



MRK-SYSTEME GMBH



# **Company presentation**

## **MRK-Systeme GmbH**

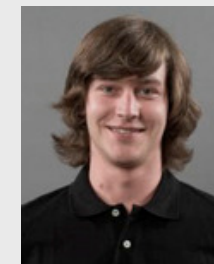
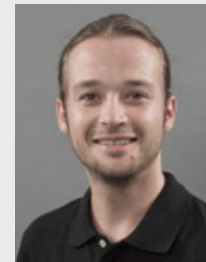
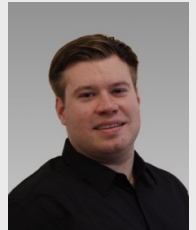
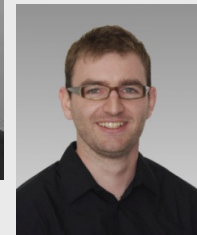


- **Introduction to MRK-Systeme GmbH**
- **History**
- **Sales - Markets**
- **Goals**
- **Products**
  - SafeGuiding (hand guided robot)
  - KR 5 SI
- **Services**
  - Design, simulation, cell construction, risk assessments, CE Mark
  - Mechanical and electrical design, installation, commissioning, programming
- **Presentation of selected projects**
  - Cover protected robotic arm unit for the construction of dies (Co. Daimler)
  - Cover protected robotic arm unit for loading Coordinate measuring machines (Co. Hella)
- **References**





- **Robotic systems integrator (13 Employees; 1,3 M. turn over in 2013):**  
**Mensch-Roboter Kooperations-Systeme**
- **Official System partner of KUKA Roboter GmbH**
- **Technology packages for human robot cooperation**
- **Entire cells / System Integration / Programming**
- **[www.MRK-Systeme.de](http://www.MRK-Systeme.de)**





○ **July 2004: Company founded**

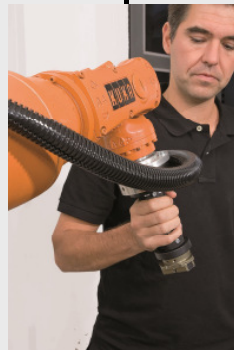
○ **February 2005: first delivery of Robot KR 3 SI**



○ **June 2006: Completed SafeHandling technology package**

○ **July 2007: system partners of KUKA Roboter GmbH**

○ **July 2008: First prize IHK innovation competition**



**September 2011: first delivery of KR 5 SI**

**October 2011: Completed Safe Guiding  
Technology package (based on KRC4)**

○ **March 2012: ISO 9001  
certification**



2005

2006

2007

2008

2009

2010

2011

2012

2013



## Markets-customers

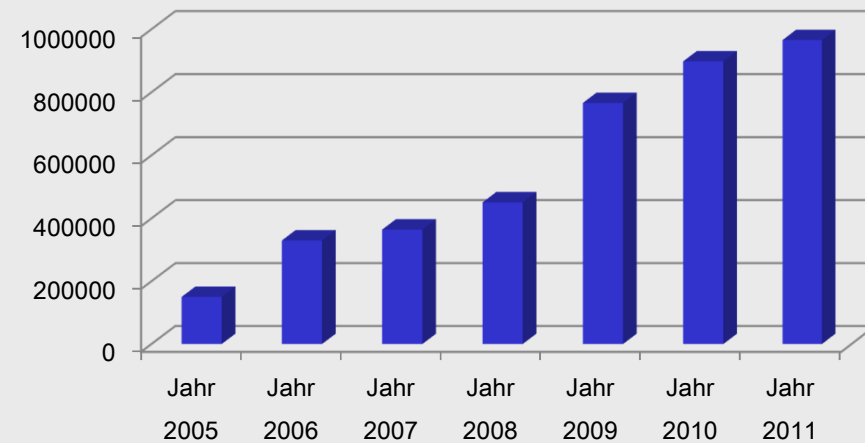
(since 2004: 280 customer Projects, 150 customers)

- Automotive industry
- Automotive suppliers
- Casting
- Mechanical Engineering
- Research – universities

