

CenterMax >>>

Machine for Measurements on the Production Line
Achieves Outstanding Precision without Inspection Room!

ZEISS

CenterMax

High-Precision CNC 3D Coordinate Measuring Machine

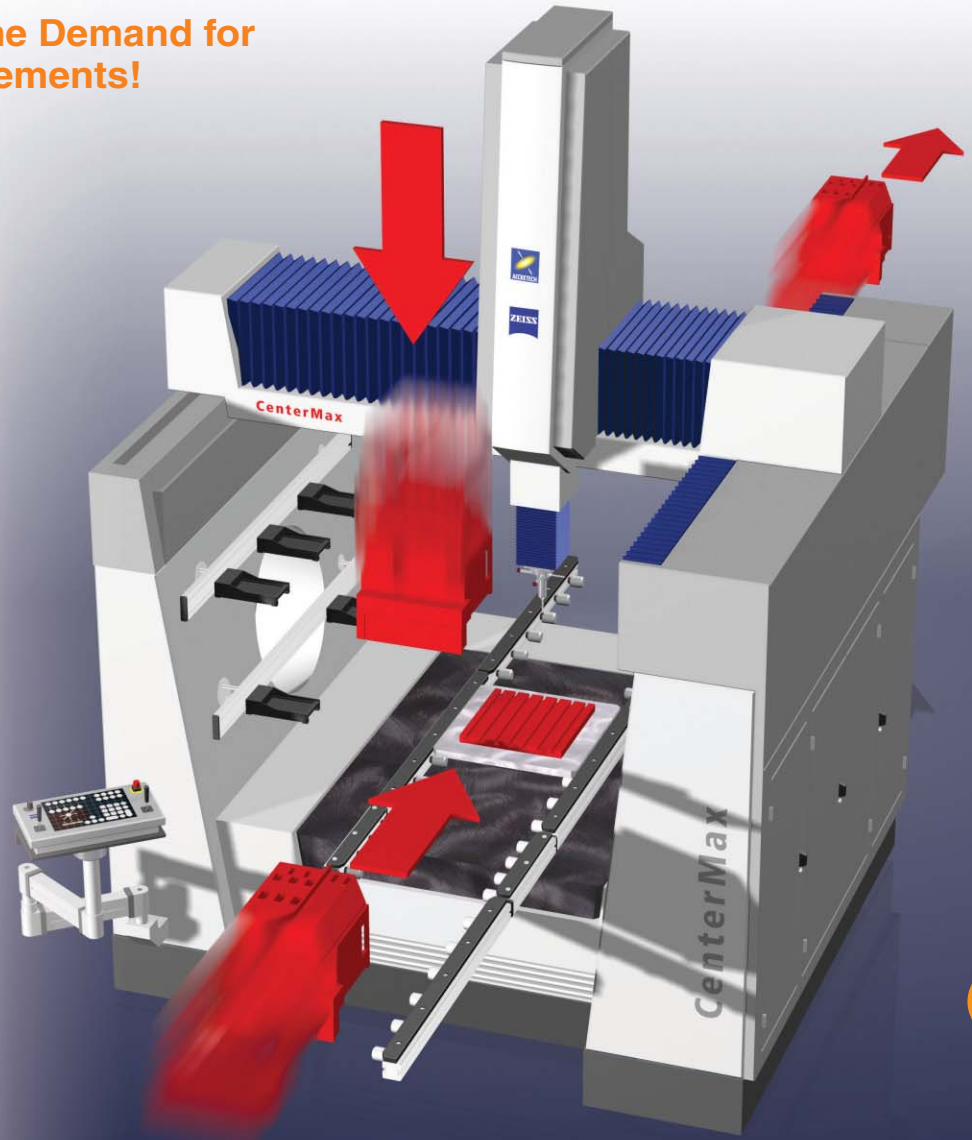
Facilitates real-time measurements and feed back to the production line. This enables flexible measurements for small-lot production of multiple items.



CenterMax: Satisfying the Demand for Production Line Measurements!

