
DIGITAL MEASUREMENT TECHNOLOGY FOR STAMPING PROCESSES

Smart stamping

Inline process control and integrated quality assurance for stamping lines

Integrated process and quality control for best-in-class stamping processes

With over 50 years' experience, Kistler is at the forefront of monitoring and control for stamping processes. Thanks to our solutions, manufacturers can achieve highest quality for small parts produced continuously in large quantities – in application areas ranging from the automotive and electrical industries to the medtech sector.

Inline process control

We developed our KCA 400T analog controller as a subsystem. It serves as a smart link between the sensor equipment in the stamping die and the tool or process monitoring system. The analog controller is based on the principle of proven double sheet control. With the KCA 400T, users can detect the finest stamping scrap on the stamping strip – and they can also adjust sensor parameters and process tolerances directly on the device.

Smart and reliable stamping

Application-specific sensors can be integrated directly into the progressive stamping die. Optical, inductive, or PE (piezoelectric) sensors are used for tool monitoring, depending on the application: examples include double sheet control, feed control, ejection control, and press force monitoring.

Optical, inductive and PE (piezoelectric) sensors from Kistler can be integrated directly into stamping dies to detect malfunctions at an early stage and attain maximum levels of quality and safety. By combining our sensor technology with end-of-line vision inspection and laser marking systems, manufacturers can achieve zero-defect, fully traceable stamping production.

The Kistler Group delivers solutions to equip stamping lines with process control, die-integrated sensors, and 100 percent vision inspection – including KiVision image processing software and laser marking-on-the-fly. We also offer modular systems that can be tailored to customer requirements.

Vision inspection

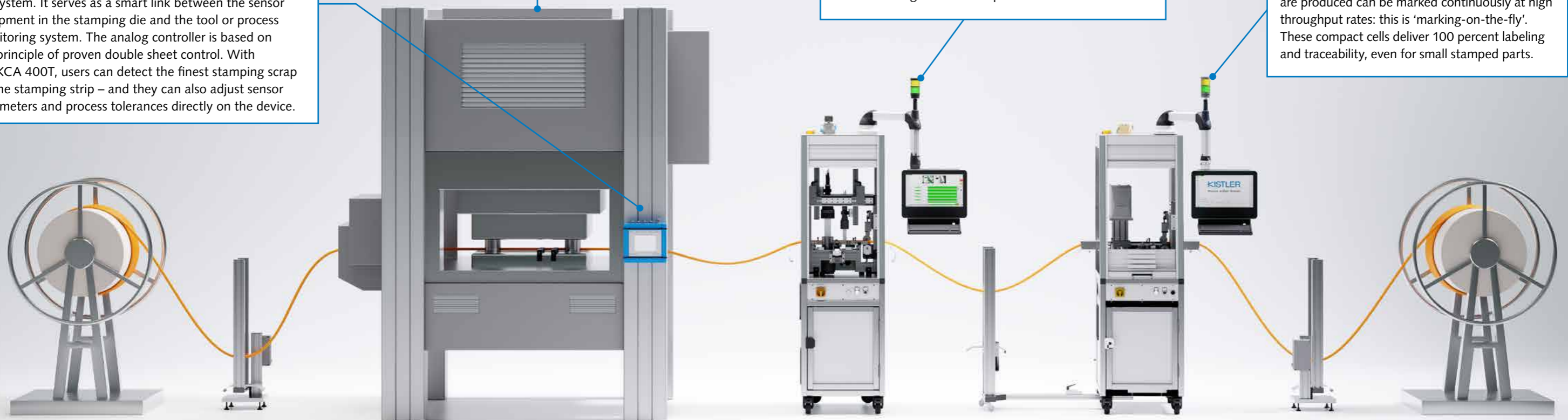
Our autonomous vision systems deliver state-of-the-art optical inspections of continuously produced parts. Even complex assignments can be processed at high speeds: options range from dimension checks and complete contour tracing to surface inspections – and more.

