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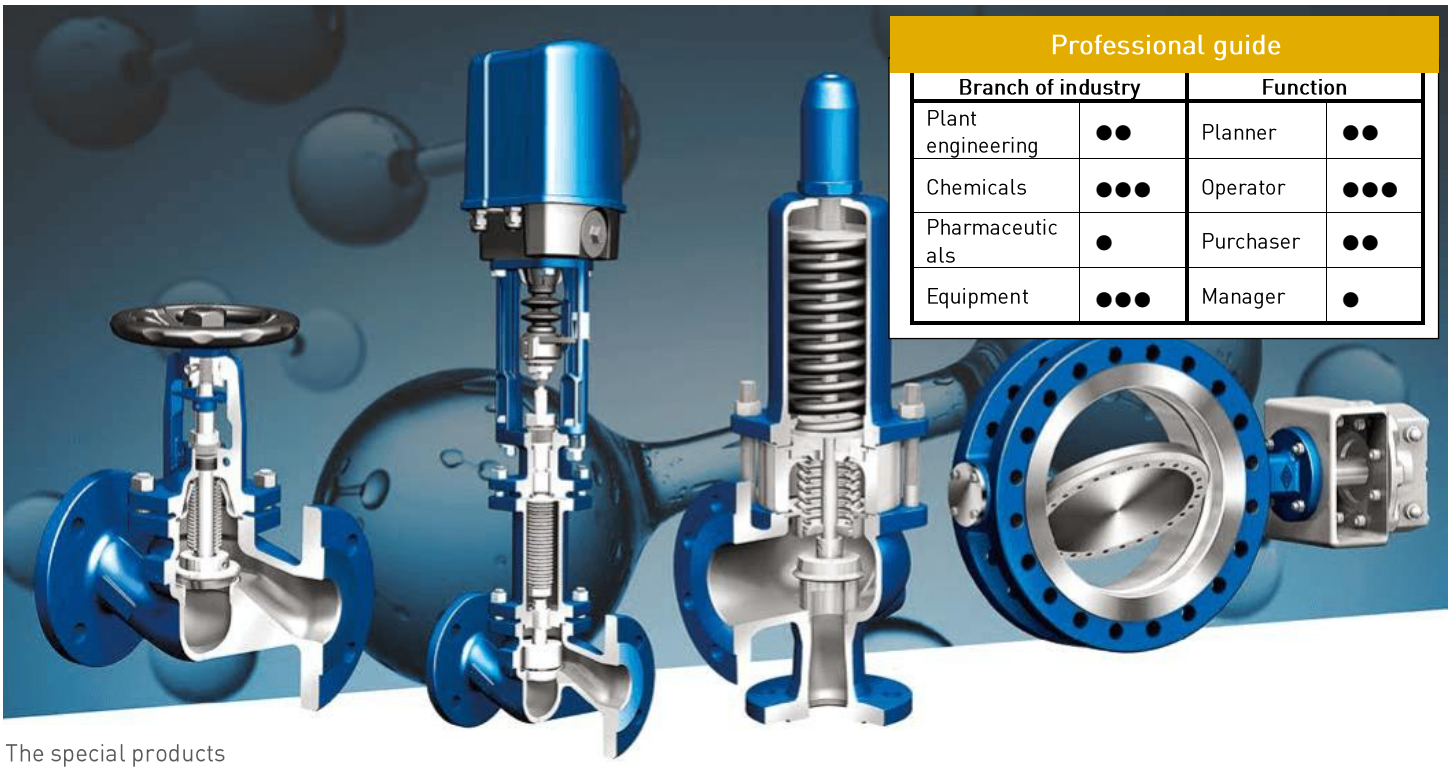
Hydrogen special



Professional guide			
Branch of industry		**Function**	
Plant engineering	●●	Planner	●●
Chemicals	●●●	Operator	●●●
Pharmaceuticals	●	Purchaser	●●
Equipment	●●●	Manager	●

The special products from ARI-Armaturen for the hydrogen infrastructure feature high-level leak tightness, both internally and externally. From left to right: Faba-Plus manual stop valve, Stevi Smart control valve, Safe safety valve and Zetrix triple offset metal seated process valve.

