



Safety Service

Turck's interface devices ensure reliable isolation of the Ex signals in Portugal's first hydrogen filling station, and the safety controller from Banner ensures the safety of the overall system

The first hydrogen filling station in Portugal is operated by the municipality of Cascais in the Lisbon region, to refuel its hydrogen buses. This commitment is no coincidence, as two of the largest manufacturers of hydrogen-powered buses, CaetanoBus and Toyota, produce their hydrogen buses in Portugal.

These buses will be refueled for the first time at a mobile hydrogen filling station operated by PRF Gas Solutions. The company has specialized for thirty years

in systems for the distribution, compression, storage, refueling and transport of natural gas – and also hydrogen since 2021. The tender for the first hydrogen filling station reached PRF in the middle of the Covid-19 pandemic. Supply chains were under particular strain at that time and as a result replenishment and delivery times for many industrial goods were extended. PRF ordered hydrogen compressors, valves, pipes and other components in advance in order to be able to manufac-



The control cabinets house the hydrogen filling station's control and communication technology

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PRF Hydrogen Solutions implemented the first hydrogen filling station for refueling H2 buses for the Portuguese municipality of Cascais in record time – despite difficult conditions due to supply chain problems caused by the pandemic. The system has a modular design and can therefore be transported at any time if required. Bresimar Automação, Turck's representative in Portugal, supported PRF with the appropriate interface technology for safe processing of the Ex signals and safety controllers from Banner Engineering, which ensure the system safety of the H2 filling station.

ture a hydrogen filling station in the shortest possible time.

This foresight quickly paid off when the municipality of Cascais purchased two hydrogen buses and commissioned PRF to build the hydrogen filling station. Despite the foresighted procurement, there was only a little more than a month to implement the H2 filling station. "There really wasn't much time to design everything, calculate everything, lay out the mechanics and structure and everything else. We finally received the compressor we ordered two days before the deadline," says Hugo Antunes, project engineer for hydrogen filling stations at PRF, describing the tight schedule of the project.

The automation and control of hydrogen filling stations is considerably more complex and demanding than conventional filling stations for petrol and diesel fuels. During refueling, the vehicles communicate pressure values, temperatures and other data with

the refueling system via an infrared interface to ensure a smooth and safe refueling process. In the event of a malfunction or emergency, the system is immediately put into a safe state.

Technological support from Bresimar and Turck

PRF turned to its long-standing partner Bresimar Automação, Turck's representative in Portugal, for the electrical control and safety of the system. Bresimar and PRF have been working closely together for over 20 years. The long-standing partnership and the expertise of the employees at Bresimar enabled the automation experts to offer considerable support – even with the relatively new hydrogen filling station project. "The galvanic isolation barriers from Turck, which Bresimar supplied were particularly important for us," explains Hugo Antunes. "These barriers were crucial to ensure the connections between the non-ATEX and ATEX areas of the plant."



»By working with Bresimar and Turck, we were able to ensure that our systems not only work safely and efficiently, but are also future-proof.«

Hugo Antunes | PRF

Turck's interface devices are responsible for the isolation of the intrinsically safe signals and their pre-processing. For example, the IM33-22Ex-HI two-channel isolating transducers and the single-channel IM33-14EX-CDRI are used in the filling station. They and other variants process temperature and pressure signals and pass them on to the Siemens controller at the filling station. The XS26 safety controller from Turck's strategic partner Banner Engineering is responsible for controlling all safety-related processes.

