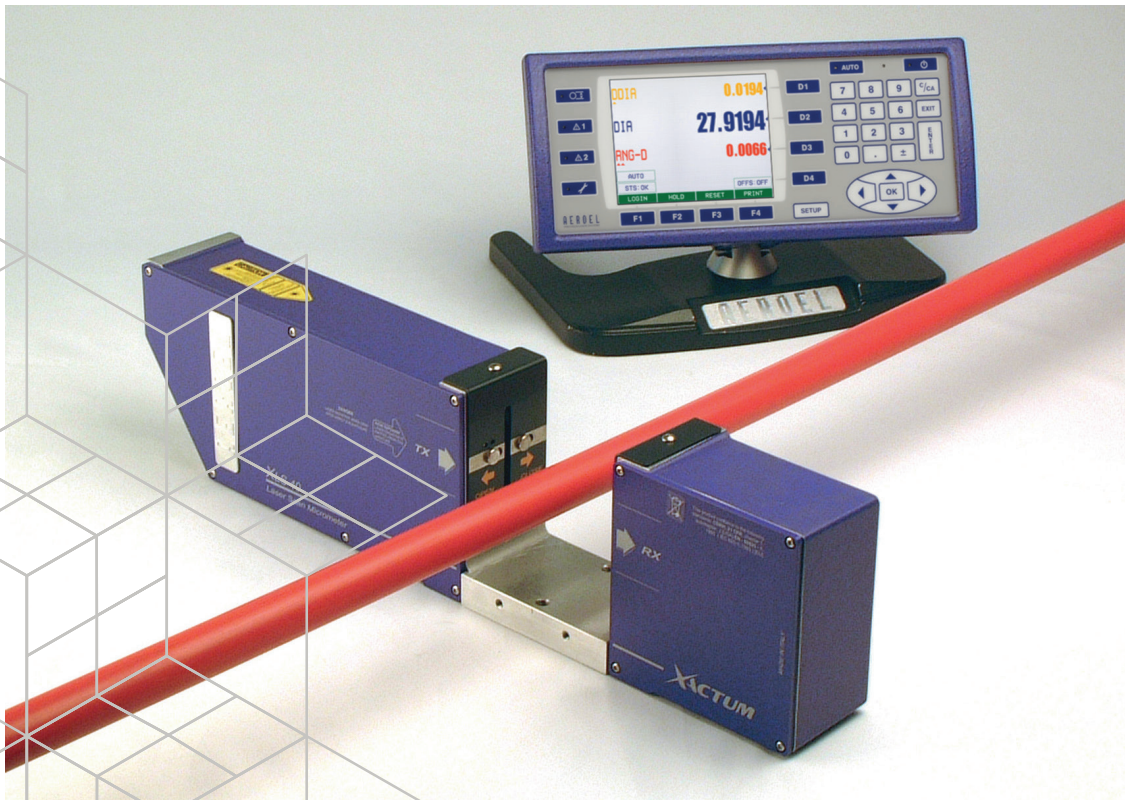


EXTRULINE.X

**Laser system for on-line diameter measurement
and automatic extrusion control.**



Extruline.X is a laser system designed to control the external diameter of extruded products such as electrical wires, plastic tubes and similar products.

In addition to the diameter measurement and tolerance checking, Extruline.X can provide the automatic extrusion process regulation, detect and locate diameter flaws all along the product's length.

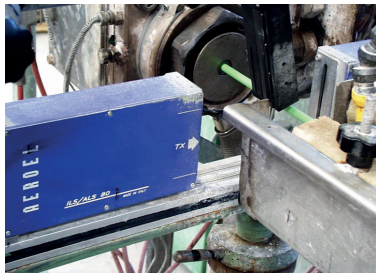
With non contact technology it is possible to measure moving products, hot or soft, where conventional instruments cannot be used and may even damage the product.

How does it work?

The Extruline.X system is based on an Xactum laser gauge, installed at the exit of the extruder, which measures the external diameter of the product

The measured average diameter is continuously compared with the nominal value pre-set by the operator: if the product size is going out of the pre-set limits, the Extruline.X software automatically corrects the extruder so that the product is always within the desired tolerance limits.

The measured data are displayed on the screen of a CE-200 Operator Interface Panel, which is also used to program the system; in addition all measurements are recorded and processed to get a complete statistical report which can be immediately printed to prove the product Quality.



Any sudden change in the product diameter is detected as a Flaw: the position of each flaw along the product length is stored in the system memory, in order to print a Flaw location Report for each spool.

The main functions of the Extruline.X system are:

- Measurement and display the **external diameter**;
- **Out-of-tolerance alarms**;
- **Regulation** of the extrusion process;
- **Flaw detection and location** along the spool;
- Processing and printing of **statistical reports**;
- Interfacing with a **remote computer**

System configuration

The Extruline.X system uses single-axis Xactum Laser Gauges.

