

KUKA

29 languages

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KUKA AG is a German manufacturer of [industrial robots](#) and [factory automation](#) systems. In 2016, the company was acquired by the Chinese appliance manufacturer [Midea Group](#).^[2]

It has 25 subsidiaries in countries including the United States, the European Union, Australia, Canada, Mexico, Brazil, China, Japan, South Korea, Taiwan, India, and Russia. KUKA is an acronym for [Keller und Knappich Augsburg](#).

KUKA Systems GmbH, a division of KUKA, is a supplier of engineering services and automated manufacturing systems with around 3,900 employees in twelve countries globally.^[3] KUKA Systems' plants and equipment are used by automotive manufacturers such as [BMW](#), [GM](#), [Chrysler](#), [Ford](#), [Volvo](#), [Volkswagen](#), [Daimler AG](#) and [Valmet Automotive](#), as well as by manufacturers from other industrial sectors such as [Airbus](#), [Astrium](#) and [Siemens](#). The range includes products and services for task automation in the industrial processing of metallic and non-metallic materials for various industries, including automotive, energy, aerospace, rail vehicles, and agricultural machinery.^[4]

History [edit]

The acetylene factory in Augsburg was founded in 1898 in [Augsburg](#), Germany, by Johann Josef Keller and Jakob Knappich for the production of low-cost domestic and municipal lighting, household appliances, and automobile headlamps. Their production extended into autonomous welding equipment in 1905.

After the First World War, Keller and Knappich resumed production of safety winches, manual winches, and lower winches and began manufacturing large containers. As a result, [Bayerische Kesselwagen GmbH](#) was formed in 1922. The new company developed and produced superstructures for municipal vehicles. In 1927, this business division presented the first large garbage truck. [\[citation needed\]](#)

The name KUKA came into being in the same year through the company's name at that time, "Keller und Knappich Augsburg". In Hungary, the name—being prominently displayed on the first closed container garbage trucks—eventually became a generic trademark and ultimately a synonym for trash cans.^{[5][6]}

Keller & Knappich GmbH merged with part of Industrie-Werke Karlsruhe AG to become Industrie-Werke Karlsruhe Augsburg Aktiengesellschaft, eventually shortened to KUKA (Keller und Knappich Augsburg).

The development and manufacture of [spot welding](#) equipment began in 1936. By 1939, KUKA had more than 1,000 employees.

Starting in 1934, KUKA expanded to become a major company. Its owners joined the [NSDAP](#) early on and benefited from the contacts this provided. The production of machine tools and machine components for the increasing demands of the arms industry, such as being an important supplier for [Messerschmitt AG](#), had 1,000 employees in 1939, and this number steadily increased with the use of prisoners of war, "civilian workers", and concentration camp prisoners. In 1944, 1,400 people working for "KUKA" were housed in Collective Camp II alone.^[7]

After the major destruction of the company during the Second World War in 1945, KUKA resumed manufacturing welding machines and other small appliances. With new products such as the double-cylinder circular knitting machine and the portable typewriter "Princess", KUKA introduced new industrial fields and gained independence from the supply sector.^[8]

In 1956, KUKA manufactured the first automatic welding system for refrigerators and washing machines and supplied the first multi-spot welding line to [Volkswagen AG](#). Ten years later, the first [friction welding](#) machine went into production.

In 1971, the delivery of the first robotic welding system for the S-Class took place. A year later, the magnetic arc-welding machine came to market.

In 1973, KUKA created its own industrial robot, [FAMULUS](#).^{[9][10]} At that time, the company belonged to the [Quandt](#) group.

In 1980, the [Quandt](#) family withdrew, and a publicly owned firm was established. In 1981, KUKA's main activities were grouped into three independent companies: [KUKA Schweisanlagen](#) and [Roboter GmbH](#), [KUKA Umwelttechnik GmbH](#) and [KUKA Wehrtechnik GmbH](#), which was re-sold to [Rheinmetall](#) in 1999. Towards the end of 1982, [LSW Maschinenfabrik GmbH](#), [Bremen](#) became a subsidiary of KUKA.^[11]

In 1993, the first laser-root-seam welding systems were manufactured. These welding systems were then further expanded to adhesive bonding and sealing technologies in the following year. Around the same time, KUKA took over the tools and equipment manufacturer [Schwarzberg GmbH](#) and expanded its business to China and the USA in the following years.

In 1995, the company was split into KUKA Robotics Corporation and KUKA Schweißanlagen (now KUKA Systems), both subsidiaries of KUKA AG. The company is a member of the [Robotics Industries Association](#) (RIA), the [International Federation of Robotics](#) (IFR), and the German engineering association [VDMA](#).

In 1996, KUKA Schweisanlagen GmbH became an independent company and, two years later, became the leader among European welding equipment manufacturers. The supply of the first pressing tools for automobile side-walls made of high-strength steel began in 2002. The company launched the [KUKA RoboScan](#) with a remote laser welding head in 2003. Since 2006, KUKA Systems has operated its own body shell factory in [Toledo](#), Ohio, producing the bodywork for the [Jeep Wrangler](#) by [Chrysler](#).

