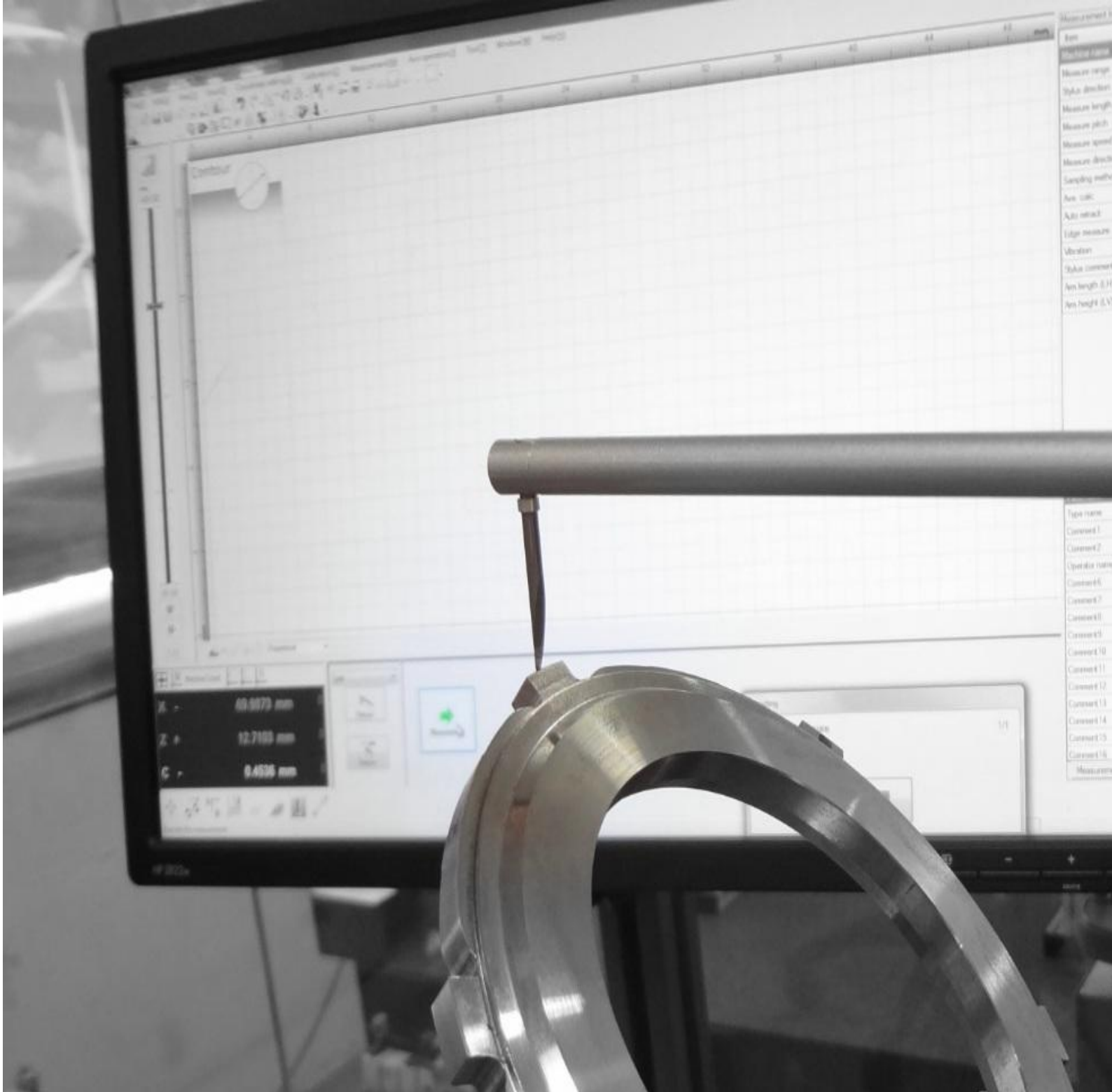




Contourecord 1600 G

Product Portfolio



We make it visible.

The moment criticality starts becoming routine work.

This is the moment we work for.



// PRECISION
MADE BY CARL ZEISS

Product overview

Contourecord 1600 G

Flexible CNC measuring station for
contour measurements



Auto Element Judgment (AI Function)

- The 1600G automatically determines the type of element (point, line, circle).

Profile Synthesis Function (merging of several different profiles)

- The limitation on the analysis range due to the stylus angle are addressed with the synthesis function.

Work piece Trace Function

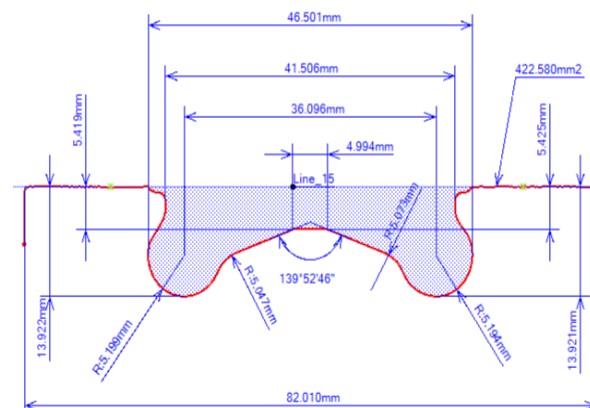
- This helps in pre determination of the work piece trace .Effective for measurement of minute profiles.

