



Laser Positioning Sensor 3D

Smart LPS 3D H720

The User's Manual

Thank you for choosing our products.

Before using the Products, read this manual, thoroughly.

After reading this manual, please keep it close for your immediate future reference.



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Introduction

This document is the "User's Manual" for the H720 series - Laser Positioning Sensor 3D (hereafter, referred to as "the Products").

This "User's Manual" (hereafter referred to as "this Manual") provides information and basic operation methods for the Products, which prefixed with H720

To use the Products effectively and safely, please read this Manual carefully and fully understand its contents before using the Products.

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H720 User's Manual

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Revision History

Date	Revision	Details
2025. June	001E	1 st edition
2025. July	002E	· Installation PC System Requirements - Removed “Pro” - Added Windows 11 version - Added note that the potential dysfunctionalities depend on version · Symptoms and Solutions - Added details on dysfunctionalities depending on Windows version and countermeasures · Added interlock control specifications · Added external trigger mode
2025. September	003E	Added 1/e ² beam divergence calculation function and the rotation angle calculation function
2026. June	004E	Suruga OptGauge Ver.1.3.7 Support Operating Environment · Compatible with .NET 10 Software Startup · Added Quick Start instructions Measurement Method · For usage instructions, refer to the "Suruga OptGauge User's Manual" Sensor Head Specifications · Frame rate changed to 60 Hz

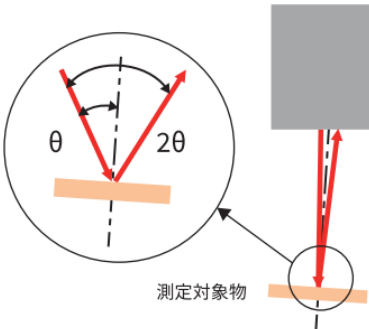
NOTICE

All information contained in this Manual is deemed correct at the time of publication.

The SURUGA SEIKI Co. Ltd. (thereafter, “the SURUGA”) reserves the right to change specifications without notice the users of the Product.

For the latest version of this Manual and the Software, you can obtain by downloading them from our website (<http://jpn.surugaseiki.com/>) or (<https://eng.surugaseiki.com/>).

0. Definitions (terms and abbreviations)

Terms and Abbreviations	Definitions
Reflection Angle Measurement	 The diagram illustrates the reflection angle measurement process. It shows a grey rectangular light source at the top emitting a red beam downwards. The beam hits a small orange rectangular device under test (DUT) at the bottom. A circular inset provides a magnified view of the reflection point. In this inset, a vertical dashed line represents the normal. The incident beam is shown as a red arrow hitting the surface, and the reflected beam is shown as another red arrow. The angle between the incident beam and the normal is labeled θ, and the angle between the reflected beam and the normal is labeled 2θ. Below the DUT, the Japanese text '測定対象物' (Measurement Target Object) is written. A method to measure the angle of a beam from an internal light source reflected up on a device under test (DUT). The angle of 2θ is measured to calculate θ.
The Software	The Suruga OptGauge Software
This Manual	The User's Manual for Smart LPS H720 series
Sensor Camera	Internal sensor camera embedded in this product.

1. For your Safety – Precautions of Use

1.1. Warning labels addressed in this Manual

	May result in severe injury, damage to equipment, or other severe damage.
	May result in minor physical injury or equipment damage.
	Instructions for safe handling are provided for the product.

1.2. Managing the Products

The Products use a laser diode for its internal light source. We recommend that the Products are in an environment where appropriate safety measures are taken for the laser before any use.

- The SURUGA shall not guarantee the functions and performance of the Products if used in a manner other than that specified in this Manual, or if modified.
- When other equipment is combined with the Products, the functions and the SURUGA shall not guarantee the performance of the Products, depending on your design, operating conditions, and environment.
- Do not subject each device, including peripherals, to sudden temperature changes, which may cause condensation and equipment failure.
- Do not wipe the Products with a wet rag, benzene, thinner, or the alike, which may cause discoloration or deformation of the Products. If the Products is heavily soiled, wring out a cloth with diluted pH-neutral detergent and wipe off the stain, then dry the Products with a soft cloth.
- If you suspect the Products being malfunctioning, please contact our local sales office.

1.3. Precautions

1.3.1. Ambient Temperature and Illuminance

- Changes in ambient temperature can cause measurement errors. Please be advised to keep the ambient temperature, always, at a constant level.
- Avoid using the Product near lighting equipment that repeatedly turns on and off at high frequencies. If this is not possible, use a light shield or similar device to avoid being affected.

1.3.2. Power Supply



- Use the correct power supply voltage. Otherwise, fire, electric shock, or malfunction may occur.
- Be sure to turn off the power to and devices connected to the Product when connecting or disconnecting various connecting wires. Otherwise, the Products may be damaged.
- Do not turn off the power while setting items. Sudden power cut-off while setting data, part or all configuration data may be lost.

1.3.3. Disassembly / Modification



Do not disassemble or modify any unit of the Products. Disassembly or modification may cause fire or electric shock. The warranty is void if the Products are disassembled or modified by anyone other than our employees or our certified third party.

1.3.4. Effects of dust and dirt

The following cases may cause measurement errors due to the influence of dust, dirt, water, oil, etc.

- Dust and dirt on the cover glass: Use dry-clean air to blow off any dirt on the cover glass. If the cover glass is heavily soiled, wipe it off with a soft cloth soaked in thin alcohol.
- Adhesion on the surface of the object to be measured: Blow it off with clean air or wipe off the dirt.
- Intrusion into the optical axis area by floating or by splashing: Take measures such as installing a protective cover or air purging.

1.3.5. Influence of Vibration

Vibration transmitted either to the Products or to a measurement target (or both) may cause measured values unstable. In such cases, please be advised that, in order to obtain stable results, you may take extra efforts such as suppressing the vibration or averaging out result values upon

increasing the number of measurements.

1.3.6. Disturbance by the air fluctuation

The influence of slow air fluctuation may cause the measured value to vary. In such cases, covering the measuring section with an airproof cover is advised.

1.3.7. Not waterproof or explosion-proof



The Products are not intended for use in areas where explosion protection is required. Do not use the Products in locations where flammable gases or other explosive atmospheres exist.

The Products are not waterproof. Do not use the Products in locations where liquids may splash or flow into the Products.

1.3.8. Actions in case of abnormality



In the following cases, immediately turn off the power and disconnect the USB cable.

Continuing to use the Products in an abnormal state may cause damage.

- When abnormal sounds, strange smells, or smoke is detected.
- If the power cord is damaged.
- If water or other liquid is spilled on the Product.

1.3.9. Repair

For repair, please contact our local sales office,

- When water or foreign objects get inside the main unit.
- When the Products are damaged due to being dropped or external impact.
- When there is a strange odor due to smoke emission.

1.3.10. Disposal of the Products

- When disposing of the Products, treat it as industrial waste. Please follow in accordance with laws and regulations or by any other appropriate methods. The SURUGA shall not collect the Products for purpose.
- Please dispose of all materials used to package the Products in accordance with the law or by other appropriate methods. The SURUGA shall not collect these materials.

1.3.11. Residual Risks

Attention

This document does not disclose all risks associated with the Products. For residual or unexpected risks, or any other risks involved, please implement the safety design of machinery in accordance with ISO 12100 or your appropriate industrial safety standards.

1.3.12. CE Marking

The Products comply with the CE marking for the following standards and conditions.

When the Products are applied in the EU countries, the following conditions must be met.

- EN IEC 61000-6-4:2019(EMI)
- EN IEC 61000-6-2:2019(EMS)
- EN IEC 61326-1:2021(EMI : Class A, EMS:INDUSTRIAL ELECTROMAGNETIC ENVIRONMENT)

※ The length of all input and output cables, including the power cable connected to the Products, must be less than 30 meters."

1.4. Use of Laser Products for Your Safety

1.4.1. Corresponding laser classes for the Products

The following describes the hazards of the laser classes in the Products.

For your safety, precautions for the laser class, please follow your occupational safety regulations.



Laser Class	Precautions
Class 2	Normally, your eyes are protected and safe due to aversion reactions such as blinking. Laser products that may cause temporary visual impairment or risk of secondary injury due to aversive reactions if the user intentionally stares at the laser beam.

Ref : IEC 60825:2014 (JIS C 6802 : 2018) *Safety of Laser Products*

1.4.2. Laser Class Identification Labels on the Products

The description contents of the laser class identification labels and the warning label, and their posting positions are illustrated below.



The descriptions of the laser class identifications and the content of the warning label are as below.

