



Making empty tanks a thing of the past

Remote monitoring of tank filling levels

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AVIA Osterwalder St. Gallen AG operates more than 120 filling stations in eastern Switzerland. This company also sells and distributes motor vehicle and other fuels to corporate and private customers. For many years now, AVIA Osterwalder St. Gallen AG has deployed the EasyOil® system to offer its customers a practical method for remote monitoring of filling levels in oil and gasoline tanks. To assist with the recent relaunch of the EasyOil® system, AVIA Osterwalder St. Gallen AG called on the measurement technology expertise offered by KELLER AG für Druckmesstechnik.

In essence, EasyOil® comprises a measurement system that determines the filling level in the oil tank, together with a GSM modem to transmit the filling levels via the mobile telephone network once they have been ascertained. In collaboration with Fredell GmbH Informatiklösungen, an IT solutions provider based in Widnau, AVIA Osterwalder St. Gallen AG has developed software that enables contracting customers to call up current filling levels and previous purchase orders for

their tank installations. Customers are also alerted via SMS or email if the filling level falls below a certain limit (which can be freely defined). By replying to these messages, customers can immediately trigger purchase orders to AVIA Osterwalder St. Gallen AG. Another benefit: because they can call up data anywhere and at any time, customers are able to plan their purchasing efficiently. For example, stocks of fuel can be bought in when the price of oil is low, or when a tank truck is nearby.

This service offers far more than convenience for busy private customers who might find themselves returning to an unheated home after a long working day because they forgot to place their fuel order. Most of all, the system offers major economic benefits to facility managers in companies, and for real estate managers who have to coordinate fuel supplies for multiple properties. Gas station operators and their suppliers (i.e. large oil corporations) can also benefit from a system such as EasyOil®.

The Head of Marketing at AVIA Osterwalder St. Gallen AG points out: „By offering our customers the EasyOil® service, AVIA Osterwalder St. Gallen AG clearly stands out from its competitors.“ She adds: „There’s plenty of evidence that our customers appreciate the convenience of this service: in the last three years, for example, 80% of customers whose contracts would allow them to purchase from other suppliers preferred to order their heating oil from us on a regular basis.“

EasyOil® has therefore proven to be a win-win model in the ten or so years since the system was launched on the market: customers appreciate its convenience and transparency, while AVIA Osterwalder St. Gallen AG benefits from long-term customer loyalty in the fiercely contested fuel market. So from 2013 onwards, the company will offer its customers updated contract models that are even more transparent and easier to manage than those in place at present.

Cutting-edge technology

The technology behind the EasyOil® system had already been relaunched prior to this redesign. As AVIA Osterwalder St. Gallen AG searched for a suitable supplier who could deliver the measuring probes as well as the GSM transmission module, their attention was drawn to KELLER AG für Druckmess-technik, based in Winterthur. KELLER operates across the globe and earns some 10% of its sales revenue from applications that use pressure probes to measure filling levels. This is technically possible because the pressure at a specified point in a tank rises in proportion to the filling level. The measured pressure can therefore be used to perform a very accurate electronic calculation of the corresponding filling level. The current content can be determined in liters, taking account of the tank shape.

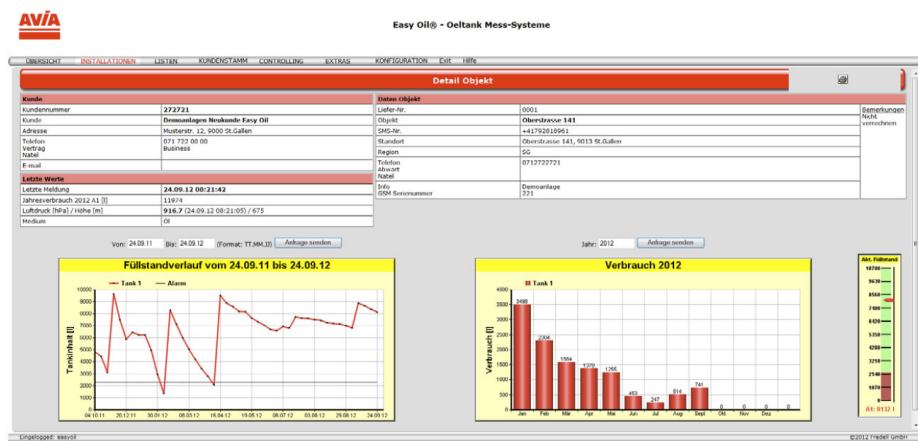
The benefits of using EasyOil® are derived from the combination of measurement and remote transmission. While developing the proposed solution for AVIA Osterwalder St. Gallen AG, KELLER’s pressure measurement experts were able to draw on experience garnered from customers in the water management sector, where similar concepts are used to monitor groundwater and river water levels.



For EasyOil® systems at gas stations, KELLER uses its intrinsically safe piezoresistive Series 26 Y Ei level sensors, which are suitable for environments subject to a high explosion hazard.

The underlying technology is developed by KELLER in-house, so special solutions of this sort can be developed for customers with great flexibility and speed.

