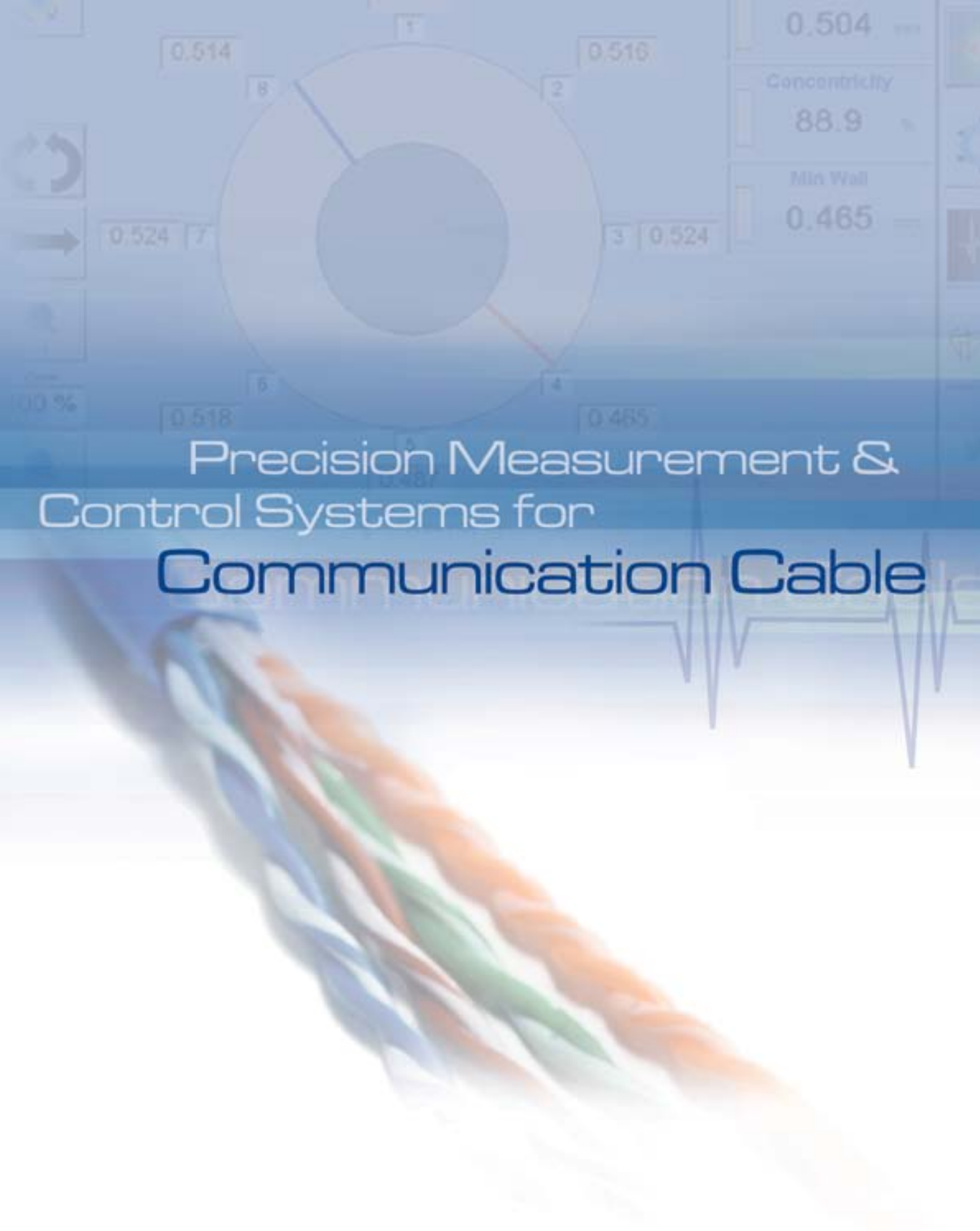
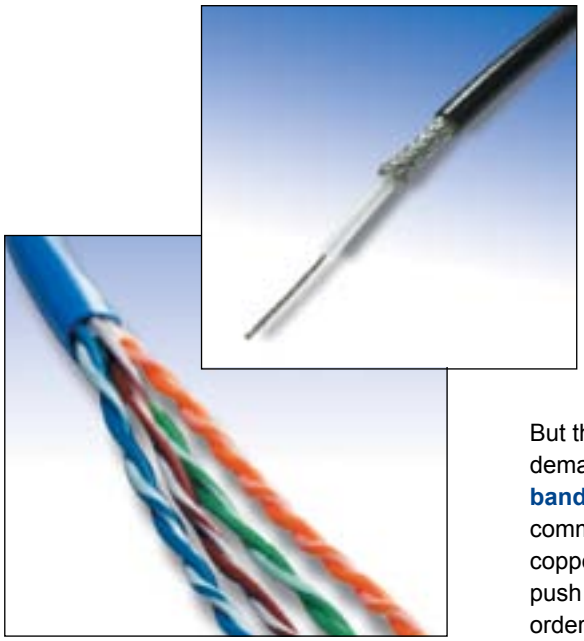


Precision Measurement & Control Systems for Communication Cable

BETA LaserMike

Contents

BETA LaserMike



The Challenges of Communication Cable Production

Communication cable manufacturers face a number of production challenges based around **productivity and quality.** A highly competitive marketplace that continues to consolidate creates challenges for the manufacturer to reduce costs, especially in the midst of rising polymer prices. Reducing manufacturing costs requires using less material and running at higher line speeds in order to make more finished product in less time. The pursuit of these goals is an effort to ensure optimum efficiency from the equipment and people that are required to operate the plant.

But the same marketplace that demands lower costs is also demanding higher quality. Customers are calling for **greater bandwidth, higher speed,** and **longer distance** from their communication cables. Whether the communication medium is copper or optical fiber, the cable manufacturer must endeavor to push the limits of quality and performance from their product in order to remain competitive in today's demanding marketplace.

Adding Value to the Communication Cable Extrusion Process

Manual vs. Automated Inspection

Manual inspection and test methods are attractive candidates for improvement. They are generally time consuming to set-up and maintain and difficult to accurately reproduce. Whereas on-line measurement systems allow automated collection of product data, as well as providing the feedback necessary for process control. The results speak for themselves with:

- Reduced start-up time
- Improved quality and documentation
- Decreased material usage
- Improved data management

Beta LaserMike Can Help

That is why Beta LaserMike provides cable manufacturers with the capability to automatically measure and control all the dimensional aspects of their production process. **Beta LaserMike is the only company** with the ability to provide and integrate:

- Laser diameter measurement
- Ultrasonic wall measurement
- Infrared and spark fault detection
- Laser length measurement
- Wire preheating
- Eccentricity measurement
- Capacitance measurement
- SRL prediction

We have pioneered technologies to automate set-up and provide full product measurement coverage. So regardless of your cable application, Beta LaserMike has a measurement and control system that will enable you to meet the demands of the marketplace.

In fact we've also been providing precision measurement solutions for more than 30 years. Isn't it time to introduce your manufacturing process to the standard of accuracy and excellence that is Beta LaserMike?

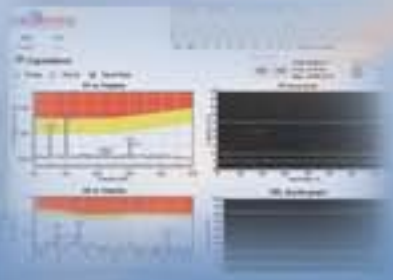
▶▶▶ Can you afford not to?

Wall & Ecce

Capacitance

Ult

SRL Prediction



CapScan

SRL Pro

Precision contr

Productivity Solutions for Comm

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A

Off-Line
Diameter & Ovality

BenchMike

Eccentricity

CenterScan

Sp

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Diameter & Ovality

AccuScan

Process Control

DataPro

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Reduce jacketing material usage

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se down-time and production loss

ccurate on-line SRL prediction

Length & Speed

LaserSpeed

Preheating

Preheater

Fault Detection

LN Detector

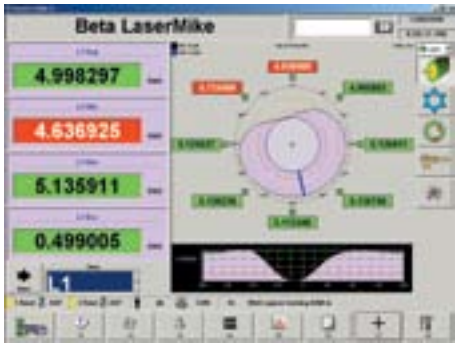
park Testing

Spark Tester

Reduce Start-Up Time...

...with Die Centering

The start-up period of a cable extrusion line is often the cause of scrapped material and the most significant loss of production time. Without an on-line gauging and control system that shows the true cross-sectional profile of the cable's eccentricity, the operator's only tool to quickly center the die is his or her own skill and experience, and perhaps a bit of luck.



DataPro 5000 Cross Section Display

Start Up Problem:	DataPro Solution:
1. The result of a die centering adjustment is unknown until the cable reaches the end of the line.	Provides on-line cross-section display of cable eccentricity, which greatly reduces the delay between the time of a die centering adjustment and when the operator sees the result of that adjustment.
2. Multiple iterations of die centering adjustments are often required increasing startup time. The number of iterations of die centering adjustments is very dependent on operator experience.	Reduces the dependence of start-up time on the experience of the operator by allowing more iterations of die centering adjustments to take place in the same amount of time.

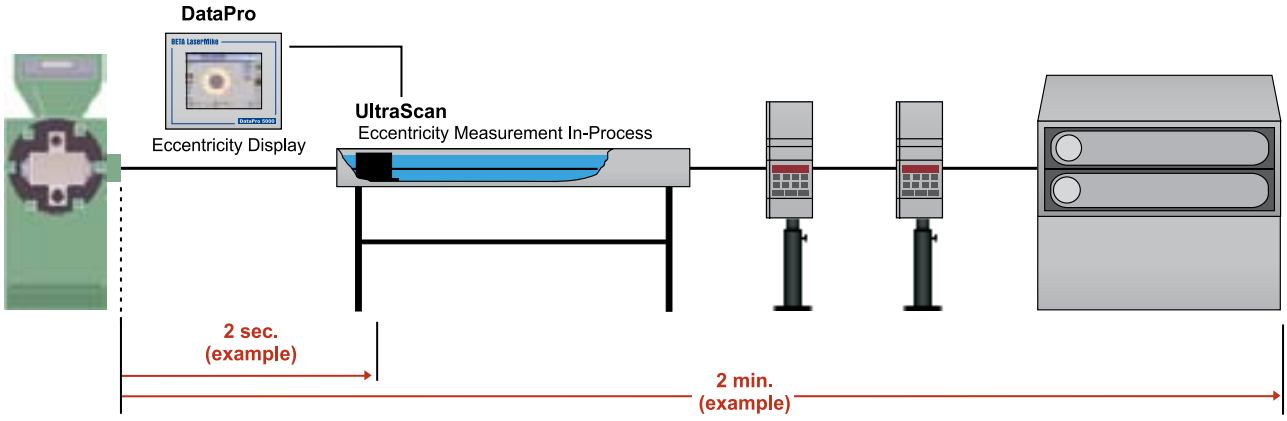
Savings from Reduced Startup Time

To calculate the mass of scrap material that can be saved during startup each year:

Material Savings = π [(OD/2)^2 - (Core/2)^2] * [Startup Without Control – Startup With Control] * [Material Density] * [Average Line Speed] * [Start-ups Per Year]

- Multiply the material savings by the cost of material (per unit of weight) to find cost savings.
- For total savings, add the saved amont of core product as well.

Note: Be sure to use consistent units of measure in calculations



Example:			
Average Diameter	50 mm (2 in.)	Start-ups Per Year	200
Wall Thickness	2.5 mm (0.1 in.)	Average Line Speed	60 m/min (200 ft/min)
Insulation Area	191.441 mm^2 (20.30631in.^{2})	**Material Weight Savings**	**41868 kg (96997 lb.)**
Material Density	1215kg/m^3 (76lb/ft^3)	Material Cost	1Euro/kg ($0.5/lb.)
Startup Without Control	30 min. (30 min.)	**Annual Cost Savings**	**41,868 Euro ($56,164)**
Startup With Control	15 min. (15 min.)		

