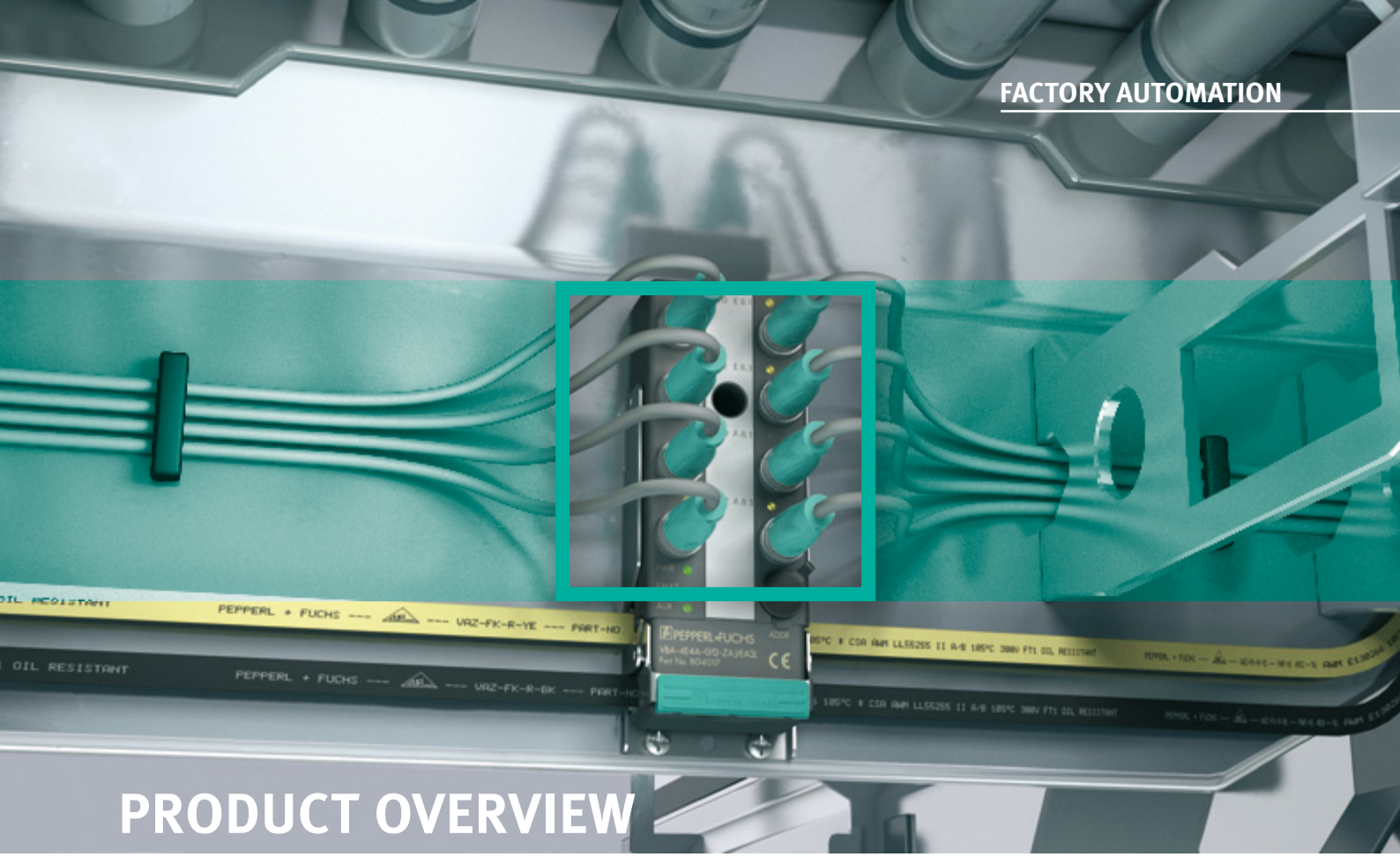


PRODUCT OVERVIEW

AS-INTERFACE

PEPPERL+FUCHS
SENSING YOUR NEEDS

PEPPERL+FUCHS – YOUR EXPERT PARTNER

Pepperl+Fuchs is a world market leader in the development and manufacture of sensors and sensor systems for the automation market. We continually set new standards in quality and innovative technology.

AS-Interface is the standard solution for simple, cost-effective networking of sensors and actuators in the field. AS-Interface has established a strong position throughout the automation technology industry:

- Automotive industry
- Chemical and process technology
- Warehousing and material handling
- Mechanical engineering
- Food industry
- Packaging industry

In addition to expert advice, Pepperl+Fuchs offers a complete portfolio of components for your AS-Interface system. With our global presence, reliable service and flexible production facilities, we deliver complete individual solutions for reliable and efficient operation of your systems.

Our experts will be happy to help you.

Tel.: 0621 776-4411
Fax: 0621 776-27-4411
E-mail: fa-info@pepperl-fuchs.com
Internet: www.pepperl-fuchs.com/as-interface

CONTENTS

ADVANTAGES OF AS-INTERFACE

AS-INTERFACE: A WORLDWIDE STANDARD

The actuator-sensor interface (AS-Interface) replaces conventional wiring technology on the sensor-actuator level. AS-Interface has firmly established itself as a worldwide standard for the cost-effective transfer of power and signals along a single cable. It is an open system and is compatible with all common fieldbus systems.

