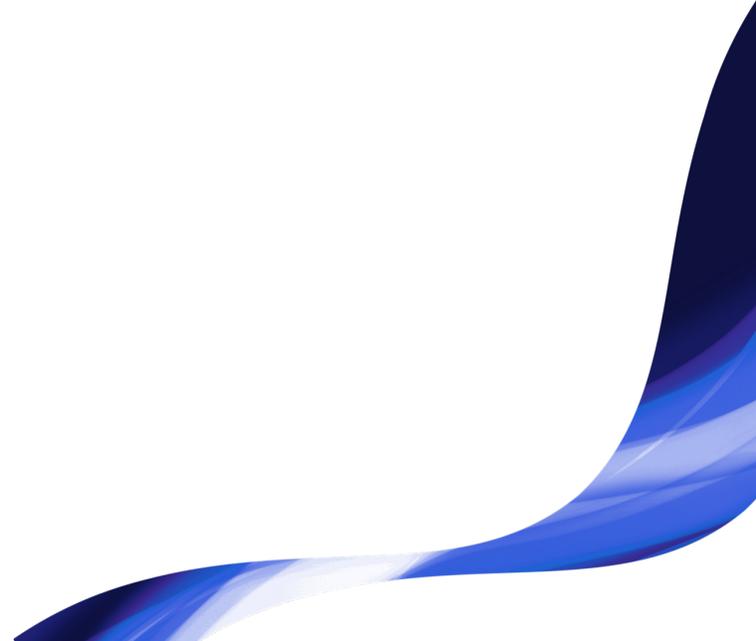




Tobii Pro Fusion
User Manual



Tobii Pro Fusion User Manual

v. 3.0

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Please visit [Tobii Connect](#) for updated versions of this document.

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1 Introduction

Tobii Pro Fusion is a compact, high performance data collection solution that you can take into the field. Use Tobii Pro Fusion when your research takes you to locations and to subjects that would otherwise be hard to bring to the lab. You can collect data in schools, hospitals, libraries, and other locations where your subjects are easier to recruit.

With sampling frequencies of up to 250 Hz, two eye tracking cameras, and two pupil tracking modes (bright and dark pupil), Tobii Pro Fusion enables you to adapt your data collection setup to different research populations, scenarios, and data requirements.

Use Tobii Pro Fusion for studies on:

- Windows laptop and desktop computers
- Monitors with optimum size 24" (16:9) or less as optimum size
- Real-world setups such as physical objects and social interactions (using the Tripod Stand)
- Projections, simulators, and larger screens (using the Tripod Stand)

Tobii Pro Fusion is primarily designed for use in indoor office environments with adult participants.

1.1 Symbols used in this document

Three different symbols are used in this document:



The Information symbol means something is important or needs special attention.



The Tip symbol denotes additional information that can make a process or function easier.



The Warning symbol means there is a possible risk of harm if the warning is ignored.

1.2 Tobii Pro Eye Tracker Manager

Tobii Pro Eye Tracker Manager is free software available on [Tobii Connect](#).

Tobii Pro Eye Tracker Manager helps you manage your Tobii Pro eye tracker. It lets you see which eye tracker firmware and software versions you are running and also facilitates updates (where applicable). It provides:

- Drivers and Firmware installation or updates
- Display setup
- Eye tracker frequency
- Eye tracking mode selection

- Positioning guide
- User calibration
- Gaze visualization¹
- Eye images²
- Get diagnostics³



References in product documentation to Tobii Pro Eye Tracker Manager refer to the latest version available on Tobii's website.

¹Gaze visualization in Tobii Pro Eye Tracker Manager lets you quickly evaluate the quality of the eye tracking data. The Gaze visualization overlaps data only on the Tobii Pro Eye Tracker Manager screen while Tobii Pro Eye Tracker Manager is open.

²Applicable when Tobii Pro Eye Tracker Manager is used with eye trackers that support eye images (Tobii Pro Spectrum and Tobii Pro Fusion).

³Get diagnostics button enables you to collect an encrypted blob file with full frame images and eye tracker logs to send to Customer Care for assistance with troubleshooting.

2 System Requirements

2.1 Tobii Pro Fusion system requirements

Operating system:	Windows, macOS and Linux For information on versions visit Tobii Connect
CPU:	1 GHz, 2 cores
RAM:	2 GB RAM memory NOTE: Software for eye tracking research may require higher RAM
Port:	USB Type-A or USB Type-C

2.2 Additional software options

Tobii Pro Lab	Tobii Pro Lab is a comprehensive research software platform for eye tracking designed to meet the highest demands on different research scenarios with exact timing accuracy. This software offers an efficient workflow, making it easy to design experiments, record data, analyze and visualize eye tracking data, and to sync this data with other biometric data streams.
Tobii Pro SDK	Tobii Pro SDK offers a broad set of tools that makes it simple to develop a variety of niche applications or scripts across multiple platforms, using a wide range of programming languages. This SDK gives the researcher access to the full set of relevant gaze data streams, such as 3D eye coordinates, raw data, pupil data, etc.
Third-party software	This term refers to any application built on Tobii Pro SDK.

3 Safety

3.1 Mounting warning



Tobii Pro eye trackers should be mounted according to the instructions of the approved mounts used.

The mounting bracket is designed for adhesion to a wide variety of surfaces, such as monitors or laptop screens. It is also designed for clean removability. Failure to follow the recommended removal instructions can result in damage to both the monitor/laptop and the mounting bracket. Do not mount the eye tracker on monitors positioned above the head or face of a user, as it might fall.

3.2 Emergency warning



Tobii eye trackers are designed to be used only for research purposes. Be aware that due to the low, but possible risk of failure or distraction, the eye tracker should not be relied upon or used in dangerous or critical situations.

3.3 Epilepsy warning



Some people with photosensitive epilepsy are susceptible to epileptic seizures or loss of consciousness when exposed to certain flashing lights or light patterns in everyday life. This may happen even if the person has no medical history of epilepsy or has never had any epileptic seizures.

