Safety

Product Profile
ABB Jokab Safety

Power and productivity
for a better world™

We develop innovative products and solutions for machine safety

We make it simple to build safety systems. Developing innovative products and solutions for machine safety has been our business idea since the company Jokab Safety, now ABB AB, was founded in Sweden in 1988. Our vision is to become "Your partner for machine safety – globally and locally".

Many industries around the world, have discovered how much easier it has become to build protection and safety systems with our components and guidance.

Experience

We have great experience of practical application of safety requirements and standards from both authorities and production. We represent Sweden in standardisation organisations for machine safety and we work daily with the practical application of safety requirements in combination with production requirements. You can use our experience for training and advice.

Systems

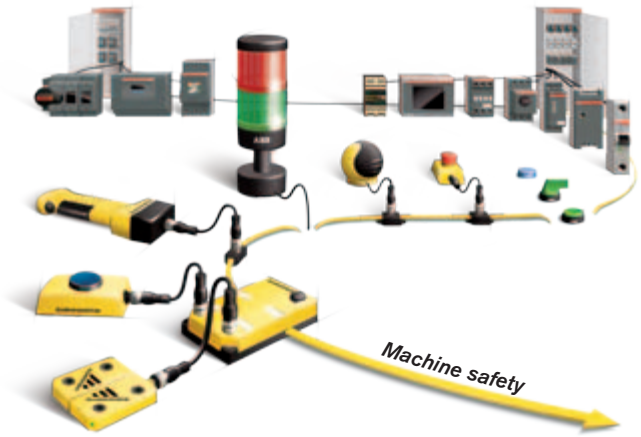
We deliver everything from a safety solution to complete safety systems for single machines or entire production lines. We combine production demands with safety demands for production-friendly solutions.

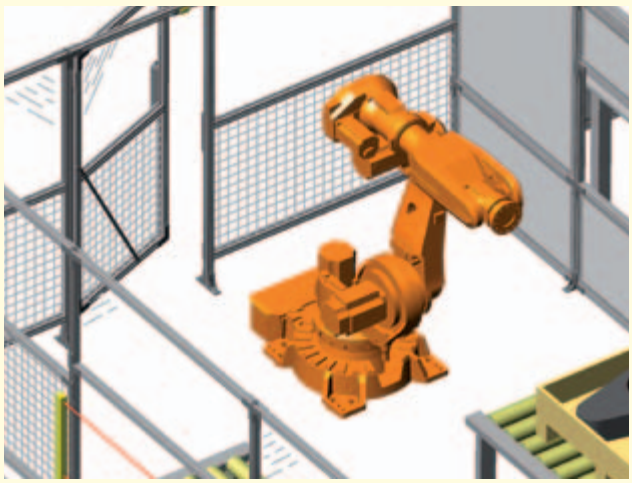
Products

We market a complete range of safety products, which makes it easy to build safety systems. We develop these innovative products continuously, in cooperation with our customers Our extensive program of products, safety solutions and our long experience in machine safety makes us a safe partner.

Jokab Safety - a member of the ABB Group

Jokab Safety is now a member of the ABB Group, which gives us extra strength and a world wide sales network in 120 countries. Our goal is to become even better at providing service to you by cooperation within ABB globally and locally.





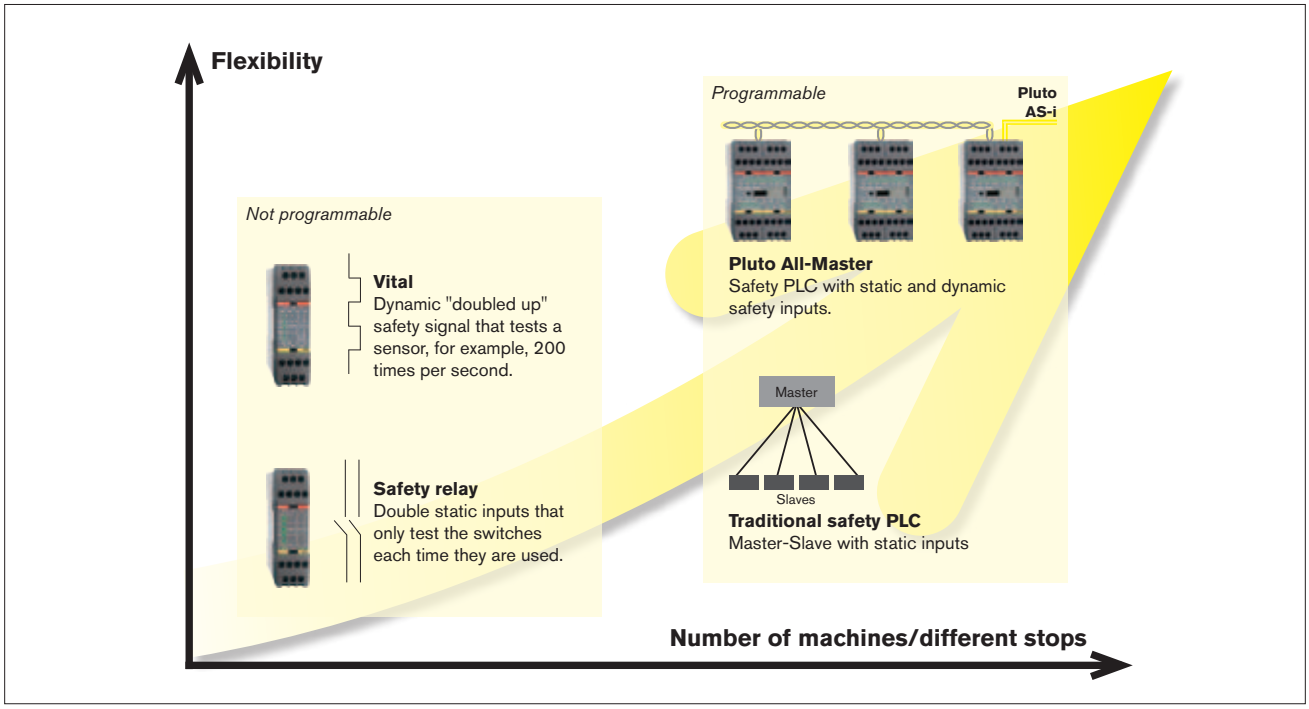
Do you need to learn about the new safety requirements for robots? If so, please contact us.

Standards and regulations

We help to develop standards

Directives and standards are very important to machinery and safety component manufacturers. We therefore participate in several international committees that develop standards, for among other things industrial robots, safety distances and control system safety features. This is experience that we absorb so that the standards will present requirements that benefit production efficiency allied to a high level of safety. We are happy to share our knowledge of standards with our customers.

Our products revolutionise the market



Our dynamic safety circuits and our comprehensive safety PLC are probably the most revolutionary ideas that have happened in the safety field in the control and supervision of protection, in many respects:

- They save on inputs: a dual safety circuit with one conductor instead of two. In addition, many protection devices can be connected to the same input while maintaining the highest level of safety.
- Reliability is better. Our electronic sensors have much longer lives than mechanical switches
- They are safer, since the dynamic safety sensors are checked 200 times per second. Switches on a door can only be checked each time they are used, for example once per hour or even once a month.
- With the All-Master Safety PLC it is easy to connect and disconnect machinery from a safety viewpoint. Common emergency stop circuits and sensors can be created as soon as the buses are interconnected between our safety PLCs.

We are continuously designing safety systems for difficult environments and also to create new safety solutions where practical solutions are missing. New technical improvements give new possibilities and therefore we continuously develope new products.

