CONTURA® G2 RDS
CONTURA® G2 aktiv

Specifications and Performance Features

CONTURA G2

The next generation scanning platform.

- Affordable high accuracy
- Choose machine based on application needs
- Articulating or Active Scanning Sensor
- U-STONE option
- Multi-Sensor-Rack option

Version: 2007-08

ZEISS

We make it visible.

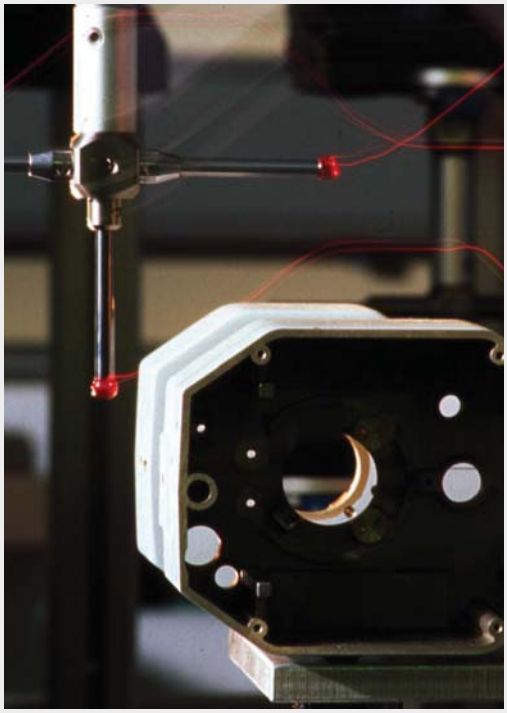
Introducing the next generation scanning platform.

CONTURA G2 RDS and CONTURA G2 aktiv: The CMM that brought Active Scanning to small and mid-size manufacturers has been redesigned from the ground up to offer greater flexibility and better accuracy.
We have been developing and manufacturing the core components of our measuring machines in our own company for more than 30 years.

Key benefits

Scanning Technology

High-speed scanning is the accepted standard for leading-edge performance in precision measurement. Scanning not only saves precious time by capturing large data quantities in a shorter time and increases measuring reliability to improve your part production, but it also permits you to pinpoint production problems. In solving these problems, product quality and reliability will improve.



We Introduced Scanning

Carl Zeiss introduced scanning in the mid-1970s, then created high-speed scanning in 1989. In 1994, "reference-class" measurement performance was transferred to the PRISMO VAST (Variable Accuracy and Speed probing Technology), a shop floor CMM that became the worldwide standard for high-speed scanning. In 2000, this patented technology went mainstream with the introduction of the CONTURA.

Redesigned from the ground up, **CONTURA G2 RDS** and **CONTURA G2 aktiv** allow you to choose the VAST technology that best suits your applications:

CONTURA G2 RDS

- Designed for measuring complex features and parts with multiple angles that require very small styli.
- Best-in-class ZEISS RDS articulating probe holder that can reach 20,376 positions in 2.5° increments.
- Articulating scanning with the VAST XXT.

CONTURA G2 aktiv

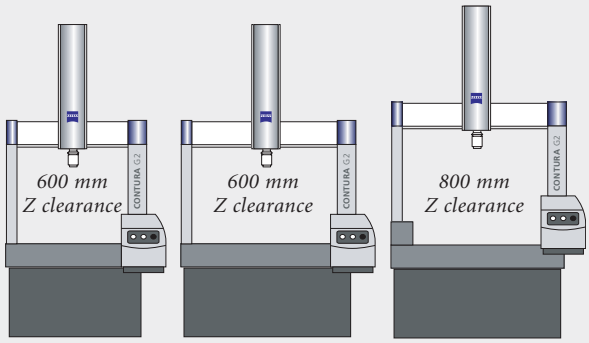
- Designed for measuring deep features or projected tolerance zones over long distances, self-centering probings, and high throughput needs.
- ZEISS Active Scanning with VAST XT for multi-point measurement of size, form, and position.

