Engineered Solutions

Flexible Fully Automatic CNC Measuring Station - Series 1000

Measurement Task

Roughness and high presicion contour measurement on:

- Injection parts like: pump housing, nozzle needle, injection cylinder head
- Cams
- Centrifugal pump housing
- Break discs

The Solution

This fully automated measuring station with 5 positioning axes (three linear and two rotational axes) is particularly suitable for small workpieces weighing up to 10 kg and a volume of up to 1 liter, e.g. nozzle body or valve needles.
The measuring station stands for a high degree of efficiency and flexibility for the production or measuring room.
The measuring station concept is characterized by:

- Full automatic operation without any user interference
- Reproducible clamping of different workpiece fixtures
- Proximity to production - time-savings due to short distances
- "One-touch operation" - easy to use and reliable results
- Time savings - no set-up time is required for each measurement
- Statistic evaluation of each characteristic

Automation:	full-automatic
Main application:	injection system; camshaft
Reference No:	6

CNC Measuring Station for Larger Workpieces - 2000.000-GD25

Measurement Task

This measuring station is designed for full automatic roughness measurement on large workpieces such as cylinder blocks and cylinder heads.

Complex and diverse measuring tasks can easily be performed without influence of operating personnel on measurement results and avoids any labour time during performance of the measurement.

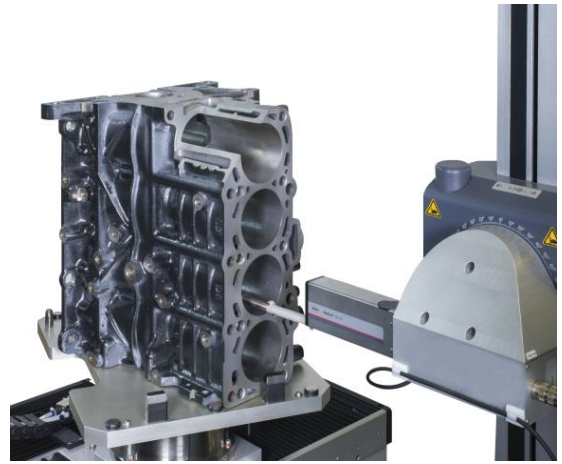
The Solution

This station comes with a positioning system of the workpiece of two CNC-linear axis and one TC rotary axis. Furthermore, the measurement station is capable to rotate the drive unit (HA) in addition to the HZ and HB-axis of the column. This arrangement of full automatic axis allows high flexibility and accessibility of measuring points and ensures an proceeding without any interference by user.

The workpiece is clamped by a customer-specific clamping device.

The measuring station concept is characterized by:

- Good accessibility of a broad variaty of measuring points
- The software CNCPlus supports full-automatic processing
- Usability by employees from the workshop
- Small drive unit for complete immersion in larger and deep bores



Automation:	full-automatic
Main application:	motorblock; cylinderhead
Reference No:	7

CNC Measuring Station for Cylinderblock and -Head

Measurement Task

The drive unit GD25 enables high grade access to any roughness feature to be measured. The concept is full automatic processing, which means the station can be operated by non-metrology specialised personell and does not require any ressources during the measurement process.

- Full automatic roughness measurement
- Suits 3-cylinder and 4-cylinder engines

The Solution

This measurement station is based on the series 2000 design. Additionally, there is a electronic controlled swivelling unit (TB-axis) on top of the workpiece positioning system which is fully integrated in the automatic run of the machine. It enables the measurement station to swivel the workpiece in any position between -90° till +90°.

Axis beeing realised:

- TX - 600mm
- TY -600 mm
- TC - 340°
- TB -90° bis +90°
- HB - +/- 45°
- HA - 360°
- HZ - 750mm

Drive unit: GD25
Workpiece weight: up to 150kg
Workpiece dimensions: 500 mm x 550 mm x 550 mm

Automation:	full-automatic
Main application:	cylinderhead, cylinderblock
Reference No:	8

Measuring Station for Small Workpieces - S1100

Measurement Task

- Fully automatic roughness measurement
- Fully automatic, high-precision contour measurement
- Inner and outer geometries
- Typical workpieces: injector body, nozzle, valve seat, needle
- Fast serial measurement

The Solution

This measuring station enables fully automatic measurements combined with maximum flexibility. The measuring station allows the simultaneous use of up to six different clamping devices for different workpieces. Thus, a large number of different measuring tasks and workpieces can be carried out without loss of time due to set-up, recalibration, etc.

