

# KUKA

KUKA Systems Automotive

**FULL THROTTLE FOR  
YOUR PRODUCTION**



# DREAM CAR

or

# RUST BUCKET

**TAKE YOUR COMPANY IN THE FAST LANE.**

Efficient use of resources, the highest quality standards, shortened development cycles, growing diversity of models and ongoing technical innovations – car manufacturers are constantly facing new challenges in global competition. No wonder that they are among the pioneers in the optimization of flexible automatic production sequences – relying

as they do on the innovative drive of KUKA Systems Automotive. The global network of KUKA Systems competence centers specializes in the automation of processes and sequences in the automotive industry and offers a range of products and services for the implementation of production processes with the utmost precision and efficiency.



### COMPETENCIES

#### ENGINEERING

1

Benefit from our engineering experience in the development of highly efficient, automated production solutions.



#### PROJECT MANAGEMENT

2

Rely on our expertise in project control, and we will give you reliable advice and work promptly to the agreed deadlines – no matter how complex the task.



#### TECHCENTER

3

Come and work with us at the KUKA Systems TechCenter covering an area of 2,500 sqm. There is plenty of space here for realistic mock-ups to provide reliable project data for applications without the need to take risks.



## TRENDSETTER OR KILLJOY?

**KUKA SYSTEMS AUTOMOTIVE OFFERS YOU EFFICIENT AUTOMATION SOLUTIONS – FOR NEARLY EVERY PART OF THE PROCESS CHAIN IN THE AUTOMOTIVE INDUSTRY.**

KUKA Systems covers the entire spectrum of manufacturing automation – from the individual cell to turnkey systems. Further business segments are press dies for vehicle components and automated lines for the assembly of engines, transmissions and axles. Short development phases, reliable project management, commitment and competency are taken for granted here.

### PROCESSES



KUKA Systems offers its customers support with component development, in order to optimize these for production. A verification of feasibility, cost-effectiveness and efficiency has a major influence on the subsequent manufacturing concept.

In the Tools and Dies Business Unit, experienced specialists are at your service who are able to manufacture forming and cutting tools at all levels of complexity and for a wide range of different metals. Whether for simultaneous engineering, customized tools and dies or system solutions – KUKA Systems is your reliable partner.

