Perfected quality
Robots for arc welding
Always one step ahead
Arc welding with KUKA

For our customers in the central manufacturing sectors of the automotive and metalworking industries, it is important to automate complex welding tasks efficiently and to implement them to perfection down to the tiniest weld seam with high system stability. With pioneering automation solutions and intelligent robotics, KUKA is predestined to meet these challenges. Our welding robots stand out for their significantly increased productivity, made possible by integrated process steps, reduced cycle times and long maintenance intervals.

As a thought leader and trailblazer, KUKA offers permanent security of investment. Smart integration into the digital and connected world of production results in greater effectiveness and flexibility throughout the entire value chain.
KUKA robots in practice
Flexibility in different applications

KUKA welding robots are robust and flexible, making them suitable for a wide range of welding tasks. For confined workspaces and sites with limited access, we offer a broad spectrum of linear axes and positioners. Our wide-ranging portfolio and many years of experience are of particular benefit when it comes to the highly automated and linked production lines of the automotive and components industry. However, we can also support small-batch production and newcomers with intuitive teaching aids and a proprietary offline programming system. KUKA supplies suitable solutions for thick plate welding, such as seam tracking systems and software for multi-layer weld seam structures.

Chassis components
- Aluminum components
- Aerospace components
- Chassis components
- Agricultural machinery

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Perfected quality...Robots for arc welding
Not all robots are the same
Service-proven arc welding with KUKA

Industrial welding robots must master numerous challenges simultaneously. Besides absolute quality and reliability, they must ensure simple operator control and high productivity.

Using the proven KUKA 6-point program for arc welding, we work with you to develop a suitable robot system which optimally supports the work output of human personnel and provides supplementary assistance at decisive points.

1. Top quality despite time pressure
   Production conditions are extremely difficult and the time pressure is immense. Nevertheless, customers demand 100% quality. Our individual robot systems offer outstanding path accuracy – regardless of whether the welding process involved is MIG/MAG, TIG, plasma or a special welding process. Pages 4 – 5

2. Success despite price pressure
   The pressure on prices in production is set to increase drastically. To remain successful, you have to continuously remain one step ahead of your competitors. We help you to gain a clear advantage in the highly competitive marketplace through the use of tailor-made, robot-based automation solutions. Pages 8 – 9

3. Standardized and yet individual
   Get off to a flying start in automated welding with our modular cell4arc portfolio. Quickly available and individually preconfigured – for steel or aluminium, for solving problems of all sizes. Ultimate manufacturing efficiency, compact solution in confined spaces. Pages 10 – 11

4. Easy and straightforward
   Our innovative software technologies, such as KUKA.ArcTech or KUKA.SeamTech, enable the fast and easy programming of weld seams. Ready2Pilot in conjunction with preconfigured power sources makes it easy for you to get started. From page 12 onwards

5. On-board process monitoring
   To safeguard your welding quality, process parameters can be freely entered in the newly revised process data software from KUKA and compared with limit values. Monitoring is carried out directly on the robot controller – without additional hardware. From page 17 onwards

6. Freely combinable modular system
   Would you like to be as flexible as the market in which your company has to prove itself on a daily basis? With our compatible linear units, you can immediately increase the work envelope of the robot many times over. Our high-precision positioners can also be docked onto the robots. Pages 18 – 19
KUKA robots for arc welding
The right robot for every application

From the smallest subassemblies in the furniture industry to complete side panels for freight cars: KUKA has the right robot in its portfolio. From the compact KR AGILUS KR 6 R700 with a reach of 700 millimeters to the KR IONTEC KR 20 R3100 with 3,100 millimeters, we cover a wide component spectrum with 6-axis kinematic systems. Should you wish to process larger components, all robots can be traversed up to 30 meters on KUKA linear units. To ensure optimum accessibility during welding, you can choose from a large portfolio of single-axis to 5-axis positioners in different sizes and with different payload capacities. All linear axes and positioners can be controlled by our KR C5 robot controller.

Quality resulting from top accuracy

Due to the outstanding path accuracy of our robots, there is no need for complicated reworking. Programmable limit values for the weld parameter data sets ensure adherence to weld parameters. Integrated data set management enables maximum quality assurance for the weld seams.

Decades of experience for absolute production reliability

Technical availability of the robot and controller has increased from generation to generation; paired with our first-class service, this takes your production to the highest level. Among other ways, this is ensured with shielded, maintenance-free robot cable sets and sealed gear oil chambers as standard.

KUKA hollow wrist

Our hollow wrist is optimally suited to arc welding applications in confined spaces. It allows rotation of the torch about axis 6; depending on the welding equipment, infinite rotation is also possible. Installation is easy – with dress packages routed close to the robot to relieve strain.

