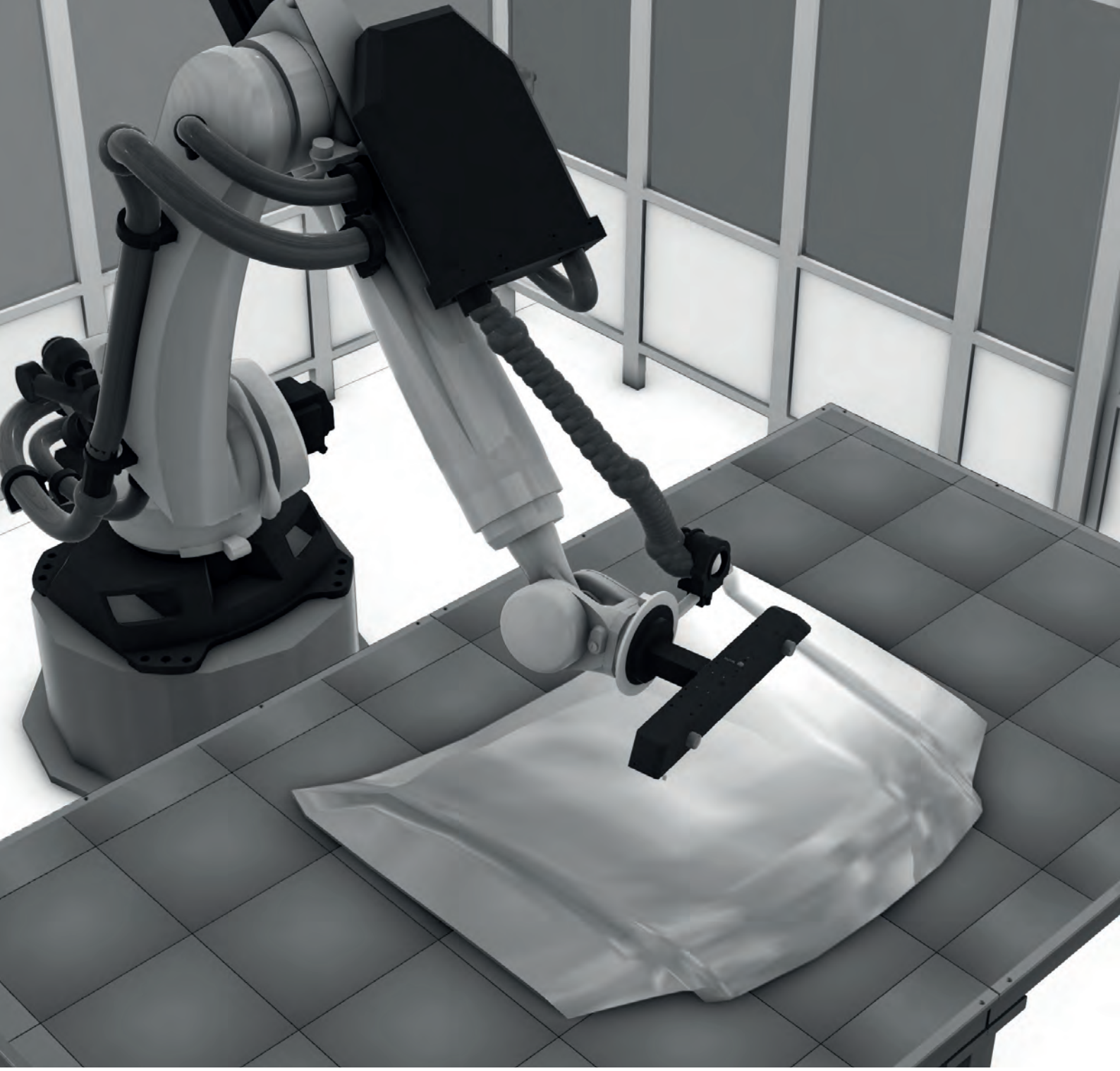


ZEISS ABIS II

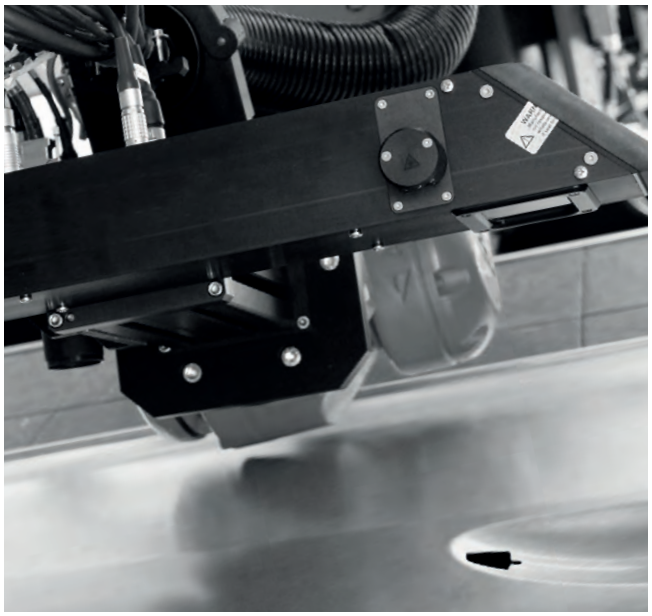
Optical Surface Inspection

Objective and efficient quality control throughout the production process

ZEISS ABIS II

Optical Surface Inspection - objective and efficient quality control throughout the production process

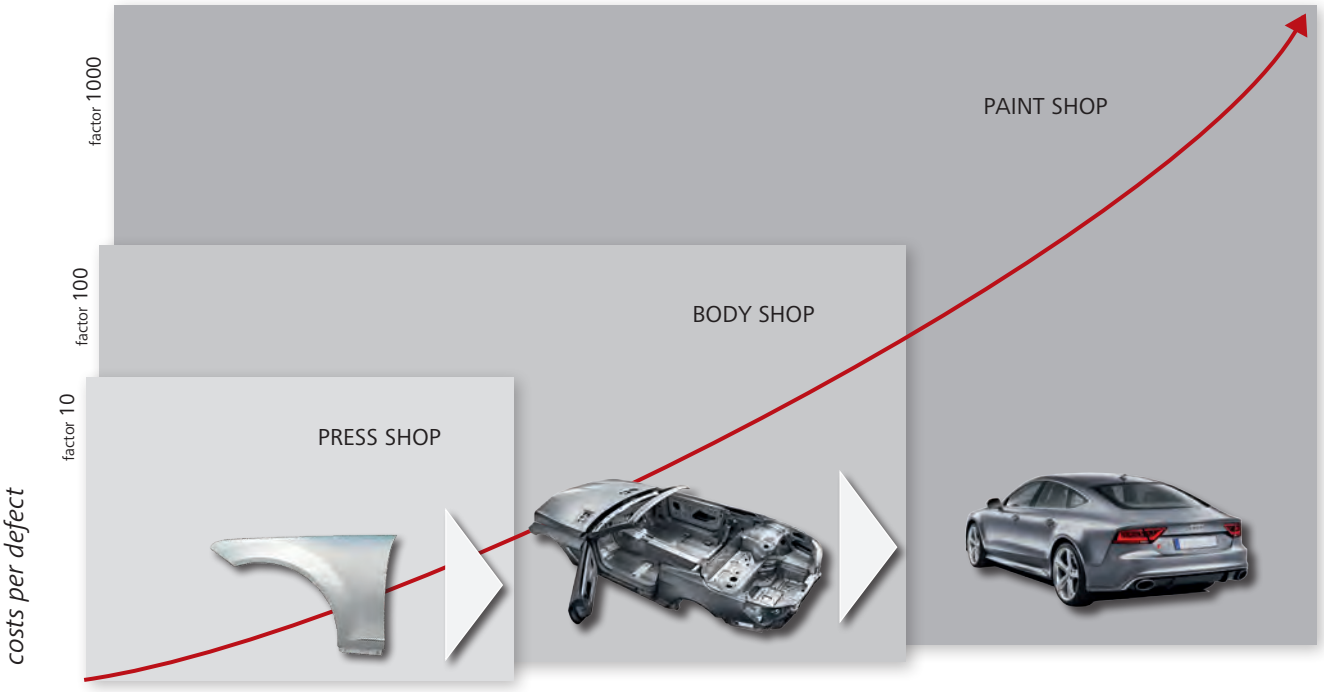
The surface quality of a product - particularly in the automotive industry - constitutes an important criterion for the customer and is generally seen in close relation to the quality and high value of the overall vehicle.
The timely detection and objective classification of surface defects with the high-precision ZEISS ABIS II surface inspection system opens up new perspectives in quality assurance.



