BIHL-WIEDEMANN.DE ■ YEAR 14 ■ EDITION 01.2020

AS-INTERFACE MASTER NEWS

THE BIHL+WIEDEMANN MAGAZINE

INTERVIEW

ASi-5 is up and running

TECHNOLOGY

ASi Profile Cable: Symbol of efficient wiring

Exciting (packaging) solutions for your system:

Take off now with ASi-5

Bihl + Wiedemann

Editorial

Dear Reader,

There is no other way to put it: the interest in ASi-5 at sps 2019 in Nuremberg was phenomenal. And at the same time very concrete, because the cost savings that ASi-5 achieves - as a perfect shuttle bus for IO-Link devices and their simple wiring in the field - are becoming recognized over a wide swath of industry. The same applies to the function of ASi-5 as an enabling technology for digitalized machine building thanks to its high data bandwidth and short cycle times. Visitors at our booth – 50 percent more, compared to the previous year – also valued the fine granularity of our product portfolio, which offers them the ability to implement their smart automation in a custom tailored way. And some of them are already at work, as first test machines equipped with our components show. Further backgrounds and information about the successful kickoff of ASi-5 are covered in the interview with our Head of Sales André Hartmann on page 14.

In our cover story starting on page 3 you will learn how automation using ASi-5 can look like in practice. And how you are able to save 60 percent and more of sensor and actuator integration costs. We will 'travel' with a beverage six-pack through a packaging plant and show where ASi-5 creates which benefits. You will learn about efficient industry 4.0 applications using IO-Link devices as well as about safety using ASi-5/ASi-3 and experience how Bihl+Wiedemann implements customized requirements – from safe temperature monitoring to manufacture-specific control of drive assemblies and gearmotors. And wherever you go - the yellow ASi cable will run like a red thread throughout the machine.

THE yellow cable, you might be asking? Aren't there various versions of the cable when using ASi – yellow and black, profile and round cable? This is true – and makes complete sense, as you will read beginning on p. 9. Spoiler alert: the yellow profile cable enables simple, flexible and cost-effective solutions with reduced wiring effort, transmits data and power using one single cable, is – due to its geometry - protected against polarity reversal and offers – at the same time - maximum safe contacting up to IP67. In applications with higher power requirements, the black profile cable handles various supply voltages while also realizing efficient power supply and distribution. And in situations where round cables have to be used, we offer ASi modules with the corresponding connection technology as well.

Actually, we wanted to present our ASi-5 related news - as usual - at the Hanover Messe which traditionally takes place in April. But due to the global development regarding the corona virus, Deutsche Messe AG decided to postpone HMI 2020 to July 13-17, 2020. We will be there and cordially invite you to visit us there in Hall 9, booth H01.

Until then we hope you will enjoy reading our current issue of AS-INTERFACE MASTER NEWS.
Best regards,

Jochen Bihl & Bernhard Wiedemann
Managing Directors

HANNOVER MESSE

NEW DATE

13.07. - 17.07.2020
Hanover I Hall 9
Booth H01

Request your free Ticket

1 IO-Link Multi-Vendor Wall
Here you can see a variety of IO-Link devices connected to the new ASi-5 Slave / IO-Link Master Modules.

2 IO-Link Workstations
Test the fast and simple integration of IO-Link in just 3 minutes.

3 Latest Conveyor Applications
RFID sensors are simple to read with IO-Link.

Exhibition grounds Hanover

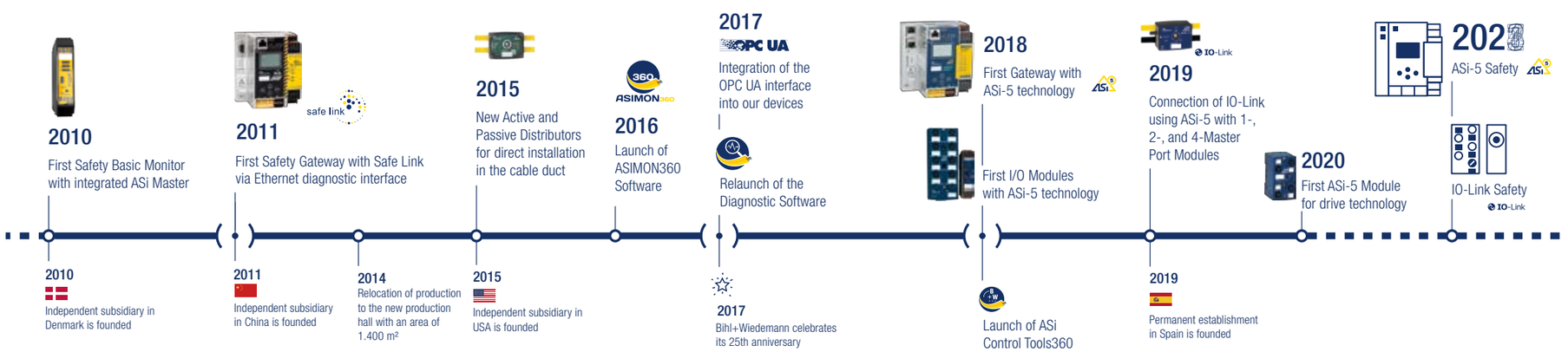
4 ASi-5 Highlights
Get your plant ready for industry 4.0.

