Ra Tpi

THIELENHAUS
MICROFINISH

HYPER FINISH 2.0

BearingStar

Innovation in precision machining

BearingStar mini | BearingStar 90 | KM 90 evo | BearingStar 120 | BearingStar 200 | BearingStar 320 | BearingStar 650 | Infinity 600 | Infinity 900 – 1100

THIELENHAUS
MICROFINISH

HIGHEST QUALITY PRECISION MACHINING OF ROLLER BEARING RACEWAYS

Precision machining of rolling bearings today has to be flexible, highly productive and economical. The BearingStar is a modern, modular machine solution that has been designed precisely with these aims in mind. Microfinish processing significantly improves the roundness and roughness of roller bearing surfaces, enabling top quality. After machining, the anti-friction bearings also display a higher load-bearing capacity and longer service life, as well as lower noise emissions.

BENEFITS AT A GLANCE

- **Increase in precision and performance** thanks to innovative Microfinish precision machining
- **Increased flexibility** through several tool oscillation units in one machine, e.g. for ball or roller bearing raceways
- **Universal machine platforms** for all anti-friction bearing types
- **Short set-up times** thanks to the menu-driven set-up and workpiece visualisation on the monitor
- **Interactive online direct service** via the Internet

NEW GENERATION OF MACHINES FOR FLEXIBLE AND EFFICIENT MICROFINISH MACHINING OF RACEWAYS

RING OUTSIDE DIAMETER

P. 5	BearingStar mini	5	–	19 mm
P. 6	BearingStar 90	26	–	90 mm
P. 6	BearingStar 120	60	–	120 mm
P. 7	KM 90 evo	26	–	90 mm
P. 8	BearingStar 200	85	–	200 mm
P. 9	BearingStar 320	180	–	320 mm
P. 10	BearingStar 650	200	–	650 mm

ROLLER OUTSIDE DIAMETER

P. 11	Infinity 600	1.5	–	15 mm* (50 mm)
P. 11	Infinity 900 – 1100	5	–	35 mm

*Main area of application

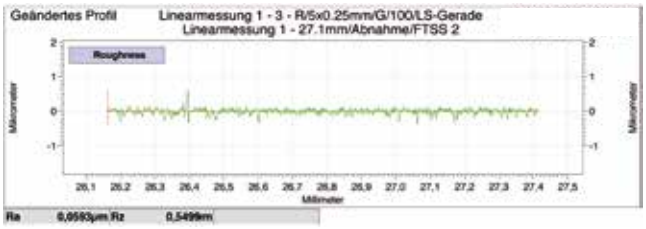
HYPERFINISH:
SHORTER PROCESSING TIME + HIGHER QUALITY

Equipped with the innovative HyperFinish technology (optional), up to 4 µm more material removal can be achieved and, depending on the workpiece and task, higher qualities as well. Your increased productivity will allow you to do without additional machining stations and/or machines, resulting in operational cost savings.

- **Up to 4 µm more material removal** thanks to a higher level of tool cutting capability
- **Improved quality and form parameters thanks to a reduced oscillation angle**
- **Highest quality with transverse shape and roundness** by plunge-cutting with wide honing stone tool on four-point ball tracks with gothic profile

CONVENTIONAL PROCESSING PRINCIPLE

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

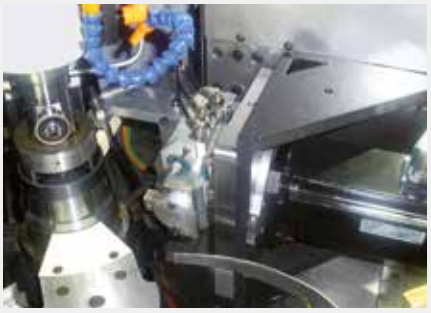


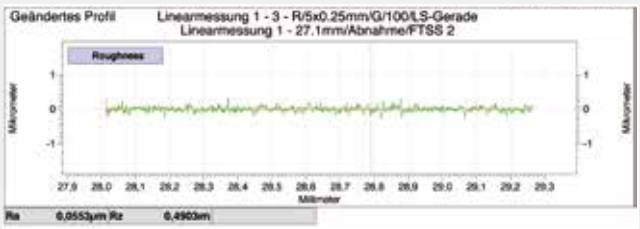
Roughness	Ra 0.0593 µm
Stone contact time	25 sec
Material removal	5 µm

Example: Tapered roller bearing inner ring, 50 mm bore

HYPERFINISH PROCESSING PRINCIPLE (OPTIONAL)

- Rotation of the workpiece
- Main oscillation of the honing stone
- Additional, high-frequency oscillation
- Contact of the honing stone





