Innovation: The future of automation
So that data flows openly and transparently

The technology surrounding industrial data transmission and data analysis has changed dramatically. One new term follows the next. GenAI, data analytics, cloud ecosystems – to name just a few catchwords from the field of digitalization. It appears obvious that effectiveness can be increased if there is trouble-free access at all levels. Seamless access and trusted data are subjects that are of concern to users.

Seamless access and trusted data for the future of automation

What are the essential effects of seamless access in automation?

⇒ **Increase in efficiency:** Thanks to seamless access, automation systems can be operated more easily across different platforms so that users can interact with them effortlessly. This improves efficiency by reducing misinterpretations when accessing and using automated services.

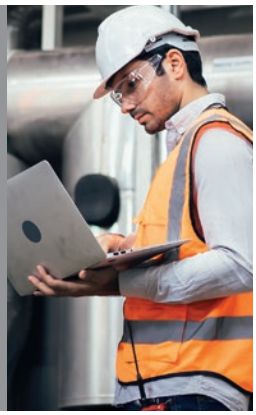
⇒ **Simplification of connectivity:** Seamless access facilitates connectivity between different systems and devices so that they can work together harmoniously. The coupling of different automation and communication technologies is crucial for the construction of modern, integrated automation ecosystems.

⇒ **Improvement of the user experience and increased acceptance:** Automation becomes more user-optimized when users can seamlessly access different automation systems and interact with known and expected behaviour.

⇒ **Increase in scalability:** Seamless access via well-defined interfaces facilitates the scaling of automation solutions and platforms to comply with growing and changing requirements.

⇒ **Simplified data access:** Seamless access facilitates access to data so that users can call up and analyze information efficiently. This accessibility is decisive for easy and effective use of data-based findings to optimize processes.

IO-Link and GEMÜ:
GEMÜ uses IO-Link technology in automation products and supports the community through active collaboration in working groups.
The General Communications Architecture mentioned in the text is one of the results from the IO-Link Future WG, in which the author, Werner Flögel, is involved.



What does trusted data mean for automation?

The term ‘trusted data’ refers to data that is reliable, accurate and secure, and complies with the relevant regulations and directives. In the context of automation, trusted data is essential to ensure the effectiveness, integrity and security of automated systems. Which essential features offer trusted data for automation is explained below:

Trusted data

⇒ …is reliable and correct, i.e. it can be relied upon to precisely reflect the condition of the automated system or the automated environment, consequently avoiding misinterpretation. The semantics of the data are clear, the data is accurate and free of errors or inconsistencies. Accuracy is crucial for automation systems to be able to make correct decisions and take appropriate measures based on the data they receive.

⇒ … is transparent, i.e. its sources, processing methods and significance are well-documented and accessible to all participants.

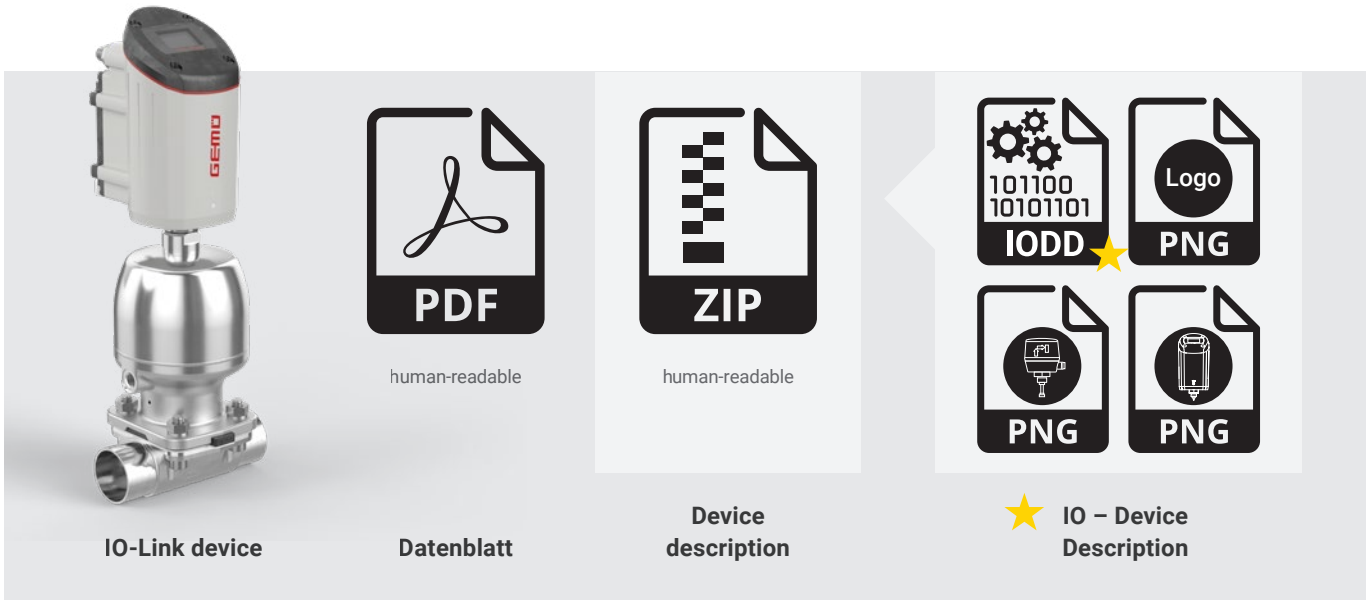
⇒ … is secure and protected against unauthorized access and tampering, and complies with the relevant data protection regulations and standards. Security measures such as encryption, access control and data integrity checks help to ensure that the data remains secure throughout the automation process and is protected against cyber threats and data breaches.