5 Drive Solutions using ASi-5
Replacing PROFINET wiring in the field with ASi-5.

6 Meeting Areas
We are always happy to take time for a personal meeting with you.

7 Product Areas
Here you can learn all about our portfolio including our new products.

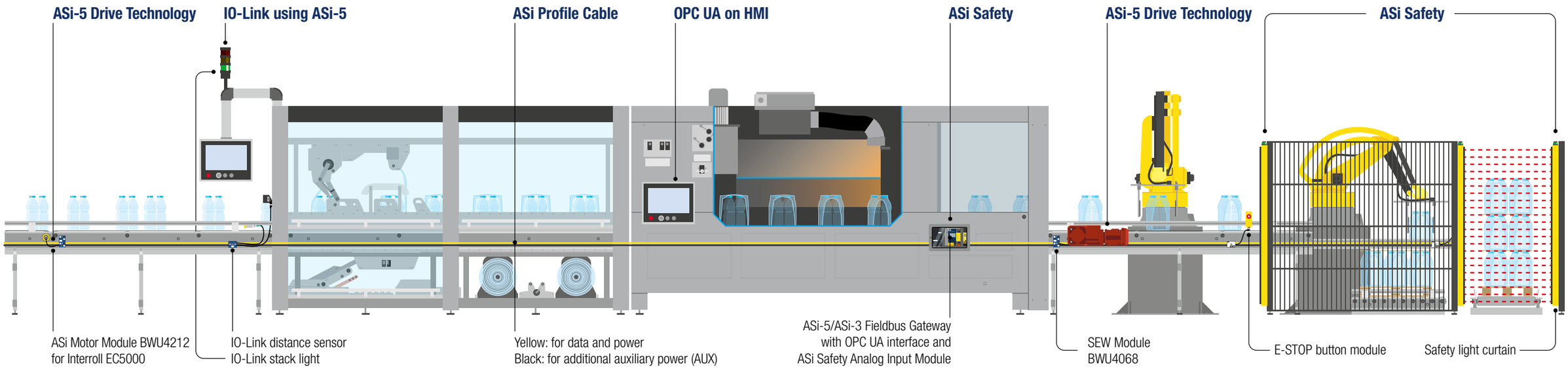
Bihl+Wiedemann: Milestones since 2010



AS-INTERFACE | APPLICATION

Exciting (packaging) solutions for your system

TAKE OFF NOW WITH ASI-5

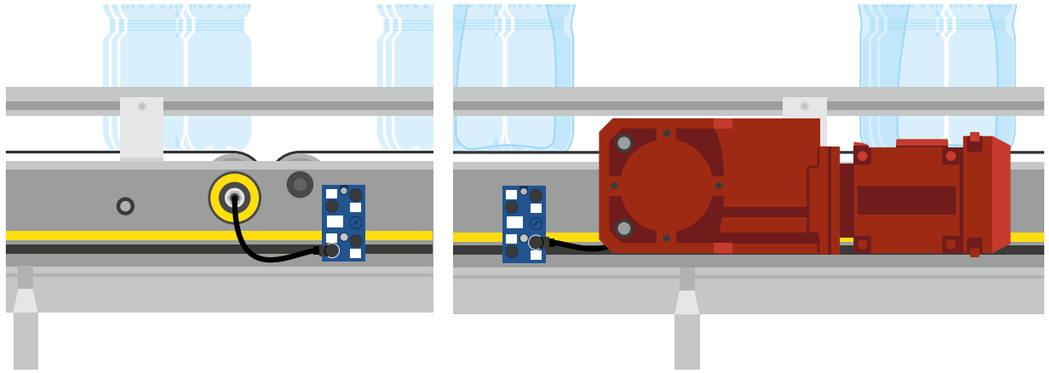


Listen up, engineers and cost accountants: Thanks to ASi-5 it has never been that easy to intelligently automate machines, get them in shape for industry 4.0 – and at the same time save at least 60 percent of the costs for the integration of sensors and actuators. Not possible? You bet it is, as the example of a packaging system shows.

What makes all of this possible is not only the convincingly simple wiring technology of AS-Interface, which has long replaced the routing of entire cable bundles with its flexible, cost-saving profile cable solution in innovative machines, but also the cleverly designed gateways and ASi slaves – led by the IO-Link masters and the motor modules with ASi-5 technology from Bihl+Wiedemann. They collect data from intelligent sensors and actuators cost-effectively in the field using IO-Link. They allow the use of smart sensor functions for efficient industry 4.0 applications. They are compatible with any topology. They make it possible to use the same connection cable for standard signals and safety technology. They bring all the data from a machine to the cloud and the applications there via OPC UA. And finally they represent the smart hard- and software basis for solving individual challenges in an innovative way. Sounds exciting – and it indeed is.

Imagine you are a beverage six-pack and …

… are taking a trip through a packaging machine in which your protective film is custom tailored heat-shrunk around you, after which a robot stacks you on a pallet along with other six-packs. The first thing you notice is the yellow profile cable which accompanies you through all the machine stages: from the roller conveyor system with intelligent IO-Link devices – a distance sensor and a multi-functional stack light at the machine infeed point – to the PET film station and the temperature-monitored shrink tunnel with the following cooling section. Then through a safety light curtain over to a robot which grips you precisely and lifts you on to the pallet. Everywhere the continuous yellow profile cable – and everywhere drive and automation technology which docks to the cable in order to exchange controller commands, status messages and other machine data. But just what are those gateways, I/O modules and motor modules



From left to right: ASi Motor Module BWU4212 for EC5000 and BWU4068 for SEW MOVIMOT®

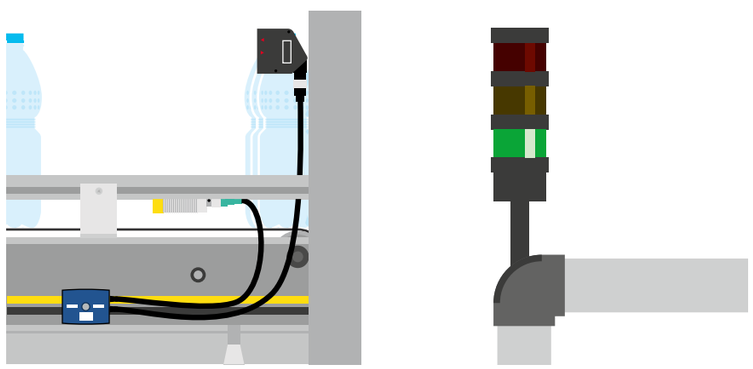
which Bihl+Wiedemann has developed as quasi-docking stations for sensors, actuators, automation systems and smart applications? What functions do they have in the machine? How do they manage to control the machine intelligently while at the same time achieving immense cost savings? And what else can they do? Questions, questions – and here come the answers.

Custom-tailored performance for drive technology: ASi-5

Material handling is in most machines the mechanically linking element between the individual work steps or system components – as it is in the packaging machine for beverage six-packs. Here, two different drive concepts are installed: the roller conveyor at the infeed transports the bottle packs over a conveyor segment with roller drives, e.g. from Interroll, whereas in the machine outfeed palletizing uses decentralized frequency inverters such as MOVIMOT® from SEW-EURODRIVE. Using the special motor modules from Bihl+Wiedemann for the motorized rollers and gearmotors from both manufacturers, ASi-5 can show its full strengths. Now for example ASi modules can control roller drives EC5000 from Interroll - both in the 24 V input voltage and 48 V power supply versions. The new Motor Module BWU4212 offers – compared to the 24 V version – the advantage that the current is reduced by half, thereby also reducing the power loss by 75 percent. This way, short load spikes can be better compensated. The integrated fuse ensures effective cable protection. But above all, BWU4212 makes it possible to change the roller speed cyclically for adapting to the process on-the-fly – with a cycle time of 1.27 ms. In the packaging machine described here this can be realized with an intelligent distance sensor with IO-Link.

More performance at the “end of line” as well: BWU4068 is the new ASi-5 Motor Module for the MOVIMOT® gearmotor with decentralized frequency inverter as used in packaging machines for palletizing. The short cycle time of ASi-5 makes it possible to read and write ramps and speed cyclically with virtually no time delay. At the same time, all the SEW diagnostic data and the actually measured output current can be read cyclically as an analog value. Therefore, the Motor Module additionally provides four digital inputs and two digital outputs. Taking into account the wiring effort and the higher costs for PROFINET components, ASi-5 can achieve cost savings of 60 percent and more within machines.

