

*Trust connects.*

RESISTANCE WELDING & FRICTION WELDING





*We weld together ...*

*... and create new, successful connections*

Harms & Wende stands for competence, innovation and meaningful solution orientation since the company was founded in 1946. From day one, it is our ambition to develop innovative resistance and friction welding technology at the highest level and to implement them quickly. An ambition that we continue to put into practice every day together with our customers and partners.

In doing so, we always have welding quality and efficiency in our sights: striving toward continuous evolution and optimisation of our welding equipment and control systems as well as the software. In addition, individual, customer tailored solutions are also a driving force and source of our motivation. We realize new ideas and manufacture innovative systems that stand out through efficiency, economy and reliable connections. After all, in the tradition of our founders, we are fully committed to the idea of innovation.

*We are convinced that **trust is the basis of successful cooperation.***

Service and customer orientation are anchored in our corporate philosophy. That is why the wishes and concerns of our customers have top priority for us.

We are convinced that trust is the basis of successful cooperation and therefore rely on an open, honest and friendly customer relationship. We have already won multiple customer champion awards for this philosophy.

To ensure that we live up to our ambition and continue to thrill our customers, we regularly conduct customer satisfaction analyses and continuously adapt our range of services to new requirements. In this way, we ensure that Harms & Wende will continue to act with competence, innovation, efficiency and in a solution-oriented manner in the future.



## *Focus on innovative technologies*

*We cover the entire spectrum of resistance and friction welding.*



With our system portfolio, our developments and our experience, we cover the entire spectrum of resistance and friction welding. In doing so, we set standards in the use of innovative technologies – we have been and are a pioneer in the field of medium frequency or as a forerunner for adaptive controls and inline monitoring systems. To be able to meet this standard in the future as well, we got to grips with the possibilities of digitalisation early on and developed digital solutions that can be used to weld more efficiently, economically and individually. Today, we also manufacture network-capable products that can be integrated into production processes, thus laying the foundation for implementing Industry 4.0.

After all, when we develop new products, we always pursue the objective of optimising the welding process in economic and technological terms. In the process, we always focus on resource efficiency and the environment as well. The Environmental Award for our GeniusMFI system and our being named as an "Ökoprofit" company are proof positive of how energy-efficient and environmentally friendly our technologies and our production processes are.

