HAFNER

Measuring and Crack Testing Automaton for Brake Disc

Brief description

- measuring automaton for 100% check

Measuring task

- measurement of diameters, lengths, form tolerances (flatnesses, roundnesses), orientation tolerances (parallelisms), location tolerances (concentricities), run-out tolerances (radial run-outs, axial run-outs), ripple, detection of cracks transverse to the direction of rotation

Technology

- tactile
- dynamic

Special features

- cycle time: ≤ 9 s
- loading/unloading: on a conveyor
- changeover: automatic
- identification of the types of workpieces for mix mode
- nok-classification
- marking station for marking on the friction ring surface

HAFNER

Measuring Automaton for Ceramic Brake Disc

Brief description

- measuring automaton for 100% check

Measuring task

- measurement of diameters, lengths, form tolerances (flatnesses), orientation tolerances (parallelisms), run-out tolerances (radial run-outs, axial run-outs), ripple, DTV – Disc Thickness Variation

Technology

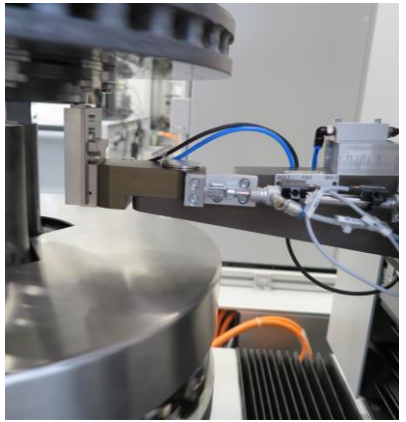
- tactile
- dynamic

Tolerances

- ≤ 3 µm

Special features

- cycle time: < 2,5 min, loading/unloading excluded
- wide range of workpieces: brake disc-Ø 250 – 500 mm
- workpiece clamping in center bore-Ø 55 – 110 mm
- changeover: without
- loading/unloading: manual
- control system: PLC control



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Measuring Automaton for Truck Brake Disc

Brief description

- measuring automaton post-process

Measuring task

- measurement of diameters, lengths, form tolerances (flatnesses, roundnesses), orientation tolerances (parallelisms), location tolerances (concentricities), run-out tolerances (radial run-outs, axial run-outs), ripple, thickness measurement ventilation duct (static)

Technology

- tactile
- dynamic, and static if necessary (thickness ventilation duct)

Special features

- cycle time: < 20 s
- loading/unloading: portal or robot or a conveyor
- changeover: automatic
- identification of the types of workpieces
- mix mode for different types of workpieces

HAFNER

Measuring Automaton for Brake Disc

Brief description

- measuring automaton for 100% check

Measuring task

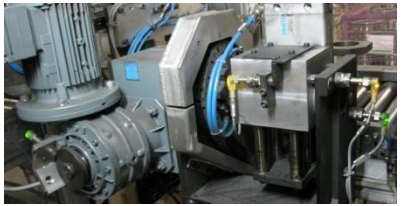
- measurement of diameters, lengths, form tolerances (flatnesses, roundnesses), orientation tolerances (parallelisms), location tolerances (concentricities), run-out tolerances (radial run-outs, axial run-outs), ripple

Technology

- tactile
- dynamic

Special features

- cycle time: < 10 s
- loading/unloading: on a conveyor
- changeover: automatic
- workpiece marking by means of pin marker or ink jet
- identification of the types of workpieces
- mix mode of 150 different types of workpieces



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Measuring Automaton for Brake Disc Blank

Brief description

- measuring automaton for 100% check

Measuring task

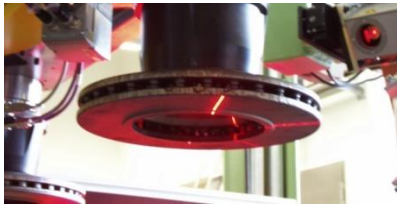
- measurement of diameters, lengths, surfaces inspection, duct check

Technology

- contactless, optical
- dynamic

Special features

- cycle time: < 4,6 s
- loading/unloading: on a conveyor
- calibration: automatic
- changeover: automatic
- identification of the types of workpieces
- batch mode of 150 different types of workpieces