Surface quality throughout the production process
Even minimal inevitable disturbances in the early production stages prior to applying the paint work (in the press shop or body shop) may cause defects such as dents, bumps or sink marks that are invisible to the eye while the surface is still unpainted.
On a high-gloss paint surface, however, even the slightest irregularities are clear to see with incident light from the proper angle, and constitute a reduction in quality that can only be remedied using costly corrective measures.

ABIS - objective and highly precise surface inspection
Available in different versions and system concepts, the ZEISS ABIS systems allow the fast, reliable and ultra-accurate detection of surface defects. Time-consuming and thus expensive rework in subsequent process steps, e.g. at the finish belt, can be efficiently reduced.
Numerous renowned automotive manufacturers and suppliers have implemented the ZEISS ABIS II surface inspection system with great success in a wide range of configurations tailored to their press shop environments.
Be it routine offline auditing at regular intervals or fully automated inline inspection of parts at the end of a press line, ABIS II systems always provide first class quality assurance.

Customer-specific system configuration
With a wide diversity of combinations and layouts, including components such as sensor technology, software, robot and safety engineering, ZEISS provides application-specific and customer-driven solutions. The user thus benefits by getting automation individually designed for his specific application and he profits from a fast, safe and innovative complete solution which is optimally integrated into his existing processes.



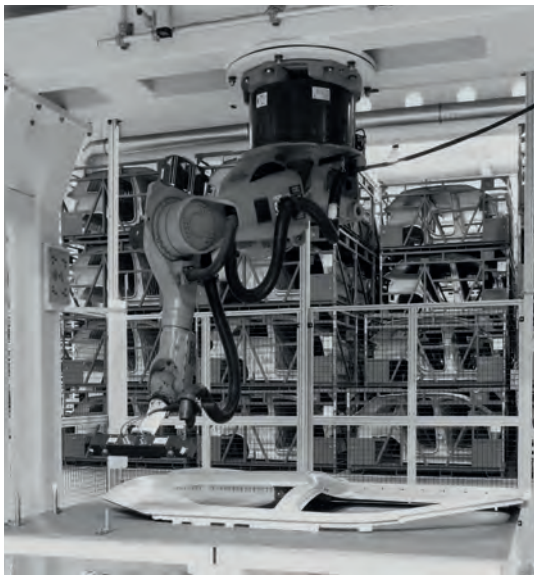
Significantly increased costs for late correction of surface defects - exponential rise during the process chain

Early defect recognition for cost-saving and resource-efficient production

The majority of defects that can occur during the production process are “invisible” at the early stages of manufacture. These minute surface defects become visually perceptible later on, however, when subsequent work steps such as paint work have been completed.

The costs of removing these defects increase drastically with the progress of work within the production cycle (press shop, body shop, paint shop, final assembly). Consequently, particularly the rework of defects that have been propagated throughout the production process constitutes a substantial factor with regard to manpower and time. With the ZEISS ABIS II systems, surface defects can be determined directly at the production step where they occur.

Quality control with ZEISS ABIS II substantially optimizes the sustainability of the production processes by significant savings of work resources and raw materials - environmentally friendly and economically efficient high-end technology.



