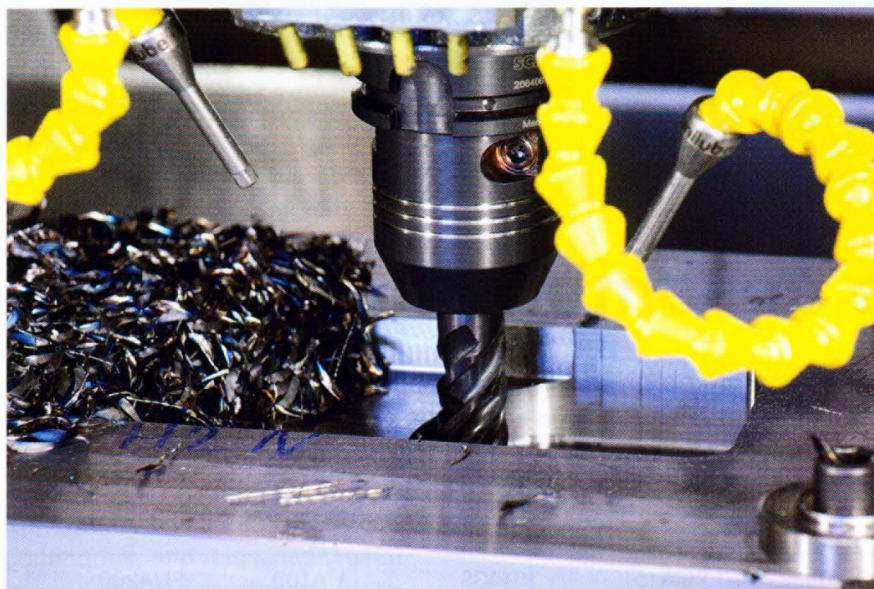


Toolholding Systems used for the mold making industry

In the interplay between precision, flexibility and economy



1 |
The TENDO E compact disposes of high holding forces and can be used for volume machining

expansion toolholder, which combines high holding forces with an affordable price.

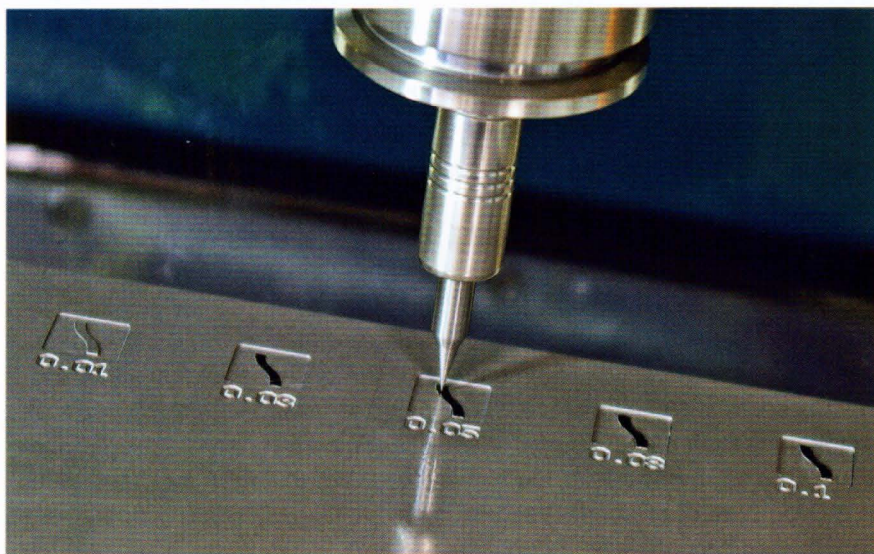
Universal toolholders of the next generation

Up to now, low-cost Weldon chucks have been typically used for rough applications, and the comparably expensive hydraulic expansion toolholders, heat-shrinking mountings or precision collet chucks for precise metal cutting. This is no longer the case, due to the TENDO E compact. With a torque transmission of up to 2000 Nm (at $\varnothing$ 32 mm), the cost-benefit optimized hydraulic expansion toolholders are used more and more by mold makers and replace the function of universal toolholders. They can be used for volume machining and also for high-precision drilling, honing, or finish grinding. Every h6 shank can be quickly and process-reliably clamped with an Allen key. This ensures a true-running accuracy of less than 0.003 mm at a projecting length of $2,5 \times D$, a balancing quality of HSK mountings of G 2.5 at 25.000 rpm, and excellent vibration damping. Therefore there is no comparison to conventional universal toolholders, where you always have to ensure that the shanks, the clamping screw, and the cap nut have been screwed on tight enough, not to mention the deficits in true-running accuracy and

Users who want to benefit from the possibilities of integrated CAD/CAM solutions, highly dynamic 5-axis machines, and efficient cutting material in the mold making industry, should also consider its toolholding systems, which have become to a decisive success factor, if the balancing act between precision, flexibility, and efficiency should succeed.

