

How to Choose the Right EinScan Handheld Scanner

BASICS ABOUT

3D

3D scanners have become an essential tool to turn physical objects into 3D digital models compatible with CAD/CAM and other design softwares, 3D printing and digital manufacturing technologies. They are widely used in many industries, like medical health, inspection, reverse engineering, education, cultural & heritage preservation, and many more. When you google “3D scanner”, you will be surprised about the millions of results showing up.

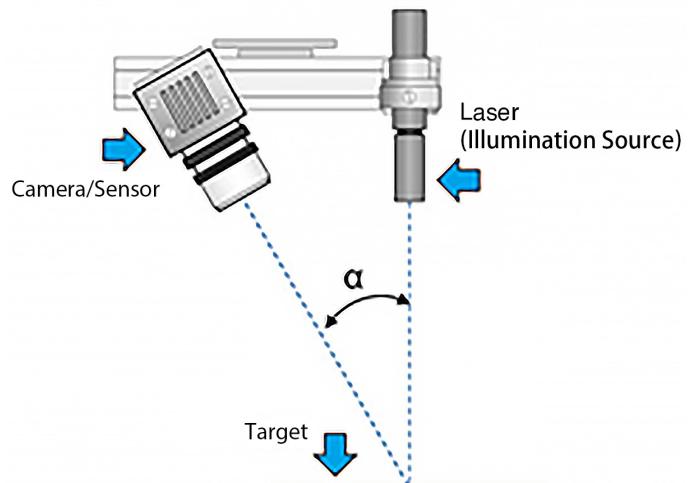
How to choose the right 3D scanner to meet your needs? Is the lowest price the best price? Is the expensive one the right one for you? You don't want to miss to carefully evaluate all the product specifications and thoroughly compare the different models with each other. We have created this guidebook to share some key specifications helping you to select the device that perfectly meets your need. Covering all the relevant aspects from accuracy, resolution, scan speed, scan size and light source, we hope that this guidebook will be a reliable companion for you on the journey to finding the 3D scanner suiting your requirements.

SCANNING

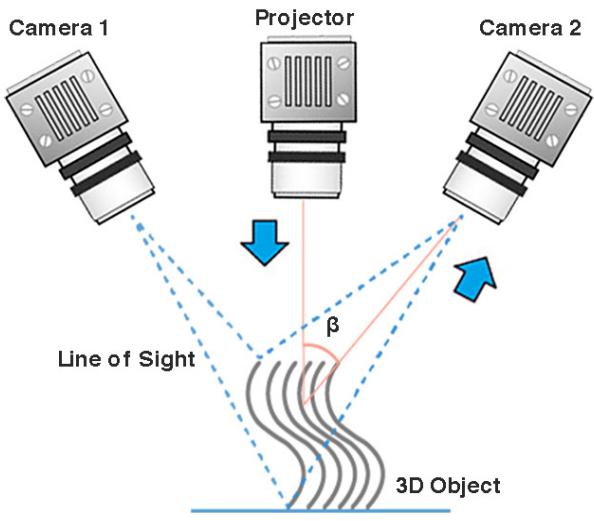
1.1. Laser Scanner or Structure Light Scanner

You can't say that one system is better than the other system. Each system has its strengths and weaknesses.

Laser scanning works through projection of a laser point, beam or multi beams onto an object and then capturing the laser's reflection with sensors.



source: 3dnatives.com/en/laser-3d-scanner-vs-structured-light-3d-scanner



Structure light scanners project a light pattern on the object to be scanned. These light patterns are tracked simultaneously by one camera or multiple cameras. With a color camera, color capturing is available, too. The pattern of light is produced by using light modulators based on different technologies.

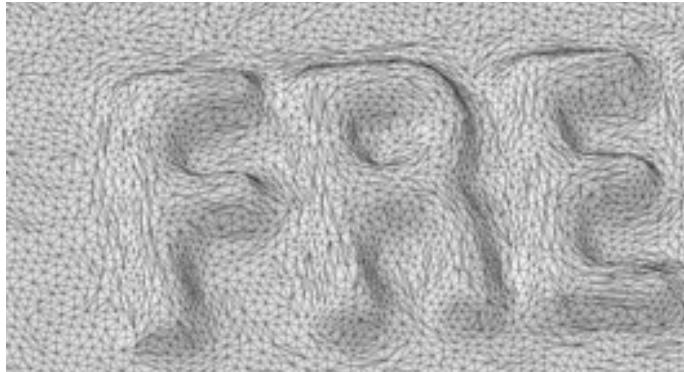
The main advantage of laser scanning is that it can achieve high resolution and accuracy. Also, it is less sensitive to environment light and performs better in scanning shiny or dark surfaces. And, most of the laser scanners are handheld. However, very shiny or transparent surfaces are also difficult to capture by laser scanning.

