



Catalog

# ABB Jokab Safety Safety switches and emergency stops



# ABB Jokab Safety Safety switches and emergency stops



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# Safety switches from ABB Jokab Safety

## About Machine Interlocking Safety

### International Standards / European Standards

#### Basic Safety Standards:

- **EN ISO 12100-1 EN ISO 12100-2 (supersedes EN 292-1 EN 292-2) Safety of Machinery- Basic Terminology and concepts for Design**  
Outlines the concepts for Risk Assessment, Interlocking, Emergency Stops, and references other standards and directives e.g. EN 60204-1, EN ISO 13850.
- **ISO 14121-1 (supersedes EN 1050) Safety of Machines – Risk Evaluation**  
Outlines the requirements for assessing Hazard analysis and Risk reduction for the Machine.
- **EN 60204-1 Electrical Equipment of Machines – General requirements.**  
Outlines the requirements for Electrical wiring safety on machines and specifies the Emergency Stop functions and requirements.

#### Design Standards:

- **EN 1088 Safety of Machinery – Safety of Machinery – Interlocking Devices**  
Outlines the principles for the design and selection of Interlock and Emergency Stop devices. Provides references to the other basic standards and to standards for verifying the performance of various devices e.g. IEC 947-5-1 for positive break switching elements and IEC 947-5-3 for Non Contact devices with defined behaviour.
- **EN ISO 13849-1 (supersedes EN954-1) Safety of Machines – Safety related parts of control systems – General principles for Design**  
EN954-1 described the categories which apply to Safety related parts of the controls. It describes risk evaluation by means of which the required Safety Categories (B, 1, 2, 3, 4) are met. This standard will be superseded late in 2011 by ISO13849-1 which is based on the familiar categories from EN 954-1 but examines complete safety functions, including all the components involved in their design. ISO 13849-1 goes beyond the qualitative approach of EN 954-1 to include a quantitative assessment of the safety functions. A performance level (PL) is used for this, building upon the categories. There are five PL (a to e) replacing the five EN954-1 Categories (B to 4).
- **IEC 947-5-1 Low voltage switchgear and controlgear – Electro-Mechanical control circuit devices.**  
Describes the Mechanical Design and Test requirements for control circuit devices incorporating positive break contacts. Designates Electrical switching characteristics e.g. AC15 10A.
- **IEC 947-5-5 Low voltage switchgear and controlgear- Emergency Stop devices with mechanical latching.**  
In addition to the requirements of IEC 947-5-1, describes the Mechanical Design and Test requirements for Control circuit devices with Emergency Stop Functions with mechanical latching. Provides specific requirements relating to Safety Rope switches and systems.
- **IEC 947-5-3 Low voltage switchgear and controlgear- Proximity devices with defined behaviour under fault conditions**  
Describes the Design and Test requirements for Non Contact devices with defined behaviour under fault conditions. Specifies 4 categories to define Fault behaviour D T S or M.
- **EN ISO 13850 (supersedes EN 418) - Emergency Stop Design guidelines.**  
Provides principles for design of latching Emergency Stop devices. Specifies the requirement for Emergency stop devices to be latching with a mechanical reset.
- **UL 508 Industrial Control Equipment.**  
Describes the Electrical performance requirements and material specification used for Industrial Control switchgear in USA.
- **IEC 61508 Functional Safety for Safety Related E/E/PES – Functional Safety for Electrical, Electronic or Programmable Electronic Systems**  
A generic standard covering various industries – Measures the Safety of an E/E/PES by using Safety Integrity Levels (SIL's). Provides a SIL based upon the Probability of Failure on demand (PFd) or the Probability of Failure per hour (PFh) up to SIL 4.
- **EN 62061 Safety of Machines – Safety related parts of controls.**  
In addition to IEC 61508 and specifically for Machine Safety Systems this standard covers the entire life cycle of a 'system' or devices used to make up a system from concept through to shutdown. Measures Safety the same as IEC 61508 by using Safety Integrity Level up to SIL 3. Provides a SIL based upon the Probability of Failure on demand (PFd) or the Probability of Failure per hour (PFh) up to SIL 3. IDEM devices will be specified as up to SIL3 for devices provided as sub systems or intended to be used in sub systems by the end user.

### EC Directives



All products are supplied with a Declaration of Conformity to the following EC Directive:

- RoHS 02/95/EC

and to one or more of the following EC Directives:

- Machinery Directive 2006/42/EC
- Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC

### Third Party Approvals

All products are supplied with independent testing and approval by one or more of the following organisations:



# Safety switches from ABB Jokab Safety

## About Safety Levels for Machinery – the transition to ISO13849-1 and EN62061 from EN954-1.

Companies involved in building, refurbishing or maintaining machinery need to consider the transition to the new standards especially when designing new machinery or planning a major upgrade. In terms of the established machinery safety standard EN954-1 (Safety of Machinery – Safety related parts of Control Systems), this standard currently categorizes safety levels, but will be superseded by two new standards that will coexist.

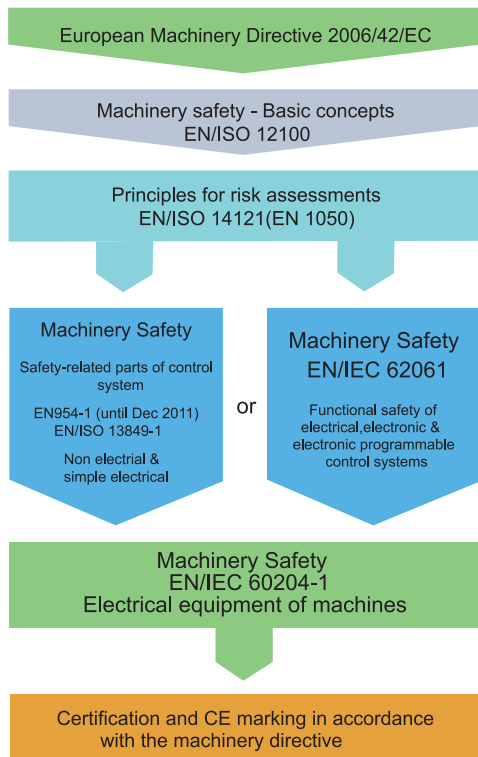
The original standard EN954-1 will remain valid until late 2011 to provide a period of transition to the new standards.

Designers and installers of safety systems can choose to conform to the requirements of any of the three standards.

Figure 1 shows the design process and how the three standards relate. For most non electrical or simple electrical machine controls EN954-1 or ISO13849-1 will be sufficient.

EN/IEC62061 is a derivative from the software based standard EN/ISO61508 which covers programmable devices such as Safety PLC's or sophisticated safety electronics.

Figure 1.



Before these standards can be applied, a risk assessment as defined in EN/ISO 14121 should have been performed, to identify potential risks and risk reduction measures.

Best practice dictates the assessments are documented and in many cases produced in addition to the equipment operating instructions and technical documentation.

## EN/ISO 13849-1 Machine Safety - safety-related parts of control systems non electrical and simple electrical.

This standard is a development of EN954-1 and provides safety requirements and guiding principles for design and integration of safety-related parts of control systems. Introduced in 1996, EN954-1 was considered by some as an over simplistic approach and failed to force designers to assess the reliability of the safety components.

The new standard EN/ISO13849-1 adds a quantitative calculation to the qualitative requirements of EN954-1 and considers the likelihood of safety system component failure. As with EN954-1 an estimation of risk is used to determine the required performance level (PL). EN954-1 establishes Safety Categories B, 1, 2, 3, 4 (highest), EN ISO 13849-1 establishes Performance Levels PLa to PLe (highest).

This is done using a risk graph (see Figure 2).

S = Severity of injury  
 S1 = Slight (normally reversible)  
 S2 = Serious (normally irreversible injury including death)  
 F = Frequency and/or exposure to a hazard  
 F1 = Seldom to less often and/or the exposure time is short  
 F2 = Frequent to continuous and/or the exposure time is long

P = Possibilities of avoiding the Hazard or limiting the harm  
 P1 = Possible under specific conditions  
 P2 = Scarcely possible

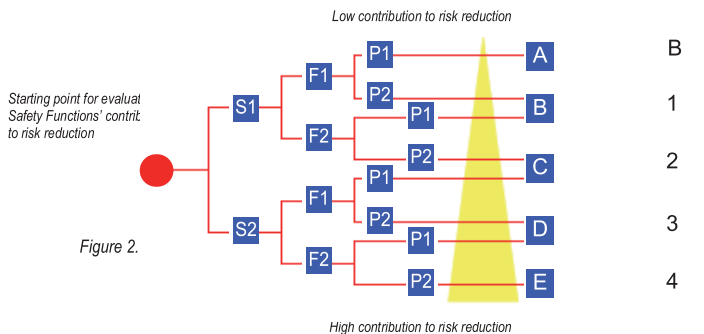


Figure 2.

Following on from this graph, further guidance is included in the new standards to assist with the system design, meaning that the math's required is minimal.

In general terms, EN/ISO13849-1 takes a four-stage approach to the design of safety-related control systems.

1. Perform a risk assessment (EN/ISO14121)
  2. For the identified risks, allocate the safety measure, Performance Level (PL)
  3. Devise a system architecture that is suitable for the Performance Level or Category.
  4. Validate the design to check that it meets the requirements of the initial risk assessment.
- For ISO 13849-1 and EN/IEC62061 this last step involves using manufacturers' data for the reliability of the components, including the calculation of MTTFd (Mean time to Dangerous Failure) and DC (Diagnostic capability) and accounting for common mode failure of components. ABB Jokab Safety device is shown in the specification table on the product page.

## EN/IEC 62061 Machine Safety - Functional safety of electrical, electronic and programmable electronic control systems.

Safety-related electrical control systems in machines (SRECS) are playing an increasing role in ensuring the overall safety of machines and are more and more frequently using complex electronic technology. EN/IEC62061 is a machinery sector standard and is derived from the more complex EN/IEC61508 (Functional safety of electrical/electronic/programmable electronic safety-related systems). EN/IEC62061 describes both the amount of risk to be reduced and the ability of a control system to reduce that risk in terms of SIL (Safety Integrity Level). There are 3 SILs used in the machinery sector, SIL 1 is the lowest and SIL 3 is the highest. Risks of greater magnitude can occur in other sectors such as the process industry and for that reason EN/IEC61508 includes SIL 4. A SIL applies to a safety function. The subsystems that make up the system that implements the safety function must have an appropriate SIL capability. This is sometimes referred to as the SIL Claim Limit (SIL CL).

The detailed requirements and steps to ensure compliance with EN/IEC62061 are too complex to be covered in detail here.

SIL data for each ABB Jokab Safety device is shown in the specification table on the product page.

## PL and SIL Level

EN/ISO 13849-1 uses the term PL (Performance Level), EN/IEC 62061 will use SIL, and in many respects the five performance levels PLa to PLe can be related to SIL.

Figure 3 shows the approximate relationship between PL and SIL when applied to typical circuit structures achieved by low complexity electro-mechanical technology e.g. a Tongue Switch with a Safety Monitoring relay. This is for general guidance and to help show the relationship between the two standards. It should not be used for direct conversion purposes.

PL (Performance Level)	PFH <sub>0</sub> (Probability of a failure to danger per hour)	SIL (Safety Integrity Level)
a	≥ 10 <sup>-5</sup> to < 10 <sup>-4</sup>	None
b	≥ 3x10 <sup>-6</sup> to < 10 <sup>-5</sup>	1
c	≥ 10 <sup>-6</sup> to < 3x10 <sup>-6</sup>	1
d	≥ 10 <sup>-7</sup> to < 10 <sup>-6</sup>	2
e	≥ 10 <sup>-8</sup> to < 10 <sup>-7</sup>	3

Figure 3.

# Explosion-proof safety switches



ABB Jokab Safety's range of Explosion Proof switches have been developed to satisfy the latest IECEx and ATEX standards and provide Explosion Proof switching to satisfy the hazardous conditions created within the oil, chemical and food processing industries. They combine Explosion Proof protection and satisfy high Functional Safety requirements all in one device.

Safety Switches for use in Hazardous Areas.  
Gas and Dust

Functional Safety up to Ple ISO13849-1  
IP69K suitable for harsh environments



**MKey 5ZX**



**Estrong ZX**



**Sense 6ZX**



**Sense 10ZX**



**Line strong 3DZX**



**Line strong 3LX**



**Line strong 3DX**



**Line strong 3RX**



**Sense 8ZX**



**Line strong 2ZX**



**Line strong 2X**



**Sense 12ZX**

## Application:

Interlock and Emergency Stop Safety Switches for use in Hazardous Areas – positively operated contacts or high life non contact dry reed switching.

For use in hazardous areas IECEx and ATEX EExd IIC T6. (Gas and Dust).

Designed for Petro-chemical and food applications where explosive atmospheres are present.



Exd IIC T6 (-20 ≤ Ta ≤ +60C) Gb



Ex tb IIC T85C (-20 ≤ Ta ≤ +60C) Db

Mechanical Interlock Switches and Emergency Stop Switches



II 2G Ex mb IIC T6 Gb



II 2D Ex mb IIIC T80C Db

Non Contact Magnetic Interlock Switches

ABB Jokab Safety's Explosion Proof Safety Interlock switches are designed to fit the leading edge of sliding, hinged or lift off machine guards to provide safe electrical switching within explosion risk environments like petro-chemical and food production. ABB Jokab Safety's Explosion Proof Rope Pull switches are designed to provide protection to conveyors used in hazardous areas like beverage production and chemical handling. In addition to Explosion Proof switching, and depending upon the risk assessment for the application, they can also be used on combination with any dual channel safety monitoring relays to provide high functional safety up to Category 4 and Ple ISO 13849-1 or SIL3 EN62061.

**General Features:** Housings are either durable High Strength Plastic, Die cast painted or Stainless Steel 316  
High temperature stability up to 80C. Resistant to high temperature hosing and detergent washdown – IP67 and IP69K  
Electrical switching elements are fully encapsulated

## Tongue and Emergency Stop Switches Zones 1,21,2,22

High Power Switching up to 230V.ac 4A.  
Positive break contacts to IEC 947-5-1

## Non Contact Switches Zones 0,20,1,21,2,22

Highly reliable high power reed switching elements  
Contacts de-rated and protected by internal fuses  
High tolerance to guard misalignment

# Explosion-proof non-contact safety interlock switches



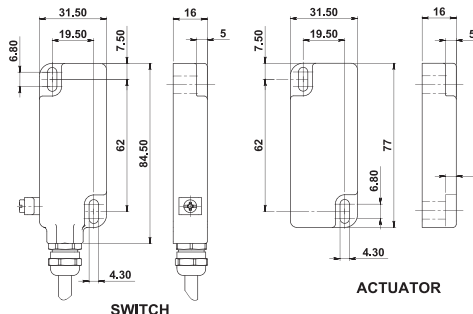
**II IG Ex ma IIC T6 Ga**

**II ID Ex ma IIIC T80 Da IP67\***

**Zones 0,20,1,21,2,22 Gas and Dust**

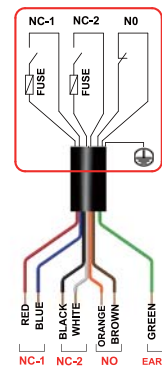


**Sense 6ZX**



Stainless Steel housing - Supplied fitted with Stainless Steel Flexible conduit

<b>Sense 6 ZX Flex Conduit</b>		<b>Electrical Rating</b>	<b>Electrical Rating</b>
2TLA050074R5125	Sense 6, Ex rated SS 5m cable, 2NC/1NO	<b>Normally Closed Circuits</b> (Actuator present) Red/Blue NC1 White/Black NC2	<b>Normally Open Circuit</b> (Actuator present) Orange/Brown NO
2TLA050074R6125	Sense 6, Ex rated SS 10m cable, 2NC/1NO		
		230V.ac / 24Vdc 0.6A. Max. Internally fused	230V.ac / 24Vdc 200mA. Max.



**II 2G Ex mb IIC T6 Gb**

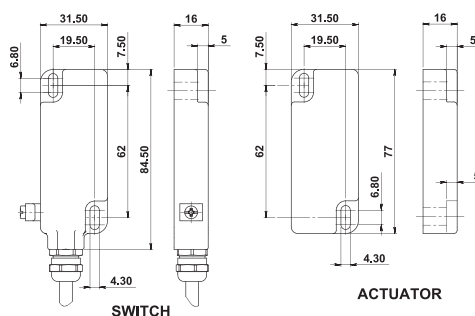
**II 2D Ex mb IIIC T80 Db IP67\***

**Zones 1, 21, 2, 22 Gas and Dust**

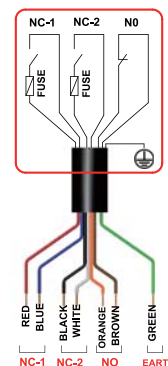


Stainless Steel

**Sense 6ZX**



<b>Sense 6ZX Standard Cable</b>		<b>Electrical Rating</b>	<b>Electrical Rating</b>
2TLA050075R5125	Sense 6, Ex rated SS 5m cable, 2NC/1NO	<b>Normally Closed Circuits</b> (Actuator present) Red/Blue NC1 White/Black NC2	<b>Normally Open Circuit</b> (Actuator present) Orange/Brown NO
2TLA050075R6125	Sense 6, Ex rated SS 10m cable, 2NC/1NO		
		230V.ac / 24Vdc 2A. Max. Internally fused	230V.ac / 24Vdc 200mA. Max.



\* Product is fully encapsulated which is considered to provide Ingress Protection to at least IP67

# Explosion-proof non-contact safety interlock switches



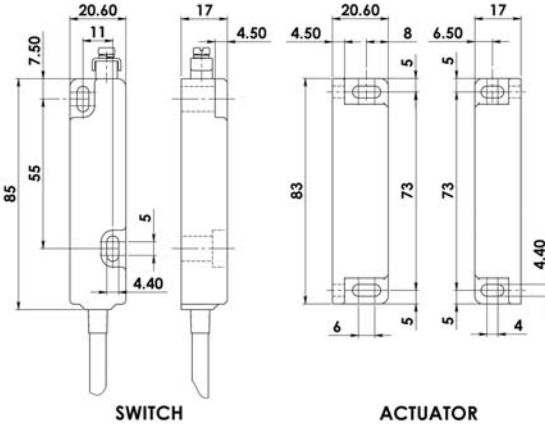
**II 2G Ex mb IIC T6 Gb**

**II 2D Ex mb IIIC T80 Db IP67\***

**Zones 1, 21, 2, 22 Gas and Dust**



**Sense 10ZX**



<b>Sense 10ZX</b> 2TLA050078R5125 Sense 10, Ex rated SS 5m cable, 2NC/1NO 2TLA050078R6125 Sense 10, Ex rated SS 10m cable, 2NC/1NO	<b>Electrical Rating</b> Normally Closed Circuits (Actuator Present) NC	<b>Electrical Rating</b> Normally Open Circuits (Actuator Present) NO
	230V.ac / 24Vdc 0.6A. Max. Internally Fused	230V.ac / 24Vdc 200mA. Max.

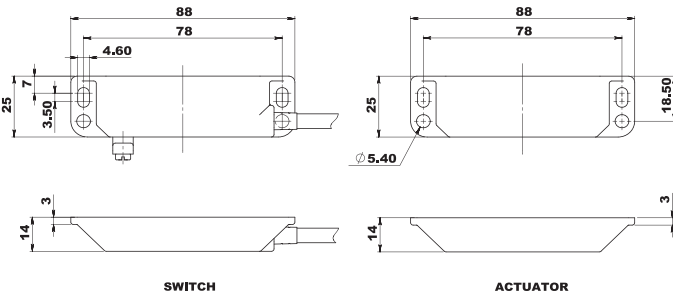
**II 2G Ex mb IIC T6 Gb**

**II 2D Ex mb IIIC T80 Db IP67\***

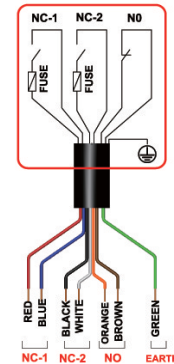
**Zones 1, 21, 2, 22 Gas and Dust**



**Sense 8ZX**



<b>Sense 8ZX</b> 2TLA050076R5125 Sense 8, Ex rated SS 5m cable, 2NC/1NO 2TLA050076R6125 Sense 8, Ex rated SS 10m cable, 2NC/1NO	<b>Electrical Rating</b> Normally Closed Circuits (Actuator Present) Red/Blue NC1 White/Black NC2	<b>Electrical Rating</b> Normally Open Circuits (Actuator Present) Orange/Brown NO
	230V.ac / 24Vdc 0.6A. Max. Internally Fused	230V.ac / 24Vdc 200mA. Max.



\* Product is fully encapsulated which is considered to provide Ingress Protection to at least IP67



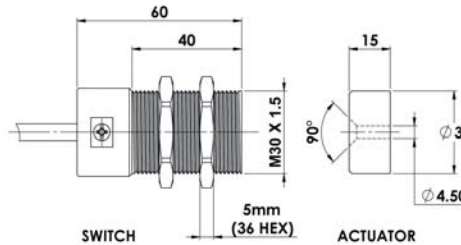
# Explosion-proof non-contact safety interlock switches



**II 2G Ex mb IIC T6 Gb**

**II 2D Ex mb IIIC T80 Db IP67\***

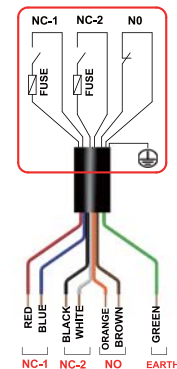
**Zones 1, 21, 2, 22 Gas and Dust**



**Sense 12ZX**

**Stainless Steel 316 M30 x 1.5mm threaded body**

<b>Sense 12ZX</b> 2TLA050080R5125 Sense 12, Ex rated SS 5m cable, 2NC/1NO 2TLA050080R6125 Sense 12, Ex rated SS 10m cable, 2NC/1NO	<b>Electrical Rating</b> Normally Closed Circuits (Actuator present) Red/Blue NC White/Black NC	<b>Electrical Rating</b> Normally Open Circuits (Actuator present) Orange/Brown NO
	230V.ac / 24Vdc 0.6A. Max. Internally fused	230V.ac / 24Vdc 200mA. Max.



# Explosion-proof non-contact safety interlock switches



## Summary Specification and selection guide

Switch Type	Housing Material	Maximum current	Zones
<b>Sense 6ZX</b>	Stainless Steel 316 and fitted with Stainless Steel Flexible conduit	0.6A	Zone 0 Gas Zone 20 Dust  (An area where Gas and Dust are continuously present)
<b>Sense 6ZX</b>	Stainless Steel 316	2.0A.	Zone 1 Gas Zone 21 Dust Zone 2 Gas Zone 21 Dust  (An area where Gas and Dust is likely to occur in use)
<b>Sense 10ZX</b>	Stainless Steel 316	0.6A.	
<b>Sense 8ZX</b>	Stainless Steel 316	0.6A.	
<b>Sense 12ZX</b>	Stainless Steel 316	0.6A.	

## Technical and Safety Specification :

Standards	IEC/EN 60079-0 IEC/EN 60079-18 EN1088 IEC 947-5-3 EN 60204-1 ISO 13849-1 EN62061 EN 954-1 UL508	Contact release time	<2ms
Safety Classification and Reliability Data:	3.3 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay up to PLE depending upon system architecture up to SIL3 depending upon system architecture	Initial contact resistance	<500 milliohm
		Minimum switched current	10V. dc 1mA
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days	Insulation Resistance	100 Mohms
		Recommended setting gap	5mm
PFHd	2.52 x 10 <sup>-8</sup>	Switching Distance: (Target to target)	Sao 10mm Close Sar 22mm Open
		Approach speed	200mm/m. to 1000mm/s.
Proof Test Interval (Life)	47 years	Temperature Range	-20 / 80C.
		Enclosure Protection	IP67
MTTFd	470 years	Shock Resistance	IEC 68-2-27 11ms 30g
		Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
		Cable Type	6mm O.D.
		Mounting Position	Any
		Approval Body	BASEEFA UK

**\* Product is fully encapsulated which is considered to provide Ingress Protection to at least IP67**

# Notes

# Explosion-proof emergency stop switches



Emergency Stop Switches with ATEX EExd IIC T6 certified explosion proof contact blocks.

These switches conform to European harmonized standards EN 60079-0 and EN 60079-1 and can be used in European Zone 1, 2, 21, 22 environments. (Gas and Dust).

Designed to the latest standard ISO13850, the switch mechanism will latch the instant the safety contacts open.

Designed for use in oil, petro-chemical and food applications where potential explosive atmospheres are present.

Exd IIC T6 (-20 ≤ Ta ≤ +60C) Gb

Ex tb IIIC T85C (-20 ≤ Ta ≤ +60C) Db

## Heavy Duty Mushroom Button Switches - EStrong ZX



EStrong ZX

Protection shroud and lock off versions  
 Special Lid Safety Trip Mechanism – contacts will open if the lid is removed  
 Positive break contacts to IEC 947-5-1  
 Resistant to high temperature hosing and detergent washdown.  
 Enclosure Protected to IP67 and IP69K  
 Robust Stainless Steel 316 Housings  
 Pre-wired 2NC contacts

## Standard Duty Rope Pull Switches - LineStrong 2ZX, LineStrong 2X



LineStrong 2ZX  
Protect up to 100m



LineStrong 2X  
Protect up to 80m

Die Cast (painted yellow) or S/Steel 316  
 Positive break contacts to IEC 947-5-1  
 Resistant to high temperature hosing  
 Enclosure Protected to IP67 and IP69K  
 High Impact Robust Stainless Steel 316 Housings  
 2NC contacts

## Heavy Duty Rope Pull Switches - LineStrong 3LX, LineStrong 3RX



LineStrong 3DZX  
Protect up to 250m



LineStrong 3LX



LineStrong 3DX

Die Cast (painted yellow) or S/Steel 316  
 Positive break contacts to IEC 947-5-1  
 Resistant to high temperature hosing  
 Enclosure Protected to IP67 and IP69K  
 2NC 2NO contacts

Dual Head version covers up to 250m, with one switch or can be connected in series with other switches to protect long lengths over hundreds of meters.

Standards: IEC/EN 60079-0 IEC/EN 60079-1  
 EN1088 IEC 947-5-1 EN 60204-1  
 ISO 13849-1 EN62061 EN 954-1 UL508

Safety Classification and Reliability Data:

Mechanical Reliability B10d	1.5 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	<1.0 x 10 <sup>-7</sup>
Proof Test Interval (Life)	21 years
MTTFd	214 years

Enclosure Protection	IP69K IP67
Operating Temperature	-20C +60C.
Vibration	IEC 68-2-6, 10-55Hz+1Hz,
Classification	Excursion: 0.35mm, 1 octave/min
	Exd IIC T6 (-20 ≤ Ta ≤ +60C) Gb
	Ex tb IIIC T85C (-20 ≤ Ta ≤ +60C) Db
Rated Voltage	250V a.c
Rated Current	2 Pole 4A.ac 4 Pole 2.5A.ac
Cable length	3m.

# Explosion-proof emergency stop switches



(P) versions include button protection shroud and padlock holes for lock off.



**EStrong ZX**

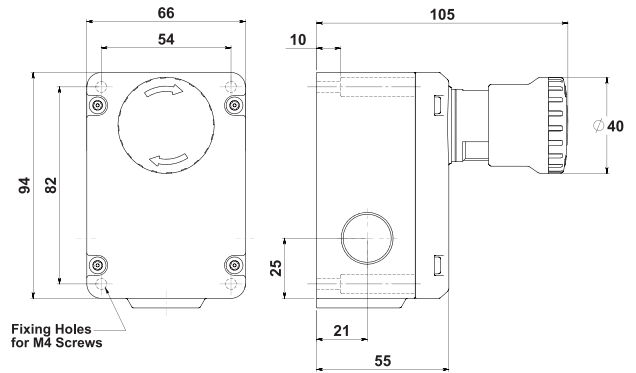


**EStrong ZX**

Zones 1 and 2

Zones 21 and 22

Gas and Dust IP67



## Estrong ZX

2TLA050220R0025 EstrongZX E-Stop 2NC, NPT, SS, EX  
 2TLA050220R0125 EstrongZX E-Stop 2NC, M20, SS Locked, EX

All switches are pre-wired with 3m. length of cabling through the cable glands as shown.

# Explosion-proof emergency stop switches



## Rope Pull Emergency Stop Switches

Zones 1 and 2

Zones 21 and 22

Gas and Dust IP67



**LineStrong 3LX**



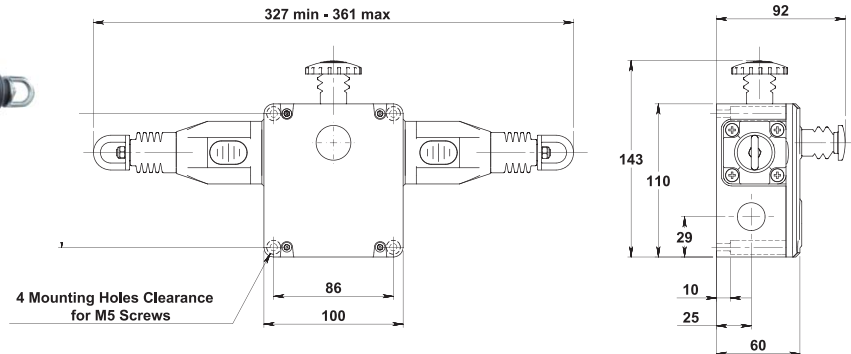
**LineStrong 3DX**



**LineStrong 3RX**



**LineStrong 3DZX**



**LineStrong 3LZX (LineStrong 3RZX not shown)**

All switches are pre-wired with 3m. length of cabling through the cable glands as shown. Other lengths and cable exits available upon request.

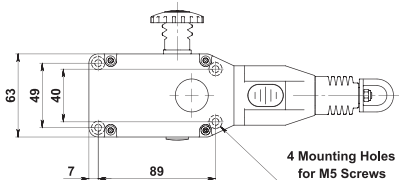


**LineStrong 2X**

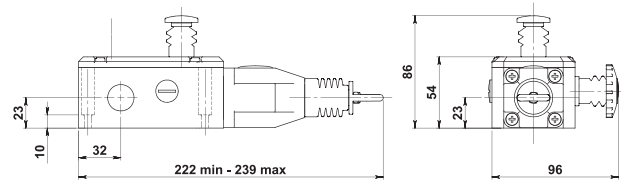


**LineStrong 2ZX**

LineStrong X	
2TLA050202R7135	LineStrong2X, EX rated, 2NC, ESTOP
2TLA050202R7125	LineStrong2ZX, EX rated, 2NC, ESTOP, SS
2TLA050208R7135	LineStrong3DX, EX rated, 2NC/2NO, ESTOP
2TLA050208R7125	LineStrong3DZX, EX, 2NC/2NO ESTOP SS
2TLA050204R7135	LineStrong3LX, EX rated, 2NC/2NO, ESTOP
2TLA050206R7135	LineStrong3RX, EX rated, 2NC/2NO, ESTOP
2TLA050204R7125	LineStrong3LZX, EX, 2NC/2NO ESTOP SS
2TLA050206R7125	LineStrong3RZX, EX, 2NC/2NO ESTOP SS



All Dimensions in mm



# MKey 5ZX Explosion-proof tongue interlock switches





**Tongue Interlock Switches for use in Hazardous Areas.**  
ATEX approved contact blocks. Gas and Dust (Zones 1, 2, 21, 22)

**Functional Safety up to Ple ISO13849-1**  
**IP69K suitable for harsh environments**



Tongue Interlock Safety Switches for use in Hazardous Areas – positively operated ATEX Certified contact blocks  
For use in hazardous areas IECEx and ATEX EExd IIC T6. (Gas and Dust).  
These switches conform to harmonized standards IEC/EN 60079-0 and IEC/EN 60079-1.  
Suitable for European Zones 1, 2, and 21, 22. Designed for Petro-chemical and food applications where explosive atmospheres are present.

-  Exd IIC T6 (-20 ≤ Ta ≤ +60C) Gb
-  Ex tb IIIC T85C (-20 ≤ Ta ≤ +60C) Db

## Application:

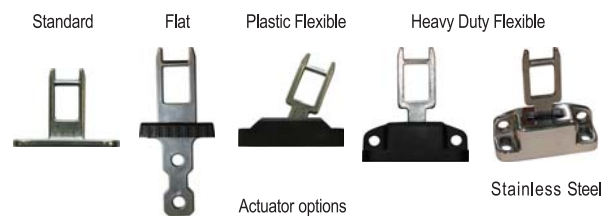
ABB Jokab Safety ATEX approved Tongue-operated Safety Interlock switches are designed to fit to the leading edge of sliding, hinged or lift off machine guards to provide positively operated switching contacts and provide a tamper resistant, not easily defeatable key mechanism. They are designed to provide robust position interlock detection for moving guards within areas which have an explosion risk atmosphere. Depending upon the risk assessment for the application, they can be used independently to provide positive interlocking to IEC-947-5-1 or they can be used in combination with any dual channel safety monitoring relays to provide functional safety up to Ple ISO 13949-1 or SIL3 EN62061.

## Operation:

The switch is rigidly mounted to the frame of the guard or machine. The actuator is fitted to the moving part (frame) of the guard and is aligned to the switch entry aperture. The actuator profile is designed to match a cam mechanism within the switch head and provides a positively operated not easily defeatable interlock switch. When the actuator is inserted into the switch the safety contacts close and allow the machine start circuit to be enabled. When the actuator is withdrawn from the switch the safety contacts are positively opened and the machine circuit is broken. The internal contact blocks are robust are fully encapsulated and pre-wired.

## Features:

- High Power Switching up to 230V.ac 4A.
- 2 enclosure shapes are available providing Plastic, Die cast painted or Stainless Steel
- 2NC Contacts
- High temperature stability up to 60C.
- High tolerance to guard misalignment
- Resistance to many organic and inorganic chemicals
- Enclosure Protected to IP67 and IP69K
- Conformance to IEC 947-5-1 Positively operated
- Rotatable heads to give up to 8 actuator entry positions
- Resistant to high temperature hosing and detergent washdown
- Choice of actuators to suit mounting conditions and alignment



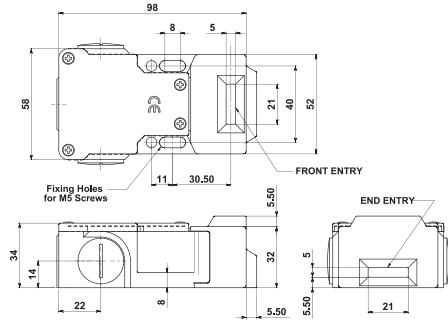
# MKey 5ZX Explosion proof tongue interlock switches



MKey 5ZX



**Stainless Steel 316 Housing**  
**Zones 1 and 2    Zones 21 and 22    Gas and Dust IP67**



MKey 5ZX	
2TLA050003R0025	Mkey5Z, SS Ex. 3m Cab. 2NC No Key
2TLA050003R0125	Mkey5Z, SS Ex. 3m Cab. 2NC Std. Key
2TLA050003R0225	Mkey5Z, SS Ex. 3m Cab. 2NC Flat Key
2TLA050003R0325	Mkey5Z, SS Ex. 3m Cab. 2NC Pla.Flex Key
2TLA050003R0425	Mkey5Z, SS Ex. 3m Cab. 2NC Met. Flex Key
2TLA050003R0525	Mkey5Z, SS Ex. 3m Cab. 2NC SS Flex Key

Standards IEC/EN 60079-0 IEC/EN 60079-1  
 EN1088 IEC 947-5-1 EN 60204-1  
 ISO 13849-1 EN62061 EN 954-1 UL508

**Safety Classification and Reliability Data:**

Mechanical Reliability B10d 2.5 x 10<sup>6</sup> operations at 100mA load  
 EN 954-1 up to Category 4 with Safety Relay  
 ISO 13849-1 up to PLe depending upon system architecture  
 EN 62061 up to SIL3 depending upon system architecture  
 Safety Data - Annual Usage 8 cycles per hour / 24 hours per day / 365 days  
 PFHd 3.44 x 10<sup>-8</sup>  
 Proof Test Interval (Life) 35 years  
 MTTFd 356 years

Travel for Positive Opening 8mm  
 Actuator entry minimum radius 175mm Standard  
 Enclosure Protection IP69K IP67  
 Operating Temperature -20C +60C.  
 Vibration IEC 68-2-6, 10-55Hz+1Hz,  
 Excursion: 0.35mm, 1 octave/min  
 Classification Exd IIC T6 (-20≤Ta≤+60C) Gb  
 Ex tb IIIC T85C (-20≤Ta ≤+60C) Db  
 Rated Voltage 250V a.c  
 Rated Current 2 Pole 4A.ac 4 Pole 2.5A.ac  
 Cable length 3m.

# Notes



# MKey Tongue operated safety interlock switches

## Application:

ABB Jokab Safety Tongue operated Safety Interlock switches are designed to fit to the leading edge of sliding, hinged or lift off machine guards to provide positively operated switching contacts and provide a tamper resistant, not easily defeatable key mechanism. They are designed to provide robust position interlock detection for moving guards.

Depending upon the risk assessment for the application, they can be used independently to provide positively operated contacts to IEC-947-5-1 or they can be used in combination with any dual channel safety monitoring relays to provide up to Category 4 Plc ISO 13849-1 or SIL3 EN62061. They are available in various materials and housing styles to provide complete flexibility of choice depending upon the application. They offer a choice of actuators to aid installation and maintain durability.

## Operation:

The switch is rigidly mounted to the frame of the guard or machine. The actuator is fitted to the moving part (frame) of the guard and is aligned to the switch entry aperture. The actuator profile is designed to match a cam mechanism within the switch head and provides a positively operated not easily defeatable interlock switch. When the actuator is inserted into the switch the safety contacts close and allow the machine start circuit to be enabled. When the actuator is withdrawn from the switch the safety contacts are positively opened and the machine circuit is broken. Standard versions use high specification plastic or die-cast housings and are sealed to IP67 and provide long term protection against moisture ingress. For harsh applications like Food Processing, Pharmaceutical and Chemical Industries the Stainless Steel 316 range offers protection up to IP69K for use in high pressure chemical cleaning or CIP/SIP applications.



### MKey 1 (Plastic)

8 actuator entry positions - rotatable head  
3 pole contact block  
32mm wide, 97mm long, 22mm fixing  
IP67



### MKey 4 (Plastic)

4 actuator entry positions - rotatable head  
Compact Body 3 conduit entries  
3 pole contact blocks,  
54mm side, 86mm long, 40mm fixing  
Plastic or Stainless Steel Head  
IP67



### MKey 5 (Plastic)

4 actuator entry positions - rotatable head  
3 conduit entries  
3 pole contact blocks  
52mm wide, 98mm long, 40mm fixing  
Plastic or Stainless Steel Head  
IP67



### MKey 6 (Metal)

8 actuator entry positions - rotatable head  
3 pole contact block  
40mm wide, 118mm long, 30mm fixing  
Die Case Alloy  
IP67



### MKey 5Z (Fully Stainless Steel)

4 actuator entry positions - rotatable head  
3 conduit entries  
3 pole contact blocks  
52mm wide, 98mm long, 40mm fixing  
IP69K high temperature hose down

MKey 5Z and MKey 6Z developed for guard interlocking in the applications of Food Processing, Pharmaceutical, Packaging and Chemical Industries.

They are tested to ingress protection degree IP69K (high pressure hosing with detergent at 80C and 100 psi).



### MKey 6Z (Fully Stainless Steel)

8 actuator entry positions - rotatable head,  
3 pole contact block  
42mm wide, 118mm long, 30mm fixing  
IP69K high temperature hose down

# MKey 1 Tongue interlock safety switches

ABB Jokab Safety MKey1 Compact Safety Interlock switches are designed to provide position detection for small moving guards.

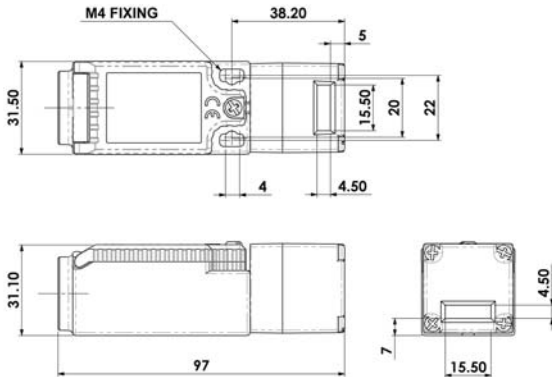
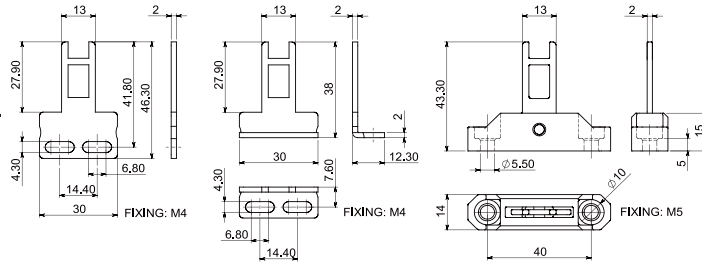
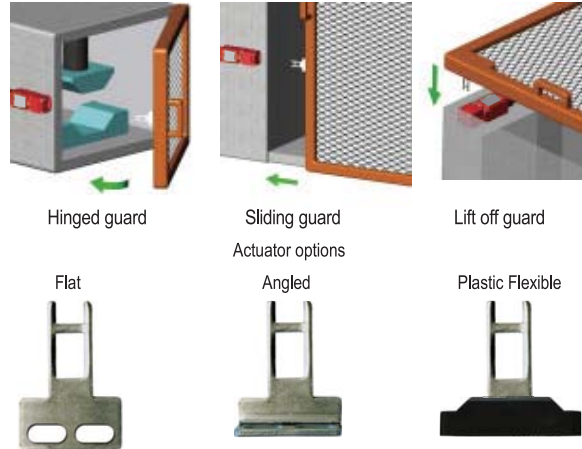
They are designed to fit to the leading edge of sliding, hinge or lift off machine guards.



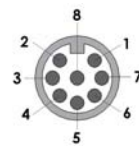
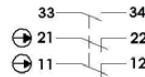
The rugged Stainless Steel actuator profile is designed to match a cam mechanism to provide a positively operated not easily defeatable interlock mechanism.

The compact body, 22mm fixing profile and rotatable head make them easy to install where space is restricted. A Plastic Flexible Actuator is available for tight radius guards.

Contact blocks are replaceable with optional slow or snap break operation.



Slow Make Break 2NC 1NO



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

Standards EN1088 IEC 947-5-1 EN 60204-1  
ISO 13849-1 EN62061 EN 954-1 UL508

Safety Classification and Reliability Data:

Mechanical Reliability B10d	2.5 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	3.44 x 10 <sup>-8</sup>
Proof Test Interval (Life)	35 years
MTTFd	356 years
Utilization Category	AC15 A300 3A.
Thermal Current (Ith)	5A
Rated Insulation / Withstand Voltages	600VAC / 2500 VAC
Travel for Positive Opening	6mm
Actuator entry minimum radius	175mm Standard 100mm Flexible
Maximum Approach / Withdrawal speed	600mm/s.
Body Material	Polyester
Enclosure Protection	IP67
Operating Temperature	-25C. +80C.
Vibration	IEC 68-2-6, 10-55Hz+1Hz.
Conduit Entry	Excursion: 0.35mm, 1 octave/min
Fixing	Various (See Sales Part Numbers)
	2 x M4

MKey 1	
2TLA050021R0100	Mkey1, Compact M20, 2NC/1NO Angle Key
2TLA050021R1100	Mkey1, Compact NPT, 2NC/1NO Angle Key
2TLA050021R2100	Mkey1, Compact QC, 2NC/1NO Angle Key
2TLA050021R0200	Mkey1, Compact M20, 2NC/1NO Flat Key
2TLA050021R1200	Mkey1, Compact NPT, 2NC/1NO Flat Key
2TLA050021R2200	Mkey1, Compact QC, 2NC/1NO Flat Key
2TLA050021R0300	Mkey1, Compact M20, 2NC/1NO Flex Key
2TLA050021R1300	Mkey1, Compact NPT, 2NC/1NO Flex Key
2TLA050021R2300	Mkey1, Compact QC, 2NC/1NO Flex Key

# MKey 2 Hinge interlock safety switches



ABB Jokab Safety MKey 2 Compact Hinge Safety Interlock switches are designed to provide interlock detection for moving guards

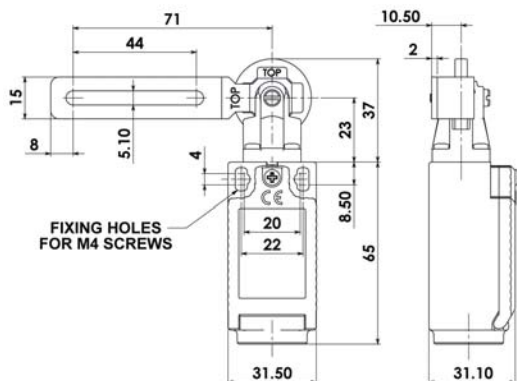
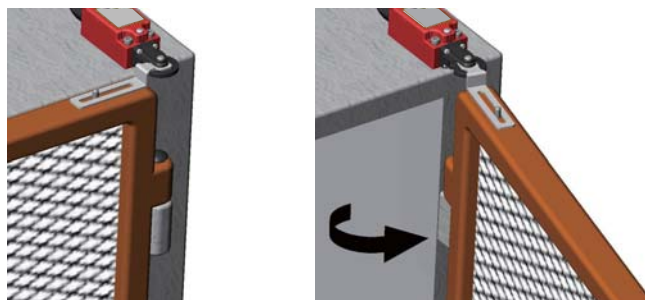
They are designed to fit to the hinged axis of machine guard doors. The switch body fits to the door frame and the leaf actuator fits to the door.



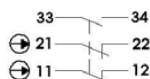
Universal fitting – opening angle 180 degrees for swing doors

The rugged Stainless Steel actuator profile is designed to fix to the door and provide a positively operated not easily defeatable interlock mechanism. They can be mounted unobtrusively away from direct vision or contact.

The compact body and 22mm fixing profile make them easy to install where space is restricted. The head can be rotated through 90 degree increments to provide ease of mounting in 4 positions.



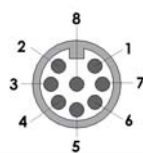
Contact Block Options:  
Slow Make Break 2NC 1NO



Standards EN1088 IEC 947-5-1 EN 60204-1  
ISO 13849-1 EN62061 EN 954-1 UL508

## Safety Classification and Reliability Data:

Mechanical Reliability B10d	2.5 x 10 <sup>8</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage PFHd	8 cycles per hour / 24 hours per day / 365 days
Proof Test Interval (Life) MTTFd	3.44 x 10 <sup>-8</sup> / 35 years / 356 years
Utilization Category	AC15 A300 3A.
Thermal Current (Ith)	10A
Rated Insulation / Withstand Voltages	600VAC / 2500 VAC
Actuator Rotation for Positive Opening	7 degrees 0.5Nm
Actuator entry minimum radius	175mm Standard 60mm Heavy Duty
Materials	UL approved glass-filled polyester
Enclosure Protection	IP67
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



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

MKey 2	
2TLA050020R0000	Mkey2, Compact Hinge M20, 2NC/1NO
2TLA050020R1000	Mkey2, Compact Hinge NPT, 2NC/1NO
2TLA050020R2000	Mkey2, Compact Hinge QC, 2NC/1NO

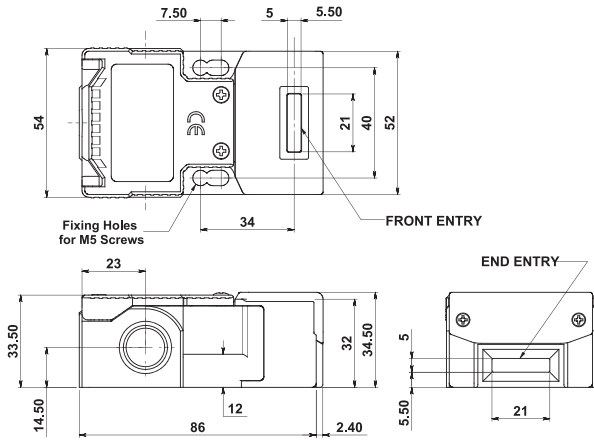
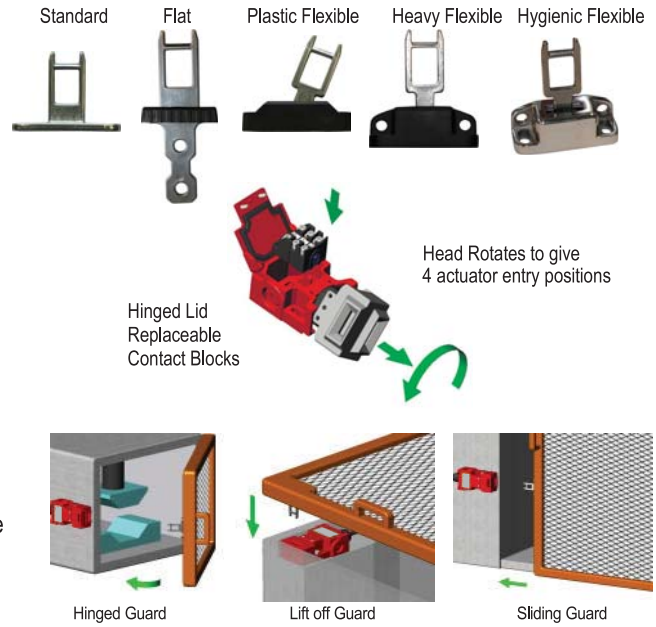
# MKey 4 Tongue interlock safety switches



ABB Jokab Safety's MKey 4 Safety interlock switches are designed to provide position interlock detection for moving guards. They are designed to fit to the leading edge of sliding, hinge or lift off machine guards.



They offer a compact 86mm long body to fit to applications where space is restricted, yet offer 3 pole contacts and choice of 3 conduit entries for wiring versatility. The head can be rotated to give actuator entry positions. For extra durability, Flexible Actuators and Stainless Steel head versions are available. Available with 40N holding force. Contact blocks are replaceable.