Full CNC Programmable

- Ensures improving the productivity as the contour profile can be programmed , right from measurement to analysis & report generation.

CAD comparable

- Measured profile can be compared one to one with the actual CAD data (IGES, DXF) for any kind of profile. Especially helpful for free form profiles



ALL in the Document!

ACCTee



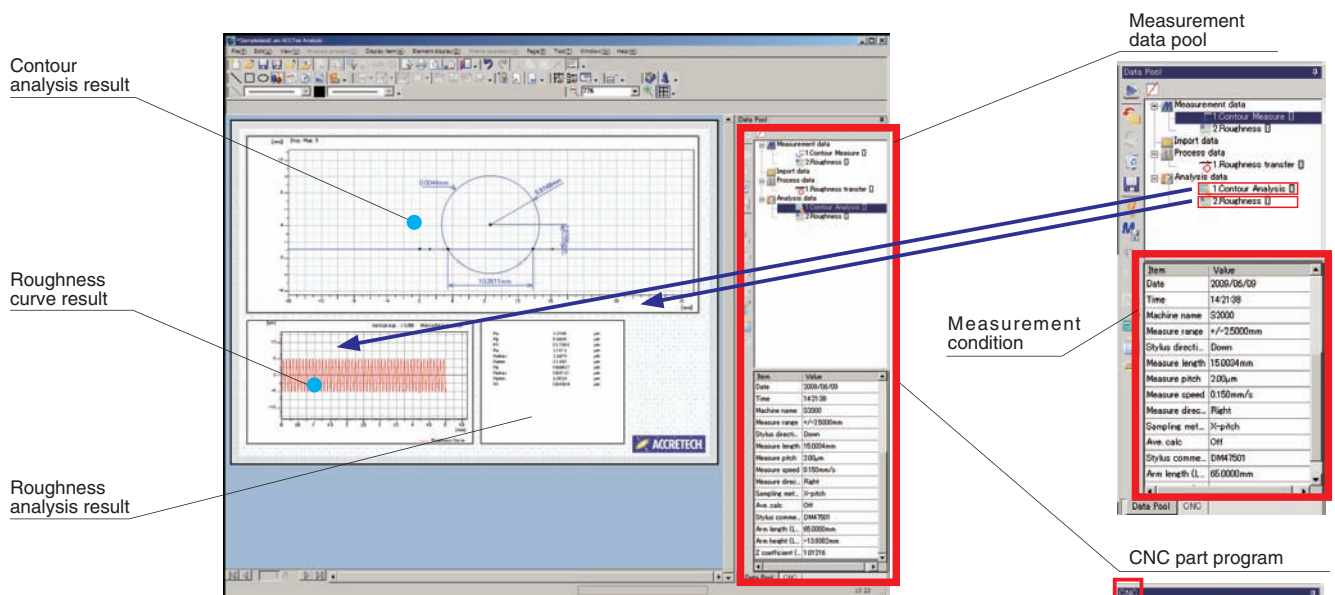
New measurement style with new concept

Integrated analysis software ACCTee

ACCTee is newly developed to suggest a measurement style of the new concept as the next generation system of the integrated software TIMS. By allowing the measurement and analysis on a document basis, the software provides preminent operability and comfortable work environment for measurement and analysis tasks. With the document basis new measurement style, all the operation are available on the document (measurement result sheet), and all the data and information also can be saved with related data. This is the "All in the Document", next generation integrated software, ACCTee.

Preminent operative ness in the document screen

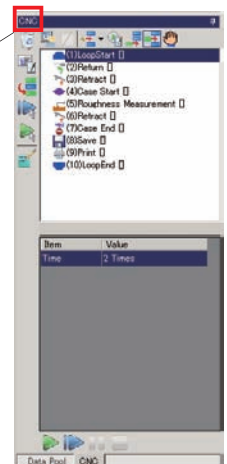
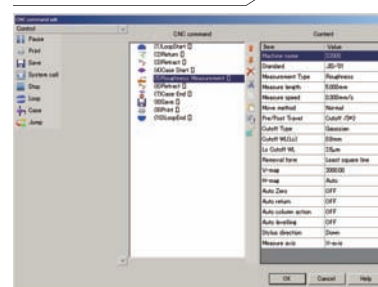
ACC Tee is equipped with a Windows style user interface to which anyone can access easily. High operability is achieved with the friendly and intuitive icons that assist a series operation from the measurement to the printing of analysis result.



