DALEX and KYOKUTOH combine competencies

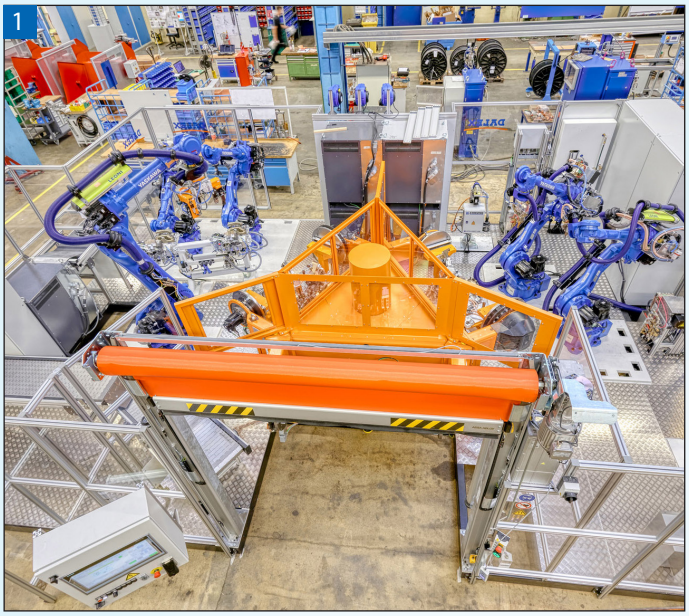
SHORTER NON-PRODUCTIVE TIMES THANKS TO NEW AUTOMATION SOLUTION FOR SPOT WELDING

FURTHER DEVELOPED WELDING GUN MATCHED WITH CAP CUTTER

In automotive production, efficient and economical welding solutions with a high degree of automation are an indispensable part of production lines. DALEX Schweißmaschinen GmbH & Co. KG has been successfully designing such systems for many years and has launched many innovative developments. One example is micro welding guns for welding exhaust gas lines, among other things. Together with KYOKUTOH Europe GmbH, a Munich-based specialist in cap milling cutters, the company has now developed a fully automatic finishing unit for milling the associated micro welding electrodes.

DALEX is a sought-after expert for all processes related to resistance welding and, in addition to its proven standard machines, primarily develops robotic cells, automated systems and interlinked overall solutions. The company has many years of experience in the welding of insulation for exhaust tracts, especially for passenger cars, and has already developed and built a wide variety of product-dependent welding cells. For example, a well-known car manufacturer also turned to DALEX to completely automate such a production process.„In addition to the welding tasks, this means on the one hand that the system is fully automatically loaded and also unloaded. This is no problem for us and we have already implemented it many times. On the other hand, however, the electrodes were also to be re-milled automatically. This was the challenge," says M. Eng., SFI Marcel Groß, Team Leader Engineering Design at DALEX.

Only a perfect electrode, matched to the task at hand, conducts the current optimally to the welding spot and thus ensures a clean and strong welded joint. There are two ways to do this: Either the worn electrodes are disposed of - which is not very sustainable or economical - or they are reworked in a resource-saving way. Depending on the electrode, this can be done about five to ten times. When building exhaust gas lines or insulating them, very thin sheets of 0.15 mm have to be welded. For this task, DALEX has developed micro welding guns with special electrodes or special butt spotters. In order to rework these very small electrodes in an automated production sequence, an automated milling unit was previously lacking on the market „This means that the operator previously had to remove the electrodes manually and rework them on the lathe. With the desired fully automated line concept, this was not an option," explains Marcel Groß.