Laser Class Identification Labels	Warning Label
Laser Class 2 	

Labeling method and contents conform to IEC60825-1:2014 (JIS C 6802:2018)

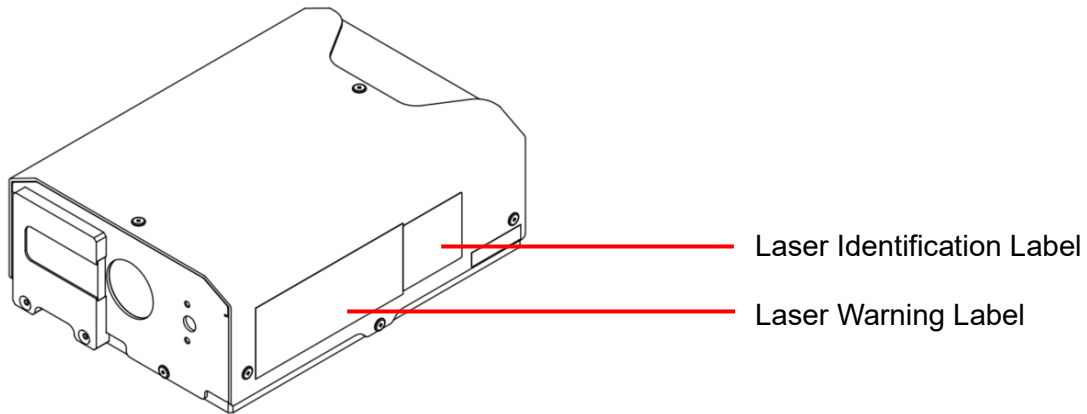


About KC correspondence : Class A 사용자 안내문 이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다. Reference English translation: User guide This equipment has been conformity-assessed for use in a professional environment and Interference may occur.
--



The pasting positions of the labels

The warning label and laser class identification label are pasted on the right side of the Products when viewed from the front.



2. Preparations

2.1. Functions and Features

The Products are a multifunctional sensor which derives the displacement and angle of a target object by an incoming beam light to the sensor camera. The following are its notable features.

- Angle Measurement

- Measurement range: $\pm 1.35^\circ$ (circular Area)

- Linearity : 0.25 % of F.S. (when measuring within the displacement measurement range at F.S. = 2.7° using the internal light source)

- Repeatability : 1 sec. (within 6σ of the averaging times = 256 measurements)

- See "[Specifications of the Products and Accessories](#)"

- Displacement Measurement

- W.D. 50 mm Model

- Measurement range: 50 mm $\pm$ 10 mm (at $T_x = T_y = 0^\circ$)

- Linearity: $\pm 0.05\%$ of F.S. (at $T_x = T_y = 0^\circ$)

- Repeatability: 0.2 μm (when measuring with 1 σ and number of averaging times = 256)

- See "[Specifications of the Products and Accessories](#)"

- Measurement of multiple luminous points is feasible

- The Software installed in the PC with connecting the Products is capable of the measurements.

- See "Preparations - [System Configuration Example](#)"

- Divergence measurement is available

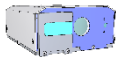
- Measurement range: 20 mrad or less

- Linearity: 5% of F.S. (F.S. = 20 mrad)

For details on functions and usage, please refer to the separate software manual "SurugaOptGauge_User's Manual".

2.2. Packaged Items

The shipping box will contain the main unit, a USB memory stick, and an AC/DC adapter specifically for the internal light source.

1.  The Product

2.  A USB memory stick contents: the Suruga OptGauge (the sensor application), camera driver, device authentication file and this Manual).

*The latest version can be downloaded from the SURUGA website (<http://jpn.surugaseiki.com/>)

3. An AC/DC power supply for the Internal light source (12 V DC Output)

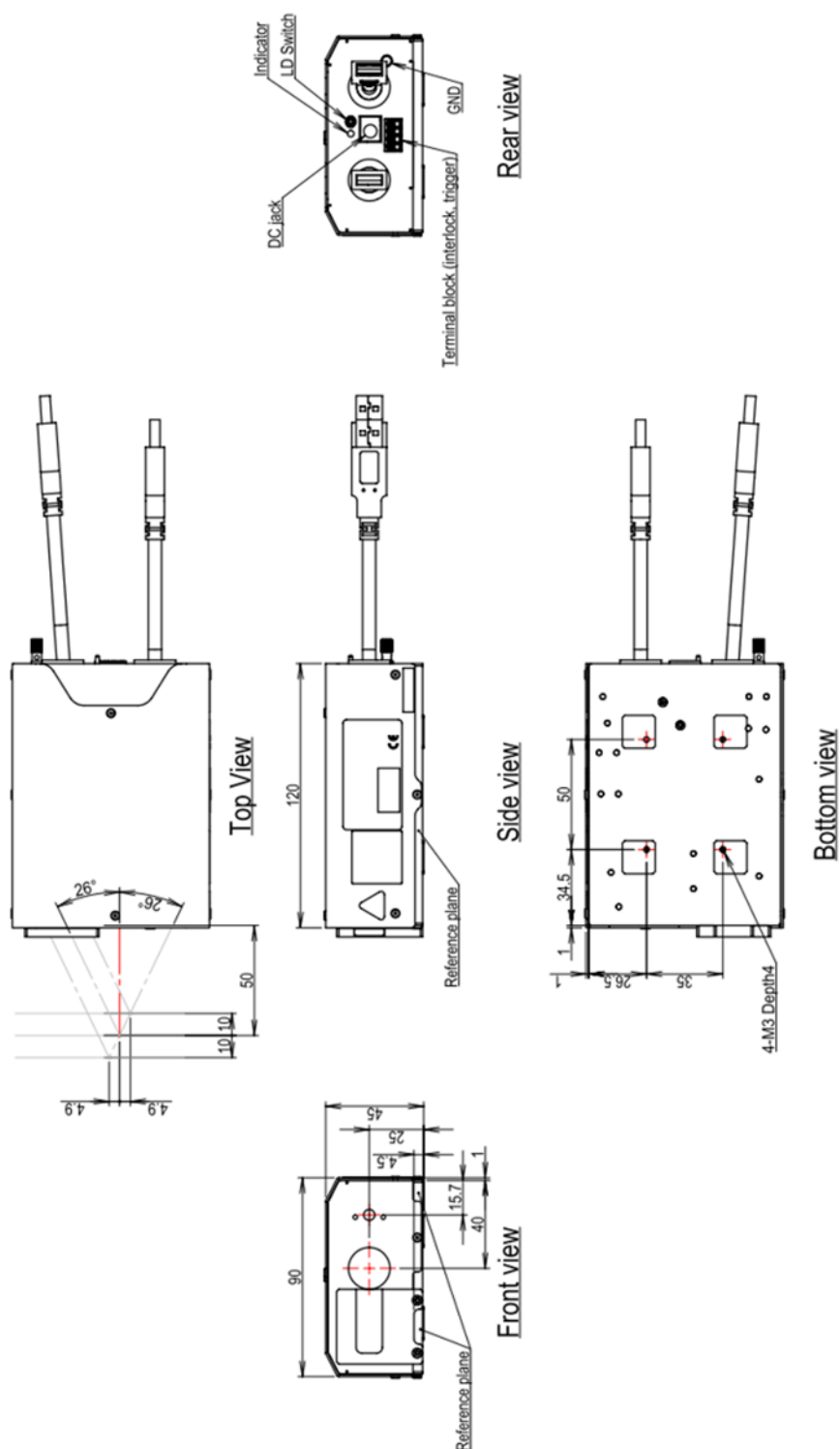
2.3. Overview Specifications of the Products

Specifications Table of the Products

External dimensions (mm)	90 x 120 x 45
Product weight	0.8kg
Main power source	DC12 V
Power consumption	6 W or below
Laser class	Class 2
Protective functions	Short-circuit protection, polarity reversed connection protection
Communication functions	USB3.0 standard
Operating temperature/humidity	0 to +40 °C、 35% to 85% RH (no condensation)
Storage temperature and humidity	-10 to +60 °C、 35% to 85% RH (no condensation)
Atmosphere	Avoid direct sunlight, corrosive or inflammable gases, liquids, powders/dust, and other toxic substances
Housing Material	Aluminum

2.4. External Dimensions of the Products

W.D. with the 50 mm model (H720CL-13510R2-10-050A)



2.5. Names and functions of each part of the Products

① Power Switch

Turns the power of the unit ON/OFF.

② Indicators

Displays the internal light source status with 3 colors.

Green : the internal light source is OFF (initial status)

Orange : the internal light source is ON

Red : Detecting interlock (*Internal light source cannot be activated while being interlocked)

③ USB connector x 2

It connects the Products to your computer

④ Power source

Connector for the supplied AC/DC adapter.

⑤ The Interlock and trigger input connector

You may connect the interlock trigger inputs as follows.