Standards EN1088 IEC 947-5-1 EN 60204-1  
ISO 13849-1 EN62061 EN 954-1 UL508

## Safety Classification and Reliability Data:

Mechanical Reliability B10d	2.5 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	3.44 x 10 <sup>-8</sup>
Proof Test Interval (Life)	35 years
MTTFd	356 years
Utilization Category	AC15 A300 3A.
Thermal Current (Ith)	5A
Rated Insulation / Withstand Voltages	500VAC / 2500 VAC
Travel for Positive Opening	8mm
Actuator entry minimum radius	175mm Standard 100mm Flexible
Maximum Approach / Withdrawal speed	600mm/s.
Body Material	Polyester
Head Material	Polyester or Stainless Steel 316
Enclosure Protection	IP67
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 M5

# MKey 4 Tongue interlock safety switches



QC Quick Connect Versions

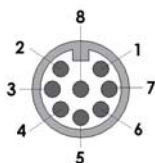
Contact Block Options:

Slow Make Break 2NC 1NO



Quick Connect

Pin View from switch



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

## MKey 4 Standard

2TLA050001R0000	Mkey4, M20, 2NC/1N0 No Key
2TLA050001R1000	Mkey4, NPT, 2NC/1N0 No Key
2TLA050001R2000	Mkey4, QC, 2NC/1N0 No Key
2TLA050001R0100	Mkey4, M20, 2NC/1N0 Std. Key
2TLA050001R1100	Mkey4, NPT, 2NC/1N0 Std. Key
2TLA050001R2100	Mkey4, QC, 2NC/1N0 Std. Key
2TLA050001R0200	Mkey4, M20, 2NC/1N0 Flat Key
2TLA050001R1200	Mkey4, NPT, 2NC/1N0 Flat Key
2TLA050001R2200	Mkey4, QC, 2NC/1N0 Flat Key
2TLA050001R0300	Mkey4, M20, 2NC/1N0 Pla.Flex Key
2TLA050001R1300	Mkey4, NPT, 2NC/1N0 Pla.Flex Key
2TLA050001R2300	Mkey4, QC, 2NC/1N0 Pla.Flex Key
2TLA050001R0400	Mkey4, M20, 2NC/1N0 Met. Flex Key
2TLA050001R1400	Mkey4, NPT, 2NC/1N0 Met. Flex Key
2TLA050001R2400	Mkey4, QC, 2NC/1N0 Met. Flex Key
2TLA050001R0500	Mkey4, M20, 2NC/1N0 SS Flex Key
2TLA050001R1500	Mkey4, NPT, 2NC/1N0 SS Flex Key
2TLA050001R2500	Mkey4, QC, 2NC/1N0 SS Flex Key
2TLA050001R0001	Mkey4+, M20, 2NC/1N0 No Key 40N
2TLA050001R1001	Mkey4+, NPT, 2NC/1N0 No Key 40N
2TLA050001R2001	Mkey4+, QC, 2NC/1N0 No Key 40N
2TLA050001R0101	Mkey4+, M20, 2NC/1N0 Std. Key 40N
2TLA050001R1101	Mkey4+, NPT, 2NC/1N0 Std. Key 40N
2TLA050001R2101	Mkey4+, QC, 2NC/1N0 Std. Key 40N
2TLA050001R0201	Mkey4+, M20, 2NC/1N0 Flat Key 40N
2TLA050001R1201	Mkey4+, NPT, 2NC/1N0 Flat Key 40N
2TLA050001R2201	Mkey4+, QC, 2NC/1N0 Flat Key 40N
2TLA050001R0301	Mkey4+, M20, 2NC/1N0 Pla.Flex Key 40N
2TLA050001R1301	Mkey4+, NPT, 2NC/1N0 Pla.Flex Key 40N
2TLA050001R2301	Mkey4+, QC, 2NC/1N0 Pla.Flex Key 40N
2TLA050001R0401	Mkey4+, M20, 2NC/1N0 Met. Flex Key 40N
2TLA050001R1401	Mkey4+, NPT, 2NC/1N0 Met. Flex Key 40N
2TLA050001R2401	Mkey4+, QC, 2NC/1N0 Met. Flex Key 40N
2TLA050001R0501	Mkey4+, M20, 2NC/1N0 SS Flex Key 40N
2TLA050001R1501	Mkey4+, NPT, 2NC/1N0 SS Flex Key 40N
2TLA050001R2501	Mkey4+, QC, 2NC/1N0 SS Flex Key 40N

## MKey 4 Stainless Steel Head

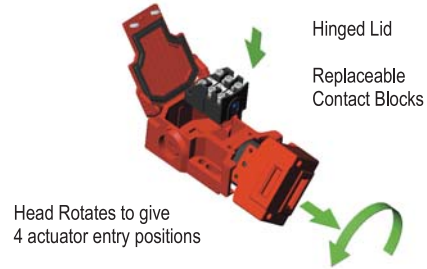
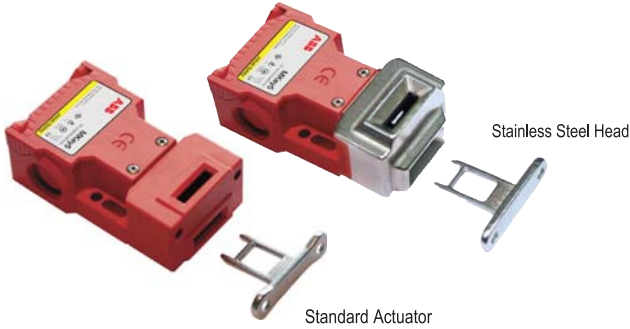
2TLA050001R0010	Mkey4, M20, 2NC/1N0 No Key
2TLA050001R1010	Mkey4, NPT, 2NC/1N0 No Key
2TLA050001R2010	Mkey4, QC, 2NC/1N0 No Key
2TLA050001R0110	Mkey4, M20, 2NC/1N0 Std. Key
2TLA050001R1110	Mkey4, NPT, 2NC/1N0 Std. Key
2TLA050001R2110	Mkey4, QC, 2NC/1N0 Std. Key
2TLA050001R0210	Mkey4, M20, 2NC/1N0 Flat Key
2TLA050001R1210	Mkey4, NPT, 2NC/1N0 Flat Key
2TLA050001R2210	Mkey4, QC, 2NC/1N0 Flat Key
2TLA050001R0310	Mkey4, M20, 2NC/1N0 Pla.Flex Key
2TLA050001R1310	Mkey4, NPT, 2NC/1N0 Pla.Flex Key
2TLA050001R2310	Mkey4, QC, 2NC/1N0 Pla.Flex Key
2TLA050001R0410	Mkey4, M20, 2NC/1N0 Met. Flex Key
2TLA050001R1410	Mkey4, NPT, 2NC/1N0 Met. Flex Key
2TLA050001R2410	Mkey4, QC, 2NC/1N0 Met. Flex Key
2TLA050001R0510	Mkey4, M20, 2NC/1N0 SS Flex Key
2TLA050001R1510	Mkey4, NPT, 2NC/1N0 SS Flex Key
2TLA050001R2510	Mkey4, QC, 2NC/1N0 SS Flex Key
2TLA050001R0011	Mkey4+, M20, 2NC/1N0 No Key 40N
2TLA050001R1011	Mkey4+, NPT, 2NC/1N0 No Key 40N
2TLA050001R2011	Mkey4+, QC, 2NC/1N0 No Key 40N
2TLA050001R0111	Mkey4+, M20, 2NC/1N0 Std. Key 40N
2TLA050001R1111	Mkey4+, NPT, 2NC/1N0 Std. Key 40N
2TLA050001R2111	Mkey4+, QC, 2NC/1N0 Std. Key 40N
2TLA050001R0211	Mkey4+, M20, 2NC/1N0 Flat Key 40N
2TLA050001R1211	Mkey4+, NPT, 2NC/1N0 Flat Key 40N
2TLA050001R2211	Mkey4+, QC, 2NC/1N0 Flat Key 40N
2TLA050001R0311	Mkey4+, M20, 2NC/1N0 Pla.Flex Key 40N
2TLA050001R1311	Mkey4+, NPT, 2NC/1N0 Pla.Flex Key 40N
2TLA050001R2311	Mkey4+, QC, 2NC/1N0 Pla.Flex Key 40N
2TLA050001R0411	Mkey4+, M20, 2NC/1N0 Met. Flex Key 40N
2TLA050001R1411	Mkey4+, NPT, 2NC/1N0 Met. Flex Key 40N
2TLA050001R2411	Mkey4+, QC, 2NC/1N0 Met. Flex Key 40N
2TLA050001R0511	Mkey4+, M20, 2NC/1N0 SS Flex Key 40N
2TLA050001R1511	Mkey4+, NPT, 2NC/1N0 SS Flex Key 40N
2TLA050001R2511	Mkey4+, QC, 2NC/1N0 SS Flex Key 40N

# MKey 5 Tongue interlock safety switches



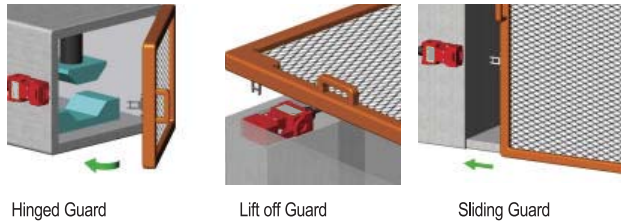
ABB Jokab Safety MKey 5 Interlock switches are designed to provide position interlock detection for moving guards.

They are designed to fit to the leading edge of sliding, hinge or lift off machine guards. They provide a forced disconnect of the safety contacts at the withdrawal of the actuator and have an anti-tamper mechanism.



The head can be rotated to give 4 actuator entry positions. For extra durability, Flexible Actuators and Stainless Steel head versions are available.

Contact blocks are replaceable with optional explosion proof versions. They are sealed to IP67 and survive most wash down solutions due to the high material specification.



## Functional Specification:

Positive break contacts to IEC947-5-1

High Functional Safety to ISO 13849-1

3 pole Contact Blocks

Stainless Steel Head version available

Connects to most Safety Relays to give up to up to Ple Cat.4.

Industry Fitting 52mm wide 98mm long 40mm fixing

Available with 40N holding force

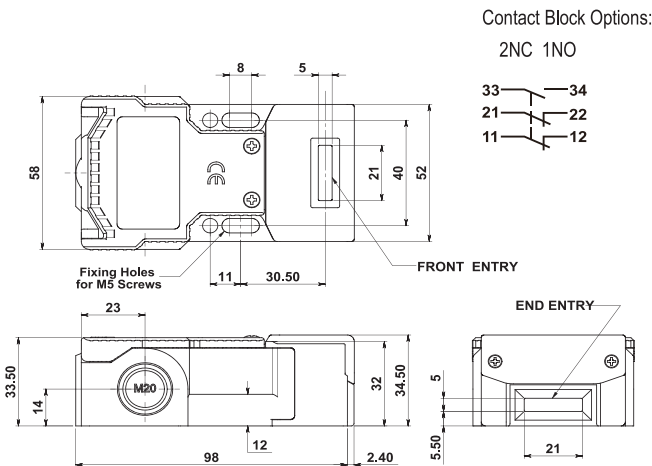


ABB Jokab Safety switches the normally closed (NC) circuits are closed when the guard is closed actuator inserted

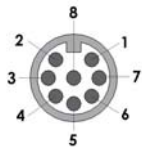
Standards	EN1088 IEC 947-5-1 EN 60204-1 ISO 13849-1 EN62061 EN 954-1 UL508
Safety Classification and Reliability Data:	
Mechanical Reliability B10d	2.5 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	3.44 x 10 <sup>-8</sup>
Proof Test Interval (Life)	35 years
MTTFd	356 years
Utilization Category	AC15 A300 3A.
Thermal Current (Ith)	5A
Rated Insulation / Withstand Voltages	500VAC / 2500 VAC
Travel for Positive Opening	8mm
Actuator entry minimum radius	175mm Standard 100mm Flexible
Maximum Approach / Withdrawal speed	600mm/s.
Body Material	Polyester
Head Material	Polyester or Stainless Steel 316
Enclosure Protection	IP67
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 M5

# MKey 5 Tongue interlock safety switches



QC Quick Connect Versions

Quick Connect  
Pin view from switch



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

Contact operation at withdrawal of Actuator

2NC 1N0 7.8 7.0 0 mm

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

## MKey 5 Standard

2TLA050003R0000	Mkey5, M20, 2NC/1N0 No Key
2TLA050003R1000	Mkey5, NPT, 2NC/1N0 No Key
2TLA050003R2000	Mkey5, QC, 2NC/1N0 No Key
2TLA050003R0100	Mkey5, M20, 2NC/1N0 Std. Key
2TLA050003R1100	Mkey5, NPT, 2NC/1N0 Std. Key
2TLA050003R2100	Mkey5, QC, 2NC/1N0 Std. Key
2TLA050003R0200	Mkey5, M20, 2NC/1N0 Flat Key
2TLA050003R1200	Mkey5, NPT, 2NC/1N0 Flat Key
2TLA050003R2200	Mkey5, QC, 2NC/1N0 Flat Key
2TLA050003R0300	Mkey5, M20, 2NC/1N0 Pla.Flex Key
2TLA050003R1300	Mkey5, NPT, 2NC/1N0 Pla.Flex Key
2TLA050003R2300	Mkey5, QC, 2NC/1N0 Pla.Flex Key
2TLA050003R0400	Mkey5, M20, 2NC/1N0 Met. Flex Key
2TLA050003R1400	Mkey5, NPT, 2NC/1N0 Met. Flex Key
2TLA050003R2400	Mkey5, QC, 2NC/1N0 Met. Flex Key
2TLA050003R0500	Mkey5, M20, 2NC/1N0 SS Flex Key
2TLA050003R1500	Mkey5, NPT, 2NC/1N0 SS Flex Key
2TLA050003R2500	Mkey5, QC, 2NC/1N0 SS Flex Key
2TLA050003R0001	Mkey5+, M20, 2NC/1N0 No Key 40N
2TLA050003R1001	Mkey5+, NPT, 2NC/1N0 No Key 40N
2TLA050003R2001	Mkey5+, QC, 2NC/1N0 No Key 40N
2TLA050003R0101	Mkey5+, M20, 2NC/1N0 Std. Key 40N
2TLA050003R1101	Mkey5+, NPT, 2NC/1N0 Std. Key 40N
2TLA050003R2101	Mkey5+, QC, 2NC/1N0 Std. Key 40N
2TLA050003R0201	Mkey5+, M20, 2NC/1N0 Flat Key 40N
2TLA050003R1201	Mkey5+, NPT, 2NC/1N0 Flat Key 40N
2TLA050003R2201	Mkey5+, QC, 2NC/1N0 Flat Key 40N
2TLA050003R0301	Mkey5+, M20, 2NC/1N0 Pla.Flex Key 40N
2TLA050003R1301	Mkey5+, NPT, 2NC/1N0 Pla.Flex Key 40N
2TLA050003R2301	Mkey5+, QC, 2NC/1N0 Pla.Flex Key 40N
2TLA050003R0401	Mkey5+, M20, 2NC/1N0 Met. Flex Key 40N
2TLA050003R1401	Mkey5+, NPT, 2NC/1N0 Met. Flex Key 40N
2TLA050003R2401	Mkey5+, QC, 2NC/1N0 Met. Flex Key 40N
2TLA050003R0501	Mkey5+, M20, 2NC/1N0 SS Flex Key 40N
2TLA050003R1501	Mkey5+, NPT, 2NC/1N0 SS Flex Key 40N
2TLA050003R2501	Mkey5+, QC, 2NC/1N0 SS Flex Key 40N

## MKey 5 Stainless Steel Head

2TLA050003R0010	Mkey5, M20, 2NC/1N0 No Key
2TLA050003R1010	Mkey5, NPT, 2NC/1N0 No Key
2TLA050003R2010	Mkey5, QC, 2NC/1N0 No Key
2TLA050003R0110	Mkey5, M20, 2NC/1N0 Std. Key
2TLA050003R1110	Mkey5, NPT, 2NC/1N0 Std. Key
2TLA050003R2110	Mkey5, QC, 2NC/1N0 Std. Key
2TLA050003R0210	Mkey5, M20, 2NC/1N0 Flat Key
2TLA050003R1210	Mkey5, NPT, 2NC/1N0 Flat Key
2TLA050003R2210	Mkey5, QC, 2NC/1N0 Flat Key
2TLA050003R0310	Mkey5, M20, 2NC/1N0 Pla.Flex Key
2TLA050003R1310	Mkey5, NPT, 2NC/1N0 Pla.Flex Key
2TLA050003R2310	Mkey5, QC, 2NC/1N0 Pla.Flex Key
2TLA050003R0410	Mkey5, M20, 2NC/1N0 Met. Flex Key
2TLA050003R1410	Mkey5, NPT, 2NC/1N0 Met. Flex Key
2TLA050003R2410	Mkey5, QC, 2NC/1N0 Met. Flex Key
2TLA050003R0510	Mkey5, M20, 2NC/1N0 SS Flex Key
2TLA050003R1510	Mkey5, NPT, 2NC/1N0 SS Flex Key
2TLA050003R2510	Mkey5, QC, 2NC/1N0 SS Flex Key
2TLA050003R0011	Mkey5+, M20, 2NC/1N0 No Key 40N
2TLA050003R1011	Mkey5+, NPT, 2NC/1N0 No Key 40N
2TLA050003R2011	Mkey5+, QC, 2NC/1N0 No Key 40N
2TLA050003R0111	Mkey5+, M20, 2NC/1N0 Std. Key 40N
2TLA050003R1111	Mkey5+, NPT, 2NC/1N0 Std. Key 40N
2TLA050003R2111	Mkey5+, QC, 2NC/1N0 Std. Key 40N
2TLA050003R0211	Mkey5+, M20, 2NC/1N0 Flat Key 40N
2TLA050003R1211	Mkey5+, NPT, 2NC/1N0 Flat Key 40N
2TLA050003R2211	Mkey5+, QC, 2NC/1N0 Flat Key 40N
2TLA050003R0311	Mkey5+, M20, 2NC/1N0 Pla.Flex Key 40N
2TLA050003R1311	Mkey5+, NPT, 2NC/1N0 Pla.Flex Key 40N
2TLA050003R2311	Mkey5+, QC, 2NC/1N0 Pla.Flex Key 40N
2TLA050003R0411	Mkey5+, M20, 2NC/1N0 Met. Flex Key 40N
2TLA050003R1411	Mkey5+, NPT, 2NC/1N0 Met. Flex Key 40N
2TLA050003R2411	Mkey5+, QC, 2NC/1N0 Met. Flex Key 40N
2TLA050003R0511	Mkey5+, M20, 2NC/1N0 SS Flex Key 40N
2TLA050003R1511	Mkey5+, NPT, 2NC/1N0 SS Flex Key 40N
2TLA050003R2511	Mkey5+, QC, 2NC/1N0 SS Flex Key 40N

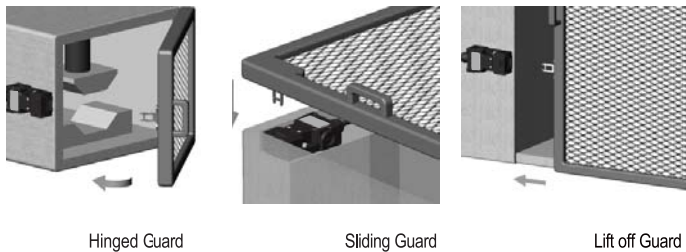
# MKey 5Z Tongue interlock stainless steel safety switches



ABB Jokab Safety MKey 5Z Series interlock switches have a rugged Stainless Steel 316 body and have been designed to cope with the rigorous applications of the Food Processing and Chemical Industries.

They have IP69K enclosure protection (maintained by a double seal lid gaskets and seals) and can be high pressure hosed with detergent at high temperature.

They are designed to fit to the leading edge of sliding, hinge or lift off machine guards. They provide a forced disconnect of the safety contacts at the withdrawal of the actuator and have an anti-tamper mechanism.



The head can be rotated to give 4 actuator entry positions. For extra durability, Flexible Actuators and Stainless steel head versions are available. They are sealed to IP69K and survive most caustic wash down solutions.

## Functional Specification:

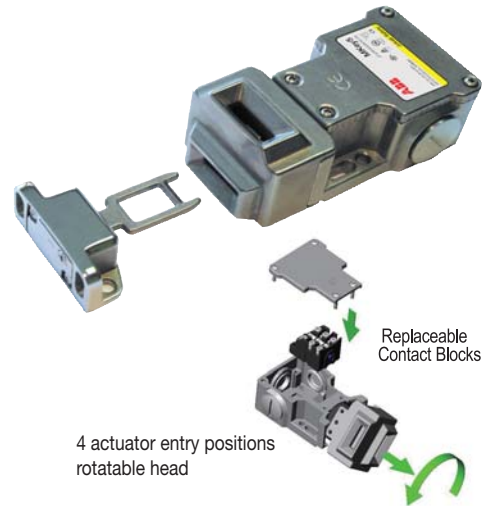
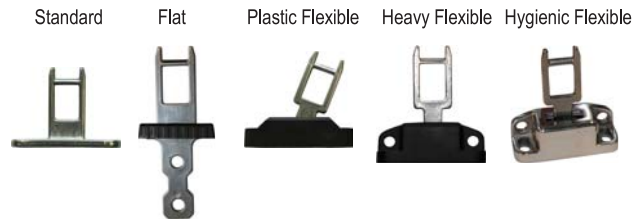
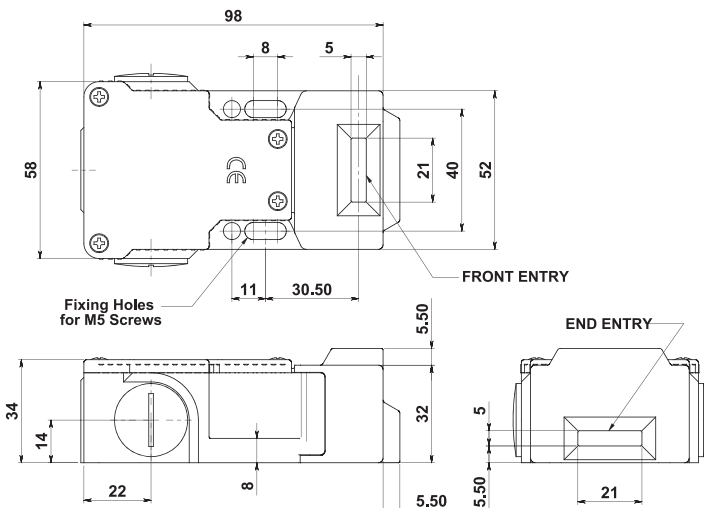
Positive break contacts to IEC947-5-1

High Functional Safety to ISO 13849-1

Will fit on 40mm fixing centres –industry standard housing

## Contact Block Options:

2NC 1NO



Stainless Steel 316 Body and External Fixings

Connects to most Safety Relays to give up to up to Ple Cat.4.

IP69K Suitable for SIP and CIP processes

Available with 40N holding force.

Standards	EN1088	IEC 947-5-1	EN 60204-1
	ISO 13849-1	EN62061	EN 954-1 UL508

## Safety Classification and Reliability Data:

Mechanical Reliability B10d	2.5 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	3.44 x 10 <sup>-8</sup>
Proof Test Interval (Life)	35 years
MTTFd	356 years
Utilization Category	AC15 A300 3A.
Thermal Current (Ith)	5A
Insulation / Withstand Voltages	500VAC / 2500 VAC
Rated Travel for Positive Opening	8mm
Actuator entry minimum radius	175mm Standard 100mm Flexible
Maximum Approach / Withdrawal speed	600mm/s.
Body Material	Stainless Steel 316
Head Material	Stainless Steel 316
Enclosure Protection	IP67 IP69K
Operating Temperature	-25C. +80C.
Vibration	IEC 68-2-6, 10-55Hz+1Hz, Excursion: 0.35mm, 1 octave/min
Conduit Entry Fixing	Various (See Sales Part Numbers) 4 x M5



# MKey 5Z Tongue interlock stainless steel safety switches



Contact operation at withdrawal of Actuator

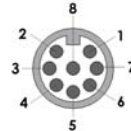
QC Quick Connect Versions

2NC 1NO 7.8 7.0 0 mm

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

## MKey 5Z

2TLA050003R0020	Mkey5Z, SS M20 2NC/1N0 No Key
2TLA050003R1020	Mkey5Z, SS NPT 2NC/1N0 No Key
2TLA050003R2020	Mkey5Z, SS QC 2NC/1N0 No Key
2TLA050003R0120	Mkey5Z, SS M20 2NC/1N0 Std. Key
2TLA050003R1120	Mkey5Z, SS NPT 2NC/1N0 Std. Key
2TLA050003R2120	Mkey5Z, SS QC 2NC/1N0 Std. Key
2TLA050003R0220	Mkey5Z, SS M20 2NC/1N0 Flat Key
2TLA050003R1220	Mkey5Z, SS NPT 2NC/1N0 Flat Key
2TLA050003R2220	Mkey5Z, SS QC 2NC/1N0 Flat Key
2TLA050003R0320	Mkey5Z, SS M20 2NC/1N0 Pla.Flex Key
2TLA050003R1320	Mkey5Z, SS NPT 2NC/1N0 Pla.Flex Key
2TLA050003R2320	Mkey5Z, SS QC 2NC/1N0 Pla.Flex Key
2TLA050003R0420	Mkey5Z, SS M20 2NC/1N0 Met. Flex Key
2TLA050003R1420	Mkey5Z, SS NPT 2NC/1N0 Met. Flex Key
2TLA050003R2420	Mkey5Z, SS QC 2NC/1N0 Met. Flex Key
2TLA050003R0520	Mkey5Z, SS M20 2NC/1N0 SS Flex Key
2TLA050003R1520	Mkey5Z, SS NPT 2NC/1N0 SS Flex Key
2TLA050003R2520	Mkey5Z, SS QC 2NC/1N0 SS Flex Key
2TLA050003R0021	Mkey5+Z, SS M20 2NC/1N0 No Key 40N
2TLA050003R1021	Mkey5+Z, SS NPT 2NC/1N0 No Key 40N
2TLA050003R2021	Mkey5+Z, SS QC 2NC/1N0 No Key 40N
2TLA050003R0121	Mkey5+Z, SS M20 2NC/1N0 Std. Key 40N
2TLA050003R1121	Mkey5+Z, SS NPT 2NC/1N0 Std. Key 40N
2TLA050003R2121	Mkey5+Z, SS QC 2NC/1N0 Std. Key 40N
2TLA050003R0221	Mkey5+Z, SS M20 2NC/1N0 Flat Key 40N
2TLA050003R1221	Mkey5+Z, SS NPT 2NC/1N0 Flat Key 40N
2TLA050003R2221	Mkey5+Z, SS QC 2NC/1N0 Flat Key 40N
2TLA050003R0321	Mkey5+Z, SS M20 2NC/1N0 Pla.Flex Key 40N
2TLA050003R1321	Mkey5+Z, SS NPT 2NC/1N0 Pla.Flex Key 40N
2TLA050003R2321	Mkey5+Z, SS QC 2NC/1N0 Pla.Flex Key 40N
2TLA050003R0421	Mkey5+Z, SS M20 2NC/1N0 Met.Flex Key 40N
2TLA050003R1421	Mkey5+Z, SS NPT 2NC/1N0 Met.Flex Key 40N
2TLA050003R2421	Mkey5+Z, SS QC 2NC/1N0 Met.Flex Key 40N
2TLA050003R0521	Mkey5+Z, SS M20 2NC/1N0 SS Flex Key 40N
2TLA050003R1521	Mkey5+Z, SS NPT 2NC/1N0 SS Flex Key 40N
2TLA050003R2521	Mkey5+Z, SS QC 2NC/1N0 SS Flex Key 40N



Quick Connect  
Pin view from switch

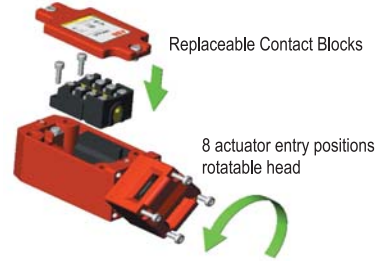
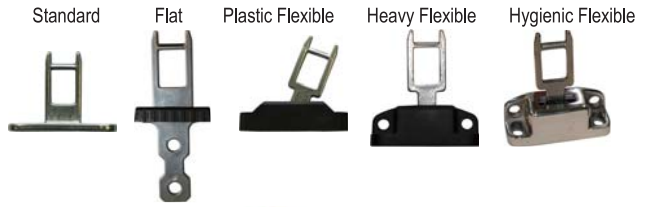
Switch Circuit	Quick Connect (QC) M12 8 Way Male (on Flying Lead 250mm) Pin view from switch
11 / 12	1 7
21 / 22	6 5
33 / 34	4 3
Earth	8

# MKey 6 Tongue interlock safety switches



ABB Jokab Safety MKey 6 Interlock switches are designed to provide position interlock detection for medium to heavy duty moving guards.

They have robust die-cast housings and are designed to fit to the leading edge of sliding, hinge or lift off machine guards. They provide a forced disconnect of the safety contacts at the withdrawal of the actuator and have an anti-tamper mechanism.



The rotatable heads have dual actuator entry positions to give up to 8 different entry positions. For extra durability, Flexible Actuators and Stainless Steel head versions are available.

High holding force versions are available for applications where vibration can be a nuisance.



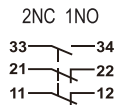
## Functional Specification:

Positive break contacts to IEC947-5-1

High Functional Safety to ISO 13849-1

3 pole, 4 pole or Explosion Proof Contact Blocks

Contact Block Options:

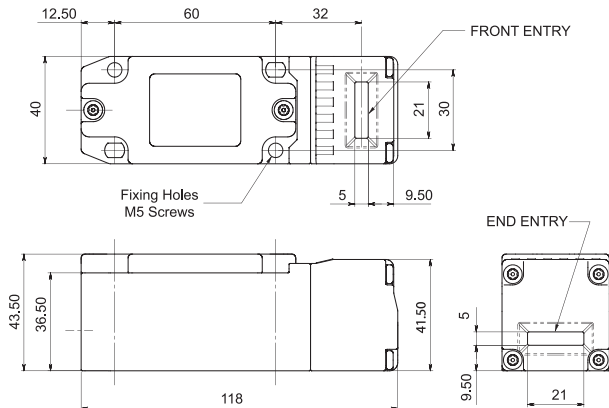


Stainless Steel Head version available

Connects to most Safety Relays to give up to up to Ple Cat.4.

Industry Fitting 118mm long 40mm wide 30mm fixing

Available with 40N holding force



For all ABB Jokab Safety switches the normally closed (NC) circuits are closed when the guard is closed actuator inserted.

Standards EN1088 IEC 947-5-1 EN 60204-1  
ISO 13849-1 EN62061 EN 954-1 UL508

Safety Classification and Reliability Data:

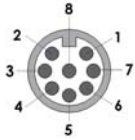
Mechanical Reliability B10d	2.5 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	3.44 x 10 <sup>-8</sup>
Proof Test Interval (Life)	35 years
MTTFd	356 years
Utilization Category	AC15 A300 3A.
Thermal Current (Ith)	5A
Rated Insulation / Withstand Voltages	500VAC / 2500 VAC
Travel for Positive Opening	8mm
Actuator entry minimum radius	175mm Standard 100mm Flexible
Maximum Approach / Withdrawal speed	600mm/s.
Body Material	Die Cast Painted Red
Head Material	Die Cast Painted Red or Stainless Steel 316
Enclosure Protection	IP67
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	4 x M5

# MKey 6 Tongue interlock safety switches

QC Quick Connect Versions



Quick Connect  
Pin view from switch



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

Contact operation at withdrawal of Actuator

2NC 1NO 7.8 7.0 0 mm

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

## MKey 6 Standard

2TLA050005R0030	Mkey6, M20, 2NC/1NO No Key
2TLA050005R1030	Mkey6, NPT, 2NC/1NO No Key
2TLA050005R2030	Mkey6, QC, 2NC/1NO No Key
2TLA050005R0130	Mkey6, M20, 2NC/1NO Std. Key
2TLA050005R1130	Mkey6, NPT, 2NC/1NO Std. Key
2TLA050005R2130	Mkey6, QC, 2NC/1NO Std. Key
2TLA050005R0230	Mkey6, M20, 2NC/1NO Flat Key
2TLA050005R1230	Mkey6, NPT, 2NC/1NO Flat Key
2TLA050005R2230	Mkey6, QC, 2NC/1NO Flat Key
2TLA050005R0330	Mkey6, M20, 2NC/1NO Pla.Flex Key
2TLA050005R1330	Mkey6, NPT, 2NC/1NO Pla.Flex Key
2TLA050005R2330	Mkey6, QC, 2NC/1NO Pla.Flex Key
2TLA050005R0430	Mkey6, M20, 2NC/1NO Met. Flex Key
2TLA050005R1430	Mkey6, NPT, 2NC/1NO Met. Flex Key
2TLA050005R2430	Mkey6, QC, 2NC/1NO Met. Flex Key
2TLA050005R0530	Mkey6, M20, 2NC/1NO SS Flex Key
2TLA050005R1530	Mkey6, NPT, 2NC/1NO SS Flex Key
2TLA050005R2530	Mkey6, QC, 2NC/1NO SS Flex Key
2TLA050005R0031	Mkey6+, M20, 2NC/1NO No Key 40N
2TLA050005R1031	Mkey6+, NPT, 2NC/1NO No Key 40N
2TLA050005R2031	Mkey6+, QC, 2NC/1NO No Key 40N
2TLA050005R0131	Mkey6+, M20, 2NC/1NO Std. Key 40N
2TLA050005R1131	Mkey6+, NPT, 2NC/1NO Std. Key 40N
2TLA050005R2131	Mkey6+, QC, 2NC/1NO Std. Key 40N
2TLA050005R0231	Mkey6+, M20, 2NC/1NO Flat Key 40N
2TLA050005R1231	Mkey6+, NPT, 2NC/1NO Flat Key 40N
2TLA050005R2231	Mkey6+, QC, 2NC/1NO Flat Key 40N
2TLA050005R0331	Mkey6+, M20, 2NC/1NO Pla.Flex Key 40N
2TLA050005R1331	Mkey6+, NPT, 2NC/1NO Pla.Flex Key 40N
2TLA050005R2331	Mkey6+, QC, 2NC/1NO Pla.Flex Key 40N
2TLA050005R0431	Mkey6+, M20, 2NC/1NO Met. Flex Key 40N
2TLA050005R1431	Mkey6+, NPT, 2NC/1NO Met. Flex Key 40N
2TLA050005R2431	Mkey6+, QC, 2NC/1NO Met. Flex Key 40N
2TLA050005R0531	Mkey6+, M20, 2NC/1NO SS Flex Key 40N
2TLA050005R1531	Mkey6+, NPT, 2NC/1NO SS Flex Key 40N
2TLA050005R2531	Mkey6+, QC, 2NC/1NO SS Flex Key 40N

## MKey 6 Stainless Steel Head

2TLA050005R0040	Mkey6, M20, 2NC/1NO No Key
2TLA050005R1040	Mkey6, NPT, 2NC/1NO No Key
2TLA050005R2040	Mkey6, QC, 2NC/1NO No Key
2TLA050005R0140	Mkey6, M20, 2NC/1NO Std. Key
2TLA050005R1140	Mkey6, NPT, 2NC/1NO Std. Key
2TLA050005R2140	Mkey6, QC, 2NC/1NO Std. Key
2TLA050005R0240	Mkey6, M20, 2NC/1NO Flat Key
2TLA050005R1240	Mkey6, NPT, 2NC/1NO Flat Key
2TLA050005R2240	Mkey6, QC, 2NC/1NO Flat Key
2TLA050005R0340	Mkey6, M20, 2NC/1NO Pla.Flex Key
2TLA050005R1340	Mkey6, NPT, 2NC/1NO Pla.Flex Key
2TLA050005R2340	Mkey6, QC, 2NC/1NO Pla.Flex Key
2TLA050005R0440	Mkey6, M20, 2NC/1NO Met. Flex Key
2TLA050005R1440	Mkey6, NPT, 2NC/1NO Met. Flex Key
2TLA050005R2440	Mkey6, QC, 2NC/1NO Met. Flex Key
2TLA050005R0540	Mkey6, M20, 2NC/1NO SS Flex Key
2TLA050005R1540	Mkey6, NPT, 2NC/1NO SS Flex Key
2TLA050005R2540	Mkey6, QC, 2NC/1NO SS Flex Key
2TLA050005R0041	Mkey6+, M20, 2NC/1NO No Key 40N
2TLA050005R1041	Mkey6+, NPT, 2NC/1NO No Key 40N
2TLA050005R2041	Mkey6+, QC, 2NC/1NO No Key 40N
2TLA050005R0141	Mkey6+, M20, 2NC/1NO Std. Key 40N
2TLA050005R1141	Mkey6+, NPT, 2NC/1NO Std. Key 40N
2TLA050005R2141	Mkey6+, QC, 2NC/1NO Std. Key 40N
2TLA050005R0241	Mkey6+, M20, 2NC/1NO Flat Key 40N
2TLA050005R1241	Mkey6+, NPT, 2NC/1NO Flat Key 40N
2TLA050005R2241	Mkey6+, QC, 2NC/1NO Flat Key 40N
2TLA050005R0341	Mkey6+, M20, 2NC/1NO Pla.Flex Key 40N
2TLA050005R1341	Mkey6+, NPT, 2NC/1NO Pla.Flex Key 40N
2TLA050005R2341	Mkey6+, QC, 2NC/1NO Pla.Flex Key 40N
2TLA050005R0441	Mkey6+, M20, 2NC/1NO Met. Flex Key 40N
2TLA050005R1441	Mkey6+, NPT, 2NC/1NO Met. Flex Key 40N
2TLA050005R2441	Mkey6+, QC, 2NC/1NO Met. Flex Key 40N
2TLA050005R0541	Mkey6+, M20, 2NC/1NO SS Flex Key 40N
2TLA050005R1541	Mkey6+, NPT, 2NC/1NO SS Flex Key 40N
2TLA050005R2541	Mkey6+, QC, 2NC/1NO SS Flex Key 40N

# MKey 6Z Tongue interlock stainless steel safety switches

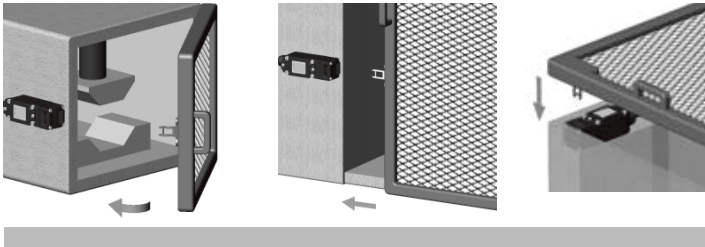


ABB Jokab Safety MKey 6Z Series Interlock Switches have a rugged Stainless Steel 316 body and have been designed to cope with the rigorous applications of the Food Processing and Packaging Industries. The surface finish is mirror polished to Ra10 to resist the accumulation of food, debris and is suitable for high pressure hosing at high temperature.

They offer compact slimline housing which will fit to areas where there are space restrictions and are sealed to IP69K enclosure protection. They can be high pressure hosed with most detergents at high temperature.

They are designed to fit to the leading edge of sliding, hinge or lift off machine guards. They provide a forced disconnect of the safety contacts at the withdrawal of the actuator and have an anti-tamper mechanism.

The rotatable heads have dual actuator entry positions to give up to 4 different entry positions. High holding force versions are available for applications where vibration can be a nuisance.



They offer 3 pole contacts to suit modern control circuits.

## Functional Specification:

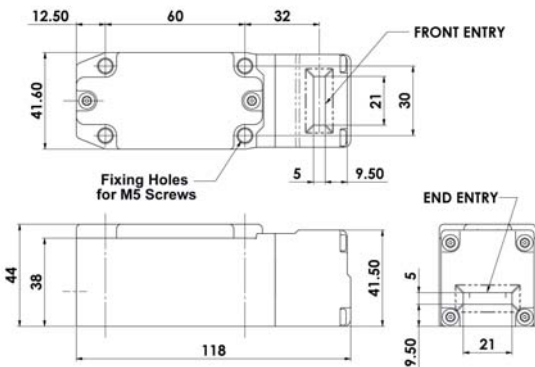
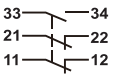
Positive break contacts to IEC947-5-1

High Functional Safety to ISO 13849-1

Will fit on 30mm fixing centres –DIN standard body mounting

## Contact Block Options:

2NC 1NO



Mirror Finish Stainless Steel 316 Body

Connects to most Safety Relays to give up to up to Ple Cat.4.

IP69K Suitable for SIP and CIP processes

Available with 40N holding force

Standards	EN1088	IEC 947-5-1	EN 60204-1
	ISO 13849-1	EN62061	EN 954-1 UL508

Mechanical Reliability B10d	2.5 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	3.44 x 10 <sup>-8</sup>
Proof Test Interval (Life)	35 years
MTTFd	356 years
Utilization Category	AC15 A300 3A.
Thermal Current (Ith)	5A
Rated Insulation / Withstand Voltages	500VAC / 2500 VAC
Travel for Positive Opening	8mm
Actuator entry minimum radius	175mm Standard 100mm Flexible
Maximum Approach / Withdrawal speed	600mm/s.
Body Material	Stainless Steel 316
Head Material	Stainless Steel 316
Enclosure Protection	IP67
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	4 x M5

For all ABB Jokab Safety switches the normally closed (NC) circuits are closed when the guard is closed actuator inserted.

# MKey 6Z Tongue interlock stainless steel safety switches



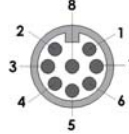
Contact operation at withdrawal of Actuator

QC Quick Connect Versions

2NC 1NO 7.8 7.0 0 mm

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

Quick Connect  
Pin view from switch



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

## MKey 6z

2TLA050005R0020	Mkey6Z, SS M20 2NC/1N0 No Key
2TLA050005R1020	Mkey6Z, SS NPT 2NC/1N0 No Key
2TLA050005R2020	Mkey6Z, SS QC 2NC/1N0 No Key
2TLA050005R0120	Mkey6Z, SS M20 2NC/1N0 Std. Key
2TLA050005R1120	Mkey6Z, SS NPT 2NC/1N0 Std. Key
2TLA050005R2120	Mkey6Z, SS QC 2NC/1N0 Std. Key
2TLA050005R0220	Mkey6Z, SS M20 2NC/1N0 Flat Key
2TLA050005R1220	Mkey6Z, SS NPT 2NC/1N0 Flat Key
2TLA050005R2220	Mkey6Z, SS QC 2NC/1N0 Flat Key
2TLA050005R0320	Mkey6Z, SS M20 2NC/1N0 Pla.Flex Key
2TLA050005R1320	Mkey6Z, SS NPT 2NC/1N0 Pla.Flex Key
2TLA050005R2320	Mkey6Z, SS QC 2NC/1N0 Pla.Flex Key
2TLA050005R0420	Mkey6Z, SS M20 2NC/1N0 Met.Flex Key
2TLA050005R1420	Mkey6Z, SS NPT 2NC/1N0 Met.Flex Key
2TLA050005R2420	Mkey6Z, SS QC 2NC/1N0 Met.Flex Key
2TLA050005R0520	Mkey6Z, SS M20 2NC/1N0 SS Flex Key
2TLA050005R1520	Mkey6Z, SS NPT 2NC/1N0 SS Flex Key
2TLA050005R2520	Mkey6Z, SS QC 2NC/1N0 SS Flex Key
2TLA050005R0021	Mkey6+Z, SS M20 2NC/1N0 No Key 40N
2TLA050005R1021	Mkey6+Z, SS NPT 2NC/1N0 No Key 40N
2TLA050005R2021	Mkey6+Z, SS QC 2NC/1N0 No Key 40N
2TLA050005R0121	Mkey6+Z, SS M20 2NC/1N0 Std. Key 40N
2TLA050005R1121	Mkey6+Z, SS NPT 2NC/1N0 Std. Key 40N
2TLA050005R2121	Mkey6+Z, SS QC 2NC/1N0 Std. Key 40N
2TLA050005R0221	Mkey6+Z, SS M20 2NC/1N0 Flat Key 40N
2TLA050005R1221	Mkey6+Z, SS NPT 2NC/1N0 Flat Key 40N
2TLA050005R2221	Mkey6+Z, SS QC 2NC/1N0 Flat Key 40N
2TLA050005R0321	Mkey6+Z, SS M20 2NC/1N0 Pla.Flex Key 40N
2TLA050005R1321	Mkey6+Z, SS NPT 2NC/1N0 Pla.Flex Key 40N
2TLA050005R2321	Mkey6+Z, SS QC 2NC/1N0 Pla.Flex Key 40N
2TLA050005R0421	Mkey6+Z, SS M20 2NC/1N0 Met.Flex Key 40N
2TLA050005R1421	Mkey6+Z, SS NPT 2NC/1N0 Met.Flex Key 40N
2TLA050005R2421	Mkey6+Z, SS QC 2NC/1N0 Met.Flex Key 40N
2TLA050005R0521	Mkey6+Z, SS M20 2NC/1N0 SS Flex Key 40N
2TLA050005R1521	Mkey6+Z, SS NPT 2NC/1N0 SS Flex Key 40N
2TLA050005R2521	Mkey6+Z, SS QC 2NC/1N0 SS Flex Key 40N

# MKey Guard locking safety interlock switches



## Application:

ABB Jokab Safety MKey Guard Locking switches are designed to provide robust position interlock detection for moving guards and provide a lock mechanism to keep the guard closed until the hazard has been removed.

They are Tongue operated and are designed to fit to the leading edge of sliding or hinged machine guards to provide positively operated switching contacts and provide a tamper resistant, not easily defeatable key mechanism. Depending upon the risk assessment for the application, they can be used independently to provide positively operated contacts to IEC-947-5-1 or they can be used in combination with any dual channel safety monitoring relays to provide up to Ple Category 4 to ISO 13849-1 or SIL3 EN62061. They are available in various materials and housing styles to provide complete flexibility of choice depending upon the application. They offer a choice of contact blocks, LED diagnostics and various actuators to aid installation and maintain durability throughout the rigorous applications of Factory Automation, Packaging, Food Processing, Pharmaceutical and Petro-Chemical Industries.

## Operation:

The switch is rigidly mounted to the frame of the guard or machine. The actuator is fitted to the moving part (frame) of the guard and is aligned to the switch entry aperture. The actuator profile is designed to match a cam mechanism within the switch head and provides a positively to the switch operated interlock switch. When the actuator is inserted into the switch the safety contacts can be closed and allow the machine start circuit to be enabled. When the solenoid receives the required signal the safety contacts are positively opened, the machine circuit is broken and the guard door can be opened. They can be used in combination with safety timers to provide a delay before allowing the guard to open (e.g. for machines which require run down).

**Standard versions automatically spring locked at the insertion of the actuator and will only unlock when power is applied to the solenoid.**

**Power to Lock versions are available for special applications where the hazard is immediately removed (no run down necessary) and it is favourable to have the switch unlock if a power failure occurs.**

They offer a choice of high specification plastic or die-cast housings and are sealed to IP67 and provide long term protection against moisture ingress. For harsh applications like Food Processing, Pharmaceutical and Chemical Industries the Stainless Steel 316 range offers protection up to IP69K for use in high pressure chemical cleaning or CIP/SIP applications.



**1800N.**

### MKey 9 Solenoid Locking (Plastic)

8 actuator entry positions – rotatable head  
 High Holding Force: 1800N.  
 2 lock monitoring safety contacts  
 46mm wide 160mm long 30mm fixing  
 LED 1 status of solenoid applied power  
 LED 2 status of guard lock  
 2 Emergency manual release points  
 IP67



**2000N.**

### MKey 8 Solenoid Locking (Metal)

8 actuator entry positions – rotatable head  
 46mm wide 176mm long 30mm fixing  
 2 lock monitoring safety contacts  
 Die Cast Alloy  
 High Holding Force: 2000N.  
 LED 1 status of solenoid applied power  
 LED 2 status of guard lock  
 2 Emergency manual release points  
 IP67



Mirror Polished Finish

**2000N.**

### MKey 8Z Solenoid Locking (Fully stainless Steel)

8 actuator entry positions – rotatable head  
 48mm wide 177mm long 30mm fixing  
 2 lock monitoring safety contacts  
 High Holding Force: 2000N.  
 LED 1 status of solenoid applied power  
 LED 2 status of guard lock  
 2 Emergency manual release points  
 IP69K high temperature hose down

Stainless Steel 316 versions have been developed for guard interlocking in the applications of Food Processing, Pharmaceutical, Packaging and Chemical Industries. They are tested to ingress protection degree IP69K (high pressure hosing with detergent at 80C. and 100psi).

# MKey Guard locking safety interlock switches



## Function Guide:

All Guard Locking Switches are intended to prevent an operator accidentally opening a guard door and being exposed to a hazard. When choosing the correct switch it is necessary to take into account the dimensions and weight of the guard door and to install the switch so as to avoid applying unnecessary forces to the switch locking mechanism during normal use. Door catches, stops and guides should always be fitted in addition to the safety switch to prevent unnecessary damage to the switch.

## Standard Versions - (Energise the switch solenoid to unlock).



When the guard is closed the switch actuator is automatically locked and the switch safety contacts close.

The guard will be held closed and can only be opened after the switch solenoid is energised causing the actuator to unlock.

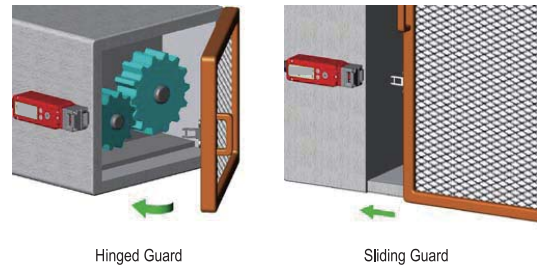
The operator cannot accidentally open the guard until the hazard is removed. When the solenoid is energised the safety contacts open and the actuator can be released.

