



# Safety Limit Switches

## HLM HLM-SS Operating Instructions

### HLM (Die-Cast) IP66 / IP67



### HLM-SS (Stainless Steel) IP66 / IP67 / IP69K



#### APPLICATION:

IDEM Limit switches are designed to be mounted for position sensing of moving applications e.g. guard doors, conveyors, machine beds, elevators etc. They are available with linear plungers, rotary levers or roller plungers and either slow or snap action contacts. All contact blocks are positively operated to satisfy IEC 60947-5-1.

#### Operation:

Operation of the switches is achieved by a sliding actuation of the moving object to cause deflection of the switch plungers or levers. For safety applications it is important that the moving object does not pass completely over the switch actuators so as to cause the actuator to return to its original position.

#### Installation Guide: Correct Mounting of Limit 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.

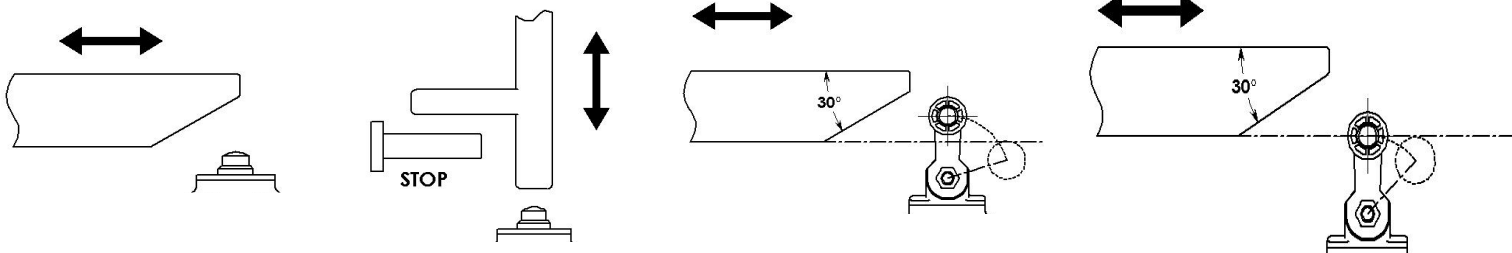
1. Never use the switch as a mechanical stop. Ensure that the actuator is protected from mechanical shock.
2. For switches with Linear actuators the actuating direction and force from the moving object should be applied in line with the axis of the plunger.
3. For switches with Rotary actuators or rollers the operating cam from the moving object should be designed such that the switch is never operated beyond its over travel position. Always use a 30 degree tapered actuating cam.

Incorrect

Correct

Incorrect

Correct

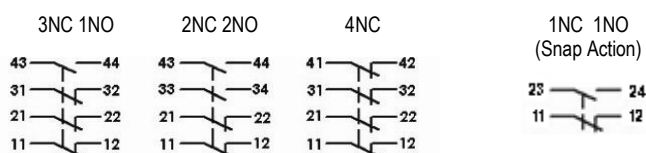


4. Always ensure that when running electrical conductors that they are routed correctly and no damage can occur to the cable insulation.
5. Always use M5 mounting bolts and ensure 2Nm tightening torque for robust fitting.
6. Ensure 1Nm tightening torque for conduit plugs and cable glands to achieve IP rating.
7. 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 PL<sub>e</sub> Cat3/4 or once per year for PL<sub>d</sub> 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).

#### Maintenance:

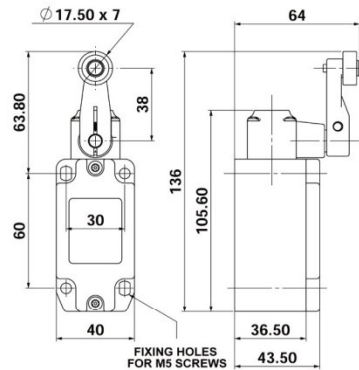
Every Month: Check switch actuator and body for signs of mechanical damage and wear. Replace any switch showing damage.  
Every 6 Months: Isolate power and remove cover. Check screw terminal tightness and check for signs of moisture ingress. Never attempt to repair any switch.

