



# Safety Switches

## Machine Safety - Jokab Safety products

Power and productivity  
for a better world™



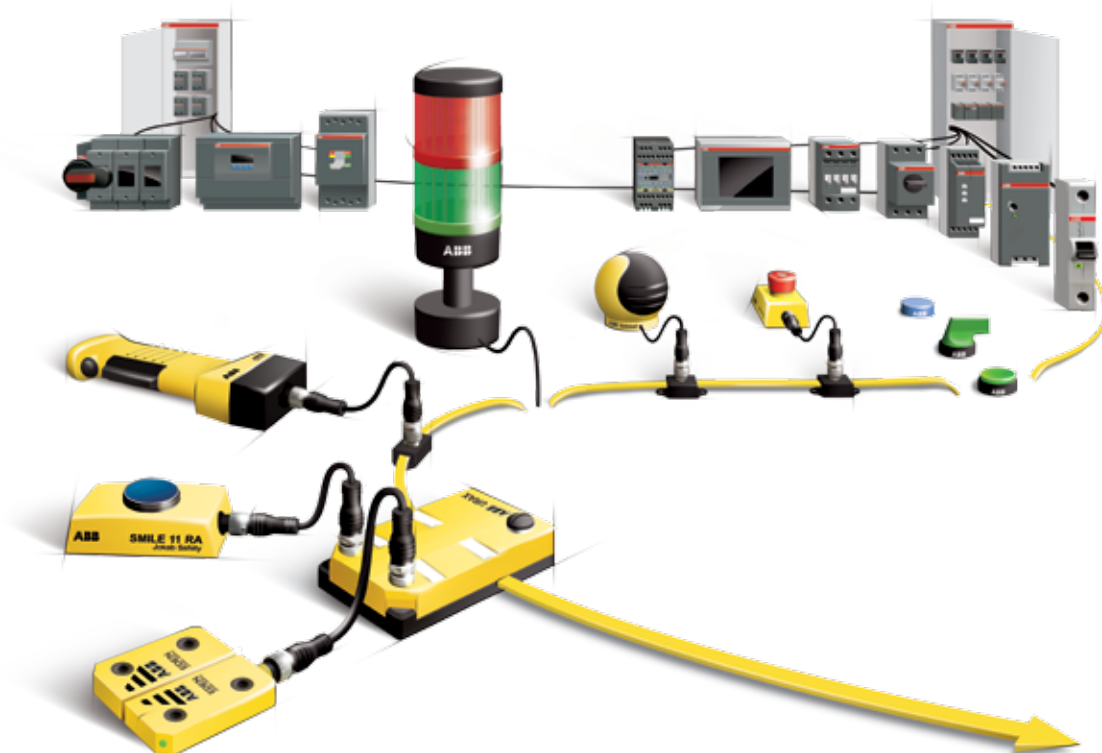
# We develop products and solutions for machine safety

The fact that the leading power and automation technology company, ABB, and a leader in machine safety, Jokab Safety, are joining forces means a lot more than just a new organisational chart. ABB has made a huge footprint in the industry - from power supply to the control of each individual motor - and has been delivering reliable solutions for decades that boost productivity in the industry. The acquisition of Jokab Safety now means that the last building block is in place. We can now offer our customers tailored, turnkey solutions where machine safety is an integral and value-enhancing component.

Since its inception in 1988, Jokab Safety has been adhering to the business concept of developing innovative products and solutions for machine safety. The company has supplied everything from individual safety components to fully installed protection systems for entire production lines, and works on a daily basis with the practical application of safety requirements in combination with production requirements. Jokab Safety is also represented on a variety of international

standards committees concerned with the safety of machinery, which means that we have added this very valuable experience and knowledge to our offering. Similarly, ABB has always been a pioneer and a representative for its business areas and a powerful voice in professional organisations and committees. All in all, this creates an enormous bank of knowledge and experience that we look forward to sharing with our customers.

Productivity and safety are not contradictory terms. On the contrary, safety solutions that are properly executed and adapted from the beginning will increase productivity. A partner that can deliver integrated and well thought out turnkey solutions enables a production-friendly safety environment. By building up and upgrading safety solutions in existing environments in a smart way, the mode of production will not need to be adapted to meet the requirements that safety sets. Instead, this allows a system that is manufacturing-friendly and that takes into account the business and its productivity objectives.



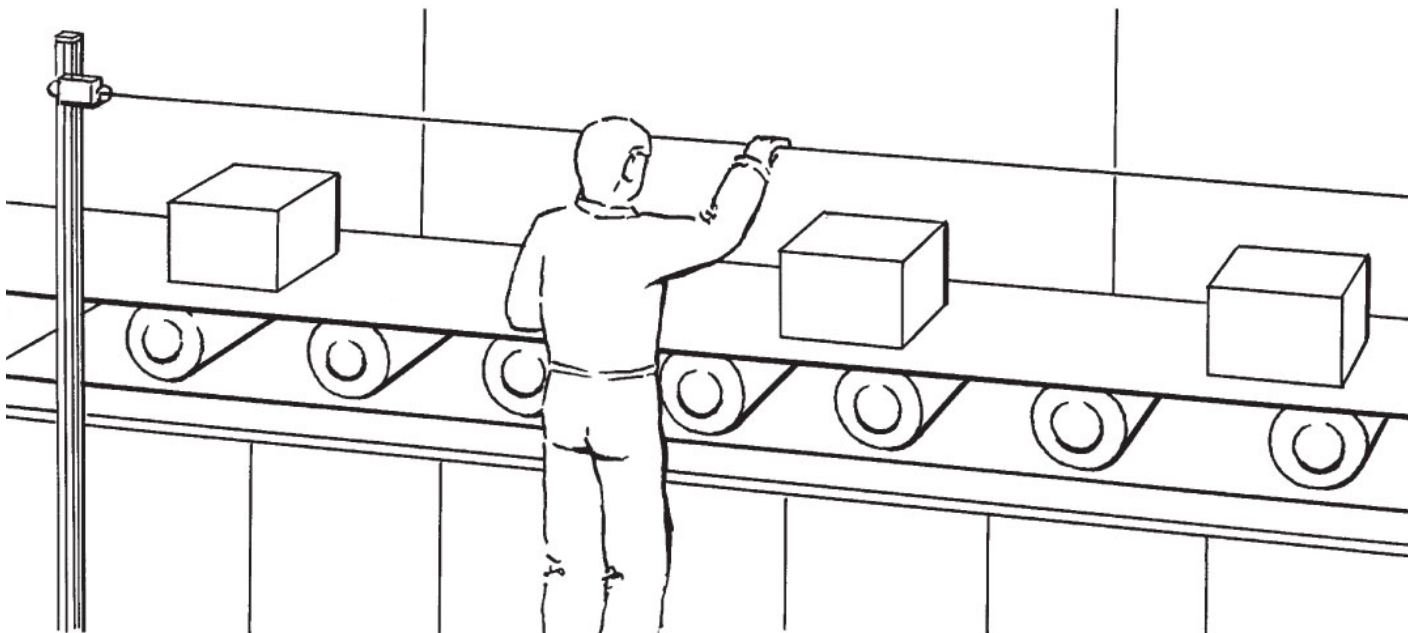
## ABB Jokab Safety - Safety Switches

ABB Jokab Safety has a complete range of safety switches for machine safety. The range consists of key switches, non-contact switches, grab wire emergency stop switches and emergency stops button. The safety switches are designed to be robust and suitable for a variety of applications.



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# Why should you use Safety Switches?

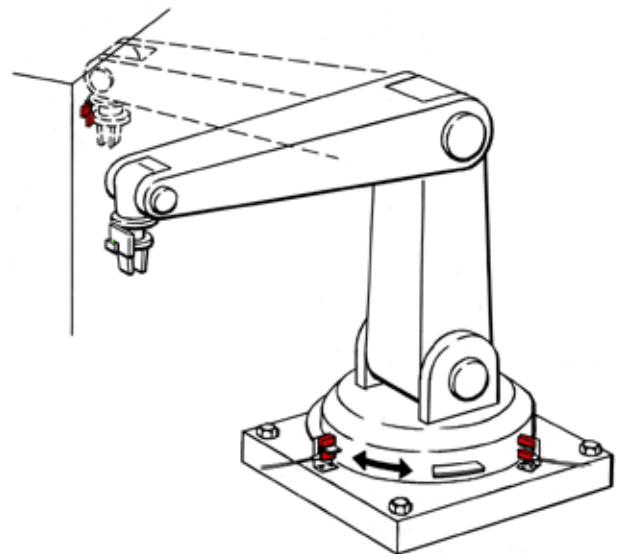
## - to supervise doors and hatches around dangerous machines!

Assurance that a machine stops when a door or a hatch is opened can be solved by using different types of switches and sensors which are monitored with a safety relay or a safety PLC. Switches and sensors are available both as non-contact (dynamic or magnetic) and various types of interlocking devices. Interlocking devices can be used, when it is required and then, via a signal, lock a gate during processes that should not be stopped during certain operations. They are also used with machines that have a long stopping time, to prevent someone from entering before the machine has stopped.



## - to ensure that a safe position is kept/reached!

A safe position can sometimes be monitored by a safety switch. So instead of supervising the machines physical protection, the supervising is therefore made directly on the dangerous moving parts of the machine. For an example, a robot can be standing still in a monitored position without being powered off. Then someone can enter the robot's working area to do maintenance and if the robot leaves the safe position the robot will be directly power off.



## - to manage the safety in harsh environments!

Non-contact switches have a long lifetime because they are not physical mechanically operated. They also endure very harsh environments, e.g. cold, heat, high-pressure wash-down which is important in the food industry for example. Because the switches are small, they are very easy to position and can even be completely concealed in doors and hatches.

## What requirements should one have on safety switches?

The safety switch shall be reliable from both the safety and production point of view.

- A person must be able to trust that dangerous movements and functions are safely stopped by the sensors/switches.
- From the production point of view, unintentional stops should be avoided.
- Standard EN ISO 13855 now includes requirements for safety distances for interlocked doors without locking function.



# Safety Interlock Switch

## MKey5

### Approvals:



### Application:

Gates  
Hatches

### Features:

2NC + 1NO (actuator in)  
4 actuating positions  
Actuator holding force 12 or 40N  
Up to PL e Cat.4  
Plastic, Plastic with stainless steel head or stainless steel



### Switch operational description

MKey5 Interlock switches are designed to provide position interlock detection for moving guards. They are designed to fit the leading edge of sliding, hinged or lift off machine guards. The actuator is fitted to the moving part of the guard and is aligned to the switch entry aperture.

The head can be rotated to provide four given actuator entry positions. When the actuator is inserted into the switch the safety contacts close and allow the machine start circuit to be enabled. MKey5 has two versions regarding holding force, 12N and 40N. MKey5 has several types of actuators as an option. A standard actuator key is always delivered with interlock switches.

### Material

Depending on the environment where the switch will be used, different material can be chosen on the MKey5. The basic version is in a full plastic body (polyester) and in cases where the demands are higher on the interlock switch head, there is a version with a plastic body and with a stainless steel head. Both these types give the MKey5 interlock switch a rating of IP67.

In harsh applications as for food processing and chemical industry there is a MKey5 Interlock switch with a total rugged stainless steel 316 body. This version has IP69K enclosure protection (maintained by a double seal lid gasket) and can be high pressure hosed with detergent at high temperature.

### Positive forced disconnected contacts

A positive forced contact provides a forced disconnect of the safety contacts at the withdrawal of the actuator. The design of the MKey5 ensures that the contacts will not fail

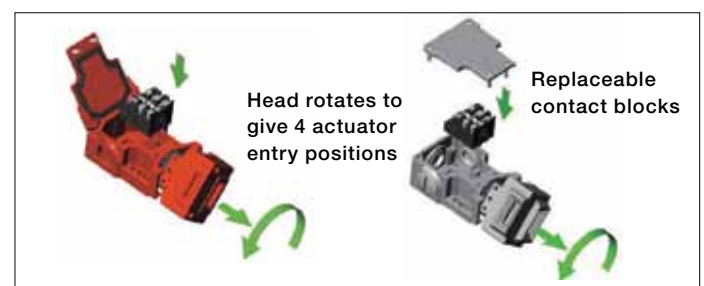
or be held in a normally closed position, due to failure of the spring mechanism or that welding/sticking of the contacts can occur.

### Safety level

The positive forced disconnect contacts gives a high safety level and the interlock switch has an anti-tamper mechanism. By combining the MKey5 with one of our suitable safety control module, for example a safety relay from the RT-series, Pluto safety-PLC or Vital module, the requirements for both hatch and gate switch supervision can be fulfilled. To obtain the highest level of safety, two switches per gate are required.