Depending upon a risk assessment for the application, the solenoid is usually energised either by:

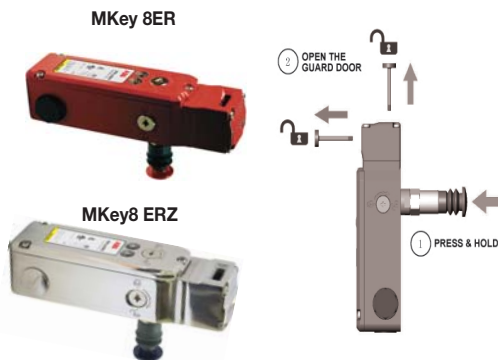
A request push button (for applications with immediate removal of the hazard).

A request pushbutton and safety timer (for applications with a run down hazard after removing the machine power).

From a PLC or if necessary a Safety PLC via a machine control command.



## Standard Versions with Rear Manual release buttons:



All the features and specifications of the standard MKey 8 and MKey 8Z are maintained.

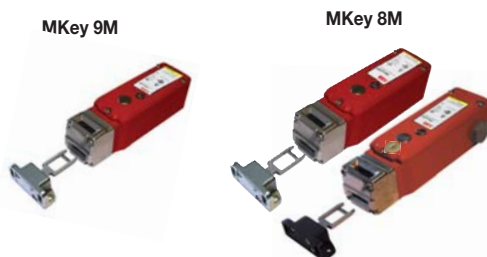
Where the risk assessment for the application permits, a non-latching manual escape release is provided to enable quick release of the switch lock in case of emergency.

The switch can be mounted such that access to the release button is available from inside the active guard area.

Pressing and holding the red button will release the lock mechanism and open the lock monitoring safety contacts and allow the guard to be pushed open.

## Power to Lock Versions – (Energise the switch solenoid to keep locked)

Only suitable for applications where immediate unlocking is required at removal or loss of solenoid power. Not suitable for machines with a running down time.



When the guard is closed the switch actuator will only lock and allow the safety contacts to close after the solenoid is energised.

The guard will be held closed and can only be opened after the solenoid is de-energised either by controlled request (or by power loss).

A latching Stop/Start circuit or a PLC or Safety PLC machine command usually energises the solenoid.

# MKey 8 Guard locking metal safety switches



## Solenoid Locking Interlock Safety Switches featuring Guard Holding up to 2000N. (200Kg.)

The MKey 8 Series Guard Locking switches have rugged Die Cast housings and have been developed with a high Holding Force of 2000N to keep medium to large Guard Doors closed until hazards have been removed.

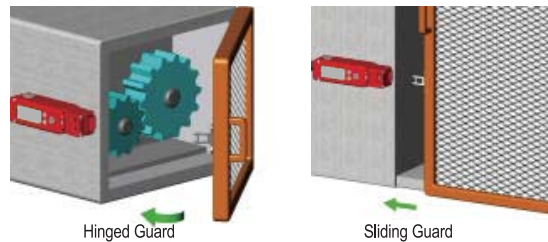
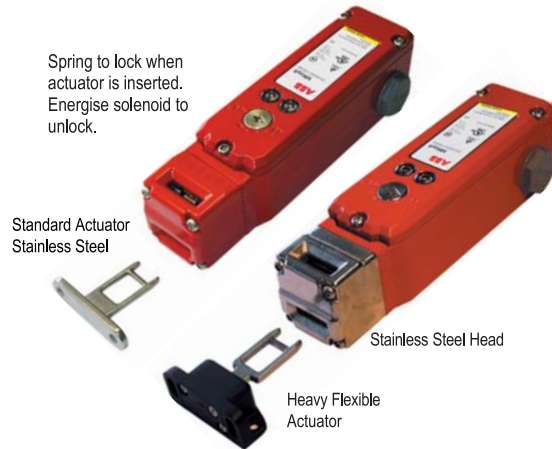
They have a slim profile and are designed to fit on 50mm (2in.) frame sections or to applications where space is restricted. The Head will rotate to provide up to 8 actuator entry positions.

They have 2 independent contact blocks to individually monitor the Lock status and Door Status.

An LED is available to indicate Lock Status.

Versions are available offering a Rear Manual Escape Release.

Accessories include a Sliding Handle Bolt to provide holding of heavy or hinged doors and lock off actuators.



### Functional Specification:

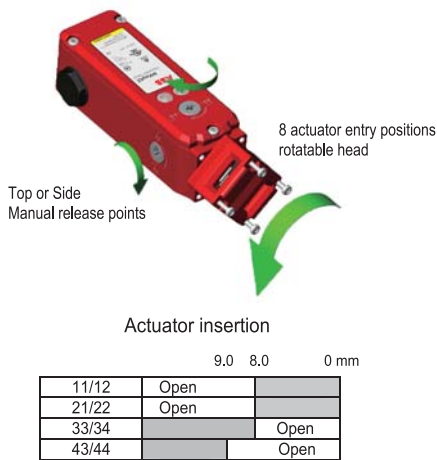
Positive break contacts to IEC947-5-1

High Functional Safety to ISO 13849-1

4NC Safety Circuits - 2 Solenoid/Lock 2 Actuator/Guard  
 1NO Circuit Auxiliary circuit for indication of actuator status (Guard open)  
 1NO Circuit Auxiliary circuit for Lock Status (selectable with LED2)

Stainless Steel Head version available

Connects to most Safety Relays to give up to up to Ple Cat.4.



For all ABB Jokab Safety switches the normally closed (NC) circuits are closed when the guard is closed actuator inserted.

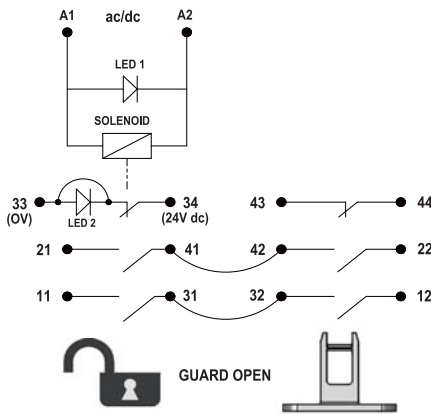
Standards	EN1088	IEC 947-5-1	EN 60204-1	
	ISO 13849-1	EN62061	EN 954-1	UL508
Safety Classification and Reliability Data:				
Mechanical Reliability B10d	2.5 x 10 <sup>6</sup> operations at 100mA load			
EN 954-1	up to Category 4 with Safety Relay			
ISO 13849-1	up to PLe depending upon system architecture			
EN 62061	up to SIL3 depending upon system architecture			
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days			
PFHd	3.44 x 10 <sup>-8</sup>			
Proof Test Interval (Life)	35 years			
MTTFd	356 years			
Solenoid Voltage (by part number)	24V ac/dc or 110V. ac or 230V. ac			
Solenoid Wattage	12W.			
LED 2 - Supply Voltage	24V dc			
Utilization Category	AC15 A300 3A.			
Thermal Current (Ith)	5A			
Rated Insulation / Withstand Voltages	600VAC / 2500 VAC			
Travel for Positive Opening	10mm			
Actuator entry minimum radius	175mm Standard	60mm Heavy Duty		
Maximum Approach / Withdrawal speed	600mm/s.			
Body Material	Die Cast Painted Red			
Head Material	Die Cast Painted Red or Stainless Steel 316			
Enclosure Protection	IP67			
Operating Temperature	-25C. 55C.			
Vibration	IEC 68-2-6, 10-55Hz+1Hz, Excursion: 0.35mm, 1 octave/min			
Conduit Entry	Various (See Sales Part Numbers)			
Fixing	4 x M5			



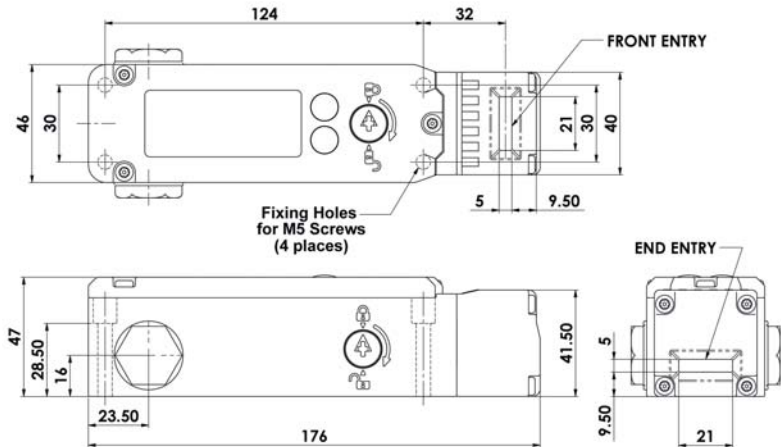
# MKey 8 Guard locking metal safety switches



Schematic circuit:



Dimensions:



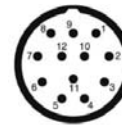
## Mkey 8 Standard

2TLA050011R0032 Mkey8, Sol M20, 24V No Key  
 2TLA050011R1032 Mkey8, Sol NPT, 24V No Key  
 2TLA050011R2032 Mkey8, Sol QC, 24V No Key  
 2TLA050011R0033 Mkey8, Sol M20, 110V No Key  
 2TLA050011R1033 Mkey8, Sol NPT, 110V No Key  
 2TLA050011R2033 Mkey8, Sol QC, 110V No Key  
 2TLA050011R0034 Mkey8, Sol M20, 230V No Key  
 2TLA050011R1034 Mkey8, Sol NPT, 230V No Key  
 2TLA050011R2034 Mkey8, Sol QC, 230V No Key  
 2TLA050011R0132 Mkey8, Sol M20, 24V Std. Key  
 2TLA050011R1132 Mkey8, Sol NPT, 24V Std. Key  
 2TLA050011R2132 Mkey8, Sol QC, 24V Std. Key  
 2TLA050011R0133 Mkey8, Sol M20, 110V Std. Key  
 2TLA050011R1133 Mkey8, Sol NPT, 110V Std. Key  
 2TLA050011R2133 Mkey8, Sol QC, 110V Std. Key  
 2TLA050011R0134 Mkey8, Sol M20, 230V Std. Key  
 2TLA050011R1134 Mkey8, Sol NPT, 230V Std. Key  
 2TLA050011R2134 Mkey8, Sol QC, 230V Std. Key  
 2TLA050011R0232 Mkey8, Sol M20, 24V Flat Key  
 2TLA050011R1232 Mkey8, Sol NPT, 24V Flat Key  
 2TLA050011R2232 Mkey8, Sol QC, 24V Flat Key  
 2TLA050011R0233 Mkey8, Sol M20, 110V Flat Key  
 2TLA050011R1233 Mkey8, Sol NPT, 110V Flat Key  
 2TLA050011R2233 Mkey8, Sol QC, 110V Flat Key  
 2TLA050011R0234 Mkey8, Sol M20, 230V Flat Key  
 2TLA050011R1234 Mkey8, Sol NPT, 230V Flat Key  
 2TLA050011R2234 Mkey8, Sol QC, 230V Flat Key  
 2TLA050011R0432 Mkey8, Sol M20, 24V Met. Flex Key  
 2TLA050011R1432 Mkey8, Sol NPT, 24V Met. Flex Key  
 2TLA050011R2432 Mkey8, Sol QC, 24V Met. Flex Key  
 2TLA050011R0433 Mkey8, Sol M20, 110V Met. Flex Key  
 2TLA050011R1433 Mkey8, Sol NPT, 110V Met. Flex Key  
 2TLA050011R2433 Mkey8, Sol QC, 110V Met. Flex Key  
 2TLA050011R0434 Mkey8, Sol M20, 230V Met. Flex Key  
 2TLA050011R1434 Mkey8, Sol NPT, 230V Met. Flex Key  
 2TLA050011R2434 Mkey8, Sol QC, 230V Met. Flex Key  
 2TLA050011R0532 Mkey8, Sol M20, 24V SS Flex Key  
 2TLA050011R1532 Mkey8, Sol NPT, 24V SS Flex Key  
 2TLA050011R2532 Mkey8, Sol QC, 24V SS Flex Key  
 2TLA050011R0533 Mkey8, Sol M20, 110V SS Flex Key  
 2TLA050011R1533 Mkey8, Sol NPT, 110V SS Flex Key  
 2TLA050011R2533 Mkey8, Sol QC, 110V SS Flex Key  
 2TLA050011R0534 Mkey8, Sol M20, 230V SS Flex Key  
 2TLA050011R1534 Mkey8, Sol NPT, 230V SS Flex Key  
 2TLA050011R2534 Mkey8, Sol QC, 230V SS Flex Key

## Mkey 8 Stainless Steel Head

2TLA050011R0042 Mkey8, Sol M20, 24V No Key  
 2TLA050011R1042 Mkey8, Sol NPT, 24V No Key  
 2TLA050011R2042 Mkey8, Sol QC, 24V No Key  
 2TLA050011R0043 Mkey8, Sol M20, 110V No Key  
 2TLA050011R1043 Mkey8, Sol NPT, 110V No Key  
 2TLA050011R2043 Mkey8, Sol QC, 110V No Key  
 2TLA050011R0044 Mkey8, Sol M20, 230V No Key  
 2TLA050011R1044 Mkey8, Sol NPT, 230V No Key  
 2TLA050011R2044 Mkey8, Sol QC, 230V No Key  
 2TLA050011R0142 Mkey8, Sol M20, 24V Std. Key  
 2TLA050011R1142 Mkey8, Sol NPT, 24V Std. Key  
 2TLA050011R2142 Mkey8, Sol QC, 24V Std. Key  
 2TLA050011R0143 Mkey8, Sol M20, 110V Std. Key  
 2TLA050011R1143 Mkey8, Sol NPT, 110V Std. Key  
 2TLA050011R2143 Mkey8, Sol QC, 110V Std. Key  
 2TLA050011R0144 Mkey8, Sol M20, 230V Std. Key  
 2TLA050011R1144 Mkey8, Sol NPT, 230V Std. Key  
 2TLA050011R2144 Mkey8, Sol QC, 230V Std. Key  
 2TLA050011R0242 Mkey8, Sol M20, 24V Flat Key  
 2TLA050011R1242 Mkey8, Sol NPT, 24V Flat Key  
 2TLA050011R2242 Mkey8, Sol QC, 24V Flat Key  
 2TLA050011R0243 Mkey8, Sol M20, 110V Flat Key  
 2TLA050011R1243 Mkey8, Sol NPT, 110V Flat Key  
 2TLA050011R2243 Mkey8, Sol QC, 110V Flat Key  
 2TLA050011R0244 Mkey8, Sol M20, 230V Flat Key  
 2TLA050011R1244 Mkey8, Sol NPT, 230V Flat Key  
 2TLA050011R2244 Mkey8, Sol QC, 230V Flat Key  
 2TLA050011R0442 Mkey8, Sol M20, 24V Met. Flex Key  
 2TLA050011R1442 Mkey8, Sol NPT, 24V Met. Flex Key  
 2TLA050011R2442 Mkey8, Sol QC, 24V Met. Flex Key  
 2TLA050011R0443 Mkey8, Sol M20, 110V Met. Flex Key  
 2TLA050011R1443 Mkey8, Sol NPT, 110V Met. Flex Key  
 2TLA050011R2443 Mkey8, Sol QC, 110V Met. Flex Key  
 2TLA050011R0444 Mkey8, Sol M20, 230V Met. Flex Key  
 2TLA050011R1444 Mkey8, Sol NPT, 230V Met. Flex Key  
 2TLA050011R2444 Mkey8, Sol QC, 230V Met. Flex Key  
 2TLA050011R0542 Mkey8, Sol M20, 24V SS Flex Key  
 2TLA050011R1542 Mkey8, Sol NPT, 24V SS Flex Key  
 2TLA050011R2542 Mkey8, Sol QC, 24V SS Flex Key  
 2TLA050011R0543 Mkey8, Sol M20, 110V SS Flex Key  
 2TLA050011R1543 Mkey8, Sol NPT, 110V SS Flex Key  
 2TLA050011R2543 Mkey8, Sol QC, 110V SS Flex Key  
 2TLA050011R0544 Mkey8, Sol M20, 230V SS Flex Key  
 2TLA050011R1544 Mkey8, Sol NPT, 230V SS Flex Key  
 2TLA050011R2544 Mkey8, Sol QC, 230V SS Flex Key

QC Quick Connect Connector Length 24mm



Quick Connect (QC) M23 12 way Male Plug (Pin view from switch)	Switch Circuit
1 3	A1 A2
4 6	11 / 12
7 8	21 / 22
2 5	43 / 44
9	33
10	34
Earth	12

# MKey 8Z Guard locking stainless steel safety switches



## Solenoid Locking Interlock Safety Switches featuring Guard Holding up to 2000N. (200Kg.)

The MKey 8Z Series Guard Locking switches have a rugged Stainless Steel 316 body and have been developed with a holding force of 2000N to keep medium to large Guard Doors closed until hazards have been removed.

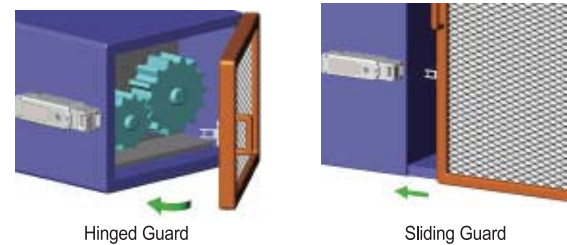
They are designed in accordance with EHEDG guidelines for hygienic design (EHEDG European Hygienic Engineering & Design Group). The mirror-polished surface to Ra10 is designed to cope with direct food splash and cleaning found in the tough applications of the Food Processing Industries. They have IP69K enclosure protection and can be high pressure hosed with detergent at high temperature.

They have a slim body design under 50mm wide and can be fitted to 50mm (2in.) frame sections or to applications where space is restricted. The Head will rotate to provide up to 8 actuator entry positions.

2 Manual override points are provided (by using anti-tamper key).

A unique mechanical design featuring 2 independent contact blocks gives a high function and diagnostic specification:

- 4NC Safety Contacts
- 1NO Auxiliary Contact (Guard open)
- LED1 Solenoid Power
- LED2 Lock Status indication or 1NO Auxiliary Contact (Lock Open)

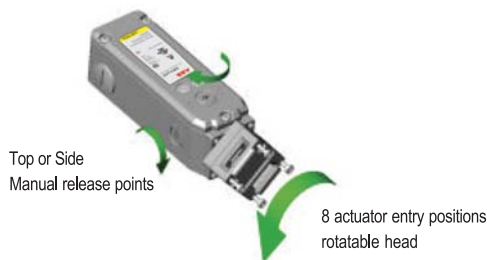


### Functional Specification:

Positive break contacts to IEC947-5-1

High Functional Safety to ISO 13849-1

4NC Safety Contacts independently selectable



Actuator insertion

9.0 8.0 0 mm

11/12	Open	
21/22	Open	
33/34		Open
43/44		Open

Spring to lock when actuator is inserted. Energise solenoid to unlock.



Stainless 316 Housings – Mirror Polished Finish to Ra10

Connects to most Safety Relays to give up to up to Ple Cat.4.

IP69K Suitable for SIP and CIP processes

Standards EN1088 IEC 947-5-1 EN 60204-1  
ISO 13849-1 EN62061 EN 954-1 UL508

Safety Classification and Reliability Data:

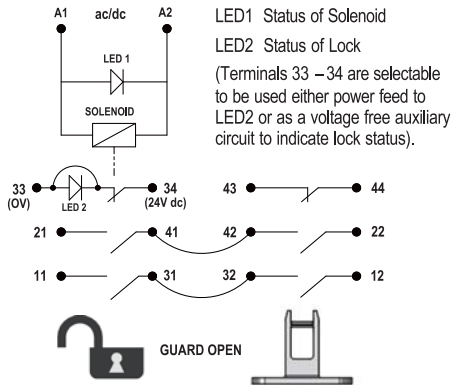
Mechanical Reliability B10d	2.5 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLE depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365
PFHd	3.44 x 10 <sup>-8</sup>
Proof Test Interval (Life)	35 years
MTTFd	356 years
Solenoid Voltage (by part number)	24V ac/dc or 110V. ac or 230V. ac
Solenoid Wattage	12W.
LED 2 Supply Voltage	24V dc
Utilization Category	AC15 A300 3A.
Thermal Current (Ith)	5A
Rated Insulation / Withstand Voltages	600VAC / 2500 VAC
Travel for Positive Opening	10mm
Actuator entry minimum radius	175mm Standard 60mm Heavy Duty
Maximum Approach / Withdrawal speed	600mm/s.
Body Material	Stainless Steel 316
Enclosure Protection	IP69K / IP67
Operating Temperature	-25C. 55C.
Vibration	IEC 68-2-6, 10-55Hz+1Hz, Excursion: 0.35mm, 1 octave/min
Conduit Entry Fixing	Various (See Sales Part Numbers) 4 x M5

For all ABB Joakab Safety switches the normally closed (NC) circuits are closed when the guard is closed actuator inserted.

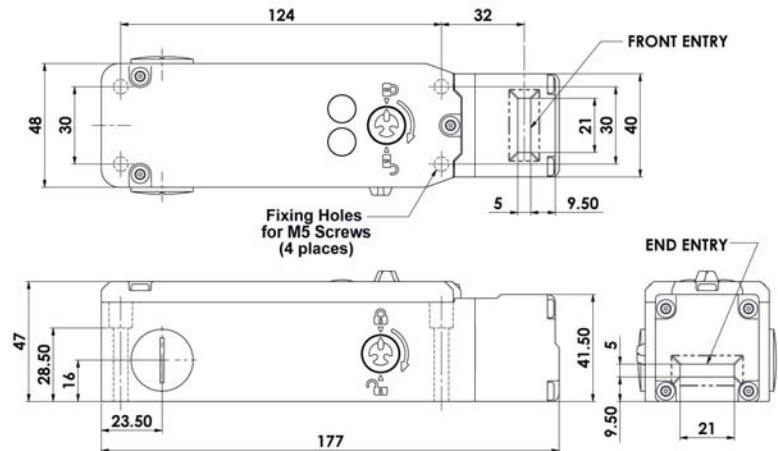
# MKey 8Z Guard locking stainless steel safety switches



Schematic circuit:



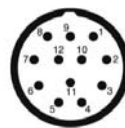
Dimensions:



## MKey 8Z

2TLA050011R0022	Mkey8Z, SS Sol M20, 24V No Key
2TLA050011R1022	Mkey8Z, SS Sol NPT, 24V No Key
2TLA050011R2022	Mkey8Z, SS Sol QC, 24V No Key
2TLA050011R0023	Mkey8Z, SS Sol M20, 110V No Key
2TLA050011R1023	Mkey8Z, SS Sol NPT, 110V No Key
2TLA050011R2023	Mkey8Z, SS Sol QC, 110V No Key
2TLA050011R0024	Mkey8Z, SS Sol M20, 230V No Key
2TLA050011R1024	Mkey8Z, SS Sol NPT, 230V No Key
2TLA050011R2024	Mkey8Z, SS Sol QC, 230V No Key
2TLA050011R0122	Mkey8Z, SS Sol M20, 24V Std. Key
2TLA050011R1122	Mkey8Z, SS Sol NPT, 24V Std. Key
2TLA050011R2122	Mkey8Z, SS Sol QC, 24V Std. Key
2TLA050011R0123	Mkey8Z, SS Sol M20, 110V Std. Key
2TLA050011R1123	Mkey8Z, SS Sol NPT, 110V Std. Key
2TLA050011R2123	Mkey8Z, SS Sol QC, 110V Std. Key
2TLA050011R0124	Mkey8Z, SS Sol M20, 230V Std. Key
2TLA050011R1124	Mkey8Z, SS Sol NPT, 230V Std. Key
2TLA050011R2124	Mkey8Z, SS Sol QC, 230V Std. Key
2TLA050011R0222	Mkey8Z, SS Sol M20, 24V Flat Key
2TLA050011R1222	Mkey8Z, SS Sol NPT, 24V Flat Key
2TLA050011R2222	Mkey8Z, SS Sol QC, 24V Flat Key
2TLA050011R0223	Mkey8Z, SS Sol M20, 110V Flat Key
2TLA050011R1223	Mkey8Z, SS Sol NPT, 110V Flat Key
2TLA050011R2223	Mkey8Z, SS Sol QC, 110V Flat Key
2TLA050011R0224	Mkey8Z, SS Sol M20, 230V Flat Key
2TLA050011R1224	Mkey8Z, SS Sol NPT, 230V Flat Key
2TLA050011R2224	Mkey8Z, SS Sol QC, 230V Flat Key
2TLA050011R0422	Mkey8Z, SS Sol M20, 24V Met. Flex Key
2TLA050011R1422	Mkey8Z, SS Sol NPT, 24V Met. Flex Key
2TLA050011R2422	Mkey8Z, SS Sol QC, 24V Met. Flex Key
2TLA050011R0423	Mkey8Z, SS Sol M20, 110V Met. Flex Key
2TLA050011R1423	Mkey8Z, SS Sol NPT, 110V Met. Flex Key
2TLA050011R2423	Mkey8Z, SS Sol QC, 110V Met. Flex Key
2TLA050011R0424	Mkey8Z, SS Sol M20, 230V Met. Flex Key
2TLA050011R1424	Mkey8Z, SS Sol NPT, 230V Met. Flex Key
2TLA050011R2424	Mkey8Z, SS Sol QC, 230V Met. Flex Key
2TLA050011R0522	Mkey8Z, SS Sol M20 24V SS Flex Key
2TLA050011R1522	Mkey8Z, SS Sol NPT, 24V SS Flex Key
2TLA050011R2522	Mkey8Z, SS Sol QC, 24V SS Flex Key
2TLA050011R0523	Mkey8Z, SS Sol M20, 110V SS Flex Key
2TLA050011R1523	Mkey8Z, SS Sol NPT, 110V SS Flex Key
2TLA050011R2523	Mkey8Z, SS Sol QC, 110V SS Flex Key
2TLA050011R0524	Mkey8Z, SS Sol M20, 230V SS Flex Key
2TLA050011R1524	Mkey8Z, SS Sol NPT, 230V SS Flex Key
2TLA050011R2524	Mkey8Z, SS Sol QC, 230V SS Flex Key

QC Quick Connect M23 Connector Length 24mm



Quick Connect (QC) M23 12 way Male Plug (Pin view from switch)	Switch Circuit
1 3	A1 A2
4 6	11 / 12
7 8	21 / 22
2 5	43 / 44
9	33
10	34
Earth	12

# MKey 8ER and MKey 8ERZ Guard locking with manual escape release safety switches



## Solenoid Locking Interlock Safety Switches featuring Guard Holding up to 2000N. (200Kg.) & Rear Manual Release

### Features:

All the features and specifications of the standard MKey 8 and MKey 8Z are maintained, an extra Rear Manual Release button is provided at the rear of the housing.

### Application:

Where the risk assessment for the application permits, a non latching manual escape release is provided to enable quick release of the switch lock in case of emergency. The switch can be mounted such that access to the release button is available from inside the active guard area.

Pressing and holding the red button will release the lock mechanism and open the lock monitoring contacts whilst the guard can be pushed open.

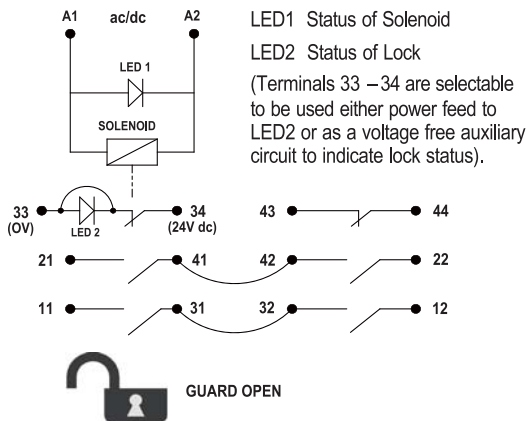
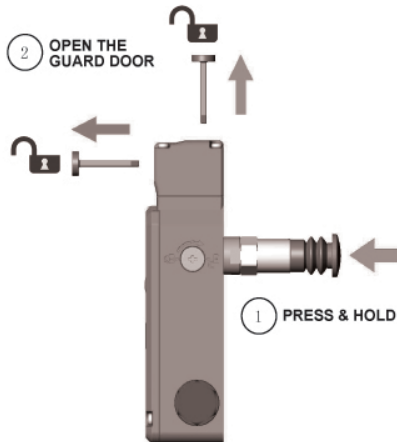
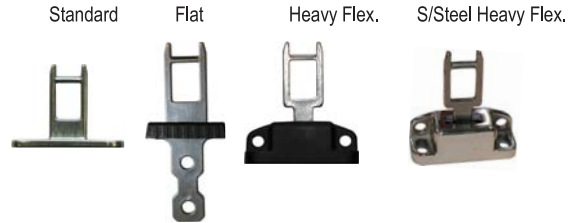


**MKey 8ER**  
IP67 - Die - Cast Painted Red



**MKey 8ERZ**  
Stainless Steel 316 Housing - Mirror polished finish (Ra10)

Spring to lock when actuator is inserted.  
Energise solenoid to unlock or press rear release button.



For all ABB Jokab Safety switches the normally closed (NC) circuits are closed when the guard is closed actuator inserted.

Standards EN1088 IEC 947-5-1 EN 60204-1  
ISO 13849-1 EN62061 EN 954-1 UL508

### Safety Classification and Reliability Data:

Mechanical Reliability B10d	2.5 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	3.44 x 10 <sup>-8</sup>
Proof Test Interval (Life)	35 years
MTTFd	356 years
Solenoid Voltage (by part number)	24V ac/dc or 110V. ac or 230V. ac
Solenoid Wattage	12W.
LED 2 Supply Voltage	24V dc
Utilization Category	AC15 A300 3A.
Thermal Current (Ith)	5A
Rated Insulation / Withstand Voltages	600VAC / 2500 VAC
Travel for Positive Opening	10mm
Actuator entry minimum radius	175mm Standard 60mm Heavy Duty
Maximum Approach / Withdrawal speed	600mm/s.
Body Material	Mkey 8ER Die Cast Painted Red
Head Material	Mkey 8ERZ Stainless Steel 316
Enclosure Protection	Die Cast Painted Red or Stainless Steel 316
Operating Temperature	Mkey 8ER IP67 Mkey 8ERZ IP69K
	-25C. 55C.
Vibration	IEC 68-2-6, 10-55Hz+1Hz,
	Excursion: 0.35mm, 1 octave/min
Conduit Entry	Various (See Sales Part Numbers)
Fixing	4 x M5

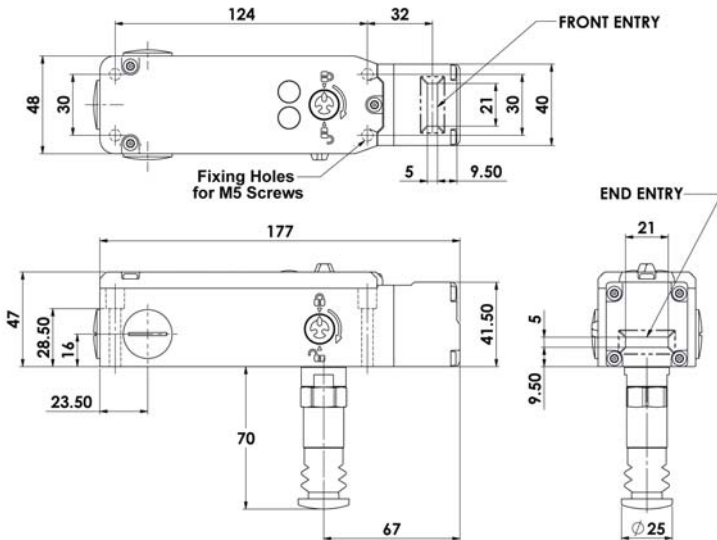
# MKey 8ER and MKey 8ERZ Guard locking with manual escape release safety switches



QC Quick Connect  
Connector Length 24mm



Quick Connect (QC) M23 12 way Male Plug (Pin view from switch)	Switch Circuit
1 3	A1 A2
4 6	11 / 12
7 8	21 / 22
2 5	43 / 44
9	33
10	34
Earth	12



## Mkey 8ER Standard

2TLA050015R0032	Mkey8ER, Sol M20, 24V No Key
2TLA050015R1032	Mkey8ER, Sol NPT, 24V No Key
2TLA050015R2032	Mkey8ER, Sol QC, 24V No Key
2TLA050015R0033	Mkey8ER, Sol M20, 110V No Key
2TLA050015R1033	Mkey8ER, Sol NPT, 110V No Key
2TLA050015R2033	Mkey8ER, Sol QC, 110V No Key
2TLA050015R0034	Mkey8ER, Sol M20, 230V No Key
2TLA050015R1034	Mkey8ER, Sol NPT, 230V No Key
2TLA050015R2034	Mkey8ER, Sol QC, 230V No Key
2TLA050015R0132	Mkey8ER, Sol M20, 24V Std. Key
2TLA050015R1132	Mkey8ER, Sol NPT, 24V Std. Key
2TLA050015R2132	Mkey8ER, Sol QC, 24V Std. Key
2TLA050015R0133	Mkey8ER, Sol M20, 110V Std. Key
2TLA050015R1133	Mkey8ER, Sol NPT, 110V Std. Key
2TLA050015R2133	Mkey8ER, Sol QC, 110V Std. Key
2TLA050015R0134	Mkey8ER, Sol M20, 230V Std. Key
2TLA050015R1134	Mkey8ER, Sol NPT, 230V Std. Key
2TLA050015R2134	Mkey8ER, Sol QC, 230V Std. Key
2TLA050015R0232	Mkey8ER, Sol M20, 24V Flat Key
2TLA050015R1232	Mkey8ER, Sol NPT, 24V Flat Key
2TLA050015R2232	Mkey8ER, Sol QC, 24V Flat Key
2TLA050015R0233	Mkey8ER, Sol M20, 110V Flat Key
2TLA050015R1233	Mkey8ER, Sol NPT, 110V Flat Key
2TLA050015R2233	Mkey8ER, Sol QC, 110V Flat Key
2TLA050015R0234	Mkey8ER, Sol M20, 230V Flat Key
2TLA050015R1234	Mkey8ER, Sol NPT, 230V Flat Key
2TLA050015R2234	Mkey8ER, Sol QC, 230V Flat Key
2TLA050015R0432	Mkey8ER, Sol M20, 24V Met. Flex Key
2TLA050015R1432	Mkey8ER, Sol NPT, 24V Met. Flex Key
2TLA050015R2432	Mkey8ER, Sol QC, 24V Met. Flex Key
2TLA050015R0433	Mkey8ER, Sol M20, 110V Met. Flex Key
2TLA050015R1433	Mkey8ER, Sol NPT, 110V Met. Flex Key
2TLA050015R2433	Mkey8ER, Sol QC, 110V Met. Flex Key
2TLA050015R0434	Mkey8ER, Sol M20, 230V Met. Flex Key
2TLA050015R1434	Mkey8ER, Sol NPT, 230V Met. Flex Key
2TLA050015R2434	Mkey8ER, Sol QC, 230V Met. Flex Key
2TLA050015R0532	Mkey8ER, Sol M20, 24V SS Flex Key
2TLA050015R1532	Mkey8ER, Sol NPT, 24V SS Flex Key
2TLA050015R2532	Mkey8ER, Sol QC, 24V SS Flex Key
2TLA050015R0533	Mkey8ER, Sol M20, 110V SS Flex Key
2TLA050015R1533	Mkey8ER, Sol NPT, 110V SS Flex Key
2TLA050015R2533	Mkey8ER, Sol QC, 110V SS Flex Key
2TLA050015R0534	Mkey8ER, Sol M20, 230V SS Flex Key
2TLA050015R1534	Mkey8ER, Sol NPT, 230V SS Flex Key
2TLA050015R2534	Mkey8ER, Sol QC, 230V SS Flex Key

## Mkey 8ERZ Stainless Steel

2TLA050015R0022	Mkey8ERZ, SS Sol M20, 24V No Key
2TLA050015R1022	Mkey8ERZ, SS Sol NPT, 24V No Key
2TLA050015R2022	Mkey8ERZ, SS Sol QC, 24V No Key
2TLA050015R0023	Mkey8ERZ, SS Sol M20, 110V No Key
2TLA050015R1023	Mkey8ERZ, SS Sol NPT, 110V No Key
2TLA050015R2023	Mkey8ERZ, SS Sol QC, 110V No Key
2TLA050015R0024	Mkey8ERZ, SS Sol M20, 230V No Key
2TLA050015R1024	Mkey8ERZ, SS Sol NPT, 230V No Key
2TLA050015R2024	Mkey8ERZ, SS Sol QC, 230V No Key
2TLA050015R0122	Mkey8ERZ, SS Sol M20, 24V Std. Key
2TLA050015R1122	Mkey8ERZ, SS Sol NPT, 24V Std. Key
2TLA050015R2122	Mkey8ERZ, SS Sol QC, 24V Std. Key
2TLA050015R0123	Mkey8ERZ, SS Sol M20, 110V Std. Key
2TLA050015R1123	Mkey8ERZ, SS Sol NPT, 110V Std. Key
2TLA050015R2123	Mkey8ERZ, SS Sol QC, 110V Std. Key
2TLA050015R0124	Mkey8ERZ, SS Sol M20, 230V Std. Key
2TLA050015R1124	Mkey8ERZ, SS Sol NPT, 230V Std. Key
2TLA050015R2124	Mkey8ERZ, SS Sol QC, 230V Std. Key
2TLA050015R0222	Mkey8ERZ, SS Sol M20, 24V Flat Key
2TLA050015R1222	Mkey8ERZ, SS Sol NPT, 24V Flat Key
2TLA050015R2222	Mkey8ERZ, SS Sol QC, 24V Flat Key
2TLA050015R0223	Mkey8ERZ, SS Sol M20, 110V Flat Key
2TLA050015R1223	Mkey8ERZ, SS Sol NPT, 110V Flat Key
2TLA050015R2223	Mkey8ERZ, SS Sol QC, 110V Flat Key
2TLA050015R0224	Mkey8ERZ, SS Sol M20, 230V Flat Key
2TLA050015R1224	Mkey8ERZ, SS Sol NPT, 230V Flat Key
2TLA050015R2224	Mkey8ERZ, SS Sol QC, 230V Flat Key
2TLA050015R0422	Mkey8ERZ, SS Sol M20, 24V Met. Flex Key
2TLA050015R1422	Mkey8ERZ, SS Sol NPT, 24V Met. Flex Key
2TLA050015R2422	Mkey8ERZ, SS Sol QC, 24V Met. Flex Key
2TLA050015R0423	Mkey8ERZ, SS Sol M20, 110V Met. Flex Key
2TLA050015R1423	Mkey8ERZ, SS Sol NPT, 110V Met. Flex Key
2TLA050015R2423	Mkey8ERZ, SS Sol QC, 110V Met. Flex Key
2TLA050015R0424	Mkey8ERZ, SS Sol M20, 230V Met. Flex Key
2TLA050015R1424	Mkey8ERZ, SS Sol NPT, 230V Met. Flex Key
2TLA050015R2424	Mkey8ERZ, SS Sol QC, 230V Met. Flex Key
2TLA050015R0522	Mkey8ERZ, SS Sol M20 24V SS Flex Key
2TLA050015R1522	Mkey8ERZ, SS Sol NPT, 24V SS Flex Key
2TLA050015R2522	Mkey8ERZ, SS Sol QC, 24V SS Flex Key
2TLA050015R0523	Mkey8ERZ, SS Sol M20, 110V SS Flex Key
2TLA050015R1523	Mkey8ERZ, SS Sol NPT, 110V SS Flex Key
2TLA050015R2523	Mkey8ERZ, SS Sol QC, 110V SS Flex Key
2TLA050015R0524	Mkey8ERZ, SS Sol M20, 230V SS Flex Key
2TLA050015R1524	Mkey8ERZ, SS Sol NPT, 230V SS Flex Key
2TLA050015R2524	Mkey8ERZ, SS Sol QC, 230V SS Flex Key

# MKey 8M Guard locking metal safety switches



## Solenoid Locking Interlock Safety Switches featuring POWER TO LOCK Guard Holding up to 2000N. (200Kg.)

The MKey 8 Series Guard Locking switches have rugged die cast housings and have been developed with a holding force of 2000N to keep large Guard Doors closed until hazards have been removed.

They are Power to Lock – Spring to unlock – suitable for applications where immediate unlocking is required at removal or loss of power. (They are NOT suitable for machines with a running down time).

The rugged Die Cast body provides a durable robust hold closed interlock protection and is available with Stainless Steel Heads for extra durability. Flexible actuators are available to aid where some alignment is a problem.

IP67 enclosure protection is maintained by a double seal lid gasket design and metal fixings.

They have a slim profile and are designed to fit on 50mm (2in.) frame sections or to applications where space is restricted. The Head will rotate to provide up to 8 actuator entry positions.

An LED is available to indicate Lock Status.

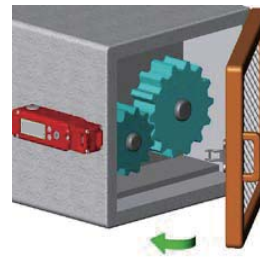


Energise solenoid to lock.

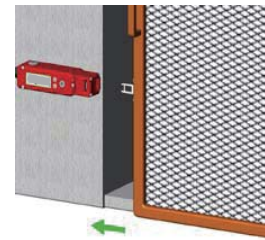
Spring to unlock when solenoid is de-energised.



### POWER TO LOCK



Hinged Guard



Sliding Guard

### Functional Specification:

Positive break contacts to IEC947-5-1

2NC Safety circuits – 2 Solenoid (1 Actuator in series)

1NC 1NO Auxiliary circuits - Actuator / Door Status

High specification polyester housings - Stainless Steel Head

Machine Safety Contacts open when power is released.

LED Status of solenoid power



8 actuator entry positions rotatable head

Actuator insertion

	7.8	6.5	0 mm
11/12	Open	Solenoid energised	
21/22	Open	Solenoid energised	
33/34		Open – solenoid energised	
43/44		Open	

For all ABB Jokab Safety Power to Lock switches the normally closed (NC) circuits are closed when the guard is closed actuator inserted and power is applied to the solenoid.

Standards	EN1088	IEC 947-5-1	EN 60204-1	
	ISO 13849-1	EN62061	EN 954-1	UL508

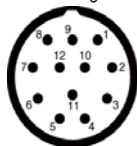
#### Safety Classification and Reliability Data:

Mechanical Reliability B10d	2.5 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay
EN 954-1	up to PLe depending upon system architecture
ISO 13849-1	up to SIL3 depending upon system architecture
EN 62061	8 cycles per hour / 24 hours per day / 365 days
Safety Data - Annual Usage	3.44 x 10 <sup>-8</sup>
PFHd	
Proof Test Interval (Life)	35 years
MTTFd	356 years
Solenoid Voltage (by part number)	24V ac/dc or 110V. ac or 230V. ac
Solenoid Wattage	12W. (Inrush 50W).
Utilization Category	AC15 A300 3A.
Thermal Current (Ith)	5A
Rated Insulation / Withstand Voltages	600VAC / 2500 VAC
Travel for Positive Opening	10mm
Actuator entry minimum radius	175mm Standard 60mm Heavy Duty
Maximum Approach / Withdrawal speed	600mm/s.
Body Material	Die Cast Painted Red
Head Material	Die Cast Painted Red or Stainless Steel 316
Enclosure Protection	IP67
Operating Temperature	-25C. 40C.
Vibration	IEC 68-2-6, 10-55Hz+1Hz, Excursion: 0.35mm, 1 octave/min
Conduit Entry Fixing	Various (See Sales Part Numbers) 4 x M5

# MKey 8M Guard locking metal safety switches



QC Quick Connect  
Connector Length 24mm



Quick Connect (QC) M23 12 way Male Plug (Pin view from switch)	Switch Circuit
1 3	A1 A2
4 6	11 / 12
7 8	21 / 22
2 5	43 / 44
9	33
10	34
12	Earth

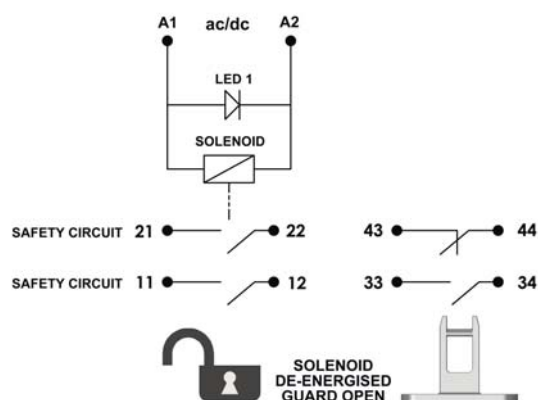
## MKey 8M Standard

2TLA050013R0032	Mkey8M, Sol M20, 24V No Key
2TLA050013R1032	Mkey8M, Sol NPT, 24V No Key
2TLA050013R2032	Mkey8M, Sol QC, 24V No Key
2TLA050013R0033	Mkey8M, Sol M20, 110V No Key
2TLA050013R1033	Mkey8M, Sol NPT, 110V No Key
2TLA050013R2033	Mkey8M, Sol QC, 110V No Key
2TLA050013R0034	Mkey8M, Sol M20, 230V No Key
2TLA050013R1034	Mkey8M, Sol NPT, 230V No Key
2TLA050013R2034	Mkey8M, Sol QC, 230V No Key
2TLA050013R0132	Mkey8M, Sol M20, 24V Std. Key
2TLA050013R1132	Mkey8M, Sol NPT, 24V Std. Key
2TLA050013R2132	Mkey8M, Sol QC, 24V Std. Key
2TLA050013R0133	Mkey8M, Sol M20, 110V Std. Key
2TLA050013R1133	Mkey8M, Sol NPT, 110V Std. Key
2TLA050013R2133	Mkey8M, Sol QC, 110V Std. Key
2TLA050013R0134	Mkey8M, Sol M20, 230V Std. Key
2TLA050013R1134	Mkey8M, Sol NPT, 230V Std. Key
2TLA050013R2134	Mkey8M, Sol QC, 230V Std. Key
2TLA050013R0232	Mkey8M, Sol M20, 24V Flat Key
2TLA050013R1232	Mkey8M, Sol NPT, 24V Flat Key
2TLA050013R2232	Mkey8M, Sol QC, 24V Flat Key
2TLA050013R0233	Mkey8M, Sol M20, 110V Flat Key
2TLA050013R1233	Mkey8M, Sol NPT, 110V Flat Key
2TLA050013R2233	Mkey8M, Sol QC, 110V Flat Key
2TLA050013R0234	Mkey8M, Sol M20, 230V Flat Key
2TLA050013R1234	Mkey8M, Sol NPT, 230V Flat Key
2TLA050013R2234	Mkey8M, Sol QC, 230V Flat Key
2TLA050013R0432	Mkey8M, Sol M20, 24V Met. Flex Key
2TLA050013R1432	Mkey8M, Sol NPT, 24V Met. Flex Key
2TLA050013R2432	Mkey8M, Sol QC, 24V Met. Flex Key
2TLA050013R0433	Mkey8M, Sol M20, 110V Met. Flex Key
2TLA050013R1433	Mkey8M, Sol NPT, 110V Met. Flex Key
2TLA050013R2433	Mkey8M, Sol QC, 110V Met. Flex Key
2TLA050013R0434	Mkey8M, Sol M20, 230V Met. Flex Key
2TLA050013R1434	Mkey8M, Sol NPT, 230V Met. Flex Key
2TLA050013R2434	Mkey8M, Sol QC, 230V Met. Flex Key
2TLA050013R0532	Mkey8M, Sol M20, 24V SS Flex Key
2TLA050013R1532	Mkey8M, Sol NPT, 24V SS Flex Key
2TLA050013R2532	Mkey8M, Sol QC, 24V SS Flex Key
2TLA050013R0533	Mkey8M, Sol M20, 110V SS Flex Key
2TLA050013R1533	Mkey8M, Sol NPT, 110V SS Flex Key
2TLA050013R2533	Mkey8M, Sol QC, 110V SS Flex Key
2TLA050013R0534	Mkey8M, Sol M20, 230V SS Flex Key
2TLA050013R1534	Mkey8M, Sol NPT, 230V SS Flex Key
2TLA050013R2534	Mkey8M, Sol QC, 230V SS Flex Key

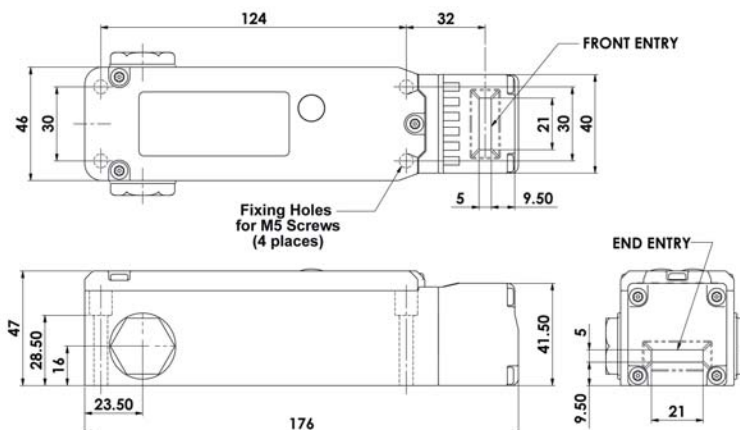
## MKey 8M Stainless Steel Head

2TLA050013R0042	Mkey8M, Sol M20, 24V No Key
2TLA050013R1042	Mkey8M, Sol NPT, 24V No Key
2TLA050013R2042	Mkey8M, Sol QC, 24V No Key
2TLA050013R0043	Mkey8M, Sol M20, 110V No Key
2TLA050013R1043	Mkey8M, Sol NPT, 110V No Key
2TLA050013R2043	Mkey8M, Sol QC, 110V No Key
2TLA050013R0044	Mkey8M, Sol M20, 230V No Key
2TLA050013R1044	Mkey8M, Sol NPT, 230V No Key
2TLA050013R2044	Mkey8M, Sol QC, 230V No Key
2TLA050013R0142	Mkey8M, Sol M20, 24V Std. Key
2TLA050013R1142	Mkey8M, Sol NPT, 24V Std. Key
2TLA050013R2142	Mkey8M, Sol QC, 24V Std. Key
2TLA050013R0143	Mkey8M, Sol M20, 110V Std. Key
2TLA050013R1143	Mkey8M, Sol NPT, 110V Std. Key
2TLA050013R2143	Mkey8M, Sol QC, 110V Std. Key
2TLA050013R0144	Mkey8M, Sol M20, 230V Std. Key
2TLA050013R1144	Mkey8M, Sol NPT, 230V Std. Key
2TLA050013R2144	Mkey8M, Sol QC, 230V Std. Key
2TLA050013R0242	Mkey8M, Sol M20, 24V Flat Key
2TLA050013R1242	Mkey8M, Sol NPT, 24V Flat Key
2TLA050013R2242	Mkey8M, Sol QC, 24V Flat Key
2TLA050013R0243	Mkey8M, Sol M20, 110V Flat Key
2TLA050013R1243	Mkey8M, Sol NPT, 110V Flat Key
2TLA050013R2243	Mkey8M, Sol QC, 110V Flat Key
2TLA050013R0244	Mkey8M, Sol M20, 230V Flat Key
2TLA050013R1244	Mkey8M, Sol NPT, 230V Flat Key
2TLA050013R2244	Mkey8M, Sol QC, 230V Flat Key
2TLA050013R0442	Mkey8M, Sol M20, 24V Met. Flex Key
2TLA050013R1442	Mkey8M, Sol NPT, 24V Met. Flex Key
2TLA050013R2442	Mkey8M, Sol QC, 24V Met. Flex Key
2TLA050013R0443	Mkey8M, Sol M20, 110V Met. Flex Key
2TLA050013R1443	Mkey8M, Sol NPT, 110V Met. Flex Key
2TLA050013R2443	Mkey8M, Sol QC, 110V Met. Flex Key
2TLA050013R0444	Mkey8M, Sol M20, 230V Met. Flex Key
2TLA050013R1444	Mkey8M, Sol NPT, 230V Met. Flex Key
2TLA050013R2444	Mkey8M, Sol QC, 230V Met. Flex Key
2TLA050013R0542	Mkey8M, Sol M20, 24V SS Flex Key
2TLA050013R1542	Mkey8M, Sol NPT, 24V SS Flex Key
2TLA050013R2542	Mkey8M, Sol QC, 24V SS Flex Key
2TLA050013R0543	Mkey8M, Sol M20, 110V SS Flex Key
2TLA050013R1543	Mkey8M, Sol NPT, 110V SS Flex Key
2TLA050013R2543	Mkey8M, Sol QC, 110V SS Flex Key
2TLA050013R0544	Mkey8M, Sol M20, 230V SS Flex Key
2TLA050013R1544	Mkey8M, Sol NPT, 230V SS Flex Key
2TLA050013R2544	Mkey8M, Sol QC, 230V SS Flex Key

Schematic Circuit:



Dimensions:



# MKey 9 Guard locking plastic safety switches



## Solenoid Locking Interlock Safety Switches featuring Guard Holding up to 1800N. (180Kg.)

The MKey 9 Series Guard Locking switches have a slim plastic body design and have been developed with a holding force of 1800N to keep medium guard Doors closed until hazards have been removed.