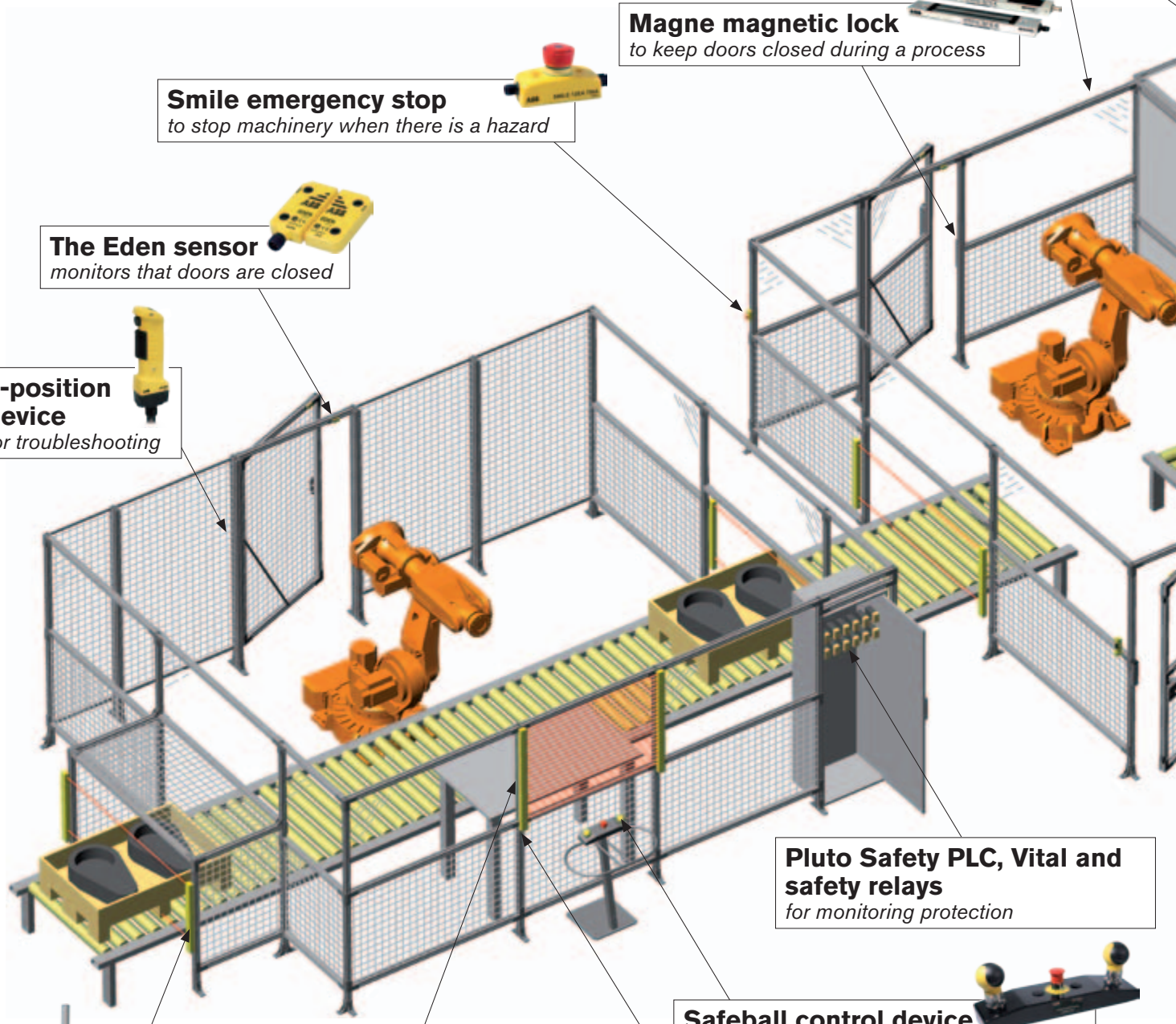
We train both machine builders and machine operators

Do you construct machinery?
We can provide the training you need to construct machinery that meets the requirements. Example subjects:

- Practical implementation of the requirements in the new Machinery Directive 2006/42/EC, which is valid for machines that was delivered/put into service from the 29th of december 2009
- Risk analysis – in theory and practice
- Control systems safety, standards EN ISO 13849-1 and EN 62061

Do you purchase and use machinery?
As a machinery user it is your responsibility to ensure that the correct requirements are complied with – regardless of whether your machinery is “new” or “old”, i.e. CE-labelled or not. Unfortunately many have purchased CE-labelled machinery that does not meet the requirements. This must not be used. Having it brought into compliance by the supplier can take a long time and be expensive in terms of loss of production, etc. We can educate you on this and help you to set the right demands when buying new or even second-hand machinery.

Production-friendly safety systems from ABB Jokab Safety



Quick-Guard fencing system
prevents unauthorised access and offers noise reduction

Magne magnetic lock
to keep doors closed during a process

Smile emergency stop
to stop machinery when there is a hazard

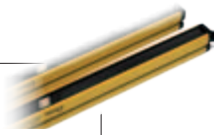
The Eden sensor
monitors that doors are closed

3-position device
for troubleshooting

Pluto Safety PLC, Vital and safety relays
for monitoring protection

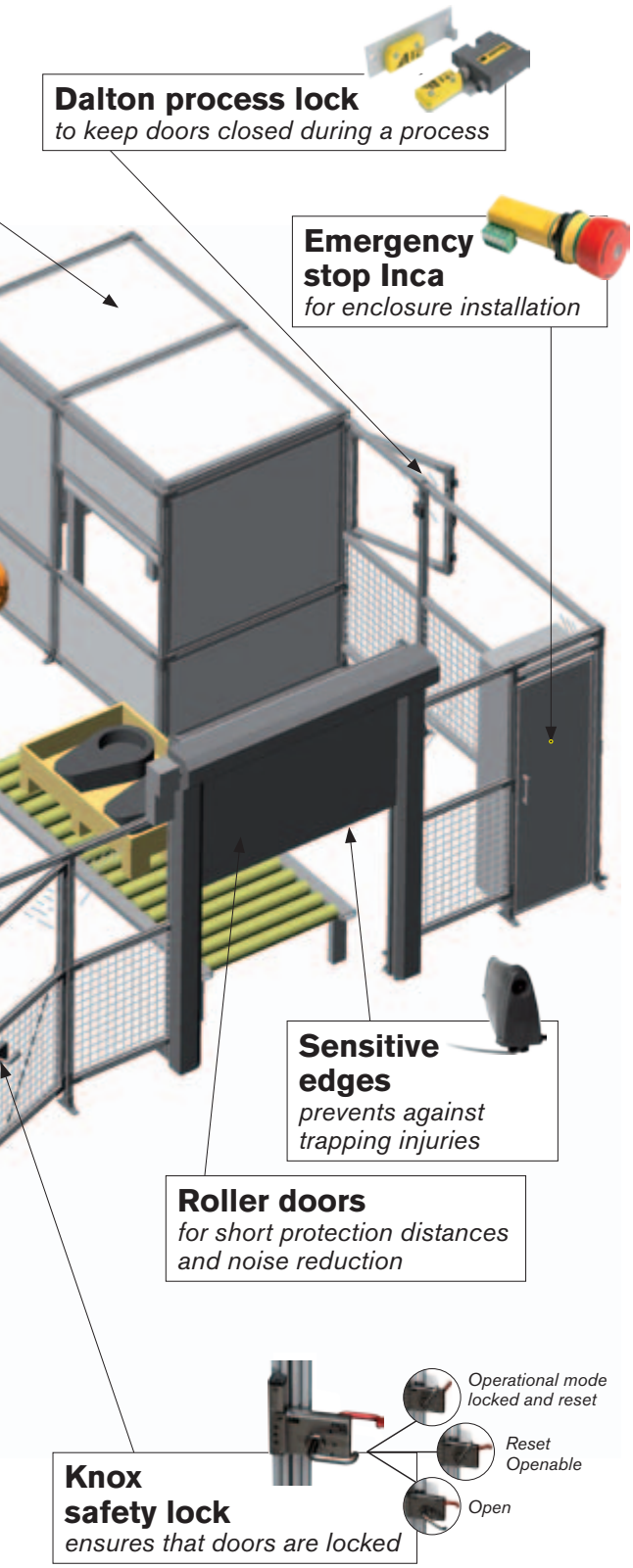
Safeball control device
for ergonomic and safe two-handed control

Focus light beam
to provide protection when entering an area



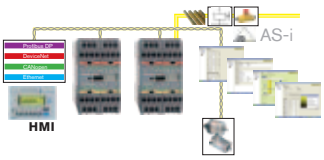
Focus light curtain
with finger detection

Smart stopping timer
to assist in determining protection locations



Product groups

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

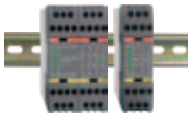


Pluto Safety PLC
A unique All-Master safety PLC for dynamic and static safety circuits.

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.

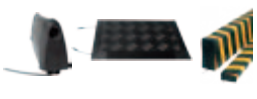
Stopping time & machinery diagnosis
Used for stopping time measurement, annual maintenance and for trouble-shooting machinery.

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-handed control units and foot pedals.

Emergency stop devices
Emergency stop devices for dynamic and static safety circuits.