Decrease Material Usage & "Give Away"...

...with Closed-Loop Control

Most cable extrusion operators run the line at sizes that are well above the minimum specifications in order to ensure that they do not create scrap product. This ensures that the extrusion line is at a maximum of up-time, but also creates a scenario where all finished product includes a high amount of material "give away".

How DataPro decreases material usage and give away:

- **Closed loop feedback control** continuously monitors cable dimensions and automatically controls the line to target sizes
- **Auto-setpointing** automatically lowers the target size (setpoint) toward the minimum specification, while monitoring standard deviation to allow enough "safety margin" that ensures the size does not go below specification
- **Eccentricity improvement** of the cable allows the average wall to run closer to the minimum specification without one side of the wall going below specification

DataPro 5000 Material Usage Display

DataPro control features:

- Control of line speed or extruder RPM
- Cross-section display of cable allows for quick die centering
- Control ouptuts include direct analog, relay contacts, or stepper motor drive
- Control algorithms include PI and Correct & Delay

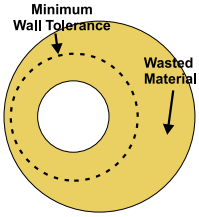
Savings from Decreased Material Usage and Give Away

To calculate the mass of material that can be saved each year by decreasing the amount of extra material that is "given away":

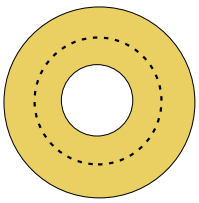
Material Savings = $\{\pi [(OD_1/2)^2 - (Core/2)^2] * [Density] * [Length]\} - \{\pi [(OD_2/2)^2 - (Core/2)^2] * [Density] * [Length]\}$

Where OD_1 is the OD of the cable before the wall is reduced, and OD_2 is the OD of the cable after the wall is reduced. "Density" is the density of the material and "Length" is the length of cable produced per year.

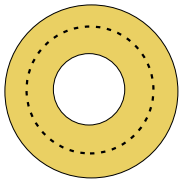
Note: Be sure to use consistent units of measure in calculations.



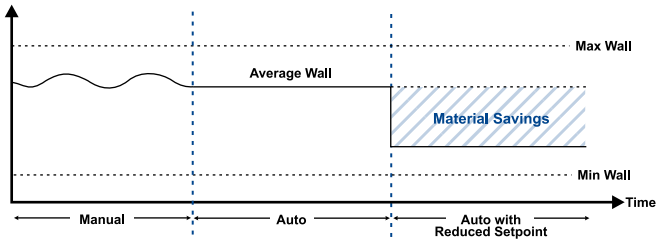
1. Any wall reduction is out-of-tolerance due to poor eccentricity



2. Eccentricity improvement allows more wall reduction



3. Average wall reduction saves material usage



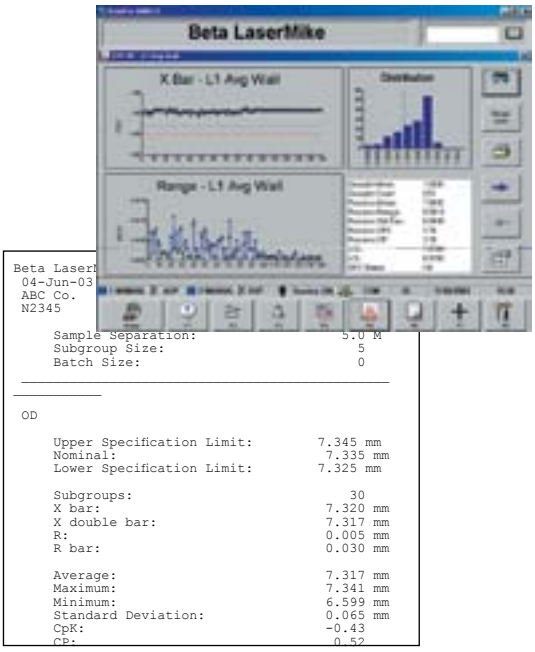
Example:			
Average Diameter	50mm (2 in.)	Density*Length	10935 kg/mm² (15833333 lb./inch²)
Wall Reduction	50 micron (2 mils)	**Material Weight Savings**	**42920 kg (99434 lb.)**
Area Saved	3.925 mm² (0.00628 in.²)	Material Cost	1 Euro/kg ($0.5/lb.)
Material Density	1215 kg/m³ (76 lb./ft³)	**Annual Cost Savings**	**42,920Euro ($57,576)**
Annual Production	9 million/m (30 million ft)		

Improve & Document Product Quality...

...with Closed -Loop Control and SPC

Closed-loop control has significant benefits in material cost savings, but it also improves product quality. In addition, when coupled with the collection and analysis of SPC data, it truly maximizes the benefit of the measurements taken by Beta LaserMike systems. The DataPro controller receives measurement information on a continuous basis from the gauging systems and will take samples of those measurements on a periodic basis defined by the user. Once those samples of measurement data are taken, the many benefits of SPC data analysis can be utilized:

- Improve product quality by controlling the process and using SPC data to identify and improve on process trends
- Improve the efficiency and effectiveness of your quality documentation and show your customers and ISO auditors that you can prove your quality claims
- Improve preventative maintenance efforts by monitoring standard deviation of the process over time and looking for potential degradation of the process capability



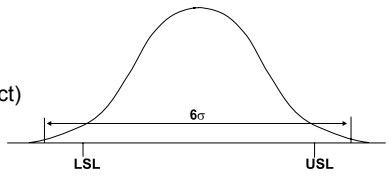
On-Screen and Printed Reports

Using the CP and CpK Process Capability Indexes

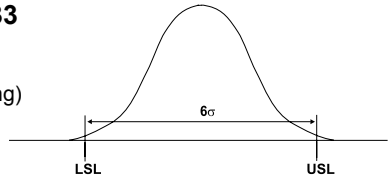
CP answers the question:
"Am I capable of making good product?"

The CP index compares the total specification range versus the full distribution of product sizes. It is calculated as: CP= $\frac{USL-LSL}{6\sigma}$ where USL and LSL are the Upper and Lower Specification Limits and σ is the Standard Deviation.

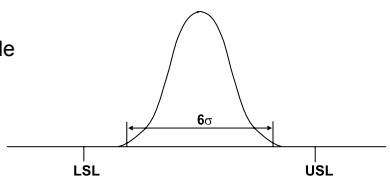
CP < 1.0
(Process Not Capable of Making 100% Good Product)



1.0 < CP < 1.33
(Process is Capable, but Requires Monitoring)



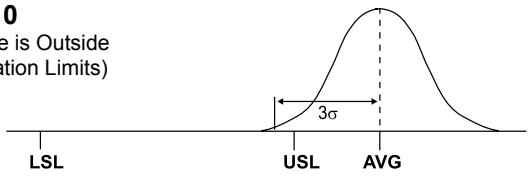
CP > 1.33
(Process is Capable of Making 100% Good Product)



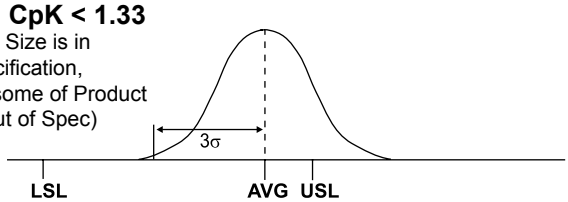
CpK answers the question:
"Did I make good product?"

The CpK indicates whether the distribution of product sizes is within the desired specifications. It is calculated as CpK= smaller of $\frac{USL-Avg}{3\sigma}$ and $\frac{Avg-LSL}{3\sigma}$.

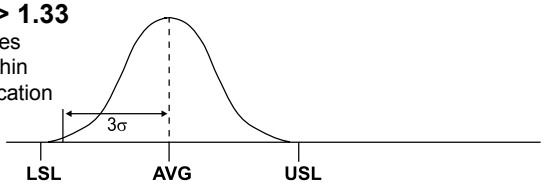
CpK < 0
(Avg Size is Outside Specification Limits)



0 < CpK < 1.33
(Avg Size is in Specification, but some of Product is Out of Spec)



CpK > 1.33
(All Sizes are Within Specification Limits)



Improve Data Management...

...with Real-time Trend Charts

Real-time trend charts allow operators to monitor product sizes graphically. The user may customize the trend charts to show any desired data trending versus time, length, or data points. Screens may be formatted to show one, two, or four trend charts per page. Trend charts are available only with DataPro 5000.


```
Beta LaserMike DataPro 3000 - Summary Report
 04-Jun-03  12:34  Library 5
 ABC Co.
 N2345
     Sample Separation:                    5.0 M
     Subgroup Size:                         5
     Batch Size:                          ________
 ____________________________________________
 ID
     Upper Specification Limit:        6.178 mm
     Nominal:                           6.168 mm
     Lower Specification Limit:        6.158 mm

     Subgroups:                           30
     X bar:                             6.174 mm
     X double bar:                      6.178 mm
     R:                                 0.002 mm
     R bar:                             0.015 mm
```

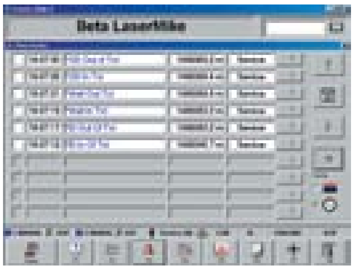
...with Printed Reports

Printed reports are generated to document product quality. Reports can be triggered manually by the operator or automatically at the end of a run or after a certain amount of product length. With the DataPro 5000, the user customizes the reports and may save multiple formats. These reports can be saved electronically or printed to hard copy.

...with Data Logging

Data logging allows managers and engineers to record and analyze process data without having to stand and observe the extrusion line. Data can be logged to a local drive at the DataPro 5000 or to a network drive away from the plant floor. Logging of data can occur manually or automatically, based on a pre-defined period of time or length, or at the crossing of a line speed.

```
*DataPro 5000 Datalog File.  Started 20-Mar-03
15:15:01
*DataLog_Line35_20Mar03
*Time        Avg Wall      Min Wall
15:15:31     1.683         1.651
15:16:01     1.684         1.655
15:16:31     1.693         1.661
15:17:01     1.700         1.671
15:17:31     1.692         1.671
15:18:01     1.699         1.668
15:18:31     1.701         1.675
15:19:01     1.689         1.652
15:19:31     1.678         1.640
15:20:01     1.687         1.643
15:20:31     1.686         1.648
```

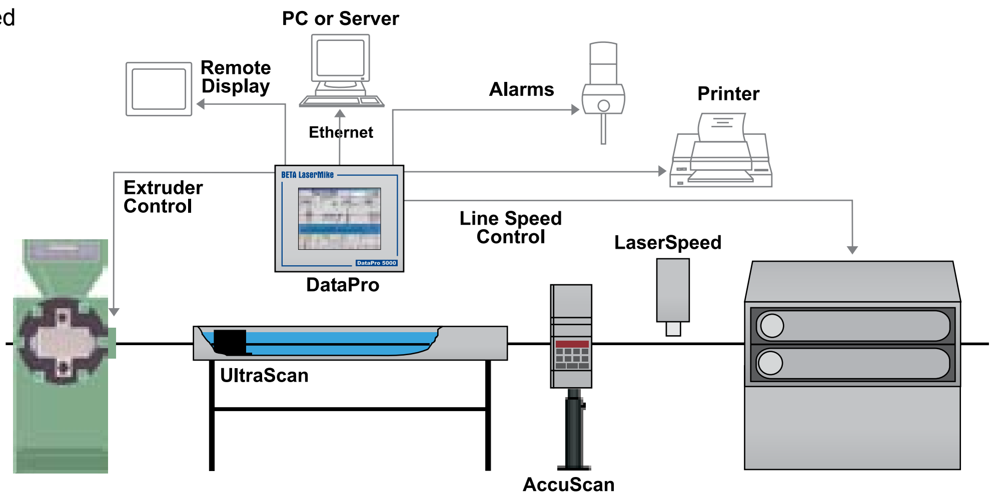


...with Alarming

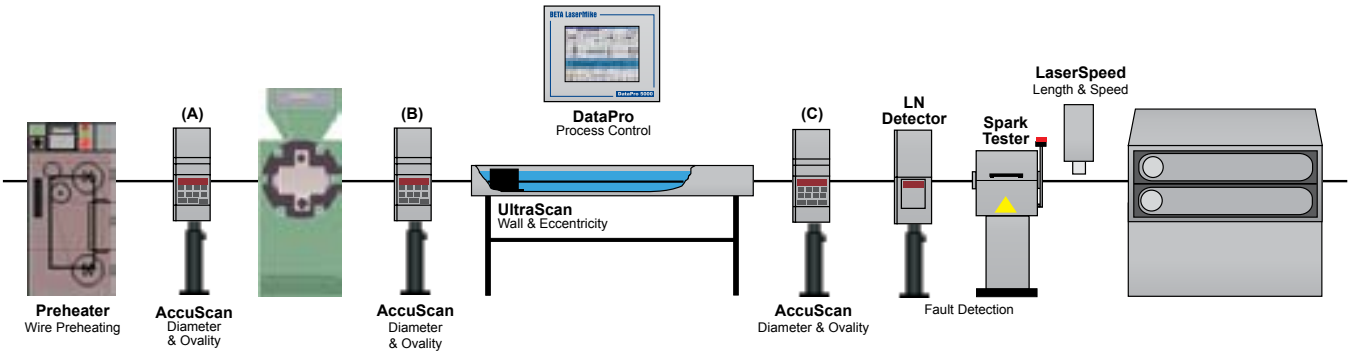
Alarming allows notification to operators when product or process problems occur. DataPro controllers are connected to alarm lights or horns for immediate alarm notification at the extrusion line. DataPro 5000 also has an alarm history log that shows product tolerance errors, process problems, or any other "events" defined by the user.

