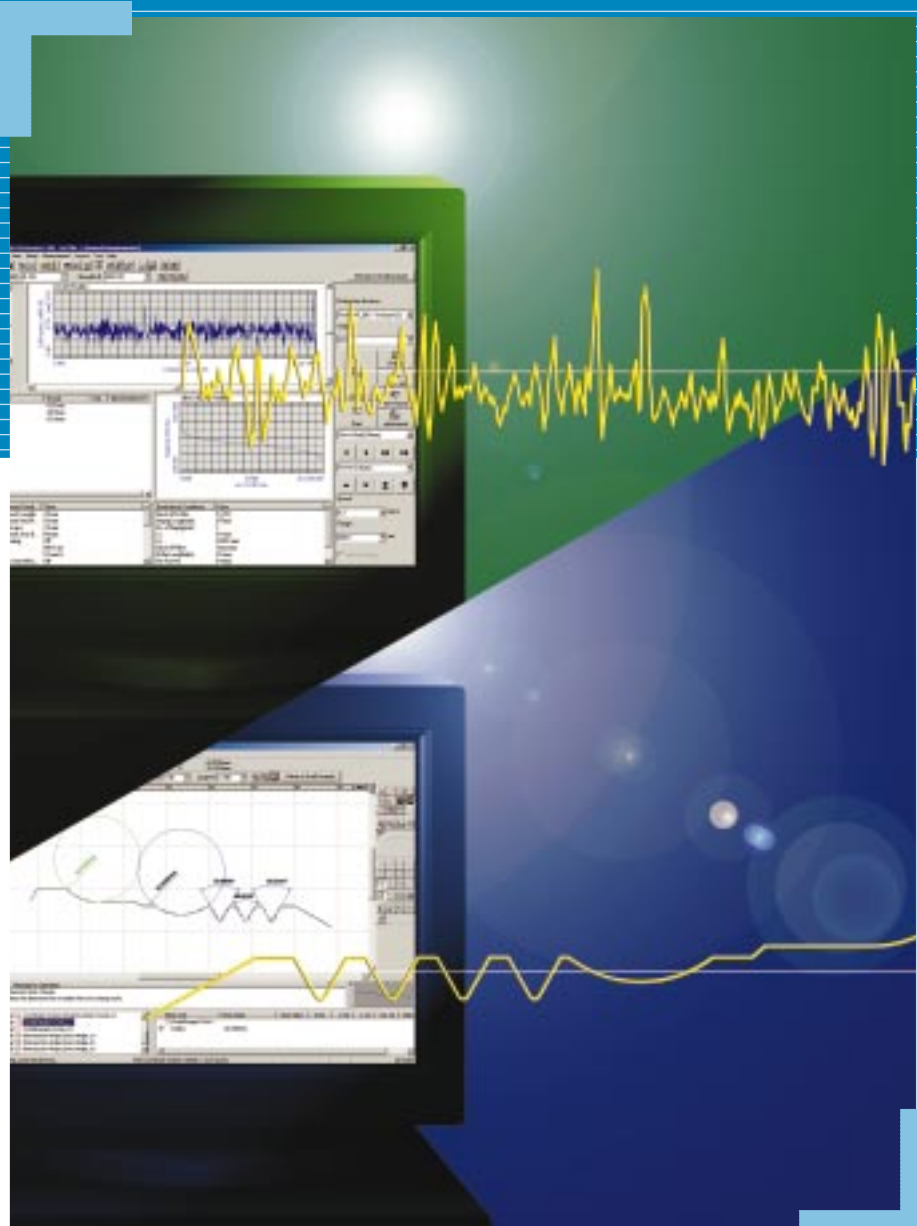


# FORMTRACER® SV-C3000/4000

Bulletin No. 1832



**Combination SurfTest/Contracer System:**

**Powerful measurement and analysis of  
both surface roughness *and* contour**

**Mitutoyo**

## Double Duty! Surftest + Contracer

The SV-C3000/4000 series is a surface roughness/contour combination measuring machine that functions as a Surftest and a Contracer just by replacing the detecting unit. This system is perfect for use in prototype fabrication or research and development where the total assessment of workpiece surface roughness and contour is required.

