



Sensors/Switches/Locks

Why should you use sensors/switches?	9/3
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Non-contact safety sensor

Eden	9/5
Eden AS-i	9/7
Safety Magnetic Switch - Sense7	9/13

Magnetic lock

Magne	9/15
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Process lock

Dalton	9/21
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Safety and process lock

Knox	9/27
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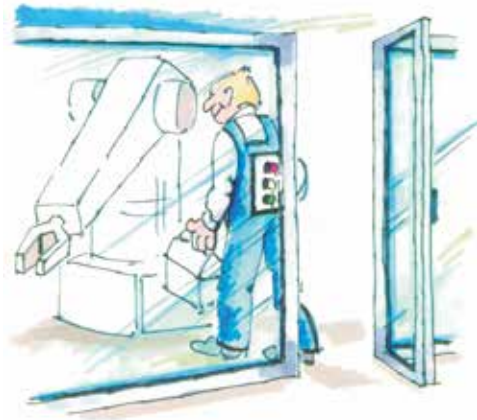
Safety Interlock Switch

Safety Interlock Switch - MKey5	9/33
Safety Interlock Switch - MKey8	9/35
Safety Interlock Switch - MKey9	9/39

Why should you use sensors/switches?

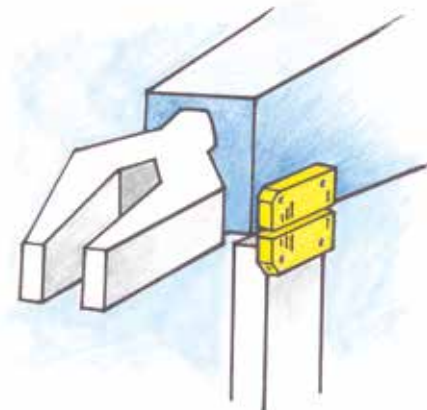
– to supervise doors and hatches around dangerous machines!

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, via a signal, to lock a gate during processes that cannot 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 position is reached!

The sensor monitors that the robot is standing still in a monitored position when someone enters the robot's working area. The robot is then only stopped by the program, not by loss of power. If the robot leaves the position the power will be cut directly. This is used when the robot can not be stopped safely without resolving in restarting problems.



– to manage the safety in harsh environments!

Non-contact dynamic sensors have a long lifetime because they are not physically 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 sensors are small, they are very easy to position and can even be completely concealed in doors and hatches.



Eden – highest safety level and reliability

Our recommendation is to use the Eden sensor because it is the safest and most reliable solution. The Eden sensor is a non-contact switch and has a dynamic function. Also it is possible to connect up to 30 Eden sensors in series and still achieve PL e according to 13849-1.

What requirements should one have on sensors/switches?

The sensor/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 level

**Eden -
sensor with
dynamic signal**



Magnetic switch

**Safety Interlock
switch**

Reliability

How safe is a sensor/switch?

In order to trust the safety function it is essential to be aware that a safety sensor/switch must be mounted and be used according to the specifications. The certification authorities only test the product according to the appropriate standards and to the specifications from the manufacturer.

Mechanical switches

For mechanical switches, e.g. key operated, this means that a door or a hatch has to be constructed to small tolerances in order for the switch, the key or the mounting brackets to last according to the life time specification from the supplier. The screws holding the parts have to be locked in such a way that they cannot be loosened. In order to prevent material from getting into the slot for the key the environment has to be clean. If a door goes outside the design tolerances from wear, the screws loosen or material comes into the slot, this may lead to the interlocked switch not giving a stop signal when the door is opened. Even two mechanical switches on a door could fail to an unsafe state if the door somehow gets outside the tolerances of the switches. To prevent accidents the mechanical switch normally needs continuous checks of both the switch and the installation.

Non-contact sensors/switches

For non contact sensors the risks associated with mechanical switches (see above) do not exist. If screws, brackets or sensors get loose, it will lead to a stop signal. Therefore only one sensor with dual or dynamic function is needed in order to reach the high-

est safety level. There are two types of non-contact sensors - active and passive. The active sensor, Eden, is constantly communicating via a dynamic signal between the two parts and any failure will directly lead to a stop signal. The passive type, a magnet switch, has two reed contacts which are activated by a coded magnet. Both the passive and the active sensors are checked every time a door is opened. From a safety point of view the active sensor, Eden, is to be preferred because it is checked constantly whereas the passive sensor is only checked when a door opens.

From the reliability point of view a long detection distance with large tolerances and a well defined on and off position is needed. The active sensor, Eden, fulfils these demands. A magnet switch has smaller tolerances and an intermediate position where only one contact opens. A bad installation or vibrations can lead to an unintentional stop if one contact opens and closes again. The supervision of a two channel system is based on both contacts having to be operated in order to permit a new start. In a dynamic safety circuit there is only one pulsed signal and therefore no intermediate position.

Non-contact safety sensor Eden

Approvals:



Application:

- Door and hatches
- Position control
- Sector detection
- Slot detection

Features:

- PL e/Cat. 4 according to EN ISO 13849-1 together with Vital or Pluto
- Non-contact detection, large sensing distance 0 - 15 mm +/- 2 mm
- Up to 30 sensors in series with the highest level of safety PL e
- Versatile mounting, 360° detection
- Protection class IP67/IP69K
- The dynamic signal passes through wood and plastic (not metal)
- Status information with LED on the sensor and in the cable connection,
- Small hysteresis (< 1mm)

A non-contact safety sensor for the highest safety level

Eden - Adam and Eva is a non-contact safety sensor for use on interlocked gates, hatches etc. The safety sensor Eden is built on the principle of a dynamic safety signal that can be generated and interpreted by the control device Vital, or Safety PLC Pluto. The maximum sensing distance between Adam and Eva is 15 mm ± 2 mm.

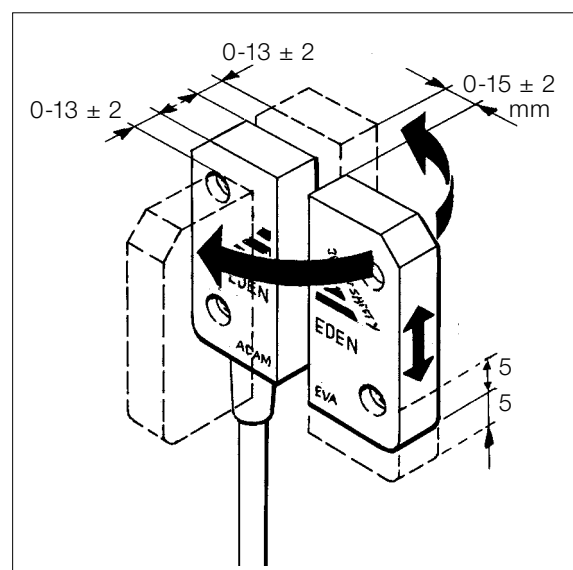
Up to 30 Edens can be connected in series to Vital and still achieve the same safety level in the safety circuit. It is also possible to connect safety light beams and E-stops in the same safety circuit.

Adam is available with only a M12 connector or with cable lengths up to 20 m (also with M12 connector). For harsh environments there is a special version of Eden cast in Polyurethane; Eden E.

In addition to the safe signal out from Adam, there is also a non-safe status signal (on pin 5) that indicates contact/non-contact between Adam and Eva.

LED indication

The LED on Adam provides a green indication of contact between Adam and Eva, and a red indication indicates a non-contact. A rapid flash indicates that an alignment of the sensor is necessary. If the LED is flashing between red and green the sensor is not receiving a dynamic signal from previous sensor or Vital/Pluto.

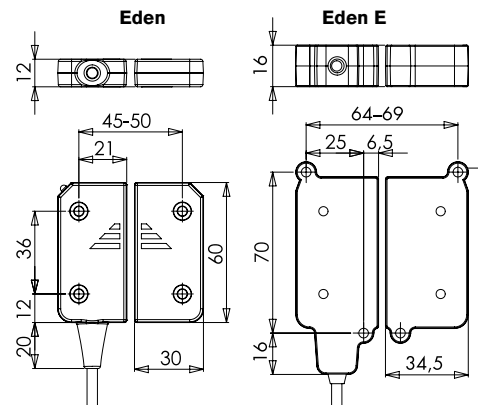


Flexible mounting

Technical data – Eden

Article number	
Eva	2TLA020046R0000
Eva E	2TLA020046R0600
Adam M12 (with 4 DA1)	2TLA020051R0000
Adam 3 m (with 4 DA1)	2TLA020051R0200
Adam 10 m (with 4 DA1)	2TLA020051R0400
Adam 20 m with (4 DA1)	2TLA020051R0500
Adam E 10 m	2TLA020051R0600
Adam E 0.5 M12	2TLA020051R0700
Adam E 20 m	2TLA020051R0800
Level of safety	
IEC/EN 61508-1...7	SIL3
EN 62061	SIL3
EN ISO 13849-1	PL e/Cat. 4
PFH_D	4.50×10 ⁻⁹
Colour	Yellow and black
Weight	Eva: 26 g Eva E: 36 g Adam M12: 30 g Adam 3 m: 220 g incl. cable Adam 10 m: 650 g incl. cable Adam E10 m: 660 g incl. cable Adam E 0,5 m + M12: 100 g incl. cable
Power supply	24 VDC +15%-25%
Power consumption	Adam: without info output 45 mA with info output max 55 mA
Max cable length	see Vital technical data
Ambient temperature	
Eden	-25°C ... +70°C (operation) -25°C ... +70°C (stock)
Eden E	-40°C ... +70°C (operation) -25°C ... +70°C (stock)
Protection class	
Eden	IP67
Eden E	IP67 and IP69K
Mounting	
Installation Eden	M4 screw, e.g. safety screw 2TLA020053R4200. Max. torque 2 Nm. Screw to be locked with Loctite or similar.
Installation Eden E	M4 screw, e.g. safety screw 2TLA020053R4300. Max. torque 0.8 Nm. Screw to be locked with Loctite or similar.
Detection distance max	
Adam/Eva 15 ± 2 mm	Flash 2 mm before red position.
Adam E/Eva E 12 ± 2 mm	Flash 2 mm before red position.
Hysteresis approx. 1 mm	
Metal may have influence on detection distance. This can be prevented by protection plates, DA1.	
Minimum distance to metal when there is metal on one or more sides.	
Adam/Eva	One More 0 mm 2.5 mm
Adam E/Eva E	0 mm 0 mm
Minimum distance between Eden pairs	50 mm
Mechanical life	>10 ⁷ cycles

Material	Eden: Macromelt Eden E: Polyurethane (PU)
Chemical resistance	
Macromelt:	Cutting oils, vegetable and animal oils, hydrogen peroxide, diluted acids and bases: good Alcohol and strong acids: not recommended
PU (EdenE):	Cutting oils, vegetable and animal oils, hydrogen peroxide, diluted acids and bases, alcohols: good Strong oxidating acids: not recommended
LED on Adam	
Green:	Eva within range, safety circuit closed (door closed)
Flashing:	Eva within range, earlier safety circuit open (door closed)
Red:	Eva out of range, safety circuit open (door open)
Rapid flashing:	Eva is within 2 mm from maximum sensing distance (door closed)
Cable	3, 10 or 20 m, ø 5.7mm, black, PVC 5 x 0.34 mm ² + screen, UL 2464
Connector	M12: 5-pin male contact
Connections	
Brown (1)	+24 VDC
White (2)	Dynamic signal in
Blue (3)	0 VDC
Black (4)	Dynamic signal out
Grey (5)	Info output, see below
24 VDC when LED is green or flashing (tolerance -2 VDC), 10 mA max 0 VDC when LED is red. (tolerance +2 VDC)	
Warning: Incorrect connection may cause permanent damage to Adam devices.	
Conformity	2006/42/EG EN ISO 12100 1/2, EN 60204-1, EN ISO 13849-1, EN 1088



Non-contact safety sensor with integrated AS-i node Eden AS-i



Approvals:



Application:

- Door and hatches
- Position control
- Sector detection
- Slot detection

Features:

- PL e/Cat. 4 according to EN ISO 13849-1
- Non contact detection 0-15 mm +/- 2 mm
- Versatile mounting, 360 degrees
- Protection class IP69K
- The signal passes through wood and plastic (not metal)
- Status information LED
- Small hysteresis (1-2 mm)
- Individually coded

A non-contact safety sensor for the highest safety level

Eden AS-i is a non-contact safety sensor for use on inter-locked gates, hatches etc. Eden AS-i consists of two complementary parts called Adam and Eva. The sensor is only activated if the gate or hatch is closed e.g. when Adam and Eva are within sensing distance. Eden AS-i is constantly communicating between the two parts and any failure will directly lead to a stop signal.

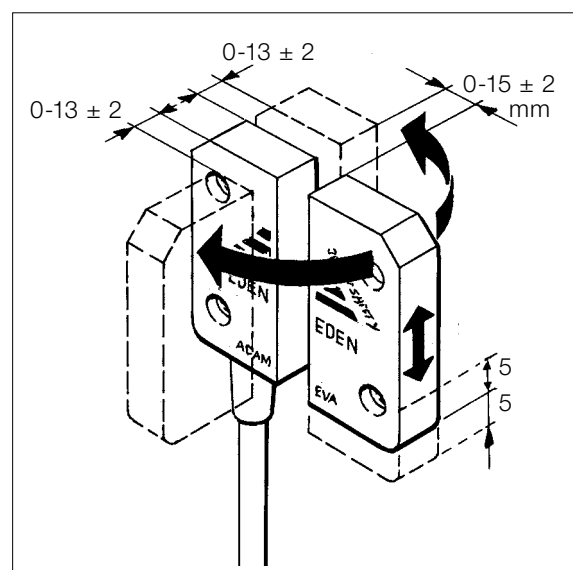
A non-contact safety sensor for AS-i

Eden AS-i has an integrated AS-i node and is connected via an M12 connection directly to the AS-i cable.

Eden AS-i has a protective encapsulation that enables Eden AS-i to be used in harsh environments. Each Eden AS-i is individually coded which makes it secure against manipulation.

The advantage of safety within AS-i is that it is very easy to install since connection of the safety devices is just to the buss cable. The function of the safety devices is determined by the software program in the safety monitor/master. Each safety device (node) has its own address and a unique safety code.

It is simple to add, move and disconnect safety devices on the AS-i cable as well as to extend the AS-i cable. Traditional safety systems require new cable running from the electrical cabinet for each new protection. Connection with Eden AS-i is simple as all units are connected to the same cable.



