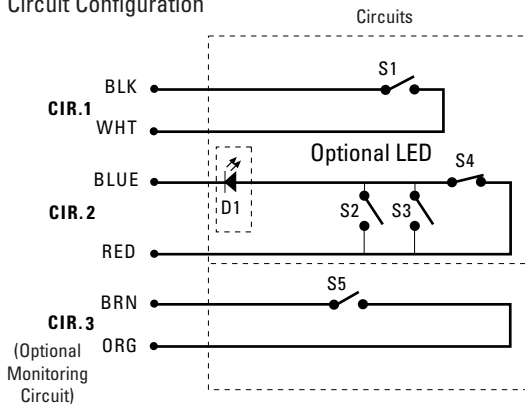


Figure 2



The parallel actuation can result in on/off/on (double actuation) signal if the actuator passes by the switch rather than coming to rest in proximity to it. This is NOT a recommended configuration for safety interlock applications.

### Circuit Configuration



\*Circuits shown with magnet actuator away from switch.

- S1 Normally open reed switch, closed when actuator is within specified sense range
- S2, S3 Normally open reed switches, will close if misaligned or tampered with a standard magnet
- S4 Biased closed reed switch, open when actuator is between specified sense range
- S5 Normally open reed switch, closed when actuator is within specified sense range

N.O. circuit: Black and white wires.  
 N.C. biased tamper circuit: Red and blue wires.  
 N.O. monitor circuit: Orange and brown wires.

### Installation

1. Position the switch and actuator so the labels are reading in the same direction.
2. Mount the switch on the stationary frame of the machine and mount the actuator on the moveable guard, door or gate. Keep the switch and actuator within the listed sense range.

See Figure 1 and Figure 2 for recommended mounting configurations.

3. Mounting on a ferrous material will effect the sense range a minimum of 50%. However, a 1/4" non-ferrous spacer positioned under the actuator and/or switch should restore most of the lost sense range.
4. For best protection against operator defeat, mount with non-removable screws, bolts or nuts (see Accessories).
5. **CAUTION:** When not used with a INT safety relay particular care must be taken to determine the actual load of the switch circuit. High voltage transients from coils, motors, contactors, and solenoids must be considered. Transient protection, such as back-to-back zener diodes (TransZorb®) or an RC network, is recommended for such loads to ensure that maximum ratings of the switch are not exceeded. Not recommended to be used with tungsten filament loads because of high current inrush surges. Line capacitance and load capacitance must be considered. Excessive line capacitance can be caused by cable lengths over 50' when using a maximum 48 VAC. A resistor can be added in series to limit the inrush current (at least 48 Ohms for 24V applications). The resistor can be added in series just before the load. The voltage drop and the power rating of the resistor must be considered.  
**Voltage drop = I•R; Watts = I<sup>2</sup>R**  
**(I = maximum continuous current of the load).**
6. When mounting the switch on an ungrounded machine, ground the switch housing by connecting your ground lead to one of the switch mounting screws.

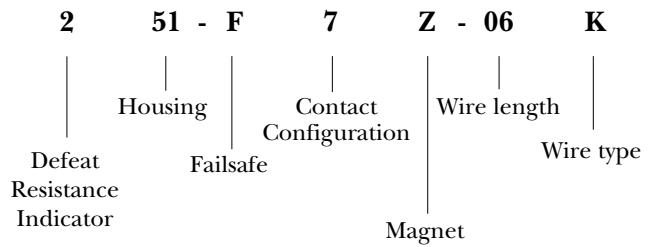
# FailSafe Guardswitches™

The FailSafe Guardswitch is designed as a safety interlock to be attached to a machine's guard or door. Unlike a standard reed switch interlock, the circuit had been designed to have an "open" failure mode. If the main reed sticks closed when the guard opens, the in-line fuse will blow, opening the circuit. If the watchdog reed sticks closed when the guard closes, the in-line fuse will blow, opening the circuit. The circuit will draw up to 4.0A to blow the fuse in less than 200ms.

## Reading GE Interlogix Industrial Part Numbers

### Part Number Matrix

Typical part number — 251-F7Z-06K





# Patented Non-Contact Safety Interlock Switch 251 F7 GuardSwitch

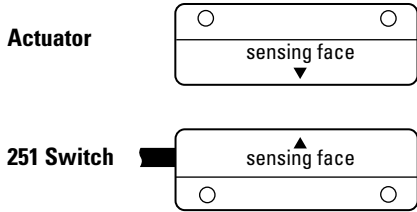
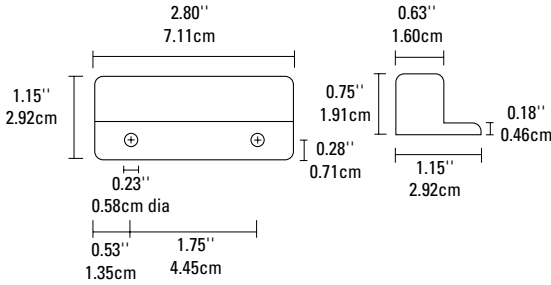
## Applications

- Requiring a “Fail-Safe” Switch
- Waste Compactors
- Mixers, Blenders and Dryers
- Packaging Machinery
- Food Products Machinery

## General Specifications

Enclosure	Polyurethane Enamel-Coated Aluminum
Temperature Range	-40°F to 150°F (-40°C to 65°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4X, 5, 6, 12, 12K
Protection Class	IP 67
Response Time	5 msec
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Lead Types/O.D.	SJTOW-A (K) 18/3 AWG / 0.33" (0.84cm)
UL/CSA	All Models

*Note: The F7 model has a patented “watch-dog” circuit which, when switch failure occurs, the fused watch-dog circuit will draw 4.0 Amps. The voltage supply must have a current capacity of 4.0 Amps. This results in an open, fail-safe condition.*



Order Information		Electrical Specifications							
Part Number	Contact <sup>1</sup> Configuration	Load Rating (AC/DC)	Voltage Range (AC/DC)	Switch Current Max. (AC/DC)	Contact Resistance	Sense Range <sup>2</sup> Nominal	Break Range Nominal	Break at Failure Max.	Lead Length
251-F7Z-12K	N.O.	100VA	100-120V AC	0.83A	0.5 Ohms	1.0" (2.5cm)	1.8" (4.5cm)	2.7" (6.8cm)	12' (3.6m)
150-Z	Actuator Only								

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

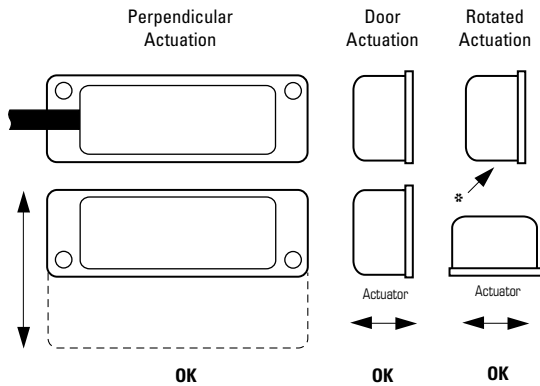
- <sup>1</sup> Configuration with actuator away from the switch
- <sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.

# Series 200 Safety Switches

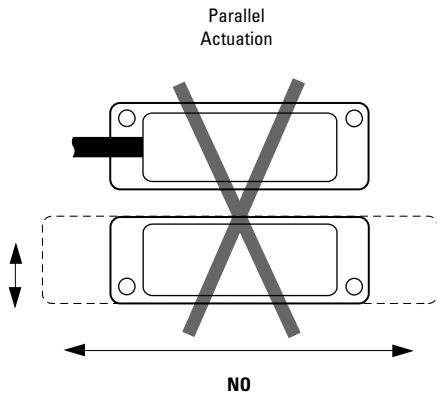
## Installation Instructions

### Mounting Configurations

Figure 1 —



\* Actuation surface



### Installation

#### Mounting Instructions

1. Do not wire the switch until it is mounted and tested. (See testing)
2. Select a mounting location where the switch and actuator can be installed with their labels reading in the same direction.
3. Mount the switch on the stationary frame of the machine and the actuator on the moveable guard, door or gate.
4. For best protection against operator defeat, mount with non-removeable screws, bolts, or nuts. (See accessories)
5. The switch and actuator must be mounted so that the actuator moves in one of the approved directions ( Figure 1).
6. Parallel actuation is NOT recommended and may cause switch failure. An on/off/on (double actuation) signal may result when the actuator passes by the switch rather than coming to rest in proximity to it.
7. When mounting on a hinged gate or door, mount the switch and actuator at least 6" away from the hinges so a more face to face approach is achieved.
8. The actuator can be mounted at a 90° rotation.
9. Keep the switch and actuator within the listed sense range ( see specific switch electrical specifications).
10. Mounting on a ferrous (steel) material will reduce the sense range a minimum of 50%. A 1/4" nonferrous (plastic or aluminum) spacer installed under the actuator and switch will restore most of the lost gap.
11. When mounting a metal switch to an ungrounded machine, connect the ground lead to one of the switch mounting screws.

**CAUTION — Particular care must be taken to determine the actual load of the switch circuit.**

1. Surges from coils, motors, contactors, solenoids and tungsten filaments must be considered.
2. Transient protection, such as back-to-back zener diodes (Transorb) or an RC network, is recommended for such loads to ensure that maximum ratings of the switch are not exceeded.
3. Line capacitance and load capacitance must be considered. An in-line resistor can be added to limit the inrush current.
4. The resistor can only be added in series with the last red wire just before the load.
5. The voltage drop and the power rating of the resistor must be considered.

$$\text{Voltage drop} = I \cdot R$$

$$\text{Watts} = I^2 \cdot R$$

( I = maximum continuous current of the load)

Note—If the installation instructions are not followed carefully, the switch may not work properly or fulfill its failsafe function, or it may fail prematurely.

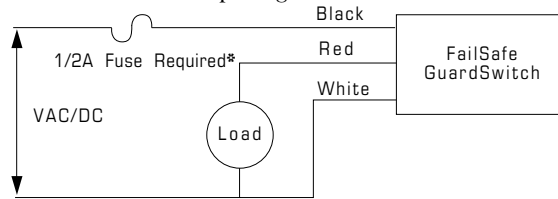
# Series 200 Safety Switches

## Testing & Wiring Instructions

### Wiring for one FailSafe GuardSwitch™

Figure 2

Add a 1/2 amp *fast-acting* fuse\* in series to protect the switch from premature failure caused by inrush-currents, tampering, or excessive vibration.

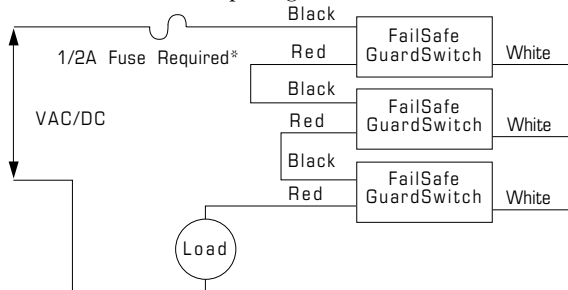


\* Use fast-acting Littlefuse 216, fast-acting Microfuse or fast-acting Pico II fuse up to 1/2 Amp.

### Wiring for two to ten FailSafe GuardSwitches™ in series

Figure 3

Add a 1/2 amp *fast-acting* fuse in series to protect the switch from premature failure caused by inrush-currents, tampering, or excessive vibration.



\* Use fast-acting Littlefuse 216, fast-acting Microfuse or fast-acting Pico II fuse up to 1/2 Amp.

### Testing

After mounting the switch and actuator, test the switch for proper operation. Test with circuit disconnected from source and load. For multiple switches in series, test one switch at a time with all other guard doors closed. Then:

1. Hook the black and white leads of the switch to an Ohmmeter. Move the gate or door open and closed several times slowly. At all times the meter should read O.L. or "open."
2. Hook the Ohmmeter to the black and red leads of the switch. Move the door or gate open and closed. The meters should read O.L. when the actuator is away and it should read less than 1 Ohm when the actuator is in range.
3. Hook the Ohmmeter to the white and red leads of the switch. Move the door or gate open and closed. The meter should read 500-100 ohms when the actuator is away and it should read O.L. when the actuator is in range.

### Wiring

1. After the switch and actuator have been mounted and tested, wire the FailSafe GuardSwitch™ as shown in Figure 2.
2. For wiring 2 to 10 FailSafe GuardSwitches™ in series, see Figure 3. (Do not exceed 10 switches in a series).
3. Failure to install in-line fuse voids warranty.

### Troubleshooting

If the in-line fuse blows or the GuardSwitch™ remains open:

1. Check the application for premature failure caused by inrush-currents, tampering, excessive vibration and misalignment.
2. Disconnect all three wires of GuardSwitch™ and test according to testing instructions, steps 1-3.
3. If the GuardSwitch™ fails any of the three tests, it must be replaced.
4. Replace the in-line fuse if blown.

### Accessories

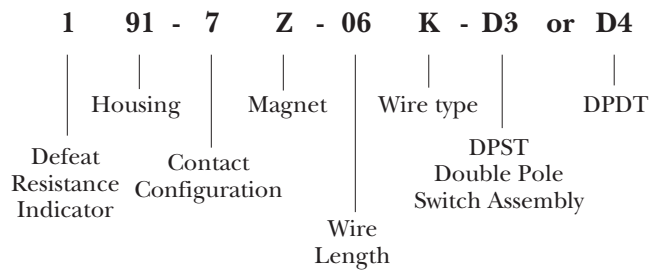
Part Number	Tamper proof screws & screwdriver
1953	#6 x 3/4"L Tampruf Roundhead Screw
1954	#8 x 1-1/2"L Tampruf Roundhead Screw
1955	Tampruf® Screwdriver

# Industrial Interlock Switches

## Reading GE Interlogix Industrial Part Numbers

### Part Number Matrix

Typical part number — 191-7Z-06K-D3 or D4



# Non-Contact Interlock/Position Switch

## 104 GuardSwitch

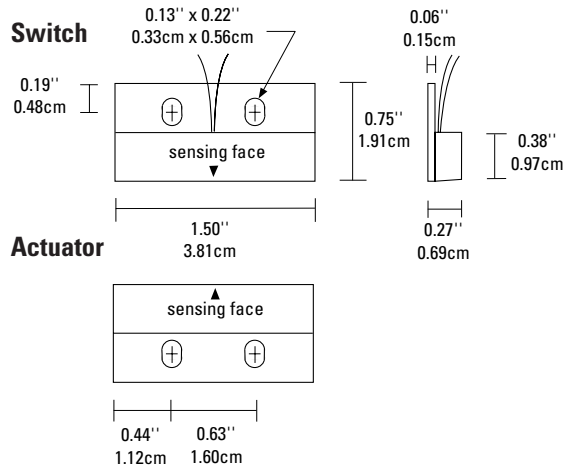


### Applications

- Mail Sorting Machines
- Gaming Industry
- Drop Doors
- Player Tracking
- Bill Validators
- Access Doors
- Scissor Lifts
- Position Sensing

### General Specifications

Enclosure	ABS Plastic
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4x, 5, 6, 12
Protection Class	IP 67
Response Time	1 msec
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Lead Type/O.D.	22/2 Flying Lead (V) AWG /0.05" (0.13cm) 22/3 Flying Lead (V) AWG /0.05" (0.13cm)
UL/CSA/CUL	All Models



### Order Information      Electrical Specifications

Part Number	Contact <sup>1</sup> Config.	Load Rating (AC/DC)	Switching Voltage Maximum (AC/DC)	Switching Current Maximum (AC/DC)	Contact Resistance	Sense Range <sup>2</sup> Nominal	Break Range Nominal	Lead Length
104-1U-03V	N.O.	15VA	120V (@0.11A)	0.5A (@30V)	0.2 Ohms	0.5" (1.3cm)	1.3" (3.3cm)	3' (0.9m)
104-2U-03V	SPDT	15VA	120V (@0.11A)	0.5A (@30V)	0.2 Ohms	0.5" (1.3cm)	1.3" (3.3cm)	3' (0.9m)
104-U	Actuator Only							

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch  
<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.



# Non-Contact Interlock/Position Switch

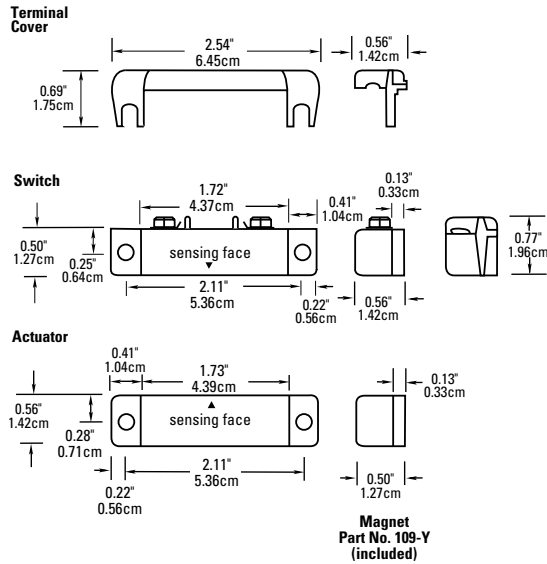
## 109 GuardSwitch

### Applications

- Economical Position Sensing
- Terminal Requirement
- Non-Wash Down Environments

### General Specifications

Enclosure	ABS Plastic
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1
Protection Class	IP 62
Response Time	1 msec
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Connection	Screw Terminals
UL/CUL	All Models



File E 122942

### Order Information

### Electrical Specifications

Part Number	Contact <sup>1</sup> Config.	Load Rating		Switching Voltage, Max.		Switching Current, Max.		Contact Resistance	Sense Range <sup>2</sup> Nominal	Break Range Nominal	Terminal Type
		AC	DC	AC	DC	AC	DC				
109-3Y	N.C.	100VA	84W	120V (@0.8A)	28V (@3.0A)	3.0A (@34V) <sup>3</sup>	3.0A (@28V) <sup>3</sup>	1.0 Ohms	0.5" (1.3cm)	1.2" (3.0cm)	#6 screw
109-6Y	N.O.	25VA	25W	120V (@0.2A)	120V (@0.2A)	1.0A (@25V)	1.0A (@25V)	0.2 Ohms	1.0" (2.5cm)	2.0" (5.0cm)	#6 screw
109-7Y	N.O.	100VA	84W	120V (@0.8A)	28V (@3.0A)	3.0A (@34V) <sup>3</sup>	3.0A (@28V) <sup>3</sup>	1.0 Ohms	0.5" (1.3cm)	1.2" (3.0cm)	#6 screw
109-Y	Actuator Only										

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

- <sup>1</sup> Configuration with actuator away from the switch
- <sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.
- <sup>3</sup> Rated at 3.0A for 6,000 cycles only. Other ratings are at 100,000 cycles.