Detection of all relevant defect types with ABIS II

Objective and fast measurement with robust sensors

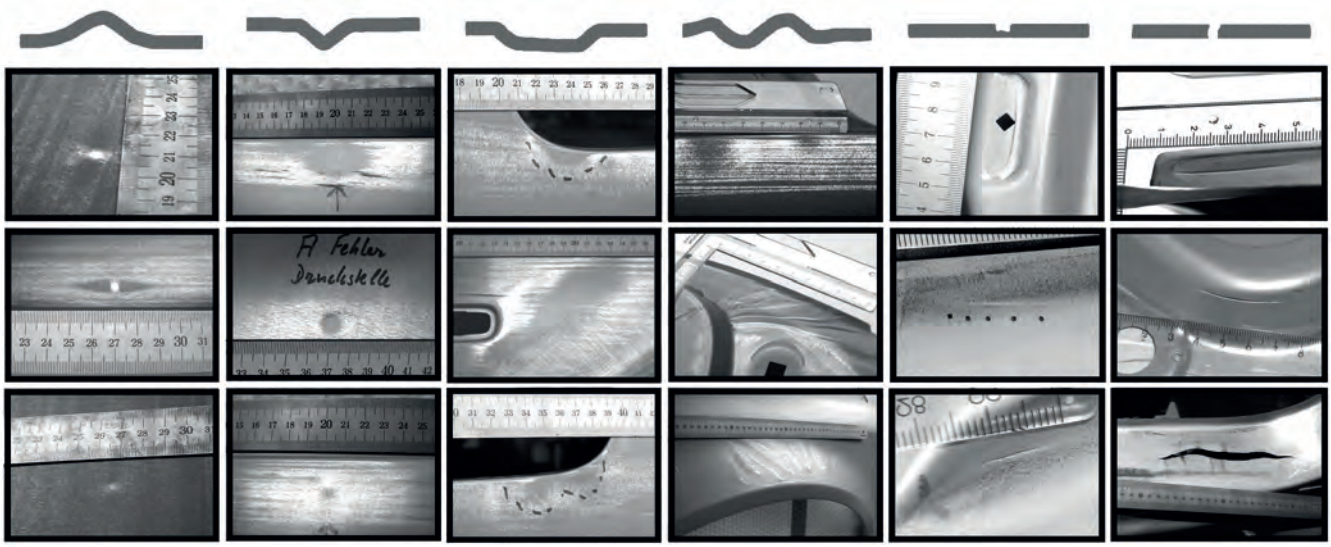
Using ZEISS ABIS II sensors, a wide range of defect types can be detected. Featuring a reliable recognition and objective evaluation of dents, bumps, sink marks, waviness, impact lines, constrictions and cracks, the systems represent the perfect quality control instruments for the production of sheet metal parts and bodies-in-white.

