Flexible Machining – Extreme Precision

BearingStar
Innovation in High-Precision Machining

NEW!
HYPER FINISH
faster and even more precise
TOP QUALITY BEARING RACEWAYS VIA
HIGH-PRECISION MICROFINISH

When machining bearing raceways, manufacturers require a machining solution that is flexible, productive and economical. Thielenhaus’s modularly designed BearingStar platform has been conceived to meet exactly these requirements. Via BearingStar MICROFINISH-machining, manufacturers can improve the surface roughness and roundness of relevant bearing components and thereby render their bearings less noisy and more durable.

HIGHLIGHTS BEARINGSTAR PLATFORM

- **Increase in efficiency and precision** through innovations in high-performance MICROFINISH
- **High flexibility** – via 2 or more tool oscillation units in a single machine, e.g. can do both ball and roller bearing raceways
- **Universal machine platforms** for all types of bearing raceways, i.e. ACBB, TRB, SRB, gothic etc.
- **Short change-over time**
  - step-by-step change-over instructions with graphic assistance on operator touchscreen
- **Interactive Online Direct Service** via Internet

NEW MACHINE GENERATION
for flexible and highly efficient MICROFINISH of raceways

OUTER DIAMETER RANGE OF RINGS

<table>
<thead>
<tr>
<th>Page</th>
<th>BearingStar</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>P. 5</td>
<td>mini</td>
<td>5 – 19 mm</td>
</tr>
<tr>
<td>P. 6</td>
<td>50</td>
<td>17 – 42 mm</td>
</tr>
<tr>
<td>P. 7</td>
<td>100</td>
<td>32 – 90 mm</td>
</tr>
<tr>
<td>P. 8</td>
<td>200</td>
<td>85 – 200 mm</td>
</tr>
<tr>
<td>P. 9</td>
<td>200 XL</td>
<td>180 – 320 mm</td>
</tr>
<tr>
<td>P. 10</td>
<td>300</td>
<td>200 – 600 mm</td>
</tr>
<tr>
<td>P. 12</td>
<td>400</td>
<td>400 – 1,600 mm</td>
</tr>
</tbody>
</table>

OUTER DIAMETER RANGE OF ROLLERS

<table>
<thead>
<tr>
<th>Page</th>
<th>BearingStar</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>P. 14</td>
<td>SF125</td>
<td>3.8 – 80 mm</td>
</tr>
<tr>
<td>P. 15</td>
<td>PC24</td>
<td>30 – 200 mm</td>
</tr>
</tbody>
</table>
HYPERFINISH – REDUCE MICROFINISH/SUPERFINISH MACHINING TIME BY UP TO 35 %

Via Thielenshaus’s new Hyperfinish technology, manufacturers can significantly reduce machining time while achieving even higher workpiece qualities. With the Hyperfinish-enabled increased productivity, bearing manufacturers can reduce the number of machines on their shop floors and reduce investment and operating expenditures by up to 30%.

HYPERFINISH ADVANTAGES:

- Approx. 20% less cycle time thanks to additional honing stone total travel motion
- Up to 4 µm additional stock removal on diameter
- Reduced oscillation angle results in improved quality and form results
- Approx. 30% less investment in case of 1-station instead of 2-station machine

CONVENTIONAL MACHINING PRINCIPLE

- Rotation of the workpiece
- Oscillation of the honing stone
- Contact pressure of the honing stone

Example: Taper roller inner ring, bore diameter 50 mm

| Roughness | Ra 0.0593 µm |
| Stone contact time | 25 sec |
| stock removal | 5 µm |

HYPERFINISH MACHINING PRINCIPLE (OPTIONAL)

- Rotation of the workpiece
- Primary oscillation of the honing stone
- Secondary, high-frequency oscillation
- Contact pressure of the honing stone

Example: Taper roller inner ring, bore diameter 50 mm

| Roughness | Ra 0.0553 µm |
| Stone contact time | 20 sec |
| stock removal | 8 µm |
OPERATOR SUPPORT ON TOUCH SCREEN

WORKPIECE VISUALIZATION AND AUTOMATIC NC-PROGRAM GENERATION (OPTIONAL)

See the workpiece on screen by entering dimensions into a template, and create the machining process by selecting from a table of options including pressure, rpms, frequency, amplitude, etc.