CNC function

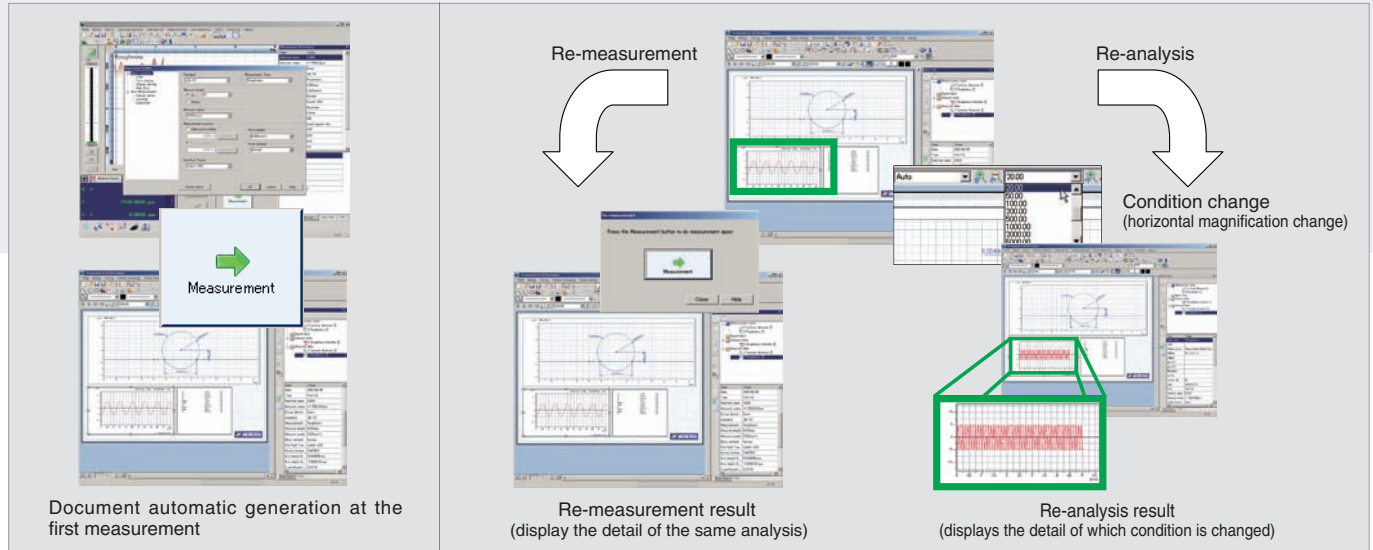
This provides high efficient measurement work environment, as the series of tasks, from the measurement to the output of the test result, can be executed automatically. For the case and calculation error in the measurement result, such operations as "Jump", "Pause", "Stop" and "Continue" can be chosen. Because of the system call command, you can display any type of image files during CNC operation, and can check the posture for setting works and the shape of the stylus probe with photos so that you can avoid careless errors in advance.

CNC command edit screen



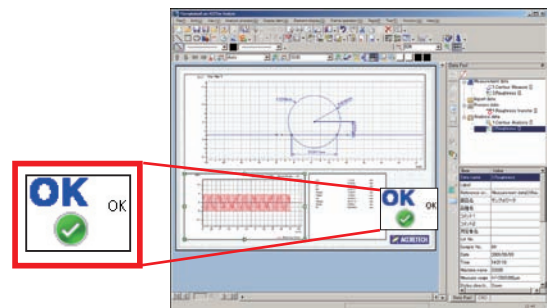
■ Efficiency improvement of re-analysis and re-measurement with easy operation

As ACCTee contains all the information including the layout, measurement condition, analysis condition, measurement data, and part program in the document, so that the data edit, addition, re-analysis, and re-measurement of the analysis details can be executed freely. Since the switchover between windows is not necessary which improves the operational efficiency for 40 % or more comparing with the conventional software. Besides executing re-analysis, when executing the same measurement and analysis of the previous times, the measurement result similar to the previous time can be acquired by selecting the measurement data of the data pool and clicking the re-measurement data.



■ Document comprehensive judgment display

For individual parameter, ACCTee can provide judgment concerning the 16% rule and the design value. In addition, the software can display OK/NG in the graphic image for comprehensive judgment relating to the whole document. As the master page preparation can be registered, the inspection sheet unifying the logo mark and the background can be output.



■ Self-diagnosis function

In preparation for emergency, the self-diagnosis function is always working. As the support function for handling errors, the message indicating the troubled locations such as failures and errors of the measurement machine screen is displayed, so that the operator smoothly can take appropriate action in order to settle down the problem as soon as possible.



■ International support

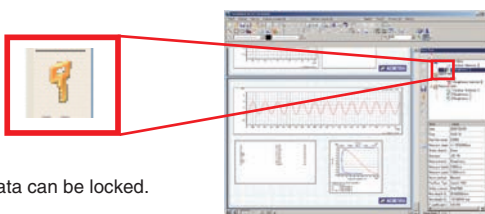
ACCTee can be used overseas and supports several languages including Japanese, English, German, French, Italian, Spanish, Chinese, and Korean. (consult us before taking out to overseas countries)



Support multiple languages

■ Software data protection

The data measured by ACCTee can be protected by locking the data, eliminating the unintended data clear or data exchange, so that accidental data loss can be prevented.



