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AS-INTERFACE MASTER NEWS

THE BIHL+WIEDEMANN MAGAZINE

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SAFETY

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INDUSTRIAL INTERNET OF THINGS

FAST AND SAFE INTO THE IIOT WITH ASi-5

Bihl + Wiedemann

INDUSTRIAL INTERNET OF THINGS

FAST AND SAFE INTO THE IIOT WITH ASi-5

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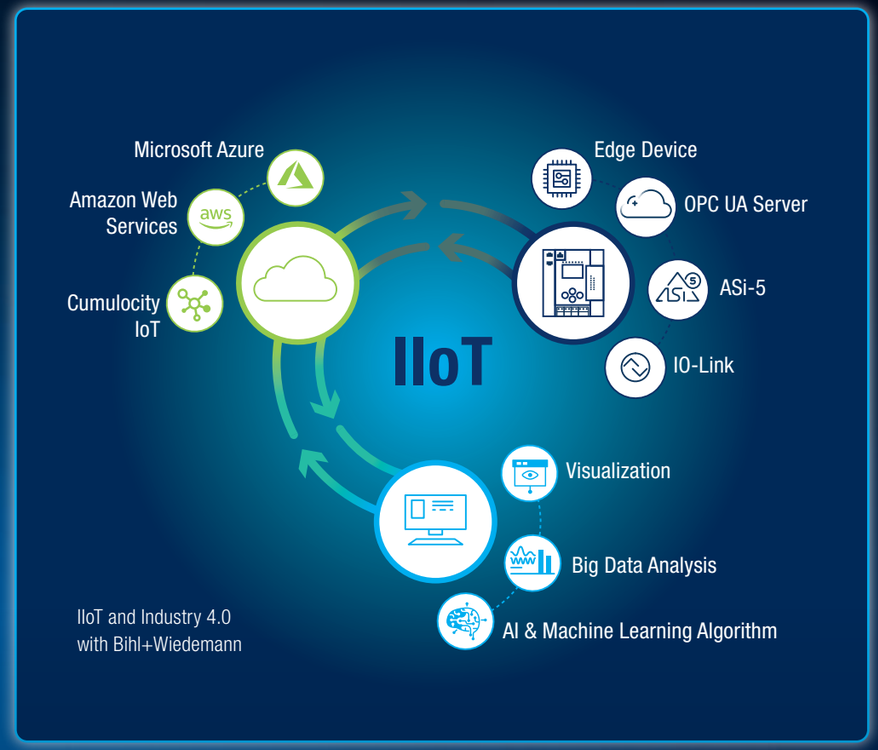
For a long time IIoT solutions used to be a distant vision for many companies. In the meantime, however, there are more and more concrete use cases in the sense of Industry 4.0. For a successful implementation, Bihl+Wiedemann offers not only a high-performance data shuttle between field level and OT and IT with their ASi-5 but also their ASi-5/ASi-3 fieldbus gateways with OPC UA interface ensure future-proof connectivity with IT systems.

As early as the SPS fair in 2017, Bihl+Wiedemann introduced the first ASi gateways with integrated OPC UA interface, already anticipating today's importance of a direct communication channel for vertical transmission of machine, process and diagnostic data. Because OPC UA makes it possible to collect, aggregate and make available the data for use by IT specialists for any kind of data analysis. Consequently, all of today's ASi-5/ASi-3 gateways from Bihl+Wiedemann are equipped with an OPC UA server to enable fieldbus-independent direct data transmission between field devices and IT systems via AS-Interface. This allows the data to be used at various locations – in a visualization tool, a local server or in the cloud. No matter how the demands for implementing IIoT solutions evolve in the future, the gateways can also be expanded with additional interfaces such as REST API and MQTT on short notice.



IIoT and Industry 4.0 with Bihl+Wiedemann

Different meanings of data for OT and IT

Modern manufacturing generates huge quantities of machine, process and diagnostic data, especially machines and systems where smart devices with IO-Link or ASi-5 interfaces and high data rates are employed. While these data can be transmitted fast and conveniently using the ASi-5 data shuttle, very few of them are directly useful for OT – controlling processes with a PLC – and thereby for transmission via a fieldbus.

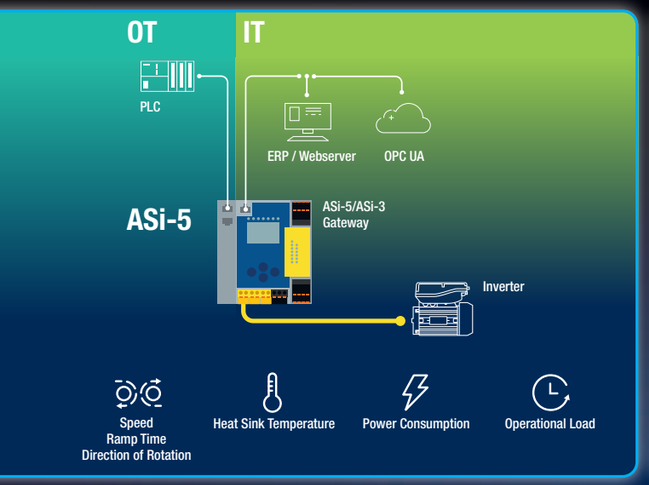
The majority of the acquired machine data are needed, in fact, at a different location, namely in database systems of the IT, where these data are stored and analyzed – with these data in turn being accessed by applications such as preventive maintenance or for centralized ERP inventory management. For this reason – as well as out of consideration for data load and data speed in the fieldbus network – it makes complete sense to send OT and IT data in IIoT applications in parallel network structures. The ASi-5/ASi-3 gateways from Bihl+Wiedemann are ready for this in their standard configuration: they have always provided two physically independent network interfaces – fieldbus and OPC UA – for separate transmission of data to OT and IT. Concerning the IT data, the gateway offers two options for sending via OPC UA: either an edge server prepares the data and sends it for example to a cloud like Microsoft Azure, Amazon Web Services (AWS) or Cumulocity IoT, or the cloud solution gets the data directly from the OPC UA server contained in the gateway. In both cases, the data are then available as valuable IT data in the cloud.

