

WIRELINEXY

Laser System for on-line diameter and ovality measurement of drawn wire.



Wireline.XY is a Laser Measuring System specially designed to monitor the diameter and ovality of steel and copper wires

The system has been designed to work in the Wire Industry, to check the wire diameter during drawing, with high accuracy and reliability, as the measurement is unaffected by wire vibration and speed.



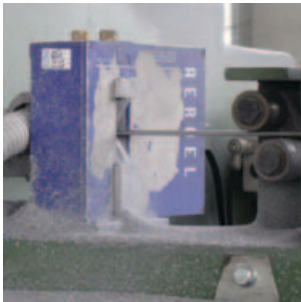
Thanks to a new and patented dust protective bracket, it is possible to install the gauge on dry drawing drawing benches, where soap and iron dust can strongly affect the measuring accuracy and blind the sensor in a very short period of time.

How does it work ?

The Wireline.XY system is based on an Xactum laser gauge, installed after the finishing die, to measure the external diameter of the product. By using a dual axis gauge and checking the diameter along two crossed directions, it is possible to compute the average diameter of ovalized products, when the simple measurement along one axis would not be accurate enough to perform efficient control.

This average diameter is directly related to the cross section area, which can be accurately measured even on ovalized product and in spite of its random orientation.

The signals from the laser gauge are processed by the software, which displays the measurements and compares the actual values with the nominal set point: when the wire diameter, due to the wearing of the die, exceeds tolerance limits, suitable output signals are activated to stop the machine or to alert the operator.



The measured data are displayed on the screen of a CE-100 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.

The main functions of the Wireline.XY system are:

- Measurement and display the **external diameter and ovality**
- **Out-of-tolerance alarms**
- Processing and printing of **statistical reports**
- Interfacing with a **remote computer**

(*) recommended to be used on dry drawing machines or in very dusty environment

The Dust Protection



It is a well known fact that a major obstacle in expanding on-line diameter measurement practice in the Wire Industry is the dust sensitivity of all optical instruments, which jeopardizes applications on dry drawing benches, where soap and iron dust can strongly affect the measuring accuracy and blind the sensor in a short time.

Aeroel has developed and **patented** a brand new **pneumatic protection system against dust**, to be used with their dual axis Laser Gauges.

Based on a "self-cleaning" concept, this new pneumatic protection system has been designed to fit the gauge onto dry drawing machines, where the soap dust is a serious problem for every optical instrument. Extensive on-field tests have proven that, using this new bracket, **several weeks of uninterrupted operation** can be expected, without any need for gauge cleaning, even on most critical situations, where previous systems would have lasted only a few hours.

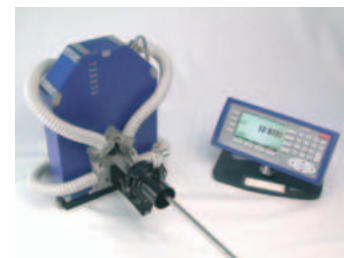
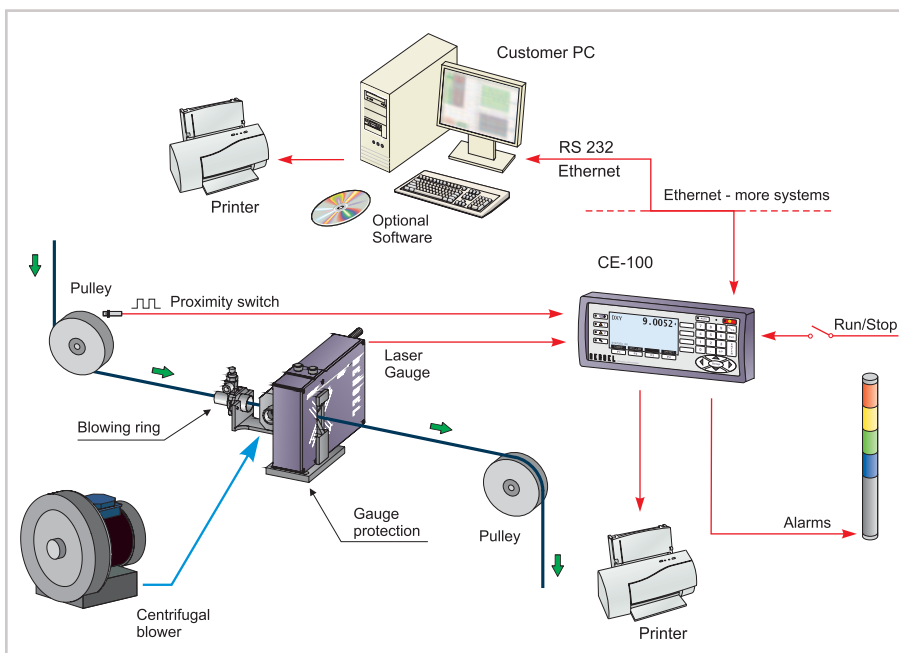
System configuration

The Basic system is composed of:

- **XLS13XY** or **XLS35XY** (dual axis) Laser Gauge
- **CE-100**, Operator's Interface Panel, 19" Rack mount or Table-top version;
- **Wireline.XY Software** (basic module) pre-installed in the Gauge;
- 5 m long connecting cable

Some options and accessories available to complete the system are:

- Supplementary software for Weight computation and/or for Statistical Analysis.
- Mechanical shields to protect the gauge; compressed air can be fed into the shield (*).
- High pressure centrifugal blower, to supply dry and clean air (*).
- Air blowing ring, to clean the wire (*).
- Proximity switch for length counting.
- Extension cables.
- Software for PC connection.