1. INTERLOCK (+)
2. INTERLOCK (-)
3. TRIG 5V (+)
4. TRIG 5V (-)

*For the connecting wires, please see the following sections in this Manual:

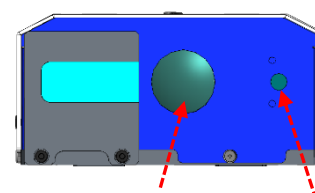
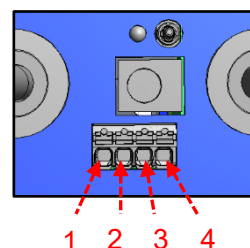
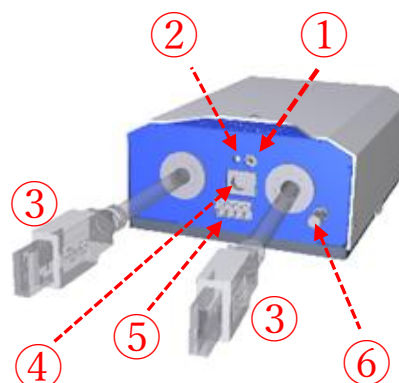
"[Specifications of the Products and Accessories](#)" and "[Interlock control specifications](#)."

⑥ FG Terminal

Connecting to a frame ground to reduce electrical noise and to prevent malfunction.

⑦ Laser emission port

The port Irradiates the laser when the internal light source is ON.

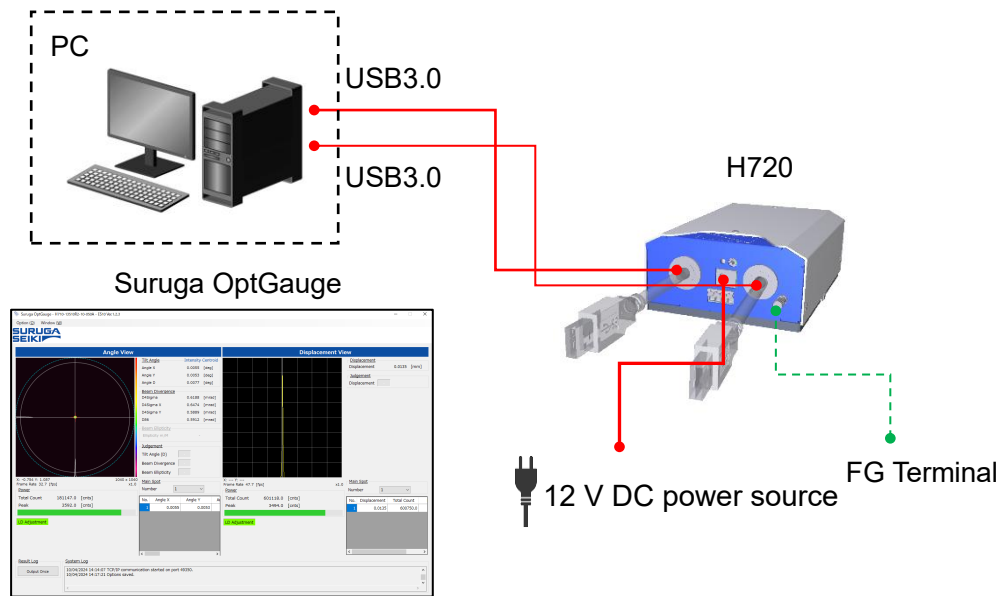


Laser emission port (angle) (displacement)



Do not irradiate the human body, eyes, skin, or any other object before safety is confirmed.

2.6. System Configuration Example



2.7. Required Parts for Configuration

- The H720 Sensor Head
- The 12VDC power source (the AC/DC adapter included).
- A computer, a monitor, and a keyboard for the Products.
- The Suruga OptGauge : the measuring Software for the Products.

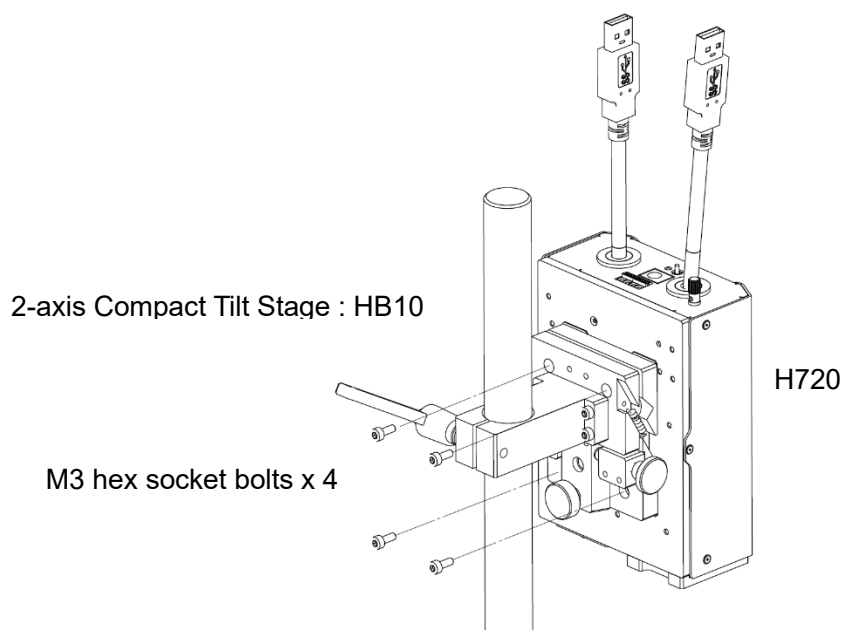
2.8. Installation Method (Example)

This section illustrates mounting methods for the Products.

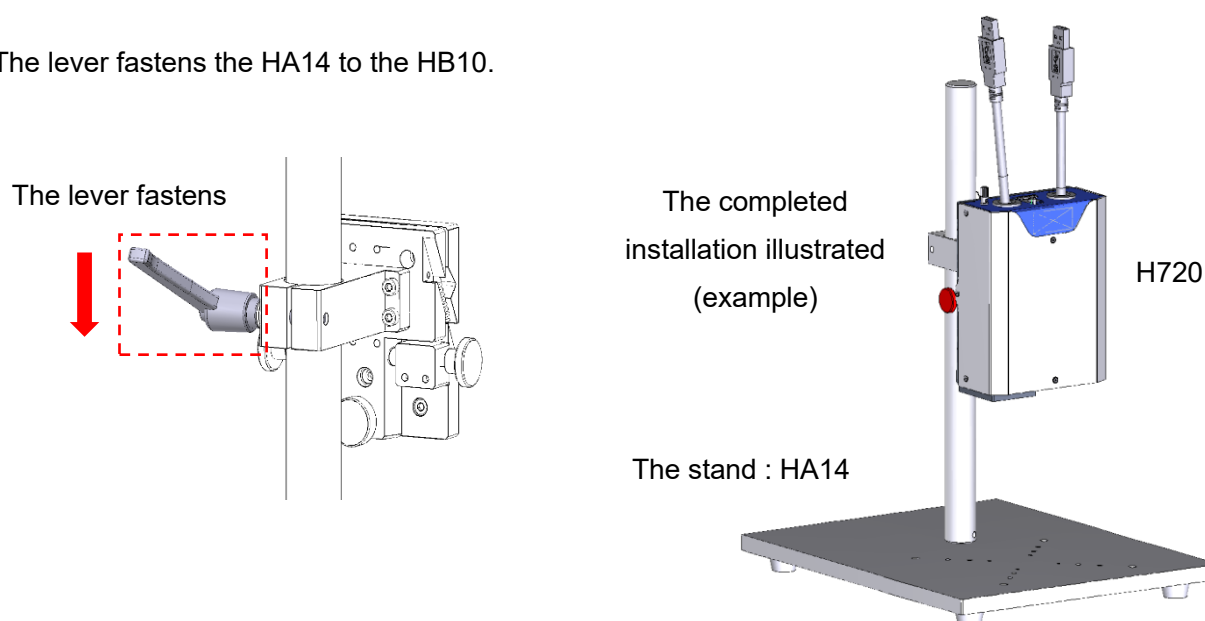
You may install the Products (H720 body) on the 2-axis Compact Tilt Stage (model: HB10) along with the Stand (model: HA14), which are the common optical accessories by the SURUGA.

1. The H720 body may be installed to HB10 with hex socket bolts.

*Please note that you may use M3 hex socket bolts (length: 8mm).



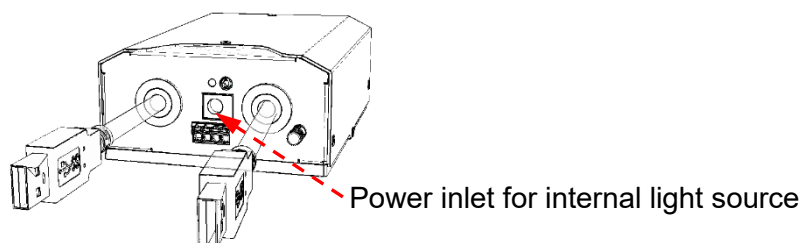
2. The lever fastens the HA14 to the HB10.