Flexible thanks to modular design

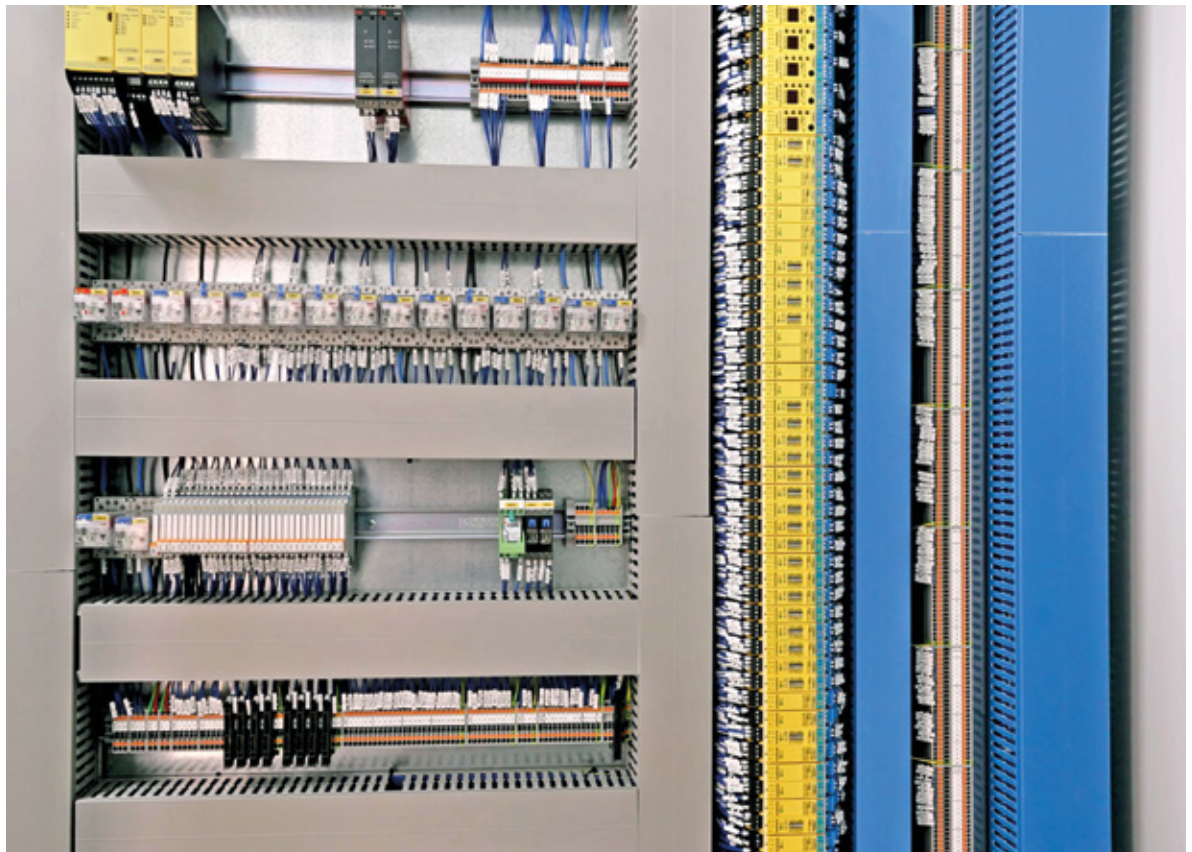
PRF's hydrogen filling station is housed in a 20-foot container and can therefore be transported if necessary, as can the three high-pressure modules for

hydrogen compression. "This modular structure enabled us to work flexibly and efficiently," Hugo Antunes emphasizes. "We were able to complete the system on time because we already had many of the necessary components in stock."

The galvanic isolation barriers from Turck stood out on account of their competitive price and delivery time as well as their reliability. "Another major benefit was the excellent after-sales support we received from Bresimar," the project engineer adds.

Success and expansion

The hydrogen filling station in Cascais was an immediate success. It not only provided for the refueling of the local hydrogen buses but was also used by Toyota for



The Turck interface technology (on the right in yellow) isolates Ex signals, amplifies them and supplies the connected devices with the permissible voltage



The first hydrogen filling station in Portugal was built by the municipality of Cascais to refuel its hydrogen buses

the first time to refuel its hydrogen buses and cars produced in Portugal. "We have refueled more than 26 tons of hydrogen so far and carried out over 2,000 refuelings without any failures," reports Antunes.

The success of this first filling station led to the municipality of Cascais issuing a tender for a larger, permanently installed hydrogen filling station, which PRF also won. The new station will include four compressors and local hydrogen production with a capacity of one megawatt through electrolysis. "This plant will be one of the largest in Europe and will supply completely green hydrogen, provided the power supply comes from renewable energies," the project manager explains.

Conclusion

The project shows how forward-looking planning, modular construction and the use of reliable technology partners such as Bresimar and Turck can create innovative and sustainable infrastructures that make an important contribution to sustainable mobility in Europe. "We are very proud of what we have achieved and look forward to the upcoming projects with excitement," project manager Hugo Antunes sums up. "By working with Bresimar and Turck, we were able to ensure that our systems not only work safely and efficiently but are also future-proof."



The Banner SC26 safety controllers process all safety-related signals

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