X-SIGHT ST

Optical Extensometer for small-scale testing

FEATURES

- Micro sample tests with high accuracy
- Flexibility of sample sizes provided by a high resolution semi-telecentric lens
- Tests at ambient temperature, in temperature chambers and even in the vicinity of furnaces
- Capable of low-frequency cycling test measurement
- Possibility of strain-controlled tests

SOFTWARE

- X-Sight Alpha DIC®
- Tensile (axial), compressive, shear, flexural and torsional tests
- Recording and post-process option
- Additional advanced features

SUPPORTED OPERATING SYSTEMS

- Win 11 64bit / Win 10 64bit
- Win Server 2019 / Win Server 2022

Latest Release on date of purchase



▲ X-Sight ST comes with an industrial camera and semi-telecentric lens, LED spotlight, profile adapter, USB relay, installation medium, USB license key and calibration grid.

SMALL-SCALE & HIGH-TEMPERATURE STRAIN MEASUREMENT

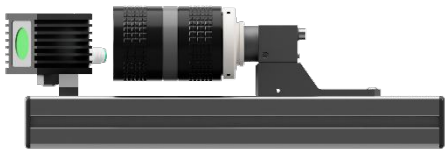
OVERVIEW

The ST is an advanced optical extensometer designed for precision measurements on small samples and optimized even for high-temperature testing up to 1800 °C.

It features a high-resolution, low-distortion semi-telecentric lens that maintains excellent telecentricity across a wide range of sample sizes, — effectively minimizing out-of-plane motion and ensuring exceptional measurement stability. The lens is paired with an industrial-grade digital camera, delivering detailed images for highly accurate results.

When equipped with specific filters, the system effectively suppresses unwanted wavelengths, further improving measurement accuracy. An integrated monochromatic green LED light source provides consistent, optimal illumination.

Both the camera and the light can be mounted on a lightweight aluminum profile, or on a custom arm allowing quick and effortless repositioning.



For advanced setups, the system also supports external camera triggering, enabling seamless synchronization with other instruments and expanding its versatility across a range of testing applications.

MEASURING LENGTH

A semi-telecentric lens offers greater flexibility: its internal components are not fixed (unlike standard telecentric lenses), allowing the working distance and field of view to be fine-tuned according to the user's specific requirements. This unique characteristic ensures that the image size remains consistent regardless of the distance between the lens and the image plane, making semi-telecentric optics ideal for precision measurements.

The minimum measurable length of the ST system is 18 mm, with a measurement accuracy corresponding to ISO 9513 Class 0.2.

Model Designation	Measuring Length [mm]	Resolution [µm]*
X-Sight-ST	62	0,2
	152	0,5

▲ *At room temperature. Resolution at elevated temperature is highly affected by boundary conditions (vibrations, air turbulence).

SAMPLING RATE

The cameras resolution and 5Gbps data throughput of the USB 3.0 bus give the default sampling rate, which can be further increased by cropping the sensor readout area.

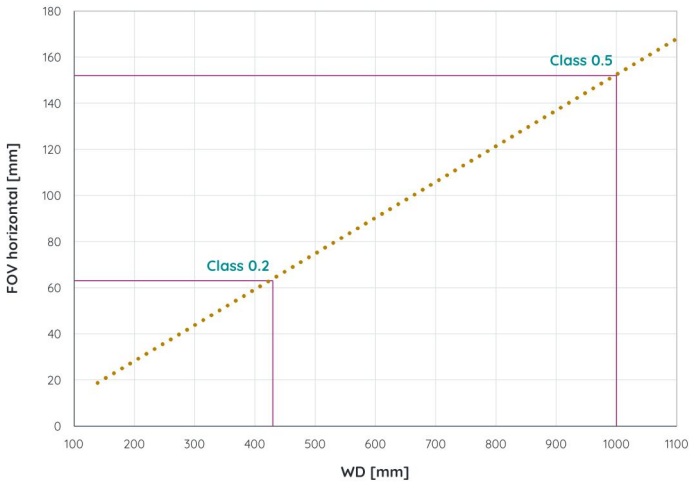
Model Designation	Sampling Rate at Full View [Hz]	Typical Sampling Rate [Hz]
X-Sight-ST	75	175

WORKING DISTANCE

A fully telecentric lens typically offers outstanding measurement stability, but its fixed working distance and field of view can limit flexibility in practical applications.

