Technology — Rotary friction welding
A strong partner
We’re one of the world’s leading suppliers with more than 1,150 rotary friction welding machines installed in over 44 countries.

50 Years Experience

Over 50 years ago, KUKA established rotary friction welding (short friction welding) as an industrial joining process. Numerous KUKA innovations, such as short-cycle welding, mixed-material combinations and defined-angle friction welding, have shaped this field ever since.

With the takeover of the machine manufacturer Thompson Friction Welding (UK) in 1994, the product range was extended continuously to applications beyond the automotive industry. Since then KUKA has been one of the global leaders in this field. The machines set standards not only in terms of precision, dynamics and process control, but also with their cost-saving potential for your production. No matter which markets you are active in, which customers you serve or which tasks you are faced with, this KUKA Industries product guarantees you supreme quality in the production of safety-relevant components and enables you to weld even unusual material combinations (e.g. aluminium-copper).
The friction welding process

Advantages of rotary friction welding

Very high weld quality
- Fine-grained structure, no pores, minimal hardening
- No distortion of the component (uniform heat input)
- Maximum reproducibility
- Excellent traceability of the quality through documentation of the weld parameters

High savings potential
- No consumables materials required
- Unit cost advantage through short cycle times
- Material savings through component optimization
- Cost optimization through composite construction

Additional process advantages
- No fumes, no dazzling
- No weld spatter
- Good process control and monitoring ensure highest process reliability

Vast range of applications

Thanks to the KUKA Industries range of friction welding machines, a wide variety of components can be joined for many different industries. These include sectors such as aerospace, automotive, construction machine, electrical, general mechanical engineering, oil and gas exploration. Technology trends such as e-mobility and lightweight design make high demands on the mastery of the welding process which allows industrial joining of different material combinations at low cost.
Rotary friction welding

Maximum flexibility
Every technology has its advantages, whether double headstock, fixed or moving headstock. We offer the ideal solution for every component.

Component optimization
The automotive industry demands solutions that reduce weight – welding paves the way for the mobility of the future.

Highest ergonomics
The use of intuitive touchscreen operation and the ergonomically-designed workspace make work faster and more effective.

Maximum cost reduction
The state-of-the-art friction welding processes make it possible to limit use of expensive material to those points that are relevant for the component.

Maximum availability
As a result of the use of high-quality components, maintenance expenses are low and the machine availability is very high.

Very high weld quality
Avoid unnecessary problems – opt for a production process in which every component is validated.

The main advantages of KUKA friction welding machines

KUKA Industries supplies the machine perfectly tailored to your requirements

With its vast portfolio of 1 to 10,000 kN upsetting force, KUKA Industries can friction weld even the most difficult customer components. Whether you decide on our new universally applicable compact Genius series or whether you look for special machines for special parts. The machine range with its two different construction designs is tailored exactly to your requirements.

Special sizes and designs (double-head machines and machines of vertical design) are available on request.

Various material combinations

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KUKA technology pays off
Technology highlights

Nowadays, high-tech machinery must meet the customer requirements for ever shorter cycle times, higher quality requirements, welding of new component combinations and complete traceability.

Mechanical engineering
- Optimized flow of forces and FEM-optimized machine components
- Highest dimensional accuracy due to main spindle with multiple bearing
- Big maintenance advantages due to long-term lubricated bearings
- Cycle time reduction due to automatic compensation of insertion inaccuracies due to floating slide
- High-precision joining due to HNC controlled process axis

Design / Ergonomics / Energy efficiency
- Ergonomic workspace
- Optimized design for highest sound insulation
- Highest energy efficiency due to self-regulating hydraulic system
- Simple and intuitive touchscreen operation

Options
- Turning and facing devices
- Flash cut-off device
- Chip conveyor
- Automation solutions

Revolutionary control and process monitoring made by KUKA

VIPER-Drive offers new opportunities
The combination of high-dynamic drive and revolutionary process control in the millisecond range (VIPER Drive = Virtual Infinitely Programmable with Extreme Response) allows the welding process to be accurately defined and controlled specifically for the part to be welded. This opens the possibility for new applications and further increases the productivity and versatility of KUKA friction welding machines.

Active Travel Control (ATC)
With the active travel control (ATC), variations in the individual parts can be compensated so that the finished part always reaches its exact component length with consistently high weld quality.

Traceability newly defined
All process data is documented numerically and graphically by the KUKA PCD (Process Control and Documentation) and archived electronically. Thus, claims will be a thing of the past.
From the machine to the system

KUKA Industries is prepared for Industry 4.0

Even higher productivity can be reached by complete integration of the friction welding machines in your production network. This will require open interfaces and an intelligent control. As a manufacturer of flexible, automated production systems, KUKA Industries has the experience and competence to develop and realize process-safe and economically successful turnkey solutions. With their optimally accessible work space and the network capability of their control, the machines offer ideal conditions for the new age of Industry 4.0.

We offer

- Full or partial automation with linear axes for infeed and outfeed of parts
- Robot automation for handling components
- Completely integrated solution in the specific production workflow using state-of-the-art 3D process simulation

KUKA Industries – Your global partner from engineering to service

Long before the first workpiece passes through your application, we support you with our know-how.

Consultation, planning, engineering, implementation all the way through to complete customer service – all around the globe. We know what you need and have the right solution ready for you. One of the ways we ensure this is through our unique KUKA TechCenter. Our engineers carry out feasibility studies and test the practicability of innovative concepts.

Of course, the best kind of service is the kind you don’t need to waste any words about because everything functions perfectly. KUKA Industries offers you exactly this kind of service – and it doesn’t just start with maintenance and end with spare parts: from process and system training to comprehensive concepts for supplying and stocking spare and wearing parts, not forgetting maintenance, servicing, telediagnostics and hotline support.

We can also take care of the complete manufacturing operation for you – from process validation to prototype construction and small-batch production at our sites in Augsburg (Germany) and Halesowen (UK).
Together with our affiliated companies, KUKA Robotics and KUKA Systems, we can be found locally all over the world:

Argentina  Malaysia
Australia  Mexico
Austria  New Zealand
Belgium  Norway
Brazil  Poland
Canada  Portugal
Chile  Russia
China  Sweden
Czech Republic  Switzerland
Germany  Singapore
Hungary  Slovakia
France  Spain
Great Britain  South Africa
India  Taiwan
Italy  Thailand
Japan  Turkey
Korea  USA

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