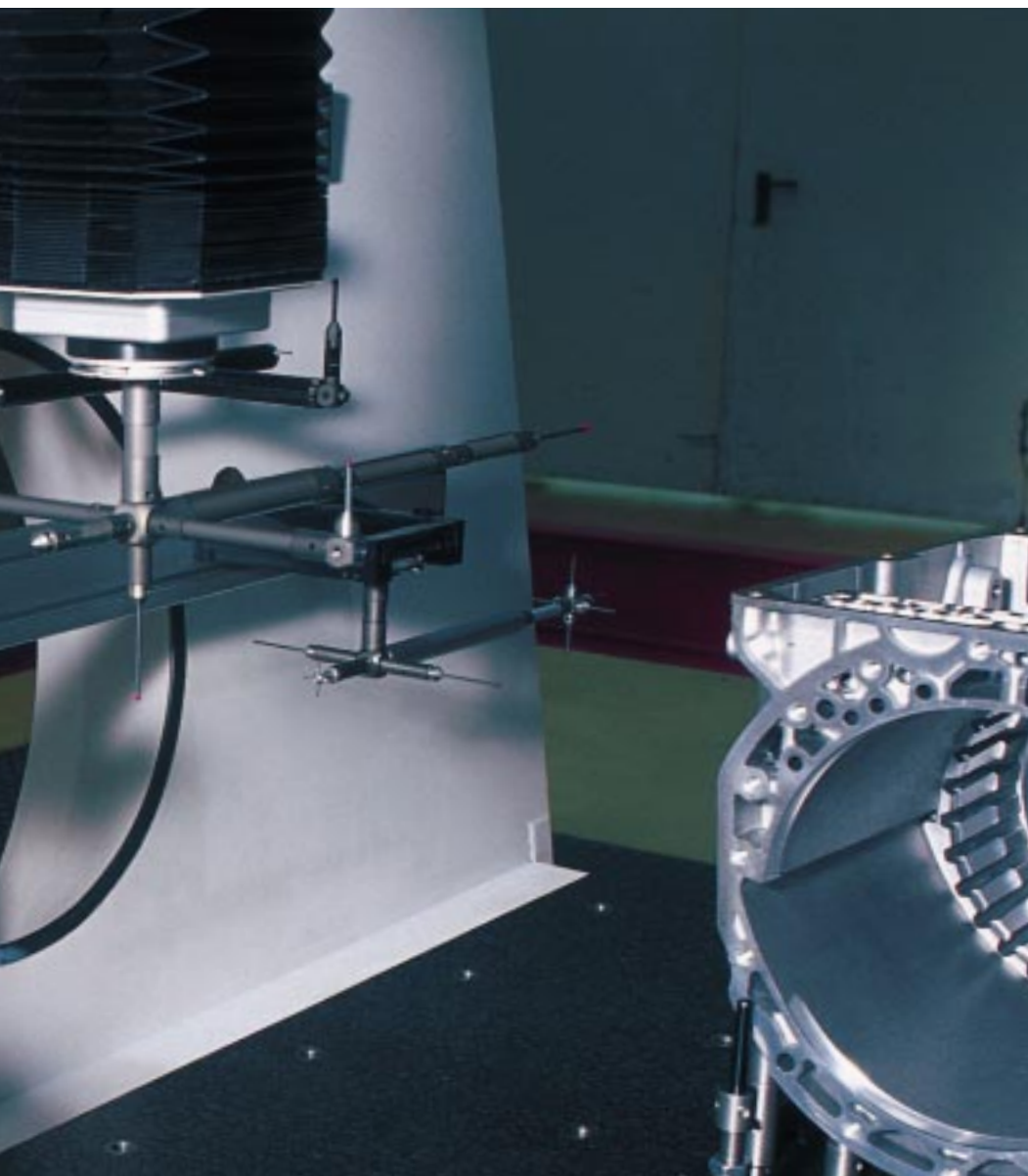


**Future-proof.
Production-proof.
CenterMax®.**



SIMPLY MEASURE

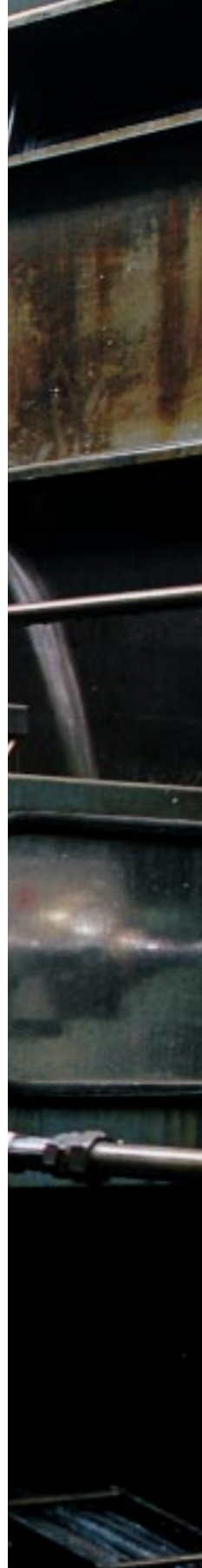


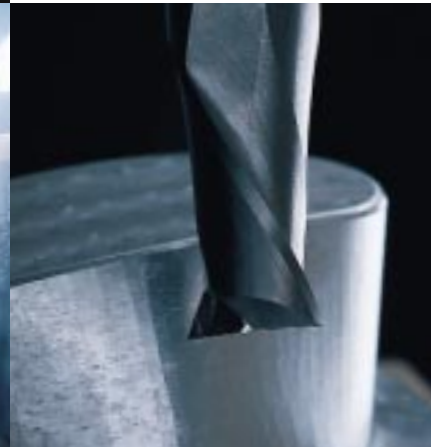
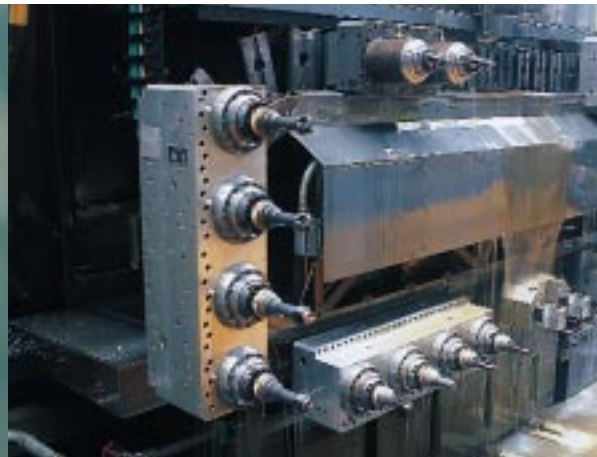
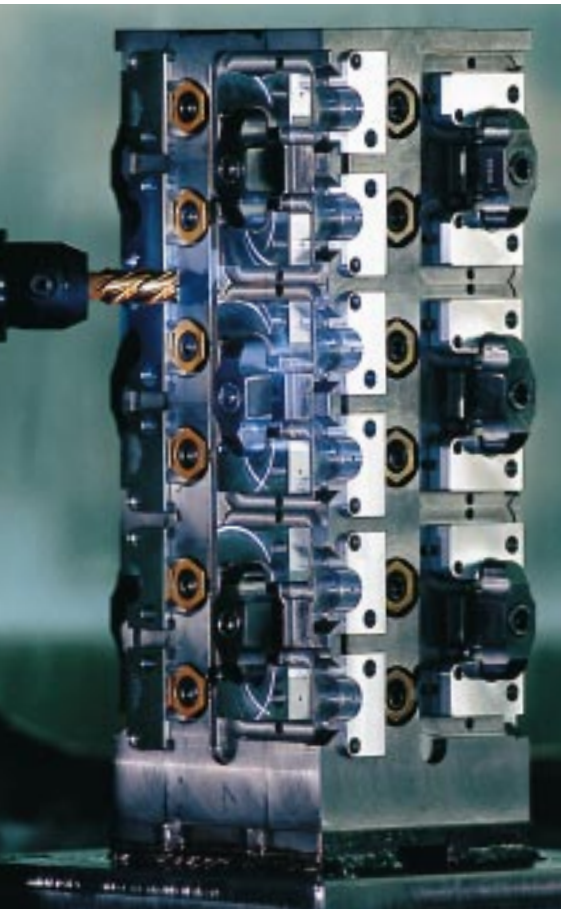
**Could you imagine operating
a coordinate measuring
machine in this environment?**



CenterMax[®], because ...

- ... the machine is totally resistant to ambient conditions, even without an enclosure,
- ... the long-term stability of the machine is guaranteed thanks to its sophisticated design,
- ... the coordinate measuring machine operates as accurately on the shopfloor as a measuring machine in the metrology room,
- ... the machine can be easily integrated in automatic production lines and loaded from all sides,
- ... despite the small footprint, it provides a maximum measuring volume,
- ... quality assurance in the manufacturing area is more efficient and faster than in the metrology room,
- ... with the reliable service we provide, you can rely on the machine functions at all times.