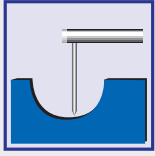
The data can be locked.

■ Help system

ACCTee always can call up the Help whenever the ACCTee is on.

ACCTee introduces on-line manual system so that an appropriate help message can be displayed by clicking the soft key of the help. The help message also can be retrieved by the index or by keywords.





ALL in the Document!

Contour profile measurement and analysis system

Applicable machines

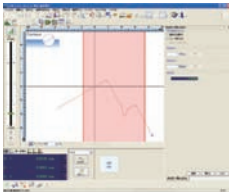
CONTORRECORD 1700DX3/SD3	SURFCOM 1900DX3/SD3
CONTORRECORD 2700DX3/SD3	SURFCOM 2900DX3/SD3
	SURFCOM 2000DX3/SD3

ACCTee contour profile measurement and analysis system

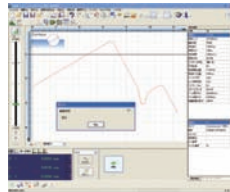
This is the standard software associated with the Contourrecord cord DX3 and SD3 series contour system. ACCTee completely changes the measurement style of the contour profile by a new concept, measures, can analyze with the document base, and provides preminent operability and comfortable work environment. As the setting of each function from measurement to analysis can be proceeded with the operability easy for operators, anyone can perform the measurement tasks easily and efficiently.

Work trace function

As this function displays manually traced profile, it is effective for such measurements as understanding the measurement limit point for measuring as far as the edges of a wall or valley with standing at the trace start or end points, or the place where it is difficult to check visually such as inside of a hole and the like. As the start point and the end point can be specified in the profile traced on the screen, the measurement will never be failed. The screen turns to show the real-time status upon starting a measurement, which displays the profile in measuring.



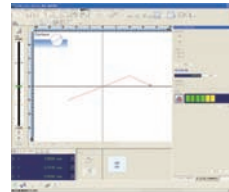
Work trace measurement area setting



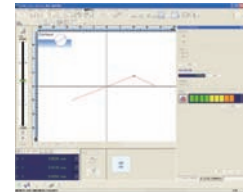
Real-time display

Peak and valley function

There are two modes in this function: Auto mode - The minimum point is automatically detected; and Manual mode - when the level mark on the screen is approaching, it is notified by means of color and sound change by turning the knob of the adjustment platform or the driving unit.



Manual mode detection start



Manual mode maximum point detection

Stylus calibration wizard

The calibration for the stylus is executed by the masterball calibration unit. Through the masterball measurement and step difference measurement, the tip R correction and the arc error correction can be executed automatically or manually. The calibration is proceeded under the instruction of the guidance in following order: calibration condition (inputting reference value) setting, placement of the calibration unit, confirmation of measurement start point, and execution of calibration.

Calibration alarm

Any time can be accepted for the calibration time. In addition to the stylus replacement time, a message for encouraging calibration based on the measurement frequencies or lapsed days is periodically displayed, which guarantees an accurate and stable measurement.

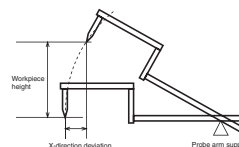
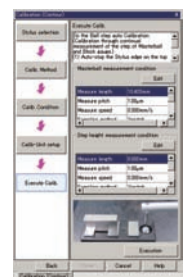
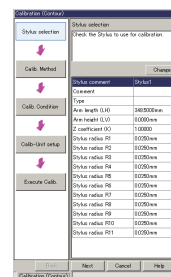
Masterball calibration function (patented)

Arc correction calculation

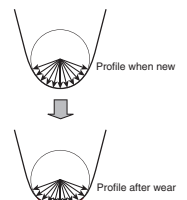
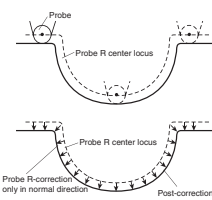
As the stylus makes an arc movement around the fulcrum of the stylus arm, an error emerges with the data in X direction at the stylus tip. This arc step difference is corrected by the masterball calibration unit, which guarantees high accuracy measurement.

Tip R correction

The tip R correction is also an indispensable element for high accuracy measurement. The measurement surface is captured at the center of the tip R, and an offset correction is made in the normal line direction for the amount of the tip R (radius). (Fig. a) If the profile of the stylus tip R is always complete round, correcting only R value is accepted, however, the errors may be generated with the correction amount itself by the process errors or biased wears of the tip R (Fig.b). The contour system of Tokyo Seimitsu monitors the status of the stylus tip based on the proprietary algorithm by creating the correction value for each 10 degrees of the tip R.

