

# 3D-Coordinate Measuring Machine (CMM) LH 108

STANDARD / PREMIUM / PREMIUM-SELECT

## Technical Data



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## Short description

- CNC-bridge design measuring machine capable for touch-trigger and scanning probes; for optical or continuous and indexing probe systems
- Dynamic and high precision series with air bearings in all axis
- All granite guideways accurately hand-lapped
- Compact design. Operator workstation with integrated controller and computer
- CMM available in multiple sizes for the optimal selection of the required measurement volume

## Application areas

- In production, quality control, process and production control; in reverse engineering and model making
- Geometric and free-form components
- Both series and individual measurements
- Palletized operation possible

## Features

- The Y-axis guideway is machined directly in the base plate, providing optimal long-term stability
- Pre-stressed, encompassing air bearings in all axes
- Passive vibration dampers
- Active pneumatic vibration damping optionally available and field retrofittable
- Compact control panel with central, logarithmic joystick, "mouse function" and context-sensitive function buttons. Selectable joystick's axis assignment. Wireless version optionally available.
- The X- and Y-guideways feature bellows protections against contamination
- High-speed-dynamic servo drives with position monitoring, combined friction power transmission
- Three-axis contouring controller with intelligent "lookahead" function for application-optimized trajectory
- Manual temperature compensation in Standard version
- Premium- and Premium-Select version with automatic temperature compensation on all axes and work piece
- Two-stage speed selection and variable speed adjustment (override 0-100%) in all operation modes, resulting in sensitive movement via joystick or in CNC mode

## Probe systems

- PH10M / PH10T motorized indexing head
- TP200 touch-trigger probe, highly precise and suitable for styli up to 100 mm in length. Styli can be changed via optional tool changer
- Touch-trigger probe TP20, Stylus module changeable via optional tool changer
- PH10M motorized indexing head
- SP25M scanning and single-point probe, precise and flexible for stylus lengths of up to 400 mm. Probe module and stylus can be changed via optional tool changer.
- Shapetracer: 3D Line Scanner to report and handle point clouds
- SP80 scanning probe head, highly precise for larger probe lengths. For scanning and single-point probing. Stylus combinations can be changed via optional tool changer
- PH20<sup>TM</sup>: Continuous 5-axis touch-trigger system with „head touch“
- REVO: 5-axis head and probe system for scanning of complex contours and high throughput

