K-Flow
Flow drill fastening

Discover our robot-assisted flow drill fastening automation for high-strength joints.

Meeting future joining challenges

Our K-Flow technology enables the joining of different materials and material combinations without the need of a pre-hole – a perfect match of advanced technology and deep joining competence.

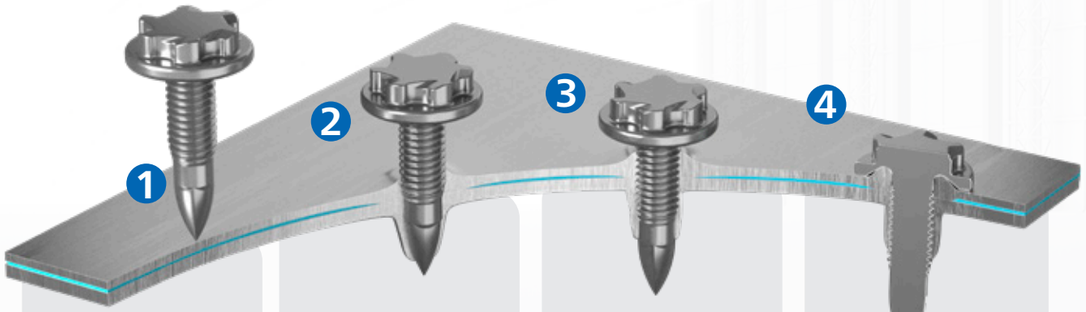
Flow drill fastening offers a solution to challenges in car manufacturing. This robot-assisted flow drill fastening automation provides multi-material joining with single-sided access, using a fastener as both drill and joining element. The high-quality system solutions of our K-Flow product line are designed for precise operation in tough manufacturing environments, with repeatable high-quality results.

CHALLENGES

- **Joining of multiple materials with different strength properties**
- **Limited accessibility**
- **Short cycle times**

Multi-material joints approached from one side

With the extensive know-how of our joint analysts and process experts, we develop the ideal process parameters for your individual requirements and material combinations.



1. Finding

The fastener is positioned on the workpiece and rotated at high-speed. This heats up the material.

2. Passage

With high rotation speed (up to 9000 rpm) and high process force (up to 3000 N), the fastener is pushed through the materials.

3. Thread forming

With reduced speed and process force, the fastener drives through the material and forms a thread without cutting.

4. Final tightening

The fastener is tightened with the required final torque.

The VALUES for your manufacturing process

Multi-material joining

Flow drill fastening can join multiple layers of different materials

Single-sided accessibility

A strong and reliable joint entered from one side in a one-shot process

Hybrid joining

By combining flow drill fastening with adhesive bonding, the dynamic joint strength and corrosion resistance are increased

Reliable process

Best alignment of joining technology, fastener and materials lead to a fast and reliable process

Less damage to the fastener

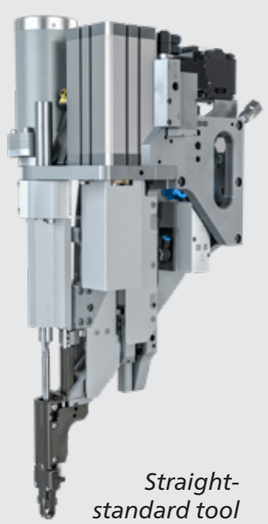
By implementing our swivel module, we enable less wear on the hoses and less damage to the fastening elements as well as a cycle time improvement

Releasable fastener

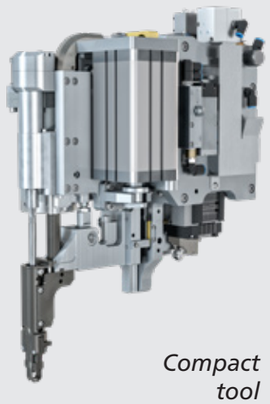
The fastener can be loosened again to facilitate service and dismanteling.

