Tobii Pro Glasses 3
User’s Manual

Tobii Pro Glasses 3 Head Unit
Glasses 3 Recording Unit
Corrective Lenses
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1 Introduction

Tobii Pro Glasses 3 is designed to enable easy, precise, and efficient collection of eye tracking data in a wide variety of research scenarios. The discreet, ultra-lightweight design ensures natural behavior and research validity in both qualitative and quantitative situations. Accurate data and robust eye tracking capabilities can be relied on in uncontrolled situations and real-world environments.

This document describes how to use the Pro Glasses 3 product and Tobii Pro Glasses 3 controller application.

1.1 Intended use

Tobii Pro Glasses 3 is a wearable eye tracker for academic, commercial, and industrial use for the capture of truly objective and deep insights into human behavior in a real-world environment. Pro Glasses 3 is designed to capture what the wearer is viewing while providing robust and accurate eye-tracking data. The complete Pro Glasses 3 product package consists of a head unit, a recording unit, and the Tobii Pro Glasses 3 controller application installed on an external device.

The product should only be used as described in the Pro Glasses 3 User Manual. Please read the Pro Glasses 3 User Manual and other supplied documentation thoroughly before using the product.

This product is continuously being developed and refined. Please visit www.tobiipro.com for the most recent specifications for the application and for the latest version of this document.

1.2 Documentation

Further documentation is available for viewing and download at www.tobiipro.com

- Pro Glasses 3 Developer’s Guide
- Pro Glasses 3 Product Description
- Pro Glasses 3 Quick Start Guide
- Pro Glasses 3 Corrective Lenses Quick Start Guide
- Safety and Compliance

1.3 Symbols used in this document

In this manual we use symbols for three levels of information:

- The Note symbol is used for notifying the user of something important or of something that needs special attention.

- The Caution symbol is used to inform of something that could cause harm to, or malfunction of, the equipment.

- The Warning symbol is used to inform of something in which there is a conceivable risk of harm to the user if the Warning is ignored.
2 System Requirements

2.1 Tobii Pro Glasses 3 controller application requirements

<table>
<thead>
<tr>
<th>Operating system</th>
<th>Windows® 10</th>
<th>Android™ 10, 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>Intel® Core™ i5</td>
<td>n/a</td>
</tr>
<tr>
<td>Memory</td>
<td>8 GB RAM</td>
<td>6 GB RAM</td>
</tr>
</tbody>
</table>

There are many variants of Android devices, with a wide range of different hardware configurations. While most devices meeting the minimum requirements should work with the Glasses 3 controller application, we cannot guarantee it. Below you will find a table listing the Android devices we have tested and verified will work.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samsung</td>
<td>Galaxy Tab S5e</td>
</tr>
<tr>
<td>Samsung</td>
<td>Galaxy S10</td>
</tr>
<tr>
<td>Google</td>
<td>Pixel 4 XL</td>
</tr>
</tbody>
</table>

2.2 Additional Tobii Pro software

Tobii Pro Lab

tobiipro.com/product-listing/tobii-pro-lab/

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.
3 Safety

3.1 General precautions

The Pro Glasses 3 system is described in the Pro Glasses 3 User’s Manual and must be used according to the manufacturer’s instructions. Connecting any other component to the system, or using the components improperly can cause injury to the user or damage to the equipment and is done so entirely at the user’s own risk.

The Pro Glasses 3 system must be fitted on the test participant according to instructions in the Pro Glasses 3 User’s Manual. Tobii Pro or its agents are not liable for damage or injuries to a person or their property due to a Pro Glasses 3 eye tracker system in any configuration being dropped. Fitting the Pro Glasses 3 onto a test participant is done entirely at the user’s own risk.

The Pro Glasses 3 system is to be used for research purposes only. Be aware that due to the low, but possible risk of failure or distraction, the Pro Glasses 3 should not be relied upon or used in dangerous or otherwise critical situations.

Tobii Pro Glasses 3 head unit is equipped with a head strap to enable tighter mounting of the eye tracker onto the wearer’s head. Neither Tobii Pro nor its agents are liable for damages or injuries to a person or their property caused by the Pro Glasses 3 head unit head strap.

3.2 Usage warning

The Pro Glasses 3 system is composed of several components as described in the User’s Manual and should be used according to manufacturer instructions. Connecting, or by other means using any other component than advised in the User’s Manual may damage or injure a person, their property or recorded data, and is done entirely at the user’s own risk.

Pro Glasses 3 eye tracker should be fitted on the test participant according to manufacturer instructions. Tobii Pro or its agents are not liable for damage or injuries to a person or their property due to a Pro Glasses 3 eye tracker being dropped in any configuration. Fitting the Pro Glasses 3 onto a test participant is done entirely at the user’s own risk.

Pro Glasses 3 head unit is equipped with a head strap to enable tighter mounting of the eye tracker onto the wearer’s head. Neither Tobii Pro nor its agents are liable for damages or injuries to a person or their property caused by the Pro Glasses 3 head unit head strap.

3.3 Emergency

The Pro Glasses 3 system is to be used for research purposes only. Be aware that due to the low, but possible risk of failure or distraction, the Pro Glasses 3 should not be relied upon or used in dangerous or otherwise critical situations.

3.4 Child warning

The Pro Glasses 3 is an advanced computer system and electronic device that is composed of numerous separate, assembled parts. These parts have the possibility of becoming separated from the device, constituting a potential choking hazard or other danger to a child. Young children should not have access to, or use, the device without parental or guardian supervision.
3.5 Infrared warning

Do not use the Pro Glasses 3 system when in the vicinity of devices that are susceptible to Infrared (IR) light. When activated, the Pro Glasses 3 head unit emits IR light, which can affect certain medical devices and other devices that are susceptible to disturbance by IR light and/or radiation.

3.6 Photosensitivity/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 the participant starts to feel odd during use, have them remove the Pro Glasses 3 head unit immediately.

3.7 Mechanical shock

The Pro Glasses 3 system is a delicate measuring instrument used for research purposes and should be treated with care at all times. To avoid breaking or damaging the internal electronic circuits, do not drop, knock, or shake the device. Eye-tracking quality or accuracy can be seriously affected if the Pro Glasses 3 head unit or recording unit are dropped. If the eye tracker is exposed to mechanical shock, for example, when dropped, do not try to start it or connect it to a power source. Contact Tobii Pro Support for instructions.

3.8 Bending

To avoid breaking or damaging the internal electronic circuits, do not bend any part of the eye-tracking system. Eye-tracking quality or accuracy can be seriously affected if the Pro Glasses 3 head unit or recording unit has been bent.

3.9 Do not open or disassemble

Do not open or disassemble the Pro Glasses 3 head unit or the recording unit. Non-compliance will result in loss of warranty! There are no user serviceable components inside. Contact Tobii Pro Technical Support if your Pro Glasses 3 system is not working properly.

3.10 Connectors

The Pro Glasses 3 head unit and recording unit have numerous external interfaces (connectors). Connecting any other device or connector than those intended may cause personal injuries and/or damage the Pro Glasses 3. Tobii Pro or its agents are not liable for any damages or injuries to a person or their property due to connecting unintended connectors.