### Regulations and Standards

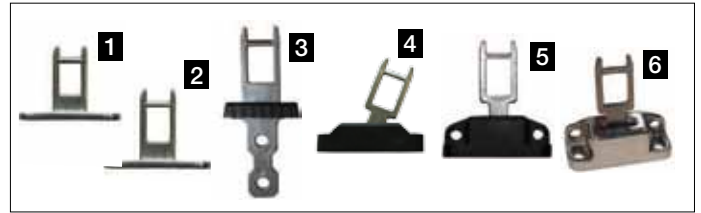
The MKey5 is designed and approved in accordance to relevant standards. Examples of relevant standards are EN1088, IEC/EN60947-5-1, EN60204-1, EN ISO13849-1, EN62061 and UL508.



**Note!** The switch should not be used as an end stop!

## Technical data – MKey5 series

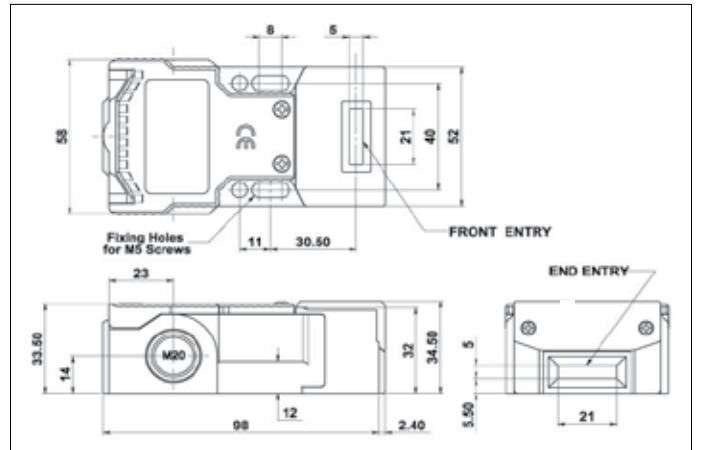
<b>Supplier</b>	ABB AB Jokab Safety, Sweden
<b>Article number/ Ordering data Standard</b>	
MKey5 - 12N	2TLA050003R0100
Mkey5+ - 40N	2TLA050003R0101
<b>Stainless steel head</b>	
MKey5 - 12N	2TLA050003R0110
MKey5+ - 40N	2TLA050003R0111
<b>Full stainless steel</b>	
MKey5Z - 12N	2TLA050003R0120
MKey5+Z - 40N	2TLA050003R0121
<b>EN ISO13849-1</b>	Up to PL e, Cat. 4 depending upon system architecture
<b>EN62061</b>	Up to SIL3 depending upon system architecture
<b>Safety data</b>	
<b>Mechanical reliability <math>B_{10d}</math></b>	2.5 x 10 <sup>6</sup> operations at 100mA load
<b>Proof test interval (life) <math>MTTF_d</math></b>	35 years 356 years (8 cycles per hour/24 hours per day/365 days)
<b>Utilisation category</b>	AC15 A300 3A
<b>Force/travel for positive opening</b>	6 mm
<b>Acuator entry mini. radius</b>	175 mm standard actuator 100 mm heavy duty actuator
<b>Max. approached/ withdrawal speed</b>	600 mm/s
<b>Actuator</b>	Stainless steel
<b>Mechanical life</b>	1 million switch operations
<b>Rated insulation/ withstand voltage</b>	500VAC / 2500VAC
<b>Vibration resistance</b>	IEC 68-2-6, 10-55Hz+1Hz, excursion: 0.35 mm, 1 octave/min
<b>Contacts (actuator key inserted)</b>	2NC + 1NO (NC are direct opening action)
<b>Thermal current (Ith)</b>	10A
<b>Enclosure protection</b>	
MKey5	IP67
MKey5Z	IP69K, IP67
<b>Operating temperature</b>	-25°C to +80°C
<b>Conduit entries</b>	3 x M20
<b>Material</b>	
MKey5	Polyester or/and stainless steel 316
MKey5Z	Stainless steel 316
<b>Colour</b>	Red or stainless steel
<b>Mounting position</b>	Any
<b>Mounting bolts</b>	Body 2 x M5, actuator 2 x M5



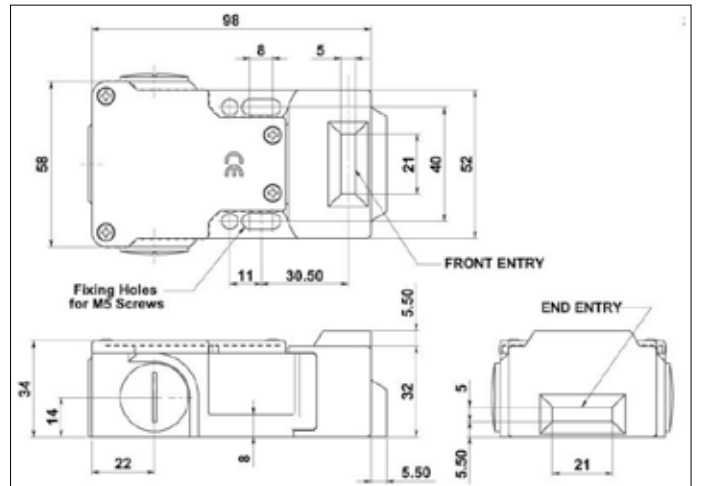
### Actuator

1. Standard Key for plastic head	2TLA050040R0201
2. Standard Key for SS head	2TLA050040R0202
3. Flat Key	2TLA050040R0220
4. Flexible Key with plastic housing	2TLA050040R0221
5. Flexible Key with metal housing	2TLA050040R0203
6. Flexible Key with SS housing	2TLA050040R0204

(Key always in Stainless steel)

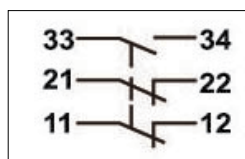


Dimension MKey5



Dimension MKey5Z

For all MKey the normally closed (NC) circuits are closed when the guard is closed (actuators inserted).



2 NC 1 NC 6.80 6 0 mm		
11/12	Open	
21/22	Open	
33/44		Open

Contact block configuration 2NC, 1NO

Contacts at withdrawal of actuator

# Safety Magnetic Switch Sense7

## Approvals:



## Application:

Gates  
Hatches  
Position control

## Features:

Small size  
Up to IP69K  
LED  
2NC + 1NO  
Solid State outputs



### Switch operational description

The coded non-contact switches Sense7 are designed to interlock hinged, sliding or removable guard doors. Its design makes it advantageous to operate in environments that require the highest level of safety.

The magnetic switch is small in size which makes it easy to position and hide on gates and hatches. Sense7 is resistant to both dirt and water, and has no dust collecting cavities, which make it useful in environments where hygiene is paramount. The magnetic switch has a long working life since no mechanical contact is necessary for operation. Sensing distance of Sense7 is 14 mm and it has a high tolerance to misalignment. Actuator is always delivered with the non-contact switch.

### Material

The Sense7 switch is available in UL approved polyester and in stainless steel 316. The stainless steel has a mirror polished finished (Ra4) suitable for CIP cleaning - food splash zones according to EHEDG guidelines.

### Protection from unauthorised or incidental access

To avoid unauthorised operation of the Sense7 switch, it is only possible to actuate the coded magnetic switch with the coded magnet. Other magnets, screwdrivers and tools have no effect on the switch contacts.

### Safety level

The Sense7 has two closing and one opening contact. Two contacts have to be monitored to achieve the highest level of safety regulations, PL e, Cat. 4 according to EN ISO13849-1 together with safety relay or Safety Pluto PLC.

### Regulations and Standards

The Sense7 is designed and approved in accordance to relevant standards. Examples of relevant standards are EN1088, IEC/EN60947-5-3, EN60204-1, EN ISO13849-1, EN62061 and UL508.



Sensing distance 14 mm



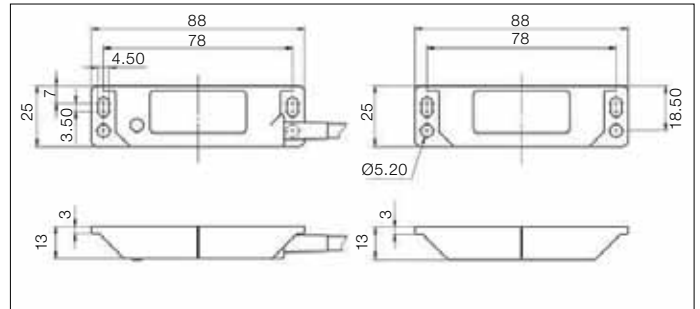
Quick connected version fitted with 250 mm cable and M12.

**Note!** Sense7 versions have 2NC and 1NO circuits. For all Sense7 switches the NC circuits are closed when the guard is closed and the actuator present.

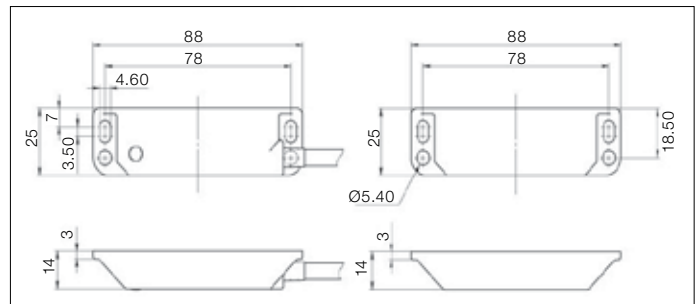


Technical data – Sense7 series	
<b>Supplier</b>	ABB AB Jokab Safety, Sweden
<b>Article number/ Ordering data</b>	
<b>Plastic</b>	
Sense7 - 2 m cable	2TLA050056R4100
Sense7 - 5 m cable	2TLA050056R5100
Sense7 - 10 m cable	2TLA050056R6100
Sense7 - 250 mm cable with M12	2TLA050056R2100
<b>Stainless steel</b>	
Sense7Z - 2 m cable	2TLA050056R4120
Sense7Z - 5 m cable	2TLA050056R5120
Sense7Z - 10 m cable	2TLA050056R6120
Sense7Z - 250 mm cable with M12	2TLA050056R2120
<b>EN ISO13849-1</b>	Up to PL e, Cat. 4 depending upon system architecture
<b>EN62061</b>	Up to SIL3 depending upon system architecture
<b>Safety data</b>	
<b>PFH<sub>D</sub></b>	2.52 x 10 <sup>-8</sup>
<b>Switching reliability</b>	3.3 x 10 <sup>6</sup> operations at 100mA load
<b>Proof test interval (life)</b>	47 years
<b>MTTF<sub>d</sub></b>	470 years (8 cycles per hour/24 hours per day/365 days)
<b>Safety channel 1NC</b>	24VDC 0.2 A max. rating
<b>Safety channel 2NC</b>	24VDC 0.2 A max. rating
<b>Safety channel 3NO</b>	24VDC 0.2 A max. rating
<b>Power supply</b>	24VDC ±10%
<b>Minimum switched current</b>	10VDC 1mA
<b>Dielectric withstand</b>	250VAC
<b>Insulation resistance</b>	100 MOhm
<b>Recommended setting gap</b>	5 mm
<b>Switching distance (target to target)</b>	Sao 10 mm close (on) Sar 20 mm open (off)
<b>Tolerance to misalignment</b>	5 mm in any direction from 5 mm setting gap
<b>Switching frequency</b>	1.0 Hz maximum
<b>Approach speed</b>	200 mm/m to 1000 mm/s
<b>Vibration resistance</b>	IEC 68-2-6, 10-55 Hz 1 mm
<b>Shock resistance</b>	IEC 68-2-27, 11 ms, 30 g
<b>Enclosure protection</b>	IP67, IP69K

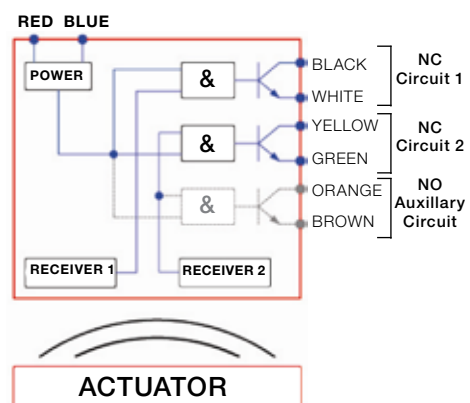
<b>Cable type</b>	PVC 8 core 6 mm O.D
<b>Operating temperature</b>	
Sense7	-25°C to +80°C
Sense7Z	-25°C to +105°C
<b>Material</b>	
Sense7	UL approved polyester
Sense7Z	Stainless steel 316
<b>Colour</b>	Red or stainless steel
<b>Mounting position</b>	Any
<b>Mounting bolts (Tightening torque)</b>	2 x M4 (1.0 Nm)



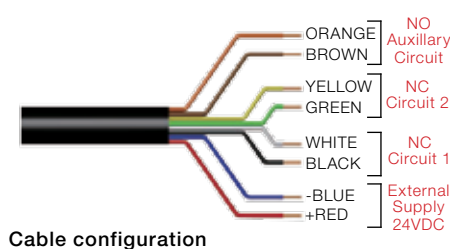
Dimension Sense7



Dimension Sense7Z



Electrical connection



Cable configuration

M12 8pol	Sense7 - 250 mm cable with M12 (Pin view from switch)	Colours
1	1	White
2	2	Red
3	3	Blue
4	4	Yellow
5	5	Brown
6	6	Green
7	7	Black
8	8	Orange

# Safety Interlock Switch

## MKey8



### Approvals:



### Application:

Gates  
Hatches

### Features:

Robust design  
8 actuating positions  
High holding force  
Up to PL e, Cat.4  
Painted metal or stainless steel  
LED status indication

### Switch operational description

MKey8 interlock safety switches are designed to provide position interlock detection and locking for moving guards. They are designed to fit the leading edge of sliding, hinged or lift off machine guards. The actuator is fitted to the moving part of the guard and is aligned to the switch entry aperture. The possibility to lock the switch in the protective position prevents unwanted access to machinery until dangerous operations have ceased.

