IQ CLAMPING DEVICES

Clamping devices with integrated
intelligent measuring technology

HAINBUCH

YOUR CHALLENGES

- Obligation to document measurements
- Deviations of clamping force
- Shortage of skilled workers

- Deformation of workpieces
- Long throughput times
- Process deviations
- Low productivity
- High scrap rate
- Unmanned production 24/7
- High maintenance costs

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IQ clamping devices

OUR SOLUTION – IQ CLAMPING DEVICES

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What is an IQ clamping device?

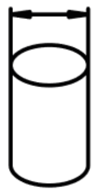
Clamping devices for measurement of defined parameters and contactless transmission of data.

Areas of application: O.D. and I.D. clamping

Process integration: In-Line measurement [measuring and clamping in one step]
Post-Process measurement [quality control].

Advantages:

- No need for separate measuring machines or stations
- Increased part quality and quantity
- Traceable, certifiable process
- Integration into automated process possible



Measurement of clamped workpieces

Monitoring of clamping force

Check of workpiece contact

MEASURING AND MONITORING OPTIONS

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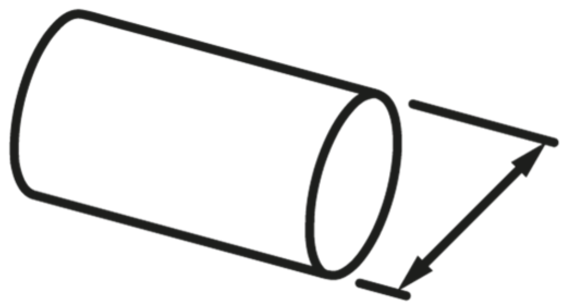
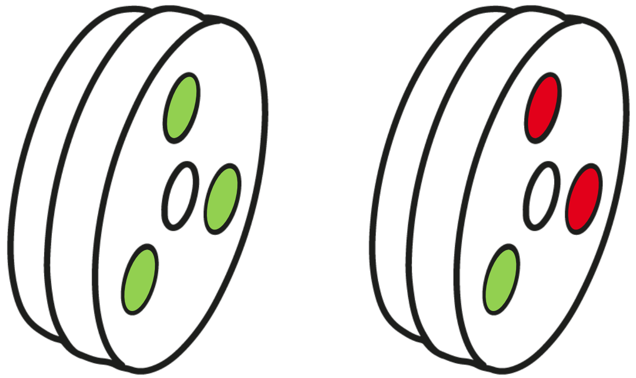
Measurement of clamped workpieces

- Measuring accuracy ≤ 0.01 mm [In-Line] & ≤ 0.001 mm [Post-Process]
- Use of measurement data for control circuit
  - Ejection of scrap parts - no further machining
  - Adaptation of machining parameters
  - Dynamic reaction to raw material tolerances
  - Recognition of tool wear



Check of workpiece contact

- Query through the 3-point part support contact
- Detection via sensors – no air sensing control necessary
- Detection of foreign objects
  - Minimum thickness ≥ 0.01 mm



MEASURING AND MONITORING OPTIONS

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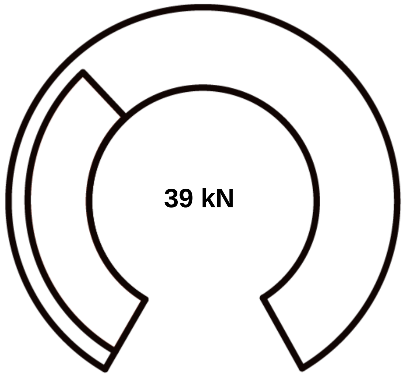
Monitoring of clamping force

- Predictive Maintenance
    - Monitoring and analysis of the maintenance condition of the clamping device
    - Condition monitoring - long-term recording and evaluation

- Defined clamping force
    - Permanent clamping force monitoring
    - Correction of clamping force control circuit clamping force actuators
        - High clamping force - high cutting speeds and cutting depths
        - sensitive low clamping force - deformation-critical workpieces



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Application examples – IQ clamping devices in use

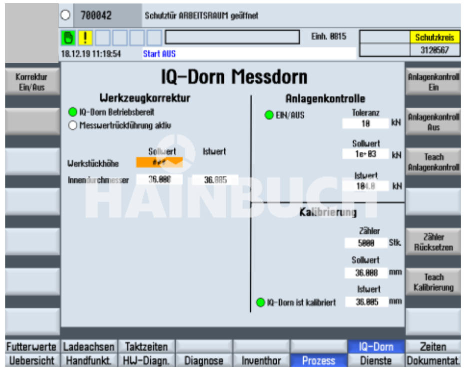
AUTOMATED GRINDING CELL [GEARS]

- Components are measured in the process
- IQ mandrel replaces expensive, labor intensive measuring station
- Measurement of the ground inner bore
  - Components within tolerances?
  - Components ground?

