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AS-INTERFACE MASTER NEWS

THE BIHL+WIEDEMANN MAGAZINE

INTERVIEW

Optimal data for big data

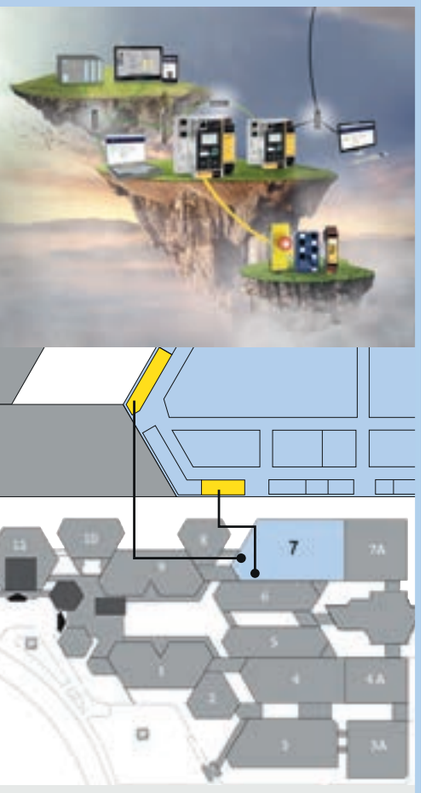
UNIVERSAL DATA EXCHANGE

BETWEEN THE WORLDS

ASi INTERFACE

Bihl + Wiedemann

THE AS-INTERFACE MASTERS



Editorial

Dear reader,

”Nothing in the world is as powerful as an idea whose time has come.”: Of course the French author Victor Hugo had no clue of industry 4.0 when he formulated this sentence – nevertheless he hits the bull’s eye there too with his appropriate words. One thing is certain: the smart factory of tomorrow will come, and with it the digital linking of industrial manufacturing with information technology.

As specialists in automated communication on the lower field level – for which AS-Interface is virtually predestined – we are certainly not the primary drivers of this holistic megatrend. But it does provide us with a fundamental task: because it goes without saying that the data collected via AS-i from actuators and sensors plays an important role for analyses on the top-most IT level.

Here AS-Interface is presented with two large challenges: for one, in addition to safe and non-safe controllers, diagnostic programs, remote maintenance servers and visualization tools there will be another highly demanding interested party for AS-i data in the future – which means for us that our Gateways need to become significantly more powerful in one fell swoop. Secondly, users are finding for many reasons that it makes little sense to push the data all the way from the bottom to the top using traditional communication paths – we need so to speak a direttissima, a direct route in the form of another communication channel which enables data transfer between our gateways and the IT level independent of the controller channels.

Together with the customers our development engineers have given great thought during the past year to how exactly to configure AS-Interface for the intelligent factory in accordance with industry 4.0. You can read about the first results on the following pages. We hope you will enjoy reading it.

Best regards,
Jochen Bihl & Bernhard Wiedemann
Managing Directors

Interview with Jochen Bihl and Bernhard Wiedemann, Founders and Managing Directors of Bihl+Wiedemann

“Optimal data for big data“

The efficiency of the intelligent factory in the age of industry 4.0 rises and falls on the quality of the data to be analyzed. At the same time, ever more complex production plants need ever simpler structures if they are to remain manageable by the operator. Especially equipment at the base level of automation needs to be upgraded without compromise. In a conversation with AS-i MASTER NEWS Jochen Bihl and Bernhard Wiedemann sketch out their strategy.

Bernhard Wiedemann (left) and Jochen Bihl (right), Managing Directors of Bihl+Wiedemann

AS-i MASTER NEWS: Mr. Bihl, it was almost exactly two years ago when in an interview on the subject of industry 4.0 you said: “Even if no one can yet define in specific detail what the optimizations will look like – one thing is clear: something great is imminent.” How does your estimation sound today?

Jochen Bihl: That something great was imminent has been more than confirmed in the meantime. What exactly it looks like in detail is something we still don’t know, but we actually don’t have to: the big data analyses which will be a basis for the intelligent factory of tomorrow are being performed on a much higher level than that of the actuators and sensors. At the end of the day we are “only” responsible for ensuring that the data arrives there in the most optimal form and in the most efficient way possible so that it can be analyzed. And I say “only” in quotation marks because we cannot forget what an enormous challenge lies behind this task. If the data coming from the lower level is no good, the analyses on the upper level are of no use at all.

Bernhard Wiedemann: Our AS-i Gateways are often the first component in the automation pyramid which provides sufficient performance to deliver all the data from actuators and sensors to various interfaces. And this is exactly what we see at the moment as our most pressing task: making our devices ready for all the increasing demands our customers will place on us in the next few years as part of industry 4.0.

AS-i MASTER NEWS: How much time is still left for this?