...with Networking & Integration

DataPro controllers are designed for easy and flexible integration with other devices and systems at the cable extrusion line, from alarm lights and printers to the actual extruder or take up.



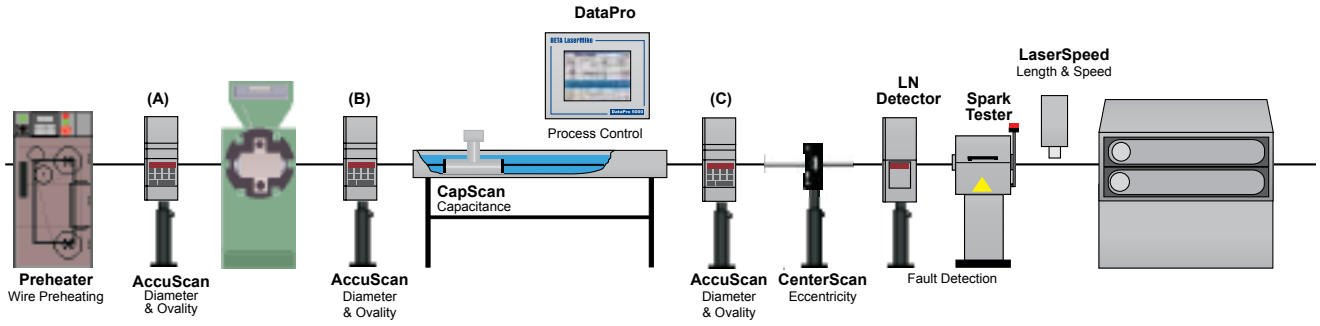
Solutions for Primary Cable (Solid Insulation)



	Gauge Inputs		
Solution*	**AccuScan**	**UltraScan Wall**	**Config. #**
Diameter	C		-01
Hot/Cold Diameter; Shrink Compensation	B/C		-02
Core/Cold Diameter; Wall Calculation	A/C		-10
Core/Hot/Cold Diameter; Shrink Compensation; Wall Calculation	A/B/C		-12
Diameter; Wall & Eccentricity	C	X	-22

***Preheater, LN Detector, Spark Tester, and/or LaserSpeed can be added to any configuration for solutions of preheating, fault detection or length/speed measurement.**

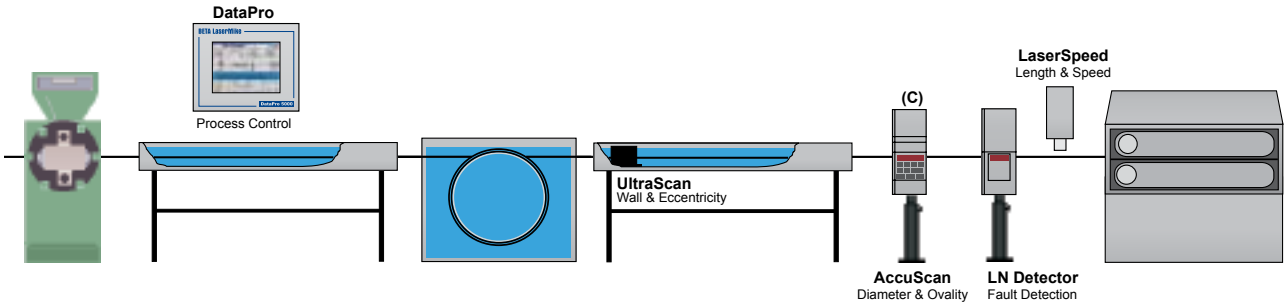
Solutions for Coaxial & Primary Cable (Foamed Insulation)



	Gauge Inputs	
Solution*	**AccuScan**	**Config. #**
Diameter	C	-01
Hot/Cold Diameter; Shrink Compensation	B/C	-02
Core/Cold Diameter; Wall Calculation	A/C	-10
Core/Hot/Cold Diameter; Shrink Compensation; Wall Calculation	A/B/C	-12

***Preheater, CapScan, CenterScan, LN Detector, Spark Tester, and/or LaserSpeed can be added to any configuration for solutions of preheating, capacitance, eccentricity, fault detection or length/speed measurement.**

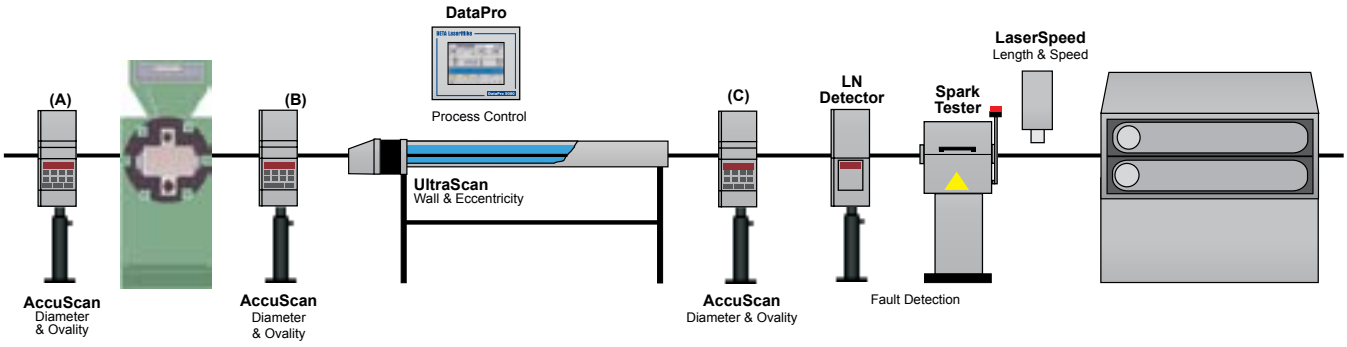
Solutions for Tight Buffer & Loose Tube Fiber (Dimensional)



	Gauge Inputs		
Solution*	**AccuScan**	**UltraScan Wall**	**Config. #**
Diameter	C		-01
Wall & Eccentricity		X	-20
Diameter; Wall & Eccentricity	C	X	-22

***LN Detector and/or LaserSpeed can be added to any configuration for solutions of fault detection or length/speed measurement.**

Solutions for Jacketed Cable



	Gauge Inputs			
Solution*	**AccuScan**	**UltraScan Wall**	**UltraScan OD**	**Config. #**
Diameter	C			-01
Hot/Cold Diameter; Shrink Compensation	B/C			-02
Core/Cold Diameter; Wall Calculation	A/C			-10
Core/Hot/Cold Diameter; Shrink Compensation; Wall Calculation	A/B/C			-12
Wall & Eccentricity		X		-20
Diameter; Wall & Eccentricity		X	X	-21
Diameter; Wall & Eccentricity	C	X		-22
Hot/Cold Diameter; Wall & Eccentricity; Shrink Compensation	C	X	X	-23
The -8X series configuarations are the “multi-extruder” configurations. The -8X series provide either multiple gravimetric hoppers for co-extrusion/tandem lines or multiple OD gauges before and after tandem extruders for multiple wall calculations. The -8X series is available in multiple configurations.				-8X

LN Detector, Spark Tester, or LaserSpeed can be added to any configuration for fault detection or length/speed measurement

Process Control & Data Management Systems

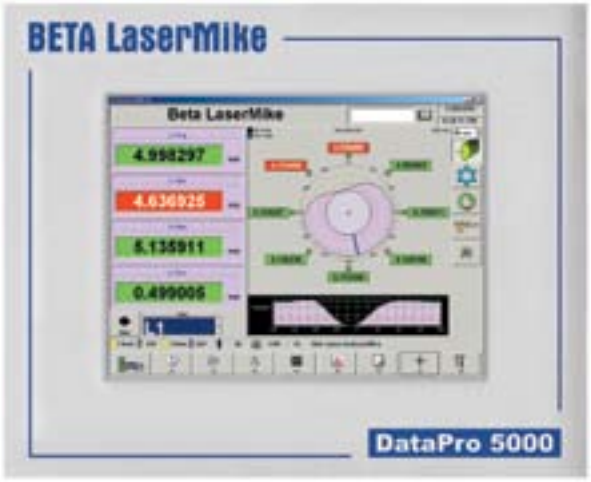
Beta LaserMike's DataPro controller series, when coupled with dimensional measurement instrumentation and a versatile set of I/O capabilities, enable you to produce superior quality cable by providing all the information and control capability you need to keep your production process running smoothly. DataPro systems aid and improve the cable manufacturing process at every step, from the start-up period to the production period to the final quality checks.

DataPro Controller Models

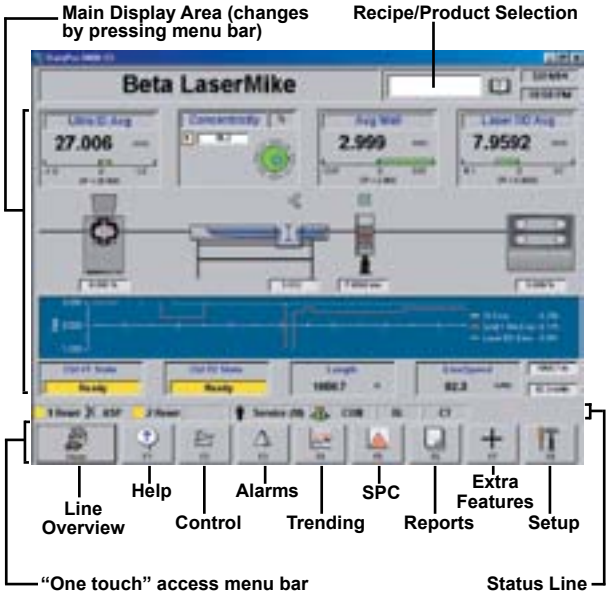
Feature	DataPro 1000	DataPro 3100	DataPro 5000
Display	Vacuum fluorescent	5.7" TFT touch screen	15" TFT touch screen
Gauge support	AccuScan	UltraScan AccuScan LaserSpeed	UltraScan AccuScan LN Detector LaserSpeed CapScan SRL CenterScan Spark Testers Preheaters
Max gauges	1	2	Not limited
Cross-section display	No	Yes (1 layer only)	Yes (multi-layer possible)
Control loops	1	1	2
Auto setpoint control	No	No	Yes
SPC	1 channel	2 channels	15" 8 channels
Trend charts	No	No	15" 5 channels
Printed reports	Yes (fixed)	Yes (fixed)	Yes (custom)
Data logging	No	Yes (via Ethernet)	15" 20 channels
Serial ports	RS-232	RS-232 (2)	RS-232 & USB
Ethernet port	Configuration & XY Data Output	Configuration & Data I/O	Yes (10/100 Base T)
Alarming	Yes	Yes	Yes
Product recipes	No	Yes (100)	Yes (not limited)
Security	No	3 levels	10 levels
Remote display output	No	No	VGA with optional touchscreen
I/O	Digital, analog, serial & Ethernet	Digital, analog, relay contacts, serial, USB & Ethernet	Digital, analog, relay contacts, serial, parallel, Ethernet & VGA

DataPro 5000

The DataPro 5000 is a high-end, fully featured process controller and data management system. Its easy-to-use, touch-screen interface provides the user with a color graphical view of product dimensions and process parameters in a variety of formats. DataPro 5000 is designed with various users in mind: operators, supervisors, process engineers, and plant managers. The user interface is designed to be simple enough for any operator to use, while also being very flexible in its configuration and allowing easy accessibility to data.



