

Bright STRATO

Series 355 – CNC Coordinate
Measuring Machines

Mitutoyo



The Bright STRATO CMM Series with
Real-time Temperature Compensation!

Features

Temperature Compensation

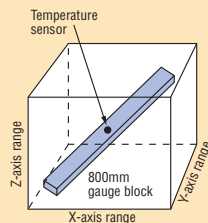
The Bright STRATO offers real-time temperature compensation on the X,Y and Z axes and on the actual workpiece. Temperature variations 64.4°F to 71.6°F (18°C to 22°C) on the shop floor are adjusted to ensure accurate measurements. This capability expands the range of CMM applications to shop floor functions.

Temperature sensor

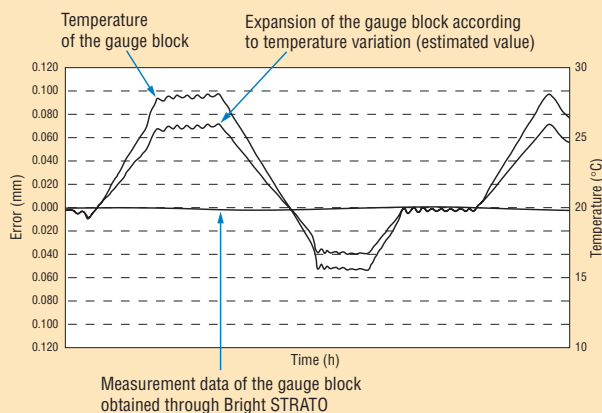
Two temperature sensors are used to monitor the workpiece temperature in addition to the temperature sensor incorporated in each axis.

Experiment data

The graph below shows measurement data obtained on an 800mm gauge block set up as illustrated, and subjected to ambient temperature variation. It is clear from the graph that measurements are stable, yielding dimensions at the temperature of 68°F (20°C), despite the dimensional change of the gauge block under the temperature variation.



Measurement data with temperature compensation



Accuracy in the STRATO

$E=(1.4 + 3L/1000)\mu\text{m}$ – Bright STRATO 707/710

$E=(1.7 + 3L/1000)\mu\text{m}$ – Bright STRATO 910/916

Real-time Temperature Compensation

64.4°F to 71.6°F (18°C to 22°C)

Moving Speed

16.93"/s (430mm/s) at max – Bright STRATO 700/900

19.68"/s (500mm/s) at max – Bright STRATO 1600

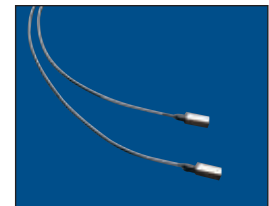
High Accuracy and High Speed

The Bright STRATO provides high measuring accuracy of $E=(1.4 + 3L/1000)\mu\text{m}^*$ even at its maximum drive speed of 16.93"/s (430mm/s) with 0.17G acceleration. Incorporating innovative technology – lightweight materials and a new machine structure – have achieved excellent motion stability and rigidity.

*Bright STRATO 707/710



Multi-function Joystick Box

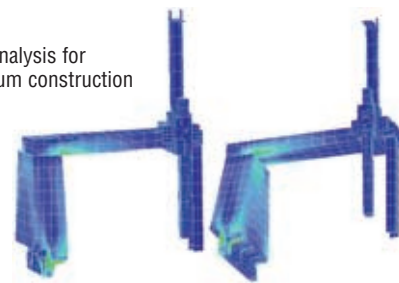


Temperature sensor

Vibration-free Operation

Optimum machine structure has been determined for the Bright STRATO through the FEM (Finite-Element Method) and modal analysis, resulting in vibration-free operation.

FEM analysis for optimum construction



Complete Wrap Around Covering for Guideways and Bridges

Advanced Structural Design with Low Mass/High Stiffness Ratio

Excellent Performance/Cost Ratio

Digital Servo Controller

Bright STRATO

Accurate 3-D measuring on the shop floor is now more important than ever.

