Metrology of the future

Labom makes pressure transmitters for hydrogen refueling stations

We are supporting the energy transition with special pressure transmitters for hydrogen refueling stations. There should be around 100 hydrogen refueling stations in Germany by the end of 2020. The technology is not only tricky in terms of propulsion systems, the hydrogen tanks themselves also require highly sensitive and extremely reliable parts and components. Very specific conditions therefore also apply to gauges that measure the tank pressure, for example.

At Labom we have been dealing with this forward-looking topic for some years and manufacture special pressure transmitters for applications in hydrogen filling stations.

The callange of hydrogen

The unique chemistry of hydrogen poses a special challenge: its small and mobile molecules are not stopped by commercially available materials such as stainless steel; they simply diffuse through the metal. If they reach the oil in the diaphragm seal and dissolve in it, hydrogen can outgas as the pressure decreases – expansion that leads to deterioration of the membrane, or in the worst case an explosion. Depending on the material used, hydrogen can also be absorbed by the metal itself, thus changing its mechanical properties and introducing a risk that cracks and fractures occur under load.

Gold - the answer

In order to prevent this from happening, hydrogen compatible devices by Labom have a gold-plated membrane for this purpose.
In general, the wider atoms are arranged in a material, the higher its permeability for the tiny hydrogen atoms. Due to its tight lattice structure, gold is not permeable, even for tiny hydrogen atoms. The diffusion rate of hydrogen in gold is several orders of magnitude lower than stainless steel, which means that in effect it is impermeable for hydrogen.

Labom pressure transmitters are ATEX certified and SIL2-approved. Since the gas is kept liquid under pressures of up to 1,000 bar, the transmitters must also be robustly built - a specially designed, stronger process connection ensures that the mechanical parts of the measuring devices can withstand these high pressures.

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Hydrogen cars – the drive of the future

What is the point of all this effort? Do hydrogen cars really stand any chance alongside electric cars as the drive system of the future? The answer is a resounding yes! Despite all the discussion and research on the topic of alternative drives, it has still not proved possible to make sufficient improvements to battery capacity. Long distances therefore still pose a problem for electric cars. For hydrogen cars the situation is quite different: They have a significantly greater range per tank filling, and refueling is achieved in a matter of minutes. Scandinavia is currently pioneering this innovative technology and has by far the most hydrogen refueling stations - but the topic is also gaining mor and more importance in Germany.

A Scandinavian manufacturer of hydrogen filling stations relies on a pressure transmitter with a gold-plated diaphragm from Labom. The reliability of the devices in particular has convinced the manufacturer: the gauges have worked faultlessly for many years and hardly ever need to be replaced.

We are likewise pleased to be collaborating on this future-oriented project:

“We have managed to develop a customised, extremely reliable solution from a standard product”

says Florian Simpson, Head of International Sales. “It is naturally exciting to play a pioneering role in the development of hydrogen refueling stations in Germany - we are certainly proud to be a part of it with our measuring devices!”

Florian Simpson, Head of International Sales

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