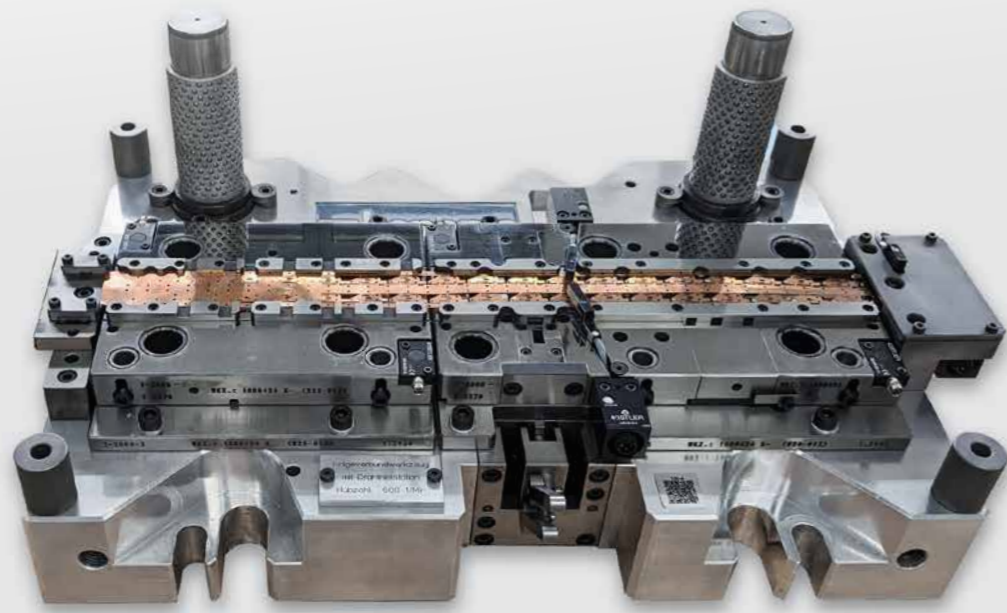
Your customer benefits

- Smart, reliable and efficient stamping due to inline process control
- High level of die and machine protection, less downtime, higher Overall Equipment Effectiveness (OEE)
- Specialized sensors for different processes and applications in stamping dies
- Quality control thanks to 100% inspection
- High-speed inline quality control for high volumes
- Complete traceability of each component thanks to laser marking

Laser marking

With special laser marking systems such as the KLM 621 from Kistler, all stamped parts that are produced can be marked continuously at high throughput rates: this is 'marking-on-the-fly'. These compact cells deliver 100 percent labeling and traceability, even for small stamped parts.





Progressive stamping die with integrated sensors for a reliable stamping process

Gain full control of stamping – with integrated sensor technology

Kistler makes it easier than ever before to control and optimize stamping processes. A varied range of sensor technologies can be integrated directly into stamping dies, enabling real-time process control of the continuous production process – including direct machine feedback.

With our extensive portfolio of optical, inductive, and PE sensors, we offer perfect solutions for diverse monitoring functions in a progressive stamping die. One example: double sheet control to ensure that no stamping scrap will damage the produced part, or even the stamping die itself.

In combination with the 6 mm slim PMI infrared fork light barrier, manufacturers can achieve precise feed and position monitoring in stamping and forming processes. The robust and miniature design ensures reliable process monitoring even in limited space – for example in a progressive stamping die.

PE force and strain sensors can also be integrated into stamping dies. For instance: longitudinal and transverse measuring pins deliver precise data with only a minimum of required space. PE force transducers deliver accurate quality control over the process in cases where press forces need to be measured (when joining different materials during the stamping process, for example).

Your customer benefits

- Reliable stamping process thanks to integrated process control
- Extensive portfolio of optical sensors, inductive switches, and PE sensors
- Compact and robust versions available for tool integration
- High accuracy and high repeatability
- Long lifetime and robust design

Feed and position control made simple with our PMI light barriers

With a width of only 6 mm, these slim fork light barriers use infrared light to deliver efficient monitoring of stamping and forming processes. Our light barriers feature a robust and miniature design that makes them easy to integrate into progressive stamping dies. These single-beam light barriers come with high repeatability (<0.02 mm) and a switchable output signal (NO/NC). They are also available with cleaning nozzles for use in dirty environments.

Versatile designs and mounting options available

The optical sensors in the PMI family are available in many different designs and with various connection options such as an M8 connector, free cable end, or mounting blocks. By offering these choices, we ensure that integration of the sensors into your stamping dies is both convenient and highly reliable. We will deliver the solution that perfectly meets your needs – backed by expert consulting support and a complete range of services.



Various designs and connection options are available for Kistler's slim fork light barriers.

Application-specific sensors to monitor stamping processes

Kistler offers special sensors such as the PDI and PXI light barriers for double sheet control. They are mounted either directly in the die, or on the die with the help of suitable brackets. Two sensors in a diagonal configuration reliably detect tilting of the spring-loaded guide plate caused by material scrap.

We also offer inductive distance sensors to measure precise distances in the stamping die.

Our frame light barriers are used for ejection control and precise detection of small parts (starting from 0.9 mm), as well as for challenging counting tasks.



Application-specific sensors from Kistler include frame light barriers and sensors for double sheet control.

Analog signal processing in the stamping process

We purposely developed our high-performance KCA 400T analog controller as a subsystem. It serves as the intelligent link between the sensors in the stamping die and the process control on the machine control system. The KCA 400T is based on the principle of proven double sheet control. In combination with analog sensors, even the finest stamping scrap on the stamping strip can be precisely detected.

Seamless integration with existing systems

The KCA 400T analog controller features a touch display and an easy-to-use multilingual menu. Users can set the tolerances they need separately for each connected sensor. The KCA 400T can be combined with all standard tool or process monitoring systems, making it easy to retrofit. Each KCA 400T occupies only one input – so one digital input of the control unit becomes four analog measuring inputs.



The Analog Controller KCA 400T can reliably detect finest stamping waste in stamping processes.



Vision inspection systems in the KVC 621 series combine optimum quality control with full traceability.