K-Flow system solution

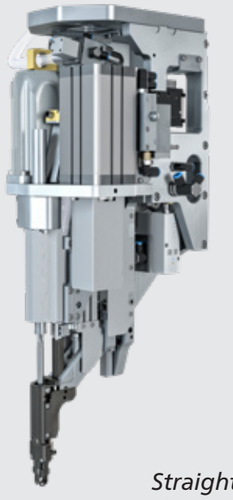
We offer a comprehensive flow drill fastening solution. Learn more about our system and its components.



Straight-standard tool



Compact tool



Straight-piercing tool

Joining tools

The powerful K-Flow joining tool is the heart of the system solution. It is mounted to the robot flange and can process M4, M5 and M6 fasteners with high rotation speed and process force. Depending on the accessibility of the parts, three different tool geometries are available. If joining is required in a limited space, the tool changer can be used to switch from the standard tool to the compact tool.

Feeding unit

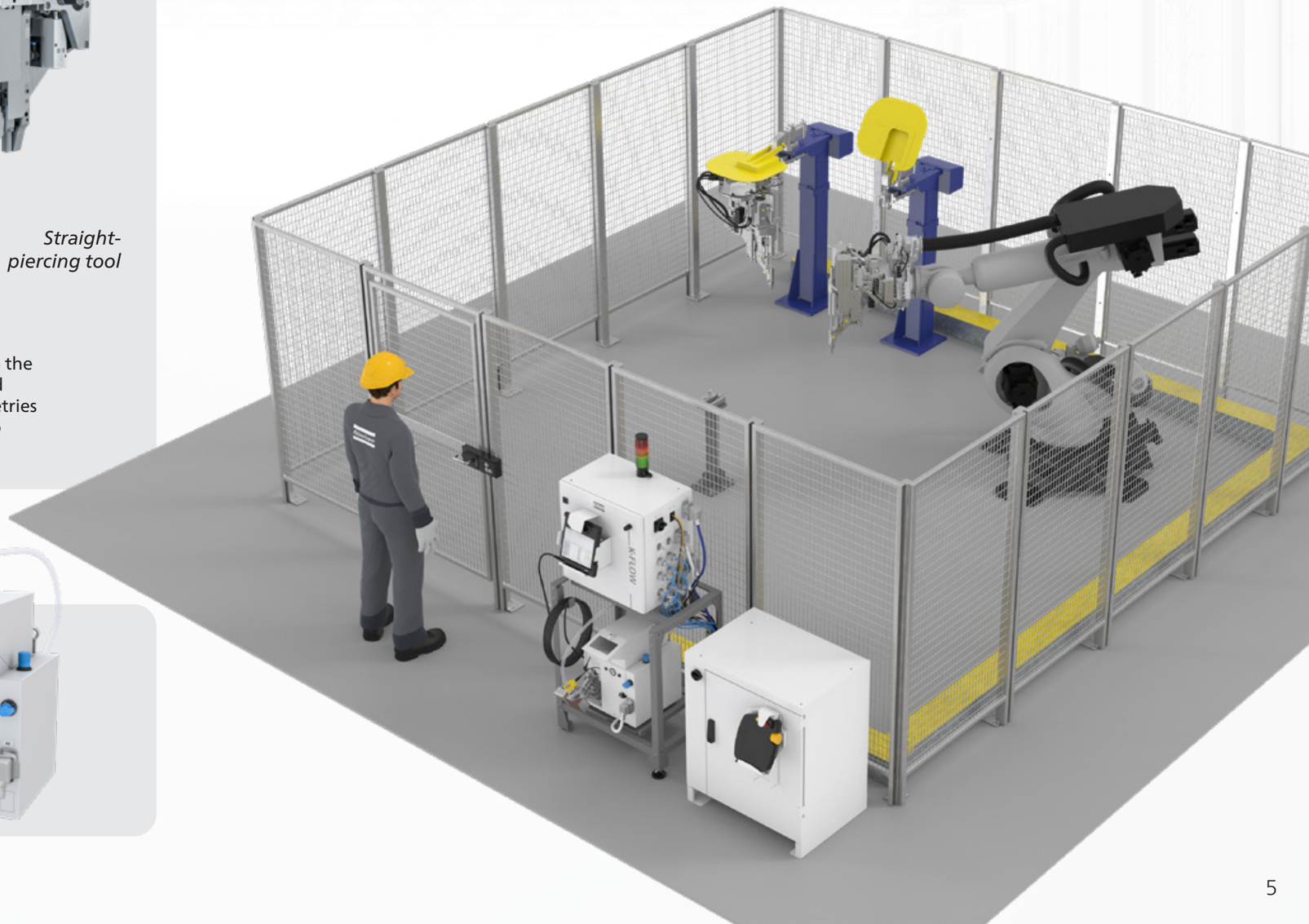
The feeding unit is essential for an uninterrupted operation of the K-Flow system. The feeder sorts and separates the loose fasteners and supplies them as requested to the joining tool. The system with integrated container is easy to maintain and, due to its low noise levels, requires no additional sound protection.

