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Swiss Rotary Table Technology

NEWSLETTER

Maximum flexibility succeeds



Fast and with high positioning accuracy: The TF-510510.LL varioX-Y1 two-axis rotary table from pL LEHMANN on the Brother BAZ TC-22B-0 is ideal for machining complex parts such as lock cylinders. Werder has automated this machining operation with a robot. (Images: pL LEHMANN)

Complementary CNC axes make contract manufacturer a match winner

Samuel Werder AG is a renowned contract manufacturer with a focus on precision engineering. In order to be able to respond optimally to different customer requirements in milling, many of the 38 CNC milling/drilling centers are equipped with additional, mostly two-axis CNC rotary tables from pL LEHMANN. «The machining solutions are relatively inexpensive and usually available quickly, and the five-axis capability thus gained gives us maximum flexibility,» explains Managing Director André Stäger in an on-site interview.

Precision, flexibility and reliability are essential characteristics that Werder Feinwerktechnik in Veltheim (Switzerland) has been offering its customers for over six decades. Responsible for this is a qualified production team, which finds a suitable

solution for almost every customer request with modern CNC machinery.

After all, the requirements are diverse: the production range extends from individual parts to series of 100,000 pieces - parts made of aluminum, steel, titanium, silver, brass, bronze, nickel silver, magnesium and plastics. «We definitely want challenging requirements in terms of complexity and precision,» says Managing Director André Stäger. «Because our prices are not competitive for simple parts.»

In addition to 33 high-performance CNC lathes with turning diameters of up to 250 mm and a turning length of up to 650 mm, the production team has 38 CNC-controlled machining centers



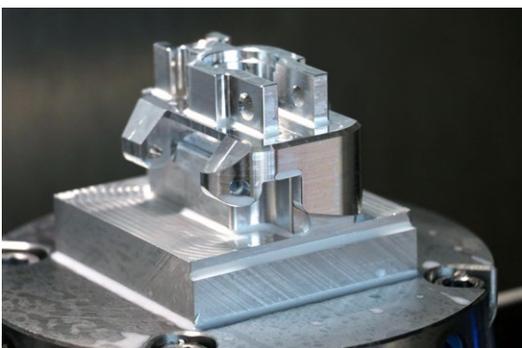
One of the two new Brother Speedio R650X2 milling/drilling centers is equipped with a part changing table. Currently, both halves of the table are equipped with a two-axis CNC rotary table from pL LEHMANN. This manufacturing system is characterized by high flexibility and cost-effectiveness.

with up to five axes at its disposal. They are able to carry out high-precision milling and drilling work - partly automated with robots and handling systems and assisted by CNC measuring machines in the air-conditioned measuring room.

3+2-axis principle is optimal for contract manufacturer

«Components are becoming increasingly complex and have to meet demanding accuracy requirements, down to tolerances of a few μm », explains Stäger, who is responsible for the entire technology. «With our machining centers we achieve the required values in a part spectrum from 1 x 1 x 1 mm to 600 x 600 x 1500 mm. For elongated component geometry, we can mill parts up to 3000 mm in length.»

It is becoming increasingly important to be able to completely machine even demanding workpieces in a single clamping operation. «Five-axis capability is the key to producing even small series economically», emphasizes Stäger. For smaller components up to a size of 500 x 250, he prefers to use Brother drilling/milling centers, which he says are hard to beat in terms of production speed.



The complex component is finished on the Brother Speedio R650X2 machining center (with part changing table and two two-axis pL CNC rotary tables on top) in two setups, each with five axes.

Many of the 20 Brother machines are equipped with additional two-axis dividing / indexing units that give the machines five-axis capabilities. «We have found for many years that this 3+2 principle is optimal for us as a contract manufacturer», emphasizes Stäger. «Especially when the fourth and fifth axes are needed primarily for positioning and not for simultaneous milling. Such a five-axis machine gives us a high degree of flexibility, can usually be procured more quickly, and is significantly more favorable in terms of price/performance ratio than pure five-axis machines.» In addition, there is still space on the machine table next to the dividing / indexing unit for one or even two vises for three-axis machining of the rear side of the workpiece. On strictly 5-axis machines, this is almost never the case.



Werder also uses pL CNC axes on horizontal machining centers, as here on this Kitamura HX400. This means that complicated components can be machined in five axes on the originally four-axis machining center.

