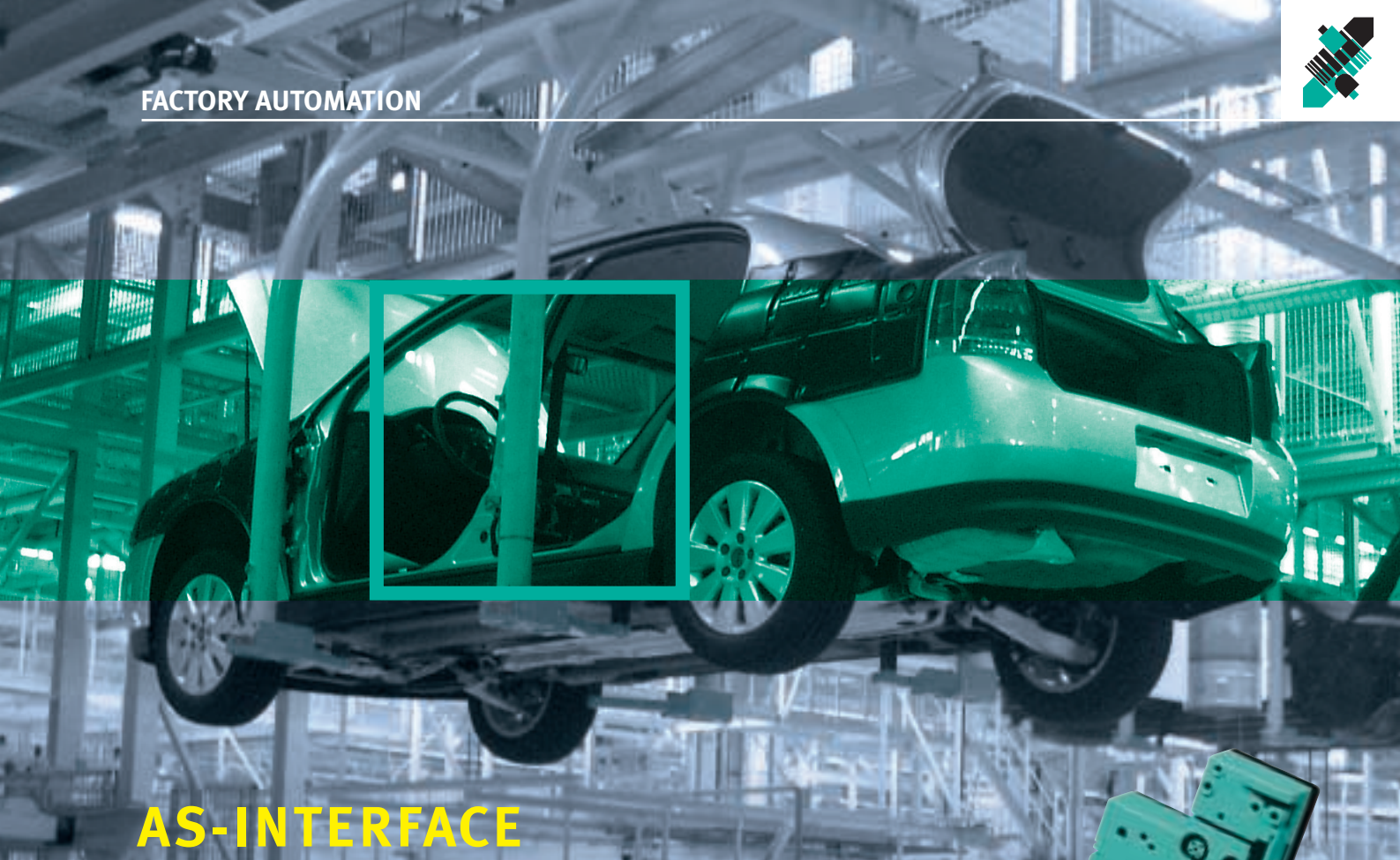




FACTORY AUTOMATION



AS-INTERFACE PROVEN IN USE



AS-INTERFACE

System configuration and product overview

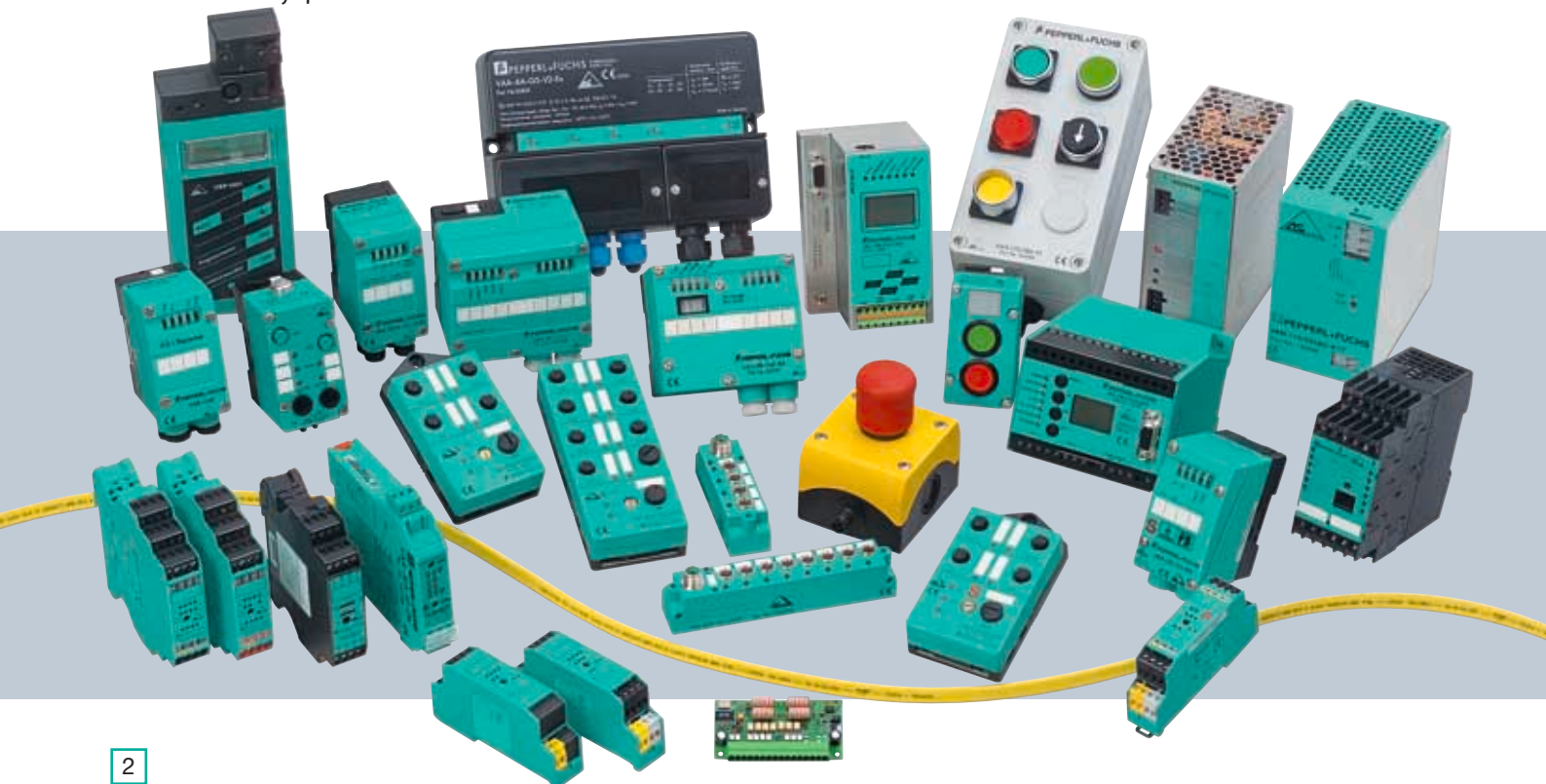
The actuator sensor interface (AS-Interface) is a cost-saving and flexible alternative to the conventional wiring technology of sensors and actuators.

Two wires in a reverse-polarity protected flat cable are used for signal transmission and supply. In addition to automatic addressing in the case of a replacement, flexible expansion and quick installation are some of the important features of AS-Interface.

AS-Interface Safety

AS-Interface can also be used to transmit safety-related signals such as emergency off, door tumblers, two-hand control devices, light grid safety devices etc. The BIA (German institutions for statutory accident insurance and prevention) has rated the communication as safe and the system has been approved by TÜV according to IEC 61508 and EN 954-1. Maximum switch-off times of only 40 msec are achieved.

Safe slaves transmit a dynamic code sequence, which is monitored by a safety monitor (with 1 or 2 shutoff circuits, OSSDs). This way, malfunctions are detected immediately and lead to a shutoff within a maximum of 40 msec. The ASIMON software makes it possible to generate logic operations and assignments to the shutoff circuits in a simple and concise way. The transmission of safe and non-safe signals on the same flat cable reduces the installation costs by half. AS-Interface Safety can also be operated autonomously and compared with other safety systems, it is one of the simplest, most cost-effective and flexible safety bus systems on the market.





