
SURFCOM 3000
RONDCOM65A

3D Coordinate Measuring Machine Series

CNC Coordinate Measuring Machines

ZEISS

CenterMax

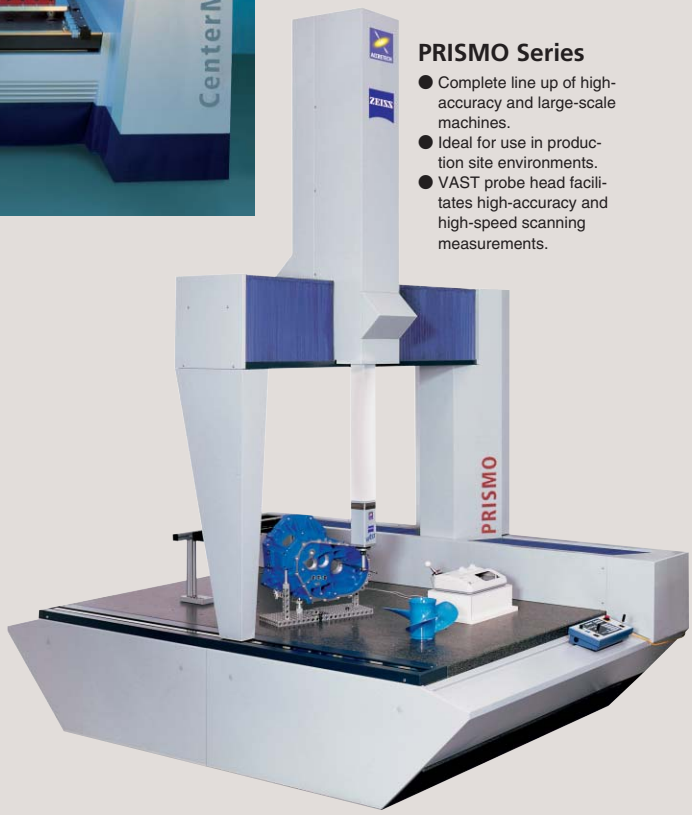
- Full-fledged coordinate measuring machine for production line measurements.
- Real-time on-site measurement and feedback to production line.
- Superior resistance to environmental factors.
- Incorporates VAST probe and various other ZEISS technology and patents.

UPMC-CARAT

- ZEISS patented bridge-center drive system provides superior dynamic rigidity.
- ZEISS Zerodur reference scales suppress effect of temperature changes.

PRISMO Series

- Complete line up of high-accuracy and large-scale machines.
- Ideal for use in production site environments.
- VAST probe head facilitates high-accuracy and high-speed scanning measurements.



Horizontal Arm Type Coordinate Measuring Machines

Carmet

- Compact size makes machine ideal for mold measurements.

SMC/SMM

- CNC type is optimum for car body measurements.

Eagle Eye

- Non-contact high-speed measuring sensor (incorporated in SMC).

CONTURA

- Economical high-performance system.
- Culmination of latest ZEISS scanning technology enables high-density data collection (200 points/sec.).
- Incorporates VAST XT high-speed scanning probe head.

MMZ-G

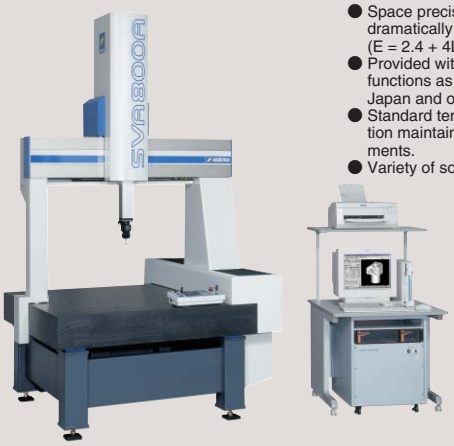
- Ideal for large high-precision parts.
- Floor can be used as the measuring table.

AI Function

New Series Integrates ZEISS Technology

XYZAX SVA-A

- Space precision compensation technology dramatically boosts measuring precision (E = 2.4 + 4L / 1000 μm: SVA800A).
- Provided with Accretech Advantage and AI functions as standard feature (patented in Japan and overseas).
- Standard temperature compensation function maintains precision in various environments.
- Variety of software programs available.



World's First Measuring Systems with AI Function

XYZAX RVA-A

- CNC machine combining CARL ZEISS control technology and ACCRETECH hardware.
- ACCRETECH patented AI function simplifies operation.
- Standard temperature compensation function minimizes influence of temperature changes.

Easy-to-Operate Manual Machine with AI Function

XYZAX RVF-A

- Manual machine combining CARL ZEISS controller and ACCRETECH hardware.
- Standard color LCD monitor with touch panel function. Patented AI function makes machine easy to operate even for beginners.
- Standard terminate switch on Z axis. This enables measurements to be continued without releasing the Z axis (patent pending).

AI: Artifical Intelligence

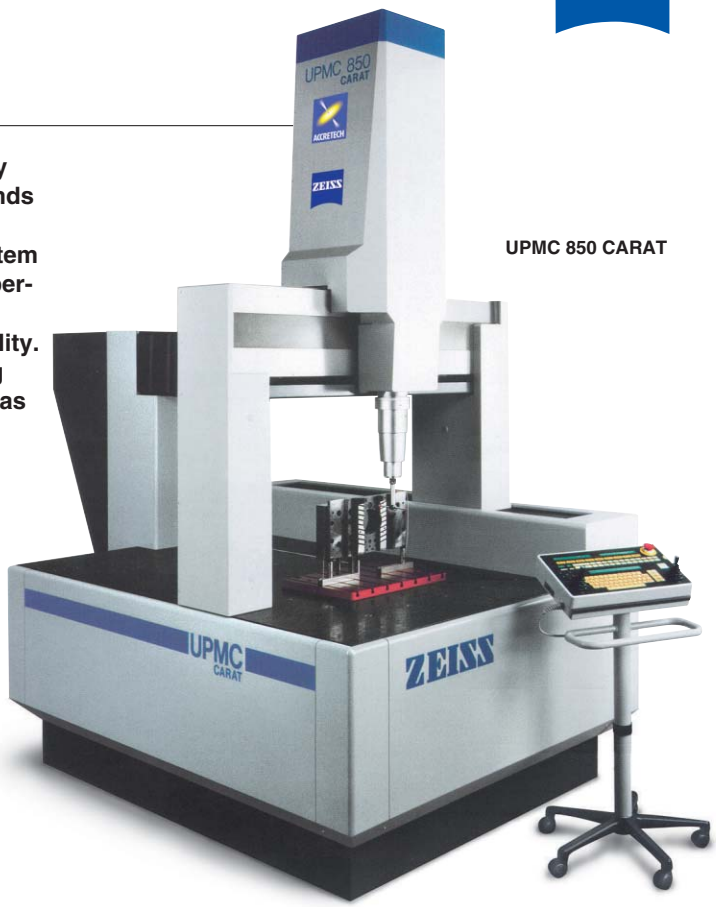
UPMC Series »»

CNC Coordinate Measuring Machines with World's Highest Precision

UPMC Series

Our uncompromising approach to precision technology has resulted in the birth of the UPMC series that responds to the most demanding requirements for measurement precision. In addition to outstanding precision, the system features an optimum balance of high speed, rigidity, operating ease and cost. The latest material research in the space-engineering field guarantees stability and reliability. The result is a three-dimensional coordinate measuring machine with the world's highest accuracy that serves as a "Mother" machine.

- World's highest precision: 0.4 + L / 1000 μm (UPMC 850 Ultra ACC)
- High guide precision maintained by new CARAT technology.
- Bridge-center drive system (ZEISS patent) provides superior dynamic rigidity.
- HSS high-speed scanning probe head has wide application range.
- Comprehensive measures to eliminate influence of temperature changes.
- Extremely high precision makes the UPMC ideal for measurement and calibration options for reference gauges, and inspection/measurement of prototypes and checking tools in gauge rooms.



UPMC 850 CARAT

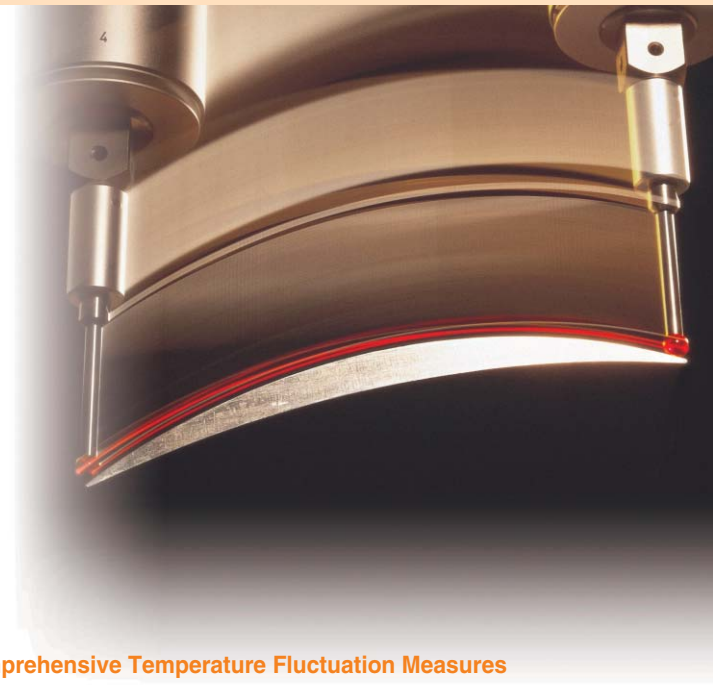
UPMC 1200 CARAT

UPMC 550 CARAT
(Model with embedded RT 05-400 rotary table shown in picture)

ACCRETECH TOKYO SEIMITSU

World's Highest Measuring Precision E=0.4+L/1000 µm (UPMC 850 Ultra ACC) New CARAT Technology Guarantees Consistently High Accuracy

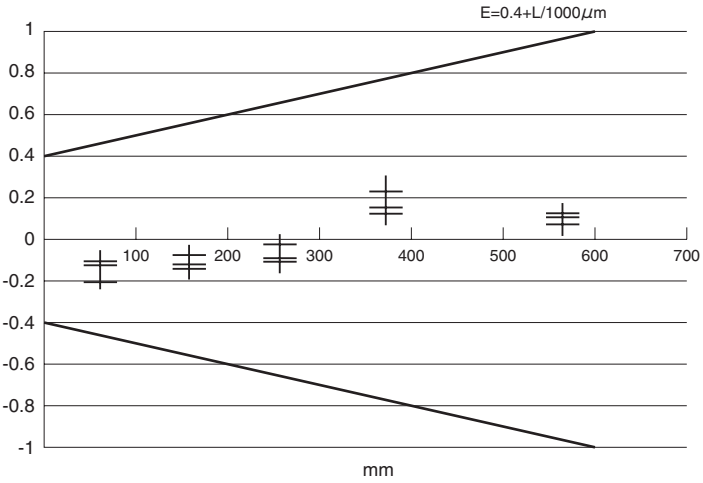
A wide variety of problems must be solved to achieve high precision, including the influence of ambient temperature and floor vibration. The UPMC series provides consistently high precision measurement through effective measures to deal with ambient conditions. In particular, new CARAT technology maintains high stability. We are using these and other cutting-edge ZEISS technologies and expertise to achieve unparalleled measuring performance.



World's Highest Measuring Precision E=0.4+L/1000 µm

(UPMC 850 Ultra ACC)

The UPMC provides the top level of precision required for the measurement/ calibration of reference gauges in gauge rooms, and the inspection of products. This means it can serve as the reference machine for 3D coordinate measurements.



New CARAT Technology Maintains Guide Accuracy

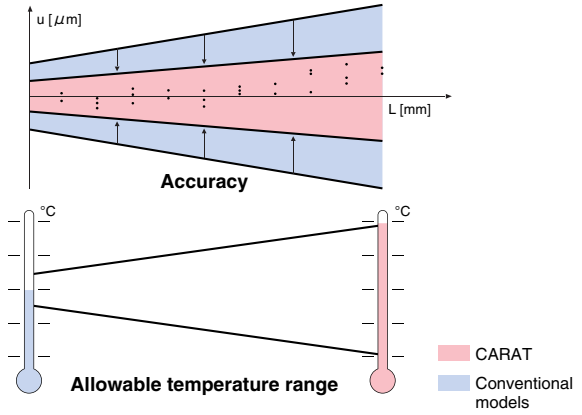
Cast-iron guides are often subject to a drop in the stability of accuracy over an extended period. The UPMC series has adopted a special alloy and CARAT (Coated Aging Resistant Alloy Technology) to solve this problem. CARAT surface treatment technology was perfected through space engineering. This provides a thermal conductivity 80 times that of gabbro, resulting in no temperature gradient for the guides (difference between external and internal surfaces), and no distortion due to temperature changes. CARAT technology provides extremely high stability for many years.

CARAT guides keep influence due to ambient temperature changes to the absolute minimum.

Comprehensive Temperature Fluctuation Measures

The reference scale incorporates ZERODUR on each axis, with a thermal expansion coefficient of ±0.05 · 10^{-6} K^{-1}. In practice, this virtually eliminates the influence of temperature changes, guaranteeing the ideal thermal characteristics.

Achieves high measuring precision under temperature conditions that are not ideal.



Temperature Compensation by Machine

The UPMC integrates our concept of error removal and compensation throughout the machine. This consists of efficiently removing the influence of the external temperature and computer-compensation of the influence due to any remaining heat radiation. Any system error in the guides, scales or squareness is addressed by using CAA (Computer Aided Accuracy). At this time, compensation is performed for the center of the probe ball. The result is extremely high precision even when temperature conditions are not ideal.

Compensation of Table Temperature Gradient

In the event there is a temperature gradient on the table made from gabbro even when heat radiation is blocked, compensation can be performed for the measured values. The table temperature is detected by multiple temperature sensors installed above and beneath the table, and an expanded CAA compensation method is used to compensate for any distortion due to temperature changes.

Automatic Leveling Air Damper Efficiently Removes External Vibration

This air damper efficiently attenuates mechanical vibration from the building or surrounding sources that may have an adverse influence on measurements.

UPMC Series »»

High Speed and Flexibility Enhance Measurement Efficiency

High speed and high efficiency are essential elements of superior probing technology. For example, the machine does not really shine unless setup can be completed in a minimum of time, part changes are easy and it can evolve to meet future requirements. In addition to outstanding precision, the UPMC offers a diverse range of scanning methods and other characteristics that anticipate future trends.

HSS High Speed Scanning Probe Head

The HSS High Speed Scanning probe head consists of a parallel plate spring, displacement measuring system using a differential transformer and an independent clamp mechanism. The head maintains superior accuracy, reproducibility and functionality. In addition, the wide variety of methods to retrieve measured values on the UPMC provide a virtually unlimited number of measuring applications.

Static Measurement for Extra High Precision

Static retrieval of measured values is ideal when the ultimate in precision is required. Measured values are not retrieved until the machine movement axes are stopped at the probe system zero point, eliminating any dynamic influence on the measured values. Reproducibility of multi-processing/probing and average value is high, which indirectly leads to higher resolution.

Scanning Achieves High-Speed Measurement

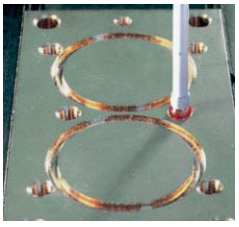
Probing technology has been adopted that features high measuring point interval density and is effective in boosting the speed of scanning measurement (profile measurement). The probe head follows the profile of the designated surface, and the measured values are continuously acquired.

Multi-Point Measurement Reduces Measuring Time

As with copy control, the probe moves from one point to another while remaining in contact with the workpiece. The measured value is acquired during the short interval the probe is stopped, enhancing measuring efficiency.

Effective Centripetal Probing for Thread/Hole/Groove Measurements

The ability to perform positioning control simultaneously for multiple axes during probing enables centripetal probing measurements of grooves, gear grooves, small holes and other such shapes. The appropriate axis is clamped, and loop control is performed to enable probing to the proper position.



Interchangeable Probe with High Reproducibility

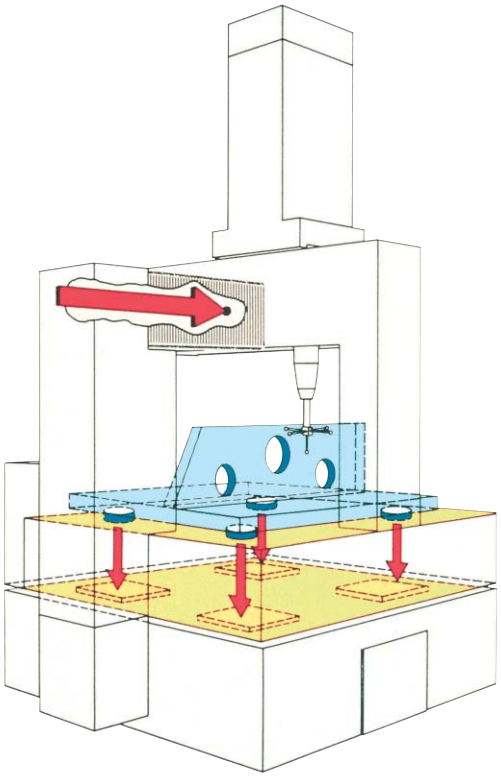
The HSS high-speed scanning probe head on the UPMC features a built-in probe change mechanism to ensure easy setup. The reproducibility after each probe change is extremely high, eliminating the necessity of calibration each time the probe is changed. This enables the current measuring process to be interrupted to accommodate rush measurement jobs. An optional automatic probe changing system is also available.

Culmination of Mature Technologies

High rigidity enhances the quality of measurements. Productivity cannot be increased unless quality is maintained, no matter how high the original precision or speed may be. A number of technological features were incorporated on the UPMC to provide a structure with superior rigidity and resistance to corrosion. These include air bearings, the bridge-center drive system (static table) and the use of gabbro. The well-balanced provision of a full line of functions give birth to outstanding measurement reliability.

Bridge-Center Drive System with Superior Dynamic Rigidity

This ZEISS patented drive system that was designed to achieve ultra-high precision also features extra high drive power due to the location the bridge drive near the center of gravity. Furthermore, since there is no torsion due to mass moment of inertia, pitching and yawing are kept to an absolute minimum during bridge movement. This drive system has no adverse influence on measuring accuracy, and enables high-speed measurements in the manual or CNC mode.



Static Table Enhances Ease of Work

The adoption of bridge drive (static table) makes it easy to provide an inlay rotary table (optional) and provides a large area for the mounting of workpieces, even though the machine is compact. In particular, the measuring table can be directly used as the supporting point to receive heavy workpieces, eliminating any influence on the straightness of the guides due to the workpiece weight. The structure also simplifies the securing of workpieces.

Table Material Enhances Stability

Gabbro is used for the machine table. This type of stone was selected because of its high hardness, freedom from the influence of corrosive elements and ability to be cut in a dimension that is large enough for the table in a single piece. In addition, this material was chosen due to the high level of plane production technology required for the machine guides.

Options

RT05-400 Inlay Type Rotary Table

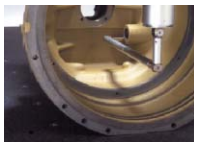
A 4th axis can be added to the UPMC to enhance the range of applications as a CNC measuring machine.

- Efficient measurement of rotary symmetric workpieces
- Enhances ease of probing
- Reduces measuring time
- Simplifies probe configuration
- Expands effective measuring range
- Improves viewing conditions
- Reduces causes of error during straightness and other such measurements

Resolution: 0.5 sec.
Angle error (PW): 2 sec.
Positioning accuracy: 0.5 sec.
Axial direction run-out: 0.3 μm

Radial direction run-out: 0.5 μm
Wobble α: 0.5 sec.
Allowable load: 3000 N
Allowable moment: 50 Nm

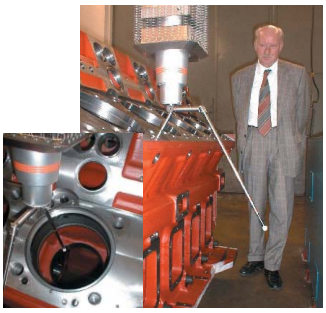
Scanning Measurement Examples



Combination probe
(600mm overall length)

φ0.3mm probe

Measurement of large workpiece



Specifications

Model			UPMC 550 CARAT		UPMC 850 CARAT			UPMC 1200 CARAT	
			Standard	SuperACC	Standard	SuperACC	Ultra ACC	Standard	SuperACC
Measuring range	X axis (mm)		550		850			1150	
	Y axis (mm)		500		1150			1500	
	Z axis (mm)		450		600			1000	
Measuring accuracy*1	Standard probe (115mm)	E (μm)	1.2+L/400	0.8+L/600	1.2+L/400	0.7+L/600	0.4+L/1000	1.9+L/300	1.5+L/300
		R (μm)	1.2	0.8	1.2	0.6	0.5	2.1	1.5
	200mm long probe	E (μm)	1.2+L/400	0.8+L/600	1.2+L/400	0.7+L/600	0.7+L/600	1.9+L/300	1.5+L/300
		R (μm)	1.2	0.8	1.2	0.6	0.6	2.1	1.5
Temperature conditions	Ambient temperature		20°C±3K	20°C±1K	20°C±3K	20°C±1K	20°C±0.5K	20°C±3K	20°C±1K
	Temp. change	Per hour (K/h)	1.0	0.5	1.0	0.5	0.5	1.0	1.0
		Per day (K/d)	1.5	0.5	1.5	0.5	0.5	1.5	1.0
	Material	Height direction	1.5	0.5	1.5	0.5	0.5	1.5	1.0
Measuring scale			Optical type: ZEISS PHOCOSIN, ZERODUR scale						
Resolution (μm)			0.2	0.08	0.2	0.08	0.08	0.2	0.08
Table	Material		Gabbro						
	Usable width (mm)		700		1000			1500	
	Usable depth (mm)		1170		1970			2650	
	Height from floor (mm)		850		850			600	
	No. of workpiece securing bolts (M12)		16		40			48	
Workpiece measured	Max. height (mm)		490		640			1050	
	Max. weight (kg)		600		1500			2000	
Guide system			Air bearings						
Drive speed (mm/s)	Joy stick mode		Max. 65		Max. 65			Max. 65	
	CNC mode		Max. 110		Max. 110			Max. 260	
	Scanning mode		Max. 40	Max. 20	Max. 40	Max. 20	Max. 20	Max. 40	Max. 20
Drive acceleration (mm/s²)			Max. 130		Max. 130			Max. 430	
Probing method			Point-to-point method and scanning method						
Measuring force			0.2 N (0.1 – 1.0 N: Can be changed in 1 mN steps)						
Probe head movement range (mm)			±2.5						
No. of scanning points per second			100						
Probe mount	Max. weight (g)		600 (including automatic weight balance and change plate)						
	Max. length (mm)		600						
Air source	Supply air pressure		0.6 – 1.0 MPa						
	Air pressure used		0.5 MPa						
	Air consumption (N ℓ /min)		60 (atmospheric equivalent)						
Power source	Power supply		Single phase 100 V ±10%, 50 or 60 Hz						
	Power consumption		Max. 2000 VA		Max. 2000 VA			Max. 3300 VA	
Unit dimensions	Width (mm)		1260		1590			2330	
	Depth (mm)		1620		2935			4330	
	Height (mm)		2725		3025			4050	
Unit weight (kg)			2100		4000			7100	

*1 E and R are in accordance with ISO 10360-2. L is an arbitrary length. The ambient environment (temperature gradient, etc.) needs to be taken into consideration when selecting the location for the machine.

