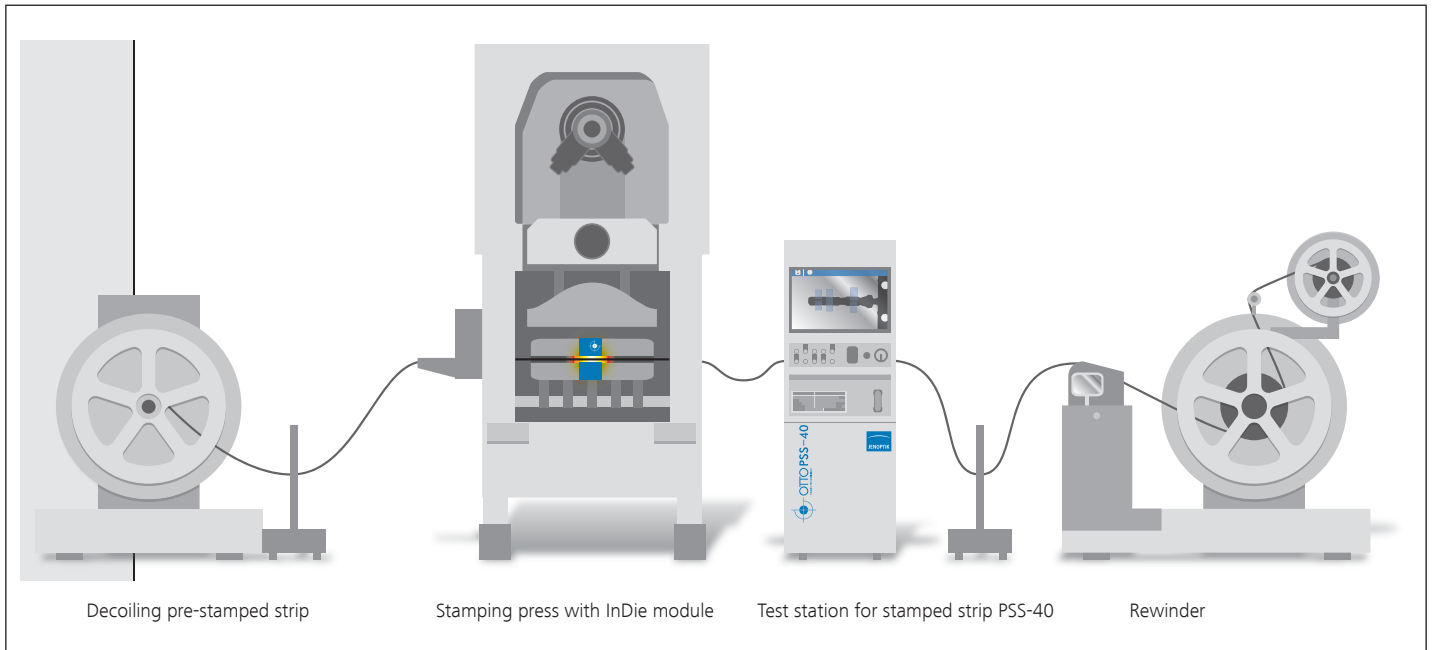


MORE LIGHT

Optical Inspection Stamping

PSS-40 test stations for stamped strips

An elementary link in the high-end stamping shop



The demands for efficiency and cost structure in stamped part production have grown rapidly. Manufacturers of stamped parts need competitive solutions that enable zero-defect production despite increasing process complexity.

PSS test stations are an innovative leap from the traditional inspection by random test of stamped parts, to the fully automated in-line inspection, measurement and sorting of stamped production parts.

Real-time delivery and processing of each manufactured part's inspection data, from the first punching stroke onwards, allows shorter and more efficient changeover processes, high stamping line utilization, and the lowest possible consumption of resources. Our customers benefit from improved quality at lower costs.

