

The P3 camera at  
Ensinger detects  
25,000 bottles an hour  
– wrong bottles are  
immediately removed



**Webcode** more11356e | **User** www.ensinger.de | **System Integrator** www.loeffelhardt.de  
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# Wrong Bottles

Ensinger Mineral Heilquellen GmbH uses camera technology from Banner Engineering to identify drink bottles

It is considered as a classic example of German product design: the mineral water pearl bottle from the Genossenschaft Deutscher Brunnen (GDB – Cooperative of German Wells). When it was launched on the market at the end of the sixties its design was revolutionary. The raised pearls in the top third of the bottle were not only meant to be an attractive feature – they offer extra grip on the tapered bottle. The bottle was also one of the first mineral water bottles to be provided with a screw cap instead of a swing top.

The deposit system of the GDB had proved to be worthwhile. Today, around 450 million of the green and

white glass bottles alone are in circulation. However, not every customer returns the crates of empty bottles correctly sorted to the beverage store. Before manufacturers clean the bottles and refill them, they must first identify any non-brand bottles and remove them.

This is also the case at the plant of drinks manufacturer Ensinger Mineral-Heilquellen GmbH in Vaihingen/Enz-Enzingen, near Stuttgart. A camera is used in the filling plant to check whether each bottle on the conveyor is of the correct bottle type before the bottle caps are unscrewed. Three types of bottles run through the plant: the standard 0.7 liter bottle, the half liter bottle and the green GDB water bottle. The camera has to monitor 25,000 bottles an hour. Any fault that occurs considerably delays the production.

## Quick read

Powerful image processing solutions can very quickly become complex and expensive. As high-end systems exceed the requirements of many applications, Turck also offers solutions for simple applications from the camera portfolio of its partner Banner Engineering. The reliability and the good price-performance ratio of the Banner system, which detects incorrect bottles with the P3 camera and LED lighting, impressed the drinks manufacturer Ensinger.

## Previous solution with weaknesses

The camera used at Ensinger up to 2010 had considerable weaknesses since the measuring lines by which they identified the bottles were fixed. The camera focused on a defined range and measured the distance

of two light-dark transitions that were characteristic features of the bottle. If the bottles came slightly off-set into the viewing range of the camera, it identified it as a wrong bottle even though it had the correct dimensions. "Our service electricians were in action every week when the machine had to be reset for a different container," Siegfried Winkler, head of electrical engineering at Ensinger, describes the situation of the previous solution. "We also had errors if the lighting was poor." In short: Too many weaknesses to ensure the continuous identification of the bottles.

Ensinger looked around for a new solution and came across a camera from Turck at an information event of the automation wholesaler Löffelhardt. The responsible employees at Ensinger were able to bring bottles and directly try out which camera solution was best suited for identifying their bottles. The test impressed the Ensinger employees from the start.

