Ultra accurate, high speed Laser Gauges for contact-less diameter measurement, featuring built-in electronics and Ethernet/Rs232/Rs485 interface

- Up to 150 mm measuring range
- Multiple measuring modes and types
- Up to 0.07 μm repeatability
- 1500 Hz scanning frequency
- Outstanding single shot repeatability
- Excellent linearity
- Permanent self calibration
- Fully re-programmable
- Direct connection to PC, PLC e NC
- Motor with Fluid Dynamic Bearing Technology
- NO-VAR: active thermal compensation
- Direct connection to Internet Browser
- Capability to store different application programs
- Inputs for reading and synchronizing quadrature encoders

It’s an ideal Intelligent Diameter Sensor for the on-line control of products like:

- Ground or turned parts
- Metal tubes and bars
- Plastic extruded tubes
- Electric cables and conductors
- Rolled or extruded profiles
- Hot rolled products
- Glass tubes and rods
The Sensor Software

The XLS sensors are equipped with a pre-loaded software to perform different types of measurements and in several modes, to meet a number of applications. In general the instrument performs just as an Intelligent Sensor, transmitting the measured data to an external device, through its serial ports. The tolerance checking or other more sophisticated features are not included, these are performed by the user’s device or by the available Aeroel Dedicated Systems.

Types of measures

**Measuring transparent objects**

Using the measuring modes 1-DIA and 1-EDG and enabling the Glass-Logic, it is possible to check also transparent parts. In all other modes the parts being measured must be opaque.

**Single face scanning**

It is possible to use 1 mirror face only, to cancel the side dither of the scanning plane: when this option is selected, the scanning rate is reduced to 125 Hz.

**Measurement processing**

**Instant values**: simple average over n scans, being n ≥ 1 programmable

**Extreme values**: Average, Max, Min over k Instant Values, being k ≥ 1 programmable

**Note**: not all the measuring modes included in the standard software are enabled in other types of software, designed for specific applications. Check the detailed specifications of any application software.
Input/Output and Interfacing

- **2 optocoupled digital inputs**, 10 – 30 Vdc, (5 - 15 mA). The two inputs can be programmed for different functions:
  - Start/Stop measurement and Send Data via RS232
  - Pulse counter and Reset command for meter counting function
  - To read the signals from a quadrature encoder, to synchronize the measures with the part position
  - Pulse counter and Reset command for the synchronization of several sensors
- Rs232, max 115.2 Kbaud, Master or Slave, for sensor programming, data transmission and commands (Aeroel protocol)
- Rs485, max 115.2 Kbaud, used in Master mode to drive Aeroel Units (i.e. Display Module) or in Slave mode to network the sensor (Aeroel protocol)
- Ethernet 10 Base-T, TCP/IP protocol for sensor programming, data transmission, commands and networking

Exclusive Aeroel features

- The scanning motor **without ball bearing** works perfectly, with no wear.
- The **NO-VAR option** allows you to automatically compensate for the expansion of the part when room temperature changes. The user only needs to program the proper coefficient of thermal expansion of the part.
- The **Web Server** allows you to connect the sensor through the Ethernet line to any Internet browser and “see it” as a website, where you can view the measures, enable an application program may be installed, set-up and program the gauge and even display the video signal (light pulse).
- In the memory of the sensor you can store **up to 3 different application programs**. The program change is possible only by connecting a PC to the Ethernet port and using a special Aeroel software utility or the Web Server function.
- The two sensor inputs **can be programmed** to read the signals of a quadrature encoder and i.e. synchronizing the gauge measurements with the position measured along the axis of the piece.

Programming and set-up

The sensor Set-up and programming are possible through the RS232, RS485 or Ethernet ports, using the Aeroel protocol and dedicated commands. In addition, there are several possibilities for using the sensor without writing any specific communication software:

- The **Web Server** allows you to connect the sensor through the Ethernet line to any Internet browser and “see it” as a website
- The **VT100 terminal mode** (through the RS232 port) makes it possible the connection of the sensor to a PC using the Windows (*) Hyperterminal program
- You can use an optional hand-held VT-100 terminal.
- Using an optional DM-200 **display module** with IR Remote Control, you can display the measurement data and program the sensor
- **GageXcom** software running on PC, to program the sensor and to get the measured data through Excel (*) spreadsheets.

Accessories

- **DM-200**, 6 digit Multicolor LED display module to display the measured data and to program the sensor through its IR Remote Control.
- **GageXcom** software running on PC, to program the sensor and to get the measured data through Excel (*) spreadsheets.
- Air compressed windows to protect the optics in heavy-duty environment
- **IR Remote Control** to program the sensor and to drive the display module.
- **Devices and fixture** to hold and transport the part being measured.
- **Devices to clean the product being measured**.
- **RS232/Profibus or RS232/Profinet bidirectional converter modules**
- **XLS-NCB**, connecting box with universal power supply and sockets for network connection through Ethernet or RS485 ports and RS232 connection.
- **Connecting cables and extensions**.
- **PC software** for driving an Ethernet network of sensors.
- **Calibration report**.