Less than the total cost of the Surftest plus Contracer

Multifunction analysis software for powerful and advanced evaluation and reporting

Only half the footprint of both the Surftest plus Contracer

### FORMTRACER

# SV-C 3000

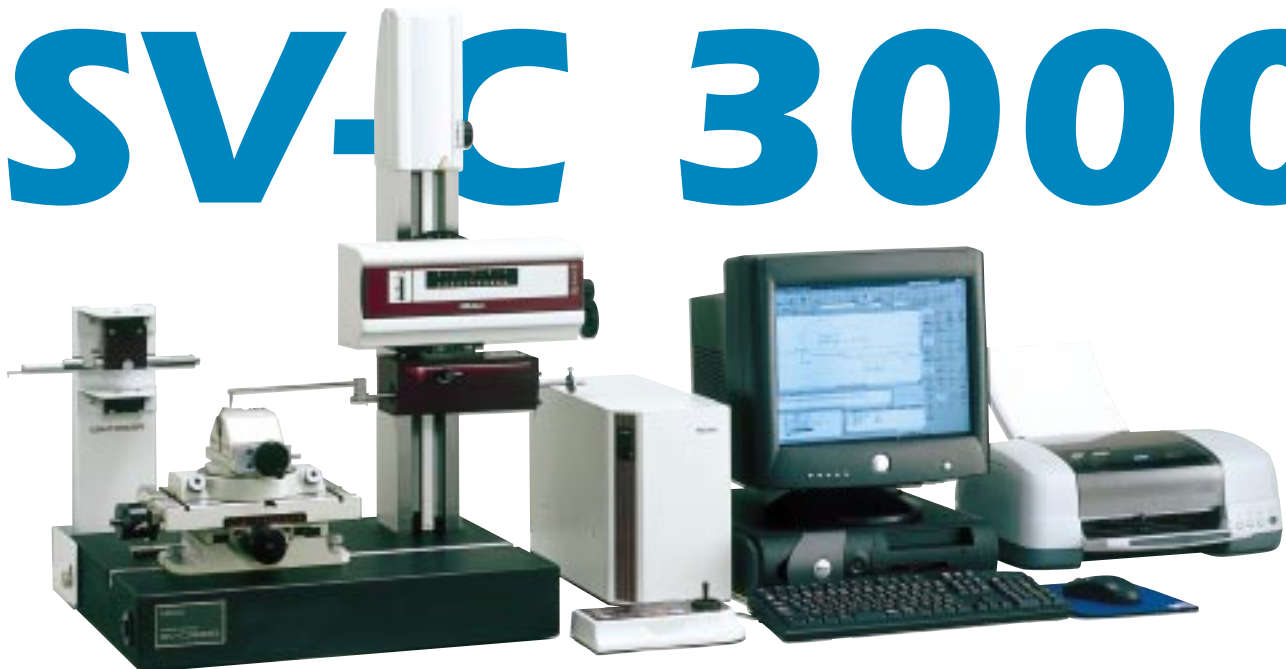
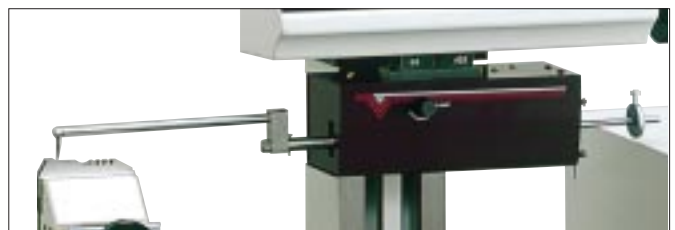


Photo: SV-C3000S4 with personal computer system

### Featuring a digital scale unit installed in the Z-axis detection unit (SV-C3000 Series)

The SV-C3000 Series uses a digital scale unit in its Z-axis detection unit to achieve a resolution of  $.000008''$  ( $0.0002 \text{ mm}$ ) at a full stroke of  $\pm 50 \text{ mm}$  ( $\pm 2''$ ). And, unlike conventional differential transformer units, there is no change in resolution as the magnification range changes. The result: a dramatic improvement in operation and performance.