Measuring ranges and accuracy

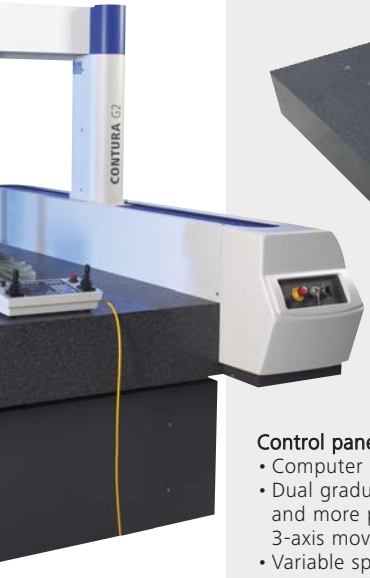
A variety of measuring volumes
- Five available sizes, increasing for larger tasks: X-bridge width at 700 mm or 1000 mm, Y length from 700 mm to 2100 mm.

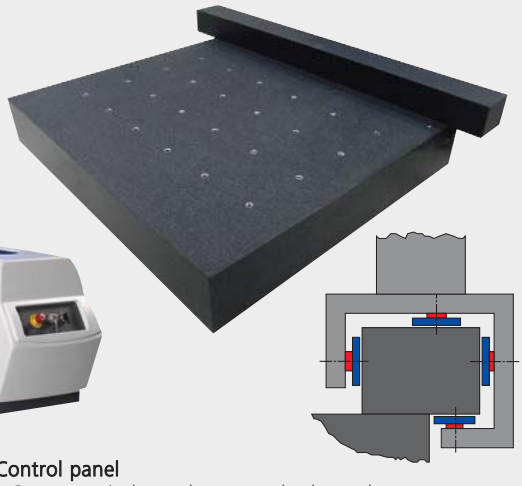
U-STONE Z-height raised bridge option
- Increases the effective measuring range.
- Z-axis clearance extended an additional 200 mm.

Optimal precision
- Extremely low dimension errors at ambient temp: 18-22°C. HTG option increases it to 18-26°C.
- HTG option includes CMM and workpiece temperature sensors.



Machine technology





Robust design
- Granite table provides a durable and secure surface for your parts.
- Ceramic guideway technology in X and Z offers rigidity and stability against temperature changes, moisture, and other contaminants.
- The measuring scales are less susceptible to dirt and contamination.
- All 3 axes have support with 4-sided air bearings
- Switches for operation type, Emergency Stop, and Start, Run, and Reset.

CAA (Computer Aided Accuracy)
- Computer-aided error correction of the kinematics for very accurate results.

Control panel
- Computer independent, standard panel.
- Dual graduated control joysticks for easy and more precise remote control of 3-axis movement.
- Variable speed control in CNC modes.

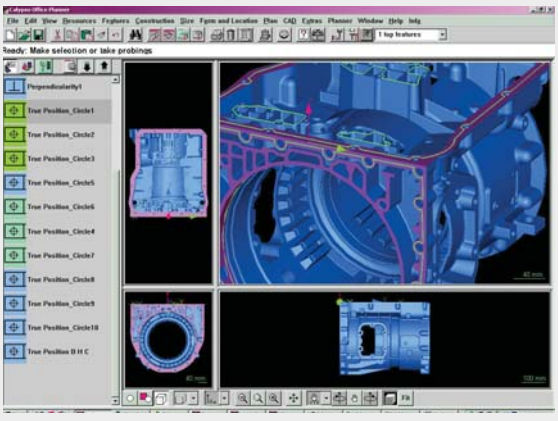
C99 controller
- Optimized to machine and sensor.
- ZEISS Active Scanning or touch-trigger and passive scanning.

Software

CALYPSO CAD-Based Software
- Visual Metrology concept for creating and maintaining measuring plans.
- Intelligent: rules-based programming sets the detailed parameters, automatic paths, and collision avoidance.
- Powerful: supports a wide range of sensors, high-level tools, formulas, and parameters.
- Better performance with scanning technology.