The locking is useful when applications include:

- processes which cannot be interrupted, such as welding.
- machinery with a long stopping procedure, such as paper machinery that requires a long braking operation.
- prevention of unauthorised access to a particular area.

The head can be set in four positions, thus providing the safety device with eight different operating positions. The leading edges of the actuator key are reinforced and beveled in order to guide it properly into the hole. The MKey8 series have been developed with a high holding force of 2000N. MKey8 has several types of actuators as an option. A standard actuator key is always delivered with interlock switches.

### Material

Depending on the environment where the switch will be used, different material can be chosen for the MKey8. The basic version has a rugged die cast housing with a rating of IP67. In harsh applications as for food processing and chemical industry there is a MKey8 Interlock switch with a total rugged stainless steel 316 body. This version has IP69K enclosure

protection (maintained by a double seal lid gasket and seals) and can be high pressure hosed with detergent at high temperature.

### Two ways to interlock

The MKey8 is available in two basic versions, either with a spring lock or an electro-magnetic lock.

In the spring lock version, the locking mechanism moves into the locked position directly when the door is closed and the actuator key is pushed into the switch. The actuator key can only be released and the gate opened by supplying operational voltage to the solenoid (A1-A2).

The MKey8 also has an emergency rear release 'unlocking' facility to enable the actuator key to be released without the energisation of the solenoid (A1-A2). This version is called MKey8ER.

MKey8M is the electro-magnetic lock version, the locking mechanism is only in the locked position when the solenoid (A1-A2) is supplied with operating voltage. Release of the actuator key is only possible when the operating voltage is removed from the solenoid (A1-A2). The solenoid voltage can be 24VDC or 230VAC depending on choice.

### Safety level

The MKey8 has double forced disconnection contacts connected to the actuator key and the locking mechanism. The actuator key is designed to protect against unauthorised access; no tools, magnets or similar allow that the MKey8 can be tampered with. To achieve highest safety level in connection with the machine control system, it is recommended that the MKey8 is monitored by an appropriate ABB Jokab Safety safety relay, Pluto safety-PLC or Vital system. To obtain the highest level of safety, two switches per gate are required.

# MKey8, MKey8M and MKey8Z

## MKey8 -Standard version with spring lock

The version of MKey8 with die cast housing and spring lock. The switch has a contact block configuration of 2NC + 2NC with positive force disconnection contacts. One pair closes when the actuator key is pushed into the head (2NC). The other pair closes when the locking mechanism is in the locked position (2NC). There are two NO auxiliary circuits, 1NO circuit with indication of guard open and on another 1NO circuit indication of lock status.



MKey8

MKey8Z

## MKey8Z - Stainless Steel version with spring lock

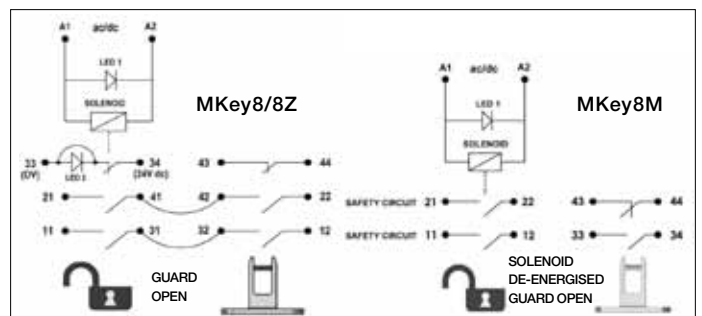
The version of MKey8 with rugged stainless steel housing and spring lock. The switch has a contact block configuration of 2NC + 2NC with positive force disconnection contacts. One pair closes when the actuator key is pushed into the head (2NC). The other pair closes when the locking mechanism is in the locked position (2NC). There are two NO auxiliary circuits, 1NO circuit with indication of guard open and on another 1NO circuit indication of lock status.



MKey8M

## MKey8M - Power to lock version with magnetic lock

The version of MKey8 with die cast housing and magnetic lock. The switch has a contact block configuration of 2NC + 1 (NC + NO) with positive force disconnection contacts. One pair closes when the actuator key is pushed into the head (1NC + 1NO). The other pair closes when the locking mechanism is in the locked position (2NC). A 1NO/1NC circuit gives an indication of actuator status.



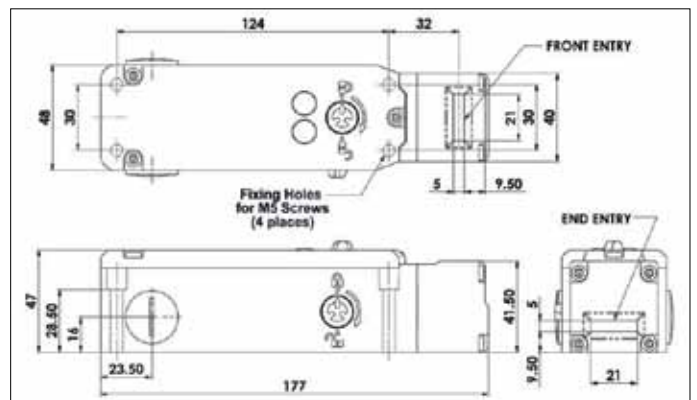
Schematic circuit: LED1 status of solenoid, LED2 status of lock (Terminals 33 - 34 are selectable to be used either as power feed to LED2 or as a voltage free auxiliary circuit to indicate lock status).

	6.0	5.0	0 mm
11/12	Open		
21/22	Open		
33/44			Open
43/44			Open

MKey8/8Z, Contacts at withdrawal of actuator.

	6.0	5.0	0 mm
11/12	Open		Solenoid energised
21/22	Open		Solenoid energised
33/34	Open		Tongue Inserted
43/44		Open	Tongue Inserted

MKey8M, Contacts at withdrawal of actuator.



Dimensions MKey8, MKey8M and MKey8Z

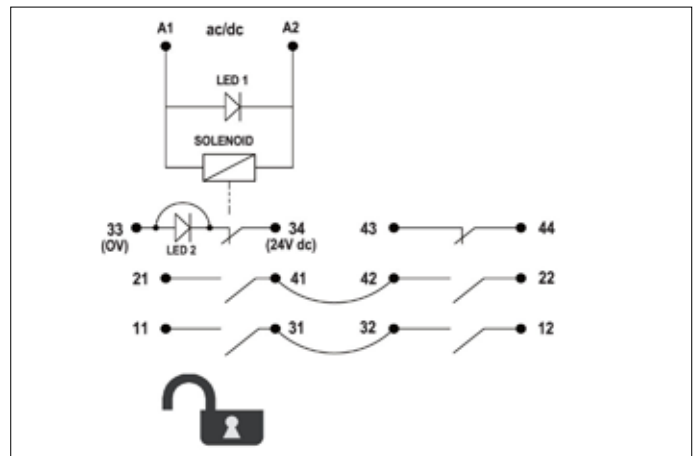
# MKey8ER

## MKey8ER - Standard version with emergency release

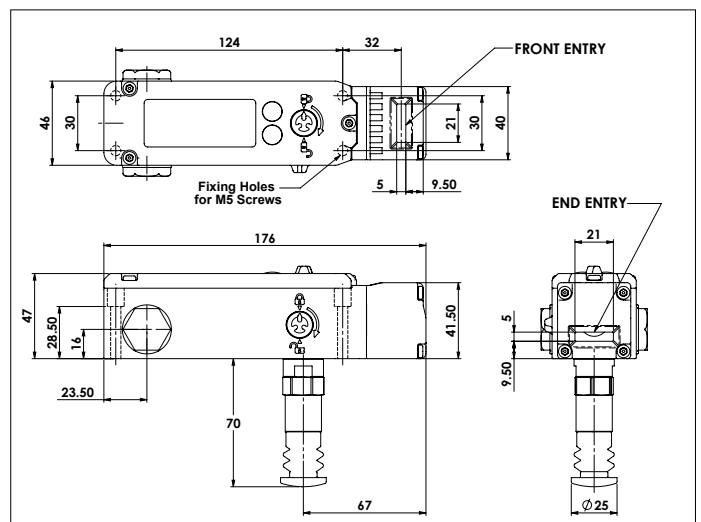
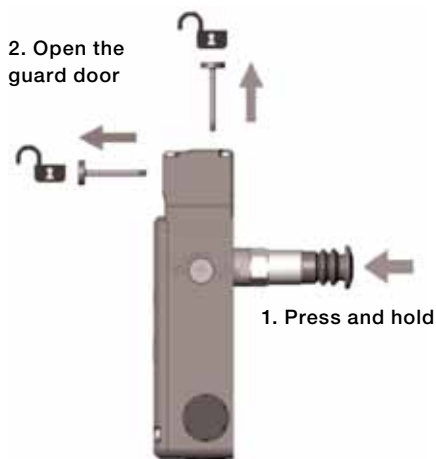
The version of MKey8 with die cast housing and spring lock with Emergency release. The switch has a contact block configuration of 2NC + 2NC with positive force disconnection contacts. One pair closes when the actuator key is pushed into the head (2NC). The other pair closes when the locking mechanism is in the locked position (2NC). There are two NO auxiliary circuits, 1NO circuit that indicates guard open and 1NO circuit that indicates lock status.

## Features

The MKey8ER has manual release button at the rear of the housing. This can be used where the risk assessment for the application permit, a non latching manual escape of the switch lock in case of emergency. The switch must be mounted so that the release button is reachable from inside the active guard area. Press and holding the red button will release the lock mechanism and lock monitoring contacts while the guard can be pushed open.



LED1 status of solenoid LED2 status of lock (terminals 33-34 are selectable to be used either as power feed to LED2 or as a voltage free auxiliary circuit to indicate lock status).



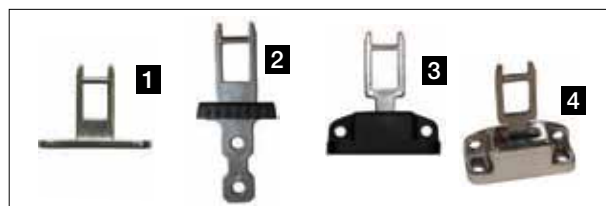
Dimensions MKey8ER

Technical data – MKey8 series	
<b>Supplier</b>	ABB AB Jokab Safety, Sweden
<b>Article number/ Ordering data MKey8 - Standard</b> MKey8 - 24VDC MKey8 - 230VAC	2TLA050011R0132 2TLA050011R0134
<b>MKey8M - Power to Lock</b> MKey8M - 24VDC MKey8M - 230VAC	2TLA050013R0132 2TLA050013R0134
<b>MKey8ER - Emergency release</b> MKey8ER - 24VDC MKey8ER - 230VAC	2TLA050015R0132 2TLA050015R0134
<b>MKey8Z - Stainless Steel</b> MKey8Z - 24VDC MKey8Z - 230VAC	2TLA050011R0122 2TLA050011R0124
<b>EN ISO13849-1</b>	Up to PL e, Cat. 4 depending upon system architecture
<b>EN62061</b>	Up to SIL3 depending upon system architecture
<b>Safety data</b>	
<b>Mechanical reliability B<sub>10d</sub></b>	2.5 x 10 <sup>6</sup> operations at 100mA load
<b>Proof test interval (life)</b>	35 years
<b>MTTF<sub>d</sub></b>	356 years (8 cycles per hour/24 hours per day/365 days)
<b>Utilisation category</b>	AC15 A300 3A
<b>Solenoid voltage (by part number)</b>	24VDC or 230VAC
<b>Solenoid power consumption</b>	12 W (MKey8M inrush 50 W)
<b>LED 2 supply voltage</b>	24VDC (MKey8, MKey8ER, MKey8Z)
<b>Travel for positive opening</b>	10 mm
<b>Actuator entry mini. radius</b>	175 mm standard actuator 100 mm heavy duty actuator
<b>Max. approached/ withdrawal speed</b>	600 mm/s
<b>Rated insulation/ withstand voltages</b>	600VAC / 2500VAC
<b>Vibration resistance</b>	IEC 68-2-6, 10-55 Hz+ 1 Hz excursion: 0.35 mm 1 octave/min.
<b>Thermal current (I<sub>th</sub>)</b>	5A

### Regulations and Standards

The MKey8 is designed and approved in accordance to relevant standards. Examples of relevant standards are EN1088, IEC/EN60947-5-1, EN60204-1, EN ISO13849-1, EN62061 and UL508.

