Safety Interlock Switch Operating Instructions

INCH-1, INCH-3, MK1-SS



INCH-1



INCH-3



MK1-SS

IMPORTANT NOTE:

Read and understand these instructions before installing, operating, or maintaining this equipment.
These products are designed to be a component of a customised safety orientated control system. It is the responsibility of each manufacturer to ensure the correct overall functionality of its systems and machines. IDEM, its subsidiaries and affiliates, are not in a position to guarantee all of the characteristics of a given system or product not designed by IDEM.

Application:

INCH-1, INCH-3 and MK1-SS Interlock Switches are designed to be mounted for interlock position sensing of hinged moving guards.
They can be fitted to the leading edge of sliding, hinged or lift off guards.
They have positive opening contacts in accordance with IEC 60947-5-1 and the switch design offers a tamper resistant actuator key. They are available with either an angled or flat actuator fixing to cover most fixing positions and contact blocks are available in slow make/break 1NC 1NO, 2NC or 2NC 1NO (dependant on model).
Enclosures are protected to IP67 (MK1-SS is rated IP69K).

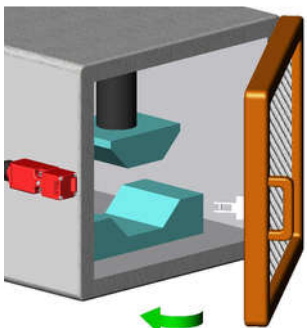
Operation:

Operation of the switches is achieved by withdrawing the actuator key from the switch to cause deflection of the switch plunger.
Positive actuation of the contacts is achieved at 5mm withdrawal of the actuator.

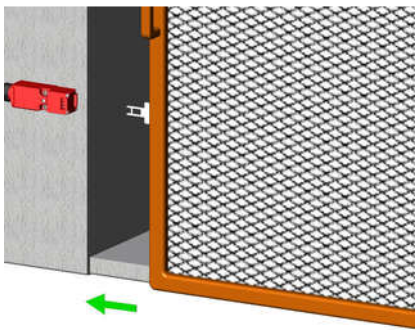
Installation guide:

Correct Mounting of Interlock Switches is critical to obtain optimum performance and ensure safety reliability.
Installation of all switches must be in accordance with a risk assessment for the individual application.
Installation must only be carried out by competent personnel and in accordance with these instructions.
Warning: Do not defeat, bypass or tamper with this switch, severe injury may result.

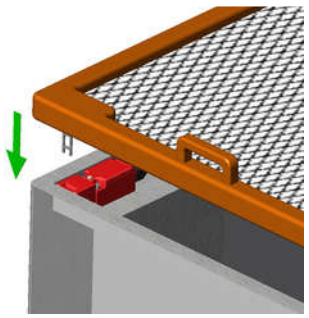
1. Never use the switch as a mechanical stop.
2. To ensure that the actuator and switch are protected from mechanical shock, guides and stops must be used to prevent mechanical damage.
3. The heads of the switch can be rotated to obtain the best switch orientation by removing the 4 head screws and rotating the head through 90 degrees. Always ensure the 4 head screws are tightened to 1Nm to ensure switch robustness. Always fit the blanking plug (supplied) to the unused actuator entry aperture.
4. When mounting to the guard door align and fix the switch body and actuator using 2 x M4 mounting bolts tightened at 1.5Nm.
5. Typical applications:



Hinged guard



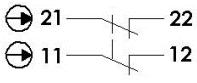
Sliding guard



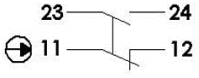
Lift off guard

Contact Blocks/Connections:

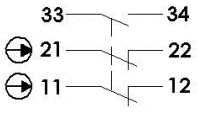
INCH-1
Slow Make Break 2NC



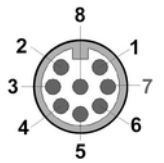
Slow Make Break 1NC 1NO



INCH-3 and MK1-SS
Slow Make Break 2NC 1NO

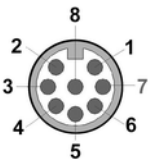


Switch Circuit	Quick Connect (QC) M12 8 Way Male (on Flying Lead 250mm) Pin view from switch
11/12	1 7
21/22 or 23/24	6 5