Mitutoyo's new Bright STRATO CMM, a high accuracy CNC coordinate measuring machine with real-time temperature compensation from 64.4°F to 71.6°F (18°C to 22°C) takes you there.

Now instead of taking parts to a lab, the Bright STRATO provides both high accuracy and fast

measuring speeds right on the manufacturing line. Whether you're using point-to-point probing for part inspection or scanning to improve your production processes, Bright STRATO keeps you one step ahead of the competition.

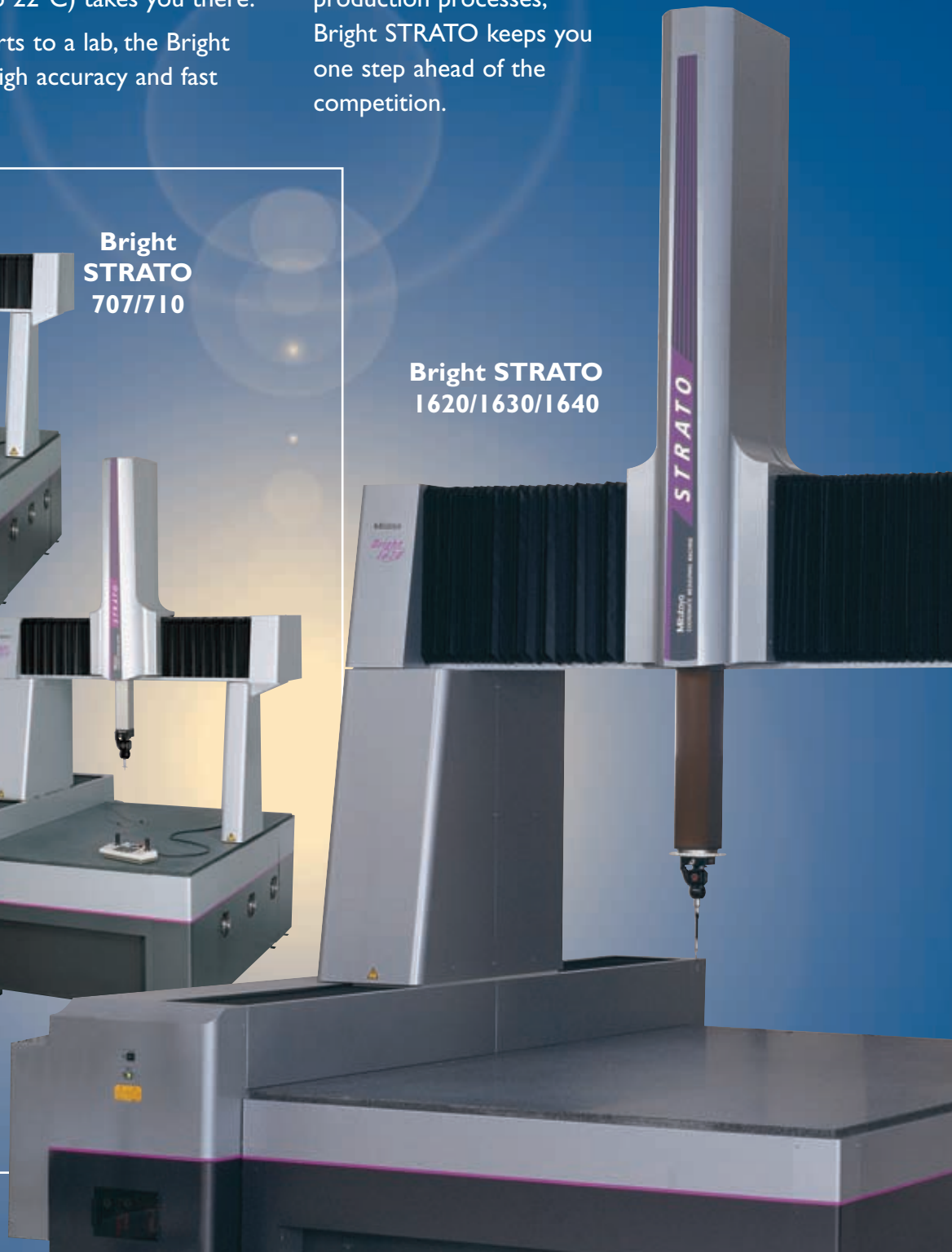


**Bright
STRATO
707/710**

**Bright
STRATO
910/916**



**Bright STRATO
1620/1630/1640**



Specifications

Bright STRATO Series

BRIGHT STRATO 707		BRIGHT STRATO 710		BRIGHT STRATO 910		BRIGHT STRATO 916	
Measuring Range	X-axis	27.75" (705mm)			35.62" (905mm)		
	Y-axis	27.75" (705mm)	39.56" (1005mm)		39.56" (1005mm)		63.18" (1605mm)
	Z-axis	23.81" (605mm)					
Resolution		.000004" (0.0001mm)					
Drive Speed		CNC: Max moving speed = 430 mm/s(3D) Measuring speed = 1~3mm/s J/S: Max moving speed = 80 mm/s Measuring speed = 0~3mm/s					
