

ASi-5 – The technology for intelligent automation



Why ASi-5?

ASi-5 technology offers supreme performance for machines and plants. Easy connectivity through piercing technology provides a fast connection for sensors, actuators and field devices. Economically, the ideal automation solution.

Easy connectivity captivates the numerous fans of this automation technology. The system's data transmission performance is now increased by a factor of 40. Through ASi-5 technology, the system offers an easy solution, as it always does, for new challenging applications. AS-Interface is ready to convince, and to unfold new applications with new products.

The performance of the new ASi-5 components opens up the use of AS-Interface in complex intelligent machines and plants. The technology can perfectly be integrated into new plants and service concepts. The system is suitable to all control systems, ranging from classical PLCs and distributed control to cloud service. AS-Interface is the data shuttle for process and diagnostics data.

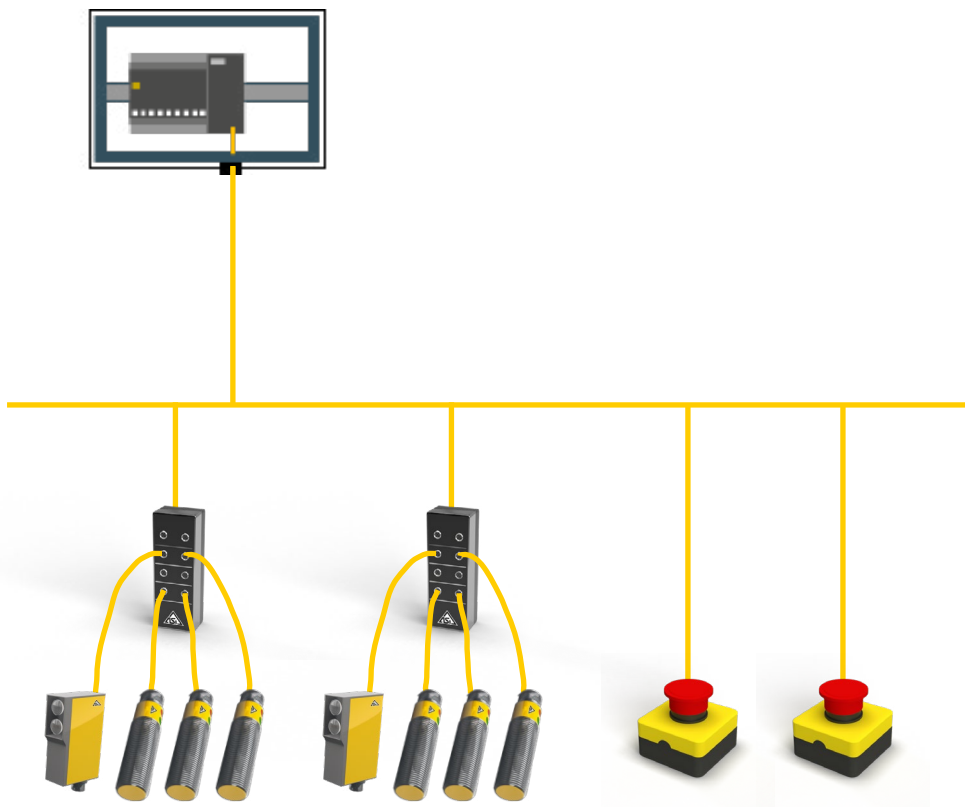




The new technology ASi-5

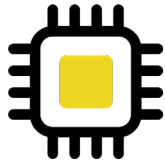
ASi-5 is a state-of-the-art communication technology based on the orthogonal frequency division multiplexing method (OFDM). OFDM uses several frequencies simultaneously to transmit data. This technology is able to significantly increase data transmission. In addition, OFDM uses a special implementation of multicarrier modulation where multiple carriers are used for digital data transmission. For this purpose, each connected device receives its own redundant frequency channels. These frequency channels, also called transport channels, are used by the components to communicate with the master. The master manages the communications. ASi-5 can combine several of these transport channels for a device and is therefore able to transmit more data per device and system clock.

Incorporating the advantages of existing AS-Interface technology was an obvious, yet challenging task for the developers. Easy connectivity and the associated electromechanics have a significant influence on the development options. The system developers achieved just that: the new system is fully compatible with the existing one. Thus, existing plants can be enhanced with the functions of the new technology. In new plants, the existing product variety can be utilized to create ideal solutions by using the new functions of ASi-5 technology.



AS-Interface replaces complex wiring with a two-conductor cable for data and energy.

ASi-5 – Features in detail



16 Bit DATA WIDTH

- 16 bits per device per cycle
- Fast bidirectional analog data transmission
- Parallel parameter channel
- Channel-specific diagnostics
- Combined transmission of safe and standard data per device
- Maximum user data image / process data image of 3,072 bytes per system
- Flexible process data up to 32 bytes per device per system

In modern plants, automation is used for more than just controlling production steps. The traditional execution of an “if-then”-list no longer meets the requirements of modern production control. Today, networked production processes are state of the art. This is why ASi-5 was specifically developed to meet these requirements. Devices with sizable data volumes and large parameter sets can now be integrated easily and economically with AS-Interface. Analyzers, drives, encoders and position indicators, identification systems, control valves, devices that generate more than just a short binary signal are now easily integrated. This allows designing solutions for challenging areas of application. In addition, AS-Interface permits the combination with safety communications in terms of functional safety. Safe dynamic movements, safe process data, safe area identification – all running reliably on a single AS-Interface network.