**~1,000
systems**

**30 years
experience**

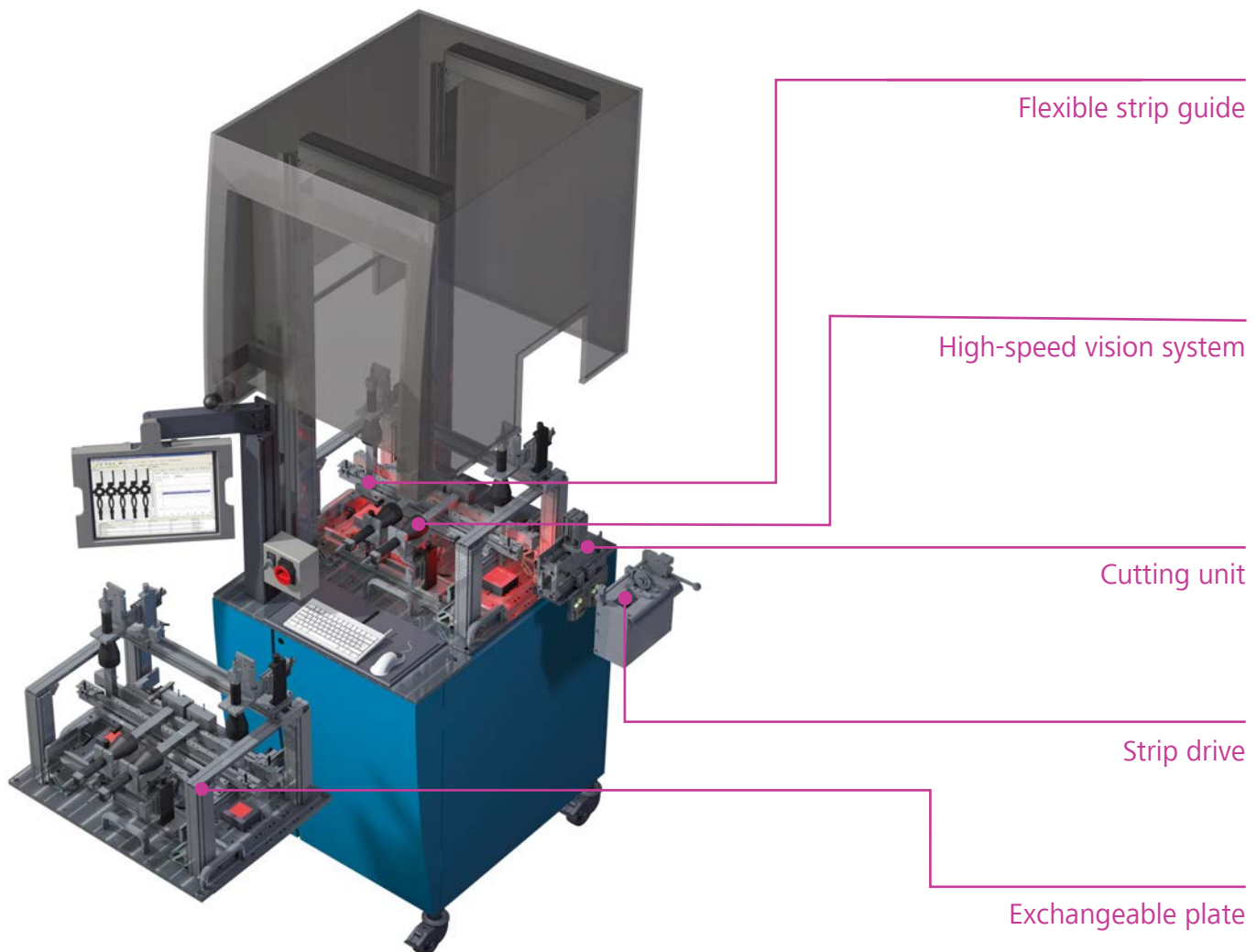
**200+
active customers**

**100 Billions+
tested parts**

100 % process control for error-free production

For extremely high quantities at highest precision level without interrupts

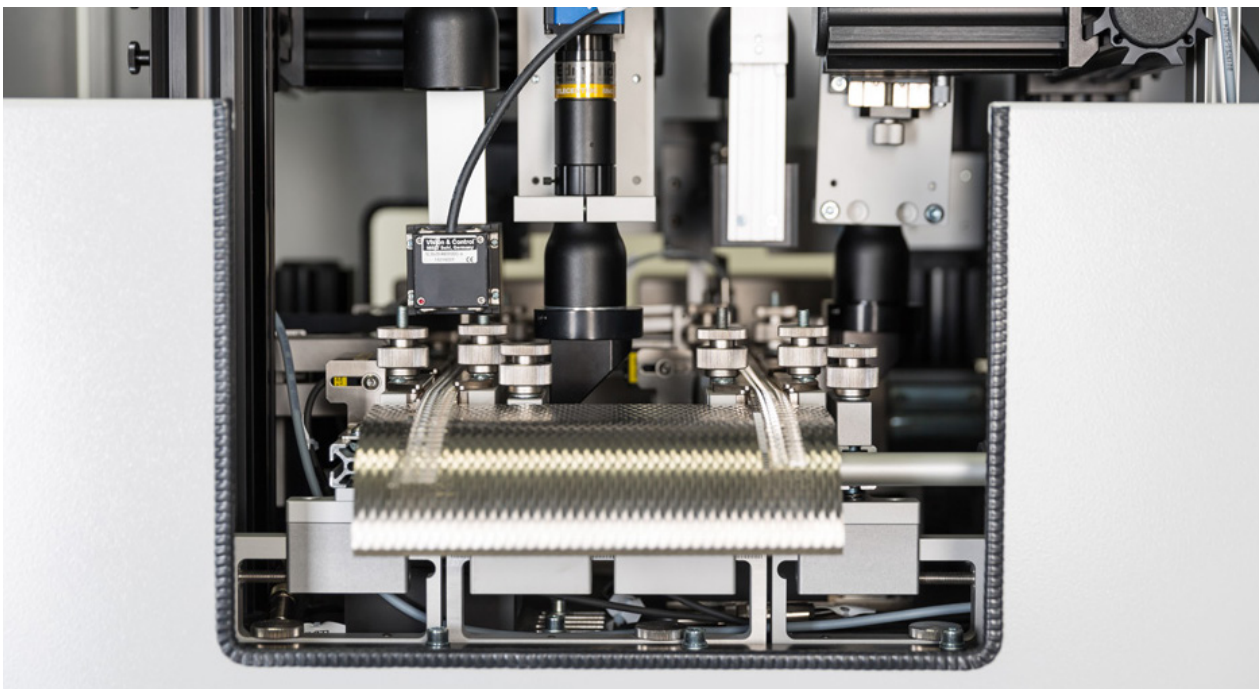
- Manufacture around the clock 24/7
- Separate or mark bad parts automatically without press stop
- Monitor and optimize quality
- Avoid scrap and expensive complaints
- Minimize the changeover effort for tool changes by exchangeable plates and network server
- Proof of KPIs with SPC and MSA
- Networking of multiple systems
- Increase efficiency results in maximized output



Inline test stations for high-performance stamping industry

Hardware experience of almost 1,000 running systems around the world

- Modular sizes (S/M)
- Exchangeable plates for quick changeover