⇒ … is managed through sound data governance practices, with roles, responsibilities and processes for managing data throughout its lifecycle. Data governance contributes to ensuring that data remains trusted and accessible, and complies with company guidelines and standards.

In automation technology in particular, different communication systems are predominant. In addition to IO-Link, Ethernet-based systems such as Profinet, EthernetIP and Ethercat or communication technologies such as TCP/IP and Modbus have been established, to name just a few of the systems used in applications. Data transmission within one communication system is largely considered to have been mastered, and the associated protocols of one system are considered to have been known and established.

In modern systems, data interpretation and data representation have become significantly more complex due to the **combination of versatile and different systems** and protocols. Moreover, in addition to the control logic, IoT and IIoT interfaces are increasingly being integrated for cloud services.

The meaning and semantics of a data word at field level, on the sensor or actuator, should be unambiguous right up to the highest hierarchy level of the automation architecture.



What advantages does the IO-Link data model offer for the future of automation?

IO-Link is a worldwide standard with more than 25,000 devices in the product database and a strong community of 470 companies forming a global group. It is therefore open for all fieldbuses, controls and IoT interfaces.
With the **IODD (IO Device Description)**, it is possible for the IO-Link community to create a machine-readable device description **for all manufacturers**.

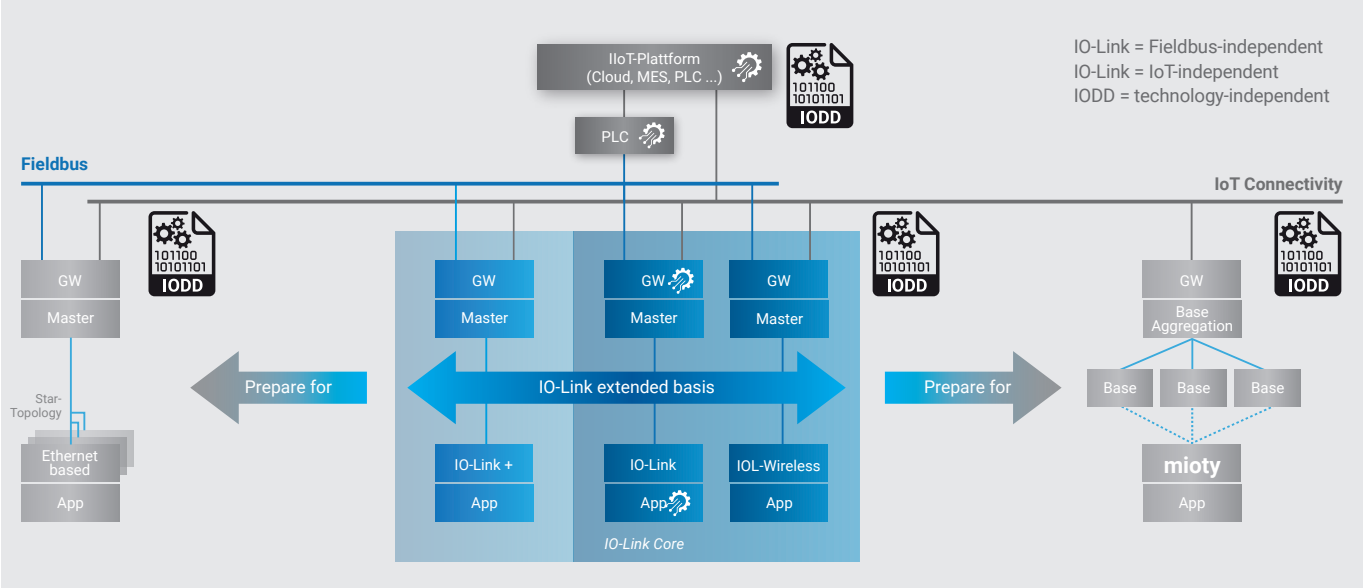
Fieldbus-independent, IoT-independent, technology-independent

Furthermore, the General Communications Architecture of IO-Link technology has made it possible to establish an open and universal concept with the IODD, where users benefit from the fact that different wired and wireless systems can be integrated equally easily into the automation solution. Even new lowest-power technologies like Mioty with completely different data structures can be mapped. Mioty's behaviour is similar to that of a black box. A user no longer needs to know the details of the communication. It is much more important to concentrate on the data of the field devices, such as sensors and actuators, as well as the clear definition and description of these points in the overarching IODD.
This makes automation effective and efficient for the future.

To summarize, the IO-Link data model offers the following benefits for the future of automation:

⇒ Data transparency
⇒ Fast software integration
⇒ Data recording (quality), with uniform format
⇒ Simple device replacement for sensors and actuators
⇒ Creation of your own service cockpits/dashboards
⇒ Online calculation of indicators
⇒ Less Babylon, more compatibility.

Incidentally: IO-Link technology comes from the PNO – Profibus Nutzerorganisation (Profibus user organization).



Typical problems due to the most varied interfaces

Problem:

⇒ Different interfaces in the field, control and management level
⇒ Incomplete awareness of the problem
⇒ Incompatible protocols for data transmission
⇒ No clear semantics of data transmission
⇒ Heterogeneous

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