YOUR BENEFITS

- Minimized installation costs and connection via insulation piercing technology
- High noise immunity during data transfer
- Extensive diagnostic function
- Automatic addressing when the device is replaced
- Flexible system extensions
- Compatible with all fieldbuses

FLEXIBLE

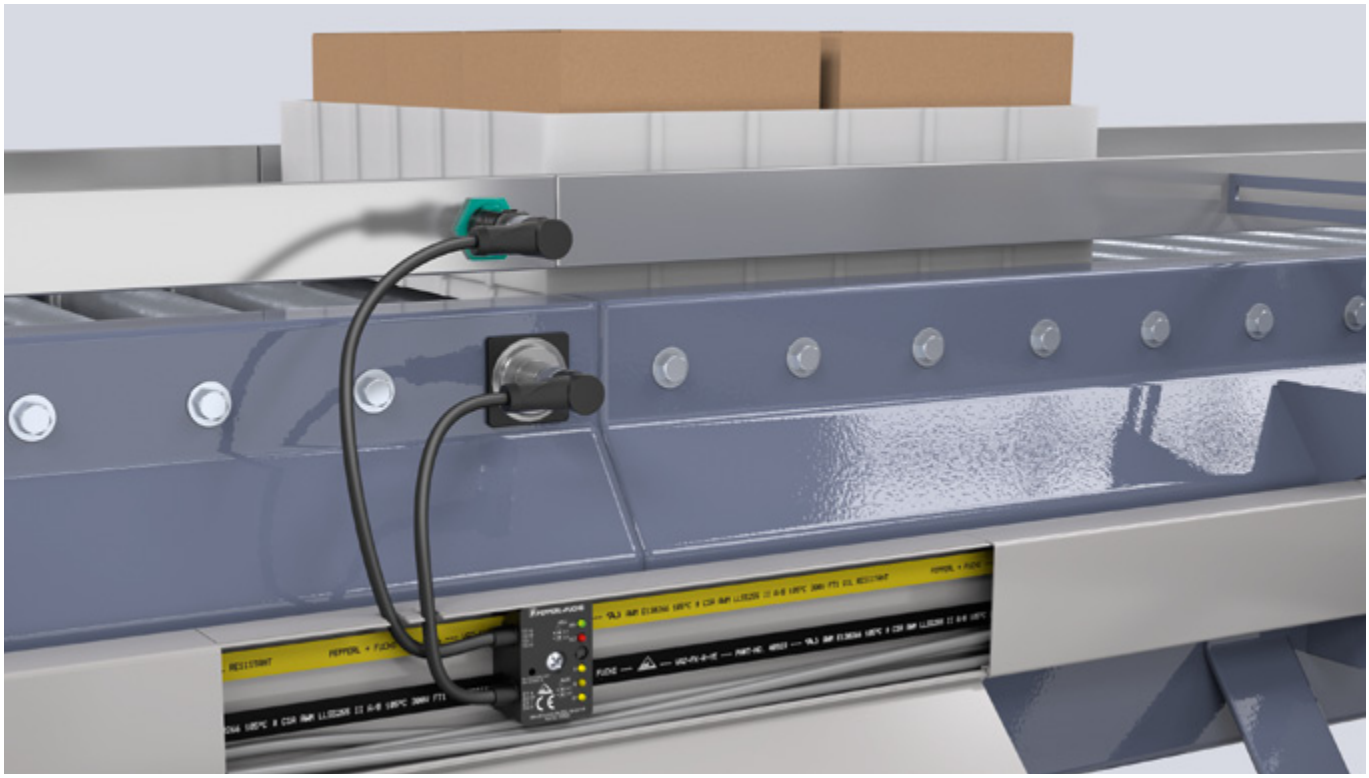
Signals and power are transferred along the reverse polarity protected yellow flat cable. Auxiliary power to the module outputs is supplied along the black flat cable. Motors and electrical or pneumatic valves can be controlled via AS-Interface.

FAST

Connection via insulation piercing technology enables rapid installation and automatic addressing minimizes system downtimes in the event of replacement.

SAFE

Analog values can be transferred easily and installation in hazardous areas is possible up to Class I/Div. 2, Zone 1. Safety installations may be operated with AS-Interface up to Category 4 or SIL3/PLe. The gateway provides extensive diagnostic functions such as ground fault detection, communication quality monitoring, and double address detection. Sensors with integrated AS-Interface detect coil breakage and issue a failure warning to reduce downtimes.



COMPONENTS OF AN AS-INTERFACE SYSTEM

GATEWAYS
connect the IOs to all common controllers

SAFETYMONITORS
monitor bus communication in safety applications

AS-INTERFACE POWER SUPPLIES
have integrated data decoupling

DC POWER SUPPLIES
supply auxiliary power to the AS-Interface nodes along the black flat cable

DIGITAL AND ANALOG MODULES
for the field and control cabinets, suitable for every application

AS-INTERFACE INTELLIGENT DEVICES
allow direct connection to the flat cable

AS-INTERFACE ACCESSORIES
enable the simple construction of networks

AS-INTERFACE ADDRESSING DEVICES
enable the simple commissioning of the AS-Interface system

SOFTWARE
for diagnostics and the configuration of the safety logic module

GATEWAYS

The gateway controls the AS-Interface system and transmits process data to all types of higher-level control in a standardized I/O map. The AS-Interface adopts the role of a conventional I/O card in the controller, which allows a simple changeover to the AS-Interface system.

The stainless steel gateway manages communication with the slaves and informs the PLC of faults. All diagnostic information from the field I/O and the safety system can be transmitted to a higher level control system.

K20 MODELS

- Single and double gateways for the control cabinet
- Large backlit display
- Double address detection
- Ground fault detection
- Diagnostic interface
- Stainless steel housing
- Removable terminals
- Dimensions: 120 mm x 75 mm x 80 mm
- Available interfaces: PROFIBUS, PROFINET, Modbus TCP, EtherNet IP, DeviceNet

K25 MODELS

- Single gateway with PROFIBUS connection for the control cabinet
- 7-segment display
- Compact stainless steel housing
- Removable terminals
- Dimensions: 120 mm x 45 mm x 45 mm

K30 SAFETY CONTROLLER WITH INTEGRATED GATEWAY

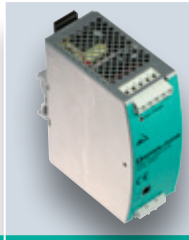
- Safety controller with integrated gateway

See the chapter “AS-Interface Safety at Work” on page 16 for more information.

AS-INTERFACE POWER SUPPLIES

Each AS-Interface segment requires one AS-Interface power supply (VAN-...) with 30.5 V DC voltage and data decoupling to provide power and send modulated signals along a cable without interference. Control cabinet power supplies are available with 2.8 A, 4 A, or 8 A for high efficiency. The AS-Interface K19 is a NEC Class 2 power supply. The ground fault monitor is already integrated in the 4 A K27 AS-Interface power supply.

