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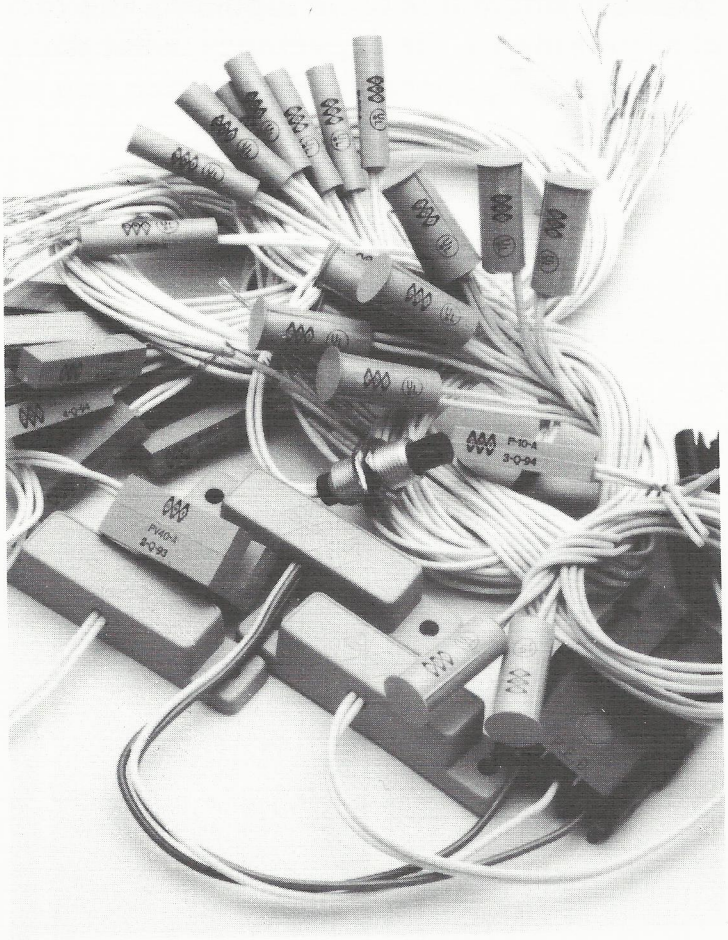
A Worldwide Manufacturer of Quality Keyboards

Proximity Sensors



- HIGH RELIABILITY - LONG LIFE
- EXCEPTIONALLY VERSATILE
- SMALL SIZE/ENERGY SAVING
- IMMUNE TO DUST & DIRT

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G.R.I. PROXIMITY SENSORS are encapsulated reed switches actuated by a magnetic field. These sensors are excellent when used on interlocks. G.R.I. Application Engineers are available to answer questions on our standard product line or to assist with your custom design requirements.

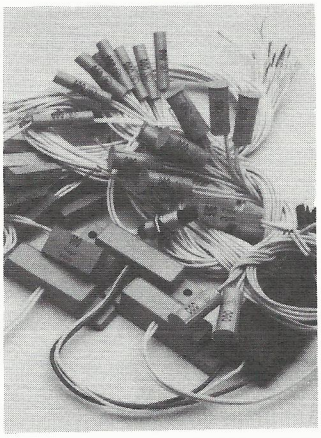
G.R.I. CUSTOM SENSORS — You can have a proximity sensor designed to fit your exact needs. G.R.I. engineers will help you to develop the right product to meet your requirements.

MAKING THE CORRECT SENSOR CHOICE — When choosing the sensor for your application, please consider where it is to be mounted, the temperature(s) it will be exposed to, electrical requirements, life expectancy, what you plan to sense and the type load conditions. By planning ahead in this manner, you will save both time and money, avoiding costly errors.