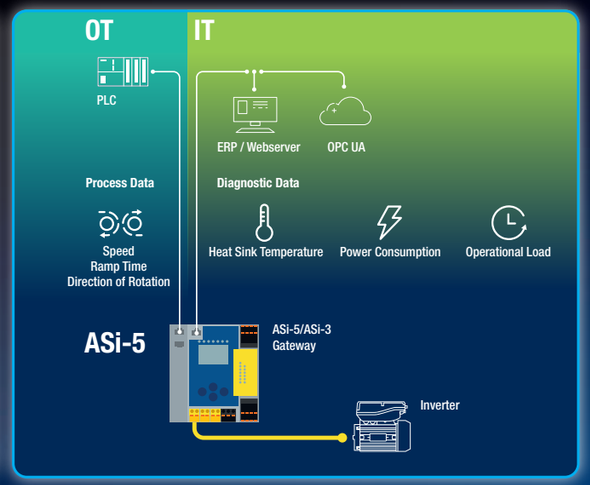
ASi-5/ASi-3 gateways provide their own diagnostic data

However, the ASi-5/ASi-3 fieldbus gateways from Bihl+Wiedemann are not just clever data switches for separating the data and distributing it over two networks – as smart components on the field level they are also able to independently generate their own diagnostic information over an ASi network for meaningfully supplementing the device data coming from the field. How many and which nodes are connected, how much current and voltage is present in the ASi network, whether the power supply is functioning properly, what errors have been reported – all questions that are important for both the OT and IT.

Drive technology example: OT and IT data on separate paths

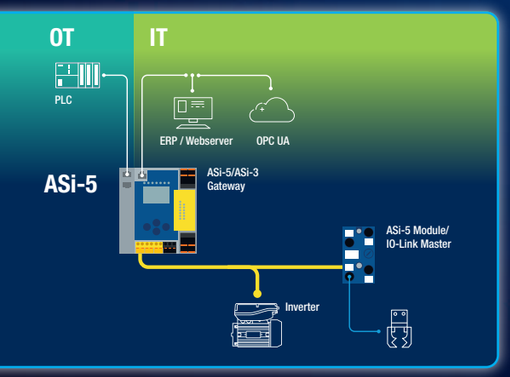
One illustrative example of how ASi-5/ASi-3 gateways can function as smart data





Using the ASi-5/ASi-3 gateway as an edge device, data from smart factory devices such as decentralized inverters are made available for further use by the OT and IT as required.

switches can be found in the drive systems for material handling. Here smart factory devices such as decentralized inverters or intelligent sensors with IO-Link make sense for both IT database systems and process control (OT). The latter is responsible for the motion of drives. This means it requires process data for the device such as the variable speed, the ramp time and the direction of rotation. At the same time the IT systems can collect and evaluate diagnostic information such as heat sink temperature, power consumption or the operational load on the drive – and then for example use big data analytics, machine learning or AI algorithms to generate real added value. By monitoring load and current draw for example you can predict when a bearing of a drive will need to be replaced before it's too late. As one can surmise from this example, the smart frequency inverter provides much more diagnostic data for IT systems than actual OT process data for the machine controller. To relieve the load on the OT with a fieldbus such as PROFINET and the real-time-critical data, the gateways employ a separate safe and established IT interface for sending the IT data using the integrated OPC UA server for data transport.



Smart devices with ASi-5 or IO-Link provide data which are of great importance for OT as well as IT.

Maximum data security ensured

Likewise, this example shows that the IT data no longer move in closed network structures, but rather in open ones which are accessible over the internet and externally. This exposes Industry 4.0 devices to potential unauthorized data access and use as an attack platform – a risk which only increases with the degree of smart device networking. Therefore, Bihl+Wiedemann uses encrypted communication and authentication for its devices, which are designed for the highest level of data security while being easy to integrate into existing IT security concepts. Specifically, this means:

- ASi-5/ASi-3 gateways from Bihl+Wiedemann can be updated to ensure their continued suitability for future security requirements.
- The update servers use only signed firmware. The signature must be verified in addition by the devices.
- Each TCP/IP capable device receives an individual certificate for SSL communication in the production process.
- Customer-specific certificates for TLS (Transport Layer Security) are supported.
- ASi as a fieldbus on the first automation level has no direct communicative transition between TCP/IP and the field devices. This separation provides additional security.
- OPC UA uses established encryption procedures such as AES-256 with SHA up to 512 or RSA.
- Software updates and OPC UA can also be blocked locally on the device – for reliable and absolute protection.

REST API and MQTT: additional options for sensor-cloud data exchange

OPC UA places the focus on industrial communication, with its technology-immanent, high security standards providing great confidence for systems builders. Nevertheless, it is already evident that OPC UA will not remain the only interface format for the data exchange of edge devices like the ASi-5/ASi-3 gateways with higher levels. In order to continue to provide reliable data from the lowest field level to remote maintenance servers, visualization systems or cloud-based applications looking ahead to the future, the focus will be on at least two additional communication interfaces: REST API (Representational State Transfer – Application Programming Interface) and MQTT (Message Queuing Telemetry Transport). The REST API interface – probably familiar to every internet programmer – is often used for communication between servers or with programs and apps. Due to its HTTP-based client-server architecture it is also however useful for IT environments where machine data need to be used for web applications. The data can be used both live – for example, as a display on a web page – or can be included into a database. With MQTT, unlike OPC UA, the devices are not organized hierarchically as senders and receivers, but can all communicate with each other asynchronously using publish/subscribe messaging, also known as pub/sub. Messages are sent by a publisher via a message broker and can be received by one or more subscribers. Such bidirectional communication does not exist among OPC UA servers. However, since this is often desirable, MQTT is integrated into OPC UA – as OPC UA pub/sub or OPC UA FX. At the same time, MQTT forms the communicative bridge between REST API and OPC UA. But no matter what the exact design of the interfaces will be: the current versions of the ASi-5/ASi-3 gateways from Bihl+Wiedemann are already well-prepared for this because both REST API and MQTT can be implemented in the devices on short notice as additional interfaces and supplements to OPC UA if the necessity arises.

