

Kistler – The Industrial Partner for Cost-effective Assembly Systems

One-Stop Shop for Sensors, Joining Systems, Engineering and Service

As a pioneer and technology leader of piezoelectric measurement of pressure, force, torque and acceleration, Kistler has established an excellent reputation for its products worldwide over five decades. Ongoing practical development has grown what began in 1959 with just a few sensors is now a wide portfolio of sensors, systems, accessories and services.

Assembly techniques also make extensive use of force and torque sensors from Kistler for process optimization, production monitoring and reject separation. Directly from the process, these sensors (see pages 3 and 4 for latest innovations) yield force-displacement or torque-rotation angle curves that can be evaluated with the aid of analysis systems. For joining, measuring and monitoring, Kistler has gained a firm foothold over a number of years with complete electromechanical NC joining systems with integral monitoring systems. Several hundred new installations a year mean these have become the market's shooting star. Most recently, Kistler has steadily expanded its range of joining systems (see also pages 2 and 3) to provide a complete and comprehensive selection for measuring ranges from 0,25 ... 300 kN. These electromechanical NC joining systems with integral force-displacement monitoring document the development of the Kistler Group from sensor supplier to all-round problem solver.

With 50 years of leadership in dynamic measurement technology and decades of application experience, expert specialists from Kistler are also on constant standby to help with a wide variety of individual support requirements. These include professional advice, support with sensor design, application development and engineering, on-site calibration and recalibration of sensors and NC joining systems, as well as after-sales service and a wide range of training opportunities.



Martin Werner, Service Manager of NC Joining Systems, shown presenting the smallest and the largest Kistler joining module (NCFT: 0,5 kN / 1 kN and NCFN: 300 kN)

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Cost-effective NC Joining Module NCFB for Standard Joining Processes

The new electromechanical NC joining module NCFB Type 2160A... is designed specifically for standard joining processes. Its cost-optimized design offers good value for money. The integral piezoelectric force sensor in the robust housing gives a choice of two predefined ranges of 25 kN and 50 kN for precise force measurement.

The stroke of 400 mm allows effort-less reaching of deep end points, such as bearings in transmission half shells. Even with long feed travels, the high speed of up to 150 mm/s offers a quick idle stroke and hence short machine cycle. Use of the absolute encoder integrated into all Kistler NC joining modules as standard avoids the need for reference point determination.

The NC Compact Firmware Type 2159A (see following article) integrated into the servo controller is ideal for force-displacement evaluation and easy documentation of standard joining processes with the NC joining module NCFB.

The force-displacement monitoring system DMF-P A300 NCF Type 4734A... can also be used as an alternative. It makes use of different tolerance windows to evaluate the force-displacement curves of virtually any application. Comprehensive documentation of the curve and associated setpoints and actual values is also possible.

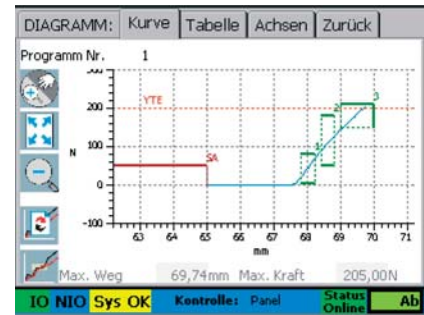


New NC joining module NCFB Type 2160A... the ideal solution for standard joining processes

NC Compact System Accelerates Setting Up of NC Joining Modules

Standard joining processes, such as pressing bearings onto shafts, can be flexibly and reliably automated, using electromechanical NC joining modules from Kistler with integral force-displacement monitoring. The NC Compact Firmware (Type 2159A) integrated into the servo controller is ideal for force-displacement evaluation and easy documentation of standard joining processes with the NC joining module NCFB. As a closed system with integral controller and Firmware, it cuts capital expenditure and installation costs, reduces proneness to faults and facilitates integration into existing on-site control environments.

