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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.
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
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

<table>
<thead>
<tr>
<th></th>
<th>3</th>
<th>41 - B</th>
<th>3 - L</th>
<th>T - 06</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Housing</td>
<td>3rd Circuit Feedback (Monitor)</td>
<td>Coded Magnets</td>
<td>Lead Type</td>
</tr>
<tr>
<td>Defeat Resistance Indicator Coded Actuator</td>
<td>Contact Configuration</td>
<td>LED</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I NO</td>
<td>I NC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Buy: www.ValinOnline.com | Phone 844-385-3099 | Email: CustomerService@valin.com
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
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 SJTW (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 |

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

1 NH—no minimum sense range
2 Configuration with actuator away from the switch
3 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.

Order Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Configuration</th>
<th>Sense Range $^1$</th>
<th>Sense Range $^2$</th>
<th>Break Range</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>301-BT-12(J)or(K)</td>
<td>DPST: 1 N.O., 1 N.C.</td>
<td>0.3” (0.8cm)</td>
<td>0.6” (1.5cm)</td>
<td>1.2” (3.0cm)</td>
<td>12” (3.6m)</td>
</tr>
<tr>
<td>301-BT-12(J)-NH</td>
<td>DPST: 1 N.O., 1 N.C.</td>
<td>0.6” (1.5cm)</td>
<td>1.2” (3.0cm)</td>
<td>12” (3.6m)</td>
<td></td>
</tr>
<tr>
<td>301-BLT-12(J)or(K)</td>
<td>DPST: 1 N.O., 1 N.C. w/ LED</td>
<td>0.3” (0.8cm)</td>
<td>0.6” (1.5cm)</td>
<td>1.2” (3.0cm)</td>
<td>12” (3.6m)</td>
</tr>
<tr>
<td>301-B3T-12(J)</td>
<td>TPST: 2 N.O., 1 N.C.</td>
<td>0.3” (0.8cm)</td>
<td>0.6” (1.5cm)</td>
<td>1.2” (3.0cm)</td>
<td>12” (3.6m)</td>
</tr>
<tr>
<td>301-B3LT-12(J)</td>
<td>TPST: 2 N.O., 1 N.C. w/LED</td>
<td>0.3” (0.8cm)</td>
<td>0.6” (1.5cm)</td>
<td>1.2” (3.0cm)</td>
<td>12” (3.6m)</td>
</tr>
</tbody>
</table>

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

1 NH—no minimum sense range
2 Configuration with actuator away from the switch
3 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 Hightest 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® 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: 1 msec (individual circuits)

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)

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

Order Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Configuration</th>
<th>Sense Range</th>
<th>Sense Range</th>
<th>Break</th>
<th>Lead</th>
</tr>
</thead>
<tbody>
<tr>
<td>341-BT-06(K)</td>
<td>DPST: 1 N.O., 1 N.C.</td>
<td>0.12'(0.3cm)</td>
<td>0.38'(1.0cm)</td>
<td>0.75'(1.9cm)</td>
<td>6'(1.8m)</td>
</tr>
<tr>
<td>341-BT-12(J)</td>
<td>DPST: 1 N.O., 1 N.C.</td>
<td>0.12'(0.3cm)</td>
<td>0.38'(1.0cm)</td>
<td>0.75'(1.9cm)</td>
<td>12'(3.6m)</td>
</tr>
<tr>
<td>341-BLT-12(K)</td>
<td>DPST: 1 N.O., 1 N.C. w/ LED</td>
<td>0.12'(0.3cm)</td>
<td>0.38'(1.0cm)</td>
<td>0.75'(1.9cm)</td>
<td>12'(3.6m)</td>
</tr>
<tr>
<td>341-B3T-12(J)</td>
<td>TPST: 2 N.O., 1 N.C.</td>
<td>0.12'(0.3cm)</td>
<td>0.38'(1.0cm)</td>
<td>0.75'(1.9cm)</td>
<td>12'(3.6m)</td>
</tr>
<tr>
<td>341-B3LT-12(J)</td>
<td>TPST: 2 N.O., 1 N.C. w/LED</td>
<td>0.12'(0.3cm)</td>
<td>0.38'(1.0cm)</td>
<td>0.75'(1.9cm)</td>
<td>12'(3.6m)</td>
</tr>
</tbody>
</table>

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

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SAFETY
300-BT SERIES
10 1-800-247-9447
GE Interlogix
Industrial
Safety Switch
371-BT GuardSwitch Explosion Proof

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

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 (individual circuits) The two circuits do not switch simultaneously and depend on the speed of the guard closure.
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
<table>
<thead>
<tr>
<th>Circuit No.</th>
<th>Circuit Type</th>
<th>Contact Configuration</th>
<th>Load Rating</th>
<th>MAX Switching Voltage</th>
<th>MAX Switching Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Switch</td>
<td>N.O.</td>
<td>40W/VA</td>
<td>48VAC/VDC</td>
<td>1.0ADC, 0.7AC</td>
</tr>
<tr>
<td>2</td>
<td>Tamper</td>
<td>N.C.</td>
<td>10W/VA</td>
<td>48VAC/VDC</td>
<td>0.3A</td>
</tr>
</tbody>
</table>

Order Information

Part Number | Contact Configuration | Sense Range 1 Minimum | Sense Range 1 Maximum | Sense Range 2 Minimum | Sense Range 2 Maximum | Break Range | Terminal Type |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>371-BT</td>
<td>DPST: 1 N.O., 1 N.C.</td>
<td>0.3&quot;(0.8cm)</td>
<td>0.6&quot;(1.5cm)</td>
<td>1.2&quot;(3.0cm)</td>
<td>#6 screws</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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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.

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### Safety Switch

#### 391-BT GuardSwitch

**Applications**

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

**General Specifications**

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

#### Electrical Specifications

<table>
<thead>
<tr>
<th>Circuit No.</th>
<th>Circuit Type</th>
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<td>48VAC/VDC</td>
<td>1.0ADC, 0.7AC</td>
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<tr>
<td>2</td>
<td>Tamper</td>
<td>N.C.</td>
<td>10W/VA</td>
<td>48VAC/VDC</td>
<td>0.3A</td>
</tr>
<tr>
<td>2</td>
<td>w/optional LED</td>
<td>N.C.</td>
<td>0.1–1.4W</td>
<td>48VDC(3V drop)</td>
<td>30mA</td>
</tr>
</tbody>
</table>

**Order Information**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Configuration</th>
<th>Sense Range</th>
<th>Sense Range</th>
<th>Break Range</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>391-BT-06(K)</td>
<td>DPST: 1 N.O., 1 N.C.</td>
<td>0.3”(0.8cm)</td>
<td>0.6”(1.5cm)</td>
<td>1.2”(3.0cm)</td>
<td>6” (1.8m)</td>
</tr>
<tr>
<td>391-BLT-12(J)</td>
<td>DPST: 1 N.O., 1 N.C. w/ LED</td>
<td>0.3”(0.8cm)</td>
<td>0.6”(1.5cm)</td>
<td>1.2”(3.0cm)</td>
<td>12” (3.6m)</td>
</tr>
</tbody>
</table>

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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: Perpendicular Actuation](image)

- Best
- Best
- Good

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.

![Figure 2: Parallel Actuation](image)

- Not Recommended

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

![Circuit Diagram](image)

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 movable 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 voltage drop and the power rating of the resistor must be considered. Voltage drop =IR; Watts = I^2R (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.

---

*S* 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.D. circuit: Black and white wires.
N.C. biased tamper circuit: Red and blue wires.
N.O. monitor circuit: Orange and brown wires.
**300-BT Series Safety Switches**

**Installation Instructions**

**Wiring Diagram For Category 3**

Inputs shown with safety gates/guards in closed position.

When guards are closed, safe outputs are closed.

One 300-BT Series GuardSwitch required for each safety gate, one INT relay for each machine.

**Wiring Diagram For Category 4**

Inputs shown with safety gates/guards in closed position.

When guards are closed, safe outputs are closed.

Two 300-BT Series GuardSwitches with one INT relay are required for each safety gate.

When first applying the GuardSwitch Monitor Relay, the inputs must be cycled to check for proper operation before the output contact close. To cycle the inputs, the guard must be opened and then closed. This start-up test is sufficient; however, we recommend that the proper operation of the switches and relay be checked at least every 24 hours.

---

*300-BLT-

*Or other DPST GuardSwitch

(See the 300-BT Series installation instructions)
### Series 300-BT Safety Switches

#### Installation Instructions

**EC Compliance Information**

These switches are TÜV certified for CE applications only when used with the INT Series Safety Monitor Relays. See Risk Category 3 and Category 4 wiring diagrams.

---

**EUROPEAN DIRECTIVES**

<table>
<thead>
<tr>
<th>Directive</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Voltage Directive (73/23/EEC)</td>
<td>Risk Assessment Category 3 or 4 depending on wiring method, see diagrams.</td>
</tr>
</tbody>
</table>

**SPECIFIC EUROPEAN STANDARDS**

- EN 60204-1: Safety of electrical equipment of industrial machines.
- EN 292 Part 1, 2: Safety of Machinery, basic terminology, technical principles.
- EN 954-1: Risk Assessment Category 3 or 4 depending on wiring method, see diagrams.
- EN 1088: Interlocking Devices.
- EN 947-5-3: Control Circuit Devices.
- EN 50178: Safety of Electrical Equipment.
- IEC 664-1: Insulation requirements.

**Notes:**

1. Humidity Rating: 30 to 95%
2. Environment: Pollution Degree II.
3. Correct use of this control devise is an essential part of proper machine cycle control.
4. Failure to follow ALL instructions could lead to serious bodily injury or death.
5. Maintenance to be done by qualified personnel only.
6. The connecting cables between the INT devices and the switches must be located in an IP 23 type enclosure (minimum).
7. The mounting for the switch and the actuator must be accomplished per this specification.
8. Non-removable hardware must be used for installation.
9. The housing of the 300-BT Series GuardSwitches must be connected to the PE (Primary Earth) ground circuit via a lock washer on the mounting screw. The PE ground symbol must be placed adjacent to the screw.
GuardSwitch™ Safety Monitor Relay

INT-22.5–024

Applications

- Designed for use with 300-BT Series GuardSwitch
- Space saving profile
- Meets European Machine Safety Standards, Risk Category 4
- Requires both normally-open and normally-closed inputs
- Inhibits machine restart in case of component failure
- Low current for longer GuardSwitch life
- DIN Rail or panel mount
- LED power indicator
- Manual restart only

The safety monitor relay INT-22.5-024 is used to monitor switching elements on guards or protective installations, and to generate a safety output signal (enable). Depending on the type of construction, the protective installation can be defined as: protective gate, protective door, housing, cover, enclosure, shield etc. The INT-22.5-024 meets the requirements of EN 201 and EN 422 Type I & II. Sensors and a safety switching device (analyzing unit) form the safety circuit for “non-contacting position switches with safety functions” in accordance with DIN VDE 0660 Part 209 and EN 61496-1.

After the supply voltage has been applied to terminals A1/A2 the starting inhibiting circuit prevents an unintentional start-up of the safety relay. The device can be enabled after the start-up test has been performed by opening and closing the guard door or gate. With this operation the simultaneous activation of both switching elements is tested. If the test is passed the device is only enabled when the guard door or gate is closed and the feedback circuit is closed as well. If a malfunction occurs in the external contactors connected to the item, the feedback loop at terminals Y1/Y2 can prevent the INT-22.5-024 from being enabled. It is possible to recognize any manipulation and failure in the safety circuit.

The INT-22.5-024 is equipped with four removable terminals. This feature allows a quick installing/removing operation. The terminal locations are coded and not interchangeable. The position of the door or gate is checked by means of the cross monitoring feature via the two channels S13/S14 and S21/S22. After the supply voltage has been applied, the starting inhibiting circuit prevents an unintentional start-up of the safety monitor/relay.
Technical Data

**INT-22.5-024**

**Function** According to EN 60204-1

Function Display 3 LED, green (Supply, K1-Actuation, K2-Simultaneity)

Function Diagram FD 0221-21 W1

**Power Supply Data**

<table>
<thead>
<tr>
<th>Power Supply Data</th>
<th>icted Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Voltage (U_N)</td>
<td>24 V AC/DC</td>
</tr>
<tr>
<td>Rated Consumption at 50 Hz and min (U_N) (AC)</td>
<td>3.7 VA</td>
</tr>
<tr>
<td>Rated Consumption at 50 Hz and (U_N) (AC)</td>
<td>2.3 W</td>
</tr>
<tr>
<td>Rated Consumption at (U_N) (DC)</td>
<td>1.8 W</td>
</tr>
<tr>
<td>Residual Ripple</td>
<td>2.4 (V_{ss})</td>
</tr>
<tr>
<td>Rated Frequency</td>
<td>50 to 60 Hz</td>
</tr>
<tr>
<td>Operating Voltage Range</td>
<td>0.85 to 1.1 (x U_N)</td>
</tr>
</tbody>
</table>

**Control Circuit** only for Supplying the Control Inputs

DC Isolation Between the Supply Circuit and the Control Circuit

Line Resistance in Y1/Y2, S13/S14 and S21/S22 (at \(U_N\))

\[\leq 70 \Omega\]

Control Outputs Y1, S13, S21:

- Rated Output Voltage: \(\leq 24 \text{ V DC}\)
- Rated Current Y1/S13, S21: 20/12 mA
- Rated Short-Circuit Current \(I_{K\text{ max}}\) 1100 mA
- Fuse: AC/DC: PTC-Resistance
- Response Time: 2 s
- Recovery Time: 3 s