- Production release in minutes
- Customized individual strip guides and special inlets
- Sensor-free digital loop control for safe runtime optimisation
- Part-specific cutting or marking units without press stop
- Integrated cutting and welding systems without press stop (cutting & welding)
- Systems for two parallel strips



Applications

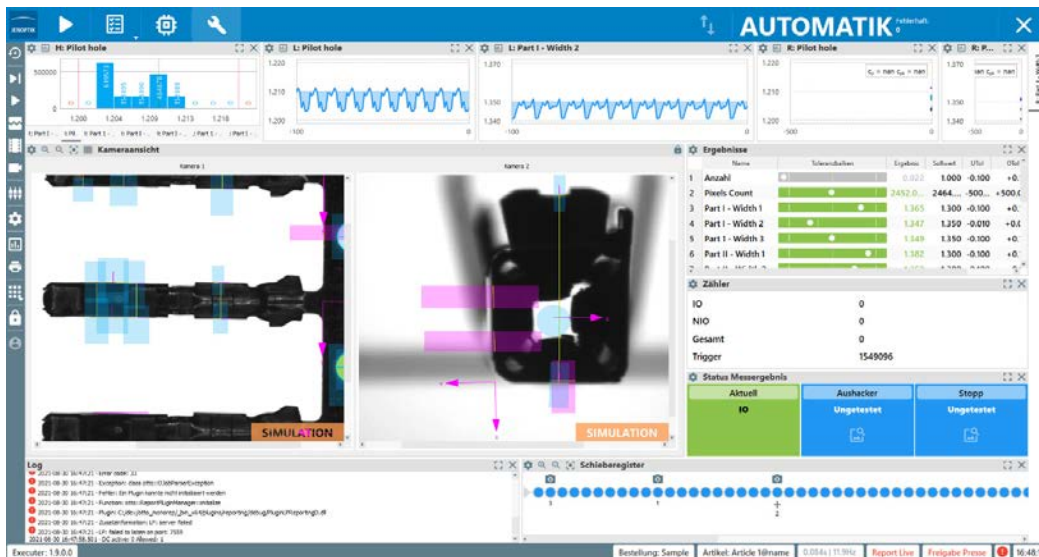
- Dimensional, contour and surface inspection of connectors, punching grids, lead frames, etc.
- Dimensional and attributive inspection of overmolded punched strips, plastic tapes, etc.
- Test and sorting of separated falling parts directly inside the stamping die or by conveyor belt separation latch
- Surface inspection of galvanized strips in electroplating and bimetallic production
- Anomaly detection and classification of laser spot welds or surface defects with deep learning/AI