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Measuring Device for Brake Disc Pot

Brief description

- measuring device for sample check

Measuring task

- measurement of diameters
  (two-ball measurement with measuring balls)

Technology

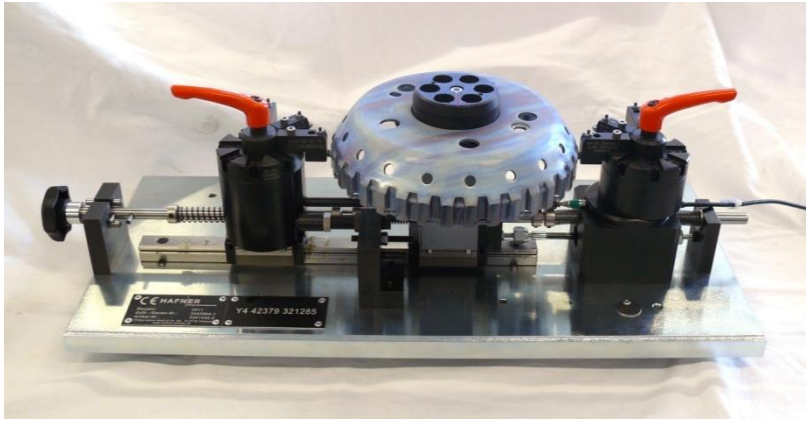
- tactile
- static

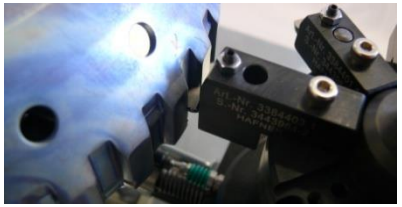
Tolerances

- ± 30 µm

Special features

- standard measuring device (ZMV250)
- batch mode for three different workpieces
- measuring in two measuring levels





HAFNER

Measuring Automaton for Brake Disc Pot

Brief description

- measuring automaton for 100% check

Measuring task

- measurement of diameters (two-ball measurement with measuring balls)

Technology

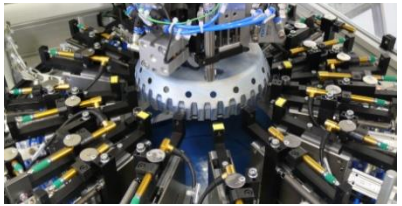
- tactile
- static

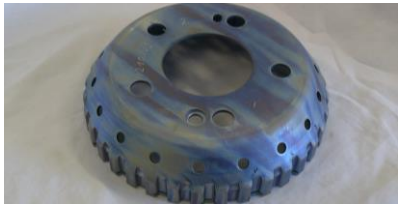
Tolerances

- ± 30 µm

Special features

- measurement: four diameters in two measuring levels
- cycle time: ca. 15 s
- loading/unloading: with an integrated three axis handling
- radial work piece alignment with “search function“ and servo axis
- calibration: automatic
- changeover: without changeover for several types
- nok-classification





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Measuring System for Wheel Flanges

Brief description

- measuring system for sample check

Measuring task

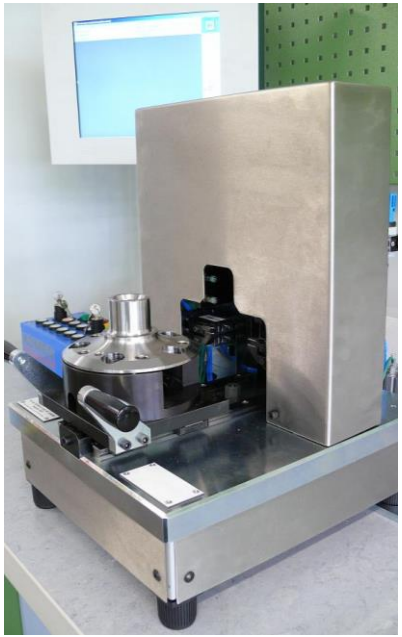
- measurement of diameters, lengths

Technology

- tactile
- static

Special features

- loading/unloading: manual
- calibration: manual
- changeover: without changeover
- mix mode for 3 different types of workpieces



