



Safety Interlock Switch HS-SS / HSM Operating Instructions



HSM (Die Cast)



HS-SS (Stainless Steel)

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 the user 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:

HS-SS and HSM Hinge 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 and provide a robust hinge function in addition to interlock position sensing. They have positive opening contacts in accordance with IEC 60947-5-1 and after fitting the switch offers a very high degree of anti-tamper. The hinge switch shall be used to mount the machine guard door into the machine guard frame and contact blocks are available in slow make/break 3NC 1NO, or 2NC 2NO. Enclosures are protected to IP67 / IP69K with a low profile, hygienic design for washdown.

Operation:

Operation of the switches is achieved by the rotating action of a cam and actuator to cause deflection of the switch plunger. Positive actuation of the contacts is achieved at only 6 degrees of opening of the guard and can be adjusted up to 12 degrees if required upon installation.

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.

1. Never use the switch as a mechanical stop.
2. The hinge switch can be mounted in any orientation depending upon the opening direction of the guard.
3. The hinge switch can be supplied in left and right-handed variants, and can be mounted with the connector either in the top or bottom orientation.
4. **All hinge switches are factory set to 6 degrees positive break.** This should be sufficient for the majority of applications. However, should the installer require a large switching angle, this can be achieved upon installation via adjustment of the internal cam. See step 5.
5. **IMPORTANT:** If the hinge switch activation angle is adjusted during installation, the cam locking screw must be re-tightened to a torque of 2Nm. See Fig.1 opposite. Ensure rear cover and gasket are re-fitted correctly using M3 screws provided.
6. Check that the machine is stopped and cannot be started when the interlocked guard is open.
7. After installation apply tamper resistance paint or compound to the hinge (or bracket) mounting bolts.
8. All mounting hardware is supplied by the user. Fasteners must be of sufficient strength to guard against breakage or loosening of the hinge and guard.
9. The mounting holes on the rear of the switch accept M5 screws, the mounting slots on the front of the optional fixing bracket accept M6 screws (see dimensional drawings and specification page 2).
10. Excessive force must not be exerted by the weight and swing of the guard door (see limits in specification page 2).
11. If hinges are used in pairs for larger guard doors (or with a separately supplied Idem Blank Hinge) the hinges must be mounted co-axially. This can typically be ensured by mounting onto the same flat profile, and using a flat edge to ensure the hinges are parallel and aligned either vertically or horizontally (depending on installation orientation).
12. After mounting of the hinge(s) check the rotation and swing of the guard for misalignment and potential binding.

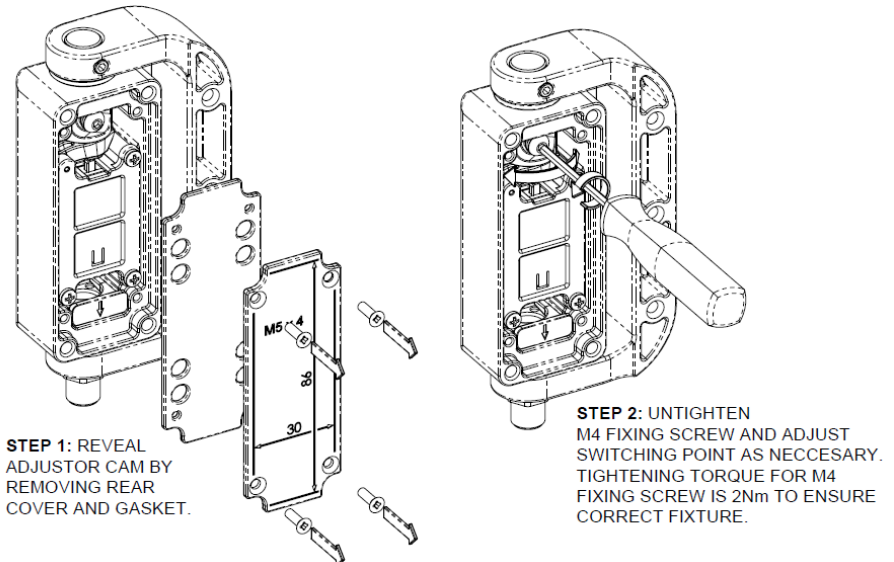


Fig.1: (If Required) Positive Opening Angle Adjustment during Installation



Warning: Do not use the hinge switch as an end stop. The hinge will rotate freely through 360 degrees. If the operating angle needs to be limited, this must be done so through a separate outer end stop within the guard.



