



## AS-Interface Safety at Work

Safety controller and safety sensors with integrated AS-i Safety Interface



605081-08/06 Subject to change without prior notice



### Simple and cost-effective safety sensor networking

- Low installation costs
- High interference immunity
- Flexible expansion



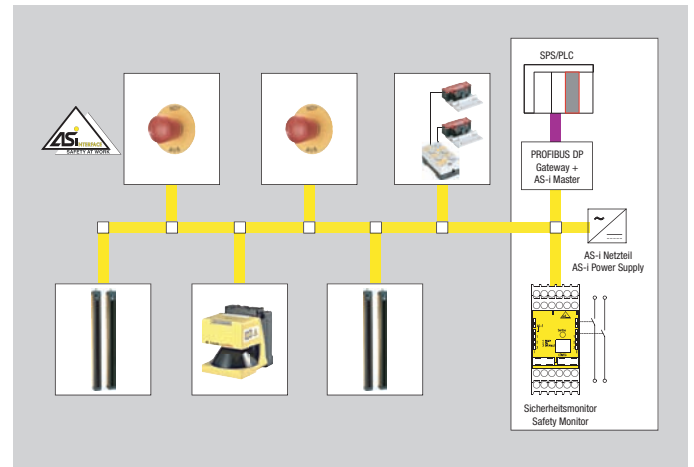
# AS-i Safety Monitor ASM1 – the centerpiece of space-saving in your cabinet

With AS-i Safety, safety tasks can be performed up to safety category 4 in accordance with EN 954-1. AS-i Safety enables the transmission of safety-relevant status information via the standard AS-i protocol. The system uses a code string table here with 8 x 4 bit data strings, which characterizes the safe slaves by a factory setup and is taught in with system start-up of a Safety Monitor.

During operation a constant comparison is performed by the Safety Monitor in the AS-i network between the slave-target string and the slave-actual string. If the slave delivers a false 4-bit string, then the Safety Monitor switches off the release circuit assigned to the slave. The AS-i Safety Monitor is therefore the centerpiece of the AS-i Safety concept. This parameterizable AS-i Safety Controller continuously monitors the data traffic of the AS-i Safety safety sensors. Whether it is an AND, OR, Emergency STOP, STOP 0, STOP 1 or Two-Hand Element, with the AS-i Safety Monitor ASM1, you save a lot on safety relays.



A typical robot application with 2 release circuits for switching off the dangerous movement



AS-i network for the robot application shown, with sensors, power supply and control

## AS-i Safety Monitor – the small device for big tasks

- Housing width – 45 mm; height/installation depth – 100/120 mm; protection rating – IP 20.
- Monitoring of the safety-relevant data traffic of the AS-i Safety sensors.
- Emergency STOP relay with STOP0/STOP1 function in accordance with EN 60204-1.
- Safety category 4 in accordance with EN 954-1; SIL 3 in accordance with IEC 61508.
- Freely selectable assignment (Drag & Drop) of the sensors to output-side release circuits via an easy to use Windows™ Configuration and Diagnostics Software (“asimon”) with convenient user interface.
- 48 configurable software modules.



