



PhoXi 3D Scanner

User Manual and Installation Instructions

Thank you for choosing Photoneo® PhoXi® 3D Scanner. Please take a few minutes to read this manual and become familiar with the device.

For more information on our products, accessories, replacement parts, software and services, see our website www.photoneo.com/phoxi-3d-scanner/ or contact our team at support@photoneo.com.

Legal Information

Warning Notice System

This manual contains notices that should be observed in order to ensure personal safety, as well as prevent damage to equipment. The notices referring to personal safety are highlighted with a safety alert symbol, while notices referring only to equipment do not have a safety alert symbol. The notices are graded according to the degree of danger.

⚠ WARNING

Indicates that death or severe personal injury may result if proper precautions are not taken.

⚠ CAUTION

When a safety alert symbol is shown, it indicates that minor personal injury can result if proper precautions are not taken.

CAUTION

When no safety alert symbol is shown, it indicates that equipment damage can result if proper precautions are not taken.

NOTICE

Indicates that an unintended result or situation can occur if the relevant information is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger is used. Notice warning of injury to persons with a safety alert symbol may also include a warning relating to equipment damage.

Qualified Personnel

The device described in this documentation may be operated only by **qualified personnel**. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with this device.

Installation, commissioning, use, decommissioning and disposal of this device should be done in accordance with relevant documentation, in particular, its warning notices and safety instructions.

Proper Use of Photoneo Products

Please note the following:

WARNING

Photoneo products may only be used in accordance with relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Photoneo. Proper transport, storage, installation, assembly, commissioning, operation, and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions for storage or operation of the device must be complied with. All information provided in the relevant documentation must be observed.

Preface

Purpose of the Manual

This manual provides information about the installation and set up of the PhoXi 3D Scanner and is designed for engineers, installers, and electricians who possess a general knowledge of automation.

Scope of the Manual

This manual describes the following products:

- Photoneo® PhoXi® 3D Scanner

Trademarks

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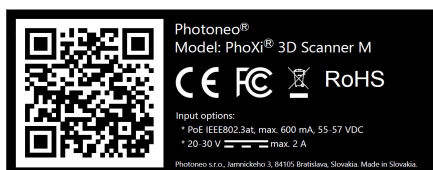
Product Overview

Photoneo PhoXi 3D Scanner is a device that uses a structured light projection to reconstruct the geometry of a 3D surface of an inspected object. One or more structured patterns are projected onto a scene during scan, which allows calculation of depth from images of the scene. The surface geometry is provided to the user as a depth map or in the form of a point cloud.

The scanning process consists of three phases: capturing (or acquisition), processing (computation) and transfer. In the first stage, the Photoneo PhoXi 3D Scanner projects a series of light patterns onto the scene. Once the data has been acquired, the Scanner calculates all visible points on the surface and sends this data to the user via Ethernet connection. Communication with the Scanner should be at least 1 Gbps in order to prevent bottlenecks during the data transfer process. To learn more about the scanning process, please consult the PhoXi Control User Guide (see section [PhoXi Control](#)).

General Information

General information about the device and the manufacturer can be located on the back panel of the device.



Label with manufacturer address, product name, and model, CE, FCC, WEEE and RoHS marks, country of origin and input options.

⚠ WARNING

Hot surface warning

The surface of the processing unit becomes hot to touch when the device is in use. Mount the device on a metal mounting plate that will act as a thermal bridge to dissipate the heat or use the carbon body to manipulate the device.

Laser Device

⚠ WARNING

This device is a laser product. Do not deliberately look into the laser beam. This may cause injury to the retina. The use of protective eyewear is normally not necessary. The laser class label is present on the back of the device.

The laser projector aperture is located at the right side of the front panel of the device (Figure 1). The aperture is clearly marked with a warning label. Do not look directly into the laser projector while the device is in use.

To avoid unauthorized contact with the Scanner or unintentional viewing of the laser beam, it is recommended to locate the device in a restricted area and take measures to restrict laser light exposure to the surroundings. Although diffuse reflections are not harmful, users should remove mirrors, polished objects, and similar items from the vicinity of the Scanner to avoid specular reflections.

All components of the device, including those sourced from 3rd party suppliers, conform fully with all applicable European directives and regulations.



Figure 1: PhoXi 3D Scanner laser aperture location

The device uses the following labels and warning systems. Apart from the laser aperture label, all are located on the back panel of the device.



Laser radiation hazard warning symbol.

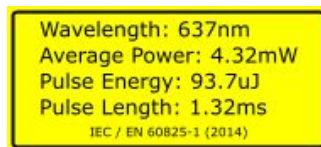


Laser aperture label. Designates the place from which laser radiation is emitted.

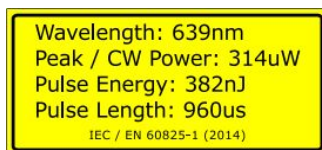
Laser Class 3R devices



Laser radiation warning with laser class label. The serial number of the device can be found above the warning labels.



Label specifying wavelength, average power, pulse energy and pulse length of the laser. User on scanner models M, L, XL.



Label specifying wavelength, average power, pulse energy and pulse length of the laser. User on scanner models XS, S.

Laser Class 2 devices



Laser radiation warning with laser class label. The serial number of the device can be found above the warning labels.



Label specifying wavelength, average power, pulse energy and pulse length of the laser. User on scanner models M, L, XL.

Objects Suitable for Scanning

The PhoXi 3D Scanners uses structured light patterns to acquire 3D data. The scene must be completely still during the scan, free from smoke and particles dispersed in the air. Always bear in mind that the Scanner can only see what you can see with the naked eye and nothing more.

Objects most suitable for scanning are (including and not limited to):

- rough surface objects, for example, wood, rubber, etc.
- objects with a matte finish, such as sand-blasted aluminum, cast iron, etc.
- molded, un-polished plastic materials.

Some objects not suitable for scanning (including and not limited to):

- mirrors and polished metals,
- most liquids (e.g. water, oil),
- moving objects,
- translucent and transparent objects (e.g. glass, transparent plastic),
- some hairy objects (e.g. carpets).

Scope of Delivery

- Selected model of PhoXi 3D Scanner
- Desktop PoE injector (input: 90 ~ 264 VAC, output: 33.6 W, 56 V, IEEE802.3at) with power cable (3 m)
- Ethernet cable M12-X male - RJ45 male, 5 m, PUR

NOTICE

Software components are needed for operation of the Scanner. See section [Configuration](#) for more information.

Installation

Guidelines for Installation

PhoXi 3D Scanners have been designed to allow easy installation.

The Scanner can be mounted¹:

- Using a mounting plate of suitable size and 4 M4 screws.
 - This is preferred mounting method to ensure rigid mounting of the device to avoid unwanted movement
- Using a M8 screw.
- On a tripod using a 3/8-16 UNC screw.

To install the Scanner:

1. Mount the Scanner using any preferred method. Refer to [Dimensions and Illustrations](#).
2. When mounting the Scanner, ensure that an appropriate scanning distance is set between the Scanner and the scanned object and eliminate any potential obstacles.

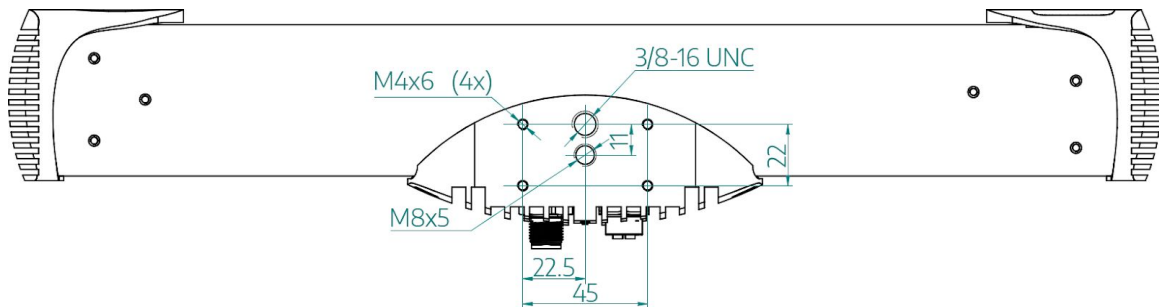


Figure 2: Mounting plate

3. Connect the Scanner to the computer or local network and plug it into the power. See the section [Powering the device & Data connection](#) for more details.
4. Download and install the PhoXi Control application from the Photoneo webpage.
5. Run the PhoXi Control application and try to make your first scan. Please refer to the [PhoXi Control User Guide](#).