CenterMax

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

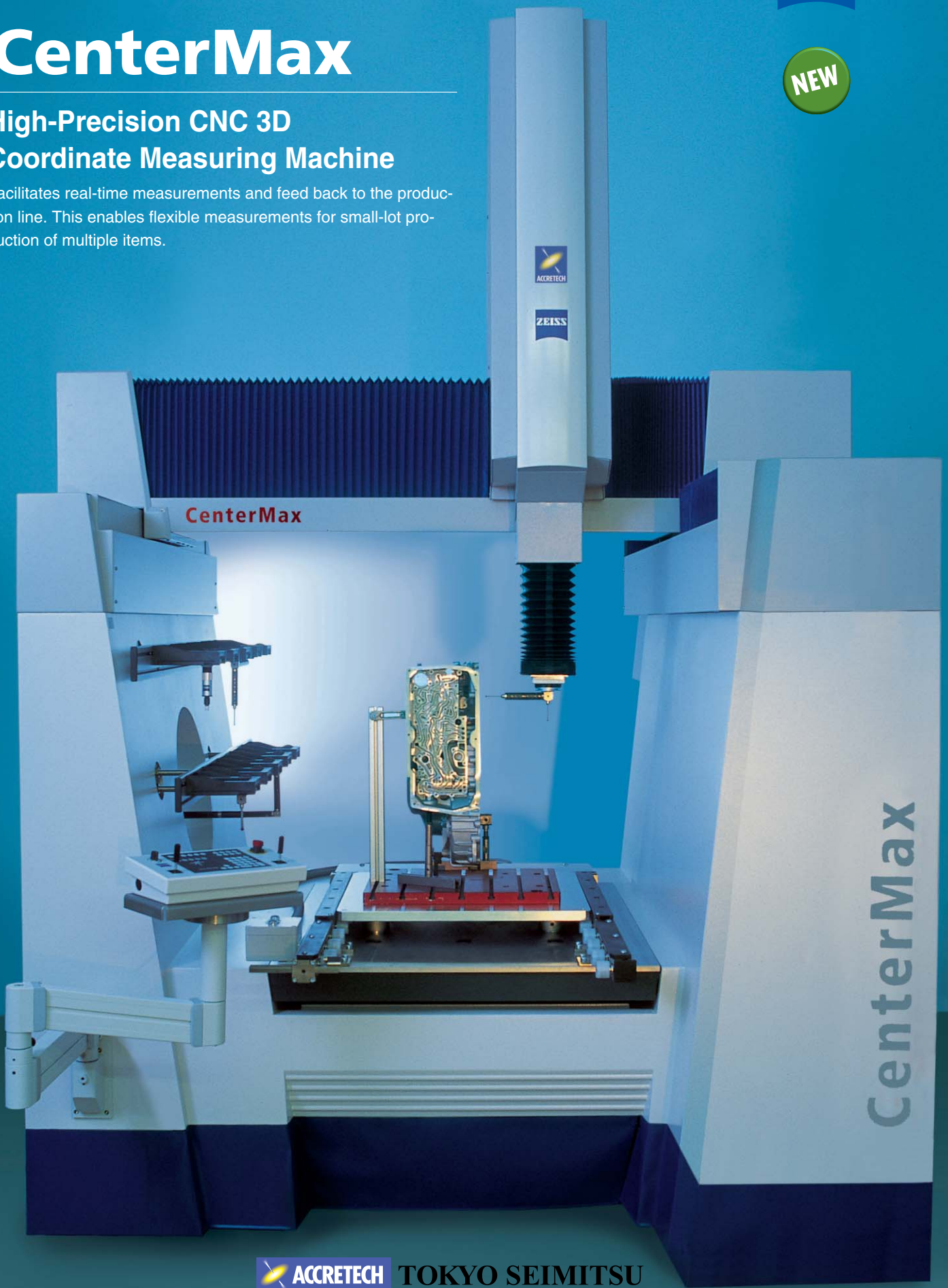
ZEISS

NEW

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.

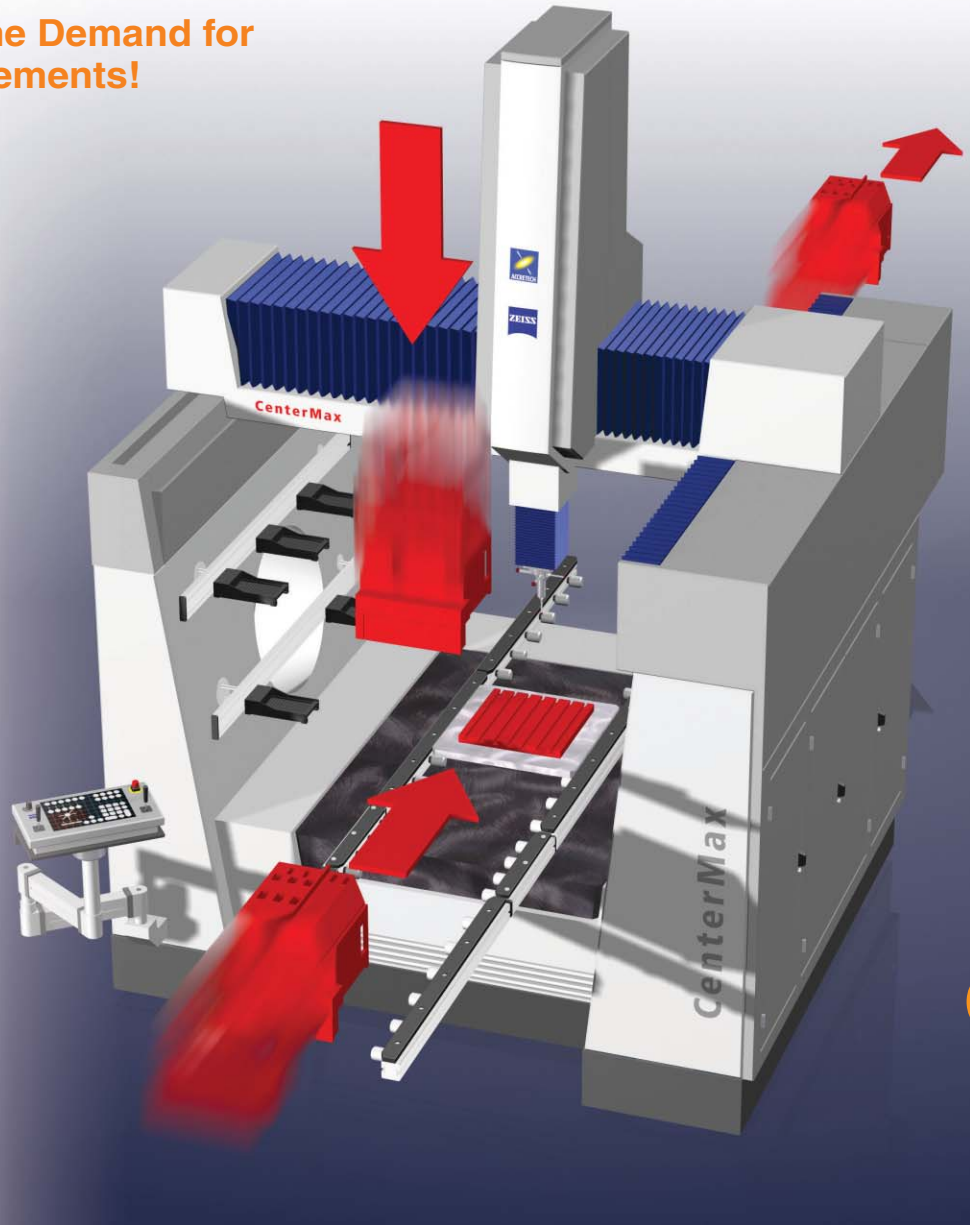


ACCRETECH TOKYO SEIMITSU

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°C ± 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 – 35°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.



Workpiece Loading/Unloading Diagram

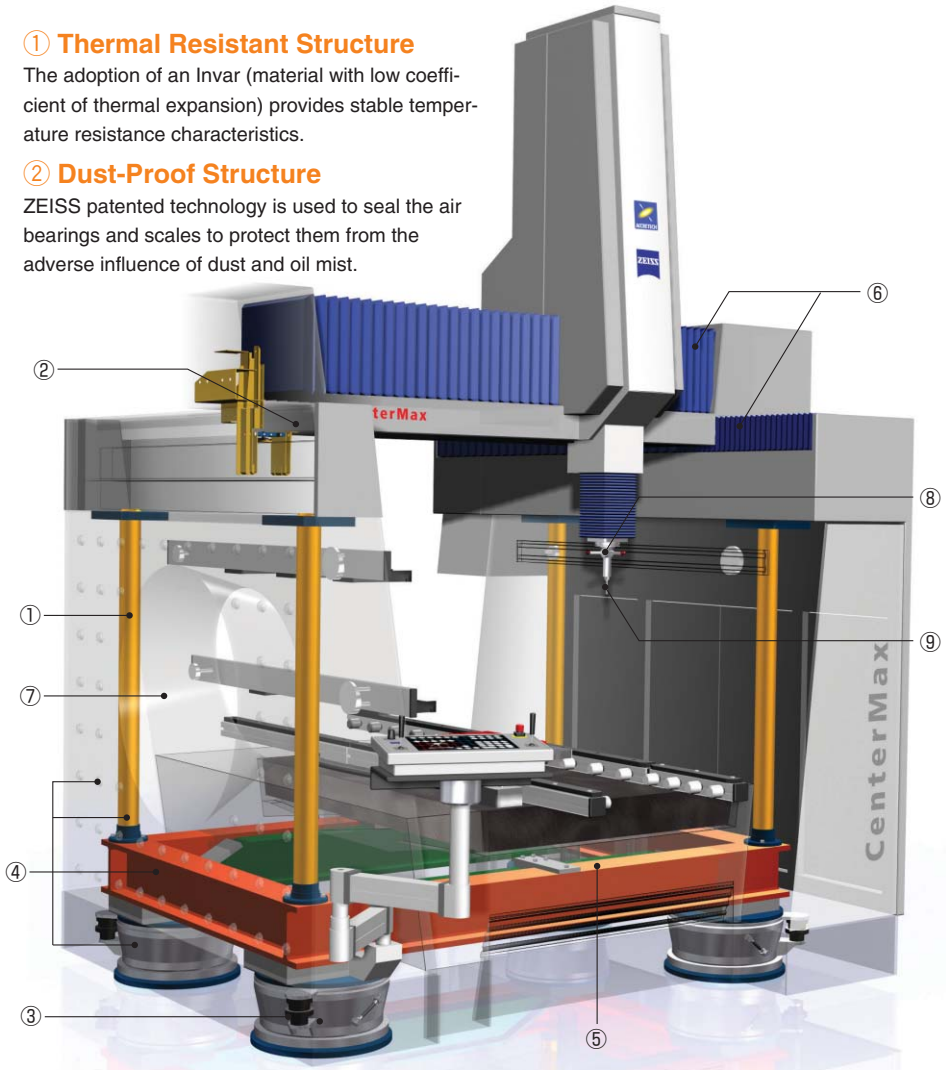
Example of Installation on Production Floor

CenterMax »»

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.

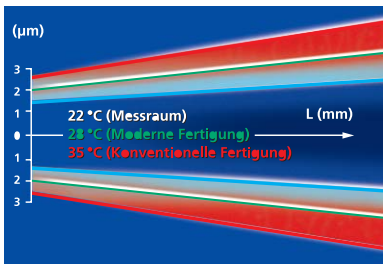
⑥ Upward Guideway Structure
Installing the X guide in an upper position minimizes the amount of weight moved, achieving higher precision when high-speed measurements are performed. This enhances the efficiency of workpiece loading and work in the clamping area.

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
The adoption of the VAST scanning probe head (ZEISS patent) provides outstanding resistance to vibration and stable measuring 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.



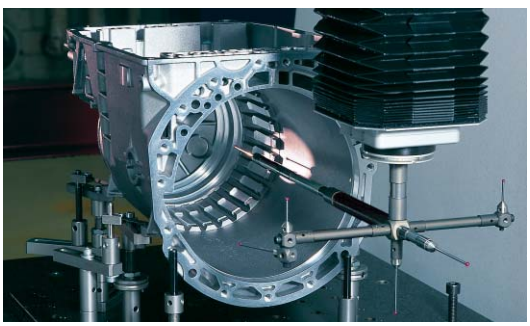
→ Accuracy at Different Ambient Temperatures

1. Precision measuring room	22°C	E=1.7+L/286µm
2. New production line	28°C	E=2.0+L/244µm
3. Conventional production floor	35°C	E=2.35+L/195µm

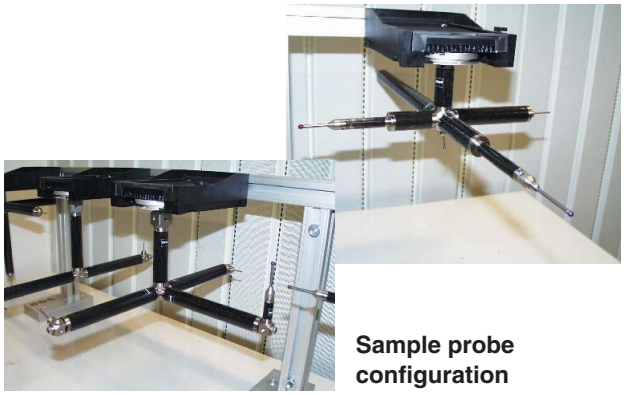
$$E = 1.6 + (0.05 \times |\Delta\zeta|) + L/(300 - (7 \times |\Delta\zeta|))$$

$|\Delta\zeta|$: 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

ACCRETECH TOKYO SEIMITSU

Specifications

Model			CenterMax	
Measuring range (mm)	X axis (mm)		900 (1100)	
	Y axis (mm)		1200	
	Z axis (mm)		700	
Accuracy	Indication accuracy	E (μm) *1	1.6+(0.05×|⊿ζ|) +L/(300-(7×|⊿ζ|)) |⊿ζ|: Ambient temperature deviation from 20°C	
			1.7+L/286 (22°C)	
			2.0+L/244 (28°C)	
			2.35+L/195 (35°C)	
	Probing accuracy	R (μm) *1	1.7	
		Ambient temp. (°C)	15 – 35	
		Temp. change (°C/hour)	2.0	
		(°C/day)	8.0	
		(°C/m – height)	2.0	
	Measuring scale		ZERODUR scale (Resolution: 0.2 μm)	
Table	Material		Granite (Gabbro)	Universal plate
	Usable width (mm)		900	900
	Usable depth (mm)		1200	1200
	Height from floor to table (mm)		770	660
Workpiece measured	Max. height (mm)		760	870
	Max. weight (kg)		750	1000
No. of probe magazine slots	Standard		8	
	Maximum (option)		24	
Probe mounting conditions	Max. weight (g)		450 (including change plate)	
	Max. length (mm)		600	
Guide system			Air bearings	
Drive speed	Joy stick mode (mm/s)		70	
	Axis directions in CNC mode (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 – 1.0 MPa, Usage pressure: 0.5 MPa, Consumption; 120 N ℓ /min	
Power source			Supply: Single phase AC 100V (±10%), 50/60 Hz (±5%), Consumption: Max. 2000 VA	
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: E and R are accuracy evaluation methods designated by ISO 10360-2.
Rotary table can be installed as an option.

PRISMO Series »»

High-Speed CNC 3D Measuring Machine
High Precision Under Various Environmental Conditions

PRISMO Series

Maintaining high speed and consistently high precision under different temperatures, vibration, with contaminants and other environmental conditions is imperative. The machine must be able to flexibly handle all types of measuring requirements, and not require any specialized knowledge to operate. The PRISMO series effectively responds to all of these demands from the production line. It incorporates the wealth of expertise nurtured by CARL ZEISS over 20 years, superior precision technology and a full host of functions in order to provide high precision, speed, stability and ease of operation. This series features outstanding quality and cost performance.

Features

- Adequate precision for production floor measurements
  E=1.7+L/330 μm
  (PRISMO 5/7 HTG VAST)
  Higher precision available:
  E=1.2+L/330 μm
  (PRISMO 5 S-ACC VAST)
- Point measurement and scanning with VAST probe head
- Scanning of 200 points per second (VAST)
- High precision maintained in wide range of ambient temperatures (HTG)
- Easy-to-use graphical user interface
- Extensive lineup responds to user requirements

PRISMO Vario
Various general-purpose probes can be provided (point, scanning, non-contact).

PRISMO HTG VAST
Maintains high precision throughout wide ambient temperature range
(see specifications)

PRISMO Super ACC VAST
Provides even higher level of precision.

PRISMO 10 HTG VAST

ACCRETECH TOKYO SEIMITSU

Adequate Precision for Production Floor Inspections E=1.7+L/330μm

The design criteria for the PRISMO series were adequate precision for measurements on the production floor and maintaining this precision under virtually all environmental conditions. A variety of technological features have been implemented to guarantee the precision in the specifications is maintained under a wide range of ambient temperatures and other adverse environmental conditions, including floor vibration. The VAST version adopts multi-point scanning to satisfy requirements for measurement of multiple items at a high level.

Measurement Precision Guaranteed on Production Floor E=1.7+L/330μm (PRISMO 5/7 HTG VAST) For Higher Precision Requirements: E=1.2+L/350μm (PRISMO 5 S-ACC VAST)

Measuring accuracy is a very important factor in effectively utilizing the product dimension tolerance range. When selecting a measuring machine, the measuring accuracy must be 20% or less of the dimension tolerance for normal machining. For example, for a diameter value of 50 H7 (i.e. dimension tolerance of ±15 μm), the measuring accuracy must be within 3 μm. The PRISMO series features outstanding speed and acceleration, and precision that more than satisfies this standard under a wide range of ambient temperatures and various other measuring conditions.

Point Measurement and Scanning Measurement with VAST Probe Head

The VAST probe head that is incorporated as a standard feature on the PRISMO series combines two probing technologies: point-to-point measurement and high-speed scanning measurement. This enables the same machine to perform profile inspections and position inspections, in addition to dimension measurements.

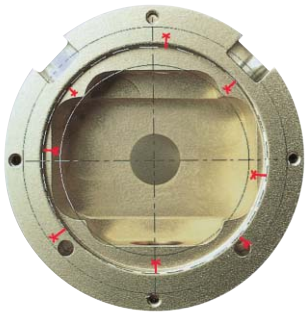
VAST: Variable Accuracy and Speed Probing Technology

High-Speed Scanning Measurement

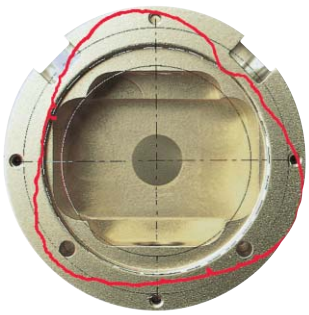
The VAST probe head achieves a high scanning measurement speed of 200 points per second.

Bore Profile Measurement Completed in One Operation

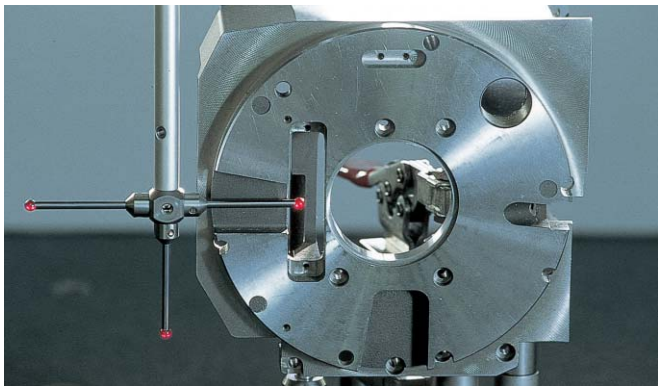
Bore and cylinder inspection consists of one of the most frequently performed set of measurements. The revolutionary VAST performance exhibits its true value in this inspection where profile tolerance is the foremost problem. Since VAST scanning features multi-point measurement, all types of plug and ring gauge dimensions can be evaluated, and dimensions can be displayed at the tolerance limit. Naturally, multi-point scanning measurement has higher reliability and repeatability for judgment of diameters and position dimensions than point-to-point measurements. A variety of evaluations can be performed with only one VAST measuring operation.



Portion of surface cannot be determined with point-to-point measurement



Overall profile can be determined with VAST scanning multi-point measurement



High-speed precision measurement of tools, thin-plate parts, dies and molds

High Speed for High Tolerances, High Precision for Low Tolerances

The VAST probe head allows the scanning speed/precision to be selected according to the measuring job and dimension tolerance. There are two levels of VAST scanning; One for rough machining and the other for finish machining.

■ VAST Scanning Level 1: High Precision
- Effective for high precision measurement and profile evaluation
- Highly precise evaluation of diameter (dimension), position and roundness

■ VAST Scanning Level 2: High Speed
- Enables high speed measurement when tolerance is high (Measuring error increases at this level)
- Reduces measuring time when reproducing diameter and center point position

Temperature Management by Multi-Function Interface (option)

With this option, the VAST probe head automatically measures the workpiece temperature. The probe changer magazine loads the ZEISS temperature sensor, and the machine program instructs the machine to measure/record the workpiece temperature at precisely determined positions. The results are transmitted in real time, enabling compensation for thermal expansion of the workpiece in the measured data.

PRISMO Series »»

High-Speed and High Efficiency
Short Stop Time Boosts Measuring Efficiency

A high speed in the specifications does not necessarily mean that the machine has the high-speed measuring capability that leads to enhanced productivity. Other factors such as a short stop time at each probing location and ease of setup are important. The PRISMO series was designed with all of these requirements of the production floor in mind to provide high speed and high precision measurement. A wealth of unique expertise has been incorporated to satisfy these two conflicting objectives.