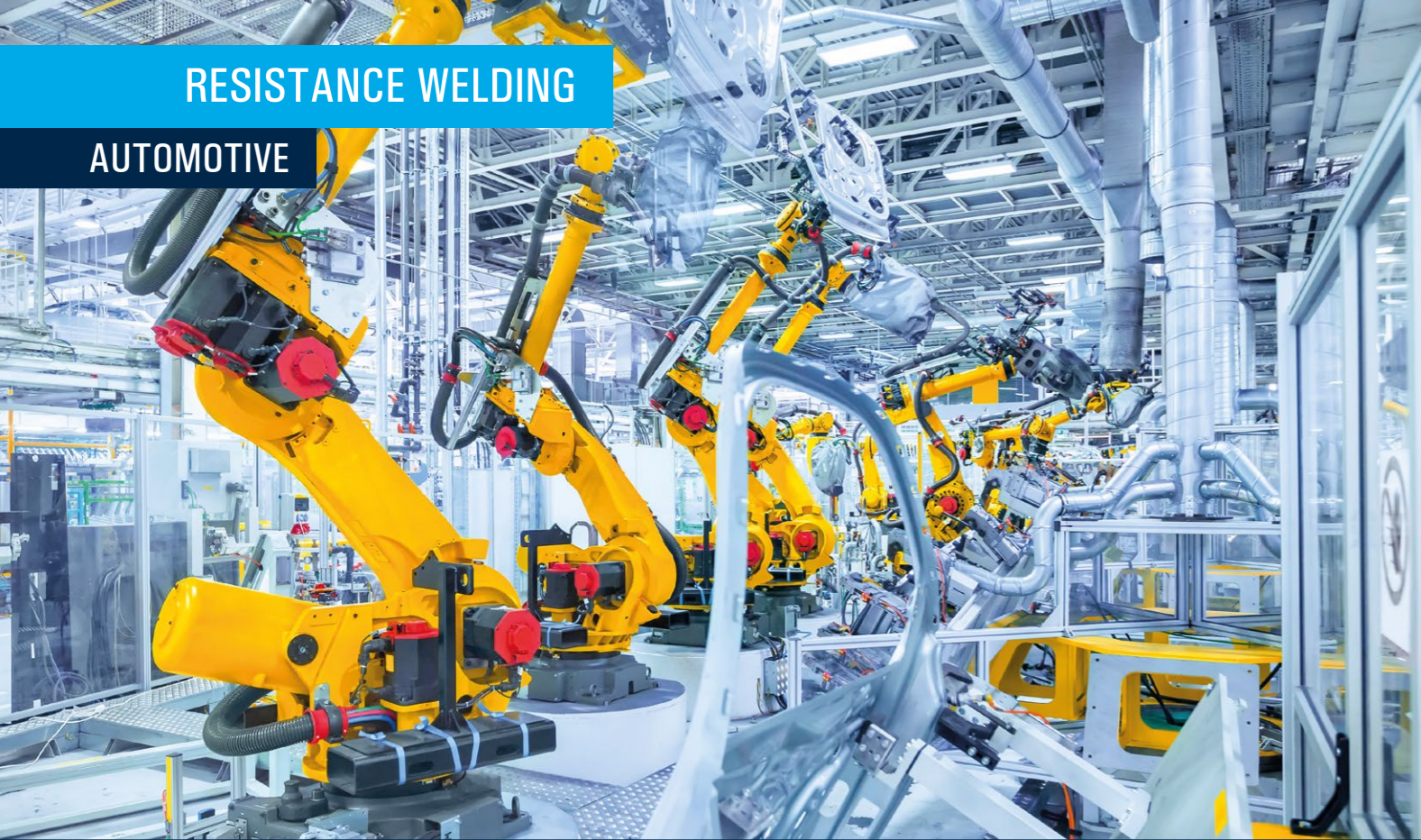
*When we **develop new products**, we always pursue the objective of **optimising the welding process in economic and technological terms.***

To ensure maximum possible process reliability, we rely on reproducible parameters during welding, because what is reproducible is also controllable.



# RESISTANCE WELDING

## AUTOMOTIVE



*Welding quality that moves you*

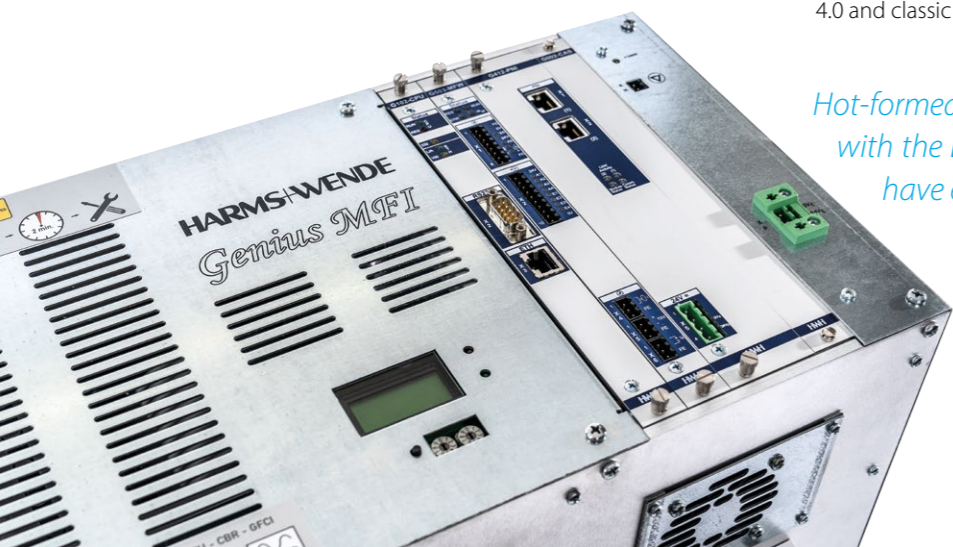
### *Our robust spot welding systems for automotive applications join demanding materials securely*

Efficient and reliable automotive production necessitates the latest materials, which in turn demand welding technology that is as flexible as it is precise. At the same time, the systems have to be easy to operate and offer a high level of robustness in order to ensure disturbance-free processes. Harms & Wende accomplishes this balancing act with high-quality product lines that are optimally tailored to the specific requirements of automotive manufacturing.