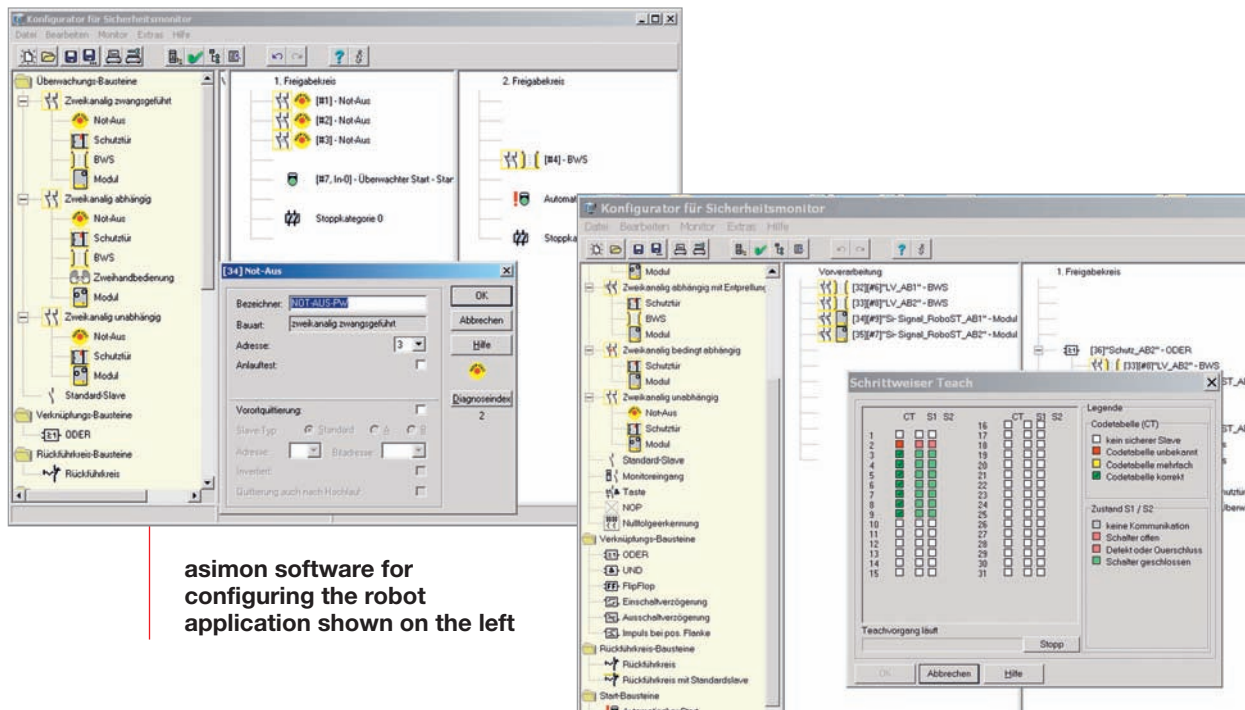
- Several variants: ASM1/1 with one independent 2-channel release circuit and ASM1/2 with two independent 2-channel release circuits.
- Variants with extended functionality: ASM1E/1 and ASM1E/2.
- SERVICE button for automatic system integration (teach-in) of AS-i sensors with a sensor exchange and for resetting the Safety Monitor.



# Convenient configuration, efficient online diagnostics

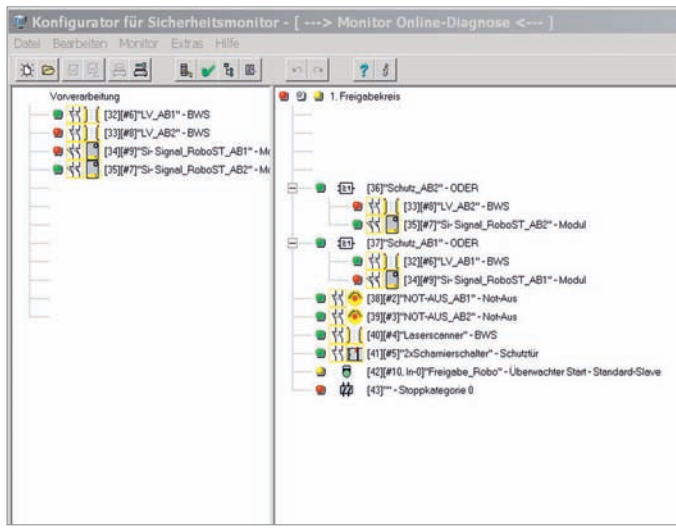
Logical links can be easily created with the graphic user interface of the Windows™ based Configuration and Diagnostics Software, “asimon”. You can combine safety sensors and control devices practically with a mouse click and assign different release circuits for switching off the dangerous movement.

Good diagnostics are a particularly important prerequisite for a rapid start-up and fault clearance. The AS-i Safety Monitor delivers diagnostic information for every safety-set AS-i participant. This can be transparently displayed via the diagnostics interface of the asimon Configuration and Diagnostics Software. Specific analyses can consequently be performed more efficiently. The diagnostics information of the AS-i Safety Monitor is also provided cyclically to the PLC via the AS-i master in order to enable a continuous control-side evaluation.



asimon software for configuring the robot application shown on the left

The asimon teach-in shows which slaves can be taught in by the Safety Monitor



With the asimon diagnostics function the safety-related processes are documented step-by-step during operation



## Lean safety technology with integrated AS-i Safety Interfaces

Select between type 4 safety light curtains, type 4 multiple light beam safety devices or safety laser scanners. All Leuze lumiflex AS-i safety sensors have an integrated interface for the direct AS-Interface connection. The sensors can consequently be directly connected without

coupling modules to the standard yellow AS-i flat cable. With this 2-wire cable and the direct connection technology you save yourself the complex cable trees and external connection modules.

