

Press Information

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SpheroStar – innovative machine solution by Thielenhaus Microfinish: Spherical parts in shortest possible cycle times

A fast two-step machine for machining spherical workpieces / Indexing table like for MicroStar and NanoStar / 2 vertical tool spindle units / Cycle-time-neutral loading and unloading / IPM-monitored pre-finishing and finishing operations / Workpiece rotation up to 4,500 rpm / Cycle time of 12 to 13 seconds / Most important assemblies of approved platforms / Switching from external to internal finishing within the shortest time possible / High process repeat rate / Workpiece diameter of up to 75 mm /

Wuppertal. Based on the high-precision Sphero machine tool, Thielenhaus Microfinish has now developed a highly efficient two-step solution which performs the entire fine-finishing process for spherical workpieces in short cycle times. The new SpheroStar also builds upon the MicroStar and NanoStar platforms constructively and like these two it is equipped with an indexing table. The world market leader will introduce the machine equipped for working on sliding shoes at the 2019 EMO trade fair in Hanover.

The SpheroStar has two tool spindle units that can automatically rotate by up to 90 degrees so that the optimal machining position for the relevant process is always selected, thus enabling the production of flat surfaces as well – with optional cross slides – instead of only spherical surfaces. The units are mounted vertically and are easily accessible for fast changeover. The machine is loaded at the first station by a handling robot in a cycle-time-neutral manner and is later again unloaded after machining. The indexing table then moves to station 2 where the workpiece is aligned axially. Pre-finishing takes place in-process in station 3 under size-controlled conditions, and the end-finishing with a flexible stone is done in station 4. This operation too is IPM-monitored.

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A MicroSens force sensor is used for both work steps with workpiece contact detection and brick wear compensation.

The clamped workpiece rotates at up to 4,500 revolutions per minute during machining. The spherical surfaces are created in a reliable manner in terms of process in connection with a corresponding contour of the Microfinish tools. Depending on pre-machining, the cycle time is only 12 to 13 seconds, so that the machine can be properly integrated into efficient production lines.

Since the most important assemblies are from approved platforms that have already been on the market for long, the new machine also features a high level of failure safety. This means that the indexing table comes from Nano-Star, the spindle unit from Sphero and the lining together with the tensioning system are from MicroStar.

This new SpheroStar enables machining of surface topography, spherical roundness, spherical diameter and sealing surfaces. Plus the improvement in supporting components enables tribological requirements to be fulfilled. In just a few installation steps the machine can be converted from outer machining to inner machining, i.e. from a sphere to a sealing ring or a socket. Since the workpiece remains in the clamp until it is completely finished, the operator influence is reduced and errors due to repeated clamping are ruled out. This increases process repeatability considerably.

Workpieces can be machined up to a diameter of 75 mm on the ergonomically designed machine. It is typically used in the automotive industry for machining the joint heads of wheel suspension and steering components that require a high level of freedom and movement for the associated assembly units. Metal-lically-sealing valve balls and seating rings for valves in the chemical industry,

through which aggressive or very hot media travel, are able to be machined with a high degree of dimensional and surface accuracy. Another instance are the axial piston pumps found in all fields of hydraulics. The axial piston has a spherical sliding surface at the end, and the dimensions of this component must be accurate to 1 µm or less in order to guarantee safe operation at great strain – such as in aviation.

More information can be found at: Thielenhaus Technologies GmbH, P.O.B. 201855, 42218 Wuppertal / Germany, Telephone + 49 (0)2 02 481-0, Fax + 49 (0)2 02 45 04 45, or at www.thielenhaus.com and at the EMO 2019 trade fair in Hanover, Hall 11 Stand B53, from 16 to 21 September

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Picture caption:

<<1_SpheroStar>>



The new SpheroStar by Thielenhaut Microfinish makes it possible to machine spherical workpieces in short cycle times effectively and with great precision.

Illustration: Thielenhaut Technologies GmbH