HAFNER

Measuring Automaton for Wheel Hub

Brief description

- measuring automaton postprocess

Measuring task

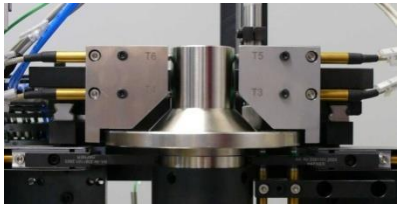
- measurement of diameters, run-out tolerances (radial run-outs, axial run-outs), temperature/compensation of the temperature

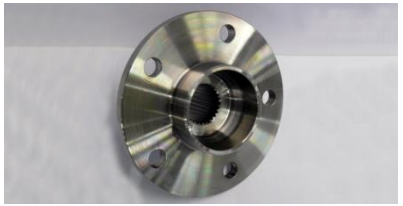
Technology

- tactile
- dynamic

Special features

- loading/unloading: with a handling supplied by the customer
- calibration: automatic





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HAFNER

Measuring Automaton for Axle Housing

Brief description

- measuring automaton postprocess

Measuring task

- measurement of diameters, lengths, temperature

Technology

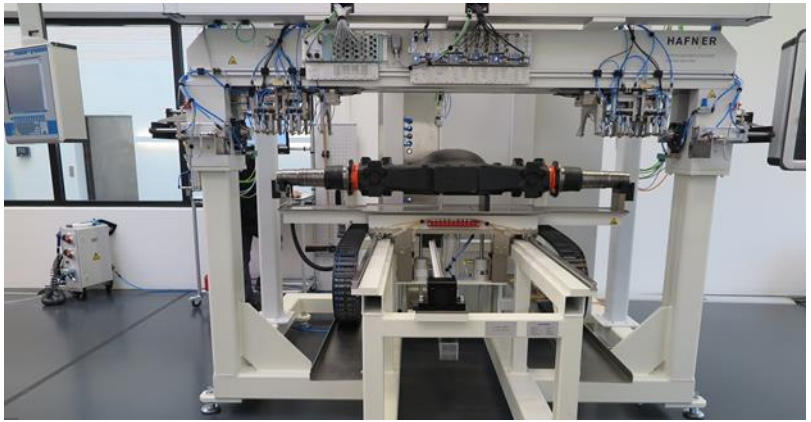
- static
- tactile

Tolerances

- 152 H6 / 158 h7

Special features

- cycle time: < 30 s
- loading/unloading: with handling supplied by customer
- changeover: automatic; no changeover for axis lengths 2115mm & 2121mm; manual changeover for axis length 2211mm
- temperature compensation: 5 diff. temperature zones on workpiece
- length / distance measurement of L=1.800 mm is only possible due to a special measurement system & temperature compensation (1.800 mm x 1°K cause a length change of 0,020 mm)



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HAFNER

Measuring Automaton for Steering Shaft

Brief description

- measuring automaton for 100% check

Measuring task

- measurement of length, run-out tolerances (radial run-outs)

Technology

- tactile as well as contactless, optical
- static

Special features

- loading/unloading: with a handling supplied by the customer
- calibration: automatic
- control system: external control
- using of a light-band sensor for measuring of the crack

3439357/ib

HAFNER

Measuring Automaton for Steering Pinion

Brief description

- measuring automaton postprocess

Measuring task

- measurement of diameters, run-out tolerances (rough outline to centers)

Technology

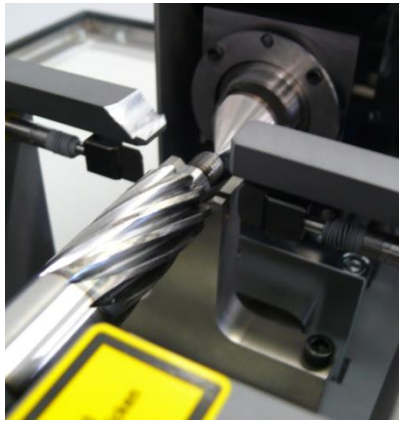
- tactile as well as contactless, optical
- dynamic