Easy-To-Use Touch Screen Interface



Options

- Industrial enclosure – arm or pedestal mountable
- Industrial remote touch-screen – includes VGA extender and industrial enclosure
- Standard remote touch-screen – includes VGA extender, but does not include enclosure
- Pedestal stand for enclosures – controller industrial enclosure or remote touch-screen
- Uninterruptable Power Supply (UPS) – with serial output to shut down controller at power loss

Features

- 15" color touch-screen display
- Line overview page
- Die centering cross section display (multi-layer possible)
- Closed-loop control (2 control loops, auto setpointing)
- Alarming (alarm history log)
- Trending (configurable trend charts)
- SPC (on-screen statistics and charts)
- Reporting (customizable printed or electronic reports)
- Data logging (configurable local or network data logging)
- Recipes (unlimited product recipes for quick changeovers)
- Security (10 levels of security for system protection)
- Networking (Ethernet and USB ports allow easy data access)
- Instant support for 14 languages; user-customizable

I/O

- Digital I/O
- Analog I/O
- Relay contact alarm outputs
- Relay contact control outputs
- Analog summing junction control outputs
- Ethernet 10/100 Base T
- Serial (RS-232 and USB)
- Parallel
- VGA output
- Length counter

All controller configurations are available with DataPro 5000

DataPro 3100

The DataPro 3100 is a mid-range featured process controller and data management system. Its color TFT touch-screen display is bright and is easily viewed along the extrusion line. It is designed to provide the operator with simple numeric product information, as well as a graphical display of the cable cross-section for eccentricity (when used with UltraScan gauges). DataPro 3100 provides the user with simple, yet powerful, operation in a compact package.

Features

- 5.7” color TFT touch-screen display
- Provides power and communication for up to two gauges
- Die centering cross section display when used with UltraScan gauges (1-layer only)
- Magnified display for longer viewing range
- Closed-loop control (1 control loop)
- Alarming (tolerance alarm outputs)
- SPC (on-screen statistics)
- Reporting (fixed hard-copy reports)
- Recipes (100 product recipes for quick changeovers)
- Security (3 levels of security for system protection)
- Instant support of multiple languages

I/O

- Digital I/O
- Analog I/O
- Relay contact alarm outputs
- Relay contact control outputs
- Analog summing junction control output
- Open collector stepper motor control outputs
- Serial (RS-232)
- USB printer support
- Length counter
- Ethernet configuration & data I/O

Options

- 19” rack adapter plate

The controller configurations available with DataPro 3100 include: -01, -02, -10, -18, -19, -20, -21, -22.

DataPro 1000

The DataPro 1000 is an economical process controller and indicator. Its VFD display shows numeric diameter and ovality data to the operator on-line. It is limited in the amount of data it provides, but when in-process measurements, tolerance checking, and simple process control is critical, the DataPro 1000 provides a very cost-effective package.

Features

- Vacuum Fluorescent Display
- Closed-loop control (1 control loop)
- Alarming (tolerance alarm outputs)
- SPC (on-screen statistics)
- Instant support of multiple languages

I/O

- Digital I/O
- Analog I/O
- Analog summing junction control output
- Open collector stepper motor control outputs
- Serial (RS-232)
- Length counter
- Ethernet X,Y data output
- USB printer support

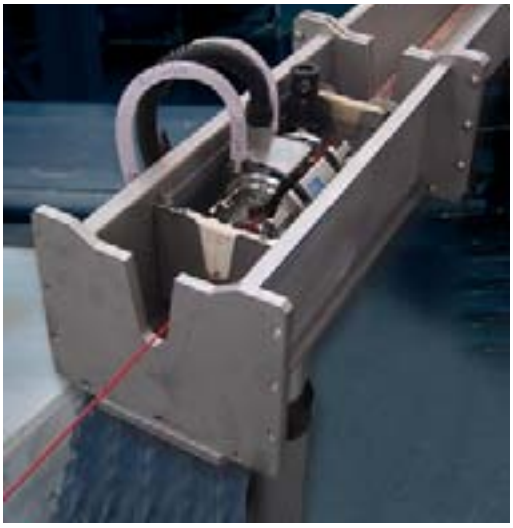
Options

- 19” rack adapter plate

The only controller configuration available with DataPro 1000 is -01.

Wall , Eccentricity, Diameter & Ovality Measurement Systems

UltraScan systems from Beta LaserMike provide on-line precision measurements of cable wall thickness and eccentricity, with an option to also measure diameter and ovality. UltraScan systems are able to make high-speed, non-contact measurements during production. The powerful and unique UltraScan DSP digital signal processor provides the only ultrasonic system capable of fully automatic setup and calibration, making operation quick and simple.



UltraScan Gauge

The Ultrascan 3007 gauge is designed specifically for the Wire & Cable industry. It features a stainless steel construction, protected transducers and cabling.

Beta LaserMike ultrasonic gauges are available with 4 or 8 transducers and will measure multiple layers. Different transducer types are available for critical applications. Beta LaserMike engineers will help select the optimum transducer type for your application.

Specifications

Model	OD range	Gauge Throat	Transducers
UltraScan 3007	0.4 - 7.00 mm (0.016 - 0.275 in.)	29 mm (1.1 in.)	4 or 8
UltraScan 1025	2.5 – 25 mm (0.098 - 0.984 in.)	30 mm (1.18 in.)	4 or 8

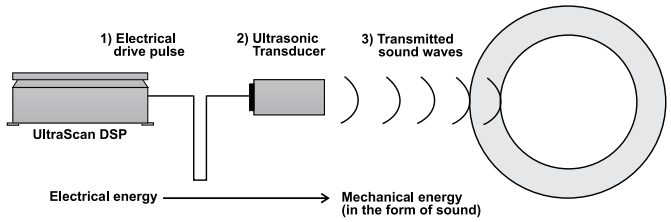
- Wall measurement accuracy of ±0.001mm (0.00004 in.)
- Eccentricity accuracy to ±0.1% (using min/max calculation)
  (US3007 provides the most accurate method for centring and alarming on solid category products)

Options

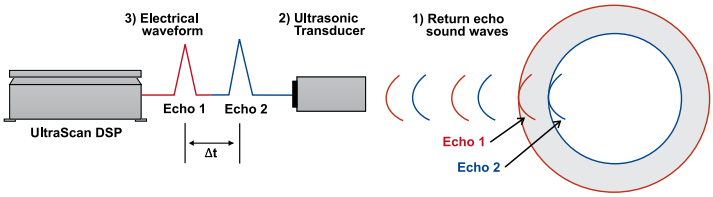
- Small trough for mounting outside existing cooling troughs
- Height stand for trough
- OD measurement software
- High-speed tolerance checking software for solid core and loose tube extrusion

Ultrasonic Wall & Eccentricity Measurement Principle

UltraScan DSP sends an electrical drive pulse and the transducers convert that energy into an ultrasonic sound wave.



Echoes are sent back to the ultrasonic transducers from the walls of the pipe and the transducers convert that energy into an electrical waveform.*



The UltraScan DSP calculates the wall thickness as:

Wall = (▲t * s) / 2 **▲t** = time between echoes

s = speed of sound through the material

Multi-Point Wall & Eccentricity

The use of multiple transducers (or reversing the transducers), provides full measurement of the product. This allows the calculation of eccentricity in addition to the display of minimum and maximum wall thickness. This information can be used in control to maximise material saving by centering the die and by controlling to minimum wall.

***With multi-layer cables, an echo occurs at each layer and therefore each layer can be measured individually.**

Unique Ultrasonic Technology

Snap Technology

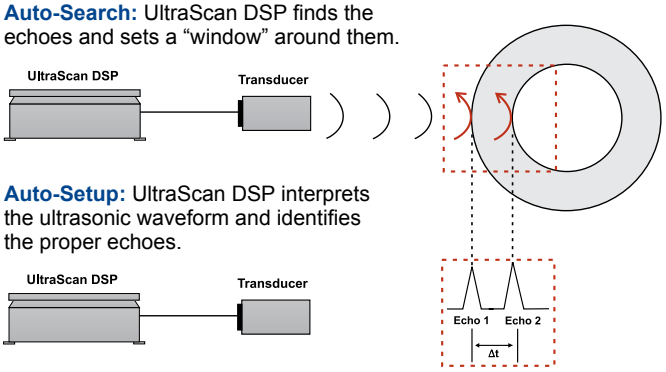
So Simple, it's always being used

All ultrasonic measurement systems require some form of setup of the ultrasonic waveform. The measurement system must know what are the proper echoes and positions in the waveform to trigger on and measure from, and the user must set this up.

But the UltraScan DSP, with its unique and powerful patented **Snap Technology**, is the world's only ultrasonic system that is capable of completely setting up its own ultrasonic waveforms instantly and automatically. The intelligence of Snap Technology provides fully automatic ultrasonic measurement with:

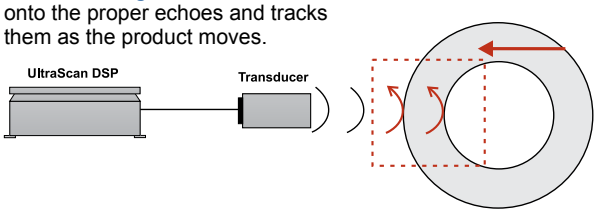
- Auto-search
- Auto-setup
- Auto-tracking

Auto-Search: UltraScan DSP finds the echoes and sets a "window" around them.



Auto-Setup: UltraScan DSP interprets the ultrasonic waveform and identifies the proper echoes.

Auto-Tracking: UltraScan DSP "locks" onto the proper echoes and tracks them as the product moves.



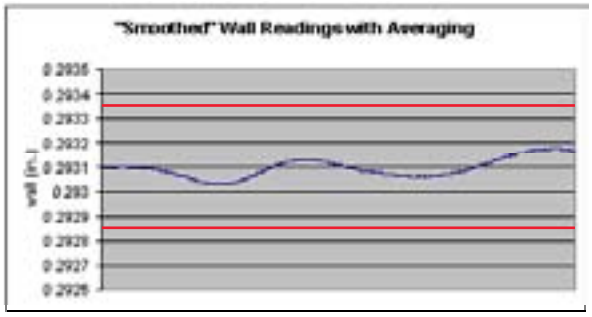
Unique Ultrasonic Technology

High-Speed Tolerance Checking

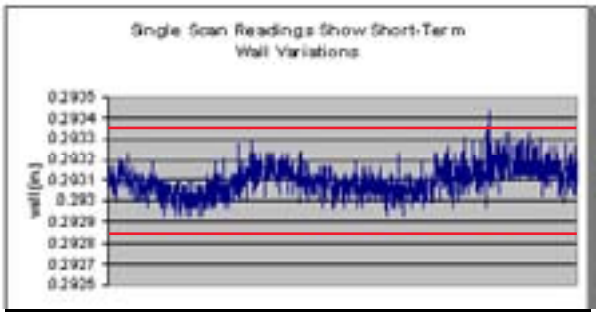
Detection and notification of short-term wall variations

Ultrasonic systems are often implemented in cable extrusion lines to monitor for and correct gradual changes in the wall thickness. Short-term variations in wall thickness are often missed when the ultrasonic system is averaging data and monitoring for periodic changes. But UltraScan systems are capable of taking approximately 2,000 wall measurements per second, dependent on thickness, and have an advanced feature for **High-Speed Tolerance Checking**. The UltraScan DSP checks each scan of each transducer and compares the measurement against wall tolerances. This high-speed checking of tolerances is designed to catch short-term wall variation on each individual layer of the cable.