System control

The K-Flow system control manages the joining tool and feeding unit, with software for easy programming, monitoring, analyzing, and documenting of processes. Special wizards assist with complex applications, and an integrated backup system secures data. The system integrates easily into customer networks, is operated via an operation panel, and allows importing process parameters from Excel.

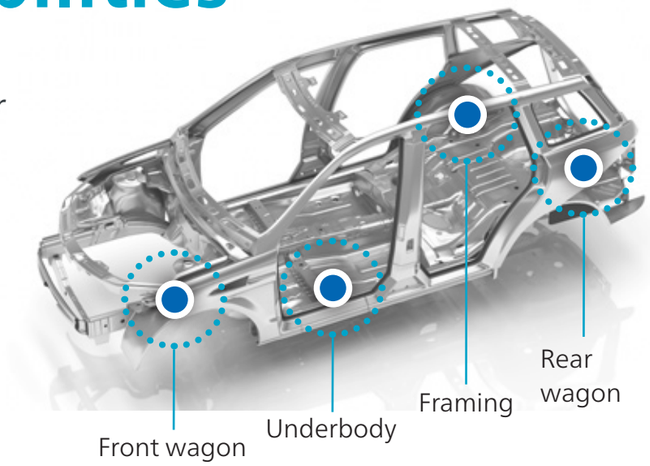
Operation panel

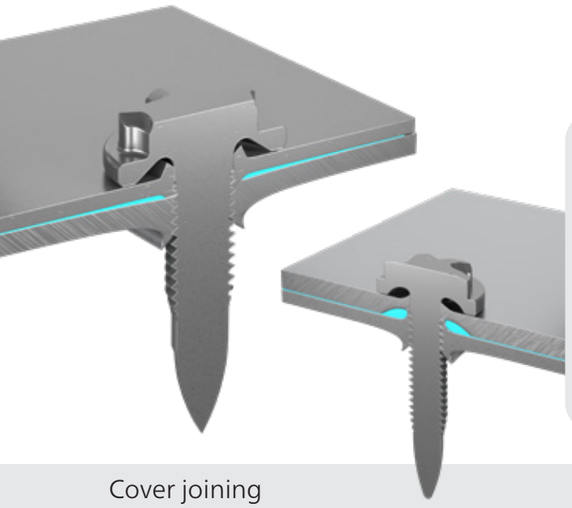
With the portable operation panel we offer flexible and trouble-free operation of the system control and software.



Joining capabilities

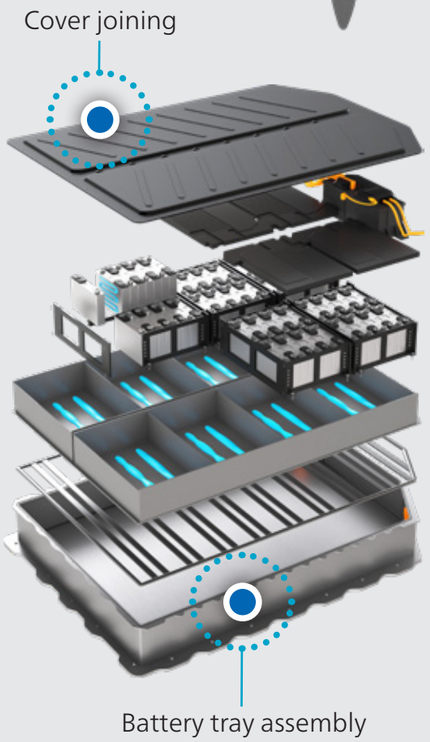
Flow drill fastening can be used for many body-in-white applications.





