

Precimar

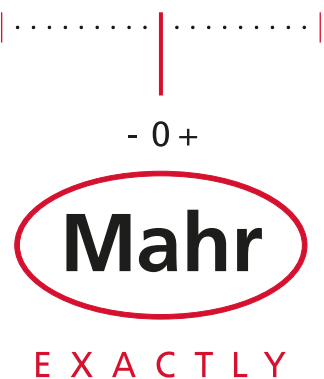


PRECIMAR PLM-E

THE FUTURE OF ACCURACY – NANO-PRECISE,
AUTOMATIC AND FAST LENGTH METROLOGY

- Automatic bore and inside thread measurement
- Motorized tilting axis
- Ergonomic operation

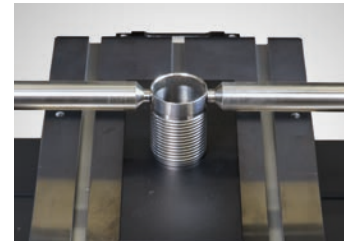
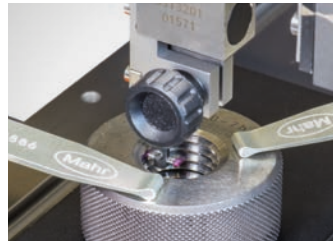
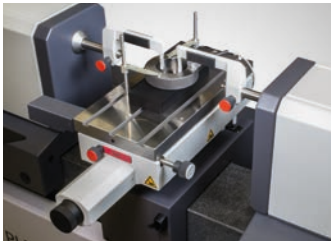
This is what EXACTLY means to us.



PRECIMAR PLM-E SERIES

LENGTH MEASURING MACHINES FOR HIGH-END CALIBRATION

The universal length measuring machines from Mahr are suitable for the absolute and relative measurement of precision products and test equipment. Typical applications here are products and test equipment used in the aerospace and automotive industries, precision engineering as well as series testing of test equipment in calibration laboratories. The PLM and CIM series thereby represents high-end length measuring machines that indicate the slightest length deviations and implement both semi-automated and automated test sequences. In other words: Metrology of the high-precision with extremely efficient processes, both in the measuring room and the calibration laboratory. The diverse range of accessory sets and components allows for the solution of the most diverse measurement and calibration tasks.



Arguments for the PLM-E series

Technical solution	Operator advantages
Granite	Highly homogenous and rigid
Air bearing technology	Low measuring uncertainty due to aerostatic guides for measuring slide and tailstock
Online temperature monitoring	Compensation of thermic measuring deviations via software
Object table	5-axes object table with CNC control in Z and Y
Electronics	Independent recognition of outside and inside measurement. Realization through modern MarEcon machine control
Measuring force generation	Electronic measuring force regulation and thus friction-free measuring force generation and automatic contacting
Automatic drive	Measuring slide with progressive deflection, automatic contact detection, independent recognition of external and internal measurement and automatic search of the reversal points
High-performance MS Windows	Highest operating comfort due to easy and clear software



Main areas of application

Calibration of

- Plain plug gages and rings
- Setting gage rings
- Snap gages
- Spherical gages blocks, internal micrometers
- Gage blocks
- Thread gages
- Taper thread gages
- Gear gages
- Dial indicators
- Dial comparators
- 2-point inside micrometers
- Precision length measurements
- Measurement of thin-walled and deformed workpieces

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Design

Comparator according to Ernst Abbe with horizontal base (highly homogeneous and rigid granite)

Measuring system

X axis incremental, high-precision Heidenhain length measuring system, 200 mm long
Z axis incremental measuring system, 100 mm long

Drives

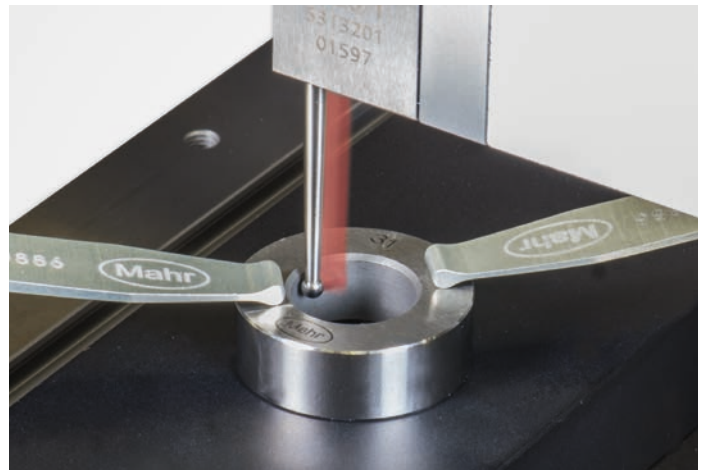
X axis motor-controlled measuring slide and automatic contacting
TY axis motorized Y adjustment (25 mm) manual and automatic/CNC-controlled
TZ axis motorized height adjustment of work table manual and automatic/CNC-controlled
TB axis motorized tilting axis, manually controlled