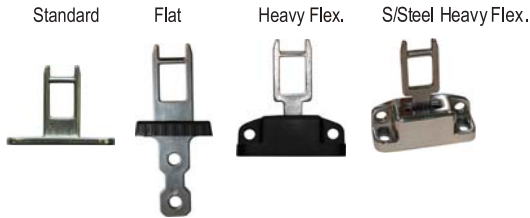
The high specification plastic body has a high resistance to chemical and washdown solutions, and the Stainless Steel Head provides a durable robust protection of the cam interlock

IP67 enclosure protection is maintained by a double seal lid gasket design and metal fixings.

They have a slim profile and are designed to fit on 50mm (2in.) frame sections or to applications where space is restricted. The Head will rotate to provide up to 8 actuator entry positions.

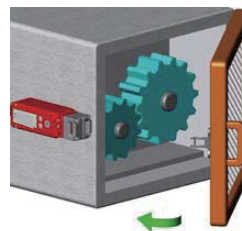
An LED is available to indicate Lock Status.

Accessories include a Sliding Handle Bolt and lock off actuators.

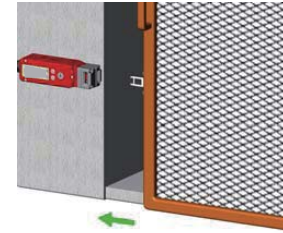


Spring to lock when actuator is inserted. Energise solenoid to unlock.

Stainless Steel Head



Hinged Guard



Sliding Guard

### Functional Specification:

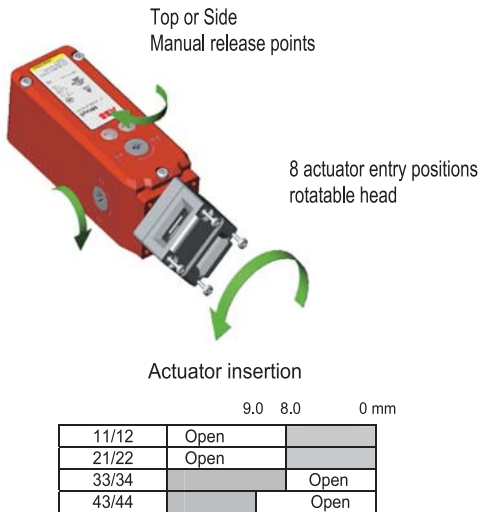
Positive break contacts to IEC947-5-1

High Functional Safety to ISO 13849-1

2NC Safety Circuits - Solenoid/Lock and Actuator/Guard wired in series  
 1NO Circuit Auxiliary circuit for indication of actuator status (Guard open)  
 1NO Circuit Auxiliary circuit for Lock Status (selectable with LED2)

High specification polyester housings Stainless Steel Head

Connects to most Safety Relays to give up to up to Ple Cat.4.



Top or Side Manual release points

8 actuator entry positions rotatable head

Actuator insertion

9.0 8.0 0 mm

11/12	Open	
21/22	Open	
33/34		Open
43/44		Open

For all ABB Jokab Safety switches the normally closed (NC) circuits are closed when the guard is closed actuator inserted.

Standards	EN1088 IEC 947-5-1 EN 60204-1 ISO 13849-1 EN62061 EN 954-1 UL508
Safety Classification and Reliability Data:	
Mechanical Reliability B10d	2.5 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay
EN 954-1	up to PLe depending upon system architecture
ISO 13849-1	up to SIL3 depending upon system architecture
EN 62061	
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	3.44 x 10 <sup>-6</sup>
Proof Test Interval (Life)	35 years
MTTFd	356 years
Solenoid Voltage (by part number)	24V ac/dc or 110V. ac or 230V. ac
Solenoid Wattage	12W.
LED 2 Supply Voltage	24V dc
Utilization Category	AC15 A300 3A.
Thermal Current (Ith)	5A
Rated Insulation / Withstand Voltages	600VAC / 2500 VAC
Travel for Positive Opening	10mm
Actuator entry minimum radius	175mm Standard 60mm Heavy Duty
Maximum Approach / Withdrawal speed	600mm/s.
Body Material	Polyester
Head Material	Stainless Steel 316
Enclosure Protection	IP67
Operating Temperature	-25C. 55C.
Vibration	IEC 68-2-6, 10-55Hz+1Hz, Excursion: 0.35mm, 1 octave/min
Conduit Entry Fixing	Various (See Sales Part Numbers) 4 x M5

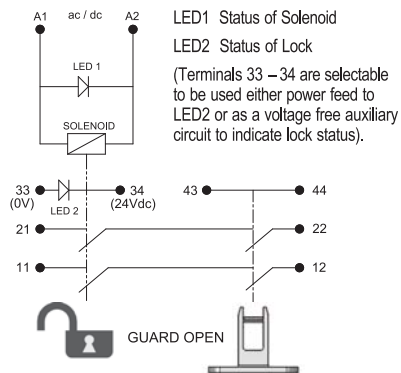


# MKey 9 Guard locking plastic safety switches



MKey 9	
2TLA050007R0012	Mkey9, Sol M20, 24V No Key
2TLA050007R1012	Mkey9, Sol NPT, 24V No Key
2TLA050007R2012	Mkey9, Sol QC, 24V No Key
2TLA050007R0013	Mkey9, Sol M20, 110V No Key
2TLA050007R1013	Mkey9, Sol NPT, 110V No Key
2TLA050007R2013	Mkey9, Sol QC, 110V No Key
2TLA050007R0014	Mkey9, Sol M20, 230V No Key
2TLA050007R1014	Mkey9, Sol NPT, 230V No Key
2TLA050007R2014	Mkey9, Sol QC, 230V No Key
2TLA050007R0112	Mkey9, Sol M20, 24V Std. Key
2TLA050007R1112	Mkey9, Sol NPT, 24V Std. Key
2TLA050007R2112	Mkey9, Sol QC, 24V Std. Key
2TLA050007R0113	Mkey9, Sol M20, 110V Std. Key
2TLA050007R1113	Mkey9, Sol NPT, 110V Std. Key
2TLA050007R2113	Mkey9, Sol QC, 110V Std. Key
2TLA050007R0114	Mkey9, Sol M20, 230V Std. Key
2TLA050007R1114	Mkey9, Sol NPT, 230V Std. Key
2TLA050007R2114	Mkey9, Sol QC, 230V Std. Key
2TLA050007R0212	Mkey9, Sol M20, 24V Flat Key
2TLA050007R1212	Mkey9, Sol NPT, 24V Flat Key
2TLA050007R2212	Mkey9, Sol QC, 24V Flat Key
2TLA050007R0213	Mkey9, Sol M20, 110V Flat Key
2TLA050007R1213	Mkey9, Sol NPT, 110V Flat Key
2TLA050007R2313	Mkey9, Sol QC, 110V Flat Key
2TLA050007R0314	Mkey9, Sol M20, 230V Flat Key
2TLA050007R1314	Mkey9, Sol NPT, 230V Flat Key
2TLA050007R2214	Mkey9, Sol QC, 230V Flat Key
2TLA050007R0412	Mkey9, Sol M20, 24V Met. Flex Key
2TLA050007R1412	Mkey9, Sol NPT, 24V Met. Flex Key
2TLA050007R2422	Mkey9, Sol QC, 24V Met. Flex Key
2TLA050007R0413	Mkey9, Sol M20, 110V Met. Flex Key
2TLA050007R1413	Mkey9, Sol NPT, 110V Met. Flex Key
2TLA050007R2423	Mkey9, Sol QC, 110V Met. Flex Key
2TLA050007R0414	Mkey9, Sol M20, 230V Met. Flex Key
2TLA050007R1414	Mkey9, Sol NPT, 230V Met. Flex Key
2TLA050007R2424	Mkey9, Sol QC, 230V Met. Flex Key
2TLA050007R0512	Mkey9, Sol M20, 24V SS Flex Key
2TLA050007R1512	Mkey9, Sol NPT, 24V SS Flex Key
2TLA050007R2522	Mkey9, Sol QC, 24V SS Flex Key
2TLA050007R0513	Mkey9, Sol M20, 110V SS Flex Key
2TLA050007R1513	Mkey9, Sol NPT, 110V SS Flex Key
2TLA050007R2523	Mkey9, Sol QC, 110V SS Flex Key
2TLA050007R0514	Mkey9, Sol M20, 230V SS Flex Key
2TLA050007R1514	Mkey9, Sol NPT, 230V SS Flex Key
2TLA050007R2524	Mkey9, Sol QC, 230V SS Flex Key

Schematic circuit:

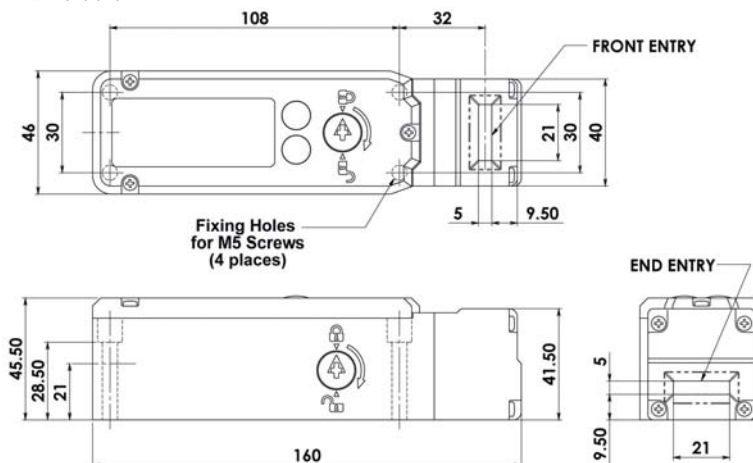


QC Quick Connect  
Connector Length 24mm



Quick Connect (QC) M23 12 way Male Plug (Pin view from switch)		Switch Circuit
1 3		A1 A2
4 6		11 / 12
7 8		21 / 22
2 5		43 / 44
9 10		33 / 44

Dimensions:



# MKey 9M Guard locking plastic safety switches



## Solenoid Locking Interlock Safety Switches featuring POWER TO LOCK Guard Holding up to 1800N.(180kg.)

The MKey 9M Series Guard Locking switches have a slim plastic body design and have been developed with a holding force of 1800N to keep medium guard Doors closed until hazards have been removed.

They are Power to Lock - Spring to unlock - suitable for applications where immediate unlocking is required at removal or loss of power. (They are NOT suitable for machines with a running down time).

The high specification plastic body has a high resistance to chemical and washdown solutions, and the Stainless Steel Head provides a durable robust protection of the cam interlock

IP67 enclosure protection is maintained by a double seal lid gasket design and metal fixings.

They have a slim profile and are designed to fit on 50mm (2in.) frame sections or to applications where space is restricted. The Head will rotate to provide up to 8 actuator entry positions.

An LED is available to indicate Lock Status.

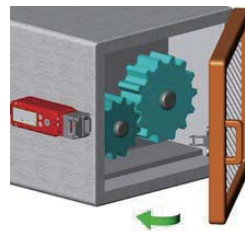


Energise solenoid to lock.

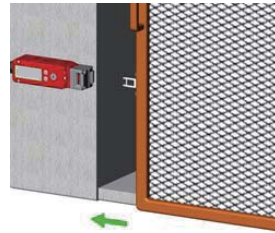
Spring to unlock when solenoid is de-energised.



**POWER TO LOCK**



Hinged Guard



Sliding Guard

### Functional Specification:

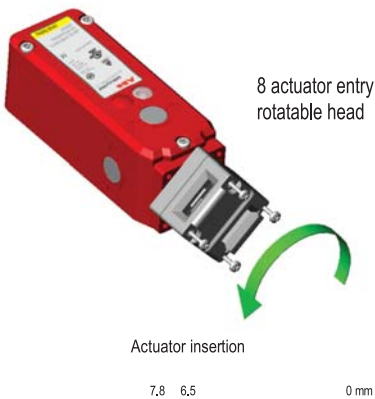
Positive break contacts to IEC947-5-1

- 2NC Safety Circuits - 2 Solenoid (1 Actuator in series)
- 1NO Auxiliary circuit - Actuator status
- 1NO Auxiliary circuit - Solenoid de-energised / unlocked

High specification polyester housings Stainless Steel Head

Machine Safety Contacts open when power is released.

LED Status of solenoid power



11/12	Open	Solenoid energised
21/22	Open	Solenoid energised
33/34		Open - solenoid energised
43/44		Open

For all ABB Jokab Safety switches the normally closed (NC) circuits are closed when the guard is closed actuator inserted.

Safety Classification and Reliability Data:

Standards	EN1088	IEC 947-5-1	EN 60204-1	ISO 13849-1	EN62061	EN 954-1	UL508
Mechanical Reliability B10d	2.5 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay						
EN 954-1	up to PLe depending upon system architecture						
ISO 13849-1	up to SIL3 depending upon system architecture						
EN 62061	8 cycles per hour / 24 hours per day / 365 days						
Safety Data - Annual Usage	3.44 x 10 <sup>-8</sup>						
PFHd	35 years						
Proof Test Interval (Life)	356 years						
MTTFd	356 years						
Solenoid Voltage (by part number)	24V ac/dc or 110V. ac or 230V. ac						
Solenoid Wattage	12W. (Inrush 50W)						
Utilization Category	AC15 A300 3A.						
Thermal Current (Ith)	5A						
Rated Insulation / Withstand Voltages	600VAC / 2500 VAC						
Travel for Positive Opening	10mm						
Actuator entry minimum radius	175mm Standard		60mm Heavy Duty				
Maximum Approach / Withdrawal speed	600mm/s.						
Body Material	Polyester						
Head Material	Stainless Steel 316						
Enclosure Protection	IP67						
Operating Temperature	-25C. 40C.						
Vibration	IEC 68-2-6, 10-55Hz+1Hz, Excursion: 0.35mm, 1 octave/min						
Conduit Entry	Various (See Sales Part Numbers)						
Fixing	4 x M5						

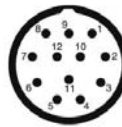
# MKey 9M Guard locking plastic safety switches



## MKey 9M

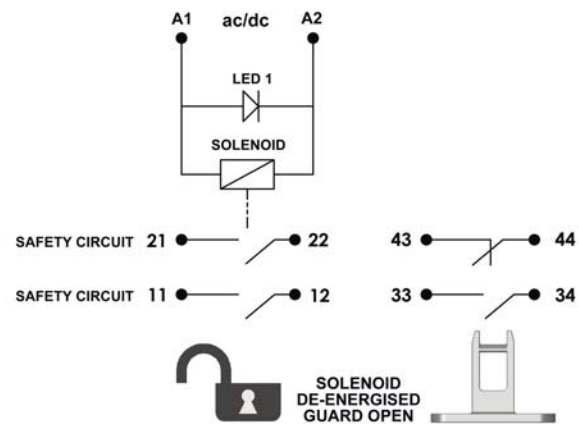
2TLA050009R0012 Mkey9M, Sol M20, 24V No Key  
 2TLA050009R1012 Mkey9M, Sol NPT, 24V No Key  
 2TLA050009R2012 Mkey9M, Sol QC, 24V No Key  
 2TLA050009R0013 Mkey9M, Sol M20, 110V No Key  
 2TLA050009R1013 Mkey9M, Sol NPT, 110V No Key  
 2TLA050009R2013 Mkey9M, Sol QC, 110V No Key  
 2TLA050009R0014 Mkey9M, Sol M20, 230V No Key  
 2TLA050009R1014 Mkey9M, Sol NPT, 230V No Key  
 2TLA050009R2014 Mkey9M, Sol QC, 230V No Key  
 2TLA050009R0112 Mkey9M, Sol M20, 24V Std. Key  
 2TLA050009R1112 Mkey9M, Sol NPT, 24V Std. Key  
 2TLA050009R2112 Mkey9M, Sol QC, 24V Std. Key  
 2TLA050009R0113 Mkey9M, Sol M20, 110V Std. Key  
 2TLA050009R1113 Mkey9M, Sol NPT, 110V Std. Key  
 2TLA050009R2113 Mkey9M, Sol QC, 110V Std. Key  
 2TLA050009R0114 Mkey9M, Sol M20, 230V Std. Key  
 2TLA050009R1114 Mkey9M, Sol NPT, 230V Std. Key  
 2TLA050009R2114 Mkey9M, Sol QC, 230V Std. Key  
 2TLA050009R0212 Mkey9M, Sol M20, 24V Flat Key  
 2TLA050009R1212 Mkey9M, Sol NPT, 24V Flat Key  
 2TLA050009R2212 Mkey9M, Sol QC, 24V Flat Key  
 2TLA050009R0213 Mkey9M, Sol M20, 110V Flat Key  
 2TLA050009R1213 Mkey9M, Sol NPT, 110V Flat Key  
 2TLA050009R2313 Mkey9M, Sol QC, 110V Flat Key  
 2TLA050009R0314 Mkey9M, Sol M20, 230V Flat Key  
 2TLA050009R1314 Mkey9M, Sol NPT, 230V Flat Key  
 2TLA050009R2214 Mkey9M, Sol QC, 230V Flat Key  
 2TLA050009R0412 Mkey9M, Sol M20, 24V Met. Flex Key  
 2TLA050009R1412 Mkey9M, Sol NPT, 24V Met. Flex Key  
 2TLA050009R2422 Mkey9M, Sol QC, 24V Met. Flex Key  
 2TLA050009R0413 Mkey9M, Sol M20, 110V Met. Flex Key  
 2TLA050009R1413 Mkey9M, Sol NPT, 110V Met. Flex Key  
 2TLA050009R2423 Mkey9M, Sol QC, 110V Met. Flex Key  
 2TLA050009R0414 Mkey9M, Sol M20, 230V Met. Flex Key  
 2TLA050009R1414 Mkey9M, Sol NPT, 230V Met. Flex Key  
 2TLA050009R2424 Mkey9M, Sol QC, 230V Met. Flex Key  
 2TLA050009R0512 Mkey9M, Sol M20, 24V SS Flex Key  
 2TLA050009R1512 Mkey9M, Sol NPT, 24V SS Flex Key  
 2TLA050009R2522 Mkey9M, Sol QC, 24V SS Flex Key  
 2TLA050009R0513 Mkey9M, Sol M20, 110V SS Flex Key  
 2TLA050009R1513 Mkey9M, Sol NPT, 110V SS Flex Key  
 2TLA050009R2523 Mkey9M, Sol QC, 110V SS Flex Key  
 2TLA050009R0514 Mkey9M, Sol M20, 230V SS Flex Key  
 2TLA050009R1514 Mkey9M, Sol NPT, 230V SS Flex Key  
 2TLA050009R2524 Mkey9M, Sol QC, 230V SS Flex Key

QC Quick Connect  
Connector Length 24mm

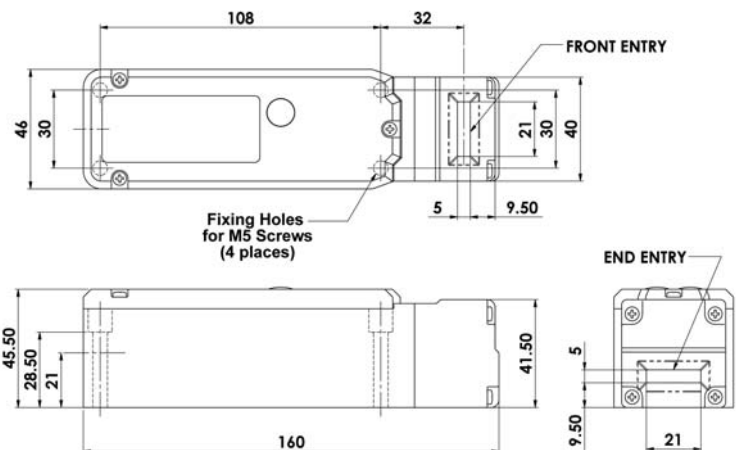


Quick Connect (QC) M23 12 way Male Plug (Pin view from switch)	Switch Circuit
1 3	A1 A2
4 6	11 / 12
7 8	21 / 22
2 5	43 / 44
9	33
10	44

Schematic circuit:



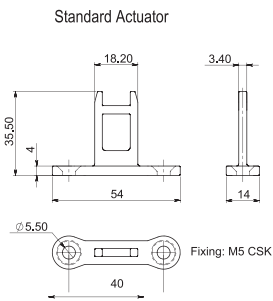
Dimensions:



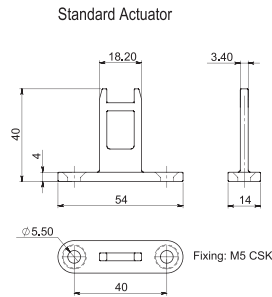
# MKey Tongue switches with actuator options



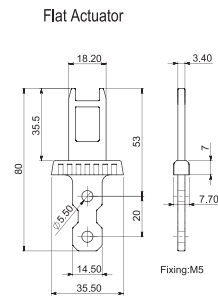
## Actuator Dimensions



Stainless Steel 316



Stainless Steel 316

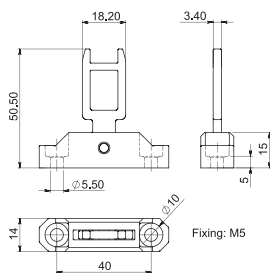


Stainless Steel 316  
Plastic Shroud

### MKey Accessories

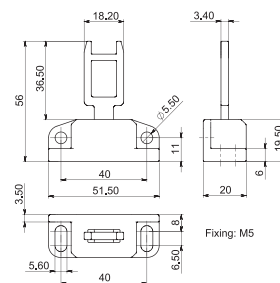
- 2TLA050040R0200 MKey1 Angled Actuator
- 2TLA050040R0201 MKey 4,5 Std. Key
- 2TLA050040R0202 MKey 4,5,6,8,9 Pla. Flex Key
- 2TLA050040R0203 MKey 4,5,6,8,9 Met. Flex Key
- 2TLA050040R0204 MKey 6,8,9 SS Flex Key
- 2TLA050040R0400 Manual release key
- 2TLA050040R0220 MKey 4,5,6,8,9 Flat Actuator
- 2TLA050040R0221 MKey 4,5,6 Plastic Flexible Actuator

### Plastic Flexible Actuator



Plastic Flexible Actuator  
(Adjust angle by screw)  
Stainless Steel 316  
Plastic Housing

### Metal Heavy Duty Actuator



Heavy Duty Flexible  
Stainless Steel 316  
Die Cast Metal Housing (Black colour)



Heavy Duty Flexible (Hygienic Version)  
Stainless Steel 316 Housing  
Mirror Polished Finish

# Notes

# Coded non-contact safety switches

## Operation:

All ABB Jokab Safety Coded Non-Contact Safety Switches are designed to conform to IEC 947-5-3 and be used as directed by ISO12100, ISO14121 and EN 60204-1.

They have coded magnetic sensing which provides a wide sensing distance and provides a high tolerance to misalignment after sensing. They can be fitted behind stainless steel fittings and can operate from 4 directions even in extreme environments of temperature and moisture.

When used in combination with most Dual Channel Safety Monitoring Relays they can be used to provide up to PLe / Category 4 to ISO 13849-1.

They offer a choice of high specification plastic or Stainless Steel 316

## Features:

Dual channel electronic safety output 2NC (1NO auxiliary optional)

Visual LED indication of switch status

Enclosure Protected to IP67 or IP69K - wash down suitable

Conformance to IEC 947-5-3 PDF-S

No moving parts to give high reliability and long life

Wide sensing distance 14mm

## Plastic versions:

The Plastic Sense range has been developed for non-contact guard door interlocking in the applications of general factory automation packaging and some food processing industries.

Supplied with Screw Cap covers to prevent contamination from food deposits.



**Sense 1**

Miniature industry standard design. 22mm fixing centres, available with Left or Right cable exit.



**Sense 3**

Universal 22mm fixing centres.



**Sense 5**

Industry standard wide fitting. Front face actuation for large guards.



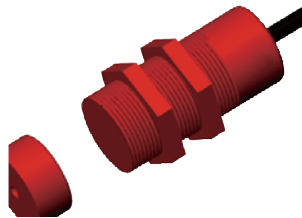
**Sense 7**

European industry standard fitting. End cable exit.



**Sense 9**

Compact slim fitting housing - suitable for fitting to applications where space is limited.



**Sense 11**

M30 threaded body - easy to mount

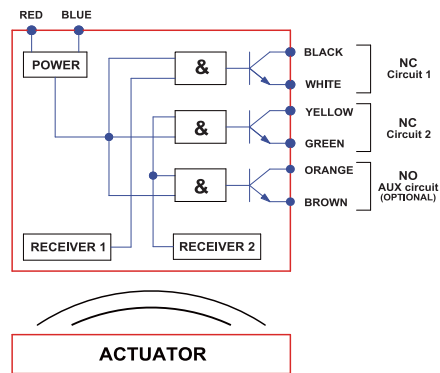
## Application:



ABB Jokab Safety Coded Non-Contact switches are designed to interlock hinge, sliding or removal guard doors. They are specifically advantageous when:

- poor guard alignment exists
- anti tamper sensing is required
- high hygiene requirements exist, e.g. food industry hose down
- long life is required (no moving or touching parts)
- LED status indication is desirable

## Principle:



# Coded non-contact safety switches



## Stainless Steel 316 versions:

The Stainless Steel 316 Sense range has been developed for non-contact guard door interlocking in the applications of food processing, pharmaceutical, packaging and chemical industries.

### Stainless Steel 316

Can be high pressure hosed at high temperature - IP69K

Designed in accordance with EHEDG guidelines for hygienic design (EHEDG European Hygienic Engineering & Design Group)

Suitable for CIP and SIP cleaning

Wide 14mm sensing high tolerance to misalignment

The housing designs, surface finish and styling means they can be used in almost any environments subject to high levels of cleaning following contamination from foreign particles.

They are offered with various types of mounting styles to cover different levels of food contact (as described by the EHEDG Design Group).

- Direct contact zone - The switch mounting is designed according to EHEDG hygienic guidelines and also fulfils the requirements of the splash zone
- Splash zone - The switch must be easy to clean and withstand the CIP and SIP cleaning processes found in the food industry (tested IP69K).

### Mirror polished finish – Ra4

Can be high pressure hosed at high temperature - IP69K

Designed in accordance with EHEDG guidelines for hygienic design (EHEDG European Hygienic Engineering & Design Group)

Suitable for CIP and SIP cleaning

Can be mounted on steel structures



**Sense 3Z**

Universal 22mm fixing centres - suitable for food splash zones.



**Sense 3Z (Food)**

Universal 22mm fixing centres. Rear fixing - M4 tapped holes at rear of housing. Suitable for food contact zones.



**Sense 5Z**

Industry standard wide fitting - suitable for food splash zones. Front face actuation.



**Sense 7Z**

European industry standard fitting - suitable for food splash zones.



**Sense 9Z**

Compact slim fitting housing - suitable for food splash zones. Can be fitted to applications where space is restricted.



**Sense 9Z (Food)**

Compact slim fitting housing. Rear fixing - M4 tapped holes at rear of housing. Suitable for food contact zones.



**Sense 11Z**

M30 thread - suitable for some food contact zones.

# Sense 1 Coded non-contact safety switches

## Coded Magnetic Actuation

## Switching Tolerance up to 10mm



Compact yet robust fitting suitable for all small guard applications.

LED indication.

Hygienic screw covers ensure suitability for Food Processing washdown.

Cost effective interlock solution.

Wide sensing at 10mm.

High Specification polyester housing with backplate

Can be mounted unobtrusively in channels or behind doors - left or right cable exit

Up to: PLe ISO 13849-1 SIL 3 EN 62061 Cat 4 EN 954-1

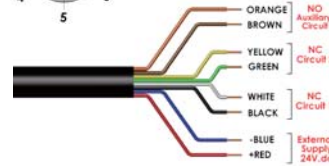
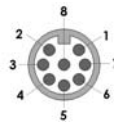
2NC 1NO circuits - High switching life - no moving parts

**Specified to 80C but designed to work up to 100C**  
**Will operate with most EN 954-1 Cat.4 Safety Relays**

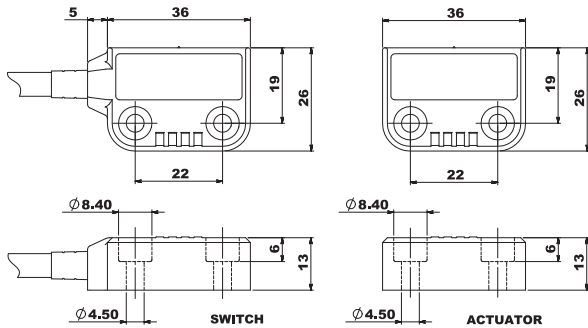


Left or Right Cable Exits

Quick Connect (QC) M12 8 way Male Plug (Pin view from switch)	Flying Lead Colours	Circuit (Actuator Present)	Output Types Solid State
8	Orange	Auxiliary NO	200mA Max. 24Vdc
5	Brown	Auxiliary NO	
4	Yellow	Safety NC2 +ve	200mA Max. 24Vdc
6	Green	Safety NC2 -ve	
7	Black	Safety NC1 +ve	200mA Max. 24Vdc
1	White	Safety NC1 -ve	
2	Red	Supply +24Vdc	Supply 24Vdc +/- 10%
3	Blue	Supply 0Vdc	



Quick Connect M12 versions fitted with 250mm (10") cable



Sense 1	
2TLA050050R4108	Sense 1, 2m cable Rt. 2NC/1NO LED
2TLA050050R5108	Sense 1, 5m cable Rt. 2NC/1NO LED
2TLA050050R6108	Sense 1, 10m cable Rt. 2NC/1NO LED
2TLA050050R2108	Sense 1, QC cable Rt. 2NC/1NO LED
2TLA050050R4107	Sense 1, 2m cable Lt. 2NC/1NO LED
2TLA050050R5107	Sense 1, 5m cable Lt. 2NC/1NO LED
2TLA050050R6107	Sense 1, 10m cable Lt. 2NC/1NO LED
2TLA050050R2107	Sense 1, QC cable Lt. 2NC/1NO LED
2TLA050040R0205	Sense 1, Spare Actuator

Standards EN1088 IEC 947 5 3 EN 60204 1  
 ISO 13849-1 EN62061 EN 954-1 UL508

### Safety Classification and Reliability Data:

Switching Reliability	3.3 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay
EN 954-1	up to PLe depending upon system architecture
ISO 13849-1	up to SIL3 depending upon system architecture
EN 62061	8 cycles per hour / 24 hours per day / 365 days
Safety Data - Annual Usage PFHd	2.52 x 10 <sup>-8</sup>
Proof Test Interval (Life) MTTF	47 years
Safety Channel 1 NC	24V.dc 0.2 A Max. Rating
Safety Channel 2 NC	24V.dc 0.2 A Max. Rating
Safety Channel 3 NO	24V.dc 0.2 A Max. Rating
Minimum switched current	10V. dc 1mA
Dielectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance: (Target to target)	Sao 8mm Close Sar 12mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	UL approved polyester
Temperature Range	-25 +80C.
Enclosure Protection	IP 67
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 or 8 core 6mm O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any

ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present



# Sense 3 Coded non-contact safety switches

**Coded Magnetic Actuation**

**Switching Tolerance up to 14mm**



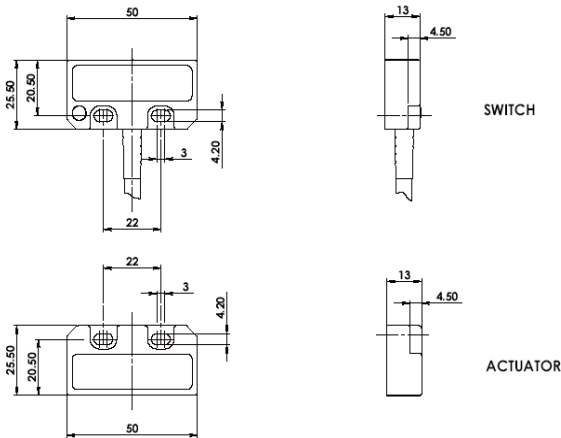
**Will operate with most Safety Relays**

**Specified to 80C but designed to work up to 100C**

Universal fitting - established 22mm fixing footprint suitable for most general applications.  
 Withstands environments where high humidity or hose down is required.  
 Durable polyester housing.  
 Wide 14mm sensing and high tolerance to misalignment.  
 Up to: PLe ISO 13849-1 SIL 3 EN 62061 Cat 4 EN 954-1  
 2NC 1NO circuits - High switching life - no moving parts  
 Quick connect versions.



Quick Connect M12 versions fitted with 250mm (10") cable



Quick Connect (QC) M12 8 way Male Plug (Pin view from switch)	Flying Lead Colours	Circuit (Actuator Present)	Output Types Solid State
8	Orange	Auxiliary NO	200mA Max. 24Vdc
5	Brown	Auxiliary NO	
4	Yellow	Safety NC2 +ve	200mA Max. 24Vdc
6	Green	Safety NC2 -ve	
7	Black	Safety NC1 +ve	200mA Max. 24Vdc
1	White	Safety NC1 -ve	
2	Red	Supply +24Vdc	Supply 24Vdc +/- 10%
3	Blue	Supply 0Vdc	



Standards: ISO 13849-1 EN62061 EN 954-1 UL508  
 Safety Classification and Reliability Data:

Switching Reliability	3.3 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay
EN 954-1	up to PLe depending upon system architecture
ISO 13849-1	up to SIL3 depending upon system architecture
EN 62061	8 cycles per hour / 24 hours per day / 365 days
Safety Data - Annual Usage	PFHd 2.52 x 10 <sup>-8</sup>
Proof Test Interval (Life)	47 years
MTTFd	470 years
Safety Channel 1 NC	24V.dc 0.2 A Max. Rating
Safety Channel 2 NC	24V.dc 0.2 A Max. Rating
Safety Channel 3 NO	24V.dc 0.2 A Max. Rating
Minimum switched current	10V. dc 1mA
Dielectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance:	Sao 10mm Close
(Target to target)	Sar 20mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	UL approved polyester
Temperature Range	-25 +80C.
Enclosure Protection	IP69K IP67
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 or 8 core 6mm O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any

Sense 3	
2TLA050052R4100	Sense 3, 2m cable, 2NC/1NO LED
2TLA050052R5100	Sense 3, 5m cable, 2NC/1NO LED
2TLA050052R6100	Sense 3, 10m cable, 2NC/1NO LED
2TLA050052R2100	Sense 3, QC cable, 2NC/1NO LED
2TLA050040R0206	Sense 3, Spare Actuator

For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

# Sense 3Z Coded non-contact safety switches

**Coded Magnetic Actuation**

**Switching Tolerance up to 14mm**



**Will operate with most Safety Relays**

**Specified to 105C, but designed to work up to 125C.**

Robust Stainless Steel 316 enclosure designed to survive the tough environments of Food and Pharmaceutical applications.

LED indication. Stainless Steel 316 Mirror polish finish (Ra4).

Survives high pressure hosing at high temperature.

High temperature specification 105C.

Wide 14mm sensing and high tolerance to misalignment.

Universal fitting - established 22mm fixing footprint suitable for most general applications.

Up to: Ple ISO 13849-1 SIL 3 EN 62061 Cat 4 EN 954-1

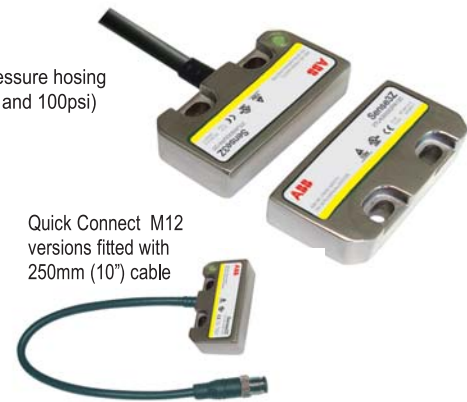
2NC 1NO circuits - High switching life - no moving parts

Quick connect versions.

Suitable for CIP SIP cleaning - Food Splash zones EHEDG guidelines

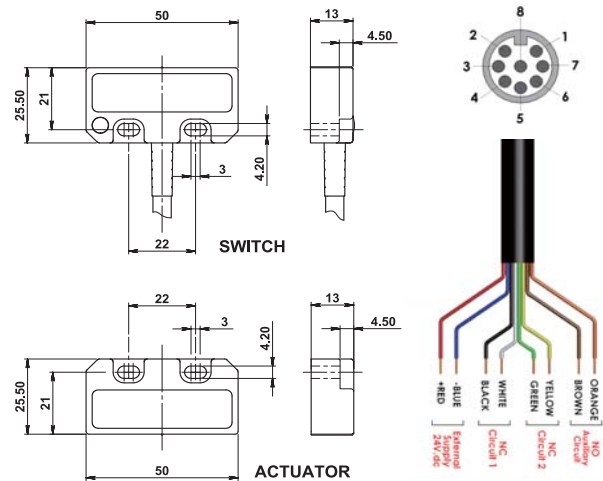
**Stainless Steel Housing**

Tested IP69K (high pressure hosing with detergent at 80C. and 100psi)



Quick Connect M12 versions fitted with 250mm (10") cable

Standards	EN1088 IEC 947-5-3 EN 60204-1 ISO 13849-1 EN62061 EN 954-1 UL508
Safety Classification and Reliability Data:	
Switching Reliability	3.3 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay
EN 954-1	up to PLe depending upon system architecture
ISO 13849-1	up to SIL3 depending upon system architecture
EN 62061	
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	2.52 x 10 <sup>-8</sup>
Proof Test Interval (Life)	47 years
MTTFd	470 years
Safety Channel 1	NC 24V.dc 0.2 A Max. Rating
Safety Channel 2	NC 24V.dc 0.2 A Max. Rating
Safety Channel 3	NO 24V.dc 0.2 A Max. Rating
Minimum switched current	10V. dc 1mA
Delectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance:	Sao 10mm Close
(Target to target)	Sar 20mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	Stainless Steel 316 Mirror polished finish (Ra4)
Temperature Range	-25 +105C.
Enclosure Protection	IP69K IP67
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 or 8 core 6mm O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any



For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

Quick Connect (QC) M12 8 way Male Plug (Pin view from switch)	Flying Lead Colours	Circuit (Actuator Present)	Output Types Solid State
8	Orange	Auxiliary NO	200mA Max. 24Vdc
5	Brown	Auxiliary NO	
4	Yellow	Safety NC2 +ve	
6	Green	Safety NC2 -ve	200mA Max. 24Vdc
7	Black	Safety NC1 +ve	
1	White	Safety NC1 -ve	200mA Max. 24Vdc
2	Red	Supply +24Vdc	Supply 24Vdc +/- 10%
3	Blue	Supply 0Vdc	

Sense 3Z Standard	
2TLA050052R4120	Sense 3Z, SS 2m cable, 2NC/1NO LED
2TLA050052R5120	Sense 3Z, SS 5m cable, 2NC/1NO LED
2TLA050052R6120	Sense 3Z, SS 10m cable, 2NC/1NO LED
2TLA050052R2120	Sense 3Z, SS QC cable, 2NC/1NO LED
2TLA050040R0207	Sense 3Z, SS Spare Actuator

# Sense 3Z Coded non-contact safety switches

**Coded Magnetic Actuation**

**Switching Tolerance up to 14mm**



**Stainless Steel 316 housing**

**IP69K**

**Specified to 105C, but designed to work up to 125C.**

Specifically designed for Food Processing applications - Stainless Steel 316 Mirror polished finish (Ra4).

Suitable for CIP and SIP cleaning - mounting holes are at the rear - no food traps

Universal housing - 22mm fixing hole centre - 50mm wide body

Rear fixing 2 x M4 tapped holes

Can be high pressure hosed at high temperature - IP69K

Wide 14mm sensing high tolerance to misalignment.

LED indication

Up to: PLe ISO 13849-1 SIL 3 EN 62061 Cat 4 EN 954-1

2NC 1NO circuits - High switching life - no moving parts

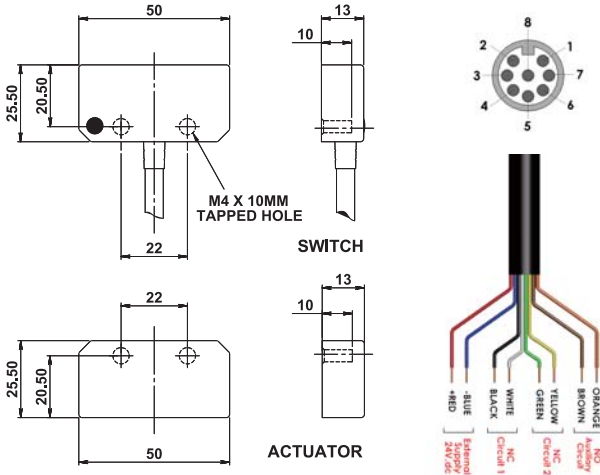
No Food Trap Housing - Rear Mounting Holes



Quick Connect M12 versions fitted with 250mm (10") cable

**Stainless Steel Housing**

Tested IP69K (high pressure hosing with detergent at 80C. and 100psi)



Quick Connect (QC) M12 8 way Male Plug (Pin view from switch)	Flying Lead Colours	Circuit (Actuator Present)	Output Types Solid State
8	Orange	Auxiliary NO	200mA Max. 24Vdc
5	Brown	Auxiliary NO	
4	Yellow	Safety NC2 +ve	200mA Max. 24Vdc
6	Green	Safety NC2 -ve	
7	Black	Safety NC1 +ve	200mA Max. 24Vdc
1	White	Safety NC1 -ve	
2	Red	Supply +24Vdc	Supply 24Vdc +/- 10%
3	Blue	Supply 0Vdc	

Standards EN1088 IEC 947-5-3 EN 60204-1  
ISO 13849-1 EN62061 EN 954-1 UL508

**Safety Classification and Reliability Data:**

Switching Reliability	3.3 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay
EN 954-1	up to PLe depending upon system architecture
ISO 13849-1	up to SIL3 depending upon system architecture
EN 62061	
Safety Data - Annual Usage PFHd	8 cycles per hour / 24 hours per day / 365 days 2.52 x 10 <sup>-8</sup>
Proof Test Interval (Life) MTTFd	47 years 470 years
Safety Channel 1 NC	24V.dc 0.2 A Max. Rating
Safety Channel 2 NC	24V.dc 0.2 A Max. Rating
Safety Channel 3 NO	24V.dc 0.2 A Max. Rating
Minimum switched current	10V. dc 1mA
Dielectric withstand	250V. ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance:	Sao 10mm Close
(Target to target)	Sar 20mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	Stainless Steel 316 Mirror polished finish (Ra4)
Temperature Range	-25 +105C.
Enclosure Protection	IP69K IP67
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 or 8 core 6mm O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any

**Sense 3Z Food Industry**

2TLA050052R4150	Sense 3Z, SS 2m cable, 2NC/1NO LED
2TLA050052R5150	Sense 3Z, SS 5m cable, 2NC/1NO LED
2TLA050052R6150	Sense 3Z, SS 10m cable, 2NC/1NO LED
2TLA050052R2150	Sense 3Z, SS QC cable, 2NC/1NO LED
2TLA050040R0208	Sense 3Z, SS Spare Actuator

For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

# Sense 5 Coded non-contact safety switches

**Coded Magnetic Actuation**

**Switching Tolerance up to 14mm**



## Will operate with most Safety Relays

Slim fitting suitable for all industry applications.

Wide 14mm sensing high tolerance to misalignment.

LED indication - no moving parts - survives shock and vibration

Up to: PLe ISO 13849-1 SIL 3 EN 62061 Cat 4 EN 954-1

2NC 1NO circuits - High switching life - no moving parts

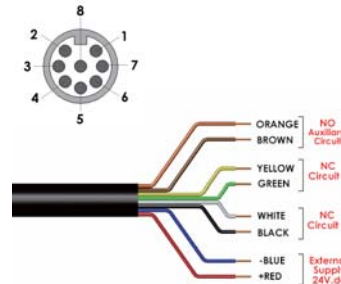
Quick connect versions.

**Specified to 80C.  
but designed to work up to 100C.  
Will operate with most Safety Relays**



Quick Connect M12 versions fitted with 250mm (10") cable

Quick Connect (QC) M12 8 way Male Plug (Pin view from switch)	Flying Lead Colours	Circuit (Actuator Present)	Output Types Solid State
8	Orange	Auxiliary NO	200mA Max. 24Vdc
5	Brown	Auxiliary NO	
4	Yellow	Safety NC2 +ve	200mA Max. 24Vdc
6	Green	Safety NC2 -ve	
7	Black	Safety NC1 +ve	200mA Max. 24Vdc
1	White	Safety NC1 -ve	
2	Red	Supply +24Vdc	Supply 24Vdc +/- 10%
3	Blue	Supply 0Vdc	

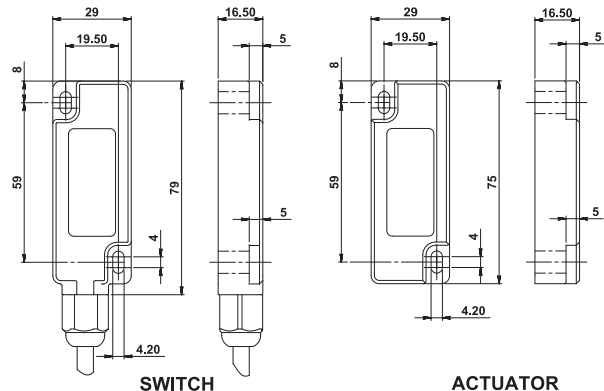


Sense 5	
2TLA050054R4100	Sense 5, 2m cable, 2NC/1NO LED
2TLA050054R5100	Sense 5, 5m cable, 2NC/1NO LED
2TLA050054R6100	Sense 5, 10m cable, 2NC/1NO LED
2TLA050054R2100	Sense 5, QC cable, 2NC/1NO LED
2TLA050040R0209	Sense 5, Spare Actuator

Standards EN1088 IEC 947-5-3 EN 60204-1 ISO 13849-1 EN62061 EN 954-1 UL508

### Safety Classification and Reliability Data:

Switching Reliability	3.3 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay up to PLe depending upon system architecture up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	2.52 x 10 <sup>-8</sup>
Proof Test Interval (Life)	47 years
MTTFd	470 years
Safety Channel 1 NC	24V.dc 0.2 A Max. Rating
Safety Channel 2 NC	24V.dc 0.2 A Max. Rating
Safety Channel 3 NO	24V.dc 0.2 A Max. Rating
Minimum switched current	10V. dc 1mA
Dielectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance:	Sao 10mm Close
(Target to target)	Sar 20mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	UL approved polyester
Temperature Range	-25 +80C.
Enclosure Protection	IP 67
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 or 8 core 6mm O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any



For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

# Sense 5Z Coded non-contact safety switches

**Coded Magnetic Actuation**

**Switching Tolerance up to 14mm**



**Will operate with most Safety Relays**

**Specified to 105C.  
but designed to work up to 125C.**

Specifically designed for Food Processing applications - Stainless Steel 316 Mirror polished (Ra4)

Robust 32mm wide housing - no moving parts - survives shock and vibration

Can be high pressure hosed at high temperature - IP69K

Wide 14mm sensing high tolerance to misalignment.