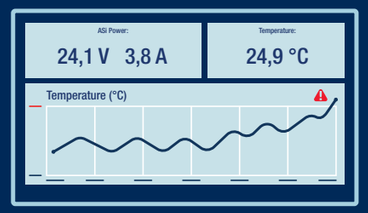
IIoT and Industry 4.0 with Bihl+Wiedemann

Industry 4.0, Smart Factory and IIoT are becoming increasingly prominent in industry. Data is the most important raw material that must be collected, evaluated and transferred to OT and IT environments in an intelligent and efficient manner. The ASi-5/ASi-3 fieldbus gateways from Bihl+Wiedemann play an important role here, since in their dual function as interface and network node at the lowest field level they are the first line of access to the data from sensors and actuators and offer direct and future-proof communication channels for data from the sensor to the cloud, both today and in the future.

AS-Interface as collector and concentrator of IT data

ASi as a standardized fieldbus for the first automation level scores with its clever wiring concept. The network devices, including sensors and actuators, can be connected anywhere desired on the yellow profile cable using piercing technology. This simplified wiring effort also benefits applications not involving OT data but rather purely the collection and aggregating of IT data. Examples here would include the monitoring and documenting of temperature, relative humidity and other measurands in large production, warehousing and building complexes.

Here AS-Interface from Bihl+Wiedemann provides industry-proven components as well as an open system concept. With their interfaces, the ASi fieldbus gateways enable linking to a wide range of higher level IT systems where the data can be collected, evaluated and documented. At the same time ASi also offers openness to the field level, since field devices from different manufacturers are easy to connect and use with each other. No special solutions or modifications are required, nor is there any need for proprietary, often highly costly global solutions from corresponding vendors with all the technological implications.



The monitoring of temperature values can provide indications of increasing component wear for example as part of predictive maintenance.

APPLICATION:
RIELEC: AUTOMATED PACKAGE SORTING WITH ASi-5

picture: RIELEC

The RIELEC Fit Sorter package sorter can sort up to 1800 cartons per hour.

Sorting 1800 cartons per hour to the correct vehicle for further transport by parcel services requires either a considerable number of people, or a flexible and cost-effective intralogistics solution like the RIELEC Fit Sorter package sorter, which relies on ASi-5 and ASi Safety from Bihl+Wiedemann.

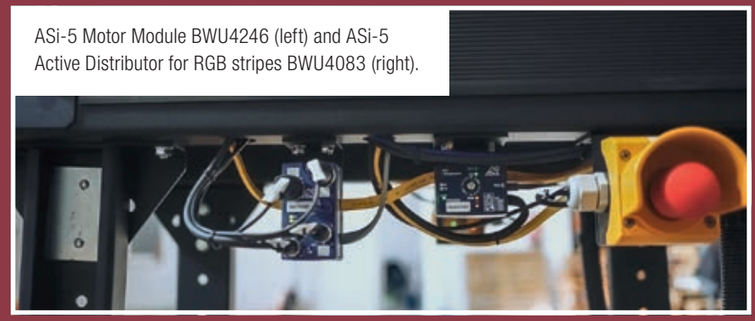
RIELEC headquarters in Valencia, Spain.

With headquarters in Valencia, Spain, RIELEC represents a high degree of experience in industrial automation and intralogistics robotics. The internationally operating company has since 2015 developed and implemented intelligent solutions for intralogistics, RFID systems for the logistics sector, conveying systems and custom-tailored software solutions. RIELEC consists of three business units: the brand RIELEC Logistics Systems, which deals with consulting, conception and production, installation and maintenance of material handling systems and industrial installations; CLUSTAG, the division for RFID solutions; and CODOPI, which is dedicated to the manufacturing of components for industry and design elements made of metal. When implementing projects, the focus of RIELEC is always the optimization of work processes with the goal of improving the efficiency of the logistic sequences of its customers. For this purpose, the company not only relies on the latest state of the art, but also on the integration of innovative technologies such as ASi-5.

AS-Interface at RIELEC

AS-Interface has long been recognized as an internationally standardized wiring system in intralogistics due to its high user comfort – simple installation, high functionality and flexibility as well as low cost. In this respect, it is not surprising that RIELEC implemented the first applications with ASi-3 motor modules from Bihl+Wiedemann as early as 2018 and now uses products from the German company in many of its machines. ASi-5 has been in use at RIELEC since 2020, as this new AS-Interface generation is a perfect fit to the requirements of RIELEC with respect to flexible automation concepts – keyword Intralogistics 4.0. The ASi-5 technology from Bihl+Wiedemann enables not only configurable and expandable designs of the machine in the engineering phase, but also more flexible and therefore faster production processes, since AS-Interface allows both safe and standard signals to be simply integrated into the machines just where they are needed.

And because the efficient nature of the ASi-5 installation concept means that



ASi-5 Motor Module BWU4246 (left) and ASi-5 Active Distributor for RGB stripes BWU4083 (right).

Ejection of a package using pneumatic actuators.

machines can be assembled and, when necessary, disassembled in a much shorter time with less effort and material, no additional connectors are required and programming and commissioning with AS-Interface is simpler than with other systems, thereby RIELEC is saving both installation and commissioning costs.

RIELEC Fit Sorter package sorter

The RIELEC Fit Sorter package sorter is an application that can automatically transport many packages from the entry point to various stations in a short period of time. For example, it can be used in a logistics center to load many delivery vehicles from parcel delivery companies having different delivery districts. Packages marked with an SKU barcode (SKU = Stock Keeping Unit, article number) are placed one after the other on a conveyor belt driven by motorized rollers, scanned and provided with a tracking code. They are then transported via a second conveyor belt to a defined discharge point, where they are pushed by pneumatic actuators from the conveyor belt and travel via roller conveyor to their final destination. For the Fit Sorter, RIELEC not only uses its CLUSTAG RFID solution, but also employs ASi-5 and ASi Safety solutions from Bihl+Wiedemann at many points in the application.

