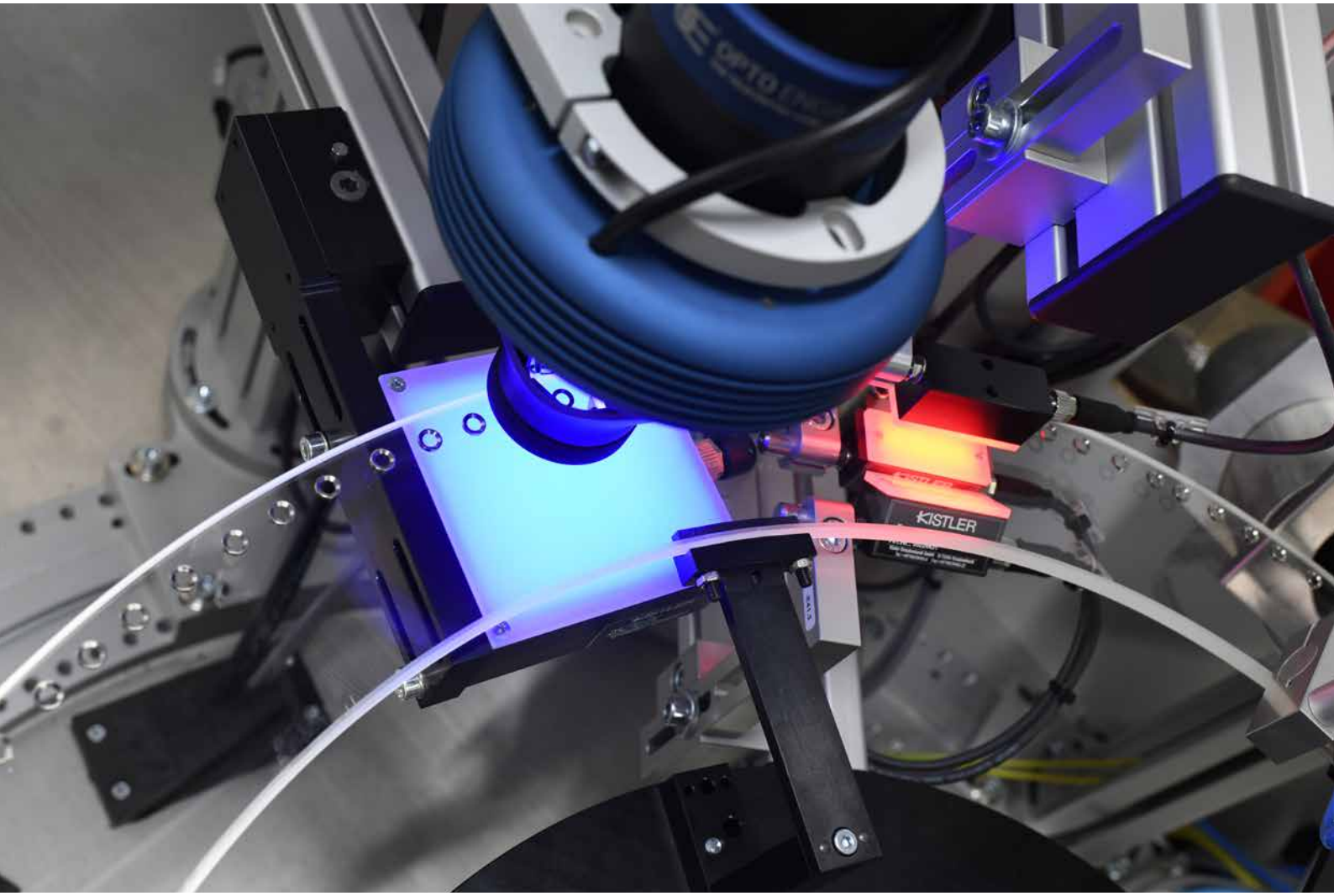
