



**Off-Line ID/OD/Wall Measurement System**

## **BenchMike 283 Series**

**for Pipe and Tube Samples**

### **The BenchMike Advantage:**

#### **Accuracy**

- Patented optical design and edge-sensing electronics provide high-precision measurements
- Auto-compensation features maintain accuracy throughout entire measurement range and adjust for thermal expansion outside laboratory environments

#### **Reliability**

- Non-contact measurement technique provides the same level of accuracy regardless of operator
- Tolerance checking quickly alerts the operator of out-of-tolerance conditions
- Mounting fixtures from Beta LaserMike ensure the test piece is always properly presented to the gauge

#### **Ease-of use**

- A touch-screen interface provides simple operation and setup
- A library list stores product "recipes" and allows the operator to switch products quickly and easily
- Several input/output (I/O) ports allow flexible integration with other devices

### **The industry's most accurate, reliable, and easiest-to-use gauging system**

The BenchMike 283 series from Beta LaserMike provides fast and accurate measurements of manufactured parts or cut samples of extruded parts. Used either in a quality control (QC) laboratory or on the plant floor, BenchMike gives operators a simple and repeatable system for measuring parts and immediately knowing whether they meet specifications within tolerances of less than 1  $\mu\text{m}$  (0.00004 in.).

Laser technology allows BenchMike to measure multiple product dimensions without touching, deforming, scratching, or damaging the part. Unlike other micrometers and mechanical indicators that can err in zero setting, end play, calibration, or sensitivity of the user, BenchMike gives repeatable measurements regardless of the operator. With BenchMike, there is nothing to adjust between part measurements and nothing to wear out.

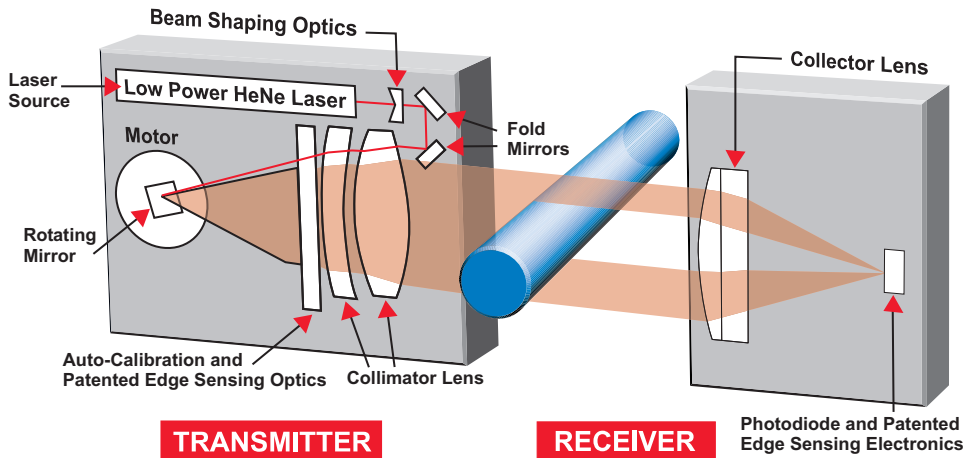
**BETA LaserMike**  
Measured by Commitment

## Innovative Technology

Beta LaserMike operates on the cutting edge of measurement technology. In 1973, we patented our innovative laser measurement technique (the first of its kind in the world), and today we continue to improve our designs by making them easier to use while maintaining precision accuracy.

Each BenchMike contains a transmitter, receiver, processor electronics, and a touch-screen display in an integrated package. A thin band of high-speed scanning laser light is projected from the transmitter by a low-power laser source, a scanning mirror, and a series of optics.

