

# CMM BENCHMARK SPECIFICATIONS

Models	Measurement performances											Max. 3D Positioning Speed	Max. 3D Acceleration	
	Environment conditions	MOTORIZED												
		MH20i / PH10T / M / PH20 - TP20			PH10T / M - TP200			PH10M / PH6M - SP25M						
MPE <sub>E0/ISO</sub> <sup>(1)</sup>	MPL <sub>RO</sub> <sup>(2)</sup>	MPE(PFTU) <sup>(3)</sup>	MPE <sub>E0/ISO</sub> <sup>(1)</sup>	MPL <sub>RO</sub> <sup>(2)</sup>	MPE(PFTU) <sup>(3)</sup>	MPE <sub>E0/ISO</sub> <sup>(1)</sup>	MPL <sub>RO</sub> <sup>(2)</sup>	MPE(PFTU) <sup>(3)</sup>	MPE <sub>Tij</sub> <sup>(4)</sup>	MPT <sub>Tij</sub> <sup>(5)</sup>	[mm/s]	[mm/s <sup>2</sup> ]		
06.05.05	T <sub>1</sub> : 18 ÷ 22 °C	2,7 + 3,0 L/1000	2,5	2,7	2,5 + 3,0 L/1000	2,3	2,5	2,5 + 3,0 L/1000	2,3	2,5	5,0	120	500	1500
	T <sub>2</sub> : 16 ÷ 26 °C	2,7 + 5,0 L/1000	2,5	2,7	2,5 + 5,0 L/1000	2,3	2,5	2,5 + 5,0 L/1000	2,3	2,5	5,5	120		

## Performance data are only valid if the following specifications are met:

- MPE<sub>E0</sub>/MPE(PFTU)/MPL<sub>RO</sub>: PH10 M/PH10T/PH20/TP20/TP200: tip diameter Ø4 mm, stylus length 10 mm.
- MPE<sub>E150</sub>: PH10M/TP20/TP200: tip diameter Ø4 mm, stylus length 40 mm. PH20/MH20i: EMI STDF, tip diameter Ø4 mm, stylus length 20 mm. PH10T: PEL2, tip diameter Ø4 mm, stylus length 10 mm
- L = measuring length in mm
- Ambient temperature Range:  
T<sub>1</sub>: 18 ÷ 22 °C; Max. Gradients: 1,0 °C/h - 2,0 °C/24h - 1,0 °C/m  
T<sub>2</sub>: 16 ÷ 26 °C; Max. Gradients: 1,0 °C/h - 5,0 °C/24h - 1,0 °C/m

- <sup>(1)</sup> Maximum Permissible Error of indication for size measurement according UNI EN ISO 10360-2:2010
- <sup>(2)</sup> Maximum Permissible Probing Error according UNI EN ISO 10360-2:2010
- <sup>(3)</sup> Maximum Permissible Shape error with single stylus according UNI EN ISO 10360-5:2010
- <sup>(4)</sup> Maximum Permissible Scanning Probing Error in according UNI EN ISO 10360-2:2010, applicable to the SP25M/SP80 probes only, reference sphere Ø25 mm - REVO RSP3-1
- <sup>(5)</sup> Maximum Permissible Time for Scanning test in according UNI EN ISO 10360-2:2010, applicable to the SP25M/SP80 probes only, reference sphere Ø25 mm - REVO RSP3-1

# CMM BENCHMARK PERFORMANCE VERIFICATION

## MPE<sub>E0</sub>: Maximum Permissible Error on length measurement with standard probe OFFSET

Measurement of a set of 5 sizes, taken through two opposite probing points on two nominally parallel planes. The sizes are positioned with direction on the 4 volume diagonals and in 3 different positions chosen by the customer (or along the axes according to the standard) in the measurement volume. Each size is measured 3 times for a total of 105 measurements. All 105 measurements (100 %) must be within the specified MPE<sub>E0</sub>.

## MPE<sub>E150</sub>: Maximum Permissible Error on length measurement with probe OFFSET 150 mm

Measurement of 1 set of 5 different sizes in 2 diagonal positions on the XZ or YZ plane with a probe OFFSET of 150 mm. All 30 measurements must be less than the Maximum Permissible Error MPE<sub>E150</sub>.

