X·SIGHT

X-SIGHT SWIFT 3D
AI-Powered Optical Extensometer

FEATURES
- AI-powered specimen detection
- Ideal for general tensile, compressive, and flexural tests
- Full 3D measurement
- Resilient to out-ot-plane error
- Cross-polarization kit included

SOFTWARE
- X-Sight Alpha DIC®
- Swift 3D software module
- Line Probe, 3D and AI detection

SUPPORTED OPERATING SYSTEMS
- Win 11 64bit / Win 10 64bit
- Win Server 2019 / Win Server 2022

Latest Release on date of purchase

AI-DRIVEN FULL 3D OPTICAL EXTENSOMETER.
READY TO USE OUT OF THE BOX.

OVERVIEW

The X-Sight SWIFT 3D series is a brand-new approach to a universal stereoscopic optical extensometer. Its AI-powered feature reduces the need for human interaction when starting a new test, while the mark-detection mode eliminates the need for software interaction.

Equipped with two cameras operating in true full 3D mode, it eliminates errors caused by the specimen's back-and-forth movements.

The SWIFT 3D comes pre-calibrated, making installation easier than ever.

Measures strain, total length, delta length angle, and much more.

WORKING MODES

AI-Powered Detection

Automated specimen shape detection and probe positioning make the measurement process very smooth. This mode runs without specimen marking and is suitable for specimens with significant surface contrast.

In shape detection mode, the gauge length and specimen thickness or diameter must be specified before the test. These values can be entered either through digital communication with UTM software, manually in the Alpha DIC software, or via Alpha Deck.

Mark Detection

The marks eliminate uncertainty about whether the specimen surface is suitable for markless measurement. They enable the system to read the specimen's thickness, diameter, and gauge length, so no specimen details need to be entered before the test.

The SWIFT 3D is supplied with a marking stencil Xact Gauge for both metric and imperial gauge lengths.

VARIANTS

The SWIFT 3D is available in two versions designed to meet either Class 0.5 or Class 1 standards according to ISO 9513.

SWIFT-3D-140	SWIFT-3D-280

The number refers to the system's field of view (measuring length).

The system includes one pair of lenses. The second pair is available as an optional accessory. With the second pair of lenses, you can use both 140- and 280-mm field of views with a single system.

ISO 9513 COMPLIANCE

The stated resolution applies to the entire field of view, regardless of gauge length.

Variant Designation	Resolution Class	Measuring Length [mm]
SWIFT 3D-140	0.5	140
SWIFT 3D-280	1	280

ASTM E83 COMPLIANCE

To comply with Class B-1, the gauge length must be greater than the minimum values shown in the table below.

Variant Designation	Min. GL for B-1 [in]	Measuring Length [in]
SWIFT 3D-140	0.4	5.5
SWIFT 3D-280	0.8	11

For Class B-2, the minimum gauge length is half.

SAMPLING RATE

Typical values apply during standard tensile tests when only part of the image is used due to the specimen's geometry.

Sampling Rate	Data Rate
Typical	200 Hz
Maximal	323 Hz
Full Resolution	60 Hz

SIGNAL TRANSFER

There are several methods for outputting the measured data to the machine control unit or to the testing machine software.

- ### DIGITAL
  DOLI Binary, MODBUS, HP VIDEO, TCP/IP, Rs232

- ### API
  Alpha API (JSON), MRT API

- ### ANALOG-(OPTIONAL)
  A 16-bit 4CH single-ended DA converter with a selectable voltage / current range can be fitted inside the SWIFT 3D. The output is then connected to the unit's DC I/O connector.
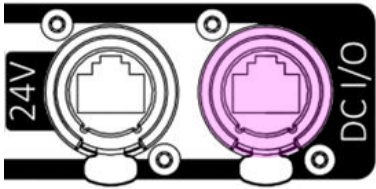
Output	Value
Voltage	0-5, 0-10, ±5, ±10 V
Current	0-20, 4-20 mA

- ### PULSE INCREMENTAL-(OPTIONAL)
  2CH single-ended, or 1CH differential quadrature pulse signal output with **5 V logic** (optical encoder-like) can be fitted inside the SWIFT 3D. The output is then connected to the unit's DC I/O connector.

The table below shows the wiring of both hardware output conditioners.