Projecting light pattern rather than a laser line, a structured light 3D scanner can capture a large size in seconds, and also guarantees a high level of accuracy and high resolution. The light source is not hazardous to the human eyesight, so structure light scanning technology can be used to scan people. Structure light scanners can be tripod mounted for stationary scanning, and also used in handheld mode to scan by going around the objects. However, it is sensitive to environment light conditions and reflective parts.

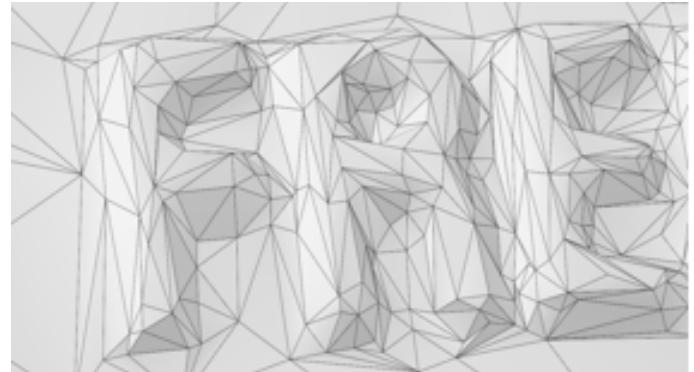
1.2. Resolution

Resolution is defining the point distance which the scanner is capturing. The distance between two points in a 3D model is one of the most important factors for your scan.

When you take a high resolution, the point distance is very small, and details are better to see on the scan. If you take a low resolution the point distance is big and big objects can be captured faster.



Result high resolution

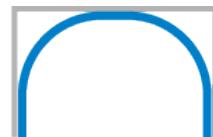


Result low resolution



Real Surface

Scan Data



Using SHINING 3D's handheld scanners, the resolution can be changed depending on the object size.



Coin, Small object



Engine parts



Furniture



Human body



Full car

0.16mm-0.24mm

0.3mm-0.5mm

0.5mm-1.5mm

1mm-1.5mm

2mm

Design,
Reverse Engineering,
Customization

Inspection,
Reverse Engineering,
Customization

AR, VR,
Reverse Engineering,
Inspection

Customization,
Prosthetic

Reverse Engineering,
Inspection,
Analysis

1.3. Accuracy

The accuracy gives an information about the authenticity of a 3D model to the real object. Knowing the accuracy of your scanner is very important because it determines whether it is suitable for quality inspection, reverse engineering design, medical health, or any other applications with rigid accuracy requirements. Usually, the higher accuracy the scanner is able to generate, the more applications it could be suitable for, and of course, the higher the cost is. So, when you consider accuracy, you need to think about what you want to scan and if a high accuracy is absolutely necessary. Do you really need a very high accuracy?

The accuracy used in the specifications of the scanner usually refer to the accuracy of a single scan. The volumetric accuracy refers to the relationship between 3D data accuracy and object size; with EinScan Pro Series the accuracy is reduced by 0.3mm/m. This conclusion is obtained by measuring the center of sphere under marker alignment. The volumetric accuracy of EinScan HX in laser mode is 0.06 mm/m.

1.4. Scan Speed

Scan speed is a specification to define how long it takes to scan one given object. It especially matters when you are going to scan the human body, as people can not stay still for a long time, and it also helps to improve the work efficiency when you are going to scan big objects like cars, buildings, etc.

Scan speed can be expressed by points amount collected per second, frames per second, or how many seconds it takes to do a single scan. The more points or frames collected per second, the faster the scan speed.

Take a sound decision by considering the resolution, accuracy and scan speed requirements of your project.