# FORMTRACER

## SV-C 3000/4000 Selection Guide

**SV-C3000H4  
SV-C4000H4**

**X-axis traverse range:**  
4" (100mm)

**Vertical travel:**  
18" (450mm)

**Base size (WxD):**  
24"x18" (610x450mm)

**SV-C3000W4  
SV-C4000W4**

**X-axis traverse range:**  
4" (100mm)

**Vertical travel:**  
18" (450mm)

**Base size (WxD):**  
40"x18" (1000x450mm)

**SV-C3000S8  
SV-C4000S8**

**X-axis traverse range:**  
8" (200mm)

**Vertical travel:**  
10" (250mm)

**Base size (WxD):**  
24"x18" (610x450mm)

**SV-C3000H8  
SV-C4000H8**

**X-axis traverse range:**  
8" (200mm)

**Vertical travel:**  
18" (450mm)

**Base size (WxD):**  
24"x18" (610x450mm)

**SV-C3000S4  
SV-C4000S4**

**X-axis traverse range:**  
4" (100mm)

**Vertical travel:**  
10" (250mm)

**Base size (WxD):**  
24"x18" (610x450mm)

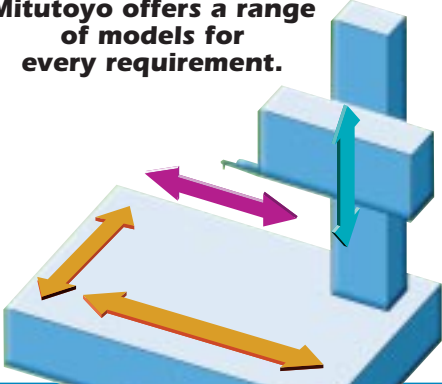
**SV-C3000W8  
SV-C4000W8**

**X-axis traverse range:**  
8" (200mm)

**Vertical travel:**  
18" (450mm)

**Base size (WxD):**  
40"x18" (1000x450mm)

**Mitutoyo offers a range of models for every requirement.**



## FORMTRACER

# SV-C 4000



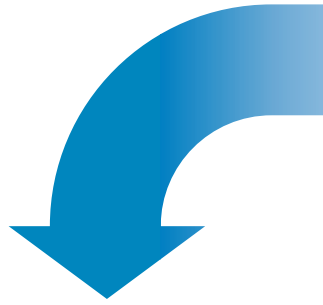
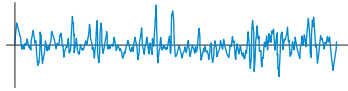
Photo: SV-C4000S4 with personal computer system

### Mitutoyo's Holographic Scale delivers super-high accuracy (SV-C4000 Series)

A top-of-the-line Holography Scale based on the interference phenomenon of diffracted light, ensures extreme accuracy. It allows dimensional measurement at a resolution of .000002" (0.00005mm) over the entire measurement range of 2" (50mm).