Bernhard Wiedemann: Not much. The whole thing has in fact become concrete for us faster than we originally thought. There has been a lot of talking about it for quite some time already. But now there are users who are saying: "As soon as you have devices with the needed power and necessary interfaces, we are ready to install them – we can already see the added value." Which is why we are working intensively right now on the implementation. We will be introducing the first results at sps ipc drives in Nuremberg.

Jochen Bihl: I believe this sudden dynamic on the part of our customers is the best thing that could have happened to us. The direct line to practical situations is known to motivate our developers to their greatest level of accomplishment. We always prefer to find concrete solutions to concrete problems in cooperation with our customers. When the results of these specific solutions then turn out to have universal application, this is of course ideal. And this is exactly the ideal case we are dealing with here.

AS-i MASTER NEWS: What should, and what will run more efficiently, simpler and faster in the digital factory of tomorrow compared with today?

Bernhard Wiedemann: First comes the recognition that automation technology must provide an appropriate response to the rapidly increasing complexity of manufacturing plants. If the technology doesn't change, there will inevitably come a point where it is no longer manageable by the user. Therefore we need to structure the systems simpler, and they need to become more logical.

Jochen Bihl: The demand for easier operation of the systems means conversely that complexity on the component manufacturer side is exploding. Take for example a 7-year old boy with his new smart phone: he can easily talk to his grandmother, watch videos and chat with his friends on WhatsApp. But this is only possible because in the background the device is taking care of everything required for complicated technical operations.

AS-i MASTER NEWS: Does this mean your vision is for manufacturing systems to someday become as easy to use as a smart phone?

Jochen Bihl: Exactly. The user should be able to go through his plant with a tablet in his hands and with one click get an overview of everything that is important to him at this moment. The system could use voice output to say "Check in the back, left side, there is a loose terminal on module 4711 – you need to tighten it before it causes trouble." There shouldn't be any more unexpected problems, since big data analyses can identify more of the potential problem sources far in advance.

Bernhard Wiedemann: And once a month the strategy program could make a suggestion for targeted optimizations of the individual production steps – say according to the motto "If you make the following changes you can produce two more automobiles per day. We know this because we have performed a simulation using the actual data from the specific machine, which we record every day and every second."

AS-i MASTER NEWS: And the optimal data for big data comes in part from AS-Interface?

Bernhard Wiedemann: Yes. The data is to a certain extent the raw material. It has always been there, but until now it hasn't been accessible. With our new hardware

Jochen Bihl with an AS-i 3.0 CIP Safety over EtherNet/IP+Modbus TCP Gateway

platform we are able to aggregate the data and deliver it in a form that allows the data analysts to do something intelligent with it. What they exactly do with it is less important to us. Our job is to prepare and provide the data in the best way possible for any conceivable use.

Jochen Bihl: There is one critical aspect here: we integrate an additional interface into our devices so that the IT specialists can have direct access to our data. This is important because the controller of the plant is of course still running in parallel. Without this additional interface the data would have to be routed to the top through multiple controllers. This would represent not only enormous effort for the PLC programmers, but also great risks: if something goes wrong, in the worst case the machine or the warehouse may be entirely shut down.

AS-i MASTER NEWS: I assume this additional interface also noticeably increases the requirements for the computing power of your devices?

Bernhard Wiedemann: Correct. The AS-i Gateways that we started with had just one interface to the top and one to the bottom, and in between some calculations were made. At that time there was also just one recipient interested in the data from sensors: the PLC. Today we are dealing with multiple recipients: from the diagnostic software to the remote maintenance server to the visualization tool. Furthermore each module communicates via Safe Link with many others of its kind in other safe AS-i networks. All that happens simultaneously. And now IT analysis comes along as an additional entity that wants to be supplied with data.

Jochen Bihl: To give you just a few figures: our earlier device generations had a 16 MHz processor. Our future hardware platform will use dual-core processors running at 800 MHz. The computing power of our devices has therefore grown by a factor of 100 in the last 10 years. In words: one hundred! Of course here we benefited from a favorable situation in the processor market. We are clearly benefiting from the fact that the prices for powerful, small chips have fallen thanks to rapid development in the area of mobile phones. And so we decided to go right to the limits of what was affordable in order to develop 'future-proof' solutions so that we are prepared for any eventualities over the next five years.

AS-i MASTER NEWS: Do these dramatically increasing demands pertain only to the standard application or also to safety technology?

Bernhard Wiedemann: When all is said and done there is hardly any difference. The only thing that is different are the respective drivers. In standard applications the trend is towards industry 4.0, which makes upgrading unavoidable. Our safety concepts on the other hand need greater performance because we are finding ourselves in ever more complex environments. This means the object is to control even more drives and turn them off with even greater differentiation. In early 2016 for example we were able to safely monitor eight drives via CIP Safety over Sercos, and tomorrow it will need to be 30 of them. This is not a factor of 100, but still a different order of magnitude – and it has to be implemented in an even shorter time.