OVIS Inspect

Approved high-speed vision software for stamping

OVIS Inspect is made to solve complex inspection demands easily and quickly and with unrivaled speed. The software allows fully automatic and seamless monitoring of manufacturing processes of stamping parts. Demanding

measurement and inspection requirements are realized quickly and precisely in real time. In addition to quality assurance, OVIS Inspect helps to continuously monitor and optimize smooth and efficient production processes.



Benefits

- No speed limits for stamping
- Extremely high performance in live operation
- Several hundreds of dimensions for every individual part inspected
- Extensive dimension library as well as powerful image processing tools for contour comparisons and surface inspection
- Deep Learning / AI
- Intuitive inspection job creation with full flexibility
- Full process integration
- Statistical process control (cg, cmk,...). SPC, MSA.
- Industry 4.0, fully network based concept
- Press stop can be controlled based on action plan (pre-warming by e-mail / info window / Signal, "Action-Logic")



PSS-40/LCLW

Test station for stamped strips
with Laser Cutting/Laser Welding

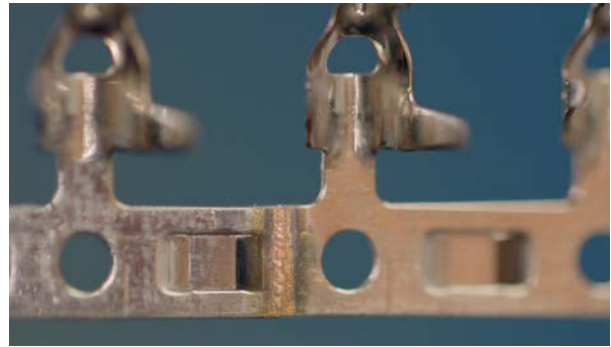


Advantages of the LCLW in detail

- Image processing checks each stamping part for quality deviations continuously and identifies bad parts
- Integrated laser removes individual bad parts or strip sections
- Integrated laser welds carrier strip for good part reels without interrupts, even during material coil changes or stamping die maintenance
- Strip drive performs tensile test and camera saves image of the welding point after the tensile test

Cutting and welding with integrated laser

- Missing parts are cut out with a laser
- The carrier strip is automatically welded with the same laser providing a seamless production process



Camera documentation of welding quality

- Stored images of each weld joint for documentation



Individual part or strip section sort

- Strip outlet for good parts and separate strip outlet for sorted strip sections and unchecked bypass parts
- fully automatic connection of the strip to fill good parts reel after parts sorting or maintenance



Access to bin for bad parts during production



Technical data

- Support for a wide range of matrix cameras and 3D sensors
- Max. 8 cameras with up to 30 MPixel and more
- Ultra-fast image capturing up to 2,000 parts per min and more
- Use of standard and special optics as well as various light sources (front and back light, tunnel, coaxial, RGB, angled, etc.)
- Fully integrated PLC
- Easy integration into control concepts via standard interfaces (digital I/O, Profibus®, OPC®, etc.)
- Flexible adjustment options for fast and repeatable hardware modification



PSS-40/S



PSS-40/MH

Specification	S small	M medium	MH medium, special housing	LCLW cutting/welding
Dimensions (W x D x H in mm)	550 x 900 x 2,100	810 x 1,000 x 2,020	810 x 1,000 x 2,130-2,800	1.143 x 985 x 2.162
Max. number of cameras	2-3	4-6	4-6	2-3
PLC	yes	yes	yes	yes
Specials	compact design	large size	hood to lift up, flexible access	laser welding
Part separation		cutting		cutting and welding
Power supply		110/230 V / 10 A		3L / N / PE 400V / 50 Hz / 16A
Compressed air			8 bar	
Operating system			Windows 10/11* (64 Bit)	

**in preparation*

It is our policy to constantly improve the design and specifications. Accordingly, the details represented herein cannot be regarded as final and binding.