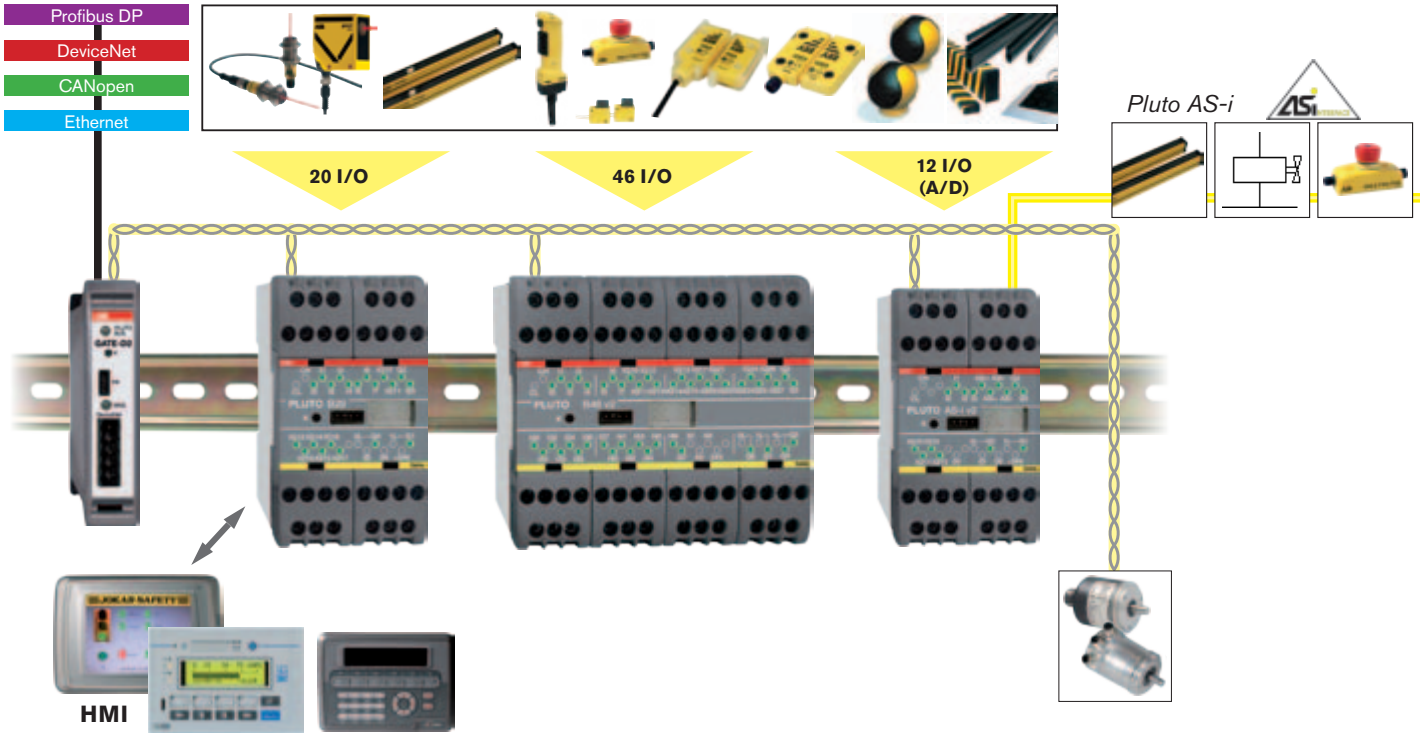


Contact strips/Bumpers/Safety mats
Sensitive edges, bumpers and safety mats.

Fencing systems/SafeCAD/Roller doors
A stable and flexible fencing system that is easy to install.

Programmable safety systems

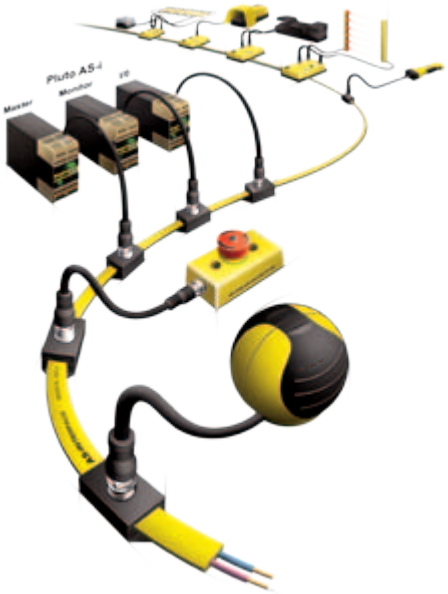
Safety PLC Pluto



Pluto Safety PLC enables freely programmable functions

- Save I/O's by connecting several sensors in series to one input while maintaining the highest safety level
- Write your own programme or use TÜV approved function blocks
- All-Master system with up to 32 Plutos on one bus

Pluto AS-i

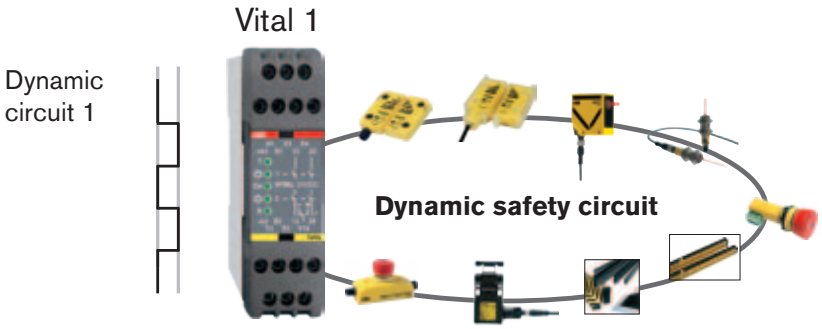


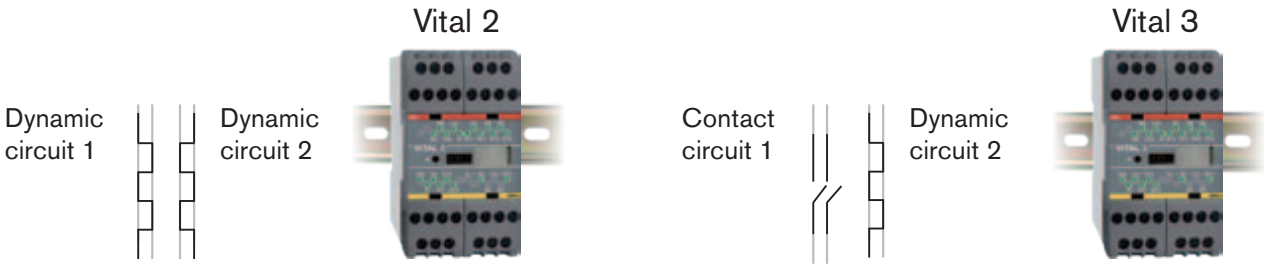
AS-i two-wire bus simplifies function and installation

- Easy to add, remove and move units on the bus
- Power, data and control in the same cable
- Pluto AS-i as master, monitor or safe I/O

Configurable safety systems

Vital safety controller





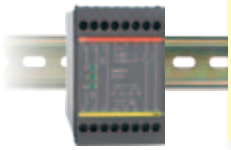
Dynamic safety circuits simplifies installation

- Serial connection of sensors while maintaining the highest safety level
- Status indication on each sensor
- Selectable functions on Vital 2 and 3

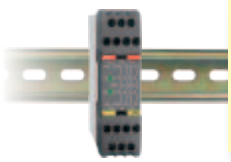
Safety relays

The RT series
The RT series consists of universal relays that can perform most of the functions required for safety operations.

The JSB series
This series consists of relays for two-handed control, and are compact relays with many outputs, and relays for simultaneous requirements of between 0.5 and 1.5 seconds.



Safety timers
Relays in this group are used for timed resetting, bypassing and stepping.



Expansion relays
Relays in this group are used to expand the number of dual output connections, with or without delay functions, and to switch off heavy current loads.

Flexible safety relays give freedom of choice

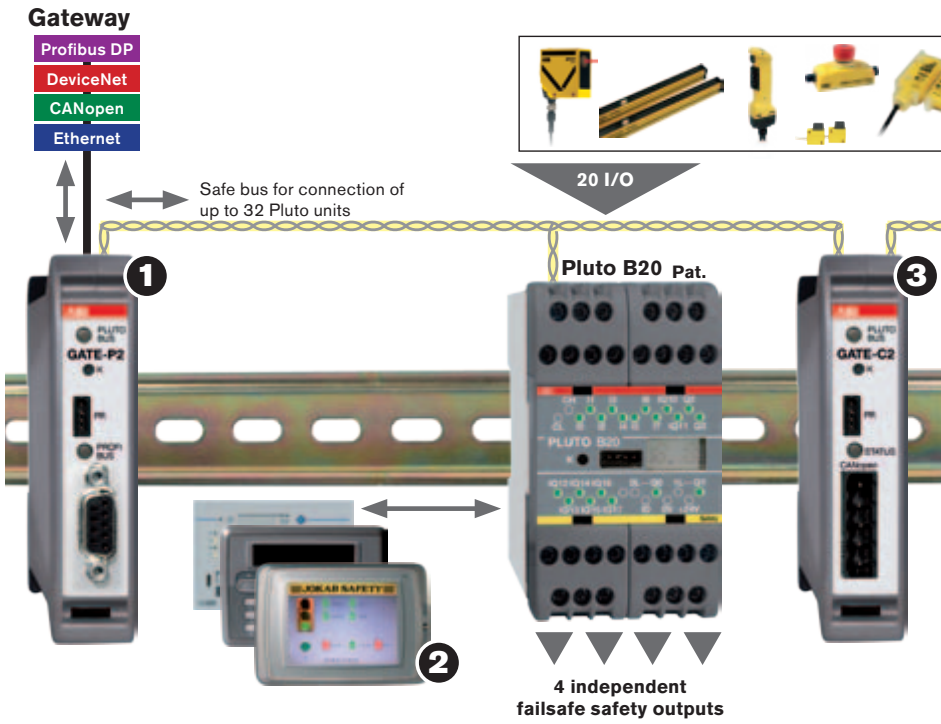
- One- or two-channel inputs
- Manual or automatic reset
- LED indication for run, I/O, short circuit and undervoltage

Safety PLC Pluto

Pluto with databus is an All-Master-System

Pluto is an All-Master-System for dynamic and static safety circuits where the inputs and other information are shared on a databus. Several safety sensors can be connected to one input while still achieving the highest level of safety. There are also combined inputs and outputs that can be used, for example, for lamp pushbuttons where the input and output functions are used simultaneously. Pluto has inputs for all safety devices on the market, and the Pluto Manager software selects how each input shall respond.