## MPL<sub>RO</sub>: Maximum Permissible Repeatability Limit

Evaluation of the 35 repeatability values calculated from the difference between the maximum and minimum values of the 3 different measurements made on the same length size on each of the 5 samples in each of the 7 positions. Each of these 35<sub>RO</sub> value must be less than the maximum permissible limit MPL<sub>RO</sub>.

## MPE (PFTU): Maximum Permissible Single Stylus Form Error

A reference sphere is measured with 25 equally distributed probings, estimate of the deviation in the shape of the sphere, obtained as a dispersion band of the 25 polar rays. The probing performance shall be verified in one position, placed in the middle of the CMM measure volume. Calculation of the Gaussian sphere using the 25 measures. Calculation of the radial distances R, for each of the 25 measured points. Calculation of the PFTU point gripping error, as dispersion band of the 25 radial distances, Rmax-Rmin. The PFTU error must be within the MPE(PFTU).



# CMM BRIDGE BENCHMARK

06.05.05 MOT

HALF-GANTRY TYPE CNC COORDINATE  
MEASURING MACHINE



# CMM BRIDGE | BENCHMARK

## STRUCTURE

**Coordinate Measuring Machine, CNC,** with aluminum alloy mobile half-gantry structure on granite table machine base

### Surface Plate:

Granite table with integrated guide-ways with flatness to DIN876/III and MS threaded insert grid

### CMM Basement:

**BENCHMARK:** STD CMM Basement

**OPTION:** CNC controller & PC integrated

### Guideways:

X axis: machined into granite table (left) and micro-machined and hard anodized alloy extrusions (right)

Y axis: micro-machined and hard anodized alloy extrusions

Z axis: micro-machined and hard anodized alloy extrusions

### Drive Method:

NC drive via DC motors with zero hysteresis friction drive on steel bar to all axes

### Bearing System:

Air bearings to all axes

### Measuring System:

High resolution (0,1µm) free floating linear scales mounted in carriers

### Motion Control:

DC servomotor on all axes

### Counterbalance:

Adjustable pneumatic on Z ram

### Thermal compensation:

Multi-sensors temperature compensation system (total 4 sensors) in option

## OPTION

Active vibration insulating system  
Multi-wire cable

## POWER SUPPLY

### Power Supply voltage:

230 V ± 10%; 50 Hz ± 2% single phase

115 V ± 10%; 60 Hz ± 2% single phase

## AIR SUPPLY

### Air Consumption:

90 NI/min

### Minimum Air Supply:

5 Bar (71 PSI)

## PROBING SYSTEM

### Manual Probe Head:

TPC3, MIH, MH20, MH20i, MH8, RTP20

### Motorized Probe Head:

PH10T, PH10M, PH20

### Point-to-point Trigger Probe:

TP20, TP200, TP200B

### Stylus and Probe Changer:

Fully automated stylus and probe changers

## ENVIRONMENT

### Temperature Range for Metrological Specification:

Ambient Temperature Range: 18 ÷ 22 °C

Max. gradient for hour: 0,5 °K/h

Max. gradient for day: 2,0 °K/24h

Max. gradient in space: 0,5 °K/m

### Operating Temperature:

15 ÷ 35 °C

### Relative Humidity:

40 ÷ 80 % (non condensing)

### Acceptable Vibrations:

(vibration acceleration between peaks)