- 1.2 ms cycle time
- System jitter less than 10 ns
- 96 nodes within 5 ms
- Fast analog data transmission



1,2 ms CYCLE TIME

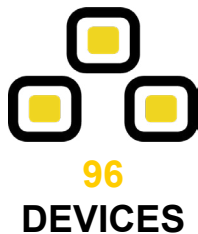
By using multiple transport channels (frequency channels), the new ASi-5 technology always communicates simultaneously with up to 24 components. Therefore, the system can simultaneously communicate with up to 24 axes or independent devices, respectively, with a deterministic cycle time of 1.2 ms and with a system jitter of less than 10 ns.

The new ASi-5 technology can achieve significantly faster cycle times for machines and plants. Machine tools, packaging systems, robotics, ... whenever the focus is on speed, AS-Interface can now



be used with ASi-5 technology. Through faster device control and higher plant speeds overall, economic goals become easier to achieve.

With ASi-5, position accuracy can be significantly increased at the same cost. Compared to other technologies, AS-Interface effectively reduces costs through time saving potentials. Time, that can now be used for other productive processes. This applies not only to engineering but also to parametrization and therefore to setup times.



- Up to 96 devices per master
- Full expandable with standard, safety or IO-Link nodes

Using new message transmission technologies now allows up to 96 nodes on a single AS-Interface network by utilizing the improved data width of 16 bits per standard transmission and the faster cycle times. This results in large transmission capacities; 1,536 binary inputs and 1,536 binary outputs can be mapped. The 96 nodes are connected through a master/gateway that provides the data to the host system.

Larger stand-alone applications are now possible. Even larger systems become more manageable due to the increased number of devices per master as the number of required IP addresses decreases. Now, up to 3,072 I/O points per IP address can be integrated.

Important for everyone already using AS-Interface: Existing systems can be expanded with ASi-5 components without any problems. This creates investment security.

- 16 safe bits per device
- 96 safe devices
- 1,536 safe inputs and 1,526 safe outputs
- Highest safety level/class up to SIL3 / PLe achievable according to EN ISO 13849
- Integration in safe Ethernet systems
- ASi-5 Safety = TÜV certified safety



96x16
SAFE I/O



ASi-5 technology stands for more components on a network, more components that can also provide more safety in plants and machines. Each of the 96 ASi-5 nodes uses the Black Channel principle to communicate bidirectional using 16 safe bits, thus enabling the integration of complex safe devices. With ASi-5 technology, AS-Interface continues to achieve safety level SIL3 and performance level e according to EN ISO 13849. Safe communication on the system is TÜV certified.

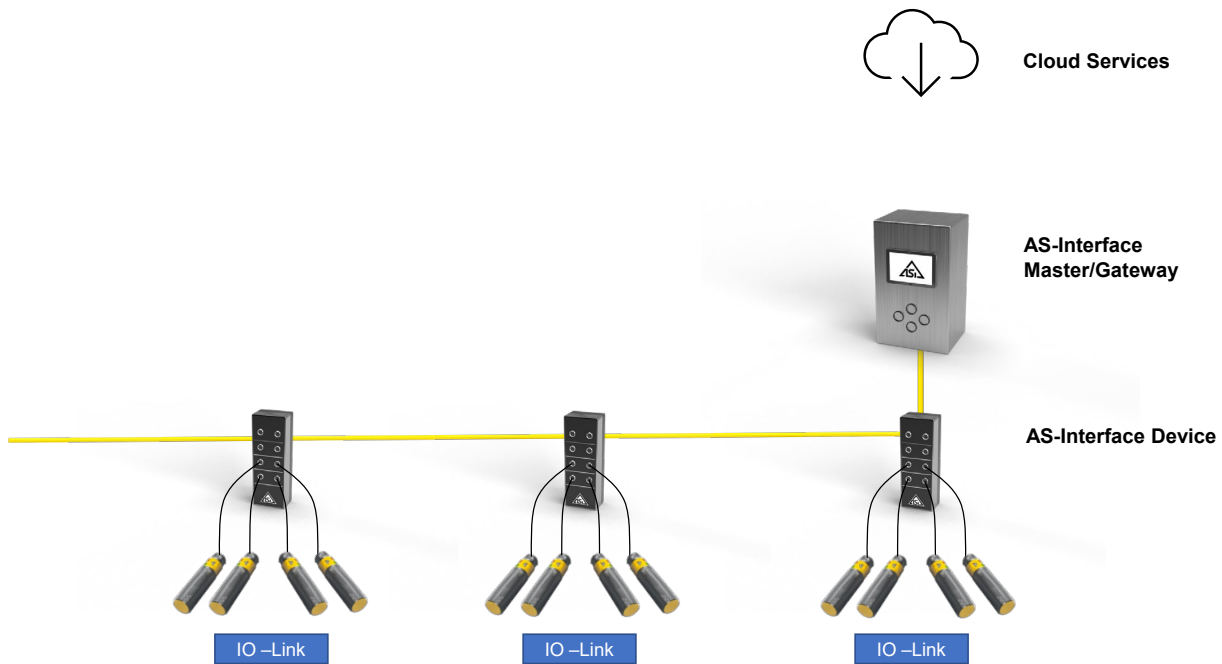
AS-Interface technology can reliably be integrated into Ethernet systems, as does functional safety. Therefore, AS-Interface can be used to wire safety technology in large plants. AS-Interface values the facilitated integration of both standard and safety. Consequently, AS-Interface's primary advantage remains unchallenged in safety technology as well: wiring is reduced. This advantage becomes particularly obvious in safety technology because the traditional design of safety circuits is complex and error-prone. AS-Interface prevents wiring errors by using the AS-Interface profile cable. Using a single cable for safe and non-safe signals facilitates wiring and enables adding new components safely and flexibly.