Conveyor belt with LED stripes and SKU barcode scanner (front) and CLUSTAG RFID technology.

The active distributor ASi Safety (BWU3599) from Bihl+Wiedemann permits implementation of safety applications up to SIL3/PLe.

The RIELEC Fit Sorter can sort more than 1800 packages per hour. An operator first scans the SKU barcode of an article. The system then assigns it a tracking code, which it uses to travel throughout the installation to its destination. The package is then placed on a conveyor belt. ASi-5 motor modules for two 24 V motorized rollers of type BWU4246 control the motorized rollers driving this conveyor belt and thereby regulate speed and acceleration in the respective sections. Via an ASi-5/ASi-3 PROFINET Gateway model BWU3862, which monitors the ASi system, it is also possible to display the present voltage range. And to make the status of the package also visually distinguishable in different colors, LED strips are embedded at the edge of the conveyor line. These are controlled by the ASi-5 active distributors for RGB strips (BWU4083) from Bihl+Wiedemann.

In addition to tracking via the SKU barcode, an RFID control reading is performed using RIELEC's CLUSTAG RFID technology. This technology makes it possible, for example, to identify and correct incorrectly coded labels. This eliminates error sources and makes the data available to the system in real time, which in turn significantly increases the productivity of the application. After the RFID control reading, the respective package is transferred to a second conveyor belt having a large number of ejection points. Optical sensors and pneumatic actuators are installed at each of these points for ejection onto a roller conveyor.

All these sensors and actuators along the conveyor lines are connected to ASi-5 self-configuring I/O modules BWU4231 from Bihl+Wiedemann for 16 digital I/O signals. This allows all data required by the RIELEC Fit Sorter along the conveyor line to be collected and the article to be ejected at the appropriate point. Once the package has been ejected, it is transported via a roller conveyor to its final destination.

In the RIELEC Fit Sorter, however, AS-Interface is not only used for the conveyor technology and pneumatics, but also for safety technology. In order to equip operator stations with the necessary means for safe and continuous operation, ASi Safety active distributors model BWU3599 are used for the required safe signals, enabling implementation of safety applications up to SIL3/PLe. The main element of the AS-Interface technology in the RIELEC Fit Sorter is the ASi-5/ASi-3 PROFINET Gateway BWU3862 with integrated safety monitor from Bihl+Wiedemann, which collects the process and diagnostic information of the safe and standard nodes in the network and sends all control-relevant data for processing to the PLC. If necessary, it can also take over some of the tasks of the control itself, thereby unburdening the PLC. In addition, the gateway can also transfer data to a cloud, SCADA or ERP system via integrated OPC UA server to make it available for Industry 4.0 applications, for example.

ASi-5/ASi-3 PROFINET Gateway BWU3862 with integrated safety monitor (left) and ASi-5 self-configuring I/O modules BWU3884 in IP20 (right) from Bihl+Wiedemann.

The Fit Sorter package sorter from RIELEC is an example of how innovative technologies such as CLUSTAG-RFID and ASi-5 can help to make intralogistics processes more flexible and make them as efficient as possible for customers.

Using the ASi-5 self-configuring I/O modules BWU4231 from Bihl+Wiedemann, optical sensors and pneumatic actuators are integrated for the ejection of packages.