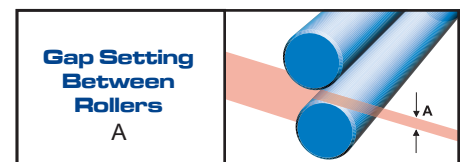
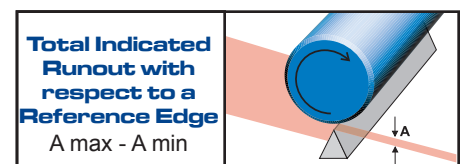
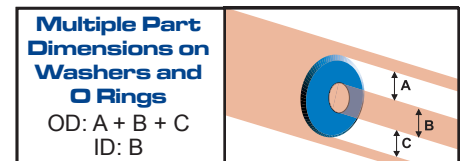
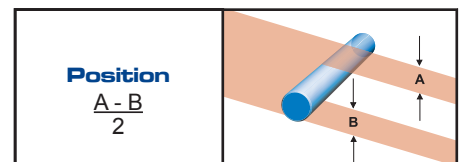
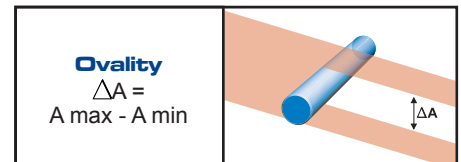
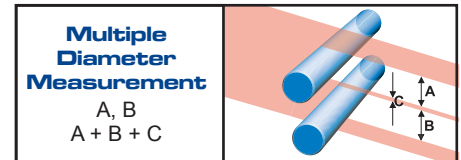
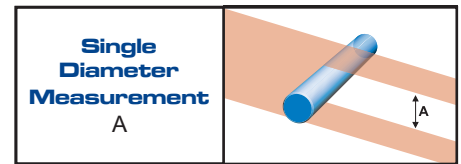
The receiver houses a collector optic, photodiode, and preamplifier. Through our patented edge-sensing process, the laser light signal entering the receiver is used to calculate the distances between the edges of the product. Dimensional data is instantly displayed and can be transmitted to a computer for further processing.



### No Field Calibration Required

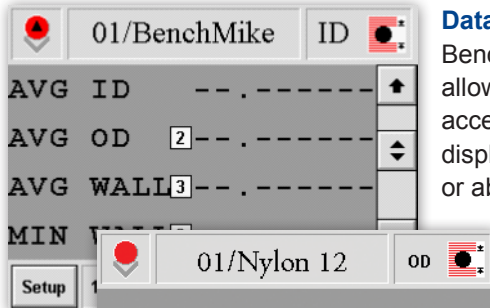
BenchMike uses a combination of built-in autocalibration and dual differentiation technology providing unmatched accuracy without field calibration. Never has it been easier to incorporate precision measurement on the production line, and since every system includes a programmable RS-232C interface, collecting and sending data to your storage and control system is almost effortless.

Contact your local Beta LaserMike Sale Engineer and start seeing the benefits of improved quality, increased production yield, and decreased material cost on the bottom line today.



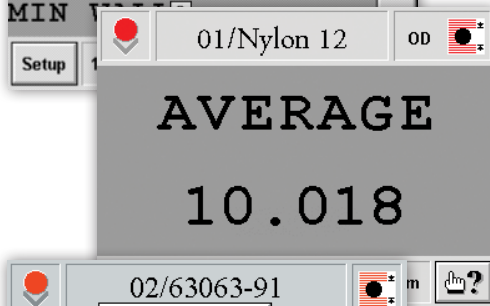
# Simple Touch-Screen Interface Lets You Easily Access BenchMike Features and Functions

BenchMike's touch-screen graphical user interface (GUI) gives operators a quick and simple means of viewing dimensional measurements, accessing gauge and system information, and changing parts. Screen layouts are customized for the needs of the user or application and the "look and feel" is simple for any user familiar with Windows.



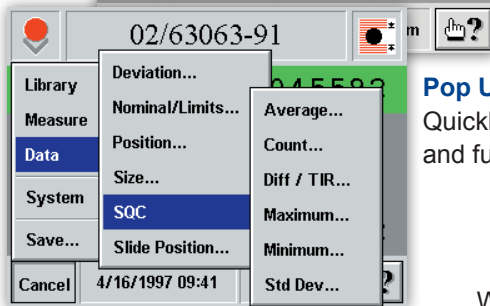
## Data Display:

BenchMike has advanced display capabilities allowing you to display measurement data, access menus to configure BenchMike, and display general information such as presence or absence of error conditions.