The Basic system is composed of:

- **XLS40, XLS80 or XLS150**, Xactum Laser Gauge;
- **CE-200**, Operator's Interface Panel, 19" Rack mount;
- **Extruline.X software** (basic module) pre-installed in the Gauge;
- 5 m long connecting cable

Some options and accessories available to complete the system are:

- Additional software for the extruder regulation
- Additional software for statistical analysis
- Additional software for Flaw Detection and Location
- Electronic potentiometer for the extruder interfacing
- Proximity switch for length counting
- Blow rings to dry the product
- Telescopic stand for the laser gauge
- Extension cables
- Gauge Calibration Report

Advantages

Two instruments in one: diameter controller and flaw detector.

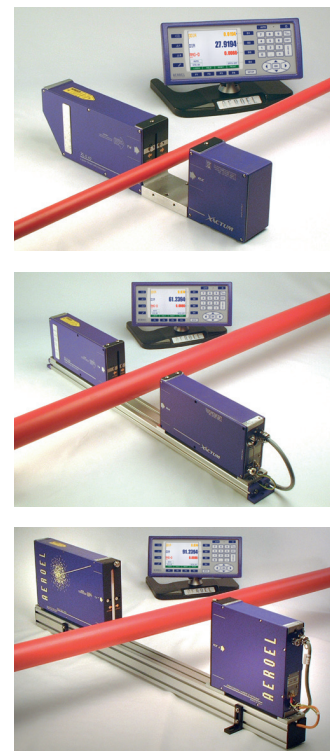
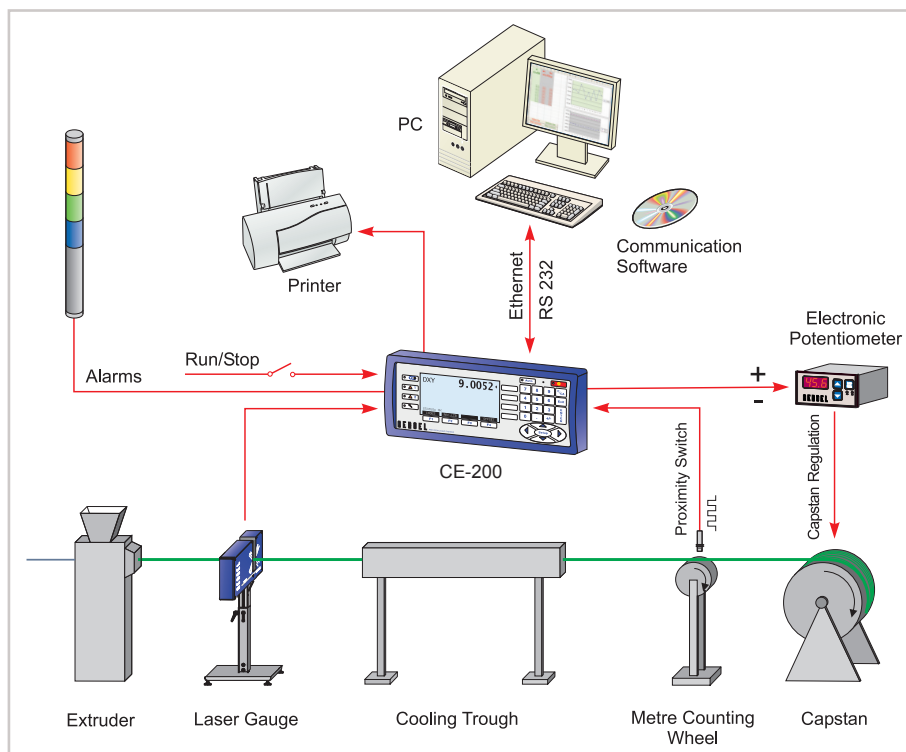
Extruding at the lower limits of tolerance means significant **savings in materials**.

The automatic control capability saves labour costs.

Non-contact measurement for the on-line application and 100% control.

Improvement in product quality and reduction of waste.

Flaw-free products with assessed quality.



The Extruline.X Software

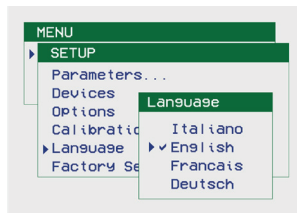
The Extruline.X software is pre-loaded inside the Xactum gauge and, thanks to its modular structure (basic package + optional Regulation, Statistics and Flaw Location) it can meet all operational requirements. Special care has been taken to ensure that the system is easy to use and simple to program even by non-experts. Through the CE-200 Interface



Panel, the operator uses function keys and pop-up menus to select the various functions or to enter the numerical values requested by the program.