ASi-5 Safety Muting Module BWU4411
from Bihl+Wiedemann

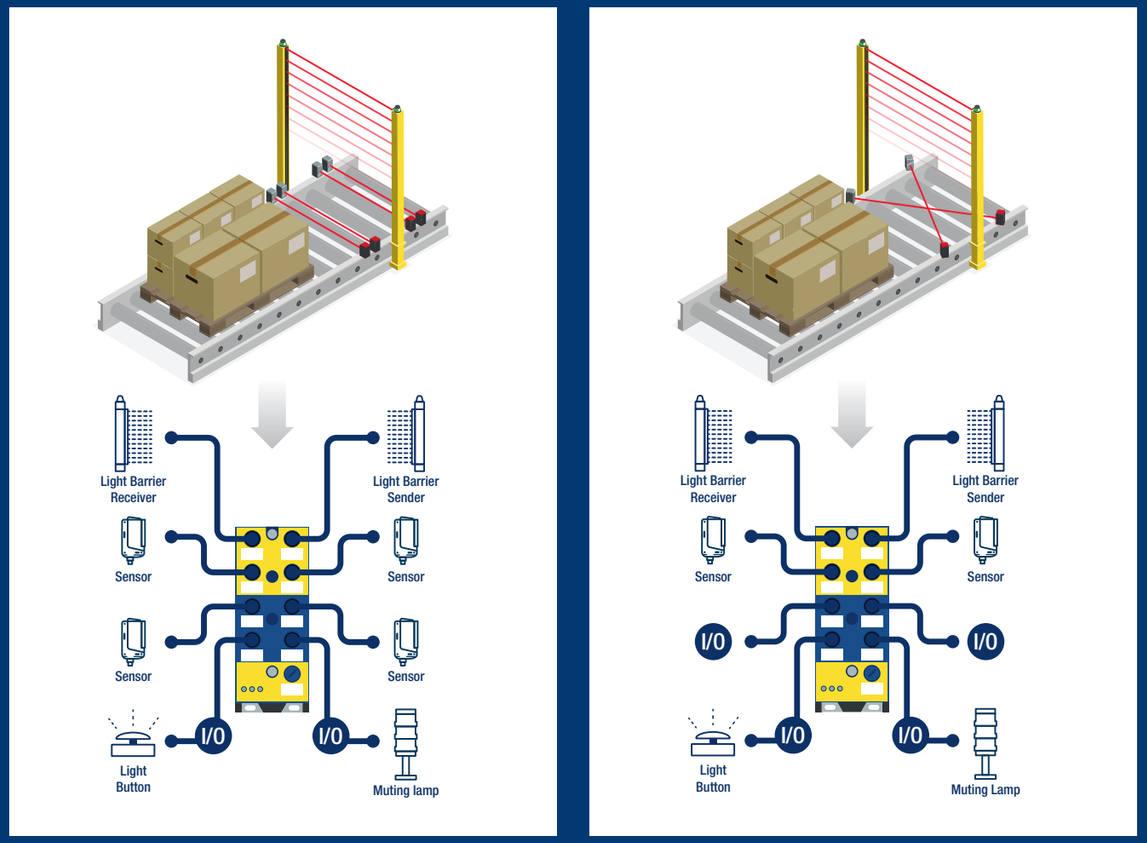
MUTING: MORE EFFICIENT THROUGH THE “HOLE IN THE GUARD FENCE” WITH ASI-5 SAFETY

Material yes, people no – this distinction is what muting is all about. This safety function enables safe, automated material transport into and out of hazardous areas in stationary conveyor systems. ASi-5 Safety and the new Muting Module BWU4411 from Bihl+Wiedemann give new performance and cost advantages for this safe path through the “hole in the guard fence”.

"Gatekeeper for the hole in the guard fence": with the ASi-5 Safety Muting Module BWU4411 from Bihl+Wiedemann, muting applications with and therefore machine safety up to SIL3 and PLe can be realized. Connected via the yellow ASi profile cable, it represents the single, central collection point for all muting components and their I/O signals. The module requires only a single ASi-5 address in the safety network for this purpose – which significantly reduces hardware and addressing effort. It features an integrated power supply connection for a contactless protective device and can be easily configured via the Bihl+Wiedemann ASIMON360 safety software. In operation, the BWU4411 provides the user with important diagnostic data while offering connectivity into the IIoT via the company's ASi-5/ASi-3 fieldbus gateways, if required. Purchasing departments are happy as well, since the cost of the ASi-5 Safety Muting Module is only a third that of comparable solutions of this type on the market.

Safety for material pass-throughs in the guard fence

Muting – a term that describes the controlled suppression of the protective function of a contactless protective device, e.g. a safety light curtain or a light barrier – is used in a variety of intralogistic tasks. The function makes it possible to perform automated material transport in machines located inside a safety fence or other mechanically separating protective device. Muting is used especially in highly



The ASi-5 Safety Muting Module from Bihl+Wiedemann supports all industry standard muting signals. This allows both sequential muting and cross muting up to SIL3/PLe.

automated machines and systems – e.g. in robot cells in the automotive industry, turntable and lifting table stations in stationary material handling, transfer vehicles in the front zone of a high-bay warehouse, strapping and film wrapping machines, or multi-side labelers for pallets. Despite all the automation, people can still be present in areas that are not actually accessible and can therefore be exposed to hazards from machine movements – operators, service technicians, maintenance personnel, but also unauthorized persons. Therefore, a safe distinction between man and material is essential at the 'open' access points to the hazardous areas.

Muting solution from Bihl+Wiedemann uses potentials

This process engineering challenge is not new – and yet, many muting solutions lack technical and economic efficiency. Alternative solutions to ASi Safety usually have to be laboriously wired using expensive, preassembled Ethernet cables. Bihl+Wiedemann's implementation stands out here not only because of the module costs, but also because of the piercing technology used with AS-Interface. This minimizes costs and errors during installation. The simple, intuitive configuration via the ASIMON360 safety software is also a key feature – an option that not every muting solution has by a long shot. For IIoT-compliant integration, it is also of little help if, in the case of Ethernet-based solutions, numerous IP addresses are required for multiple muting areas in a single application due to the large number of components, or if no direct data transfer to IT systems is possible – a function that all ASi-5/ASi-3 fieldbus gateways from Bihl+Wiedemann support. And finally, previous muting solutions are often real cost factors for many users due to their scope or technical structure. Although muting has been possible in various ways for a long time, it is only now becoming really smart and cost-effective with ASi-5 Safety.

The smart solution: the new ASi-5 Safety Muting Module BWU4411

In recent months, Bihl+Wiedemann has consistently expanded its portfolio of solutions for ASi-5 Safety, including certified input modules designed to meet different requirements (see info box). In this context, the ASi-5 Safety Muting Module BWU4411 with protection rating IP67 was also developed – including 1-channel and 2-channel safe muting signals and, depending on the configuration, up to eight standard inputs or outputs. It supports all industry-standard muting types – cross muting, in which the two muting sensors must respond simultaneously to trigger the muting cycle, as well as the various forms of four-beam sequential muting. Concerning the latter, several sensors are connected in series and must respond in a specific sequence to activate muting. In parallel, the new muting module also collects the signals of all connected standard sensors and integrates components such as reset buttons or muting lamps into the application. The muting function can be created automatically in the ASIMON360 safety software from Bihl+Wiedemann – alternatively, the signals can also be transmitted to a safety control via a safe fieldbus protocol, such as PROFIsafe, and used there for bridging. With ASi-5 Safety, muting can be efficiently implemented in a single piece of hardware – especially since AS-Interface as a wiring technology makes the connection of the components via piercing technology extremely simple, safe and economical. And the module itself is also a winner in terms of cost: it is more than 60% less expensive than comparable Ethernet-based solutions from other suppliers.

Maximum convenience with AS-Interface

Solutions using AS-Interface and ASi Safety – ASi-5 and ASi-5 Safety included – represent not only economic efficiency, but also simplicity and flexibility. Since suitable gateways are available for many common fieldbuses, once a solution has been created, it can be easily and cost-effectively adapted to other requirements – such as when a new control is required in the project. In such cases only the gateway needs to be replaced. With AS-Interface, several identical muting applications in an installation can be transferred without any problems using copy and paste and then configured under a single IP address, addressed by the control and analyzed in the event of a problem. If a module should ever fail, the complete configuration is automatically transferred to a replacement module, which reduces downtimes to a minimum. Additional safety devices can also be integrated on the same ASi line, as well as complex standard modules such as IO-Link masters, all while retaining the familiar advantages of ASi and ASi Safety. AS-Interface thus offers all the prerequisites for finding the optimum solution for every application.