2. EinScan Model Specification

EinScan	2X	2X Plus	HD	H	HX
Accuracy	★★★★★	★★★★★	★★★★★	★★★★	★★★★★
Versatility	★★★★★	★★★★★	★★★★★	★★★	★★★★★
Resolution	★★★★★	★★★★	★★★★★	★★★★	★★★★★
Speed	★★★★	★★★★	★★★★★	★★★★★	★★★★★
Dark/shiny surface	★★★	★★★★	★★★★	★★★★	★★★★★
Suitable scan size	3cm-100cm	3cm-300cm	3cm-300cm	30cm-300cm	30cm-300cm
Fixed scan mode	Support with Industrial Pack	Support with Industrial Pack	Support with Industrial Pack	No	No
Color Texture	Support with Color Pack	Support with Color Pack	Support with Color Pack	Yes	Yes(Rapid scan) No (Laser scan)
Light source	LED	LED	LED	LED, Infrared ray	LED, Laser

3. Comparison

3.1 Light Source Comparison

Models	EinScan Pro Series			EinScan H	EinScan HX
Light Source	LED light			LED light and Infrared	LED light and Laser
Add-On	Industrial Pack 	Color Pack 	HD Prime Pack (only for EinScan Pro 2X Plus) 	No	No

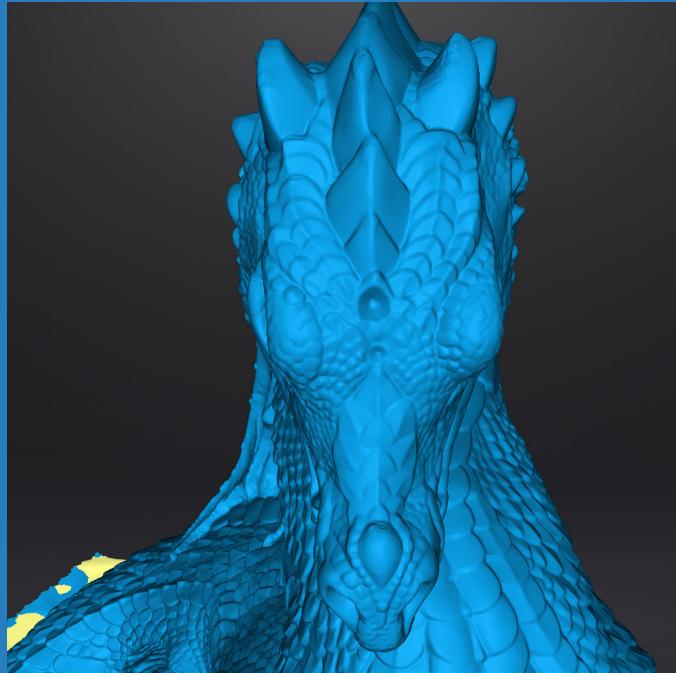
3.2 Accuracy Comparison

In general, there is no difference between all EinScan Pro series scanners. EinScan Pro HD has an accuracy of 0.045mm in Handheld HD mode, while it is 0.05mm for other scanners mentioned above. So accuracy might not be a critical parameter for you to choose a proper device among EinScan Pro series. If high accuracy is a top priority on your agenda, EinScan HX is the best choice among all EinScan scanners. Let's explore more details on the next pages.

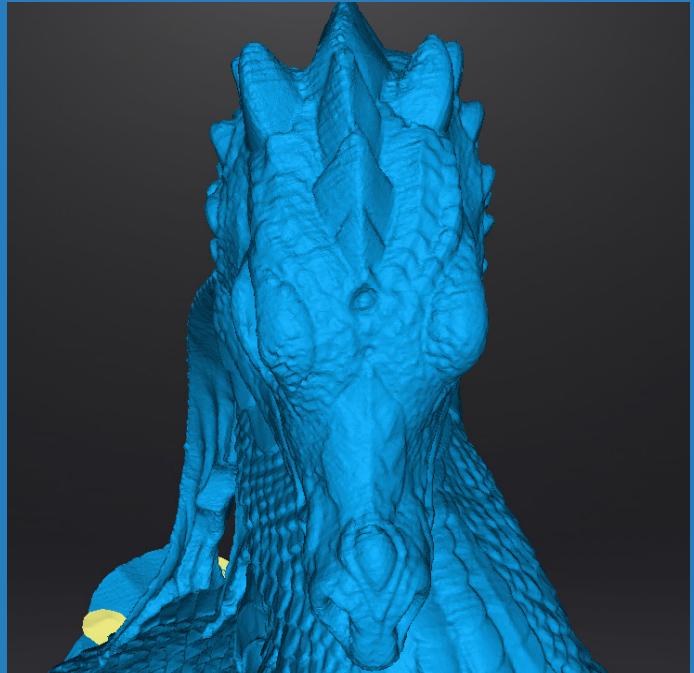
3.3 Resolution Comparison

Before making a conclusion, let's check out below screenshots of data scanned in handheld HD mode respectively by EinScan Pro HD and EinScan Pro 2X Plus.