Flexible mounting

Connection to the AS-i bus

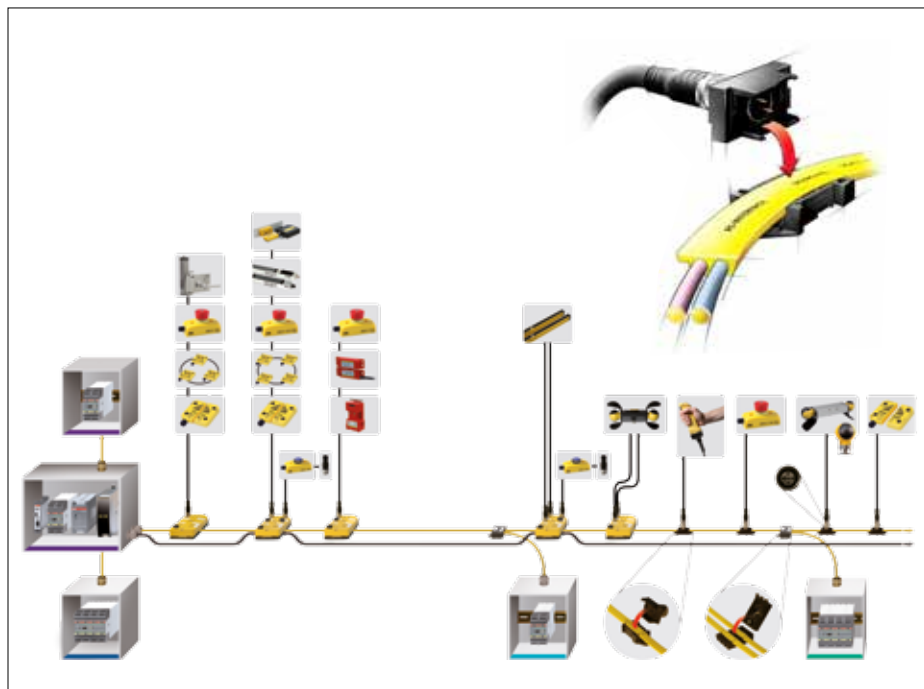
AS-i makes safety easy

Installation is easy as all units are connected to the same yellow AS-i cable/bus. This thereby minimises the risk of faulty connection. Each safety node has its own address and a unique safety code.

Eden AS-i has a built-in AS-i safety node and is supplied with 30 VDC from the AS-i bus.

Connection to the AS-i bus is through a flat cable connector to M12, making it possible to quickly and easily connect Eden AS-i to the AS-i cable.

Our Pluto is the most flexible AS-i Safety Controller on the market. Pluto can be used as Safety Master, Monitor or I/O and can control and monitor the safety of a machine at the same time.



Manual Status LED indication

LED	Setting (hex)	Setting (binary)	Description
LED on Adam AS-i	1	0,0,0,1	LED lights red
	3	0,0,1,0	LED lights green
	All other	All other	LED OFF

Automatic Status LED indication

LED	Indication	Description
LED on Adam AS-i	Green	Eva within sensing distance of Adam
	Green and/or Red (fast flash) or both lights at the same time	Eva within ~2 mm of maximum sensing distance
	Red	Eva not within sensing distance of Adam

Status LED indication (independent of manual or automatic control)

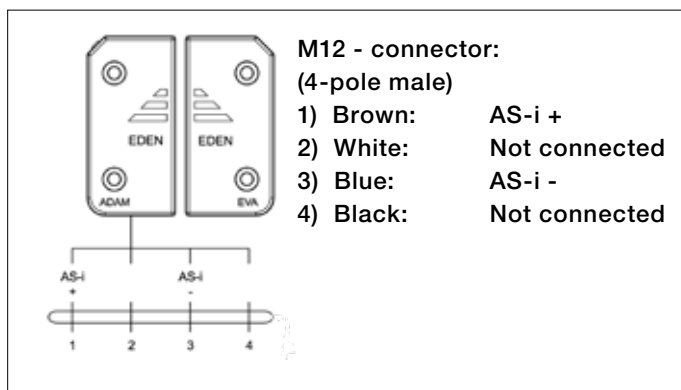
LED	Indication	Description
LED on Adam AS-i	Green-Red (flash)	No contact with AS-i master
	Red (flash)	Internal fault. Power cycle, replace if still present

AS-i LED and Fault LED in combination

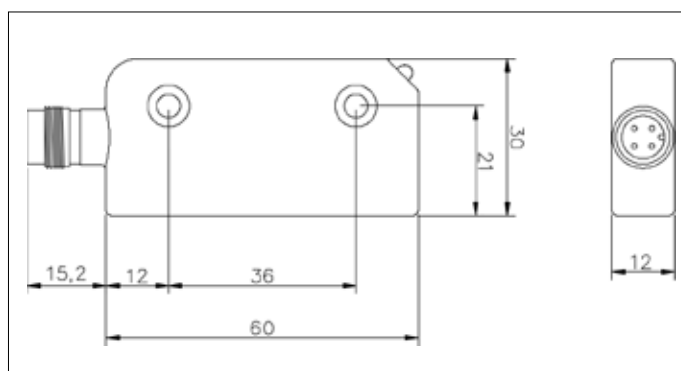
AS-i (green)	Fault (red)	Description
OFF	OFF	AS-i power missing
ON	OFF	Normal operation
ON	ON	No data exchange with master
Flash	ON	No data exchange because address = 0

Technical data – Eden AS-i

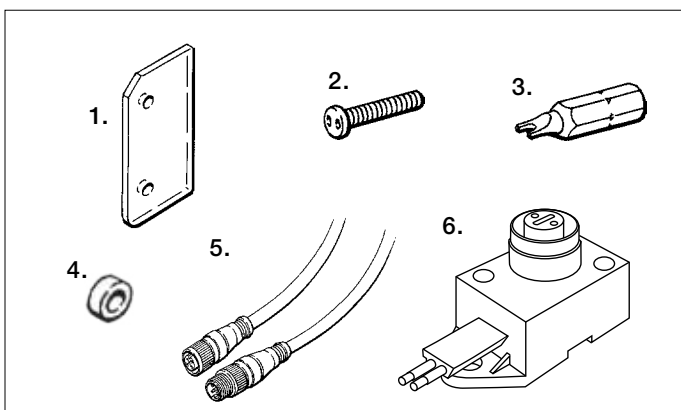
Article number	
Adam AS-i with 4 DA2 B	2TLA020051R6000
Eva AS-i	2TLA020051R8000
AS-i data	
AS-i profile	S-7.B.E
Slave address at delivery	0
Addressing via	M12-connector
Response time over AS-i bus	10 ms
Safety data - annual usage	
PFH _D	6.0*10e-10
Proof test interval (life)	20 years
Power supply, operating voltages	30 VDC, AS-i bus. Tolerance 26.5-31.6 VDC
Switching distance (target to target)	15 +/- 2 mm
Total current consumption	65 mA
Assured release distance (Sar)	45 mm
Assured operating distance (Sao)	7.5 mm
Enclosure protection	IP67 and IP69K
Cable type	M12-connector 4-pole male (only pin1 and pin3 used)
Ambient temperature	Storage: -40...+85°C Operation: -25...+55°C
Weight	~150 g
Material	Housing: Polybutylene terephthalate (PBT) Moulding: Epoxy
Colour	Yellow, black text
Mounting bolts	SM4
EN ISO13849-1	Up to PL e/Cat. 4
EN62061	Up to SIL3
IEC/EN 61508-1...7	SIL3, PFH _D : 9.11x 10 ⁻¹⁰
Approved standards	European Machinery Directive 2006/42/EG EN ISO 12100-1:2003+A1:2009, EN ISO 12100-2:2003+A1:2009, EN ISO 13849-1:2008, EN 62061:2005, EN 60204-1:2006+A1:2009, EN 60664-1:2007, EN 61000-6-2:2005, EN 61000-6-4:2007, EN 60947-5-1:2003+A1:2009, EN 1088+A2:2008



Eden AS-i electrical connections



Dimensions



Accessories:

1. Protection plate DA1: 2TLA020053R0000
2. Safety screws, SM4 x 20: 2TLA020053R4200
3. SBITS: 2TLA020053R5000
4. DA2B, Mounting spacer: 2TLA020053R0300
5. M12-C112 1 m cable, 5-pole, 0.34 mm², M12 female + male: 2TLA020056R2000, M12-C312 3 m cable, 5-pole, 0.34 mm², M12 female + male: 2TLA020056R2100
6. AS-i T-connector with M12, Flat cable connector to M12: 2TLA020073R0000

Eden and Eden AS-i

Application examples

Eden to detect position

Adam and Eva can be used to ensure that a safe position is kept/reached. The safety sensor has contact if they are within 15 mm from each other.

Eden is used for sector detection

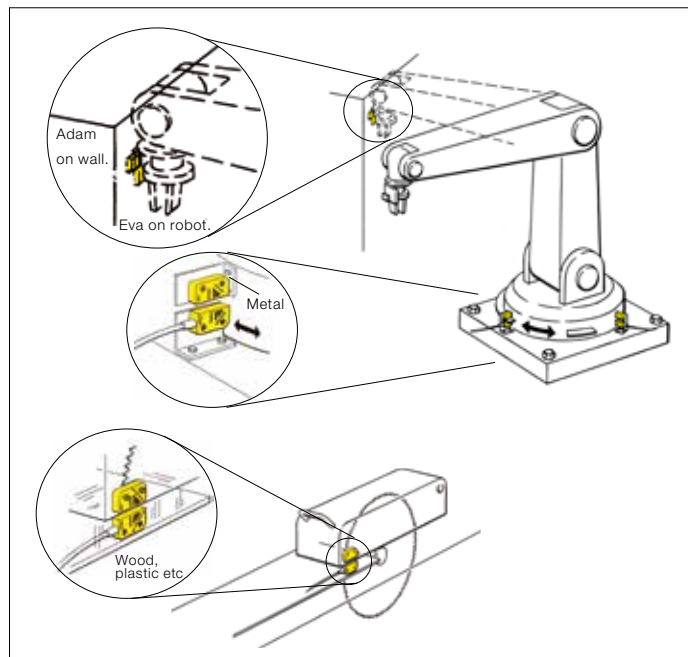
Additional Eden sensor(s) can be mounted on a machine to detect working place.

Eden can communicate through wood and plastic

Wood, plastic and other non-metallic materials between Adam and Eva let the communication signal pass.

Eden can be hidden in doors and hatches

Because of the small size, Eden can easily be hidden in frames or guards.



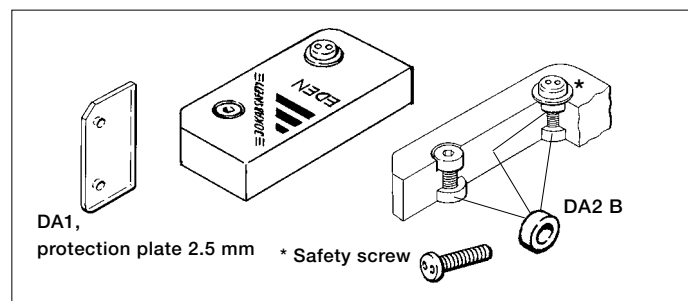
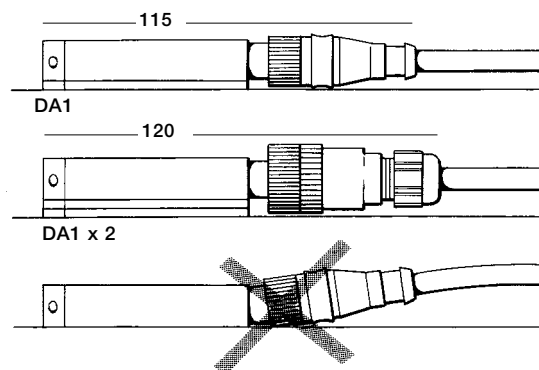
Mounting – Eden

Installation and maintenance for Eden

Eva can be turned in a number of different ways relative Adam. Depending on the cable connector used to connect Eden, different protection plates can be necessary in order to avoid damage to Adam. The protection plates (DA1) supplied with Adam M12-models connector are recommended for this, see figure below. Also, the mounting spacers supplied must be used in order to physically protect Eden from damage.

- Mounting with one protection plate (DA1) for Adam M12 using prewired moulded M12 connector. For M12 connection, a straight contact is recommended.
- Mounting with two protection plates (DA1) for Adam M12 using M12 connector with glanded cable.
- Wrong mounting without protection plate may cause permanent damage to sensor.

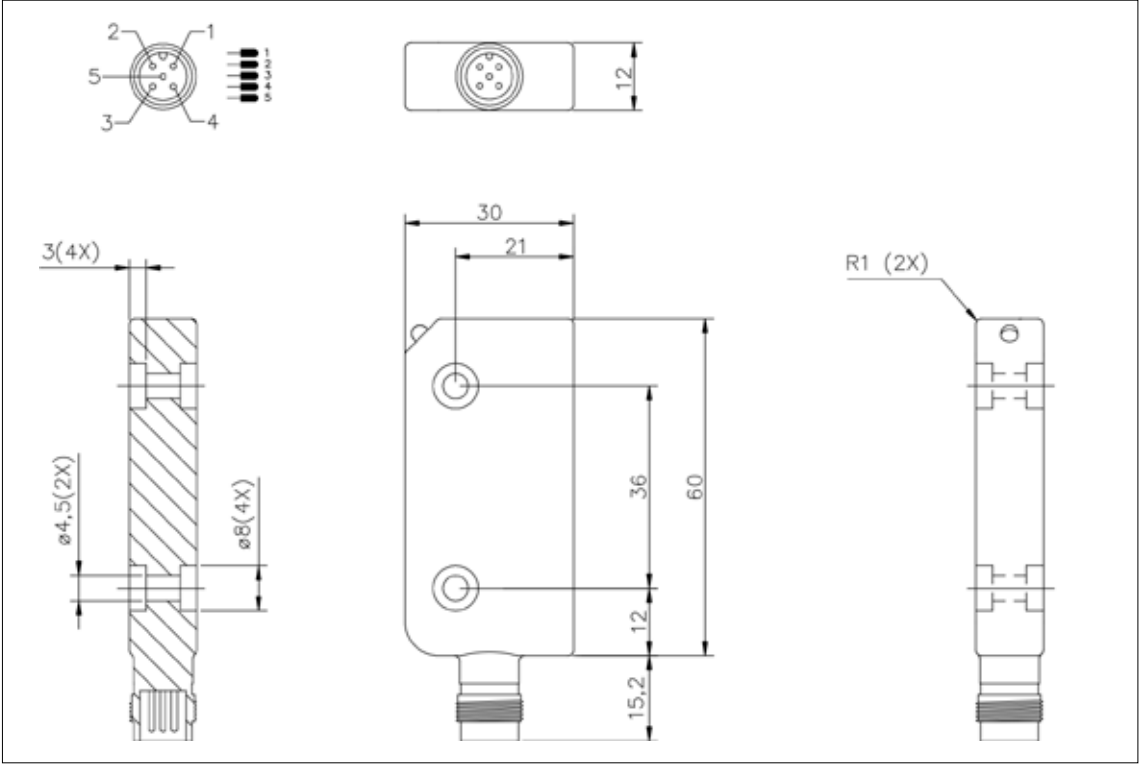
Sensing distance between Adam and Eva: 0-15 mm +/- 2 mm
Minimum distance between two Eden pairs: 100 mm