With the BWU4411 muting module from Bihl+Wiedemann, muting applications can now be implemented much more efficiently, both technically and, above all, economically. The company based in Germany also offers, together with the already existing I/O, IO-Link, motor and counter modules, the new ASi-5 safety input modules and the ASi-5/ASi-3 gateways with OPC UA server, future-proof solutions for stationary material flow and material handling from a single source.

ASi-5 Safety input modules: first series with a dozen models

A total of 12 ASi-5 safety input module variants can cover almost all industry-relevant integration and application scenarios in the future thanks to the combining of safe signals and standard signals in one module.

In addition to the currently available ASi-5 safety input modules in IP67, each with 12 standard signals as well as two safe inputs for floating contacts, for OSSDs or for the combination floating contact/OSSD, Bihl+Wiedemann will introduce the new control cabinet modules in IP20 for DIN rail mounting at SPS 2023, which are comparable to the IP67 types in their range of functions. Corresponding solutions in the form of PCB modules for space-saving installation, for example in a machine operating panel, and – somewhat more compact than the field modules already available – with four standard signals in IP67 are also in development, as are additional ASi-5 safety modules.

Interview with André Hartmann, Head of Sales Germany at Bihl+Wiedemann

ASi-5/ASi-3 Gateways: Edge devices for smart and safe automation

André Hartmann,
Head of Sales Germany at Bihl+Wiedemann

The range of ASi-5/ASi-3 gateways that Bihl+Wiedemann has introduced in recent years leaves hardly any automation wish unfulfilled due to its numerous modular variants. The functionality is further increased by gateways with integrated ASi-5/ASi-3 safety monitor, enabling transmission and evaluation of safety-relevant data and of safe switching signals up to PLe. In this interview, André Hartmann, Head of Sales Germany at Bihl+Wiedemann, explains how the company's current gateway generation meets both automation needs up to the cloud as well as user requirements at the edge level in equal measure.

ASi MASTER NEWS: With the possibility of collecting safe signals and standard signals in the field at low cost using the AS-Interface wiring technology, material handling and material flow systems, packaging machine construction or process technology seem like obvious target industries. Were their requirements also the top priority in the development of the new ASi-5/ASi-3 gateways?

André Hartmann: Yes and no. Yes, because our development activities are very strongly customer-oriented. As a result, user and industry requirements are naturally always reflected in our products – in other words, including those from material handling or packaging technology. But also no because in conjunction with ASi-5, it is precisely customers from completely different industries who are placing higher demands on the automation potential of our devices in a wide variety of areas, especially in connection with IIoT. Our current ASi portfolio clearly shows our commitment to versatility. Our ASi gateways, of which there is at least one variant with ASi-5 and OPC UA for almost every fieldbus, form the optimal IIoT interface into the field. There we have a wide range of safe and standard devices available for all kinds of applications – from the integration of IO-Link devices to drive control and complex safety applications.

ASi MASTER NEWS: And everywhere we're hearing increasing talk about connecting ASi-5 solutions in particular to the IIoT?

André Hartmann: Yes, the trend is unmistakable. Users are increasingly interested in gathering diagnostic information from drives or from IO-Link devices in the field and using them directly in applications within corporate IT or even in the cloud. IIoT interfaces such as OPC UA, but also other standards such as REST API and MQTT, can send this data bypassing the PLC. Now you're not impairing the performance of fieldbuses and automation systems due to an unnecessary communication load. At the same time, digital services can use this data directly, for example to monitor the operating behavior of conveyor drives or machine axes. This means our gateways are prepared to support not only OPC UA, but in the future REST API and MQTT if required, which provides multiple paths into the IIoT.

ASi MASTER NEWS: What other advantages do customers derive from your new gateway generation?

André Hartmann: For many, an important advantage is the fact that safe signals and standard signals can be collected and evaluated simultaneously in the ASi-5 circuits. The gateways with integrated ASi-5/ASi-3 Safety Monitor make machine safety easier, more cost-effective and more tailored than ever before. Power supply and communication are both on a single, yellow profile cable. Connection using our piercing technology is simple and makes polarity reversal impossible. No more plugs, pre-assembled cables, special connection technology, or special switches are needed. It's also quick and cost-effective to implement specific functions and applications. One example would be our new ASi-5 Safety Muting Module BWU4411 (p.10 ff., editor's note). It's simple and intuitive to config-

ure, the configuration is automatically loaded and restored from the gateway in the event of replacement, it requires only a single ASi-5 node number for complete functionality, and it costs only about one-third of the solutions currently available on the market.

ASi MASTER NEWS: Conveyor systems, packaging machines and many applications in other industries work with Ethernet-based fieldbus systems. Wouldn't it be easier to collect the signals directly this way?

André Hartmann: At first glance, ASi-5 may appear to be just an additional bus system, which of course costs money. However, if you consider the time and cost involved in directly connecting many sensors and actuators along a conveyor line or in a packaging machine via Ethernet, or if you think about the many plugs and sockets you need for bus communication and the power supply, then things look quite different. ASi is a complete wiring system, not just a bus technology, and that makes it unbeatable at the lowest field level: route the yellow cable, simply pin on the node, screw it down, and you're done. And unlike applications with Ethernet-based field modules, our range also allows for very fine-grained solutions. For example, IO-Link masters with one, two, four and eight ports are available for IO-Link integration. This means that there is no expense for ports or sockets that are not needed. In addition to cost-effectiveness, AS-Interface is also often favored for security reasons because some companies would rather not have any Ethernet sockets on a freely accessible machine or system, even if they are unused.

ASi MASTER NEWS: You mentioned the cost-effectiveness of ASi. To what extent does this depend on the size of the system?