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| Machine Type                                                  |                                                          |                                                                | LH 108 Standard                                                                                                    |                    |                      |                   | LH 108 Premium    |                    |                      |                   | LH 108 Premium-Select |                |      |       |
|---------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------|----------------------|-------------------|-------------------|--------------------|----------------------|-------------------|-----------------------|----------------|------|-------|
| Measuring Ranges, Weights                                     |                                                          |                                                                |                                                                                                                    |                    |                      |                   |                   |                    |                      |                   |                       |                |      |       |
| Measuring ranges                                              | X                                                        | [mm]                                                           | 1000                                                                                                               |                    |                      |                   | 1000              |                    |                      |                   | 1000                  |                |      |       |
| with PH10M probe                                              | Y*                                                       | [mm]                                                           | 1200                                                                                                               | 1600               | 2000                 | 3000              | 1200              | 1600               | 2000                 | 3000              | 1200                  | 1600           | 2000 | 3000  |
|                                                               | Z                                                        | [mm]                                                           | 800                                                                                                                |                    |                      |                   | 800               |                    |                      |                   | 800                   |                |      |       |
| Machine weight                                                |                                                          | [kg]                                                           | 4480                                                                                                               | 5540               | 6925                 | 10390             | 4480              | 5540               | 6925                 | 10390             | 4480                  | 5540           | 6925 | 10390 |
| Permissible part weight                                       |                                                          | [kg]                                                           | 2000                                                                                                               | 2250               | 2400                 | 3300              | 2000              | 2250               | 2400                 | 3300              | 2000                  | 2250           | 2400 | 3300  |
| General Requirements                                          |                                                          |                                                                |                                                                                                                    |                    |                      |                   |                   |                    |                      |                   |                       |                |      |       |
| Electric                                                      |                                                          |                                                                | Single-phase AC 1P+N+PE, 115/230 V ± 10 %, 50/60 Hz, max. 1000 VA, acc. to EN 60204/1                              |                    |                      |                   |                   |                    |                      |                   |                       |                |      |       |
| Compressed air                                                |                                                          |                                                                | Supply pressure 6-10 bar, pre-filtered, quality according to ISO 8573-1: Class 4 or better                         |                    |                      |                   |                   |                    |                      |                   |                       |                |      |       |
| Air consumption                                               | passive                                                  | [ <sup>Nl</sup> / <sub>min</sub> ]                             | Ø 67                                                                                                               |                    |                      |                   |                   |                    |                      | 91 (max.)         |                       |                |      |       |
|                                                               | active                                                   | [ <sup>Nl</sup> / <sub>min</sub> ]                             | Ø 91                                                                                                               |                    |                      |                   |                   |                    |                      | 137 (max.)        |                       |                |      |       |
| Measuring Accuracy**                                          |                                                          |                                                                |                                                                                                                    |                    |                      |                   |                   |                    |                      |                   |                       |                |      |       |
| Measurement system                                            |                                                          |                                                                | Photoelectric scale system, optical division 20 µm                                                                 |                    |                      |                   |                   |                    |                      |                   |                       |                |      |       |
| Resolution                                                    |                                                          | [µm]                                                           | 0,1                                                                                                                |                    |                      |                   |                   |                    |                      | 0,02              |                       |                |      |       |
| Single-stylus probing uncertainty <sup>1</sup>                | P <sub>F<sub>TU</sub>, MPE</sub><br>[µm]                 |                                                                | TP20<br>2,3                                                                                                        | TP200<br>2,1       | SP25/80<br>1,8       | REVO<br>1,8       | PH20<br>2,1       | TP200<br>1,8       | SP25/80<br>1,5       | REVO<br>1,5       | SP25/80<br>1,3        |                |      |       |
| Repeatability range uncertainty <sup>2</sup>                  | R <sub>0</sub> , MPL<br>[µm]                             |                                                                | TP20<br>2,3                                                                                                        | TP200<br>2,1       | SP25/80<br>1,8       | REVO<br>1,8       | PH20<br>2,1       | TP200<br>1,8       | SP25/80<br>1,5       | REVO<br>1,5       | SP25/80<br>1,3        |                |      |       |
| Volumetric length measuring uncertainty <sup>2</sup>          | E <sub>0</sub> , MPE /<br>E <sub>150</sub> , MPE<br>[µm] |                                                                | TP20<br>2,3+L/300                                                                                                  | TP200<br>2,1+L/300 | SP25/80<br>1,8+L/300 | REVO<br>1,8+L/300 | PH20<br>2,1+L/300 | TP200<br>1,8+L/350 | SP25/80<br>1,5+L/350 | REVO<br>1,5+L/350 | SP25/80<br>1,3+L/400  |                |      |       |
| Scanning probe uncertainty <sup>3</sup>                       | MPE <sub>THP</sub> [µm]                                  |                                                                | SP25/80<br>2,4                                                                                                     |                    |                      | REVO<br>2,4       |                   | SP25/80<br>2,1     |                      | REVO<br>2,1       |                       | SP25/80<br>1,9 |      |       |
| Total measuring time for THP                                  | MPT <sub>τ<sub>HP</sub></sub> [sec]                      |                                                                | 72                                                                                                                 |                    |                      |                   | 72                |                    |                      |                   | 72                    |                |      |       |
| Operating Environment                                         |                                                          |                                                                |                                                                                                                    |                    |                      |                   |                   |                    |                      |                   |                       |                |      |       |
| Operating temperature                                         |                                                          | [°C]                                                           | 15-30                                                                                                              |                    |                      |                   |                   |                    |                      |                   |                       |                |      |       |
| Temperature range for E <sub>L</sub> , MPE (Standard/Premium) |                                                          |                                                                | 20 °C ± 2 K, ΔT: 1 <sup>K</sup> / <sub>h</sub> , 1 <sup>K</sup> / <sub>m</sub> , 2 <sup>K</sup> / <sub>d</sub>     |                    |                      |                   |                   |                    |                      |                   |                       |                |      |       |
| Temperature range for E <sub>L</sub> , MPE (Premium-Select)   |                                                          |                                                                | 20 °C ± 1 K, ΔT: 0,5 <sup>K</sup> / <sub>h</sub> , 0,5 <sup>K</sup> / <sub>m</sub> , 1 <sup>K</sup> / <sub>d</sub> |                    |                      |                   |                   |                    |                      |                   |                       |                |      |       |
| Relative humidity                                             |                                                          | [%]                                                            | 40-70                                                                                                              |                    |                      |                   |                   |                    |                      |                   |                       |                |      |       |
| Dynamics***                                                   |                                                          |                                                                |                                                                                                                    |                    |                      |                   |                   |                    |                      |                   |                       |                |      |       |
| Joystick operation                                            |                                                          | v <sub>max</sub> [ <sup>mm</sup> / <sub>s</sub> ]              | 0-20 (creep mode), 0-100 (normal)                                                                                  |                    |                      |                   |                   |                    |                      |                   |                       |                |      |       |
| CNC mode                                                      |                                                          | v <sub>max</sub> [ <sup>mm</sup> / <sub>s</sub> ]              | 300 axial, 520 volumetric                                                                                          |                    |                      |                   |                   |                    |                      |                   |                       |                |      |       |
| CNC mode                                                      |                                                          | a <sub>max</sub> [ <sup>mm</sup> / <sub>s</sub> <sup>2</sup> ] | 600 axial, 1000 volumetric                                                                                         |                    |                      |                   |                   |                    |                      |                   |                       |                |      |       |