Maximum Workpiece Height***		29.13" (740mm)					
Maximum Workpiece Load		1100 lbs (500kg)	1760 lbs (800kg)		1760 lbs (800kg)		2640 lbs (1200kg)
Air Pressure		0.4MPa (4kgf/cm ²) or 58 PSI 50 liters per minute (in normal state) or 1.8 CFM					
Measuring Table							
	Material	Granite stone					
	Size	33.07" x 51.97" (840 x 1320mm)	33.07" x 63.78" (840 x 1620mm)		40.94" x 67.72" (1040 x 1720mm)		40.94" x 91.34" (1040 x 2320mm)
Dimensions	Width	62.48" (1587mm)			70.35" (1787mm)		
	Depth	60.67" (1541mm)	72.48" (1841mm)		76.42" (1941mm)		105.55" (2681mm)
	Height	106.89" (2715mm)					
Machine Weight		3097 lbs (1405kg)	3604 lbs(1635kg)		4277 lbs (1940kg)		6526 lbs (2960kg)
Accuracy	ISO 10360-2*	E = 1.4+3L/1000 μm R = 1.8μm (As using TP-200)			E=1.7+3L/1000 μm R = 1.9μm (As using TP-200)		
	ANSI/ASME** B89. 1.12M	Ball Bar performance = 7.5μm Repeatability = 4.0μm			Ball Bar performance = 8.5μm Repeatability = 4.0μm		
Temperature	Range	64.4°F~71.6°F (18°C ~ 22°C)					
	Variation	1.8°F (1.0°C) / hour, 9.0°F (5.0°C) / 24 hours					
	Gradient	1.8°F (1.0°C) /m (Vertically and Horizontally)					