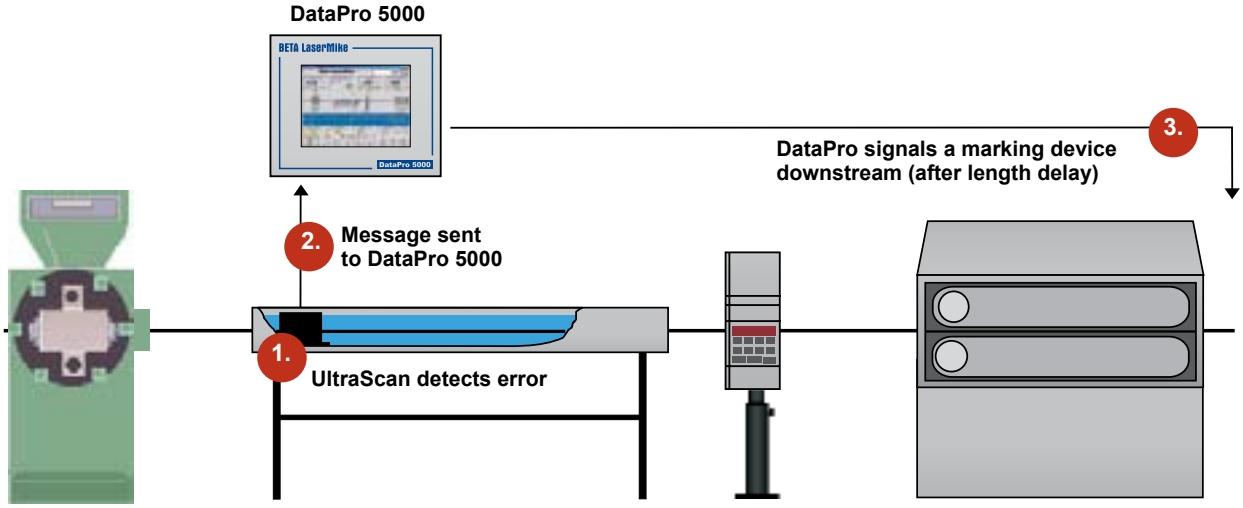
Once a high-speed tolerance error is found, the UltraScan DSP sends a signal to the DataPro 5000 controller to indicate that an error has occurred. The DataPro 5000 can then send a signal to a device downstream that will mark or cut out the area of the product that is out-of-tolerance. A length delay is implemented by the DataPro 5000 after the error message is received, so that the mark or cut matches with the position of the error.



Standard tolerance checking compares averaged wall values against tolerance limits



High speed tolerance checking compares individual scans against tolerance limits

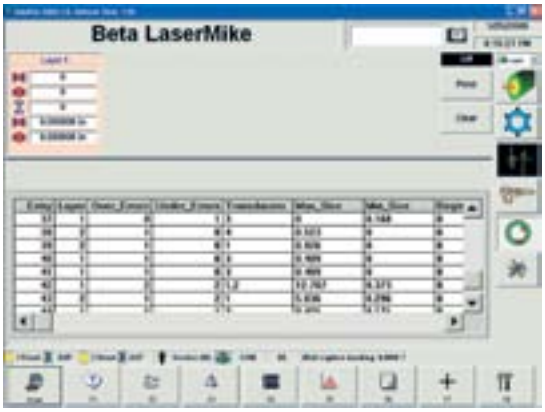


Record keeping of short-term wall variations

The UltraScan DSP sends details of each error* to the DataPro 5000, including:

- which transducers detected the error
- max and min wall size during error
- length of error
- which layer or layers contain error

*Each error message sent is logged to a report on the DataPro 5000 screen



Lay Length Measurement Systems

Beta LaserMike's LayScan system (patent pending) accurately and consistently measures the lay length of twisted pairs used in telecommunication cables. The system uses optical, non-contact measurement technology to perform on-line, high-speed lay length measurements. Providing high data rate capabilities, LayScan precisely determines the variations in lay length within each lay. It enables you to readily observe and measure systematic lay variations that are typically caused by twinning and cabling operations. A data acquisition system effectively collects and processes the lay length data and reports the measurement results.

Beta LaserMike's LayScan system uses new, advanced non-contact measurement technology to precisely measure the lay length of twisted pairs, enabling cable manufacturers to achieve the highest product quality and performance results.

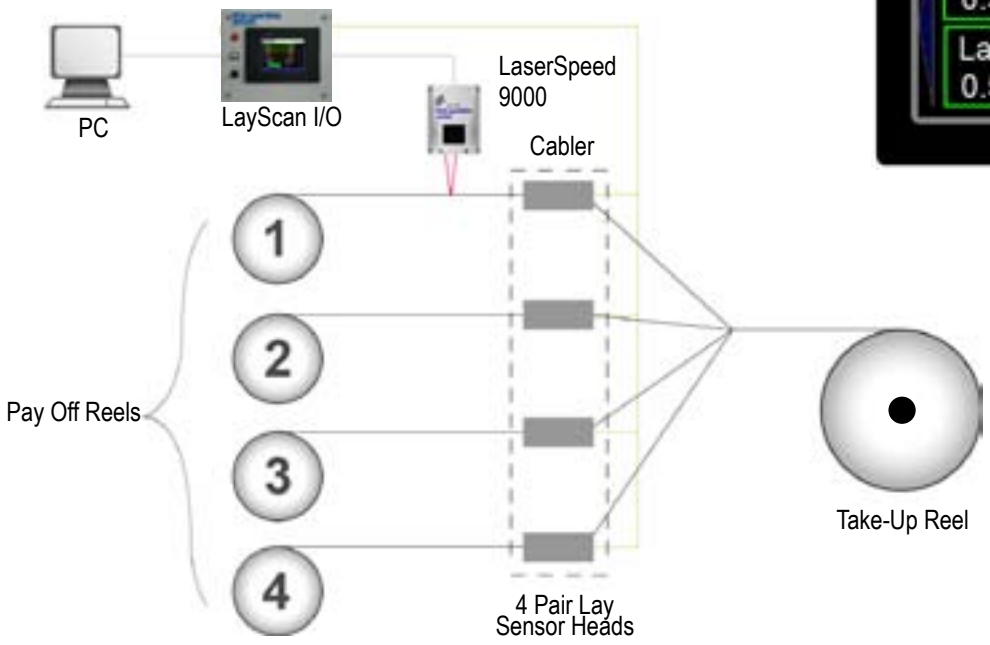
LayScan Advantage

- Perform on-line, high-speed lay length measurements
- Use FFT analysis to monitor changes in lay length variations and take rapid remedial action
- Improve product performance by better controlling lay lengths and delivering a higher level of cross-talk performance
- Minimize product cost and scrap by optimizing the lay set and consistently control lay lengths over time
- Reduce the product development cycle through precise measurements of lay length values during design trials and experiments
- Allow standardized pair lays across various twinning systems and reduce the need to limit production scheduling to qualified equipment

Specifications

Lay Length	0.25 - 1 in.
Throughput Speed	25 - 500 ft/min (5 - 100 in./sec)

System Configuration



Off-line Diameter & Ovality Measurement System

The BenchMike from Beta LaserMike provides fast and accurate measurements of cut cable samples. Used either in a Quality Control (QC) laboratory or on the plant floor, the BenchMike gives operators a simple and repeatable system for measuring cable samples and immediately knowing whether they meet specifications within tolerances of less than 0.000040 inch.

BenchMike Models

Model	OD Range	Accuracy
BenchMike 283-10	0.100 - 25 mm (0.004 - 1.0 in.)	±0.0009 mm (±0.000036 in.)
BenchMike 283-20	0.254 – 50 mm (0.010 – 2.0 in.)	±0.0015 mm (±0.000060 in.)

The BenchMike Advantage

The BenchMike separates itself from other measurement devices with features that make it the industry's most accurate, reliable, and easiest-to-use gauging system.

Accuracy

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

Reliability

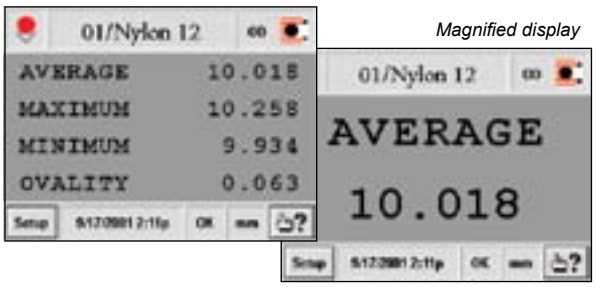
- Non-contact measurement technique provides the same level of accuracy, regardless of operator
- Tolerance checking quickly alerts the operator of out-of-tolerance conditions
- Mounting fixtures from Beta LaserMike ensure the test piece is always properly presented to the gauge.

Ease-of-use

- A touch-screen interface provides simple operation and set-up
- 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.

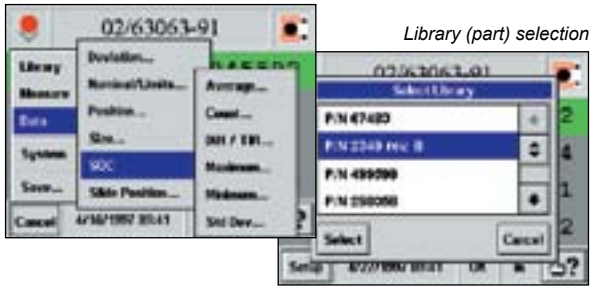
Touch-Screen User Interface

Data display



Magnified display

Pop-up menus



Library (part) selection

Part Holding Fixtures

▲ V-Block

▲ Small Sample Rotating Chuck

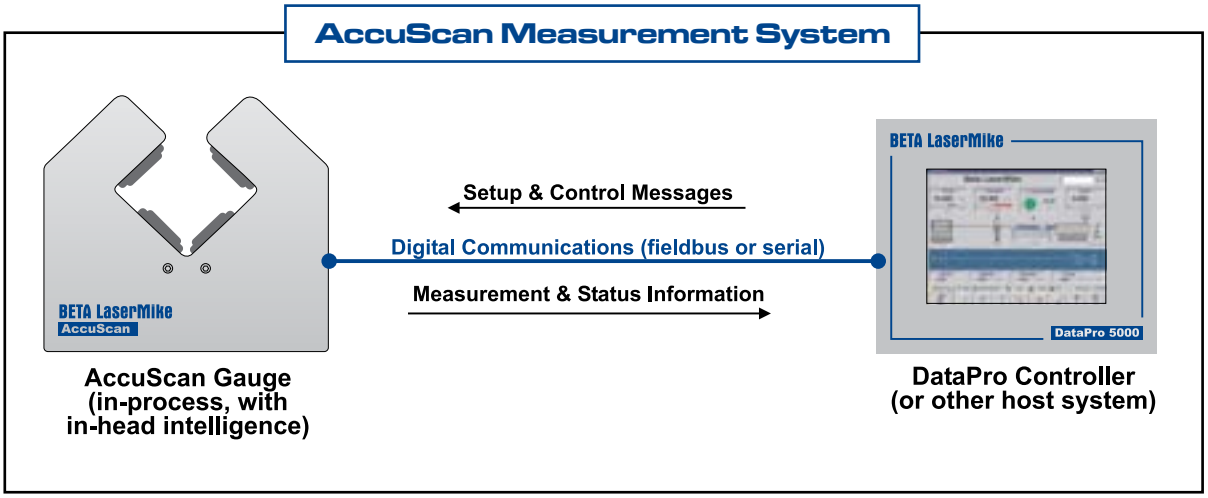
◀ Large Sample Rotating Chuck

Diameter & Ovality Measurement Systems

AccuScan systems from Beta LaserMike provide on-line precision measurements of the diameter and ovality of cables. Using laser scanning technology, AccuScan systems are able to perform diameter measurements in an intelligent gauge head during production and communicate those measurements to a host system or controller.

AccuScan 1000 and 4000 series gauges are single-plane laser scanners that measure only diameter.

AccuScan 5000 series gauges are dual-plane laser scanners that measure both diameter and ovality.

