

Warning! To avoid switch failure determine the actual load of the switch circuit and take steps to protect the switch from voltage spikes, current inrush and line/load capacitance using the following recommendations.

- Surges from coils, motors, contactors, solenoids and tungsten filaments. 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. An in-line resistor can be added in series immediately before the load 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 also be calculated as follows:

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

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

(I = maximum continuous current of the load)

To verify switch operation with an ohmmeter:

Set range at 20 mega ohms (switches with triac output, set ohm range at 20 kilo ohms). For a normally open switch, the meter will read a high impedance with the actuator away. It will read very high to infinity range (triac switches will read high kilo ohm to infinity range) with the actuator within sense range. You will see the opposite reading for a normally closed switch.

Dimensions

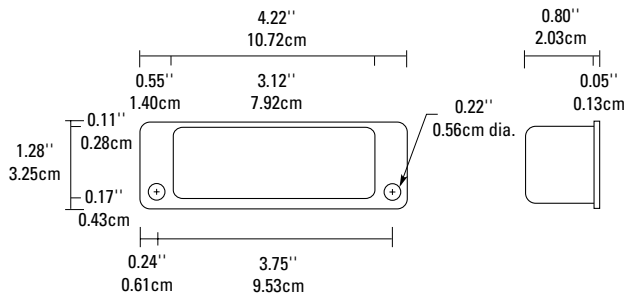
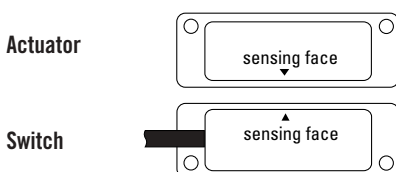
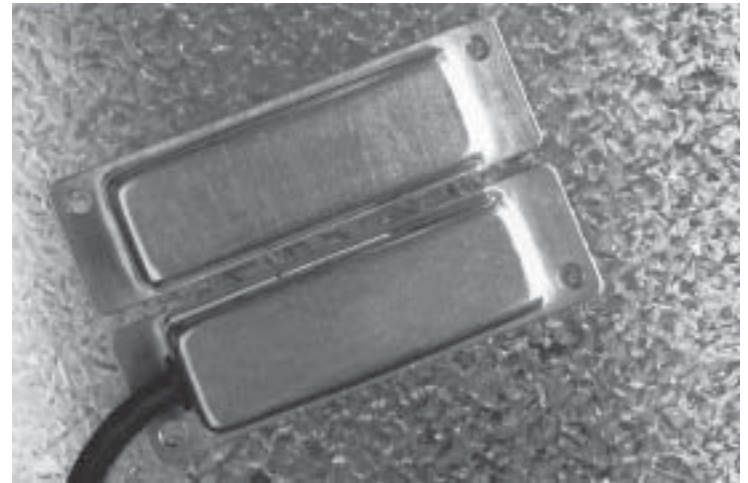


Figure 1



GuardSwitch™ Series 300
Interlock Switch

- | | | |
|------------|-------------------------------------|-------------------------------------|
| 391 | <input type="checkbox"/> 391-CT-06K | <input type="checkbox"/> 391-DT-12K |
| | <input type="checkbox"/> 391-CT-12K | <input type="checkbox"/> 391-_____ |
| | 393 | <input type="checkbox"/> 393-_____ |



Installation

Use non-removable screws, bolts, or nuts to mount the switch and actuator. Do not over-torque mounting hardware.

1. Position the switch and actuator so the labels are reading in the same direction. (See Figure 1.)
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 Ordering/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 2). Parallel actuation is NOT recommended. An on/off/on signal may result when the actuator passes by the switch rather than coming to rest in proximity to it.

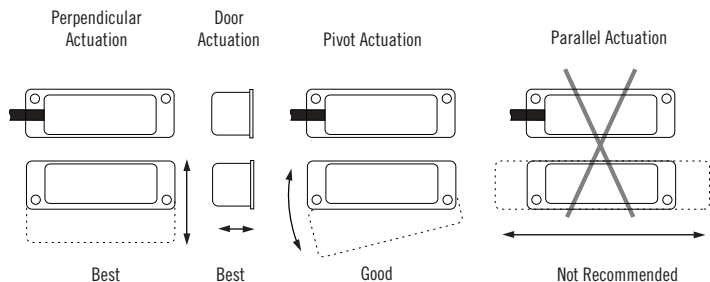
3. Mounting on a ferrous material will effect the sense range a minimum of 50%. However, a 1/4" nonferrous spacer positioned under the actuator and/or switch should restore most of the lost sensor range.

- For best protection against operator defeat, mount with non-removable screws, bolts or nuts (see Accessories).
- When mounting a metal switch to an ungrounded machine, connect the ground lead to one of the switch mounting screws.

Mounting Configurations

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

Figure 2



Three configurations are appropriate for safety interlock applications. The parallel actuation can result in on/off/on signal if the magnet passes by the switch rather than coming to rest in proximity to it. This is NOT a recommended configuration for safety interlock applications.

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
Protection Class	IP 67
Response Time	1 msec (5.4VA); 10 msec (150VA)
Life Cycles	100,000 Under Full Load; Up to 200,000,000 Under Dry Circuit
Lead Type/O.D.	SJTOW (K)/18/2, 0.30" (0.76cm)
UL/CSA	All Models



Accessories

PART NUMBER	TAMPER PROOF SCREWS & SCREWDRIVER
1953	#6 x 3/4"L Tampruf Roundhead Screw
1954	#8 x 1-1/2"L Tampruf Roundhead Screw
1955	Tampruf® Screwdriver
1956	Tampruf® 1/4" Drive Bit for #6 and #8 Screws

Ordering/Electrical Specifications

PART NUMBER ¹	CONTACT ² CONFIG.	LOAD RATING AC/DC	SWITCHING VOLTAGE MAXIMUM, AC/DC		SWITCHING CURRENT MAXIMUM, AC/DC		CONTACT RESISTANCE	NOMINAL SENSE RANGE ³		BREAK RANGE NOMINAL	LEAD LENGTH NOMINAL
			AC	DC	AC	DC		Max.	Min.		
391-CT-06K	N.O.	2.5VA/2.5W	30V@0.08A	30V@0.08A	0.18A@13.8V	0.18A@13.8V	0.5 Ohms	0.8"(2cm)	0.1"(0.25cm)	1.2"(3.0cm)	6'(1.8m)
391-CT-12K	N.O.	2.5VA/2.5W	30V@0.08A	30V@0.08A	0.18A@13.8V	0.18A@13.8V	0.5 Ohms	0.8"(2cm)	0.1"(0.25cm)	1.2"(3.0cm)	12'(3.6m)
391-DT-06K ⁵	N.O./ triac output	150VA/NA	120V@1.25A	NA	1.25A ⁴ @120V	NA	NA	0.8"(2cm)	0.1"(0.25cm)	1.2"(3.0cm)	6'(1.8m)
391-DT-12K ⁵	N.O./ triac output	150VA/NA	120V@1.25A	NA	1.25A ⁴ @120V	NA	NA	0.8"(2cm)	0.1"(0.25cm)	1.2"(3.0cm)	12'(3.6m)

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

- The part numbers 391 and 393 are the same in all respects except the cable exits, 391 left and 393 right.
- 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.
- Can withstand inrush surge up to 4 Amps. Voltage drop is 1.5V. Minimum Switch Current 30mA.
- Do not exceed 10 switches in series.



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