## Magnified Display

Magnify measurement items on the screen for visibility from a distance.

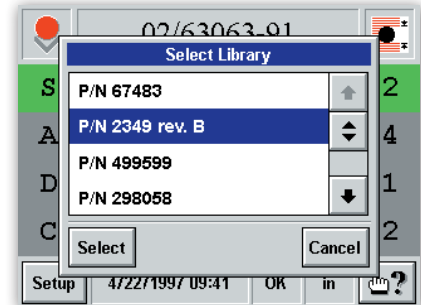


## Pop Up Menus

Quickly, easily access BenchMike features and functions via clear pop-up menus.

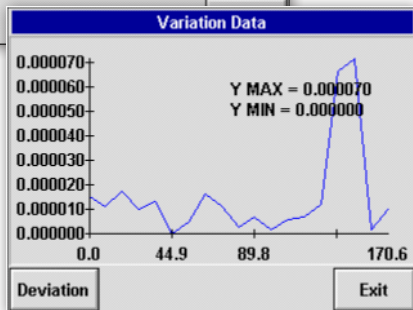
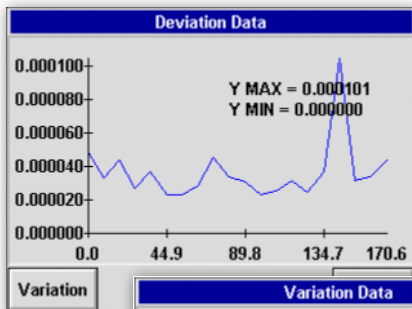
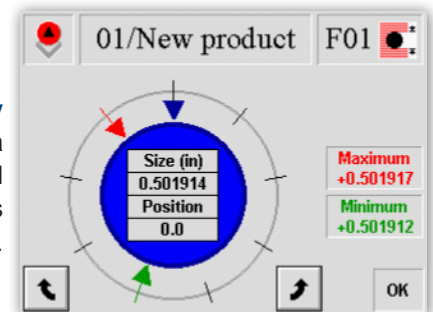
## Rotational Cross-Section Display

When using a rotary ID/OD/Wall fixture, create a rotary graph that displays the size, position, and minimum and maximum data for measurements taken at multiple points around the product.



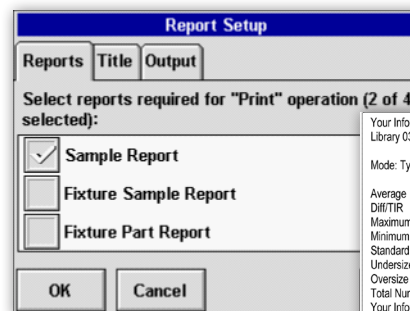
## Library (Part) Selection

Use BenchMike libraries to store and recall how the measurements are to be taken, and manage other system setup information via separate libraries. By defining libraries for each product or for different fixtures, you can shorten set-up times for various parts or applications.



## Rotational Deviation/Variation Graphs

Create Deviation and Variation graphs when using an intelligent fixture. The graphs show the deviation from nominal at each position and size variation between positions.



## Robust Reporting

Easily generate Sample, Batch, and Fixture reports. Use the Sample Report when taking a single measurement of multiple parts. Use the Batch report to summarize statistical results for all measured parts. Use the Fixture reports to generate similar sample and batch details when using automated part-positioning fixtures.