AS-i MASTER NEWS: With respect to the additional interface in your devices you have settled on the OPC UA protocol. Why was that?

Bernhard Wiedemann with the new EtherNet/IP+Modbus TCP Gateway BWU3543

Jochen Bihl: There are several reasons. For one thing it is an open standard that enables communication with a wide range of components. We can take the data we have collected and send it to a cloud, a local server or to a visualization tool. It is precisely this flexibility that plays such a central role in view of further developments concerning industry 4.0. For another, OPC UA is currently the most widely used protocol in this context. Which is why as of today at least we consider it to be the best solution? And then there was also another very individual reason for this decision: customers are already waiting for our gateway with OPC UA so that they can connect it past the PLC to the operating panels. Should a different standard establish itself tomorrow, that would of course not be a problem for us either. Multi-language automated communication based on many different protocols is actually one of our specialties. Consider just our wide range of Gateways from AS-Interface to nearly all commonly used automation systems.

AS-i MASTER NEWS: IT security is of course gaining in importance in the age of industry 4.0. How secure is secure given the current state of the art?

Bernhard Wiedemann: In the first place OPC UA offers a clean cryptographic concept. It contains all the modern mechanisms such as RSA or AES, which are of course supported by our devices – and these are the best prerequisites for building an effective cryptography infrastructure in the respective plant. Additional security comes from the fact that the various network interfaces in our devices are physically separated. This simplifies segmentation of the systems greatly and thereby makes access from one network to another much more difficult.

Jochen Bihl: And any users who do not want to use OPC UA currently don't need to worry either. The OPC UA interfaces in our devices are disabled by default.

AS-i MASTER NEWS: You noted earlier that universal automated communication has always been one of the strengths of Bihl+Wiedemann. This would have to mean that the current trend towards greater networking is actually a welcome development…

Jochen Bihl: Yes, this is exactly how we see it. The challenge that awaits us is in fact already part of our DNA. We are meeting it with the corresponding decisiveness: confident, but not presumptuous. As AS-i specialists we are not pioneers when it comes to industry 4.0. But we will provide anyone who wants to profit from big data analyses with the data they need in the best possible way.

Bernhard Wiedemann: And one thing you should never forget: the greatest competition to our AS-i based systems is still the cumbersome parallel wiring, and that will definitely have a difficult time competing in the intelligent factories of tomorrow.

AS-i MASTER NEWS: Mr. Bihl, Mr. Wiedemann, thank you for speaking with us.

AS-INTERFACE | TECHNOLOGY

Universal data exchange

Between the worlds

The digital networking of industrial production with information technology is the central nervous system of the intelligent factory of tomorrow. With a new hardware platform Bihl+Wiedemann is ensuring that the data from actuators and sensors arrives with optimal preparation at the top IT level. The bridge between the worlds leads first over the open communication protocol OPC UA, which has established itself currently as the first de facto standard for industry 4.0 applications.

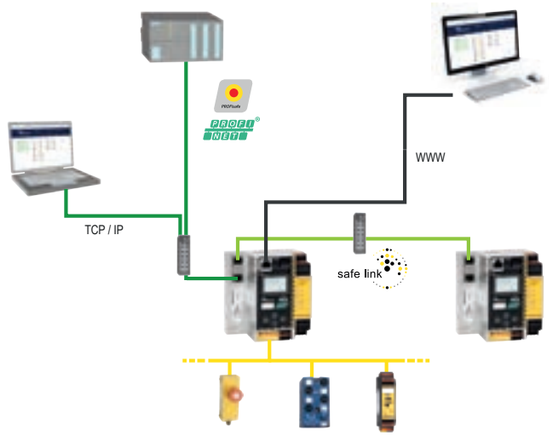
The history of Bihl+Wiedemann is a history of universal automated communication. The Gateways from the AS-Interface specialists have always spoken all the languages of automation – and can be incorporated into the most varied control systems as simply as a normal slave. It is to these perfect team player qualities that AS-i owes a not inconsiderable part of its global success.

That the era of industry 4.0 is now beginning means "just" one thing from the perspective of the AS-Interface Masters from Mannheim, Germany: the team that is playing together with AS-i will consist of many more players in the future. Because in the intelligent factory of tomorrow it is not just the host controller that is interested in the data from actuators and sensors. In view of the rapidly increasing networking of industrial production with information technology a whole series of additional recipients is suddenly appearing on the scene (see also the interview "Optimal data for big data" starting on page 3).