Control Inputs Y2, S14, S22:

- Rated Current Input Y2/S14, S22: 20/12 mA
- Minimum Switch-ON Time \(t_{S14, S22}\): 100 ms
- Simultaneity Time \(t_{S}\) for S14, S22: 300 ms
- Release Time \(t\): 20 ms
- Recovery Time \(t\): 200 ms

**Output Circuit**

Contact Equipment:

- 3 N.O. Safety Contact
- 1 N.C. Control Contact

Contact Type: Forced Contact

Switching Voltage \(U_n\)

Modern Rating: Ag-Alloy; Gold-Plated

Minimum Rated Current \(I_{R}\) per Contact 6 A

Maximum Total Current for all Contacts 12 A

Application Category According to EN 60947-5-1: 1991

- AC-15: \(U_e\) 230 V AC, \(I_e\) 6 A*
- DC-13: \(U_e\) 24 V DC, \(I_e\) 6 A **
- DC-13: \(U_e\) 24 V DC, \(I_e\) 3 A *

\(*3600 \text{ Switch/h }\) ** 360 Switch/h

Short-Circuit Protection, Max. Fuse Element Class gG

Permissible Switching Frequency 3600 Switching Cycles/h

Mechanical Lifetime 10 x 10^6 Switching Cycles

**General Data**

Creepage and Clearance Distances Between Circuits

According to DIN VDE 0110-1:04.97: Rated Withstand Voltage 4 kV

Over-Voltage Category III

Contamination Level 3 Outside, 2 Inside

Design Voltage 230 V AC/DC

Test Voltage \(U_{test}\) 50 Hz acc. to DIN VDE 0110-1, Table A.1

Protection Class Housing/Terminals acc. to DIN VDE 0470 Sec. 1:11.92

Radiated Noise/Noise Immunity

- 400 kV/m outdoor/200 kV/m indoor
- 400 kV/m indoor/200 kV/m indoor
- 600 kV/m outdoor/300 kV/m indoor

Safety Category 4 & Stop Category 0

Ambient Temperature, Working Range

- –15 to 131 (–25 to +55) °F/°C

Dimension Diagram: SNT 4453 K/SNT 4453 K-A

Connection Diagram: KS 0358-1

Max. Wire Cross Section (flexible/single core)

- 1 x 2.5 or 2 x 0.5/1 x 2.5 or 2 x 0.75 mm²

Weight 0.21 kg

Approvals BG, CSA, UL

**Order Information**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Power Input A1/A2</th>
<th>Required Fuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT-22.5-024</td>
<td>24VAC/DC</td>
<td>AC/DC: PTC-Resistance</td>
</tr>
</tbody>
</table>
SAFETY RELAYS

INT SERIES

171-800-247-9447

GE Interlogix

Industrial

Applications

- Meets European Machine Safety Standards, Risk Category 4
- Designed for use with 300-BT Series GuardSwitch™
- Requires both normally-open and normally-closed inputs
- Inhibits machine restart in case of component failure
- Provides 2 safe outputs plus a form C output for signaling
- Low current for longer GuardSwitch life
- DIN Rail or panel mount
- LED power on indicator

The INT-03-024 or INT-03-120, Safety Monitor Relay is intended for use as a part of a safety circuit in guard interlock applications. It is a safety relay which uses positive-guided relays, configured for self-checking, to inhibit machine start-up in the event of an internal component failure.

Both normally-open and normally-closed inputs are required. Multiple N.O. contacts can be wired in series while multiple N.C. contacts can be wired in parallel. Upon failure of either the N.O. or N.C. contact, the relay will prevent restart.

The INT-03 relay can also monitor contacts on external relays for controlling expansion block relays (INT-05 and INT-06).

General Specifications

UL/TUV All Models

Control Inputs (X1, X2 & Y1, Y2 terminals)
- Open-circuit voltage 24VDC
- Closed-circuit current 24mA
- Max. contact resistance 30 Ohms
- Simultaneity 500 ms typical

Safe Outputs (A,B,C,D terminals)
- Voltage 230 VAC/60VDC
- Current 4A (resistive)
- Response time < 100 ms
- Fuse 4A, 250V, 5 x 20 mm, F/T

AUX. Signaling Outputs (E,F,G terminals) (SPDT)
- Voltage 120 VAC/30VDC
- Current 1A (resistive)

Note: Transient protection is required across the load when switching an inductive load.

Operation

A. With a RESTART button from Terminal 1 to 2, INT-03 energizes after all guards are in place and RESET button is pressed (monitored contacts must also be closed).

B. With a jumper from Terminal 1 to 2, INT-03 energizes when all guards are in place (autostart).

C. With no connection from Terminal 1 to 2, INT-03 will not energize.

Order Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Electrical Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT-03-024</td>
<td>24VDC+20%</td>
</tr>
<tr>
<td>INT-03-120</td>
<td>120VAC+10%, -20%, 50/60 Hz, 5VA</td>
</tr>
</tbody>
</table>

Warning—Each electrical rating is an individual maximum and cannot be exceeded!
Emergency-Stop Safety Relay

INT-04 Series

Applications
- Monitors both contacts on E-stop buttons
- Incorporates loop break detection for floor mat sensing
- Provides 2 safe outputs plus a form C output for signaling
- Inhibits machine restart in case of component failure
- DIN Rail or panel mount
- LED power on indicator

The INT-04-024 or INT-04-120 Safety Relay is intended for use as part of a safety circuit in emergency-stop or safety floor mat sensing applications. It is a safety relay which uses positive-guided relays, configured for self-checking, to inhibit machine start-up in the event of an internal component failure.

The INT-04 relay can also monitor contacts on external relays for controlling expansion block relays (INT-05 and INT-06).

As E-Stop Relay
Both contacts on E-stop buttons are monitored to ensure both have opened and closed to allow machine restart. Multiple contacts can be wired in series. Upon failure of either contact, the relay will prevent restart.

As Safety Floor Mat Relay
The INT-04 monitors both loops of a safety floor mat. The safety outputs of the INT-04 turn off when an operator steps on the mat. The relay incorporates loop break detection to turn off if one of the loops breaks or becomes disconnected.

General Specifications

<table>
<thead>
<tr>
<th>UL/TUV</th>
<th>All Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Inputs (X1, X2 &amp; Y1, Y2 terminals)</td>
<td></td>
</tr>
<tr>
<td>Open-circuit voltage</td>
<td>24VDC</td>
</tr>
<tr>
<td>Closed-circuit current</td>
<td>24mA</td>
</tr>
<tr>
<td>Max. contact resistance</td>
<td>30 Ohms</td>
</tr>
<tr>
<td>Simultaneity</td>
<td>500 ms typical</td>
</tr>
<tr>
<td>Safe Outputs (A,B,C,D terminals)</td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>230 VAC/60VDC</td>
</tr>
<tr>
<td>Current</td>
<td>4A (resistive)</td>
</tr>
<tr>
<td>Response time</td>
<td>&lt; 100 ms</td>
</tr>
<tr>
<td>Fuse</td>
<td>4A, 250V, 5 x 20 mm, F/T</td>
</tr>
<tr>
<td>AUX. Signaling Outputs (E,F,G terminals)</td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>120 VAC/30VDC</td>
</tr>
<tr>
<td>Current</td>
<td>1A (resistive)</td>
</tr>
</tbody>
</table>

Note: Transient protection is required across the load when switching an inductive load.

Operation
E-Stop: The INT-04 energizes after E-stop button contacts are closed and RESET button is pressed (monitored contacts must also be closed).

Floor Mat: The 2 floor mat loops connect from terminal X1 to X2 and Y1 to Y2. The INT-04 energizes after RESET button is pressed with no object on mat. It turns off when a heavy enough object operator is on mat.

Order Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Power Input (L1,L2)</th>
<th>Required Fuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT-04-024</td>
<td>24VDC±15%,100mA</td>
<td>Fast Acting 1/4 A (250V, 5 x 20 mm F/T)</td>
</tr>
<tr>
<td>INT-04-120</td>
<td>120VAC+10%, - 20%, 50/60 Hz, 5VA</td>
<td>Fast Acting 80mA (250V, 5 x 20 mm F/T)</td>
</tr>
</tbody>
</table>

Warning—Each electrical rating is an individual maximum and cannot be exceeded!
Safety Expansion Relay

**INT-05 Series**

*Applications*
- Adds 3 safe outputs when used with Sentrol safety relays INT-03 and INT-04
- Maintains safety circuit integrity by providing feedback to INT-03 or INT-04 to inhibit machine restart in case of component failure
- Electrical isolation between input and output
- Switches AC or DC loads
- DIN rail or panel mount
- LEDs indicate relay status

The INT-05-024 or INT-05-120 Expansion Safety Relay is intended for use as part of a safety circuit. It provides three additional safe output contacts when used with the INT-03 Safety Monitoring Relay or INT-04 Emergency-Stop Safety Relay. The INT-05 uses positive-guided relays along with feedback contacts to the INT-03 or INT-04 safety relay to prevent machine start-up in the event of a component failure.

Voltage to the INT-05 is switched thru the contacts of the INT-03 or INT-04. If a component failure occurs, the feedback loop to the INT-03 or INT-04 prevents machine restart.

**General Specifications**

| UL/TUV | All Models |
| Control Inputs (X1, X2 & Y1, Y2 terminals) |  |
| Open-circuit voltage | 24VDC |
| Closed-circuit current | 24mA |
| Max. contact resistance | 30 Ohms |
| Simultaneity | 500 ms typical |

| Safe Outputs (A,B/C,D/E,F terminals) |  |
| Voltage | 230 VAC/60VDC |
| Current | 4A (resistive) |
| Response time | ON:< 40 ms, OFF:<30 ms |
| Fuse | 4A, 250V, 5 x 20 mm, F/T |

| AUX. Signaling Outputs (F1,F2 terminals) |  |
| Voltage | 120 VAC/30VDC |
| Current | 1A (resistive) |

*Note: Transient protection is required across the load when switching an inductive load.*

**Operation**

A. With voltage applied to control inputs via INT-03 or INT-04 output contacts, relay energizes

B. With control voltage removed, relay de-energizes

C. If an internal failure has occurred, feedback loop will not close thereby disabling INT-03 or INT-04

**Order Information**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Power Input (L1,L2)</th>
<th>Required Fuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT-05-024</td>
<td>24 VDC± 15%</td>
<td>Fast Acting 1/4 A (250V, 5 x 20 mm, F/T)</td>
</tr>
<tr>
<td>INT-05-120</td>
<td>120 VAC±10%, - 20%, 50/60 Hz, 5VA</td>
<td>Fast Acting 80mA (250V, 5 x 20 mm, F/T)</td>
</tr>
</tbody>
</table>

*Warning—Each electrical rating is an individual maximum and cannot be exceeded!*
Safety Expansion Relay With Time Delay Opening

**INT-06 Series**

**Applications**
- Adds 3 safe, time-delay outputs when used with GE safety relay INT-03 or INT-04
- Maintains safety circuit integrity by providing feedback to INT-03 or INT-04 to inhibit machine restart in case of component failure
- Electrical isolation between input and output
- Switches AC or DC loads
- DIN rail or panel mount
- LEDs indicate relay status

The INT-06-024 or INT-06-120 Expansion Safety Relay with Time Delay Opening is intended for use as part of a safety circuit. It provides three additional safe output contacts when used with the INT-03 Safety Monitor Relay or INT-04 Emergency-Stop Safety Relay. The time delay is adjustable from 1 to 25 seconds to allow for controlled stops for high inertia loads.

The INT-06 uses positive-guided relays along with feedback contacts to the INT-03 or INT-04 safety relay to prevent machine start-up in the event of a component failure.

Input voltage to the INT-06 is switched thru the contacts of the INT-03 or INT-04. If a component failure occurs, the feedback loop to the INT-03 or INT-04 prevents machine restart.

**General Specifications**

<table>
<thead>
<tr>
<th>UL/TUV</th>
<th>All Models</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control Inputs</strong> (X1, X2 &amp; Y1, Y2 terminals)</td>
<td></td>
</tr>
<tr>
<td>Open-circuit voltage</td>
<td>12VDC</td>
</tr>
<tr>
<td>Closed-circuit current</td>
<td>&lt;10mA</td>
</tr>
<tr>
<td>Max. contact resistance</td>
<td>30 Ohms</td>
</tr>
<tr>
<td>Simultaneity</td>
<td>500 ms typical</td>
</tr>
</tbody>
</table>

| **Safe Outputs** (A,B/C,D/E,F terminals) |                                |
| Voltage | 230 VAC/60VDC                    |
| Current | 4A (resistive)                   |
| Response time | ON: <50 ms                      |
|           | OFF: adjustable from 1 to 25 seconds |
| Fuse     | 4A, 250V, 5 x 20 mm, F/T         |

| **AUX. Signaling Outputs** (F1,F2 terminals) |                                |
| Voltage | 120 VAC/30VDC                    |
| Current | 1A (resistive)                   |

*Note: Transient protection is required across the load when switching an inductive load.*

**Operation**

A. With voltage applied to control inputs via INT-03 or INT-04 output contacts, relay energizes.

B. With control voltage removed, relay de-energizes after selected time delay.

C. If an internal failure has occurred, feedback loop will not close thereby disabling INT-03 or INT-04.

**Order Information**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Power Input (L1,L2)</th>
<th>Required Fuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>INT-06-024</td>
<td>24VDC± 20%</td>
<td>Fast Acting 1/4 A (250V, 5 x 20 mm F/T)</td>
</tr>
<tr>
<td>INT-06-120</td>
<td>120VAC+10%, -20%, 50/60 Hz, 5VA</td>
<td>Fast Acting 80mA (250V, 5 x 20 mm F/T)</td>
</tr>
</tbody>
</table>

*Warning— Each electrical rating is an individual maximum and cannot be exceeded!*
**INT Monitor Relay “Integrity Series”**

**Installation Instructions**

**Typical Wiring Diagram**

Inputs shown with safety gates/guards in closed position.
When guards are closed, safe outputs are closed.
One 300-BT Series GuardSwitch is required for each safety gate.