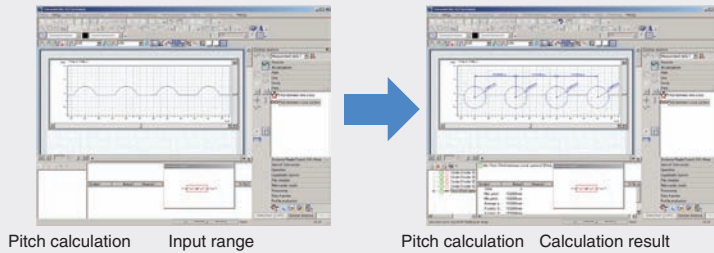


Confirmation screen of calibration result



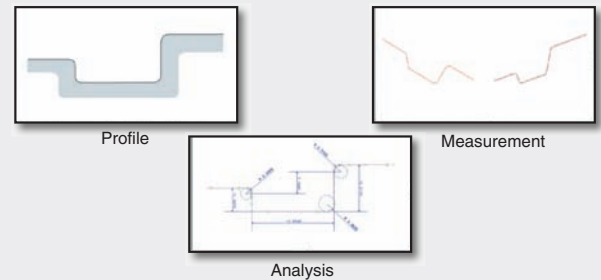
Pitch calculation function

For the same multiple profiles composed of circles and straight lines, the pitch between line cross or pitch between circle centers can be automatically output just by specifying the arc by mouse. The efficiency of the analysis task can be improved by using the dimension line auto output function concurrently.



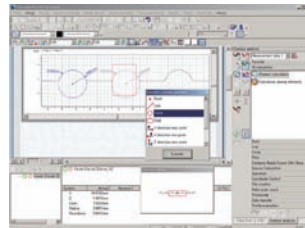
Profile synthesis function

Even for the work that requires measurement for multiple times because of the limitation of the stylus angle, the analysis can be made by combining the data into one with using the profile synthesis function.



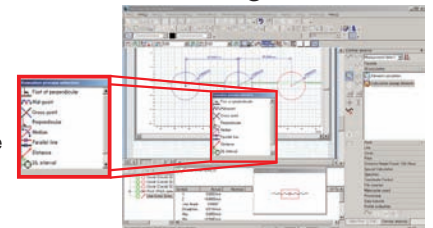
AI function(automatic element judgment)

The points, straight lines, and circles of the basic elements are automatically extracted by turning on the AI function and by selecting the specified area of the measurement data. This eliminates the specification of the menu and icon in each case, which significantly reduce the operation procedure.



Elements calculation with icon guidance

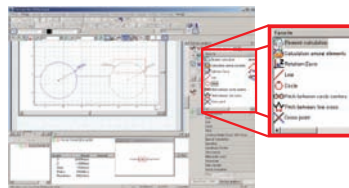
When making a new calculation from any of the multiple elements already calculated, the element calculation possible to calculate is displayed. Multiple inter-element calculation can also be selected intuitively in accordance with the purpose.



Element calculation(candidate of circle-circle calculation is displayed)

Favorite

The frequently used commands can be gathered in "Favorite." The commands can be re-aligned for easy-to-use.

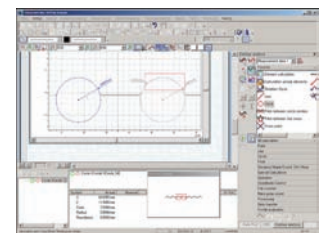


Edge detection measurement (patent pending)

It is possible to set so that the edge part can be detected during measurement and the measurement can be finished automatically. It is effective when you want to measure the far end of the edge part.

Calculation result preview function (patent pending)

When the multiple area input function is turned off, upon the input of the area that can set calculation area freely, the preview for the calculation result and the dimension line is displayed so that the calculation result can be checked beforehand. When the multiple area input function is turned on, the calculation result is displayed at the time of finalizing the element.



State of preview

Importing external data

It is possible to read in the IGES/DXF data of CAD, and the measurement data* of the coordinate measurement machine, Calypso Curve, and make an evaluation based on the contour analysis.

*The nominal data to be output by the Calypso option form data, ASCII I/O program.

Calculation point manual input

When analyzing the same profile repeatedly, it is possible to intervene the manual operation of the operator for the targeted analysis during CNC execution by setting the condition of re-calculation, which enables detailed analysis.

Specification	ACCTee contour profile measurement machine and analysis program
AI function	Automatic distinction of elements including points, straight lines, and circles Automatically distinguish the combination executable of calculation between two elements (point - point, point - straight line, point - circle, point - oval, straight line - straight line, circle - straight line, circle - circle, straight line - oval, circle - oval, oval - oval)
Arithmetic processing	Point (cross point, mid-point, contact point, peak, valley), Line (perpendicular, median, contact line, parallel line, bisector, virtual line), Circle (partial circle, oval, contact circle, virtual circle), Pitch (pitch between line cross, pitch between circle centers), Distance, Curve length, Angle, Inter angle(cmplm. angle, suppl. angle), Coord. Diff (X coord. difference, Z coord. difference, diff. angle, radius difference), Polar coord difference, Step difference (average step, max. step, min. step), Area calculation (addition, subtraction, multiplication, division, power operation, surplus, absolute value, square root), Statistics (average, max., min., std. dev., total sum), Over-pin calculation, Dimension line display function, Calculation result design value collation, mirror inverse, smoothing, form combining (whole composition, partial composition), Calculation point repeat function, Work trace function, Peak/valley function, CNC function, Nominal collation, Best fit (parallel move, rotary move), Nominal value preparation function
Data file I/O	Input of point sequence, text, CSV, IGES, DXF data and ASCII data of Calypso Curve
Coordinate control	Origin, setting each axis, parallel move, and rotary move
Calculation support function	Infinite cursor, cursor form vertical/horizontal switch, one point micro motion, setting or error band
Stylus calibration	Batch automatic calibration and manual calibration by the masterball calibration unit Maximum 20 units of stylus calibration information can be registered (the deadline of the calibration time can be specified)
Measure pitch	0.01~1000 μm
Number of data points	Maximum 300,000 points
Magnification display: Lengthwise	Arbitrary value (unit:0.01), automatic and 0.01 - 10,000,000 times
Magnification display: Sidewise	Arbitrary value (unit:0.01), automatic and 0.01 - 10,000,000 times