Next level at the stamping shop

Network your inline inspection with our data management

Comprehensive quality inspection as a component of quality management in the sense of industry 4.0 places greater demands on inspection systems in a networked environment. These services are covered within the framework of Progressive Stamping Data Management

(PSDM) and combined inspection system networks from Jenoptik into more than the sum of the individual systems. Server-based archiving, evaluation and availability of inspection data and production-specific data reduce production costs and improve customer satisfaction.

Data capturing and collection

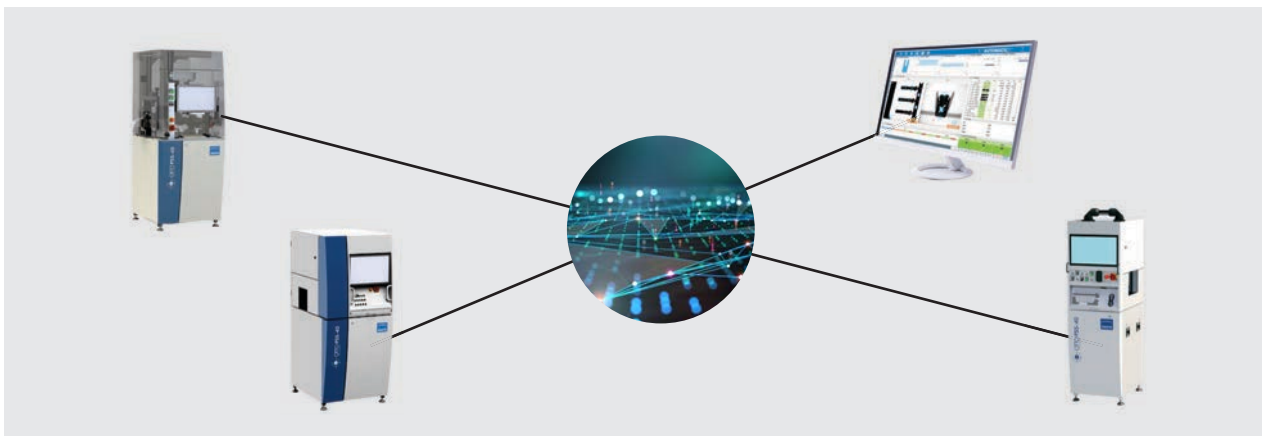
- Data is provided centrally in combination with current test criteria and real operating states of the test systems.
- Statistical data and defective parts images from past periods are available at each terminal. Inspection processes for different batches are traceable and reproducible.

Analysing & monitoring

- The seamless provision of the latest test data for all active test systems, as well as their configuration and operating states, make the PSDM a unique real-time control centre for production.

Administration

- The provision and distribution of test jobs in the PSDM facilitates the application of test systems and ensures the safe application of test criteria throughout the network. Largely automated changeover of production lines saves time and resources.



The PSDM is installed on a database server with any number of terminals. The test systems are connected to the server via the intranet.

Communication nodes direct the data flow and the connected terminals allow access to the database of the PSDM.

- Real Time SPC and for past orders
- NOK parts images and NOK data history
- Server-based real time data management (control centre function)
- Central management of inspection jobs, changeover functions
- Configurable traceability
- Central administration of networked inspection systems

