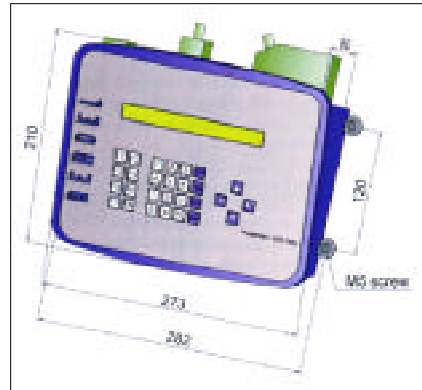


Wireline Series

Dual Axis Laser Micrometers

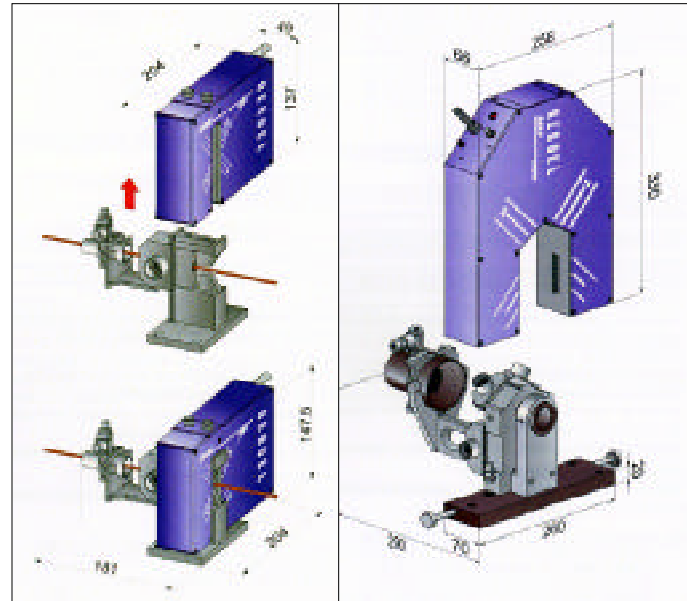
Specifications	Wireline 13 xy	Wireline 35 xy
Measurement field	13 x 13mm (0.51 x 0.51")	35 x 35mm (1.378 x 1.378")
Measurement range	0.1 - 10mm (0.004 - 0.39")	0.2 - 32mm (0.0078 - 1.260")
Selectable resolution	0.1/1/10 μ m (0.000004/0.00004/0.0004")	1/10 μ m (0.00004/0.0004")
Repeatability	$\pm 0.3\mu$ m (0.000011") @ 3 Sigma	$\pm 0.6\mu$ m (0.000023") @ 3 Sigma
Linearity (centered)	$\pm 0.75\mu$ m ¹ (0.000029")	$\pm 1.5\mu$ m (0.000059")
Linearity (full range)	$\pm 2.0\mu$ m (0.000078")	$\pm 3\mu$ m (0.00018")
Scan frequency	100 (X) + 100 (Y)Hz	100 (X) + 100 (Y)Hz
Laser source	visible diode, class 2	visible diode, class 2
Dimensions (L x W x H)	204 x 49 x 137mm (8.03 x 1.93 x 5.39")	258 x 66 x 330mm (10.1 x 2.6 x 13")
Throat distance	22mm (0.87")	100mm (3.93")
Operating temperature	0 to 45° C	0 to 45° C
Weight	5.5Kg (12.12lbs.)	5.3Kg (11.68lbs.)

Note: ¹ For diameters < 1mm

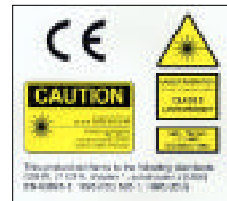


IBU 10 Control Unit

LCD Display	backlit, 2 lines, 40 char. each line
Keyboard	numerical, includes 8 additional function keys
Alarm outputs	4 programmable (30 or 24 VDC)
Communications	RS 232 serial port
Inputs	2 optocoupled (10-30VDC, 10ma)
Protection class	IP54
Power input	24VDC or 20 VAC, 15W
Operating temp.	0 - 50° C
Dim. (LxWxH)	282 x 210 x 60mm (11.1 x 8.27 x 2.36")



Pictured above from left to right are the 13 xy and 35 xy gauge heads with their associated quick removal gauge protection fixtures and air blow rings.



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The closer you look, the better we measure!

Freedom Technologies, LLC.

P.O. Box 117
E. Glastonbury, CT 06025-0117
Tel: (860) 659 9662
Fax: (860) 633 0281
Website: www.freedomlaser.com
Email: sales@freedomlaser.com

Dual Axis Laser Micrometers

Wireline Series

"On-line diameter measurement and ovality gauging of drawn wire."



Wireline 13 xy includes ILS/ALS 13 xy gauge head and IBU 10 controller

Wireline 35 xy includes ILS/ALS 35 xy gauge head and IBU 10 controller

General Description

The Wireline series of dual axis laser micrometers is ideally suited for monitoring steel wire for tires and copper wire for electric cables in a wire drawing process.