---

**Installation**

1. Mount the relay on a 35mm DIN rail or panel. See Dimensions.

2. Connect the wiring for the switches and relay. See Wiring Diagrams. (For proper operation, DO NOT jumper terminal 1 to terminal 2. Use a momentary button.) For floor mat applications, connect the two floor mat loops from terminal X1 to X2 and from Y1 to Y2.

   **CAUTION!** The relay is available in either a 24 VDC, 120 VAC, or 230 VAC model. Make sure correct model is used before applying power.

3. Use one of the following methods to energize the relay:
   - For E-stop installations, close all E-stop button contacts and monitored contacts, and then press the START button.
   - For floor mat installations, press the START button without an object on the mat.
**INT Monitor Relay “Integrity Series”**

**Installation Instructions**

**Wiring Diagram For Risk Category 3**

Inputs shown with safety gates/guards in closed position.

When guards are closed, safe outputs are closed.

One 300-BT Series GuardSwitch required for each safety gate.

**Wiring Diagram For Risk Category 4**

Inputs shown with safety gates/guards in closed position.

When guards are closed, safe outputs are closed.

Two 300-BT Series or other DPST GuardSwitches with one INT relay are required for each safety gate.

When first applying the GuardSwitch Monitor Relay, the inputs must be cycled to check for proper operation before the output contact close. To cycle the inputs, the guard must be opened and then closed. This start-up test is sufficient; however, we recommend that the proper operation of the switches and relay be checked at least every 24 hours.

**Note** – The LED on the BLT model will be ON when the guard is open

Fuses: 1 A (250 V)

*Multiple DPST GuardSwitches* – Shown with actuators in position, all guards closed.

The LED of the BLT model will be on when the guard is open. If multiple guards are open, LED will be dimmer. The maximum number of GuardSwitches that can be used is 50, although troubleshooting and line resistance must be considered. (Do not exceed 30 Ohms of combined contact and line resistance. Each GuardSwitch will have less than 0.5 Ohms of resistance.)
INT Monitor Relay “Integrity Series”

Installation Instructions

CE Compliance Information

European Directives
Machinery Directive (89/392/EEC)
EMC Directive (89/336/EEC)
Low Voltage Directive (73/23/EEC)

Specific European Standards
EN60204-1 Safety of electrical equipment of industrial machines.
EN292 Part 1, 2 Safety of Machinery, basic terminology, technical principles.
EN954-1 Risk Assessment Category 3 or 4 depending on wiring method, see diagrams.
EN55081-2 Electromagnetic Emissions.
EN550082-2 Electromagnetic Immunity.
EN1088 Interlocking Devices.
EN 947-5-3 Control Circuit Devices.
EN 50178 Safety of Electrical Equipment.
IEC 664-1 Insulation requirements.
IEC 68 part 2-1, 2-2, 2-3, 2-8, 2-14, 2-27, 2-30.

Notes:
1. Unit must be installed in a IP 54 type enclosure.
2. Humidity Rating: 30 – 95%
3. Environment: Pollution Degree II.
4. A primary disconnect device that meets EN requirements must be installed.
5. Correct use of this control devise is an essential part of proper machine cycle control.
6. Failure to follow ALL instructions could lead to serious bodily injury or death.
7. Maintenance to be done by qualified personnel only.
8. If a 42.4V – 230V output circuit is connected to the relay contacts, the insulation of any wiring associated with the switches must be rated to 250 VAC. If any devices connected to the unit have metal housings, the housings must be connected to a PE ground circuit.
9. If the monitor relay is in a safe state, the system must not be used until the problem has been corrected. Injury or death to personnel may result from attempts to use the machine under such conditions. The monitor relay contains no field-replaceable components. Return to factory for all repairs.
10. The connecting cables between the INT devices and the switches must be located in an IP 23 type enclosure (minimum).
11. The mounting for the switch and the actuator magnet must be accomplished per this specification.
12. Non-removable hardware must be used for installation.
13. The housing of the 301-BT, 371-BT, 381-BT and 391-BT must be connected to the PE (Primary Earth) ground circuit via a lock washer on the mounting screw. The PE ground symbol must be placed adjacent to the screw.
EC Declaration of Conformity

According to EC machinery Directive 89/392/EEC, Annex II C

We herewith declare, GE Interlogix Industrial
12345 SW Leveton Drive
Tualatin, OR 97062
USA

that the following described safety components in our delivered version complies with the appropriate basic safety and health requirement of the EC Machinery Directive 89/392/EEC based on its design and type, as brought into circulation by us. In case of alteration of the safety components not agreed upon by us, this declaration will lose its validity.

Description of the safety component
Guard Switch monitoring relays;
Proximity switches

Safety component type:
INT-01-024, 120, 230; INT-02-024, 120, 230;
INT-03-024, 120, 230; INT-04-024, 120, 230;
INT-05-024, 120, 230; INT-06-024, 120, 230
301/303-B, BT, B3T; 341/343-B, BT, B3T; 371-B, BT;
381-B, BT; 391-B, BT; 430-B

Safety Function: Safety gate/guard interlock system.

Applicable EC Directives
EC Machinery Directive (89/392/EEC)
EC Low Voltage Directive (73/23/EEC)

Applicable Harmonized Standards
EN 60204-1
EN 1088
EN 954-1, category 3,4
IEC 947-5-3
EN 50178
IEC 664-1, IEC 60664
EN 60529
EN 50081-2, EN 50082-2
IEC 68, part 2-1, 2-2, 2-3, 2-6, 2-14, 2-27, 2-30

Notified Body (according to annex VII): TUV Product Service GmbH
Westendstr. 199
D-80339 Munchen
Germany

Responsible for: EC type-examination
(EC type examination certificate no. U 98 01 28199 003)

Authorized Signature: Geraldine F. Williams

Title of signatory: Manager
REV. 09/07/99
Mechanical Safety Switches

General Description

Safety switches are used to detect the opening of machine guard doors, gates or panels and to prevent physical access to dangerous areas of the machine. Safety switches are designed to help deter tampering with either the internal machine controls or guards while in an unsafe condition.

All mechanical safety switches are equipped with positive opening contacts that open any normally closed contacts to assure machine shutdown when an unsafe condition is detected.

Safety switches are furnished completely assembled, ready to mount to the machine.

Approvals

According to European Standard: EN 60947-5-1
According to International Standard: IEC 947-5-1
According to UL Standard: UL508

Positive Opening Contacts

In conformance with: IEC 337-1, IEC 947-5-1, VDE 0660-206

Class of Protection

IP65 to IP67 (Type 12 to Type 4)

International Approvals

IMQ
CE
VDE
UL File Number E131787
CSA File Number JLR93682

How to read the part number

Enclosure
FR/FP/FS Plastic, one conduit entry
FD Metal, one conduit entry
FX Plastic, two conduit entries

Operating Key
D/F Straight Key
D1/F1 Right Angle Key
D2/F2 Jointed Key
D3/F3 Adjustable Jointed Key

Contacts
6 1NO + 1NC
9 2NC
Key-Operated Safety Switches

FR 692-D / FX 692-D / FD 693-F

Description

GE Interlogix Industrial Key-Operated Safety Switches utilize a removable stainless steel key to provide a positive means of turning the control power off should an access panel, door, gate, guard, etc. be opened during machine operation.

When the key is removed from the switch, the normally closed contacts are mechanically forced open. This opens the safety circuit turning off the control power in the machine—disabling the machine. Since the switch contacts can only be closed when the key is installed in the switch, the machine cannot be re-started until the door, gate, guard, etc. is closed.

General Specifications

Enclosure

FR, FX, FP series
Polymeric glass-reinforced, self extinguishing, shockproof thermal-plastic providing double insulation

FD series
Die cast metal w/ baked epoxy powder coating

Compliance

Low Voltage Directive 73/23/CEE
Directive 93/68/CEE
Machinery Directive 89/392/CEE

Conduit entry

FD, FR series (One entry) PG 13.5
FX series (Two entries) PG 13.5
Adapter not furnished Order P/N IN12135

Mechanical endurance

Life Cycle 1 million operations
Operating temperature range - 13º to +175ºF (-25º to +80º C)
Maximum activating speed 19.5 inches / sec (0.5m/s)
Minimum activating speed 0.039 inches / sec (1mm/s)

Order Information

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Body Material</th>
<th>Contact Config.</th>
<th>Contact Operating Voltage, Max.</th>
<th>Short Circuit Protection, Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR 692-D</td>
<td>Thermal Plastic</td>
<td>1 N.O. + 1 N.C.</td>
<td>600 VAC, 300 VDC4</td>
<td>10A fuse</td>
</tr>
<tr>
<td>FR 992-D</td>
<td>Thermal Plastic</td>
<td>2 N.C.</td>
<td>600 VAC, 300 VDC4</td>
<td>10A fuse</td>
</tr>
<tr>
<td>FX 692-D</td>
<td>Thermal Plastic</td>
<td>1 N.O. + 1 N.C.</td>
<td>600 VAC, 300 VDC4</td>
<td>10A fuse</td>
</tr>
<tr>
<td>FX 992-D</td>
<td>Thermal Plastic</td>
<td>2 N.C.</td>
<td>600 VAC, 300 VDC4</td>
<td>10A fuse</td>
</tr>
<tr>
<td>FD 693-F</td>
<td>Die Cast Metal</td>
<td>1 N.O. + 1 N.C.</td>
<td>600 VAC, 300 VDC4</td>
<td>10A fuse</td>
</tr>
<tr>
<td>FD 993-F</td>
<td>Die Cast Metal</td>
<td>2 N.C.</td>
<td>600 VAC, 300 VDC4</td>
<td>10A fuse</td>
</tr>
<tr>
<td>FP 693-F</td>
<td>Thermal Plastic</td>
<td>1 N.O. + 1 N.C.</td>
<td>600 VAC, 300 VDC4</td>
<td>10A fuse</td>
</tr>
<tr>
<td>FP 993-F</td>
<td>Thermal Plastic</td>
<td>2 N.C.</td>
<td>600 VAC, 300 VDC4</td>
<td>10A fuse</td>
</tr>
</tbody>
</table>

Contact rating

UL/CSA 10A A600/Q300
IEC AC15 DC13

<table>
<thead>
<tr>
<th>Volts</th>
<th>250</th>
<th>400</th>
<th>500</th>
<th>24</th>
<th>125</th>
<th>250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current (A)</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>6</td>
<td>1.1</td>
<td>0.4</td>
</tr>
</tbody>
</table>

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

1 Switches are furnished standard with D1 or F1 (90º) key. Other key styles available on Accessories page.
2 Configuration with key in
3 POSITIVE DOUBLE BREAK CONTACTS. Electrically isolated contacts allow different voltages placed on contact poles.
4 UL508
SAFETY
MECHANICAL SWITCHES

9.30cm 3.66”
4.15cm 1.63”
5.15cm 2.03”
3.40cm 1.34”
0.30cm 0.12”

min. door radius
8.66” 22cm

FR 692-D
FR 992-D
one conduit entry

Note: illustrated with key inserted

FX 692-D
FX 992-D
two conduit entries

General Specifications (continued)

Standards
Safety Switch is in compliance with standards: UL508, CSA C22-2 nr.14,
VDE 0113, CEI EN 60947-5-1, EN 292, EN 418, EN 1088, EN 60204, EN
60947-5-1, IEC 204, IEC 337-1, IEC 947-5-1, NFC 63-140, VDE0113, VDE
0660, BG-GS-ET-15. Positive Break Contacts are in compliance with
standards: CEI EN60947-5-1, EN 60947-5-1, IEC 947-5-1, VDE 0660-206.

Protection class
FR, FX, FP Series IP 65 (according to IEC529)
FD Series IP 66 (according to IEC529)

Terminal Screws
Captive with self-lifting pressure plates

Minimum Door Radius
(FR 692-D/FX 69 2-D, FP693-F)
Side 7.87” (20.0cm)
Front 8.66” (22.0cm)
(FD 693-F)
Side 11.8” (30.0cm)
Front 17.7” (45.0cm)

FP 693-F / FP 993-F

Note: illustrated with key inserted
Installation

1. Safety circuits must be connected to the normally closed (NC) contact (11-12 or 21-22). Contacts are normally closed when the key is inserted into the switch. The contacts are opened when the key is removed from the switch. Normally open (NO) contacts (13-14) are for indicating circuits and are not for use in the safety circuit.

2. Mount the switch and key into the machine using tamper resistant fasteners (not supplied). Always use washers under the switch mounting fasteners to prevent the fasteners from pulling through the switch mounting holes. See figure 1.

3. The head of the switch can be rotated in 4 x 90 degree steps allowing 8 different key entry positions. To rotate the head, insert the key, remove the 4 head attachment screws, rotate the head into the proper position, reinsert the head attachment screws. It is recommended the head be locked into position by replacing 2 of the 4 head attachment screws with tamper proof screws (not provided). See figure 2.

4. Always insert the dust protection plug into the unused port in the key head.

5. When the key is removed from the switch, take care to protect the key entrance from dust and dirt.

6. Verify proper Safety Switch operation before placing the machine in service. Key Operated Safety Switches can protect areas where an operator can physically enter.