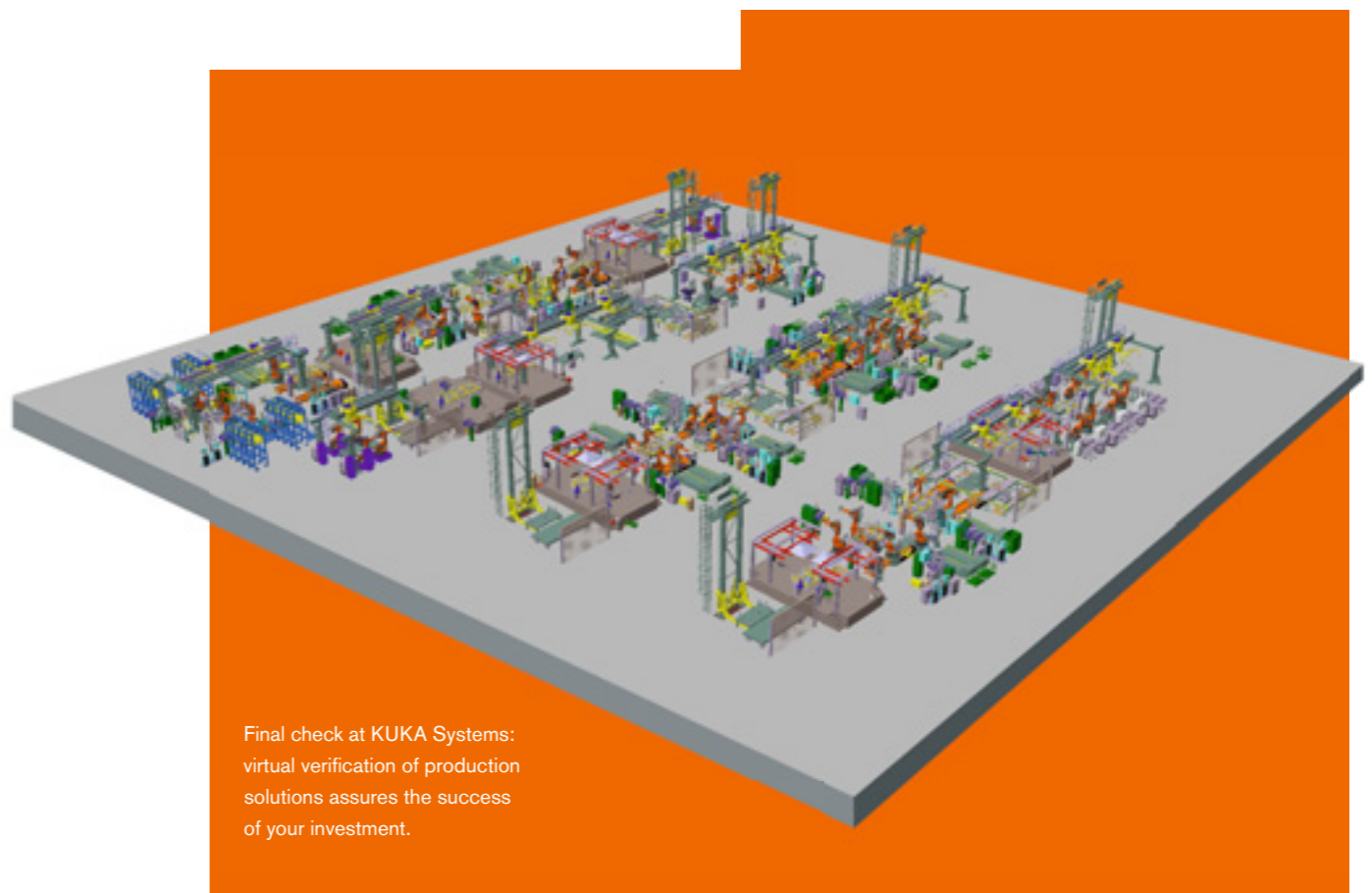
From manual production to fully automated manufacturing – KUKA Systems is an expert builder of bodyshop systems. The flexible production lines are used in the manufacture not only of high-volume models, but also of vehicles with up to eight variants – one of the reasons why KUKA Systems is the first port of call in body production for many major automotive players.

Utmost precision and flexibility in the assembly of chassis components, engines, cylinder heads, axles, transmissions and steering systems: KUKA Systems designs and implements turnkey assembly systems for the entire powertrain – from stand-alone solutions to complex, fully automated manufacturing lines.

KUKA Systems is the right partner, not just in Body-in-White construction, but also for final assembly of vehicles. This includes demanding tasks such as window installation or the automated “marriage” of the body with the powertrain.

### TECHNOLOGIES | PRODUCTS

Benefit from our long-standing experience with innovative automation solutions – which we will also be happy to adapt to your requirements.



Final check at KUKA Systems: virtual verification of production solutions assures the success of your investment.

## PERFECTION OR CAPITULATION?

### OUR SOLUTIONS FOR BODY PRODUCTION: THE PINNACLE OF HIGH TECHNOLOGY.

The automotive industry is developing at a phenomenal pace, and the demands are constantly increasing. KUKA Systems is already well prepared: with innovative automation solutions for every conceivable variant of body production – from the smallest hang-on part to the complete Body-in-White, and from manual production to fully automatic manufacturing.

Thanks to its long experience in all areas of automotive production, KUKA Systems is the first choice for many major manufacturers when it comes to complicated issues concerning body production. Our teams build complete plants on green-field sites, and also take care of the modernization, relocation or rebuilding of existing production facilities. You too can benefit from our long experience.