# Non-Contact Interlock/Position Switch

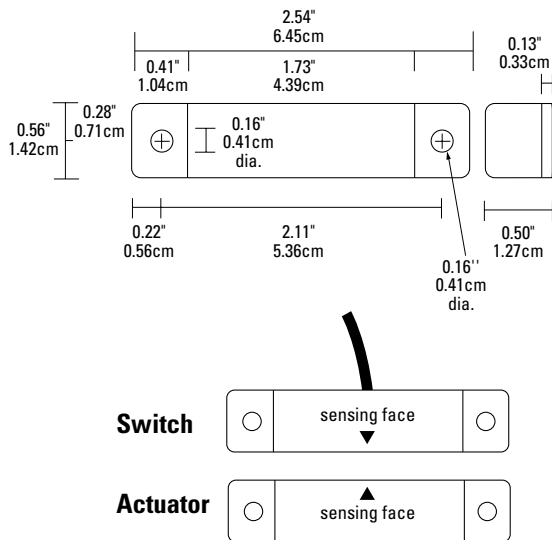
## 111 GuardSwitch

### Applications

- Gaming Industry
- Farm Equipment
- Drop Doors
- Emergency Vehicles
- Player Tracking
- Position Sensing
- Bill Validators
- Access Doors

### General Specifications

Enclosure	ABS Plastic
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4x, 5, 6, 12
Protection Class	IP 67
Response Time	1 msec
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Lead Types/O.D.	18/2 (J) / 0.24" (0.62cm)
UL/CSA	All Models



### Order Information

### Electrical Specifications

Part Number	Contact <sup>1</sup> Config.	Load Rating		Switching Voltage, Max.		Switching Current, Max.		Contact Resistance	Sense Range <sup>2</sup> Nominal	Break Range Nominal	Lead Length
		AC	DC	AC	DC	AC	DC				
111-6Y-06(J)	N.O.	25VA	25W	120V (@0.2A)	120V (@0.2A)	0.7A (@35V)	1.0A (@25V)	0.2 Ohms	1.0" (2.5cm)	2.0" (5.1cm)	6' (1.8m)
111-6Y-12(J)	N.O.	25VA	25W	120V (@0.2A)	120V (@0.2A)	0.7A (@35V)	1.0A (@25V)	0.2 Ohms	1.0" (2.5cm)	2.0" (5.1cm)	12' (3.6m)
111-7Y-12(J)	N.O.	100VA	84W	120V (@0.8A)	28V (@3.0A)	3.0A (@34V) <sup>3</sup>	3.0A (@28V) <sup>3</sup>	1.0 Ohms	0.7" (1.8cm)	1.2" (3.0cm)	12' (3.6m)
111-Y	Actuator Only										

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

- <sup>1</sup> Configuration with actuator away from the switch
- <sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.
- <sup>3</sup> Rated at 3.0A for 6,000 cycles only. Other ratings are at 100,000 cycles.



# Non-Contact Interlock/Position Switch

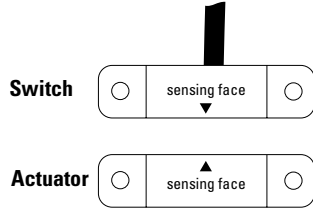
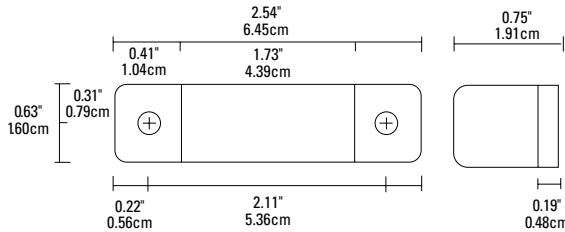
## 115 GuardSwitch

### Applications

- Packaging Industry
- Farm Equipment
- Waste Compactors
- Emergency Vehicles
- Position Sensing

### General Specifications

Enclosure	Nylon 6/6
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4X, 5, 6, 12, 12K
Protection Class	IP 67
Response Time	1msec; 10 msec (150VA)
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Lead Types/O.D.	18/2 SJTOW (K) / 0.30" (0.76cm) 18/3 SJTOW (K) / 0.33" (0.84cm) 18/4 SJTOW (K) / 0.34" (0.86cm)
UL/CSA	All Models



### Order Information

### Electrical Specifications

Part Number	Contact <sup>1</sup> Config.	Load Rating		Switching Voltage, Max.		Switching Current, Max.		Contact Resistance	Sense Range <sup>2</sup> Nominal	Break Range Nominal	Lead Length
		AC	DC	AC	DC	AC	DC				
115-3Y-12K	N.C.	100VA	84W	120V(@0.8A)	28V(@3.0A)	3.0A (@34V) <sup>3</sup>	3.0A (@28V) <sup>3</sup>	1.0 Ohms	0.7" (1.8cm)	1.2" (3.0cm)	12'(3.6m)
115-4Y-06K	SPDT	100VA	84W	120V(@0.8A)	28V(@3.0A)	3.0A (@34V) <sup>3</sup>	3.0A (@28V) <sup>3</sup>	1.0 Ohms	0.7" (1.8cm)	1.2" (3.0cm)	6'(1.8m)
115-4Y-12K	SPDT	100VA	84W	120V(@0.8A)	28V(@3.0A)	3.0A (@34V) <sup>3</sup>	3.0A (@28V) <sup>3</sup>	1.0 Ohms	0.7" (1.8cm)	1.2" (3.0cm)	12'(3.6m)
115-6Y-06K	N.O.	25VA	25W	120V(@0.2A)	120V(@0.2A)	0.7A (@35V)	1.0A (@25V)	0.2 Ohms	1.0" (2.5cm)	2.0" (5.1cm)	6'(1.8m)
115-6Y-12K	N.O.	25VA	25W	120V(@0.2A)	120V(@0.2A)	0.7A (@35V)	1.0A (@25V)	0.2 Ohms	1.0" (2.5cm)	2.0" (5.1cm)	12'(3.6m)
115-7Y-06K	N.O.	100VA	84W	120V(@0.8A)	28V(@3.0A)	3.0A (@34V) <sup>3</sup>	3.0A (@28V) <sup>3</sup>	1.0 Ohms	0.7" (1.8cm)	1.2" (3.0cm)	6'(1.8m)
115-7Y-12K	N.O.	100VA	84W	120V(@0.8A)	28V(@3.0A)	3.0A (@34V) <sup>3</sup>	3.0A (@28V) <sup>3</sup>	1.0 Ohms	0.7" (1.8cm)	1.2" (3.0cm)	12'(3.6m)
115-8Y-06K	N.O.	150VA	NA	120V(@1.25A)	NA	1.25A(@120V) <sup>4</sup>	NA	NA	1.0" (2.5cm)	1.5" (3.8cm)	6'(1.8m)
115-8Y-12K	N.O.	150VA	NA	120V(@1.25A)	NA	1.25A(@120V) <sup>4</sup>	NA	NA	1.0" (2.5cm)	1.5" (3.8cm)	12'(3.6m)
115-8Y-06K-SER25 <sup>5</sup>	N.O.	150VA	NA	120V(@1.25A)	NA	1.25A(@120V) <sup>4</sup>	NA	NA	1.0" (2.5cm)	1.5" (3.8cm)	6'(1.8m)
115-8Y-12K-SER25 <sup>5</sup>	N.O.	150VA	NA	120V(@1.25A)	NA	1.25A(@120V) <sup>4</sup>	NA	NA	1.0" (2.5cm)	1.5" (3.8cm)	12'(3.6m)
115-6Y-06K-D6	2 N.O.	25VA	25W	120V(@0.2A)	100V(@0.2A)	0.7A (@35V)	1.0A (@25V)	0.2 Ohms	1.0" (2.5cm)	2.0" (5.1cm)	6'(1.8m)
115-6Y-12K-D6	2 N.O.	25VA	25W	120V(@0.2A)	100V(@0.2A)	0.7A (@35V)	1.0A (@25V)	0.2 Ohms	1.0" (2.5cm)	2.0" (5.1cm)	12'(3.6m)
115-Y	Actuator Only										

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.

<sup>3</sup> Rated at 3.0A for 6,000 cycles only. Other ratings are at 100,000 cycles.

<sup>4</sup> Can withstand inrush surge up to 4 amps. Voltage Drop 1.5V, minimum switch current of 30mA.

<sup>5</sup> SER25 — Maximum 25 switches in series, triac output.



# Non-Contact Interlock/Position Switch

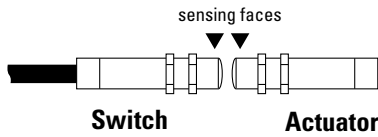
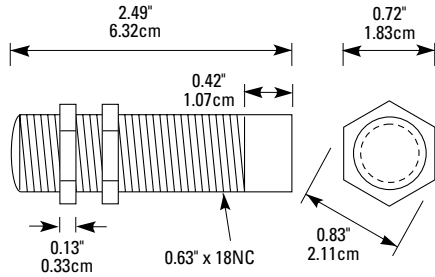
## 125 GuardSwitch

### Applications

- Food Processing
- Textile Machines
- Elevator Lifts
- Position Sensing
- Proximity Switches

### General Specifications

Enclosure	Nickel-plated Aluminum
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4x, 5, 6, 12
Protection Class	IP 67
Response Time	1 msec; (150VA)
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Lead Types/O.D.	18/2 SJTOW (K) / 0.30" (0.76cm)
UL/CSA	All Models



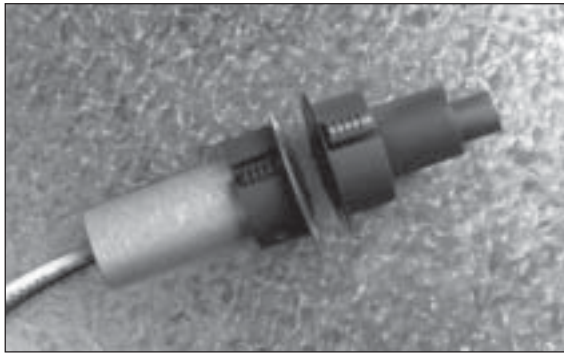
File E 122942

### Order Information Electrical Specifications

Part Number	Contact <sup>1</sup> Config.	Load Rating		Switching Voltage, Max.		Switching Current, Max.		Contact Resistance	Sense Range <sup>2</sup> Nominal	Break Range Nominal	Lead Length
		AC	DC	AC	DC	AC	DC				
125-6Y-06K	N.O.	25VA	25W	120V(@0.2A)	120V(@0.2A)	0.7A(@35V)	1.0A(@25V)	0.2 Ohms	0.6" (1.5cm)	1.4" (3.6cm)	6' (1.8m)
125-7Y-06K	N.O.	100VA	84W	120V(@0.8A)	28V(@3.0A)	3.0A(@34V) <sup>3</sup>	3.0A(@28V) <sup>3</sup>	1.0 Ohms	0.5" (1.3cm)	0.9" (2.3cm)	6' (1.8m)
125-Y	Actuator Only										

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

- <sup>1</sup> Configuration with actuator away from the switch
- <sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.
- <sup>3</sup> Rated at 3.0A for 6,000 cycles only. Other ratings are at 100,000 cycles.
- <sup>4</sup> Can withstand inrush surge up to 4 amps. Voltage Drop 1.5V, minimum switch current of 30mA.



# Magnetic Door Position Switch

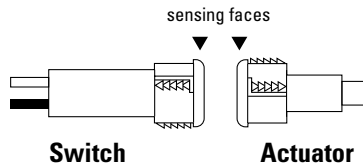
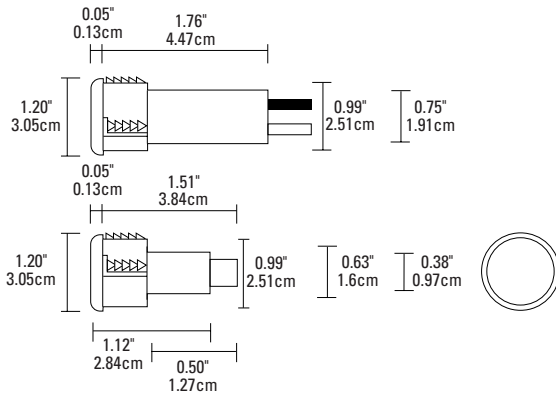
## 126 GuardSwitch

### Applications

- Closet Door Switch
- Environmental Controls

### General Specifications

Enclosure	ABS Plastic with Protective Nylon
Switch Sleeve	
Temperature Range	-40°F to 180°F (-40°C to 80°C)
NEMA Rating	1, 2, 3, 4, 4x, 5, 6, 12
Protection Class	IP 67
Response Time	10 msec
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Lead Types/O.D.	12 AWG (AX) / 0.13" (0.33cm) Flex Conduit (X) / 0.58" (1.5cm)
UL/CSA	All Models



New York  
Calendar # 40018

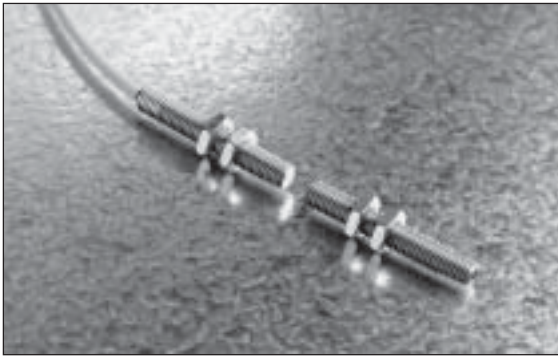
Order Information	Electrical Specifications			AC ONLY				
Part Number	Contact <sup>1</sup> Config.	Load Rating (AC)	Switching Voltage Maximum (AC)	Switching Current <sup>3</sup> Maximum (AC)	Voltage Drop	Sense Range <sup>2</sup> Nominal	Break Range Nominal	Lead Length
126-EY-01AX	N.C.	150VA	120V AC	1.25A	1.5V	1.0" (2.5cm)	1.5" (3.8cm)	1' (0.3m)
126-EY-06X	N.C.	150VA	120V AC	1.25A	1.5V	1.0" (2.5cm)	1.5" (3.8cm)	6' (1.8m)
126-8Y-01AX	N.O.	150VA	120V AC	1.25A	1.5V	1.0" (2.5cm)	1.5" (3.8cm)	1' (0.3m)
126-EY-03AX	N.C.	150VA	120V AC	1.25A	1.5V	1.0" (2.5cm)	1.5" (3.8cm)	3' (0.9m)
126-Y	Actuator Only							

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

- <sup>1</sup> Configuration with actuator away from the switch
- <sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.
- <sup>3</sup> Can withstand inrush surge up to 4 amps. Voltage Drop 1.5V, minimum switch current of 30mA.

# Non-Contact Interlock/Position Switch

## 128C GuardSwitch

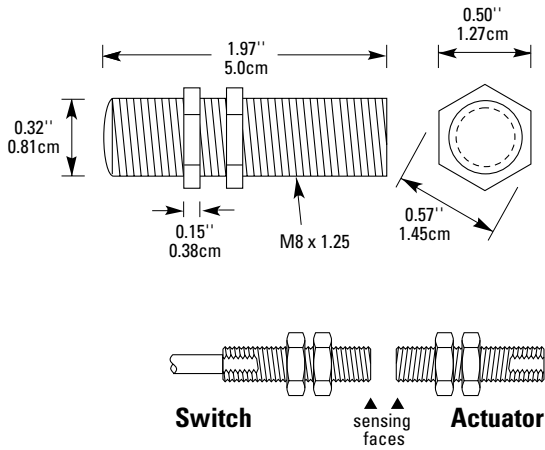


### Applications

- Semi-conductor Equipment
- Packaging Machinery
- Farm Implement
- Conveyers
- Position Sensing
- Economical Proximity Switch Replacement

### General Specifications

Enclosure	Stainless Steel Threaded Barrel with 2 Jam Nuts
Dimensions	M8 dia. x 1.25 Thread x 50mm Long
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4X, 5, 6, 12, 12K
Protection Class	IP 67
Response Time	1 msec
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Lead Types/O.D.	22/2 Jacketed / 0.24" (0.62cm)
UL/CSA	All Models



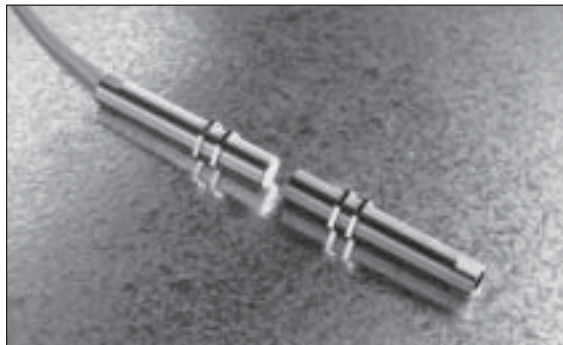
Order Information	Electrical Specifications				ACTUATOR SOLD SEPARATELY				
Part Number	Contact <sup>1</sup> Config.	Load Rating AC	Load Rating DC	Switching Voltage, Max. AC	Switching Voltage, Max. DC	Switching Current, Max. AC	Switching Current, Max. DC	Contact Resistance	Lead Length
128C-6N-06(J)	N.O.	25VA	25W	120V(@0.2A)	120V(@0.2A)	0.7A (@35V)	1.0A (@25V)	0.2 Ohms	6'(1.8m)
128C-6N-12(J)	N.O.	25VA	25W	120V(@0.2A)	120V(@0.2A)	0.7A (@35V)	1.0A (@25V)	0.2 Ohms	12'(3.6m)

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

Sense range <sup>2</sup>			
Actuator Options	Make, Min.	Break, Max.	Actuator Description
128C-U	0.15	1.00	Alnico Magnet in M8x1.25x50 stainless steel threaded barrel w/2 jam nuts
129-X	0.35	1.35	Alnico Magnet in M12x1x70 stainless steel threaded barrel w/2 panel nuts
1057	0.85	2.15	Bare Alnico Magnet 3/8" dia. x 1-1/2" long
1830	0.15	0.65	Rare Earth 0.375" dia. x 0.12" thick w/#4 countersink hole
IND1835	0.40	1.00	Rare Earth 0.6" dia. x 0.12" thick w/#4 countersink hole

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.



# Non-Contact Interlock/Position Switch

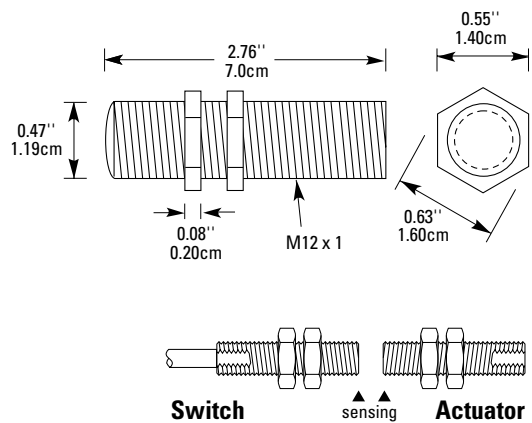
## 129 GuardSwitch

### Applications

- Position Sensing
- Semi-conductor Equipment
- Economical Proximity Switch Replacement
- Packaging Machinery
- Farm Implement
- Conveyers

### General Specifications

Enclosure	Stainless Steel Threaded Barrel Panel Nuts
Dimensions	M12 dia. x 1 Thread x 70mm Long
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4X, 5, 6, 12, 12K
Protection Class	IP 67
Response Time	1 msec
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Lead Types/O.D.	22/2 Jacketed (J) / 0.24" (0.62cm) 22/4 Jacketed (J) / 0.19" (0.48cm)
UL/CSA	All Models

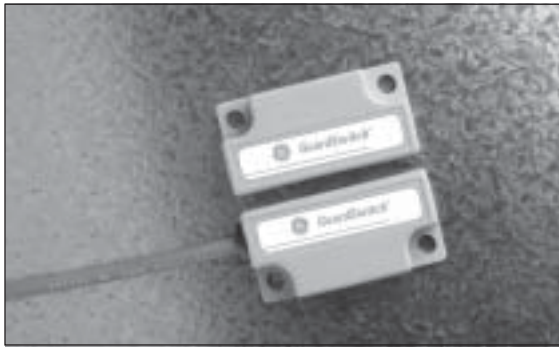


Order Information	Electrical Specifications				ACTUATOR SOLD SEPARATELY				
Part Number	Contact <sup>1</sup> Config.	Load Rating AC	Load Rating DC	Switching Voltage, Max. AC	Switching Voltage, Max. DC	Switching Current, Max. AC	Switching Current, Max. DC	Contact Resistance	Lead Length
129-6N-06(J)	N.O. <sup>2</sup>	25VA	25W	120V(@0.2A)	120V(@0.2A)	0.7A (@35V)	1.0A (@25V)	0.2 Ohms	6'(1.8m)
129-6N-12(J)(-D6)(-DG)	N.O. <sup>2</sup>	25VA	25W	120V(@0.2A)	120V(@0.2A)	0.7A (@35V)	1.0A (@25V)	0.2 Ohms	12'(3.6m)

<sup>1</sup> Configuration with actuator away from the switch<sup>2</sup> D6=DPST: 2 N.O., DG=DPST: 1 N.O., 1 N.C. 15VA<sup>3</sup>Rated at 3.0A for 6,000 cycles only. Other ratings are at 100,000 cycles

Sense range <sup>4</sup>					
Actuator Options	129-6 -DG		129-6 -D6		Actuator Description
	Make, Min.Break, Max.		Make, Min.Break, Max.		
128C-U	0.25	0.80	0.15	1.00	Alnico Magnet in M8x1.25x50 stainless steel threaded barrel w/2 jam nuts
129-X	0.45	1.10	0.35	1.35	Alnico Magnet in M12x1x70 stainless steel threaded barrel w/2 panel nuts
1057	0.90	1.75	0.85	2.15	Bare Alnico Magnet 3/8" dia. x 1-1/2" long
1830	0.25	0.55	0.15	0.65	Rare Earth 0.375" dia. x 0.12" thick w/#4 countersink hole
IND1835	0.50	0.85	0.40	1.00	Rare Earth 0.6" dia. x 0.12" thick w/#4 countersink hole

<sup>4</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.