After the market introduction of the TENDO E compact toolholder in 2010 from SCHUNK, the

competence leader for clamping technology and gripping systems as a fully functional hydraulic



2 | When machining fine micro structures, the TRIBOS-Mini proves its skills in micro mold making

the tendency to chatter. The efficient hydraulic expansion toolholders which are exclusively manufactured at the headquarters of SCHUNK in Lauffen, prevent the cutting edge and spindle from damage, and also procure a brilliant workpiece surface. According to SCHUNK, they help to reduce 40% of the tool costs – compared with the Weldon or heat shrinking mountings. They are offered at an affordable cost because the tool mountings are exclusively offered with the most commonly used interfaces and diameters. They are available in 17 versions for the interfaces HSK-A50, HSK-A63, HSK-A100, SK40, SK50, JIS-BT30, JIS-BT40, JIS-BT50, and SK50. By using intermediate sleeves, the complete clamping range can be completely covered.

Slim toolholders for confined spaces

Similarly impressive is the boom of tool extensions. Since the triumphant success of modern 5-axis machines, tool mountings with slim interfering contours have become vastly more important. In contrast to the toolholders with optimized interfering contour and spindle interface, tool extensions are much more versatile. For precision clamping in the field of mold making, they are based on various clamping systems, with heat shrinking, polygonal clamping, and hydraulic expansion technology. The use of heat shrinking extensions is not recommended due to the combination of low interfering contours and high transmittable torques, and for tool change, a high price heat shrinking unit is necessary. If no

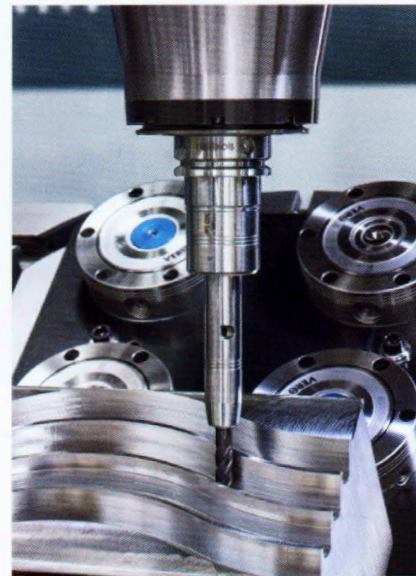
shrinking unit is available, or if vibration damping characteristics such as frequent tool change are necessary, SCHUNK experts recommend the use of hydraulic expansion extensions. They minimize vibrations and ensure a high true-running accuracy even in case of many clamping cycles. Without a peripheral unit, they turn every precision toolholder into a highly flexible expert in confined spaces – independent from the spindle's interface. Its precise true-running accuracy, excellent vibration damping, and the possibility of internally supplying coolant provide for excellent machining results and long tool life. When drilling, reaming, or finish milling, its high torque ensures a safe tool hold. In case of rough milling however, it makes sense to use extensions with polygonal clamping technology. At an L1



3 | The price-attractive hydraulic expansion toolholder TENDO E compact can be used for applications from volume machining up to finish machining



4 | By using TRIBOS-S, extremely fine contours can be process-reliably machined when graphite machining



5 | With the hydraulic expansion extensions type TENDO SVL, even confined spaces can be machined powerful and precisely

dimension of up to 250 mm, and a true-running and repeat accuracy of less than 0.003 mm these one-piece, maintenance-free extensions are suitable for powerful and high-precision applications.

Experts for details

If fine exteriors, filigree bars, or particularly brilliant surfaces are

concerned, the TRIBOS polygonal clamping technology from SCHUNK is one step ahead of the competition. The same applies for metal cutting and for dust-creating machining of graphite. With the high-precision clamping system, even micro forms with extremely sharp edges of 10 microns can be manufactured. Experts of the micro

mold manufacturing industry are using the mountings to achieve precise results with 30 micron milling cutters. This is the dimension, where heat shrinking mountings and other clamping systems can no longer compete. With polygonal toolholders, even the smallest tool diameters from 0.3 mm can be clamped precisely. Endurance tests show that despite thousands of repeated clamping operations, no material fatigue will occur. The HSC compatible, almost maintenance and wear-free precision toolholders are suitable for every tool shank of h6 quality, and depending on the type, extreme torques of up to 205.000 rpm have been tested. For milling graphite, a surface roughness of $Ra \leq 0,005$ mm can be achieved. For tool change, a simple low-cost clamping device is sufficient, where the pressure which is required for tool change can be firmly adjusted, and tool change is carried out within 20 seconds.



6 | When selecting the suitable extension it is worthwhile to receive a neutral consultancy (Pictures: Schunk GmbH & Co. KG, Lauffen, Germany)

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