



## Universal Bridge

## CMM

07.07 - 09.08 - 10.08

10.09 - 10.10 - 12.10 - 15.10 - 15.13

Universal Bridge

Coordinate Measuring Machine



# Universal Bridge CMM

## STRUCTURE

**CNC Bridge Type Coordinate Measuring Machine** with alloy bridge frame on granite base.

Surface plate in monolithic granite table with **integral guide-ways** and isostatic support with flatness to **DIN876/III** and **MB** threaded insert grid.

### Guideways

X axis: guideways integral dovetail machined into granite table

Y/Z axes: guideways micro-machined and hard anodized alloy extrusions

**Drive systems:** CNC drive via DC motors with toothed drive belts to all axes

**Bearing system:** isostatic system of air bearings to all axes

**Measuring system:** high resolution (0.1µm) free floating linear scales mounted in carriers.

**Counterbalance:** adjustable pneumatic on Z ram

**Thermal compensation:** NTC sensors for lines and pieces

## OPTION

Active vibration insulation system (AVM)

Basement side skirts

Perimetral safety system with SAFE MODE operation

Multi-wire cable

## POWER SUPPLY

### Power supply voltage:

230 V ± 70%; 50 Hz ± 2% single phase

775 V ± 70%; 60 Hz ± 2% single phase

## AIR SUPPLY

### Air consumption:

250 NI/min

### Minimum air supply:

5 Bar (77 PSI)

## PROBING SYSTEM

### Manual probe head:

MIH, MH20, MH20i

### Motorized indexable probe head:

PH70T, PH70M, PH70MQ

### Motorized continuous probe head:

## ENVIRONMENT

### Temperature range for metrological specification:

T<sub>1</sub>: Ambient temperature range: 78 -c 22 °C Max.  
gradient per hour: 7,0 °K/h

Max. gradient per day: 2,0 °K/24h

Max. gradient in space: 7,0 °K/m

T<sub>2</sub>: Ambient temperature range: 76 -c 26 °C Max.  
gradient per hour: 7,0 °K/h

Max. gradient per day: 5,0 °K/24h

Max. gradient in space: 7,0 °K/m

### Operating temperature:

75 -c 35 °C

### Relative humidity:

40 -c 80 % (non condensing)

### Acceptable vibrations

(Vibration acceleration between peaks)

30 mm/s<sup>2</sup> tra 7 e 70 Hz

7S mm/s<sup>2</sup> tra 70 e 20 Hz

50 mm/s<sup>2</sup> tra 20 e 700 Hz

# Performance

Models	T <sub>1</sub> : 18+22 °C											Max.3D Pas. Speed	Max.3D Accel.
	PHI0M/MQ/T/PH20-TP20			PHI0M/MQ/T-TP200			PHI0M/PHI0MQ-SP25M-REVO-SP80						
	MPEE0/15 <sup>111</sup> <sub>0</sub>	MPLR0(2)	MPE(PFTU) <sup>131</sup>	MPEE0/150 <sup>111</sup>	MPLR0(2)	MPE(PFTU) <sup>131</sup>	MPEE0/15 <sup>111</sup> <sub>0</sub>	MPLR0(2)	MPE(PFTU) <sup>131</sup>	MPE <sub>TJ</sub> <sup>141</sup>	MPTTij <sup>151</sup>		
	{μm}	{μm}	{μm}	{μm}	{μm}	{μm}	{μm}	{μm}	{μm}	{μm}	{sec}		
xx.07.07	1,9 + 3,0 L/1000	1,9	2,0	1,8 + 3,0 L/1000	1,7	1,8	1,7 + 3,0 L/1000	1,4	1,7	3,0	90	866	2000
xx.09.08	1,9 + 3,0 L/1000	1,9	2,0	1,8 + 3,0 L/1000	1,7	1,8	1,7 + 3,0 L/1000	1,4	1,7	3,0	90	866	2000
xx.10.08	2,0 + 3,0 L/1000	2,0	2,1	1,9 + 3,0 L/1000	1,8	1,9	1,7 + 3,0 L/1000	1,6	1,7	3,4	90	866	2000
xx.10.09	2,2 + 3,0 L/1000	2,2	2,2	2,0 + 3,0 L/1000	1,9	2,0	1,9 + 3,0 L/1000	1,8	1,9	4,0	90	866	1500
xx.10.10	2,5 + 3,0 L/1000	2,5	2,5	2,4 + 3,0 L/1000	2,3	2,4	2,4 + 3,0 L/1000	2,3	2,4	4,8	90	866	1200
xx.12.10	2,7 + 3,0 L/1000	2,7	2,7	2,5 + 3,0 L/1000	2,4	2,5	2,4 + 3,0 L/1000	2,3	2,4	4,8	90	866	1200
xx.15.10	2,8 + 3,5 L/1000	2,8	2,8	2,6 + 3,5 L/1000	2,5	2,6	2,5 + 3,5 L/1000	2,4	2,5	5,0	90	866	1000
xx.15.13	3,5 + 3,5 L/1000	3,5	3,5	3,0 + 3,5 L/1000	2,9	3,0	3,0 + 3,5 L/1000	2,8	3,0	5,8	90	800	900