Thus, ASi-5 with its dynamic characteristics, data bandwidth and cost advantages opens up new horizons in the integration of material handling components – but not only in this area.



Distance sensor (lt.) and stack light (rt.): Integration of IO-Link devices using ASi-5

Integration of intelligent IO-Link devices using ASi-5

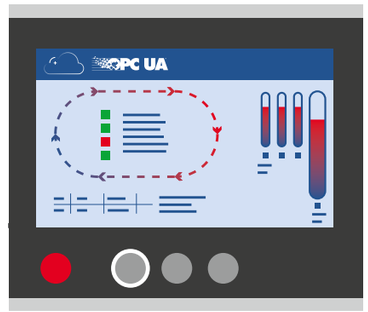
With ASi-5, both actuators and especially intelligent sensors are entering in innovative machines. This is made possible mainly by the already mentioned extremely short cycle times and the previously unattained data bandwidth of ASi-5. By this, intelligent components such as IO-Link devices and their functions can be meaningfully integrated. In the example of the described packaging system two smart IO-Link devices – connected using ASi-5 – are employed.

One of them is an optical distance sensor – wired to an ASi-5 slave with integrated IO-Link master. Its primary task is to measure the distance to the next six-pack and transmit this value. In addition, the integrated intelligence of the sensor allows to evaluate the measured value. When distance limits on either end of the range are violated, the speed of the drive can be adjusted without significant delay such that the required object distance is maintained for the shrink oven feed.

The other smart device in the infeed section is a stack light which can be multifunctionally parameterized via its IO-Link connection. Color, flash pattern and brightness can be individually set for various scenarios and changed on-the-fly from the controller. A level measurement for the infeed or the film wrapping station then looks different from a package congestion in the shrink oven for example. The parameter setting does not have to take place through the automation system – nor for the IO-Link distance sensor – but rather can also be accomplished simply and intuitively using the ASIMON360 and ASi Control Tools360 software packages from Bihl+Wiedemann.

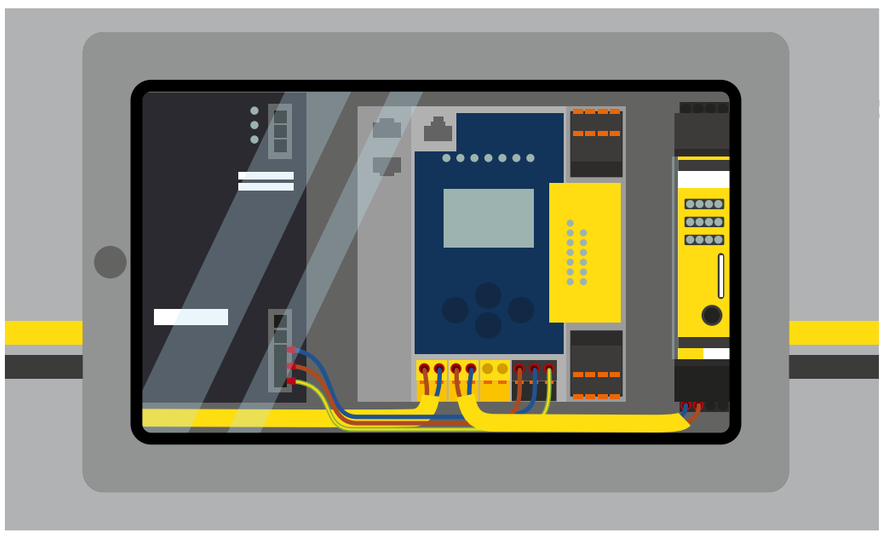
ASi-5/ASi-3 Fieldbus Gateways with OPC UA: “direct wiring” up to the very top

IO-Link devices such as sensors are able to collect a variety of additional information about themselves, the immediate environment or ongoing processes and to transmit this information. Quite popular in packaging machines for example are the autonomous report of increased contamination of the optics or the monitoring of the signal quality and stability of the switching threshold. In the context of industry 4.0 autonomous counting and classifying of objects, counting operating hours and measuring current consumption as well as additional functions are becoming standard procedure. Much of the information



Temperature monitoring displayed via HMI

is often not directly relevant to the process. Other data – such as temperature over time – is not needed in short time intervals since it does not change rapidly. Making all this available through a fieldbus and using an automation system in an ERP or MES level or a cloud would increase the communication load and tie up controller resources. This is why Bihl+Wiedemann equips their ASi-5/ASi-3 Fieldbus Gateways with an OPC UA interface – thereby making the devices and the connected ASi networks with their sensors and actuators ready for industry 4.0. In addition, OPC UA gives you the option of visualizing the information on a Human-Machine-Interface (HMI). In the specific example of the packaging machine a safety-certified



Control cabinet with ASi-5/ASi-3 Fieldbus Gateway and ASi Safety Analog Input Module for temperature monitoring

gateway is used – installed in the control cabinet at the shrink oven along with Pt100 sensors and an ASi Safety Analog Input Module BWU2692. This monitors the temperature in the shrink oven to ensure that the film wrapping process of the beverage six-packs always takes place in the prescribed temperature range.

Safety: an integral component of ASi-5

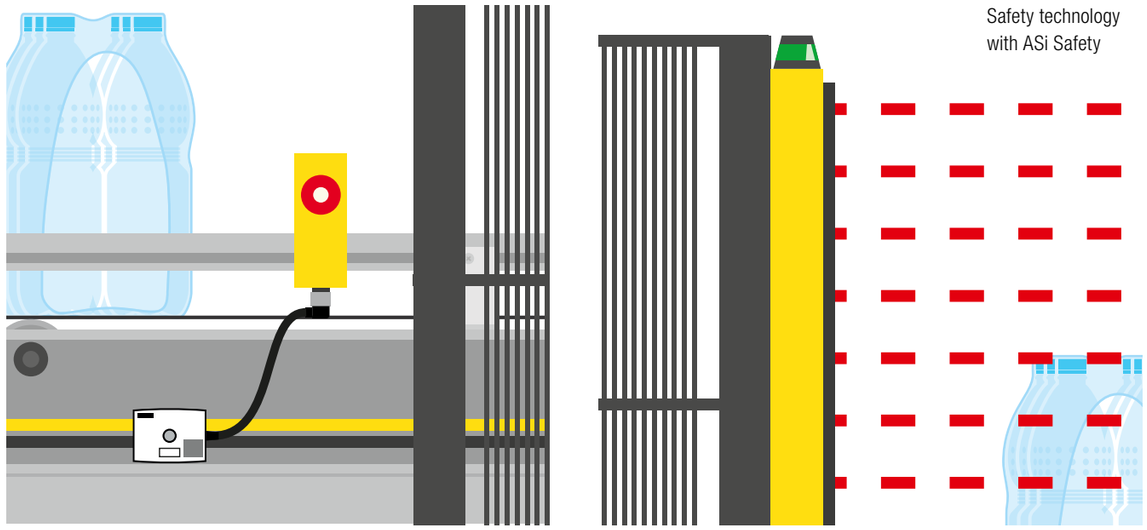
The topic of safety plays a key role when it comes to ASi-5. Because safety-oriented automation also wants to use the benefits of ASi-5 technology and transmit large quantities of data, as – for instance – provided by safety laser scanners, at high speed. It will still take a bit of time until the first ASi-5 Safety devices are available, but in the meantime ASi Safety at Work – a proven safety system – continues to be available and can also be used with ASi-5 without any restricition. Therefore the shrink oven control cabinet contains an ASi-5/ASi-3 PROFIsafe via PROFINET Gateway with integrated Safety Monitor (BWU3862). Connected – in addition to the ASi motor modules and ASi-5 slaves with integrated IO-Link master – are also the E-STOP button modules for the conveyor line at the machine infeed, the safe door interlock at the shrink oven and the safety light curtain at the entrance to the fenced working range of the robot.