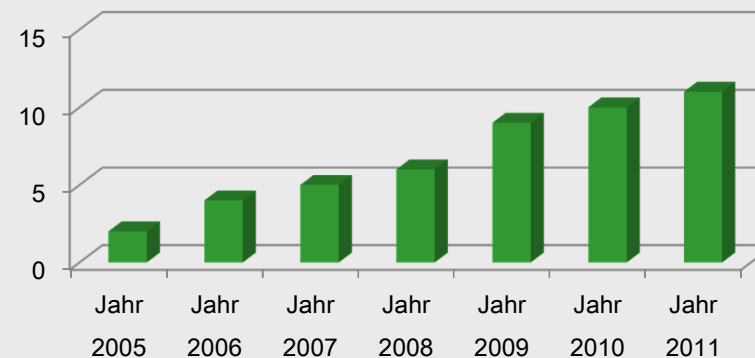
## Applications

- Assembly
- Handling
- Processing (eg pressing of seals (BMW DGF), bonding) Trockeneisstrahlen (z. B. BMW-LH)

## Umsatz gemäß Jahresabschluss



## Mitarbeiter





## ○ Basic technology of human-robot cooperation development

- Member of the standards committee (Robotics standardization meeting NA 060-30-02 AA: DIN EN ISO 10218, TS 15066)
- research projects (EU- project, BMBF), e.g. ExoLegs, AMIKA, SafeAssistance

## ○ Advancement of the technology packages

- Specific application packages (e.g. KR 5 SI: door seals Anrollern, handling, dispensing / SafeGuiding: dry ice blasting, assembly (OPTOFIT))
- Funded Projects (e.g. ZIM): OptoFit, RoboGrind: Projekte mit Applikationsziel
- Make the technology known (conferences, fairs)

## ○ Implementation of industrial applications

- Focus: Automotive Industry (partner, KUKA BMW - AUDI - Daimler)
- Real-world application - all cells including CE (especially human-robot cooperation)





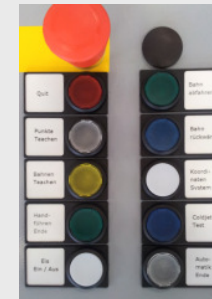
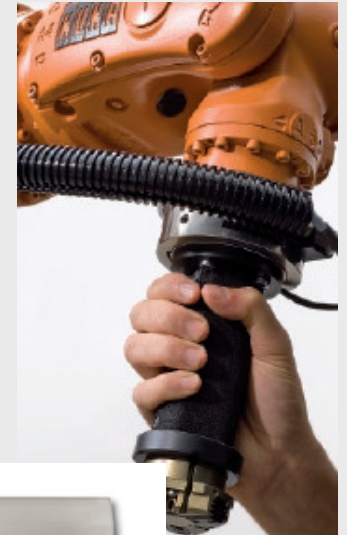
- Technology package for manual movement of a robot by an external sensor (hand-held robot), e.g. Force-torque sensor or joystick

### **Extent of SafeGuiding technology package**

- Software for analyzing and processing the sensor data and locking on the robot motion
- Additional control functions such as virtual walls, gravity compensation
- Secure hardware components for a collaborative operation of the robot according to DIN EN ISO 10218 and 13849

### **Applications**

- Simplified learning trajectories of the robot
- Replacement of manipulators / handling equipment
- More than 20 SafeGuiding applications in use







- Technology package for the small robots KR 5 ARC HW to allow the operation of the robot in direct contact with the people

### **Extent of the KR 5 SI technology package**

- Safe monitoring of robot motion with respect to permitted work rooms and rates
- Consistent dismantling of the kinetic energy stored in the robot through a dampening cover on exposed parts of the robot
- A stop Trigger for safety, tactile actuators and capacitive proximity sensors
- Protection of the tool by a removable flange Type-tested safety system
- Type-tested safety system

### **Applications**

- Handling, assembly
- Processing tasks (eg pressing of gaskets, bonding)







## o **conception**

- Creation of concepts, specifications and feasibility studies (in particular for safety considerations or sensor input)