Pin	Color	Analog	Incremental
1	Orange	AO 0	CH0 A
2	Orange stripe	AO GND	CH0 B
3	Green stripe	AO 1	CH1 A
4	Blue	24V I/O	24V I/O
5	Blue Stripe	AO 2	CH0 GND
6	Green	AO GND	CH1 B
7	Brown stripe	AO 3	CH1 GND
8	Brown	GND I/O	GND I/O

When using a signal conditioner, only analog or incremental signals can be used at the same time, not both.

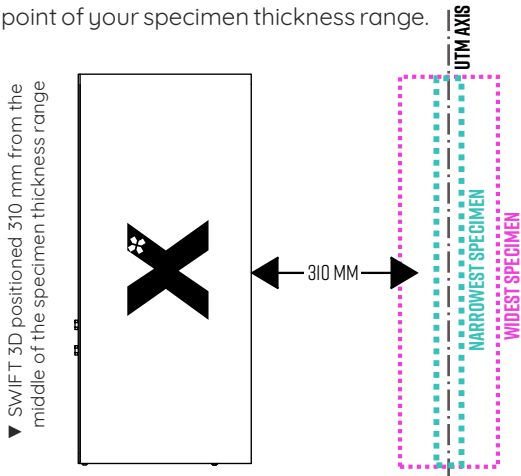▲ Connector for power input/output and analog or incremental signal output

INPUT of external data into X-Sight Alpha DIC software (force, temperature, pressure) is also possible (requires the Device Input software module – DI).

API communication allows remote control of the SWIFT 3D. This feature includes commands like START/STOP, Method Switch, Set Gauge Length, and more. For further details, see the Communication Options document.
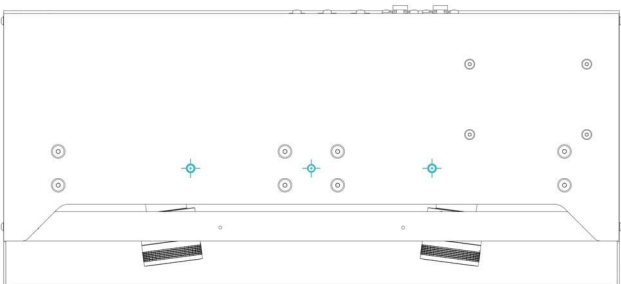
WORKING DISTANCE

The working distance is **310 mm ± 1%**, measured from the front edge of the camera housing.
If your specimens vary in thickness, set the focus distance to the midpoint of your specimen thickness range.

MOUNTING DIMENSIONS

A common way to mount the SWIFT 3D to a UTM is to use a pair of M6 screw holes with **165 mm vertical spacing**, securing the system in a fixed position. However, it is also possible to mount the unit via a 1/4" UNC threaded hole in the middle of the bottom plate onto a tripod head for portable use.

▲ The bottom plate of the X-Sight SWIFT 3D – 1/4" UNC in the middle and M6 screw holes

MOUNTING TO UTM

X-Sight offers brackets for T-Slots or cylindrical columns. The bracket is modified to fit your UTM.
To shorten and stiffen the bracket, we recommend **rotating the UTM grips by 45°**. This allows the SWIFT 3D to be mounted securely in a fixed position near the column without any rotating bracket parts and provides sufficient space for the operator when swapping specimens.

MECHANICAL DIMENSIONS

The table below shows the mechanical dimensions.

Dimension	Value
Height	424 mm
Length	187 mm
Width	80 mm
Weight	2.6 kg

LIGHT PARAMETERS

The SWIFT 3D features a white L400 LED light.

Parameter	Value
Active Length	400 mm
Color	5000K, CRI80
Luminous Flux	1850 lumens
Power	11 W