For customers in the water management sector – to take one example – KELLER has developed a GSM modem that supports data exchange via email, SMS and FTP. Now, for AVIA Osterwalder St. Gallen AG, KELLER is producing the GSM-3 variant (modified at the customer’s request) which



To ensure that purchasing is planned efficiently, the software enables visualization of current tank filling levels as well as consumption and order histories via a web portal. Different graphic display options guarantee a transparent overview for users.

also offers the option of SMS communication with consumers. „Customer surveys have confirmed that this is the most reliable version, and the one that customers prefer,“ according to AVIA Osterwalder St. Gallen AG. More so than email, SMS messages guarantee that customers are informed promptly; they are spam proof and can be clearly personalized. „Especially in offices, emails could be called up by different individuals who might not all be authorized to make a purchase decision. And that could waste valuable time“.

Intrinsically safe and temperature resistant for areas subject to explosion hazards (EX areas)

The GSM-3 comprises the modem itself and what is known as the SB box, to which as many as three KELLER pressure transmitters (with voltage outputs of 0,5...4,5 V) can be connected. The box contains three built-in safety barriers (SBs). These circuits also make it possible to process the electrical measurement signals to gas stations, where an electrical spark could cause an explosion due to the gases contained in the atmosphere.

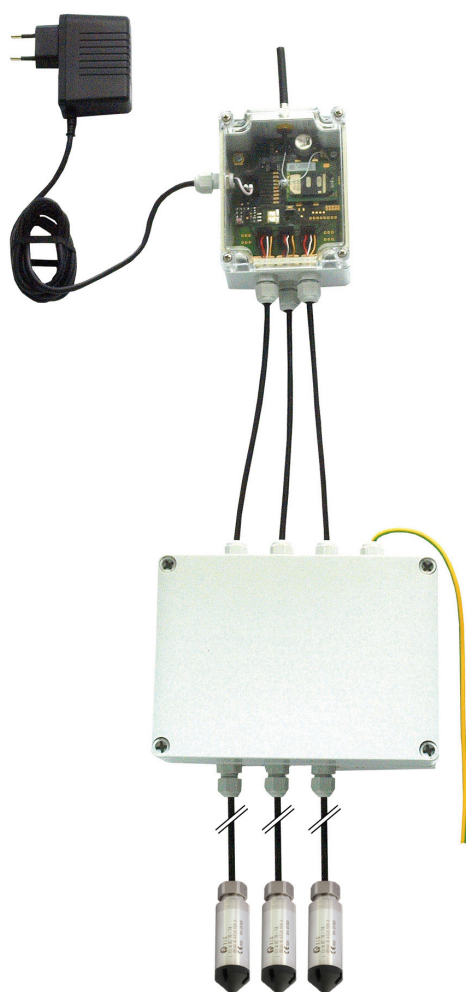
This is why any pressure transmitter that performs measurements in an environment of this sort must be intrinsically safe. The safety barrier limits the electrical power produced by the measurement system within the area subject to explosion hazards (EX area).

The GSM-3 itself may only be installed outside of the EX area. As part of the complete package, KELLER also supplies the level sensor cables used to transmit the measurement signals.

KELLER uses its intrinsically safe 26 Y Ei level sensor for EasyOil® systems at gas stations, whereas the conventional version is used for heating oil tanks in locations not classified as EX areas. Like all of KELLER's pressure measurement equipment, the transmitters in these devices are based on the piezoresistive silicon measuring cell invented by the company's founder and CEO, Hannes W. Keller, at the end of the 1960s. Nowadays, KELLER is one of the world's leading manufacturers of piezoresistive pressure sensors. The slight mechanical deformation caused by the pressure on a piezoresistive element in the sensor triggers a change in resistance which, in turn, produces the electrical voltage that is used as the measurement signal. In Series 26 Y, which includes the level sensor, the temperature error (as it is known) is compensated electronically.

One-stop expertise

Thanks to KELLER's long years of experience and its highly mature product range, the company can produce



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Stocking up on fuel when the tank truck is in the vicinity – the system enables AVIA Osterwalder St. Gallen AG to offer its customers this service.

the pressure transmitters for the EasyOil® system with an excellent cost-to-benefit ratio. These products guarantee long service lifetimes, even in an aggressive medium such as gasoline, because of their robust stainless steel housing (degree of protection: IP68) and a design whereby the silicon measuring cell is protected against the measured medium by a stainless steel diaphragm.

„Originally, we planned only to purchase the pressure sensors from KELLER,“ the EasyOil® equipment specialist at AVIA Osterwalder St. Gallen AG recalls. „But as the project proceeded, it became clear that KELLER has extensive experience with the remote transmission of measurement data, as well as a high level of expertise in measurement technology. This prompted us to entrust KELLER with delivery of the entire package.“

Depending on the location where each EasyOil® system is deployed, AVIA Osterwalder St. Gallen AG now purchases either the conventional 26 Y level sensor or the intrinsically safe 26 Y Ei version from KELLER, together with the GSM-3 transmission unit and the cables (whose lengths vary according to on-site conditions). Final assembly and installation of the systems at the customer's premises and software configuration are handled by AVIA Osterwalder St. Gallen AG, whose overall comment on the project is positive:

„Response from customers is positive. We are very satisfied with the perfect functioning and reliability of these systems. Our good working relationship with KELLER AG is equally satisfactory – and they have also assisted us with implementing our special requests. For all these reasons, we are looking forward to a long-term partnership to provide technical support for our new sales and marketing concepts based on EasyOil®.“ ■