### ROTOSCAN RS4/AS-i – high-tech on the standard yellow flat cable!

- Type 3 safety laser scanners for person protection in acc. with IEC 61496-1, -3.
- Scan angle – 190°, 4 m protective field, 15 m warning field.
- Four programmable protective field pairs, can be switched over during operation.
- Small dimensions (140 x 155 x 135 mm).
- Additional diagnostics information (fault report, active protective field) can be retrieved via AS-i.

### COMPACT/AS-i – it couldn't be easier!

- Type 4 safety light curtain in acc. with IEC 61496-1,-2.
- Detection capacity: 14, 30, 50, 90 mm.
- Range: 0.3 – 6 m and 0.8 – 18 m.
- Protective heights: 150 – 1800 mm and 450 – 3000 mm.



### COMPACTplus CPRT-m/AS-i – the best muting solution for AS-i!

- Type 4 multiple light beam safety devices with muting in acc. with IEC 61496-1,-2.
- AS-i wiring only on one side of the protective field (a transceiver contains transmitter and receiver; a passive deflecting mirror is located on the other side of the protective field).
- Range: 0.8 – 6.5 m (with PM 2V deflecting mirror).
- Muting sensors, lamps can be connected directly on the transceiver.
- Additional diagnostics information (fault report, muting sensor status) can be retrieved via AS-i.

### ROBUST/AS-i – tough meets cost-effective!

- Type 4 multiple light beam safety devices in acc. with IEC 61496-1,-2.
- Active/passive system, AS-i wiring only on one side of the protective field.
- Range: 0.5 – 8 m (with PM 2V deflecting mirror).
- High availability even under extreme environmental conditions with IP 67 protection rating, temperature range from –25° to +55° C and integrated optical heating.



## Components flexibly extended with a click

### AS-i Safety Monitor "Enhanced Version" ASM1E – for future-proof concepts

The ASM1 Safety Monitor is available in different variants. The ASM1E enhanced version features an extended functionality. Besides additional logic and diagnostics functions, ASM1E also has an activation/deactivation mode for parameterized software modules. The machine manufacturer can therefore already prepare the configuration of the Safety Monitor in the preliminary stage for all safety sensors that could be used with an optional extension.



### Complete solution: fast with the AS-i Safety accessories

- The AS-i Safety coupling module ASKM1 with two secure inputs for connecting safety sensors with contact-based outputs, such as Emergency STOP Control Devices or Door Interlocks, for example.
- ASM1-SWC Safety Monitor Start-Up Set with Configuration and Diagnostics Software, PC cable set and detailed technical manual.
- APG-02 Programming Device for entering bus addresses for Standard/A/B AS-i slave programming cable, data exchange cable, AS-i bus terminals and flat cable.

### Extend system without changing wiring

With the ASM1E Safety Monitor optional components remain deactivated at first in the current configuration. If the end user decides to extend their system, the additional AS-i safety technology is activated by the service technician with a simple mouse click. A time and money-consuming wiring change in the controls or the additional installation of components in the cabinet is therefore no longer required.

In addition to the advantages with the machinery extension in the after-sales phase, the activation and deactivation mode also offers significant advantages during the early production phase of a machine. The planned safety technology can, for example, be flexibly and quickly adapted to changing customer requests right up until just before its delivery – without costly wiring changes in the machine or in the cabinet.

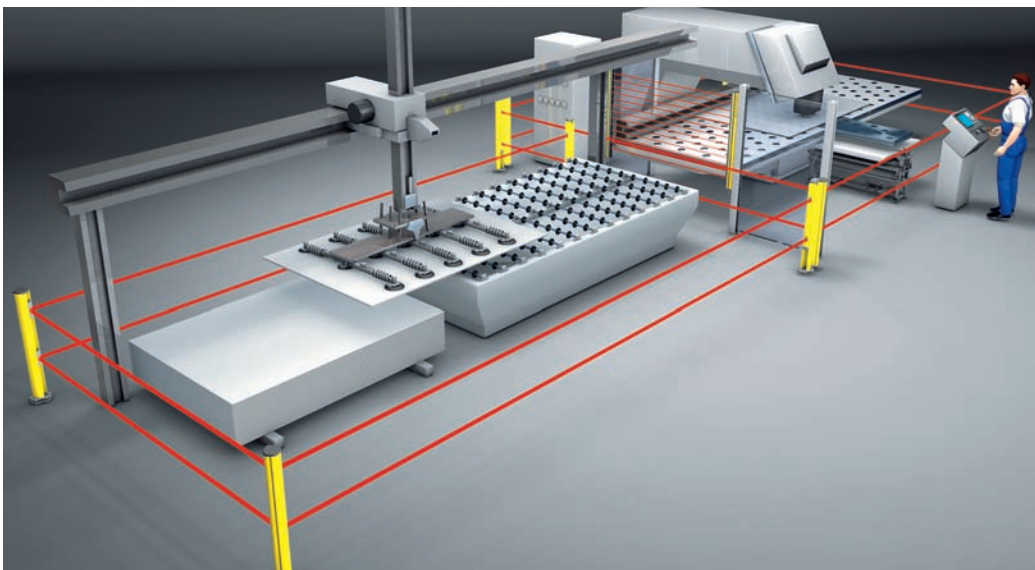
### ► More questions on AS-i?