Your Information Here		Batch Report
Library 03/Untitled/F01		01/31/2009 8:34a Page 1 of 2
Mode: Type 7, Units:Inches (in)		
Average	0.049816	
Diff/TIR	0.000006	
Maximum	0.049818	
Minimum	0.049812	
Standard Deviation	0.0000032	
Undersize Samples	0	
Oversize Samples	0	
Total Number of Samples	3	
Your Information Here		Batch Report
Library 03/Untitled/F02		01/31/2009 8:34a Page 2 of 2
Mode: Type 8, Units:Inches (in)		
Average	0.049957	
Diff/TIR	0.000005	
Maximum	0.049949	
Minimum	0.049954	
Standard Deviation	0.0000029	
Undersize Samples	0	
Oversize Samples	0	
Total Number of Samples	3	



# Solutions for Pipe & Tube Applications

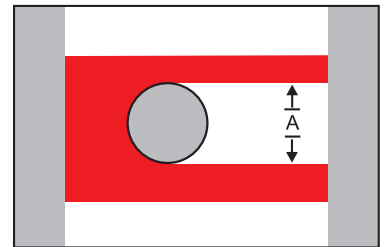
The BenchMike 283 series from Beta LaserMike is the ideal solution for fast, simple, and accurate measurements of cut samples of extruded pipe or tube. BenchMikes are used worldwide on extrusion plant floors and quality control (QC) laboratories to give operators and technicians immediate feedback of product dimensions.

Pipe and tube manufacturers must ensure that the dimensions of their products are maintained within tight specifications to ensure the quality of the product and the profitability of the company. To satisfy this need, the BenchMike utilizes the latest in laser gauging technology to provide high-precision measurements of the OD, ID, wall thickness, concentricity and ovality of a pipe or tube within specifications of less than  $1\mu\text{m}$  (0.00004 in.).



## OD Measurement

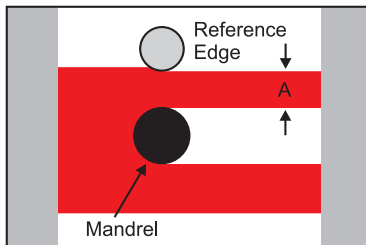
For precision OD measurements, simply place your pipe or tube sample on the V-block fixture and the BenchMike will instantly measure it. Using the V-block and BenchMike, an operator can measure dozens of parts per minute and with a much higher level of accuracy than any other method available for sample inspection. And with the use of laser technology, the measurements will be repeatable from one operator to another.



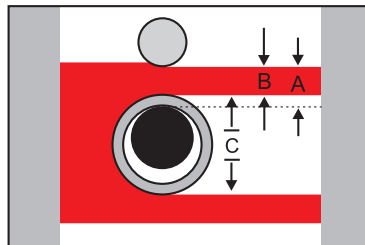
Single Diameter Measurement  
 $\text{OD} = A$

## ID/OD/Wall Measurement

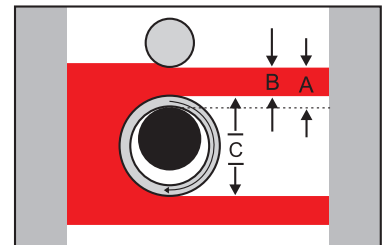
For precision ID, OD, and wall thickness measurements, simply place a pipe or tube sample on the ID/OD/Wall fixture and the BenchMike will calculate all of the dimensions. The ID/OD/Wall fixture can also automatically rotate a sample to a pre-defined number of positions for measurements at multiple points around the product. This rotation also allows for the calculation of concentricity and ovality of the product. The graphical user interface has options to view the rotational cross section of the product and a graph that shows deviation or variation at the various rotational degrees of measurement.



**Step 1:** Master on reference edge and mandrel



**Step 2:** Place product on mandrel and take measurements  
 $\text{Wall} = A - B$     $\text{OD} = C$   
 $\text{ID} = \text{OD} - (2 \times \text{Wall})$



**Step 3:** Rotate the product to attain multiple points of measurement as well as concentricity and ovality  
 $\text{Concentricity} = \Delta (A - B)$   
 $\text{Ovality} = \Delta C$