3.11 Head unit cable

The head unit cable connected to the head unit must only be used to connect to the recording unit. Do not use the head unit cable for any other purpose or for connecting to any other devices. Tobii Pro or its agents are not liable for any damages or injuries to a person or property due to incorrect use of the head unit cable.
3.12 Environment

Avoid any exposure to direct sunlight as this will affect eye tracking quality and longer exposure can overheat the equipment. Avoid prolonged exposure to any liquids, gels, moist, rain, or sweat. Do not use the eye tracker underwater.

Do not place or use the equipment in places subject to extreme temperatures and humidity, such as on top of and or near a heating element, in a hot or damp room, or in a hot automobile in the sun. Usage temperature: 5°C to +45°C / 23°F to 113°F.

3.13 Safety and usage

The Tobii Pro Glasses 3 head unit is designed to connect only to the Tobii Pro Glasses 3 recording unit and should not be connected to any other device.

The recording unit is designed to connect only to the head unit and a device running Windows 10 or later operating system, or an Android device with version 9 or later, and with the Glasses 3 controller application installed. The recording unit should not be connected to any other devices.

3.14 Wireless warning

The recording unit contains radio transmitters and receivers (WLAN). Make sure that it is placed as far as possible from any equipment, objects or body parts sensitive to such signals.

電波法により5GHz帯は屋内使用に限ります。

3.15 Transportation

Always use the supplied carry case and packaging material to transport the eye-tracking equipment and provide added protection.

3.16 Accessories

Only use accessories provided by or approved by Tobii Pro.

3.17 Cleaning

Before cleaning any part of the Pro Glasses 3 system, disconnect all cables and make sure the device is turned off. Both the Pro Glasses 3 head unit, recording unit, and Corrective Lenses have surface coatings that require special care. Only use the supplied microfiber cleaning cloth or similar products specially intended for cleaning screens or glass with a special coating. Avoid touching, scratching, or smudging the lenses on the Pro Glasses 3 head unit or the Corrective Lenses and keep all the surfaces clean. Eye-tracking quality may be degraded if surfaces are dusty or damaged. Some plastic parts, such as the sidepieces and the nose pads, can be cleaned with water or disinfectant applied on a piece of soft cloth. Take special care to ensure that there are not smudges or scratches covering either the illuminators or sensors in the lenses.
4 Overview of Tobii Pro Glasses 3

4.1 Product versions

Pro Glasses 3 is sold in four different packages. The table below details the specific features available in each package.

<table>
<thead>
<tr>
<th>Components</th>
<th>Live View Package 50</th>
<th>Live View Package 100</th>
<th>Live View Wireless Package 50</th>
<th>Live View Wireless Package 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pro Glasses 3 controller application</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>50 Hz</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>100 Hz</td>
<td>●</td>
<td></td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Wireless functionality</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Basic support</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

4.2 What’s in the box

The Tobii Pro Glasses 3 ships with a convenient carry case containing the following:

1. Recording unit
2. Head unit
3. Removable nose pads (4 pcs in two different sizes)
4. Rechargeable Li-ion batteries, type 18650 (3 pcs)
5. SD cards with cases (3 pcs)
6. Calibration card
7. Cleaning cloth
8. Head strap
9. Cable clip
There is also an accessories box which contain the following items:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Battery charger for Li-ion batteries</td>
</tr>
<tr>
<td>2</td>
<td>Ethernet to USB Type-C adapter</td>
</tr>
<tr>
<td>3</td>
<td>Standard and 12v power cords for the battery charger (EU, US, UK, AUS)</td>
</tr>
<tr>
<td>4</td>
<td>USB charger for recording unit and USB Type-A to micro USB adapter cable</td>
</tr>
<tr>
<td>5</td>
<td>Power adapter plugs for the USB charger (EU, US, UK, AUS)</td>
</tr>
<tr>
<td>6</td>
<td>Ethernet cable (3 meters)</td>
</tr>
<tr>
<td>7</td>
<td>SD card to USB Type-A adapter</td>
</tr>
<tr>
<td>8</td>
<td>Calibration cards (2 pcs)</td>
</tr>
<tr>
<td>9</td>
<td>Calibration stickers (10 pcs)</td>
</tr>
</tbody>
</table>

In the box you will also find:

- Safety and Compliance leaflet

### 4.3 Optional accessories

The following optional components can be added to the Pro Glasses 3 system
### Component Description

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrective Lenses</td>
<td>Snap-on corrective lenses for Tobii Pro Glasses 3 to cater for people who wear prescription lenses. The Corrective Lenses accessory for Pro Glasses 3 is a set of attachable lenses to correct both nearsightedness and farsightedness. This accessory allows you to include a larger cross-section of the population in your research. See appendix B for more information.</td>
</tr>
<tr>
<td>IR Blocking Safety Lenses</td>
<td>This accessory package contains two lenses (clear and tinted) that are compliant with safety glass standards to support research in bright environments and locations requiring eye protection.</td>
</tr>
</tbody>
</table>

### 4.4 System components

The Pro Glasses 3 system comprises the head unit, recording unit, and the Pro Glasses 3 controller application installed on either a computer running Windows 10 or later, or on an Android device running version 9 or later. Each component is briefly described below. In addition, Pro Lab can be used for further analysis of eye-tracking data.

**The system includes:**

1. The head unit. Wearable eye-tracking glasses.
2. A recording unit, connected to the head unit via a head unit cable. The recording unit holds the battery and stores the recorded data on a SD card. The recording unit is controlled from a device running Pro Glasses 3 controller application.
3. Pro Glasses 3 controller application is used to manage the participants, start and stop recordings, and to view real time and recorded video and eye-tracking data.
4. Either a computer running Windows 10 or later, or an Android device running version 9 or later with Pro Glasses 3 controller application installed. Pro Glasses 3 controller application connects to the eye tracker through an network connection (either wireless or wired).
5. Tobii Pro Lab (optional) installed on a Windows computer. Any eye-tracking analysis beyond qualitative analysis of eye-tracking session replay, is carried out using Tobii Pro Lab.

**Pro Glasses 3 controller application is designed to be used only with Pro Glasses 3. No other types of eye trackers can or should be used together with the Pro Glasses 3 controller application.**

**Pro Glasses 3 controller application is designed to be installed and used on a computer running Windows 10 or later or an Android device running version 9 or later. The application should not be installed on any other types of devices.**

### 4.5 Head unit

The head unit is a highly sophisticated measuring device. It consists of several very sensitive sensors and must be cared for correctly. See *7 Product Care, page 32* for more information on product care.

**The head unit consists of the following parts:**

---

1. Must be purchased separately.
4.6 Recording unit

The recording unit is a small computer that controls the head unit. It records and stores eye-tracking data, sounds, and scene camera video on a removable SD card. The recording unit carries a replaceable and rechargeable Li-ion battery that
supplies power to both the recording unit and the head unit. The recording unit has several connectors and a power button and is controlled from Pro Glasses 3 controller application.