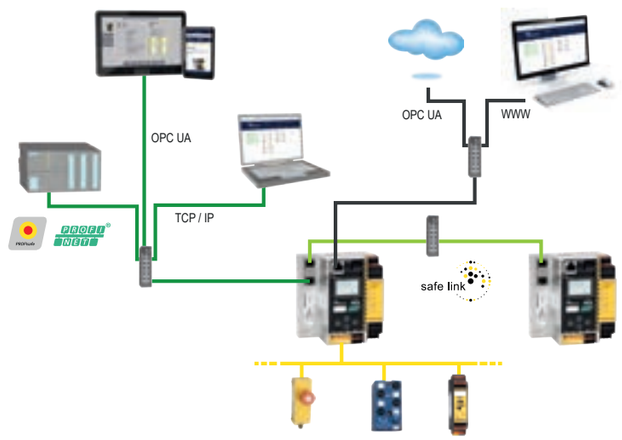
And no matter whether the data is sent to a PLC or diagnostic PC, to a control panel or webserver, a local analysis server or to a cloud for further analysis: the data from the actuators and sensors forms the basis for everything that happens on the next levels. Thus, it must be available simultaneously, but how the data is used varies greatly: on the lowest level simply structured binary transmission via fieldbus is appropriate with respect to speed and robustness. Further up it is not so much the time as the quantity of data that plays a decisive role. In addition, the higher levels require that the data conveys information by adding corresponding semantics which can be optimally interpreted within the overall context.

To make the data exchange from the bottom to the very top as simple, efficient and reliable as possible, in spite of ever more complex demands, integration of an additional interface is the solution. When selecting the right communication protocol, Bihl+Wiedemann's close relationships with customers served the company well: in numerous discussions with users OPC UA was quickly recognized as the best solution by far given the current environment – customers in Mannheim have even asked specifically for AS-i devices with just this linkage for industry 4.0 applications. "If another standard should become established in the future, we will of course respond immediately," says Managing Director Jochen Bihl. "But at the moment the market has made a clear choice for OPC UA – and this makes absolute sense to us from both a technological and strategic point of view."

Data exchange today



Data exchange in the future with OPC UA



OPC UA as an open communication protocol both through the fieldbus and the diagnostic interface

As a universal, standardized cross-platform interface OPC UA already meets all the requirements for the intelligent factory of tomorrow: it enables data access across all levels, networking of components from different manufacturers as well as analysis, processing and representation of the data on a wide range of devices such as smart phones or tablets. It also ensures trouble-free linking to common enterprise resource planning and cloud systems like SAP or Microsoft Azure.

For the user this offers many advantages: thanks to the standardized data transmission to all its machine and system parts it eliminates cumbersome piecing together or conversion of data. This applies both for horizontal integration such as networking of different plants around the world and for vertical integration from the actuator/sensor level through the control and production level up to the manufacturing and execution level and finally to corporate planning.

When it comes to using bite-size delivered data from actuators and sensors there are virtually unlimited possibilities in the age of industry 4.0. That way, monitoring over a longer period of time can help to uncover weak points or irregularities in processes and productions. By processing on a local server or in the cloud parameters for tool wear can be recorded and automatically corrected – sometimes even in-process.

Intelligent algorithms also permit big data analyses on the higher levels: for example with respect to the relation between service life and cost of tools from different manufacturers, optimization of the production cycle and resource consumption, or early planning of servicing (predictive maintenance).

The OPC UA interface, which is now being integrated incrementally into all Bihl+Wiedemann devices, also helps the user in implementing innovative Internet of things (IoT) strategies. And of course thought has been given to effective IT security: a clean encryption concept with all the modern ingredients such as RSA or AES offers the best foundation for constructing a highly effective cryptography infrastructure in the respective plant. Additional security comes from a unique feature of Bihl+Wiedemann devices whereby the various network interfaces are physically separated – a technological trick with two positive effects: it not only makes access from one network to another much more difficult, but also facilitates segmenting of the individual systems. Because one thing is always at the top of a product concept catalog for the development team around Managing Director Bernhard Wiedemann when it comes to industry 4.0: “The more complex the production equipment gets, the more clearly structured the systems need to be.”

Installation technology

The great freedom

As unassuming as they might appear, the Active and Passive Distributors from Bihl+Wiedemann: upon closer inspection one immediately sees the virtually unlimited possibilities they offer when integrating any desired sensors and actuators into AS-i networks. And the new freedoms for AS-Interface users will become even greater in the future: because thanks to the unabatedly increasing demand there are more and more variants of these compact multi-talents.

The great flexibility in designing machines and systems, the easy installation and enormous selection of modules have always been among the decisive advantages of AS-Interface. At the beginning of last year the AS-i Masters from Bihl+Wiedemann again set the bar even higher in these three areas: since then even switches, detectors, sensors or actuators without interfaces to AS-i can be easily incorporated into the AS-Interface network – without expensive special adapters and additional cables that would have to be assembled.

