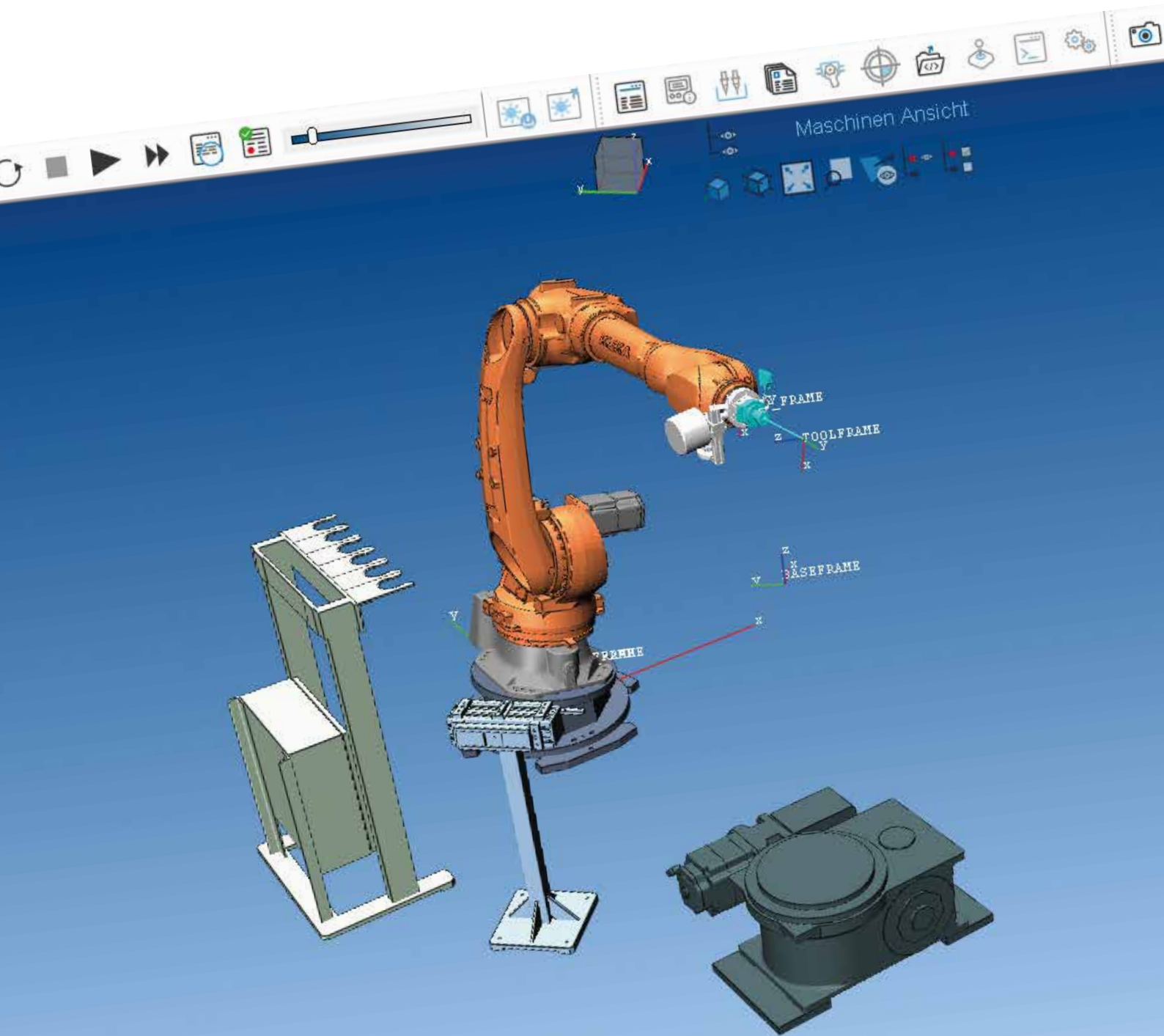


# ELO \ SCAN

Robot controlled Eddy Current inspection system



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## The flexible robot controlled inspection system

With their ELOSCAN inspection systems, Rohmann GmbH have been the leader in non destructive testing of materials in the aviation industry for more than 20 years.

The automated ELOSCAN Eddy Current inspection system is mainly conceived for the inspection of rotationally symmetric engine parts. The system can also be used to inspect other complex component geometries owing to its universal structure. The precise sensor guidance makes it possible to inspect the part along its surface, even on points which are difficult to access, owing to the customized sensor fixtures.