Quick Connect M12

Switch Circuit	Quick Connect (QC) M12 8 Way Male (on Flying Lead 250mm) Pin view from switch
11/12	1 7
21/22	6 5
33/34	4 3



Quick Connect M12

6. Always ensure that when fitting electrical conductors that they are routed correctly and do not interfere with the switch cover during fitting. Recommended conductor size is 1.5 – 2.5sq.mm, contact terminal tightening torque is 1Nm.
7. Tightening torque for the lid screw and cable glands is1Nm to maintain IP rating.
8. Check that the machine is stopped and cannot be started when the interlocked guard is open.
9. After installation apply tamper resistance paint or compound to the actuator and switch mounting bolts.

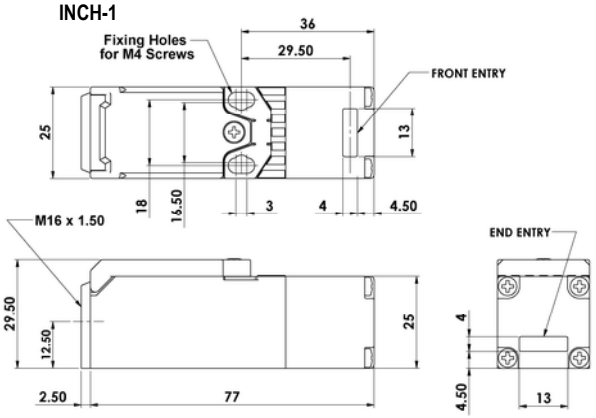
Maintenance:

Every Week: Check the switch actuator and body for signs of mechanical damage and wear. Replace any switch showing damage.
Check that the machine is stopped and cannot be started when the interlocked guard is open.

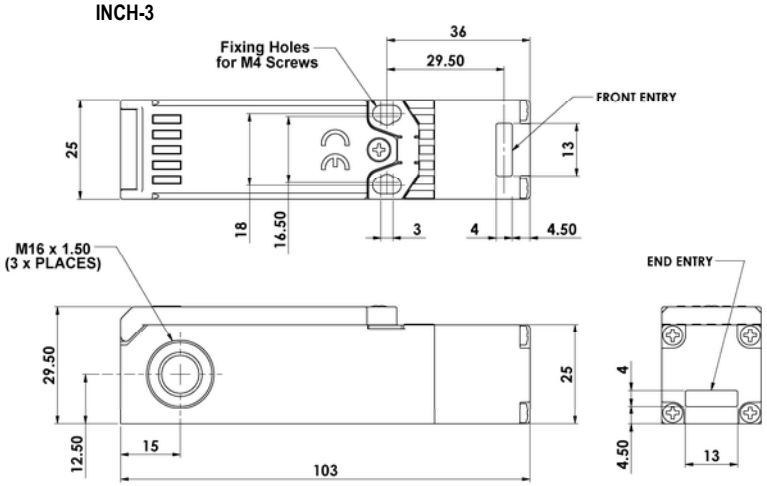
Every 6 Months: Check for mechanical damage to switch body or actuator. Replace any switch showing damage.
Isolate power and remove cover. Check screw terminal tightness and check for signs of moisture ingress. Never attempt to repair any switch.