Powering the Device & Data Connection

There are two possibilities to power the device:

¹ A CAD model of the Scanner is available at: www.photoneo.com/dl/cad/poe

1. Using the M12-X Power over Ethernet (PoE) connector (providing both power and data connection)
2. Using the M12-A 24 V power connector to power the device and the M-12X connector for data transfer

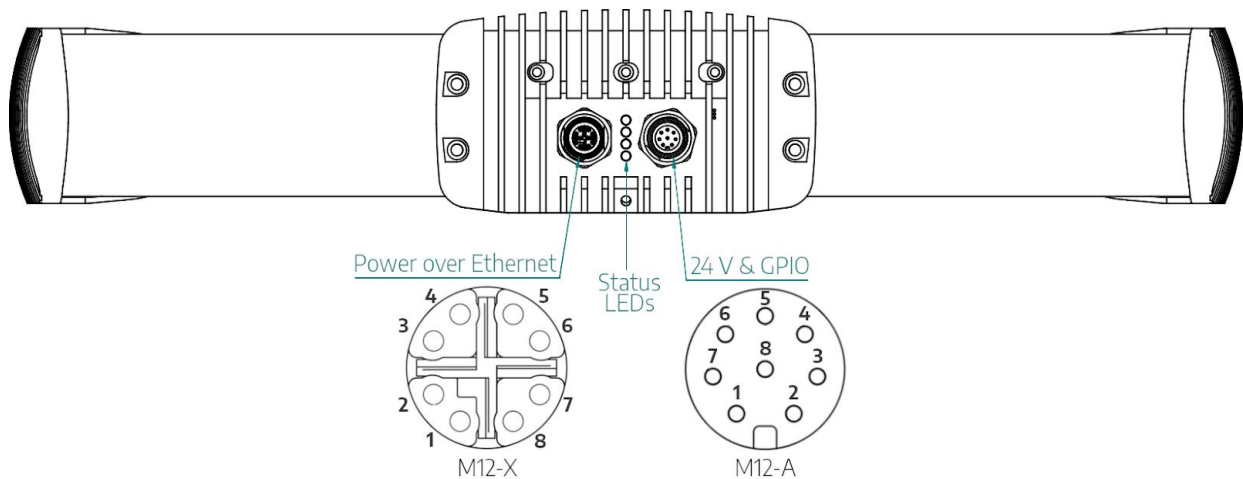


Figure 3: Back panel of the PhoXi 3D Scanners

Powering Through PoE Connector

1. Connect 1 Gbps capable (standardly delivered) ethernet cable to the PoE injector IN port
2. Connect the M12-X RJ45 cable to the scanner and to the PoE injector OUT port
3. Plug in the power cable of the PoE injector

NOTICE

It is recommended to use PoE connection to power the device.

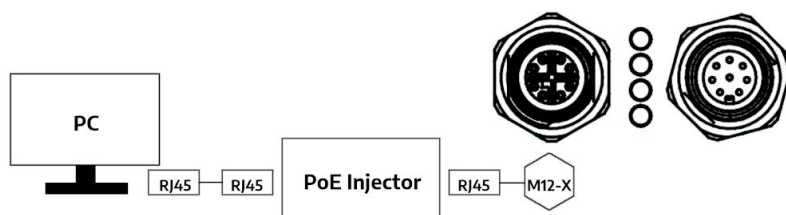


Figure 4: Connection schematics for PoE

Powering by 24 V

1. Connect the M12-X RJ45 cable to the scanner and to your computer or switch
2. Connect the M12-A to the scanner and to the adapter and plug in the 24 V power adapter

3. Alternatively connect the M12-A to the scanner and the open-end wires to the 24 V DIN rail adapter

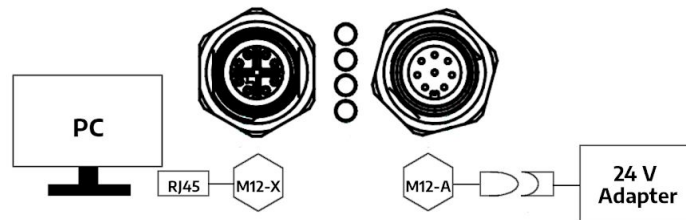


Figure 5: Connection schematics for 24 V power using desktop adapter

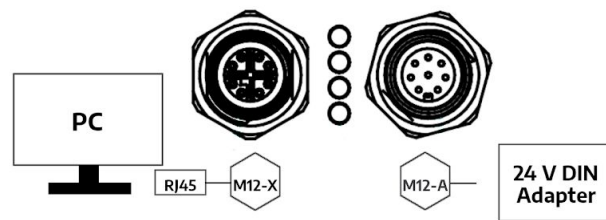


Figure 6: Connection schematics for 24 V power using DIN rail adapter

Status LEDs

#	LED Name	Color	Description
1	POWER	Green Red Off	Power ON and OK Power ON, power on processing unit not OK No power
2	STATUS	Green Red	Firmware ready HW fault
3	ETH1	Flashing green Green Off	Activity on link No activity on link Link is down
4	ETH2	Green Off	Gigabit ethernet connected No gigabit ethernet



Figure 7: Status LEDs of correctly working device

Supported Network Topologies

The following network topologies are supported by the PhoXi 3D Scanners:

- Direct connection to a computer

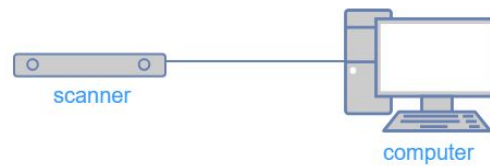


Figure 8: Direct connection

- Scanner connected to a switch

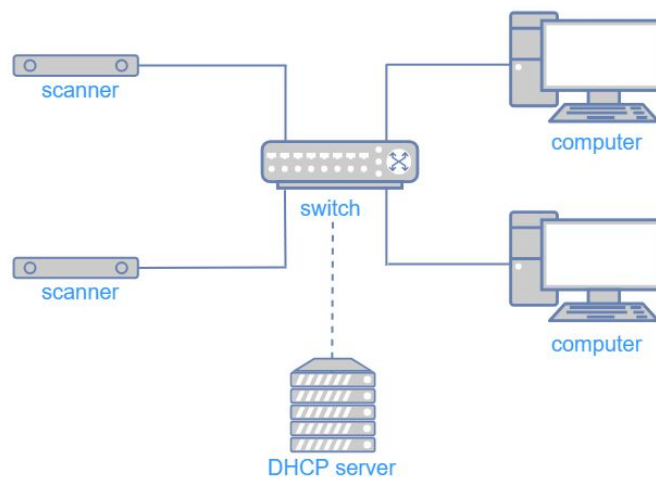


Figure 9: Connected to a switch

The following network topology is not supported by the PhoXi 3D Scanners:

- Scanner connected to a router:

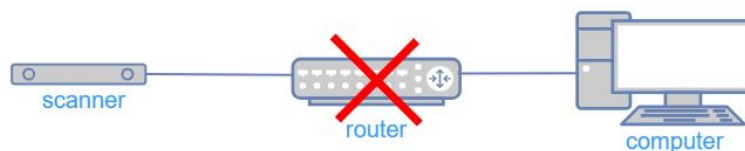


Figure 10: Connecting the Scanner through router is not supported

Note:

- Connecting to the Scanner via WiFi is not recommended as it is slower and less reliable.