Due to the high degree of automation in combination with an automatic probe arm changer, a fully automatic measuring sequence is realised without any user interaction. The operator interface is designed in such a way that the measuring station can be operated by workshop personnel in daily use.

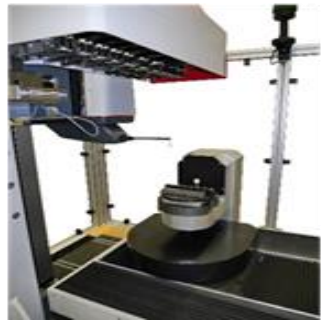
The measuring station layout is available for use in the measuring room or also for direct use in the production area.

Automation:	full-automatic
Main application:	injection system
Reference No:	17

Full Automatic Measuring Station for Cam Pieces - Series 1201

Measurement Task

- Roughness and contour
- Cam pieces in long and short version
- Workpieces with a weight of up to 5 kg and a volume of approx. 2 litres (including workpiece clamping devices)



The Solution

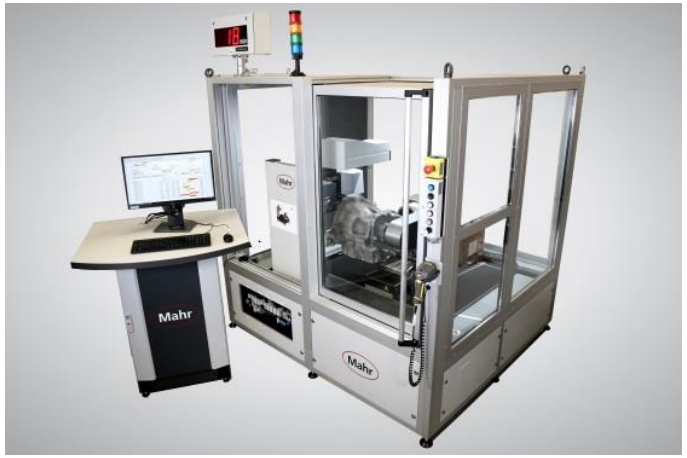
This measuring station enables fully automatic measurements with maximum flexibility due to five automatic workpiece positioning axes. The workpiece holder is designed with a clamping ball adapter, so that any number of different workpiece fixtures for a wide range of measuring tasks can be easily and reproducibly applied.

Due to the high degree of automation in combination with an automatic probe arm changer, a fully automatic measuring sequence is realised without any user interaction. The operator interface is designed in such a way that the measuring station can be operated by workshop personnel in daily use.

The measuring station layout is available for use in the measuring room or also for direct use in the production area.

Automation:	full-automatic
Main application:	cam parts, shaft
Reference No:	21

Fully Automatic Measuring Station for Gear Boxes - Series 2200



Measurement Task

- Full automatic roughness and contour measurement based on drive unit LD260
- Typically, high numbers of features and/or complex measurement tasks

The Solution

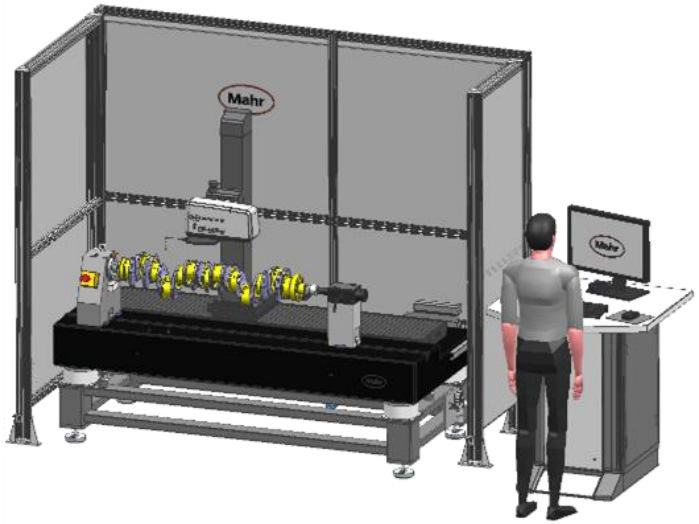
This measuring station is designed to handle large components and measure contour and roughnesses on those fully automatically. High flexibility is granted due to six full automatic axis positioning the workpiece to the required position. Thanks to the user-friendly CNCplus software, the operator can operate the measuring station after only a brief introduction to the system.
The safety concept enables fast positioning and short testing times. Thanks to the active vibration damping system, the CNC measuring station can also be integrated directly into the production area. Thus, short distances and fast test results are achieved.