RACEWAY PROFILE OPTIMIZATION (OPTIONAL)

Logarithmic or convex raceway profiles can be preserved or even improved at their ends by overlapping-stroke-MICRO-FINISH with a narrow stone and variable speeds.

MENU-GUIDED CHANGE-OVER PROCEDURE (OPTIONAL)

Templates describing the different steps of the changeover procedure are used for a better understanding of the task. The operator follows the instructions on the screen and confirms the finished task. After confirmation the next template is shown on the screen. This procedure continues until all necessary steps have been performed. Only then can the machining program be started.
BEARINGSTAR MINI

Fully automatic MICROFINISH machine for machining raceways on miniature ball or roller bearings, inner and outer rings, according to a single-step-method

RING TYPES

- Deep groove ball bearings (DGBB)
- Angular contact ball bearings (ACBB)
- Cylindrical roller bearings (CRB)
- Special shaft bearings

TECHNICAL DATA

- Working stations: 1
- Workpiece diameters: 5 – 19 mm
- Workpiece width: 2.5 – 15 mm
- Workpiece speed: 0 – 36,000 rpm
- Oscillation frequency: 0 – 1,200 double strokes/min
- Radial oscillation angle: +/- 0 – 15°
- Linear oscillation stroke: 0 – 2 mm
- Stone pressure: 0 – 10 N

MACHINING SOLUTIONS

- 1-step machining with 1-stone type
- Rough and fine machining by varying cutting speed, stone pressure and oscillation
**BEARINGSTAR 50**

Fully automatic MICROFINISH machine for machining of raceways on ball and roller bearings, inner or outer rings, according to single- or two-step method.

**RING TYPES**
- 1- or 2-row radial ball bearings
- Axial ball bearings
- 1- or 2-row angular contact ball bearings
- Cylindrical roller bearings
- Taper roller bearings

**MACHINING SOLUTIONS**
- 1-step machining on single-station machine
- 1- or 2-step-machining selectable on two-station machine
- Outer or inner rings on 1 machine
- Rough and fine machining by varying cutting speed, stone pressure and oscillation

**TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer diameter of outer ring</td>
<td>17 – 42 mm</td>
</tr>
<tr>
<td>Inner diameter of inner ring</td>
<td>8 – 20 mm</td>
</tr>
<tr>
<td>Ring width</td>
<td>5 – 12 mm</td>
</tr>
<tr>
<td>Workspindle speed</td>
<td>0 – 12,000 rpm</td>
</tr>
<tr>
<td>Oscillation frequency</td>
<td>0 – 1,200 double strokes/min</td>
</tr>
<tr>
<td>Oscillation angle</td>
<td>+/- 0 – 18°</td>
</tr>
<tr>
<td>Linear oscillation stroke</td>
<td>0 – 6 mm</td>
</tr>
<tr>
<td>Stone pressure at 4.5 bar</td>
<td>0 – 140 N</td>
</tr>
<tr>
<td>No. of machining stations</td>
<td>1 or 2</td>
</tr>
</tbody>
</table>

Two-station machine BS 50

Single-station machine BS 50
BEARINGSTAR 100

Fully automatic MICROFINISH machine for machining of raceways on ball and roller bearings, inner or outer rings, according to single- or two-step method.

RING TYPES

- 1- or 2-row radial ball bearings
- Axial ball bearings
- 1- or 2-row angular contact ball bearings
- Cylindrical roller bearings
- Taper roller bearings

TECHNICAL DATA

- Outer diameter of outer ring: 32 – 90 mm
- Inner diameter of inner ring: 15 – 55 mm
- Ring width: 8 – 30 mm
- Work spindle speed: 0 – 9,000 rpm
- Oscillation frequency: 0 – 1,200 double strokes/min
- Oscillation angle: +/- 0 – 18°
- Linear oscillation stroke: 0 – 6 mm
- Stone pressure at 4.5 bar: 0 – 140 N
- No. of machining stations: 1 or 2