Custom tailored solution with AS-Interface: safe temperature monitoring

Also connected is the ASi Safety Analog Input Module BWU2692. It monitors the temperature in the packaging machine to ensure that the film is wrapped around the bottles when heated but that the bottles themselves are not damaged. In addition to these “low-temperature applications” there are also applications such as heat treatment furnaces and systems where there are also great demands placed on safe temperature monitoring. That is why Bihl+Wiedemann has joined with a leading manufacturer from this field to develop a safety thermocouple module. One focus here was on simple and flexible operability from the software side. That way, various types of thermocouples can be selected by using the ASIMON360 configuration software. Up to eight temperature ranges and switching thresholds can be set. When needed, the thermocouple module can be calibrated through the software. The ASi Safety Input Module thus handles application, measurement and evaluation tasks with simplicity and ease. At the same time its SIL3/PLe rating means it also meets the requirements of EN 746-2/5.7.2 for safe, industrial and gas heated thermoprocess systems.

Our exciting trip is over – but the ASi-5 success story continues

The trip onboard the ASi-5 bus through the packaging machine ends with stacking of the beverage six-packs on the pallet. It illustrates how much technological performance capability the new fieldbus standard has. At the same time there is no need for loyal users of AS-Interface to panic: ASi-5 is fully compatible with all ASi generations and communicates with ASi-3 in the same network. This means users can expand their existing ASi-3 solutions with innovative ASi-5 modules and their functionalities. Both standards will continue to coexist: ASi-3 especially in simpler applications due to cost considerations, ASi-5 through its interplay with IO-Link and due to its performance in the digital world.



Technology

THE ASI PROFILE CABLE: SIMPLE WIRING, EFFICIENT POWER SUPPLY, MASSIVE SAVINGS

AS-Interface, developed in the early 1990’s as an alternative to parallel wiring by leading automation companies, was intended from the very outset to be one thing: a rugged fieldbus system at the base of automation which connects sensors and actuators to a controller in a simple, flexible, efficient and cost-effective way. Data and power should be able to be provided on a maximum of two cables and modules should be able to be connected exactly where they are needed without additional connectors and without the risk of making mistakes. To realize these objectives the decision was made not for round cable, but rather for an unshielded, 2-conductor profile cable to which modules can simply be connected using piercing technology. That this was the correct decision can be seen until today – because nothing is symbolically more representative for the success of AS-Interface than the typical yellow ASi profile cable.

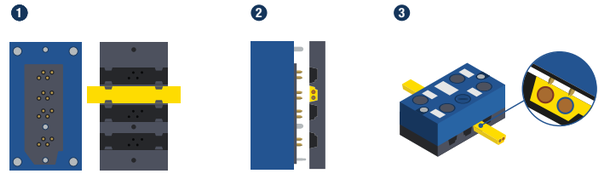
Cables are mostly round. This has always been the case, with good reason. Round cables are especially easy to route and the pass-throughs are easy to seal. So why is the cable of the presumably simplest fieldbus system in the world flat and has a profile? There are several reasons: the connection technology is extremely simplified, it allows a free selection of topology, the power supply for the connected components can be made much more efficient, control signals and auxiliary power can be clearly separated if needed, and – not to be underestimated – the profile cable significantly reduces wiring costs.

Thanks to piercing technology, ASi-3 and ASi-5 components can easily be mounted on the yellow profile cable – with perfect contacting and by reaching a protection rating of IP67. An additional supply of 24 V or 48 V is also easy to realize with AS-Interface. Simply use a second black profile cable in parallel to implement power-intensive applications such as high-performance IO-Link applications or drive solutions in material handling.

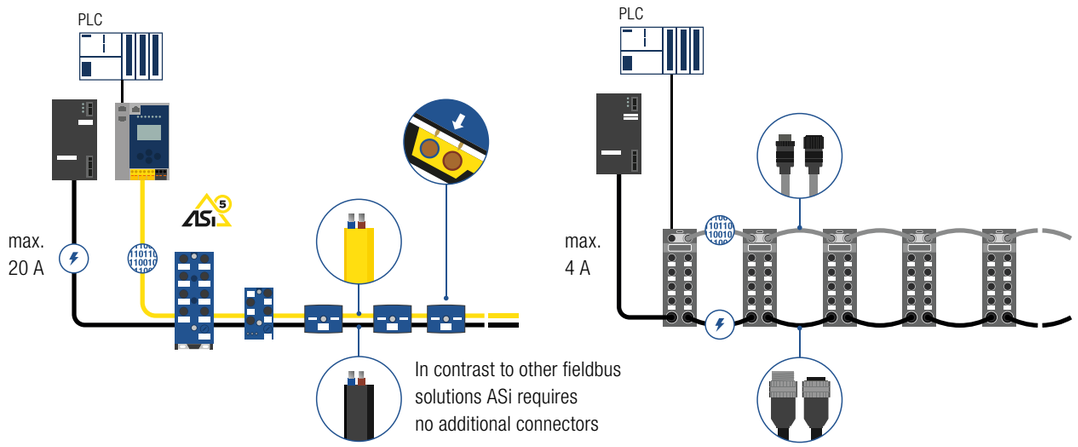
Simple installation, perfect contacting

Thanks to the ASi piercing technology, modules can easily be mounted to the yellow profile cable exactly where they are needed. The special profile of the cable not only prevents components from being connected the wrong way around – i.e.