LED indication

Up to: Ple ISO 13849-1 SIL 3 EN 62061 Cat 4 EN 954-1

2NC 1NO circuits - High switching life - no moving parts

Suitable for CIP SIP cleaning - food Splash zones EHEDG guidelines

**Stainless Steel Housing**



Quick Connect M12 versions fitted with 250mm (10") cable

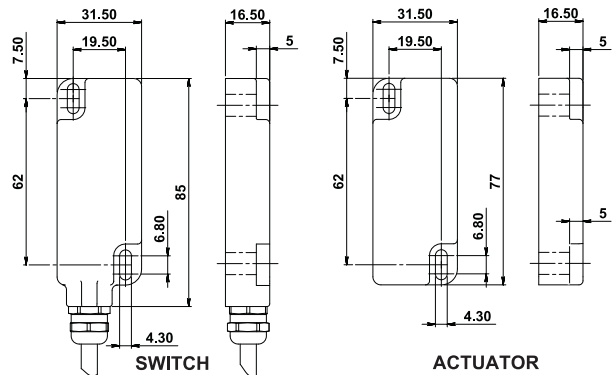
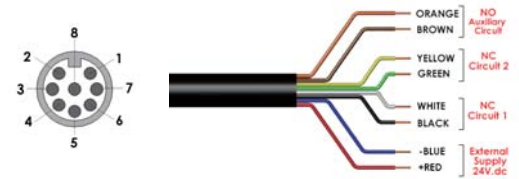
Tested IP69K (high pressure hosing with detergent at 80C. and 100psi)

Sense 5Z	
2TLA050054R4120	Sense 5Z, SS 2m cable, 2NC/1NO LED
2TLA050054R5120	Sense 5Z, SS 5m cable, 2NC/1NO LED
2TLA050054R6120	Sense 5Z, SS 10m cable, 2NC/1NO LED
2TLA050054R2120	Sense 5Z, SS QC cable, 2NC/1NO LED
2TLA050040R0210	Sense 5Z, SS Spare Actuator

Standards EN1088 IEC 947-5-3 EN 60204-1  
ISO 13849-1 EN62061 EN 954-1 UL508

**Safety Classification and Reliability Data:**

Switching Reliability	3.3 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	2.52 x 10 <sup>-8</sup>
Proof Test Interval (Life)	47 years
MTTFd	470 years
Safety Channel 1	NC 24V.dc 0.2 A Max. Rating
Safety Channel 2	NC 24V.dc 0.2 A Max. Rating
Safety Channel 3	NO 24V.dc 0.2 A Max. Rating
Minimum switched current	10V. dc 1mA
Delectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance:	Sao 10mm Close
(Target to target)	Sar 20mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	Stainless Steel 316 Mirror polished finish (Ra4)
Temperature Range	-25 +105C.
Enclosure Protection	
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 or 8 core 6mm O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any



For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

Quick Connect (QC) M12 8 way Male Plug (Pin view from switch)	Flying Lead Colours	Circuit (Actuator Present)	Output Types Solid State
8	Orange	Auxiliary NO	200mA Max. 24Vdc
5	Brown	Auxiliary NO	
4	Yellow	Safety NC2 +ve	200mA Max. 24Vdc
6	Green	Safety NC2 -ve	
7	Black	Safety NC1 +ve	200mA Max. 24Vdc
1	White	Safety NC1 -ve	
2	Red	Supply +24Vdc	Supply 24Vdc +/- 10%
3	Blue	Supply 0Vdc	

# Sense 7 Coded non-contact safety switches

## Coded Magnetic Actuation      Switching Tolerance up to 14mm

Popular European fitting suitable for all industry applications.  
 Can be high pressure hosed at high temperature - IP69K  
 Wide 14mm sensing - high tolerance to misalignment  
 LED indication  
 Up to: Ple ISO 13849-1 SIL 3 EN 62061 Cat 4 EN 954-1  
 2NC 1NO circuits - High switching life - no moving parts  
 Quick connect versions.

Sense 7	
2TLA050056R4100	Sense 7, 2m cable, 2NC/1NO LED
2TLA050056R5100	Sense 7, 5m cable, 2NC/1NO LED
2TLA050056R6100	Sense 7, 10m cable, 2NC/1NO LED
2TLA050056R2100	Sense 7, QC cable, 2NC/1NO LED
2TLA050040R0211	Sense 7, Spare Actuator

Standards	EN1088 IEC 947-5-3 EN 60204-1 ISO 13849-1 EN62061 EN 954-1 UL508
Safety Classification and Reliability Data:	
Switching Reliability	3.3 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay up to PLe depending upon system architecture up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	2.52 x 10 <sup>-8</sup>
Proof Test Interval (Life)	47 years
MTTFd	470 years
Safety Channel 1	NC 24V.dc 0.2 A Max. Rating
Safety Channel 2	NC 24V.dc 0.2 A Max. Rating
Safety Channel 3	NO 24V.dc 0.2 A Max. Rating
Minimum switched current	10V. dc 1mA
Delectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance:	Sao 10mm Close
(Target to target)	Sar 20mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	UL approved polyester
Temperature Range	-25 +80C.
Enclosure Protection	IP69K IP67
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 or 8 core 6mm O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any

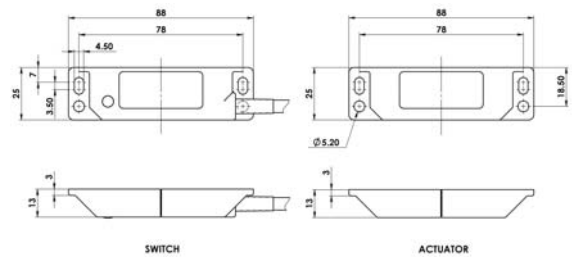
For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present



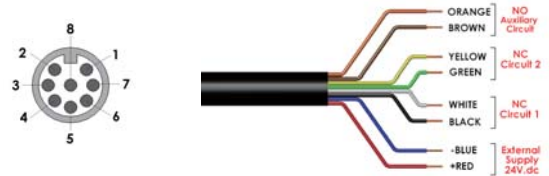
**Specified to 80C , but designed to work up to 100C**  
**Will operate with most EN 954-1 Cat.4 Safety Relays**



Quick Connect M12 versions fitted with 250mm (10") cable



Quick Connect (QC) M12 8 way Male Plug (Pin view from switch)	Flying Lead Colours	Circuit (Actuator Present)	Output Types Solid State
8	Orange	Auxiliary NO or NC	200mA Max. 24Vdc
5	Brown	Auxiliary NO or NC	
4	Yellow	Safety NC2 +ve	200mA Max. 24Vdc
6	Green	Safety NC2 -ve	
7	Black	Safety NC1 +ve	200mA Max. 24Vdc
1	White	Safety NC1 -ve	
2	Red	Supply +24Vdc	Supply 24Vdc +/- 10%
3	Blue	Supply 0Vdc	



# Sense 7Z Coded non-contact safety switches



## Coded Magnetic Actuation

## Switching Tolerance up to 14mm

Specifically designed for Food Processing applications - Stainless Steel 316 Mirror polished finish (Ra4).

Suitable for CIP cleaning - Food Splash zones EHEDG guidelines

Wide 14mm sensing high tolerance to misalignment.

LED indication

Up to: Ple ISO 13849-1 SIL 3 EN 62061 Cat 4 EN 954-1

2NC 1NO circuits - High switching life - no moving parts

Quick connect versions.

**Specified to 105C,  
but designed to work up to 125C.  
Will operate with most EN 954-1  
Cat.4 Safety Relays**

## Stainless Steel Housing



Quick Connect M12 versions fitted with 250mm (10") cable

Tested IP69K (high pressure hosing with detergent at 80C. and 100psi)

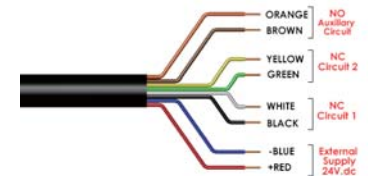
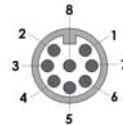
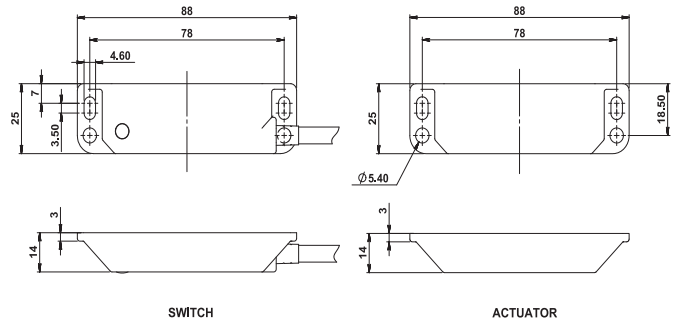
Sense 7Z	
2TLA050056R4120	Sense 7Z, SS 2m cable, 2NC/1NO LED
2TLA050056R5120	Sense 7Z, SS 5m cable, 2NC/1NO LED
2TLA050056R6120	Sense 7Z, SS 10m cable, 2NC/1NO LED
2TLA050056R2120	Sense 7Z, SS QC cable, 2NC/1NO LED
2TLA050040R0212	Sense 7Z, SS Spare Actuator

Standards EN1088 IEC 947-5-3 EN 60204-1  
ISO 13849-1 EN62061 EN 954-1 UL508

### Safety Classification and Reliability Data:

Switching Reliability	3.3 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay up to PLE depending upon system architecture up to SIL3 depending upon system architecture
Safety Data - Annual Usage PFHd	8 cycles per hour / 24 hours per day / 365 days 2.52 x 10 <sup>-8</sup>
Proof Test Interval (Life) MTTFd	47 years 470 years
Safety Channel 1 NC	24V.dc 0.2 A Max. Rating
Safety Channel 2 NC	24V.dc 0.2 A Max. Rating
Safety Channel 3 NO	24V.dc 0.2 A Max. Rating
Minimum switched current	10V. dc 1mA
Delectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance: (Target to target)	Sao 10mm Close Sar 20mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	Stainless Steel 316 Mirror polished finish (Ra4)
Temperature Range	-25 +105C.
Enclosure Protection	IP69K IP67
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 or 8 core 6mm O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any

For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present



Quick Connect (QC) M12 8 way Male Plug (Pin view from switch)	Flying Lead Colours	Circuit (Actuator Present)	Output Types Solid State
8	Orange	Auxiliary NO	200mA Max. 24Vdc
5	Brown	Auxiliary NO	
4	Yellow	Safety NC2 +ve	200mA Max. 24Vdc
6	Green	Safety NC2 -ve	
7	Black	Safety NC1 +ve	200mA Max. 24Vdc
1	White	Safety NC1 -ve	
2	Red	Supply +24Vdc	Supply 24Vdc +/- 10%
3	Blue	Supply 0Vdc	

# Sense 9 Coded non-contact safety switches

**Coded Magnetic Actuation**      **Switching Tolerance up to 14mm**



- Slim fitting suitable for all industry applications.
- Easy to install within narrow frame structures.
- Durable polyester housing.
- Wide 14mm sensing and high tolerance to misalignment.
- LED indication
- Up to: Ple ISO 13849-1 SIL 3 EN 62061 Cat 4 EN 954-1
- 2NC 1NO circuits - High switching life - no moving parts
- Quick connect versions.

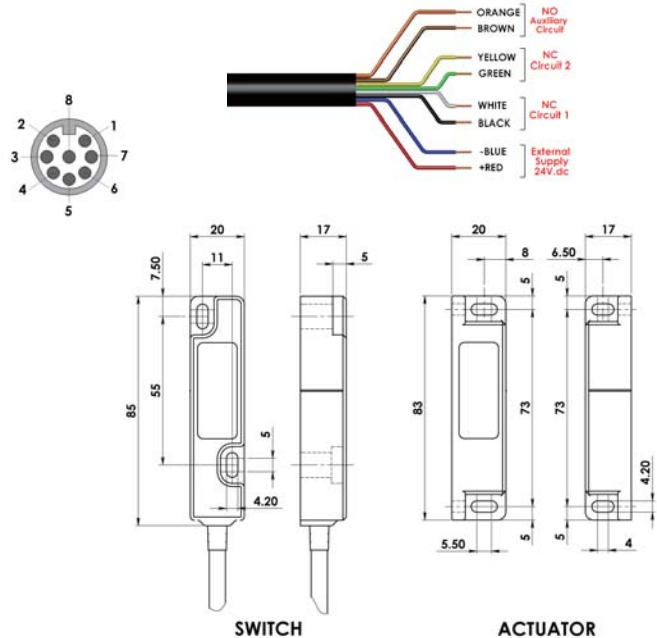
**Specified to 80C, but designed to work up to 100C.**  
**Will operate with most Safety Relays**



Quick Connect M12 versions fitted with 250mm (10") cable

Sense 9	
2TLA050058R4100	Sense 9, 2m cable, 2NC/1NO LED
2TLA050058R5100	Sense 9, 5m cable, 2NC/1NO LED
2TLA050058R6100	Sense 9, 10m cable, 2NC/1NO LED
2TLA050058R2100	Sense 9, QC cable, 2NC/1NO LED
2TLA050040R0213	Sense 9, Spare Actuator

Quick Connect (QC) M12 8 way Male Plug (Pin view from switch)	Flying Lead Colours	Circuit (Actuator Present)	Output Types Solid State
8	Orange	Auxiliary NO	200mA Max. 24Vdc
5	Brown	Auxiliary NO	
4	Yellow	Safety NC2 +ve	200mA Max. 24Vdc
6	Green	Safety NC2 -ve	
7	Black	Safety NC1 +ve	200mA Max. 24Vdc
1	White	Safety NC1 -ve	
2	Red	Supply +24Vdc	Supply 24Vdc +/- 10%
3	Blue	Supply 0Vdc	



Standards EN1088 IEC 947-5-3 EN 60204-1  
 ISO 13849-1 EN62061 EN 954-1 UL508

**Safety Classification and Reliability Data:**

Switching Reliability	3.3 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay
EN 954-1	up to PLe depending upon system architecture
ISO 13849-1	up to SIL3 depending upon system architecture
EN 62061	8 cycles per hour / 24 hours per day / 365 days
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFFd	2.52 x 10 <sup>-8</sup>
Proof Test Interval (Life)	47 years
MTTFd	470 years
Safety Channel 1 NC	24V.d.c 0.2 A Max. Rating
Safety Channel 2 NC	24V.d.c 0.2 A Max. Rating
Safety Channel 3 NO	24V.d.c 0.2 A Max. Rating
Minimum switched current	10V. dc 1mA
Dielectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance:	Sao 10mm Close
(Target to target)	Sar 20mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	UL approved polyester
Temperature Range	-25 +80C.
Enclosure Protection	IP67
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 or 8 core 6mm O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any

For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present



# Sense 9Z Coded non-contact safety switches

## Coded Magnetic Actuation

## Switching Tolerance up to 14mm



Will operate with most Safety Relays

IP69K

Specified to 105C.  
but designed to work up to 125C.

Specifically designed for Food Processing applications - Stainless Steel 316 Mirror polished finish (Ra4).

Suitable for CIP cleaning

Industry standard slim 20mm wide housing - can be fitted in narrow channels

Can be high pressure hosed at high temperature - IP69K

Wide 14mm sensing high tolerance to misalignment.

LED indication

Up to: PLe ISO 13849-1 SIL 3 EN 62061 Cat 4 EN 954-1

2NC 1NO circuits - High switching life - no moving parts

Suitable for CIP SIP cleaning - Food Splash zones EHEDG guidelines

Stainless Steel Housing



Quick Connect M12 versions fitted with 250mm (10") cable

Tested IP69K (high pressure hose) with detergent at 80C. and 100psi)

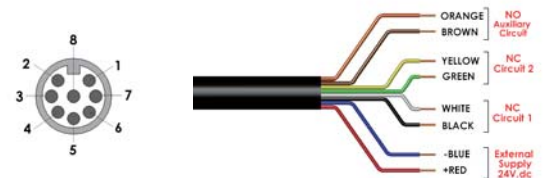
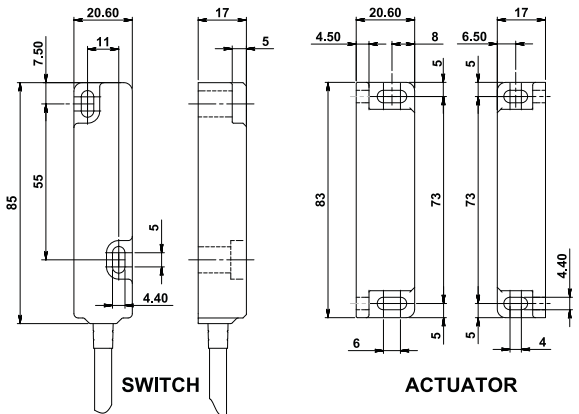
Sense 9Z Standard	
2TLA050058R4120	Sense 9Z, SS 2m cable, 2NC/1NO LED
2TLA050058R5120	Sense 9Z, SS 5m cable, 2NC/1NO LED
2TLA050058R6120	Sense 9Z, SS 10m cable, 2NC/1NO LED
2TLA050058R2120	Sense 9Z, SS QC cable, 2NC/1NO LED
2TLA050040R0214	Sense 9Z, SS Spare Actuator

Standards EN1088 IEC 947-5-3 EN 60204-1  
ISO 13849-1 EN62061 EN 954-1 UL508

### Safety Classification and Reliability Data:

Switching Reliability	3.3 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	2.52 x 10 <sup>-6</sup>
Proof Test Interval (Life)	47 years
MTTFd	470 years
Safety Channel 1 NC	24V.dc 0.2 A Max. Rating
Safety Channel 2 NC	24V.dc 0.2 A Max. Rating
Safety Channel 3 NO	24V.dc 0.2 A Max. Rating
Minimum switched current	10V. dc 1mA
Dielectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance:	Sao 10mm Close
(Target to target)	Sar 20mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	Stainless Steel 316 Mirror polished finish (Ra4)
Temperature Range	-25 +105C.
Enclosure Protection	IP69K IP67
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz, 1mm
Cable Type	PVC 6 or 8 core 6mm O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any

For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present



Quick Connect (QC) M12 8 way Male Plug (Pin view from switch)	Flying Lead Colours	Circuit (Actuator Present)	Output Types Solid State
8	Orange	Auxiliary NO	200mA Max. 24Vdc
5	Brown	Auxiliary NO	
4	Yellow	Safety NC2 +ve	200mA Max. 24Vdc
6	Green	Safety NC2 -ve	
7	Black	Safety NC1 +ve	200mA Max. 24Vdc
1	White	Safety NC1 -ve	
2	Red	Supply +24Vdc	Supply 24Vdc +/- 10%
3	Blue	Supply 0Vdc	

# Sense 9Z Coded non-contact safety switches

**Coded Magnetic Actuation      Switching Tolerance up to 14mm**



**Specified to 105C, but designed to work up to 125C.  
Will operate with most Safety Relays**

**Stainless Steel 316 housing      IP69K**

Specifically designed for Food Processing applications - Stainless Steel 316 Mirror polished finish (Ra4).

Suitable for CIP SIP cleaning - mounting holes are at the rear - no food traps

Suitable for Food contact zones - EHEDG guidelines

Slim fixing - can be fitted in narrow channels

Can be high pressure hosed at high temperature - IP69K

Wide 14mm sensing high tolerance to misalignment.

LED indication

Up to: Ple ISO 13849-1 SIL 3 EN 62061 Cat 4 EN 954-1

2NC 1NO circuits - High switching life - no moving parts

**Stainless Steel Housing**

**No Food Trap Housing –  
Rear Mounting Holes**



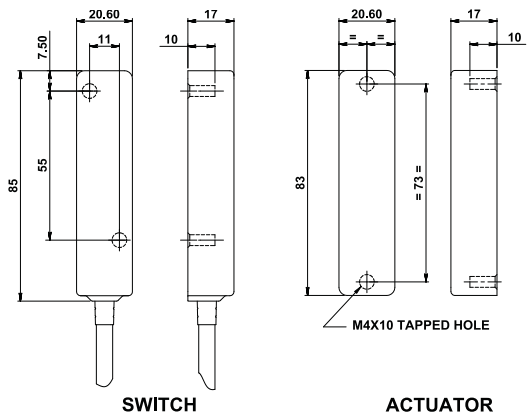
Quick Connect M12 versions fitted with 250mm (10") cable

Tested IP69K (high pressure hosing with detergent at 80C. and 100psi)



Sense 9Z Food Industry	
2TLA050058R4150	Sense 9Z, SS 2m cable, 2NC/1NO LED
2TLA050058R5150	Sense 9Z, SS 5m cable, 2NC/1NO LED
2TLA050058R6150	Sense 9Z, SS 10m cable, 2NC/1NO LED
2TLA050058R2150	Sense 9Z, SS QC cable, 2NC/1NO LED

Quick Connect (QC) M12 8 way Male Plug (Pin view from switch)	Flying Lead Colours	Circuit (Actuator Present)	Output Types Solid State
8	Orange	Auxiliary NO	200mA Max. 24Vdc
5	Brown	Auxiliary NO	
4	Yellow	Safety NC2 +ve	200mA Max. 24Vdc
6	Green	Safety NC2 -ve	
7	Black	Safety NC1 +ve	200mA Max. 24Vdc
1	White	Safety NC1 -ve	
2	Red	Supply +24Vdc	Supply 24Vdc +/- 10%
3	Blue	Supply 0Vdc	



Standards EN1088 IEC 947-5-3 EN 60204-1  
ISO 13849-1 EN62061 EN 954-1 UL508

**Safety Classification and Reliability Data:**

Mechanical Reliability B10d	3.3 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay
EN 954-1	up to PLE depending upon system architecture
ISO 13849-1	up to SIL3 depending upon system architecture
EN 62061	8 cycles per hour / 24 hours per day / 365 days
Safety Data - Annual Usage PFHd	2.52 x 10 <sup>-8</sup>
Proof Test Interval (Life) MTTFd	47 years / 470 years
Safety Channel 1 NC	Voltage free : 250V.ac 1.0 A Max. Rating
Safety Channel 2 NC	Voltage free : 250V.ac 1.0 A Max. Rating
Safety Channel 3 NO	Voltage free : 24V.dc 0.2 A Max. Rating
Fuse	Internal 1.0 A (F) External 0.8A (F) (User)
Contact release time	<2ms
Initial contact resistance	<500 milliohm
Minimum switched current	10V, dc 1mA
Dielectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance: (Target to target)	Sao 10mm Close Sar 22mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	Stainless Steel 316 Mirror polished finish (Ra4)
Temperature Range	-25 +105C.
Enclosure Protection	IP69K IP67
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 or 8 core 6mm O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any

For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

# Sense 11 Coded non-contact safety switches

## Coded Magnetic Actuation

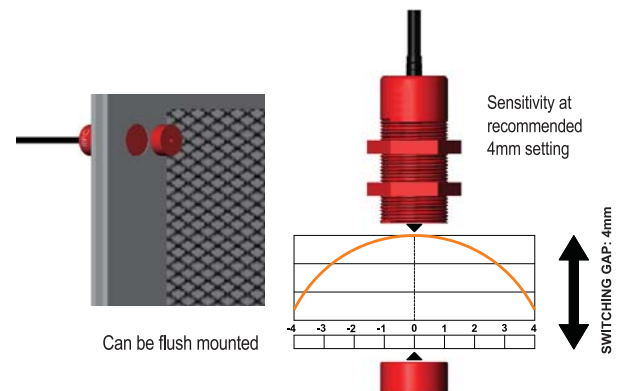
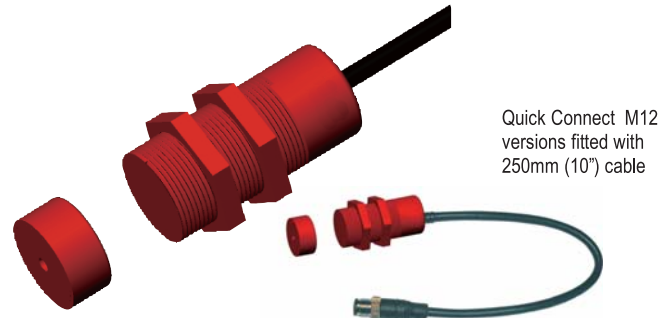
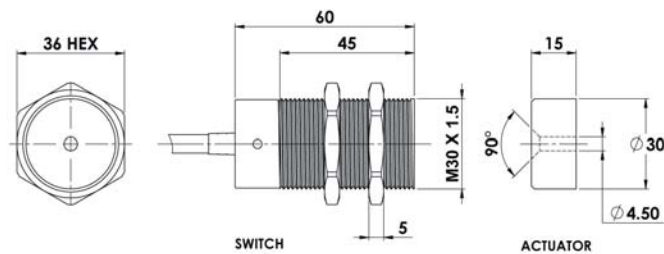
Switching Tolerance up to 10mm



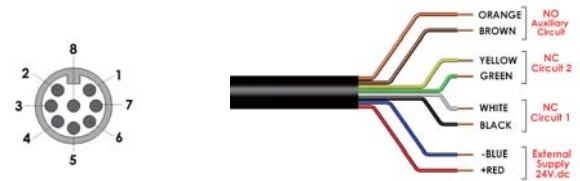
- Cylindrical fitting suitable for all industry applications.
- Easy to install - M30 threaded body - easy to set
- Wide 10mm sensing
- Robust, suitable for harsh environments
- Can be flush mounted
- LED indication
- Up to: Ple ISO 13849-1 SIL 3 EN 62061 Cat 4 EN 954-1
- 2NC 1NO circuits - High switching life - no moving parts
- Quick connect versions.

**Specified to 80C, but designed to work up to 100C.**  
**Will operate with most Safety Relays**

Sense 11	
2TLA050060R4100	Sense 11, 2m cable, 2NC/1NO LED
2TLA050060R5100	Sense 11, 5m cable, 2NC/1NO LED
2TLA050060R6100	Sense 11, 10m cable, 2NC/1NO LED
2TLA050060R2100	Sense 11, QC cable, 2NC/1NO LED
2TLA050040R0215	Sense 11, Spare Actuator



Standards	EN1088 IEC 947-5-3 EN 60204-1 ISO 13849-1 EN62061 EN 954-1 UL508
Safety Classification and Reliability Data:	
Switching Reliability	3.3 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay
EN 954-1	up to PL e depending upon system architecture
ISO 13849-1	up to SIL3 depending upon system architecture
EN 62061	
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	2.52 x 10 <sup>-8</sup>
Proof Test Interval (Life)	47 years
MTTFd	470 years
Safety Channel 1 NC	24V.dc 0.2 A Max. Rating
Safety Channel 2 NC	24V.dc 0.2 A Max. Rating
Safety Channel 3 NO	24V.dc 0.2 A Max. Rating
Minimum switched current	10V. dc 1mA
Dielectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance: (Target to target)	Sao 8mm Close Sar 20mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	UL approved polyester
Temperature Range	-25 +80C.
Enclosure Protection	IP69K IP67
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 or 8 core 6mm O.D.
Mounting Position	Any



Quick Connect (QC) M12 8 way Male Plug (Pin view from switch)	Flying Lead Colours	Circuit (Actuator Present)	Output Types Solid State
8	Orange	Auxiliary NO	200mA Max. 24Vdc
5	Brown	Auxiliary NO	
4	Yellow	Safety NC2 +ve	200mA Max. 24Vdc
6	Green	Safety NC2 -ve	
7	Black	Safety NC1 +ve	200mA Max. 24Vdc
1	White	Safety NC1 -ve	
2	Red	Supply +24Vdc	Supply 24Vdc +/- 10%
3	Blue	Supply 0Vdc	

For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

# Sense 11Z Coded non-contact safety switches

**Coded Magnetic Actuation      Switching Tolerance up to 10mm**



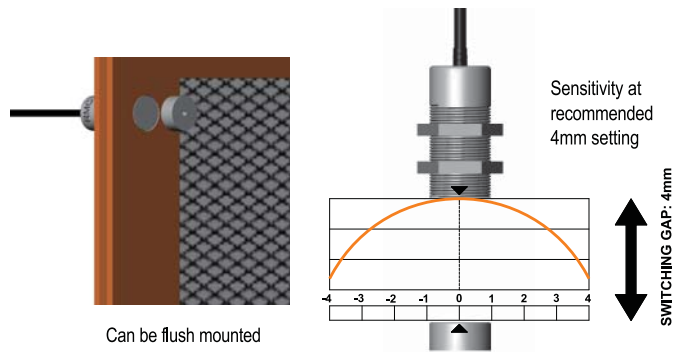
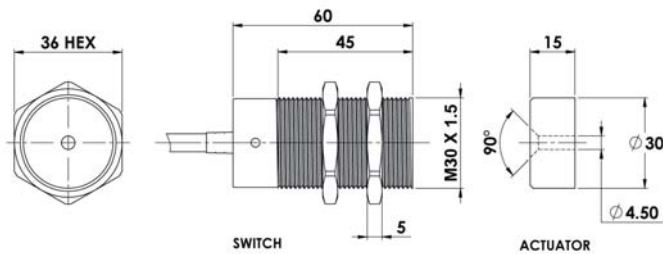
- Cylindrical fitting suitable for all industry applications.
- Easy to install - M30 threaded body - easy to set
- Wide 10mm sensing - low hysteresis - no moving parts
- Suitable to be harsh environments of Food processing and packaging
- Can be flush mounted - solid stainless steel 316 housing
- LED indication Stainless Steel 316
- Up to: Ple ISO 13849-1 SIL 3 EN 62061 Cat 4 EN 954-1
- 2NC 1NO circuits
- Quick connect versions.

**Specified to 105C, but designed to work up to 125C.  
Will operate with most Safety Relays**

## Stainless Steel Housing



Tested IP69K (high pressure hosing with detergent at 80C. and 100psi)

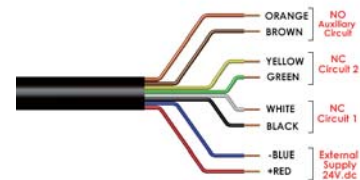
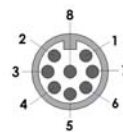


Sense 11Z	
2TLA050060R4120	Sense 11Z, SS 2m cable, 2NC/1NO LED
2TLA050060R5120	Sense 11Z, SS 5m cable, 2NC/1NO LED
2TLA050060R6120	Sense 11Z, SS 10m cable, 2NC/1NO LED
2TLA050060R2120	Sense 11Z, SS QC cable, 2NC/1NO LED
2TLA050040R0216	Sense 11Z, SS Spare Actuator

Standards EN1088 IEC 947-5-3 EN 60204-1  
ISO 13849-1 EN62061 EN 954-1 UL508

### Safety Classification and Reliability Data:

Switching Reliability	3.3 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay
EN 954-1	up to PLE depending upon system architecture
ISO 13849-1	up to SIL3 depending upon system architecture
EN 62061	
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	2.52 x 10 <sup>-8</sup>
Proof Test Interval (Life)	47 years
MTTFd	470 years
Safety Channel 1 NC	24V.dc 0.2 A Max. Rating
Safety Channel 2 NC	24V.dc 0.2 A Max. Rating
Safety Channel 3 NO	24V.dc 0.2 A Max. Rating
Minimum switched current	10V. dc 1mA
Delectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance:	Sao 10mm Close
(Target to target)	Sar 20mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	Stainless Steel 316 Mirror polished finish (Ra4)
Temperature Range	-25 +105C.
Enclosure Protection	IP69K IP67
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 or 8 core 6mm O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any



Quick Connect (QC) M12 8 way Male Plug (Pin view from switch)	Flying Lead Colours	Circuit (Actuator Present)	Output Types Solid State
8	Orange	Auxiliary NO	200mA Max. 24Vdc
5	Brown	Auxiliary NO	
4	Yellow	Safety NC2 +ve	200mA Max. 24Vdc
6	Green	Safety NC2 -ve	
7	Black	Safety NC1 +ve	200mA Max. 24Vdc
1	White	Safety NC1 -ve	
2	Red	Supply +24Vdc	Supply 24Vdc +/- 10%
3	Blue	Supply 0Vdc	

For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

# Notes

# Magnetic non-contact safety switches

## Operation:

All ABB Jokab Safety Magnetic Non-Contact Safety Switches are designed to conform to IEC 947-5-3 and be used as directed by ISO12100, ISO14121 and EN 60204-1.

They have magnetic sensing which provides a wide (>12mm) sensing distance and provides a high tolerance to misalignment after sensing.

They can operate from 4 directions even in extreme environments of temperature and moisture.

They have volt free high power switching capability (either 1A. or 2A. ac/dc) and can be used independently to switch low risk applications, or connect to a Safety Relay to provide higher safety levels.

## Features:

Magnetic High Power Switching up to 230V.ac 2A.

Dual channel safety output 2NC (1NO auxiliary optional)

Wide switching distance up to 12mm

High tolerance to guard misalignment

Enclosure Protected to IP67 or IP69K

Conformance to IEC 947-5-3 PDF-S PDF-D

Choice of miniature, compact, wide or barrel type housings.

Choice of high specification plastic or Stainless Steel 316 (Food Industry Compatible)

High temperature stability up to 80C.(Plastic) and 105C. (Stainless Steel)

Resistance to many organic and inorganic chemicals

Resistant to high temperature hosing and detergent washdown

Volt free contacts – up to 230V.ac 2A. and 24V.dc 2A. (Internally Fused)

## Application:



ABB Jokab Safety Coded Non-Contact switches are designed to interlock hinge, sliding or removal guard doors.

They are specifically advantageous when :

- poor guard alignment exists and a wide tolerance to misalignment is required
- high hygiene is required e.g. food industry hose down
- high switching capacity is required

When used in combination with Dual Channel Safety Relays they can be used to provide up to Ple / Category 4 to ISO 13849-1

## Plastic versions:

The Plastic Sense range has been developed for non-contact guard door interlocking in the applications of general factory automation, packaging and some food processing industries.

Supplied with Screw Cap prevent contamination from deposits.



**Sense 2**

Miniature industry standard design. 22mm fixing centres, available with Left or Right cable exit.



**Sense 4**

Universal 22mm fixing centres.



**Sense 6**

Industry standard wide fitting. Front face actuation for large guards.



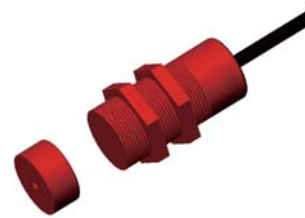
**Sense 8**

European industry standard fitting. End cable exit.



**Sense 10**

Compact slim fitting housing - suitable for fitting to applications where space is limited.



**Sense 12**

M30 threaded body – easy to mount

# Sense Z Magnetic non-contact safety switches



## Stainless Steel 316 versions:

The Stainless Steel 316 Sense Z range has been developed for non-contact guard door interlocking in the application for Food Processing, Pharmaceutical, Packing and Chemical Industries.

### Stainless Steel 316

Can be high pressure hosed at high temperature - IP69K

Designed in accordance with EHEDG guidelines for hygienic design (EHEDG European Hygienic Engineering & Design Group)

Suitable for CIP and SIP cleaning

Wide 12mm sensing high tolerance to misalignment

The housing designs, surface finish and styling means they can be used in almost any environments subject to high levels of cleaning following contamination from foreign particles.

They are offered with various types of mounting styles to cover different levels of food contact (as described by the EHEDG Design Group).

- Direct contact zone - The switch mounting is designed according to EHEDG hygienic guidelines and also fulfils the requirements of the splash zone
- Splash zone - The switch must be easy to clean and withstand the CIP and SIP cleaning processes found in the food industry (tested IP69K).

### Mirror polished finish – Ra4

Can be high pressure hosed at high temperature - IP69K

Designed in accordance with EHEDG guidelines for hygienic design (EHEDG European Hygienic Engineering & Design Group)

Suitable for CIP and SIP cleaning

Can be mounted on steel structures



**Sense 4Z**

Universal 22mm fixing centres - suitable for food splash zones.

**Sense 4Z (Food)**

Universal 22mm fixing centres. Rear fixing - M4 tapped holes at rear of housing. Suitable for food contact zones.

**Sense 6Z**

Industry standard wide fitting - suitable for food splash zones. Front face actuation.

**Sense 8Z**

European industry standard fitting - suitable for food splash zones.



**Sense 10Z**

Compact slim fitting housing - suitable for food splash zones. Can be fitted to applications where space is restricted.



**Sense 10Z (Food)**

Compact slim fitting housing. Rear fixing - M4 tapped holes at rear of housing. Suitable for food contact zones.



**Sense 12Z**

M30 thread - suitable for some food contact zones.

# Sense 2 Magnetic non-contact safety switches

**Magnetic Actuation      Switching Tolerance up to 12mm**

**Will operate with most Safety Relays**

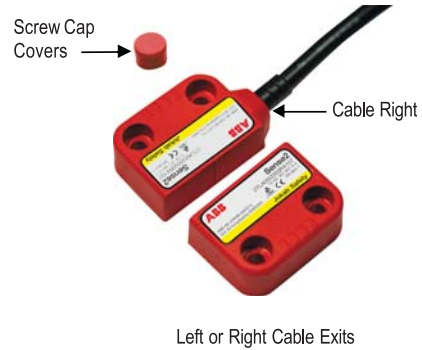
Compact yet robust fitting suitable for all small guard applications.  
 Can be mounted unobtrusively in channels or behind doors – left or right cable exit  
 Hygienic screw cap covers ensure suitability for Food Processing washdown.  
 Cost effective interlock solution.

Wide sensing at 12mm and high tolerance to misalignment.  
 High current switching capability to 0.5A.  
 Up to: PLe ISO 13849 1    SIL 3 EN 62061    Cat.4 EN 954 1  
 2NC 1NO circuits  
 Quick connect versions M12 - 8 way or M8 - 4 way

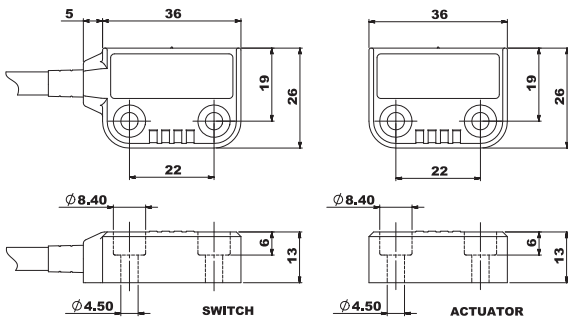


**Specified to 80C.  
 but designed to work up to 100C.**

**Plastic Housing**



Quick Connect M12 versions fitted with 250mm (10") cable



Sense 2	
2TLA050070R4108	Sense 2, 2m cable Rt. 2NC/1NO
2TLA050070R5108	Sense 2, 5m cable Rt. 2NC/1NO
2TLA050070R6108	Sense 2, 10m cable Rt. 2NC/1NO
2TLA050070R2108	Sense 2, QC cable Rt. 2NC/1NO
2TLA050070R4107	Sense 2, 2m cable Lt. 2NC/1NO
2TLA050070R5107	Sense 2, 5m cable Lt. 2NC/1NO
2TLA050070R6107	Sense 2, 10m cable Lt. 2NC/1NO
2TLA050070R2107	Sense 2, QC cable Lt. 2NC/1NO
2TLA050070R3108	Sense 2, M8 QC Rt. 2NC/1NO
2TLA050070R3107	Sense 2, M8 QC Lt. 2NC/1NO
2TLA050040R0217	Sense 2, Spare Actuator

Standards EN1088 IEC 947-5-3 EN 60204-1  
 ISO 13849-1 EN62061 EN 954-1 UL508

**Safety Classification and Reliability Data:**

Mechanical Reliability B10d	3.3 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	2.52 x 10 <sup>-5</sup>
Proof Test Interval (Life)	47 years
MTTFd	470 years
Medium Duty Safety Channel 1 NC	Voltage free : 250V.ac 0.5 A Max. Rating
Safety Channel 2 NC	Voltage free : 250V.ac 0.5 A Max. Rating
Safety Channel 3 NO	Voltage free : 24V.dc 0.2 A Max. Rating
Fuse	Internal 1.0 A. (F) External 0.4 A (F) (User)
Contact release time	<2ms
Initial contact resistance	<500 milliohm
Minimum switched current	10V. dc 1mA
Dielectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance: (Target to target)	Sao 10mm Close Sar 22mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	UL approved polyester
Temperature Range	-25 +80C.
Enclosure Protection	IP69K (NEMA PW12) IP67 (NEMA 6)
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 core 6mm O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any

For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present



# Sense 4 Magnetic non-contact safety switches

## Magnetic Actuation - Power series

Medium Duty versions 230V.ac / 24V.dc 1A.

Switching Tolerance up to 12mm

Universal fitting - established 22mm fixing footprint suitable for most general applications.

Can be high pressure hosed at high temperature - IP69K.

Withstands environments where high humidity or hose down is required.

Durable polyester housing.

Wide 12mm sensing – high tolerance to misalignment.

Long life high switching capability to 1A.

Up to: PLe ISO 13849-1 SIL 3 EN 62061 Cat.4 EN 954-1

2NC 1NO circuits

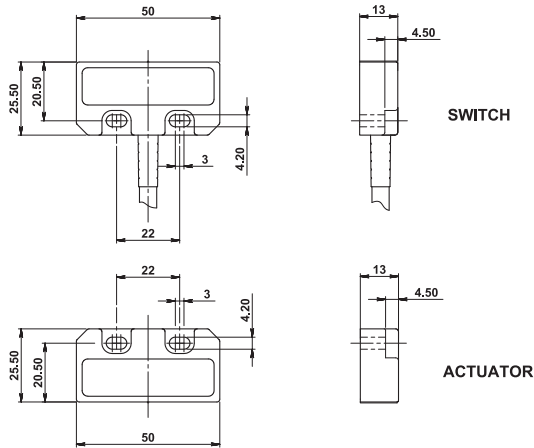
Quick connect versions



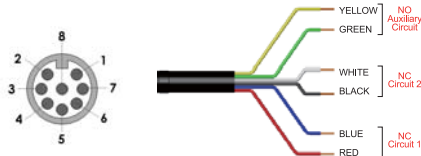
Specified to 80C, but designed to work up to 100C.  
Will operate with most Safety Relays



Quick Connect M12 versions fitted with 250mm (10") cable



Quick Connect (QC) M12 8 Way Male Plug Pin view from switch	Standard Lead Colour	Circuit (Actuator Present)
4	Yellow	NO
6	Green	NO
7	Black	NC2
1	White	NC2
2	Red	NC1
3	Blue	NC1



### Sense 4

2TLA050072R4100	Sense 4, 2m cable, 2NC/1NO
2TLA050072R5100	Sense 4, 5m cable, 2NC/1NO
2TLA050072R6100	Sense 4, 10m cable, 2NC/1NO
2TLA050072R2100	Sense 4, QC cable, 2NC/1NO

Standards EN1088 IEC 947-5-3 EN 60204-1  
ISO 13849-1 EN62061 EN 954-1 UL508

#### Safety Classification and Reliability Data:

Mechanical Reliability B10d	3.3 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	2.52 x 10 <sup>-8</sup>
Proof Test Interval (Life)	47 years
MTTFd	470 years
Safety Channel 1 NC	Voltage free : 250V.ac 1.0 A Max. Rating
Safety Channel 2 NC	Voltage free : 250V.ac 1.0 A Max. Rating
Safety Channel 3 NO	Voltage free : 24V.dc 0.2 A Max. Rating
Fuse	Internal 1.0 A. (F) External 0.8A (F) (User)
Contact release time	<2ms
Initial contact resistance	<500 milliohm
Minimum switched current	10V. dc 1mA
Dielectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance:	Sao 10mm Close
(Target to target)	Sar 22mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	UL approved polyester
Temperature Range	-25 +80C.
Enclosure Protection	IP69K (NEMA PW12) IP67 (NEMA 6)
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	m O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any

For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

# Sense 4Z Magnetic non-contact safety switches

**Magnetic Actuation - Power series 230V.ac 1.0A. / 24V.dc 1.0A. IP69K**



## Switching Tolerance up to 12mm

**Specified to 105C, but designed to work up to 125C.  
Will operate with most Safety Relays**

Specifically designed for Food Processing applications - Stainless Steel 316 Mirror polished finish (Ra4).

## Stainless Steel Housing

Suitable for CIP SIP cleaning - Food Splash Zones EHEDG guidelines

Universal Housing - 22mm fixing hole centre - 50mm wide body

Can be high pressure hosed at high temperature - IP69K

Wide 12mm sensing high tolerance to misalignment

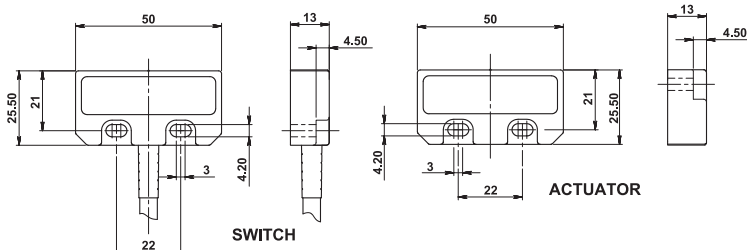
High switching capability - up to 1A.

Up to : PLe ISO 13849-1 SIL 3 EN 62061 Cat. 4 EN 954-1

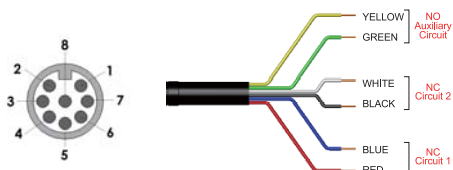
Quick connect versions



Quick Connect M12 versions fitted with 250mm (10") cable



Quick Connect (QC)	Standard Lead Colour	Circuit (Actuator Present)
M12 8 Way Male Plug Pin view from switch		
4	Yellow	NO
6	Green	NO
7	Black	NC2
1	White	NC2
2	Red	NC1
3	Blue	NC1



### Sense 4Z Standard

2TLA050072R4120	Sense 4, SS 2m cable, 2NC/1NO
2TLA050072R5120	Sense 4, SS 5m cable, 2NC/1NO
2TLA050072R6120	Sense 4, SS 10m cable, 2NC/1NO
2TLA050072R2120	Sense 4, SS QC cable, 2NC/1NO

Standards EN1088 IEC 947-5-3 EN 60204-1  
ISO 13849-1 EN62061 EN 954-1 UL508

#### Safety Classification and Reliability Data:

Mechanical Reliability B10d	3.3 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	2.52 x 10 <sup>-8</sup>
Proof Test Interval (Life)	47 years
MTTFd	470 years
Safety Channel 1 NC	Voltage free : 250V.ac 1.0 A Max. Rating
Safety Channel 2 NC	Voltage free : 250V.ac 1.0 A Max. Rating
Safety Channel 3 NO	Voltage free : 24V.dc 0.2 A Max. Rating
Fuse	Internal 1.0 A. (F) External 0.8A (F) (User)
Contact release time	<2ms
Initial contact resistance	<500 milliohm
Minimum switched current	10V. dc 1mA
Dielectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance:	Sao 10mm Close
(Target to target)	Sar 22mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	Stainless Steel 316 Mirror polished finish (Ra4)
Temperature Range	-25 +105C.
Enclosure Protection	IP69K (NEMA PW12) IP67 (NEMA 6)
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 core 6mm O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any

For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

# Sense 4Z Magnetic non-contact safety switches

**Magnetic Actuation - Power series**

**Medium Duty 230V.ac 1.0A. / 24V.dc 1.0A.**



**Switching Tolerance up to 12mm**

**IP69K**

**Specified to 105C, but designed to work up to 125C.  
Will operate with most Safety Relays**

**Temperatures up to 105C.**

Specifically designed for Food Processing applications - Stainless Steel 316 Mirror polished finish (Ra4).

Suitable for CIP SIP cleaning - mounting holes are at the rear - no food traps

Suitable for Food Contact Zones - EHEDG guidelines

Universal Housing - 22mm fixing hole centre - 50mm wide body

Can be high pressure hosed at high temperature - IP69K

Wide 12mm sensing high tolerance to misalignment

High switching capability - up to 1A.

Up to : PLe ISO 13849-1 SIL 3 EN 62061 Cat. 4 EN 954-1

2NC + 1NC circuits

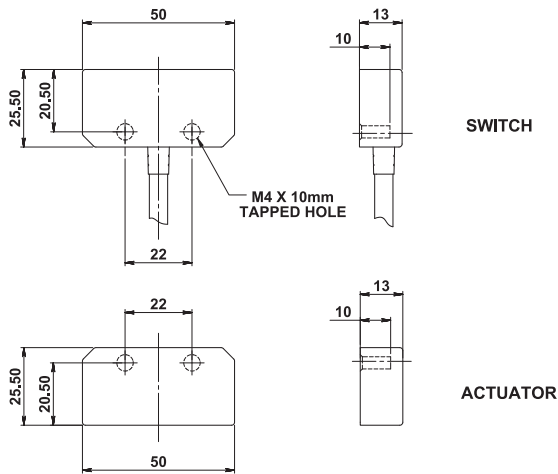
Quick connect versions

**No Food Trap Housing -  
Rear Mounting Holes**

Quick Connect M12  
versions fitted with  
250mm (10") cable



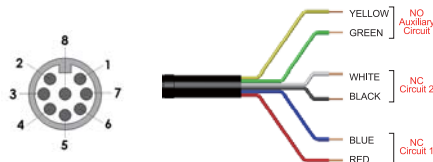
**Stainless Steel Housing**



Sense 4Z (Food industry)	
2TLA050072R4150	Sense 4, SS 2m cable, 2NC/1NO
2TLA050072R5150	Sense 4, SS 5m cable, 2NC/1NO
2TLA050072R6150	Sense 4, SS 10m cable, 2NC/1NO
2TLA050072R2150	Sense 4, SS QC cable, 2NC/1NO

Quick Connect (QC)	Standard Lead Colour	Circuit (Actuator Present)
M12 8 Way Male Plug Pin view from switch		
4	Yellow	NO
6	Green	NO
7	Black	NC2
1	White	NC2
2	Red	NC1
3	Blue	NC1

Standards	EN1088 IEC 947-5-3 EN 60204-1 ISO 13849-1 EN62061 EN 954-1 UL508
Safety Classification and Reliability Data:	
Mechanical Reliability B10d	3.3 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	2.52 x 10 <sup>-6</sup>
Proof Test Interval (Life)	47 years
MTTFd	470 years
Safety Channel 1 NC	Voltage free : 250V.ac 1.0 A Max. Rating
Safety Channel 2 NC	Voltage free : 250V.ac 1.0 A Max. Rating
Safety Channel 3 NO	Voltage free : 24V.dc 0.2 A Max. Rating
Fuse	Internal 1.0 A. (F) External 0.8A (F) (User)
Contact release time	<2ms
Initial contact resistance	<500 milliohm
Minimum switched current	10V, dc 1mA
Dielectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance:	Sao 10mm Close
(Target to target)	Sar 22mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	Stainless Steel 316 Mirror polished finish (Ra4)
Temperature Range	-25 +105C.
Enclosure Protection	IP69K (NEMA PW12) IP67 (NEMA 6)
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz, 1mm
Cable Type	PVC 6 core 6mm O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any



For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

# Sense 6 Magnetic non-contact safety switches

## Magnetic Actuation - Power series

Heavy Duty 230V.ac / 24V.dc 2.0A.

