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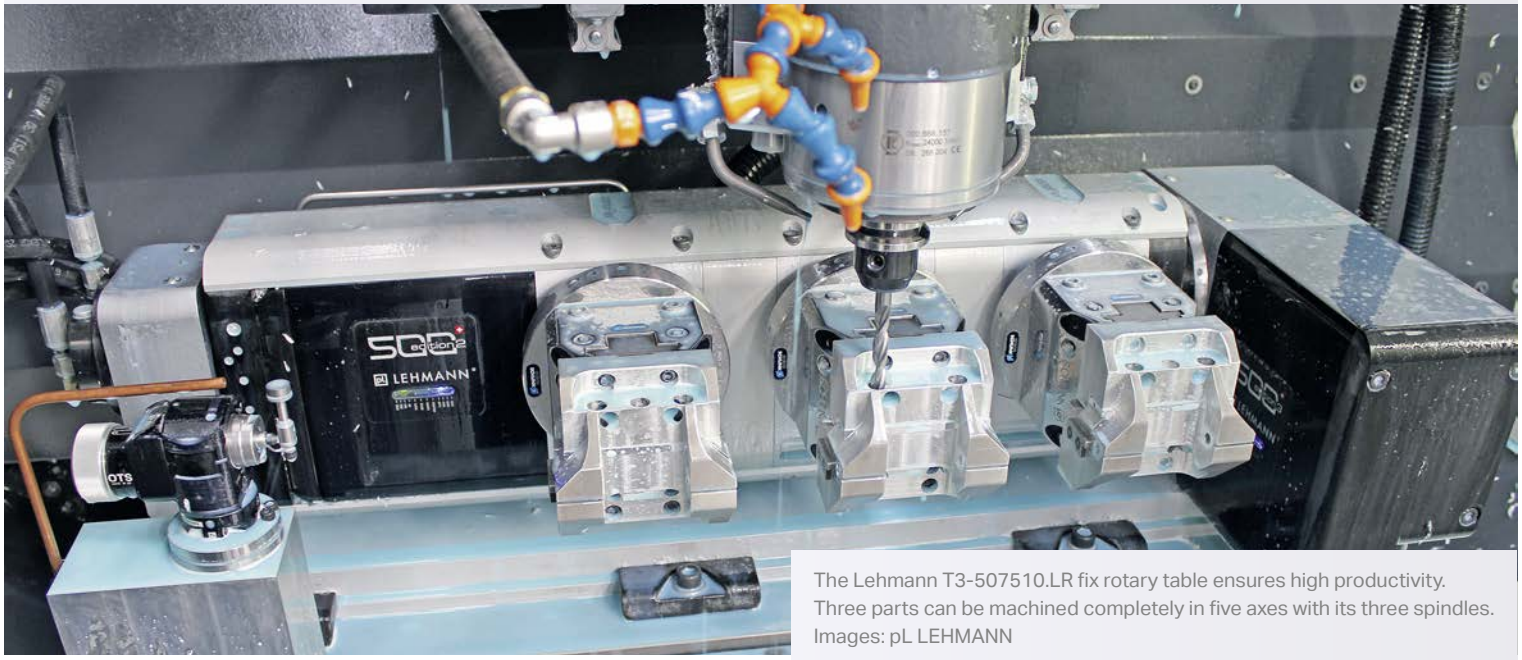
Swiss Rotary Table Technology

NEWSLETTER

Greater efficiency

T3-507510 fix



The Lehmann T3-507510.LR fix rotary table ensures high productivity. Three parts can be machined completely in five axes with its three spindles. Images: pL LEHMANN

pL LEHMANN CNC rotary tables ensure economical complete machining to finished parts

High-quality door hardware made in Germany – this requires optimized machining that takes quality and economical factors into account. WSS Wilh. Schlechtendahl & Söhne GmbH & Co. KG decided to use compact machining centers from DMG Mori equipped with additional CNC rotary tables from pL LEHMANN. This concept allows efficient and complete machining of various hinges in a small area.

The company Wilh. Schlechtendahl & Söhne GmbH & Co. KG in Heiligenhaus – WSS for short – develops and produces locks and hardware for use in steel, aluminum and glazing applications in the construction industry around the world. In addition to high quality and an innovative approach, efficient manufacturing makes an additional contribution to financial success. For the plant

The photo shows a larger, but conceptually and proportionally comparable table of the Type T3-510520.LL fix.

The product line of Wilh. Schlechtendahl & Söhne includes door hardware such as these 3D hinges.

manager Lars Sternberg, this is why it is important that – starting with every component – optimized production equipment be available: «Only in this way can our well-trained employees make full use of their capabilities and produce economically in Germany.»