Perfect contacting of the profile cable



Piercing technology vs. connector solutions

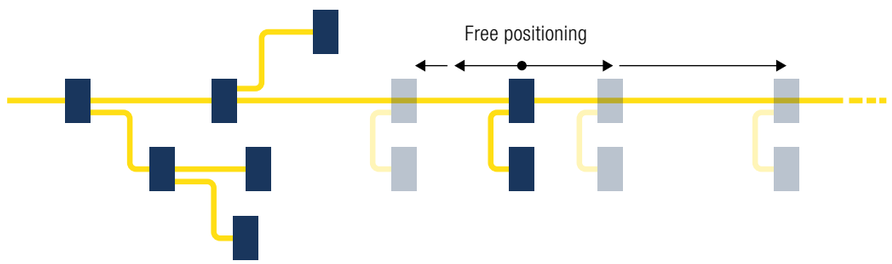


polarity-reverseed. It also ensures that the gold-plated pins on the bottom of the module always penetrate the rubber mantle of the profile cable vertically and contact both wires of the cable. Since at least two redundant pins penetrate both wires, maximum safe contacting is assured. A small contact resistance is also guaranteed. No trimming, stripping or screwing of the wire is necessary as it is for round cables – simply remove the desired length from the cable reel. Another great advantage of the piercing technology: modules such as the ASi-5 Slave / IO-Link Master modules from Bihl+Wiedemann are easy to connect, replace, move or add – without any additional connection costs, since neither pre-assembled cables or tees are required. All of which makes initial installation or retrofitting incomparably cost-effective.

Free selection of topology

Unlike round cable solutions in other automation systems, AS-Interface does not require cables of different lengths and with pre-assembled connectors for the 24 V supply or for connecting to the bus when the profile cable is used. By this, ASi users save a considerable amount of time and money in procurement/logistics, installation and documentation. And since simple cable branches are possible at any point, ASi is fully supportive of tree, ring, star or line topologies. In contrast to other fieldbus solutions where the selection of topology is often restricted and allows only certain structures, ASi users can select any topology desired for wiring the sensors and actuators – and change it at any later time when modifications are required.

Free selection of topology



Efficient power supply up to 20 A

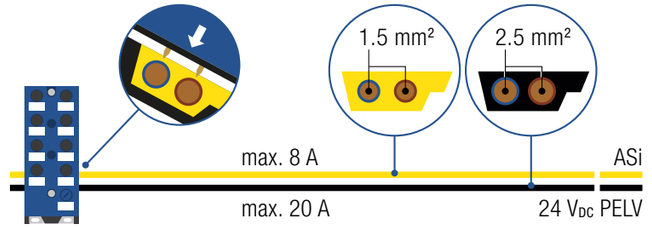
Efficient power distribution is a great challenge in many applications – for example when using IO-Link devices and for drives in material handling. Here again the black profile cable offers advantages compared to round cable solutions: depending on the conductor cross-section up to a maximum of 16 A or 20 A is available. In round cable solutions the respective plug determines the maximum current available. Using a M12 connection, no more than 4 A can generally be transmitted. For high-current applications special, expensive connectors have to be used. The difference becomes especially evident when multiple modules are used in series. Wiring with round cables means that the current has to be looped through all the devices. This results on one hand in power losses in the modules. On the other hand the plug being used represents the bottleneck for all the following modules.

But the power supply via profile cable works not only for ASi devices. Using special passive distributors, non-ASi devices can also be connected to the profile cable and supplied from it. Bihl+Wiedemann here also offers a wide portfolio for most diverse devices and can also develop customized passive distributors on request.

Clear separation of control signals and auxiliary power

Yet another advantage of the ASi solution using a profile cable is the ability to separate control signals and auxiliary power. The control signals are sent via the yellow profile cable, whereas different black profile cable versions are available for auxiliary power for both 24 V and 48 V. The separation between yellow and black profile cable makes it possible to turn off just the AUX power supply while the ASi signals for monitoring the system continue to be sent. Such a separation can be useful for example during setup or for creating passive safety.

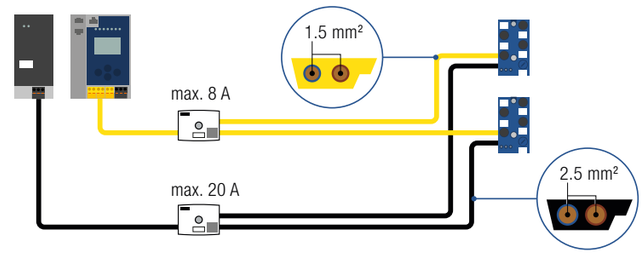
Power distribution using ASi profile cable



Comparison: current capacity of profile vs. round cable with connector

Profile cable 1.5 mm²	16 A
Profile cable 2.5 mm²	20 A
M12 (A or B coded)	4 A
7/8"	2 x 9 A
M12 (S or T coded)	12 A
M12 (K or L coded)	16 A
M12 (M coded)	8 A

Clear separation of control signals and auxiliary power

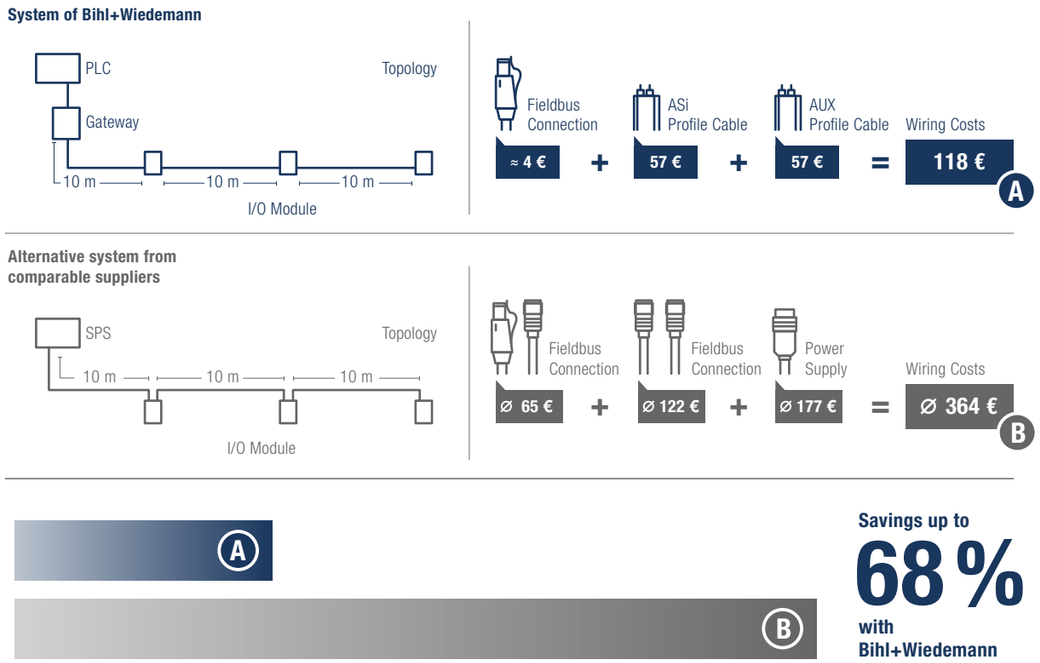


Significant reduction of wiring costs using profile cable compared with other fieldbus systems

Thanks to the profile cable and piercing technology, wiring is not only unbeatably simple with ASi, but also almost always significantly less expensive than with other fieldbus systems. One reason is the fact that no various pre-assembled connection cables are required. This saves not only material costs but also expensive installation time. In addition, ASi does not require that you know in advance the lengths of the cables used – you can decide on the spot at which points along the profile cable you want to install the modules. And if needed you can always insert additional branches. This represents a noticeable lessening of the planning effort, which also reduces costs. A sample calculation (see figure below) shows the extent of the savings potential solely in the field of wiring using an ASi profile cable solution compared with other fieldbus systems.

