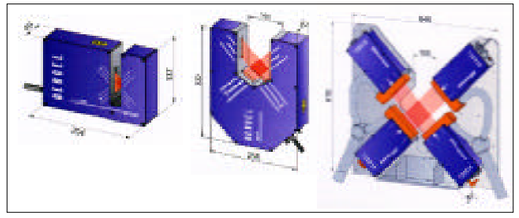
Intelligent Dual Axis Laser Micrometers

ILS Series

Specifications	ILS 13xy/B	ILS 13xy/A	ILS 35xy	LS 80xy
Measurement field	4 x 4mm (0.157 x 0.157")	13 x 13mm (0.51 x 0.51")	35 x 35mm (1.38 x 1.38")	80 x 80mm (3.15 x 3.15")
Measurement range	0.03 - 3.0mm (0.001 - 0.118")	0.1 - 10.0mm (0.004 - 0.394")	0.2 - 32mm (0.008 - 1.26")	0.75 - 78mm (0.03 - 3.07")
Selectable resolution	0.01 / 0.1 / 1 / 10µm (0.4 / 4 / 40 / 400) x 10^{-6}")	0.01 / 0.1 / 1 / 10µm (0.4 / 4 / 40 / 400) x 10^{-6}")	0.1 / 1 / 10µm (4 / 40 / 400) x 10^{-6}")	1 / 10µm (40 / 400) x 10^{-6}")
Repeatability [2]	± 0.05µm [4] @ 3 Sigma (± 0.000002")	± 0.15µm @ 3 Sigma (± 0.000006")	± 0.4µm @ 3 Sigma (± 0.000015")	± 1µm @ 3 Sigma (± 0.00004")
Linearity [1]	± 0.5µm [3] (±0.00002")	± 1.0µm (± 0.000039")	± 1.5µm (± 0.000059")	± 2µm (± 0.0000.8")
Scan frequency	200 (x) x 200 (y)Hz	200 (x) x 200 (y)Hz	200 (x) x 200 (y)Hz	200 (x) x 200 (y)Hz
Laser source	visible diode, class 2	visible diode, class 2	visible diode, class 2	visible diode, class 2
Dimensions (l x w x h)	204 x 49 x 137mm (8 x 1.9 x 5.4")	204 x 49 x 137mm (8 x 1.9 x 5.4")	258 x 66 x 330mm (10.1 x 2.6 x 13")	640 x 87 x 610mm (25.2 x 3.42 x 24")
Throat distance	22mm (0.87")	22mm (0.87")	100mm (3.93")	120mm (4.73")
Operating temperature	0 to 45° C	0 to 45° C	0 to 45° C	0 to 45° C
Weight	2.2Kg (4.85lbs.)	2.2Kg (4.85lbs.)	5.3Kg (11.68lbs.)	21.5Kg (47.36lbs.)

Notes:
1. Product is positioned in the center of the measurement field; full range ± 3µm (± 0.00012").
2. Within ± 3 sigma and a one second averaging time.
3. Up to 1mm (0.039").
4. Up to 0.5mm (0.019"), ± 0.1µm (± 0.0000039") up to 3mm (0.118").
5. The ILS 13xy / 200 / B model uses a round laser spot; diameter = 0.04mm (0.0016").
6. The ILS 13xy / 200 / A model uses an elliptical laser spot, 4 x 0.04mm (0.16 x 0.0016").

Physical Sizes



ILS 13 xy, ILS 35 xy, and ILS 80 xy dimensions in mm.

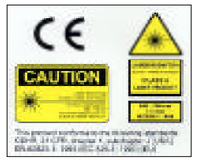
Definitions

Measurement Field - the area within which the object must be placed to obtain the specified accuracy.

Measurement Range - the range of diameters that are measurable by the laser micrometer to the stated specifications.

Repeatability - the maximum variation of the measured diameter. The value specified is at an ambient temperature of 20° C, ± 1° C. The confidence level is ± 3 sigma (99.7%) with a one second measurement.

Throat distance - the distance between the transmitter and receiver on the laser gauge head. As an example, with the ILS 35 xy it is 100mm (3.94").



