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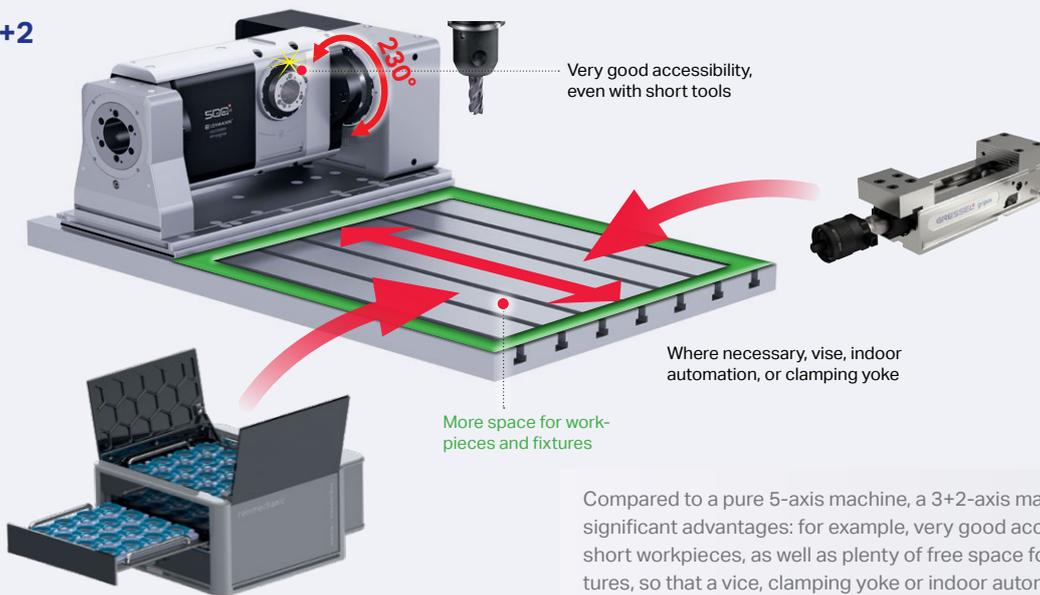
Swiss Rotary Table Technology

NEWSLETTER

CNC Axes «on-top»

3+2 axes

3+2



Compared to a pure 5-axis machine, a 3+2-axis machining center offers significant advantages: for example, very good accessibility even with short workpieces, as well as plenty of free space for workpieces and fixtures, so that a vise, clamping yoke or indoor automation can be installed if required. Images: pL LEHMANN

Efficient and adaptable with 3+2 – investing correctly in a fast-paced working world

Machinists often have to react flexibly to changing requirements and workpieces. This makes the evaluation of manufacturing machines challenging. Three-axis vertical machining centers equipped with additional CNC axes promise particularly high flexibility. Compared to pure 5-axis machines and horizontal machining centers, they score points for high surface quality and accuracy, better accessibility and tool life, among other things. By the way: Even a four-axis horizontal machining center offers additional benefits with addition of a fifth axis.

In mechanical and equipment engineering, tool and die making, the automotive and consumer goods industries, etc. – machining is a core discipline wherever you look. According-



An optimal manufacturing solution, especially for job shops: a three-axis milling machine with an additional two-axis CNC rotary table from pL LEHMANN, which gives the machines five-axis capabilities.

ly, a wide variety of machine concepts are available for drilling and milling operations. There is a major trend toward four- and five-axis machining, as this avoids reclamping, which in turn contributes to shorter non-productive times and higher precision.

At first glance, a vertical 5-axis machining center thus appears to be a perhaps cost-intensive but good solution. Such a machine is relatively easy to put into operation and – no question – it is convincing when it comes to machining large components and in cases of difficult five-axis machining. However, apart from such cases, there are alternatives that are worth a closer look.

3+2 is more than 5

For many machining tasks, the addition of an additional 4th or 4th/5th axis to a three-axis vertical machining center is a good idea. CNC axis particularly interesting. This often not only gives the user more flexibility with regard to the range of workpieces, but also requires less space and provides benefits from lower acquisition costs.