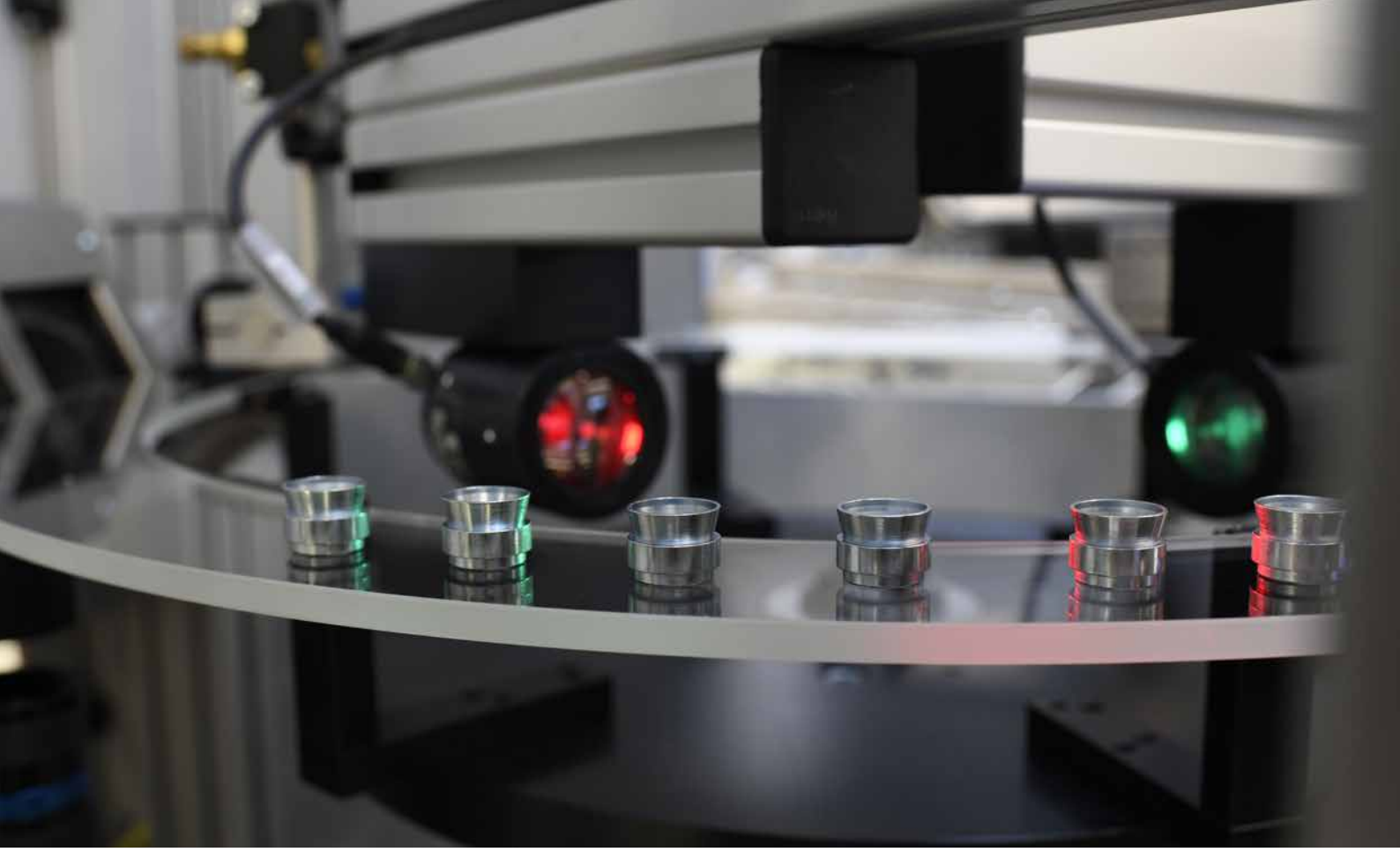
KISTLER