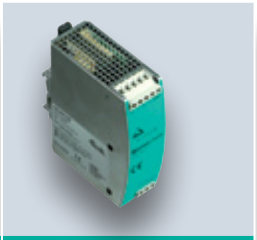
AS-INTERFACE POWER SUPPLIES WITH 115 VAC/230 VAC SUPPLY



AS-Interface power supply	VAN-115/230AC-K19	VAN-...-K27	VAN-...-K16
Width	49 mm	73 mm	91 mm
Max. output current	2.8 A	4 A	8 A

AS-Interface power supply K18 to 500 VAC, 3-phase available.

AS-INTERFACE POWER SUPPLIES WITH 24 VDC SUPPLY

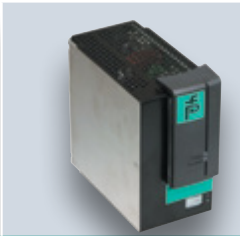


AS-Interface power supply	VAN-24DC-K28
Width	49 mm
Max. output current	4 A

DC POWER SUPPLIES FOR AUXILIARY POWER

DC POWER SUPPLIES 115/230 VAC ENERGY SUPPLY

- Output voltage can be regulated between 23 V ... 30 V




DC power supply	K17-STR...	K24-STR...
Width	70 mm	70 mm
Max. output current at 24 V	5 A	10 A

See the catalog or visit our website for more detailed information and product details:
www.pepperl-fuchs.com/as-interface

TERMINATOR, REPEATER AND POWER EXTENDER

TERMINATOR

AS-Interface can reach a specified length of 100 m per segment without a terminator. A terminator is required to extend networks from 100 m to a maximum of 200 m.

The terminator reduces reflections at the cable ends and improves communication. With the integrated multiple impedance and two options for inserting the flat cable, a network length of 200 m has been achieved with all tested topologies and cable loads. The device also displays the voltage drop for both AS-Interface and AUX. The one-piece terminator can be fitted to the flat cable without additional accessories.

ECOLAB IP68/69K

REPEATERS

Repeaters were designed to extend network lengths and galvanically isolate network segments. They are ideal for applications where a decentralized power supply is required or the longer cable length is insufficient due to the 200 m terminator.

Up to two repeaters can be connected in series to achieve a maximum network expansion of 1 km in combination with the terminators.

In principle, any number of repeaters can be wired in parallel to construct a large network with a star topology.

POWER EXTENDERS

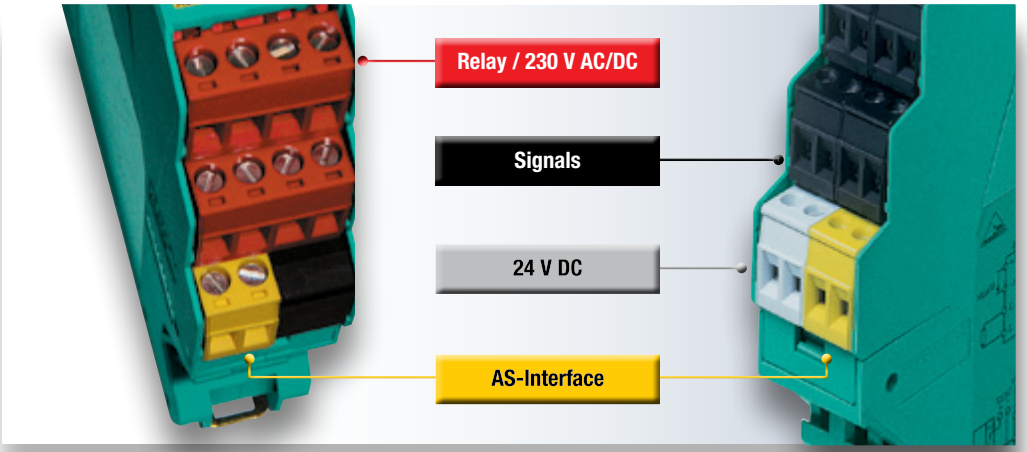
Regulated DC power supplies provide 30 V DC of power to the VAN-G4-PE-4A power extender, which is responsible for data decoupling. Used with the G4 repeater, it extends the network. As a result, the extender can be installed in the field without a control cabinet or junction box.

KE SERIES CONTROL CABINET MODULES

MAIN FEATURES

- Only 22.5 mm wide for 4 inputs and 4 outputs
- Removable color-coded terminals included with delivery
- DIN rail mounting
- Integrated addressing jack
- Choice of sensor supply from AS-Interface or AUX
- Max. 2 A switching current per channel and 4 A total current
- Channel-specific overload detection with red/green dual LEDs
- Lead breakage monitoring
- Safe isolation of AS-Interface and AUX

KE series control cabinet modules are available in various sizes with different numbers of terminal connections. Color-coded, removable terminals simplify installation and maintenance.



KE1 MODELS

- Slim design only 50 mm high for integration into compact junction boxes
- 16 terminal connections
- Maximum of 4 inputs and 4 outputs
- Also available as a safety module

KE MODELS

- 24 terminal connections
- Maximum of 4 inputs and 4 outputs
- Also available with relay outputs

See the catalog or visit our website for more detailed information and product details:
www.pepperl-fuchs.com/as-interface

AS-INTERFACE G10 ULTRA-COMPACT MODULE

The G10 is the world's smallest IP68/69K AS-Interface module; the one-piece housing mounts quickly and securely using a single stainless steel screw. Just 23 mm high, it fits in the cable duct. With an M12 pigtail connection, no additional sensor cable is required.

The decentralized installation optimizes line lengths to sensors and actuators. The G10 is the ideal AS-Interface module for applications that have just a few I/O.

MAIN FEATURES

- Mounting possible even in very confined spaces
- Can be placed in the cable duct with no additional mounting requirements
- Decentralized installation reduces amount of wiring required
- One-piece housing is quick to install and makes every standard sensor AS-Interface-compatible
- Unique seal contours around the gold-plated contact pins help to ensure IP68/69K protection

Available types
1 cable outlet for one or two sensor signals
2 cable outlets for two sensor signals
2 cable outlets for two sensor signals and one output

ECOLAB IP68/69K

G10 – THE WORLD'S SMALLEST AS-INTERFACE MODULE OFFERS A SOLUTION FOR DECENTRALIZED APPLICATIONS.

