

TECHNICAL DATA | FSW



# Friction Stir Welding Technology Package

## FRICION STIR WELDING SOLUTION

**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, Grenzbach provides the overall process solution, ranging from system layout, tools, fixtures and safety concepts all the way to project implementation, process optimization, training, operation support and after sales services. Having handled a first large scale robotized FSW-production project with a significant number of cells, we know what it takes to provide an industrialized overall solution.

**EADS** Our technology partnership with EADS and license agreement for EADS's „DeltaN FS“ tool concept ensures access to cutting-edge technology developments, research networks and FSW process experts.

**KUKA** 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.

Grenzbach Automation, located in Karlsruhe, Germany, is part of the successful and globally active Grenzbach Group and focuses on developing technology for the automation of handling tasks and logistic processes. Core expertise includes robotics, vision technologies, application-specific handling systems and material flow automation. With production capabilities in three continents and a professional 24/7 service organization with locations in all relevant time zones Grenzbach is always close to you. The family-owned company with its global footprint employs about 1,500 persons around the world.



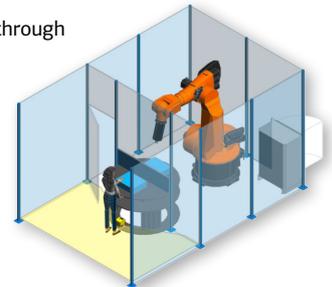
### BENEFITS

- Excellent & solid joint structure and robustness
- High welding depths achievable (up to 50 mm)
- High seam quality
- No fumes, dust or spatter
- Minimal welding distortion & discoloration
- No need for filler material or consumables
- Inter-metallic joints possible
- Well suited especially for aluminum-alloys



### SPECIFIC BENEFITS OF GRENZBACH ROBOTIC FSW SOLUTION

- Excellent cost & energy efficiency
- High flexibility to configure paths and process parameters
- Support of 3D weld lines
- Long geometric reach (> 3 m)
- Industrialized and field proven
- Excellent process robustness through active force control
- Quality control through logging of relevant process parameters



### TARGET INDUSTRIES

Aerospace, automotive and others

### TECHNICAL PARAMETERS

Welding speed	up to 2000 mm/min
Welding depth	up to 50 mm
Process forces axial	up to 10 kN
Process forces radial	up to 5 kN
Spindle rotation	typ. up to 5000 rpm



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