

## **Multifrequency ultrasonic technology makes component cleaning more efficient and powerful**

### **Fewer cleaning units due to more frequencies**

**Optical components for sensors and sensor solutions are subject to the strictest quality requirements. And component cleanness plays a decisive part here. To achieve the necessary cleanness economically, SICK AG decided to invest in new ultrasonic cleaning technology. With the use of innovative multifrequency generators and transducers, a single cleaning system now performs tasks for which two units and time-consuming manual cleaning were previously needed. This has not only made component cleaning more economical, it also saves space and offers greater flexibility and safety.**

Whenever a traffic signal on the motorway warns drivers of dense fog, a driverless transport system stops to avoid a collision or the content of packaging is assigned fully automatically, you will often find sensor systems made by SICK AG. The company based in Waldkirch is one of the worldwide leading manufacturers of intelligent sensors and sensor solutions. It concentrates on the fields of automation technology, industrial safety systems, auto-ident applications and analysis/process measurement technology.

### **Cleanness is a must**

Sensor systems use many different glass parts, such as lenses, prisms and analysis filters, which SICK manufactures from various optical and filter glasses. „To ensure that our devices work correctly, these components must be perfectly clean. Even the smallest residue or soiling could cause product failure. Component cleaning therefore has a decisive influence on the quality of the products“, explains Wolfram Horst, head of glass optics at SICK. Residues from production, such as filler, coatings and polish, adhere to the sensitive glass components. And due to their varied composition, these can then be difficult to clean. For a long time, the company used two ultrasonic cleaning units to remove this soiling - one for precleaning and one for superfine cleaning of the glass parts. „We still had to clean various filters by hand, since they wouldn't fit in the old, inflexible cleaning units“, adds the head of department.

### **A single unit for both precleaning and superfine cleaning**

Alongside excellent cleaning results, the key issues for the investment in a new cleaning system were a good price-performance ratio and flexible treatment of the various components. The project team at SICK met with various manufacturers to discuss these issues. The Swiss company UCM AG presented a concept that uses the innovative multifrequency ultrasonic technology by Weber Ultrasonics GmbH. The „heart“ of the cleaning system is the SONIC DIGITAL MULTI ultrasonic generator module. This device can generate up to three different ultrasonic frequencies, which are set directly on the generator or via an interface. The frequency selected is generated and controlled digitally. This ensures reliable and constant power output, which can be set between 100 and 10 percent. The SONOSUB MULTI multifrequency submersible transducer from the Ittersbach-based ultrasonic component manufacturer is perfect for this application.

With its multifrequency technology, the ultrasonic system can be used for removing coarse soiling and for fine/superfine cleaning jobs with minimal residual soiling values as well as for extremely sensitive components with complex structures. „The multifrequency technology allows us to perform precleaning and superfine cleaning in a single unit, which saves us a significant amount of space and also costs. This was a key argument in the decision to opt for the ultrasonic cleaning unit by UCM“, explains Wolfram Horst. The new, fully encapsulated cleaning system was equipped with a total of eight cleaning and rinsing tanks, as well as four multifrequency generators. In terms of frequencies, SICK decided to use 40 and 80 kHz. The SONIC DIGITAL MULTI generators guarantee maximum operational reliability through innovative protective functions. This includes an intelligent cooling system. With this system, the temperature of the heat sink is continuously monitored. If at any time it exceeds a defined value, integrated sensors automatically start the casing fan. With this „cooling as required“, the air throughput and thereby also soiling of the generator are significantly reduced. This function also guarantees a constant operating temperature, which in turn increases the service life of the components and the entire system. And protection against short-circuits, no-load operation and overload comes as standard.

The system also uses the so-called lift-out process, which ensures that the parts-specific goods holders move through the surface of the water extremely slowly when being lifted out of the final rinsing tank with demineralised water. Any water molecules adhering to the glass parts are drawn back into the rinsing tank here. The drying takes place under infrared light in a class 100 laminar pure air stream. After cleaning, some of the glass parts are coated in a PVD process for their later application.

### **Clean results with a high degree of flexibility**

Around 3,000 glass parts a day are cleaned using an aqueous alkaline cleaner. The cleaning process runs fully automatically. The 16 cleaning programs defined in the system ensure optimum processing of every batch. The parts-specific programs are selected via a code on the goods/substrate holder. The code is scanned using a barcode reader which, just like the positioning sensors and safety light barriers, is also supplied by SICK.

Wolfram Horst is very happy with the cleaning quality. „Specially trained staff check the cleaned glass products“, he explains. Thanks to the new ultrasonic unit, the manual cleaning work that used to be necessary has now been almost completely eliminated. „The multifrequency technology has made us much more flexible, especially when handling sensitive glass parts. We can now clean these products very gently in the unit using high-frequency ultrasound. And we have also begun cleaning tests using calcium fluoride, for which the requirements are even stricter“, he continues.

FotoSick1 Four SONIC DIGITAL MULTI ultrasonic generator modules sit at the „heart“ of the new ultrasonic cleaning system at SICK AG. They generate frequencies of 40 and 80 kHz and thereby allow precleaning and superfine cleaning of the glass parts in a single unit.

FotoSick3 One cleaning unit instead of two: The use of innovative multifrequency ultrasonic technology not only saves space and makes cleaning more efficient, it also makes the whole process safer and more flexible.



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