A person with photosensitive epilepsy would also be likely to have problems with TV screens, some arcade games, and flickering fluorescent bulbs. Such people may have a seizure while watching certain images or patterns on a monitor, or even when exposed to the light sources of an eye tracker. It is estimated that about 3-5% of people with epilepsy have this type of photosensitive epilepsy. Many people with photosensitive epilepsy experience an “aura” or feel odd sensations before the seizure occurs. If you feel odd during use, move your eyes away from the eye tracker.

3.4 Infrared warning



When activated, the Tobii eye tracker emits pulsed infrared (IR) light. Certain medical devices are susceptible to disturbance by IR light and/or radiation. Do not use the eye tracker in the vicinity of these kinds of susceptible medical devices, as their accuracy or proper functionality could be inhibited. Do not stare into the LED lights at a close distance (<15cm).

3.5 Magnetic field warning



This Tobii Pro eye tracker contains magnets. Magnetic fields may interfere with the function of cardiac pacemakers and implantable cardioverter defibrillators. As a general rule, maintain a minimum distance of 6 inches (15 centimeters) between any item with magnets and your heart device.

3.6 Child safety



A Tobii Pro eye tracker Tobii Pro Fusion is an advanced computer system and electronic device. As such, it is composed of numerous separate, assembled parts. In the hands of a child, some of these parts have the possibility of being separated from the device, possibly resulting in a choking hazard or other danger to the child.

Young children should not have access to, nor use of the device or its accessories without parental or guardian supervision.

3.7 Electricity



Do not open the casing of the Tobii Pro eye tracker, this could expose you to potentially hazardous electrical voltage. The device contains no user-serviceable parts. Non-compliance will result in loss of warranty! Contact Tobii Customer Care if your eye tracker is not working properly.

3.8 Accessories



Only use accessories provided by or approved by Tobii AB.

3.9 Third party



Any use of a Tobii Pro eye tracker outside the intended use and together with any third-party software or hardware that changes the intended use is a risk, and Tobii AB can not take any responsibility in these situations.

3.10 Power supply



Only use the AC power adapter provided by Tobii AB to power your Tobii Pro eye tracker. If the AC power adapter is damaged, it should be replaced only by Tobii Service Personnel. If damaged, do not use the AC power adapter until it has been replaced. Tobii Pro and its agents are not liable for any damages or injuries to a person or property due to incorrect use of the provided accessories.

4 Compliance Information

4.1 EU Compliance

4.1.1 CE statement

 Tobii Pro Fusion is CE-marked, certifying compliance with the essential requirements for health, safety, and environmental protection requirements for the European Single Market. Tobii Pro Fusion complies with the following directives:

- 2014/35/EU (LVD) – Low Voltage Directive.
- 2014/30/EU (EMC) – Electromagnetic Compatibility Directive.
- 2011/65/EU (RoHS) and (EU)2015/863 – Restriction of Hazardous Substances Directive.

4.1.2 Other EU directives and regulations

Tobii AB and Tobii Pro Fusion comply with the essential requirements of the following EU directives and regulations:

- 2012/19/EU (WEEE) – Waste Electrical and Electronic Equipment Directive.
- 1907/2006 EC (REACH) – Registration, Evaluation, Authorization and Restriction of Chemicals.

Furthermore, Tobii AB complies with applicable parts of the Directive 94/62/EC on packaging and packaging waste.

Manufacturer Contact Information

Tobii AB
Karlsrovägen 2D
S-182 53 Danderyd, Sweden

4.2 UKCA Statement



Tobii Pro Fusion is UKCA-marked, certifying compliance with the essential requirements for health, safety, and environmental protection requirements for the GB market. Tobii Pro Fusion complies with the following statutory instruments:

- The Electrical Equipment (Safety) Regulations 2016. UK Statutory Instruments 2016 No. 1101.
- The Electromagnetic Compatibility Regulations 2016. UK Statutory Instruments 2016 No. 1091.
- The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012. UK Statutory Instruments 2012 No. 3032.

4.2.1 Other UK Legislation

Tobii AB and Tobii Pro Fusion comply with the essential requirements of the UK regulations regarding WEEE, REACH, packaging and packaging waste.

UK Importer Contact Information

Tobii UK Limited

1st Floor, Advantage House, 87 Castle Street

RG1 7SN Reading, United Kingdom

4.3 FCC interference statement

Tobii Pro Fusion 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. Tobii Pro Fusion 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 Tobii Pro Fusion does cause harmful interference to radio or television reception, which can be determined by turning Tobii Pro Fusion 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 Tobii Pro Fusion and receiver.
- Connect Tobii Pro Fusion 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.

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Modifications not expressly approved by Tobii AB could void the user's authority to operate Tobii Pro Fusion under FCC rules.

U.S. Responsible Party Contact Information

Tobii Technology, Inc.

12007 Sunrise Valley Dr # 400

Reston, VA 20191, USA

4.4 ISED statement

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

4.5 Australia and New Zealand compliance



Tobii Pro Fusion is registered in the Australian National Equipment Registration System.

Tobii Pro Fusion is RCM-marked which signifies compliance with the Australian and New Zealand product safety requirement for electrical and electronic equipment according to EESS and radio communication and electromagnetic compatibility according to ACMA.

4.6 Japan compliance

Tobii Pro Fusion is VCCI-marked which signifies Tobii Pro Fusion is compliant with emission (interference) standards in Japan.



この装置は、クラスB機器です。この装置は、住宅環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。

VCCI - B

4.7 Korea compliance



Tobii Pro Fusion is KC-marked which signifies compliance with Korea's product safety requirements for electrical and electronic equipment.

Certificate number:

R-R-TBI-ProF

4.8 Safety compliance

Tobii Pro Fusion complies with the following standards:

- EN IEC 62471:2008, Photobiological safety of lamps and lamp systems.
- EN 62368-1:2014 +A11, Audio/video, information and communication technology equipment - Part 1: Safety requirements.
- IEC 62368-1:2018, Audio/video, information and communication technology equipment - Part 1: Safety requirements.

