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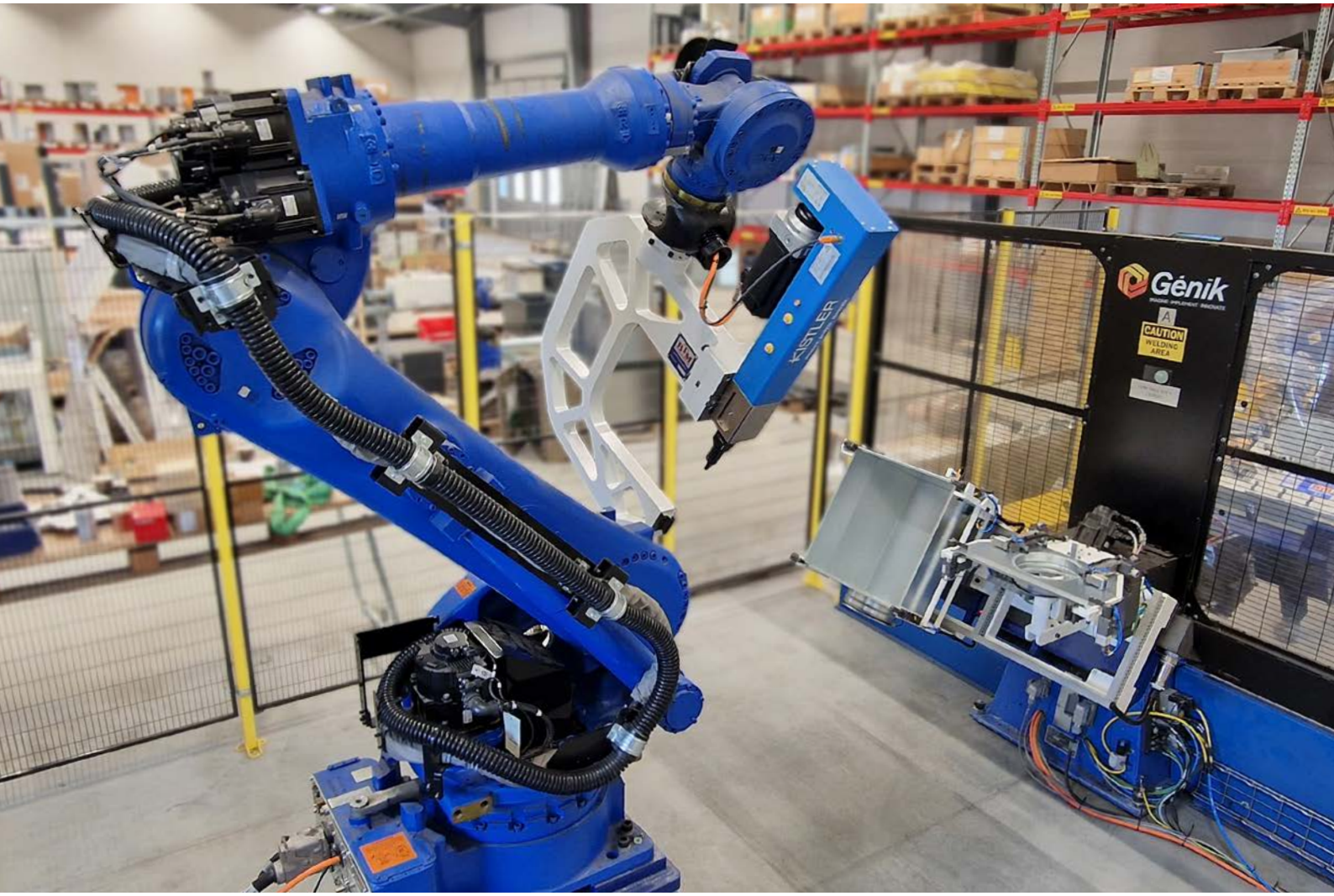

Electromechanical clinching – efficient also at the robot

BTM Scandinavia uses Kistler NCFC joining system to join ventilation housing by clinching

