



# Safety Interlock Switch HC-1, HC-3, HC-SS Operating Instructions



HC-1



HC-3



HC-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:

HC-1, HC-3 and HC-SS Hingecam Switches are designed to be mounted for interlock position sensing of hinged moving guards. They have been designed to be fitted to the hinged axis of machine guard doors..

They have positive opening contacts in accordance with IEC 60947-5-1 and after fitting the switch offers a high degree of anti-tamper. Various lengths and diameters of actuator shafts are available 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 (HC-SS is rated IP69K).

## Operation:

Operation of the switches is achieved by the sliding action of the stainless steel shaft to cause deflection of the switch plunger. Positive actuation of the contacts is achieved at only 7 degrees of opening of the guard.

## 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.

- Never use the switch as a mechanical stop.
- 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.
- The stainless steel shaft can be set to rotate clockwise or anti-clockwise depending upon the opening direction of the guard.
- When mounting to the guard door, align and fix the switch body to the frame of the door using 2 x M4 mounting bolts tightened at 1.5Nm.
- 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.
- Tightening torque for the lid screw and cable glands is 1Nm to maintain IP rating.
- The switch shaft should be aligned axially with the hinge point of the guard. The shaft must be secured using at least 2 fixing screws (grub type) and after final checking secured permanently by drilling and fixing with a spirol pin. See image 1 opposite:
- Check that the machine is stopped and cannot be started when the interlocked guard is open.
- After installation apply tamper resistance paint or compound to the actuator and switch mounting bolts.

## Maintenance:

Every Week: Check the switch body and stainless steel shaft 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.

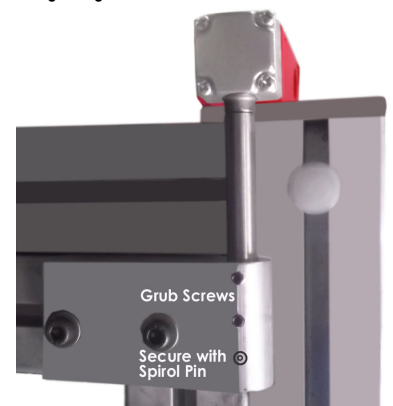
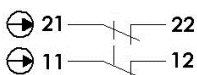


Image 1

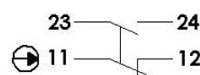
## Contact Blocks/Connections:

### HC-1

Slow Make Break 2NC

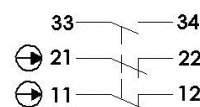


Slow Make Break 1NC 1NO

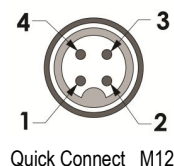


### HC-3 and HC-SS

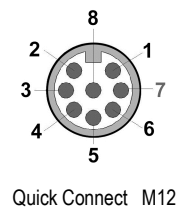
Slow Make Break 2NC 1NO



Switch Circuit	Quick Connect (QC) M12 4 Way Male (on Flying Lead 250mm) Pin view from switch
11/12	1 3
21/22 or 23/24	4 2

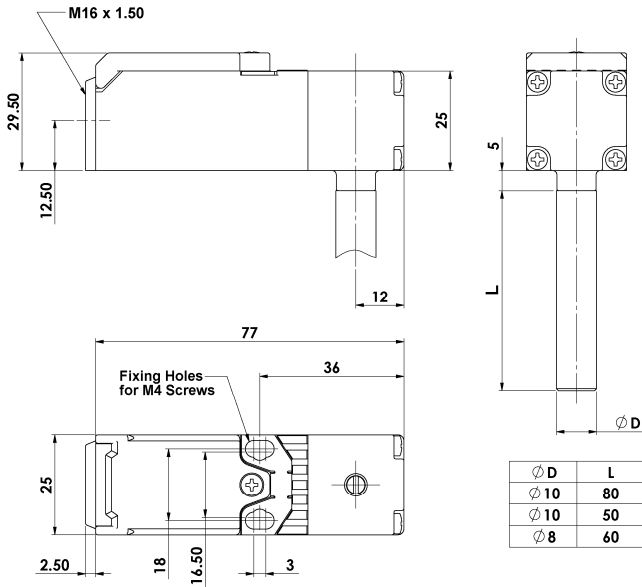


Switch Circuit	Quick Connect (QC) M12 8 Way Male (on Flying Lead 250mm) Pin view from switch
11/12	1 7
21/22	6 5
33/34	4 3
Earth	8