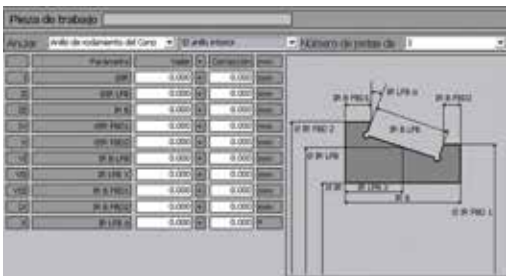
Roughness	Ra 0.0553 µm
Stone contact time	20 sec
Material removal	8 µm

Example: Tapered roller bearing inner ring, 50 mm bore

MENU-GUIDED OPERATOR SUPPORT

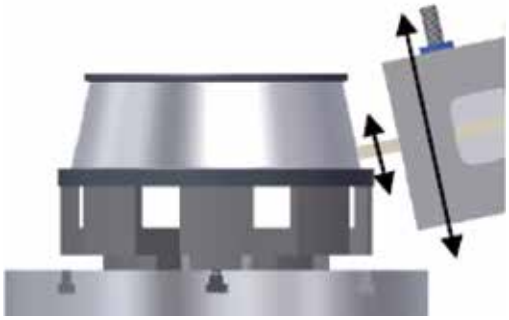
WORKPIECE VISUALISATION AND AUTOMATIC NC PROGRAM GENERATION (OPTIONAL)

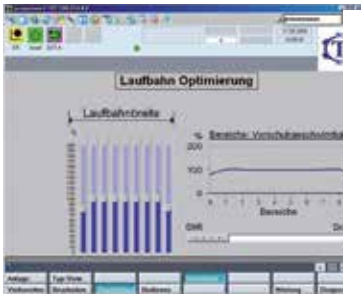
The input of the workpiece dimensions can be done on a screen displaying the workpiece with its main dimensions and the machining process as a table with forces, speeds, etc.

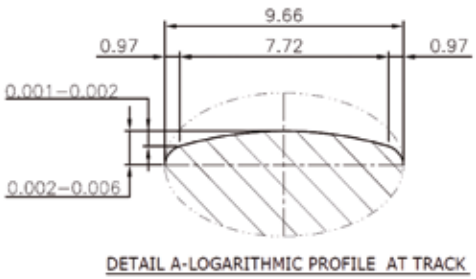


RACEWAY PROFILE OPTIMISATION (OPTIONAL)

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







MENU-GUIDED SETUP (OPTIONAL)

Screens can be created to visualise the set up, which display the setup tasks in order. The operator carries out the task and confirms it has been executed. After confirmation the next task to be carried out 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 miniature ball and roller bearing inner and outer rings according to the 1-step method

RING TYPES

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

TECHNICAL DATA

Number of machining stations	1
Workpiece diameter	5 – 19 mm
Workpiece width	2.5 – 15 mm
Workpiece spindle 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 contact pressure	0 – 10 N

MACHINING SOLUTIONS

- 1-step machining with a stone type
- Pre- and final machining by changing the cutting speed, stone contact pressure and oscillation

BEARINGSTAR BS 90 / BS 120

Fully automatic MICROFINISH machines for machining ball and roller bearing inner and outer rings in line with the 1- or 2-step method

RING TYPES

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

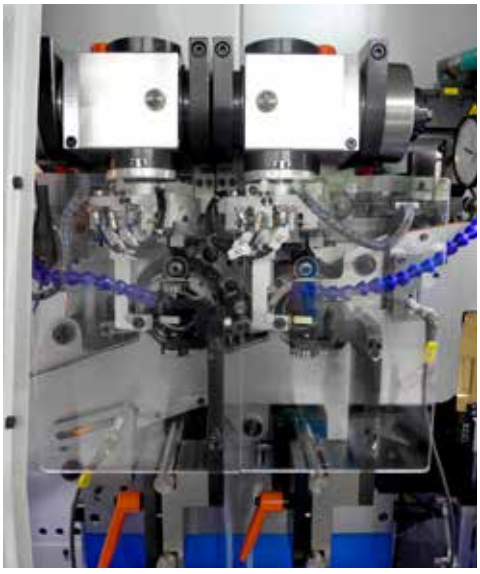
MACHINING SOLUTIONS

- 1-step machining on a 1-station machine
- 1- or 2-step machining as desired on a 2-station machine
- Outer or inner rings in one machine
- Pre- and final machining by changing the cutting speed, stone contact pressure and oscillation
- Mechanical radial or linear oscillation
- Mechanical adjustment of the raceway position
- P2 raceway quality

TECHNICAL DATA

	BS 90	BS 120
OR - outside diameter	26 – 90 mm	60 – 120 mm
IR - inside diameter	10 – 50 mm	30 – 80 mm
Ring width	8 – 35 mm	12 – 40 mm