Technical characteristics:

Any topology, up to 62 slaves per line with 248 inputs and 248 outputs as standard, slaves with 4 inputs/outputs with A/B addressing, master/slave access method with max. cycle times of 5 or 10 msec at maximum configuration (2 msec reaction time possible), supply 30.5 V (max. 8 A), unshielded cable, cable lengths of several hundred meters (with repeaters), data length per telegram 4 bits bidirectionally, ...

AS-Interface must not necessarily be regarded as a competitor of other fieldbuses. As an underlying system, it is a sensible extension of all fieldbus systems. With this combination, also larger system concepts can be realised in a simple, cost-effective and concise way.

Innovation level 3.0: AS-Interface with perspectives

The new specification 3.0 offers full downward compatibility and makes it possible to implement further interesting features via AS-Interface:

- 4 inputs and outputs for up to 62 nodes on the line
- Modules with 8 or 16 inputs
- Quick analogue transmission or up to 62 analogue modules per line
- FDT connection (field device tool) of AS-Interface devices via DTMs
- Additional diagnosis channel during operation
- Parameterisation during operation possible
- Definition of a new flexible switch cabinet cable

AS-Interface has a future. This is proven not only by these innovations, but also by the steadily increasing market shares of AS-Interface compared with other fieldbus systems.