**The recording unit consists of the following parts:**

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Head unit connector</td>
<td>Connects to the head unit cable</td>
</tr>
<tr>
<td>2. Micro USB connector</td>
<td>Connects to USB charger for powering the unit and charging the battery</td>
</tr>
<tr>
<td>3. 3.5 mm connector for data synchronization</td>
<td>TTL pulse for synchronization with external data sources</td>
</tr>
<tr>
<td>4. Power button and LED power indicator</td>
<td>Touch button that turns the recording unit on and off. LED power indicator indicates power state and remaining battery power</td>
</tr>
<tr>
<td>5. SD card Activity LED</td>
<td>Indicates if SD card is present and if the recording unit is currently saving data to the SD card</td>
</tr>
<tr>
<td>6. Connection status LED</td>
<td>Indicates connection to the head unit.</td>
</tr>
<tr>
<td>7. LAN port</td>
<td>Connects to a device running the Pro Glasses 3 controller application, via the supplied Ethernet cable. The recording unit can also be connected to a device via WLAN².</td>
</tr>
<tr>
<td>8. SD card slot</td>
<td>Slot for SD card</td>
</tr>
<tr>
<td>9. Belt clip</td>
<td>Attaches the recording unit to participant’s belt</td>
</tr>
<tr>
<td>10. Battery compartment</td>
<td>Holds the Li-ion battery</td>
</tr>
</tbody>
</table>

The Pro Glasses 3 package contains an external SD card reader for use with computers that are not equipped with an internal SD card reader. For installation instructions, see the documentation in the SD card reader’s package or the manufacturer’s website.

² Not available in the Tobii Pro Glasses 3 Live View Package
4.7 Recording unit status LEDs

There are three LED indicators on the recording unit: the Power Indicator, the Connection Status, and the SD card Activity. The image below illustrated the different meanings of the recording unit’s status LEDs. When lights are blinking yellow, a message will also display on Pro Glasses 3 controller application.

<table>
<thead>
<tr>
<th>Power Indicator</th>
<th>SD Card Activity</th>
<th>Connection Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recording unit is ready to be powered on</td>
<td>Recording unit is ready to start recording. The SD card can be removed</td>
<td>Recording unit is not connected to the head unit. Check the head unit cable</td>
</tr>
<tr>
<td>LED off</td>
<td>Solid green</td>
<td>Blinking yellow</td>
</tr>
<tr>
<td>The recording unit is powered on. ~30–100% of battery power is remaining</td>
<td>There is 15 minutes or less of recording time left on the SD card</td>
<td>Recording unit is connected to the head unit</td>
</tr>
<tr>
<td>Solid green</td>
<td>Solid red</td>
<td>Solid green</td>
</tr>
<tr>
<td>The recording unit is powered on. ~10–29% of battery power is remaining (approx. 15 minutes)</td>
<td>There is less than 5 minutes of recording time left on the SD card</td>
<td>Blinking red</td>
</tr>
<tr>
<td>Solid red</td>
<td>Blinking red</td>
<td></td>
</tr>
<tr>
<td>Battery charge is critically low, approx. 5 minutes or less remaining. (User must replace the battery3)</td>
<td>There is an error with the SD card and it cannot be written to</td>
<td>Blinking yellow</td>
</tr>
<tr>
<td>Blinking red</td>
<td>Blinking yellow</td>
<td></td>
</tr>
<tr>
<td>The battery inside the recording unit is charging via the USB port</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blinking green</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.8 Pro Glasses 3 controller application

The Pro Glasses 3 controller application is used to manage recordings made using the recording unit. It can perform the following functions:

- Manage participant information
- Manage recordings
- Show live view of the scene camera with gaze overlay
- Instant replay of recordings
- Perform personal calibration

This section provides an overview of the Pro Glasses 3 controller application.

The Pro Glasses 3 controller application is optimized for easy and efficient data collection with Pro Glasses 3. The application also supports a basic replay functionality for qualitative observational analysis and for validation of recorded data. Further, more in-depth analysis must be performed in Tobii Pro Lab, see the Tobii Pro Lab User’s Manual for more information.

4.8.1 Pro Glasses 3 controller menu

The Pro Glasses 3 controller menu is used to switch between the RECORD screen and the VIEW RECORDINGS screen.

3. The recording unit will stop the recording immediately
<table>
<thead>
<tr>
<th>#</th>
<th>Description</th>
<th>#</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Open sidebar menu</td>
<td>3</td>
<td>Open RECORD</td>
</tr>
<tr>
<td>2</td>
<td>Close sidebar menu</td>
<td>4</td>
<td>Open VIEW RECORDINGS</td>
</tr>
</tbody>
</table>

![Diagram showing steps 1 to 4 for Tobii Pro Glasses 3](image-url)
4.8.2 Record

The Record displays the available recording units and can be used to begin a new recording and stop an ongoing recording.

<table>
<thead>
<tr>
<th>#</th>
<th>Description</th>
<th>#</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connection help screen</td>
<td>6</td>
<td>Battery time remaining for selected recording unit</td>
</tr>
<tr>
<td>2</td>
<td>Selected glasses</td>
<td>7</td>
<td>Estimated recording time remaining for selected unit</td>
</tr>
<tr>
<td>3</td>
<td>Show/hide the sidebar menu</td>
<td>8</td>
<td>Live view screen</td>
</tr>
<tr>
<td>4</td>
<td>Show/hide glasses list</td>
<td>9</td>
<td>Entry field for participant name</td>
</tr>
<tr>
<td>5</td>
<td>Name and serial number of selected glasses</td>
<td>10</td>
<td>Start a new recording</td>
</tr>
</tbody>
</table>

4.8.3 View recordings

The View Recordings lists all of the recordings stored in the SD card of the connected recording unit. From this screen, it is possible to playback or delete a recording.
All video and eye-tracking data is stored on the SD card inside the recording unit. This means that for any replay to work, the recording unit, complete with the SD card that was used for recording, must be connected to the device running Pro Glasses 3 controller application. For best performance, use a wired connection.

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
<th>Part</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>List of recordings</td>
<td>4</td>
<td>Sidebar menu</td>
</tr>
<tr>
<td>2</td>
<td>Currently playing recording</td>
<td>5</td>
<td>Delete selected recording(s)</td>
</tr>
<tr>
<td>3</td>
<td>Highlighted recording</td>
<td>6</td>
<td>Recording playback screen</td>
</tr>
</tbody>
</table>
5 Set up Pro Glasses 3

5.1 Introduction

This section describes how to assemble and prepare the head unit and the recording unit, and how to download and install the Pro Glasses 3 controller application.

To get Pro Glasses 3 ready for use, follow the instructions in the sections below.

5.2 Prepare the head unit

5.2.1 Attach the nose pad (optional)

Pro Glasses 3 comes with four additional nose pads (2 x 2 different sizes) that can be attached to the built-in nose pad on the head unit. Use these, if needed, to ensure that the Pro Glasses fits comfortably on the participant's face.

Figure 5.1 Push the top of the nose pad against the lip of the nose pad mount.

Figure 5.2 Holding the top of the nose pad in place, push the bottom of the nose pad onto the frame until you hear a click and it snaps into place.
5.2.2 Remove the nose pad

To remove the nose pad, do the following:

![Figure 5.3](image)

Figure 5.3 (1) Place your index finger on the top of the nose pad. (2) With your thumb and middle finger, gently squeeze the bottom tips together and pull the nose pad away from the bottom.

5.2.3 Prepare the Corrective Lenses (optional)

If you have the Corrective Lenses accessory, see Appendix B Corrective Lenses (sold separately) on how to prepare them.