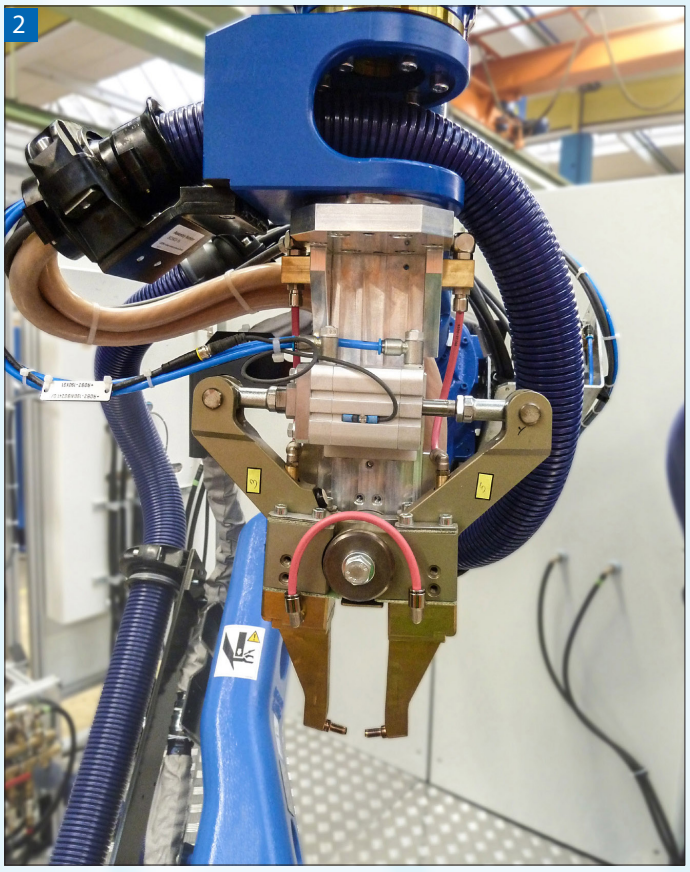


DALEX designed and manufactured several robotic welding systems for welding exhaust tract insulation for a well-known automotive manufacturer. An important component of the systems, in order to completely automate the production process, is the fully automatic finishing unit developed together with KYOKUTOH.

BUNDLED EXPERT KNOWLEDGE FOR DEVELOPMENT SYNERGIES

In order to develop an automatic solution for reworking the tiny parts, DALEX sought the support of an expert in the special milling technology. DALEX found the ideal partner for this undertaking in KYOKUTOH. Founded in 1953 in Japan, the family-owned company is one of the world's leading manufacturers of automated electrode cap cutters and cap changers. It develops customizable welding solutions with the highest efficiency for the body shop. KYOKUTOH has locations in the world's major automotive regions. KYOKUTOH Europe GmbH has been headquartered in Munich since 2011 and has a technical and logistics center in Unna near Dortmund, from where it supplies automotive manufacturers from Europe, the Middle East and Africa (EMEA).

„We work with almost all major automotive manufacturers and have already developed many suitable automation concepts for a wide range of requirements in close exchange with our partners. The cooperation with DALEX for automation in the milling of microelectrodes was a challenge that we were happy to take on," says Tamer Demirkaya, Sales Director EMEA at KYOKUTOH Europe GmbH.



In order to achieve a perfect result when milling the microelectrodes, the experts from DALEX and KYOKUTOH have made numerous adjustments and further developed their technologies.

The KYOKUTOH tip dresser CD-EL with frequency converter, tuned to the welding process of the exhaust tract insulation.

TURNING ALL THE SCREWS

The process is the same as for other automated post-processing solutions: The robot-guided welding gun is moved to the cap cutter as soon as the electrode is worn. Then the gun opens, moves over the running cap cutter, closes, and the electrodes in the welding gun are reworked. Then the robot gun moves back to the welding station and the process can continue. However, in order to achieve a perfect result with the microelectrodes, the experts from DALEX and KYOKUTOH had to tweak numerous screws and further develop their technologies. To this end, a number of tests were carried out with different milling cutters at DALEX.

Tamer Demirkaya: „Maximum precision is the top priority, especially when milling the small electrodes, and can only be achieved with the right tools for the respective application. That's why we worked together to constantly adjust the blade geometries until the electrodes could be milled smoothly for the welding process without any interfering contours."