NOTICE

If several Scanners are connected to a computer with several ethernet adapters, using static IP addresses on different subnets is recommended.

Mounting Restrictions

Movement During Scanning

NOTICE

It is allowed to mount the scanner on moving constructions or robotic arms, but it is necessary to stop the movement during the acquisition. Movement of the Scanner during projection of light patterns causes loss of quality and interferes with depth calculation. Make sure the Scanner is still during acquisition.

If vibrations are present, use damping apparatus to isolate Scanner's mounting from their source. Acceleration and deceleration forces according to Scanner's environment restrictions should be taken into account when mounting of the Scanner is designed.

The maximum acceleration allowed during operation (not including the scanning process) is up to 20 ms^{-2} .

Strong Electric Field

As a general rule, always isolate low-voltage, logic-type devices such as PhoXi 3D Scanners from devices that are high voltage and generate high electrical noise. Carefully consider the routing of the wiring for the devices in the panel as well. Avoid placing low-voltage signal wires and communication cables in the same tray with AC power wiring and high energy, rapidly-switched DC wiring.

Clearance for Cooling and Wiring

PhoXi 3D Scanners are designed to be cooled through natural convection cooling. In order to ensure adequate cooling, a clearance of at least 25 mm above and below the device must be allowed. When planning placement of the PhoXi 3D Scanners, consider placing heat-generating and electronic-type devices in the cooler areas. By reducing exposure to high-temperature environments, you can extend the operating life of the electronic devices considerably.

NOTICE

It is recommended to mount the scanner on a metal plate that will act as a thermal bridge and dissipate the heat produced by the processing unit away from the scanner.

Configuration

PhoXi Control

PhoXi Control application allows the user to control the PhoXi 3D Scanners manually through graphical user interface or programmatically through the provided API.

The GUI is primarily used to set up the scanning environment, to configure advanced Scanner parameters and to visualize the output. In addition, the GUI can also be used as a powerful debugging tool for development with the API. Calls to the API trigger the same response in the GUI as user inputs. After triggering the scan by calling API method, the application will execute the scan, send it as an output of the call and display it simultaneously in the GUI.

The API serves as a central platform for building custom applications for PhoXi 3D Scanners. In order to facilitate the development process and reduce computing demands all computations are performed on the device itself.

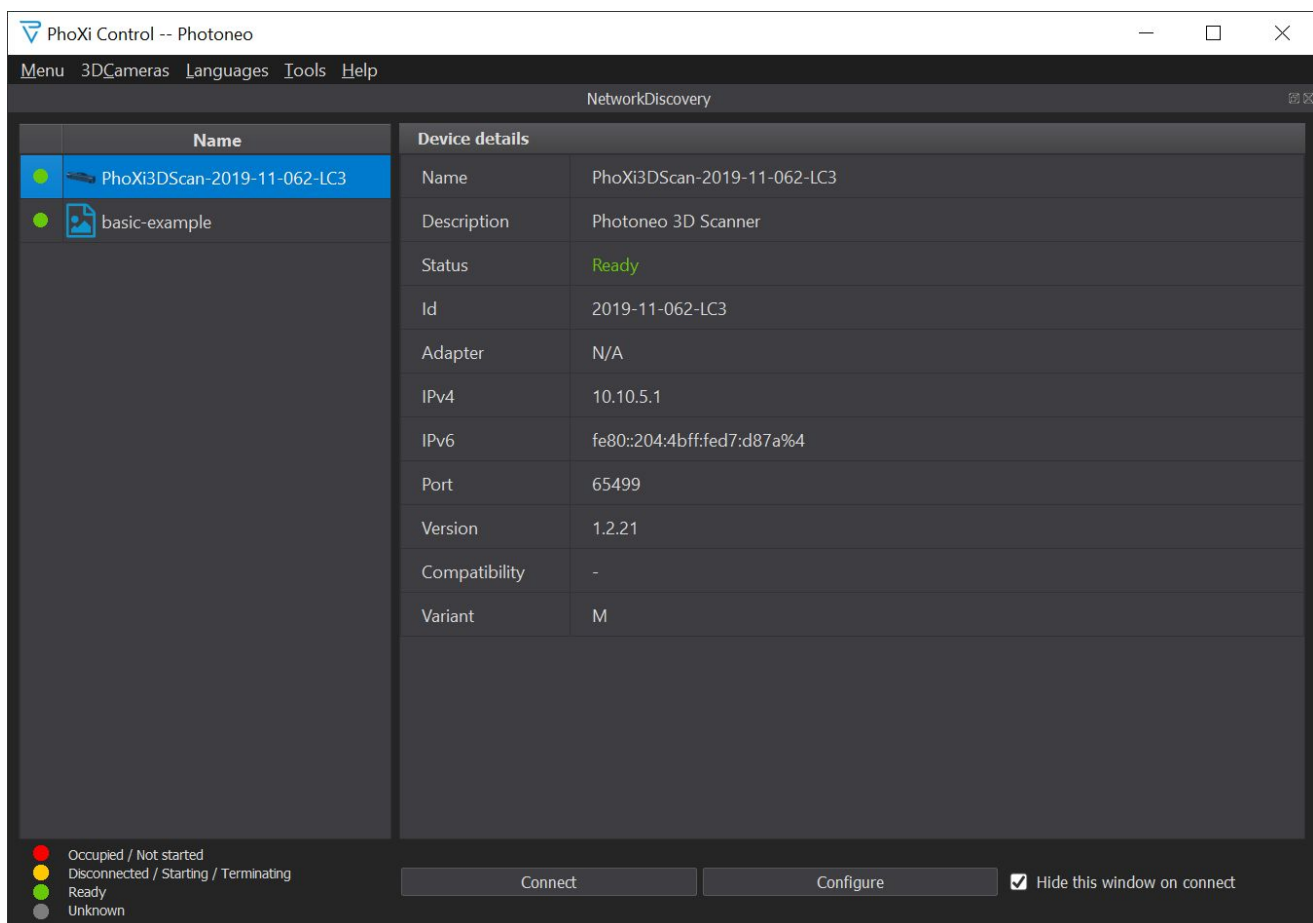


Figure 11: PhoXi Control – Network Discovery

You can download the latest version of PhoXi Control from our website

www.photoneo.com/3d-scanning-software/

For more information about the PhoXi Control application, please refer to the [PhoXi Control User Guide](#).

Hardware Parameters

Power Over Ethernet Connector

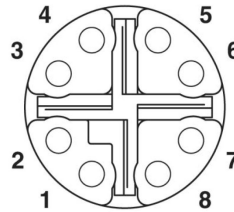


Figure 12: PoE connector pinout, view from the mating side

Connector type: M12 X coded, 1404741

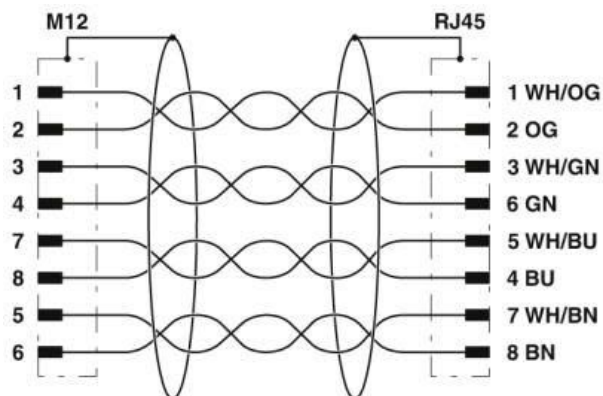


Figure 13: Contact assignments of the M12 and RJ45 plug

Powering Requirements

PoE Standard	IEEE802.3at
Operating voltage U_e DC	min. 55 V
Residual ripple maximum (% of U_e)	0.5 %
Rated operating current I_e (I_{max})	0.360 A (0.6 A)
Minimum Power	33 W
Shielding	Fully Shielded RJ45
Transfer data rate	1 Gbit
Maximum recommended cable length	20 m