Automation:	full-automatic
Main application:	gear, motorblock, steering
Reference No:	49

Automatic Measuring Station for Crank- and Camshaft

Measurement Task

- Roughness and contour measurement on big camshafts and Crankshafts e.g. truck industry
- Measurement of main and pin bearings
- Roughness of the cheeks
- Contour and roughness of undercuts or radii on main and pin bearings
- Center hole on the front sides

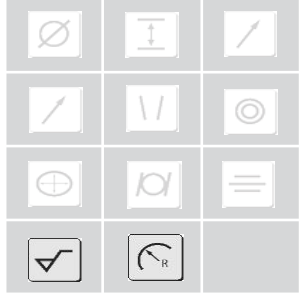


The Solution

This measuring station is specially designed for the full automatic measurement of roughness and contour features on crankshafts and camshafts. The full automatic process enables reliable and reproducible measurement results of complex and demanding measuring tasks without any operator influence. Thus the daily use of the measuring station by trained but not metrologically trained personnel is possible.
The possibility of swiveling the drive unit +/- 45 ° enables operation with a minimized number of different clamping positions.
The 2 storage prisms are axially displaceable. Means, the workpieces can be inserted and then stretched between tips. Typically measuring tasks are:

- Roughness and contour on main and pin bearings
- Roughness of the cheeks
- Contour and roughness of undercuts or radii on main and pin bearings
- Center hole on the front sides

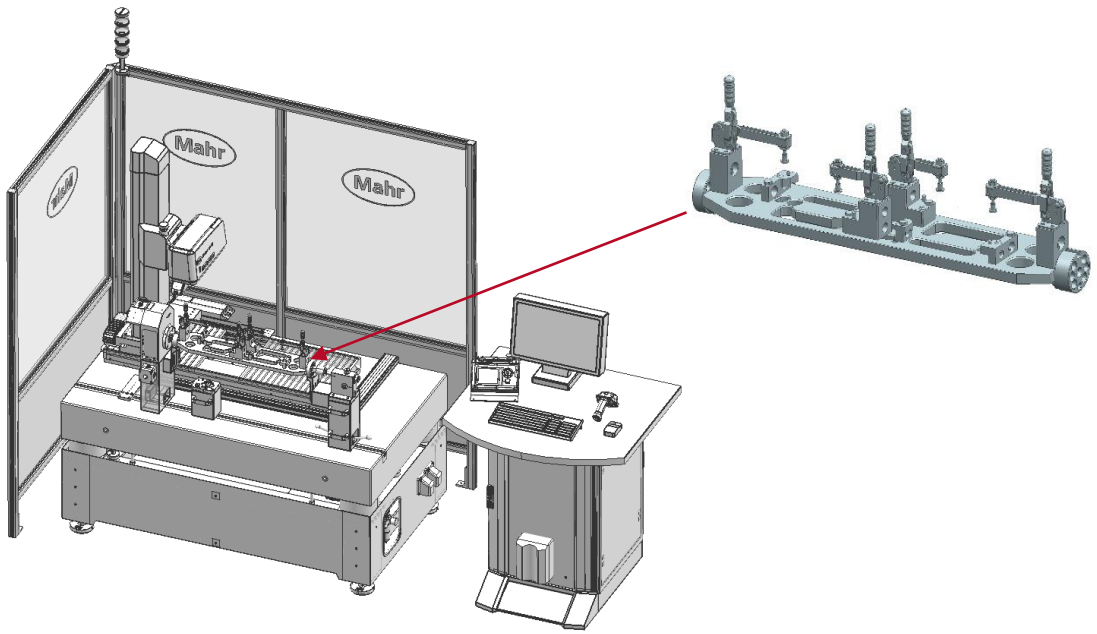
Automation:	full-automatic
Main application:	shaft, crankshaft, camshaft
Reference No:	50



Automatic Measuring of Transmission Plates - Series 9020

Measurement Task

Contour and roughness measurement
of transmission plates and rotationally symetric parts e.g. shafts.
Also further cubic geometries can be applied.



The Solution

This measuring station is designed for the full automatic measurement of roughness and contour characteristics. The measuring direction is transverse to the workpiece axis. The clamping of the workpiece is either directly between tips (shafts) or clamping devices supporting cubic workpieces are been clamped between tips.