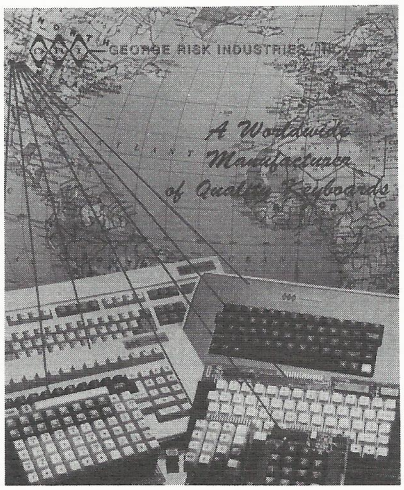
OTHER G.R.I. CATALOGS

Available Free of Charge

SECURITY PRODUCTS

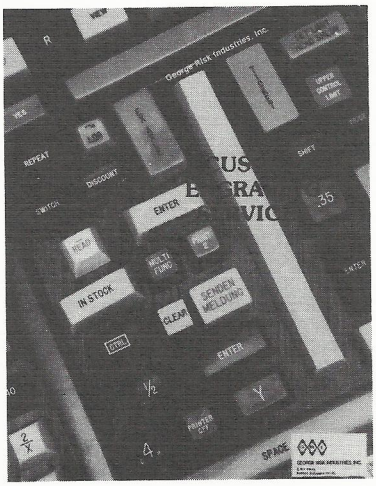


SECURITY SENSORS



KEYBOARDS & KEYPADS

PUSHBUTTON SWITCHES



ENGRAVING SERVICES

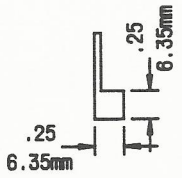
G.R.I.! WHEN RELIABILITY MATTERS!

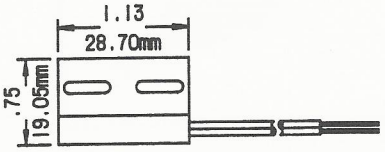
GRI — PROXIMITY SENSORS

SAFETY INTERLOCK

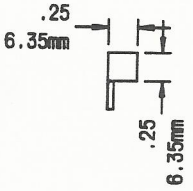
- Miniature Sensor
- Low-Profile
- Horizontal and Vertical Mounting Slots
- Hermetically Sealed Reed Switch
- Hi-Rel for Switching Low Level Loads
- Custom Requirements on Request

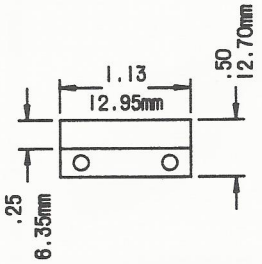
P-10





PSM-7F





PART NUMBER			P-10A	P-10B	P-10C
Contact Form			A	B	C
ELECTRICAL CHARACTERISTICS					
Contact Rating		Watts Maximum	10	3	3
Voltage	Switching	Vdc. Maximum	100	30	30
	Breakdown	Vdc. Minimum	200	200	200
Current	Switching	Amps Maximum	0.3	0.2	0.2
Resistance	Contact Initial	Ohms. Maximum	0.2	0.2	0.2
OPERATING CHARACTERISTICS					
Operate Time		ms typical	0.4	1.0	1.0
Shock Without False Operation		G's Max. 11ms ½ sine wave	30	30	30
Operating Temperature		Degrees Celsius	-40 to +95	-40 to +95	-40 to +95
LOAD/LIFE CHARACTERISTICS (millions of operations)					
Load Operations			5Vdc, 10ma 50	5Vdc, 10ma 50	5Vdc, 10ma 50
Load Operations			24Vdc, 100ma 40	24Vdc, 100ma 40	24Vdc, 100ma 40
Case			ABS Plastic		
Case Color			Grey		
Flying Leads			24", 22 AWG		
Wire Color			White		
Actuator			Alnico V Magnet		

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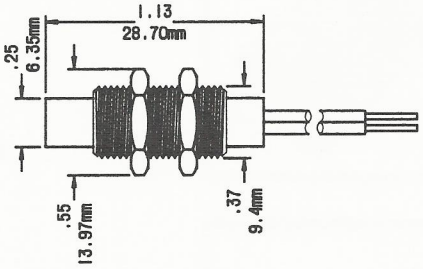
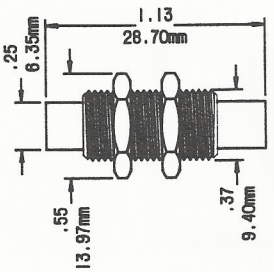
- ✦ Threaded Barrel with Retaining Nuts
- ✦ Easily Adjusted
- ✦ Hermetically Sealed Reed Switch
- ✦ Hi-Rel for Switching Low Level Loads
- ✦ Custom Requirements on Request