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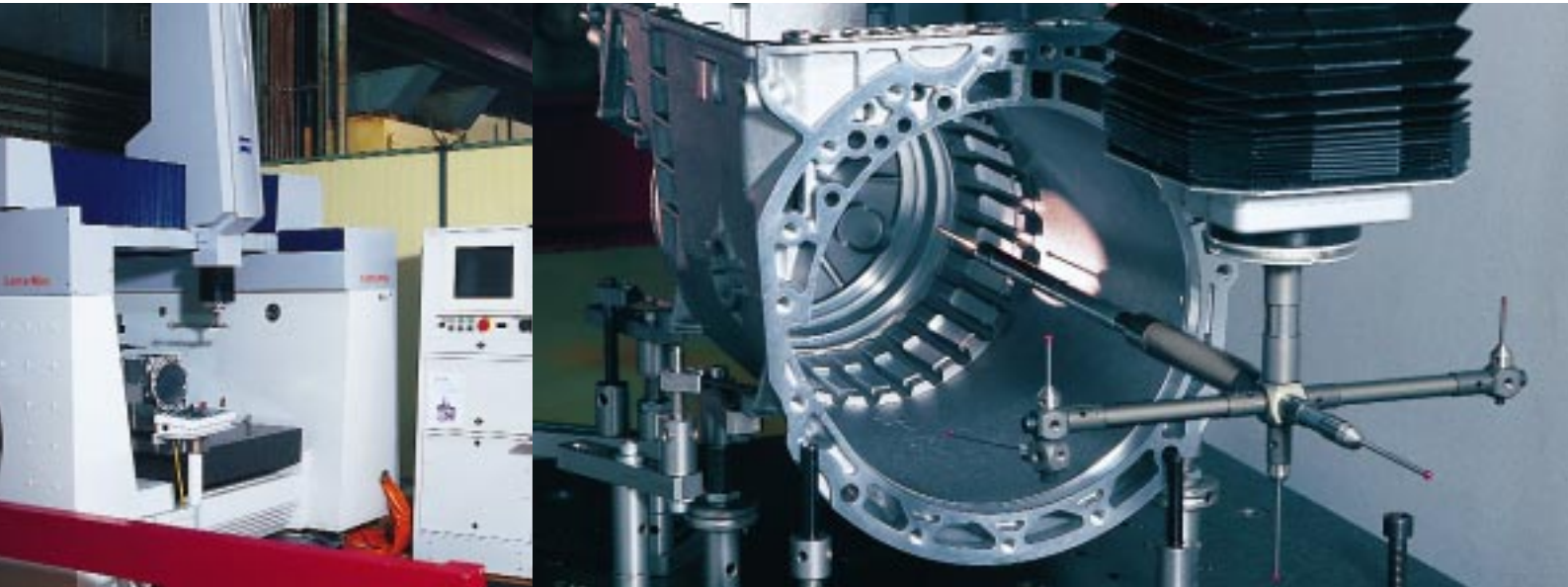
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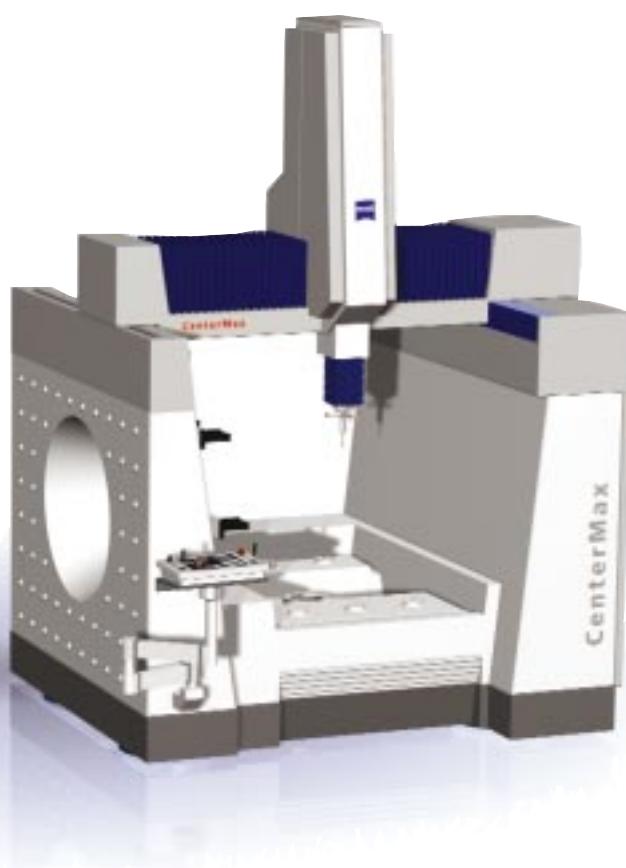
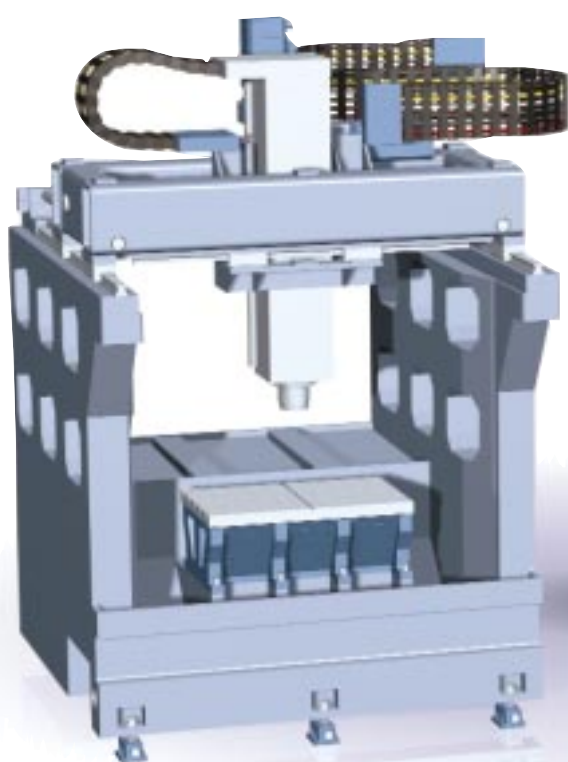
How can a measuring machine be a production device?



One of the primary demands made on a coordinate measuring machine to be used like a production device on the shopfloor: it must be resistant to environmental influences, much like a machining center. The solid construction and symmetrically arranged gantry axes ensure optimum vibration damping in milling technology and therefore also stable cutting processes. We have now borrowed this manufacturing design principle for our measuring technology.

See for yourself:

- CenterMax® fits neatly into any production line. Its dimensions avoid any unnecessary waste of production space.
- The design principle of CenterMax® was developed using the Finite Element Method.
- The gantry design provides a statically and dynamically perfect construction.
- Thanks to the raised guideways, we have achieved extremely high dynamic precision in scanning and high travel speeds because the moving mass is considerably lower than in conventional designs.



A common situation:

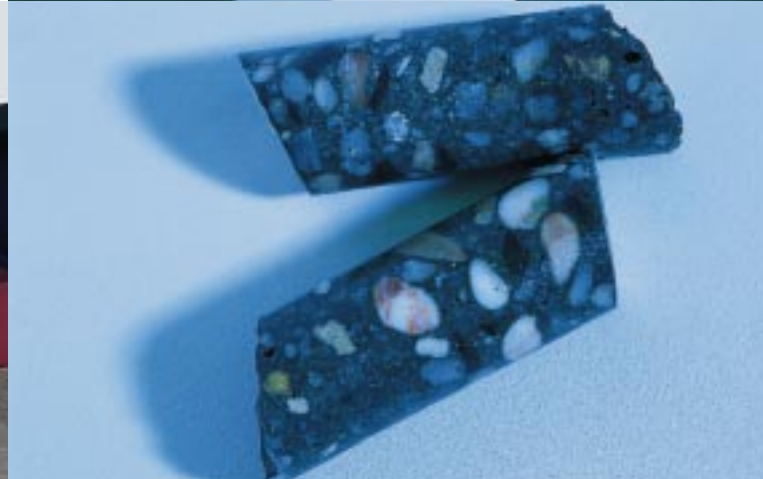
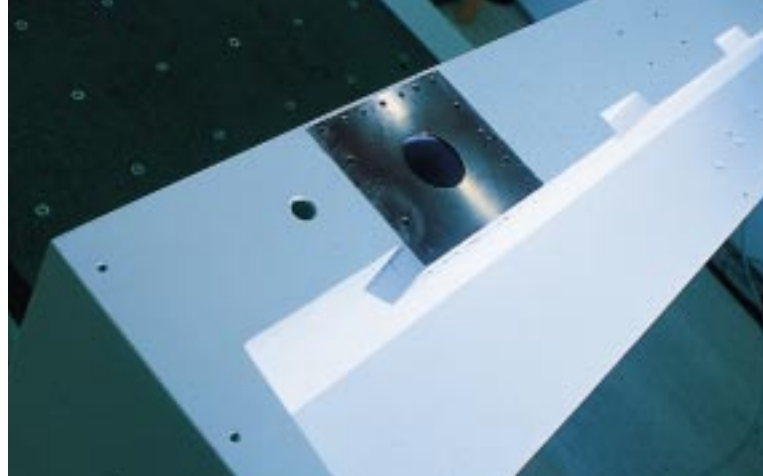
Extreme room temperatures. Noisy machining centers causing floor vibrations you can feel. Temperature differences up to 10 °C. The work-piece covered in lubricants and solvents. And right in the center of this “production inferno” stands CenterMax® – operating with the same accuracy as Prismo in a metrology room.

Production

What about the details?

The strength of Carl Zeiss lies in its ability to develop high-tech materials and combine them with each other to develop products of cutting edge quality.

CenterMax® benefits from our many years of engineering experience. A measuring machine can reach this degree of perfection only if all the details of a coordinate measuring machine are perfectly harmonized and only if materials and components of the highest quality are used. See for yourself!



Take a look inside:

1 Invar carriers

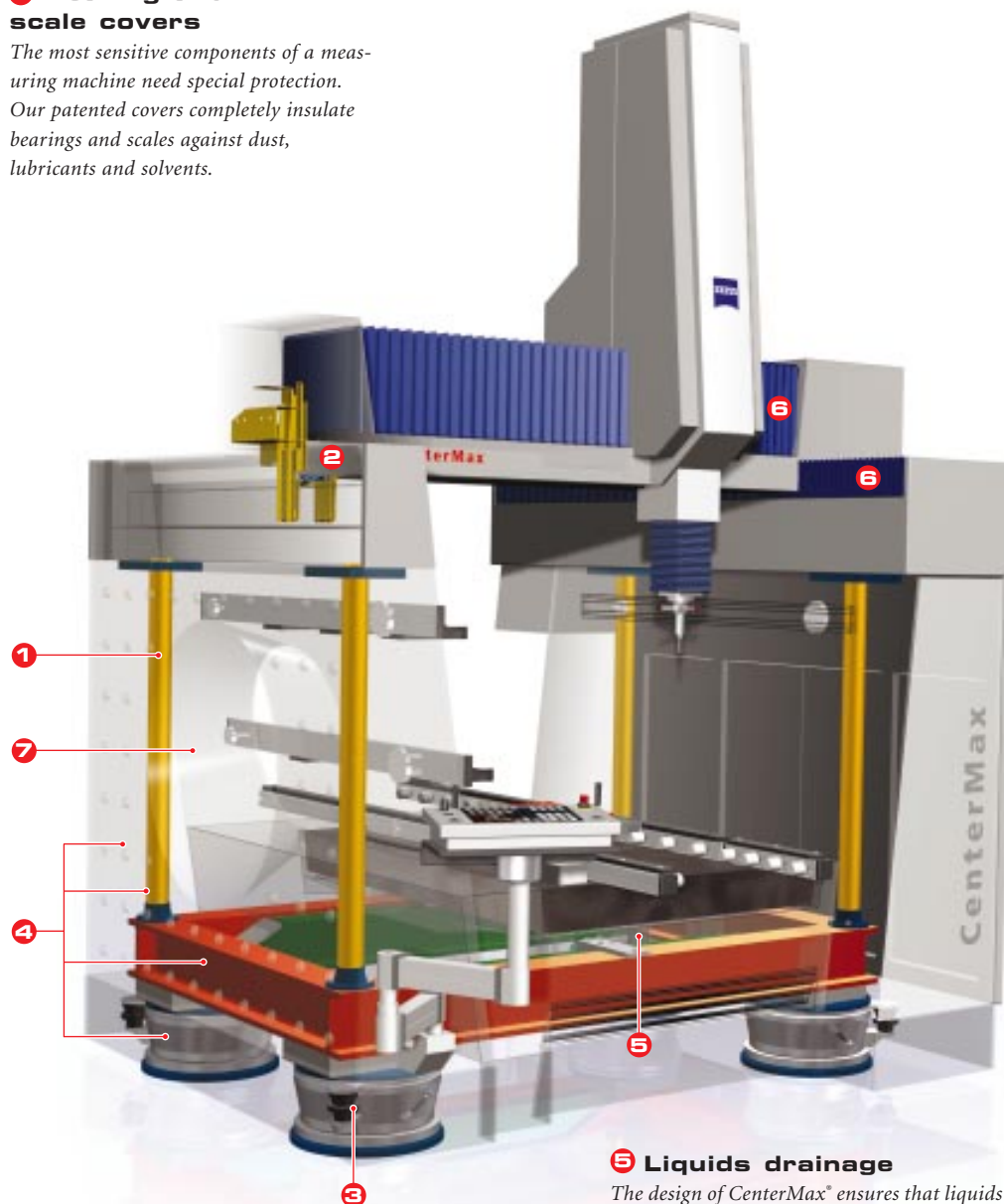
Together with the mineral cast, these form the framework of CenterMax®. Invar is a special type of steel with an extremely high nickel content and an extremely low expansion coefficient.