- Up to 96 IO-Link masters on a single network
- IO-Link can be integrated cyclically with 32 bytes per device
- Parametrization via acyclic services possible
- Networking IO-Link devices over large distances
- IO-Link master ports easier distributed on the network
- Typical ASi Installation with drastically reduced effort, easy and cost-optimized: fewer cables, fewer connectors, no cable assembly through piercing technology
- Economically even with just a few IO-Link devices
- Integrated power supply for IO-Link devices class A

IO-Link is a global interface standard for intelligent sensors and actuators. AS-Interface can easily be combined with IO-Link. AS-Interface allows the cost-effective installation of the IO-Link interface. ASi-5 technology significantly facilitates this concept. ASi-5 IO-Link ports are connected to the AS-Interface network just like ordinary ASi nodes and instantly become part of the AS-Interface network. Connect the IO-Link device to the ASi-5 IO-Link port, parametrize, done!

Up to 96 IO-Link masters can be connected in a single network. Thus, through AS-Interface's reduced wiring, IO-Link can be integrated even across larger distances. The ASi-5 IO-Link port is connected to the yellow cable using AS-Interface's typical easy connection technology, and the IO-Link port is ready to be used. The AS-Interface cable even provides power to the IO-Link devices.



IO-Link becomes network-compatible through AS-Interface. IO-link devices can be integrated just as easily as traditional analog current or voltage transducers.

- Large diagnostics data width
- Diagnostics on the field level
- Channel-specific diagnostics
- Additional acyclic communication services
- Predictive maintenance capable



Extended DIAGNOSTICS

ASi-5 provides diagnostics capabilities that allow the design of highly productive plants and machines with sophisticated features. Diagnostics for predictive maintenance and real time condition monitoring starts in the connected components. Depending on the implementation and the device itself, the connected components can obtain extensive diagnostics information. This information can be transmitted bidirectional using acyclic services without interrupting process communications. Therefore, AS-Interface network components can react swiftly and report situations to the machine or plant operator priority-controlled. Prioritizing of system messages is implemented in the ASi-5 system.

Another system feature is channel diagnostics, also important for predictive maintenance and real time condition monitoring. At any given time, the ASi-5 master has precise information about communications with the individual components on the network. This information is continuously available and can be accessed systematically or on demand.



ASi-5 technology enables detailed diagnostics. Even for systems that start out with reduced diagnostics, ASi-5 offers the necessary reserves. At any time, diagnostics on available system data can be extended by implementing the appropriate data evaluation.



**Proven
connectivity
COMPATIBILITY**

- Familiar and easy connectivity through piercing technology
- Smooth interaction between existing and new AS-Interface components
- ASi-5's complete downward compatibility: Seamless expandability of existing networks for inventory protection and investment security
- Maintaining the strengths typical to the system:
 - Topology freedom
 - Energy and data on a single cable
 - Robust and stable communications
 - Manufacturer-independent interoperability

AS-Interface provides devices, switches, sensors and actuators with an efficient connection to modern control systems by using a two-conductor cable that handles communication as well as power supply. The components can quickly and easily be connected by using piercing technology. The connection can be created at any point at any time. Piercing technology is quick and easy to use. It reduces installation, plant and maintenance costs. This proven connectivity technology is utilized in many plants and machines worldwide.

AS-Interface guarantees the compatibility of old and new devices. New specifications always extend the various existing ones. As a result, first generation devices can still be used side by side with the latest components and functions. If an existing system is to be enhanced with new functions, only the respective components need to be exchanged. Thus, expanding a system to include additional functions is easily achieved. The resulting inventory protection and the associated investment security have a long tradition with the AS-Interface system and are consequently continued for the new technology.

With ASi-5 technology, the system is ready for the future of automation.

Find more information:

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