Automatic Probe Change System Reduces Setup Time

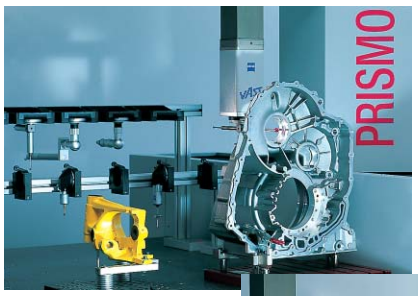
One probe combination is adequate for the inspection of a small number of workpieces. However, when multiple probes are required for workpieces with many measuring locations or many types of workpieces, the provision of an automatic probe changing system dramatically enhances measuring efficiency. Extremely high reproducibility when changes are performed eliminates the necessity of recalibration.

Unique Design Concepts Provide High Speed and High Precision

The ZERODUR scale with a resolution of 0.2 μm has been adopted for each axis. In addition, the machine has powerful control technology and bridge movement weight has been minimized. These unique design concepts provide the stability necessary to achieve high speed and high precision measurements.

Single RDS Probe Capable of Measurements in All Directions

A newly developed RDS two-axis rotating probe holder is capable of pointing the probe at virtually any angle by moving it in 2.5° increments (144 × 144 for total of 20,736 positions). This eliminates the trouble of using different probes for different special orientations.



Measurement with VAST probe

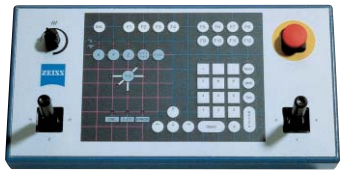
Measurement with RDS/RST probe

Accuracy Guaranteed Without Temperature Compensation

The adoption of the ZERODUR scale that is free from thermal expansion/contraction, bridge structure/material that have stable thermal characteristics (simple expansion/contraction without distortion) and Thermo-fit stylus featuring no thermal expansion/contraction enable accuracy to be guaranteed over a wide temperature range without temperature compensation. This minimizes uncertainty in measurements due to compensation.

Portable Operation Panel

The most important functions and frequently used measuring programs can be directly called from the portable operation panel during measuring operation.



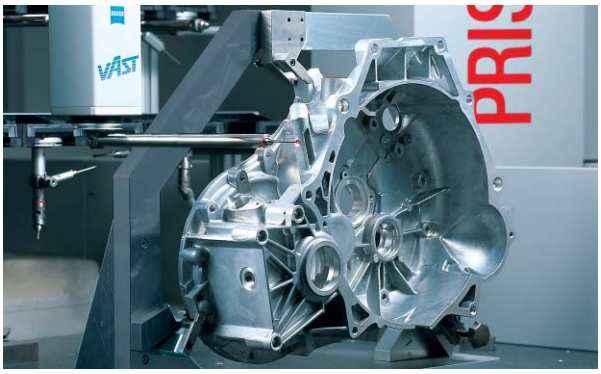
PRISMO 5 S-ACC VAST with rotary table

Designed with the Production Floor in Mind Measuring Accuracy Guaranteed Between 16 and 30°C (PRISMO 5/7 HTG VAST) (see specifications)

Temperature change, floor vibration, oil mist and various other problems must be taken into consideration for measurements made on the production floor. The PRISMO series incorporates a number of features that effectively address these problems in this type of environment. These include the use of a material with a low coefficient of thermal expansion, covers on the guides and reference scales, heat source insulation and absorption of floor vibration. This eliminates the necessity of providing air conditioning or a separate compartment on the production floor, reducing cost.

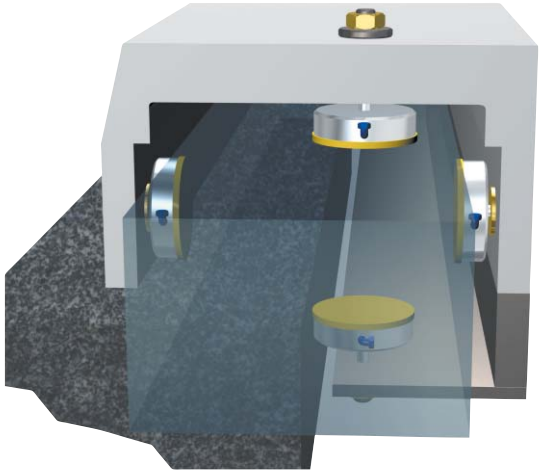
Comprehensive Ambient Temperature Measures

Constant accuracy can be guaranteed between an ambient temperature of 16 to 30°C (PRISMO 5/7 HTG VAST). The PRISMO series uses the ZERODUR scale that has zero thermal expansion for practical purposes. In addition, two temperature sensors are provided to measure the workpiece temperature.



High Rigidity Air Bearings

Eight air bearings are used for the Y axis guides to boost rigidity with respect to torsion. The air bearing structure surrounds the guides from four directions, guaranteeing accuracy even when moving at high speeds.



Bridge Has Superior Rigidity

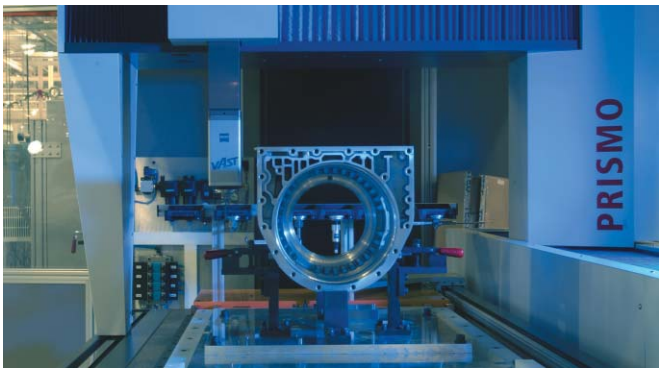
The bridge is lightweight and the finite element method has been used in its design to provide superior static and dynamic rigidity. In addition, state-of-the-art material is used at important locations.

Innovative Design Minimizes Thermal Influence

All granite plate surfaces except for the top are covered to insulate against heat. The operation panel is installed on the front cover.

Table Enhances Ease of Work

The table surface where measuring is performed has been designed to make it easy to clamp workpieces.



Protection from Contamination/Scratches

The guide surfaces and reference scales have covers to protect against contaminants and scratches. The X axis and Y axis guides are protected on the PRISMO VAST.

Y axis left side guide protective cover

Highly Functional Design

The design facilitates operation, easy clamping/removal of workpieces, maintenance and inspection. Of course, all mechanical and electrical safety standards are satisfied.

Reduced Facility Costs

Since the PRISMO does not require air conditioning, a separate measuring room or special foundation, substantial savings in facility costs are realized.

PRISMO Series »»

PRISMO Vario

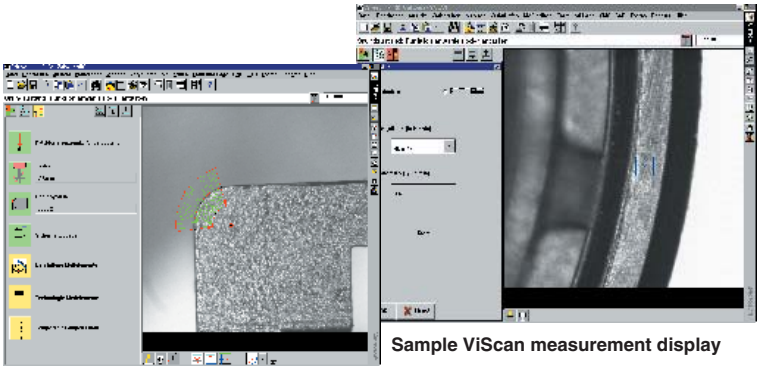
The PRISMO Vario has been newly added to our lineup to respond to the diverse measuring requirements of our customers. The Vario offers a wide variety of non-contact measurement sensors. This expands the range of workpieces that can be measured to include sheet metal, soft plastic, printed circuit boards, rubber and resin.

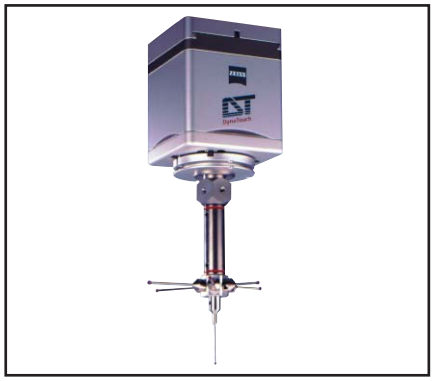
PRISMO 5 Vario

PRISMO Vario can be provided with a variety of sensor systems (select when ordering).

1) Average reading single point probe head: DT (Dyna-Touch)
2) High-speed scanning probe head: VAST-XT (can upgrade from DT to VAST-XT)
3) Rotary dynamic sensor: RDS (sensor shown below can be automatically changed by dedicated probe magazine)
   - Touch trigger type single point measuring probe : RST-P (PRISMO 5/7 series)
     : TP6 (PRISMO 10 series)
   - Optical 2-D auto focus camera sensor (non-contact type): ViScan
   - Optical single point measuring diode probe (non-contact type): DTS

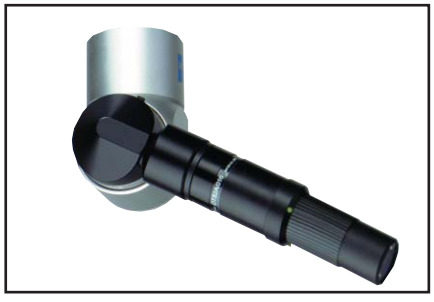
* Calypso software is used for ViScan and DTS.

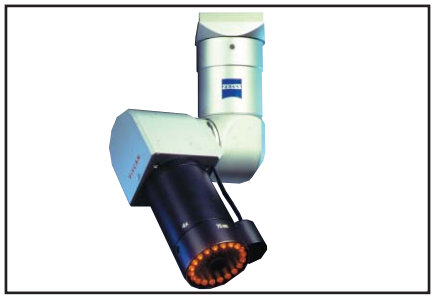

Sample ViScan measurement display


DT Probe Head

VAST-XT Probe Head


RDS-RST


RDS+DTS


RDS+Vi Scan

* The PRISMO HTG and S-ACC version can only be provided with the VAST probe head (standard) or RDS-RST/TP6 probe (option).

Specifications

Model			PRISMO 5	PRISMO 7				PRISMO 10 (X:1200)				PRISMO 10 (X:1600)		
			7/9/5	9/12/7	9/15/7	9/18/7	9/24/7	12/18/10	12/24/10	12/30/10	12/42/10	16/18/10	16/24/10	16/30/10
Measuring range (mm)		X	700	900	900	900	900	1200	1200	1200	1200	1600	1600	1600
		Y	900	1180	1500	1800	2400	1800	2400	3000	4200	1800	2400	3000
		Z (HTG/S-ACC)	500	650	650	650	650	1000	1000	1000	1000	1000	1000	1000
		Z (Vario)	500	700	700	700	700	1000	1000	1000	1000	1000	1000	1000
PRISMO Vario VAST-XT	Indication accuracy	E (μm)	2.0+L/300 (*2.3+L/300)					2.9+L/250 (*3.2+L/250)				4.7+L/200 (*5.0+L/200)		
	Probing accuracy	R (μm)	2.0					2.9				6.8		
		Ambient temp. (°C)	18 – 22 (* 18 – 26)					18 – 22 (* 18 – 26)				18 – 22 (* 18 – 26)		
		Temp. change (°C/h)	1.0					1.0				1.0		
		(°C/day)	2.0					2.0				2.0		
		(°C/m-height)	1.0					1.0				1.0		
	Measuring scale		ZERODUR scale					ZERODUR scale		Y: Steel tape scale		ZERODUR scale		Y: Steel tape scale
PRISMO HTG VAST	Indication accuracy	E (μm)	1.7+L/330 (*1.9+L/300)					2.4+L/300				4.2+L/250		
	Probing accuracy	R (μm)	1.5					1.9				6.0		
		Ambient temp. (°C)	18 – 26 (*16 – 30)					18 – 28				18 – 28		
		Temp. change (°C/h)	2.0					2.0				2.0		
		(°C/day)	5.0					5.0				5.0		
		(°C/m-height)	1.0					1.0				1.0		
	Measuring scale		ZERODUR scale					ZERODUR scale		Y: Steel tape scale		ZERODUR scale		Y: Steel tape scale
PRISMO S-ACC VAST	Indication accuracy	E (μm)	1.2+L/350			1.7+L/350		1.9+L/350				3.5+L/280		
	Probing accuracy	R (μm)	1.5					1.7				5.1		
		Ambient temp. (°C)	18 – 22					18 – 22				18 – 22		
		Temp. change (°C/h)	1.0					1.0				1.0		
		(°C/day)	2.0					2.0				2.0		
		(°C/m-height)	1.0					1.0				1.0		
	Measuring scale		ZERODUR scale					ZERODUR scale		Y: Steel tape scale		ZERODUR scale		Y: Steel tape scale
Table (mm)	Material		Gabbro											
	Usable width (mm)		925	1100				1435				1670		
	Usable depth (mm)		1220	1520	1820	2120	2950	2420	3020	3620	4820	2420	3020	3620
	Height from floor (mm)		850					620		670		620		
Workpiece measured	Max. height (mm)		595	705 (HTG/S-ACC VAST)				1060 (HTG/S-ACC VAST)				1379 (HTG/S-ACC VAST)		
				805 (Vario VAST-XT)				1179 (Vario VAST-XT)				1479 (Vario VAST-XT)		
	Max. weight (kg)		1200	1300	1500	1500	2000	2000	2500	3500	3500	3500	3500	3500
Guideway system			Air bearings											
Drive speed (mm/s)	Joy stick mode (mm/s)		0~70mm/s											
	Axis directions in CNC mode (mm/s)		Max. 300											
	Vector direction (mm/s)		Max. 520											
	Scanning mode (mm/s)		Max. 100											
Drive acceleration (mm/s²)	Axis directions (mm/s²)		1400					800				600		
	Vector direction (mm/s²)		2400					1400				1000		
Air source			Supply pressure: 0.6 – 1.0 MPa, Usage pressure: 0.5 MPa, Consumption; 120 ℓ /min (ANR)											
Power source			Supply: Single phase AC 100V (±10%), 50/60 Hz (±5%), Consumption: Max. 2000 VA											
Machine dimensions (mm)	Width (mm)		1525	1700				2050				2450		
	Depth (mm)		1740	2040	2340	2640	3240	2940	3540	4140	5340	2940	3540	4140
	Height (mm)		2930	3030				3590				3890		
Machine weight (kg)			1650	2200	2850	3360	4740	6000	7250	7820	10310	8500	10500	12500
Required ceiling height for installation (mm)			3230	3230 (HTG/S-ACC)				3740		3790		4040 (HTG/S-ACC)		
				3330 (Vario)				3840		3890		4140 (Vario)		
Delivery clearance height (mm) (+100)			1750	1850				2500				3200		

E and R are accuracy evaluation methods designated by ISO 10360-2.
There are different values for the accuracy of the RDS/RST, ViScan and DTS probes.

CONTURA »»

Low-Cost High-Performance 3D Measuring Machine

CONTURA

ZEISS developed a CNC scanning probe in the 1970s, a high-speed scanning probe (HSS) in 1989 and the PRISMO VAST in 1994 as a high-speed scanning coordinate measuring machine that can serve as a reference for measuring performance on the production floor. The CONTURA provides a higher level of economic performance, based on the PRIMO VAST.

Probe Changing Magazine

This magazine enable probes to be automatically changed.

Controller Enclosed in Table Housing

Enclosure of the controller inside the table housing allows the CMM footprint to be minimized. This machine uses a new 32-bit ISC (Intelligent Scanning Controller) specially developed for scanning measurements.

Features

- Culmination of state-of-the-art ZEISS scanning technology enables high-density data collection (200 points/second).
- Incorporates VAST XT high-speed scanning probe head (Max. scanning speed: 70 mm/second).

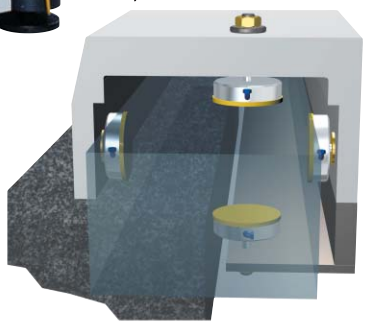
X axis and Z axis guides use ceramic material that is very hard, and high stability with respect to temperature changes and humidity.

VAST XT High-Speed Scanning Probe Head

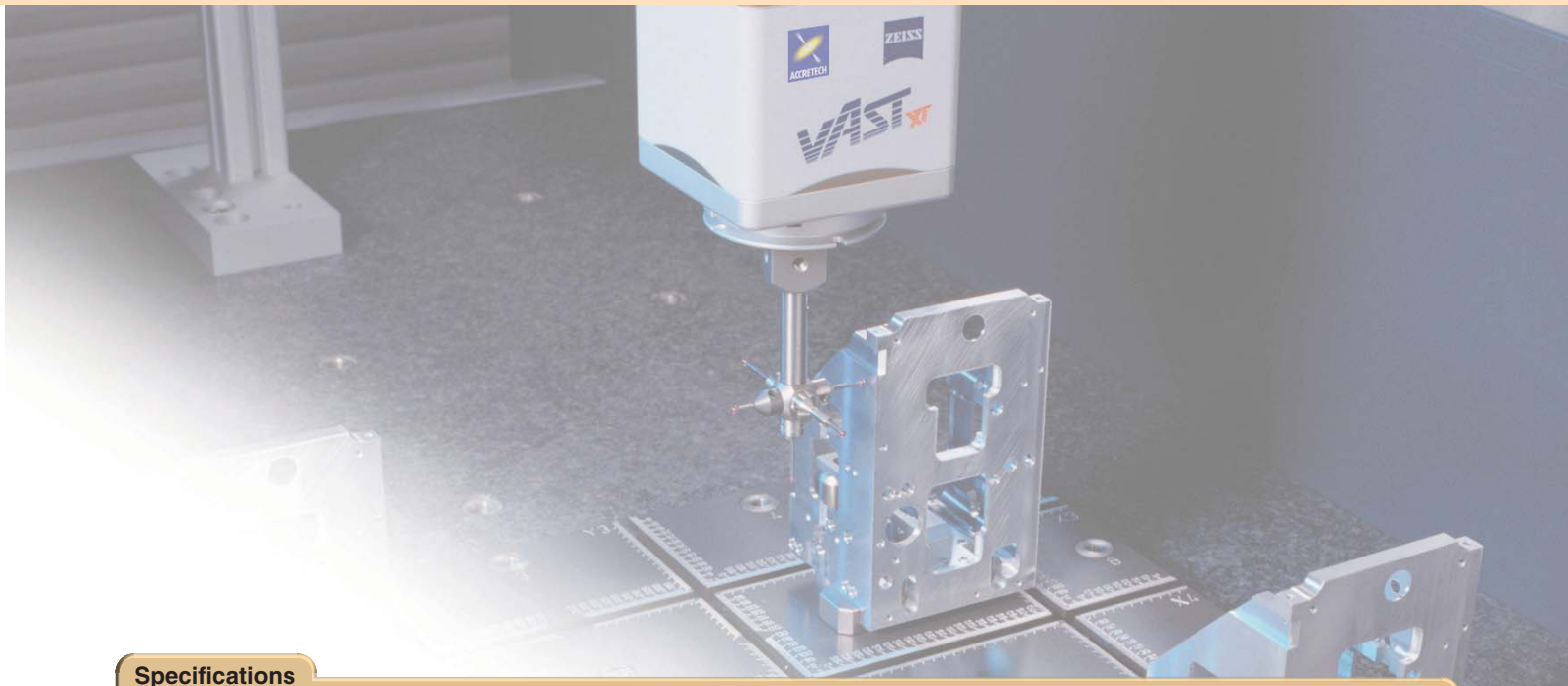
Heavy probes and extensions with long, complicated shapes can be attached.

* Can be upgraded to DT average reading type single point measurement probe or VAST-XT.

Standard Operation Panel



Superior rigidity of air bearings used for Y guide provides consistent performance at high speeds and high acceleration rates (same as for PRISMO).



Specifications

Model			CONTURA700		CONTURA1000	
			7/7/6	7/10/6	10/12/6	10/16/6
Measuring range (mm)		X axis	700	700	1000	1000
		Y axis	700	1000	1200	1600
		Z axis	600	600	600	600
CONTURA Standard VAST-XT DT	Indication accuracy	E (μm)	2.7+L/250		2.9+L/250	
	Probing accuracy	R (μm)	2.4		2.6	
		Ambient temp. (°C)	18 – 22			
		Temp. change (°C/hour)	1.0			
		(°C/day)	1.5			
		(°C/m – height)	1.0			
	Measuring scale		ZEISS glass scale			
CONTURA HTG VAST-XT DT	Indication accuracy	E (μm)	2.3+L/300		2.5+L/300	
	Probing accuracy	R (μm)	2.0		2.2	
		Ambient temp. (°C)	18 – 26			
		Temp. change (°C/hour)	2.0			
		(°C/day)	3.0			
		(°C/m – height)	1.0			
	Measuring scale		ZEISS glass scale			
Table (mm)	Material		Gabbro			
	Usable width		920		1225	
	Usable depth		1040	1340	1545	1945
	Height from floor to table		850			
Workpiece measured	Max. height (mm)		680			
	Max. weight (kg)		560	730	1150	1500
Guide system			Air bearings			
Drive speed (mm/s)	Joy stick mode		70			
	Axis directions in CNC mode		250			
	Vector direction		425			
	Scanning mode		70			
Drive acceleration (mm/s^2)	Axis directions		1000			
	Vector direction		1700			
Air source			Supply pressure: 0.6 – 0.8 MPa, Usage pressure: 0.5 MPa, Consumption; 180 N ℓ /min			
Power source			Supply: Single phase AC 100V (±10%), 50/60 Hz (±3.5%), Consumption: Max. 2000 VA			
Machine dimensions (mm)		STANDARD	1430(W) × 1540(D) × 2800(H)	1430(W) × 1850(D) × 2800(H)	1735(W) × 2050(D) × 2800(H)	1735(W) × 2450(D) × 2800(H)
		HTG	1580(W) × 1540(D) × 2800(H)	1580(W) × 1850(D) × 2800(H)	1870(W) × 2050(D) × 2800(H)	1870(W) × 2450(D) × 2800(H)
Machine weight (kg)			1100	1300	2150	2550
Required ceiling height for installation (mm)			2900			
Delivery clearance height (mm)			2620			

E and R are accuracy evaluation methods designated by ISO 10360-2.