Depending on the customer's requirements and materials, different variants are possible.

- Two- or three-layer stack
- Direct connection or clamping parts with pre-holes
- Different material thicknesses
- Use of adhesive between the layer stacks



A perfect joining technology for battery assembly

Biggest challenges in battery assembly:

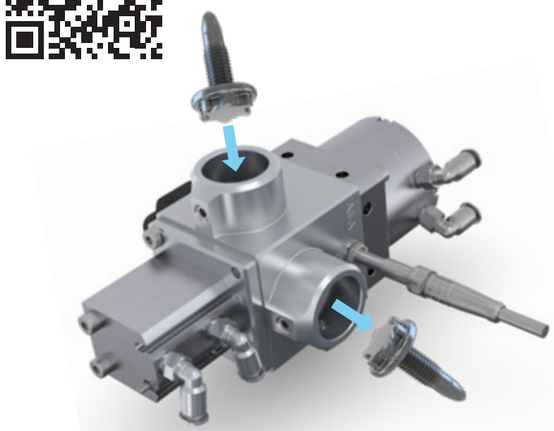
- Removable cover for service requirements
- One-sided access

Our solution

Flow drill fastening meets high standards for joint strength and crash performance. With our K-Flow technology, the battery cover can be mounted to the tray with single-sided accessibility. At the same time, the fastener can be loosened again to facilitate maintenance and disassembly.

Watch animation!

Product features



Swivel module

For head first feeding

The K-Flow swivel module is a product feature that ensures a "head first" feeding of the fastener into the joining system. The module is mounted on the tool and enables a safe feeding of the fastener.

As a consequence the damage of the fastener tip can be avoided. The module allows a fastener to be stored in the tool to shorten feed times and facilitates an improved cycle time.

Product advantages

Less wear

- reduced wear of the hoses and less fastener damage

Improved cycle time

- shorter cycle times and increased productivity

Full circular downholder

And mechanical jaw patent

High thrust and pressure are applied to the fastener before penetration, and any small robot movement can significantly affect its seating position.

Incorrect application of torque and thrust can scratch the surface, damaging the tool and material. The fully circular downholder keeps the fastener in place until thread formation begins, then mechanically unlocks to release it, protecting the surface from scratches.

Product advantage

Increased joint safety

- guided joining reduces fastener errors

System options:

Learn more about our multiple system options, that can help boost your productivity.

HLX 70 Magazine

Smart tool feeding

The new magazine feeding technology HLX 70 is a reliable system option for fast applications without unnecessary interruptions. Its high capacity of up to 70 fasteners and the lack of feed hoses, enables a more flexible and reliable motion of the robot and a short “point-to-point” time. This unique redundancy of feed hoses allows the system to function in any direction (such as inverted, horizontal or vertical) with ease.