5.3 Prepare the recording unit

5.3.1 Insert/remove the battery

Only use the rechargeable Li–ion batteries (type 18650, 4.2 Volts) supplied by Tobii Pro in the recording unit.
Procedure for inserting a battery into the Pro Glasses 3 recording unit (see figure):

1. Turn off the recording unit.

   ![Battery insertion diagram]

   Wait until all LEDs are off before removing the battery or SD card. For more information, see 4.7 Recording unit status LEDs, page 11.

2. Press in the battery compartment cover and turn counter-clockwise. Depress to release the cover and open the battery compartment.
3. Remove any partially- or fully depleted battery and insert a new one.
4. Put the battery container lid back on and lock it by pressing it in and turning it clockwise.

   Never insert batteries the wrong way in the recording unit as this may damage the device. The battery should be inserted with the positive end (+) at the top of the recording unit and the negative end (-) against the bottom.

   Never insert any other type of batteries than the Li–ion batteries (type 18650, 3.6 Volts) supplied by Tobii Pro in the recording unit as this may damage the device permanently.

5.3.2 Charge the battery using the battery charger

When charging recording unit batteries, use the supplied battery charger. Use only batteries supplied by Tobii Pro. Charging the battery inside the recording unit by using the USB charger should only be considered a backup solution.

1. Take out the battery charger that came with the Pro Glasses 3.
2. Pull down the bottom spring-tensioned tabs and insert rechargeable batteries with the positive end (+) at the top of the charger and negative end (-) against the bottom spring tab.
3. Plug the power cord into a standard AC outlet.
4. Check the charge of the inserted battery on the LCD screen.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>![Battery Icon]</td>
<td>No battery is loaded OR the battery has been damaged OR the battery has been inserted upside down.</td>
<td></td>
</tr>
<tr>
<td>![Battery Icon] 3.67</td>
<td>Charging in progress with battery voltage displayed and capacity bar flashing.</td>
<td></td>
</tr>
<tr>
<td>![Battery Icon] 4.22</td>
<td>Fully charged (4.2 Volts) as indicated by battery voltage display and the five solid bars in the battery.</td>
<td></td>
</tr>
<tr>
<td>![Battery Icon] 500</td>
<td>Charging in progress, normal speed (500 mA/h)</td>
<td></td>
</tr>
<tr>
<td>![Battery Icon] 1000</td>
<td>Charging in progress, high speed (1000 mA/h).</td>
<td></td>
</tr>
</tbody>
</table>

5. Use the red buttons above the batteries to toggle between 500 mA (normal) and 1000 mA (high speed) charging. Note that high speed charging will reduce the cycle life and maximum deliverable capacity of the battery. We recommend to only use high speed charging if the situation demands it. Normal charging should always be used by default to extend battery life and capacity.

6. Remove the batteries and unplug the power cord when done charging.

---

⚠️ The Pro Glasses 3 system includes rechargeable Lithium-ion batteries. Lithium-ion batteries can explode or cause a fire if they are used or charged incorrectly or if they are defective.

⚠️ Do not short-circuit the battery. Do not expose the battery to water or humidity. Do not expose batteries to heat, direct sunlight, solder or fire. Immediately disconnect the batteries if, during operation, they emit an unusual smell, feel hot, change shape/dimensions, or behave abnormally. Do not use any defective batteries.

⚠️ To recharge the batteries, use a battery charger specifically designed for the purpose and observe the recharging instructions specified by the manufacturer of the charger. Charge the batteries under supervision and do not place combustible materials close to or on top of the batteries or the charger, as this may result in overheating, explosion or fire.

⚠️ Never install batteries backwards or attempt to charge non-rechargeable batteries in the battery charger.
Use only batteries supplied by Tobii Pro.

Use the charger only as instructed.

High speed charging (1000 mA) reduces battery life and capacity. Use it sparingly.

Stop using the battery charger if the battery contacts, cord, or charger are dropped or damaged in any way.

Always disconnect the power supply and remove the batteries when charging is complete.

Do not attempt to charge with AC and car outlet at the same time.

Under no circumstances should the charger be dismantled, modified, or used for other purposes.

Keep the charger out of the reach of children.

5.3.3 Charge the Pro Glasses 3 recording unit battery using USB charger

We recommend charging the batteries using the supplied, stand-alone battery charger. See 5.3.2 Charge the battery using the battery charger, page 17. You should only charge a battery inside the recording unit with the supplied USB charger as a backup solution. If the recording unit is in use while it is being charged with the USB charger, the recording unit may become hot. If so, stop charging the battery immediately.

Procedure for charging a battery inside the recording unit:

1. Take out the USB charger that came with the Pro Glasses 3.
2. With the battery inside the recording unit, connect the micro USB cable to the recording unit.
3. Plug the USB charger into a standard AC outlet. The Power LED on the recording unit will blink green when the battery is being charged.

Only use the USB charger and cable provided by Tobii Pro.

5.3.4 Change an SD card in the recording unit

Procedure for changing an SD card into the Pro Glasses 3 recording unit

1. If the recording unit is on, make sure the SD card activity LED is not lit before removing the SD card.
2. Open the SD card lid of the recording unit.
3. Release the SD card by firmly pressing and releasing the SD card inside the recording unit.
4. Remove the SD card.
5. Gently insert a new SD card into the SD card slot.

The contacts of the SD card must face towards the front of the recording unit.

6. Close the SD card lid.

Never remove the SD card from the Pro Glasses 3 recording unit while a recording is ongoing. Doing so corrupts any data being recorded.

The recording unit only supports SD cards formatted as FAT32 or exFAT. Make sure any new SD cards are formatted to FAT32 or exFAT before inserting them in the recording unit.
SD card formatted with FAT32 has a file size limit of 4 GB. This means it is only possible to record videos somewhere between 45 min — 1 hour 45 minutes in length. The exact recording time differs depending on the light conditions during the recording. If you plan to record longer periods than 45 minutes, make sure the SD card used is formatted to exFAT.

Do not change the name of, or move, files and folders on the SD card. Doing so may make Pro Glasses 3 controller application and Tobii Pro Lab unable to find them.

5.3.5 Connect the head unit cable

The head unit cable from the head unit connects to the recording unit as shown in the figure.

5.3.6 Update the Pro Glasses 3 firmware

Tobii periodically releases new updates of the Pro Glasses 3 firmware that will improve performance and/or introduce new functionality. You can update the firmware via Pro Glasses 3 controller application. If the device is online, Pro Glasses 3 controller application shows an indicator in the list of glasses when new firmware is available. The Pro Glasses 3 may also be updated using an SD card with the new firmware. If this alternative is necessary, contact Tobii Support or visit http://www.tobiipro.com/learn-and-support for further instructions and to download the latest firmware.

Procedure for updating the recording unit firmware:

1. Make sure the device running Pro Glasses 3 controller application is connected to the recording unit and that the recording unit is powered.
2. In the application, select the Glasses icon to bring up a list of connected Glasses.
3. Select the cogwheel icon next to the relevant Glasses unit.
4. Select Upgrade Firmware.
5. Follow the instructions on the screen.

5.4 Install and Update Pro Glasses 3 controller application

The Pro controller application is designed to be installed on either a computer running Windows 10 or later or on an Android device running version 9 or later.
5.4.1 Download and install ProGlasses 3 controller application for Windows

A QR code containing the download link to the installer for ProGlasses 3 controller is in the ProGlasses 3 carry case. Alternatively, the latest version of ProGlasses 3 controller application can be downloaded from the Tobii Pro website at http://connect.tobiipro.com. For best performance of the application check for updates frequently and install available new releases.