24 V Power Connector

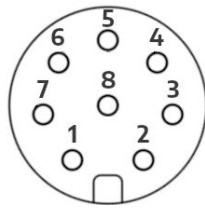


Figure 14: 24 V Power & GPIO pinout, view from the mating side

Connector type: M12 A coded, M12A-08PMMP-SF8001

Pin	Cable Color	Pinout	Function
1	White	DC_IN	+ 24 V
2	Brown	OPTO_IN2_GND	*laser interlock ground
3	Green	GND	ground
4	Yellow	OPTO_IN1	-
5	Grey	OPTO_IN1_GND	-
6	Pink	OPTO_OUT	-
7	Blue	OPTO_OUT_GND	-
8	Red	OPTO_IN2	*laser interlock signal

* devices with laser safety interlock needs to be ordered separately

Powering Requirements

Operating DC voltage U_e (U_{min} - U_{max})	24 V (20 - 30 V)
Residual ripple maximum (% of U_e)	2 %
Rated operating current I_e (I_{max})	1 A (2 A)
Minimum Power	60 W
Maximum recommended cable length	20 m *

* for cable length over 10 m please ensure operating voltage at minimum 28 V

Projection Unit

Projection width horizontal	47.5° ± 1°	
Projection width vertical	36.0°± 2°	
Laser Class 3R devices		
Model	XS, S	M, L, XL
Light source	Visible red light (laser)	Visible red light (laser)
Wavelength	639 nm	637 nm
Average power	0.314 mW	4.32 mW
Pulse energy	382 nJ	93.7 µJ
Pulse length	0.96 ms	1.32 ms
Laser Class 2 devices		
Model	M, L, XL	
Light source	Visible red light (laser)	
Wavelength	637 nm	
Peak power	18.6 mW	
Average power	340 µW	
Pulse energy	18.6 µJ	
Pulse length	1 ms	

Environmental Conditions

Transport

Ambient temperature	From -20 °C to 50 °C (max gradient 10 °C/hour)
Humidity	From 0 % to 95 % non-condensing
Atmospheric pressure	From 1080 hPa to 660 hPa (corresponding to an altitude of -1000 m tp 3500 m)

⚠ CAUTION

Please ensure that the device is always transported in its original casing or that it is properly cushioned for transport.

Operation

Operating temperature for optimal scanning performance	From 22 °C to 25 °C
Overall operating temperature	From 0 °C to 45 °C
Humidity	From 0 % to 95 % non-condensing
Atmospheric pressure	From 1080 hPa to 660 hPa (corresponding to an altitude of -1000 m tp 3500 m)
Maximum acceleration	20 ms ⁻²

Scanning Parameters

Common parameter	PhoXi 3D Scanner
Resolution (number of 3D points)	Up to 3.2 Million
3D points throughput: <i>Number of 3D points that can be reconstructed in a second in sequential scans</i>	16 Million
GPU	NVIDIA Pascal™ Architecture GPU with 256 CUDA cores

Operation Temperature

For correct performance of the scanner, make sure it has reached its operation temperature. Statistically, this temperature is reached after around 45 minutes of the scanner being powered up, or after 10 minutes of continuous scanning in the free run mode followed by 2 - 5 minutes of cool down to stabilize the temperature.

Datasheet Parameters Explanation

Depth Map Resolution

Maximum number of measured points (the resolution of the camera sensor).

Point to Point Distance

The average distance between two neighboring points in the point cloud of a plane located in the focus distance of the camera. Alternatively, the square of the point size is the average surface sampled by a single 3D point on the plane scanned in the focus distance of the camera.

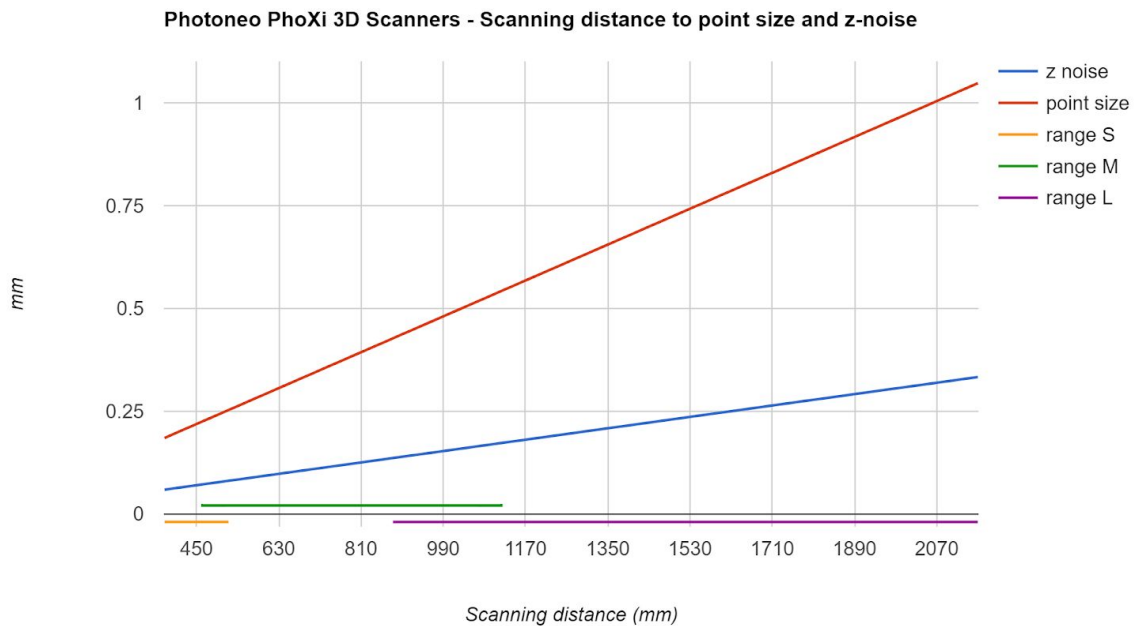


Figure 15: Relationship between scanning distance and point size.

Calibration Accuracy

The accuracy of point measurement as the result of device calibration (can also be understood as space deformation). Every 3D point is determined with a certain measurement error. This measurement error is different for each point across the whole measured volume. Calibration accuracy is standard deviation (σ) of measurement errors of all 3D points.

Temporal Noise

The standard deviation of noise (measured on a diffuse surface with 80 percent albedo). The noise level describes the ability of the sensor to capture local surface details. The noise distribution of our sensor is similar to Gaussian distribution.

Equivalently, temporal noise can also be defined as the average distance of the 3D points from the average Z-value of the 3D points.

Data Acquisition Time

Data acquisition time from shortest possible to maximum estimated in a worst case scenario.

Note:

Values in datasheets are valid in the temperature range 22 °C - 25 °C.