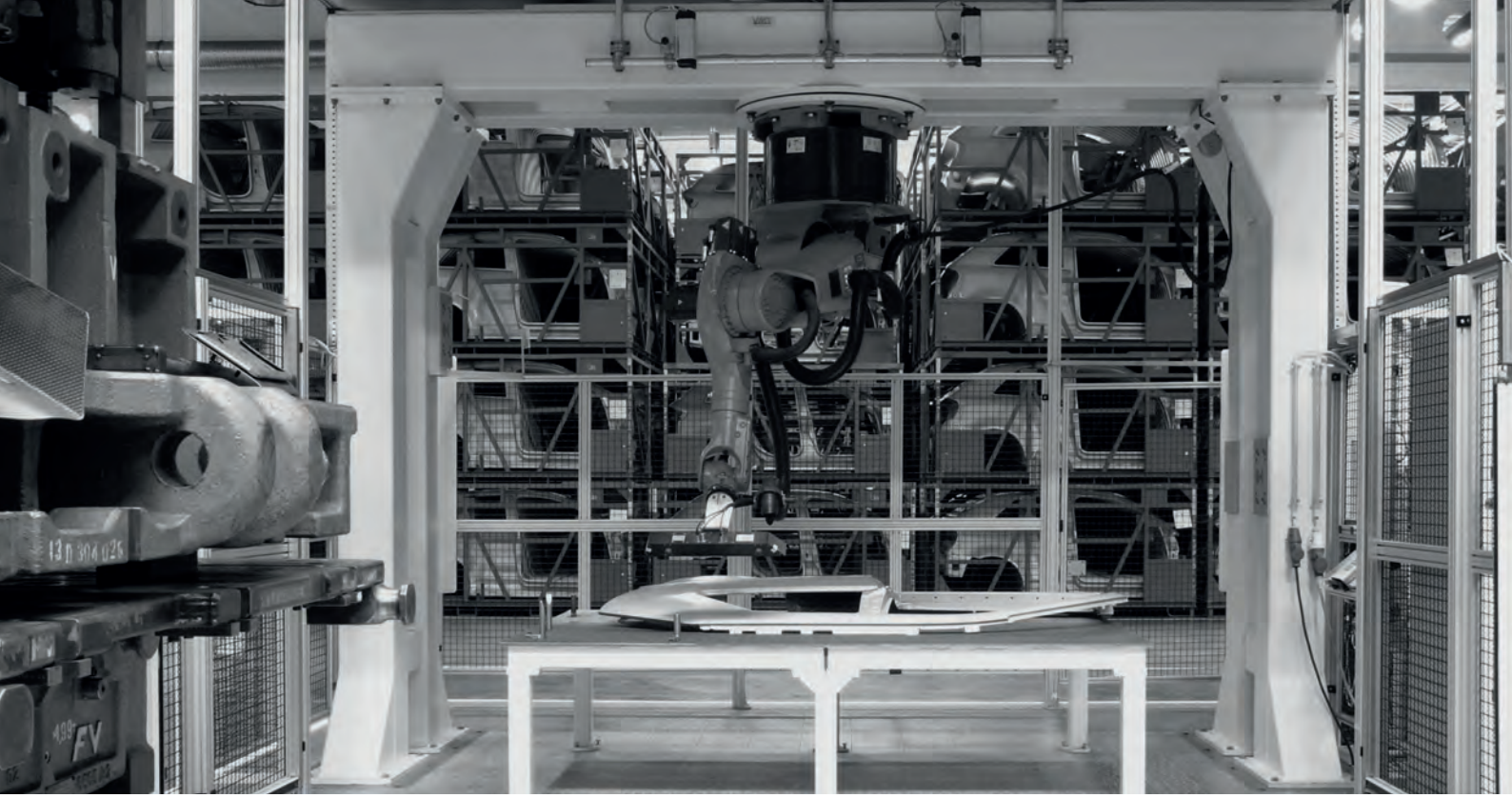
In addition to the detection of top coat affecting surface defects on exterior body panels, ZEISS ABIS II systems also demonstrate their strengths in the reliable quality inspection for safety-relevant constrictions and cracks on inner parts.

One of the unique features of the ZEISS ABIS II sensor is its high resistance against ambient conditions. Featuring an extremely short exposure time and thus being unaffected by vibrations, ABIS II constantly delivers highly precise results. This makes the sensor ideal for the use in production environment, for example close to a press line.

Examples for 3D defects:

bumps *dents* *sink marks* *waviness* *constrictions* *cracks*





ZEISS ABIS II

Continuous analysis of the surface quality throughout the complete process chain

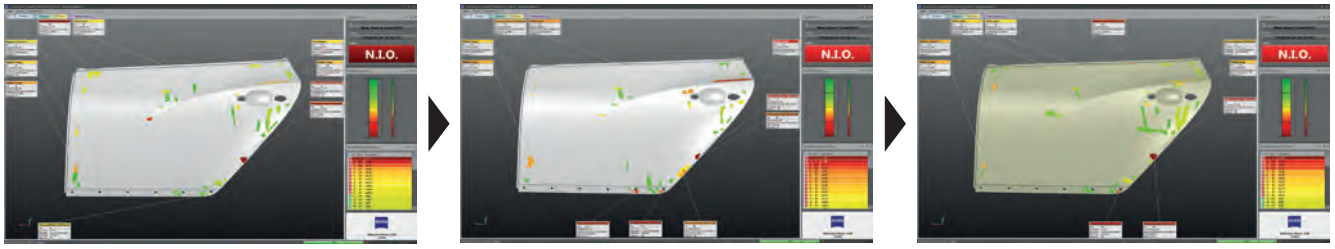
Many users in the automotive industry rely on an integrated surface quality analysis across the entire process chain. After each of the process steps single part, assembly and cathodic dip painting, the individual parts are examined again by same inspection application to identify any surface defects that might affect the top coat quality.