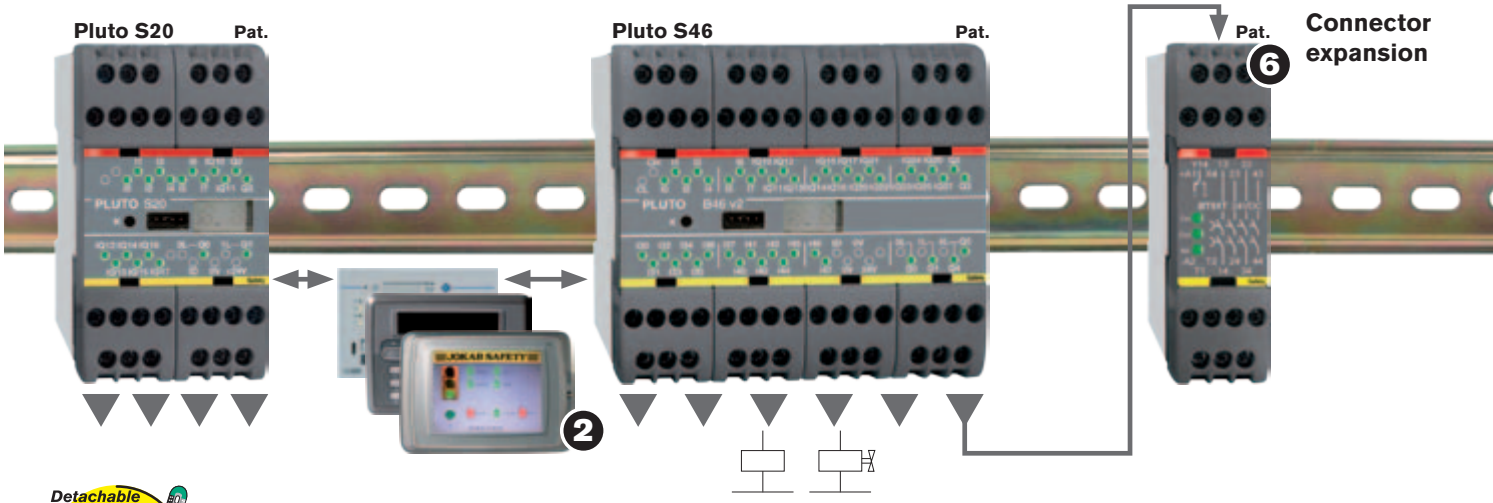
Pluto without a bus connection is available in two sizes, with 20 and 46 I/O , the S20 and S46-6 respectively. In other words, they are similar to the equivalent versions with bus connections, the B20 and B46-6.



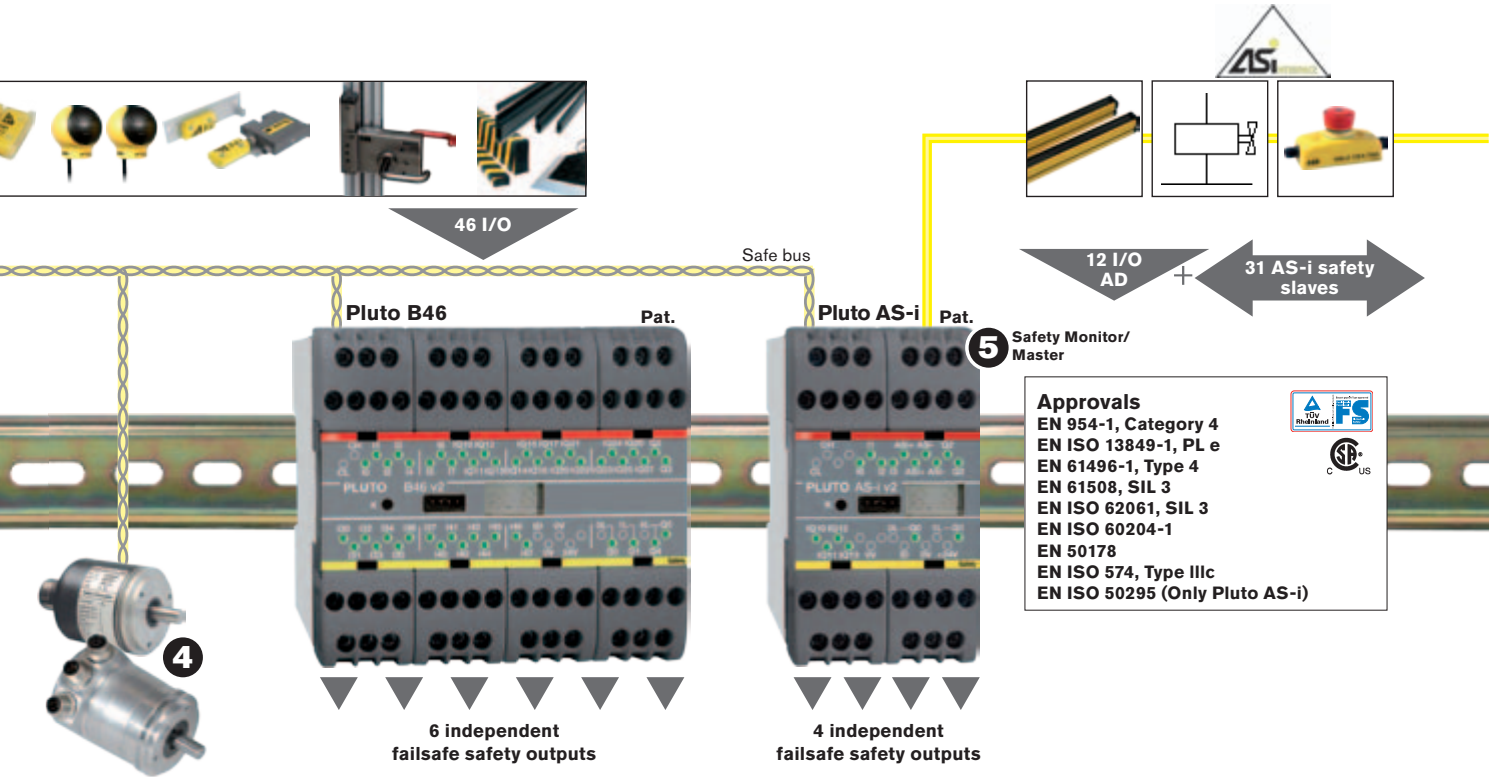
1 Gateway for two-way databus communication between Pluto and other control systems.

2 HMI – An HMI operator panel can communicate with Pluto in both directions. Connection can be made via the bus or direct to the front of the Pluto. The interface is RS232 using Modbus ASCii commands.

Pluto without a databus – A single Pluto can be used as a fully programmable safety logic controller.



6 Connector expansion – Several expansion relays can be connected to a single Pluto safety output while retaining the safety level.



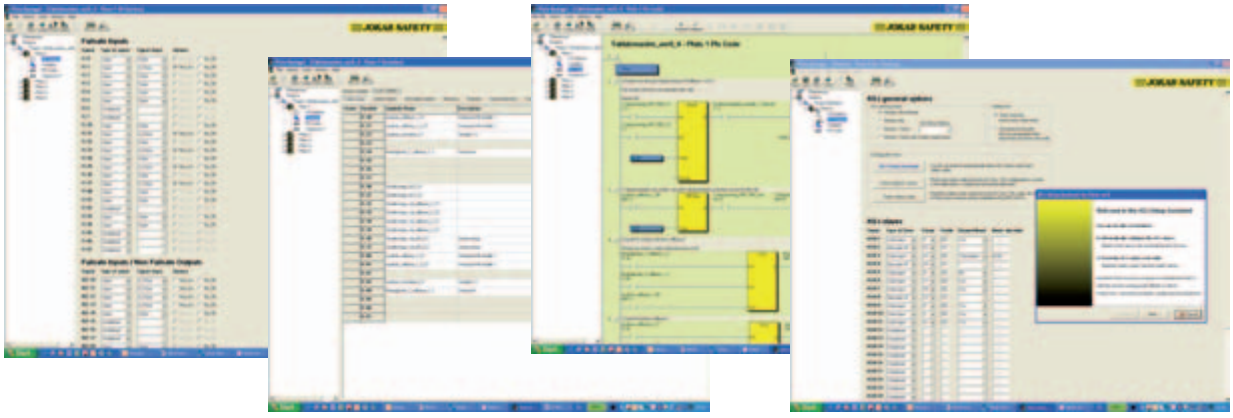
3 Pluto bridge – With a Gateway set up as a Pluto bridge, it is possible to:

- increase the databus length
- use different databus speeds for each section
- filter information from one section to reduce the databus loading on other sections.

4 Absolute encoder – 8 single turn or multi turn absolute encoders can be connected directly to the safety bus.

5 Pluto AS-i is an AS-i module which can be connected to a AS-i bus. It can either be AS-i master on the bus or work together with an AS-i master as monitor. It includes AS-i nodes, analogue and digital outputs, as well as safety outputs.

