

Roughness measurement on large parts with MarSurf RD 18 and MarSurf SD 26

Introduction

Roughness measurements on large parts are mostly critical and difficult to realize. In most cases, extensive efforts are necessary. Optimized holders for roughness drive units make these measuring tasks easy and fast.

Large parts like engine blocks from emergency power generators, construction machines or ship engines, knuckles from trucks, or gears and bearings from wind wheels are very often too big and too heavy to measure them on a stationary roughness measuring station. Nevertheless, roughness parameters must be tested on these large parts too. Normally the roughness should be measured on these parts with mobile roughness measurement systems like MarSurf M300: The measuring system is therefore moved to the large parts. The portable roughness system or drive unit with internal roughness stylus is positioned by hand on the tested measuring position.



Fig. 1: Portable roughness measuring system MarSurf M 300 with drive unit MarSurf RD 18

Measurements on large and plane areas are relatively simple to realize and users need only little skill. The repeatability of measurements fluctuates greatly because the user cannot find the same exact measuring position by eye.

To perform critical roughness measurements on slanting, vertical or (upside down) overhead positions, it is necessary to fix the drive unit or roughness measuring system during the measurement. Otherwise the measured results will be incorrect.

These problems can be solved by the usage of special and handy fixtures. They make sure that the drive unit is fixed during the measurement and the roughness results are reliable. If the test instruction defines the measuring positions, the fixture of the portable roughness measuring system needs a scale or marks so the user can exactly position the measuring system on the part or in the bore and then clamp it. If only one position is defined in the drawing, the fixture is rigid.



Roughness measurement on large parts with MarSurf SD 26: Hand-held bore fixture and measuring fixtures