*Innovative solutions for robot guns, automated welding cells and classic manual systems - perfect joining and **Industry 4.0** for steel and aluminium*

From manual systems and fully automated systems with bus connections up to and including cross-system networking and archiving, we offer a variety of individual solutions for the automotive sector. Both welding systems for use in the context of Industry 4.0 and classic manual systems are available.

*Hot-formed steels, coated sheets and aluminium - with the **Harms & Wende** welding systems, you have every material under control.*



## *Automotive*

*We supply the driving force*



#### **High-quality connections**

High-performance and robust spot welding systems that enable demanding materials to be reliably welded with high- and ultra-high-strength steel (UHSS materials) grades to be reproducibly joined are primarily used in body-in-white production lines. No matter whether you choose alternating current, medium-frequency (1 kHz) or high-frequency welding, our products always guarantee high-quality joints between diverse types of metal. Our equipment is also designed to avoid expulsion and compensate for process fluctuations.

#### *The adaptive control IQR ensures a **stable welding process.***

We meet the requirements of Industry 4.0 with our intelligent, adaptive control IQR. Thanks to automated manufacturing and inspection technologies which is crucial for the efficient use of autonomously operating robots and networked machines. This ensures a stable weld process.

#### **Fast start-up times and low rework costs**

IQR adapts to the current conditions during welding in a fraction of a second. IQR additionally eliminates relevant interference and prevents disturbances caused by poor fits and shunts as well as electrode wear.

The result is fast start-up times and low rework costs. The HWI has been carefully designed with feedback from our users to enter very few data at the start of the line-setup. It also grants a view into each single weld process.

#### *Our systems for weld gun applications as well as our weld processors for automated solutions provide **highest standards in flexibility and quality.***

Our welding systems, our operating concepts and our automated solutions are ultimately characterised by maximum flexibility, efficiency. Our high-performance products are therefore able to meet the particular challenges posed by the automotive industry to the highest of standards and help our customers to achieve high productivity.

## RESISTANCE WELDING

### INDUSTRIAL SOLUTIONS



*Industrial companies are provided with all-encompassing solutions*

Industrial companies are therefore provided with all-encompassing solutions that enable their processes to be structured more effectively, economically and reliably. In addition, we exclusively use high-quality products that have been tested over a number of years and are continuously evolved. Our systems are therefore always state-of-the-art and able to optimally meet the diverse requirements of individual applications.

*Complete control cabinets for every requirement*

With our extensive wealth of experience, we also succeed in manufacturing complete control cabinets according to our own design or customer specifications. These are equipped with high-quality inverters in different power variants and with a main switch and power supply for supplying the undervoltage triggering function. Both air- and water-cooled variants are available.

## *Individual solutions for industrial production*

### *Our systems guarantee high welding quality, economy and efficiency*

Our flexible solutions enable you to meet the diverse requirements of industrial welding processes to the highest of standards. No matter whether you rely on spot, projection, seam, butt or flash butt welding: as a resistance welding specialist, Harms & Wende designs the appropriate system for every application.

After all we offer a broad range products from AC to MFDC, power units and timer modules. From single station to networked solutions – we provide it all. Our product range extends from tried and tested standards to individual special solutions.

*As a resistance welding specialist, Harms & Wende designs the appropriate system for every application.*

We attach great value to the fact that systems developed by us are characterised not only by outstanding welding quality, but also by economy and efficiency.

This is ensured through simple and intuitive operation and by the outstanding options for integration into new and existing systems via universal interfaces to PLC systems and higher-level systems.

Our innovative process control systems enable continuous reproducibility throughout the welding process and therefore guarantee both stable production and a particularly high output. A high level of process reliability is additionally offered by the detection and reporting of disturbances and process deviations.