## Non-Contact Interlock/Position Switch

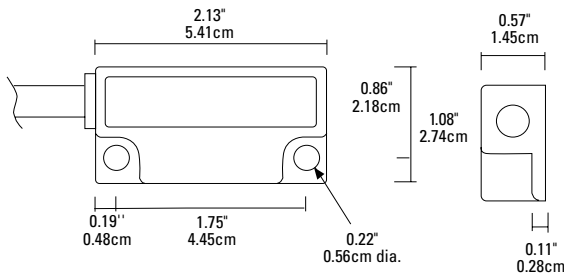
### 141 GuardSwitch

#### Applications

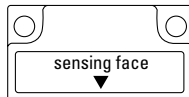
- Commercial Dishwashing Machine
- Parts Cleaning Machines
- Chemical Environments

#### General Specifications

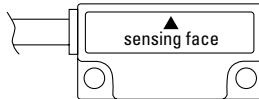
Enclosure	Kynar® Polyvinylidene Fluoride with sonic welded lid
Temperature Range	14°F to 150°F (-10°C to 65°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4X, 5, 6, 12, 13
Protection Class	IP 67
Response Time	10 msec
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Lead Types/O.D.	18/2 SJTO / 0.29" (0.74cm)
UL/CSA	All Models



Actuator



Switch



File E 122942



File LR 89176

#### Order Information

#### Electrical Specifications

Part Number	Contact <sup>1</sup> Config.	Load Rating Max.(AC/DC)	Switching Voltage Max.(AC/DC)	Switching Current Max.(AC/DC)	Sense Range <sup>2</sup> Nominal	Break Range Nominal	Lead Length
141-8Y-06M	N.O.	150VA/NA	120V(@1.25A)/NA	1.25A <sup>4</sup> /NA	1"(2.5cm)	1.2"(3cm)	6'(1.8m)
141-18Y-03M	N.O.	220VA/NA	220V(@1.0A)/NA	1.0A/NA	0.7"(1.8)	1.6"(4.1cm)	3'(0.9m)
141-Y	Actuator Only						

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

- <sup>1</sup> Configuration with actuator away from the switch
- <sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.
- <sup>3</sup> Can withstand inrush surge up to 4 amps, voltage drop 1.5V, minimum switch current of 30 mA, triac output.



# Non-Contact Interlock/Position Switch

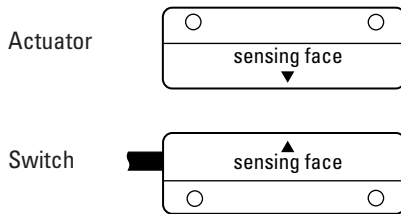
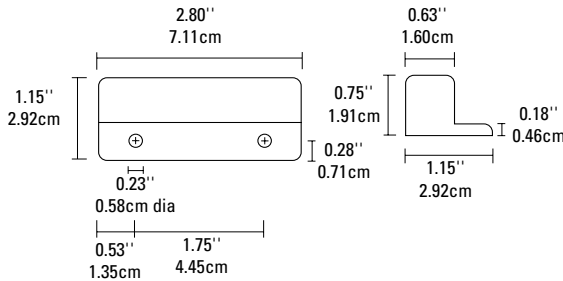
## 151 & 153 GuardSwitch

### Applications

- Packaging Machines
- Food Processing Machines
- Waste Compactors
- Mixers, Blenders, and Dryers

### General Specifications

Enclosure	Polyurethane Enamel-Coated Aluminum
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	4, 4X, 5, 6, 12, 12K
Protection Class	IP 67
Response Time	1 msec; 10 msec (150VA)
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit Load
Types/O.D.	18/2 SJTOW (K) / 0.30" (0.76cm)
(Armored cable available)	18/4 SJTOW (K) / 0.34" (0.86cm)
UL/CSA	All Models



File E 122942

LR89176

### Order Information

### Electrical Specifications

Part Number <sup>1</sup>	Contact <sup>2</sup> Config.	Load Rating		Switching Voltage, Max.		Switching Current, Max.		Contact Resistance	Sense Range <sup>3</sup> Break Range		Lead Length
		AC	DC	AC	DC	AC	DC		Nominal	Nominal	
151-6Z-06K	N.O.	25VA	25W	120V (@0.2A)	120V (@0.2A)	0.7A (@35V)	1.0A (@25V)	0.2 Ohms	1.5" (3.8cm)	2.0" (5.1cm)	6' (1.8m)
151-6Z-12K	N.O.	25VA	25W	120V (@0.2A)	120V (@0.2A)	0.7A (@35V)	1.0A (@25V)	0.2 Ohms	1.5" (3.8cm)	2.0" (5.1cm)	12' (3.6m)
151-7Z-06K	N.O.	100VA	84W	120V (@0.8A)	28V (@3.0A)	3.0A (@34V) <sup>4</sup>	3.0A (@28V) <sup>4</sup>	1.0 Ohms	1.2" (3.0cm)	1.8" (4.6cm)	6' (1.8m)
153-7Z-06K	N.O.	100VA	84W	120V (@0.8A)	28V (@3.0A)	3.0A (@34V) <sup>4</sup>	3.0A (@28V) <sup>4</sup>	1.0 Ohms	1.2" (3.0cm)	1.8" (4.6cm)	6' (1.8m)
151-7Z-12K	N.O.	100VA	84W	120V (@0.8A)	28V (@3.0A)	3.0A (@34V) <sup>4</sup>	3.0A (@28V) <sup>4</sup>	1.0 Ohms	1.2" (3.0cm)	1.8" (4.6cm)	12' (3.6m)
153-7Z-12K	N.O.	100VA	84W	120V (@0.8A)	28V (@3.0A)	3.0A (@34V) <sup>4</sup>	3.0A (@28V) <sup>4</sup>	1.0 Ohms	1.2" (3.0cm)	1.8" (4.6cm)	12' (3.6m)
151-7Z-06K-D3	DPST,N.O.,N.C.	100VA	84W	120V (@0.8A)	28V (@3.0A)	3.0A (@28V) <sup>4</sup>	3.0A (@28V) <sup>4</sup>	1.0 Ohms	1.2" (3.0cm)	1.8" (4.6cm)	6' (1.8m)
151-8Z-12K	N.O.	150VA	NA	120V (@0.8A)	NA	1.25A (@120V) <sup>5</sup>	NA	NA	1.4" (3.5cm)	2.1" (5.3cm)	12' (1.8m)
150-Z	Actuator Only										

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> The part number 153 is the same as 151 in all respects except the cable exits 151 left and 153 right.

<sup>2</sup> Configuration with actuator away from the switch

<sup>3</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.

<sup>4</sup> Rated at 3.0A for 6,000 cycles only. Other ratings are at 100,000 cycles.

<sup>5</sup> Can withstand inrush surge up to 4 amps. Voltage Drop 1.5V, minimum switch current, 30mA, triac output.

# Non-Contact Interlock/Position Switch

## 166 GuardSwitch

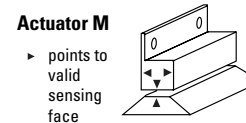
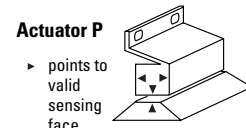
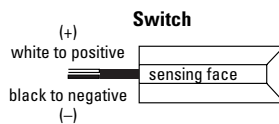
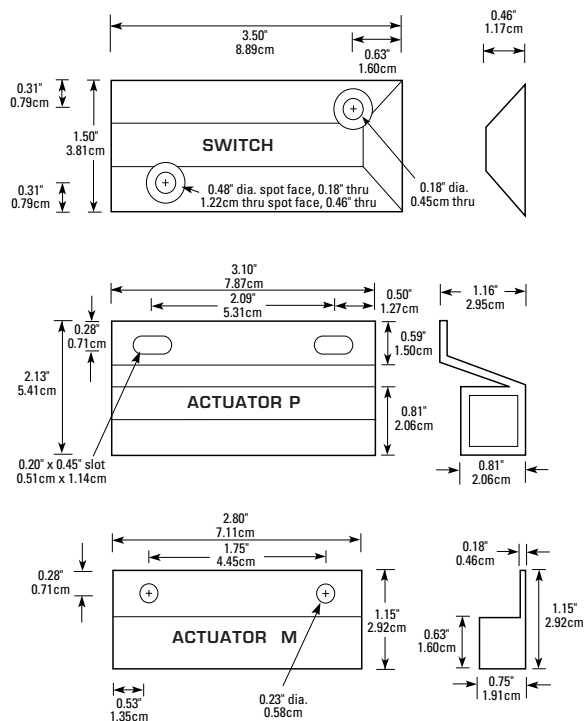


### Applications

- Low Profile Requirements
- Overhead Doors
- Boom Trucks
- Emergency Vehicles
- Rugged Outdoor Use

### General Specifications

Enclosure	Epoxy-coated aluminum
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4X, 5, 6, 12
Protection Class	IP 67
Response Time	1 msec
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Lead Types/O.D.	18/2 SJTOW (K) / 0.30" (0.76cm)
UL/CSA	All Models



INTERLOCK SWITCH  
100 SERIES

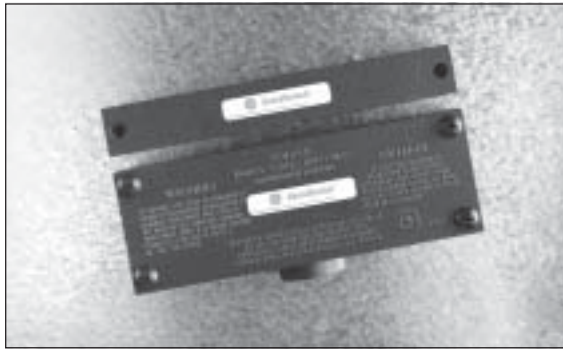


Order Information	Electrical Specifications			DC ONLY				
Part Number	Contact <sup>1</sup> Config.	Load Rating (DC)	Switching Voltage Maximum (DC)	Switching Current Maximum (DC)	Voltage Drop	Sense Range <sup>2</sup> Nominal	Break Range Nominal	Lead Length <sup>3</sup>
166-RM-06K	N.C.	100W	24V (@4.0A)	5.0A (@20V)	1.5V	1.6" (4.0cm)	2.1" (5.3cm)	6' (1.8m)
166-RN-06K <sup>4</sup>	N.C.	100W	24V (@4.0A)	5.0A (@20V)	1.5V	Switch Only	Switch Only	6' (1.8m)
166-P	Actuator P Only							
150-Z	Actuator M Only							

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

Note: This switch cannot be used for AC applications. In DC applications it is polarity sensitive white to positive, black to negative.

- 1 Configuration with actuator away from the switch
- 2 Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.
- 3 Armored cable available
- 4 Switch only



# Non-Contact Interlock/Position Switch

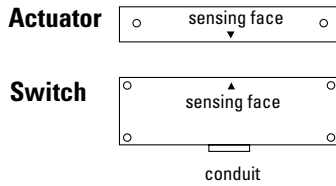
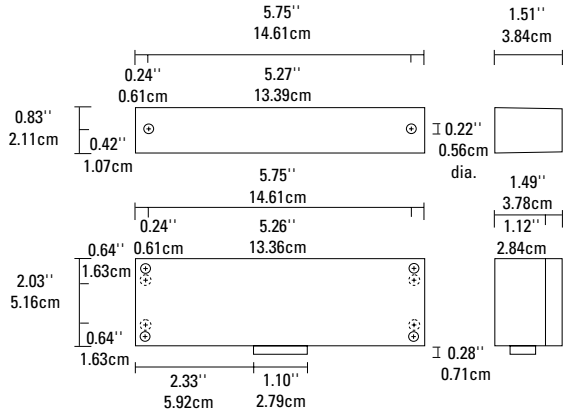
## 171 GuardSwitch Explosion Proof

### Applications

- Explosive Environments
  - Automotive Paint Companies
  - Industrial Paint Companies
  - Grain Mills
  - Chemical/Toxic Environments
  - Fertilizer Manufacturers
- Enclosure UL classified for hazardous locations classes:
  - Class I, Group B, C, D
  - Class II, Group E, F, G
  - Class III, Divisions 1 & 2

### General Specifications

Enclosure	UL Explosion proof, Die Cast Aluminum
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 5
Protection Class	IP 64
Response Time	1 msec; 10 msec (150VA)
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Conduit Connection	1/2" Threaded NPT
UL	Enclosure Only



### Order Information

### Electrical Specifications

Part Number	Contact <sup>1</sup> Config.	Load Rating		Switching Voltage, Max.		Switching Current, Max.		Contact Resistance	Sense Range <sup>2</sup> Nominal	Break Range Nominal	Terminal Type
		AC	DC	AC	DC	AC	DC				
171-6Z	N.O.	25VA	25W	120V(@0.2A)	100V(@0.2A)	0.7A (@35V)	1.0A (@25V)	0.2 Ohms	1.5"(3.8cm)	2.4"(6.1cm)	#6 Screw

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.



## Non-Contact Interlock/Position Switch

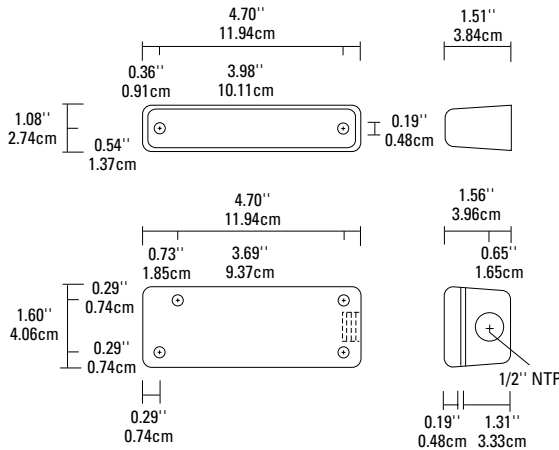
### 181 GuardSwitch 1/2" Conduit Enclosure

#### Applications

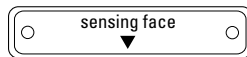
- Requiring Conduit Connection
- Non-wash Down Environment
- Heavy-duty Housing

#### General Specifications

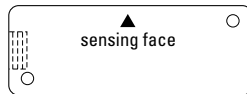
Enclosure	Coated aluminum
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 5
Protection Class	IP 64
Response Time	1 msec; 10 msec (150VA)
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Conduit Connection	1/2" Threaded NPT



Actuator



Switch



#### Order Information

#### Electrical Specifications

Part Number	Contact <sup>1</sup> Config.	Load Rating		Switching Voltage, Max.		Switching Current, Max.		Contact Resistance	Sense Range <sup>2</sup> Nominal	Break Range Nominal	Terminal Type
		AC	DC	AC	DC	AC	DC				
181-7Z	N.O.	100VA	84W	120V(@0.8A)	28V(@3.0A)	3.0A (@34V) <sup>3</sup>	3.0A (@28V) <sup>3</sup>	1.0 Ohms	1.4" (3.5cm)	1.8" (4.6cm)	#6 Screw

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.z



# Non-Contact Interlock Position/Switch

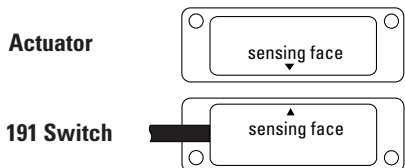
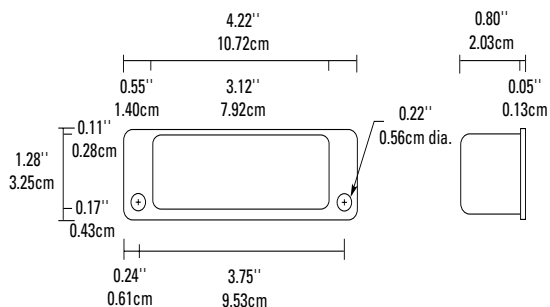
## 191 GuardSwitch

### Applications

- USDA approved
- Food Processing Machines
- Chemical Industry Machinery
- Wash-down Environments

### General Specifications

Enclosure	Seamless 304 Stainless Steel
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4X, 5, 6, 12, 12K
Protection Class	IP 67
Response Time	1 msec; 10 msec (150VA)
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Lead Types/O.D.	18/2 SJTOW (K) / 0.30" (0.76cm) 18/4 SJTOW (K) / 0.34" (0.86cm)
UL/CSA	All Models



Part Number	Contact <sup>1</sup> Config.		Load Rating		Switching Voltage, Max.		Switching Current, Max.		Contact Resistance	Sense Range <sup>2</sup>		Break Range Nominal	Lead Length
	AC	DC	AC	DC	AC	DC	AC	DC		Nominal	Nominal		
191-6Z-12K	N.O.	25VA	25W	120V (@0.2A)	120V (@0.2A)	0.7A (@35V)	1.0A (@25V)	0.2 Ohms	1.0" (2.5cm)	2.0" (5.1cm)	12' (3.6m)		
191-7Z-06K	N.O.	100VA	84W	120V (@0.8A)	28V(@3.0A)	3.0A (@34V)	3.0A (@28V) <sup>3</sup>	1.0 Ohms	0.5" (1.3cm)	1.8" (4.6cm)	6' (1.8m)		
191-7Z-12K-D3	DPST <sup>3</sup>	100VA	84W	120V (@0.8A)	28V(@3.0A)	3.0A (@34V)	3.0A (@28V) <sup>3</sup>	1.0 Ohms	0.5" (1.3cm)	1.8" (4.6cm)	12' (3.6m)		
191-7Z-12K	N.O.	100VA	84W	120V (@0.8A)	28V(@3.0A)	3.0A (@34V)	3.0A (@28V) <sup>3</sup>	1.0 Ohms	0.5" (1.3cm)	1.8" (4.6cm)	12' (3.6m)		

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.