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: sales2@freedomlaser.com

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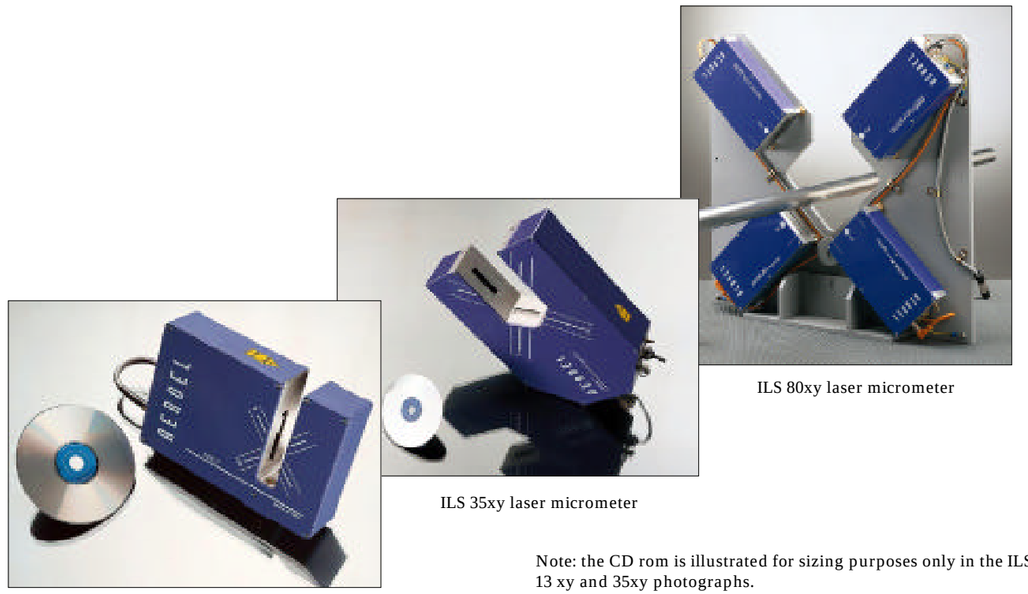
ILS Series



ILS 80xy laser micrometer

ILS 35xy laser micrometer

ILS 13xy laser micrometer

Note: the CD rom is illustrated for sizing purposes only in the ILS 13 xy and 35xy photographs.

General Description

The dual axis Intelligent Laser Sensor (ILS) series represents the latest technological development in scanning laser micrometry. With completely built in electronics, the ILS dual axis micrometer can be used as a stand alone smart sensor or it can be directly connected to a PC, NC or PLC via its internal RS 232 / RS 485 serial interface. In the RS 485 mode, up to 30 ILS sensors can be networked on a common line for connection to a PC or plant computer.

Due to its accuracy, sub-compactness and rugged construction, the ILS series is ideal for a wide variety of applications. Diameters as small as 0.03mm (0.001") and as large as 78mm (3.07") can be measured with the ILS dual axis series.

Typical applications for diameter measurement include:

- drawn wire
- electric cable
- extruded tube
- glass tubes
- magnet wire
- medical tubing
- optical fibers
- rolled and extruded profiles
- steel cord

Sophisticated data processing software included in the ILS sensor enables excellent single scan repeatability. Because of this capability, flaws (blisters) in magnet wire are easily computed and indexed as related to the smoothness of enamel coatings. The blister detection feature is included in the ILS 13xy only.

Features

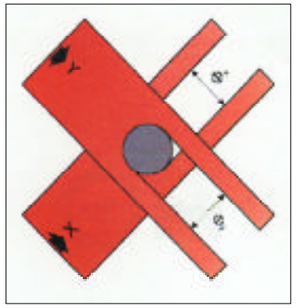
- Measurement range: 0.03 to 78mm (0.001 to 3.07")
- ± 0.05µm (0.000002") repeatability @ ± 3 sigma
- 200Hz in X and 200Hz in Y axis scan rates
- Display values, xy average, x, y, and ovality
- View data in histograms, x-bar charts with cp, cpk
- RS 232 and RS 485 bidirectional interface
- Up to 30 sensors can be networked on a single line
- Detects blisters on magnet wire
- Class 2 visible laser diode for safety and long life
- Three (3) year warranty

Benefits

- Fast non contact measurements
- Remastering is not required for different size parts
- Patented self calibration guarantees accuracy
- Objective measurements regardless of operator experience
- Fast throughput with high accuracy results
- Monitors in line production process
- Store data for trending and product traceability

Principle of Operation

A laser beam scans at a very high speed the measuring area along two crossed directions (X and Y) and casts the shadows of the product being measured. The shadow analysis technique allows a very accurate computation of the diameters, the ovality, and the position of the product crossing the measuring plane.



An exclusive self calibration device guarantees permanent measurement accuracy, as a result, periodical remastering is no longer required. The measurement is unaffected by product speed or vibration, thanks to a sophisticated data processing software which in addition minimizes the errors due to the random positioning of the product inside the laser beams.

The innovative optical and electronic design of the ILS series features a high degree of protection against drawing dust or emulsion spray, which makes it suitable for use in heavily polluted environments.