This also means, however, that the equipment available must use state-of-the-art technology. With this in mind, WSS has invested in, among other things, two new DMG MORI Milltap 700 compact machining centers in the past three years. These machines are so-called tapping centers, i.e. three-axis boring/milling machines equipped with BT30 tool chucks and a 15-position tool changer, a highly dynamic spindle (speed up to 10,000 rpm), rapid traverse of 60 m/min, axis accelerations of 10, 10 and 18 m/s².

3+2 axes - a successful combination: At WSS, the DMG MORI Milltap 700 machines equipped with pL Lehmann rotary tables achieve a significant efficiency increase and high precision.

«We ordered the first Milltap 700 in 2013», stated Marcus Klett, spokesman for the machining team, which includes the CNC programmers and equipment designers Monrem Orahhou, Herbert Janssen and Claudius Jainta. Their area of responsibility includes, among other things, the machining of hardware components for doors, i.e. hinges, which takes place on the two Milltap machines. The cubic components with an edge length of up to 100 mm are manufactured primarily from aluminum, but also steel and stainless steel. They must be milled, drilled and tapped. Marcus Klett explains: «While this does not require high energy input, it does call for speed, precision and high process reliability. Since our space is limited, we looked for a compact solution for the machining and found the Milltap 700 from DMG MORI.»

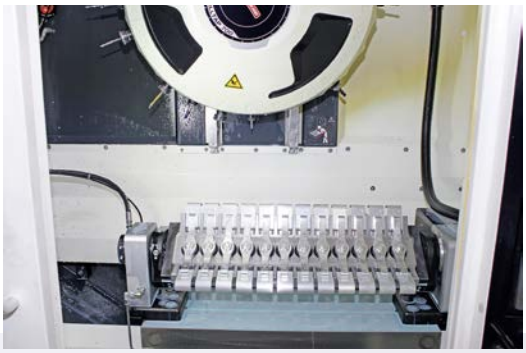
Complete machining in a small area

This door hardware is not simple three-axis parts, but rather involves quite complex geometries that require one or two additional axes for complete machining. For the team around Marcus Klett, it is important that «we do not have to handle each part two or three times, but instead can perform as many operations as possible with a single clamping». To accomplish this, we have equipped many machining centers with additional rotary tables for years.

Our preferred supplier is pL LEHMANN from Bärau in Switzerland, which delivered the first axis to Heiligenhaus in 1995. In this regard, the WSS machining team is also in agreement: «To date we have only had good experiences with the Lehmann axes. They are as reliable as the proverbial Swiss watch, extremely fast, compact and have a high clamping force. Ideal for us – so that we do not need to give a lot of thought to the Milltap machines.»

WSS had the first Milltap 700 equipped with an additional Lehmann axis of Type EA510.L with rotoFIX. It features a clamped counterbearing and a long clamping yoke on which up to twelve parts can be clamped simultaneously for three-side machining. An extremely efficient solution, since it utilizes the entire 700 mm long X-traverse stroke of the tapping center.

Despite this, not all parts can be produced on this machine in a single clamping. For more complex elements of the hinges, five-axis machining is required, which is why WSS had the second Milltap 700, which was ordered in 2015, equipped with the additional two-axis T3-507510.LR fix CNC rotary table from pL LEHMANN.



A single-axis pL LEHMANN EA510.L CNC rotary table with rotoFIX is installed on the first DMG MORI Milltap 700 purchased by WSS in 2013; it permits simultaneous clamping of up to twelve parts. They are machined to finished parts from three sides there.

Five axis machining with three spindles

What is special about this tilting table, which also features a clamped counterbearing, is its three workpiece spindles. They allow three different parts to be clamped simultaneously and machined in five axes. The number of spindles depends on the size of the parts to be machined, as Marcus Klett explained: «A certain amount of space must be available for five-side machining. The selected solution with three spindles is furthermore optimal for us, since it allows us to clamp part families consisting of two frame hinges and one leaf hinge.» The T3-507510.LR fix permits short tool lengths and equally short clamping of workpieces. This ensures low-vibration clamping and machining with high precision to meet the stringent requirements of WSS.

Maximum stability in any position: the counterbearing of the table is clamped at the same time as the drive side. It is therefore also possible to work with high precision off-center with large tools and at a high feed rate.

Since DMG MORI offers the pL LEHMANN products as a catalog option, machines are delivered with the rotary table completely pre-installed. For the clamping mechanism, WSS turned to IVO Oesterle NC-CNC Technik Vertriebs GmbH, which has been a marketing partner in Germany for the Switzerland-based pL LEHMANN for over 20 years. General Manager Markus Oesterle explains: «WSS came to us with the request to equip the three spindles with a zero-point clamping system – which we were also glad to do on the basis of an exact design.»

