X-SIGHT 3D DIC

Optical
Measuring
System

FEATURES

- Universal solution for all engineering measurements
- Ideal for component and material testing
- Adjustable for wide range of applications

SOFTWARE

- X-Sight Alpha
- Full software capabilities

SUPPORTED OPERATING SYSTEMS

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

Latest Release on date of purchase

X-SIGHT 3D DIC COMES WITH CAMERAS, LENSES, LIGHTING, GRID AND CALIBRATING GRID

OVERVIEW

Discover the X-Sight 3D DIC system—your ultimate answer for precise strain and deflection measurements in real-time or post-process scenarios. Unleash its versatility as a powerful video extensometer with single or multiple cameras, or harness its capabilities as a stereoscopic optical system, delivering detailed strain data perfect for validating FEM analyses. Elevate your measurement game with X-Sight 3D DIC—where accuracy meets adaptability.

MODELS

Unlock precision tailored to your needs with the X-Sight 3D DIC system, available in four standard camera configurations. Whether it's about resolution, measurement area, or sampling rate, we've got you covered.
The numeric value at the end of the model designation indicates the camera resolution in megapixels.

XS-DIC3D-M5	XS-DIC3D-M16	XS-DIC3D-M24	XS-DIC3D-M67

The system can also be customized through the selection of cameras, lenses, and auxiliary hardware to suit your experiment the best.

MEASURING AREA

Measuring area sets the achievable resolution of the DIC system. The smaller the area, the better the resolution, and vice versa.
The optical system does not have any maximum or minimum measuring area, as this value depends on the optics used for the particular experiment. Therefore, the following chart shows the field of view size equivalent to 1 micron resolution.

Model Designation	Measurement Area at 1 micron resolution [mm]	Measurement Area at 1 mils resolution [mm]
XS-DIC3D-M5	300	7 800
XS-DIC3D-M16	650	16 800
XS-DIC3D-M24	650	16 800
XS-DIC3D-M67	1 000	26 000

WORKING DISTANCE

The working distance, meaning the distance from the camera to the measured object, is in a triangle selection together with a measuring area and focal length of the lens. By selecting two of these values, the third becomes driven. The following table presumes a 1-micron resolution and use of default supplied lenses and is, therefore, illustrative.

Model Designation	XS-DIC3D-M5	XS-DIC3D-M16	XS-DIC3D-M24	XS-DIC3D-M67
Typical Lenses used	S16	H16	H16	XH16
Working Distance [mm]	550	725	725	715

Use the Field of View & Working Distance charts at the end of the datasheet for more specific values.

SAMPLING RATE

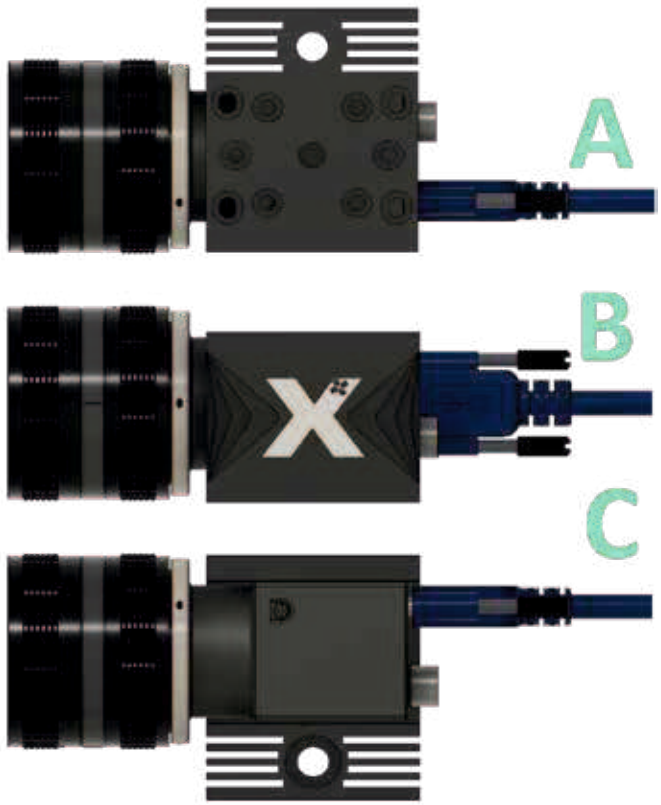
The sampling rate depends on the camera resolution and throughput of the bus used to transfer the images to the PC. The frame rate of each system can be increased by reducing the image size