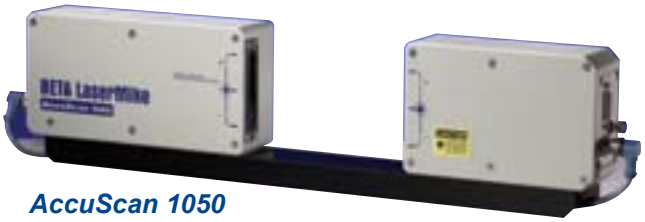


The AccuScan Advantage

- Increase measurement accuracy with uniquely designed and crafted optics
- Increase measurement repeatability with intelligent Digital Signal Processor (DSP)
- Increase up-time and reduce maintenance cost with built-in air purge system that keeps lenses free of dust and debris
- Increase durability with rugged construction sealed to IP 65 (NEMA 4) standards
- Flexible communication integration with Ethernet IP, RS-232, DeviceNet, and Profibus protocol support

AccuScan 5040

AccuScan 5080

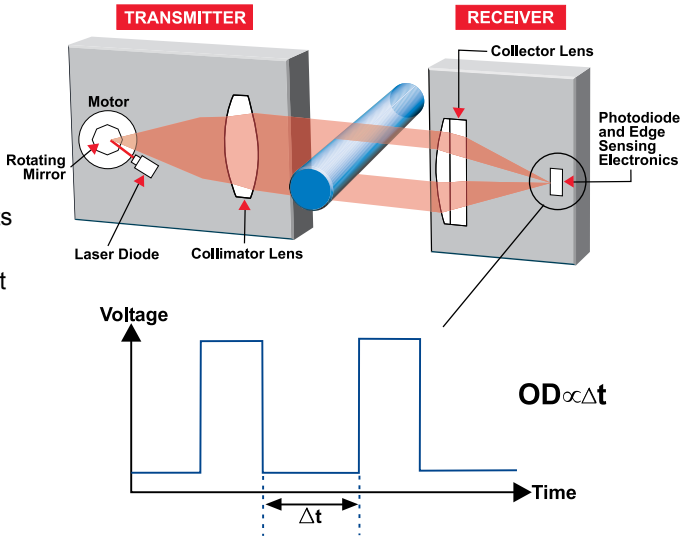


AccuScan 1050

Laser Scanning Measurement Principle

In 1972, the founders of Beta LaserMike introduced the world's first laser scanning micrometer (the "LaserMike"). AccuScan gauges employ this laser scanning measurement principle, which uses a low-power helium-neon laser that is scanned at high speed through a measurement window and across the cable.

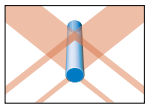
When the laser first scans across to the receiver, the light hits the photocell and the voltage rises. The voltage drops when the light is blocked by the pipe and rises again when the light reaches the photocell. The change in time (△t) that the light is blocked by the pipe is proportional to the cable's outside diameter.



AccuScan Models

Each AccuScan gauge has built-in signal processing and intelligence and supports communication in Ethernet IP, RS-232, DeviceNet, and Profibus protocols. Air purge systems are available to keep the windows clean of dust and debris.

Model	OD Range	Gate Size	Accuracy
AccuScan 1050	0.35–50 mm (0.014–2.00 in.)	66 mm (2.6 in.)	±0.003 mm (±0.00010 in.)
AccuScan 1100	1.27–100 mm (0.050–4.00 in.)	117 mm (4.6 in.)	±0.006 mm (±0.00025 in.)
AccuScan 1140	0.75–140 mm (0.030–5.50 in.)	152 mm (6.0 in.)	±0.020 mm (±0.00080 in.)
AccuScan 1190	1.25–190 mm (0.050–7.50 in.)	218 mm (8.6 in.)	±0.025 mm (±0.00100 in.)
AccuScan 4012 NEW!	0.1—12 mm (0.004–0.47 in.)	16 mm (0.63 in.)	±0.0005 mm[1] (±0.000020 in.)



Model	OD Range	Gate Size	Accuracy
AccuScan 5012	0.1–12 mm (0.004–0.47 in.)	16 mm (0.63 in.)	±0.0005 mm[1] (±0.000020 in.)
AccuScan 5025	0.2–25 mm (0.008–1.00 in.)	52 mm (2.05 in.)	±0.001 mm[1] (±0.000040 in.)
AccuScan 5040	0.2–40 mm (0.008–1.50 in.)	52 mm (2.05 in.)	±0.001 mm[1] (±0.000040 in.)
AccuScan 5080	1.27–80 mm (0.050–3.15 in.)	108 mm (4.25 in.)	±0.002 mm[2] (±0.000080 in.)
AccuScan 3175*	10–175 mm (0.39–6.89 in.)	200 mm (7.87 in.)	±0.02 mm[3] (±0.00080 in.)

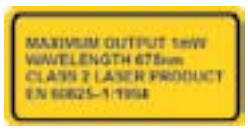
Options

- Height stand (normal upright or at 45 degrees)
- Roller guides
- Air cleaner filtering unit
- In-head, high-speed flaw detection software
- STAC logic software (measures max/min OD of corrugated products)

AccuScan 1000/4000 Series

AS5000 Features

- Standard 2400 measurements per second
- Standard per facet calibration for highest achievable accuracy
- Integrated air purge for extended operation
- Highly flexible communication including: Ethernet IP, DeviceNet, Profibus, CanOpen & RS232
- Enhanced ultra-bright display
- Rugged, robust IP65 rated housing
- Use stand-alone or as part of a full line solution



AccuScan 3000/5000 Series

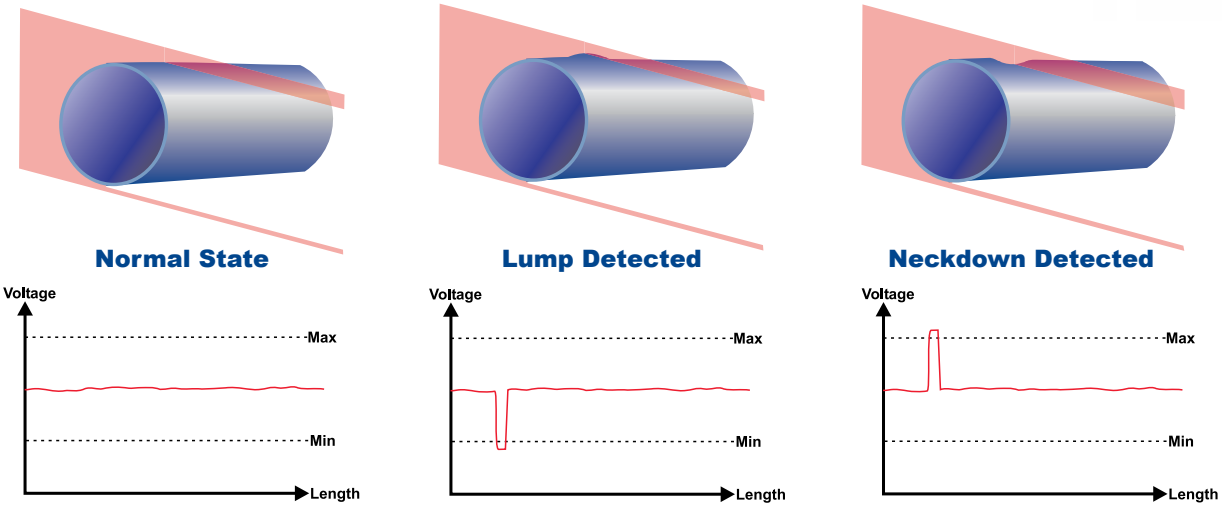
[1] ±0.02% of product size [2] ±0.01% of product size [3] ±0.1% of product size (at center of gate)

*AccuScan 3175 uses camera CCD technology. All other AccuScan 1000 and 5000 series gauges use laser scanning technology.

Fault Detection Systems

The LN Detector series of dual- and three-axis products are designed for detection of short-term faults in the diameter of the cable (lumps or neckdowns). LN Detectors are self-contained instruments with fast response circuitry and solid-state infrared light sources that allow instant detection of changes in the cable diameter. The signal processing and intelligence is built into the gauge head and outputs can be taken straight from the LN Detector that trigger alarms or marking devices when faults are detected.

Infrared Fault Detection Principle



The infrared light source and optics inside the gauge head create a continuous "curtain" of light across the cable. The product blocks a certain amount of the light that registers a voltage level at the receiver. A short variation in the diameter changes the amount of light at the receiver. When the change in sensitivity to light passes a user-defined threshold, a fault is triggered. (Single-axis detection is shown to clearly illustrate the measurement principle.)

Specifications

Model	LN1025–D (-DL)	LN1040–D (-DL)	LN3015
Number of axes	2	2	3
Gate size	50 mm (2.0 in.)	50 mm (2.0 in.)	16 mm (0.63 in.)
Sensitivity range	0.05 - 2 mm (0.0020 - 0.08 in.)	0.100 - 10 mm (0.0040 - 0.40 in.)	0.02 - 2 mm (0.0008 - 0.08 in.)
Minimum flaw length	0.80 mm (0.03 in.)	0.80 mm (0.03 in.)	0.5 mm (0.02 in.)
Maximum Line Speed	1500 m/min (4,920 ft/min.)	1500 m/min (4,920 ft/min.)	3000 m/min (9,842 ft/min.)
Interfaces			
Standard	RS-232	RS-232	RS-232, DeviceNet, Ethernet
Optional			Ethernet/IP, Profibus, Profinet
Power requirements	100-240 VAC, 50-60 Hz, 0.5 A	100-240 VAC, 50-60 Hz, 0.5A	24 VDC, 1.0 A
Dimensions	360 x 380 x 80 mm (14.2 x 15.0 x 3.1 in.)	360 x 380 x 80 mm (14.2 x 15.0 x 3.1 in.)	245 x 255 x 82 mm (9.6 x 10.0 x 3.2 in.)

3-Axis Lump & Neckdown Detector

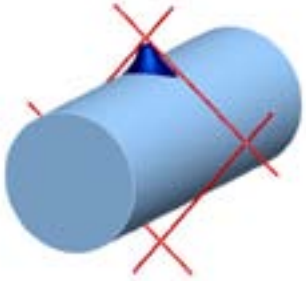
NEW!

The **new three-axis LN3015** is the newest solution in fault detection from Beta LaserMike. It provides more precise detection of short-term faults in the product diameter at higher line speeds than the two-axis systems. The LN3015 uses three optical axes spaced at 60-degree intervals to deliver a higher degree of coverage around the product's circumference to instantly detect sudden changes in the surface. It can accommodate product diameters up to 15 mm.

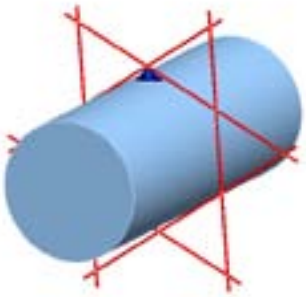
Three-Axis LN3015 Advantages

- **More built-in communications for easy integration** – accept a range of inputs including length encoder, tachometer, line start/stop, clear faults, and reel change. The LN3015 can be easily connected to a host PC or PLC using RS232, Ethernet IP, DeviceNet, Profibus, and Profinet.
- **Capture, track, and report critical data** – capture important flaw process information and effectively report on height, length, number, and location.
- **Monitor gauge performance with built-in diagnostics** –keep a close eye on emitter signal strength for each axis, dirty optics, and other gauge issues.
- **Visualize fault and gauge statuses** – alert operators on lump and neckdown conditions or when the gauge is operational via color-coded status indicators.
- **Synchronize with reel changes** – accept signals from reel changers to clear system data and initialize for the next reel.
- **Performs in toughest environments** – benefit from long, reliable service with ruggedized and environmentally sealed metal housing designed to IP65 standards. Engineered to minimize light and dust contamination.
- **User-friendly operator interface** – no need to mount an external display. The LN3015 is equipped with an ultra-bright, integrated display and operator interface for easy access to gauge functions and to view messages.

2-Axis



3-Axis



The LN 3015 three-axis detector provides a higher degree of coverage around the product's circumference compared to the LN1025/LN1040 two-axis gauges. The LN3015 precisely detects the smallest of flaws at higher production line speeds.