Adam M12

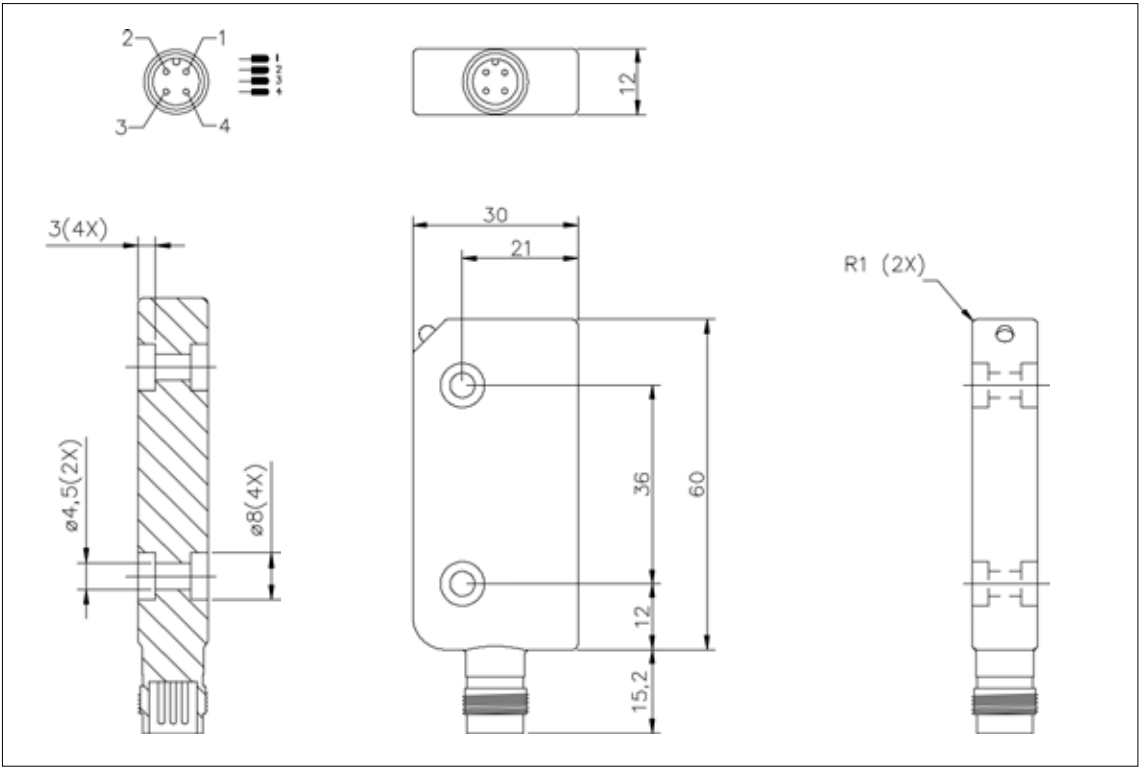
Dimensions

Adam M12



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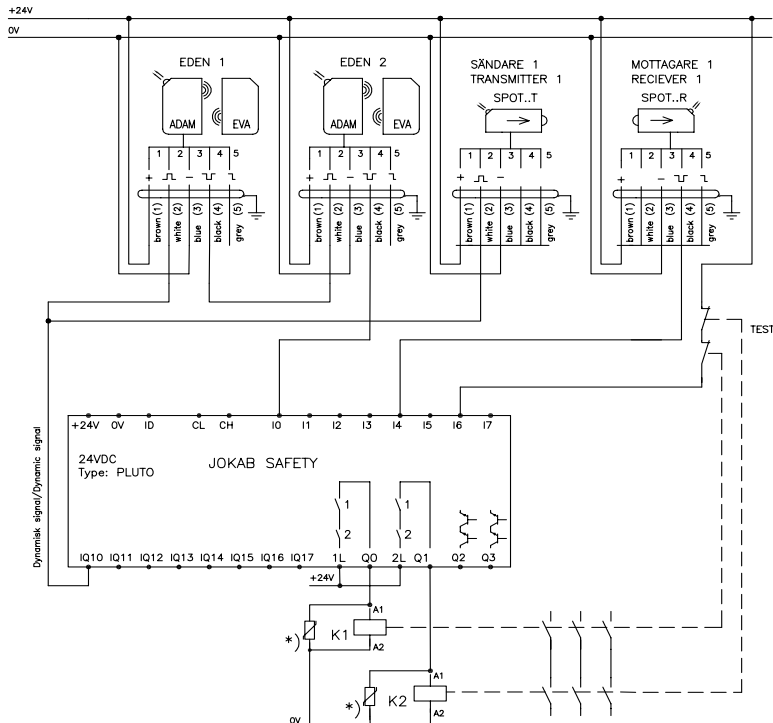
Adam M12 AS-i



Eden

Connection examples

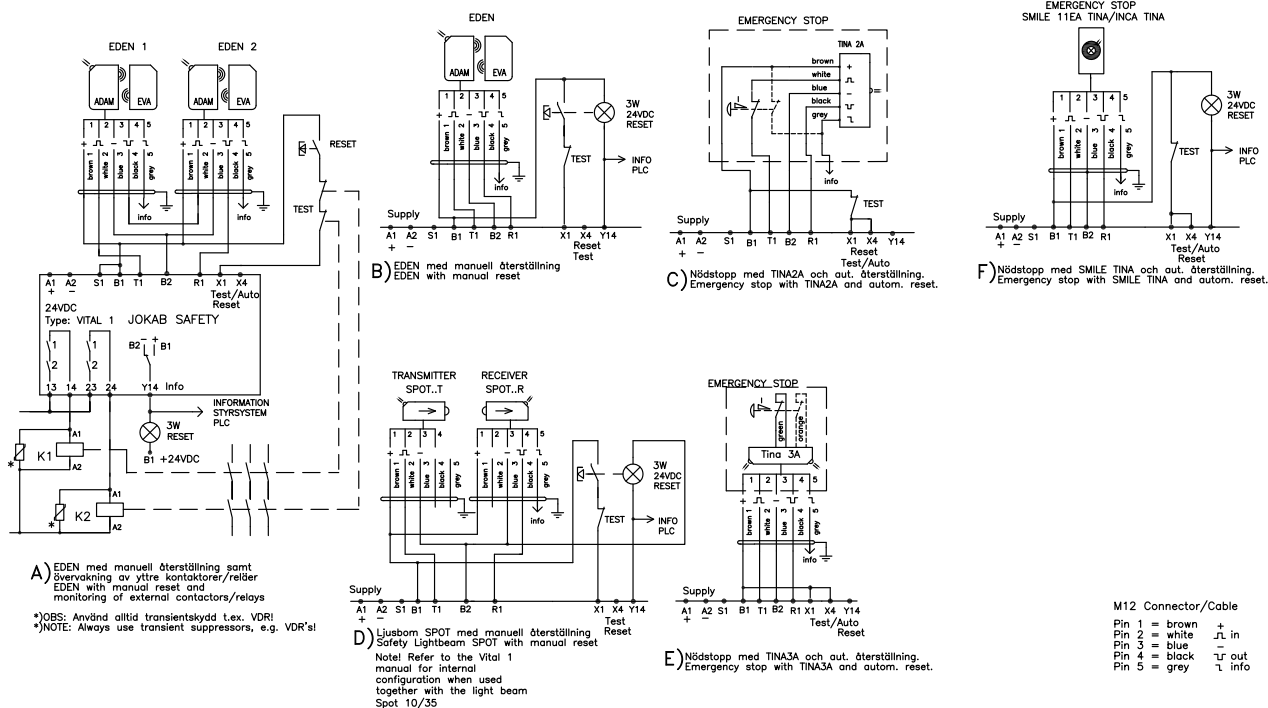
Connection of Eden to Pluto



*)OBS: Använd alltid transient skydd t.ex. VDR!
*)NOTE: Always use transient suppressors, e.g. VDR's!

9

Connection of Eden to Vital 1



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/EN 60947-5-3, EN 60204-1, EN ISO 13849-1, EN 62061 and UL 508.



Sensing distance 14 mm

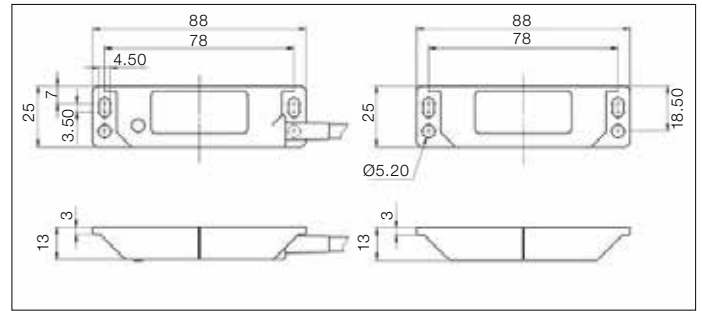


Quick connected version fitted with 250 mm cable and M12.

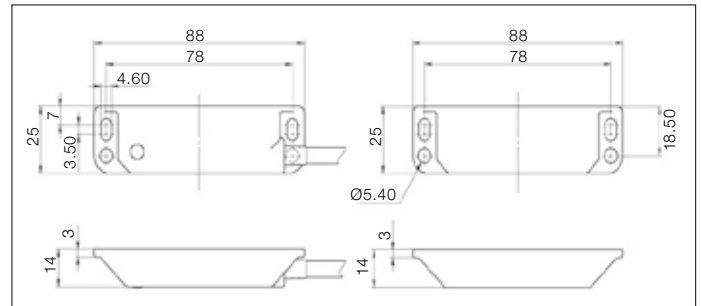
NOTE! Sense7 versions have 2NC and 1NO circuits. For all Sense7 switches the NC circuits are closed when the guard is closed and the actuator present.

Technical data – Sense7 series

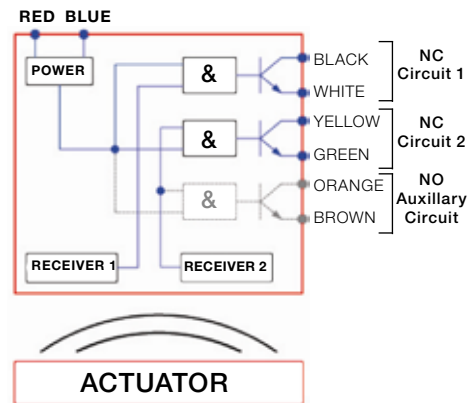
Article number	
Plastic	
Sense7 - 2 m cable	2TLA050056R4100
Sense7 - 5 m cable	2TLA050056R5100
Sense7 - 10 m cable	2TLA050056R6100
Sense7 - 250 mm cable with M12	2TLA050056R2100
Stainless steel	
Sense7Z - 2 m cable	2TLA050056R4120
Sense7Z - 5 m cable	2TLA050056R5120
Sense7Z - 10 m cable	2TLA050056R6120
Sense7Z - 250 mm cable with M12	2TLA050056R2120
Level of Safety	
EN ISO 13849-1	Up to PL e/Cat. 4 depending upon system architecture
EN 62061	Up to SIL3 depending upon system architecture
Safety data	
PFH _D	2.52 x 10 ⁻⁸
Switching reliability	3.3 x 10 ⁶ operations at 100mA load 47 years
Proof test interval (life)	470 years (8 cycles per hour/24 hours per day/365 days)
Safety channel 1NC	24 VDC 0.2 A max. rating
Safety channel 2NC	24 VDC 0.2 A max. rating
Safety channel 3NO	24 VDC 0.2 A max. rating
Power supply	24 VDC ±10%
Minimum switched current	10 VDC 1mA
Dielectric withstand	250 VAC
Insulation resistance	100 MOhm
Recommended setting gap	5 mm
Switching distance (target to target)	Sao 10 mm close (on) Sar 20 mm open (off)
Tolerance to misalignment	5 mm in any direction from 5 mm setting gap
Switching frequency	1.0 Hz maximum
Approach speed	200 mm/m to 1000 mm/s
Vibration resistance	IEC 68-2-6, 10-55 Hz 1 mm
Shock resistance	IEC 68-2-27, 11 ms, 30 g
Enclosure protection	IP67 and IP69K
Cable type	PVC 8 core 6 mm O.D
Operating temperature	
Sense7	-25°C to +80°C
Sense7Z	-25°C to +105°C
Material	
Sense7	UL approved polyester
Sense7Z	Stainless steel 316
Colour	Red or stainless steel
Mounting position	Any
Mounting bolts (Tightening torque)	2 x M4 (1.0 Nm)



Dimension Sense7

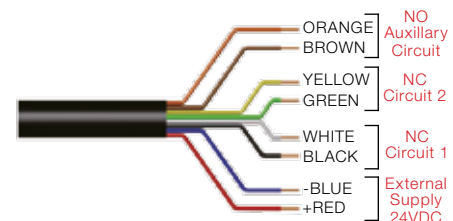


Dimension Sense7Z



Electrical connection

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



Cable configuration

Magnetic lock

Magne

Approvals:



Application:

- Electrical locking of doors and hatches for production applications that are sensitive to unintentional/unnecessary interruptions.
- For safety supervision the Magne 2 has an integrated Eden.

Features:

- No moving parts
- Strong Magnetic holding force: 1500N
- Can withstand and operate in harsh environments
- Locked/unlocked indication
- Possible to connect in series with Eden sensors
- No current peaks on activation
- Magne 2 in combination with a handle profile provides a complete door solution

Magnetic lock with indication

Magne is a electro-magnetic lock that is designed for industrial applications and that can withstand harsh environments. As it is designed with no moving parts, it is durable and long lasting. The unit is intended for use in preventing unnecessary process stoppages, i.e. it is not a safety lock. Magne, with its electro-magnet, keeps a door locked with a holding force up to 1500 N and magnetic material does not attach to the magnetic surface when the power is off.

Use of M12 connectors makes it easy to connect several Magne units and Eden sensors in series enabling control and monitoring by either a Pluto safety PLC or a Vital safety controller. Via the connection cable it is also possible to obtain an indication signal informing if the Magne unit is locked or not.

Accessories:

- Mounting kit for conventional door, with fitting and screws for assembly on ABB Jokab Safety Quick-Guard fencing system (5-15 mm door gap)
- Plastic handle
- Handle profile for mounting on a hinged door with ABB Jokab Safety's Quick-Guard fencing system (5-15 mm door gap).



Magne is easy to install, adjust and dismantle in and out of the T-slot of the Quick-Guard fencing system.

Magne

Models and accessories



Magne 1A with installation kit JSM D21B and JSM D27.



Magne 2A with installation kit JSM D21B, JSM D24 and JSM D27.



JSM D28 handle profile which cover Magne completely when the door is closed.



Magne 2A with installation kit JSM D23.

