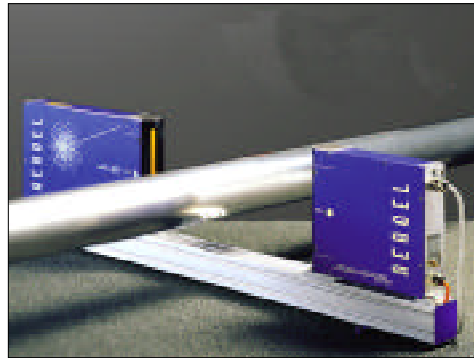


## Intelligent Single Axis Laser Micrometers

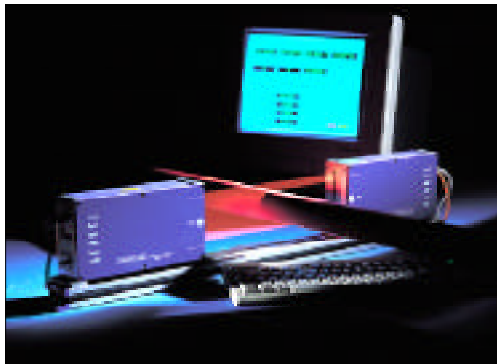
## ILS Series



ILS 40 laser micrometer



ILS 150 laser micrometer



ILS 80 laser micrometer



ILS 200 laser micrometer

## General Description

The Intelligent Laser Sensor (ILS) represents the latest technological development in scanning laser micrometry. With completely built in electronics, the ILS single axis laser 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 32 ILS sensors can be networked on a common line to one comm port on a PC or plant computer by using our Network software package.

Due to its performance, rugged construction, and cost effectiveness, the ILS single axis series is ideal for a wide variety of applications. Diameters as small as 0.05mm (0.002") and as large as 207mm (8.15") can be measured with the ILS single axis series.

Typical applications for single axis diameter measurements include:

- ground bars and parts
- turned components
- extruded products
- electric cable
- glass, metal, and plastic tubes or pipes
- rolled sections

## Features

- Measurement range: 0.05 to 207mm (0.002 to 8.15")
- $\pm 0.2\mu\text{m}$  (0.000008") repeatability @  $\pm 3$  sigma
- Display values on remote low cost display
- View data in histograms, x-bar charts with cp, cpk
- RS 232 and RS 485 bidirectional interface
- Up to 32 sensors can be networked on a single line
- 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 and casts the shadows of the product being measured. The shadow analysis technique allows a very accurate computation of the diameter. 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 beam.

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. A simple program on the PC which can be used is Hyper Terminal.

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.

**VT 100 Emulation Software**- is a low cost software package which utilizes the RS 232 serial port. It enables remote gauge programming.

**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 and 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 40, ILS 80, ILS 200 and any of the dual 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
- Display of measurement data
- 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 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 serial line. 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 32) 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 on page 3. For a complete list of options or accessories, please contact Freedom Technologies or your local sales representative.

#### Remote Display

By using the convenient low cost remote displays, the user can quickly display the desired parameters.

The model M0-00 is a very convenient display. It can be mounted in a panel or used on a table top. It can be used



with any of the single or dual axis laser micrometers. The M0-00 displays; diameter x, diameter y, average diameter, and ovality. When connected to a ILS single axis laser micrometer, the average value is used to display the diameter. Any of the 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.

#### CBX Connection Box

For a quick and simple connection to the ILS laser gauge, a CBX connection box is available. The ILS gauge connects to the Device port. Connections are available for RS 232 and 485. The remote display connects through the Auxiliary port. A 110VAC/24VDC power supply is included and connects to the Power port.



While the gauge is measuring and displaying data on the remote display, the RS 232 port can be used with a PC or terminal to set tolerances and view measurements.

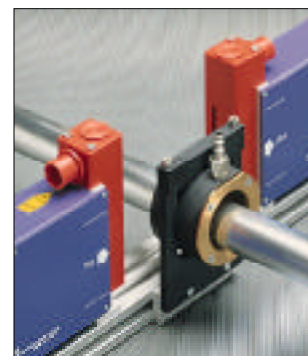
#### Telescoping Floor Stand

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.



#### Cleaning Devices

A variety of cleaning accessories are available for making the appropriate measurements in harsh environments with the ILS series of laser micrometers. Pictured to the right are compressed air windows mounted to the face of the transmitter and receiver of the ILS 80 laser micrometer and an air blow ring mounted to the base plate which cleans the product as it enters the field of measurement.



Pictured to the right is a fixture which is used in dry wire applications. The soap type lubricants stick to the windows of the laser micrometer quickly. This specially designed dry wire fixture enables the use of a laser micrometer without the worry of frequent cleaning due to the quick build up of contaminants on the windows. For a complete list of accessories contact Freedom Technologies or your local sales representative.