2.9. Power Connection

Please connect to the designated AC/DC adapter, only.

Insert the DC plug of the AC/DC adapter into the designated socket before inserting the AC side into an outlet. Note: you should ground the FG terminal.



Attention

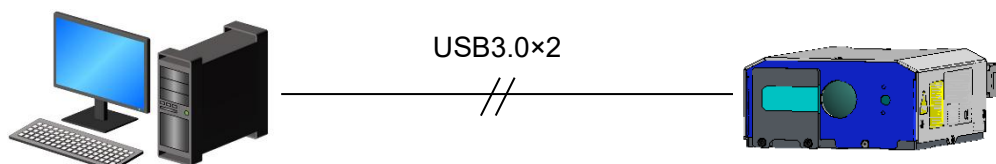
Do not turn on the AC/DC adapter until the Suruga OptGauge installation is complete.

Please ground the FG terminal to prevent malfunctions caused by electrical noise.

2.10. Connection to a Computer

Connect the USB3.0 cable to a USB port compatible with USB3.0.

Be sure to use a computer with a USB3.0-compatible port.



Attention

Do NOT disconnect the USB cable while the Suruga OptGauge is running. Normal operation will be disrupted. If the USB cable disconnects, close the application, reinsert the USB cable, and restart the Suruga OptGauge.

2.11. The Software - Installation of the Suruga OptGauge



If downgrading of the Software, setting information added to a newer version may not be correctly loaded. If downgrading to an earlier version of the Software, it would not read correctly the settings only available to the newer versions so that the software would not even start up.

Therefore, please be advised to back up the folder with your option files being stored, to delete the original option file folder and then to re-installing an earlier version.

[Folder Path]

C:/Users/[*UserName*]/Documents/Suruga/OptGauge/[*Product Serial No.*]

2.11.1. Software License

To use the Suruga OptGauge (hereafter as "the Software"), the customer must consent to the following software license agreement (hereafter as "this agreement").

When installing or copying all or part of the Software on a computer, or using the Software after installation, it is considered that the customer has consented to all terms of this agreement, and the agreement is bilaterally concluded.

Article 1 (Permissions)

The Software is free of charge.

The copyright for the Software, its manual, and other documents concerning the Software belong to SURUGA SEIKI Co., Ltd. (hereafter as "the SURUGA").

The SURUGA grants all users for non-proprietary rights to the use of the Software.

Article 2 (Usage Restrictions)

The SURUGA permits the use of the Software only for the purposes of operating the Products and collecting data.

The SURUGA prohibits the use of the Software for any other purposes than that the SURUGA's intended.

Article 3 (Reproduction and Modification)

The Software can be copied only to the computers using the Products. The SURUGA prohibits modification, redistribution, and reverse engineering.

Article 4 (Disclaimers)

Users make the use of the Software on their own responsibility.

The SURUGA bears no responsibility and is not liable for any direct, indirect, incidental, special, supervenient, or punitive damage including but not limited to; data loss, business interruptions, and loss of profit, incurred arising out of or failure to use the Software.

In addition, The SURUGA bears no responsibility and is not liable for any damage incurred arising out of software bugs, errors, viruses, malfunctions due to illicit third-party access, or security issues with the Software.

The SURUGA holds no responsibility and is not liable to damages incurred upon modification of the Software.

Article 5 (Support)

The SURUGA provides technical support for the Software. However, there is no guarantee that our technical support will achieve the customer's purpose.

Article 6 (Termination of Agreement)

The right to use the Software will be, immediately, terminated upon violation of the conditions of this agreement.

2.11.2. PC System Requirements for your installation

[Recommended System Requirements]*¹

Hardware requirements	Supported OS	Windows 11 64-bit, Version 24H2 or later* ⁴
	CPU	Intel Core i5 - 1345U CPU 1.6 GHz or higher 10-core 12-thread
	RAM	16GB or higher
	Storage capacity	1GB or higher
	Display resolution	1920 x 1080
	USB	USB3.0 (type A) port: 2 or more
Software requirements	Framework	.NET10.0* ³

[Minimum System Requirements]*²

Hardware requirements	Supported OS	Windows 10 Pro 64bit, Windows 11 64-bit, Version 24H2 or later* ⁴
	CPU	Intel Core i5 - 8265U CPU 1.6GHz 4-core 8-thread
	RAM	8GB or higher
	Storage capacity	1GB or higher
	Display resolution	1920 x 1080
	USB	USB3.0 (type A) port: 2 or more
Software requirements	Framework	.NET10.0* ³

*1 "Recommended System Requirements" refers to a level where waiting times are minimal and operation is comfortable.

*2 "Minimum System Requirements" refers to a level where the Software can start and perform basic functions.

*3 If .NET10.0 is not installed on your computer, install ".NET Desktop Runtime 10.x.x." from the Microsoft website

*4 It has been confirmed that the Software may not operate properly on Windows 11 Version 23H2 due to differences in certain system components and operating specifications. Please update to the Windows version (24H2 or later).

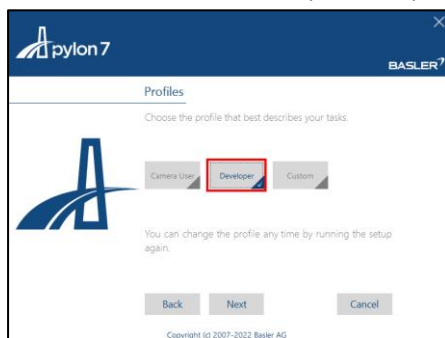
2.11.3. Installation of the Software

2.11.3.1. Installation of the USB device driver

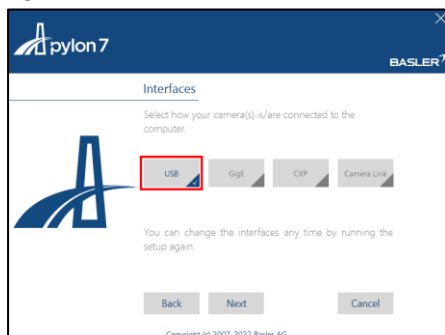
1. Double-click the "... ¥Driver" "Basler_pylon_7.0.0.24651.exe" to begin installation.



2. Consent to your installation on the confirmation screen.
3. Set the installation method (Profiles) to "Developer".



4. Set the sensor camera connection method (Interfaces) to "USB." Thereafter, use the default settings to complete the installation.



2.11.3.2. Download

The latest version can be downloaded from our website (<http://jpn.surugaseiki.com/>).

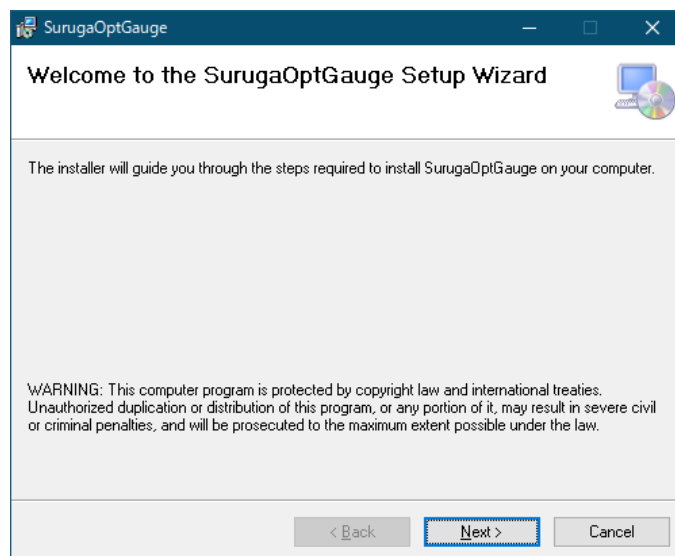
2.11.3.3. Installation of the Software

Installing the Software.

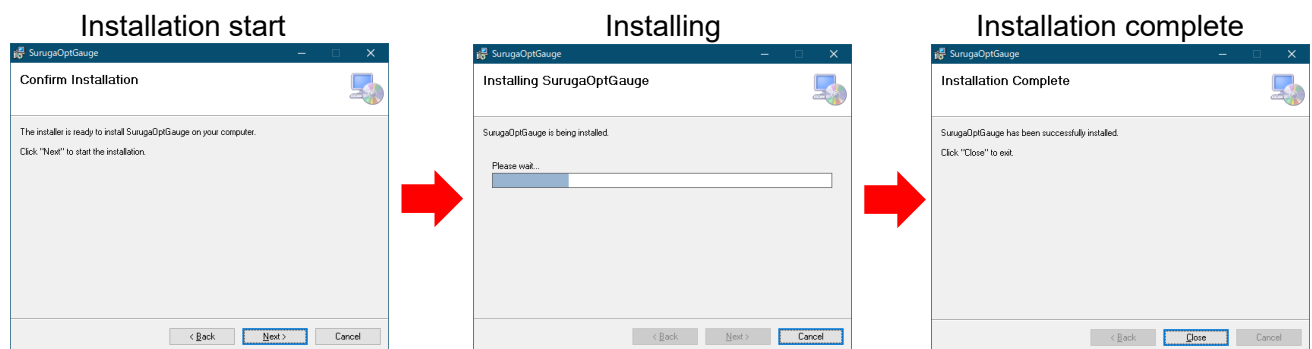
1. Double-click "SurugaOptGaugeSetup_x.x.xx.msi" in the directory "... /Application".

