Robotic Friction Stir Welding
Robotic Friction Stir Welding (FSW) allows joining metals, alloys or even metallic ceramics with higher efficiency and flexibility and at significantly reduced cost compared to classical FSW concepts or alternative welding processes.

Being an experienced system integrator and solution provider, Grenzebach provides the overall process solution, ranging from system layout, tools, fixtures and safety concepts all the way to project implementation, testing and process optimization, training, operation support and after sales services. Having handled large scale FSW-production projects, we know what it takes to provide an industrialized overall solution.

With production capabilities in three continents and a professional 24/7 service organization with locations in all relevant time zones Grenzebach is always close to you. The family-owned company with its global footprint employs about 1600 persons around the world.

The use of specially designed robots from our partner KUKA allows us to offer a flexible and cost-efficient FSW solution, supporting configurable 3D-geometries and a wide range of process forces.

**SPECIFIC BENEFITS OF GRENBACH ROBOTIC FSW SOLUTION**

- Customer specific, turn-key production systems for Friction Stir Welding
- Engineering and production of specific FSW tools
- Metallic connections of highest seam and surface quality
- Highest robustness for industrial series operation by means of active process control
- Flexible configuration of complex weld paths and parameters
- Central Master Control Unit for process control and monitoring
- Online quality control and logging of the relevant process variables
- No fumes, dust or spatter
- High welding speeds
- Non-sensitive to parasitic induction
- Low-vibration process control
- Attainable surface roughness of the welding seam in the area of the base material
- Ideally suited especially for aluminum-alloys, cast aluminum, copper, magnesium, etc.
- Inter-metallic joints possible

**TARGET INDUSTRIES**

- Aerospace
- Automotive
- Power electronics
- Aluminum processing and others

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**WELDING PARAMETERS ROBOT KR 500-3 MT**

- Welding speed ................. up to 2.000 mm/min
- Welding depth .................. up to 10 mm
- Process forces axial ............ up to 10 kN
- Process forces radial .......... up to 5 kN
- Spindle rotation ............... up to 14.000 rpm