Including national deviations for European Group, Australia, New Zealand, China, Japan, USA, and Canada.

4.9 EMC compliance

Tobii Pro Fusion complies with the following standards:

- EN 55032:2015/A11, Electromagnetic compatibility of multimedia equipment - Emission requirements.
- EN 55035:2017/A11, Electromagnetic compatibility of multimedia equipment - Immunity requirements.
- FCC 47 CFR Part 15, Subpart B, Class B.
- ICES-003 Issue 7 Class B, Information Technology Equipment (including Digital Apparatus).
- CISPR32:2015, Electromagnetic compatibility of multimedia equipment - Emission requirements (International standard accepted in AS/NZS and Japan).
- KN32, Electromagnetic interference prevention test for multimedia equipment.
- KN35, Electromagnetic wave immunity test for multimedia devices.
- EN 61000-3-2:2014, Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase).
- EN 61000-3-3:2013, Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.

4.10 RoHS compliance

RoHS compliance for Tobii Pro Fusion is achieved by following the standard:

- EN IEC 63000: 2018, Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

4.11 Waste disposal and recycling

Tobii AB is committed to reducing the environmental impact of our products throughout their life-cycle, from manufacturing to use and disposal. We are a member of various compliance schemes for collection, recycling and re-using of electronic waste, batteries, and packaging of our products.



Tobii Pro Fusion is marked with the crossed-out wheeled bin symbol, which indicates that it must not be disposed of with household waste. You can return your used Tobii Pro Fusion to one of the municipality's recycling centers free of charge.

For more information about the WEEE directive and recycling at Tobii AB, please visit: [How we run our business](#)

or



5 Overview of Tobii Pro Fusion

Tobii Pro Fusion is the next generation of compact high-performance eye trackers from Tobii. It provides a flexible solution that supports different research scenarios and study designs.

Tobii Pro Fusion has a slim design that integrates well with external monitors up to 24 inches and laptop screens. The eye tracker can also be mounted on a tripod and coupled with a scene camera so it can be used in study setups that use real-world stimuli such as physical objects or scenes. The sampling speed of up to 250 Hz allows you to capture data for a wide range of experimental paradigms (fixation, smooth pursuit, and saccade-based).

With high, selectable, sampling rates (up to 250 Hz), two eye tracking cameras and two pupil tracking modes (bright and dark pupil), Tobii Pro Fusion enables you to adapt your data collection setup to different research populations, scenarios, and data requirements.

Use Tobii Pro Fusion for studies on:

- Laptop and desktop computers
- PC monitors, 24" (16:9) or less
- Real-world setups such as physical objects and social interactions (using the Tripod Stand)
- Larger screens, projections, simulators (using the [Tripod Stand](#), available separately)

5.1 Tobii Pro Fusion versions

Tobii Pro Fusion is available in three different product versions: 60 Hz, 120 Hz, and 250 Hz.

The 60 Hz and 120 Hz versions can be upgraded to a faster version by contacting your sales representative. [Contact Tobii](#).



All versions of the Tobii Pro Fusion eye tracker can also run in 30 Hz mode.

5.2 Key features

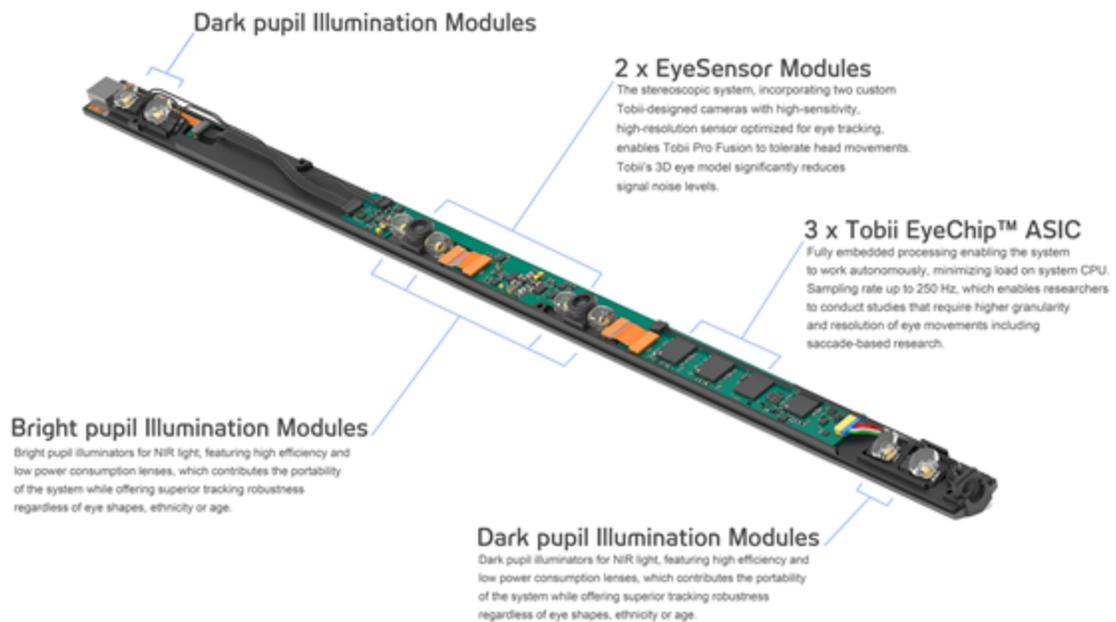


Figure 1. Tobii Pro Fusion's key features

5.3 How Tobii Pro Fusion works

During tracking, eye trackers from Tobii use infrared illuminators to generate reflection patterns on the corneas of the participant's eyes. These reflection patterns, together with other visual data about the participant, are collected by image sensors. Sophisticated image processing algorithms identify relevant features, including the eyes and the corneal reflection patterns. Tobii Pro Fusion is a dual camera system that automatically chooses when to use dark or bright pupil tracking. Complex mathematics is used to calculate the 3D position of each eyeball along with the gaze point (where the participant is looking).