The Wireline dual axis series includes two models, the Wireline 13 xy, and 35 xy. Each Wireline micrometer is made up of an ILS/ALS laser gauge head and a controller. Either gauge head (the ILS/ALS 13 xy, and 35 xy) connects to the IBU 10 controller via a single cable. These two models enable measurements of diameters from 0.1mm (0.0039") to 32mm (1.26").

The main function of a Wireline series micrometer is to:

- measure diameter and ovality
- generate out of tolerance alarms
- length counting and weight computation
- process, print and report statistics
- interface and or network with a remote computer

Features

- Measurement range: 0.1 to 32mm (0.0039 to 1.26") dia.
- Repeatability: $\pm 0.3\mu$ m (0.000011") @ 3 Sigma
- Measures dia. X, dia. Y, avg. dia. and ovality
- Software for length and weight of each spool
- Software for statistical analysis
- Proximity switch for length counting
- Patented self-calibration guarantees accuracy
- Numerous optional accessories for a complete system

Benefits

- Fast non contact measurement
- On-line measurements for 100% control
- Identifies die wear instantly thereby reducing scrap
- Enables the use of drawing machines with automatic reel change
- Improvement in quality and product consistency
- Assists in quality certification

System Operation

A Wireline series dual axis laser micrometer, when installed after the finishing die on a wire line can measure the product's diameter with extreme precision. The measurement is unaffected by wire vibration and drawing speed.

The Wireline system gauges the wire along two crossed directions, x and y to get the average diameter and the ovality. The average diameter is directly related to the cross sectional area of the wire. This diameter is accurately measured in spite of random orientation of the wire and even if the product is oval.

The IBU 10 controller processes the signals from the gauge head to display the measurements and compare the actual values to the nominal set points. When the wire diameter (mainly due to die wear) exceeds the tolerance limits, appropriate output signals are generated to stop the wire drawing machine and/or alert the operator.

By processing the pulses coming from a length - counting-wheel, the Wireline gauge can compute the length and weight of the drawn wire. An automatic machine stop is possible at the preset length or weight. All values measured during the production run can be stored in memory and processed to print detailed statistical reports. They are useful for quality assurance and certification.

Pictured to the right is the IBU 10 control panel. The keypad is uncluttered and very simple to use. It can easily be mounted to a wall or placed on a table top. It is angled for ease of keystroke entry and viewing of data. Droplets of oil on the front panel are illustrated to demonstrate the environmental capability of the IBU 10 control unit.



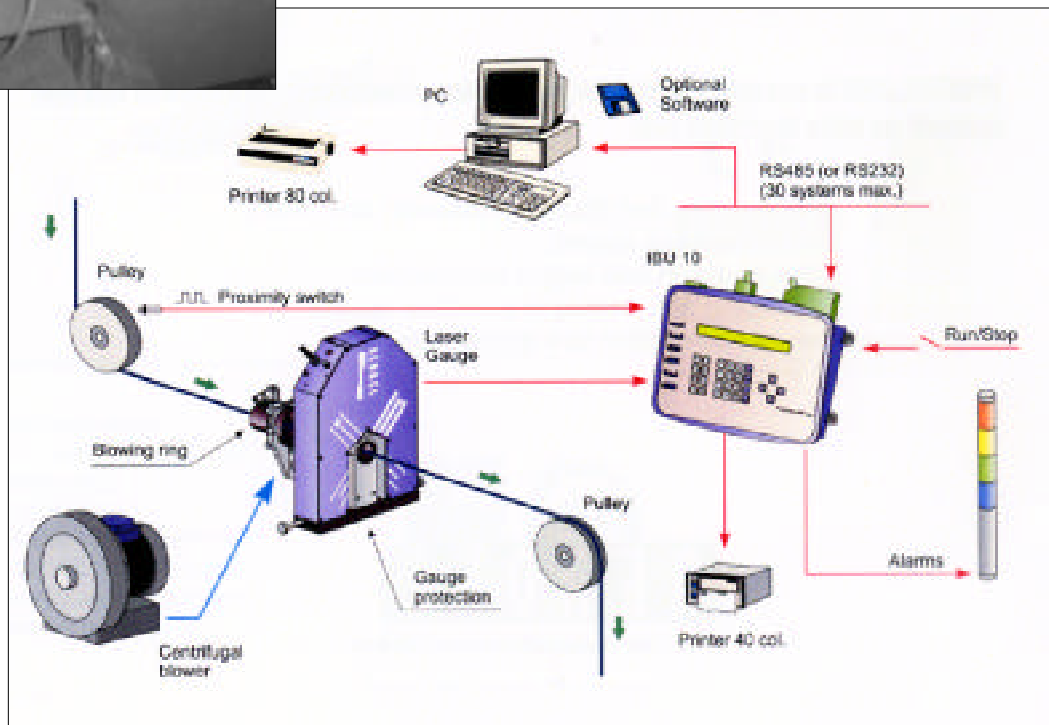
Optional Accessories

- Gauge mechanical shields. Compressed air can be fed into the shield to prevent gauge contamination
- High pressure blower to supply clean air
- Air blow rings to clean the wire
- Proximity switch for length counting
- Software for PC, dedicated and/or networking



Pictured above is a typical drawn wire process. The Wireline 13 xy dual axis laser micrometer is visible in the center of the picture. The dirt protective housing, with air blow ring, window cleaning attachment, and centrifugal blower are attached to the ILS/ALS 13 xy laser gauge head.