### *Innovative power sources as the core element of the system*

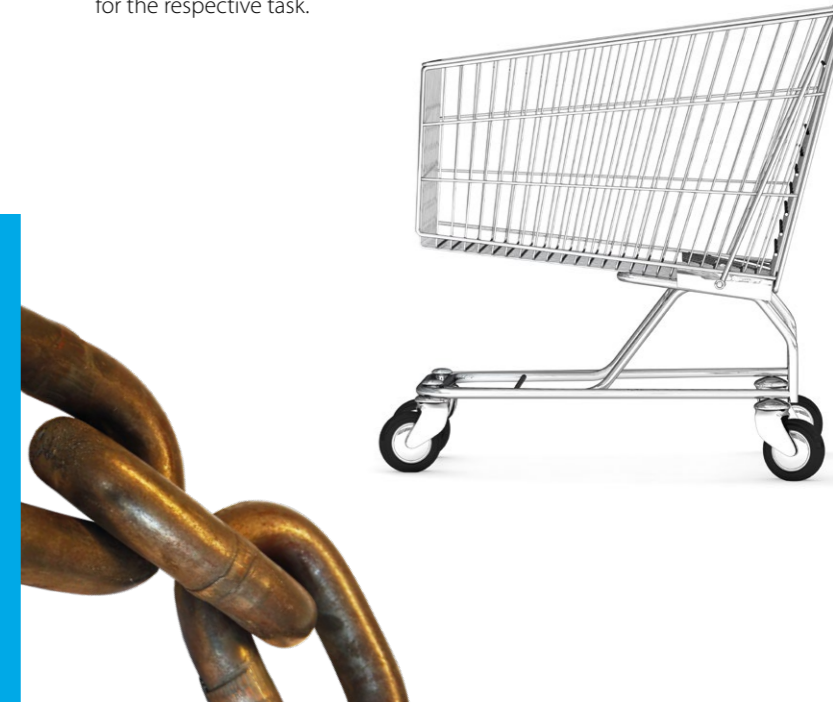
Modern inverter systems in a wide power range are the heart element for welding. Harms & Wende offers it all from small to very high current for short to long current demands as spot, seam and projection welding. Highly accurate regulation, electrode management, monitoring as displacement or voltage are part of our innovative electrode systems.

From adaptive weld timer for ultra-high-strength and hot-formed steel grades, aluminium spot welding processes up to and including welding copper materials, a wide variety of resistance welding processes are covered by Harms & Wende systems. This extensive portfolio enables the welding processes to be individually adapted for the respective task.