In the course of internationalisation and expansion of business units and technologies such as reshaping, tooling, bonding, sealing, etc., KUKA Schweisanlagen GmbH became [KUKA Systems GmbH](#) in 2007. In 2010, KUKA presented a newly developed standardised cell concept for welding machines, KUKA flexibleCUBE.

In the automation sector, KUKA Systems offers standard and customized products for industrial production automation; joining technologies and component handling are among their activities. The technologies are tested, and the production processes are fully optimized before development. The company also provides engineering and individual consulting.^[12]

In June 2016, [Midea Group](#) offered to buy KUKA for about €4.5 billion (\$5 billion). Midea completed the takeover bid in January 2017 by purchasing the 94.55% voting stake in the company.^[13]

In late 2017, KUKA announced that 250 employees of KUKA Systems were terminated. The management cited project troubles as the reason.^[14]

In November 2022, Midea Group acquired the remaining 4.69% stake in KUKA.^{[15][16]}

Most robots are finished in "KUKA Orange" (the official corporate color) or black.

Corporate structure [edit]

The company is headquartered in [Augsburg](#), Germany. As of December 2014, KUKA employed more than 13,000 workers.^[17] While initially focused on customers in the [automotive](#) industry, the company has since expanded to other industries. It has five divisions:^[18]

- Systems
- Robotics
- Swisslog Logistics Automation
- Swisslog Healthcare
- China^[2]

Notable milestones [edit]

- 1971: Europe's first welding transfer line built for [Daimler-Benz](#).
- 1973: The world's first industrial robot with six electromechanically driven axes, known as [FAMULUS](#).
- 1976: IR 6/60 – A new robot type with six electromechanically driven axes and an offset wrist.
- 1989: A new generation of industrial robots is developed – brushless drive motors for low maintenance and higher technical availability.
- 2004: The first [Cobot](#) KUKA LBR 3 is released. This computer-controlled lightweight robot can interact directly with humans without safety fences, resulting from a collaboration with the [German Aerospace Center](#) institute since 1995.^[19]
- 2007: KUKA Titan – at the time, the biggest and strongest industrial robot with six axes, entered the [Guinness Book of World Records](#).^[20]
- 2010: The robot small series KR QUANTEC completely covers the load range of 90 to 300 kg with a reach of up to 3100 mm.
- 2012: The new small robot series KR AGILUS is launched.
- 2014: The company gained recognition with a video supposedly teasing their new robot, specialized in Table Tennis, showing a match against [Timo Boll](#), a German professional. The video, a commercial with heavy CGI, received criticism from the table tennis community but has been viewed over 10 million times on YouTube and has won numerous awards.^[21]
- 2016: KUKA was acquired by the Chinese company [Midea Group](#).^[22]
- 2018: KUKA presents first consumer robot prototype (KUKA i-dro, a modular service robot) at [Hannover Messe](#) 2018; the robot takes a self-portrait of its human controller, Angela Merkel.^{[23][24][25]}
- 2024: KUKA's next generation comes to Modex 2024.

System information and application areas [edit]

System information [edit]

The KUKA system software is the operating software and the core of the entire control system. It contains all the basic functions needed for the deployment of the robot system.

Robots come with a control panel (the KCP, or KUKA Control Panel), also known as a [teach pendant](#), which features a display and axis control buttons for A1-A6, as well as an integrated [6D](#) mouse that allows the robot to be moved in manual (teaching) mode. The pendant also enables users to view and modify existing programs, as well as create new ones. To manually control the axes, an enabling switch (also called a [dead man's switch](#)) on the back of the pendant must be pressed halfway for motion to be possible.

The connection to the controller is a proprietary video interface and [CAN bus](#) for the for the interlock system and button operation.

A [rugged computer](#) located in the control cabinet communicates with the robot system via the Multi Function Card (MFC).^[26] which controls the real-time servo drive electronics. The Digital Servo Electronics (DSE) board is in the control cabinet, usually located or integrated into the MFC. While the Resolver Digital Converter (RDW/RDC) board is located in the base of the robot. Servo position feedback is transmitted to the controller through the DSE-RDW/RDC connector.

The software comprises two elements running simultaneously: the user interface and program storage, which run on Windows 95 for KRC1 and early KRC2 controllers, Windows XP Embedded for KR2 controllers, and Windows 7 Embedded for KRC4 controllers, as well as [VxWorks](#).^[27] a KUKA-modified version of the VxWorks real-time OS for program control and motion planning, which communicates with the MFC.^[28]

The systems also contain standard PC peripherals, such as a CD-ROM drive (or 3.5" floppy on older controllers), USB ports, as well as a standard interface, either ISA or PCI/PCIe, for adding software and hardware options for industrial automation, such as [Proibus](#), [Interbus](#), [DeviceNet](#) and [Profinet](#), among others.

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