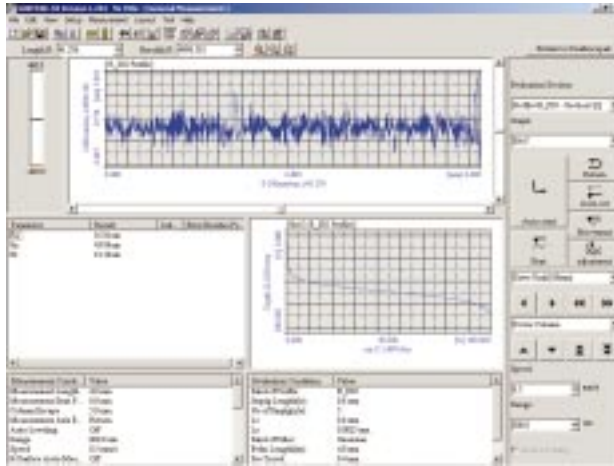


FORMTRACER SV-C3000/4000

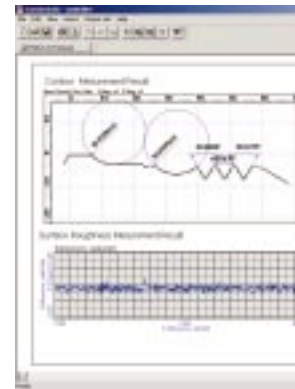


## For Surface Roughness Measurement : SURFPAK-SV

- SURFPAK®-SV dedicated analysis software allows 57 types of parameters that conform to international standards (including ISO, DIN, ANSI, and JIS) to be analyzed.
- Supports 10 types of measured profiles, including the roughness profile, primary profile, waviness profile, and 2 types of modes.
- Supports 7 types of digital filter, including Gaussian.
- Various analysis graphs, such as the bearing area curve (BAC) and amplitude distribution graph, are easily displayed.
- The system can delete unnecessary data such as scratches and assess inclined and rounded surfaces after digital compensation.
- The system has a wide measuring range of a maximum of 800µm.
- An auto-leveling table (option), which automatically levels the workpiece surface, can be mounted.
- The system supports optional software including the fine contour measuring program (FORMPAK®-SV).
- Report generation function. (printer is optional.)



**Measurement result window**



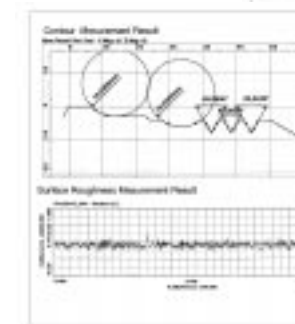
**Layout edit window**

## Surftest (Surface Roughness Measurement) Functions

<b>X-axis traverse range</b>		SV-C3000S4/H4/W4, SV-C4000S4/H4/W4: 4" (100mm) SV-C3000S8/H8/W8, SV-C4000S8/H8/W8: 8" (200mm)
<b>Straightness</b>		SV-C3000S4/H4/W4, SV-C4000S4/H4/W4: (2+1.5L)µinch [(0.05+1.5L/1000)µm] SV-C3000S8/H8/W8, SV-C4000S8/H8/W8: 20µinch/8" (0.5µm/200mm)
<b>Measuring range/Resolution</b>		32000µinch/.4µinch(800µm/0.01µm), 3200µinch/.04µinch(80µm/0.001µm), 320µinch/.004µinch(8µm/0.0001µm)
<b>Standard detector</b>	Stylus Measuring force Skid	Measuring force 0.75mN: Material: Diamond, 60° cone, Tip radius: 79µinch (2µm) Measuring force 4mN: Diamond, 90° cone, Tip radius: 200µinch (5µm) Carbide, Radius of curvature: 1.6" (40mm)
<b>Assessed profiles</b>		P (primary profile), R (roughness profile), WC, WCA, WE, WEA, DIN4776 profile, E (envelope residual profile), R-motif (roughness motif), W-motif (waviness motif)
<b>Evaluation parameters</b>	P, R, WC, WCA, WE, WEA, E, DIN4776 R-mode W-mode	Ra, Rq, Rz, Rz(JIS), Ry, Ry(DIN), Rc, Rp, Rpmax, Rpi, Rv, Rvmax, Rvi, Rt, Rti, R3z, R3zi, R3y, S, Pc, Sm, HSC, mr, dc, plateau ratio, mrd, Rk, Rpk, Rvk, Mr1, Mr2, Da, Dq, Ia, Iq, Sk, Ku, Lo, Lr, A1, A2 Rx, R, AR, SR, SAR, NR, NCRX, CPM Wte, Wx, W, AW, SW, SAW, NW
<b>Analysis graphs</b>		ADC, BAC1, BAC2, power spectrum chart, auto-correlation chart, slope distribution chart, local peak distribution chart, parameter distribution chart
<b>Digital filter</b>		2CR-50%, 2CR-75%, 2CR-50% (phase corrected), 2CR-75% (phase corrected), Gaussian-50% (phase corrected)
<b>Cutoff length</b>	λc fl fn	.001", .003", .01", .03", .1", .3", 1" or arbitrary value* (0.025mm, 0.08mm, 0.25mm, 0.8mm, 2.5mm, 8mm, 25mm or arbitrary value*) .003", .01", .03", .1", .3", 1" or arbitrary value* (0.08mm, 0.25mm, 0.8mm, 2.5mm, 8mm, 25mm or arbitrary value*) .001", .003", .01", .03", .1", .3" or arbitrary value* (0.025mm, 0.08mm, 0.25mm, 0.8mm, 2.5mm, 8mm or arbitrary value*)
<b>Sampling length (L)</b>		.001", .003", .01", .03", .1", .3", 1" or arbitrary value* (0.025mm, 0.08mm, 0.25mm, 0.8mm, 2.5mm, 8mm, 25mm or arbitrary value*)
<b>Recording magnification</b>		Vertical: 100X - 500,000X    Horizontal: 1X - 10,000X

\*Can be specified in the range from 0.025mm to 200mm (.001" to 8").