PhoXi 3D Scanner XS - Datasheet

Parameter	Value
Scanning range	161 - 205 mm
Optimal scanning distance (sweet spot)	181 mm
Scanning area (at sweet spot)	118 x 78 mm
Point to point distance	0.055 mm
Calibration accuracy (1σ)	0.035 mm
Temporal noise (1σ)	0.030 mm
Scanning time	250 - 2000 ms
Dimensions	77 x 68 x 296 mm
Baseline	85 mm
Weight	900 g

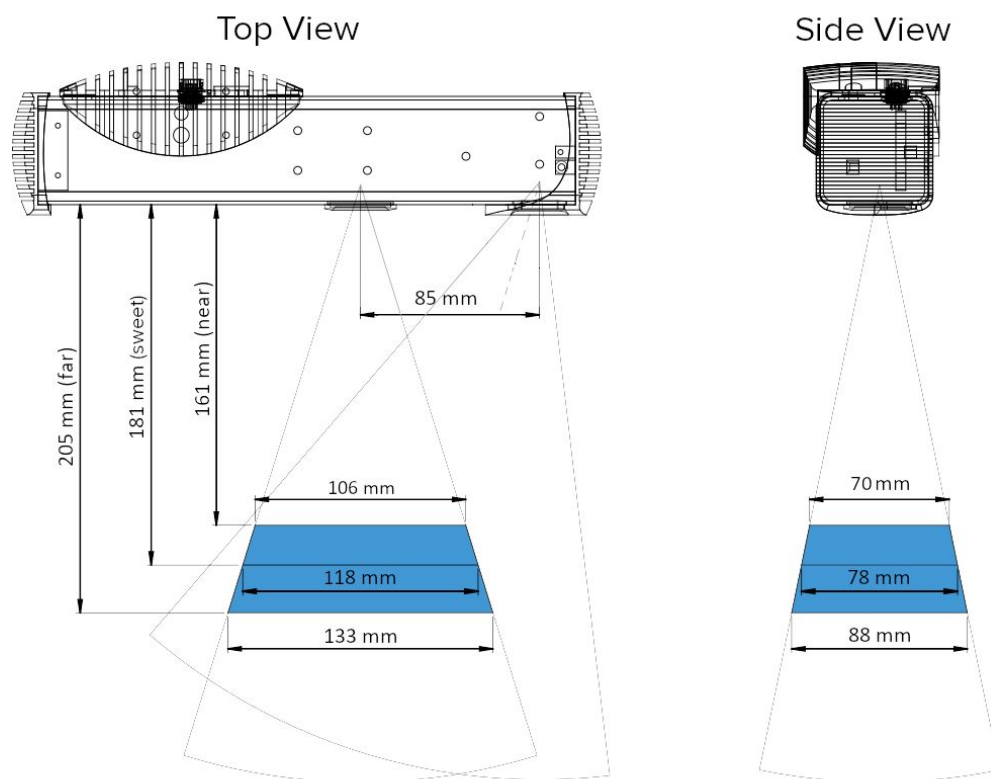


Figure 16: PhoXi 3D Scanner XS scanning range

PhoXi 3D Scanner S - Datasheet

Parameter	Value
Scanning range	384 - 520 mm
Optimal scanning distance (sweet spot)	442 mm
Scanning area (at sweet spot)	360 x 272 mm
Point to point distance	0.174 mm
Calibration accuracy (1σ)	0.050 mm
Temporal noise (1σ)	0.050 mm
Scanning time	250 - 2250 ms
Dimensions	77 x 68 x 296 mm
Baseline	230 mm
Weight	900 g

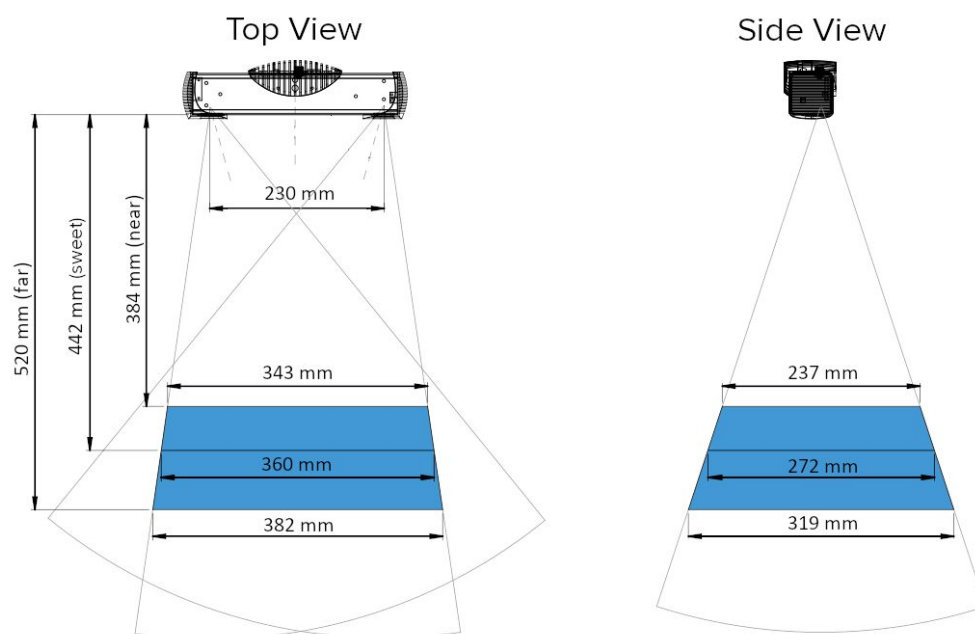


Figure 17: PhoXi 3D Scanner S scanning range

PhoXi 3D Scanner M - Datasheet

Parameter	Value
Scanning range	458 - 1118 mm
Optimal scanning distance (sweet spot)	650 mm
Scanning area (at sweet spot)	590 x 404 mm
Point to point distance	0.286 mm
Calibration accuracy (1σ)	0.100 mm
Temporal noise (1σ)	0.100 mm
Scanning time	250 - 2500 ms
Dimensions	77 x 68 x 416 mm
Baseline	350 mm
Weight	950 g

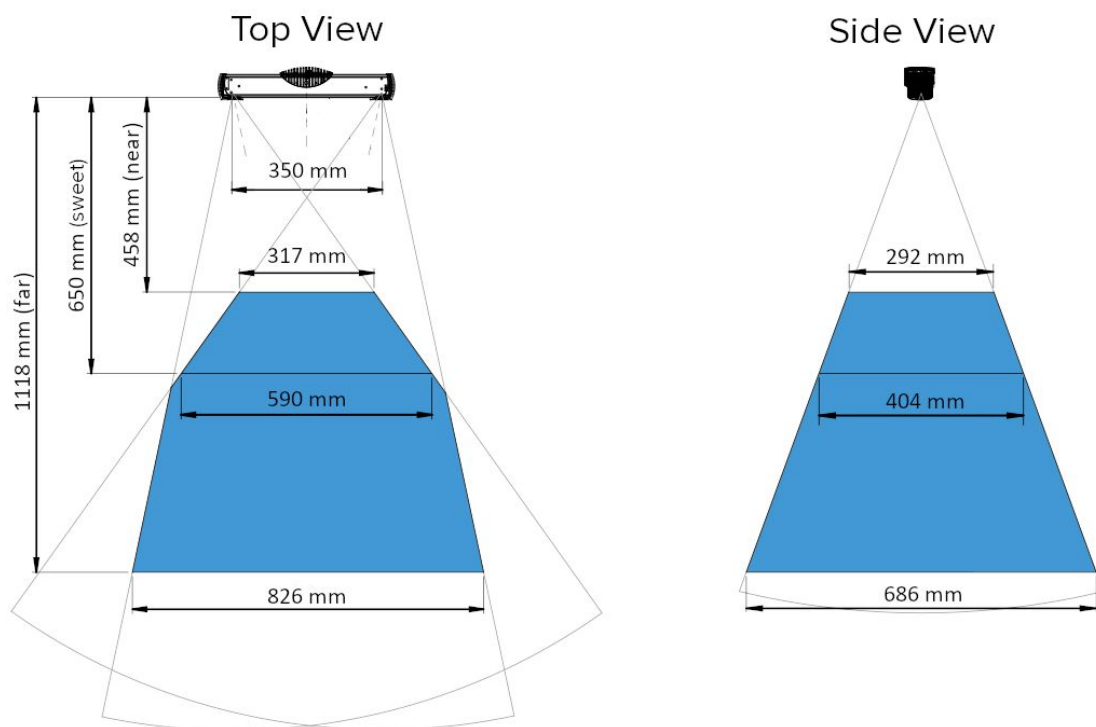


Figure 18: PhoXi 3D Scanner M scanning range

PhoXi 3D Scanner L - Datasheet

Parameter	Value
Scanning range	870 - 2150 mm
Optimal scanning distance (sweet spot)	1239 mm
Scanning area (at sweet spot)	1082 x 772 mm
Point to point distance	0.524 mm
Calibration accuracy (1σ)	0.200 mm
Temporal noise (1σ)	0.190 mm
Scanning time	250 - 2750 ms
Dimensions	77 x 68 x 616 mm
Baseline	550 mm
Weight	1100 g