Free software is available via our website, at www.jokabsafety.com



Pluto Manager

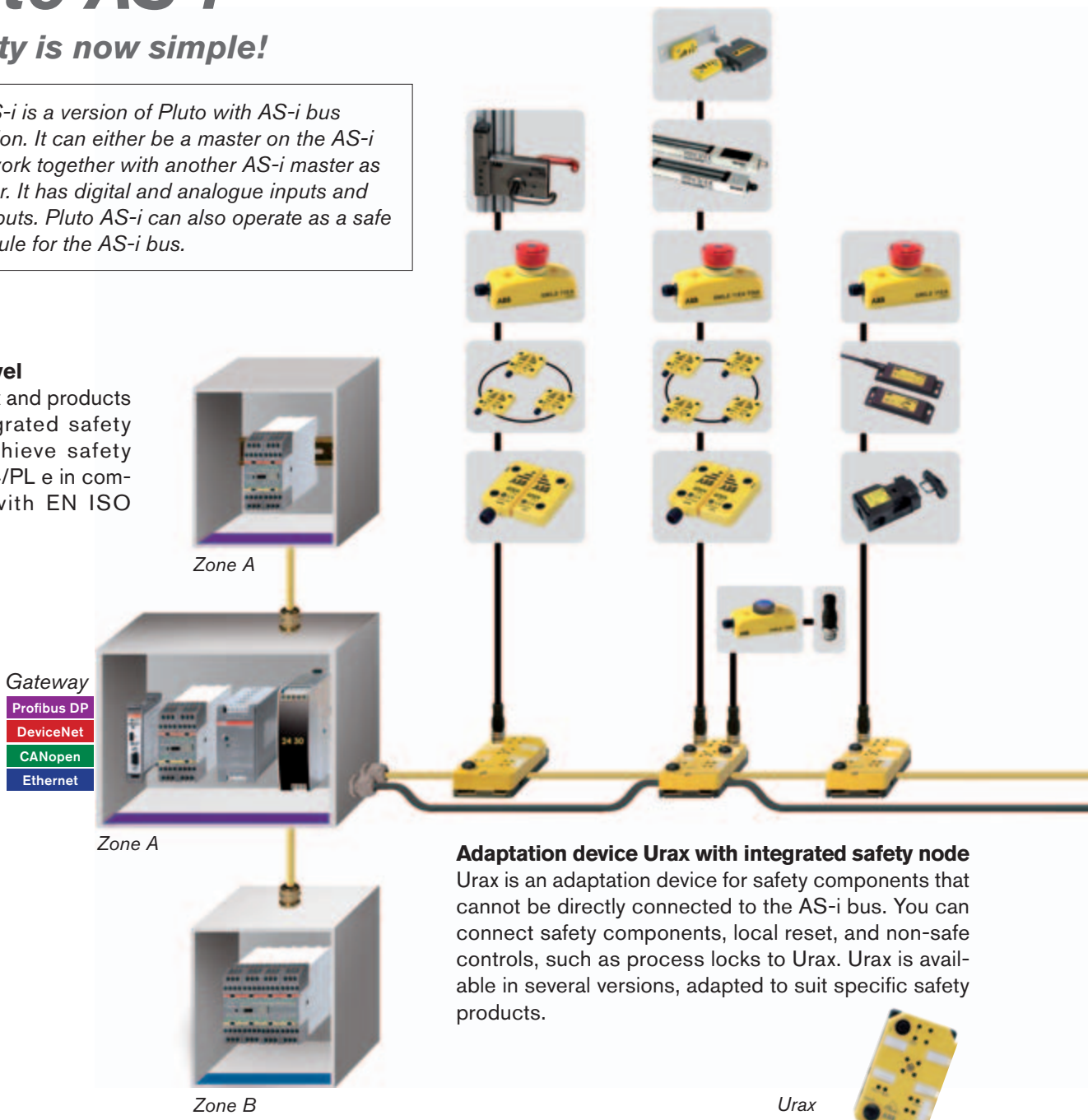
Programming is performed using ladder or Boolean algebra – with timers, auxiliary memory, registers, sequential programming and TÜV-approved function blocks. The program can be downloaded free of charge from the web site. Programs can be loaded via one Pluto to all the other Pluto units on the databus.

Pluto AS-i

– safety is now simple!

Pluto AS-i is a version of Pluto with AS-i bus connection. It can either be a master on the AS-i bus or work together with another AS-i master as a monitor. It has digital and analogue inputs and safe outputs. Pluto AS-i can also operate as a safe I/O module for the AS-i bus.

Safety level
Pluto, Urax and products with integrated safety nodes achieve safety level cat. 4/PL e in compliance with EN ISO 13849-1.



Adaptation device Urax with integrated safety node
Urax is an adaptation device for safety components that cannot be directly connected to the AS-i bus. You can connect safety components, local reset, and non-safe controls, such as process locks to Urax. Urax is available in several versions, adapted to suit specific safety products.


Urax

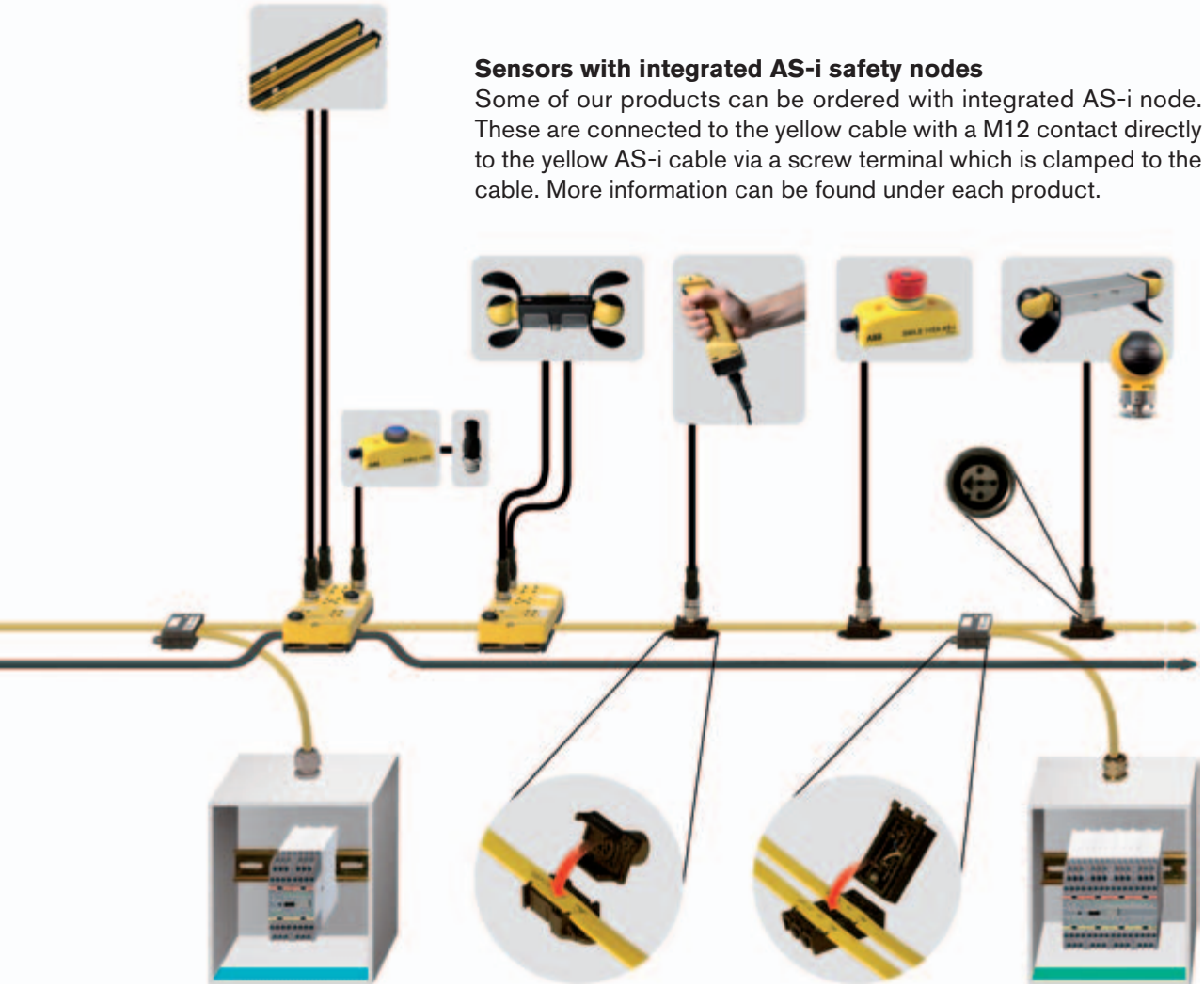
The AS-i system
The AS-i cable can be connected to the safety products separately or through the adaptation device Urax. Some components have an integrated AS-i node and are connected via an M12 connection directly to the yellow AS-i cable. Traditional products without an integrated AS-i node need to be connected via the safety node Urax.

In both cases, the highest level of safety is maintained. The AS-i cable is powered by 30V DC power supply and connected to a special AS-i power supply unit. Some components have power requirements that are higher than the AS-i cable is able to supply. Therefore, there is also a black cable (AUX 24V DC) with secondary supply voltage that is able to supply more current.

Possible connections for a complete system:
- all our sensors for AS-i via Urax
- all Pluto PLCs, gateways and absolute encoders through Pluto's safety bus to the Pluto AS-i
- operator panel via the programming port on Pluto
- expansion relay for multiple outputs

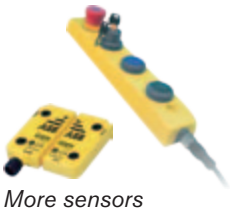
Simple connections to the AS-i cable
Adaptation devices are clamped directly to the AS-i cable. Transition from the AS-i cable to M12 units is made via a T connector on the AS-i cable. Cable branches or extensions of the AS-i cable are made using a splitter box.

Sensors with integrated AS-i safety nodes
Some of our products can be ordered with integrated AS-i node. These are connected to the yellow cable with a M12 contact directly to the yellow AS-i cable via a screw terminal which is clamped to the cable. More information can be found under each product.



Zone C

Zone D



More sensors with integrated AS-i safety nodes will be available during 2011.