Advantages

The **contactless gauging technology** makes possible on-line application: the **100% checking** enables the production of wire diameter without faults, eliminating any risk of rejects or complaints.

Labor cost can be greatly reduced and it is possible to use drawing machines with automatic collection reel change, as continuous monitoring replaces the handmade sampling at the end of each spool.

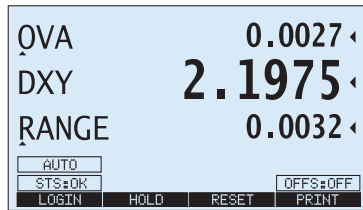
Where heavy reels of **high-carbon steel** are produced, continuous monitoring is absolutely essential: the service life of the die and the tight diameter tolerances make it intolerable to check only the end of the reel.

The better accuracy in diameter and area gauging, achieved by using a **dual axis gauge**, allows a further reduction of tolerances, especially for products whose dimensional uniformity may be an additional competitive advantage.

Dust protective bracket to install the gauge on dry drawing benches, where soap and iron dust can strongly affect the measuring accuracy and blind the sensor in a short time.

The Wireline.XY Software

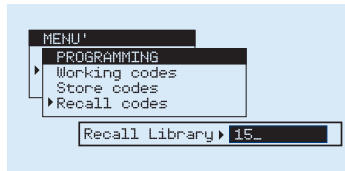
The Wireline.XY software is pre-loaded in the Xactum gauge and, thanks to its modular construction (basic package + optional Statistics and networking) it can meet all operational requirements. Special care has been taken to ensure that the system is easy to use and simple to program even by non-experts. Through



the CE-100 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 the shift from the nominal diameter.
- Computes the $(X+Y)/2$ Avg. Diameter and $(X-Y)$ Ovality.
- 3 measured values can be simultaneously displayed on the screen.
- Programmable alarms and pre-alarms for out-of-tolerance conditions.
- 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. Several systems can be connected to a unique computer, on the same Ethernet line.
- Multi-lingual menus (Italian, English, French and German).
- Selectable measuring units (mm or inches) and resolution.
- Pre-programmed factory set-up to facilitate installation and start-up of the system.



The additional weight measuring module (Option 1) features the following functions:

- It computes and displays the length and the 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.

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17/09/2010                                     10:15
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PRODUCT DATA
UNIT      : [mm]      DIA NOM.:   0.600
MACHINE # : 0         TOL HIGH:   0.020
SPOOL #   : 7         TOL LOW :  -0.020
OPERATOR # : 0         MAX. OVA:   0.020
PRODUCT # : 0         LIM.STAT:   1.0000
-----
SUMMARY
DATE      : 17/09/2009   START   : 10:13:48
                               STOP   : 10:15:18

WEIGHT    : 4.025 [kg]
LENGTH    : 1796 [mt]
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The additional Statistics module (Option 2) offers the following functions:

- Recording and printing of the maximum, minimum and average values.
- Spool length printing.
- Calculation of standard deviation and Cp and Cpk values.
- The data acquisition interval can be selected manually from the keyboard or without automatically from a Start/Stop input.
- Programmable limits for filtering abnormal readings arising from anomalous working condition.
- All listings show the date and time.
- Identification of operator, machine and type of product.
- Progressive numbering of the reel.
- Downloading of the statistical reports to a remote PC, via Ethernet or RS232 lines.

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=====
17/09/2010                                     10:15
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PRODUCT DATA
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SUMMARY
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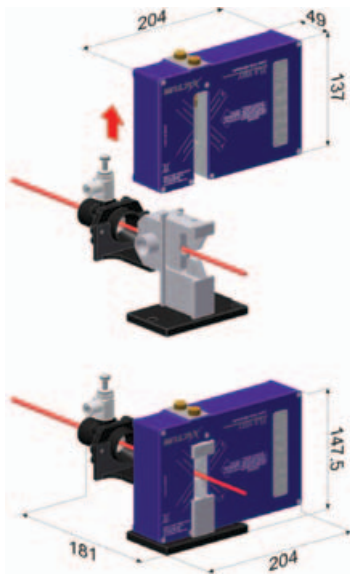
LENGTH    : 1796 [mt]

MIN : 0.606  0.000  0.607  0.604
MAX : 0.611  0.006  0.608  0.614
MED : 0.606  0.002  0.607  0.605
s (*) : 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