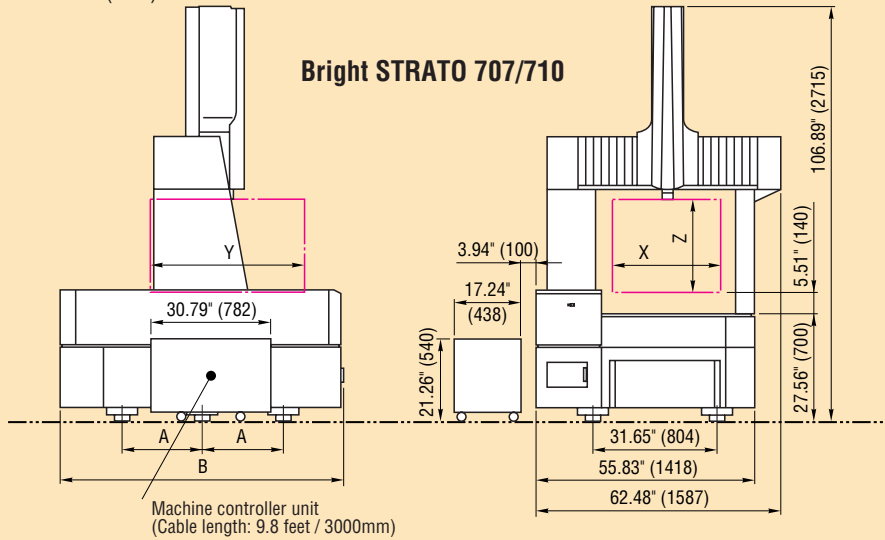
		BRIGHT STRATO 1620	BRIGHT STRATO 1630	BRIGHT STRATO 1640
Measuring Range	X-axis	63.18" (1605mm)		
	Y-axis	78.93" (2005mm)	118.30" (3005mm)	157.67" (4005mm)
	Z-axis	47.44" (1205mm) / 59.25" (1505mm)		
Resolution		.000004" (0.0001mm)		
Drive Speed		CNC: Max moving speed = 500 mm/s(3D) Measuring speed = 1~3mm/s J/S: Max moving speed = 80 mm/s Measuring speed = 0~3mm/s		
Maximum Workpiece Height***		53.14" (1350mm) / 64.96" (1650mm)		
Maximum Workpiece Load		7710 lbs (3500kg)	8810 lbs (4000kg)	9920 lbs (4500kg)
Air Pressure		0.4MPa (4kgf/cm ²) or 58 PSI 150 liters per minute (in normal state) or 5.4 CFM		
Measuring Table				
	Material	Granite stone		
	Size	72.83" x 129.13" (1850 x 3280mm)	72.83" x 168.50" (1850 x 4280mm)	72.83" x 207.87" (1850 x 5280mm)
Dimensions	Width	115.23" (2937mm)		
	Depth	145.08" (3685mm)	184.45" (4685mm)	223.71" (5685mm)
	Height	170.87" (4340mm) / 194.49" (4940mm)		
Machine Weight		21054 lbs (9550kg) 21165 lbs (9600kg)	30865 lbs (14000kg) 30975 lbs (14050kg)	39683 lbs (18000kg) 39793 lbs (18050kg)
Accuracy	ISO 10360-2*	E = 3.8+4L/1000 µm / E = 4.8+5L/1000 µm R = 4.0µm / R = 5.5µm (As using TP-200)		
	ANSI/ASME** B89. 1.12M	Ball Bar performance = 10.0µm / 14.0µm Repeatability = 4.5µm / 5.5µm		
Temperature	Range	64.4°F~71.6°F (18°C ~ 22°C)		
	Variation	1.8°F (1.0°C) / hour, 3.6°F (2.0°C) / 24 hours		
	Gradient	1.8°F (1.0°C) /m (Vertically and Horizontally)		

- * **ISO 10360-2**
E: Error of indication of volumetric length measurement,
R: Probing error,
L: Measuring length (mm)
- ** **ANSI/ASME B89.1.12M**
Ball bar length: 19.69" (500mm)
- *** Distance between the bottom face of the Z spindle and the table top.

Dimensions

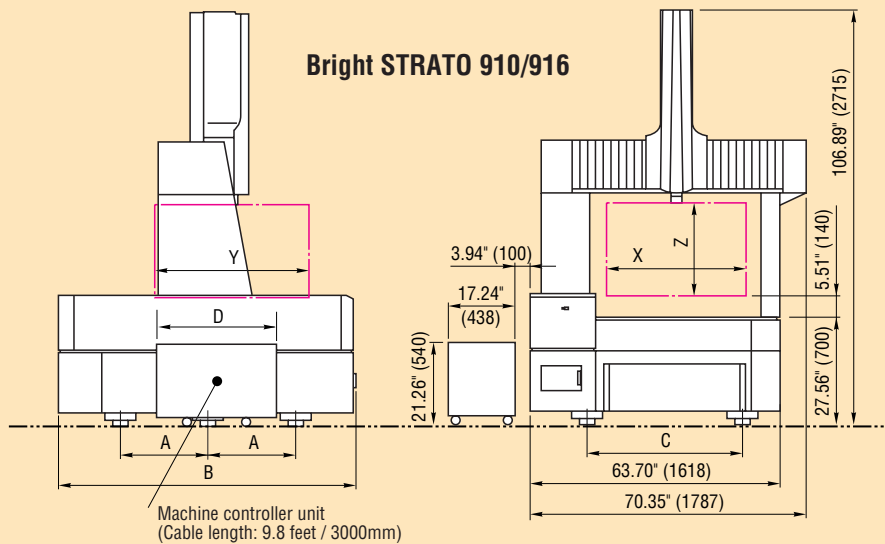
Unit: inch (mm)