In practice, when wiring three I/O modules – installed at a distance of 10 m each – using ASi you will see a reduction of almost 70% in cost compared with round cable solutions. And if you consider that ASi-5 modules – for instance when integrating IO-Link devices – are in general much less expensive than comparable Ethernet-based fieldbus modules – regardless even of how large the installation is – it soon becomes clear that in many cases using Bihl+Wiedemann solutions will reduce overall costs.

Cost comparison: wiring with ASi profile cable vs. other fieldbus systems

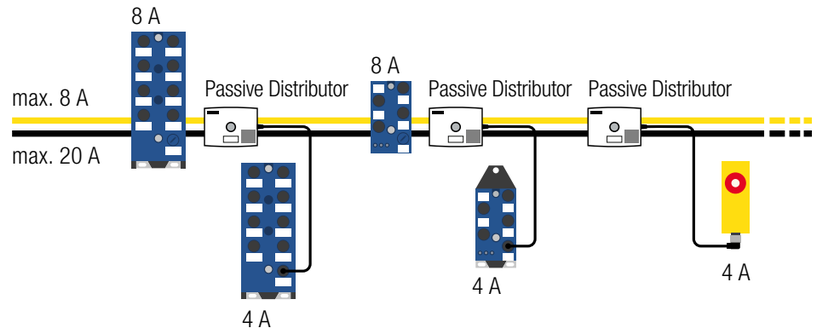


Use profile cable and round cable in combination

Even if all these advantages argue in favor of the profile cable, there are still applications where its use is not possible: for example when cable bushings need to be especially tightly sealed. In such cases round cables are a requirement. But even if round cables need to be used, Bihl+Wiedemann has solutions: modules with ASi connection via M12. Virtually all new ASi-5 modules are available as M12 versions and can be used with almost all standard round cables. And finally, it is also possible to use ASi with both profile cable and round cable in combination. This is because the passive distributors from Bihl+Wiedemann permit diverse branches from the profile cable, including push-in terminals and plugs such as M12/M8.

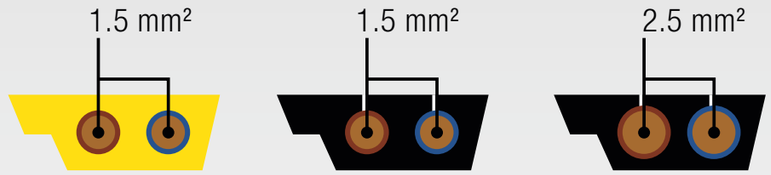
The simplest connectivity, flexible applications, efficient power distribution, significantly reduced wiring costs – wiring of sensors and actuators using profile cables with AS-Interface is almost always the better alternative. And with the introduction of ASi-5, AS-Interface with its enhanced performance, even more intelligent communication and increased flexibility will in the future remain the perfect shuttle bus to all higher level interfaces providing absolute security of investment in this age of digital conversion.

Use of profile cable and round cable in combination



Profile cable for various applications

The 2-conductor yellow ASi profile cable has a conductor cross-section of 1.5 mm². It carries both data and power. For various applications up to IP67 different cable materials are available: PUR, TPR, EPDM and rubber. If more power is required for an application – e.g. where heavy motors are used – the black profile cable can also be used for power supply. It is available in 1.5 mm² and 2.5 mm² for 24 V and 48 V respectively.



AS-INTERFACE | INTERVIEW

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

ASi-5 is up and running

IO-Link stands for efficient point-to-point connection of intelligent and communication-capable sensors and actuators. AS-Interface is the world's leading fieldbus standard for the first level of automation. With ASi-5 now an ideal shuttle bus for IO-Link devices into the digitalized, smart factory is available. André Hartmann, Head of Sales for Germany at Bihl+Wiedemann, classifies the market success of this new fieldbus generation.

André Hartmann, Head of Sales at Bihl+Wiedemann

ASi MASTER NEWS: At sps 2019 we saw ASi-5 at the center of the Bihl+Wiedemann trade fair presence – the ideal way to see how the new technology is received by the market. How was the response from your perspective?

André Hartmann: Overwhelming. I have to say sps 2019 was the best trade fair ever for Bihl+Wiedemann. The booth was full every day, with over 50 percent more visitors and many new customer contacts. The driving force indeed was ASi-5. Our visitors took the time to inform themselves about the advantages of the new ASi technology. Some of them came to us with highly concrete projects and wasted no time after the show to construct test machines using our ASi-5 components.

ASi MASTER NEWS: High speed, great data bandwidth, cost-effective components, reduced wiring effort, integration of intelligent sensors – all of which ASi-5 represents. But what was it that enthused your visitors the most?

André Hartmann: There's no question: it was the clever connection of IO-Link devices using ASi-5 – specifically the much simpler wiring in the field and the associated cost savings. But also the range and fine differentiation of our ASi-5 / IO-Link portfolio with one, two and four IO-Link master ports won people over, since this makes economical implementation of projects possible in a targeted way and based on actual requirements. But this applies not only to new machine concepts designed for industry 4.0. End users as well are seeing the light. One of them is already retrofitting an existing ASi-3 system over to ASi-5 because he wants to integrate intelligent sensors and make his machine Industry 4.0 capable.

ASi MASTER NEWS: From your point of view, to what extent is ASi-5 finding openings in particular sectors or main applications? Put another way, who needs ASi-5 or should be contemplating it?

André Hartmann: ASi-5 was not developed for particular target industries or applications, but rather as a shuttle bus for digitalized, smart machine building. But of course there are always sectors that adopt innovations quicker than others. In the case of ASi-5 this would include for example packaging machines, where there is a desire for improving flexibility and productivity by integrating intelligent sensors and actuators. In warehousing and material handling ASi-5 becomes attractive due to the immense cost savings made possible by the simplified wiring. In addition, ASi-5 nodes are significantly more cost-effective compared with Ethernet-based fieldbus modules. In the automotive industry, which uses ASi-5 among other things in the body shell, parts picking and assembly, both functionality and cost considerations are the chief motivating factors in using this new generation of the wiring system. But regardless of the industry sector ASi-5 is aimed at anyone dealing with complex applications using IO-Link devices who, due to insufficient speed and data bandwidth, is looking to replace Ethernet-based fieldbus modules in the future. Here ASi-5 trumps PROFINET cost-wise for example not only due to the simple wiring and economical hardware, but – at least in the case of Bihl+Wiedemann – also stands out with the fine granular scalability of the connected modules, starting with a simple 1-port IO-Link master.