Product advantages

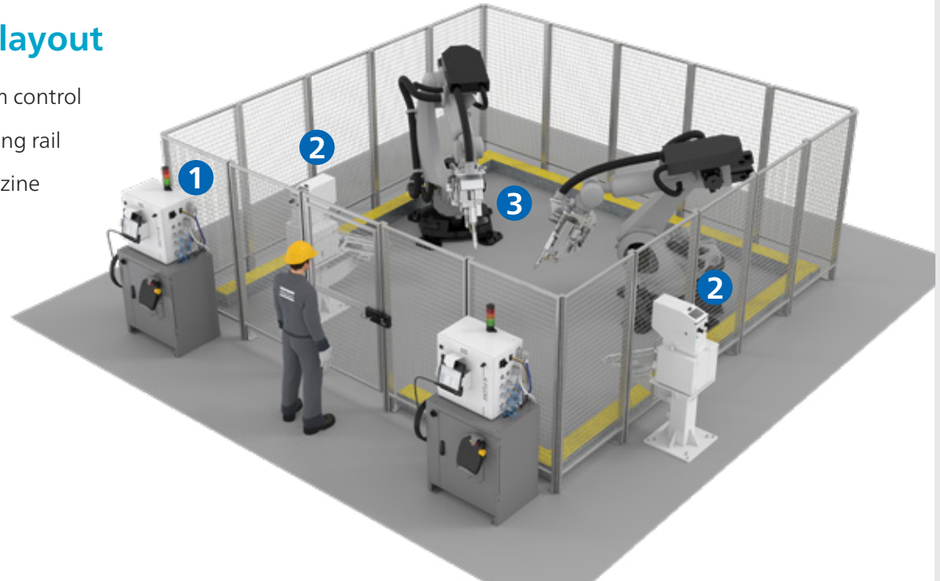
Higher flexibility
- no feeding hoses required

Resource savings
- less air consumption
- reduced amount of tools needed

Increased productivity
- faster cycle time

Flexible system layout

1. Standard K-Flow system control
2. Feeding unit with loading rail
3. Joining tool with magazine

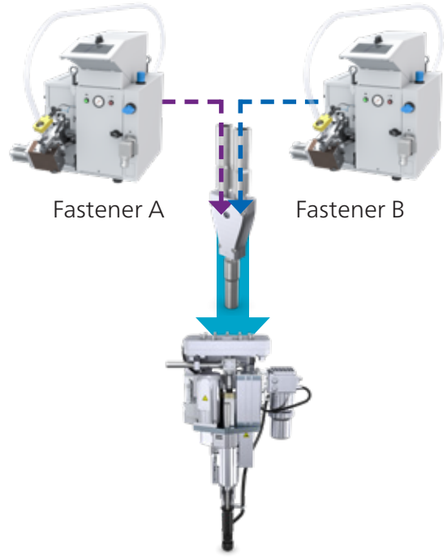


Watch animation!

Dual fastener

Two fastener types – one joining tool

When using multiple fastener types or lenghts in one station a lot of floor space is needed for the various joining tools. With the dual fastener system from our K-Flow product line, one joining tool can be fed with two different fastener types that go with the same feeding head and drive. The dual fastener system can be added to all K-Flow system layouts.



Product advantages

Reduced floor space
- reduced amount of tools needed

Increased productivity
- optimized cycle time

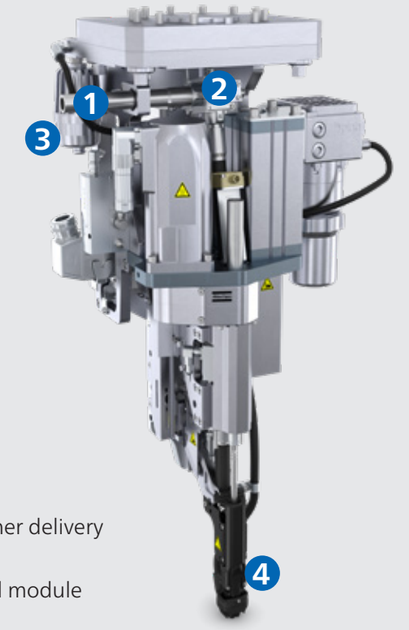
Active jaw solution

When using different fastener lengths with one joining tool, the active jaw solution is required. The active jaw makes sure that the jaw lock opens in the right piercing depth.

Air filter & integrated suction system

For a clean joining environment

While feeding fasteners through a K-Flow system, metal chips can occur and settle within. The K-Flow air filter ensures a clean joining environment. The filter with integrated suction system keeps metal chips out of the feeding head and makes sure that they don’t settle in the system.