## MILESTONE OR STONE AGE?

### DRIVING THE FUTURE WITH KUKA INNOVATIONS.

For decades, KUKA Systems has been setting new milestones in the automation of vehicle production. You can be sure that the next innovations are already in the pipeline.

| AUTOMOTIVE                    |                                   |  |                                       |                             |  |                                   | AUTOMOTIVE                   |                                |                       |   |                          |                                |                            |
|-------------------------------|-----------------------------------|--|---------------------------------------|-----------------------------|--|-----------------------------------|------------------------------|--------------------------------|-----------------------|---|--------------------------|--------------------------------|----------------------------|
| 1972                          | 1975                              | 1979   | 1982                                  | 1986                        | 1988                                   | 1992                              | 1992                         | 2000                           | 2003                  | 2007  | 2008                     | 2008                           | 2009                       |
| First line with respot robots | First KUKA Flex standard elements | First complete Body-in-White line with KUKA robots | First freely programmable controllers | First push/pull wire feeder | First lean production in robot gardens | First laser system for roof seams | First KUKA Framers (3 types) | First inline measuring station | First digital factory | First remote laser welding head KS RoboScan | First HOQ hemming system | First Jigless Bodyshop concept | Development of KS RoboSpin |

■ **FUTURE-PROOF OR OBSOLETE?**  
**APPLICATIONS AND PROCESSES**  
**FROM KUKA SYSTEMS ARE ALWAYS**  
**A STEP AHEAD OF THE PRESENT.**



KUKA Systems offers solutions for every aspect of body production. Our applications are based on state-of-the-art technologies that we are constantly developing and optimizing.



**WELDING**



No matter what material is being welded, our processes have one thing in common: uncompromising process quality. With this aim, KUKA Systems develops new technologies which are always optimally adapted to the material properties: laser welding, remote laser welding, spot welding, arc welding, friction welding, magnetarc welding and also the induction welding of new materials such as 3D CRP parts.



**BONDING AND SEALING**



A constant application quality of the adhesive/sealant bead, seam geometries that can be quickly generated, and utmost precision and speed are just some of the advantages of automatic adhesive and sealant application. The corresponding robot cells can be expanded to fully automated systems by adding intelligent process components – for example, cleaning facilities, positioning devices, measuring systems and software packages.



**HEMMING**



In order to fulfill the individual requirements for the hemming of sheet-metal parts, KUKA Systems combines standardized robot technology with high-precision fixtures and innovative hemming tools in its systems and automation cells. This flexible and cost-effective manufacturing equipment is designed for long-term use with high rates of technical availability. However, they can also be quickly and easily converted for new variants and successor models.



**HANDLING AND PRESS LINKING**



Picking up, setting down or transferring items, loading components into a fixture, or linking different production areas: KUKA Systems solutions in the areas of handling, transfer, palletizing and press linking exploit the entire range of automated possibilities. These include a wide variety of standardized modules which can be combined with one another or complemented by customized assemblies.



**ASSEMBLY**



Bolting, joining, measuring, inspection and assembly are possible processes in automated assembly systems. These tasks can be performed with maximum flexibility, precision and efficiency by robots, machines and human operators in manufacturing lines. KUKA Systems is happy to plan and implement such assembly systems to your requirements.



