BIHL-WIEDEMANN.DE ▪ YEAR 18 ▪ EDITION 02.2024

AS-INTERFACE MASTER NEWS

THE BIHL+WIEDEMANN MAGAZINE

APPLICATION

One system, two controllers, flexibility as desired

SAFETY

Expertise from a single source: safety and security for (future-)safe automation

ASi-5: high-performance data shuttle for digitalization in process technology

Bihl + Wiedemann

ASi

Picture: Bihl+Wiedemann GmbH; Adobe Stock PaulShlykov

Process technology

ASi-5: high-performance data shuttle for digitalization in process technology

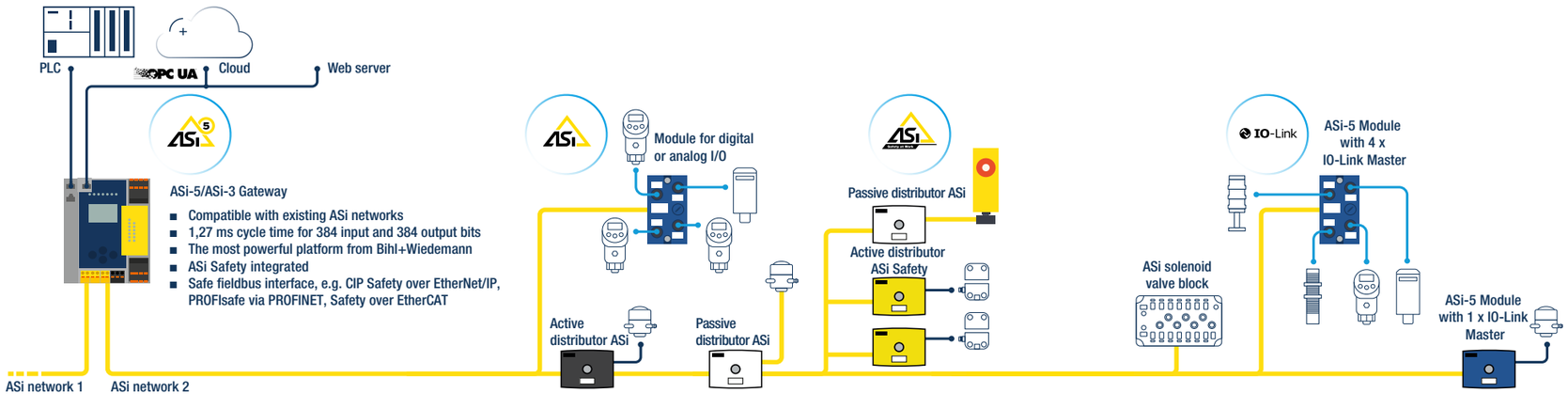
The digital transformation in process automation is already in full swing in many companies – especially in the chemical, pharmaceutical, food and biotechnology sectors. With ASi technology in general – and the ASi-5 portfolio from Bihl+Wiedemann in particular – digitalization can be implemented easily, cost-effectively, and future-proof. Especially since the infrastructure for data communication already exists in many places because...

… as an established fieldbus solution for the first automation level, ASi-3 has long enjoyed an excellent reputation in process technology. The standard is already widely used there, with its typical yellow profile cable for the simultaneous transmission of power and data. Its strengths include simple planning, the uncomplicated wiring concept with less connectors and no pre-assembled cables, simple integration of valves, for example, at the ideal wiring point, great freedom in topology selection, time-saving commissioning, convenient diagnostics, and ease of expandability. And: the high level of future-proofing thanks to the introduction of ASi-5. This is because wherever ASi-3 is already being used in process technology, systems can be made directly ready for the digitalization of process technology by extending them with ASi-5. This means that the infrastructure already in place can still be used – especially as the components from Bihl+Wiedemann, for example, are extremely compact and space-saving. This is just one of the reasons why leading manufacturers such as GEMÜ, SPX FLOW and Sitomatic also offer valves and process technology components with an ASi-5 interface. All products are already integrated in the Bihl+Wiedemann software suites and can therefore be used in conjunction with the ASi-5 products of the German company. And by using the ASi-5/ASi-3 Gateways with OPC UA and REST API, these ASi networks can also be integrated in solutions such as the ABB FIM (Field Information Manager) device management software for configuration, commissioning, diagnostics and maintenance of field devices.

Thanks to ASi-3, the data highway is already present in many places

Some manufacturers of process technology components have been working with ASi technology for well over 20 years – and know the advantages of transmitting data and power via one single cable and simple wiring using piercing technology. They confirm three things in particular: Firstly, there is no wiring technology that is simpler, more flexible, more reliable and more cost-effective in terms of installation costs than ASi. Secondly, AS-Interface has been an established standard in process technology for many years – especially in the chemical, pharmaceutical, food, biotechnology and process engineering sectors. Users around the world use ASi to automate field devices, for example, in valve terminals or for binary end position detection of process valves. Thirdly, its cost-effectiveness makes ASi in the latest ASi-5

Digitalization in process technology using AS-Interface



generation the ideal basis for Industry 4.0 and the future-proof digitalization of process technology and is already in great demand by many companies in these sectors when it comes to equipping their systems.

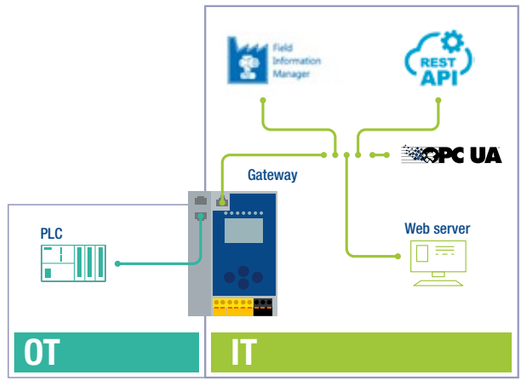
Digitalized process technology: ASi-5 as high-performance data shuttle

As a high-performance data shuttle, ASi-5 now makes it possible to transfer even more extensive data, such as analog values for controlling the valve position, diagnostic data from valve terminals and from their operating environment, and – thanks to the ASi-5 Modules with integrated IO-Link Master – also data from the world of smart IO-Link sensors and actuators with even shorter cycle times, for example, to make them available directly in IT applications such as condition monitoring via OPC UA or REST API. In addition, ASi-5 can also be used to transport safe data and standard data on one single cable. This makes it just as easy to reliably monitor a door lock using AS-Interface, for example, during a cleaning process, as it is to monitor analog signals such as temperature, pressure or fill level. Finally, the ASi-5/ASi-3 Gateways feature modern security methods such as certificates and their management to make communication with the IT – separate from the OT – as secure as possible. Experienced automation engineers will immediately think of IO-Link and its functionalities when they consider the performance features of ASi-5 – and for good reason. Both technologies are comparable in terms of data volumes and transmission speeds and complement each other perfectly: IO-Link, as a point-to-point connection protocol, can be ideally integrated into and transported over ASi-5 as a wiring system. This makes it possible to add IO-Link devices to the ASi network via ASi-5 modules with IO-Link masters, where the integrated ASi-5 connection is still missing in process technology solutions today.