Dimensions (outline fixing dimensions shown in mm)

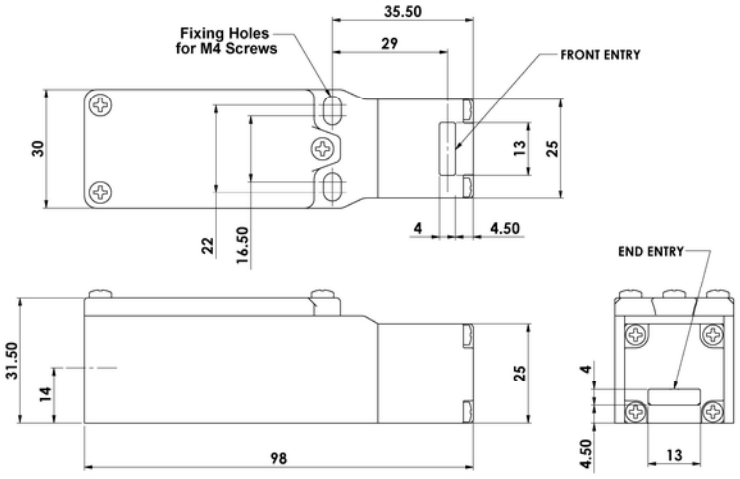
INCH-1



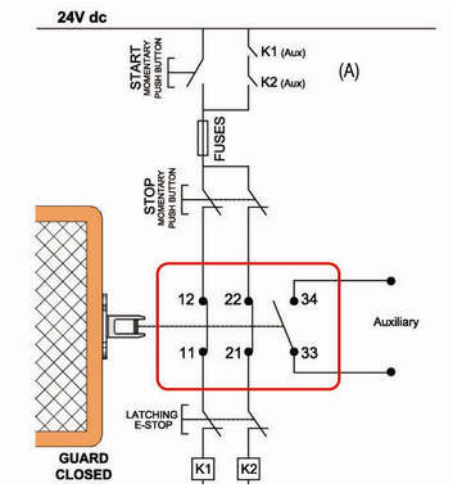
INCH-3



MK1-SS



Application Example: Door Interlock - Dual Channel non-monitored. INCH-3 or MK1-SS



This system shows interlock switch circuits 11-12 and 21-22 configured to allow dual circuit direct feeds to contactor coils K1 and K2.
When the start button is pressed and then released, the auxiliary contacts (A) of contactors K1 and K2 maintain the feed to the contactor coils.
Opening of the Interlock Switch or depressing the E Stop will isolate power to the contactor coils.
Re-start can only occur providing the Guard is closed and the E Stop is reset.

System is shown with the guards closed and the machine able to start.

Contact operation at withdrawal of actuator

2NC 1NO — 4.5 — 4.0 — 0 mm

11/12	Open	
21/22	Open	
33/34		Open

2NC — 4.0 — 0 mm

11/12	Open	
21/22	Open	

1NC 1NO (SNAP) — 4.5 — 4.0 — 0 mm

11/12	Open	
23/24		Open

Standards:	EN1088, 50047, IEC 60947-5-1, EN60204-1 ISO 13849-1, EN62061, UL508
Safety Classification & Reliability Data:	
Mechanical Reliability B10d	2.5 x 10^6 operations at 100mA load
EN 954-1	Up to Category 4 with Safety Relay
ISO 13849-1	Up to PLe depending upon system architecture
EN62061	Up to SIL3 depending upon system architecture
Safety Data – Annual Usage	8 cycles per hour/24 hours per day/365 days
PFHd	3.4 x 10^{-8}
Proof Test Interval (Life)	35 years
MTTFd	356 years
Utilization Category	AC15 A300 3A
Thermal Current (Ith)	10A
Rated Insulation/Withstand Voltages	600VAC/2500VAC
Actuator Travel/Force for Positive Opening	6mm/12N (Type Zb contacts)
Actuator Entry Minimum Radius	175mm Standard 100mm Flexible
Maximum Approach Withdrawal Speed	600mm/s
Body Material	Polyester/Stainless Steel 316
Enclosure Protection	IP67 Plastic or IP69K Stainless Steel 316
Operating Temperature	-25C +80C
Vibration	IEC 68-2-6 10-55Hz+1Hz Excursion: 0.35mm, 1 octave/min
Conduit Entry	Various (see sales part numbers)
Fixing	2 x M4
Mounting Position	Any
Pollution Degree	3
Short Circuit Overload Protection	Fuse externally 10A (FF)

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