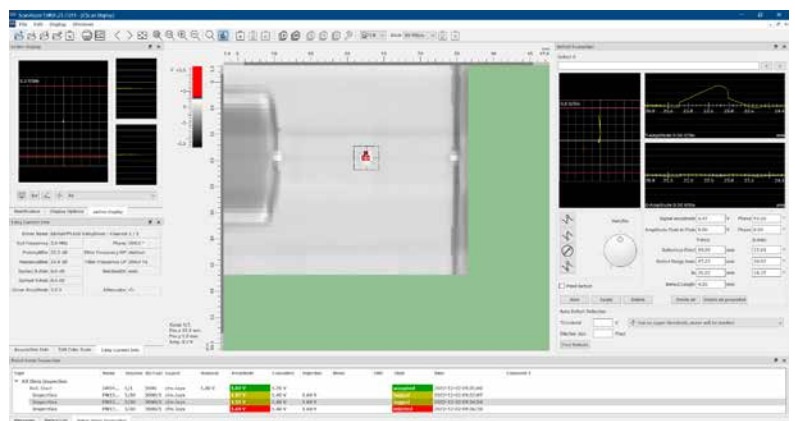
In addition to the rotating and oscillating scanning of the component surface with a static sensor, bores can also be inspected with a rotating sensor system as part of the inspection process. The application of sensor arrays in multiplex mode has proven to be useful for this system.



Inspection with the "Blue-Tool" – flexibly configurable.

These are the main components of the user-friendly overall system:

- ▶ Highly precise Kuka multi-axis robot for precise sensor guidance
- ▶ Rotary drive with a chuck for positioning and rotating the component
- ▶ ELOTEST PL650 inspection instrument, fully integrated in the system
- ▶ Various individual sensors, sensor arrays and tools.
- ▶ Industrial computer with the SCANALYZER software for the evaluation, analysis and documentation of the inspection results
- ▶ Smart pad for the operation and programming of the robot
- ▶ Reference part station for automated calibration and verification
- ▶ Tool magazine as a deposit for different sensors and other tools
- ▶ Ergonomic control panel for free positioning



ELOSCAN inspection results are logged with the SCANALYZER software.

A multi-axis industrial robot guides the sensor and positions the component. The rotation unit is integrated as the 7<sup>th</sup> axis in the robot system and thus makes a kinematic integration by the movement of the component possible.

The data recorded by the Rohmann ELOTEST PL650 Eddy Current inspection instrument and the position data are recorded and merged by the SCANALYZER software. The inspector sees a C-Scan of the respective inspection areas.

ELOSCAN robot systems perform also other, specific inspection tasks, for example for the aerospace and the automotive industries.



ELOSCAN with the GE Aviation Approval – the inspection of engine components.



ELOSCAN Compact for the inspection of turbine wheels in the automotive industry.



ELOSCAN application for components for the aerospace industry, Ø from 3.5 m up to 5.4 m.

## Eddy Current inspection with the ELO\SCAN

### CAD/CAM INTEGRATION

The optional CAD/CAM integration makes it possible to carry out a complete simulation of the robot movements during the inspection, including a collision check. The process programs are directly generated from the CAD data and thus ensure optimum sensor guidance along the component.

### ARRAY TECHNOLOGY

A variety of sensor arrays is applied in addition to the proven standard sensors to inspect large inspection areas, in order to optimize the inspection time. The number of sensors can be adjusted to the application; the sensors can be configured accordingly. The multiplex electronics are directly integrated in the sensor tool to achieve the best possible signal quality.

### TOUCH TOOL

A touch tool is used to determine the bore positions and other complex geometries of the parts to be inspected with high precision. The edge finder is fully integrated in the robot control and the inspection process and thus makes it possible to verify and adjust positions.

The latest robot generation from the Kuka IONTEC series with the KR C5 control is used together with our ELOSCAN. The sensor position data are directly imported from the robot control, thus ensuring the highest possible precision. KUKA offers an optimum service around the world in maintenance, customer service and training.

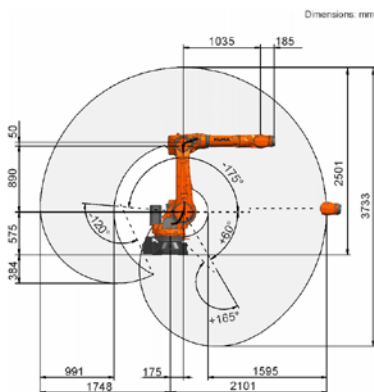
**KUKA  
ROBOT**

## Technical Data

### KUKA INDUSTRIAL ROBOT

#### KR 30 R2100 IONTEC

- ▷ Nominal load capacity: 30 kg/66,14 lbs
- ▷ Maximum operating range: 2,101 mm
- ▷ Number of axes: 6
- ▷ Accuracy of position repeatability (ISO 9283): ± 0.05 mm
- ▷ Working range > 1.5 m/ spherical, from the base pivot point
- ▷ ESD requirements IEC61340-5-1; ANSI/ESD S20.20