MMZ/MMZ-G

Extra Large 3D Coordinate Measuring Machines

- Ideal for large high-precision parts for aircraft, automobiles, machine tools and printing machines.
- Uses floor as measuring table, simplifying handling when measuring large, heavy workpieces (MMZ-G).
- Basic structure designed using finite-element method.
- Same HSS (High-Speed Scanning) probe head as the UPMC is used to enable high-speed detection of measuring points and vector control of measuring force.

MMZ-G

MMZ

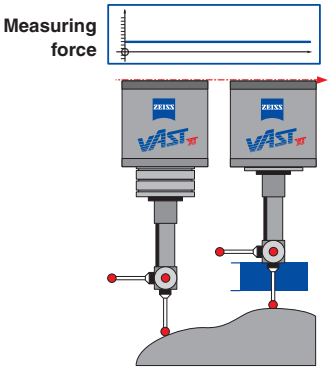
- Symmetric table structure facilitates setting of large, heavy workpieces.
- Low table height achieves high intrinsic rigidity.

Specifications

Model	MMZ 1600				MMZ 2000		MMZ-G						
	S-ACC	S-ACC	Std.	S-ACC	Std.	S-ACC	Std.	S-ACC	Std.	S-ACC	Std.	S-ACC	Std.
X axis (mm)	1600	1600	1600	1600	2000	2000	2000	2000	2500	2500	3000	3000	3000
Y axis (mm)	2400	3000	3000	3000	3000	3000	3000	3000	3000	3000	4000	4000	6000
Z axis (mm)	1200	1200	1600	1600	1600	1600	2000	2000	2000	2000	2000	2000	2500
E (μm)	3.0+L/300	3.0+L/300	4.5+L/250	3.5+L/300	6.0+L/250	5.0+L/250	5.0+L/200	3.5+L/200	5.5+L/200	4.0+L/200	6.0+L/200	4.5+L/200	6.0+L/200
R (μm)	3.2	3.2	4.8	3.2	6.3	5.3	5.3	3.7	5.8	4.2	6.3	4.8	6.8
Ambient temp. (°C)	18 – 24	18 – 22	18 – 24	18 – 22	18 – 24	18 – 22	18 – 22	19 – 21	18 – 22	19 – 21	18 – 22	19 – 21	18 – 22

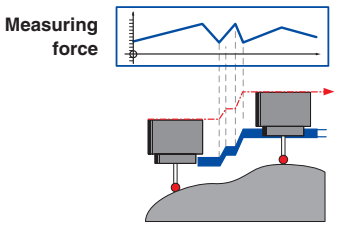
* MMZ series is manufactured after receipt of order. * Consult with ACCRETECH for sizes not listed above.

Scanning Measurement Technology



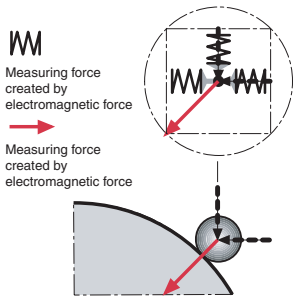
VAST Technology: Provides Measuring Force Control

A wide control range allows CMM Z axis positioning to be minimized. This results in higher measuring accuracy and scanning speed.



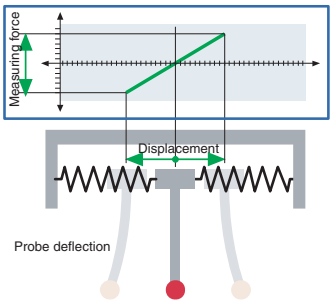
Conventional System: No Control of Measuring Force

A limited control range necessitates frequent positioning of the Z axis. This causes the measuring force to change, making it difficult to increase accuracy or scanning speed.



VAST Technology: Provides Measuring Force Control

Electromagnetic force is used to generate a constant low-level of measuring force. This measuring force is applied in the normal direction of the workpiece, minimizing probe deflection and enhancing accuracy



Conventional System: No Control of Measuring Force

The use of a mechanical spring results in non-uniform measuring force, preventing accuracy from being enhanced due to changes in deflection of the probe.

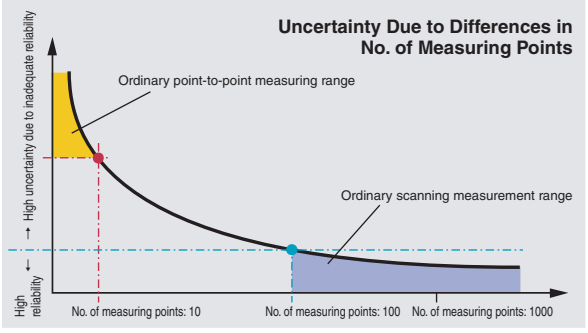
Scanning Technology

ZEISS developed a complete scanning measurement system with special high-density data collection capabilities, while other three-dimensional coordinating measuring machine manufacturers have only added scanning probes to existing hardware.
ZEISS scanning technology provides a measuring solution with high reliability.

With the unique ZEISS scanning probe system, probe head displacement and measuring force are constantly controlled. The inside of the probe head has a measuring force control unit that uses electromagnetic force, maintaining measuring force at a constant level at all times. In addition, the measuring force is controlled so that it is applied in the normal direction with respect to the workpiece surface. High measuring accuracy can be achieved since it is easy to compensate for probe deflection. Furthermore, wide-range scanning control facilitates smooth scanning measurement of the workpiece shape, allowing stable data to be acquired at high speed and high accuracy measurements to be made.

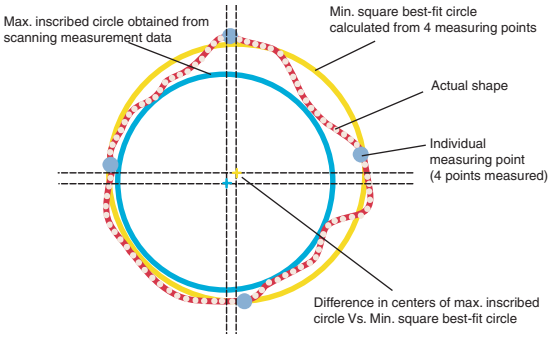
Effectiveness of Scanning Measurement

With scanning measurement, continuous measurement is performed along one shape, providing a series of adjoining points. The acquisition of high density data with as many measuring points as possible along the workpiece surface provides measuring results that are very close to the actual shape. Conventional measurement only acquires a relatively small number of points within the time allowed. When measuring shapes, this results in the danger that the results obtained differ from the actual values.
Scanning measurement enables this problem to be solved by obtaining high-density data in a short length of time. The measured results for shape dimensions, position or direction that are obtained with this high-density data enhance the reliability and stability of measurements, and help to increase production yield.



Example of Scanning Measurement Effectiveness

Using inner diameter measurement as an example, the dimension and position results obtained may differ drastically depending upon the data density and calculation method that is applied. The mutual differences are shown between dimensions and position for a maximum inscribed circle that is obtained with high-density data from scanning verses a best-fit circle obtained using the minimum square method from conventional data at several points.
In order to find the actual values for the shape like the one in the diagram below, it can be verified that it is better to obtain these values from high-density data. The differences in the diagram below can all be applied to shape measurements.

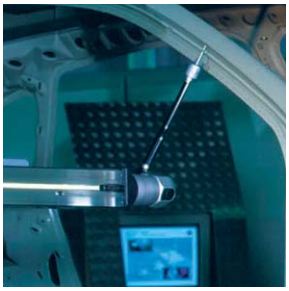


Carmet

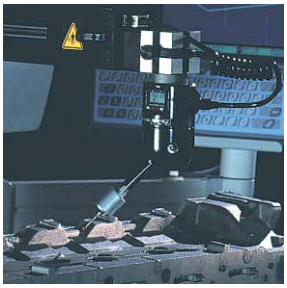
CMM Series with Flexible Horizontal Arm

Carmet

Diverse Measurements with One Machine



RDS + TP6 probe
(CNC type)



MIH-S + TP6 probe
(manual and motorized type)

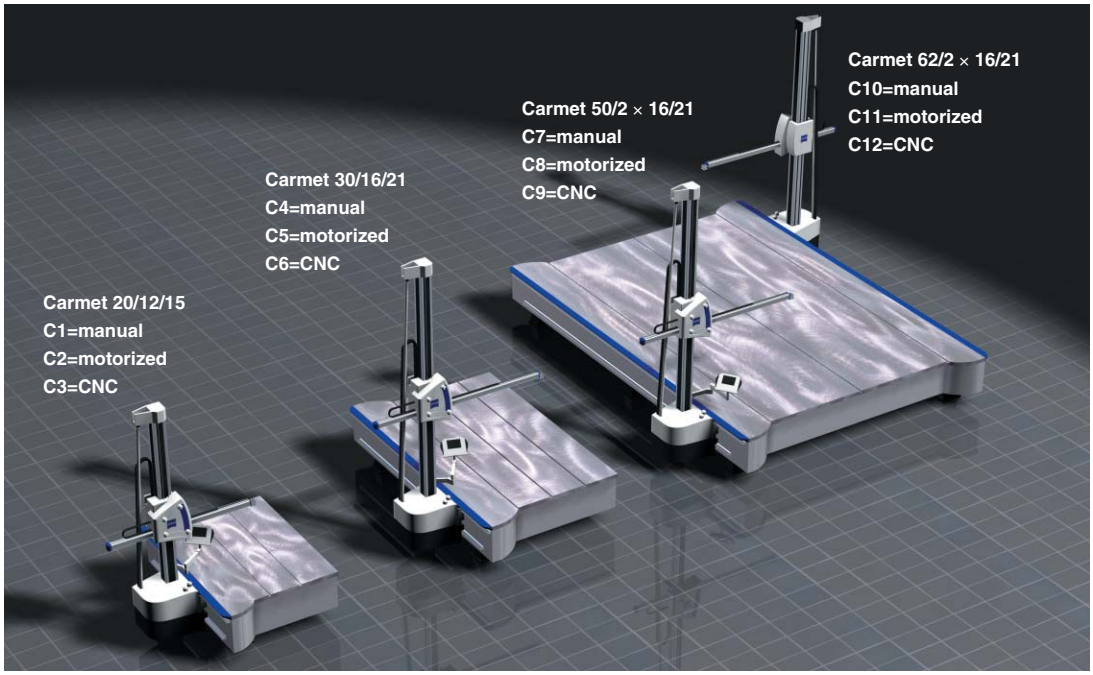
Accessories enabling marketing of cast and forged items

The CARL ZEISS RDS 2-axis rotating probe holder and TP6 probe head are standard features on the Carmet CNC measuring machine. The RDS rotation angle can be set for the two axes in 2.5" increments, enabling measurements of deep holes without having the shaft come into contact with the workpiece. Provision of the optional probe changing magazine for the RDS enables probes to be automatically changed, and the CNC machine can be manually operated with the motor drive changeover unit (option). By changing the RDS to a non-similar figure cube(CNC machine option), a marking needle or inscribing tool can be mounted, enabling traditional work to be performed by the same machine. The manual and motorized Carmet machines are equipped with the MIH-S manual two-axis rotating holder and TP6 probe head as a standard feature. When the sensor interface is connected to the MIH-S, the angle set can be verified on the operation panel. Since the non-similar figure cube is a standard feature, marking and other tools can be easily attached.

Graphic Operation Panel Can be Moved to Measuring Point

The graphic operation panel can be moved to the desired location.

Four Carmet sizes are available, and the two large models can be equipped with two arms. CNC, motorized and manual type can be selected for each size. The well-balanced design is ideal for mold and model manufacturers, and die and mold production floors. The CNC model can be separated from the motor drive to allow manual operation (option). Manual models can be upgraded to motorized models, and motorized models can be upgraded to CNC models.



Specifications

Model		Carmet			
Structure		Horizontal Arm Type Coordinate Measuring Machine			
Probe system	Manual	MIH-S manual 2-axis rotating probe holder + TP6 touch trigger probe			
	Motorized	MIH-S manual 2-axis rotating probe holder + TP6 touch trigger probe			
	CNC	RDS automatic 2-axis rotating probe holder + TP6 touch trigger probe			
	Option	Diode probe			
Controller	Manual	MZ1070 II			
	Motorized	C99			
	CNC	C99			
Operation method	Manual	Manual operation			
	Motorized	Manual operation and joy stick operation			
	CNC	Joy stick operation and CNC program operation			
Operation panel	Manual	Standard operation panel			
	Motorized	Standard operation panel			
	CNC	Standard operation panel			
Size		20/12/15	30/16/21	50/2 × 16/21	62/2 × 16/21
		Single column	Single column	Double column	Double column
Measuring range (mm)	X axis	2000	3000	5000	6200
	Y axis	1200	1600	2710 (CNC:2586)	2710 (CNC:2586)
	Z axis	1500	2100	2100	2100
Max. workpiece dimensions in X/Y directions (mm)		2140/1357	3140/1757	5140/2800	6140/2800
Machine height (mm)		3115	3765	3765	3765
Max. workpiece weight (kg)		1000	1500	5000	6000
Machine weight (kg)		3050	5170	11900	15300
Measuring system		Reflected light measuring system			
Measuring accuracy (μm) L=Measuring length (mm)	U1	20+L/50≦50	25+L/50≦60	25+L/50≦60	25+L/50≦60
	U3	25+L/50≦70	30+L/50≦80	30+L/50≦80	30+L/50≦80
	U3D	—————	—————	40+L/35≦100	40+L/35≦100
	E3	25+L/50≦70	30+L/50≦80	30+L/50≦80	30+L/50≦80
Probing accuracy (μm)	V2	20	25	25	25
Drive speed		1 axis: Max. 150 mm/s, 3 axes: Max. 260 mm/s			
Drive acceleration		1 axis: Max. 125 mm/s², 3 axes: Max. 215 mm/s²			
Probe system	TP6	Touch trigger probe head			
		Unit length: 41 mm		Max. probe length: 50 mm	
		Unit diameter: 25 mm		Max. probe weight: 5 g	
		Measuring force: 0.11 – 0.13N (Max. 0.3 N)		Min. probe ball diameter: 0.5 mm	
	Diode probe	120° rotation			
		Unit length: 315 mm		Repeatability when calibrated: 10 μm	
		Accuracy: 40 μm		Measuring conditions: Black/white colored portions	
	MIH-S	Manual 2-axis rotating probe head holder			
		Rotation angle A axis: 0 – 105°		Positioning repeatability: 1μm	
		B axis: ±180°			
		Angle pitch: 7.5°, 720 positions		Unit weight: 580 g	
	RDS	Automatic 2-axis rotating probe head holder			
		Rotation angle A axis: ±180°		Positioning repeatability: 1sec	
		B axis: ±180°			
		Angle pitch: 2.5°, 20736 positions		Unit weight: 1000 g	
Power source		100 V ±10%, 50 or 60 Hz ±3.5%			
Power consumption		Controller: 800 VA / Single: Max. 3800 VA			
Air source CNC: When RDS is used		Supply air pressure: 0.6 – 0.8 MPa, Usage air pressure: 0.6 MPa			
Air consumption CNC: When RDS is used		10 l/h (0.6 MPa), Atmospheric equivalent: 70 l/h (1.2 l/min.)			
Ambient temperature		+10 – +35°C			
Humidity		30 – 70%			
Measuring accuracy guarantee temp.	Ambient temp.	20°C ±4K			
	Temp. gradient	1.5 K/hour, 3.0 K/day, 0.5 K/m (height)			

* Accuracy testing and evaluation methods are in accordance with VDI/VDE2617 or ISO 10360-2.

SMC/Eagle Eye,SMM »»

High-Performance 3D Measuring of Car Bodies and Sheet Metal

SMC/Eagle Eye,SMM

NEW

Eagle Eye (provided on SMC)

The Eagle Eye is a non-contact sensor that is capable of high-speed measurement of the geometric elements of sheet meet. It supports patch surfaces, round holes, spheres and flash & gap.

- Horizontal arm structure allows installation on production lines for especially long workpieces.
- Variety of collision prevention functions, from probe tip to Y axis column.
- RST touch trigger probe or LTP60/LTP60E laser probe (option) can be mounted on standard DSE05 2-axis rotating probe holder, facilitating non-contact measurements.
- ASM4 automatic sensor changing magazine can be optionally provided to automatically change between RST and LTP60/LTP60E probes.

SMM

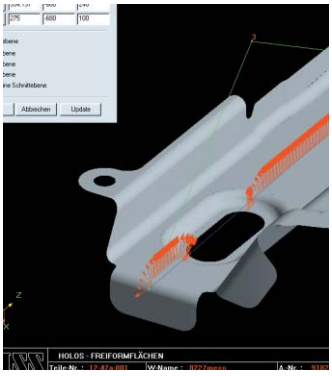
ACCRETECH TOKYO SEIMITSU

SMC

Features

Multiple Sensors

Both contact type and non-contact type sensors can be used. Changing between sensors can be completed in a very short time.
The DSE probe holder features stepless setting of the angle.

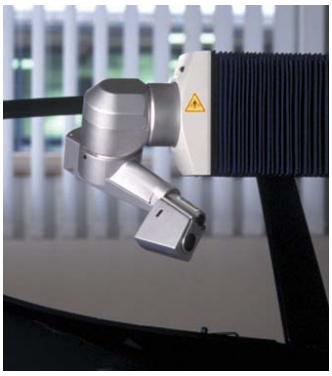


Software

Ease of use was the foremost concept for the SMC. The CMM-OS, HOLOS and other software make it very easy to perform advanced measurements.

RST-P

The adoption of a piezoelectric element minimizes fluctuation and helps achieve high accuracy. Probe extensions up to 600 mm long can be used, substantially expanding the accessible range.



Eagle Eye

The Eagle Eye non-contact sensor enables geometric elements, edge points and other types of dimensions to be measured on sheet metal. It is supported by ZEISS advanced 6-axis control technology.

New Concept X Guide

The adoption of a new material keeps the influence of temperature to a minimum, and the new design helps control the cost for the construction of the foundation. In addition, the 3-point indication method reduces the time required for installation.

New Design

A new total design flexibly accommodates the installation of safety and other devices.

Flexible Installation

The machine can either be installed on the floor or under the floor.

SMC

Specifications

Model		SMC Single Column (Granite Surface Plate) Type	
Structure		Horizontal arm type measuring machine mounted on precision granite surface plate	
Probe head	Standard	RST touch trigger probe head: Enables measured data to be acquired in all directions	
	Optional	LTP60/LTP60E laser probe head: Enables non-contact measurement	
Drive system		High-force DC servo drive with electronic monitoring function	
Controller		Micro processor 3-axis vector control	
		DSE (2-axis rotating probe holder with sensor change function) control	
Operation panel		Large panel with alphanumeric keypad (Enables most operations to be performed from operation panel without using computer keyboard) Manual operation of machine and DSE with joystick, changeover to slow motion mode	
Special devices	Standard	Silicon oil removal device	
	Optional	Automatic level vibration isolation device ASM (CNC sensor changer using probe magazine) Y axis collision prevention mechanism	
Measuring range	X axis (mm)	2400, 3000, 4200	
	Y axis (mm)	1350	
	Z axis (mm)	1500, 2000, 2400	
Measuring machine weight (kg)		Approx. 11,500 – 17,000	
Maximum allowable workpiece weight (kg)		1500	
Clamp surface		X: X axis measuring range plus 1200 mm Y: 1500 mm Clamping bolt grid: 600 x 500 mm	
Measuring system		Reflected light measuring system	
Resolution		1μm	
Measuring accuracy		Temp. spec. A: Standard	Temp. spec. B: Option
	U1 (μm)	35+L/50≦75	25+L/120≦40
	U3 (μm)	45+L/40≦85	25+L/80≦50
Drive speed	Joystick measuring	0 – 100 mm/s (Complete collision protection for probe system)	
	CNC measuring	0 – 150 mm/s (Limited collision protection for probe system)	
	CNC measuring (option)	0 – 300 mm/s (Collision protection for machine and probe system with detailed limitations)	
Probe head	RST	Measuring force (during data acquisition)	0.01 N or less
		Max. probe length	90mm
		Max. probe weight	10g
		Min. probe ball diameter	φ0.5mm
		Max. extension shaft length	400mm
		Outer dimensions (length x diameter)	65mm × φ26mm
	LTP60/LTP60E	Measuring range	60mm (±30mm)
		Operation distance (to center of measuring range)	125mm
		Measuring accuracy (6s ceramic calibration standard)	15μm
DSE 2-axis rotating probe holder		Two intersecting shafts that each have motor to enable ±180° rotation	
		Increment measuring system	0.5 sec. resolution
		Max. angle rotation speed	40°/s
		Angle positioning error	±3 sec.
		Max. sensor weight that can be changed	100Ncm
		Max. rotation moment	1000g
		Probe changing reproducibility	≦1μm/200mm
		Types of sensors that can be changed	RST touch trigger probe head LTP60 laser probe head LTP60E laser probe head
Power source		AC 100 V ±10%, 50 – 60 Hz ±3.5%	
Power consumption		Approx. 3000 VA	
Air source	Supply pressure	0.6 – 1.0 MPa	
	Usage pressure	0.5 MPa	
Air consumption		120 ℓ/min (atmospheric equivalent)	
Ambient temperature for operation		+15 – +35°C (not temperature conditions for guaranteed accuracy)	
Humidity		40 – 70% (no condensation)	
Guaranteed measuring		Temp. spec. A: Standard	Temp. spec. B: Option*2
accuracy	Ambient temp.	+18 – +30°C	+20 – +24°C
temperature	Temperature gradient	2.0 K/hour	1.0 K/hour
conditions		8.0 K/day	3.0 K/day
		0.5 K/m (height)	0.5 K/m (height)

*1: Accuracy test and evaluation methods are in accordance with VDI/VDE2617. (When RST standard probe is used. L = Arbitrary measuring length.)
*2: Can only be applied for CNC measurements at 150 mm/s or less.