## o **Simulation - KUKA SIM**

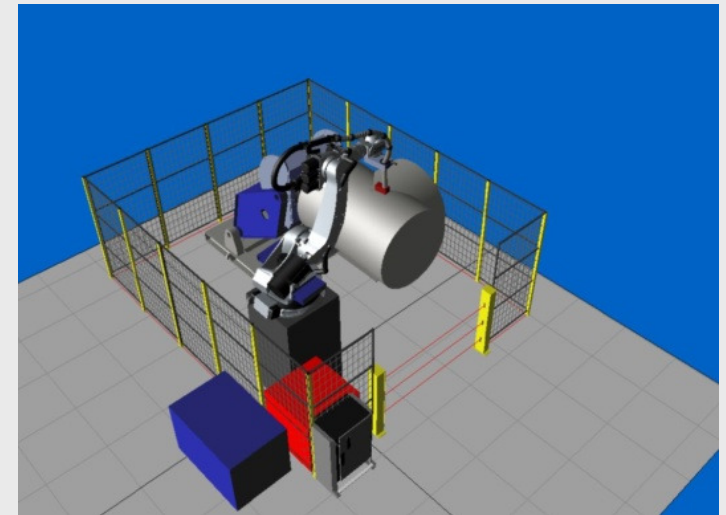
- Cell layout / access studies
- Cycle time studies

## o **Mechanical Design - Unigraphics**

- Parametric 3D design
- Equipment and gripper design

## o **Electrical Construction**

- Eplan P8





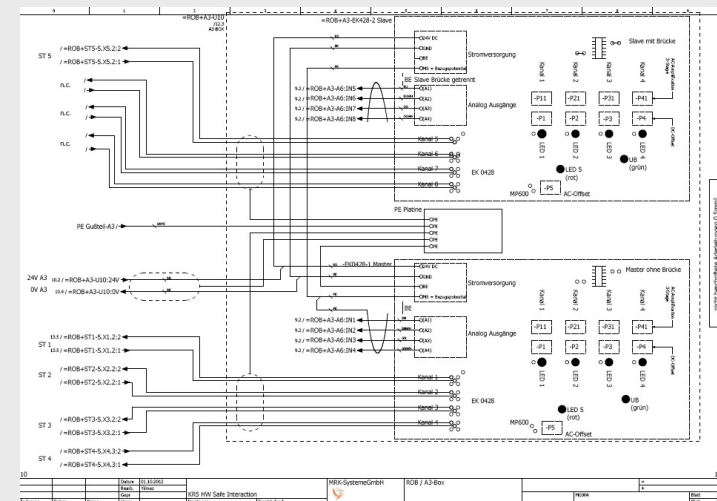
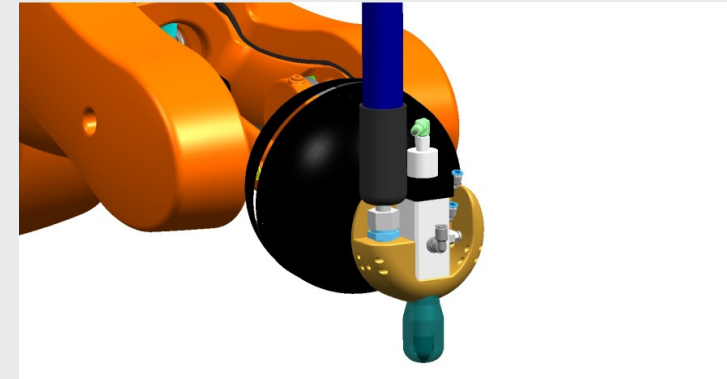
## ○ Installation, commissioning

## ○ programming

- robot Programming (KRL, RSI)
- Safety SPS (Siemens)
- High-level language programming (C#)

## ○ Cell construction, risk assessments, CE Mark

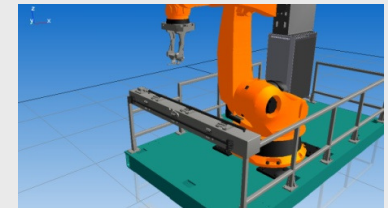
- project Management
- System Analyses
- Risk Assessment
- operating instructions