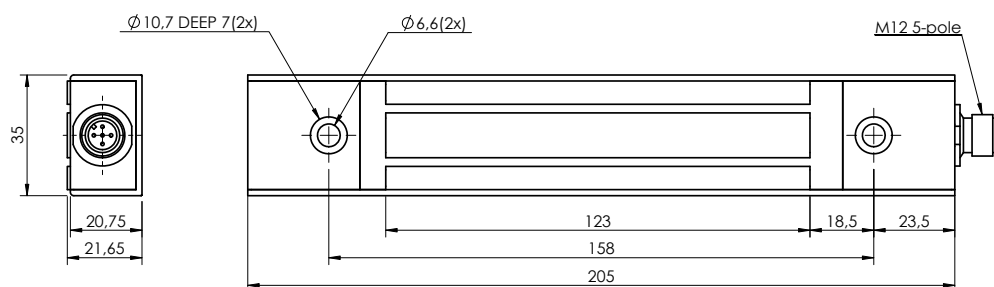
Models and ordering data

Magne 1A v2 1500N	2TLA042022R2100	Electro-magnet with 5-pole M12-contact. Anchor plate. Cell rubber.
Magne 1B v2 1500N	2TLA042022R2200	Electro-magnet with 5-pole M12-contact. Anchor plate with permanent magnet. Cell rubber.
Magne 2A v2 Eden incl. EVA, 8-pol M12	2TLA042022R1600	Magnetic lock with indication. Electro-magnet with 8-pole M12-contact. Anchor plate. Cell rubber. Adam (built-in) + Eva (free) door position sensor.
Magne 2B v2 Eden incl. EVA, 8-pol M12	2TLA042022R1800	Magnetic lock with indication. Electro-magnet with 8-pole M12-contact. Anchor plate with permanent magnet. Cell rubber. Adam (built-in) + Eva (free) door position sensor.
Magne 2Ax v2 Eden incl. EVA, 5-pol M12	2TLA042022R1700	Magnetic lock with indication. Electro-magnet with 5-pole M12-contact. Anchor plate. Cell rubber. Adam (built-in) + Eva (free) door position sensor.
Magne 2Bx v2 Eden incl. EVA, 5-pol M12	2TLA042022R1900	Magnetic lock with indication. Electro-magnet with 5-pole M12-contact. Anchor plate with permanent magnet. Cell rubber. Adam (built-in) + Eva (free) door position sensor.
JSM D28	2TLA042023R0100	Aluminum profile used as both door handle and mounting kit for Magne. Completely covers Magne unit when the door is closed.
JSM D21B	2TLA042023R0500	Mounting kit for Magne. For conventional door (5-15 mm door gap). Fits all Magne. Note: When used with Magne 2A/B, -2Ax/Bx a mounting kit for Eva is also required (JSM D24).
JSM D23	2TLA042023R0200	Mounting kit for Magne. For sliding door. Fits all Magne.
JSM D24	2TLA042023R0300	Mounting kit for Eva. For conventional door.
JSM D27	2TLA042023R1000	Handle/screw for JSM D21 Magne installation kit.
Magne cellular rubber	2TLA042023R3600	Spare part. Cellular rubber t=10 mm
Magne Anchor plate 32A	2TLA042023R1300	Spare part. Anchor plate A (without permanent magnet). Width 32 mm. Included with Magne 1/2
Magne Anchor plate 34A	2TLA042022R2300	Spare part. Anchor plate A (without permanent magnet). Width 34 mm.
Magne Anchor plate 32B	2TLA042023R0400	Spare part. Anchor plate B (with permanent magnet). Width 32 mm. Included with Magne 1/2
Magne Anchor plate 34B	2TLA042022R2400	Spare part. Anchor plate B (with permanent magnet). Width 34 mm.

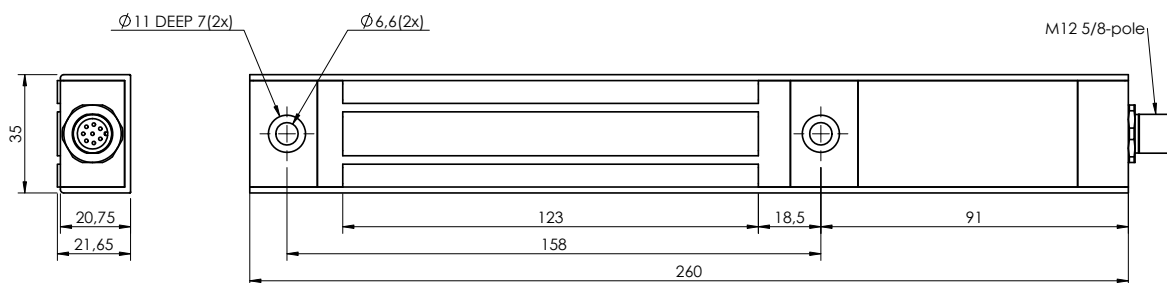
Technical data – Magne

Level of safety	
For interlocking switch Eden. Not valid for locking function.	
IEC/EN 61508-1...7	SIL3
EN 62061	SIL3
EN ISO 13849-1	PL e/Cat. 4
PFH _b	4.50×10 ⁻⁹
Power supply	Magnet: 24 VDC +/- 15% Eden: 17–27 VDC, ripple max 10%
Power consumption	Magnet: 7 W (300 mA at 24VDC) Eden: 45–55 mA (see data for Eden)
Operating temp. range	-20°C to +50°C
Protection class	IP65
Weight	Magne 1: 610 g, Magne 2: 700 g, Anchor 32A/B: 290 g, Anchor 34A/B: 308 g
Material	Anchor plate and magnet: steel Housing: Aluminium Potting: PUR, epoxy
Holding force	24 VDC: Min 1500 N 0 VDC: 0 N (Magne 1A/2A/2Ax) 0 VDC: 30 N (Magne 1B/2B/2Bx)
Contacts	Reed sensor (not safe)
Switch current max	100 mA
Mechanical life	>10 ⁷ switch operations
Connector	M12 5-pole male connector (Magne 1A/B, 2Ax/Bx) M12 8-pole male connector (Magne 2A/B)
Connections	Magne 1A/B: (1) Brown: Locking, +24 VDC (2) White: Sensor supply (3) Blue: 0 VDC (4) Black: NO-contact (5) Grey: NC-contact Magne 2A/B: (1) White: Dynamic signal input (2) Brown: +24V DC (3) Green: Locking, +24V DC (4) Yellow: Locking, 0V DC (5) Grey: Info closed (max 10 mA) (6) Pink: Dynamic signal output (7) Blue: 0V DC (8) Red: Info locked (max 100 mA) Magne 2Ax/Bx: (1) Brown: +24 VDC (2) White: Dynamic signal input (3) Blue: 0 VDC (4) Black: Dynamic signal output (5) Grey: Locking
Conformity	EN ISO 12100-1:2010, EN ISO 13849-1:2008, EN ISO 13849-2:2008, EN 62061:2005, EN 60204-1:2006+A1:2009, EN 60664-1:2007, EN 61000-6-2:2005, EN 61000-6-4:2007, EN 60947-5-1:2004, EN 1088+A2:2008

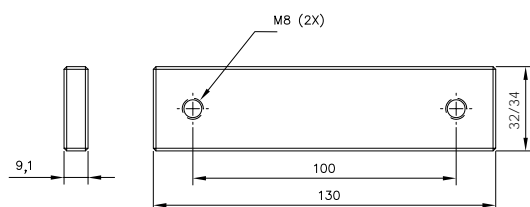
Magne Dimensions



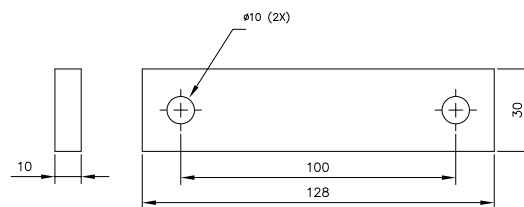
Dimensions Magne 1A/B



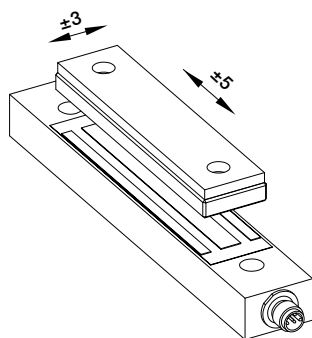
Dimensions Magne 2A/B, -2Ax/Bx



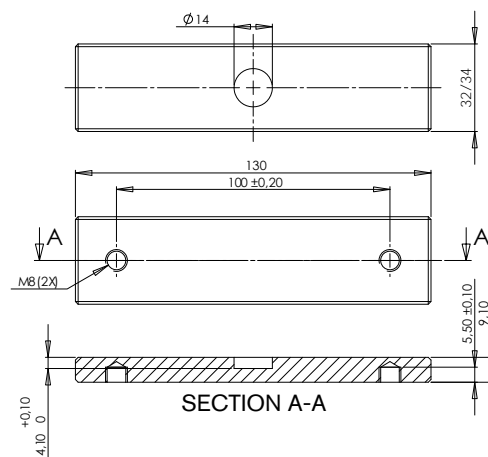
Dimensions Anchor plate 32A/34 (without permanent magnet)



Dimensions - cellular rubber



Installation tolerance (general)



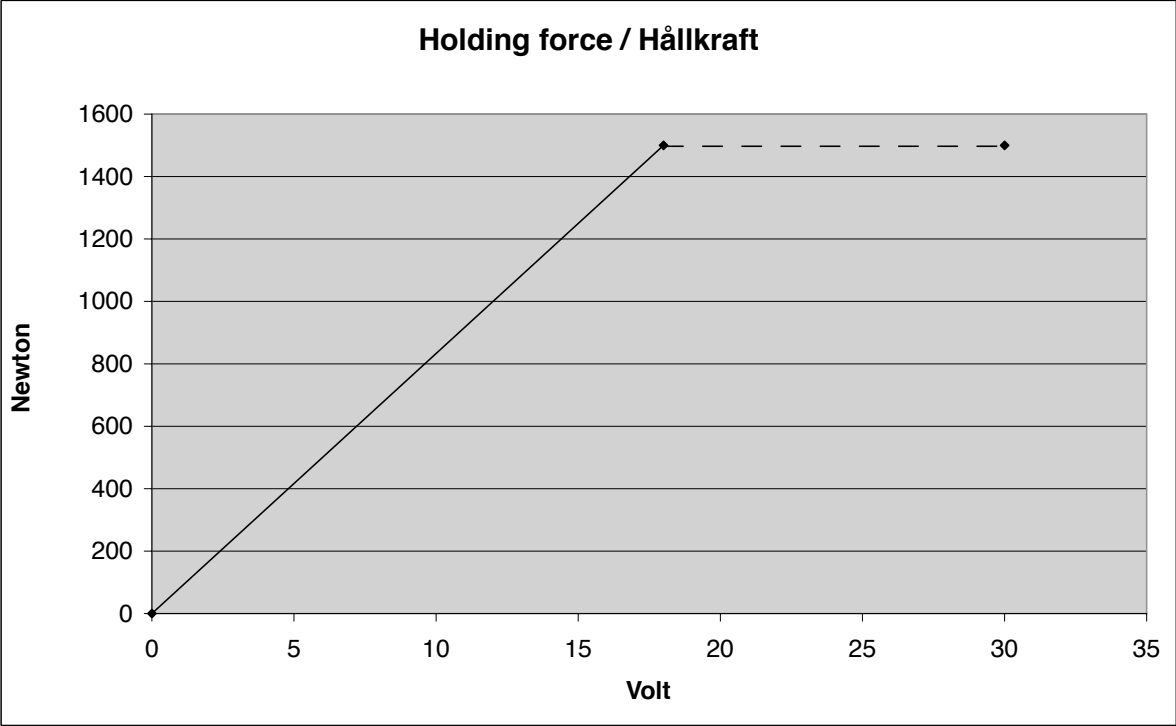
Dimensions Anchor plate 32B/34B (with permanent magnet)