Advantages of ASi-5 in process automation

ASi-5 convinces with high data transmission speeds and high data bandwidth. Together, these two factors make it possible to implement the ever-increasing device requirements associated with digitalization. In the case of valves, for example, additional information such as the air pressure in the valves for localizing leaks when using compressed air or the number of switching operations through to the path measurement of the valve stroke for the early detection of wear can be easily provided. Field level products – standard and smart sensors and actuators, as well as safety and standard devices – can be fully integrated into a digital network via ASi-5. This means that users in process automation not only benefit from being able to parameterize devices and receive their diagnostic data via the network with ASi-5/ASi-3 Gateways from Bihl+Wiedemann, but also from being able to read process data. Since these gateways are also equipped with OPC UA, the communication standard for Industry 4.0 and the IIoT, as well as the application programming interface REST API, the process data – which is usually irrelevant for the actual machine and installation control – can be provided directly in IT applications, bypassing the OT. Companies working with ABB FIM – the Field Information Manager from ABB – can take in OT and IT data via the ASi-5/ASi-3 Gateways from Bihl+Wiedemann – and in this way, communicate with valve islands and other devices, monitor them and document their parameters or changes.

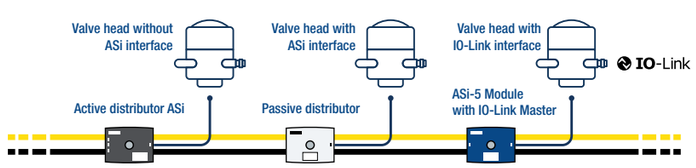
IIoT connection ensures documentation requirements in process technology



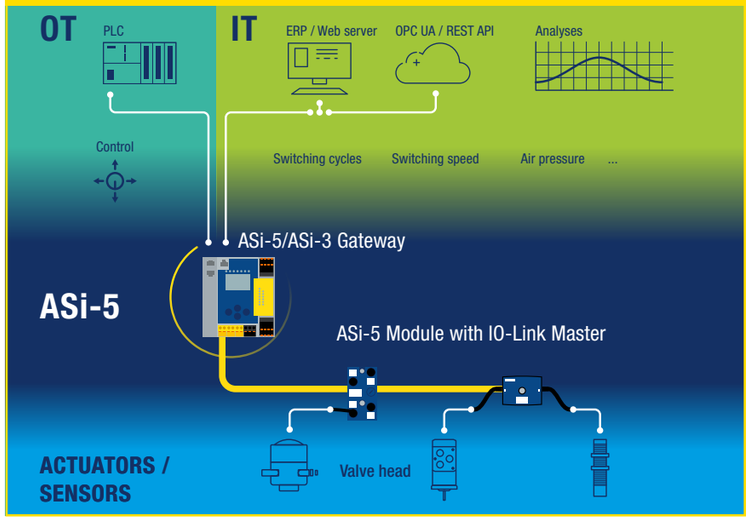
ASi Safety: functional safety directly integrated

AS-Interface and ASi Safety can be used independently of the generation, system, and manufacturer. Because all common fieldbus systems are supported, functional safety can always remain exactly the same, regardless of the control system used. Since the safety technology can be implemented on the same two-conductor cable as the transmission of standard signals, there is no need for a costly, duplicate infrastructure. This means that ASi Safety can be used to implement many different applications in process automation simply and cost-effectively – from classic E-STOP buttons, safety doors and light curtains to the safe monitoring of temperature and pressure.

Various options for connecting valve heads to ASi



The ASi-5/ASi-3 Gateway is used as an edge device to provide data from smart factory devices such as valve heads for further use by the OT and IT



Save costs with ASi-5

Since the process industry is also under a great deal of cost pressure today, the fact that installation costs can be significantly reduced makes ASi technology interesting for many companies because there is no other wiring alternative that is simpler, more flexible, and more reliable. And wherever ASi-3 is already in use, no new or additional infrastructure needs to be installed to upgrade to ASi-5 because the yellow profile cable can be used by both ASi generations. This also makes it cost-effective to connect sensors and actuators directly to ASi-5, for example, in the valve head, since there is no additional wiring effort required for digital inputs and outputs. However, if necessary, there are other options because digital and analog inputs and outputs, IO-Link sensors, or even serial protocols such as RS232, RS485, or CAN can be easily integrated with the appropriate ASi-5 modules. And on the IT side, a solution with ASi-5 also offers real monetary advantages because more than 100 field devices can be connected to a single ASi-5/ASi-3 Gateway from Bihl+Wiedemann. The gateway itself requires only one single IP address in the network and communicates with the IT via a single – physically separate – interface using OPC UA or REST API. This reduces the number of IP addresses, the complexity of planning and operating networks – and thus the costs of digitalization.

ASi-5: enabler of future-proof digitalization in process automation

ASi-3 has successfully established itself in process automation thanks to its simplicity and cost-effectiveness. And in doing so, it has also paved the way for the new ASi-5 technology standard. This offers a wide range of features for significantly increasing system performance. It also opens up a wide range of possibilities for driving forward digitalization in these industries in a cost-efficient and future-proof way.

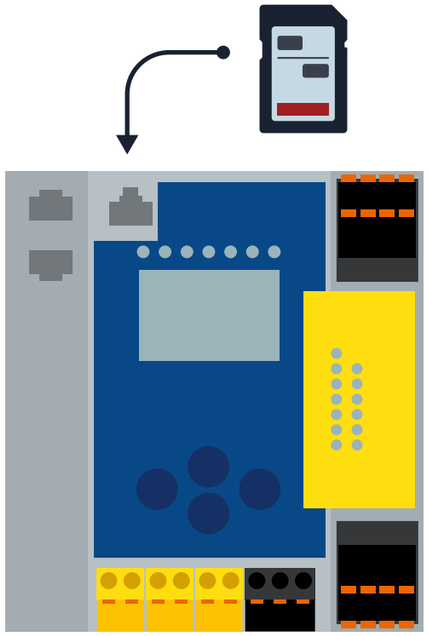
Cybersecurity: ASi-5 ensures highest datasecurity

In industrial environments, the topic of datasecurity is highly relevant due to its great importance for production stability and process reliability in process automation. ASi-5 and ASi-5 Safety offer the highest level of cybersecurity for two reasons. Firstly, data transmission is carried out using Orthogonal Frequency-Division Multiplexing (OFDM). This dynamic frequency allocation makes it very difficult to intercept the messages exchanged, and only possible if the entire context of the connection establishment between the ASi master and ASi node is known. In practice, this makes ASi-5 and ASi-5 Safety virtually tap-proof. On the other hand, the ASi-5/ASi-3 Gateways decouple TCP/IP and ASi-5 / ASi-5 Safety, i.e. the fieldbus and the field level. Thanks to ASi, no Ethernet port is required in the field. The gateway in the control cabinet thus becomes the only cybersecurity-relevant component of the entire installation, while the modules and nodes in the ASi network must fulfill far fewer security requirements. This makes it much easier to ensure cybersecurity in such systems.