7. To prevent accidental closing of the door with the operator inside, padlocks can be placed through the hole in the switch key. Minimum diameter of the lock shank is 1/4" (6mm). See Figure 3.

8. The switch is not to be used as a mechanical stop.
Key-Operated Safety Switches with Solenoid

FS 2096-D024-F

Description

GE Interlogix Industrial Key-Operated Safety Switches with Solenoid Release utilize a removable stainless steel key to provide a positive means of turning the control power off should an access panel, door, gate, guard, etc. be opened during machine operation. This series of switches also includes a solenoid built into the switch and is used to protect an area where access is to be strictly controlled. Prime candidates for this series of safety switches are equipment that cannot be shutdown in mid cycle, machines that have large mechanical inertia, high temperatures or other areas that cannot be immediately entered.

The Key Operated Safety Switch with Solenoid Release denies access to the protected area until the operator electrically allows the release of the key. There are two versions of the Key-Operated Safety Switch with Solenoid Release, Series “D” (de-energized) and “E” (energized). With the key removed, access is allowed through the guard, gate, etc., to be opened. Since the safety switch contacts can only be closed when the key is installed in the switch, the machine cannot be restarted until the guard, gate, etc., is closed. This re-establishes the protection around the machine.

The Series “D” switch locks in the key when the solenoid is “de-energized” (without power). To remove the key, power must be applied to the solenoid, which transfers the contacts. Reinserting the key, when the power is removed from the solenoid transfers the contacts and locks the key in place until power is applied to the solenoid. If power is lost, the Series “D” switch is equipped with a manual release to allow key removal.

The Series “E” switch locks in the key when the solenoid is “energized” (powered up). The key is unlocked when power is removed from the solenoid. The key must be in place before powering up the Series “E” switch or the contacts will not be transferred. CAUTION: The Series “E” switch will also allow the key to be removed should there be a power failure. This is an important consideration when using this Series in safety applications.

General Specifications

Enclosure
Polymeric glass-reinforced, self-extinguishing, shockproof thermal-plastic providing double insulation

Standards
Use of this device implies compliance with standards:
EN 954-1, EN 60 204-1, EN 1088, UL508, IEC 947-5-1, EN 1088, BG-GS-ET-19, EN50081-1, EN50082-2, 89/392/CEE, 73/23/CEE, 89/336/CEE, 93/68/CEE.

Order Information

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Body Material</th>
<th>Contact Config.</th>
<th>Contact Operating Voltage, Max.</th>
<th>Short Circuit Protection, Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS 2096-D024-F1</td>
<td>Thermal Plastic</td>
<td>2 N.C., 1 N.O.</td>
<td>600 VAC, 300 VDC</td>
<td>10A fuse</td>
</tr>
<tr>
<td>FS 2096-E024-F1</td>
<td>Thermal Plastic</td>
<td>2 N.C., 1 N.O.</td>
<td>600 VAC, 300 VDC</td>
<td>10A fuse</td>
</tr>
</tbody>
</table>

Contact rating

<table>
<thead>
<tr>
<th>UL/CSA</th>
<th>10A A600/Q300°C (UL 508)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC AC15</td>
<td>DC13</td>
</tr>
<tr>
<td>Volts</td>
<td>250 400 500 24 125 250</td>
</tr>
<tr>
<td>Current (A)</td>
<td>3 1 6 1.1 0.4</td>
</tr>
</tbody>
</table>

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

1 Switches are furnished standard with F1 (90°) key. Other key styles available on Accessories page.
2 Configuration with key in
3 POSITIVE DOUBLE BREAK CONTACTS. Electrically isolated contacts allow different voltages placed on contact poles.
4 UL508
Conduit entry
One entry  PG 13.5
Adapter not furnished  Order P/N IN12135

Life Cycle  800,000 operations
Operating temperature range  -13º to +140ºF (-25º to +60º C)
Maximum activating speed  19.5 inches / sec (0.5m/s)
Minimum activating speed  0.039 inches / sec (1mm/s)
Maximum Opening Frequency  120 Openings per hour
Maximum Holding Force  225 lbs. (1,000 N)

Protection class  IP 66 (according to IEC529)

Terminal Screws  Captive with self-lifting pressure plates

Minimum Door Radius
Side  11.8” (30cm)
Front  19.7” (50cm)

Positive Double Break Contacts

Solenoid
Operating Voltage  24 Volts AC/DC (+10%/-10%)
Inrush Current  96 VA (0.1 sec)
Holding Current  20 VA

NOTE: Switch contacts are pilot duty and are not switchable to sustain a motor load.

Installation

1. Safety circuits must be connected to the normally closed (NC) contact (11-12 or 21-22). Contacts are normally closed when the key is inserted into the switch. The contacts are opened when the key is removed from the switch. Normally open (NO) contacts (13-14) are for indicating circuits and are not for use in the safety circuit.

2. Mount the switch and key into the machine using tamper resistant fasteners (not supplied). Always use washers under the switch mounting fasteners to prevent the fasteners from pulling through the switch mounting holes. See figure 1.

3. The head of the switch can be rotated in 4 x 90 degree steps. The head of the switch has 2 key openings allowing 8 different key entry positions. To rotate the head, insert the key, remove the 2 head attachment screws, rotate the head into the proper position, reinset the head attachment screws. It is recommended the head be locked into position by replacing the 2 head attachment screws with tamper proof screws (not provided). See figure 2.

4. Always insert the dust protection plug into the unused port in the key head.

5. When the key is removed from the switch, take care to protect the key entrance from dust and dirt.

6. Verify proper Safety Switch operation before placing the machine in service. Key Operated Safety Switches with Solenoid Release can protect areas where an operator can physically enter.

7. To prevent accidental closing of the door with the operator inside, padlocks can be placed through the hole in the switch key. Minimum diameter of the lock shank is 1/4” (6mm). See figure 3.

8. The switch is not to be used as a mechanical stop.
Hinge-Operated Safety Switches

FR 695-1

Description
GE Interlogix Industrial Hinge Operated Safety Switches utilize a rotating shaft to provide a positive means of turning the control power off should an access panel, door, gate, guard, etc. be rotated open during machine operation.

The switch operating shaft is designed to be in line with the rotation point of the door and uses the opening force of the door to rotate the safety switch operating shaft. When the access panel, door, gate, guard, etc. is rotated to the “open” position, the normally closed contacts in the safety switch are mechanically forced open turning off the control power in the machine—disabling the machine. Since the switch contacts can only be closed when the shaft is rotated to the closed position, the machine cannot be re-started until the door, gate, guard, etc. is closed.

General Specifications

Enclosure
Polymeric glass-reinforced, self-extinguishing, shockproof thermal-plastic providing double insulation

Compliance
Low Voltage Directive 73/23/CEE
Directive 93/68/CEE
Machinery Directive 89/392/CEE

Conduit entry
One entry PG 13.5
adapter not furnished Order PIN IN12135

Mechanical endurance
Life Cycle 1 million operations
Operating temperature range - 13º to +175ºF (-25º to +80º C)

Standards

Protection class
IP 65 (according to IEC529)

Terminal Screws
Captive with self-lifting pressure plates

Door Operating Radius
4º to OPEN the normally closed contact
8º to CLOSE the normally open contact
Switch is in the normal position when the door is CLOSED

Order Information

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Body Material</th>
<th>Model Number</th>
<th>Body Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR 695-1</td>
<td>Thermal Plastic</td>
<td>FR 995-1</td>
<td>Thermal Plastic</td>
</tr>
</tbody>
</table>

Electrical Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Body Material</th>
<th>Contact Config</th>
<th>Contact Operating Voltage, Max.</th>
<th>Short Circuit Protection, Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR 695-1</td>
<td>Thermal Plastic</td>
<td>1 N.O. + 1 N.C.</td>
<td>600 VAC, 300 VDC</td>
<td>10A fuse</td>
</tr>
<tr>
<td>FR 995-1</td>
<td>Thermal Plastic</td>
<td>2 N.C.</td>
<td>600 VAC, 300 VDC</td>
<td>10A fuse</td>
</tr>
</tbody>
</table>

Contact rating

<table>
<thead>
<tr>
<th>UL/CSA</th>
<th>IEC</th>
<th>DC13</th>
</tr>
</thead>
<tbody>
<tr>
<td>10A A600/O300</td>
<td>AC15</td>
<td>24 250</td>
</tr>
<tr>
<td>10A A600/O300</td>
<td>AC15</td>
<td>125 250</td>
</tr>
</tbody>
</table>

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

1 Configuration with door/gate closed
2 POSITIVE DOUBLE BREAK CONTACTS. Electrically isolated contacts allow different voltages placed on contact poles.
3 UL508

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Installation

1. Safety circuits must be connected to the normally closed (NC) contact (11-12 or 21-22). The normally closed contacts are opened when the door is rotated past 4° and normally open (NO) contacts (13-14) are closed when the switch is rotated past 8°. Normally open contacts are for indicating circuits and are not for use in the safety circuit.

2. Mount the switch using tamper resistant fasteners (not supplied). Always use washers under the switch mounting fasteners to prevent the fasteners from pulling through the switch mounting holes. See figure 1.

3. The head of the switch can be rotated in 4 x 90 degree steps allowing 4 different shaft rotating positions. To rotate the head, remove the 4 head attachment screws, rotate the head into the proper position, reinsert the head attachment screws. It is recommended the head be locked into position by replacing 2 of the 4 head attachment screws with tamper proof screws (not provided). See figure 2.

4. The switch is to be used with the rotating hinge pin of the door. Attach the Hinge Operated Safety Switch to the machine at the door swing centerline. Extend the door hinge pin into the Hinge Operated Safety Switch operating tube using the M4 set screw provided. Verify operation of the entire assembly including the operating point for the normally closed safety contact and once verified as correct drill a hole through the hinge pin/operating tube assembly to permanently lock the hinge pin into the operating tube using the roll pin provided. See figure 1.

5. Verify proper Safety Switch operation before placing the machine in service. Safety Switches can protect areas where an operator can physically enter.

6. The switch is not to be used as a mechanical stop.
Top-Entrance Rope Safety Switches

FD 678

Description
These rope operated safety switches are installed on machines or belts. They enable the stop command at any point of the machine simply by pulling the rope by hand. Being equipped with a self-checking function, they constantly test their right operation and signal by the opening of the contacts, if an accidental loosening or break of the rope may happen. These safety switches maintain the contacts open after operation, even if the rope is released.

General Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enclosure</strong></td>
<td>Die cast metal w/ baked epoxy powder coating</td>
</tr>
<tr>
<td><strong>Conduit entry</strong></td>
<td>One entry PG 13.5, Adapter not furnished Order P/N IN12135</td>
</tr>
<tr>
<td><strong>Mechanical endurance</strong></td>
<td>Life Cycle 1 million operations, Operating temperature range -13º to +175ºF (-25º to +80º C), Minimum Activating Speed 0.039 inches/sec (1mm/sec)</td>
</tr>
<tr>
<td><strong>Standards</strong></td>
<td>Safety Switch is in compliance with standards: UL508, CSA, EN 292, EN 418, EN 1088, EN 60204, EN 60947-5-1, IEC 204, IEC 947-5-1. Positive Break Contacts are in compliance with standards: EN 60947-5-1, EN 60947-5-1, EN 60947-5-1, Protection class IP 66 (according to IEC529, CE 170-1)</td>
</tr>
<tr>
<td><strong>Operating Force</strong></td>
<td>Minimum 14 lbs. (64 N), Maximum 18 lbs. (83 N)</td>
</tr>
<tr>
<td><strong>Recommended Maximum Operating Distance</strong></td>
<td>Without intermediate supports 19.5 feet (6 meter), With intermediate support 39.4 feet (12 meter) (Intermediate support every 9.8 feet (3 meters))</td>
</tr>
</tbody>
</table>

Order Information

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Body Material</th>
<th>Reset Operation</th>
<th>Contact Configuration</th>
<th>Contact Operating Voltage, Max.</th>
<th>Short Circuit Protection, Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FD 678</td>
<td>Die Cast Metal</td>
<td>Manual</td>
<td>1 N.O. + 1 N.C.</td>
<td>600 VAC, 300 VDC</td>
<td>10A fuse</td>
</tr>
<tr>
<td>FD 978</td>
<td>Die Cast Metal</td>
<td>Manual</td>
<td>2 N.C.</td>
<td>600 VAC, 300 VDC</td>
<td>10A fuse</td>
</tr>
</tbody>
</table>

Warning—Each electrical rating is an individual maximum and cannot be exceeded!
1 Configuration with rope in tension
2 POSITIVE DOUBLE BREAK CONTACTS. Electrically isolated contacts allow different voltages placed on contact poles.
3 UL508

How to read diagrams

How to read diagrams

<table>
<thead>
<tr>
<th>UL/CSA</th>
<th>IEC</th>
<th>Volts</th>
<th>Current (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10A A600/Q300°C</td>
<td>AC15 DC13</td>
<td>250</td>
<td>3 1 6 1.1 0.4</td>
</tr>
<tr>
<td>24 125 250</td>
<td>Current (A) 16</td>
<td>3</td>
<td>1 6 1.1 0.4</td>
</tr>
</tbody>
</table>

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**Installation**

- Tighten the rope connected to the switch until the indicator's end (1), reaches about half of the green ring (2). Afterwards, pull the pommel (3) to close the safety contacts inside the switch (a green ring (4) will appear).
- The safety circuit must be connected to the contacts NC (21-22 or 11-12). The contacts 13-14 shall be used for signals only.
- It is recommended to use only original accessories (rope, thimble, etc.), otherwise the declared performances will not be guaranteed.