ASi MASTER NEWS: That sounds almost like ASi-5 is out to replace PROFINET in the machine?

André Hartmann: No, that is definitely not the case. In the control cabinet for example or when controlling safe drives using PROFIsafe it makes no sense at all to try and replace PROFINET with ASi-5. However, in many cases it makes perfect sense at the machine directly, since many of the components there require protection rating IP67. In the field ASi-5 – used as an optimal shuttle system for the Ethernet world – can handle even the most complex tasks. Because ASi-5 does represent a professional solution for the problem of efficient wiring of IO-Link devices using the 2-conductor cable and industry-proven piercing technology. Back in the control cabinet ASi-5 again docks to a PROFINET topology. But in the field the less expensive wiring and economical ASi-5 connection technology compared with a PROFINET infrastructure results in cost savings of 50 percent.

ASi MASTER NEWS: If ASi-5 is more than just an alternative to PROFINET in the field, the question naturally arises whether on the other hand ASi-3 is still needed any longer. Is there a discontinuation of ASi-3 in favor of ASi-5 lying ahead?

André Hartmann: At Bihl+Wiedemann we assume that ASi-3 and ASi-5 will continue to coexist in the coming years. Ultimately it is the customer who will decide based on the required functionality and the associated costs, since these two factors are always key subjects. Especially in simple scenarios, such as connecting standard initiators or simple valves to a slave with four in- and outputs, ASi-3 devices are simply much less expensive than the corresponding ASi-5 modules. But as soon as the requirements start to rise the cost barrier falls. Because the more complex a product is, the more economically one can produce an ASi-5 version compared with the ASi-3 equivalent. The reason for this is that many features are already specified for ASi-5 which would have to be added on for ASi-3. For example ASi-5 Slave / IO-Link Master modules with protection rating IP67 and four ports are much smaller and cost-effective than ASi-3 solutions with equivalent functionality. But getting back to the initial question: we do not currently foresee an abrupt end to ASi-3 – and there is yet another reason for that.

ASi MASTER NEWS: And this would be what – safety?

André Hartmann: Correct. ASi Safety at Work continues to be usable to its full extent due to the compatibility of ASi-5 with all ASi generations, and over 95 percent of all applications can be handled perfectly today using ASi Safety. But to be able to utilize the advantages of ASi-5 for safety technology as well, we soon want to keep up with ASi-5 Safety and develop new products based on the specification. At the moment the great success of standard ASi-5 is occupying various resources internally, but we are already working on ASi-5 Safety devices. Our goal is to introduce the first gateway with ASi-5 Safety technology during this current year.

ASi MASTER NEWS: As long as we're talking about safety technology: to what extent is IO-Link Safety becoming a competitor to ASi-5 Safety?

André Hartmann: It's absolutely not a matter of competition. Rather of cooperation and synergy, because the same advantages of ASi-5 apply as well to safety related automation using ASi-5 Safety and IO-Link Safety: high speed, large data bandwidth, freedom of topology, connectivity openness, to name just a few. Just as ASi-5 now already is to standard IO-Link devices, ASi-5 Safety will in the future be the ideal data shuttle for IO-Link Safety devices. Add to this the fact is that overall – compared with the quantity of signals from standard IO-Link devices – far few safety signals generally need to be collected which are also generally distributed even more decentralized in the field. A fine grained portfolio of ASi-5 Safety Slave / IO-Link Safety Master modules with one, two or four master ports will offer even greater savings potentials for the safety sector in the future than those that even today can be realized using ASi-5 in combination with IO-Link standard modules.

ASi MASTER NEWS: Mr. Hartmann, we thank you for the discussion.

ASi-5 and ASi NEWS FROM BIHL+WIEDEMANN

24 V ASi-5/ASi-3 Fieldbus Gateways

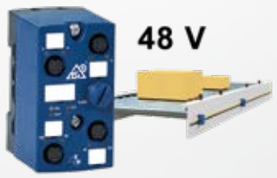
- ✓ New: 24 V ASi-5/ASi-3 POWERLINK Gateway (BWU4016)
- ✓ Compatible with existing networks
- ✓ 1.27 ms cycle time for up to 384 in- and 384 output bits
- ✓ Integrated webserver, OPC UA server
- ✓ Also available for: PROFINET (BWU3847), EtherNet/IP (BWU3849) & EtherCAT (BWU3854)

Starter Set ASi-5 / IO-Link

- ✓ Set consisting of:
  - 24 Volt ASi-5/ASi-3 PROFINET Gateway (BWU3847) or 24 Volt ASi-5/ASi-3 EtherNet/IP + Modbus TCP Gateway (BWU3849), also Gateways to other fieldbus systems selectable
  - ASi-5 Slave / IO-Link Master with 4 Ports, IP67, M12 (BWU4067)
  - ASi Substructure Module in IP67, 45 mm (BWU2349)
  - Bihl+Wiedemann Software Suite for Configuration, Diagnostics and Commissioning (BW2902)
- ✓ Starter set is shipped fully assembled and wired in a convenient case
- ✓ Cost-effective version for starting with ASi-5
- ✓ Sufficient space for installing your own IO-Link sensors

ASi-5 Motor Module, IP67, M12
for SEW MOVIMOT®, 1M/4I/20 (BWU4068)

- ✓ Control of 1 x SEW MOVIMOT® gearmotor with frequency converter per module
- ✓ Cyclic writing of speed, ramps etc.
- ✓ 4 digital inputs for connecting sensors
- ✓ 2 digital outputs
- ✓ Input voltage out of ASi
- ✓ Output voltage out of AUX (24 V auxiliary power)



ASi-5 Motor Module, IP67, M12
for Interroll EC5000, 2M/4I (BWU4212)

- ✓ Control of 2 x 48 V Interroll EC5000 motorized rollers with 20 W / 35 W / 50 W
- ✓ Cyclic writing of speed in 1.27 ms
- ✓ 4 digital inputs for connecting sensors
- ✓ Input voltage out of ASi
- ✓ Motor voltage with 48 V out of AUX
- ✓ Internal line protection fuse, separate for each motor

Other new ASi-5/ASi-3 Fieldbus Gateways

- ✓ ASi-5 Master and ASi-3 Master in one device
- ✓ Integrated webserver for simple diagnostics / remote maintenance
- ✓ OPC UA server as interface for OPC UA communication
- ✓ Chip Card for storing configuration data
- ✓ Can replace ASi-3 Master / Gateways without any programming effort