HOLOS for measuring free-form surfaces

Teleservice (Optional)
- Onboard diagnostics
- Remote support
- Software updates
- User assistance

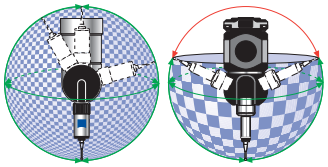


Sensors and Accuracy

CONTURA G2 RDS

	7/7/6 to 7/10/6	10/12/6 to 10/21/6

Articulating Rotary Dynamic Sensor holder for optical, touch, and scanning sensors. Lateral swivel axis offers several advantages over articulated joints with a stacked tilt/swivel axis: tilt/swivel range of ±180°, large measuring range, 2.5° increments of rotation, CAA correction for automatic calibration of all 20,736 possible angular positions. Conventional indexing has a 130° inaccessible zone.



VAST XXT [7]

Passive scanning and single-point sensor. Measuring rate is up to 1.7 seconds per point.Stylus length with module TL1:30-125 mm, with module TL2: 125-250 mm; maximum extension is 100 mm; maximum mass is 10 g; minimum tip diameter is 0.3 mm.

Length (size) measuring error [1]			
MPE acc. EN ISO 10360-2	for E in µm (in./1000)	1.8 + L/300 (0.071 + L/300)	1.9 + L/300 (0.075 + L/300)
Probing error			
MPE acc. EN ISO 10360-2	for P in µm (in./1000)	1.8 (0.071)	1.9 (0.075)
Scanning probing error			
MPE acc. EN ISO 10360-4	for THP in µm (in./1000)	3.5 (0.138)	3.8 (0.150)
Required measuring time MPT	τ (s)	68	68
Form measuring error [2]			
MPE for roundness acc. EN ISO 12181 (VDI/VDE 2617 Part 2.2)	RONt (MZCI) in µm (in./1000)	1.8 (0.071)	1.9 (0.075)

RST-P [3][6]

Single-point, touch-trigger sensor. Measuring rate is up to 1.7 seconds per point.
Stylus: maximum length is 90 mm; maximum extension is 300 mm; maximum mass is 10 g; minimum tip diameter is 0.5 mm.

Length (size) measuring error			
MPE acc. EN ISO 10360-2	for E in µm (in./1000)	2.2 + L/300 (0.087 + L/300)	2.8 + L/300 (0.110 + L/300)
Probing error			
MPE acc. EN ISO 10360-2	for P in µm (in./1000)	2.0 (0.079)	2.6 (0.102)

ViScan [4]

Optical 2D image sensor with autofocus.

Probing error			
2D probing uncertainty acc. VDI/VDE 2617 Part 6	R2 in µm (in./1000)	10 (0.394)	10 (0.394)
1D probing uncertainty of autofocus acc. VDI/VDE 2617 Part 6	R1 in µm (in./1000)	50 (1.969)	50 (1.969)

CONTURA G2 aktiv

	7/7/6 to 7/10/6	10/12/6 to 10/21/6

DT or VAST XT [5]

DT active single-point sensor: adjustable measuring force; dynamic for more probing security; upgradeable to VAST XT and uses the same styli configurations and probe change rack.

VAST XT active scanning and active single-point sensor: Variable Accuracy and Speed probing Technology; measure dimension, position, and form; for function-oriented inspection required with ring or plug gage; adapts to measuring task. Measuring force during data aquisition is variable, 50 to 1000 mN. Stylus: maximum length is 500 mm; maximum mass is 500 mm including adapter plate; minimum tip diameter is 0.5 mm.

Length (size) measuring error [1]			
MPE acc. EN ISO 10360-2	for E in µm (in./1000)	1.8 + L/300 (0.071 + L/300)	1.9 + L/300 (0.075 + L/300)
Probing error			
MPE acc. EN ISO 10360-2	for P in µm (in./1000)	1.8 (0.071)	1.9 (0.075)
Scanning probing error for VAST XT			
MPE acc. EN ISO 10360-4	for THP in µm (in./1000)	2.5 (0.098)	3.0 (0.118)
required measuring time MPT	τ (s)	68	68
Form measuring error for VAST XT [2]			
MPE for roundness acc. EN ISO 12181 (VDI/VDE 2617 Part 2.2)	RONt (MZCI) in µm (in./1000)	1.8 (0.071)	1.9 (0.075)

1) Measured length L in mm (in.).
2) Roundness in scanning mode with v_{scan} = 5 mm/sec (0.2 in./sec), filter 50 UPR, gage calibration.
3) RST: acceptance with stylus length 40 mm (1.6 in.) and tip diameter 3 mm (0.12 in.). Probe can be operated at an acoustic pressure of max. 75 dB (A) for single frequencies and max. 80 dB (A) for combination frequencies in the range 50-2000 Hz.
4) Use of optical probes is only recommended in conjunction with a contacting sensor (RST-P), temperature range 18 - 26°C (64.4 - 78.8 °F).
5) DT and VAST XT: acceptance with stylus length 60 mm (2.4 in.) and tip diameter 8 mm (0.3 in.).