	BS 90 / BS 120
Workpiece spindle speed	0 – 6,000 rpm
Oscillation frequency	0 – 1,200 double stroke/min
Oscillation angle	+/-0 – 18°
Linear oscillation stroke	0 – 6 mm
Stone contact pressure	0 – 170 N
Number of machining stations	1 or 2



KM 90 EVO

Fully automatic MICROFINISH machine for machining ball and roller bearing inner and outer rings in line with the 1- or 2-step method for **flexible maching** with NC adjustment of the raceway position and direct drive of the oscillation unit

RING TYPES

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

TECHNICAL DATA

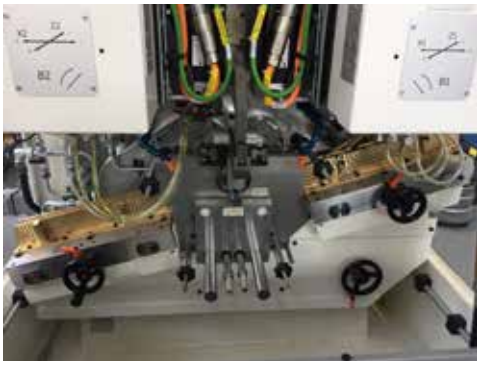
Outer ring outside diameter	26 – 90 mm
Inner ring inner diameter	10 – 50 mm
Ring width	8 – 55 mm
Workpiece spindle speed	0 – 10,000 rpm
Oscillation frequency	0 – 1,200 double stroke/min
Oscillation angle	+/-0 – 16°
Linear oscillation stroke	0 – 6 mm
Stone contact pressure	0 – 140 N
Number of machining stations	2

COMPARISON KM 90 EVO AND BS 90

MACHINE TYPE	BS 90	KM 90 EVO
Number of machining stations	1 or 2	2
Mechanical radial or linear oscillation unit with **manual** adjustment of oscillation, oscillation angle and stroke	yes	no
Direct drive radial or linear oscillation unit with **automatic** adjustment of oscillation, oscillation angle and stroke	yes (optional)	yes
HyperFinish® technology for up to 4 µm more material removal and for four-point ball bearing raceways	no	yes (optional)
Microfinish of ball and roller bearing raceways in just one machine	no	yes
NC setting of the X-Z axis position of the raceways	yes (optional)	yes
Use tooling from previous version	no	yes
Raceway quality	P2	P2
Loading and unloading	1.8 s	1.0 s

MACHINING SOLUTIONS

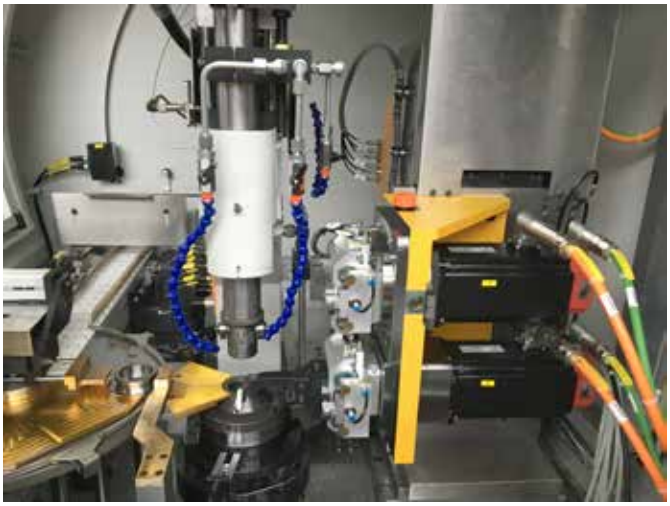
- 1- or 2-step machining option
- Outer or inner rings in one machine
- Outer raceway and board for tapered roller inner rings
- Direct driven radial or linear oscillation unit
- NC adjustment of the raceway position
- P2 raceway quality
- Use tooling from the previous version
- Automatic programming
- Driver height adjustment
- HyperFinish® technology (optional)
- Menu-guided setup (optional)



BEARINGSTAR 200

Fully automatic MICROFINISH machine for machining ball and roller bearing inner and outer rings in line with the 1- or 2-step method

TECHNICAL DATA



Outer ring outside diameter	85 – 200 mm
Inner ring inner diameter	50 – 180 mm
Ring width	15 – 80 mm
Workpiece spindle speed	0 – 3,000 rpm
Oscillation frequency	0 – 1,200 double strokes/min
Oscillation angle	+/-0 – 18°
Linear oscillation stroke	0 – 6 mm
Stone contact pressure	80 – 360 N
Number of machining stations	1 or 2

BEARINGSTAR 320

Fully automatic MICROFINISH machine for machining ball and roller bearing inner and outer rings in line with the 1- or 2-step method