Upgradable to Surface Roughness _ On Site



Contourecord 1600G can be upgraded to a Dual Machine having both Contour as well as roughness measuring facility, And the same can be done ON Site

Skiddless Surface roughness pickup

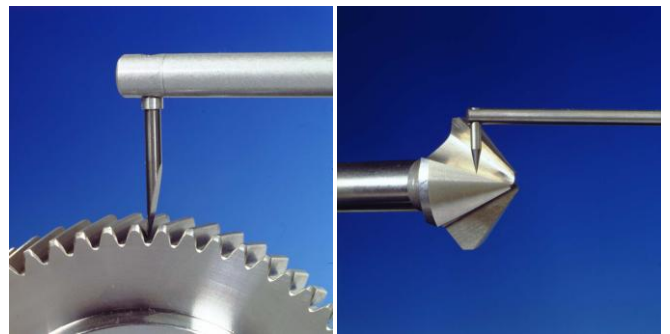
+

Contour Tracing pickup

Components that can be measured

Four wheeler & two wheeler engine & transmission parts,

like crank shafts, cylinder head, connecting rod, transmission shafts, gears, screws, engine valves, pistons, piston rings, rocker arms, bearings etc.



Apart from automobiles Contour can be utilised in the field of medical, aircrafts, wind mill industry, sports