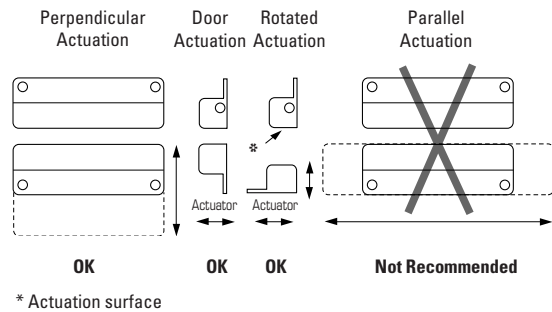
<sup>3</sup> DPST: 1 N.O., 1 N.C

# Series 100 Interlock Switches

## Installation Instructions

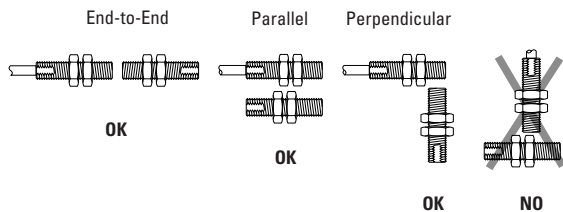
### Surface Mounting Configurations

Figure 1



### Barrel Switch Mounting Configurations

Figure 2



### Installation

#### Mounting Instructions

1. Select a mounting location where the switch and actuator can be installed with their labels reading in the same direction.
2. Mount the switch on the stationary frame of the machine and the actuator the moveable guard, door, or gate.  
Switches Models 125, 126, 128C & 129: Slightly over-drill holes for easy insertion. The switch and actuator should easily slide or screw into the predrilled holes – DO NOT force or hammer. This may damage switch.
3. For best protection against operator defeat, mount with non-removable screws, bolts, or nuts. (See accessories)
4. The switch and actuator must be mounted so that the actuator moves in one of the approved directions ( Figure 1 and Figure 2).
5. Parallel actuation is NOT recommended except for barrel type switches. An on/off/on double actuation signal may result when the magnet passes by the switch.
6. When mounting on a hinged gate or door, mount the switch and actuator at least 6" away from the hinges so a more face to face approach is achieved.
7. The actuator can be mounted at a 90° rotation.
8. Keep the switch and actuator within the listed sense range (see specific switch electrical specifications).
9. Mounting on a ferrous (steel) material will reduce the sense range a minimum of 50%. A 1/4" nonferrous (plastic or aluminum) spacer installed under the actuator and switch will restore most of the lost gap.
10. When mounting a metal switch to an ungrounded machine, connect the ground lead to one of the switch mounting screws.

**CAUTION — Particular care must be taken to determine the actual load of the switch circuit.**

1. Surges from coils, motors, contactors, solenoids and tungsten filaments must be considered.
2. Transient protection, such as back-to-back zener diodes (Transorb) or an RC network, is recommended for such loads to ensure that maximum ratings of the switch are not exceeded.
3. Line capacitance and load capacitance must be considered. An in-line resistor can be added to limit the inrush current.
4. The resistor can only be added in series with the last wire just before the load.
5. The voltage drop and the power rating of the resistor must be considered.

$$\text{Voltage drop} = I \cdot R$$

$$\text{Watts} = I^2 \cdot R$$

( I = maximum continuous current of the load)



## Interlock Switch

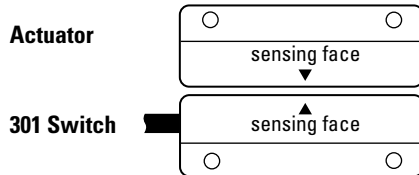
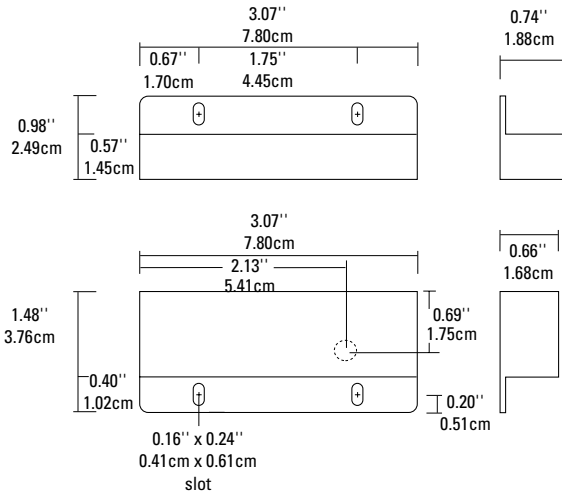
### 301 GuardSwitch

#### Applications

- Requiring Highly Defeat Resistant Switches
- Grinder Machines
- Augur Machines
- Chopper Machines

#### General Specifications

Enclosure	Folded 304 Stainless Steel
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 4, 4X, 5, 12, 12K
Protection Class	IP 66
Response Time	1 msec (5.4 VA); 10 msec (150VA)
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Lead Types/O.D.	SJTOW (K) 18/2 AWG / 0.30" (0.76cm) SJTOW (K) 18/4 AWG / 0.34" (0.86cm)
UL/CSA	All Models



Part Number	Contact <sup>1</sup> Config.		Load Rating		Switching Voltage, Max.		Switching Current, Max.		Contact Resistance	Sense Range <sup>2</sup>		Break Range	Lead Length
	AC	DC	AC	DC	AC	DC	AC	DC		Max.	Min.		
301-CT-06K	N.O.	2.5VA	2.5W	30V(@0.08A)	30V(@0.08A)	0.18A(@13.8V)	0.18A(@13.8V)	0.5 Ohms	0.75"(1.9cm)	0.375"(1.0cm)	1.2"(3.0cm)	6' (1.8m)	
301-CT-12K	N.O.	2.5VA	2.5W	30V(@0.08A)	30V(@0.08A)	0.18A(@13.8V)	0.18A(@13.8V)	0.5 Ohms	0.75"(1.9cm)	0.375"(1.0cm)	1.2"(3.0cm)	12' (3.6m)	
301-CT-12K-CD	DPST	2.5VA		30V(@0.08A)	30V(@0.08A)	0.18A(@13.8V)	0.18A(@13.8V)	0.5 Ohms	0.75"(1.9cm)	0.375"(1.0cm)	1.2"(3.0cm)	12' (3.6m)	
301-DT-06K <sup>4</sup>	N.O.	150VA	NA	120V @1.25A	NA	1.25A(@120V <sup>3</sup> )	NA	NA	0.75"(1.9cm)	0.375"(1.0cm)	1.2"(3.0cm)	6' (1.8m)	
301-DT-12K <sup>4</sup>	N.O.	150VA	NA	120V @1.25A	NA	1.25A(@120V <sup>3</sup> )	NA	NA	0.75"(1.9cm)	0.375"(1.0cm)	1.2"(3.0cm)	12' (3.6m)	

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

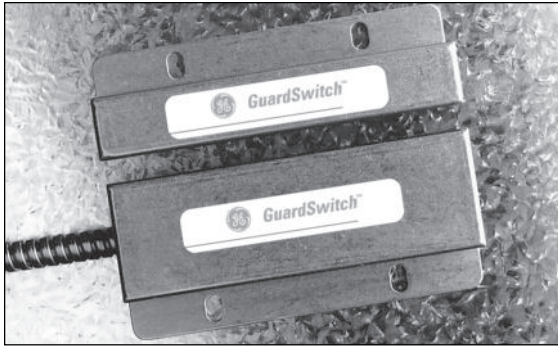
<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects.

Testing is required to determine actual sense range for specific applications.

<sup>3</sup> Can withstand inrush surge up to 4 amps. Voltage drop is 1.5V, minimum switch current, 30 mA, triac output.

<sup>4</sup> Do not exceed 10 switches in series.



## Interlock Switch

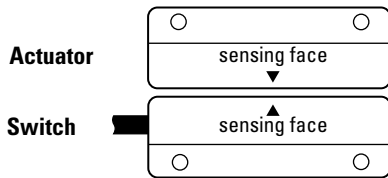
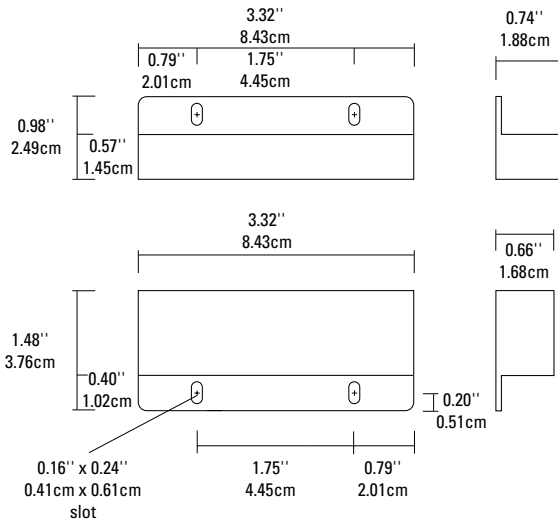
### 302 GuardSwitch

#### Applications

- Requiring Highly Defeat Resistant Switches
- Grinder Machines
- Augur Machines
- Chopper Machines

#### General Specifications

Enclosure	Folded 304 Stainless Steel
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 4, 4X, 5, 12, 12K
Protection Class	IP 66
Response Time	1 msec (5.4VA); 10 msec (150VA)
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Lead Types/O.D.	Armored Cable (A) 3/16" Stainless Steel with two 18/2 AWG wires / 0.28" (0.59cm)
UL/CSA	All Models

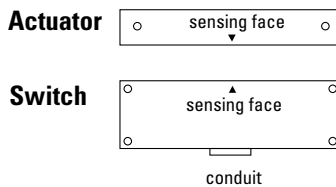
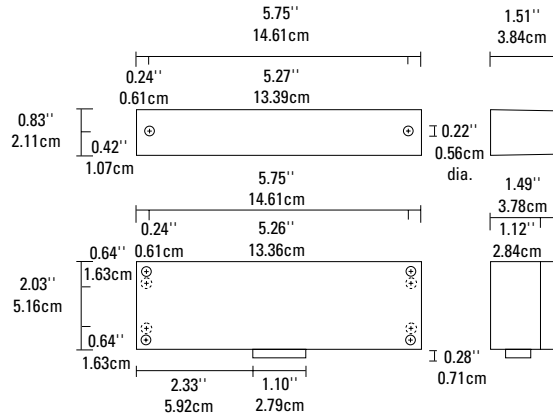
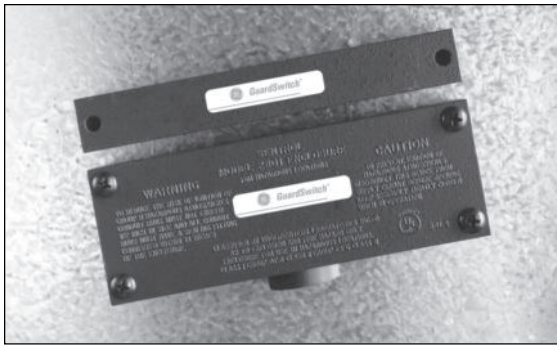


#### Order Info.    Electrical Specifications

Part No.	Contact <sup>1</sup> Config.	Load Rating		Switching Voltage, Max.		Switching Current, Max.		Contact Resistance	Sense Range <sup>2</sup>		Break Range	Lead Length
		AC	DC	AC	DC	AC	DC		Max.	Min.		
302-DT-06A <sup>4</sup>	N.O.	150VA	NA	120V @1.25A	NA	1.25A(@120V <sup>3</sup> )	NA	NA	0.75"(1.9cm)	0.375"(1.0cm)	1.2"(3.0cm)	6' (1.8m)

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

- <sup>1</sup> Configuration with actuator away from the switch
- <sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.
- <sup>3</sup> Can withstand inrush surge up to 4 amps. Voltage drop is 1.5V, minimum switch current, 30 mA, triac output.
- <sup>4</sup> Do not exceed 10 switches in series.



## Interlock Switch

### 371 GuardSwitch Explosion Proof

#### Applications

- Explosive Environments
  - Automobile Paint Booths
  - Industrial Paint Booths
  - Chemical/Toxic Environments
  - Fertilizer Manufacturers
  - Grain Mills
- Requiring Highly Defeat Resistant Switches
- Enclosure UL classified for hazardous locations classes:
  - Class I, Group B, C, D
  - Class II, Group E, F, G
  - Class III, Divisions 1 & 2

#### General Specifications

Enclosure	UL Explosion Proof, Black Anodized Die Cast Aluminum
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 5
Protection Class	IP 64
Response Time	1 msec (5.4VA); 10 msec (150VA)
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Conduit Connection	1/2" Threaded NPT
UL	All Models



File E 22942

#### Order Info. Electrical Specifications

Part No.	Contact <sup>1</sup> Config.	Load Rating		Switching Voltage, Max.		Switching Current, Max.		Contact Resistance	Sense Range <sup>2</sup>		Break Range	Terminal Type
		AC	DC	AC	DC	AC	DC		Max.	Min.		
371-CT	N.O.	2.5VA	2.5W	30V(@0.08A)	30V(@0.08A)	0.18A(@13.8V)	0.18A(@13.8V)	0.5 Ohms	0.5"(1.3cm)	0.25"(0.635cm)	1.2"(3.0cm)	#6 Screws
371-DT <sup>4</sup>	N.O.	150VA	NA	120V(@1.25A)	NA	1.25A(@120V) <sup>3</sup>	NA	NA	0.5"(1.3cm)	0.25"(0.635cm)	1.2"(3.0cm)	#6 Screws

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

- <sup>1</sup> Configuration with actuator away from the switch
- <sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.
- <sup>3</sup> Can withstand inrush surge up to 4 amps. Voltage drop is 1.5V, minimum switch current, 30 mA, triac output.
- <sup>4</sup> Do not exceed 10 switches in series.



# Interlock Switch

## 381 GuardSwitch

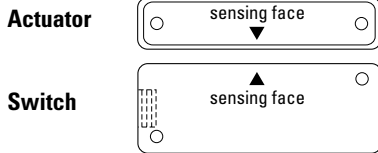
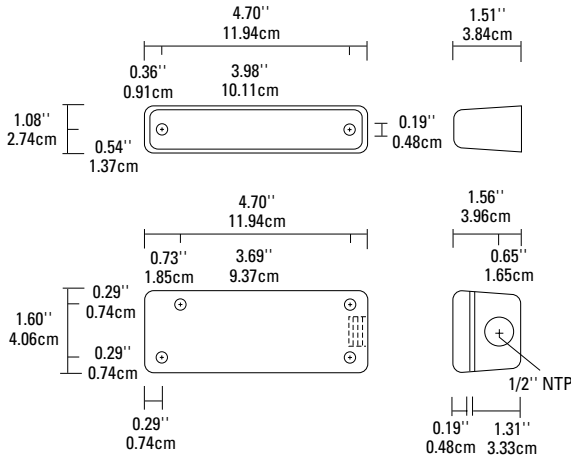
### 1/2" Conduit Enclosure

#### Applications

- Requiring Highly Defeat Resistant Switches
- Heavy-duty Housing
- Conduit Connection
- Terminals
- Non-wash down Environment

#### General Specifications

Enclosure	Coated Aluminum
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 5
Protection Class	IP 64
Response Time	1 msec (5.4VA); 10 msec (150VA)
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Conduit Connection	1/2" Threaded NPT
UL/CSA	All Models



File E 122942

LR89176

Part No.	Contact <sup>1</sup> Load Rating		Switching Voltage, Max.		Switching Current, Max.		Contact Resistance	Sense Range <sup>2</sup>		Break Range	Terminal Type	
	Config.	AC	DC	AC	DC	AC		DC	Max.			Min.
381-CT	N.O.	2.5VA	2.5W	30V(@0.08A)	30V(@0.08A)	0.18A(@13.8V)	0.18A(@13.8V)	0.5 Ohms	0.75"(1.9cm)	0.375"(1.0cm)	1.2"(3.0cm)	#6 Screw
381-DT <sup>4</sup>	N.O.	150VA	NA	120V(@1.25A)	NA	1.25A(@120V) <sup>3</sup>	NA	NA	0.75"(1.9cm)	0.375"(1.0cm)	1.2"(3.0cm)	#6 Screw

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

- <sup>1</sup> Configuration with actuator away from the switch
- <sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.
- <sup>3</sup> Can withstand inrush surge up to 4 amps. Voltage drop is 1.5V, minimum switch current, 30 mA, triac output.
- <sup>4</sup> Do not exceed 10 switches in series.



# Interlock Switch

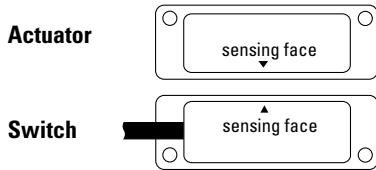
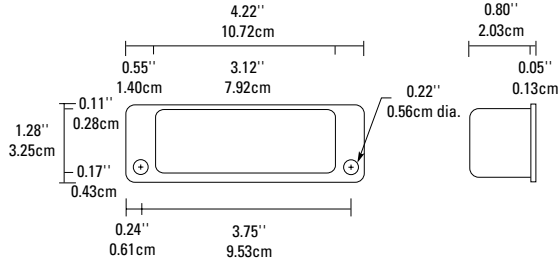
## 391 & 393 GuardSwitch

### Applications

- USDA Approved Housing
- Food Processing Machines
- Rugged, Seamless SS Housing
- Requiring Highly Defeat Resistant Switches
- Wash-down and Corrosive Environments

### General Specifications

Enclosure	304 Seamless Stainless Steel
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Contact Switch Encapsulated in Polyurethane
Response Time	1 msec (5.4VA); 10 msec (150VA)
NEMA Rating	1, 2, 3, 4, 4X, 5, 6, 12, 12X
Protection Class	IP 67
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Lead Types/O.D.	SJTOW (K)/18/2, 0.30" (0.76cm)
UL/CSA	All Models



Order Info.		Electrical Specifications										
Part No. <sup>1</sup>	Contact <sup>2</sup> Config.	Load Rating		Switching Voltage, Max.		Switching Current, Max.		Contact Resistance	Sense Range <sup>3</sup>		Break Range	Lead Length
		AC	DC	AC	DC	AC	DC		Max.	Min.		
391-CT-06K	N.O.	2.5VA	2.5W	30V(@0.08A)	30V(@0.08A)	0.18A(@13.8V)	0.18A(@13.8V)	0.5 Ohms	0.8"(2cm)	0.1"(0.25cm)	1.2"(3.0cm)	6' (1.8m)
391-CT-12K	N.O.	2.5VA	2.5W	30V(@0.18A)	30V(@0.18A)	0.18A(@13.8V)	0.18A(@13.8V)	0.5 Ohms	0.8"(2cm)	0.1"(0.25cm)	1.2"(3.0cm)	12' (3.6m)
391-DT-06K <sup>5</sup>	N.O.	150VA	NA	120V @1.25A	NA	1.25A(@120V <sup>4</sup> )	NA	NA	0.8"(2cm)	0.1"(0.25cm)	1.2"(3.0cm)	6' (1.8m)
391-DT-12K <sup>5</sup>	N.O.	150VA	NA	120V @1.25A	NA	1.25A(@120V <sup>4</sup> )	NA	NA	0.8"(2cm)	0.1"(0.25cm)	1.2"(3.0cm)	12' (3.6m)
393-DT-06K <sup>5</sup>	N.O.	150VA	NA	120V @1.25A	NA	1.25A(@120V <sup>4</sup> )	NA	NA	0.8"(2cm)	0.1"(0.25cm)	1.2"(3.0cm)	6' (1.8m)
393-DT-12K <sup>5</sup>	N.O.	150VA	NA	120V @1.25A	NA	1.25A(@120V <sup>4</sup> )	NA	NA	0.8"(2cm)	0.1"(0.25cm)	1.2"(3.0cm)	12' (3.6m)

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

- <sup>1</sup> The part number 391 and the 393 are the same in all respects except the cable exits 391 left and 393 right.
- <sup>2</sup> Configuration with actuator away from the switch
- <sup>3</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.
- <sup>4</sup> Can withstand inrush up to 4 amps. Voltage drop is 1.5V. Minimum switch current, 30 mA, triac output.
- <sup>5</sup> Do not exceed 10 switches in series.