The chart below displays sampling rates for some common image resolutions. For the Maximal Sampling Rate [1]) column, a 128 px image height is assumed. The Full HD [2]) corresponds to 1920 x 1080 px, and the VGA [3]) to 640 x 480 px. Be aware that the image can be cropped according to specific needs.

Model Designation	Frame Rate at Full Image [Hz]	Maximal Frame Rate [Hz][1])	Frame rate at Full HD[2]	Frame rate at VGA[3]
XS-DIC3D-M5	75	200	150	200
XS-DIC3D-M16	23	280	57	115
XS-DIC3D-M24	15	230	47	94
XS-DIC3D-M67	31	1 170	528	164

MECHANICAL INTERFACE

Cameras are mounted in a passive aluminum cooler either in a portrait or landscape orientation. The cooler serves as a part of thermal management and a mechanical interface at the same time and has two mounting options. Either a 1/4UNC threaded hole (center hole in View A) for use with standard tripods or via a through hole designed for M6 screws (hole between the ribs visible in view A, C) using a T-slot nut to attach to camera to a 3D Bar.



Camera/Cooler interface

The 3D Bar with cameras is then attached to a tripod ball head with a tripod using a quick-release fixing plate. The 3D Bar is depicted in the first image of this datasheet.
Both the ball head and tripod are part of the system.

Tripod with a tripod ball head

LIGHTING OPTIONS

The X-Sight 3D system comes with four light sources in total. Two BLEDs are battery-powered, and the other two LED lights are powered by an electrical grid and have higher light intensity.

BLED Light

A BLED is to be used for field measurements, measurements of smaller objects, or to light up hard-to-reach places.
Note: LED lights have power bank capabilities for easier work in the field.

Parameter	Value
Light temperature	3 200 – 5 600 K
Intensity	1 350 Lumens on 1 m2
Power	10W
Power source	Battery/Charger
Batter Capacity	4 200 mAh

For medium-sized applications, one or two high-intensity LED lights are used.

High-intensity
LED lighting

Parameter	Value
Light temperature	3 200 K
Intensity	4 860 lumens on 1 m2
Power	54W
Power source	Electrical Grid
Batter Capacity	4 200 mAh

The lights are typically mounted on the 3D bar using a mounting arm (MARM). The MARM has 1/4UNC threaded ends. Its spherical joints allow for the flexible positioning of the light source. Each system is equipped with a pair of MARM with a crab clamp.

MARM with a crab clamp

For large fields of view, a custom solution is applied. In many cases, separate light stands are used.

PC CONNECTION

According to the DIC system model, the cameras are connected to the measuring computer either via USB 3.0 (all besides M67) or 10GigE (M67) bus. Usage of a dedicated PCIe USB 3.0 card or a Thunderbolt in the measuring PC is recommended to secure a stable connection. Connection via USB Hub could make the frame rates listed in the Sampling Rate table unachievable.
USB camera cables are supplied in standard 4.6m length and can be extended via active optical extenders (not included).

MEASURED DATA TRANSFER (I/O)

Every X-Sight DIC System is equipped with an AD/DA converter. This device has two single-ended ±10V output channels and eight single-ended or four differential input channels.
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 Incremental**
  Quadrature encoder-like pulse communication with the use of a PULSEGEN device

INPUT of external data to X-Sight Alpha software (force, temperature, pressure) is also possible (requires Device Input software module – DIN).
The API communication allows the DIC System to operate remotely. 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

The high-intensity lights are powered by a single 120 W AC adapter providing 24 VDC output. A Y-splitter is used to supply both lights at the same time.
The battery power lights can be charged via a USB-C or a micro USB cable. A pair of USB cables with a dual-port charger are included in each system.
Cameras are powered by the PC by USB cables, with the exception of the M67 configuration, for which a Power over Ethernet or 10 – 36 VDC external power source is required.