Switching Tolerance up to 12mm

Robust wide fitting suitable for all industry applications.

Can be high pressure hosed at high temperature - **IP69K**

Wide 12mm sensing high tolerance to misalignment.

High switching capability - Heavy Duty 2A.

Up to: PLe ISO 13849-1 SIL 3 EN 62061 Cat. 4 EN 954-1

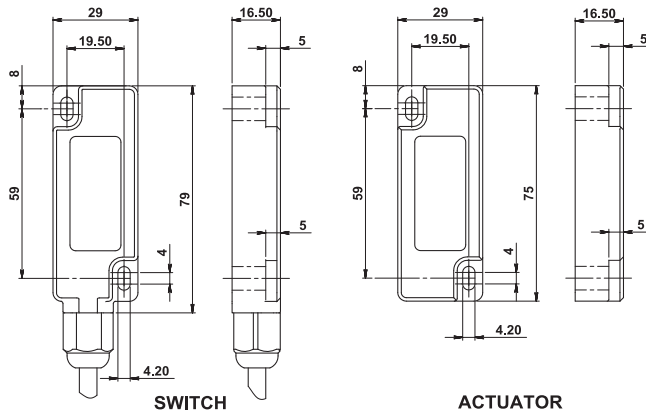


Specified to 80C, but designed to work up to 100C.

Will operate with most Safety Relays

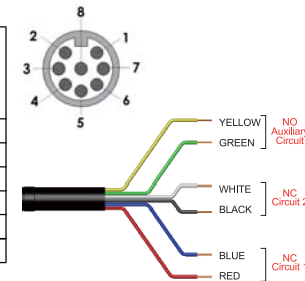


Quick Connect M12 versions fitted with 250mm (10") cable



Quick Connect (QC)	Standard Lead Colour	Circuit (Actuator Present)
M12 8 Way Male Plug Pin view from switch		
4	Yellow	NO
6	Green	NO
7	Black	NC2
1	White	NC2
2	Red	NC1
3	Blue	NC1

ACTUATOR



### Sense 6

2TLA050074R4100	Sense 6, 2m cable, 2NC/1NO
2TLA050074R5100	Sense 6, 5m cable, 2NC/1NO
2TLA050074R6100	Sense 6, 10m cable, 2NC/1NO
2TLA050074R2100	Sense 6, QC cable, 2NC/1NO

Standards	EN1088 IEC 947-5-3 EN 60204-1 ISO 13849-1 EN62061 EN 954-1 UL508
Safety Classification and Reliability Data:	
Mechanical Reliability B10d	3.3 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay
EN 954-1	up to PLe depending upon system architecture
ISO 13849-1	up to SIL3 depending upon system architecture
EN 62061	
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	2.52 x 10 <sup>-9</sup>
Proof Test Interval (Life)	47 years
MTTFd	470 years
Heavy Duty Safety Channel 1 NC	Voltage free : 250V.ac 2.0 A Max. Rating
Safety Channel 2 NC	Voltage free : 250V.ac 2.0 A Max. Rating
Safety Channel 3 NO	Voltage free : 24V.dc 0.2 A Max. Rating
Heavy Duty Fuse	Internal 2.0 A. (F) External 1.6 A.(F) (User)
Contact release time	<2ms
Initial contact resistance	<500 milliohm
Minimum switched current	10V. dc 1mA
Dielectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance:	Sao 10mm Close
(Target to target)	Sar 22mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	UL approved polyester
Temperature Range	-25 +80C.
Enclosure Protection	IP69K (NEMA PW12) IP67 (NEMA 6)
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 core 6mm O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any

For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

# Sense 6Z Magnetic non-contact safety switches

## Magnetic Actuation - Power series

Heavy Duty 230V.ac / 24V.dc 2.0A.

Switching Tolerance up to 12mm IP69K

Specially designed for Food Processing applications- Stainless Steel 316 Mirror polished finish (Ra4).

Suitable for CIP SIP cleaning - Food splash Zones EHEDG guidelines

Industry standard fixings - can be high pressure hosed at high temperature - IP69K

Wide 12mm sensing high tolerance to misalignment

High switching capability - Heavy Duty 2A.

Up to : PLe ISO 13849-1 SIL 3 EN 62061 Cat. 4 EN 954-1

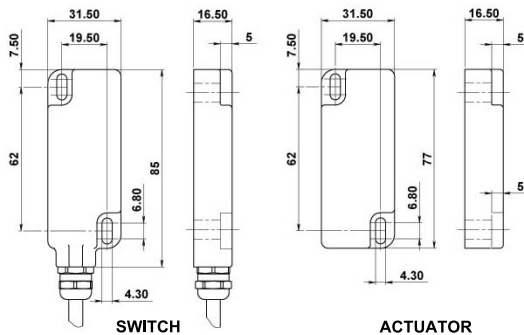


**Specified to 105C, but designed to work up to 125C.**  
**Will operate with most Safety Relays**

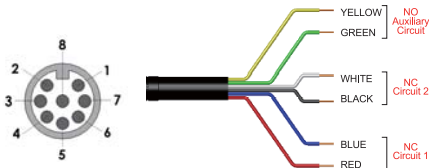
### Stainless Steel Housing



Quick Connect M12 versions fitted with 250mm (10") cable



Quick Connect (QC)	Standard Lead Colour	Circuit (Actuator Present)
M12 8 Way Male Plug Pin view from switch		
4	Yellow	NO
6	Green	NO
7	Black	NC2
1	White	NC2
2	Red	NC1
3	Blue	NC1



### Sense 6Z

2TLA050074R4120	Sense 6, SS 2m cable, 2NC/1NO
2TLA050074R5120	Sense 6, SS 5m cable, 2NC/1NO
2TLA050074R6120	Sense 6, SS 10m cable, 2NC/1NO
2TLA050074R2120	Sense 6, SS QC cable, 2NC/1NO

Standards EN1088 IEC 947-5-3 EN 60204-1  
 ISO 13849-1 EN62061 EN 954-1 UL508

#### Safety Classification and Reliability Data:

Mechanical Reliability B10d	3.3 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	2.52 x 10 <sup>-8</sup>
Proof Test Interval (Life)	47 years
MTTFd	470 years
Heavy Duty Safety Channel 1 NC	Voltage free : 250V.ac 2.0 A Max. Rating
Safety Channel 2 NC	Voltage free : 250V.ac 2.0 A Max. Rating
Safety Channel 3 NO	Voltage free : 24V.dc 0.2 A Max. Rating
Heavy Duty Fuse	Internal 2.0 A. (F) External 1.6 A.(F) (User)
Contact release time	<2ms
Initial contact resistance	<500 milliohm
Minimum switched current	10V. dc 1mA
Delectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance:	Sao 10mm Close
(Target to target)	Sar 22mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	Stainless Steel 316 Mirror polished finish (Ra4).
Temperature Range	-25 +05C.
Enclosure Protection	IP69K (NEMA PW12) IP67 (NEMA 6)
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 core 6mm O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any

For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

# Sense 8 Magnetic non-contact safety switches

## Magnetic Actuation - Power series

### Switching Tolerance up to 12mm

### Medium Duty versions 230V.ac / 24V.dc 1A.

Popular European fitting suitable for all industry applications.

Wide 12mm sensing – high tolerance to misalignment

Narrow fitting for flush mounting

Long Life High Power switching capability up to 1A.

Up to: PLe ISO 13849-1 SIL 3 EN 62061 Cat.4 EN 954-1

2NC + 1NO circuits

Quick connect versions



**Specified to 80C, but designed to work up to 100C.  
Will operate with most Safety Relays**

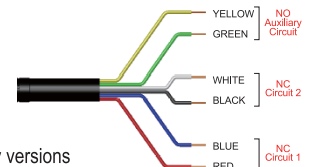
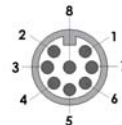


Quick Connect M12 versions fitted with 250mm (10") cable

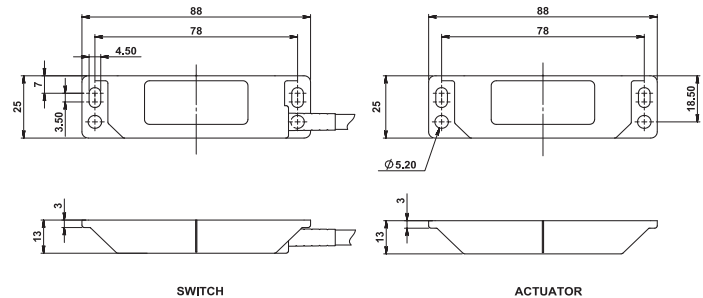
Sense 8	
2TLA050076R4100	Sense 8, 2m cable, 2NC/1NO
2TLA050076R5100	Sense 8, 5m cable, 2NC/1NO
2TLA050076R6100	Sense 8, 10m cable, 2NC/1NO
2TLA050076R2100	Sense 8, QC cable, 2NC/1NO

Standards	EN1088 IEC 947-5-3 EN 60204-1 ISO 13849-1 EN62061 EN 954-1 UL508
Safety Classification and Reliability Data:	
Mechanical Reliability B10d	3.3 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	2.52 x 10 <sup>-8</sup>
Proof Test Interval (Life)	47 years
MTTFd	470 years
Medium Duty Safety Channel 1 NC	Voltage free : 250V.ac 1.0 A Max. Rating
Safety Channel 2 NC	Voltage free : 250V.ac 1.0 A Max. Rating
Safety Channel 3 NO	Voltage free : 24V.dc 0.2 A Max. Rating
Fuse	Internal 1.0 A. (F) External 0.8A (F) (User)
Contact release time	<2ms
Initial contact resistance	<500 milliohm
Minimum switched current	10V. dc 1mA
Dielectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance:	Sao 10mm Close
(Target to target)	Sar 22mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	UL approved polyester
Temperature Range	-25 +80C.
Enclosure Protection	IP69K (NEMA PW12) IP67 (NEMA 6)
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 core 6mm O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any

Quick Connect (QC)	Standard Lead Colour	Circuit (Actuator Present)
M12 8 Way Male Plug Pin view from switch		
4	Yellow	NO
6	Green	NO
7	Black	NC2
1	White	NC2
2	Red	NC1
3	Blue	NC1



Standard M12 8 Way versions  
Pin View from Switch



For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

# Sense 8Z Magnetic non-contact safety switches

## Magnetic Actuation - Power series



Medium Duty versions 230V.ac / 24V.dc 1A.

Specified to 105C, but designed to work up to 125C.  
Will operate with most Safety Relays

## Switching Tolerance up to 12mm

Specially designed for Food Processing applications - Stainless Steel 316 Mirror polished finish (Ra4).

Suitable for CIP SIP cleaning - Food splash Zones EHEDG guidelines - IP69K

Popular European fitting suitable for all industry applications.

Wide 12mm sensing - high tolerance to misalignment

Narrow fitting for flush mounting and high temperature hosing

Long Life High Power switching capability up to 1A.

Up to : PLe ISO 13849-1 SIL 3 EN 62061 Cat. 4 EN 954-1

2NC + 1NC circuits

Quick connect versions

## Stainless Steel Housing



Quick Connect M12 versions fitted with 250mm (10") cable

### Sense 8Z

2TLA050076R4120	Sense 8, SS 2m cable, 2NC/1NO
2TLA050076R5120	Sense 8, SS 5m cable, 2NC/1NO
2TLA050076R6120	Sense 8, SS 10m cable, 2NC/1NO
2TLA050076R2120	Sense 8, SS QC cable, 2NC/1NO

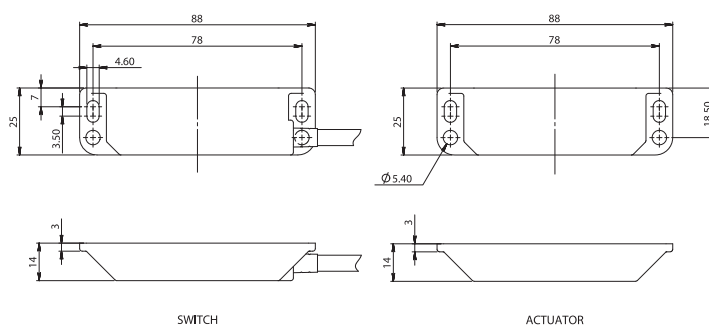
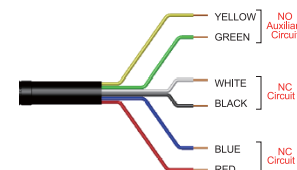
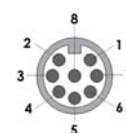
Standards EN1088 IEC 947-5-3 EN 60204-1  
ISO 13849-1 EN62061 EN 954-1 UL508

#### Safety Classification and Reliability Data:

Mechanical Reliability B10d	3.3 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay
EN 954-1	up to PLe depending upon system architecture
ISO 13849-1	up to SIL3 depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	2.52 x 10 <sup>-6</sup>
Proof Test Interval (Life)	47 years
MTTFd	470 years
Medium Duty Safety Channel 1 NC	Voltage free : 250V.ac 1.0 A Max. Rating
Safety Channel 2 NC	Voltage free : 250V.ac 1.0 A Max. Rating
Safety Channel 3 NO	Voltage free : 24V.dc 0.2 A Max. Rating
Medium Duty Fuse	Internal 1.0 A. (F) External 0.8A (F) (User)
Contact release time	<2ms
Initial contact resistance	<500 milliohm
Minimum switched current	10V. dc 1mA
Dielectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance:	Sao 10mm Close
(Target to target)	Sar 22mm Open
Tolerance to misalignment	5mm in any direction from 5mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	Stainless Steel 316 Mirror polished finish (Ra4).
Temperature Range	-25 +105C.
Enclosure Protection	IP69K (NEMA PW12) IP67 (NEMA 6)
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 core 6mm O.D.
Mounting Bolts	2 x M4 Tightening torque 1.0 Nm
Mounting Position	Any

For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

Quick Connect (QC)	Standard Lead Colour	Circuit (Actuator Present)
M12 8 Way Male Plug		
Pin view from switch		
4	Yellow	NO
6	Green	NO
7	Black	NC2
1	White	NC2
2	Red	NC1
3	Blue	NC1



# Sense 10 Magnetic non-contact safety switches

## Magnetic Actuation – Power series

### Switching Tolerance up to 12mm

Can be high pressure hosed at high temperature - **IP69K**

Slim fitting suitable for all industry applications.

Easy to install within narrow frame structures.

Operates from 2 sides for ease of application.

Wide 12mm sensing high tolerance to misalignment.

High switching capability - Medium Duty 1A.

Up to: PLe ISO 13849-1 SIL 3 EN 62061 Cat.4 EN 954-1

2NC + 1NO circuits

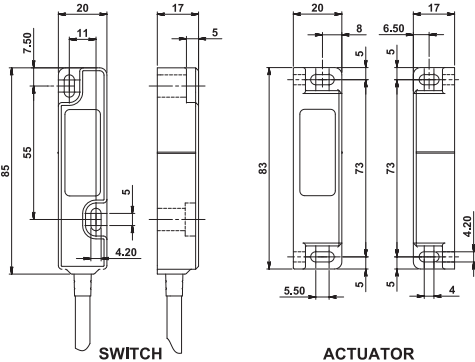
Quick connect versions



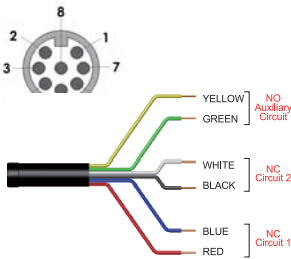
**Specified to 80C, but designed to work up to 100C.**  
**Will operate with most Safety Relays**



Quick Connect M12 versions fitted with 250mm (10") cable



Quick Connect (QC)	Standard Lead Colour	Circuit (Actuator Present)
M12 8 Way Male Plug Pin view from switch		
4	Yellow	NO
6	Green	NO
7	Black	NC2
1	White	NC2
2	Red	NC1
3	Blue	NC1



<b>Standards</b>	EN1088 IEC 947-5-3 EN 60204-1 ISO 13849-1 EN62061 EN 954-1 UL508
<b>Safety Classification and Reliability Data:</b>	
Mechanical Reliability B10d	3.3 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
<b>Safety Data - Annual Usage</b>	8 cycles per hour / 24 hours per day / 365 days
PFHd	2.52 x 10 <sup>-8</sup>
<b>Proof Test Interval (Life)</b>	47 years
MTTFd	470 years
<b>Medium Duty Safety Channel 1 NC</b>	Voltage free : 250V.ac 1.0 A Max. Rating
<b>Safety Channel 2 NC</b>	Voltage free : 250V.ac 1.0 A Max. Rating
<b>Safety Channel 3 NO</b>	Voltage free : 24V.dc 0.2 A Max. Rating
<b>Fuse</b>	Internal 1.0 A. (F) External 0.8A (F) (User)
<b>Contact release time</b>	<2ms
<b>Initial contact resistance</b>	<500 milliohm
<b>Minimum switched current</b>	10V. dc 1mA
<b>Dielectric withstand</b>	250V.ac
<b>Insulation Resistance</b>	100 Mohms
<b>Recommended setting gap</b>	5mm
<b>Switching Distance:</b>	Sao 10mm Close
(Target to target)	Sar 22mm Open
<b>Tolerance to misalignment</b>	5mm in any direction from 5mm setting gap
<b>Switching frequency</b>	1.0 Hz maximum
<b>Approach speed</b>	200mm/m. to 1000mm/s.
<b>Body Material</b>	UL approved Polyester
<b>Temperature Range</b>	-25 +80C.
<b>Enclosure Protection</b>	IP69K (NEMA PW12) IP67 (NEMA 6)
<b>Shock Resistance</b>	IEC 68-2-27 11ms 30g
<b>Vibration Resistance</b>	IEC 68-2-6 10-55 Hz. 1mm
<b>Cable Type</b>	PVC 6 core 6mm O.D.
<b>Mounting Bolts</b>	2 x M4 Tightening torque 1.0 Nm
<b>Mounting Position</b>	Any

For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

Sense 10	
2TLA050078R4100	Sense 10, 2m cable, 2NC/1NO
2TLA050078R5100	Sense 10, 5m cable, 2NC/1NO
2TLA050078R6100	Sense 10, 10m cable, 2NC/1NO
2TLA050078R2100	Sense 10, QC cable, 2NC/1NO



# Sense 10Z Magnetic non-contact safety switches

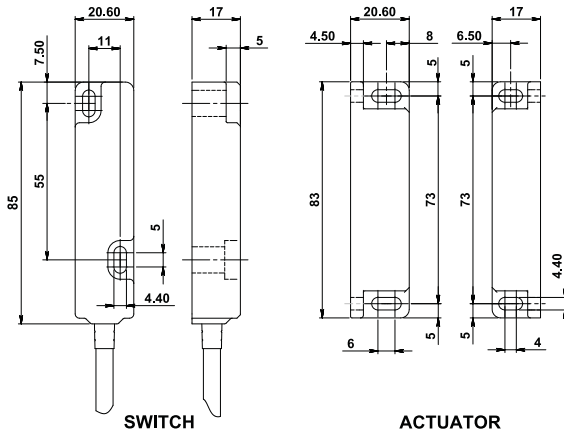
**Magnetic Actuation - Power series      Switching Tolerance up to 12mm**



**Specified to 105C, but designed to work up to 125C.  
Will operate with most Safety Relays**

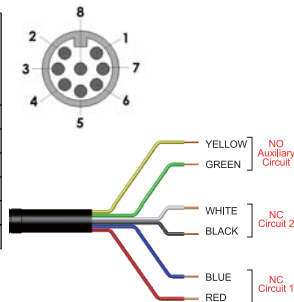
Specifically designed for Food Processing applications - Stainless Steel 316 Mirror polished finish (Ra4).  
Suitable for CIP SIP cleaning - Food Splash Zones EHEDG guidelines  
Slim 20mm wide housing - can be fitted into narrow channels  
Wide 12mm sensing high tolerance to misalignment  
High switching capability - up to 1A.  
Up to: PLe ISO 13849-1    SIL 3 EN 62061    Cat.4    EN954-1

## Stainless Steel Housing



Quick Connect M12 versions fitted with 250mm (10") cable

Quick Connect (QC)	Standard Lead Colour	Circuit (Actuator Present)
M12 8 Way Male Plug Pin view from switch		
4	Yellow	NO
6	Green	NO
7	Black	NC2
1	White	NC2
2	Red	NC1
3	Blue	NC1



Sense 10Z Standard	
2TLA050078R4120	Sense 10, SS 2m cable, 2NC/1NO
2TLA050078R5120	Sense 10, SS 5m cable, 2NC/1NO
2TLA050078R6120	Sense 10, SS 10m cable, 2NC/1NO
2TLA050078R2120	Sense 10, SS QC cable, 2NC/1NO

**Standards** EN1088 IEC 947-5-3 EN 60204-1  
ISO 13849-1 EN62061 EN 954-1 UL508

**Safety Classification and Reliability Data:**

**Mechanical Reliability B10d** 3.3 x 10<sup>6</sup> operations at 100mA load  
EN 954-1 up to Category 4 with Safety Relay  
ISO 13849-1 up to PLe depending upon system architecture  
EN 62061 up to SIL3 depending upon system architecture

**Safety Data - Annual Usage** 8 cycles per hour / 24 hours per day / 365 days  
PFHd 2.52 x 10<sup>-8</sup>

**Proof Test Interval (Life)** 47 years  
MTTFd 470 years

**Medium Duty Safety Channel 1 NC** Voltage free : 250V.ac 1.0 A Max. Rating  
**Safety Channel 2 NC** Voltage free : 250V.ac 1.0 A Max. Rating  
**Safety Channel 3 NO** Voltage free : 24V.dc 0.2 A Max. Rating  
Fuse Internal 1.0 A, (F) External 0.8A (F) (User)

**Contact release time** <2ms  
**Initial contact resistance** <500 milliohm  
**Minimum switched current** 10V. dc 1mA  
**Dielectric withstand** 250V.ac  
**Insulation Resistance** 100 Mohms  
**Recommended setting gap** 5mm  
**Switching Distance:**  
Sao 10mm Close  
Sar 22mm Open  
**Tolerance to misalignment** 5mm in any direction from 5mm setting gap  
**Switching frequency** 1.0 Hz maximum  
**Approach speed** 200mm/m. to 1000mm/s.  
**Body Material** Stainless Steel 316 Mirror polished finish (Ra4)  
**Temperature Range** -25 +105C.  
**Enclosure Protection** IP69K (NEMA PW12) IP67 (NEMA 6)  
**Shock Resistance** IEC 68-2-27 11ms 30g  
**Vibration Resistance** IEC 68-2-6 10-55 Hz. 1mm  
**Cable Type** PVC 6 core 6mm O.D.  
**Mounting Bolts** 2 x M4 Tightening torque 1.0 Nm  
**Mounting Position** Any

For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

# Sense 10Z Magnetic non-contact safety switches

**Magnetic Actuation - Power series**

**No Food Trap Housing Rear Mounting Holes**



**Switching Tolerance up to 12mm**

**IP69K**

**Specified to 105C, but designed to work up to 125C.  
Will operate with most Safety Relays**

Specially designed for Food Processing applications- Stainless Steel 316 Mirror polished finish (Ra4).

Suitable for CIP SIP cleaning - mounting holes are at the rear - no food traps

Suitable for Food Contact Zones - EHEDG guidelines

Industry standard fixings - can be high pressure hosed at high temperature

Wide 12mm sensing high tolerance to misalignment

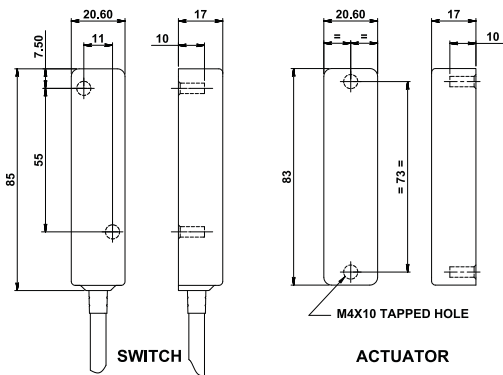
High switching capability - up to 1A.

Up to : PLe ISO 13849-1 SIL 3 EN 62061 Cat. 4 EN 954-1

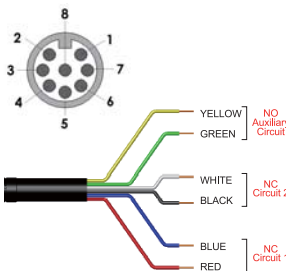
## Stainless Steel Housing



Quick Connect M12 versions fitted with 250mm (10") cable



Quick Connect (QC)	Standard Lead Colour	Circuit (Actuator Present)
M12 8 Way Male Plug Pin view from switch		
4	Yellow	NO
6	Green	NO
7	Black	NC2
1	White	NC2
2	Red	NC1
3	Blue	NC1



- Standards EN1088 IEC 947-5-3 EN 60204-1  
ISO 13849-1 EN62061 EN 954-1 UL508
- Safety Classification and Reliability Data:
- Mechanical Reliability B10d 3.3 x 10<sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay
  - EN 954-1 up to PLe depending upon system architecture
  - ISO 13849-1 up to SIL3 depending upon system architecture
  - EN 62061 8 cycles per hour / 24 hours per day / 365 days
  - Safety Data - Annual Usage PFHd 2.52 x 10<sup>-8</sup>
  - Proof Test Interval (Life) 47 years
  - MTTFd 470 years
- Medium Duty Safety Channel 1 NC Voltage free : 250V.ac 1.0 A Max. Rating
- Safety Channel 2 NC Voltage free : 250V.ac 1.0 A Max. Rating
- Safety Channel 3 NO Voltage free : 24V.dc 0.2 A Max. Rating
- Fuse Internal 1.0 A. (F) External 0.8A (F) (User)
- Contact release time <2ms
- Initial contact resistance <500 milliohm
- Minimum switched current 10V. dc 1mA
- Dielectric withstand 250V.ac
- Insulation Resistance 100 Mohms
- Recommended setting gap 5mm
- Switching Distance: Sao 10mm Close Sar 22mm Open (Target to target)
- Tolerance to misalignment 5mm in any direction from 5mm setting gap
- Switching frequency 1.0 Hz maximum
- Approach speed 200mm/m. to 1000mm/s.
- Body Material Stainless Steel 316 Mirror polished finish (Ra4)
- Temperature Range -25 +105C.
- Enclosure Protection IP69K (NEMA PW12) IP67 (NEMA 6)
- Shock Resistance IEC 68-2-27 11ms 30g
- Vibration Resistance IEC 68-2-6 10-55 Hz. 1mm
- Cable Type PVC 6 core 6mm O.D.
- Mounting Bolts 2 x M4 Tightening torque 1.0 Nm
- Mounting Position Any

### Sense 10Z Food Industry

2TLA050078R4150	Sense 10, SS 2m cable, 2NC/1NO
2TLA050078R5150	Sense 10, SS 5m cable, 2NC/1NO
2TLA050078R6150	Sense 10, SS 10m cable, 2NC/1NO
2TLA050078R2150	Sense 10, SS QC cable, 2NC/1NO

For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

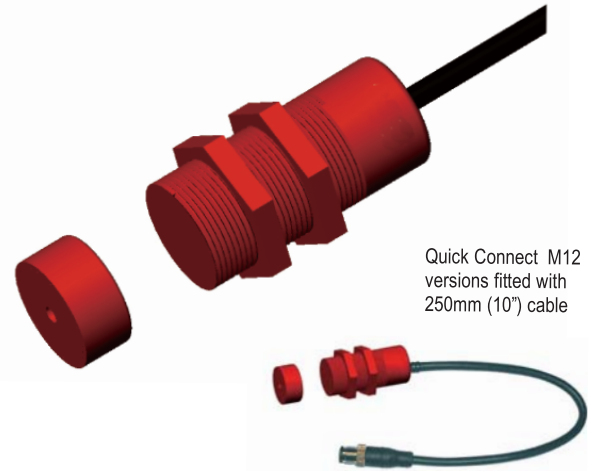
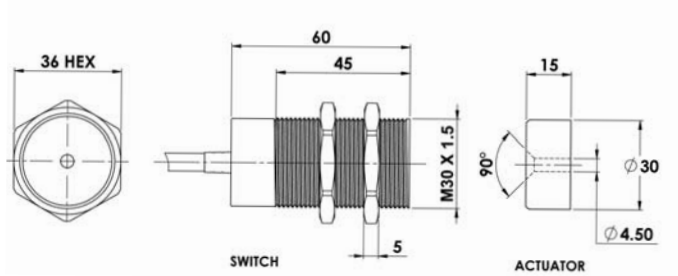
# Sense 12 Magnetic non-contact safety switches

## Magnetic Actuation Switching Tolerance up to 10mm



- Cylindrical fitting suitable for all industry applications.
- Easy to install - M30 threaded body - easy to set
- Wide 10mm sensing
- Suitable for the harsh environments of Food processing and packaging
- Red Polyester housing
- UP to: PLe ISO 13849-1 SIL3 EN 62061 Cat. 4 EN 954-1
- 2NC 1NO circuits
- Quick connect versions.

Will operate with most Safety Relays

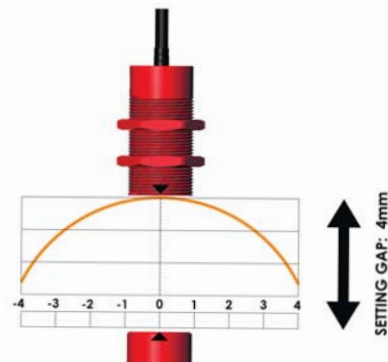
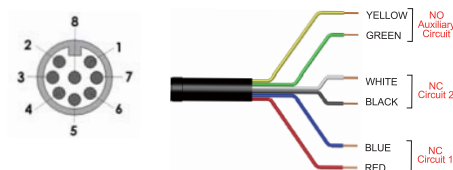


Quick Connect M12 versions fitted with 250mm (10") cable

Standards	EN1088 IEC 947-5-3 EN 60204-1 ISO 13849-1 EN62061 EN 954-1 UL508
Safety Classification and Reliability Data:	
Switching Reliability	3.3 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay
EN 954-1	up to PLe depending upon system architecture
ISO 13849-1	up to SIL3 depending upon system architecture
EN 62061	
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	2.52 x 10 <sup>-8</sup>
Proof Test Interval (Life)	47 years
MTTFd	470 years
Safety Channel 1 NC	24V.dc 0.5 A Max. Rating
Safety Channel 2 NC	24V.dc 0.5 A Max. Rating
Safety Channel 3 NO	24V.dc 0.2 A Max. Rating
Minimum switched current	10V. dc 1mA
Dielectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance:	Sao 10mm Close
(Target to target)	Sar 20mm Open
Tolerance to misalignment	4mm in any direction from 4mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	RPR Plastic
Temperature Range	-25 / 80C
Enclosure Protection	IP69K IP67
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 core 6mm O.D.
Mounting Position	Any

Sense 12	
2TLA050080R4100	Sense 12, 2m cable, 2NC/1NO
2TLA050080R5100	Sense 12, 5m cable, 2NC/1NO
2TLA050080R6100	Sense 12, 10m cable, 2NC/1NO
2TLA050080R2100	Sense 12, QC cable, 2NC/1NO

Quick Connect (QC)	Standard Lead Colour	Circuit (Actuator Present)
M12 8 Way Male Plug Pin view from switch		
4	Yellow	NO
6	Green	NO
7	Black	NC2
1	White	NC2
2	Red	NC1
3	Blue	NC1



For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

# Sense 12Z Magnetic non-contact safety switches

## Magnetic Actuation Switching Tolerance up to 10mm



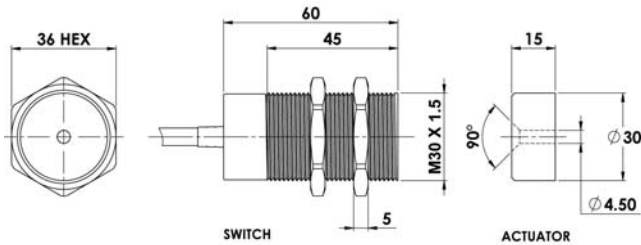
Cylindrical fitting suitable for all industry applications.  
 Easy to install - M30 threaded body - easy to set  
 Wide 10mm sensing  
 Suitable for the harsh environments of Food processing and packaging  
 Stainless Steel 316 housing  
 UP to: PLe ISO 13849-1 SIL3 EN 62061 Cat. 4 EN 954-1  
 2NC 1NO circuits  
 Quick connect versions.

Will operate with most Safety Relays

### S/Steel Housing



Quick Connect M12 versions fitted with 250mm (10") cable

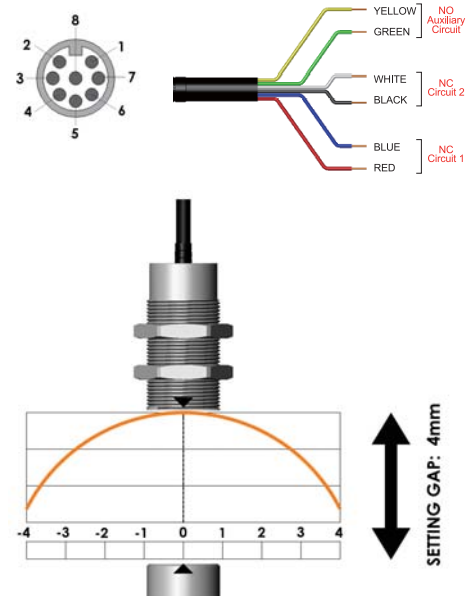


### Sense 12Z

2TLA050080R4120	Sense 12, SS 2m cable, 2NC/1NO
2TLA050080R5120	Sense 12, SS 5m cable, 2NC/1NO
2TLA050080R6120	Sense 12, SS 10m cable, 2NC/1NO
2TLA050080R2120	Sense 12, SS QC cable, 2NC/1NO

Quick Connect (QC)	Standard Lead Colour	Circuit (Actuator Present)
M12 8 Way Male Plug Pin view from switch		
4	Yellow	NO
6	Green	NO
7	Black	NC2
1	White	NC2
2	Red	NC1
3	Blue	NC1

Standards	EN1088 IEC 947-5-3 EN 60204-1 ISO 13849-1 EN62061 EN 954-1 UL508
Safety Classification and Reliability Data:	
Switching Reliability	3.3 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay up to PLe depending upon system architecture up to SIL3 depending upon system architecture
Safety Data - Annual Usage PFHd	8 cycles per hour / 24 hours per day / 365 days 2.52 x 10 <sup>-8</sup>
Proof Test Interval (Life) MTTFd	47 years 470 years
Safety Channel 1 NC	24V.dc 0.5 A Max. Rating
Safety Channel 2 NC	24V.dc 0.5 A Max. Rating
Safety Channel 3 NO	24V.dc 0.2 A Max. Rating
Minimum switched current	10V. dc 1mA
Dielectric withstand	250V.ac
Insulation Resistance	100 Mohms
Recommended setting gap	5mm
Switching Distance: (Target to target)	Sao 10mm Close Sar 20mm Open
Tolerance to misalignment	4mm in any direction from 4mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200mm/m. to 1000mm/s.
Body Material	RMR Stainless Steel 316
Temperature Range	-25 / 105C
Enclosure Protection	IP69K
Shock Resistance	IEC 68-2-27 11ms 30g
Vibration Resistance	IEC 68-2-6 10-55 Hz. 1mm
Cable Type	PVC 6 or 8 core 6mm O.D.
Mounting Position	Any



For all ABB Jokab Safety switches the NC circuits are closed when the guard is closed and the actuator present

# Notes

# Line Strong Series - Grab wire safety rope switches



**Heavy Duty Dual Head**  
Type: Line Strong 3D

Up to  
250m.

**Heavy Duty Dual Head**  
Type: Line Strong 3DZ

Up to  
125m.

**Heavy Duty Dual Head**  
Type: Line Strong 3L - 3R



**General Duty**  
Type: Line Strong 2Z (Stainless Steel)

Up to  
100m.



**General Duty**  
Type: Line Strong 2

Up to  
80m.



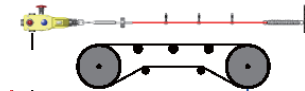
**General Duty**  
Type: Line Strong 1

Up to  
50m.

## Application:

Safety Rope Emergency Stop switches are mounted on machines and sections of plant conveyors which cannot be protected by guards. In contrast to traditional mushroom head type Emergency Stop buttons, Safety Rope Switches can initiate the emergency command from any point along the installed rope length.

In combination with any dual channel safety monitoring controller, ABB Jokab Safety Rope Systems can be used as emergency stop devices and monitored for up to Category 4 / Ple to ISO 13849.



## Operation:

All ABB Jokab Safety Rope Emergency stop switches conform to European Standard ISO 13850 (EN418) and IEC 947-5-5. They have a positive mechanical linkage between the switch contacts and the wire rope as per IEC 947-5-1. The emergency stop switches are brought into the operational condition by pre-tensioning the rope by use of a tensioner / gripper device which clamps the rope and then hooks to the switch eyebolts. Correct tension can be observed by viewing the tension indicator on the switch housing. Once tensioned, the switch contact blocks can be set to the operational condition (safety contacts closed, auxiliary contacts open) by pressing a blue reset button on the switch cover. All of the Safety Rope Switches have wire-breaking monitoring. On pulling or breakage (tension loss) of the rope, the safety contacts are positively opened and the auxiliary contacts are closed. The switches are mechanically latched and can then only be returned to the operational condition by pressing the reset button a required by EN418, (ISO 13850).

## Features:

LED visual indication of Rope status: Steady Green – Machine running  
Steady or Flashing Red – Machine stopped.



Rugged die-cast metal body - Yellow colour

Stainless steel 317 Housings are available (Z versions) - ideal for the food industry

All internal and external screws and fittings are Stainless Steel

Enclosure protected to IP67 - washdown suitable (IP69K on Stainless Steel Versions)

Easy to wire – up to 4 conduit entries

A patented Tensioner / Gripper accessory is available in Stainless Steel to provide rapid installation significantly reducing installation connection to the switch eyebolts and prevents frequent re-tensioning or maintenance caused by cable tension loss, therefore reducing machine down time.



Screw fitting mushroom type E Stop Button



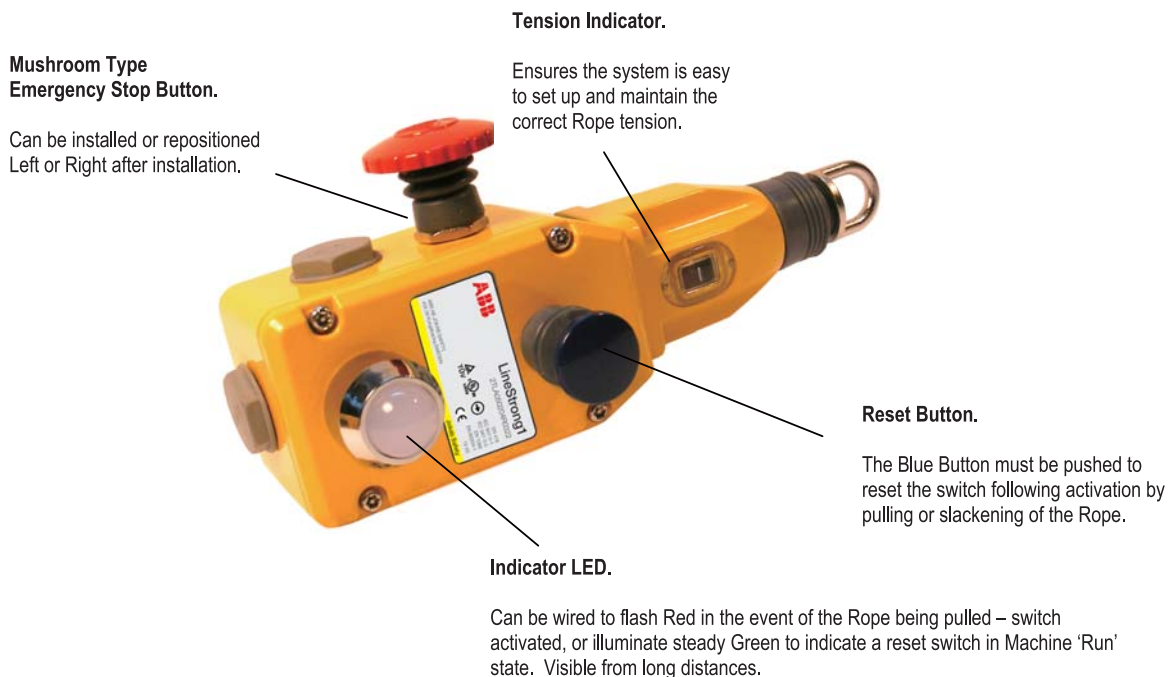
# Using safety rope switches

## Use of Safety Rope Switches.

ABB Jokab Safety Line Strong switches are designed to be mounted on machines and sections of conveyors which cannot be protected by guards. In contrast to traditional mushroom head type Emergency Stop buttons, Safety Rope Switches can initiate the emergency command from any point along the installed rope length and provide robust Emergency Stop Rope Pull protection for exposed conveyors or machines.

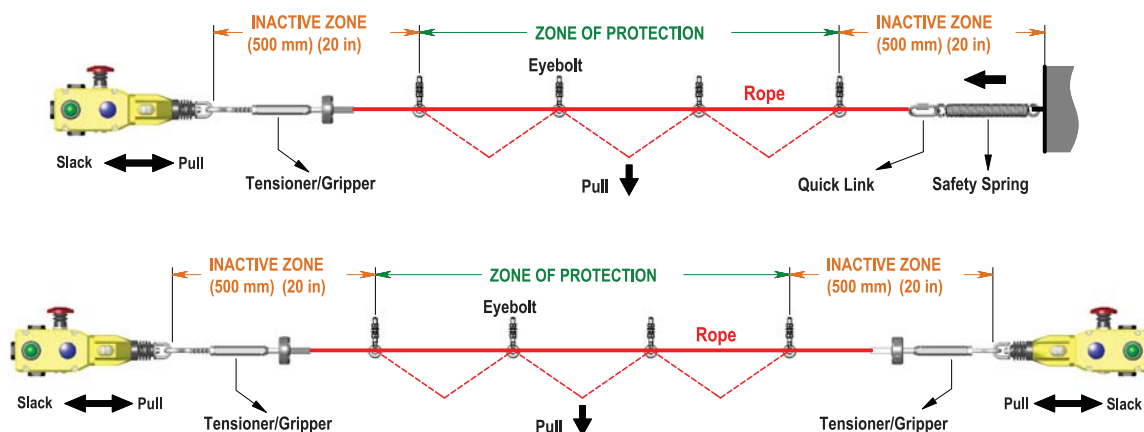
In combination with a dual channel safety monitoring relay, ABB Jokab Safety Rope Systems can be used as emergency stop devices monitored for up to Category 4 to EN 954-1 or PL<sub>e</sub> ISO13849-1. All ABB Jokab Safety Rope Emergency stop switches conform to ISO13850 and IEC 947-5-5. They have a positive mechanical linkage between the switch contacts and the wire rope. The switches have wire-breaking monitoring.

On pulling the rope the safety contacts are positively opened and the auxiliary contacts are closed. The switches are mechanically latched and can then only be returned to the operational condition by a pressing the blue reset button as required by ISO13950. An optional 2 colour LED indicator is available to enable switch status to be viewed from a distance.



## System set up:

Rope support eyebolts must be fitted at 2.5 m. min. to 3m. maximum intervals along all rope lengths between switches. The rope must be supported no more than 500mm from the switch eyebolt or Safety Spring (if used). It is important that this first 500mm is not used as part of the active protection coverage. When using one switch the rope must be anchored at the other end using a Safety Spring. When using a Safety Spring a maximum of one corner pulley only may be used to ensure complete lengths of rope are visible to either the switch or the spring anchorage.

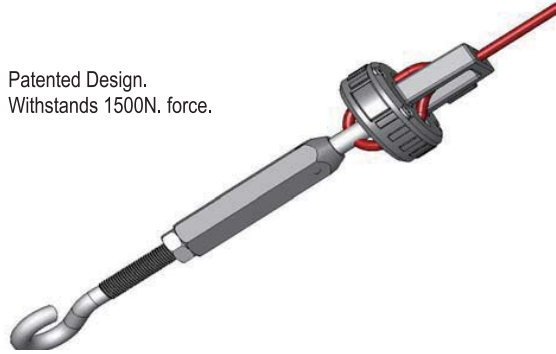


# Using safety rope switches

## Reliable connectivity:

Tensioning of rope is achieved by the use of ABB Jokab Safety's new patented Tensioner / Gripper accessory. Traditional turnbuckle and and clamp systems are difficult to tension and adjust and frequent re-tensioning or maintenance is normally required of either the turnbuckle or the clamps. Viewing of the switch tension window is difficult.

For greater reliability and ease of installation the Tensioner / Gripper accessory significantly reduces the installation time by offering an eyehook and tensioner thimble and high strength gripper in one assembly to enable rapid connection to the switch eyebolts and fast and accurate tensioning of the Rope. By being in close proximity to the switch viewing window systems can be easily tensioned accurately and quickly. The double clamp mechanism prevents rope slippage and significantly reduces machine 'down time' which can occur with traditional turnbuckle systems.

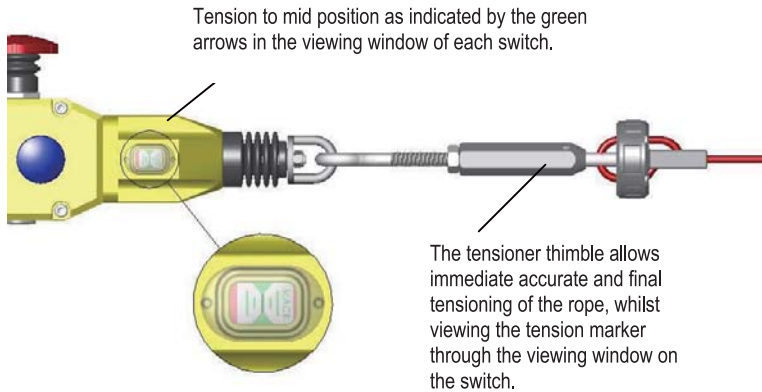


Patented Design.  
Withstands 1500N. force.

The end of the safety rope is fed through a central hole in a cone shaped guide which protrudes from the main housing.

After being fed through the guide hole the rope enters the main housing by going through a feed hole and then is looped back through 180 degrees and is fed through a second feed hole on the opposite side of the mechanism.

The rope is then pulled for maximum tension and is locked in position by a locking bar inside the main housing which is moved by turning an Allen type locking bolt.



Tension to mid position as indicated by the green arrows in the viewing window of each switch.

The tensioner thimble allows immediate accurate and final tensioning of the rope, whilst viewing the tension marker through the viewing window on the switch.



For systems up to 50m. a Quick Link termination is provided for easy connection to either a Safety Spring or Switch eyebolt.

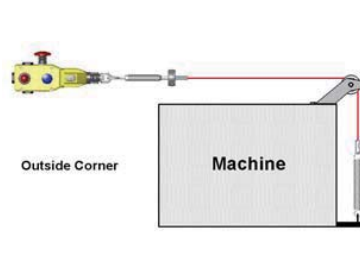
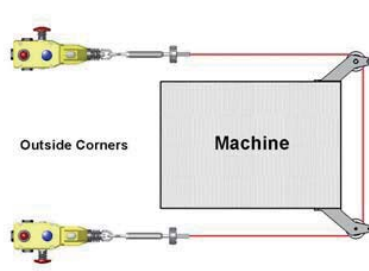
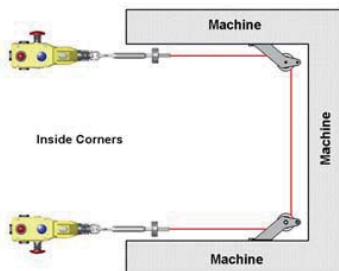


(Note for systems above 50m. a Tensioner / Gripper is required each side).

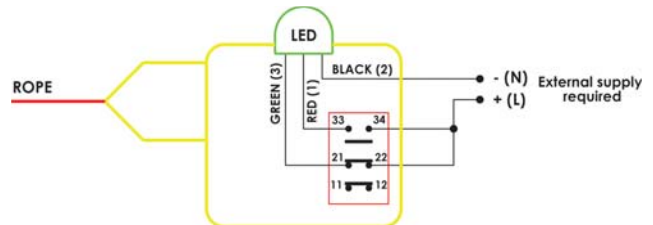
## Navigating Corners:

Because of the added friction on the eyebolts and rope when navigating corners, ABB Jokab Safety's unique "universal" pulley can be used to navigate inside or outside corners without causing damage to the rope. They are stainless steel and can be rigidly mounted.