The measuring station concept is characterised by its outstanding features:

- Individual clamping options
- Very high degree of automation
- Measurement without influence even of non-trained operator
- Very easy handling even on complex and demanding measuring tasks

Automation:	full-automatic
Main application:	gear; shaft
Reference No:	51

CNC Measuring Station for Large Workpieces - Series 2010

Measurement Task

Roughness and contour measurement
Typical measurement tasks are:

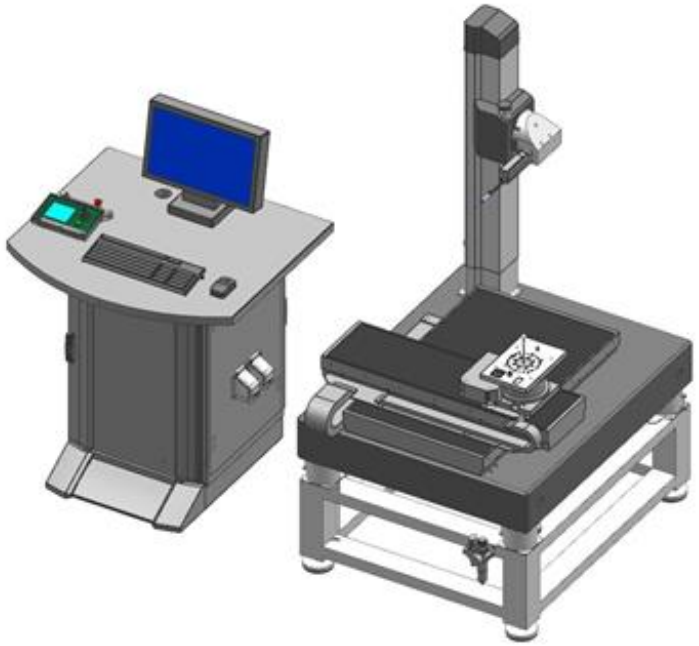
- Roughness on sealing surfaces
- Roughness on bearing surfaces
- Contour and roughness of valve seats
- etc.

The Solution

This measuring station is designed for fully automatic contour and roughness measurement on large workpieces. The workpiece is positioned during the automatic program sequence via two CNC linear axes and one rotary axis. This arrangement of the axes allows a high flexibility with regard to measuring tasks and the accessibility of the corresponding measuring locations. Customer-specific workpiece clamping systems can be integrated.
The measuring station is designed for use in production. The programs, control and processes are designed in such a way that no specific expert knowledge is required for operation and the measuring station can be operated by workshop personnel.

Automation:	full-automatic
Main application:	cylinderblock, cylinderhead
Reference No:	52

Full-Automatic Roughness Measurement for Gear Flanks



Measurement Task

Skidless roughness measurement on gear wheel and gear shaft

- External toothing of straight or helical gears
- Different positions of teeth on the workpiece in one run
- Right and left tooth flanks
- Different number of teeth and modules (1 to 6)
- Freely configurable measuring tasks

The Solution

This measuring station is build for roughness measurement on large gear wheels and gear shafts (Ø 15 mm - 400 mm). In contrast to all competitive systems this station comes with a skidless system, which allows very high precise and reliable measurements in respect to metrology standards.
The station comes with a family program "Gear Measurement". Therefore it requires no specific measuring knowledge as well as no programming skills for operation the stations. Only gear paramenter like modul, root diameter, etc. needs to be entered and measurement tasks needs to be selected by means of a user-guided mask.
The measuring sequence is without any further user intervention:

- Automatic tooth gap search
- No reclamping of workpiece
- No change of probe arms

Automation:	full-automatic
Main application:	gear
Reference No:	71

Fully Automatic Measuring Station for Injection Parts - Series 1200

Measurement Task

- Fully automatic roughness measurement
- Fully automatic, high-precision contour measurement
- Inner and outer geometries
- Typical workpieces: injector body, nozzle, valve seat, needle
- Workpieces weighing up to 5 kg and with a volume of 2 litres (including workpiece clamping devices)

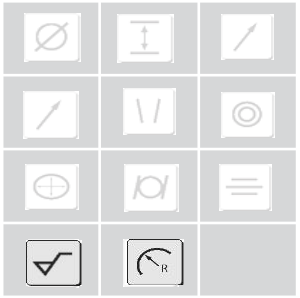
The Solution

This measuring station enables fully automatic measurements with maximum flexibility due to five automatic workpiece positioning axes. The workpiece holder is designed with a clamping ball adapter, so that any number of different workpiece fixtures for a wide range of measuring tasks can be easily and reproducibly applied.

Due to the high degree of automation in combination with an automatic probe arm changer, a fully automatic measuring sequence is realised without any user interaction. The operator interface is designed in such a way that the measuring station can be operated by workshop personnel in daily use.