1: According to DIN EN ISO 10360-5 / Maximum Permissible Error  $P_{FTU, MPE}$

- SP25M with Module SM25-1 and Styli Ø 4 x < 30 mm
- SP80 and Styli Ø 5 x 50 mm
- TP200 with Standard Force Module and Styli Ø 4 x < 30 mm
- TP20 with Standard Force Module and Styli Ø 4 x 10 mm
- REVO with RSP3-3 and Styli Ø 4 x 10 mm
- PH20 with Standard Force Module and Styli Ø 4 x < 10 mm

2: According to DIN EN ISO 10360-2 / Maximum Permissible Error  $E_{L, MPE}$

- SP25M with Module SM25-1 and Styli Ø 4 x < 30 mm
- SP80 and Styli Ø 5 x 50 mm
- TP200 with Standard Force Module and Styli Ø 4 x < 30 mm
- TP20 with Standard Force Module and Styli Ø 4 x < 30 mm
- REVO with RSP3-3 and Styli Ø 4 x < 30 mm
- PH20 with Standard Force Module and Styli Ø 4 x < 30 mm

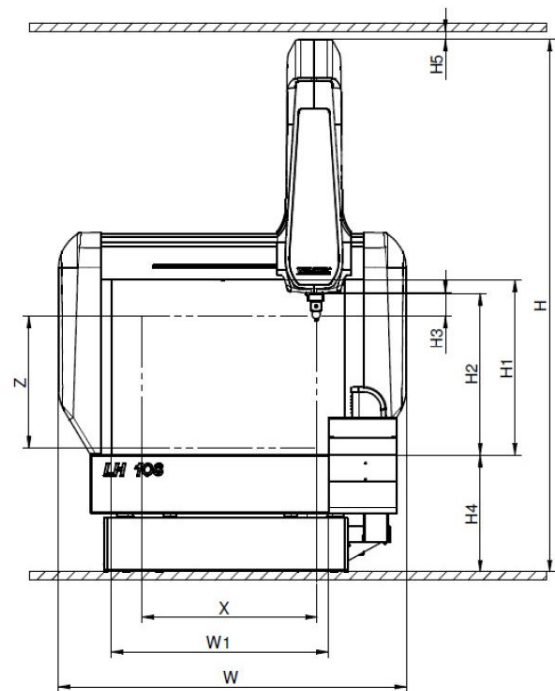
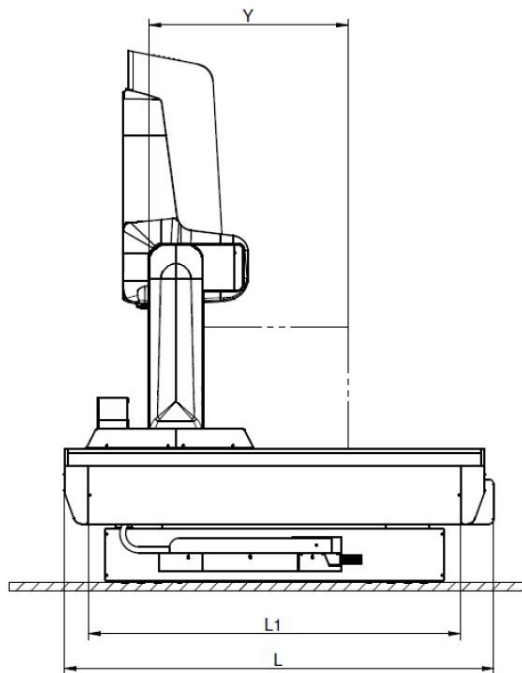
3: According to DIN EN ISO 10360-4 / Maximum Permissible Error  $MPE_{THP}$

- SP25M with Module SM25-1 and Styli Ø 4 x < 30 mm
- SP80 and Styli Ø 5 x 50 mm
- REVO with RSP3-3 and Styli Ø 4 x < 30 mm

\* Y-measuring ranges on request up to 6500 mm possible

\*\* Specification of accuracies valid under inclusion of temperature compensation

\*\*\* Dependent on used controller



| Overall Dimensions [mm]              |                 |           |      |      |      |
|--------------------------------------|-----------------|-----------|------|------|------|
| Measuring ranges<br>with PH10M probe | X               | 1000      |      |      |      |
|                                      | Y*              | 1200      | 1600 | 2000 | 3000 |
|                                      | Z               | 800       |      |      |      |
| Overall dimensions                   | W               | 2100      |      |      | 2150 |
|                                      | L               | 2594      | 3010 | 3410 | 4434 |
|                                      | H               | 3210      |      | 3220 | 3180 |
| Workspace dimensions                 | H1              | 1060      |      |      |      |
|                                      | H2              | 980       |      |      |      |
|                                      | H3**<br>(PH10M) | 97        |      |      |      |
|                                      | H4              | 700       |      | 710  | 670  |
|                                      | L1              | 2250      | 2650 | 3050 | 4050 |
|                                      | W1              | 1310      |      |      |      |
| Inspection room dimension            | H5              | 50 (min.) |      |      |      |

\* Y-measuring ranges on request up to 6500 mm possible

\*\* Measuring ranges dependent on probe system

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