## Examples of using the Universal Pulley:



## WIRING DIAGRAM FOR LED





# Line Strong 1 Mini-duty switches

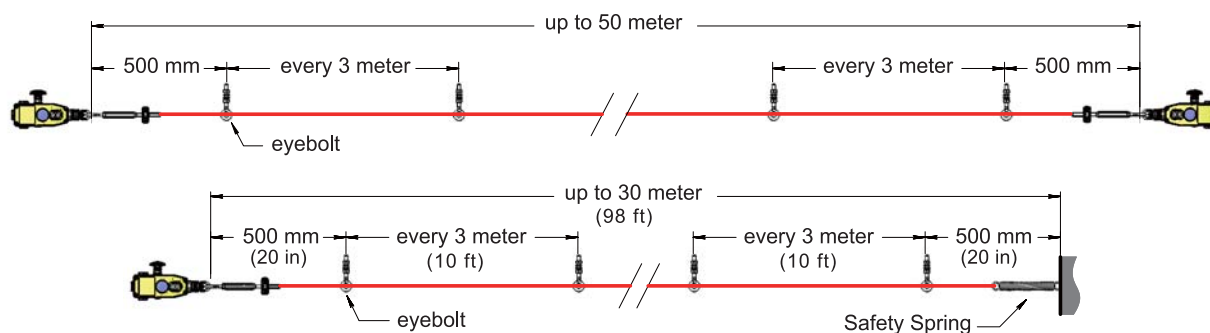
## Protection up to 50 meters



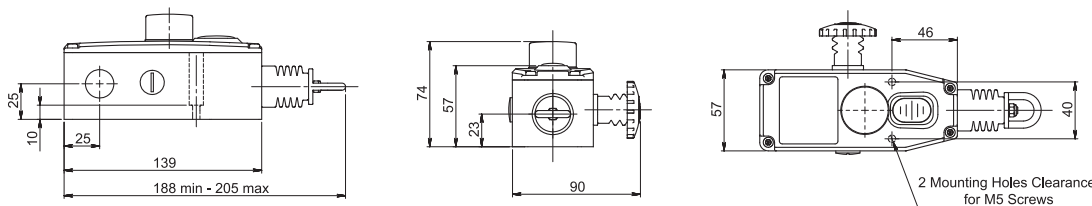
Line Strong 1 is a compact, yet robust die-cast Mini Duty SafetyReop Pull switch designed to protect short conveyor lengths where protection is required up to 50m using two switches or up to 30m using a single switch.

They provide reliable, cost effective safety solutions for conveyor systems and can be enhanced by adding external mushroom Type E Stope at the switch or bi-color LED available to show switch status from a distance.

They have 4 pole contact to ensure flexibility with all modern control applications. Rugged integral sealing bellows means they can be high pressure hosed.



It is recommended when using a Safety Spring that a maximum of one corner pulley is used.



All Dimensions in mm

### Line Strong 1

2TLA050200R0030	LineStrong1, 2NC/2NO, M20
2TLA050200R1030	LineStrong1, 2NC/2NO, NPT
2TLA050200R0130	LineStrong1, 2NC/2NO, M20, ESTOP
2TLA050200R1130	LineStrong1, 2NC/2NO, NPT ESTOP
2TLA050200R0232	LineStrong1, 2NC/2NO, M20 LED 24VDC
2TLA050200R1232	LineStrong1, 2NC/2NO, NPT LED 24VDC
2TLA050200R0233	LineStrong1, 2NC/2NO, M20 LED 110VAC
2TLA050200R1233	LineStrong1, 2NC/2NO, NPT LED 110VAC
2TLA050200R0234	LineStrong1, 2NC/2NO, M20 LED 230VAC
2TLA050200R1234	LineStrong1, 2NC/2NO, NPT LED 230VAC
2TLA050200R0332	LineStrong1, 2NC/2NO, M20 ESTOP/LED 24VDC
2TLA050200R1332	LineStrong1, 2NC/2NO, NPT ESTOP/LED 24VDC
2TLA050200R0333	LineStrong1, 2NC/2NO, M20 ESTOP/LED 110VAC
2TLA050200R1333	LineStrong1, 2NC/2NO, NPT ESTOP/LED 110VAC
2TLA050200R0334	LineStrong1, 2NC/2NO, M20 ESTOP/LED 230VAC
2TLA050200R1334	LineStrong1, 2NC/2NO, NPT ESTOP/LED 230VAC

For all ABB Jokab Safety Rope Switches, the normally closed (NC) circuits are closed when the system is tensioned correctly and the switch has been reset.

Standards: IEC 947-5-1 IEC947-5-5 EN954-1 EN62061  
UL508 ISO13850 ISO13849-1

#### Safety Classification and Reliability Data:

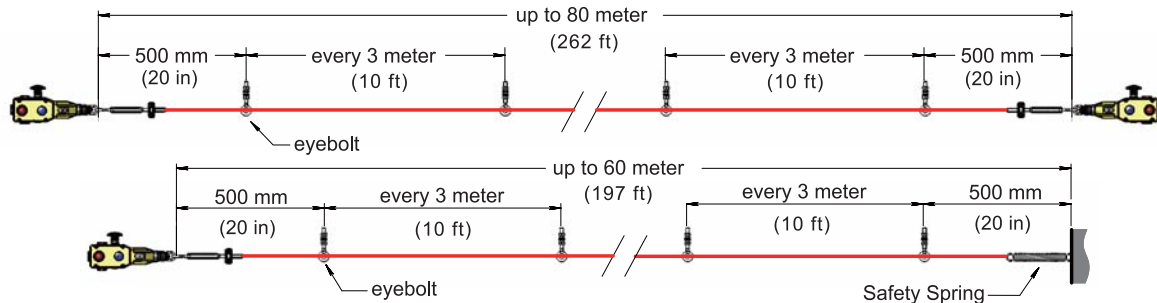
Mechanical Reliability B10d	1.5 x 10 <sup>8</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PfHd	<1.0 x 10 <sup>-7</sup>
Proof Test Interval (Life)	21 years
MTTFd	214 years
Enclosure Material	Die Cast Painted Yellow
IP Rating	IP67 (NEMA 6)
Rope Span	up to 50m.
Rope Tension device	Tensioner / Gripper – Quick Fixing
Rope Type:	4.0 mm Outside Dia. Steel Inner – PVC sheath
Mounting	4 x M5
Mounting position	Any
Conduit entries	3 x M20 or 3 x 1/2" NPT by part number
Torque settings	Mounting M5 4.0 Nm Lid T20 Torx M4 1.5 Nm Terminals 1.0 Nm
Ambient Temperature	-25C +80C.
Vibration resistance	10-500Hz 0.35mm
Shock resistance	15g 11ms
Tension Force (typical mid setting)	130N.
Typical Operating Force (Rope pulled)	< 125N. < 300mm Deflection
Weight	700g.
Contact type	IEC 947-5-1 Double break Type Zb Snap Action up to 2NC (Positive break) 2NO (Auxiliary)
Termination	Clamp up to 2.5 sq. mm conductors
Rating	Utilisation Category: AC15 A300
Operational Rating	240V. 3A.
Thermal Current (Ith)	10A.
Rated Insulation Voltage (Ui)	500V.
Withstand Voltage (Uimp)	2500V.
Short Circuit Overload Protection	Fuse Externally 10A. (FF)

# Line Strong 2 Standard duty switches

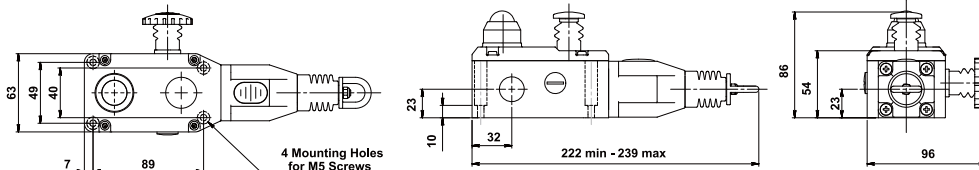
## Protection up to 80 meters

Line Strong 2 is a General Duty robust die-cast Safety Rope Pull switch designed to protect conveyor lengths where protection is required up to 80m using two switches or up to 60m using a single switch. They provide a reliable general purpose safety solution for conveyors and offer a choice of fittings depending upon the application. They can be supplied with a mushroom type emergency Stop button which can be fitted to the side of the switch to offer an extra traditional Emergency Stop function close to the switch or can be fitted later after installation without any extra wiring.

A Bi-color LED is available to show switch status from a distance and they have 4 pole contact blocks to ensure flexibility with all modern control applications. Rugged integral sealing bellows means they can be high pressure hosed and the choice of materials makes them suitable for inside or outside use.



It is recommended when using a Safety Spring that a maximum of one corner pulley is used.



Standards: IEC 947-5-1 IEC947-5-5 EN954-1 EN62061  
UL508 ISO13850 ISO13849-1

### Safety Classification and Reliability Data:

Mechanical Reliability B10d	1.5 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFDd	<1.0 x 10 <sup>-7</sup>
Proof Test Interval (Life)	21 years
MTTFd	214 years
Enclosure / Cover	Die-Cast – Painted Yellow
External Parts	Stainless Steel
IP Rating	IP67 (NEMA 6)
Rope Spans	Up to 80m.
Rope Tension device	Tensioner / Gripper – Quick Fixing
Rope Type:	4.0 mm Outside Dia. Steel inner – PVC sheath
Mounting	4 x M5
Mounting position	Any
Conduit entries	3 x M20 or 3 x ½" NPT by part number
Torque settings	Mounting M5 4.0 Nm Lid T20 Torx M4 1.5 Nm Terminals 1.0 Nm
Ambient Temperature	-25C +80 C.
Vibration resistance	10-500Hz 0.35mm
Shock resistance	15g 11ms
Tension Force (typical mid setting)	130N.
Typical Operating Force (Rope pulled)	< 125N. < 300mm Deflection
Weight	820 g.
Contact type	IEC 947-5-1 Double break Type Zb Snap Action up to 2NC (positive break) 2NO (Auxiliary)
Contact Material	Silver
Termination	Clamp up to 2.5 sq. mm conductors
Rating	Utilisation Category: AC15
Operational Rating	240V. 3A.
Thermal Current (Ith)	10A.
Rated Insulation Voltage (Ui)	500V.
Withstand Voltage (Uimp)	2500V.
Short Circuit Overload Protection	Fuse Externally 10A. (FF)

### Line Strong 2

2TLA050202R0030	LineStrong2, 2NC/2NO, M20
2TLA050202R1030	LineStrong2, 2NC/2NO, NPT
2TLA050202R0232	LineStrong2, 2NC/2NO, M20 LED 24VDC
2TLA050202R1232	LineStrong2, 2NC/2NO, NPT LED 24VDC
2TLA050202R0233	LineStrong2, 2NC/2NO, M20 LED 110VAC
2TLA050202R1233	LineStrong2, 2NC/2NO, NPT LED 110VAC
2TLA050202R0234	LineStrong2, 2NC/2NO, M20 LED 230VAC
2TLA050202R1234	LineStrong2, 2NC/2NO, NPT LED 230VAC
2TLA050202R0130	LineStrong2, 2NC/2NO, M20, ESTOP
2TLA050202R1130	LineStrong2, 2NC/2NO, NPT ESTOP
2TLA050202R0332	LineStrong2, 2NC/2NO, M20 ESTOP/LED 24VDC
2TLA050202R1332	LineStrong2, 2NC/2NO, NPT ESTOP/LED 24VDC
2TLA050202R0333	LineStrong2, 2NC/2NO, M20 ESTOP/LED 110VAC
2TLA050202R1333	LineStrong2, 2NC/2NO, NPT ESTOP/LED 110VAC
2TLA050202R0334	LineStrong2, 2NC/2NO, M20 ESTOP/LED 230VAC
2TLA050202R1334	LineStrong2, 2NC/2NO, NPT ESTOP/LED 230VAC

For all ABB Jokab Safety Rope Switches, the normally closed (NC) circuits are closed when the system is tensioned correctly and the switch has been reset.

# Line Strong 2Z Standard duty switches

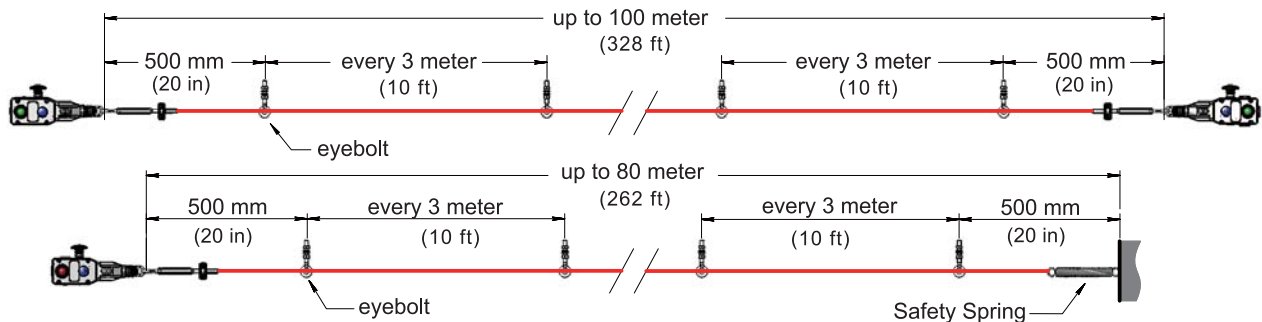
## Protection up to 100 meters



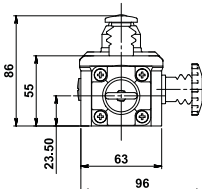
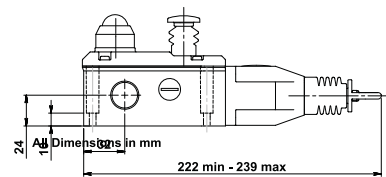
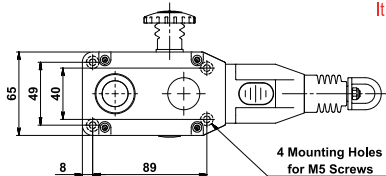
The Line Strong 2Z is a General Duty Safety Rope Pull switch designed to protect long conveyor lengths up to 100m. The Stainless Steel 316 housings are designed specifically to withstand the tough environments found in the Food and Pharmaceutical Industries. The fixing holes are under the cover of the switch to prevent food trap areas. They are all purpose switches and will survive chemical and detergent wash-down by providing all stainless steel parts and robust IP67 and IP69K sealing by using integral bellows and gaskets.

An easily seen bi-color LED is available to show switch status from a distance and they have 4 pole contact blocks to ensure flexibility with all modern control applications. Shorter rope spans up to 80m can be achieved by using just one switch therefore making a cost effective solution and also reducing electrical wiring runs.

Stainless Steel



It is recommended when using a Safety Spring that a maximum of one corner pulley is used.



Standards: IEC 947-5-1 IEC947-5-5 EN954-1 EN62061  
UL508 ISO13850 ISO13849-1

Safety Classification and Reliability Data:

Mechanical Reliability B10d	1.5 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	<1.0 x 10 <sup>-7</sup>
Proof Test Interval (Life)	21 years
MTTFd	214 years
Enclosure / Cover	Stainless Steel 316
External Parts	Stainless Steel
IP Rating	IP69K (NEMA PW12) IP67 (NEMA 6)
Rope Spans	100m
Rope Tension device	Tensioner / Gripper - Quick Fixing
Rope Type:	4.0 mm Outside Dia. Steel inner - PVC sheath
Mounting	4 x M5
Mounting position	Any
Conduit entries	3 x M20 or 3 x 1/2" NPT by part number
Torque settings	Mounting M5 4.0 Nm Lid T20 Torx M4 1.5 Nm Terminals 1.0 Nm
Ambient Temperature	-25C +80 C. (100C. Cleaning)
Vibration resistance	10-500Hz 0.35mm
Shock resistance	15g 11ms
Tension Force (typical mid setting)	130N.
Typical Operating Force (Rope pulled)	< 125N. < 300mm Deflection
Weight	1750 g.
Contact type	IEC 947-5-1 Double break Type Zb Snap Action up to 4NC (positive break) 2NO (Auxiliary)
Contact Material	Silver
Termination	Clamp up to 2.5 sq. mm conductors
Rating	Utilisation Category : AC15 A300
Operational Rating	240V. 3A.
Thermal Current (Ith)	10A.
Rated Insulation Voltage (Ui)	500V.
Withstand Voltage (Uimp)	2500V.
Short Circuit Overload Protection	Fuse Externally 10A. (FF)

### Line Strong 2Z

2TLA050202R0020	LineStrong2Z, 2NC/2NO, M20, SS
2TLA050202R1020	LineStrong2Z, 2NC/2NO, NPT, SS
2TLA050202R0222	LineStrong2Z, 2NC/2NO, M20 LED, SS 24VDC
2TLA050202R1222	LineStrong2Z, 2NC/2NO, NPT LED, SS 24VDC
2TLA050202R0223	LineStrong2Z, 2NC/2NO, M20 LED, SS 110VAC
2TLA050202R1223	LineStrong2Z, 2NC/2NO, NPT LED, SS 110VAC
2TLA050202R0224	LineStrong2Z, 2NC/2NO, M20 LED, SS 230VAC
2TLA050202R1224	LineStrong2Z, 2NC/2NO, NPT LED, SS 230VAC
2TLA050202R0120	LineStrong2Z, 2NC/2NO, M20, ESTOP, SS
2TLA050202R1120	LineStrong2Z, 2NC/2NO, NPT ESTOP, SS
2TLA050202R0322	LineStrong2Z, 2NC/2NO, M20 ESTOP/LED, SS 24VDC
2TLA050202R1322	LineStrong2Z, 2NC/2NO, NPT ESTOP/LED, SS 24VDC
2TLA050202R0323	LineStrong2Z, 2NC/2NO, M20 ESTOP/LED, SS 110VAC
2TLA050202R1323	LineStrong2Z, 2NC/2NO, NPT ESTOP/LED, SS 110VAC
2TLA050202R0324	LineStrong2Z, 2NC/2NO, M20 ESTOP/LED, SS 230VAC
2TLA050202R1324	LineStrong2Z, 2NC/2NO, NPT ESTOP/LED, SS 230VAC

For all ABB Jokab Safety Rope Switches, the normally closed (NC) circuits are closed when the system is tensioned correctly and the switch has been reset.

# Line Strong 3L and 3R Heavy duty switches

## Protection up to 125 meters



The Line Strong 3L/R is a robust die-cast Heavy Duty Safety Rope Pull switch designed to protect long conveyor lengths where protection is required up to 125m using two switches or up to 100m using a single switch.

The die-cast housings are robust to survive indoor or outdoor use.

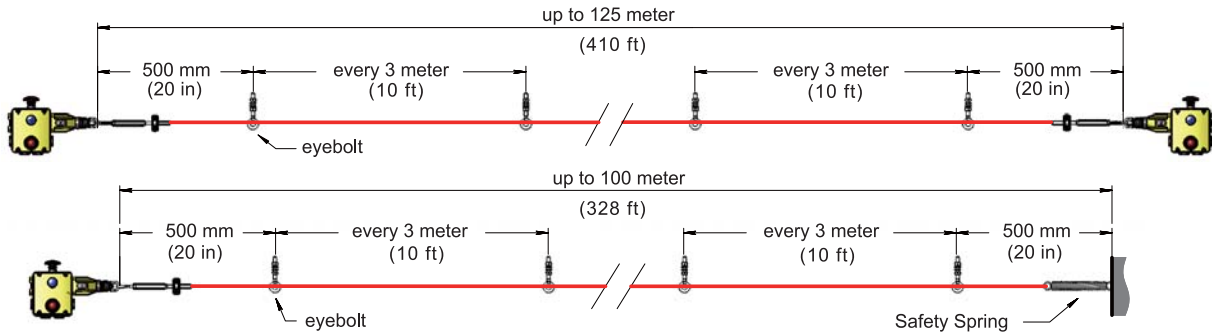
A bi-color LED ensures switch status can be seen easily from a distance. They have 4NC 2NO contacts to ensure flexibility with all modern control applications.

They can be used to compliment the Line Strong 3D versions at each end of the rope span.

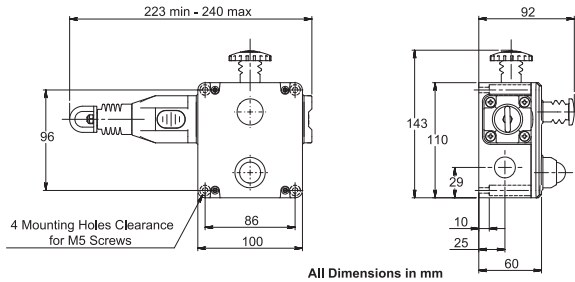


Line Strong 3L

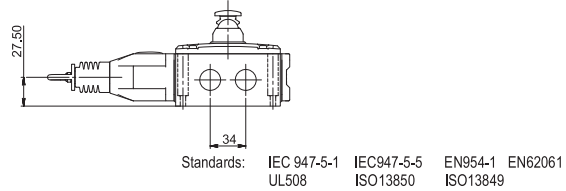
Line Strong 3R



It is recommended when using a Safety Spring that a maximum of one corner pulley is used.



All Dimensions in mm



Standards: IEC 947-5-1 IEC947-5-5 EN954-1 EN62061  
UL508 ISO13850 ISO13849

### Safety Classification and Reliability Data:

Mechanical Reliability B10d	1.5 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFFhd	<1.0 x 10 <sup>-7</sup>
Proof Test Interval (Life)	21 years
MTTFd	214 years
Enclosure / Cover	Die-Cast – Painted Yellow
External Parts	Stainless Steel
IP Rating	IP67
Rope Spans	125m.
Rope Tension device	Tensioner / Gripper - Quick Fixing
Rope Type:	4.0 mm Outside Dia. Steel inner – PVC sheath
Mounting	4 x M5
Mounting position	Any
Conduit entries	4 x M20 or 4 x 1/2" NPT by part number
Torque settings	Mounting M5 4.0 Nm Lid T20 Torx M4 1.5 Nm Terminals 1.0 Nm
Ambient Temperature	-25C +80 C.
Vibration resistance	10-500Hz 0.35mm
Shock resistance	15g 11ms
Tension Force (typical mid setting)	130N.
Typical Operating Force (Rope pulled)	< 125N. < 300mm Deflection
Weight	1320 g.
Contact type	IEC 947-5-1 Double break Type Zb Snap Action up to 4NC (positive break) 2NO (Auxiliary)
Contact Material	Silver
Termination	Clamp up to 2.5 sq. mm conductors
Rating	Utilisation Category: AC15 A300
Operational Rating	240V. 3A.
Thermal Current (Ith)	10A.
Rated Insulation Voltage (Ui)	500V.
Withstand Voltage (Uimp)	2500V.
Short Circuit Overload Protection	Fuse Externally 10A, (FF)

### Line Strong 3L and 3R

- 2TLA050206R0332 LineStrong3L, 4NC/2NO, M20 ESTOP/LED 24VDC
- 2TLA050206R1332 LineStrong3L, 4NC/2NO, NPT ESTOP/LED 24VDC
- 2TLA050206R0333 LineStrong3L, 4NC/2NO, M20 ESTOP/LED 110VAC
- 2TLA050206R1333 LineStrong3L, 4NC/2NO, NPT ESTOP/LED 110VAC
- 2TLA050206R0334 LineStrong3L, 4NC/2NO, M20 ESTOP/LED 230VAC
- 2TLA050206R1334 LineStrong3L, 4NC/2NO, NPT ESTOP/LED 230VAC
- 2TLA050206R0232 LineStrong3L, 4NC/2NO, M20 LED 24VDC
- 2TLA050206R1232 LineStrong3L, 4NC/2NO, NPT LED 24VDC
- 2TLA050206R0233 LineStrong3L, 4NC/2NO, M20 LED 110VAC
- 2TLA050206R1233 LineStrong3L, 4NC/2NO, NPT LED 110VAC
- 2TLA050206R0234 LineStrong3L, 4NC/2NO, M20 LED 230VAC
- 2TLA050206R1234 LineStrong3L, 4NC/2NO, NPT LED 230VAC
- 2TLA050206R0130 LineStrong3L, 4NC/2NO, M20, ESTOP
- 2TLA050206R1130 LineStrong3L, 4NC/2NO, NPT ESTOP
- 2TLA050206R0030 LineStrong3L, 4NC/2NO, M20
- 2TLA050206R1030 LineStrong3L, 4NC/2NO, NPT
- 2TLA050208R0332 LineStrong3R, 4NC/2NO, M20 ESTOP/LED 24VDC
- 2TLA050208R1332 LineStrong3R, 4NC/2NO, NPT ESTOP/LED 24VDC
- 2TLA050208R0333 LineStrong3R, 4NC/2NO, M20 ESTOP/LED 110VAC
- 2TLA050208R1333 LineStrong3R, 4NC/2NO, NPT ESTOP/LED 110VAC
- 2TLA050208R0334 LineStrong3R, 4NC/2NO, M20 ESTOP/LED 230VAC
- 2TLA050208R1334 LineStrong3R, 4NC/2NO, NPT ESTOP/LED 230VAC
- 2TLA050208R0232 LineStrong3R, 4NC/2NO, M20 LED 24VDC
- 2TLA050208R1232 LineStrong3R, 4NC/2NO, NPT LED 24VDC
- 2TLA050208R0233 LineStrong3R, 4NC/2NO, M20 LED 110VAC
- 2TLA050208R1233 LineStrong3R, 4NC/2NO, NPT LED 110VAC
- 2TLA050208R0234 LineStrong3R, 4NC/2NO, M20 LED 230VAC
- 2TLA050208R1234 LineStrong3R, 4NC/2NO, NPT LED 230VAC
- 2TLA050208R0130 LineStrong3R, 4NC/2NO, M20, ESTOP
- 2TLA050208R1130 LineStrong3R, 4NC/2NO, NPT ESTOP
- 2TLA050208R0030 LineStrong3R, 4NC/2NO, M20
- 2TLA050208R1030 LineStrong3R, 4NC/2NO, NPT

For all ABB Jokab Safety Rope Switches, the normally closed (NC) circuits are closed when the system is tensioned correctly and the switch has been reset.

# Line Strong 3LZ and 3RZ Heavy duty switches

## Protection up to 125 meters



The Line Strong 3LZ / RZ is a robust Heavy Duty Safety Rope Pull switch designed to protect long conveyor lengths where protection is required up to 125m using two switches or up to 100m using a single switch.

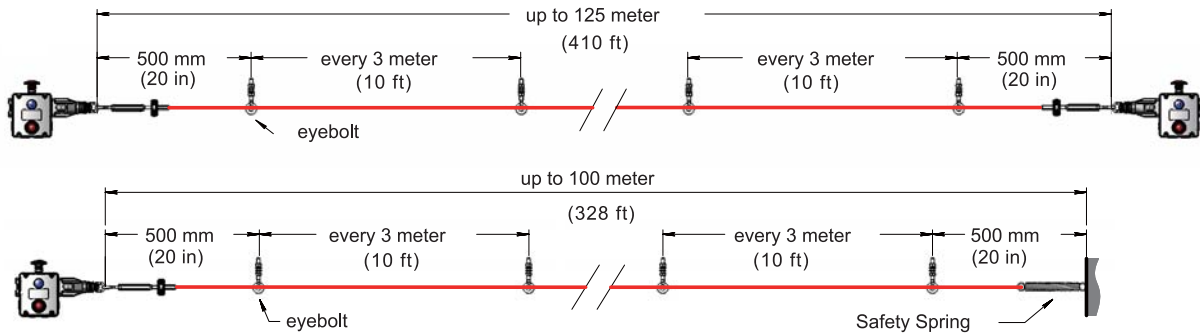
The Stainless Steel 316 housings are designed specifically to withstand the tough environments found in the Food and Pharmaceutical industries. They will survive chemical and detergent washdown by providing all stainless steel parts and robust IP67 and IP69K sealing by using integral bellows and gaskets.

They can be used to compliment the Line Strong 3DZ versions at each end of the rope span.

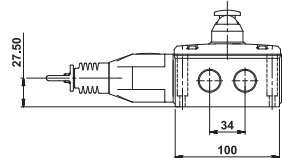
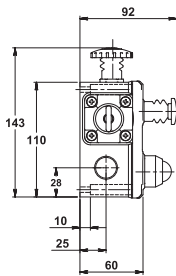
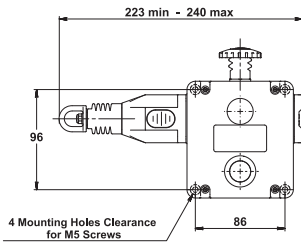


Line Strong 3LZ

Line Strong 3RZ



It is recommended when using a Safety Spring that a maximum of one corner pulley is used.



All Dimensions in mm

Standards: IEC 947-5-1 IEC947-5-5 EN954-1 EN62061  
UL508 ISO13850 ISO13849-1

### Safety Classification and Reliability Data:

Mechanical Reliability B10d	1.5 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	< 1.0 x 10 <sup>-7</sup>
Proof Test Interval (Life)	21 years
MTTFd	214 years
Enclosure / Cover	Stainless Steel 316
External Parts	Stainless Steel
IP Rating	IP69K (NEMA PW12) IP67 (NEMA 6)
Rope Spans	125m.
Rope Tension device	Tensioner / Gripper – Quick Fixing
Rope Tension device	4.0 mm Outside Dia, Steel inner – PVC sheath
Mounting	4 x M5
Mounting position	Any
Conduit entries	4 x M20 or 4 x 1/2" NPT by part number
Torque settings	Mounting M5 4.0 Nm Lid T20 Torx M4 1.5 Nm Terminals 1.0 Nm
Ambient Temperature	-25C +80 C. (100C. cleaning)
Vibration resistance	10-500Hz 0.35mm
Shock resistance	15g 11ms
Tension Force (typical mid setting)	130N.
Typical Operating Force (Rope pulled)	< 125N. < 300mm Deflection
Weight	1320 g.
Contact type	IEC 947-5-1 Double break Type Zb Snap Action up to 4NC (positive break) 2NO (Auxiliary)
Contact Material	Silver
Termination	Clamp up to 2.5 sq. mm conductors
Rating	Utilisation Category : AC15 A300
Operational Rating	240V. 3A.
Thermal Current (Ith)	10A.
Rated Insulation Voltage (Ui)	500V.
Withstand Voltage (Uimp)	2500V.
Short Circuit Overload Protection	Fuse Externally 10A. (FF)

### Line Strong 3LZ and 3RZ

2TLA050206R0322	LineStrong3LZ, 4NC/2NO, M20 ESTOP/LED SS 24VDC
2TLA050206R1322	LineStrong3LZ, 4NC/2NO, NPT ESTOP/LED SS 24VDC
2TLA050206R0323	LineStrong3LZ, 4NC/2NO, M20 ESTOP/LED SS 110VAC
2TLA050206R1323	LineStrong3LZ, 4NC/2NO, NPT ESTOP/LED SS 110VAC
2TLA050206R0324	LineStrong3LZ, 4NC/2NO, M20 ESTOP/LED SS 230VAC
2TLA050206R1324	LineStrong3LZ, 4NC/2NO, NPT ESTOP/LED SS 230VAC
2TLA050206R0222	LineStrong3LZ, 4NC/2NO, M20 LED, SS 24VDC
2TLA050206R1222	LineStrong3LZ, 4NC/2NO, NPT LED, SS 24VDC
2TLA050206R0223	LineStrong3LZ, 4NC/2NO, M20 LED, SS 110VAC
2TLA050206R1223	LineStrong3LZ, 4NC/2NO, NPT LED, SS 110VAC
2TLA050206R0224	LineStrong3LZ, 4NC/2NO, M20 LED, SS 230VAC
2TLA050206R1224	LineStrong3LZ, 4NC/2NO, NPT LED, SS 230VAC
2TLA050206R0120	LineStrong3LZ, 4NC/2NO, M20, ESTOP, SS
2TLA050206R1120	LineStrong3LZ, 4NC/2NO, NPT ESTOP, SS
2TLA050206R0020	LineStrong3LZ, 4NC/2NO, M20, SS
2TLA050206R1020	LineStrong3LZ, 4NC/2NO, NPT, SS
2TLA050208R0322	LineStrong3RZ, 4NC/2NO, M20 ESTOP/LED SS 24VDC
2TLA050208R1322	LineStrong3RZ, 4NC/2NO, NPT ESTOP/LED SS 24VDC
2TLA050208R0323	LineStrong3RZ, 4NC/2NO, M20 ESTOP/LED SS 110VAC
2TLA050208R1323	LineStrong3RZ, 4NC/2NO, NPT ESTOP/LED SS 110VAC
2TLA050208R0324	LineStrong3RZ, 4NC/2NO, M20 ESTOP/LED SS 230VAC
2TLA050208R1324	LineStrong3RZ, 4NC/2NO, NPT ESTOP/LED SS 230VAC
2TLA050208R0222	LineStrong3RZ, 4NC/2NO, M20 LED, SS 24VDC
2TLA050208R1222	LineStrong3RZ, 4NC/2NO, NPT LED, SS 24VDC
2TLA050208R0223	LineStrong3RZ, 4NC/2NO, M20 LED, SS 110VAC
2TLA050208R1223	LineStrong3RZ, 4NC/2NO, NPT LED, SS 110VAC
2TLA050208R0224	LineStrong3RZ, 4NC/2NO, M20 LED, SS 230VAC
2TLA050208R1224	LineStrong3RZ, 4NC/2NO, NPT LED, SS 230VAC
2TLA050208R0120	LineStrong3RZ, 4NC/2NO, M20, ESTOP, SS
2TLA050208R1120	LineStrong3RZ, 4NC/2NO, NPT ESTOP, SS
2TLA050208R0020	LineStrong3RZ, 4NC/2NO, M20, SS
2TLA050208R1020	LineStrong3RZ, 4NC/2NO, NPT, SS

For all ABB Jokab Safety Rope Switches, the normally closed (NC) circuits are closed when the system is tensioned correctly and the switch has been reset.

# Line Strong 3D Heavy duty switches

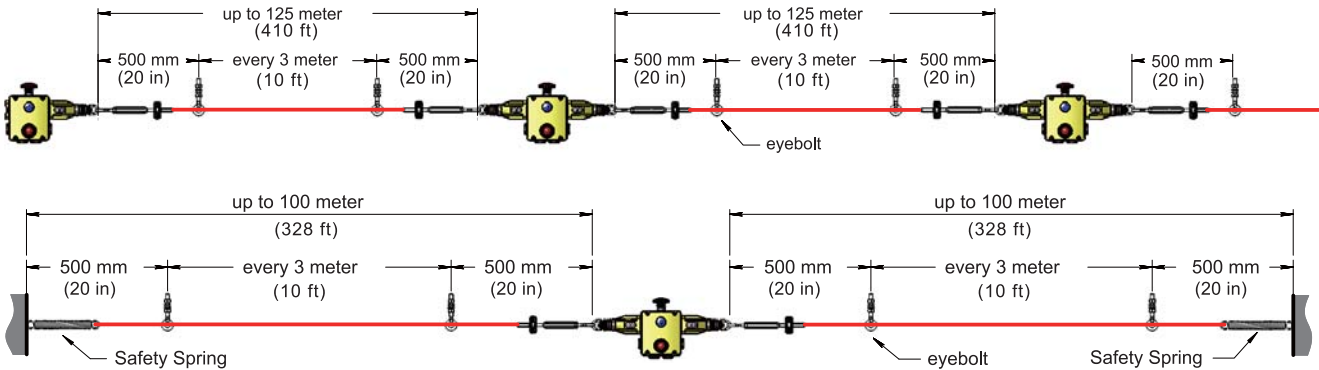
## Protection up to 250 meters



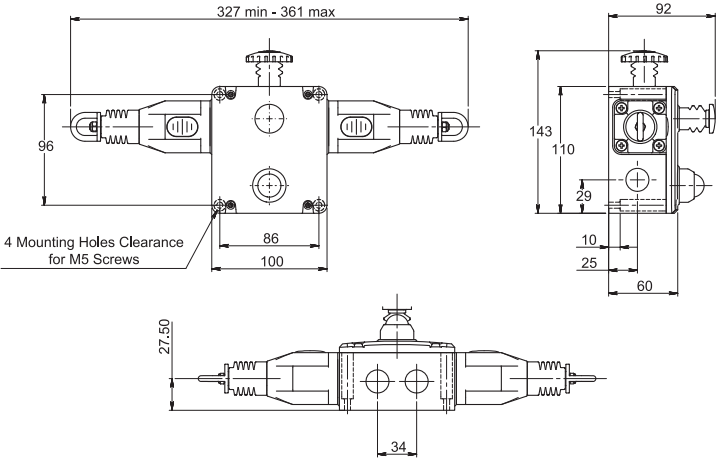
The Line Strong 3D is a Heavy Duty Safety Rope Pull switch designed to protect long conveyor lengths. The die-cast housings are robust to survive indoor or outdoor use including washdown (IP67 rating).

Lengths over 2 Km can be achieved with less than 20 switches. A bi-color LED ensures switch status can be seen easily from a distance. They have 4NC 2NO contacts to ensure flexibility with all modern control applications.

Shorter rope spans up to 200m can be achieved by using just one switch, therefore making a cost effective solution and also reducing electrical wiring runs.



It is recommended when using a Safety Spring that a maximum of one corner pulley is used.



Standards:	IEC 947-5-1	IEC947-5-5	EN954-1	EN62061
	UL508	ISO13850	ISO13849-1	
Safety Classification and Reliability Data:				
Mechanical Reliability B10d	1.5 x 10 <sup>6</sup> operations at 100mA load			
EN 954-1	up to Category 4 with Safety Relay			
ISO 13849-1	up to PLe depending upon system architecture			
EN 62061	up to SIL3 depending upon system architecture			
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days			
PFHd	<1.0 x 10 <sup>-7</sup>			
Proof Test Interval (Life)	21 years			
MTTFd	214 years			
Enclosure / Cover	Die-Cast – Painted Yellow			
External Parts	Stainless Steel			
IP Rating	IP67 (NEMA 6)			
Rope Spans	Dual Head 250m.			
Rope Tension device	Tensioner / Gripper - Quick fixing			
Rope Type:	4.0 mm Outside Dia. Steel inner – PVC sheath			
Mounting	4 x M5			
Mounting position	Any			
Conduit entries	4 x M20 or 4 x 1/2" NPT by part number			
Torque settings	Mounting M5 4.0 Nm Lid T20 Torx M4 1.5 Nm Terminals 1.0 Nm			
Ambient Temperature	-25C +80 C.			
Vibration resistance	10-500Hz 0.35mm			
Shock resistance	15g 11ms			
Tension Force (typical mid setting)	130N.			
Typical Operating Force (Rope pulled)	< 125N. < 300mm Deflection			
Mechanical Life	1,000,000 operations			
Weight	1320 g.			
Contact type	IEC 947-5-1 Double break Type Zb Snap Action up to 4NC (positive break) 2NO (Auxiliary)			
Contact Material	Silver			
Termination	Clamp up to 2.5 sq. mm conductors			
Rating	Utilisation Category : AC15 A300			
Operational Rating	240V. 3A.			
Thermal Current (Ith)	10A.			
Rated Insulation Voltage (Ui)	500V.			
Withstand Voltage (Uimp)	2500V.			
Short Circuit Overload Protection	Fuse Externally 10A. (FF)			

### Line Strong 3D

- 2TLA050204R0332 LineStrong3D, 4NC/4NO, M20 ESTOP/LED 24VDC
- 2TLA050204R1332 LineStrong3D, 4NC/4NO, NPT ESTOP/LED 24VDC
- 2TLA050204R0333 LineStrong3D, 4NC/4NO, M20 ESTOP/LED 110VAC
- 2TLA050204R1333 LineStrong3D, 4NC/4NO, NPT ESTOP/LED 110VAC
- 2TLA050204R0334 LineStrong3D, 4NC/4NO, M20 ESTOP/LED 230VAC
- 2TLA050204R1334 LineStrong3D, 4NC/4NO, NPT ESTOP/LED 230VAC
- 2TLA050204R0232 LineStrong3D, 4NC/4NO, M20 LED 24VDC
- 2TLA050204R1232 LineStrong3D, 4NC/4NO, NPT LED 24VDC
- 2TLA050204R0233 LineStrong3D, 4NC/4NO, M20 LED 110VAC
- 2TLA050204R1233 LineStrong3D, 4NC/4NO, NPT LED 110VAC
- 2TLA050204R0234 LineStrong3D, 4NC/4NO, M20 LED 230VAC
- 2TLA050204R1234 LineStrong3D, 4NC/4NO, NPT LED 230VAC
- 2TLA050204R0130 LineStrong3D, 4NC/4NO, M20, ESTOP
- 2TLA050204R1130 LineStrong3D, 4NC/4NO, NPT ESTOP
- 2TLA050204R0030 LineStrong3D, 4NC/4NO, M20
- 2TLA050204R1030 LineStrong3D, 4NC/4NO, NPT

For all ABB Jokab Safety Rope Switches, the normally closed (NC) circuits are closed when the system is tensioned correctly and the switch has been reset.

# Line Strong 3DZ Heavy duty switches

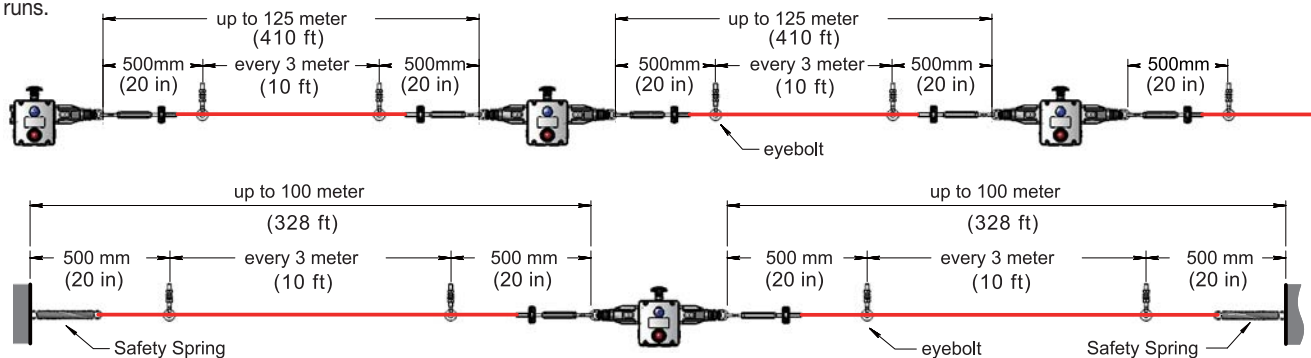
## Protection up to 250 meters



The Line Strong 3DZ is a robust Heavy Duty Safety Rope Pull switch designed to protect long conveyor lengths up to 250m. The Stainless Steel 316 housings are designed specifically to withstand the tough environments found in the Food and Pharmaceutical industries. They will survive chemical and detergent washdown by providing all stainless steel parts and robust IP67 and IP69K sealing by using integral bellows and gaskets.

A bi-color LED ensures switch status can be seen easily from a distance. They have 4NC 2NO contacts to ensure flexibility with all modern control applications.

Shorter rope spans up to 200m can be achieved by using just one switch, therefore making a cost effective solution and also reducing electrical wiring runs.

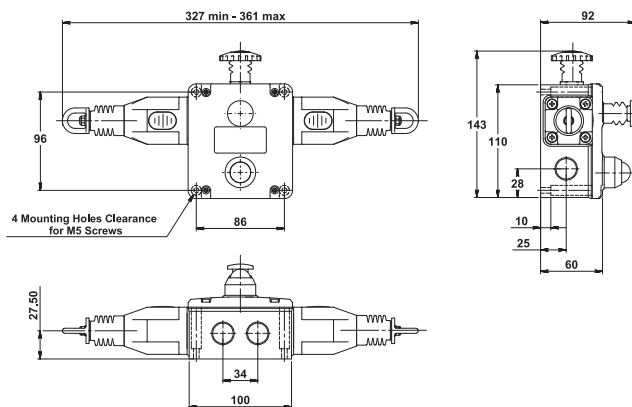


It is recommended when using a Safety Spring that a maximum of one corner pulley is used.

Standards: IEC 947-5-1 IEC947-5-5 EN954-1 EN62061  
UL508 ISO13850 ISO13849-1

### Safety Classification and Reliability Data:

Mechanical Reliability B10d	1.5 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage PFHd	8 cycles per hour / 24 hours per day / 365 days
	< 1.0 x 10 <sup>-7</sup>
Proof Test Interval (Life) MTTFd	21 years
	214 years
Enclosure / Cover	Stainless Steel 316
External Parts	Stainless Steel
IP Rating	IP69K (NEMA PW12) IP67 (NEMA 6)
Rope Spans	Dual Head 250m.
Rope Tension device	Tensioner / Gripper - Quick Fixing
Rope Type:	4.0 mm Outside Dia. Steel inner - PVC sheath
Mounting	4 x M5
Mounting position	Any
Conduit entries	4 x M20 or 4 x 1/2" NPT by part number
Torque settings	Mounting M5 4.0 Nm Lid T20 Torx M4 1.5 Nm Terminals 1.0 Nm
Ambient Temperature	-25C +80 C. (Cleaning 100C.)
Vibration resistance	10-500Hz 0.35mm
Shock resistance	15g 11ms
Tension Force (typical mid setting)	130N.
Typical Operating Force (Rope pulled)	< 125N. < 300mm Deflection
Weight	2000 g.
Contact type	IEC 947-5-1 Double break Type Zb Snap Action up to 4NC (positive break) 2NO (Auxiliary)
Contact Material	Silver
Termination	Clamp up to 2.5 sq. mm conductors
Rating	Utilisation Category : AC15 A300
Operational Rating	240V. 3A.
Thermal Current (Ith)	10A.
Rated Insulation Voltage (Ui)	500V.
Withstand Voltage (Uimp)	2500V.
Short Circuit Overload Protection	Fuse Externally 10A. (FF)



All Dimensions in mm

### Line Strong 3DZ

2TLA050204R0322	LineStrong3DZ, 4NC/4NO, M20 ESTOP/LED SS 24VDC
2TLA050204R1322	LineStrong3DZ, 4NC/4NO, NPT ESTOP/LED SS 24VDC
2TLA050204R0323	LineStrong3DZ, 4NC/4NO, M20 ESTOP/LED SS 110VAC
2TLA050204R1323	LineStrong3DZ, 4NC/4NO, NPT ESTOP/LED SS 110VAC
2TLA050204R0324	LineStrong3DZ, 4NC/4NO, M20 ESTOP/LED SS 230VAC
2TLA050204R1324	LineStrong3DZ, 4NC/4NO, NPT ESTOP/LED SS 230VAC
2TLA050204R0222	LineStrong3DZ, 4NC/4NO, M20 LED, SS 24VDC
2TLA050204R1222	LineStrong3DZ, 4NC/4NO, NPT LED, SS 24VDC
2TLA050204R0223	LineStrong3DZ, 4NC/4NO, M20 LED, SS 110VAC
2TLA050204R1223	LineStrong3DZ, 4NC/4NO, NPT LED, SS 110VAC
2TLA050204R0224	LineStrong3DZ, 4NC/4NO, M20 LED, SS 230VAC
2TLA050204R1224	LineStrong3DZ, 4NC/4NO, NPT LED, SS 230VAC
2TLA050204R0120	LineStrong3DZ, 4NC/4NO, M20, ESTOP, SS
2TLA050204R1120	LineStrong3DZ, 4NC/4NO, NPT ESTOP, SS
2TLA050204R0020	LineStrong3DZ, 4NC/4NO, M20, SS
2TLA050204R1020	LineStrong3DZ, 4NC/4NO, NPT, SS

For all ABB Jokab Safety Rope Switches, the normally closed (NC) circuits are closed when the system is tensioned correctly and the switch has been reset.

# Line Strong Rope switch accessories

## Line Strong Accessories

2TLA050210R0030	5M Rope Kit, Galv. w/Allen Key
2TLA050210R0130	10M Rope Kit, Galv. w/Allen Key
2TLA050210R0230	15M Rope Kit, Galv. w/Allen Key
2TLA050210R0330	20M Rope Kit, Galv. w/Allen Key
2TLA050210R0430	30M Rope Kit, Galv. w/Allen Key
2TLA050210R0530	50M Rope Kit, Galv. w/Allen Key
2TLA050210R0630	80M Rope Kit, Galv. w/Allen Key
2TLA050210R0730	100M Rope Kit, Galv. w/Allen Key
2TLA050210R0830	126M Rope Kit, Galv. w/Allen Key
2TLA050210R0020	LineStrong Acces. 5M Rope Kit SS w/ Key
2TLA050210R0120	LineStrong Acces. 10M Rope Kit SS w/ Key
2TLA050210R0220	LineStrong Acces. 15M Rope Kit SS w/ Key
2TLA050210R0320	LineStrong Acces. 20M Rope Kit SS w/ Key
2TLA050210R0420	LineStrong Acces. 30M Rope Kit SS w/ Key
2TLA050210R0520	LineStrong Acces. 50M Rope Kit SS w/ Key
2TLA050210R0620	LineStrong Acces. 80M Rope Kit SS w/ Key
2TLA050210R0720	LineStrong Acces. 100M Rope Kit SS w Key
2TLA050210R0820	LineStrong Acces. 126M Rope Kit SS w Key
2TLA050210R2020	LineStrong Acces. 5m Rope Only
2TLA050210R2120	LineStrong Acces. 10m Rope Only
2TLA050210R2220	LineStrong Acces. 20m Rope Only
2TLA050210R2320	LineStrong Acces. 30m Rope Only
2TLA050210R2420	LineStrong Acces. 50m Rope Only
2TLA050210R2520	LineStrong Acces. 80m Rope Only
2TLA050210R2620	LineStrong Acces. 100m Rope Only
2TLA050210R2720	LineStrong Acces. 126m Rope Only
2TLA050210R2820	LineStrong Acces. 500m Rope Only
2TLA050210R4020	LineStrong Acces. Rope Tensioner, SS
2TLA050210R4030	LineStrong Acces. Rope Tensioner, Galv.
2TLA050210R8020	LineStrong Acces. Eyebolt M8x1.25, SS
2TLA050210R8030	LineStrong Acces. Eyebolt M8x1.25, Galv.
2TLA050210R6020	LineStrong Acces. Pulley, SS
2TLA050210R6030	LineStrong Acces. Pulley, Galv.
2TLA050211R0001	LineStrong Acces. LED Green/Red 24 VDC
2TLA050211R0002	LineStrong Acces. LED Green/Red 110 VDC
2TLA050211R0003	LineStrong Acces. LED Green/Red 230VDC
2TLA050211R0004	LineStrong Acces.Spring, 220mm, SS
2TLA050211R0005	LineStrong Acces. E-Stop Button
2TLA050211R0006	LineStrong Acces. Anti-Tamper, Torx T20



Tensioner / Gripper Assembly  
 Allen Key 4mm  
 Quick Link (QL)  
 For up to 50m. spans ,one rope end is terminated with a thimble and permanent clamp.  
 For over 50m. spans, 2 Tensioner / Gripper assemblies are supplied (no Quick Link).