OPERATION CONDITIONS

The X-Sight 3D DIC system is designed for indoor use, but outdoor applications under supervision are permissible. Do not allow the unit to get wet.

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

The system allows measurement through the glass or the use of a mirror. In such cases, these optical elements must be of a 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 reduce/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 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

Each X-Sight 3D DIC system is supplied in a dust-proof case containing, except for the PC, everything needed to start the measurement.
The outer dimensions of the case are 687 × 528 × 366 mm, with a weight of approximately 15 kg.

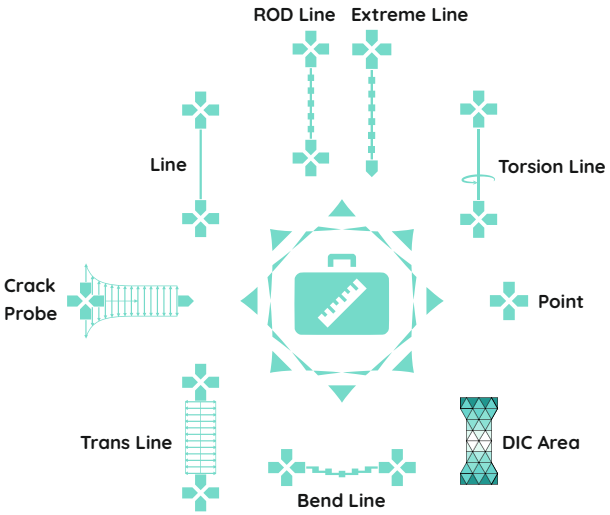
X-Sight 3D DIC dustproof case

Note: The above-depicted case is an illustration of a standard configuration; the content of the case may vary based on the customer's needs.

Item	No. of pieces
Dust-proof Case	1
Camera	2
Lens	2
Battery-powered LED	2
High-intensity LED	2
MARM + crab clamp	2
Tripod + Head	1
3D Bar	1
Power Supply for lights	1
Camera Data Cable	2
Synchronization Cable	1
Calibration Grid	3
AD/DA Converter	1
Plastic angle kit	1
6 + 2.5 mm Allen key	1
Lens cleaning cloth	1
Quad-port USB3.0 hub	1
Installation USB	1
USB License Key	1

MODULARITY AND PROBES

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



The measurements with the X-Sight 3D DIC system are primarily performed post-processing on surface elements with many possible inputs of scalar values. In post-processing, the number of line-based probes can be multiplied or switched for an area strain or displacement mapping function.

The X-Sight 3D DIC system is capable of measuring in a Real-time fashion and outputting selected values to 3RD party software or devices.

LICENSING

The 3D DIC system comes with 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.