Advantages of the AS-Interface:

AS-Interface already offers excellent potentials for reducing costs, increasing flexibility and saving space.

- Automatic addressing on exchange of a slave
- Open for all current fieldbus systems
- Extensive diagnostic options
- Integration of the PLC function in the master possible
- Reduced wiring expense
- Low space requirement in the switch cabinet
- Can be mounted in any topology
- Connection using insulation penetration technique

When comparing AS-Interface and e.g. PROFIBUS at the lowest field level ...

	AS-Interface	PROFIBUS
Topology	Any	Rigid line structure (or special tee-off substations)
Cable length	100 m	100 m (at 12 MBd)
Cable	2-wire, unshielded	Special 2-wire PROFIBUS cable with shielding
Connection	Insulation penetration technique, without finishing expense	Shielded screwed connections or Plug connections, time-consuming finishing work
Replacement of a slave	Automatic addressing, system continues to run automatically	New slave must be addressed
Configuration	Automatically via ID code	Via GSD file
Diagnostic option	Exist, possible down to the sensor level	Exist, however only poss. down to module level

... the AS-Interface concept shows clear advantages!

PRODUCTION OF THE VECTRA

at the new OPEL plant in Rüsselsheim (D)

Task

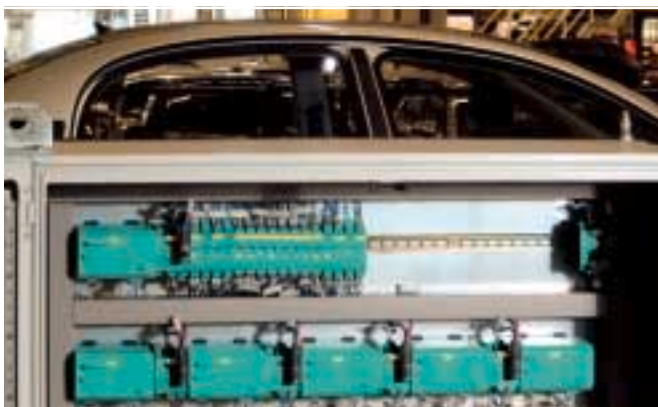
Realisation of continuous networked production line with a length of roughly 1 km, with high failure safety, as there are hardly any buffer systems. The installation efforts should be minimised. The height position of the electronic overhead conveyor (EOC) must be controlled.

Realisation

Integration of the AS-Interface cable into the rail system of the overhead or floor-level conveyor system. Setting up an AS-Interface network using sliding contacts with segmentation. Automatic addressing of the modules and transfer of the AS-Interface modules travelling on the conveyor to the master of the next segment. This way, a continuous AS-Interface line with a length of more than 1 km is realised. AS-Interface integrated rotary encoders are responsible for height control in the electronic overhead conveyor.

Customer benefit

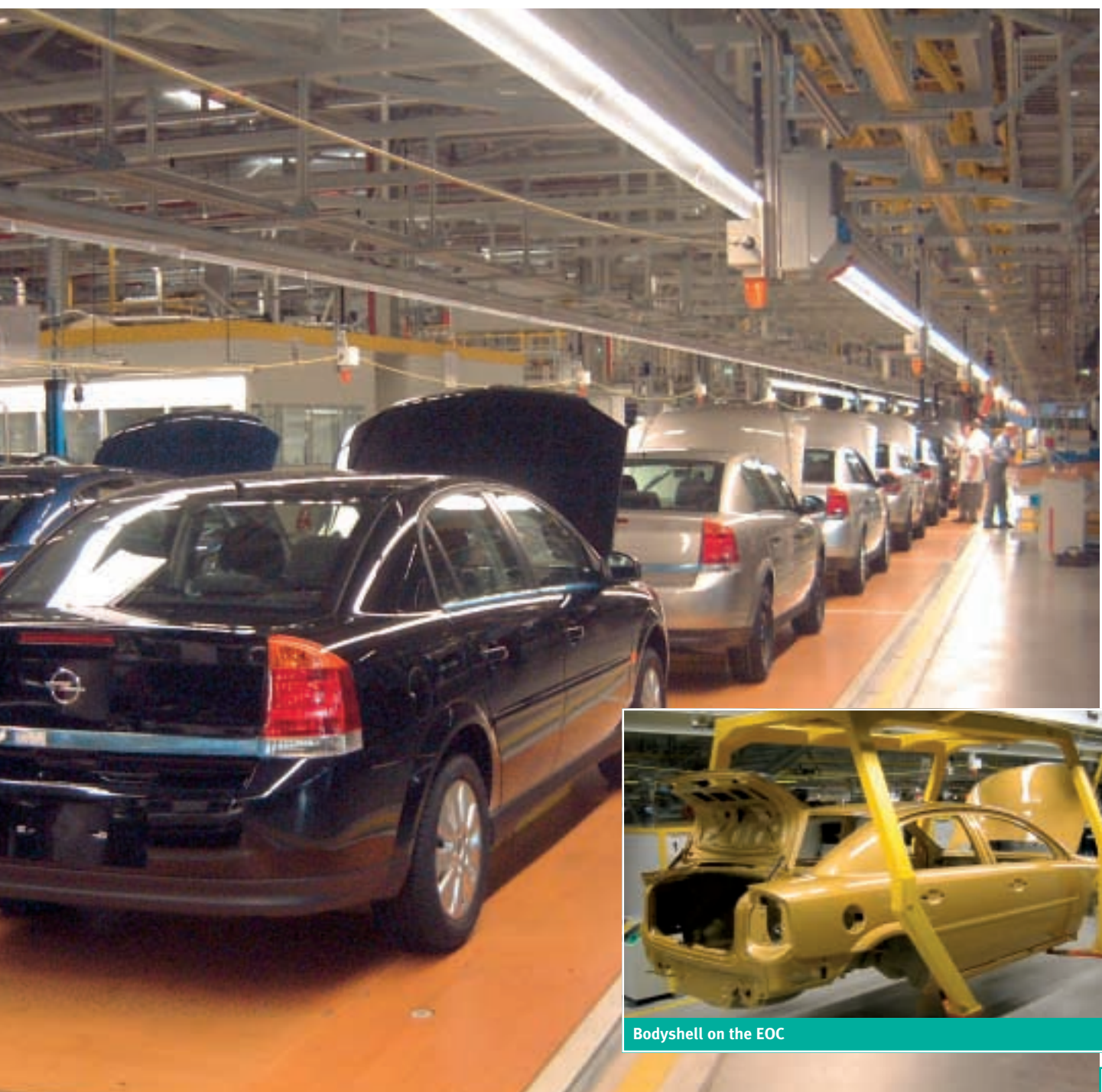
This takes significant load off and thus accelerates the higher-level PROFIBUS system and the PLC. A simple and cost-effective decentralised control is possible. EMC effects do not interfere with the robust AS-Interface system. The cost-effective installation was possible in a short project phase.