NOTE!
All dimensions are in mm

Magne

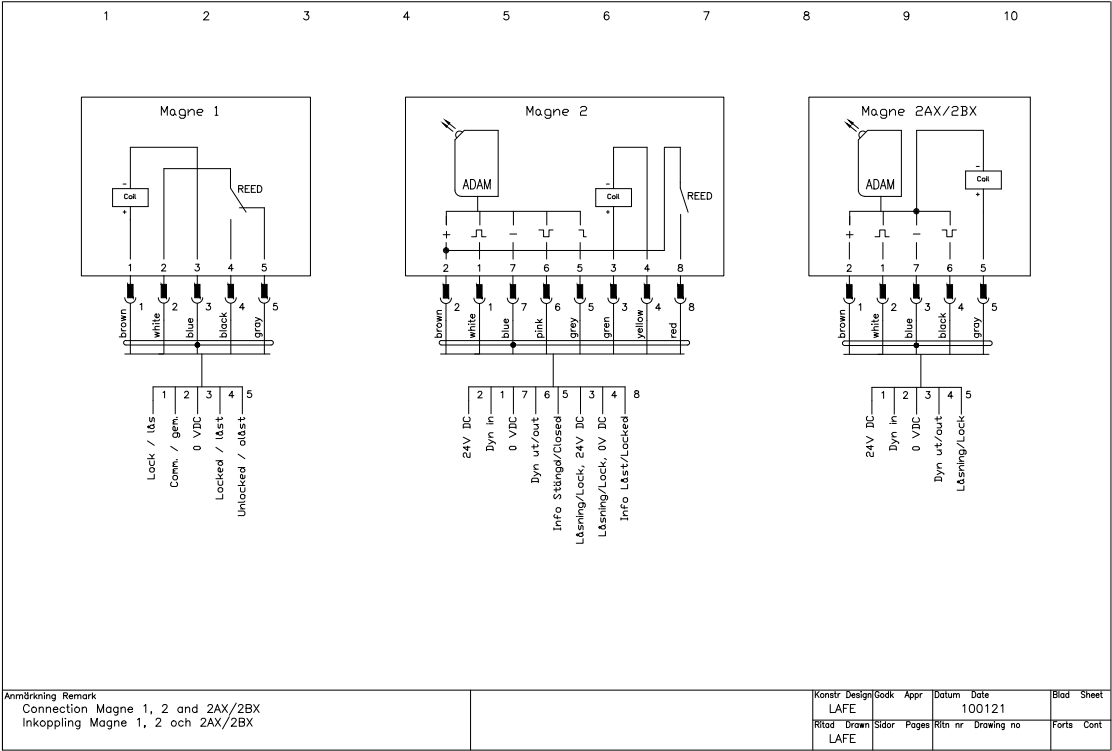
Connection examples

Holding force - Magne 1 and 2



9

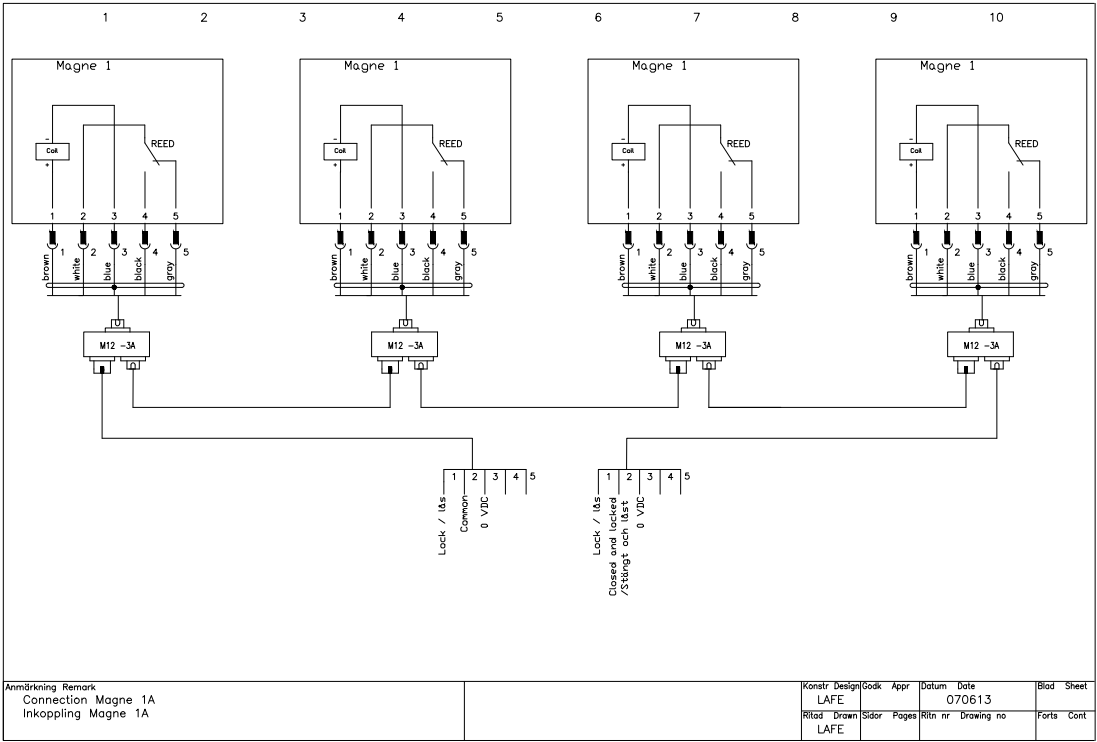
Connection example - Magne 1 and 2



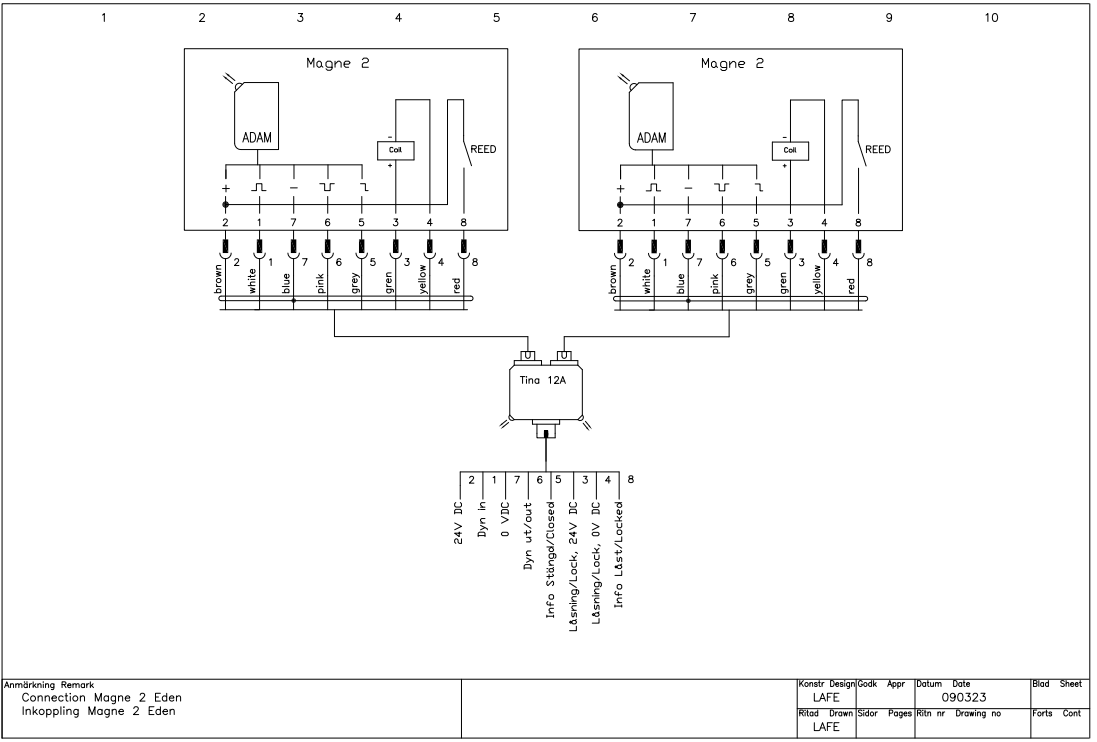
Magne

Connection examples

Connection example - Magne 1 in series



Connection example - Magne 2 in series



Process lock Dalton

Use:

- Door and hatches

Features:

- Small and robust
- Integrated with Eden
- High enclosure classification IP67
- Withstands harsh environments
- Low current consumption
- Status information with LED on the lock housing and in the cable connection.



Dalton – the intelligent process lock

Dalton is a locking unit that is intended for use in preventing unnecessary process stoppages, i.e. it is not a safety lock. It can be used either as a free-standing lock or integrated with Eden as a safety sensor. In the unlocked state the door is held closed by a ball catch and in locked state the balls are mechanically blocked so the lock tongue can not be pulled out. If necessary, the holding force of the ball catch can be adjusted. The device only allows to lock when the ball latch is centred around the lock tongue, and when Eva is with Adam (depending on version). When an input is supplied with voltage, the ball catch is locked.

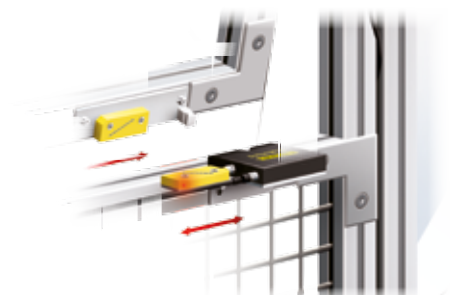
Dalton is easily connected with an M12 connector. The Tina junction block can be used for distribution of both the safety and locking functions. The Dalton status is indicated by LEDs and can also be read by a PLC via the information output.

Dalton has a modular structure

The Dalton process lock has a modular structure and can be combined in different ways depending on position, installation and function. You choose the lock housing, lock tongue and fixing plate yourself to create a complete Dalton.

Installation

Dalton offers many different installation possibilities as the lock tongue may enter the ball catch from three directions. In order to ensure that Dalton works without any problems, the ball catch must be resting, i.e. the balls not pressed in by the lock tongue when the door is in closed position. Dalton's brackets are therefore made to ensure easy adjustment of the lock tongue and ball latch positions.



Dalton is easy to install, adjust and dismantle in the Quick-Guard fence system's T-slots.

Dalton

Modular structure

1. Choose Dalton lock housing according to your preferences:

- Dalton M11/M31 If you only need to be able to lock your door/hatch (8-pin/5-pin M12)
- Dalton M12 If you want to lock your door/hatch and also have the interlocking switch Eden installed with one cable, common for both Dalton and Eden.
- Dalton L00 If you only need to use Dalton to keep the door fixed and closed



Dalton M11

with 8-pin male contact

Dalton M12

with 8-pin male contact, 5 pin female contact for Adam

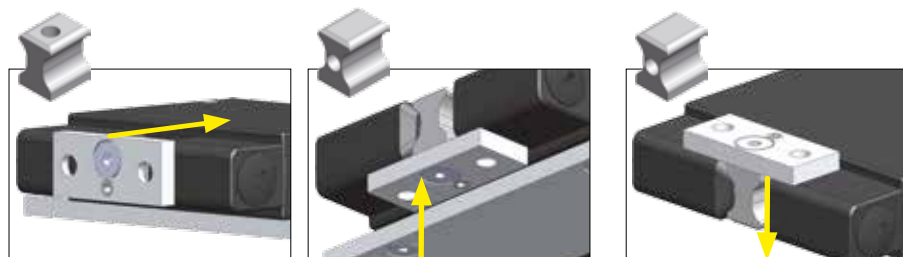
Dalton M31

with 5-pin male contact

Dalton L00

as ball latch, no electrical functions.

2. Choose a lock tongue depending on how the door/hatch is closed.



Lock from front - Tongue A

Lock from lower side - Tongue B

Lock from upper side - Tongue B

Lock tongue A

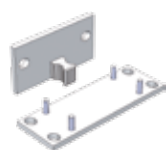
Selected when the door closes to the Dalton front

Lock tongue B

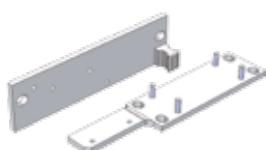
Selected when the door closes to Dalton's upper or lower side

For Dalton L00 both lock tongues can be used regardless of the operating direction

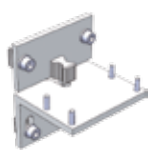
3. Choose a fixing kit that fits your installation.



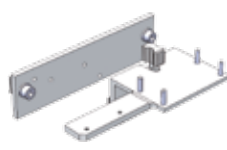
Fixing kit 1
for Dalton and lock tongue



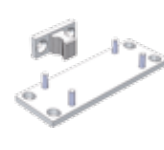
Fixing kit 2
for Dalton and Adam and also for lock tongue and Eva



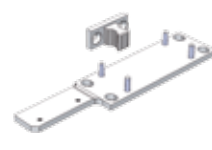
Fixing kit 3
for Dalton adapted to ABB Jokab Safety fencing system



Fixing kit 4
for Dalton and Eden adapted to ABB Jokab Safety fencing system



Fixing kit 5
for Dalton, small bracket for lock tongue



Fixing kit 6
for Dalton and Eden, small bracket for lock tongue

Read the manual for further information about correct installation of Dalton

Accessories - Dalton

Tina 12A junction block

Tina 12A can be used to connect two Daltons with Edens with one cable to the apparatus enclosure. The summed information that indicates the states of both the Dalton and Eden also goes to the apparatus enclosure.







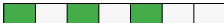






Transfer cables

A transfer cable can be used when the Dalton's 8-pole connector is to be connected to the 5-pole M12 connector of Tina 4A or Tina 8A. Note that the info-signals from Dalton and Adam can not be used.

Technical data – Dalton

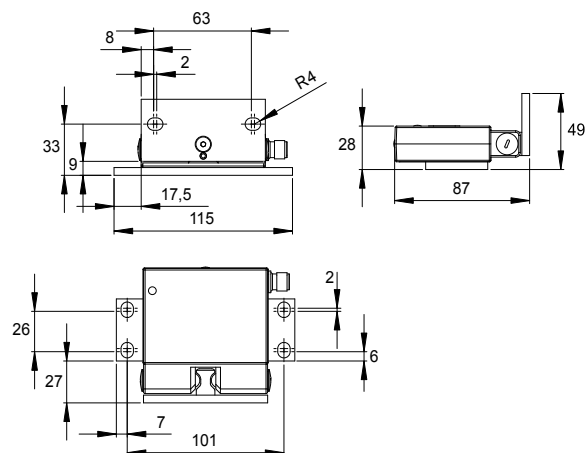
Article number	
Dalton L00	2TLA020038R3000
Dalton M11	2TLA020038R3100
Dalton M12	2TLA020038R3200
Dalton M31	2TLA020038R3300
Lock tongue A	2TLA020039R0800
Lock tongue B	2TLA020039R1000
Fixing kit 1	2TLA020039R0000
Fixing kit 2	2TLA020039R0100
Fixing kit 3	2TLA020039R0200
Fixing kit 4	2TLA020039R0300
Fixing kit 5	2TLA020039R0400
Fixing kit 6	2TLA020039R0500
Accessories	
DA 1	2TLA020053R0000
M12-CT0214	2TLA020060R0100
Tina 12A	2TLA020054R1800
Level of safety	
For interlocking switch Eden. Not valid for locking function.	
IEC/EN 61508-1...7	SIL3
EN 62061	SIL3
EN ISO 13849-1	PL e/Cat. 4
PFH_D	
For interlocking switch Eden. Not valid for locking function.	
	4.50×10 ⁻⁹
Locking function	
M - Locked when energised	
L - Only ball latch	
Colour	
Black	
Operating voltage	
24 VDC +25/-20%	
Current consumption	
Unlocked	40 mA
Locked	130 mA
Lock input	5 mA
Information output	Max. 10 mA
Eden	
See the data for Adam M12	
Operating temp. range	
-10°C to +55°C	
Enclosure classification	
IP67	
Holding force	
Unlocked	25-100 N
Locked	2000 N
Material	
Ball catch, securing plate	Anodised aluminium
Enclosure	Anodised aluminium
Lock tongue, securing plate	Stainless steel
Chemical resistance	
Stainless steel	Good resistance against most acids except hydrochloric acid and sulphuric acid.
Anodised aluminium	Very good resistance against corrosion, good resistance to most acids.