Tolerances

- Ø-tolerances <10µm

Special features

- cycle time: ≤ 10s
- loading/unloading: with a handling supplied by the customer
- calibration: automatic
- changeover: manual, in approx. 10 minutes
- control system: external control
- measurement of 12 different types of workpieces by use of set of replacement parts
- nok-classification by handling supplied by the customer



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Measuring Device for Steering Piston and Worm

Brief description

- measuring device for sample check

Measuring task

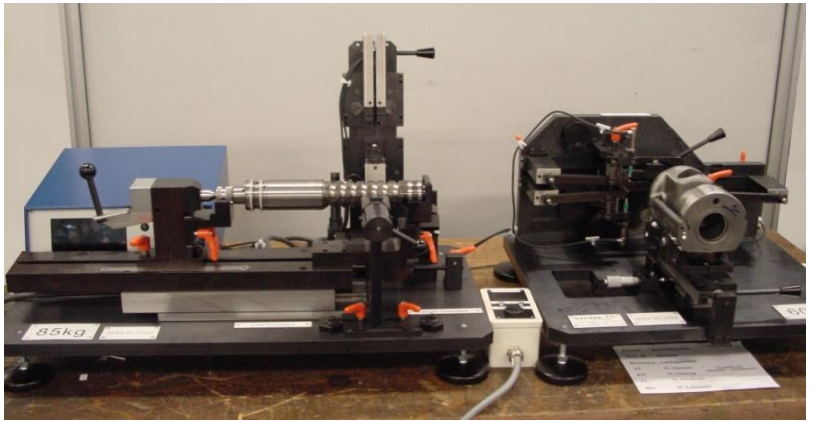
- measurement of diameter of the ball screw track

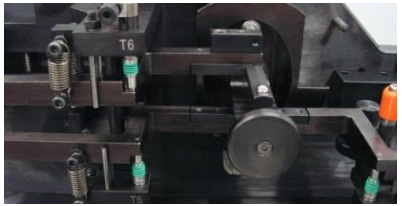
Technology

- tactile
- static

Special features

- loading/unloading: manual
- changeover: manual





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Measuring Automaton for Steering Piston

Brief description

- measuring automaton postprocess

Measuring task

- measurement of diameter of the ball screw track

Technology

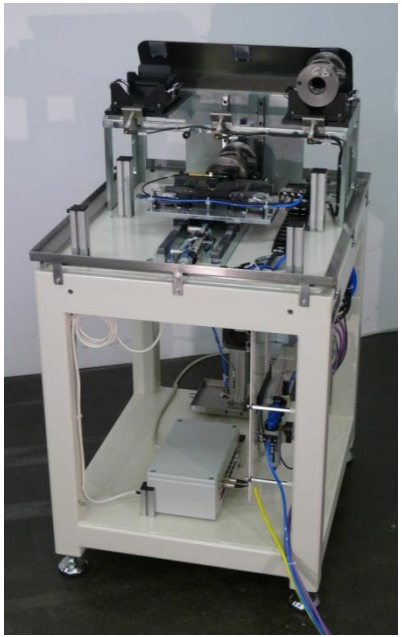
- tactile
- static

Tolerances

- Ø tolerance = 0,1 mm

Special features

- loading/unloading: with a handling supplied by the customer
- calibration: automatic
- changeover: manual
- workpieces with different thread pitches and outer contours can be measured



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Measuring Automaton for Steering Nut

Brief description

- measuring automaton for 100% check

Measuring task

- measurement of diameter of the ball screw track

Technology

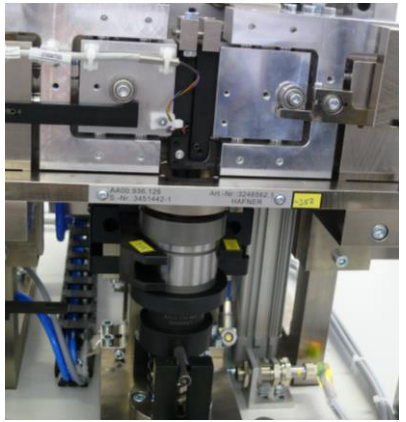
- tactile
- dynamic

Tolerances

- Ø tolerance 30 µm

Special features

- cycle time: 20 s for 1 measurement (40 s for 2 measurements)
- loading/unloading: manual
- calibration: automatic
- changeover: manual
- control system: PLC control