For AS-Interface users this represents a whole new range of freedom when selecting their modules. Because whether a device is AS-i capable or not will hardly play a role in the future. The actuators and sensors can then be chosen exclusively according to application-specific criteria – for example by form factor, electromechanics and range of functions. No more compromises need to be made in this regard. The path to truly custom-tailored solutions is open.

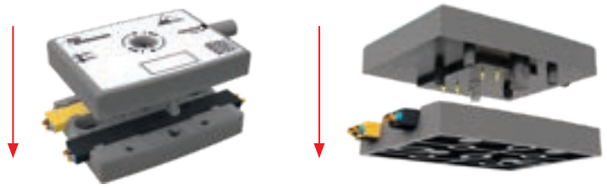
It is all made possible by the innovative Active Distributors from Bihl+Wiedemann with integrated AS-i chip, which thanks to their compact form factor optimized for the cable duct are ideal for individual cable routing scenarios. It used to be for example that some slaves couldn't be positioned exactly where they were needed, since most modules have an M12 or M8 connection on the top side and were accordingly taller. The new Active Distributors do not face this limitation, not even in switchboxes or control panels. And if the sensor favored by a user has an unusual pin configuration, this is no longer a problem either: the compact multi-talents are shipped in exactly the configuration the customer requires – complete with pre-assembled cables.

The same also applies by the way to the new Passive Distributors from Bihl+Wiedemann, which additionally feature two further advantages: for one they offer integrated line protection as an option – either in the form of 4 A replaceable fuses or 1 A self-resetting fuses. They also help to save on hardware: it used to be that installation required two Passive Distributors for AS-i and AUX, making up to four AS-i end caps necessary. The descendants in the current generation are suitable as both the start and end point of the profile cable, making additional end caps superfluous.

How much AS-Interface users have longed for the virtually limitless freedom they get from the innovative Active and Passive Distributors can be seen from the demand, which has continued to rise right from the almost explosive start as the products were introduced. "In my presentations I am getting almost 100% positive feedback," said Director of Sales Christian Lang in an interview with AS-i MASTER NEWS. "Of course such at first glance unassuming products seldom merit a cover page in the trade press, but they make the lives of users so much easier."

For Bihl+Wiedemann the enormous success of the new Distributor generation is reason enough to continually expand the already considerable variety of different versions. Following is a brief glance at the newest family members:

Perfect contacting



Perfect contacting with four gold-plated – turned, not punched – pins per cable ensures that the pins will always penetrate vertically into the profile cable

Upper section can be rotated as desired thanks to the mounting mechanism

By connecting the upper and lower section by mounting mechanism the upper section can be freely rotated without risking damage of the profile cable

Unrestricted selection of sensors/actuators

Active and Passive Distributors for specific applications

- Active Distributor AS-i for controlling valves: 4I/20 module with 6 x M8 socket, suitable for connecting valves (2 x 5/2 directional valve or 1 x 5/3 directional valve + 4 sensors)

- Active Distributor AS-i for Lenze Smart Motor: 4I/30 module with 2 x M12 socket for connecting to the Smart Motor and 2 x M12 socket for connecting up to 3 additional sensors

- Active Distributors AS-i for Schmersal and Pilz interlocks: 1 two-channel safe input, 1 digital output, connection via M12 socket, 8-pin, pin configuration suitable for Schmersal and Pilz interlocks

- Passive Distributor AUX: 2 x AUX profile cable to 1 x M12 power plug, T-coded, for connecting consumers with T-coded M12 power connection, up to 20 A

The concept optimized for manufacturing the Distributors also meets the need for an even greater variety. Until now the circuit board was mounted in a pre-assembled plastic cover. Since recently an innovative injection molding process (Low Pressure Molding) has been used whereby the board is placed in a form and then insert molded. This promises even greater flexibility for the future both in the height of the housing and in the arrangement and number of outgoing cables.

Automated communication

We need to talk

Right at the base of the automation pyramid there is a demand for universal communication capability, so that actuators and sensors can play their supporting role in the modern plant à la industry 4.0. The AS-Interface pioneers at Bihl+Wiedemann have long been making their portfolio ready for the wholly networked future – here are just a few examples:

AGENDA

Safe coupling using Safe Link
Now even more flexible and efficient

With the ability to safely couple multiple AS-Interface networks Bihl+Wiedemann has long been setting new efficiency standards in safety technology: the so-called Safe Link technology is onboard in all the Gateways with integrated Safety Monitor and in the Safety Basic Monitors with Ethernet diagnostic interface and provides all the slaves in the network with safe signals.