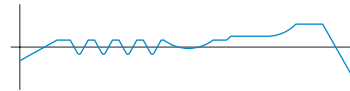
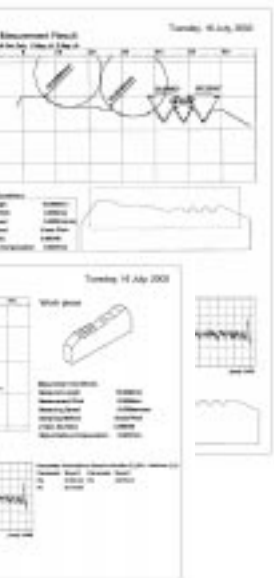
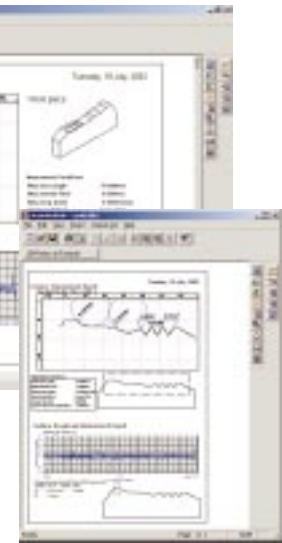
**The layout editing function allows both Contour and Surface Roughness analyses to be printed out in one report.**



# ACEPAK

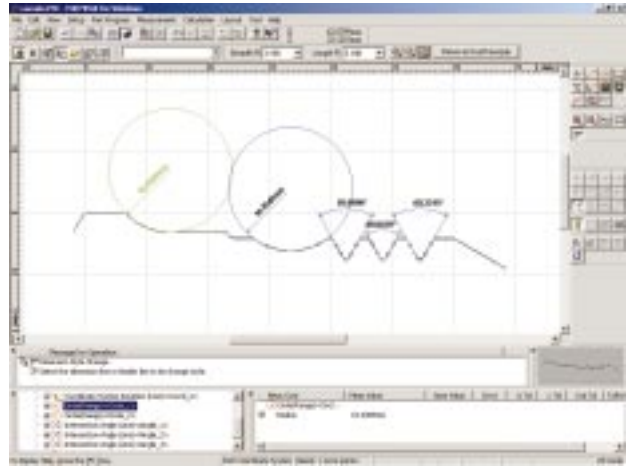


Start!



## For Contour Measurement : FORMPAK-1000

- The dedicated analysis software, FORMPAK®-1000, allows easy calculation, tolerancing, and analysis of two-dimensional coordinate (contour) data obtained by measuring geometric elements such as points, lines, circles, angles, and pitches.
- In the Formtracer, a high-accuracy linear scale is installed both on the X axis and Z-axis detecting units. Since high resolution measurements can always be performed at full stroke, the measuring magnification does not need to be changed, so the unit can measure more efficiently.
- There are two models: the SV-C3000 series (standard type) that has a Z-axis resolution of 0.2μm; and the SV-C4000 series (high-accuracy type) which has a resolution of 0.05μm.
- The X-axis drive unit has excellent straightness to guarantee high accuracy.
- The system can make comparisons between measured data, or between measured data and nominal data, and display the deviation. Not only can the coordinate values and specific dimensions be measured, but the form can also be assessed and any deviation observed for the entire workpiece.
- Report generation function. (printer is optional.)