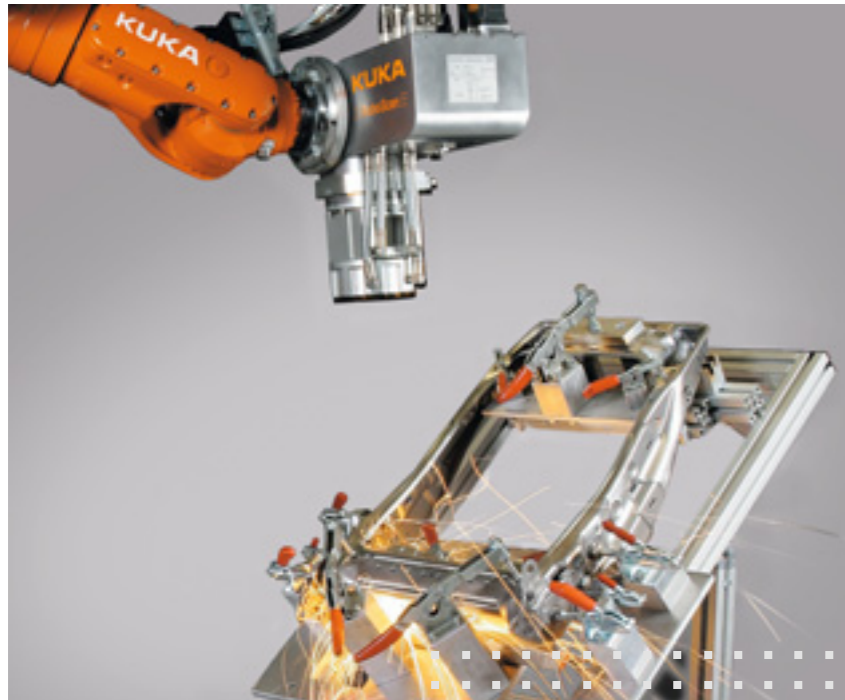
**TESTING**



To ensure the functioning of the assembled unit, KUKA Systems designs and builds the necessary test and inspection equipment. With highly complex measurements and analyses, transmissions and engines are put through their paces: cold tests, leak tests and functional checks such as noise, torque and oil system tests disclose possible defects and enable them to be efficiently eliminated – a must for every production line.

## PRODUCTS

### REMOTE LASER WELDING WITH KS ROBOSCAN.



The name of KS RoboScan stands for an innovation on the laser market: the new KUKA remote laser welding head, which is guided and controlled by a robot.

In this process, the laser beam is guided to the welding point from a distance of up to 1,500 mm. This enables extremely short repositioning times between laser seams. With an adjustment and working range that can be varied between 270 mm and 1,500 mm, KS RoboScan offers maximum flexibility in the 3D processing of components.

The focus diameter and angle of divergence remain constant over the entire adjustment range, guaranteeing optimal process reliability. The focal length adjustment is integrated into the controller as an additional robot axis.

#### Your advantages at a glance:

##### COST-EFFECTIVENESS

- Large working distance enables:
  - High output due to short repositioning motions
  - Low operating costs due to reduced fouling

##### FLEXIBILITY

- 3D work envelope for optimal orientation on the workpiece
- Adaptable to all common laser sources
- Any orientation of the head possible during welding

##### USER-FRIENDLINESS

- Simple teaching
- Simple programming with inline forms
- Integrated, intuitive, menu-guided operator control

##### CAPITAL COSTS

- Low capital costs
- Simple, cost-effective system integration into the robot controller
- Concept and implementation from a single source

### FRAMING – FOR THE CENTERPIECE OF EVERY PRODUCTION LINE.



The framing station is where the vehicle floor, side panels and roof are joined together to form the vehicle body – a centrally important and impressively complex station in automotive Body-in-White production. This station can be implemented in different ways, depending on the customer's requirements and the demands posed by the product itself: from manual processes to robotic framing concepts and laser framing.

The main systems currently in use involve different model-specific clamping tools, up to six meters in length, which are locked in the exact working position. These are automatically exchanged and stored on load carriages after the joining process. For such applications, the new generation of KUKA standard framers has been developed, based on service-proven components from other KUKA standard products, together with numerous new ideas. One recently implemented variant allows a degree of model flexibility that ranges from small cars right up to large vans – impressive proof of the flexibility of our system.