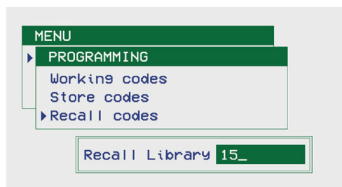
The basic package includes the following functions:

- Display of the measured diameter and of the shift from the nominal diameter.
- 3 measured values can be simultaneously displayed on the screen.
- Programmable alarms and pre-alarms for out-of-tolerance conditions.
- Measurement of opaque or transparent products (Glass Logic).
- Library for 1000 different products, retrievable directly by the operator.
- Possibility of entering a password to restrict the programming functions to authorized personnel.
- Ethernet / Rs232 interface for remote programming or data retrieval.
- Multi-lingual menus (Italian, English, French and German).
- Selectable measuring unit (mm or inches) and resolution.
- Pre-programmed factory set-up to facilitate installation and start-up of the system.



The additional Process Regulation module (Option 1) features the following functions:

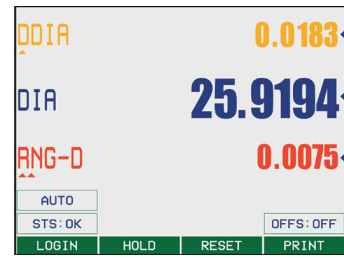
- Software for automatic regulation of the diameter by adjusting the drawing speed or the flow rate of the extruder.
- PI (Proportional Integral) mode using INC (+) or DEC (-) signals.
- The process regulation is started only when a real trend to deviate from the nominal pre-set value is detected.
- Automatic compensation of dead time, according to variations of the line speed.
- All control parameters can be programmed and stored in the product library.
- Programmable hot/cold offset to compensate for the thermal expansion of the extruded product when the measurement is performed immediately after the extrusion head.



(*) Only flaws which turn into a diameter change all along the product circumference, like "olives" or "neck-down", can be surely detected. The minimum detectable flaw length is given by the max line speed divided by the gauge scan frequency.

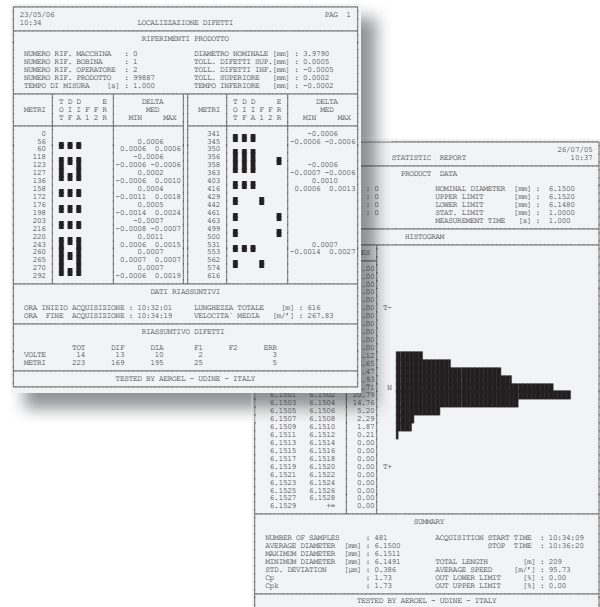
The additional Statistics module (Option 2) offers the following functions:

- Histograms showing the measured diameters
- Programmable diameter limits to filter out and ignore abnormal measurements arising from anomalous working conditions.
- The data acquisition interval can be selected manually by the operator or automatically determined via a Start/Stop input.
- Recording of maximum, minimum and average values.
- Calculation of standard deviation of Cp and Cpk values.
- Total length and average speed reporting.
- All listings show the date and time.
- Identification of the operator, the machine and the type of product.
- Progressive numbering of the reel.



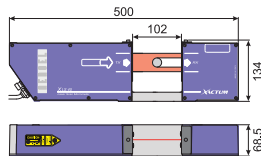
The additional Flaw Detecting and Location module (*) (Option 3) offers the following functions:

- Single scan diameter checking capability.
- Separate tolerance limits for the flaw detection function, added to the pre-set nominal value or to the average diameter previously measured (self adapting mode)
- Independent outputs for + and - flaws.
- Recording of the max or min value of the flaw and its position along the spool.
- Print out of a Flaw Location Report.
- The report can include flaws detected by other external devices (i.e. Spark Testers, Capacitance Testers, etc.)