2 Bearing and scale covers

The most sensitive components of a measuring machine need special protection. Our patented covers completely insulate bearings and scales against dust, lubricants and solvents.

3 Active anti-vibration system

The machine features four standard vibration dampers. A sensor system uses a compressed-air system to monitor the interconnected damping pods. Any loss or excess in pressure is compensated for automatically.



4 Dynamic and thermal damping through TRF (Temperature Resistant Frame)

It's the combination that does it! The combination of mineral cast and Invar rods gives CenterMax® its superb stability. In addition, the carrier frame of the workpiece base is separated from the machine body. Any dynamic workpiece influences are compensated for by the active anti-vibration system.

5 Liquids drainage

The design of CenterMax® ensures that liquids such as oil and water can be drained away underneath the workpiece base.

6 Raised guideways

Less moving mass, greater stability and, as a result, increased precision of the coordinate measuring machine. The high-precision guideway elements are located away from the critical loading and clamping areas.

7 Mineral cast

This gives CenterMax® its required basic weight. And the material has ideal thermal and dynamic damping characteristics.



Design

CenterMax® – Future-proof

Certain technical features must be standard for high-end measuring machines. The basic version of CenterMax® is modeled on Prismo, our most successful machine. Therefore, the standard CenterMax® version comes with the following features:

Stylus changing system

Standard with 8 magazine locations, optionally with up to 24 locations

VAST sensor system

- Size, form and location in one measurement
- Stylus extensions up to 450 mm
- Stylus configurations up to 600 g incl. plate

Active anti-vibration system

Software

Universal PC software packages from Carl Zeiss
For a variety of applications

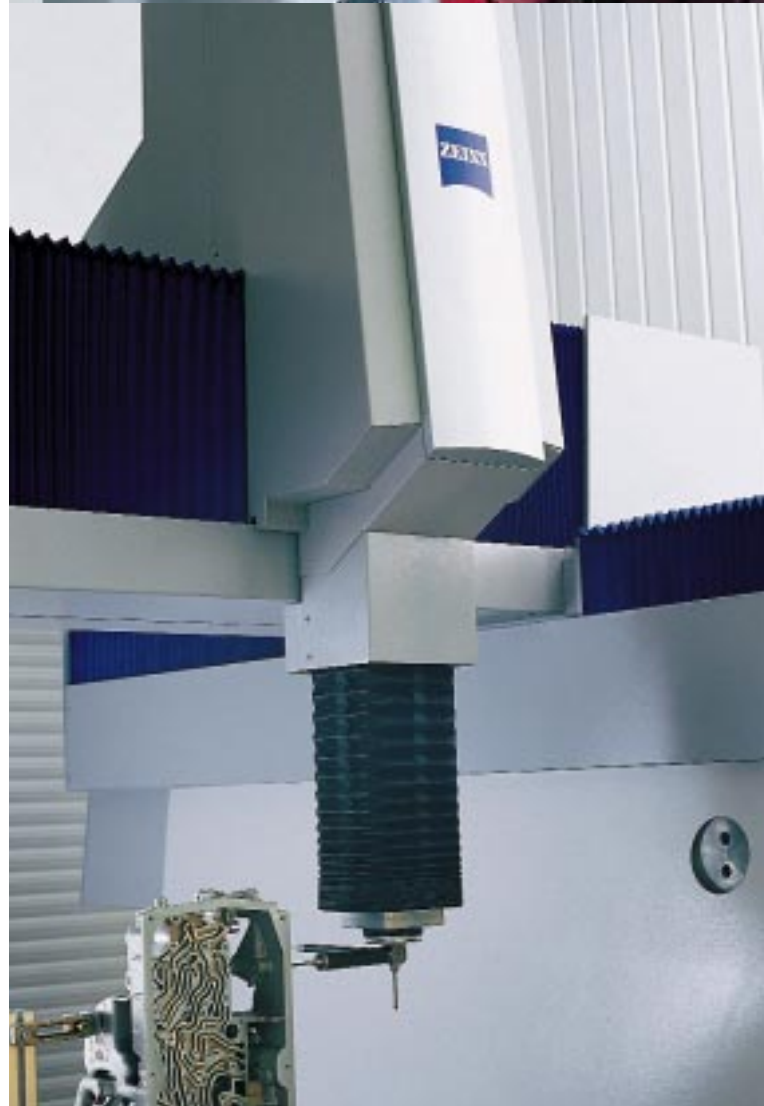
Computer enclosure

- Keyboard and printer
- LCD with touch screen
- flexible set-up, lockable, easy to use with gloves, shop hardened to IP 54

Automatic teleservice capability

Standard control panel

- IP 54 version
- Mobile supporting arm

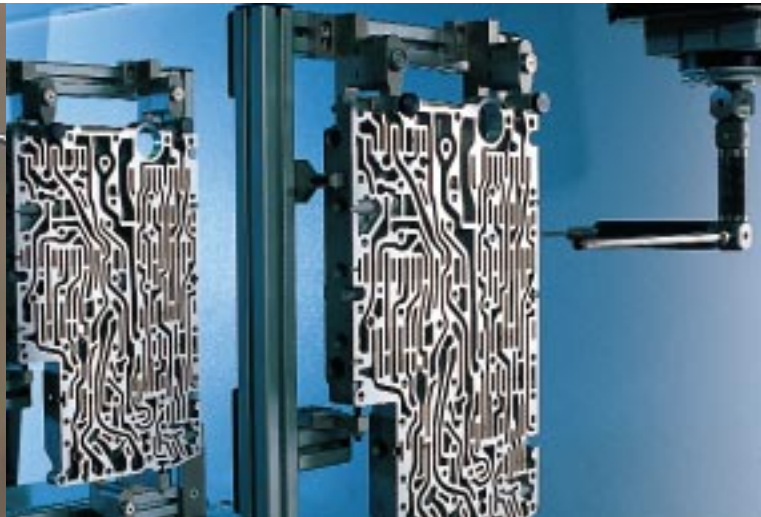


CenterMax

ZEISS

CenterMax

Just how precise can a measuring machine be in the middle production?