KUKA in-line wrist

Our in-line wrists with IP67 certification impress with their streamlined design. They have been designed to master even the harsh ambient conditions encountered during welding and to withstand lubricants and other fluids.

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Our in-line wrists with IP67 certification impress with their streamlined design. They have been designed to master even the harsh ambient conditions encountered during welding and to withstand lubricants and other fluids.

The beating heart at the center of the production of tomorrow

Maximum performance, connectivity and flexibility – with the groundbreaking latest generation of robot controllers from KUKA that set the pulse of automated production racing. The KR C5 can be seamlessly integrated into existing infrastructures and immediately delivers added value with more efficient performance in all areas of application.

<table>
<thead>
<tr>
<th>KR AGILUS</th>
<th>Type</th>
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<td>KR 10 R1100-2</td>
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KUKA cell4_arc

Powerful concept

With its optimally coordinated components and tried-and-tested arc welding standards, the KUKA MIG/MAG cell is the ideal solution for your welding automation requirements. The intelligent cell concept offers configurable variants and options for your tasks in different performance classes.

Shape the complete life cycle of your system with a comprehensive package.

Service
- Increased productivity and minimized downtime
  - 24/7 hotline
  - Global spare parts and service support
  - Remote Service
  - Service agreements and maintenance
  - Role-specific training courses
- Services for maintaining optimal performance throughout the entire life cycle of the machine

Planning
- KUKA supports you in the planning phase
- Fast feasibility studies with KUKA.Sim
- Flexible financing models
- Short delivery times
- Modular structure enables adaptation to your production requirements

Integration and commissioning
- Short installation times at the customer’s site
- Simple integration of fixtures and other system components
- Easy programming with KUKA technology packages and ready2pilot
- Offline programming with KUKA.Sim

Operation
- High system availability thanks to the use of service-proven components
- Future-oriented KUKA.Web HMI for clear visualization and operator control
- Web access to operating data with freely configurable dashboards
- Quality assurance by means of flexible process data monitoring and component-specific documentation
KUKA smartPAD
Easy and straightforward

Master even complex operating tasks easily – that’s what the KUKA smartPAD is designed for. The context-specific user interface only displays the options relevant at the moment of operation. All six axes can be limited in their motion range using safe technology, monitored for operational stop or completely switched off.

Always up-to-date

All application and robot messages are displayed in the relevant local language and saved in the logbook.

One display – many functions

The KUKA smartPAD combines all operator control elements and features in an easily accessible manner. This enables easy programming of simple, more complex and extremely challenging welding applications.

KUKA ready2_pilot makes robot control mere child’s play. The control package is quickly installed and can be used directly without complex programming. Manual guidance of the robot is all that is required to teach the desired sequences. From precise welding to rough palletization, and from agile small robots such as the KUKA KR AGILUS to heavy-duty giants such as the KUKA KR 1000 titan – KUKA ready2_pilot enables you to master a wide range of different requirements simply and straightforwardly.

Intuitive control package
Precise and user-friendly

Intuitive, reorienting 6D mouse

Operation of KUKA ready2_pilot is child’s play and is carried out using an intuitive 6D mouse with no training required. Fastened directly to the robot with adapter plates, the control package can be used from different positions and thus always remains within the user’s reach.

Freedom of motion to the right degree

Move the robot exclusively on your desired paths by simply deactivating directions that are not required. This prevents unintentional drifting and saves time-consuming corrections.

Adaptable navigation buttons

Two buttons on the side of the 6D mouse enable quick access to freely selectable functions. From opening and closing a gripper to adjusting process parameters or saving motions in the robot program: a simple click suffices and saves precious time.

Connectivity and flexibility

The wireless concept of KUKA ready2_pilot is compatible with all standard KUKA robots and ensures maximum freedom for operator control.

The path points are addressed by means of manual guidance directly at the torch during welding. Context-specific welding and motion commands can be entered using the buttons on the 6D mouse.

Teach pendant: KUKA smartPAD

Display: Scratch-resistant, capacitive, industrial touch display
Display size: 8.4”
Dimensions (H x W x D): 292 x 247 x 63 mm
Weight: 1,100 g
KUKA.ArcTech – application software
Simplicity, performance and quality

With the products of the KUKA.ArcTech family, you receive an automation solution that is optimized for welding applications. The application software provides you with all essential functions for easy operation and programming in order to meet the highest production requirements.

Simple start-up and programming

KUKA.ArcTech weld parameter management ensures simple programming and optimization of weld parameters. This is achieved by mapping the weld procedure specification (WPS) in a weld data set.

For simple and convenient operation, several EasyTech status keys are added to the familiar KUKA smartPAD user interface. This allows intuitive programming of weld seams.