<b>Enclosure protection</b> MKey8/M/ER MKey8Z	IP67 IP69K, IP67
<b>Operating temperature</b> MKey8 MKey8M MKey8ER MKey8Z	-25°C to +55°C -25°C to +40°C -25°C to +55°C -25°C to +55°C
<b>Conduit entries</b>	3 x M20
<b>Material</b> MKey8/M/ER MKey8Z	Die cast painted red Stainless steel 316
<b>Colour</b>	Red or stainless steel
<b>Mounting position</b>	Any
<b>Mounting bolts</b>	4 x M5



#### Actuator

- |                                    |                 |
|------------------------------------|-----------------|
| 1. Standard Key for SS head        | 2TLA050040R0202 |
| 2. Flat Key                        | 2TLA050040R0220 |
| 3. Flexible Key with metal housing | 2TLA050040R0203 |
| 4. Flexible Key with SS housing    | 2TLA050040R0204 |
- (Key always in Stainless steel)



Manual release key for MKey8Z  
2TLA050040R0400



Top or side manual release points (not on MKey8M)

8 actuators entry positions rotatable head

# Safety Interlock Switch

## MKey9



### Switch operational description

The MKey9 interlock safety switches are design to provide position interlock detection and locking for moving guards. They are designed to fit the leading edge of sliding, hinged or lift off machine guards. The actuator is fitted to the moving part of the guard and is aligned to the switch entry aperture. The possibility to lock the switch in the protective position prevents unwanted access to machinery until dangerous operations have ceased.

The locking is useful when applications include:

- processes which cannot be interrupted, such as welding.
- machinery with a long stopping procedure, such as paper machinery, that requires a long braking operation.
- prevention of unauthorised access to a particular area.

The head can be set in four positions, thus providing the safety device with eight different operating positions. The leading edges of the actuator key are reinforced and bevelled in order to guide it properly into the hole. The safety switch is design to have a high holding force of 2000N. MKey9 has several types of actuators as an option. A standard actuator key is always delivered with interlock switches.

### Material

The MKey9 is made in a rugged polyester housing with a stainless steel head which give the switch a rating of IP67.

### Two versions

The MKey9 is available in two basic versions, either with a spring lock or an electro-magnetic lock.

In the spring lock version, the locking mechanism moves

### Approvals:



### Application:

Gates  
Hatches

### Features:

Compact and robust  
8 actuating positions  
High holding force  
Up to PL e, Cat.4  
LED status indication

into the locked position directly when the door is closed and the actuator key is pushed into the switch. The actuator key can only be released and the gate opened by supplying operational voltage to the solenoid (A1-A2).

MKey9M is the electro-magnetic lock version, the locking mechanism is in the locked position when the solenoid (A1-A2) is supplied with operating voltage. Release of the actuator key is only possible when the operating voltage is removed from the solenoid (A1-A2). The solenoid voltage is 24VDC.

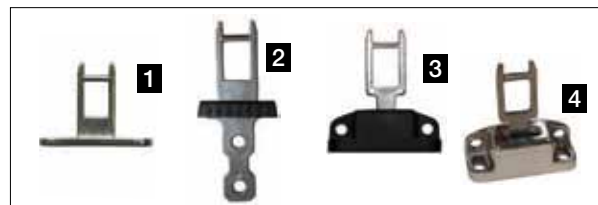
### Safety level

The MKey9 has double forced disconnection contacts to the actuator key and the locking mechanism. The actuator key is designed to protect against unauthorised access; no tools, magnets or similar allow that the MKey9 can be tampered with. To achieve maximum safety level in connection with the machine control system, it is recommended that the MKey9 is monitored by an appropriate ABB Jokab Safety safety relay, Pluto safety-PLC or Vital system. To obtain the highest level of safety, two switches per gate are required.

### Regulations and Standards

The MKey9 is designed and approved in accordance to relevant standards. Examples of relevant standards are EN1088, IEC/EN60947-5-1, EN60204-1, EN ISO13849-1, EN62061 and UL508.

Technical data – MKey9 series	
<b>Supplier</b>	ABB AB Jokab Safety, Sweden
<b>Article number/ Ordering data</b>	MKey9 - 24VDC MKey9M - 24VDC (power to lock)
<b>EN ISO13849-1</b>	Up to PL e, Cat. 4 depending upon system architecture
<b>EN62061</b>	up to SIL3 depending upon system architecture
<b>Safety data</b>	
<b>Mechanical reliability B<sub>10d</sub></b>	2,5 x 10 <sup>6</sup> operations at 100mA load
<b>Proof test interval (life) MTTF<sub>d</sub></b>	35 years 356 years (8 cycles per hour/24 hours per day/365 days)
<b>Utilisation category</b>	AC15 A300 3A
<b>Solenoid voltage</b>	24VDC
<b>Solenoid power consumption</b>	MKey9 12 W MKey9M 12 W (Inrush 50W)
<b>LED 2 supply voltage</b>	24VDC
<b>Travel for positive opening</b>	10 mm
<b>Actuator entry mini. radius</b>	175 mm standard actuator 100 mm heavy duty actuator
<b>Max. approached/ withdrawal speed</b>	600 mm/s
<b>Rated insulation/ withstand voltages</b>	600VAC / 2500VAC
<b>Vibration resistance</b>	IEC 68-2-6, 10-55 Hz+ 1 Hz excursion: 0.35 mm 1 octave/min.
<b>Thermal current (Ith)</b>	5A
<b>Conduit entry</b>	1 x M20
<b>Enclosure classification</b>	IP67
<b>Operating temperature</b>	MKey9 -25°C to +55°C MKey9M -25°C to +40°C
<b>Head/body material</b>	Stainless steel 316/polyester
<b>Colour</b>	Red
<b>Mounting position</b>	Any
<b>Mounting bolts</b>	4 x M5



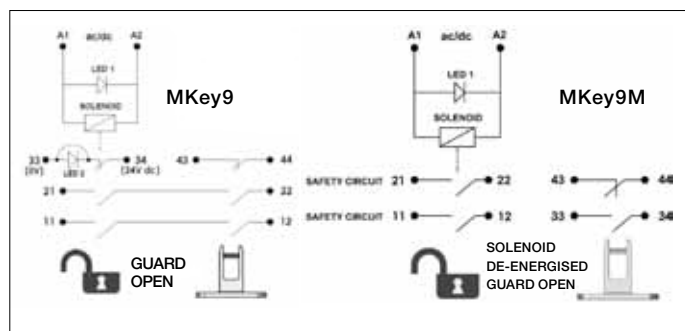
**Actuator**

- |                                    |                 |
|------------------------------------|-----------------|
| 1. Standard Key for SS head        | 2TLA050040R0202 |
| 2. Flat Key                        | 2TLA050040R0220 |
| 3. Flexible Key with metal housing | 2TLA050040R0203 |
| 4. Flexible Key with SS housing    | 2TLA050040R0204 |
- (Key always in Stainless steel)

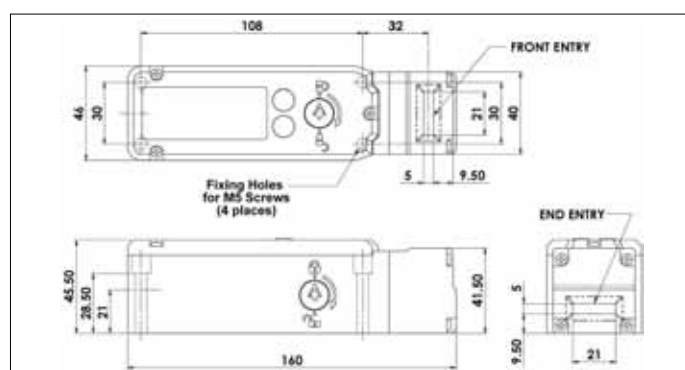


Top or side manual release points (not on MKey9M)

8 actuator entry positions rotatable head



Schematic circuit MKey9 LED1 status of solenoid LED2 status of lock (Terminals 33 - 34 are selectable to be used either as power feed to LED2 or as a voltage free auxiliary circuit to indicate lock status).



Dimensions MKey9 and MKey9M

	6.0	5.0	0 mm
11/12	Open		
21/22	Open		
33/34			Open
43/44			Open

MKey9, Contacts at withdrawal of actuator.

	6.0	5.0	0 mm
11/12	Open		Solenoid energised
21/22	Open		Solenoid energised
33/34	Open		Tongue Inserted
43/44		Open	Tongue Inserted

MKey9M, Contacts at withdrawal of actuator.

# Emergency Stop

## EStrongZ

### Approvals:



### Application:

To stop a machine or a process

### Features:

- Compact and robust
- Universal installation
- Stainless steel
- LED status indication (optional)
- 2NO + 2NC



### Switch operational description

The EStrongZ is an emergency stop designed to provide a robust unit in exposed and severe environments. Perfect for industries that have special demands.

The contact block configuration is a 2NC and 2NO and the emergency stop is mounted with 4 x M4 screws from the inside.

The EStrongZ has a special lid that is mechanical linked to the emergency stop safety mechanism. This means that the safety contacts will open if the lid is removed. An optional feature gives the EStrongZ a two colour LED that can be seen easily from a distance.

### Material

The EStrongZ is available in a total rugged stainless steel 316 body, developed for applications such as food processing and chemical industry. With a double seal lid gasket and seals, the EStrongZ has an IP69K enclosure protection and therefore can be high pressure hosed with detergent at high temperature.

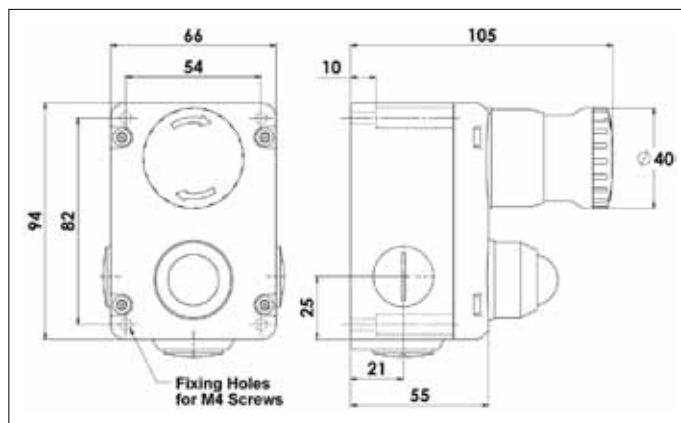
### Regulations and Standards

The EStrongZ is designed and approved in accordance to relevant standards. Examples of relevant standards are IEC/EN60947-5-1, IEC/EN60947-5-5, EN62061, UL508, ISO13850 and EN ISO13849-1.





Technical data – EStrongZ series	
<b>Supplier</b>	ABB AB Jokab Safety, Sweden
<b>Article number/ Ordering data</b>	EStrongZ EStrongZ (LED)
<b>EN ISO13849-1</b>	Up to PL e, Cat. 4 depending upon system architecture
<b>EN62061</b>	Up to SIL3 depending upon system architecture
<b>Safety data</b>	
<b>Mechanical reliability <math>B_{10d}</math></b>	1.5 x 10 <sup>6</sup> operations at 100mA load
<b>Proof test interval (life) MTTF<sub>d</sub></b>	21 years 214 years (8 cycles per hour/24 hours per day/365 days)
<b>Torque settings</b>	Mounting M5 4.0Nm Lid T20 Torx M4 1.5Nm Terminals 1.0Nm
<b>Termination</b>	Clamp up to 2.5 mm <sup>2</sup> conductors
<b>Short circuit overload protection</b>	Fuse extenally 10A (FF)
<b>Rated insulation/ withstand voltages</b>	500VAC / 2500VAC
<b>Utilisation category</b>	AC15 A300 3A
<b>Shock resistance</b>	15 g 11 ms
<b>Thermal current (I<sub>th</sub>)</b>	10A
<b>Conduit entries</b>	3 x M20
<b>Enclosure classification</b>	IP67, IP69K
<b>Operating temperature</b>	-25°C to +80°C
<b>Weight</b>	820 g
<b>Contact type</b>	IEC/EN60947-5-1 double break typ Zb snap action
<b>Contact material</b>	Silver
<b>Enclosure / Cover</b>	Stainless steel 316
<b>Mounting position</b>	Any
<b>Mounting bolts</b>	4 x M4



Dimensions EStrongZ (LED)

# Emergency Stop Grab Wire Safety Switches

## Application

ABB Jokab Safety Emergency stop grab wire safety switches are designed to be mounted on machines and sections of conveyors which can not be protected by guards. In contrast to traditional mushroom head type Emergency stop buttons, Emergency stop grab wire safety switches can initiate the emergency command from any point along the installed wire length, and thereby provide robust emergency stop protection for exposed conveyors and machines.