MACHINING SOLUTIONS

- 1-step machining on single-station machine BearingStar 111
- 1- or 2-step-machining selectable on two-station machine BearingStar 122
- Outer or inner rings in 1 machine
- Outer raceway and flange for taper roller inner rings in two-station machine BearingStar 122
- Rough and fine machining by varying stone pressure and oscillation

1- or 2-row radial ball bearings
Axial ball bearings
1- or 2-row angular contact ball bearings
Cylindrical roller bearings
Taper roller bearings
**TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer diameter of outer ring</td>
<td>85 – 200 mm</td>
</tr>
<tr>
<td>Inner diameter of inner ring</td>
<td>50 – 180 mm</td>
</tr>
<tr>
<td>Ring width</td>
<td>15 – 80 mm</td>
</tr>
<tr>
<td>Workspindle speed</td>
<td>0 – 3,000 rpm</td>
</tr>
<tr>
<td>Oscillation frequency</td>
<td>0 – 1,200 double strokes/min</td>
</tr>
<tr>
<td>Oscillation angle</td>
<td>+/- 0 – 18°</td>
</tr>
<tr>
<td>Linear oscillation stroke</td>
<td>0 – 6 mm</td>
</tr>
<tr>
<td>Stone pressure</td>
<td>80 – 360 N</td>
</tr>
<tr>
<td>No. of machining stations</td>
<td>1 or 2</td>
</tr>
</tbody>
</table>

**BEARINGSTAR 200**

Fully automatic MICROFINISH machine for machining of raceways on ball or roller bearings, inner and outer rings, according to single- or two-step method.
BearingStar 200 XL

Fully automatic MICROFINISH machine for machining of raceways on ball and roller bearings, inner or outer rings, according to single- or two-step method

RING TYPES

- 1- or 2-row radial ball bearings
- Axial ball bearings
- 1- or 2-row angular contact ball bearings
- Cylindrical roller bearings
- Taper roller bearings
- Spherical roller bearings

MACHINING SOLUTIONS

- 1-step machining on single-station machine BearingStar 211
- 1- or 2-step machining selectable on single-station machine BearingStar 212
- Outer or inner rings in 1 machine
- Outer raceway and flange for taper roller inner rings in single-station machine BearingStar 212
- OD polishing with tape unit
- Rough and fine machining by varying cutting speed, stone pressure and oscillation

TECHNICAL DATA

- Outer diameter of outer ring 180 – 320 mm
- Inner diameter of inner ring 100 – 270 mm
- Ring width 60 – 200 mm
- Workspindle speed 0 – 3,000 rpm
- Oscillation frequency 0 – 1,200 double strokes/min
- Oscillation angle +/- 0 – 18°
- Linear oscillation stroke 0 – 6 mm
- Stone pressure 80 – 360 N
- No. of machining stations 1
**BEARINGSTAR 300**

Fully or semi-automatic MICROFINISH machine for machining of raceways on ball and roller bearings, inner and outer rings, according to single- or two-step method.

**RING TYPES**
- 1- or 2-row radial ball bearings
- Axial ball bearings
- 1- or 2-row angular contact ball bearings
- Cylindrical roller bearings
- Taper roller bearings
- Spherical roller bearings

**TECHNICAL DATA**
- Outer diameter of outer ring: 200 – 600 mm
- Inner diameter of inner ring: 180 – 580 mm
- Ring width: 20 – 300 mm
- Workspindle speed: max. 1,000 rpm
- Oscillation frequency: 0 – 1,200 double strokes/min
- Oscillation angle: +/- 0 – 18°
- Linear oscillation stroke: 0 – 6 mm
- Stone pressure: max. 1,000 N
- No. of machining stations: 1

**MACHINING SOLUTIONS**
- 1- or 2-step machining
- Outer or inner rings
- Rough and fine machining by varying cutting speed, stone pressure and oscillation
- Flange microfinishing
- OD polishing

**RING TYPES**
- 1- or 2-row radial ball bearings
- Axial ball bearings
- 1- or 2-row angular contact ball bearings
- Cylindrical roller bearings
- Taper roller bearings
- Spherical roller bearings
MACHINING UNITS