Models	T <sub>2</sub> : 16 - 26 °C											Max.3D Pas. Speed	Max.3D Accel.
	PHI0M/MQ/T/PH20-TP20			PHI0M/MQ/T-TP200			PHI0M/PHI0MQ-SP25M-REVO-SP80						
	MPEE0/150 <sup>111</sup>	MPLR0(2)	MPE(PFTU) <sup>131</sup>	MPEE0/150 <sup>111</sup>	MPLR0(2)	MPE(PFTU) <sup>131</sup>	MPEE0/15 <sup>111</sup> <sub>0</sub>	MPLR0(2)	MPE(PFTU) <sup>131</sup>	MPE <sub>TJ</sub> <sup>141</sup>	MPTTij <sup>151</sup>		
	{μm}	{μm}	{μm}	{μm}	{μm}	{μm}	{μm}	{μm}	{μm}	{μm}	{sec}		
xx.07.07	2,4 + 5,0 L/1000	2,4	2,4	2,2 + 5,0 L/1000	2,2	2,2	2,2 + 5,0 L/1000	2,2	2,2	4,4	90	866	2000
xx.09.08	2,4 + 5,0 L/1000	2,4	2,4	2,2 + 5,0 L/1000	2,2	2,2	2,2 + 5,0 L/1000	2,2	2,2	4,4	90	866	2000
xx.10.08	2,5 + 5,0 L/1000	2,5	2,5	2,3 + 5,0 L/1000	2,3	2,3	2,3 + 5,0 L/1000	2,3	2,3	4,6	90	866	2000
xx.10.09	3,0 + 5,0 L/1000	3,0	3,0	2,8 + 5,0 L/1000	2,8	2,8	2,8 + 5,0 L/1000	2,8	2,8	5,6	90	866	1500
xx.10.10	3,0 + 5,0 L/1000	3,0	3,0	2,8 + 5,0 L/1000	2,8	2,8	2,8 + 5,0 L/1000	2,8	2,8	5,6	90	866	1200
xx.12.10	3,5 + 5,0 L/1000	3,5	3,5	3,3 + 5,0 L/1000	3,3	3,3	3,3 + 5,0 L/1000	3,3	3,3	6,6	90	866	1200
xx.15.10	3,5 + 6,0 L/1000	3,5	3,5	3,3 + 6,0 L/1000	3,3	3,3	3,3 + 6,0 L/1000	3,3	3,3	6,6	90	866	1000
xx.15.13	4,0 + 6,0 L/1000	4,0	4,0	3,7 + 6,0 L/1000	3,7	3,7	3,7 + 6,0 L/1000	3,7	3,7	7,4	90	800	900

