# *XACTUM*™ Laser Micrometers
for very high accuracy diameter measurement

The XLS (eXactum Laser Scan Micrometer) **series Laser Gauges** represent the latest technological development in laser scanning micrometry, featuring record performance.

With their built-in and very powerful electronics, the XLS micrometers can be used as Stand Alone, Intelligent Diameter Sensors. When programmed with a Dedicated Software and completed with external Display Units and Operator Panels, they can be the hart of Dedicated Laser Measuring and Control Systems, for the on-line control of a variety of different products.

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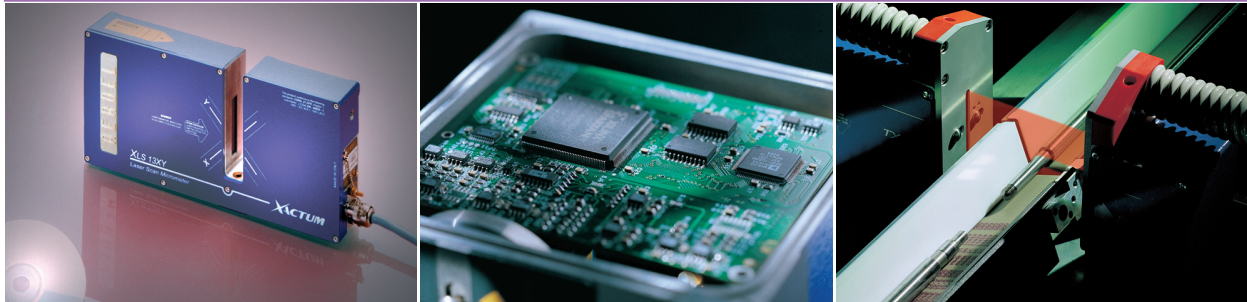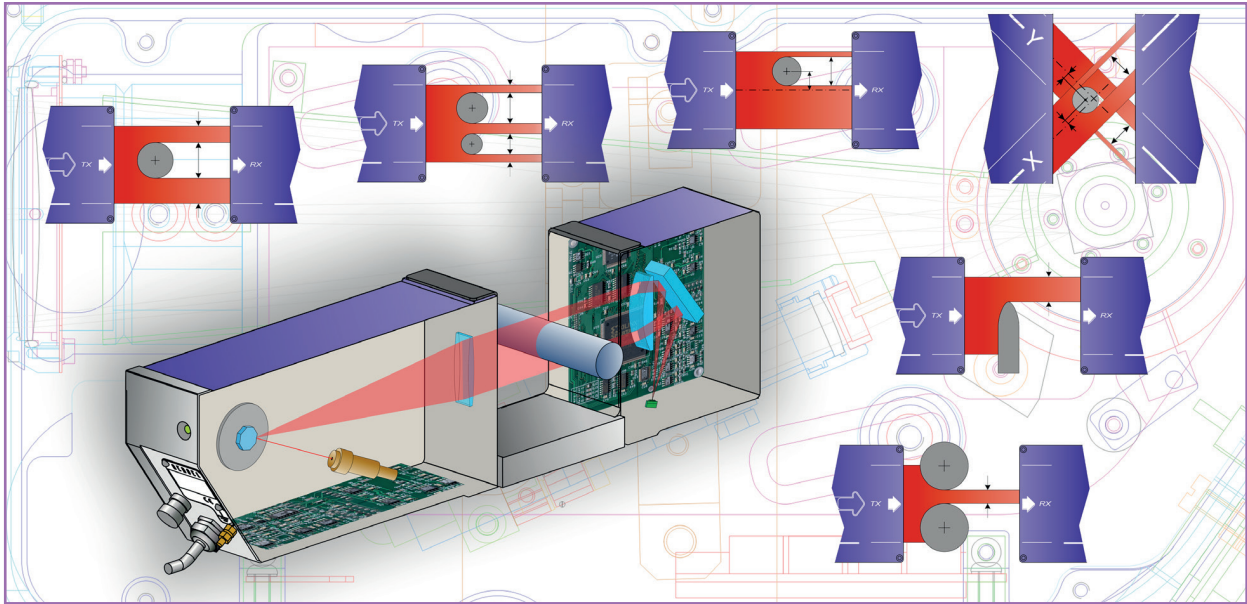
Operating principle

The Laser Gauges use a visible Laser Diode as a high intensity, monochromatic and coherent light source: a thin beam of this light is then collimated onto the object to be measured.