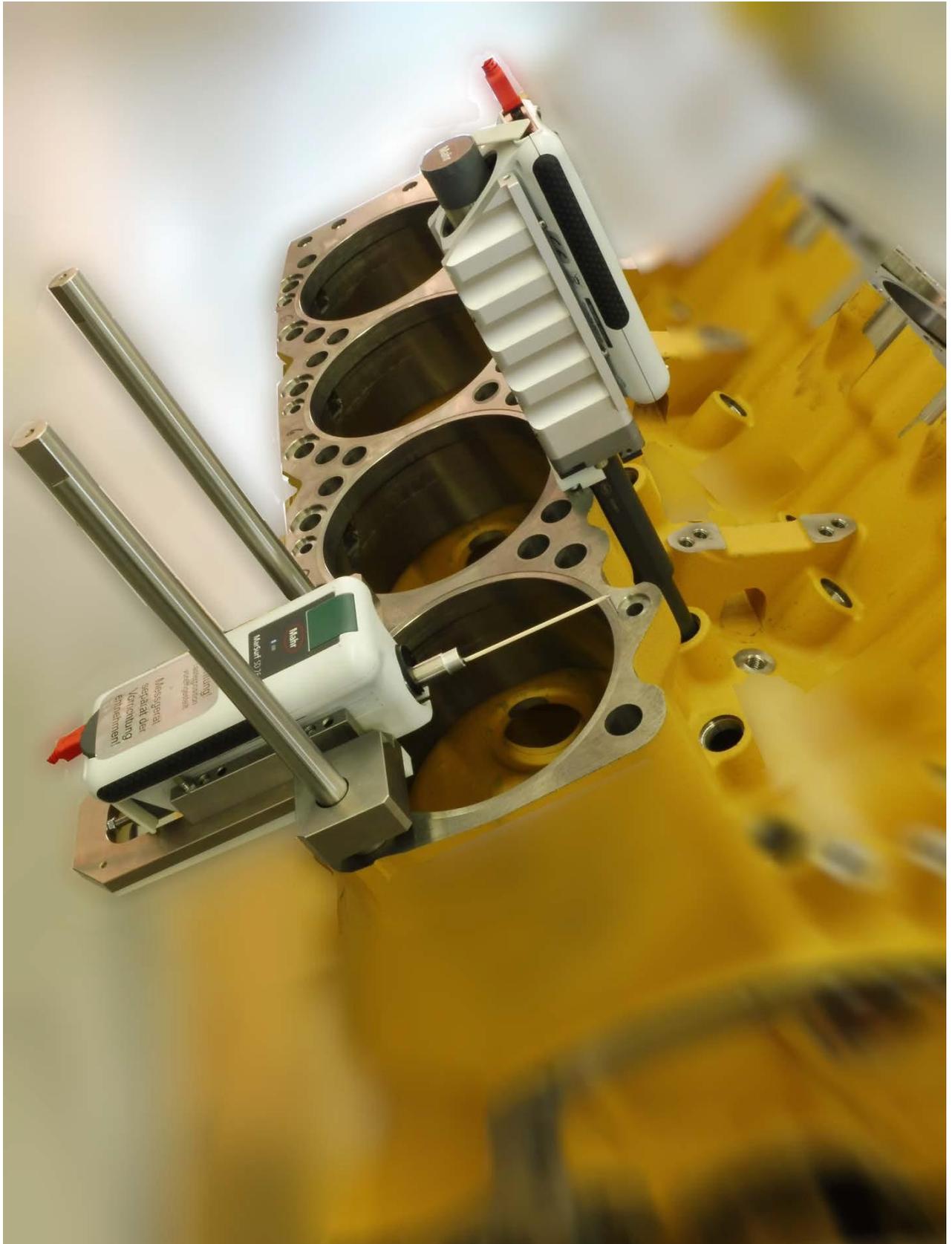


Fig. 2: Portable roughness drive unit MarSurf SD 26 with motorized height adjustment and automatic zero setting; Measurement of the cylinder head plane and the valve guide.

Roughness measurement in the valve guide and in the cylinder, bore with MarSurf SD 26

Roughness measurement in the valve guide with MarSurf SD 26

The portable, handy roughness measurement system contains the drive unit SD 26, the basic holder and the special bore and centering device. It measures the roughness in the valve guide. The centering device is also a stylus tip protection. The mechanical end stop defines the start of the measurement, so the exact measuring position can be reached quickly and reliably. The measurement starts after pressing the green start button.



Fig. 3: MarSurf SD 26 with bore fixture

Roughness measurement of a cylinder-bore with MarSurf SD 26

The roughness measurement starts after a motorized zero setting and clamping the fixture at the marked depth position.

Two cylindrical rods were screwed in the thread-bores of the cylinder head. They are the parallel guides of the drive unit. In the defined depth, the clamping-screws fixed the drive unit. Marks at the cylinder show the user the right position.

The measurement takes place at the right position and with a fixed drive unit.

Roughness measurement at the plane of the crankshaft bearing side with MarSurf SD 26

The measuring fixture with MarSurf SD 26 is mounted and clamped onto the workpiece. The right measuring position can be easily reached with the crank handle and the digital indicator (Fig. 5).



Fig. 4: Roughness measurement in different depths of the cylinder bore with MarSurf SD 26



Roughness measurement on the plane of the crankshaft bearing side with MarSurf SD 26