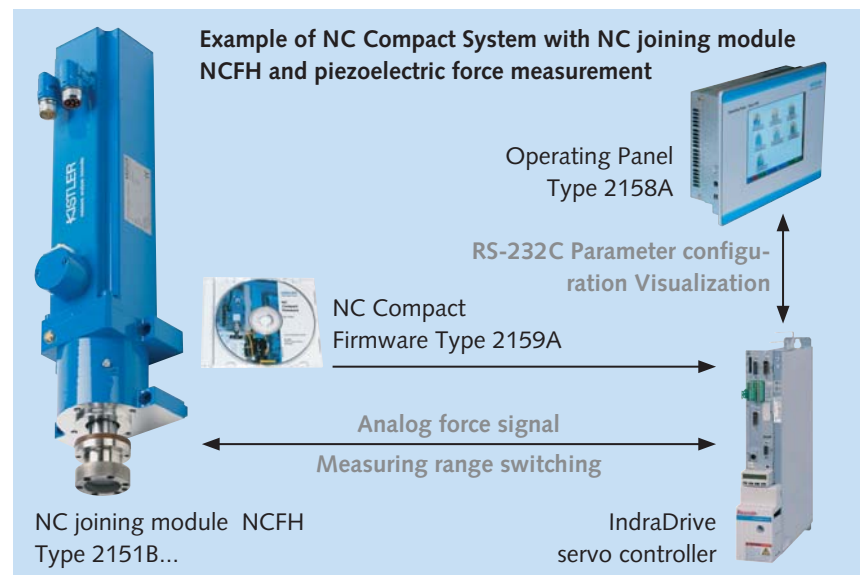
In addition to the NC joining module with matching IndraDrive servo controller, an NC Compact System consists of the NC Compact Firmware and the operating panel (Type 2158A) with 5,7" TFT color touch screen display. The operating panel is used for configuring the parameters of a standard joining process, visualizing the process and backing up data. As it is not needed for normal operation, a single panel is sufficient for configuring the parameters of several joining modules. 16 different programs offer a high degree of flexibility for the joining process. Each program has available a configurable home position, an idle stroke, a joining stroke and an intermediate position, which can be traversed or accessed at different speeds depend-



Force-displacement monitoring of standard joining processes with NC compact system

ing on the application. It also contains functions such as measuring range switching, a fast shutdown, an active deflection compensation system that eliminates the effect of bending of the customer's assembly, and evaluations with up to three tolerance windows.

As well as the result ("OK" or "not OK"), the Profibus interface of the servo controller can also transfer event values from the window evaluation to the system PLC. In addition to force-displacement monitoring, the NC Compact Firmware includes an integral sequence control system with the three modes: Automatic, Step and Jogging. Depending on the program, two predefined measuring ranges can be used for the NC joining modules NCFH (Type 2151B...), NCFH (Type 2157A...) and NCFB (Type 2160A...) with integral piezoelectric force sensor.



Example of NC Compact System with NC joining module NCFH and piezoelectric force measurement

Kistler Reinforces Services Ranging from Advice through Design to Calibration

Successful measurement technology is not just a matter of using powerful, technically sophisticated instruments, it also requires extensive application experience. In order to support customers in the implementation of successful applications in both production and the laboratory, Kistler supplements its tried and tested products with a broad range of services. With sensors and systems from Kistler, customers and users always have access to expert advice, worldwide service and other useful offers.

Advice and Engineering

Expert advisory staff help search for the best solution for each application. Kistler is able to draw on 50 years' experience in industrial measurement and production monitoring here.