Name	Date Modified	Type	Size
 SurugaOptGaugeSetup_x.x.xx.msi		Windows インストー...	61,590 KB

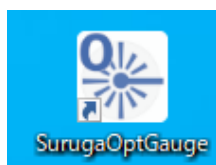
2. Click "Next>".



3. Click "Next>" to begin installation.
When installation is complete, click "Close".



4. The “SurugaOptGauge” will be created on the desktop. The installation is completed.



2.11.3.4. Copying the Device Authentication File

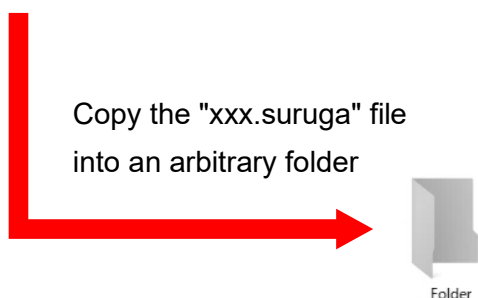
Attention

An Authentication File

For the Products, calibration values are set for each device. Therefore, the Software requires reading of a "device authentication file (.suruga)" in which the unique individual device information is stored.

To load the device authentication file into the Software, copy the file "xxx.suruga" in the ".../Authentication File" to an arbitrary file location.

名前	更新日時	種類	サイズ
xxx.suruga	2023/09/28 10:55	SURUGA ファイル	6 KB



Note

If your security policy does not allow the device authentication file to be copied to your PC, you can read the file directly from the USB memory device provided with the product. In this case, this procedure is not required.

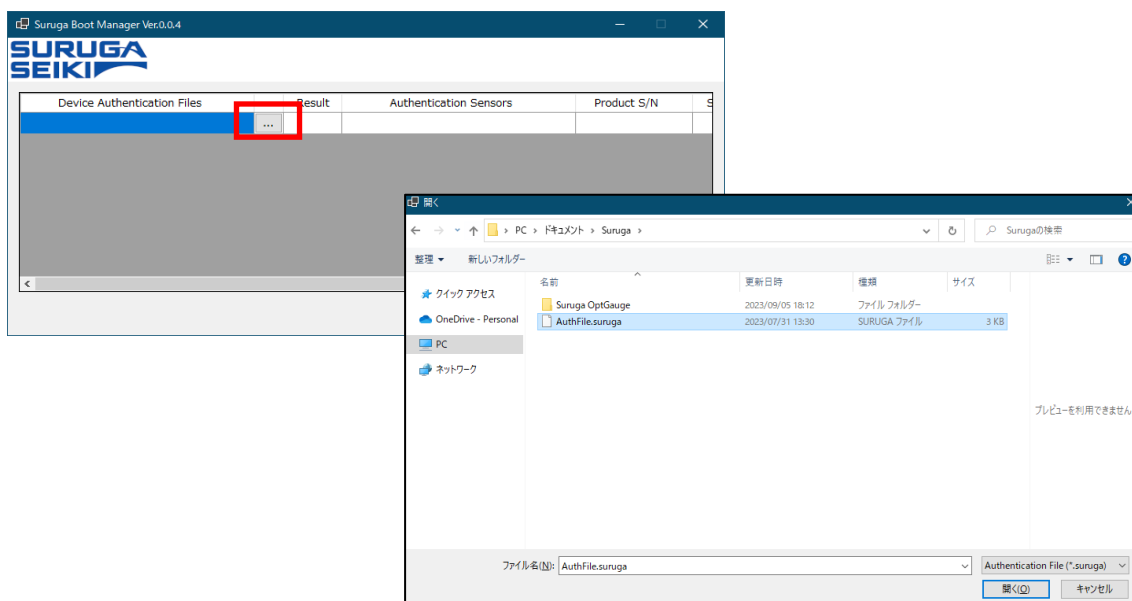
2.11.3.5. Starting up and Closing down the Suruga OptGauge

1. Double-click the SurugaOptGauge icon in the "...¥Desktop".

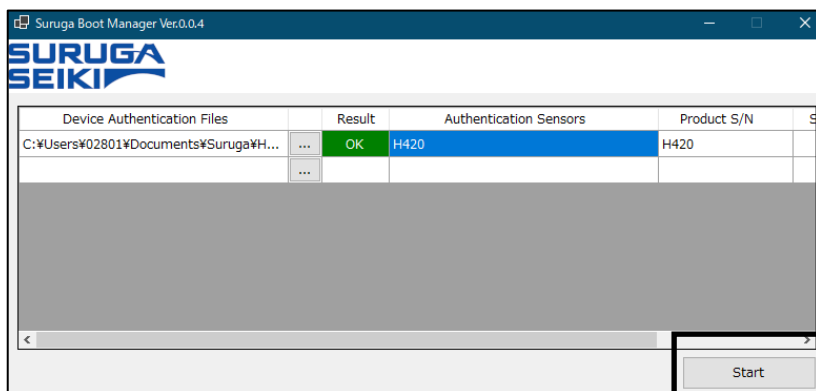


2. Click on "..." in the item "Device Authentication File" and select the extension ".suruga" in the folder in which the unique "Device Authentication File" was copied.

If not able to copy the device authentication file to your computer, select it directly from the USB memory stick.



3. Confirm that the "Result" is "OK" and click "Start."

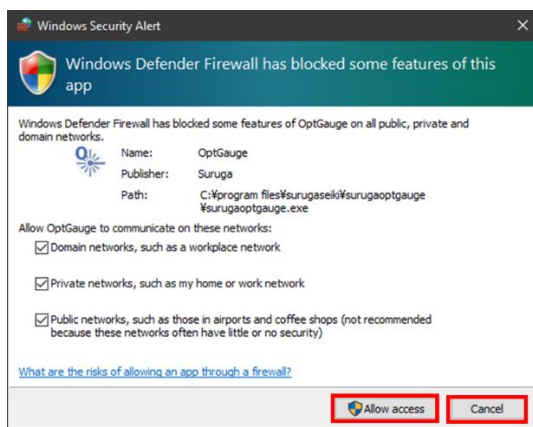


Attention

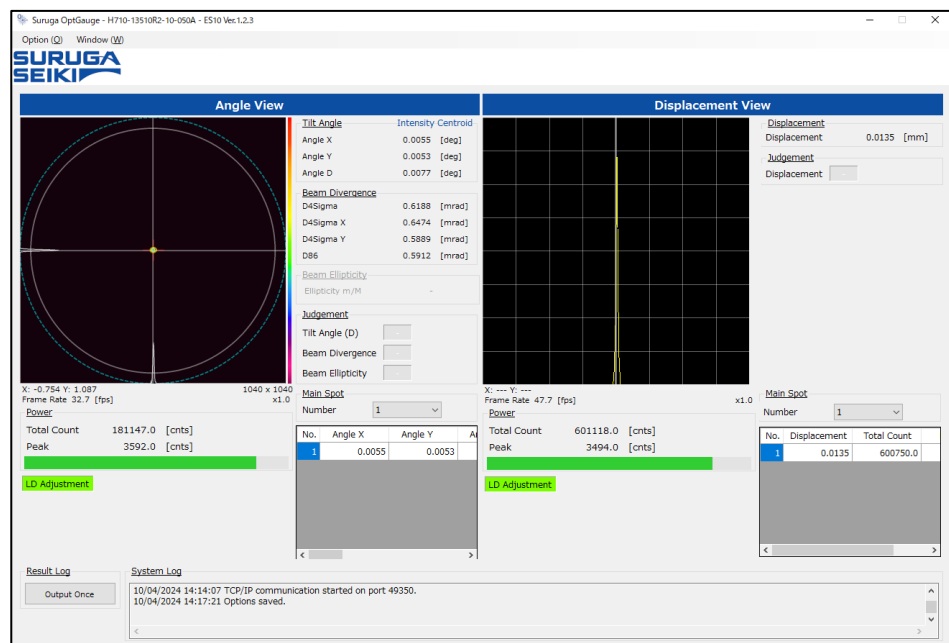
The Software incorporates TCP/IP communication control. Therefore, depending on your PC's security settings, the following warning may appear upon initial startup.