Safety technology

EXPERTISE FROM A SINGLE SOURCE: SAFETY AND SECURITY FOR (FUTURE-)SAFE AUTOMATION

ASi-5 Safety and ASi Safety at Work – both with the option of also transmitting standard signals on the same line – plus a wide range of gateways and modules for implementing a variety of safety solutions regardless of industry or controller, as well as Safe Link for PLC-free, safe coupling and networking of ASi networks: the extensive portfolio underscores Bihl+Wiedemann's expertise in functional safety technology. But with digitalization in mechanical and plant engineering, safety is hardly conceivable without security – that is, without protection against cyberattacks. This is also the case for the automation specialists from Mannheim (Germany).



When a replacement is needed, the hardware and safety configuration stored on the SD card, as well as the parameter data of the connected devices, can be completely transferred to a new gateway of the same type.

Functional safety serves to protect people and the environment from the risk of accidents that may originate from machines. Data and communication security is about monitoring operational technology (OT) structures and IT networks, as well as potential gateways, to reliably eliminate the risks posed by the manipulation or theft of data. As functional safety is becoming increasingly digitalized, safety solutions that do not take security risks into account can be exposed to the risk of external changes – changes that can impair or even negate their protective function.

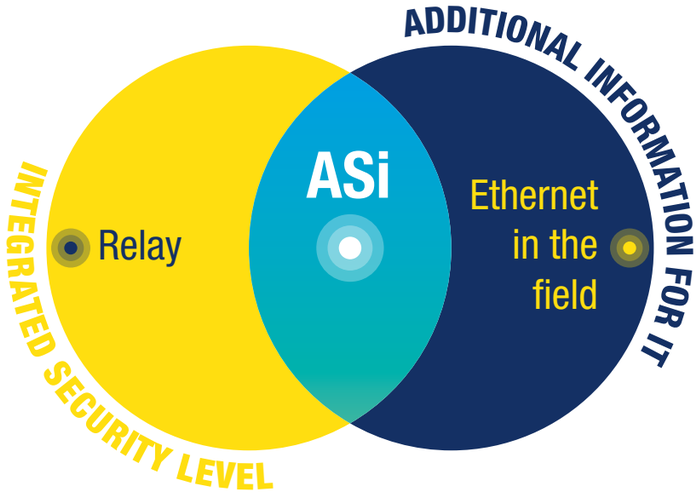
Security: new significance in legislation

It is not without reason that the EU Machinery Regulation 2023/1230, for example, which will replace the Machinery Directive 2006/42/EC on January 20, 2027, stipulates that machines must be designed and constructed in such a way that neither a connected device nor a remote device communicating with the machine can lead to a dangerous situation. This applies to hardware and software, both when the machine is used as intended and in the event of possible manipulation. Even the connection to or communication via remote access devices, such as routers, must not lead to dangerous situations. The Cyber Resilience Act (CRA) of the European Union, which will harmonize the cybersecurity rules for products with digital elements throughout the EU and is also scheduled to apply from 2027, has the same thrust. And the latest revision of the Technical Rules for Operational Safety and Health (TRBS) of the German Federal Institute for Occupational Safety and Health also reflects the fundamental connection between safety and security. Safe automation therefore means considering and combining both aspects of the term "safety".

Safety & security: two approaches to integration ...

In principle, any device in a network with a connection to the IT world via TCP/IP can become a vehicle for attacks on other devices – and thus jeopardize production stability and process security. One possible solution – as was common in the past and is still found to some extent today – would be to implement a safety solution without a link between the external fieldbus and IT world and the data network structure of a machine. Besides the fact that such decoupling no longer enables automated diagnostics of the safety technology, for example, it also goes against current and future trends in automation – i.e. digitalization and the implementation of Industry 4.0. And separate wiring of standard and safety components is no longer state of the art, not least because of the effort involved.

Assuming that innovative machine concepts in the sense of Industry 4.0 and business models based on them are unlikely without additional diagnostic and secondary data, including from the field of safety technology, the use of Ethernet-based safety technology in the field would be an alternative. Standardized and certified communication protocols such as PROFIsafe, FSoE or CIP Safety enable the transmission of safety-related data in automation applications with functional safety. However, each of these network components must have its own Ethernet connection and its own IP address, which must be individually secured regarding cybersecurity. This involves a great deal of work and high risk, especially when open Ethernet ports are freely accessible in the field. To make matters worse, the data collected for Industry 4.0 is often not transported via a separate IT interface, but also via the OT interface, for example, to a cloud. This means that there is no longer a barrier between the OT and IT worlds and the often-associated internet connections.



The communicative break between TCP/IP and field level in the gateway ensures that ASi can provide IT with a high level of available additional information, such as diagnostic data, while at the same time providing the best possible protection against cyberattacks.

... and one simple solution: ASi-5 Safety

No connectors, one cable for standard and safety technology of different generations, best connection from any point in the network – AS-Interface, as the established wiring system for the lowest field level offers the possibility to realize machine safety more easily, cost-effectively, and customized than ever before. And arguably more efficiently than ever before. Because in contrast to a safe Ethernet-based communication, where each component requires its own IP address, ASi-5 Safety offers a much higher I/O density per IP address. Distributed over up to 2 x 200 m cable length, a gateway with ASi-5/ASi-3 safety monitor from Bihl+Wiedemann can easily manage well over 100 safe I/Os under one single IP address in two ASi networks and with I/O modules such as the new BWU4277 with 14 safe inputs and two electronic safe outputs. These, in turn, can be easily created and monitored in the company's configuration software ASIMON360.