Preferred supplier for the CNC rotary tables: pL LEHMANN from nearby Bärau. «The quality, performance, reliability and service can't be beat», states Stäger. «In addition, pL LEHMANN offers a wide variety of products. The axes can be combined in almost configuration, so that we can fulfill all our wishes. Another plus: In an emergency, a service technician can be with us in an hour. That's worth a lot to us as a contract manufacturer.»

Flexibility is decisive

Just recently, Werder retired two aging Brother machining centers and invested in new ones. After an extensive evaluation process, the decision was made in favor of two Brother Speedio



The part changing table and automation with a robot make the Kitamura/pL LEHMANN system suitable for extremely economical 24/7 operation.

R650X2 machines equipped with a part changing table. André Stäger comments regarding the choice: «Although these machines are somewhat more expensive than our previous Brother milling/drilling centers, and they also require a little more floor space, they also offer more. The Z travel of 435 mm and the tool changer with 40 places were particularly important to us. This increases our flexibility, which we have already mentioned.»

The Werder production team is enthusiastic about the ultra-fast tool change and the part changing table, which rotates the pallets into the machining area in a sporty 3.4 seconds. This setup allows operators to prepare parts for the next operation on one side of the table while the machine processes the parts on the other side. This significantly increases efficiency and production output.

Originally, Werder had designed the part changing table portions once with three axes and once with five axes - with a pL rotary table T1-510520.RL TAP2-S2. In the meantime, however, the order changed. «Since the new parts are very demanding on both sides, we have since upgraded to five-axis twice», explains André Stäger. «This allows us to completely finish the workpieces with a changeover time that approaches zero.»

As of today, Samuel Werder AG has more than 20 CNC rotary tables from pL LEHMANN in use, and the number is tending to increase. Not only were the new Brother machines ordered right away with additional axes, Werder also retrofits older machines depending on the application. «The Combiflex system from pL LEHMANN makes it quick and easy to replace individual axle modules», explains the Technical Manager. «We now even have replacement modules in house. Should a crash occur, we can easily replace an axis and not have to disassemble and repair the damaged one first or wait for the repair. That's how we avoid downtime.»

pL rotary tables also on other machines

Werder also uses the pL CNC rotary tables on milling machines from other manufacturers, for example on two NVX5100 vertical Mori Seiki machining centers. Here, existing dividing / indexing units were replaced with pL LEHMANN products because, according to Stäger, they are more reliable and have better performance data.



Werder retrofitted this Mori Seiki NVX5100 machining center with a new T2-510520.LR fix-F1-220 two-spindle CNC rotary table, which features high reliability, speed, holding torques and precision.

Werder also uses the pL axes on horizontal machining centers. This is how André Stäger expanded the capabilities of a Kitamura HX400: «The idea actually came from the machine supplier, H.P. Müller Werkzeugmaschinen AG. In order to machine with five axes on the 4-axis machining center, we installed two additional axes and thus two clamping positions on one turret. This has allowed us to machine very delicate aluminum electronic housings completely on five sides.» Since the Kitamura has a part changing table, Werder was able to achieve extremely economical 24/7 operation by means of robot-automated loading and unloading.