5.4 What's in the Tobii Pro Fusion box



Figure 2. What's in the Tobii Pro Fusion box

#	Item	Additional information
1	Travel case	Stores, protects, and carries Pro Fusion and the included accessories
2	Tobii Pro Fusion eye tracker	Used for eye tracking
3	AC power adapter	Provides the additional power required when the USB Type-A to Type-C adapter is used
4	Safety and Compliance	Printed versions of important information
5	USB Type-A to Type-C adapter plug	Used when the computer does not have a USB Type-C port

6	6 International plug adapters	Used with the AC power adapter to match international outlets
7	Cleaning cloth	For cleaning the surface of the eye tracker
8	Four mounting plates with non-permanent adhesive	Attaches the Tobii Pro Fusion eye tracker to the screen bezel
9	Four cleaning wipes	Removes any dust and grease in the area around the screen before attaching a mounting plate

5.5 USB and power adapter

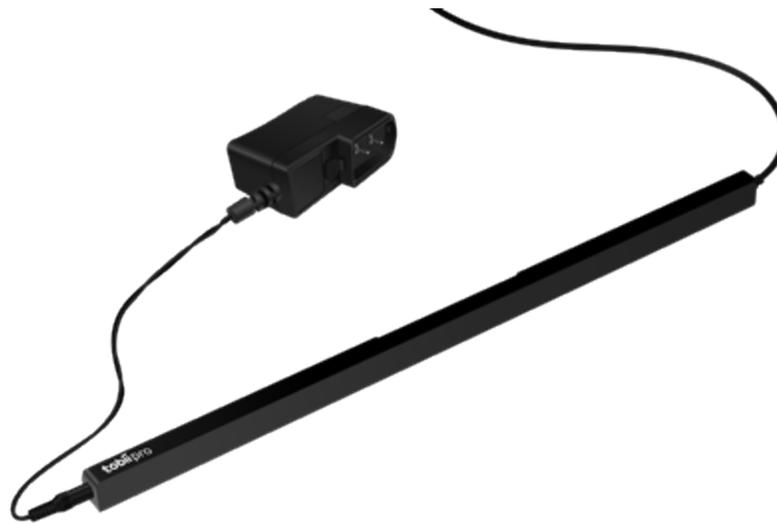


Figure 3. The fixed USB cable is on the right side of Tobii Pro Fusion and the power supply port is on the left side.

The right side of the Tobii Pro Fusion eye tracker has a fixed USB cable that plugs into the computer's Type-C port or into a Type-A port using the included USB Type-A to Type-C adapter. For more information, read [How to use the USB Type-A to Type-C adapter](#).

- i When using the Type-A to Type-C adapter, you should also use the AC power adapter since Type-A ports can deliver less power. Your computer's power settings can also influence the amount of power delivered to peripherals.

5.6 How to use the USB Type-A to Type-C adapter

Tobii Pro Fusion is connected to a computer via a standard USB Type-C interface.

The USB Type-C interface enables a better user experience over the older Type-A interface due to its higher data transfer rate, symmetrical connector which eliminates the “right side up” problem, and increased power. **If your computer doesnot have a USB Type-C connection, you need to use the included USB Type-A to Type-C adapter *and* the power adapter with your**

Tobii Pro Fusion.



Figure 4. USB Type-A to Type-C adapter

What to do:

1. Plug the USB Type-A to Type-C adapter into the USB end of the cable.
2. Plug the cable with the adapter into the computer.
3. Attach the correct adapter plug for your country to the AC power adapter. For more information, read [Attach the adapter plug](#).
4. Plug the AC power adapter into the left-hand side jack on the eye tracker.
5. Plug the AC power adapter and adapter plug into a power outlet.

5.7 Attach the adapter plug



Figure 5. International plug adapters

How to use the international adapter plugs:

1. Select the correct plug adapter for your region.
2. Line up the rounded top of the plug adapter with the top of the AC power adapter.
3. Click the adapter plug into the AC power adapter at an angle, starting with the upper part first and then the lower part.



Figure 6. The adapter plug snaps firmly in with a click sound

5.8 Remove the adapter plug from the AC power adapter

When storing the AC power adapter in the eye tracker case, you will need to remove the adapter plug so that it fits in the case. You may also need to exchange one plug adapter for another if you travel with your eye tracker to another country.

How to remove an adapter plug:

1. Use your thumb to draw the latch underneath the AC power adapter down to release the clip.
2. Remove the adapter plug starting by withdrawing the lower part first and then the upper part.

5.9 Tobii accessories

Find out more about Tobii products and accessories on [tobii.com/products](https://www.tobii.com/products).

6 Set up your Tobii Pro eye tracker

At the end of this setup, you will have a verified installation that is ready for use.

6.1 Download and install Tobii Pro Eye Tracker Manager

The first step is to get the free software, Pro Eye Tracker Manager on your computer. Setting up your eye tracker involves installing the necessary drivers and software on your computer. Pro Eye Tracker Manager makes this easy. For more information, read [Tobii Pro Eye Tracker Manager](#).

 Your eye tracker does *not* need to be connected to the computer to install Pro Eye Tracker Manager.

1. Before starting, double-check the hardware and system requirements, [System Requirements](#). You should also check the requirements for your analysis software, for example, Tobii Pro Lab.
2. Download Pro Eye Tracker Manager from the [Tobii product page](#).
3. Open Pro Eye Tracker Manager and follow the prompts to finish installation.

6.2 Install Tobii Pro Fusion using Tobii Pro Eye Tracker Manager

Now it's time to make sure your computer can communicate with your eye tracker. This is necessary for downloading the proper driver updates.

1. Open Tobii Pro Eye Tracker Manager if it is not already open.
2. Connect Tobii Pro Fusion's USB cable to a Type-C port in your computer. If your computer does not have a USB Type-C port, read [How to use the USB Type-A to Type-C adapter](#). Do not mount the eye tracker just yet, just plug in the USB so you can make sure everything's working.