Specifications

Model		SMC Double Column (Independent X Guide) Type	
Structure		Horizontal arm type measuring machine mounted on independent X guide (foundation work required)	
Probe head	Standard	RST touch trigger probe head: Enables measured data to be acquired in all directions	
	Optional	LTP60/LTP60E laser probe head: Enables non-contact measurement	
Drive system		High-force DC servo drive with electronic monitoring function	
Controller		Micro processor 3-axis vector control	
		DSE (2-axis rotating probe holder with sensor change function) control	
Operation panel		Large panel with alphanumeric keypad (Enables most operations to be performed from operation panel without using computer keyboard) Manual operation of machine and DSE with joystick, changeover to slow motion mode	
Special devices	Standard	Interlock function for each column	
	Optional	ASM (CNC sensor changer using probe magazine) Y axis collision prevention mechanism	
Measuring range	X axis (mm)	4200, 6000, 9000	
	Y axis (mm)	1350	
	Z axis (mm)	2000, 2400	
Measuring system		Reflected light measuring system	
Resolution		1μm	
Measuring accuracy		Temp. spec. A: Standard	Temp. spec. B: Option
	U1 (μm)	35+L/50≦75	25+L/120≦40
	U3 (μm)	45+L/40≦85	25+L/80≦50
Drive speed	Joystick measuring	0 – 100 mm/s (Complete collision protection for probe system)	
	CNC measuring	0 – 150 mm/s (Limited collision protection for probe system)	
	CNC measuring (option)	0 – 300 mm/s (Collision protection for machine and probe system with detailed limitations)	
Probe head	RST	Measuring force (during data acquisition)	0.01 N or less
		Max. probe length	90mm
		Max. probe weight	10g
		Min. probe ball diameter	ϕ0.5mm
		Max. extension shaft length	400mm
		Outer dimensions (length × diameter)	65mm × ϕ26mm
	LTP60/LTP60E	Measuring range	60mm (±30mm)
		Operation distance (to center of measuring range)	125mm
		Measuring accuracy (6δ ceramic calibration standard)	15μm
DSE 2-axis rotating probe holder		Two intersecting shafts that each have motor to enable ±180° rotation	
		Increment measuring system	0.5 sec. resolution
		Max. angle rotation speed	40°/s
		Angle positioning error	±3 sec.
		Max. rotation moment	100Ncm
		Max. sensor weight that can be changed	1000g
		Probe changing reproducibility	≦1μm/200mm
		Types of sensors that can be changed	RST touch trigger probe head LTP60 laser probe head LTP60E laser probe head
Power source		AC 100 V ±10%, 50 – 60 Hz ±3.5%	
Power consumption		Approx. 3000 VA	
Air source	Supply pressure	0.6 – 1.0 MPa	
	Usage pressure	0.5 MPa	
Air consumption		120 ℓ/min (atmospheric equivalent)	
Ambient temperature for operation		+15 – +35°C (not temperature conditions for guaranteed accuracy)	
Humidity		40 – 70% (no condensation)	
Guaranteed measuring accuracy temperature conditions		Temp. spec. A: Standard	Temp. spec. B: Option*2
	Ambient temp.	+18 – +30°C	+20 – +24°C
	Temperature gradient	2.0 K/hour	1.0 K/hour
		8.0 K/day	3.0 K/day
		0.5 K/m (height)	0.5 K/m (height)

*1: Accuracy test and evaluation methods are in accordance with VDI/VDE2617. (When RST standard probe is used. L = Arbitrary measuring length.)
*2: Can only be applied for CNC measurements at 150 mm/s or less.

XYZAX SVA-A

SVA-A Reduces Costs and Enhances Quality

XYZAX SVA-A

CNC 3D Coordinate Measuring Machines

CNC Machine Integrating ZEISS Technology
Space precision compensation technology dramatically boosts measuring precision (E=2.4+4L/1000μm: SVA800A).
Provided with Accretech Advantage and AI functions as standard feature (patented in Japan and overseas).
Standard temperature compensation function maintains precision in various environments.
Variety of software programs available.

Features

Integrates ZEISS Technology
This CNC machine combines CARL ZEISS control technology with ACCRETECH hardware.

High-Speed Measurements
The incorporation of a ZEISS high-performance controller has reduced the required CNC measuring time by approximately 30% (comparison with other ACCRETECH machine).

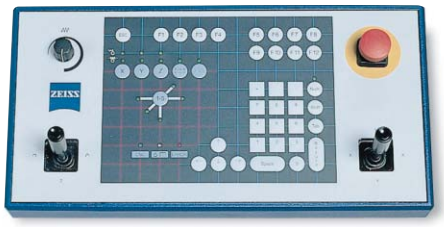
AI Function (patented in Japan and overseas)
An AI (Artificial Intelligence) function enables measured shapes to be automatically recognized. This dramatically reduces the number of input steps, making the machine easy to operate even for beginners.

Standard Temperature Compensation Function
Temperature compensation enables measurements to be made at measuring room temperatures between 16 and 26°C. This substantially reduces the operating cost for the air conditioning system.

Compact Operation Panel
The operation panel is compact and can be used at the desired location around the measuring table.

Optional LCD Monitor with Touch Panel
Placement of this optional monitor on a mobile stand enables operation at the most convenient location.

LCD monitor with touch panel



Compact operation panel

Specifications

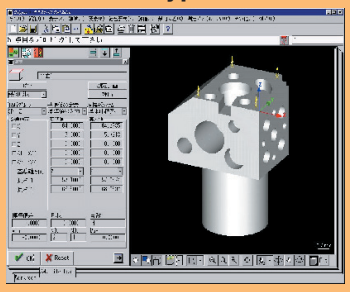
Model			SVA600A	SVA800A	SVA1000A	SVA1500A	SVA1010A	SVA1012A	SVA1015A
Measuring range	X axis (mm)		650	850			1000		
	Y axis (mm)		500	600	1000	1500	1000	1200	1500
	Z axis (mm)		300	600					
Measuring scale			High-precision Moiré striped scale						
Min. display value			0.01μm						
Measuring accuracy (μm)	Indication accuracy		2.4+4L/1000		2.9+4L/1000		2.9+5L/1000		
	Probing accuracy	TP2	2.9		3.4		3.4		
		TP20	2.9		3.4		3.4		
		TP200	2.7		3.2		3.2		
		PTS-30	2.6		3.1		3.1		
Table (mm)	Material		Granite						
	Usable width (X)		800	1000			1150		
	Usable depth (Y)		1220	1370	1810	2310	1810	2010	2310
	Height from floor		725						
	Flatness		JIS 1 class						
	Mounting screws for workpiece measured		M10 screw holes						
Workpiece measured	Max. height (mm)		470	770					
	Max. load (kg)		400	800	1000	1500	1000	1200	1500
Drive speed	Max. acceleration/deceleration		1700mm/sec^2						
	Movement speed		Auto mode automatic measurement: 0.01 - 425 mm/sec (stepless)						
			Joystick and manual mode (automatic measurement) operation: 0 - 120 mm/sec. (stepless)						
	Measuring speed		Joystick and manual mode (automatic measurement) operation: 0 - 5 mm/sec						
Guide system for axes			Air bearings						
Max. probe weight			2 kg						
Machine dimensions	Width (mm)		1415	1615			1765		
	Depth (mm)		1390	1540	1980	2480	1980	2180	2480
	Height (mm)		2205	2655					
Machine weight (kg)			1300	1600	2700	3400	3000	3200	3500
Temperature conditions	Ambient temperature (°C)		16 - 26						
	Temperature change	(°C/hour)	2.0						
		(°C/day)	5.0						
		(°C/m)	1.0						

* The indication accuracy (E) and probing accuracy (R) for measuring accuracy are evaluation methods for 3D coordinate measuring machines in accordance with JIS B7440-2.
* The "L" in the indication accuracy (E) is the distance between two arbitrary points (Unit: mm).
  * Standard stylus specifications.
  (1) TP2/TP20/TP200: Renishaw special stylus with φ4L20mm tip
  (2) PTS-30: Makino stylus with φ4L50mm tip

XYZAX SVA-A

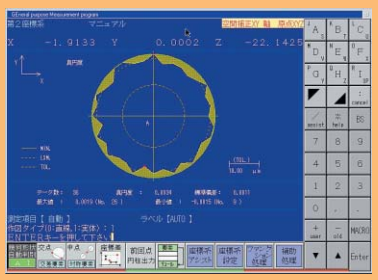
Standard Software

Calypso



- CAD I/F option
- Hole pattern best fit
- Threaded hole measurement option
- Calypso - CURVE
- CURVE ASCII input/output
- Calypso - TIMS conversion
- IGES/DXF conversion
- DIMENSION
- HYPER STATIS

XYANA2000



- Geometric deviation option
- Position deviation best fit
- Threaded hole measurement option
- Inscribed and circumscribed circles option
- Four rules of arithmetic calculation option
- TESCHART
- DMIS compatibility

Optional Software

- HOLOS - NT2.0
  - Light Plus
  - Extension
  - GEO
  - Digitize
- TESCART 32
- Calypso CURVE (manual)
- Calypso text data output
- PH9/10 list calibration option

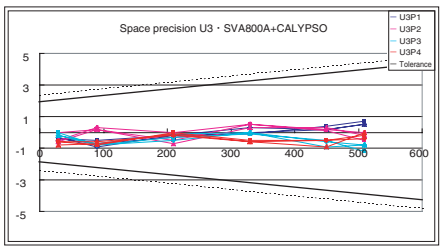
- Contour measurement program
  - Manual measurement
  - Automatic measurement
  - Evaluation function

- Chinese language display

Achieves Higher Precision

SVA800A Indication Accuracy: E=2.4+4L/1000 μm

Space precision compensation (CAA) technology and a temperature compensation function dramatically boost measuring precision.
(Comparable model RVA 800A: E = 3.5 + 5L / 1000(m)



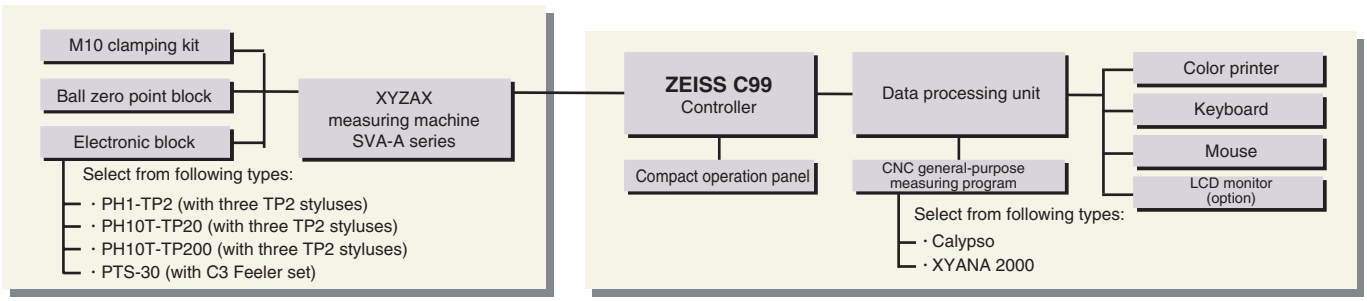
Electronic Probes

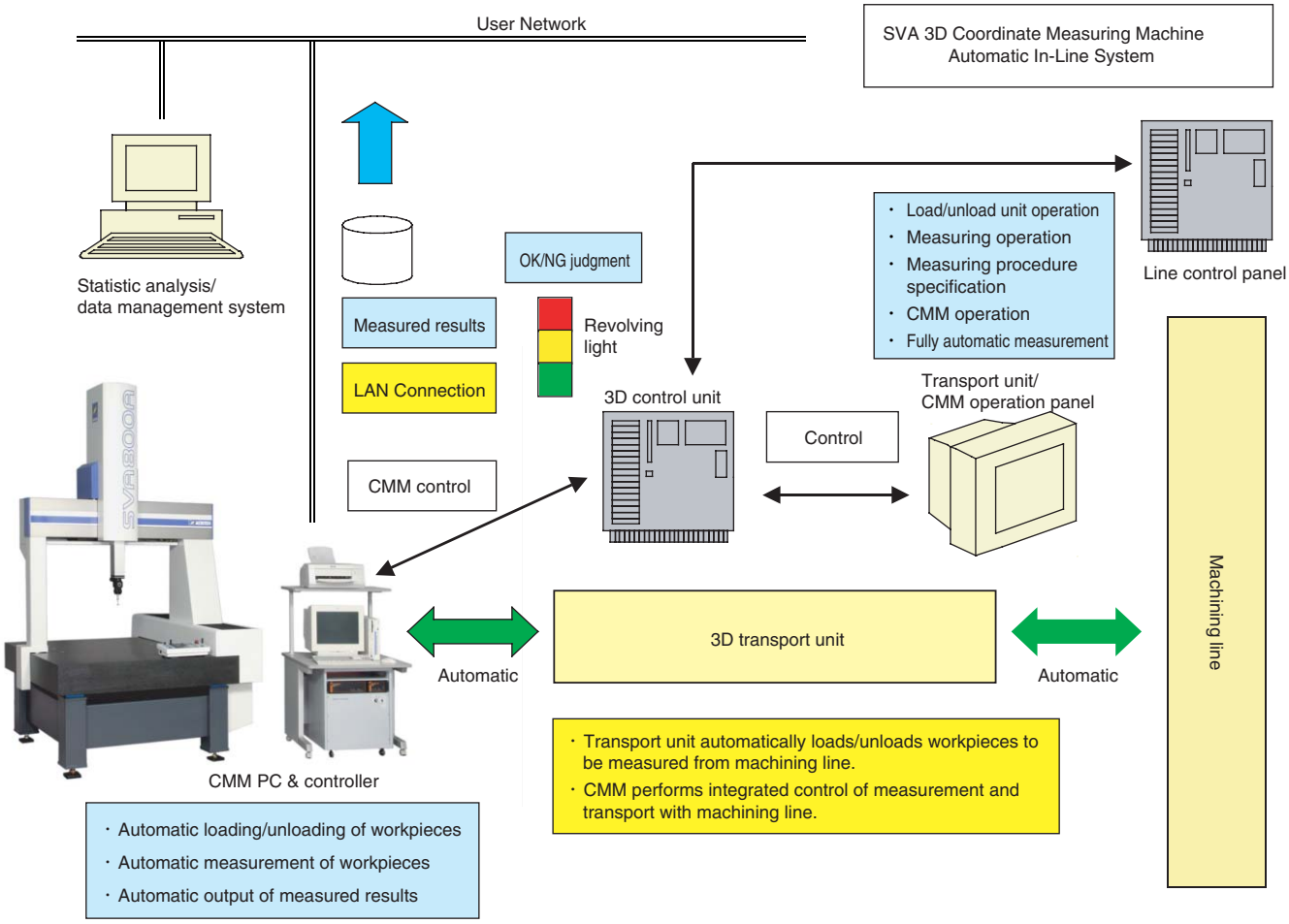
PH10T-TP200/TP20

PTS-30

PH1-TP2

Basic System Configuration

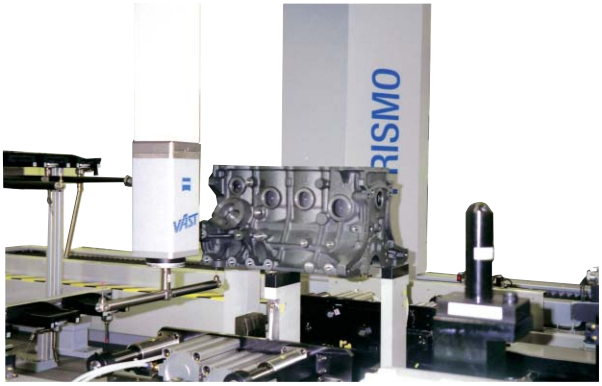




Example of robot transport

Sample RVA system

Sample PRISMO system (1)



Sample PRISMO system (2)

XYZAX RVA-A

RVA-A Helps Reduce Costs While Boosting Quality

XYZAX RVA-A

CNC 3D Coordinate Measuring Machines

CNC Machine Integrating ZEISS Technology
ACCRETECH's Patented AI Function Simplifies Operation
Standard Temperature Compensation Enhances Accuracy

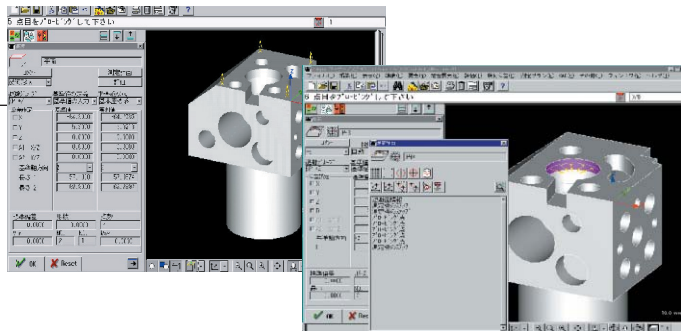
ACCRETECH TOKYO SEIMITSU

Specifications

Model			XYZAX RVA-A							
			600A	800A	1000A	1500A	1010A	1012A	1015A	1215A
Measuring range	X axis (mm)		650	850	850	850	1000	1000	1000	1200
	Y axis (mm)		500	600	1000	1500	1000	1200	1500	1500*
	Z axis (mm)		300	600	600	600	600/800	600/800	600/800	800/1000
Min. display value (mm)			0.00001							
Measuring scale			High-precision Moiré striped scale							
Measuring accuracy (μm)	Indication accuracy		2.9+4L/1000	3.5+5L/1000	3.9+5L/1000		4.1+5L/1000 (Z=600)			5.5+5L/1000 (Z=800)
							5.0+5L/1000 (Z=800)			5.5+5L/1000 (Z=1000)
	Probing accuracy	(TP200)	2.8	3.0	3.8		3.8 (Z=600)			4.5(Z=800)
							4.5 (Z=800)			5.0 (Z=1000)
Table (mm)	Material		granite							
	Usable range	Width	780	980	980	980	1110	1110	1110	1310
		Depth	1270	1370	1810	2310	1810	2010	2310	2310
	Height from floor		755、 600 (Z=1000)							
	Flatness		JIS 1 class							
Workpiece measured	Max. height (mm)		470	770 (Z=600), 970 (Z=800), 1170 (Z=1000)						
	Max. load (kg)		400	800	1000	1500	1000	1200	1500	1500
Drive speed	CNC automatic measurement		0.01 – 250 mm/s (stepless)							
	Joystick operation		Movement speed: 0 – 100 mm/s (stepless), Measuring speed: 0 – 5 mm/s							
Max. drive acceleration (mm/s²)			1000							
Guide system for axes			High rigidity air bearings							
Max. probe weight			2kg							
Air source			Supply pressure: 0.49 – 0.69 MPa, Usage pressure: 0.39 MPa, Consumption 30 l/min (atmospheric equivalent)							
Machine dimensions	Width (mm)		1372	1572	1572	1572	1712	1712	1712	1912
	Depth (mm)		1365	1535	1975	2475	1975	2175	2475	2475
	Height (mm)		2070	2670 (Z=600)、3070 (Z=800)、3320 (Z=1000)						
Machine weight (kg)			1300	1600	2700	3400	3000	3200	3500	3800
Temperature conditions	Ambient temperature (°C)		18 – 28, 18 – 22 (Z=800, 1000)							
	Temperature change	(°C/hour)	2.0, 1.0 (Z=800, 1000)							
		(°C/day)	5.0, 2.0 (Z=800, 1000)							
		(°C/m)	1.0, 1.0 (Z=800, 1000)							

The indication accuracy (E) and probing accuracy (R) for measuring accuracy are evaluation methods for 3D coordinate measuring machines in accordance with JIS B7440-2.
* The "L" in the indication accuracy (E) is the distance between two arbitrary points (Unit: mm).
* Auto leveling pneumatic vibration isolation is available for all models.
* The temperature compensation function is a standard feature.
NOTE: A 2000mm Y axis model is also available.

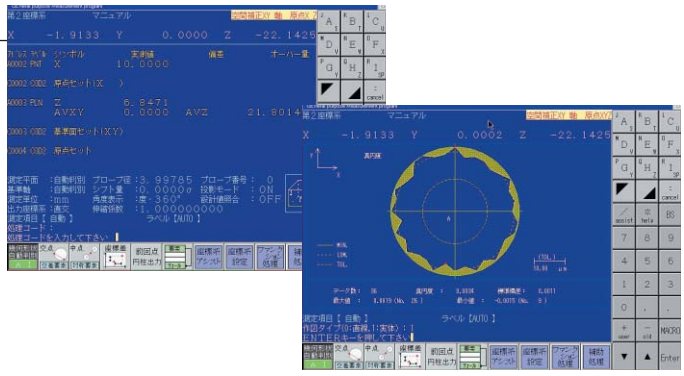
Two Types of Software for Different Applications



Calpyso

High-Performance Software with Expandability

- Advanced Calypso software developed by CARL ZEISS operates on Windows 2000/NT.
- Provided with superior graphical functions and AI functions (automatic element discrimination, automatic coordinate setting) as a standard feature.
- CAD data (IGES, CATIA, VDA, STA, pro-engineer, etc.) can be captured and measuring procedure on CAD element (simple off-line teaching) can be generated.



XYANA 2000

Software Focusing on Ease of Operation

- XYANA 2000 is a versatile software package developed by ACCRETECH that enables dimensions to be measured in the same way that Vernier calipers are used.
- Touch panel provides excellent operability.
- Provided with conventional AI functions as a standard feature.

Variety of Optional Software

- HOLOS: Free curved surface measuring program
- Calypso Curve (XYANA profile): Profile measuring program
- Calypso-TIMS conversion: 2D second analysis program
- TESCHART: Test chart generation program
- DIMENSION: Digitizing program
- DMIS compatible program
- Off-line teaching interface program
- Hypter Statis: Statistical processing program

＊ Various other programs are also available.

XYZAX RVF-A

AI Function (patented in Japan and abroad) for Operation as Easy as Using Vernier Calipers!

XYZAX RVF-A

3D Coordinate Measuring Machines

ZEISS Technology and AI Functions Make Operation Surprisingly Easy

Basic Configuration

- Ceramic ball zero point block
- Electronic probe
- XYZAX measuring machine RVF-A series
  - Select one of the following:
    - TP1 (with star type stylus)
    - PH1+TP2 (with three TP2 styluses)
    - MIP (with three TP2 styluses)
- ZEISS MZ1070 II system interface used
  - Color LCD monitor with touch panel function
  - Xyana 2000 data processing system
    - Color printer
    - Keyboard/mouse
    - Versatile measuring software with AI function
      - Various optional software:
        - Geometric deviation plotting program
        - Position deviation best-fit program
        - TESCHART32 test chart generation system

Features

ZEISS and ACCRETECH Technology

The MZ1070-II ZEISS controller has been combined with ACCRETECH hardware on this outstanding measuring machine.

Standard Color LCD Monitor with Touch Panel

All functions are displayed as color icons on the LCD monitor, enabling the machine to be operated by even a beginner. The mobile platform (option) allows the monitor to be easily moved to the measuring position.

Guides on Both Sides for High Table Rigidity (patented)

The Y axis guides must be especially stable since this determines the measuring accuracy to a great extent. The sides of the table are precision finished and the guides on both sides of the table use a spring mechanism. This provides high rigidity and consistent measuring precision over an extended period.