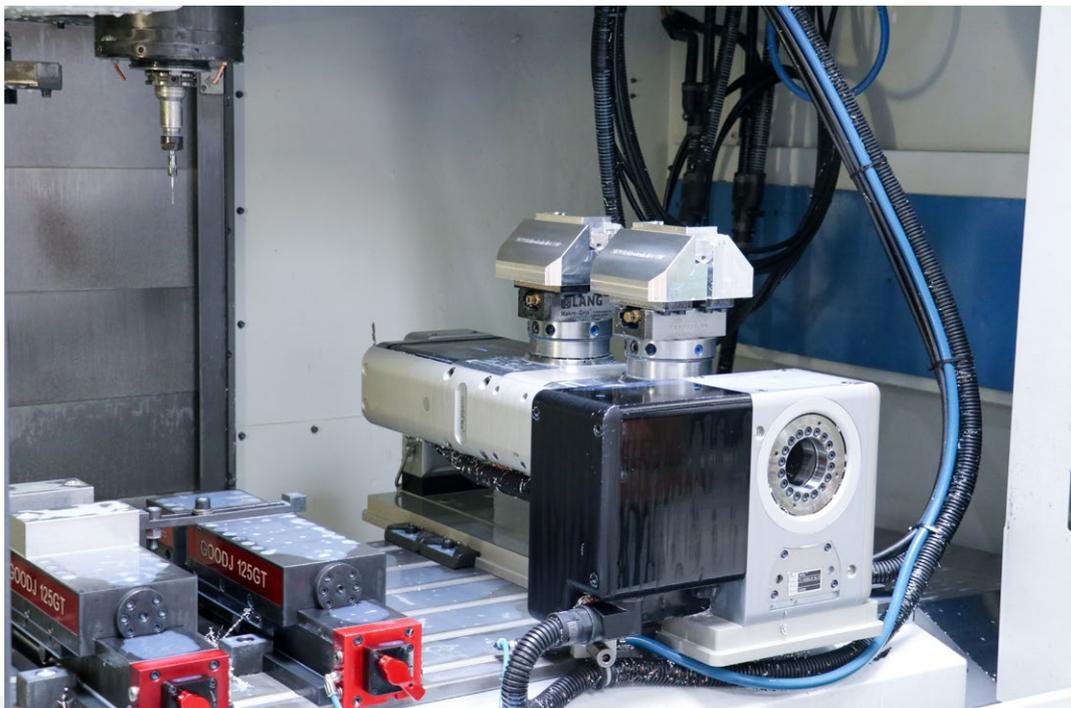
In what is typical for a contract manufacturer, the order has since changed. Today, Werder is machining respirator components on the Kitamura. Components weighing 900 g are produced from aluminum blanks weighing 12 kg. The conversion was easy. One of the two rotary tables with two clamping positions was converted to a two-axis rotary table T2-510520.LR fix-MI1 and used further on one of the Mori Seiki NVX5100 machines mentioned above. In this way, pL LEHMANN's Combiflex system allows machines to be adapted to changing orders and investments to be scaled.

The Kitamura HX400 machine's own rotary table now accommodates a stable dividing / indexing unit from pL LEHMANN - an EA-520.L-MI1 - instead of the previous turret. thanks to its high holding torques, it also permits massive rough machining. «The additional axis gives us all the degrees of freedom we need to produce these 5-axis parts», confirms André Stäger. «Here



An optimal manufacturing solution for contract manufacturers: At Werder, many of the 20 Brother machines are equipped with additional two-axis dividing / indexing units from pL LEHMANN, giving the machines five-axis capabilities.

again, we manufacture automatically around the clock, and the pL LEHMANN axis performs extremely well.»



One benefit of the 3+2 solutions: In addition to the dividing /indexing unit, there is still room for one or two vises for machining the rear side of the workpiece.

Precision machining at its best

In 1957, Samuel Werder founded the company of the same name in Veltheim (Switzerland). Today, Samuel Werder AG employs around 70 people, who generated approximately CHF 13 million in the past financial year. In addition to owner and Chairman of the Board Claude Werder, André Stäger and Raphael Vögtli manage the business. The main activity is in the precision mechanical sector, where turning and milling operations are used to produce workpieces with complex contours to tight tolerances. Customers come from a variety of industries, such as mechanical and automotive engineering and the aerospace industry. More and more frequently, the turbocharger sector, medical and fiber optics areas are served. At the same time, Werder is also active for the jewelry and chemicals sectors.

CNC rotary tables with Swiss quality

Founded in 1960 strictly as a contract manufacturer, pL LEHMANN has been developing and producing CNC rotary tables for over 40 years. With innovations and Swiss quality, the family-owned company in the Swiss town of Bärau (Emmental) succeeded in opening up new opportunities for its customers and developing lean machining solutions characterized by high productivity through use of additional NC axes. One of the highlights of the company's history is the powerful and flexible Series 500 - developed in 2009 - which is ideal for the most demanding tasks thanks to its modular design. With the backlash-free, preloaded PGD gear unit - developed in 2014 - pL LEHMANN reached another milestone. In 2017, the company introduced, among other things, the new pL iBox generation, making their rotary tables ready for Industry 4.0 and digital production. This was followed in 2019 by introduction of the Series 900 DD (Direct Drive) rotary tables with speeds of up to 5'450 rpm. As an additional new product, the AM-LOCK system, a special zero-point clamping system for 3-D printing, including preprocessing and postprocessing, was presented for the first time in 2019.

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