Bright STRATO 707/710



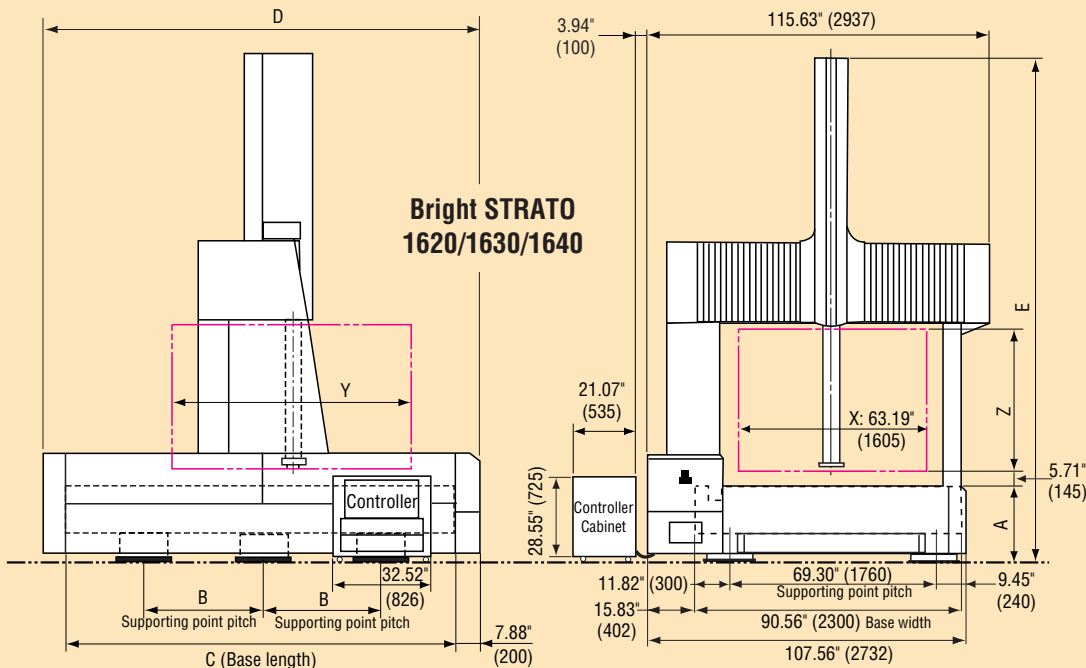
Model	707	710
A	14.57" (370mm)	20.47" (520mm)
B	60.67" (1541mm)	72.48" (1841mm)

Bright STRATO 910/916



Model	910	916
A	22.44" (570mm)	31.50" (800mm)
B	76.42" (1941mm)	105.55" (2681mm)
C	39.53" (1004mm)	39.37" (1000mm)
D	30.79" (782mm)	32.52" (826mm)

Bright STRATO 1620/1630/1640



Model	1640
A	27.56" (700mm)
B	64.96" (1650mm)
C	207.88" (5280mm)
D	223.82" (5685mm)
E	172.84" (4390mm)
Z	47.25" (1200mm)
	59.06" (1500mm)

A close-up photograph of a Mitutoyo CMM probe scanning a complex, multi-layered metal part. The probe is a thin, black, cylindrical tool with a red tip, mounted on a white and blue CMM arm. The part being scanned is a large, circular, multi-layered metal component with a central bore. The background is a blurred blue and white. The probe is positioned directly above the part, and a small red light is visible at the tip of the probe.