### *Diverse application options*

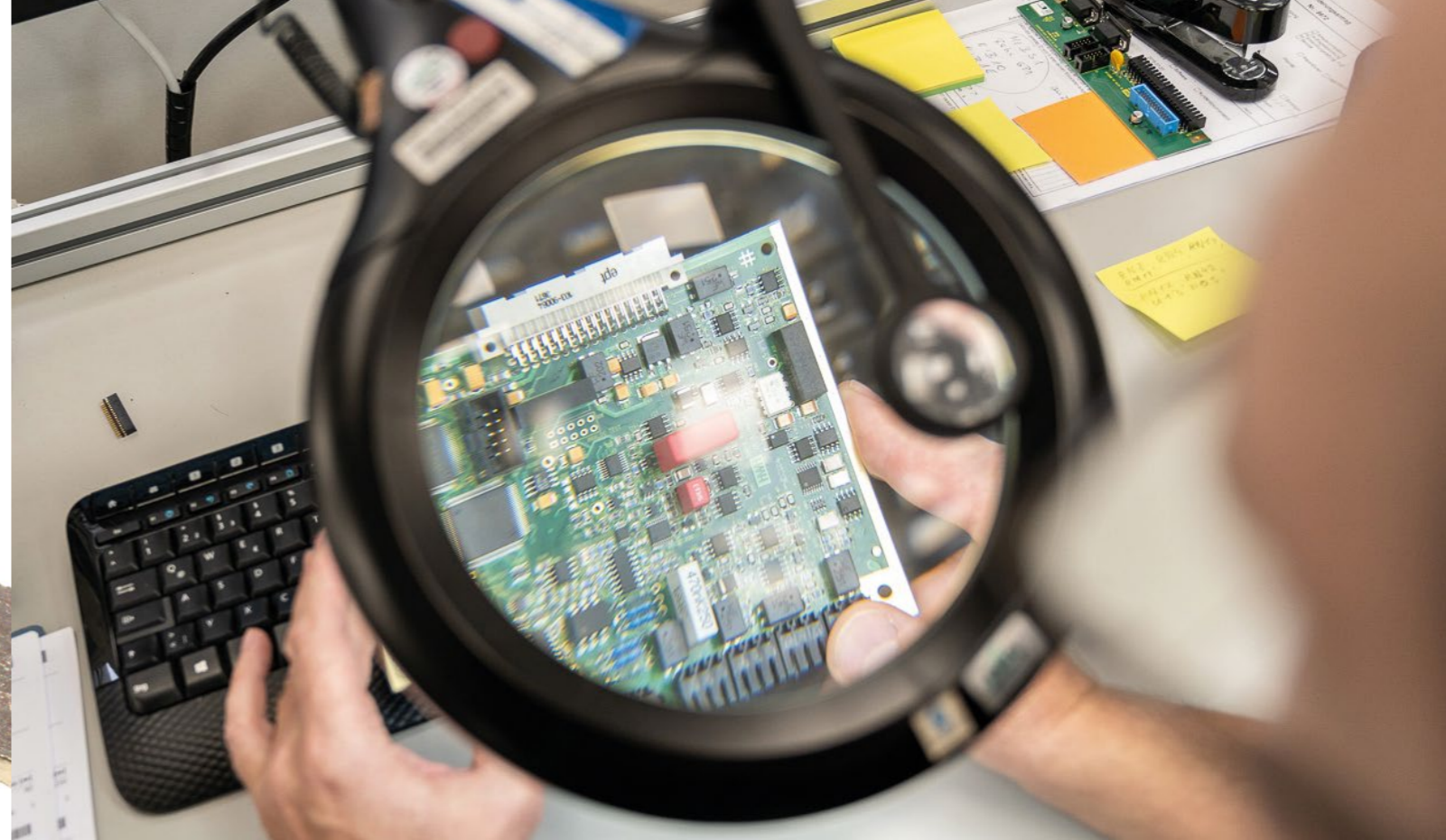
Harms & Wende offers comprehensive solutions for the following resistance welding techniques:

- Spot welding
- Projection welding
- Seam welding
- Butt welding
- Flash butt welding



## RESISTANCE WELDING

### MICRO WELDING



*With an eye for detail ...*

## We keep an eye on challenging micro tasks

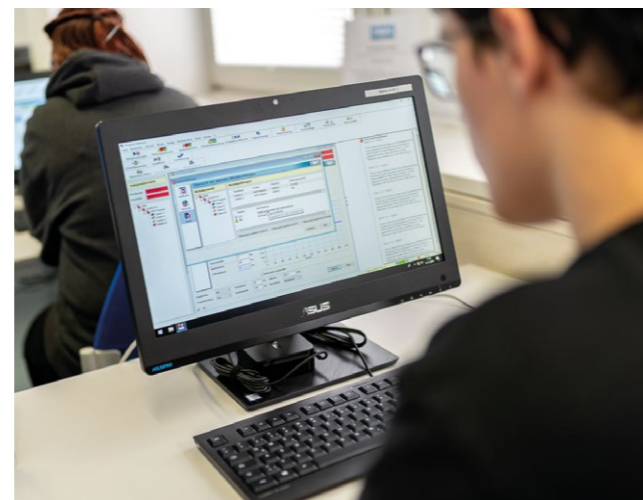
Extremely fast processes, diverse materials and difficult precision work: the world of micro welding makes high demands on modern welding technology. Harms & Wende is able to meet these requirements with weld timer systems that are tailored to the specific issues of welding small parts. No matter whether iron, electrical connections, aluminium lines or non-ferrous metals have to be joined, our micro welding range offers the right solution for all components to be welded.

*Our welding timer are characterised by very short response and control times.*

Our product portfolio encompasses welding timer for frequency ranges from AC and 10 kHz that are characterised, in particular, by their very short response and weld times. Distance, current, power, voltage and temperature control are available, among others. Event-oriented process monitoring and extensive monitoring functions offer you reliability in your joining process.

The intuitively operated systems are extremely easy to handle. Thanks to the clearly designed user interfaces, the devices are easy to parameterise and set up as required. You also have the option of designing your own individual user interfaces.