The safe signals, if necessary supplemented by standard signals, are collected exclusively via one single cable – the yellow ASi profile cable. This acts as the central nervous system in the OT network of a machine or installation and as a shuttle for safe signals to the ASi-5 Safety Gateway. The integrated safety monitor can be configured as a safety controller, thus making it possible to implement a safety application

as a stand-alone solution. However, since the gateways always have an integrated fieldbus interface such as PROFINET, EtherNet/IP, EtherCAT or POWERLINK, the higher-level control can be provided with extensive diagnostic information about the safety functions. When a gateway with a safe fieldbus protocol such as PROFIsafe, CIP Safety or Safety over EtherCAT (FSoE) is used, not only the diagnostic data but also the secure data itself can be transmitted to a safe controller. The gateway not only serves as a door opener to the world of intelligent ASi wiring technology with its broad portfolio of safety and standard I/O modules for the field, but also helps to reduce the number of Ethernet interfaces and thus significantly lowers the security risk within an installation. To make the additional data useful, all gateways with ASi-5 Safety also have a separate diagnostic interface that is optimized for the IT world. This supports current IT communication standards such as OPC UA, REST API, and, in the future, MQTT. Thanks to the option of performing certificate-based, secure firmware updates in the field, new standards as well as new security requirements can be easily retrofitted and thus fulfilled – even in the field. To ensure high availability and minimal downtime in the event of a replacement, the hardware and safety configuration and the parameter data of the connected devices are stored on an SD card and transferred in full to a new, identical gateway when it is installed.

ASi-5 Safety has security on board and in view

The high level of networking between Industry 4.0 devices and the risk that these will become a vehicle for attacks on other devices means that the security requirements for network nodes are increasing very rapidly. This is where the products from Bihl+Wiedemann deliver an impressive array of features and measures that ensure production stability and process reliability in the secure network.

Even if the ASi gateway with its connection to TCP/IP is the connection between the external fieldbus and IT world and the data network structure of a machine, it cannot become a point of entry or an attack platform for cyberattacks because it physically decouples the TCP/IP level and the field level with ASi and ASi Safety. This communicative break between ASi and TCP/IP isolates the ASi network nodes from the outside, thereby preventing direct TCP/IP access to the field level in the first place.

While the modules and nodes in the ASi network must meet far lower security requirements, as they cannot communicate in TCP/IP networks, the gateway is in principle the only component that is significantly relevant to cybersecurity. To protect ASi gateways, Bihl+Wiedemann carries out extensive tests with a wide range of cybersecurity tools during development and commissioning. For example, the Ethernet fieldbus interface and the Ethernet diagnostic interface of the gateways are subjected to stringent resilience tests using the industry-proven Achilles® Robustness Test software from GE Digital to ensure that they are impervious to cyberattacks.

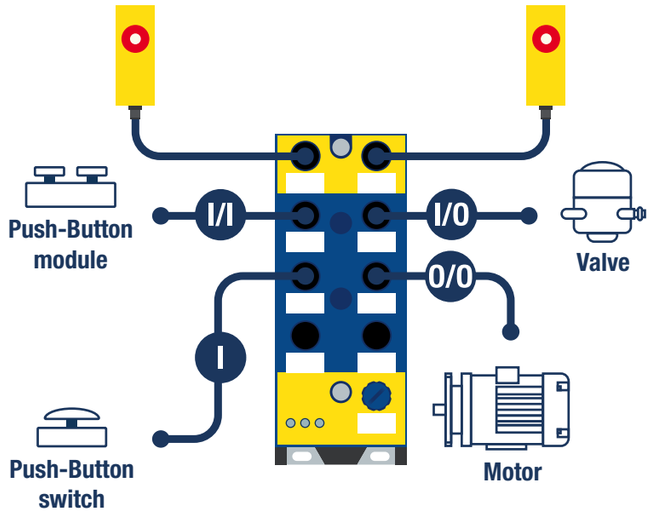
Security: comprehensive and future-proof

Due to the long service life of ASi products, it must also be possible to rectify detected vulnerabilities in the device software long after the devices have been placed in service. In addition, hackers and cybercriminals can pose new threats at any time, which are intended to circumvent existing security measures. True to the motto “The future on board and in view”, Bihl+Wiedemann therefore offers the option of updating safe parts of gateways during ongoing system operation by means of in-system firmware updates and signed security software to be authenticated by the device in advance as part of certificate-based end-to-end encryption. This enables the company’s ASi-5 modules to always be equipped with the latest security standards, making them investment-proof almost indefinitely.

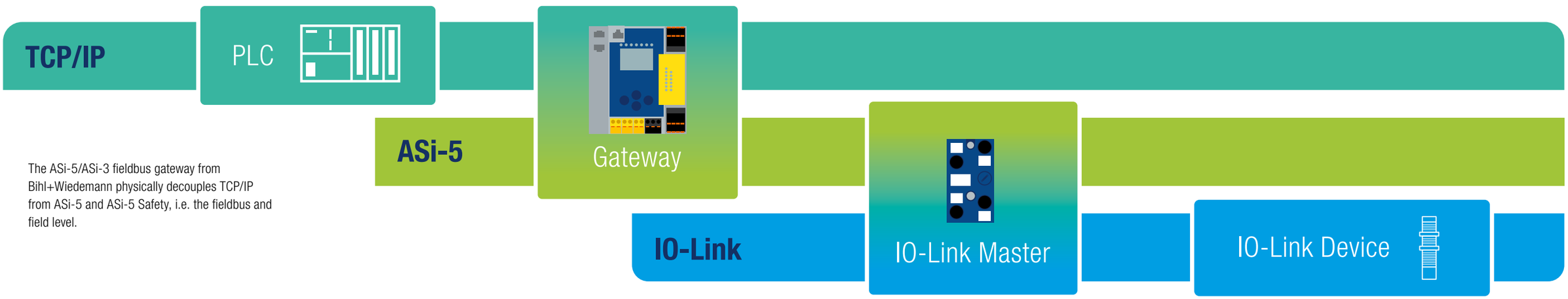
Other reasons why ASi-5 and ASi-5 Safety offer the highest level of cybersecurity include the use of cryptographic and authenticated encryption and verification algorithms such as AES-256 with SHA or RSA in Bihl+Wiedemann’s OPC-UA-capable products, as well as support for customer-specific certificates such as TLS. Secondly, ASi-5 uses Orthogonal Frequency-Division Multiplexing (OFDM) to transmit data. Due to this dynamic frequency allocation, recording the exchanged messages is very complex and only possible if the entire context of the connection setup, including the frequency changes between the ASi master and ASi node, is known.

Safety & security: secure machines need both

The digital transformation in mechanical and plant engineering offers both the opportunity and the necessity to understand and implement machine safety and industrial cybersecurity as equally important aspects of safety technology. At Bihl+Wiedemann, this is consistently reflected in the company’s products. As already seen in standard configurations with ASi-5, where its high performance has opened up numerous areas of application, using many new products since the introduction of the new standard – for example, in drive technology or in the integration of IO-Link devices – ASi-5 Safety also offers many new potentials for even smarter safety technology, taking into account all security aspects required in the future. This is because machine safety 4.0 can only be achieved through this kind of interaction between safety and security, ensuring not only functionality and cyberresilience but also financial security into the future.