You will find more AS-i Safety information at:  
[www.leuze.de/asi](http://www.leuze.de/asi)

You can also contact your local Leuze sales partner or our service office directly.

**Hotline +49 (0) 8141 5350-111**

**E-Mail [service.lumiflex@leuze.de](mailto:service.lumiflex@leuze.de)**



Especially with large systems, such as this punch press with automatic feeding, the AS-i system can visibly reduce the costs for the integrated safety technology and very much simplify a safety-relevant extension



## Reduce your engineering and installation costs for binary sensors and actuators by up to 40 %

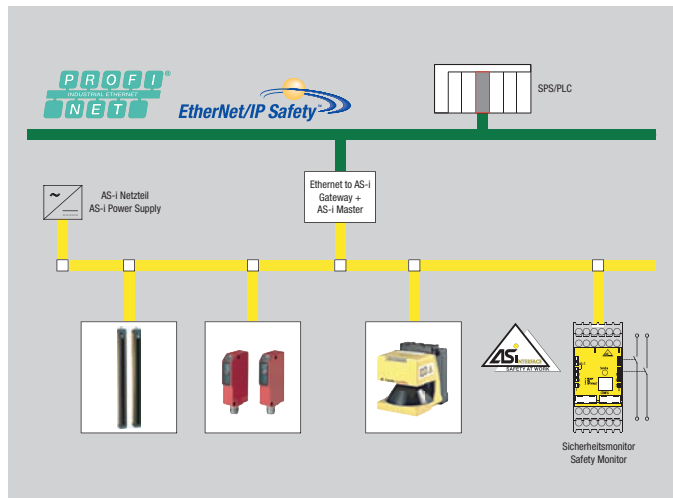
### AS-Interface and Ethernet – a great combination

Every automation level makes its own demands on communication. While Ethernet-based systems are increasingly used at the management, control and field level, AS-Interface (AS-i) has established itself at the sensor/actuator level as the de facto standard.

When compared with point-to-point wiring, AS-i pushes to the fore with its low installation, wiring and connection costs. Suitable gateways create connections to higher-level field bus systems. AS-i is therefore a particularly economic and flexibly integrated solution, which, with the Safety at Work function (AS-i Safety), also meets safety-related requirements.

### AS-i Safety – established safety technology for a good reason

- High safety standard: Communication up to safety category 4 (EN 954-1) and SIL 3 (IEC 61508).
- Cost-effective with mixed operation of non-safety and safety participants on a bus line.
- Increased productivity with diagnostics via AS-i master.
- Investment security with future-proof concept: Parameterizable Safety Monitor with one or two switch-off circuits.
- The highest demands are met with an extremely short response time: 40 ms.
- Simple start-up and maintenance: Reduced space requirement in the switching rack; no further safety relay or safety controls are required.
- Simple and flexible system extension with available safety sensors that meet requirements: Light Beam Safety Devices, Laser Scanners, Door Switches, Enabling Switches, Emergency STOP Buttons, Two-Hand Switches.



**Networking with AS-Interface at the sensor/actuator level and coupling to higher level field buses**

### AS-Interface – the most important features at a glance

- Sub-system for higher-level field buses.
- Flexible and modular extension.
- Any kind of network topology (tree, star, line).
- Up to 62 AS-i participants (maximum 248 inputs and 248 outputs).
- Unshielded 2-wire cable, round or flat.
- Cable length up to 100 m; with 2 repeaters up to 300 m.
- Cycle time: 5 ms; with A/B slaves: 10 ms.
- Simple connection via penetration technology.
- Automatic addressing with device exchange.



## AS-i Safety at Work – a safe bet for a good solution

Flexibility and fast diagnostics are becoming increasingly important for automation technology in modern production systems, which of course also applies for safety technology.

