

Surface quality and removal rate doubled

Laser machining center Femto E3 becomes more powerful

■ In 2020 Kern launched the first ultra-short pulse laser center Femto E3. With the latest developments – especially in the case of process parameters – the engineers from Kern achieved an essential increase in productivity.

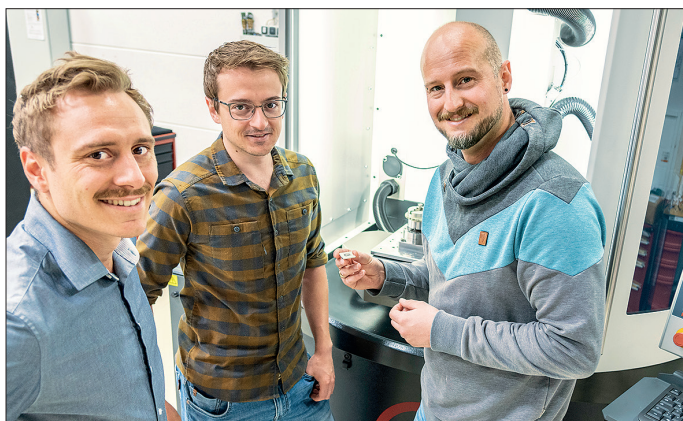
The manufacturing of carbide press punches, which are used to produce inserts and other small parts, received an enormous boost in terms of cost-effectiveness and productivity with the Kern Femto E3 around three years ago. On the one hand there are no tool costs when working with the femtosecond laser. On the other hand time needed for manufacturing is far less than time needed for erosion and milling.

With a lot of know-how and intense engineering Kern now succeeded, after only three years, to optimize parameters like pulse power, pulse time and scan speed so that the manufacturing of carbide press punches becomes even more productive. No matter for what application, the results are a significantly improved surface quality and removal rate.

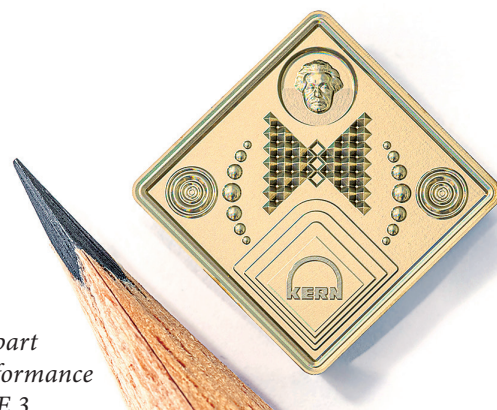
The single values could be doubled and were proved by orders from customers and demo parts, as could be seen at EMO 2023. Quirin Herterich, responsible for sales of laser technologies at Kern provides the numbers: “Up to now we achieved a removal rate of around one cubic millimeter per minute with tungsten carbide press punches, now we are constantly at two cubic millimeters per minute.” Equally interesting are the improvements in surface quality achieved by Kern – from the previous $Ra=0.2\mu m$ to now $Ra=0.1\mu m$. This means that the final polishing can be shortened significantly, which has a correspondingly positive effect on the overall running time of the parts.

Energy efficient, reliable and easy automation

Regarding cost-effectiveness, Kern's ultra-short pulse laser center scores in many ways, like no costs for tools. Addition-



The strong Kern: Quirin Herterich, responsible for sales of laser technology; Stefan Kletzenbauer, laser processing developer and Daniel Asam, laser processing development manager (l. to r.)



This small sample part shows the high performance of the Kern Femto E 3

ally lower energy consumption compared to other technologies, because of the very economical laser source with an output of 20 W. The simple operation contributes significantly to process reliability and good automation. Ultimately the designer does most of the work by creating the 3D CAD data. At the end he converts this into a so-called negative model and transfers it to the Kern Femto E3. The machine operator then only has to activate the material-dependent parameters, enter the number of parts required and start the program. The machine does everything else – 100 % error-free.

When is it worth purchasing a Femto E3?

According to Quirin Herterich, there is no general answer as to who can benefit from purchasing the innovative femto-laser center, since many different parameters have to be taken into account: “We always discuss options together with the potential customer,” says Herterich, but still gives a thumbnail: “As a rule, the purchase is worthwhile if the machine is used for around 2,000 hours per year, which roughly corresponds to continuous single-shift operation.” During this time, depending on the topography, around 500 to 1,000 punches can be produced.

As an alternative to purchasing the Femto E3, Kern offers to manufacture it to order. Meaning that even smaller quantities up to batch size 1 can be produced economically. This applies for example if prototype parts have to be produced in several loops. Then all you have to do is adapt the CAD data and convert it to the negative model. The new part can now be created. “Minimal effort compared to other manufacturing processes,” confirms Quirin Herterich.

The Kern laser technology expert is certain that the Femto E3 will soon open up additional fields of application. “We now use processing software that allows very fine texturing to be introduced onto small parts.” This means that lines, troughs, or free shapes with just $10\mu m$ or $20\mu m$ can be created into any surface according to customer requirements. There are many applications for this.

further information: www.kern-microtechnik.com