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Measuring Automaton for Steering Nut

Brief description

- measuring automaton postprocess

Measuring task

- measurement of diameter of the ball screw track

Technology

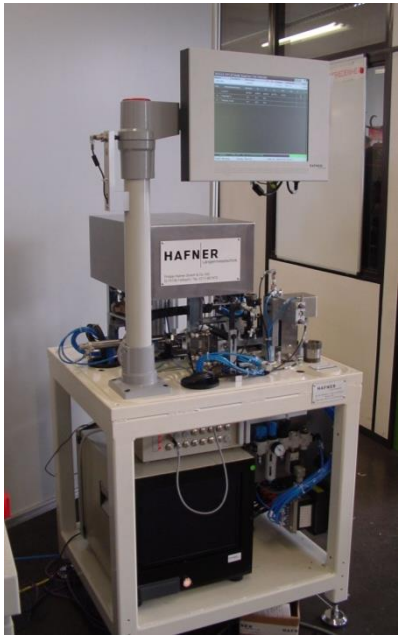
- tactile
- dynamic

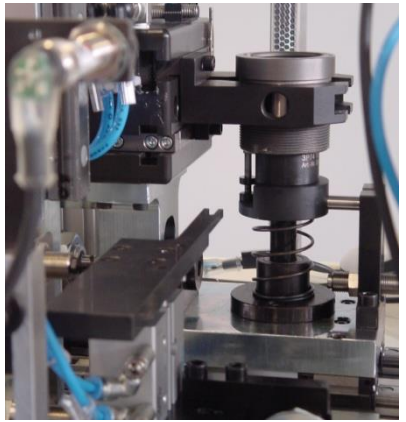
Tolerances

- Ø tolerance: ± 0,015 mm

Special features

- loading/unloading: with a handling supplied by the customer





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Measuring Automaton for Steering Nut

Brief description

- measuring automaton postprocess

Measuring task

- measurement of diameter of the ball screw track, form tolerances (roundnesses), thread pitches

Technology

- tactile
- dynamic

Tolerances

- roundnesses, pitch and diameter tolerances in the range of 3 to 8µm each with a repeatability < 1µm

Special features

- loading/unloading: manual or with a handling supplied by the customer
- control system: PLC control
- measurement of the characteristics possible for each thread

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Measuring Automaton for Steering Nut

Brief description

- measuring automaton for 100% check

Measuring task

- measurement of diameter of the ball screw track

Technology

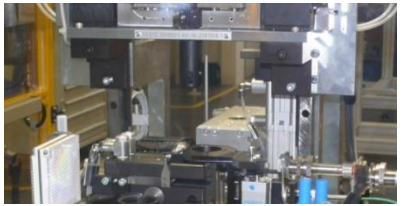
- tactile
- dynamic

Tolerances

- Ø tolerance 10 µm

Special features

- cycle time: <16 s
- integrated into interlinking
- reading station for DMC-Code
- calibration: automatic



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Measuring Device for Steering Nut

Brief description
- measuring device for sample check

Measuring task
- measurement of diameter of the ball screw track

Technology
- tactile
- dynamic (manual)

Tolerances
- Ø tolerance: ± 0,005 mm

Special features
- measurement of the characteristics possible for each thread

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Measuring System for Gear Rack