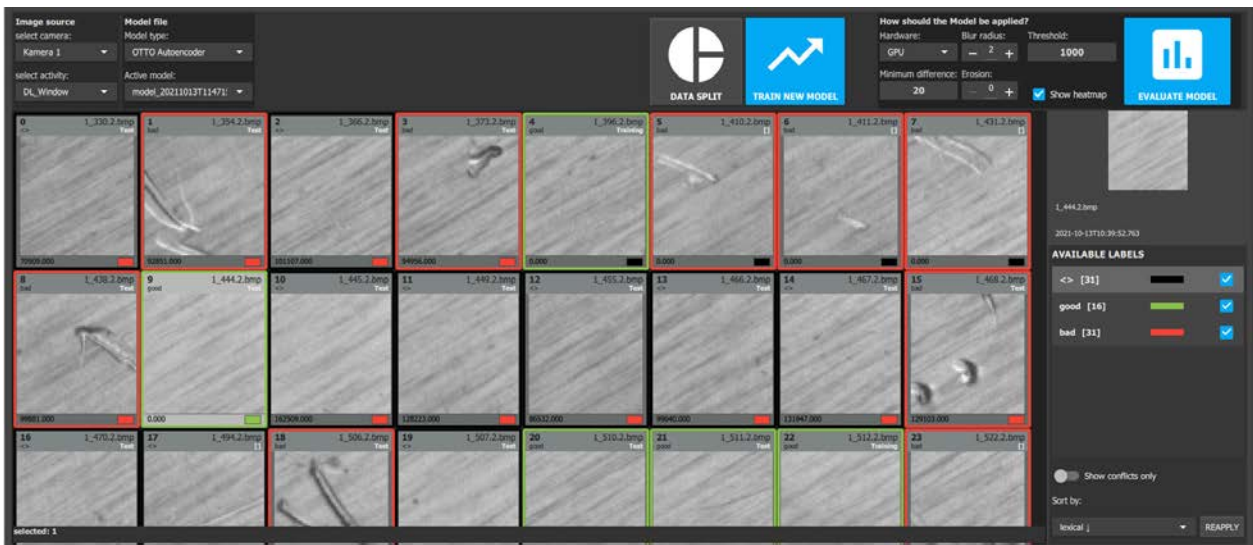
Deep learning

Artificial Intelligence in high speed stamping

Many inspection applications are difficult, if not impossible, to solve with conventional tools of image processing. There are two main challenges leading into a new approach of software technology.

- Classification – recognition of predefined parts or properties
- Anomalies – detection of any deviation from an ideal.

Both challenges can be solved using artificial intelligence – or so called deep learning (machine learning).



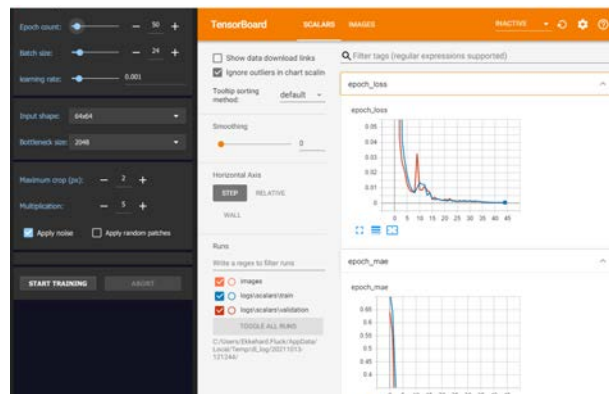
In contrast to the standard tools of image processing, no test job tailored to the specific article is created, instead a learning procedure is run using a large number of real images. Real-time delivery and processing of each manufactured part's inspection data, from the first punching stroke onwards, allows shorter and more efficient changeover processes, high stamping line utilization and the lowest

possible consumption of resources.

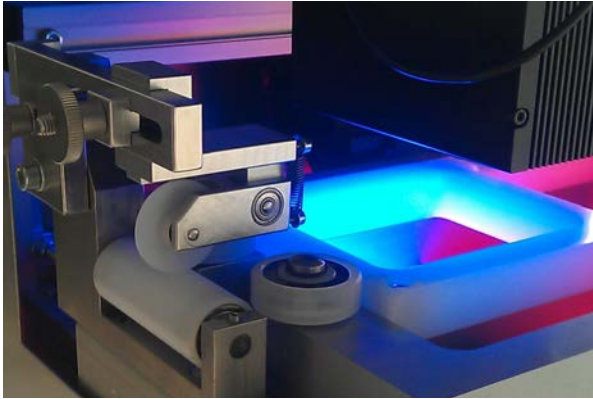
Our customers benefit from improved quality at lower costs. The learning process takes place on a separate training station, while the deep learning module for 100% inspection is integrated into our vision software. Supported by a power graphics card, even fast applications can use the tools of artificial intelligence.

Benefits

- Grouping of the parts in defined classes
- Example classification of known defects
- Prerequisite availability of a sufficient number of parts per defect class
- Detection of any deviations (anomalies, defects) from a trained ideal part
- Training on the basis of faultless parts, recognition of defects that were unknown at the time of training

