

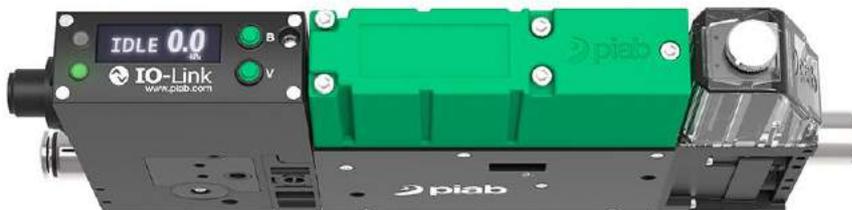
By Josef Karbassi, Vice President Automation Division, Piab

## Generic communication link signals the era of smart factories

***With proprietary and particularly user-friendly software tools for a generic input/output (IO) technology, Piab is taking their first step towards smart sensor and actuator communication. The premium all-in-one vacuum ejector, piCOMPACT®23, is now available with IO-Link.***

Smart factories implementing the Industrial Internet of Things (IIoT) are the focus for the fourth industrial revolution, coined Industry 4.0. In these cyber age factories, sophisticated communication links will play a vital role. Indeed, the German Government's Industry 4.0 initiative has already encouraged some high-end vacuum technology suppliers to provide improved communication concepts for their electronically controlled vacuum systems.

However, in an industrial landscape built with a plethora of different fieldbus protocols, i.e. network systems for real-time distributed control, and with no standardization in sight, it is difficult for suppliers to know where to start. With different countries and different industry segments presenting different preferences, the challenge is often to find solutions that suit as many as possible.



*All-in-one ejector  
piCOMPACT®23 with IO-  
Link.*

### Works with any fieldbus

IO-Link actually by-passes this problem as it is not a fieldbus, but a generic communication technology that will fit any type of fieldbus. IO-Link is the first worldwide standard (IEC 61131-9) for IO technology used for sensor and actuator communication. The powerful point-to-point communication is based on the long established 3-wire sensor and actuator connection, and places no additional requirements on the cable material.

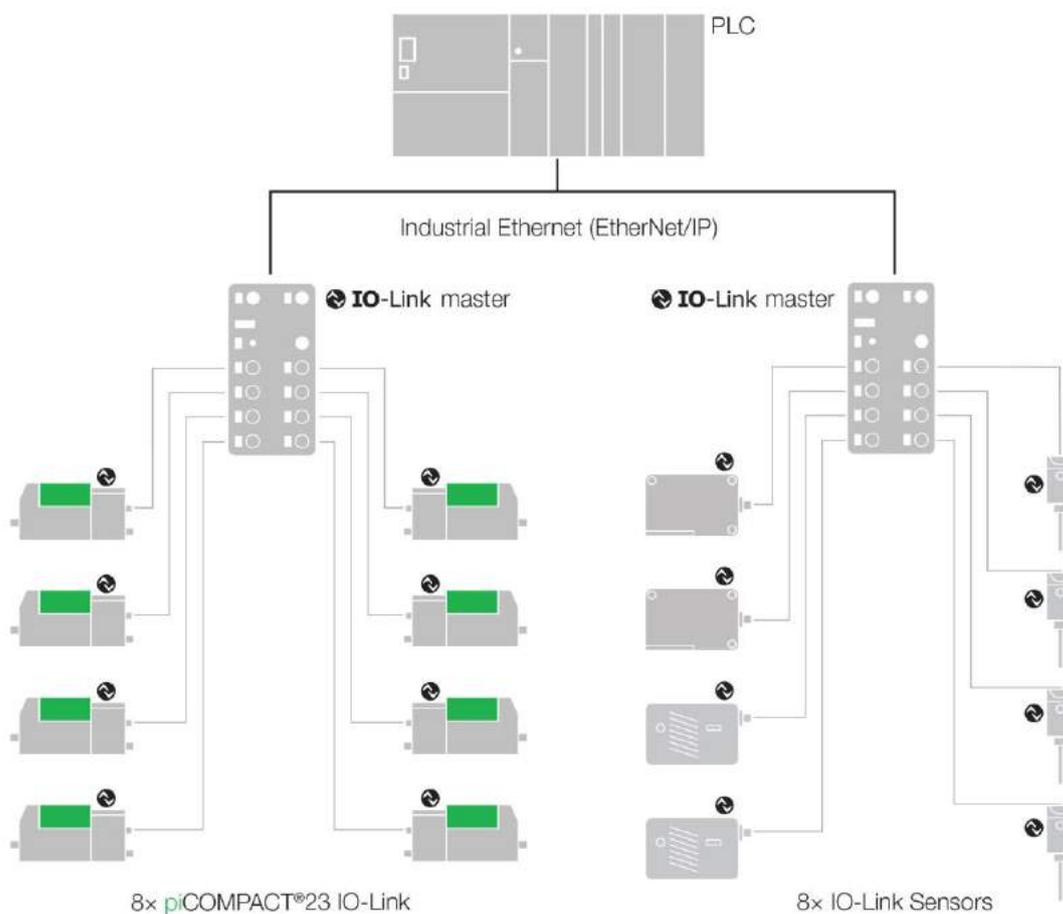
Offering fieldbus-independence, IO-Link is really a further development of the existing, tried-and tested connection technology for sensors and actuators. This made it the obvious right starting-point for Piab, and the compact, [all-in-one ejector piCOMPACT®23](#) is the first of the company's products to be offered with IO-Link as an optional added feature. Some of

the company's other electronically controlled products will follow when the feature gains popularity among users.