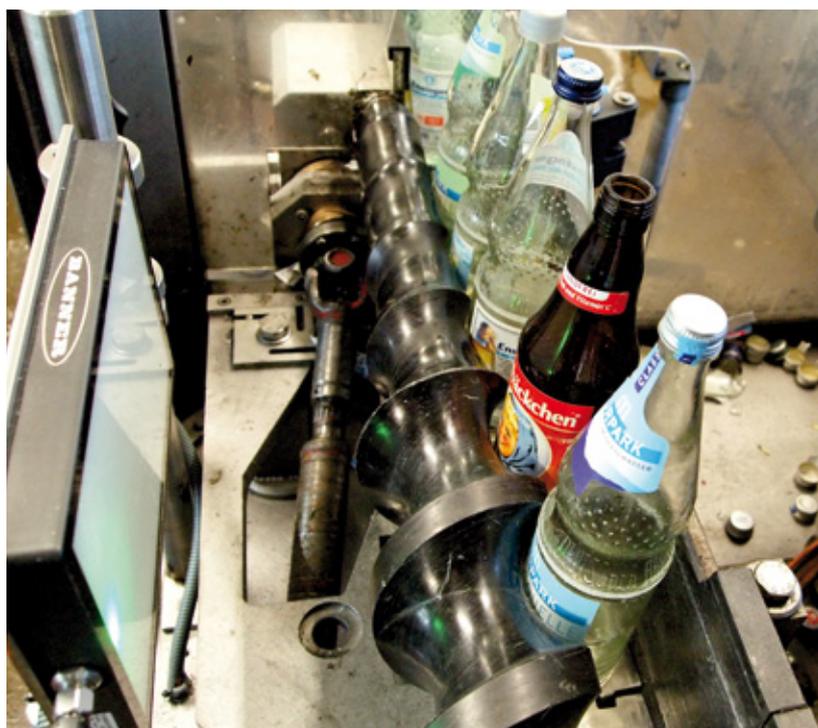
Uwe Binder, camera expert at Löffelhardt put together a suitable camera system for Ensinger. Thanks to his knowledge he hit upon Turck's comprehensive portfolio for optical identification, which is developed by Turck's optical partner Banner Engineering. As the identification needed is relatively simple, a high-end system would exceed requirements and would be too expensive for the customer. Binder was able to put together an attractively priced solution from the Turck range that was exactly tailored to the requirements involved. "For us it is a major benefit that we can find components in the Turck portfolio for complete vision systems. From the camera to lenses, processors and lighting, right through to the required connectivity products, we can get everything from a single source. Turck always provides us with the support that knows every component of the vision system and can offer additional help," Uwe Binder explains his decision.

## Measuring lines adjusted

Compared to the previous solution, today's camera solution has considerable benefits. It does not aim rigidly at two points but searches for a defined reference point, adjusts the measuring lines accordingly and then triggers the appropriate image automatically. Besides the trigger signal that the camera receives from the cam switch mechanism of the screw conveyor, the camera is triggered again almost automatically. It measures the bottle diameter using the distance between two light-dark transitions. The two measurements are enough to identify the bottles unambiguously. This also functions if the bottles are positioned slightly off-set in the screw conveyor.

The present solution also has another advantage: The Ethernet port of the camera enables Siegfried Winkler to fetch the

**The P3-PPROCAM with a 12 mm wide angle lens is positioned with the signal processor in the housing in front of the decapping machine**



**The robust IP67 LED infra-red light is positioned opposite the camera**

camera image directly onto his PC. If a fault message occurs, he can check where the problem is from his desk– or at least where it is not. "The camera and the entire system from Banner particularly impressed us on account of the good price-performance ratio," Winkler says. The P3 is not designed for highly complex identification tasks. It is better suited for reliable bottle identification than more complex and more expensive solutions. With a resolution of 640 x 480 pixels and a 1/3 inch CCD sensor, it can detect 256 gray scale values and produce 48 images a second.

The Banner P3 camera is housed in a watertight metal housing which the customer specially manufactured for the application. The signal processor is also contained in the housing. It evaluates the images and identifies the bottles as correct or wrong. Only the "good/not good" signal is transferred to the controller – and if required, also the camera image for remote diagnostics via the Ethernet port. In the event of a fault, the controller triggers a compressed air valve to remove the wrong bottle. A round plexiglass window is embedded in the housing through which the camera views the conveyor belt.

The LED background lighting that was also supplied by Turck is positioned behind the bottles. The IP67 degree of protection enables the LED infra-red lighting also to be fitted directly in the wet area of the bottle detection. With a lifespan of 50,000 hours, there is now no more risk of poor lighting. "We are very pleased with the new camera. It runs perfectly and saves us the time consuming service operations that were required with the old solution.

The best indication of this is the fact that since commissioning, Turck has no longer heard from us," Winkler concludes. ■



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**Uwe Binder,  
Emil Löffelhardt GmbH**