Now Safe Link has become even more versatile. Now in addition to the "Standard" option in the ASI-MON360 safety software, which is optimized for speed and availability of the signals, two other variations can be selected: in "Augmented reliability" mode the tolerance of the system is increased at the expense of worst-case response times, whereas the "Fast" setting is targeted towards short worst-case turn-off times to reduce the safety response time over Safe Link by around 75 percent.

safe link

Configuration and diagnostics
Intuitive and self-explanatory

That the simplest bus system in the world needs to be utterly simple to configure goes without saying – both in standard applications and in safety technology. The same thing applies to the comprehensive diagnostic information: the more comprehendible, the more profitable. To achieve this, Bihl+Wiedemann offers various software programs which can run on a normal PC which is incorporated into the same network as the corresponding Gateway.

All these systems are in continuous development – always with the goal of making it as easy as possible for the user. The focus here for example is on intuitive operation, wizard-assisted startup, and also for non-experts a regime of transparent system diagnostics accompanied by clear action recommendations.

Optimized Gateway platform for EtherNet/IP
Extremely fast and future oriented

Bihl+Wiedemann is moving up a gear especially with respect to the trend towards the smart factory à la industry 4.0 at the interfaces to the respective controller. One example are the new EtherNet/IP Gateways, which feature significantly improved cycle time over Ethernet. The RPI (Requested Packet Interval) can be set to one millisecond even for maximum data transmission.

New webserver for remote maintenance
Universal, simple and secure

Remote access to the networked components in an automated assembly plant is taken for granted in the intelligent factory of tomorrow. Bihl+Wiedemann is already paving the way for this – with a consistently advanced webserver having optimal usability and functionality.

Regardless of whether the objective is monitoring, diagnostics and setup or addressing of the slaves at commissioning, or whether the emphasis is on rapid diagnostics of the system, testing and troubleshooting, or simply changing settings on-the-fly: the new webserver makes many Gateway functions available over the network and can be used regardless of the display medium – even with portable terminal devices.

Interface to the field level
Versatile, efficient and cooperative

As sensors become ever more intelligent and provide greater quantities of data, the demands on communication with the components in the field beneath the industrial Ethernet increase as well. The AS-Interface Masters at Bihl+Wiedemann are taking the initiative in driving this development – for example by continually expanding their broad range of IP67 I/O modules with highly efficient and versatile products.

Among the new introductions is a flexibly configurable safety I/O module with 6 to 8 two-channel inputs and up to 2 safe electronic outputs. And of course efficient solutions are also provided for cooperation between AS-Interface and IO-Link: 2 versions of the IO-Link master/AS-i slave with 4 IO-Link ports each for IO-Link Class A or Class B.

AS-INTERFACE HIGHLIGHT

AS-i 3.0 EtherNet/IP+Modbus TCP Gateways with integrated Safety Monitor and improved response time (BWU3542, BWU3543, BWU3544)

- Extremely fast: Significantly improved cycle time over Ethernet
- RPI (Requested Packet Interval) < 1 ms, even with large data quantities
- AS-i 3.0 Gateway with integrated Safety Monitor and Safe Link
- Available as:
  - ✓ Single Master (BWU3542)
  - ✓ Double Master with 1 Power Supply for 1 AS-i network (BWU3544)
  - ✓ Double Master with 1 Power Supply for 2 AS-i networks (BWU3543)
- With integrated switch
- 6 fast electronic safe outputs
- Chip Card for storing configuration data
- Variably configurable Assembly Object
- 3 two-channel safe inputs built-in, expandable with up to 31 two-channel safe inputs (Single Master) or with up to 62 two-channel safe inputs (Double Master)
- Applications up to SIL3, PLe

Other Bihl+Wiedemann innovations at SPS IPC DRIVES

AS-i Safety I/O Modules in IP67 with up to 8SI/2SO/16I/160 (BW3489, BW3490, BW3499)

■ Up to 8 two-channel safe inputs (SIL3, PLe), depending on the configuration ■ Safe inputs flexibly configurable for: floating contacts, optoelectronic protective devices or complementary switches and as standard inputs and diagnostic outputs ■ Up to 2 fast electronic safe outputs, depending on the configuration ■ Connection of periphery using 8 x M12 socket (5-pin) ■ Memory plug for storing configuration data ■ In- & output voltage provided ✓ from AUX (24 V auxiliary power): ● Connection of AS-i and AUX using profile cable (BW3490) ✓ from AS-i: ● Connection of AS-i using profile cable (BW3489) ● Connection of AS-i using M12 socket (BW3499) ■ Protection rating IP67 ■ Flexible use for many different applications, e.g. as muting block in conveying technology (muting with just one module) ■ Space-saving when many safe inputs and outputs are required

Active Distributor AS-i for controlling valves (BW3577)

■ Control of 2 x 5/2 directional valves or 1 x 5/3 directional valve as well as 4 sensors ■ Especially flat form factor, can be installed in cable duct (35mm deep) ■ 4 digital inputs ■ 2 digital outputs ■ In- & output voltage provided from AS-i ■ Connection of AS-i using profile cable ■ Connection of periphery using 6 x M8 socket (straight, 4-pin) ■ Protection rating IP67

