

## RETROFIT | JIG GRINDERS

### FANUC for IHR Electronic AG/SA

**Task** Jig grinders with  $\mu\text{m}$ -precision can be achieved either with new machines or by retrofitting an old machine that still works with mechanical precision. IHR Elektronik AG/SA in Swiss Lajoux provides these upgrades – with FANUC components. In 2016, the company retrofitted two Hauser machines at Pomtava S.A. and one Hauser S3 at Diametal AG.

**Solution** Thanks to the owner Roland Haslebacher's experience with Hauser machines – having spent 10 years working on customer service for the company – the IHR Elektronik AG/SA is specifically qualified to update their machines. Haslebacher uses FANUC components for retrofitting, for example, the FANUC control 0i-MF, or for larger machines, the FANUC CNC of the 31i series.

**Result** Customers can work with the retrofitted machines as they would new ones, but can save two thirds of the costs. Thanks to new operator terminals, the machines meet today's CNC programming requirements and their precision is often greatly enhanced. FANUC has been particularly convincing with their quality, reliability and technical support, and is therefore the first choice for retrofitting projects at IHR Elektronik AG/SA.



# Jig grinding machines from the fountain of youth

## Retrofit specialist imparts new properties to old Hauser grinding machines

Due to its high requirements in precision, jig grinding is a niche market. They are simply very special products for drilling or form grinding that require a high quality surface finish and have tolerances in the lower  $\mu\text{m}$  area. This is because jig-grinding machines are primarily deployed for the most demanding machining operations in punching-die construction and mould-making as well as for high-precision parts in optical equipment or for special precision components. For this reason, the machines are produced in small quantities, which, combined with the high precision requirements, makes prices high.

### Retrofitting with FANUC components

Since then, FANUC Schweiz has always been at his side as his partner in control and drive matters. *“As a microenterprise, which consists of my wife and myself, you have to specialise,”* Haslebacher explains. *“I have known FANUC for a long time, so I know that all of their components are of high quality and reliability. From the beginning I received the best assistance from FANUC’s technical support, so that I could gain the experience required for retrofitting.”*

Meanwhile, Roland Haslebacher has specialised particularly on modernising older Hauser machines. In this context, he benefits from the ten years of working in the customer service department of the Biel based company at the beginning of his career. *“These experiences are extremely important,”* the machine tool professional beams. *“The mechanics of these jig grinding machines are very well executed and*

*remain of high-precision for a long time, but they are also thoroughly complicated. After all, these grinding machines with Z and U axes are also suitable for conical bores and mould-making. Understanding how they work in detail is important.”*

Therefore, not many companies offer to retrofit your 20 or 30-year-old Hauser grinding machine.

**Rene Scherz, sales engineer at FANUC Schweiz, even claims: “Roland Haslebacher is probably the only specialist in Switzerland and the bordering regions abroad who will accept such tasks on Hauser machines.”**

### Dispensing pumps require bores with $\mu\text{m}$ precision

In 2016, he retrofitted two Hauser machines for the Swiss company Pomtava S.A. Reconvilier: a type S35 single-stand machine and a bigger type S40 two-stand machine. The 1986-founded family company is specialised in high-precision gear metering pumps, which are used in industrial and automobile painting, for example. Pomtava also has suitable pumps for metering mono and multi-component process liquids such as silicones, glues, resins, different hardeners, etc.

Director Arnaud Zimmermann points to the fact that the output of many of his pumps – depending



on the individual case – may be between a minimum of 0.0005 l/min up to 20 l/min: *“Always, however, at a consistently precise metering, which requires the highest precision from our pump components. This applies to the gears and as well as all bores through which the liquid enters and exits.”*

To create bores within a tolerance of 5 µm, precision mechanics use said jig grinding machines made by Hauser which Roland Haslebacher has modernised. The mechanics of the approximately 20-year-old machines were in perfect condition, which means only the electrical components had to be refitted. The previous FANUC control type 0 had to make way for the latest CNC-series 0i F-model by FANUC. With up to eleven axes, four spindle axes and two rails, it completely meets the requirements of this application. *“It can control four axes simultaneously and 3+2 axis machining,”* Rene Scherz explains. *“Also, it is fully compatible with the other FANUC controls of the 30i, 35i and Power Motion series, which simplifies the supply of spare parts.”* He further emphasises: *“Thanks to cutting-edge hardware and a range of standard software, the FANUC CNC 0i-MF hit the ground running. And – an especially important aspect in retrofitting – it offers an excellent cost-benefit ratio.”* Roland Haslebacher prefers this control, but also employs the FANUC CNC of the 31i series for bigger machines.

**Beneficial complements with dressing and gauge station as well as pneumatic grinder bypass**

Besides the installation of the new CNC, his work on the Hauser S35 and S40 comprised the replacement of metering technology, engines, repeaters and I/O modules, the assembly of the switchboard and the programming of the high-speed PMC (SPS), to tailor them to the respective functions of the machines. For Pomtava, Roland Haslebacher complemented the machines with a Fischer CBN-HF dressing spindle, a



gauge station and the new multi sensor system, which serve the pneumatic grinder bypass. This means that the U axis sets in faster until it touches the component, which saves the user working time. *“It is precisely these kinds of complements which lift the machine to the most modern level,”* the retrofit specialist emphasises.