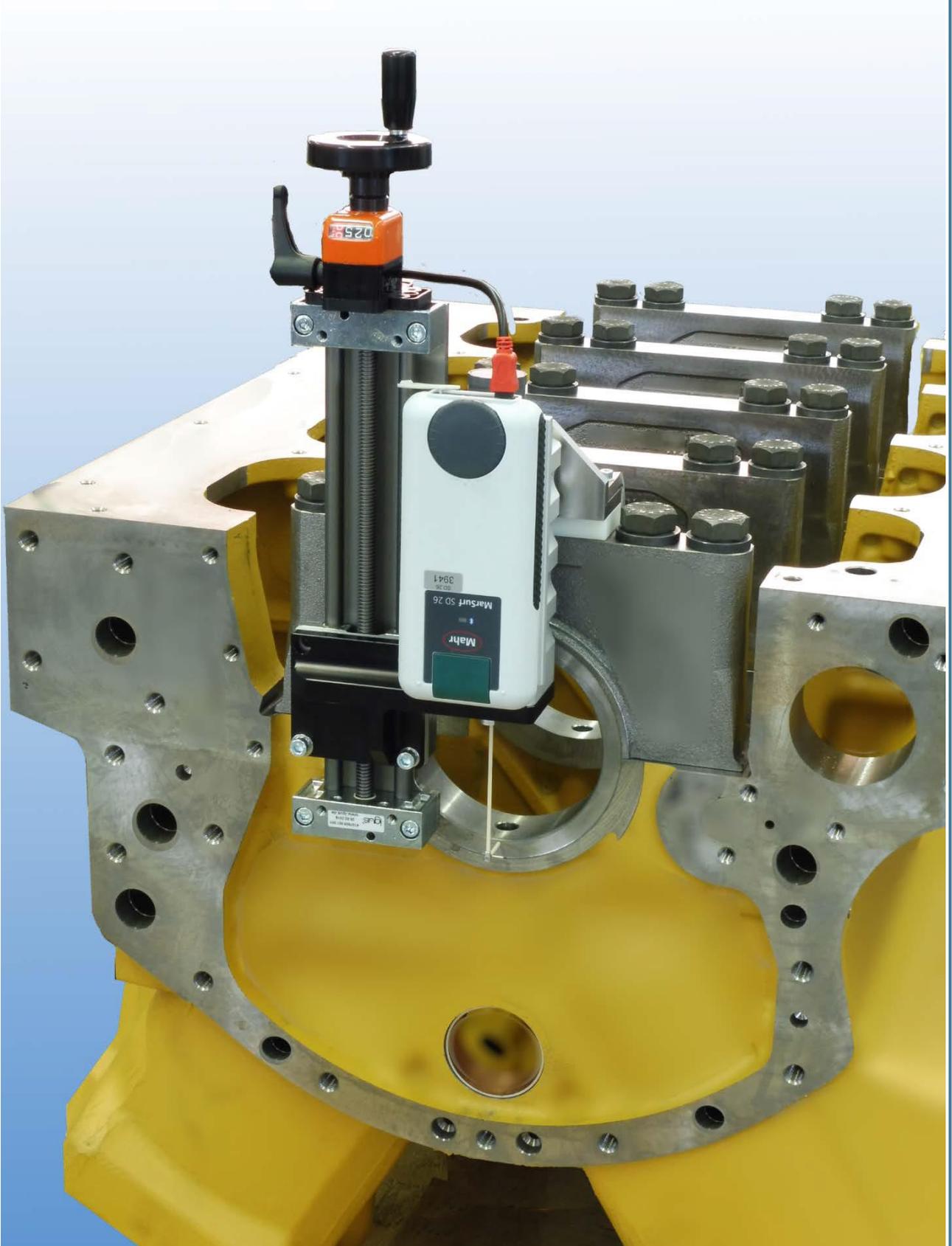


Fig. 5: Measurement on the plane of the crankshaft bearing side with MarSurf SD 26 and integrated height adjustment



Roughness measurement of crankshaft bearings with measuring head MarSurf MCR 1

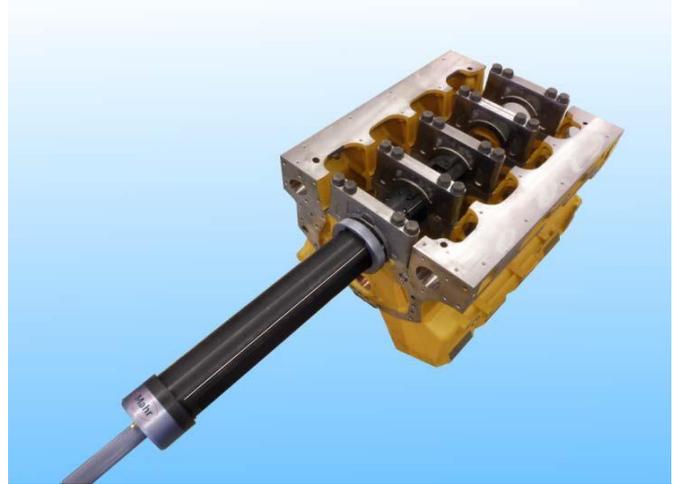
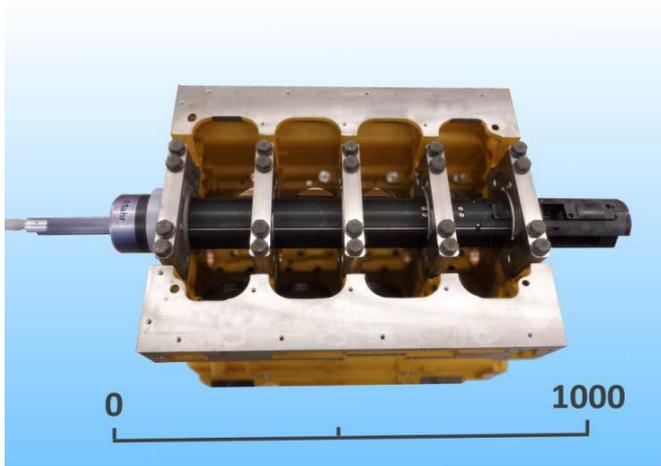