# Series 300 Interlock Switches

## Installation Instructions

The interlock switch and actuator should be mounted in only three configurations for actuation:

Figure 1

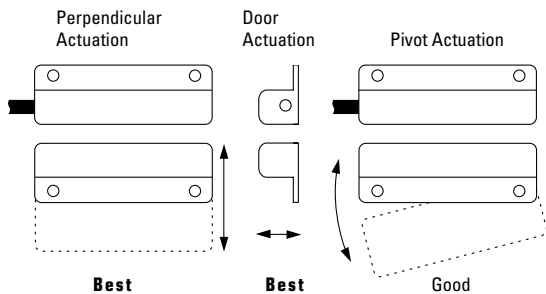
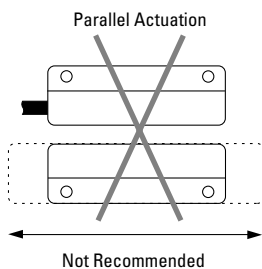


Figure 2



### Installation

#### Mounting Instructions

1. Position the switch and actuator so the labels are reading in the same direction.
2. Mount the switch on the stationary frame of the machine and mount the actuator on the moveable guard, door or gate. To determine the optimum sense range, shown under the electrical specifications for each product, attach an ohmmeter to the black and white wires.

The meter should read "Infinity" with the actuator away from the switch. Bring the actuator toward the switch until the meter reads 0 ohms. Mark this point and bring the actuator closer to the switch until the meter again reads "Infinity". Mark this point and position the actuator between the two marks. Align the actuator with the switch so the labels read in the same direction.

\* (For DT models, which incorporate a triac, the meter will read some resistance when the switch is "on," and the direct current (DC) from the meter may cause the switch to latch in the "on" state until the meter is disconnected.)

The switch and actuator must be mounted so that the actuator moves in one of the approved directions (Figure 1).

Parallel actuation is NOT recommended. An on/off/on (double actuation) signal may result when the actuator passes by the switch rather than coming to rest in proximity to it (Figure 2).

3. Mounting on a ferrous material will effect the sense range a minimum of 50 %. However, a 1/4" nonferrous spacer positioned under the actuator and/or switch should restore most of the lost sensor range.
4. For best protection against operator defeat, mount with non-removable screws, bolts or nuts (see Accessories).
5. When mounting a metal switch to an ungrounded machine, connect the ground lead to one of the switch mounting screws.

**CAUTION — Particular care must be taken to determine the actual load of the switch circuit.**

**Surges from coils, motors, contactors, solenoids and tungsten filaments must be considered.**

**Transient protection, such as back-to-back zener diodes (Transorb) or an RC network, is recommended for such loads to ensure that maximum ratings of the switch are not exceeded.**

**Line capacitance and load capacitance must be considered. An in-line resistor can be added to limit the inrush current.**

**The resistor can only be added in series with the last wire just before the load.**

**The voltage drop and the power rating of the resistor must be considered.**

**Voltage drop =  $I \cdot R$**

**Watts =  $I^2 \cdot R$**

**(I = maximum continuous current of the load)**

# *Position Sensors*

## ***Setting the Standard***

### ***Pioneers in Position Sensors***

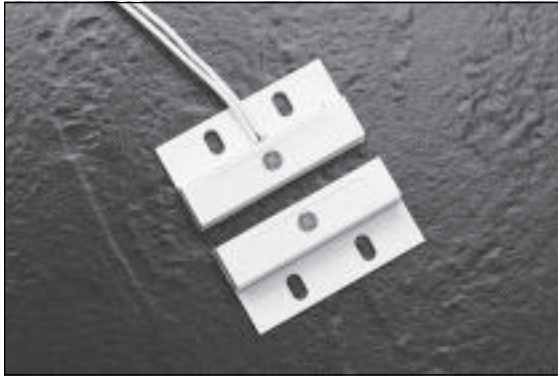
GE Interlogix Industrial has been a pioneer in the use of multiple reeds and “wide gapping” in our position sensors. We continue to lead the way in finding new and innovative solutions to problems that vex the industry.

### ***Quality Reputation***

Designed to make installation easier, GE Interlogix Industrial position sensors have earned their reputation for quality. They are built for durability and dependability. Most are conservatively rated at 100,000 cycles under full load, and 10,000,000 cycles under dry circuit.

Every reed connection is hand soldered and the reeds in all models are environmentally sealed. Like the GuardSwitch™ safety interlock switches, our position sensors are tested before they leave the factory — 100% of the time.

Our world-class manufacturing standards and attention to detail virtually eliminate all out-of-box failures. You can install GE Interlogix Industrial position sensors quickly and with every confidence in their reliability.



# Miniature Flange Mount With Wire Leads

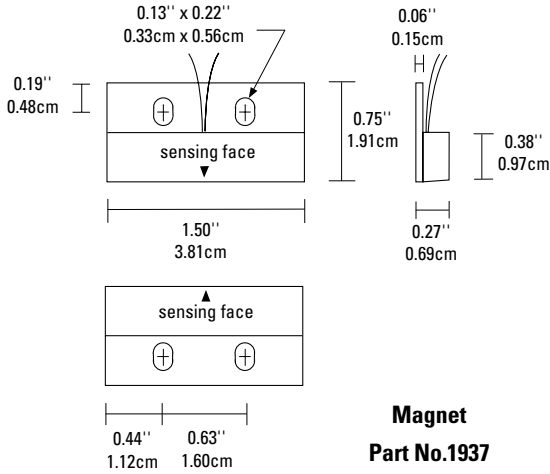
## 1032 Series

### Applications

- Flanges for rapid mounting
- Convenient surface mounting
- Includes adhesive mounting strips
- Mounting screws

### General Specifications

Enclosure	ABS Plastic
Temperature Range	-40°F to 150°F (-40°C to 65°C)
Environmental	Hermetically Sealed Reed Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4x, 5, 6, 12
Protection Class	IP 67
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load, 10,000,000 Under Dry Circuit
Lead Types/O.D.	#22 wire / 0.05" (0.15cm)
Color	Natural
UL/ULC Listed	All Models



**Magnet**  
**Part No.1937**  
**(included)**



Order Information		Electrical Specifications					
Part Number	Contact <sup>1</sup> Configuration	Load Rating (AC/DC)	Switching Voltage (AC/DC)	Switching Current (AC/DC)	Contact Resistance	Sense Range <sup>2</sup> Nominal	Lead Length
1032-N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	0.6"(1.6cm)	1'
1032W-N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	1.0"(2.5cm)	1'
1937-N	Actuator Only						

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects.

Testing is required to determine actual sense range for specific applications. As measured on a nonferrous surface.

Gap distances are nominal make distance ± 20%. Gap Specifications are for switch to make. Break distance is approximately 1.1 to 1.5 times make.



# Miniature Self-Adhesive With Wire Leads

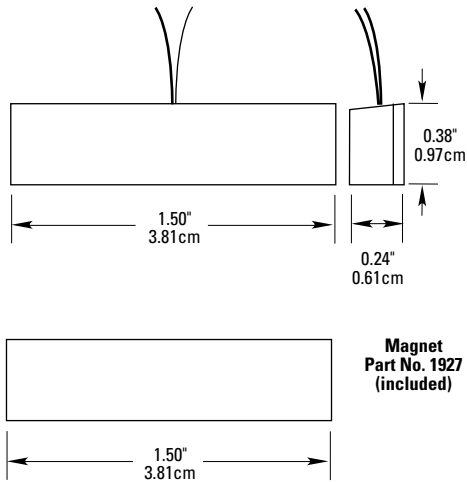
## 1035 Series

### Applications

- Quick tape mounting; no screws or glues needed
- Urethane/acrylic tape bonding improves with age
- Convenient surface mounting

### General Specifications

Enclosure	ABS Plastic
Temperature Range	-40°F to 150°F (-40°C to 65°C)
Environmental	Hermetically Sealed Reed Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4x, 5, 6, 12
Protection Class	IP 67
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load, 10,000,000 Under Dry Circuit
Lead Types/O.D.	#22 wire / 0.05" (0.15cm)
Color	Natural
UL/ULC Listed	All Models



Order Information		Electrical Specifications					
Part Number	Contact <sup>1</sup> Configuration	Load Rating (AC/DC)	Switching Voltage (AC/DC)	Switching Current (AC/DC)	Contact Resistance	Sense Range <sup>2</sup> Nominal	Lead Length
1035-N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	0.6"(1.6cm)	1'

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications. As measured on a nonferrous surface.

Gap distances are nominal make distance ±20%. Gap Specifications are for switch to make. Break distance is approximately 1.1 to 1.5 times make.



# Surface Mount With Wire Leads

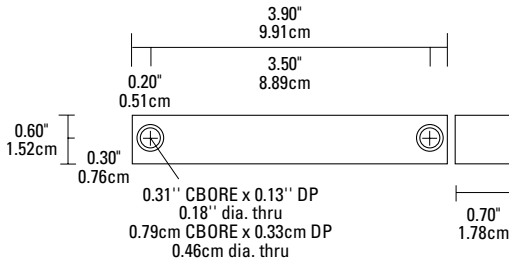
## 1045 Series

### Applications

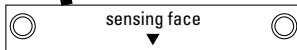
- Models for use on steel without time-consuming brackets
- Rugged construction
- Convenient surface mount wiring
- Mounting screws

### General Specifications

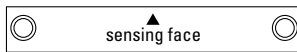
Enclosure	ABS Plastic
Temperature Range	-40°F to 150°F (-40°C to 65°C)
Environmental	Hermetically Sealed Reed Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4x, 5, 6, 12
Protection Class	IP 67
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load, 10,000,000 Under Dry Circuit
Lead Types/O.D.	Jacketed #22 AWG / 0.187" (0.48cm)
Color	Grey
UL/ULC Listed	All Models



Switch



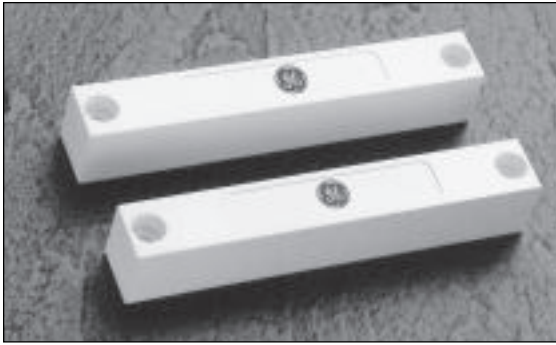
Actuator



Order Information		Electrical Specifications					
Part Number	Contact <sup>1</sup> Configuration	Load Rating (AC/DC)	Switching Voltage Maximum (AC/DC)	Switching Current Maximum (AC/DC)	Contact Resistance	Sense Range <sup>2</sup> Nominal	Lead Length
1045W-G	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	3.0" (7.6cm)	3'

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

- <sup>1</sup> Configuration with actuator away from the switch
- <sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications. As measured on a nonferrous surface. Gap distances are nominal make distance ± 20%. Gap Specifications are for switch to make. Break distance is approximately 1.1 to 1.5 times make.



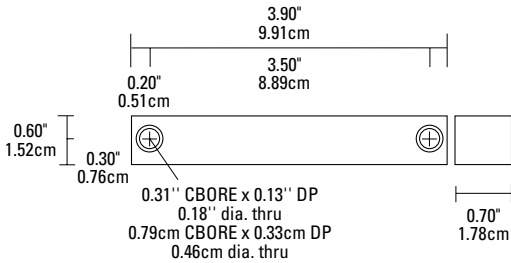
## Industrial Screw Terminal

### 1045T Series

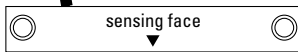
#### Applications

- Models for use on steel without time-consuming brackets
- Rugged construction
- Concealed terminals resist tampering and inadvertent shorting
- Easy clamping terminals speed installation
- Mounting screws

#### Test Points (Top)



#### Switch



#### Actuator



#### General Specifications

Enclosure	ABS Plastic
Temperature Range	-40°F to 150°F (-40°C to 65°C)
Environmental	Hermetically sealed reed switch
NEMA Rating	1
Protection Class	IP 62
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load 10,000,000 Under Dry Circuit
Connection	#6 screw terminal
Color Choices	Natural(N), Grey(G), Mahogany(M)
UL/ULC Listed	All Models

#### Order Information

#### Electrical Specifications

Part Number	Contact <sup>1</sup> Configuration	Load Rating (AC/DC)	Switching Voltage (AC/DC)	Switching Current (AC/DC)	Contact Resistance <sup>3</sup>	Sense Range <sup>2</sup> Nominal
1045T-G, M, N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	1.3" (3.2cm)
1047T-N	SPDT	3W/VA	30V	0.25A	0.2 Ohms	1.3" (3.2cm)
1042TW-G, M, N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	3.0" (7.6cm)
1044TW-N	SPDT	3W/VA	30V	0.25A	0.2 Ohms	3.0" (7.6cm)
1933-N	Actuator Only (For 1045T, 1046T, 1047T, 1047TH)					

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects.

Testing is required to determine actual sense range for specific applications. As measured on a nonferrous surface.

Gap distances are nominal make distance ± 20%. Gap Specifications are for switch to make. Break distance is approximately 1.1 to 1.5 times make.

<sup>3</sup> Biased for higher security applications



## 1/4" Diameter Switch With Wire Leads

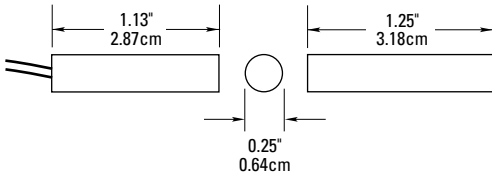
### 1055 Series

#### Applications

- Economical
- Versatile
- Fits in limited space

#### General Specifications

Enclosure	ABS Plastic
Temperature Range	-40°F to 150°F (-40°C to 65°C)
Environmental	Hermetically Sealed Reed Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4x, 5, 6, 12
Protection Class	IP 67
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load, 10,000,000 Under Dry Circuit
Lead Types/O.D.	#22 wire / 0.05" (0.15cm)
Color	Natural
UL/ULC Listed	All Models



#### Order Information      Electrical Specifications

Part Number	Contact <sup>1</sup> Configuration	Load Rating (AC/DC)	Switching Voltage (AC/DC)	Switching Current (AC/DC)	Contact Resistance	Sense Range <sup>2</sup> Nominal	Lead Length
1055-N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	0.5" (1.3cm)	1'
1055W-N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	1.3" (3.2cm)	1'

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects.

Testing is required to determine actual sense range for specific applications.

Gap distances are nominal make distance ±20%. Gap Specifications are for switch to make. Break distance is approximately 1.1 to 1.5 times make.



## 3/8" Diameter Flanged With Wire Leads

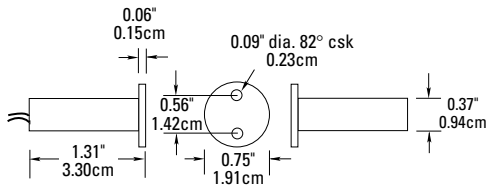
### 1072 Series

#### Applications

- Flanges for positive mounting; over-size holes
- Mounting screws included

#### General Specifications

Enclosure	ABS Plastic
Temperature Range	-40°F to 150°F (-40°C to 65°C)
Environmental	Hermetically Sealed Reed Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4x, 5, 6, 12
Protection Class	IP 67
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load, 10,000,000 Under Dry Circuit
Lead Types/O.D.	#22 wire / 0.05" (0.15cm)
Color	Natural
UL/ULC Listed	All Models



Order Information		Electrical Specifications					
Part Number	Contact Configuration <sup>1</sup>	Load Rating (AC/DC)	Switching Voltage (AC/DC)	Switching Current (AC/DC)	Contact Resistance	Sense Range <sup>2</sup> Nominal	Lead Length
1072-N	N.O.	7.5VA	100V	0.5A	0.2 Ohms	0.5" (1.3cm)	1'

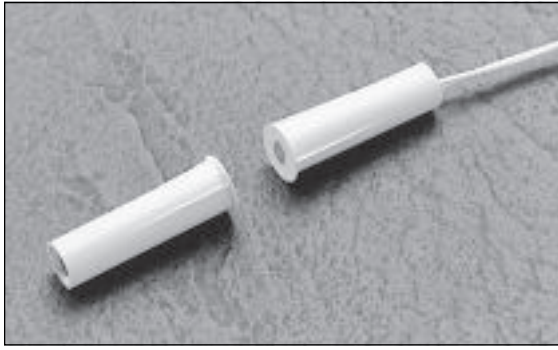
**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects.

Testing is required to determine actual sense range for specific applications. As measured on a nonferrous surface.

Gap distances are nominal make distance  $\pm$  20%. Gap Specifications are for switch to make. Break distance is approximately 1.1 to 1.5 times make.



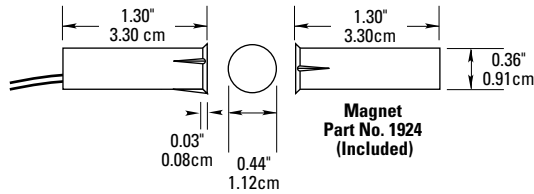
## 3/8" Diameter Press Fit With Wire Leads

### 1075 Series

#### Applications

- 3/8" press-fit mounting; no screws or glue needed
- Heavy-duty housing resists crushing

#### General Specifications



Enclosure	ABS Plastic
Temperature Range	-40°F to 150°F (-40°C to 65°C)
Environmental	Hermetically Sealed Reed Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4x, 5, 6, 12
Protection Class	IP 67
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load, 10,000,000 Under Dry Circuit
Lead Types/O.D.	#22 wire / 0.05" (0.15cm)
Color Choices	Natural(N), Mahogany(M)
UL/ULC Listed	All Models



Order Information		Electrical Specifications					
Part Number	Contact <sup>1</sup> Configuration	Load Rating (AC/DC)	Switching Voltage (AC/DC)	Switching Current (AC/DC)	Contact Resistance	Sense Range <sup>2</sup> Nominal	Lead Length
1075-M, N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	0.5" (1.3cm)	1'
1075W-M, N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	1.3" (3.2cm)	1'
1070-N	SPDT	3W/VA	30V	0.25A	0.2 Ohms	0.5" (1.3cm)	1'
1924-M, N	Actuator Only						

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects.

Testing is required to determine actual sense range for specific applications. As measured on a nonferrous surface.

Gap distances are nominal make distance ±20%. Gap Specifications are for switch to make. Break distance is approximately 1.1 to 1.5 times make.