**Installation Examples**

![Diagram of installation examples](image)

**Rope Installation**

- **application with rope without any support**
- **application with rope supported by eyebolts every 2'**
- **application with rope supported by eyebolts every 10'**

**Accessories**

- **T 870**
  stay bolt suitable for setting the rope in tension correctly (1 pc.)
- **M 870**
  rope clamp (2 or 4 pcs.)
- **C 870**
  thimble (1 pc.)
- **F 05-100**
  Rope: 100m (~300')
  5mm Diameter (~7/16')
### Key Operators for FR Series

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Accessory Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>Straight Key Operator</td>
</tr>
<tr>
<td>D1</td>
<td>90 Degree Key Operator</td>
</tr>
<tr>
<td>D2</td>
<td>Jointed Key Operator</td>
</tr>
<tr>
<td>D3</td>
<td>Adjustable Jointed Key Operator</td>
</tr>
</tbody>
</table>

### Key Operators for FD, FP, FS Series

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Accessory Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Straight Key Operator</td>
</tr>
<tr>
<td>F1</td>
<td>90 Degree Key Operator</td>
</tr>
<tr>
<td>F2</td>
<td>Jointed Key Operator</td>
</tr>
<tr>
<td>F3</td>
<td>Adjustable Jointed Key Operator</td>
</tr>
</tbody>
</table>

### Rope Accessories for Rope Pull Switches

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Accessory Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T870</td>
<td>Rope Guide</td>
</tr>
<tr>
<td>M870</td>
<td>Rope Clamp</td>
</tr>
<tr>
<td>C870</td>
<td>Rope Thimble</td>
</tr>
</tbody>
</table>

### General Accessories

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Accessory Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IN 12135</td>
<td>PG 13.5 to 1/2&quot; NPT Cable Adaptor</td>
</tr>
<tr>
<td>PGT1</td>
<td>Cable Entrance Cap</td>
</tr>
<tr>
<td>PG 13.5</td>
<td>Cable Gland 0.35&quot;-0.47&quot; dia.</td>
</tr>
</tbody>
</table>

### Rope Accessories for Rope Pull

- **T 870**
  - stay bolt suitable for setting the rope in tension correctly (1 pc.)

- **F 05-100**
  - Rope: 100m (~300’)
  - 5mm Diameter (~ 3/16")

- **M 870**
  - rope clamp (2 or 4 pcs.)

- **C 870**
  - thimble (1 pc.)
Mechanical Safety Switches

Installation Examples

FR 692-D / FX 692-D / FD 693-F

FS 2096-D024-F
FS 2096-E024-F
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

<table>
<thead>
<tr>
<th>Part Number Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical part number — 251-F7Z-06K</td>
</tr>
<tr>
<td>2 51 - F 7 Z - 06 K</td>
</tr>
<tr>
<td>Defeat Resistance Indicator</td>
</tr>
<tr>
<td>Housing</td>
</tr>
<tr>
<td>Magnet</td>
</tr>
</tbody>
</table>

Buy: www.ValinOnline.com | Phone 844-385-3099 | Email: CustomerService@valin.com
Patented Non-Contact Safety Interlock Switch

**251 F7 GuardSwitch**

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

**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)

**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**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Configuration</th>
<th>Load Rating (AC/DC)</th>
<th>Voltage Range (AC/DC)</th>
<th>Switch Current Max. (AC/DC)</th>
<th>Contact Resistance</th>
<th>Sense Range Nominal</th>
<th>Break Range Nominal</th>
<th>Break at Failure Max.</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>251-F7Z-12K</td>
<td>N.O.</td>
<td>100VA</td>
<td>100-120V AC</td>
<td>0.83A</td>
<td>0.5 Ohms</td>
<td>1.0” (2.5cm)</td>
<td>1.8” (4.5cm)</td>
<td>2.7” (6.8cm)</td>
<td>12’ (3.6m)</td>
</tr>
<tr>
<td>150-Z</td>
<td>Actuator Only</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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.
# Series 200 Safety Switches

## Installation Instructions

### Mounting Configurations

<table>
<thead>
<tr>
<th>Perpendicular Actuation</th>
<th>Door Actuation</th>
<th>Rotated Actuation</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Perpendicular Actuation Diagram" /></td>
<td><img src="image2" alt="Door Actuation Diagram" /></td>
<td><img src="image3" alt="Rotated Actuation Diagram" /></td>
</tr>
</tbody>
</table>

* 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-removable 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.
   
   \[
   \text{Voltage drop} = I \times R \\
   \text{Watts} = I^2 \times R \\
   \text{(I = maximum continuous current of the load)}
   \]

**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.

VAC/DC  
\[ \text{Load} \]  
\[ \text{Black} \quad \text{Red} \quad \text{White} \]  
\[ \text{FailSafe GuardSwitch} \]  
\[ 1/2A \text{ Fuse Required}^* \]

* 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.

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.

VAC/DC  
\[ \text{Load} \]  
\[ \text{Black} \quad \text{Red} \quad \text{White} \]  
\[ \text{FailSafe GuardSwitch} \]  
\[ 1/2A \text{ Fuse Required}^* \]

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

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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Tamper proof screws &amp; screwdriver</th>
</tr>
</thead>
<tbody>
<tr>
<td>1953</td>
<td>#6 x 3/4″L Tampruf Roundhead Screw</td>
</tr>
<tr>
<td>1954</td>
<td>#8 x 1-1/2″L Tampruf Roundhead Screw</td>
</tr>
<tr>
<td>1955</td>
<td>Tampruf® Screwdriver</td>
</tr>
</tbody>
</table>
Industrial Interlock Switches

GE Interlogix Industrial is the market leader in the development and manufacture of interlock switches for industrial applications. We produce a full line of interlock switches and position sensors.

Reading GE Interlogix Industrial Part Numbers

Part Number Matrix

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

<table>
<thead>
<tr>
<th>1</th>
<th>91</th>
<th>7</th>
<th>Z</th>
<th>06</th>
<th>K</th>
<th>D3</th>
<th>or</th>
<th>D4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
<td>Magnet</td>
<td>Wire type</td>
<td>DPST</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defeat Resistance Indicator</td>
<td>Contact Configuration</td>
<td>Wire Length</td>
<td>Double Pole Switch Assembly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Non-Contact Interlock/Position Switch

104 GuardSwitch

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

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

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

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.
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

Electrical Specifications

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

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

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 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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Config</th>
<th>Load Rating AC</th>
<th>Switching Voltage, Max. AC</th>
<th>Switching Current, Max. AC</th>
<th>Contact Resistance</th>
<th>Sense Range</th>
<th>Break Range</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>111-6Y-06(J)</td>
<td>N.O.</td>
<td>25VA 25W</td>
<td>120V (i=0.2A)</td>
<td>120V (i=0.2A)</td>
<td>0.7A (i=35V)</td>
<td>0.2 Ohms</td>
<td>1.0' (2.5cm)</td>
<td>2.0' (5.1cm)</td>
</tr>
<tr>
<td>111-6Y-12(J)</td>
<td>N.O.</td>
<td>25VA 25W</td>
<td>120V (i=0.2A)</td>
<td>120V (i=0.2A)</td>
<td>0.7A (i=35V)</td>
<td>0.2 Ohms</td>
<td>1.0' (2.5cm)</td>
<td>2.0' (5.1cm)</td>
</tr>
<tr>
<td>111-7Y-12(J)</td>
<td>N.O.</td>
<td>100VA 84W</td>
<td>120V (i=0.8A)</td>
<td>28V (i=3.0A)</td>
<td>3.0A (i=34V)³</td>
<td>1.0 Ohms</td>
<td>0.7' (1.8cm)</td>
<td>1.2' (3.0cm)</td>
</tr>
</tbody>
</table>

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 Rated at 3.0A for 6,000 cycles only. Other ratings are at 100,000 cycles.

Warning — Each electrical rating is an individual maximum and cannot be exceeded!
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: 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)
- UL/CSA: All Models

Order Information

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: 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)
- UL/CSA: All Models

Order Information

Part Number | Contact Config. | Load Rating | Switching Voltage, Max. | Switching Current, Max. | Contact Resistance | Sense Range | Break Range | Lead Length |
-------------|----------------|-------------|------------------------|------------------------|-------------------|-------------|------------|-------------|
115-3Y-12K   | N.C.           | 100VA       | 120V(0.8A)             | 84W                    | 1.0 Ohms          | 0.7” (1.8cm) | 1.2” (3.0cm) | 12” (3.6m)  |
115-4Y-06K   | SPDT           | 100VA       | 120V(0.8A)             | 84W                    | 1.0 Ohms          | 0.7” (1.8cm) | 1.2” (3.0cm) | 6” (1.8m)   |
115-4Y-12K   | SPDT           | 100VA       | 120V(0.8A)             | 84W                    | 1.0 Ohms          | 0.7” (1.8cm) | 1.2” (3.0cm) | 12” (3.6m)  |
115-6Y-06K   | N.O.           | 25VA        | 120V(0.2A)             | 25W                    | 0.7” (1.8cm)      | 1.2” (3.0cm) | 6” (1.8m)   |
115-6Y-12K   | N.O.           | 25VA        | 120V(0.2A)             | 25W                    | 0.7” (1.8cm)      | 1.2” (3.0cm) | 12” (3.6m)  |
115-7Y-06K   | N.O.           | 100VA       | 120V(0.8A)             | 84W                    | 1.0 Ohms          | 0.7” (1.8cm) | 1.2” (3.0cm) | 12” (3.6m)  |
115-7Y-12K   | N.O.           | 100VA       | 120V(0.8A)             | 84W                    | 1.0 Ohms          | 0.7” (1.8cm) | 1.2” (3.0cm) | 12” (3.6m)  |
115-8Y-06K   | N.O.           | 150VA       | 120V(1.25A)            | NA                     | NA                | 0.7” (1.8cm) | 1.2” (3.0cm) | 12” (3.6m)  |
115-8Y-12K   | N.O.           | 150VA       | 120V(1.25A)            | NA                     | NA                | 0.7” (1.8cm) | 1.2” (3.0cm) | 12” (3.6m)  |
115-8Y-06K-25S | N.O.         | 150VA       | 120V(1.25A)            | NA                     | NA                | 0.7” (1.8cm) | 1.2” (3.0cm) | 12” (3.6m)  |
115-8Y-12K-25S | N.O.         | 150VA       | 120V(1.25A)            | NA                     | NA                | 0.7” (1.8cm) | 1.2” (3.0cm) | 12” (3.6m)  |
115-6Y-06K-D6 | 2 N.O.        | 25VA        | 120V(0.2A)             | 100V(0.2A)             | 0.7” (1.8cm)      | 1.2” (3.0cm) | 6” (1.8m)   |
115-6Y-12K-D6 | 2 N.O.        | 25VA        | 120V(0.2A)             | 100V(0.2A)             | 0.7” (1.8cm)      | 1.2” (3.0cm) | 12” (3.6m)  |
115-Y         | Actuator Only  |             |                        |                        |                   |             |            |             |

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

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 Rated at 3.0A for 6,000 cycles only. Other ratings are at 100,000 cycles.
4 Can withstand inrush surge up to 4 amps. Voltage Drop 1.5V, minimum switch current of 30mA.
5 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

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

Order Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Config</th>
<th>Load Rating AC</th>
<th>Switching Voltage AC Max DC</th>
<th>Switching Current AC DC</th>
<th>Contact Resistance</th>
<th>Sense Range Nominal</th>
<th>Break Range Nominal</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>125-6Y-06K</td>
<td>N.O.</td>
<td>25VA</td>
<td>120V (α=0.2A) 120V (α=0.2A)</td>
<td>0.7A (α=35V) 1.0A (α=25V)</td>
<td>0.2 Ohms</td>
<td>0.6” (1.5cm)</td>
<td>1.4” (3.6cm)</td>
<td>6’11.8m</td>
</tr>
<tr>
<td>125-7Y-06K</td>
<td>N.O.</td>
<td>100VA</td>
<td>120V (α=0.8A) 28V (α=3.0A)</td>
<td>3.0A (α=34V) 3.0A (α=28V)</td>
<td>1.0 Ohms</td>
<td>0.5” (1.3cm)</td>
<td>0.9” (2.3cm)</td>
<td>6’11.6m</td>
</tr>
<tr>
<td>125-Y</td>
<td>Actuator Only</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

Order Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact1 Config.</th>
<th>Load Rating (AC)</th>
<th>Switching Voltage Maximum (AC)</th>
<th>Switching Current1</th>
<th>Voltage Drop</th>
<th>Sense Range2 Nominal</th>
<th>Break Range Nominal</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>126-EY-01AX</td>
<td>N.C.</td>
<td>150VA</td>
<td>120V AC</td>
<td>1.25A</td>
<td>1.5V</td>
<td>1.0” (2.5cm)</td>
<td>1.5” (3.8cm)</td>
<td>1’ (0.3m)</td>
</tr>
<tr>
<td>126-EY-06X</td>
<td>N.C.</td>
<td>150VA</td>
<td>120V AC</td>
<td>1.25A</td>
<td>1.5V</td>
<td>1.0” (2.5cm)</td>
<td>1.5” (3.8cm)</td>
<td>6’ (1.8m)</td>
</tr>
<tr>
<td>126-8Y-01AX</td>
<td>N.O.</td>
<td>150VA</td>
<td>120V AC</td>
<td>1.25A</td>
<td>1.5V</td>
<td>1.0” (2.5cm)</td>
<td>1.5” (3.8cm)</td>
<td>1’ (0.3m)</td>
</tr>
<tr>
<td>126-EY-03AX</td>
<td>N.C.</td>
<td>150VA</td>
<td>120V AC</td>
<td>1.25A</td>
<td>1.5V</td>
<td>1.0” (2.5cm)</td>
<td>1.5” (3.8cm)</td>
<td>3’ (0.9m)</td>
</tr>
<tr>
<td>126-Y</td>
<td>Actuator Only</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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 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
- Conveyors
- 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

<table>
<thead>
<tr>
<th>Order Information</th>
<th>Electrical Specifications</th>
<th>ACTUATOR SOLD SEPARATELY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part Number</td>
<td>Contact Config.</td>
<td>Load Rating AC</td>
</tr>
<tr>
<td>128C-6N-06(J)</td>
<td>N.O.</td>
<td>25VA</td>
</tr>
<tr>
<td>128C-6N-12(J)</td>
<td>N.O.</td>
<td>25VA</td>
</tr>
</tbody>
</table>

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

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.