AS-interface -
an intelligent cable running system
The field bus system AS-interface came to light in the 90s. The system was the result of a collaboration between several component manufacturers for machine control. The idea was a bus system at a component level where the goal was simplicity and flexibility. Since the system was launched, many new and innovative ideas have been added.

AS-International Association
In 1991, the AS-International Association for organisational cohesion and marketing was founded. The AS-i association works in both an advisory and auditing capacity to ensure the AS-i standard is maintained.

The goal of the AS-i Association is that the AS-interface is to become a world standard for easy communication for components within the automation industry.

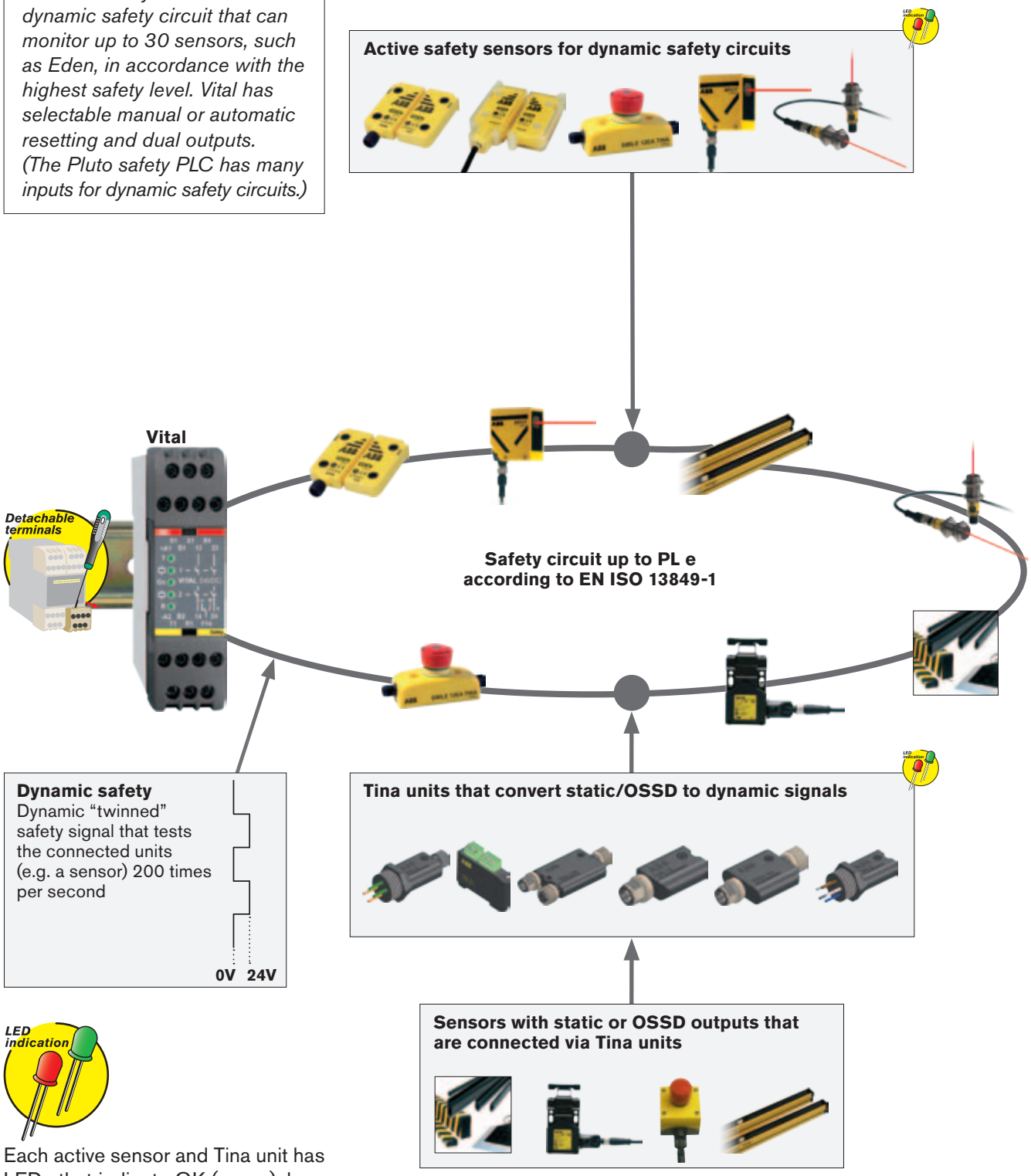
The distinguishing feature of the AS-interface is that data communication is mixed with the power supply. This is done in a simple two-wire cable. In 2001 safety was integrated in the AS-interface via the work group Safety at Work, which also includes ABB Jokab Safety.

Vital & Tina safety systems

TÜV Nord – Vital 1
TÜV Rheinland – Vital 2 and 3

Vital and Tina – dynamic safety circuits

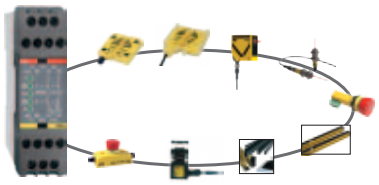
Vital is a safety controller with a dynamic safety circuit that can monitor up to 30 sensors, such as Eden, in accordance with the highest safety level. Vital has selectable manual or automatic resetting and dual outputs. (The Pluto safety PLC has many inputs for dynamic safety circuits.)



Each active sensor and Tina unit has LEDs that indicate OK (green), broken safety circuit (red) or flashing if the loop has been broken by another, earlier, sensor.

Vital 1

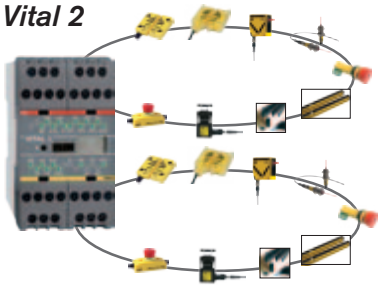
Dynamic circuit 1



- Up to 30 sensors can be connected to the same dynamic safety circuit

Vital 2

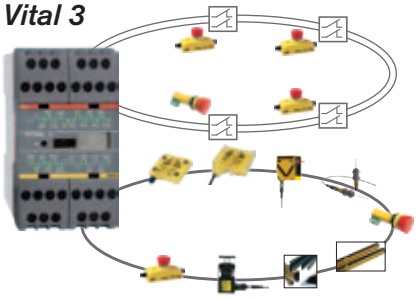
Dynamic circuit 1 **Dynamic circuit 2**



- Two safety circuits are monitored by one module
- Simple system with extensive functionality
- Up to 10 sensors can be connected to each dynamic safety circuit
- Output group 2 can be set for time delay
- Three different modes of operation

Vital 3

Contact circuit 1 **Dynamic circuit 2**



- Two safety circuits are monitored by one module
- Devices with two-channel, opening contacts can be connected to one circuit
- Simple system with extensive functionality
- Output group 2 can be set for time delay
- Three different modes of operation

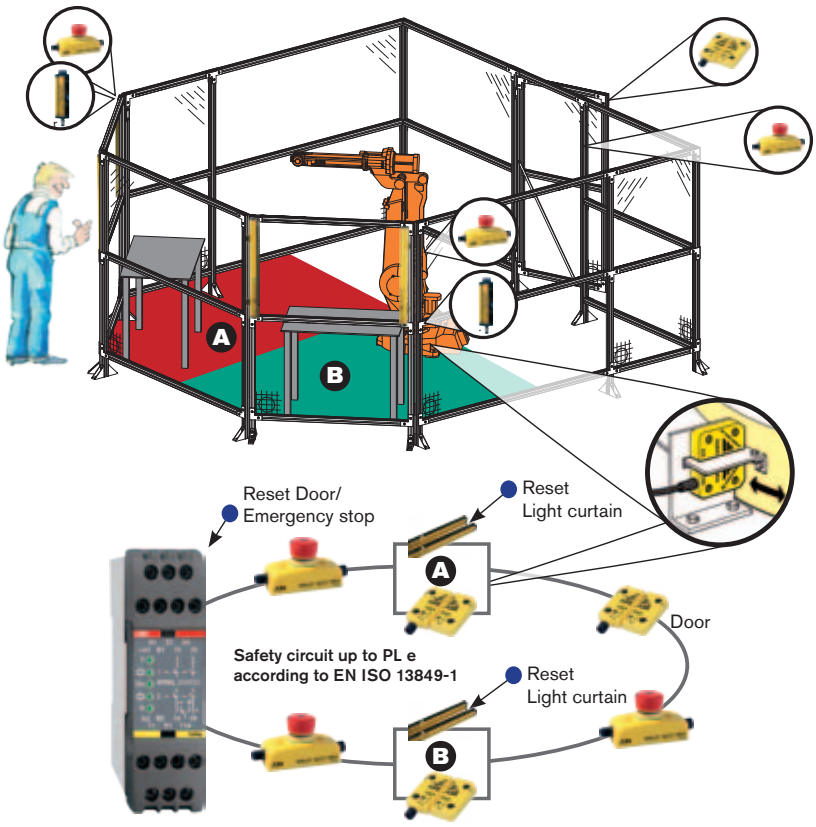
One Vital supervises the entire robot cell!