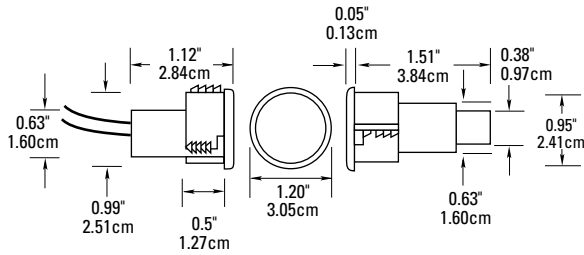


# 1" Diameter Steel Door With Wire Leads

## 1078 Series

### Applications

- Special design for special mounting
- Self-lock mounting
- Rugged construction
- 15/16" dia. hole required
- UL approved for specific fire doors



### General Specifications

Enclosure	ABS Plastic
Temperature Range	-40°F to 150°F (-40°C to 65°C)
Environmental	Hermetically Sealed Reed Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4x, 5, 6, 12
Protection Class	IP 67
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load 10,000,000 Under Dry Circuit
Lead Types/O.D.	#22 wire / 0.05" (0.15cm)
Color Choices	Natural(N), Mahogany(M), Grey(G)
UL/ULC Listed	All Models



Order Information		Electrical Specifications					
Part Number	Contact <sup>1</sup> Configuration	Load Rating (AC/DC)	Switching Voltage (AC/DC)	Switching Current (AC/DC)	Contact Resistance	Sense Range <sup>2</sup> Nominal	Lead Length
1078-G, M, N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	0.5" (1.3cm)	1'
1078W-M, N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	1.0" (2.5cm)	1'
1076-G, M, N	SPDT	3W/VA	30V	0.25A	0.2 Ohms	0.5" (1.3cm)	1'
1076H-M, N	SPDT	3W/VA	30V	0.25A	0.2 Ohms	0.5" (1.3cm)	1'
1076W-M, N	SPDT	3W/VA	30V	0.25A	0.2 Ohms	1.0" (2.5cm)	1'
1076D-M, N	DPDT	3W/VA	30V	0.25A	0.2 Ohms	0.4" (1.0cm)	1'

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

- <sup>1</sup> Configuration with actuator away from the switch
- <sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications. As measured on a nonferrous surface.  
Gap distances are nominal make distance ± 20%. Gap Specifications are for switch to make. Break distance is approximately 1.1 to 1.5 times make.
- <sup>3</sup> Biased for higher defeat resistance.



## 3/4" Steel Door With Wire Leads

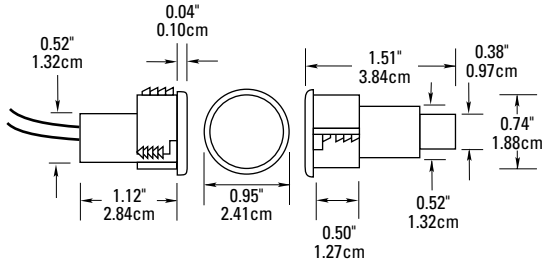
### 1078C Series

#### Applications

- 3/4" diameter for easier drilling in metal
- Self-lock mounting
- Rugged construction

#### General Specifications

Enclosure	ABS Plastic
Temperature Range	-40°F to 150°F (-40°C to 65°C)
Environmental	Hermetically Sealed Reed Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4x, 5, 6, 12
Protection Class	IP 67
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load 10,000,000 Under Dry Circuit
Lead Types/O.D.	#22 wire / 0.05" (0.15cm)
Color Choices	Natural(N), Mahogany(M), Grey(G)
UL/ULC Listed	All Models



#### Order Information

#### Electrical Specifications

Part Number	Contact <sup>1</sup> Configuration	Load Rating (AC/DC)	Switching Voltage (AC/DC)	Switching Current (AC/DC)	Contact Resistance	Sense Range <sup>2</sup> Nominal	Lead Length
1078C-G, M, N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	0.4" (1.0cm)	1'
1078CW-G, M, N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	0.8" (1.9cm)	1'
1076C-M, N	SPDT	3W/VA	30V	0.25A	0.2 Ohms	0.4" (1.0cm)	1'
1076CW-M, N	SPDT	3W/VA	30V	0.25A	0.2 Ohms	0.8" (1.9cm)	1'

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects.

Testing is required to determine actual sense range for specific applications. As measured on a nonferrous surface.

Gap distances are nominal make distance ±20%. Gap Specifications are for switch to make. Break distance is approximately 1.1 to 1.5 times make.



## Screw Mount With Leads

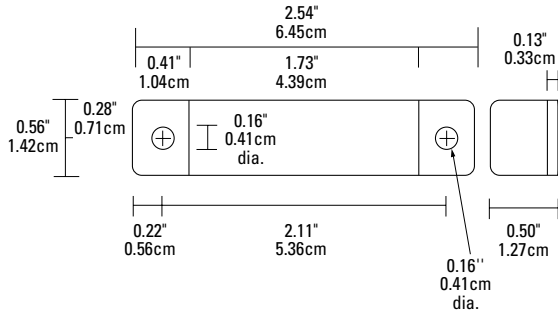
### 1082 Series

#### Applications

- Convenient surface mounting
- Mounting screws included

#### General Specifications

Enclosure	ABS Plastic
Temperature Range	-40°F to 150°F (-40°C to 65°C)
Environmental	Hermetically Sealed Reed Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4x, 5, 6, 12
Protection Class	IP 67
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load, 10,000,000 Under Dry Circuit
Lead/O.D.	#22 wire / 0.05" (0.15cm)
Color Choices	Natural(N), Mahogany(M), Grey(G)
UL Listed	All Models



Order Information		Electrical Specifications					
Part Number	Contact <sup>1</sup> Configuration	Load Rating (AC/DC)	Switching Voltage (AC/DC)	Switching Current (AC/DC)	Contact Resistance	Sense Range <sup>2</sup> Nominal	Lead Length
1082-G, N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	1.0" (2.5cm)	1'
1084-M	SPDT	3W/VA	30V	0.25A	0.2 Ohms	1.0" (2.5cm)	1'

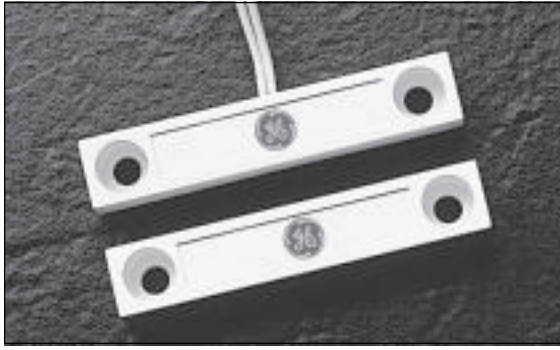
**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects.

Testing is required to determine actual sense range for specific applications. As measured on a nonferrous surface.

Gap distances are nominal make distance ± 20%. Gap Specifications are for switch to make. Break distance is approximately 1.1 to 1.5 times make.



## Screw Mount With Wire Leads

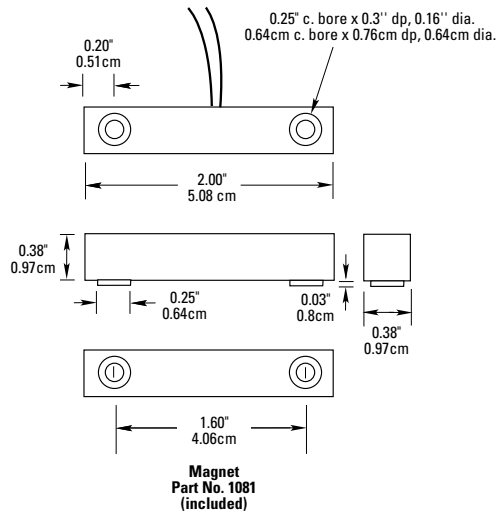
### 1085 Series

#### Applications

- Convenient surface mounting
- Mounting screws included

#### General Specifications

Enclosure	ABS Plastic
Temperature Range	-40°F to 150°F (-40°C to 65°C)
Environmental	Hermetically Sealed Reed Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4x, 5, 6, 12
Protection Class	IP 67
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load, 10,000,000 Under Dry Circuit
Lead Types/O.D.	#22 wire / 0.05" (0.15cm)
Color Choices	Natural (N), Mahogany (M), Grey (G)
UL/ULC Listed	All Models



Order Information		Electrical Specifications					
Part Number	Contact <sup>1</sup> Configuration	Load Rating (AC/DC)	Switching Voltage (AC/DC)	Switching Current (AC/DC)	Contact Resistance	Sense Range <sup>2</sup> Nominal	Lead Length
1085-G, M, N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	0.6" (1.6cm)	1'
1085W-M, N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	1.5" (3.8cm)	1'
1086-N	N.C.	3W/VA	30V	0.25A	0.2 Ohms	0.6" (1.6cm)	1'
1086W-M	N.C.	3W/VA	30V	0.25A	0.2 Ohms	1.5" (3.8cm)	1'
1081-N	Actuator Only						

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects.

Testing is required to determine actual sense range for specific applications. As measured on a nonferrous surface.

Gap distances are nominal make distance ± 20%. Gap Specifications are for switch to make. Break distance is approximately 1.1 to 1.5 times make.



# Screw Terminal

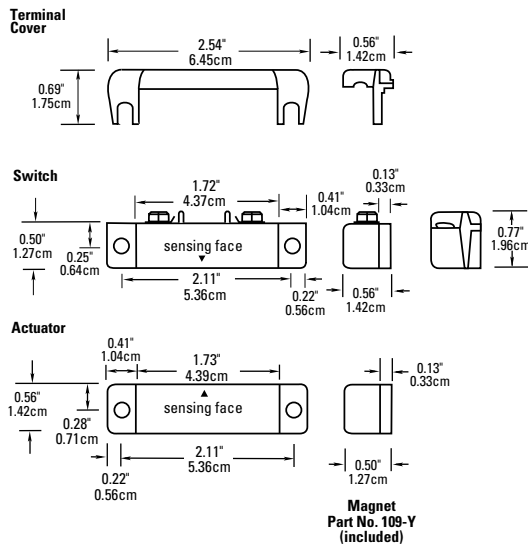
## 1085T Series

### Applications

- Easy clamping terminals speed installation
- Convenient surface mounting
- Built-in resistors available; consult factory
- Cover, spacer, screws included

### General Specifications

Enclosure	ABS Plastic
Temperature Range	-40°F to 150°F (-40°C to 65°C)
Environmental	Hermetically Sealed Reed Switch
NEMA Rating	1
Protection Class	IP 62
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load, 10,000,000 Under Dry Circuit
Connection	#6 screw terminal
Color Choices	Natural(N), Mahogany(M), Grey(G)
UL/ULC Listed	All Models



### Order Information

### Electrical Specifications

Part Number	Contact <sup>1</sup> Configuration	Load Rating (AC/DC)	Switching Voltage (AC/DC)	Switching Current (AC/DC)	Contact Resistance	Sense Range <sup>2</sup> Nominal
1085T-G, M, N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	0.8" (1.9cm)
1085TW-G, M, N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	1.5" (3.8cm)
1084TW-N	SPDT	3W/VA	30V	0.25A	0.2 Ohms	2.0" (5.1cm)
1086T-N	N.C.	3W/VA	30V	0.25A	0.2 Ohms	0.8" (1.9cm)
1087T-M, N	SPDT	3W/VA	30V	0.25A	0.2 Ohms	0.8" (1.9cm)
1087TW-M, N	SPDT	3W/VA	30V	0.25A	0.2 Ohms	1.5" (3.8cm)
1080T-N	Actuator Only (For 1082T, 1083T, 1084T, 1082TW, 1083TW, 1084TW)					
1081T-N	Actuator Only (For 1085T, 1086T, 1087T, 1085TW, 1086TW, 1087TW)					

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications. As measured on a nonferrous surface.

Gap distances are nominal make distance ±20%. Gap Specifications are for switch to make. Break distance is approximately 1.1 to 1.5 times make.



## Miniature With Screw Terminals

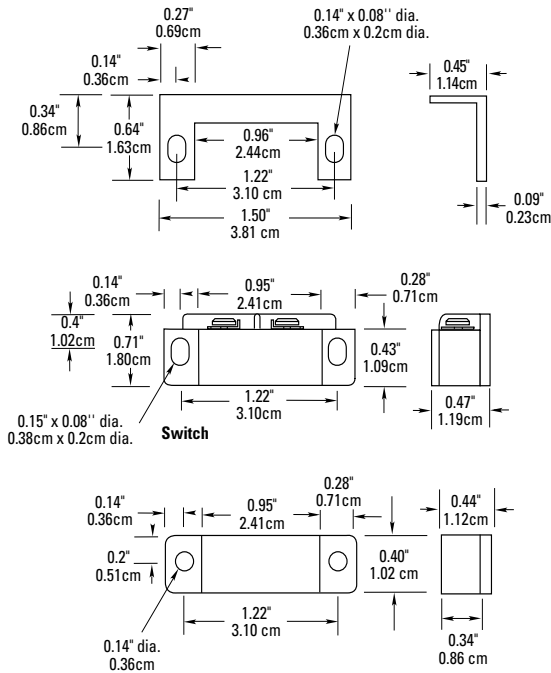
### 1135T Series

#### Applications

- Ideal for limited space applications
- Hermetically sealed switches resist corrosion and build up
- Ideal for use in dusty areas
- Cover, spacer, screws included

#### General Specifications

Enclosure	ABS Plastic
Temperature Range	-40°F to 150°F (-40°C to 65°C)
Environmental	Hermetically Sealed Reed Switch
NEMA Rating	1
Protection Class	IP 62
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load, 10,000,000 Under Dry Circuit
Connection	#6 screw terminal
Color Choices	Natural (N), Mahogany (M)



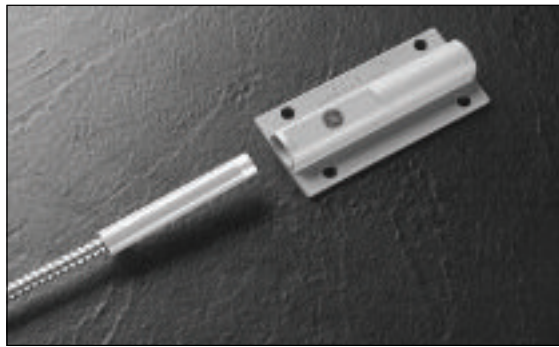
Order Information		Electrical Specifications				
Part Number	Contact <sup>1</sup> Configuration	Load Rating (AC/DC)	Switching Voltage (AC/DC)	Switching Current (AC/DC)	Contact Resistance	Sense Range <sup>2</sup> Nominal
1135T-N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	0.6" (1.6cm)
1136T-M	N.C.	3W/VA	30V	0.25A	0.2 Ohms	0.6" (1.6cm)

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications. As measured on a nonferrous surface.

Gap distances are nominal make distance ± 20%. Gap Specifications are for switch to make. Break distance is approximately 1.1 to 1.5 times make.



# Magnapull™ Heavy Duty Magnetic Pull-Apart Cords

## 2100 Series

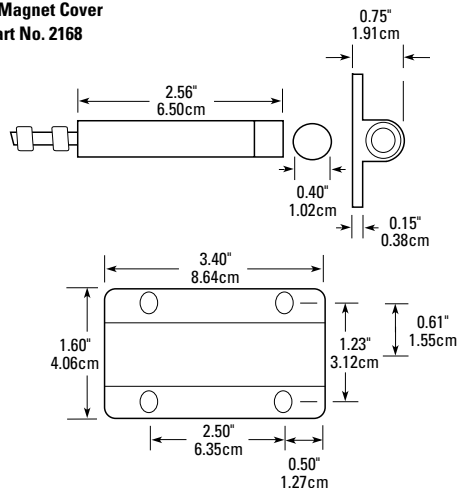
### Applications

- Protect boats, trailers, heavy equipment
- Secures almost any loose item
- Positive magnetic retention
- Reed-actuated for high reliability
- Durable, heavy gauge construction for long life
- Mounting hardware included

### General Specifications

Enclosure	ABS Plastic
Temperature Range	-40°F to 150°F (-40°C to 65°C)
Environmental	Hermetically Sealed Reed Switch
NEMA Rating	1, 2, 3, 4, 4x, 5, 6, 12
Protection Class	IP 67
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load 10,000,000 Under Dry Circuit
Lead Types/O.D.	Stainless Steel Armored Cable with #22 wire / 0.28" (0.71cm)
Color	Grey

2105 Magnet Cover  
Part No. 2168



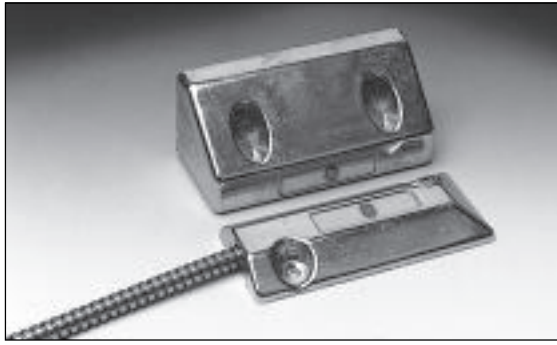
### Order Information

### Electrical Specifications

Part Number	Contact <sup>1</sup> Configuration	Load Rating (AC/DC)	Switching Voltage (AC/DC)	Switching Current (AC/DC)	Contact Resistance	Lead Length
2105A-G	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	3'
2107A-G	SPDT	3W/VA	30V	0.25A	0.2 Ohms	3'

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch



# Miniature Surface Mount With Armored Cable

## 2200 Series

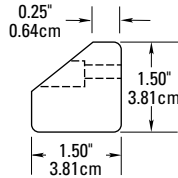
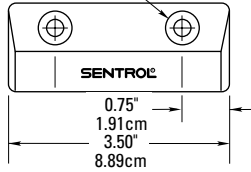
### Applications

- Miniature, low-profile design
- Stainless steel armored cable for added reliability
- Wide working gap for overhead doors
- Small size less likely to be damaged by forklifts
- Aluminum bar stock resists corrosion in harsh environments
- Mounting hardware included
- Jacketed lead available

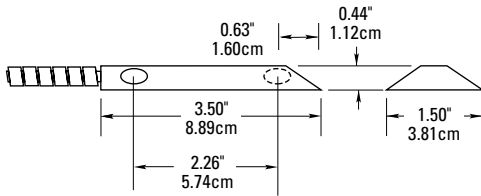
### General Specifications

Enclosure	Aluminum (L)
Temperature Range	-40°F to 150°F (-40°C to 65°C)
Environmental	Hermetically Sealed Reed Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4x, 5, 6, 12
Protection Class	IP 67
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load, 10,000,000 Under Dry Circuit
Lead Types/O.D.	Stainless Steel Armored Cable with #22 Wire / 0.28" (0.71cm)
UL/ULC Listed	All Models

0.47" c. bore, 0.18" thru  
1.19cm c. bore, 0.46cm thru



Magnet  
Part No. 1958  
(included)



Magnet  
Part No. 1982



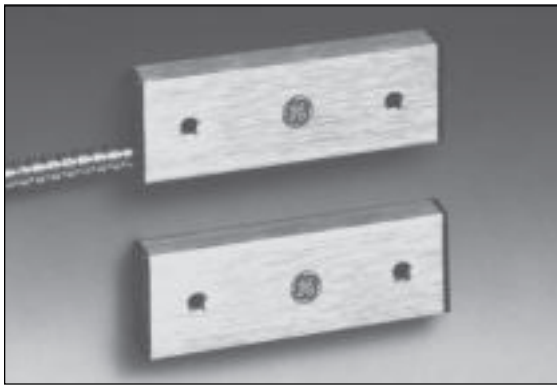
Order Information		Electrical Specifications					
Part Number	Contact <sup>1</sup> Configuration	Load Rating (AC/DC)	Switching Voltage (AC/DC)	Switching Current (AC/DC)	Contact Resistance	Sense Range <sup>2</sup> Minimum	Lead Length
2202A/2202AU-L	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	3.0" (7.6cm)	1.5'
2204A/2204AU-L	SPDT	3W/VA	30V	0.25A	0.2 Ohms	3.0" (7.6cm)	1.5'
2205AU-L	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	3.0" (7.6cm)	3'
2207A/2207AU-L	SPDT	3W/VA	30V	0.25A	0.2 Ohms	3.0" (7.6cm)	3'
1982	Flange Mount Universal Actuator Only						

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications. As measured on a nonferrous surface.