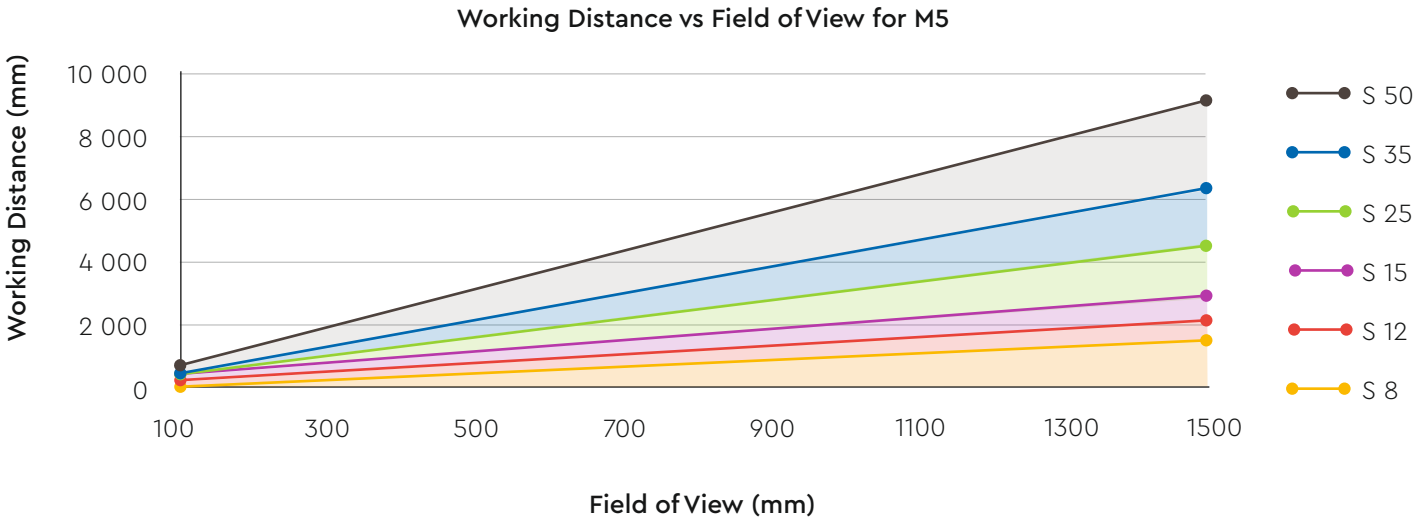
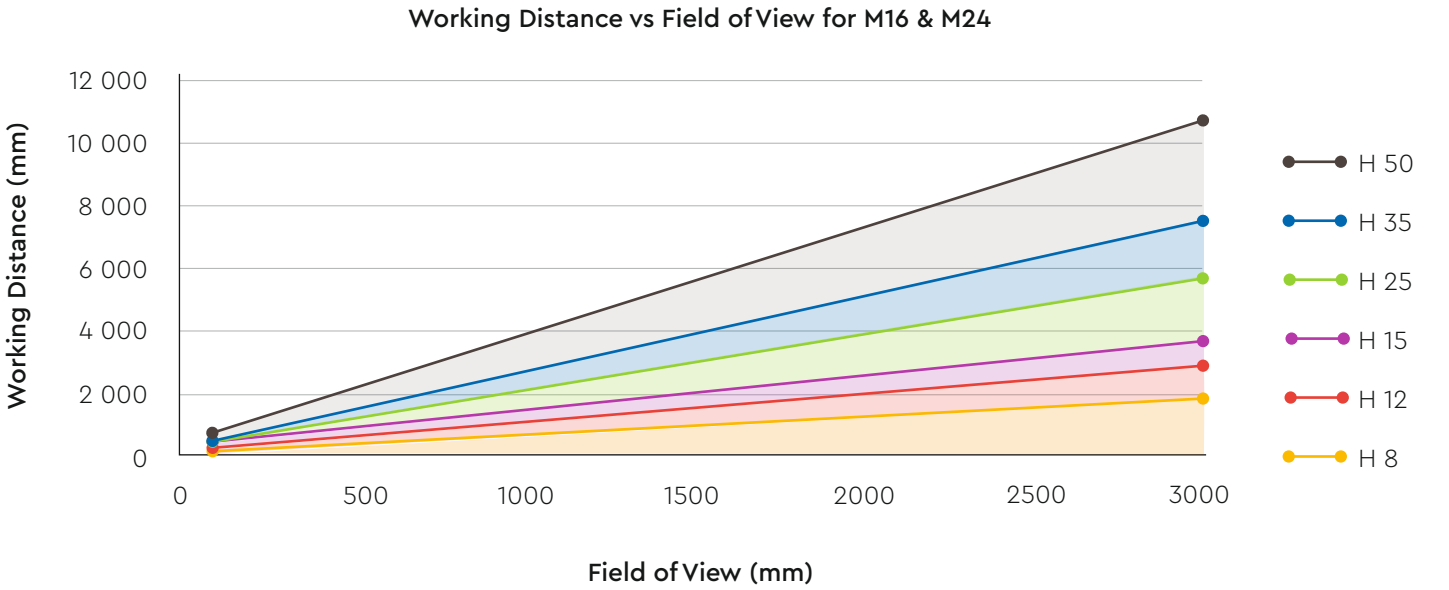
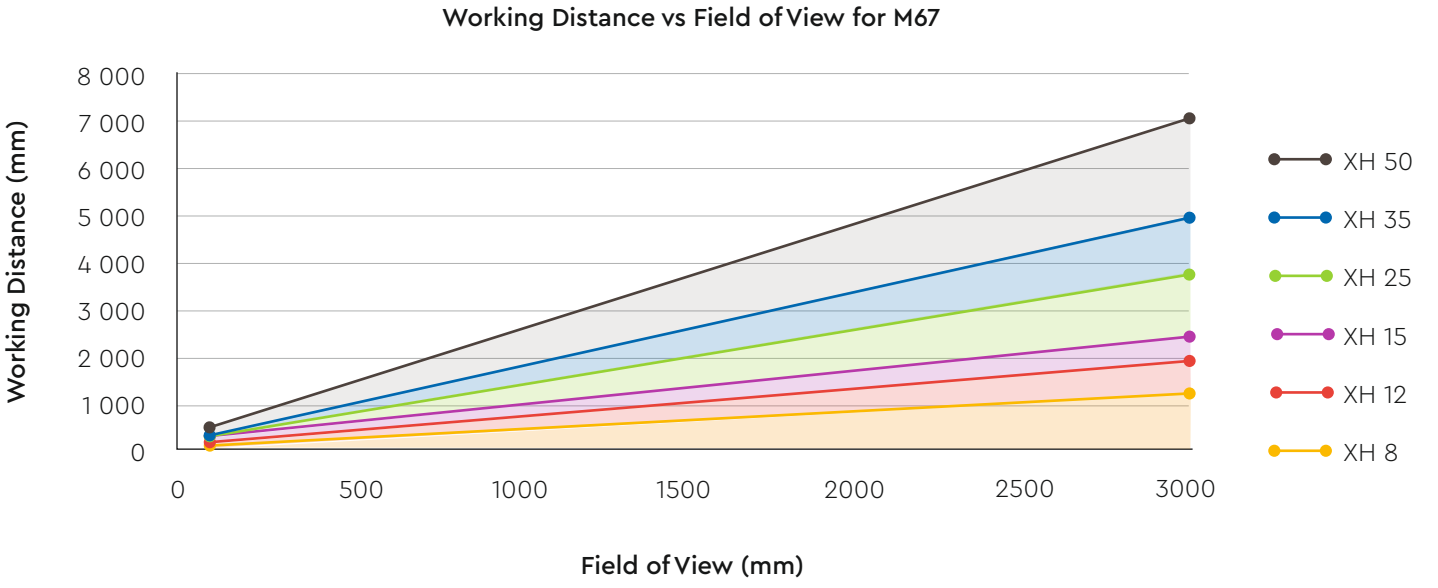
The standard X-Sight 3D DIC system includes all the software modules.

Software Module	Point	Line	Extreme Line	Trans Line	Bend Line	Torsion Line	Crack Probe	ROD Line	DIC Area
AX	•	•	•						
TR				•	•				
TO						•			
CR							•		
ITT								•	
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, ROD, or Bend Line								

SYSTEM REQUIREMENTS

System requirements	System requirements | Recommended
CPU	Intel/AMD 2GHz 2-core (>3000 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	1xUSB (HW key), 1xUSB3.0 for each ONE device + 1xUSB2.0 (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

FIELD OF VIEWS & WORKING DISTANCE

Bellow charts show the dependency of working distance on the field of view for each X-Sight system with various lens models.