The switches have a positive mechanical linkage between the switch contacts and the wire rope. The switches also include wire-breakage monitoring. This means, on pulling or breakage (tension loss) of the wire, 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 as required according to EN418, (ISO13850).

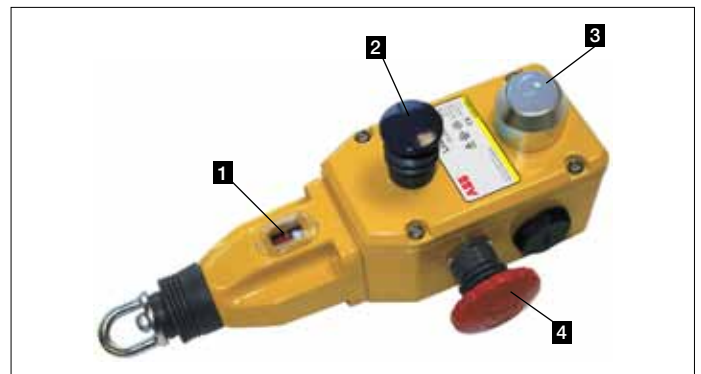
## System set up

Wire support eyebolts must be fitted at 2.5-3 meters intervals along the hole wire length and the wire must be supported no more than 500 mm from the switch eyebolt or Safety Spring (if used). It is important that the first 500 mm not are used as part of the active protection coverage. When using one switch, the wire must be anchored at the other end using a Safety spring. When using a Safety spring, a maximum of one corner pulley may be used, to ensure that the complete length of the wire is visible to either the switch or the spring anchorage. The emergency stop switches are brought into the operational condition by pre-tensioning the wire by using a tensioner / gripper device which clamps the wire 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.

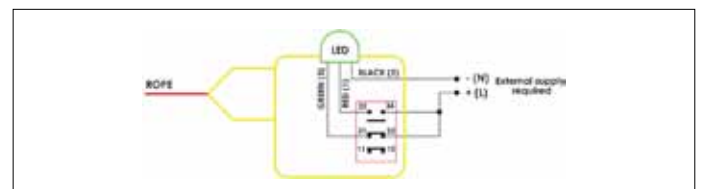
## Safety level

All ABB Jokab Safety Emergency stop grab wire safety switches conform to European Standard ISO13850 (EN418) and IEC/EN60947-5-5. They have a positive mechanical linkage between the switch contacts and the wire rope as per IEC/EN60947-5-1.

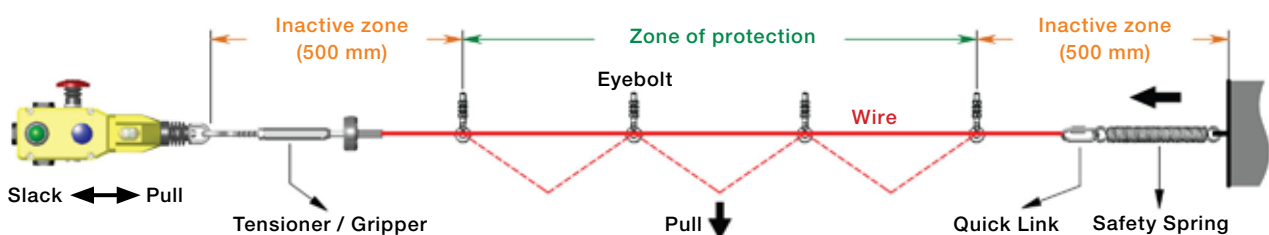
In combination with a dual channel safety monitoring relay (or safety PLC) an Emergency stop grab wire system can be used as emergency stop device monitored for up to PL e, Cat 4 according to EN ISO13849-1.



1. Tension indicator -Ensures the system is easy to set up and maintain the correct wire tension.
2. Reset button -The blue button must be pushed to reset the switch following activation by pulling or slackening of the wire.
3. Indicator LED -Can be wired to flash red in the event of the wire being pulled-switch activated, or illuminate steady green to indicate a reset switch in machine 'Run' state. Visible from long distances.
4. Mushroom type Emergency stop button -Can be installed or repositioned left or right after installation.



Wiring diagram for LED



### Reliable connectivity

When setting up an Emergency stop grab wire system from ABB Jokab Safety it is recommended to do the tensioning of the wire by using of ABB Jokab Safety Tensioner / Gripper accessory. Traditional grab wire systems normally need turnbuckle and clamps, which are difficult to tension and adjust, and also normally require frequent re-tensioning.

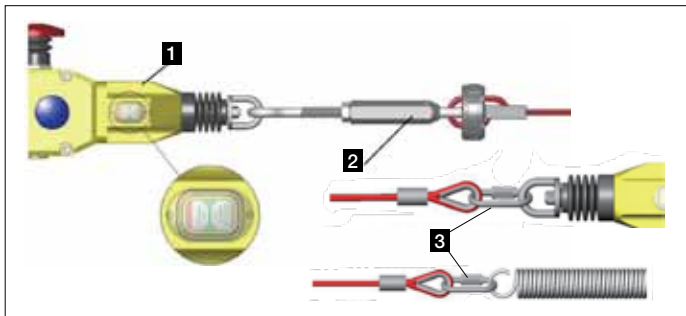
For greater reliability and ease, of installation the Tensioner / Gripper accessory significantly reduces the installation time. This by offering an eyehook, tensioner thimble and wire strength gripper in one assembly which enables rapid connection to the switch eyebolts and fast and accurate tensioning of the wire. Thanks to the switch viewing window, systems can be accurately and quickly tensioned. The double clamp mechanism prevents wire slippage and significantly reduces machine 'down time' which can occur which traditional turnbuckle systems.



Wire Tensioner / Gripper, Stainless Steel article no: 2TLA050210R4020,  
Wire Tensioner / Gripper, Galvanized article no: 2TLA050210R4030.

### Tensioner / Gripper installation

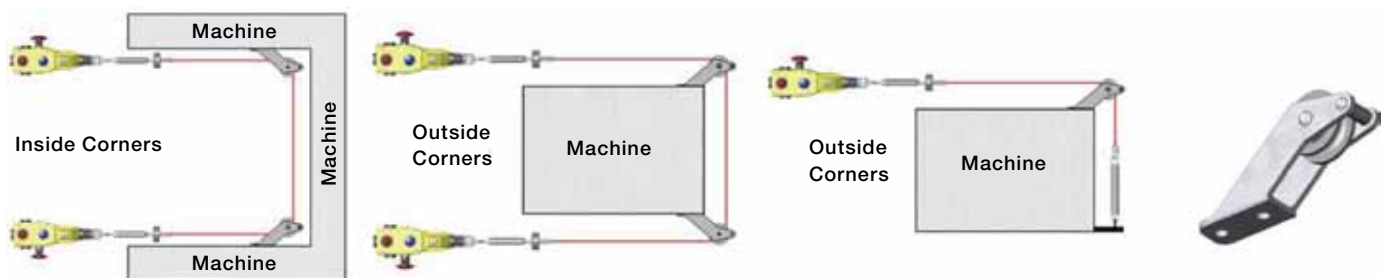
The end of the safety wire is fed through a central hole in a cone shaped guide which protrudes from the main housing. After being fed through the guide hole, the wire enters the main housing by going through a feed hole and then is looped back through 180 degrees and is fed through a second feed hole on the opposite side of the mechanism. The wire 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.



1. Tension to mid position as indicated by the green arrows in the viewing window of each switch.
2. The tensioner thimble allows immediate accurate and final tensioning of the wire, whilst viewing the tension marker through the viewing window on the switch.
3. For systems up to 50 meter Quick Link termination is provided for easy connection to either a Safety spring or Switch eyebolt. (Note for systems above 50 meter a Tensioner / Gripper is required each side).

### Navigating Corners

Because of the added friction on the eyebolts and wire when navigating corners, a corner pulley can be used to navigate inside or outside corners without causing damage to the wire. They are stainless steel and can be rigidly mounted.



Examples of using the corner pulley

# Emergency Stop Grab Wire Safety Switch LineStrong1

## Approvals:



## Application:

Machines  
Transportation lines



## Features:

Easily accessible  
Forced contacts  
Double switching in both directions of travel  
Up to 50 m Wire length  
IP67  
2NO + 2NC

### Switch operational description

LineStrong1 is an emergency stop grab wire safety switch used for easy reach of an emergency stop along machines, conveyors and processes. LineStrong1 is a compact and small, yet robust switch that can handle wires up to 30 meters on a single switch (up to 50 meters on two switches).

A grab wire emergency stop is easier to install than a system of several emergency stop buttons along a carriage path. LineStrong1 can be used as protection, for example along a conveyors with low risks where the wire can be installed at waist height in front of the conveyor, which provides an emergency stop if someone walks or falls towards the conveyor. LineStrong1 has double switching in both directions of the wire. So if someone pulls the wire or if the wire is broken, the switch goes to a safe state, e.g. the machine is emergency-stopped. After a safe state the LineStrong1 needs to be reset to be able to run again and this is made on the local reset button. LineStrong1 is equipped with an indication of how taut the wire is, which make the installation or adjustment easy.

### Material

The LineStrong1 is made a rugged die cast housing with a rating of IP67.

### Positive forced disconnected contacts

A positive forced contact provides a forced disconnect of the safety contacts when the wire is being pulled or broken. The design of the LineStrong1 ensures that the contacts will not fail or be held in a normally closed position, due to

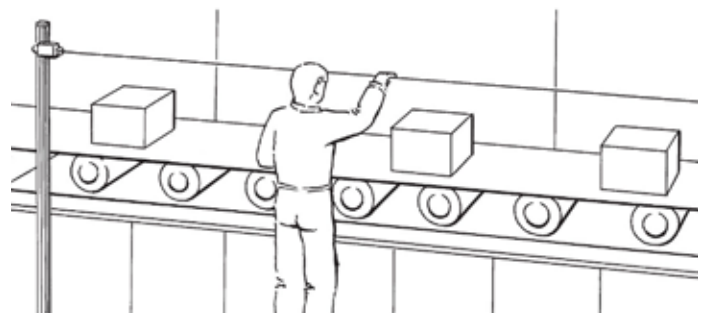
failure of the spring mechanism or that welding/sticking of the contacts can occur. The LineStrong1 switch has 2NC and 2NO contacts.

### Safety level

The forced disconnected contacts provide a high level of safety. To achieve a maximum safety level in connection with the machine control system, it is recommended that the LineStrong1 is monitored by an appropriate ABB Jokab Safety safety relay, Pluto safety-PLC or a Vital system.

### Regulations and Standards

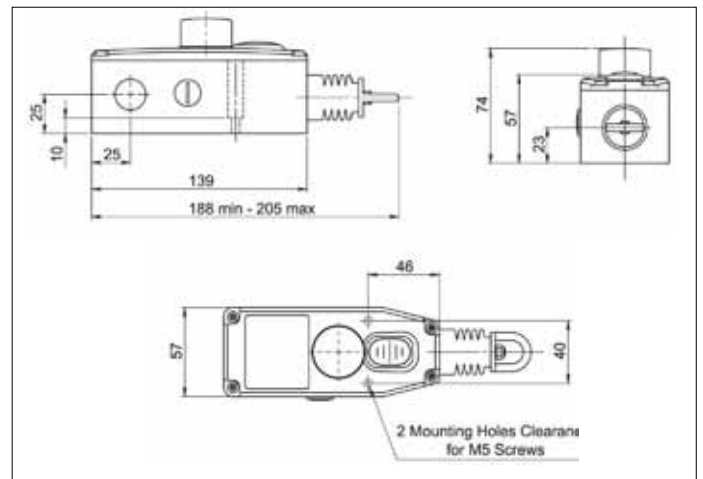
The LineStrong1 is designed and approved in accordance to relevant standards. Examples of relevant standards are IEC/EN60947-5-1, IEC/EN60947-5-5, EN62061, UL508, ISO13850 and EN ISO13849-1.