 If the included USB Type-A to Type-C adapter is used then the AC power adapter must also be used.

3. If your Tobii Pro Fusion is connected to the USB port but doesn't appear in the list of connected eye trackers, click the plus (+) symbol in the upper right corner to install (or reinstall in some cases) the required drivers. Sometimes removing the USB and plugging it in again is necessary.
4. Select **Tobii Pro Fusion** and select the **Install** button.
5. Follow the prompts in Tobii Pro Eye Tracker Manager to finish the installation.

6.3 Mount the eye tracker on a laptop or monitor

To ensure quality in eye tracking data, the Tobii Pro Fusion hardware package includes several mounting brackets that can be affixed to a laptop or monitor. You can easily snap the eye tracker on and off the laptop using the magnetic mounting bracket. The mounting bracket sticks to the

frame with a special adhesive that doesn't damage the underlying surface when the bracket is removed. For more information, read [Detach the eye tracker](#).

 If the screen bezel is thinner than the height of the eye tracker, affix the mounting bracket as low as possible on the screen frame, or directly on the screen. Don't use this setup if you intend to put stimuli in the lower part of the screen, as they might become covered by the eye tracker.

 Some laptops are very thin and there is little space between the screen and the keyboard when the laptop is closed. We recommend that you check whether the laptop can close with the mounting bracket present *before* you attach it.

What to do:

1. Make sure the eye tracker is attached to the monitor and connected to your computer. Open Pro Eye Tracker Manager. You should be able to see and expand your eye tracker's "card" in Pro Eye Tracker Manager. The serial number of your eye tracker should match the number displayed.
2. You can leave your eye tracker USB cable connected with the eye tracker to the side (for example on the table) *or* you can disconnect it while you attach the mounting bracket.
3. If you plan to attach the eye tracker to a laptop, make sure the laptop can close with the magnetic mounting bracket attached. Some laptops have very little space when closed.

 You can test whether you can close the laptop with the mounting bracket by placing the mounting bracket (with the backing paper still attached) on the keyboard side of the laptop and carefully closing the laptop lid. Watch for any potential interference between the screen, bracket, and keyboard.

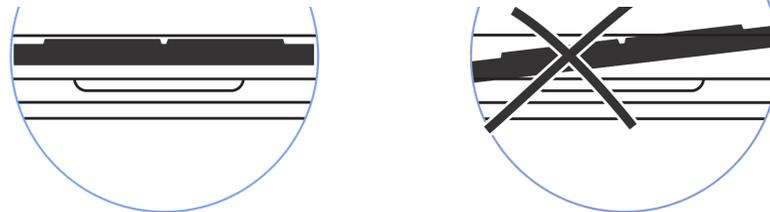
4. Find the center of the screen and clean the bezel with one of the included cleaning wipes.
5. Peel the adhesive tape off the mounting bracket and mount it on the bezel so that your Tobii Pro Fusion is as close to the bottom of the screen as possible without covering the screen. Press the bracket against the bezel for 30 seconds and wait one hour before attaching the eye tracker.

Figure 7. Align the mounting bracket properly. The magnet holds the eye tracker firmly in place when the slots are lined up correctly.

6. Attach the eye tracker, making sure that it aligns properly with the mounting bracket. The magnet holds the eye tracker firmly in place when the slots are lined up correctly.



Figure 8. Place the mounting bracket on the bezel so that Tobii Pro Fusion is as close to the bottom of the screen as possible without covering the screen.



7. If it is not yet connected, plug in the eye tracker's USB cable to the correct USB port in your computer.



The included USB Type-A to Type-C adapter and the eye tracker AC power adapter must be used if the computer does not have a USB Type-C port. For more information, read [How to use the USB Type-A to Type-C adapter](#).

8. Continue to the next step.

6.4 Display setup in Tobii Pro Eye Tracker Manager

Now the algorithms on the eye tracker need to understand where the eye tracker is in relation to the screen and map the gaze points accordingly.

1. Open Tobii Pro Eye Tracker Manager if it is not already running and select your eye tracker.
2. On the Overview tab, locate **Display Setup** and select the ellipsis icon to the right. On the dropdown menu, select **New**.
3. Select **Regular setup** and select **Next**.
4. If multiple screens are used, select the screen that has the Tobii Pro Fusion attached to its bezel.
5. Enter the position of the eye tracker in relation to the screen. Use the radio buttons to select whether the eye tracker is positioned under or over the screen and enter the measurement in millimeters.
6. Align the dotted blue lines on the screen with the two outer white marks on the top of your Tobii Pro Fusion.
7. Save your display by naming the setup and selecting **Save**.
8. To confirm that Tobii Pro Fusion can detect your eyes, enable the Position Guide at the bottom left of Tobii Pro Eye Tracker Manager. Once activated, you should be able to see two “eyes” in a face contour.
9. Move to the next step. In the next section, you will test your setup by performing a calibration. For more information, read [Calibration](#).

 You can always return to Tobii Pro Eye Tracker Manager and use it when you change computers or screens or want to recalibrate.

6.5 Calibration

When you are done configuring your eye tracker, you should run a calibration to test to see if the eye tracker is mapping the gaze points correctly to your display.

How to test your eye tracking setup in Tobii Pro Eye Tracker Manager:

1. Make sure the eye tracker is attached to the screen bezel and connected to your computer. Open Tobii Pro Eye Tracker Manager.
2. By now you should have also tested your setup as described in [Display setup in Tobii Pro Eye Tracker Manager](#).
3. Select **Calibrate** in Tobii Pro Eye Tracker Manager and follow the on-screen instructions.
4. Evaluate your calibration results. Large systematic errors i.e., a large distance between the average gaze point and the target gaze point may be indicative of a configuration error. No calibration feedback data on the targets located on the top of the screen may indicate that there is a mismatch between the screen size and eye tracker configuration. Select **Recalibrate** to improve an unsuccessful calibration (e.g., recalibrate points with missing data). Select **Use Calibration** when you are satisfied with the calibration.