Many job shops have found the 3+2 principle to be optimal – especially when the fourth and fifth axes are needed primarily for positioning and not for simultaneous milling. Such a five-axis machine gives them 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, the attached rotary/tilting table still leaves enough space to install additional clamping options (for example, a vice or clamping yoke) or even a small indoor automation system. In addition, the workpiece is easier to access. If the workpiece is

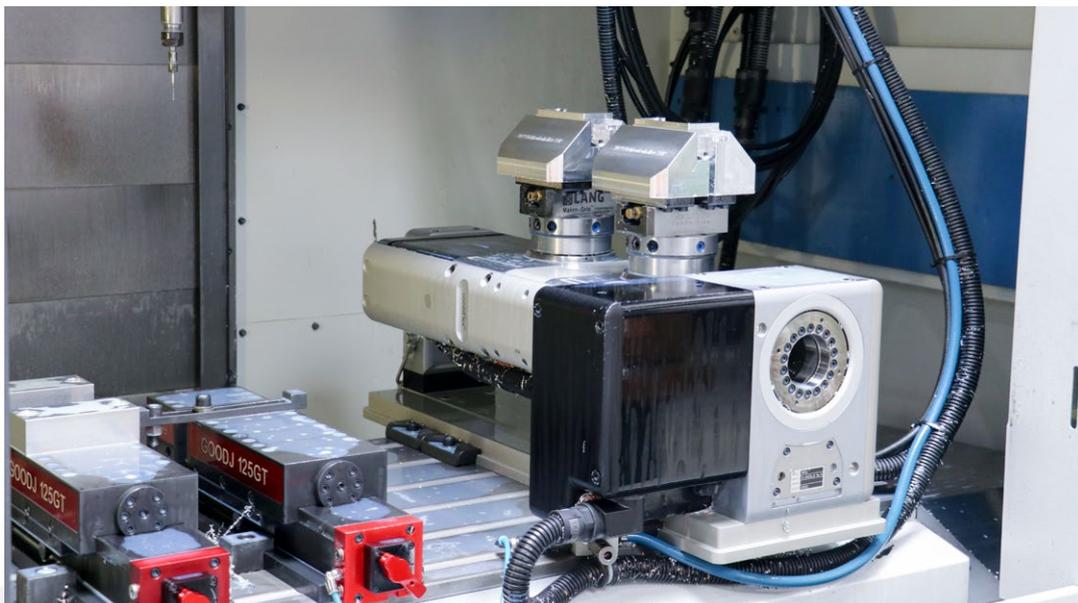
clamped on an attached rotary table, the interfering edges are significantly lower, allowing the use of short, low-vibration tools. This has a beneficial effect on precision, surface finish and tool life.

Horizontal machining centers can also be profitably supplemented with an additional CNC axis. Although a four-axis horizontal machining center with a clamping tower already offers high production capacity, the addition of a dividing / indexing head further increases the degrees of freedom in machining and the benefits.

pL rotary tables – powerful with a compact design

pL LEHMANN, CH-Bärau, is a renowned address for such complementary CNC rotary tables. The family-owned company offers a huge selection of different axes and complementary components that can be combined in almost any way. This makes it possible to configure an optimal single- or two-axis rotary table solution for every application. These are all characterized by high clamping and feed values with a compact design, high leak tightness and quality and, last but not least, a favorable price-performance ratio.

Today, pL rotary tables are in use on more than 200 different machine brands or more than 1,000 different machine models. This results in enormous competence regarding integration in all known CNC control systems (Fanuc, Siemens, Heidenhain, Haas, Winmax, Mitsubishi, Brother...) – for new machines as well as for retrofits.



One advantage of the 3+2 solutions from pL LEHMANN: In addition to the dividing /indexing head (two-spindle unit in the picture), there is still room for one or two vises for machining the rear side of the workpiece or other tasks.



pL CNC axes can also be employed usefully on horizontal machining centers. Thus, the original four-axis machining center becomes a 5-axis center.

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 the introduction of the 900 DD (Direct Drive) series of 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 in 2019. As a highlight at EMO 2021, the product range will be expanded – with a compact indoor automation system for unmanned production and the new MT series for measurement applications on the shop floor.

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