The AS-i Safety at Work concept based on the AS-Interface is the especially economical solution for networking binary non-safety and safety sensors for machinery. The user consequently has the option of integrating all binary switching safety-related components into their AS-Interface network.

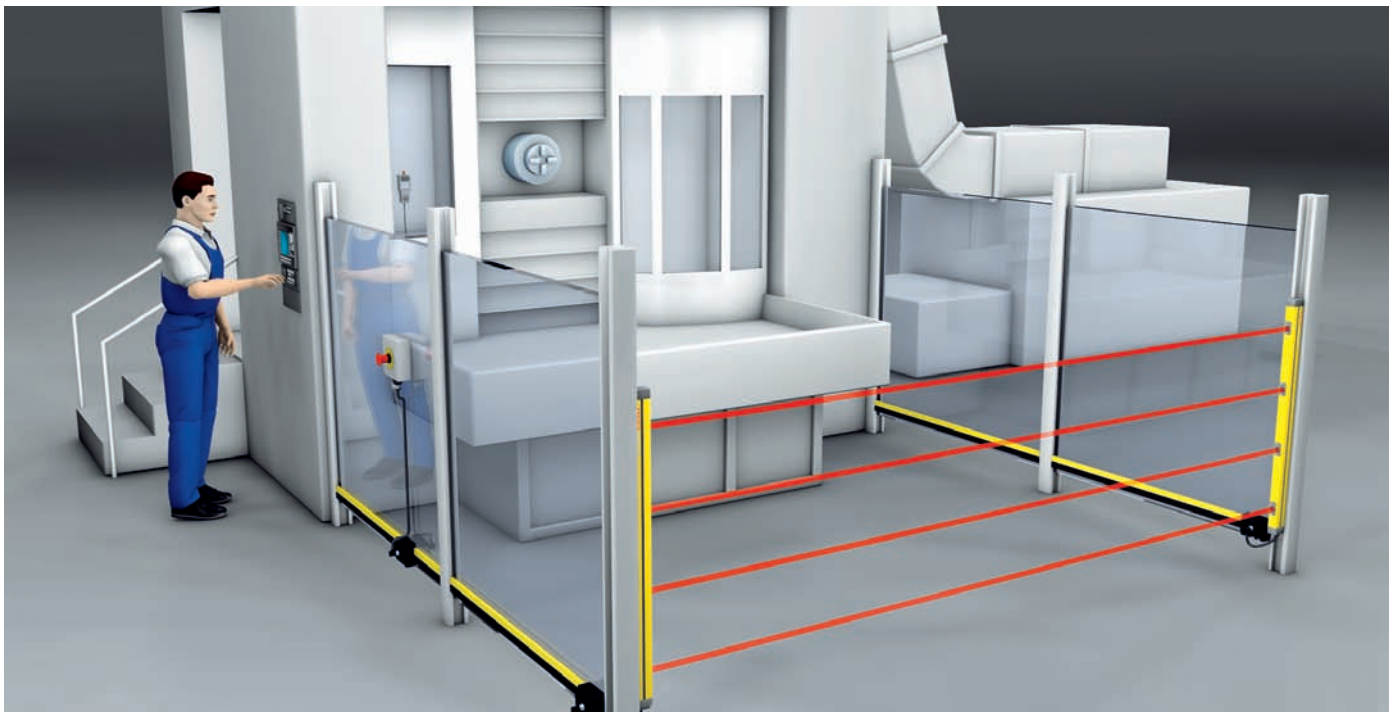
### AS-i Safety – a vibrant technology with global success

Eleven enterprises, among them **Leuze lumiflex**, were on board from the moment AS-i was conceived. Since then we have actively participated in shaping this

technology with new ideas and innovative developments. As a global meeting point for manufacturers and users of AS-i system solutions, the AS-International Association today has over 260 members around the world.

**Leuze lumiflex** offers a complete range of opto-electronic safety sensors with integrated AS-i safety interfaces for direct bus connection. Connection of Safety Door Interlocks, Emergency STOP Buttons or sensors without integrated AS-i interface is enabled via the ASKM safety-related coupling module.

Because it is simple and cost-effective, and on the basis of a wide range of products, AS-i Safety has developed into the international market leader in the lower field range. Numerous installed AS-i Safety applications prove the worldwide acceptance of this system in all industries. The yellow profile cable is the typical AS-i trademark.



### AS-Interface – an international standard

- Over 10 million nodes in the field.
- Over 1000 certified products.
- Over 280 manufacturers worldwide.
- Trend: Increasingly steadily!

**Multiple Light Beam Safety  
Devices with integrated AS-i  
interface at a machining center**