The semi-telecentric design of the ST system directly addresses this limitation by allowing adjustable working distances while maintaining a high degree of telecentricity. This combination provides both measurement precision and adaptability, making the system suitable for a wide range of specimen sizes.

The graph below illustrates the relationship between field of view (FoV) and working distance (WD), with the corresponding resolution classes highlighted for clarity.



MECHANICAL INTERFACE

The ST unit can be easily mounted on standard aluminum profiles using T-slot nuts.

In most cases, however, the ST system is mounted directly onto a Universal Testing Machine (UTM) for stable and repeatable measurements.

Custom-mounting solutions can also be provided upon request, allowing full integration with specific test configurations.

MECHANICAL DIMENSIONS

The following table includes the mechanical dimensions of a ST unit.

Dimension	Value
Length	20 mm
Width	135 mm
Height	60 mm
Weight	2.9 kg

LIGHT PARAMETERS

ST unit is equipped with a green high-power spotlight.

Parameter	Value
Beam angle	13°
Wavelength	523 nm
Luminous Flux	580 lm
Power	9 W

PC CONNECTION

The ST is connected to the PC using one USB 3.0 cable for the camera and one USB 2.0 cable for relay operation. The standard cable length is **3 m**. All cables can be extended using Active Optical extension Cables.
A USB 3.0 extension card for the PCIe slot supplied by X-Sight is recommended to secure a stable camera connection, as some integrated USB 3.0 ports may lack appropriate bandwidth.

DATA TRANSFER

Multiple ways exist to **OUTPUT** the measured data to the machine control unit or the testing machine software.

- **DIGITAL**

  DOLI Binary, MODBUS, HP VIDEO, TCP/IP, RS232

- **API**

  Alpha API (JSON), MRT API

- **ANALOG**

  Auxiliary AD/DA converters

- **PULSE**

  quadrature encoder-like pulse communication with the use of a PULSEGEN device

INPUT of external data to X-Sight Alpha DIC software (force, temperature, pressure) is also possible (requires Device Input software module – DI).
The API communication allows the OE to be remotely operated. This feature includes commands like START/STOP, Method Switch, Set Gauge Length, and others. For more info, check out the **Communication Options** document.

POWER CONNECTION

An ethernet PoE cable provides power for the ST unit. This cable is connected via a 3-pin connector to an INPUT port of the X-Sight Relay unit. Up to 4 light sources can then be connected to any of the OUTPUT ports.



An 802.3.af Mode B PoE standard is used to power the ST unit.

Pin	Connection
4 & 5	DC+ (24V)
7 & 8	DC- (GND)

POWER CONSUMPTION

The power consumption of each component of the ST unit goes as follows:

Component	Value
Camera	3 W
USB relay	1 W
LED Spotlight	9 W
SUM	**13 W**

Cameras and the relay are powered via the USB bus.

MEASUREMENT CONDITIONS

To achieve the best measurement results, we recommend following our guidelines for optimal measurement conditions.
The ST allows measurement through the glass or the use of a mirror. In such cases, these optical elements must be of high optical quality so as not to introduce unwanted disturbance to the measurement. When measuring through the glass, a polarization set may be required to eliminate the light reflections. When measuring with a climatic chamber, be aware that the vibrations and heat turbulence may introduce a raised noise base to your signal. This can be mitigated by using a tunnel between the lens and the furnace or by employing a fan to redirect the airflow.
Another potential source of disturbance is the tilt of the furnace window, which may cause reflections captured by the camera, thereby affecting the measurement accuracy. It is advisable to consider this factor and position the lighting accordingly.

OPERATION CONDITIONS

The ST unit is designed for indoor use only. Do not allow the device to get wet.

Conditions	Permissible value
Temperature	10–30 °C
Humidity	30–70 %

When operating inside a climatic chamber, heat radiation can introduce additional noise into the measurement.
To counteract these effects, the ST unit is equipped with filters that effectively suppress unwanted interference, ensuring stable and accurate measurements.
This equipment is compatible with Class A of CISPR 32. In a residential environment, this equipment may cause radio interference.
This product complies with EU Directive 2002/96/EC.