 You can toggle on and off Gaze Visualization in the upper left corner of the Calibration Results window (or on the Overview tab). This can be used to confirm the participant’s calibration results.

6.5.1 What calibration does

The human eye shows a natural individual variation in its shape and geometry. For example, the exact location of the fovea, the area responsible for the part of the visual field that we perceive in focus and full color, varies from individual to individual. Tobii eye trackers use an individual calibration procedure to optimize their gaze estimation algorithms (i.e., the 3D eye model) and account for this variation. The end result of this optimization is a fully customized and more accurate gaze point calculation. Additionally, some Tobii eye trackers use the calibration procedure to select the detection mode (e.g. dark or bright pupil tracking) that provides the most accurate data. You can do basic calibration in Tobii Pro Eye Tracker Manager. There is more functionality, including calibration validation, in Tobii Pro Lab.

For more information, read the articles on [eye tracker calibration](#) and on [how to calibrate and validate in Tobii Pro Lab](#).

6.6 Detach the eye tracker

To temporarily remove the eye tracker, gently pull it away from the magnetic mounting bracket and leave the bracket in place.

To permanently remove the mounting bracket, you must remove the non permanent but strong adhesive that fastens your eye tracker mounting bracket to the screen bezel. Since it is fairly strong, you may not be able to take it away with only your fingers. If you want to remove it, we recommend using something very thin such as dental floss or a thin thread, a plastic guitar pick, or a credit card. Use this to slide between the mounting plate and the computer bezel (or whatever it is attached to). As you slide it behind the mounting plate, gently bend the mounting plate towards you so that it detaches.



The mounting bracket adhesive should be removed carefully. If placed over a manufacturer logo on the bezel, removing the mounting bracket could damage the logo.

You can purchase additional mounting brackets. For more information, contact your Account manager by logging in to [Tobii connect](#) and selecting the Account tab.

6.7 Change Tobii Pro Fusion's frequency

You can change Tobii Pro Fusion's frequency using Tobii Pro Eye Tracker Manager or your analysis software, for example, Tobii Pro Lab.

In Pro Eye Tracker Manager, use the **Frequency** dropdown selector on the **Overview** tab to select an available frequency.

Read more about [Tobii Pro Fusion versions](#).



All versions of the Tobii Pro Fusion eye tracker can also run in 30 Hz mode.

7 Display Setups

7.1 Standard setup

The standard setup for using Tobii Pro Fusion is with a screen of maximum size 24". The eye tracker is attached below the screen whether it is a laptop screen or separate monitor. For more information, read [Display setup in Tobii Pro Eye Tracker Manager](#).

7.2 User coordinate system

User Coordinate System (UCS): a coordinate system used to communicate 3D positions for gaze calculations. The origin of the UCS is located at the top (center) of the eye tracker. This is also the external reference point for physical measurements in advanced setups.

 For more information, read [Coordinate Systems](#).

7.3 Advanced setup

Advanced setups include using the Tripod Stand or other setups in which the eye tracker is not attached to the screen bezel.

7.3.1 Setup with Tobii Pro Tripod Stand

Tobii Pro Fusion eye tracker mounts directly on the Tripod Stand. The Tripod Stand is ideal in test situations in which the subject is sitting at a table in front of a monitor or projected screen larger than 24". Using the Tripod Stand with Tobii Pro Fusion is also useful in scene camera setups when studying physical objects and social interactions between people. For more information about the Tobii Pro Tripod Stand, visit the [Tobii product page](#).



Figure 9. Tobii Pro Fusion with the Tripod Stand and external, large-size monitor.

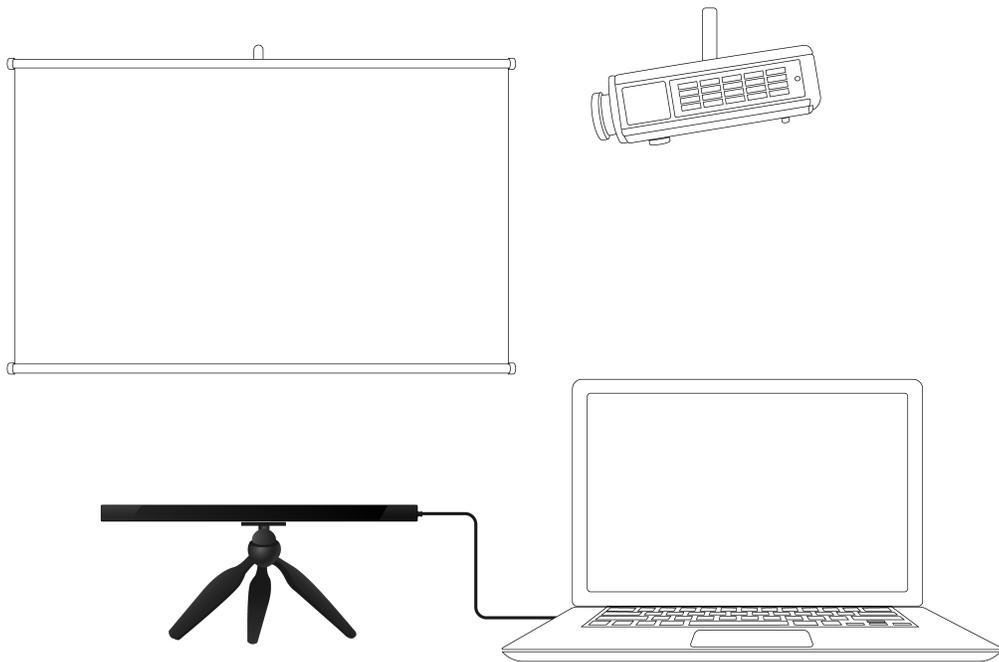


Figure 10. Tobii Pro Fusion with the Tripod Stand and projected screen .