CAD Download Service

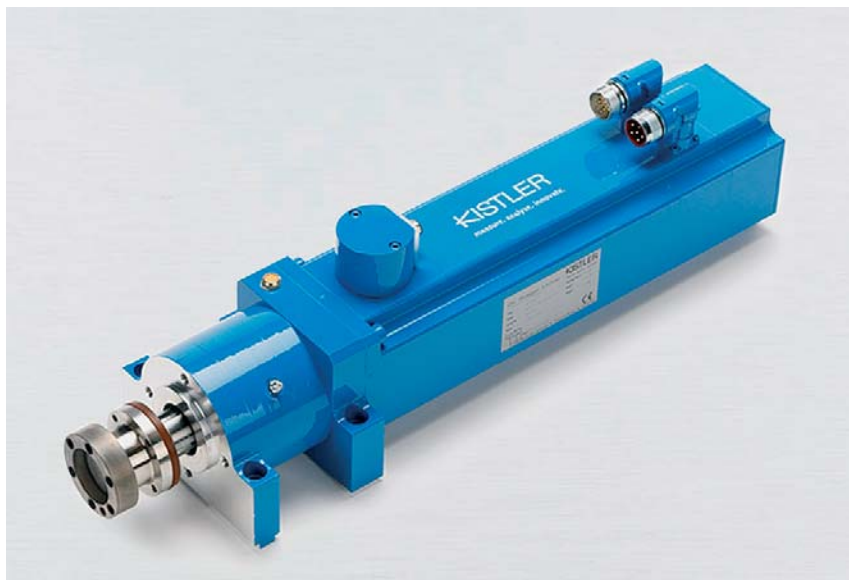
Daily updates of all of the products for manufacturing, assembly and product testing can be downloaded from our website free of charge as 3D CAD models that can be used directly in designs.

Maintenance and Calibration

Periodic recalibration is necessary in order to extend a successful application over a number of years. Kistler also offers various levels of support in this area. Depending on customer requirements, Kistler provides training, specially tailored calibration software, factory and on-site calibrations.

- www.kistler.com
> Support/Download > 3D CAD Models of Kistler Products

NCFH Now Also Available for Joining Force of 15 kN



Size 1 electromechanical NC joining module NCFH with Rated Joining Force of 15 kN

The tried and tested electromechanical NC joining modules NCFH Type 2151B... are now also available with a rated joining force of 15 kN. The new model is of heavier construction yet just as compact as the established 10 kN version. The piezoelectric force sensor gives the option of a second measuring range of 5 kN

(Type 2151B15052001) or 2 kN (Type 2151B15022001). With an overall height of 475 mm the joining modules offer a stroke of 200 mm, speed of up to 300 mm/s, tension and compression force as standard, and a regular holding brake.

Video: NC Joining Systems in Practice

Kistler has installed many hundreds of electromechanical NC joining systems on site over the last few months alone. A new video offers an insight into the development and production of NC joining systems at Kistler and the use of systems by customers in a wide variety of industries.



Assembly with NC joining modules in factory of special machinery manufacturer SITEC

- www.kistler.com
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New Basic Line Torque Sensor Type 4520A... for 1 ... 1 000 N·m

The new compact Basic Line torque sensor Type 4520A... is recommended as a primarily entry-level solution in the area of torque measurement, offering particularly good value for money for measuring torques on rotating shafts. With a robust bearing system, integral speed monitoring, built-in amplifier and

± 10 V output, it is suitable for simple industrial monitoring functions, quality assurance in product testing and use in the laboratory. The new sensor is available for a fine gradation of rated torques from 1 ... 1 000 N·m.



New Basic Line Torque Sensor Type 4520A... with rated torque of up to 1 000 N·m

NEW: Press Force Sensor up to 300 kN



New Press Force Sensor Type 9383A... (back) with Measuring Range up to 300 kN Greatly Increases Sensor Family Capacity

The new sensor Type 9383A... extends Kistler's successful series of piezoelectric press force sensors. The sensor preloaded ready for mounting with the three standardly calibrated measuring ranges of 0 ... 3 kN, 0 ... 30 kN and 0 ... 300 kN is ideal for measuring both dynamic and quasistatic forces. Together with an in-line charge amplifier with range switching, such as the ICAM Type 5073A..., extremely wide force ranges can be represented with one and the same sensor – with

consistent accuracy over the entire range. The sensor also offers tried and tested mechanical features with flange connections at both ends for easier interfacing with the machine environment, and centering rings for axial adjustment. The rotationally symmetrical shape makes the press force sensor perfect for use on the end of push rods or press plungers. Press force sensors from Kistler are available in different sizes and measuring ranges.

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