In the past, accuracy specifications of a coordinate measuring machine were related directly to the least favorable ambient conditions. If temperatures changed, you could never be sure just how precise your machine would measure.

Carl Zeiss is the first manufacturer to define the innovative accuracy specification:

Temperature Variable Accuracy (TVA)

The new dimension in precision

You can specify the applicable accuracy yourself as a function of the temperature range at the site of installation. It couldn't be easier: you receive CenterMax®'s specific accuracy for the respective environment.

“ We have compared CenterMax® with Prismo. It is a simple fact: CenterMax® supplies us with the same results on the shop floor as Prismo in the metrology room. It measures with the same precision. ”

Peter Haller, Metrology Room Manager
Grüner Systemtechnik GmbH

→ The formula for precision

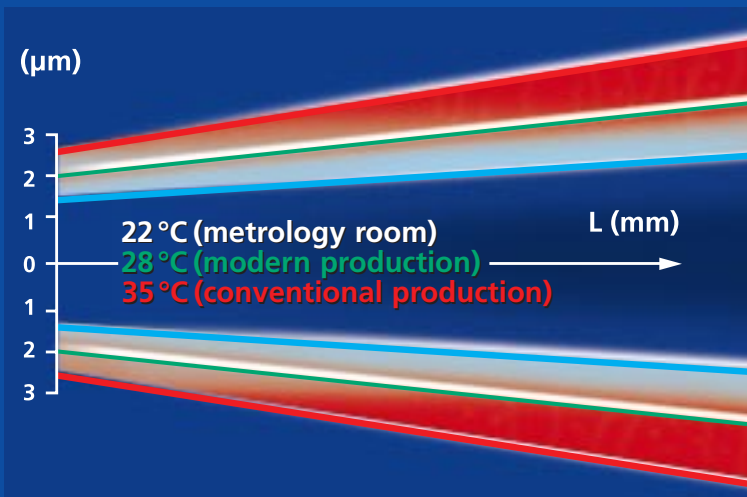
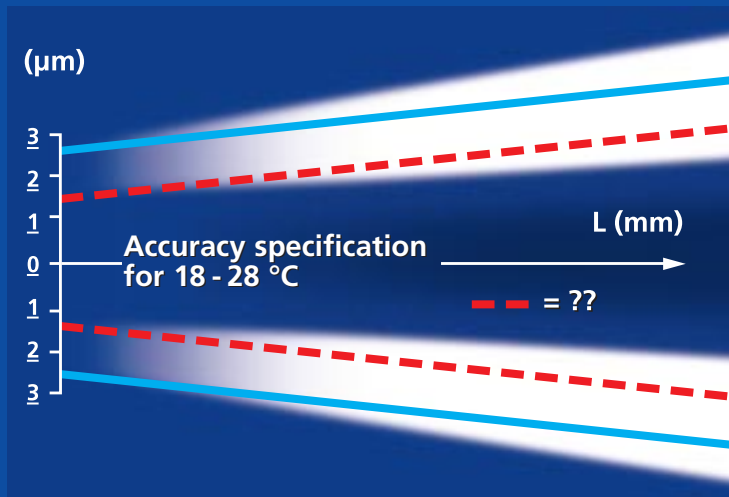
$$\text{TVA U3/MPE}_E (\mu\text{m}) = (1.6 + 0.05 \cdot \Delta\vartheta) + L / (300 - 7 \cdot \Delta\vartheta)$$

$1.6 + 0.05 \cdot \Delta\vartheta$ corresponds to the traditional constant components, but with the temperature-dependent supplement
 $\Delta\vartheta$ = error in °K of +20 °C

$L / (300 - 7 \cdot \Delta\vartheta)$ corresponds to the traditional length-dependent component
 L = measured length

Conventional accuracy specification

TVA (Temperature Variable Accuracy)



Normally, manufacturers specify the accuracy of their machines for 20 °C. If the temperature changes, the specified accuracy no longer applies. Therefore, Carl Zeiss has already specified the accuracy for a temperature range (e.g. from 18 °C to 28 °C) in the past. A machine's accuracy is guaranteed for this range. Although the accuracy is indicated for a wide range, the worst possible ambient conditions are always assumed. In practice, however, such temperatures do not always exist. This means that your measuring machine may be measuring with much higher accuracy, but you don't know exactly how accurately!

CenterMax® includes your situation in the equation! From now on, you will know exactly just how accurately your machine operates. Even better: you yourself define the accuracy of CenterMax® depending on whether you install it on the shopfloor or in the metrology room. TVA shows you how accurately CenterMax®'s is measuring – even up to 35 °C. The advantage: CenterMax® can perform reference measurements in the metrology room near the production site, and other machines in-process measurements on-site.