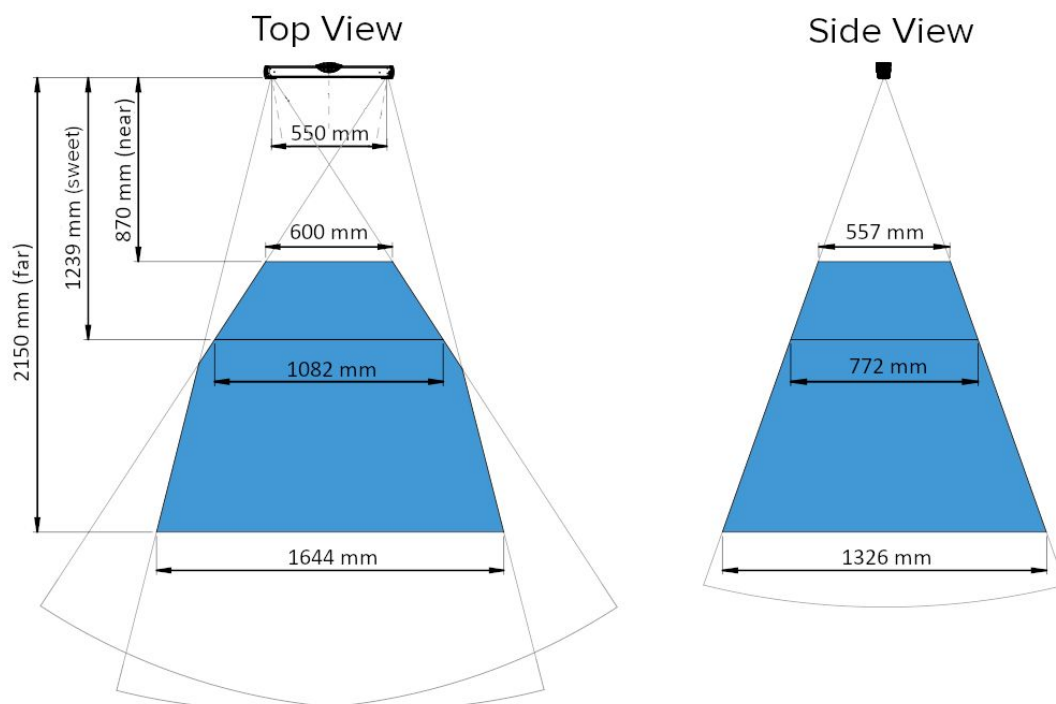


Figure 19: PhoXi 3D Scanner L scanning range

PhoXi 3D Scanner XL - Datasheet

Parameter	Value
Scanning range	1680 - 3780 mm
Optimal scanning distance (sweet spot)	2326 mm
Scanning area (at sweet spot)	1954 x 1459 mm
Point to point distance	0.947 mm
Calibration accuracy (1σ)	0.500 mm
Temporal noise (1σ)	0.400 mm
Scanning time	250 - 3000 ms
Dimensions	77 x 68 x 941 mm
Baseline	850 mm
Weight	1200 g

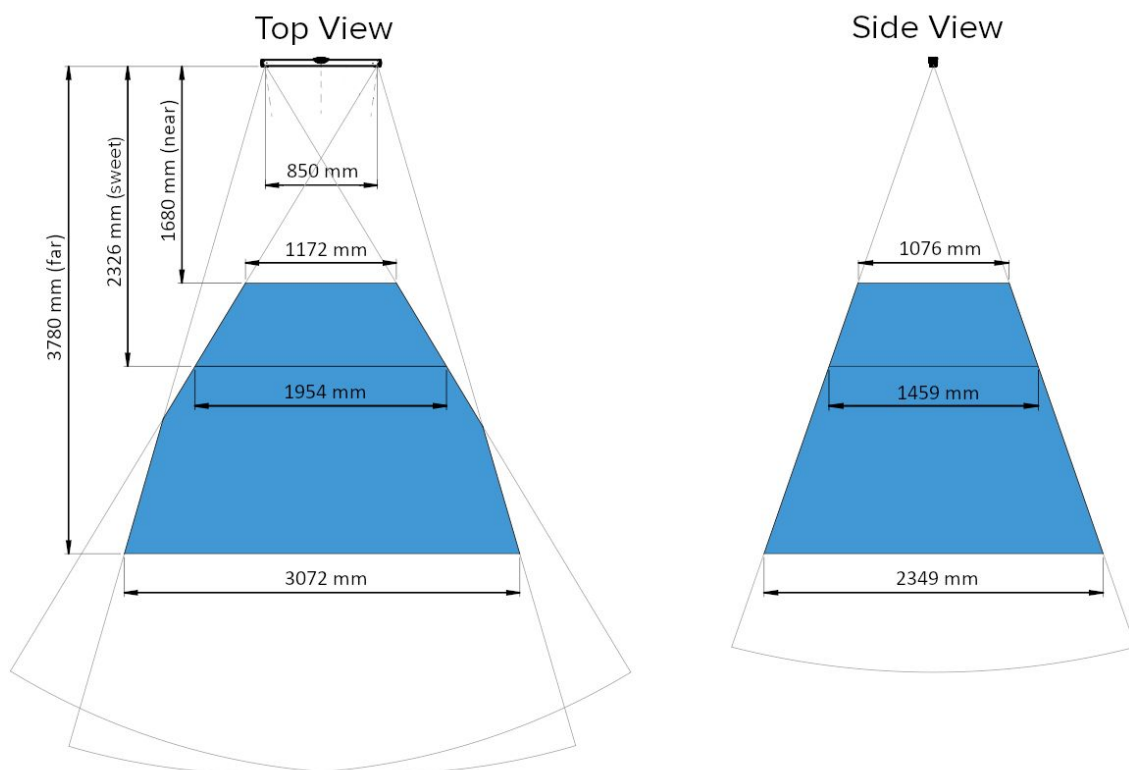


Figure 20: PhoXi 3D ScannerX L scanning range

Cleaning Instructions

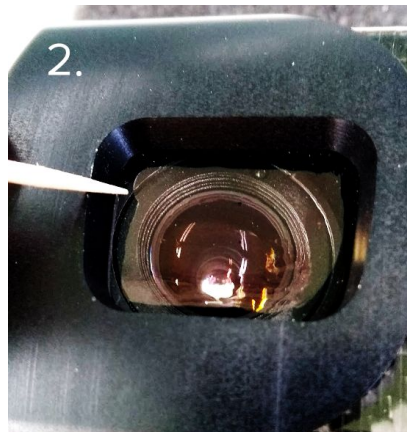
PhoXi 3D Scanners are generally low maintenance. To preserve their performance and quality of the scans, please check and maintain their outer optical parts regularly.

The glasses covering the camera unit and the projection should not be touched by bare hands to avoid staining of the glass. This could interfere with light passing through them. If the glass was touched or lightly stained by any other mechanism, wipe the glass with lint free wipes intended for optical components.

In cases where the scanner is used in an environment with lots of dust, especially when the dust contains sharp or hard particles that could potentially damage the glass, clean the glasses with specialized cleaning solution for optical components, eg: First Contact™ Cleaning Solution².

To clean the glasses:

1. Coat the glass with the solution using the applicator. Make sure not to spread it to the edges. The solution immediately dries and creates a film over the glass.
2. Remove the film from the glass using peel tabs with wooden or plastic tips.
3. The film removes any dirt or particles from the glass.



² www.photoniccleaning.com/product-p/rfcr.htm

Compliance with Standards

PhoXi 3D Scanners conforms with the following standards and test specifications. The test criteria under which were PhoXi 3D Scanners certified are stated in the standards. Please note that the certification status may change without notification. Consult your local Photoneo representative if you need additional information related to the latest listing of exact approvals.