measure. analyze. innovate.



Maximizing the quality of series products

Efficient 100 percent inspection with the KVC 821 automatic testing and sorting system



Test objects are optimally separated thanks to the rotary plate that handles the parts.

Quality testing at the very highest level

Industrial manufacturers are confronted with growing quality requirements, so they need high-performance testing equipment that can deliver reliable results – even when the quantities involved are vast. Kistler responds to this need with automatic testing and sorting systems consistently designed to meet customers' requirements. These include high throughput rates, 100 percent testing, traceability and easy operation as well as flexible layout and modification based on a modular structure.

The Kistler Group has accumulated its expertise in the course of more than 30 years' experience of industrial test automation. Our customers benefit from our high level of vertical production integration: we have our own in-house development and production departments for sensors and optical components. And as well as its own image processing laboratory, Kistler has facilities available for PLC and robot programming together with software for parameterization and image processing – and development work is constantly ongoing in all these areas.

An individual system from one single source – available worldwide
When customers opt for solutions from Kistler, they get a complete, coordinated package from one single source. Expertise in mechanical engineering, image processing and software as well as accurate laboratory analyses: a combination to ensure that our solutions are precisely fit-for-purpose – the essential prerequisite for reliable quality assurance based on high-performance test automation. And by no means least, we offer an extensive range of services, available throughout the world: support from a dedicated contact person, remote as well as onsite service, and also rental systems and retrofits – just ask us!

Efficient data acquisition for Industry 4.0
With the help of high-performance software and hardware components, automatic testing and sorting systems from Kistler capture quality data – with no exceptions – and go on to prepare statistical evaluations. Data is collected from all tested parts (no random sampling) to provide an invaluable basis for optimizing production processes. This data is then made available to higher-level systems via programmed interfaces such CAQ connections. In all these ways, our test systems play a major part in helping our customers to implement Industry 4.0.

Your benefits at a glance:
- In-depth advisory service with feasibility analyses of testing tasks
- 100% testing of series parts
- Large production quantities and fast cycle times
- Enhanced process reliability and optimized process efficiency
- Comprehensive recording and transmission of quality data
- Reduced quality costs
- Rapid amortization (ROI)
- Increased plant efficiency and lower total cost of ownership (TCO)
- Worldwide service and sales

Exclusion and ejection control for bad and good parts upstream of each station

Test chamber with rotary plate and various testing stations

An efficient and reliable process – even for large quantities

Automatic testing and sorting solutions from Kistler are universal modular systems equipped with digital camera measurement technology: the key to 100 percent control of series parts. The strengths of our systems come into play whenever high throughput rates are a critical requirement for producers of turned, punched, injection-molded or die-cast parts.

Ongoing development of the glass plate sorting systems in the VISIONcheck KVC 821 series has focused specifically on the growing requirements for surface inspection. These systems are underpinned by lengthy experience of industrial image processing and test engineering, combined with expertise in feeding and handling technology for series parts. Thanks to the consistent implementation of a modular strategy, users can choose from these options (also available as retrofits):

- Dimensional inspection of individual parts
- Attributive surface inspection
- Option to integrate various testing systems from third-party providers (including hardness, material and crack tests)
- Add-on modules and flexible adaptations depending on each application and testing process

Modular structure for adaptation to individual testing tasks

Testing is performed on a continuously rotating plate with a glass ring attachment and a regulated servo drive with an adjustable friction clutch. Depending on the workpiece type and production line structure, customers can choose from two basic versions: the compact KVC 821/C with integrated feed, and the more flexible KVC 821/E, supplied with an external feed.

As an option, the basic versions of both designs can be expanded by adding up to eight digital cameras with different resolutions, as well as multiple sorting and ejection stations. Based on "Shape from Shading" technology, this module delivers exceptionally convincing results, especially for complex surface inspections.