*Thanks to the easily operated user interfaces, the devices are simple to handle and set up as required.*



*From parameter to process monitoring, we offer numerous safety features.*

Extensive monitoring functions are available to you in various expansion stages: from parameter to process monitoring, we offer numerous safety features to ensure the quality of your welding tasks and document all relevant processes.

### Fast and precise welding

The control systems are selected according to your requirements. For instance, various components can be combined to form task-specific function units.

This ensures that you achieve a high level of process reliability and efficiency. From safety-relevant small parts to assemblies, diverse components can be welded very quickly and precisely.

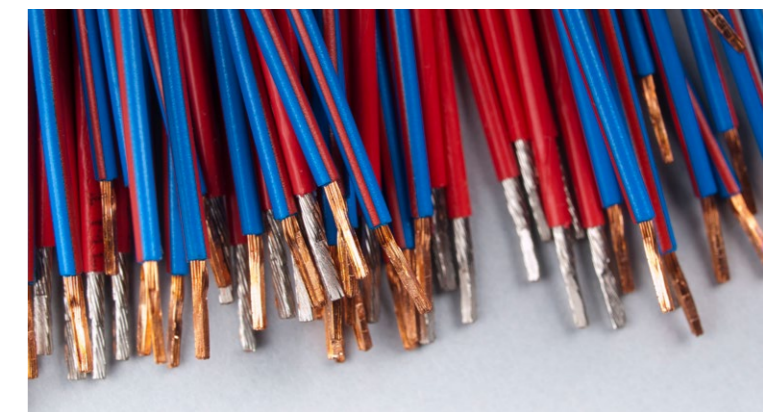
### Can be integrated into existing systems

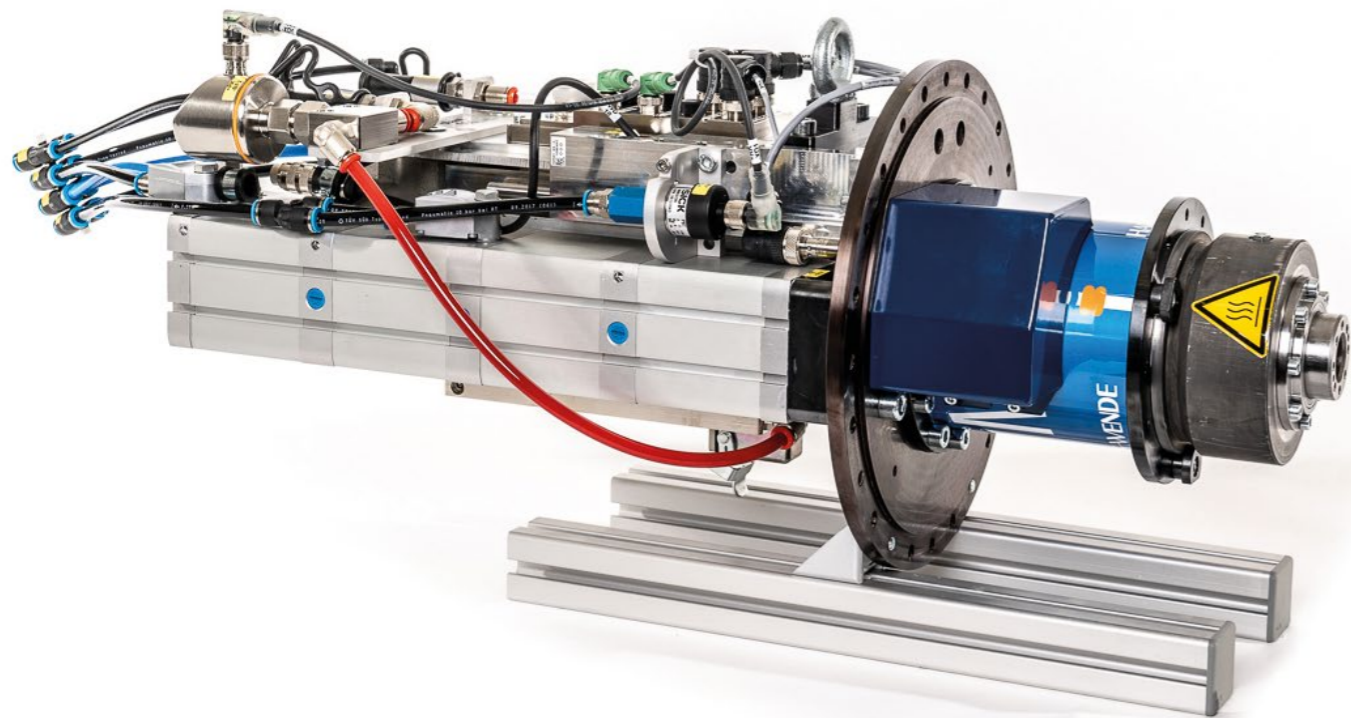
With comprehensive engineering services, we support you in integrating control systems into automated systems.