This example shows a cell that consists of dynamic protection sensors connected to a Vital with the following functions:

Two charging stations
At each charging station a light curtain checks for anyone putting their hand into a risk area, and an Eden sensor checks whether a robot is inside the same risk area. This means that a stop is only ordered if a robot and a person are in the same area. When the station is clear, the person presses the reset button connected to the light curtain.

Fence with Eden-interlocked door
If the door is opened, the robot stops. To reset the robot system, the door must be closed and a supervisory reset button operated.

Three emergency stops with Tina units
If any of the emergency stop buttons is pressed, the robot performs an immediate emergency stop.



Safety relays

RT-series, JSB-series, safety timers and expansion relays

Safety relays are used for:
- *meeting safety requirements*
- *checking protection arrangements*
- *providing secure stopping and reliable restarting*

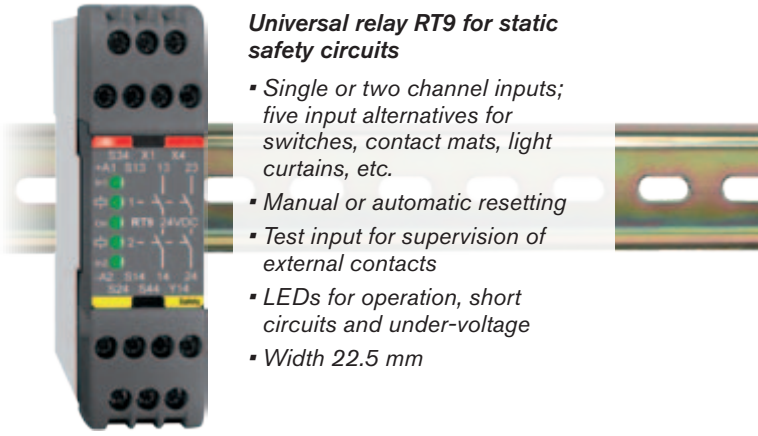
We have the most flexible safety relays on the market. Internally they have the highest safety level (according to EN ISO 13849-1, cat.4/PL e).

RT Series
This series consists of universal relays that have the most common functions used in safety situations.

JSB Series
In this series you can find relays for two hand devices, dual input channel synchronization (0.5 s – 1,5s) and also a small, single channel relay for 12 VDC.

Safety timer relays
The relays in this series are used for time reset, time bypassing and inching.

Expansion relays
These relays are used for expanding the outputs of safety relays. Stop signals can be delayed, outputs are also provided for function indication.



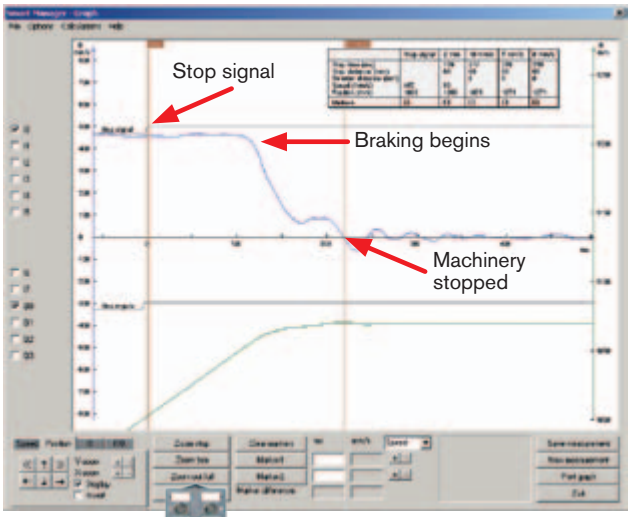
Universal relay RT9 for static safety circuits
- *Single or two channel inputs; five input alternatives for switches, contact mats, light curtains, etc.*
- *Manual or automatic resetting*
- *Test input for supervision of external contacts*
- *LEDs for operation, short circuits and under-voltage*
- *Width 22.5 mm*

Stopping time and Machine diagnosis tool

Smart

Smart is a measuring tool that allows the measurement of moving machinery parts and analyses motion sequences and digital signals. Above all it is used to measure machinery stopping times, to permit calculation of the distance where a device such as a light curtain should be located.

Smart has many valuable features for machine diagnosis:
Smart is perfect for periodic monitoring of safety parameters and other conditions for the maintenance and trouble-shooting of machines. Smart can compare old and new graphs, it becomes easy to find out the reasons for machine malfunctions. One can also supervise machines during operation and compare how they perform over time.

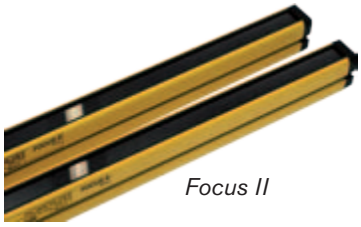


Smart - for stop timing and machine diagnostics

Light beams/Light curtains/ Scanner

Focus II, Spot and Look

Light beams and light curtains are a production friendly safety component that do not physically impact on the actions of the machine operator. Light barrier protection is also a good safety component for use when goods are to be passed in and out of a risk area.



Focus II

Spot 35

Focus with integrated muting and M12 connector.

Spot 10

Connect any light protection...

..via our clever connection boxes...

..to the junction box. With just one cable or M12!

Bjorn – a strong stand for Focus

Focus Wet – for extreme environments

The Focus II with double light beams - prevents nuisance tripping by airborne particles

Focus II

Focus II light curtains/light beams cover all cases. They are cost-efficient since most functions are integrated. As standard there are inputs for muting (partial or complete bypassing), monitoring of the muting lamp and manually supervised or automatic resetting. The light curtains also have “Floating blanking” as an option.

Focus II is available from 14 mm resolution for both Types 2 and 4. In addition, Focus II is simplicity itself to install. Several light beams and also Edens can be connected together in the same safety circuit and supervised dynamically by our Vital safety controller or a Pluto safety PLC.

In order to avoid unnecessary halts in production, the Focus II with double light beam is a good choice, since it is meant for environments with many airborne particles, such as sawdust. Both beams must be obstructed in order to generate a stop signal.

FMI and FMC connection boxes

With the aid of FMI and FMC connection boxes and their M12 connectors it is also easy to install Focus II with muting, reset, etc.

Spot

The Spot Light beam has separate transmitters/receivers, having ranges of 10 or 35 m. This construction allows individually selected positioning/installation. Six pairs of light beams can be connected in series to our Vital safety controller or even the Pluto safety-PLC. Eden and e-stops can also be connected in series.

For information, there are LEDs on both the transmitter and receiver which indicate the current status, connection between transmitter and receiver and also safety status.

Look

The Laser Scanner is the first device of this type that has the ability to scan four individual areas. Each area can be programmed individually for the specific application requirement. e.g. different areas at different speeds of an auto-carrier.

Look – Laser Scanner

Sensors/Switches/Locks

Eden, Magne, Dalton, Knox and JSNY-series

Sensors/Switches/Locks are used to control the gates and hatches around hazardous machinery, and to monitor the position of a machine.

The Eden non-contact sensor

Eden is a non-contact sensor with dynamic signal transmission. It has long detecting distance and operates at the highest safety level (cat.4). Several Eden and even light beams can be connected together in the same safety circuit and be dynamically monitored by the Vital safety controller or the Pluto safety-PLC. Eden E manages harsh environments e.g. high-pressure washdown, high and low temperatures (has been tested up to +100°C and down to -70°C).

The Dalton process lock

Dalton is a small process lock that can operate in most conditions. It can be installed with its opening in different directions, and is easily fitted due to its low height. Status indications are provided by both LEDS and the information output.

Magne magnetic lock

Magne is a magnetic lock that is suitable for industrial applications and that can withstand demanding conditions. It can electrically keep a door closed against a force of up to 1500 Newtons, and in addition has no magnetic field when the current is switched off

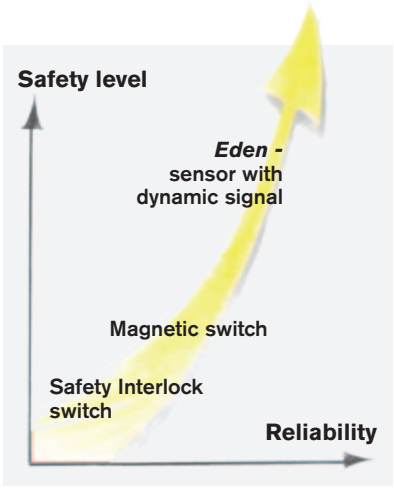
Knox safety lock

A strong and robust safety lock with a new combined reset and locking function, with emergency opening from the inside.

Key switches and Solenoid switches

Our key switches and solenoid switches are used to control gates and hatches. Key switches are also available with a locking function.

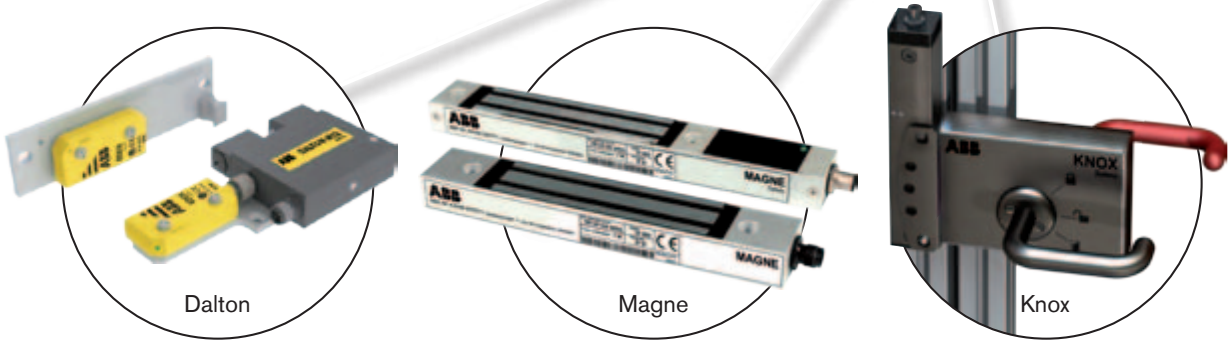
Eden E – for extreme environments. IP69K.