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

- MPEEJMPE(PFTU)/MPLR<sub>0</sub>: PH70M/PH70MQ/PH70T/PH20/TP20/TP200:  
 stylus 0 4 mm, stylus length 70 mm.  
 SPBO: stylus 0 5 mm, stylus length 50 mm

- MPEE<sub>0</sub>: PH70M/PH70MQ/TP20/TP200: stylus 0 4 mm, length 40 mm.  
 PH20: EM7 STDF, stylus 0 4 mm, stylus length 20 mm.  
 PH70T: PEL2, stylus 0 4 mm, length 70 mm. SPBO: SHBO cube, MS  
 EXT LI00, stylus 0 5 mm, stylus length 50 mm

- MPEE<sub>0</sub>Mo: PH70MQ/SP25M: SM25-2, stylus 0 5 mm, stylus length 27 mm.  
 REVO: RSP2/RSH775 - RSP3-I/SH25-7, stylus 0 5 mm,  
 stylus length 21 mm

- L = measuring length (mm)

- Environment temperature conditions:

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>111</sup> Maximum Permissible Error of Length measurement in according  
 UNI EN ISO10360-2:2070

<sup>121</sup> Maximum Permissible Limit of Repeatability range in according  
 UNI EN ISO 10360-2:2010

<sup>131</sup> Maximum Permissible Single Stylus Form Error in according  
 UNI EN ISO70360-5:2010

<sup>141</sup> Maximum Permissible Scanning Probing Error in according UNI EN ISO  
 10360-4:2005, applicable to the SP25M/SP80 probes only, reference sphere 0  
 25 mm - REVO RSP3-I

<sup>151</sup> Maximum Permissible Time for Scanning test in according UNI EN ISO  
 10360-4:2005, applicable to the SP25M/SP80 probes only, reference sphere 0  
 25 mm - REVO RSP3-7



# Performance Verification

## **MPE<sub>rn</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 705 measurements. All 705 measurements (700%) must be within the specified MPE<sub>rn</sub>.

## **MPEE<sub>150</sub>**: Maximum Permissible Error on length measurement with probe OFFSET 150mm.

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

## **MPLR<sub>0</sub>**: Maximum Permissible Repeatability Limit

Evaluation of the 35 repeatability values calculated from the difference between the maximum and minimum values of the three different measurements made on the same length size on each of the 5 samples in each of the 7 positions. Each of these 35 R<sup>0</sup> value must be less than the maximum permissible limit MPLR<sup>0</sup>.