# Specifications

## Measurement Specifications

	Model 283-10	Model 283-20
Measurement Range <sup>1</sup>	0.100 to 25.4 mm (0.004 to 1.0 in.)	0.254 to 50 mm (0.010 to 2.0 in.)
Repeatability <sup>2</sup>	±0.25 µm (0.000010 in.)	±0.5 µm (0.000020 in.)
Linearity	±0.9 µm (±0.000036 in.)	±1.5 µm (±0.000060 in.)
Measurement Area Depth Of Field	±.75 x 25 mm (±0.030 x 1.0 in.)	±1.5 x 50 mm (±0.060 x 2.0 in.)
Laser Beam Spot Size	100 µm (0.004 in.)	250 µm (0.010 in.)
Laser Beam Velocity	50 m/sec. (2,000 in./sec.)	100 m/sec. (4,000 in./sec.)
Temperature Coefficient	<0.2 µm/°C (<0.000004 in./°F)	
Calibration	Factory calibrated	
Scan Rate	100/sec	

<sup>1</sup>For ID/OD/Wall applications, maximum OD is dependent on product.

<sup>2</sup>Accuracy of ID/OD/Wall measurement is dependent on product.

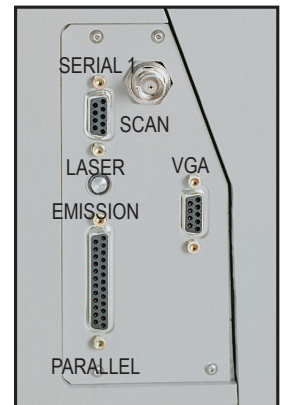
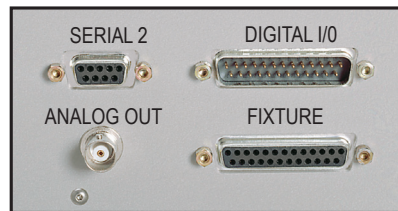
## General Specifications

Operating Temperature	7° to 36° C (45° to 97° F) at < 90% relative humidity
Storage Temperature	-20° to 60° C (-4° to 140° F)
Dimensions (H x W x D)	254 x 635 x 228 mm (10 x 25 x 9 in.)
Weight	17 kg (38 lb.)
LaserSource	HeNe gas laser; <1 mW output
Display	320 x 240 liquid crystal display; 256 colors
Power Requirements	100-240 volts AC (+5% to -10%), 50/60 Hz (+/-2 Hz) 100 watts total power

## Input/Output

The BenchMike provides a variety of input/output connectors to allow flexible integration with other devices. The available BenchMike I/O includes:

- Serial ports to link with computers or data gathering devices
- Parallel port to connect to printers for printed reports
- Digital I/O port for connection of alarm outputs to indicate out-of-tolerance conditions and other errors, as well as digital inputs to activate functions remotely
- Analog output BNC port for sending information to chart recorders or PLCs
- Fixture port for connection to intelligent fixtures capable of moving and rotating the test pieces
- Scan output BNC port for diagnostic access to the laser scan signal













# Modular Fixtures

## Ready-To-Mount Flexibility

Beta LaserMike offers an extensive line of ready-to-mount modular fixtures from simple manual fixtures to fully automatic and intelligent fixtures. These fixtures hold workpieces properly and effectively for any gauging need. Simply attach these easy-to-install fixtures to your BenchMike for precise, reliable measurements without calibration.

We provide a full line of heavy-duty fixtures to measure small and large parts, along with automatic motorized fixtures for part translation and rotation. For your custom needs, the Beta LaserMike Special Engineering group excels at developing fixtures for special applications.