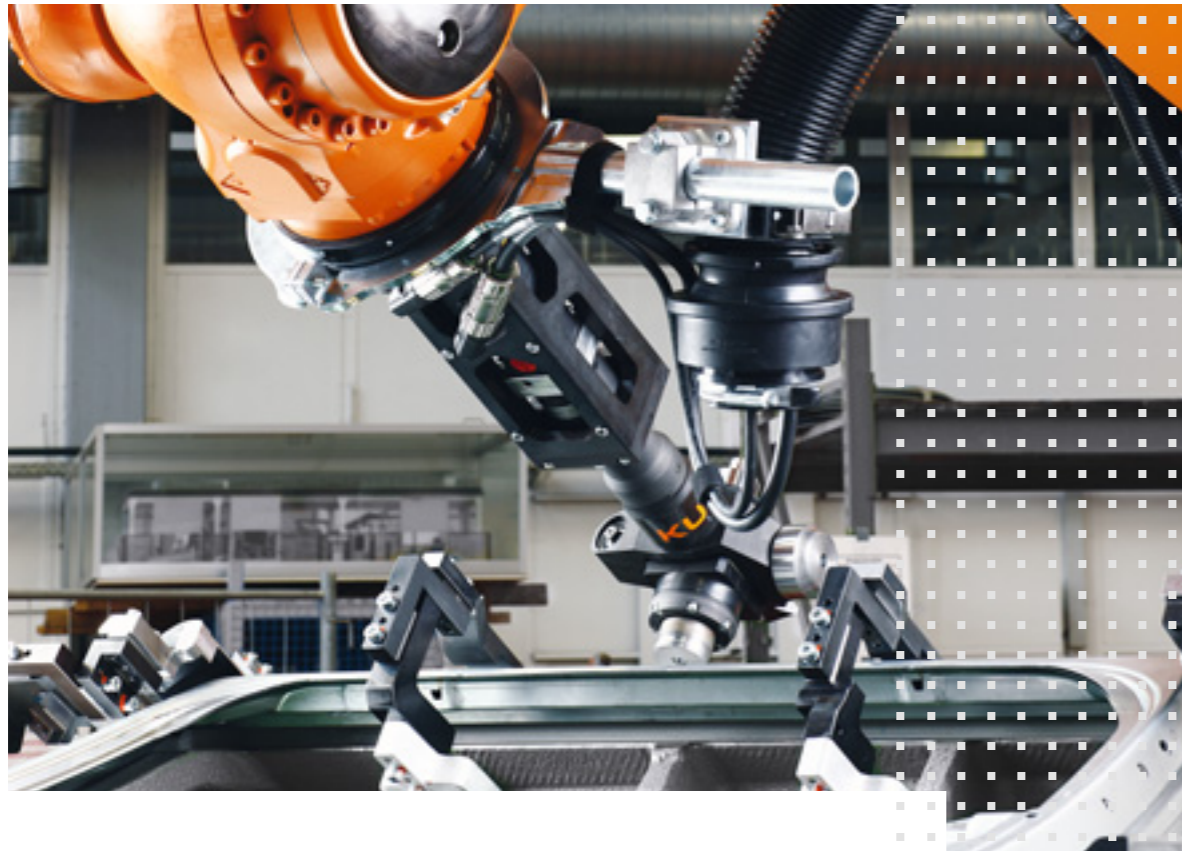
### TOOLMAKING TAILORED TO YOUR NEEDS.



Whether for simultaneous engineering, individual tools and dies, or system solutions – we are your reliable partner, supporting you all the way from the initial consultation through to stable series production.

On the basis of your requirements and initial parameters, we develop proposals for technical solutions for a cost-effective tooling investment. Comprehensive feasibility studies give our partners security. The trend in automotive production toward reducing the number of operations and thus increasing the complexity within an operation is supported by KUKA Systems.

## PRODUCTS



### IMPROVED EFFICIENCY WITH HOQ HEMMING.



If you need to meet higher quality requirements while also increasing the output, then HOQ Hemming is the answer.

For years, robots have been used to hem body components. With the innovative High Output Quality (HOQ) Hemming, KUKA Systems has set a milestone by achieving significantly improved control of the driven hemming roller.

In this process, the hemming roller is minutely synchronized with the robot motion as it runs across the metal. Irrespective of the shape of the component, the KUKA hemming head can produce a multitude of contour flanges. This cuts the production time by approx. 50%, while also increasing the product quality. New modules for robotic hemming make the process even more efficient.

**SHORTER PROCESS TIME**

- Increased path velocity
- Reduced number of hemming paths
- Optional use of hemming modules

**HIGHER QUALITY**

- Lower contact forces
- Improved bonding of the hem flange adhesive
- Reduced impact on the component surface

**FREE CHOICE OF CLAMPING SYSTEM**

- Piano clamping technology
- Swivel-in hold-down clamps
- Flexible hold-down clamps

### BODY PRODUCTION WITHOUT FIXTURES: KUKA JIGLESS BODYSHOP.



State-of-the-art robot functions without conventional, stationary locating and clamping equipment: the KUKA Jigless Bodyshop technology.