AS-Interface switch cabinet for decentralised control



G2 modules above the EOC



Bodyshell on the EOC

PRODUCTION INCREASE

at Thyssen Krupp coke works (D)



Switch cabinet before retrofitting



Switch cabinet after retrofitting

Task

Retrofitting of several coke works within just 6 weeks. Replacing conventional wiring with switch cabinets of more than 20,000 clamp points by a bus system. Integration of the safety-related components such as emergency off and cable-operated switches into the system concept.

Realisation

Use of AS-Interface with higher-level PROFIBUS connection. The simplification is shown in the pictures of the switch cabinets (before/after). Only with AS-Interface was it possible to retrofit such an extensive plant wiring within such a short time and to recommission it on schedule with improved processes after 6 weeks.

Customer benefit

Increase in productivity due to improved automation technology. Integration of the safety system with AS-Interface Safety reduces the wiring expense by half. In future, it will be possible to expand the system flexibly and quickly at any time. Concise wiring concept.



Plant exterior with cable pull

QUALITY IN METAL PROCESSING

at the automotive supplier Pittl (A)



Task

Several welding and material handling cells were to be automated. If possible, the wiring structure should always be the same and only vary in type and number of sensors. The concept should be transferable to similar manufacturing cells. The wiring expense should be kept to a minimum. Safety-related system components should also be integrated.

Realisation

The welding cells are equipped with pinching protection and an emergency stop switch. Both components are connected using safe AS-Interface modules and are controlled by a master plus safety monitor. The selective switchoff behaviour can be easily realised via AS-Interface Safety.



Customer benefit

Integration of automation and safety systems on just one flat cable saves wiring expense. Modular design simplifies copying system components and saves configuration expense. Flexible extensions can now be easily realised.



Welding cell with safety equipment and operating buttons

BAGGAGE HANDLING SYSTEMS

at airports from VanDerLande (NL)



Airport logistics



Task

Long, branched conveyor routes with many decentralised drive motors are to be controlled. Wiring must be realised in a flat profile along the conveyor route. A simple and quick installation is absolutely necessary because large projects must often be realised at short notice.

Realisation

AS-Interface evaluates the complete sensor system and controls the drives. The external power supply is provided using a parallel 24 V DC flat cable. The interface connection is realised by means of special and easy-to-mount AS-Interface branch distributors, which were specially designed for this application.

Customer benefit

Some of the advantages of this application are: flexibility, rational planning, space-saving wiring, reduction of installation costs and connection to all fieldbus systems.



Baggage handling systems

SPEED MAKES THE DIFFERENCE

at the mail distribution centre in Brussels (B)