Eden – the safest.
A non-contact sensor that always works – whatever the environment.

The Eden non-contact sensor used separately...

Eden for IP67



..or as a part of a product:
Dalton process lock, Magne magnetic lock and Knox safety lock.

Control devices

Safeball, JSHD4 and Fox

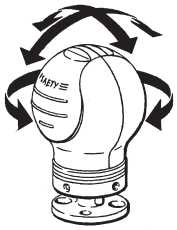
A control device is used so that a machine operator will be able to directly start and stop a hazardous machinery movement.

*Two-channel all the way out to the hand. Safeball is an ergonomic **two-hand control device** with four built-in buttons.*

Safeball for permanent installation

Single/two-handed control device

"Safeball" – a unique world-wide control device providing the highest level of safety (category IIIc as a two-handed device in accordance with EN 574). Its ergonomic shape fits all hand sizes and provides many grip possibilities. Safety is obtained by having two buttons on each ball, i.e. double safety function for each hand.



Safeball is installed with a ball joint which can be rotated and angled

Movable two-handed device with Eden sensor for positioning control

*Ergonomic **three position control unit** JSHD4 with double three-position buttons that provide a stop signal when released or pressed fully in a panic situation.*

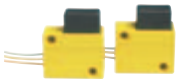
Red and green LEDs

Front and top buttons with selectable functions

Positive grip

Double three-position buttons that give a stop signal when released or pressed fully in, and electronics that detects that it is a human hand that is pushing the buttons (i.e. cheat-proof).

Three-position device JSHD4



Three-position push button JSHD2

Three-position device for troubleshooting and testing

With a three-position device the operator can either press harder in an emergency or release the device to stop the machine. The all-clear signal is provided in an ergonomically distinct central position. The two JSHD2 three-position switches in the handgrip are also used in the programming units for both new and old industrial robots.

*A **three-position foot-operated control device** is used for extra safety when an operator must hold the material in both hands during processing.*

Fox three-position foot-operated control device with emergency stop in bottom position

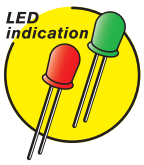
Foot-operated control device with three-position operation

Used when an operator must hold the material in both hands during processing and has to be able to stop in the third (bottom) position.

E-stops

Smile series, JSNY10, Stop-Line and INCA

Smile Tina



An emergency stop device is used to permit anyone to stop machinery if it breaks down or if someone is in danger.

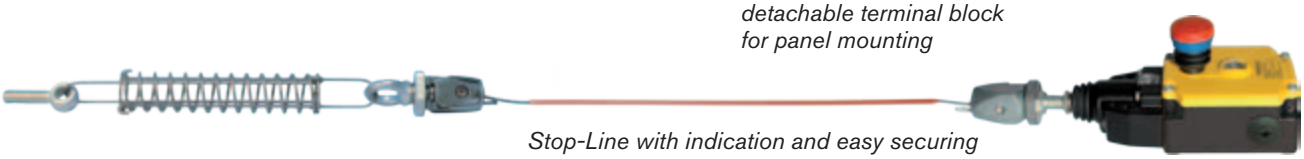
Smile – a small and easily installed emergency stop device with indication and M12 connection.

Indication of an emergency stop is standard
All our emergency stop devices are fitted with an indication as standard so that the emergency stop that has been activated can be easily identified.

The Smile series of emergency stops are for installation on fence profiles or walls. These are available with or without dynamic safety signal adaptation. INCA is used for installation in 22.5 mm holes in panels and apparatus enclosures. These are also available with or without dynamic safety signal adaptation. We also have the Stop-Line emergency stop grab wire for installation along machinery, conveyor belts and process machinery.

INCA with indication and a detachable terminal block for panel mounting

Smile 41



Stop-Line with indication and easy securing

Contact strips/Bumpers/ Safety mats

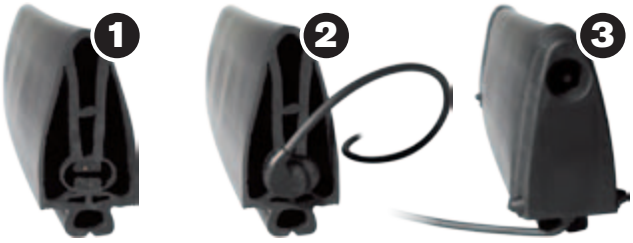
Contact strips/Bumpers/Safety mats

Safety mats with built-in ramps that can easily be cut off as necessary.

Our sensitive edges and bumpers are used to protect against crush injuries where there are moving machine parts, automatic hatches and doors.
Our mats are used for personal protection around robots, production lines, machinery, etc.

Contact strips/Bumpers/Safety mats
Our sensitive strips are available in any length (up to 25 m) and size. The advantage of our new sensitive strips is that the contact strip is embedded in the sensitive edge. All that is required is to make the electrical connection and glue on the covering. We have Bumpers for longer stop lengths. These are also used as safety bumpers on driverless vehicles.

The range also includes safety mats with built-in ramp edge trims. These are cost-efficient and easy to install. If two or more mats are to be joined together, the ramp edges are simply cut off.



Make your own contact strip

1. ***Cut to the desired length***
2. ***Press the contact into place***
3. ***Glue to secure the cover***

Bumpers for long stop distances

Safety Fence Systems

Quick-Guard®, Quick-Guard® E and SafeCAD®

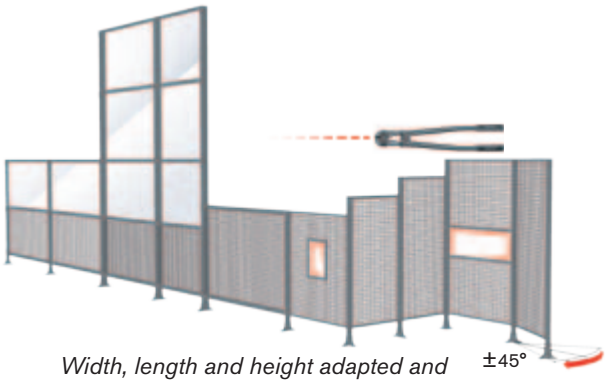
Quick-Guard is a very flexible fencing system consisting of a minimum of different components, e.g. aluminium profiles, patented brackets, net-locks, mesh, solid or noise reduction panels. Using these components there are almost no limitations as to what can be built. Quick-Guard fencing costs little to assemble and modify.

Due to our patented screw-lock system, we can supply all brackets pre-mounted with fixing screws and nuts. No holes need to be drilled in the profiles and all cutting is straight. This makes assembly and modification very easy.

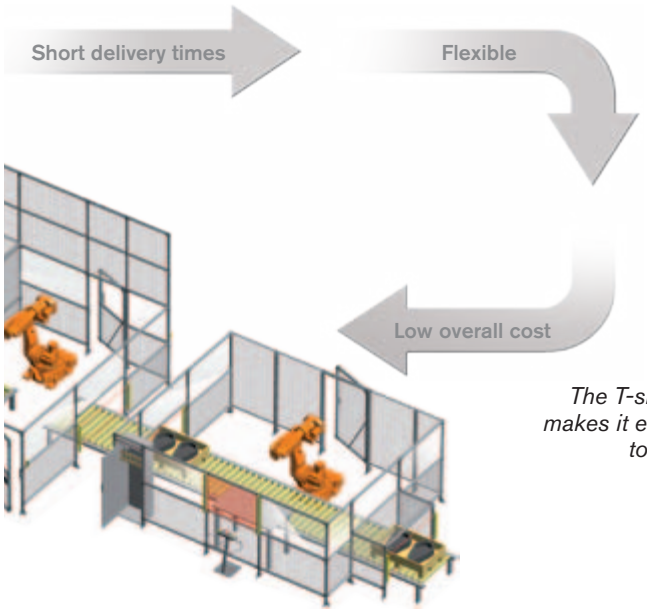
Standard components with endless possibilities

Light aluminium profiles allow ergonomic assembly

Fixings with pre-mounted screws and nuts mean easy assembly



Width, length and height adapted and easily changed according to needs ±45°

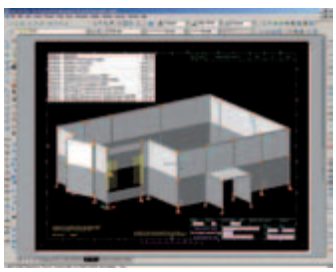


Easy to adjust the position of fittings

The T-slot and patented nut makes it easy to attach fittings to the fencing profiles

Choose from a large selection of automatic and manual hatches and doors

Mesh, Plastic, Glass, Plate and/or Sound absorbing



SafeCAD®
SafeCAD is a plug-in program for AutoCAD®.With AutoCAD we can easily tailor your protection solution together.

Brought to you by:

800-575-5562