How to set up Tobii Pro Fusion with a large monitor or projector screen:

1. Select a suitable location and set up the monitor/screen.
2. Set up the monitor/screen and connect it to the laptop.
3. Mount the eye tracker on a separate tripod and connect it to the laptop. If the USB Type-A to Type-C adapter is needed, use it along with the AC power adapter.
4. Place the participant 50-80 cm from the eye tracker and use the **Position Guide** in Tobii Pro Eye Tracker Manager's Overview to ensure that the eye tracker can detect the participant's eyes.
5. Select *New* in the dropdown **Display Setup** menu.
6. Select **Advanced setup** and select the **Next** button.
7. Enter the width and height of your screen in millimeters. The width must be at least 10 mm. Select the **Next** button.
8. Enter the angle of your screen in degrees. Select the **Next** button.
9. Enter the height difference in millimeters between the top of the eye tracker and the bottom of your screen. Select the **Next** button.
10. Enter the position of the eye tracker in relation to the screen. Use the radio buttons to select whether the eye tracker is positioned under or over the screen and enter a measurement in millimeters.
11. Enter the angle of your eye tracker in degrees. Select the **Next** button.
12. Save your display by naming the setup and selecting the **Save** button.

8 Start Experimenting

8.1 Start eye tracking

To see where the participant's focus is, open Pro Eye Tracker Manager and activate **Gaze Visualization** by toggling the switch on the Overview tab. A hazy blob appears on the screen, indicating where attention is focused. Use this functionality to verify that your eye tracker is running, that the display is correctly set up, and that your eye tracker is calibrated.

8.2 Tobii Pro Lab

Tobii Pro Lab provides a comprehensive platform for the recording and analysis of eye gaze data, which helps in the interpretation of human behavior, consumer responses, and psychology. Combining simple preparation for testing procedures and advanced tools for Visualization and analysis, eye-tracking data is easily processed for useful comparison, interpretation, and presentation. A broad range of studies are supported, from usability testing and market research, to psychology and oculomotor physiological experiments. Pro Lab's intuitive workflow, along with its advanced analysis tools, enables large and small studies in a timely and cost-efficient way without the need for extensive training.

In addition to offering powerful analysis tools, Pro Lab is also designed to work with other software commonly used for recording and analyzing data. This is done by synchronizing with recording software using TTL, as well as by enabling data exports in standardized formats, for example for Microsoft Excel, Matlab, and SPSS.

Find out more information about [Tobii Pro Lab](#).

8.3 Keep your eye tracker software updated

From time to time, Tobii releases updates for an eye tracker's applicable driver and firmware in order to improve performance and/or introduce new functionalities. Please check the Tobii website regularly for news and information about updates about your eye tracker. We recommend that you leave updates and notifications in Tobii Pro Eye Tracker Manager activated. (They are activated by default and the sliders are colored blue.)

How to activate notifications and updates in Tobii Pro Eye Tracker Manager:

1. Expand the dropdown list at the top of Tobii Pro Eye Tracker Manager.
2. Toggle the switches for notifications. Blue means they are activated.
3. If a software update is available, the available update has a clickable link.
4. Select an interface language. The default is English.

8.4 Keep your display setup updated

Use Tobii Pro Eye Tracker Manager whenever you change computers or display setups.



All references to Tobii Pro Eye Tracker Manager assume that you are using the latest version of this free software.

9 Product care

9.1 Operational environment

The recommended range for temperature and humidity during operations is:

- **Temperature:** 10°C to 35°C (50°F to 95°F)
- **Humidity:** Max 20% to 95% (no condensation on the device)

9.2 Transportation and storage

Use the provided case when traveling with the eye tracker. For shipping and storage, use the original packing.

For transportation and storage, the recommended range for temperature and humidity for the device is as follows:

- **Temperature:** -40°C to 70°C (-40°F to 158°F)
- **Humidity:** 20% to 95% (no condensation on the device)



Tobii Pro eye trackers are not waterproof or water resistant. The eye tracker should not be kept in excessively humid, damp or wet conditions. Do not submerge the eye tracker in water or in any other liquid. Be careful not to spill liquids on the device.

9.3 Cleaning

- Before cleaning your Tobii Pro eye tracker, unplug its USB cable and electrical cable if there is one.
- Use the included cleaning cloth and clean the eye tracker's front gently.
- Avoid getting moisture in openings on the device.
- Do not use window cleaners, household cleaners, aerosol sprays, solvents, alcohol, ammonia, or abrasives.



Scratches on the front surface of the eye tracker may impair its performance.

9.4 Disposal of the eye tracker

Do not dispose of your Tobii Pro eye tracker in general household or office garbage receptacles. Follow your local regulations for the proper disposal of electrical and electronic equipment.

9.5 Limitation of liability

Except where prohibited by law, Tobii AB is not liable for any loss or damage arising from the use or misuse of a Tobii eye tracker or the mounting plate, whether direct, indirect, special,

incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence, or strict liability.

10 Technical specifications

For definitions of terms used in the tables below, see the [eye tracker glossary](#) on Tobii Connect.

10.1 Eye tracking specifications

The characteristics of the gaze data from an eye tracker are described in terms of accuracy and precision. For more details, take the *Accuracy and precision* course in [Tobii Academy](#). See notes below.

-  For more information about output data and the supplementary data stream, please read the [Tobii Pro SDK documentation](#).