Task

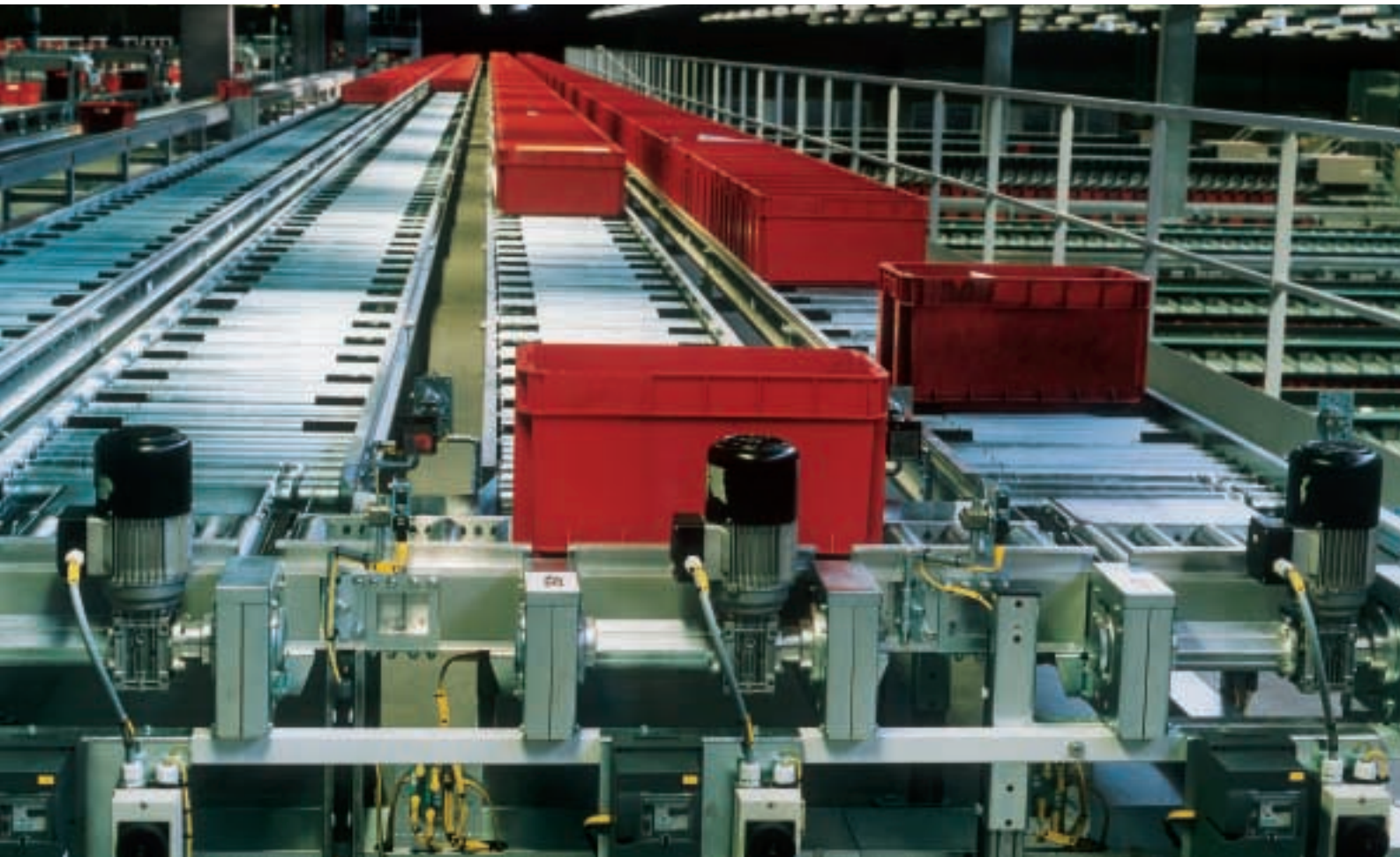
If possible, the allocation and distribution of postal items is to be controlled using pneumatic valves. Reaction times of less than 5 msec are required. Due to the comprehensive plant, a bus system is to be used down to the lowest level.

Realisation

An AS-Interface integrated logic module, which directly controls the pneumatic valves, has been used. Due to the reduced line system, reaction times of less than 3 msec could be achieved.

Customer benefit

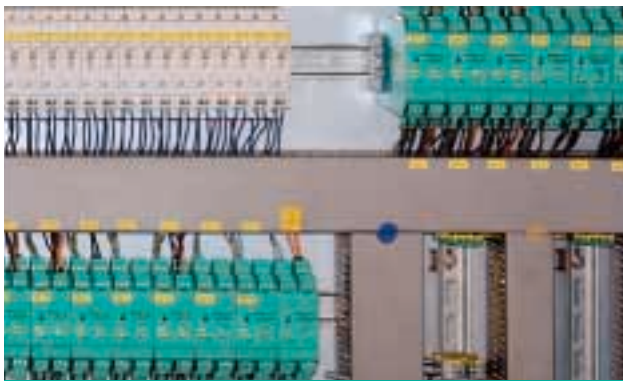
Less installation effort with AS-Interface and acceleration of the distribution process.



Mail distribution centre in Brussels

KRONES BOTTLING PLANTS

at Hassia Mineralquellen in Bad Vilbel (D)



AS-Interface switch cabinet modules



Bottling plant

Task

In KRONES plants, sensor signals are transmitted at circularly moving conveyor elements using AS-Interface with sliding contacts. The number of contacts is strongly limited and other bus systems are not sufficiently robust for this application. A good on-site diagnosis system in the case of a failure and the easy replaceability of modules and devices are required. Moreover, a connection method with the lowest possible installation effort is desired.





Realisation

At the bottling plant at Hassia in Bad Vilbel, the AS-Interface system is used in several halls to control plant processes such as sorting empties, cleaning, filling and labelling. For this purpose, switch cabinet and field modules with screwed connections are used. The higher-level control is connected using the AS-Interface PROFIBUS Gateway.

Customer benefit

The complete plant including the bus concept is planned and supplied by KRONES in cooperation with Pepperl+Fuchs according to customer specification. Due to the flexible AS-Interface concept, expansions and modifications of the plant by the customer can be easily realised at any time.