The development of a defect is documented after each process step. Practical experience in production shows that the relevance of a surface defect can increase or decrease after a process step.

Based on a process-wide quality analysis, the required rework is done precisely at the required location on the part and at the required process steps. This increases the efficiency in the finishing area and results in a significant cost saving. Besides the development of a surface defect across the process chain, the time-related changes within a production period also give users important information on the quality changes.

For example, when the audit value deteriorates, corrective action (e.g. regarding press parameters or tool surfaces) can be taken at an early stage before producing parts with defects that will later require rework.

Surface inspection with ZEISS ABIS II - documentation of defects after consecutive process steps:



single part *assembly* *cathodic dip painting*

User-friendly sensor technology, software and automation

For tool making, press shop and complete bodyshell work

ZEISS ABIS II offers the highest standards in terms of suitability for industrial applications as well as expandability, defect detection and ease of use. To inspect a part, all the user has to do is select the part on the touch screen and start the test sequence. Thanks to the high-speed inspection and evaluation capacity, a report of the inspection result will be available in minimum time.

The entire operation is done very simply by selecting the relevant part inspection processes on the touch screen. When programming additional test sequences for new parts, the user is systematically supported by the easy-to-use ABIS-TeachIn software.

The classification criteria and threshold values for a subsequent automatic evaluation of the defects are always based on the customer's specifications. In addition, the system applies the customer's internal audit note standards and defect names. The specified threshold values can be flexibly adapted to the relevant production stage at any time (floating audit).

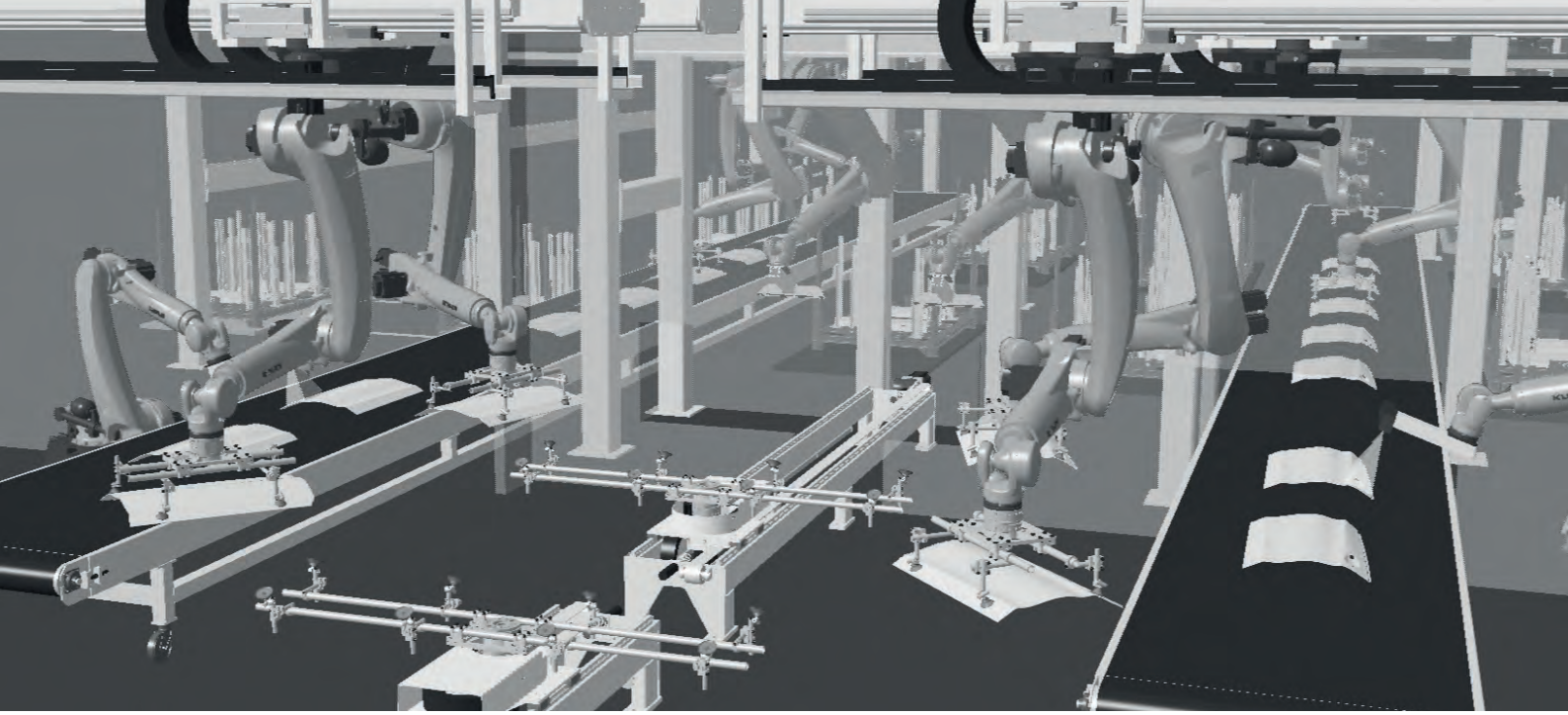
- Efficient, highly precise quality control
- Objective classification and documented surface quality
- Easy operation and fast evaluation
- Fully automatable process
- Less rejects and complaints
- Reduction of rework costs
- Sustainable optimization of production processes