1. Fastener delivery
2. Swivel module
3. Air filteration unit
4. Integrated suction system

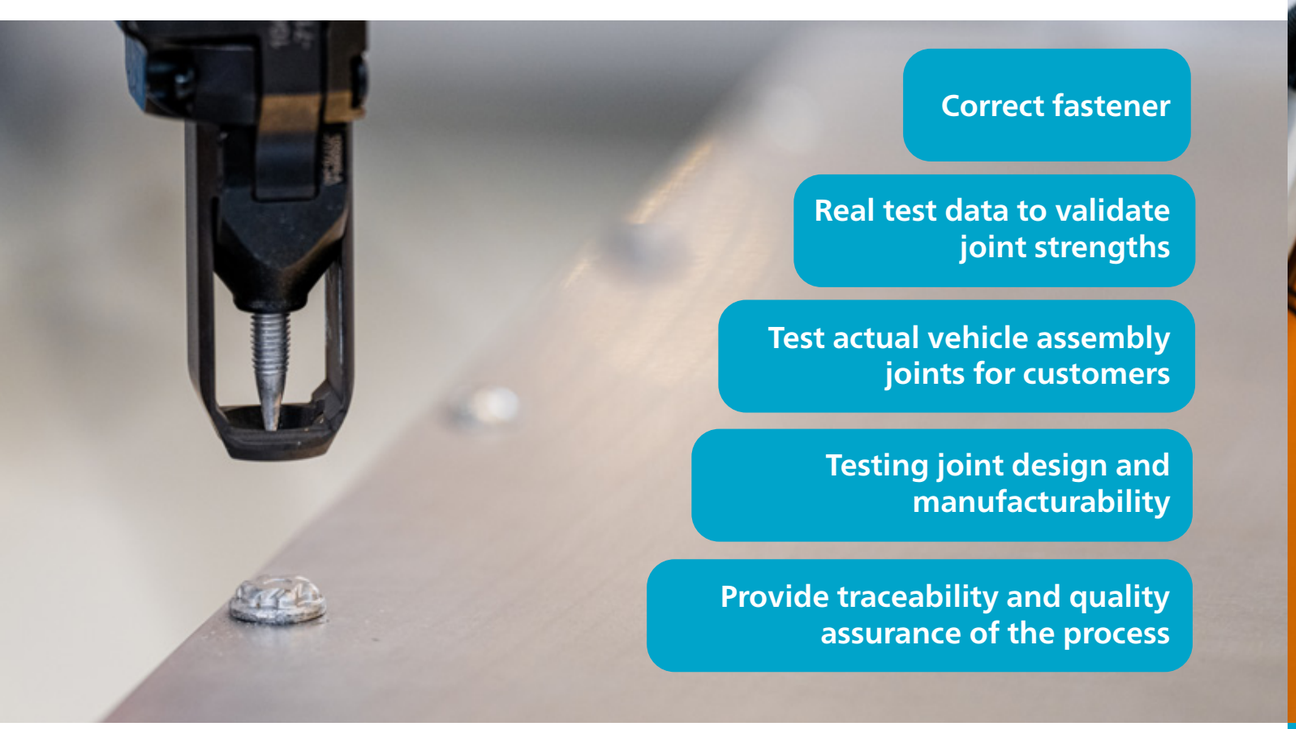
   Cleans the surface of the joint from any contamination that can be caused by fastener friction or any other external contamination.

