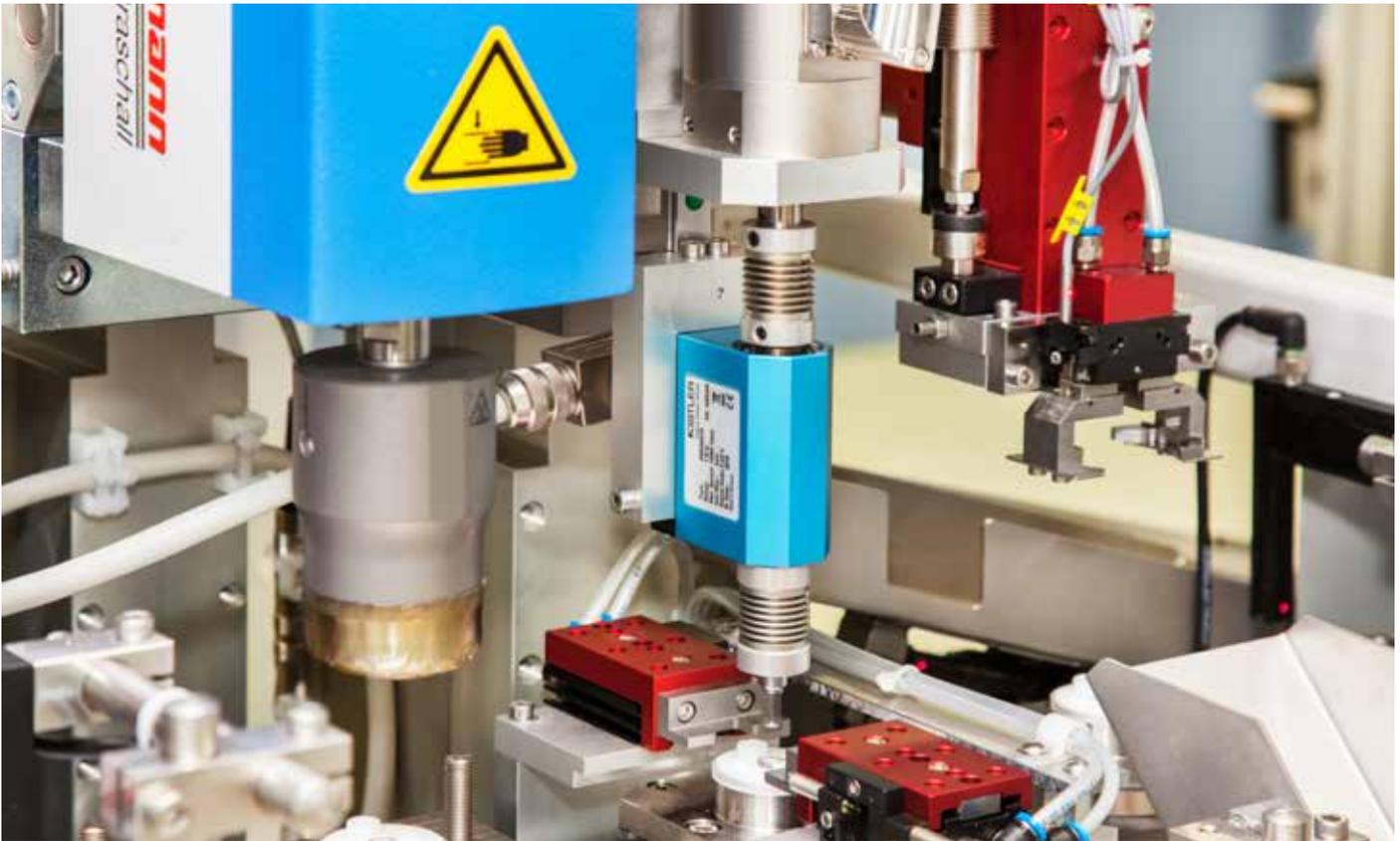




## Integrated process monitoring in medical engineering

A torque sensor guarantees the functionality of mixing  
nozzles at Jonas & Redmann



The built-in Kistler torque sensor carries out integrated function checks on the component and communicates directly with the control: the cycle time is a mere 1.5 seconds.

**Special-purpose machinery manufacturer Jonas & Redmann puts its trust in integrated process monitoring by Kistler to guarantee the functionality of mixing nozzles for dental applications. A friction coefficient test – performed with the help of a Kistler torque sensor – ensures automatic segregation of good and bad parts. The necessary measurement technology is also integrated into the solution, so the signal is transmitted directly to the machine control.**

A young company that has already built up a tradition: mechanical engineering specialist Jonas & Redmann was founded in Berlin almost 30 years ago. Since then, the firm has built up an outstanding reputation with its high-caliber machines and systems for assembly and process automation; over 400 employees now work at JR's five sites spread across three continents. The Berlin-based engineers offer an extensive portfolio of innovative automation solutions, ranging from integrated standalone cells through to highly automated production lines. As well as factory automation in general, Jonas & Redmann has a special focus on sunrise industries such as medical engineering, photovoltaics and energy storage.