P-20



MM-20



PART NUMBER			P-20A	P-20B	P-20C
Contact Form			A	B	C
ELECTRICAL CHARACTERISTICS					
Contact Rating		Watts Maximum	10	3	3
Voltage	Switching	Vdc. Maximum	100	30	30
	Breakdown	Vdc. Minimum	200	200	200
Current	Switching	Amps Maximum	0.3	0.2	0.2
Resistance	Contact Initial	Ohms. Maximum	0.2	0.2	0.2
OPERATING CHARACTERISTICS					
Operate Time		ms typical	0.4	1.0	1.0
Shock Without False Operation		G's Max. 11ms ½ sine wave	30	30	30
Operating Temperature		Degrees Celsius	-40 to +95	-40 to +95	-40 to +95
LOAD/LIFE CHARACTERISTICS (millions of operations)					
Load Operations			5Vdc, 10ma 50	5Vdc, 10ma 50	5Vdc, 10ma 50
Load Operations			24Vdc, 100ma 40	24Vdc, 100ma 40	24Vdc, 100ma 40
Case			ABS Plastic		
Case Color			Grey		
Flying Leads			24", 22 AWG		
Wire Color			White		
Actuator			Alnico V Magnet		

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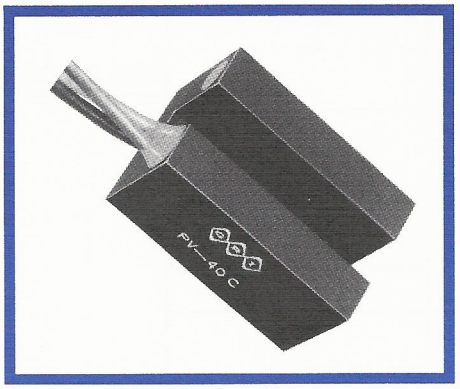
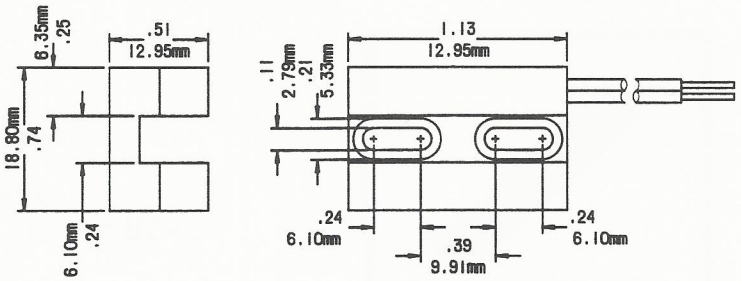
- ✦ Screw Mount
- ✦ Self Contained Sensor
- ✦ Hermetically Sealed Reed Switch
- ✦ Hi-Rel for Switching Low Level Loads
- ✦ Custom Requirements on Request

PV-40 VANE SENSOR is actuated when a ferrous plate is passed between the switch and magnet portions of the sensor.



PV-40 VANE SENSOR



PART NUMBER			P-40A	P-40B	P-40C
Contact Form			A	B	C
ELECTRICAL CHARACTERISTICS					
Contact Rating		Watts Maximum	3	10	3
Voltage	Switching	Vdc. Maximum	175	100	175
	Breakdown	Vdc. Minimum	200	200	200
Current	Switching	Amps Maximum	0.25	0.3	0.25
Resistance	Contact Initial	Ohms. Maximum	0.2	0.2	0.2
OPERATING CHARACTERISTICS					
Operate Time		ms typical	0.7	0.4	0.7
Shock Without False Operation		G's Max. 11ms ½ sine wave	50	30	50
Operating Temperature		Degrees Celsius	-40 to +95	-40 to +95	-40 to +95
LOAD/LIFE CHARACTERISTICS (millions of operations)					
Load Operations			5Vdc, 10ma 50	5Vdc, 10ma 50	5Vdc, 10ma 50
Load Operations			24Vdc, 100ma 40	24Vdc, 100ma 40	24Vdc, 100ma 40
Case			ABS Plastic		
Case Color			Grey		
Flying Leads			24", 22 AWG		
Wire Color			White		
Actuator			Alnico V Magnet		

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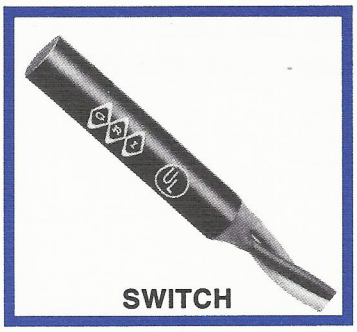
GRI — PROXIMITY SENSORS