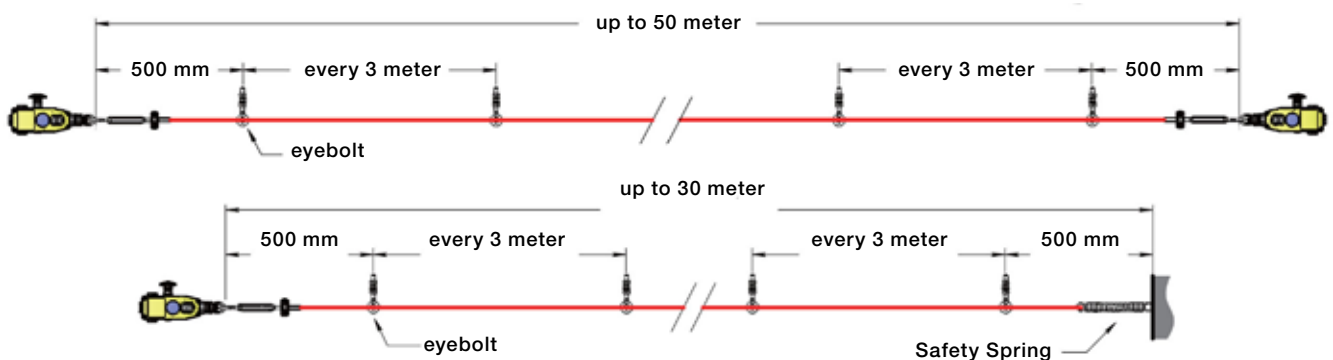
Emergency stop grab wire easily accessible during normal work operation along a machine.

Technical data – LineStrong1 series	
Supplier	ABB AB Jokab Safety, Sweden
Article number/ Ordering data LineStrong1	2TLA050200R0030
EN ISO13849-1	Up to PL e, Cat. 4 depending upon system architecture
EN62061	Up to SIL3 depending upon system architecture
Safety data	
Mechanical reliability $B_{10d}$	$1.5 \times 10^6$ operations at 100mA load
Proof test interval (life) MTTF <sub>d</sub>	21 years 214 years (8 cycles per hour/24 hours per day/365 days)
Wire span	up to 50 m
Wire tension device	Tensioner / Gripper-Quick Fixing
Wire type	PVC sheath steel wire 4.0 mm outside diameter
Torque settings	Mounting M5 4.0Nm Lid T20 Torx M4 1.5Nm Terminals 1.0Nm
Termination	Clamp up to 2.5 mm <sup>2</sup> conductors
Tension force (typical mid setting)	130N
Tension operating force (wire pulled)	< 125N < 300 mm deflection
Short circuit overload protection	Fuse externally 10 A (FF)
Rated insulation/withstand voltages	500VAC / 2500VAC

Utilisation category	AC15 A300 3A
Vibration resistance	10-500 Hz 0.35 mm
Shock resistance	15 g 11 ms
Thermal current (Ith)	10A
Contact type	IEC/EN60947-5-1 double break Typ Zb snap action
Contact material	Silver
Conduit entries	3 x M20
Enclosure classification	IP67
Operating temperature	-25°C to +80°C
Enclosure material/cover	Die cast painted yellow
Mounting position	Any
Mounting bolts	4 x M5



Dimension LineStrong1



# Emergency Stop Grab Wire Safety Switch LineStrong2



## Switch operational description

LineStrong2 is an emergency stop grab wire safety switch used for easy reach of an emergency stop along machines, conveyors and processes. LineStrong2 is a robust switch that can handle wires up to 80 meters on a single switch (up to 100 meters on two switches). A grab wire emergency stop is easier to install than a system of several emergency stop buttons along a carriage path. LineStrong2 can be used as protection, for example along conveyors with low risks, where the wire can be installed at waist height in front of the conveyor, which provides an emergency stop if someone walks or falls towards the conveyor. LineStrong2 has double switching in both directions of the wire. If someone pulls the wire or if the wire is broken, the switch goes to a safe state, e.g. the machine is emergency-stopped. After a safe state the LineStrong2 needs to be reset to be able to run again and this is made with the local reset button. Additional features on the LineStrong2 are a "normal" emergency stop that is fitted on the side of the grab wire safety switch and also a two coloured LED for indication. LineStrong2 is equipped with an indication of how taut the wire is, which make the installation and adjustment easy.

## Material

Depending on the environment where the switch will be used, different material can be chosen for the LineStrong2. The basic version has a rugged yellow die cast housing with a rating of IP67. In severe applications as for food processing and chemical industry there is a LineStrong2Z with a total rugged stainless steel 316 body. This version has IP69K enclosure protection (maintained by a double seal lid gasket

## Approvals:



## Application:

Machines  
Transportation lines

## Features:

Duplicate extraction in two directions  
Up to 100 m length  
Up to IP69K  
Integrated emergency stop button  
2NO + 2NC

and seals) and can be high pressure hosed with detergent at high temperature.

## Positive forced disconnected contacts

A positive forced contact provides a forced disconnect of the safety contacts when the wire is being pulled or broken. The design of the LineStrong2 ensures that the contacts will not fail or be held in a normally closed position, due to failure of the spring mechanism or that welding/sticking of the contacts can occur. The LineStrong2 switch has 2NC and 2NO contacts.

## Safety level

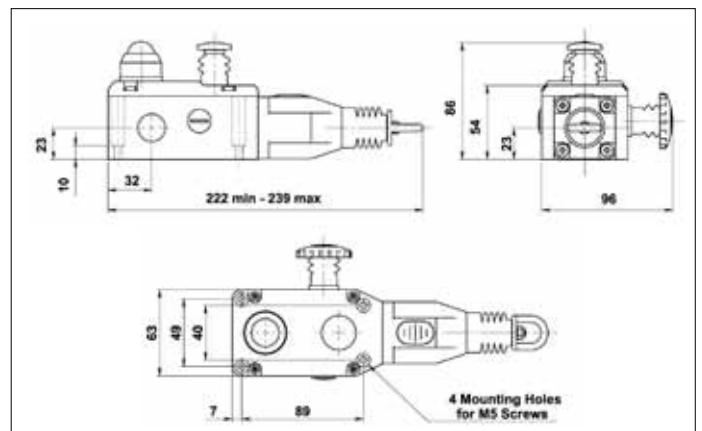
The forced disconnected contacts provide a high level of safety. To achieve a maximum safety level in the connection with the machine control system, it is recommended that the LineStrong2 is monitored by an appropriate ABB Jokab Safety safety relay, Pluto safety-PLC or a Vital system.

## Regulations and Standards

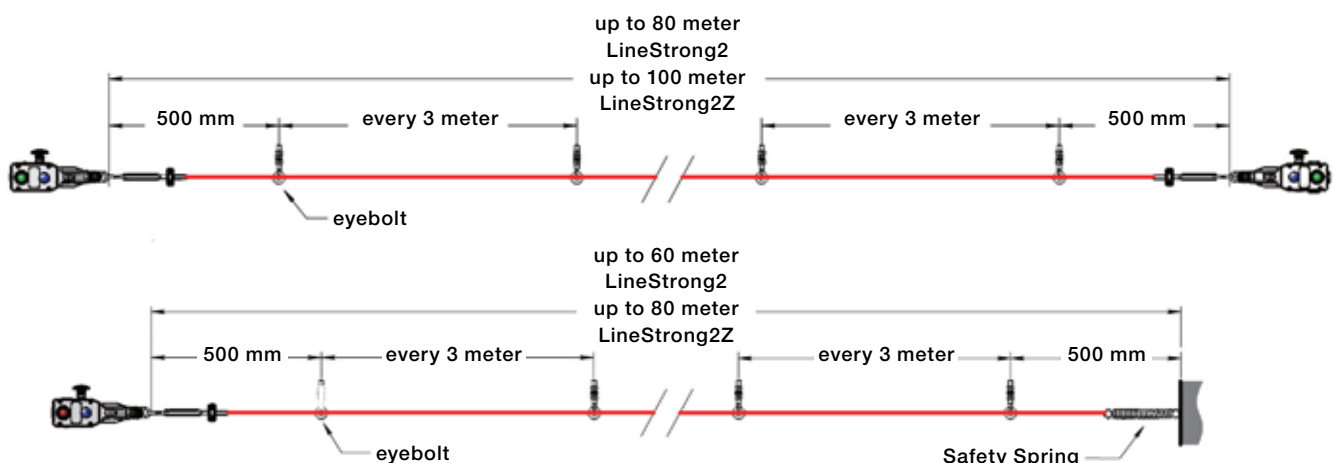
The LineStrong2 is designed and approved in accordance to relevant standards. Examples of relevant standards are IEC/EN60947-5-1, IEC/EN60947-5-5, EN62061, UL508, ISO13850 and EN ISO13849-1.

Technical data – LineStrong2 series	
<b>Supplier</b>	ABB AB Jokab Safety, Sweden
<b>Article number/ Ordering data</b> LineStrong2 LineStrong2Z	2TLA050202R0332 2TLA050202R0322
<b>EN ISO13849-1</b>	Up to PL e, Cat. 4 depending upon system architecture
<b>EN62061</b>	Up to SIL3 depending upon system architecture
<b>Safety data</b> <b>Mechanical Reliability B<sub>10d</sub></b> <b>Proof test interval (life) MTTF<sub>d</sub></b>	1.5 x 10 <sup>6</sup> operations at 100mA load 21 years 214 years (8 cycles per hour/24 hours per day/365 days)
<b>Wire span</b> LineStrong2 LineStrong2Z	Up to 80 m Up to 100 m
<b>Wire tension device</b>	Tensioner / Gripper-Quick Fixing
<b>Wire type</b>	PVC sheath steel wire 4.0 mm outside diameter
<b>Torque settings</b>	Mounting M5 4.0Nm lid T20 Torx M4 1.5Nm terminals 1.0Nm
<b>Termination</b>	Clamp up to 2.5 mm <sup>2</sup> conductors
<b>Tension force (typical mid setting)</b>	130N
<b>Tension operating force (wire pulled)</b>	< 125N < 300 mm deflection
<b>Short circuit overload protection</b>	Fuse externally 10A (FF)
<b>Rated insulation/withstand voltages</b>	500VAC / 2500VAC
<b>Utilisation category</b>	AC15 A300 3A

<b>Vibration resistance</b>	10-500Hz 0.35 mm
<b>Shock resistance</b>	15 g 11 ms
<b>Thermal current (Ith)</b>	10A
<b>Contact type</b>	IEC/EN60947-5-1 double break Typ Zb snap action
<b>Contact material</b>	Silver
<b>Conduit entries</b>	3 x M20
<b>Enclosure classification</b> LineStrong2 LineStrong2Z	IP67 IP69K, IP67
<b>Operating temperature:</b> LineStrong2 LineStrong2Z	-25°C to +80°C -25°C to +80°C (100°C cleaning)
<b>Enclosure material/cover</b> LineStrong2 LineStrong2Z	Die cast painted yellow Stainless steel 316
<b>Mounting position</b>	Any
<b>Mounting bolts</b>	4 x M5



Dimensions LineStrong2 and LineStrong2Z



# Emergency Stop Grab Wire Safety Switch LineStrong3



## Switch operational description

LineStrong3 is an emergency stop grab wire safety switch used for easy reach of an emergency stop along machines, conveyors and processes. LineStrong3 is a quite robust switch that can handle long wires, up to 250 meters on a single switch. A grab wire emergency stop is easier to install than a system of several emergency stop buttons along a carriage path. LineStrong3 can be used as protection, for example along conveyors, with low risks where the wire can be installed at waist height in front of the conveyor, which provides an emergency stop if someone walks or falls towards the conveyor.

LineStrong3 has double switching in both directions of the wire. If someone pulls the wire or if the wire is broken, the switch goes to a safe state, e.g. the machine is emergency-stopped.

After a safe state the LineStrong3 needs to be reset to be able to run again and this is made on the local reset button. Additional features on the LineStrong3 is a "normal" emergency stop fitted on the top of the grab wire safety switch and also a two coloured LED for indication.

LineStrong3 is equipped with an indication of how taut the wire is, which make the installation and adjustment easy.

## Material

Depending on the environment where the switch will be used, different materials can be chosen for the LineStrong3. The basic version has a rugged yellow die cast housing with a rating of IP67. In severe applications as for food processing and chemical industry, there is a LineStrong3Z with a total rugged stainless steel 316 body. This version has IP69K enclosure protection (maintained by a double seal lid gasket

## Approvals:



## Application:

Machines  
Transportation lines

## Features:

Duplicate extraction in two directions

Up to 250 m length

Up to IP69K

Integrated emergency stop button

4NC + 2NO

and seals) and can be high pressure hosed with detergent at high temperature.