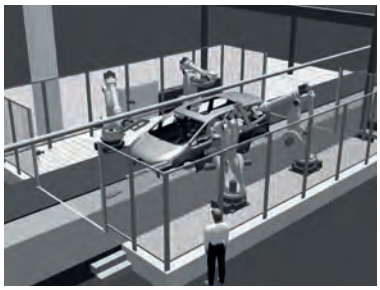
Virtual design - individual system configuration perfect for integration into production process

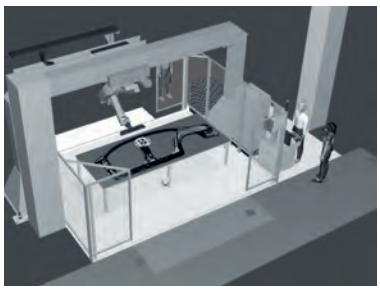
Before a ZEISS ABIS II surface inspection system is installed, a virtual system concept is always created first. Simulation programs help to select the specific robot and its position with reference to the part under test. This ensures that the sensor will be able to reach all the positions required for inspection.

How many sensors and data analyzers the final system concept provides depends on the part size(s) (from small bodyshell parts to the complete car body / body-in-white) and on the specified maximum inspection time per part (cycle time). Corresponding accessibility studies build the basis for optimal customer-specific system configurations.

The safety concept and the construction of the system are designed and implemented in accordance with user guidelines. Customers can choose to do this themselves or order a complete, end-to-end surface inspection solution.







ZEISS ABIS system variants - from portable sensor and offline-system to fully integrated inline unit

ZEISS ABIS II is a flexible system concept that comes in three different versions. Users can thus choose the sensor system that best meets their application requirements.

The compact and highly precise ZEISS ABISoptimizer sensor system has been developed especially for applications at an early stage of the manufacturing process. Due to its high mobility, the system allows for a quick change of the location for concurrent and focused, punctual inspection measurements in production.

ZEISS ABIS II Offline allows data acquisition and evaluation at an automatic test stand and is excellently suited for accompanying production monitoring.

With ZEISS ABIS II Inline, a fully automated inspection and assessment can be performed by direct integration of the system into the manufacturing environment of the body shop or press shop.
According to the customer's specifications, the ABIS II Inline system can be configured for either 100 % inspection of all parts or for the inspection of certain object areas and defined zones on the test part.
The achieved complete or partial inspection of bodyshells and sheet metal parts sets highest standards in quality assurance and auditing.

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