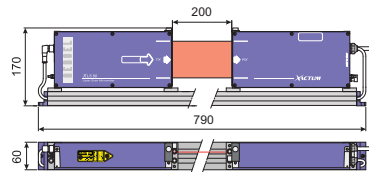


Specifications

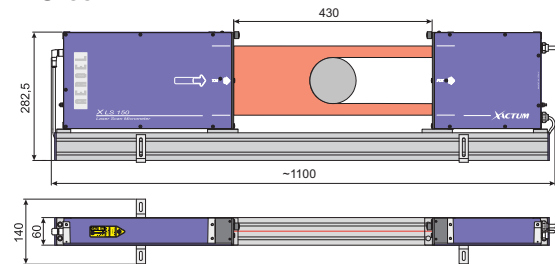
XLS40



XLS80



XLS150



All dimensions are in mm.

	EXTRULINE.X40/A	EXTRULINE.X80/A	EXTRULINE.X150/A
Type of gauge	XLS40/1500/A	XLS80/1500/A	XLS150D/1500/A
Measuring Field (mm)	40	80	150
Measurable Diameters (mm)	0.1 - 38	0.75 - 78	0.8 - 149
Resolution (Selectable) (µm)		10 / 1 / 0.1 / 0.01	
Linearity (Centred Product) (µm)	± 0.5 ⁽¹⁾	± 1 ⁽²⁾	± 3 ⁽³⁾
Linearity (in the Measuring Plane) ⁽⁴⁾ (µm)	± 0.5	± 1	± 4
Repeatability (T=1s, ±2σ) (µm)	± 0.07	± 0.2	± 0.4
Single Shot Repeatability (±2σ) (µm)	± 1.5	± 3.5	± 5
Beam Spot Size (s,l) ⁽⁵⁾ (mm)	0.08 x 2	0.4 x 3.5	0.5 x 4
Side Dither of the Scanning Plane (mm)	± 0.02	± 0.05	± 0.08
Scanning Frequency (Hz)		1500	
Scanning Speed (m/s)	300	588	940
Gauge Thermal Coefficient ⁽⁶⁾ (µm/m°C)		- 11.5	
Laser Source	VLD (Visible Laser Diode); λ = 650 nm		
Dimensions (mm)	500 x 134 x 68.5	790 x 170 x 60	~1100 x 282.5 x 140
Weight (kg)	4.2	7	15

Notes

- (1) For $\varnothing \leq 25$ mm. For $\varnothing > 25$ mm the linearity is ± 0.75 µm. The value is inclusive of the Aeroel's masters uncertainty (± 0.3 µm)
- (2) For $\varnothing \leq 40$ mm. For $\varnothing > 40$ mm the linearity is ± 1.5 µm. The value is inclusive of the Aeroel's masters uncertainty (± 0.3 µm)
- (3) Per $\varnothing \leq 70$ mm. Per $\varnothing > 70$ mm la linearità è ± 5 µm. Tale valore include l'incertezza dei master Aeroel (± 0.3 µm)

(4) Maximum error, when a master is moved in the measuring plane, checked with $\varnothing = 8$ mm (XLS40), $\varnothing = 20$ mm (XLS80) or $10 \leq \varnothing \leq 140$ (XLS150). The measuring plane is located halfway between transmitter and receiver.

(5) Elliptical spot: "s" is the thickness and "l" is the width.

(6) This is the measuring error due to a change in the ambient temperature when measuring a part with zero thermal expansion coefficient (INVAR). This is specified for gauges using a software PRESET for the NO-VAR option and when the rate of change of the ambient temperature is lower than 3°/h. When the NO-VAR option is ENABLED, the gauge thermal expansion coefficient is programmable by the user.

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



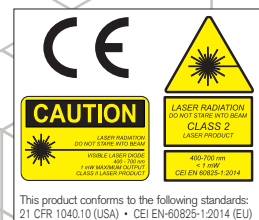
CE-200 Operator's Interface Panel

Color **LCD Display**, 640x480, backlit
 "Touch-Sensitive" **capacitive keyboard**, with 35 keys and 7 warning LED
RS485 interface to connect the XLS gauges
8 protected PNP outputs, **5 PNP inputs**, **2 inputs** to the gauge
Ethernet & RS232 ports and **Centronics output for parallel printer**
2 configurable analog outputs
Dimensions: 132 x 350 x 76.5 mm (panel alone)
Weight: 2 kg (panel), 3.1 kg (table-top version)
Power supply: 24 VDC, 100 mA Typical (1 A max)



Electronic potentiometer

Analog output from 0 to 10 Volt, adjusted by INC (+) or DEC (-) pulses.
Additional PWM output to drive solenoid valve
Output level display in % of range, 3 digits LED display H=14.2 mm
LOCAL or REMOTE adjustment mode.
Memory of last setting before power down.
Plastic case DIN43700
Dimensions: 96 x 48 x 106 mm
Power supply: 24 VDC/VAC, 100 mA



This product conforms to the following standards:
 21 CFR 1040.10 (USA) • CEI EN-60825-1:2014 (EU)