Warning: Do not defeat, bypass or tamper with this switch, severe injury may result.

Maintenance:

- Every Month:
1. Check the switch body for signs of mechanical damage and wear.
 2. Replace any switch showing damage.
 3. Check that the machine is stopped and cannot be started when the interlocked guard is open.
 4. Check for signs of moisture ingress.
 5. Never attempt to repair any switch.



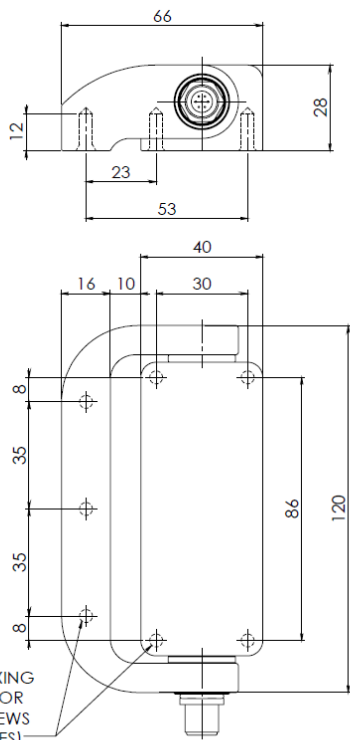
Important: The safety functions and mechanics must be tested regularly. For applications where infrequent guard access is foreseeable, the system must have a manual function test to detect a possible accumulation of faults. At least once per month for PLe Cat3/4 or once per year for PLd Cat3 (ISO13849-1). Where possible it is recommended that the control system of the machine demands and monitors these tests, and stops or prevents the machine from starting if the test is not done. (See ISO14119).

Contact Blocks / Connections:

| Function | M12 8 way Male (Pin view from switch) | Conductor Colours (8 Core) |
|-----------------------|--|----------------------------|
| NC3 or NO2 (optional) | 4 | Red |
| NC3 or NO2 (optional) | 3 | Blue |
| NO (auxiliary) | 2 | Brown |
| NO (auxiliary) | 8 | Orange |
| NC 1 | 7 | Black |
| NC 1 | 1 | White |
| NC 2 | 6 | Yellow |
| NC 2 | 5 | Green |

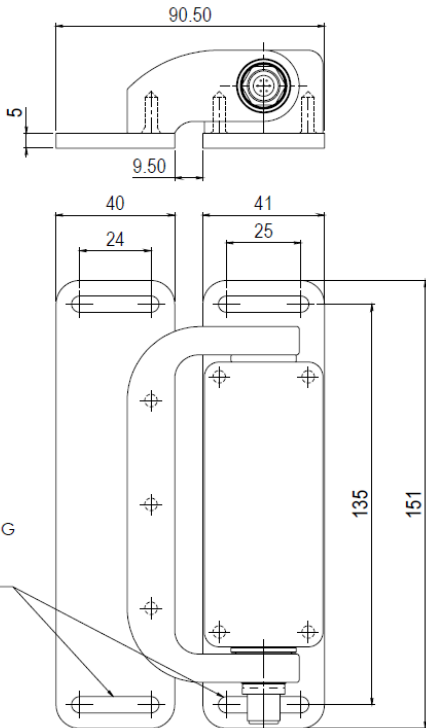
Dimensions (all shown in mm)

HS-SS / HSM



REAR FIXING HOLES FOR M5 SCREWS (7 PLACES)

HS-SS / HSM Fixing Bracket



FRONT FIXING SLOTS FOR M6 SCREWS (4 PLACES)

Application Example: Door Interlock - Dual Channel non-monitored. HS-SS / HSM

This system shows interlock switch circuits 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 machine able to start. See Fig 2.

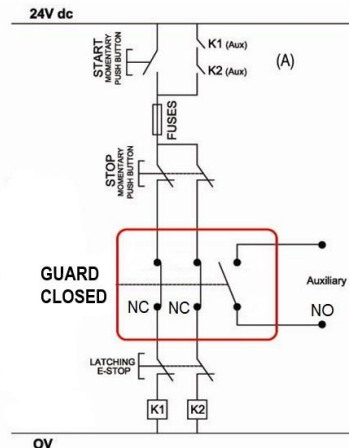


Fig.2: Dual Circuit Interlocking Switch Diagram

Standards: ISO 14119, IEC 60947-5-1, EN60204-1
ISO 13849-1, EN62061.

