

3D Image distance measurement:

2D in-picture accuracy:	$\pm 3 \text{ mm}^*$
3D in-picture accuracy:	$\pm 6 \text{ mm}^*$

Laser distance measurement (ISO 163331-1):

Accuracy with favourable conditions: **	$\pm 1.0 \text{ mm} / 0.04 \text{ in}^{****}$
Accuracy with unfavourable conditions: ***	$\pm 2.0 \text{ mm} / 0.08 \text{ in}^{****}$
Range with favourable conditions: **	250 m / 820 ft
Range with unfavourable conditions: *****	120 m / 394 ft
Smallest unit displayed:	0.1 mm / 1/32 in
X-Range Power Technology™:	yes
∅ laser point at distances:	6/30 / 60 mm (10 / 50 / 100 m)

Tilt measurement:

Measuring tolerance to laser beam: *****	$\pm 0.2^\circ$
Measuring tolerance to housing: *****	$\pm 0.2^\circ$
Range:	360°

* Measurement accuracy depends upon various factors including distance from the object, baseline length, texture of object, light conditions, temperature, calibration etc. Figures quoted assume normal to favourable conditions and recommended baselines (see [Measurement Principle](#)) and are subject to change.

** applies for 100 % target reflectivity (white painted wall), low background illumination, 25 °C

*** applies for 10 to 100 % target reflectivity, high background illumination, - 10 °C to + 50 °C

**** Tolerances apply from 0.05 m to 10 m with a confidence level of 95%. The maximum tolerance may deteriorate to 0.1 mm/m between 10 m to 30 m, to 0.2 mm/m between 30 m to 100 m and to 0.3 mm/m for distances above 100 m

***** applies for 100 % target reflectivity, background illumination of approximately 30'000 lux

***** after user calibration. Additional angle related deviation of +/- 0.01° per degree up to +/-45° in each quadrant.

Measurement Principle



- 1 The BLK3D Imager has a calibrated stereo-camera, which takes two simultaneous 3D images of the same scene from two different positions. This is analog to the left and right eye in human 3D stereo vision.

Reality Capture: Photo capture process using the BLK3D Imager.

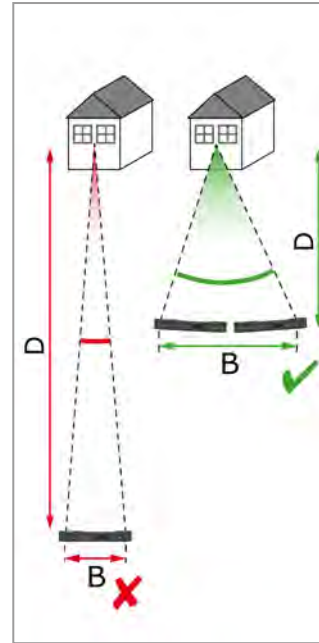
Single-shot: Capture of a single stereo photo.

Multi-shot: Capture of multiple stereo photos of the same 3D image from slightly different positions.

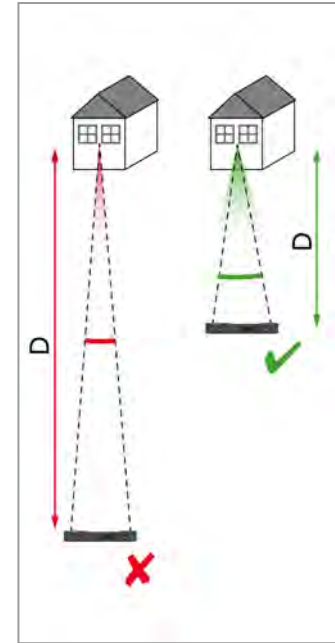
Baseline: Maximum distance between the cameras during Reality Capture. This distance can be increased by using Multi-shot from slightly different positions.



- 2 The photos from the two cameras are displayed on the BLK3D screen. Only points which are visible in both photos can be measured.



- 3 The intersection angle between the two lines of sight from the two cameras is key for good 3D accuracy. The angle is affected by the distance (D) to the object and the baseline length (B).



- 4 Take the photo from a short distance (D) to the object to increase the accuracy.

i Shorter distance (D) => Better results



The person responsible for the instrument must ensure that all users understand these directions and adhere to them. The product is permitted to use for skilled persons only.

Symbols used

The symbols used have the following meanings:

WARNING

Indicates a potentially hazardous situation or an unintended use which, if not avoided, will result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation or an unintended use which, if not avoided, may result in minor injury and/or appreciable material, financial and environmental damage.



Important paragraphs which must be adhered to in practice as they enable the product to be used in a technically correct and efficient manner.