KUKA.ArcTech Basic Software

The optimal software package with all the functions for standard welding applications:

- One-click start-up via preconfigured welding source profiles
- Creation of documentation with all weld parameters as a system handover report
- Weld parameter management for ignition, weld and end crater parameters to implement WPSs
- Editors for optimization of weld parameters
- Display of power source websites for visualization and configuration of weld parameters
- TCP check routine for quick manual corrections

KUKA.ArcTech – application software
Simplicity, performance and quality

Expansion with KUKA.ArcTech Advanced

Supplements KUKA.ArcTech Basic software with additional functions for demanding welding tasks.

- Advanced process monitoring functions and reactions: seam length monitoring and Advanced Error Recovery
- Programmable weld-specific error recovery
- Various function blocks for producing the most challenging welded joints, including for thick plate welding
- Sloping of weld parameters
- Support of SKS Synchroweld and Fronius Dynamic Power Control
- PLC interface for weld seam sequence control
- Engineering interface for user-specific expansions
- Welding in a robot team: combined with the KUKA.RoboTeam software for synchronized welding with up to four robots

Top quality thanks to seam tracking

In the case of component tolerances and distortion due to the introduction of heat, the robot can automatically compensate for these influences by means of laser sensor technology and perform the weld with high production reliability.

Seamless integration of technology partners

Nearly all power sources from market-relevant manufacturers can be integrated seamlessly into the KUKA system landscape.
KUKA function and technology software

Maximum productivity and flexibility

KUKA.TouchSense can be used to implement component and seam detection via the welding torch of the KUKA robot or via external sensors. The corrections are calculated using the comparative measurement of a previously taught master part. Any deviations that occur can be compensated in up to six dimensions. Thanks to the Fast Measurement inputs on the KRC controller, the search can be carried out at high speed and with maximum accuracy in the measurement results. This reduces the duration of the measurement motions to a minimum in order to ensure the robot’s system’s highest levels of productivity.

KUKA.SemTech Finding

The great advantage of component or seam detection using intelligent line laser sensors lies in the ability to capture multiple component or seam dimensions in a single measurement. The KUKA.SemTech Finding software uses these geometry data to calculate a linear and/or rotational offset of the component, seam or individual path points directly in this way. Position corrections in up to six dimensions can be configured extremely flexibly and easily in the robot program. This method provides the basis for the optimized and process-reliable welding of components.

KUKA.ArcSense

The through-arc seam tracking sensor (TASy) is a reliable and long-established technology. KUKA.ArcSense analyzes a checkback signal (actual weld parameters) for this, thus automatically compensating for process-related deviations. These may be caused, for example, by heat distortion or warpage inaccuracies. Arc sensor technology ensures optimal positioning of the weld seam. This results in maximum productivity and quality. Combined with all KUKA welding robots, KUKA.ArcSense is a software solution that ensures maximum stability and reliability during the welding process.

KUKA.SeamTech Tracking

With KUKA.SemTech Tracking, the robot can perform edge and seam tracking during welding using an intelligent line laser sensor. Thanks to KUKA’s high-performance Ethernet real-time interface, the sensor system can carry out high-precision robot path correction with ease, not only at the typical MIG/MAG and TIG welding velocities, but also at the very high velocities used in laser welding. Using special commands, the weld start and end can be found automatically. This allows the robot to independently adapt the seam position and length according to the component being welded.

KUKA.ArcTech AdaptiveWelding

KUKA.ArcTech AdaptiveWelding expands the functional spectrum of KUKA.ArcTech Basic. Even more powerful quality and productivity requirements on the automated welding of workpieces necessitate the integration of sensors and measured values. KUKA.ArcTech AdaptiveWelding processes measured variables such as weld volume, gap width or even the offset of edge heights in order to automatically and autonomously adjust to weld parameters. It does not matter whether the deviations are detected in advance or during the welding process. The continuous adaptation of the parameters ensures consistent and reliable weld seam quality and boosts the productivity of the application.

KUKA.ArcTech MultiLayer

KUKA.ArcTech MultiLayer expands KUKA.ArcTech Basic to include user-friendly functions for quick and easy programming of multi-layer weld seams. The position for the filler and cover layers is determined via specific offset values based on the root layer programmed in a predefined program structure. In addition, MultiLayer allows for specific weld parameters to be defined for each programmed section of a weld seam. To maximize productivity, KUKA.ArcTech MultiLayer can be combined with KUKA.ArcSense or KUKA.SemTech Tracking. For the purpose of optimizing heat input, it is possible to perform welding tasks after individual filler and cover layers.