Safety Classification & Reliability Data:

Mechanical Reliability B10d

ISO 13849-1

EN62061

Safety Data – Annual Usage

1.5 x 10⁶ operations at 100mA load
Up to PLe depending upon system architecture
Up to SIL3 depending upon system architecture
8 cycles per hour/24 hours per day/365 days
MTTFd 356 years

Utilization Category

Thermal Current (Ith)

Overload protection fuse (fuse externally)

AC15 A300 3A

10A

10A. (FF)

Rated Insulation/Withstand Voltages

Actuator Rotation for Positive Opening

Maximum Approach Withdrawal Speed

Body Material

Enclosure Protection

Operating Temperature

Vibration

Conduit Entry

Fixing

Tightening Torque (all mounting bolts)

Mounting Position

Pollution Degree

Short Circuit Overload Protection

Altitude

Humidity

600VAC/2500VAC

6 degrees 0.5Nm (Type Zb contacts)

600mm/s

Stainless Steel 316 (Mirror Polished Finish) or Die Cast (Black Plated Mirror Finish)

IP67 / IP69K

-25C +80C

IEC 68-2-6 10-55Hz+1Hz

Excursion: 0.35mm, 1 octave/min

Various (see sales part numbers)

7 x M5

4Nm

Any

3

Fuse externally 10A (FF)

Max. Altitude 2000m

Relative Humidity 90% at 20 °C (Non-Condensing)

| | |
|--|--|
| Information with regards to UL standards: | Type 1 Enclosures. |
| | Electrical Rating: Pilot Duty A300 240V. 3A. 6,000 cycles. Maximum ambient temperature 80°C. |
| | Connector versions: 30V. AC/DC 2A. Max. |



WARNING: DO NOT DEFEAT, TAMPER, OR BYPASS THE SAFETY FUNCTION. FAILURE TO DO SO CAN RESULT IN DEATH OR SERIOUS INJURY.

AVERTISSEMENT: NE PAS DESACTIVER, MODIFIER, RETIRER, OU CONTOURNER CETI INTERVERROUILLAGE IL PEUT EN RESULTER DES BLESSURES GRAVES DU PERSONNEL UTILISATEUR.

Original Instructions:

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Um dieses Datenblatt in Deutscher Sprache wenden Sie sich bitte anfordern info@idemsafety.com
Pour obtenir cette fiche en Français, veuillez contacter info@idemsafety.com
Para solicitar esta hoja de datos en Español, por favor contacto con info@idemsafety.com



Warning: Do not exceed recommended working loads. Where medium or large sized guard doors are to be supported using the hinge switch, use of secondary hinge switch, or blank hinges should be considered by the installer (See Fig. 3)

$$F_A = 800N \quad F_R = 800N$$

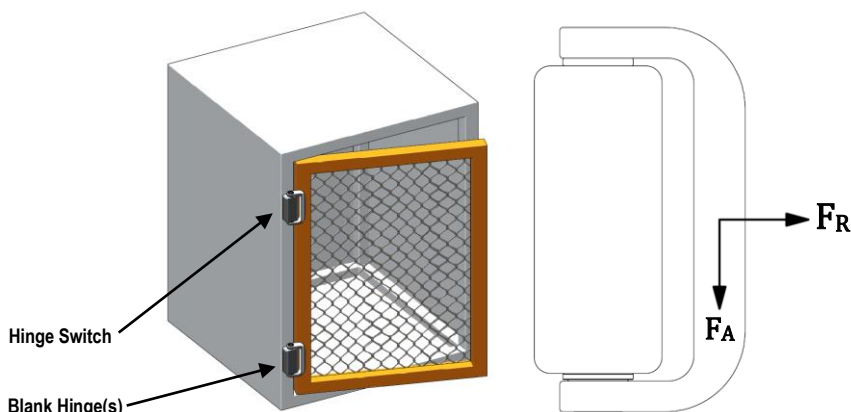


Fig.3: Hinge Arrangement and Max Loading Diagram