Reliable, flexible testing with the KVC 821

- 100 percent testing of up to 600 parts/min
- Comfortable operator experience thanks to 24" touchscreen
- Up to eight high-resolution matrix and line-scan cameras (B/W or color)
- LED flash illumination, transmitted and reflected light (telecentric, coaxial, diffuse)
- Surface-independent testing based on "Shape from Shading"
- Traceable quality data for each individual part
- Highly reliable processing and sorting thanks to ejection controls using light barriers manufactured by ourselves and electronic safety concepts

The KVC 821: highly integrated, modular and flexible

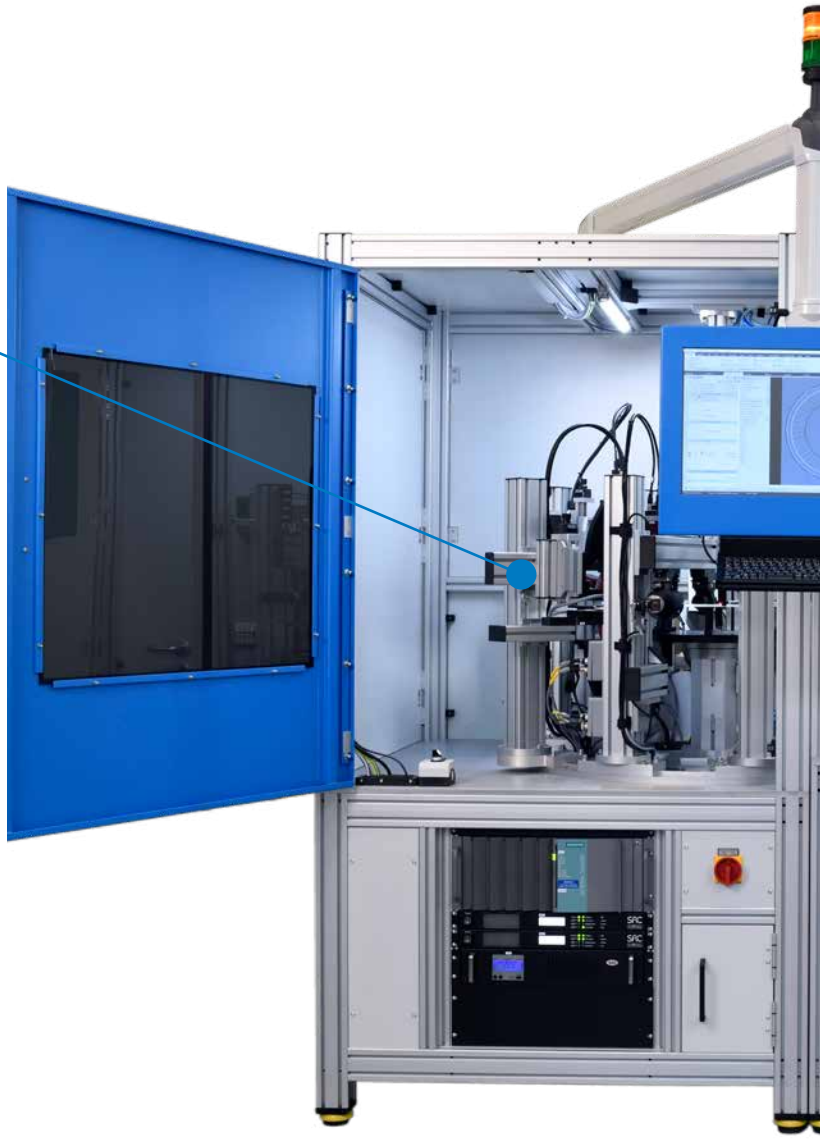
Users of the KVC 821 automatic testing and sorting system can test the quality of mass-produced and series parts with high levels of efficiency and process reliability. Intelligent feed, cavity-based sorting and surface-independent testing: these advantages guarantee maximum quality assurance and 100 percent control so users can pursue a zero PPM strategy.