Checking the labels



Bottle conveyor system

RETROFITTING A MAJOR PROCESS PLANT for aluminium production (N)



Hall for aluminium production



Crane system for electrodes

Task

Achieving a more environmentally friendly aluminium production with increased production capacity. All mechanical switches are to be monitored for lead breakage and several hundred valves in the exhaust gas purification system are to be automated. Although there is a great number of widely distributed inductive and optical sensors, cable trees and junction boxes are to be avoided. The system is to be realised in several steps and will contain an integrated safety concept.

Realisation

During the 3-year project phase of this major plant, the automation technology was adapted to AS-Interface in 3 steps. The exhaust gas systems and the transport systems for the electrodes as well as the safety systems (including crane systems) are controlled via AS-Interface. The overall length of the cable network with several masters and repeaters amounts to approximately 3 kilometres.

Customer benefit

Gradual changeover to new automation technology. Low capital expenditure and simple integration of the safety systems. Hardly any production interruption during the simple and quick changeover to AS-Interface.

Switch cabinet
with AS-Interface



COLD PRESSED OLIVE OIL WITH AS-INTERFACE

in Malaga (E)



Task:

In a retrofitting project, the processes of unloading, conveying, cleaning, pressing, filling the oil with level control are to be rationalised.

Realisation:

Due to the decentralised AS-Interface concept, great savings were achieved with regard to wiring. G4 housings with screwed connections were used.

Customer benefit:

Compared with conventional technology, the installation took place in record time. Due to the improved control and automation using AS-Interface, the efficiency of the oil presses increased by more than 30% without having changed the machines themselves.



Control of the numerous valves using AS-Interface

WOOD PROCESSING MACHINES

from AMS (I)

Task

Reduction of downtimes in the case of a failure due to good diagnosis functionality. Open system with the possibility to connect to a higher-level host system or other fieldbuses. Integration of the safety-related functions. Simple technology and easy-to-handle components.

Realisation

The AS-Interface master is responsible for the decentralised control of pneumatic valves for the production of door and window frames. Nevertheless, the machines can be easily connected to other controls and fieldbuses. The safety systems were integrated using AS-Interface Safety.

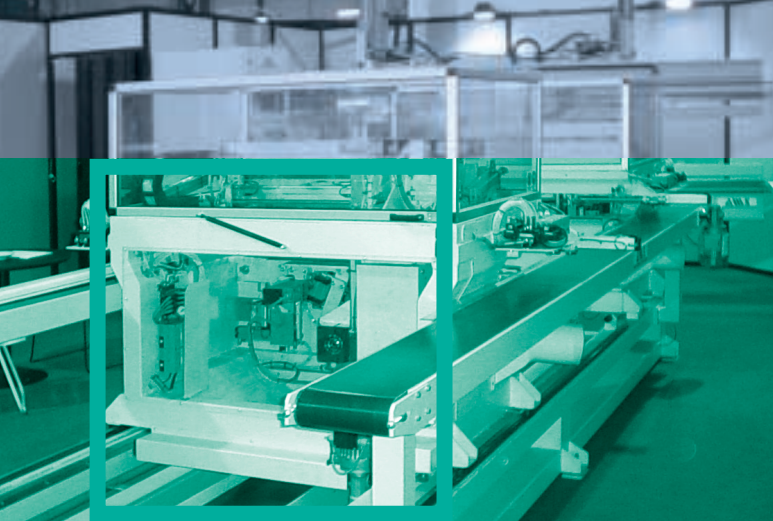
Customer benefit

Savings with regard to wiring were achieved and cable trays within the machine are no longer necessary. Modular copyable automation concept with cost-saving integration of the safety systems.



Wood working machine



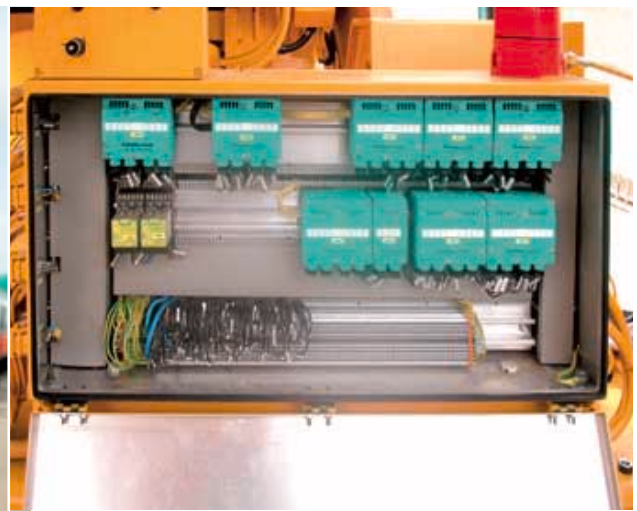


NEW RAILWAY LINES

from Matisa (CH)



Rail laying system



Switch box with modules

Task

Using well-tried and tested technology, which is easy to use, a rail laying machine is to be improved and wiring costs drastically reduced. Additional requirements include the flexible expandability and simple replacement of components in the case of a failure.

Realisation

The approx. 110 meter long vehicle was equipped with AS-Interface technology. This machine achieves laying speeds of up to 650 m per hour.