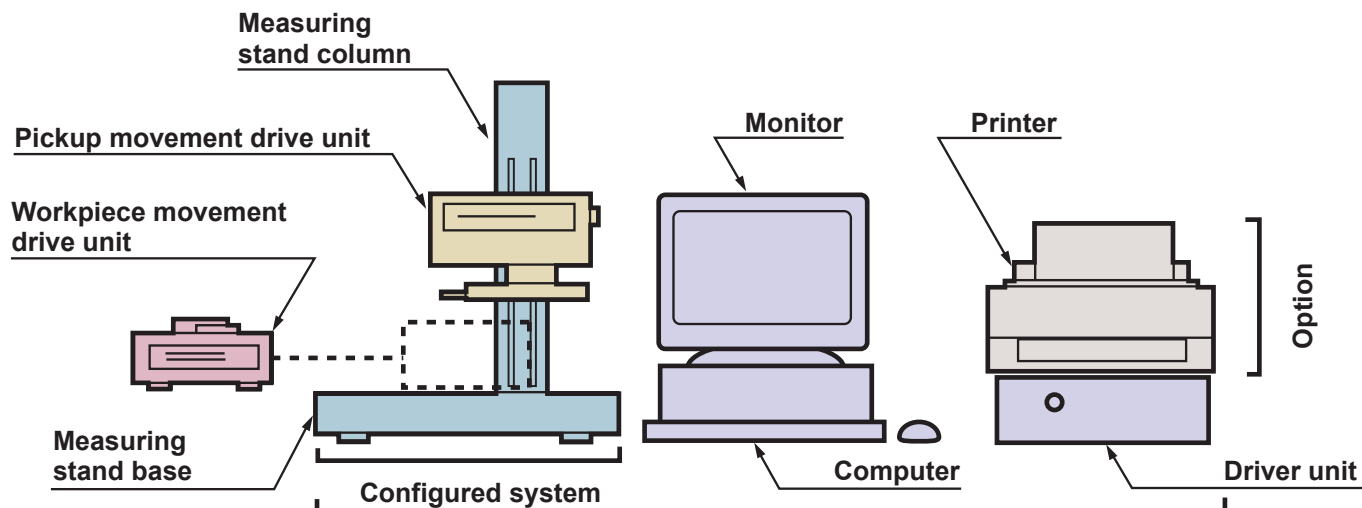
Technical data

Contourecord 1600 G

Model			Contourecord 1600 G									
			- 11	-12	- 13	-14	- 21	- 22	- 23	- 24		
Measuring Range		Z-axis (vertical)		50 mm								
		X-axis (horizontal)		100mm				200mm				
	Detector	Measuring Resolution		0.1 μm / 5 mm range, 1 μm / 50 mm range								
		Z-axis indication accuracy (vertical)		±4.5 μm / 50 mm range								
	Tracing driver	X-axis indication accuracy (horizontal)		±1.0 + [2L /100] μm								
		Measuring Resolution		0.1 μm								
Straightness accuracy			1 μm/100mm									
Sensing method		X-axis (horizontal)		Moiré striped scale				Linear scale				
		Detectors		Differential transducer (trans)								
Speed		Column up/down speed (Z-axis)		---	10mm/s (3mm/s)''			---	10mm/s (3mm/s)			
		Speed (X-axis)		Measuring : 0.03, 0.06, 0.15, 0.3, 0.6, 1.5, 3, 6 mm/sec 8 speeds								
Detectors		Stylus, Measuring Force		Changeable, 10 30mN, Retract function								
		Stylus radius (Stylus material)		25 μm R conical super-solder								
		Measuring Direction, Orientation		Pull/push and Up/down directions								
Moving range		Pickup movement drive distance		100mm				200mm				
		Measuring height		250mm		450mm		250mm		450mm		
Stone table dimensions and weight		Dimensions		600 x 317mm			1000 x 450mm	600 x 317mm			1000 x 450mm	
		²		41kg	35kg	26kg	41kg	35kg	29kg	20kg	35kg	
Dimensions and weight			Installation dimensions	Width	2000mm			2300mm	2000mm			2300mm
				Depth	1000mm				1000mm			
					1700mm		1900mm		1700mm		1900mm	
			Weight		120kg	125kg	135kg	240kg	125kg	130kg	140kg	245kg
			Power source/power consumption		Single Phase AC220V±10% grounding required, 50/60 Hz, 710 VA							



SURFCOM ○○○○△-□□
 Drive unit
 Measuring stand
 S1400G, C1600G, C2600G, S1800G, S2800G Series

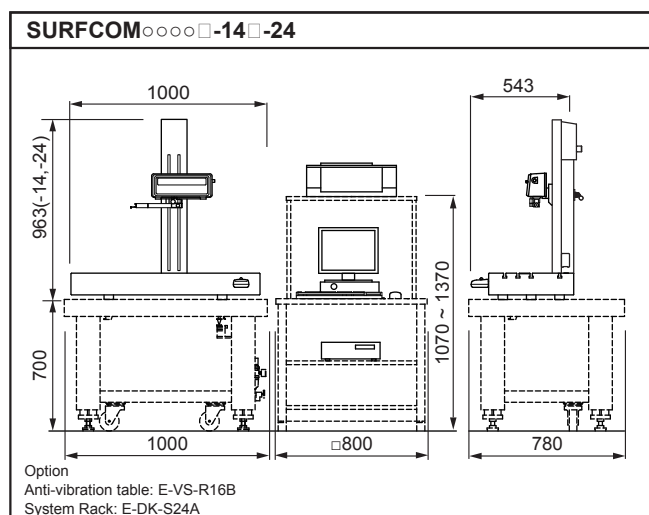
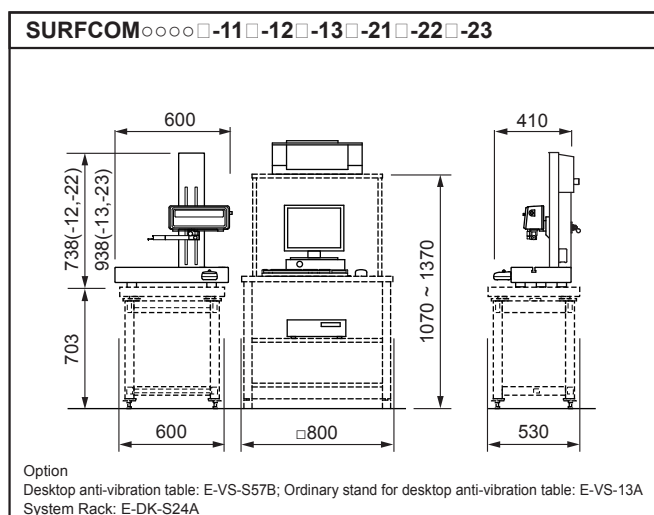


* The optional printer can be an A3/A4 printer, laser printer or color printer.

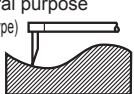
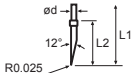
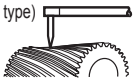
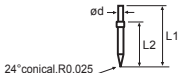
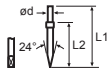
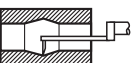
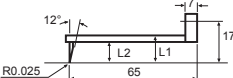
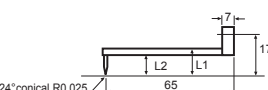
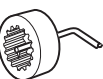
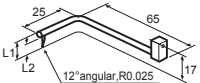
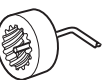
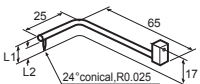
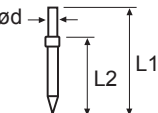
Drive		Measurement stand	
- 1 □	Pickup movement E-RM-S72B,S138B Max. movement Distance 100mm	- 4 □	Workpiece movement E-RM-S75A Max. movement Distance 50mm
- 2 □	E-RM-S178A,S182A Max. movement Distance 200mm	- 5 □	E-RM-S76A Max. movement Distance 150mm
- 3 □	(Low-speed drive unit)E-RM-S141A Max. movement Distance 100mm	- 6 □	E-RM-S77A Max. movement Distance 300mm
		- □ 1	Manual Column Base Dimensions 600×317mm Measuring height 250mm Allowable load 50kg
		- □ 3	MotORIZED Column Base Dimensions 600×317mm Measuring height 450mm Allowable load 50kg
		- □ 2	MotORIZED Column Base Dimensions 600×317mm Measuring height 250mm Allowable load 50kg
		- □ 4	MotORIZED Column Base Dimensions 1000×450mm Measuring height 450mm Allowable load 155kg