To install the ProGlasses 3 controller application, do the following:

1. Download the ProGlasses 3 controller installer.
2. Tap or double click the installer file.
3. Follow the on-screen instructions to install the file.
4. To launch ProGlasses 3 controller application, double-click the Glasses 3 icon on your desktop.

ProGlasses 3 controller application uses the following ports to communicate with the recording unit: 5353 (udp), 80 (tcp, http). Please make sure to allow the application to use these ports in Windows Firewall.

We recommend you don’t install any antivirus software on your device because these might block communication between your device and the ProGlasses 3. For best performance, also avoid installing any application that relies on constant Internet access such as communication or media software.

5.4.2 Download and install ProGlasses 3 controller application for Android

ProGlasses 3 controller can be run from any device running Android 9 or later. To install ProGlasses 3 controller application for Android, do the following:

1. Open Google Play™ on your Android device.
2. Search for Tobii Pro Glasses 3 controller application.
3. Tap Install.

To get the latest updates of the ProGlasses 3 controller application, allow Auto download over Wi-Fi in the settings for your Android device. This can be found under Settings>Software update.

5.4.3 Update ProGlasses 3 controller application

When a new version of ProGlasses 3 controller application is available, the user gets notified with an alert symbol at the top of the user interface if the device is online.

Procedure for updating ProGlasses 3 controller application:

1. Select the alert symbol.
2. Select Release Notes and read the release notes.
3. Select Update.
4. Follow the instructions on the screen.

5.5 Connect the ProGlasses 3 system

For ProGlasses 3 controller application to be able to send or receive information to or from ProGlasses 3, the recording unit and the device running ProGlasses 3 controller application must be connected to each other. The connection can either be established over WLAN (wireless) or with an Ethernet cable. The recording unit works as a network access point and a device running ProGlasses 3 controller application connects to it in a way similar to how a computer would connect to any network.

5.5.1 Connect via Wi-Fi (access point)

Procedure for connecting ProGlasses 3 controller application to ProGlasses 3 via Wi-Fi:
1. Connect the Pro Glasses 3 recording unit to the head unit.
2. Turn on the recording unit.
3. Go to the Wi-Fi settings on your device that has Pro Glasses 3 controller application installed:
   a. If using a Windows computer, click on the network icon in the bottom right of the screen.
      Networks settings on the computer must be set to Obtain an IP address automatically for the connection to work correctly. Most computers have this as the default setting.
   b. If using an Android device, go to Settings and tap Network & Internet.
4. Wait for the list of available Wi-Fi networks to appear. This might take a few minutes to complete.
5. Select the Wi-Fi network name that corresponds to “TPG3+serial number” and click Connect.
   To find the serial number, look on the label on the back of the recording unit.
6. Enter the Wi-Fi password TobiiGlasses into the network security field and click Next.
7. Confirm that the recording unit now appears in the list of connected Glasses unit in Pro Glasses 3 controller application.

   Pro Glasses 3 supports 802.11 a/b/g/n Wi-Fi standard [also known as Wi-Fi 1(a),2(b),3(g),4 (n)]. Most adapters automatically detect a device’s supported Wi-Fi standard when they are set to automatic.
   The Wi-Fi 802.11ac and Wi-Fi 5 standards are not supported.

5.5.2 Connect using an cable (peer-to-peer)

   Procedure for connecting Pro Glasses to Pro Glasses 3 controller application using an Ethernet cable:
1. Locate the LAN port on your computer, or install a USB Ethernet adapter if there is no available Ethernet port.
2. Disable the Wi-Fi (if connected). Most laptops provide a button specifically for turning on/off Wi-Fi. Alternatively, go to the Wi-Fi settings in Windows to turn it off.
3. Connect the Ethernet cable to the LAN port on the computer and to the recording unit's LAN port. When the network is established, the glasses will appear in the list of available glasses in Pro Glasses 3 controller application. This can take up to a few minutes.

The connection is lost if the Ethernet cable is unplugged or if the computer or the recording unit is turned off. When there is no connection between Pro Glasses 3 controller application and the recording unit, the Glasses control panel displays **Disconnected**. The connection is re-established when the Ethernet cable is reconnected.
6 Operation

Pro Glasses 3 recordings are initiated from the Pro Glasses 3 controller application on your device. Before you start or stop a recording, make sure the recording unit is correctly connected over WLAN or Ethernet to your device with Pro Glasses 3 controller application.

6.1 Prepare the Pro Glasses 3 system

6.1.1 Fit the Pro Glasses 3 head unit

Before fitting the head unit to the participant, ensure the following:

- All optical parts, such as eye-tracking cameras and IR illuminators are clean and undamaged
- Pro Glasses 3 controller application is running on the connected device
- The recording unit is switched on
- That the RECORD screen shows a connection between the controller application and the recording unit

1. Fit the head unit on to the participant as shown in the figure below.

   Use the head strap to secure the head unit on the participant’s head. This will reduce the risk of the head unit falling.

2. Check that the glasses fit comfortably and securely.
3. Check that the glasses are correctly positioned on the participant’s head with their eyes positioned in the center of the lenses.
4. If the glasses are not positioned correctly, change the nose pad. See 5.2.1 Attach the nose pad (optional), page 15.
5. Secure the head unit cable to the participant’s clothes using the Clip.
6. Attach the recording unit to the participant, usually either on the belt or waistband, or in the back pocket.

   The recording unit can become warm during use. Do not place the recording unit in direct skin contact with the participant.

6.1.2 Turn Pro Glasses 3 on and off

Procedure for turning on the Pro Glasses 3 Eye Tracker:

1. Make sure the head unit and recording unit are properly connected.
2. On the recording unit, press and hold the power button until the Connection Status LED and the SD card Activity LED flash green.

Procedure for turning off the Pro Glasses 3 Eye Tracker:

1. On the recording unit, press and hold the power button. All three LEDs will blink yellow.
2. Wait for the LEDs to stop blinking yellow and turn solid yellow, then release the power button.
3. Wait for all three LED indicators to turn off.

   For more information on the indicator LEDs and their responses, see 4.7 Recording unit status LEDs, page 11.
6.2 Make a recording

Making a recording consists of the following steps:

- Enter the participant name
- Calibrate the head unit
- Verify the calibration
- Start the recording

6.2.1 Enter the participant name

To create a new participant, use the following procedure:

1. Open the study in Pro Glasses 3 controller application.
2. Select RECORD in the side menu bar.
3. Select the glasses from the list.
4. Enter the participant’s name into the text field at the bottom of the screen
5. Select **NEW RECORDING**.

### 6.2.2 Calibration

To collect accurate eye-tracking data, Pro Glasses 3 must be calibrated individually for each participant. During the calibration process, the participant must wear the head unit and focus their gaze at the center of the calibration card.

The **red circle** (gaze target) shows what the participant is focusing their eyes on. Before calibration the gaze target will not accurately show where the participant is focusing.

The **green circle** (calibration marker) shows what the calibration is tracking.

1. Hold the calibration card facing the participant at about arm’s length, 0.5 to 1 m (20” — 40”).
Make sure that the calibration card is visible in the scene camera RECORD screen.

Tip! The calibration card is not required to be in the center of the scene camera view. Hold the calibration card in the area of the view where you want the most accuracy.