André Hartmann: The more signals need to be collected in the field, the more economical ASi-5 is. The wiring technology scores particularly well when the components are distributed throughout the application with a distance of between one and five meters between them. In some systems, such as packaging machines with all their accesses and flaps, the signal density is often even greater. And it's frequently here that safety-related signals need to be collected, for which, in my view, there is no better solution than ASi Safety. Of course, this also applies to the collection of standard signals. But there are also special applications, such as on AGVs or other autonomous mobile equipment, where other functionalities, such as Safe Link via WLAN or safe speed detection of the system, are more relevant than just saving wiring costs and resources.

ASi MASTER NEWS: Predictive maintenance is still one of the most common applications of signals or IT data from the field. What trends do you see here, how is Bihl+Wiedemann positioned here?

André Hartmann: In addition to typical parameters such as temperature, vibration, pollution degree or power consumption, more and more measured variables will be added for condition monitoring in the future. In addition, we see new digital services also accessing other data in order to use them in their application. The IIoT is moving closer to the field level via OPC UA, REST API or MQTT – that's why we already have the interfaces on board of our ASi-5/ASi-3 gateways or have prepared them for this. We can already tell our customers today that we are technologically equipped for ongoing development in the IIoT, for example when processes like pattern recognition or artificial intelligence are used. In addition, we have of course expanded and improved a number of functions in the new gateways. We have designed the diagnostic concept in the devices on multiple levels – and in doing so, we have discovered how important one very specific component still is for this: the display. There are many customers for whom the visual status display and fault diagnostics on the device are still the criterion that makes the difference. This is because regardless of the expertise of the maintenance technician, the display provides directly meaningful diagnostics using simple messages. Of course, you can get even more tips on how to solve a problem via our web server or even from the diagnostic software, but this requires having a PC on site. In addition, you have to open an Ethernet connection to the gateway, which is not always so easy to do. If, for example, the signals from an ASi node stop coming, this not only lights up on the machine or gateway, but the machine operator or maintenance technician also receives a corresponding plain text message. Now you can eliminate the causes of simple faults in particular much more quickly – without the need for specialists and additional technical equipment, and without affecting the availability of machines and processes.

ASi MASTER NEWS: But shouldn't such plain text messages be a given for any machine visualization?

André Hartmann: In principle, yes, and it usually is the case. Our experience shows that machine builders often already implement these diagnostics very well for series machines. With single machines, on the other hand, it's more often the case that the diagnostics in the visualization are only programmed very superficially and that people prefer to rely on the display of the field devices. And that's where the display of our ASi-5/ASi-3 gateways is literally 'worth its weight in gold', because it saves the machine or installation operator from unnecessary downtime and thus saves him money. And the visualization on the device also helps during commissioning, for example when assigning IP addresses, ASi-5 node numbers or for other service work.

ASi MASTER NEWS: Versatility, connectivity, cost-effectiveness, diagnostic convenience – with the ASi-5/ASi-3 gateways, Bihl+Wiedemann has put together a well-rounded and coherent technology package. Thank you very much for the interview.

ASi-5 AND ASi HIGHLIGHTS FROM BIHL+WIEDEMANN

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

ASi-5 Safety is the right complement to ASi Safety at Work 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 quantity of safe bits have to be transmitted from different devices, or diagnostic and additional information has to be used. When it comes to integrating the new safety generation of AS-Interface, which is compatible with all previous ASi devices and components, runs in parallel on the same infrastructure and can therefore be easily integrated into existing applications, Bihl+Wiedemann offers the perfect solution with the ASi-5/ASi-3 Safety Gateways.

The ASi-5/ASi-3 fieldbus gateways with integrated ASi-5/ASi-3 safety monitor are available now in different variants for PROFINET and EtherNet/IP, some with safe fieldbus and local I/Os. For the SPS, the existing range will be extended by the addition of ASi-5/ASi-3 EtherNet/IP+Modbus TCP gateways, CIP Safety via EtherNet/IP, with integrated ASi-5/ASi-3 safety monitor, Safe Link, OPC-UA and web server.

Other variants for Ethernet/IP, Sercos, EtherCAT and POWERLINK (also together with CIP Safety and FSoE) are in development.

Even when the devices are not currently destined for use in ASi-5 safety applications, users will benefit directly from new gateways that have the same price level as comparable models with the ASi-3 safety monitor: on the one hand from the functional improvements, and on the other hand from the modern 16 gigabyte chip card. A complete project can now be stored on it – including safety and hardware configuration, parameter data of connected devices and user comments from the ASIMON360 software.

ASi-5 Safety Modules in IP20 and IP67

Connect and transmit many safe signals and standard signals under a single address: in addition to the significantly higher transmission speed and the greater data bandwidth, the advantage of significantly more efficient node addressing is also an argument for why ASi-5 Safety is the ideal supplement for ASi Safety at Work.

In addition to the new ASi-5/ASi-3 Safety Gateways with integrated ASi-5/ASi-3 Safety Monitor, Bihl+Wiedemann is also introducing a series of new ASi-5 Safety Modules. The two ASi-5 Safety Input Modules BWU4209 for floating contacts and BWU4210 for OSSDs in IP67, each with two safe two-channel inputs and 12 self-configuring I/Os for standard signals, are supplemented by the BWU4395, a third variant for a floating contact and an OSSD. Also published with the models BWU4186, BWU4187 and BWU4188 are control cabinet modules with protection rating IP20, which are comparable in their range of functions. And lastly, at the SPS fair in Nuremberg, the company will also be introducing the BWU4411, the first ASi-5 safety solution for muting applications.

ASi-5 Safety Muting Module BWU4411

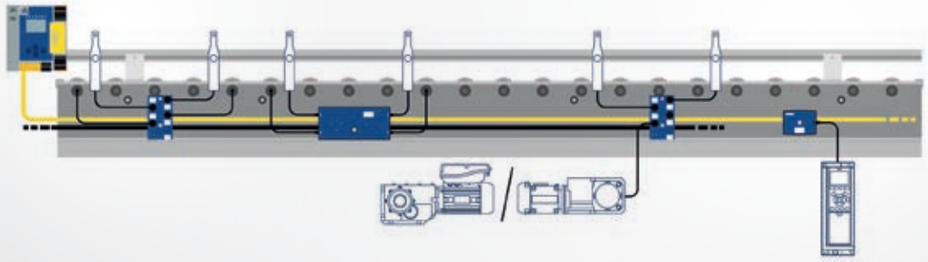
In material handling technology, muting refers to the momentary bypassing of contactless protective devices, for example a light barrier or a light curtain, in order to safely move automated material transports into and out of hazardous areas using muting sensors without endangering persons.