#### Contact Block Options:



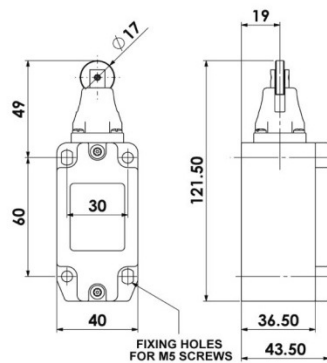
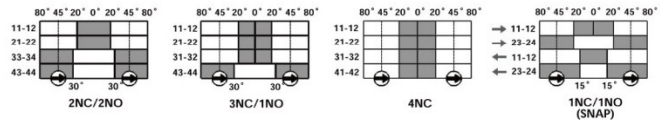
# Safety Limit Switches

## Safety Limit Switches HLM



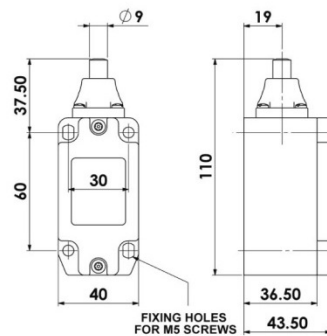
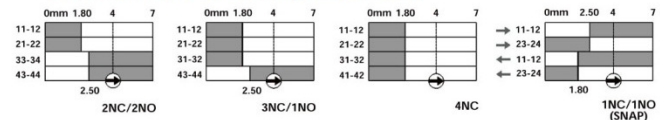
| HLM Short Roller Lever |        | Sales Numbers |        |
|------------------------|--------|---------------|--------|
|                        | M20    | 1/2"NPT       | QC M23 |
| 2NC 2NO                | 174001 | 174002        | 174003 |
| 3NC 1NO                | 174004 | 174005        | 174006 |
| 4NC                    | 174007 | 174008        | 174009 |
| 1NC 1NO Snap           | 174010 | 174011        | 174012 |
| 1NC 1NO EX             | 174013 | 3m. 4 core    | Ex     |
| 2NC EX                 | 174014 | 3m. 4 core    | Ex     |
| 2NC 2NO EX             | 174015 | 3m. 8 core    | Ex     |

Gold Plated Contacts available for low power circuits (5V. 5mA).  
Add GC to Part Number e.g. 174001-GC



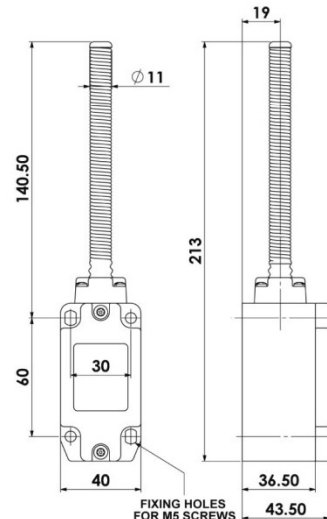
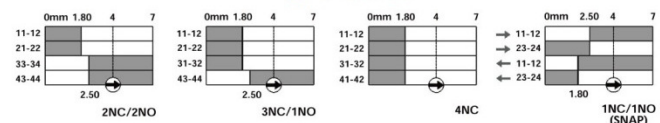
| HLM Roller Plunger |        | Sales Numbers |        |
|--------------------|--------|---------------|--------|
|                    | M20    | 1/2"NPT       | QC M23 |
| 2NC 2NO            | 174051 | 174052        | 174053 |
| 3NC 1NO            | 174054 | 174055        | 174056 |
| 4NC                | 174057 | 174058        | 174059 |
| 1NC 1NO Snap       | 174060 | 174061        | 174062 |
| 1NC 1NO EX         | 174063 | 3m. 4 core    | Ex     |
| 2NC EX             | 174064 | 3m. 4 core    | Ex     |
| 2NC 2NO EX         | 174065 | 3m. 4 core    | Ex     |

Gold Plated Contacts available for low power circuits (5V. 5mA).  
Add GC to Part Number e.g. 174051-GC