* -4□, -5□, -6□ combinations are not supported for the CONTOURECORD Series.

External View



C1600G/C2600G Contour Stylus

Measuring Application	Model	Outer Appearance	d	L1	L2	Application Arm		Remarks
						C1600G	C2600G	
	DM45501		3	60	52	010 2804	DM45531	
	DM45502		3	34	26	010 2800	DM45528	
	DM45503		2	21	13	010 2801	DM45529	
	DM45504		3	60	52	010 2804	DM45531	
	DM45505		3	34	26	010 2800	DM45528	· Standard accessory
	DM45506		2	21	13	010 2801	DM45529	
	DM45507		3	60	52	010 2804	DM45531	
	DM45508		3	34	26	010 2800	DM45528	
	DM45509		2	21	13	010 2801	DM45529	
	DM45081		-	12	9	010 2802	—	· Measuring force: 10mN or less · Deflection: Approx. 1.5μm for 10mN
	DM45082		-	7	5			
	DM45083		-	3.5	1.5			
	DM45510		-	12	9	—	DM45530	
	DM45511		-	8	5			
	DM45512		-	4.5	1.5			
	DM45084		-	12	9	010 2802	—	· Measuring force: 10mN or less · Deflection: Approx. 1.5μm for 10mN
	DM45085		-	7	5			
	DM45086		-	3.5	1.5			
	DM45513		-	12	9	—	DM45530	
	DM45514		-	8	5			
	DM45515		-	4.5	1.5			
	DM45087		-	12	9	010 2802	—	· Offset: 25mm · Measuring force: 10mN or less · Deflection: Approx. 3μm for 10mN
	DM45088		-	7	5			
	DM45089		-	3.5	1.5			
	DM45516		-	12	9	—	DM45530	
	DM45517		-	8	5			
	DM45518		-	4.5	1.5			
	DM45090		-	12	9	010 2802	—	· Offset: 25mm · Measuring force: 10mN or less · Deflection: Approx. 3μm for 10mN
	DM45091		-	7	5			
	DM45092		-	3.5	1.5			
	DM45519		-	12	9	—	DM45530	
	DM45520		-	8	5			
	DM45521		-	4.5	1.5			
	DM45522		3	60	52	010 2804	DM45531	· ϕ0.7ruby ball
	DM45523		3	34	26	010 2800	DM45528	
	DM45524		2	21	13	010 2801	DM45529	
	DM45525		3	60	52	010 2804	DM45531	· ϕ1ruby ball
	DM45526		3	34	26	010 2800	DM45528	
	DM45527		2	21	13	010 2801	DM45529	

C1600G/C2600G Arms for Contour

Measuring Application	Model	Outer Appearance	Application Stylus			Remarks	
General purpose 	010 2800		DM45502	DM45505	DM45508	C1600G	· Standard configuration · Deflection: Approx. 1.2μm for 10mN Approx. 3.7μm for 30mN
	DM45528		DM45523	DM45526		C2600G	
Inner surface 	010 2801		DM45503	DM45506	DM45509	C1600G	· Deflection: Approx. 1.2μm for 10mN Approx. 3.7μm for 30mN
	DM45529		DM45524	DM45527		C2600G	
Small holes 	010 2802		DM45081~DM45092			C1600G	· Stylus combination arm for measuring small holes (Provided with auxiliary weight)
	DM45530		DM45510~DM45521			C2600G	
Deep grooves 	010 2804		DM45501	DM45504	DM45507	C1600G	· Max.magnification : x50 010 2744 pickup holder coupling required. · Measuring force: 10mN or less (Provided with auxiliary weight) · Deflection: Approx. 1.2μm for 10mN Approx. 3.7μm for 30mN
	DM45531		DM45522	DM45525		C2600G	
Offset measurement 	010 2805		DM45502	DM45505	DM45508	C1600G	· Max.magnification : x100 · Offset : 50mm · Measuring force: 10mN or less (Provided with auxiliary weight) · Deflection: Approx. 2.6μm for 10mN Approx. 7.8μm for 30mN
	DM45532		DM45523	DM45526		C2600G	
	010 2807		DM45503	DM45506	DM45509	C1600G	
	DM45533		DM45524	DM45527		C2600G	