

Press release

Even smarter and more precise joining

Kistler is fully integrating force sensors into the tool holder of electromechanical joining systems for the first time

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Kistler is presenting electromechanical joining systems that transmit measurement data wirelessly via advanced telemetry – for even more accurate results and precise process monitoring. In the new 2164A NCFx Pro joining modules, users can choose between two sensor technologies: a piezoelectric force sensor with an especially wide, flexible measuring range and increased overload protection, or a strain-gauge-based (DMS) force sensor. Both sensors are integrated directly in the tool holder of the servo press – right where the joining force is applied. Compared with their predecessors, the new joining modules are slimmer, faster and optimally designed for future functional enhancements such as predictive maintenance. The NC electromechanical joining modules are also available as an angled design for limited installation spaces.

A basic principle in measurement technology says that the closer a measurement is taken to the point of action, the more accurate the results will be. This is equally true for joining systems whose sensors check whether the system is applying the correct force. Thanks to telemetry, the force sensors on the new electromechanical joining modules in the NCFx Pro series from Kistler are integrated in the tool holder, more precisely on the ram, now, exactly where the joining force is generated. The transmission from the sensor to the electronics in the joining module housing is purely digital. Data are transmitted via an EtherCAT interface to the maXYmos NC process monitoring system from Kistler. This digital communication offers several advantages: it is less susceptible to interference while offering extensive diagnostic options and direct access to additional sensor data, such as the built-in temperature sensors. What's more, cable length no longer affects measurement accuracy, system stability is further improved, and sources of error are minimized.

Thanks to the new sensor position and digital data transmission, the energy-efficient servo presses achieve a new level of precision for applications in the electronics industry, medical technology and the automotive industry. "Especially in steering, chassis, and axle assemblies or other safety-relevant components, precision and reliability are core requirements for our customers. The new product family offers crucial advantages here," reports Alexander Müller, who is responsible for these joining systems at Kistler.

Flexibility through piezoelectric measurement technology

The strain gauge (DMS) force sensors cover measurement ranges from 2 to 120 kN, while the piezoelectric force sensors cover ranges from 0.05 to 120 kN. Depending on the sensor, seven predefined measuring ranges can be used with the piezoelectric sensors via maXYmos NC process monitoring system. This selection enables more accurate measurements while offering high overload protection, particularly in the smaller measuring ranges. Users also benefit from reduced spare parts inventory (“one fits alle”) and flexible system adjustment without re-calibration.

Both joining-module variants – with either piezoelectric or strain gauge (DMS) force sensors – are designed with a 20 percent overload reserve. This reserve provides additional safety if the actual joining force is higher than expected. Both sensors are mechanically compatible, can be easily exchanged or reordered from 2 kN and can be returned for calibration. An optional DAkkS calibration is already in preparation. Thanks to plug-and-play, the sensors are automatically recognized, including their sensitivity and measuring ranges. This avoids errors during commissioning and greatly simplifies handling.

Simplified integration and commissioning of the new electromechanical joining systems thanks to their compact design

At speeds of 250 to 500 millimeters per second, the new NCFx Pro electromechanical joining modules from Kistler achieve significantly shorter cycle rates and thus increased productivity in automated manufacturing processes. They also feature a more compact design that allows for smaller center distance and reduces space requirements, simplifying integration into existing machine concepts. Another advantage: up to 60 kN, only a single cable is required to connect the motor for commissioning. The new servo amplifiers ctrlX DRIVE are also more compact and save additional space in the control cabinet. A safety-zone box for the functions SMES, SMST2 and safe limited speed is no longer necessary.

The joining module itself also features a plug-and-play architecture, allowing users to commission it quickly and without extensive parameterization. The externally located lubrication port enables simple maintenance and connection to a central lubrication system.

Forward-thinking: an accelerometer for future predictive maintenance functionality is already integrated

When developing the NCFx Pro systems series, Kistler placed particular emphasis on future viability. Another sensor-based expansion is already underway, as Alexander Müller reveals: “An accelerometer for an upcoming predictive maintenance feature is already integrated into the NCFx Pro joining modules. This can be activated later via a software license through the maXYmos NC process monitoring system—without any further adjustments.

Image material (please name the Kistler Group as picture source)

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Thanks to telemetry, the new NCFx Pro joining modules Type 2164A from Kistler are equipped with wireless strain gauges (DMS) or piezoelectric sensors directly in the tool holder, more precisely on the ram.



The strain gauge force sensor (DMS) (left) and the piezoelectric force sensor (right) are intended exclusively for use in combination with NCFx Pro Type 2164A electromechanical joining system from Kistler.



The portfolio of electromechanical joining systems contains the new NCFx Pro electromechanical joining modules (Type 2164A) with integrated piezoelectric or strain gauge force sensors directly in the tool holder, the ctrlX DRIVE servo amplifier and the maXYmos NC process monitoring system.

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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 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 2,000 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 2025, it posted sales of 424 million Swiss francs. About 9 percent of this figure is reinvested in research and technology – with the aim of delivering innovative solutions for every customer.