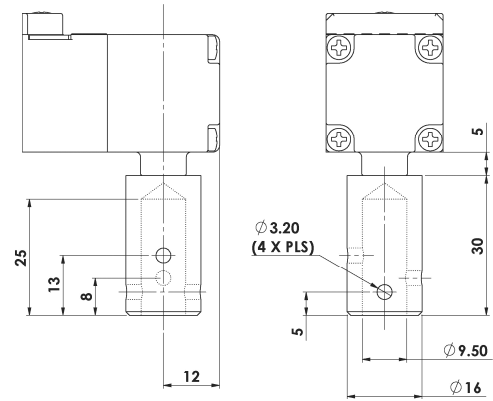
Dimensions (outline fixing dimensions shown in mm)

HC-1



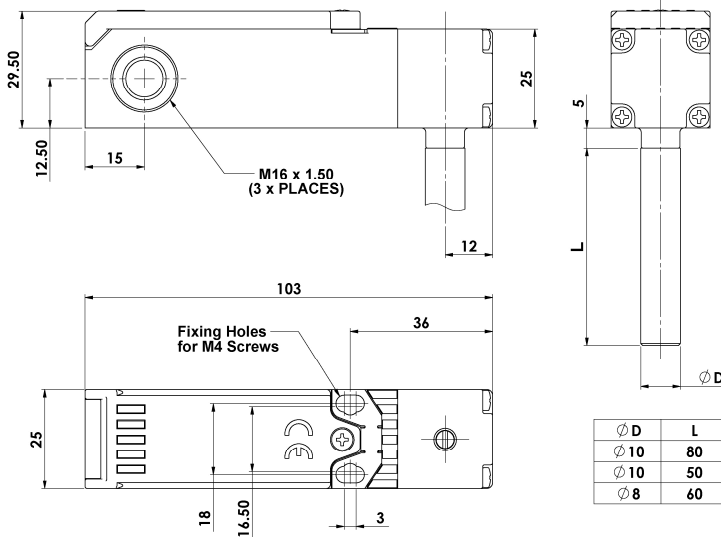
# Safety Interlock Switch

Dimensions for hollow shaft – all versions

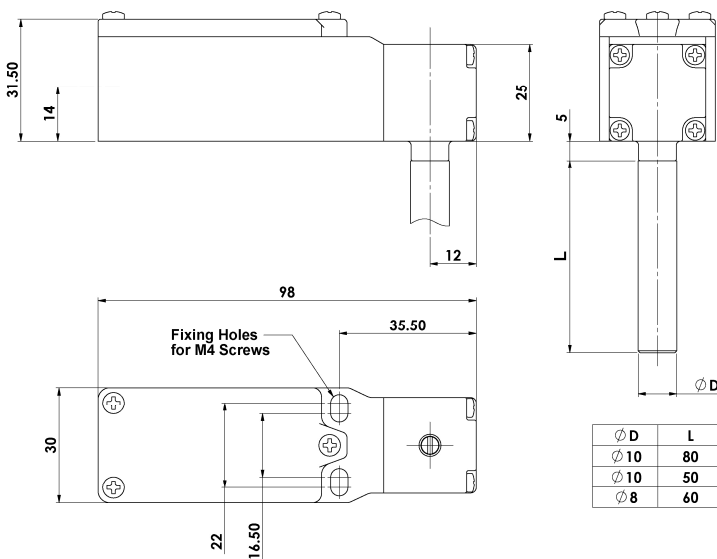


Application Example: Door Interlock - Dual Channel non-monitored. HC-1, HC-3 and HC-SS.

HC-3

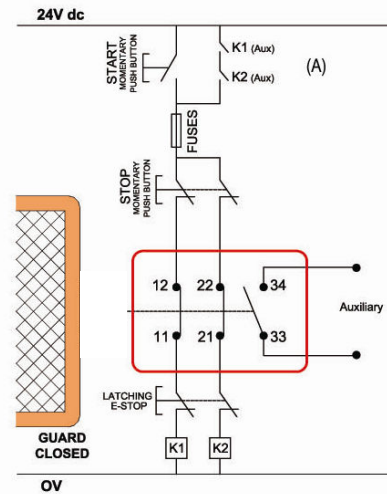


HC-SS



Information with regard to UL 508:

Type 1 Enclosures.  
 Use 16 - 12AWG copper conductors, rated 90°C minimum.  
 Intended for same polarity use and one polymeric conduit connection.  
 Electrical Rating:  
 Max. Switching Current / Volt / Amp:  
 120V. 6A. (720VA break) PF 0.38  
 240V. 3A. (720VA break) PF 0.38



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.

- Standards:** ISO 14119, 50047, IEC 60947-5-1, EN62024-1, ISO 13849-1, EN62061, UL508
- Safety Classification & Reliability Data:**
- Mechanical Reliability B10d 2.5 x 10<sup>6</sup> operations at 100mA load
  - 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
  - PFFhd 3.4 x 10<sup>-8</sup>
  - 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 Rotation for Positive Opening 7 degrees 0.5Nm (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)