FITS EASILY INTO EVERY CABLE TRAY

Because the G10 ultra-compact module fits easily into the cable tray, the flat cable remains there at all times.
Sensors and actuators are connected directly to the cable outlet.

ONE-PIECE HOUSING

The one-piece housing mounts in seconds:
Insert flat cable, close the top, and tighten central screw.
Because the housing is so compact, additional mounting is usually not required.

PATENTED HINGED COVER

The patented hinged cover ensures that there is a reliable connection to the AS-Interface cables.

AS-INTERFACE G11 WITH INNOVATIVE SEAL CONCEPT

G11 field modules offer an innovative seal concept in a robust, compact, round design and are particularly suitable for machine builders and harsh and process environments. Cleaning processes involving steam cleaners, pressure washdowns, and high mechanical stresses do not affect the performance of G11 modules. Therefore, you can quickly and easily connect sensors and actuators to an AS-Interface, even under these harsh ambient conditions.

MAIN FEATURES

- Highest degree of protection IP68/IP69K without encapsulation
- Smooth surface prevents accumulation of dirt
- Arbitraty flat cable orientation
- Connection via M12 or flat cable
- Compact design
- Channel-specific overload indicator with red/green dual LEDs
- Outputs with high current load rating

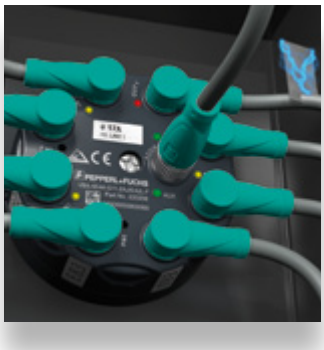
Available types

- **4 inputs**
- **4 inputs/4 outputs**

The G11 module is available in four versions with different types of connection to the AS-Interface network, and input/output configurations.

ECOLAB IP68/69K

G11 – DURABLE HOUSING FOR HARSH CONDITIONS

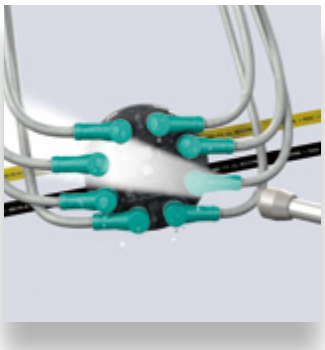


NO MORE TROUBLESHOOTING!

In the event of a short circuit at the output, the fault transmitted to the PLC, and also a red LED at the relevant M12 port indicates a fault.

INNOVATIVE ROUND HOUSING

The compact, round design allows arbitrary alignment of the flat cable to any position.



STEAM CLEANING NEVER POSES A PROBLEM

Radial O-ring seals provide hermetic protection without encapsulation. Aging and thermal effects do not come into play.

See the catalog or visit our website for more detailed information and product details:
www.pepperl-fuchs.com/as-interface

G12 AS-INTERFACE FLAT MODULE WITH TOOL-FREE INSTALLATION

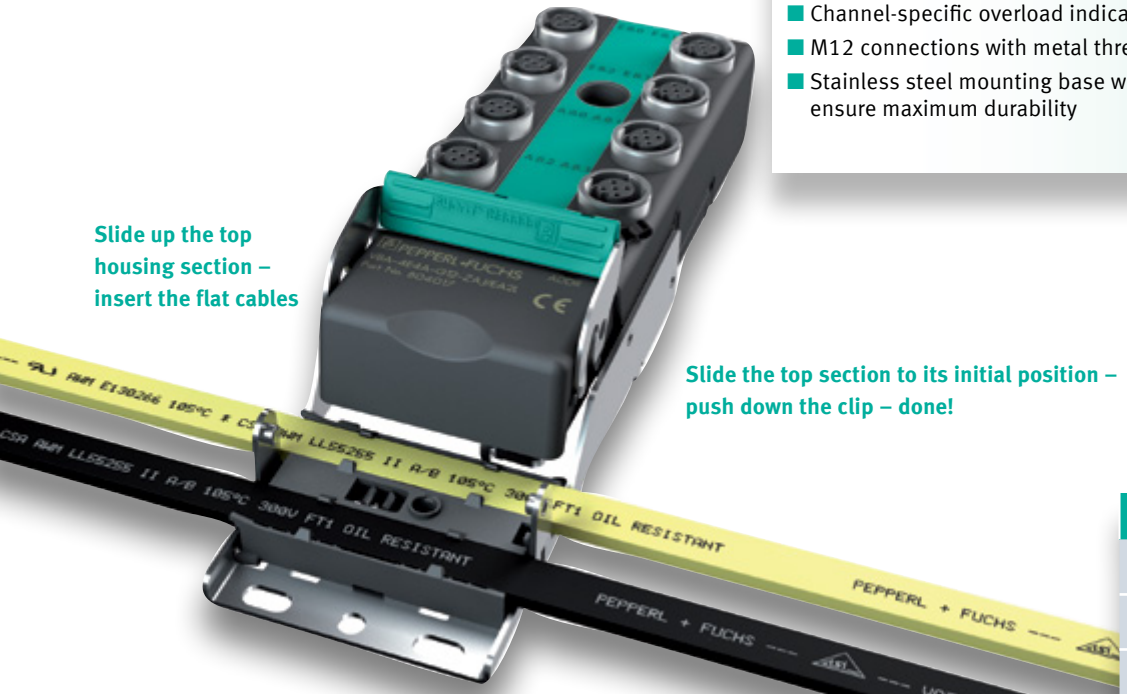
G12 flat modules are extremely easy to connect and can be replaced with a minimum of fuss in the event of a fault. The G12 has a one-piece housing with a cable guide that reduces installation times considerably. The cable guide can be reversed so that the cable orientation can be changed.