### Sense Range

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

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### 129 GuardSwitch

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

#### Sense range

- Actuator Options
  - 129-6-DG Make, Min.Break, Max.
  - 129-6-D6 Make, Min.Break, Max.
  - Actuator Description

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

#### 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

- **Contact**
  - 129-6N-06(J) N.O.2 25VA 25W 120V(@0.2A) 120V(@0.2A) 0.7A (@35V) 1.0A (@25V) 0.2 Ohms 6'(1.8m)
  - 129-6N-12(JI)(-D6)(-DG) N.O.2 25VA 25W 120V(@0.2A) 120V(@0.2A) 0.7A (@35V) 1.0A (@25V) 0.2 Ohms 12'(3.6m)

#### Notes
- Configuration with actuator away from the switch
- D6=DPST: 2 N.O., DG=DPST: 1 N.O., 1 N.C.
- Rated at 3.0A for 6,000 cycles only. Other ratings are at 100,000 cycles only.
- Other ratings are at 100,000 cycles only.
- 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**

- **Contact**
  - 129-6N-06(J) N.O.2 25VA 25W 120V(@0.2A) 120V(@0.2A) 0.7A (@35V) 1.0A (@25V) 0.2 Ohms 6'(1.8m)
  - 129-6N-12(JI)(-D6)(-DG) N.O.2 25VA 25W 120V(@0.2A) 120V(@0.2A) 0.7A (@35V) 1.0A (@25V) 0.2 Ohms 12'(3.6m)

---

**Sense range**

- **Actuator Options**
  - 129-6-DG Make, Min.Break, Max.
  - 129-6-D6 Make, Min.Break, Max.
  - Actuator Description

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

---

**Notes**

- 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 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, 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

Order Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Config.</th>
<th>Load Rating Max.(AC/DC)</th>
<th>Switching Voltage Max.(AC/DC)</th>
<th>Switching Current Max.(AC/DC)</th>
<th>Sense Range Nominal</th>
<th>Break Range Nominal</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>141-8Y-06M</td>
<td>N.O.</td>
<td>150VA/NA</td>
<td>120V(a1.25A)/NA</td>
<td>1.25A/NA</td>
<td>1&quot;(2.5cm)</td>
<td>1.2&quot;(3cm)</td>
<td>6'(1.8m)</td>
</tr>
<tr>
<td>141-18Y-03M</td>
<td>N.O.</td>
<td>220VA/NA</td>
<td>220V(a1.0A)/NA</td>
<td>1.0A/NA</td>
<td>0.7&quot;(1.8)</td>
<td>1.6&quot;(4.1cm)</td>
<td>3'(0.9m)</td>
</tr>
</tbody>
</table>

1 Actuator Only

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

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 Can withstand inrush surge up to 4 amps, voltage drop 1.5V, minimum switch current of 30 mA, triac output.

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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 SJTW (K) / 0.30" (0.76cm)
- (Armored cable available) 18/4 SJTW (K) / 0.34" (0.86cm)
- UL/CSA: All Models

Order Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Config.</th>
<th>Load Rating, Max.</th>
<th>Switching Voltage, Max.</th>
<th>Switching Current, Max.</th>
<th>Contact Resistance</th>
<th>Sense Range</th>
<th>Break Range</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>151-6Z-06K</td>
<td>N.O.</td>
<td>25VA 25W</td>
<td>120V (0.2A) 120V (0.2A)</td>
<td>0.7A (0.35V) 1.0A (0.25V)</td>
<td>0.2 Ohms</td>
<td>1.5&quot; (3.8cm)</td>
<td>2.0&quot; (5.1cm)</td>
<td>6&quot; (1.8m)</td>
</tr>
<tr>
<td>151-6Z-12K</td>
<td>N.O.</td>
<td>25VA 120V (0.2A) 120V (0.2A)</td>
<td>0.7A (0.35V) 1.0A (0.25V)</td>
<td>0.2 Ohms</td>
<td>1.5&quot; (3.8cm)</td>
<td>2.0&quot; (5.1cm)</td>
<td>12&quot; (3.6m)</td>
<td></td>
</tr>
<tr>
<td>151-7Z-06K</td>
<td>N.O.</td>
<td>100VA 84W</td>
<td>120V (0.8A) 28V (0.8A) 4</td>
<td>3.0A (3A4V) 3.0A (3A28V) 4</td>
<td>1.0 Ohms</td>
<td>1.2&quot; (3.0cm)</td>
<td>1.8&quot; (4.6cm)</td>
<td>6&quot; (1.8m)</td>
</tr>
<tr>
<td>153-7Z-06K</td>
<td>N.O.</td>
<td>100VA 84W</td>
<td>120V (0.8A) 28V (0.8A) 4</td>
<td>3.0A (3A4V) 3.0A (3A28V) 4</td>
<td>1.0 Ohms</td>
<td>1.2&quot; (3.0cm)</td>
<td>1.8&quot; (4.6cm)</td>
<td>6&quot; (1.8m)</td>
</tr>
<tr>
<td>151-7Z-12K</td>
<td>N.O.</td>
<td>100VA 84W</td>
<td>120V (0.8A) 28V (0.8A) 4</td>
<td>3.0A (3A4V) 3.0A (3A28V) 4</td>
<td>1.0 Ohms</td>
<td>1.2&quot; (3.0cm)</td>
<td>1.8&quot; (4.6cm)</td>
<td>12&quot; (3.6m)</td>
</tr>
<tr>
<td>153-7Z-12K</td>
<td>N.O.</td>
<td>100VA 84W</td>
<td>120V (0.8A) 28V (0.8A) 4</td>
<td>3.0A (3A4V) 3.0A (3A28V) 4</td>
<td>1.0 Ohms</td>
<td>1.2&quot; (3.0cm)</td>
<td>1.8&quot; (4.6cm)</td>
<td>12&quot; (3.6m)</td>
</tr>
<tr>
<td>151-7Z-06K-D3</td>
<td>DPST (N.O., N.C.)</td>
<td>100VA 84W</td>
<td>120V (0.8A) 28V (0.8A) 4</td>
<td>3.0A (3A28V)</td>
<td>3.0A (3A28V) 4</td>
<td>1.0 Ohms</td>
<td>1.2&quot; (3.0cm)</td>
<td>1.8&quot; (4.6cm)</td>
</tr>
<tr>
<td>151-8Z-12K</td>
<td>N.O.</td>
<td>150VA NA</td>
<td>120V (0.8A) NA</td>
<td>1.25A (120V)</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>1.4&quot; (3.5cm)</td>
</tr>
<tr>
<td>150-Z</td>
<td>Actuator Only</td>
<td>NA</td>
<td>NA</td>
<td>1.25A (120V)</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>1.4&quot; (3.5cm)</td>
</tr>
</tbody>
</table>

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

1 The part number 153 is the same as 151 in all respects except the cable exits 151 left and 153 right.
2 Configuration with actuator away from the switch.
3 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.
4 Rated at 3.0A for 6,000 cycles only. Other ratings are at 100,000 cycles.
5 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
- Emergency Vehicles
- Overhead Doors
- Rugged Outdoor Use
- Boom Trucks

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 SJTW (K) / 0.30" (0.76cm)
UL/CSA: All Models

Order Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Config.</th>
<th>Load Rating (DC)</th>
<th>Switching Voltage Maximum (DC)</th>
<th>Switching Current Maximum (DC)</th>
<th>Voltage Drop</th>
<th>Sense Range Nominal</th>
<th>Break Range Nominal</th>
<th>Lead Length Nominal</th>
</tr>
</thead>
<tbody>
<tr>
<td>166-RM-06K</td>
<td>N.C.</td>
<td>100W</td>
<td>24V (±0.4A)</td>
<td>5.0A (±20V)</td>
<td>1.5V</td>
<td>1.6&quot; (4.0cm)</td>
<td>2.1&quot; (5.3cm)</td>
<td>6' (1.8m)</td>
</tr>
<tr>
<td>166-RN-06K</td>
<td>N.C.</td>
<td>100W</td>
<td>24V (±0.4A)</td>
<td>5.0A (±20V)</td>
<td>1.5V</td>
<td>Switch Only</td>
<td>Switch Only</td>
<td>6' (1.8m)</td>
</tr>
</tbody>
</table>

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

Order Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Configuration</th>
<th>Load Rating</th>
<th>Switching Voltage, Max.</th>
<th>Switching Current, Max.</th>
<th>Contact Resistance</th>
<th>Sense Range</th>
<th>Break Range</th>
<th>Terminal Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>171-6Z</td>
<td>N.O.</td>
<td>25VA 25W</td>
<td>120V (0.2A) 100V (0.2A)</td>
<td>0.7A (35V) 1.0A (25V)</td>
<td>0.2 Ohms</td>
<td>1.5'(3.8cm)</td>
<td>2.4'(6.1cm)</td>
<td>#6 Screw</td>
</tr>
</tbody>
</table>

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

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.
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

Order Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact1 Config.</th>
<th>Load Rating</th>
<th>Switching Voltage, Max.</th>
<th>Switching Current, Max.</th>
<th>Contact Resistance</th>
<th>Sense Range2 Nominal</th>
<th>Break Range Nominal</th>
<th>Terminal Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>181-7Z</td>
<td>N.O.</td>
<td>100VA</td>
<td>120V (a=0.8A)</td>
<td>3.0A (a=34V)2</td>
<td>1.0 Ohms</td>
<td>1.4&quot; (3.5cm)</td>
<td>1.8&quot; (4.6cm)</td>
<td>#6 Screw</td>
</tr>
</tbody>
</table>

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

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

Order Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact</th>
<th>Load Rating</th>
<th>Switching Voltage, Max.</th>
<th>Switching Current, Max.</th>
<th>Contact Resistance</th>
<th>Sense Range</th>
<th>Break Range</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Config.</td>
<td>AC</td>
<td>DC</td>
<td>AC</td>
<td>DC</td>
<td>Nominal</td>
<td>Nominal</td>
<td></td>
</tr>
<tr>
<td>191-6Z-12K</td>
<td>N.O.</td>
<td>25VA</td>
<td>25W</td>
<td>120V (a=0.2A)</td>
<td>0.7A (a=35V)</td>
<td>0.2 Ohms</td>
<td>1.0” (2.5cm)</td>
<td>12” (3.6m)</td>
</tr>
<tr>
<td>191-7Z-06K</td>
<td>N.O.</td>
<td>100VA</td>
<td>84W</td>
<td>120V (a=0.8A)</td>
<td>3.0A (a=34V)</td>
<td>1.0 Ohms</td>
<td>0.5” (1.3cm)</td>
<td>6” (1.8m)</td>
</tr>
<tr>
<td>191-7Z-12K-D3</td>
<td>DPST†</td>
<td>100VA</td>
<td>84W</td>
<td>120V (a=0.8A)</td>
<td>3.0A (a=34V)</td>
<td>1.0 Ohms</td>
<td>0.5” (1.3cm)</td>
<td>12” (3.6m)</td>
</tr>
<tr>
<td>191-7Z-12K</td>
<td>N.O.</td>
<td>100VA</td>
<td>84W</td>
<td>120V (a=0.8A)</td>
<td>3.0A (a=34V)</td>
<td>1.0 Ohms</td>
<td>0.5” (1.3cm)</td>
<td>12” (3.6m)</td>
</tr>
</tbody>
</table>

Warning—Each electrical rating is an individual maximum and cannot be exceeded!
† Configuration with actuator away from the switch
† 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.
† DPST: 1 N.O., 1 N.C
**Interlock Switches**

**Installation Instructions**

**Surface Mounting Configurations**

Figure 1

<table>
<thead>
<tr>
<th>Actuation Configuration</th>
<th>OK</th>
<th>Not Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perpendicular Actuation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Door Actuation</td>
<td>OK</td>
<td></td>
</tr>
<tr>
<td>Rotated Actuation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parallel Actuation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Actuation surface

**Barrel Switch Mounting Configurations**

Figure 2

<table>
<thead>
<tr>
<th>Actuation Configuration</th>
<th>OK</th>
<th>Not Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>End-to-End</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parallel Actuation</td>
<td>OK</td>
<td></td>
</tr>
<tr>
<td>Perpendicular Actuation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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.