Note: Listed characteristics may not apply based on application. Contact a Carl Zeiss representative for specifications on other available probes.

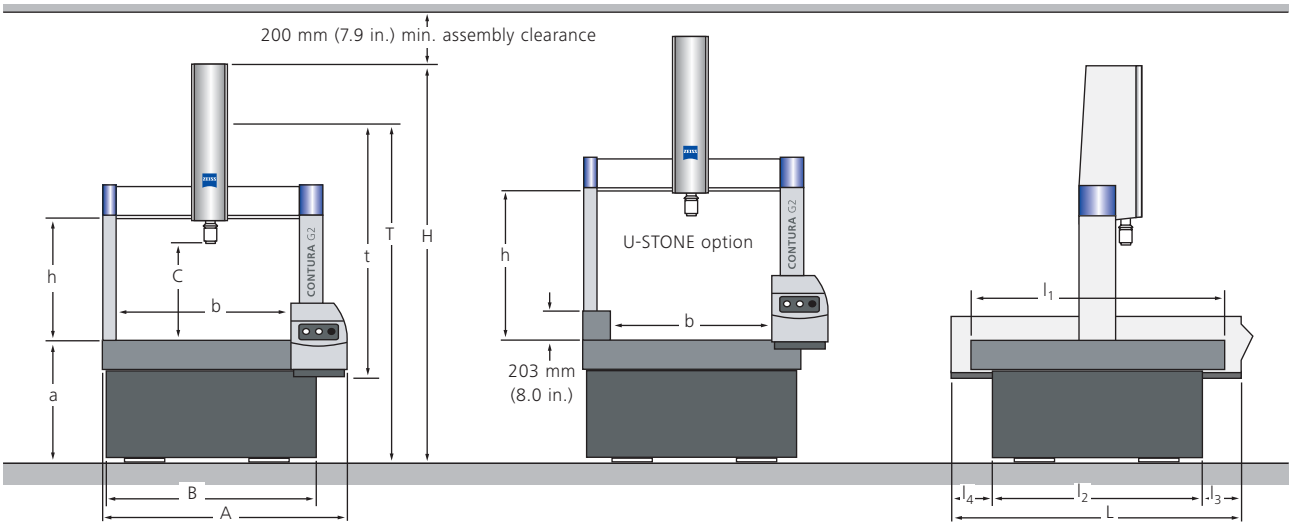
6) TP 20/200 on request
7) VAST XXT: acceptance with module TL1, stylus length 30 mm (1.18 in.) and tip diameter 5 mm (0.2 in.).