- Dedicated inspection rooms are required to use ordinary 3D coordinate measuring machines on the production line since they can only operate at $20^{\circ}\text{C} \pm$ several degrees.
- This prevents real-time measurements from being performed due to the time that the workpiece must be left in the inspection room to acclimatize to the different temperature to prevent the influence of thermal deformation.
- The machine accuracy of the CenterMax is guaranteed at room temperature ($15 - 40^{\circ}\text{C}$) without using a dedicated inspection room. Furthermore, the elimination of temperature compensation reduces fluctuations in measurements to the absolute minimum.
- CenterMax is a 3D coordinate measuring machine with dramatically improved resistance to environmental influence (see detailed explanation).
- Workpiece temperature compensation is performed by the temperature sensor that is provided (automatically changed by probe changer).
- Special stylus (Thermo-fit) has been developed that does not expand or contract due to changes in temperature.
- Machine design facilitates easy loading and unloading of workpieces. Granite table, rotary table or pallet table can be selected according to the application.

These superior CenterMax features enable measurements in production-line environments.



Work Piece Loading/Unloading



Example of Installation on Production Floor

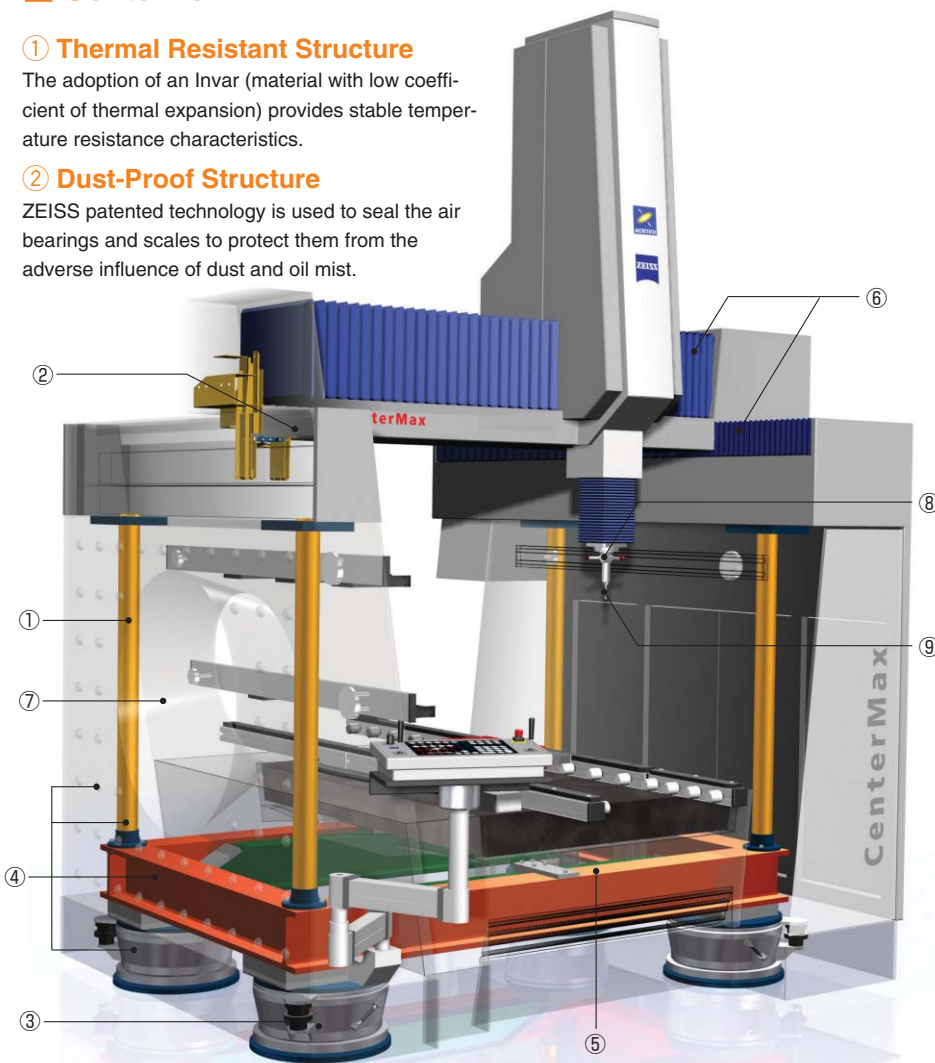
CenterMax

① Thermal Resistant Structure

The adoption of an Invar (material with low coefficient of thermal expansion) provides stable temperature resistance characteristics.