Gap distances are nominal make distance ± 20%. Gap Specifications are for switch to make. Break distance is approximately 1.1 to 1.5 times make.



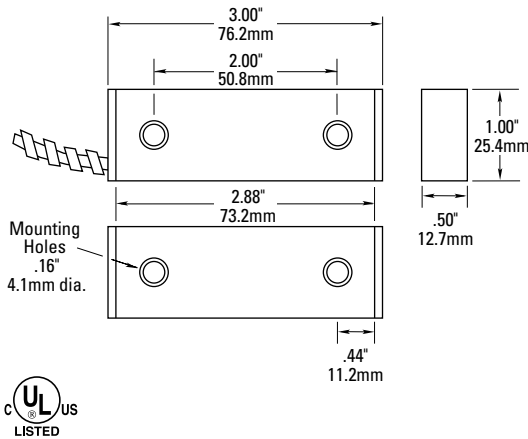
# Aluminum Housing Armored Cable Wide Gap 2500 Series

## Applications

- Mounting brackets available for gates, garage doors, freezers
- Rugged construction for long life
- Convenient surface mounting
- 2507AH is polarity-sensitive with reference to magnet direction

## General Specifications

Enclosure	Brushed anodized aluminum with ABS plastic end caps (L)
Temperature Range	-40°F to 150°F (-40°C to 65°C)
Environmental	Hermetically Sealed Reed Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4x, 5, 6, 12
Protection Class	IP 67
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load, 10,000,000 Under Dry Circuit
Lead Types/O.D.	Stainless Steel Armored Cable with #22 wire / (0.28") (0.71cm)
UL/ULC Listed	Most Models



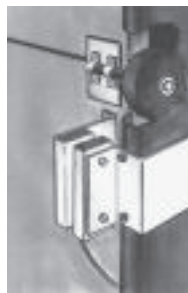
## Mounting Kits for 2500 Series

### 1092A Garage Door Track

#### Mounting Kit for Model 2505A

Includes:

- 1- 1940 bracket
- 1-1912 bracket
- 1-2505A contact,
- mounting screws
- and instructions



### 1094A Curtain Door

#### Mounting Kit for Model 2507AH

Includes:

- 1- 1941 bracket
- 1-1942 bracket
- 1-2507AH contact,
- mounting screws
- and instructions



## Order Information

## Electrical Specifications

Part Number	Contact <sup>1</sup> Configuration	Load Rating (AC/DC)	Switching Voltage (AC/DC)	Switching Current (AC/DC)	Contact Resistance	Sense Range <sup>2</sup> Nominal	Lead Length
2505A-L	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	3.0" (7.6cm)	3'
2507A-L	SPDT	3W/VA	30V	0.25A	0.25 Ohms	3.0" (7.6cm)	3'
2507AD <sup>3</sup> -L	DPDT	3W/VA	30V	0.25A	0.25 Ohms	1.5" (3.8cm) Min	3'
2507AH <sup>3,4</sup> -L	SPDT	3W/VA	30V	0.25A	0.25 Ohms	0.8" (1.9cm) Min	3'

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

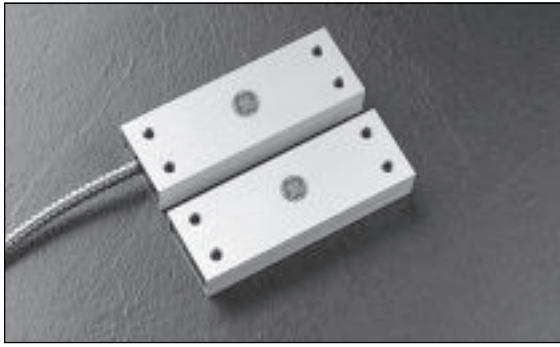
<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications. As measured on a nonferrous surface.

<sup>3</sup> Gap distances are nominal make distance ± 20%. Gap Specifications are for switch to make. Break distance is approximately 1.1 to 1.5 times make.

<sup>4</sup> Note: 2507AH biased type temperature rating: -20°F to 150°F (-28°C to 65°C).

<sup>4</sup> Not ULC Listed



# Anodized Alloy Housing with Armor Cable

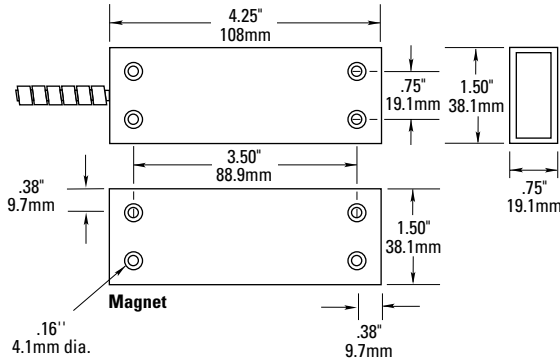
## 2700 Series

### Applications

- Triple-biased reeds make defeat of switch with external magnet virtually impossible
- Magnetic field tamper for added protection
- Factory compensated for effects of steel
- Available for several applications
  - overhead door
  - outside gate

### General Specifications

Enclosure	Anodized Aluminum (L)
Temperature Range	-20°F to 150°F (-28°C to 65°C)
Environmental	Hermetically Sealed Reed Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 4, 4x, 5, 6, 12
Protection Class	IP 67
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load, 10,000,000 Under Dry Circuit
Lead Types/O.D.	Stainless Steel Armored Cable with #22 wire / 0.28" (0.71cm)
UL Listed	All Models



Order Information		Electrical Specifications						
Part Number	Contact <sup>1</sup> Configuration	Load Rating (AC/DC)	Switching Voltage (AC/DC)	Switching Current (AC/DC)	Contact Resistance	Sense Range <sup>2</sup> Minimum	Sense Range Maximum	Lead Length
2707A-L	SPDT	3W/VA	30V	0.25A	1.5 Ohms	0.18" (0.5cm)	0.6" (1.6cm)	3'
2707 AD-L	DPDT	3W/VA	30V	0.25A	1.5 Ohms	0.18" (0.5cm)	0.6" (1.6cm)	3'

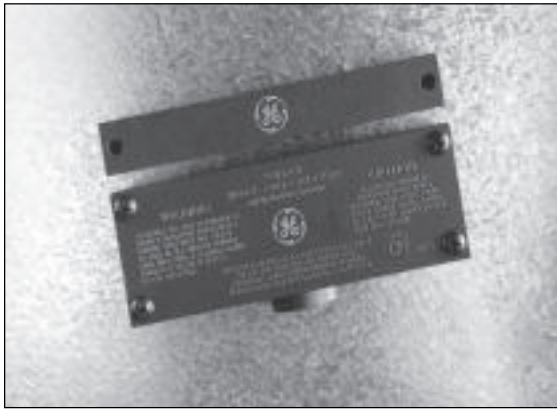
**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects.

Testing is required to determine actual sense range for specific applications. As measured on a nonferrous surface.

Gap distances are nominal make distance ± 20%. Gap Specifications are for switch to make. Break distance is approximately 1.1 to 1.5 times make.



# Explosion-Proof With Terminals

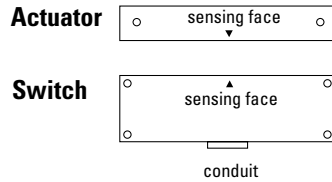
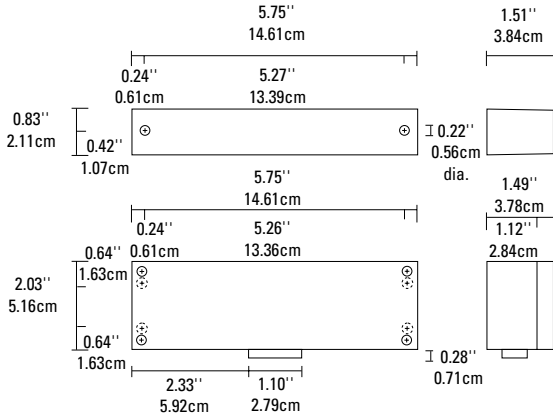
## 2800T Series

### Applications

- Explosion-proof; UL listed for hazardous location classes:
  - Class I Group C, D
  - Class II Group E, F, and G
  - Class I Group B housing available
- Options include remote test, resettable current limiting device, custom modifications available
- Switch has pry-tamper plate

### General Specifications

Enclosure	UL Explosion Proof, Die Cast Aluminum
Temperature Range	-40°F to -180°F (-40°C to 80°C)
Environmental	Hermetically Sealed Reed Switch Encapsulated in Polyurethane
NEMA Rating	1, 2, 3, 5, 12
Protection Class	IP 64
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load, 10,000,000 Under Dry Circuit
Conduit Connection	1/2" Thread NPT
UL Listed	All Models



### Order Information

### Electrical Specifications

Part Number	Contact <sup>1</sup> Configuration	Load Rating (AC/DC)	Switching Voltage (AC/DC)	Switching Current (AC/DC)	Sense Range <sup>2</sup> Nominal	Terminal Type
2807T-M	SPDT	3W/VA	30V	0.25A	0.18" (0.5cm) to 0.62" (1.6cm)	#6 Screw
2845T-M	N.O.	7.5W/VA	100V	0.5A	1.0" (2.5cm)	#6 Screw
2847T-M	SPDT	3W/VA	30V	0.25A	1.0" (2.5cm)	#6 Screw

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with actuator away from the switch

<sup>2</sup> Proximity of ferrous materials usually reduces sense range — typically by 50%. The shape and type of material cause a wide diversity of effects.

Testing is required to determine actual sense range for specific applications. As measured on a nonferrous surface.

Gap distances are nominal make distance ± 20%. Gap Specifications are for switch to make. Break distance is approximately 1.1 to 1.5 times make.



# Recessed Roller Plunger With Wire Leads

## 3008 Series

### Applications

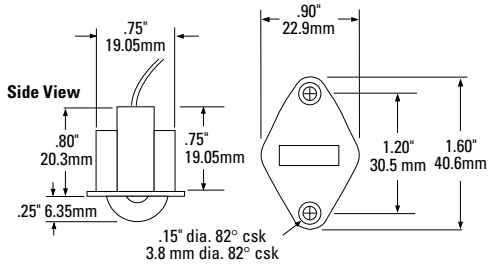
Model 3008 "Shorty"

- Short housing (3/4") fits in tight quarters
- Ideal for replacing short mechanical switches
- Flow-through design to ensure operation in dirty environments

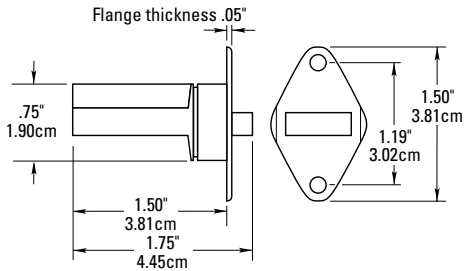
Model 3007

- Versatile; three different mounting configurations
- Ideal for doors
- Works as plunger or ball switch
- Flanges for reliable, positive retention
- Spacers, mounting screws included

### Model 3008



### Model 3007



### General Specifications

Enclosure	ABS plastic
Temperature Range	-40°F to 150°F (-40°C to 65°C)
Environmental	Contact Housing is made of flame-retardant ABS plastic. Reed switch is protected and held in place by a polyurethane potting material
NEMA Rating	1
Protection Class	IP 62
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load, 10,000,000 Under Dry Circuit
Lead Types/O.D.	#22 wire / 0.05" (0.15cm)
Color Choices	Natural(N), Mahogany(M)
UL Listed	All Models



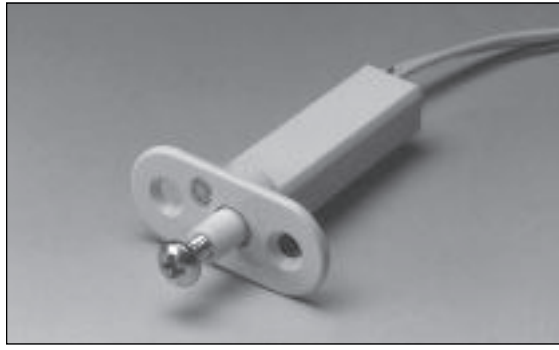
### Order Information

### Electrical Specifications

Part Number	Contact Configuration	Load Rating (AC/DC)	Switching Voltage (AC/DC)	Switching Current (AC/DC)	Contact Resistance	Load Length
3008-M, N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	1'
3007-M, N	SPDT	3W/VA	30V	0.25A	0.2 Ohms	1'

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with plunger out.



# Recessed Pin Plunger

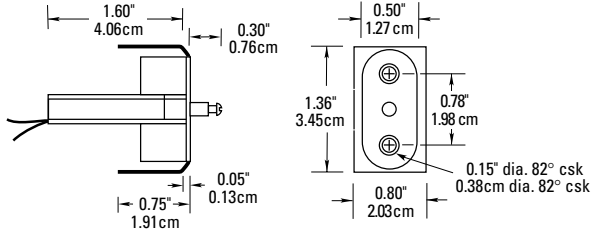
## 3010 Series

### Applications

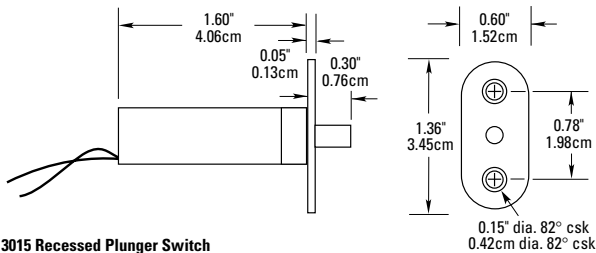
- Model 3015 available in plate mount or clip mount configuration
- Model 3025 plunger self-adjusts to proper reach
  - Pulling out on plunger shunts switch
  - Disconnection while servicing equipment is unnecessary

### General Specifications

Enclosure	ABS plastic
Temperature Range	-40°F to 150°F (-40°C to 65°C)
Environmental	Contact Housing is made of flame-retardant ABS plastic. Reed switch is protected and held in place by a polyurethane potting material
NEMA Rating	1
Protection Class	IP 62
Response Time	1 msec max.
Life Cycles	100,000 Under Full Load, 10,000,000 Under Dry Circuit
Lead Types/O.D.	#22 wire / 0.05" (0.15cm)
Color Choices	Natural(N), Mahogany(M)
UL Listed	All Models

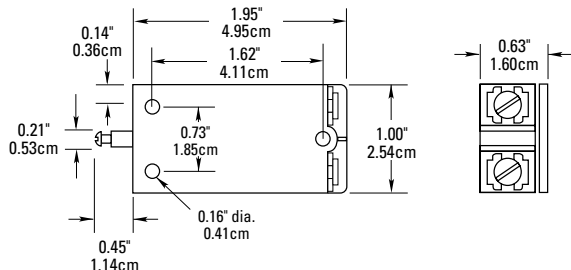


3012 Clip Mount Plunger



3015 Recessed Plunger Switch

Includes: 1- Adjustable #6 x 32 1/2" Phillips screw



3025 Tamper Switch



### Order Information

### Electrical Specifications

Part Number	Contact Configuration	Load Rating (AC/DC)	Switching Voltage (AC/DC)	Switching Current (AC/DC)	Contact Resistance	Lead Length
3012-M, N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	1'
3015-M, N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	1'
3027-M, N	SPDT	3W/VA	30V	0.25A	0.2 Ohms	1'
3025T-M, N	N.O.	7.5W/VA	100V	0.5A	0.2 Ohms	#6 Screw Terminal

**Warning— Each electrical rating is an individual maximum and cannot be exceeded!**

<sup>1</sup> Configuration with plunger out.

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# Magnets & Accessories

Sold by AA Electric 1-800-237-8274 Lakeland, FL • Lawrenceville, GA • Greensboro, NC • East Rutherford, NJ www.AAelectric.com

3/8" dia. x 1 1/2" L



Part Number 1057

Ceramic  
1/2" dia. x 1/4" thick



Part Number 1802

1/4" dia. x 5/8" L



Part Number 1804

Rare Earth  
Mini-Max standard gap  
3/8" dia. x 1/8" thick



Part Number 1830

Rare Earth  
Mini-Max wide gap  
5/8" dia. x 1/8" thick



Part Number IND1835

3/8" dia. x 2 1/2" L



Part Number 1923



Part Number 1955

Part Number 1956

## Tampruf® Screws

### Installation Tools for Tampruf® Screws

- Tampruf screwdriver (1955)
- Fits 1/4" drive for #6 and #8 screws (1956)  
(Bit not included with screwdriver)

### Tampruf® Roundhead Metal/Wood Screw

- #6 x 3/4" L
- Cadmium plated
- Case hardened

### Tampruf® Roundhead Metal/Wood Screw

- #8 x 1-1/2" L
- Cadmium plated
- Case hardened



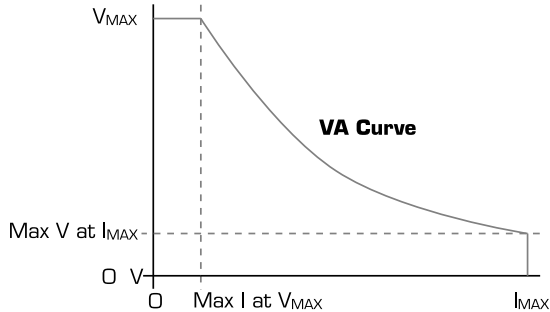
Part Number 1953



Part Number 1954

## Maximum VA Rating

**Figure 1**



### Example

Switch Rating: 15 VA, 120 V, 0.5A

Maximum Current at 120 Volts:

$$A = \frac{VA}{V} = \frac{15}{120} = 0.125\ A$$

Maximum Voltage at 0.5 Amps:

$$V = \frac{VA}{A} = \frac{15}{0.5} = 30\ V$$

Most GE Interlogix Industrial products are based on reed switch technology. Reeds are fast mechanical switches which are magnetically actuated. Inherent in their design are contacts in close proximity. This facilitates the “magnetic circuit” necessary for actuation. It also puts strict limitations on the amount of power which a given switch can handle. The power rating curve of a generic reed switch has the shape shown in figure 1.

$V_{max}$  is the ABSOLUTE MAXIMUM allowable voltage which the switch can EVER see (including switching transients). Above this level internal arcing will occur and damage the switch. However, there are conditions where a voltage less than  $V_{max}$  will overload the switch. See VA rating below.

$I_{max}$  is the ABSOLUTE MAXIMUM allowable current which the switch can EVER carry (including switching transients). Above this level serious degrading of reed contacts which can cause the switch to stick closed, producing an extreme safety hazard for interlock applications. Remember also, there are conditions where currents less than  $I_{max}$  will overload the switch. See VA rating below.

### VA Curve

This curve indicates the power limitation for the load which a given switch can handle, and cuts a big chunk out of the square defined by  $V_{max}$  and  $I_{max}$ :

$V_{max}$  can only be approached if the current is severely limited.

$I_{max}$  can only be approached if the voltage is severely limited.

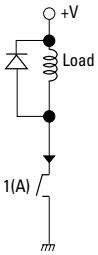
The load power rating for GE Interlogix Industrial switches is always stated in Volt-Amps. In DC applications Volts times Amps always yields power in Watts. However, in AC applications this is true only with a unity Power Factor. In general, for AC applications apparent power exceeds real power. Real Power is measured in Watts. Apparent Power is measured in Volt-Amps.