The new ASi-5 Safety Muting Module BWU4411 in IP67 from Bihl+Wiedemann offers different muting solutions up to SIL3/PIe, which can now be implemented easily, efficiently and significantly more cost-effectively than with comparable Ethernet-based solutions.

Whether cross-muting or sequential muting, all the sensors and safety components required for this can be flexibly connected to the new ASi-5 Safety Muting Module BWU4411. This means all the signals required for muting are available in one module under a single ASi-5 address. Unused inputs and outputs can also be used for other applications, for example to control muting lamps or to integrate pushbutton modules. As an alternative to processing in the ASi safety monitor, all relevant signals can also be passed on using safe fieldbuses – PROFIsafe, CIP Safety, FSoE or openSAFETY.

The Bihl+Wiedemann software suite ASIMON360 includes ready-certified building blocks for convenient parameterization in many applications. No complex programming in the control system is necessary. The ASi-5 muting solution from Bihl+Wiedemann stands out not only from a technical point of view, but also from a cost perspective. The ASi-5 Muting Module BWU4411 from Bihl+Wiedemann is a good 60% less expensive than comparable Ethernet-based fieldbus solutions on the market. In addition, the user saves assembly and material costs due to the simple, fast and fail-safe installation thanks to the ASi profile cable and the piercing technology.

Portfolio of ASi-5 and ASi-3 drive solutions for motorized rollers, DC motors and frequency inverters continues to grow



Bihl+Wiedemann already offers an extensive range of motor modules for a wide variety of drive solutions with ASi-5 and ASi-3. This applies both to the control of motorized rollers and to DC motors and frequency inverters. And the portfolio continues to grow. There are additions to the ASi-5 modules for installation in the cable duct, which can currently be used to control up to four 48 V or 24 V motorized rollers from Interroll or two 24 V motorized rollers from Itoh Denki. In addition to the two self-configuring ASi-5 I/O modules BWU4977 and BWU4979, whose 16 and 8 digital signals respectively can be used bidirectionally as inputs or outputs, allowing many different applications to be realized with one and the same device, the ASi-5 cable duct module BWU4942 is also new in the product range. Two 24 V motorized rollers from Interroll, Itoh Denki or RULMECA can be connected to the motor module. It is accordingly equipped with two M8 and M12 cable sockets each, plus four digital inputs for connecting sensors. These modules are therefore also perfect fits in the long list of ASi-5 or ASi-3 drive solutions in IP54 and IP67 for roller drives from leading manufacturers such as Interroll, Itoh Denki, Rollex or RULMECA. But the range of motor modules for DC motors and frequency inverters also continues to grow. In addition to the currently available solutions for SEW MOVIMOT, SEW MOVI-C, NORD NORDAC frequency inverters, ebm-papst K4, Rockwell PF525, Bonfiglioli DGM/DGM-R as well as for Lenze Smart motors and Lenze i550, the BWU4980 motor module now also offers compatibility with Danfoss: an ASi-5 active distributor with protection rating IP67 which is connected to the Danfoss VLT frequency inverter via connecting wires. All of the above drives can thus be efficiently controlled via ASi-5, allowing access to performance parameters such as speed, acceleration and braking behavior as well as advanced diagnostics during operation. What applies to roller drives is also true of course for DC motors and frequency inverters: for all applications where less complex functions need to be implemented cost-effectively, Bihl+Wiedemann also offers a wide range of ASi-3 motor modules for many drives in different versions, in addition to the ASi-5 modules.

Simple, flexible, needs-based, cost-effective: IO-Link integration with ASi-5

Connecting IO-Link devices to the control level or cloud offers a number of advantages when using ASi-5 and the ASi-5 modules with integrated IO-Link master from Bihl+Wiedemann. With the fieldbus-independent solution, users benefit not only from perfect embedding of IO-Link in ASi-5 and in the user-friendly configuration tools ASIMON360 and ASi Control Tools360, but also from the freedom in the choice of topology, reduced wiring effort requiring no assembled connectors and switches, minimal IP management, and a smart power supply concept. Another key point: they save costs. Because ASi-5 modules with integrated IO-Link master are generally not only significantly less expensive than Ethernet fieldbus modules or IO-Link hubs, they are also available on demand. A finely graduated range of variants with one, two and four IO-Link ports Class A and Class B as well as with eight IO-Link ports Class A is available for field application. These are complemented by an OEM module and control cabinet modules with configurable connections for four IO-Link ports, whereby the new ASi-5 control cabinet module BWU4775 also provides four analog inputs (4 ... 20 mA). This means that the user always gets and pays for the exact connection module equipped the way he really needs it.

ASi-5/ASi-3 Address Programming Device – regular updates for continuous improvement

The modern ASi-5/ASi-3 address programming device BW4925 for all ASi generations from Bihl+Wiedemann undergoes constant further development. New functions such as extended setting or diagnostic options are regularly made available to users via free field updates. And together with the ASIMON360 PC software, the advantages of decentralized addressing can be perfectly combined with those of central planning and parameterization when commissioning an ASi system.

An OLED color display, six rugged buttons for easy operation, a high-performance power supply for fast charging while in use, a USB-C port as PC and charging interface, and extensive accessories with addressing cables and power supply – the ASi-5/ASi-3 address programming device from Bihl+Wiedemann is a standout not only due to its features. The clearly organized display menu with plain text error messages in different languages, display of operating and input functions, and the use of easily recognizable icons also ensure a positive user experience.

In addition to addressing ASi-5 and ASi-3 nodes, the address programming device can be used to check and change I/O data and settings of connected ASi nodes, among other things. It is also possible to access the display of the gateway remotely via a module in the ASi circuit.

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