Aluminum Alloy Minimizes Operator Fatigue

The X guide and Z axis are finished to a high level of straightness precision, and an aluminum alloy is used that has been underdone aging treatment and surface hardening treatment. This reduces the inertia when measurements are made due to the light weight, and in turn minimizes operator fatigue.

Knob Allows Smooth Slow Motion Feed

The adjustment knob for the X, Y and Z axes is located at an easy to operate location. The smooth slow-motion feed of 0.5 mm/revolution is especially effective for measurements when using a microscope or ITV camera.

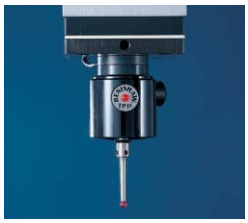
Standard Terminate Switch on Z Axis (patent pending)

The measurement, terminate and intermediate point operation switches can be freely selected during operation. This enables continuous measurements without taking your hand off the Z axis.

Vertical Rack for Data Processing Unit (option)

This rack provides a compact housing for the computer.

Electronic Probes



TP1

PH1-TP2

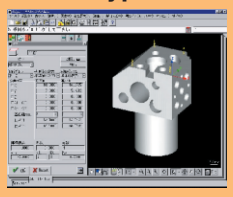
MIP

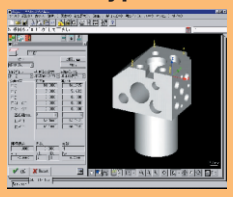
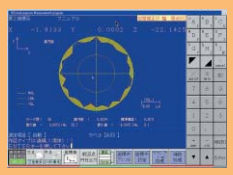
Specifications

Model		XYZAX RVF-A			
		400A	600A	800A	1000A
Measuring range	X axis (mm)	400	600	800	800
	Y axis (mm)	350	500	600	1000
	Z axis (mm)	300	300	600	600
Min. display value (mm)		0.00001			
Measuring scale		High-precision Moiré striped scale			
Measuring accuracy	U1 (μm)	2.6+4.0L/1000	3.0+4.0L/1000	4.4+4.5L/1000	
	U3 (μm)	3.0+4.0L/1000	4.0+5.0L/1000	5.4+5.5L/1000	
Table	Material	Granite			
	Usage range (mm)	600 × 895	800 × 1045	1000 × 1250	1000 × 1750
	Height from floor (mm)	760			
	Flatness	JIS 1 class			
Workpiece measured	Max. height (mm)	450	450	750	750
	Max. load (kg)	300	400	600	800
Guide system		High rigidity air bearings			
Z axis probe weight		Can be changed from front in 200 g increments between 0 and 1 kg			
Air source	Supply pressure	0.4 – 0.69 MPa	0.4 – 0.69 MPa	0.5 – 0.69 MPa	
	Air consumption	40 N ℓ /min (atmospheric equivalent)			
Power source		AC 100 V ±10%, Consumption: 500 VA			
Dimensions: Width × Depth × Height (mm)		990 × 895 × 2105	1190 × 1045 × 2105	1490 × 1250 × 2705	1490 × 1750 × 2705
Machine weight (kg)		580	770	1200	1700

Software

Software Configuration

Measuring Machines	Standard Software	Optional Software
CONTURA 	Calypso 	CAD I/F option Hole pattern best fit Threaded hole measurement option Calypso - CURVE CURVE ASCII input/output Calypso - TIMS conversion IGES/DXF conversion DIMENSION HYPER STATIS	HOLOS - NT2.0 - Light Plus - Extension - GEO - Digitize TESCART 32 Calypso CURVE (manual) Calypso text data output DMIS post processor
PRISMO Series 	UMESS/LX 	KUM/LX contour measurement GON/LX gear measurement DIMENSION HYPER STATIS Threaded hole measurement option KUM-TIMS conversion IGES/DXF conversion DMIS post processor Data transfer program (DCOM)	HOLOS - NT2.0 - Light Plus - Extension - GEO - Digitize TESCART 32 Bevel-Pro bevel gear measurement (RT required) Involute-Pro gear measurement (RT required)
UPMC-CARAT 			

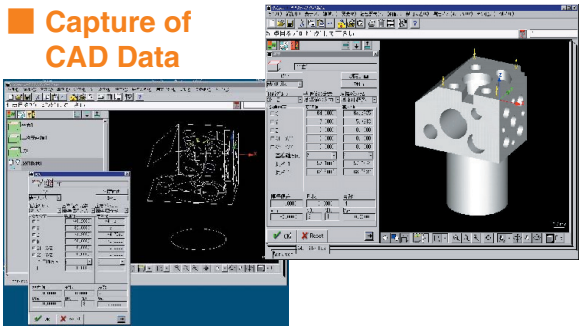
Measuring Machines	Standard Software	Optional Software
SVA-A 	Calypso 	CAD I/F option Hole pattern best fit Threaded hole measurement option Calypso - CURVE CURVE ASCII input/output Calypso - TIMS conversion IGES/DXF conversion DIMENSION HYPER STATIS	HOLOS - NT2.0 - Light Plus - Extension - GEO - Digitize TESCART 32 Calypso CURVE (manual) Calypso text data output PH9/10 list calibration option
RVF-A 	XYANA2000 	Geometric deviation option Position deviation best fit Threaded hole measurement option Inscribed and circumscribed circles option Fundamental rules of arithmetic calculation option TESCHART DMIS compatibility	Contour measurement program - Manual measurement - Automatic measurement - Evaluation function Chinese language display

3D Coordinate Measuring Machine Software

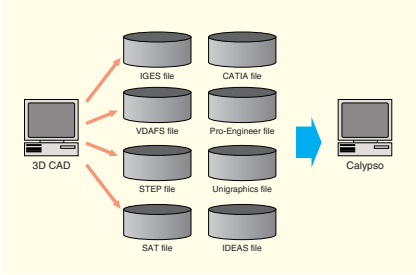
Calypso Versatile Measuring Program

- Calypso is an advanced software package developed by CARL ZEISS. It runs on Windows 2000/NT to provide a new measuring environment.
- Superior graphic functions and AI functions (element auto judgment, coordinate system auto setting) are standard features.
- Captures CAD data (IGES, VDAFS, STEP, SAT, CATIA, Pro-Engineer, Unigraphics, IDEAS) to create the measuring procedure (simplified off-line teaching) on the CAD element.

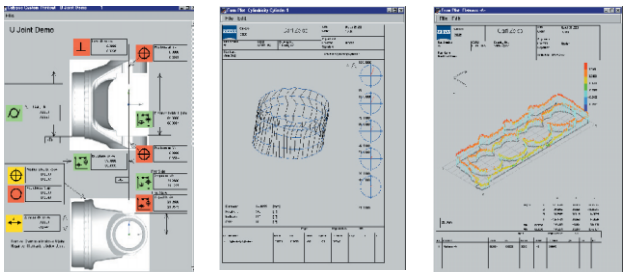
Capture of CAD Data



Captures 3D CAD model and allows manipulation in window.
(same procedure can be used with HOLOS free curved surface measuring program)

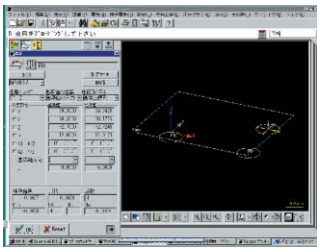


Variety of Printouts



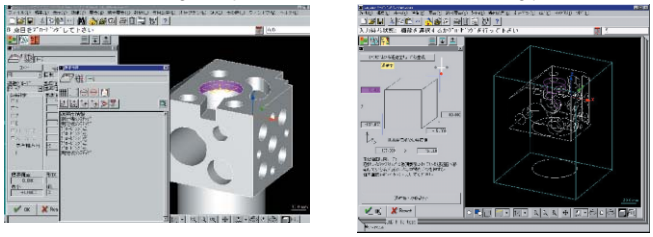
AI Function

The AI function automatically recognizes the geometric profile by means of direct probing measurement, eliminating the necessity of entering the judgment item.



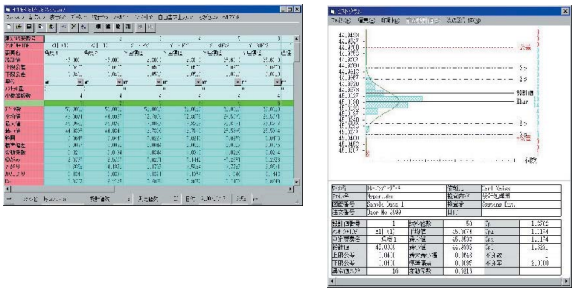
Automatic Generation of Measuring Path

The measuring path is automatically generated by determining the conditions for the safety refuge surfaces, supplementary refuge surfaces, measuring points and probing return distance. The by-pass points and probing points can be arbitrarily determined in the measuring elements and between elements, allowing the operator to create the ideal measuring path.



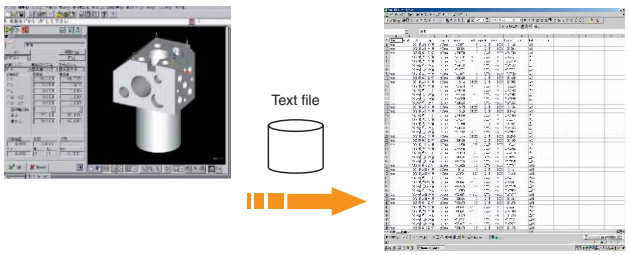
HyperStatis Statistical Processing Program

This program enables compiling of measured data into a database for editing and statistical processing.



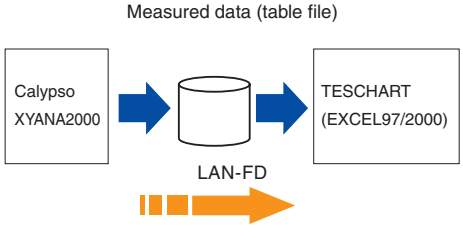
Tables and graphs generated with HyperStatis can be pasted into Excel and Word documents, and Excel and Word can be used to output statistical values in the desired format. There is a simplified Excel export function. Other features include real-time analysis and automatic output (printing) processing.

Text Data Output Option Program (Calypso)



Output to text file in tab format since measured results are imported into Excel.
Data is inserted in cells when tab-delineated text is imported into Excel.

TESCHART Test Chart Generation Program

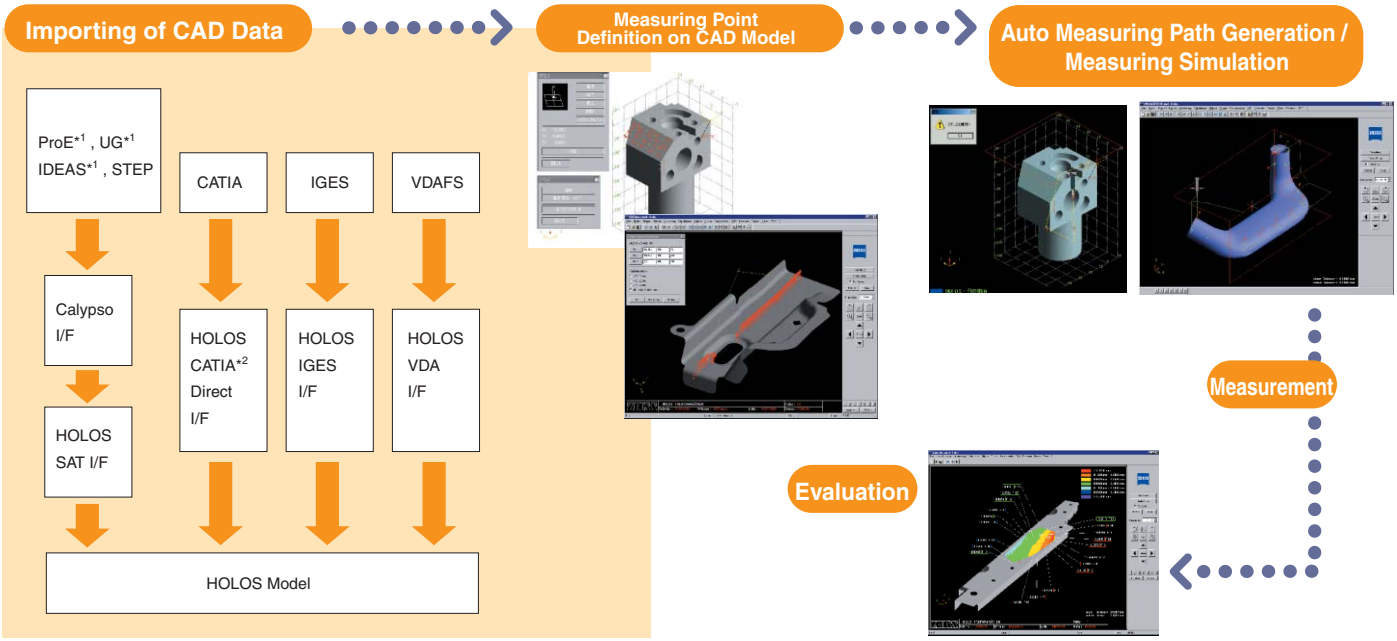


This is an add-in program that allows measured results to be captured in Excel and test charts to be generated.
It simplifies tolerance judgment/diagram insertion/graph generation.
File transfer can be performed using LAN/FD.
Can be used as Calypso and XYANA 2000 data.

Software

HOLOS : Free Curved Surface Measuring/Digitizing Program

HOLOS enables digitizing of unknown free curved surface, and it can be made comparison between design values with a CAD model and measured values of free curved surfaces.
The 3D best fit function is used to set the coordinate system.



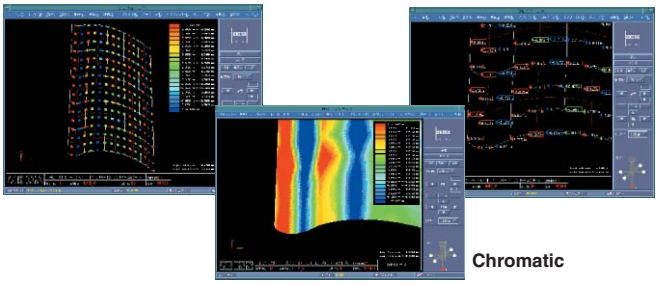
*1: CAD license required for Calypso I/F. *2: CATIA Direct I/F is optional.

Merit 1 of Using HOLOS

Extensive graphic functions simplify collation of measured data and CAD data. This enables intuitive evaluation of measured results.

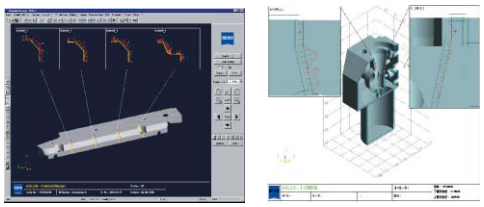
Color map

Tag

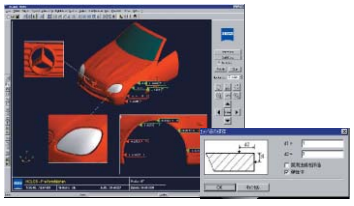


Chromatic

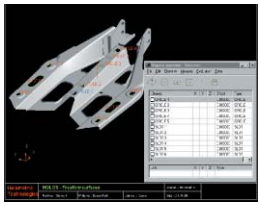
Section evaluation, partial view display



Edge measurement evaluation

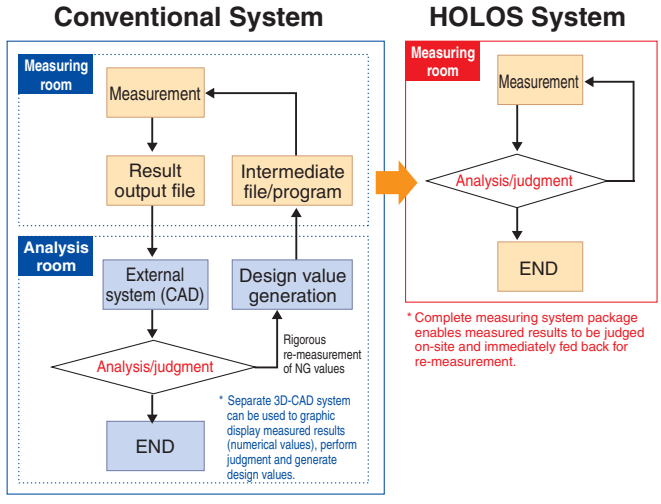


Standard geometric element evaluation



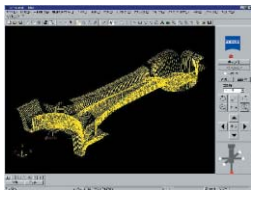
Merit 2 of Using HOLOS

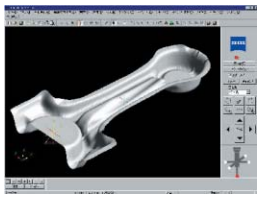
Measurement, result output, analysis/judgment and re-measurement feedback can be performed in real time.



Digitizing function

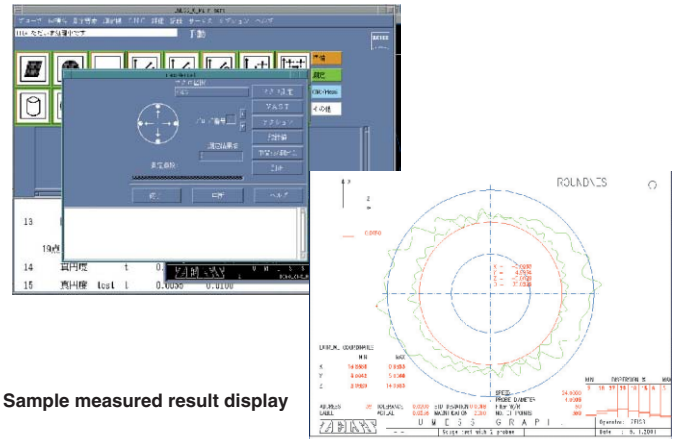
Required surfaces for CAD can be generated from group point data.





UMESS : Versatile Measuring

UMESS performs manual or automatic measurement of points, lines, surfaces, circles, ellipses, cylinders, cones, spheres and other basic geometric elements, and allows evaluation and output of dimensions and locations.

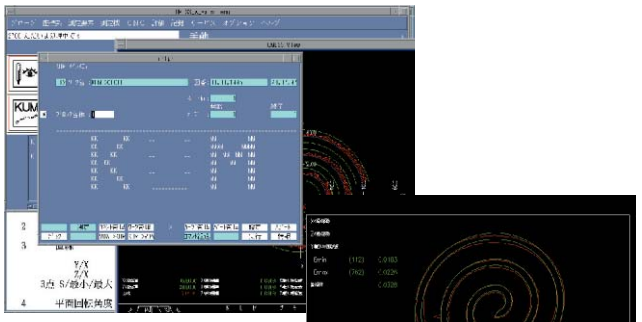


Sample measured result display

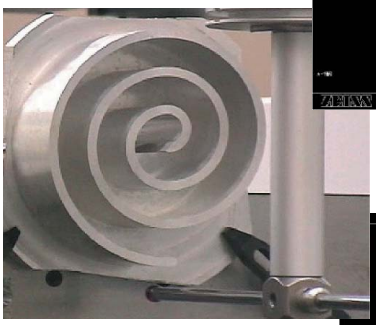
Enables evaluation of roundness, parallelness, positioning, squareness and concentricity. The desired process is chosen by selecting the appropriate icon, providing an operating environment that is easy to understand for all personnel, including beginners.

KUM : Profile Measuring Program

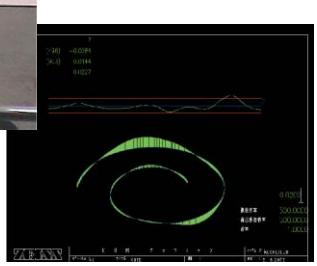
KUM facilitates measurement and design value collation of known and unknown profiles. The measured data is output as normal direction error with respect to the design values. When the error is offset due to deviation of the standard, two-dimensional best fit can be used to remove the error from the inappropriate measuring standard for evaluation.



Design value collation



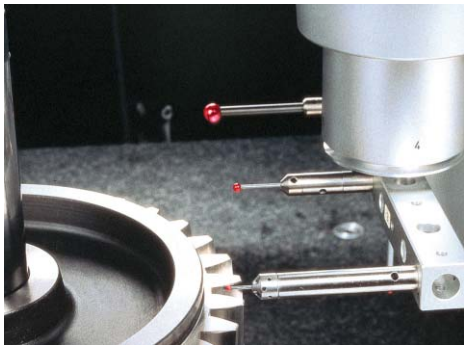
Scroll scanning measurement



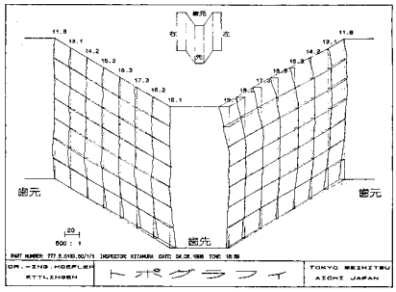
Scroll bottom surface flatness

GON : Involute Gear Measuring Program

This program is used to measure and evaluate involute flat gears and helical gears. Measurement can be automatically performed by simply entering the gear specification data. This program enables measurements without a rotary table.



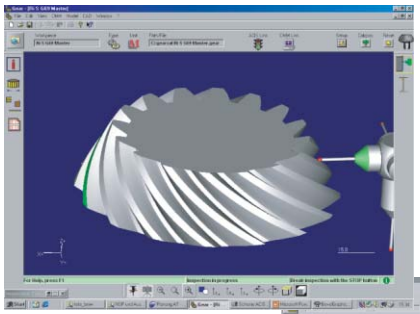
Gear measurement

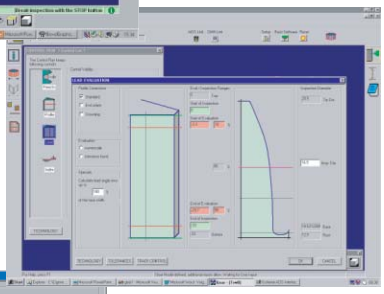


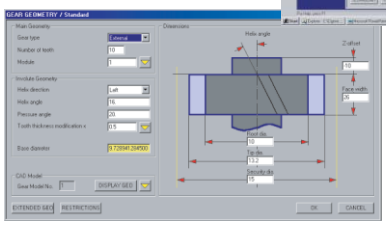
Topography analysis

Gear-PRO

- Uses graphical user interface.
- Visualization of specifications and other input simplifies operation.
- Adopts CAD model.
- Execution of measuring simulation (off line function).