2. Ask the participant to focus on the center of the calibration card. The green calibration marker should be stable and centered around the calibration card.

   Keep the calibration card completely still during the calibration process.

3. Select CALIBRATE at the bottom of the RECORD screen.

4. Wait until the calibration is complete and a prompt appear on screen.

5. If the calibration was unsuccessful, repeat steps 1 to 4.

6. Verify the calibration. Ask the participant to focus on a known object and check that the gaze indicator in the live view matches what the participant focuses on. You can re-use the calibration card if there is no obvious thing to focus on. Check that the gaze indicator in the live view matches what the participant is focusing on.

6.2.3 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 Pro 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.
6.2.4 Troubleshooting calibration

If you are having trouble getting the calibration to work, check the following:

- The participant should be focusing on the calibration card before you start the calibration.
- Sunlight and devices that emit IR light (e.g., halogen lights) interfere with the eye tracking sensors. Avoid using the Pro Glasses 3 in sunlight or near other IR sources. Tobii Pro sells IR Blocking Safety Lenses (comes with both clear and tinted lenses) that can be used when testing is required to be done in such environments.
- Avoid flickering light sources.
- Make sure there are no other objects visible in the scene view that looks similar to the calibration card. The green calibration marker should follow the calibration card and not jump around in the view.
- Too dark or too brightly lit environments can also cause trouble with the calibration. Try making the calibration in another room or area with different lighting conditions.
- The distance between the eye tracking cameras and the eye can affect the calibration and tracking quality. Try fitting the glasses with the alternative nose pads to change the distance.

6.2.5 Start the recording

To make a recording from Pro Glasses 3 controller after calibration, Click Record at the bottom of the screen to start the recording. A timer will appear to indicate that the recording has started.

6.2.6 End the recording

Recordings in progress can only be stopped when the recording unit is connected to the device running Pro Glasses 3 controller application. To stop the recording, do the following:

1. Click the stop button at the bottom of the screen.
2. In the pop-up window, click STOP to confirm the command.

   The recording is still ongoing until you click STOP. To continue the recording without stopping, click CONTINUE RECORDING.

3. To view the new recording, see 6.3 Handle recordings.

6.3 Handle recordings

6.3.1 Locate and play a recording

Recordings can be found and accessed from the Recordings list in Pro Glasses 3 controller. The live view functionality enables you to view and hear live video/audio from the Pro Glasses 3 head unit with real-time eye-tracking data overlaid. Playback only works when the recording unit is connected to the device with Pro Glasses 3 controller application.
1. Click **VIEW RECORDINGS** in the Pro Glasses 3 controller menu.
2. In the side menu, scroll and select the recording to view.

![View Recordings](image)

3. The recording will start playing automatically. To pause the playback, click the pause icon at the bottom left of the screen.

- A weak or low quality WLAN signal might decrease the quality of, or even interrupt, the live viewing video in Pro Glasses 3 controller application or disconnect the recording unit from the device. You get the best possible live viewing quality when you use an Ethernet cable to connect to the recording unit.

- The live view audio is muted by default. Avoid audio feedback; it may occur if the Pro Glasses 3 head unit is too close to the device you use for Live View.

- Video/Audio and eye-tracking data is stored only on the SD card inside the recording unit, not on the Pro Glasses 3 controller application device. For any replay to work, the recording unit with the SD card used during the recording must be connected to Pro Glasses 3 controller application.

The image below shows the different playback functions in the video playback screen.
6.3.2 Delete a recording

When you delete recordings, the recording unit with the associated inserted SD card must be connected to Pro Glasses 3 controller application.

Procedure for deleting a recording:

1. Click VIEW RECORDINGS in the sidebar menu.
2. In the left side menu, click the checkbox to the left of each recording you wish to delete.
3. Click the delete icon in the top right corner of the side menu.
4. In the pop-up window, click **DELETE** to confirm the deletion. Click **CANCEL** to cancel the action and instead return to the previous screen.

   To select all recordings in the side menu, click the checkbox at the top of the list.

6.4 **Other operations**

6.4.1 **Displaying the Pro Glasses 3 recording unit properties**

Every recording unit has unique Device name, Serial number, Firmware version etc. This information is accessible through Pro Glasses 3 controller application.

**Procedure for displaying recording unit properties:**

1. In Pro Glasses 3 controller application, select the desired recording unit from the **RECORD** screen.
2. Select the cogwheel icon to the right of the recording unit name.

3. The Pro Glasses 3 information will appear in a browsing window.

**Information displayed**

- Name of recording unit (editable)
- Recording unit serial number
- Firmware version
- Date of last firmware update

6.4.2 **Pro Glasses 3 API**

The Pro Glasses 3 use a REST API intended for developers that wants to integrate with third party solutions. For more information on the functionality of the API and how to use it, please refer to the Pro Glasses 3 Developer’s Guide, available from [www.tobiipro.com](http://www.tobiipro.com).
7 Product Care

7.1 Operational environment

The recommended range for temperature and humidity during operations is as follows:

- **Temperature**: -5°C to 45°C (32°F to 113°F)
- **Humidity**: 5% to 95%

ETSI 300 019-2-7 V3.0.1, Portable T7.2 (Partly temperature-controlled locations).

7.2 Transportation

Use the provided case when traveling with the eye tracker.

For shipping and storage, use the original packing.

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

- **Temperature**: -40°C to 65°C (-40°F to 149°F)
- **Humidity**: 5% to 95%

ETSI 300 019-2-2 V2.4.1, T2.3 (Public transportation) with exception of high air temperature at +65°C.

7.3 Storage

For shipping and storage, use the original packing.

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

- **Temperature**: -25°C to 55°C (-13°F to 131°F)
- **Humidity**: 5% to 100%

ETSI 300 019-2-1 V2.3.1, T 1.2 (Weather protected, not temperature-controlled storage locations).

7.4 Cleaning

- Before cleaning ProGlasses 3, unplug the head unit cable.
- Use the included cleaning cloth and clean the ProGlasses 3 lenses gently.
- Avoid getting moisture in openings and ports on the device.
- Don’t use window cleaners, household cleaners, aerosol sprays, solvents, alcohol, ammonia, or abrasives.

Avoid touching, scratching, or smudging the lenses on the ProGlasses 3 head unit or the corrective lenses and keep all the surfaces clean. Eye tracking quality may be degraded if surfaces are dusty or damaged. Take special care to ensure that there are not smudges or scratches covering either the illuminators or sensors in the lenses as these can impair performance.

7.5 Disposal of the eye tracker

Do not dispose of a ProGlasses 3 in general household or office waste. Follow your local regulations for disposal of electronic equipment.
Appendix A Support, Learning Center, and Warranty

A1 Customer support

Help online
Visit Customer Support (connect.tobiipro.com) for help with your Tobii Pro device. It contains the latest information about contacting Support, links to our Learning Center, and much more.

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

A2 Learning center

If you are new to eye tracking, or want to extend your knowledge about eye tracking research, sign up for one of our learning programs and events, or browse through our extensive article library in our Learning Center.

For further product information and other support resources, please visit www.tobiipro.com.