Brief description

- measuring system for sample check

Measuring task

- measurement of diameters of ball screw track, thread pitch

Technology

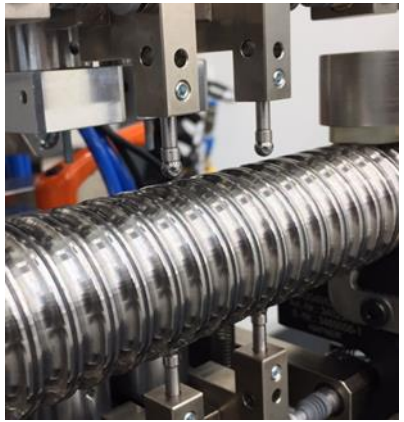
- tactile
- dynamic

Tolerances

- tolerance pitch error: ± 0,001 mm

Special features

- cycle time: 15 s
- loading/unloading: manual
- calibration: manual
- changeover: changeover with set of replacement parts, without readjustment of the probes
- control system: PC control



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Measuring Automaton for Gear Rack

Brief description

- measuring automaton postprocess

Measuring task

- measurement of diameter of the ball screw track, form tolerances (straightnesses), pitches

Technology

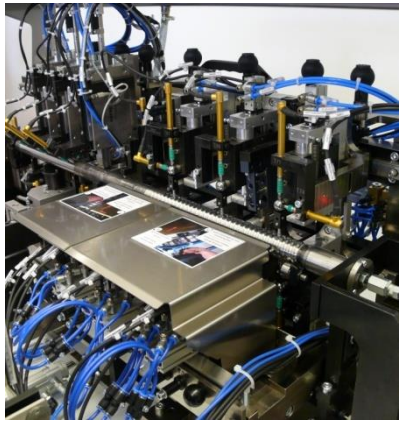
- tactile
- dynamic

Tolerances

- Ø tolerance: ± 0,01 mm

Special features

- loading/unloading: with a handling supplied by the customer



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Measuring Automaton for Gear Rack

Brief description

- measuring automaton for 100% check

Measuring task

- measurement of diameter of the ball screw track, form tolerances (straightnesses), pitches

Technology

- tactile
- dynamic

Tolerances

- Ø tolerance ± 5 µm

Special features

- cycle time: <16 s
- integrated into interlinking
- reading station for DMC-Code
- calibration: automatic
- manual changeover for other work piece types possible

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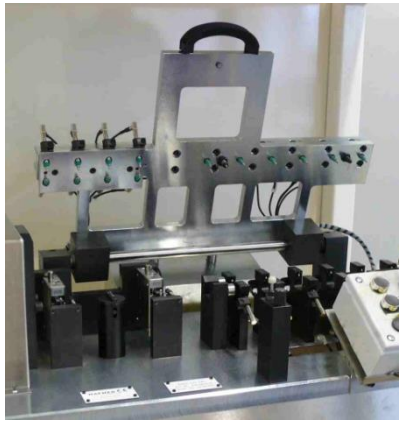
Measuring Device for Gear Rack

Brief description
- measuring device for sample check

Measuring task
- measurement of location tolerances (symmetries, concentricities)

Technology
- tactile
- static

Special features
- cycle time: < 20 s.



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Measuring Device for Gear Rack

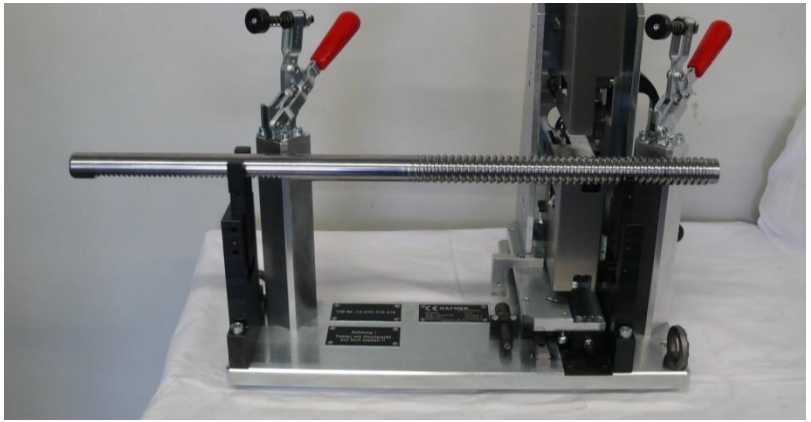
Brief description
- measuring device for sample check