The functional concept is based on two simple handling grippers, which are used in combination to perform geometry functions such as rotating and turning over a body component into the best position for welding.

Cooperating process robots ensure optimal accessibility thanks to fewer joining steps and simple gun geometries. Special turnover fixtures are no longer required, saving time and money.



#### Your advantages at a glance:

**MAKING PRODUCTION LINES MORE FLEXIBLE**

- Integration of different variants/ successor models via clamping, locating and joining equipment only
- Flexible component positioning through cooperation of the robots
- Variable due to autonomous controllers

**STANDARDIZATION BY USING ROBOTS**

- By eliminating fixture changing systems and transport components

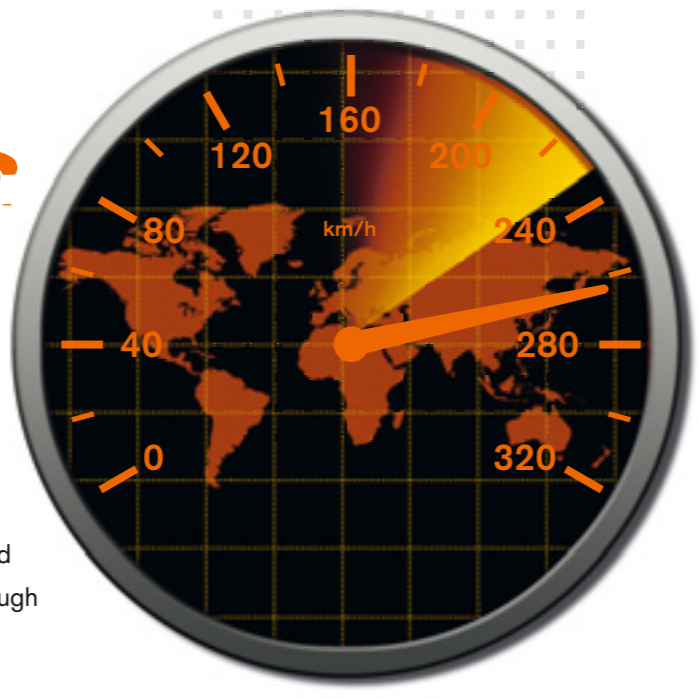
**OPTIMIZATION OF PRODUCTION SPACE**

- Space-neutral compared with conventional concepts
- Reduced production space (compact bodyshop)

**COST SAVINGS**

- For model diversity and future flexibility
- Minimized cycle time due to direct "geometric coupling" of multiple robots

## GLOBAL, LOCAL – OR BOTH?



### WE ARE THERE WHERE YOU NEED US: WORLDWIDE

Our strength stems from 30 years of successful automation experience in the automotive industry, as well as from highly-qualified, lightning-fast customer service. What's more, we have a global presence and offer you concentrated expertise in special technologies for the automotive sector through dedicated business units and subsidiaries.

### AT KUKA SYSTEMS, OUR SERVICES DOVETAIL PERFECTLY – FOR LASTING, FUNCTIONAL SOLUTIONS.

From project management to the optimization of flexible automated production sequences, from the manufacture of individual assemblies to the planning and building of complete systems – our broad spectrum of services offers you solutions from a single source. During integration of all the system components, we guarantee you unparalleled expertise and full functionality. No matter how complex the task: we take care of the details, so that you are free to concentrate on the essentials.