### KUKA ROBOT CONTROL KR C5

- ▷ KSS software
- ▷ 16 input / output signals 24 V
- ▷ SAFETY I/O parallel safe signals for cell safety
- ▷ Various BUS systems: PROFINet / PROFI-safe / EtherCAT etc.
- ▷ Axes: 6 robot axes, up to 6 more additional axes
- ▷ Software packages: KUKA.PathMode, KUKA.UserTech, KUKA.Ethernet KRL, KUKA.DeviceConnector
- ▷ Internal memory: 60 GB (SSD M.2)
- ▷ Dimensions: H 720 × W 720 × D 600 mm
- ▷ Weight: approx. 83 kg/183 lbs
- ▷ Protection class: IP 54
- ▷ Ambient temperature in operating mode: 0 °C to + 45 °C
- ▷ Safety: ISO 10218-1 Industrial robots, ISO 13849-1 Cat. 3 / Performance Level d
- ▷ Approval: UL / CSA

### KUKA SMARTPAD

- ▷ Direct operation and programming
- ▷ 6D mouse for intuitive commands
- ▷ Eight movement buttons
- ▷ 8.4" capacitive industrial touch display
- ▷ 10 m cable length, suitable for hot-plugs
- ▷ Integrated fall protectors
- ▷ Ergonomic operation for left- and right-handers
- ▷ Dimensions: H 292 × W 247 × D 63 mm
- ▷ Weight: approx. 1.1 kg/2,4 lbs

### ROTARY AND POSITIONING DRIVE

- ▷ Load capacity > 250 kg/551 lbs
- ▷ Diameter rotary table 700 mm
- ▷ Positioning precision ≤ 0.005 °
- ▷ Radial run-out ≤ 0.01 mm TIR (Table Inner Radius)
- ▷ Concentricity ≤ 0.02 mm TIR
- ▷ Adjustable speed 0 - 60 R/min.
- ▷ Integrated as the 7th robot axis
- ▷ Kuka servo drive controlled via KR C5

### EDDY CURRENT INSPECTION TECHNOLOGY

- ▷ Electronics cabinet IP54  
Dimensions: H 1600 × W 600 × D 600 mm
- ▷ Industrial computer (Intel i7, Win 10, 16 GB RAM)
- ▷ Periphery (UPS, safety, mains filter, etc.)
- ▷ ELOTEST PL650 R Eddy Current inspection instrument
- ▷ SCANALYZER software 7.X
- ▷ Sensor box incl. cabling

### ELOTEST PL650 TEST INSTRUMENT

- ▷ 10 Hz - 12 MHz
- ▷ Driver output +/- 10 Vs; 1 A max.
- ▷ All digital demodulation and FPGA based signal processing, with a sample rate of 250 kSps
- ▷ Sensor multiplexer with a multiplex rate of up to 125 kHz
- ▷ Remote control via TCP/IP and supplied client computer
- ▷ Signal filter HP/LP 1 Hz - 100 kHz
- ▷ Phases adjustable from 0 to 359.5° in 0.5° steps
- ▷ Various field bus modules available

### SCANALYZER SOFTWARE

- ▷ Configurable user interface
- ▷ Request and control of the inspection processes
- ▷ Data recording in C-Scans
- ▷ Generate your own XML files for your inspection processes
- ▷ Integrated calibration processes of the sensors
- ▷ Automation interface with KR C5
- ▷ Post-processing of Eddy Current data
- ▷ Inspection data recording incl. raw data
- ▷ Inspection logs (configurable)
- ▷ Automatic threshold evaluation
- ▷ Integration of array sensors

### SYSTEM COMPONENTS

- ▷ Monitored magazine for 6 sensors
- ▷ Pneumatics unit for coupling/uncoupling the tools
- ▷ Station for reference parts
- ▷ Customized safety fence
- ▷ Safety technology
- ▷ Positioning laser
- ▷ Mobile operating station
- ▷ DMC scanner for tool verification (option)
- ▷ Documentation

### SENSORS & TOOLS (OPTION)

- ▷ Blue Tool in different versions for mounting individual sensors
- ▷ SR1 rotor for rotating sensors
- ▷ Dovetail slot sensors
- ▷ Customized array sensors
- ▷ Touch tool (edge finder)

### CAD/CAM (OPTION)

- ▷ Consideration of CAD data of the components
- ▷ Implementation of the robot cell
- ▷ Simulation of the inspection
- ▷ Collision check
- ▷ Generation of the paths
- ▷ Post processor for SCANALYZER