Thanks to the combination of safe signals and standard signals in one module, ASi-5 Safety can cover almost all industry-relevant integration and application scenarios.



The ASi-5/ASi-3 fieldbus gateway from Bihl+Wiedemann physically decouples TCP/IP from ASi-5 and ASi-5 Safety, i.e. the fieldbus and field level.

Grinding machines from Schütte with AS-Interface

ONE SYSTEM, TWO CONTROLLERS, FLEXIBILITY AS DESIRED

AS-Interface has a long tradition at Schütte Schleiftechnik GmbH. Starting with the wiring of valves and standard sensors, Schütte now also implements the complete safety technology with ASi and ASi Safety solutions from Bihl+Wiedemann, in addition to connecting the entire decentralized periphery in its 105linear, 330linear and 335linear grinding machine series. And Schütte has long been keeping an eye on the future – keyword Industry 4.0 – with the integration of IO-Link sensors via ASi-5.

Series 335linear grinding machine from Schütte.

© Schütte

Alfred H. Schütte GmbH & Co. KG is a German machine tool manufacturer based in Cologne. The product range includes multi-spindle automatic lathes and 5-axis CNC grinding machines. The subsidiary Schütte Schleiftechnik GmbH, founded in 2007, develops and produces high-precision grinding machines and grinding solutions for the metalworking industry and is one of the leading experts in grinding technology. The product portfolio includes a wide range of machines for various applications such as tool and mold making, medical technology, the automotive industry, and aviation. Schütte's grinding machines are characterized by maximum precision, reliability, and efficiency and are valued worldwide for their quality and performance. Thanks to its many years of experience in the field of CNC grinding technology as well as investments in research and development and the resulting innovations, Schütte can achieve innovative solutions for its customers that are tailored to their specific requirements.

Schütte grinding machines

Schütte Schleiftechnik GmbH currently offers grinding machines from the 105linear, 330linear and 335linear series. While the 105linear, as a compact production machine, is designed more for manufacturing complex tools, such as drills or milling cutters, in large quantities and with high accuracy requirements, the 330 series, in particular the 335linear, are universal grinding machines with five axes, with which all requirements for the production and regrinding of tools of any kind can be realized. They can also be used to produce medical products, such as knee or hip implants.

Both series are available with a wide range of automation options for continuous adaptation and expansion – for example, in tool and workpiece handling for unmanned operation. This allows users to react flexibly to changing production requirements over the entire service life of the machine. Schütte enables the use of two different control systems for its grinding machines: SIEMENS SINUMERIK ONE and NUM Flexium+. While SINUMERIK ONE uses PROFIsafe via PROFINET for communication and is used together with the SIGSpro (Schütte Integrated Grinding Software) operating and programming interface, NUM Flexium+ relies on EtherCAT and works with NUMROTO.

Simple and compact – Schütte chooses AS-Interface

The history of AS-Interface at Schütte goes back to 1998, when ASi components were first used as part of the development of the 300 series – ASi valve terminals and limit switches for pneumatic valves. As Christoph W. Langen, Head of Electrical Design for Machine Tools at Schütte and significantly involved in the introduction, notes, the main reasons for the introduction of AS-Interface at that time were "firstly the simplicity of the technology itself and secondly the compactness of the ASi components, which is still not found in any other fieldbus solution today". Schütte's grinding machines – then as now – are characterized by a large number of movements in the machines. These are not hydraulic movements, but pneumatic ones.

All these movements are controlled via ASi valves, which, together with the connections for the corresponding sensors, are located on extremely compact valve terminals with a very small installation footprint.

© Schütte

Christoph W. Langen, Head of Electronic Design for Machine Tools at Schütte, in front of a 335linear series machine.

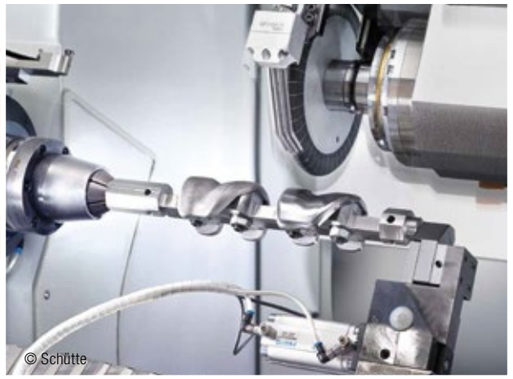
ASi also for safety

Over the 25 years since the introduction of AS-Interface, the complexity of the grinding machines at Schütte has steadily increased. This has become particularly clear when it comes to safety technology, which was still wired into the control cabinet in terms of hardware. Due to the positive experience with ASi in the standard area, Schütte therefore decided in 2013 to also implement all safety functions such as door interlocks with guard locking, contactless safety technology, or E-STOP circuits via ASi Safety at Work from this point onwards. "What convinced us at the time, in addition to the service and excellent support from Bihl+Wiedemann," reveals C. Langen, "was the technology of the company's safety gateways in conjunction with the ASi safety monitor. Simple handling, the most advanced technology. It was a big change

Alfred H. Schütte GmbH & Co. KG is a German machine tool builder with headquarters in Cologne.


© Schütte

Schütte grinding machines can be used to produce complex tools, such as drills or milling cutters, as well as medical products such as knee or hip implants.


© Schütte

for us at first, but in the end we realized that it couldn't be easier than with ASi Safety."

Schütte profits from many ASi advantages

The decision to use ASi and ASi Safety and the fact that a common infrastructure – the yellow ASi profile cable – can be used for safety and standard applications has many advantages for Schütte. One point that quickly convinced Schütte was the simple connection concept of AS-Interface. With ASi, modules can simply be "screwed on" to the yellow profile cable in the machine exactly where they are needed without connectors and pre-assembled cables using piercing technology. According to C. Langen, this simplicity and flexibility are important because the mounting locations on the grinding machines can vary greatly, depending on the tool or workpiece handling and other optional equipment variants or extensions. It is therefore not surprising that Schütte's grinding machines – starting with the connection of valve terminals with integrated inputs and end position sensors, flow monitors, and pressure switches through to door interlocks, door switches, and E-STOP buttons – are now equipped with the complete decentralized periphery via ASi and ASi Safety. The Cologne-based company relies on the Bihl+Wiedemann portfolio for the selection of components, including ASi gateways and I/O modules. In addition to the ASi Safety Gateways, the company mainly uses ASi digital modules in IP67 for collecting the ASi signals in the machine as well as the Active Distributor ASi (BWU3374) and the Active Distributors ASi Safety (BWU3248 and BWU3373), which can be used to easily integrate standard and safety components not having their own ASi interfaces into the AS-Interface network.