If your computer and network environment allow the TCP/IP communication permission, check all, and click "Allow access". If not, click "Cancel".

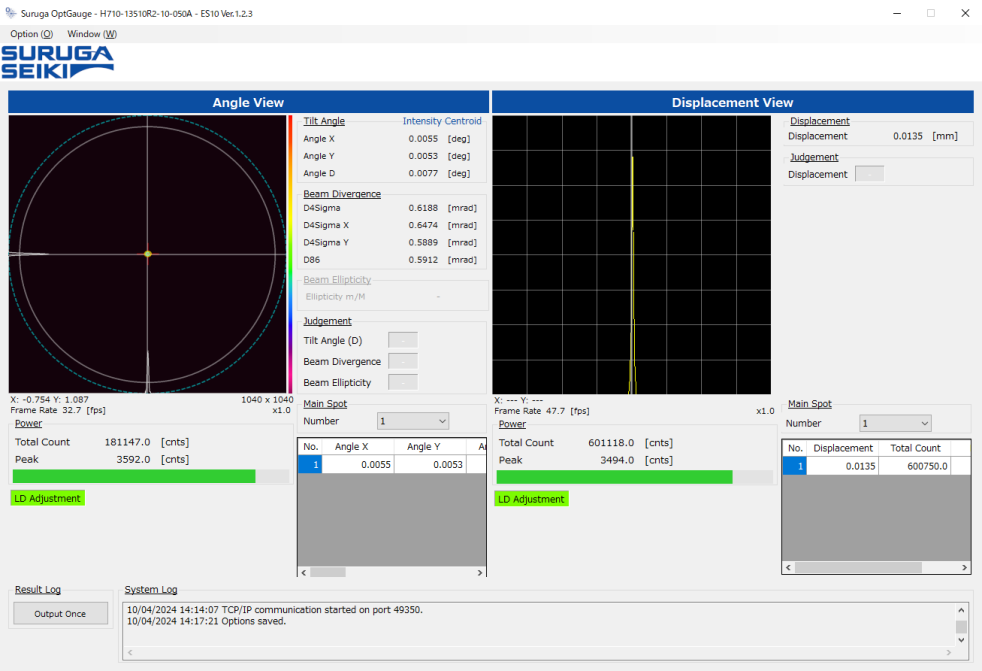
(Changes can be made after the fact in "Control Panel / All Control Panel Items / Windows Defender Firewall / Allowed Apps".)



4. The application will start up.



Closing the Suruga OptGauge.
Click the "x" icon to shut down OptGauge.

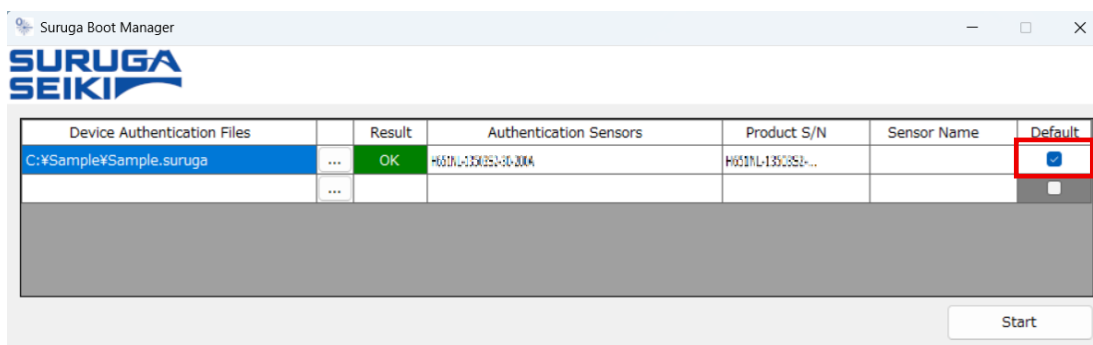


2.11.3.6. Quick Start

Quick Start is a feature that allows you to pre-select the authentication file used at software startup with the Boot Manager.

By configuring Quick Start, you can skip selecting the authentication file in the Boot Manager and pressing [Start] at the next startup.

When you enable Default for the relevant authentication file, Quick Start will be applied from the next startup.



Disabling Quick Start Even if Quick Start is enabled, you can still open the Boot Manager **by starting the software while holding down the Shift key** (hold down the Shift key until the Boot Manager screen appears).

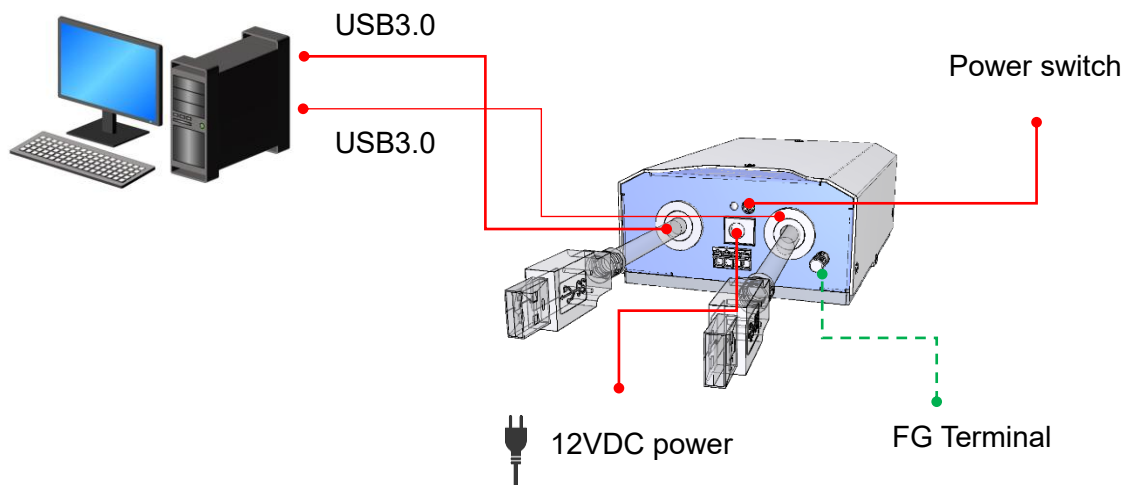
By using this method, you can temporarily disable Quick Start and select the authentication file in the Boot Manager before starting the software.

2.12. Turning on the Power



Do not turn on this Product power until the Products and the Software installation on your PC are completed and a supervisor has confirmed work safety

Connect the AC/DC adapter to a power outlet, and then turn the power switch ON.

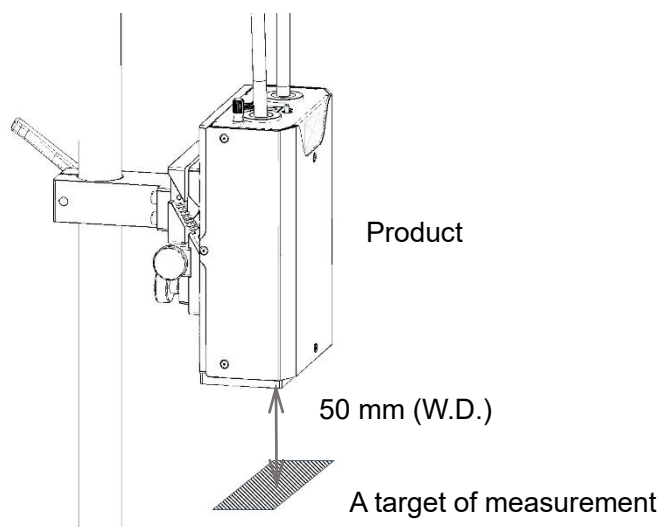


3. Measurement

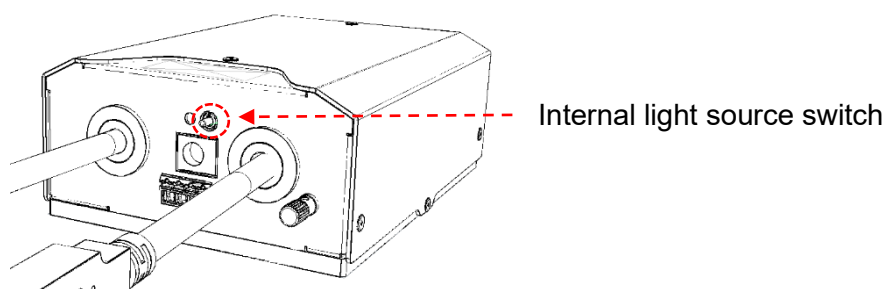
3.1. Precautions and Setting (Installation) of the Products

This section describes how to configure the Products, using the Software.