PC CONNECTION

The SWIFT 3D connects to the PC with two USB 3.0 cables for each camera, one USB 2.0 cable for relay operation, a license dongle, and an optional signal conditioner. The standard cable length is 3 meters. All cables can be extended using Active Optical Extenders.
If the system is used in a severely harsh EMI environment and requires long cables, it is better to equip it with fully optical data cables rather than extenders.
Using a USB 3.0 extension card for the PCIe slot from X-Sight is recommended to maintain a stable camera connection, as some built-in USB 3.0 ports may not have sufficient bandwidth.
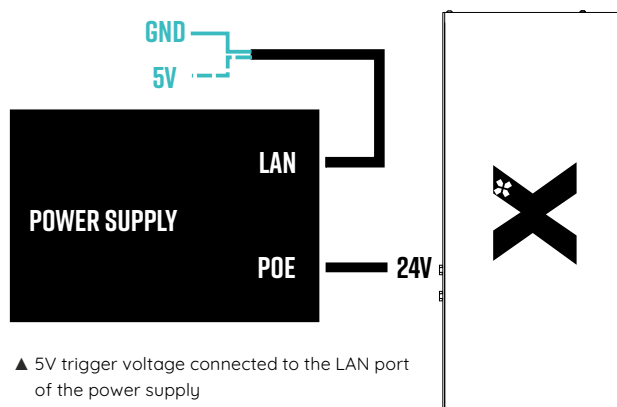
REMOTE START/STOP

Measurement start and stop can be automated using SW commands or via digital communication over 5 V logic.
The START event can be configured for either a RISING or a FALLING edge.

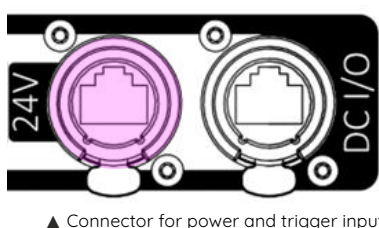| Logical State	Value
Logical 1 (HIGH)	>2.8 V
Logical 0 (LOW)	<0.3 V

To activate the trigger, connect the 5V to pin 3 and GND to pin 6 of the 24V connector.
The easiest way to do so is to use the LAN port on the power supply.

▲ 5V trigger voltage connected to the LAN port of the power supply

POWER CONNECTION

An Ethernet PoE cable supplies power to the unit. It connects to a 24V-marked RJ45 port on the back of the SWIFT 3D.

▲ Connector for power and trigger input

The pinout complies with the 802.3.af Mode B PoE standard.

Pin	Color	Function
1	Orange	NC
2	Orange stripe	NC
3	Green stripe	TRG+ (5V)
4	Blue	PWR+ (24V)
5	Blue Stripe	PWR+ (24V)
6	Green	TRG- (GND)
7	Brown stripe	PWR- (GND)
8	Brown	PWR- (GND)

The DC I/O port can serve as an alternative power INPUT. In this case, power is supplied directly to the LED, bypassing the USB relay.

Caution: If the SWIFT 3D is equipped with an analog or incremental output module, the power input on the DC I/O port is limited to a single pair of wires (4 & 8). When no output module is installed, the pinout is the same as the 24V connector.

When using the DC I/O port as a power OUTPUT, it supplies 24V DC only when the USB relay is switched ON. A common use of the DC output is to power an auxiliary light.

POWER CONSUMPTION

SWIFT 3D has the following power consumption.

Dimension	Value
Cameras	6 W
USB relay + HASP	1 W
L400 LED Light	11 W
Analog Module	2.4 – 3.1 W
Incr. Module	<1W
SUM / +ANALOG / +INCREMENTAL	18 / 21 / 19 W

The cameras, relay, and incremental module are powered via the USB bus. The light and the analog converter are powered by the 24 V power supply.

POLARIZATION KIT

The system default includes a polarization kit to minimize or eliminate reflections from the specimen surface or glass.

Cross-polarization is strongly recommended in mark-detection mode to enhance mark visibility and improve measurement robustness.

The kit consists of a pair of polarization filters that screws on the lenses and a polarization foil that goes under the fiberglass pressure plate mounted on the LED light.

OPERATION CONDITIONS

The SWIFT 3D unit is intended solely for indoor use. Prevent the device from getting wet.

Conditions	Permissible value
Temperature	5–40 °C
Humidity	30–70 %

The SWIFT **3D allows measurement through glass** or using a mirror. In such cases, these optical elements must be of high optical quality to avoid introducing unwanted disturbances to the measurement.

When measuring through glass, a polarization filter might be needed to reduce or eliminate light reflections.

When measuring with a climatic chamber, be aware that vibrations and thermal turbulence can increase the noise level in your signal.