Connections		Connector to connect Dalton (varies depending on type)			
		8-pole male plug, M12			
		5-pole male plug, M12			
		Outlet for externally connected Adam female plug M12, 5-pole			
Colour markings (pins)		8-pole	Colour	5-pole	Colour
Function		1	(White)		
Dynamic input signal, Adam +24 VDC		2	(Brown)	1	(Brown)
Lock signal		3	(Green)	4	(Black)
Not used		4	(Yellow)	2	(White)
Information Adam		5	(Grey)		
Dynamic output signal, Adam 0 VDC		6	(Pink)		
Information Dalton		7	(Blue)	3	(Blue)
		8	(Red)	5	(Grey)
Warning Dalton locks mechanically. If the lock is forced, the Dalton can be permanently damaged.					
Conformity (lock only)		EN 61000-6-4:2007, EN 61000-6-2:2005			

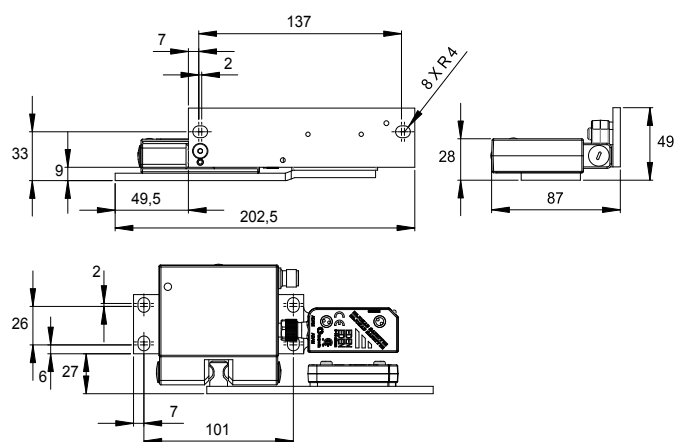
LED indication – Dalton	
LED indication  =Red  =Green  =Paus	Information function
  	1 Locked 0 Closed but unlocked 0 Open
Alarm: 	1Hz Lock has not entered the unlocked state
  	1Hz Eden or ball catch not in position = open 1Hz Open, locking not permitted 1Hz Lock has not entered the locked state
  	1Hz Undervoltage - locking not permitted 1Hz Overvoltage 1Hz Overtemperature (> 80°C)

Dalton

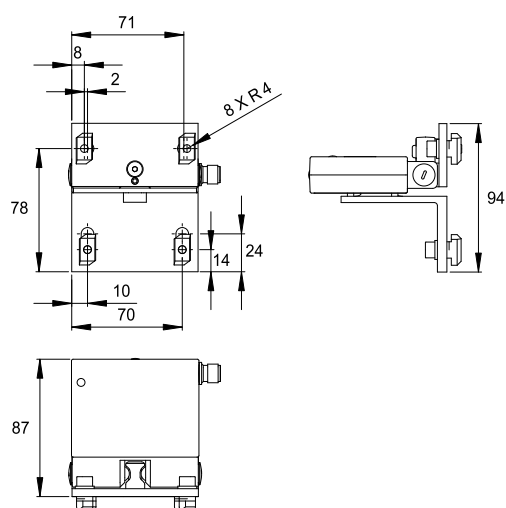
Dimensions



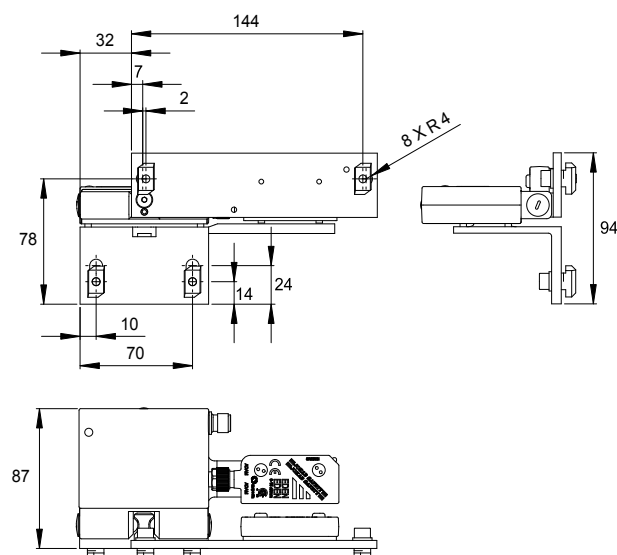
Bracket 1 with Dalton



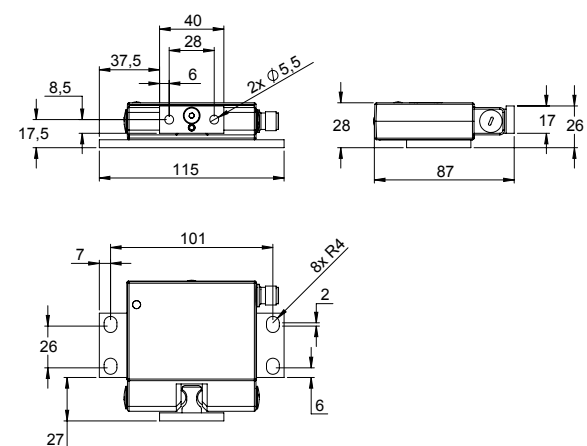
Bracket 2 with Dalton and Eden



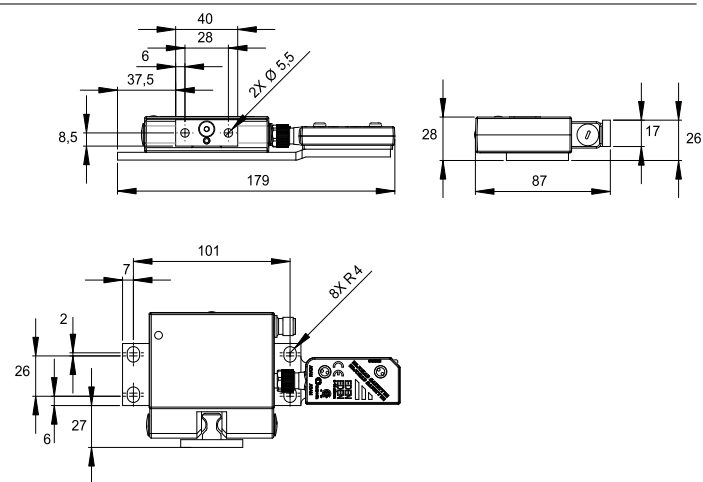
Bracket 3 with Dalton



Bracket 4 with Dalton and Eden



Bracket 5 with Dalton

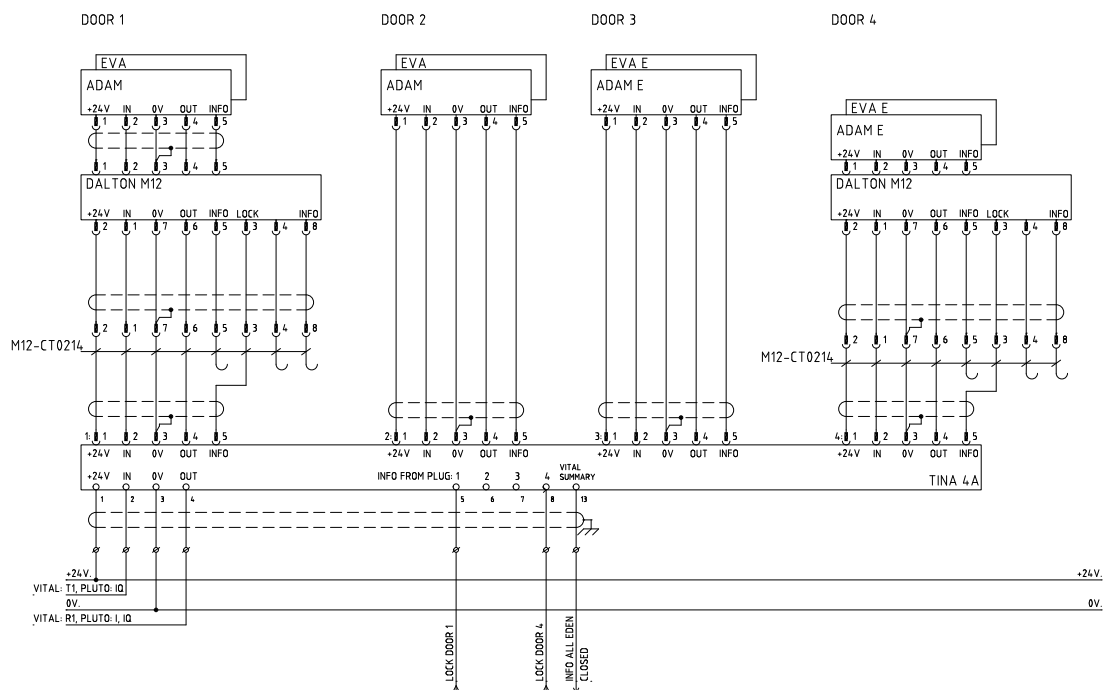


Bracket 6 with Dalton and Eden

Dalton

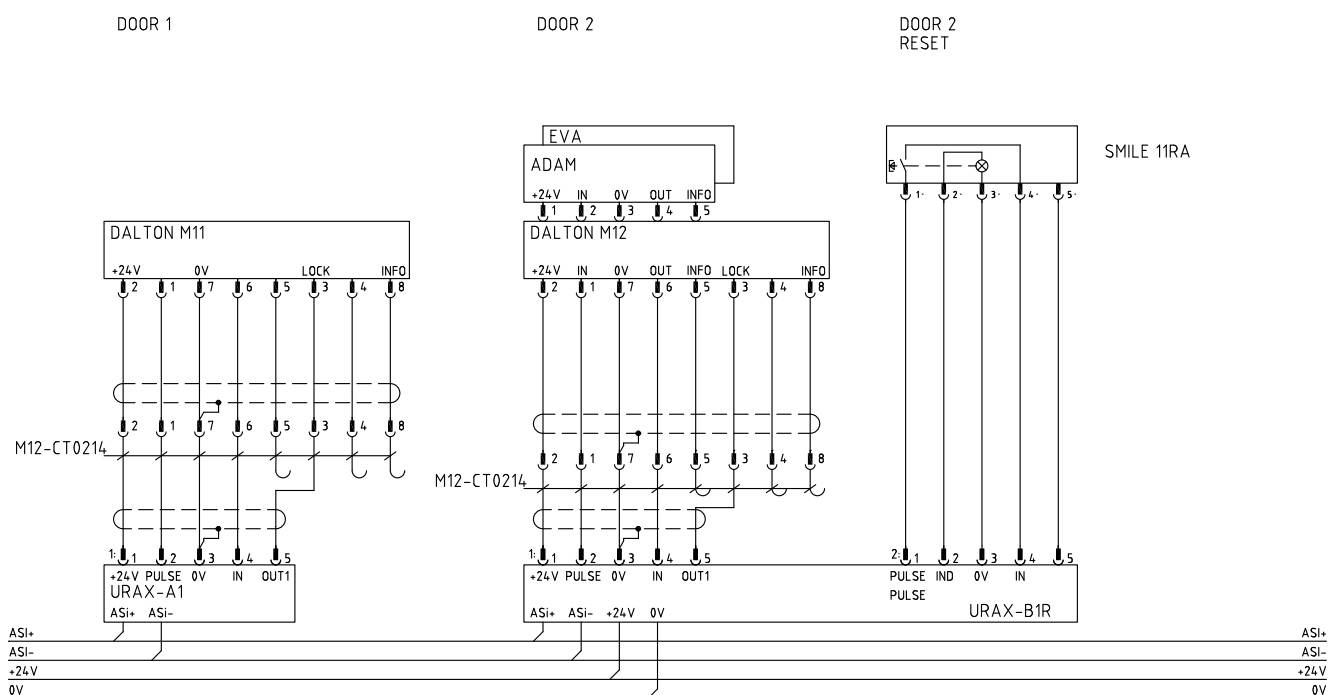
Connection examples

Connection example – Dalton M12 and Eden through Tina 4A



9

Connection example – Dalton M12 and Eden through Urax (AS-i)



Safety and process lock

Knox



Knox - Double safety lock as specified in PL e/Cat. 4

Knox is a double lock that complies with the highest safety level (two lock cylinders with monitored positions) that can be used both as a safety and process lock. The locking function is electrically controlled and is bi-stable, i.e. it retains its position (unlocked/locked) in the event of a power failure. Dual signal for unlocking is safe at both short-circuits and cable breaks.

The handles operate as they would on a normal door but the exterior handle also have a reset function, why a separate reset button is not necessary and the interior handle that can be used for emergency opening also in locked state. The design and durability of the lock mean that it is ideal for harsh environments as the sensors are non-contact and the lock is manufactured of stainless steel. Knox is available in a number of adaptations such as left-hung door, right-hung door, inward and outward opening, with manual unlocking and for sliding door.

Approvals:



Application:

- Safe locking of door to a cell/line with long stopping time.
- Prevents unintentional interrupts of processes

Features:

- Double locking function as specified in PL e/Cat.4 (EN ISO 13849-1)
- Withstands harsh environments
- Status information with LEDs on the lock and at cable connection.
- Controlled in locked and unlocked positions - position power failure.
- Electronic connection only on the door frame.
- Robust design



Knox is easy to assemble, adjust and dismantle in and out of the T-slot of the Quick-Guard fencing system.

Knox in 4 different states



Open



Emergency opened



Reset, openable



Operational mode locked and reset
(emergency opening only)

Models and ordering data

Door part	Right	Left
Outward opening without manual unlocking	Knox 1A-R v2 2TLA020105R5000	Knox 1A-L v2 2TLA020105R5100
Outward opening with manual unlocking	Knox 1AX-R v2 2TLA020105R5800	Knox 1AX-L v2 2TLA020105R5900
Inward opening without manual unlocking	Knox 1B-R v2 2TLA020105R5200	Knox 1B-L v2 2TLA020105R5300
Inward opening with manual unlocking	Knox 1BX-R v2 2TLA020105R6100	Knox 1BX-L v2 2TLA020105R6300
Sliding door without manual unlocking	Knox 1F-R v2 2TLA020105R6400	Knox 1F-L v2 2TLA020105R6500
Sliding door with manual unlocking	Knox 1FX-R v2 2TLA020105R6400	Knox 1FX-L v2 2TLA020105R6500
Frame part		
Knox safety lock	Knox 2A v2 2TLA020105R2200	
Knox process lock	Knox 2X v2 2TLA020105R2300	
Accessories		
PC plate for Knox on mesh door	2TLA020106R0000	When mounting Knox on door with mesh the accessory PC plate for Knox is recommended. This is to avoid emergency opening from the outside.
Escutcheon plate for Knox (without emergency release handle)	2TLA020106R0600	When mounting Knox on a low door it is recommended to replace emergency release handle to prevent opening from the outside by reaching over.

9



Knox door part 1A-R
and frame part 2A



Knox door part 1A-L
and frame part 2A



Knox door part 1B-R
and frame part 2A



Knox door part 1B-L
and frame part 2A



Knox door part 1F-R
and frame part 2A



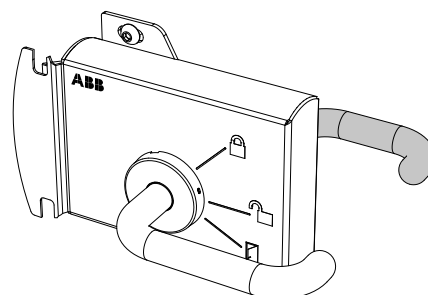
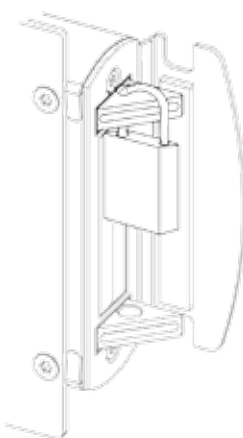
Knox door part 1F-L
and frame part 2A

Maintenance mode

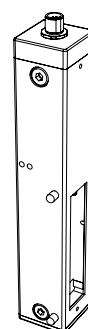
If any work is to be carried out inside the hazardous area, a padlock can be put in place in any of the two locking bolts to prevent the door from locking. This can also act as an indication of presence within the hazardous area (only helpful if operators are informed of the use of padlocks).