KUKA.TRACC TCP

With the automatic TCP inspection function KUKA.TRACC TCP, the robot becomes even more effective and autonomous. The function ensures that weld seams are reliably produced in the correct position, since the programmed TCP is checked against the actual value and corrected if necessary. This automatically keeps the productivity of the welding cell at the highest possible level and dispenses with the need for time-consuming manual reprogramming due to a torch collision or exchange of the torch neck. The special aspect: KUKA.TRACC TCP calibrates the TCP during absolutely accurate measurement and thus also takes into account inaccuracies of the welding torch or collision box.

Visualization, monitoring and seamless documentation

Application software package acts almost in real time

KUKA.ProcessScreen enables comprehensive and component-oriented documentation of your production data. Evaluation and analysis are also possible. The comparison with individually configurable limit values reveals any deviations – thereby assuring production quality. The results are available in tabular and graphical overviews at the touch of a button. KUKA.ProcessScreen is freely configurable for a wide range of different applications.

Use of a single software package for the entire production system not only results in a standardized configuration and operator control philosophy that is independent of the application or process equipment used, but also ensures seamless process monitoring and reduces training requirements. Thanks to web-based technology, KUKA.ProcessScreen can be visualized on virtually any end device. The recorded process data are archived locally in a ring memory on the robot controller.

They can optionally be transferred to a decentralized customer network for documentation of production processes. The easy generation of evaluations as tables or graphics is another bonus.

KUKA.Sim 4.0 and KUKA.ArcWelding AddOn 1.0

Fast, simple, efficient: decisive advantages in the planning of welding applications

KUKA.Sim 4.0 provides you with a professional simulation environment for your KUKA robots. With KUKA ArcWelding AddOn, we also offer you advanced offline programming capability especially for your ArcWelding application. KUKA.Sim 4.0 already comes with extensive CAD import functions. You can implement automatic seam generation on the basis of CAD component edges using KUKA.Sim ArcWelding AddOn – including positions for moving to the component and away from it. The torch orientation required for this can be defined.

A visual preview of the torch along the path is also available. This ensures optimum orientation control during path creation.

Features:

- CAD import functions
- Path generation by means of edge detection
- Best position generation of the positioner
- Definition of the positioning motions
- Torch preview
- ArcTech Basic functions (e.g. weaving)
KUKA products for arc welding
Versatile and reliable

Perfected quality - Robots for arc welding

KUKA AGILUS – the solution for compact installation spaces
The KR AGILUS enables you to tap new fields of application through its versatility. Irrespective of the installation position – whether on the floor, ceiling or wall – it offers utmost precision in confined spaces thanks to its integrated energy supply system and service-proven controller. This robot is also available in dust and water-protected versions (protection rating IP 67).

KUKA KR CYBERTECH – the solution for the most common applications
The KR CYBERTECH family includes machines for arc welding with payload capacities from 6 to 20 kilograms and reaches from 1,440 to 2,100 millimeters. With either a hollow wrist or an in-line wrist, KUKA offers the right robot for every task. This in turn ensures reliable welding results with maximum productivity and efficiency.

KUKA IONTEC – the solution for large workspaces
The KR 20 produces supreme quality in the shortest cycle times – and, what’s more, with unrivaled repeatability. The long arm with a reach of 3,101 millimeters enables an extremely large work envelope and expands the production options many times over. Proven standard components stand for reliability and durability.

KUKA positioners
Depending on the production task and workpiece, we offer the right solution for every application. KUKA offers a wide range of positioners with payload capacities from 250 to 12,000 kilograms and up to five freely programmable axes.

KUKA cell4 – welding cells for your production facility
Implement safe, reliable and cost-effective production with the standardized KUKA cell4-production series. Whatever your application – arc welding, spot welding or laser welding: together with you, we will find the right solution for your specific requirements.

KUKA.Sim
Simulate your production and processes with the fully-integrated KUKA.Sim software. From simple feasibility studies to complete offline programming: KUKA.Sim provides you with the right tools and functions.

KUKA linear units
With KUKA linear units, you add a further axis to the robot, thereby considerably extending its work envelope. A great advantage: The linear units are controlled by the same controller as the robot. They can thus be integrated seamlessly into the work sequence – without the need for additional equipment.

Quick connection of weld power sources
Connect your power source to the KUKA controller quickly and easily. We are constantly expanding our extensive power source profiles to ensure the reliable connection of power sources from renowned manufacturers.

Top quality thanks to seam tracking
Compensate automatically for component tolerances and material distortion. We offer interfaces for quick connection of the necessary sensor systems from the most commonly-used manufacturers.

Perfect service around the clock
From programming the application to installing your system, and during planning or operation, we are happy to support you – with local service worldwide and around the clock!
Details provided about the properties and usability of the products are purely for information purposes and do not constitute a guarantee of these characteristics. The extent of goods delivered is determined by the subject matter of the specific contract. No liability accepted for errors or omissions. Subject to technical alterations.
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