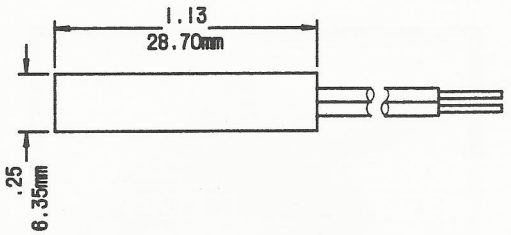
SAFETY INTERLOCK

- ✦ 1/4" Diameter
- ✦ Hermetically Sealed Reed Switch
- ✦ Hi-Rel for Switching Low Level Loads
- ✦ Custom Requirements on Request



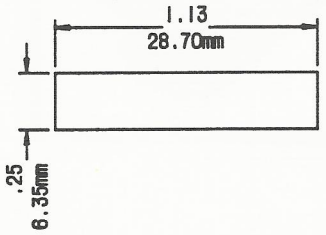
SWITCH

P-30



ACTUATOR

PSM-12



PART NUMBER			P-30A	P-30B	P-30C
Contact Form			A	B	C
ELECTRICAL CHARACTERISTICS					
Contact Rating		Watts Maximum	10	3	3
Voltage	Switching	Vdc. Maximum	100	30	30
	Breakdown	Vdc. Minimum	200	200	200
Current	Switching	Amps Maximum	0.3	0.2	0.2
Resistance	Contact Initial	Ohms. Maximum	0.2	0.2	0.2
OPERATING CHARACTERISTICS					
Operate Time		ms typical	0.4	1.0	1.0
Shock Without False Operation		G's Max. 11ms ½ sine wave	30	30	30
Operating Temperature		Degrees Celsius	-40 to +95	-40 to +95	-40 to +95
LOAD/LIFE CHARACTERISTICS (millions of operations)					
Load Operations			5Vdc, 10ma 50	5Vdc, 10ma 50	5Vdc, 10ma 50
Load Operations			24Vdc, 100ma 40	24Vdc, 100ma 40	24Vdc, 100ma 40
Case			ABS Plastic		
Case Color			Grey		
Flying Leads			24", 22 AWG		
Wire Color			White		
Actuator			Alnico V Magnet		

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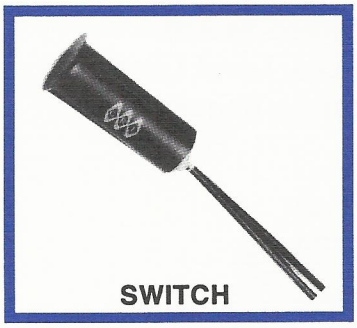
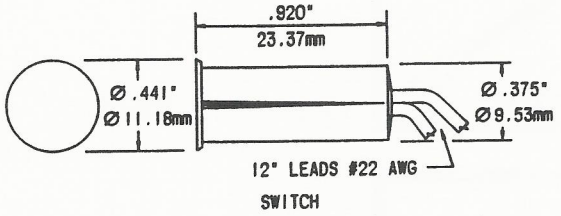
GRI — PROXIMITY SENSORS

SAFETY INTERLOCK

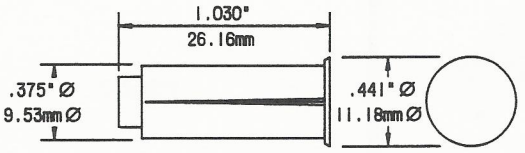
- 3/8" Diameter
- Very Versatile
- Hermetically Sealed Reed Switch
- Hi-Rel for Switching Low Level Loads
- Custom Requirements on Request



PS-2020



PSM-5



PART NUMBER			PS-2020	PS-3030	PS-4040
Contact Form			A	B	C
ELECTRICAL CHARACTERISTICS					
Contact Rating		Watts Maximum	10	3	3
Voltage	Switching	Vdc. Maximum	100	30	30
	Breakdown	Vdc. Minimum	200	200	200
Current	Switching	Amps Maximum	0.3	0.2	0.2
Resistance	Contact Initial	Ohms. Maximum	0.2	0.2	0.2
OPERATING CHARACTERISTICS					
Operate Time		ms typical	0.4	1.0	1.0
Shock Without False Operation		G's Max. 11ms ½ sine wave	30	30	30
Operating Temperature		Degrees Celsius	-40 to +95	-40 to +95	-40 to +95
LOAD/LIFE CHARACTERISTICS (millions of operations)					
Load Operations			5Vdc, 10ma 50	5Vdc, 10ma 50	5Vdc, 10ma 50
Load Operations			24Vdc, 100ma 40	24Vdc, 100ma 40	24Vdc, 100ma 40
Case			ABS Plastic		
Case Color			Grey		
Flying Leads			24", 22 AWG		
Wire Color			White		
Actuator			Alnico V Magnet		