Valve position monitoring for the hydrogen infrastructure

Mechanical, non-contact, wireless

Setting up the hydrogen infrastructure – from the electrolyser to the distribution network to the consumer – requires both suitable valves and controls to monitor their positions.

The hydrogen infrastructure is emerging, and hundreds of valves are required every time individual elements, some very large, such as reservoirs in caverns or electrolysers, are set up. Work on the core network has already begun and is expected to reach completion by 2035. As it expands, the demand for valves will grow significantly.

Valves for the hydrogen infrastructure

Valve manufacturers, such as the company ARI-Armaturen in Schloss Holte-Stukenbrock in Westphalia, are prepared. This company sells a wide range of industrial valves for the control, isolation, safety and steam trapping of liquid and gaseous media. Jan-Eric Fischer, Team Leader Key Account Management, explains why not all valves are suited to hydrogen

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Position switches and inductive sensors communicate via a radio module (centre left) with the corresponding receiver unit (centre right) or with gateway receivers.

applications: "As the lightest element in the periodic table, hydrogen is highly diffusive, and at the same time highly flammable. The highest levels of leak tightness, both internally and externally, are therefore required."

In order to prevent hydrogen embrittlement, both the valve design and the valve production processes must include suitable materials and qualified methods. This is why the company portfolio contains product series specifically for hydrogen applications. They include "smart" position valves, as well as safety valves and process flaps.

Position monitoring with limit switches

Users often require feedback regarding the position of the valves – especially in complex plants and distribution networks. For such cases, ARI provides customised solutions on the basis of a modular product range. Key Account Manager Fischer explains: "The exact technical solution will depend on the type of drive system and any additional installed components. For stroke control valves with a pneumatic drive, for example, the open/closed position can be verified via limit switches at the valve spindle or continuously monitored via a valve positioner. With electric drives, the valve position is monitored directly at the drive system."

If a user requests valve position monitoring with open/closed feedback, the valve manufacturer usually opts for mechanical or inductive limit switches. Here the product of choice is often from the steute Controltec range, and not only for hydrogen applications. "Classic" position switches from various series are used most often, often in explosion-proof variants. But position switches with a safety function, or "Extreme" position switches for heavy-duty environments, are also in demand, as are position switches suitable for use in very high temperatures (up to 180°C).

"Problem solvers" for hydrogen networks

These two cooperating companies have similar business models: both offer a wide range of products which can be adapted to very specific requirements. Both companies have special devices within their portfolios which can act as "problem solvers" in hydrogen applications. At ARI, these include the compact and variable Stevi control valves, which can be fitted with pneumatic or electric drives, the Faba stop valves with bellows seals, the Safe and Reyco safety valves, as well as the Zetrix triple offset metal seated process valves. Overall, the product range covers large parts of the hydrogen value chain – from electrolysers and steam reforming plants, to storage and transport, to applications in e.g. the steel or chemicals industries.

steute produces for these applications not only a comprehensive range of electro-mechanical limit switches for valve position monitoring, but also magnetic switches and inductive sensors for the same task. Wireless switching devices for valve position monitoring are also available.

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Facts for decision makers

- *Hydrogen makes high demands on materials and components, making the emergence of the hydrogen infrastructure an attractive market for manufacturers of industrial valves.*
- *In addition to suitable valves, corresponding switching elements are also necessary, for example to monitor the positions of the valves.*
- *Solutions for adverse environments, high temperatures or with explosion protection are all available as standard products, and wireless control systems are also an option.*

Trending topic "Wireless" – also for valve technology

Wireless technologies are becoming increasingly established in industry, also for valve position monitoring. For such use cases, steute has adapted its compact electromechanical position switches and sensors to include a separate universal transmitter, also supplying the switching devices with energy. This wireless system is suitable for use in gas Ex zones 1 and 2, and therefore also for hydrogen applications. Communication between the sensor or radio module and the receiver unit is via the steute sWave wireless technology. The receiver unit is usually installed outside the Ex zone.

The sensor is powered by a lithium battery which can also be changed inside the Ex zone. This type of power supply permits the use of additional functions, such as monitoring the switching device via a status signal, and simplifies installation in Ex conditions. It also removes the need for Ex-approved cables.

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