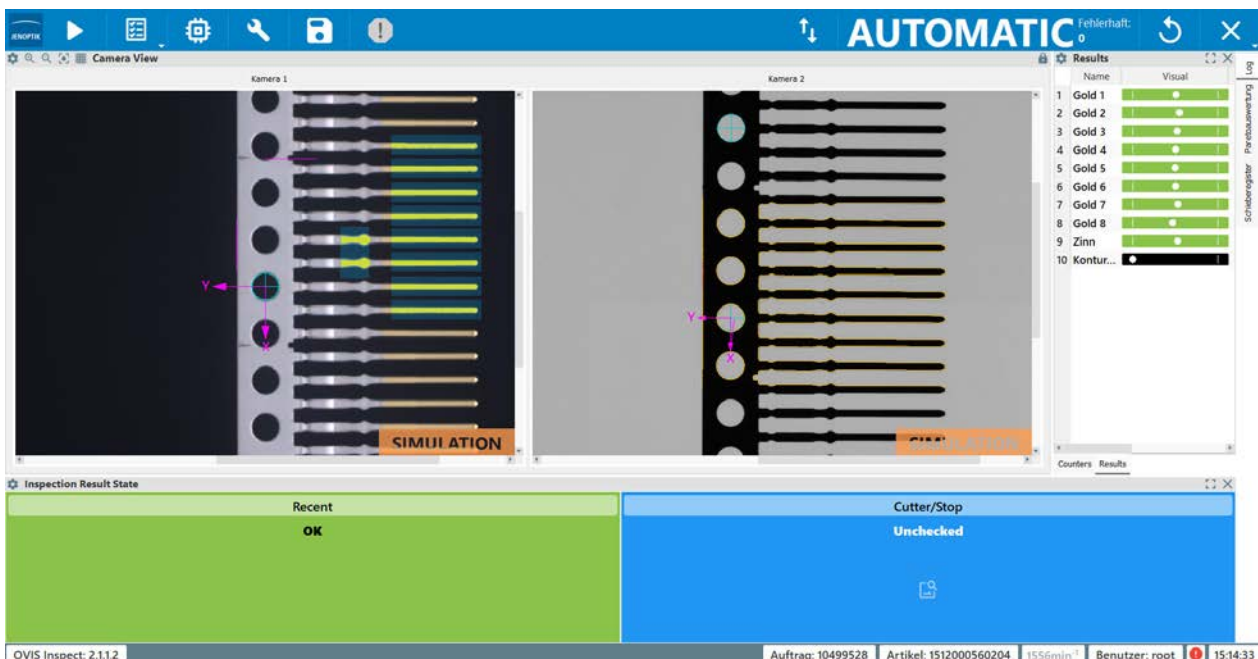


Solutions for plating



- Special systems for electroplating
- Customer specific mechanical and electrical plating line integration
- Inspection of seamless drawn strips
- Strip guidance on rolls
- PLC for tracking defective coil areas
- Application in electroplating and bimetal production

Demanding environmental conditions – no problem with extreme requirements for fail-safety



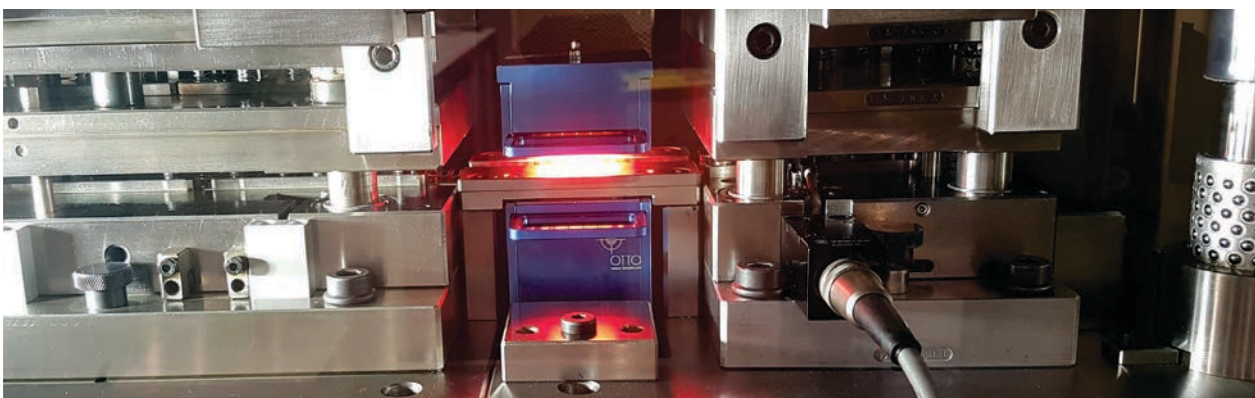
- Surface and geometry inspection
- Use of colour cameras and RGB lighting
- Deep Learning for defect screening
- Control of the completeness of coating processes