Judging from the comparison of data quality, we can easily know that EinScan Pro HD does a better job in the fine detail capturing, due to its different projecting patterns in handheld HD mode.



HD Scan mode of EinScan Pro HD (Res:0.5mm)



HD Scan mode of EinScan Pro 2X Plus (Res: 0.5mm)

In conclusion, if the best resolution is requested when scanning medium to large sized objects, EinScan Pro HD could be your ideal companion. If markers can be considered, EinScan HX laser mode is most suitable.

3.4 Speed Comparison

To compare the speed of scanners, two facts need to be considered: single scan range and the points captured per second. For points captured per second, in Handheld Rapid mode, all scanners of the EinScan Pro Series come with the same speed of 1,500,000 points/s.

Models	EinScan Pro 2X	EinScan Pro 2X Plus	EinScan Pro HD	EinScan H	EinScan HX
Light Source	LED light	LED light	LED light	LED light and Infra-red	LED light and Laser
Single Scan Range	135*100mm-225*170mm	208*136mm-312*204mm	209*160mm-310*240mm	420*440mm (standard scan & body scan)	420*440mm (rapid scan)
Scan Speed	Handheld HD Mode 100,000 points/s	1,100,000 points/s	3,000,000 points/s	Rapid Scan Mode 1,200,000 points/s	1,200,000 points/s

4. EinScan Application & Scanner Recommendation



For Higher Efficiency & Quality

- Manufacturing & Reverse Engineering
- 3D Modeling for Product Customization & 3D Printing



For Unlimited Inspiration

- Art & Heritage
- Design



For A Healthier Life

- In prostheses & orthopedics



For Creative Imagination

- Virtual Display





EinScan Pro 2X

EinScan Pro 2X is a versatile handheld 3D scanner which can perform in both handheld and fixed scan modes for **high resolution results up to 0.16mm**. A great option for scanning of **small to medium size objects** (3cm-100cm) and ideal for high-quality 3D modeling and design.

Small to medium size part



EinScan Pro 2X Plus

EinScan Pro 2X Plus has great advantage in scanning speed, processing up to 1,500,000 points per second (30 fps) under Handheld Rapid Scan Mode. **Big sculpture with few details** is recommended to be scanned by EinScan Pro 2X Plus Handheld Rapid Scan Mode with fast speed and smooth scan experience.



EinScan Pro HD

EinScan Pro HD delivers unparalleled performance in capturing high resolution and accuracy by handheld scanning. Exceptional versatility and powerful optimizations come together for the ultimate high-efficiency and professional-grade 3D scanning experience.



Metal parts



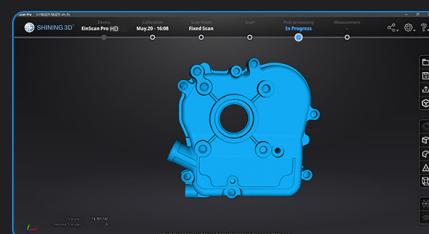
Intricate carving/artwork



Car interior design

By adopting a new structure light projection modular, the stripe pattern scanning which was traditionally used in Fixed Scan Mode is now utilized to Handheld HD Scan Mode. By 0.2mm minimum point distance setting with optimized algorithm, it brings **high resolution and accuracy** in handheld scanning as good as under fixed scan. Suitable to scan **intricate carving and artworks** with rich details.

With new lighting projection hardware and software algorithm, EinScan Pro HD is capable to scan a wider range of objects of **dark or black color** and **casting metal surface**, enriching the capability for 3D scanning of materials, suitable for **car interior design** and **metal parts scanning**.



Fixed Scan Mode

Handheld HD Scan Mode

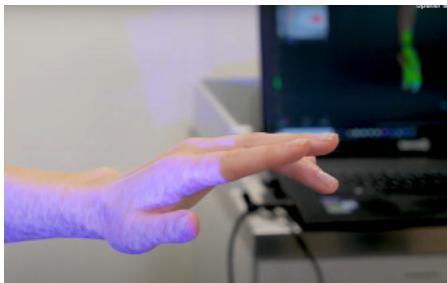
Handheld Rapid Scan Mode



EinScan H

The scan is fast without light perception. It captures more complete data including hair. Dedicated body mode and portrait mode facilitate and professionalize the scanning process. The portrait mode adopts infrared ray to **reduce eye discomfort** in the process of scanning and realize **hair acquisition** at the same time to acquire complete portrait data.