The laser beam is deflected at constant speed by a turning mirror positioned at the focus of a transmitting lens, so as to obtain a parallel-moving scanning beam in the measuring field. During the scanning period, the laser beam intercepts the object being measured and casts its shadow onto the receiver. The duration of the shadow is proportional to the transversal dimension of the measured object, while the duration of the light is related to the object position in the measuring field. Inside the receiver a lens gathers all the light from the transmitter and concentrates it on a high-speed photo diode, which converts the light pulse into electrical signal. The signal from the photo diode, after preliminary conditioning, is processed by the internal microprocessor which converts shadow / light times into diameter and position values. Any other dimension which is related to a shadow or to a light segment can be measured in fractions of a second, with high accuracy: whenever the edge of a shadow may represent the dimension being measured, the laser gauges are the ideal solution to the gauging problem.

Intelligent Diameter Sensors

The XLS micrometers can be directly connected to a PC, PLC or NC via standard Ethernet or RS232 or RS485 interface line. Any electronic unit equipped with such an interface can simply get accurate and fast diameter readings: the user can input the measurement data into his own programme, to perform any specific task. Thanks to this feature, the XLS gauges are ideal diameter sensors for OEM Customers, System Integrators or for large scale applications.

Software flexibility for dedicated applications

When, in addition to computing the diameter or any other measurable dimension, some other specific and complex functions are required, it is possible to install in the gauge a Dedicated Application Software: add-on external I/O Modules and Displays, driven by the gauge through the RS485 line, assure the connection with external devices / machines and the operator's interface.
In such a way the Customer gets a Dedicated System tailored to meet his specifications and to fit perfectly the operational requirements.
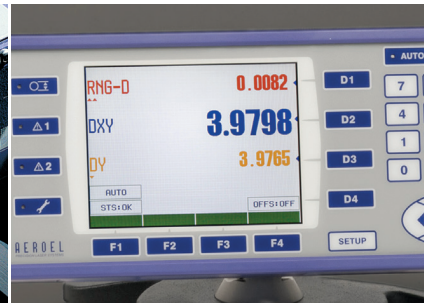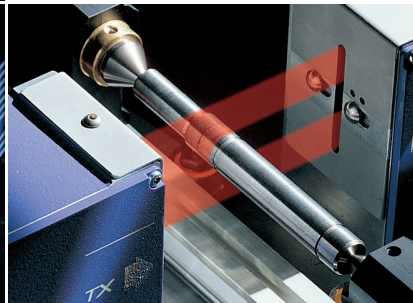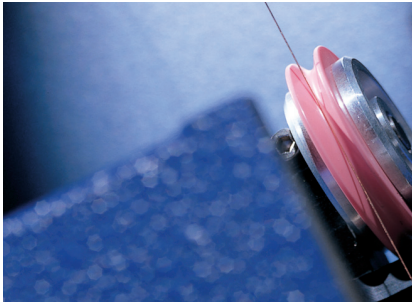
Benefits

Non contact measurement: moving parts, hot or soft, can be easily gauged, in such conditions that would be off-limits for any other instrument.

Wide measuring range: parts of different size can be measured, without any pre-setting.

Insensitive to product speed and vibration: the measurement can be performed on-line, during the manufacturing process.

Absolute measuring concept: no "zeroing" is required when the part diameter is changed.

High gauging speed and reduced beam spot size: it detects details that would escape a contact probe or an air ring, even on moving parts.

On-Line application for 100% checking: "zero defect" manufacturing and proved Quality.

Ideal sensors for the automatic process regulation: savings in raw material and manpower.

Easy and quick gauging: reduced cost for off-line sample checks.

Accurate and reproducible results, regardless of the operator's experience.

Typical Applications

Due to their accuracy, speed and flexibility, the Aeroel Laser Gauges are specially suited for the monitoring and control of:

ground or turned components, on-line or bench-top

extruded products like plastic tubes, electric cables, optical fibres

metal drawn wires

steel bars and tubes

magnet wire

glass tubes and rods

Why Aeroel?