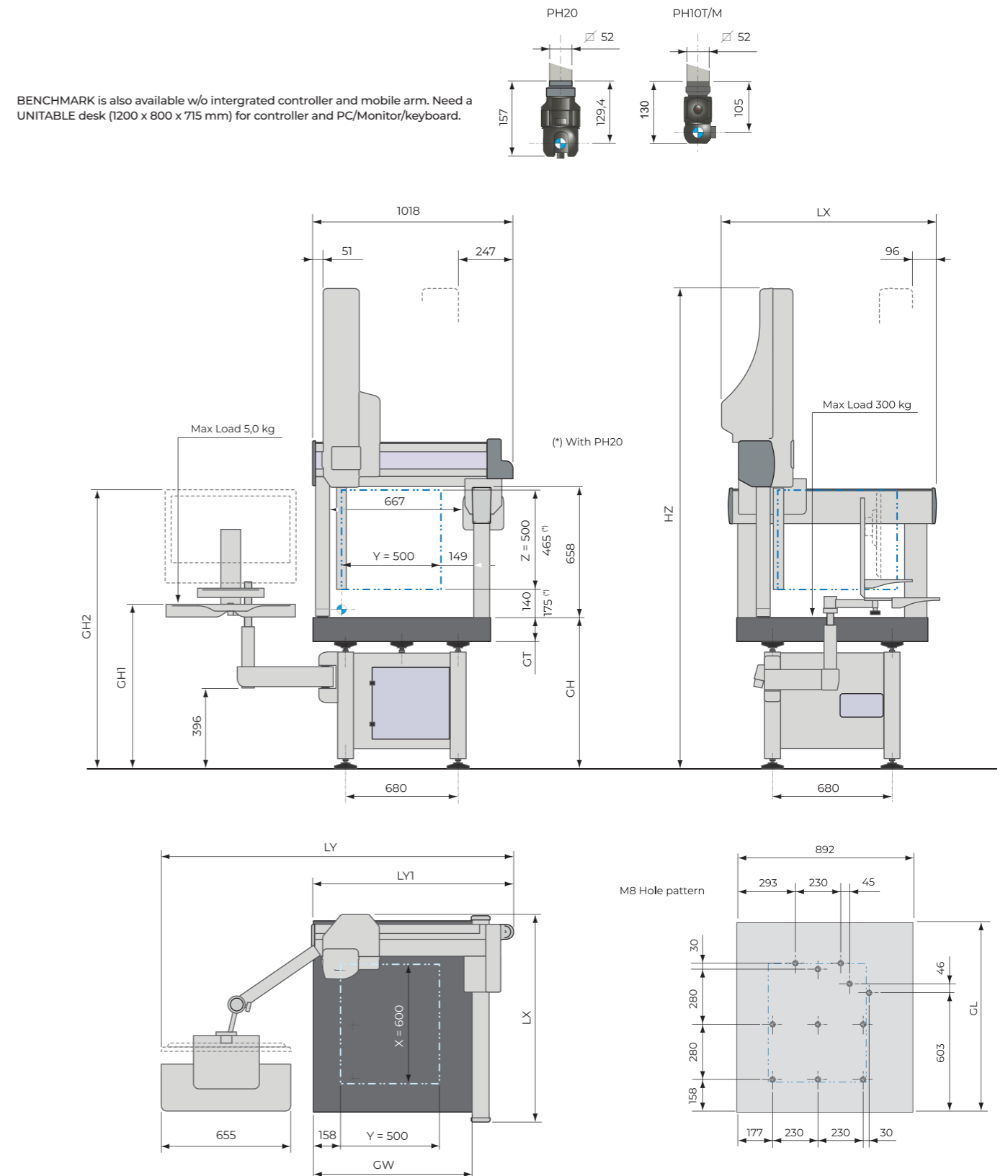
30 mm /s<sup>2</sup> from 1 to 10 Hz

15 mm /s<sup>2</sup> from 10 to 20 Hz

50 mm /s<sup>2</sup> from 20 to 100 Hz

## CMM BENCHMARK

# STROKES, DIMENSIONS, WEIGHTS



Models	Measuring Strokes			Overall Dimensions				Surface Plate					Weights		
	X	Y	Z <sup>(a)</sup>	LX	LY	LY1 <sup>(c)</sup>	HZ	GH	GT	GL	GW	GH1	GH2	Max. Part Weight	Machine Weight <sup>(b)</sup>
	[mm]			[mm]				[mm]					[kg]		
<b>06.05.05</b>	600	500	500	1066	1800÷1930	1018	2392	750	100	960	803	800÷1200	1395÷1825	300	435

<sup>(a)</sup>With PH20 Probe Head Z Measuring stroke will be reduced to 470 mm

<sup>(b)</sup>Weight includes CMM, Basement. Weight does not include Control and PC, keyboard and Video Terminal (approx. 20 kg)

<sup>(c)</sup>BENCHMARK w/o integrated control and articulated arm - Need a UNITABLE desk for controller and PC