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SAFETY INTERLOCK

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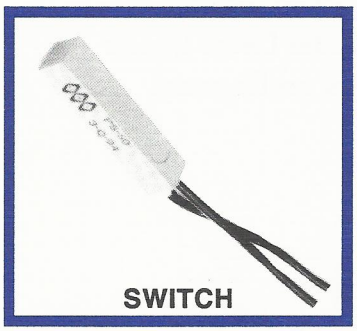
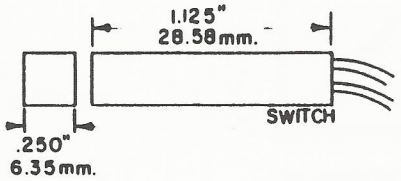
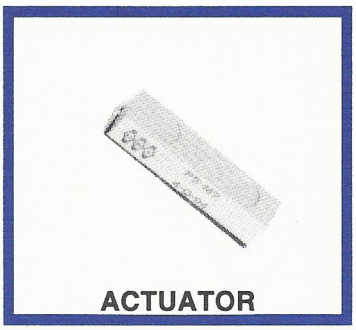
- ✦ Adhesive Mount
- ✦ Low-Profile
- ✦ Hermetically Sealed Reed Switch
- ✦ Hi-Rel for Switching Low Level Loads
- ✦ Custom Requirements on Request



SWITCH

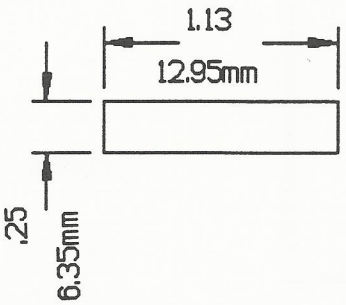
PS-50





ACTUATOR

PSM-7



PART NUMBER			P-50	P-60	P-70
Contact Form			A	B	C
ELECTRICAL CHARACTERISTICS					
Contact Rating		Watts Maximum	10	3	3
Voltage	Switching	Vdc. Maximum	100	30	30
	Breakdown	Vdc. Minimum	200	200	200
Current	Switching	Amps Maximum	0.3	0.2	0.2
Resistance	Contact Initial	Ohms. Maximum	0.2	0.2	0.2
OPERATING CHARACTERISTICS					
Operate Time		ms typical	0.4	1.0	1.0
Shock Without False Operation		G's Max. 11ms ½ sine wave	30	30	30
Operating Temperature		Degrees Celsius	-40 to +95	-40 to +95	-40 to +95
LOAD/LIFE CHARACTERISTICS (millions of operations)					
Load Operations			5Vdc, 10ma 50	5Vdc, 10ma 50	5Vdc, 10ma 50
Load Operations			24Vdc, 100ma 40	24Vdc, 100ma 40	24Vdc, 100ma 40
Case			ABS Plastic		
Case Color			Grey		
Flying Leads			24", 22 AWG		
Wire Color			White		
Actuator			Alnico V Magnet		

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- Packaging Machines
- Paper Roll Size Indicator

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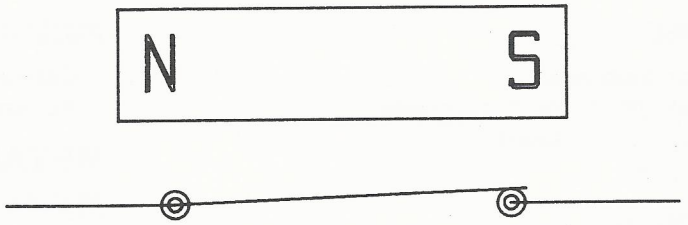
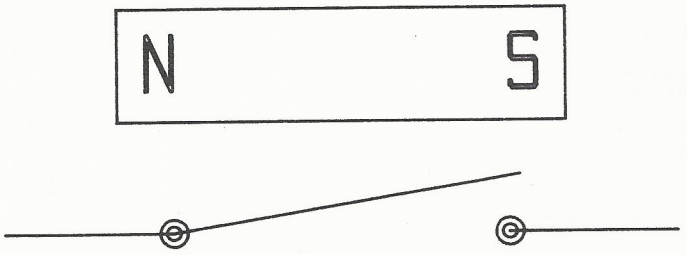
TERMINOLOGY