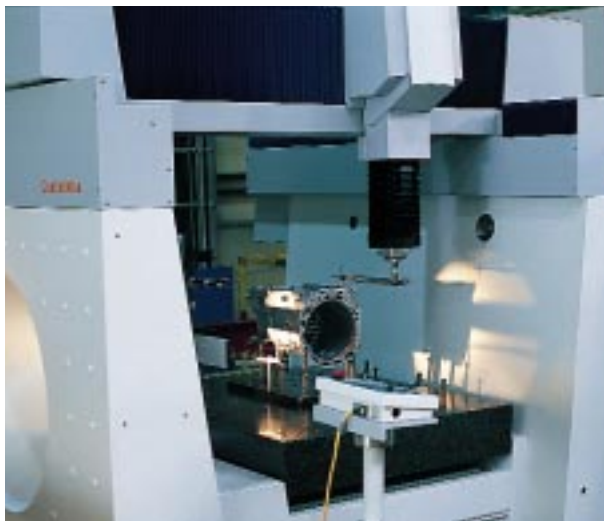
→ Comparison:

Case 1:	Metrology room	22 °C	$MPE_E = 1.7 \mu m + L/286$
Case 2:	Modern production	28 °C	$MPE_E = 2.0 \mu m + L/244$
Case 3:	Conventional production	35 °C	$MPE_E = 2.35 \mu m + L/195$

You know your accuracy!

Precision

How flexible can a measuring machine be?



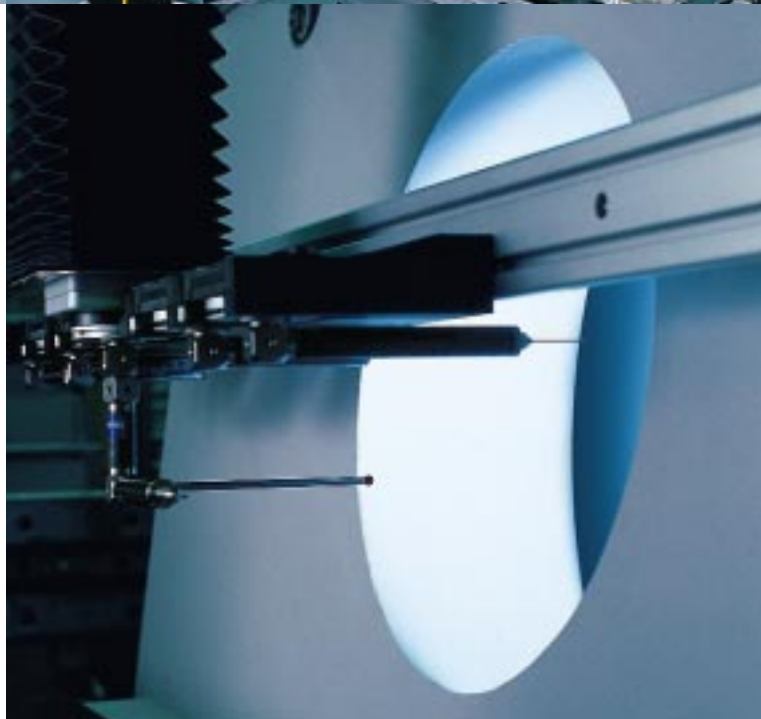
Most measuring machines are used exclusively in the metrology room. Traditional coordinate measuring machines require constant ambient temperatures and a vibration-free, clean metrology room. CenterMax® propels measuring technology into a new dimension.