	Fixture	Description	Part #
	<b>V-Block: General Purpose, Fixed</b>	Used for measuring parts positioned on their outside diameter.	83855 (283-10) 83854 (283-20)
	<b>V-Block: General Purpose, Adjustable</b>	Designed for ultra fine wire or other material that must be centered for best measurement accuracy. Holds wires in the range of 0.001 to 0.400 in. (0.025 to 10.16 mm).	84260
	<b>V-Block: General Purpose, Full-Range, Adjustable</b>	Enables part centering and measurement over the full measuring range of the BenchMike Series.	83976
	<b>V-Block: Adjustable</b>	Supports parts that must be held on their outside diameters. Must be mounted on a slide.	83609
	<b>Slide: Universal Manual</b>	Used to linearly position parts by hand. Available in 18, 25 or 32 in. (457, 635 or 829 mm) lengths.	83610 (18 in.) 83611 (25 in.) 83618 (32 in.)
	<b>Slide: Digital Readout</b>	Used to linearly position parts to predetermined positions for measurement, and/or measure the points distance between two on a part. Available in 18, 25 or 32 in. (457, 635 or 829 mm) lengths.	83616 (18 in.) 83617 (25 in.) 83863 (32 in.)
	<b>ID/OD/Wall: Small Tube &amp; Hose, Auto-Rotating</b>	Automatically rotates enabling inside diameter, outside diameter, and wall thickness measurements of small tubular products such as medical tubing, hose, and glass. Can be supplied with separate Force Gauge Option (AM8248).	84019
	<b>ID/OD/Wall: Small Tube &amp; Hose, Manual</b>	Enables inside diameter, outside diameter, and wall thickness measurement of small tubular products such as medical tubing, hose, and glass.	83921
	<b>ID/OD/Wall: Large Tube &amp; Hose, Auto-Rotating, Heavy Duty</b>	Enables the inside diameter, outside diameter, and wall thickness measurement of large, heavy tubular products such as metal tube, hose, and glass.	84291
	<b>Chuck: Auto-Rotating</b>	Motorized rotation of shafts or wires to detect variation in diameter around the circumference. Keyless precision chuck holds diameters 0.030 to 0.50 in. (0.76 to 12.7 mm).	84015

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## Options

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Special accessories are available to address certain non-standard applications or data needs:

- **Small Spot Size Option**  
Special measurement range from 25  $\mu\text{m}$  (0.001 in.) to 10 mm (0.4 in.) (factory installed option)
- **Digital I/O Interface**  
High-current open collector outputs for Hi/Low/Go and Warning Limits. A footswitch accessory lets the user activate the gauge's measure function or initiate single measurements.
- **Language Legends**  
Can be used worldwide with the display language option.
- **Transparent Object Measurement**  
Enables the BenchMike to measure the diameter of transparent material, such as clear plastic tubing and glass rods.

- **Force Gauge**  
For precision ID, OD, and Wall Thickness measurements on thin-wall small diameter tubing, such as medical tubing, simply place a tube sample on the ID/OD/Wall fixture, apply the desired force on the sample, and BenchMike will calculate all the dimensions.



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## Other Beta LaserMike Measurement and Control Solutions

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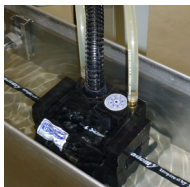
In addition to our BenchMike off-line gauging system, Beta LaserMike offers a complete portfolio of measurement and control solutions for on-line production applications. Our solutions enable manufacturers to realize a number of performance and production benefits, such as improved product quality, enhanced process reliability, increased productivity, and reduced manufacturing costs.



**AccuScan**  
*High-Speed Diameter and Ovality Measurement Systems*



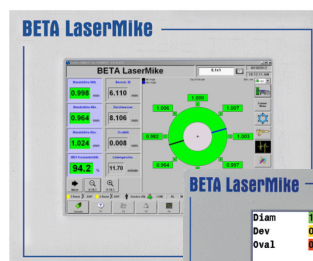
**LaserSpeed**  
*Non-Contact Length and Speed Measurement Systems*



**UltraScan**  
*Wall and Concentricity Measurement Systems*



**LN Detectors**  
*Lump and Neckdown Measurement Systems*



**DataPro**  
*Process Control and Data Management Systems*



**BETA LaserMike**  
Measured by Commitment



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## Serving Your Measurement & Control Needs with World-Class Solutions

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### About Beta LaserMike

Beta LaserMike provides integrated process control solutions using a wide range of non-contact measurement technologies designed to improve product quality and reduce manufacturing costs. These solutions provide in-process dimensional monitoring, control, and sample/part inspection of products such as wire and cable, fiber optics, metals, rubber and plastic, flat rolled goods, pipe and tube, and other manufactured goods. Every system is backed by Beta LaserMike's world-class service and support organization. With offices around the globe, we're committed to serving your unique measurement application needs.

# **BETA LaserMike**

Measured by Commitment

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