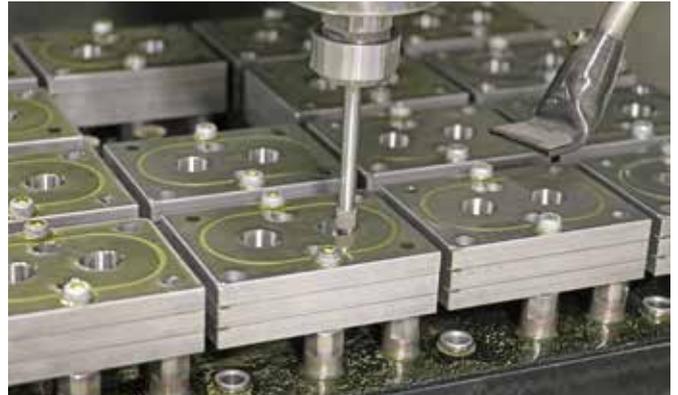
*"Naturally, we have programmed respective cycles for grinding holes and contours as well as for all the complementary functions."*

With FANUC Picture Haslebacher created his own, multilateral digital surface holding customer and use-specific input screens and diagnostic pages – drastically simplifying the handling of the machine. Arnaud Zimmermann is thrilled: *"We can work with these two retrofit machines as we would with new ones. The only thing is we've saved two thirds of the costs thanks to IHR."* As a result, the next order has been placed: At the beginning of 2018, Roland Haslebacher will retrofit another Hauser jig grinding machine S40 (the twelfth) from an Elesta control type 314 to the new FANUC 0i-MF control for Pomtava.

### Super hard, high-precision wear parts

Another satisfied IHR customer is Diametal AG in Biel (Switzerland). Right from the beginning, the 1936-founded company specialised in the production and development of carbide tools, watch components and wear parts made of hard material as well as diamond and CBN abrasive tools. The company has always believed that all products should be characterised by constant, high precision.

The accuracy of diverse wear parts plays a special role, for example the perforated disc, which is employed in a spectrometer. The component is made of 99.9 percent pure aluminium oxide and has a central opening with four radii, which must comply with strict tolerances. Production manager Raffaele Carfora explains: *"The four radii require a distance accuracy of +/- 1 µm. The radius is tolerated with 3 µm and the centricity of the radii must remain within 4 µm. In this super hard ceramic material, such values can only be reached with jig grinders."*



Since 1981, a Hauser jig grinding machine has been performing this task. Raffaele Carfora, who started working at Diametal in the same year, can now operate this machine with his eyes shut. He also knows its weaknesses: *"This is clearly due to the old Hauser positioning control 111, which still had to be fed with programs via the tape deck. A lot of experience was required to model the component with the highest possible mechanical precision."* What's more, the control or other electrical components could suddenly just fail. Replacement parts are no longer available and a *"machine failure would mean a small catastrophe,"* the production manager adds. *"Because we don't have a replacement machine for this high-precision machining available."*



**As efficient as a new one after 35 years**

This is why the responsible persons went on a quest to find a new, suitable jig grinding machine – and rather by chance happened upon Roland Haslebacher. He promised them that he would lift the Hauser S3 to a modern CNC level. For good measure, he had the X/Y table laser-measured. The result of the ISO measurement was a non-conformance of merely 0.0025 mm – “a great value for a 35-year-old machine,” specialist Roland Haslebacher assesses. “The only change to the mechanics was the replacement of the frontal spindle bearings. Other than that, the entire electrical installation including CNC came up for renewal.”

Haslebacher also equipped the grinding machine for Diametal with the tried and tested new FANUC CNC 0i-MF, with optical absolute measuring systems, a new multi sensor system. Furthermore, the machine received a new operator panel which meets today’s CNC programming requirements. The IHR-developed input screens and diagnostic pages simplify the use of the retrofitted Hauser S3.



Jean-François Pérez, Process Engineer at Diametal, assesses: “Our old Hauser S3 is just like a new machine. Even our young employees, who are all experienced in CNC, can accurately grind the described high-precision parts at the  $\mu\text{m}$ .” Furthermore, the implementation

of absolute scales instead of reference brands has substantially improved process safety regarding the created precision, as Jean-François Pérez confirms: “Where permanent control of the machine was previously required, it can now work without supervision.”



**About the IHR Elektronik AG/SA**

If you want to save money, you should consider retrofitting an older machine model the way Roland Haslebacher offers. The experienced mechanical engineer founded his own company a good 20 years ago – IHR Elektronik AG/SA – which is today based in Lajoux in Swiss Jura. While the business was primarily defined by orders regarding automation and handling technology as well as loading/unloading systems for machines including part measuring, the retrofitting of old machine tools has been gaining in importance since 2006. Roland Haslebacher remembers: “My first retrofitting order concerned an Oerlikon machine, which I updated with the newest electrical and control technology using FANUC components.” This was followed by a VDF lathe, and as early as 2007, the first Hauser jig grinding machine.