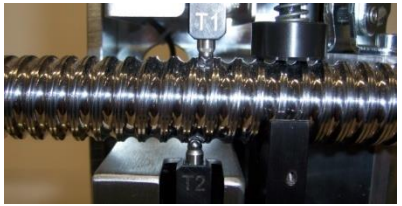
Measuring task
- measurement of diameter of the ball screw track

Technology
- tactile
- dynamic (manual)

Tolerances
- Ø tolerance : ± 0,01 mm

Special features
- measurement of the characteristics possible for each thread





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Measuring Automaton for Ball Screw Nut

Brief description
- measuring machine assembly process

Measuring task
- measurement of ball screw diameter

Technology
- tactile
- dynamic

Tolerances
- Ø tolerance ± 20 µm

Special features
- cycle time: 10 s
- loading/unloading: with a handling supplied by the customer
- calibration: automatic
- changeover: possible
- control system: PLC control

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MEASURING TECHNOLOGY
FOR FIRST RATE PRODUCTION

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Measuring Automaton for Ball Screw Spindle

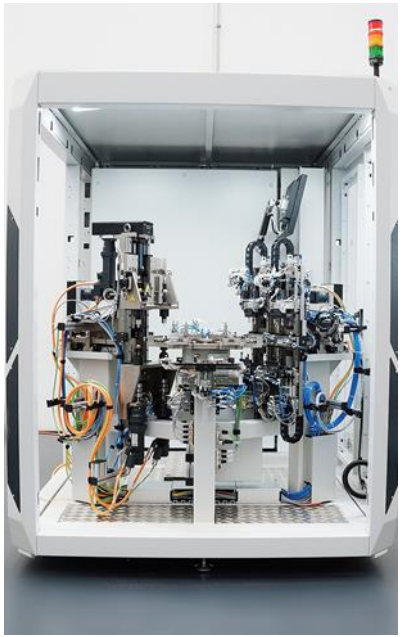
Brief description
- measuring machine assembly process

Measuring task
- measurement of ball screw diameter

Technology
- tactile
- dynamic

Tolerances
- Ø tolerance ± 15 µm

Special features
- cycle time: 10 s
- loading/unloading: with a handling supplied by the customer
- calibration: automatic
- changeover: possible
- control system: PLC control



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HAFNER

Measuring Automaton for Steering Pinion

Brief description

- measuring automaton postprocess

Measuring task

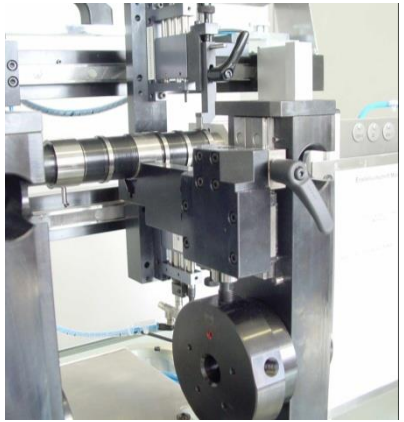
- measurement of diameters

Technology

- tactile
- static

Special features

- loading/unloading: with a handling supplied by the customer
- changeover: manual in 3 min.
- batch mode of 10 different types of workpieces



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HAFNER

Measuring System for Threaded Tube

Brief description

- measuring system for sample check

Measuring task

- measurement of lengths (groove)

Technology

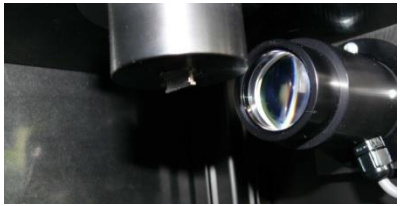
- contactless, optical

Tolerances

- lengths tolerance = 0,1 mm

Special features

- loading/unloading: manual
- calibration: manual
- interface to second measuring computer (data interface and handshake via Ethernet)



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Measuring Automaton for Support Frame

Brief description

- measuring automaton post-process

Measuring task

- measurement of diameters, system level distance, location tolerances (positions), form tolerances (roundnesses)