This equipment is compatible with Class A of CISPR 32. In a residential environment, this equipment may cause radio interference.

This product is based on X-Sight 4106-3D and complies with EU Directive 2002/96/EC.

PACKAGE CONTENTS

The SWIFT 3D unit has either 16 mm or 8 mm lenses (140 or 280 variants).

Each system comes with one calibration grid.

Item	No. of pieces
SWIFT 3D Unit	1
Polarization Kit	1
Cable harness	1
Power Supply	1
Calibration Grid	1
Xact Gauge Metric	1
Xact Gauge Imperial	1
Marking Pen	2
Installation USB	1
USB License Key	1

SWIFT 3D SOFTWARE

The X-Sight SWIFT 3D optical extensometer is operated by the X-Sight Alpha DIC software, providing accurate measurements with an intuitive user experience.

LICENSING

The X-Sight optical extensometers include a **perpetual X-Sight Alpha DIC** software license tied to a USB dongle. This allows installing the software on unlimited computers and using only the one with the license key plugged in.

This licensing method makes it easy to switch computers if one breaks down.

FEATURES

The SWIFT 3D features a specialized software bundle consisting of **full 3D** capabilities, a **LINE PROBE**, and **AI-powered detection**.

POST-PROCESSING

The measurements with SWIFT 3D 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, you can add a post-processing feature. In post-processing, the number and/or their positions can be modified, and the test re-evaluated.

EXTENSIONS

A **Transversal measurement package** is available for applications requiring measurement of the second direction.

The transversal package includes the TRANS LINE probe, offering measurements in multiple positions to deliver the AVERAGE, MAX, or MIN transversal value (WIDTH, WIDTH CHANGE, TRANS STRAIN).

Additional narrow-focused measuring probes can be unlocked to expand the system's capabilities. **If many extensions are needed, consider a model from the X-Sight 4000-3D series.**

X-SIGHT OPTICAL EXTENSOMETER SERIES FEATURE COMPARISON

XS Optical Extensometer	3D function	Point	Line	Extreme Line	Trans Line	Bend Line	Torsion Line	Crack Probe	Net Probe	ROD Line	DIC Area
SWIFT 3D	•	+	•	×	+	+	+	+	+	+	NR
XS 2000 & 4000 Series	×	•	•	•	+	+	+	+	+	+	+
XS 4000-3D Series	•	•	•	×	+	+	+	+	+	+	+
Extension SW module											
TR					•	•					
TO							•				
CL								•			
NP									•		
ITT										•	
DIC Area											•
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, ROD, or Bend Line										

- • Included
- + Optional
- × Not available
- NR Not-recommended

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X-Sight SWIFT 3D	140	280
ISO 9513	Class 0.5	Class 1
ASTM E83 B-1 / B-2	Gauge Length > 0.4/0.2"	Gauge Length > 0.8/0.4"
Minimal Gauge Length	5 mm	10 mm
Minimal Specimen Width	1.5 mm	3 mm
Max Test Speed	2000 mm/min	
Data Rate Typical / Max	150 Hz	
Data Rate Max	323 Hz	
Data Rate at Full Image	60 Hz	
Working Distance	310 mm	
Signal Output	Digital / Analog / Incremental	
Data Output	Strain / Length / Elongation / Angle / Angle Change	
Remote Operation	API / WebSocket / 5 V Start/Stop Trigger	
PC Interface	2x USB 3.0 + USB 2.0	
Power Supply	24 V	
Power Consumption	Typical 18 W, Maximal 22 W	
Dimensions H / L / W	424 / 187 / 80 mm	
Weight	2.6 kg	
Operation Temperature	5 – 40°C	
Great Choice	Yes	

ORDERING INFORMATION

Item	Description
SWIFT 3D-140	Class 0.5 extensometer with 16mm lenses
SWIFT 3D-280	Class 1 extensometer with 8mm lenses
SWIFT-T	Transversal measurement SW package TRANS LINE
SWIFT-A	4CH analog output module
SWIFT-I	2CH incremental output module
COB	Custom mounting bracket
B08	1 piece of an 8 mm lens (two needed)
B16	1 piece of a 16 mm lens (two needed)

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 (for Post-Processing)
Ports	2×USB 3.0 + 1×USB 2.0; 1×Ethernet Port for 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