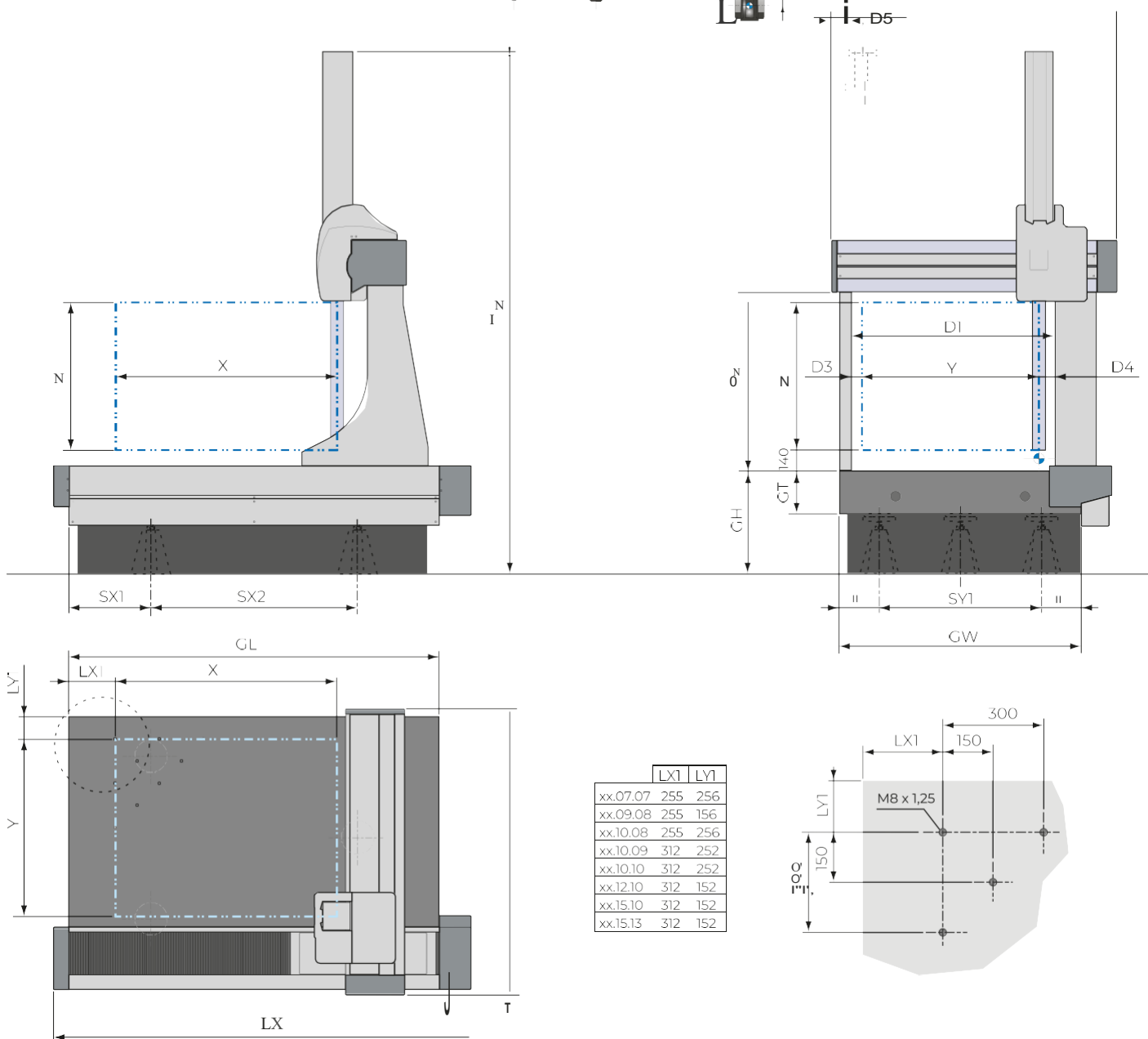
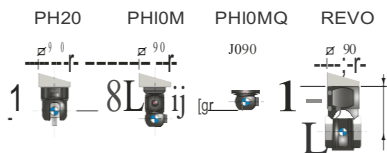
## **MPE (PFTU)**: Maximum Permissible Single Stylus Form Error

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, R<sub>max</sub>-R<sub>min</sub>. The PFTU error must be within the MPE(PFTU).

## **MPET<sub>ij</sub>**: Maximum Permissible Scanning Probing Error

MPETU is the Maximum Permissible Scanning Probing Error of the range of all measured sphere radii (sphere form error), with high point density and predefined path scanning, where MPTTU indicates the maximum useful time (seconds) to perform the verification test. The performance of the scanning probing is verified in only one position, placed in the middle of the CMM measure volume. The size's sphere is measured along 4 defined sections. The scanning probing error T<sub>ij</sub>, is calculated as the range of sphere radii between the measured centre and all of the valued scan points. The scanning probing error (T<sub>ij</sub>) and the time taken for verification(T<sub>ij</sub>) must be within the value of MPETU and MPTTU.