A3 Warranty information

Read more about Tobii Pro Care and the Tobii Pro’s eye tracker warranty in Service Description.
Appendix B  Corrective Lenses (sold separately)

The Corrective Lenses kit contains corrective snap-on lenses for Pro Glasses 3 to facilitate studies involving subjects with either short- or long-sightedness. Separate lenses are provided for the left and right eyes so you can accommodate differences between the participant’s eyes. The lenses are attached securely enough for test situations that involve a lot of natural movement, such as in sports research scenarios. The corrective lenses kit consists of the following items:

- Correction lenses, 32 pcs., ranging from -5.0 dpt. to +3.0 dpt, in increments of 0.5 dpt
- Vision testing card
- Cleaning cloth
- Carry case with custom foam insert

We also created a helpful quick start guide on how to determine lens strength for participants and mounting the lenses. You can find it together with the other documentation at www.tobiipro.com.

⚠ Scratches or smudges on the corrective lenses might inhibit eye tracking. Handle the lenses with care and inspect the lenses before use to ensure that there are no scratches or smudges.

⚠ Always make sure the corrective lenses are properly mounted. If they are not, they may interfere with the eye tracking. Correctly inserted lenses snap into place and it should not be possible to move or angle them. See the instructions below on how to properly mount the lenses.

The lenses included in the package offer spherical correction only.

B1  Prepare the head unit for Corrective Lenses

Corrective Lenses are snapped into place in the inside of the Pro Glasses 3. To attach the Corrective Lenses, use the following procedure. Each lens is inserted individually.

Select the lens from the carry case.

![Figure B.1](image) Insert the inner notch of the corrective lens into the space in the inside of the Pro Glasses 3 frame.
B2 Find the correct lens strength

If the participant uses ordinary glasses, explain that the Tobii Pro Glasses 3 head unit cannot be worn over normal glasses, but it can be equipped with correction lenses to enable their participation in the study. As the kit only contain correction lenses for either short-sightedness or long-sightedness, not bi-focal or progressive lenses, you cannot correct both impairments at once. If the participant has glasses with both corrections, correct for short-sightedness only. Follow the procedure below to find out the suitable corrective lens strength for the participant.

1. Start by asking the participant if they know what type of correction and the value of correction they need. Short-sightedness is indicated by negative values and long-sightedness by positive values. As mentioned above, if the participant states that they have both types of correction, follow the procedure for short-sightedness.
2. Ask the participant to take off their glasses and store them safely.
If the participant knows their prescription strength values

a. Mount the corresponding correction lenses in the lenses using the process outlined above. The diopter number for each lens can be seen on the outer tab of the lens frame.

b. Hold up the vision testing card at the distance at which the viewing of the targets in the study will take place and make sure the participant can read the letters on the row corresponding to that distance.

   The lens strengths are supplied in increments of 0.5 dpt. If the participant requires a 0.25 increment (i.e. a x.25 or x.75 dpt value), it is better to use the closest lower value, as a higher value might cause some discomfort. Under normal circumstances the slighter lower value should hardly be noticeably for these applications.

c. If the participant only needs correction on one eye, do not mount a lens on the other side.

If the participant does not know their prescription strength values

a. Ask the participant if they need glasses to see well for either longer distances or both longer and shorter distances. If so, use correction lenses with negative values. If the participant says they need glasses to see well on short distances (i.e., to read) then use correction lenses with positive values.

b. Mount a correction lens with a value of +/-1 (depending on the answer above) on the right side of the head unit by using the procedure detailed above.

c. Ask the participant to cover their left eye.

d. Hold up the vision testing card at the distance at which the viewing of the targets in the study will take place and make sure the participant can read the letters on the row corresponding to the distance.

e. If the participant can read the text at the stated distance, proceed to check the left side by repeating the above process, this time with the right side covered. If the participant has trouble reading the text, change the correction lens to the next higher value and repeat.

   The lens strengths are supplied in increments of 0.5 dpt. If the participant requires a 0.25 increment (i.e., a x.25 or x.75 dpt value), it is better to use the closest lower value, as a higher value might cause some discomfort. Under normal circumstances the slighter lower value should hardly be noticeably for these applications.

f. After finding the two correction values, check the participant's sight with both eyes open. If the participant experiences some discomfort, attach correction lenses with the closest lower values, and try again.

g. If the participant only need correction on one eye, do not mount a lens on the other side.

   Be careful to always replace the lenses into the correct slot in the carrying case to avoid mix-ups.

Now the participant should have a working sight correction and you are ready to proceed with the study.

B3 Removing the Corrective Lenses

To remove the Corrective Lenses, use the following procedure:
1. Apply pressure on the outer tab to remove the outer notch from the frame.

2. Pull the lens away from the head unit.
3. Check the lens and gently wipe it clean with a cleaning cloth if necessary.

4. Make sure to replace the lens in the correct storage slot to avoid confusion in the future. A good habit is to only have one lens per side removed from the carrying case at a time.
5. Repeat steps 1 to 4 for the other lens.
Appendix C  Compliance Information

C1  EU Compliance

C1.1 Conformity with EU directives
Tobii Pro AB declares that this device is in compliance with the essential requirements of the following EU directives:

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

C1.2 CE marking
All Tobii Pro Glasses 3 are CE-marked, indicating compliance with the essential health and safety requirements set out in European Directives.

C1.3 WEEE marking
Pro Glasses 3 is compliant with the Waste Electrical and Electronic Equipment (WEEE) Directive 2012/19/EU

C2 US and Canada compliance

C2.1 FCC interference and Industry Canada statement
Pro Glasses 3 recording unit 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 Glasses 3 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 Glasses 3 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 increasing the separation between Tobii Pro Glasses 3 and the receiver. Modifications not expressly approved by Tobii Pro AB could void the user’s authority to operate the equipment under FCC rules.

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.

C2.2 ETL compliance

The Pro Glasses 3 recording unit complies with UL 60950-1 and CAN/CSA C22.2 No. 60950-1-07, certification number E180881.

C2.3 UL compliance
The Pro Glasses 3 recording unit E180881 is compliant with UL 508A.
C2.4 California proposition 65

This Pro Glasses 3 recording unit and battery can expose you to chemicals including carbon-black extracts and Nickel, which are known to the State of California to cause cancer. For more information, go to www.P65Warnings.ca.gov.

C3 Electromagnetic compatibility compliance

Pro Glasses 3 recording unit complies with the following emission standards:

- EN 55032:2012/AC:2013 Class B
- EN 61000-3-3:2013
- VCCI V-3/2014.04, Class B ITE
- KN 32

Pro Glasses 3 recording unit complies with the following immunity standards:

- EN 61000-6-1:2007
- KN 35

Pro Glasses 3 head unit complies with the following emission standards:

- EN 55032:2015
- VCCI CISPR 32:2016 (Class B)

Pro Glasses 3 head unit complies with the following immunity standards:

- EN 55035:2017

C4 Safety compliance

Pro Glasses 3 complies with the following standards:

- IEC/EN 62471:2008, Photobiological safety of lamps and lamp systems
- EN 62311:2008, Specific Absorption Rate

Pro Glasses 3 head unit complies with the following standards:

- IEC 62368-1:2014 2nd Ed, Audio/video, information and communication technology equipment - Part 1: Safety requirements

Pro Glasses 3 recording unit complies with the following standards:


C5 China regulatory information

The Tobii Pro Glasses 3 recording unit and its operation comply with the following standards:

GB 4943.1-2011 (Chinese Standard)