## Positive forced disconnected contacts

A positive forced contact provides a forced disconnect of the safety contacts when the wire is being pulled or broken. The design of the LineStrong3 ensures that the contacts will not fail or be held in a normally closed position, due to failure of the spring mechanism or that welding/sticking of the contacts can occur. The LineStrong3 switch has 4NC and 2NO contacts.

## Safety level

The forced disconnected contacts provide a high level of safety. To achieve a maximum safety level in the connection with the machine control system, it is recommended that the LineStrong3 is monitored by an appropriate ABB Jokab Safety safety relay, Pluto safety-PLC or a Vital system.

## Regulations and Standards

The LineStrong3 is designed and approved in accordance to relevant standards. Examples of relevant standards are IEC/EN60947-5-1, IEC/EN60947-5-5, EN62061, UL508, ISO13850 and EN ISO13849-1.



# Single Wire

## LineStrong3L/3R and LineStrong3LZ/3RZ

### LineStrong3L/3R - Standard version

The Linestrong3L/3R are two different versions depending on installation.

L - "Left hand" - is the version of LineStrong3 where the placement of the grab wire switch is to the left in the installation.

R - "Right hand" - is the version of LineStrong3 where the placement of the grab wire switch is to the right in the installation.

Both versions have die-cast housings and are robust to severe indoor or outdoor use. LineStrong3L/3R are designed to protect a length up to 100 meters on a single switch. If two switches are used together, up to 125 meters. A two colour LED ensures switch status can be seen easily from a distance. They have 4NC and 2NO contacts to ensure flexibility with all modern control application.

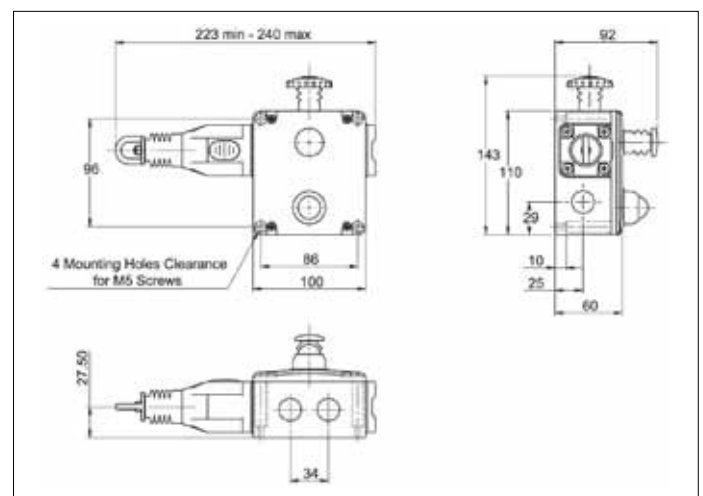
### LineStrong3LZ/3RZ - Stainless steel version

The Linestrong3LZ/3RZ are two stainless steel switches with different installations possibilities.

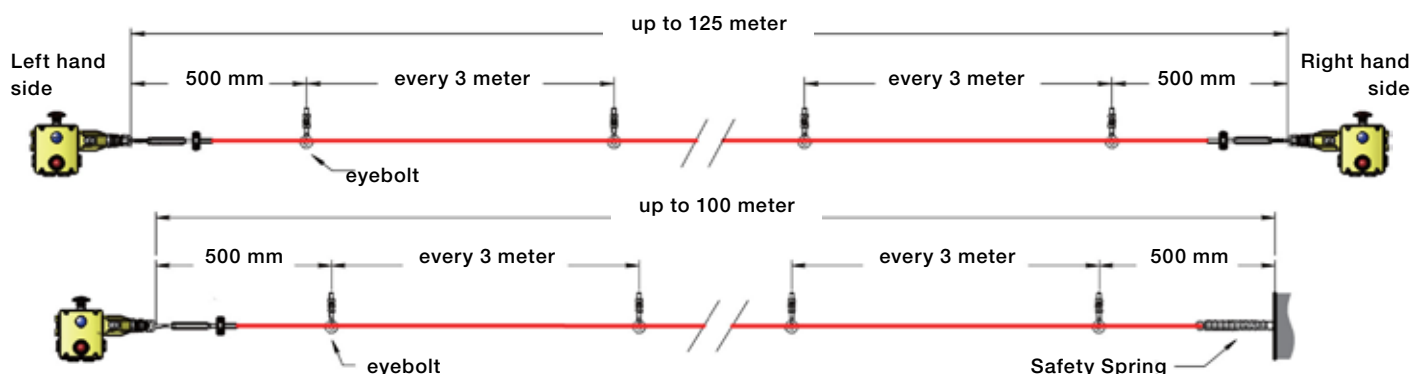
L - "Left hand" - is the version of LineStrong3Z where the placement of the grab wire switch is to the left in the installation.

R - "Right hand" - is the version of LineStrong3Z where the placement of the grab wire switch is to the right in the installation.

Both versions are in stainless steel 316 housings and are designed specifically to withstand the tough environments found in the food and pharmaceutical industries. LineStrong3LZ/3RZ are designed to protect a length up to 100 meters on a single switch. If two switches are used together, up to 125 meters. A two colour LED ensures switch status can be seen easily from a distance. They have 4NC and 2NO contacts to ensure flexibility with all modern control application.



Dimensions LineStrong3L/R and LineStrong3LZ/RZ



# Double Wire

## LineStrong3D and LineStrong3DZ

### LineStrong3D - Standard version

The Linestrong3D is a third version of the Linstrong3.

With wire entries from both sides of the grab wire switch, LineStrong3D can be used for a long protection length.

The LineStrong3D has a die-cast housing and is robust to manage severe indoor or outdoor use. LineStrong3D is designed to protect a length up to 200 meters on a single switch. If several switches are used together, it will be possible with a length up to 125 meters between the switches. A two colour LED ensures switch status can be seen easily from a distance. LineStrong3D have 4NC and 2NO contacts to ensure flexibility with all modern control application.

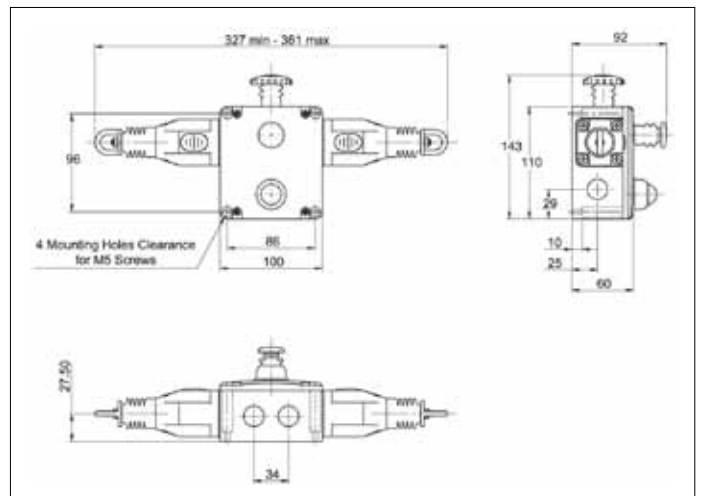


### LineStrong3DZ - Stainless steel version

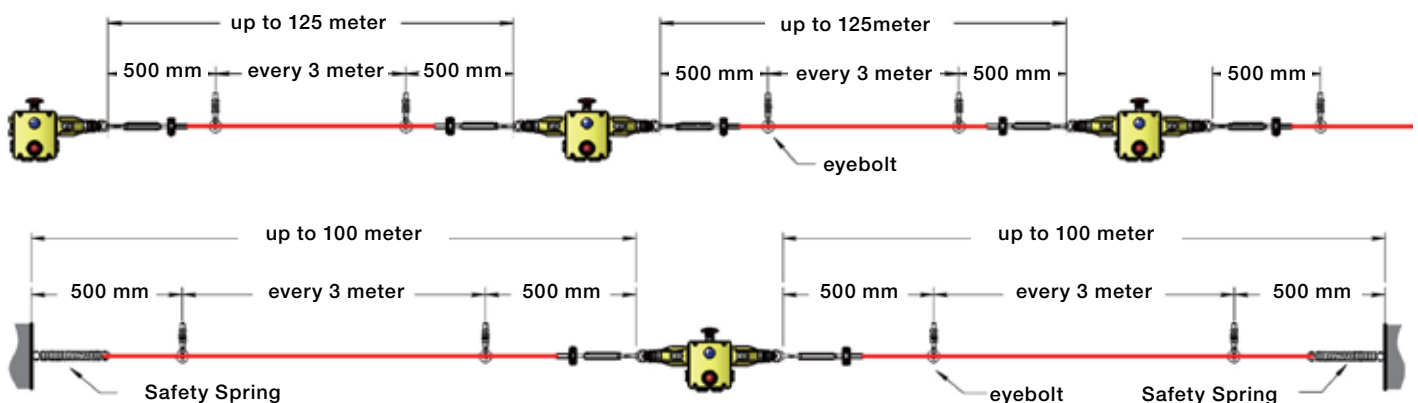
The Linestrong3DZ is a third version of the Linstrong3Z.

As a stainless steel version with wire entries on both sides of the grab wire switch, LineStrong3DZ can be used for a long protection length.

The LineStrong3DZ has stainless steel 316 housing and is designed specifically to withstand the tough environments found in the food and pharmaceutical industries. LineStrong3DZ is designed to protect a length up to 200 meters on a single switch. If several switches are used together it will be possible with a length up to 125 meters between the switches. A two colour LED ensures switch status can be seen easily from a distance. LineStrong3DZ have 4NC and 2NO contacts to ensure flexibility with all modern control application.



Dimensions LineStrong3D and LineStrong3DZ



Technical data – LineStrong3 series	
<b>Supplier</b>	ABB AB Jokab Safety, Sweden
<b>Article number/ Ordering data</b>	
LineStrong3L	2TLA050206R0332
LineStrong3R	2TLA050208R0332
LineStrong3LZ	2TLA050206R0322
LineStrong3RZ	2TLA050208R0322
LineStrong3D	2TLA050204R0332
LineStrong3DZ	2TLA050204R0322
<b>EN ISO13849-1</b>	Up to PL e, Cat. 4 depending upon system architecture
<b>EN62061</b>	Up to SIL3 depending upon system architecture
<b>Safety data</b>	
<b>Mechanical reliability <math>B_{10d}</math></b>	1.5 x 10 <sup>6</sup> operations at 100mA load
<b>Proof test interval (life) <math>MTTF_d</math></b>	21 years 214 years (8 cycles per hour/24 hours per day/365 days)
<b>Wire span</b>	
LineStrong3L/R/LZ/RZ	Up to 125 m
LineStrong3D/DZ	Up to 250 m
<b>Wire tension device</b>	Tensioner / Gripper-Quick Fixing
<b>Wire type</b>	PVC sheath steel wire 4.0 mm outside diameter
<b>Torque settings</b>	Mounting M5 4.0Nm Lid T20 Torx M4 1.5Nm Terminals 1.0Nm
<b>Termination</b>	Clamp up to 2.5 mm <sup>2</sup> conductors
<b>Tension force (typical mid setting)</b>	130N
<b>Tension operating force (wire pulled)</b>	< 125N < 300 mm deflection
<b>Short circuit overload Protection</b>	Fuse externally 10A (FF)
<b>Rated insulation/withstand voltages</b>	500VAC / 2500VAC
<b>Utilisation category</b>	AC15 A300 3A
<b>Vibration resistance</b>	10-500Hz 0.35 mm
<b>Shock resistance</b>	15 g 11 ms
<b>Thermal current (I<sub>th</sub>)</b>	10A
<b>Contact type</b>	IEC/EN60947-5-1 double break Typ Zb snap action
<b>Contact material</b>	Silver
<b>Conduit entries</b>	4 x M20
<b>Enclosure classification</b>	
LineStrong3D/L/R	IP67
LineStrong3LZ/RZ/DZ	IP69K, IP67

<b>Operating temperature:</b>	
LineStrong3L/R/D	-25°C to +80°C
LineStrong3LZ/RZ/DZ	-25°C to +80°C (100°C cleaning)
<b>Enclosure material/cover:</b>	
LineStrong3L/R/D	Die cast painted yellow
LineStrong3LZ/RZ/DZ	stainless steel 316
<b>Mounting position</b>	Any
<b>Mounting bolts</b>	4 x M5

# Emergency Stop Grab Wire Safety Switch

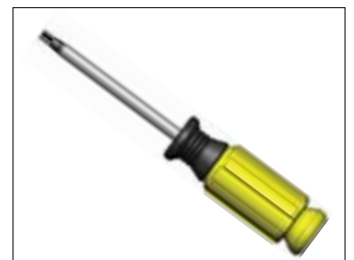
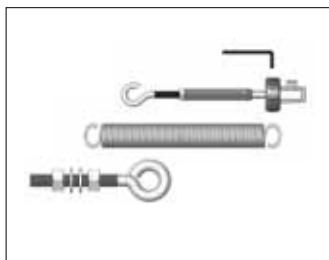
## Accessories