NOTE! The use of padlocks is not a part of the safety function and only serves as an additional measure to reduce the risk of entrapment.

NOTE! Cable outlet on frame part must be mounted upwards.



Door part Knox1



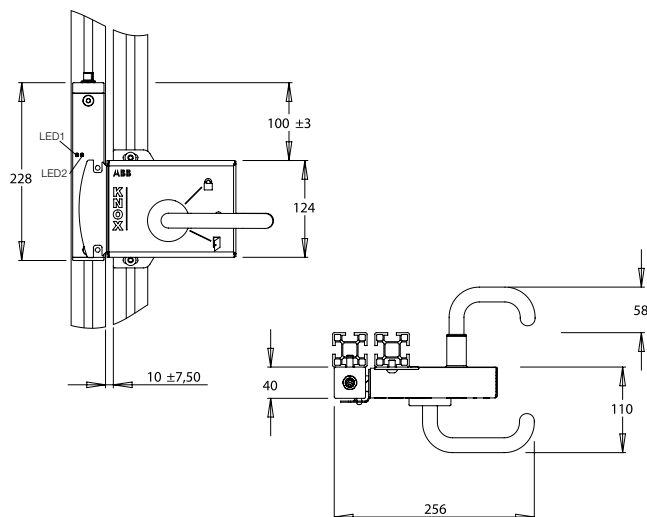
Frame part
Knox 2

Technical data – Knox

Level of safety	
EN ISO 13849-1	PL e/Cat. 4
PFH _D	4.50×10 ⁻⁹
Lock function	S/M - unlocked and locked with voltage.
Operating voltage	24 VDC +/- 10%
Operating temperatur	+5°C...+55°C
Power consumption	
Electronics	70 mA (in locked position)
Lock/lock inverse	135 mA (when locking/unlocking)
Total max	Knox 2A 160mA, Knox 2x 165mA
Information output	Max. 10 mA
Insulation class	IP65
Holding strength	
Unlocked	5000 N (10,000 N ultimate breaking strength)
Locked	5000 N (10,000 N ultimate breaking strength)
Connection	Male plug M12, 8-pole
Connections Knox 2A	
Function	8-pole Colour
Dynamic input signal	1 (White)
+24 VDC	2 (Brown)
Lock	3 (Green)
Lock inverse	4 (Yellow)
Information Locked	5 (Grey)
Dynamic output signal	6 (Pink)
0 VDC	7 (Blue)
Information reset	8 (Red)
Connections Knox 2X	
Function	5-pole Colour
+24 VDC	1 (Brown)
Dynamic signal input	2 (White)
0 VDC	3 (Blue)
Dynamic signal output	4 (Black)
Lock	5 (Grey)
Warning	
Knox locks mechanically. Forcing the lock may damage Knox permanently.	
When mounting Knox on door with mesh the accessory PC plate for Knox is recommended. This is to prevent emergency opening from the outside.	
When mounting Knox on a low door it is recommended to replace emergency release handle with the accessory Escutcheon plate for Knox to prevent opening from the outside by reaching over.	
Conformity	2006/42/EG EN ISO 12100-1/2:2003, EN ISO 13849-1:2008, EN 62061:2005, EN 1088

LED indicator – Knox

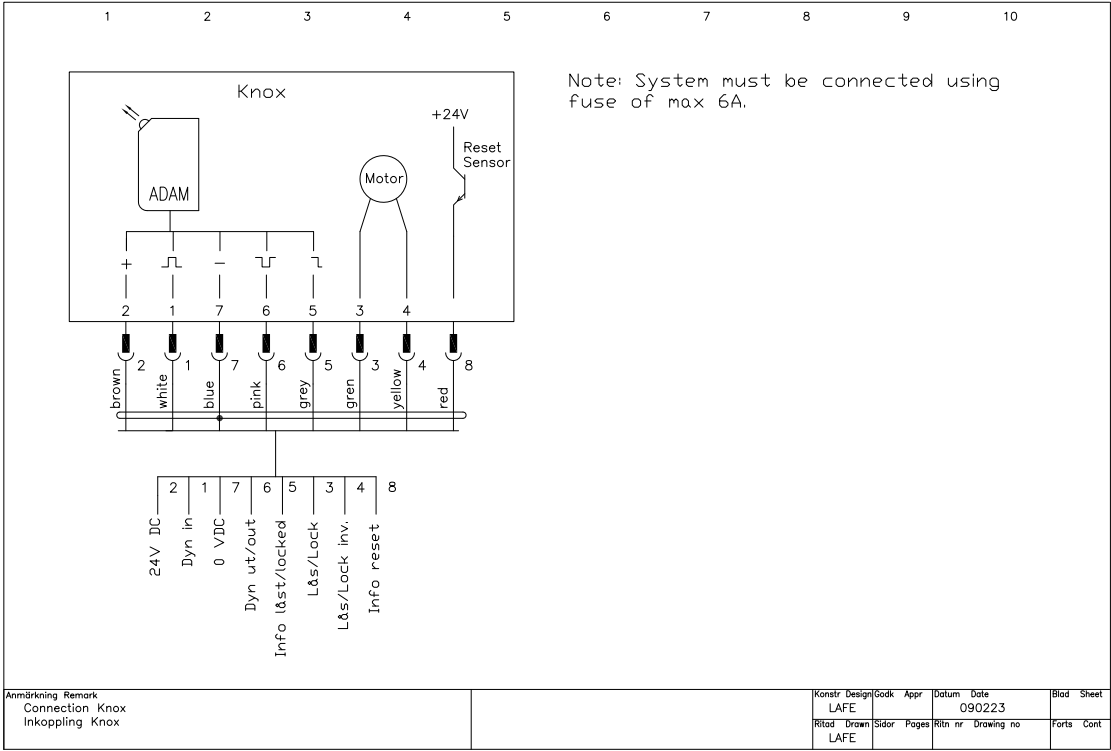
LED indicator	
 =Red =Green =Paus	Function
LED 1	
	Locked (and reset)
	Locked, no dynamic signal in
	Unlocked
LED 2	
	Reset
	Not reset
Alarm LED 2	
	Dirt indicator reset sensor
	Reset
	Not reset



Knox

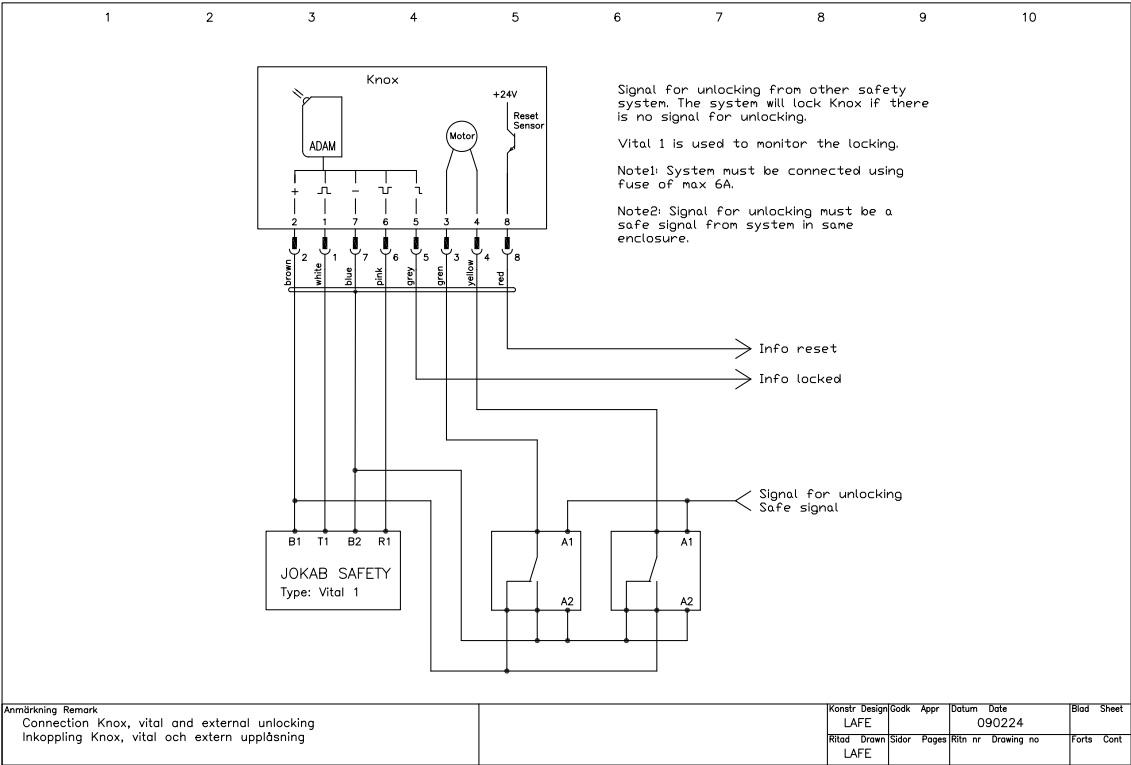
Connection examples

Connection example - Knox



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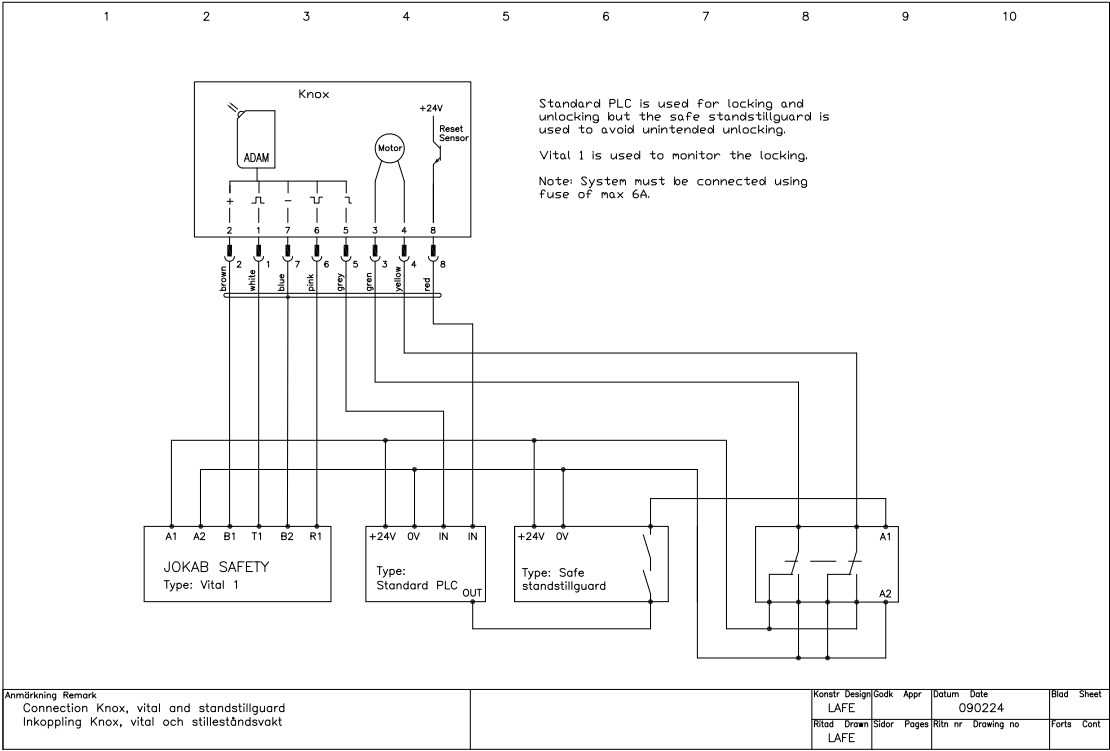
Connection example - Knox with other unlocking



Knox

Connection examples

Connection example - Knox with downtime monitor



Safety Interlock Switch MKey5



Approvals:



Application:

- Gates
- Hatches

Features:

- 2NC + 1NO (actuator in)
- 4 actuating positions
- 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 MKey5Z 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.

Explosion Proof version (X)

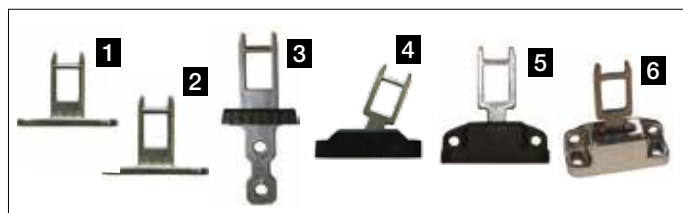
MKey5 also exist in versions with certified explosion proof contact block (X-versions). MKey5ZX is in stainless steel and can be used in European Zone 1, 2, 21,22 environments (Gas and Dust). Preassembled with 3 meter cable.

Regulations and Standards

The MKey5 is designed and approved in accordance to relevant standards. Examples of relevant standards are EN 1088, IEC/EN 60947-5-1, EN 60204-1, EN ISO 13849-1, EN 62061 and UL 508.