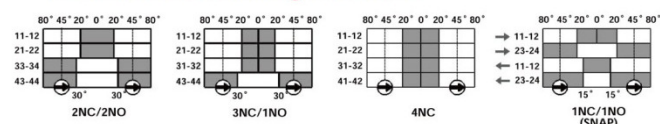
| HLM Pin Plunger |        | Sales Numbers |        |
|-----------------|--------|---------------|--------|
|                 | M20    | 1/2"NPT       | QC M23 |
| 2NC 2NO         | 174101 | 174102        | 174103 |
| 3NC 1NO         | 174104 | 174105        | 174106 |
| 4NC             | 174107 | 174108        | 174109 |
| 1NC 1NO Snap    | 174110 | 174111        | 174112 |
| 1NC 1NO EX      | 174113 | 3m. 4 core    | Ex     |
| 2NC EX          | 174114 | 3m. 4 core    | Ex     |
| 2NC 2NO EX      | 174115 | 3m. 8 core    | Ex     |

Gold Plated Contacts available for low power circuits (5V. 5mA).  
Add GC to Part Number e.g. 174101-GC



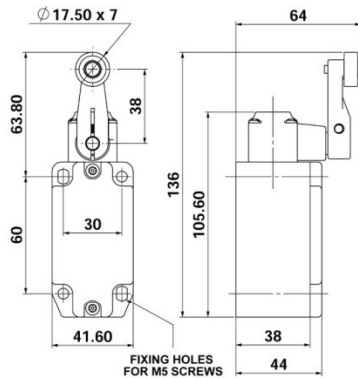
| HLM Spring Lever |        | Sales Numbers |        |
|------------------|--------|---------------|--------|
|                  | M20    | 1/2"NPT       | QC M23 |
| 2NC 2NO          | 174151 | 174152        | 174153 |
| 3NC 1NO          | 174154 | 174155        | 174156 |
| 4NC              | 174157 | 174158        | 174159 |
| 1NC 1NO Snap     | 174160 | 174161        | 174162 |
| 1NC 1NO EX       | 174163 | 3m. 4 core    | Ex     |
| 2NC EX           | 174164 | 3m. 4 core    | Ex     |
| 2NC 2NO EX       | 174165 | 3m. 8 core    | Ex     |

Gold Plated Contacts available for low power circuits (5V. 5mA).  
Add GC to Part Number e.g. 174151-GC



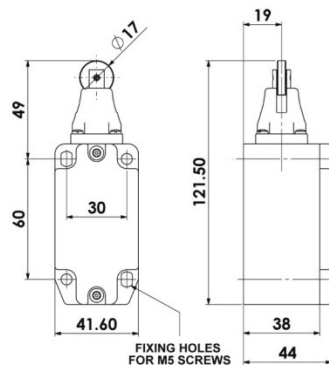
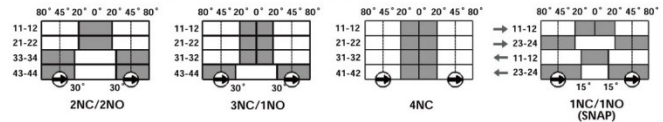
# Safety Limit Switches

## Safety Limit Switches HLM-SS



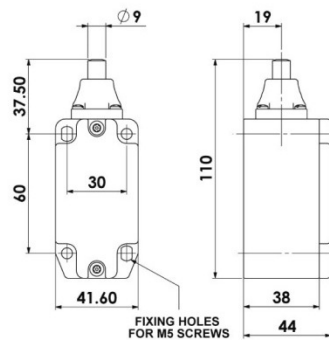
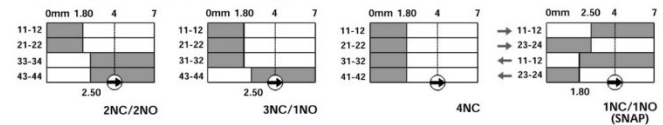
| HLM-SS       | Short Roller Lever | Sales Numbers |        |
|--------------|--------------------|---------------|--------|
|              | M20                | ½"NPT         | QC M23 |
| 2NC 2NO      | 175001             | 175002        | 175003 |
| 3NC 1NO      | 175004             | 175005        | 175006 |
| 4NC          | 175007             | 175008        | 175009 |
| 1NC 1NO Snap | 175010             | 175011        | 175012 |
| 1NC 1NO EX   | 175013             | 3m. 4 core    | Ex     |
| 2NC EX       | 175014             | 3m. 4 core    | Ex     |
| 2NC 2NO EX   | 175015             | 3m. 8 core    | Ex     |