PACKAGE CONTENTS

The ST unit consist of one semi-telecentric lens, green LED high power spotlight together with an adapter, and an external X-Sight Relay.



Note: The aluminum profile is not part of the system.

Each system contains one calibration grid of size adequate to a desired application.

Item	No. of pieces
ST unit	1
Cable Harness	1
Power Supply	1
Calibration Grid	1
Installation USB	1
USB License Key	1

ALPHA DIC SOFTWARE

The X-Sight ST optical extensometer runs on the Alpha DIC software, delivering high-quality measurement results while providing straightforward and intuitive user experience.

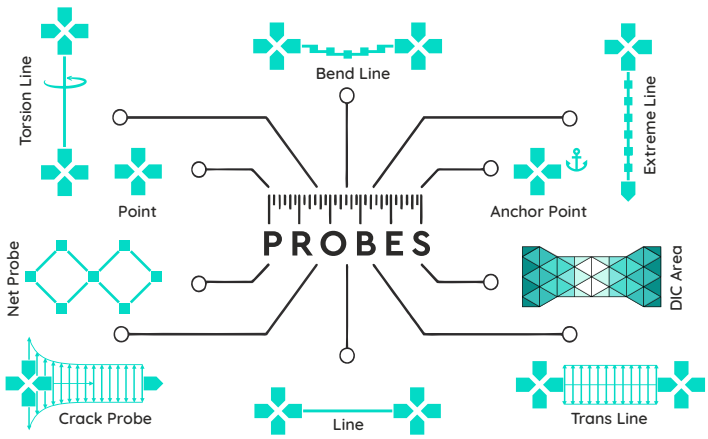
MODULARITY AND PROBES

The X-Sight Alpha DIC software is split into several modules. Modules group different measuring probes or advanced features.

The measurements with ST are primarily performed in real-time using line-based measuring probes with online data transfer to the testing machine.

However, to get the most out of an optical strain measuring device, there is an option to add a post-processing feature.

In post-processing, the number of line-based probes can be multiplied or switched to an area strain or displacement mapping function.



▲ Measuring probes

LICENSING

The X-Sight optical extensometers have a perpetual X-Sight Alpha software license bonded to a HW USB dongle. This allows the user to install the software on unlimited computers and use only the one where the license key is plugged in. This way of licensing makes it easy to switch the computer in case of a PC breakdown.

Alternatively, a network license is available upon request, which allows the software to be used on multiple devices within the same network without the need for physical key transfers.

SW Module	Point	Anchor	Line	Extreme Line	Trans Line	Bend Line	Torsion Line	Crack Probe	ROD Line	Net Probe	DIC Area
AX	•	•	•	•							
TR*					•	•					
TO*							•				
CL*								•			
ITT*									•		
NP*										•	
DIC*											•
PP*	Post-processing of recorded measurements (different probes or layouts)										
DI*	Possibility to input auxiliary signals (digital and analog)										
LVD*	Color value distribution along Extreme, or Bend Line										

* Expansion software module requires the presence of AX.

SYSTEM REQUIREMENTS

Parameter	Value - Minimum | Recommended
CPU	Intel/AMD 2GHz 2-core (>4000-3D points - Average CPU Mark *) | Intel/AMD 4GHz >8-core (>4000 points - Single Thread Rating **)
GPU	NVidia/AMD/Intel OpenGL 3.0 1024x768px (>300 points ***) | NVidia/AMD/Intel OpenGL 3.0 1920x1200px (>5000 points ****)
Memory	4GB | 16GB DDR4
Disk	8GB HDD free | 1TB SSD / M.2
Ports	1x USB (HW key), 1x USB 3.0 for each OE device + 1x USB 2.0 (relay) (Optional) 1xUSB for peripheral data transfer device (Optional) 1xEthernet Port of MODBUS or TCP/IP communication
Operating System	Windows 11 64-bit ***** or Windows 10 64-bit ***** Windows Server 2019 ***** or Windows Server 2022 *****

* MID CPU BENCHMARK www.cpubenchmark.net
** HIGH-END CPU BENCHMARK www.cpubenchmark.net
*** MIDLOW GPU BENCHMARK www.videocardbenchmark.net
**** HIGH-END GPU BENCHMARK www.videocardbenchmark.net
***** Latest Release on date of purchase