Analysis result window

### ■ Contracer (Contour Measuring) Functions

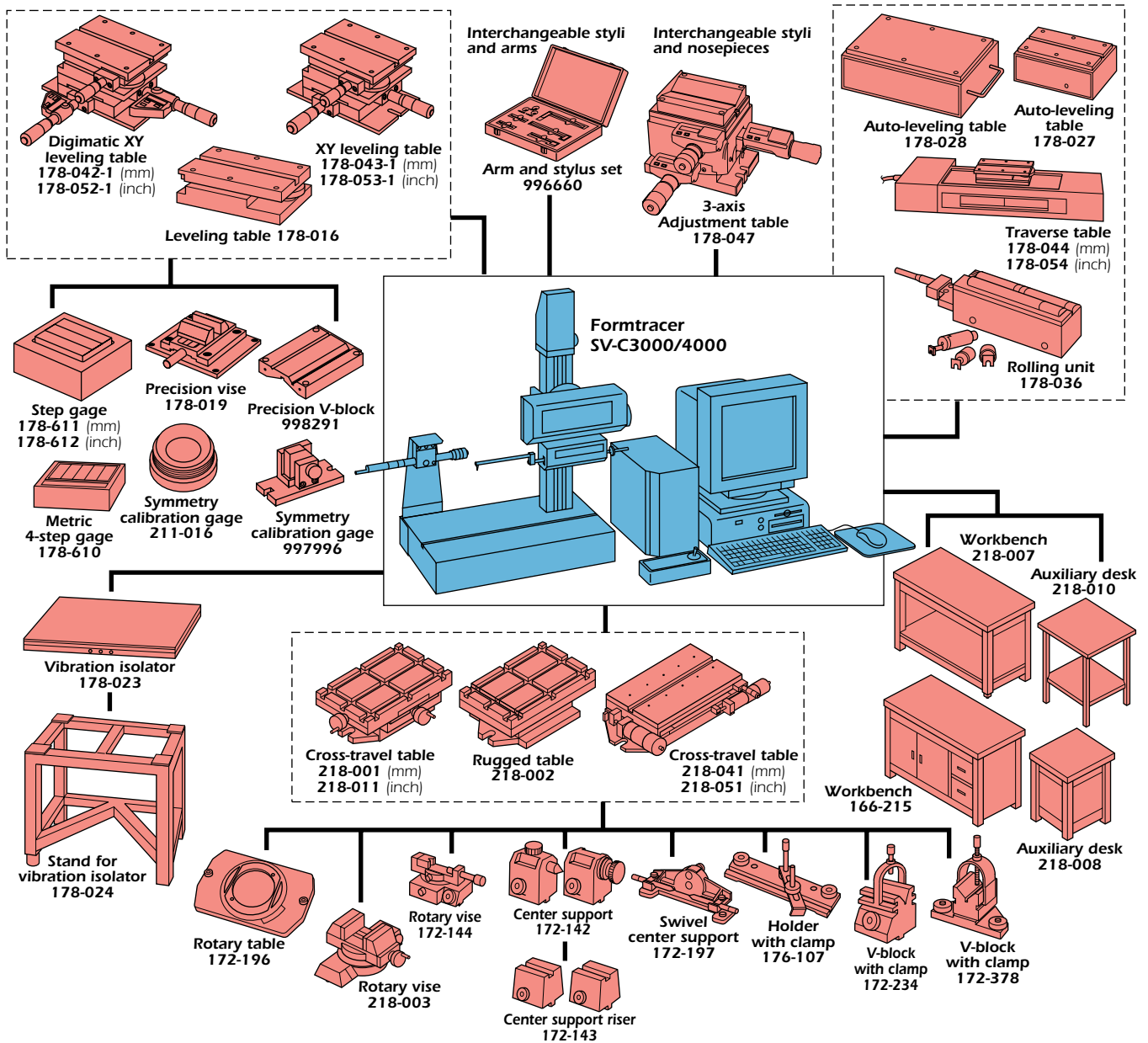
Measuring range	X-axis	SV-C3000S4/H4/W4, SV-C4000S4/H4/W4: 4" (100mm) SV-C3000S8/H8/W8, SV-C4000S8/H8/W8: 8" (200mm)
	Z-axis	2" (50mm)
Straightness		SV-C3000S4/H4/W4, SV-C4000S4/H4/W4: 32μinch/4" (0.8μm/100mm) SV-C3000S8/H8/W8, SV-C4000S8/H8/W8: 80μinch/8" (2μm/200mm)
Accuracy	X-axis	SV-C-3000S4/H4/W4: ±(40+20L)μinch [±(1+2L/100)μm]* SV-C-3000S8/H8/W8: ±(40+20L)μinch [±(1+4L/200)μm]* SV-C-4000S4/H4/W4: ±(31+20L)μinch [±(0.8+2L/100)μm]* SV-C-4000S8/H8/W8: ±(31+20L)μinch [±(0.8+4L/200)μm]*
	Z-axis	SV-C-3000 models: ±(120+ 40H )μinch [±(3+ 2H /25)μm]** SV-C-4000 models: ±(31+ 10H )μinch [±(0.8+ 0.5H /25)μm]**
Resolution	X-axis	.000002" (0.00005mm)
	Z-axis	SV-C3000 Series: .000008" (0.0002mm) SV-C4000 Series: .000002" (0.00005mm)
Stylus tip orientation		Upward/downward
Traverse direction		Forward/backward
Measuring force		30mN (3gf)
Maximum traceable angle		77 degrees for upward slope*** 87 degrees for downward slope***
Drive unit inclination range		±45 degrees
Stylus speed	Tracing	.0008"/s to .08"/s (0.02mm/s to 2mm/s), Can be specified by 7 steps.
	Retracing	.2"/s (5mm/s)
	Positioning	.004"/s to .2"/s (0.1mm/s to 5mm/s), Can be adjusted manually with a operation box.