The measuring station layout is available for use in the measuring room or also for direct use in the production area.

Automation:	full-automatic
Main application:	injection system
Reference No:	76



Full Automatic Measuring Station Including Workpiece Feeding

Measurement Task

- Roughness and contour
- Channels, bore holes and sealing surfaces on transmission plate of automatic gear
- Suitable also for other work pieces e.g. brake disc, injection components, etc.

The Solution

This fully automated measuring station enables complex measurement processes without any user interference. To allow maximum flexibility it comes with 5 CNC positioning axes and a probe arm changer.

Attached to the measurement system there is a workpiece storage and feeding system. Up to 15 work pieces can be stored and in consequence measured in one automatic cycle. This allows a maximum degree of utilization of the station in combination with minimal efforts in ressources and impact on results by staff.

Automation:	full-automatic
Main application:	gear
Reference No:	84

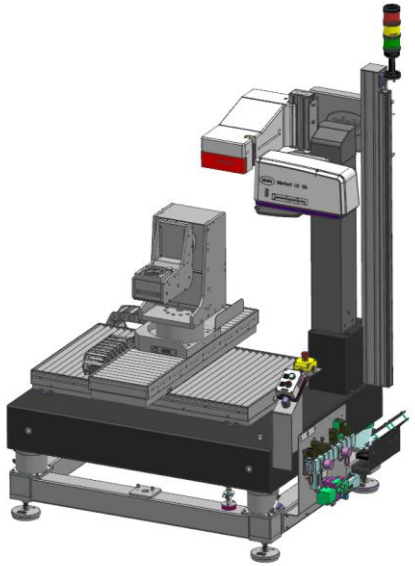
Flexible Roughness and Contour on Medium Sized Workpieces

Measurement Task

Measurement of roughness and contour on shafts and for e drive shafts, complex workpiece geometries such as pump housings, etc. up to Ø 300mmx225mm and 15 kg.
Optionally family program "Gear" is available for high accuracy measurement of surface roughness. This allows measurement on the most complex gear geometries without special programming knowledge.

The Solution

This roughness and contour measuring station with LD130 is characterized by 6 axes of motion and an automatic probearm changer. This allows a very flexible and fully automatic measuring of workpieces. Due to the 3 linear and 3 rotary axes, the workpieces can even be measured from all 6 sides depending on the clamping. The system was designed for the measurement of drive shafts of electric drives, but can be used universally for workpieces of medium size. The machine is protected by a two-sided housing and is operated from the front side.

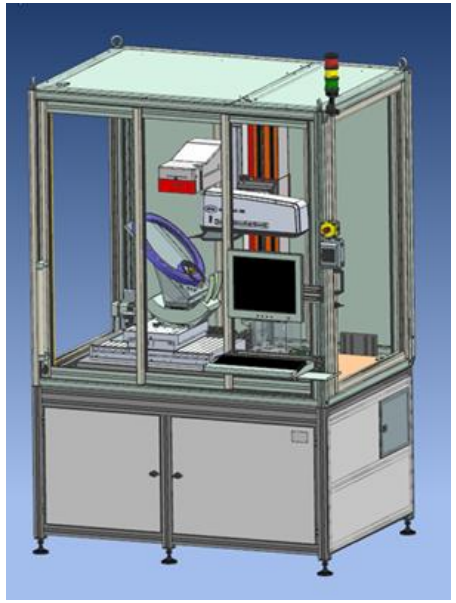


Automation:	full-automatic
Main application:	gear
Reference No:	87

Roughness and Contour on Medium Sized Bearing Rings

Measurement Task

- Roughness and contour on bearing rings
- Outer and inner rings
- Roughness, chamfers and straightness of the contact and bearing surfaces



The Solution

This roughness and contour measuring station with LD260 is specialized to measure bearing rings. Two linear axis and a special rotary axis with external pivot point allows flexible positioning, tilting and measuring of all kinds of bearing rings. The rotary axis is to swivel the bearing ring centrically. This reduces efforts in axes movement in order to save time. The X-Y linear axis positioning the workpiece in the zenith or moves it to the measuring or loading position. The probearm exchange unit ensures a full autonomic operation.

A universal fixture clamps the bearing rings by means of a magnet or clamping element onto a V fixture and a prism. To ensure an reproducibly clamping of the workpiece the loading position is at 45°. The station is designed to fit work piece dimensions up to Ø 450mm and up to 225 mm in thickness as well as a maximum weight of the work piece of 15 kg.

Automation:	full-automatic
Main application:	bearing
Reference No:	88