Optimised retooling and upgrading of multi-needle quilting machines

# Quick changeover

**Industrial multi-needle quilting machines add a wide range** of stitched patterns to mattress covers. Up to now, the stumbling block to quick pattern changes has been the need to manually adapt the needle configuration. A new quilting system facilitates customised, program-controlled selection of individual sewing positions from a bank of sewing units. A cylinder/valve combination developed by Festo optimises the assembly, changeover and upgrading of systems.

Photo : © Emil Stutznäcker GmbH + Co. KG

**VMK Select:** the latest multi-needle quilting machine is setting standards throughout the industry thanks to customised cylinder/valve combinations from Festo.

A hundred needles sew patterns in the soft fabric in white thread at breathtaking speed. What sounds like the buzzing of a swarm of bees soon turns into something on which people spend around one third of their lives: a mattress, or to be more precise, a mattress cover. These days, a mattress is more than simply something to sleep on. The quality concealed on the inside should also be visible on the outside – in softly curved lines, elegant diamond shapes, perfect circles and an almost infinite number of freehand patterns. Since millions of people want to sleep as comfortably as possible, the production of mattress covers depends on high speed and increasingly also on a high degree of flexible pattern design. Emil Stutznäcker GmbH & Co. KG uses new cylinder/valve combinations with AS-interface technology from Festo in their latest multi-needle quilting machines in order to be able to quickly switch from one pattern to the next.


**Textures in seconds**

Industrial multi-needle quilting machines – like those by Stutznäcker – sew up to 10 m of stitched pattern a minute. This is the case with the latest addition to Stutznäcker's range, a quilting machine with two rows of up to 96 needles each, each needle capable of an impressive 1,600 strokes a minute. Distinctive and impressive textures can be added to mattresses within seconds. However, the increasing variety of options brings with it a new challenge: diminishing batch sizes. This means that the multi-needle quilting machines have to switch to new patterns more and more often. Stutznäcker achieves a high level of flexibility through the automatic variation of the needle configuration, meaning the various arrangements of the needles required for different patterns. Needles that are not required for the new configuration are pushed away from the drive axis by pneumatic cylinders, while needles that are required are pushed back on. This allows program-controlled variation of the needle configuration from one pattern to the next in a matter of seconds and customised selection of individual sewing positions from a bank of sewing units. ➔


**The new cylinder/valve combination** with AS-interface bus technology and integrated AND gate enables fast, fully automated changeover of the needle configuration.

**Less burdensome upgrades**

Until recently, the stumbling block to fast and flexible assembly of the machines was the complexity of the tubing between the valve terminals and the pneumatic cylinders. The technical complexity involved in an upgrade or change in the position of switchable needles was also immense. Three experts in the field of innovative automation met in 2011 to solve the problem: Burkhard Feige, Head of Design at Nähmaschinenfabrik Emil Stutznäcker GmbH + Co. KG, Michael Dahl, Technical Consultant at Festo in the Cologne region, and Ulrich Beck, Head of Project Engineering for Sensors and Connection Technology at Festo in Esslingen. The solution was soon found: a cylinder/valve combination with AS-interface bus technology and integrated AND gate. The latter is required so that the thread wiper can pull the thread out of the active sewing process during changeovers. The old machines needed their own pneumatic AND gate manifold to realise this function.

**Standard cylinders plus special housing**

A major challenge was the restriction limiting the overall width of the cylinder/valve combination to a maximum of 25 mm. After the initial discussions, Ulrich Beck and his team began to look for the slimmest components in Festo's comprehensive range of products. They found what they were looking for in the compact short-stroke cylinder ADVC-16-15-I-P, which is distinguished by a rapid response to pressurisation, high clamping forces relative to its size and minimum fitting space. However, since the standard version was still too wide, they developed a new, even slimmer housing. To speed up the process, a rapid prototyping model was created alongside 3D designs for better visualisation.

In 2012, the first prototypes of the bus-capable cylinder/valve combination arrived at Emil Stutznäcker and were successfully tested. Just a few months later, the first Mammut VMK Select with AS-interface technology and Festo cylinder/valve combination was presented as a world first at the Interzum 2013 industry trade fair. Now in its second generation, these innovative units from Festo enable the basic configuration of the sewing units in the VMK Select to be varied or upgraded in just a few steps.

**Competitive advantage thanks to a simple solution**

The elaborate tubing of the past is now replaced by a single flat cable. The cylinder/valve combinations are simply linked by means of pin connectors, and automatically integrated into the master/slave

**The VMK Select multi-needle quilter** uses two rows with up to 96 needles each, each needle capable of 1,600 strokes of minute.

"The rapid development of the new generation of machines would not have been possible without the close cooperation with Festo."

Burkhard Feige, Head of Design at Nähmaschinenfabrik Emil Stutznäcker

system of the AS-interface bus. Whereas previously a separate compressed air supply from the valve terminal to each of the individual cylinders was required, today the cylinder/valve combinations have one compressed air supply controlled by an integrated AND gate. The days of costly individual tubing for cylinders are no more. The electronic controller of the AS-interface master activates the individual valves, which then provide the compressed air required to move the cylinders.

The combination of bus-controlled standard cylinders and custom-made housings now makes it very easy to change over to new patterns, and simplifies the process of adding more needles tothe machines. With these innovations, Emil Stutznäcker can not only offer its customers an even more powerful generation of multi-needle quilting machines but also a real competitive advantage through increased flexibility. ■

## Nähmaschinenfabrik Emil Stutznäcker GmbH + Co. KG

Max-Planck-Straße 3
50858 Cologne
Germany
www.mammut.de

Area of business:
Production of high-quality quilting machines for industrial stitching