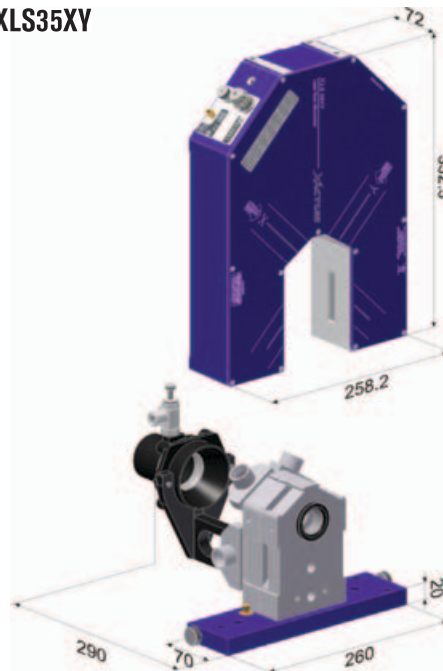
(*) STANDARD DEVIATION: 1/10000 [mm]
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Specifications

XLS13XY



XLS35XY



All dimensions are in mm.

NEW

NEW

		WIRELINE.XY13/A	WIRELINE.XY35/A
Gauge Model		XLS13XY/480/A	XLS35XY/480/A
Measuring Field	(mm)	13 x 13 ⁽¹⁾	35 x 35 ⁽²⁾
Measurable Diameters	(mm)	0.1 - 10	0.2 - 32
Resolution (Selectable)	(µm)	10 / 1 / 0.1 / 0.01	
Linearity (Centered Product) ⁽³⁾	(µm)	± 0.5 ⁽⁴⁾	± 1 ⁽⁵⁾
Linearity (Full Range) ⁽⁶⁾	(µm)	± 1.5	± 2.5
Linearity (Reduced Field) ⁽⁷⁾	(mm)	± 1	± 1.5
Repeatability (T=1s, ±2σ)	(µm)	± 0.15 ⁽⁸⁾	± 0.3
Single Shot Repeatability (±2σ)	(µm)	± 1	± 3.5
Beam Spot Size (s,l) ⁽⁹⁾	(mm)	0.1 x 4	0.2 x 4
Scanning Frequency	(Hz)	480 (X) x 480 (Y)	480 (X) x 480 (Y)
Scanning Speed	(m/s)	156	288
Gauge Thermal Coefficient ⁽¹⁰⁾	(µm/m°C)	-18	-18.4
Laser Source		VLD (Visible Laser Diode); λ = 650 nm	
Dimensions	(mm)	204 x 137 x 49	352.5 x 258.2 x 72
Weight	(kg)	2	5.8

Notes

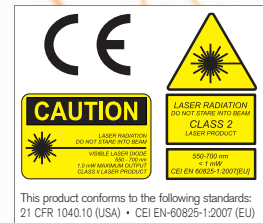
- (1) For $\varnothing \geq 0.3$ mm; for smaller diameters the field is proportionally reduced up to 4x4 mm for $\varnothing = 0.1$ mm.
- (2) For $\varnothing \geq 0.3$ mm; or smaller diameters the field is proportionally reduced up to 20x20 mm for $\varnothing = 0.2$ mm.
- (3) Related to the average diameter $(X+Y)/2$. The linearity value is inclusive of the Aeroel's masters uncertainty (± 0.3 µm).
- (4) For $\varnothing \leq 1$ mm. For $\varnothing > 1$ mm the linearity is ± 1 µm.
- (5) For $\varnothing \leq 15$ mm. For $\varnothing > 15$ mm the linearity is ± 1.5 µm.
- (6) Maximum measurable shift of the average diameter $(X+Y)/2$, when a master is moved along the two X and Y axes crossing the center of the field, checked with $\varnothing = 3$ mm (XLS13XY) or $\varnothing = 8$ mm (XLS35XY).
- (7) The field is 5x5 (XLS13XY) or 16x16 (XLS35XY).
- (8) For $\varnothing \leq 0.5$ mm the repeatability is ± 0.03 µm.
- (9) Elliptical spot: "s" is the thickness and "l" is the width.
- (10) Typical value. It states the measurement drift due to the room temperature change, when measuring a master with null coefficient of expansion (INVAR).

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



CE-100 Operator's Interface Panel

Monochromatic **LCD Display**, 240 x 128, backlit
 "Touch-Sensitive" **capacitive keyboard**, with 34 keys and 7 warning LED
RS485 interface to connect the XLS gauges
8 protected and optocoupled **outputs**, **4 optocoupled inputs**,
2 inputs to the gauge
Ethernet & RS232 ports and **Centronics output** for parallel printer
 Available with adjustable **table-top base** or for 19" Rack mounting
Dimensions: 132 x 300 x 72 mm (panel alone)
Weight: 1,9 kg (panel), 3,4 kg (table-top version), 2,8 kg (Rack mounting version)
Power supply: 24 VDC, 100 mA Typical (1 A max)



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