Advantages

- Avoidance of further processing of scrap parts
- No need for expensive measuring stations
- Automatic sorting out of scrap parts
- Automated process

PICK-UP TURN-MILL CENTER [BALL CAGE RETAINER BLANKS]

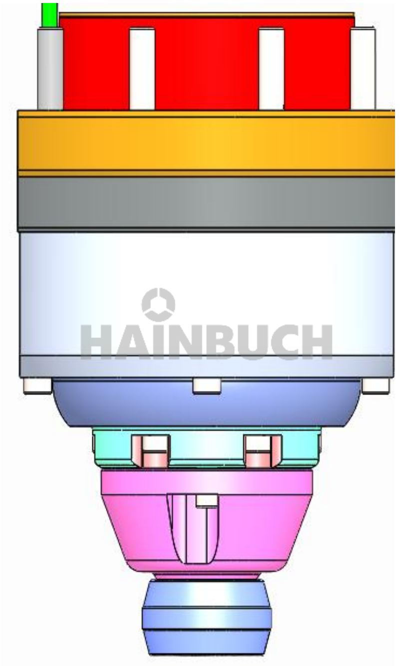


- In-Line measurement of inner diameter of blank
- Check of workpiece contact
- Automatic adjustment of machining parameters [constant volume - constant finished part].

Advantages

- Dynamic response to the quality of the raw material
- Reduction of process time
- Savings in measuring process
- Reduction of scrap parts
- Tool wear detection

DOUBLE-SPINDLE VERTICAL MACHINE [INNER RACE]

