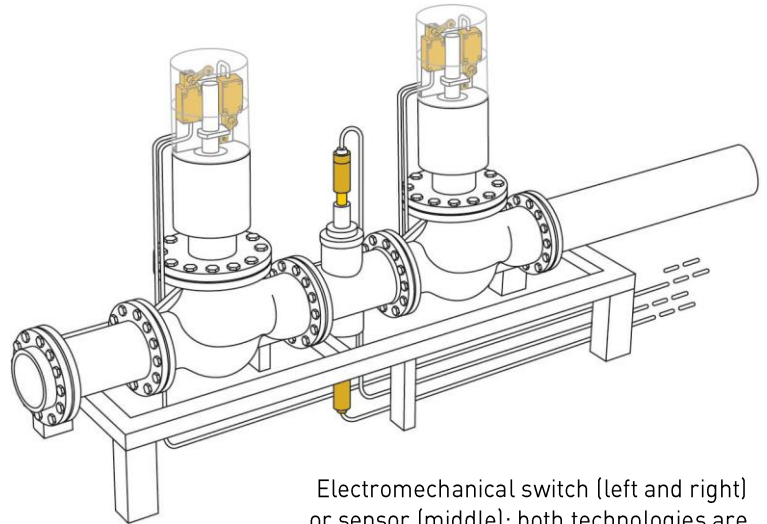




## Keywords

- *Position monitoring*
- *Valves*
- *Switches and sensors*

# Select the right valve position monitoring system



Electromechanical switch (left and right) or sensor (middle): both technologies are suitable for valve position monitoring.

## Switches and sensors for complex applications

Valve manufacturers have a wide choice when searching for suitable switching equipment to monitor valve positions. Different types of electromechanical switches and non-contact sensors are available, with series suited to explosive zones, corrosive environments and subzero applications. In many cases it can be beneficial to opt for wireless switches, including in Ex zones.

Open or closed? That is the key question for fixtures like valves or flaps, especially those integrated in automated plants. This is why valve position monitoring is one of the basic tasks of plant planning – and why valve manufacturers, as well as plant designers and operators, have numerous options to choose between in the steute Controltec range.

### Daily business: adverse environments

Another reason why the available technologies include so many variants and options is because the ambient conditions for valve position monitoring are often so unfavourable that conventional switches and sensors fail to achieve the desired or required lifetime. The switching devices must instead be developed especially for the application profile in question. To name just a few examples, environments could include a risk of corrosion (e.g. offshore), a risk of gas explosion (e.g. in the chemicals industry, energy plants or the hydrogen infrastructure), or extreme temperatures (e.g. in the oil and gas industry).



This Ex position switch with integrated sensor and analogue output signal facilitates the precise position monitoring of proportional valves.



The Steute "Wireless Ex" range includes inductive sensors with a universal transmitter module which also provides the power.

Other application fields involve special hygiene requirements, such as cleaning with hot steam.

### Electromechanical technology or sensor technology?

Independently of these environmental conditions, the two end positions of the valve (open or closed) are monitored separately. Another possibility is to monitor the position of the spindle which causes the valve to open and close. There are two fundamental detection types here: electromechanical position switches or non-contact sensors. Electromechanical position switches usually monitor the valve position at the spindle actuating the valve. Monitoring can be from above or from the side via a ramp. Actuators include roller plungers, roller levers, fulcrum levers or parallel levers.

### Non-contact monitoring – using magnetic or inductive sensors

If monitoring needs to be non-contact, i.e. via a sensor, then magnetic sensors are usually chosen. A permanent magnet is mounted on

the spindle, where it can be detected by the sensor. It is also possible to use inductive sensors not requiring a "target" as their counterpart. Instead they monitor, for example, the position of the metal spindle directly.

For valves used in explosive zones or during the transport of aggressive or health hazardous substances, the pressure chamber is often isolated or encapsulated. This effectively avoids leaking. The valves are switched by solenoid. This of course means that position monitoring also has to be non-contact. In this case it makes sense to use magnetic sensors with large switching distances. The magnetic sensors can detect the current valve position through non-magnetic materials (e.g. stainless steel). The "target" is then a permanent magnet attached to the moving part of the spindle. Another advantage of magnetic sensors is their long lifetime, resulting from the non-contact principle: the mechanical lifetime of the Steute (Ex) RC magnetic sensor series is between 10<sup>6</sup> and 10<sup>9</sup> switching cycles.

## **Demand for explosion protection and/or subzero usability**

Many valve position monitoring applications demand switching devices with Ex protection. This is realisable for both electromechanical position switches and non-contact sensors. Some valve manufacturers require position switches suitable for ambient temperatures up to e.g. 180 °C. Other applications, for example in oil and gas exploration, demand the opposite end of the temperature scale: subzero down to -40 or -60 °C. Here, too, suitable device series are available.

## **Analogue position monitoring is also an option**

The steute range of position switches for industrial valves unusually also includes a variant for analogue position monitoring. One valve manufacturer requested a switching device which not only monitored whether the valve position was "open/closed", but also delivered precise information about the switching state of a proportional valve. The solution: the exact position of the plunger within the position switch is monitored by a sensor and then converted to a standard analogue signal (0...20 mA, 4...20 mA or 0...10 VDC). The position sensor can be programmed in the factory and thus adapted to individual requirements.

## **Wireless technology – also for valves**

Wireless technologies are becoming increasingly established in all branches of

industry – also for valve position monitoring. A typical application case might be the electrical retrofitting of previously hand-operated valves. This can be in cabled form, with a large investment for all the cables which have to be laid, or cable-free, which is the far simpler solution.

This also holds true for explosive zones. Here there is even a special benefit: the switching devices can transmit from inside the Ex zone to the outside. Suitable for "Wireless Ex" applications are e.g. wireless position switches in a slim rectangular design for valve position monitoring, as well as wireless inductive sensors in a cylindrical design. They are ready for radio transmission in combination with an Ex RF ST universal transmitter and are also powered via the transmitter unit. These series are both suitable and certified for use in gas Ex zones 1 and 2, as well as dust Ex zones 21 and 22.

## **Valve manufacturers have the choice**

Valve manufacturers have the choice when designing their perfect valve monitoring scenario. The steute Controltec range offers different options which all work reliably and durably even in adverse ambient conditions. They include series which go beyond expected standards, for example wireless sensors also for Ex zones and subzero temperatures, as well as switching devices for analogue or proportional valve position monitoring.

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