\* L = Traverse length (inch [mm])

\*\* H = Measuring height (within ±1inch [±25mm])

\*\*\* Depends on the workpiece surface condition.

# System Diagram



## Standard accessories

- 354884 High one-side cut stylus
- 996506 Straight arm
- 546-113 Dial tension gage
- 178-043-1 Leveling table (CV-4000 only, for metric)
- 178-053-1 Leveling table (CV-4000 only, for inch/mm)
- 211-016 Symmetry calibration gage (CV-4000 only)
- 537976 Carrying bolts
- 352637 Lubricant
- 998861 Pin gage (inch) and holder
- 538333 Thread gage (p=.05")
- 178-602 Roughness specimen
- 12AAB355 Skidless nosepiece
- 178-612 Step gage
- 12AAB338 WE-curve stylus
- 996786 Inclined stage (SV-C3000 only)

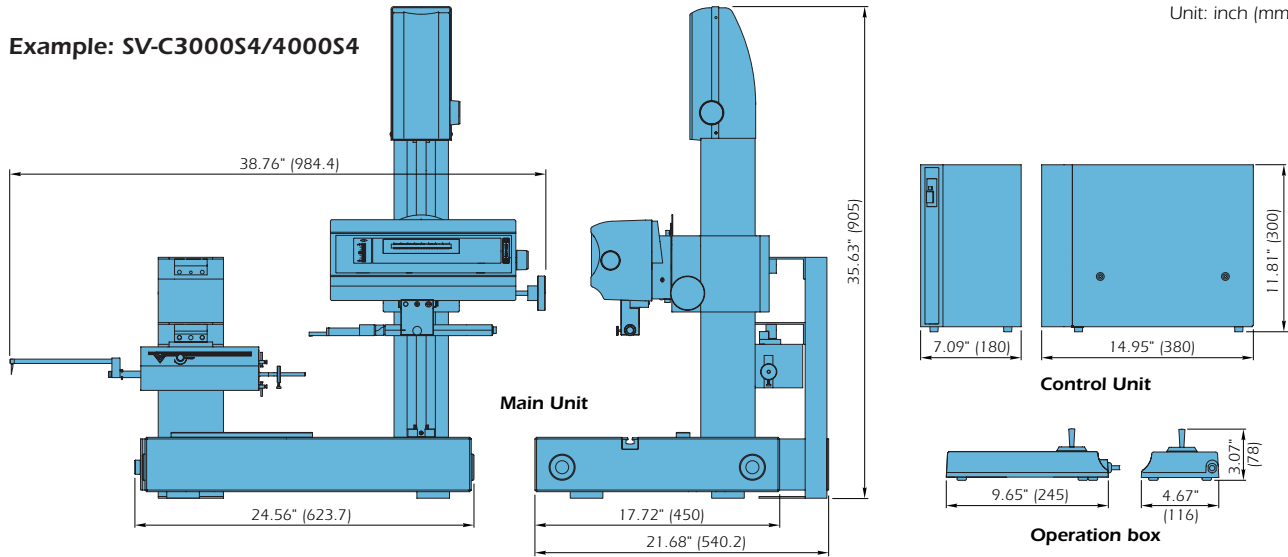
- Gauge blocks
- (SV-C3000) 611194-231 (.4")
  - 611198-231 (.8")
  - 611202-231 (2")
  - (SV-C4000) 611194-221 (.4")
  - 611198-221 (.8")
  - 611202-221 (2")