Comfortable control is another benefit for operators: for example, they can use the touchscreen or keyboard and trackball to adjust the target feed rate – even while testing is in progress. Up to eight high-resolution matrix and line-scan cameras ensure that every part is tested – with no exceptions. Detailed recording of quality data also guarantees that every single workpiece is traceable.

Cavity-based evaluation of errors and measured values
Cavity-based sorting is possible for parts from injection or die-casting molds with stamped-on cavity numbers – even without batch pre-sorting (part mixing). The number of the relevant cavity is scanned by OCR software during the test cycle, and all measured values and tolerance deviations are stored separately with the appropriate index. The result: a detailed evaluation is guaranteed for each individual cavity.

Optional sorting by tolerance or NOK classes
For precise classification and application of specific tolerances, the KVC 821 can perform sorting into as many as four evaluation classes for good parts. Bad parts can also be sorted into as many as four different NOK containers based on detected tolerance violations (e.g. reworking, scrap, manual resorting, etc.).

All variants of illumination with reflected or transmitted light can be implemented in the KVC 821.

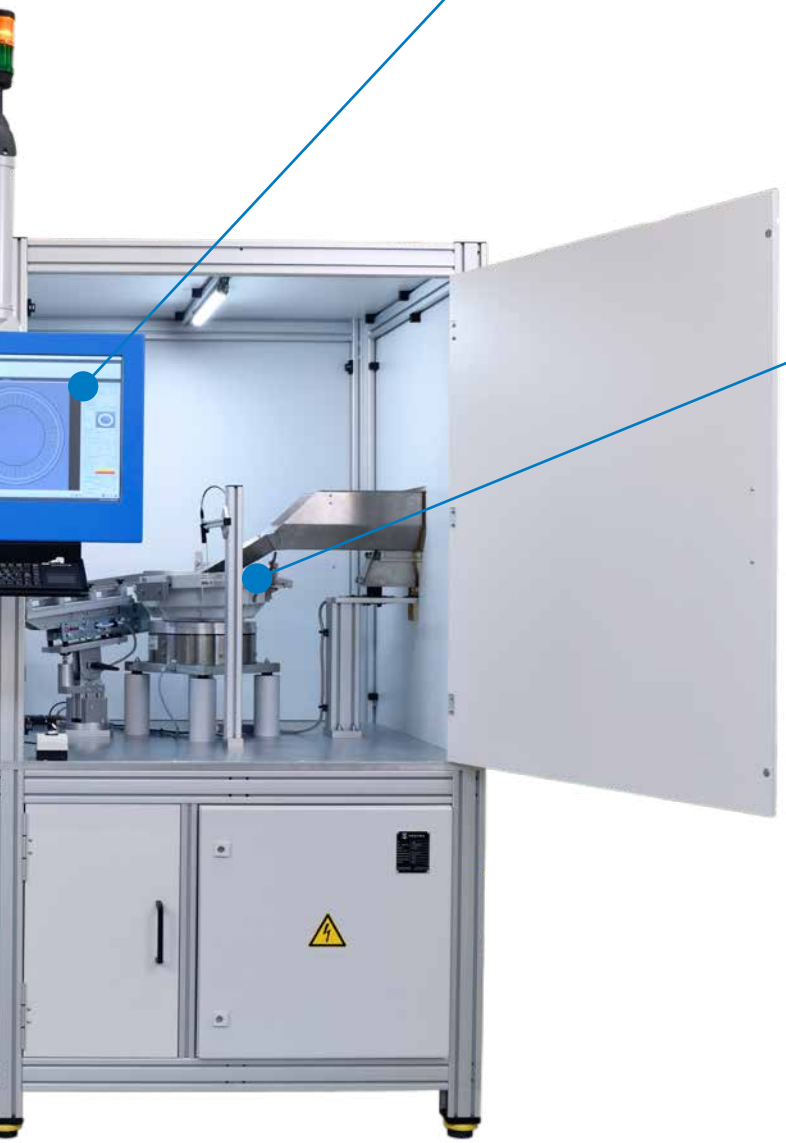


For more insights, please take a look at the explainer videos for our automatic sorting systems on our YouTube channel.