Frank Polak has been a key player in the company's success story for the last 22 years: he started out as a design engineer, and has since become JR's Head of Medical Engineering. He now leads a team of six design engineers who also benefit from the support of colleagues in other departments. "Most of our customers are large corporations with global reach, and several

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Frank Polak, Head of Medical Engineering at Jonas & Redmann

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of them are DAX-listed. Standards in the medical technology sector are always high, but our customer base means that we have to meet even more demanding requirements – after all, the patients' wellbeing and safety are at stake," Polak points out. This is why every plant built by Jonas & Redmann must be appropriately qualified and validated – and that also applies to all sub-assemblies and add-on components.

#### **Automated quality testing – including traceability**

Many of the projects in the medical technology segment revolve around "disposables" – single-use medical products that must be disposed of after use, so they need to be produced in large quantities. High quality is an absolute necessity here, as Frank Polak confirms by offering some insights into a current project: "On behalf of a dental laboratory, we collaborated with a firm of consulting engineers to develop a highly automated production cell for mixing nozzles. To ensure quality in the live process, we use a Kistler torque sensor that communicates



Jonas & Redmann's highly-automated cells manufacture millions of high-quality disposables.

directly with the machine control." The dental laboratory uses the mixing nozzle to produce casting compounds for dental products such as those needed by dentists to prepare dental impressions.

To guarantee the functionality of the sub-assembly, a friction coefficient test (< 0.5 Nm) is carried out on the mixing mechanism of the assembled nozzle: "This product is a plastic sub-assembly consisting of four parts that are joined in the machine and then tested. Thanks to Kistler's solution, we can guarantee the quality of about five million units per year – and at the same time, we can ensure traceability," Polak explains. "Traceability is an essential requirement in today's medical sector – and responsibility for it is increasingly passed on to the special-purpose machinery manufacturer."

#### **End-to-end inline process monitoring**

The combination of Kistler's 4502A torque sensor and the maXYmos BL evaluation system ensures end-to-end inline process monitoring: the torque curve for each individual product can be tracked accurately on the monitor of the maXYmos system.

But no highly-automated plant from Jonas & Redmann would be complete without a pre-integrated mechanism for segregating bad parts: the measurement value produced by the torque sensor is used to generate an OK/NOK signal that is then transmitted directly to the control – so any parts joined

with insufficient torque can be segregated immediately. Polak notes: "With a production rate of 40 parts per minute – equivalent to a cycle time of one and a half seconds – this poses an enormous challenge. And that's why we're so highly satisfied with Kistler's solution – because it does exactly what we need for the application! Before we use any third-party components, we carefully check whether we could meet the requirement by designing the solution ourselves. But in this case, Kistler's system was quite simply the better alternative for integrated process monitoring."

#### **Process monitoring yields added value**

Users get more out of their machinery and plant when they opt for measurement technology from Kistler: key variables such as force, torque, strain and pressure are determined while the process is running, and they can be used as the basis for quality assurance. When this technology is combined with appropriate evaluation and control systems – also included in Kistler's specialized portfolio – users can implement application-specific process optimizations that will protect their machinery and ultimately translate into hard cash.

#### **Tried-and-tested technology – fast integration**

Polak's attention was drawn to Kistler by his colleague Andreas Nowak, Head of Mechanical Engineering and Operational Technology at Jonas & Redmann, who is thoroughly familiar with the components and systems available on the market. Nowak has opted for solutions from Kistler in the past, and he is highly satisfied with them: "In our joining processes, we already make use of Kistler's electromechanical joining systems: they ensure effective automation because they feature high efficiency and precise control. But there could also be further applications for medical engineering in the future, especially as regards process monitoring."

The prototype of the new plant to produce the mixing nozzles, with integrated Kistler components, was showcased on Jonas & Redmann's stand at the 2018 Automatica trade fair. One important factor in the successful outcome was Kistler's collaboration with the consulting engineers who were executing the project: together, the two teams quickly devised a test rig to verify the solution's feasibility. At the very first attempt, the test confirmed that the transducer shaft is suitable for this application case. The assumed theoretical values for frictional torque were almost entirely identical to the actual torques measured on the test rig. Jörg Nimz, a Sales Engineer at Kistler, is naturally delighted with the results: "The transducer shaft used here has already proven its excellence on the market many times over – especially in applications such as this one for measuring frictional coefficients. So we're pleased that Jonas & Redmann placed their trust in us, and now we're eager to hear about the end user's experience."