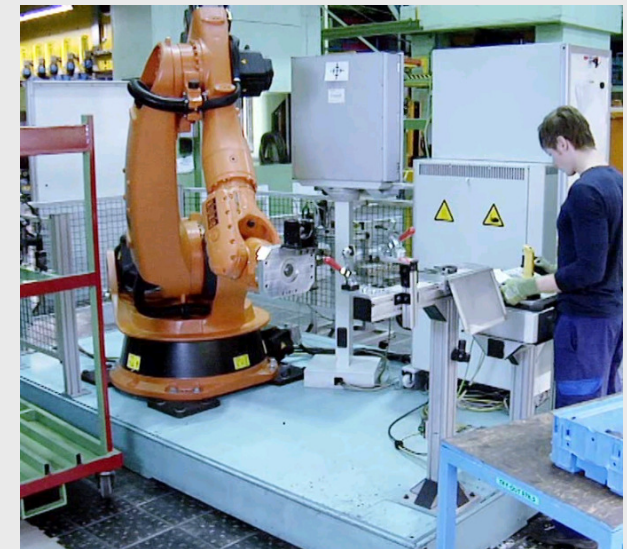
## ○ Task Description :

- Robots as a positioning aid for aligning and assembling gripping tools in the press automation
- Establish the geometric chain between fixation point and operating point of the tool to be mounted gripper



## ○ Technical Features

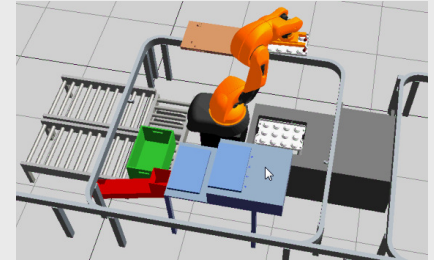
- Using a KR 210 robot with 210 kg payload
- Automation without guards
- Secure collaborative operation of humans and robots to DIN EN ISO 13849
- Starting from given points (geometrical chain between the fixation point and working tool) via joystick and Commands to tune





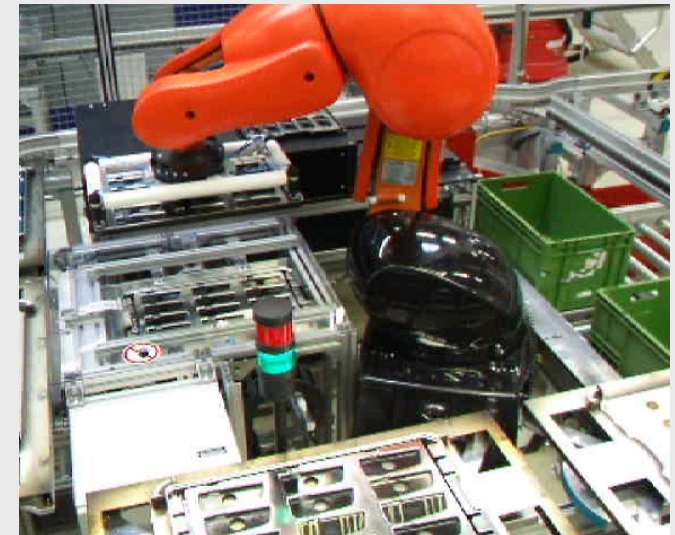
### ○ Task Description :

- Handling of small carriers, loss of handling and feeding to a measuring machine
- Retrofitting an existing production plant



### ○ Technical Features

- Automation without additional guards (KR 5 SI), characterized simple retrofit concept
- Simple cell design (no additional safety devices) 4-spot suction gripper
- Secure collaborative operation of humans and robots to DIN EN ISO 13849





MRK-SYSTEME GMBH

## References (150 customers)

KUKA

OFFICIAL SYSTEM  
PARTNER



Laempe.



DAIMLER



PSA PEUGEOT CITROËN



KUKA