Product advantages

Clean process
- reduces joint contaminations

Flexible solution
- both components can come stand-alone

Your values with flow drill fastening automation



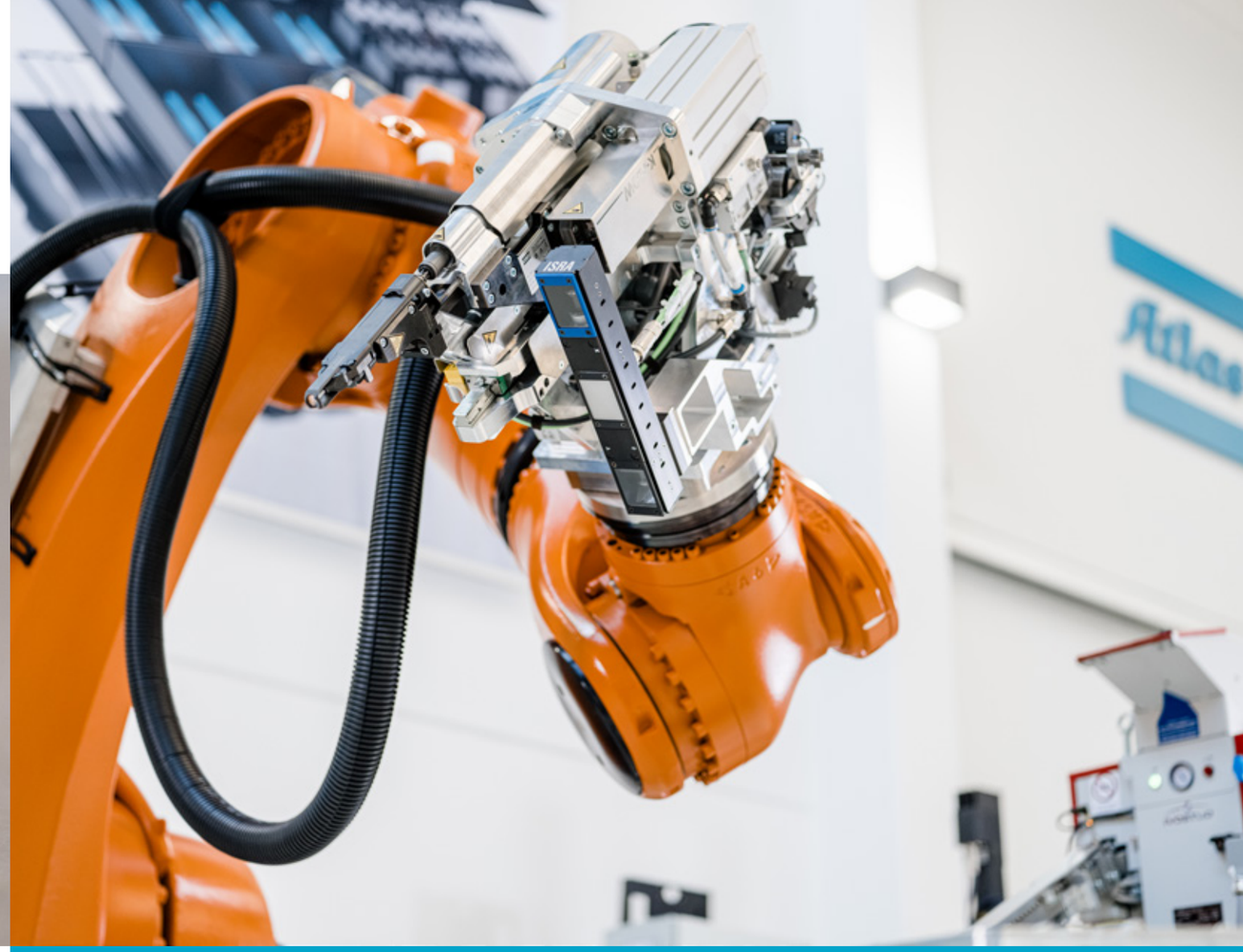
- Correct fastener
- Real test data to validate joint strengths
- Test actual vehicle assembly joints for customers
- Testing joint design and manufacturability
- Provide traceability and quality assurance of the process

From Lab to Fab

Driving innovations with our customers

Together we solve your joining challenge. With their extensive know-how, our experts carry out joint analyses on specific samples of customer joining materials in our lab, using dedicated fasteners according to customers' specifications. We can help finding the ideal parameter setting in order to achieve best joint quality and shortest process cycle times.

Watch video!



Your values at a glance

With a K-Flow system, you are investing in a technology that will benefit your production on many levels.

High availability and exceptional reliability

We offer an efficient, reliable joining solution for one-sided access, using the fastener as both drill and joint.

Easy to use systems

Our systems are intuitive, reducing training and maintenance time, and speeding up production.

A global team at your service

Our global team of flow drill fastening specialists will develop the best solution for your joining challenges, working closely with fastener manufacturers.