# Strokes, Dimensions, Weight



	LX1	LY1
xx.07.07	255	256
xx.09.08	255	156
xx.10.08	255	256
xx.10.09	312	252
xx.10.10	312	252
xx.12.10	312	152
xx.15.10	312	152
xx.15.13	312	152

# Universal Bridge Model Specifications

Models	Measuring strokes			Overall dimensions			Surface Plate						Daylights						Weights		
	X	y	z111	LX	LY	HZ	Height	Thick.	Lenght	Width	Supports			D1	D2	D3	D4	DS	D6	Max part weight	CMM weight
							GH	GT	GL	GW	SX1	SX2	SYI								
	[mm]			[mm]			[mm]				[mm]			[mm]						[kg]	
07.07.07	700	700	700	1852	1324	2843	670	200	1530	mo	316	900	700	873	909	73	100	67	365	650	1200
10.07.07	1000	700	700	2152	1324	2843	670	200	1830	mo	415	1000	700	873	909	73	100	67	365	900	1380
12.09.08	1200	900	800	2352	1524	3073	700	250	2030	1310	455	1120	880	1073	1009	73	100	67	365	1300	2125
15.09.08	1500	900	800	2652	1524	3073	700	250	2330	1310	540	1250	880	1073	1009	73	100	67	365	1500	2400
20.09.08	2000	900	800	3152	1524	3073	700	250	2830	1310	665	1500	880	1073	1009	73	100	67	365	1800	2860
12.10.08	1200	1000	800	2352	1624	3073	700	250	2030	1410	455	1120	980	1173	1009	73	100	67	365	1400	2270
15.10.08	1500	1000	800	2652	1624	3073	700	250	2330	1410	540	1250	980	1173	1009	73	100	67	365	1600	2570
20.10.08	2000	1000	800	3152	1624	3073	700	250	2830	1410	665	1500	980	1173	1009	73	100	67	365	1900	3070
15.10.09	1500	1000	900	2832	1737	3339	700	250	2510	1440	555	1400	960	1180,5	1111	70,5	110	109,5	435,5	1500	2890
20.10.09	2000	1000	900	3332	1737	3339	700	290	3010	1440	655	1700	960	1180,5	1111	70,5	110	109,5	435,5	1600	3890
15.10.10	1500	1000	1000	2832	1737	3539	700	250	2510	1440	555	1400	960	1180,5	1211	70,5	110	109,5	435,5	1500	2890
20.10.10	2000	1000	1000	3332	1737	3539	700	290	3010	1440	655	1700	960	1180,5	1211	70,5	110	109,5	435,5	1600	3900
15.12.10	1500	1200	1000	2832	1937	3539	700	290	2510	1640	555	1400	1100	1380,5	1211	70,5	110	109,5	435,5	1800	3730
20.12.10	2000	1200	1000	3332	1937	3539	700	340	3010	1640	655	1700	1100	1380,5	1211	70,5	110	109,5	435,5	2300	5100
25.12.10	2500	1200	1000	3832	1937	3539	700	360	3510	1640	780	1950	mo	1380,5	1211	70,5	110	109,5	435,5	2400	6210
20.15.10	2000	1500	1000	3332	2237	3539	700	360	3010	1940	655	1700	1300	1680,5	1211	70,5	110	109,5	435,5	3600	6330
25.15.10	2500	1500	1000	3832	2237	3539	700	400	3510	1940	780	1950	1300	1680,5	1211	70,5	110	109,5	435,5	4000	8080
30.15.10	3000	1500	1000	4332	2237	3539	700	420	4010	1940	895	2220	1300	1680,5	1211	70,5	110	109,5	435,5	4000	9650
20.15.13	2000	1500	1300	3332	2237	4139	700	360	3010	1940	655	1700	1300	1680,5	1511	70,5	110	109,5	435,5	3600	6650
25.15.13	2500	1500	1300	3832	2237	4139	700	400	3510	1940	780	1950	1300	1680,5	1511	70,5	110	109,5	435,5	4000	8300
30.15.13	3000	1500	1300	4332	2237	4139	700	420	4010	1940	895	2220	1300	1680,5	1511	70,5	110	109,5	435,5	4000	9850

<sup>01</sup>With REVO Z measuring strokes will be reduced of 48 mm