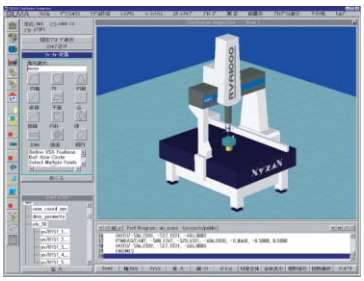






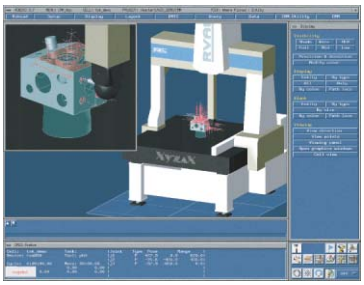
Software

Off Line Teaching Program



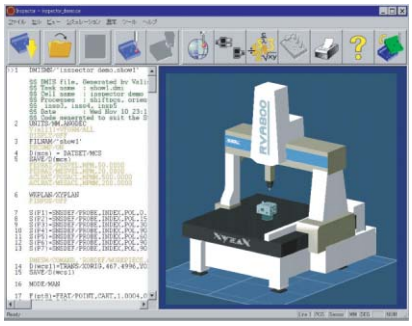
Off line teaching system
(Cimstation Inspection)

DMIS



DMIS post processor

3D-CAD + Off line teaching system
(eM-probeCAD)



DMIS post processor

DMIS
plus

CMM control (eM-Inspector)

Calypso ZVI program

DIMENSION Program

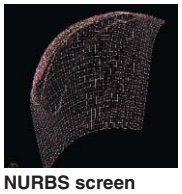
Regular point and surface data can be generated from irregular measured data that is obtained by probing an arbitrary surface. DIMENSION is particularly effective in digitizing unknown free curves to facilitate reverse engineering.

Variety of Editing Functions

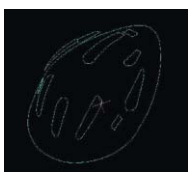
- **Trimmed surface**
- **Fillet generation**
- **Curved surface generation from COP**
- **Division/extension of free curved surface**
- **Sharing with HOLOS data**

Object

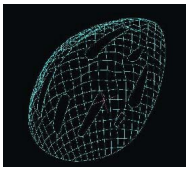
COP (point group)



NURBS screen



Trimming curve



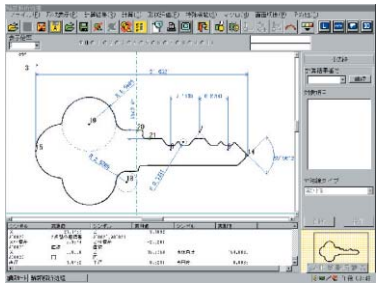
CAD model (face)

Rendering display

TIMS Conversion Program

The TIMS conversion program provides a profile analysis function that allows the evaluation of data measured with KUM or Calypso-Curve.

Sample measurement with PRISMO
Scanning measurement of 1.0 mm thick key with 0.6 mm diameter probe (Scanning of unknown profile)



Analysis results

Probes

Probes for 3D Coordinate Measuring Machines

High-Precision Active Scanning Probes

Specifications

Model	VAST XT	VAST	HSS
Measuring method	Scanning/point	Scanning/point	Scanning/point
Max. stylus weight (g)	400	600	600
Max. stylus length (mm)	300	600	600
Min. tip diameter (mm)	1.0	0.5	0.3
Applicable models	PRISMO Vario, CONTURA	PRISMO HTG/S-ACC, CenterMax	UPMC, MMZ

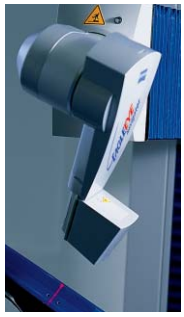
Point Measuring Probes

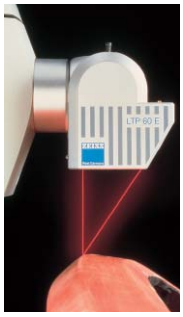
Specifications

Model	DT(Dyna Touch)	RDS/RST	PTS30	Renishaw
Measuring method	Point	Point	Point	Point
Max. stylus weight (g)	PRISMO Vario, CONTURA	PRISMO, Carmet, SMC	RVA-A	RVA-A, RVF-A

* DT (Dyna Touch) probe can be upgraded to VAST XT scanning probe.
* Max. stylus weight, max. length and min. tip diameter of the DT probe are the same as for the VAST XT probe.

Non-Contact Probes / Temperature Sensors





Specifications

Model	ViScan	DTS	EagleEye	LTP 60	Temperature Sensor
Applicable Models	PRISMO Vario	PRISMO Vario	SMC	SMC	PRISMO, CenterMax

XYZAX Probes

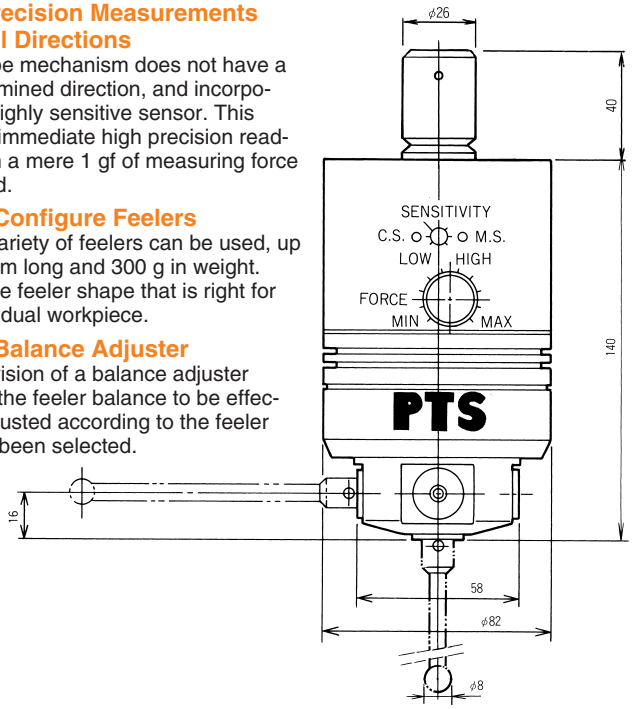
PTS-30 High Precision Touch Trigger Probe

Probe No.
CM92204

●High Precision Measurements from All Directions
The probe mechanism does not have a predetermined direction, and incorporates a highly sensitive sensor. This enables immediate high precision reading when a mere 1 gf of measuring force is applied.

●Freely Configure Feelers
A wide variety of feelers can be used, up to 200 mm long and 300 g in weight. Select the feeler shape that is right for the individual workpiece.

●Feeler Balance Adjuster
The provision of a balance adjuster enables the feeler balance to be effectively adjusted according to the feeler that has been selected.



PTS-30 Specifications

Measuring directions	±X, ±Y, ±Z
Repeatability	Standard deviation $\sigma = 0.5\,\mu$m or less
Measuring force	Approx. 0.01 N (1 gf)
Measuring speed	1 - 50 mm/s
Max. feeler length	200 mm
Max. feeler weight	300 gf

Configuration

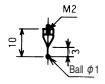
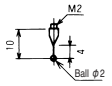
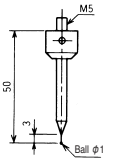
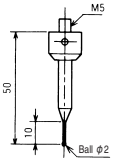
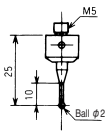
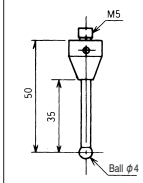
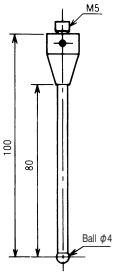
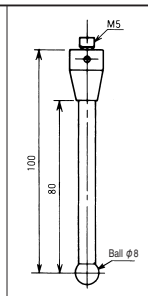
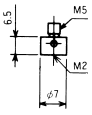
- Probe unit (PTS-30)
- Storage box
- Instruction manual
- Signal adapter cable

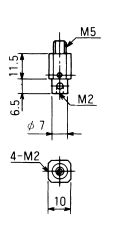
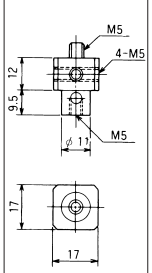
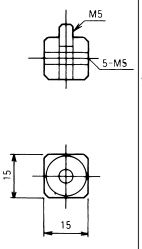
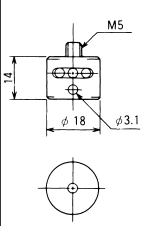
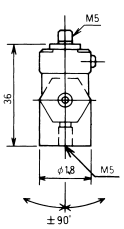
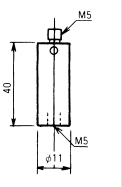
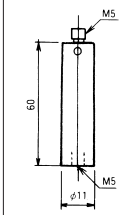
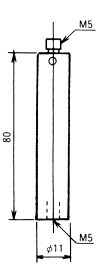
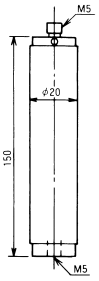
Operation Principle

The sensor outputs a detection signal when a measuring force of 1 gf (0.01 N) is applied after the feeler comes into contact with the workpiece. The unit begins to output a confirm signal almost the same time as this, enabling judgment that the sensor detection signal is valid.
Therefore, the signal is only read as a measured data coordinate value when both a detection signal and confirm signal are output.

C1, C2 and C3 Feeler Sets

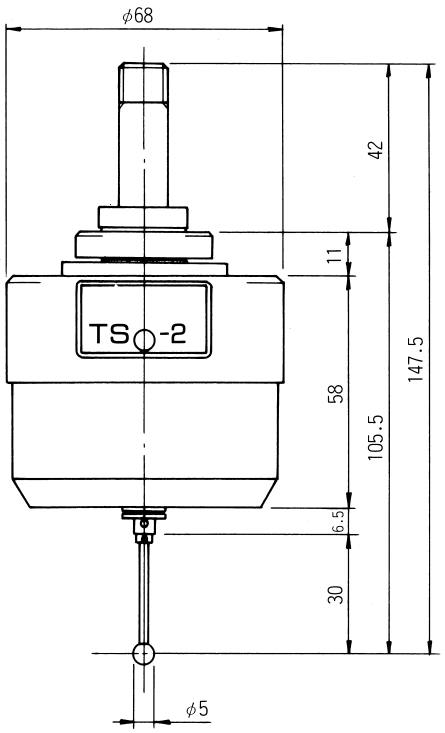
Feelers can be combined to create three types of sets (C1, C2 and C3) for the PTS-30. Specially ordered items can also be manufactured.

Name		Ball feeler		Ball feeler						M2-M5 joint
Shape										
Quantity	C1	1	4	1	4	2	2	2	2	1
	C2	1	4	1	4	2	2	0	2	1
	C3	0	0	1	1	1	1	0	1	0
Drawing No.		78011	78016	78131	78136	78126	78141	78146	78151	74001

Name		Swivel joint		Square joint	360° rotary joint	90° rotary joint	Extension			
Shape										
Quantity	C1	1	2	1	1	1	4	2	1	1
	C2	1	1	0	0	1	1	1	1	1
	C3	0	1	0	0	1	1	1	1	0
Drawing No.		78021	78056	74003	2689	78156	78061	78066	78071	78076

C1 and C2 are provided with two ϕ2, ϕ4 and ϕ8 ruby balls each and adhesive.
C1, C2 and C3 are provided a feeler change jig, hex wrench and storage platform.

TS-2 Low Measuring Force Electronic Probe



Probe No.
68466

TS-2 Specifications

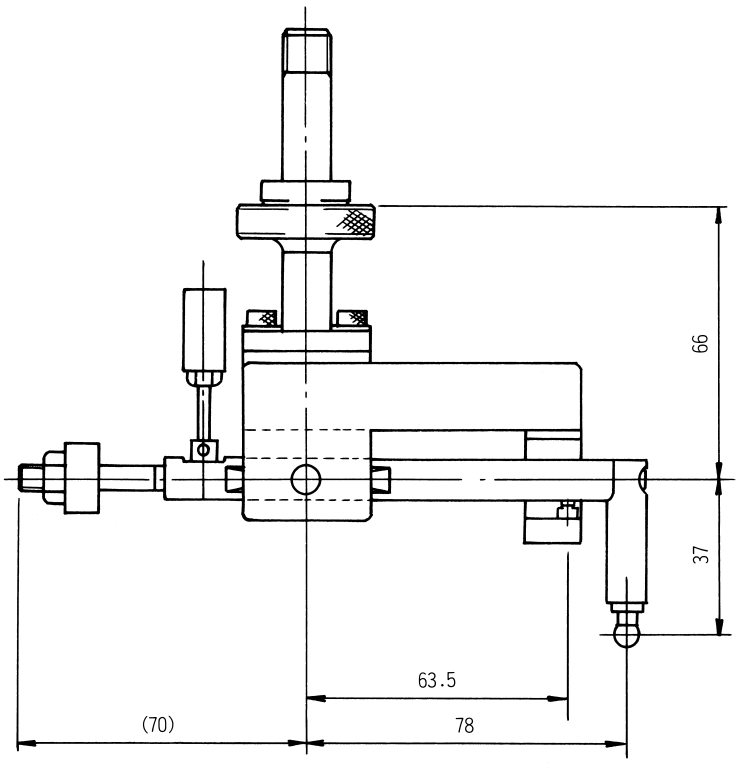
Measuring directions	±X, ±Y, +Z
Repeatability	Standard deviation $\sigma = 0.5\,\mu m$ or less
Measuring force	Approx. 0.03 N (3 gf)
Mounting orientation	Vertically, used pointing downward
Movement speed	Within 20 mm/s

Configuration

- Probe unit (TS-2)
- Ball feeler ϕ2 & ϕ5, each
- Feeler change tool
- Storage box
- Instruction manual

Please inquire for feelers other than the TS-2 standard feeler.

Special Low Measuring Force Electronic Probe



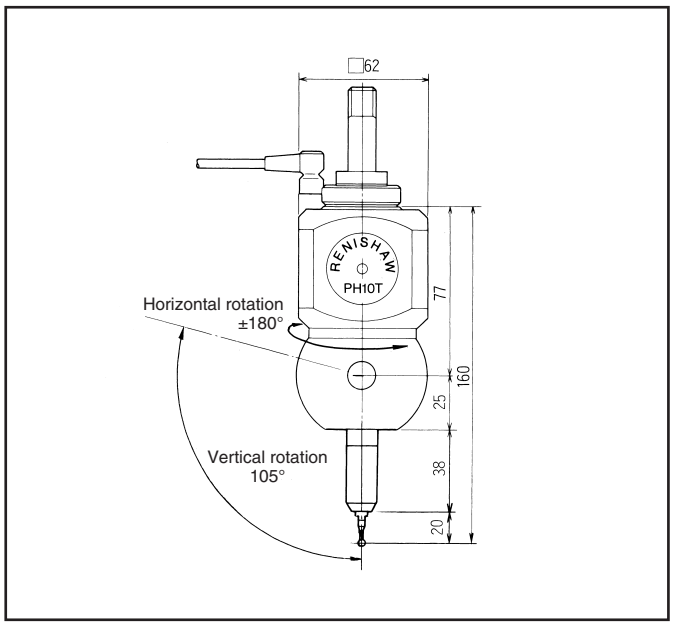
Special Low Measuring Force Electronic Probe Specifications

Repeatability	Standard deviation $\sigma = 0.001\,\mu m$ or less
Measuring force	0.01 - 0.04 N (1 - 4 gf)

This probe is produced after consultation with the customer.

XyzAX Probes

PH10T + TP2 Electronic Probe



PH10T Specifications

Horizontal rotation angle	±180° (7.5° steps, 48 positions)
Vertical rotation angle	0 - +105° (7.5° steps, 15 positions)

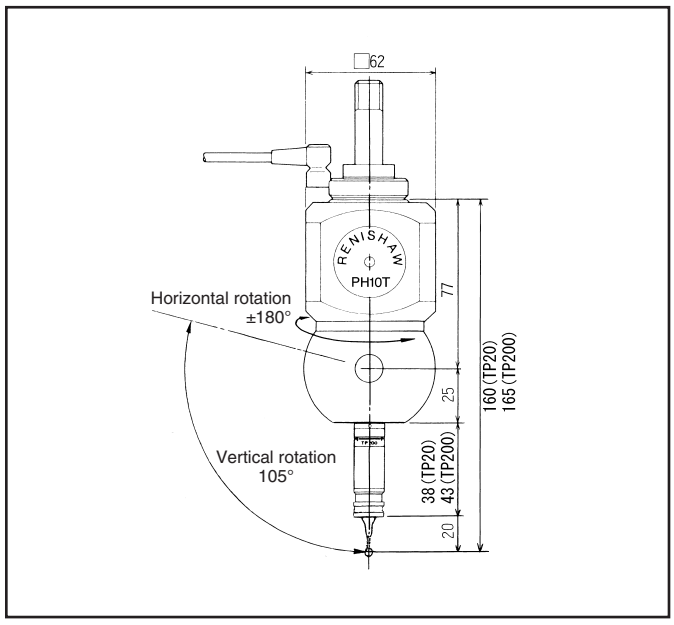
TP2 Specifications

Measuring directions	±X, ±Y, +Z
Repeatability	Standard deviation 2σ = 0.35μm or less
Measuring force	Approx. 0.07 - 0.15 N (7 - 15 gf, vertical direction with respect to probe axis) Approx. 0.4 N (Approx. 40 gf, probe axial direction)

Configuration

- Probe unit (PH10T)
- Probe head controller (PHC10-2)
- Probe head driver (HCU1)
- Electronic probe (TP2)
- ϕ4 ball feeler
- Storage box
- Instruction manual

PH10T + TP20/TP200 Electronic Probes



PH10T Specifications

Horizontal rotation angle	±180° (7.5° steps, 48 positions)
Vertical rotation angle	0 - +105° (7.5° steps, 15 positions)

TP20 Specifications

Measuring directions	±X, ±Y, +Z
Repeatability	Standard deviation 2σ = 0.35μm or less (for 10mm long feeler)
Measuring force (with SF module)	Approx. 0.08 N (8 gf, vertical direction with respect to probe axis) Approx. 0.7 N (Approx. 70 gf, probe axial direction)

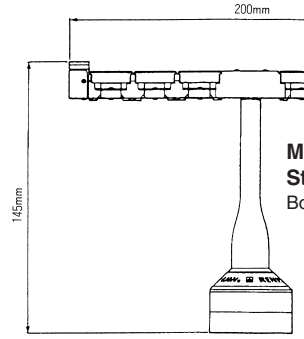
TP200 Specifications

Measuring directions	±X, ±Y, +Z
Repeatability	0.40 (50mm stylus)
Measuring force (with SF module)	Approx. 0.02 N (2 gf, vertical direction with respect to probe axis) Approx. 0.15 N (15 - 35 gf, probe axial direction)

Configuration

- Probe unit (PH10T)
- Probe head controller (PHC10-2)
- Probe head driver (HCU1)
- Electronic probe (TP20)→SF module: 2
(TP200)→SF module: 1
- ϕ4 ball feeler
- Storage box
- Instruction manual

PH10T + TP20 + MCR20 System
PH10T + TP200 + SCR200 System



* The diagram shows the SCR200 changer rack.

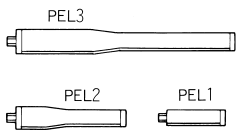
Module changer rack (MCR20)
Stylus changer rack (SCR200)
Both racks can store up to 6 probe modules.

Configuration

・MCR20
Module changer rack: MCR20
SF modules: 2
Installation kit
Alignment measuring stylus

・SCR200
Stylus changer rack: SCR200
Connection cable (10m)
SF modules: 3
Installation kit
Alignment measuring stylus

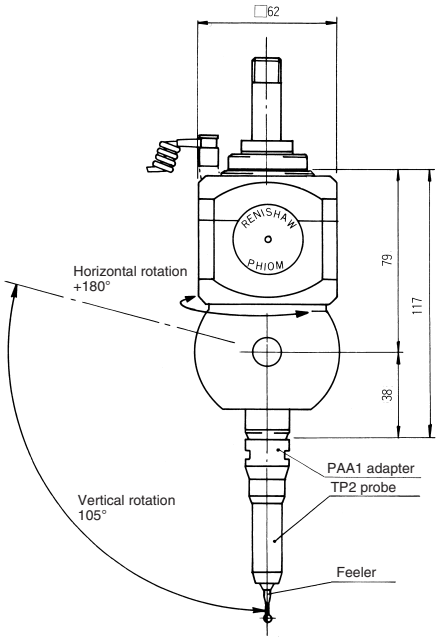
PH10T Lightweight Extension Bar



PEL3 : L=200
PEL2 : L=100
PEL1 : L=50

Sets are provided with a storage box and a wrench set.

PH10M + TP2 Electronic Probe



Probe No.
CM99907-D002

PH10M Specifications

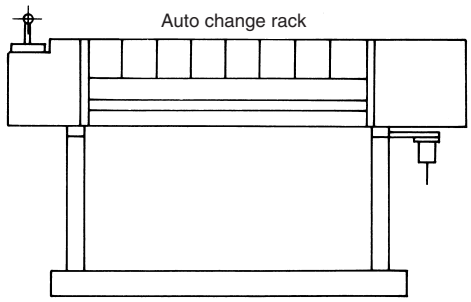
Horizontal rotation angle ±180° (7.5° steps, 48 positions)
Vertical rotation angle –0 - +105° (7.5° steps, 15 positions)

TP2 Specifications

Measuring directions	±X, ±Y, +Z
Repeatability	Standard deviation 2σ = 0.35μm or less
Measuring force	Approx. 0.07 - 0.15 N (7 - 15 gf, vertical direction with respect to probe axis) Approx. 0.4 N (Approx. 40 gf, probe axial direction)

Please inquire for the configuration and details.

PH10M + AC System



PH10M Auto Change Rack

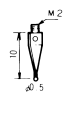
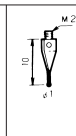
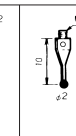
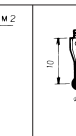
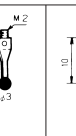
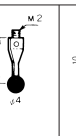
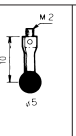
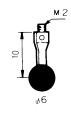
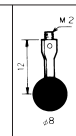
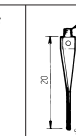
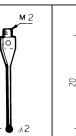
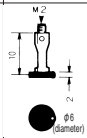
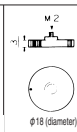
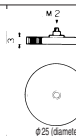
For a maximum of 8 probes and extensions (can be stored while fit together).