**Gold Plated Contacts available for low power circuits (5V. 5mA).**  
**Add GC to Part Number e.g. 175001-GC**



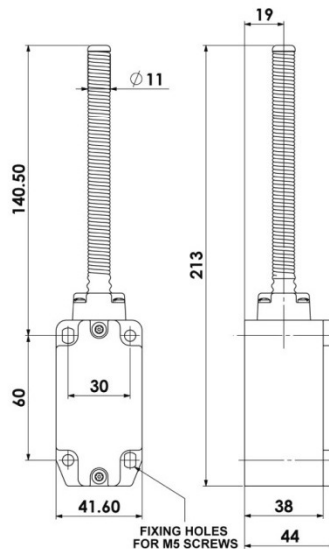
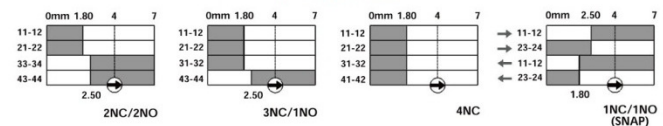
| HLM-SS       | Roller Plunger | Sales Numbers |        |
|--------------|----------------|---------------|--------|
|              | M20            | ½"NPT         | QC M23 |
| 2NC 2NO      | 175051         | 175052        | 175053 |
| 3NC 1NO      | 175054         | 175055        | 175056 |
| 4NC          | 175057         | 175058        | 175059 |
| 1NC 1NO Snap | 175060         | 175061        | 175062 |
| 1NC 1NO EX   | 175063         | 3m. 4 core    | Ex     |
| 2NC EX       | 175064         | 3m. 4 core    | Ex     |
| 2NC 2NO EX   | 175065         | 3m. 4 core    | Ex     |

**Gold Plated Contacts available for low power circuits (5V. 5mA).**  
**Add GC to Part Number e.g. 175051-GC**



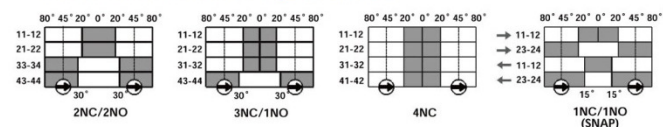
| HLM-SS       | Pin Plunger | Sales Numbers |        |
|--------------|-------------|---------------|--------|
|              | M20         | ½"NPT         | QC M23 |
| 2NC 2NO      | 175101      | 175102        | 175103 |
| 3NC 1NO      | 175104      | 175105        | 175106 |
| 4NC          | 175107      | 175108        | 175109 |
| 1NC 1NO Snap | 175110      | 175111        | 175112 |
| 1NC 1NO EX   | 175113      | 3m. 4 core    | Ex     |
| 2NC EX       | 175114      | 3m. 4 core    | Ex     |
| 2NC 2NO EX   | 175115      | 3m. 8 core    | Ex     |

**Gold Plated Contacts available for low power circuits (5V. 5mA).**  
**Add GC to Part Number e.g. 175101-GC**



| HLM-SS       | Spring Lever | Sales Numbers |        |
|--------------|--------------|---------------|--------|
|              | M20          | ½"NPT         | QC M23 |
| 2NC 2NO      | 175151       | 175152        | 175153 |
| 3NC 1NO      | 175154       | 175155        | 175156 |
| 4NC          | 175157       | 175158        | 175159 |
| 1NC 1NO Snap | 175160       | 175161        | 175162 |
| 1NC 1NO EX   | 175163       | 3m. 4 core    | Ex     |
| 2NC EX       | 175164       | 3m. 4 core    | Ex     |
| 2NC 2NO EX   | 175165       | 3m. 8 core    | Ex     |

**Gold Plated Contacts available for low power circuits (5V. 5mA).**  
**Add GC to Part Number e.g. 175151-GC**



# Safety Limit Switches

## Safety Classification and 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    |
| Safety Data – Annual Usage  | 8 cycles per hour / 24 hours per day / 365 days |
|                             | MTTFd 356 years                                 |

