

cell4_production manufacturing cells
_friction stir welding efficiently automated



KUKA FSW application module _the module for joining non-ferrous metals

KUKA Friction Stir Welding (FSW) application modules offer system integrators and end customers maximum flexibility for joining non-ferrous metals with a low melting temperature and for mixed-material combinations such as aluminum and steel. Ideal for demanding material combinations for future-oriented markets, such as electromobility. For efficiency in top quality.

Highlights FSW application module

- Use of heavy-duty robots with process-specific additions and expansions in software and hardware
- Joining of 1D, 2D and complex 3D seams
- Suitable for the cost-effective joining of non-ferrous metals (aluminum up to 8 mm)
- Precise path accuracy of up to 0.5 mm achievable thanks to KUKA path calibration
- Large workspace, can be expanded by means of linear axes
- Low investment costs

KUKA FSW application module

—extremely flexible friction stir welding application for joining non-ferrous metals

Standard configuration /

Process feature	FSW application module
Weld seam forms	1D, 2D and 3D
Control concept	Force-controlled Z axis Position-controlled X and Y axes
Safeguarded spaces	Multiple ranges programmable
Max. axial/radial force	10 kN / 4.8 kN
Recommended tool length	150 mm
Process monitoring	KUKA PCD 507 (optional)

Standard configuration / robot system

	FSW application module
Robot type	KR 500 R2830 FORTEC MT
Robot controller	KR C4 with KSS 8.6
Weight, approx.	2,440 kg

Standard configuration /

Spindle	FSW application module
Spindle type	FSW 3–5 k
Sensor	3 shear force sensors for force measurement and control in the Z direction

Various option packages can be selected, depending on the specific requirements on the friction stir welding applications:

- PCD 507 and HMI Advanced:
 - 100% process monitoring and documentation with display on the new HMI Advanced
- 6D sensor
 - Additional process data by measuring the process forces and torques in three directions
- KR C4 extended Controller
 - Compact control cabinet for connection of additional positioner and linear axes
- Tooling kit »Rotating Shoulder« (pin and shoulder)
 - Tool with adjustable welding pin length for different workpiece thicknesses
- Tooling kit »Stationary Shoulder« (pin and shoulder)
 - Tool with stationary shoulder and rotating pin (lower heat input, reduced burring)
- KUKA Connectivity Box
 - Remote access to KUKA Remote Service and for data exchange with cloud systems
- Safety PLC
 - For setting up simple cells with Emergency Stop and door interlock (R&D cells)
- Customer-specific designs on request

Target applications

- Battery housings for EV and HEV
- Housings for power electronics and heat exchangers
- Cooling systems for power electronics
- Casings for smartphones, tablets and operator panels

Features

- Integrated FSW spindle for force-controlled FSW process
- Improved ease of operation with HMI on KUKA smartPAD and HMI Advanced
- 100% process monitoring with KUKA PCD 507



Basic components of the FSW application module

- Energy supply for FSW 3 spindle
- KR 500 R2830 FORTEC MT robot
- FSW 3 spindle
- KR C4 Controller
- KUKA smartPAD
- FSW technology cabinet with hydraulic and pneumatic components
- Spindle cooling

www.kuka.com/contacts

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. © 2020 KUKA