Customer benefit

As planned, the installation costs were significantly reduced and the excellent project support delivered by Pepperl+Fuchs contributed to the success.



AUTHENTIC COFFEE

in the European distribution centre of
Douwe Egberts in Utrecht (NL)



Task

In the European distribution centre of Douwe Egberts in Utrecht, different types of coffee are to be sorted, commissioned, packed on pallets and shipped fully automatically. This application covers approximately 1 km of conveyors with 5 sorting and 5 palletising systems.

Realisation

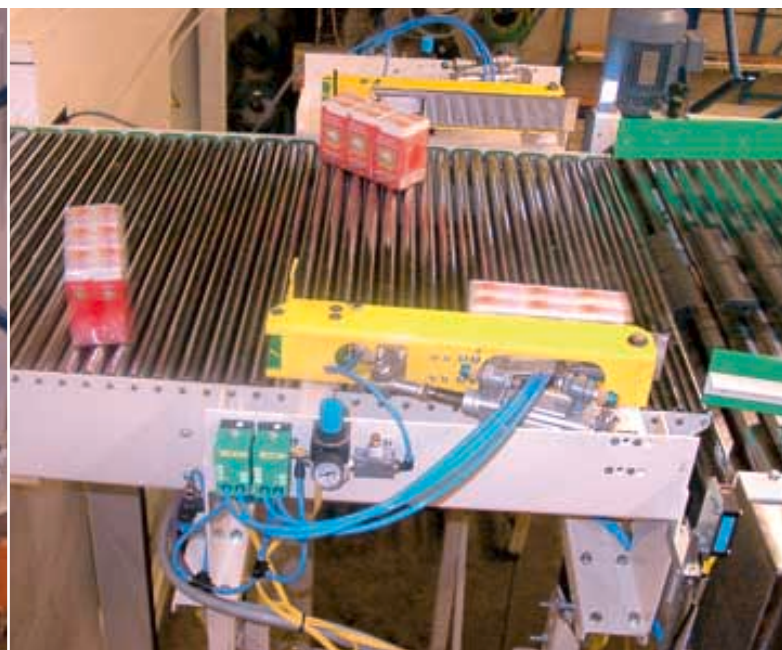
AS-Interface with PROFIBUS dual master was used. The sensor signals are queried using G2 modules and the sorting system is controlled using AS-Interface integrated pneumatic modules.

Customer benefit

The AS-Interface system offers advantages with regard to time during the installation. It is connected upwards



to PROFIBUS, but in principle open for all other field-buses. A decentralised control of pneumatically driven swivel arms is possible via AS-Interface using hose connections. Due to the reduced space requirement, the control cabinets could be designed more compact.



Conveyor system with pneumatic stoppers at the sorting point

THE FOLLOWING USERS ARE CONVINCED OF AS-INTERFACE

Automobile manufacture

- Adam Opel AG, Rüsselsheim, Germany
- BMW AG, Landshut, Germany
- BMW AG, Dingolfing, Germany
- BMW AG, Wackersdorf, Germany
- BMW AG, Shenyang, China
- DaimlerChrysler, Wörth, Germany
- Ford AG, Saarlouis, Germany
- Mitsubishi Motors Australia Ltd, Australia
- Toyota, Toyota City, Japan
- TRW Air Bag Systems GmbH & Co. KG, Laage-Kronskamp, Germany
- Vauxhall, Oldham, England
- Volkswagen AG, Wolfsburg, Germany

Chemical industry and process technology

- BASF Pigment AG, Besigheim, Germany
- Bayer Chemicals AG, Leverkusen, Germany
- CTP Chemisch thermische Prozesstechnik GmbH, Graz, Austria
- DuPont Performance Coatings Austria GmbH, Guntramsdorf, Austria
- Emerson, St. Louis, USA
- Exxonmobil Chemical Films, Virton, Belgium
- Fisher-Rosemount, Sondika, Spain
- Fügen Fachhandel GmbH, Munich, Germany
- Herberts Lacke, Austria
- Kuwait Petroleum, Antwerp, Belgium
- Omya GmbH, Gummern, Austria
- PPG Coatings BV, Tiel, Netherlands
- Roche Diagnostics GmbH, Mannheim, Germany
- Rudolf Chemische Fabrik GmbH & Co. KG, Geretsried, Germany
- Westfalia, Pennsylvania, USA
- Westinghouse, USA