CMM Specifications

Dimensions and Weights			7/7/6	7/10/6	10/12/6	10/16/6	10/21/6
Measuring ranges in mm (in.)		X axis	700 (27.6)	700 (27.6)	1000 (39.4)	1000 (39.4)	1000 (39.4)
		Y axis	700 (27.6)	1000 (39.4)	1200 (47.2)	1600 (63.0)	2100 (82.7)
		Z axis	600 (23.6)	600 (23.6)	600 (23.6)	600 (23.6)	600 (23.6)
CMM weight in kg (lb)			1278 (2818)	1545 (3406)	2301 (5073)	2809 (6193)	5305 (11696)
		with U-STONE option	—	—	2583 (5695)	3163 (6973)	5755 (12688)
Maximum workpiece weight in kg (lb)			560 (1235)	730 (1609)	1150 (2535)	1500 (3307)	1814 (3999)
Dimensions in mm (in.)	Machine:	Width **A**	1430 (56.3)	1430 (56.3)	1734 (68.3)	1734 (68.3)	1734 (68.3)
		Depth **L**	1525 (60.0)	1830 (72.0)	2030 (79.9)	2430 (95.7)	2945 (115.9)
		Height **H** [1]	2800 (110.2)	2800 (110.2)	2800 (110.2)	2800 (110.2)	2800 (110.2)
	Work area:	Width **b** [2]	920 (36.2)	920 (36.2)	1225 (48.2)	1225 (48.2)	1225 (48.2)
		Depth l_1	1041 (41.0)	1346 (53.0)	1546 (60.9)	1946 (76.6)	2464 (97.0)
		Height **a**	850 (33.5)	850 (33.5)	850 (33.5)	850 (33.5)	850 (33.5)
		Y-axis l_3	283 (11.1)	283 (11.1)	283 (11.1)	283 (11.1)	283 (11.1)
		Y-axis l_4	203 (8.0)	203 (8.0)	203 (8.0)	203 (8.0)	203 (8.0)
		to RDS **C** [1]	665 (26.2)	665 (26.2)	665 (26.2)	665 (26.2)	665 (26.2)
		to VAST XT **C** [1]	716 (28.2)	716 (28.2)	716 (28.2)	716 (28.2)	716 (28.2)
		to bridge **h** [1]	845 (33.2)	845 (33.2)	845 (33.2)	845 (33.2)	845 (33.2)
	Base:	Width **B**	1095 (43.1)	1095 (43.1)	1316 (51.8)	1316 (51.8)	1316 (51.8)
		Depth l_2	915 (36.0)	1177 (46.3)	1385 (54.5)	1771 (69.7)	2288 (90.0)
Transport height in mm (in.)		Height **T** [1]	2500 (98.4)	2500 (98.4)	2500 (98.4)	2500 (98.4)	2500 (98.4)
		without base **t** [1]	1903 (74.9)	1903 (74.9)	1903 (74.9)	1903 (74.9)	2056 (80.9)

Dynamics			7/7/6 to 7/10/6	10/10/6 to 10/21/6
Travel speeds	Setup mode:		0 to 70 mm/s (0 to 2.8 ips)	0 to 70 mm/s (0 to 2.8 ips)
	Series measurement mode:	Axis: maximum	250 mm/s (0 to 10 ips)	250 mm/s (0 to 10 ips)
		Vector: maximum	520 mm/s (20.5 ips)	520 mm/s (20.5 ips)
	Acceleration:	Axis: maximum	1000 mm/s² (39.3 in/s²)	1000 mm/s² (39.3 in/s²)
		Vector: maximum	1700 mm/s² (66.9 in/s²)	1700 mm/s² (66.9 in/s²)
Scales	Reflected light system, photoelectric. Resolution 0.2 µm (0.000008 in.)			

Ambient Requirements			
Temperature to guarantee specified length-measuring error		Ambient temperature	18 - 22 °C (64.4 - 71.6 °F)
		HTG option	18 - 26 °C (64.4 - 78.8 °F) incl. temperature sensor for machine and workpiece
	Thermal fluctuations:	Per hour and day	1.0 K/h (1.8 °F/h); 1.5 K/d (2.7 °F/d)
	Thermal gradient:	Spatial	1.0 K/m (0.3 K/ft)
Permissible ambient temperature		For ready-to-operate status	17 - 35 °C (63 - 95 °F)
Floor vibrations	CONTURA G2 is equipped with a passive damping system (limit curves on request). On request, we will perform a vibration analysis.		



1) U-STONE option for 10/12/6, 10/16/6, and 10/21/6 models adds 203 mm (8.0 in.).
2) U-STONE option for 10/12/6, 10/16/6, and 10/21/6 models subtracts 25 mm (1.0 in.)
Note: Listed weights and dimensions are approximate. Information is subject to change without notice.

Environment

Connection Requirements

Power	1/N/PE 100/110/115/120/125/230/240 V (±10%); 50-60 Hz (±3.5%). Power consumption (machine and control unit) max. 1000 VA
Compressed-air supply	Supply pressure 6 to 10 bar (87 to 145 psi), pre-filtered. Consumption approx. 30 l/min (1.06 cfm) at 5.5 bar (79.8 psi) operating pressure. Air quality acc. to ISO 8573 Part 1: Class 4
Network	The CONTURA G2 is available with the latest PC technology. On request, these systems can be configured with network access.