Flexible in production

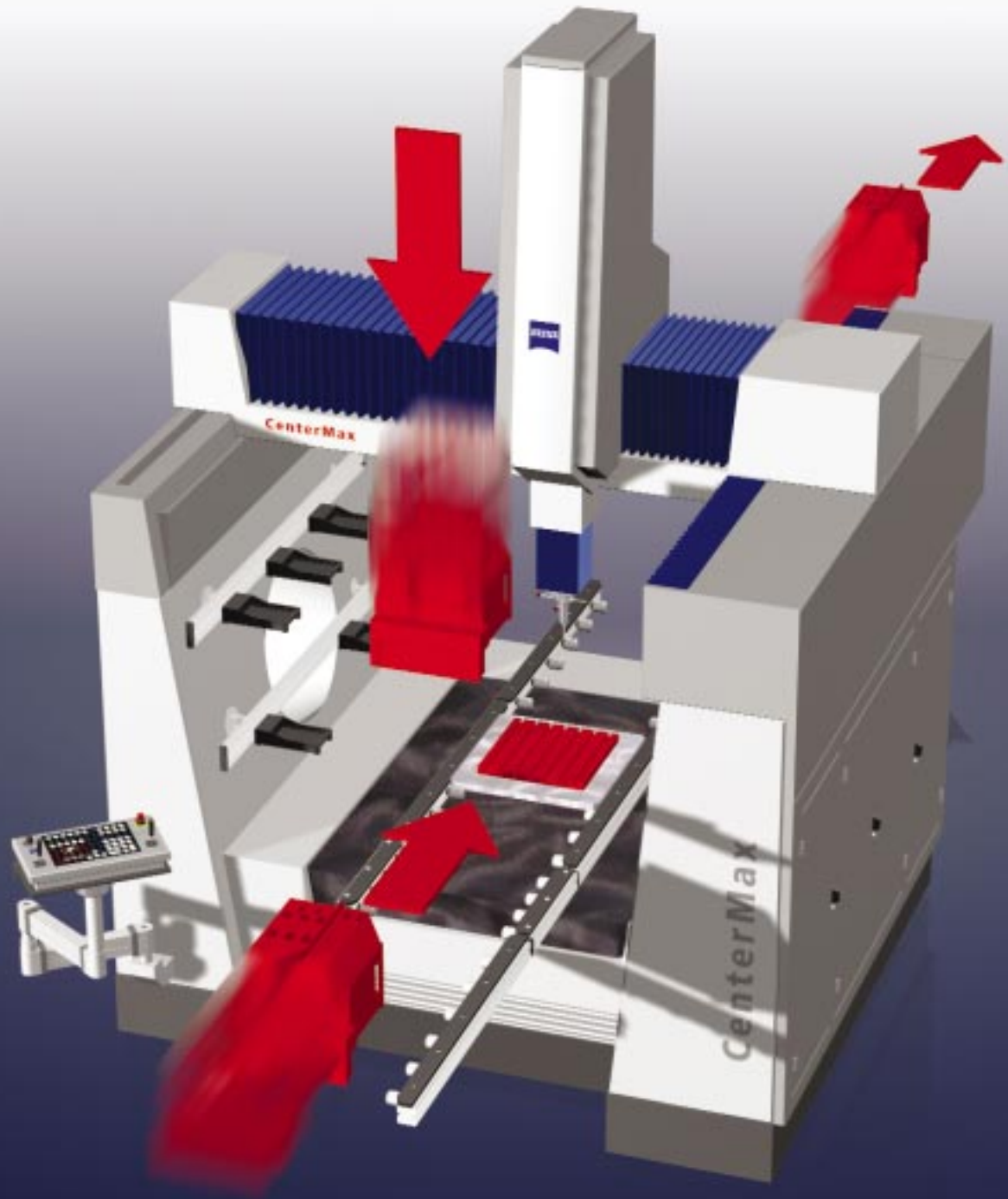
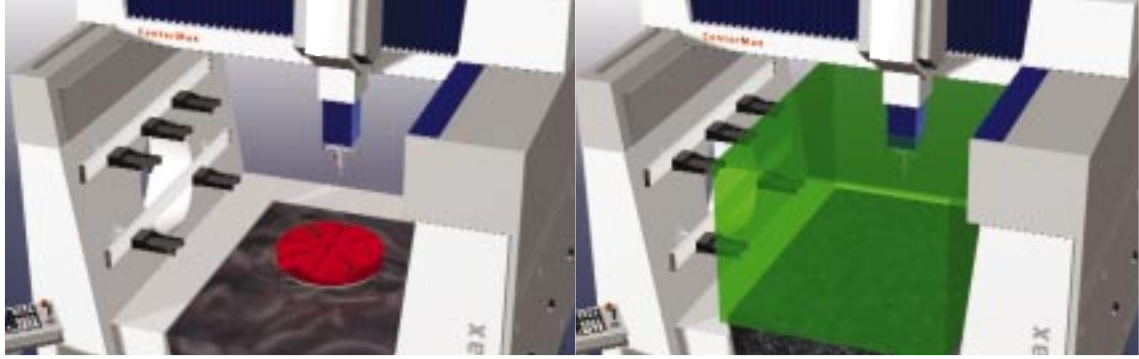
- CenterMax® is suitable for the shopfloor and the metrology room. In either case, the machine will achieve the highest precision.
- CenterMax® is easy to transport. Moving it to another location is no problem whatsoever.
- The computer enclosure holds a touch screen, printer, PC and all control elements. It can be set up as needed, is shop-hardened and easy to use with gloves.

Flexible in measurement

- CenterMax® is equipped with a variable workpiece base. This system permits straightforward installation of a granite plate or a pallet carrier frame with a loading system without limiting the measuring volume.



- Two of the stylus changing magazines are set up in such a way that they do not restrict the nominal measuring range. The effective measuring range is always the same as the nominal measuring range. The usable volume of CenterMax® is therefore larger than with any other coordinate measuring machine.
- Thanks to the bridge design, CenterMax® can be loaded from above, from the front or from the back.



Flexibility

What makes CenterMax® such an economical measuring machine?



A measuring machine that needs no metrology room operates more economically than other machines. But this is not the only aspect which makes CenterMax® cost effective.

No metrology room = shorter routes, more space

- Measuring centers are cost centers. CenterMax® eliminates the cost of maintaining a metrology room. This also means that you have more production space at your disposal.
- Transport routes in the manufacturing area are reduced. This not only saves time – it also means that intermediate storage locations for workpieces on their way to the metrology room are a thing of the past. Yet even more space.
- We have designed CenterMax® so that optimum use can be made of the measuring volume – in other words, a smaller machine for workpieces of the same size.

Quick return on investment = reduced costs

- Compared to doghouse gauges, CenterMax® pays for itself within a very short time. And you can use it to inspect not just one type of workpiece, but all parts manufactured in your production area.
- Forget about numerous gauges, multiple measuring devices or test configurations. The result: a noticeable drop in your calibration costs. Measuring devices no longer have to be recalibrated. The state-of-the-art technology of CenterMax® saves your money.



Higher process stability

- CenterMax® supplies the required corrective values for your production in next to no time. Production processes are rarely interrupted.

Faster maintenance

- CenterMax® is designed to ensure easy access to all major components. This greatly reduces installation and maintenance work.

What can you expect?

When you integrate a measuring machine into the production line you expect this machine to operate as a production facility in multi-shift operation. There is no time for programming. And there is no time to compile complex measuring records.

This is precisely why we supply you with a customized package to meet your specific requirements. The benefit: you will feel at ease operating the coordinate measuring machine right from day one. No special training is required for CenterMax®.

This is what you can expect from us:

- **System engineering**
We can take care of the entire metrology equipment or we create individual strategies for operating and organizing your measuring technology.
- **Training/contract measurement/parts programming**
We offer customized training, one-time measurement, prototype sampling and much more.
- **Automation**
We develop fixtures for batch measurement, special styli or complete loading systems.



value services

Measuring technology which pays for itself.



- **Calibration/reverification of CMMs/artifacts**

We perform DKD calibrations and reverify your CMM at regular intervals to DIN EN ISO 10360/VDI/VDE 2617.

- **Technical service**

We guarantee regular maintenance and perform machine status checks on your machine.

- **Off-line programming**

We program all your measuring routines for you or look after your measuring system.

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