Measuring force generation

Electronically controlled measuring force generation

Operation

- Measuring spindle motorized via joystick as well as automatic contacting
- Motorized height, horizontal and tilt adjustment of object table via joystick, handwheel, function keys or CNC-controlled
- Measuring slide and tailstock are easily positionable due to air bearing



Features

- The **Precimar PLM-E series** has a large universal object table with 5 axes with a loading capacity of 35 kg, a modern PC-based, multi-axis machine control, including PC workstation and **828 WIN** "Free measurement" basic software
- Automatic detection of outer and inner measurements and computer-aided search for reversal points
- Simple operating procedure by means of measuring force-adjusted and joystick-controlled measuring slides with progressive deflection characteristic and automatic contact detection
- Motorized measuring slide allows for high travel speeds
- CNC-controlled motorized vertical movement of the universal measuring table for highly efficient measurement
- State-of-the-art machine control (MarEcon)
- Measuring data recording, processing, logging and transfer via powerful software and menu-driven controls
- Software compensation of thermal dimensional deviations
- Easy setting of measuring force via software
- Aerostatic guides for all slides mounted on the machine bed ensure low measuring uncertainties
- Electronic measuring force adjustment and automatic contacting
- Subjective influences are largely eliminated and unintended collisions with the testpiece avoided
- Automatic bore and inner thread measurement
- Automatic TY-adjustment: **Unique is that a manual TY adjustment is still possible**
- Dynamic measuring of thin-walled and easily deformable workpieces with calculation of results with measuring force 0 N
- A factory calibration or DAkks/DKD calibration can be offered together with the **Precimar PLM-E series**

PRECIMAR PLM-E SERIES

LENGTH MEASURING MACHINES FOR HIGH-END CALIBRATION

Technical Data

Product		PLM 600-E	PLM 1000-E
Order No.		5350700	5350800
Measuring ranges (switchable mm/inch)			
External measurement	mm	0 to 600	0 to 1000
Internal measurement	mm	0.5 to 445	0.5 to 845
Performance data			
Measuring range (incremental)	mm	200	200
Increment	µm	0.01/0.001	0.01/0.001
Max. permissible errors *)	µm	(0.07 + L/2000)	(0.07 + L/2000)
Measuring uncertainty MPE _{E1} (L in mm)	µm	≤ (0.085 + L/1500)	≤ (0.085 + L/1500)
Reproducibility	µm	≤ 0.05	≤ 0.05
Measuring forces (internal/external measurement)	N	0 to 13.9, electr. monitoring	0 to 13.9, electr. monitoring
Guides			
Drive (measuring slide)		aerostatic	aerostatic
Max. travel speed	mm/s	motorized	motorized
Max. contact speed with joystick	mm/s	50	50
Max. contact speed with direction buttons		8	8
		3.5	3.5
Object table			
Table surface (length x width)	mm	150 x 300	150 x 300
Table load capacity	N	350	350
Table load capacity	mm	100	100
Vertical movement of Z-drive	mm	0.001	0.001
Increment Z	mm	25	25
Transverse movement Y	mm	±10	±10
Floating movement X	Grad	2	2
Tilting movement TY	Grad	8	8
Swivel movement TZ	mm	85	85
Probe height (above lowest table position)			
Total length	mm	1660	2110
Total width	mm	790	790
Total height (without monitor)	mm	1300	1300
Total weight	kg	480	535
Ambient conditions (to ensure indicated accuracy)			
Temperature	°C	20 ± 0.5 K	20 ± 0.5 K
Temperature gradient	K/h	< 0.2	< 0.2
Humidity	%	35 to 65	35 to 65
Operating temperature	°C	15 to 35	15 to 35
Electrical connection data			
Supply voltage	V/Hz	230 V/115 V; 50/60 Hz	230 V/115 V; 50/60 Hz
Power consumption	VA	200	200
Pneumatic connection data (using clean compressed air free of oil and water)			
Network pressure	bar	≥ 5	≥ 5
Supply pressure	bar	≥ 4	≥ 4
Particle size	µm	< 10	< 10
Air consumption (depending on number of air bearings connected)	Liter/h	100 to 276	100 to 276

* Verification is carried out optionally in Goettingen



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