InDie solutions – inspect one step ahead

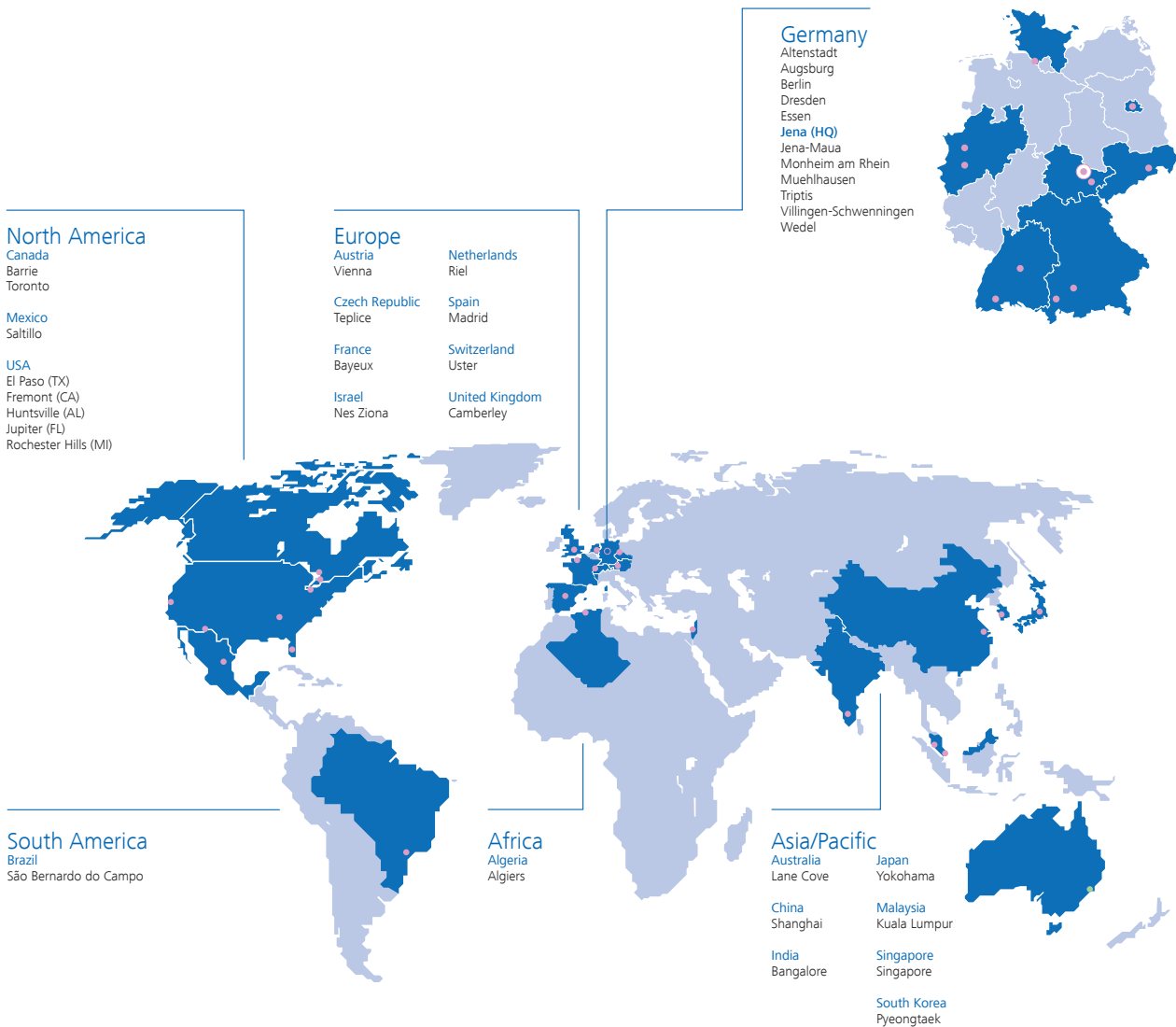


Inspection of loose pieces inside the die

- High-precision testing with up to > 2,000 strokes / min
- Considerable cost reduction compared to test equipment outside the press
- Sorting of bad parts directly inside the die
- Welding spot check
- Surface inspection
- Use of several modules in series IN the stamping die



Jenoptik – Worldwide



We are a globally operating photonics group which is present in more than 80 countries; the Advanced Photonic Solutions division, for example with production and assembly sites in the USA and China. Additionally, the division is represented abroad by shareholdings in India, Israel, Japan, South Korea and Singapore.

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ART-KON-TOR – DIE AGENTURGRUPPE (pages 1, 3, 4, 10)

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