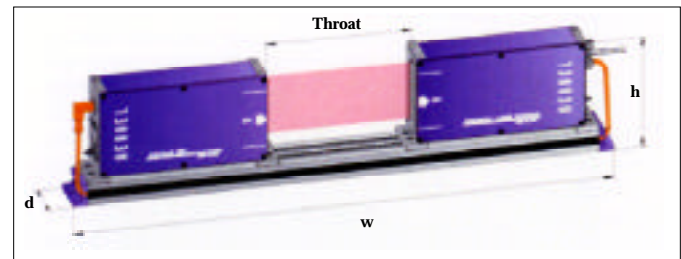


## Intelligent Single Axis Laser Micrometers

Specifications	ILS 40	ILS 80	ILS 150	ILS 200
Meas. field	40mm (1.57")	80mm (3.15")	150mm (5.9")	209mm (8.23")
Meas. range	0.05- 38mm (0.002 - 1.50")	0.75-78mm (0.03- 3.07")	0.8-149mm (0.03- 5.87")	0.75-207mm (0.03-8.15") <sup>5</sup>
Prog. resolution	0.1/1/10µm (4/40/400) x 10 <sup>-6"</sup>	0.1/1/10µm (4/40/400) x 10 <sup>-6"</sup>	1/10µm (40/400) x 10 <sup>-6"</sup>	1/10µm (40/400) x 10 <sup>-6"</sup>
Repeatability <sup>3</sup>	± 0.3µm (± 0.000012")	± 0.5µm (± 0.00002")	± 0.75µm (± 0.000029")	± 1µm (0.00004") ± 3µm (0.00012") <sup>5</sup>
Linearity (cent.)	± 1.5µm (± 0.00006")	± 2µm (± 0.00008")	± 3µm (± 0.00012")	± 2µm (0.00008") <sup>6</sup> ± 6µm (0.00024") <sup>7</sup>
Lin. (in meas. plane)	± 1.5µm (± 0.00006") <sup>9</sup>	± 2µm (± 0.00008") <sup>1</sup>	± 5µm (± 0.0002") <sup>1</sup>	± 4µm (0.00016") <sup>6</sup> ± 6µm (0.00024") <sup>7</sup>
Linearity (side) <sup>2</sup>	± 0.5µm/mm	± 0.7µm/mm	± 0.7µm/mm	± 0.7µm/mm
Scan frequency	200/400Hz <sup>10</sup>	200/400Hz <sup>10</sup>	200/400Hz <sup>10</sup>	200Hz
Laser source	visible diode, class 2	visible diode, class 2	visible diode, class 2	visible diode, class 2
Beam spot size	0.4t x 0.2w mm (0.015 x 0.008")	0.4t x 0.2w mm (0.015 x 0.008")	0.5t x 0.4w mm (0.019 x 0.015")	0.4t x 0.2w mm (0.015 x 0.008")
Dither	± 0.4mm (0.016")	± 0.8mm (0.03")	± 1.3mm (0.05")	± 0.8mm (0.03")
Dim. (w x d x h)	445 x 68.5 x 134mm (17.5 x 2.7 x 5.3")	736 x 60 x 163mm <sup>8</sup> (28.97 x 2.36 x 6.42")	1090 x 60 x 279mm <sup>8</sup> (42.9 x 2.36 x 11")	836 x 66.5 x 312mm (32.9 x 2.6 x 12.28")
Throat distance	101.9mm (4.01")	200/300mm (7.87/11.81") <sup>4</sup>	400/600mm (15.74/23.621") <sup>4</sup>	259mm (10.2")
Operating temp.	0 to 45° C	0 to 45° C	0 to 45° C	0 to 45° C
Weight	3.8Kg (8.4lbs.)	6.2Kg (13.66lbs.)	15.0Kg (33lbs.)	13.0Kg (28.6lbs.)

## Notes:

- Max. error when a master is moved in the measuring plane, within the field. Checked with 20mm (0.78") diameter master. The measuring plane is located halfway between the transmitter and receiver.
- Max. error for a side displacement of the master out of the measuring plane.
- Specified within ± 3 sigma (99.7%) with simple averaging over 200 scans. Measurement time = 1 second.
- The ILS 80 comes in two versions, 200mm or 300mm throat distance. (ILS 80/200/2, ILS 80/300/3)
- ILS 200: for diameters from 0.75 to 72mm in lower beam. For diameters from 63 to 207mm between the two beams.
- ILS 200: for diameters > 70mm (2.75") lower beam.
- ILS 200: for diameters > 70mm between the two beams.
- Width dimension for ILS 80/300/3. Subtract 100mm for ILS 80/200/2. For the ILS 150 add 200mm from the width for the 600mm separation .
- Max. error when a master is moved in the measuring plane, within the field. Checked with 20mm (0.78") diameter master. The measuring plane is located halfway between the transmitter and receiver.
- The ILS gauge comes in two versions, a 200Hz or 400Hz unit. The repeatability and linearity for the 400Hz unit are improved. Request the specific ILS gauge data sheet for the improved specifications.



ILS 40, 80, and 150 gauge head dimensions



This document is not to be reprinted without written permission of Freedom Technologies, LLC.. Data subject to change without notice. 3/31/03.

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

The closer you look, the better we measure!