# Modern positioners

It is not always immediately obvious how important positioners are in industrial processes: surrounded by an extensive network of pipes and huge valves, they are often easily overlooked due to their compact size and direct attachment on the control valve. Yet, they fulfill extremely important tasks in industrial processes.

*By Melanie Dürr*

Positioners link the process control system with the control valve and ensure that the control valve moves to the required position at all times. Positioners also control the flow of the process medium through the valve continuously at the desired rate.

As interfaces, they also enable operators to configure the control valve. For example, they allow valve properties to be configured, such as the direction of action, travel characteristic and travel range, to adapt the control performance to individual requirements. Positioners are increasingly used for on/off service as well thanks to their controlled pneumatics and smart test functions including special analytical algorithms.

In addition, heterogeneous demands are placed on positioners: as usual in process industry applications, positioners are expected to be explosion-protected, rugged and durable. At the same time, they must comply with the latest technical standards, be easy-to-operate and suitable for use in a wide variety of applications. As a result, modern positioners must be extremely versatile. They must offer an excellent control behavior for both small-sized valves and large customized valves. Operators also expect positioners to have a low air consumption since the treatment of compressed air is expensive and complex.

## The evolution of positioners

Over the years, positioners have undergone various evolutionary stages as industrial technology has progressed. Initially, positioners were purely pneumatic/mechanical devices.

In the mid-1970s, electronic components were added to the positioners. This paved the way for electropneumatic devices. The next major milestone was the introduction of digital communication in the 1990s. With a data transfer rate of 1.2 kbit/s (HART®) and 31.25 kbit/s (FOUNDATION™ fieldbus and PROFIBUS®), these communication protocols are still standard in the process industry.

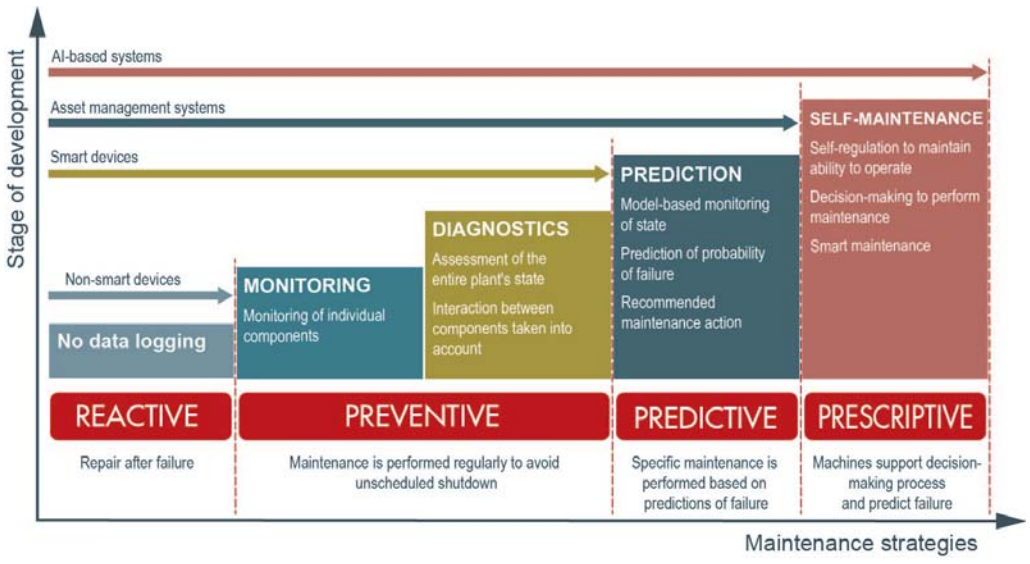
Data transmission will be raised to the next level thanks to the imminent introduction of Ethernet-APL. Various key players in the process industry made consistent efforts over the past few years to pave the way for this new technology. With a data transfer rate of 10 Mbit/s, Ethernet technology, which is well established in commercial environments and factory automation, has been adapted to the special requirements of the process industry to enable the continued use of conventional two-wire technology and the possible use in hazardous areas.

## Key to digitalization

But why do positioners and other field devices need such communication capabilities when their operation is optimized for use in energy-limited zones?

Well, positioners are no longer simple control devices that only rely on the set point, valve position and set point deviation to function. Positioners can also continuously monitor and record raw valve data thanks to the microprocessor, which is a standard feature in positioners these days.

As a result, positioners can condense such data and generate concise, meaningful diagnostic parameters already at the field level. This makes them true data collectors for the entire valve assembly during its life cycle. Such data can be used as the basis for numerous diagnostic

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## Modern positioners in practice

SAMSON proves how technological innovations can enhance a well-established range of positioners.

SAMSON not only joined the Ethernet-APL consortium in its early days and helped contribute to driving forward this technology. The company also constantly strives to upgrade its device base.

For example, TROVIS 3730-1 and TROVIS 3730-3 Positioners, the two latest additions to the proven Series 3730, advance the positioner series by adding state-of-the-art technology. Highlights include optimized air consumption, protected non-contact measuring system as well as a plain-text display with icons and NAMUR condensed state readings.

The positioner range also includes the TROVIS 3793 Positioner, a special top-of-the-range model. Its modular design makes it extremely flexible and customizable for a wide range of requirements. Its pneumatic and electronic option modules can be replaced or retrofitted while the positioner is installed on site.

The web-based SAM VALVE MANAGEMENT solution was developed to integrate valve diagnostics into an efficient asset management and predictive maintenance scheme.

The system is used for the smart monitoring and management of control valves installed in process plants. It provides a complete overview of all connected control valves fitted with smart positioners, a clearly structured dashboard displaying the relevant operating and diagnostic parameters, immediate detection of malfunctions and algorithm-based predictive maintenance.


*Fig. 1: TROVIS 3730-3 Positioner (SAMSON).*

*Fig. 2: Modular TROVIS 3793 Positioner (SAMSON).*

insights, such as the detection of increased valve friction.

Positioners as the only communication-enabled unit within a control valve are also the key to Industry 4.0, IIoT and other digitalization projects. Connectivity to higher-level asset management and cloud-computing systems is essential to the systematic, plant-wide aggregation of valve data, which can be used for example, to identify potential improvements in valve sizing and configurations.

### Maintenance

Another milestone for plant operators is the implementation of predictive maintenance. The continuous monitoring and analysis of valve data make it possible to detect impending failure in advance due to increased material wear at the seat or plug, for example. Countermeasures can be planned and implemented as part of regularly scheduled maintenance routines during plant shutdowns. As a result, expensive unplanned disruption in plant operations due to undetected failures will likely become a thing of the past.

It is not hard to imagine how Ethernet-APL (Advanced Physical Layer) will contribute to improving the continuous availability of valve data across the plant.

### Outlook

The question remains whether positioners have reached their natural boundaries and the potential for their development can go no further.

In view of ongoing market developments, the short answer to this question is clearly no. In fact, development is just starting to gain momentum. The opportunities offered by the use of Ethernet-APL alone reveal what will soon be possible: fast data transmission rates make it possible to put data to much better use. In case of a zero point shift of the valve due to deposits for example, the user can get quick information in order to locate the cause and to take countermeasures.

Positioners have been logging some of these data records for several years already. However, access options will become more varied: Ethernet-APL makes IP-based access to field devices possible. This will enable the implementation of entirely new and more user-friendly concepts for device configuration and diagnostics (e.g. over a web server).

A possible parallel implementation of OPC UA opens up new opportunities as well as enabling NAMUR Open Architecture (NOA) as a second channel.

Trends towards modularity and flexibility in the positioners themselves are also promising. Consequently, the evolution is far from over. Rather, it is well under way.