Machine construction/production technology

- ABB Stotz-Kontakt GmbH, Heidelberg, Germany
- ABB Sistemay Industriales, Madrid, Spain
- Amcor Beverage Australasia, Australia
- Baljer & Zembrod GmbH, Altshausen, Germany
- Continental Teves AG+Co.oHG, Gifhorn, Germany
- Croon Elektrotechniek BV, Rotterdam, Netherlands
- E.C.H. Will GmbH, Hamburg-Eppendorf, Germany
- Eduard Kraft GmbH, Bönnigheim, Germany
- ElectroSteel Casting Ltd, Calcutta, India
- Electrolux, La Rioja, Spain
- Emerson Process Management Servicios, Madrid, Spain
- ETF Machinefabriek BV, Nederweert, NL
- Fisher&Paykel Ltd, Australia
- H. A. Schlatter AG, Schlieren, Switzerland
- Honeywell Romania s.r.l., Bucharest, Romania
- ISP System s.r.l., Pesaro, Italy
- Karl Pittl Metallwerk GmbH, Fulpmes, Austria
- Knauf s.r.o., Prague, Czech Rep.
- Kronos AG, Neutraubling, Germany
- M & A Maschinen- & Anlagenbau GmbH, Erbach, Germany
- Mass GmbH, Geseke, Germany
- MPN Maschinenbau GbR, Nieder-Olm, Germany
- Nopra S.L., Barcelona, Spain
- Pechiney Nederland NV, Vlissingen, NL
- Philips Oral Healthcare, Washington, USA
- Preh-Werke GmbH & Co. KG, Bad Neustadt, Germany
- Robert Bosch GmbH, Hildesheim, Germany
- Robert Bürkle GmbH+Co., Freudenstadt, Germany
- Saint-Gobain Vertex a.s., Litomysl, Czech Rep.
- Saxlund GmbH, Soltau-Harber, Germany
- TEMA, Legnano, Italy
- Trumpf GmbH & Co KG, Pasching, Austria
- Trumpf, Connecticut, USA
- Wes-Tech Automation Systems, USA
- WM-Wild Maschinen, Rietberg-Mastholte, Germany
- Wopfinger Baustoffindustrie GmbH, Waldegg, Austria



Hotline Tel.
+49 621 776 1111

Food processing industry

- Brauerei Beck GmbH & Co., Bremen, Germany
- Chang Beer Ltd, Thailand
- Dole Thailand Co. Ltd, Thailand
- Ensinger Mineralheilquelle, Vaihingen, Germany
- Freiburger Lebensmittel GmbH, St. Michael am Bruckbach, Austria
- Fürstliche Bissinger Auerquelle W. Hörhammer GmbH & Co. KG, Bissingen, Germany
- Hassia Mineralquellen GmbH, Bad Vilbel, Germany
- Kraft Foods Belgium N.V., Halle, Belgium
- Kempenservice Elektrotechn. BV, Bladel, Netherlands
- Mahou, Madrid, Spain
- Nestlé España A.S.A., Cantabria, Spain
- Nowka Sauerkonserven KG, Uelzen, Germany
- Parmalat Australia Ltd, Australia
- Plzensky Prazdroj a.s., Pilsen, Czech Rep.
- Rostocker Brauerei GmbH, Rostock, Germany
- Unilever Foods, Vizcaya, Spain

Other industries

- Alstom Power Conversion GmbH, Berlin, Germany (Power engineering)
- ASI Robicon, Vicenza, Italy (Logistics)
- Brabant Water, Breda, Netherlands (Water supplier)
- EJA Ltd., Manchester, England (Machine engineering supplier)
- Ergo Computing UK Ltd., Nottingham, England (Computer systems)
- INA-Schaeffler KG, Herzogenaurach, Germany (Roller bearings)
- K2 Automation GmbH, Bretzfeld, Germany (Road constr.)
- Konings Medical Systems BV, Swalmen, Netherlands (Medical technology)
- Küttner GmbH & Co. KG, Essen, Germany (Plant constr.)
- Mega, Bambolo, Italy
- Merck, Virginia, USA (Pharmaceutical industry)
- Philip Morris Holland BV, Bergen op Zoom, Netherlands (Tobacco industry)
- Robert Bosch GmbH, Karlsruhe, Germany (Storage systems)
- Rockwell Automation A/S, Albertslund, Denmark (Control technology)
- ThyssenKrupp Stahl AG, Duisburg, Germany (Steel industry)
- Tuchenhausen S.A., Madrid, Spain (System planning)
- Walt Disney World, Florida, USA (Theme park)



Technical sales support

A technically experienced team can support you with questions about configuration, commissioning, and control connection.



SIGNALS FOR THE WORLD OF AUTOMATION

For half a century Pepperl+Fuchs has continuously provided new impulses for the world of automation and set standards for quality and innovative technology. We develop, produce and sell electronic sensors and interface components world-wide. Due to our global presence and the high flexibility in production and services, we offer you individual complete solutions – where you need us. We know what we are talking about – Pepperl+Fuchs is regarded as the company with the world's largest choice of industrial sensor technology for a wide variety of applications. **Our signals move the world.**



www.pepperl-fuchs.com

Worldwide Headquarters

Pepperl+Fuchs GmbH · Königsberger Allee 87
68307 Mannheim · Germany
Tel +49 621 776-0 · Fax +49 621 776-1000
E-mail: info@de.pepperl-fuchs.com

USA Headquarters

Pepperl+Fuchs Inc. · 1600 Enterprise Parkway
Twinsburg, Ohio 44087 · USA
Tel. +1 330 4253555 · Fax +1 330 4254607
E-mail: sales@us.pepperl-fuchs.com

Asia Pacific Headquarters

Pepperl+Fuchs Pte Ltd. · P+F Building
18 Ayer Rajah Crescent · Singapore 139942
Company Registration No. 199003130E
Tel. +65 67799091 · Fax +65 68731637
E-mail: sales@sg.pepperl-fuchs.com



 **PEPPERL+FUCHS**
SIGNALS FOR THE WORLD OF AUTOMATION