Capacitance Measurement Systems

CapScan gauging systems from Beta LaserMike provide on-line, high-speed measurement of cable capacitance. A combination of low signal-to-noise ratio and proprietary drift-free electronics provide the CapScan with highly accurate and consistent measurements. With a local intelligence module directly connected to the measurement head, CapScan can communicate directly to DataPro controllers or other host systems.

- Minimal external interference due to the complete EMC shielding of an all-in-one, stainless steel design
- Enhanced accuracy due to a unique self-balancing bridge, automatic gain and automatic self calibration
- Superior repeatability due to a Digital Signal Processor (DSP) running complex filtering algorithms
- Accurate readings on wet or dry trough installations with line speeds up to 3000 m/min (10,000 ft/min)
- IP68 (NEMA 6P) head and IP65 (NEMA 4) design prevents degradation of readings due to environmental factors including changes in water resistance from chemical impurities

CapScan Models

Model	OD range	Short electrode length	Long electrode length	Accuracy
KG 2008	0.102 – 8.13 mm (0.004 – 0.32 in.)	66.6 mm (2.62 in.)	100 mm (3.94 in.)	Zero: ±0.1 pF/m Gain: ±0.2%
KG 2016	0.102 – 16.00 mm (0.004 – 0.63 in.)	100 mm (3.94 in.)	150 mm (5.90 in.)	Zero: ±0.1 pF/m Gain: ±0.2%
KG 2025	0.102 – 25.4 mm (0.004 – 1.0 in.)	100 mm (3.94 in.)	150 mm (5.90 in.)	Zero: ±0.3 pF/m Gain: ±0.5%

All CapScan models have:

- **Measurement range:** 0 – 400 pF/m (0 – 120 pF/ft)
- **Resolution:** 0.1 pF/m (0.03 pF/ft) with 0.01 pF/m (0.003 pF/ft) with averaging over 0.5 sec.

Options

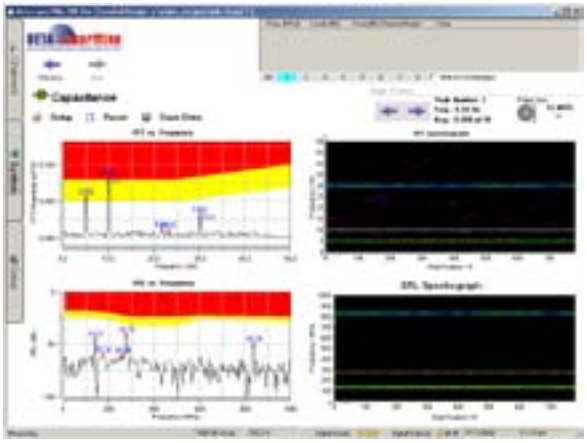
- High pressure end caps for dry trough installations
- In-head FFT analysis
- Fast analog output
- DeviceNet or ProfiBus communications interface
- KI1000 capacitance indicator and configuration module
- Calibration set
- Water tight gland kit for installation in a spray trough
- Mounting collars

On-Line Structural Return Loss Prediction

SRL Pro software from Beta LaserMike provides on-line structural return loss (SRL) prediction and analysis. By monitoring process variables at extremely high speeds, SRL Pro identifies potential causes of SRL problems on datacom cable insulation lines in real time. When datacom cables fail post-process compliance inspection and must be downgraded, the profitability of the entire run is lost. That is why the capability of detecting SRL problems before the run is completed allows an investment in SRL Pro to often be recovered in a matter of weeks or even days.

SRL Pro is a uniquely featured system providing:

- Eight user-defined channels for analysis of process variables including diameter, capacitance, line speed, line tension, accelerometer input, extruder RPM, wire temperature, etc.
- Dedicated multichannel filter module to minimize aliasing from unwanted signals
- Automatically identifies suspect SRL sources by comparing a user-configured table to the periodic variation from each gauge or sensor (recommends targeted areas to investigate for troubleshooting the line)
- Trends the FFT and SRL performance information for the entire reel and archives the data for possible future analysis
- Unique spectrograph display of data to identify transient problems
- Real-time alarming and alarm history for quick and easy notification of present or past problems
- Simple operation with product recipes, graph printout, data saving, and the capability of simultaneously displaying multiple graphs
- Fast update rate (twice/second)



Product Specifications

Analog Input Card

- Eight-channel A to D acquisition card, PCI type.

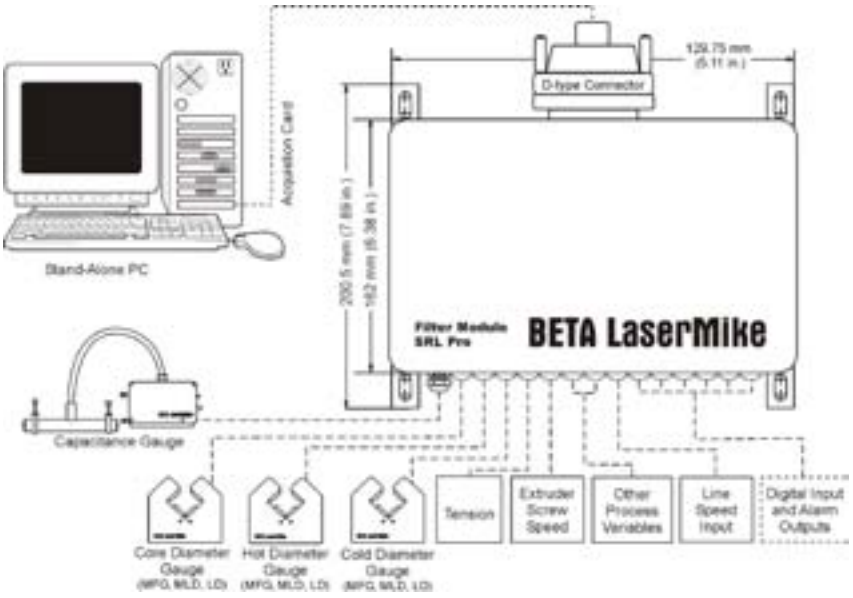
Minimum PC Requirements

- Windows 98®, NT and 2000 (2000 preferred)
- 1 GHz Pentium IV or better with 512 MB RAM, 200 MB hard disk space.
- PCI or AGP video card with 16 MB memory.
- 1024 x 768 pixel screen area (System may not work properly in computers with secondary backplane.)

Input Filter Box

- Input voltage range: ±10V, ±5V, ±2.5V, and ±1.25V
- Input current (with eight filter channels operating): ≤280 mA

System Layout



Option

- PC option provides software with a high-performance industrial PC

Wire Preheating Systems

Preheaters from Beta LaserMike provide uniform, in-process wire heating to eliminate insulation voids in primary cables. When a wire is preheated for only fractions of a second by a low frequency (50/60 Hz) heat cycle, the heat is unevenly applied to the wire, resulting in hot and cold spots. When high frequency preheating is used, more heat cycles are applied to the wire, ensuring more consistent heating all along the length of the wire. For this reason, all Beta LaserMike Preheaters use high frequency heating.

- Safety features include wire break detection, current overload sensors, and a wire path that is concealed behind an electrically locked door
- An interface for an external temperature controller is provided on all models, allowing compensation for low speed applications and varying input temperatures
- All Preheater components are carefully designed to ensure that power losses are minimized and that all input power is used to heat the wire

Preheater Models

Model	OD range	Max line speed	Pulley size	Power output	Max loop voltage
MCS 120L0817	0.28 – 1.4 mm (0.01– 0.055 in.) 29 – 15 AWG	2500 m/min. (8200 ft/min.)	2 x 120 mm (2 x 4.7 in.)	8 kVA	17 V
MCS 280L1640	0.45 – 2.8 mm (0.02– 0.11 in.) 25 – 9 AWG	2500 m/min. (8200 ft/min.)	2 x 280 mm (2 x 11 in.)	16 kVA	40 V
MCS 190L1640	0.37 – 1.4 mm (0.015 – 0.055 in.) 27 – 15 AWG	2500 m/min. (8200 ft/min.)	2 x 190 & 2 x 120 mm (2 x 7.5 in. & 2 x 4.7 in.)	16 kVA	40 V

- Max wire temperature is 370º F (190º C) for MCS 120 and 280.
  Max wire temperature is 750º F (400º C) for MCS 190.
- Pulley sleeve is contact/insulating for MCS 120 and 280.
  Pulley sleeve is ceramic for MCS 190.

Fault Detection Systems

Spark Testers from Beta LaserMike provide on-line detection of faults in cable insulation such as voids and pin holes. All Spark Testers are height-adjustable and floor mounted for easy placement in line. Standard models are available for a variety of applications, including high-frequency models for higher line speeds. Spark Testers can be controlled via the SI900 spark tester indicator with standard RS-232 communication and built-in I/O, or via a Profibus interface module.

- Meets virtually every international spark testing standard
- Multiple safety features include EHT warning lamps, interlock safety switches, ozone extraction ports, and current limiting circuits
- Grounding chains on the input and output remove any excess charge on the cable
- Easy threading at startup with a lid design that lifts bead chain electrodes away from cable
- Unique bead chain design lets you replace individual strands instead of entire assembly

Standard Models

Model	OD range	Test voltage	Electrode length	Max line speed	Max electrode current*
S1525	1 – 25 mm (0.04 – 1.0 in.)	1 – 15 kV	330 mm (13 in.)	400 m/min. (1300 ft/min.)	10/4.5 mA
S2550	1 – 50 mm (0.04 – 2.0 in.)	1 – 25 kV	330 mm (13 in.)	400 m/min. (1300 ft/min.)	10/4.5 mA
S25100	1 – 100 mm (0.04 – 4.0 in.)	1 – 25 kV	200 mm (7.87 in.)	240 m/min. (790 ft/min.)	10/4.5 mA
S25150	1 – 150 mm (0.04 – 6.0 in.)	1 – 25 kV	200 mm (7.87 in.)	240 m/min. (790 ft/min.)	10/4.5 mA

High Frequency Models

Model	OD range	Test voltage	Electrode length	Max line speed	Max electrode current*
HFS0610	0.1 – 10 mm (0.004 – 0.4 in.)	1 – 6 kV	180 mm (7.1 in.)	3000 m/min. (9840 ft/min.)	6/25 mA
HFS0915	0.1 – 15 mm (0.004 – 0.6 in.)	1 – 9 kV	135 mm (5.3 in.)	2250 m/min. (7380 ft/min.)	6/25 mA
HFS1220	0.1 – 20 mm (0.004 – 0.8 in.)	1 – 12 kV	90 mm (3.5 in.)	1000 m/min. (3300 ft/min.)	6/25 mA

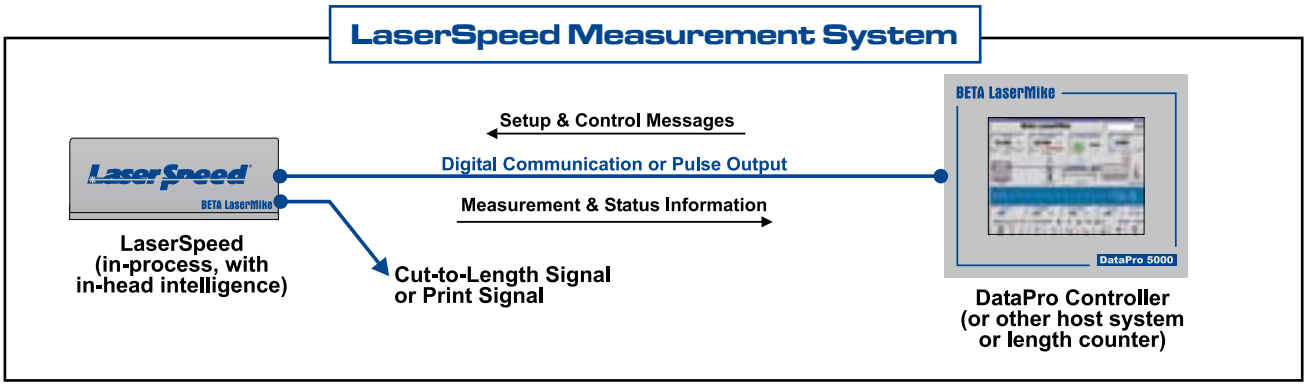
*Resistive/Capacitive

Options

- SI900 or SI900-RC spark tester indicator module
- PIB1000 Profibus interface module

Length & Speed Measurement Systems

With the ability to measure length and speed with accuracy better than ±0.05%, LaserSpeed is the ideal gauge for replacing contact tachometers that are prone to a variety of measurement errors and high maintenance costs. LaserSpeed uses the non-contact laser doppler velocimetry (LDV) technique with all signal processing and intelligence built directly into the gauge, allowing it to integrate with a variety of other systems from simple length counters to advanced control systems.