   - Voltage drop = I \* R
   - Watts = I^2 \* 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

**Order Info.**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Config.</th>
<th>Load Rating</th>
<th>Switching Voltage, Max.</th>
<th>Switching Current, Max.</th>
<th>Contact Resistance</th>
<th>Sense Range</th>
<th>Break Range</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>301-CT-06K</td>
<td>N.O.</td>
<td>2.5VA</td>
<td><a href="mailto:30V@0.08A">30V@0.08A</a></td>
<td>0.18A(13.8V,0.18A(13.8V)</td>
<td>0.5 Ohms</td>
<td>0.75(1.9cm)</td>
<td>1.2(3.0cm)</td>
<td>6(1.8m)</td>
</tr>
<tr>
<td>301-CT-12K</td>
<td>N.O.</td>
<td>2.5VA</td>
<td><a href="mailto:30V@0.08A">30V@0.08A</a></td>
<td>0.18A(13.8V,0.18A(13.8V)</td>
<td>0.5 Ohms</td>
<td>0.75(1.9cm)</td>
<td>1.2(3.0cm)</td>
<td>12(3.6m)</td>
</tr>
<tr>
<td>301-CT-12K-CD</td>
<td>DPST</td>
<td>2.5VA</td>
<td><a href="mailto:30V@0.08A">30V@0.08A</a></td>
<td>0.18A(13.8V,0.18A(13.8V)</td>
<td>0.5 Ohms</td>
<td>0.75(1.9cm)</td>
<td>1.2(3.0cm)</td>
<td>12(3.6m)</td>
</tr>
<tr>
<td>301-DT-06K4</td>
<td>N.O.</td>
<td>150VA</td>
<td><a href="mailto:120V@0.25A">120V@0.25A</a></td>
<td>NA</td>
<td>1.25A(120V)</td>
<td>NA</td>
<td>0.75(1.9cm)</td>
<td>1.2(3.0cm)</td>
</tr>
<tr>
<td>301-DT-12K4</td>
<td>N.O.</td>
<td>150VA</td>
<td><a href="mailto:120V@0.25A">120V@0.25A</a></td>
<td>NA</td>
<td>1.25A(120V)</td>
<td>NA</td>
<td>0.75(1.9cm)</td>
<td>1.2(3.0cm)</td>
</tr>
</tbody>
</table>

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

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.
3 Testing is required to determine actual sense range for specific applications.
4 Can withstand inrush surge up to 4 amps. Voltage drop is 1.5V, minimum switch current, 30 mA, triac output.

---

Order Info.

Electrical Specifications

Part Number | Contact Config. | Load Rating | Switching Voltage, Max. | Switching Current, Max. | Contact Resistance | Sense Range | Break Range | Lead Length |
-------------|-----------------|-------------|-------------------------|-------------------------|-------------------|-------------|-------------|-------------|
301-CT-06K   | N.O.            | 2.5VA       | 30V@0.08A               | 0.18A(13.8V,0.18A(13.8V) | 0.5 Ohms         | 0.75(1.9cm) | 1.2(3.0cm)  | 6(1.8m)    |
301-CT-12K   | N.O.            | 2.5VA       | 30V@0.08A               | 0.18A(13.8V,0.18A(13.8V) | 0.5 Ohms         | 0.75(1.9cm) | 1.2(3.0cm)  | 12(3.6m)   |
301-CT-12K-CD | DPST          | 2.5VA       | 30V@0.08A               | 0.18A(13.8V,0.18A(13.8V) | 0.5 Ohms         | 0.75(1.9cm) | 1.2(3.0cm)  | 12(3.6m)   |
301-DT-06K4  | N.O.            | 150VA       | 120V@0.25A              | NA                      | 1.25A(120V)      | NA          | 0.75(1.9cm) | 1.2(3.0cm)  | 6(1.8m)    |
301-DT-12K4  | N.O.            | 150VA       | 120V@0.25A              | NA                      | 1.25A(120V)      | NA          | 0.75(1.9cm) | 1.2(3.0cm)  | 12(3.6m)   |

---

**Buy:** www.ValinOnline.com | Phone 844-385-3099 | Email: CustomerService@valin.com
**Interlock Switch**

**302 GuardSwitch**

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

**General Specifications**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Contact Config.</th>
<th>Load Rating</th>
<th>Switching Voltage, Max.</th>
<th>Switching Current, Max.</th>
<th>Contact Resistance</th>
<th>Sense Range</th>
<th>Break Range</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>302-DT-06A4</td>
<td>N.O.</td>
<td>150VA</td>
<td>120V @1.25A</td>
<td>NA</td>
<td>1.25A (@120V)</td>
<td>NA</td>
<td>NA</td>
<td>0.75 (1.9cm)</td>
</tr>
</tbody>
</table>

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

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.
3 Testing is required to determine actual sense range for specific applications.
4 Can withstand inrush surge up to 4 amps. Voltage drop is 1.5V, minimum switch current, 30 mA, triac output.
5 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

### Order Info.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Contact Config.</th>
<th>Load Rating</th>
<th>Switching Voltage, Max.</th>
<th>Switching Current, Max.</th>
<th>Contact Resistance</th>
<th>Sense Range</th>
<th>Break Range</th>
<th>Terminal Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>371-CT</td>
<td>N.O.</td>
<td>2.5VA, 2.5W</td>
<td>30V (≥0.08A)</td>
<td>0.18A (≥13.8V)</td>
<td>0.5 Ohms</td>
<td>0.5&quot; (1.3cm)</td>
<td>0.25&quot; (0.635cm)</td>
<td>#6 Screws</td>
</tr>
<tr>
<td>371-DT</td>
<td>N.O.</td>
<td>150VA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>0.5&quot; (1.3cm)</td>
<td>0.25&quot; (0.635cm)</td>
<td>#6 Screws</td>
</tr>
</tbody>
</table>

### Electrical Specifications

**Order Info.**

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. Can withstand inrush surge up to 4 amps. Voltage drop is 1.5V, minimum switch current, 30 mA, triac output.
4. Do not exceed 10 switches in series.

---

**Warning:** Each electrical rating is an individual maximum and cannot be exceeded.

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Buy: www.ValinOnline.com | Phone 844-385-3099 | Email: CustomerService@valin.com
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

Order Info. Electrical Specifications

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Contact* Load Rating</th>
<th>Switching Voltage, Max.</th>
<th>Switching Current, Max.</th>
<th>Contact Resistance</th>
<th>Sense Range¹</th>
<th>Break Range</th>
<th>Terminal Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>381-CT</td>
<td>N.O. 2.5VA 2.5W</td>
<td>30V(0.08A) 30V(0.08A)</td>
<td>0.18A(13.8V) 0.18A(13.8V)</td>
<td>0.5 Ohms</td>
<td>0.75(1.9cm) 0.375(1.0cm)</td>
<td>1.2(3.0cm)  #6 Screw</td>
<td></td>
</tr>
<tr>
<td>381-DT¹</td>
<td>N.O. 150VA NA</td>
<td>120V(1.25A) NA</td>
<td>1.25A(120V) NA</td>
<td>NA</td>
<td>0.75(1.9cm) 0.375(1.0cm)</td>
<td>1.2(3.0cm)  #6 Screw</td>
<td></td>
</tr>
</tbody>
</table>

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

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 Can withstand inrush surge up to 4 amps. Voltage drop is 1.5V, minimum switch current, 30 mA, triac output.
⁴ Do not exceed 10 switches in series.

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**Order Info.**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Contact Config.</th>
<th>Load Rating</th>
<th>Switching Voltage, Max.</th>
<th>Switching Current, Max.</th>
<th>Contact Resistance</th>
<th>Sense Range</th>
<th>Break Range</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>391-CT-06K</td>
<td>N.O.</td>
<td>2.5VA 2.5W</td>
<td>30V (0.08A) 30V (0.08A)</td>
<td>0.18A (13.8V) 0.18A (13.8V)</td>
<td>0.5 Ohms</td>
<td>0.8&quot; (2cm) 0.1&quot; (0.25cm)</td>
<td>1.2&quot; (3.0cm) 6&quot; (1.8m)</td>
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</tr>
<tr>
<td>391-CT-12K</td>
<td>N.O.</td>
<td>2.5VA 2.5W</td>
<td>30V (0.18A) 30V (0.18A)</td>
<td>0.18A (13.8V) 0.18A (13.8V)</td>
<td>0.5 Ohms</td>
<td>0.8&quot; (2cm) 0.1&quot; (0.25cm)</td>
<td>1.2&quot; (3.0cm) 12&quot; (3.6m)</td>
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</tr>
<tr>
<td>391-DT-06K</td>
<td>N.O.</td>
<td>150VA NA</td>
<td>120V ø1.25A NA</td>
<td>1.25A (120V) NA</td>
<td>NA</td>
<td>0.8&quot; (2cm) 0.1&quot; (0.25cm)</td>
<td>1.2&quot; (3.0cm) 6&quot; (1.8m)</td>
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</tr>
<tr>
<td>391-DT-12K</td>
<td>N.O.</td>
<td>150VA NA</td>
<td>120V ø1.25A NA</td>
<td>1.25A (120V) NA</td>
<td>NA</td>
<td>0.8&quot; (2cm) 0.1&quot; (0.25cm)</td>
<td>1.2&quot; (3.0cm) 12&quot; (3.6m)</td>
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<tr>
<td>393-DT-06K</td>
<td>N.O.</td>
<td>150VA NA</td>
<td>120V ø1.25A NA</td>
<td>1.25A (120V) NA</td>
<td>NA</td>
<td>0.8&quot; (2cm) 0.1&quot; (0.25cm)</td>
<td>1.2&quot; (3.0cm) 6&quot; (1.8m)</td>
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<tr>
<td>393-DT-12K</td>
<td>N.O.</td>
<td>150VA NA</td>
<td>120V ø1.25A NA</td>
<td>1.25A (120V) NA</td>
<td>NA</td>
<td>0.8&quot; (2cm) 0.1&quot; (0.25cm)</td>
<td>1.2&quot; (3.0cm) 12&quot; (3.6m)</td>
<td></td>
</tr>
</tbody>
</table>

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

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

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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 • R
Watts = I² • 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

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

Order Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Configuration</th>
<th>Load Rating (AC/DC)</th>
<th>Switching Voltage (AC/DC)</th>
<th>Switching Current (AC/DC)</th>
<th>Contact Resistance</th>
<th>Sense Range (Nominal)</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1032-N</td>
<td>N.O.</td>
<td>7.5W/VA</td>
<td>100V</td>
<td>0.5A</td>
<td>0.2 Ohms</td>
<td>0.6&quot; (1.6cm)</td>
<td>1'</td>
</tr>
<tr>
<td>1032W-N</td>
<td>N.O.</td>
<td>7.5W/VA</td>
<td>100V</td>
<td>0.5A</td>
<td>0.2 Ohms</td>
<td>1.0&quot; (2.5cm)</td>
<td>1'</td>
</tr>
<tr>
<td>1937-N</td>
<td>Actuator Only</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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. 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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Configuration</th>
<th>Load Rating (AC/DC)</th>
<th>Switching Voltage (AC/DC)</th>
<th>Switching Current (AC/DC)</th>
<th>Contact Resistance</th>
<th>Sense Range Nominal</th>
<th>Lead Length</th>
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</thead>
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<tr>
<td>1035-N</td>
<td>N.O.</td>
<td>7.5W/VA</td>
<td>100V</td>
<td>0.5A</td>
<td>0.2 Ohms</td>
<td>0.6&quot; (1.6cm)</td>
<td>1'</td>
</tr>
</tbody>
</table>

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

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. 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

Order Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Configuration</th>
<th>Load Rating (AC/DC)</th>
<th>Switching Voltage Maximum (AC/DC)</th>
<th>Switching Current Maximum (AC/DC)</th>
<th>Contact Resistance</th>
<th>Sense Range Nominal</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1045W-G</td>
<td>N.O.</td>
<td>7.5W/VA</td>
<td>100V</td>
<td>0.5A</td>
<td>0.2 Ohms</td>
<td>3.0” (7.6cm)</td>
<td>3’</td>
</tr>
</tbody>
</table>

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

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. 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

**General Specifications**

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

**Order Information**

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

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

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3. Biased for higher security applications

---

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**1055 Series**

**Applications**
- Economical
- Versatile
- Fits in limited space

**General Specifications**

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

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<thead>
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<th>Part Number</th>
<th>Contact Configuration</th>
<th>Load Rating (AC/DC)</th>
<th>Switching Voltage (AC/DC)</th>
<th>Switching Current (AC/DC)</th>
<th>Contact Resistance</th>
<th>Sense Range (Nominal)</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1055-N</td>
<td>N.O.</td>
<td>7.5W/VA</td>
<td>100V</td>
<td>0.5A</td>
<td>0.2 Ohms</td>
<td>0.5&quot; (1.3cm)</td>
<td>1&quot;</td>
</tr>
<tr>
<td>1055W-N</td>
<td>N.O.</td>
<td>7.5W/VA</td>
<td>100V</td>
<td>0.5A</td>
<td>0.2 Ohms</td>
<td>1.3&quot; (3.2cm)</td>
<td>1&quot;</td>
</tr>
</tbody>
</table>

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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.