Technical data:
Connection values
- 230 VAC; 0.8 kVA; 6 bar

Dimensions
- KVC 821/C
  Width = 2,500 x depth = 1,600 x height = 2,600 mm
- KVC 821/E
  Width = 1,200 x depth = 1,600 x height = 2,600 mm

Weight
- KVC 821/C: approx. 650 kg (without feed system)
- KVC 821/E: approx. 1,250 kg (depending on feed system)



Equipment
- 61 cm (24") touchscreen monitor
- Windows- and IPC-based image processing system
- Telescopic tray with keyboard and trackball
- Rotary plate with glass ring attachment for different measuring stations

All feed system variants can be operated with correct positioning of parts fed into the test line.

- Separating device (belt conveyor/linear conveyor) with swarf separator
- Intelligent feed with vibratory conveyor and adjustable chicanes

Extendable to match your specific application

Kistler does not regard its test automation solutions as completed units. On the contrary: the basic version and the add-on components can be tailored flexibly to match customers' specific testing scenarios. This applies to the testing tasks as such, and also to part handling (feed, positioning, removal) and the software options.

Thanks to an extensive range of accessories, the automatic testing and sorting systems in series KVC 821 can be adapted to each customer's individual testing tasks. Available hardware features include (for example) electric actuators, parts buffers, storage hopper systems and charging systems as well as optional modules for surface and material testing. When it comes to software, Kistler offers CAQ connections as well as extensive documentation and statistics functions, among other possibilities.

Test process/modules

- Surface inspection with "Shape from Shading" light dome illumination unit
- Integrated hardness testing with cutting-edge test sensor technology
- Line-scan camera for correct positioning of parts fed into the test line, or pre-sorting of extraneous parts

Part handling

- Quantity charger with bag, box or carton pick-up# for precise counting of good parts in predefined quantities
- Storage hopper: variable size and choice depending on period of autonomous operation
- Part removal via belt conveyors for better protection of parts
- Electric actuators for automatic positioning of working ranges or aperture preselection for automated changeover between testing jobs

Software options

- Extended documentation functions
- Extended statistics functions

Flexible structure – inside and outside: thanks to its modular design, the KVC 821 automatic testing and sorting system can be equipped and extended for each specific application.

Software grows to meet the challenges it faces

As regards software, the KVC 821 automatic testing and sorting system is equipped with the fully redesigned KVC Visu user interface and the KiVision image processing system – so operators have continuous access to all the process information they need. Parameterization for the current testing job can be performed at any time, on a plant-specific or workpiece-specific basis.

For image processing (IP), the Kistler Group has developed KiVision, its own Windows-based software. KiVision's graphic interface guides users through the operating steps and supports them so they can perform their chosen testing tasks quickly and efficiently. The functional scope includes an extensive library of process-specific applications and macro commands, geared to the testing requirements for turned, punched and other series parts.

KiVision can handle all commonly used industrial processes for measurement based on image processing, such as contour tracking and surface inspection, etc. Measurement accuracies in the micrometer range are achieved thanks to high-performance subpixel algorithms. Proof can be supplied automatically with measurement system analyses according to commonly used methods (Bosch, VDA, Ford).