	Article	Fieldbus	Double Master	Safety Gateway (integr. Safety Monitor)	OPC UA	Selection of mode of safe operation	Safe speed and standstill monitoring	24 Volt ASi Gateway
	**BWU3825**	EtherNet/IP+ Modbus TCP	✓	✓	✓	✓	✓	–
	**BWU3852**	PROFINET	✓	–	✓	–	–	✓
	**BWU3866**	EtherNet/IP+ Modbus TCP	–	✓	✓	✓	✓	–
	**BWU3991**	EtherCAT	–	✓	✓	✓	✓	–
	**BWU3998**	PROFINET	–	✓	✓	✓	–	–
	**BWU4000**	PROFINET	✓	✓	✓	✓	✓	–

New ASi-5 Slave / IO-Link Master Module

- ✓ Comfortable parameter setting of the connected IO-Link sensors using B+W software suites
- ✓ In 1.27 ms up to 4 x 16 bit user data available

	Article	Type	Number of IO-Link ports	IO-Link Port Class A	IO-Link Port Class B	Connection of ASi	Connection of periphery	Protection rating
	**BWU3819**	ASi-5 Slave / IO-Link Master, 4 Ports	4	4	–	Profile cable	4 x M12 socket (5-pin)	IP67
	**BWU3899**	ASi-5 Slave / IO-Link Master, 4 Ports	4	4	–	M12	4 x M12 socket (5-pin)	IP67
	**BWU3897**	ASi-5 Slave / IO-Link Master, 4 Ports	4	2	2	M12	4 x M12 socket (5-pin)	IP67

New ASi-5 Digital Modules

✓ High I/O density
✓ Low overhead costs

	Article	Type	Inputs	Outputs	Wiring	Input voltage	Output voltage	Connection of ASi	Connection of periphery	Protection rating
	**BWU3894**	ASi-5 Digital Output Module	–	8	Single	–	AUX	Profile cable	8 x M12 socket (5-pin)	IP67
	**BWU4193**	ASi-5 Digital I/O Module	8	8	Y	ASi	AUX	M12	8 x M12 socket (5-pin)	IP67
	**BWU4194**	ASi-5 Digital Input Module	16	–	Y	ASi	–	M12	8 x M12 socket (5-pin)	IP67
	**BWU4195**	ASi-5 Digital Input Module	8	–	Single	ASi	–	M12	8 x M12 socket (5-pin)	IP67
	**BWU4196**	ASi-5 Digital Input Module	16	–	Y	AUX	–	M12	8 x M12 socket (5-pin)	IP67
	**BWU4207**	ASi-5 Digital I/O Module	8	8	Y	AUX	AUX	Profile cable	8 x M12 socket (5-pin)	IP67

New Active Distributors ASi

✓ Especially flat form factor (19 or 35 mm deep), can be installed in cable duct
✓ Appropriate connection of periphery integrated
✓ Comfortable parameter setting using B+W software suites

	Article	Type	Depth	Inputs	Outputs	Input voltage (sensor supply)	Output voltage (actuator supply)	Connection of ASi	Connection of periphery	Protection rating
	**BWU4083**	Active Distributor ASi-5 for controlling RGB lights over ASi	35 mm	–	1 x RGB (3 x PWM)	–	out of AUX	Profile cable	1 x M12 cable socket (straight, 4-pin)	IP67
	**BWU3785**	ASi Active Distributor for connecting Banner K50 Pro Stacklight to ASi	35 mm	3 x digital	4 x digital	out of AUX	out of AUX	Profile cable	2 x M12 cable socket (straight, 5-pin)	IP67
	**BWU4087**	ASi Active Distributor for connecting Banner K50 Pro multicolor indicator to ASi	19 mm	–	4 x digital	–	out of AUX	Profile cable	1 x M12 cable socket (straight, 5-pin)	IP67

Other new ASi Motor Modules:

BWU3907
✓ ASi-3 Motor Module for Volta24 BLDC drives, IP67, M12/M8, 1I ✓ Controls 1 x Volta24 BLDC motor with external commutation ✓ 1 digital input ✓ 1 AB Slave ✓ Input voltage out of AUX ✓ Motor voltage out of AUX ✓ Connection of periphery via 1 x M12 cable socket (straight, 8-pin) and 1 x M8 cable socket (straight, 4-pin), cable length both 1 m ✓ Connection of ASi using profile cable ✓ Especially flat form factor, can be installed in cable duct ✓ Protection rating IP67

BWU3628
✓ Active Distributor ASi-3, IP67, M12, 2I/20 ✓ Motor Module for controlling Lenze Smart Motors ✓ 2 digital inputs ✓ 2 digital outputs ✓ 1 AB Slave ✓ In- and output voltage out of AUX ✓ Connection of periphery via 1 x M12 cable socket (straight, 5-pin) ✓ Y wiring (inputs), round cable/connection leads (outputs) ✓ Connection of ASi using profile cable ✓ Especially flat form factor, can be installed in cable duct ✓ Protection rating IP67

BWU3783
✓ Active Distributor ASi-3, IP67, 4I/30 ✓ Motor Module for controlling 1 x Lenze Smart Motor ✓ 4 digital inputs ✓ 3 digital outputs ✓ 1 AB Slave ✓ In- and output voltage out of AUX ✓ Connection of periphery via 4 x M12 cable socket (right-angle, 5-pin) ✓ Connection of ASi using profile cable ✓ Especially flat form factor, can be installed in cable duct ✓ Protection rating IP67

BWU4205
✓ ASi-3 Motor Module for 24 V motorized rollers, IP67, M12, 2I/2M ✓ Controls 2 x 24 V Interroll EC5000 motorized rollers (20 W / 35 W) ✓ 4 digital inputs ✓ 2 digital outputs, 2 analog outputs ✓ 1 AB Slave ✓ Input voltage out of ASi ✓ Output voltage out of AUX ✓ Connection of periphery via 4 x M12 sockets (5-pin) ✓ Connection of ASi using profile cable ✓ Internal line protection fuse, separate for each motor 4.5 A (slow-blow) ✓ Protection rating IP67

ASi Light Button Module (BW3478)
✓ ASi Light Button Module, illuminated (white/blue) ✓ 1 x illuminated button (blue) ✓ 1 x illuminated rotary switch (white), momentary contact function (2 x 40° as NO contact) ✓ With mounting clip ✓ Connection of ASi using M12 plug ✓ 1 AB Slave ✓ Protection rating IP54

ASi-5 Counter Module, IP67, M12 (BWU4202)
✓ 4 x counter inputs ✓ 4 x M12 sockets ✓ Pulse counter ✓ Counter frequency max. 250 kHz ✓ Input voltage out of ASi ✓ Connection of periphery via 4 x M12 sockets (5-pin) ✓ Connection of ASi using M12 ✓ 1 ASi-5 Slave ✓ Protection rating IP67

IMPRINT

Publisher
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ASi-5

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Hall 9, booth H01
13.07. – 17.07.2020

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