# Digitalisation: Sensible operation and monitoring of valves

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**Intelligent, forward-looking solutions are becoming increasingly important in complex industrial applications. This is because downtime incurs costs, which a production system operator wants to avoid if possible. The "smart valve monitoring" concept devised by the valve manufacturer EBRO employs continuous monitoring to ensure that all components in a valve unit work correctly, employing various cutting-edge communication technologies.**

Guided by its extensive experience in developing and engineering valves and actuators and prompted by the changing requirements of the market, EBRO has developed a modular sensor platform for drives and actuator units.

## AUTOMATION: BOTH A CHALLENGE AND AN OPPORTUNITY

Automated valves play a crucial role in process engineering these days, regulating flow rates, cutting off product flows and releasing blocked-off pipes and lines. The challenge facing manufacturers of these valves lies in incorporating specific customer requests for the valve and actuator to work in perfect harmony with each other. System operators are also conscious of the need for a monitoring function.
With its special automation technology, EBRO wants to help users to simplify complex systems, lower their error rate and thus set up their operations more efficiently

**Figure 1: Smart Valve Monitoring with Bluetooth interface**

## MODULAR SENSOR PLATFORM

As well as acting as a conventional limit switch box, EBRO's newly developed SBU Advanced platform primarily serves to support plant engineers and operators with their digitalisation projects (**Figure 1**). The shift away from simple switches and sensors towards integrated electronics and the use of "Hall-effect sensor technology" is the key factor in a solution of this kind. This long-established, commonly used technique for the contactless detection of movements, angles of rotation and positions in a wide range of applications monitors the valve position continuously, without any mechanical contact whatsoever. There is no need for any expensive sensors or elaborate wiring either.
Monitoring the valve position in conjunction with an integrated electronic control unit allows important conclusions to be drawn about the operation and status of valve units. It is vital that valves work correctly and close reliably. As a manufacturer of valves, actuators and accessories, EBRO is keen to take end-to-end responsibility for its products – in

this case for its valve units running reliably. All relevant components are included in the monitoring, which thus extends beyond the actual functioning of the butterfly valve. Deviations in the valve's operation, valve failure, insufficient compressed air for the control functions of pneumatic units, and the actuation and running of pilot solenoid valves are all checked reliably. As well as being able to evaluate data from the sensor itself, a great deal of other data can be derived from this and be made available. Information on power cuts, operating hours and switching states is stored throughout the entire lifecycle, while temperature curves provide feedback on ambient conditions. Deviations from standard operation are detected early and output in an error message.

## EASY-TO-USE MONITORING FUNCTIONS AVAILABLE ON THE GO

The extreme and confusing variety of sensors available on the market, all offering largely the same inflexible functions, posed a challenge to EBRO when it devised its concept. Its new solution is based on conventional 24 V signals and is fully compatible with most switches and sensors, meaning that the device is easy and inexpensive to integrate into systems and existing concepts. With its contactless position monitoring, the SBU Advanced represents a more competitively priced alternative. As a modular unit, the SBU Advanced is compatible with commercially available pneumatic actuators with an interface in accordance with VDI/VDE 3845, ensuring that it can be used in new systems and retrofitted into existing ones.

In a first step, EBRO uses an integrated Bluetooth interface to process the data. In combination with the free "EBRO Connect" app, the BLE4.0 wireless standard enables direct access to detailed status monitoring and parameterisation functions (**Figure 2**). This functionality allows the system operator to intervene in processes promptly and methodically. If any maintenance is required, the device can be used to generate information relevant to procurement. These are all factors that contribute to system safety and prevent unexpected system downtime and the associated loss of production. Besides being compatible with mobile devices, another key advantage of Bluetooth is the fact that it can be used as a proper second communication interface for supplying operating and process data while the system is running. As well as running via conventionally wired signals,

**Figure 2: The app identifies the assembly via Bluetooth or a QR code. Specifications and analyses can be read in plain text and transmitted directly to the user's cloud.**

Bluetooth allows a much wider variety of information to be provided than just valve position and status.

## OLD WORLD AND NEW WORLD

Integrability into existing control concepts is also an important attribute for field devices in the long term. Although the hierarchical model of control and communication is likely to be around for some time yet, these control concepts can be enhanced with the addition of more interfaces and channels. This is because new, more "wide-ranging" communication is making it increasingly attractive to enable plant engineers and operators to harness the additional possibilities presented by smart devices in their digitalisation projects. The control systems that many plant engineers use already offer many more benefits nowadays, such as interlinking and supplying data to cloud platforms to name but two. It therefore makes sense to demand more and more data from field devices such as pumps, valves and sensors to create a more transparent process. The data is used to optimise the system and run analyses following faults. The more data on these that is available from


**Figure 3: TMonitoring valve states**

the process and from operation in general, the more reliable these kinds of opportunities will be. EBRO is tackling this challenge by making it simple and inexpensive to integrate the features of the SBU Advanced into conventional devices.

The use of smart field devices that are both comfortable in the "old world" and easy to integrate into cloud-based IoT platforms via a second standardised interface is opening a raft of completely new possibilities. Plant engineers can set up digital services and make them available to the operator without having to interfere with the control devices. In parallel operation, the additional data available is read in the field via an IoT gateway and output. This enhanced form of communication is ushering in entirely new possibilities for working with and using a field device. The inflexible structures are being enhanced with the addition of IT solutions, allowing any number of measurements and states to be stored, for instance. The operator also has a broad range of features at their disposal. There are no limits to data preparation and visualisation, and any necessary alarms and notifications can be generated and forwarded (**Figure 3**).

## IO-LINK: AN ATTRACTIVE BRIDGING TECHNOLOGY

Although suitable for many industrial applications, Bluetooth cannot always be used to access the cloud in practice. If you need to retain the familiar controls, handling and wiring of your equipment but want to make use of the ever-expanding features of smart devices, this is where the communication protocol IO-Link comes in. Based on tried-and-tested wiring, this digital communication interface enables the full functional scope of smart field devices to be utilised. Compared with the inglorious story of the "fieldbus war", IO-Link allows component manufacturers to provide similar access functionality at an extremely low cost and a very low level of complexity. Both this and the proximity of valves to the process could be exploited even more effectively in future – key factors for successful digitalisation strategies of component manufacturers and in plant engineering.

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