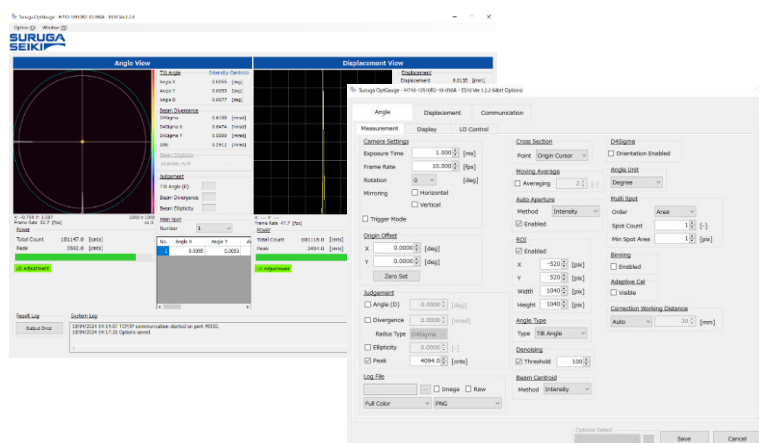
1. After connecting the USB cables to a computer, place the sensor so that the distance between the measurement target and the sensor is equal to the working distance.



2. When installation is complete, turn ON the internal light source switch.



3. Launch the Software to open the option screen.



4. At the Angle tab in the Option screen, select the LD Control subcategory tab.
5. Click the Tune button*1 in the LD Adjustment group box.
6. At the Displacement tab in the Option screen, select the LD Control subcategory tab.
7. Click the Tune button*1 in the LD Adjustment group box.
8. 90 minutes warm-up time to ensure stable measurements (no additional operations necessary).

*1 see the separate software manual, “the Suruga OptGauge User’s Manual” for option content details

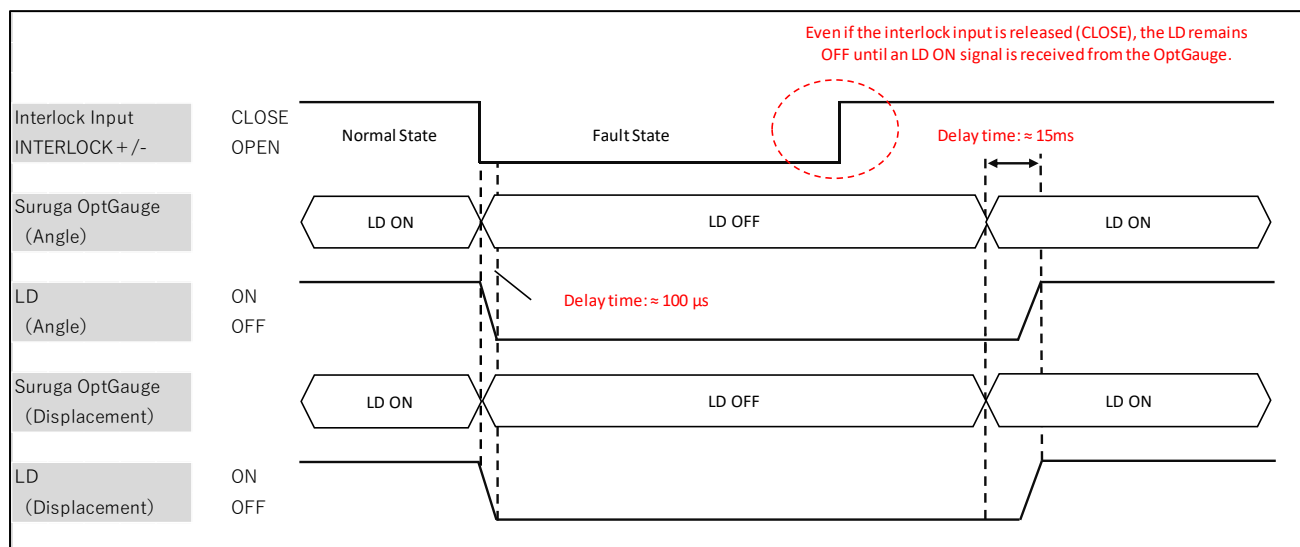
The settings are complete.

Attention

The Products are designed and intended with only a single unit connected per use; multiple units cannot be connected for measurements at any given time.

3.1.1. Interlock control specifications

To ensure your safe operation, the Products use interlock control to manage the activation and deactivation of the internal light source (LD). For details on the timing of the interlock, the Software, and the internal light source (LD) control, refer to the timing chart below.



3.2. Measurement Method

For instructions on using each measurement-related function, please refer to the separate software manual "SurugaOptGauge User's Manual".

4. Specifications of the Products and Accessories

4.1. Specifications of the Products

Item		Specifications
Internal light source	Wavelength	660 nm
	Diameter (angle/ displacement)	Φ 1 mm
	Radiant flux of the light emission (angle/ displacement)	1 mW or below (Class 2)
	Emission position (angle)	40 mm (distance from the side surface reference) 25 mm (distance from the bottom surface reference) (see " External Dimensions of the Products ")
	Emission position (displacement)	16.7 mm (distance from the side surface reference) 25 mm (distance from the bottom surface reference) (see " External Dimensions of the Products ")
Angle measurement	Measurement range	± 1.35° (circular range)
	Linearity* ¹	± 0.25% of F.S. (F.S. = 2.7°)
	Repeatability (6σ)* ²	1 sec.
Divergence measurement	Measurement range	20 mrad or less
	Linearity	5% of F.S. (F.S. = 20 mrad)
Displacement	Measurement range	± 10 mm
	Linearity* ¹	± 0.05% of F.S. (at Tx = Ty = 0 deg)
	'Repeatability (1σ)* ²	0.2 μm
Working distance (W.D. 50 mm Model)		50 mm ± 10 mm
Frame rate		60Hz (with the recommended computer specifications)
Interlock input terminal INTERLOCK + INTERLOCK –		Interlock input (none-voltage contact, the laser emission starts with the short circuit of +/-) Internal voltage: 3.3 V Short circuit current: 2 mA Open input conditions: "10 kΩ or more" or "2.6 V or above" Short-circuit input conditions: "0.5 kΩ or less" or "1.0 V or below"
Trigger input terminal TRIG 5V +		The trigger input for a measurement starts (rising edge detection to start a measurement in the 5V

TRIG 5V –		signal system) Input voltage: 0 V to 6 V Input current: 4 mA (at 5 V input) ON voltage: 3.0 V or above OFF voltage: 1.0 V or below
Environmental Conditions	Operating environment*3	0 to + 40°C and 35 to 85% RH
	Storage environment	- 10 to + 60°C
	Vibration resistance	Frequency range: 10 to 500 Hz Maximum acceleration: 2 G, X/Y/Z three directions (10 sweeps)
Dimensions (mm)		90 x 120 x 45
Weight		0.8kg

*1 By measurements with the wavelength of 660 nm ± 10 nm

*2 Averaging times of 256 measurements

*3 Inspection Environment for shipping: 22 to 24°C and 35 to 85% RH

4.2. AC/DC Converter Electrical Specifications

AC/DC adapter Specifications Overview	
Rated Input (AC)	100 V to 240 V
Rated Output (DC)	12 V / 3.0 A
Acquired Industrial Standards	PSE, BSMI, cUL, FCC, KC, CE, GS, RCM, CCC
Protective Functions	Short-circuit protection, overcurrent protection, overvoltage protection
RoHS	RoHS10
AC Side Plug Shape	Type-A
Product Dimensions (mm)	99 x 50 x 33
DC Cable Length	1.5 m +/- 30 mm
DC Plug Polarity	Center Positive