Fig. 6 and Fig. 7: Roughness measuring head MarSurf MCR 1 with pneumatic clamping mechanism

The measuring head MarSurf MCR 1 can measure roughness inside the single crankshaft bearings. The positioning at each crankshaft bearing is done by hand with a deactivated pneumatic clamp. The adjustment ring is fixed at the mark on the cylinder. This creates the end stop for the right measuring position. After the activation of the pneumatic clamp, the drive unit MarSurf RD 18 is centered and fixed in the bore. The integrated MarSurf RD 18 contacts the bearing automatically and measures the roughness. Inside the measuring head, the probe is protected against collisions and damages. To measure other bore diameters such as those of camshaft bearings, the design of the measuring head must be modified.

		MarWin 8.50-09	Mahr GmbH Carl-Mahr-Strasse 1 D 37073 Goettingen	16.09.2016 1 13:48:08 Inspector: Gödecke Signature:
Part: Crankcase	Drawing n°: 852456	Machining operation: OP 140		
Mashine No.: 5	Production line 7			
Comment:		Job No.: 32 1448		
Measuring instrument: MarTalk Drive unit: RD18 Probe: PHT 6-350		Lt: 5.60 mm Ls: 2.50 µm VB: +/-250.0 µm Vt: 0.50 mm/s Points: 11200		
Roughness parameters - roughness_camshaft_bearing_1; P; R[LC GS 0.8 mm]				
Rz	7,775 µm	0,000		10,000
Roughness parameters - roughness_camshaft_bearing_2; P; R[LC GS 0.8 mm]				
Rz	9,639 µm	0,000		10,000
Roughness parameters - roughness_camshaft_bearing_3; P; R[LC GS 0.8 mm]				
Rz	9,719 µm	0,000		10,000

Fig. 8: Comprehensive documentation with PC-based MarSurf XR1

Roughness measurement on large parts with MarSurf SD 26 and MarSurf RD 18

Roughness measuring from big crankcases with measuring fixtures and portable measuring heads

Measurements of very large parts and difficult to access positions, custom-made measuring heads or fixtures realize the roughness tests easily, quickly and with a high repeatability.

Up to 16 drive units of type MarSurf RD18 or MarSurf SD 26 can be connected to the PC-based MarSurf XR 1 at the same time. With this measuring system, roughness measurements can be performed practice-orientated, reliably and cost-efficient in the production line.

Please contact us regarding your individual measuring solution:

Mahr UK PLC +44 1908 563700

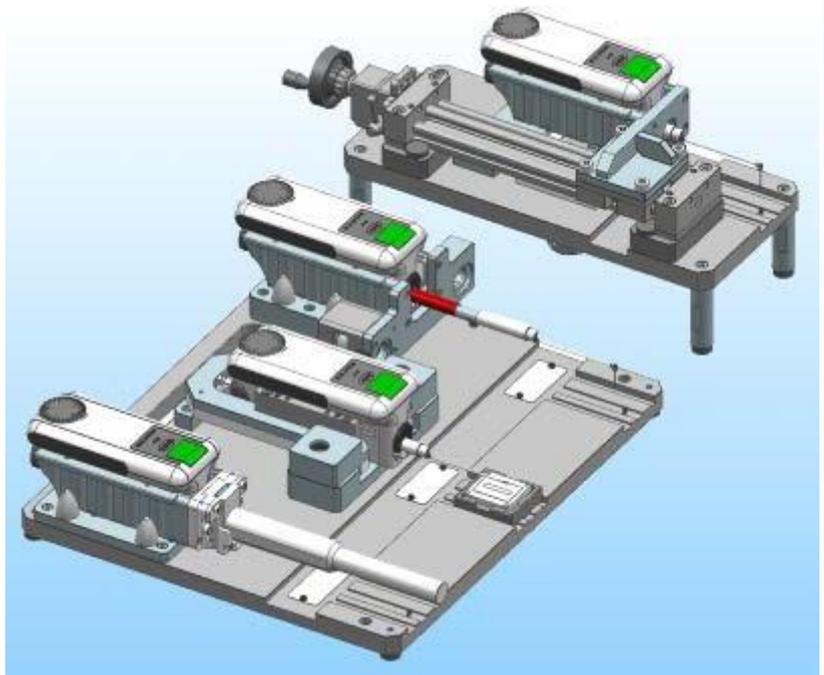


Fig. 9: Measuring heads and fixtures for roughness measurements in bores and on planes with support station and calibration standards.