Accessories	
<b>Supplier</b>	ABB AB Jokab Safety, Sweden
<b>Article number/ Ordering data</b>	
<b>Galvanized wire pull kits</b>	
10 m wire kit	2TLA050210R0130
20 m wire kit	2TLA050210R0330
80 m wire kit	2TLA050210R0630
100 m wire kit	2TLA050210R0730
<b>Stainless steel wire pull kits</b>	
50 m wire kit	2TLA050210R0520
100 m wire kit	2TLA050210R0720
<b>Wire only</b>	
10 m wire	2TLA050210R2120
80 m wire	2TLA050210R2520
100 m wire	2TLA050210R2620
1 m wire (order by length)	2TLA020034R0500
<b>Wire Tensioner / Gripper</b>	
Tensioner / Gripper, galvanized	2TLA050210R4030
Tensioner / Gripper, stainless steel	2TLA050210R4020
<b>Corner pulley</b>	
Corner pulley, galvanized	2TLA050210R6030
Corner pulley, stainless steel	2TLA050210R6020
<b>Eyebolt</b>	
Eyebolt, M8 x 1.25, galvanized	2TLA050210R8030
Eyebolt, M8 x 1.25, stainless steel	2TLA050210R8020
<b>General wire pull accessories</b>	
Safety spring, 220 mm long, stainless steel	2TLA050211R0004
Screw driver, Anti-Tamper, Torx T20	2TLA050211R0006
<b>Gland and plug</b>	
M20 x 1.5 gland	2TLA050040R0002
M20 x 1.5 conduit plug	2TLA050040R0004



### Wire pull kit includes:

- Wire
- Eyebolts
- Tensioner / Gripper
- Allan key



# Explosion Proof Safety Switches



ABB Jokab Safety is working on introducing a range of Explosion proof switches which satisfy the latest IECEx and ATEX standards and provide safe switching to satisfy the hazardous conditions created within the oil, chemical and food processing industries. The purpose is to combine Explosion proof protection and high functional safety requirements all in one device. These are planned to be launched later in 2012.



## Application

The ABB Jokab Safety Explosion proof safety interlock switches are designed for Petro-chemical and food applications where explosive atmosphere is present. The Interlock and Emergency stop safety switches have positively operated contacts special made for use in hazardous areas. This according to IECEx and ATEX EExd IIC T6 (gas and dust).

These switches are designed in the same way as non-explosion proof safety switches to fit to the leading edge of sliding, hinged or lift off machine guards to provide safe switching or used for easy reach of an emergency stop along machines, conveyors and processes. The difference is that the electrical switching is spark safe, which is essential in environments with a risk of explosion like petro-chemical and food production.

In addition to Explosion proof switching, and depending upon the risk assessment for the application, these switches can also be used in combination with any dual channel safety monitoring relays (or safety-PLC) to provide high functional safety.


## Material

The housings of the Explosion proof safety switches are in stainless steel 316 with high temperature stability up to 80°C. They are resistant to high temperature hosing and detergent washdown, this according to IP67 and IP69K. The electrical switching elements are fully encapsulated.

## Zones 1,21,2,22

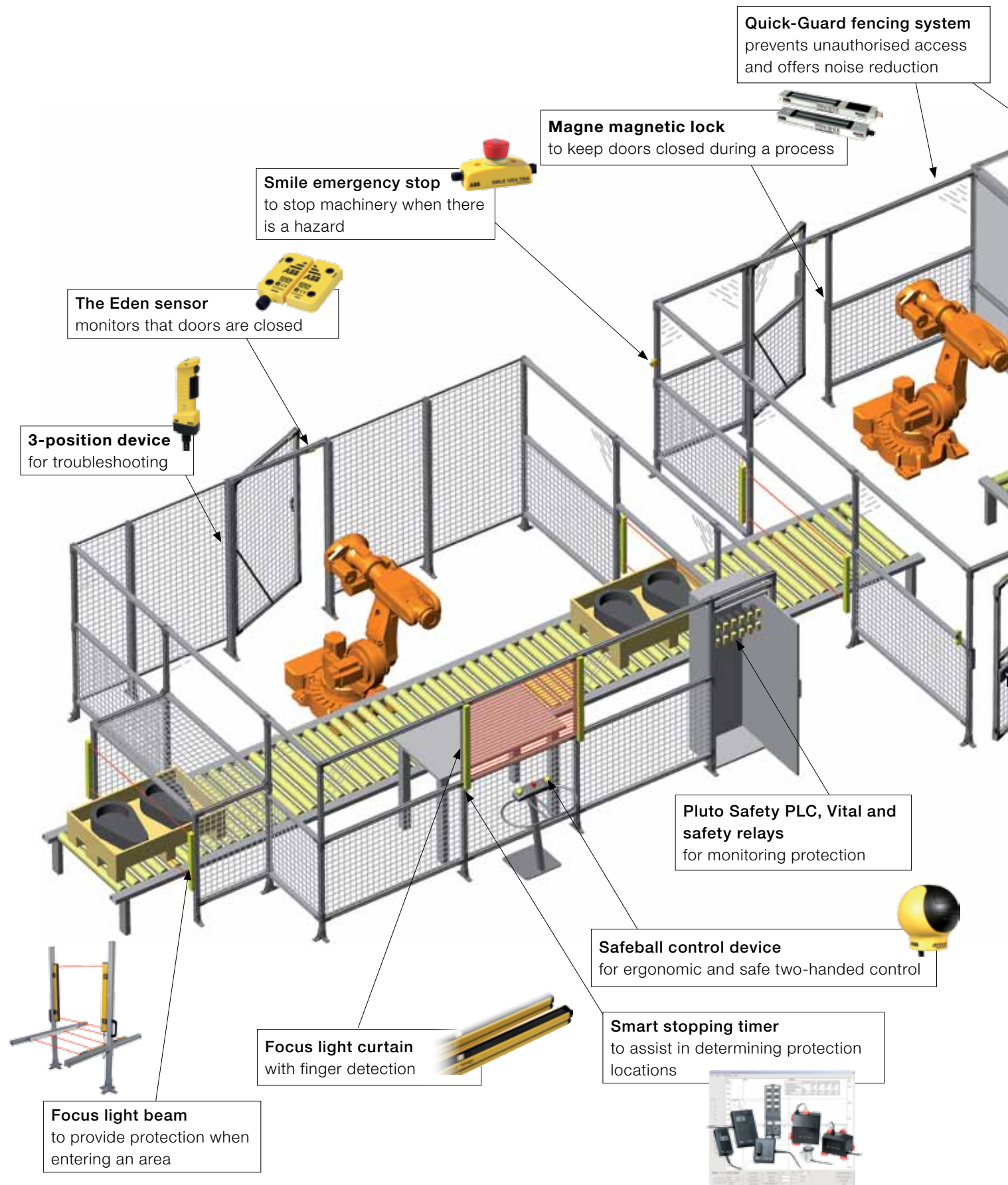
High power Switching up to 230VAC 4A. Positive break contacts to IEC/EN60947-5-5.

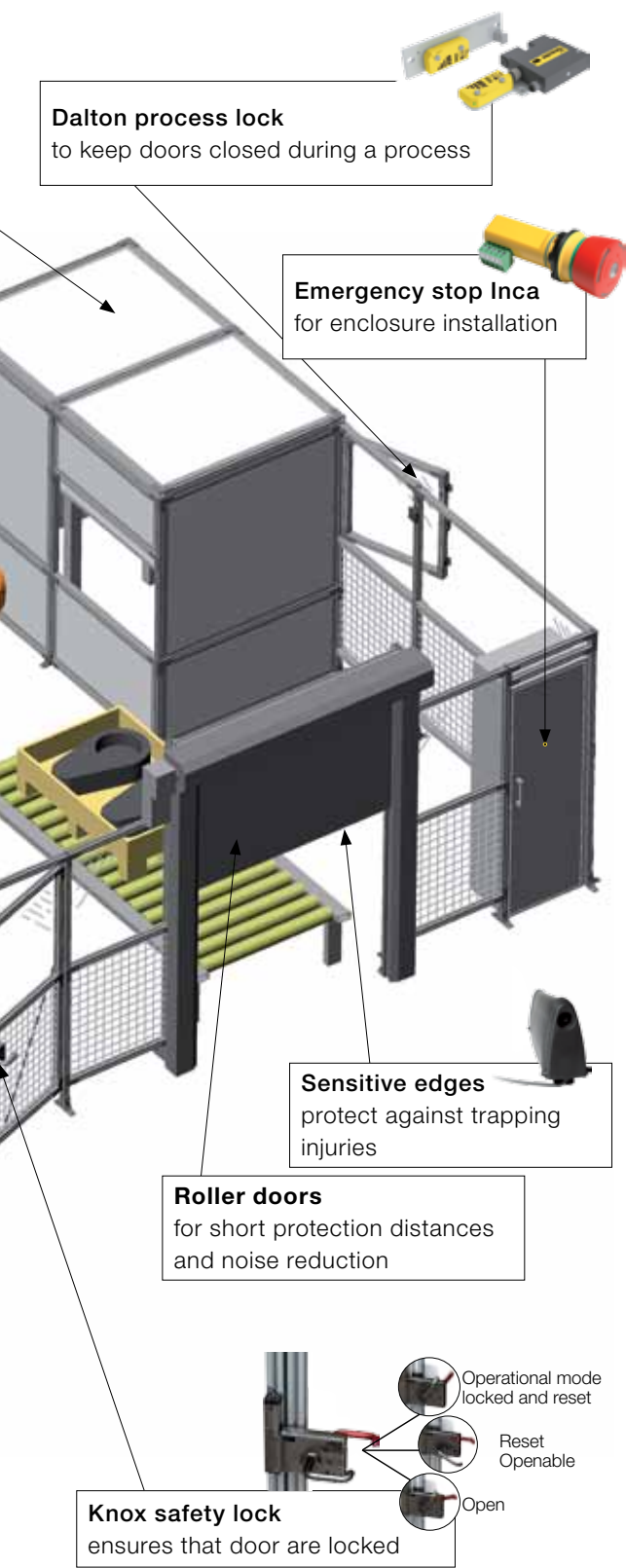
## Mechanical interlock switches and Emergency stop switches

 Exd IIC T6 (-20<Ta<+60C) Gb

 Ex tb IIIC T85C (-20<Ta<+60C) Db

# Production-friendly Safety Systems from ABB Jokab Safety





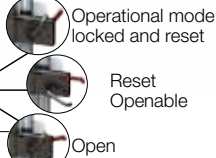
**Dalton process lock**  
to keep doors closed during a process

**Emergency stop Inca**  
for enclosure installation

**Sensitive edges**  
protect against trapping injuries

**Roller doors**  
for short protection distances and noise reduction

**Knox safety lock**  
ensures that door are locked

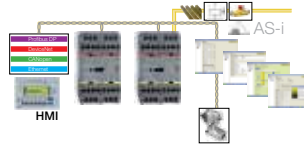


## Product family Jokab Safety



### Training & Advice

Practical application of standards and regulations, along with CE-labelling.



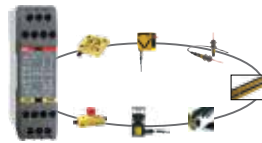
### Pluto Safety PLC

A unique All-Master safety PLC for dynamic and static safety circuits.



### Pluto AS-i

Programmable safety system AS-i where all units are connected to the same bus cable and the function of the unit is determined in the PLC program.



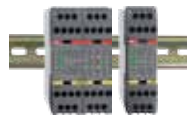
### Vital safety controller

Dynamic safety circuit for multiple protection according to the highest safety category



### Tina adapter units

Transformation of static signals to dynamic safety signals, etc.



### Safety relays

The market's most flexible safety relays for different protection purposes and categories.



### Stopping time & machinery diagnosis

Used for stopping time measurement, annual maintenance and for trouble - shooting machinery.



### Light curtain/light beam/scanner

Complete range of light beams, light curtains and scanners.



### Sensors/switches/locks

Dynamic non-contact sensors, safety switches, magnetic switches and locks.



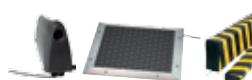
### Control devices

Ergonomic three-position control units, two-hand control units and foot pedals.



### Emergency stop devices

Emergency stop devices for dynamic and static safety circuits.



### Contact strips/Bumpers/Safety mats

Sensitive edges, bumpers and safety mats.



### Fencing systems/SafeCAD/Roller doors

A stable and flexible fencing system that is easy to install.

# Contact us

## **ABB AB**

### **Jokab Safety**

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