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Press release

High-speed assembly and joining technology meets precise force measurement

Kistler combines electromagnetic linear modules with piezoelectric measurement technology for precise joining at high speeds

Winterthur, September 2025

With its unique NCFQ 2166A joining system[1], Kistler combines the high dynamics of linear direct drives with the precision of piezoelectric sensor technology. As experts in measurement and joining technology, they use the proven drive technology from LinMot[2] and enhance it with piezoelectric sensors. The innovative turnkey systems come with optional acceleration compensation. They fill a gap in markets where quality and high production speeds are particularly important – such as the manufacturing of medical and electronic products, semiconductors, or in the automotive industry.

Especially highly dynamic applications with low forces of up to 500 N – like the production of autoinjectors and insulin pens – benefit from the new NCFQ high-speed joining system. Being equipped with sensors, the joining system also shows its strengths in the electronics industry in relay or haptic tests. The magnet-based technology of the joining module featuring a linear motor accelerates at up to 50 m/s² and reaches speeds of up to 5 m/s. In addition to the linear motor, the module has a magnetic spring for weight compensation in vertical installation positions. Kistler complements the system with piezoelectric force and acceleration sensors, the ICAM-B industrial charge amplifier, and the maXYmos NC process monitoring system, which ensures data transparency, process reliability, and process control.

High-speed assembly and joining technology for medical device production

“The demands for highly accurate force measurement combined with high dynamics are constantly increasing. Until now, users had to decide whether to focus on precision and exact process monitoring or on speed. In areas where consistently high quality is crucial, choosing a slower system has traditionally been the only viable option. With our new NCFQ high-speed joining system, there is no need to compromise,” explains Peter Balzer, Product Manager for NC joining systems at Kistler. The first systems are already in use in the pharmaceutical industry. In a production facility for insulin pens, for example, the insulin cartridge is automatically inserted into the plastic housing of the auto-injector

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and then assembled using the NCFQ joining system. In addition to speed, absolute precision is essential: if the force is too low, the individual parts are not reliably joined; if the force is too high, the cartridge can be damaged and insulin can leak out. Thanks to the reliable measuring and joining technology, the company can be sure that the pens are functional and that potential production errors are eliminated – even at cycle times of 500 milliseconds.

High-speed joining system with automatic acceleration compensation

One major challenge in this process is that the forces acting on the product itself are not the only variables that need to be considered. “Due to the high dynamics of the linear module, the acceleration forces are always measured, too” explains Peter Balzer. “However, they are irrelevant for product quality and make it difficult to evaluate the process based solely on force data. For particularly accurate process monitoring, we therefore offer, in addition to the basic version of the NCFQ high-speed joining system an advanced version. Here, we have integrated an additional highly sensitive 8203A piezoelectric acceleration sensor. It enables the system to automatically filter out the acceleration forces of the joining module and make joining forces only visible. This greatly simplifies process control and evaluation.”

In addition to integration into complete production lines, the system can also be used in process development. In this application, it is already being used as a stand-alone workstation for manual assembly at a pharmaceutical company. Depending on the specific application requirements, the system can also be equipped with alternative sensors and joining modules with different strokes and joining forces. For maximum planning reliability, transparent cost control, and the optimization and validation of joining processes, Kistler’s Assembly Competence Center (ACC) provides support. “The ACC is our central point of contact for determining precise measurement values and process parameters in the production environment. Together with users, we tailor our systems to the specific application so that they meet all requirements for precision, speed, and tool compatibility,” concludes Peter Balzer.

[1] NCFQ 2166A high-speed joining system. Joining technology with a unique operating principle – **patent pending**.

[2] LinMot is a registered trademark of NTI AG.

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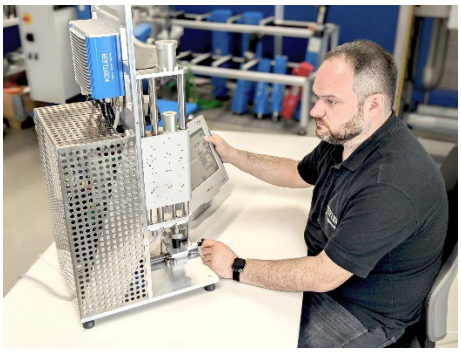
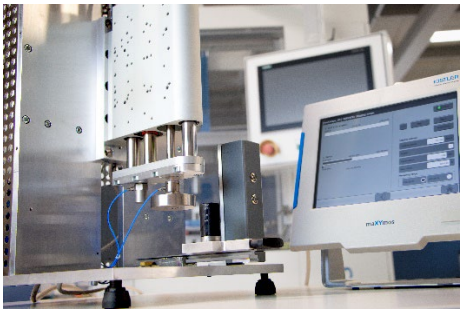
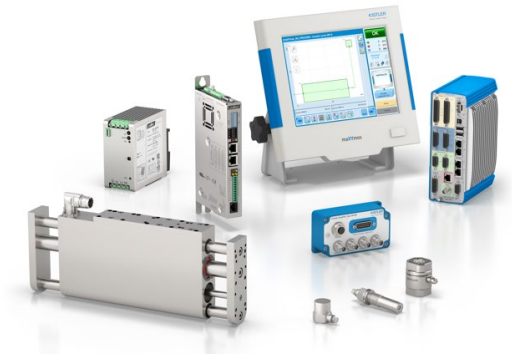


The new NCFQ high-speed joining system from Kistler combines a LinMot linear module with precise piezoelectric measurement technology. It is ideal for demanding joining applications with high dynamics – especially in the medical, electronics, semiconductor, and automotive industries.



High-speed joining meets precise force measurement: Kistler supplements the proven LinMot linear module with piezoelectric force measurement technology and automatic acceleration compensation.



The advanced high-speed joining system with acceleration compensation consists of a joining module with linear motor, servo drive, switching power supply, one force sensor and one acceleration sensor, the corresponding ICAM-B industrial load amplifier, and the maXYmos NC process monitoring system.

High-speed joining meets precise force measurement: Kistler supplements the proven LinMot linear module with piezoelectric force measurement technology and automatic acceleration compensation.

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High cycle times and precision are essential in the production of insulin pens – the NCFQ joining system with a linear motor delivers both.

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About the Kistler Group

Kistler is the global market leader for dynamic pressure, force, torque and acceleration measurement technology. Cutting-edge technologies provide the basis for Kistler's modular solutions. Customers in industry and scientific research benefit from Kistler's experience as a development partner, enabling them to optimize their products and processes so as to secure sustainable competitive edge. Unique sensor technology from this owner-managed Swiss corporation helps to shape future innovations not only in automotive development and industrial automation but also in many newly emerging sectors. Drawing on our extensive application expertise, and always with an absolute commitment to quality, Kistler plays a key part in the ongoing development of the latest megatrends. The focus is on issues such as electrified drive technology, autonomous driving, emission reduction and Industry 4.0. Some 2,200 employees at more than 60 facilities across the globe are dedicated to the development of new solutions, and they offer application-specific services at the local level. Ever since it was founded in 1959, the Kistler Group has grown hand-in-hand with its customers and in 2023, it posted sales of CHF 465 million. About 9% of this figure is reinvested in research and technology – with the aim of delivering better results for every customer.