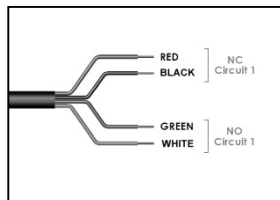
## Technical Specification:

|                                          |                                                                    |
|------------------------------------------|--------------------------------------------------------------------|
| Conforming to standards                  | ISO14119 IEC947-5-1 UL60947-5-1 EN50041 ISO13849-1                 |
| Positive Opening Operation (NC Contacts) | Linear Types 18N.<br>Rotary Types 0.4Nm.<br>Spring Lever Types 2N. |
| Utilization Category                     | AC15 A300 240V. 3A.                                                |
| Min Current                              | 5V, 5mA, DC                                                        |
| Thermal Current (Ith)                    | 10A                                                                |
| Rated Impulse Withstand Volt             | 2500VAC                                                            |

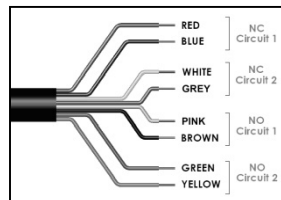
|                            |                                                         |
|----------------------------|---------------------------------------------------------|
| Case Material              | HLM (Die Cast Painted Red) HLM-SS (Stainless Steel 316) |
| Enclosure Protection       | HLM IP66 / IP67 HLM-SS IP66 / IP67 / IP69K              |
| Operating Temperature      | Min. -25°C Max 80°C                                     |
| Mechanical Life Expectancy | 2,500,000 Cycles                                        |
| Vibration                  | IEC 68-2-6, 10-55Hz 0.35mm                              |
| Conductor size             | 1.5 sq.mm                                               |

## Pre-Wired EX versions:

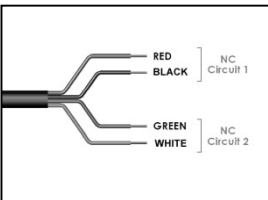
1 NC 1 NO



2 NC 2 NO



2 NC



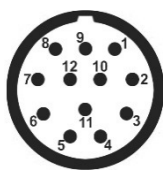
### Optional EX circuits:

|                |                                                                  |
|----------------|------------------------------------------------------------------|
| Type           | IDEM LS-EX internal switch                                       |
| Classification | Ex d IIC T6 (-20C Ta 60C) Gb<br>Ex tb IIIC T85C (-20C Ta 60C) Db |
| Rated Voltage  | 250V ac/dc                                                       |
| Rated Current  | 2 pole 4A. 4 pole 2.5A.                                          |

### IMPORTANT:

**SPECIFIC CONDITION OF USE:**  
THE INTEGRAL CABLE SHALL BE SUITABLY  
PROTECTED FROM PHYSICAL DAMAGE AND ABRASION.  
THE INTEGRAL CABLE IS TO BE TERMINATED IN A  
SUITABLE TERMINAL FACILITY.

## Quick Connect Version:



| Quick Connect (QC)<br>M23 12 Way Male<br>(connector length 26mm)<br>(Pin View from Switch) |    | Switch Circuit     |
|--------------------------------------------------------------------------------------------|----|--------------------|
| 1                                                                                          | 3  | 11 / 12            |
| 4                                                                                          | 6  | 21 / 22 or 23 / 24 |
| 7                                                                                          | 8  | 33 / 34 or 31 / 32 |
| 9                                                                                          | 10 | 41 / 42 or 43 / 44 |
| 12                                                                                         |    | Earth              |

### INFORMATION FOR UL Standards:

Type 1 Enclosures.  
Use 16 - 12AWG copper conductors, rated 75°C minimum.  
Intended for same polarity use.  
Electrical Rating: A300 240V.ac 3A. (6,000 cycles)  
240V. 10A. carry only.  
Wire range: 16AWG – 12AWG Copper Torque 7lb/in (0.8Nm)  
Earth bonding terminal inside enclosure if required.



**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

### Original Instructions.

To request this data sheet in other languages please contact [info@idemsafety.com](mailto:info@idemsafety.com)  
Um dieses Datenblatt in Deutscher Sprache wenden Sie sich bitte anfordern [info@idemsafety.com](mailto:info@idemsafety.com)  
Pour obtenir cette fiche en Français, veuillez contacter [info@idemsafety.com](mailto:info@idemsafety.com)  
Para solicitar esta hoja de datos en Español, por favor contacto con [info@idemsafety.com](mailto:info@idemsafety.com)