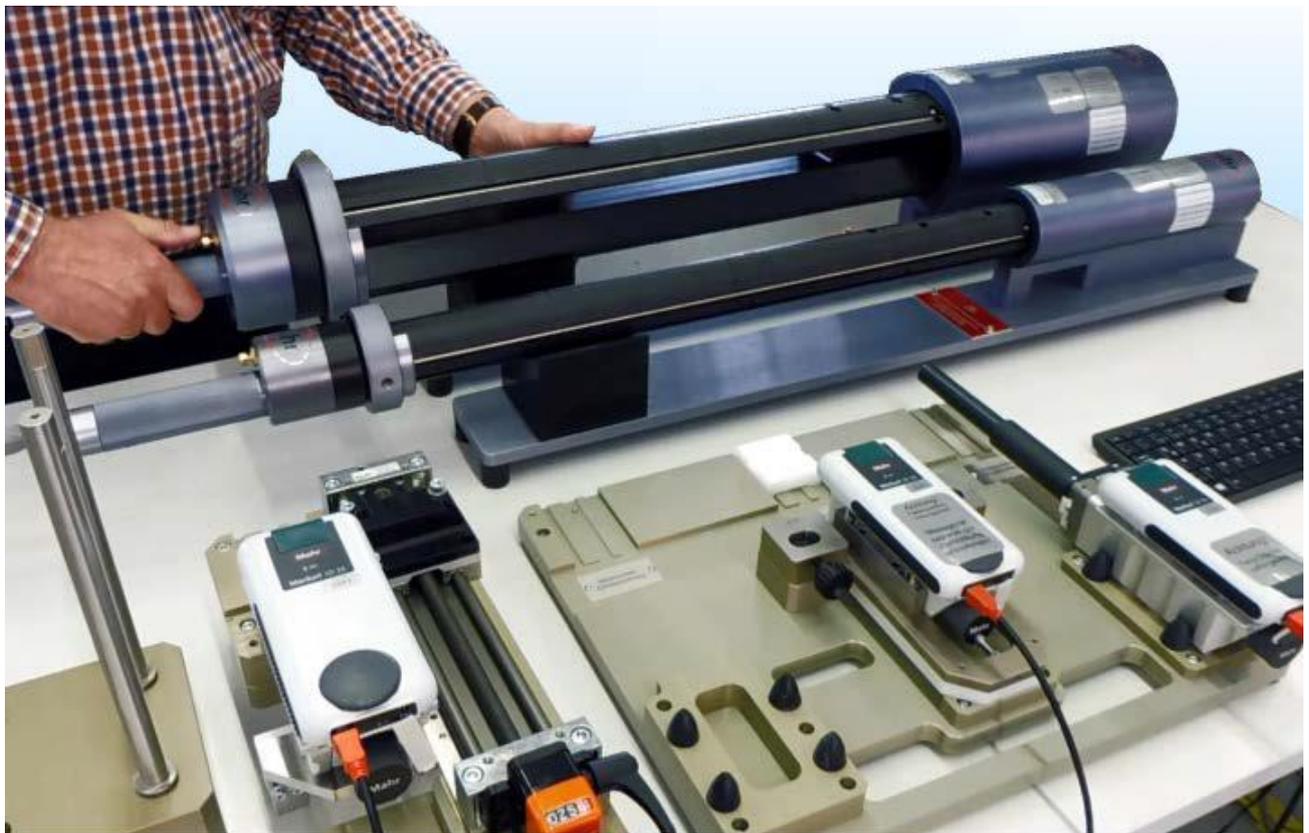


Fig. 10: Support station for measuring heads for camshaft and crankshaft bearings, valve guides, plane of the vertical side of the crankshaft bearing, cylinder bore and the horizontal cylinder plane with calibration standards included.