Contact Tachometers vs. LaserSpeed

Contact tachometers are typically used in extrusion applications for length and speed measurement. However, there are a variety of problems with the use of contact length measurement that can be avoided by replacing tachometers with LaserSpeed:

Normal Tachometer Problem:	LaserSpeed Solution:
1. Measurement errors and inaccuracy caused by: product slippage, dirt build-up, day-to-day wear problems	Non-contact measurement ensures high accuracy and repeatability
2. High cost of ownership due to the need to regularly replace parts and recalibrate	Use of 100% solid-state digital technology with no moving parts ensures permanent calibration and low cost of ownership
3. Contact measurement can mark or damage the product	Non-contact measurement ensures no marking or damage of the product

The LaserSpeed Advantage

- Non-contact length and speed measurement, unaffected by:
  - Product diameter
  - Material texture or color
  - Product diameter
  - Ramp up & ramp down cycles
  - Surface shape
  - Ambient temperature over operating range
  - Speed–even speeds over 39000 ft/min (11887 m/min)
- Low cost of ownership due to permanent calibration and no moving parts
- Easy integration to other devices due to in-head intelligence
- “Cut-to-length” application
- Index pulse output to printing device

Laser Doppler Velocimetry Principle

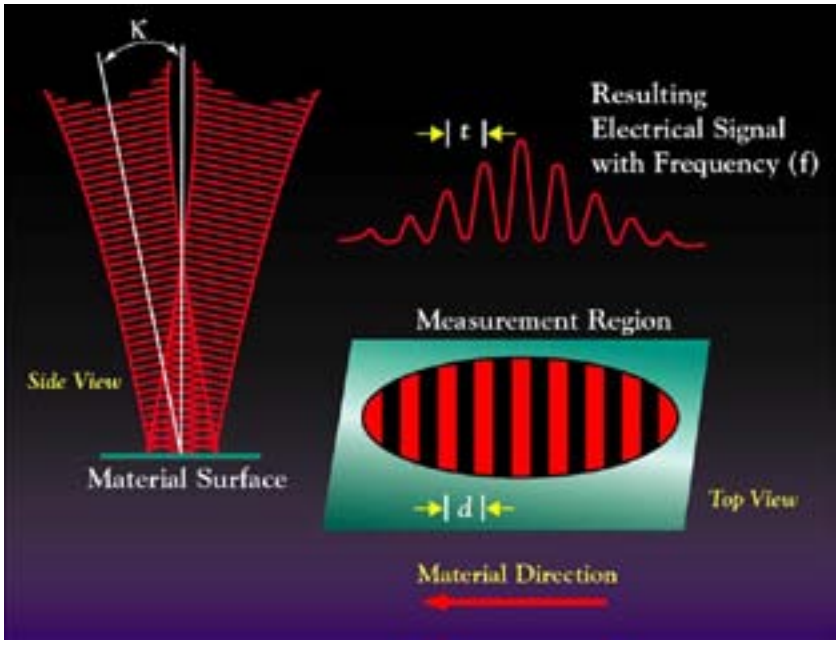
LaserSpeed uses dual-beam laser interferometer technology to measure product velocity (speed), which is integrated over time to measure length.

Fringe distance is a function of laser wavelength and beam angle: $d = \frac{\lambda}{2 \sin \kappa}$

Velocity is distance over time: $v = \frac{d}{t}$

Period is the inverse of frequency: $t = \frac{1}{f}$

Velocity is integrated to find length: $L = \int_0^T v dt$



LaserSpeed Models

LS4000			
Model	**Speed Range**	**Standoff Distance**	**Depth of Field**
LS4000-301	0.2 – 1,700 m/min (0.7 – 5,500 ft/min)	100 mm (4 in.)	15 mm (0.6 in.)
LS4000-303	0.4 – 4,000 m/min (1.3 – 13,100 ft/min)	300 mm (12 in.)	35 mm (1.4 in.)
LS4000-306	0.8 – 8,000 m/min (2.6 – 26,200 ft/min)	600 mm (24 in.)	50 mm (2.0 in.)
LS4000-310	1.0 – 12,000 m/min (3.2 – 39,400 ft/min)	1000 mm (39.4 in.)	100 mm (4.0 in.)
LS9000 **With Zero Speed & Automatic Direction Detection!**			
Model	**Speed Range**	**Standoff Distance**	**Depth of Field**
LS9000-303	0..±4000 m/min (0..±13100 ft/min)	300 mm (12 in.)	35 mm (1.4 in.)
LS9000-306	0..±8000 m/min (0..±26200 ft/min)	600 mm (24 in.)	50 mm (2.0 in.)
LS9000-310	0..±12000 m/min (0..±39400 ft/min)	1000 mm (39.4 in.)	100 mm (4.0 in.)

Each model has the same high accuracy (<±0.05%) and repeatability (<±0.02%) and comes in an IP 67 rated industrial enclosure

The following I/O is included as standard with each model:

- **Speed output:** RS-232
  0 – 2 volts (user selectable full scale)
- **Length output:** Isolated quadrature pulse output (user selectable resolution)
  Isolated quadrature pulse output (fixed at 1000 pulses/ft)
  Index pulse output for printer or cutter (selectable pulse rate per unit of measure)
- **Status output:** RS-232 or analog voltage (0 – 1V)
- **Inputs:** Direction, Measurement Hold, Shutter Control, Laser Interlock

Options

- Height Stand
- Air Wipe
- Quick Change Window
- Analog Output Converter: Converts 0 – 2V speed output to other voltage or current ranges

Non-Contact Eccentricity Measurement System

Wire and cable manufacturers now have better quality control

When the core of insulated wire and cable moves off-center, your product quality suffers. And with the increasingly tighter tolerances demanded by users, unchecked wire or cable eccentricity can leave you with reels of unusable product. There's now a proven solution to help you dramatically control and improve the quality of your product while reducing material consumption and scrap, increasing productivity, and maximizing your profits.

The CenterScan measurement system from Beta LaserMike accurately and reliably monitors the diameter of insulated wire and cable and eccentricity of conductors during extrusion and insulation processes. This intelligent gauge never touches your product and can determine eccentricity and diameter measurements on products from 0.1 – 10 mm (0.004 – .40 in). Also, CenterScan's high-speed measurement capabilities enable you to run higher line speeds and produce more finished wire and cable in less time while maintaining the highest level of product quality.

- Non-contact gauge
- Multi-function: eccentricity, diameter and flaw detection
- Ultra accurate, low-drift measurements
- High-speed signal processing for precise measurements on stranded products
- Compact design for wider range of gauge installation on production line
- Robust electronics with superior noise immunity allows closer placement to line devices
- Factory calibrated for fast, easy setup and simple recalibration
- Accurate product positioning with minimal alignment
- Rugged construction for reliable operation under the harshest conditions
- Flexible communication for easy integration, data management
- Optional ultra-bright integrated display and operator interface for ease of use

CenterScan is compact, easy to calibrate and simple to use!

CenterScan Measurement System Includes:

- Inductor Driver
- Gauge head with high-frequencey laser scanning technology and sensing coils
- Optional controller

Optical and inductive measurement technology detects the center of your wire with the highest accuracy

CenterScan combines optical and inductive technology to precisely measure the insulation diameter and conductor eccentricity. The optical measurement system is based on Beta LaserMike's *legendary AccuScan* technology. This high-frequency laser scanning engine measures the outer diameter and position of insulation in two axes. The orientation of the conductor is measured inductively. A driver induces an alternating current into the conductor to produce a magnetic field along the wire. This field is detected by four sets of highly sensitive coils strategically located around the wire to determine the precise location of the conductor.

Applications

The CenterScan gauge is designed to effectively measure all round, single conductor wire and cable with solid or stranded conductors. Wire and cable applications include:

- LAN
- Mini coaxial
- Installation
- RF
- Telephone
- And more...
- Coaxial
- Automotive

Flexible Communication for Easy Integration

Wide range of interfacing options

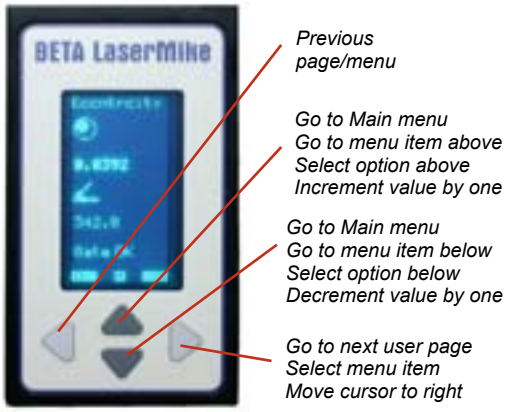
The CenterScan measurement system includes a wide range of interfacing options for flexible communication and easy integration into your production environment. It comes standard with RS232 connection. Communication options include Profibus, Devicenet, Ethernet IP, and CANopen. Other options include analog outputs, relay outputs, in-head FFT, and single-scan flaw detection. A gauge status indicator displays the operating status of the CenterScan. All connections are located in the gauge's side panel for easy access.

Comprehensive control capabilities keep your production processes running smoothly

The CenterScan system transfers eccentricity and diameter measurements to either a Beta LaserMike controller, such as the DataPro 3100 or DataPro 5000, or third-party devices for integrated process control. Users are provided with detailed product information and process parameters, such as wire and cable dimensions, line speed (optional), and other status information, to monitor every step of the manufacturing process to produce the highest quality product. CenterScan can also be supplied with **XVIEW**, a Windows®-based software tool that allows you to view trend and log measurement data on your desktop or laptop PC.

Optional integrated display with operator interface

An ultra-bright fluorescent display with operator interface is available for the CenterScan. This display can be mounted directly to the CenterScan system for easy readout and access by the operator. The gauge can be configured to operate as a local display or in stand-alone mode for continuous display of eccentricity and diameter measurements.



Beta LaserMike's controllers, such as the DataPro 5000, provides product and process-critical information including wire and cable position, diameter, eccentricity, ovality, and wall thickness, as well as line speed (optional), statistical data, alarms, and other details. You can also configure Beta LaserMike controllers to send input signals to PLCs to control external devices.

CenterScan			
Measurement range	0.1 – 10 mm (0.004 – 0.40 in)	**Weight**	12.3 kg (27 lbs)
Gate Size	14 mm (0.55 in)	**Environment:**	
Resolution	0.00001 mm (0.0000004 in)	**Ambient operating temperature**	5 – 50°C (41 – 122°F)
Accuracy	±0.0005 mm[1] (±0.000020 in)	**Ambient storage temperature**	-20 – 50°C (-4 – 122°F)
Measurement speed	1200 per axis per second	**Power supply**	24 VDC; 2.3AMP
Dimensions (overall)	463 x 279 x 202 mm (18.25 x 11 x 7.96 in)		

Why Choose Beta LaserMike?

We offer measurement and control solutions and inspection consulting, not just sensors

Over 30 years of expertise in non-contact dimensional measurement and control

The inventors of the world's first laser scanning micrometer and still the world leader

The most comprehensive pre and post sales support in the industry

Global support, local expertise

Beta LaserMike USA
8001 Technology Blvd.
Dayton, Ohio 45424
Phone: +1 937 233 9935
Fax: +1 937 233 7284

Beta LaserMike Europe
Unit 3, First Avenue
Globe Park, Marlow
Buckinghamshire, SL7 1YA
United Kingdom
Phone: +44 1628 401510
Fax: +44 1628 401511

Beta LaserMike Asia
Unit 302, XinAn Plaza
Building 13, No. 99 Tianzhou Rd.
Shanghai, 200233, China
Phone: +86 21 6133 3688
Fax: +86 21 6113 3616

www.betalasermike.com

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