Passive Distributor AUX to 1 x M12 power cable plug (BW3568)

■ Connects consumers with T-coded M12 power plugs ■ Especially flat form factor, can be installed in cable duct (25mm deep) ■ Connection of AUX using profile cable ■ Connection of periphery using 1 x M12 power plug (straight, T-coded, 4-pin) ■ Protection rating IP67 ■ Up to 16 A / 20 A possible depending on the black AUX profile cable used

Active Distributor AS-i for Lenze Smart Motor (BW3436)

■ Motor Module for control of 1 x Lenze Smart Motor and up to 3 additional sensors ■ Especially flat form factor, can be installed in cable duct (35mm deep) ■ 4 digital inputs ■ 3 digital outputs ■ In- & output voltage provided from AUX (24 V auxiliary power) ■ Connection of AS-i and AUX using profile cable ■ Connection of periphery using 4 x M12 socket (straight, 5-pin) ■ Protection rating IP67

Active Distributors AS-i Safety for Schmersal and Pilz interlocks

■ Pin configuration for: ✓ Interlock AZM400 from Schmersal (BWU3565) ✓ Interlock AZM200 von Schmersal (BWU3635) ✓ Interlocks from Pilz (BW3488) ■ Especially flat form factor, can be installed in cable duct (19mm deep) ■ 1 two-channel safe input, 1 digital input ■ 1 digital output ■ In- & output voltage provided from AUX (24 V auxiliary power) ■ Connection of AS-i and AUX using profile cable ■ Connection of periphery using 1 x M12 socket (straight, 8-pin) ■ Protection rating IP67

AS-i 3.0 DeviceNet Gateway with integrated Safety Monitor (BWU2972)

■ Modern safety technology from Bihl+Wiedemann now also for DeviceNet systems ■ AS-i 3.0 Gateway with integrated Safety Monitor and Safe Link ■ 1 AS-i Master, Version "1 Gateway, 1 Power Supply for 2 AS-i networks" ■ AS-i Power24V-capable ■ 6 digital inputs or 3 two-channel safe inputs (SIL3, PLe), expandable with up to 31 two-channel safe inputs ■ 6 fast electronic safe outputs, expandable up to a maximum of 31 safe outputs ■ Chip Card for storing configuration data ■ Safe Link over Ethernet diagnostic interface ■ Greatest possible flexibility when using local I/Os in the integrated Safety Monitor ■ Suitable for use in medium size and large applications ■ Protection rating IP20

Digital Module AS-i 4I/0A, IP67, with up to 2 A output current (BWU3540)

■ 4 digital inputs ■ 4 electronic outputs ■ Input voltage provided from AS-i ■ Output voltage provided from AUX (24 V auxiliary power) ■ Up to 2 A output current per output possible ■ Connection of AS-i and AUX using profile cable ■ Connection of periphery using 7 x M12 socket (5-pin) ■ With addressing socket for connecting an AS-i address programming device ■ Protection rating IP67 ■ Drop-in compatible with Schneider Electric ASI67FFP44D

PROFINET Master Simulator Plus DLL Kit (BW3649)

■ Set consisting of monitoring software PROFINET Master Simulator Plus and program library DLL (Dynamic Link Library) ■ DLL: Enables incorporation of the PROFINET and PROFIsafe interfaces into your own programs. Full flexibility in selecting the user interface and automated tests and demos ■ PROFINET Master Simulator Plus: ✓ Universal testing of PROFINET slaves without a PLC ✓ Test Gateway functionality of Bihl+Wiedemann Masters ✓ Test in- and outputs of slaves in systems ✓ Presentation of fieldbus functionality of your own devices ✓ Development of PROFINET slaves ✓ PROFIsafe functionality

AS-i 3.0 EtherCAT Gateway with integrated Safety Monitor, Safety over EtherCAT (FSoE) (BWU3509)

■ Safe control of drives with safe fieldbus connection ■ Safety over EtherCAT, Safe Link and AS-i Safety in one unit ■ Integrated switch ■ 1 AS-i Master, Version "1 Gateway, 1 Power Supply for 2 AS-i networks" ■ AS-i Power24V-capable ■ 3 two-channel safe inputs built-in, expandable with up to 31 two-channel safe inputs ■ 6 independent safe outputs built-in, expandable up to a maximum of 32 independent safe outputs ■ Chip Card for easy device replacement ■ Applications up to SIL3, PLe

AS-i 3.0 Motor Modules, IP67, M12, for 24 V DC motors, reversible (BWU3501, BWU3551)