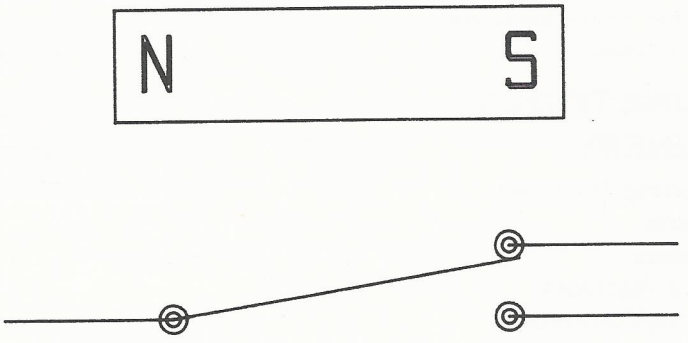
Closed Loop Circuit closed when switch and actuator (magnet) in proximity.



Open Loop Circuit open when switch and actuator (magnet) in proximity.



SPDT Switch has common, open and closed contact.



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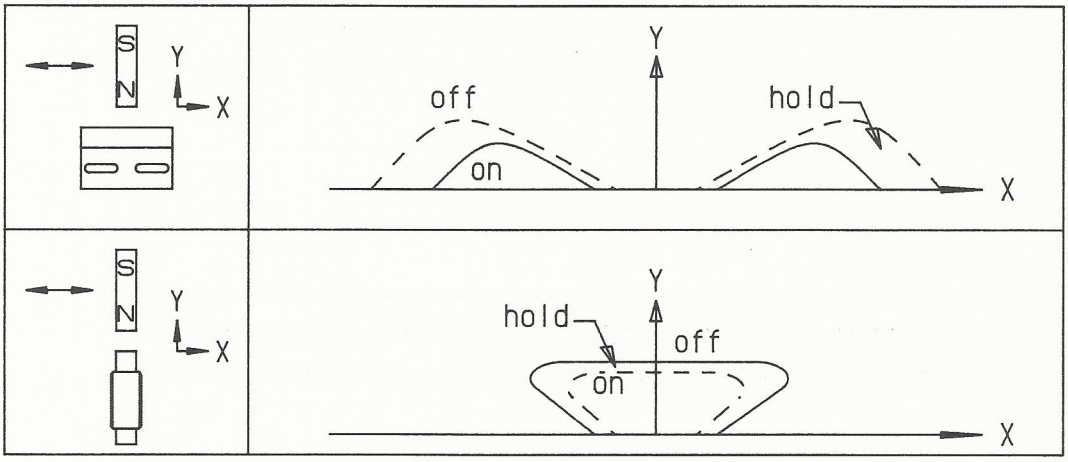
ACTUATION POSITIONS

Actuation Patterns

The most common way of actuating a switch is with a permanent magnet. The typical pattern of actuations are shown below.

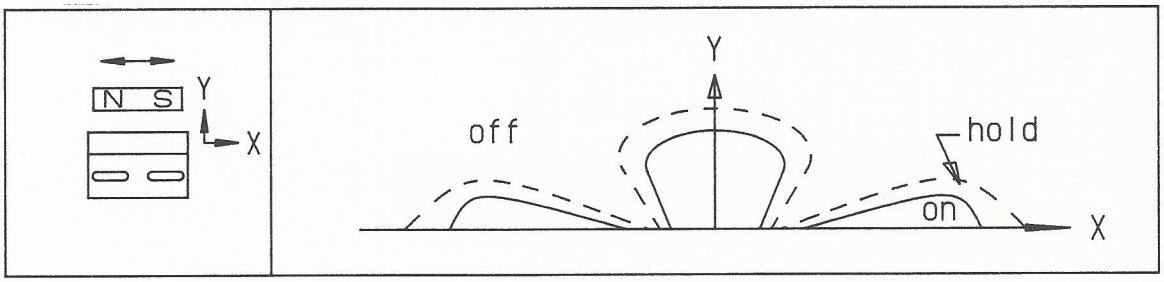
(←→Direction of Travel)