The complete connection of the decentralized periphery via AS-Interface provides Schütte with a further advantage. The grinding machines can be built much more efficiently, regardless of the control technology used, because the respective control concept only needs to be implemented in the control cabinet. Schütte builds its machine tools in cycles – in series of 12 machines. The configuration of the respective machine body is determined solely by its future functionality. Which control system is used in the end is irrelevant for the assembly at this point. The connection to one of the two variants of the machine control system is only established in the control cabinet by selecting an appropriate ASi Safety Gateway, which Bihl+Wiedemann offers with interfaces to many different (safe) fieldbuses. In the case of Schütte, ASi-5/ASi-3 PROFIsafe via PROFINET Gateways (BWU3862) are used for machines with SIEMENS SINUMERIK ONE and ASi-5/ASi-3 Safety over EtherCAT Gateways (BWU3583) for machines with NUM Flexium+, which connect the ASi peripherals to the machine control system. "Only the yellow ASi cable leads out of the machine body into the control cabinet," explains C. Langen," and simply by using an appropriate control cabinet, we can turn the machine into a machine with a NUM or Siemens controller."

The complete linking of the peripherals is implemented in the machine bodies of the Schütte grinding machines via AS-Interface.

ASi 4E/4A Modules from Bihl+Wiedemann

And when all is said and done, a solution with AS-Interface is not only unbeatable for Schütte in terms of technology, but also for cost and efficiency reasons. According to C. Langen, the company regularly reviews whether switching to a fieldbus system could make sense. However, it has been clear for many years that the use of PROFINET or EtherCAT components in the periphery would not only be significantly more expensive but would also make production much more complicated, as it would no longer be possible to produce the machine bodies independently of the control system, as described above.

ASi-5 and IO-Link

Schütte is constantly developing its grinding machines – also with a view to the future. In order to make the machines even more efficient and precise and to expand their range of functions, the company will not only rely on a new generation of control units and a new generation of control panels in the future but is also taking a major step towards Industry 4.0 by integrating IO-Link. A large amount of process data is recorded at various points in the machine via IO-Link sensors and made available for advanced diagnostics and predictive maintenance. At Schütte, for example, it is important that the machines are in thermal equilibrium. A constant temperature level must be maintained in the cooling lubricant systems, which are very complex and energy intensive. Possible defects or incorrect settings of a cooler, for example, which were previously undetectable, can be detected, diagnosed and rectified with the help of IO-Link temperature sensors. Fill levels, flows (of cooling lubricants), and pressures (e.g. in air handling) are also detected.

Against this background, it once again becomes clear how advantageous the decision was to connect the entire decentralized periphery in the machine via AS-Interface. This is because hardly any changes need to be made to the existing machine concept for the integration of IO-Link sensors. All that needs to be done is to replace the previous ASi Safety Gateway with an ASi-5/ASi-3 PROFIsafe via PROFINET Gateway or an ASi-5/ASi-3 Safety over EtherCAT Gateway. IO-Link devices can then be easily integrated into the existing ASi network via ASi-5 Modules from Bihl+Wiedemann with four or eight IO-Link master ports (BWU3819 or BWU4386) wherever they are to be used.

Compact, simple, high-quality, flexible in use, economical, and future-proof – attributes that aptly describe both the grinding machines from Schütte and the AS-Interface solutions from Bihl+Wiedemann. It is therefore no great surprise that the collaboration between the two companies has become a success story over the years – and one to be continued.

Linking of the machine body to one of the two controller versions – SIEMENS SINUMERIK ONE (left) or NUM Flexium+ (right) – is accomplished in the control cabinet by selecting a corresponding ASi Safety Gateway.

Active Distributor ASi Safety BWU3373 from Bihl+Wiedemann for integrating safety switches into the ASi network.

To use process data, IO-Link sensors can be easily integrated into existing ASi networks via ASi-5 Modules with integrated IO-Link Masters (above) and ASi-5/ASi-3 Safety Gateways (below) from Bihl+Wiedemann.

AS-INTERFACE | FAIR

Meet us @ SPS 2024

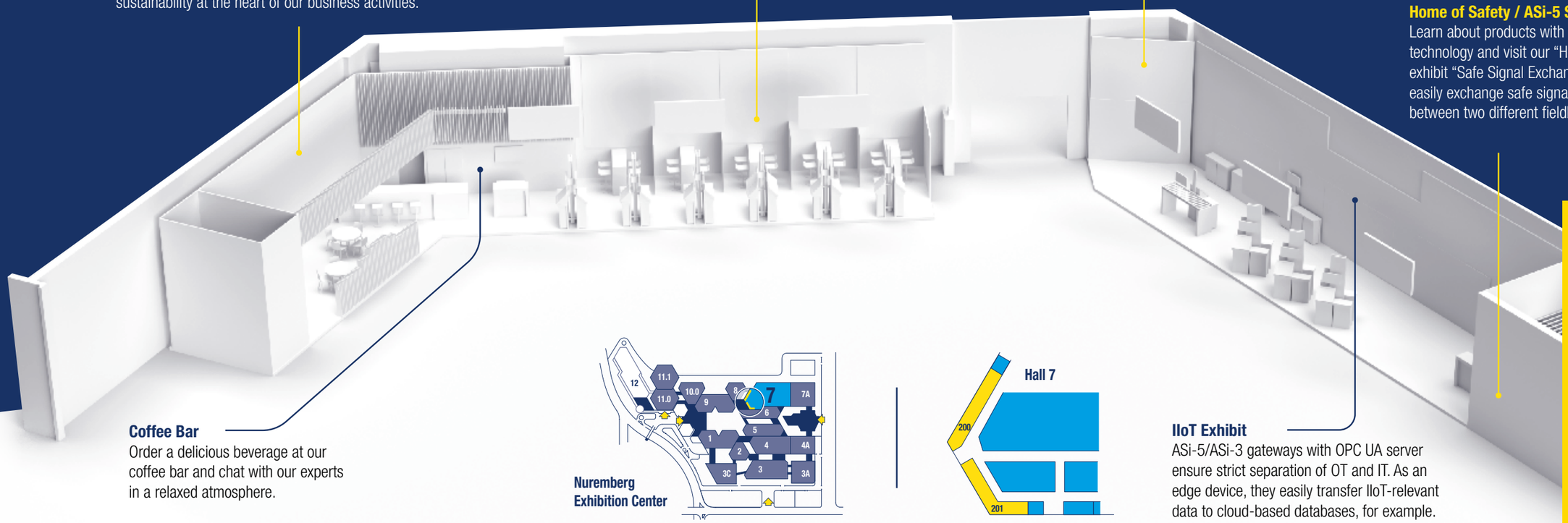
We cordially invite you to visit us at our booth 200 + 201 in Hall 7. See our ASi experts present this year's fair highlights to you in our over 220 m² space.