- Radial oscillation unit with direct drive AC servo motor for ball bearings
- Linear oscillation unit with direct drive linear motor for roller bearings
- Cup wheel unit for spherical bearing outer rings
- Tape unit for machining of flanges
- Tape unit for polishing of outer diameter of outer rings
- Radial oscillation unit with AC servomotor for spherical roller inner rings
- MicroSens force-controlled cup wheel machining of spherical roller outer rings
**BearingStar 400**

Semi-automatic MICROFINISH machine for finishing of raceways on ball and roller bearings, inner or outer rings, according to single- or two-step method.

**RING TYPES**

- 1- or 2-row radial ball bearings
- Axial ball bearings
- 1- or 2-row angular contact ball bearings
- Cylindrical roller bearings
- Taper roller bearings
- Spherical roller bearings

**TECHNICAL DATA**

- Outer diameter of outer ring: 400 – 1,600 mm
- Inner diameter of inner ring: 300 – 1,400 mm
- Ring width: 40 – 500 mm
- Workspindle speed: 0 – 300 rpm
- Oscillation frequency: 0 – 1,200 double strokes/min
- Oscillation angle: +/- 6°
- Linear oscillation stroke: 0 – 6 mm
- Stone pressure max: 1,000 N
- No. of machining stations: 1

**CUP WHEEL MICROFINISH**
- on spherical roller bearing
  - outer ring raceway

**STONE MICROFINISH**
- on spherical roller bearing
  - inner ring raceway

**TAPE MICROFINISH**
- on taper roller bearing
  - outer ring raceway
MACHINING SOLUTIONS

- 1- or 2-step machining
- MicroSens force-controlled cup wheel machining for SRB outer rings
- Outer or inner rings
- Outer diameter polishing with tape unit
- Rough and fine machining by varying cutting speed, stone pressure and oscillation
- Tape MICROFINISH of roller bearings outer and inner rings
**TECHNICAL DATA**

- Working diameter: 3.8 – 80 mm
- Drive roll speed: 0 – 720 rpm
- Drive roll length: 1,090 mm
- Number of toll carriers: 8
- Tool oscillation frequency: 75 – 1,500 double strokes/min
- Horizontal oscillation stroke of the tool: 0 – 6 mm
- Vertical oscillation stroke of the tool: 50 mm
- Total power required: 9 kW
- Minimum compressed air pressure: 4.5 bar
- Flushing oil system – flow rate: 80 l/min

**BEARINGSTAR SF125**

Automatic MICROFINISH machine for machining small and medium rollers for mass production

**ROLLER TYPES**

- Cylindrical rollers
- Taper rollers
- Needle rollers

**MACHINING SOLUTIONS**

- Cylindrical profile
- Crown profile
- Logarithmic profile
**BEARINGSTAR PC24**

Automatic MICROFINISH machine for medium to large rollers in smaller lots

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**TECHNICAL DATA**

- **Working diameter**: 30 – 140 mm
- **Working length**: 30 – 200 mm
- **Number of working stations**: 1 – 2

**Stone unit**
- **Oscillation stroke**: ±1/±2/±3 mm
- **Oscillation frequency**: 0 – 1,600 double strokes/min
- **Tool contact pressure**: 20 – 160 N

**Tape unit**
- **Number of tape units**: 1(0)
- **Oscillation stroke**: ±1/±2/±3 mm
- **Oscillation frequency**: 0 – 1,600 double strokes/min
- **Tool contact pressure**: 20 – 160 N
- **Flushing oil system – flow rate**: 80 l/min

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**ROLLER TYPES**

- Cylindrical rollers
- Taper rollers
- Spherical tapered rollers
- Barrel-type rollers

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**MACHINING SOLUTIONS**

- Cylindrical profile
- Crown profile
- Logarithmic profile
Finishing • Grinding • Honing

All kinds of shafts

Flat and spherical surfaces

Double disc grinding

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**Extreme Precision for a Sustainable World**

– Manufactured Around the World

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