BTM®

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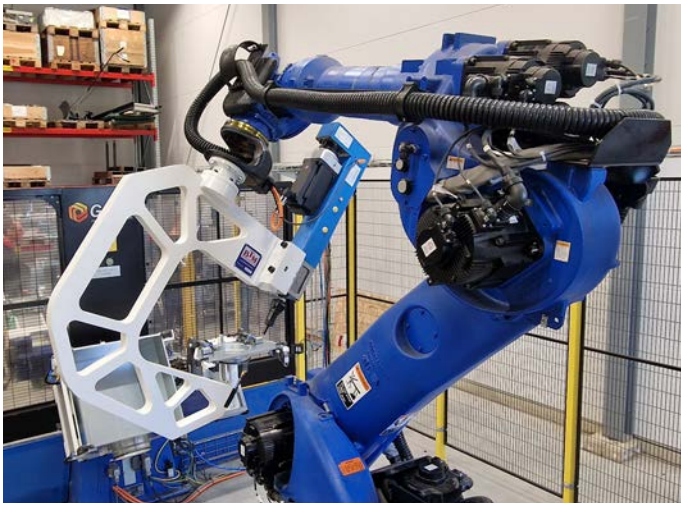
Headquarters of BTM Scandinavia AB in Kalmar, Sweden: in cooperation with Kistler BTM promotes joining technology for sheet metals



Production cell from Steinadler AB for ventilation housing: clinching is performed by the robot arm with an NCFC servo press from Kistler and a clinch plier and tools from BTM

BTM Scandinavia joins all sheet metals for a six-part ventilation housing with the help of the lightweight and compact NCFC electromechanical joining system from Kistler. Instead of energy consumptive spot welding, the precise and cost-efficient clinching is applied in the robot production cell.

Clinching is a joining technology which is especially beneficial for sheet metals. It is common in the automotive industry since the 1980ies but meanwhile it also delivers robust, energy and cost efficient joints in other sectors such as HVAC, electronics, white goods and construction. A clinching system consists of a clinch plier with attached tools (such as punch and die) and a drive unit (pneumatic, hydraulic or electric) to conduct the joining process.

One of the leading suppliers of clinching technology is BTM (Bending Tools Manufacturing): The European network of BTM Corporation – founded in 1966 in the USA where clinching is popular under the brand name Tog-L-Loc – also includes the company BTM Scandinavia AB. Established in 1990 and independent since 2008, seven employees currently take care of customers from the automotive and metal industry as well as other sectors.

"Clinching offers a series of advantages over the alternatives spot welding and riveting. With our various clinching technologies we can offer an optimum solution for almost all applications in sheet metal joining."
Bo Claesson, one of the directors of BTM Scandinavia AB

In contrast to welding there is no heat input on the part so material structure and properties remain constant. „Furthermore clinching is a joining technology free of residues which does not require any additional parts and therefore saves additional weight.

Efficient and residue-free joining of sheet metals
From an innovative Swedish HVAC manufacturer, BTM got a request – via end user Steinadler AB – to produce a ventilation housing which to date was assembled by means of spot welding and blind rivets. The task is to join six sheetmetals of partly different thickness with 34 clinch joints in a durable, residue-free and energy efficient way. Thanks to the cooperation with Kistler, BTM Scandinavia was able to refurbish a present spot-welding installation to electromechanical clinching. "Dragiza Tosovic, the CEO of Steinadler AB, explicitly asked for the newest and best technology for production of ventilation housings – considering both economic and ecologic aspects. So it was a perfect opportunity for the new NCFC from Kistler. With its low weight of 46 kg, compactness and maXYmos process monitoring it is best suited for robot application", reports Claesson.

The partially automated assembly takes place in a robot production cell with a rotary plate for reliable delivery of new sheetmetal parts for the ventilation housing. At the robot arm, the compact NCFC servo press from Kistler in the version with a nominal force of 55 kN is applied. The force displacement-controlled NC joining system with integrated sensor delivers accurate clinching also on the robot. Quality assurance is supplied by the maXYmos NC monitoring system from Kistler which relates to the production unit. It controls, visualizes, and monitors the clinching process and makes production data accessible for higher-level software systems.

Feeding of new part by Bo Claesson

Predestined for robot arm application
Volker Eilmannsberger, development engineer joining systems at Kistler, explains:

> "The main challenge in this application was to realize 34 clinch joints in a cycle time of one minute and twenty seconds. In addition to that there are multiple movements of the part to reach all processing positions. This parallel operation also has an influence on the cycle time. Thanks to the NC functionality of our joining system the different traverse paths could be optimized relatively simply. So, it was possible to pivot around present obstacle contours and to reach the required cycle time."
> Volker Eilmannsberger, development engineer joining systems

Thanks to the compactness and low weight of the NCFC the system is particularly suited for robot automation which is often applied in the automotive industry. Efficient integration is fostered by the new hybrid cable technology of the NCFC joining modules: energy, signals and data are transmitted via a single hybrid cable for the drive technology.