Less connectors, more connection
Discover AS-Interface as a resource-saving technology that requires almost no connectors and considerably less cables, plastic and copper. And find out how we put sustainability at the heart of our business activities.

Demo Cases
Talk to our experts at our exhibits about your applications and our resource-saving solutions – e.g. self-configuring I/O modules, safety solutions via EtherCAT, the safe relay output module, or a wide range of drive solutions.

ASi-5 Multi Vendor Wall
Implement digitalization at the field level cost-effectively with ASi-5 or benefit from innovative solutions for packaging technology and intralogistics. A new exhibit shows how you can easily and fully integrate products from many manufacturers into ASi-5.

Home of Safety / ASi-5 Safety
Learn about products with the simplest connection technology and visit our "Home of Safety". Our new exhibit "Safe Signal Exchange" shows how you can easily exchange safe signals and standard signals between two different fieldbus systems.



Coffee Bar
Order a delicious beverage at our coffee bar and chat with our experts in a relaxed atmosphere.

Nuremberg Exhibition Center

IIoT Exhibit
ASi-5/ASi-3 gateways with OPC UA server ensure strict separation of OT and IT. As an edge device, they easily transfer IIoT-relevant data to cloud-based databases, for example.

sps
smart production solutions

12.11. - 14.11.2024
Nuremberg | Hall 7
Booth 200 + 201

Visit us at SPS 2024

Request your free ticket

EFFICIENT DIAGNOSTICS AND MAINTENANCE WITH THE BIHL+WIEDEMANN APP

The new Bihl+Wiedemann app for mobile devices is now available in the App Store and Google Play Store. The app has been specially developed for use on smartphones and tablets to provide optimum support for service personnel on site. Whether for the diagnostics, maintenance or servicing of machines, the app offers quick access to all the necessary information and functions relating to the Bihl+Wiedemann solution and product portfolio that technical personnel need. With a simple and intuitive design, it enables immediate access to technical documents, data sheets, and diagnostic data, making day-to-day work considerably easier and faster.

The Bihl+Wiedemann app impresses with its numerous functions, which are designed to save time and increase efficiency:

- ✓ Local device search: technical personnel can quickly search for the relevant devices in the network on site and connect to them easily.
- ✓ Web server access: service personnel can use the app to access the devices' web servers and view diagnostic data and settings directly.
- ✓ Product search via the Bihl+Wiedemann website: if more detailed product information is required, the app allows direct access to the product search function on the Bihl+Wiedemann website.
- ✓ Download function: all necessary documents, e.g. data sheets, can be downloaded directly via the app and made available offline.
- ✓ Easy access: a single login is all you need to use all functions.
- ✓ Saves time: the above-mentioned functions achieve one thing above all: time savings. All relevant information and data are immediately available without having to access different systems.

The Bihl+Wiedemann app was specially designed for use directly on machines and systems in which products from the German company are installed. Service personnel can connect to gateways via the app to carry out diagnostics or make settings. Thanks to easy access, the app enables seamless and fast access to all the necessary information, especially during maintenance or servicing work, greatly simplifying and speeding up work on site, making it much more efficient. Whether the app is used for smaller machines or complex systems makes no difference – it provides support in all application scenarios and therefore offers enormous added value.

ASi-5 AND ASi HIGHLIGHTS FROM BIHL+WIEDEMANN

ASi-5/ASi-3 Address Programming Device – simplicity for all ASi generations

With the modern ASi-5/ASi-3 Address Programming Device BW4925 from Bihl+Wiedemann, ASi devices of all generations can be easily integrated into ASi networks in the field. Optimized for convenient addressing of ASi-3 and ASi-5 modules, the device has an OLED color display, six robust buttons for easy operation, a long-lasting, powerful energy storage unit for fast charging even while in use and a USB-C connection as a PC and charging interface, and is supplied with a comprehensive range of accessories (addressing cables and power supply). The clear display menu with plain text error messages in German and English, the display of operating and input functions, and the use of clear icons ensure a positive user experience. New functions, such as extended setting or diagnostic options or the ability to read out the SPIDs (Software Package IDs) of the connected modules, are regularly made available via free field updates. And in combination with the PC software ASIMON360, the advantages of decentralized addressing can be perfectly combined with those of central planning and parameterization when commissioning an ASi system with the ASi-5/ASi-3 Address Programming Device.

Find out more about the ASi-5/ASi-3 Address Programming Device BW4925 from Bihl+Wiedemann here:

ASi-5/ASi-3 Fieldbus Gateways with ASi-5/ASi-3 Safety Monitor

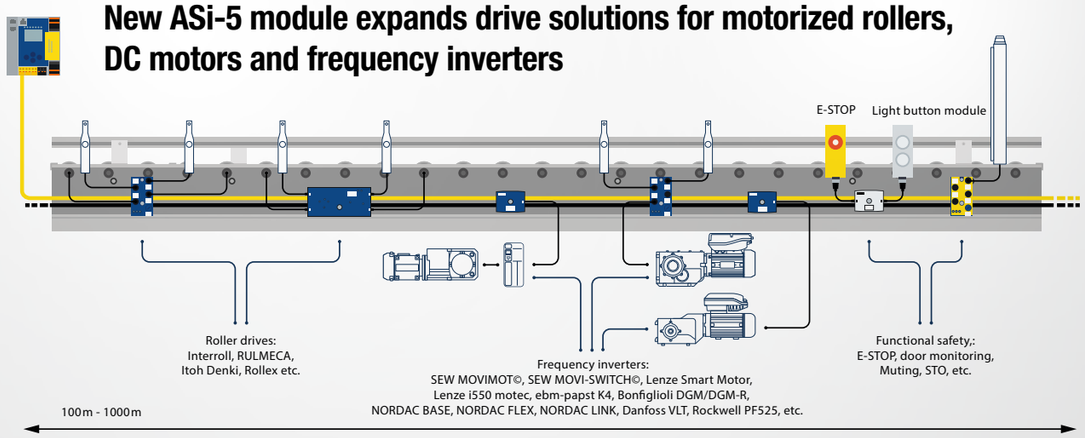
Whenever safe signals and standard signals need to be collected in the field, safe high-end sensors need to be connected, more complex safety applications need to be solved, a large number of safe bits from different nodes need to be transmitted or diagnostic and additional information needs to be used, ASi-5 Safety is the perfect addition to ASi Safety at Work. With the ASi-5/ASi-3 Fieldbus Gateways from Bihl+Wiedemann including integrated ASi-5/ASi-3 Safety Monitor, the new safety generation of AS-Interface, which is compatible with all previous ASi devices and components and runs in parallel on the same infrastructure as ASi-3 Safety, can be easily integrated into existing applications. ASi-5/ASi-3 Gateways with ASi-5/ASi-3 Safety Monitor, Safe Link, OPC UA and web server are already available in various versions for PROFINET and EtherNet/IP, some with a safe fieldbus and local I/Os. ASi-5/ASi-3 Safety Gateways for EtherNet/IP+Modbus TCP, CIP Safety over EtherNet/IP and for Safety over EtherCAT (FSoE) are new additions to the range. For both safe fieldbus solutions, four new variants will be available in the future, each for one or two ASi networks, with or without local I/Os: for CIP Safety these are the article numbers BWU4006, BWU4007, BWU3977 and BWU3978; for FSoE the gateways with the article numbers BWU3963, BWU3962, BWU3980 and BWU3979. Even if the devices are not currently intended for use in ASi-5 Safety applications, users can immediately benefit from the advantages of the new gateways, which have the same price level as comparable models with ASi-3 Safety Monitor. These advantages include functional improvements, especially the modern 16 gigabyte Chip Card, on which a complete project can now be saved, such as the safety and hardware configuration, parameter data of connected devices and user comments from ASIMON360.