If required, the user interface can also be embedded into the higher-level programmable logic controller (PLC) to enable operation from a single source. We also take care of your entire machine functions and visualise them on the PLC.

## Applications in micro welding

- Spot welding
- Projection welding
- Cross wire welding
- Seam welding
- Gap welding
- Compacting
- Hot staking
- Contact welding
- Resistance soldering
- Hot bar soldering





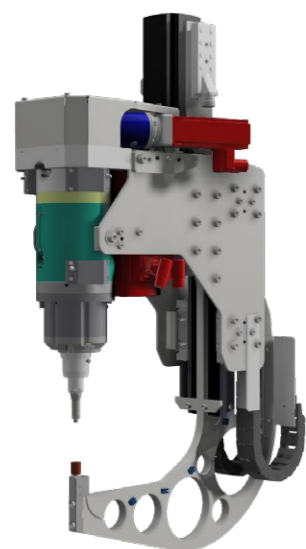
*Proven connection technology ...*



*... reinterpreted*



## *We develop friction welding systems for very special requirements*



*Friction spot welding combines the quality and the process stability of friction welding with the economic and simple principle of spot welding.*

Friction welding, also called solid state welding, is a safe and reliable solution even when other methods encounter their limits. This "old", reinterpreted connection technology can be put to various uses and offers fresh perspectives in the welding industry thanks to its high process reliability.

This is a proven joining method that has been in use in production for over three decades. In this method, components can be joined fully automatically with very high process reliability using friction and force. Welding temperatures below the melting point and symmetrical heat input are characteristic of this method.

### **Suitable for a variety of materials**

Friction welding systems are used to process diverse metals. Ultimately, a wide number of different power classes are available to cover a vast range of weldable cross-sections and materials. Among others, this process is suitable for shaft-to-sheet and shaft-to-shaft connections as well as steel, aluminium, ceramic, brass and copper. The process also offers the advantage that it is essentially independent of the conductivity and the surface characteristics of the materials.

### **Innovative friction spot welding systems**

Besides complete friction welding systems, Harms & Wendé also offers tailor made spot welding solutions. In this process, the quality and the process stability of friction welding are innovatively combined with the economic and simple principle of spot welding. This enables the advantages of friction welding process to be transferred to spot overlap joints.

Friction spot welding is characterised, for example, by joining below the solidus line and its low heat input. In addition, no recrystallisation takes place. It therefore offers ideal prerequisites for maintaining the original material characteristics and achieving maximum strength. Not for no reason have spot overlap joints long since been regarded as a robust and inexpensive joining principle.

### *Spot overlap joints have long since been regarded as a robust and simple joining principle.*

Since the process runs beneath the solidus line there is no liquid phase. Friction spot welding therefore convinces with visually attractive, clean components and the pleasing fact that laborious cleaning of the parts is forgone. The process is also extremely fast: welding a one-millimetre thick sheet takes just one second.

### **Fast and easy integration into existing process flows**

Further advantages include the familiar inspection methods, ease of implementation and usually uncomplicated integration into existing process flows. Finally, the modular design of our components offers the option of flexibly integrating the welding tool into individual system concepts.

### *Aluminium, magnesium and two-dimensional connections are easy to join using this process.*

In particular, the innovative system is used to weld wrought alloys. Aluminium, magnesium and two-dimensional connections are easy to join using this process.

Like friction welding, friction spot welding therefore represents a system for very special requirements. Ultimately, the combination of friction and spot welding systems has given rise to an innovation with which even demanding tasks can be mastered quickly and reliably.



*We weld together  
... and create new connections.*



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