(*) Windows and Excel are registered trademarks of Microsoft Corporation
### Specifications

<table>
<thead>
<tr>
<th>Type of gauge</th>
<th>XLS40/1500</th>
<th>XLS80/1500</th>
<th>XLS80D/1500</th>
<th>XLS150D/1500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Measuring Field (mm)</td>
<td>40</td>
<td>80</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>Side Measuring Field (mm)</td>
<td>± 10</td>
<td>± 40</td>
<td>± 100</td>
<td></td>
</tr>
<tr>
<td>Measurable Diameters (mm)</td>
<td>mod. /A 0.1 – 38</td>
<td>0.75 – 78</td>
<td>0.06 – 38</td>
<td>mod. /B 0.06 – 38</td>
</tr>
<tr>
<td>Resolution (Selectable) (μm)</td>
<td>10 / 1 / 0.1 / 0.01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linearity (Centred Product) (μm)</td>
<td>± 0.5</td>
<td>± 1</td>
<td>± 3</td>
<td></td>
</tr>
<tr>
<td>Linearity (in the Meas. Plane) (μm)</td>
<td>± 0.5</td>
<td>± 1</td>
<td>± 2</td>
<td>± 4</td>
</tr>
<tr>
<td>Side Linearity (μm/mm)</td>
<td>± 0.5</td>
<td>± 0.7</td>
<td>± 0.5</td>
<td>± 0.8</td>
</tr>
<tr>
<td>Repeatability (T=1s, ±2μm) (μm)</td>
<td>± 0.07</td>
<td>± 0.2</td>
<td>± 0.4</td>
<td></td>
</tr>
<tr>
<td>Beam Spot Size (s,l) (mm)</td>
<td>mod. /A 0.08 x 2</td>
<td>0.06 x 0.1</td>
<td>0.4 x 3.5</td>
<td>0.06 x 0.1</td>
</tr>
<tr>
<td>Side Dither of the Scanning Plane (mm)</td>
<td>± 0.02</td>
<td>± 0.05</td>
<td>± 0.08</td>
<td>± 0.05</td>
</tr>
<tr>
<td>Scanning Frequency (Hz)</td>
<td>1500</td>
<td>300</td>
<td>588</td>
<td>940</td>
</tr>
<tr>
<td>Scanning Speed (m/s)</td>
<td>7 (7.2)</td>
<td>7 (7.2)</td>
<td>7 (7.2)</td>
<td>7 (7.2)</td>
</tr>
<tr>
<td>Thermal Coefficient (μm/mm°C)</td>
<td>-11.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Supply</td>
<td>24 VDC; 0.3 A (1 A peak)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laser Source</td>
<td>VLD (Visible Laser Diode); λ=650 nm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (mm)</td>
<td>500 x 134 x 68.5</td>
<td>790 (890) x 170 x 60</td>
<td>-1100 (1300) x 282.5 x 140</td>
<td></td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>4.2</td>
<td>7 (7.2)</td>
<td>15 (15.7)</td>
<td></td>
</tr>
<tr>
<td>Operating Temperature Range (°C)</td>
<td>0 – 50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage Temperature (°C)</td>
<td>-20 – +70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atmospheric Humidity</td>
<td>Max 85% (non-condensing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altitude (m)</td>
<td>0 – 3000 over sea level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection</td>
<td>IP65</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes**

Two standard models are available for the XLS80 and XLS150 sensors: the first with head gap 200 and 430 mm and the second with head gap 300 and 630 mm.

1. Maximum allowed side displacement of the part axis.
2. Maximum error, when a master is moved in the measuring plane, checked with Ø8 mm (XLS40), Ø20 mm (XLS80) or Ø140 mm (XLS150). The measuring plane is located halfway between transmitter and receiver.
3. Single shot repeatability (± 2μm) is ± 0.07 ± 0.2 ± 0.4 μm (XLS40), ± 0.06 ± 0.2 ± 0.4 μm (XLS80) or ± 0.06 ± 0.2 ± 0.4 μm (XLS150).
4. Elliptical spot: “s” is the thickness and “l” is the width.
5. This is the measuring error due to a change in the ambient temperature when measuring a part with zero thermal expansion coefficient (INVAR). When the NO-VAR option is ENABLED, the gauge thermal expansion coefficient is programmable by the user.
6. The connecting cable is not included. The figures between brackets are related to the model with head separation 300 mm (XLS80) or 630 mm (XLS150).