② Dust-Proof Structure

ZEISS patented technology is used to seal the air bearings and scales to protect them from the adverse influence of dust and oil mist.



③ Active Anti-Vibration System

This system minimizes the influence of floor vibration.

④ TRF (Temperature Resistant Frame)

⑤ Oil Drain

The oil drain efficiently discharges fluids (water, oil) from below the workpiece table.

⑥ Upward Guideway Structure

Installing the X guide in an upper position minimizes the amount of weight moved, achieving higher precision when high-speed measurements are performed. This enhances the efficiency of workpiece loading and work in the clamping area.

⑦ Mineral-Cast: Special Body Material

A special ZEISS patented material provides the ideal resistance characteristics to temperature changes and vibration.

⑧ VAST Probe Head

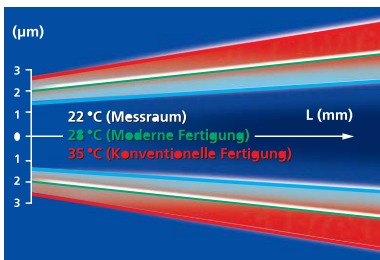
Carl Zeiss patented VAST Active Scanning probe head delivers highly vibration resistant, highly stable sampling precision.

⑨ Thermo-Fit Stylus Extension

This optional stylus does not expand or contract as a result of temperature changes (ZEISS patent).

TVA (Thermal Variable Accuracy)

This technique clarifies guaranteed machine accuracy when installed in different environments with a variety of ambient temperatures.



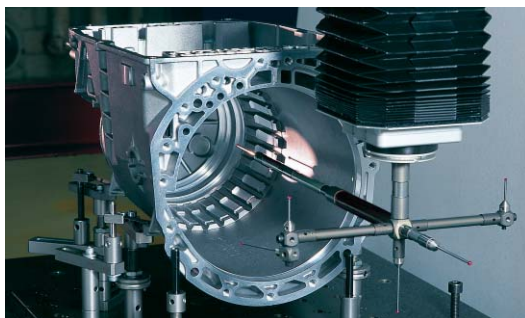
→ Accuracy at Different Ambient Temperatures

| | | |
|----------------------------------|------|--------------------------------|
| 1. Precision measuring room | 22°C | MPE _E =1.5+L/290µm |
| 2. New production line | 28°C | MPE _E =1.8+L/260µm |
| 3. Conventional production floor | 35°C | MPE _E =2.15+L/225µm |

$$\text{TVA MPE}_E = 1.4 + (0.05 \times |\Delta\zeta|) + L / (300 - (5 \times |\Delta\zeta|))$$

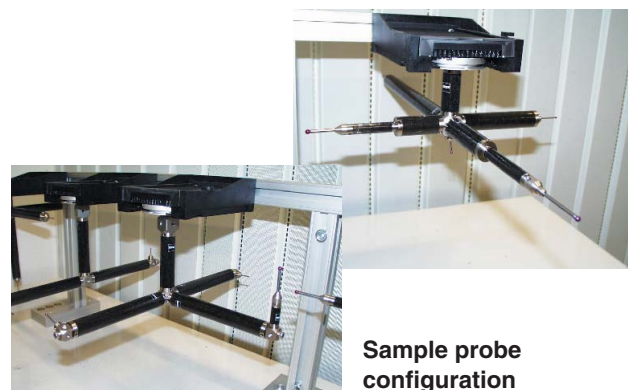
|\Delta\zeta| : Ambient temperature difference from 20°C

Options



Thermo-Fit

- Development of a special carbon material that does not expand or contract due to temperature changes has enabled the introduction of a stylus that virtually eliminates fluctuations in measurements.
- Stylus features light weight, high rigidity and is able to flexibly measure workpieces with complicated shapes.
- ZEISS Patent
- Indispensable for precision measurements on the production floor.