### Acts as a gateway

Originally developed in Germany, IO-Link is also becoming increasingly popular in the United States. Designed to offer smart communication within a plant, it is able to act as a gateway to other bus systems used in different parts of the world or in certain industry segments.

As a standard, 2 bytes of process data are available per cycle. The transmission between IO-Link master and device takes 400  $\mu$ s at a speed of 230 kBaud. However, users are also able to choose larger frame types. This means that greater process data of lengths up to 32 bytes can be transmitted at a correspondingly lower cycle time.



*Example of IO-Link system architecture.*

### Less wiring saves space, time and cost

Easy wiring is one of the main advantages offered by IO-Link. The connection between the IO-Link master and the device is established via an unscreened 3-wire cable of a maximum

length of 20 meters (65 feet). The wiring is standardized on the basis of M5, M8 and M12 connectors.

The vast majority of IO-Link devices are equipped with M12 connectors, which can be used for IO-Link's switching mode and communication mode. Each port of an IO-Link master is capable of processing binary switching signals as well as analog values. Serial IO-Link communication takes place via the same port.

However, the potential for savings is not just limited to hardware. There is also scope for simplified programming as it is only the IO-Link master that needs to be attributed an IP address. Conventional fieldbuses have to have individual IP addresses; in systems without gateways, such as IO-Link masters, the large number of IP addresses can be quite daunting for programmers to handle.

### **Benefits increase with complexity**

In plants where several all-in-one ejectors are used, the benefits of using a sophisticated input/output (IO) technology are all the more obvious. Wiring is always a time-consuming and expensive job, and the more IOs that are needed, the more it will cost, not just in terms of money, but also in time and effort. Apart from the great expense of the cables themselves, the space they require also exacts a high price.

Conventional technology requires at least two blocks of IOs for each ejector in order to separate its input from its output, and in applications where also analog signals are used, another IO-block needs to be added. However, as already mentioned, each port of an IO-Link master will handle all these signals, significantly reducing the amount of cabling.

### **Very easy to set and change parameters**

Another important benefit offered by IO-Link is automated parameter setting. To ensure that the parameter data of a device is not lost when a device is being replaced, the data can be automatically stored directly in the IO-Link master. If a new, identical substitution device is connected, the parameters of the previous device are automatically transferred to the new device.

A huge advantage of this smart modern technology is that it enables operators to read and write parameters for various features even during operation. Such a degree of process overview in real-time means that many potential issues can be dealt with before they have any real impact on the production.

### **Better diagnosis improves productivity**

The opportunity for system diagnosis are much improved in a system using data links. Problems can be identified and corrected more easily and quickly. This has the potential to lead to greatly improved productivity, as plants that operate without hiccups are more productive.

One of the key factors behind this diagnostic ability is that, contrary to conventional technology, IO-link offers a data storage function. This enables operators to quickly establish

if and why a device or operation might have failed during, for instance, an over-night run. It makes it possible to identify the cause of a failure; perhaps a faulty device needs to be replaced, or the culprit might simply be an incorrect electrical connection.

### **User-friendly configuration tools**

As it is a generic technology, IO-Link is not unique to Piab. However, each device using IO-Link has to have a unique IO Device Description (IODD). This is the software tool operators use to configure their device. The IODD file directories contain information about the technical parameters and communication properties of, in Piab's case, the ejector units.

Making sure their customers are able to take full advantage of and appreciate the new IO-Link feature, Piab has focused on developing software configuration tools that are as user-friendly as possible. [Downloadable from the company's website](#), the first IODD for the piCOMPACT®23 is intuitive and easy to understand.

### **About Piab**

Established in 1951, Piab designs innovative vacuum solutions that improve the energy-efficiency, productivity, and working environments of vacuum users around the world. As a reliable partner to many of the world's largest manufacturers, Piab develops and manufactures a complete line of vacuum pumps, vacuum accessories, vacuum conveyors and suction cups for a variety of automated material handling and factory automation processes. Piab utilizes COAX®, a completely new dimension in vacuum technology, in many of its original products and solutions. COAX® cartridges are smaller, more energy efficient and more reliable than conventional ejectors, and can be integrated directly into machinery. This allows for the design of a flexible, modular vacuum system. Piab is a worldwide organization with subsidiaries and distributors in almost 70 countries. Its headquarters are in Sweden. For more information about Piab vacuum solutions for a diverse range of applications, visit [www.piab.com](http://www.piab.com).