State-of-the-art image processing and integrated measurement system analysis

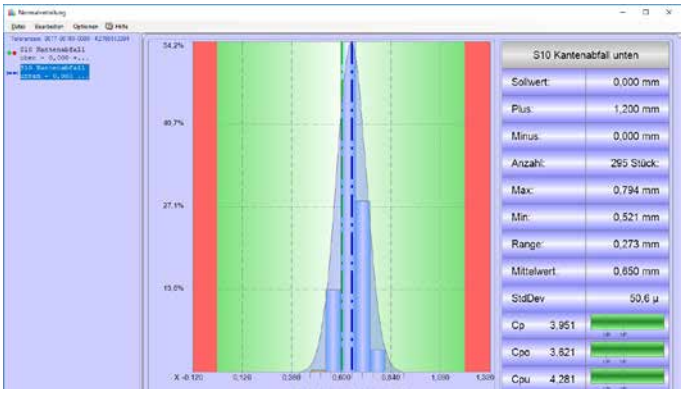
All VISIONcheck systems in the KVC 821 series also have networking capability so that program data and measured values can be managed centrally and connected to CAQ systems – and with the MD60 add-on statistics package, the measured values can also be visualized as a standard distribution curve, exported as raw data or used for the Cpk calculation.

The most commonly used measurement system analyses (MSAs) can be carried out and then evaluated, either manually or automatically, as follows:

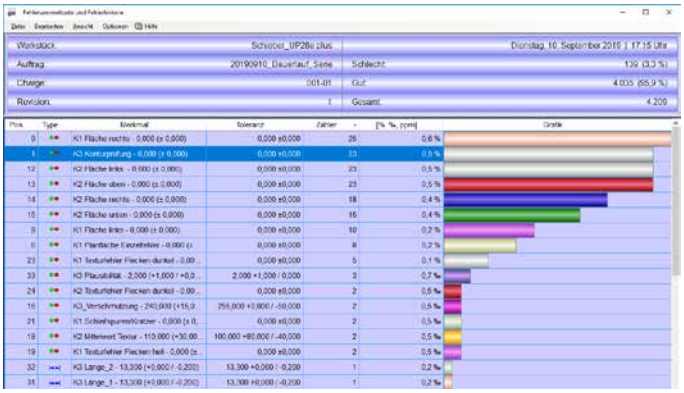
- MSA 1 – as per VDA, Bosch and Ford guidelines
- MSA 2 – procedure: ARM QS 2000 and ANOVA Bosch 2005 – control of up to three different speed ranges (motion blur)
- MSA 7 – procedure: test decisions for discrete and discretized continuous characteristics as per Bosch, booklet 10

Continuous development protects investments

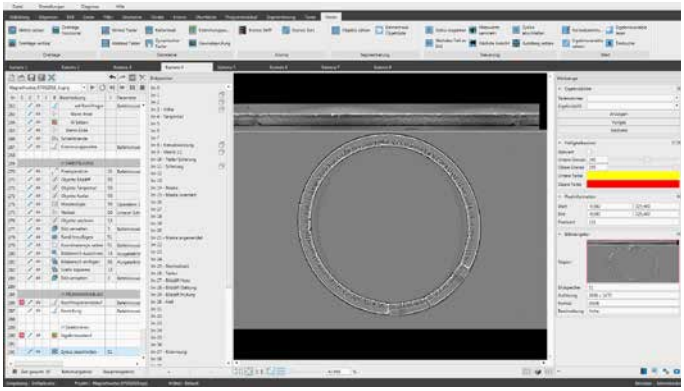
Kistler is continuously advancing the development of its KiVision IP platform at the Group's in-house Competence Center Vision. Key goals are to improve functionality in changing software environments and – most important of all – to optimally exploit the potential of new high-performance hardware. Kistler's industrial IP specialists in Karlsruhe also collaborate closely with our test automation experts in Straubenhardt to offer application-specific training courses.



Standard distribution and calculation of the Cpk value



Error log sheet to evaluate the testing process



The KiVision image processing software ensures that testing processes are efficient.

System parameterization as well as programming and evaluation of measured values – one software product handles everything!

For more information, visit:
https://www.kistler.com/en/solutions/industrial-process-control/test-automation/

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