Technical data – MKey5 series

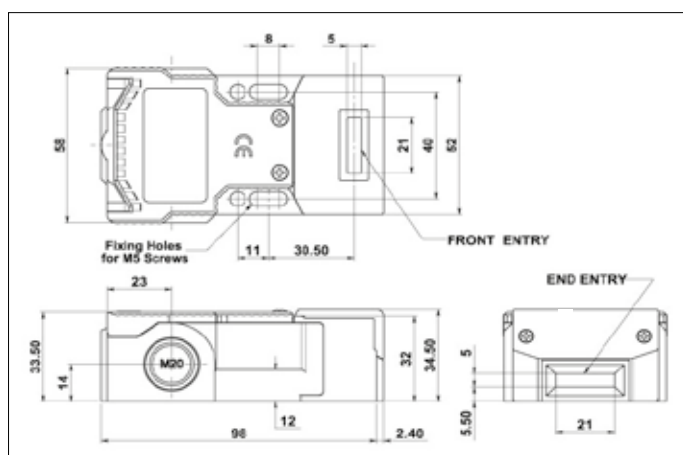
Article number	
Standard	
MKey5 - 12N	2TLA050003R0100
MKey5+ - 40N	2TLA050003R0101
Stainless steel head	
MKey5 - 12N	2TLA050003R0110
MKey5+ - 40N	2TLA050003R0111
Full stainless steel	
MKey5Z - 12N	2TLA050003R0120
MKey5+Z - 40N	2TLA050003R0121
MKey5ZX (EX)	2TLA050003R0125
Level of safety	
EN ISO 13849-1	Up to PL e/Cat. 4 depending upon system architecture
EN 62061	Up to SIL3 depending upon system architecture
Safety data	
Mechanical reliability B_{10d}	2.5×10^6 operations at 100mA load
Proof test interval (life)	35 years
MTTF _d	356 years (8 cycles per hour/24 hours per day/365 days)
Utilisation category	AC15 A300 3A
Force/travel for positive opening	6 mm
Actuator entry mini. radius	175 mm Standard Key 100 mm Flexible Key
Max. approached/withdrawal speed	600 mm/s
Actuator	Stainless steel
Mechanical life	1 million switch operations
Rated insulation/withstand voltage	500VAC / 2500VAC
Vibration resistance	IEC 68-2-6, 10-55Hz+1Hz, excursion: 0.35 mm, 1 octave/min
Contacts (actuator key inserted)	2NC + 1NO (NC are direct opening action)
Thermal current (I _{th})	10A
Enclosure protection	
MKey5	IP67
MKey5Z(X)	IP69K and IP67
Operating temperature	-25°C to +80°C
Conduit entries	3 x M20
Material	
MKey5	Polyester or/and stainless steel 316
MKey5Z(X)	Stainless steel 316
Colour	Red or stainless steel
Mounting position	Any
Mounting bolts	Body 2 x M5, actuator 2 x M5
Explosion Proof version (X)	
Classification	Ex d IIC T6 (-20°C ≤ Ta ≤ +60°C) Gb Ex tb IIIC T85°C (-20°C ≤ Ta ≤ +60°C) Db
Rated Voltage	250V AC/DC
Rated Current	2 pole 4A 4 pole 2.5A



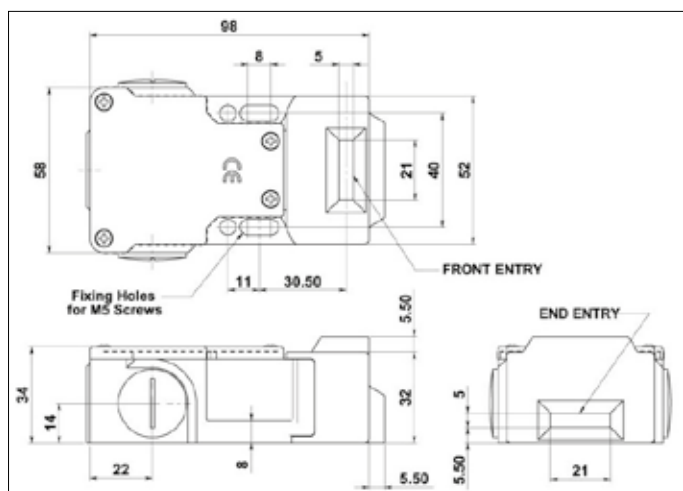
Actuator

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)

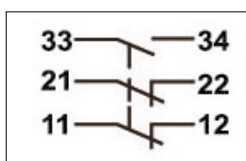


Dimension MKey5



Dimension MKey5Z

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



Contact block configuration on 2NC, 1NO

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

Contacts at withdrawal of actuator

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 24 VDC or 230 VAC 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

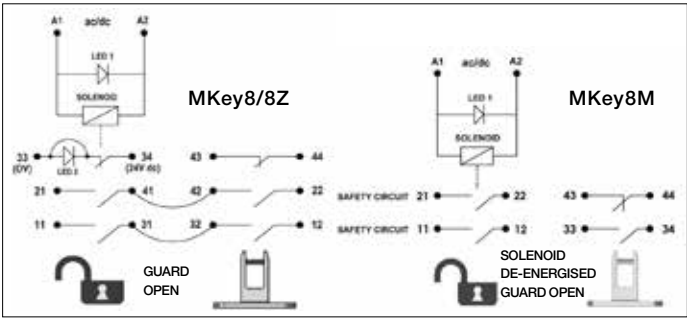
The version of MKey8 with die cast housing and spring lock. The switch has a contact block configuration of 2NC + 2NC with positive force disconnection contacts. One pair closes when the actuator key is pushed into the head (2NC). The other pair closes when the locking mechanism is in the locked position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

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 - 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.



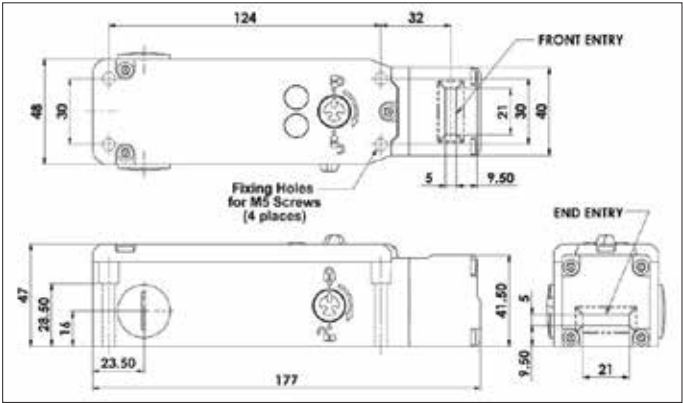
Schematic circuit: LED1 status of solenoid, LED2 status of lock (Terminals 33 - 34 are selectable to be used either as power feed to LED2 or as a voltage free auxiliary circuit to indicate lock status).

	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

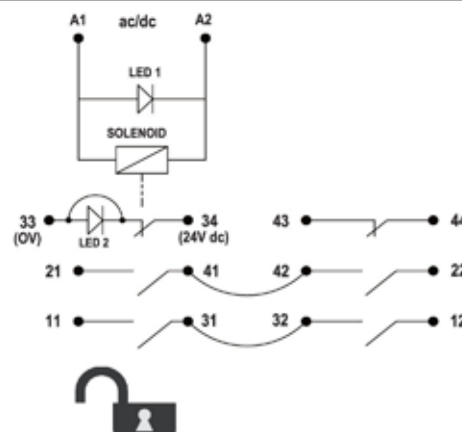
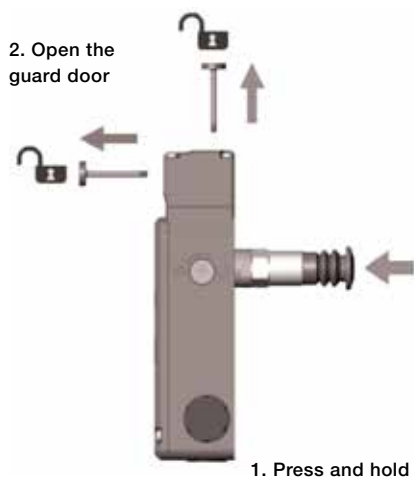
MKey8ER

MKey8ER - Standard version with escape release

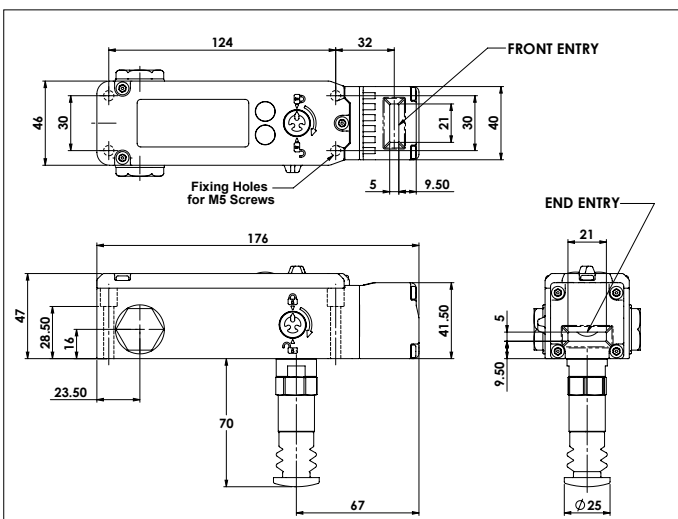
The version of MKey8 with die cast housing and spring lock with escape release. The switch has a contact block configuration of 2NC + 2NC with positive force disconnection contacts. One pair closes when the actuator key is pushed into the head (2NC). The other pair closes when the locking mechanism is 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).



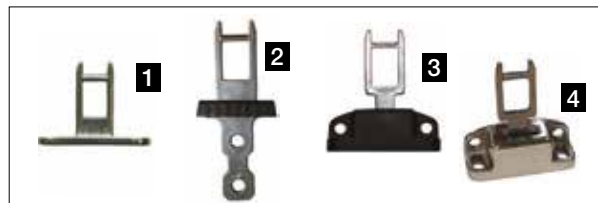
Dimensions MKey8ER

Technical data – MKey8 series

Article number	
MKey8 - Standard	
MKey8 - 24 VDC	2TLA050011R0132
MKey8 - 230 VAC	2TLA050011R0134
MKey8M - Power to Lock	
MKey8M - 24 VDC	2TLA050013R0132
MKey8M - 230 VAC	2TLA050013R0134
MKey8ER - Escape release	
MKey8ER - 24 VDC	2TLA050015R0132
MKey8ER - 230 VAC	2TLA050015R0134
MKey8Z - Stainless Steel	
MKey8Z - 24 VDC	2TLA050011R0122
MKey8Z - 230 VAC	2TLA050011R0124
Level of safety	
EN ISO 13849-1	Up to PL e/Cat. 4 depending upon system architecture
EN 62061	Up to SIL3 depending upon system architecture
Safety data	
Mechanical reliability B _{10d}	2.5 x 10 ⁶ operations at 100mA load 35 years
Proof test interval (life)	356 years (8 cycles per hour/24 hours per day/365 days)
MTTF _d	
Utilisation category	AC15 A300 3A
Solenoid voltage (by part number)	24 VDC or 230 VAC, +/- 10%
Solenoid power consumption	12 W (MKey8M inrush 50 W)
LED 2 supply voltage	24 VDC, +/- 10% (MKey8, MKey8ER, MKey8Z)
Travel for positive opening	10 mm
Actuator entry mini. radius	175 mm Standard Key 100 mm Flexible Key
Max. approached/withdrawal speed	600 mm/s
Rated insulation/withstand voltages	600VAC / 2500VAC
Vibration resistance	IEC 68-2-6, 10-55 Hz+ 1 Hz excursion: 0.35 mm 1 octave/min.
Thermal current (Ith)	5A
Enclosure protection	
MKey8/M/ER	IP67
MKey8Z	IP69K and IP67
Operating temperature	
MKey8	-25°C to +55°C
MKey8M	-25°C to +40°C
MKey8ER	-25°C to +55°C
MKey8Z	-25°C to +55°C
Conduit entries	3 x M20
Material	
MKey8/M/ER	Die cast painted red
MKey8Z	Stainless steel 316
Colour	Red or stainless steel
Mounting position	Any
Mounting bolts	4 x M5

Regulations and Standards

The MKey8 is designed and approved in accordance to relevant standards. Examples of relevant standards are EN 1088, IEC/EN 60947-5-1, EN 60204-1, EN ISO 13849-1, EN 62061 and UL 508.



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



Approvals:



Application:

- Gates
- Hatches

Features:

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

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 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

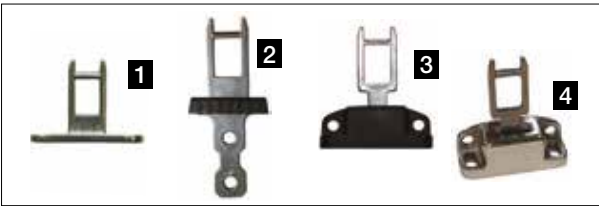
The MKey9 has double forced disconnection contacts to the actuator key and the locking mechanism. The actuator key is designed to protect against unauthorised access; no tools, magnets or similar allow that the MKey9 can be tampered with. To achieve maximum safety level in connection with the machine 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 EN 1088, IEC/EN 60947-5-1, EN 60204-1, EN ISO 13849-1, EN 62061 and UL 508.

Technical data – MKey9 series

Article number	
MKey9 - 24VDC	2TLA050007R0112
MKey9M - 24VDC (power to lock)	2TLA050009R0112
Level of Safety	
EN ISO 13849-1	Up to PL e/Cat. 4 depending upon system architecture
EN 62061	Up to SIL3 depending upon system architecture
Safety data	
Mechanical reliability B _{10d}	2,5 x 10 ⁶ operations at 100mA load 35 years
Proof test interval (life)	356 years (8 cycles per hour/24 hours per day/365 days)
Utilisation category	AC15 A300 3A
Solenoid voltage	24 VDC or 230 VAC, +/- 10%
Solenoid power consumption	
MKey9	12 W
MKey9M	12 W (Inrush 50W)
LED 2 supply voltage	24 VDC, +/- 10%
Travel for positive opening	10 mm
Actuator entry mini. radius	175 mm Standard Key 100 mm Flexible Key
Max. approached/withdrawal speed	600 mm/s
Rated insulation/withstand voltages	600VAC / 2500VAC
Vibration resistance	IEC 68-2-6, 10-55 Hz+ 1 Hz excursion: 0.35 mm 1 octave/min.
Thermal current (I _{th})	5A
Conduit entry	1 x M20
Enclosure classification	IP67
Operating temperature	
MKey9	-25°C to +55°C
MKey9M	-25°C to +40°C
Head/body material	Stainless steel 316/polyester
Colour	Red
Mounting position	Any
Mounting bolts	4 x M5

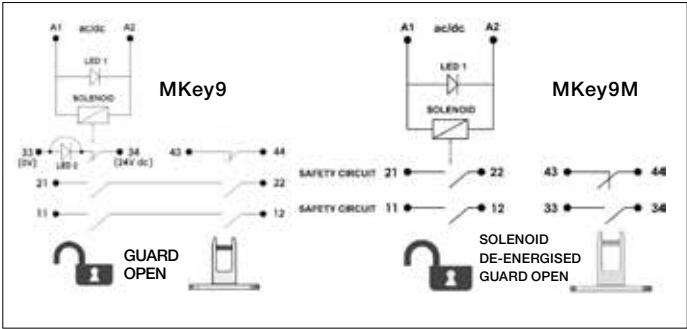


- Actuator
- | | |
|------------------------------------|-----------------|
| 1. Standard Key for SS head | 2TLA050040R0202 |
| 2. Flat Key | 2TLA050040R0220 |
| 3. Flexible Key with metal housing | 2TLA050040R0203 |
| 4. Flexible Key with SS housing | 2TLA050040R0204 |
- (Key always in Stainless steel)

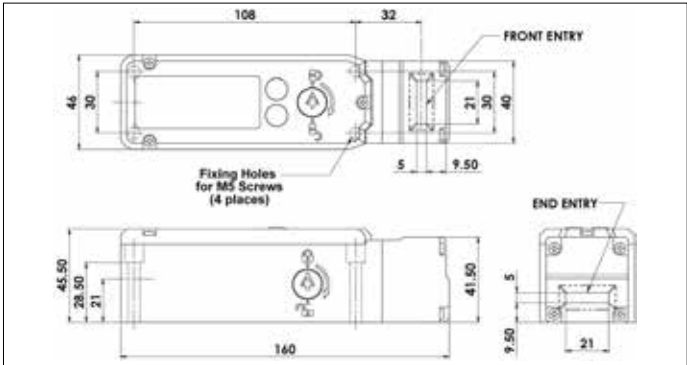


Top or side manual release points (not on MKey9M)

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.