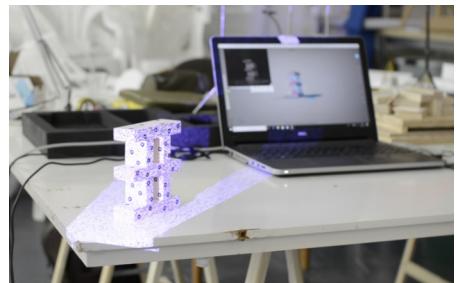
When scanning bodies, the new non-rigid algorithm in body mode facilitates data acquisition despite slight movements.



Digital Medical Analysis



Orthotics & Prosthetics



Customized design

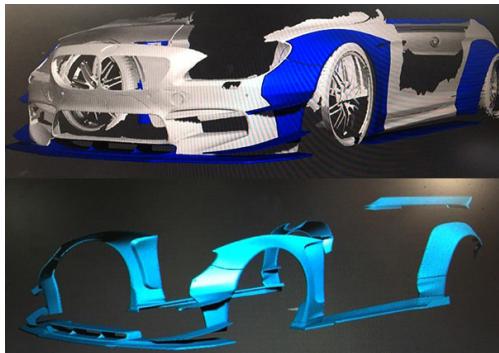
EinScan HX

By adopting laser light, EinScan HX manages to scan **dark and black colored surfaces, as well as casted metal surfaces** with less limitations. The extended scan range enables scanning of large objects at fast pace, suitable for applications like cars for modification and customization, or big metal parts for reverse engineering. The LED light pattern makes fast scanning without previous preparation with reference points possible. Laser scanning guarantees **outstanding accuracy and high resolution**.

The fusion of two different types of light in one device facilitates scanning of different materials, in a broad field of applications for a large number of industry sectors.



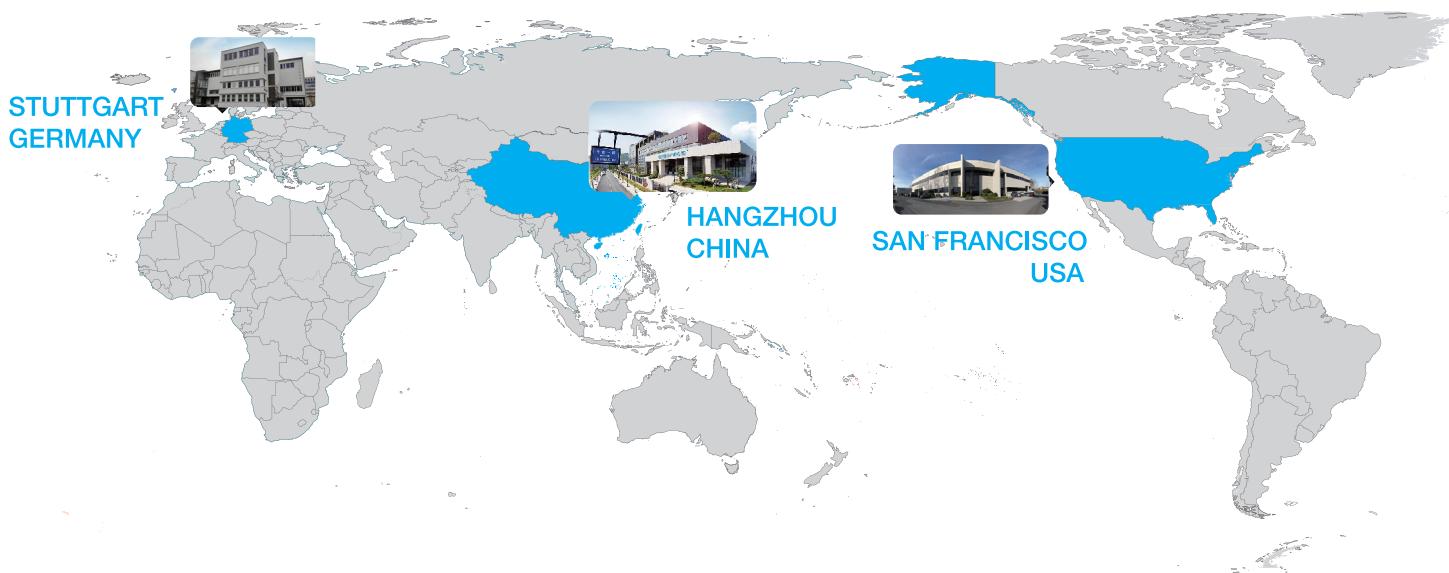
Car scanning and modification



Reverse engineering



FOR MORE SHINING IDEAS



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