C6 Japan regulatory information

The Tobii Pro Glasses 3 recording unit and its operation comply with the following standards:
• J60950-1(H22) (Japanese Standard)

The Pro Glasses 3 head unit complies with:
• J62368-1(H30) and IEC 62368:2014 2nd Edition

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

The Pro Glasses 3 recording unit complies with:
• Telefication, certification number 201-150060

C7 Korea regulatory information

The KC (Korea Certification) mark signifies compliance with Korea’s product safety requirements for electrical and electronic equipment and is issued by Korea-based certification bodies that have been approved by the Korea Standards Association.
Appendix D  Technical Specifications

D1  Eye tracking

<table>
<thead>
<tr>
<th>Eye tracking technique</th>
<th>Corneal reflection, dark pupil, stereo geometry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Binocular eye tracking</td>
<td>Yes</td>
</tr>
<tr>
<td>Sampling rate</td>
<td>50 Hz or 100 Hz</td>
</tr>
<tr>
<td>Calibration procedure</td>
<td>One point</td>
</tr>
<tr>
<td>Parallax compensation tool</td>
<td>Automatic</td>
</tr>
<tr>
<td>Slippage compensation</td>
<td>Yes, 3D eye tracking model</td>
</tr>
<tr>
<td>Pupil measurement</td>
<td>Yes, absolute measure</td>
</tr>
</tbody>
</table>

D2  Head unit

<table>
<thead>
<tr>
<th>Material</th>
<th>Grilamid plastic, stainless steel, optical grade plastic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nose pad</td>
<td>Grilamid plastic, with clip on attachments</td>
</tr>
<tr>
<td>Scene camera, video resolution</td>
<td>1920 × 1080 at 25 fps</td>
</tr>
<tr>
<td>Scene camera, video format</td>
<td>H.264</td>
</tr>
<tr>
<td>Scene camera, field of view (diagonal)</td>
<td>106 deg. 16:9 format</td>
</tr>
<tr>
<td>Scene camera, field of view (horizontal and vertical)</td>
<td>95 deg. horizontal / 63 deg. vertical</td>
</tr>
<tr>
<td>Weight</td>
<td>76.5 grams including cable</td>
</tr>
<tr>
<td>Frame dimensions (width × depth × height)</td>
<td>153 ×168 ×51 mm</td>
</tr>
<tr>
<td>Cable length</td>
<td>1200 mm</td>
</tr>
<tr>
<td>Audio</td>
<td>16 bit mono, integrated microphone</td>
</tr>
<tr>
<td>Design characteristics</td>
<td>Light weight and discreet</td>
</tr>
<tr>
<td>Number of eye tracking sensors</td>
<td>4 sensors (2 per eye)</td>
</tr>
<tr>
<td>Fixed geometry</td>
<td>Yes</td>
</tr>
<tr>
<td>Sensors</td>
<td>Gyroscope, Accelerometer, Magnetometer: ST™ LSM9DS1 (sampled at 100 Hz)</td>
</tr>
</tbody>
</table>

D3  Recording unit

| Battery recording time      | 105 min.                                                |
| Battery type                | Rechargeable 18650 Li-ion, Capacity: 3 400 mAh          |
| Storage media               | SD (SDXC, SDHC) card                                    |
| Connectors                  | Micro USB, RJ45 (Ethernet), 3.5 mm jack (sync port), head unit connector |
| Dimensions (height x width x depth) | 130 x 85 x 27 mm                                        |
| Weight                      | 312 grams                                               |
| Sync Port                   | 3.5 mm jack (TTL signal)                                |
D4  Corrective Lenses (optional)

<table>
<thead>
<tr>
<th>Correction lenses</th>
<th>32 pieces., ranging from −5.0 dpt. to +3.0 dpt. in increments of 0.5 dpt. Made of optical-grade plastic with hard coating.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (height x width x depth)</td>
<td>80 x 270 x 370 mm (complete kit)</td>
</tr>
<tr>
<td>Weight</td>
<td>1150 grams (complete kit)</td>
</tr>
</tbody>
</table>

D5  Pro Glasses 3 controller application — minimum system requirements

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Windows 10 (32 bit and 64 bit)</th>
<th>Android 9 or later</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel® Core™ i5</td>
<td>n/a</td>
</tr>
<tr>
<td>Memory</td>
<td>8 GB RAM</td>
<td>6 GB RAM</td>
</tr>
</tbody>
</table>

D5.1  Compatible Android devices

There is a very wide range of Android devices available on the market, each with their own unique combination of hardware specifications. While most devices that fulfill the minimum system requirements should be able to run the Glasses 3 controller application, Tobii Pro cannot guarantee they will do so. The following list shows the devices which have been tested and are confirmed to work with the Glasses 3 controller application.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samsung</td>
<td>Galaxy Tab S5e</td>
</tr>
<tr>
<td>Samsung</td>
<td>Galaxy S10</td>
</tr>
<tr>
<td>Google</td>
<td>Pixel 4 XL</td>
</tr>
</tbody>
</table>
Appendix E  Limitations and considerations

E1 Intended use

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’s Manual. Please read the User’s Manual and other supplied documentation thoroughly before using the product.

E2 Light conditions

Tobii Pro recommends 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. The 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.

E3 Eyelashes

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.

E4 Droopy eyelids

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 F  Sync Port

The recording unit is equipped with a sync port capable of transmitting and receiving a sync signal to and from external devices.

The sync port is a standard 3.5 mm jack where the tip is used for receiving a sync signal, the middle ring is used for transmitting the sync signal, and the sleeve, which is ground.

F1  Sync-out

Sync-out is emitted from the recording unit using a standard TTL 3.3 V signal, described as a high signal (1 (one)), or a low signal (0 (zero)).

Implementation

- The sync signal, which is 10 000 ms long, starts when the recording starts, and is initiated by a start sequence in the following format: One 500 ms long high pulse, (3.3 V), followed by a 500 ms long zero pulse (0 V), repeated three (3) times.

- During the recording the sync pulse is emitted once every ten seconds with a duration of 1000 ms, followed by a 9000 ms long zero pulse, and so on.
- When the recording is terminated, the sync pulse stops immediately. No stop sequence is transmitted.

F2  Sync-in

Sync-in is trigged by the recording unit using a standard TTL 3.3 V signal, described as a high signal (1 (one)), or a low signal (0 (zero)).
Appendix G  Calibration Target

Below are two scale illustrations of the Pro Glasses 3 Calibration Target; one with accurate dimensions illustrated (below left) and one without (below right). The right target can be printed, cut out and used for calibration with Pro Glasses 3. Please verify that the dimensions of the printout are accurate, as stated in the below left illustration.

If you wish to use a printed Calibration Target, you must print and cut out the right hand Calibration Target. Make sure your printer is set to print at 100% scale. The printed Calibration Target must have the exact dimensions defined in the left figure. If other dimensions are used, the calibration may be inaccurate.
Support for Your Tobii Pro Device

Get Help Online
Visit Tobii Pro Connect for help with your Tobii Pro device. It contains the latest information about contacting Support, links to our Learning Center, and much more.
Visit connect.tobiipro.com

Contact Your Solution Consultant or Reseller
For questions or problems with your product, contact your Tobii Pro sales representative or authorized reseller for assistance. They are most familiar with your personal setup and can best help you with tips and product training.
Visit tobiipro.com/contact