System Software

Basic System Software - the ILS laser micrometer comes with default settings for immediate measurement readout via the RS 232 interface. Either a hand held terminal or a PC can be used to program the laser micrometer. Standard outputs include;

- Average diameter
- X diameter
- Y diameter
- Ovality
- System status

In addition to the above outputs, the ILS 13xy provides;

- Flaw index
- Flaw %
- Flaw amplitude

Setup routines enable the user to set a variety of parameters, including, the measurement time, number of laser scans, tolerances, go/no go settings, etc. In summary, the standard system software enables complete control of the laser micrometer while providing the user with flexibility to setup the desired measurements and reporting. A password feature is included so that the settings cannot be changed by an unauthorized user.

Windows Based Software

Windows based software is available for the single user as well as for the network user.

Single User Software - the single user software utilizes the RS 232 serial port. It provides the following features:

- Remote gauge programming
- Display of measurement data
- Out-of-tolerance alarms
- Real time statistics
- Data storage on file

Network User Software - the Network SPC software can be used to monitor, control, analyze the operating characteristics of a process, determine the quality of that process. Up to 32 ILS laser micrometers can be networked to a host computer via the RS 485 serial interface. Any ILS laser micrometer; the ILS 13 xy, ILS 35 xy and any of the single axis ILS laser micrometers can be networked to the host computer. This feature provides the user with the utmost in process control and monitoring capability in a very cost effective manner.

The Network software enables the following:

- Remote system programming
- System polling and data display
- Out-of-tolerance data
- Real-time statistics
- data storage on files

System Interfacing Capability

Because of the laser micrometer's built in electronics, the ILS laser micrometer can be used stand alone, like a smart sensor, directly connected to a PC, NC or PLC by its RS 232/RS 485 serial line. Through this communication link, the X and Y measurement results can be transmitted. It is also possible to program a nominal set point and a tolerance range. The laser micrometer will check the product dimensions and trigger out-of-tolerance conditions. These warning conditions are transmitted to the PC through the serial line and to an optional remote display unit. The display includes a parallel output to guarantee uninterrupted product inspection when and if PC communication is interrupted.

Data transmission and sensor setup are performed through a bidirectional. Either the RS 232 or the RS 485 line can be used for setup. The RS 485 mode is frequently used for multidrop networking and to link several sensors (up to 30) on a common line. A pre-settable buffer memory, First In First Out (FIFO), can be used for delayed transmission on request. The RS 232 mode is useful for sensor setup or for point-to-point data transmission.

User setup is also possible through a hand held terminal. This includes programming of average time, unit address for RS 485 mode, nominal, set point, tolerance limits, etc..

The ILS laser micrometer factory setup enables immediate RS 232 operation without the need for any preliminary programming.

A dedicated serial BCD output line is also included for direct connection to an optional display unit or to a PLC equipped with a fast parallel input.

Some Common Accessories

There are a variety of options and accessories which can easily be interfaced or used with the ILS series of Intelligent laser micrometers. Some of them are discussed below. For a complete list of options or accessories, please contact Freedom Technologies.

Remote Display

With the convenient remote display, the user can display diameter x, diameter y, average, ovality and a flaw index. These parameters can be manually viewed by depressing the SET button or by requesting them remotely from a PC or PLC, etc. To the right of the SET button, there are four (4) alarm indicators. By programming in a nominal set point and a tolerance range, alarm points can be displayed on the remote display.

The interface for the display utilizes a serial BCD line so that the RS 232/485 line is free for use by a PC or hand held terminal. The dedicated serial BCD line is provided directly from the ILS laser micrometer.

Hand Held Terminal

A low cost hand held terminal can be used instead of a PC to program the laser micrometer. The device comes with a connector which plugs directly into the RS 232 port. Even though there may be a number of laser micrometers on the network, the hand held terminal can be used by the operator to locally program a specific laser micrometer.

Sliding Protective Bracket

A sliding protective bracket ensures protection against wire breaking effects. The bracket can also be pressurized with compressed air to improve dust immunity in hostile environments. The bracket can easily be slid out of the laser micrometer for cleaning.

Dry Wire Fixture

When measuring ferrous wire on dry drawing benches, soap and iron dust can seriously affect the measurement accuracy and blind the laser's glass windows very quickly. The dry-wire fixture virtually eliminates the problem. This fixture enables the operator to move the device out of the laser and clean it without stopping the process. It just slides out and back in. Pictured in the photograph above is the ILS 13xy laser micrometer with the standard dry wire fixture.

Telescoping Floor Stand

A telescoping floor stand is available for easily and quickly mounting the laser micrometer into a production line. The stand has an adjustment for height and a three point floor mount for leveling the laser micrometer.