At the same time, he also pointed out that the pL LEHMANN NC rotary tables come standard with either a cylindrical centering edge or a short cone / taper on the spindle nose. As a result, the workpiece can be placed very close to the spindle nose, ensuring high rigidity. Moreover IVO Oesterle offers a wide range of clamping possibilities – employing a mechanical, pneumatic or hydraulic design with appropriate clamping cylinders, rotary unions, etc. – that can be combined with the CNC rotary tables.

Application-specific optimization

«To achieve optimized machining, it is important that the user and the machine manufacturer work closely together with us» states Markus Oesterle. «We are glad to provide our know-how when it comes to selecting the rotary tables and clamping means.» He and his colleagues also stand ready to help when further application engineering is needed. «For an optimized process, it is necessary to know whether aluminum or stainless steel is being machined, whether a 60 mm hole or a 38 mm hole is to be made, and whether the hole is positioned centrically or eccentrically.» Since the Lehmann rotary tables have a modular design, it is possible to find the appropriate one that provides the required holding torques for every individual case.

Five-axis complete machining: WSS mills, drills and taps these door hinges in a single clamping on the DMG MORI Milltap 700 with pL LEHMANN T3-507510.LR fix rotary table.

IVO Oesterle is furthermore able to optimize certain sequences through the PLC and parameterization and, for instance, set the acceleration and deceleration ramps steeper or less steep. The company is also ready for automation solutions. Markus Oesterle always has the perspectives of his customers in view: «The Milltap / Lehmann solutions installed at WSS are capable of being automated. A robot could handle the loading, and the machining of the back side could also be automated with an additional clamping.»

Reliable and highly productive

That is still up in the air. For now, Marcus Klett and his team are thrilled with the status quo of their two Milltap machines with pL LEHMANN rotary tables. The speed and precision achieved through four- and five-axis complete machining has significantly increased productivity compared to previous solutions. The speaker for the team adds: «Exact positioning by the zero-point clamping system and the associated repeat accuracy and short setup times have also contributed – those are advantages that we wish to use when we make additional investments as well.»

The speaker for the team emphasizes one additional detail: «The hydraulic rotary union for the three clamp nests of the T3-507510.LR fix is also solved very well. The clamping functions perfectly, and to date no leaks of any kind have appeared.» And they shouldn›t; after all, the rotary tables are basically maintenance-free, as Markus Oesterle states, and his company also provides service for pL LEHMANN: «Nevertheless, we still seek

direct contact with the end-users in order to become familiar with the specific production situation and prevent possible difficulties that might occur, for instance, when machining especially abrasive materials.»

IVO Oesterle is counted among the so-called VARs of pL LEHMANN. It is the responsibility of these value added resellers to keep new products and spare parts packages in stock and have trained service technicians on staff in order to respond to customer requests quickly and at a reasonable cost. «We are also able to train the maintenance technicians of our customers, so that customers can make their own small repairs or obtain specific assistance over the phone», says Markus Oesterle. «Ultimately, we and pL LEHMANN want the customer to be successful with our solutions over the long term.»

Locks and hardware from Heiligenhaus

Wilh. Schlechtendahl & Söhne Gmbh & Co. KG (WSS) is a company with just under 300 employees and focuses on the lock and hardware industry. It develops, produces and markets products for fastening, operating and securely locking doors, windows and façade elements used primarily in commercial buildings. In addition to a high-quality manufacturing program, WSS also offers an extensive retail assortment of all products commonly found on the market.

3+2- vs. strictly 5th axis technology

The investment in a new, strictly five-axis machining center is usually greater than that for purchasing a vertical three-axis center with an add-on two-axis rotary table. Furthermore, the latter solution offers additional basic advantages. One example: Since on strictly 5th axis machines the fourth and fifth axes are usually in the table, the interfering edges created by the machine table are high. That would require a raised fixture for the workpiece or at least long tools. Both of these reduce stability, promote vibrations and ultimately reduce precision and machine performance. If the workpiece is clamped in the add-on rotary table, there are noticeably lower interfering edges, which allows use of short tools less prone to vibration. In addition, only a single part could be clamped on a 5-axis machining center, while the Lehmann T3-507510.LR fix used at WSS has three spindles and can accommodate three parts.

An additional major benefit of the 3+2 solution can be found in the moving masses. While a 5th axis machine must accelerate and decelerate the entire machine table including workpiece, with an add-on one- or two-axis system, only the rotary axes with the workpiece move, considerably smaller masses. This also reduces energy consumption.

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