Technology

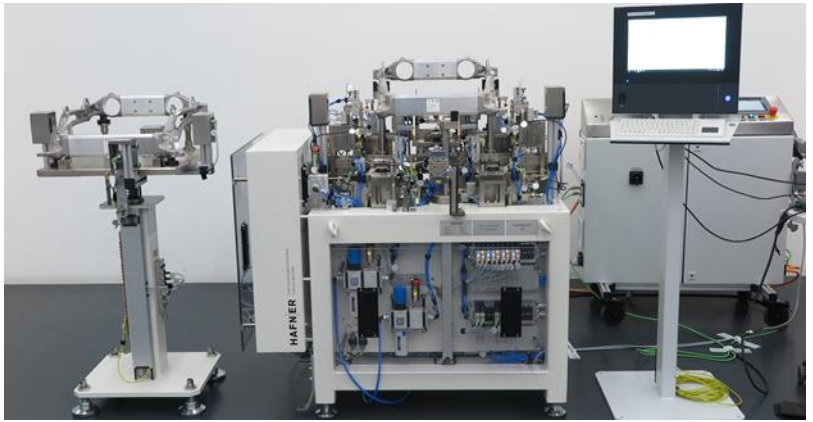
- tactile
- dynamic

Tolerances

- Ø tolerance ± 0,4 mm
- distance tolerance ± 0,5 mm

Special features

- cycle time: < 20 s
- loading/unloading: with a handling supplied by the customer (robot)
- calibration: automatic
- changeover: without changeover
- control system: external control
- reading station for DMC-Code



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HAFNER

Measuring System for Balancing Crank

Brief description

- measuring system for sample check

Measuring task

- measurement of diameters, orientation tolerances (parallelisms), location tolerances (concentricities)

Technology

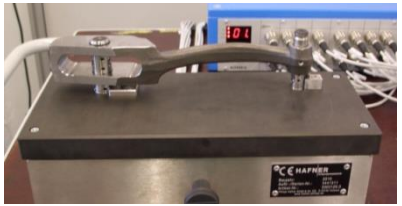
- tactile
- static

Tolerances

- Ø tolerance = 15 µm

Special features

- loading/unloading: manual
- calibration: manual
- for the measurement the workpiece is inserted at first on one side, afterwards on the other side



HAFNER

Measuring Devices and Gauges for Wheel Carrier

Brief description

- measuring devices and gauges for sample check

Measuring task

- measurement resp. gauging of diameters, lengths, orientation tolerances (parallelisms) , location tolerances (positions), bezels, thread

Technology

- tactile
- static

Special features

- measuring desk designed for wheel carrier left / right

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Measuring Automaton for Auxiliaries Bracket

Brief description

- measuring automaton for 100% check

Measuring task

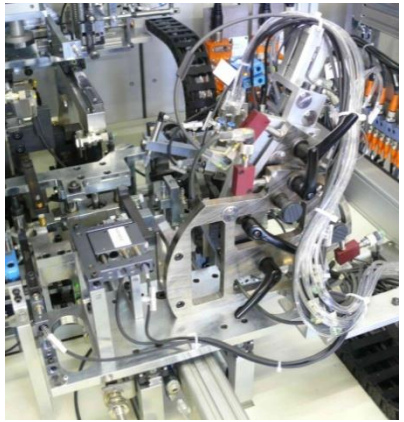
- measurement of diameters, lengths form tolerances (flatnesses, roundnesses), orientation tolerances (parallelisms, right angularities), location tolerances (positions)

Technology

- tactile as well as contactless, optical
- static

Special features

- loading/unloading: with an integrated handling
- calibration: automatic
- changeover: manual, without readjustment of the probes
- nok-classification
- batch mode of 4 different types of workpieces



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Measuring Automaton for Integral Carrier

Brief description

- measuring automaton for 100% check

Measuring task

- measurement of mid point of fixing points/bores, positions, distances, angle positions

Technology

- tactile
- static

Special features

- cycle time < 40 s for 50 measuring characteristics
- calibration: automatic
- workpiece marking by means of pin marker or scratch marker

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