User's manual (1 set), fuse, wrenches, screwdriver, connecting cables, power cord, ground wire, machine cover, driving cable assembly, column cable assembly, detector cable assembly.

# Dimensions

Example: SV-C3000S4/4000S4

Unit: inch (mm)



# Specifications

Model	SV-C3000S4	SV-C3000H4	SV-C3000W4	SV-C3000S8	SV-C3000H8	SV-C3000W8
Measuring force of detector	0.75mN 4mN	0.75mN 4mN	0.75mN 4mN	0.75mN 4mN	0.75mN 4mN	0.75mN 4mN
Order No. 120V AC inch/mm	525-810A 850A	525-811A 851A	525-812A 852A	525-815A 855A	525-816A 856A	525-817A 857A
Model	SV-C4000S4	SV-C4000H4	SV-C4000W4	SV-C4000S8	SV-C4000H8	SV-C4000W8
Measuring force of detector	0.75mN 4mN	0.75mN 4mN	0.75mN 4mN	0.75mN 4mN	0.75mN 4mN	0.75mN 4mN
Order No. 120V AC inch/mm	525-830A 870A	525-831A 871A	525-832A 872A	525-835A 875A	525-836A 876A	525-837A 877A
X-axis traverse/measuring range	4" (100mm)			8" (200mm)		
Vertical travel of drive unit	10" (250mm)	18" (450mm)	18" (450mm)	10" (250mm)	18" (450mm)	18" (450mm)
Machine base type	Granite 24.02"x17.72" (610x450mm)		Cast iron 39.37"x17.72" (1000x450mm)	Granite 24.02"x17.72" (610x450mm)		Cast iron 39.37"x17.72" (1000x450mm)
Power supply	100-240VAC, 50/60Hz					
Power consumption	150VA (at max)					
Dimensions (WxDxH)	Main unit 38.76"x17.7"x 35.63"(984.4x 450x905mm)	38.76"x17.7"x 43.5"(984.4x 450x1105mm)	53.6"x17.7"x 43.5" (1361.4x 450x1105mm)	39.78"x17.7"x 35.63" (1010.4x 450x905mm)	39.78"x17.7"x 43.5" (1010.4x 450x1105mm)	54.62"x17.7"x 43.5" (1387.4x 450x1105mm)
	Control unit	7.1"x15.0"x11.8" (180x380x300mm)				
	Operation box	9.6"x4.6"x3.1" (245x116x78mm)				
Mass	Main unit	308 lbs. (140kg)	330 lbs. (150kg)	341 lbs. (155kg)	319 lbs. (145kg)	341 lbs. (155kg)
	Control unit	14.3 lbs. (6.5kg)				
	Operation box	1.76 lbs. (0.8kg)				

# FORMTRACER EXTREME SV-C3000/4000 CNC

CNC Form Measuring System  
evolves form measurement.



**Note:**

All our product details, in particular the illustrations, drawings, dimension and performance details and other technical specifications contained in this publication are to be considered to be approximate average values. To this extent, we reserve the right to make changes in design, technical data, dimensions and weight. Our specified standards, similar technical rules and technical specifications, descriptions and illustrations of the products are correct at the time of printing. The current version of our general terms and conditions also apply. Only offers which we have submitted can be considered to be definitive.

Coordinate Measuring Machines

Vision Measuring Systems

Surface, Form and Contour  
Measurement

Optical Measuring

Sensor Systems

Hardness Measuring

Digital Scale and DRO Systems

Small Tool Instruments and  
Data Management

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**Precision is our Profession**