Permitted use

- Capture 3D images
- Measure in 3D images
- Measure distances
- Tilt measurement
- Point to point measurement
- Data transfer with Bluetooth®/WLAN
- 2D/3D CAD export

Prohibited use

- Using the device for the first time without reading instructions
- Using the device outside the stated limits of use (see section [Limits of use](#))
- Deactivating safety systems and removing explanatory and hazard labels
- Opening of the equipment by using tools (screwdrivers, etc.)
- Using not approved accessories from other manufacturers
- Deliberate dazzling of third parties; also in the dark
- Using the device in surveying sites with inadequate safeguards
- Deliberate or irresponsible behaviour on scaffolding, when using ladders, when measuring near machines which are running or near parts of machines or installations which are unprotected
- Aiming directly in the sun

Hazards in use

WARNING

Watch out for erroneous measurements if the instrument is defective or if it has been dropped or has been misused or modified. Carry out periodic test measurements. Particularly after the instrument has been subject to abnormal use, and before, during and after important measurements.

CAUTION

Never attempt to repair the product yourself. In case of damage, contact a local dealer.

WARNING

Changes or modifications not expressly approved could void the user's authority to operate the equipment.

CAUTION

Only use chargers recommended by the manufacturer to charge the batteries.

WARNING

We recommend to use the "Check & Adjust" function and the BLK3D calibration target plate to check the accuracy.

Limits of use



Refer to section [Technical data](#). The device is designed for use in areas permanently habitable by humans. Do not use the product in explosion hazardous areas or in aggressive environments.

Areas of responsibility

Responsibilities of the manufacturer of the original equipment:

Leica Geosystems AG

Heinrich-Wild-Strasse

CH-9435 Heerbrugg

Internet: www.leica-geosystems.com

The company above is responsible for supplying the product, including the User Manual in a completely safe condition.

The company above is not responsible for third party accessories.

Responsibilities of the person in charge of the instrument:

- To understand the safety instructions on the product and the instructions in the User Manual.
- To be familiar with local safety regulations relating to accident prevention.
- Always prevent access to the product by unauthorised personnel.

Disposal

CAUTION

Flat batteries must not be disposed of with household waste. Care for the environment and take them to the collection points provided in accordance with national or local regulations.



The product must not be disposed with household waste. Dispose of the product appropriately in accordance with the national regulations in force in your country. Adhere to the national and country specific regulations.

Product specific treatment and waste management can be downloaded from our homepage.

Electromagnetic Compatibility (EMC)

WARNING

The device conforms to the most stringent requirements of the relevant standards and regulations. However, the possibility of causing interference in other devices cannot be totally excluded.

FCC statement (applicable in U.S.)

This equipment has been tested and found to comply with the limits for a Class B digital instrument, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

This device complies with part 15 of the FCC rules. Operation is subjected to the following two conditions:

- This device may not cause harmful interference, and
- this device must accept any interference received, including interference that may cause undesired operation.

FCC Radiation Exposure Statement

The radiated rf output power of the instrument is below the FCC radio frequency exposure limits for portable devices according to KDB 447498.

ISED Statement (applicable in Canada)

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- l'appareil ne doit pas produire de brouillage;
- l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Japanese Radio Law and Japanese Telecommunications Business Law Compliance

This device is granted pursuant to the Japanese Radio Law (電波法) and the Japanese Telecommunications Business Law (電気通信事業法).

Regulatory

Regulatory information, certification, and compliance marks are available on BLK3D. Go to Android Settings > About phone > Regulatory labels.

Use of the product with Bluetooth®

WARNING

Electromagnetic radiation can cause disturbances in other equipment, in installations (e.g. medical ones such as pacemakers or hearing aids) and in aircraft. It can also affect humans and animals.

Precautions:

Although this product conforms to the most stringent standards and regulations, the possibility of harm to people and animals cannot be totally excluded.

- Do not use the product near petrol stations, chemical plants, in areas with a potentially explosive atmosphere and where blasting takes place.
- Do not use the product near medical equipment.
- Do not use the product in airplanes.
- Do not use the product near your body for extended periods.

Laser classification

The device produces visible laser beams, which are emitted from the instrument: It is a Class 2 laser product in accordance with:

- IEC60825-1 : 2014 „Radiation safety of laser products“



Laser Class 2 products:

Do not stare into the laser beam or direct it towards other people unnecessarily. Eye protection is normally afforded by aversion responses including the blink reflex.

WARNING

Looking directly into the beam with optical aids (e.g. binoculars, telescopes) can be hazardous.

CAUTION

Looking into the laser beam may be hazardous to the eyes. Don't dazzle other individuals. Pay particular attention to the direction of the laser beam when remotely operating the product via an app or software. A measurement could be triggered at any time.

Wavelength

655 nm

Maximum radiant output power for classification

0.95 mW

Pulse duration

> 400 ps

Pulse repetition frequency

320 MHz

Beam divergence

0.16 x 0.6 mrad

Labelling



Subject to change (drawings, descriptions and technical data) without prior notice.