Eye tracking technique	Video-based pupil and corneal reflection eye tracking with dark and bright pupil illumination modes. Dark pupil tracking is supported in all sample frequencies. Bright pupil tracking is supported at 60 and 120 Hz. Two cameras capture stereo images of both eyes for robust, accurate measurement of eye gaze and eye position in 3D space, as well as pupil diameter.
Eye tracking mode	N/A (default)
Sampling frequency	30 Hz, 60 Hz, 120 Hz, or 250 Hz (max. frequency depends on hardware version)
Precision ¹	0.04° RMS in optimal conditions (applying Savitzky-Golay filtering, settings listed in the test report) 0.2° RMS in optimal conditions (raw signal)
Accuracy ¹	0.3° in optimal conditions
Binocular eye tracking	Yes
Eye tracker latency	Mean latency < 13 ms @ 250 Hz (SD < 1.2 ms) ²
Blink recovery time	1 frame (immediate)
Gaze recovery time	250 ms
Data sample output	Timestamp, Gaze origin, Gaze point, Pupil diameter
Eye openness data stream	Eye openness stream is available in an eye tracker set to 120 Hz, 60 Hz, or 30 Hz sampling frequencies. Note that the eye openness signal is not available in 250 Hz due to the processing power limitation. Eye openness stream has the same frequency as frequency selected for the gaze stream and will have the same timestamps. Eye openness data is provided in millimeters, for each eye individually.
Eye image data stream	Eye image data stream frequency is approximately 4 Hz (one image per eye). Zoomed-in eye images available in tracking mode. Full-frame camera images are available in gaze recovery mode.
TTL input stream	Not available

Tracker and client time synchronization	Integrated between the eye tracker time domain and the client computer time domain
User calibration	Binocular, Monocular

¹ Tobii uses an extensive test method to measure and report performance and quality of data. Please download the [test report](#) for more detailed information.

² Visit [Tobii Connect](#) for more information on how to optimize your Tobii Pro Fusion setup.

10.2 Setup

For definitions, see the [Tobii eye tracker glossary](#) on Tobii Connect.

Head movement tolerance	Excellent; Dual-camera system, with more images than a one camera system, gives a more accurate data calculation and the best level of precision and robustness for head movement.
Operating distance (mounted on screen)	50 cm to 80 cm (20" to 31") from the eye tracker
Freedom of head movement (width × height)	<i>Freedom of head movement at 65 cm distance</i> 40 cm × 25 cm (15.7" × 9.84")
	<i>Freedom of head movement at 80 cm distance</i> 45 cm × 30 cm (17.7" × 11.8")
Optimal screen size	Up to 24" (16:9 aspect ratio)
Recommended monitor	N/A
Tracker setup options	Eye tracker mounted on a tripod, allows for even larger screens or physical objects to be tracked.
Participant setup	Very simple and easy. Typically, less than 1 minute.

10.3 Software and framework compatibility

Software and framework compatibility	Tobii Pro Lab Tobii Pro Eye Tracker Manager Tobii Pro SDK Any application built on the Tobii Pro SDK
Operating system	Windows, macOS, Linux

10.4 Hardware versions

60 Hz

120 Hz

250 Hz

10.5 Tobii Pro Fusion eye tracker specifications

Dimensions (L × H × W)	37.4 cm × 1.8 cm × 1.37 cm (14.72" × 0.70" × 0.53")
Weight	168 g (5.9 oz.)
Connectors	USB Type-C (110 cm or 43.3") (USB Type-A to Type-C adapter provided) AC power
Data processing	3 Tobii EyeChip™ ASIC with fully embedded data processing
Eye tracking cameras	2 x Tobii EyeSensor™ modules
Illuminators	Dark pupil illumination modules Bright pupil illumination modules
Power consumption	Typical power consumption: 4.3 W Max. rated power consumption: 9 W
Power options	Directly via USB Type-C connector, or with provided AC power adapter, when using a computer with USB 2.0 Type-A port

Appendix A Customer Care, training, and warranty

A1 Customer Care

For technical issues, please contact Tobii Customer Care via [Tobii Connect](#). To receive assistance as quickly as possible, make sure you have access to your eye tracker and, if possible, to an internet connection. You should also be able to supply the serial number of the eye tracker, which you can find on the back or bottom of the device.

A1.1 Get help

Many questions can be answered by visiting Tobii Connect. It contains the latest information about contacting Customer Care, helpful articles and FAQs, links to downloads, and much more. Log in or register to see information about your account and to reach Customer Care on [Tobii Connect](#).

A2 Training and education services

If you are new to eye tracking, or want to extend your knowledge about eye tracking research, sign up for one of our online sessions, onsite trainings, Tobii Academy, and more on [Training and education services](#).

A3 Warranty information

Read more online about [Tobii limited warranty and Tobii Care](#) (PDF download).

Appendix B Limitations and considerations

B1 Intended use

- ① Tobii Pro eye trackers are intended to be used in research activities about human behavior including eye movements, in a dry and dust free indoor environment. The product should only be used as described in this User Manual. Please read the User Manual and other supplied documentation thoroughly before using the product.

B2 Light conditions

- ① We recommend that eye tracking studies be performed in a controlled environment. Sunlight should be avoided since it contains high levels of infrared light which will interfere with the eye tracker system. Sunlight affects eye tracking performance severely and longer exposure can overheat the eye tracker. This eye tracker is not designed for exposure to (direct) sunlight. Eye tracking generally does not work in strong direct sunlight.

Shielding the eye tracker adequately from the sun may prevent sunlight from interfering with eye tracking.

B3 Eyelashes

- ① Long eyelashes can be obstructive when the participant's eyes are less open, especially if the participant is wearing mascara. In rare cases, eyelashes may completely block the view of the participant's pupils, making eye tracking impossible.

B4 Droopy eyelids

- ① Droopy eyelids or otherwise obstructive eyelids can block the view of the participant's pupils. In rare cases, such eyelids may completely block the view of the participant's pupils, making eye tracking impossible.

Appendix C Glossary

For definitions of eye tracking terms used in this manual, see the [Tobii eye tracker glossary](#) on Tobii Connect.



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Support for your Tobii product

Get help

Visit [Tobii Connect](#) for help with your Tobii device. It contains the latest information about contacting Customer Care, documentation, courses, articles, and more.

Contact your solution consultant or reseller

For questions or issues with your product, contact your Tobii sales representative or authorized reseller for assistance. They are most familiar with your personal setup and can help you with tips and product training.