

Honing faster and with more precision

KADIA develops compact honing concept further

Five years ago, KADIA Produktion GmbH + Co in Nürtingen, Germany, launched the compact rotary index table for its U6 honing machine with an integrated electrical cabinet. The objective was to offer a machine for small to medium-size components and to combine cost-effectiveness and precision with individual configuration capacity. This design was a winner and today, the honing machine is used worldwide. Now, KADIA decided it is time for an update.

To ensure that successful production machines remain in high demand, constant development is unavoidable. Ultimately, the component suppliers must also deal with continuous demands. On one hand, production costs are constantly on the rise and, on the other hand, customers require their suppliers to provide precision work that increases exponentially. High-precision machining, such as honing, is particularly affected by these requirements. As a consequence, after five years, KADIA decided to proceed with a complete overhaul of its successful U6 model.

The spatial requirement of the U line, the name of the compact machine's new design, remains the same: a little more than 5 m². The covering was modified. This change increases the accessibility to the

maintenance area considerably. What's more, the entire working area is now completely enclosed. Exhaust air connections are now available that provide more protection to the environment and make the workplace safer.

Increased efficiency due to improved honing machines

However, good things become even better if the user saves money at the end. Therefore, the comprehensive new design applies to the main components that affect the productivity. This is mainly true for the honing spindles. The U line uses LH2 spindles that were subject to further development and are protected by patents. Highly dynamic direct drives for stroke and rotational movements, as well as precise tool feed motors, guarantee an absolute uniform positioning with precise stroke reversal. The stroke drive was optimised, with the ratio of the lifting output compared to the moving mass is significantly more favourable.

"The new honing spindles of the U line make it possible to increase the output by approximately 20 percent," explains Henning Klein, general manager of KADIA Produktion GmbH + Co. The experts from Nürtingen use a newly developed spindle



U line variant with two honing machines

assembly for the LH2. The drive is state-of-the-art technology and much more powerful than its predecessor model. The concentric run-out of the machine is at its optimum.

Not only are the honing spindles extremely precise and powerful, they also minimise the maintenance and/or service costs. Wearing parts are kept to a minimum. Consequently, maintenance efforts are also minimised. Energy consumption is also a big trend factor. Electrical power and braking energy that is not required is recycled.

"The energy costs for each home component is dependent on the cost of electricity, the workpiece and the cycle time," adds Henning Klein, "however we have calculated a mean value for the honing process alone to be < 0,01 kWh per part produced."

Easy-to-use equipment reduces downtimes

In addition to the honing spindles, there are optional workstations available. These are pneumatic measuring stations with up to 16 gauging levels as well as a deburring station. Mechanical deburring on the U line is a unique feature. Kadia has developed a fully automated brush changer and tool magazine using 12 inserts. When



The compact U line honing machine shown here in its new lockable enclosure and HMC100 control panel

approaching the wear limit, the changer reaches for a new tool. The bottom line is that all of this saves time.

The rotary index table is available with three, four, five, or six stations. It is the buyers choice to select the number of stations that will move the machine. For instance, the U line can be equipped with one or two honing spindles, depending whether a single or dual step process must be accomplished.

Another very important equipment feature is the control system. In this case, KADIA uses the HMC100. This is an in-house development that has been available for the last two years. Here, state-of-the-art technologies and measuring procedures are being applied. During the development, software specialists, and hands-on experts worked as a very close team. To keep the process transparent, graphical displays dominate the monitor of the control panel. Therefore, the HMC100 is a significant building block within the entire design of the machine. Furthermore, it contributes a considerable part that improves the quality of the output and the cost-effectiveness. Only a machine that is easy-to-operate reaches top marks.

The U line is suitable for machining through bores, blind bores or interrupted bores in soft as well as hardened materials. Typical workpieces are precision components for injection pumps, sleeves and other pieces for the hydraulic sector or drive technology branch. These components are manufactured in small, medium or large production quantities. Regardless of the number of manufactured pieces, the U line always surprises the



Typical workpieces that are processed on the U-line in small and medium quantity or for mass production

customer. It provides an exceptional cost/benefit ratio for an economical and precise honing process.

Control system for honing machines with easy-to-understand graphics

Control systems specially designed for honing machines do not exist on the market. Typically, designers use all-purpose systems and adapt them with more or less effort to meet the sometimes complex process sequences required for the honing procedure. This approach is an unsatisfactory situation. Therefore, two years ago, KADIA launched its control system, custom-designed for its HMC100 model (Honing Machine Control 100).

The HMC100 makes the operation of the honing machine considerably easier. The panel (photo) is a scratch- and oil-resistant 19" touchscreen. It can be used even if you are wearing gloves. There are only a few external hardware pushbuttons for important machine functions, such as Machine ON/OFF, emergency stop, Home position, etc. For the input of text and numeric values, a pop-up keypad can be activated. The screen is connected to an IPC with a powerful dual-core processor and a fail-safe solid-state drive (SSD). If the operator wishes to clean the screen, he/she saves the current display with a simple push of a button. With this type of equipment, the HMC100 offers state-of-the-art hardware for industrial use. To be prepared for the future, the developers designed the HMC100 for the use of up to 40 axes and

integrated all honing and measuring processes that are currently in use. Among other things, the KADIA-specific high-end machining programs, e.g., match honing, power-guided honing, and much more. The unique feature of the control system is its high process transparency that is offered to the operator. In collaboration with hands-on experts, the software engineers created a navigation structure that is not only simple to use but also logical. Self-explanatory graphics make it possible to visualise all available machine functions, current operating conditions, and process qualities. The machine operator does not have to navigate through multiple menu levels. Even multi-level processes with various operations are not a complex task anymore.

New operators become familiar with the machine more quickly. Malfunctions and unforeseen downtimes have become a very rare occurrence. Thus, the control system contributes to a much higher quality of the manufactured components and increases the cost-effectiveness. The visual effect of the control panel is exceptional and due to its well-engineered functionality it received two important design awards, the Red Dot Design Award, and the IF Design Award.



The control panel of the HMC100 made by KADIA is extremely easy-to-use and this comfort level applies to all known honing and measuring procedures. Graphic images provide transparency

KADIA Produktion GmbH + Co
Tel: 0049 7022 60060
Email: henning.klein@kadia.de
www.kadia.de