4.3. The Products and Cable Electrical Specifications

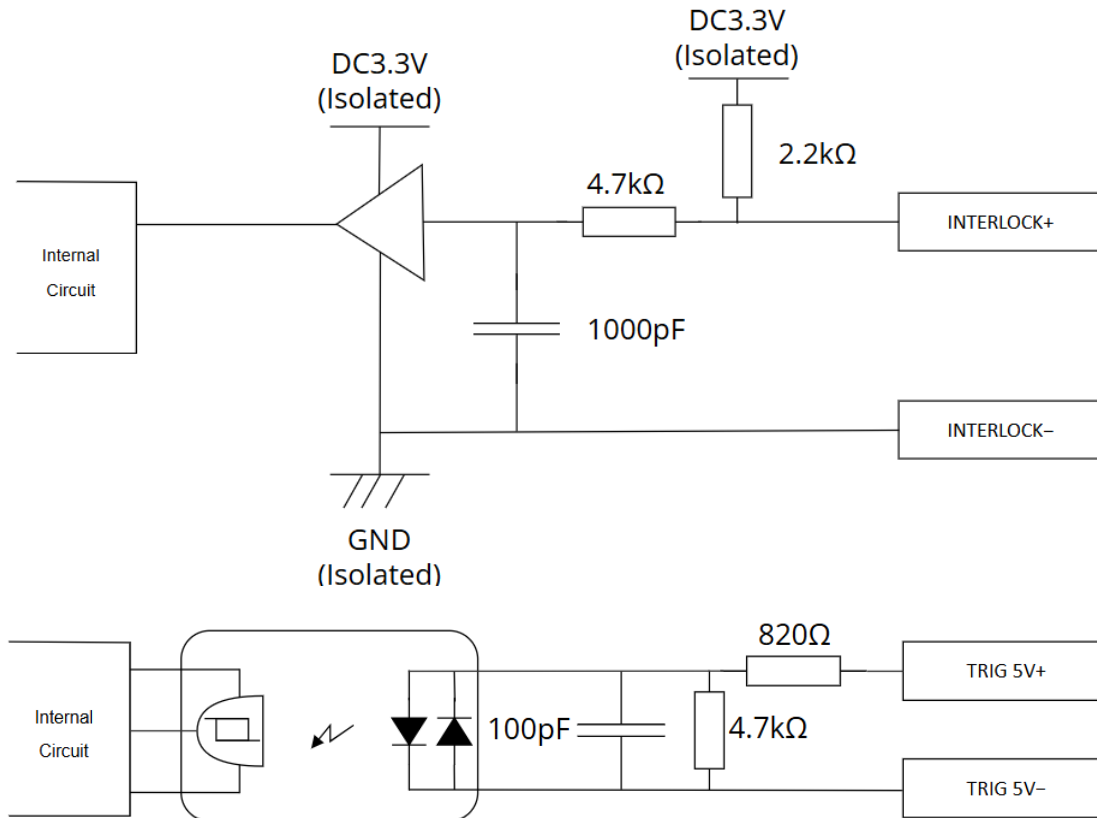
The Products and cable specifications overview	
Rated input (power consumption)	12 VDC / 3 A (5 W or below)
Cable Type	USB cable compliant with USB3.0 (5Gbps) standard
Connector	USB3.0 Type A
Cable Length	3.0 m

4.4. The specifications of the applicable wire range for the interlock and trigger inputs

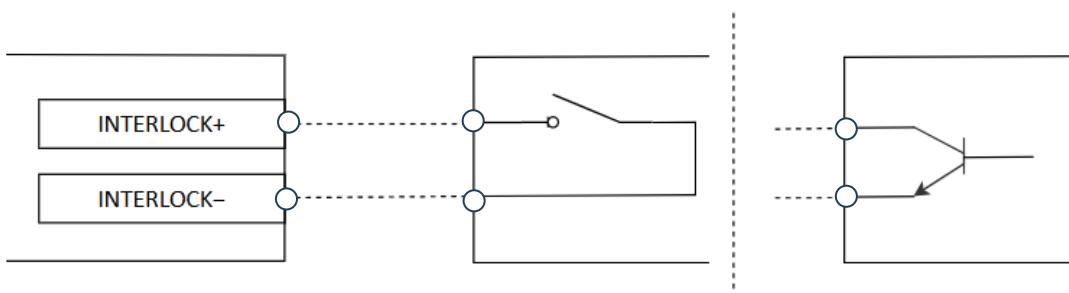
Stranded wire	0.2 mm ² to 1.5 mm ² (AWG24 to 16)
Solid wire	0.2 mm ² to 1.5 mm ² (AWG24 to 16)
Stranded wire with a ferrule terminal without insulation sleeve	0.2 mm ² to 1.5 mm ² (AWG24 to 16)
Stranded wire with a ferrule terminal with insulation sleeve	0.2 mm ² to 0.75 mm ² (AWG24 to 18)
Stripping length of outer sheath	8 mm

4.5. Equivalent Circuit Diagram

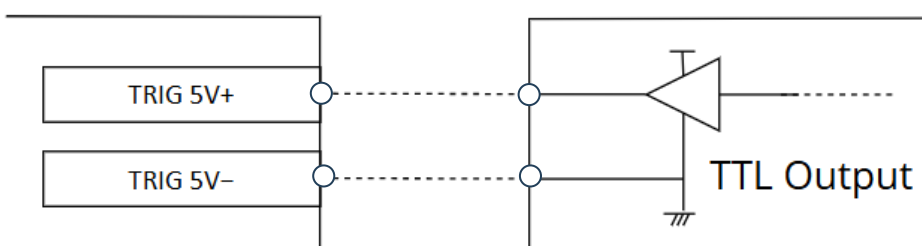
This section illustrates the circuit diagrams and connection examples for the interlock inputs and trigger inputs of the terminals.



INTERLOCK+/- connection example



TRIG 5V+/- connection example

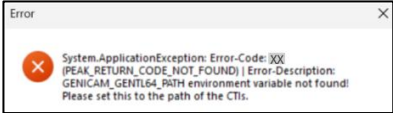


5. Failures? Frequently Asked Questions

5.1. Symptoms and Countermeasures

Useful information for troubleshooting is listed below.

Check if the table below shows your trouble.

Symptom	Cause	Countermeasure
The power does not turn on.	AC/DC adapter or power cable is not correctly connected.	DC12V is not supplied.
	DC12V is not supplied.	Correctly connect the DC12V power source.
Application does not start.	USB cable is not correctly connected.	Connect the USB cable to the USB3.0 port.
	Device authentication file is not being read.	Read the device authentication file (.suruga) corresponding to the purchased sensor head.
The following message appears when starting this software and it cannot be launched: 	The camera driver may not be installed.	Please install the camera driver. (Installation of the USB device driver) After installation, please restart your PC.
The Software does not start correctly	The sensor camera may be malfunctioning (check all cable connections)	Please contact our sales representative from the optical equipment division for further assistance.
Application stops during startup	With Windows 11 Version 23H2, due to differences in some system components and specifications, the Software may not function properly.	Please update to the latest Windows version (24H2 or later).
	USB cable disconnected.	Close the application, connect the USB cable correctly, and restart the application.
Beam is not displayed on screen	The LD is not turned ON.	Turn ON the LD in the software settings.

	Exposure Time* ¹ is too short.	Adjust the exposure time* ¹ to the optimal speed.
	Large tilt on the target.	Adjust the tilt angle of the target so that the reflected light beam enters within a viewing range of +/- 1.35°.
Measurement target centroid is unstable	Noise is causing serious effects	Enable the Threshold in the Denoising settings and adjust the threshold.
The detected peak is unstable, causing large fluctuations in the measurement value.	Small signals or noise may be detected as measurement targets depending on the sorting setting.	Set the Order setting to "Area" or "Peak".
	Noise may be detected as a measurement target because the Denoising Threshold setting is too low.	Enable the Threshold in the Denoising settings and adjust the threshold.
RS232C communication is not working	RS232C cable is not correctly connected	Correctly connect RS-232C cable.
	Computer communication conditions are not set correctly.	Set the communication settings correctly on the PC.
TCP/IP communication is not working	Ethernet cable is not correctly connected.	Correctly connect the Ethernet cable.
	Computer communication conditions are not met correctly.	Set the communication settings correctly on the PC.

*1 see "Suruga OptGauge User's Manual" in the separate software manual for details.

6. Warranty - After-Sales Service

6.1. Warranty Terms, Conditions and Coverage

- Before contacting us, please confirm the serial number of an individual product.
- The warranty period is one year after delivery.
- However, the following cases are not covered by the warranty and will be repaired for a fee.
 - Failure or damage caused by misuse, modification or repair by someone other than the company's designated persons from us.
 - Failure or damage caused by improper handling, such as dropping the Products during transportation or moving.
 - Failure or damage caused by fire, salt damage, gas damage, abnormal voltage, earthquake, lightning, wind, flood, or other natural disasters.
 - In the event of a malfunction or damage caused by improper handling, contrary to the methods and precautions described in the instruction manual.

We reserve the right to revise, modify, or amend these Warranty Terms and Conditions (hereinafter referred to as "Revisions, etc."), and in the event of such revisions, etc., we shall promptly post the revised Warranty Terms and Conditions in this catalog or on our website (<http://jpn.surugaseiki.com/>).

If you place an order for the Products after such revision, you shall be deemed to have accepted the revision.

6.2. After-Sales Service

Before requesting repair, please check the items in "[Failures? Frequently Asked Questions](#)".

If you have any questions, please contact our Optical Instruments Division Sales Department.

<During the Warranty Period>

When damage occurs under a normal use state following the cautions/warnings/notes written in this manual, the SURUGA conducts a repair service for free. For any damages out of warranty period mentioned above, the SURUGA charges a fee for any repair service.

<After the Warranty Period>

A repair service is available with a fee to maintain the functionaries of the Products up on your requests.

<If repair is required>

For repair and calibration inquiries, please contact to the following address.

info@suruga-g.co.jp

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