Screwdriver Anti-Tamper T20

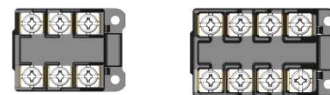
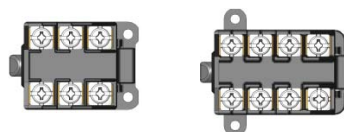
## Accessories - Contact Blocks and fittings

### Line Strong Contact Blocks

2TLA050240R0101	LineStrong Acces. Contact Block 2NC/1NO
2TLA050240R0102	LineStrong Acces. Contact Block 3NC
2TLA050240R0103	LineStrong Acces. Contact Block 2NC/2NO
2TLA050240R0104	LineStrong Acces. Contact Block 3NC/1NO
2TLA050240R0105	LineStrong Acces. Contact Block 4NC
2TLA050240R0101	LineStrong Acces. Contact Block 2NC/1NO
2TLA050240R0102	LineStrong Acces. Contact Block 3NC
2TLA050240R0103	LineStrong Acces. Contact Block 2NC/2NO
2TLA050240R0104	LineStrong Acces. Contact Block 3NC/1NO
2TLA050240R0105	LineStrong Acces. Contact Block 4NC

### Line Strong Glands and Plugs

2TLA050240R0101	LineStrong Acces. Contact Block 2NC/1NO
2TLA050240R0102	LineStrong Acces. Contact Block 3NC
2TLA050240R0103	LineStrong Acces. Contact Block 2NC/2NO
2TLA050240R0104	LineStrong Acces. Contact Block 3NC/1NO
2TLA050240R0105	LineStrong Acces. Contact Block 4NC
2TLA050240R0101	LineStrong Acces. Contact Block 2NC/1NO
2TLA050240R0102	LineStrong Acces. Contact Block 3NC
2TLA050240R0103	LineStrong Acces. Contact Block 2NC/2NO
2TLA050240R0104	LineStrong Acces. Contact Block 3NC/1NO
2TLA050240R0105	LineStrong Acces. Contact Block 4NC





# E-Strong Z Heavy duty emergency stop switches

ABB Jokab Safety's Heavy Duty Emergency Stop Switches are designed to provide robust Emergency Stop protection for exposed conveyors or machines.

Stainless Steel 316 housings (IP69K)

Conformance to ISO 13850, IEC 947-5-1 and IEC 947-5-5

A special lid safety trip mechanism means that the safety contacts will open if the lid is removed.

Button protection shroud version with Padlock holes for 'Lock off' during maintenance.

Optional 2 colour LED



Stainless steel



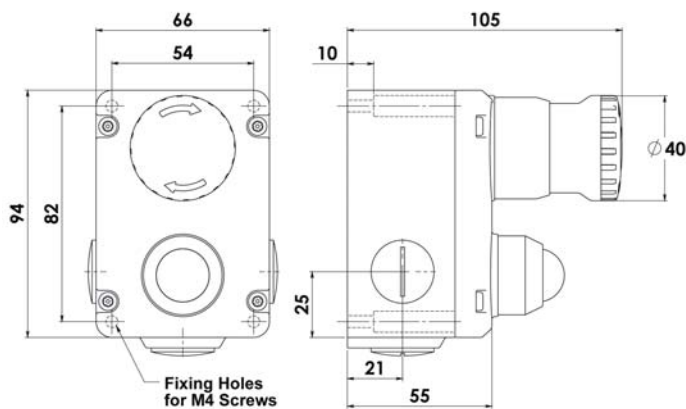
Stainless steel with protection shroud and padlock holes



Stainless steel with 2 color LED

## Estrong Z

2TLA050220R0020	EstrongZ E-Stop 2NC/2NO, M20, SS
2TLA050220R1020	EstrongZ E-Stop 2NC/2NO, NPT, SS
2TLA050220R0422	EstrongZ E-Stop 2NC/2NO, M20, SS Locked
2TLA050220R1422	EstrongZ E-Stop 2NC/2NO, NPT, SS Locked
2TLA050220R0222	EstrongZ E-Stop 2NC/2NO, M20, SS, LED 24VDC
2TLA050220R1222	EstrongZ E-Stop 2NC/2NO, NPT, SS, LED 24VDC
2TLA050220R0223	EstrongZ E-Stop 2NC/2NO, M20, SS, LED 110VAC
2TLA050220R1223	EstrongZ E-Stop 2NC/2NO, NPT, SS, LED 110VAC
2TLA050220R0224	EstrongZ E-Stop 2NC/2NO, M20, SS, LED 230VAC
2TLA050220R1224	EstrongZ E-Stop 2NC/2NO, NPT, SS, LED 230VAC



Fixing Holes for M4 Screws

Standards:	IEC 947-5-1	IEC947-5-5	EN954-1	EN62061
	UL508	ISO13850	ISO13849-1	

### Safety Classification and Reliability Data:

Mechanical Reliability B10d	1.5 x 10 <sup>6</sup> operations at 100mA load up to Category 4 with Safety Relay
EN 954-1	up to PLe depending upon system architecture
ISO 13849-1	up to SIL3 depending upon system architecture
EN 62061	8 cycles per hour / 24 hours per day / 365 days
Safety Data - Annual Usage	PFFhd < 1.0 x 10 <sup>-7</sup>
Proof Test Interval (Life)	21 years
MTTFd	214 years
Enclosure / Cover	Stainless Steel 316
IP Rating	IP67 IP69K
Mounting	4 x M5
Mounting position	Any
Conduit entries	3 x M20 or 3 x 1/2" NPT by part number
Torque settings	Mounting M5 4.0 Nm Lid T20 Torx M4 1.5 Nm Terminals 1.0 Nm
Ambient Temperature	-25C. 80 C.
Vibration resistance	10-500Hz 0.35mm
Shock resistance	15g 11ms
Weight	820 g.
Contact type	IEC 947-5-1 Double break Type Zb Snap Action up to 2NC (positive break) 2NO (Auxiliary)

Contact Material	Silver
Termination	Clamp up to 2.5 sq. mm conductors
Rating	Utilisation Category : AC15
Operational Rating	240V. 3A.
Thermal Current (Ith)	10A.
Rated Insulation Voltage (Ui)	500V.
Withstand Voltage (Uimp)	2500V.
Short Circuit Overload Protection	Fuse Externally 10A. (FF)

# Edge 1 Safety limit switches



## Features:

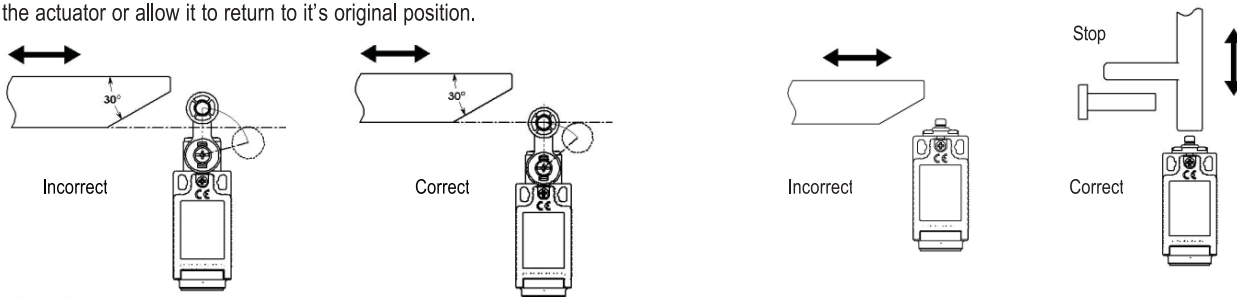
- Positive opening safety contacts to IEC 947-5-1
- Choice of 11 actuator heads Linear, Rotary and Flexible actions
- High Mechanical Life - 10,000,000 cycles
- Head position adjustment any of 4 positions
- Enclosure Protected to IP 67 - washdown suitable
- Conduit entries: M20 ½" NPT or Quick connect

## Application:

ABB Jokab Safety limit switches are designed to be mounted for position sensing of moving applications, e.g., guard doors, conveyors, machine beds, and elevators. They are available with linear plungers, rotary levers or roller plungers and either slow or snap action contacts.

## Operation:

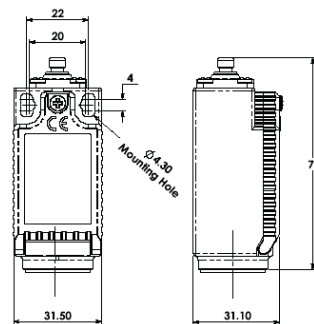
Operation of the switches is achieved by a sliding actuation of the moving object to cause deflection of the switch plungers or levers. For safety applications it is important that the moving object does not pass completely over the switch actuators so as to either cause damage to the the actuator or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



Standards EN1088 IEC 947-5-1 EN 60204-1  
ISO 13849-1 EN62061 EN 954-1 UL508

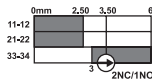
### Safety Classification and Reliability Data:

Mechanical Reliability B10d	2.5 x 10 <sup>6</sup> operations at 100mA load
EN 954-1	up to Category 4 with Safety Relay
ISO 13849-1	up to PLe depending upon system architecture
EN 62061	up to SIL3 depending upon system architecture
Safety Data - Annual Usage	8 cycles per hour / 24 hours per day / 365 days
PFHd	3.44 x 10 <sup>-8</sup>
Proof Test Interval (Life)	35 years
MTTFd	356 years
Utilization Category	AC15 A300 240V. 3A.
Thermal Current (Ith)	10A
Rated Insulation Voltage	300VAC
Rated Impulse Withstand Volt	2500VAC
Insulation Resistance	100MΩmin.
Max. Switching Speed	250mm/s
Case Material	UL approved glass-filled polyester
Roller Material	Various Polymers
Enclosure Protection	IP67
Operating Temperature	Min. -25 °C Max 80 °C
Vibration	IEC 68-2-6, 10-55Hz 0.35mm, 1 octave/min
Conduit Entry	M20 or ½ NPT

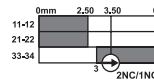


Outline fixing dimensions mm

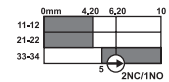
# Edge 1 Safety limit switches



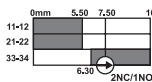
**Edge 1 Pin Plunger**  
 2TLA050100R0000 Edge1, Pin Plunger M20, 2NC/1NO  
 2TLA050100R0100 Edge1, Pin Plunger NPT, 2NC/1NO  
 2TLA050100R0200 Edge1, Pin Plunger QC, 2NC/1NO



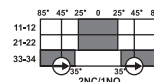
**Edge 1 Roller Plunger**  
 2TLA050101R0000 Edge1, Roller Plunger M20, 2NC/1NO  
 2TLA050101R0100 Edge1, Roller Plunger NPT, 2NC/1NO  
 2TLA050101R0200 Edge1, Roller Plunger QC, 2NC/1NO



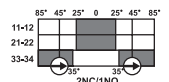
**Edge 1 Hinge Lever**  
 2TLA050102R0000 Edge1, Hinge Lever M20, 2NC/1NO  
 2TLA050102R0100 Edge1, Hinge Lever NPT, 2NC/1NO  
 2TLA050102R0200 Edge1, Hinge Lever QC, 2NC/1NO



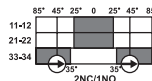
**Edge 1 Long Hinge Lever**  
 2TLA050103R0000 Edge1, Long Hinge Lever M20, 2NC/1NO  
 2TLA050103R0100 Edge1, Long Hinge Lever NPT, 2NC/1NO  
 2TLA050103R0200 Edge1, Long Hinge Lever QC, 2NC/1NO



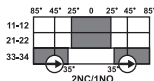
**Edge 1 Roller Lever**  
 2TLA050111R0000 Edge1, Roller Lever M20, 2NC/1NO  
 2TLA050111R0100 Edge1, Roller Lever NPT, 2NC/1NO  
 2TLA050111R0200 Edge1, Roller Lever QC, 2NC/1NO



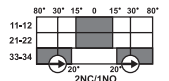
**Edge 1 Long Roller Lever**  
 2TLA050104R0000 Edge1, Long Roller Lever M20, 2NC/1NO  
 2TLA050104R0100 Edge1, Long Roller Lever NPT, 2NC/1NO  
 2TLA050104R0200 Edge1, Long Roller Lever QC, 2NC/1NO



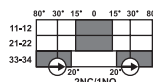
**Edge 1 Adjustable Roller lever**  
 2TLA050105R0000 Edge1, Adj. Roller Lever M20, 2NC/1NO  
 2TLA050105R0100 Edge1, Adj. Roller Lever NPT, 2NC/1NO  
 2TLA050105R0200 Edge1, Adj. Roller Lever QC, 2NC/1NO



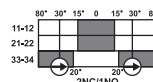
**Edge 1 Lever Arm**  
 2TLA050106R0000 Edge1, Lever Arm M20, 2NC/1NO  
 2TLA050106R0100 Edge1, Lever Arm NPT, 2NC/1NO  
 2TLA050106R0200 Edge1, Lever Arm QC, 2NC/1NO



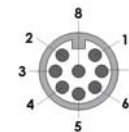
**Edge 1 Spring Lever**  
 2TLA050107R0000 Edge1, Spring Lever M20, 2NC/1NO  
 2TLA050107R0100 Edge1, Spring Lever NPT, 2NC/1NO  
 2TLA050107R0200 Edge1, Spring Lever QC, 2NC/1NO



**Edge 1 Spring Whisker**  
 2TLA050108R0000 Edge1, Spring Whisker M20, 2NC/1NO  
 2TLA050108R0100 Edge1, Spring Whisker NPT, 2NC/1NO  
 2TLA050108R0200 Edge1, Spring Whisker QC, 2NC/1NO



**Edge 1 Plastic Spring Lever**  
 2TLA050110R0000 Edge1, Plas.Spring Lever M20, 2NC/1NO  
 2TLA050110R0100 Edge1, Plas.Spring Lever NPT, 2NC/1NO  
 2TLA050110R0200 Edge1, Plas.Spring Lever QC, 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	6 5
33 / 34	4 3

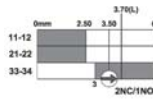


# Edge 1R Safety limit switches with reset



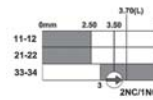
## Features:

- Lockable head mechanism
- Requires manual reset after the lock is engaged
- Positive opening safety contacts to IEC 947-5-1
- Choice of 8 actuator heads Linear or Rotary actions
- Head position adjustment any of 4 positions
- Enclosure Protected to IP 67 - washdown suitable
- Conduit entries: M20 1/2" NPT or Quick connect



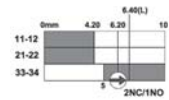
### Edge 1R Pin Plunger

2TLA050100R0006 Edge1R Pin Plunger M20, 2NC/1NO RS  
 2TLA050100R0106 Edge1R Pin Plunger NPT, 2NC/1NO RS  
 2TLA050100R0206 Edge1R Pin Plunger QC, 2NC/1NO RS



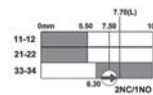
### Edge 1R Roller Plunger

2TLA050101R0006 Edge1R Roller Plunger M20, 2NC/1NO RS  
 2TLA050101R0106 Edge1R Roller Plunger NPT, 2NC/1NO RS  
 2TLA050101R0206 Edge1R Roller Plunger QC, 2NC/1NO RS



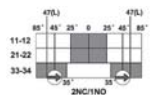
### Edge 1R Hinge Lever

2TLA050102R0006 Edge1R Hinge Lever M20, 2NC/1NO RS  
 2TLA050102R0106 Edge1R Hinge Lever NPT, 2NC/1NO RS  
 2TLA050102R0206 Edge1R Hinge Lever QC, 2NC/1NO RS



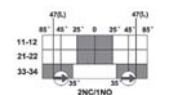
### Edge 1R Long Hinge Lever

2TLA050103R0006 Edge1R Long Hinge Lever M20, 2NC/1NO RS  
 2TLA050103R0106 Edge1R Long Hinge Lever NPT, 2NC/1NO RS  
 2TLA050103R0206 Edge1R Long Hinge Lever QC, 2NC/1NO RS



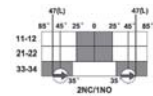
### Edge 1R Roller Lever

2TLA050111R0006 Edge1R Roller Lever M20, 2NC/1NO RS  
 2TLA050111R0106 Edge1R Roller Lever NPT, 2NC/1NO RS  
 2TLA050111R0206 Edge1R Roller Lever QC, 2NC/1NO RS



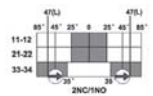
### Edge 1R Long Roller Lever

2TLA050105R0006 Edge1R Long Roller Lever M20, 2NC/1NO RS  
 2TLA050105R0106 Edge1R Long Roller Lever NPT, 2NC/1NO RS  
 2TLA050105R0206 Edge1R Long Roller Lever QC, 2NC/1NO RS



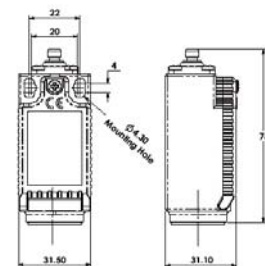
### Edge 1R Adjustable Roller Lever

2TLA050104R0006 Edge1R Adj. Roller Lever M20, 2NC/1NO RS  
 2TLA050104R0106 Edge1R Adj. Roller Lever NPT, 2NC/1NO RS  
 2TLA050104R0206 Edge1R Adj. Roller Lever QC, 2NC/1NO RS



### Edge 1R Lever Arm

2TLA050106R0006 Edge1R Lever Arm M20, 2NC/1NO RS  
 2TLA050106R0106 Edge1R Lever Arm NPT, 2NC/1NO RS  
 2TLA050106R0206 Edge1R Lever Arm QC, 2NC/1NO RS



Outline fixing dimensions - mm

Technical specification as Edge 1

# Edge 2 and Edge 3 Safety limit switches



## Features:

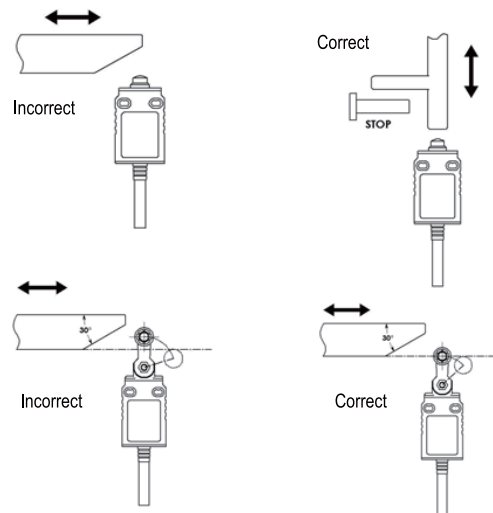
- Standard Duty Plastic body - red color
- Heavy Duty Die Cast Metal Bodies - black color
- Positive opening NC safety contacts to IEC 945-5-1
- Unique 3 pole positively operated contacts
- Choice of 7 actuator heads Linear and Rotary
- High Mechanical Life 5,000,000 cycles
- Side or End cable exit
- Enclosure Protected to IP67 - wash down suitable
- Wide operating temperature -25C to 80C.
- Contact Blocks : 2NC 1NO Slow break

## Application:

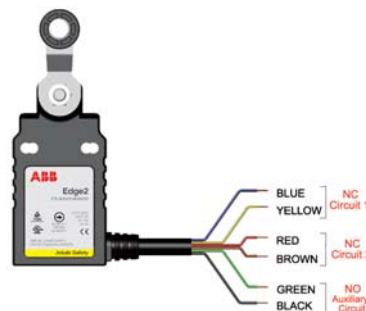
ABB Jokab Safety limit switches are designed to be mounted for position sensing of moving applications, e.g., guard doors, conveyors, machine beds, elevators. They are available with linear plungers, rotary levers or roller plungers and either slow or snap action contacts.

## Operation:

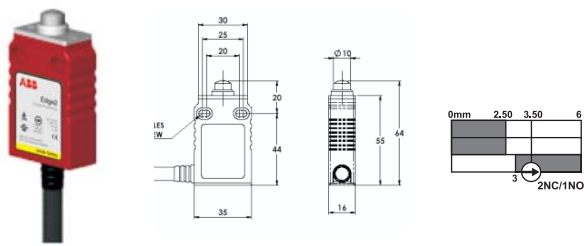
Operation of the switches is achieved by a sliding actuation of the moving object to cause deflection of the switch plungers or levers. For safety applications it is important that the moving object does not pass completely over the switch actuators so as to either cause damage to the the actuator or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



Standards	EN1088 IEC 947-5-1 UL508
Approvals	cULus TUV
Utilization Category	AC15 A300 240V. 3A.
Thermal Current (Ith)	10A
Rated Insulation Voltage	300VAC
Rated Impulse Withstand Volt	2500VAC
Insulation Resistance	100MΩmin.
Max. Switching Speed	250mm/s
Max. Switching Frequency	6,000 operation per hour
Case Material	Die Cast Metal or Plastic
Roller Material	Various Polymers
Enclosure Protection	IP67
Operating Temperature	Min. -25°C Max 80°C
Mechanical Life Expectancy	5,000,000
Vibration	IEC 68-2-6, 10-55Hz 0.35mm, 1 octave/min
Conductor size	1.5 sq.mm 4 Core or 6 Core
Cable OD	8mm max.
Fixing	2 x M4
Cable Length	2 Meter

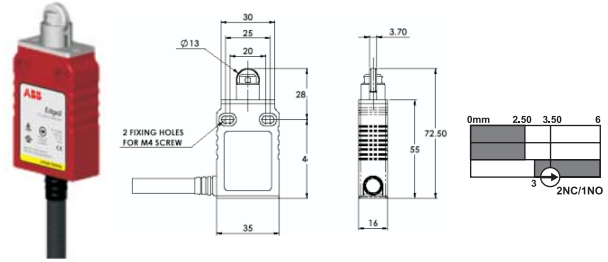


# Edge 2 Safety limit switches



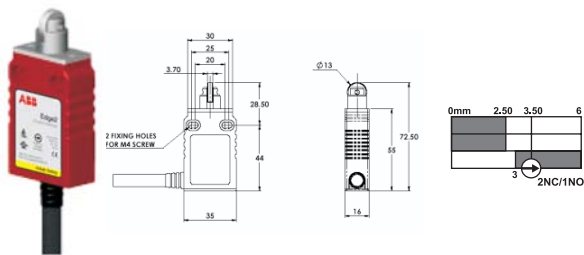
## Edge 2 Pin

2TLA050120R4008 Edge2, Pin 3m side cable, 2NC/1NO  
 2TLA050120R4000 Edge2, Pin 3m end cable, 2NC/1NO



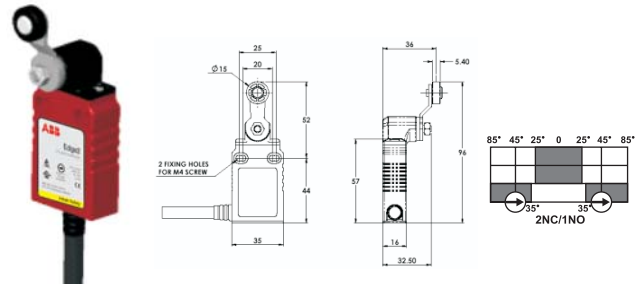
## Edge 2 Roller Plunger 1

2TLA050121R4008 Edge2, Roller 3m side cable, 2NC/1NO  
 2TLA050121R4000 Edge2, Roller 3m end cable, 2NC/1NO



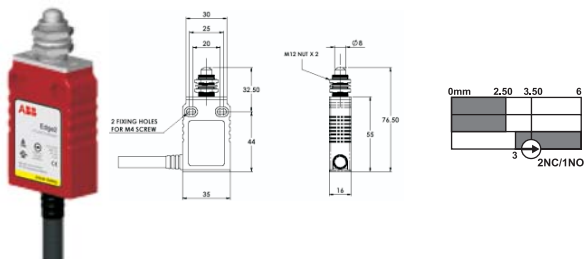
## Edge 2 Roller Plunger 2

2TLA050122R4008 Edge2, Roller 3m side cable, 2NC/1NO  
 2TLA050122R4000 Edge2, Roller 3m end cable, 2NC/1NO



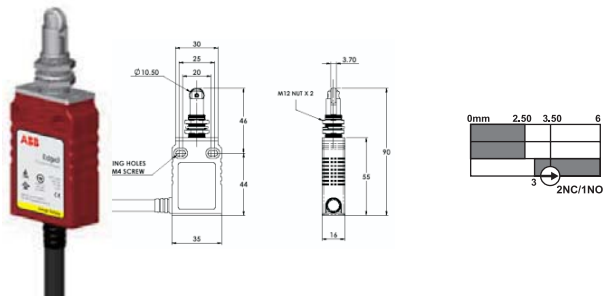
## Edge 2 Roller Lever

2TLA050123R4008 Edge2, Lever 3m side cable, 2NC/1NO  
 2TLA050123R4000 Edge2, Lever 3m end cable, 2NC/1NO



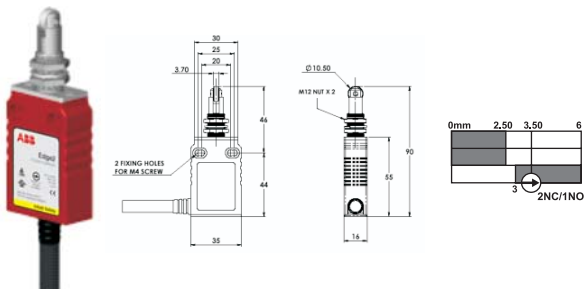
## Edge 2 Panel Mount Pin

2TLA050124R4008 Edge2, Panel Pin 3m side cable, 2NC/1NO  
 2TLA050124R4000 Edge2, Panel Pin 3m end cable, 2NC/1NO



## Edge 2 Panel Roller 1

2TLA050125R4008 Edge2, Panel Roll 3m side cable, 2NC/1NO  
 2TLA050125R4000 Edge2, Panel Roll 3m end cable, 2NC/1NO

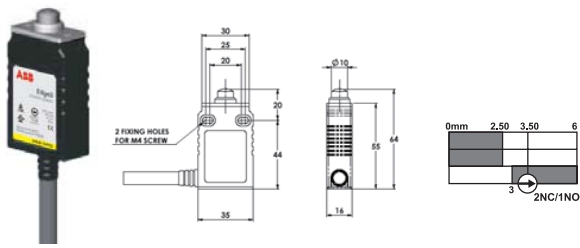


## Edge 2 Panel Roller 2

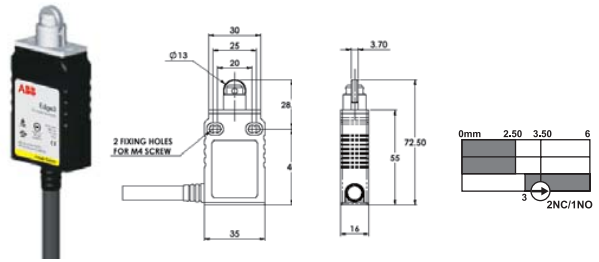
2TLA050126R4008 Edge2, Panel Roll 3m side cable, 2NC/1NO  
 2TLA050126R4000 Edge2, Panel Roll 3m end cable, 2NC/1NO



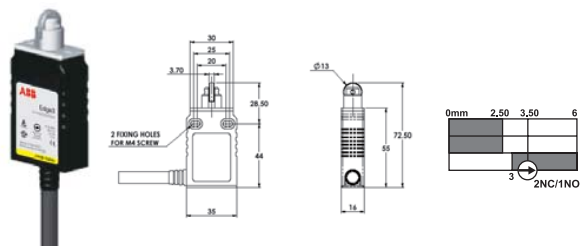
# Edge 3 Safety limit switches



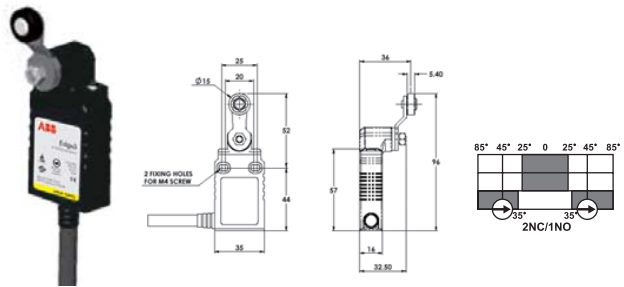
**Edge 3 Pin**  
 2TLA050120R4038 Edge3, Pin 3m side cable, 2NC/1NO  
 2TLA050120R4030 Edge3, Pin 3m end cable, 2NC/1NO



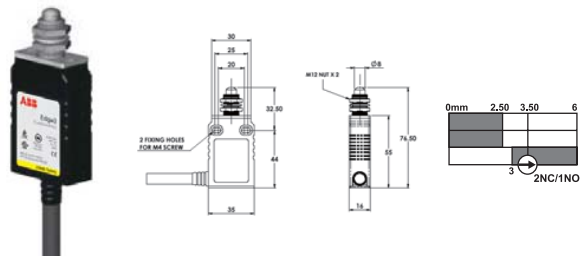
**Edge 3 Roller Plunger 1**  
 2TLA050121R4038 Edge3, Roller 3m side cable, 2NC/1NO  
 2TLA050121R4030 Edge3, Roller 3m end cable, 2NC/1NO



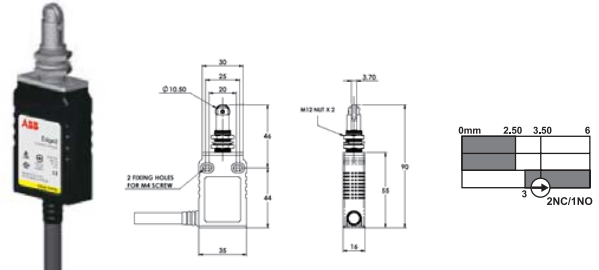
**Edge 3 Roller Plunger 2**  
 2TLA050122R4038 Edge3, Roller 3m side cable, 2NC/1NO  
 2TLA050122R4030 Edge3, Roller 3m end cable, 2NC/1NO



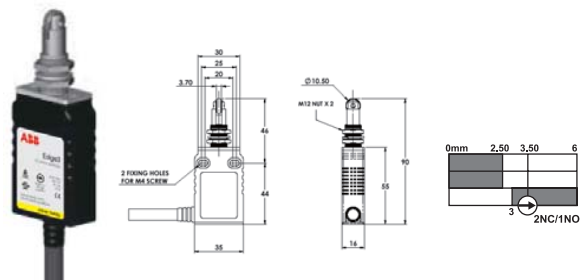
**Edge 3 Roller Lever**  
 2TLA050123R4038 Edge3, Lever 3m side cable, 2NC/1NO  
 2TLA050123R4030 Edge3, Lever 3m end cable, 2NC/1NO



**Edge 3 Panel Mount Pin**  
 2TLA050124R4038 Edge3, Panel Pin 3m side cable, 2NC/1NO  
 2TLA050124R4030 Edge3, Panel Pin 3m end cable, 2NC/1NO



**Edge 3 Panel Roller 1**  
 2TLA050125R4038 Edge3, Panel Roll 3m side cable, 2NC/1NO  
 2TLA050125R4030 Edge3, Panel Roll 3m end cable, 2NC/1NO



**Edge 2 Panel Roller 2**  
 2TLA050126R4038 Edge3, Panel Roll 3m side cable, 2NC/1NO  
 2TLA050126R4030 Edge3, Panel Roll 3m end cable, 2NC/1NO



# ABB General terms and conditions of sale

1. General. The terms and conditions contained herein, together with any additional or different terms contained in ABB's Proposal, if any, submitted to Purchaser (which Proposal shall control over any conflicting terms), constitute the entire agreement (the "Agreement") between the parties with respect to the order and supersede all prior communications and agreements regarding the order. Acceptance by ABB of the order, or Purchaser's acceptance of ABB's Proposal, is expressly limited to and conditioned upon Purchaser's acceptance of these terms and conditions, payment for or acceptance of any performance by ABB being acceptance. These terms and conditions may not be changed or superseded by any different or additional terms and conditions proposed by Purchaser to which terms ABB hereby objects. Unless the context otherwise requires, the term "Equipment" as used herein means all of the equipment, parts, accessories sold, and all software and software documentation, if any, licensed to Purchaser by ABB ("Software") under the order. Unless the context otherwise requires, the term "Services" as used herein means all labor, supervisory, technical and engineering, installation, repair, consulting or other services provided by ABB under the order. As used herein, the term "Purchaser" shall include the initial end user of the Equipment and/or services; provided, however, that Paragraph 13(a) shall apply exclusively to the initial end user.

## 2. Prices.

(a) Unless otherwise specified in writing, all Proposals expire thirty (30) days from the date thereof.

(b) Unless otherwise stated herein, Services prices are based on normal business hours (8 a.m. to 5 p.m. Monday through Friday). Overtime and Saturday hours will be billed at one and one-half (1 1/2) times the hourly rate; and Sunday hours will be billed at two (2) times the hourly rate; holiday hours will be billed at three (3) times the hourly rate. If a Services rate sheet is attached hereto, the applicable Services rates shall be those set forth in the rate sheet. Rates are subject to change without notice.

(c) The price does not include any federal, state or local property, license, privilege, sales, use, excise, gross receipts, or other like taxes which may now or hereafter be applicable. Purchaser agrees to pay or reimburse any such taxes which ABB or its suppliers are required to pay or collect. If Purchaser is exempt from the payment of any tax or holds a direct payment permit, Purchaser shall, upon order placement, provide ABB a copy, acceptable to the relevant governmental authorities of any such certificate or permit.

(d) The price includes customs duties and other importation or exportation fees, if any, at the rates in effect on the date of ABB's Proposal. Any change after that date in such duties, fees, or rates, shall increase the price by ABB's additional cost.

## 3. Payment.

(a) Unless specified to the contrary in writing by ABB, payment terms are net cash, payable without offset, in United States Dollars, 30 days from date of invoice by wire transfer to the account designated by ABB in the Proposal.

(b) If in the judgment of ABB the financial condition of Purchaser at any time prior to or delivery does not justify the terms of payment specified, ABB may require payment in advance, payment security satisfactory to ABB, or may terminate the order, whereupon ABB shall be entitled to receive reasonable cancellation charges. If delivery is delayed by Purchaser, payment shall be due on the date ABB is prepared to make delivery. Delays in delivery or nonconformities in any installments delivered shall not relieve Purchaser of its obligation to accept and pay for remaining installments.

(c) Purchaser shall pay, in addition to the overdue payment, a late charge equal to the lesser of 1 1/2% per month or any part thereof or the highest applicable rate allowed by law on all such overdue amounts plus ABB's attorneys' fees and court costs incurred in connection with collection.

## 4. Changes.

(a) Any changes requested by Purchaser affecting the ordered scope of work must be accepted by ABB and resulting adjustments to affected provisions, including price, schedule, and guarantees mutually agreed in writing prior to

implementation of the change.

(b) ABB may, at its expense, make such changes in the Equipment or Services as it deems necessary, in its sole discretion, to conform the Equipment or Services to the applicable specifications. If Purchaser objects to any such changes, ABB shall be relieved of its obligation to conform to the applicable specifications to the extent that conformance may be affected by such objection.

## 5. Delivery.

(a) All Equipment manufactured, assembled or warehoused in the continental United States is delivered F.O.B. point of shipment. Equipment shipped from outside the continental United States is delivered F.O.B. United States port of entry. Purchaser shall be responsible for any and all demurrage or detention charges.

(b) If the scheduled delivery of Equipment is delayed by Purchaser or by Force Majeure, ABB may move the Equipment to storage for the account of and at the risk of Purchaser whereupon it shall be deemed to be delivered.

(c) Shipping and delivery dates are contingent upon Purchaser's timely approvals and delivery by Purchaser of any documentation required for ABB's performance hereunder.

(d) Claims for shortages or other errors in delivery must be made in writing to ABB within ten days of delivery. Equipment may not be returned except with the prior written consent of and subject to terms specified by ABB. Claims for damage after delivery shall be made directly by Purchaser with the common carrier.

6. Title & Risk of Loss. Except with respect to Software (for which title shall not pass, use being licensed) title to Equipment shall remain in ABB until fully paid for. Notwithstanding any agreement with respect to delivery terms or payment of transportation charges, risk of loss or damage shall pass to Purchaser upon delivery.

## 7. Inspection, Testing and Acceptance.

(a) Any inspection by Purchaser of Equipment on ABB's premises shall be scheduled in advance to be performed during normal working hours.

(b) If the order provides for factory acceptance testing, ABB shall notify Purchaser when ABB will conduct such testing prior to shipment. Unless Purchaser states specific objections in writing within ten (10) days after completion of factory acceptance testing, completion of the acceptance test constitutes Purchaser's factory acceptance of the Equipment and its authorization for shipment.

(c) If the order provides for site acceptance testing, testing will be performed by ABB personnel to verify that the Equipment has arrived at site complete, without physical damage, and in good operating condition. Completion of site acceptance testing constitutes full and final acceptance of the Equipment. If, through no fault of ABB, acceptance testing is not completed within thirty (30) days after arrival of the Equipment at the site, the site acceptance test shall be deemed completed and the Equipment shall be deemed accepted.

## 8. Warranties and Remedies.

(a) Equipment and Services Warranty. ABB warrants that Equipment (excluding Software, which is warranted as specified in paragraph (d) below) shall be delivered free of defects in material and workmanship and that Services shall be free of defects in workmanship. The Warranty Remedy Period for Equipment (excluding Software, Spare Parts and Refurbished or Repaired Parts) shall end twelve (12) months after installation or eighteen (18) months after date of shipment, whichever first occurs. The Warranty Remedy Period for new spare parts shall end twelve (12) months after date of shipment. The Warranty Remedy Period for refurbished or repaired parts shall end ninety (90) days after date of shipment. The Warranty Remedy Period for Services shall end ninety (90) days after the date of completion of Services.



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(b) Equipment and Services Remedy. If a nonconformity to the foregoing warranty is discovered in the Equipment or Services during the applicable Warranty Remedy Period, as specified above, under normal and proper use and provided the Equipment has been properly stored, installed, operated and maintained and written notice of such nonconformity is provided to ABB promptly after such discovery and within the applicable Warranty Remedy Period, ABB shall, at its option, either (i) repair or replace the nonconforming portion of the Equipment or re-perform the nonconforming Services or (ii) refund the portion of the price applicable to the nonconforming portion of Equipment or Services. If any portion of the Equipment or Services so repaired, replaced or re-performed fails to conform to the foregoing warranty, and written notice of such nonconformity is provided to ABB promptly after discovery and within the original Warranty Remedy Period applicable to such Equipment or Services or 30 days from completion of such repair, replacement or re-performance, whichever is later, ABB will repair or replace such nonconforming Equipment or re-perform the nonconforming Services. The original Warranty Remedy Period shall not otherwise be extended.

(c) Exceptions. ABB shall not be responsible for providing working access to the nonconforming Equipment, including disassembly and re assembly of non-ABB supplied equipment, or for providing transportation to or from any repair facility, all of which shall be at Purchaser's risk and expense. ABB shall have no obligation hereunder with respect to any Equipment which (i) has been improperly repaired or altered; (ii) has been subjected to misuse, negligence or accident; (iii) has been used in a manner contrary to ABB's instructions; (iv) is comprised of materials provided by or a design specified by Purchaser; or (v) has failed as a result of ordinary wear and tear. Equipment supplied by ABB but manufactured by others is warranted only to the extent of the manufacturer's warranty, and only the remedies, if any, provided by the manufacturer will be allowed.

(d) Software Warranty and Remedies. ABB warrants that, except as specified below, the Software will, when properly installed, execute in accordance with ABB's published specification. If a nonconformity to the foregoing warranty is discovered during the period ending one (1) year after the date of shipment and written notice of such nonconformity is provided to ABB promptly after such discovery and within that period, including a description of the nonconformity and complete information about the manner of its discovery, ABB shall correct the nonconformity by, at its option, either (i) modifying or making available to the Purchaser instructions for modifying the Software; or (ii) making available at ABB's facility necessary corrected or replacement programs. ABB shall have no obligation with respect to any nonconformities resulting from (i) unauthorized modification of the Software or (ii) Purchaser-supplied software or interfacing. ABB does not warrant that the functions contained in the software will operate in combinations which may be selected for use by the Purchaser, or that the software products are free from errors in the nature of what is commonly categorized by the computer industry as "bugs".

(e) THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF QUALITY AND PERFORMANCE, WHETHER WRITTEN, ORAL OR IMPLIED, AND ALL OTHER WARRANTIES INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USAGE OF TRADE ARE HEREBY DISCLAIMED. THE REMEDIES STATED HEREIN CONSTITUTE PURCHASER'S EXCLUSIVE REMEDIES AND ABB'S ENTIRE LIABILITY FOR ANY BREACH OF WARRANTY.

## 9. Patent Indemnity.

(a) ABB shall defend at its own expense any action brought against Purchaser alleging that the Equipment or the use of the Equipment to practice any process for which such Equipment is specified by ABB (a "Process") directly infringes any claim of a patent of the United States of America and to pay all damages and costs finally awarded in any such action, provided that Purchaser has given ABB prompt written notice of such action, all necessary assistance in the defense thereof and the right to control all aspects of the defense thereof including the right to settle or otherwise terminate such action in behalf of Purchaser.

(b) ABB shall have no obligation hereunder and this provision shall not apply to: (i) any other equipment or processes, including Equipment or Processes which

have been modified or combined with other equipment or process not supplied by ABB; (ii) any Equipment or Process supplied according to a design, other than an ABB design, required by Purchaser; (iii) any products manufactured by the Equipment or Process; (iv) any patent issued after the date hereof; or (v) any action settled or otherwise terminated without the prior written consent of ABB.

(c) If, in any such action, the Equipment is held to constitute an infringement, or the practice of any Process using the Equipment is finally enjoined, ABB shall, at its option and its own expense, procure for Purchaser the right to continue using said Equipment; or modify or replace it with non infringing equipment or, with Purchaser's assistance, modify the Process so that it becomes non infringing; or remove it and refund the portion of the price allocable to the infringing Equipment. THE FOREGOING PARAGRAPHS STATE THE ENTIRE LIABILITY OF ABB AND EQUIPMENT MANUFACTURER FOR ANY PATENT INFRINGEMENT.

(d) To the extent that said Equipment or any part thereof is modified by Purchaser, or combined by Purchaser with equipment or processes not furnished hereunder (except to the extent that ABB is a contributory infringer) or said Equipment or any part thereof is used by Purchaser to perform a process not furnished hereunder by ABB or to produce an article, and by reason of said modification, combination, performance or production, an action is brought against ABB, Purchaser shall defend and indemnify ABB in the same manner and to the same extent that ABB would be obligated to indemnify Purchaser under this "Patent Indemnity" provision.

## 10. Limitation of Liability.

(a) In no event shall ABB, its suppliers or subcontractors be liable for special, indirect, incidental or consequential damages, whether in contract, warranty, tort, negligence, strict liability or otherwise, including, but not limited to, loss of profits or revenue, loss of use of the Equipment or any associated equipment, cost of capital, cost of substitute equipment, facilities or services, downtime costs, delays, and claims of customers of the Purchaser or other third parties for any damages. ABB's liability for any claim whether in contract, warranty, tort, negligence, strict liability, or otherwise for any loss or damage arising out of, connected with, or resulting from this Agreement or the performance or breach thereof, or from the design, manufacture, sale, delivery, resale, repair, replacement, installation, technical direction of installation, inspection, operation or use of any equipment covered by or furnished under this Agreement, or from any services rendered in connection therewith, shall in no case (except as provided in the section entitled "Patent Indemnity") exceed one-half (1/2) of the purchase price allocable to the Equipment or part thereof or Services which gives rise to the claim.

(b) All causes of action against ABB arising out of or relating to this Agreement or the performance or breach hereof shall expire unless brought within one year of the time of accrual thereof.

(c) In no event, regardless of cause, shall ABB be liable for penalties or penalty clauses of any description or for indemnification of Purchaser or others for costs, damages, or expenses arising out of or related to the Equipment and/ Services.

11. Laws and Regulations. ABB does not assume any responsibility for compliance with federal, state or local laws and regulations, except as expressly set forth herein, and compliance with any laws and regulations relating to the operation or use of the Equipment or Software is the sole responsibility of the Purchaser. All laws and regulations referenced herein shall be those in effect as of the Proposal date. In the event of any subsequent revisions or changes thereto, ABB assumes no responsibility for compliance therewith. If Purchaser desires a modification as a result of any such change or revision, it shall be treated as a change per Article 4. Nothing contained herein shall be construed as imposing responsibility or liability upon ABB for obtaining any permits, licenses or approvals from any agency required in connection with the supply, erection or operation of the Equipment. This Agreement shall be governed by the laws of the State of New York, but excluding the provisions of

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the United Nations Convention on Contracts for the International Sale of Goods and excluding New York law with respect to conflicts of law. Purchaser agrees that all causes of action against ABB under this Agreement shall be brought in the State Courts of the State of New York, or the U.S. District Court for the Southern District of New York. If any provision hereof, partly or completely, shall be held invalid or unenforceable, such invalidity or unenforceability shall not affect any other provision or portion hereof and these terms shall be construed as if such invalid or unenforceable provision or portion thereof had never existed.

12. OSHA. ABB warrants that the Equipment will comply with the relevant standards of the Occupational Safety and Health Act of 1970 ("OSHA") and the regulations promulgated thereunder as of the date of the Proposal. Upon prompt written notice from the Purchaser of a breach of this warranty, ABB will replace the affected part or modify it so that it conforms to such standard or regulation. ABB's obligation shall be limited to such replacement or modification. In no event shall ABB be responsible for liability arising out of the violation of any OSHA standards relating to or caused by Purchaser's design, location, operation, or maintenance of the Equipment, its use in association with other equipment of Purchaser, or the alteration of the Equipment by any party other than ABB.

#### 13. Software License.

(a) ABB owns all rights in or has the right to sublicense all of the Software, if any, to be delivered to Purchaser under this Agreement. As part of the sale made hereunder Purchaser hereby obtains a limited license to use the Software, subject to the following: (i) The Software may be used only in conjunction with equipment specified by ABB; (ii) The Software shall be kept strictly confidential; (iii) The Software shall not be copied, reverse engineered, or modified; (iv) The Purchaser's right to use the Software shall terminate immediately when the specified equipment is no longer used by the Purchaser or when otherwise terminated, e.g. for breach, hereunder; and (v) the rights to use the Software are non-exclusive and non-transferable, except with ABB's prior written consent. (b) Nothing in this Agreement shall be deemed to convey to Purchaser any title to or ownership in the Software or the intellectual property contained therein in whole or in part, nor to designate the Software a "work made for hire" under the Copyright Act, nor to confer upon any person who is not a named party to this Agreement any right or remedy under or by reason of this Agreement. In the event of termination of this License, Purchaser shall immediately cease using the Software and, without retaining any copies, notes or excerpts thereof, return to ABB the Software and all copies thereof and shall remove all machine readable Software from all of Purchaser's storage media.

14. Inventions and Information. Unless otherwise agreed in writing by ABB and Purchaser, all right, title and interest in any inventions, developments, improvements or modifications of or for Equipment and Services shall remain with ABB. Any design, manufacturing drawings or other information submitted to the Purchaser remains the exclusive property of ABB. Purchaser shall not, without ABB's prior written consent, copy or disclose such information to a third party. Such information shall be used solely for the operation or maintenance of the Equipment and not for any other purpose, including the duplication thereof in whole or in part.

15. Force Majeure. ABB shall neither be liable for loss, damage, detention or delay nor be deemed to be in default for failure to perform when prevented from doing so by causes beyond its reasonable control including but not limited to acts of war (declared or undeclared), Acts of God, fire, strike, labor difficulties, acts or omissions of any governmental authority or of Purchaser, compliance with government regulations, insurrection or riot, embargo, delays or shortages in transportation or inability to obtain necessary labor, materials, or manufacturing facilities from usual sources or from defects or delays in the performance of its suppliers or subcontractors due to any of the foregoing enumerated causes.

In the event of delay due to any such cause, the date of delivery will be extended by period equal to the delay plus a reasonable time to resume production, and the price will be adjusted to compensate ABB for such delay.

16. Cancellation. Any order may be cancelled by Purchaser only upon prior written notice and payment of termination charges, including but not limited to, all costs identified to the order incurred prior to the effective date of notice of termination and all expenses incurred by ABB attributable to the termination, plus a fixed sum of ten (10) percent of the final total price to compensate for disruption in scheduling, planned production and other indirect costs.

17. Termination. No termination by Purchaser for default shall be effective unless, within fifteen (15) days after receipt by ABB of Purchaser's written notice specifying such default, ABB shall have failed to initiate and pursue with due diligence correction of such specified default.

#### 18. Export Control.

(a) Purchaser represents and warrants that the Equipment and Services provided hereunder and the "direct product" thereof are intended for civil use only and will not be used, directly or indirectly, for the production of chemical or biological weapons or of precursor chemicals for such weapons, or for any direct or indirect nuclear end use. Purchaser agrees not to disclose, use, export or re-export, directly or indirectly, any information provided by ABB or the "direct product" thereof as defined in the Export Control Regulations of the United States Department of Commerce, except in compliance with such Regulations. (b) If applicable, ABB shall file for a U.S. export license, but only after appropriate documentation for the license application has been provided by Purchaser. Purchaser shall furnish such documentation within a reasonable time after order acceptance. Any delay in obtaining such license shall suspend performance of this Agreement by ABB. If an export license is not granted or, if once granted, is thereafter revoked or modified by the appropriate authorities, this Agreement may be canceled by ABB without liability for damages of any kind resulting from such cancellation. At ABB's request, Purchaser shall provide to ABB a Letter of Assurance and End-User Statement in a form reasonably satisfactory to ABB.

19. Assignment. Any assignment of this Agreement or of any rights or obligations under the Agreement without prior written consent of ABB shall be void.

20. Nuclear Insurance – Indemnity. For applications in nuclear projects, the Purchaser and/or its end user customer shall have complete insurance protection against liability and property damage resulting from a nuclear incident to and shall indemnify ABB, its subcontractors, suppliers and vendors against all claims resulting from a nuclear incident.

21. Resale. If Purchaser resells any of the Equipment, the sale terms shall limit ABB's liability to the buyer to the same extent that ABB's liability to Purchaser is limited hereunder.

22. Entire Agreement. This Agreement constitutes the entire agreement between ABB and Purchaser. There are no agreements, understandings, restrictions, warranties, or representations between ABB and Purchaser other than those set forth herein or herein provided.



## Contact us

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