Declaration of Conformity

With Directive 2001/95/EC on General Product Safety and Directive 2014/30/EU on Electromagnetic Compatibility

Manufacturer:

Business name: Photoneo s.r.o.
 Registered seat: Jamnického 3, Bratislava 841 05, Slovak Republic
 Identification number: 47353309
 Tax ID: 2023884907
 EU VAT ID: SK2023884907
 Contact: info@photoneo.com, +421 948 766 598

Product (subject of Declaration):

- Photoneo® PhoXi® 3D Scanner

Following the development and testing of the Product throughout 2015 up until now, hereby the Manufacturer declares that his Product complies with the requirements and limitations as stated in the Directive 2001/95/EC on General Product Safety and in the Directive 2014/30/EU on Electromagnetic Compatibility.

The Declaration of Conformity is issued under the sole responsibility of the Manufacturer. It relies on testing provided by:

- Research Institute of Posts and Telecommunications, Testing and Metrology Division - Test Report 22/602/2020/Eng
- Lasernetmet Limited (Bournemouth UK), Laser Classification Reports to EN 60825-1:2014 - No. 1830, 1997b and 1962
- Technical Testing Institute in Piestany / Technický skúšobný ústav Piešťany (dedicated Product Certification Body) - Conformity Certificate No. 181299001
- Rhein Tech Laboratories, Inc. - FCC Class B DoC Report No. 2017262DOC

- Test House of the Faculty of Electrical Engineering and Information Technology, Slovak University of Technology in Bratislava - Test report No. 21/16/SL EMK
- The Manufacturer

This is a revised version of the Manufacturer's Declaration of Conformity dated 16.02.2018

28.07.2020

Authorized Representative / CEO: Mgr. Ján Žižka, PhD.

To see the full signed copy of Declaration of Conformity, please visit the following link:

www.photoneo.com/dl/DoC

FCC Rules and Regulations



PhoXi 3D Scanners complies with the applicable requirements of FCC Part 2:2016 and FCC Part 15:2016 of the FCC Rules and Regulations and Industry Canada ICES-003.

NOTICE

This equipment has been tested and found to comply with the limits for a Class B digital device, 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.

CE



PhoXi 3D Scanners satisfies requirements and safety related objectives according to the EC directives listed below. This CE mark is supported by Test Report No. 22/602/2020/Eng issued by Research Institute of Posts and Telecommunications, Testing and Metrology Division in Banská Bystrica, Slovakia.

EC Directive 2014/30/EU Electromagnetic Compatibility:

- EN 55032:2015 Electromagnetic compatibility of multimedia equipment. Emission Requirements
- EN 61000-6-1:2007 Immunity for residential, commercial and light-industrial environments
- EN 61000-6-3:2007+A1:2011 Standards for residential, commercial and light-industrial environments
- EN 61000-4-2:2009 Electrostatic discharge immunity test
- EN 61000-4-3:2006 Radiated, radio-frequency, electromagnetic field immunity test
- EN 61000-4-4:2012 Electrical fast transient/burst immunity test
- EN 61000-4-5:2014 Surge immunity test
- EN 61000 4-6 :2014 Immunity to conducted disturbances, induced by radio frequency fields
- EN 61000-4-8:2010 Power frequency magnetic field immunity
- EN 61000-4-11:2004 Voltage dips, short interruptions and voltage variations immunity tests

Laser Classification

Laser class of the scanner is determined according to EN 60825-1:2014 Equipment classification and requirements standard.

PhoXi 3D Scanners are primarily manufactured as laser class 3R devices. Models M, L and XL can be manufactured as laser class 2 devices. The laser class was tested by an independent certification body Lasermet Limited which has issued certification reports No. 1830, 1997b and 1962 for both laser classes.

All devices are labeled according to their respective class following rules given by the harmonized standard.

Details about the laser device used can be found in the section [Projection Unit](#).

If necessary, please contact Photoneo for a written Declaration of Class 3R Laser Product for specific devices.

Degree of Protection

According to standard EN 60529 PhoXi 3D Scanners have the following mechanical protection:

IP65 Mechanical Protection

Completely protected against ingress of dust (dust-tight). Protected against low pressure jets of water from any direction.

Warranty

Warranty conditions are stated in General Terms and Conditions on Photoneo website:

www.photoneo.com/kb/terms-conditions

Dimensions and Illustrations

Bottom View: Mounting Plate

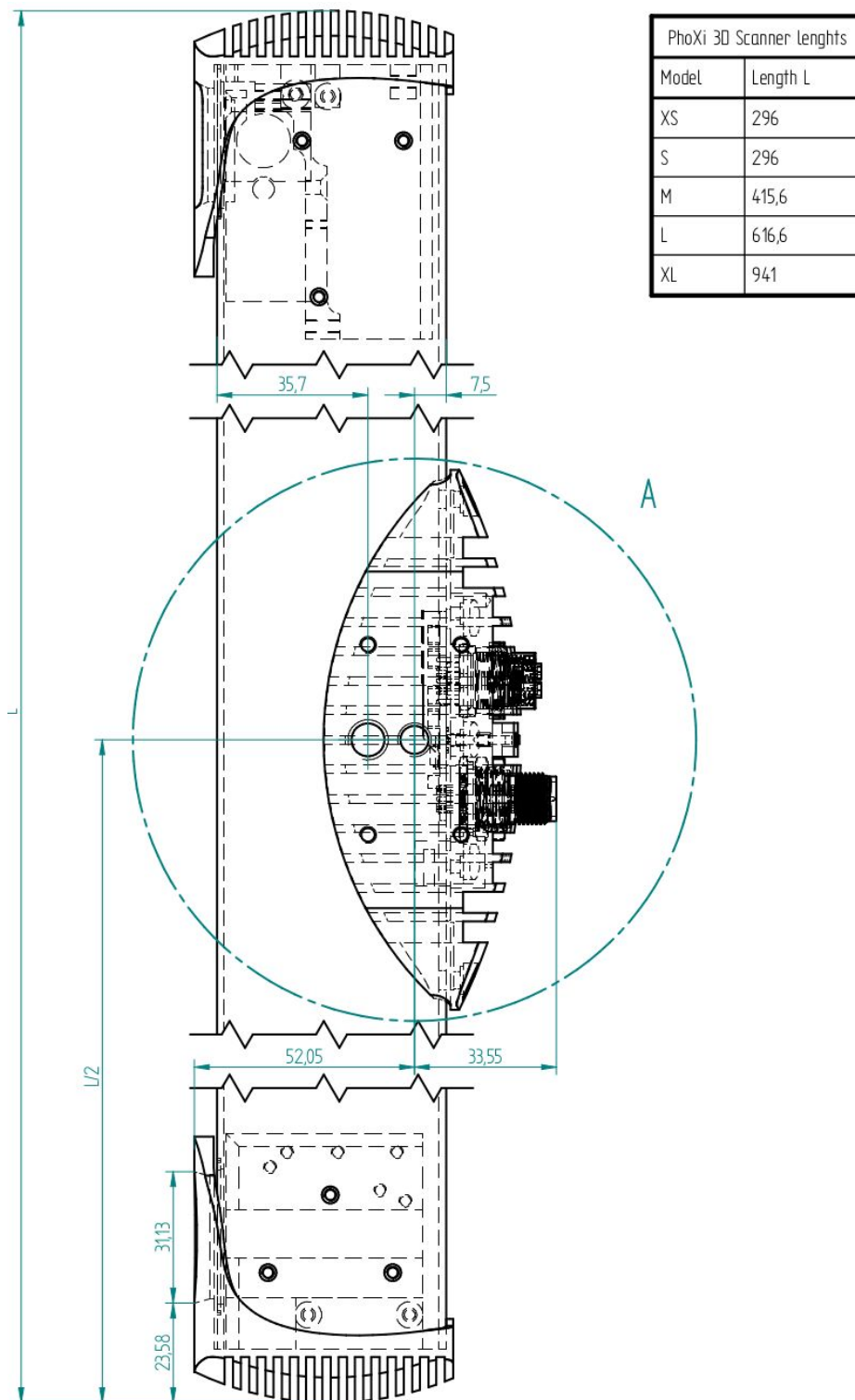


Figure 22: Bottom view of PhoXi 3D Scanner

Bottom View: Detail A

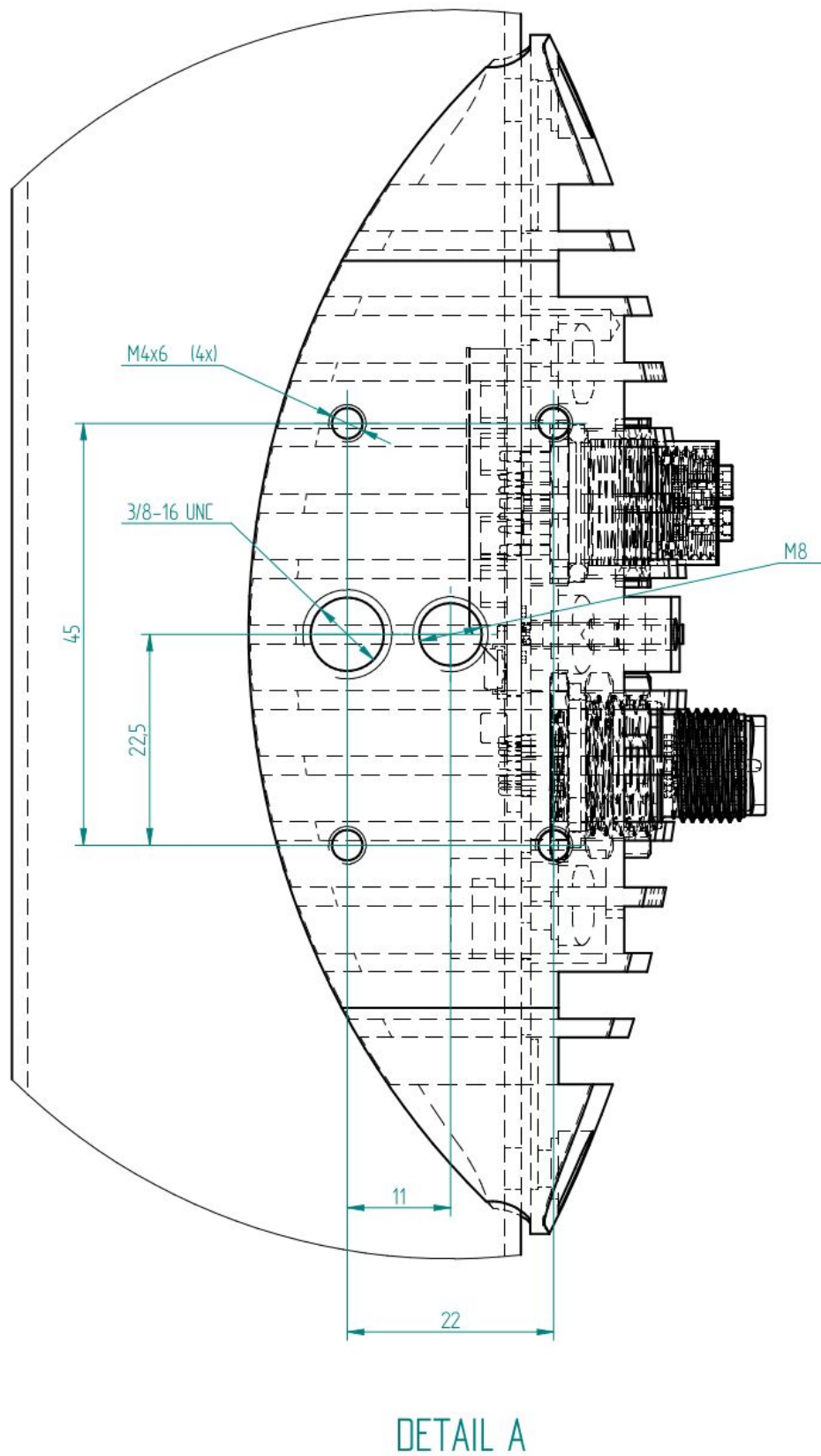


Figure 23: PhoXi 3D Scanner - Detail A

Front View: Projection Unit and Camera Unit

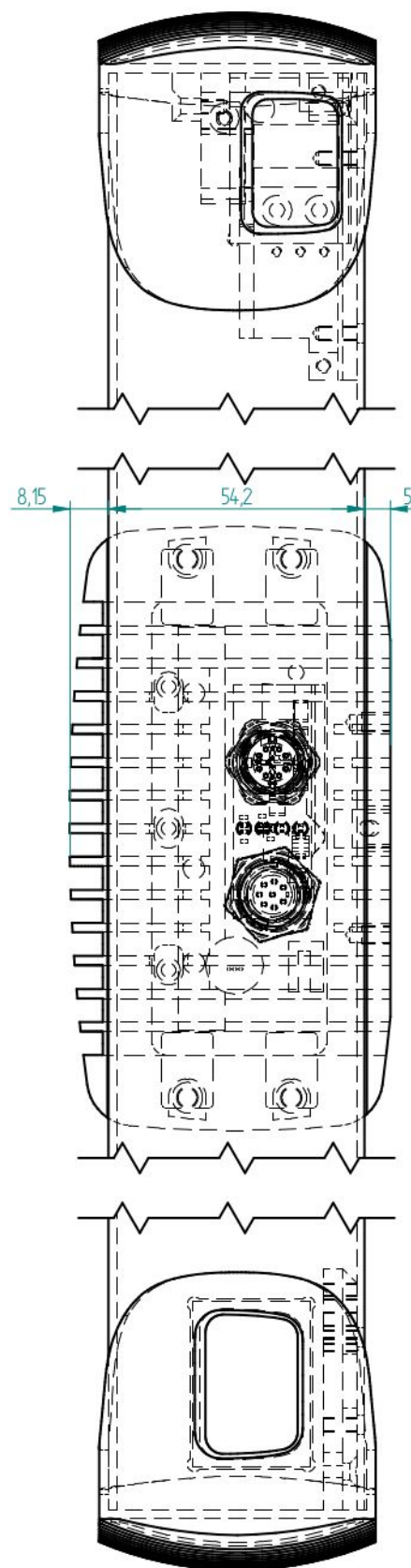


Figure 24: Projection unit and camera of PhoXi 3D Scanner

Changelog

List of changes between PhoXi 3D Scanner User Manual 08/2020 and PhoXi 3D Scanner User Manual 01/2020:

Page	Changes
8	Added section General Information : <ul style="list-style-type: none"> ■ Moved general label from Laser Device section to this section ■ Added warning about hot surface
10	Section Scope of Delivery : <ul style="list-style-type: none"> ■ Changed delivered accessories
11 - 13	Section Installation : <ul style="list-style-type: none"> ■ Changed guidelines for connecting the scanner ■ Changed powering options ■ Revised illustrations for mounting plate and back panel of the scanner ■ Added connection schematics ■ Different status LEDs
19 - 20	Section Hardware Parameters : <ul style="list-style-type: none"> ■ Pinouts and powering requirements for M12 X coded and M12 A coded connectors
21	Section Environmental Conditions : <ul style="list-style-type: none"> ■ Added directions for device transport
23	Section Scanning Parameters : <ul style="list-style-type: none"> ■ Added section about using the device after it has reached its operating temperature
25 - 29	Section Scanning Parameters : <ul style="list-style-type: none"> ■ Corrected X & Y dimensions for all models M
31 - 33	Section Compliance with Standards : <ul style="list-style-type: none"> ■ Revised based on recertification
34 - 36	Updated illustrations in section Dimensions and Illustrations

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Focused on 3D

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PhoXi 3D Scanner - User Manual and Installation Instructions

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