MAIN FEATURES

- Quick, tool-free DIN-rail mounting with stainless steel bracket
- Channel-specific overload indicator with red/green dual LEDs
- M12 connections with metal thread
- Stainless steel mounting base with encapsulated housing ensure maximum durability

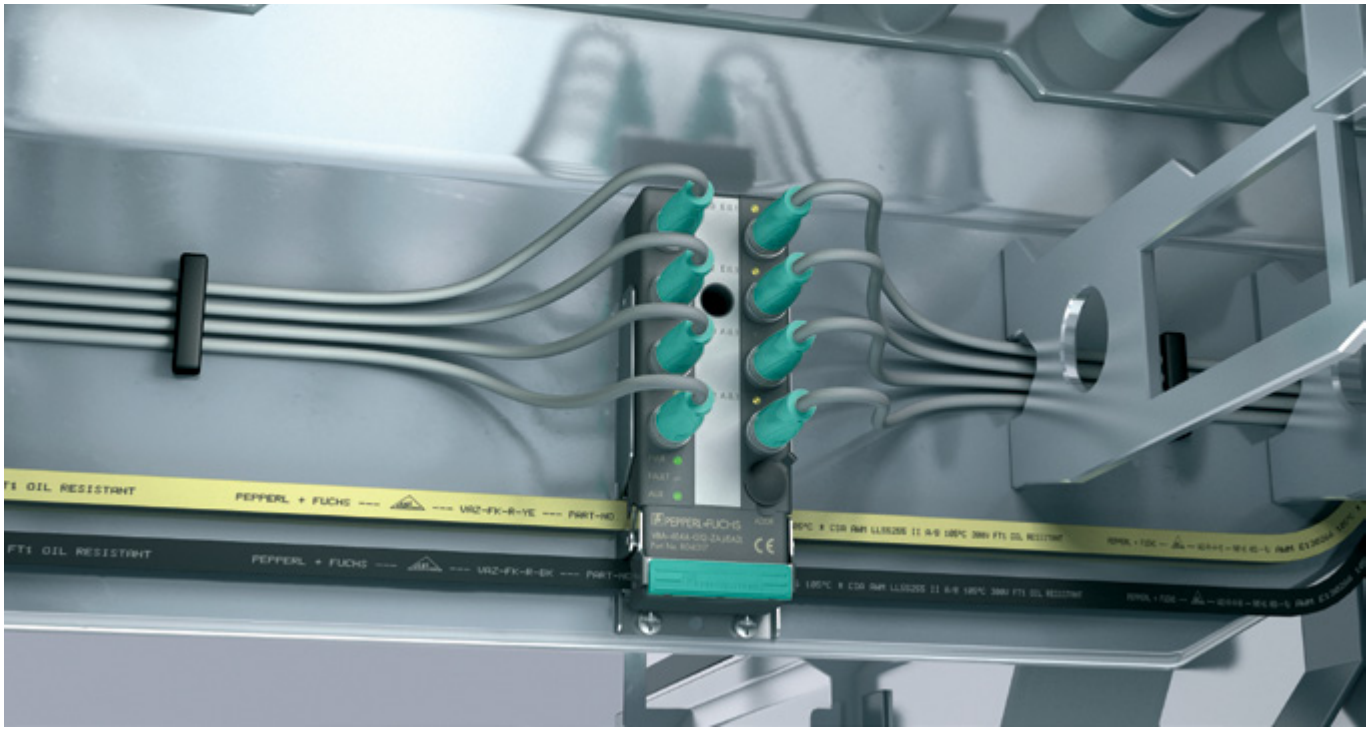
Slide up the top housing section – insert the flat cables

Slide the top section to its initial position – push down the clip – done!



Available types

- 4 inputs
- 2 inputs/2 outputs
- 4 inputs/4 outputs
- 4 outputs
- 8 inputs



G16 AS-INTERFACE COMPACT MODULE

The G16 encapsulated compact module is the ideal solution for robotics and material handling applications.
Sliding fasteners can be used to secure the module to profiles.

MAIN FEATURES

- Only 30 mm wide, available in two sizes with 4 or 8 ports
- Encapsulated electronics in IP67, IP68 and IP69K degree of protection
- Communication monitoring
- Channel-specific overload indicator with red/green dual LEDs
- Function display for network, external auxiliary voltage, and inputs/outputs
- Sensor connected via 3-pin M8 connector
- M12 connection via AS-Interface/AUX splitter

IP68/69K

Available types
4 inputs
4 inputs/4 outputs

G4 AS-INTERFACE MODULE WITH CORD GRIP

On G4 AS-Interface modules, IO cables are secured via cord grips and electrical connections are made with internal cage tension spring terminals to allow you to cut the cable to the exactl length you need for a clean installation.

MAIN FEATURES

- Inputs connected via cord grips and cage tension spring terminals
- Connection to AS-Interface via flat or round cable
- Simple DIN rail installation

Available types
4 inputs
2 inputs/2 outputs
4 inputs/4 outputs

See the catalog or visit our website for more detailed information and product details:
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EX-MODULES AND PNEUMATIC MODULES

G5 EX-MODULE

The module can be used in hazardous areas up to Zone 1 (2D/2G). The gateway and the power supply must be located outside of the hazardous area or installed in an approved explosion-proof housing. The cabling needs to follow Zone 1 installation requirements

MAIN FEATURES

- Connection of four NAMUR sensors and two outputs
- AS-Interface connection via round cable
- Encapsulated module (EEx m) with ATEX approval
- Field circuits designed with ignition protection EEx ia IIC
- Input monitoring for lead breakage and short circuits (can be disabled for the connection of mechanical contacts)

PNEUMATIC MODULES

Compressed air for pneumatically actuating valves or flaps can be controlled remotely from the AS-Interface pneumatic modules. Shorter pneumatic lines save energy and sharpen response times. If the actuators are spread apart, this solution is far superior to valve banks.

MAIN FEATURES

- Direct connection of pneumatic cylinders
- 2 pneumatic outputs (2 bar ... 8 bar) for up to 2 valves
- 4 inputs for position monitoring
- Flat or round cable connection for AS-Interface or AUX
- IP65 degree of protection
- Possible to supply power to valves externally

G11 ANALOG MODULES – THE INTELLIGENT FIELD SOLUTION FOR ANALOG SIGNALS

G11 series analog input and output modules bring the analog interface into the field. The analog signals in the field are converted to digital signals preventing external signal interference. They reduce the amount of wiring required and improve transmission reliability. The modules are ideal for process technology and food industry applications because they function reliably under harsh conditions.

