A LEVEL SOLUTION FOR BEER STORAGE

Plant operators at Marston's Brewery would monitor and control the level of beer in storage tanks – each of which can hold up to 21,000 litres of beer – manually with the aid of sight glasses. The sight glasses, however, required regular cleaning and some were not readily visible, making it hard for the operators to keep track of the levels. As a result, a tank would sometimes become completely empty, allowing air into the system which disrupted the operation of the bottling lines.

To overcome the issue, the brewery turned to ifm electronic for a solution that would enable accurate automatic control of levels in the tanks. This also needed to interface with the plant's existing PLC and SCADA systems to allow the levels to be monitored remotely; provide clear level indication adjacent to the tanks via digital displays; and be compatible with the hygienic requirements of the food and beverage industry. Engineers from ifm electronic proposed that each tank should be fitted with two flush-fitting hygienic PI2796 pressure sensors with integral displays and one LMT100 hygienic level sensor. These sensors incorporate IO-Link interfaces, meaning that digital process values are transmitted, which greatly simplified interfacing them with the existing plant systems, and also ensured that the data they captured would always be transmitted accurately.

The plant systems use an Ethernet network with redundant ring topology to ensure high reliability. The ifm IO-Link sensors were connected to this via AL1121 Ethernet interface modules which, with their IP65 rating, are suitable for installation in the field without additional protection. The requirement for local display of the tanks levels was met with E30391 IO link display modules which also connect directly to an IO-Link master port on the AL1121 and, like the Ethernet interface modules, require no additional protection when mounted in the field.

In most applications, the sensors would have been installed on top of the tanks, but here space above the tanks was limited and access was difficult. The sensors were therefore mounted in the pipes that supply the top pressure to the tanks. In this location, the sensors provide identical data, but installation was much faster, easier and safer. It also meant they would be easy to replace if necessary. An additional benefit here was the IO-Link system which allows configuration data to be directly loaded into the sensors – if a sensor needs to be replaced, the configuration data is simply sent to the replacement via its normal IO-Link connection and it is then ready for immediate use.

The new sensors were installed and commissioned in just four days, with the new level monitoring and control system operating faultlessly since it was commissioned.

ifm electronic
www.ifm.com/gb/en

A WINNING COMBINATION

Since 2005, university-based Eco-Runner Team Delft has entered the Shell Eco-Marathon, competing against teams from around Europe to build the world's most efficient hydrogen-powered car. Althen Sensors supports the team and has supplied Sensor Technology's RWT430 torque sensors for collecting key data so that the designs can be tested and optimised.

This year, the team decided to build an efficient city car, which meant practical aspects needed to be taken into consideration and incorporated into the vehicle. Examples include making a full stop and restart after each lap to simulate driving in urban traffic, and the inclusion of headlights, tail lights, direction indicators and a windscreen wiper.

To achieve best results, every element in the car needs to be as efficient as possible, so the team developed an aerodynamic body shape based on strong but lightweight materials. Further efforts were made to ensure an ultra-efficient drivetrain, including customisation of the main drive motor

To ensure the motor was optimised to the needs of the vehicle's proving regime, a special test rig was built so that the motor could be tested at various speeds, through multiple acceleration and deceleration profiles, and over long and short operating periods. The heart of the test rig was the reliable and accurate TorqSense sensor. By using TorqView software, the team was able to get a good view of the torque capabilities of the motor at different rotational speeds; and they could measure the input voltage and current of the motor controller. The team was also able to easily adjust the loads on the test rig to simulate different stages and conditions of the actual track-based vehicle test.

The information on the torque levels and rotational speeds of the motor, gained with the TorqView software, helped to forecast the most efficient operating conditions of the vehicle. These calculated conditions matched those determined by testing the car on the track, confirming that they had identified the best motor setup. This then allowed the student engineers to determine the different speeds needed for an optimal lap.

As a result, Team Delft won both the 2020 Shell Eco-marathon Hydrogen Endurance Race with a score of 2506,6 km/kg H_2 and the Vehicle Design Award.

Sensor Technology **www.sensors.co.uk**

BEAM-STEERING MIRROR POSITION FEEDBACK

A high-reliability version of Kaman Precision Products' fast beam-steering mirror measurement system is now available from Ixthus Instrumentation. The upgraded KD-5100+ enables high-precision position feedback for control systems used in mirror steering and scanning tasks for laser communications on satellites and ground stations, airborne and shipborne directed energy systems, and image stabilisation systems.

Typical inductive sensor configurations used with the KD-5100+ include Kaman's 15N or 20N series, offering non contacting measurement ranges of ±0.9 and ±1.9mm respectively. Arranged in precisely matched pairs on the X and Y mirror axes with each pair acting as a balanced bridge circuit on either side of the mirror, the sensors detect the differential distance as the mirror rotates about its pivot, providing an output voltage from the KD5100+ which is proportional to the mirror's angular displacement. The resulting resolution and precision for each axis is in the sub-micro radian range – providing the means for exceptional accuracy, the company explains.

The compact KD5100+ has an operating temperature range of -20°C to +60°C (sensors are -52°C to +105°C) with excellent thermal and long term stability. The upgraded KD5011+ features an identical Mil-PRF-38534 Class H proprietary hybrid microcircuit as the KD5100 'standard' version with the addition of high-rel diodes and capacitors plus an upgraded aerospace specification for circuit layout, ground connections and sensor connectors. The KD5100 is already providing nanometre level precision for control systems used, for example, in laser focussing for micro-column architecture in semiconductor wafer manufacture, as well as precision long-range telescope positioning and many other applications were differential inductive measurement is contributing to an advance in precision measurement technology.

Ixthus Instrumentation **www.ixthus.co.uk**