RING TYPES

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

TECHNICAL DATA

Outer ring outside diameter	180 – 320 mm
Inner ring inner diameter	100 – 270 mm
Ring width	20 – 200 mm
Workpiece spindle speed	0 – 3,000 rpm
Oscillation frequency	0 – 1,200 double stroke/min
Oscillation angle	+/-0 – 18°
Linear oscillation stroke	0 – 6 mm
Stone contact pressure	80 – 360 N
Number of machining stations	1

MACHINING SOLUTIONS

- 1- or 2-step machining
- Outer or inner rings on one machine
- Outer raceway and board for tapered roller inner rings on 1-station machine
- Outer diameter polishing with belt unit (optional)
- Range velocity programming for crowned or logarithmic roller raceways (optional)

BEARINGSTAR 650

Fully automatic MICROFINISH machine for machining ball and roller bearing inner and outer rings in line with the 1- or 2-step method

RING TYPES

- 1- or 2-row radial ball bearings
- Axial ball bearings
- 1- or 2-row angular ball bearings
- 1- or 2-row cylindrical roller bearings
- 1- or 2-row tapered roller bearings
- Spherical roller bearings

MACHINING SOLUTIONS

- 1- or 2-step machining
- Outer or inner rings
- Pre- and final machining by changing the cutting speed, stone contact pressure and oscillation
- Board Microfinish
- Outer diameter polishing with belt unit (optional)
- Microfinish of crowned or logarithmic roller tracks with vertical adjustment of the honing stone allows increased overall speed and reduction in machining time.

TECHNICAL DATA

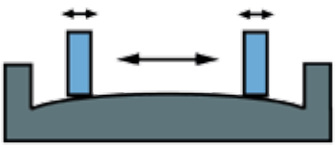
Outer ring outside diameter	200 – 650 mm
Inner ring inner diameter	180 – 580 mm
Ring width	20 – 300 mm
Workpiece spindle speed	max. 1,000 rpm
Oscillation frequency	0 – 1,200 double strokes/min
Oscillation angle	+/-0 – 18°
Linear oscillation stroke	0 – 6 mm
Stone contact pressure	max. 360 N
Number of machining stations	1

MicroSens power-controlled cup wheel machining of roller bearing outer rings

Radial oscillation unit for roller bearing inner rings

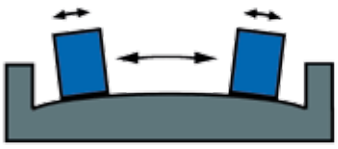
INNOVATION (PATENT)

Linear oscillation unit with integrated torque motor



CONVENTIONAL SOLUTION

Machining with narrow tool and overlay stroke without pitch correction



NEW SOLUTION

Wide toolpiece machining and overlay stroke with pitch correction

INFINITY

Automatic MICROFINISH machine for machining small and medium-sized rollers in mass production

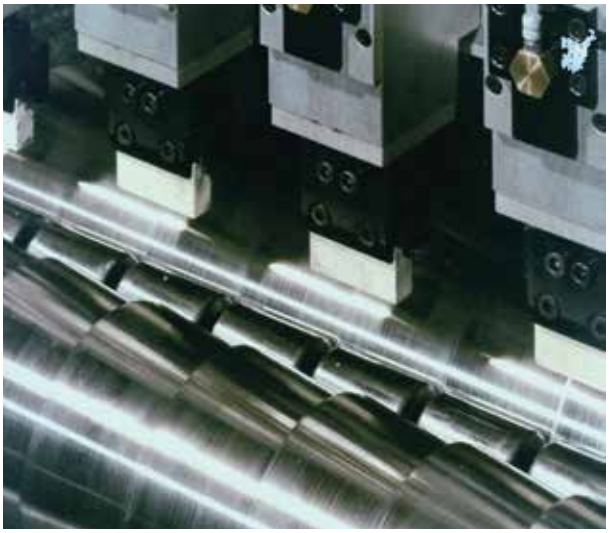
ROLLER TYPES

- Cylindrical rollers
- Tapered rollers
- Needle rollers

TECHNICAL DATA

	INFINITY 600	INFINITY 900 – 1100
Machining diameter	1.5 – 15 mm* (50 mm)	6 – 35 mm
Drive roller speed	0 – 720 rpm	0 – 720 rpm
Drive roller length	600 mm	900 – 1,100 mm
Number of tool carriers	8	10
Tool oscillation frequency	75 – 2,500 double strokes/min	75 – 2,500 double strokes/min
Horizontal tool oscillation stroke	0 – 4 mm	0 – 4 mm
Vertical tool oscillation stroke	50 mm	50 mm
Total connection	9 kW	9 kW
Minimum compressed air	4.5 bar	4.5 bar
Flushing oil flow rate	80 l/min	80 l/min

* Main area of application



MACHINING SOLUTIONS

- Cylinder profile
- Crowned profile
- **Logarithmic profile**

The Power of Precision.

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