# Appendix

## Recommended Protection Circuits

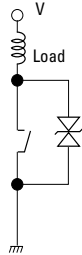
**Figure 1**

**DC Applications**



Contact protection with diode in parallel with load.

**AC/DC Applications**



Contact protection with TransZorb® or back-to-back zener diodes in parallel with switch

### Protection Circuits — Inductive Loads

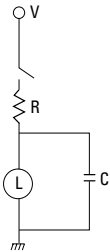
If the GuardSwitch™ is applied in a circuit that has an inductive electromechanical device such as a relay, solenoid, or contactor, the energy stored in that device will provide an inverse voltage to the GuardSwitch™ when the interlock opens. If this inductive back EMF exceeds the electrical rating of the switch, a protection circuit is required to prevent premature interlock failure. Two recommended protection circuits for inductive loads are shown in Figure 1.

### Protection Circuits —Capacitance Loads

Capacitive loads or long cable runs that exceed 50 feet are prone to high inrush currents, which if they exceed the electrical rating of the switch, will cause premature interlock failure. This inrush can be reduced by a resistor as shown in the circuits in Figure 2.

**Figure 2**

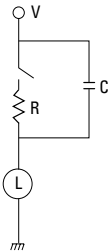
**Capacitive Load**



R=Current-limiting resistor R should be decided so the switch ratings may be obtained.

Resistor wattage must be matched to the circuit, and the voltage drop must be considered.

**Line Capacitance**



### Protection Circuits —Lamp Loads

Tungsten lamp loads are a less obvious source of transient surges, yet are equally damaging to the interlock. Cold lamp filaments can have a resistance 10 times smaller than already glowing filaments, causing an inrush 10 times greater than the steady state current. If the inrush load exceeds the electrical rating of the GuardSwitch™, a protection circuit such as illustrated in Figure 3 should be used. GE Interlogix Industrial's triac (-8, -18, -E, -DT) switches can switch up to 150 VA without added protection.

**Figure 3**



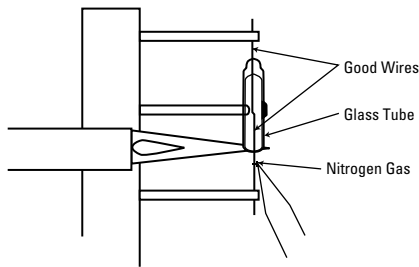
R=Current-limiting resistor R should be decided so the switch ratings may be obtained.

Resistor wattage must be matched to the circuit, and the voltage drop must be considered.

# Appendix

## Reed Switch Assembly

Figure 1



Reed assembly begins with the special forming of the magnetic wires to give them the proper shape and flexibility. Next, the blades are plated with rhodium, ruthenium, tungsten, or gold to give them a very hard surface with good electrical conductivity. Two of the reed wires are then critically positioned in a small glass tube. A nitrogen gas stream is directed through the tube as heat is applied to the upper end of the tube. The heat melts the tip of the tube around the wire to form a seal. The heat is moved to the other end of the tube and it too is melted to form the second seal. The second seal secures the second wire and forms a hermetic seal with the glass tube filled with nitrogen. See Figure 1.

### Reed Switch Types

There are three different types of reed switches in general use. They are, Form A (two wire, normally open), Form B (two wire, normally closed) and Form C (three wire, normally open and normally closed). Form C reeds are also called single pole-double throw (SPDT) switches.

#### Form A-Normally Open (N.O.)

Form A reeds are switches that are normally open when there is no magnetic field near them and closed when a magnet is in proximity. The “normally open” title is the common electrical description for switches whose non-actuated condition is open (switch contacts are not touching and no electrical current can flow.) See Figure 2.

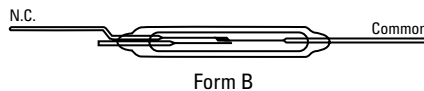
Figure 2



#### Form B-Normally Closed (N.C.)

Form B reeds are switches that are normally closed when there is no magnetic field near and open when a magnet is in proximity. The “normally closed” title is the common electrical description for switches whose non-actuated condition is closed. See Figure 3.

Figure 3



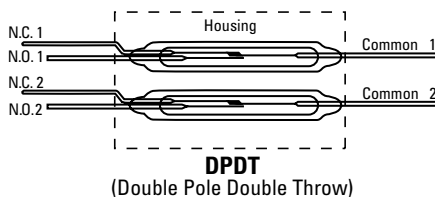
#### Form C-Single Pole Double Throw (SPDT)

Form C reeds are switches that can be either normally open or normally closed. Form C switches have three wires: the center or Common wire, the normally closed wire and the normally open wire. In the non-actuated condition, current flows in the common wire and out the closed wire as noted in Form B above. In the operated condition the common element switches from the closed wire to the open wire allowing current to flow from common to the normally open wire as noted in the Form A description above. See figure 4.

Figure 4



Figure 5



#### Double Pole Double Throw-DPDT

Double Pole Double Throw contacts are created by assembling two Form C reeds in the same switch housing. DPDT contacts can be used in circuits to perform separate functions at the same time. The two switches have independent sense ranges. Usually one contact is connected to the safety circuit and the second switch is connected to an indicator or status light. See Figure 5.

## **Reed Switch Assembly**

### ***Reed Switch Sensitivity***

The gap distance noted for a reed contact is the distance between the actuating magnet and the contact when the reed operates. Gap distance is defined by the size of the magnet and reed sensitivity. Reed sensitivity is measured in terms of how much magnetism it takes to operate the switch and is measured in ampere turns. To explain, electrical current flowing through wire creates a magnetic field around the wire. When this wire is wrapped around a reed switch the magnetism is felt by the reed proportional to the number of turns around the reed. Therefore, amps in the wire times the number of turn equals amp-turns. Standard reed sensitivities are 10 to 70 amp-turns for safety and position switches. Wide gap contacts have reed sensitivities of 6 to 10 amp-turns. In the last few years reed switch manufacturers have been able to supply reliable Form A reeds that meet the wide gap sensitivity requirements which has allowed lower cost wide gap contacts. Reed manufacturers have not been able to manufacture high sensitivity Form C reeds therefore, wide gap and SPDT contacts are created by performing a wide gap operation during contact assembly. The wide gap operation is accomplished by gluing a small magnet to the reed to give it a boost in sensitivity. Wide gapping a reed causes the contact to become polarity sensitive. When mounting a wide gap Form B and C contacts the installer must insure that the actuator magnet is installed observing proper polarity.

Other terms that are associated with switch gap are make, break and differential.

Switch “make” is the term used to note switch actuation and usually applies to the gap distance between the switch and magnet when the switch operates.

Switch “break” is the term used to note switch deactivation or “drop out”. Break also is used on reference to switch-magnet gap when the switch opens.

“Differential” is distance between switch gap at make and the switch gap at break. This is also known as the hold distance or hysteresis and it can be a significant distance with some wide gap contacts.

### ***How Temperature Affects Reeds***

A general rule to remember in considering temperature affects on reeds contacts is: As temperature increases magnetism decreases. As temperature decreases magnetism increases. In very hot conditions switch gaps are reduced. In most situations this is not a problem because safety and position contacts are mounted inside and are protected from temperature extremes. In high temperatures reed contacts perform well if they are set up at mid gap distance while ambient temp is 50 to 90 degrees F. Caution should be used when installing coded magnet switches in potential high temperature environments because the gap tolerance for coded magnet switches is narrow, sometimes only 0.4 inches. Loss of magnetism here will cause false signals or improper operation.

# Appendix

## Reed Switch Assembly

Figure 6

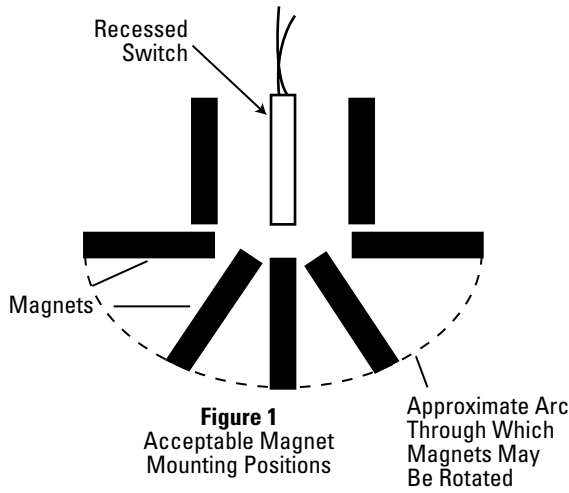


Figure 1  
Acceptable Magnet Mounting Positions

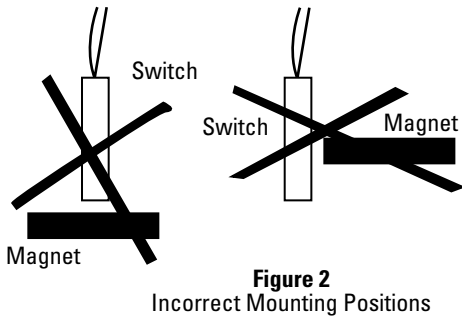
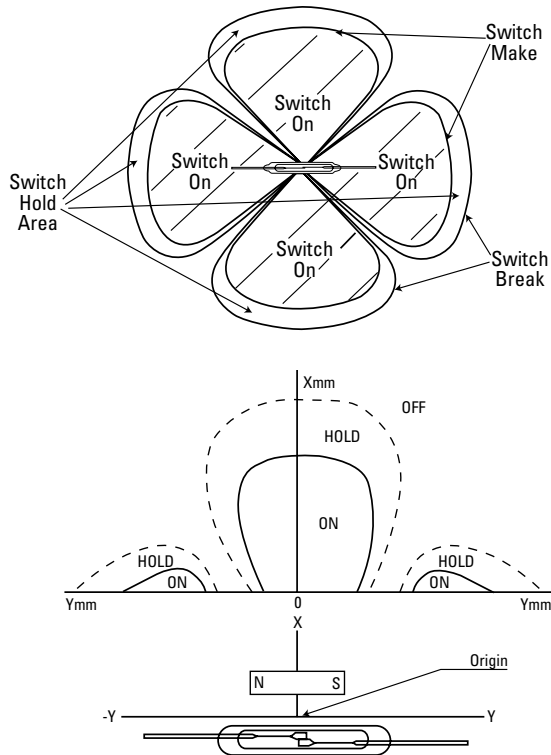


Figure 2  
Incorrect Mounting Positions

Figure 7



In cold conditions standard contacts work very well, even below  $-40^{\circ}\text{F}$ . Wide gap and high sensitivity switches however will latch in extremely cold conditions. In temperatures below freezing the wide gap magnet in the switch increases in magnetism and can cause the reed to remain closed when the control magnet is withdrawn. Use non-biased, standard gap contacts where temperatures are likely to go below  $20^{\circ}\text{F}$ .

### Magnet-Switch Orientation

There are several ways of arranging switch and magnet orientation to fit installation needs and there are some mounting arrangements that must be avoided. Surface mounted contacts are normally mounted side by side and recessed contacts are usually mounted end to end. With both mounting methods it is important to observe the proper magnet-switch polarity.

In these examples the magnet movement relative to the contact position causes the switch to operate. Figure 6 demonstrates correct and incorrect magnet positions with respect to Series 100 contact. Avoid contact mounting where the switch and magnet are positioned to form a "T". In this orientation the center of the magnet and/or the center of the switch has zero magnetism and the switch will not work.

Figure 7 is a clover leaf diagram of magnetic operational zones around a reed switch. Each leaf represents an area where a magnet can be positioned to operate the switch. Please note that the make and break zones are different in that the magnet must be close to cause switch make but once made, the switch will stay operational beyond the make distance, out to the break distance.

# Warnings & Warranty

## **Warnings**

Nominal sense range is measured on a non-ferrous surface. Proximity of ferrous material usually reduces sense range—typically by 50%. The shape of the material and type of material can cause a wide diversity of effects. Testing is required to determine actual sense range for specific applications.

All electrical ratings are individual maximums. Exceeding any one specification (including inrush) may result in switch failure. In selecting a part number, the transient surges from coils, contactors, motors, solenoids and tungsten loads must be considered.

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Certain items protected under one or more of the following patents:  
4,210,888 and 5,233,323. Other patents pending.

# Product Number Index

<b>301 &amp; 303-BT GuardSwitch</b>	<b>8</b>	<b>251 F7 GuardSwitch</b>	<b>40</b>	<b>141 GuardSwitch</b>	<b>52</b>
301-BT-12(J) OR (K)		251F7Z-12K		141-8Y-06M	
301-BT-12J-NH		150-Z		141-18Y-03M	
301-B3T-12(J)		<b>200 Series Accessories</b>	<b>42</b>	141-Y	
301-BLT-12(J) or (K)		1953		<b>151 &amp; 153 GuardSwitch</b>	<b>53</b>
301-B3LT-12(J)		1954		151-6Z-06K	
<b>341 &amp; 343-BT GuardSwitch</b>	<b>9</b>	1955		151-6Z-12K	
341-BT-06(K)		<b>104 GuardSwitch</b>	<b>44</b>	151-7Z-06K	
341-BT-12(J) OR (K)		104-1U-03V		153-7Z-06K	
341-BLT-12(K)		104-2U-03V		151-7Z-12K	
341-B3T-12(J)		104-U		153-7Z-12K	
341-B3LT-12(J)		<b>109 GuardSwitch</b>	<b>45</b>	151-7Z-06K-D3	
<b>371-BT GuardSwitch</b>	<b>10</b>	109-3Y		151-8Z-12K	
371-BT		109-6Y		150-Z	
<b>391 GuardSwitch</b>	<b>11</b>	109-7Y		<b>166 GuardSwitch</b>	<b>54</b>
391-BT-06(K)		109-Y		166-RM-06K	
391-BLT-12(J)		<b>111 GuardSwitch</b>	<b>46</b>	166-RN-06K	
<b>INT-22.5-024</b>	<b>15</b>	111-6Y-06(J)		166-P	
<b>INT-03 Series</b>	<b>17</b>	111-6Y-12(J)		150-Z	
INT-03-024		111-7Y-12(J)		<b>171 GuardSwitch</b>	<b>55</b>
INT-03-120		111-Y		171-6Z	
<b>INT-04 Series</b>	<b>18</b>	<b>115 GuardSwitch</b>	<b>47</b>	<b>181 GuardSwitch</b>	<b>56</b>
INT-04-024		115-3Y-12K		181-7Z	
INT-04-120		115-4Y-06K		<b>191 GuardSwitch</b>	<b>57</b>
<b>INT-05 Series</b>	<b>19</b>	115-4Y-12K		191-6Z-12K	
INT-05-024		115-6Y-06K		191-7Z-06K	
INT-05-120		115-6Y-12K		191-7Z-12K-D3	
<b>INT-06 Series</b>	<b>20</b>	115-7Y-06K		191-7Z-12K	
INT-06-024		115-7Y-12K		<b>301 GuardSwitch</b>	<b>59</b>
INT-06-120		115-8Y-06K		301-CT-06K	
<b>EC Declaration of Conformity</b>	<b>24</b>	115-8Y-12K		301-CT-12K	
<b>FR 692-D/FX 692-D/FD 693-F</b>	<b>26</b>	115-8Y-12K-SER25		301-DT-12K-CD	
FR 692-D1		115-8Y-12K-SER25		301-DT-06K	
FR 992-D1		115-6Y-06K-D6		301-DT-12K	
FX 692-D1		115-6Y-12K-D6		<b>302 GuardSwitch</b>	<b>60</b>
FX 992-D1		115-Y		302-DT-06A	
FD 693-F1		<b>125 GuardSwitch</b>	<b>48</b>	<b>371 GuardSwitch</b>	<b>61</b>
FD 993-F1		125-6Y-06K		371-CT	
FP 693-F1		125-7Y-06K		371-DT	
FP 993-F1		125-Y		<b>381 GuardSwitch</b>	<b>62</b>
<b>FS 2096-D024-F</b>	<b>29</b>	<b>126 GuardSwitch</b>	<b>49</b>	381-CT	
FS 2096-D024-F1		126-EY-01AX		381-DT	
FS 2096-E024-F1		126-EY-06X		<b>391 &amp; 393 GuardSwitch</b>	<b>63</b>
<b>FR 695-1</b>	<b>31</b>	126-8Y-01AX		391-CT-06K	
FR 695-1		126-EY-03AX		391-CT-12K	
FR 995-1		126-Y		391-DT-06K	
<b>FD 678</b>	<b>33</b>	<b>128C GuardSwitch</b>	<b>50</b>	391-DT-12K	
FD 678		128C-6N-06(J)		393-DT-06K	
FD 978		128C-6N-12(J)		393-DT-12K	
<b>Mechanical Safety</b>		128C-U		<b>1032 Series</b>	<b>66</b>
<b>Switch Accessories</b>	<b>35</b>	129X		1032-N	
D/D1/D2/D3		1057		1032W-N	
F/F1/F2/F3		1830		1937-N	
T870		IND1835		<b>1035 Series</b>	<b>67</b>
M870		<b>129 GuardSwitch</b>	<b>51</b>	1035-N	
C870		129-6N-06(J)		<b>1045 Series</b>	<b>68</b>
F-05-100		129-6N-12(J)(-D6)(-DG)		1045W-G	
IN 12135		128C-U		<b>1045T Series</b>	<b>69</b>
PGT1		129X		1045T-G, M, N	
PG 13.5		1057		1047T-N	
		1830			
		IND1835			

1042TW-G, M, N	
1044TW-N	
1933-N	
<b>1055 Series</b>	<b>70</b>
1055-N	
1055W-N	
<b>1072 Series</b>	<b>71</b>
1072-N	
<b>1075 Series</b>	<b>72</b>
1075-M, N	
1075W-M, N	
1070-N	
1924-M, N	
<b>1078 Series</b>	<b>73</b>
1078-G, M, N	
1078W-M, N	
1076-G, M, N	
1076H-M, N	
1076W-M, N	
1076D-M, N	
<b>1078C Series</b>	<b>74</b>
1078C-G, M, N	
1078CW-G, M, N	
1076C-M, N	
1076CW-M, N	
<b>1082 Series</b>	<b>75</b>
1082-G, N	
1084-M	
<b>1085 Series</b>	<b>76</b>
1085-G, M, N	
1085W-M, N	
1086-N	
1086W-M	
1081-N	
<b>1085T Series</b>	<b>77</b>
1085T-G, M, N	
1085TW-G, M, N	
1084TW-N	
1086T-N	
1087T-M, N	
1087TW-M, N	
1080T-N	
1081T-N	
<b>1135T Series</b>	<b>78</b>
1135T-N	
1136T-M	
<b>2100 Series</b>	<b>79</b>
2105A-G	
2107A-G	
<b>2200 Series</b>	<b>80</b>
2202A/2202AU-L	
2204A/2204AU-L	
2205AU-L	
2207A/2207AU-L	
1982	
<b>2500 Series</b>	<b>81</b>
2505A-L	
2507A-L	
2507AD-L	
2507AH-L	

<b>2700 Series</b>	<b>82</b>
2707A-L	
2707 AD-L	
<b>2800T Series</b>	<b>83</b>
2807T-M	
2845T-M	
2847T-M	
<b>3008 Series</b>	<b>84</b>
3008-M, N	
3007-M, N	
<b>3010 Series</b>	<b>85</b>
3012-M, N	
3015-M, N	
3027-M, N	
3025T-M, N	
<b>Magnets &amp; Accessories</b>	<b>87</b>
1057	
1802	
1804	
1830	
IND1835	
1923	
1955	
1956	
1953	
1954	

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