A unique feature is the automatic recognition of the connected actuators and transducers. When the devices are replaced they automatically retain the original function.

The connection to AS-Interface can be made using an M12 or a flat cable, which can be routed in any direction owing to the round shape of the housing. Current, voltage, and PT100 transducers can be connected to the 2-channel analog input modules.

The analog output modules are available with 2-channel current or a 4-channel current/voltage output.

MAIN FEATURES

- Automatic signal detection
- IP68/69K degree of protection, ECOLAB certification
- Signal conversion time: 8 ms in, 3 ms out
- Temperature range from -25 °C ... +70 °C
- ± 0.1% accuracy
- Channel-specific lead breakage and overload detection
- Integrated shielding
- Option of selecting power supply from AS-Interface or AUX

ECOLAB IP68/69K

KE2 ANALOG MODULES FOR CONTROL CABINETS

Control cabinet modules in a KE2 design are also available for analog input and output signals. The devices have two channels for current and voltage that can be selected with a switch.

See the catalog or visit our website for more detailed information and product details:
www.pepperl-fuchs.com/as-interface

AS-INTERFACE SAFETY AT WORK

"AS-Interface Safety at Work" relates to safe communication in the AS-Interface network according to the most recent Machinery Directive. The highest safety class SIL3/PLe can be achieved with this globally utilized safety system, allowing safety systems without the need for a safety PLC.

All known safety devices can be connected directly to the AS-Interface segment via modules or as an integral solution. The AS-Interface safety concept can be modified flexibly and decentrally. Logical links can be defined through a configuration program.

K30 SAFETY CONTROLLER

MAIN FEATURES

- One safety program for two AS-Interface networks
- Integrated chip card for easy device replacement
- Safe coupling of up to 31 AS-Interface networks
- Maximum of 16 safe outputs
- Diagnostic interface
- Plain text display
- 2 electronic safe outputs

GATEWAY WITH INTEGRATED SAFETY MONITOR

K30 PROFISAFE SAFETY CONTROLLER

Alternatively, AS-Interface can be used for safety technology together with a PROFIsafe version of the K30 safety controller. As a result, all functions can be controlled centrally via a safety PLC. The AS-Interface installation benefits can still be fully exploited.

K31 SAFETY MONITORS

The SafetyMonitor checks communication, makes sure that all safe slaves are functioning correctly and restores a safe state via force guided relays in the event of a fault.

MAIN FEATURES

- One safety program for two AS-Interface networks
- Maximum of 16 release circuits
- 2 electronic safe outputs
- Definition of custom function blocks
- Eliminates the need for a safe PLC
- Safe and standard signals on a single cable
- Approved by TÜV and IFA for category 4, SIL3/PLe

KE4 BASIC SAFETY MONITOR

MAIN FEATURES

- Integrated memory card for easy device replacement
- Safe coupling
- Maximum of 8 safe outputs
- LED diagnostics
- 4 safe inputs or 8 standard inputs
- 2 safe electronic outputs

OPTIONAL MASTER FUNCTION FOR STAND-ALONE SAFETY SOLUTIONS

DISPLAY AND CONTROL MODULES

Operating buttons with a flat cable connection and integrated indicator light are provided for manual operation. System components are controlled easily using the START/STOP buttons and the operator is provided with visual feedback.
Integral AS-Interface illuminated pushbuttons are also available for installation in the control panel.

See the catalog or visit our website for more detailed information and product details:
www.pepperl-fuchs.com/as-interface

SAFETY MODULES

All safety modules are approved by TÜV according to IEC 61508 and IEC 13849-1. Sensors with safety functions, standard emergency stops, position end switches, trip wire switches, enabling switches or safety light curtains of the highest safety category can be connected.

G4 MODULE

- Connects devices with OSSD semiconductor outputs e.g., light curtains

G12 MODULE

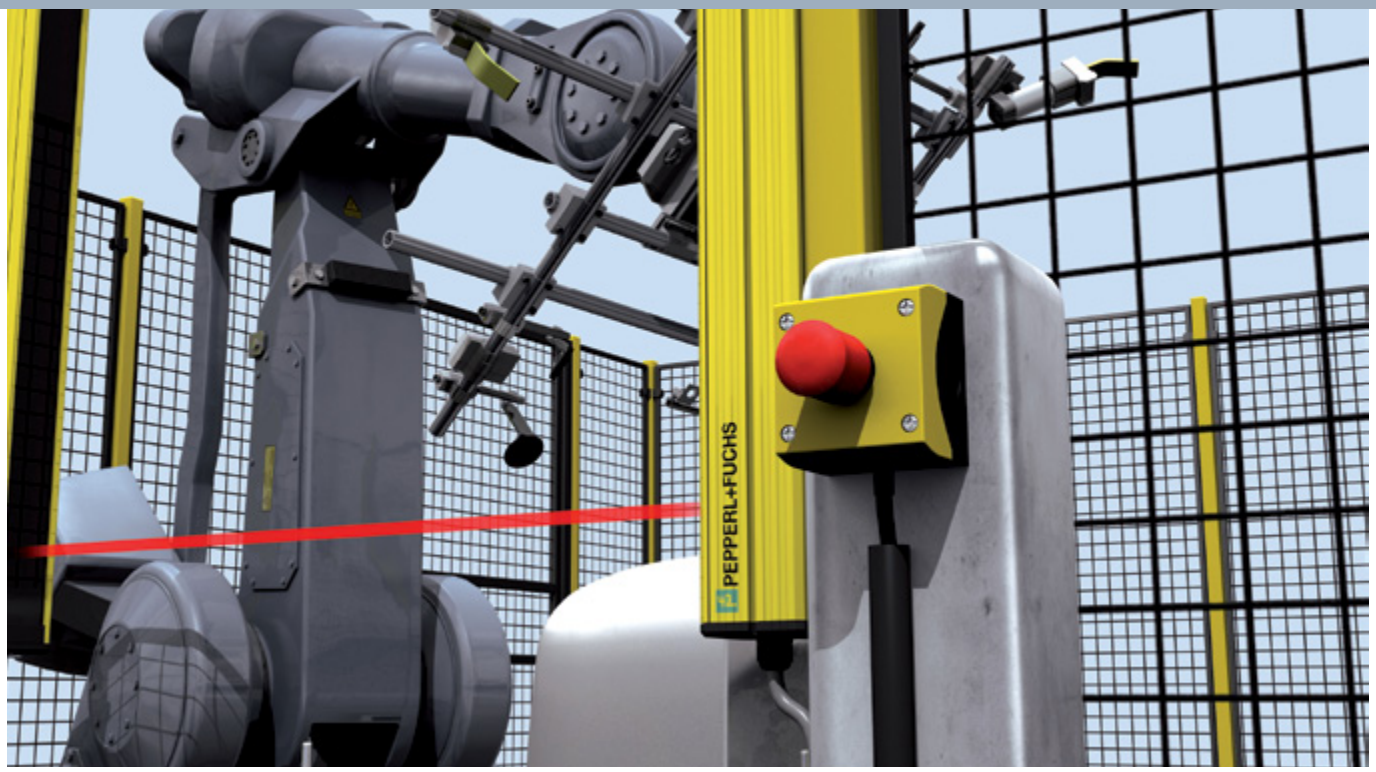
- Connection of safe contacts (e.g., position end switches) via M12 connector
- 2 safe inputs
- 2 standard outputs