Scanning

Higher measuring certainty with higher throughput – both of these attributes are possible on Strato CMMs with optional scanning probes and SCANMeasure® software. You can scan features, surfaces and profiles in continuous mode much faster than gathering points one at a time.

Due to the design of analog or digital scanning probes, a stream of point data is gathered which identifies a part feature. For example, a precision bore that could be measured with six or eight touch-points can be scanned to capture a thousand data points in less time due to the efficient motion of scanning. This higher density of data, when processed into a measurement value, delivers a consistently higher degree of measurement certainty on the Strato, or any CMM.

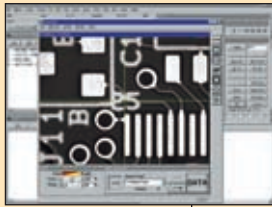
In addition, using our example of a precision bore once more, you'll be able to evaluate roundness, cylindricity and squareness along with position and diameter from the data obtained in a single scan.

Other uses of scanning include high-density inspection of precision mating surfaces and verification of 2-D profiles against design data. You can even “learn” unknown profiles and 3-D surfaces by scanning along section lines, exporting the surface data to a CAD System and building an engineering model from a master part. For general-purpose scanning, Mitutoyo offers the Renishaw® PH-10M multi-wire indexing wrist, SP-600XE analog probe and probe changing system. This allows for positioning of the probe on multiple angles and even mixing modes of operation to include touch trigger, scan and vision automatically within a CNC program.

For scanning with the highest precision, the Mitutoyo-built MPP-5 digital probe is rigidly mounted to the vertical ram and offers a family of styli specifically engineered to suit most scanning applications.

Mitutoyo

Accessories



The vision measuring software VisionPak is available. It runs on the GEOMeasure™ software system.

Artie has new image
From Apex brochure



PH10M
and TP7M



PH50



TP200 and
SCR (Stylus
Changing Rack)



PH10M and ACR
(Autochange Rack)

SCR 20, SCR 200, SCR 600

QVP Vision Probe

The QVP Vision Probe allows your CMM to be a high performance full-size vision measuring machine at a minimum cost. It will measure microscopic dimensions and elastic or very flat workpieces which are difficult to measure with conventional contact-type probes. The QVP also improves the inspection efficiency with sub-second image processing speed. Two types of probe attachment are available; the auto-joint connector and the manual-positioning shank.

Scanning Probes

These special probes allow the user to perform multi-point measurements efficiently while scanning the profile of a workpiece.



SP600XE



MPP-5

Touch Signal Probes and Probe Heads

Renishaw®'s high precision touch-signal probes and manual/motorized probe heads are available for the Bright Apex series CMM. Refer to the Renishaw probe system catalog for information.