Zero-defect thanks to 100 percent quality control and complete traceability

Manufacturers who must meet the very highest quality requirements rely on our end-of-line vision inspection and laser marking systems. These automated standalone cells guarantee that every single stamped part leaving the line has undergone quality control and is fully traceable.

Our vision inspection systems in the KVC 621 series are equipped with high-end camera systems and advanced industrial imaging software. High-volume parts produced at rates of several thousand per minute can be checked automatically for dimensions, contours, surface quality, and more. Every Kistler vision inspection system is individually engineered to meet each customer's specific requirements – throughout the process from the feasibility check in our imaging laboratory through to commissioning and optimization.

Our laser marking system turns traceability from a promise into a reality. These automated cells use MOF (marking-on-the-fly) technology to mark continuously produced high-volume parts with individual information on every single part. The benefit: production details can be attached permanently to each part without interrupting the line or the stamping process.

Your customer benefits

- Automated end-of-line quality assurance enabling zero-defect production
- Vision inspection systems based on high-level industrial imaging, including lab analysis
- Full traceability of every single part, implemented with laser marking
- Solutions are continuously developed – including AI integration
- Complete solution from one single source – from the consulting phase onwards

Complete solution for quality control of high-volume stamped parts

Kistler's KVC 621 is a universal, autonomous vision measurement system for 100 percent inspection of continuously produced parts. Thanks to integrated control and image processing components, this system offers high, adjustable processing speeds for complex quality control tasks with transmitted and reflected light. The KVC 621 is available in various sizes and designs.

Space-saving line integration – plus fast delivery and installation

The new KVC 621 SE is an extra-compact vision inspection system for mass stamped parts. Measuring only 600 mm wide and 900 mm deep, the KVC 621 SE was specifically designed for production environments where limited space is available. Thanks to close PLC monitoring, volumes of up to 6,000 stamped parts per minute can be tested with no compromises on process quality.



With the new compact KVC 621 SE automated testing system, manufacturers can measure and detect defects in up to 6,000 stamped parts per minute.

Laser marking-on-the-fly: high precision meets high speed



The KLM 621 laser marking-on-the-fly machine from Kistler can be integrated directly into existing stamping lines.

The KLM 621 laser marking cell enables automated strip transportation and labeling of continuously produced stamped parts in high volumes. This flexible high-performance system can also be used for other materials – application examples include injection molding and assembly lines. Each workpiece can be individually marked with numbers, characters, codes or safety-relevant information.

Full traceability for up to 1,500 parts per minute

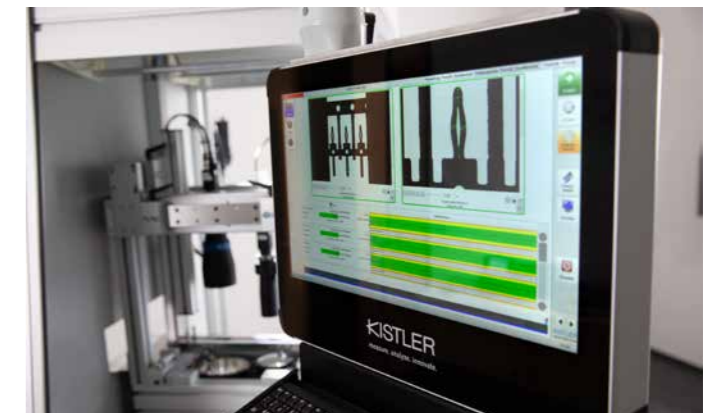
Rapid and permanent end-to-end marking and labeling ensure traceability for all produced parts – a key factor for quality assurance in every production environment. And thanks to MOF technology, parts can also be counted and separated without stopping the strip. Setup and coupling with line and master control require minimal effort.

State-of-the-art software solutions for zero-defect production

Kistler offers all-in-one imaging processing software for 100 percent quality control of mass-produced parts. The software includes VISU (the frontend for customers and the interface for machine setup), PLC software, and KiVision (software for inspection and measuring tasks): all three elements are supplied by Kistler and are fully integrated with each other. MD60 post-processing statistics software is also available as an option. With the help of these various instruments, customers can enjoy the full benefits of our automated test systems.

Highly individual usage and flexible data transfer

We are continuously developing our KiVision software in Kistler's own Competence Center Vision Inspection. As a new feature, for example, customers can now use predefined macros or even create their own user commands: this makes it simple and easy to program test criteria, with no loss of flexibility. Thanks to high-performance subpixel algorithms, measurement accuracies in the μ -range can be achieved. Also: data transfer (to CAQ systems, for example) is possible via the SQL database or OPC UA.



Optical quality inspection: The KiVision image processing software developed by Kistler analyzes test images.

Would you like to learn
more about our applications?

Explore now:



www.kistler.com/applications

Kistler Group

Eulachstrasse 22
8408 Winterthur
Switzerland

Tel. +41 52 224 11 11

Kistler Group products are protected by various intellectual property rights. For more details, visit www.kistler.com

The Kistler Group includes Kistler Holding AG and all its subsidiaries in Europe, Asia, the Americas and Australia.

Find your local contact at
www.kistler.com

KISTLER
measure. analyze. innovate.