KE1 MODULE

- Connection of safe contacts in the control cabinet or junction box via removable, color-coded terminals
- 2 safe inputs
- Also available with 2 standard outputs

KE3 SAFE OUTPUT MODULE

- Control cabinet module with a redundant relay output
- 1 EDM and 3 other standard inputs
- Several safe output modules can be grouped together via an AS-Interface address



INTEGRATED AS-INTERFACE EMERGENCY STOPS

MAIN FEATURES

- 2 force-guided contacts
- Field mount or panel mount housing
- Self-monitoring via spring preload
- Optional integrated illumination

STACK LIGHTS

A maximum of 4 indication elements can be controlled via the AS-Interface module.
Stack light modules are available in 5 colors with 3 signal horns and can be assembled as required.

MAIN FEATURES

- Modular bayonet system, IP65
- LEDs with 100,000 hours service life premounted in the lighting module, versions with bulb available
- Acoustic alarm with 85 dB (A), 105 dB (A) or dynamic
- 70 mm diameter provides excellent visibility
- Direct parallel wiring without AS-Interface module possible

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www.pepperl-fuchs.com/as-interface

The Machinery Directive governs the protection of machine operators and maintenance personnel. Mechanical and noncontact solutions are available to monitor the safety of protective equipment.

MECHANICAL DOOR MONITORING

MECHANICAL INTERLOCKING

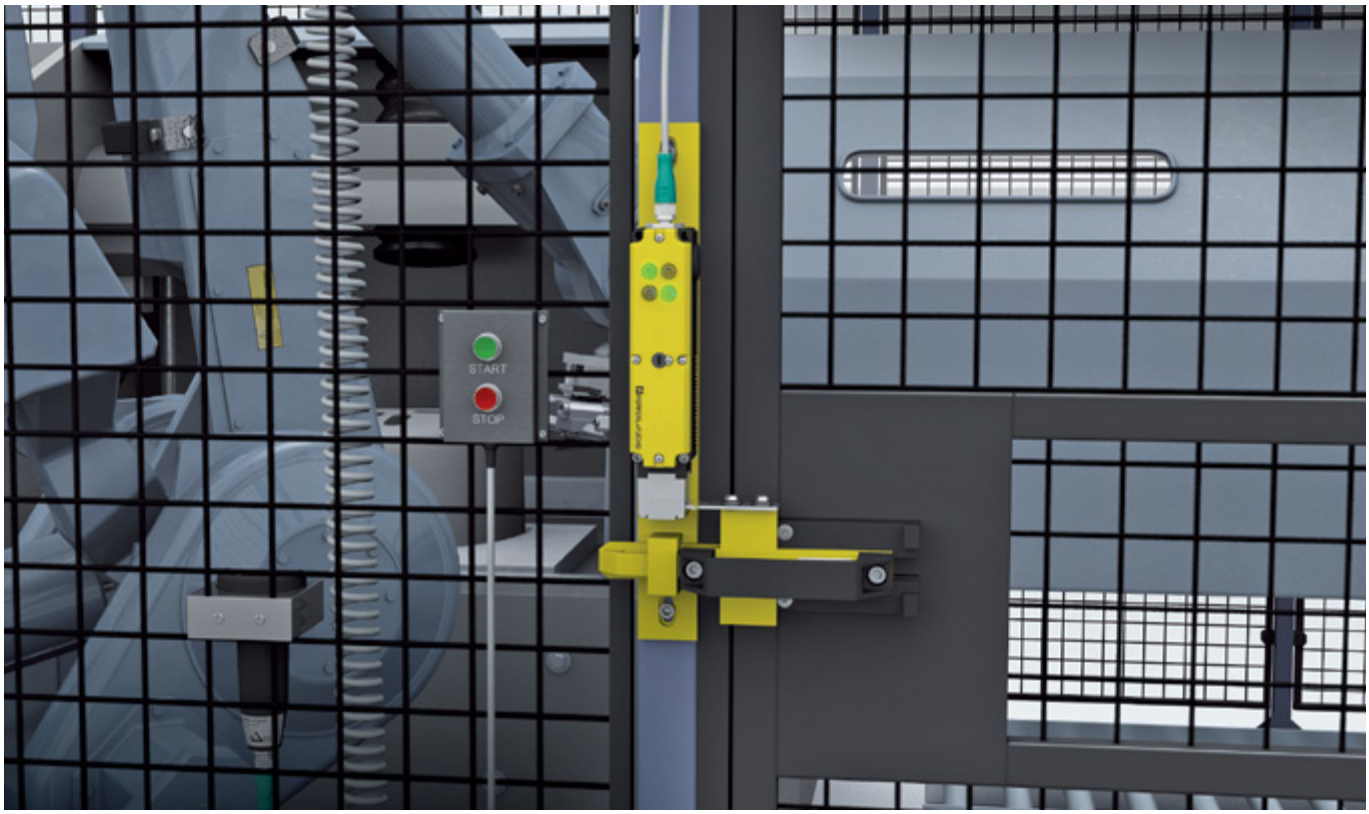
Locking devices monitor the opening of the protective device and lock the control system when necessary. A concealed installation with safety screws prevents unwanted manipulation.