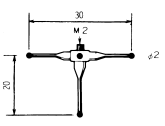
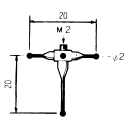
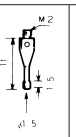
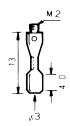
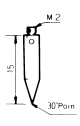
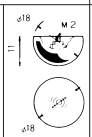
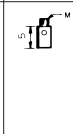
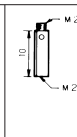
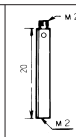
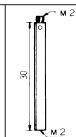
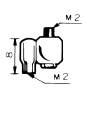
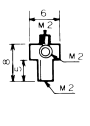
Probe No.
CM99907-D003

Please inquire for the configuration and details.

Feelers for TP2/TP20/TP200 Electronic Probes

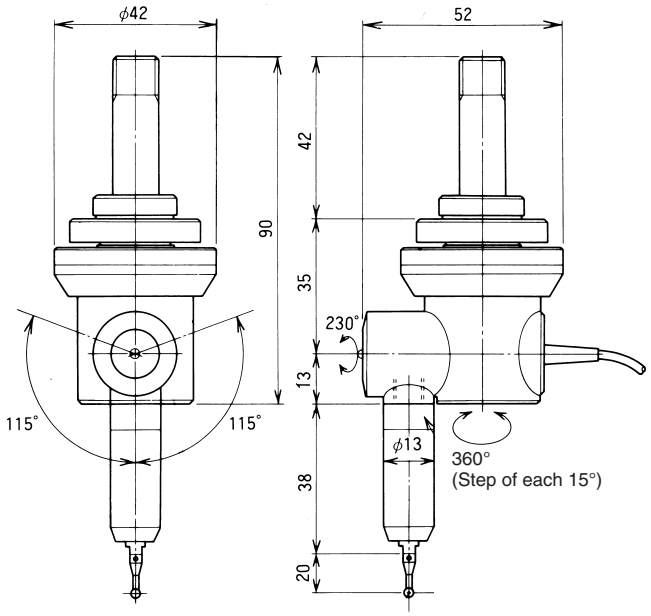
A feeler set and extension set are available (see next page).
Special items can also be manufactured.

Class	Ball feeler								Disk feeler		
Shape															
Name	PS10R	PS9R	PS8R	PS1R	PS12R	PS13R	PS14R	PS15R	PS23R	PS2R	PS16R	PS17R	PS3R	PS4R	PS22R
Drawing No.	64031	64032	64033	64034	64035	64036	64037	64038	64039	64040	64041	64042	64043	64044	64045

Class	Start feeler		Other feeler				Extension bar				Swing joint	5-direction joint
Shape												
Name	PS7R	PS6R	PS18R	PS19R	PS20R	PS21R	SE7	SE4	SE5	SE6	SK2	SC2
Drawing No.	64046	64047	64048	64049	64050	64051	64052	64053	64054	64055	64056	64057

XYZAX Probes

PH1 + TP2 Electronic Probe



Probe No.
CM92203

PH1 Specifications

Horizontal rotation angle 360° (15° steps)
Vertical rotation angle ±115°

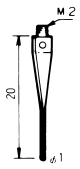
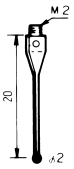
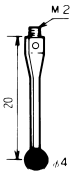
TP2 Specifications

Measuring directions	±X, ±Y, +Z
Repeatability	Standard deviation 2σ = 0.35 μm or less
Measuring force	Approx. 0.07 - 0.15 N (7 - 15 gf, vertical direction with respect to probe axis) Approx. 0.4 N (Approx. 40 gf, probe axial direction)

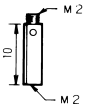
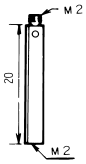
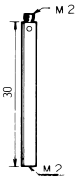
Configuration

- Probe head (PH1)
- Electronic probe (TP2)
- φ4 ball feeler
- Storage box
- Instruction manual

Feeler Set for TP2/TP20/TP200 Electronic Probes

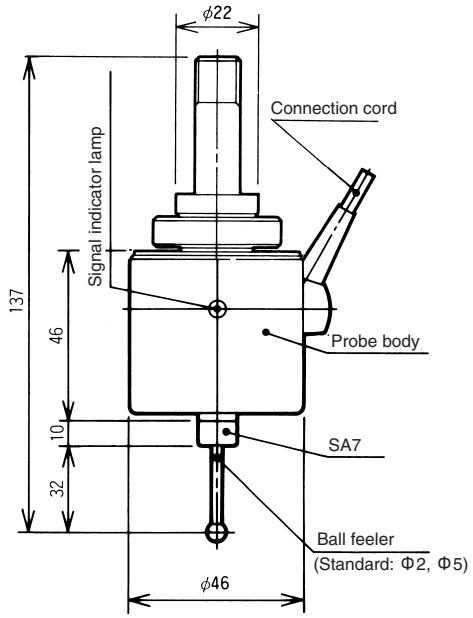
Shape			
Name	PS23R	PS2R	PS17R
Drawing No.	64039	64040	64042

Extension Bar Set for TP2/TP20/TP200 Electronic Probes

Shape				
Name	SE7	SE4	SE5	SE6
Drawing No.	64052	64053	64054	64055

A storage stand is also available.
A feeler set and extension set that include a storage standard are also available.
Refer to the previous page for other feelers.

TP1(S) Electronic Probe



Probe No.
68274

TP1(S) Specifications

Measuring directions	±X, ±Y, +Z
Repeatability	Standard deviation 2σ = 0.5μm or less
Measuring force	Approx. 0.1 - 0.5 N (10 - 50 gf, vertical direction with respect to probe axis) Approx. 0.4 - 2.5 N (Approx. 40 - 250 gf, probe axial direction)

Configuration

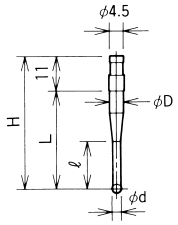
・Electronic probe	TP1(S)
・φ2, φ5 ball feeler	1 each
・Stylus adapter	(SA7)
・Storage box	

Feelers for TP1(S) Electronic Probe

Ball Feelers

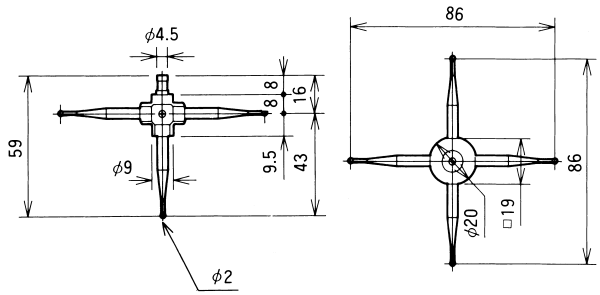
φd	φD	ℓ	L	H	Feeler No.
φ0.7	φ4.5	3	31	42	60001
φ1	φ4.5	3	31	42	60002
φ1	φ5	5	64	75	60003
φ2	φ4.5	7	—	41	60004
φ2	φ5	8	64	75	60005
φ3	φ4.5	15	31	42	60006
φ3	φ5	20	64	75	60007
φ4	φ4.5	—	29	40	60008
φ4	φ5	50	64	75	60009
φ5	φ4	64	—	75	60011
φ5	φ4.5	—	29	40	60010

Unit: mm



Star-Shaped Feeler

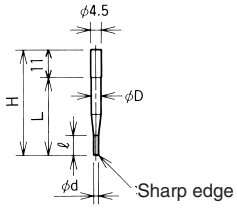
Feeler No.
68070



Cylindrical Feelers

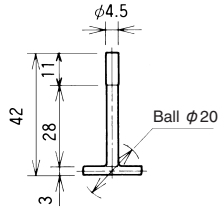
φd	φD	ℓ	L	H	Feeler No.
φ2	φ4	8	31	42	3308
φ4	—	31	—	42	3360
φ1	φ4	4	31	42	3307

Unit: mm



φ20 Disk Feeler

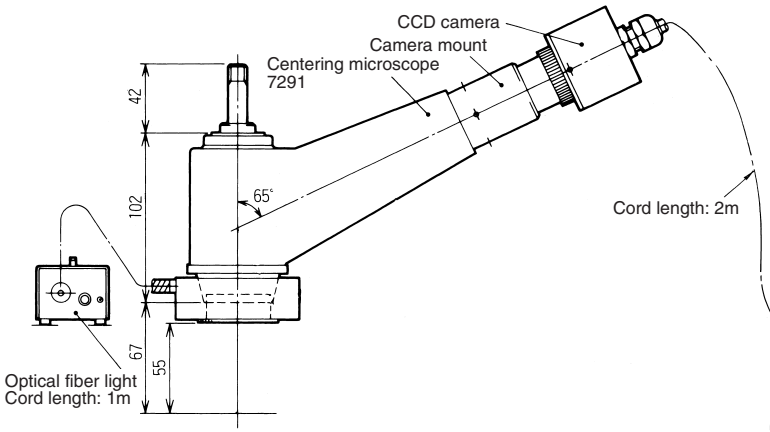
Feeler No.
3361

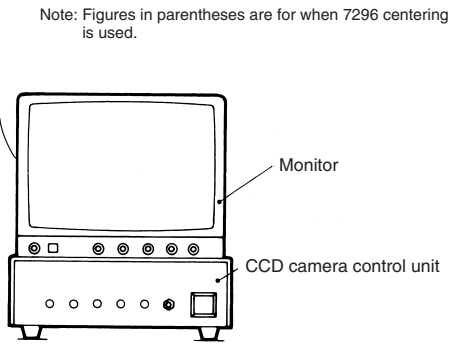


XYZAX Probes

ITV Camera System

Probe No.	
40481	Black & white system
40568	Color system



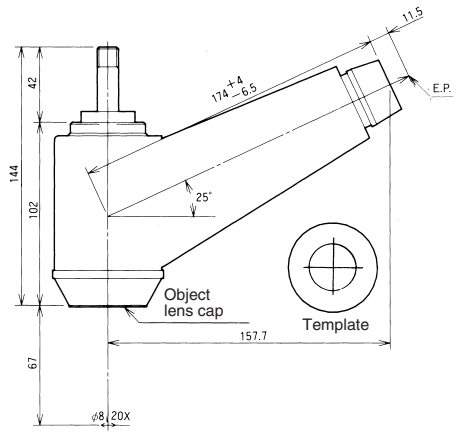


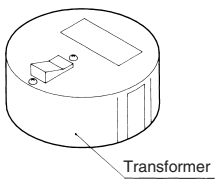
	Black & white ITV camera system	Color ITV camera system
Overall magnification	Approx. 50 × (Approx. 100 ×)	
Operation distance	55 mm (29 mm)	
Field of view image	Solid image	
Camera	High resolution CCD black & white camera	High resolution CCD color camera
Electron lines	2 vertical, 2 black & white	
Monitor	9" black & white monitor	9" color monitor
Light	50W optical fiber light (variable)	100W optical fiber light (variable)
Power consumption	78W	160W

Note: Figures in parentheses are for when 7296 centering microscope is used.

Centering Microscope

Probe No.
7291
7296



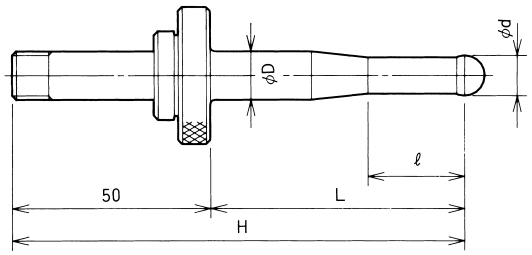


Specifications

Probe No.	7291	7296
Overall magnification	20×	40×
Object lens	2×	4×
Eyepiece lens	10×	10×
Actual field of view	φ8 mm	φ4 mm
Operation distance	67 mm	41 mm
Field of view image	Solid image	Solid image
Difference in cross centers for standard A	0.01mm or less	
Standard accessories	Storage box Transformer Edge positioning gauge	
Unit weight	Approx. 850 g	

Note: In addition to a standard template, a special broken line type, 45° division line type and other special types are available.

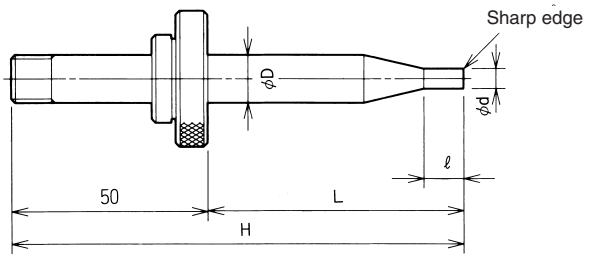
Ball Probes



φd	φD	ℓ	L	H	Probe No.
φ 1	φ12	2	65	115	4174
φ 2	φ12	2	65	115	2114
φ 3	φ12	3	65	115	4008
φ 5	φ12	6	65	115	4290
φ10	φ12	25	65	115	4050
φ10	φ9.5	—	72	122	0845

Unit: mm

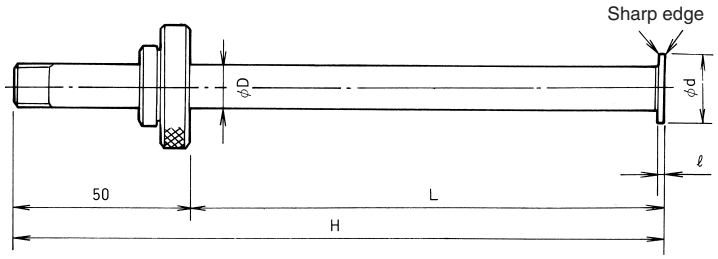
Cylindrical Probes



φd	φD	ℓ	L	H	Probe No.
φ 1	φ12	3	65	115	3338
φ 2	φ12	5	65	115	3345
φ 3	φ12	6	65	115	3354
φ 5	φ12	10	65	115	3104
φ10	φ12	40	65	115	3355

Unit: mm

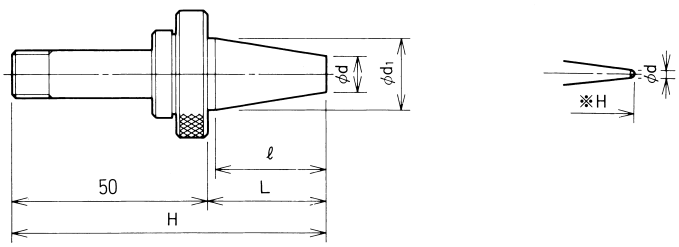
Disk Probes



φd	φD	ℓ	L	H	Probe No.
φ10	φ 7	1.5	40	90	3356
φ20	φ14	1.5	100	150	3357
φ30	φ18	1.5	130	180	3358
φ40	φ28	1.5	160	210	3359

Unit: mm

Taper Probes



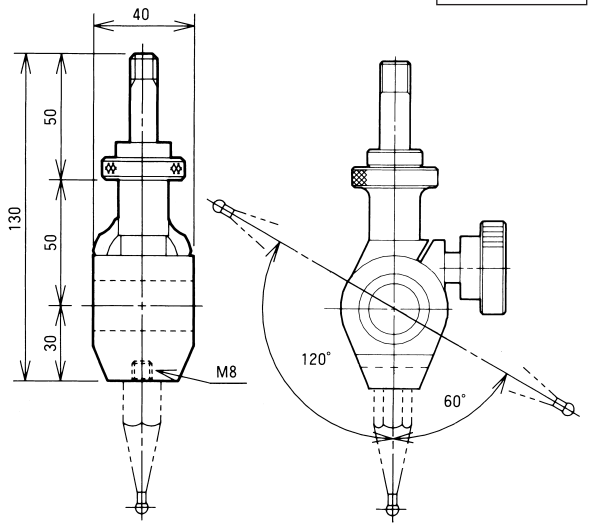
φd - φd1	ℓ	L	H	Probe No.
φ 2 - φ14	42	44	※94	0451
φ10 - φ20	30	32	82	0452
φ18 - φ28	30	32	82	0453
φ26 - φ36	30	32	82	0454
φ34 - φ44	30	32	82	0455
φ42 - φ52	30	32	82	0456
φ50 - φ60	30	32	82	0457
φ58 - φ68	30	32	82	0458
φ66 - φ76	30	32	82	0459

Unit: mm

XYZAX Probes

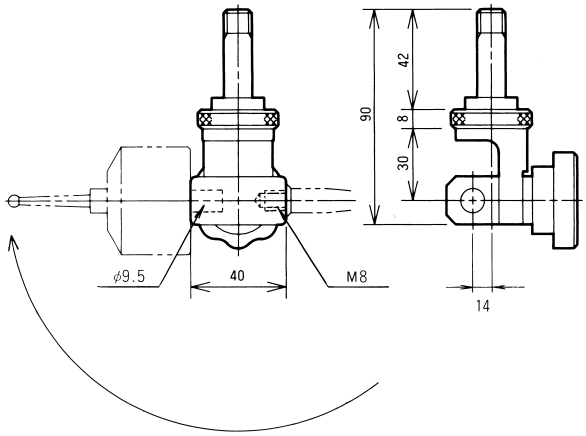
Swing Probe

Probe No.
7071



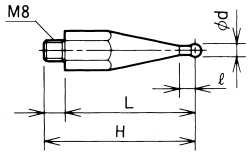
Swing Probe B

Probe No.
10086



Swing Probe Feelers

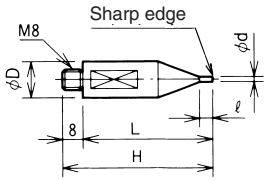
Ball feelers



ϕd	ℓ	L	H	Feeler No.
ϕ 1	2	50	58	4301
ϕ 2	2	50	58	4302
ϕ 3	3	50	58	4303
ϕ 5	6	50	58	4305
ϕ10	40	50	58	4310
ϕ 3	10	100	108	4253
ϕ 5	20	110	118	4280
ϕ10	100	120	128	4198

Unit: mm

Cylindrical feelers

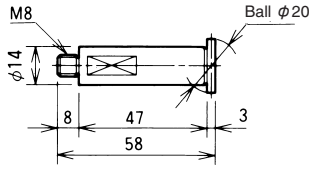


ϕd	ϕD	ℓ	L	H	Feeler No.
ϕ1	ϕ14	3	50	58	3371
ϕ2	ϕ14	5	50	58	3372

Unit: mm

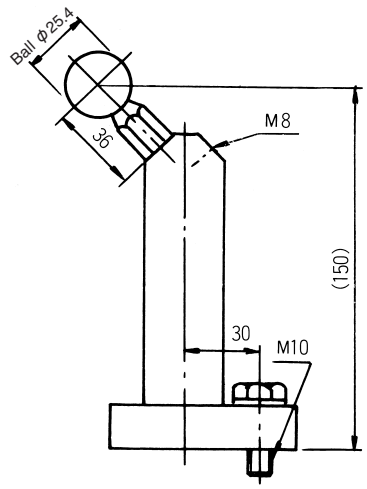
Disk Feeler

Feeler No.
3349



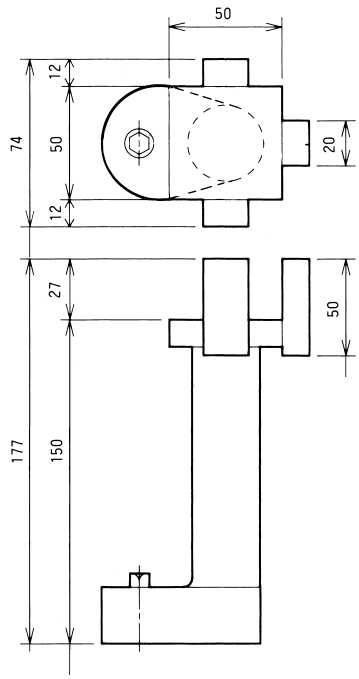
Ball Zero Point Block

No.
CM99901-D005



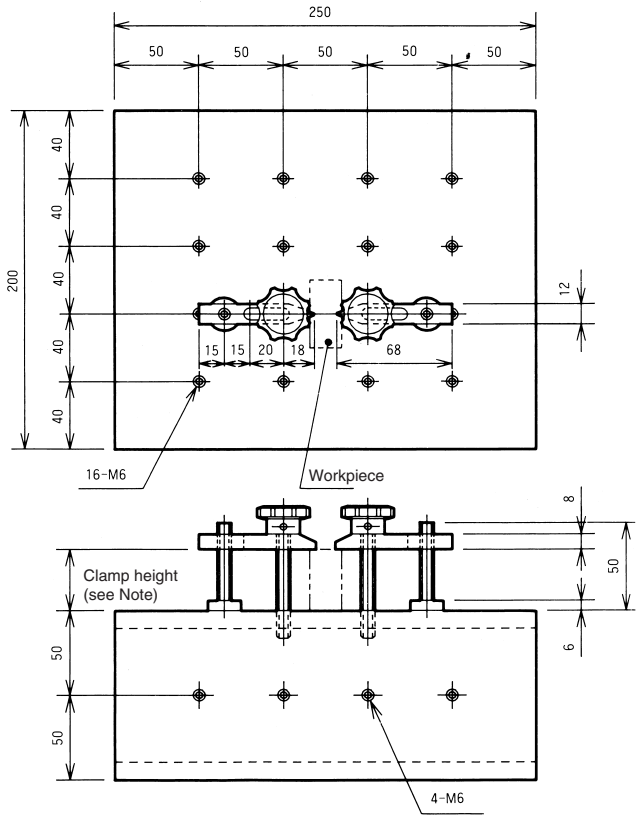
Square Zero Point Block

No.
10311



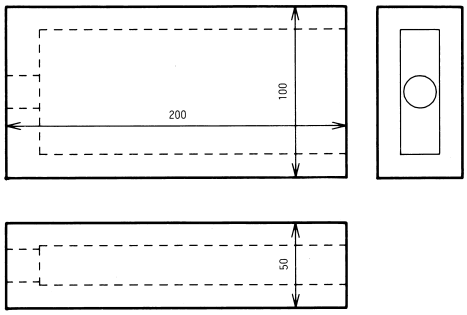
Riser Blocks

No.
7021



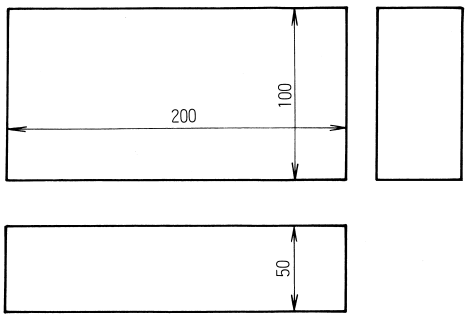
Note: Allowable workpiece clamp height: 8 - 40 mm
Convenient for securing small workpieces
Material: SS41

No.
3182



Note: Two pieces comprise one set. This spacer is placed beneath thin workpieces.
Material: FC20

No.
10372



Note: Two pieces comprise one set. This spacer is placed beneath thin workpieces.
Material: Granite