Perpendicular Actuation



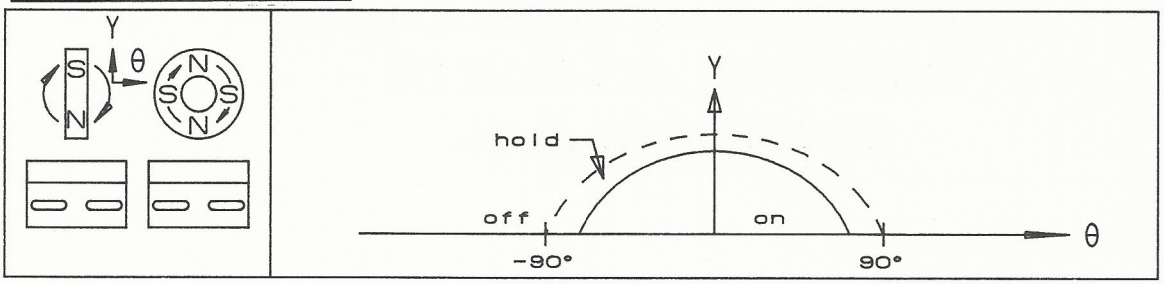
A magnet moves perpendicular toward and away activating and deactivating the switch one time.

Horizontal Actuation



As a magnet moves horizontally across the switch, it is activated one to three times.

Rotational Actuation



The switch is activated when the North/South axis of the magnet is parallel with the switch.

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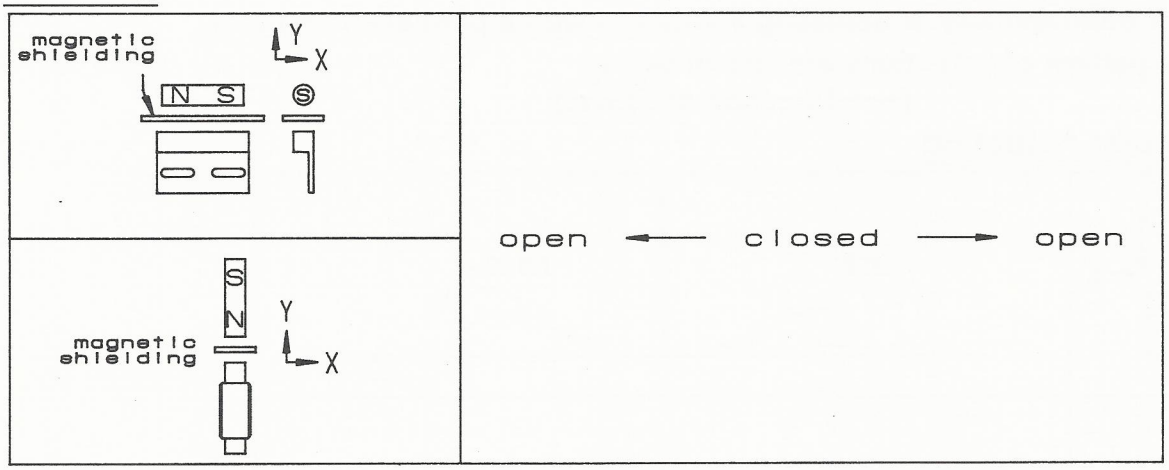
ACTUATION POSITIONS

Shielding



The magnet switch combination is permanently mounted so that the switch is activated. A ferromagnet material is placed between the magnet and the switch for deactivating.

Life Expectancy

The life expectancy of these switches is dependent on the type of load and can be in the hundreds of millions of operation.

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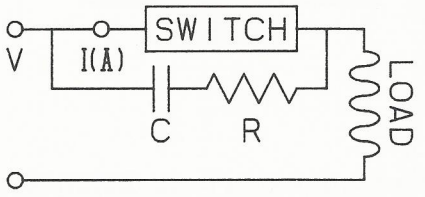
APPLICATION

Contact Protection

A switch experiencing reed arcing or large surge currents, will see a reduced life expectancy or a rapid failure due to reed damage under such conditions. This occurs when the load is inductive, capacitive, lamp or a long cable. These conditions can be eliminated by the use of one of the following protection circuits.

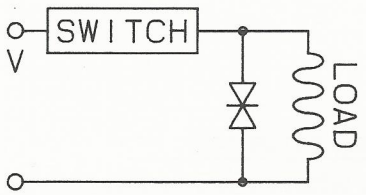
Inductive Load

In cases where a relay, solenoid, counter, or any device which has an inductive component as the load, the energy stored in the inductance will cause an inverse voltage when the reed contacts open. This voltage is dependent on the inductance value but can reach several hundred volts. To prevent this, a capacitor and a resistor can be put across the switch or a varistor placed across the inductive load as shown below.