Permanent self-calibration: the measuring accuracy is guaranteed over time and periodical remastering is no longer required.

NO-VAR technology: no measuring drift due to changing room temperature by programming the coefficient of thermal expansion of the part

Ultra high accuracy: ± 0.02 μm repeatability

Electronic linearization: the "error mapping" of each gauge makes it possible to compensate by software all errors due to optical aberrations

High scan rate up to 3000 Hz, using a 12 facets polygon mirror

Outstanding single scan repeatabilty: ± 0.75 μm, thanks to the internal data processing capability.

Every single scan measurement result can be used and downloaded at a rate of 1500 or 3000 data per second.

In many applications a single instrument can measure the diameter and detect flaws on moving products

Excellent resistance to dust and dirt: skilled optical design and innovative edge detection technique allow to discriminate the part shadow from the dirt on the optical flats.

Competitive Features

New electronics, based on an ARM-9 type processor, 32Mb RAM / 16Mb Flash Memory, clock **200 MHz.**, **FPGA** (Field Programmable Logic Array 200,000 gates)

Linux embedded Operational System and Application Software in C language

Fully re-programmable: the software in the gauge can be re-loaded to incorporate new performance or future releases.

Two fast digital inputs for triggering signals, metre counting, etc.

Internal digital sampling of the video signal: serial signal downloading for checking and teleservicing

Fully digital, non-analog interface: no loss in accuracy due to transmission line, electric noise or A/D conversion errors.

Use standard serial line: no dedicated or custom interface board inside the PC.

Ready for networking: through the Ethernet or the RS485 line, several sensors can be linked to a host computer.

In the memory of the sensor you can store **up to 3 different application programs**.

Internal temperature check: a sensor measures the internal temperature and shuts the gauge down when the operating temperature exceeds the allowed limit.

Industrial design: rugged and sealed construction (IP65) for industrial environment.

Easy self-check: a multicolor LED with coded flashing sequences immediately identifyes possible malfunction conditions.

Low voltage power supply: 24 VDC single ended, reduced power supply.

Low power Laser emission: Class II laser equipment, conforming to USA and EU standards.

High immunity to EMI: conforming to the high EU standards (CE).

Made in Europe: the XLS series Gauges comply with the high Quality and Safety Standards set by the European Union.

3 year warranty: the solid state laser diode guarantees reliability and very long operational life.

Accessories

Low cost Display / Alarm Module, driven by the RS485 line of the gauge, using a multicolor LED Display, IR Remote Control, 4 output and 2 input lines (opto-coupled).

Operator's Interface Panel, driven by the RS485 line of the gauge, using a touch-sensitive keyboard, a backlit color LCD display 640x480 pixel (87x115 mm), 8 output and 5 input lines.

Compressed air windows and other devices to protect the gauge from dirt and dust in harsh environments.

Profibus or Profinet Converter

Connecting cables and accessories for wiring and power supply.

Fixtures and belts to hold and transport the part to be gauged.

Air wipes and devices to clean the part being measured.

PC Software for user's calibration or for remote gauge control.

Available models

	XLS40	XLS80	XLS150	XLS13XY	XLS35XY
Type of measurement	Single Axis	Single Axis	Single Axis	Dual Axis	Dual Axis
Separate heads	NO	YES	YES	NO	NO
Beam height (mm)	40	80	150	13 x 13	35 x 35
Measurement range (mm)	from 0.06 to 38	from 0.75 to 78	from 0.8 to 149	from 0.03 to 10	from 0.2 to 32
Scanning rate (Hz)	1500	1500	1500	960 / 3000	960 / 3000
Resolution (µm)	0.01 at best	0.01 at best	0.01 at best	0.01 at best	0.01 at best
Repeatability (µm)	± 0.07 at best	± 0.2 at best	± 0.4 at best	± 0.02 at best	± 0.15 at best
Linearity (µm)	± 0.5 at best	± 1 at best	± 3 at best	± 0.5 at best	± 1 at best

Specifications subject to change without notice. For additional details and complete specifications please see the gauge data sheet.

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ISO 9001:2008