Our comprehensive service offerings

Downholder re-tooling

While working with such high forces in the install process, the downholder of our K-Flow joining tool may wear due to misalignment on the workpiece and will be in need of a refurbishment.
Our K-Flow downholder re-tooling system can easily check if the wear limit has been reached or not. The downholder can then be sent to repair or refurbish.

Service advantages

Easy to use
- easy self-control for wear parts

Original spare parts
- refurbishment with original parts

Quality data interface

Our quality data interface is collecting data from several K-Flow joining tools in one PC (server system). The system enables easier traceability and data collection and is compatible with multiple systems.

The K-Flow quality data interface is compatible with:

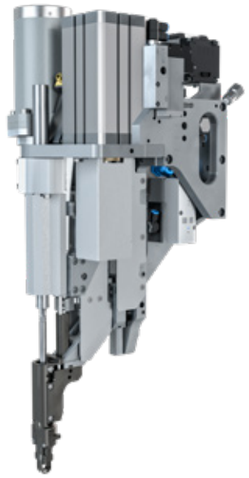
- MQTT
- SQL
- PDD
- OPC UA
- IPM
- Matlab
- UDP
- Profep
- FTP

Product advantages

High compatibility
- with all systems commonly used in the industry

Individual solution
- protocols can be adjusted according to the customer

Technical specifications



Joining tool	
Rotation speed	max. 7000 / 9000 min-1
Process force	max. 1870 / 3000 N at 6 bar
Down hold force	max. 700 / 1400 N at 6 bar
Weight	about 50 kg
Fastener	M4 - M5 - M6

Feeding unit	
Feeding type	sword feeder
Max. feeding speed	35 per minute
Capacity	6.000 fastener
Air supply	6 bar

System control	
Connection	400 - 500 V AC (3Ph/PE)
Electrical fuse protection	16 A
Top cabinet for KUKA robot control available	
Mounting frame available	
Integrated soft SPS for feeding unit	

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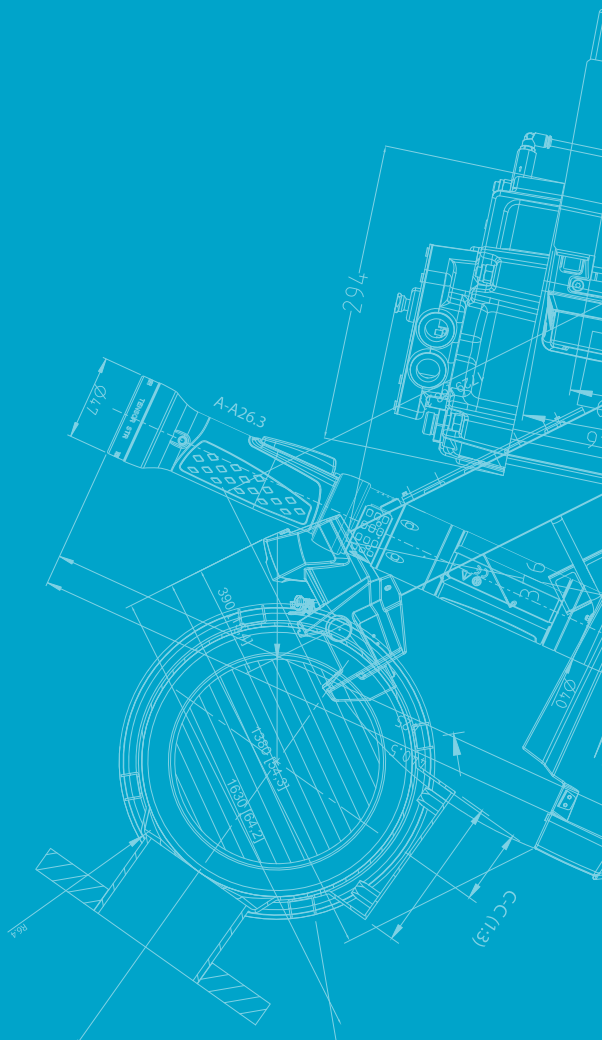

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