■ AS-i Motor Modules for direct control of 24 V DC motors or linear drives without integrated intelligence ■ The AS-i Modules are able to change the direction of the drives by reversing the motor voltage ■ **BWU3501:** ✓ Control of 2 x 24 V DC motors ✓ 2 digital inputs for sensors ✓ In- & output voltage provided from AUX (24 V auxiliary power) ✓ With integrated current limiting ✓ Connection of AS-i using profile cable ✓ Connection of periphery using 4 x M12 socket (5-pin) ■ **BWU3551:** ✓ Control of 1 x 24 V DC motor ✓ 2 additional electronic outputs ✓ 4 digital inputs for sensors ✓ Input voltage provided from AS-i ✓ Output voltage provided from AUX (24 V auxiliary power) ✓ Without integrated current limiting: maximum of 8 A output current per motor available ✓ High output current allows even heavy loads to be moved and held directly with 24 V DC motor ✓ Connection of AS-i using profile cable ✓ Connection of periphery using 4 x M12 socket (5-pin)

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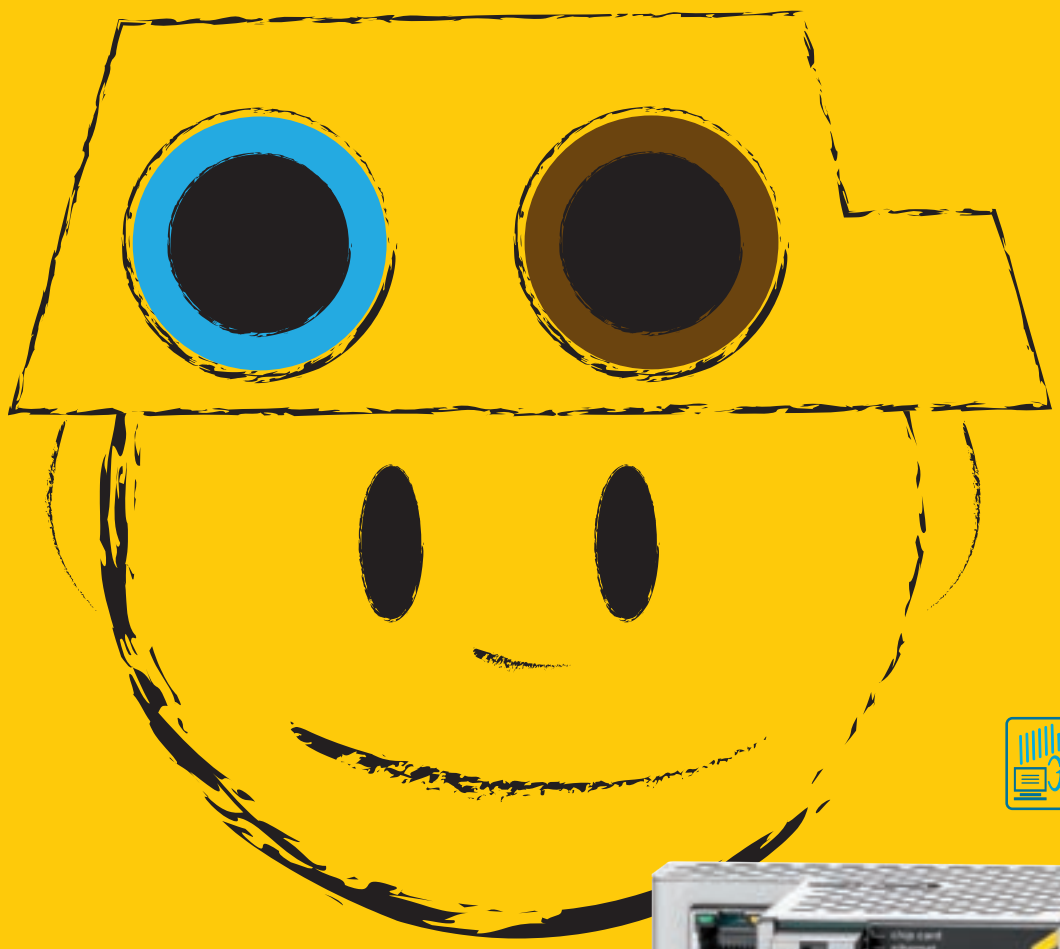

sps ipc drives
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Simple safety technology for greater efficiency

- Safety technology with AS-i Safety at Work: only one cable for data and power - easy to use, independent of system and manufacturer, approved
- PLC connection via all common fieldbuses, all diagnostic data in the controller, safety and standard signals mixed
- Safety Gateways for use as Safety Slave (in combination with a safety controller) and as Safety Master (for safely controlling drives without an additional safety PLC)
- Safe Link over Ethernet: The simplest way of coupling many safe signals
- Universally expandable with Safety I/O Modules + Standard I/O Modules in IP20 or IP67 and with a multitude of other modules for a wide range of applications

More information on your application safety at:
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PROFIBUS PROFINET sercos the automation bus CIP Safety EtherNet/IP Modbus CC-Link CANopen EtherCAT Safety over EtherCAT POWERLINK

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