|                            | AMERICA   | EUROPE  | ASIA  |
|----------------------------|---|---|---|
| <b>BODY-IN-WHITE</b>       | <p><b>KUKA Systems Corp. North America</b><br/>Sterling Heights, Michigan, USA<br/>info@kukausa.com</p> <p><b>KUKA Systems de Mexico, S. de R.L. de C.V.</b><br/>Toluca, Mexico<br/>info@kukausa.com</p> <p><b>KUKA Toledo Production Operations LLC</b><br/>Toledo, Ohio, USA<br/>info@ktpo.com</p> <p><b>KUKA Automação do Brasil Ltda.</b><br/>São Paulo, Brasil<br/>sales@kuka.ind.br</p> | <p><b>KUKA Systems GmbH</b><br/>Augsburg, Germany<br/>automotive@kuka.de</p> <p><b>KUKA Automatisering + Robots N.V.</b><br/>Houthalen, Belgium<br/>info@kuka.be</p> <p><b>Thompson Friction Welding Ltd.</b><br/>Halesowen, UK<br/>sales@thompson-friction-welding.co.uk</p> <p><b>KUKA Systems GmbH Branch Office Paris</b><br/>Paris, France<br/>info@kuka-systems.fr</p> <p><b>OOO KUKA SISTEMY</b><br/>Togliatti, Russia<br/>sales@kuka-systems.ru</p> | <p><b>KUKA Flexible Manufacturing System (Shanghai) Co. Ltd.</b><br/>Shanghai, P.R. China<br/>info@kuka-sha.com.cn</p> <p><b>KUKA Automation Equipment (India) Pvt. Ltd., Pune</b><br/>Pune (Maharashtra), India<br/>info@kuka.in</p> |
| <b>ASSEMBLY &amp; TEST</b> | <p><b>KUKA Assembly and Test Corporation</b><br/>Saginaw, Michigan, USA<br/>sales@kuka-at.com</p>   | <p><b>KUKA Systems GmbH, Division Assembly &amp; Test</b><br/>Bremen, Germany<br/>mail@kuka-at.de</p>   |   |
| <b>TOOLS AND DIES</b>      |   | <p><b>KUKA Systems GmbH, Division Tools and Dies</b><br/>Schwarzenberg, Germany<br/>sales@kuka-szb.de</p>   |   |

### OUR SERVICES FOR YOU.

|   |   |  |
|---|---|--|
| <p><b>ENGINEERING</b></p> <ul style="list-style-type: none"> <li>Layout, shop structures, logistics and personnel concepts</li> <li>Drafting of clamping and assembly plans, methods and assembly sequences</li> <li>Process and production planning</li> <li>3D CAD design and simulation</li> <li>Material flow and system availability, ergonomic studies</li> <li>Reachability and accessibility investigations</li> <li>Process simulation</li> <li>Tool development for robot-based automation solutions</li> </ul> | <p><b>IMPLEMENTATION AND PROJECT MANAGEMENT</b></p> <ul style="list-style-type: none"> <li>Concrete/detailed planning and systems engineering</li> <li>Definition of system components and process parameters</li> <li>General contracting, turnkey or full-service project management</li> <li>Optimization of project life and product unit costs</li> <li>Schedule and progress control</li> <li>Modules for high flexibility</li> <li>Cell solutions</li> </ul> | <p><b>TECHNOLOGIES</b></p> <ul style="list-style-type: none"> <li>Consulting/evaluation: component design</li> <li>Materials, process technologies, systems engineering, robot and system components</li> <li>Feasibility studies</li> <li>Method plan creation</li> <li>Test set-up, studies, prototypes</li> </ul> |
|   | <p><b>PAY ON PRODUCTION (OPERATOR MODEL)</b></p> <ul style="list-style-type: none"> <li>Production of assemblies and complete bodies</li> </ul>   | <p><b>START-UP AND OPTIMIZATION</b></p> <ul style="list-style-type: none"> <li>Ensuring system availability and quality</li> <li>Supporting process engineering</li> <li>Optimizing process parameters</li> </ul>  |

# KUKA

## KUKA Systems – International

BELGIUM  
BRAZIL  
CHINA  
CZECH REPUBLIC  
GERMANY  
FRANCE  
INDIA  
MEXICO  
RUSSIA  
SLOVAKIA  
UK  
USA



WANT TO FIND OUT MORE ABOUT HOW TO ACCELERATE YOUR PRODUCTION PROCESSES? YOU CAN CONTACT US AT **TEL +49 821 797-1880** OR SEND AN E-MAIL TO **[AUTOMOTIVE@KUKA.DE](mailto:AUTOMOTIVE@KUKA.DE)**

**KUKA Systems GmbH**

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