The diagram to the right illustrates all the components of a complete Wireline system. The IBU 10 controller is in charge of the monitoring process. This includes the alarms, proximity switch, and the printer. The PC can be included in a dedicated system and or in a network system with multiple Wireline gauges.



Wireline Software

The Wireline software resides in the IBU 10 controller and is modular in design. At any time additional modules can be added by the user. The standard software which is included in the basic price is the Wireline 290/V00 software. By adding different modules, such as weight/length measuring, networking, and statistics the system can be adapted to suit different operating requirements. Special care has been taken to ensure the user that the system is easy to use and simple to program by non computer types. Function keys and branch menus are used to select the various functions or to enter the numerical values prompted by the program(s).

Wireline 290/V00

The Wireline 290/V00 software is designed to monitor drawn wire. The basic package includes the following functions:

- Display of diameters and deviations from nominal set points.
- Calculation of average diameter (X+Y)/2 and ovality (X-Y).
- Programmable alarms and pre-alarms for out-of-tolerance conditions.
- Multi-lingual menus (English, French, German, and Italian).
- Library of parameters for 30 different products, retrievable directly by the operator.
- Possibility of entering a secret access code to restrict the programming functions to authorized personnel.
- Pre-programmed factory setup to facilitate system installation and start-up.
- The RS 485 serial port can be used for remote library programming, data collection and statistics managing. Up to 32 systems can be connected to a single PC.
- The PC is programmed to be the master unit and to poll all the IBU slave units, each one being identified by a different address code.
- In remote mode the computer overrides the keyboard to disable local programming in order to avoid any conflict.

Weight/Length Measurement

The weight/length measurement module (Option P1) features the following functions:

- Computes and displays the length and weight of the drawn wire.
- Stop and slow-down signals at the pre-set weight or length.
- Printing of the length and weight of each spool.
- Programmable operational modes (start/stop/reset) to facilitate the interfacing with a coiling machine.

Statistics Module

The Statistics Module (Option P2) offers the following additional functions:

- Recording and printing of the max., min., and avg. values.
- Calculation of standard deviation, Cp and Cpk values.
- The data acquisition interval can be selected manually by the operator or determined automatically via a run/stop input.

- Programmable limits for filtering abnormal readings arising from anomalous working condition.
- All listings show the date and time, and can be preceded by a programmable alphanumeric header.
- Identification of operator, machine and type of product.
- Progressive numbering of the reel.
- Each IBU unit can store in a FIFO (First In First Out) memory the statistical reports of the last 5 spools and the results of the last 10 diameter readings.

```

=====
01/29/97                                     10:15
-----
ENTER PERSONAL HEADER HERE
-----
PRODUCT DATA
MACHINE # : 0           DN : 0.600 mm
SPOOL #   : 5           T+ : 0.020 mm
OPERATOR # : 1         T- : 0.020 mm
PRODUCT # : 52         OV : 0.020 mm
                               LS : 1.000 mm
-----
SUMMARY
DATE : 01/29/97   START : 10:13:48
                   STOP  : 10:15:18

      DXY   OVA   DX   DY
MIN (mm) 0.606 0.000 0.607 0.604
MAX (mm) 0.611 0.006 0.608 0.614
AVG (mm) 0.606 0.002 0.607 0.605
S (n) (um) 0.98 0.90 0.34 1.68
Cp      6.80 3.70 19.61 3.97
Cpk     4.76 0.74 12.75 2.98
=====
    
```

```

=====
01/29/97                                     10:15
-----
ENTER PERSONAL HEADER HERE
-----
PRODUCT DATA
MACHINE # : 0           DN : 0.600 mm
SPOOL #   : 5           T+ : 0.020 mm
OPERATOR # : 1         T- : 0.020 mm
PRODUCT # : 52         OV : 0.020 mm
                               LS : 1.000 mm
-----
SUMMARY
DATE : 01/29/97   START : 10:13:48
                   STOP  : 10:15:18

WEIGHT : 0.065 kg.
LENGTH : 29 m
=====
    
```

By connecting a printer to the IBU 10 controller printer port, statistical reports are easily accomplished. A typical printout is illustrated above. The language selected in the IBU 10 was English.