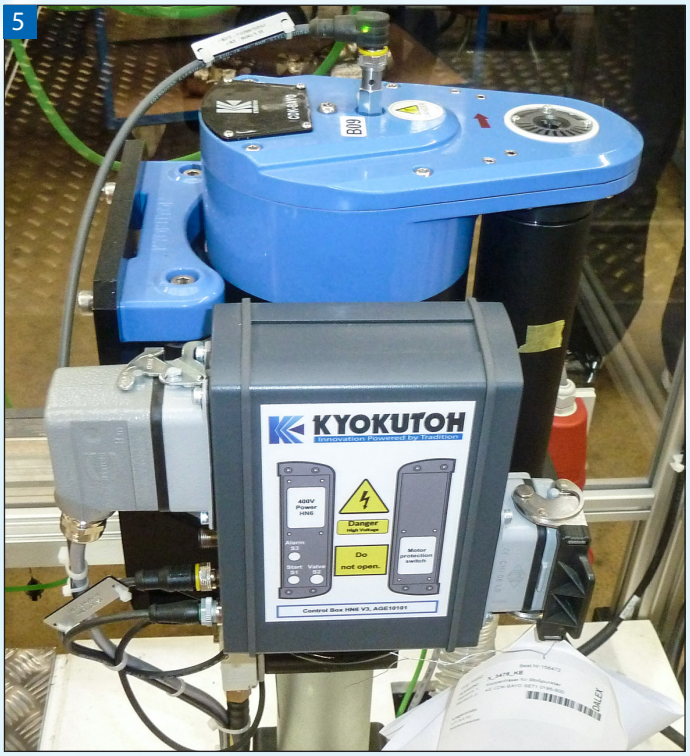
At the same time, the experts optimized another key component of the process: the cutting speed. „We modified our cap cutter so that we can readjust the speed and thus vary the speed. This has not been done before and can confidently be called a unique selling point," explains Tamer Demirkaya. „In addition, extensive tests showed that the best results are only achieved with precisely coordinated cutting speeds."

ALL COMPONENTS PERFECTLY MATCHED

And another special feature had to be taken into account: When finishing the butt spotters for single-sided spot welding of the thin sheets, milling is only performed from one side, unlike usual. For this reason, the experts at KYOKUTOH created a special compensation system that ensures high stability of the system and thus prevents unwanted movements.

For optimal interaction with KYOKUTOH's automated milling cutter, DALEX also further developed its micro welding gun. „The gearbox of the milling cutter requires a certain installation space. But our normal micro welding gun could not open enough to optimally pass over the cutter. Simply extending the opening stroke didn't seem like an option either, however, since a large opening stroke comes at the expense of cycle time during welding," explains Marcel Groß. „That's why we designed a double-stroke tong that can pneumatically move to three positions. This allows it to open wide enough for milling, and the short travel to quickly complete the welding tasks is maintained."

For the post-processing of the DALEX push spot welder, the experts from KYOKUTOH developed a special compensation for their cap milling cutter, which ensures high stability of the system.



A modification of the tip dresser CDK-BAYO was required for the special butt spotters finishing.

NON-PRODUCTIVE TIMES SIGNIFICANTLY REDUCED

The result of the joint efforts is impressive: The result is a perfectly coordinated finishing station for milling the electrodes. „The entire process section takes only a few seconds per electrode and always achieves the same high electrode quality. This has enabled us to reduce non-productive time to a fraction of the manual activity and ensure precise and fast welding of exhaust tract insulation," says Marcel Groß enthusiastically.

The unit has also already proven itself in practice. It was successfully integrated into a special welding system with seven welding robots and works reliably in the now completely automated production sequence. The customer is so satisfied with the result that subsequently ordered plants will also be equipped with these components and existing plants will be retrofitted with this system.

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