Safety

Regulations	The CONTURA G2 fullfills the EC machinery-directive 98/37/EC including the low voltage-directive 2006/95/EC and the EMC-directive 89/336/ECC.

CE C SA US DIN EN ISO 9001

Disposal information	The disposal of CZ products and packing that have been returned to us takes place in compliance with valid legal regulations.

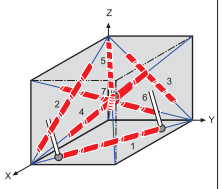
Explanation of Accuracy

MPE = Maximum Permissible Error

As defined in the EN ISO 10360, every specification for accuracy will be noted with "Maximum Permissible error (MPE)". MPE defines a maximum value that a measuring deviation is not allowed to exceed. Accuracy results are represented as an index number. MPE_E describes the length measuring error and MPE_P describes the probing error.

Maximum Permissible Error for length measurement

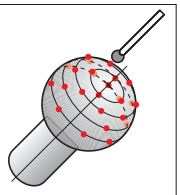
MPE_E



To determine length measuring error, calibrated gage blocks or step gage blocks are measured. With every measurement, 5 different lengths in 7 different positions within the measuring range of the CMM will be determined according to ISO 10360-2. Every length will be measured 3 times. None of the 105 measurements are allowed to deviate from the calibrated value by more then the specified amount. The specification is in most cases dependent on the length, written in the form $MPE_E=A+L/K$, whereby L represents the length. Sometimes the formula will be written as $MPE_E=A+F•L/K$, in which case the formula must be converted in order to compare to it to the first variation. For example, the values $MPE_E=2.5+1.5•L/333$ and $MPE_E=2.5+L/220$ are the same.

Maximum Permissible Error for probing

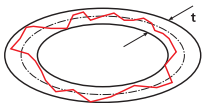
MPE_P



To determine the probing error, a sphere (diameter 10 to 50 mm) with negligible form error will be probed on 25 recommended positions (from ISO 10360-2). From the measurement results, a so called Gaussian least squares sphere is calculated. The range of radial distances from their associated is not allowed to exceed the specification.

Maximum Permissible Error for form measurement (roundness)

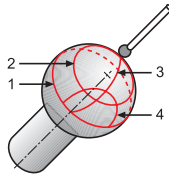
$MPE_{RONt(MZCI)}$



The application of CMMs for form measurement is discussed in VDI 2617, sheet 2.2. Parameters for roundness measurements are defined in EN ISO 12181. For testing, a 50 mm ring gage with negligible form error is measured with high point density (with Zeiss: scanning mode). From the measurement results, a so called Tschebyscheff-circle (MZCI = minimum zone circle) is calculated. The outcome of the form deviation results in the range of radial distances of this circle. It is not allowed to exceed the specification.

Maximum Permissible Error for scanning probing

MPE_{THP} and MPT_τ



To determine the scanning probing error, a sphere (diameter of 25 mm) with negligible form error will be scanned along 4 recommended scanning lines (from ISO 10360-4). When comparing the measurements with the MPE_{THP} specifications, there are two conditions that must be met. First, the range that is determined from radial distances from the associated sphere is not allowed to exceed the specification (see MPE_P). Second, the deviation between the radial distances and the calibrated sphere radius is not allowed to exceed the specification. Additionally, the time required (τ) for the test must be specified, as speed has an enormous influence on the results. **When the accuracy and time are specified, the scanning probing error is an important indicator of the productivity of a CMM.**

Carl Zeiss
Industrielle Messtechnik GmbH
73446 Oberkochen/Germany
Sales: +49 7364 20-6336
Service: +49 7364 20-6337
Fax: +49 7364 20-3870
E-Mail: imt@zeiss.de
Internet: www.zeiss.de/imt

Carl Zeiss
IMT Corporation
6250 Sycamore Lane North
Minneapolis, MN 55369/USA
Phone: +1 763 533-9990
Fax: +1 763 533-0219
E-Mail: imt@zeiss.com
Internet: www.zeiss.com/imt

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