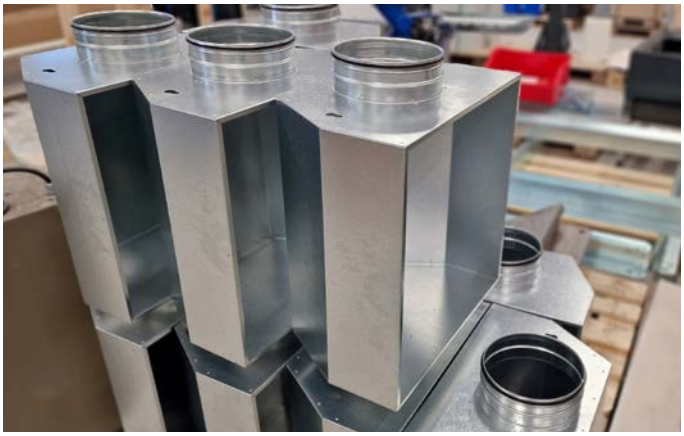
The proposed solution convinced Steinadler in a way that they want to rely on electromechanical clinching with systems from BTM and Kistler instead of the spot welding used to date. Another production cell for ventilation housings is already in progress at Steinadler.

Precise, energy-efficient press-fit, joining and assembly processes

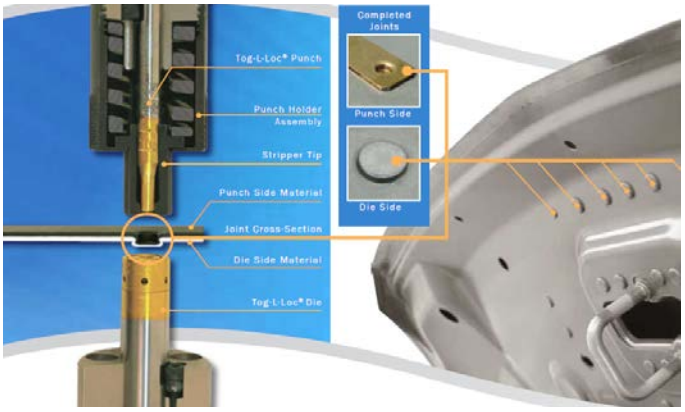
The very compact and weight-optimized NCFC joining module 2163A is the ideal solution for optimum weight and center of gravity design at the robot arm

With its electromechanical joining systems, Kistler is a leading provider for the automation of joining processes such as press-fitting, riveting and caulking. The combination of an electromechanical joining module (servo press) and the maXYmos NC process monitoring system ensures force-controlled, quality-assured assembly automation in industries such as the automotive, medical technology, white goods, furniture industry and electrical sectors. The portfolio features nominal joining forces ranging from a few newtons up to 700 kN, seven different basic types and application-specific variants, making it possible to implement many different joining processes with sensor support: a key factor in conserving resources. Thanks to decades of experience, systems from Kistler deliver high levels of consistency and integration capability in industrial production environments.

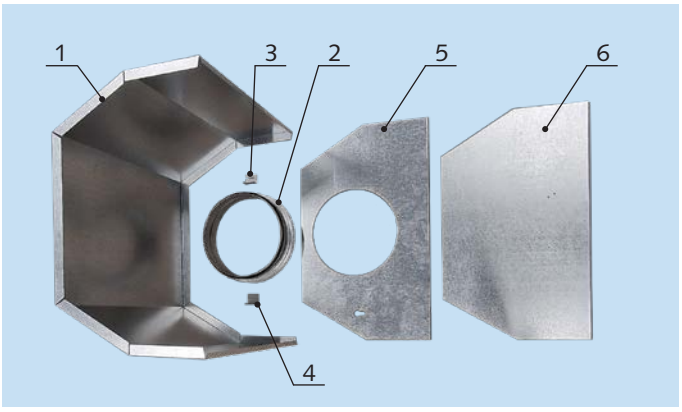
Successful project: Bo Claesson and Stefan Unosson (center, BTM directors) together with Kenneth Johansson, Thomas Kentischer (left), Neil Arstad und Volker Eilmannsberger (right) from Kistler



Assembled ventilation housings which are joined from six sheet metal parts by means of 34 clinch joints



Example of clinch joints on a bonnet (Source: Brochure BTM)



The single components of the ventilation housing before assembly with clinching technology from BTM and joining system from Kistler

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