Sample probe configuration

Specifications

| Model | | CenterMax | | |
|---|---------------------------------------|---|---|--|
| Measuring Range (mm) | X-axis (mm) | 900 | | |
| | Y-axis (mm) | 1200 | | |
| | Z-axis (mm) | 700 | | |
| Accuracy | Maximum Permissible Indication Error | TVA MPE_E(μm) ^{*1} | $1.4+(0.05 \times \Delta \zeta) + L/(300-(5 \times \Delta \zeta))$ $\Delta \zeta$: Ambient temperature deviation from 20°C | |
| | | | 1.4+L/300 (20°C) | |
| | | | 1.5+L/290 (22°C) | |
| | | | 1.8+L/260 (28°C) | |
| | | | 2.15+L/225 (35°C) | |
| | Maximum Permissible Probing Error | MPE_P(μm) ^{*2} | 1.4 | |
| | Maximum Permissible Scanning Error | MPE_THP(μm) ^{*2} | 2.4 | |
| | Temperature Conditions | Ambient Temperature (°C) | 15 - 40 | |
| | | Temperature Change (°C/hour) | 2.0 | |
| | | (°C/day) | 8.0 | |
| | (°C/m-height) | 2.0 | | |
| | Measuring Scale | ZERODUR scale (Resolution: 0.2μm) | | |
| Table | Material | Granite (Gabbro) | Universal plate | |
| | Usable Width (mm) | 900 | 900 | |
| | Usable Depth (mm) | 1200 | 1200 | |
| | Floor-to-Table Height (mm) | 770 | 680 | |
| Workpiece Measured | Max. Height (mm) | 760 | 850 | |
| | Max. Weight (kg) | 750 | 1000 | |
| Number of Probe Magazine Slots | Standard | 8 | | |
| | Maximum (Option) | 24 | | |
| Probe Mounting Conditions | Max. Weight (g) | 600 (including change plate) | | |
| | Max. Length (mm) | 800 | | |
| Guide System | | Air bearing | | |
| Drive Speed | Joystick Mode (mm/s) | 70 | | |
| | CNC Mode Axis Directions (mm/s) | 300 | | |
| | Vector Direction (mm/s) | 520 | | |
| | Scanning Mode (mm/s) | 100 | | |
| Drive Acceleration | Axis Directions (mm/s ²) | 1400 | | |
| | Vector Direction (mm/s ²) | 2400 | | |
| Air Source | | Supply pressure: 0.6 to 1.0 MPa; Usage Pressure: 0.5MPa; Consumption: 120Nℓ /min. | | |
| Power Requirements | | Supply: Single-phase 100V AC ±10%, 50/60 Hz ±5%, Consumption: 2500 VA max. | | |
| Machine Dimensions | Width (mm) | 2090 | | |
| | Depth (mm) | 2130 | | |
| | Height (mm) | 3000 | | |
| Machine Weight (kg) | | 6000 | | |
| Required Ceiling Height for Installation (mm) | | 3200 | | |
| Delivery Clearance Height (mm) | | 2900 | | |

*1 TVA: Thermal Variable Accuracy. A measurement technique that clearly defines a machine's guaranteed accuracy under various ambient temperatures under different installation environments.

*2 MPE_E (Maximum Permissible Indication Error) and MPE_P (Maximum Permissible Probing Error) are based on the ISO 10360-2:2001 (JIS B 7440-2:2003) evaluation method for 3D coordinate measuring machines. Indication accuracy L is the distance between any two points (mm). MPE_THP (Maximum Permissible Scanning Error) is based on the ISO 10360-4:2001 (JIS B 7440-4:2003) evaluation method for scanning measurement.

A rotary table can also be equipped as an option.