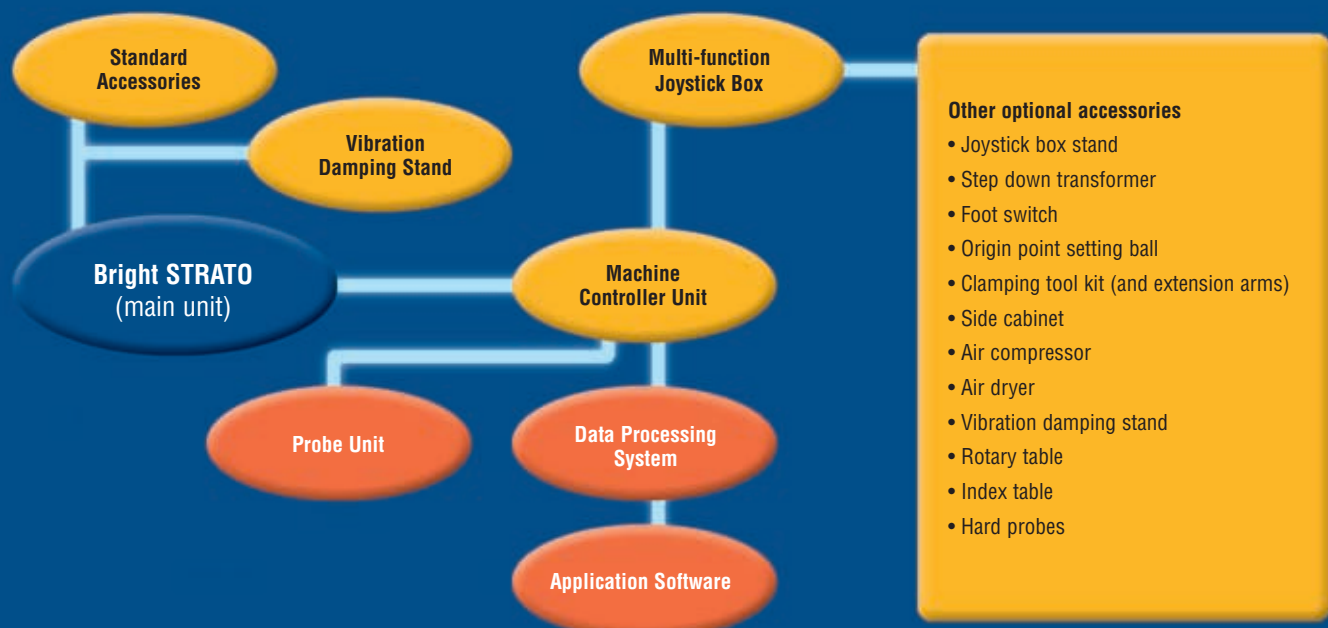
Applicable touch-signal probes

TP2-5W, TP20, TP200, TP7M, MIH (MH8)

Applicable probe heads

PH6M, PH10M, PH10T, PH50

System Diagram



Software

Powerful data processing software is available to meet diversified measuring requirements. Its capabilities can be extended with optional peripheral devices such as the scanning probe, vision probe, index table, rotary table*, SCR (stylus changing rack), and ACR (probe auto-change rack). In addition, the unique joystick box facilitates prototype verification while permitting a part program to be easily created with the "learn" function.

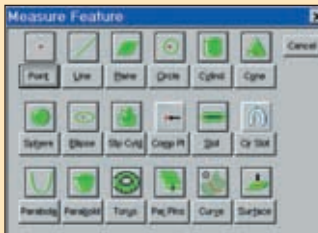
*Not available for the Bright Apex 504

GEOMeasure™ 6000 CNC Software

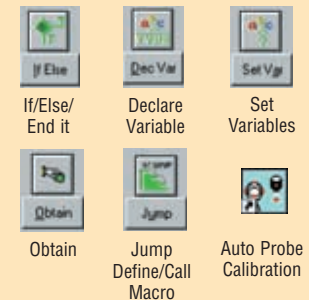
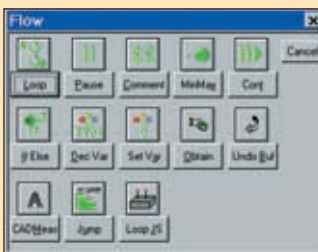
GEOMeasure™ 6000 contains the full capability of the GEOMeasure™ system, including some advanced measuring capabilities that go beyond GEOMeasure™ 4000 features. You can add the CADMeasure™ module to read CAD data directly from AutoCAD®. Adding other modules such as SCANMeasure™ or STATMeasure™ add even more productivity.

GEOMeasure™ 6000 offers advanced geometric measuring capabilities.

Features



Flow



GEOMeasure™ 3000
Manual

GEOMeasure™ 4000
CNC

GEOMeasure™ 6000
CNC

CADMeasure™

SCANMeasure™

STATMeasure™
STATMeasure™ Plus

DMISPort™ 6000

GEOPort™ 6000

MEASUREPort™ 2100

CADMeasure / Valisys™

MeasurLink® Quality Management Software

SPC Process Manager • Gage R&R
SPC Process Analyzer • Gage Management

For more software information, request GEOMeasure Bulletin No. 1419A.



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