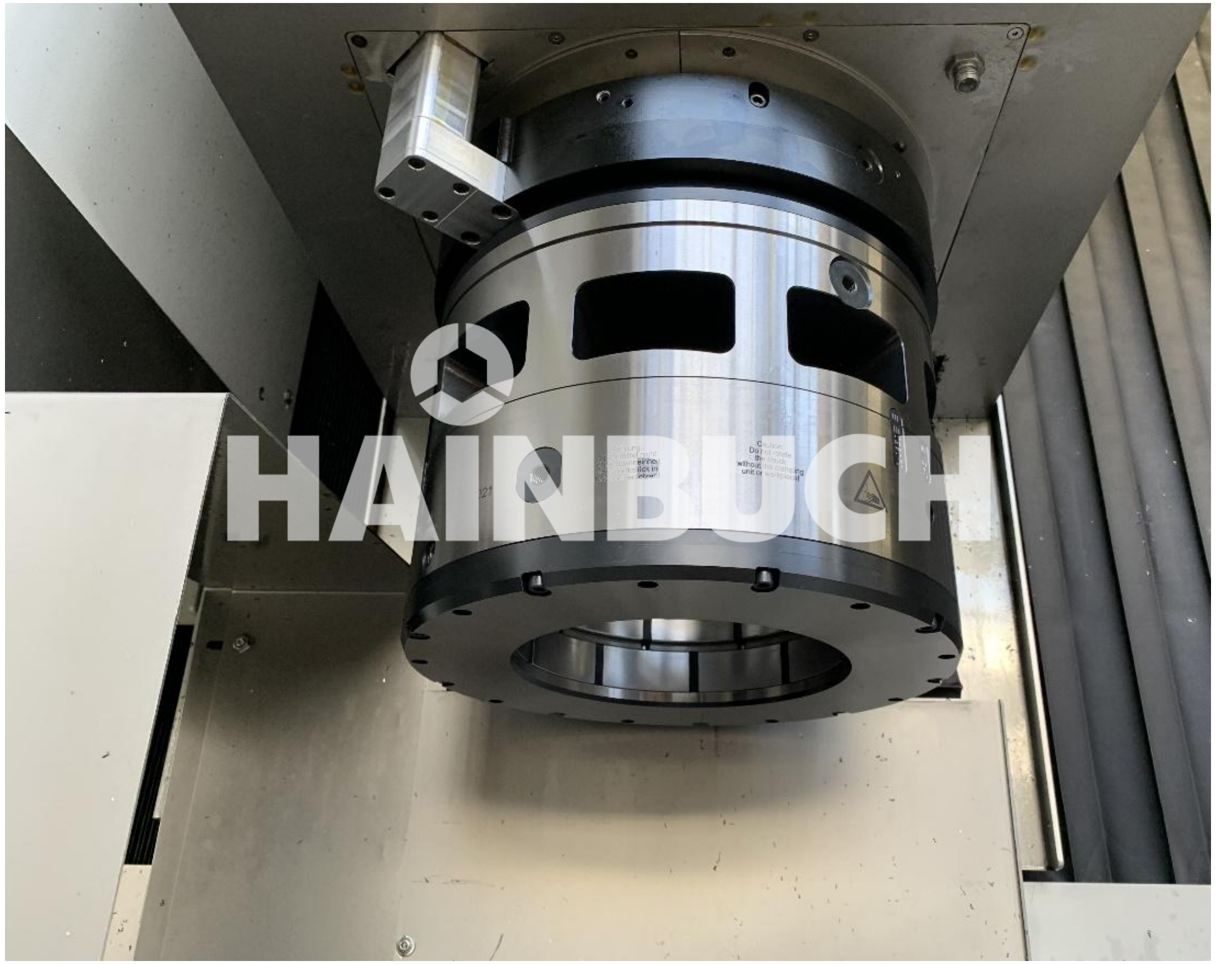


- In-Line measurement
- Integration in tightest spaces possible
- Use under the most adverse conditions

Advantages

- Reduction in process time
- Savings in measuring process
- Reduction of scrap parts

SKIVING MACHINE



- IQ segmented bushing chuck
- Check of workpiece contact
- Detection of increase in cutting forces in end-stop direction due to tool wear

Advantages

- Tool change only when the wear limit is reached - no precautionary replacement
- Longer service life of tools
- Tool change possible before cutting breakage
- High cost savings

Power Skiving Tool

https://www.grobag.ch/images/content/Landingpages/_1920x752_crop_center-center_75_none/W%C3%A4lzsch%C3%A4len_Header_L.jpg

AUTOMATED MEASURING SYSTEM

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- Integration in measuring system
- Measurement of two different diameters with one IQ double mandrel

Advantages

- 2 diameters can be measured in one clamping process
- Individual special solutions possible

INTEGRATION IN THE LOADING AND UNLOADING AREA OF THE MACHINE

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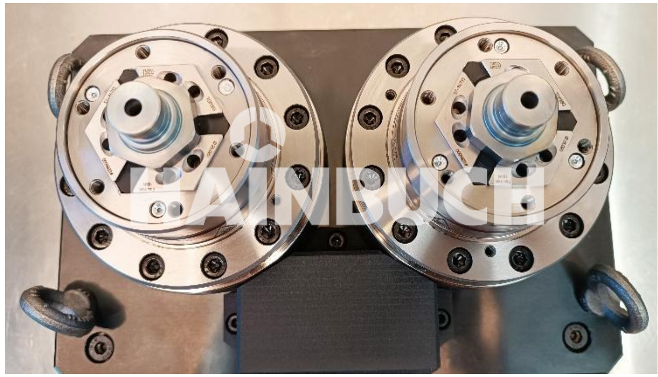
Existing measuring device

HAINBUCH solution



- Pre-Process measurement
- Replaces existing tactile measuring device
- Reduction of the reject rate from 8% to 3%
- 1,000 parts per shift
- Changeover time including teaching less than 15 minutes

Advantages

Measuring system	Reflective surface	Oil / cooling lubricant moistening	Position of the test part	Displayable tolerance [ØX + 0,018]	Price
Optical systems	No	No	No	No	medium
Tactile systems	No	No	Limited	Limited	High
HAINBUCH	**Yes**	**Yes**	**Yes**	**Yes**	**low**

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