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

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

Order Information & Electrical Specifications

<table>
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<tr>
<th>Part Number</th>
<th>Contact Configuration¹</th>
<th>Load Rating (AC/DC)</th>
<th>Switching Voltage (AC/DC)</th>
<th>Switching Current (AC/DC)</th>
<th>Contact Resistance</th>
<th>Sense Range²</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1072-N</td>
<td>N.O.</td>
<td>7.5VA</td>
<td>100V</td>
<td>0.5A</td>
<td>0.2 Ohms</td>
<td>0.5&quot; (1.3cm)</td>
<td>1'</td>
</tr>
</tbody>
</table>

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

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. 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.
### 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**

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

**Order Information**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Configuration</th>
<th>Load Rating (AC/DC)</th>
<th>Switching Voltage (AC/DC)</th>
<th>Switching Current (AC/DC)</th>
<th>Contact Resistance</th>
<th>Sense Range Nominal</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1075-M, N</td>
<td>N.O.</td>
<td>7.5W/VA</td>
<td>100V</td>
<td>0.5A</td>
<td>0.2 Ohms</td>
<td>0.5'(1.3cm)</td>
<td>1'</td>
</tr>
<tr>
<td>1075W-M, N</td>
<td>N.O.</td>
<td>7.5W/VA</td>
<td>100V</td>
<td>0.5A</td>
<td>0.2 Ohms</td>
<td>1.3'(3.2cm)</td>
<td>1'</td>
</tr>
<tr>
<td>1070-N</td>
<td>SPDT</td>
<td>3W/VA</td>
<td>30V</td>
<td>0.25A</td>
<td>0.2 Ohms</td>
<td>0.5'(1.3cm)</td>
<td>1'</td>
</tr>
<tr>
<td>1924-M, N</td>
<td>Actuator Only</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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. 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.
### 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

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

#### Order Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Configuration</th>
<th>Lead Rating (AC/DC)</th>
<th>Switching Voltage (AC/DC)</th>
<th>Switching Current (AC/DC)</th>
<th>Contact Resistance</th>
<th>Sense Range Nominal</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1078-G, M, N</td>
<td>N.O.</td>
<td>7.5W/VA</td>
<td>100V</td>
<td>0.5A</td>
<td>0.2 Ohms</td>
<td>0.5&quot; (1.3cm)</td>
<td>1'</td>
</tr>
<tr>
<td>1078W-M, N</td>
<td>N.O.</td>
<td>7.5W/VA</td>
<td>100V</td>
<td>0.5A</td>
<td>0.2 Ohms</td>
<td>1.0&quot; (2.5cm)</td>
<td>1'</td>
</tr>
<tr>
<td>1076-G, M, N</td>
<td>SPDT</td>
<td>3W/VA</td>
<td>30V</td>
<td>0.25A</td>
<td>0.2 Ohms</td>
<td>0.5&quot; (1.3cm)</td>
<td>1'</td>
</tr>
<tr>
<td>1076H-M, N</td>
<td>SPDT</td>
<td>3W/VA</td>
<td>30V</td>
<td>0.25A</td>
<td>0.2 Ohms</td>
<td>1.0&quot; (2.5cm)</td>
<td>1'</td>
</tr>
<tr>
<td>1076W-M, N</td>
<td>SPDT</td>
<td>3W/VA</td>
<td>30V</td>
<td>0.25A</td>
<td>0.2 Ohms</td>
<td>1.0&quot; (2.5cm)</td>
<td>1'</td>
</tr>
<tr>
<td>1076D-M, N</td>
<td>DPDT</td>
<td>3W/VA</td>
<td>30V</td>
<td>0.25A</td>
<td>0.2 Ohms</td>
<td>0.4&quot; (1.0cm)</td>
<td>1'</td>
</tr>
</tbody>
</table>

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3. 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.
4. 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

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

Order Information  

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

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Screw Mount With Leads

1082 Series

Applications
- Convenient surface mounting
- Mounting screws included

General Specifications

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

Order Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Configuration</th>
<th>Load Rating (AC/DC)</th>
<th>Switching Voltage (AC/DC)</th>
<th>Switching Current (AC/DC)</th>
<th>Contact Resistance</th>
<th>Sense Range Nominal</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1082-G, N</td>
<td>N.O.</td>
<td>7.5W/VA</td>
<td>100V</td>
<td>0.5A</td>
<td>0.2 Ohms</td>
<td>1.0&quot; (2.5cm)</td>
<td>1'</td>
</tr>
<tr>
<td>1084-M</td>
<td>SPDT</td>
<td>3W/VA</td>
<td>30V</td>
<td>0.25A</td>
<td>0.2 Ohms</td>
<td>1.0&quot; (2.5cm)</td>
<td>1'</td>
</tr>
</tbody>
</table>

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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, 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**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact¹ Configuration</th>
<th>Load Rating (AC/DC)</th>
<th>Switching Voltage (AC/DC)</th>
<th>Switching Current (AC/DC)</th>
<th>Contact Resistance</th>
<th>Sense Range² Nominal</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1085-G, M, N</td>
<td>N.O.</td>
<td>7.5W/VA</td>
<td>100V</td>
<td>0.5A</td>
<td>0.2 Ohms</td>
<td>0.6&quot; (1.6cm)</td>
<td>1'</td>
</tr>
<tr>
<td>1085W-M, N</td>
<td>N.O.</td>
<td>7.5W/VA</td>
<td>100V</td>
<td>0.5A</td>
<td>0.2 Ohms</td>
<td>1.5&quot; (3.8cm)</td>
<td>1'</td>
</tr>
<tr>
<td>1086-N</td>
<td>N.C.</td>
<td>3W/VA</td>
<td>30V</td>
<td>0.25A</td>
<td>0.2 Ohms</td>
<td>0.6&quot; (1.6cm)</td>
<td>1'</td>
</tr>
<tr>
<td>1086W-M</td>
<td>N.C.</td>
<td>3W/VA</td>
<td>30V</td>
<td>0.25A</td>
<td>0.2 Ohms</td>
<td>1.5&quot; (3.8cm)</td>
<td>1'</td>
</tr>
<tr>
<td>1081-N</td>
<td>Actuator Only</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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¹ Configuration with actuator away from the switch
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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.
**1085T Series**

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

**General Specifications**

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

**Order Information**

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

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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.
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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Configuration</th>
<th>Load Rating (AC/DC)</th>
<th>Switching Voltage (AC/DC)</th>
<th>Switching Current (AC/DC)</th>
<th>Contact Resistance</th>
<th>Sense Range Nominal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1135T-N</td>
<td>N.O.</td>
<td>7.5W/VA</td>
<td>100V</td>
<td>0.5A</td>
<td>0.2 Ohms</td>
<td>0.6” (1.6cm)</td>
</tr>
<tr>
<td>1136T-M</td>
<td>N.C.</td>
<td>3W/VA</td>
<td>30V</td>
<td>0.25A</td>
<td>0.2 Ohms</td>
<td>0.6” (1.6cm)</td>
</tr>
</tbody>
</table>

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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

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

Order Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Configuration</th>
<th>Load Rating (AC/DC)</th>
<th>Switching Voltage (AC/DC)</th>
<th>Switching Current (AC/DC)</th>
<th>Contact Resistance</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>2105A-G</td>
<td>N.O.</td>
<td>7.5W/VA</td>
<td>100V</td>
<td>0.5A</td>
<td>0.2 Ohms</td>
<td>3’</td>
</tr>
<tr>
<td>2107A-G</td>
<td>SPDT</td>
<td>3W/VA</td>
<td>30V</td>
<td>0.25A</td>
<td>0.2 Ohms</td>
<td>3’</td>
</tr>
</tbody>
</table>

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1 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, 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

### Order Information

**Part Number** | **Contact Configuration** | **Load Rating (AC/DC)** | **Switching Voltage (AC/DC)** | **Switching Current (AC/DC)** | **Contact Resistance** | **Sense Range 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!

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. 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

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

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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Configuration</th>
<th>Load Rating (AC/DC)</th>
<th>Switching Voltage (AC/DC)</th>
<th>Switching Current (AC/DC)</th>
<th>Contact Resistance</th>
<th>Sense Range (Nominal)</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>2505A-L</td>
<td>N.O.</td>
<td>7.5W/VA</td>
<td>100V</td>
<td>0.5A</td>
<td>0.2 Ohms</td>
<td>3.0&quot; (7.6cm)</td>
<td>3'</td>
</tr>
<tr>
<td>2507A-L</td>
<td>SPDT</td>
<td>3W/VA</td>
<td>30V</td>
<td>0.25A</td>
<td>0.25 Ohms</td>
<td>3.0&quot; (7.6cm)</td>
<td>3'</td>
</tr>
<tr>
<td>2507AD^4-L</td>
<td>DPDT</td>
<td>3W/VA</td>
<td>30V</td>
<td>0.25A</td>
<td>0.25 Ohms</td>
<td>1.5&quot; (3.8cm) Min</td>
<td>3'</td>
</tr>
<tr>
<td>2507AH^4-L</td>
<td>SPDT</td>
<td>3W/VA</td>
<td>30V</td>
<td>0.25A</td>
<td>0.25 Ohms</td>
<td>0.8&quot; (1.9cm) Min</td>
<td>3'</td>
</tr>
</tbody>
</table>

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

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. As measured on a nonferrous surface.
3 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.
4 Note: 2507AH biased type temperature rating -20°F to 150°F (-28°C to 65°C).
5 Not UL Listed

Buy: www.ValinOnline.com | Phone 844-385-3099 | Email: CustomerService@valin.com
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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Configuration</th>
<th>Load Rating (AC/DC)</th>
<th>Switching Voltage (AC/DC)</th>
<th>Switching Current (AC/DC)</th>
<th>Contact Resistance</th>
<th>Sense Range Minimum</th>
<th>Sense Range Maximum</th>
<th>Lead Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>2707A-L</td>
<td>SPDT</td>
<td>3W/VA</td>
<td>30V</td>
<td>0.25A</td>
<td>1.5 Ohms</td>
<td>0.18&quot; (0.5cm)</td>
<td>0.6&quot; (1.6cm)</td>
<td>3</td>
</tr>
<tr>
<td>2707 AD-L</td>
<td>DPDT</td>
<td>3W/VA</td>
<td>30V</td>
<td>0.25A</td>
<td>1.5 Ohms</td>
<td>0.18&quot; (0.5cm)</td>
<td>0.6&quot; (1.6cm)</td>
<td>3</td>
</tr>
</tbody>
</table>

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

Buy: www.ValinOnline.com | Phone 844-385-3099 | Email: CustomerService@valin.com
**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 devise, 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**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Configuration</th>
<th>Load Rating (AC/DC)</th>
<th>Switching Voltage (AC/DC)</th>
<th>Switching Current (AC/DC)</th>
<th>Sense Range (AC/DC) Nominal</th>
<th>Terminal Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>2807T-M</td>
<td>SPDT</td>
<td>3W/VA</td>
<td>30V</td>
<td>0.25A</td>
<td>0.18'(0.5cm) to 0.62'(1.6cm)</td>
<td>#6 Screw</td>
</tr>
<tr>
<td>2845T-M</td>
<td>N.O.</td>
<td>7.5W/VA</td>
<td>100V</td>
<td>0.5A</td>
<td>1.0' (2.5cm)</td>
<td>#6 Screw</td>
</tr>
<tr>
<td>2847T-M</td>
<td>SPDT</td>
<td>3W/VA</td>
<td>30V</td>
<td>0.25A</td>
<td>1.0' (2.5cm)</td>
<td>#6 Screw</td>
</tr>
</tbody>
</table>

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

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. 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

**General Specifications**

- **Enclosure**: ABS plastic
- **Temperature Range**: -40°F to 150°F (-40°C to 65°C)
- **Environmental Contact Housing**: 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

**Electrical Specifications**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Contact Configuration</th>
<th>Load Rating (AC/DC)</th>
<th>Switching Voltage (AC/DC)</th>
<th>Switching Current (AC/DC)</th>
<th>Contact Load</th>
<th>Load Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>3008-M, N</td>
<td>N.O.</td>
<td>7.5W/VA</td>
<td>100V</td>
<td>0.5A</td>
<td>0.2 Ohms</td>
<td>1’</td>
</tr>
<tr>
<td>3007-M, N</td>
<td>SPDT</td>
<td>3W/VA</td>
<td>30V</td>
<td>0.25A</td>
<td>0.2 Ohms</td>
<td>1’</td>
</tr>
</tbody>
</table>

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

1 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

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

Order Information

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

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

1 Configuration with plunger out.
**Magnets & Accessories**

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

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Appendix

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.

Example

Switch Rating: 15 VA, 120 V, 0.5A

Maximum Current at 120 Volts:

\[ A = \frac{VA}{V} = \frac{15}{120} = 0.125 \text{ A} \]

Maximum Voltage at 0.5 Amps:

\[ V = \frac{VA}{A} = \frac{15}{0.5} = 0.125 \text{ A} \]
**Appendix**

**Recommended Protection Circuits**

**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.

**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.
Reed Switch Assembly

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.

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.

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.

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.
Appendix

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 wire. 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.
Reed Switch Assembly

In cold conditions standard contacts work very well, even below -40°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°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.

Warranty
All products of GE Interlogix Industrial are sold with a limited warranty as specified below:

Because the manufacturer does not install, adjust, place or operate this device the manufacturer cannot guarantee the performance of this interlock device. Therefore, there are no express warranties (except as stated herein below) or implied warranties (including any warranty of merchantability or fitness) attached to the sale or use of this product.

In lieu of all other express warranties or any implied warranties MANUFACTURER EXPRESSLY WARRANTS against defects in material and workmanship in safety interlock and interlock switches for five (5) years and all other devices for one (1) year from the date of manufacture. During the warranty period, the manufacturer will repair or replace, at its sole option, free of charge, any defective unit returned freight prepaid. This warranty shall remain in full force and effect for the above stated periods from the date of manufacture provided that the unit: is owned by the original purchaser; was properly installed and operated; has not been subjected to abuse or misuse; and, has not been repaired, altered, or modified outside manufacturer’s authorized facilities.

The foregoing states the buyer’s sole and exclusive remedy for any breach of warranty or for any claim, whether sounding in contract, tort, strict liability or negligence, based upon any defect in this device. Manufacturer shall in no event be responsible for any incidental or consequential damages incurred by the buyer.

This warranty gives you specific legal rights and you may have additional rights which vary from state to state.

NOTE: The products, materials and specifications covered in the GE Interlogix Industrial Catalog are subject to change without notice.

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