Now also available: ASi-5 Safety Input Module BWU4393 in a small IP67 housing and the first ASi-5 Safety Multi I/O Module BWU4277

The range of ASi-5 Safety modules from Bihl+Wiedemann continues to grow. ASi-5 Safety modules in large IP67 and in IP20 housings, each with 12 standard signals and two safe inputs for floating contacts, for OSSDs and for the combination floating contact/OSSD, have been available since the Hannover fair, as has the ASi-5 Safety Muting Module BWU4411, with which various muting solutions up to SIL3/PLe can be realized simply, efficiently, and much more cost-effectively than with comparable Ethernet-based solutions. Bihl+Wiedemann is now expanding its portfolio for the SPS fair in this area with the ASi-5 Safety Input Module BWU4393 for floating contacts with two safe inputs and 4 standard signals, which can be used as input or output signals depending on the configuration, in a compact IP67 housing.

Another new addition to Bihl+Wiedemann's ASi-5 Safety range is BWU4277, the first ASi-5 Safety Multi I/O Module in IP20. The module's 14 inputs can be used either as up to 14 one-channel safe inputs, as up to seven two-channel safe inputs (with adjustable test pulse width), or as up to 14 digital inputs. The two-channel safe inputs can be used for floating contacts, complementary switches or OSSDs. Furthermore, the two safe inputs SI13 and SI14 can optionally be used as EDM inputs as a feedback loop for contactor monitoring. In addition to the (safe) inputs, the module also has two electronic safe outputs (two release circuits) with increased availability. The safe outputs can also be configured here as standard outputs if required. The first ASi-5 Safety Multi I/O Module from Bihl+Wiedemann, which uses just one single ASi-5 address, not only impresses with its extensive features, which optimize the costs for safe inputs and outputs on ASi, but also offers considerable savings potential in the control cabinet with a module width of just 22.5 mm.

New ASi-5 module expands drive solutions for motorized rollers, DC motors and frequency inverters



Bihl+Wiedemann already has an extensive range of motor modules for a variety of drive solutions with ASi-5 and ASi-3, both for the control of motorized rollers and for DC motors and frequency inverters. And the portfolio continues to grow with the ASi-5 Motor Module BWU4974 for controlling the Lenze i550 motec frequency inverter. The active distributor, which is supplied via the yellow ASi profile cable in a 35 mm high IP67 housing suitable for installation in a cable duct, is connected to the drive via a 4-pole, D-coded M12 cable plug. The frequency inverter is controlled via Modbus TCP. As with all ASi-5 and ASi-3 drive solutions for Lenze, BWU4974 is also a plug-and-play solution whose pin assignment has been adapted to the Lenze i550 motec.

IO-Link and the cloud: simple configuration of IO-Link devices and convenient IT interfaces for cloud connection

The connection of IO-Link devices to higher-level systems or a cloud is greatly simplified by the ASi-5 Modules with integrated IO-Link Master from Bihl+Wiedemann. On the one hand, users benefit from the simplicity and cost efficiency of the wiring system AS-Interface, saving valuable resources during planning, installation, and commissioning. On the other hand, the user-friendly software suites ASIMON360 and ASi Control Tools360 make it extremely easy to parameterize a large number of IO-Link devices. And thanks to the integrated IT interfaces such as OPC UA or REST API, the increasingly important additional information – whether from a single or several hundred IO-Link devices or ASi nodes – is available in uncomplicated, bundled form and without burdening the control system under just one node – the gateway. With this solution, Bihl+Wiedemann offers flexible and future-proof connection of IO-Link devices. This significantly simplifies the seamless exchange of information between the IO-Link device level and higher-level systems – a key factor for modern automation and networking in Industry 4.0 applications.

ASi-5 counter modules: more functions and an expanded product range

Bihl+Wiedemann's product range of ASi-5 counter modules now also includes the ASi-5 Counter Module BWU4996, which, as an active distributor, is perfectly suited for installation in cable ducts thanks to its flat design (35 mm deep), in addition to various variants with protection rating IP20 and IP67, each with four digital counter inputs that can be individually configured and parameterized. The module is equipped with two digital counter inputs that can be individually configured and parameterized as two two-channel or two one-channel inputs, making it ideal for implementing small applications even more flexibly and efficiently. All ASi-5 counter modules in the range work with counter frequencies up to a maximum of 250 kHz while enabling the connection of pulse counters and encoders (24 V). In addition to the flexibility in using the modules thanks to the typical ASi individual parameterization and drastically reduced wiring effort in the field, additional functions ensure that many different applications can be realized cost-effectively with the ASi-5 counter modules. For example, the user can now choose between a 32-bit value range and fast transmission of two or four independent 16-bit counter values in just 1.27 ms. And in addition to various counter functions, frequency and period duration measurements with and without filtering are now also possible, enabling simple piece goods counting, positioning tasks or speed measurements, to name just a few.

IMPRINT

Publisher
Bihl+Wiedemann GmbH
Flosswoerthstrasse 41
D-68199 Mannheim
Phone: +49 (621) 339960
Fax: +49 (621) 3392239
info@bihl-wiedemann.de
www.bihl-wiedemann.de

Created by
MILANO medien GmbH
Hanauer Landstraße 196A
D-60314 Frankfurt am Main
Phone: +49 (69) 48000540
Fax: +49 (69) 48000549
info@milanomedien.com
www.milanomedien.com

Edited by
Dirk Heyden,
Thomas Rönitzsch

Bihl + Wiedemann

LESS CONNECTORS
MORE CONNECTION
USING AS-INTERFACE

MORE-CONNECTION.COM

sps
smart production solutions

12.11.2024 - 14.11.2024
Messe Nuremberg
Hall 7, booth 200 + 201