- Robust actuator head guarantees long service life
- Multi-position actuator head provides flexibility, allowing an approach from any direction
- Slim, 40 mm wide device
- 2 force-guided, slow acting contacts
- Coded mechanical actuator
- M12 connection
- Safety category up to PLd possible

MECHANICAL GUARD LOCKING

Before access is permitted, guard locking devices prevent protective doors from opening and avoid unintentional process interruptions.

- Integrated guard locking up to 2500 N
- Detection of the actuator and the locking state
- Four high visibility LEDs
- Power to lock, power to unlock versions available
- Integrated emergency unlock
- Safety category up to PLd possible



NONCONTACT DOOR MONITORING

REED SWITCHES

Reed switches are small and economical. They are frequently used on opening flaps and doors.

- Compact plastic housing
- Encapsulated electronics
- Noncontact switching
- Coded magnet system
- Connection via round cable with M12 pigtail connection
- Safety category up to PLd possible

RFID TRANSPONDER SYSTEM

The system is insensitive to door bounce due to the large reading range, and coded RFID transponders offer an extremely high level of security against tampering.

- Highest safety category SIL3/PLe
- Connection of up to 4 safety switches
- Monitor 4 doors in a trip circuit
- No contact bounce due to large detection range
- High level of security against tampering

ENABLING SWITCHES

Enabling switches temporarily override the safety function, allowing a trained individual to enter the plant with reduced potential risk.

- 3-position switch with panic function
- M12 connection
- IP67 degree of protection
- Highest safety category SIL3/PLe

See the catalog or visit our website for more detailed information and product details: **www.pepperl-fuchs.com/as-interface**

G10 SPLITTER BOX

These devices are required for flat cable branching, connecting modules, and connecting integrated AS-Interface end devices. The one-piece housing design with patented hinged cover simplifies handling. A large selection of models with ECOLAB approval and IP68/69K degree of protection are available

ECOLAB IP68/69K

MAIN FEATURES

- Ultra-compact housing
- Internal mounting holes
- Optimal hinged cover
- Extremely durable due to hard gold-plated, CNC-machined piercing contacts
- ECOLAB certification and IP68/69K degree of protection
- AS-Interface only or combined AS-Interface and AUX connection

AS-INTERFACE HANDHELD

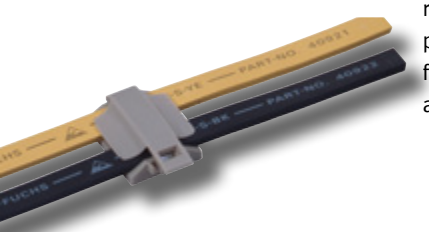
It's easy to commission your AS-Interface system with the AS-Interface handheld because each AS-Interface device requires an address to communicate with the gateway on the bus, allowing one-handed operation and easier addressing. The handheld comes in a case together with a power supply and programming cables.

MAIN FEATURES

- Quick, flexible addressing
- Keeps track of addresses that are already assigned
- Possible to loop AS-Interface and AUX voltage for continuous switching of outputs

FLAT CABLE

The flat cable for AS-Interface and AUX is available in 100 m spools or 1000 m rolls. The version with rubber sheath is preferred in applications where a flexible cable is an asset and a high degree of protection is important. The TPE version is suitable for drag chains, is resistant to oil, and is used frequently in applications using solvents and cutting fluids. A high-current version AUX cable is also available.



SOFTWARE

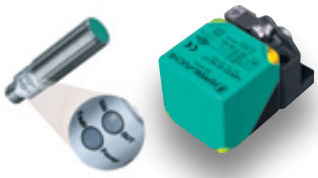
AS-i Control Tools software speeds up network disgnostics and SIMON+ software diagnoses AS-Interface safety configurations.

CABLE SOLUTIONS

Pepperl+Fuchs has been producing M8 and M12 connectors for more than 10 years.
A large variety of products always provides the perfect solution.

SENSORS WITH AS-INTERFACE

Pepperl+Fuchs offers a wide selection of sensor types with integrated AS-Interface.



INDUCTIVE SENSORS

Different designs are available with NC or NO contact function. Sensors with AS-Interface provide additional functions such as a failure warning indication and coil breakage indication.

PHOTOELECTRIC SENSORS

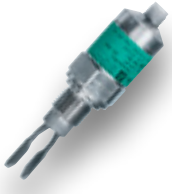
On photoelectric sensors, parameters can be used for light-on/dark-on switching.

ROTARY ENCODERS

Pepperl+Fuchs rotary encoders are fitted with 4 AS-Interface chips that enable the transfer of 16 bits during every cycle.

POSITION FEEDBACK SENSORS FOR VALVES AND DRIVES

Special sensor designs with two input signals for “open”/ “closed” are available for position monitoring. Power for the valve solenoid and the sensors is supplied from AS-Interface.



SENSORS FOR FILL LEVEL MONITORING

Vibration forks with integrated AS-Interface are used for fill level monitoring.

See the catalog or visit our website for more detailed information and product details:
www.pepperl-fuchs.com/as-interface

FACTORY AUTOMATION – SENSING YOUR NEEDS

Pepperl+Fuchs sets the standard in quality and innovative technology for the world of automation. Our expertise, dedication, and heritage of innovation have driven us to develop the largest and most versatile line of industrial sensor technologies and interface components in the world. With our global presence, reliable service, and flexible production facilities, Pepperl+Fuchs delivers complete solutions for your automation requirements – wherever you need us.

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