Contact protection with a capacitor and resistor

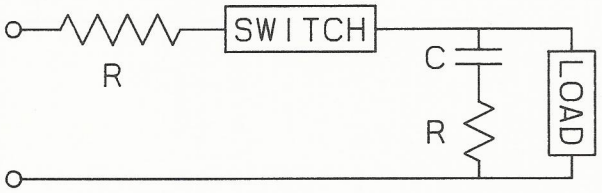
$$C=\frac{I^2}{10}(4I) \qquad R=\frac{V}{10\pm(I+60\pm V)}(\Omega)$$



Contact protection with a varistor

Capacitive Load

In cases where a capacitor is in series or parallel with the reed switch, the rush current which flows at times of charge and discharge of the capacitor will cause damage to the reed contacts. To prevent this a series resistor (R) can be used in the positions indicated below. The value of the resistor is dependent on the particular application but should be as large as possible to limit the current within the range of the switch.



Lamp Load

In cases with lamp loads, the filament resistance is small immediately after it is switched on and becomes greater as the lamp warms. The initial rush current can be 5 to 10 times the steady-state current. The circuit with a lamp load is therefore considered similar to a capacitor where large current flows to charge the capacitor, thus requiring one of the following protection circuits.

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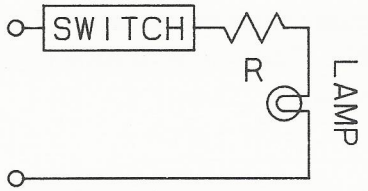
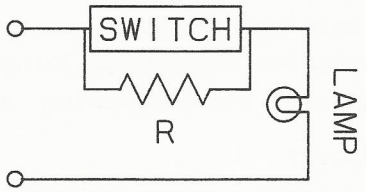
APPLICATION

Lamp Load (continued)



R = current limiting resistor
R should be a value so that
I_s is less than the reed
switching current, maximum

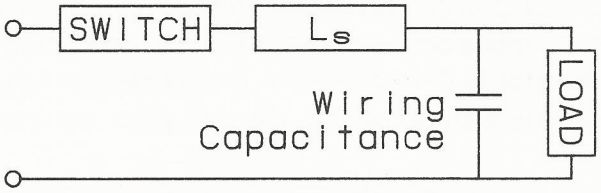


R = Parallel resistance
By connecting R, the filament
is heated and its resistance
is made higher.

$$R < \frac{\text{lamp resistance}}{3}$$

Wiring Capacitance

In cases where the reed switch is connected to the load over a long distance by a cable, static capacitance of the cable will cause a rush of current. Dependent upon the type of cable, it is recommended that a protection circuit be used on cable lengths exceeding 150 feet. A surge suppressor (coil L_s) is inserted near the reed switch to delay current flow. The value of L_s is 0.5 to 5mH depending on the load current. The suppressor can be replaced with a small resistance of 10 to 5000Ω.



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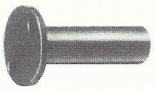
PSM-5

3/8" Press Fit

PSM-180

3/4" Dia. Steel Door

PSM-5F



3/8" Flanged

PSM-184

1" Dia. Steel Door

SURFACE MOUNT

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1/4" Sq. X 1" Lg.
Adhesive Back

PSM-14

1/2" X 1/2" X 2 1/2" Lg.
Screw Mount

PSM-110

1/4" X 3/8" X 2" Lg.
Miniature Adhesive Mount

PSM-7F

1/4" Sq. X 1" Lg.
Adhesive Back

PSM-15

1/2" X 1/2" X 4" Lg.
Screw Mount

PSM-1100

3/8" X 3/8" X 2" Lg.
Screw Mount

PSM-8

1/2" X 1/2" X 1 1/2" Lg.
Screw Mount

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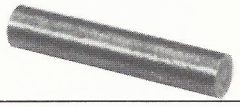
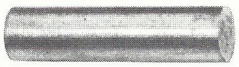
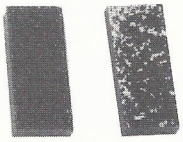
ALNICO V BARE MAGNETS

DESCRIPTION		PART NUMBER
1/4" Dia. X 1"		PSM-12
1/4" Dia. X 1 3/16"		PSM-13
3/8" Dia. X 1 1/2"		PSM-16
1/4" Dia. X 3/4"		PSM-10
3/16" Dia. X 1"		PSM-19
1/4" Dia. X 5/8"		PSM-17
1/8" Dia. X .937"		PSM-5278
1/8" X 3/8" X 7/8"		PSM-875
3/8" Dia. X 2 9/16"		PSM-3938

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